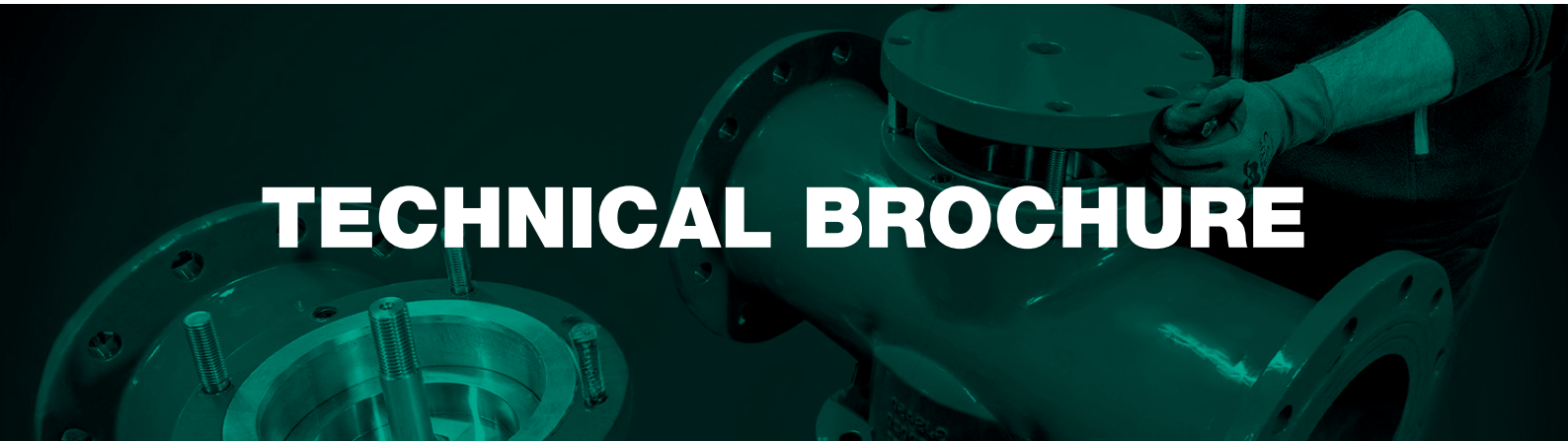
Pietro Fiorentini

H-VAL

Waterworks control valves



TECHNICAL BROCHURE

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H-VAL_ENG_revB

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Control valves **H-VAL**

The H-VAL range of control valves, consisting of the 300 series with reduced passage and the 400 series with full passage, is based on a flow-through globe valve design with a PN 25 pressure class. Made entirely of ductile cast iron and stainless steel internal components, they offer various configuration possibilities thanks to the integration of variable circuits, pilots and accessories according to the required function. They are installed in systems for pressure reduction, relief, support, flow and level control.

Construction features and advantages

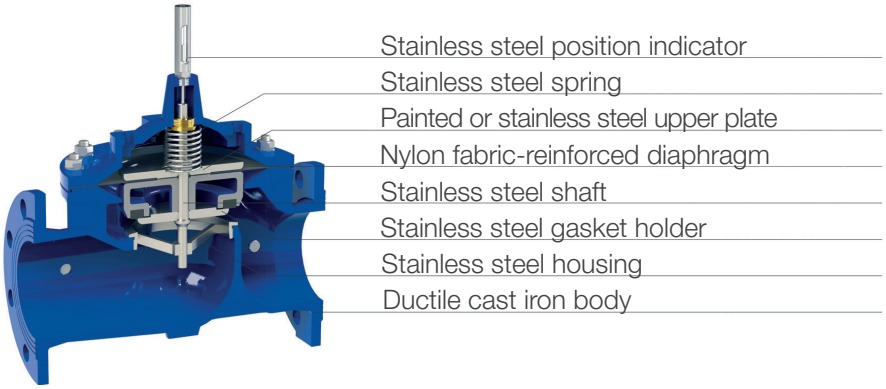
- Globe valve with ductile cast iron body, PN 25 bar class. Testing according to EN 1074.
- The drilling of the flanges, in accordance with EN 1092/2, is chosen according to the operating pressures.
- Internal profile designed to reduce pressure drops as well as vibration and noise during operation.
- Polyamide or neoprene diaphragm with nylon reinforcement.
- Stainless steel internal components; ductile cast iron plug for larger diameters.
- Different versions of the seat and seal holder, which can also be replaced in already installed valves, provide excellent cavitation resistance and stability in low flow conditions.
- Maintenance can easily be carried out from above, without removing the valve from the pipeline.
- Large expansion chamber to reduce the risk of cavitation even at high pressure differentials.

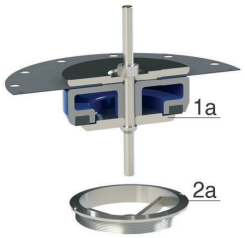
Main applications

- Intake pipelines
- Distribution networks
- Buildings
- Industrial plants

Construction features

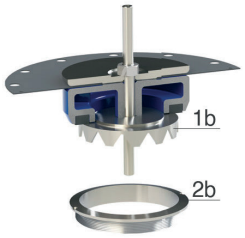
The mobile block houses the plug, top plate, diaphragm, shaft and seal holder. The latter is available in various versions to ensure the best operation under different flow and pressure conditions, according to design requirements and the results of sizing calculations.





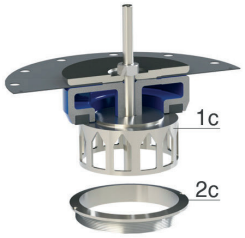
Standard version of seal holder and seal seat

In this standard version there are two guide points, at the cap and seat, which allow frictionless movement of the mobile block. The edge of the seal holder (1a) is rounded to reduce the risk of oscillations when the valve is almost closed.



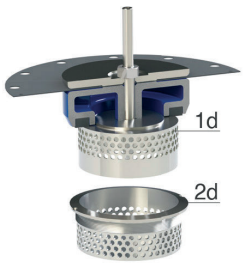
LF version for stability at low flow rates

The LF version, which is equipped with a seal-holder (1b) allowing progressive opening, ensures stability even with very low load-bearing capacities. When the mobile block is lifted, the valve opens fully, ensuring flow with minimal pressure drops due to the optimised body design.



AC version for low flow and cavitation resistance

The AC system is equipped with a progressively opening device (1c), which is designed to ensure high stability even at low flow rates, offer good cavitation resistance and improve the guidance of the mobile block.

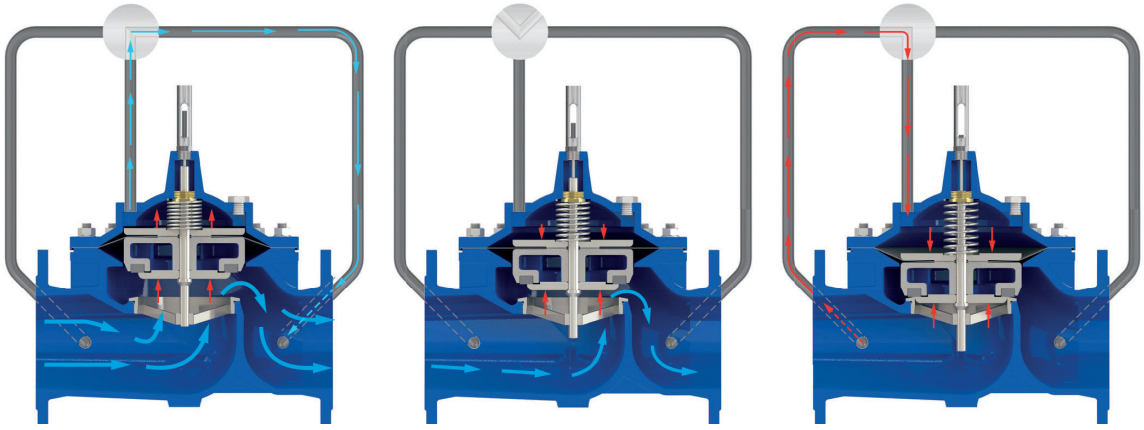


CP version for maximum cavitation resistance

The CP system, developed to offer maximum resistance to cavitation, adopts a dual stage of energy dissipation (1d, 2d), achieved by passing the flow through holes whose nominal diameter (DN) and number vary according to the specific application and performance required.

Operating principle

On-off mode



Valve opening

If the control chamber is connected to the downstream inlet, the upstream pressure acts on the plug, pushing it upwards, so that the valve opens fully.

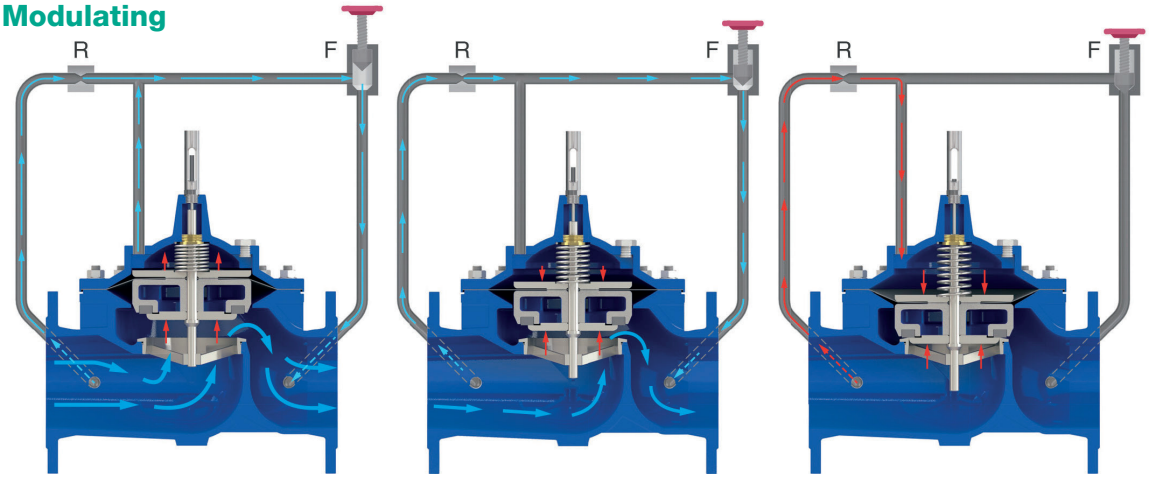
Modulating valve

If, during operation, the control chamber is completely isolated, the mobile block of the valve holds its position, generating a pressure drop corresponding to the degree of opening.

Valve closing

If the control chamber is put in communication with the upstream pressure, due to the surface difference between the upper, larger plate and the plug, the valve closes completely.

Modulating



Valve opening

When the valve is set to modulate, a pressure drop (R) is required between the circuit inlet, upstream, and the control chamber, as well as a modulating device (F). If the latter is fully open, the pressure inside the control chamber is reduced, causing the main valve to open fully.

Modulating valve

If one acts on the modulation device (F), reducing the flow through it, the pressure inside the control chamber increases, pushing down the mobile block of the valve.

Valve closing

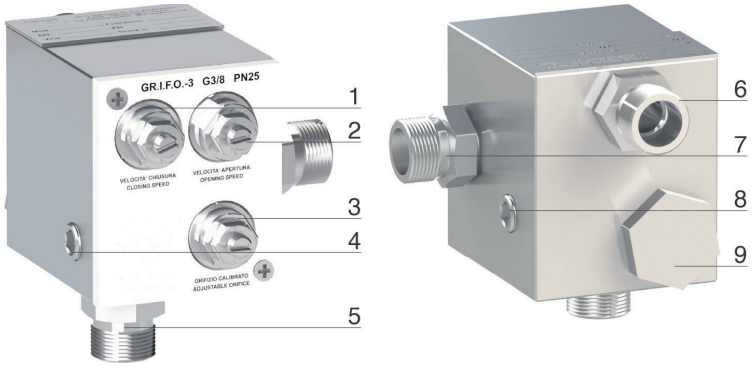
If the modulating device (F) is fully closed, the control chamber pressure reaches the upstream pressure. The mobile block then drops completely, interrupting the flow through the H-VAL control valve.

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

The GR.I.F.O. regulation and control unit is designed to include all components necessary for the smooth operation of control valves. Compared to other solutions available on the market, its compact design makes the control valves circuit easy to maintain and offers the user a wide range of adjustments, allowing various parameters to be set. It is made entirely of machined stainless steel.

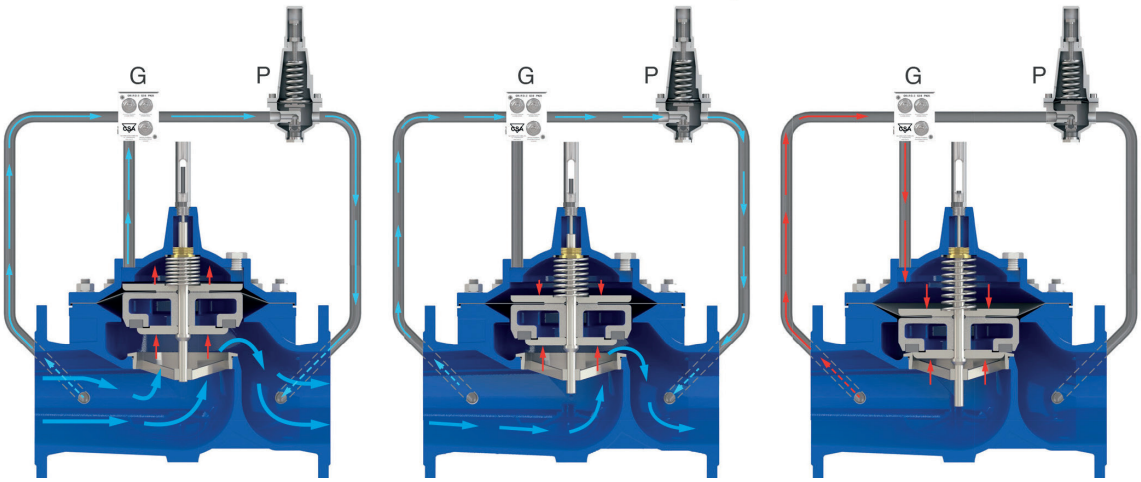
GR.I.F.O. consists of:

- an AISI 316 fine mesh filter to protect the circuit from possible impurities;
- three needle valves, for adjusting the reaction speed, opening, and closing of the valve, independently of each other; one filtered and the other not.



- Closing speed
- Opening speed
- Calibrated orifice adjustment
- 1/8 G socket, unfiltered
- Pressure outlet 3/8 G
- Pressure outlet 3/8 G
- Pressure outlet 3/8 G
- 1/8 G socket, filtered
- Filter

Modulating for downstream pressure reduction



Valve opening

In the event that the downstream pressure is lower than the set pressure of the pilot (P), the latter opens, releasing the pressure from the control chamber and thus causing the H-VAL control valve to open.

Modulating valve

In response to changes in upstream and downstream pressures, the pilot (P) modulates the mobile block, thereby adjusting the pressure drop across the valve in order to keep the downstream pressure constant.

Valve closing

If the downstream pressure exceeds the set value, the pilot (P) closes, allowing the upstream pressure to act entirely on the valve control chamber, thus causing it to close.

Control valve configurations series **H-VAL**

Control valves H-VAL series control valves can be used in different configurations and applications depending on the circuits, pilots and other accessories that are installed.

The main functions you can perform are:

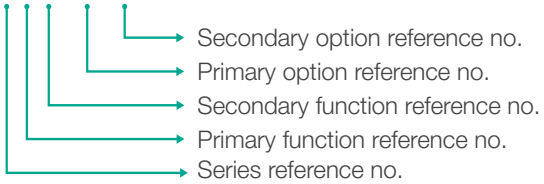
- Pressure reduction
- Support/relief of upstream pressure
- Flow control
- Level control
- Electronic remote control

The high versatility of H-VAL control valves allows them to be configured to perform several combined functions.

Nomenclature

The nomenclature of H-VAL control valves is defined according to the configuration of the piloting system and their function:

H-VAL 400-X-X



Function reference no.

- 1 - Pressure reduction
- 2 - Pressure support/relief
- 3 - Flow control
- 4 - Min. - max. level control
- 5 - Solenoid control (remote control)
- 6 - Constant level control
- 7 - Altitude control

Options reference no.

- G - With Stand-by pilot
- M - With actuator on the pilot
- ND - Night and Day (with 3 different settings)
- H - High sensitivity pilot flow control function
- P - Night and Day with external Bluetooth programmer
- T - Management via Scada system or external PLC
- R - Relief
- S - Support
- P- on/off function with battery-powered controller
- FR - Anti-backflow function (use of anti-backflow valve) on the pilot circuit
- DC - Double chamber

Main configurations

The main configurations of the H-VAL series are:

Pressure reduction

- H-VAL 310/410 for pressure reduction and stabilisation
- H-VAL 310/410-T for pressure management
- H-VAL 312/412 for downstream pressure reduction with upstream pressure support

Pressure support/relief

- H-VAL 320/420-S for upstream pressure support
- H-VAL 320/420-R for upstream pressure relief

Flow control

- H-VAL 330/430

Level control

- H-VAL 340/440 for minimum and maximum level adjustment
- H-VAL 360/460-MCP or H-VAL 360/460-Rotoway for constant level control

Electronic remote control

- H-VAL 353/453 (remote-controlled with step-by-step control)

Other configurations are available on request.

Accessories

For control valves

- Anti-cavitation seats
- Limit switches
- Position transmitter
- Stroke limiters

For the pilot circuit

- GR.I.F.O. adjustment unit
- MRV stand-by pilot
- MRV2 pressure modulation pilot
- MSM upstream pressure support pilot
- MLP flow limitation pilot
- MPZ high-sensitivity altitude pilot
- 2-way and 3-way auxiliary valves mod. A2 and A3
- Minimum and maximum ROTOWAY levels control pilot
- MCP constant level control pilot
- Flow-regulating needle valves
- Additional filter
- Autonomous battery-operated programmer
- Solenoid valve appl. for remote control
- Pressure gauges

Reducing-stabilising control valve of downstream pressure **H-VAL 310/410**

H-VAL 310 and 410 control valves reduce and stabilise downstream pressure, independent of flow rate and upstream pressure variations. Equipped with a visual position indicator in the standard version, and made of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), these models are designed to reduce pressure drops, vibrations and cavitation damage. Thanks to their high versatility, the H-VAL 310 and 410 are suitable for a wide range of applications.

Applications

- Downstream of pumps, to reduce pressure in the main pipeline
- On branches of the main pipeline in order to reduce pressure in secondary lines
- As protection of industrial and civil installations from pressure surges
- On the tank supply line, to regulate pressure and flow according to the values required for level control

Notes for the designer

- Inlet and outlet pressure and flow rate are necessary parameters for dimensioning
- The various PF modulation systems ensure accurate regulation even with low flow rates and high pressure differentials
- It is recommended to leave a distance of 3 diameters downstream of the valve to ensure better operation

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	40 bar
Minimum pressure	0.7 bar

Adjustment range of the reduction pilot

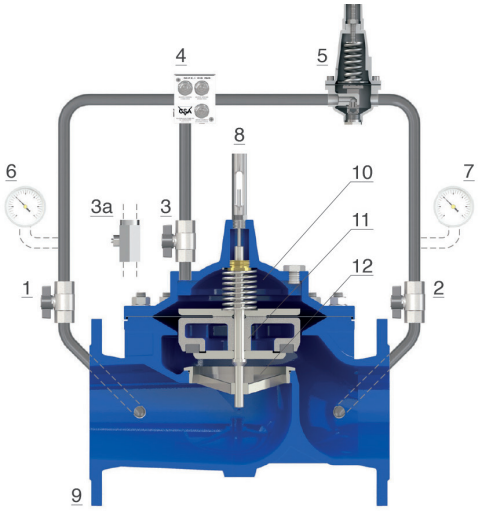
- Blue spring: 0.7 to 7 bar
- Red spring: 1.5 to 15 bar
- Higher values up to 25 bar on request
- Values below 0.7 bar available with high-sensitivity pilots

Optional configurations

- H-VAL 310/410-FR downstream pressure reducer with anti-backflow system
- H-VAL 310/410-H downstream pressure reducer with high-sensitivity pilot
- H-VAL 310/410-G downstream pressure reducer with safety system

Operation

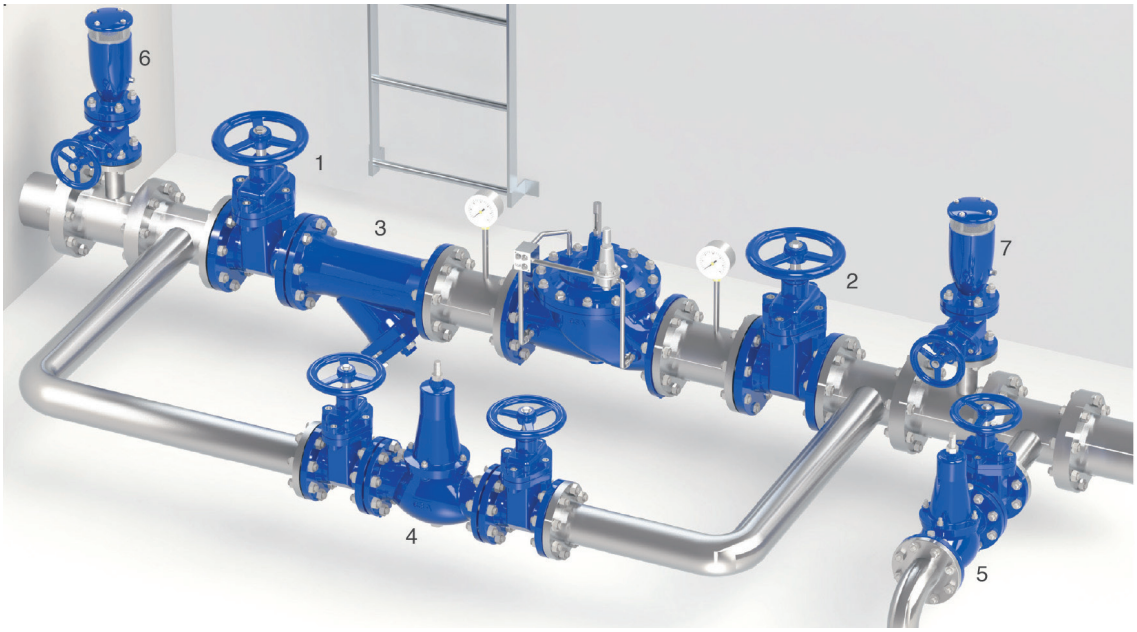
H-VAL 310/410 control valves are controlled by an adjustable two-way pilot (5). When the downstream pressure rises above the value to which it is set, the pilot modulates the flow, increasing the pressure in the main valve chamber (10). This causes the plug (11) to lower towards the seat (12), which generates the necessary pressure drop to reduce and stabilise the downstream pressure. When the downstream pressure falls below the pilot's set value, the plug (11) rises, increasing the flow through the seat (12); the reduction in pressure drop is followed by an increase in downstream pressure. The flow in and out of the main chamber (10) is controlled by the unique PF GR.I.F.O. control unit (4), which is equipped with a filter and three adjustable needle valves, necessary to ensure stability and



make the valve opening and closing speeds independent of each other. Thanks to the ball valves (1, 2 and 3), maintenance of the circuit and its components can also be carried out without interrupting the flow through the main valve.

Installation diagram

In the installation diagram of the H-VAL 310/410 control valves, shut-off devices (1,2), bypasses to allow maintenance, and a filter (3) to retain any impurities are recommended. The W-VAL HP pressure reducing direct action valve (4), which is reliable even after long periods of inactivity, is the best solution for the bypass, which is usually not in operation. The incorporation of WAVE 3S-AWH anti-water hammer air valves (6, 7), and a WR/AM pressure relief valve (5) as a protective device are also recommended.



Pressure management control valve

H-VAL 310/410-T

H-VAL 310-T and H-VAL 410-T control valves reduce and stabilise the downstream pressure value according to flow variations. They follow specially created and modifiable elbows, thanks to impulses provided by a PF programmer or an existing PLC, battery-powered or web-based remote control via a special interface. They are the ideal solution for pressure management and leakage reduction, and can interface with any type of SCADA or remote control system, as well as with sensors installed at critical points in the system.

Applications

- H-VAL 310/410-T control valves, controlled by a programmer or remotely, reduce downstream pressure in real time depending on the flow rate and pressure detected at critical points in the system. Settings can be changed from any mobile device via an intuitive and functional interface.

Adjustment range of the reduction pilot

- Blue spring: 0.7 to 7 bar
- Red spring: 1.5 to 15 bar
- Values below 0.7 bar available with high-sensitivity pilots

Notes for the designer

- The PF DC1, DC2 and DC3 control units are available in mains-powered versions, capable of real-time web interface communication, or powered by battery or hydraulic micro-turbine. The choice depends on the project requirements and the amount of data exchanged.

Optional configurations

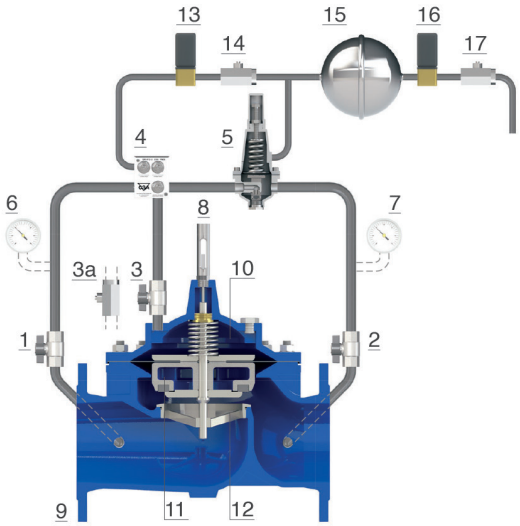
- H-VAL 310/410-T-FR pressure management valve with anti-backflow system
- H-VAL 310/410-T-H pressure control valve with high-sensitivity pilot H-VAL 310/410-T-5 pressure control valve with solenoid control valve

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	40 bar
Minimum pressure	0.7 bar

Operation

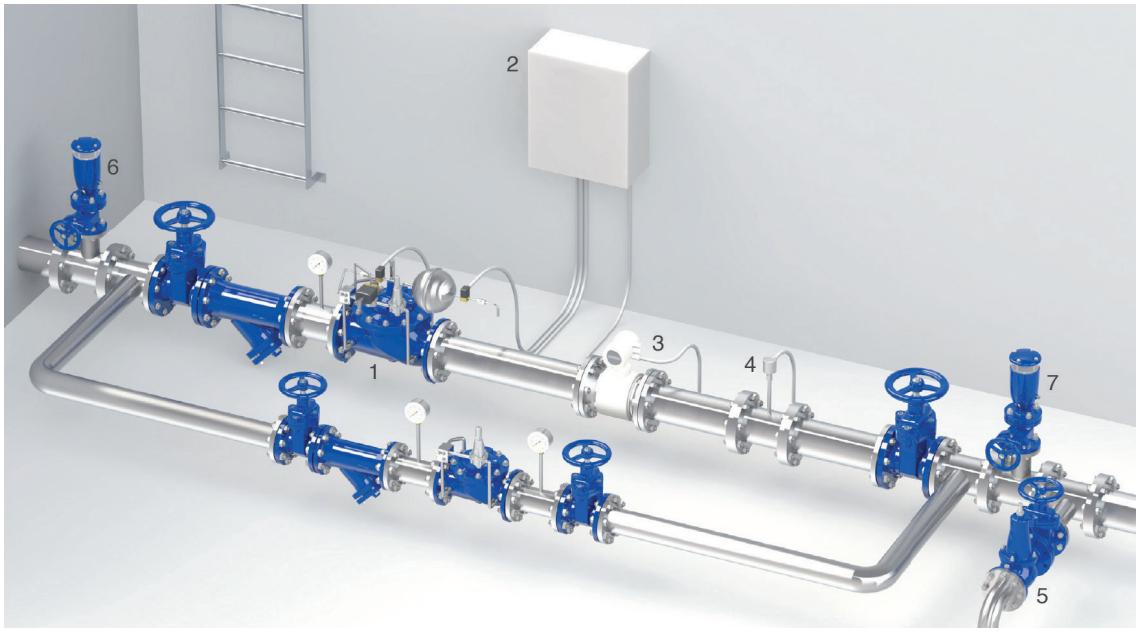
The H-VAL 310/410-T control valves are controlled by a two-way pilot (5) connected, in the cap, to the secondary line of the circuit on which two solenoid valves (13-16) are installed, which receive signals from the PF control unit, in communication with the flow and pressure gauges. The valve varies the value of the downstream pressure according to the flow rate, so that when the system requires a higher downstream pressure value, solenoid 13 opens, introducing water into the pilot cap (5). This leads to the opening of the pilot, an increased flow in the circuit and thus a reduction in the pressure in the chamber (10), which causes the plug (11) to rise. Solenoid 16, on the other hand, discharges water out of the circuit and out of the pilot cap (5), with the effect of closing the pilot and the valve and reducing the flow rate. Needle



valves 14 and 17 and tank 15 increase the stability of the valve during adjustment. The flow to and from the main chamber (10) is controlled by the unique PF GR.I.F.O. (4), which makes the valve opening and closing speeds independent of each other.

Installation diagram

In the recommended installation diagram, the H-VAL 310/410-T control valves (1) receive their signals from a PF control unit (2), which is powered by mains or battery, and is connected to flow meters (3) and pressure gauges (4), which can also be installed at critical points in the system It is recommended to use WAVE 3S-AWH anti-water hammer combined air valves (6, 7), and a WR/AM direct-acting relief valve (5), downstream, as protection, as well as a bypass with H-VAL 310/410 control valves.



Downstream pressure reducer with upstream pressure support **H-VAL 312/412**

The H-VAL 312 and H-VAL 412 control valves reduce and stabilise the downstream pressure to a set value, which can be adjusted independently of flow rate variations, and, at the same time, maintain the upstream pressure above a minimum value with the aid of a second pilot. Equipped with a visual position indicator in the standard version and made entirely of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), they are designed to reduce pressure drops, vibrations and cavitation damage.

Applications

- Downstream of pumps, to reduce pressure in the main pipeline
- To stabilise the pressure of secondary lines and prevent depressurisation of the main one
- On gravity pipelines, to ensure minimum pressure to upstream utilities and to prevent downstream overpressure in the event of reduced withdrawal

Adjustment range of the reduction pilot

- Blue spring: 0.7 to 7 bar
- Red spring: 1.5 to 15 bar
- Higher values up to 25 bar on request
- Values below 0.7 bar available with high-sensitivity pilots

Notes for the designer

- Inlet and outlet pressure and flow rate are required for sizing
- The various PF modulation systems ensure accurate regulation even with low flow rates and high pressure differentials
- It is recommended to leave a distance of 3 diameters downstream of the valve to ensure better operation

Optional configurations

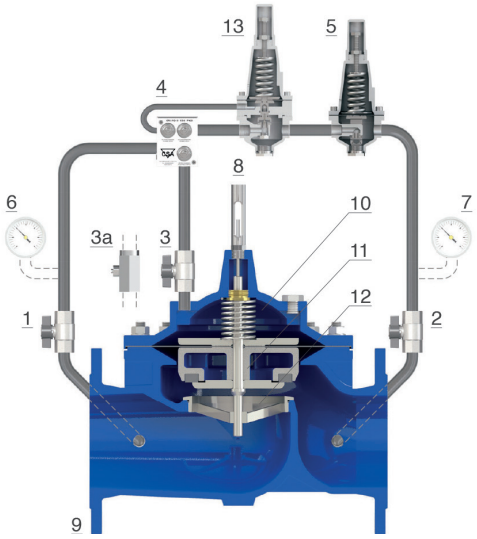
- H-VAL 312/412-FR downstream pressure reducer and upstream pressure support with anti-backflow system
- H-VAL 312/412-H downstream pressure reducer and upstream pressure support with high-sensitivity pilot
- H-VAL 312/412-5 downstream pressure reducer and upstream pressure support with solenoid control valve

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	25 bar
Minimum pressure	0.7 bar

Operation

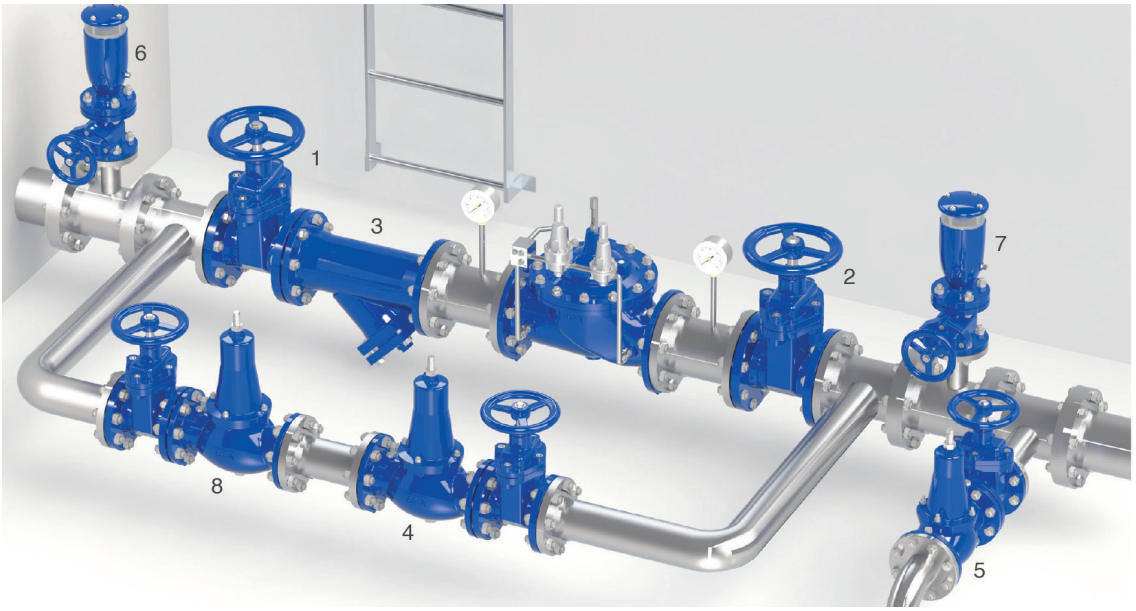
H-VAL 312/412 control valves are controlled by two two-way pilots with adjustable setting values, one for downstream pressure reduction (5) and one for upstream pressure support (13). When the upstream pressure falls below the set value, pilot 13 reduces the flow through it, increasing the pressure in the valve chamber
(10) and thus causing the plug (11) to descend towards the seat (12). When the upstream pressure exceeds the pilot setting, the latter remains open, allowing flow through the main valve and activation of pilot 5, which controls the downstream pressure. The flow in and out of the main chamber (10) is controlled by the PF GR.I.F.O. control unit (4), which is equipped with a filter and three adjustable needle valves, necessary to ensure stability and make the valve



opening and closing speeds independent of each other. Thanks to the ball valves (1, 2 and 3), maintenance of the circuit and its components can also be carried out without interrupting the flow through the main valve.

Installation diagram

The recommended installation scheme of the H-VAL 312/412 control valves provides for a W-VAL HP pressure reducing direct action valve (4) on the bypass, which is usually not in operation, preceded by a pression relief valve WR/AM (8), given their reliability even after long periods of inactivity. The insertion of WAVE 3S-AWH combined anti-water hammer air valves (6, 7), and a downstream direct-acting relief valve WR/AM (5) to prevent pressure build-up in the main line in any case, is also recommended.



Upstream pressure support control valves **H-VAL 320/420-S**

The H-VAL 320-S and H-VAL 420-S control valves sustain upstream pressure by stabilising it at a set and adjustable value, independent of flow rate variations. Equipped with a visual position indicator in the standard version and manufactured entirely from stainless steel and epoxy-coated ductile cast iron using FBT (fluid bed technology), they are designed to reduce pressure drops, vibrations and cavitation damage. In combination with various PF accessories, they can be used for a wide range of applications.

Applications

- On branches of the main pipeline in order to reduce pressure in secondary lines.
- On the tank supply lines, to regulate pressure and flow according to the values required for level control.
- In gravity pipelines, to ensure minimum pressure to the utilities in the higher zones, in case of high consumption in the lower zones.

Adjustment range of the reduction pilot

- Blue spring: 0.7 to 7 bar
- Red spring: 1.5 to 15 bar
- Higher values up to 25 bar on request
- Values below 0.7 bar available with high-sensitivity pilots

Notes for the designer

- Inlet and outlet pressure, flow rate and application are required for sizing and cavitation analysis
- Recommended flow rates and operating conditions can be found in the H-VAL catalogue
- It is recommended to leave a straight section of pipe 3 nominal diameters upstream of the valve

Optional configurations

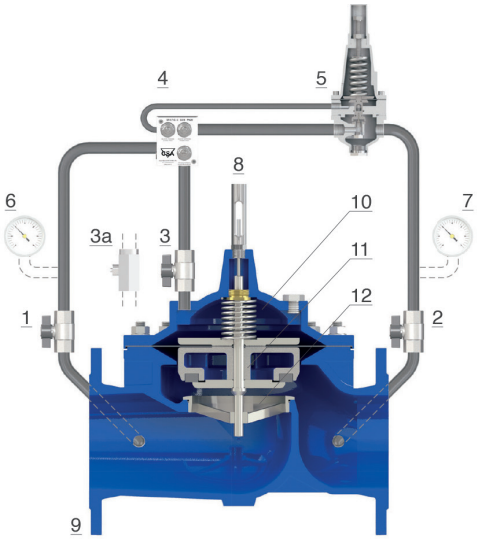
- H-VAL 320/420-S-FR upstream pressure relief valve with anti-backflow system
- H-VAL 320/420-S-5 pressure sustaining valve with solenoid control valve
- H-VAL 320/420-S-H upstream pressure sustaining valve with high-sensitivity pilot

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	25 bar
Minimum pressure	0.7 bar

Operation

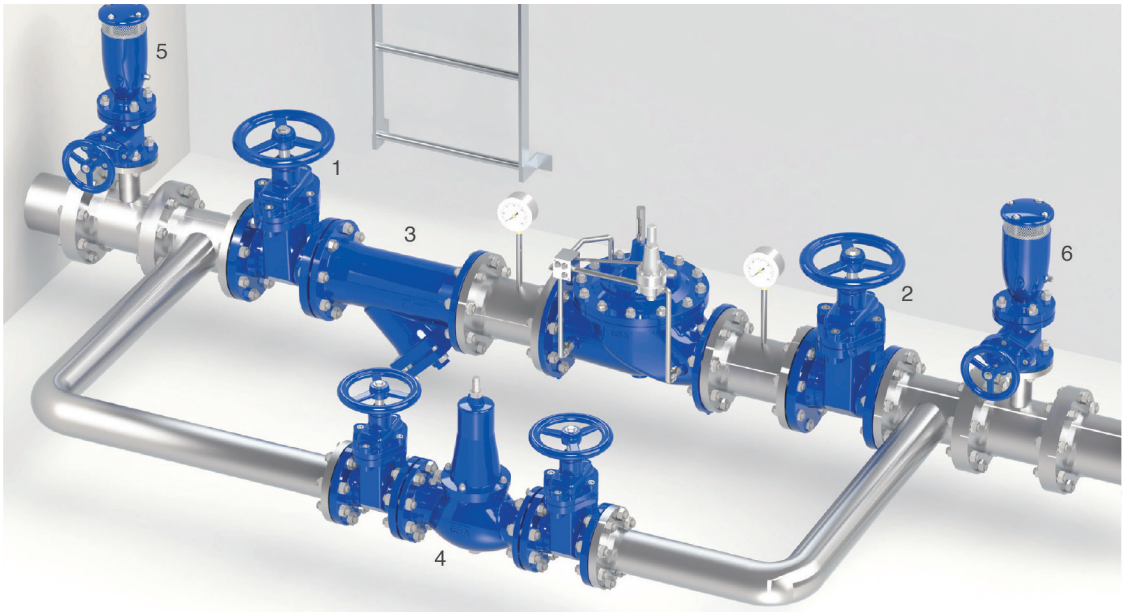
The H-VAL 320/420-S control valves are controlled by a two-way high-capacity pilot (5) with adjustable setting, which receives the upstream pressure value via the GR.I.F.O. control unit (4). When this exceeds the set value, the pilot opens, releasing pressure from the control chamber (10). This causes the plug (11) to rise and open the flow through the seat (12), thus protecting the system. Conversely, if the upstream pressure falls below the set threshold, the pilot modulates the flow in the circuit, increasing the pressure in the valve chamber. As a result, the plug approaches the closed position, interrupting the flow through the main valve. The pressure in and out of the main chamber (10) is controlled by the PF GR.I.F.O. control unit (4), which is equipped with a filter and three adjustable needle valves, which



are necessary to ensure stability and make the valve's opening and closing speeds independent of each other.

Installation diagram

The recommended installation diagram of the H-VAL 320/420-S control valves includes shut-off devices (1, 2), bypasses to allow maintenance, and a filter (3) to retain any impurities. The WR/AM direct-acting relief valve (4), which is reliable even after long periods of inactivity, is the best solution for the usually non-operational bypass. It is also recommended that combined anti-water hammer air valves WAVE 3S-AWH (5, 6) be fitted upstream and downstream.



Upstream pressure relief control valve

H-VAL 320/420-R

H-VAL 330 and H-VAL 430 control valves, installed on a branch of the main line, relieve the upstream pressure when it exceeds an adjustable set value. Equipped with a visual position indicator in the standard version and made entirely of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), they are designed to reduce pressure drops, vibrations and cavitation damage. Thanks to their high versatility, the H-VAL 320/420-R are suitable for a wide range of applications.

Applications

- Downstream of pumps to protect the system from uncontrolled pressure increases when switching on or off
- As protection of industrial and civil installations from uncontrolled pressure increases
- Downstream of pressure reduction or modulation devices, to avoid unwanted pressure fluctuations

Adjustment range of the relief pilot

- Blue spring: 0.7 to 7 bar
- Red spring: 1.5 to 15 bar
- Higher values up to 25 bar on request

Notes for the designer

- Inlet and outlet pressure, flow rate and application are necessary parameters for dimensioning and cavitation analysis
- Recommended flow rates and operating conditions can be found in the H-VAL catalogue
- When the valve discharges into the atmosphere, the anti-cavitation system (AC) is recommended

Optional configurations

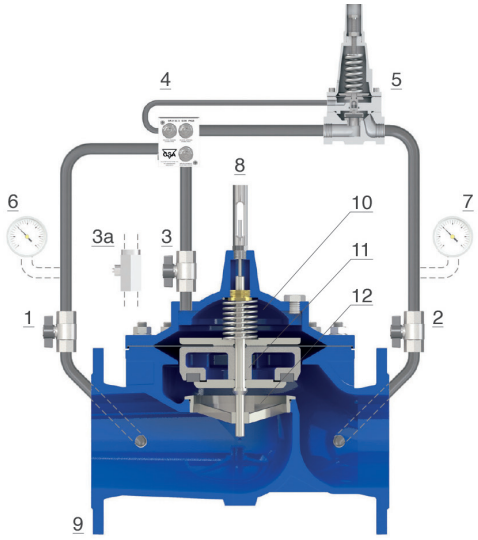
- H-VAL 320/420-R-FR upstream pressure relief valve with anti-backflow system
- H-VAL 320/420-R-5 pressure relief valve with solenoid control valve
- To improve valve response time, the valve can be supplied without the GR.I.F.O. control unit.

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	25 bar
Minimum pressure	0.7 bar

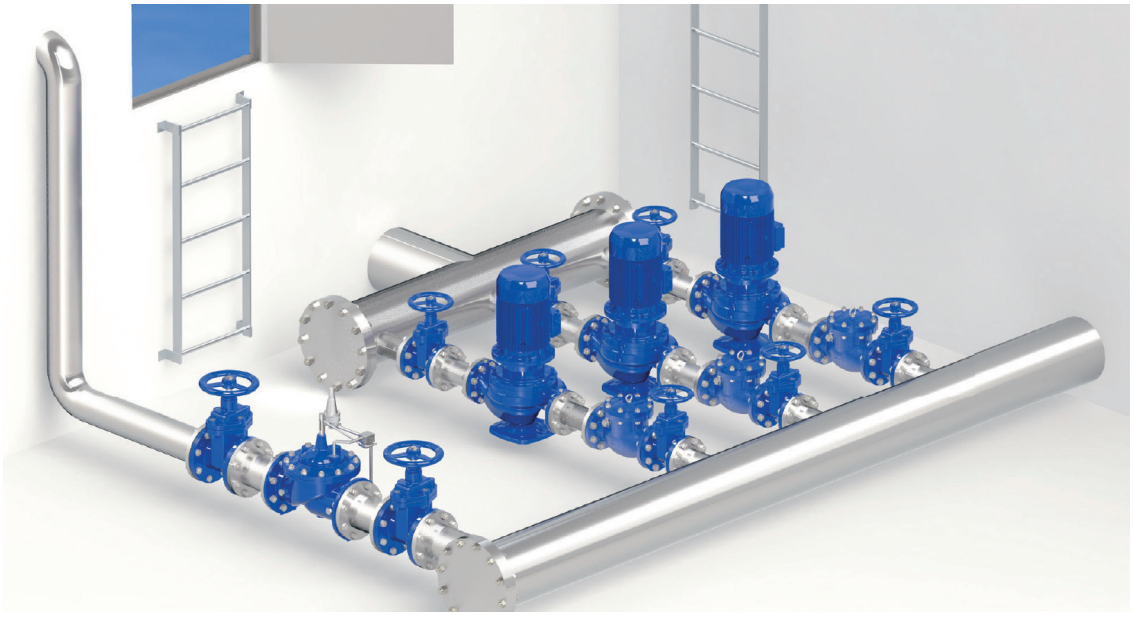
Operation

The H-VAL 320/420-R control valves are controlled by a two-way high-capacity pilot (5) with adjustable setting, which receives the upstream pressure value via the GR.I.F.O. control unit (4). If the latter exceeds the set value, the pilot opens, releasing pressure from the control chamber (10). This causes the plug (11) to open and the flow to pass through the seat (12), thus protecting the system. When the upstream pressure falls below the set threshold, the pilot modulates the flow in the circuit, increasing the pressure in the valve chamber. This pushes the plug to the closed position, interrupting the flow through the main valve. The pressure in and out of the main chamber (10) is controlled by the unique GR.I.F.O. control unit (4), which is equipped with a filter and three adjustable needle valves, necessary to ensure stability and make the valve opening and closing speeds independent of each other.



Installation diagram

The following picture shows the recommended installation diagram of the H-VAL 320/420-R control valves, used for relief on a main line branch to protect a pump assembly. The shutter is necessary for maintenance operations. Where possible, a filter is also recommended to prevent impurities from reaching the control valve. The pilot setting must be set at least 0.5-1 bar above the maximum dynamic pressure.



Flow control valve
H-VAL 330/430

H-VAL 330 and H-VAL 430 control valves limit the flow rate to a set value regardless of pressure variations. When the flow rate remains below the set value, they remain fully open. The circuit includes a flanged orifice, to be connected to the pilot and necessary for its operation. Equipped with a visual position indicator and made of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), H-VAL 330/430 control valves reduce pressure drops, vibrations and cavitation damage.

Applications

- Downstream of pumps, to prevent overloading and cavitation damage
- On the tank supply pipes to limit the flow rate
- In distribution networks of residential and industrial districts, to limit the flow rate during peak hours
- In filtration plants to avoid damage and malfunction due to excessive flow rates

Setting range of the flow pilot

- The flanged orifice is sized according to the maximum design flow rate. Variations from the calibration value are possible in accordance with the flow rate table supplied with the valve

Notes for the designer

- Inlet and outlet pressure, flow rate and application are necessary parameters for sizing and cavitation analysis
- It is recommended to leave a 5-diameter section of pipe between the valve and the calibrated flange, and another 3-diameter section downstream of the latter (picture on next page)

Optional configurations

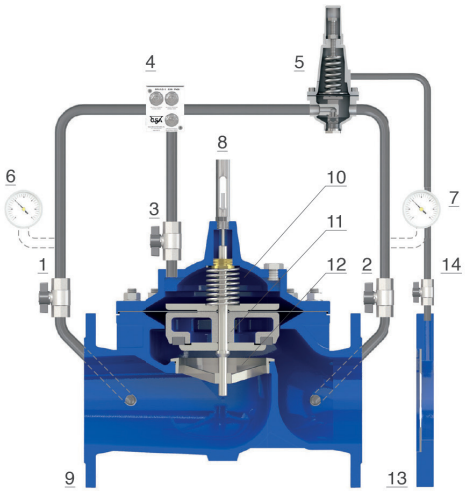
- H-VAL 330/430-FR flow control valve with anti-backflow system
- H-VAL 330/430-H flow control valve with high-sensitivity pilot

Operating conditions

Treated water	Maximum temperature 70°C
Maximum pressure	16 bar (higher on request)
Minimum pressure	1.2 bar

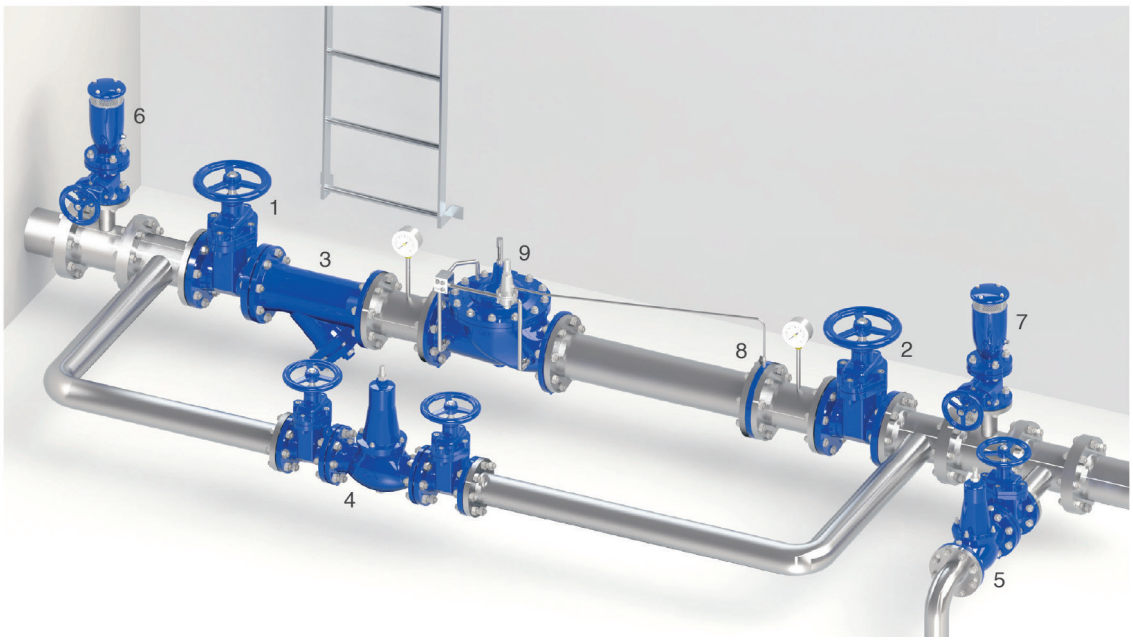
Operation

H-VAL 330/430 control valves are controlled by an adjustable two-way pilot (5) for flow control, which at the top (cap) receives pressure downstream of the flanged orifice (13), located on the pipeline.
When the flow exceeds the set maximum value, the pressure difference increases and the pilot (5) reduces the degree of opening, limiting the flow through it and thus increasing the pressure in the main valve chamber (10). The resulting lowering of the plug (11) onto the seal seat (12) generates the necessary pressure drop to reduce the flow rate. On the other hand, when the flow remains below the set value, the pressure drop at the flanged orifice (13) is less than the spring force of the pilot, which therefore remains open like the main valve. The flow in and out of the main chamber (10) is controlled by the PF GR.I.F.O. control unit (4), which is equipped with a filter and three adjustable needle valves, which guarantee stability and make the valve opening and closing speeds independent.



Installation diagram

The following picture shows the recommended installation diagram for H-VAL 330/430 control valves. It has shut-off (1, 2) and bypass parts to allow maintenance, and a filter (3), which retains any impurities. It is also recommended to install WAVE 3S-AWH combined anti-water hammer air valves (6, 7) and a downstream relief valve WR/AM (5). The calibrated flange (8) must be placed 5 DN downstream of the valve. Another 3 diameters must be left downstream of the orifice.



Minimum level regulating control valve and maximum **H-VAL 340/440**

The H-VAL 340 and H-VAL 440 control valves control the minimum and maximum level of a tank, independent of upstream pressure variations. Thanks to the PF needle valve, the response time can be adjusted to prevent water hammer when closing. Equipped with a visual position indicator and made entirely of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), H-VAL 340/440 control valves reduce pressure drops, vibrations and cavitation damage.

Applications

- In tanks, to regulate minimum and maximum levels, reducing operating cycles and maximising capacity
- For level control, where access to the tank is not possible and an external pipe is therefore required
- In elevated tanks, or multi-storey buildings fed by pumps, to ensure hydraulic safety by avoiding overflows

Level pilot adjustment range

- From 0.2 to 4 metres

Notes for the designer

- Avoid high points in the pipes connecting the valve to the pilot so as to prevent the formation of air pockets
- A minimum pressure of 0.6 bar at the pilot is required for correct operation; lower values could cause malfunctions. In this case, consider using a support pilot for low flow rates and the manual opening limiter PF CSFL

Optional configurations

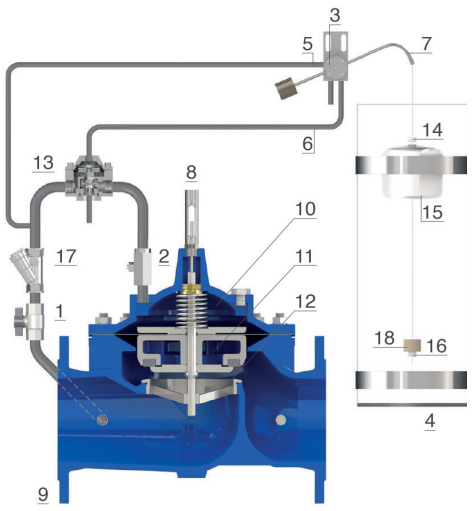
- H-VAL 340/440-FR automatic minimum and maximum level control valve with anti-backflow system
- H-VAL 445 minimum and maximum level control valve with solenoid control valve
- H-VAL 340/440-R minimum and maximum level control valve with rapid relief pilot

Operating conditions

Treated water	Maximum temperature 70°C
Maximum pressure	16 bar
Minimum pressure on the pilot	0.6 bar
Recommended operating pressure	6 bar (higher on request)

Operation (for DN 150-600)

H-VAL 340/440 control valves are controlled by a three-way Rotoway level control pilot to be connected to the valve via two pipes (not supplied) with an internal diameter of at least 4-5 mm. The pilot consists of: body (3), lever (7), and a float (15) that slides along a wire between two stops (14 and 16) that can be moved and secured at the required levels. When the water inside the tank reaches the maximum height, the float (15) touches the upper stop (14) and causes the lever (7) to rotate. This rotation directs the upstream pressure directly into the main valve chamber (10) - or to the flow throttle (13), in the case of valves with a nominal diameter of 150 mm or more - thus interrupting the flow of water to the tank. The main valve remains closed until the level drops to the minimum value, at which point the float (15) rests on the lower stop (16), turning the lever



(7) downwards. This causes the pressure in the control chamber (10) to be discharged into the atmosphere, resulting in the plug (11) rising and the flow resuming through the seat (12).

Installation diagram

The following picture shows the recommended installation diagram for H-VAL 340/440 control valves. The pilot (4) is connected to the valve via two pipes, one in communication with the upstream pressure, the other with the control chamber. The external still-pipe (2) in which the float flows, allowing adjustment and maintenance without access to the tank, is strongly recommended. Shut-off devices (1) are required to allow maintenance and a filter (3), which retains any impurities.

Constant level regulating control valves **H-VAL 360/460-MCP**

The H-VAL 360-MCP and H-VAL 460-MCP control valves, with their stainless steel proportional pilot, keep the level of a storage tank constant, regardless of changes in flow rate and upstream pressure. The PF needle valve, positioned on the chamber, allows the response time of the control valves to be adjusted, so as to avoid water hammer phenomena in the closing phase. Made of stainless steel and ductile cast iron coated with epoxy paint using FBT (fluid bed technology), they are designed to reduce pressure drops, vibrations and cavitation damage.

Applications

- In split-flow tanks and gravity pipes, when proportional level control is required, within the pilot control limits.
- For level control in tanks and where it is necessary to maintain a constant level with continuous modulation

Constant level pilot adjustment

- Standard stroke 85 mm, different on request

Notes for the designer

- Avoid high points and changes of slope in the pipe connecting the valve to the pilot in order to prevent the formation of air pockets
- A minimum pressure of 0.6 bar at the pilot is required for correct operation; lower values could cause malfunctions. In this case, consider using a support pilot for low flow rates and the manual opening limiter PF CSFL

Optional configurations

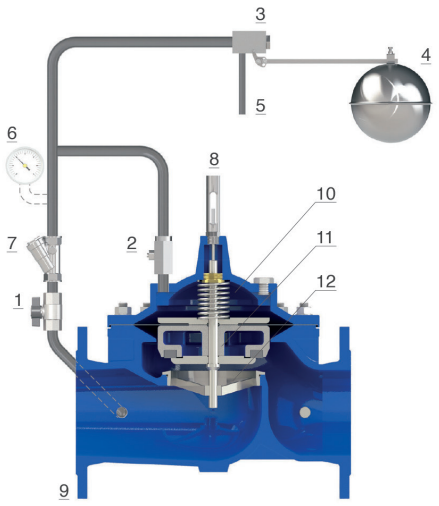
- H-VAL 360/460-MCP-FR constant level control valve with anti-backflow system
- H-VAL 360/460-MCP-R constant level control valve with rapid relief pilot

Operating conditions

Treated water	Maximum temperature 70°C
Maximum pressure	16 bar
Minimum pressure on the pilot	0.6 bar
Recommended operating pressure	6 bar (higher on request)

Operation

The H-VAL 360/460-MCP are regulated by a two-way proportional level control pilot (3), made of stainless steel and connected to the valve via a pipe (not supplied) with a minimum internal diameter of 9 mm. When the level in the tank drops, the pilot (3) opens proportionally, releasing pressure from the valve chamber (10) to the external drain (5). This causes the plug (11) to rise, thus allowing fluid to flow through the valve seat (12). When the tank level rises, the pilot (3) progressively modulates to close. The resulting reduction of the discharge to the atmosphere (5) increases the pressure in the valve chamber (10), causing the plug (11) to descend towards the seat (12) and thus decreasing the flow through the valve. Inside the filter (7) there is a fixed orifice, which is indispensable for the proper functioning of the hydraulic circuit. The needle valve (2) regulates the flow in and out of the chamber (10) to prevent pressure surges during closing.



Installation diagram

In the installation diagram of the H-VAL 360/460-MCP, which are connected to the pilot (2) by means of a single pipe, disconnecting devices (1) are recommended to allow maintenance and a strainer (3), upstream, to prevent impurities from entering the main valve. The pilot must be placed in a position protected from turbulence caused by the flow feeding the tank. For static pressure above 6 bar, we recommend the AC anti-cavitation system and a pressure reducing direct action valve W-VAL HP.

H-VAL 360/460 - Rotoway

constant level adjustment control valves

H-VAL 360 and 460-Rotoway control valves maintain a constant level in a tank by means of a three-way stainless steel pilot regardless of changes in flow rate and upstream pressure. The PF needle valve allows the response time of the control valves to be adjusted, so as to avoid water hammer phenomena in the closing phase. Equipped with a visual position indicator and made from stainless steel and ductile cast iron, they are designed to reduce pressure drops, vibrations and cavitation damage.

Applications

- In split-flow tanks and gravity pipes, when proportional level control is required, within the pilot control limits.
- For level control in civil and industrial tanks
- In small tanks and where it is necessary to keep the level constant with on/off modulation

Constant level pilot adjustment

- Standard stroke 360 mm, different on request by changing the pilot lever

Notes for the designer

- Avoid high points and changes of slope in the pipes connecting the valve to the pilot in order to prevent the formation of air pockets
- A minimum pressure of 0.6 bar at the pilot is required for correct operation; lower values could cause malfunctions. In this case, consider using a support pilot for low flow rates and the manual opening limiter PF CSFL

Optional configurations

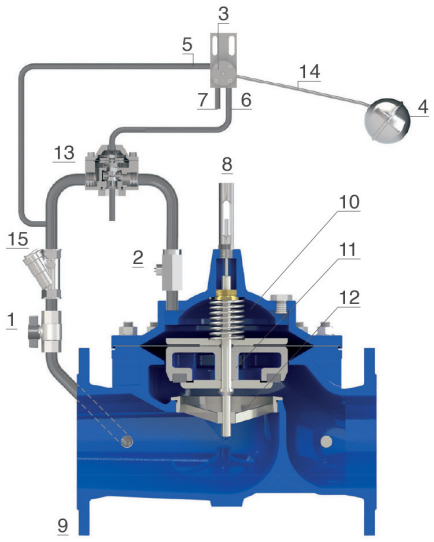
- H-VAL 360/460-Rotoway-FR constant level control valve with anti-backflow system
- H-VAL 360/460-Rotoway-R constant level control valve with rapid relief pilot

Operating conditions

Treated water	Maximum temperature 70°C
Maximum pressure	16 bar
Minimum pressure on the pilot	0.6 bar
Recommended operating pressure	6 bar (higher on request)

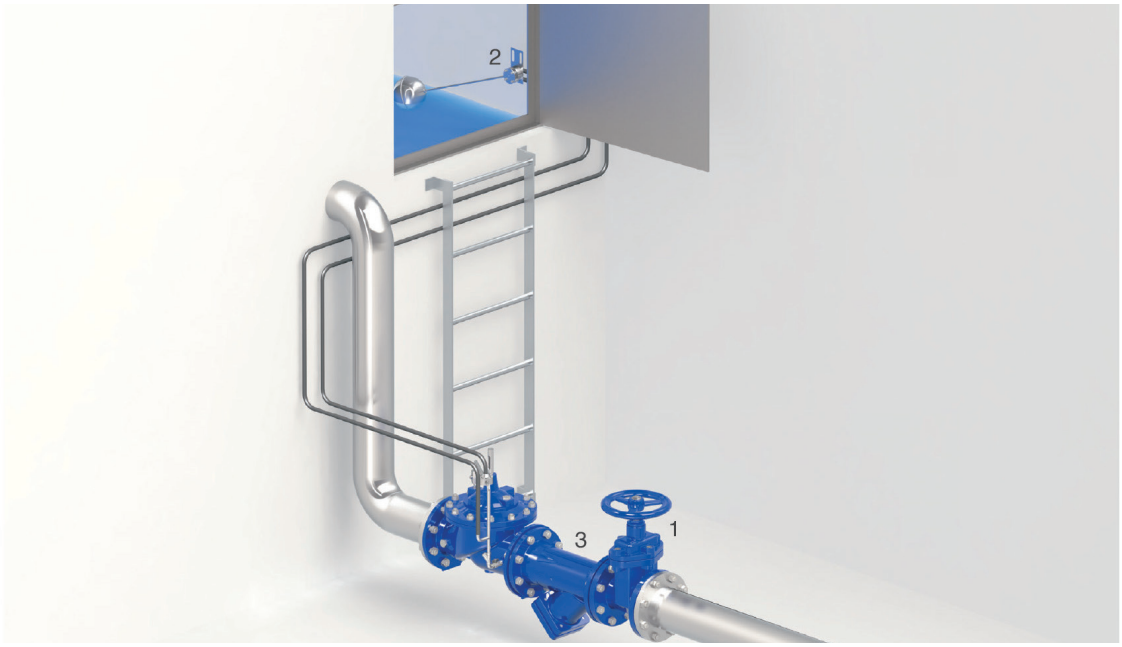
Operation

H-VAL 360/460-Rotoway control valves are controlled by a three-way pilot connected to the valve by means of two hoses with an internal diameter of at least 4-5 mm (not supplied). The pilot, made entirely of stainless steel, consists of a body (3) and a float (4), with a lever (14) that can be adjusted according to project requirements. When the water level reaches the maximum limit, the float (4) rises, rotating the lever (14) and thus directing the upstream pressure directly to the chamber (10) or to the flow throttle (13) (present on valves with DN 150 mm or higher), so as to close the main valve. If the level remains below the maximum value, the lever (14), in the lowered position, opens the outlet (7), putting the valve chamber (10) in communication with the atmosphere. As a result, the plug (11) lifts, allowing flow to pass through the seat (12). The PF needle valve (2) regulates the flow in and out of the chamber to prevent pressure surges during closing.



Installation diagram

The H-VAL 360/460-Rotoway are connected to the pilot (2) by means of two pipes. Shut-off devices (1) are required to allow maintenance and a filter (3), upstream, to prevent impurities from entering the main valve. The pilot (2) must always be placed in a position protected from turbulence caused by the flow feeding the tank. For static pressure above 6 bar, we recommend the AC anti-cavitation system and a pressure reducing direct action valve W-VAL HP.



Remote-controlled control valves with step-by-step **H-VAL 353/453** control

H-VAL 353 and 453 control valves open and close in response to pulses sent to two normally closed solenoids. Thanks to the needle valves included in the circuit, the closing and opening speeds of the valve can be varied independently of each other to ensure smooth and accurate operation. Usually supplied with a manual emergency circuit to intervene when the solenoids are inoperative, and equipped with a 4-20 mA position indicator, the H-VAL 353 and 453 control valves are designed to reduce pressure drops, vibrations and cavitation damage.

Applications

- In combination with PF controllers, to manage pressure according to flow rate variations in order to reduce drops
- For constant or variable level control on tank supply pipes
- At tank outlets, to adjust the flow according to consumption
- In systems used for heating and cooling to regulate flow according to temperature variations

Solenoid valve data

- Voltage: 24 V DC, 24 V/50 Hz, 230 V/50 Hz. Other voltage on request
- Power consumption: inrush AC (VA) 24, hold AC (VA) 17 (8 W), DC hot/cold coil 8/9 W

Notes for the designer

- The various PF modulation systems ensure accurate regulation even with low flow rates and high pressure differentials
- Recommended flow rates and operating conditions can be found in the H-VAL catalogue
- The duration of the pulses sent to the solenoids changes depending on valve size and operating conditions

Optional configurations

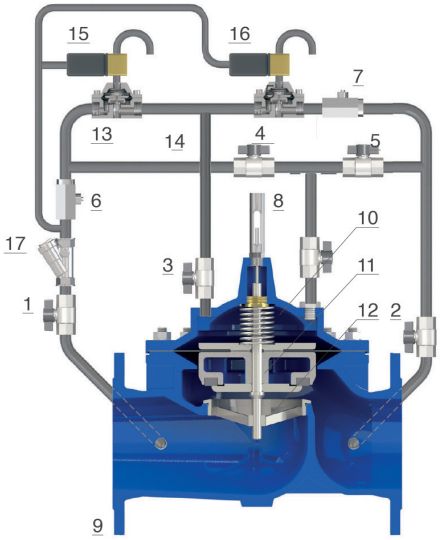
- H-VAL 353/453-FR remote-controlled valve with step-by-step regulation and anti-backflow system
- H-VAL 353/453-5 remote controlled valve with step-by-step control and solenoid for remote emergency opening
- H-VAL 353/453-R remote-controlled valve with step-by-step control and quick relief pilot

Operating conditions

Treated water	Maximum temperature 70°C
Maximum pressure	16 bar (higher on request)
Minimum pressure	1.5 bar

Operation

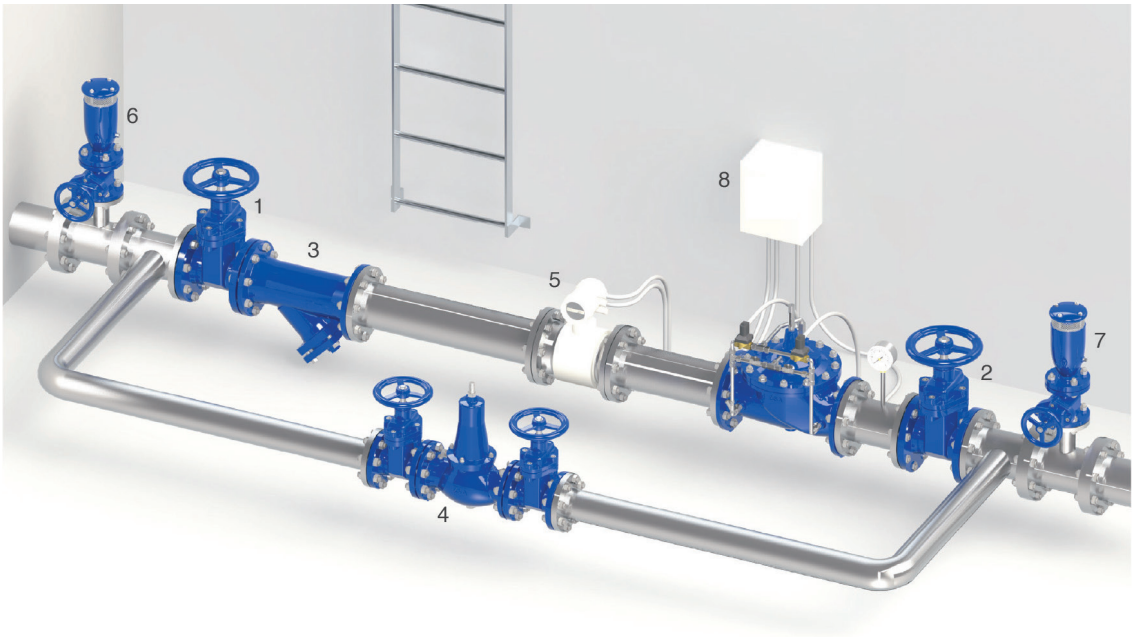
H-VAL 353/453 control valves include two normally open solenoids (15 and 16), which act on two flow accelerators (13 and 14). When the upstream solenoid (15) is energized, the throttle (13) allows a flow to the valve chamber (10) proportional to the number and duration of pulses received. In this condition, the transition between plug (11) and seat (12) is reduced. Instead, activating the downstream solenoid (16) allows a flow which lowers the pressure in the chamber (10), thus causing a gradual opening of the main valve. In any case, the flow in the circuit is always controlled by the two needle valves (6 and 7). The manual control (4, 5) is always provided, unless otherwise requested, to adjust the valve when the solenoids are not in operation due to power failure.



A filter (17), installed upstream, also protects the solenoid and other circuit components from contact with impurities and debris.

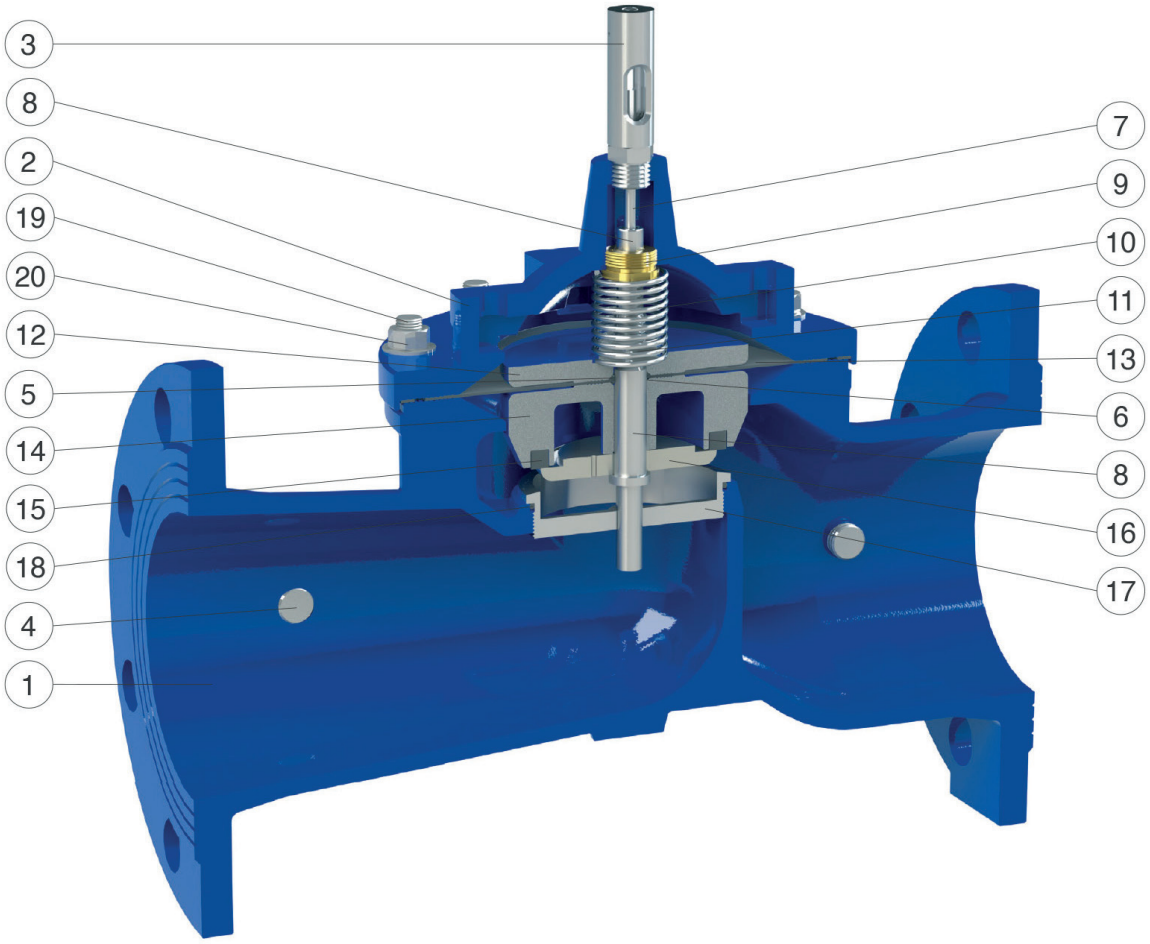
Installation diagram

In the following picture, the H-VAL 353/453 are connected to a flow meter (5). A PF control unit (8) constantly pulses the solenoids to maintain a constant flow regardless of upstream pressure fluctuations, or to adjust the downstream pressure according to flow rate changes while minimising pressure drops. Shut-off devices (1, 2) and maintenance bypasses, a filter (3) and combined upstream and downstream WAVE 3S-AWH anti-water hammer air valves (6, 7) are required.



Construction details

H-VAL 300 - Standard version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	
11	Clamping nut	AISI 304 stainless steel	AISI 316 stainless steel
12	Upper plate	painted steel Fe 37	AISI 304/316 stainless steel
13	Diaphragm	EPDM-Nylon	neoprene
14	Plug	paint. steel (DN 80 - 150), ductile cast iron (from DN 200)	AISI 303/316 stainless steel
15	Flat gasket	EPDM	NBR
16	Counterweight	AISI 303 stainless steel (316 from DN 200)	AISI 316 stainless steel
17	Seal seat	AISI 303 stainless steel (316 from DN 200)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	EPDM/Viton
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

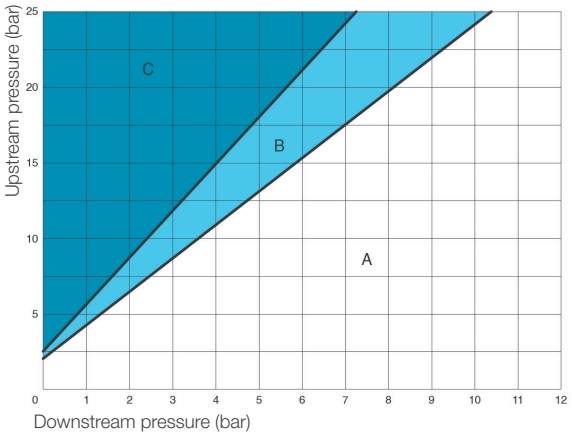
Technical data

H-VAL 300 - Standard version

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	80	100	125	150	200	250	300	400	500	600	800
Kv (m^3/h)	54	141	187	198	487	802	1256	1742	3089	3236	6706
Stroke (mm)	15	21	27	27	43	56	70	84	110	110	162

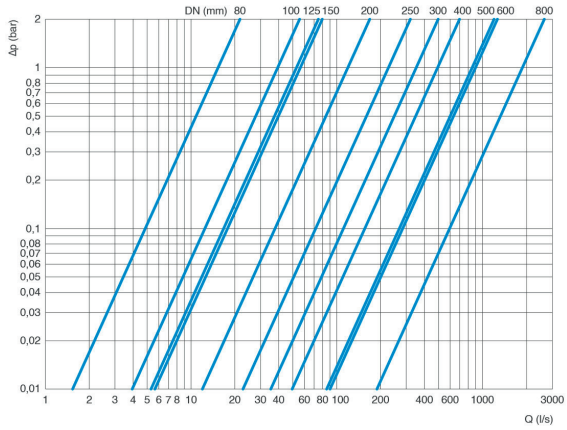


Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valve, identified by the downstream (in abscissa) and upstream (in ordinate) pressure values, falls in one of the 3 zones identified as follows

- A: optimal operation;
- B: incipient cavitation;
- C: harmful cavitation.

The graph must be used for valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.



Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 300 control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

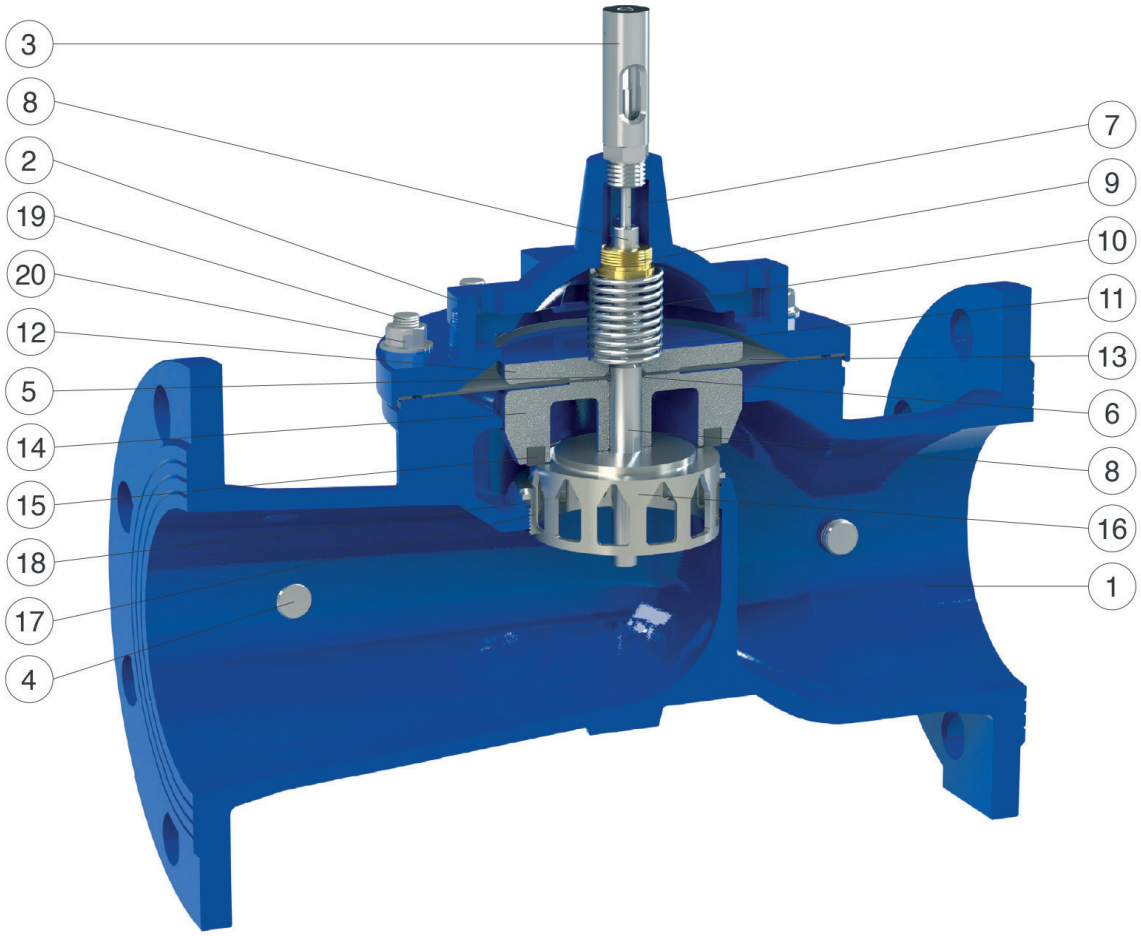
Sizing table

The following table shows the recommended flow rates for the correct use of H-VAL 300control valves.

DN (mm)			80	100	125	150	200	250	300	400	500	600	800
Flow rate (l/s)	Recommended values	Min.	1.0	2.5	3.9	4.1	8.8	16	25	35	63	82	144
		Max.	11	29	43	45	101	180	274	406	695	728	1638
	Pressure relief	Max.	15	38	59	62	132	235	368	530	942	1080	1978

Construction details

H-VAL 300 - AC version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	
11	Clamping nut	AISI 304 stainless steel	AISI 316 stainless steel
12	Upper plate	painted steel Fe 37	AISI 304/316 stainless steel
13	Diaphragm	EPDM-Nylon	neoprene
14	Plug	paint. steel (DN 80 - 150), ductile cast iron (from DN 200)	AISI 303/316 stainless steel
15	Flat gasket	EPDM	
16	V-port counterweight	AISI 303 stainless steel (304 from DN 200)	AISI 316 stainless steel
17	AC seal seat	AISI 303 stainless steel (316 from DN 200)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	EPDM/Viton
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

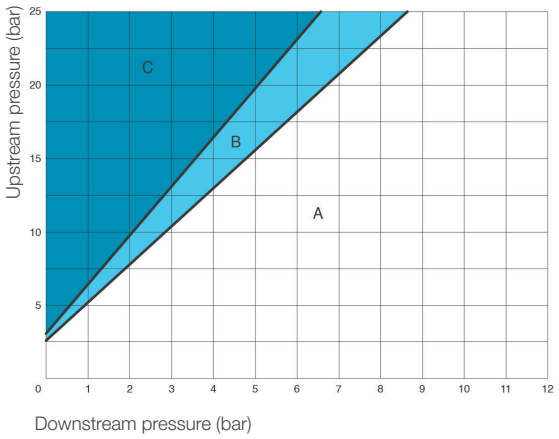
Technical data

H-VAL 300 - AC version

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	80	100	125	150	200	250	300	400	500	600	800
Kv (m^3/h)	43	111	146	154	377	633	967	1356	2409	2588	5092
Stroke (mm)	15	21	27	27	43	56	70	84	110	110	162

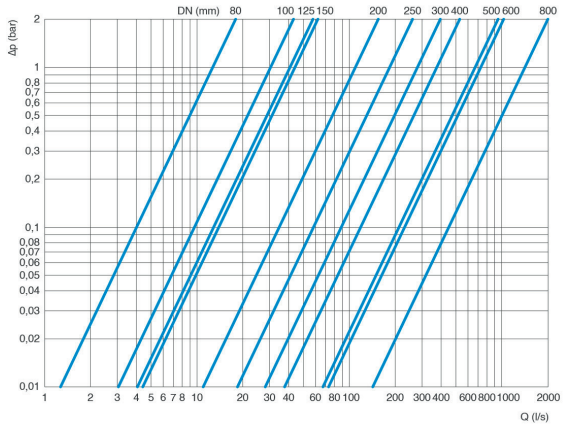


Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valve, identified by the downstream (in abscissa) and upstream (in ordinate) pressure values, falls in one of the 3 zones identified as follows

- A: optimal operation;
- B: incipient cavitation;
- C: harmful cavitation.

The graph must be used for valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.



Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 300 AC control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

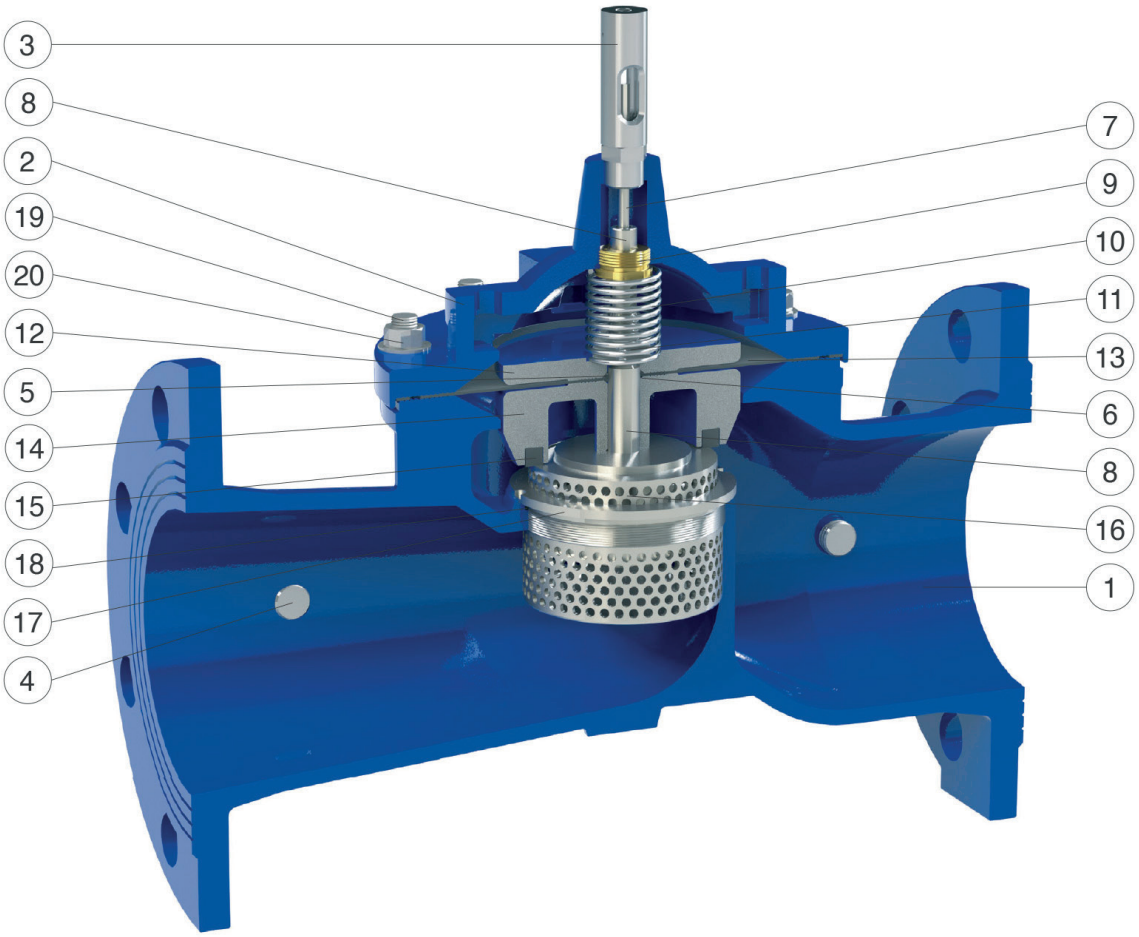
Sizing table

The following table shows the recommended flow rates for the correct use of H-VAL 300 AC control valves.

DN (mm)			80	100	125	150	200	250	300	400	500	600	800
Flow rate (l/s)	Recommended values	Min.	0.5	1.4	2.2	2.3	4.9	8.8	14	20	35	44	71
		Max.	8.8	23	33	35	78	142	211	316	542	582	1325
	Pressure relief	Max.	12	30	46	48	102	185	283	412	734	753	1600

Construction details

H-VAL 300 - CP version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	
11	Clamping nut	AISI 304 stainless steel	AISI 316 stainless steel
12	Upper plate	painted steel Fe 37	AISI 304/316 stainless steel
13	Diaphragm	EPDM-Nylon	neoprene
14	Plug	paint. steel (DN 80 - 150), ductile cast iron (from DN 200)	AISI 303/316 stainless steel
15	Flat gasket	EPDM	NBR
16	Anti-cavitation counterweight CP	AISI 303 stainless steel (304 from DN 200)	AISI 316 stainless steel
17	Anti-cavitation seal seat CP	AISI 303 stainless steel (316 from DN 200)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	EPDM/Viton
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

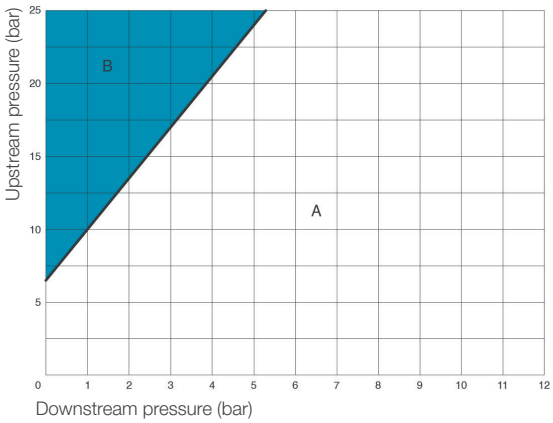
Technical data

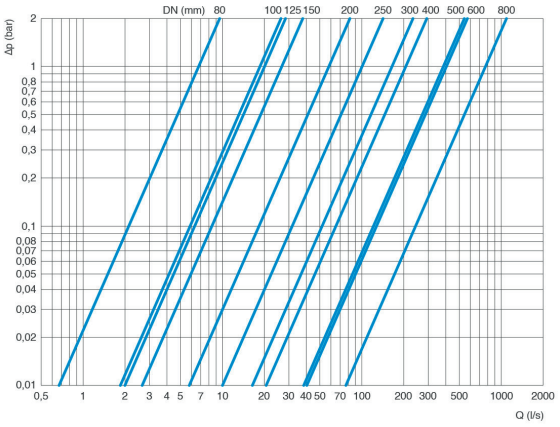
H-VAL 300 - Anti-cavitation version CP

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	80	100	125	150	200	250	300	400	500	600	800
Kv (m 16 ^{3}/h)	24	63	72	89	207	361	565	783	1390	1456	2744
Stroke (mm)	15	21	27	27	43	56	70	84	110	110	162





Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valve, identified by the downstream (in abscissa) and upstream (in ordinate) pressure values, falls in one of the 3 zones identified as follows

- A: optimal operation;
- B: incipient cavitation;
- C: harmful cavitation.

The graph must be used for valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.

Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 300 CP control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

Sizing table

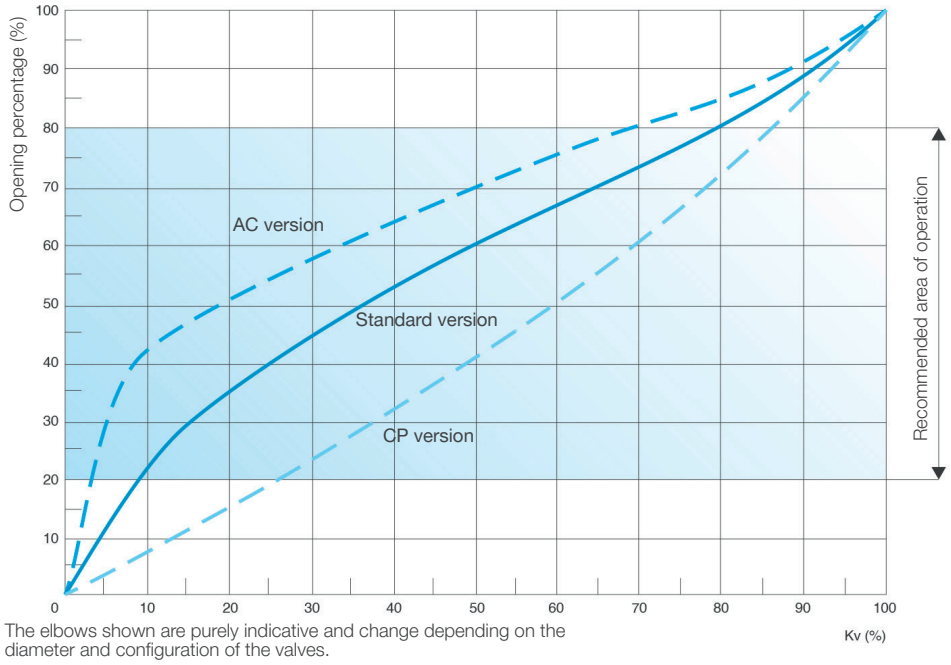
The following table shows the recommended flow rates for the correct use of H-VAL 300 CP control valves.

DN (mm)			80	100	125	150	200	250	300	400	500	600	800
Flow rate (l/s)	Recommended values	Min.	0.7	1.0	2.2	2.3	4.1	6.4	9.2	16	26	37	78
		Max.	5.1	11	16	18	43	75	118	163	289	303	740
	Pressure relief	Max.	11	25	40	42	98	170	267	370	656	688	1083

H-VAL 300 - Standard and anti-cavitation versions - Technical data

Control valve-Kv opening diagram

The following graph shows the Kv of the H-VAL 300 control valves in the standard and anti-cavitation versions in relation to the plug stroke (both values are in percent). It is advisable to size the models so as to limit the variation of the opening, during operation, to between 20% and 80%.



The elbows shown are purely indicative and change depending on the diameter and configuration of the valves.

Operating conditions

Treated, filtered water	Maximum temperature 70°C
Maximum pressure	25 bar
Minimum pressure on the pilot	0.5 bar (plus pressure drop)

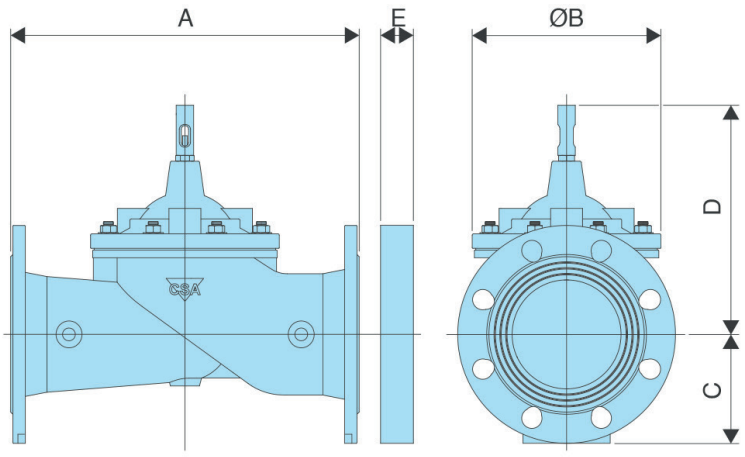
Standard

- Certification and testing according to EN 1074/5
- Drilled flanges according to EN 1092-2 (different drillings on request)
- RAL 5005 blue epoxy paint applied on fluid bed
- Class PN 25 bar

Dimensions and weights

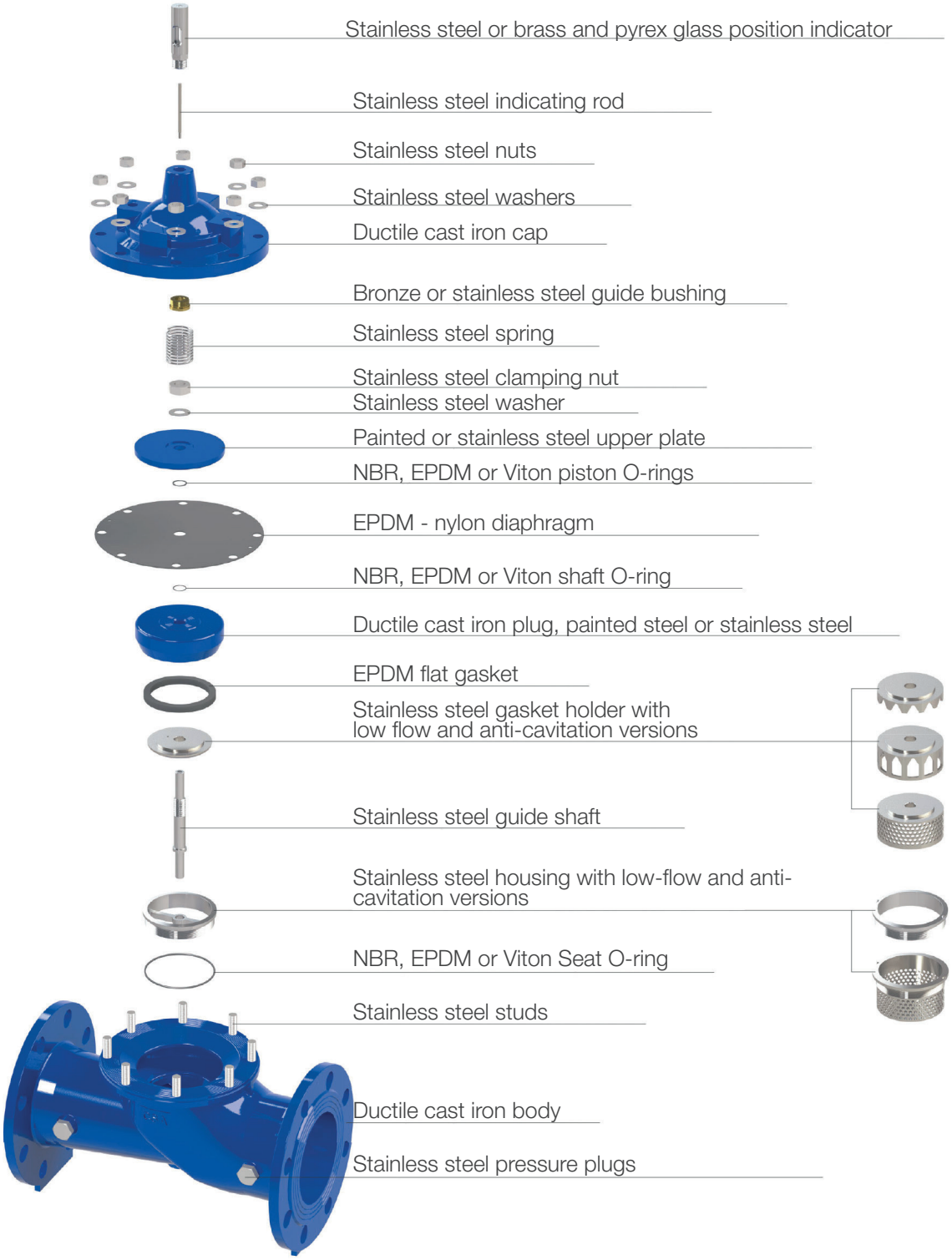
DN mm	A mm	B mm	C mm	D mm	E mm	Weight Kg
80	310	162	100	245	30	24
100	350	218	118	280	30	34
125	400	260	135	350	30	47
150	480	260	150	350	30	54
200	600	370	180	460	30	97
250	730	444	213	515	40	172
300	850	570	242	605	40	304
400	1100	680	310	745	40	480
500	1250	870	365	945	40	782
600	1450	870	423	970	40	922
800	1850	1230	543	1080*	50	1950

The dimension shown with the letter E in the table refers only to applications where the use of a calibrated flange is required, such as flow control or cavitation reduction.
*: height without position indicator.



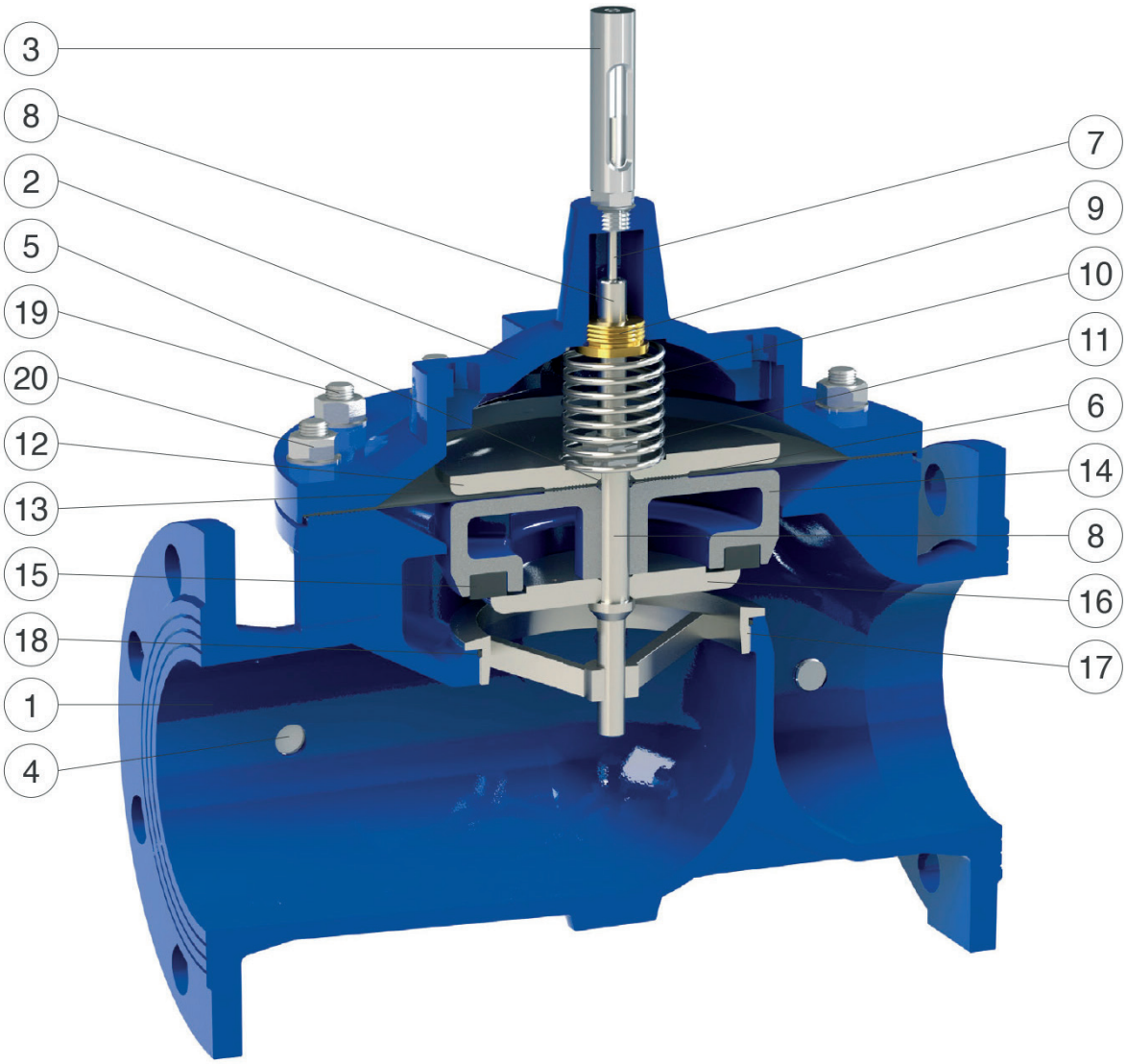
Spare parts

H-VAL 300



Construction details

H-VAL 400 - Standard version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	
11	Clamping nut	AISI 304 stainless steel	AISI 316 stainless steel
12	Upper plate	painted steel Fe 37	AISI 304/316 stainless steel
13	Diaphragm	EPDM-Nylon	neoprene
14	Plug	paint. steel (DN 80 - 150), ductile cast iron. (from DN 200)	AISI 303/316 stainless steel
15	Flat gasket	EPDM	
16	Counterweight	AISI 303 stainless steel (304 from DN 150)	AISI 316 stainless steel
17	Seal seat	AISI 303 stainless steel (304 from DN 150)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	EPDM/Viton
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

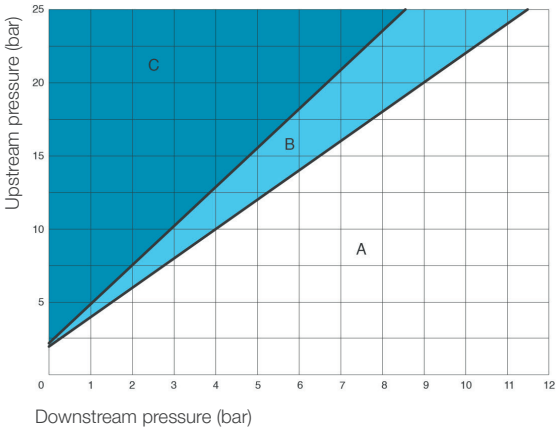
Technical data

H-VAL 400 - Standard version

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	40	50	65	80	100	150	200	250	300	400	600
Kv (m^3/h)	40.6	40.6	68	126	169	410	662	1126	1504	2675	5544
Stroke (mm)	15	15	18	21	27	43	56	70	84	110	162

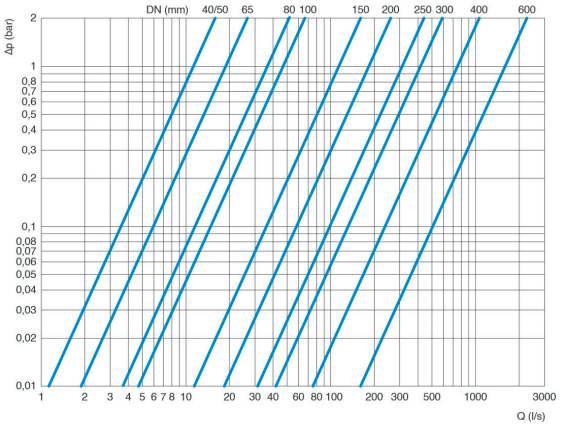


Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valves identified by the values of the downstream pressure (in abscissa) and upstream pressure (in ordinate), falls in one of the 3 zones identified as follows:

- A: optimal operation;
- B: incipient cavitation;
- C: harmful cavitation.

The graph must be used for control valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.



Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 400 automatic control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

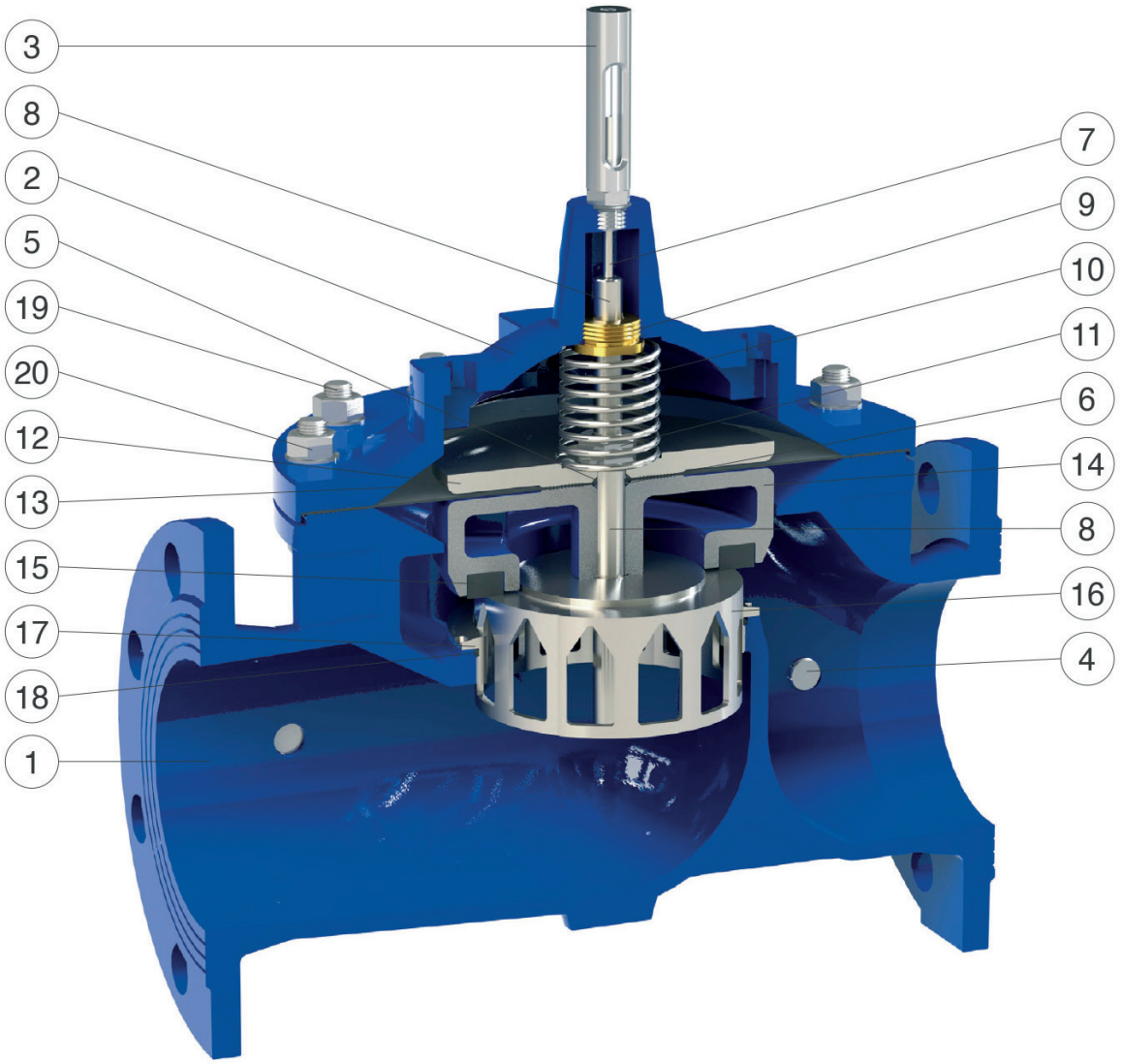
Sizing table

The following table shows the recommended flow rates for the correct use of H-VAL 400 automatic valves.

DN (mm)			40/50	65	80	100	150	200	250	300	400	600
Flow rate (l/s)	Recommended values	Min.	1	1.7	2.5	3.9	8.8	16	25	35	63	132
		MAX.	9.8	17	25	39	88	157	245	353	628	1413
	Pressure relief	MAX.	15	25	38	59	132	235	368	530	942	1978

Construction details

H-VAL 400 - AC version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	
11	Clamping nut	AISI 304 stainless steel	AISI 316 stainless steel
12	Upper plate	painted steel Fe 37	AISI 304/316 stainless steel
13	Diaphragm	EPDM-Nylon	neoprene
14	Plug	paint. steel (DN 50 - 100), ductile cast iron (from DN 150)	AISI 303/316 stainless steel
15	Flat gasket	EPDM	NBR
16	V-port counterweight	AISI 303 stainless steel (304 from DN 150)	AISI 316 stainless steel
17	AC seal seat	AISI 303 stainless steel (304 from DN 150)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	EPDM/Viton
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

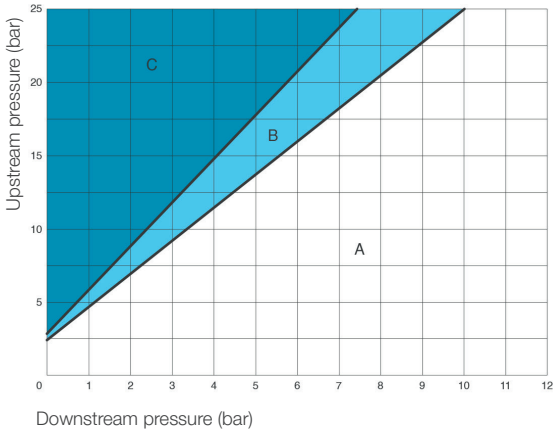
Technical data

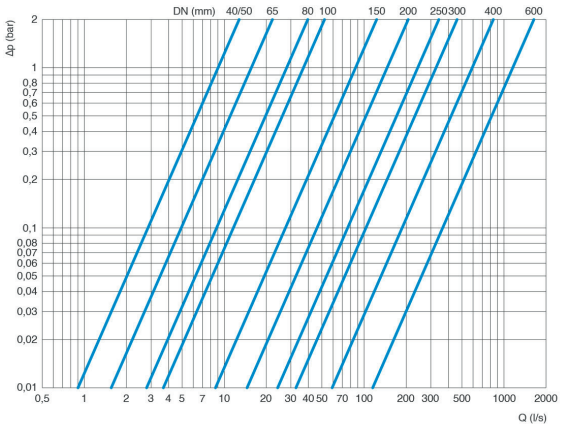
H-VAL 400 - AC version

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	40	50	65	80	100	150	200	250	300	400	600
Kv (m^3/h)	32.5	32.5	56	100	132	312	523	867	1173	2113	4158
Stroke (mm)	15	15	18	21	27	43	56	70	84	110	162





Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valve identified by the downstream (in abscissa) and upstream (in ordinate) pressure values, falls in one of the two zones identified as follows:

- A: optimal operation;
- B: harmful cavitation.

The graph must be used for control valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.

Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 400 AC control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

Sizing table

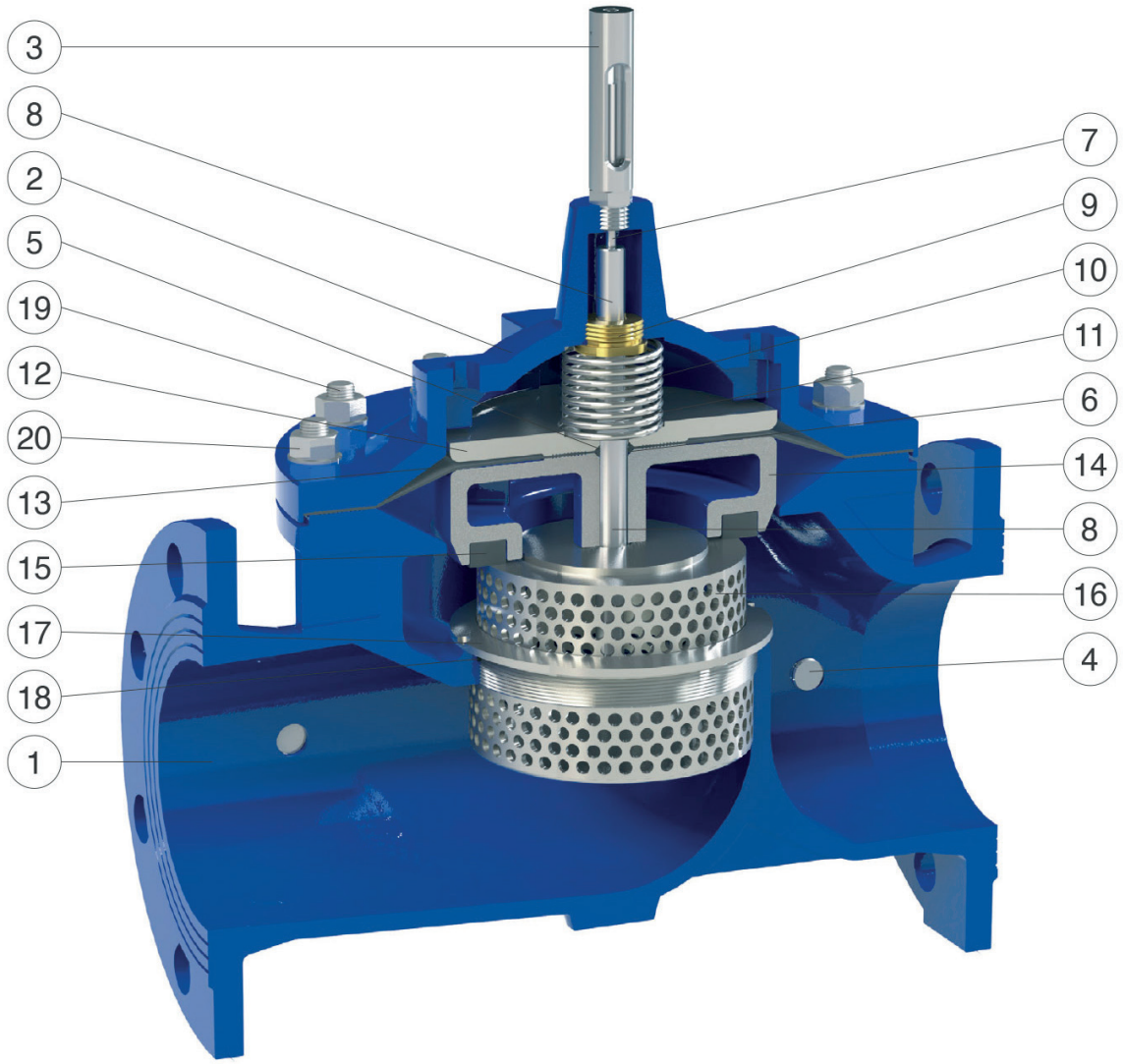
The following table shows the recommended flow rates for the correct use of H-VAL 400 AC control valves.

DN (mm)			40/50	65	80	100	150	200	250	300	400	600
Flow rate (l/s)	Recommended values	Min.	0.5	0.9	1.4	2.2	4.9	8.8	14	20	35	71
		MAX.	7.9	14	19	30	67	124	188	274	496	1130
	Pressure relief	MAX.	12	20	30	46	100	185	283	412	744	1582

The technical data shown are approximate and may change depending on the number and size of holes.

Construction details

H-VAL 400 - CP version



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Position indicator	stainless steel AISI 303	
4	Pressure plugs	AISI 316 stainless steel	
5	Upper plate O-ring	NBR	EPDM/Viton
6	Plug O-ring	NBR	EPDM/Viton
7	Indication rod	AISI 303 stainless steel	AISI 316 stainless steel
8	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
9	Guide bushing	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
10	Spring	AISI 302 stainless steel	AISI 316 stainless steel
11	Clamping nut	AISI 304 stainless steel	AISI 304/316 stainless steel
12	Upper plate	painted steel Fe 37	neoprene
13	Diaphragm	EPDM-Nylon	AISI 303/316 stainless steel
14	Plug	paint. steel (DN 50 - 100), ductile cast iron (from DN 150)	AISI 316 stainless steel
15	Flat gasket	EPDM	AISI 316 stainless steel
16	Anti-cavitation counterweight CP	AISI 303 stainless steel (304 from DN 150)	AISI 316 stainless steel
17	Anti-cavitation seal seat CP	AISI 303 stainless steel (316 from DN 150)	AISI 316 stainless steel
18	Seal seat O-ring	NBR	AISI 316 stainless steel
19	Studs	AISI 304 stainless steel	AISI 316 stainless steel
20	Nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel

The table of materials and components is subject to change without notice.

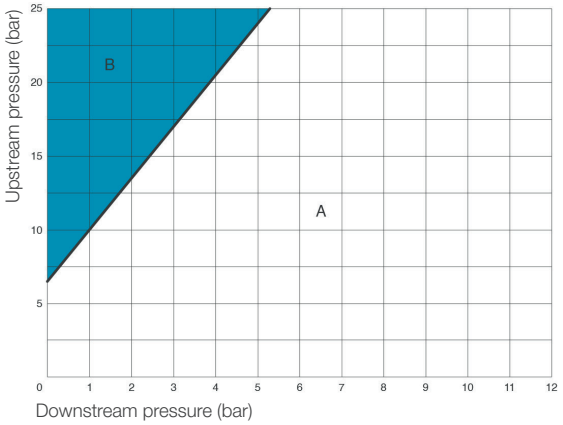
Technical data

H-VAL 400 - Anti-cavitation version CP

Pressure drop coefficient

The coefficient Kv represents the flow rate that produces a pressure drop of 1 bar in the fully open control valve.

DN (mm)	40	50	65	80	100	150	200	250	300	400	600
Kv (m 16 ^{3}/h)	20	20	34	63	84	205	331	563	752	1337	2520
Stroke (mm)	15	15	18	21	27	43	56	70	84	110	162

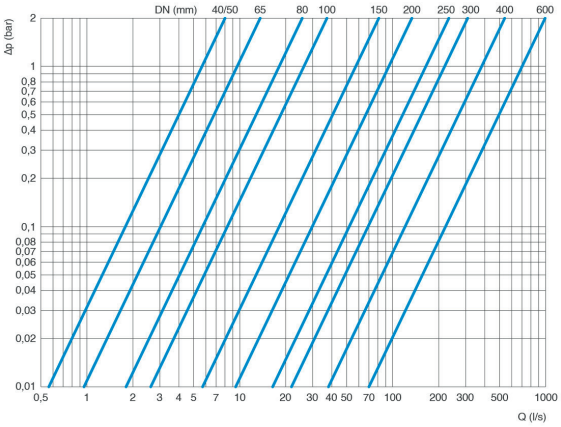


Cavitation chart

It is important to consider the risk of cavitation, which can cause extensive damage, as well as vibration and noise. On the graph, the point corresponding to the operating condition of the control valve, identified by the downstream (in abscissa) and upstream (in ordinate) pressure values, falls in one of the 3 zones identified as follows

- A: optimal operation;
- B: incipient cavitation;
- C: harmful cavitation.

The graph must be used for control valves modulating with an opening percentage of 35-40%, at standard temperature and at altitudes below 300 m. Under operating conditions, the pressure reduction differential must not exceed 15 bar.



Pressure drops chart

The graph opposite shows the pressure drops of the H-VAL 400 CP control valves in the fully open position as a function of diameter and flow rate expressed in l/s.

Sizing table

The following table shows the recommended flow rates for the correct use of H-VAL 400 CP control valves.

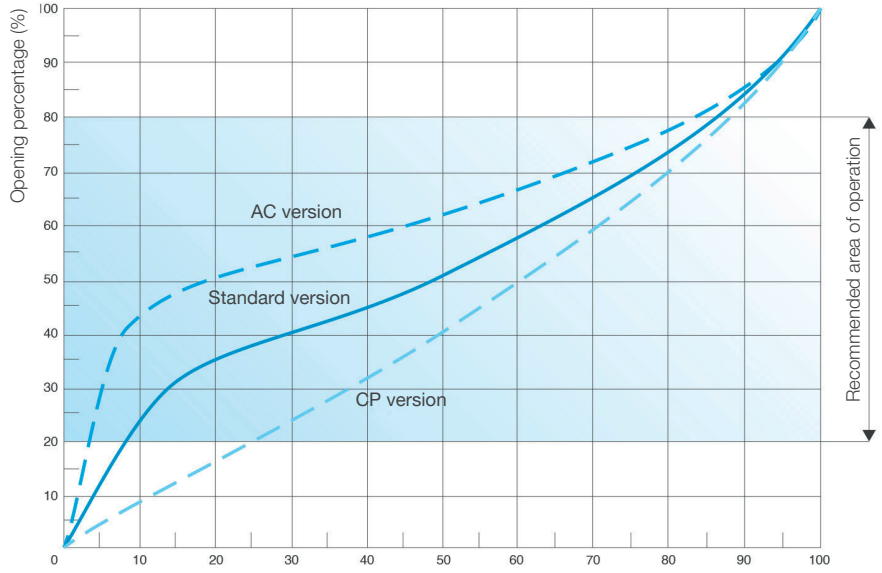
DN (mm)			40/50	65	80	100	150	200	250	300	400	600
Flow rate (l/s)	Recommended values	Min.	0.4	0.7	1.0	1.6	3.5	6.3	9.8	14	25	57
		MAX.	3.9	6.6	9.7	16	40	64	109	146	260	635
	Pressure relief	MAX.	9.8	16	25	39	88	157	245	353	628	989

The technical data shown are approximate and may change depending on the number and size of holes.

H-VAL 400 - Standard and anti-cavitation versions - Technical data

Valve-Kv opening diagram

The graph below shows the Kv of the H-VAL 400 control valves in the standard and anti-cavitation versions in relation to the plug stroke (both values are in percentages). It is advisable to size the models so as to limit the variation of the opening, during operation, to between 20% and 80%.



The elbows shown are purely indicative and change depending on the diameter and configuration of the valves.

Operating conditions

Filtered treated water	Maximum temperature 70°C
Maximum pressure	25 bar
Minimum pressure on the pilot	0.5 bar (plus pressure drop)

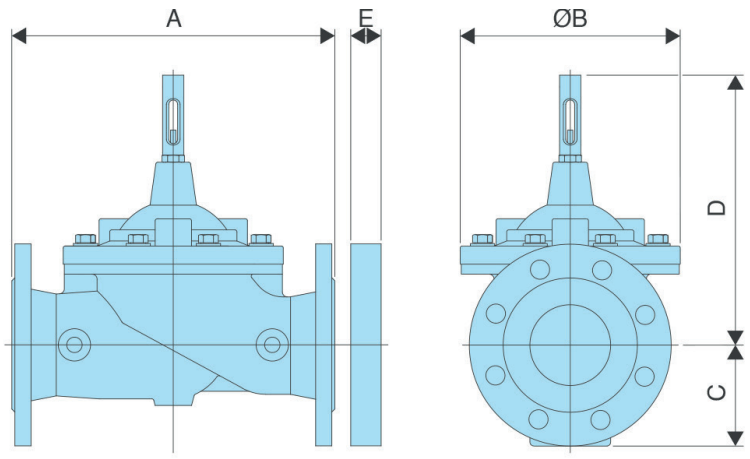
Standard

- Certification and testing according to EN 1074/5
- Drilled flanges according to EN 1092-2 (different drillings on request)
- RAL 5005 blue epoxy paint applied on fluid bed
- Class PN 25 bar

Dimensions and weights

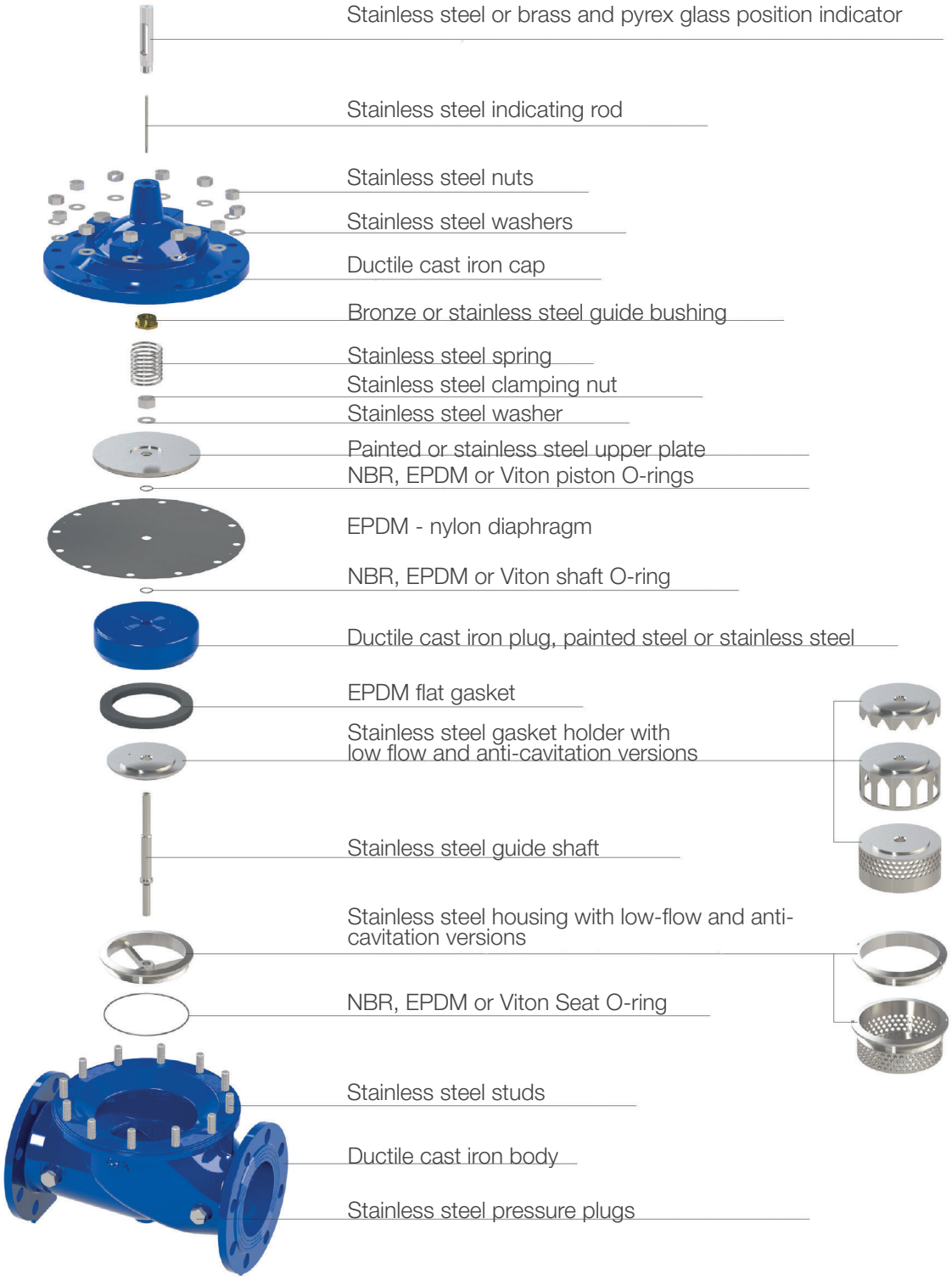
DN mm	A mm	B mm	C mm	D mm	E mm	Weight Kg
40	230	162	83	235	30	18
50	230	162	83	235	30	18
65	290	194	93	275	30	23.5
80	310	218	100	295	30	28
100	350	260	118	335	30	39
150	480	370	150	450	30	84
200	600	444	180	495	30	138
250	730	570	213	600	40	264
300	850	676	242	720	40	405
400	1100	870	310	915	40	704
600	1450	1230	433	1080*	50	2250

The dimension shown with the letter E in the table refers only to applications where the use of a calibrated flange is required, such as flow control or cavitation reduction.
*: height without position indicator.



Spare parts

H-VAL 400



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