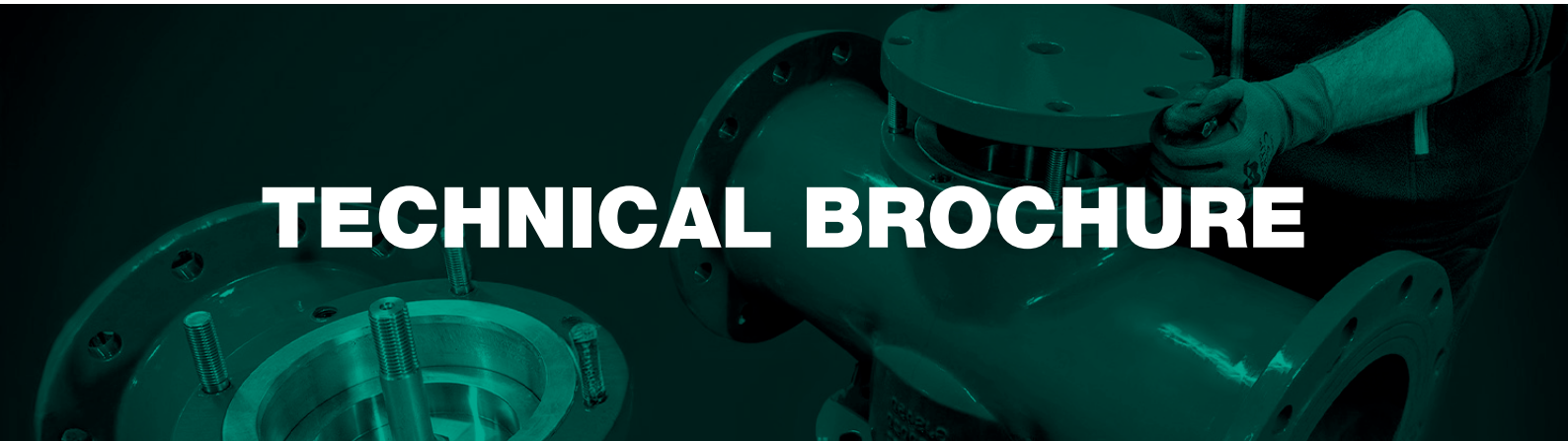
Pietro Fiorentini

WR/AM

Pressure relief valve



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WR_AM_technicalbrochure_ENG_revB

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Pressure relief valve **WR/AM**

The **WR/AM** pressure relief valve automatically maintains the upstream pressure above a minimum value, irrespective of flow variations.

Constructive features and advantages

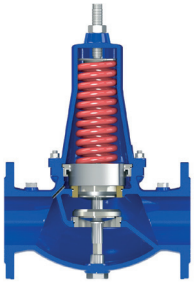
- Body and cap made of ductile cast iron class PN 40, internal components and bolts made of stainless steel.
- Self-cleaning piston with innovative technology that improves running performance and reduces maintenance.
- Mobile block consisting of three stainless steel components obtained on a CNC lathe to avoid sliding friction and leakage due to accurate machining.
- Large expansion chamber to reduce the risk of cavitation, even at high pressure differentials.
- Pressure ports for inserting pressure gauges.
- Flanged version available from DN 50 to 150.

Main applications

- Water distribution networks, as a relief valve
- Fire-fighting systems, to avoid overpressure from pumps
- Irrigation systems, as protection against water hammer and pump cavitation phenomena
- Industrial plants, buildings

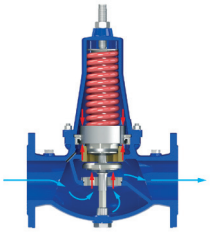
Operating principle

The WR/AM valve works by the movement of a piston that slides inside two stainless steel or bronze ring nuts of different diameters. These, securely screwed to the body and fitted with special lip seals, create an upstream and downstream pressure compensation chamber.



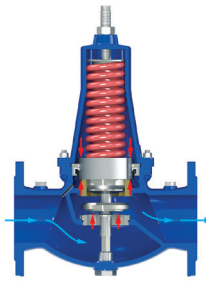
Normally closed valve

With no pressure or flow inside, the WR/AM valve is normally closed; the piston is pushed downwards by the spring force.



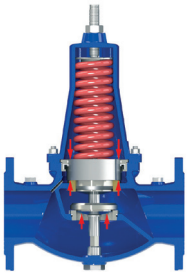
Valve fully open in operation

When the upstream pressure rises above the spring calibration, the piston moves upwards and the valve moves to the fully open position.



Modulating valve

If the upstream pressure tends to fall below the set value, it pushes the plug down, reducing the passage. The result is the creation of a pressure drop such that the upstream pressure is restored to the required value.



Valve closed (static conditions)

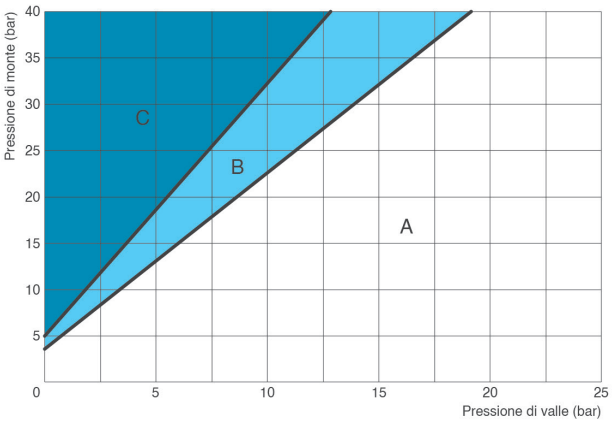
If the downstream withdrawal increases, and the upstream pressure falls below the spring setting, the valve moves to the fully closed position, maintaining the required pressure. This also occurs under static conditions.

Technical data

Pressure drop coefficient

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

DN (mm)	50	65	80	100	125	150
Kv (m^3/h)/bar	22	51	83	122	166	194



Ensure that the point corresponding to the operating condition of the valve, appropriate to the required flow rate, falls in zone A of the graph (abscissa: the downstream pressure values; ordinate: the upstream pressure values). The graph refers to valves modulating with an opening percentage of 35-40%, at standard temperature and altitude below 300 m. In pressure support, the differential must not exceed 17 bar. The relief function tolerates larger differentials.

Pressure drops chart

A: optimal operation
B: incipient cavitation
C: harmful cavitation

Operating conditions

Fluid	treated water
Maximum temperature	70°C
Maximum pressure	40 bar
Downstream pressure	calibration range 1.5 to 6 bar and 5 to 12 bar; (higher values on request)

Recommended flow rates - pressure support

DN (mm)	50	65	80	100	125	150
Min. flow rate (l/s)	0.3	0.6	0.9	1.4	2.2	3.2
Max. flow rate (l/s)	4.5	7.6	11	18	28	40

Recommended flow rates - pressure relief

DN (mm)	50	65	80	100	125	150
Max. flow rate (l/s)	8.8	14	22	35	55	39

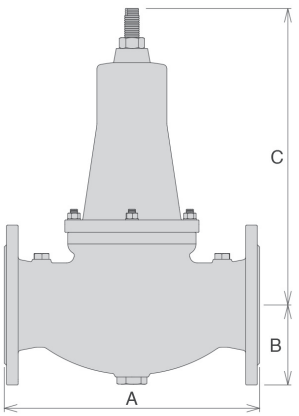
Standard

- Certification and testing according to EN 1074/5
- Drilled flanges to EN 1092/2
- RAL 5005 blue epoxy paint applied on fluid bed

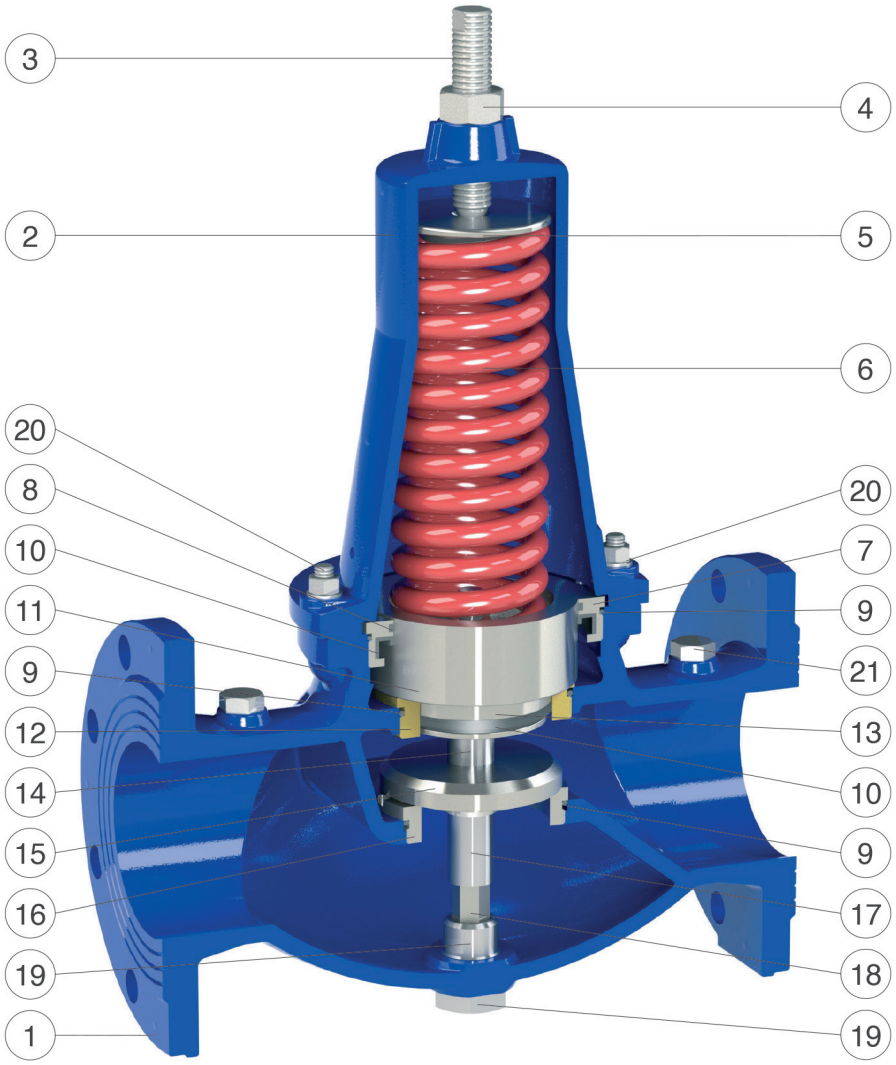
Modifications to flanges and painting on request.

Dimensions and weights

DN (mm)	50	80	100	150
A (mm)	230	310	350	480
B (mm)	90	108	126	172
C (mm)	240	340	400	500
Weight (Kg)	15	29	40	90



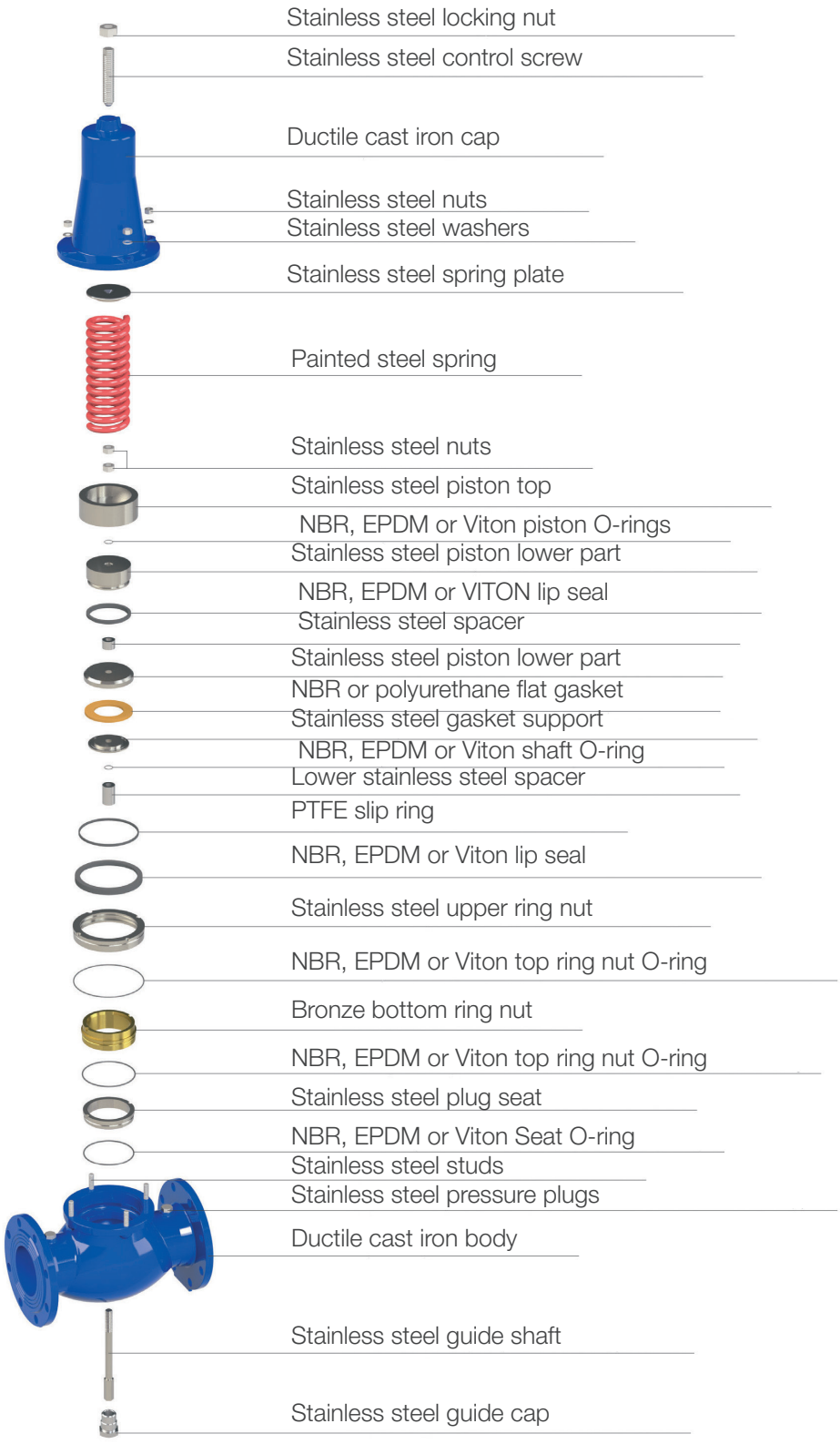
Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Control screw	AISI 304 stainless steel	AISI 316 stainless steel
4	Locking nut	AISI 304 stainless steel	AISI 316 stainless steel
5	Spring plate	AISI 303 stainless steel	AISI 316 stainless steel
6	Spring	coated spring steel 52SiCrNi5	
7	Upper ring nut	AISI 304 stainless steel	AISI 316 stainless steel
8	Slip ring	PTFE	
9	O-ring	NBR	EPDM/Viton
10	Lip seals	NBR	EPDM/Viton
11	Upper piston part	ac. AISI 303 (bronze CuSn5Zn5Pb5 for DN 125-150)	AISI 303/316 stainless steel
12	Lower ring nut	bronze CuSn5Zn5Pb5	AISI 304/316 stainless steel
13	Lower piston part	AISI 303 stainless steel	AISI 316 stainless steel
14	Central spacer	AISI 303 stainless steel	AISI 316 stainless steel
15	Plug plate	AISI 303 stainless steel	AISI 316 stainless steel
16	Plug seat	AISI 304 stainless steel	AISI 316 stainless steel
17	Lower spacer	AISI 303 stainless steel	AISI 316 stainless steel
18	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
19	Guide cap	AISI 303 stainless steel	AISI 316 stainless steel
20	Studs, nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel
21	Pressure plugs	AISI 316 stainless steel	

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

Spare parts

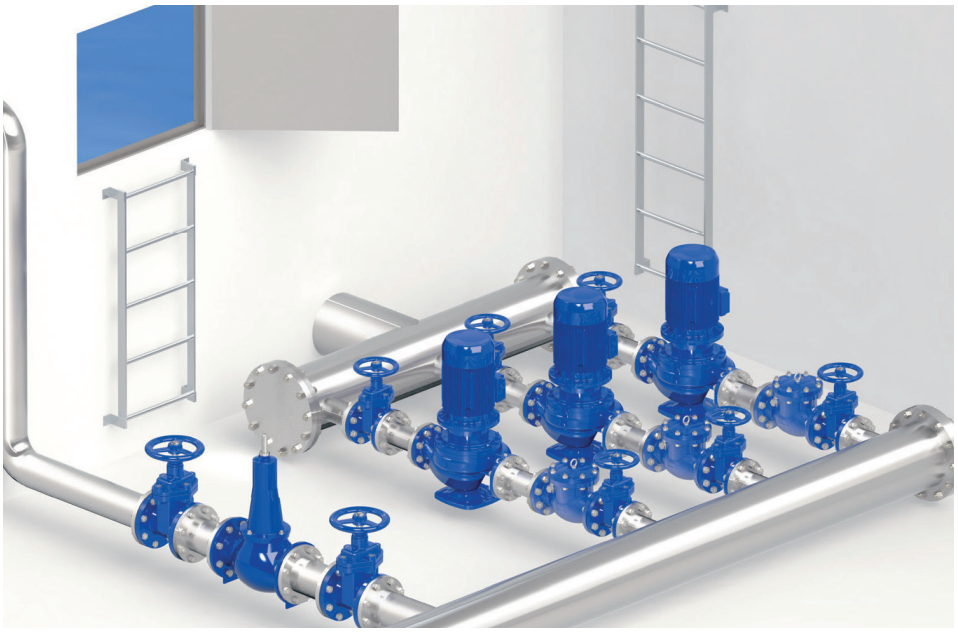

Stainless steel locking nut
Stainless steel control screw
Ductile cast iron cap
Stainless steel nuts
Stainless steel washers
Stainless steel spring plate
Painted steel spring
Stainless steel nuts
Stainless steel piston top
NBR, EPDM or Viton piston O-rings
Stainless steel piston lower part
NBR, EPDM or VITON lip seal
Stainless steel spacer
Stainless steel piston lower part
NBR or polyurethane flat gasket
Stainless steel gasket support
NBR, EPDM or Viton shaft O-ring
Lower stainless steel spacer
PTFE slip ring
NBR, EPDM or Viton lip seal
Stainless steel upper ring nut
NBR, EPDM or Viton top ring nut O-ring
Bronze bottom ring nut
NBR, EPDM or Viton top ring nut O-ring
Stainless steel plug seat
NBR, EPDM or Viton Seat O-ring
Stainless steel studs
Stainless steel pressure plugs
Ductile cast iron body
Stainless steel guide shaft
Stainless steel guide cap

Installation diagram

The following picture shows a WR/AM pressure relief valve used as protection in a pressure-reducing installation with a W-VAL HP direct action valve on the main pipeline. On the bypass, a smaller valve ensures proper control even during maintenance, while combined anti-water hammer WAVE 3S-AWH vents prevent negative pressure and the release of accumulated air pockets during operation.

Installation diagram

The following picture shows the WR/AM valve installed as a water hammer protection device in a lifting station, on a branch from the main pipeline immediately downstream of the pumps. Thanks to its compensated piston technology, the WR/AM provides a faster response than control valves, avoiding pressure surges at start-up and, more importantly, water hammer following pump shutdown.



Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technologies and solutions that can shape a more sustainable future. That is why respect for people, society and the environment form the cornerstones of our strategy.

Our commitment to the world of tomorrow

While in the past we limited ourselves to providing products, systems and services for the oil & gas sector, today we want to broaden our horizons and create technologies and solutions for a digital and sustainable world, with a particular focus on renewable energy projects to help make the most of our planet's resources and create a future in which the younger generations can grow and prosper.

The time has come to put the why we operate before the what and how we do it.

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