Normal safety valve. (AN)

Mod. 594 | EN

EP AP ES CP

Operation

The valve works as an automatic pressure releasing regulator activated by the static pressure existing at the entrance to the valve and is characterized by its ability to open, at the first proportional to the pressure increase, and after instantly and totally.

Specifications

Size

- DN-25 x 25 to DN-50 x 50

Temperature range

- -60 ˚C to +450 ˚C

Applications

- Gas, steam and liquid

Materials

- Carbon steel
- Stainless steel

Maximum pressure

- Up to 95 bar

Regulation

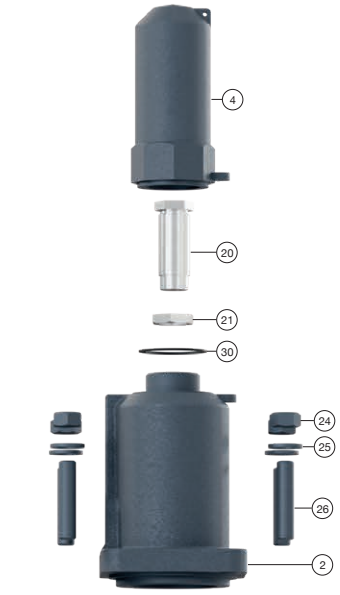
- UNE-EN ISO 4126-1
- UNE-EN ISO 4126-7
- UNE-EN 12516-2
- UNE-EN 12516-4
- UNE-EN 1092-1
- UNE-EN 1092-2
- UNE-EN 12266-1

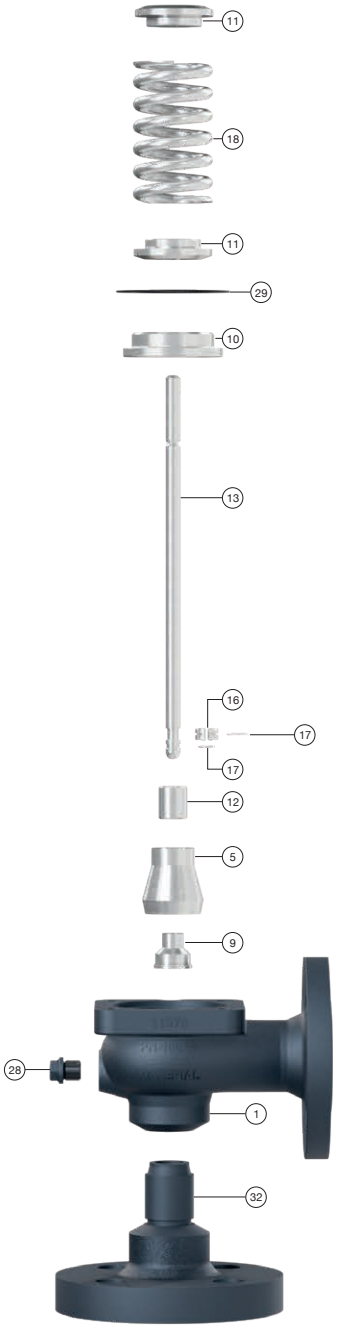
Certification

N°. PIECE	PIECE	MATERIAL	
		CARBON STEEL	STAINLESS STEEL
1	Body	Carbon steel (EN-1.0619)	Stainless steel (EN-1.4408)
2	Closed bell	Nodular iron (EN-5.3107)	Stainless steel (EN-1.4408)
3	Open bell	Carbon steel (EN-1.0619)	Stainless steel (EN-1.4408)
4	Hood	Nodular iron (EN-5.3107)	Stainless steel (EN-1.4408)
5	Elevator	Nodular iron (EN-5.3107) (1)	Stainless steel (EN-1.4408) (1)
6	Cam	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
7	Lever	Nodular iron (EN-5.3107)	Nodular iron (EN-5.3107)
9	Plug	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4542)
10	Lead	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
11	Spring press	Carbon steel (EN-1.1191)	Stainless steel (EN-1.4305)
12	Separator	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
13	Rod	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
14	Lever shaft	Carbon steel (EN-1.1191)	Stainless steel (EN-1.4305)
15	Gudgeon	Carbon steel (EN-1.1231)	Stainless steel (EN-1.4310)
16	Ring	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
17	Safety ring	Stainless steel (EN-1.4310)	Stainless steel (EN-1.4310)
18	Spring	Acero al cromo vanadio (EN-1.8159)	Stainless steel (EN-1.4310)
19	Gland	Carbon steel (EN-1.1191)	Stainless steel (EN-1.4305)
20	Hollow screw	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)
21	Hollow screw nut	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)
22	Buffer nut	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)
23	Rod check nut	Carbon steel (EN-1.1141)	Stainless steel (EN-1.4301)
24	Nut	Carbon steel (EN-1.1141)	Stainless steel (EN-1.4301)
25	Washer	Carbon steel (EN-1.1141)	Stainless steel (EN-1.4301)
26	Stud	Carbon steel (EN-1.1181)	Stainless steel (EN-1.4301)
27	Screw	Carbon steel (EN-1.1191)	Stainless steel (EN-1.4301)
28	Cap	Carbon steel (EN-1.1181)	Stainless steel (EN-1.4301)
29	Coupling	Graphite	PTFE (Teflon)
30	Coupling	PTFE (Teflon)	PTFE (Teflon)
31	Seal	Graphite	PTFE (Teflon)
32	Seating	Carbon steel (EN-1.0460)	Stainless steel (EN-1.4571)
DN1 x DN2		25 x 25 to 50 x 50	
PN		160	160
OPERATING CONDITIONS	PRESSURE [bar]	95	95
	MAXIMUM TEMPERATURE [°C]	450	450
	MINIMUM TEMPERATURE [°C]	-10	-60

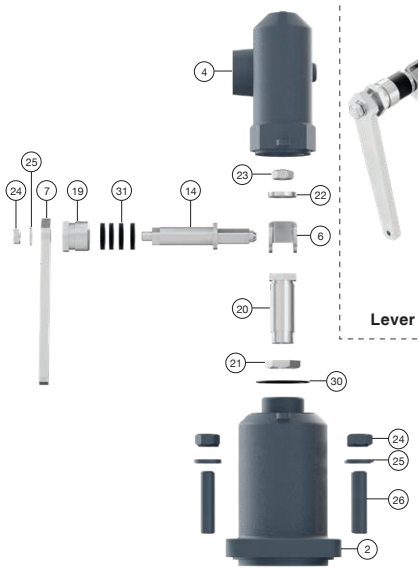
(1) DN-25 x 25 In Stainless steele (EN-1.4408).
(2) Spring in SH for 30-40 bar and 38-50 bar in DN-25x25. Spring in SH for 30 - 40 bar in DN-32x32.

ES isometric view



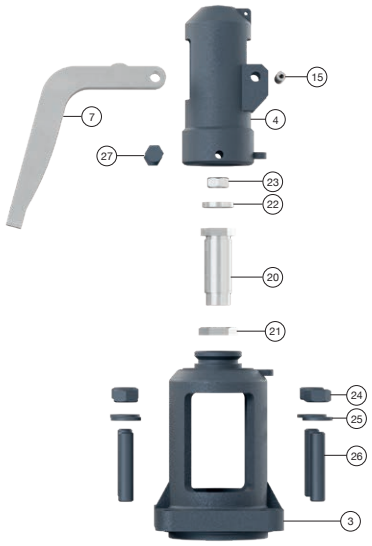


ES Exploded view

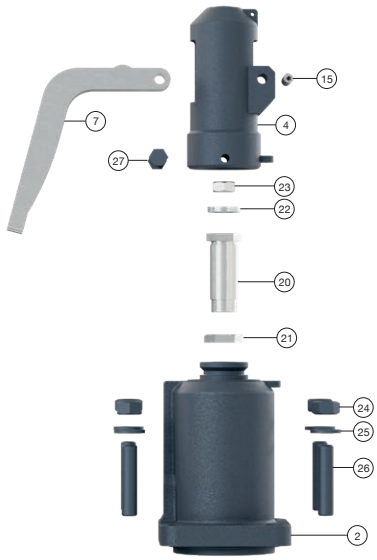


EP Hood exploded view

Lever arrangement

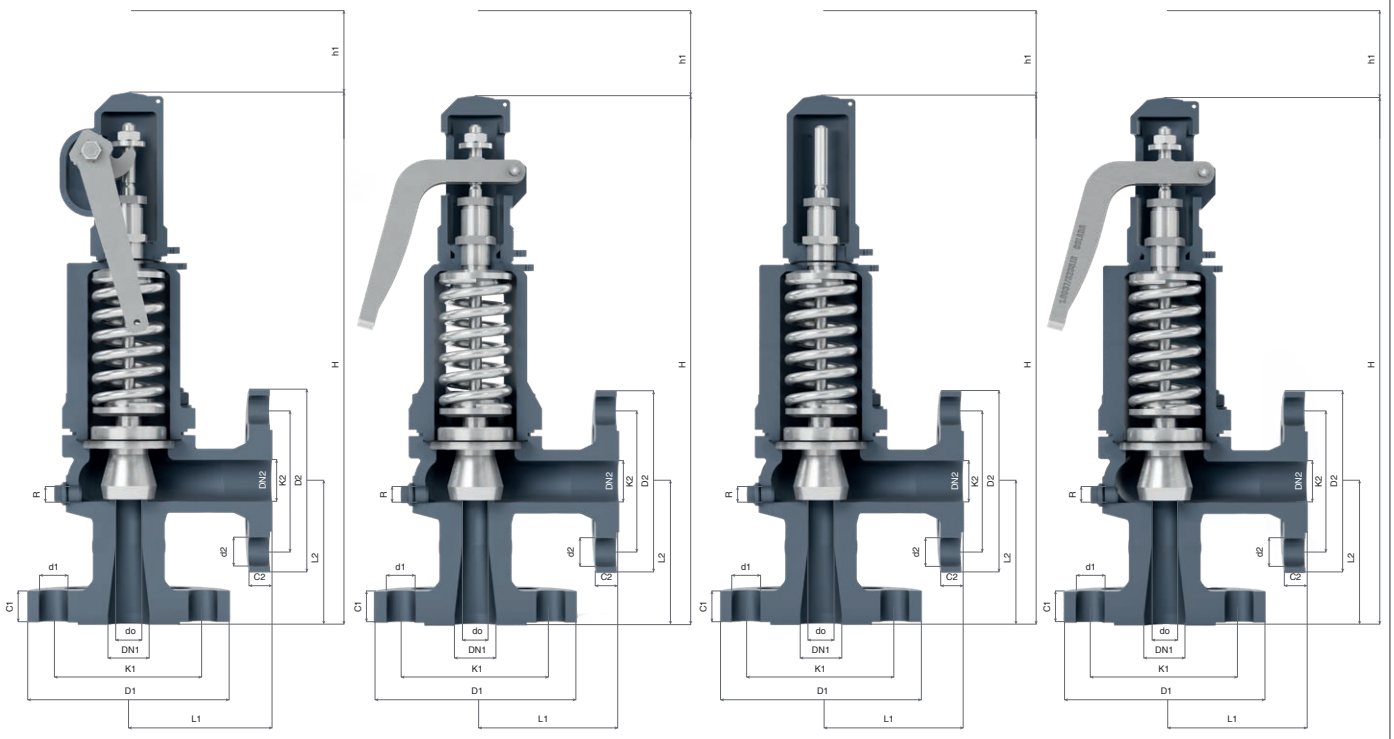


AP Hood exploded view



CP Hood exploded view

DIMENSIONS																		
DN1 x DN2			25 x 25				32 x 32				40 x 40				50 x 50			
do [mm]			16				20				25				32			
Ao: $\frac{\pi \cdot do^2}{4}$ [mm²]			201				314				491				804			
H [mm]			380				410				475				545			
h1 [mm]			150				150				150				150			
L1 [mm]			100				110				125				145			
L2 [mm]			100				110				125				145			
R			1/4"				1/4"				1/4"				1/4"			
			Female Threads Gas Whitworth Cylindrical ISO 228/1 (DIN-259)															
INLET FLANGE	PN-160 EN 1092-1 (1)	D1	140				155				170				195			
		K1	100				110				125				145			
		d1	18				22				22				26			
		C1	22				24				25				27			
		SCREWS N°	4				4				4				4			
OUTLET FLANGE	PN-40 EN 1092-1	D2	115				140				150				165			
		K2	85				100				110				125			
		d2	14				18				18				18			
		C2	18				18				18				20			
		SCREWS N°	4				4				4				4			
MODEL			EP	AP	ES	CP	EP	AP	ES	CP	EP	AP	ES	CP	EP	AP	ES	CP
WEIGHT [kg]	CARBON STEEL		10,60	10,00	10,20	10,40	12,80	12,20	12,40	12,60	14,90	14,30	14,50	14,70	22,20	21,60	21,80	22,00
	STAINLESS TEEL																	
CODE	CARBON STEEL 2002-594.		0104	01041	01042	01043	0144	01441	01442	01443	0124	01241	01242	01243	0204	02041	02042	02043
	STAINLESS STEEL 2002-594.		0102	01021	01022	01023	0142	01421	01422	01423	0122	01221	01222	01223	0202	02021	02022	02023



EP **AP** **ES** **CP**

PRESSURES AND SPRING REGULATION RANGES						
DN1 x DN2			25 x 25	32 x 32	40 x 40	50 x 50
REGULATION PRESSURE [barg]	**MAXIMUM** (LIQUIDS AND GASES)	PN-160	95	95	95	95
	MAXIMUM (SATURATED STEAM)	PN-160	95	80	95	95
	MINIMUM	STEAM AND GASES	30	30	30	23
		LIQUIDS	38	38	38	30
SPRING REGULATION RANGES [barg]	23 to 32	CODE				56258
	30 to 40	CODE	**56211** 56390	**56227** 56390	**56243**	**56259**
	38 to 50	CODE	**56212** 56391	**56228** 56391	**56244**	**56260**
	48 to 62	CODE	**56213** 56391	**56229** 56391	**56245**	**56261**
	60 to 78	CODE	**56214** 56391	**56230**	**56246**	**56262**
	75 to 95	CODE	**56215** 56391	**56231**	**56247**	**56263**

—— Spring steel (EN-10270-1-SH). Maximum temperature for the models EP, ES and CP 250 °C / AP 400 °C.
—— Stainless steele (EN-1.4310).
▭ Vanadium chrome steel (EN-1.8159).

RECOMMENDED RANGES OF APPLICATION						
MODEL			EP	AP(1)	ES	CP(1)
FLUID		SATURATED STEAM	*	*		*
		GASES	*		*	
		LIQUIDS	*		*	
PERMISSIBLE BACK PRESSURE IN % OF SET PRESSURE	INTERNAL OR GENERATED	SATURATED STEAM GASES	15			
		LIQUIDS	—			
	EXTERNAL VARIABLE (1)	SATURATED STEAM	—			
		LIQUIDS	—			
	EXTERNAL CONSTANT (1) (2) (3)	SATURATED STEAM GASES	50			
		LIQUIDS	90			
% OVERPRESSURE		SATURATED STEAM GASES	10			
		LIQUIDS	25			

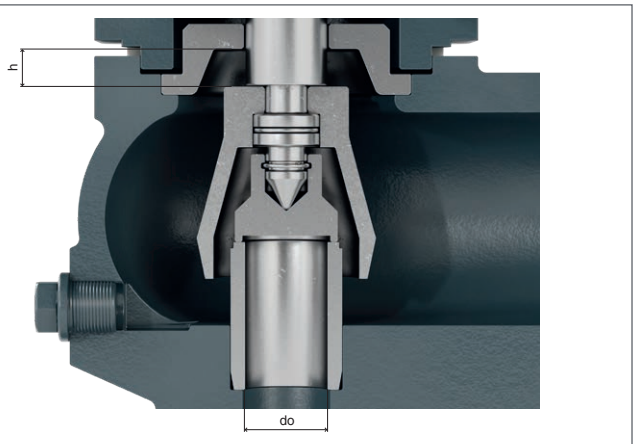
(1) If external backpressure exists, the AP and CP model cannot be used.
(2) With external constant backpressure, the spring is adjusted deducting the backpressure from the set pressure.
(3) If the set pressure <3 bar we must consider the total atmospheric pressure (1 bar) as external constant backpressure being freely released.

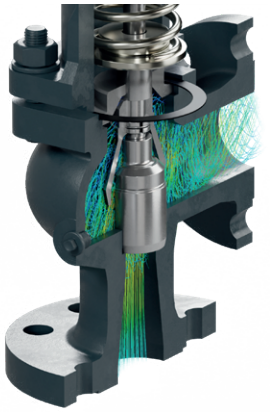
If pb >0,25 po we must limit plug speed with the consequent reduction of the Kdr coefficient of discharge. With the new reduced coefficient we determine the do, in order to remove the necessary volume.

pb = Backpressure permitted [bar] absolute. po = Set pressure [bar] absolute. Kdr = Coefficient of discharge.

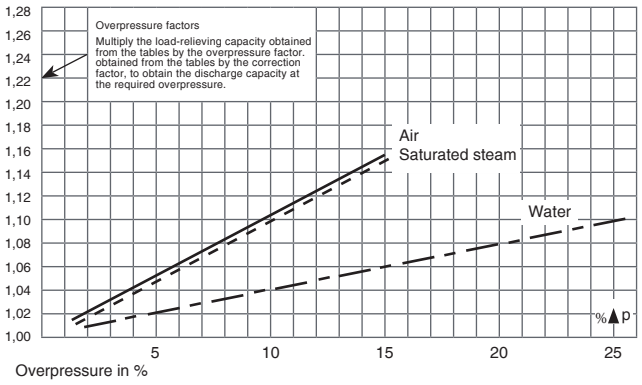
OPEN AND CLOSED PRESSURES IN % OF SET PRESSURE			
FLUID	PRESSURE [bar]	OPENING PRESSURE	CLOSING PRESSURE
SATURATED STEAM	< 3	+ 10 %	- 0,3 bar
GASES	≥ 3	+ 10 %	- 10 %
LIQUIDS	< 3	+ 10 %	- 0,6 bar
	≥3	+ 10 %	- 20 %

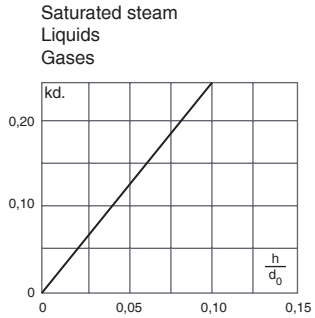
DISCHARGE COEFFICIENT				
DN1 x DN2	25 x 25	32 x 32	40 x 40	50 x 50
API ORIFICE	D-E	F	G	H
do [mm]	16	20	25	32
h [mm]	2,5	2,5	2,8	4
h/d0 [mm]	0,15	0,13	0,10	0,12
STEAM AND GASES [Kdr]	0,30			
LIQUIDS [Kdr]	0,30			

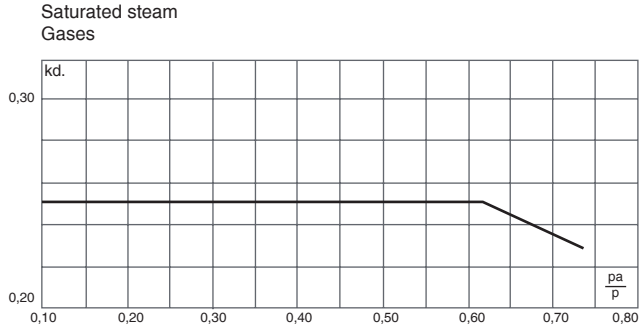




Fluid dynamics







DISCHARGE CAPACITIES												
DN1 x DN2	25 x 25			32 x 32			40 x 40			50 x 50		
d0 [mm]	16			20			25			32		
A0= $\frac{\pi \cdot d0^2}{4}$ [mm²]	201			314			491			804		
p [barg]	I	II	III	I	II	III	I	II	III	I	II	III
23,0										2465	3290	49093
24,0										2565	3427	50149
26,0										2768	3701	52197
28,0										2972	3975	54167
30,0	796	1062	14017	1243	1660	21902	1943	2593	34221	3175	4249	56068
32,0	846	1131	14477	1322	1767	22620	2066	2760	35344	3380	4523	57907
34,0	897	1199	14922	1402	1874	23316	2190	2928	36431	3584	4797	59689
36,0	948	1268	15355	1481	1981	23992	2314	3095	37487	3789	5071	61420
38,0	998	1336	15776	1560	2088	24649	2438	3262	38515	3995	5345	63103
40,0	1050	1405	16185	1640	2195	25290	2563	3430	39515	4200	5619	64742
42,0	1101	1473	16585	1720	2302	25914	2688	3597	40491	4406	5893	66341
44,0	1152	1542	16975	1800	2409	26524	2813	3764	41444	4612	6167	67902
46,0	1203	1610	17357	1880	2516	27120	2938	3931	42375	4818	6441	69428
48,0	1255	1679	17730	1961	2623	27704	3064	4098	43287	5026	6715	70921
50,0	1306	1747	18096	2041	2730	28275	3189	4266	44179	5234	6989	72384
52,0	1358	1816	18454	2122	2837	28835	3315	4433	45054	5443	7263	73817
54,0	1409	1884	18806	2202	2944	29384	3441	4600	45913	5651	7537	75223
56,0	1461	1953	19151	2284	3051	29923	3568	4767	46755	5860	7810	76604
58,0	1514	2021	19490	2365	3158	30453	3696	4934	47583	6070	8085	77960
60,0	1566	2090	19823	2447	3265	30974	3823	5102	48396	6280	8359	79292
62,0	1618	2158	20151	2529	3372	31486	3951	5269	49196	6490	8633	80603
64,0	1671	2227	20473	2610	3479	31989	4079	5436	49983	6701	8907	81893
66,0	1723	2295	20791	2692	3586	32485	4207	5603	50758	6913	9181	83162
68,0	1776	2364	21103	2774	3693	32974	4335	5771	51522	7127	9455	84413
70,0	1828	2432	21411	2857	3800	33455	4464	5938	52274	7341	9729	85645
72,0	1881	2501	21715	2940	3907	33930	4593	6105	53015	7555	10002	86860
74,0	1935	2569	22015	3023	4014	34398	4723	6272	53747	7770	10275	88059
76,0	1988	2638	22310	3107	4121	34860	4854	6440	54468	7986	10551	89241
78,0	2042	2706	22602	3196	4228	35315	4985	6607	55180	8203	10825	90407
80,0	2096	2775	22890	3275	4335	35765	5117	6774	55883	8421	11099	91559
82,0	2150	2843	23174		4442	36209	5248	6941	56577	8599	11373	926961
84,0	2204	2912	23455		4549	36648	5380	7108	57263	8815	11647	93820
86,0	2258	2980	23733		4656	37082	5514	7276	57941	9034	11921	94930
88,0	2313	3049	24007		4763	37511	5648	7443	58611	9253	12195	96028
90,0	2368	3117	24278		4870	37935	5782	7610	59273	9473	12469	97113
92,0	2423	3186	24546		4977	38354	5916	7777	59928	9693	12743	98186
94,0	2478	3254	24812		5085	38769	6051	7945	60576	9914	13017	99247
95,0	2508	3288	24943		5138	38974	6123	8028	60897	10030	13154	99774

I - Saturated steam [kg/h].

II - Air to 0 °C and 1.013 bar [Nm^3/h].

III - Water to 20 °C [l/h].

For other, not so dense liquids, other than water at 20 °C apply:

$$V_L = \sqrt{\frac{\varrho_A}{\varrho_L}} \cdot V_A \text{ Ó } V_A = V_L \cdot \sqrt{\frac{\varrho_L}{\varrho_A}}$$

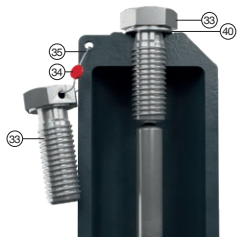
V_A = Water flow according to table.
V_L = Liquid flow.
ϱ_A = Water density at a 20 °C. (ϱ_A = 998 kg/m³)
ϱ_L = Liquid density.

ATTENTION: Flow rates according to UNE EN ISO 4126-7 with 10% overpressure.

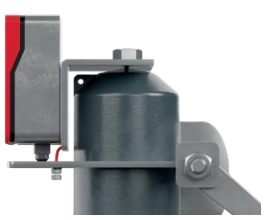
Depending on demand

1 - Locking screw that facilitates the hydrostatic test of the container to be protected.
2 - Opening/closing indicator electrical contact.
3 - Balancing bellows to:
- Protect the spring against environmental influences.
- Ensure the valve body is completely sealed to the outside.
- To level out the back pressure generated by others or by the valve itself.

4 - Possibility of manufacturing in other types of material, for special working conditions (high temperatures, fluids, etc.).
5 - Degreased and totally free of oils and greases, to work with oxygen, avoiding possible fire risks. (UV-Oxygen-VBG 62).
6 - Special springs for critical temperatures.



1 Locking screw



5 Open/Closed indicator

6 Balance bellows

33	Screw
34	Seal
35	Sealing whire
40	Joint

Specifications

— 90° angular flow.
— Activated by direct action helicoid spring.
— Simplicity of construction ensuring minimum maintenance.
— Materials carefully selected for their resistance to corrosion. With the exception of washers and couplings, the valves are free of non-ferric materials.
— Internal body designed to offer favourable flow profile.
— Sealing surfaces treated and balanced, making them extremely tightness, even exceeding EN 12266-1 requeriments.
— Great discharge capacity. For liquids typically used with openings similar to proportional safety valves.
— Equipped with draining screws for removing condensation.
— Auto-centering plug.
— Threaded shaft with lever positioner facilitating immediate manual action.
— Elevator, independent of the seal, designed facilitate sudden opening when the steam expands and, with any fluid, guarantees absolute opening and closing precision.
— All the valves are supplied sealed at the set pressure requested, simulating operational conditions, and are vigorously tested.
— All components are numbered, registered and checked. If requested in advance, material, casting, test and efficiency certificates will be enclosed with the valve, and the instruction manual, in accordance with P.E.D. 2014/68/EU.