Progressive opening safety relief valve. (AP)

Mod. 194 | EN

Operation

The valve works as an automatic pressure relief regulator acting by the static pressure at the valve inlet.

Specifications

Size

- DN-25 x 25 to DN-200 x 200

Temperature range

- -60 ˚C to +450 ˚C

Applications

- Gas, Steam and liquids

Materials

- Cast iron
- Nodular iron
- Carbon steel
- Stainless steel

Maximum pressure

- Up to 0,2 bar

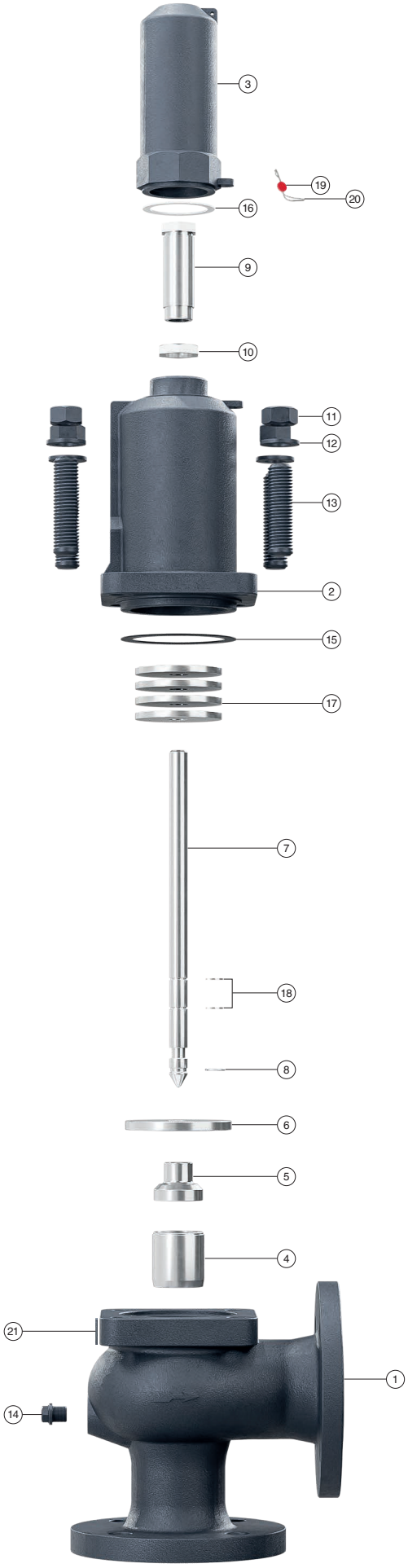
Regulation

- 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			
		CAST IRON	NODULAR IRON	CARBON STEEL	STAINLESS STEEL
1	Body	Cast iron (EN-5.1301)	Nodular iron (EN-5.3106)	Carbon steel (EN-1.0619+N)	Stainless steel (EN-1.4408)
2	Closed bell	Cast iron (EN-5.1301)	Nodular iron (EN-5.3106)	Nodular iron (EN-5.3106)	Stainless steel (EN-1.4408)
3	Hood	Nodular iron (EN-5.3106)	Nodular iron (EN-5.3106)	Nodular iron (EN-5.3106)	Stainless steel (EN-1.4408)
4	Seating	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4542)
5	Plug	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4542)
6	Guide	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
7	Rod	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4028)	Stainless steel (EN-1.4401)
8	Safety ring	Stainless steel (EN-1.4310)	Stainless steel (EN-1.4310)	Stainless steel (EN-1.4310)	Stainless steel (EN-1.4310)
9	Hollow screw	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)
10	Hollow screw nut	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)	Stainless steel (EN-1.4305)
11	Nut	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.4401)
12	Washer	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.1141)	Carbon steel (EN-1.4401)
13	Stud	Carbon steel (EN-1.1181)	Carbon steel (EN-1.1181)	Carbon steel (EN-1.1181)	Carbon steel (EN-1.4401)
14	Cap	Carbon steel (EN-1.1181)	Carbon steel (EN-1.1181)	Carbon steel (EN-1.1181)	Carbon steel (EN-1.4401)
15	Body coupling	Graphite	Graphite	Graphite	PTFE (Teflon)
16	Hood coupling	PTFE (Teflon)	PTFE (Teflon)	PTFE (Teflon)	PTFE (Teflon)
17	Calibration disc	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
18	Clip	Stainless steel (EN-1.4568)	Stainless steel (EN-1.4568)	Stainless steel (EN-1.4568)	Stainless steel (EN-1.4568)
19	Seal	Plastic	Plastic	Plastic	Plastic
20	Sealing whire	Sealing whire	Sealing whire	Sealing whire	Sealing whire
21	Characteristic plate	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)	Stainless steel (EN-1.4301)
DN1 x DN2		20 x 25 to 200 x 200			
PN		16	40	40	40
OPERATING CONDITIONS	PRESSURE [bar]	0,2			
	MAX. TEMP. [°C]	300	350	450	400
	MIN. TEMP. [°C]	-10	-10	-10	-60

Isometric view

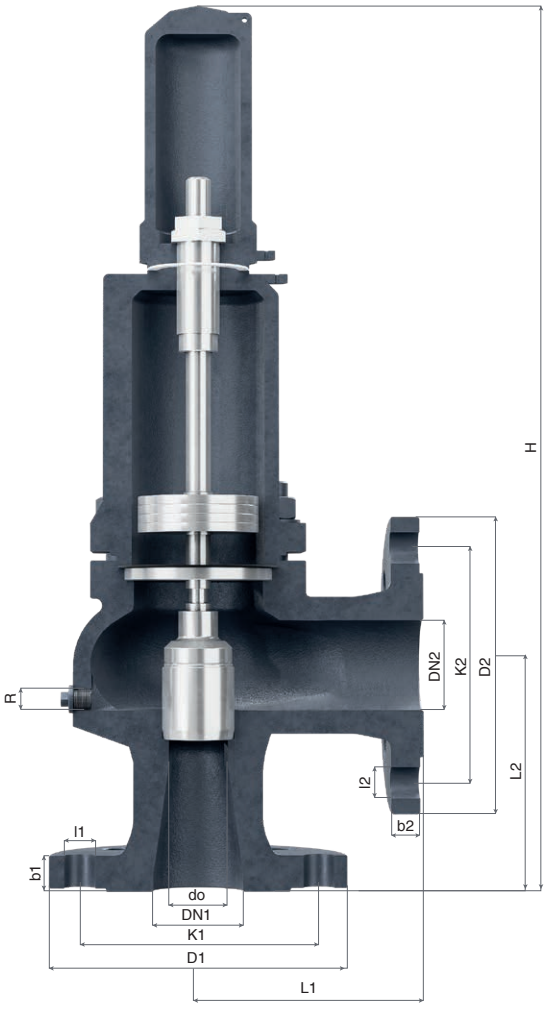


Esploded view

		DN1 x DN2	25 x 25	32 x 32	40 x 40	50 x 50	65 x 65	80 x 80	100 x 100	125 x 125	150 x 150	200 x 200
		do	16	20	25	32	40	50	63	77	93	110
		Ao = $\frac{\pi \cdot do^2}{4}$ [mm^2]	201	314	491	804	1257	1964	3117	4657	6793	9503
		H [mm]	350	390	420	495	550	655	705	810	850	990
		L1 [mm]	100	105	115	125	145	155	175	200	225	250
		L2 [mm]	100	105	115	125	145	155	175	200	225	250
		R [mm]	1/4"	1/4"	1/4"	1/4"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"
		Whitworth gas-tight cylindrical female thread ISO 228/1 (DIN-259)										
INLET FLANGE	PN-10/16 EN-1092-2 (2)	D1 [mm]	115	140	150	165	185	200	220	250	285	340
		K1 [mm]	85	100	110	125	145	160	180	210	240	295
		l1 [mm]	14	19	19	19	19	19	19	19	23	23
		b1 [mm]	16	18	18	20	20	22	24	26	26	26
		SCREWS N°	4	4	4	4	4	8	8	8	8	8
	PN-25/40 EN-1092-2 (3) PN-25/40 EN-1092-1	D1 [mm]	115	140	150	165	185	200	235	270	300	360
		K1 [mm]	85	100	110	125	145	160	190	220	250	310
		l1 [mm]	14	19(18)*	19(18)*	19(18)*	19(18)*	19(18)*	23(22)*	28(26)*	28(26)*	28(26)*
		b1 [mm]	18(16)•	18	18(20)•	20	22	24	24	26	28	30
		SCREWS N°	4	4	4	4	8	8	8	8	8	12
OUTLET FLANGE	PN-10/16 EN-1092-2 (1) PN-25/40 EN-1092-1	D2 [mm]	115	140	150	165	185	200	220	250	285	340
		K2 [mm]	85	100	110	125	145	160	180	210	240	295
		l2 [mm]	14	19	19	19	19	19	19	19	23	23
		b2 [mm]	16	18	18	20	20	22	24	26	26	26
		SCREWS N°	4	4	4	4	4	8	8	8	8	8
		MODEL	ES									
WEIGHT [kgs.]		CAST IRON	6,8	8,7	11,5	16,9	22,3	33,1	41,4	69,8	80,5	122,7
		NODULAR IRON	6,8	8,6	11,4	16,8	22,1	32,9	41,7	70,3	81,0	123,2
		CARBON STEEL	7,4	9,4	12,5	18,3	24,2	35,3	45,6	76,3	87,7	134,5
		STAINLESS STEEL	7,5	9,5	12,7	18,6	24,5	35,6	46,1	77,2	88,7	136,0
CODE		CAST IRON 2002-194.	51062	51462	51262	52062	52262	53062	54062	55062	56062	58062
		NODULAR IRON 2002-194.	81062	81462	81262	82062	82262	83062	84062	85062	86062	88062
		CARBON STEEL 2002-194.	81042	81442	81242	82042	82242	83042	84042	85042	86042	88042
		STAINLESS STEEL 2002-194.	81022	81422	81222	82022	82222	83022	84022	85022	86022	88022

(1) From DN-125x200 PN-10.
(2) DN-200x300 PN-10.
(3) DN-200x300 PN-25.

* Carbon steel (EN-1.0619) and Stainless steel (EN-1.4408).
• Nodular iron (EN-5.3106).



SET PRESSURE												
DN1 x DN2			25 x 25	32 x 32	40 x 40	50 x 50	65 x 65	80 x 80	100 x 100	125 x 125	150 x 150	200 x 200
SET PRESSURE [bar g]	**MAXIMUM** (LIQUIDS AND GASES)	PN-16	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
		PN-40	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	MAXIMUM (SATURATED STEAM)	PN-16	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
		PN-40	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	MINIMUM	STEAM AND GASES	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
		LIQUIDS	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05

RECOMMENDED RANGES OF APPLICATION			
MODEL			ES
FLUID		SATURATED STEAM	
		GASES	*
		LIQUIDS	*
PERMISSIBLE BACK PRESSURE IN % OF SET PRESSURE	INTERNAL OR GENERATED	SATURATED STEAM GASES	15
		LIQUIDS	—
	EXTERNAL CONSTANT (2) (3)	SATURATED STEAM GASES	50
		LIQUIDS	90

OPENING, OVERPRESSURE AND RESET PRESSURES			
FLUID	OPENING PRESSURE	OVERPRESSURE	RESET PRESSURE
SATURATED STEAM AND GASES	The higher of ± 3% or ± 0,1 bar	The higher of +10% o +0,1 bar	The higher of -15% o -0,3 bar
LIQUIDS	The higher of ± 3% o ± 0,1 bar	The higher of +10% o +0,1 bar	The higher of -20% o -0,6 bar

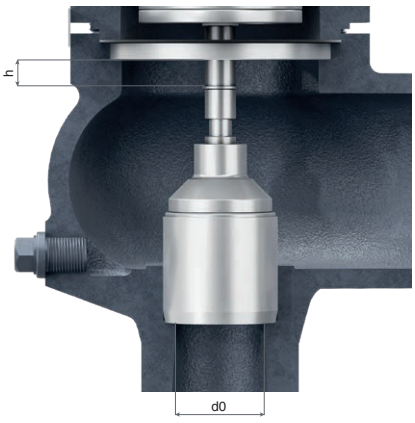
(1) With external constant backpressure, the spring is adjusted deducting the backpressure from the set pressure.

(2) 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 ad coefficient of discharge Kdr.
With the new reduced coefficient we determine the do, in order to remove the necessary volume.

pa = Backpressure permitted (bar) absolute.
po = Set pressure (bar) absolute.
Kdr = Discharge coefficients.

DISCHARGE COEFFICIENTS											
DN1 x DN2		25 x 25	32 x 32	40 x 40	50 x 50	65 x 65	80 x 80	100 x 100	125 x 125	150 x 150	200 x 200
do [mm]		16	20	25	32	40	50	63	77	93	110
h [mm]		2	2	2,5	3,5	5,3	5	6,5	8	9,5	11
h/do [mm]		0,13	0,10	0,10	0,11	0,13	0,10	0,10	0,10	0,10	0,10
DISCHARGE COEFFICIENT [kdr]	SATURATED STEAM GASES	0,30									
	LIQUIDS	0,30									



DN1 x DN2	25 x 25			32 x 32		
d0 [mm]	16			20		
A0= $\frac{\pi \cdot do^2}{4}$ [mm2]	201			314		
p [bar g]	I	II	III	I	II	III
0,05	32	29	992	50	45	1550
0,06	32	30	1025	50	46	1601
0,07	32	31	1056	50	48	1650
0,08	32	31	1087	50	49	1698
0,09	32	32	1117	51	50	1745
0,10	32	33	1146	51	52	1790
0,11	33	34	1174	51	53	1834
0,12	33	35	1202	51	54	1877
0,13	33	35	1229	51	55	1920
0,14	33	36	1255	52	57	1961
0,15	33	37	1281	52	58	2001
0,16	33	38	1306	52	59	2041
0,17	33	38	1331	52	60	2080
0,18	34	39	1356	52	61	2118
0,19	34	40	1380	53	62	2156
0,20	37	40	1403	57	63	2192

I - Saturated steam in kg/h.

II - Air at 0°C and 1,013 bar in [Nm^3/h].

III - Water at 20°C in l/h.

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

DISCHARGE CAPACITY

DN1 x DN2	40 x 40			50 x 50			65 x 65			80 x 80			100 x 100			125 x 125			150 x 150			200 x 200		
d0 [mm]	25			32			40			50			63			77			93			110		
A0= $\frac{\pi \cdot do^2}{4}$ [mm2]	491			804			1257			1963			3117			4657			6793			9503		
p [bar g]	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
0,05	78	70	2422	127	115	3969	199	179	6201	310	280	9689	493	445	15382	736	665	22978	1074	970	33520	1502	1356	46894
0,06	78	72	2502	128	119	4099	199	185	6404	312	289	10007	495	459	15887	739	686	23732	1078	1001	34619	1509	1400	48432
0,07	78	75	2579	128	122	4225	200	191	6601	313	298	10315	497	473	16376	742	707	24462	1083	1031	35685	1515	1443	49923
0,08	79	77	2653	129	126	4347	201	196	6793	314	307	10614	499	487	16850	746	727	25171	1088	1061	36719	1521	1484	51370
0,09	79	79	2726	129	129	4466	202	202	6979	316	315	10905	501	500	17312	749	747	25861	1092	1090	37725	1528	1524	52778
0,10	79	81	2797	130	132	4583	203	207	7160	317	323	11188	503	513	17762	752	766	26533	1097	1118	38705	1534	1563	54149
0,11	80	83	2866	130	136	4696	204	212	7337	318	331	11464	505	525	18200	755	785	27188	1101	1145	39661	1541	1602	55486
0,12	80	85	2933	131	139	4806	205	217	7510	320	339	11734	507	537	18629	758	803	27828	1106	1171	40595	1547	1639	56792
0,13	80	87	2999	131	142	4914	205	221	7678	321	346	11998	510	549	19047	761	821	28454	1110	1197	41507	1553	1675	58068
0,14	81	88	3064	132	145	5020	206	226	7844	322	353	12256	512	561	19457	764	838	29065	1115	1222	42400	1560	1710	59317
0,15	81	90	3127	133	148	5123	207	231	8005	324	361	12508	514	572	19858	767	855	29665	1119	1247	43274	1566	1745	60540
0,16	81	92	3189	133	151	5225	208	235	8164	325	368	12756	516	583	20252	770	872	30252	1124	1272	44131	1572	1779	61739
0,17	82	94	3250	134	153	5324	209	240	8319	326	374	12999	518	594	20637	773	888	30829	1128	1295	44972	1578	1812	62916
0,18	82	95	3309	134	156	5422	210	244	8472	327	381	13238	520	605	21016	776	904	31394	1133	1319	45797	1585	1845	64070
0,19	82	97	3368	135	159	5518	210	248	8622	329	388	13472	522	616	21388	779	920	31950	1137	1341	46607	1591	1877	65204
0,20	90	99	3426	147	161	5612	230	252	8769	359	394	13702	570	626	21754	851	935	32496	1241	1364	47404	1737	1908	66319

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 20 °C.
(ϱ_A =998 kg/m³)
ϱ_L = Liquid density

Depending on demand

1.- Totally free of oil and grease, to work with oxygen, avoiding possible fire risks (UV-Oxygen-VBG 62).

Specifications

— 90° angular flow.
— Activated by a system of weights.
— 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 API-527 requeriments.
— Great discharge capacity.
— Equipped with draining screws for removing condensation.
— Auto-centering plug.
— 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.

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