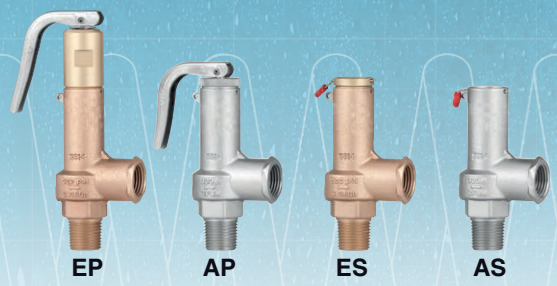
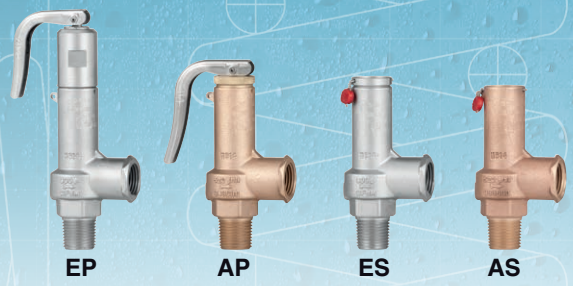
Full lift safety valve with spring loading. (AIT)

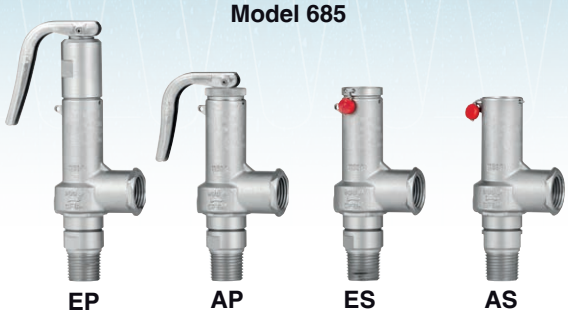
Mod. 685 - 885 - 985 - 694 | ASME | SI



Model 685



Model 885



Model 985

Model 694

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 instantly and totally.

Regulation

- ASME VIII Div.1.
- ASME II
- ASTM
- ASME B1.20.1

Specifications

Size

- 3/8" x 1/2" to 1" x 1" (685 - 885)
- 3/8" x 1/2" to 1/2" x 1/2" (985)
- 10 x 15 to 25 x 25 (694)

Temperature range

- -196 °C to +260 °C

Applications

- Gas, steam and liquids.

Materials

- Bronze
- Stainless steel

Maximum pressure

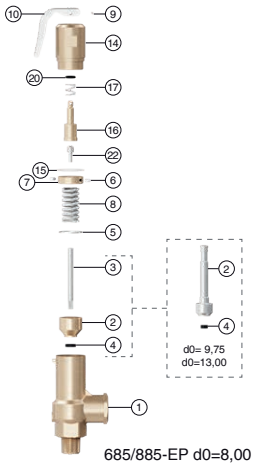
- Up to 144 bar

Certification

N.º PIECE	PIECE	MATERIAL	
		BRONZE	STAINLESS STEEL
1	Body	Bronze (EN-CC491K)	S. steel (EN-1.4408)
2	Plug	Brass (EN-CW617N)	S. steel (EN-1.4401)
3	Shaft	S. steel (EN-1.4305)	S. steel (EN-1.4305)
4	Seal	Silicone's rubber	Silicone's rubber
		Fluorelastomer (Viton)	Fluorelastomer (Viton)
		PTFE (Teflon)	PTFE (Teflon)
		Perfluorelastomer (FFKM)	Perfluorelastomer (FFKM)
5	Limiter ring	S. steel (EN-1.4310)	S. steel (EN-1.4310)
6	End-stop	PTFE (Teflon)	PTFE (Teflon)
7	Spring press	Brass (EN-CW617N)	S. steel (EN-1.4305)
8	Spring	S. steel (EN-1.4310)	S. steel (EN-1.4310)
9	Clip	S. steel (EN-1.4310)	S. steel (EN-1.4310)
10	Lever	S. steel (EN-1.4301)	S. steel (EN-1.4301)
11	Sealing wire	Sealing wire	Sealing wire
12	Characteristic plate	Aluminium	Aluminium
13	Seal	Plastic	Plastic
14	Cap	Brass (EN-CW617N)	S. steel (EN-1.4305)
15	Hood coupling	PTFE (Teflón)	PTFE (Teflón)
16	Piston	Latón (EN-CW617N)	S. steel (EN-1.4305)
17	Piston Spring	S. steel (EN-1.4310)	S. steel (EN-1.4310)
18	Inlet clamp	-	S. steel (EN-1.4404)
19	Outlet clamp	-	S. steel (EN-1.4404)
20	O-ring	Fluorelastomer (Viton) (1)	Fluorelastomer (Viton) (1)
21	Seat	-	S. steel (EN-1.4401)
22	Screw cap	S. steel (EN-1.4305)	S. steel (EN-1.4305)

MODEL				
685		MNPT1 x FNPT2	3/8" x 1/2" to 1" x 1"	
		PS	36	36
	OPERATING CONDITIONS	PRESSURE [bar]	36	36
		MAXIMUM TEMPERATURE [ºC]	200	250
		MINIMUM TEMPERATURE [ºC]	-10	-60
885		MNPT1 x FNPT2	3/8" x 1/2" to 1" x 1"	
		PS	36	36
	OPERATING CONDITIONS	PRESSURE [bar]	36	36
		MAXIMUM TEMPERATURE [ºC]	60	60
		MINIMUM TEMPERATURE [ºC]	-10	-196
985		MNPT1 x FNPT2	3/8" x 1/2" to 1/2" x 1/2"	
		PS		144
	OPERATING CONDITIONS	PRESSURE [bar]	-	144
		MAXIMUM TEMPERATURE [ºC]	-	250
		MINIMUM TEMPERATURE [ºC]	-	-60
694		DN1 x DN2	10 x 15 to 25 x 25	
		PN	-	16
	OPERATING CONDITIONS	PRESSURE [bar]	-	16
		MAXIMUM TEMPERATURE [ºC]	-	260
		MINIMUM TEMPERATURE [ºC]	-	-60

(1) Mod. 895; Perfluorelastomer (FFKM)



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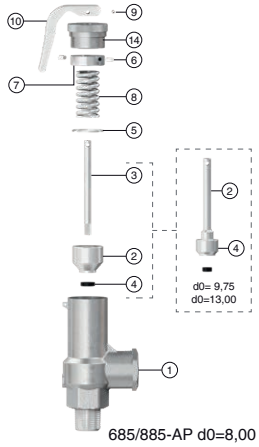

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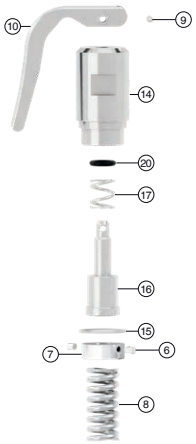
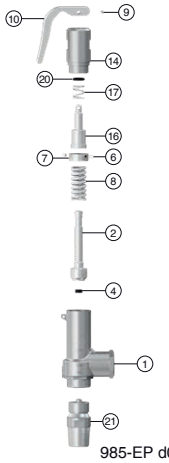

694-EP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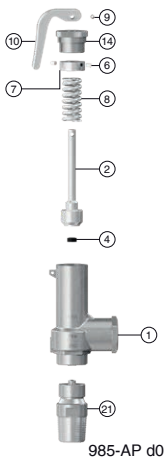
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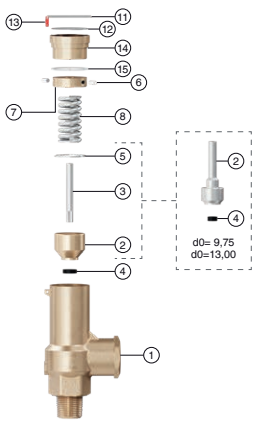

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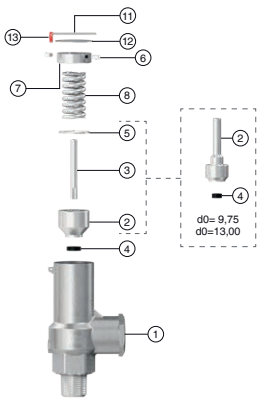

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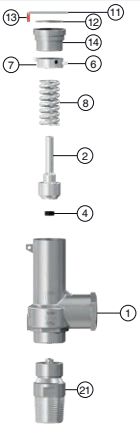
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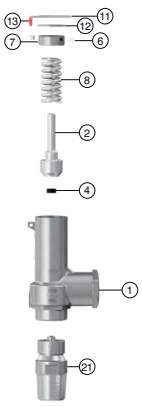
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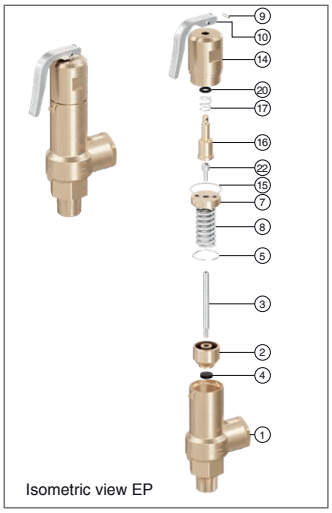


Isometric view EP

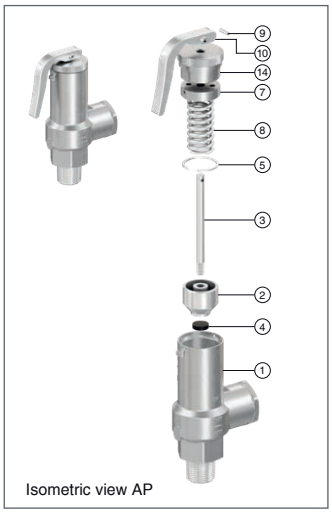
Full lift safety valve with spring loading (AIT) version EP.

1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers.
B - Withdraw the fastener (9), using a punching tool, until the lever (10) comes free.
C - Unscrew and extract the hood (14).
D - Unscrew the piston (16) from the rod (3) and then the screw cap (22).
E - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
F - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3) and the screw cap (22).
C - Adjust the set pressure with the spring press (7).
D - Screw the piston (16) to the rod (3).
E - Screw the hood (14).
F - Place the lever (10) and fix it with the fastener (9).

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C, 1.1.D, 1.1.E.
B - Proceed according to points 1.2.C, 1.2.D, 1.1.E, 1.1.F.



Isometric view AP

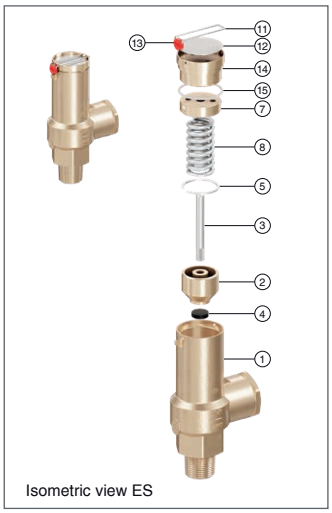
Full lift safety valve with spring loading (AIT) version AP.

1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers.
B - Withdraw the clip (9), using a punching tool, until the lever (10) comes free.
C - Unscrew and extract the hood (14).
D - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
E - Extract the spring (8).1.2 Assembly

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).
D - Screw the hood (14).
E - Place the lever (10) and fix it with the fastener (9)

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C, 1.1.D.
B - Proceed according to points 1.2.C, 1.2.D, 1.1.E.



Isometric view ES

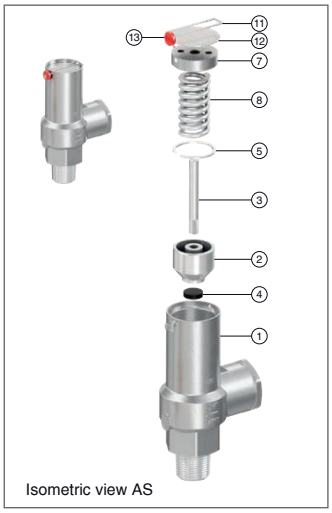
Full lift safety valve with spring loading (AIT) version ES.

1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers and extract the characteristic plate (12).
B - Unscrew and extract the hood (14).
C - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
D - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).
D - Screw the hood (14).

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C.
B - Proceed according to points 1.2.C, 1.2.D..



Isometric view AS

Full lift safety valve with spring loading (AIT) version AS.

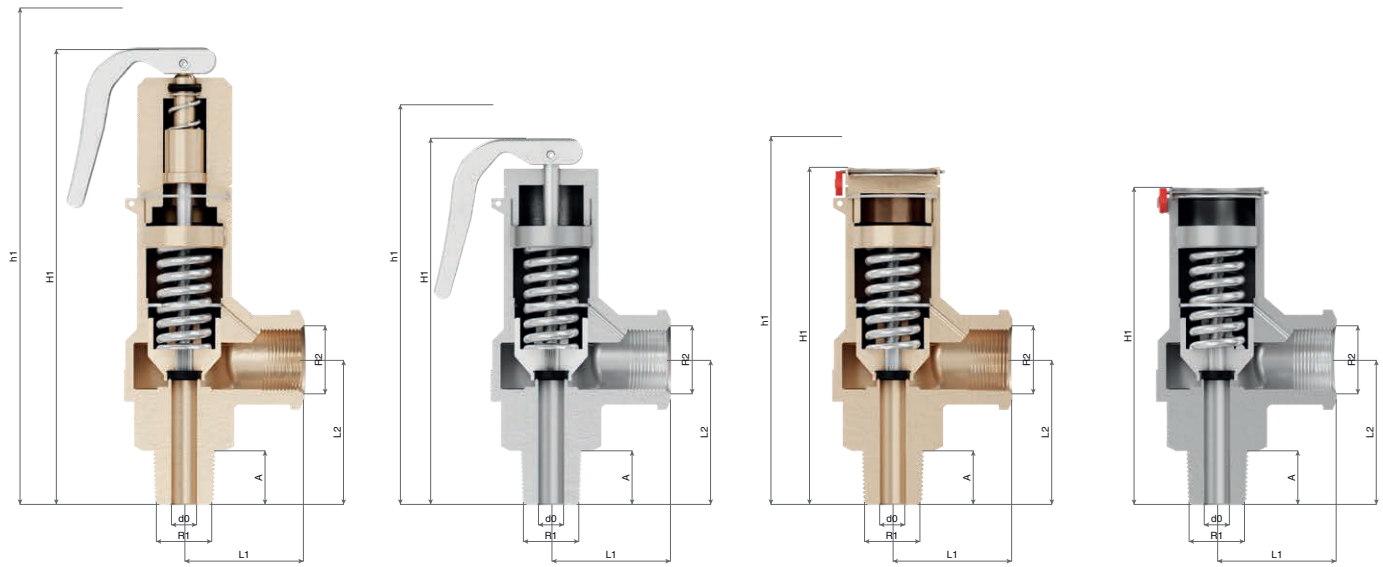
1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers and extract the characteristic plate (12).
B - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
C - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B.
B - Proceed according to points 1.2.C.

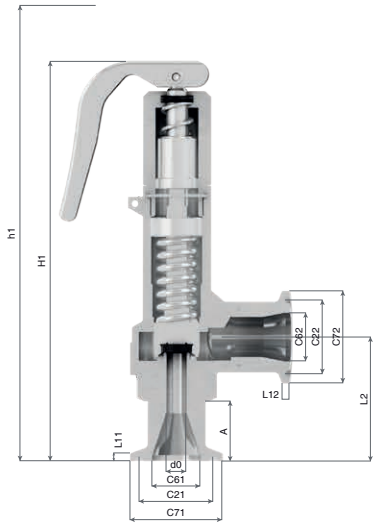
MODEL 685/885/985												
MNPT1 x FNPT2		3/8" x 1/2"				1/2" x 1/2"				1/2" x 3/4"		
CONNECTIONS		Male thread x Female thread NPT ASME B1.20.1										
MODEL 694												
DN1 x DN2		10 x 15				15 x 15				15 x 20		
CONNECTIONS		CLAMP ISO 2852:1993										
d0 [mm]	694/685/885	7,87								9,65		
	985	4,06										
Ao: $\frac{\pi \cdot d0^2}{4}$ ["2]	694/685/885	2,03								3,05		
	985	0,51										
H [mm]	685/885	-	-	-	94,23	-	-	-	98,81	-	-	
	985	-	-	-	105,16	-	-	-	109,73			
	694	-	-	-	101,09	-	-	-	101,09	-	-	
H1 [mm]	685/885	145,29	108,20	99,31	-	146,81	112,78	103,89	-	171,96	134,87	
	985	153,16	119,13	103,89	-	157,73	123,95	114,81	-			
	694	149,10	114,81	106,68	-	149,10	114,81	106,68	-	176,02	138,94	
h1 [mm]	685/885	154,18	125,22	115,32	-	158,75	129,79	119,89	-	185,93	149,86	
	985	165,35	136,14	126,24	-	169,93	140,97	130,81	-			
	694	161,04	132,08	121,92	-	161,04	132,08	121,92	-	190,50	153,92	
A [mm]	685/885/985	15,24				19,81				19,81		
	694	22,10								23,88		
L1 [mm]	685/885/985	36,07								43,94		
	694	41,40								58,42		
L2 [mm]	685/885	38,86				43,43				45,47		
	985	49,78				54,36						
	694	45,72								56,64		
INLET FLANGE PN-16 CLAMP ISO 2852:1993	C61	13,97				18,03				18,03		
	C71	34,04								34,04		
	C21	27,43								27,43		
	L11	2,79								2,79		
OUTLET FLANGE PN-16 CLAMP ISO 2852:1993	C62	18,03								23,62		
	C72	34,04								50,80		
	C22	27,43								43,43		
	L12	2,79								2,79		
WEIGHT [kg]		EP	AP	ES	AS	EP	AP	ES	AS	EP	AP	
685/885/985	BRONZE	0,47	0,38	0,36	0,34	0,47	0,38	0,36	0,34	0,97	0,74	
	STAINLESS STEEL	0,45	0,36	0,34	0,32	0,45	0,36	0,34	0,32	0,95	0,72	
694	STAINLESS STEEL	0,50	0,41	0,39	0,37	0,50	0,41	0,39	0,37	1,06	0,83	
CODE 685	BRONZE 2002-685.	83810	838110	838120	838130	80210	802110	802120	802130	80211	802111	
	STAINLESS STEEL 2002-685.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211	
885	BRONZE 2002-885.	83810	838110	838120	838130	80210	802110	802120	802130	80211	802111	
	STAINLESS STEEL 2002-885.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211	
985	STAINLESS STEEL 2002-985.	03820	03821	03822	03823	00220	00221	00222	00223			
694	STAINLESS STEEL 2002-694.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211	



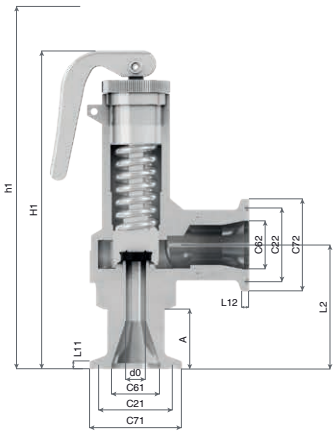
EP **AP** **ES** **AS**

Model 685/885/985

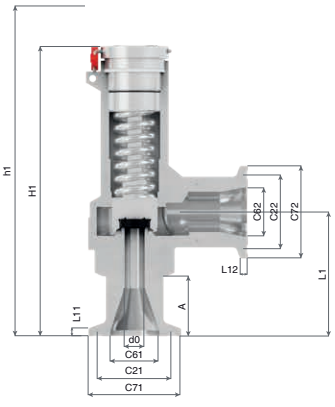
MODEL 685/885/985														
1/2" x 3/4"		3/4" x 3/4"				3/4" x 1"				1" x 1"				
Male thread x Female thread NPT ASME B1.20.1														
MODEL 694														
15 x 20		20 x 20				20 x 25				25 x 25				
CLAMP ISO 2852:1993														
9,65						12,95								
3,05						5,33								
-	116,84	-	-	-	117,09	-	-	-	143,26	-	-	-	146,05	
-	120,90	-	-	-	120,90	-	-	-	147,83	-	-	-	147,83	
123,95	-	162,05	135,13	124,21	-	201,17	164,08	152,15	-	204,22	167,13	155,19	-	
127,76	-	175,77	138,94	127,76	-	205,99	168,91	156,97	-	205,99	168,91	156,97	-	
141,73	-	186,18	150,11	142,24	-	215,14	179,07	170,18	-	218,19	152,15	173,23	-	
145,80	-	189,99	153,92	145,80	-	219,96	183,90	174,75	-	219,96	153,92	174,75	-	
503,17		509,78				509,78				632,21				
23,88						24,89								
43,94						59,94								
51,82						66,80								
45,47		48,51				58,42				61,47				
57,40						68,33								
18,03		23,62				23,62				29,72				
33,78		30,48				30,48								
27,43		43,43				43,43								
2,79						2,79								
23,62						29,72								
30,48						30,48								
43,43						43,43								
2,79						2,79								
ES	AS	EP	AP	ES	AS	EP	AP	ES	AS	EP	AP	ES	AS	
0,72	0,70	0,97	0,74	0,72	0,70	1,67	1,35	1,33	1,31	3,68	2,98	2,93	2,89	
0,70	0,68	0,95	0,72	0,70	0,68	1,65	1,33	1,31	1,29	3,64	2,93	2,89	2,84	
0,81	0,79	1,10	0,87	0,85	0,83	1,74	1,52	1,50	1,48	2,25	3,97	3,92	3,88	
802121	802131	83410	834110	834120	834130	83411	834111	834121	834131	81010	810110	810120	810130	
802221	802231	83420	834210	834220	834230	83421	834211	834221	834231	81020	810210	810220	810230	
802121	802131	83410	834110	834120	834130	83411	834111	834121	834131	81010	810110	810120	810130	
802221	802231	83420	834210	834220	834230	83421	834211	834221	834231	81020	810210	810220	810230	
802221	802231	83420	834210	834220	834230	83421	834211	834221	834231	81020	810210	810220	810230	



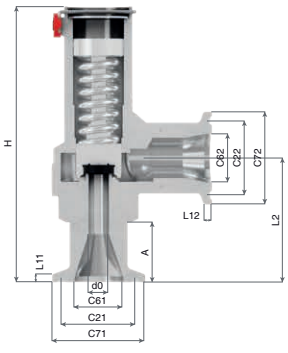
EP



AP



ES

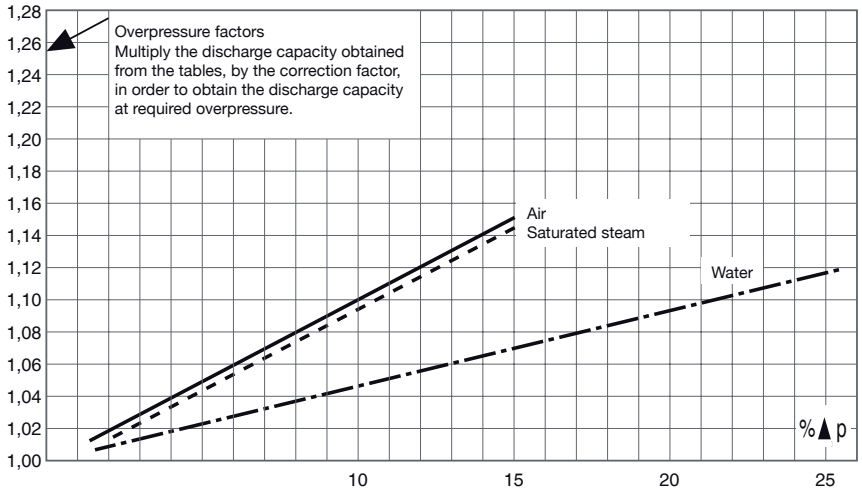


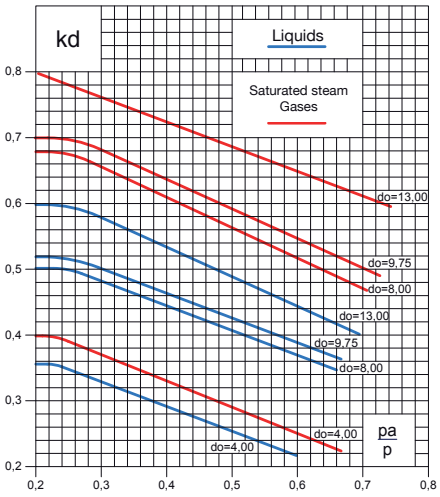
AS

Model 694

SET PRESSURES AND REGULATING RANGES										
MODEL				685/885/985/694						
ENTRY CONNECTION	685/885/985		MNPT1	3/8”	1/2”	1/2”	3/4”	3/4”	1”	
	694		DN1	10	15	15	20	20	25	
EXIT CONNECTION	685/885/985		FNPT2	1/2”		3/4”		1”		
	694		DN2	15		20		25		
d0 [mm]	685/885/694			8,00		9,75		13,00		
	985			4,00		-				
SET PRESSURE [bar]	MAXIMUM	685/885	PS 36 bar	36		36		36		
		985	PS 144 bar	144		-				
		694	PN-16	16		16		16		
	MINIMUM	685/885	PS 36 bar	0,2		0,2		0,2		
		985	PS 144 bar	36,1		-				
		694	PN-16	0,2		0,2		0,2		
SPRING REGULATING RANGE [bar]	685/885/694	985	-							
	0,20 to 0,70	-	CODE	56160		56169		56178		
	0,60 to 1,60		CODE	56161		56170		56179		
	1,50 to 3,50		CODE	56162		56171		56180		
	3,40 to 5,50		CODE	56163		56172		56181		
	5,40 to 10,00	36,10 to 40,00	CODE	56164-56334		56173		56182		
	9,80 to 15,00	39,00 to 60,00	CODE	56165-56335		56174		56183		
	14,50 to 20,00	58,00 to 80,00	CODE	56166-56336		56175		56184		
	19,00 to 25,00	76,00 to 100,00	CODE	56167-56337		56176		56185		
	24,00 to 36,00	96,00 to 144,00	CODE	56168-56338		56177		56186		

RECOMMENDED RANGES OF APPLICATION						
MODEL			685/885/985/694			
			AP	**AS**	**EP**	**ES**
FLUID	SATURATED STEAM		*	*	*	*
	GASES	INERT	*	*	*	*
		NON INERT			*	*
	LIQUIDS				*	*
OPENING PRESSURE IN % OF THE SET PRESSURE			+10%			
CLOSURE PRESSURE IN % OF THE SET PRESSURE			-10%			





DISCHARGE CAPACITY

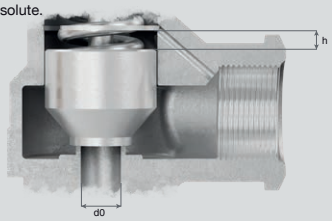
MODEL		685/885									985		
ENTRY CONNECTION	MNPT1	3/8"		1/2"		1/2"		3/4"		3/4"	1"	3/8"	1/2"
EXIT CONNECTION	FNPT2	1/2"			3/4"			1"				1/2"	
MODEL		694											
ENTRY CONNECTION	DN1	10		15		15		20		20	25	-	
EXIT CONNECTION	DN2	15			20			25					
do		8,00			9,75			13,00				4,00	
$A0=\frac{\pi \cdot do^2}{4}$ [^{m2}]		50,26			74,66			132,73				12,57	
p [bar]		I	II	III	I	II	III	I	II	III	I	II	III
0,5		31	41	1091	46	61	1621	94	125	2881			
1,0		39	53	1428	60	79	2122	121	162	3772			
1,5		48	65	1700	73	97	2526	149	198	4490			
2,0		57	77	1934	87	115	2873	176	235	5108			
2,5		67	90	2162	101	135	3212	206	275	5711			
3,0		77	103	2369	116	155	3519	237	316	6256			
3,5		87	116	2559	131	175	3801	267	356	6757			
4,0		97	129	2735	146	195	4063	297	397	7223			
4,5		107	142	2901	161	215	4310	328	437	7662			
5,0		117	156	3058	176	235	4543	358	478	8076			
6,0		136	182	3350	206	274	4976	418	558	8847			
7,0		156	208	3618	235	314	5375	479	639	9556			
8,0		176	235	3868	265	354	5746	539	720	10215			
9,0		196	261	4103	295	393	6095	600	801	10835			
10,0		215	287	4325	325	433	6424	661	882	11421			
12,0		255	340	4738	384	513	7038	782	1043	12511			
14,0		294	393	5117	444	592	7601	903	1205	13514			
16,0		334	445	5470	503	671	8126	1024	1366	14447			
18,0		373	498	5802	563	751	8619	1145	1528	15323			
20,0		413	551	6116	622	830	9085	1266	1690	16152			
22,0		452	603	6415	682	910	9529	1387	1851	16940			
24,0		492	656	6700	741	989	9953	1508	2013	17694			
26,0		531	709	6973	801	1068	10359	1629	2175	18416			
28,0		571	761	7237	860	1148	10750	1751	2336	19111			
30,0		610	814	7491	920	1227	11127	1872	2498	19782			
32,0		650	867	7736	979	1307	11492	1993	2659	20431			
34,0		689	919	7974	1039	1386	11846	2114	2821	21060			
36,0		728	972	8206	1098	1465	12189	2235	2983	21670			
38,0											113	151	1446
40,0											119	158	1483
42,0											124	166	1520
44,0											130	174	1556
46,0											136	182	1591
48,0												189	1625
50,0												197	1658
52,0												205	1691
54,0												213	1724
56,0												220	1755
58,0												228	1786
60,0												236	1553
62,0												244	1847
64,0												251	1876
66,0												259	1905
68,0												267	1934
70,0												275	1962
72,0												282	1990
74,0												290	2018
76,0												298	2045
78,0												306	2071
80,0												313	2098
82,0												321	2124
84,0												329	2150
86,0												336	2175
88,0												344	2200
90,0												352	2200
92,0												360	2250
94,0												367	2274
96,0												375	2298
98,0												383	2322
100,0												391	2345
105,0												410	2403
110,0												429	2460
115,0												449	2515
120,0												468	2569
125,0												437	2622
130,0												507	2674
135,0												526	2725
140,0												546	2775
145,0												565	2824

COEFFICIENT OF DISCHARGE

MODEL			685/885/985					
ENTRY CONNECTION	685/885/985	R1	3/8"	1/2"	1/2"	3/4"	3/4"	1"
	694	DN1	10	15	15	20	20	25
EXIT CONNECTION	685/885/985	R2	1/2"		3/4"		1"	
	694	DN2	15		20		25	
d0	685/885/694		8,00		9,75		13,00	
	985		4,00					
h			2,50		4,00		5,50	
h/d0	685/885/694		0,31		0,41		0,42	
	985		0,62					
COEFFICIENT OF DISCHARGE kd (1)	685/885/694	SATURATED STEAM GASES	0,68		0,69		0,79	
	985		0,40					
	685/885/694	LIQUIDS	0,51		0,52		0,60	
	985		0,35					

1) For set pressures less than 3 bar see grapf of discharge coefficient.

pa = Backpressure permitted [bar] absolute.
p = Set pressure [bar] absolute.
αd = Coefficient of discharge.



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/m^3)
ϱ_L = Liquid density.

ATTENTION: Flow rates according to ASME VIII Div.1/API 520 with 10% overpressure.

Características

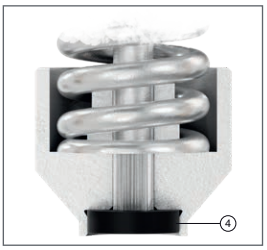
— 90° angular flow.
— Activated by direct action helicoid spring.
— Simplicity of construction ensuring minimum maintenance.
— Materials carefully selected for their resistance to corrosion.
— Internal body designed to offer favourable flow profile.
— Sealing surfaces balanced and making them extremely tightness, even exceeding API-527 requeriments.
— Great discharge capacity. For liquids typically used with openings similar to proportional safety valves.
— Auto-centering plug.
— Totally precise open and close.
— 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.

IMPORTANT

1.- Fluorelastomer (Vitón) seals, Silicone's rubber, PTFE (Teflón) o Perfluorelastomer (FFKM).

Achieving leakage levels less than: $0{,}2\text{x}10^{-8}\frac{\text{psi pulg}^3}{\text{seg.}}$

RANGE OF APPLICATION FOR THE SEALS									
FLUID		SET PRESSURE [bar]							
		0,20	1,80	4,80	20,00	30,00	36,01	45,00	144,00
Saturated steam		S	V		K	T			
Liquids and gases		S		V	K		T		
SEALS		TEMPERATURE [ºC]							
		MINIMUM			MAXIMUM				
Silicone's rubber	S	-50			200				
Fluorelastomer (Viton)	V	-20			220				
PTFE (Teflon)	T	-196			260				
Perfluorelastomer (FFKM)	K	-10			230				



Depending on demand:

1. Buna-nitryls seals, Butyl, Natural rubber, E.P.D.M., Chlorosulphonate polyethylene (Hypalon), Neoprene, etc.
2. Possibility of manufacture in other types of material, for use in special working conditions (high temperatures, fluids, etc.).