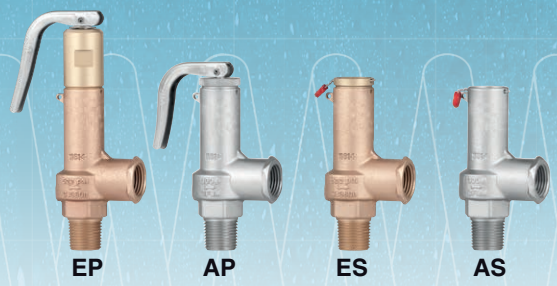
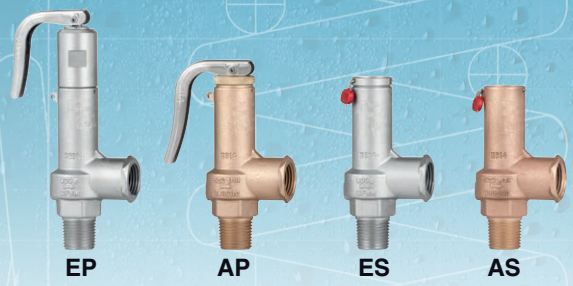
Full lift safety valve with spring loading. (AIT)

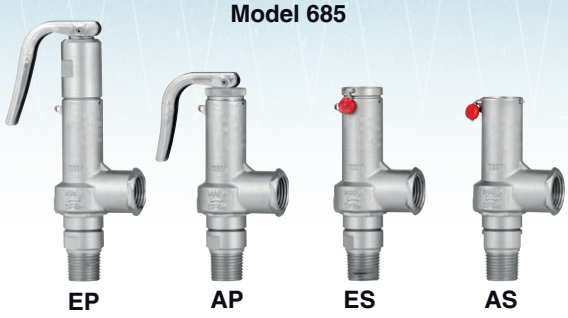
Mod. 685 - 885 - 985 - 694 | ASME | USCS



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

- -320,80 ˚F to +500 ˚F

Applications

- Gas, steam and liquids.

Materials

- Bronze
- Stainless steel

Maximum pressure

- Up to 2088,57 psi

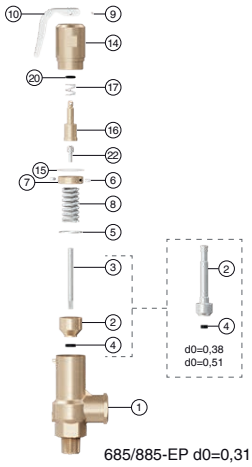
Certification

Catalog available in International System Units (SI) in PDF format.

N.º PIECE	PIECE	MATERIAL	
		BRONZE	STAINLESS STEEL
1	Body	Bronze (ASTM UNS C83600)	Stainless steel (ASTM A351 CF8M)
2	Plug	Brass (ASTM C38000)	Stainless steel (AISI 316)
3	Shaft	Stainless steel (AISI 303)	Stainless steel (AISI 303)
4	Seal	Silicone rubber	Silicone rubber
		Fluorelastomer (Viton)	Fluorelastomer (Viton)
		PTFE (Teflon)	PTFE (Teflon)
		Perfluorelastomer (FFKM)	Perfluorelastomer (FFKM)
5	Limiter ring	Stainless steel. (AISI 301)	Stainless steel (AISI 301)
6	End-stop	PTFE (Teflon)	PTFE (Teflon)
7	Spring press	Brass (ASTM C38000)	Stainless steel (AISI 303)
8	Spring	Stainless steel (AISI 301)	Stainless steel (AISI 301)
9	Clip	Stainless steel (AISI 301)	Stainless steel (AISI 301)
10	Lever	Stainless steel (AISI 304)	Stainless steel (AISI 304)
11	Sealing wire	Sealing wire	Sealing wire
12	Characteristic plate	Aluminium	Aluminium
13	Seal	Plastic	Plastic
14	Cap	Brass (ASTM C38000)	Stainless steel (AISI 303)
15	Hood coupling	PTFE (Teflon)	PTFE (Teflon)
16	Piston	Brass (ASTM C38000)	Stainless steel. (AISI 303)
17	Piston Spring	Stainless steel (AISI 301)	Stainless steel (AISI 301)
18	Inlet clamp	-	Stainless steel (AISI 316L)
19	Outlet clamp	-	Stainless steel (AISI 316L)
20	O-ring	Fluorelastomer (Viton) (1)	Fluorelastomer (Viton) (1)
21	Seat	-	-
22	Screw cap	Stainless steel (AISI 301)	Stainless steel (AISI 301)

MODEL				
685		MNPT1 x FNPT2	3/8” x 1/2” to 1” x 1”	
		MAWP	522,14	522,14
	OPERATING CONDITIONS	PRESSURE [psi]	522,14	522,14
		MAXIMUM TEMPERATURE [ºF]	392	482
		MINIMUM TEMPERATURE [ºF]	14	-76
885		MNPT1 x FNPT2	3/8” x 1/2” to 1” x 1”	
		MAWP	522,14	522,14
	OPERATING CONDITIONS	PRESSURE [psi]	522,14	522,14
		MAXIMUM TEMPERATURE [ºF]	140	140
		MINIMUM TEMPERATURE [ºF]	14	-320,80
985		MNPT1 x FNPT2	3/8” x 1/2” to 1/2” x 1/2”	
		MAWP		2088,54
	OPERATING CONDITIONS	PRESSURE [psi]	-	2088,54
		MAXIMUM TEMPERATURE [ºF]	-	482
		MINIMUM TEMPERATURE [ºF]	-	-76
694		DN1 x DN2	10 x 15 to 25 x 25	
		PN	-	16
	OPERATING CONDITIONS	PRESSURE [psi]	-	232
		MAXIMUM TEMPERATURE [ºF]	-	500
		MINIMUM TEMPERATURE [ºF]	-	-76

(1) Mod. 895; Perfluorelastomero (FFKM)



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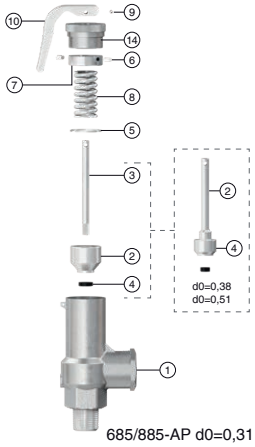

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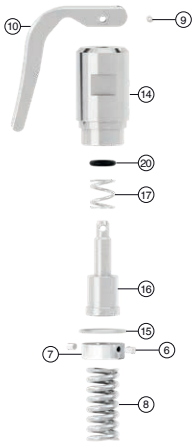
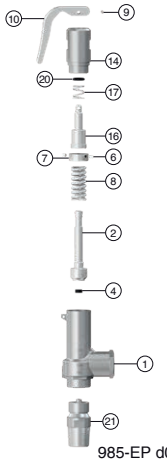

694-EP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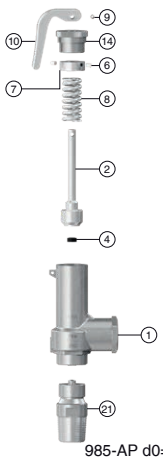
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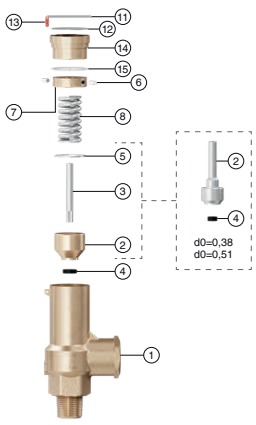

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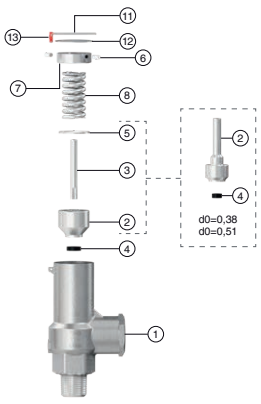

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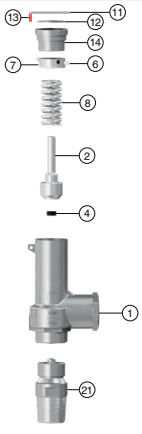
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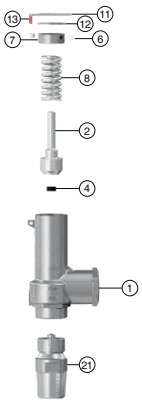
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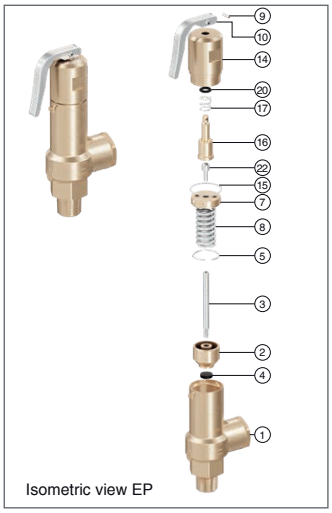


Isometric view EP

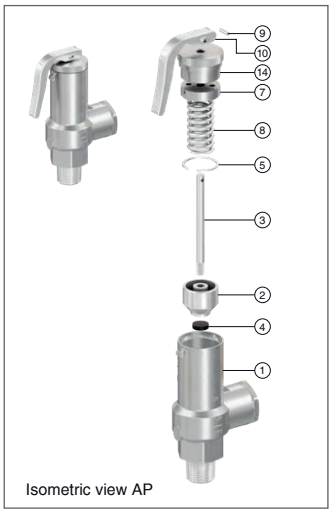
Full lift safety valve with spring loading (AIT) version EP.

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

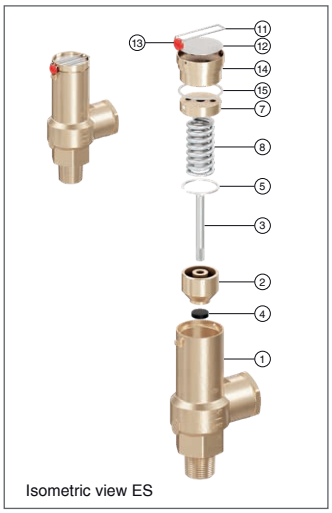
Full lift safety valve with spring loading (AIT) version AP.

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

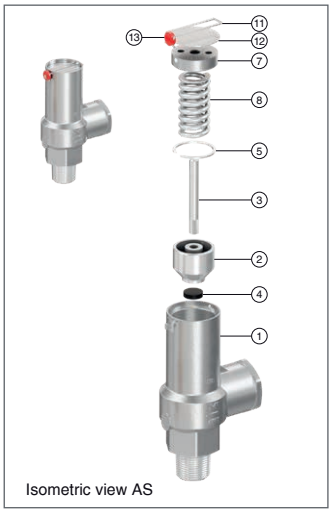
Full lift safety valve with spring loading (AIT) version ES.

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.

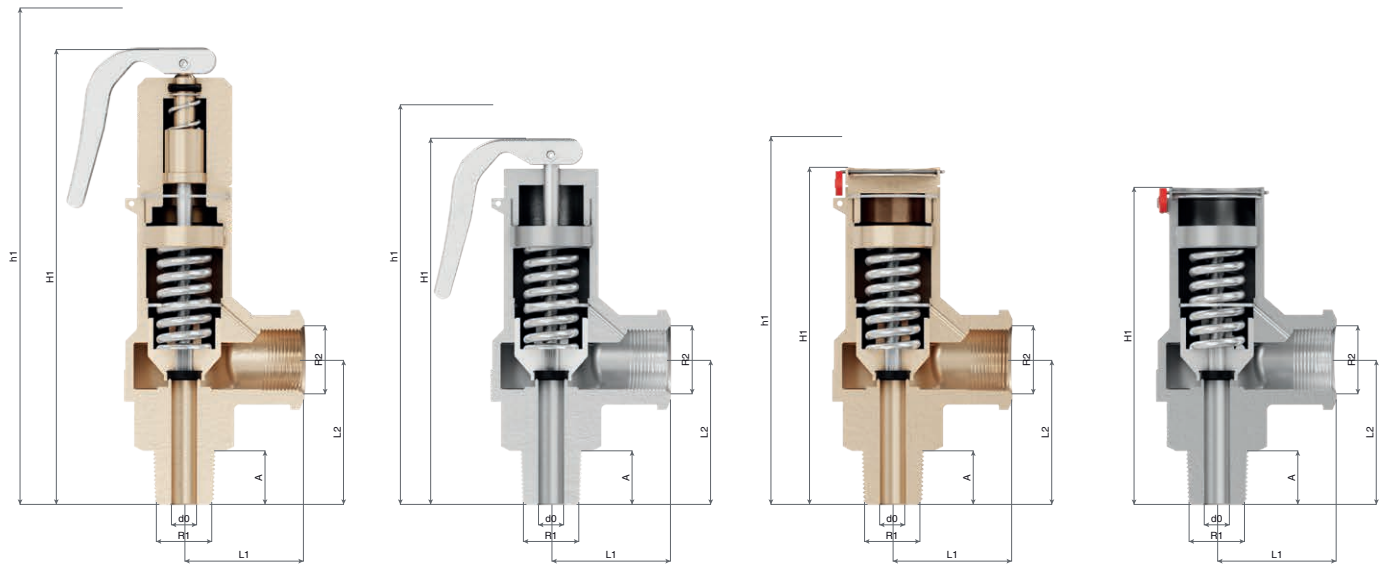
1. Disassembly and assembly

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.

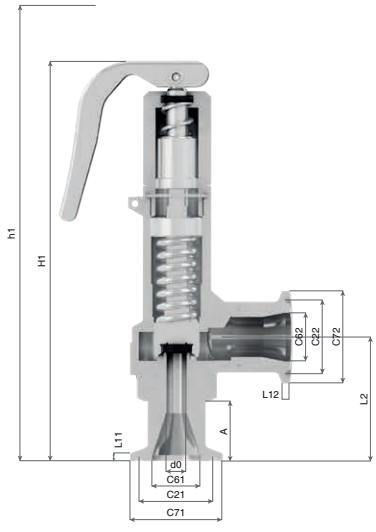
MODEL 685/885/985												
MNPT1 x FNPT2		3/8" x 1/2"				1/2" x 1/2"				1/2" x 3/4"	
CONNECTIONS		Male thread x Female thread NPT ASME B1.20.1									
MODEL 694											
DN1 x DN2		10 x 15				15 x 15				15 x 20	
CONNECTIONS		CLAMP ISO 2852:1993									
d0 ["]	694/685/885	0,31								0,38	
	985	0,16									
Ao: $\frac{\pi \cdot do^2}{4}$["2]	694/685/885	0,08								0,12	
	985	0,02									
H ["]	685/885	-	-	-	3,71	-	-	-	3,89	-	-
	985	-	-	-	4,14	-	-	-	4,32		
	694	-	-	-	3,98	-	-	-	3,98	-	-
H1 ["]	685/885	5,72	4,26	3,91	-	5,78	4,44	4,09	-	6,77	5,31
	985	6,03	4,69	4,09	-	6,21	4,88	4,52	-		
	694	5,87	4,52	4,20	-	5,87	4,52	4,20	-	6,93	5,47
h1 ["]	685/885	6,07	4,93	4,54	-	6,25	5,11	4,72	-	7,32	5,90
	985	6,51	5,36	4,97	-	6,69	5,55	5,15	-		
	694	6,34	5,20	4,80	-	6,34	5,20	4,80	-	7,50	6,06
A ["]	685/885/985	0,60				0,78				0,78	
	694	0,87								0,94	
L1 ["]	685/885/985	1,42								1,73	
	694	1,63								2,30	
L2 ["]	685/885	1,53				1,71				1,79	
	985	1,96				2,14					
	694	1,80								2,23	
INLET FLANGE PN-16 CLAMP ISO 2852:1993	C61	0,55				0,71				0,71	
	C71	1,34								1,34	
	C21	1,08								1,08	
	L11	0,11								0,11	
OUTLET FLANGE PN-16 CLAMP ISO 2852:1993	C62	0,71								0,93	
	C72	1,34								2,00	
	C22	1,08								1,71	
	L12	0,11								0,11	
WEIGHT [lbs.]		EP	AP	ES	AS	EP	AP	ES	AS	EP	AP
685/885/985	BRONZE	1,04	0,84	0,79	0,75	1,04	0,84	0,79	0,75	2,14	1,63
	STAINLESS STEEL	0,99	0,79	0,75	0,71	0,99	0,79	0,75	0,71	2,09	1,59
694	STAINLESS STEEL	1,10	0,90	0,86	0,82	1,10	0,90	0,86	0,82	2,34	1,83
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
CODE 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
CODE 985	STAINLESS STEEL 2002-985.	03820	03821	03822	03823	00220	00221	00222	00223		
CODE 694	STAINLESS STEEL 2002-694.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211



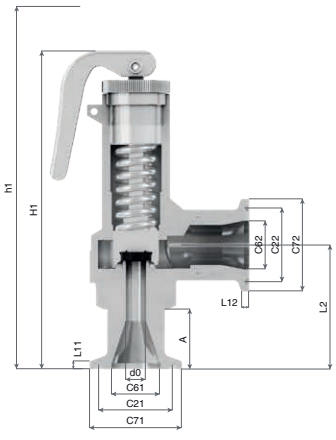
EP **AP** **ES** **AS**

Model 685/885/985

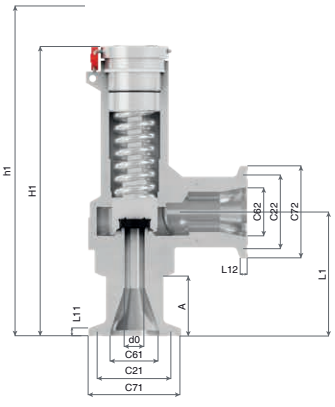
MODEL 685/885/985														
1/2" x 3/4"		3/4" x 3/4"				3/4" x 1"				1" x 1"				
Male thread x Female thread NPT ASME B1.20.1														
MODEL 694														
15 x 20		20 x 20				20 x 25				25 x 25				
CLAMP ISO 2852:1993														
0,38						0,51								
0,12						0,21								
-	4,60	-	-	-	4,61	-	-	-	5,64	-	-	-	5,75	
-	4,76	-	-	-	4,76	-	-	-	5,82	-	-	-	5,82	
4,88	-	6,38	5,32	4,89	-	7,92	6,46	5,99	-	8,04	6,58	6,11	-	
5,03	-	6,92	5,47	5,03	-	8,11	6,65	6,18	-	8,11	6,65	6,18	-	
5,58	-	7,33	5,91	5,60	-	8,47	7,05	6,70	-	8,59	5,99	6,82	-	
5,74	-	7,48	6,06	5,74	-	8,66	7,24	6,88	-	8,66	6,06	6,88	-	
0,78		0,79				0,79				0,98				
0,94						0,98								
1,73						2,36								
2,04						2,63								
1,79		1,91				2,30				2,42				
2,26						2,69								
0,71		0,93				0,93				1,17				
1,33		1,20				1,20								
1,08		1,71				1,71								
0,11						0,11								
0,93						1,17								
1,20						1,20								
1,71						1,71								
0,11						0,11								
ES	AS	EP	AP	ES	AS	EP	AP	ES	AS	EP	AP	ES	AS	
1,59	1,54	2,14	1,63	1,59	1,54	3,68	2,98	2,93	2,89	3,68	2,98	2,93	2,89	
1,54	1,50	2,09	1,59	1,54	1,50	3,64	2,93	2,89	2,84	3,64	2,93	2,89	2,84	
1,79	1,74	2,43	1,92	1,87	1,83	3,84	3,35	3,31	3,26	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	



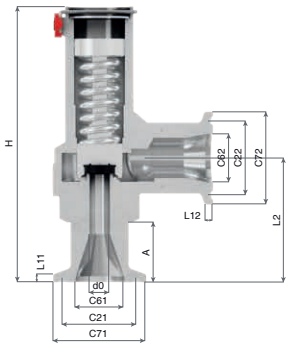
EP



AP



ES

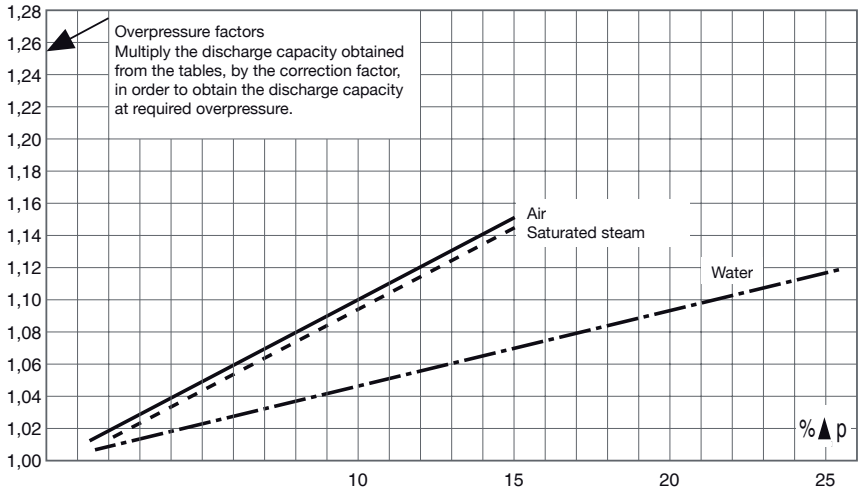


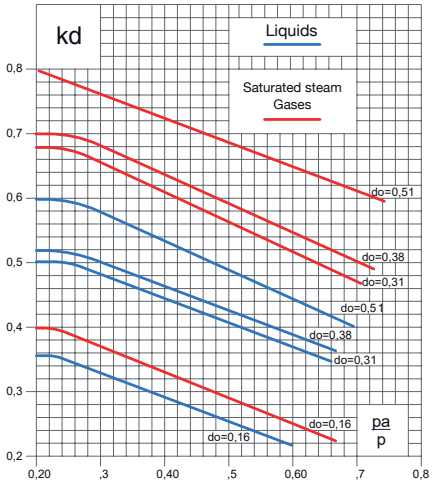
AS

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 [“]	685/885/694			0,31		0,38		0,51		
	985			0,16		-				
SET PRESSURE [psi]	MAXIMUM	685/885	MAWP 522,14 psi	522,14		522,14		522,14		
		985	MAWP 2088,54 psi	2088,54		-				
		694	PN-16	16		16		16		
	MINIMUM	685/885	MAWP 522,14 psi	2,90		2,90		2,90		
		985	MAWP 2088,54 psi	523,58		-				
		694	PN-16	0,2		0,2		0,2		
SPRING REGULATING RANGE [psi]	685/885/694	985		-						
	2,90 to 10,15	-	CODE	56160		56169		56178		
	8,70 to 23,21		CODE	56161		56170		56179		
	21,76 to 50,76		CODE	56162		56171		56180		
	49,31 to 79,77		CODE	56163		56172		56181		
	78,32 to 145,04	523,58 to 580,15	CODE	56164-56334		56173		56182		
	142,14 to 217,56	565,65 to 870,23	CODE	56165-56335		56174		56183		
	210,30 to 290,08	841,22 to 1160,30	CODE	56166-56336		56175		56184		
	275,57 to 362,59	1102,29 to 1450,38	CODE	56167-56337		56176		56185		
	348,09 to 522,14	1392,36 to 2088,54	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		0,31			0,38			0,51				0,16	
$A0=\frac{\pi \cdot do^2}{4}$ [in²]		0,08			0,12			0,21				0,02	

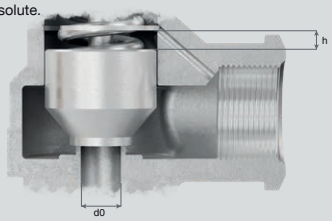
p [psi]	I	II	III	I	II	III	I	II	III	I	II	III
7,25	68	24	8	102	36	11	207	74	20			
14,50	87	31	9	132	47	13	268	95	23			
21,75	107	38	9	161	57	14	329	117	25			
29,00	127	45	10	191	68	15	389	138	27			
36,25	148	53	11	224	80	17	455	162	29			
43,50	170	61	12	256	91	18	522	186	31			
50,75	192	68	13	289	103	19	589	209	33			
58,00	214	76	13	322	115	20	655	233	35			
65,25	235	84	14	355	126	21	722	257	37			
72,50	257	91	15	388	138	22	789	281	39			
87,00	301	107	16	453	161	24	922	328	42			
101,50	344	122	17	519	185	25	1056	376	45			
116,00	388	138	18	584	208	27	1189	423	48			
130,50	431	153	19	650	231	28	1323	471	50			
145,00	475	169	20	716	255	30	1456	518	53			
174,00	562	200	22	847	301	32	1723	613	57			
203,00	649	231	23	978	348	35	1990	708	61			
232,00	736	262	25	1109	395	37	2257	803	65			
261,00	823	293	26	1240	441	39	2525	898	69			
290,00	910	324	28	1371	488	41	2792	993	73			
319,00	997	355	29	1503	535	43	3059	1088	76			
348,00	1084	386	30	1634	581	45	3326	1183	79			
377,00	1171	417	31	1765	628	46	3593	1278	83			
406,00	1258	448	32	1896	675	48	3860	1373	86			
435,00	1345	479	34	2027	721	50	4127	1468	89			
464,00	1432	510	35	2159	768	51	4394	1563	91			
493,00	1519	540	36	2290	815	53	4661	1658	94			
522,00	1606	571	37	2421	861	54	4928	1753	97			
551,00										249	89	6
580,00										262	93	7
609,00										275	98	7
638,00										287	102	7
667,00										300	107	7
696,00											111	7
725,00											116	7
754,00											120	8
783,00											125	8
812,00											130	8
841,00											134	8
870,00											139	8
899,00											143	8
928,00											148	8
957,00											152	8
986,00											157	9
1015,00											161	9
1044,00											166	9
1073,00											171	9
1102,00											175	9
1131,00											180	9
1160,00											184	9
1189,00											189	9
1218,00											193	10
1247,00											198	10
1276,00											202	10
1305,00											207	10
1334,00											212	10
1363,00											216	10
1392,00											221	10
1421,00											225	10
1450,00											230	11
1522,50											241	11
1595,00											253	11
1667,50											264	11
1740,00											275	11
1812,50											287	12
1885,00											298	12
1957,50											309	12
2030,00											321	12
2102,50											565	12

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		0,31		0,38		0,51	
	985		0,16					
h			0,10		0,16		0,22	
h/d0	685/885/694		0,32		0,42		0,43	
	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 43,50 psi see grapf of discharge coefficient.

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



I - Saturated steam [lb/h].

II - Air to 60 °F and 14,50 psi [S.C.F.M].

III - Water to 70 °F [US- G.P.M]

For other, not so dense liquids, other than water at 70 °F 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 70 °F. (ϱ_A = 0,04 lb/pulg.³)
ϱ_L = Liquid density.

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

Características

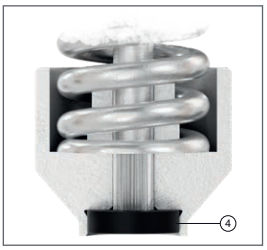
— 90° angular flow.
— Activated by direct action helicoid spring.
— Simplicity of construction ensuring minimum maintenance.
— Materials carefully selected for their resistance to corrosion.
— Internal body designed to offer favourable flow profile.
— Sealing surfaces balanced and making them extremely 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 [psi]	
		2,90 — 26,10 — 69,61 — 290,07 — 435,11 — 523,58 — 652,67 — 2088,54	
Saturated steam		S — V — K — T	
Liquids and gases		S — V — K — T	
SEALS		TEMPERATURE [ºF]	
		MINIMUM	MAXIMUM
Silicone's rubber	S	-58	392
Fluorelastomer (Viton)	V	-4	428
PTFE (Teflon)	T	-320,8	500
Perfluorelastomer (FFKM)	K	14	500



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.).