

## → Series 412



### ■ MATERIAL



### ■ SPECIFICATION



1/2" – 2"



– 60°C to + 225°C  
depending on version



0,2 – 50 bar  
depending on version

### ■ SUITABLE FOR

Air, gases and vapours neutral



### ■ EXAMPLES OF USE

For the protection of:

- pressure tanks and
- pressure systems

for air and other neutral, non-poisonous and non-flammable gases which can be freely discharged into the environment.

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- pneumatic control units
- pressure booster plants air-side
- waste water treatment plants
- traffic- and railway technology
- pneumatic braking systems
- secondary areas in the food-, pharmaceutical- and cosmetics- industries

**Safety valves are set and sealed at the factory.**

### ■ APPROVALS

TÜV Type test approval 2003	D/G
ASME	G
CRN	G
EU type examination	S/G
TSG ZF001-2006	D/G (S/G)
KGS	G
KOSHA	G (< 10 bar)
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G)

### Requirements

AD 2000 Data sheet A2  
DIN EN ISO 4126-1  
PED 2014/68/EU

ASME-Code Sec. XIII  
KGS AA 319

### Classification society

DNV  
Lloyd's Register EMEA  
American Bureau of Shipping  
Bureau Veritas  
Russian Maritime Register of Shipping  
Registro Italiano Navale

DNV  
LR EMEA  
ABS  
BV  
RS  
RINA

### ■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4404	316 L
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310 / 1.4568	302 / 631
Sealing cap	Stainless steel	1.4301	304

<b>s</b>	Standard	cylindrical form, atmospheric discharge, for air and similar neutral, non-toxic and non-flammable gases that can be freely discharged into the atmosphere.
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## ■ MEDIUM

<b>G</b>	gaseous	Air and similar neutral gases
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## ■ TYPE OF LIFTING MECHANISM

<b>K</b>	Standard with twist-type lifting mechanism	
<b>O</b>	without lifting device	

## ■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN	15	20	25	32	40	50
Inlet	1/2" (15)	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)
Atmospheric discharge via outlet apertures	■	■	■	■	■	■

## ■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

<b>m / -</b>	Standard	Male thread BSP-P / -	DIN EN ISO 228-1 / -
<b>BSP-Tm / -</b>		Male thread BSP-T / -	DIN EN 10226, ISO 7-1 / -
<b>NPT-m / -</b>		Male thread NPT / -	ANSI B1.20.1 / -

Other connection types possible on request

## ■ SEALS

<b>NBR</b>	Nitrile rubber	Elastomere flat seal 0,2 – 30 bar	-30°C to +130°C
<b>FKM</b>	Fluorocarbon	Elastomere flat seal 0,2 – 30 bar	-20°C to +200°C
<b>EPDM</b>	Ethylene propylene diene	Elastomere flat seal 0,2 – 30 bar	-40°C to +170°C
<b>PTFE</b>	Polytetrafluoroethylene	Flat seal 0,2 – 50 bar	-60°C to +225°C

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 412: Connection, installation dimensions, ranges of adjustment							
Nominal diameter	DN	15	20	25	32	40	50
Connection DIN EN ISO 228	G	1/2" (15)	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)
Installation dimensions in mm	H (H1)	144	177	177	215 (177 <sup>1</sup> )	215 (177 <sup>1</sup> )	282
	H2	137	173	173	212	212	284
	h	12	15	15	22,5	22,5	26
	SW	32	41	41	55	55	80
	d0	14	20	24	31	31	48
Coefficients of flow ISO 4126-1	$c_{w} / K_{dr} (D/G)^2$	0,76	0,8	0,8	0,8	0,8	0,51 <sup>3</sup>
Coefficients of flow ASME-Code Sec. VIII Div. 1	$c_w / K_{dr} (D/G)$	0,774	0,774	0,774	0,774	0,774	30,116 <sup>4</sup>
Weight	kg	0,6	1,3	1,3	2,6	2,6	5,4
Range of adjustment	bar	0,2-50	0,2-50	0,2-50	0,2-50	0,2-50	0,2-30
Range of adjustment ASME	psi	15-725	15-725	15-725	15-725	15-725	15-435

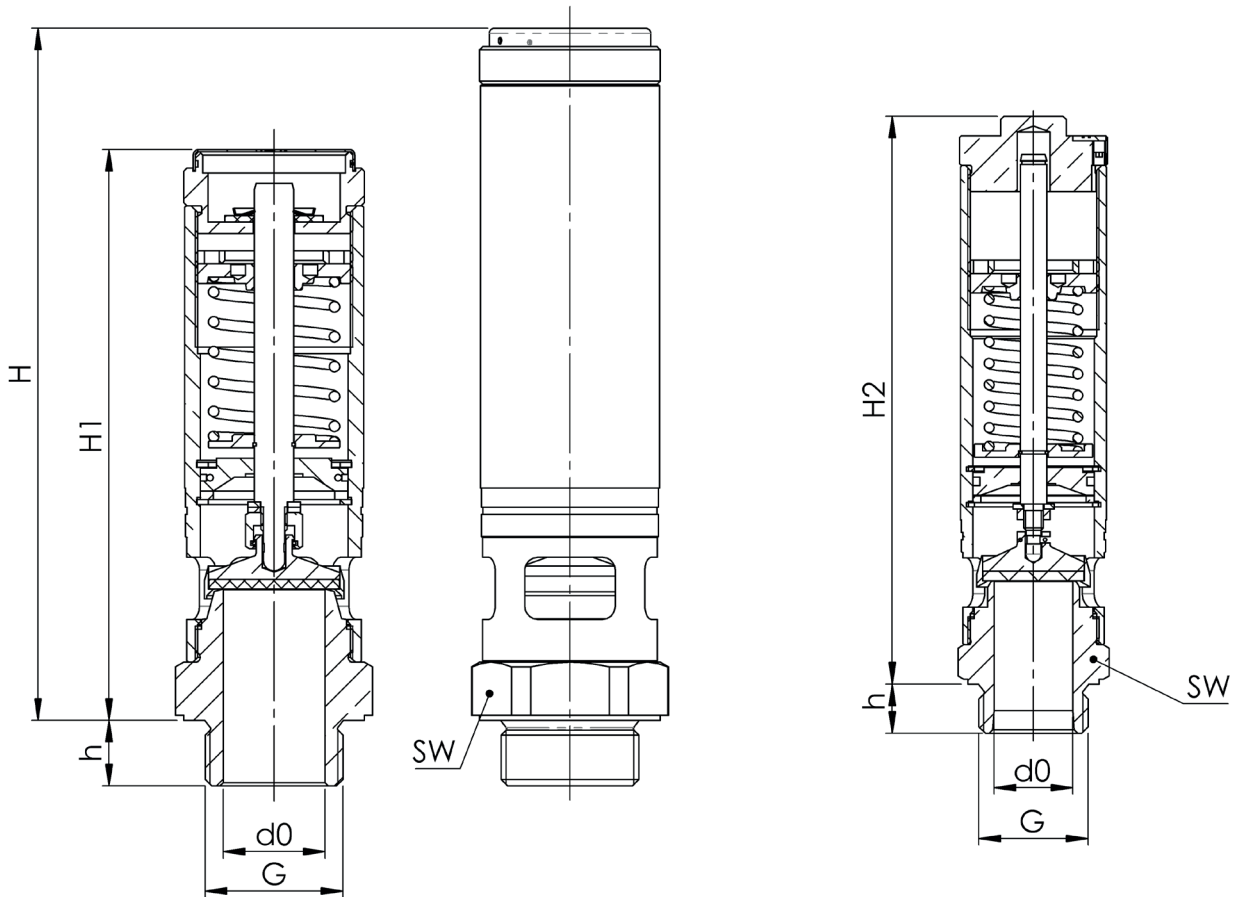
<sup>1</sup>Type 412 with the option SHORT for the pressure range 0,2 to 6 bar also available as short version

<sup>2</sup>Flow coefficients for blow-off pressures > 4,0 bar

<sup>3</sup>Flow coefficients for blow-off pressures > 7,0 bar

<sup>4</sup>Rated slope value for D/G in scfm/psia

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series 412 ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
412	s	G	K	20	NPT-m	–	20	–	FKM		4,5	2
412	s	G	K	40	NPT-m	–	40	–	PTFE	SHORT	5,0	5
412	s	G	K			–		–				
412	s	G	K			–		–				

■ PROPERTIES

<b>GOX</b>	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>	<input type="checkbox"/>
<b>P01</b>	Oil- and grease-free production	<input type="checkbox"/>	<input type="checkbox"/>

■ CERTIFICATES / APPROVALS

<b>C01</b>	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	<b>C06</b>	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
<b>C02</b>	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	<b>C07</b>	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
<b>C03</b>	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	<b>C09</b>	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
<b>C04</b>	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	<b>C10</b>	Certificate of oil- and grease free production	<input type="checkbox"/>
<b>C05</b>	Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate: .....	<input type="checkbox"/>	<b>C11</b>	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

<b>AA1</b>	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	<b>AK1</b>	Det Norske Veritas (DNV) type approval	<input type="checkbox"/>
<b>AA2</b>	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	<b>AK2</b>	Lloyd's Register (LR) type approval	<input type="checkbox"/>
<b>AA3</b>	Certification acc. to ASME Boiler and Pressure Vessel Code, Sec. XIII (ASME)	<input type="checkbox"/>	<b>AK3</b>	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
<b>AA4</b>	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	<b>AK4</b>	Bureau Veritas (BV) type approval	<input type="checkbox"/>
<b>AA5</b>	Manufacture License of Special Equipment People's Republic of China (ML)	<input type="checkbox"/>	<b>AK5</b>	Russian Maritime Register of Shipping (RMRS) type approval	<input type="checkbox"/>
<b>AA6</b>	Certification acc. to. Korean Gas Safety Corporation (KGS) <sup>3</sup>	<input type="checkbox"/>	<b>AK6</b>	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
<b>AA7</b>	Registration according to Canadian Registration Number (CRN) <sup>4</sup>	<input type="checkbox"/>	<b>AL</b>	Individual inspection by notified body inspector – (body to be indicated): .....	<input type="checkbox"/>

<sup>3</sup>KGS only in combination with ASME | <sup>4</sup>CRN only in combination with ASME

■ ENQUIRY

Series 412: Blowing-off rates at 10% above set pressure							
Nominal diameter DN		15	20	25	32	40	50
Set pressure bar		d0 = 14 mm	d0 = 20 mm	d0 = 24 mm	d0 = 31 mm	d0 = 31 mm	d0 = 48 mm
		l	l	l	l	l	l
Air l Nm³/h	0,2	57,3	147,0	211,7	353,2	353,2	662,2
	0,5	100,3	220,2	317,1	529,1	529,1	926,9
	1,0	148,5	320,9	462,2	771,1	771,1	1382,7
	1,5	196,5	422,4	608,2	1014,7	1014,7	1852,6
	2,0	246,1	522,8	752,8	1256,0	1256,0	2334,0
	2,5	292,7	621,5	894,9	1493,1	1493,1	2760,6
	3,0	340,6	722,7	1040,7	1736,4	1736,4	3194,6
	3,5	389,8	826,6	1190,3	1985,9	1985,9	3636,1
	4,0	436,0	924,5	1331,3	2221,2	2221,2	4085,1
	4,5	480,4	1018,7	1466,9	2447,4	2447,4	4541,5
	5,0	524,9	1112,9	1602,5	2673,7	2673,7	4967,8
	5,5	569,3	1207,0	1738,1	2899,9	2899,9	5388,2
	6,0	613,7	1301,2	1873,7	3126,1	3126,1	5808,5
	6,5	658,1	1395,4	2009,3	3352,3	3352,3	6228,9
	7,0	702,5	1489,5	2144,9	3578,6	3578,6	6649,2
	7,5	746,9	1583,7	2280,5	3804,8	3804,8	5815,3
	8,0	791,3	1677,9	2416,1	4031,0	4031,0	6161,1
	8,5	835,7	1772,0	2551,7	4257,3	4257,3	6506,9
	9,0	880,1	1866,2	2687,3	4483,5	4483,5	6852,6
	9,5	924,5	1960,3	2822,9	4709,7	4709,7	7198,4
	10,0	969,0	2054,5	2958,5	4936,0	4936,0	7544,2
	11,0	1057,8	2242,8	3229,7	5388,4	5388,4	8235,7
	12,0	1146,6	2431,2	3500,9	5840,9	5840,9	8927,3
	13,0	1235,4	2619,5	3772,1	6293,4	6293,4	9618,8
	14,0	1324,2	2807,8	4043,3	6745,8	6745,8	10310,4
	15,0	1413,1	2996,2	4314,5	7198,3	7198,3	11001,9
	16,0	1501,9	3184,5	4585,7	7650,8	7650,8	11693,5
	17,0	1590,7	3372,8	4856,9	8103,2	8103,2	12385,0
	18,0	1679,5	3561,2	5128,1	8555,7	8555,7	13076,6
	19,0	1768,4	3749,5	5399,3	9008,1	9008,1	13768,1
	20,0	1857,2	3937,8	5670,5	9460,6	9460,6	14459,7
	21,0	1946,0	4126,1	5941,7	9913,1	9913,1	15151,2
22,0	2034,8	4314,5	6212,9	10365,5	10365,5	15842,8	
23,0	2123,6	4502,8	6484,0	10818,0	10818,0	16534,3	
24,0	2212,5	4691,1	6755,2	11270,5	11270,5	17225,9	
25,0	2301,3	4879,5	7026,4	11722,9	11722,9	17917,4	
26,0	2390,1	5067,8	7297,6	12175,4	12175,4	18609,0	
27,0	2478,9	5256,1	7568,8	12627,9	12627,9	19300,5	
28,0	2567,7	5444,5	7840,0	13080,3	13080,3	19992,1	
29,0	2656,6	5632,8	8111,2	13532,8	13532,8	20683,6	
30,0	2745,4	5821,1	8382,4	13985,2	13985,2	21375,2	
32,0	2923,0	6197,8	8924,8	14890,2	14890,2		
34,0	3100,7	6574,4	9467,2	15795,1	15795,1		
36,0	3278,3	6951,1	10009,6	16700,0	16700,0		
38,0	3456,0	7327,8	10552,0	17605,0	17605,0		
40,0	3633,6	7704,4	11094,4	18509,9	18509,9		
42,0	3811,2	8081,1	11636,8	19414,8	19414,8		
44,0	3988,9	8457,7	12179,2	20319,7	20319,7		
46,0	4166,5	8834,4	12721,6	21224,7	21224,7		
48,0	4344,2	9211,1	13263,9	22129,6	22129,6		
50,0	4521,8	9587,7	13806,3	23034,5	23034,5		

Series 412: Blowing-off rates at 10% above set pressure							
Nominal diameter DN	15	20	25	32	40	50	
	d0= 0,551 inch (14 mm)	d0= 0,787 inch (20mm)	d0= 0,945 inch (20mm)	d0= 1,220 inch (31mm)	d0= 1,220 inch (31mm)	d0= 1,890 inch (48mm)	
Set pressure psi(g)	I	I	I	I	I	I	
Air I	15	110,8	226,1	325,5	543,1	543,1	984,8
SCFM	30	161,6	329,8	474,8	792,2	792,2	1436,5
	40	198,8	405,8	584,4	974,9	974,9	1767,8
	50	236,1	481,8	693,9	1157,6	1157,6	2099,1
	60	273,4	557,9	803,4	1340,3	1340,3	2430,4
	70	310,6	633,9	912,9	1523,0	1523,0	2761,6
	87	374,0	763,2	1099,0	1833,6	1833,6	3324,8
	90	385,2	786,0	1131,9	1888,4	1888,4	3424,2
	100	422,4	862,1	1241,4	2071,1	2071,1	3755,5
	110	459,7	938,1	1350,9	2253,8	2253,8	4086,7
	120	496,9	1014,2	1460,4	2436,5	2436,5	4418,0
	130	534,2	1090,2	1569,9	2619,2	2619,2	4749,3
	140	571,5	1166,2	1679,4	2801,9	2801,9	5080,6
	150	608,7	1242,3	1788,9	2984,6	2984,6	5411,8
	160	646,0	1318,3	1898,4	3167,3	3167,3	5743,1
	170	683,2	1394,4	2007,9	3350,0	3350,0	6074,4
	180	720,5	1470,4	2117,4	3532,7	3532,7	6405,7
	190	757,8	1546,5	2226,9	3715,4	3715,4	6736,9
	200	795,0	1622,5	2336,4	3898,1	3898,1	7068,2
	210	832,3	1698,6	2445,9	4080,8	4080,8	7399,5
	220	869,6	1774,6	2555,4	4263,5	4263,5	7730,8
	230	906,8	1850,6	2664,9	4446,2	4446,2	8062,1
	240	944,1	1926,7	2774,4	4628,9	4628,9	8393,3
	250	981,3	2002,7	2883,9	4811,6	4811,6	8724,6
	260	1018,6	2078,8	2993,4	4994,3	4994,3	9055,9
	270	1055,9	2154,8	3102,9	5177,0	5177,0	9387,2
	280	1093,1	2230,9	3212,5	5359,7	5359,7	9718,4
	290	1130,4	2306,9	3322,0	5542,4	5542,4	10049,7
	300	1167,6	2383,0	3431,5	5725,1	5725,1	10381,0
	320	1242,2	2535,0	3650,5	6090,5	6090,5	11043,5
	340	1316,7	2687,1	3869,5	6455,8	6455,8	11706,1
	360	1391,2	2839,2	4088,5	6821,2	6821,2	12368,6
	380	1465,7	2991,3	4307,5	7186,6	7186,6	13031,2
	400	1540,3	3143,4	4526,5	7552,0	7552,0	13693,7
	420	1614,8	3295,5	4745,5	7917,4	7917,4	14356,3
	435	1670,7	3409,6	4909,8	8191,5	8191,5	14853,2
	460	1763,8	3599,7	5183,5	8648,2	8648,2	
	480	1838,4	3751,8	5402,5	9013,6	9013,6	
	500	1912,9	3903,8	5621,5	9379,0	9379,0	
	550	2099,2	4284,1	6169,1	10292,5	10292,5	
	600	2285,5	4664,3	6716,6	11206,0	11206,0	
	650	2471,8	5044,5	7264,1	12119,5	12119,5	
	700	2658,1	5424,7	7811,6	13032,9	13032,9	
	725	2751,3	5614,9	8085,4	13489,7	13489,7	