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SAFETY VALVE WITH OPEN BONNET

PV 61





PV 61

Spring loaded full lift safety valve, flanged, with open bonnet

Description

The safety valve Series PV 61, is manufactured in pressure ranges, sizes and executions according to following tables. The tables contain the detail information about the dimensions, weight, range of set pressure and material of main parts too.

For PN16 and PN40, the valve's body is casted, the inlet nozzle is it's integrated part. The seat ring is tightly pressed into it. For PN63 and PN100, the casted body is provided with forged inlet nozzle with integrated seat. The flange's dimensions are according to ČSN EN 1092-1, respectively to ČSN EN 1092-2.

The flat disc is equipped with lifting bell, which is exposed to pressure of medium when the valve starts to open. The opening force is increased by this way, the result is quick opening of valve.

The spring, which causes the closing/sealing force, is designed for specific range of set pressures, the fine setting is made through adjusting screw.

The valve is equipped with lever, which serves for manual valve opening/test of function under the normal operating conditions of protected equipment.

Application

Spring loaded full lift safety valve PV 61 serves to automatically secure the pressure equipment (boiler, pressure vessel, reduction station, piping...) against an increase in the medium pressure above the permissible limit.

The safety valve Series PV 61 is certified as Safety device for protection against excessive pressure according to ČSN EN ISO 4126-1 standard and fulfill the demands of directive 2014/68/EU (PED).

The valve's discharge capacity, based on the data given in this sheet (A_0 , K_{d1}), is guaranteed, if the pressure drop in inlet pipeline doesn't exceed 3% of p_{set} and simultaneously the pressure drop in outlet pipeline doesn't exceed 15% of p_{set} in normal operating conditions of protected equipment.

Process media

The valve is determined for steam, air and other gases. Chemical composition of medium must be in accordance with material of valve's body and inner parts. Working temperature range is from +5°C to +450°C, if the temperature is higher than +350°C, the execution PV 610xWx with cooling spacer (position 9) is recommended.

Installation instructions

- 1) the valve should be installed with spindle in vertical position
- 2) outlet line must be inclined, the drainage hole must be provided in the lowest point
- 3) on demand, the valve's body can be manufactured with drainage hole

Design and ordering

For the design (calculation) of the valve and its order, it is necessary to supply the following documents, either according to point 1) or 2).

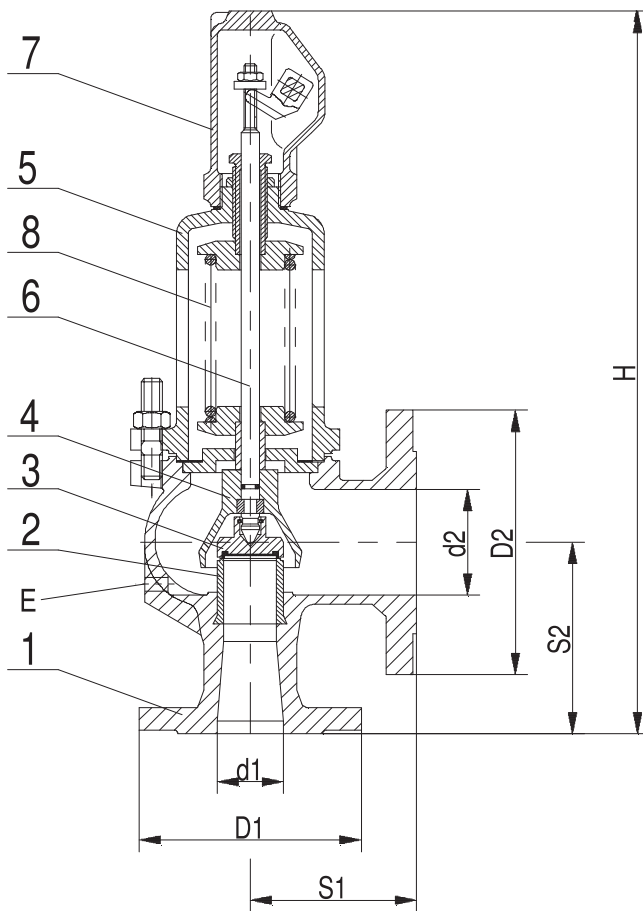
- 1) opening pressure p_{set} , kind of medium, medium temperature, DN of the valve
- 2) opening pressure p_{set} , kind of medium, medium temperature, mass flow Q_{mR}

The full type number must be given when ordering the valve. Demands for other flanges than according to ČSN EN 1092-1, resp. ČSN EN 1092-2, for position sensor or supporting brackets with drilled fixing holes must be placed in order too. The counter flanges, gaskets and bolts/nuts can be provided on demand too.

Basic dimensions, weight and range of set pressure PV 6101 | PN 16 | DN 20 x 32 to 150 x 250

Size DN $d_1 \times d_2$	Seat		Inlet flange PN16 D_1 [mm]	Outlet flange PN10 D_2 [mm]	Centre to face		Installation height H [mm]	Drainage ⁶⁾ E thread	Set pressure (p_{set})		Weight (approx.) m [kg]
	dia d_0 [mm]	area A_0 [mm ²]			S_1 [mm]	S_2 [mm]			min. [barg]	max. [barg]	
20 x 32	16	201	105	140	85	95	345	G $\frac{1}{4}$	0,45	16	7,5
25 x 40	20	314	115	150	95	105	395	G $\frac{1}{4}$	0,45	16	9
32 x 50	25	491	140	165	100	110	420	G $\frac{1}{4}$	0,45	16	13
40 x 65	32	804	150	185	115	130	495	G $\frac{1}{4}$	0,45	16	19
50 x 80	40	1257	165	200	125	145	550	G $\frac{1}{4}$	0,45	16	25
65 x 100	50	1964	185	220	140	150	660	G $\frac{3}{8}$	0,45	16	37
80 x 125	63	3117	200	250	155	170	710	G $\frac{3}{8}$	0,45	16	52
100 x 150	77	4657	220	285	175	180	810	G $\frac{3}{8}$	0,45	16	77
125 x 200	93	6793	250	340	215	220	860	G $\frac{1}{2}$	0,45	12,5	90
150 x 250	110	9503	285	395	225	245	990	G $\frac{1}{2}$	0,45	10	140

⁶⁾ delivered only after agreement with the customer



Material of safety valve PV 6101 main parts

Part	Description	Material
1	Body	EN-GJL-250
2	Seat	X39CrMo17-1
3	Plug	X39CrMo17-1
4	Bell	EN-GJS-400-15
5	Bonnet	EN-GJS-400-15
6	Spindle	X20Cr13
7	Cap	EN-GJS-400-15
8	Spring	51CrV4

Basic dimensions, weight and range of set pressure

PV 6102 | PN 40 | DN 20 x 32 to 150 x 250 | body material GP240GH

PV 6102 | PN 40 | DN 20 x 32 to 100 x 150 | body material EN-GJS-400-18

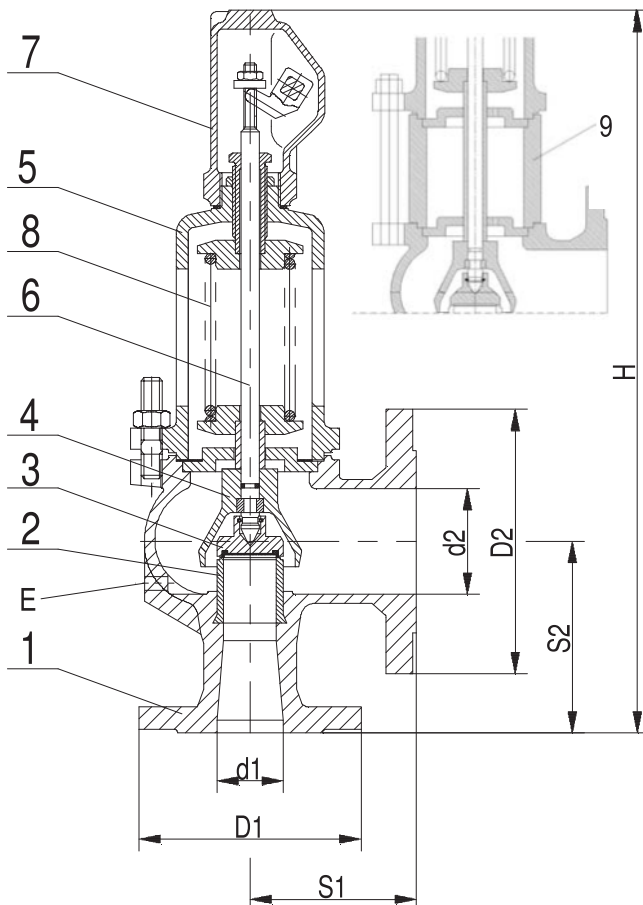
Size DN $d_1 \times d_2$	Seat		Inlet flange	Outlet flange	Centre to face		Installation height		Drainage ⁶⁾ E závit	Set pressure (p_{set})		Weight (approx.)	
	dia d_0 [mm]	area A_0 [mm ²]	PN40 D_1 [mm]	PN10 D_2 [mm]	S_1 [mm]	S_2 [mm]	wo cooling spacer	with cooling spacer		min. [barg]	max. [barg]	m [kg]	
20 x 32	16	201	105	140	85	95	345	405	G $\frac{1}{4}$	0,45	40	8	7,5
25 x 40	20	314	115	150	95	105	395	465	G $\frac{1}{4}$	0,45	40	10	9
32 x 50	25	491	140	165	100	110	420	495	G $\frac{1}{4}$	0,45	40	14	13
40 x 65	32	804	150	185	115	130	495	585	G $\frac{1}{4}$	0,45	32	20	19
50 x 80	40	1257	165	200	125	145	550	655	G $\frac{1}{4}$	0,45	32	27	25
65 x 100	50	1964	185	220	140	150	660	770	G $\frac{3}{8}$	0,45	32	39	37
80 x 125	63	3117	200	250	155	170	710	840	G $\frac{3}{8}$	0,45	25	55	52
100 x 150	77	4657	235 /239 ⁷⁾	285	175	180	810	955	G $\frac{3}{8}$	0,45	20	82	77
125 x 200	93	6793	270	340	215	220	860	970	G $\frac{1}{2}$	0,45	12,5	100	---
150 x 250	110	9503	300	395	225	245	990	³⁾	G $\frac{1}{2}$	0,45	10	155	---

³⁾ execution with cooling spacer on demand

⁶⁾ delivered only after agreement with the customer

⁷⁾ body material EN-GJS-400-18

⁸⁾ the weights of the valve with cooling spacer are given in a separate table at the end of the catalog



Material of safety valve PV 6102 main parts

(GP240GH)

Part	Description	Material
1	Body	GP240GH
2	Seat	X39CrMo17-1
3	Plug	X39CrMo17-1
4	Bell	EN-GJS-400-15
5	Bonnet	GP240GH
6	Spindle	X20Cr13
7	Cap	EN-GJS-400-15
8	Spring	51CrV4
9	Cooling spacer	C22

Material of safety valve PV 6102 main parts

(EN-GJS-400-18)

Part	Description	Material
1	Body	EN-GJS-400-18
2	Seat	X39CrMo17-1
3	Plug	X39CrMo17-1
4	Bell	EN-GJS-400-15
5	Bonnet	EN-GJS-400-15
6	Spindle	X20Cr13
7	Cap	EN-GJS-400-15
8	Spring	51CrV4

**Basic dimensions, weight and range of set pressure
PV 6103 | PN 63 | DN 20 x 32 to 400 x 500**

Size DN d ₁ x d ₂	Seat		Inlet flange		Outlet flange		Centre to face		Installation height		Drainage ⁶⁾ E thread	Set pressure (p _{set})		Weight (approx.) ⁸⁾ m [kg]
	dia d ₀ [mm]	area A ₀ [mm ²]	PN 25/40 D ₁ [mm]	PN 63 D ₁ [mm]	PN 10 D ₂ [mm]	PN 25/40 D ₂ [mm]	S ₁ [mm]	S ₂ [mm]	wo cooling spacer H [mm]	with cooling spacer H [mm]		min. [barg]	max. [barg]	
20 x 32	16	201	105 ¹⁾	130	---	140	95	110	400	470	G ¹ / ₄	38	62	12
25 x 40	20	314	115 ¹⁾	140	---	150	100	110	420	495	G ¹ / ₄	38	62	14
32 x 50	25	491	140 ¹⁾	155	---	165	110	115	475	560	G ¹ / ₄	38	62	20
40 x 65	32	804	150 ¹⁾	170	---	185	130	140	535	640	G ¹ / ₄	30	50	28
50 x 80	40	1257	165 ¹⁾	180	---	200	145	150	650	760	G ¹ / ₄	30	50	40
65 x 100	50	1964	185 ¹⁾	205	---	235	155	160	685	815	G ³ / ₈	30	50	50
80 x 125	63	3117	200 ¹⁾	215	---	270	190	180	790	935	G ³ / ₈	23	40	80
100 x 150	77	4657	235 ¹⁾	250	---	300	210	200	920	--- ³⁾	G ³ / ₈	18	32	130
125 x 200	93	6793	270 ¹⁾	295	340	360 / ---	215	220	960	--- ³⁾	G ¹ / ₂	12	25	150
150 x 250	110	9503	300	---	405 ²⁾	--- / ---	225	245	1020	--- ³⁾	G ¹ / ₂	9,5	16	180
200 x 300	155	18870	360 / ---	---	445	--- / ---	265	290	1210	--- ³⁾	G ¹ / ₄	0,45	10	300
300 x 400	220	38010	485 / ---	---	565	--- / ---	335	370	1480	--- ³⁾	G ³ / ₄	0,3	7	470
400 x 500	280	61575	620 / ---	---	670	--- / ---	375	415	1650	--- ³⁾	G ³ / ₄	0,25	4,5	550

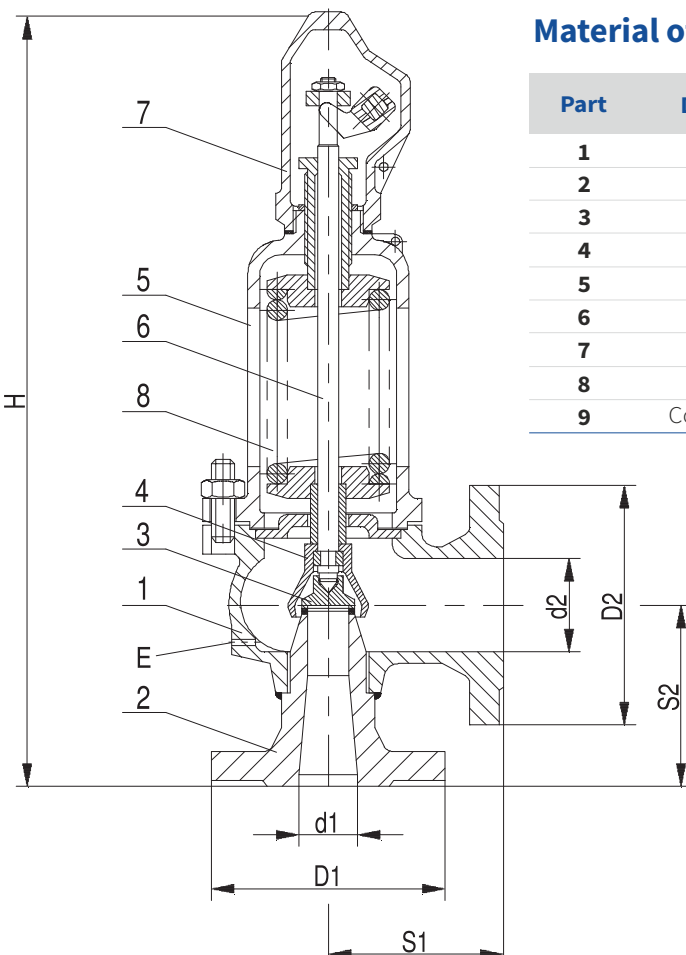
¹⁾ if possible according to the opening pressure, after agreement with the customer

²⁾ output flange drilled like PN16

³⁾ execution with cooling spacer on demand

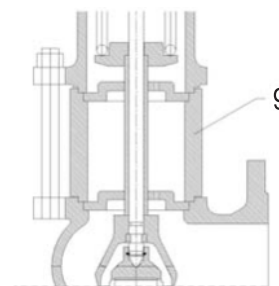
⁶⁾ delivered only after agreement with the customer

⁸⁾ the weights of the valve with cooling spacer are given in a separate table at the end of the catalog



Material of safety valve PV 6103 main parts

Part	Description	Material
1	Body	GP240GH
2	Seat	13CrMo4-5 (od DN 125 GP240GH)
3	Plug	X39CrMo17-1 (od DN200 GX5CrNi19-10)
4	Bell	EN-GJS-400-15 (od DN200 GP240GH)
5	Bonnet	GP240GH
6	Spindle	X20Cr13
7	Cap	EN-GJS-400-15 (od DN200 GP240GH)
8	Spring	51CrV4
9	Cooling spacer	C22



Basic dimensions, weight and range of set pressure PV 6104 | PN 100 | DN 25 x 40 to 100 x 150

Size DN $d_1 \times d_2$	Seat		Input flange	Output flange	Centre to face		Installation height		Drainage ⁶⁾ E thread	Set pressure (p_{set})		Weight (approx.) m [kg]
	dia d_o [mm]	area A_o [mm ²]	PN63 PN100 D_1 [mm]	PN40 D_2 [mm]	S_1 [mm]	S_2 [mm]	wo cooling spacer H [mm]	with cooling spacer H [mm]		min. [barg]	max. [barg]	
25 x 40	16	201	140	150	100	120	430	505	G $\frac{1}{4}$	60	95	15
32 x 50	20	314	155	165	110	125	485	570	G $\frac{1}{4}$	60	95	20
40 x 65	25	491	170	185	130	140	535	640	G $\frac{1}{4}$	48	95	28
50 x 80	32	804	195	200	145	150	650	760	G $\frac{1}{4}$	48	95	40
65 x 100	40	1257	220	235	155	165	685	812	G $\frac{3}{8}$	48	95	50
80 x 125	50	1964	230	270	190	185	795	940	G $\frac{3}{8}$	38	78	80
100 x 150	63	3117	250	300	210	200	940	³⁾	G $\frac{3}{8}$	30	62	130

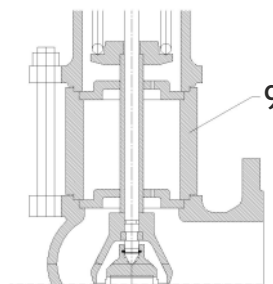
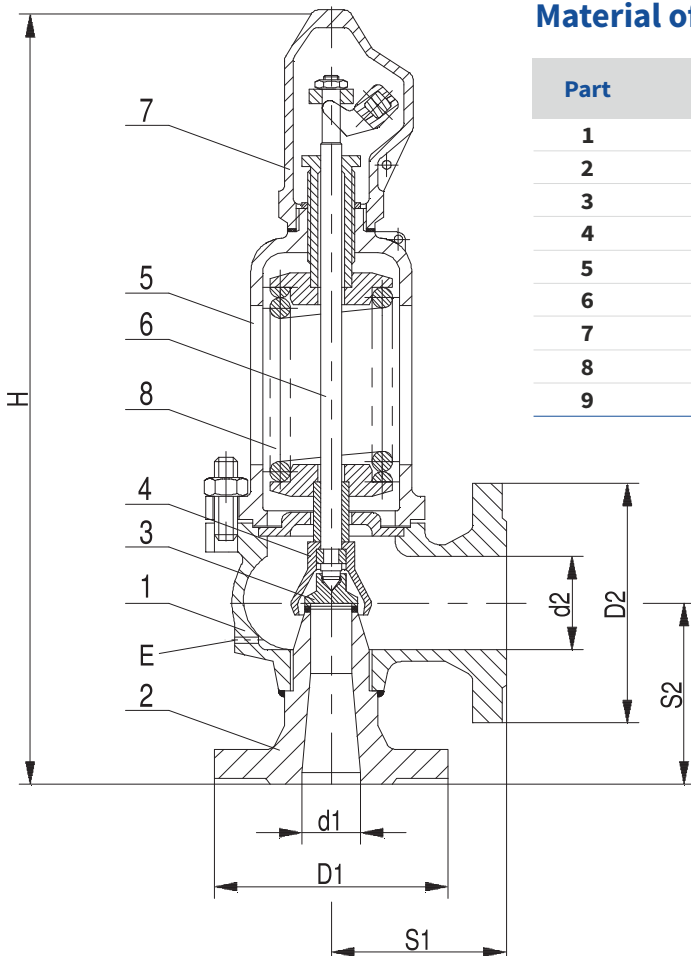
³⁾ execution with cooling spacer on demand

⁶⁾ delivered only after agreement with the customer

⁸⁾ the weights of the valve with cooling spacer are given in a separate table at the end of the catalog

Material of safety valve PV 6104 main parts

Part	Description	Material
1	Body	GP240GH
2	Seat	13CrMo4-5
3	Plug	X39CrMo17-1
4	Bell	EN-GJS-400-15
5	Bonnet	GP240GH
6	Spindle	X20Cr13
7	Cap	EN-GJS-400-15
8	Spring	51CrV4
9	Cooling spacer	C22



Supporting brackets

The valve is provided with supporting brackets.

On demand, the fixing holes can be drilled into brackets according to following tables:

Dimensions of supporting brackets/fixing holes PV 6102 (PN40)

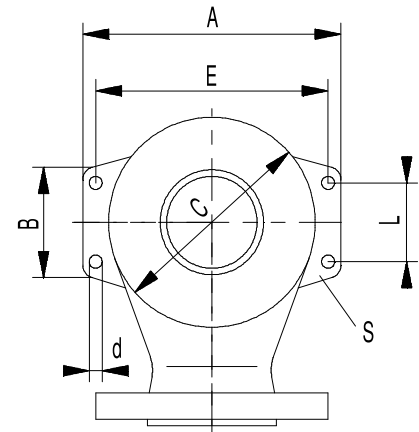
Size DN	A	B	C	L [mm]	E	d	S
40 x 65	180	84	134	65	155	14	10
50 x 80	210	93	160	70	180	14	12
65 x 100	245	94	196	70	215	14	12
80 x 125	300	100	240	90	270	18	15
100 x 150	320	160	280	130	285	18	15
125 x 200	365	120	300	90	330	18	15
150 x 250	415	150	360	120	380	18	15

Dimensions of supporting brackets/fixing holes PV 6103 (PN63)

Size DN	A	B	C	L [mm]	E	d	S
40 x 65	186	93	140	70	156	14	12
50 x 80	210	95	165	70	180	14	12
65 x 100	250	95	205	70	220	14	12
80 x 125	295	120	240	90	260	18	15
100 x 150	320	120	265	90	285	18	15
125 x 200	365	120	300	90	330	18	15
150 x 250	415	150	360	120	380	18	15
200 x 300	510	180	450	150	470	23	20
300 x 400	695	210	600	180	655	23	20
400 x 500	800	230	715	200	760	23	20

Dimensions of supporting brackets/fixing holes PV 6104 (PN100)

Size DN	A	B	C	L [mm]	E	d	S
40 x 65	186	93	140	70	156	14	12
50 x 80	210	95	165	70	180	14	12
65 x 100	250	95	205	70	220	14	12
80 x 125	295	120	240	90	260	18	15
100 x 150	320	120	265	90	285	18	15

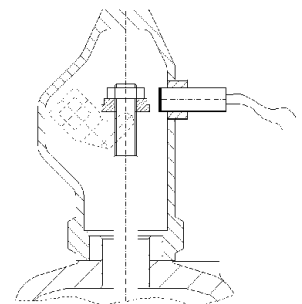


Accessories

The valve can be provided with CLOSE position sensor (inductive switch) on demand. If not specified, the standard sensor has following parameters:

Working range (sensitivity):	3 mm (M8); 6 mm (M12) resp. 10 mm (M18)
Voltage:	20 ± 10 VDC
Protection:	IP67 (M8); IP68 (M12 and M18)
Temperature range:	from -25°C to +70°C
Length of connecting cable:	2000 mm

If the working condition (temperature) is over the above mentioned limits, the valve can be provided with sensor, suitable for range from -25°C to +230°C



Value of certified coefficient of discharge K_{dr}

DN	Valve type PV 610x K_{dr} for steam and gases	
	$\Delta p_{max} = 0,1 \text{ bar}$ $p_{set} \leq 1 \text{ barg}$ or $\Delta p_{max} = 10\%$ $1 < p_{set} \leq 1,4 \text{ barg}$	$\Delta p_{max} = 10\%$ $p_{set} > 1,4 \text{ barg}$
20 x 32 to 150 x 250	0,72	0,78
200 x 300	0,70	0,74
300 x 400 400 x 500	0,54	0,70

Note: Δp_{max} is maximal value of overpressure p_{set} necessary for full lift of valve

Series PV 610x valve's type number specification

		XX	XX	XXX	XXX	/	XXX	-	XXX	XX	/	X	-	XXX,X	/	X
1. Valve	spring loaded full lift safety valve with open bonnet	PV 61														
2. Nominal pressure	PN16		01													
	PN40		02													
	PN63		03													
	PN100		04													
3. Lift	full lift			S												
	full lift + extended seat			X												
4. Seat surface material	metal / metal			M												
	metal / metal + cooling spacer			W												
5. Execution	standard			B												
6. Size	DN -inlet				XXX											
	DN - outlet						XXX									
	seat dia (mm)							XXX								
7. Connection	flanged only									PP						
8. Body material	cast iron (EN-GJL-250), $T_{max} 300^{\circ}\text{C}$													1		
	cast carbon steel (GP240GH), $T_{max} 450^{\circ}\text{C}$													2		
	nodular cast iron (EN-GJS-400-18), $T_{max} 350^{\circ}\text{C}$													4		
9. Set pressure	p_{set} [barg]													XXX,X		
10. Protected medium	gas															G
	steam															S

Example of order:

PV 6103 SMB 150/250-110 PP/2-010,5/S i.e. spring loaded full lift safety valve with open bonnet, nominal pressure PN 63, unrestricted lift, metal/metal seat, standard execution, size DN 150x250, seat dia 110 mm, flanged connection, body made from carbon steel (GP 240 GH), set pressure $p_{set} = 10,5$ barg, protected medium: steam

Maximal permissible working pressures according to ČSN EN 12516-1 resp. ČSN EN 1092-2 [bar]

Material	PN	Temperature [°C]													
		RT ¹⁾	50	100	120	150	180	200	250	300	350	375	400	425	450
Cast iron EN-GJL 250 (EN-JL-1040)	10	10,0	10,0	10,0	10,0	9,0	8,4	8,0	7,0	6,0	---	---	---	---	---
	16	16,0	16,0	16,0	16,0	14,4	13,4	12,8	11,2	9,6	---	---	---	---	---
Nodular cast iron EN-GJS-400-18 (EN-JS 1025)	10	10,0	10,0	10,0	10,0	9,7	---	9,2	8,7	8,0	7,0	---	---	---	---
	40	40,0	40,0	40,0	40,0	38,8	---	36,8	34,8	32,0	28,0	---	---	---	---
Cast carbon steel GP240GH (1.0619)	10	10,0	10,0	9,4	---	8,9	---	8,4	7,7	7,0	6,5	6,2	6,0	5,2	3,7
	25	25,0	25,0	23,4	---	22,2	---	21,0	19,2	17,4	16,2	15,6	15,0	13,0	9,2
	40	40,0	40,0	37,4	---	35,5	---	33,6	30,7	27,8	25,9	25,0	24,0	20,8	14,7
	63	63	63	59,0	---	55,9	---	52,9	48,4	43,8	40,8	39,3	37,8	32,7	23,2
	100	100	100	93,6	---	88,8	---	84,0	76,8	69,6	64,8	62,4	60,0	51,9	36,8
Alloy steel 13CrMo4-5 (1.7335)	40	40	40	40	---	40	---	40	40	40	37,3	35,9	34,1	32,7	31,5
	63	63	63	63	---	63	---	63	63	63	58,7	56,5	53,8	51,4	49,7
	100	100	100	100	---	100	---	100	100	100	93,1	89,8	85,3	81,6	78,9

¹⁾ -10°C to 50°C

Weights of valves with cooling spacer

Size DN	Valve execution - weight [kg]			
	6102 (GP240GH)	6102 (EN-GJS-400-18)	6103 (GP240GH)	6104 (GP240GH)
20 x 32	9,7	9,2	13,8	---
25 x 40	11,8	10,8	16,3	17,3
32 x 50	16,3	15,3	23,6	23,6
40 x 65	23,6	22,6	33	33
50 x 80	32	30	46,2	46,2
65 x 100	45,2	43,2	59,1	59,1
80 x 125	64,1	61,1	94,4	94,4
100 x 150	96,4	91,4	---	---
125 x 200	112,1	---	---	---
150 x 250	---	---	---	---
200 x 300	---	---	---	---
300 x 400	---	---	---	---
400 x 500	---	---	---	---

³⁾ execution with cooling spacer only after agreement with producer



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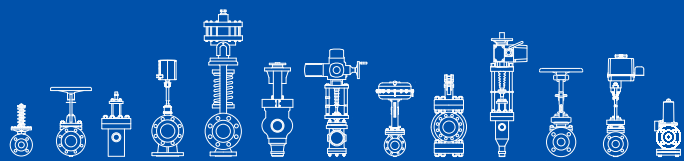
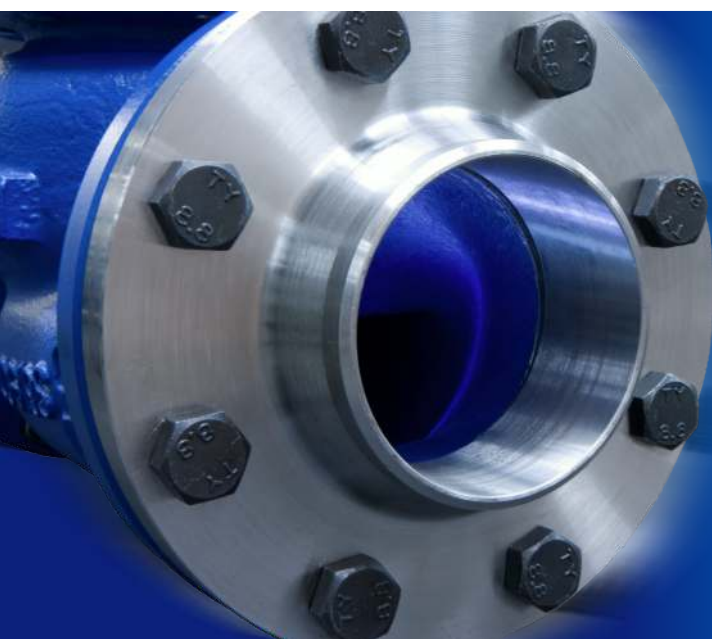
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