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SAFETY VALVE WITH CLOSED BONNET

PV 25





PV 25

Spring loaded
proportional safety valve,
flanged, with closed bonnet

Description

The safety valve Series PV 25 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+A1, 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.

Thanks to closed bonnet, the valve can be executed as gas-tight too.

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 25 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 ($A_{0,1}$, K_{dr}), 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 case of higher seat tightness demand, the disc with soft sealing (EPDM, NBR) is recommended. This execution is limited by max. temperature +120°C.

If the protected medium is liquid, the valve is, regarding the reliable function, offered either as the valve with limited lift (and reduced value of certified coefficient of discharge K_{dr} , see tables page 8) or as the full lift valve with soft seat and diaphragm (for PN16 and PN40 only).

The value of certified coefficient of discharge K_{dr} is higher, than in previous version, but this one is limited by size (DN 20x32 to 100x150), maximal temperature of medium +120°C and maximal value of set pressure p_{set} 10 barg.

Possible combinations (execution, seat material...) see relevant tables and type number specification.

Process media

The valve is determined for steam, air and other gases and liquids. 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 250x xWx 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

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}

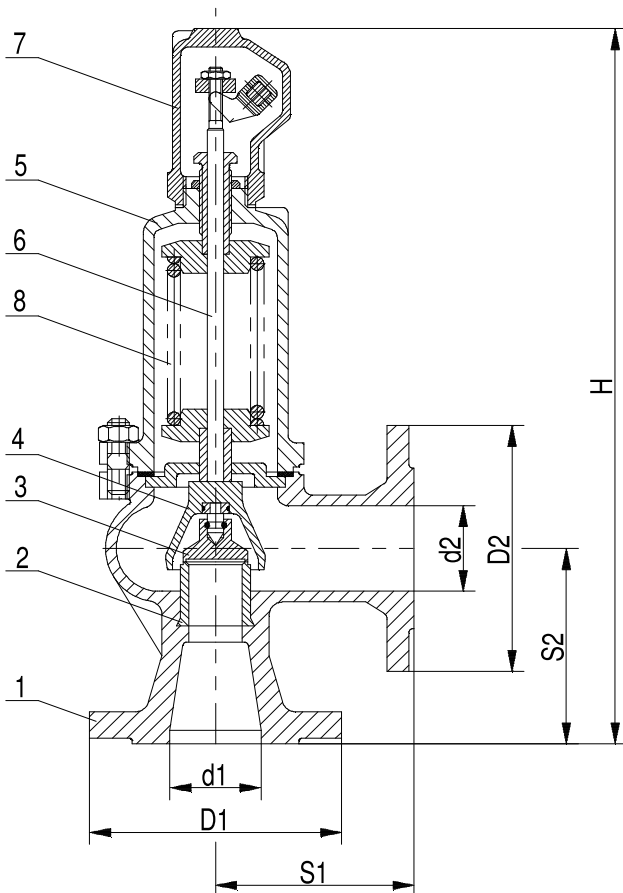
The full type number must be given when ordering the valve. Demands for other flanges than according to ČSN EN 1092-1+A1, resp. ČSN EN 1092-2, for position sensor or supporting brackets with drilled fixing holes must be placed in order too. The counter flanges, gaskets and bolts/nuts can be provided on demand too.

Basic dimensions, weight and range of set pressure PV 2501 | PN 16 | DN 15 x 15 to 200 x 200

| Size DN $d_1 \times d_2$ | Seat | | Input flange | Output flange | Centre to face | | Installation height | Opening pressure (P_{set}) | | | Weight (approx.) |
|------------------------------------|----------------------|-------------------------------------|-----------------------|-----------------------|----------------|---------------|------------------------|-----------------------------------|------------------------------|----------------|---------------------|
| | dia d_0 [mm] | area A_0 [mm ²] | PN16 D_1 [mm] | PN10 D_2 [mm] | S_1 [mm] | S_2 [mm] | H [mm] | min. ¹⁾ [barg] | min. ²⁾ [barg] | max. [barg] | m [kg] |
| 15 x 15 | 12 | 113 | 95 | 95 | 90 | 90 | 330 | 0,45 | 1,00 | 16,00 | 6 |
| 20 x 20 | 12 | 113 | 105 | 105 | 95 | 95 | 335 | 0,45 | 1,00 | 16,00 | 6 |
| 25 x 25 | 16 | 201 | 115 | 115 | 100 | 100 | 350 | 0,45 | 1,00 | 16,00 | 8 |
| 32 x 32 | 20 | 314 | 140 | 140 | 105 | 105 | 390 | 0,45 | 1,00 | 16,00 | 10 |
| 40 x 40 | 25 | 491 | 150 | 150 | 115 | 115 | 420 | 0,45 | 1,00 | 16,00 | 12 |
| 50 x 50 | 32 | 804 | 165 | 165 | 125 | 125 | 485 | 0,45 | 1,00 | 16,00 | 20 |
| 65 x 65 | 40 | 1257 | 185 | 185 | 145 | 145 | 540 | 0,45 | 1,00 | 16,00 | 25 |
| 80 x 80 | 50 | 1964 | 200 | 200 | 155 | 155 | 655 | 0,45 | 1,00 | 16,00 | 36 |
| 100 x 100 | 63 | 3117 | 220 | 220 | 175 | 175 | 705 | 0,45 | 1,00 | 16,00 | 47 |
| 125 x 125 | 77 | 4657 | 250 | 250 | 200 | 200 | 810 | 0,45 | 1,00 | 16,00 | 74 |
| 150 x 150 ¹⁾ | 93 | 6793 | 285 | 285 | 225 | 225 | 850 | 0,45 | --- | 16,00 | 100 |
| 200 x 200 ¹⁾ | 110 | 9503 | 340 | 340 | 250 | 250 | 980 | 0,45 | --- | 16,00 | 140 |

¹⁾ for metal-metal seat only

²⁾ for soft seat only



Material of safety valve PV 2501 main parts

| Part | Description | Material |
|------|--------------------|------------------------|
| 1 | Body | EN-GJL-250 |
| 2 | Seat | X39CrMo17-1 |
| 3 | Disc ¹⁾ | X39CrMo17-1 |
| 3 | Disc ²⁾ | X6CrNiTi18-10+EPDM/NBR |
| 4 | Bell | EN-GJS-400-15 |
| 5 | Bonnet | EN-GJS-400-15 |
| 6 | Spindle | X20Cr13 |
| 7 | Cap | EN-GJS-400-15 |
| 8 | Spring | 51CrV4 |

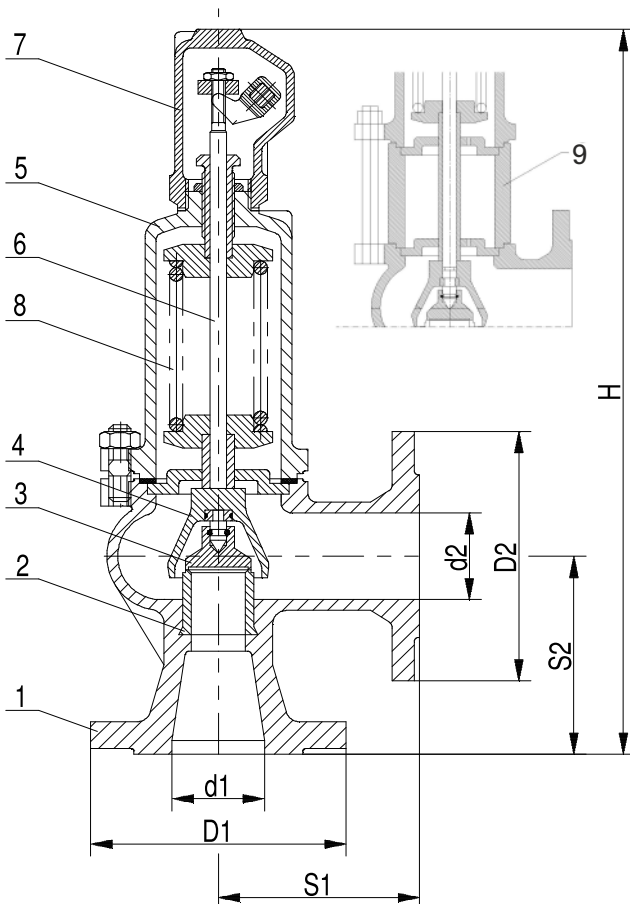
Basic dimensions, weight and range of set pressure PV 2502 | PN 40 | DN 20 x 20 to 200 x 200

| Size DN $d_1 \times d_2$ | Seat | | Inlet flange PN 25/40 | | Outlet flange PN 10 | Centre to face | | Installation height | | Opening pressure (p_{set}) | | | | Weight (approx.) | |
|------------------------------------|----------------------|-------------------------------------|-----------------------------|---------------|---------------------------|-------------------|--------------------------------------|---------------------------|------------------------------|-----------------------------------|------------------------------|----------------|-----------|-------------------------|------|
| | dia d_0 [mm] | area A_0 [mm ²] | D_1 [mm] | D_2 [mm] | S_1 [mm] | S_2 [mm] | wo cooling spacer H [mm] | with cooling spacer | min. ¹⁾ [barg] | min. ²⁾ [barg] | min. ⁴⁾ [barg] | max. [barg] | m [kg] | m ⁸⁾ [kg] | |
| 20 x 20 | 12 | 113 | --- | 105 | 105 | 95 | 95 | 335 | --- | 0,45 | 1,00 | 0,20 | 40,00 | 7 | --- |
| 25 x 25 | 16 | 201 | --- | 115 | 115 | 100 | 100 | 350 | 410 | 0,45 | 1,00 | 0,20 | 40,00 | 9 | 10,7 |
| 32 x 32 | 20 | 314 | --- | 140 | 140 | 105 | 105 | 390 | 460 | 0,45 | 1,00 | 0,20 | 40,00 | 12 | 13,8 |
| 40 x 40 | 25 | 491 | --- | 150 | 150 | 115 | 115 | 420 | 495 | 0,45 | 1,00 | 0,20 | 40,00 | 14 | 16,3 |
| 50 x 50 | 32 | 804 | --- | 165 | 165 | 125 | 125 | 485 | 575 | 0,45 | 1,00 | 0,20 | 40,00 | 22 | 25,6 |
| 65 x 65 | 40 | 1257 | --- | 185 | 185 | 145 | 145 | 540 | 645 | 0,45 | 1,00 | 0,20 | 40,00 | 28 | 33 |
| 80 x 80 | 50 | 1964 | --- | 200 | 200 | 155 | 155 | 655 | 765 | 0,45 | 1,00 | 0,20 | 40,00 | 40 | 46,2 |
| 100 x 100 | 63 | 3117 | --- | 235 | 220 | 175 | 175 | 705 | 835 | 0,45 | 1,00 | 0,20 | 40,00 | 52 | 61,1 |
| 125 x 125 | 77 | 4657 | --- | 270 | 250 | 200 | 200 | 810 | 955 | 0,45 | 1,00 | --- | 40,00 | 80 | 94,4 |
| 150 x 150 ¹⁾ | 93 | 6793 | --- | 300 | 285 | 225 | 225 | 850 | --- | 0,45 | --- | --- | 25,00 | 110 | --- |
| 200 x 200 ¹⁾ | 110 | 9503 | 360 ⁵⁾ | --- | 340 | 250 | 250 | 980 | --- | 0,45 | --- | --- | 16,00 | 150 | --- |

¹⁾ for metal-metal seat only ²⁾ for soft seat only

³⁾ execution with cooling spacer on demand ⁴⁾ for stainless steel only

⁵⁾ pro size DN 200x200 the PN 25 flange only ⁸⁾ execution with cooling spacer



Material of safety valve PV 2502 main parts

| Part | Description | Material |
|------|--------------------|-------------------------|
| 1 | Body | GP240GH |
| 2 | Seat | X39CrMo17-1 |
| 3 | Disc ¹⁾ | X39CrMo17-1 |
| 3 | Disc ²⁾ | X6CrNiTi18-10+EPDM/NBR |
| 4 | Bell | EN-GJS-400-15 |
| 5 | Bonnet | EN-GJS-400-15 / GP240GH |
| 6 | Spindle | X20Cr13 |
| 7 | Cap | EN-GJS-400-15 |
| 8 | Spring | 51CrV4 |
| 9 | Cooling spacer | C22 |

Material of safety valve PV 2502, stainless steel execution

| Part | Description | Material |
|------|--------------------|---------------|
| 1 | Body | GX5CrNi19-10 |
| 2 | Seat | X6CrNiTi18-10 |
| 3 | Disc ¹⁾ | X6CrNiTi18-10 |
| 4 | Bell | GX5CrNi19-10 |
| 5 | Bonnet | GX5CrNi19-10 |
| 6 | Spindle | X6CrNiTi18-10 |
| 7 | Cap | GX5CrNi19-10 |
| 8 | Spring | X10CrNi18-8 |

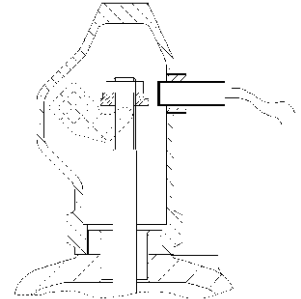
The stainless steel valve is manufactured in size range from DN 20 x 20 to DN 100 x 100 only. Regarding the fact, that the bonnet is closed and the valve is determined for corrosive service, only the gas-tight execution of valve is available.

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



| Hodnoty zaručených výtokových součinitelů K_{dr} | | |
|--|------------------------------|-------------------------|
| DN | Valve type PV 250x | |
| | K_{dr} for steam and gases | K_{dr} for liquids |
| | $\Delta p_{max} = 10\%$ | $\Delta p_{max} = 10\%$ |
| 15 x 15 to 200 x 200 | 0,25 | 0,006 |

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

Series PV 250x valve's type number specification

| | | XX | XX | XXX | XXX | / | XXX | - | XXX | XX | / | X | - | XXX,X | / | X |
|---------------------------------|--|--------------|-----------|----------|-----|------------|-----|------------|------------|----|---|-----------|---|----------|--------------|----------|
| 1. Valve | spring loaded proportional safety valve with close bonnet | PV 25 | | | | | | | | | | | | | | |
| 2. Nominal pressure | PN 16 | | 01 | | | | | | | | | | | | | |
| | PN 40 | | 02 | | | | | | | | | | | | | |
| 3. Lift | full lift | | | S | | | | | | | | | | | | |
| | full lift + extended seat | | | X | | | | | | | | | | | | |
| 4. Seat surface material | metal - metal | | | M | | | | | | | | | | | | |
| ¹⁾ up to 120°C | metal - metal + cooling spacer | | | W | | | | | | | | | | | | |
| ²⁾ up to 90°C | soft seat EPDM ¹⁾ | | | E | | | | | | | | | | | | |
| | soft seat NBR ²⁾ | | | N | | | | | | | | | | | | |
| 5. Execution | standard | | | B | | | | | | | | | | | | |
| | gas tight | | | G | | | | | | | | | | | | |
| 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°C | | | | | | | | | | | | | 1 | | |
| | cast carbon steel (GP240GH), T _{max} 450°C | | | | | | | | | | | | | 2 | | |
| | cast stainless steel (GX5CrNi19-10), T _{max} 300°C | | | | | | | | | | | | | 3 | | |
| 9. Set pressure | p _{set} [barg] | | | | | | | | | | | | | | XXX,X | |
| 10. Protected medium | gas | | | | | | | | | | | | | | | G |
| | steam | | | | | | | | | | | | | | | S |
| | liquid | | | | | | | | | | | | | | | L |

Order example

PV 2502 SEG 080/080-050 PP/2-014,5/L i.e. spring loaded proportional safety valve with closed bonnet, nominal pressure PN 40, full lift, EPDM soft seat, gas-tight execution, size DN 80x80, seat dia 50 mm, flanged connection, body made from carbon steel (GP240GH), set pressure p_{set} = 14,5 barg, protected medium: liquid

Maximal permissible working pressures according to ČSN EN 12516-1, respective 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 | --- | --- | --- | --- | --- | |
| 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 | |
| Cast stainless steel GX5CrNi19-10 (1.4308) | 10 | 10,0 | 10,0 | 9,2 | --- | 8,1 | --- | 7,00 | 6,6 | 6,2 | --- | --- | --- | --- | --- | |
| | 40 | 40,0 | 40,0 | 37,0 | --- | 32,5 | --- | 28,0 | 26,3 | 24,6 | --- | --- | --- | --- | --- | |

¹⁾ -10°C to 50°C



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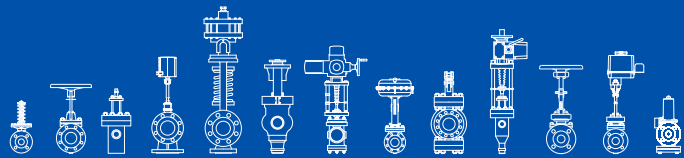
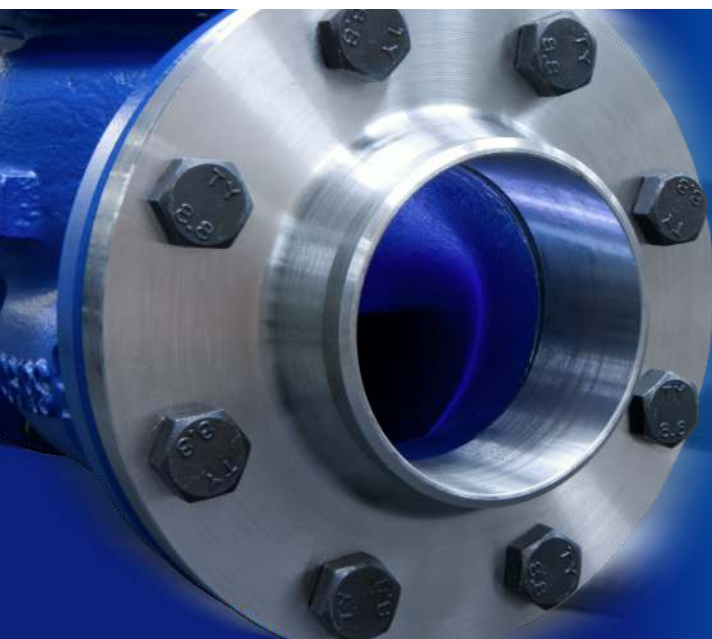
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