

Self-operated Pressure Regulators

Excess Pressure Valve Type 2422/2425



Application

Pressure regulators for set points from **0.05 bar** to **2.5 bar** · Valves in **DN 125** to **250** · Nominal pressures **PN 16** to **40** · Suitable for liquids, gases and vapors up to **350 °C**

The valve **opens** when the upstream pressure **rises**.



The excess pressure valves, consisting of a valve and an actuator, control the upstream pressure to an adjustable set point. The medium pressure to be kept constant is transmitted over a control line to the diaphragm of the actuator.

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and easy set point adjustment over a nut
- Exchangeable actuator and positioning springs
- Spring-loaded, single-seated valve with upstream and downstream pressure balanced by a stainless steel bellows or by a balancing diaphragm
- Low-noise standard plug · Special version with a flow divider St I or St III for further noise level reduction (see Data Sheet T 8081 EN)
- Reduced K_{VS} coefficients for adaption to the operating conditions

Versions

Type 2422/2425 Excess Pressure Valve for sizes DN 125 to 250 (valves above DN 250 on request) consisting of:

Type 2422 Valve with soft-seated plug, balanced by a bellows or a diaphragm · Body of cast iron, spheroidal graphite iron, cast steel or cast stainless steel · Type 2425 Actuator with EPDM rolling diaphragm and screw fitting

Special versions

- Valve with flow divider St I or St III for particularly low-noise operation
- With metal-seated plug
- FPM rolling diaphragm for oils
- Version completely in stainless steel for nominal pressure PN 16 to 40 · Details on request
- Versions for oxygen service
- Actuator with two diaphragms



Fig. 1 · Type 2422/2425 Excess Pressure Valve

Principle of operation (see Fig. 2)

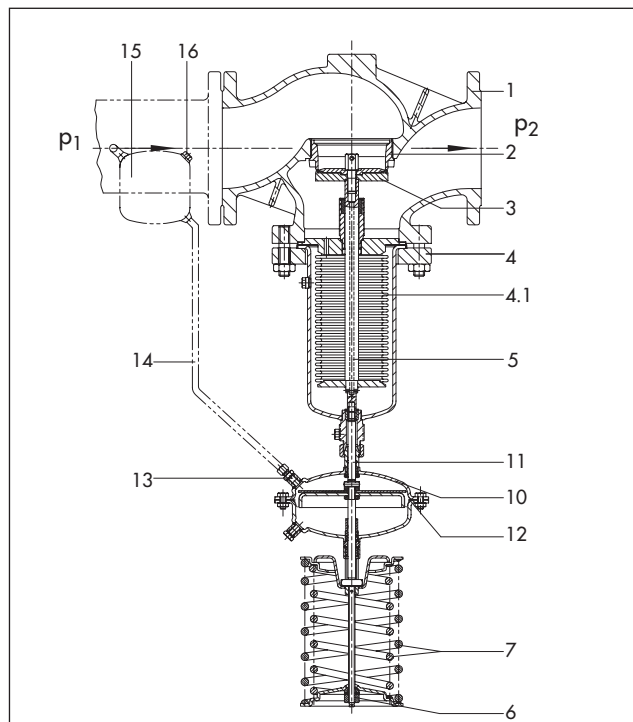
The medium flows through the valve as indicated by the arrow. The position of the valve plug (3) and the area released between the plug and seat (2) determine the flow rate. The plug stem (5) with the plug is connected to the stem (11) of the actuator (10).

To control the pressure, the upstream pressure p_1 to be controlled is adjusted using the positioning springs (7) and the set point adjuster (6). The valve is closed by the force of the positioning springs when it is relieved of pressure ($p_1 = p_2$).

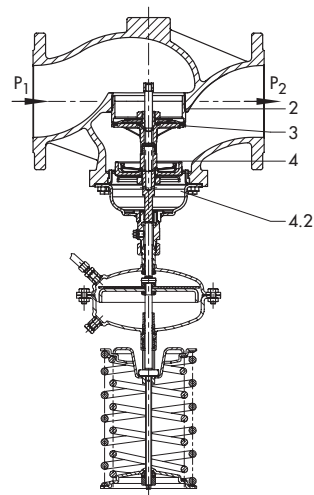
The upstream pressure p_1 to be controlled is tapped upstream of the valve and transmitted via the control line to the operating diaphragm (12) where it is converted into a positioning force. This force is used to move the valve plug (3) according to the force of the positioning springs (7), which is adjustable at the set point adjuster (6).

The principle of operation of the regulator with a valve balanced by a bellows or by a diaphragm only differ concerning their pressure balancing. The valves balanced by a diaphragm have a balancing diaphragm (4.2) instead of a balancing bellows (4.1). In both cases, the forces created by the upstream and downstream pressures acting on the valve plug are equally balanced out.

The valves can be equipped with a flow divider St I or St III. When retrofitting the valve with a flow divider, the seat must be exchanged.



Type 2422/2425 Excess Pressure Valve
Type 2422 Valve · Balanced by a bellows



Type 2422/2425 Excess Pressure Valve
Type 2422 Valve · Balanced by a diaphragm

- 1 Valve body
- 2 Seat (exchangeable)
- 3 Plug
- 4 Bellows housing
- 4.1 Balancing bellows
- 4.2 Balancing diaphragm
- 5 Plug stem
- 6 Set point adjuster
- 7 Positioning springs
- 10 Actuator
- 11 Actuator stem
- 12 Operating diaphragm
- 13 Control line connection G $\frac{3}{8}$
(screw joint with restriction)
- 14 Control line (attached on site)
- 15 Condensation chamber
- 16 Filler plug

Upstream pressure p_1
Downstream pressure p_2

Fig. 2 · Functional diagrams

Installation

- Install the valve with the actuator suspended downwards.
- Install pipelines horizontally with a slight downward slope on both sides of the valve for drainage of the condensate.
- The direction of medium flow must correspond with the arrow on the valve body.
- Connect a control line to the actuator from the point of pressure tapping in the pipeline located approximately one meter upstream of the valve or at the point of measurement of the connected plant (with condensation chamber, if necessary).

Accessories

- Screw joints for connection of the control line $\frac{3}{8}$ " to the filler neck. Other screw joints are available on request.
- Condensation chamber for steam condensation and protection of the operating diaphragm against extreme temperatures. This chamber is necessary for steam and liquids above 150 °C.
- The control line (pipe $\frac{3}{8}$ ") is to be attached on site.

Detailed information on accessories can be found in Data Sheet T 2595 EN.

Pressure-temperature diagram (acc. to DIN EN 12516-1)

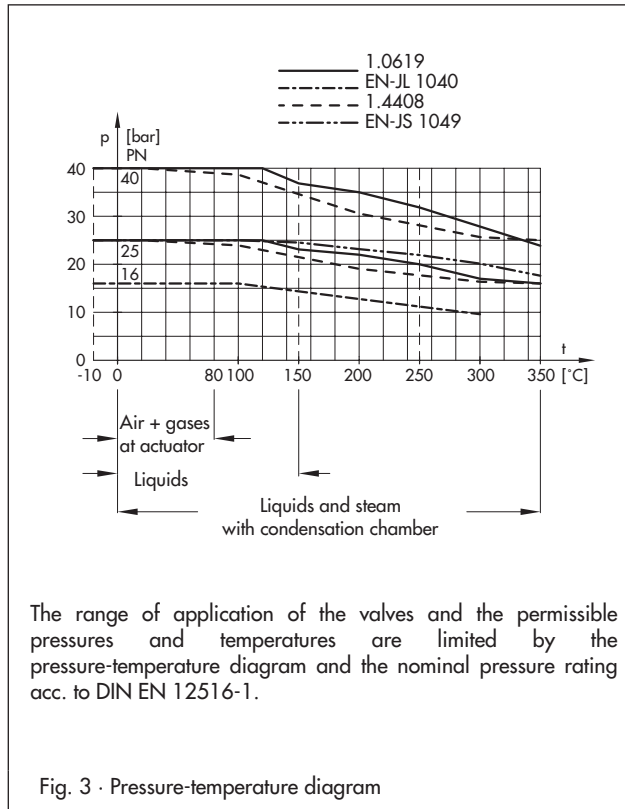


Table 1 · Technical data · All pressures in bar (gauge)

| Type 2422 Valve | | | | |
|---------------------------------|--|---------------------|--------|---------------------|
| Nominal pressure | PN 16, 25 or 40 | | | |
| Nominal size | DN 125 | DN 150 | DN 200 | DN 250 |
| Temperature range | See Fig. 3 · Pressure-temperature diagram | | | |
| Valve plug | Metal sealing: 350 °C · PTFE soft sealing: 220 °C · Valve balanced by a diaphragm: 150 °C | | | |
| Leakage rate | ≤ 0.05 % of K _{VS} | | | |
| Type 2425 Actuator | | | | |
| Set point ranges | 0.05 to 0.25 bar · 0.1 to 0.6 bar · 0.2 to 1 bar · 0.5 to 1.5 bar · 1 to 2.5 bar ¹⁾ | | | |
| Max. perm. pressure at actuator | Effective area | 320 cm ² | | 640 cm ² |
| | Pressure | 3 bar | | 1.5 bar |
| Max. perm. temperature | Gases 80 °C at the actuator · Liquids 150 °C, with condensation chamber max. 350 °C Steam with condensation chamber max. 350 °C | | | |

¹⁾ Set point ranges above 2.5 bar, refer to T 2552 EN for Type 2335 Excess Pressure Valve

Table 2 · Materials · Material number according to DIN EN

| Type 2422 Valve · Balanced by a bellows | | | | |
|--|---|-------------------------------------|-------------------|------------------------|
| Nominal pressure | PN 16 | PN 25 | PN 16/25/40 | |
| Valve body | Cast iron EN-JL1040 | Spheroidal graphite iron EN JS-1049 | Cast steel 1.0619 | Stainless steel 1.4408 |
| Seat | 1.4006 | | | 1.4571 |
| Plug | 1.4571 | | | |
| Seal for soft sealing | PTFE with 15 % glass fiber up to 220 °C | | | |
| Plug stem | 1.4301 | | | |
| Balancing bellows | 1.4571 | | | |
| Bottom section | 1.0305 | | | 1.4571 |
| Body gasket | Graphite with metal core | | | |
| Type 2422 Valve · Balanced by a diaphragm | | | | |
| Nominal pressure | PN 16 | PN 16/25 | PN 16/25/40 | – |
| Valve body | Cast iron EN-JL1040 | Spheroidal graphite iron EN JS-1049 | Cast steel 1.0619 | – |
| Seat | Red brass | | | |
| Plug | Standard version Red brass · Max. 150 °C with EPDM soft sealing or max. 150 °C with PTFE soft sealing | | | |
| Pressure balancing | Balancing cases made of sheet steel DD11 · EPDM diaphragm, max. 150 °C with liquids or max. 80 °C with non-flammable gases or NBR diaphragm, max. 60 °C | | | |
| Type 2424 Actuator | | | | |
| Diaphragm cases | Sheet steel DD11 | | | 1.4301 |
| Diaphragm | EPDM ¹⁾ with fabric insert | | | |
| Guide bushing | DU bushing | | | PTFE |
| Seals | EPDM/PTFE ¹⁾ | | | |

¹⁾ Special version for oils: FPM (FKM)

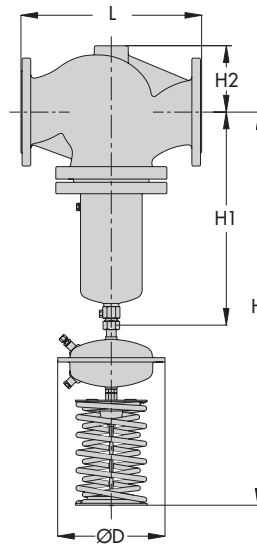
Table 3 · Standard K_{VS} coefficients and max. permissible differential pressures Δp · Balanced by a bellows

| Type 2422 Valve · Balanced by a bellows | | | | | |
|--|--------|--------------------------|-------------------------------------|---|-------------------------------------|
| Standard K _{VS} coefficients and max. permissible differential pressures Δp | | | | | |
| DN | Seat Ø | Standard K _{VS} | Flow divider St I K _{VS I} | Flow divider St III K _{VS III} | Max. perm. differential pressure Δp |
| 125 | 103 mm | 190 | 150 | 95 | 16 bar |
| 150 | 125 mm | 280 | 210 | 140 | 12 bar |
| 200 | 207 mm | 420 | 315 | 200 | 10 bar |
| 250 | 207 mm | 500 | 375 | 220 | 10 bar |
| Reduced K _{VS} coefficients and max. permissible differential pressures Δp | | | | | |
| 125 | 65 mm | 80 | 60 | 40 | 20 bar |
| 150 | 89 mm | 125 | 95 | 60 | 16 bar |
| 200 | 125 mm | 280 | 210 | 140 | 12 bar |
| 250 | 125 mm | 280 | 210 | 140 | 12 bar |

Table 4 · K_{VS} coefficients and max. permissible differential pressures Δp · Valve balanced by a diaphragm

| Type 2422 Valve · Balanced by a diaphragm | | | | | |
|---|--------------|--------|--------|--------|--------|
| Standard K_{VS} coefficients and max. permissible differential pressures Δp | | | | | |
| Nominal size | | DN 125 | DN 150 | DN 200 | DN 250 |
| K_{VS} coefficient | 22 mm travel | 190 | 290 | 550 | 600 |
| | 35 mm travel | 250 | 380 | 650 | 800 |
| Max. permissible differential pressures Δp | | 12 bar | | 10 bar | |

Dimensions · Valve balanced by a bellows



Type 2422/2425 Excess Pressure Valve

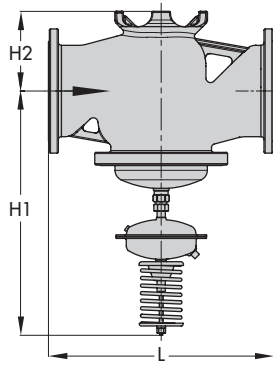
Dimensions in mm and weights · Dimensions in parentheses apply to temperatures between 220 °C to 350 °C

| Type 2422/2425 Excess Pressure Valve | | | | | |
|--------------------------------------|---|---------------------------------------|-------------|-------------|-----|
| Nominal size | DN | 125 | 150 | 200 | 250 |
| Set point range in bar | Length L | 400 | 480 | 600 | 730 |
| | Height H1 | 460 (600) | 590 (730) | 730 (870) | |
| | Height H2 | 145 | 175 | 270 | |
| 0.05 to 0.25 | Height H | 990 (1130) | 1120 (1260) | 1260 (1400) | |
| | Actuator | Ø D = 380 mm, A = 640 cm ² | | | |
| 0.1 to 0.6 | Height H | 990 (1130) | 1120 (1260) | 1260 (1400) | |
| | Actuator | Ø D = 380 mm, A = 640 cm ² | | | |
| | Valve spring force F | 3600 N | | | |
| 0.2 to 1.0 | Height H | 990 (1130) | 1120 (1260) | 1260 (1400) | |
| | Actuator | Ø D = 380 mm, A = 640 cm ² | | | |
| 0.5 to 1.5 | Height H | 940 (1080) | 1070 (1210) | 1210 (1350) | |
| | Actuator | Ø D = 285 mm, A = 320 cm ² | | | |
| 1 to 2.5 | Height H | 940 (1080) | 1070 (1210) | 1210 (1350) | |
| | Actuator | Ø D = 285 mm, A = 320 cm ² | | | |
| 0.05 to 1.0 | Weight for cast iron PN 16 ¹⁾ in kg, approx. | 135 | 185 | 425 | 485 |
| 0.5 to 1.5/ 1 to 2.5 | | 125 | 175 | 415 | 475 |

¹⁾ +10 % for cast steel PN 40 and spheroidal graphite iron PN 25

Fig. 4 · Dimensional diagram, Type 2422 Valve balanced by a bellows with Type 2425 Actuator

Dimensions · Valve balanced by a diaphragm



Type 2422 Valve · Balanced by a diaphragm

Fig. 5 · Dimensional diagram, Type 2422 Valve balanced by a diaphragm with Type 2425 Actuator

Dimensions in mm and weights in kg

| Type 2422/2425 · Balanced by a diaphragm | | | | |
|--|--------|--------|--------|--------|
| Nominal size | DN 125 | DN 150 | DN 200 | DN 250 |
| Length L | 400 | 480 | 600 | 730 |
| Height H1 | 720 | 745 | 960 | |
| Height H2 | 145 | 175 | 260 | |
| Weight in kg, approx | 75 | 95 | 250 | |

Ordering text

Excess Pressure Valve **Type 2422/2425**

DN ..., body material ..., PN ...

K_{VS} ..., set point range ... bar

Balanced by a bellows/balanced by a diaphragm

Optionally, accessories ..., optionally, special version ...

Specifications subject to change without notice.



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: <http://www.samson.de>

T 2549 EN

2011-02