# DATA SHEET

**T 2522 EN**

## Type 2406 Excess Pressure Valve

Self-operated Pressure Regulators · DIN version

### Application

Pressure regulators for set points from **5 mbar** to **10 bar** · Nominal sizes **DN 15** to **50** · Pressure rating **PN 16** to **40** · Suitable for liquids, gases and vapors · Temperature range from **-20** to **60 °C** (**0** to **150 °C**)[1)]

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



### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Compact regulator design providing excellent control accuracy
- Internal set point springs with set point adjustment using a set point adjuster on the actuator
- Spring-loaded, single-seated valve balanced by a balancing diaphragm
- External connection of a control line
- Meets strict fugitive emission requirements
- Based on the fugitive emission requirements according to TA Luft (TA Luft compliant)[2)]
- Minimum leakage class IV

1) For versions without pressure balancing that have an FKM diaphragm and FKM soft seal

2) Applies to 80 to 640 $cm^2$ actuator area, actuator diaphragm made of EPDM or FKM and temperature range 0 to +150 °C

This regulator is used to control the pressure of flammable gases used as a source of energy (e.g. in boilers, driers, vaporizers, heat exchangers or industrial ovens). Alternatively, it can control the compressed air supply in process engineering applications.

An additional application of the regulator is the pressure control of inert gas used for inerting or blanketing reaction or storage tanks to protect the product in the tank from oxidation, explosion or escaping. To achieve an economical consumption of the inert gas, its pressure must be controlled to always remain slightly higher than atmospheric pressure while the tank is being filled or emptied.

### Versions

Excess pressure valve for controlling the upstream pressure $p_1$ to the adjusted set point. The valve **opens** when the **upstream** pressure rises.

– Valves in DN 15 to 50 · Flanged connections · Plug with soft seal · Body made of cast iron EN-GJL-250, spheroidal graphite iron EN-GJS-400-18-LT, cast steel 1.0619, cast stainless steel 1.4408 or forged stainless steel 1.4404

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## Special versions

- FDA version[1)]
- NACE version for sour gas applications
- Actuator with seal and leakage line connection
- Version with connected control line. Pressure tapped directly at the valve body; optionally also with pressure gauge

1) This version is not suitable for direct contact with products manufactured in the food and pharmaceutical industries. It can only be used close to the product.

## Design and principle of operation

The medium flows through the regulator in the direction indicated by the arrow. The position of the plug (3) determines the cross-sectional area of flow between the plug and the seat (2).

In the pressureless state (control line not connected and no pressure applied) the valve is closed by the force of the set point springs (7). The spring force can be adjusted at the set point adjuster (8).

The upstream pressure $p_1$ to be controlled is tapped upstream of the regulator and transmitted over an external control line to the control line connection (9) on the actuator housing (6) where it is converted into a positioning force by the diaphragm plate with operating diaphragm (5). The diaphragm moves the plug over the plug stem (4) depending on the force of the set point springs (7).

When the force resulting from the upstream pressure $p_1$ rises above the spring force adjusted at the set point springs, the valve opens proportionally to the change in pressure.

In the version with pressure balancing, the forces produced by the upstream and downstream pressures acting on the plug are eliminated by the balancing diaphragm (10). The plug is fully balanced.

Pressure tapping directly at the valve (instead of using an external control line) is possible.

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

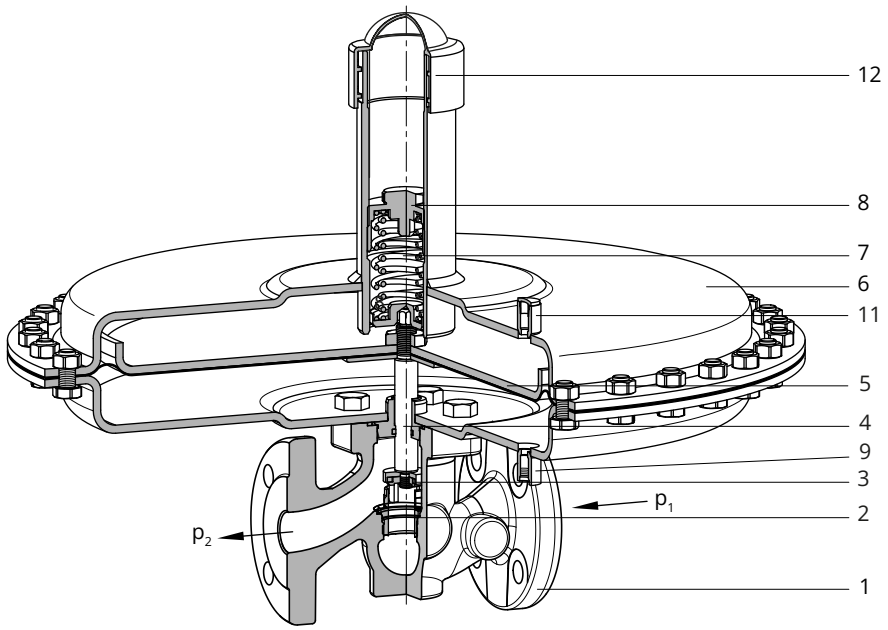



**Fig. 1:** *Type 2406 Excess Pressure Valve without pressure balancing*

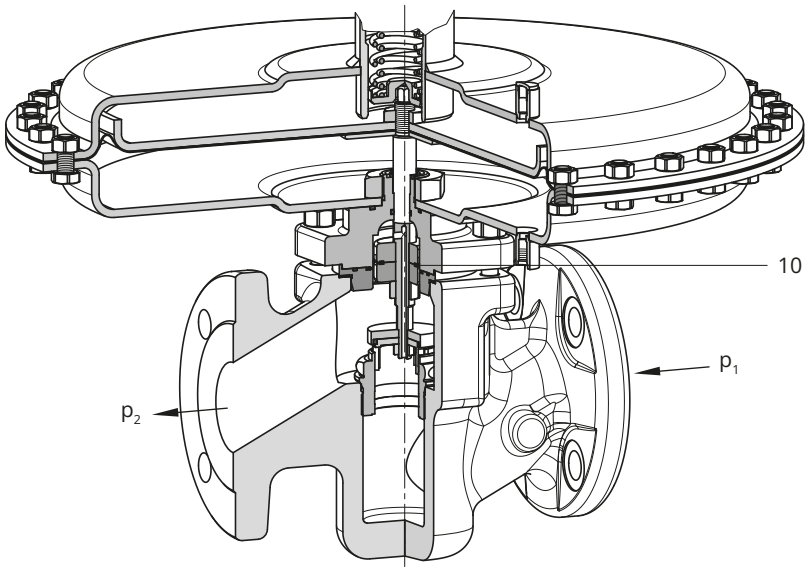



**Fig. 2:** *Type 2406 Excess Pressure Valve with pressure balancing*

## Legend for Figs. 1 and 2

1 Valve body
2 Seat
3 Plug
4 Plug stem
5 Diaphragm plate with operating diaphragm
6 Actuator housing
7 Set point spring
8 Set point adjuster (A/F 27)
9 Control line connection, G ¼ fitting
10 Balancing diaphragm
11 Leakage line connection (special version), G ¼ fitting
12 Cap

**Table 1:** *Materials*

| **Valve body** | **Cast iron EN-GJL-250, spheroidal graphite iron EN-GJS-400-18-LT, cast steel 1.0619** | **Cast stainless steel 1.4408, forged stainless steel 1.4404** |
|---|---|---|
| Seat, plug and plug stem | 1.4404 | |
| Seal and balancing diaphragm | EPDM · FKM · NBR | |
| **Actuator housing** | **1.0332** | **1.4301** |
| Operating diaphragm | EPDM · FKM · NBR | |

**Table 2:** *$K_{VS}$ coefficients*

| **Nominal size** | **DN 15** | **DN 20** | **DN 25** | **DN 32** | **DN 40** | **DN 50** |
|---|---|---|---|---|---|---|
| $K_{VS}$ (standard version) | 4.0 | 6.3 | 8.0 | 16 | 20 | 32 |
| $K_{VS}$ (reduced) | 0.1 · 0.25 · 0.4 · 1.0 · 1.6 · 2.5 | 0.1 · 0.25 · 0.4 · 1.0 · 1.6 · 2.5 · 4.0 | 0.1 · 0.25 · 0.4 · 1.0 · 1.6 · 2.5 · 4.0 · 6.3 | 6.3 · 8.0 | 6.3 · 8.0 · 16 | 6.3 · 8.0 · 16 · 20 |

**Table 3:** *Technical data · All pressures in bar (gauge)*

| Nominal size | | DN 15 | DN 20 | DN 25 | DN 32 | DN 40 | DN 50[1] |
|---|---|---|---|---|---|---|---|
| Pressure rating (valve) | | PN 16, 25 or 40 | | | | | |
| Max. permissible temperature range (medium temperature) | | -20 to +60 °C (0 to 150 °C)[2] | | | | | |
| Set point ranges | | 5 to 15 mbar · 10 to 30 mbar · 25 to 60 mbar<br>50 to 200 mbar · 0.1 to 0.6 bar · 0.2 to 1 bar<br>· 0.8 to 2.5 bar · 2 to 5 bar · 4.5 to 10 bar | | | | | |
| Max. perm. pressure at operating diaphragm[4] | 1200 cm² | **0.5 bar** | | | | | |
| | 640 cm² | **1 bar** | | | | | |
| | 320 cm² | **2 bar** | | | | | |
| | 160 cm² | **3 bar** | | | | | |
| | 80 cm² | **5 bar** | | | | | |
| | 40 cm² | **15 bar** | | | | | |
| Pressure balancing | $K_{VS}$ 0.1 to 4 | Without balancing diaphragm | | | | | |
| | $K_{VS}$ 6.3 to 32 | With balancing diaphragm | | | | | |
| Pressure tapping | | External[3] | | | | | |
| Control line connection | | G ¼ | | | | | |
| Leakage class according to DIN EN 60534-4 | | Soft seal, minimum Class IV | | | | | |
| Conformity | | CE | | | | | |

1) Larger nominal sizes on request

2) For versions without pressure balancing that have an FKM diaphragm and FKM soft seal

3) Special version with pressure tapping directly at the valve

4) Corresponds to the maximum differential pressure Δp

## Dimensional drawings

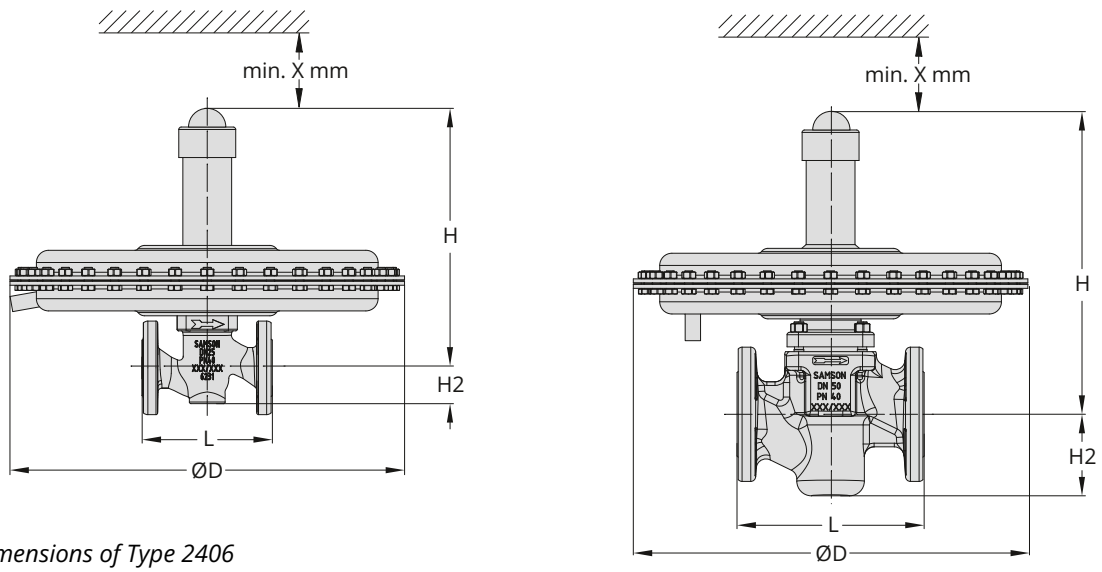



**Fig. 3:** *Dimensions of Type 2406*

**Table 4:** *Dimensions in mm*

| Nominal size | | | | DN 15 | DN 20 | DN 25 | DN 32 | DN 40 | DN 50 |
|---|---|---|---|---|---|---|---|---|---|
| Length L | | | | 130 | 150 | 160 | 180 | 200 | 230 |
| Height H2 | | Forged steel | | 53 | – | 70 | – | 92 | 98 |
| | | Other materials | | 44 | | | 72 | | |
| Height X | | | | 150 | | | | | |
| Set point ranges | 5 to 15 mbar | Height H | Without balancing | 325 | | | 370 | | |
| | | | With balancing | 352 | | | 377 | | |
| | | Actuator | | ØD = 485 mm, A = 1200 cm² | | | | | |
| | 10 to 30 mbar | Height H | Without balancing | 318 | | | 366 | | |
| | | | With balancing | 345 | | | 370 | | |
| | | Actuator | | ØD = 380 mm, A = 640 cm² | | | ØD = 485 mm, A = 1200 cm² | | |
| | 25 to 60 mbar | Height H | Without balancing | 318 | | | 366 | | |
| | | | With balancing | 345 | | | 370 | | |
| | | Actuator | | ØD = 380 mm, A = 640 cm² | | | | | |
| | 50 to 200 mbar | Height H | Without balancing | 318 | | | 366 | | |
| | | | With balancing | 345 | | | 370 | | |
| | | Actuator | | ØD = 285 mm, A = 320 cm² | | | | | |
| | 0.1 to 0.6 bar | Height H | Without balancing | 318 | | | 366 | | |
| | | | With balancing | 345 | | | 370 | | |
| | | Actuator | | ØD = 285 mm, A = 320 cm² | | | | | |
| | 0.2 to 1 bar | Height H | Without balancing | 318 | | | 366 | | |
| | | | With balancing | 345 | | | 370 | | |
| | | Actuator | | ØD = 225 mm, A = 160 cm² | | | | | |
| | 0.8 to 2.5 bar | Height H | Without balancing | 330 | | | 365 | | |
| | | | With balancing | 356 | | | 369 | | |
| | | Actuator | | ØD = 170 mm, A = 80 cm² | | | | | |
| | 2 to 5 bar | Height H | Without balancing | 333 | | | 368 | | |
| | | | With balancing | 359 | | | 373 | | |
| | | Actuator | | ØD = 170 mm, A = 40 cm² | | | | | |
| | 4.5 to 10 bar | Height H | Without balancing | 437 | | | 485 | | |
| | | | With balancing | 463 | | | 489 | | |
| | | Actuator | | ØD = 170 mm, A = 40 cm² | | | | | |

**Table 5:** *Weights in kg*

| Nominal size | | | DN 15 to 25 | DN 32 to 50 |
|---|---|---|---|---|
| Set point range | 5 to 15 mbar | Weight[1] (approx. kg) | 28 | 40 |
| | 10 to 30 mbar | | 18 | |
| | 25 to 60 mbar | | 14 | 30 |
| | 50 to 200 mbar | | | 26 |
| | 0.1 to 0.6 bar | | | |
| | 0.2 to 1 bar | | 10 | 22 |
| | 0.8 to 2.5 bar | | 8 | 20 |
| | 2 to 5 bar | | | |
| | 4.5 to 10 bar | | 9 | 21 |

[1] Body made of cast steel 1.0619: +10 %

## Installation

Normally, the valve is installed with the actuator on top. Install pipelines horizontally with a slight downward slope on both sides of the valve for drainage of the condensate.

Mounting position:



- Make sure the direction of flow matches the direction indicated by the arrow on the body.
- Adapt the control line to the conditions on site. The control line is not included in the scope of delivery. A control line kit is available on customer request for tapping the pressure directly at the valve body.
- In applications in which the blanketing gas can liquefy, condensate may form in the control line, causing damage to the regulator. To allow condensate to run back into the tank, install the control line with an approximate 10 % slope to the pressure tapping point at the tank.
- Observe the recommended inlet and outlet lengths of the regulator and for the pressure tapping point (control line).
- Install the regulator allowing sufficient space to remove it or to perform service work on it.
- Contact SAMSON if the installation conditions are different from those specified.
- Further information can be found in the Mounting and Operating Instructions ▶ EB 2522.

If the pressure p of the inert gas in the tank falls below the set point $p_2$ adjusted at the **Type 2405** Pressure Reducing Valve (1), it opens to allow more gas to enter the tank. The regulator (1) closes when the pressure p of the blanketing gas rises to the adjusted set point $p_2$. If the pressure is too high, the gas is vented off over the **Type 2406** Excess Pressure Valve (2).

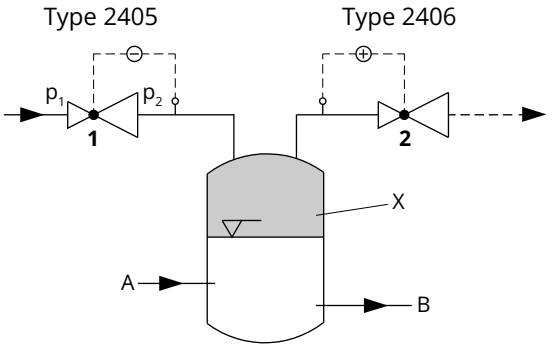



**Fig. 4:** *Sample application, Type 2406 used for tank blanketing*

1 Type 2405 Pressure Reducing Valve
2 Type 2406 Excess Pressure Valve
A Inlet for product medium
B Outlet for product medium
X Inert gas for blanketing

## Ordering text

**Type 2406** Pressure Reducing Valve

Nominal size DN …

Set point range … bar

or Set point range … mbar

Body material …

Pressure rating PN …

$K_{VS}$ coefficient …

Optionally, special version …

Materials:
Plug seal …,
balancing diaphragm …,
operating diaphragm …

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