

T 2522 EN

Type 2406 Excess Pressure Valve Self-operated Pressure Regulators



Application

Excess pressure valve for set points from 5 mbar to 10 bar · Nominal size **DN 15 to 50** · Pressure rating **PN 16 to 40** · Suitable for gases at temperatures from **-20 to +60 °C (0 to 150 °C)** ¹⁾

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.

Special features

- Low-maintenance proportional regulators
- Compact regulator design providing excellent control accuracy
- Internal set point springs with set point adjustment using a nut on the actuator
- Spring-loaded, single-seated valve balanced by a balancing diaphragm
- External connection of a control line
- Meets strict fugitive emission requirements
- Minimum leakage class IV

Version

Valve DN 15 to 50 · Flanged connections · Soft-seated plug · Body made of cast iron, spheroidal graphite iron, cast steel, cast stainless steel or forged stainless steel



Fig. 1: Type 2406 Excess Pressure Valve

Special versions

- FDA version ²⁾
- 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⁾ For unbalanced versions with FKM diaphragm and FKM soft seal

²⁾ 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.

Principle of operation

The medium flows through the regulator in the direction indicated by the arrow. The position of the plug determines the flow rate across the area released between plug (3) and 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 spring (7).

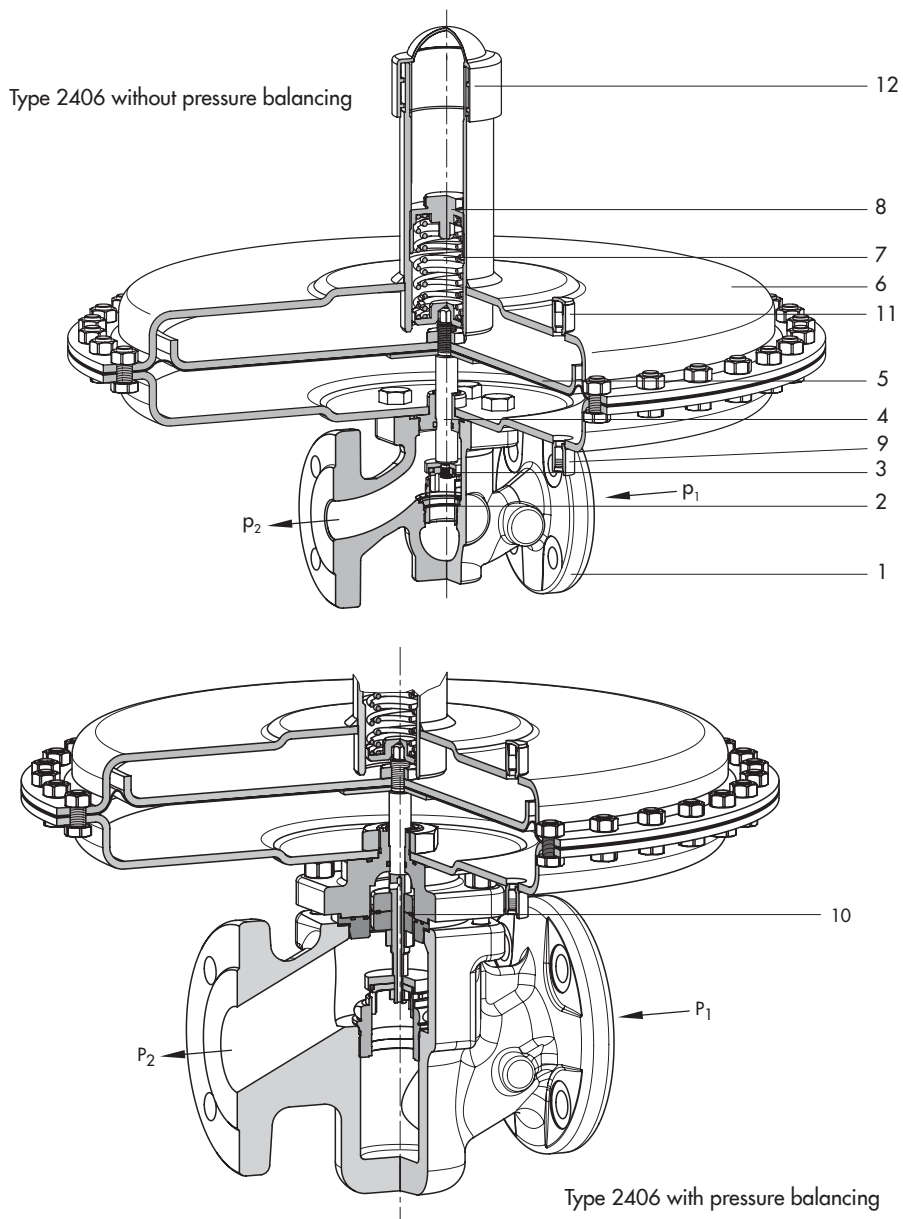
The upstream pressure p_1 to be controlled is tapped upstream of the valve and transmitted over the control line ¹⁾ to the control line connection (9) on the actuator housing (6) where it is converted into a positioning force. This force moves the plug

depending on the force of the set point spring (7).

The spring force is adjustable at the set point nut (8). When the force resulting from the upstream pressure p_1 rises above the adjusted set point, 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.

¹⁾ Optional: pressure tapping directly at the valve body



1	Valve body	4.1	Plug stem with hole	8	Set point nut
2	Seat	5	Operating diaphragm	9	Control line connection G 1/4
3	Plug	6	Actuator housing	10	Balancing diaphragm
4	Plug stem	7	Set point spring	11	Leakage line connection (optional)

Fig. 2: Functional diagram of Type 2406 Excess Pressure Valve

Table 1: Technical data

Nominal size	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50 ¹⁾	
Pressure rating (valve)	PN 16 · PN 25 · PN 40						
K _{VS} coefficients	Standard	4	6.3	8	16	20	32
	Reduced K _{VS} coefficients	0.1 · 0.25 · 0.4 1 · 1.6 · 2.5	0.1 · 0.25 · 0.4 1 · 1.6 · 2.5 · 4	0.1 · 0.25 · 0.4 · 1 1.6 · 2.5 · 4 · 6.3	6.3 · 8	6.3 8 · 16	6.3 · 8 16 · 20
Max. permissible temperature range (medium temperature)	-20 to +60 °C (0 to 150 °C) ²⁾						
Leakage class according to IEC 60534-4	Soft-seated, minimum Class IV						
Conformity	CE · ENEC						
Set point ranges	5 to 15 mbar · 10 to 30 mbar · 25 to 60 mbar · 50 to 200 mbar 0.1 to 0.6 bar · 0.2 to 1 bar · 0.8 to 2.5 bar · 2 to 5 bar · 4.5 to 10 bar						
Max. permissible pressure at operating diaphragm ³⁾	1200 cm ²	0.5 bar					
	640 cm ²	1 bar					
	320 cm ²	2 bar					
	160 cm ²	3 bar					
	80 cm ²	5 bar					
Pressure balancing	K _{VS} = 0.1 to 4	Without balancing diaphragm					
	K _{VS} = 6.3 to 32	With balancing diaphragm					
Pressure tapping	External control line · Direct at the valve body (special version)						
Control line connection	G ¼						

¹⁾ Larger nominal sizes on request

²⁾ Unbalanced version with FKM diaphragm and FKM soft seal; not for FDA version

³⁾ Corresponds to the maximum differential pressure

Table 2: Materials · Material numbers according to DIN EN

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	1.4404	1.4404
Plug	1.4404	1.4404
Plug stem	1.4404	
Seal	EPDM · FKM · NBR	
Balancing diaphragm	EPDM · FKM · NBR	
Actuator housing	1.0332	1.4301
Operating diaphragm	EPDM · FKM · NBR	

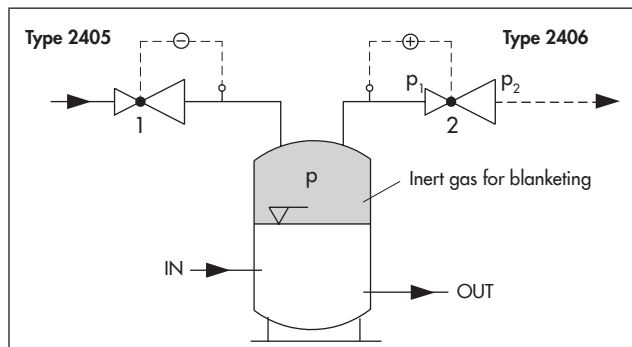
Installation

The regulator is preferably to be installed in horizontal pipelines:

- Actuator housing on top of the valve. The actuator faces upward in the upright direction.
- The direction of flow must match the direction indicated by the arrow on the 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.
- Distance between the pressure tapping point and regulator min. $2 \times \text{DN}$



In exceptional cases, the regulator can also be installed in vertical pipelines with the direction of flow from the top (see ► EB 2522 for more details).



If the pressure p of the inert gas in the tank falls below the set point p_1 adjusted at the **Type 2405** Pressure Reducing Valve (1), it opens to allow more gas to enter the tank. The valve (1) closes again when the pressure p of the blanketing gas has been reestablished.

If the pressure is too high, the inert gas is vented off over the **Type 2406** Excess Pressure Valve (2).

Fig. 3: Sample application: Type 2406 used for vapor recovery

Dimensions

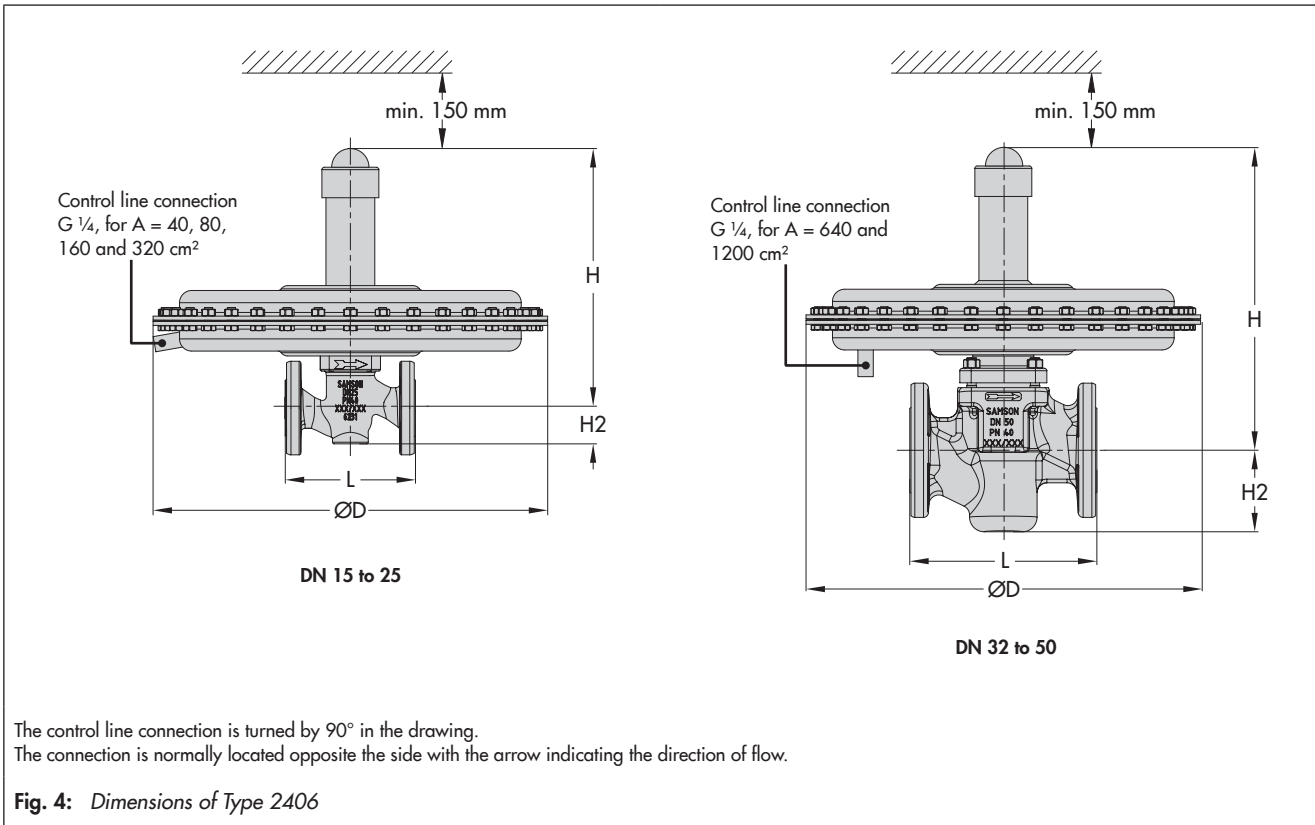


Fig. 4: Dimensions of Type 2406

Table 3: Dimensions and weights

Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Length L		130 mm	150 mm	160 mm	180 mm	200 mm	230 mm
Height H2	Forged steel	53 mm	–	70 mm	–	92 mm	98 mm
	Other materials	44 mm			72 mm		
5 to 15 mbar	Height H	Without balancing	325 mm		370 mm		
		With balancing	352 mm		377 mm		
Actuator		ØD = 485 mm, A = 1200 cm ²					
10 to 30 mbar	Height H	Without balancing	318 mm		366 mm		
		With balancing	345 mm		370 mm		
Actuator		ØD = 380 mm, A = 640 cm ²			ØD = 485 mm, A = 1200 cm ²		
25 to 60 mbar	Height H	Without balancing	318 mm		366 mm		
		With balancing	345 mm		370 mm		
Actuator		ØD = 380 mm, A = 640 cm ²					
50 to 200 mbar	Height H	Without balancing	318 mm		366 mm		
		With balancing	345 mm		370 mm		
Actuator		ØD = 285 mm, A = 320 cm ²					
0.1 to 0.6 bar	Height H	Without balancing	318 mm		366 mm		
		With balancing	345 mm		370 mm		
Actuator		ØD = 285 mm, A = 320 cm ²					
0.2 to 1 bar	Height H	Without balancing	318 mm		366 mm		
		With balancing	345 mm		370 mm		
Actuator		ØD = 225 mm, A = 160 cm ²					
0.8 to 2.5 bar	Height H	Without balancing	330 mm		365 mm		
		With balancing	356 mm		369 mm		
Actuator		ØD = 170 mm, A = 80 cm ²					
2 to 5 bar	Height H	Without balancing	333 mm		368 mm		
		With balancing	359 mm		373 mm		
Actuator		ØD = 170 mm, A = 40 cm ²					
4.5 to 10 bar	Height H	Without balancing	437 mm		485 mm		
		With balancing	463 mm		489 mm		
Actuator		ØD = 170 mm, A = 40 cm ²					
Weight ¹⁾ in kg (approx.)							
Set point range	5 to 15 mbar		28 kg		40 kg		
	10 to 30 mbar		18 kg		40 kg		
	25 to 60 mbar		14 kg		30 kg		
	50 to 200 mbar		14 kg		26 kg		
	0.1 to 0.6 bar		14 kg		26 kg		
	0.2 to 1 bar		10 kg		22 kg		
	0.8 to 2.5 bar		8 kg		20 kg		
	2 to 5 bar		8 kg		20 kg		
4.5 to 10 bar		9 kg		21 kg			

¹⁾ Body made of cast steel 1.0619: +10 %

Ordering text

Type 2406 Excess Pressure Valve

Nominal size DN ..., set point range ... mbar (bar)

K_{VS} ..., body material ..., optionally, special version ...

Materials:

Plug seal ..., balancing diaphragm ..., operating diaphragm

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