

## T 2523 EN

### Type 2406 Excess Pressure Valve

Self-operated Pressure Regulators · ANSI version



#### Application

Excess pressure valve for set points from **0.075 to 150 psi/5 mbar** to 10 bar · Valve size **NPS ½ to 2/DN 15 to 50** <sup>1)</sup>  
 Pressure rating **Class 125 to 300/PN 16 to 40** · Suitable for gases at temperatures from **-5 to +140 °F · 32 to 300 °F/**  
**-20 to +60 °C · 0 to 150 °C** <sup>2)</sup>

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

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 adjuster using a nut on the actuator
- Spring-loaded, single-seated valve balanced by a balancing diaphragm
- External connection of a control line
- Meets strict emission requirements (TA Luft)
- Minimum leakage class IV
- Suitable for use as a vacuum breaker

#### Version

Valves in NPS ½ to 2/DN 15 to 50 · Flanged connections  
 Soft-seated plug · Body made of cast iron, cast steel or cast stainless steel

<sup>1)</sup> NPS ½ and ¾ not in Class 125

<sup>2)</sup> For unbalanced versions with FKM diaphragm and FKM soft seal



Fig. 1: Type 2406 Excess Pressure Valve

#### Special versions

- Version with FDA-compliant materials for the food and pharmaceutical industries
- NACE version for sour gas applications
- Actuator with seal and leakage line connection (also as vacuum breaker)
- Version with connected control line. Pressure tapped directly at the valve body; optionally with pressure gauge



### Principle of operation

The medium flows through the valve 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 <sup>1)</sup> to the actuator where it is converted into a positioning force. This force is used to move the valve plug according to the force of the set point spring (7).

The spring force is adjustable at the set point adjuster (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.

<sup>1)</sup> Optional: pressure tapping directly at the valve body

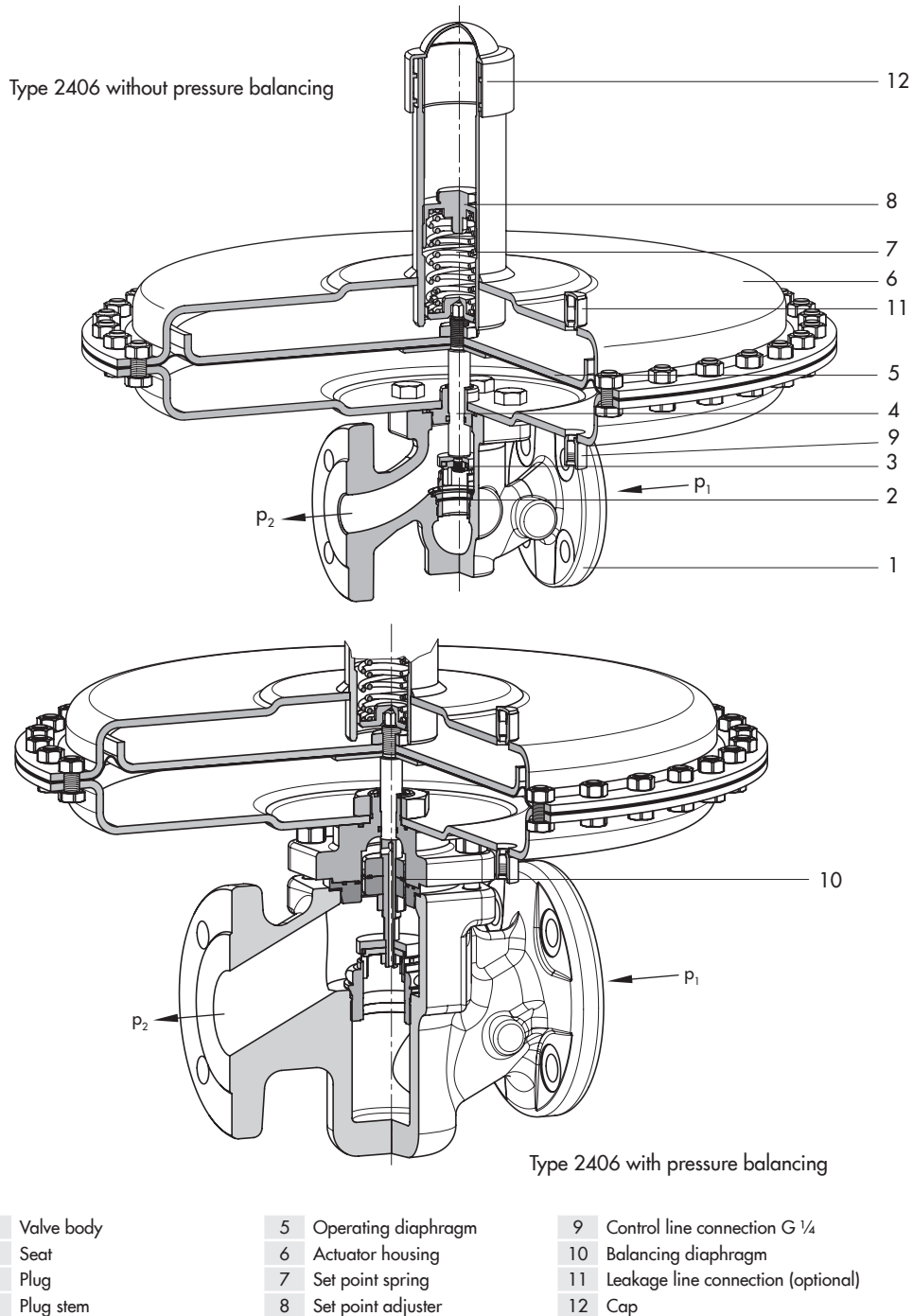


Fig. 2: Functional diagram of Type 2406 Excess Pressure Valve

**Table 1: Technical data**

Valve size <sup>1)</sup>	NPS ½ DN 15	NPS ½ DN 20	NPS 1 DN 25	NPS 1½ DN 40	NPS 2 DN 50	
Pressure rating (valve)	Class 125 · Class 150 · Class 300 PN 16 · PN 25 · PN 40					
C <sub>V</sub> coefficients	Standard	5	7.5	9.4	23	37
	Reduced C <sub>V</sub> coefficients	0.12 · 0.3 · 0.5 1.2 · 2 · 3	0.12 · 0.3 · 0.5 1.2 · 2 · 3 · 5	0.12 · 0.3 · 0.5 1.2 · 2 · 3 · 5 · 7.5	7.5 9.4 · 20	7.5 · 9.4 20 · 23
K <sub>VS</sub> coefficients	Standard	4	6.3	8	20	32
	Reduced K <sub>VS</sub> 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 · 16	6.3 · 8 16 · 20
Max. permissible temperature range (medium temperature)	-5 to +140 °F · 32 to 300 °F / -20 to +60 °C · 0 to 150 °C <sup>2)</sup>					
Leakage class according to IEC 60534-4 or ANSI/FCI 70-2	Soft-seated, minimum Class IV					
Conformity	<b>CE · ENEC</b>					
Set point ranges	0.075 to 0.25 psi · 0.15 to 0.42 psi · 0.35 to 0.87 psi · 0.75 to 3 psi 1.5 to 8 psi · 3 to 15 psi · 10 to 35 psi · 30 to 75 psi · 65 to 150 psi					
	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 <sup>3)</sup>	186 in <sup>2</sup> 1200 cm <sup>2</sup>	7 psi 0.5 bar				
	100 in <sup>2</sup> 640 cm <sup>2</sup>	14.5 psi 1 bar				
	50 in <sup>2</sup> 320 cm <sup>2</sup>	30 psi 2 bar				
	25 in <sup>2</sup> 160 cm <sup>2</sup>	45 psi 3 bar				
	12.5 in <sup>2</sup> 80 cm <sup>2</sup>	75 psi 5 bar				
	6 in <sup>2</sup> 40 cm <sup>2</sup>	220 psi 15 bar				
Pressure balancing	C <sub>V</sub> = 0.12 to 5   K <sub>VS</sub> = 0.1 to 4	Without balancing diaphragm				
	C <sub>V</sub> = 7.5 to 37   K <sub>VS</sub> = 6.3 to 32	With balancing diaphragm				
Pressure tapping over a connected control line	External control line · Direct at the valve body (special version)					
Control line connection	G ¼ (with ¼ NPT adapter)					

<sup>1)</sup> Larger valve sizes on request

<sup>2)</sup> For unbalanced version with FKM diaphragm and FKM soft seal

<sup>3)</sup> Corresponds to the maximum differential pressure

**Table 2: Materials · Material numbers according to ASTM and DIN EN**

Valve body	A126B, A216 WCC	A351 CF8M
Seat	316L	316L
Plug	316L	316L
Plug stem	316L	
Seal	EPDM · FKM · NBR	
Balancing diaphragm	EPDM · FKM · NBR	
<b>Actuator housing</b>	<b>1.0332</b>	<b>1.4301</b>
Operating diaphragm	EPDM · FKM · NBR	

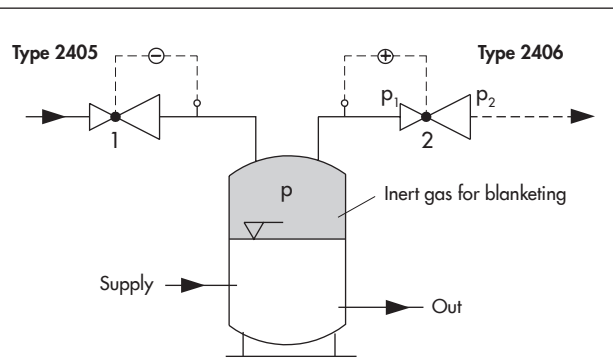
## Installation

The regulator is preferably to be installed in horizontal pipelines:

- Actuator housing on top of the valve, actuator facing upwards
- 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 x NPS (2 x DN).



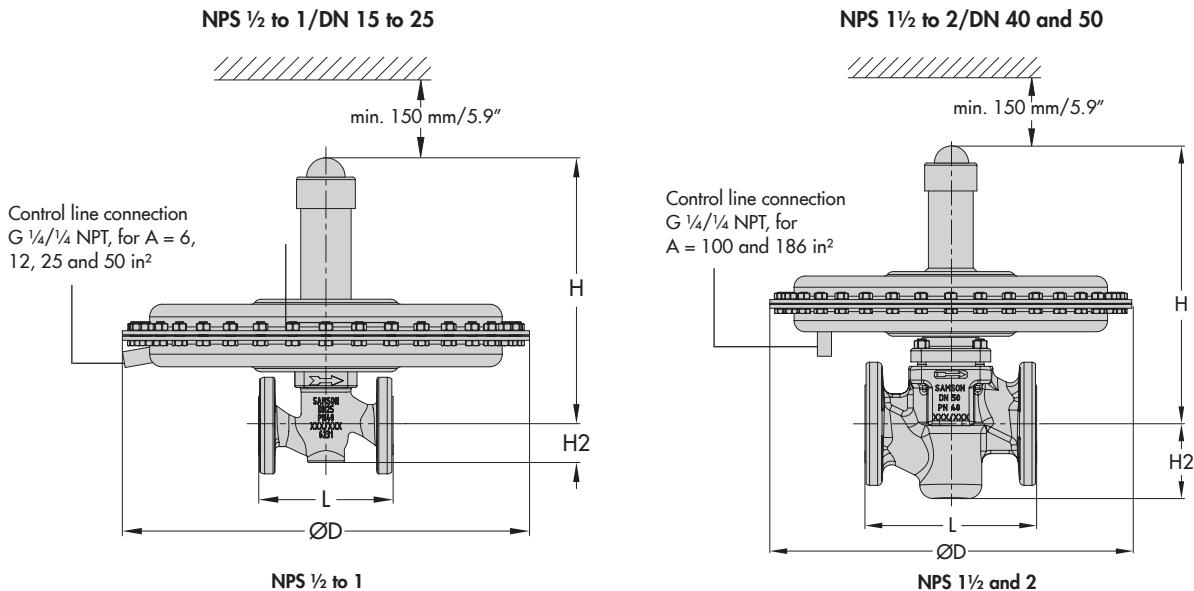
In exceptional cases, the regulator can also be installed in vertical pipelines with the direction of flow from the top (see ► EB 2522 for more details).



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

## Dimensional drawings



The control line connection is turned by 90° in the drawing. The connection is normally located opposite the side with the arrow indicating the direction of flow.

An adapter G 1/4 to 1/4-18 NPT (order no. 0230-3417) must be ordered separately.

Fig. 4: Dimensions of Type 2406

**Table 3: Dimensions in inch/mm · Weights in lb/kg**

Valve size				NPS ½ DN 15	NPS ¾ DN 20	NPS 1 DN 25	NPS 1½ DN 40	NPS 2 DN 50	
Valve	Length L	DIN	PN 16 to 40	mm	130	150	160	200	230
		ANSI	Class 125 and 150	inch	7.25 <sup>2)</sup>	7.25 <sup>2)</sup>	7.25	8.75	10.00
				mm	184 <sup>2)</sup>	184 <sup>2)</sup>	184	222	254
		Class 300	inch	7.50	7.62	7.75	9.25	10.50	
	mm		191	194	197	235	267		
	Height H2	Cast steel	inch	1.73			2.83		
			mm	44			72		
		Forged steel	inch	2.1	–	2.8	3.7	3.9	
			mm	53	–	70	92	98	
	Set point range	0.075 to 0.25 psi 5 to 15 mbar	Height H	Without balancing	12.8"/325 mm			14.6"/370 mm	
With balancing				13.9"/352 mm			14.8"/377 mm		
Actuator			ØD = 19.1"/485 mm, A = 186 in <sup>2</sup> /1200 cm <sup>2</sup>						
0.15 to 0.42 psi 10 to 30 mbar		Height H	Without balancing	12.5"/318 mm			14.4"/366 mm		
			With balancing	13.6"/345 mm			14.6"/370 mm		
Actuator			ØD = 15"/380 mm A = 100 in <sup>2</sup> /640 cm <sup>2</sup>			ØD = 19.1"/485 mm A = 186 in <sup>2</sup> /1200 cm <sup>2</sup>			
0.35 to 0.87 psi 25 to 60 mbar		Height H	Without balancing	12.5"/318 mm			14.4"/366 mm		
			With balancing	13.6"/345 mm			14.6"/370 mm		
Actuator			ØD = 15"/380 mm, A = 100 in <sup>2</sup> /640 cm <sup>2</sup>						
0.75 to 3 psi 50 to 200 mbar		Height H	Without balancing	12.5"/318 mm			14.4"/366 mm		
			With balancing	13.6"/345 mm			14.6"/370 mm		
Actuator			ØD = 11.2"/285 mm, A = 50 in <sup>2</sup> /320 cm <sup>2</sup>						
1.5 to 8 psi 0.1 to 0.6 bar		Height H	Without balancing	12.5"/318 mm			14.4"/366 mm		
			With balancing	13.6"/345 mm			14.6"/370 mm		
Actuator			ØD = 11.2"/285 mm, A = 50 in <sup>2</sup> /320 cm <sup>2</sup>						
3 to 15 psi 0.2 to 1 bar		Height H	Without balancing	12.5"/318 mm			14.4"/366 mm		
			With balancing	13.6"/345 mm			14.6"/370 mm		
Actuator			ØD = 8.9"/225 mm, A = 25 in <sup>2</sup> /160 cm <sup>2</sup>						
10 to 35 psi 0.8 to 2.5 bar		Height H	Without balancing	13.0"/330 mm			14.4"/365 mm		
			With balancing	14.0"/356 mm			14.5"/369 mm		
Actuator			ØD = 6.7"/170 mm, A = 12 in <sup>2</sup> /80 cm <sup>2</sup>						
30 to 75 psi 2 to 5 bar		Height H	Without balancing	13.1"/333 mm			14.5"/368 mm		
			With balancing	14.1"/359 mm			14.7"/373 mm		
Actuator			ØD = 6.7"/170 mm, A = 6 in <sup>2</sup> /40 cm <sup>2</sup>						
65 to 145 psi 4.5 to 10 bar		Height H	Without balancing	17.2"/437 mm			19.1"/485 mm		
			With balancing	18.2"/463 mm			19.3"/489 mm		
Actuator			ØD = 6.7"/170 mm, A = 6 in <sup>2</sup> /40 cm <sup>2</sup>						
Set point range		0.075 to 0.25 psi 5 to 15 mbar	Weight <sup>1)</sup> in lb and kg (approx.)	61.7 lb · 28 kg			88.2 lb · 40 kg		
	0.15 to 0.42 psi 10 to 30 mbar	39.7 lb · 18 kg							
	0.35 to 0.87 psi 25 to 60 mbar				66.1 lb · 30 kg				
	0.75 to 3 psi 50 to 200 mbar	30.9 lb · 14 kg			57.3 lb · 26 kg				
	1.5 to 8 psi 0.1 to 0.6 bar								
	3 to 15 psi 0.2 to 1 bar	22 lb · 10 kg			48.5 lb · 22 kg				
	10 to 35 psi 0.8 to 2.5 bar	17.6 lb · 8 kg			44.1 lb · 20 kg				
	30 to 75 psi 2 to 5 bar	17.6 lb · 8 kg			44.1 lb · 20 kg				
	65 to 145 psi 4.5 to 10 bar	19.8 lb · 9 kg			46.3 lb · 21 kg				

<sup>1)</sup> Body made of A216 WCC and A351 CF8M: +10 %

<sup>2)</sup> Not for Class 125

**Ordering text****Type 2406 Excess Pressure Valve**

Valve size NPS (DN) ...

Set point range ... psi (mbar/bar)

$K_{VS}/C_V$  coefficient ...

Materials: plug seal ..., balancing diaphragm ..., operating diaphragm ...

Body material ..., optionally, special version ...