

Self-operated Pressure Regulators

Type 2406 Excess Pressure Valve

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 1) (DN 15 to 50) Pressure rating Class 125 to 300 (PN 16 to 40) · Suitable for gases at temperatures from -5 to +140 °F (32 to 300 °F 2)) (-20 to +60 °C/0 to 150 °C 1))



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 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 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 A126B, cast steel A216 WCC or cast stainless steel A351 CF8M

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)

1) NPS ½ and ¾ not in Class 125

2) For unbalanced versions with FKM diaphragm and FKM soft seal



Fig. 1: Type 2406 Excess Pressure Valve

- Version with connected control line. Pressure tapped directly at the valve body



Ordering text

Type 2406 Excess Pressure Valve

Valve size NPS (DN) ...

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

C_v (K_{vs}) coefficient ...

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

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

Optionally, special version

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 valve 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 actuator where it is converted into a positioning force. This force is

¹⁾ Optional: pressure tapping directly at the valve body

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 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.

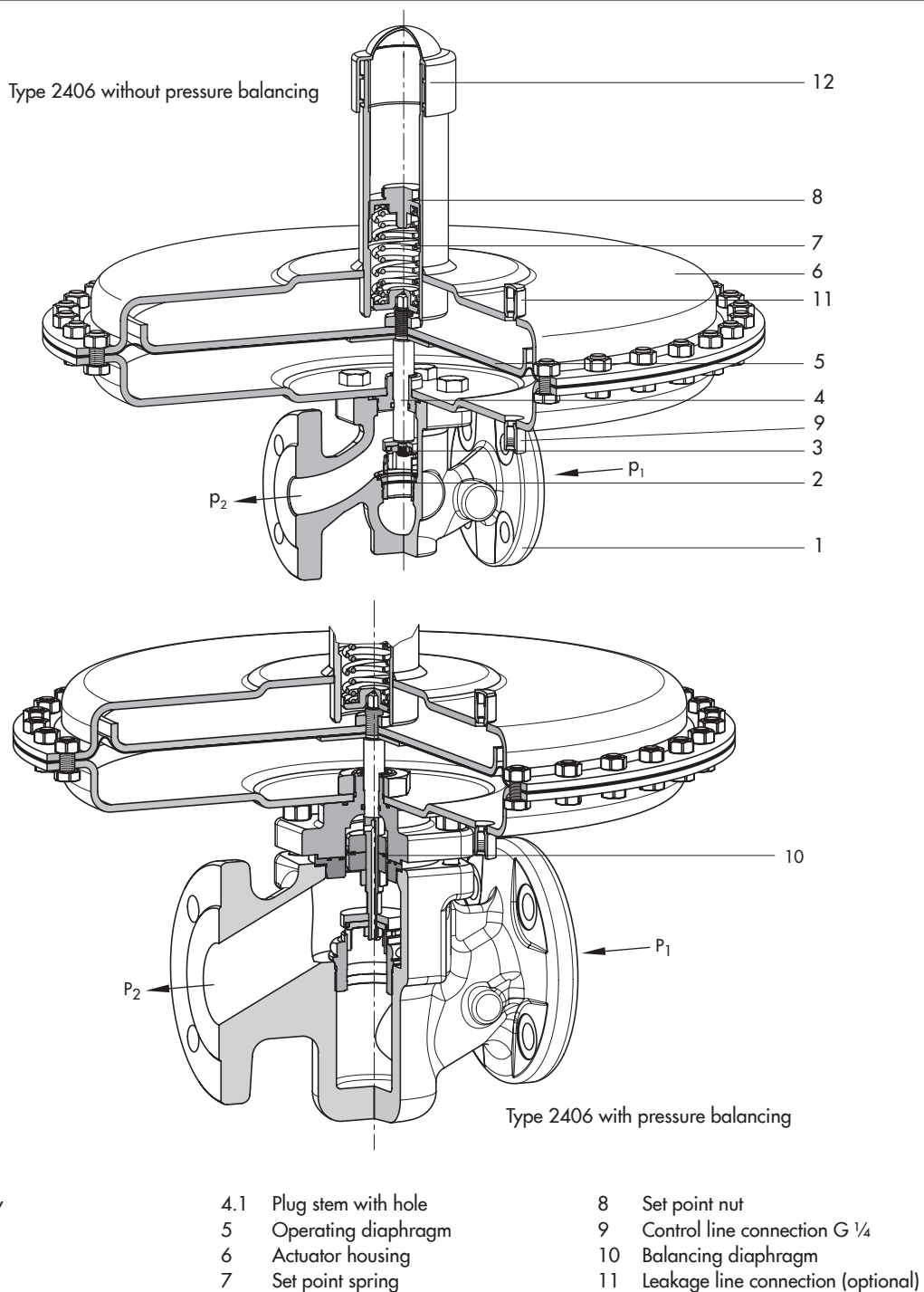


Fig. 2: Functional diagram of Type 2406 Excess Pressure Valve

Table 1: Technical data

Valve size ¹⁾	NPS ½ DN 15	NPS ½ DN 20	NPS 1 DN 25	NPS 1½ DN 40	NPS 2 DN 50	
Nominal pressure (valve)	Class 125 · Class 150 · Class 300 PN 16 · PN 25 · PN 40					
C _v coefficients	Standard	5	7.5	9.4	23	37
	Reduced C _v 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 _{vS} coefficients	Standard	4	6.3	8	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 · 16	6.3 · 8 16 · 20
Max. permissible temperature range (medium temperature)	-5 to +140 °F (32 to 300 °F) ²⁾ -20 to +60 °C (0 to 150 °C) ²⁾					
Leakage class according to IEC 60534-4 or ANSI/FCI 70-2	Soft-seated, minimum Class IV					
Compliance	CE · EAC					
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 ³⁾	186 in ² 1200 cm ²	7 psi 0.5 bar				
	100 in ² 640 cm ²	14.5 psi 1 bar				
	50 in ² 320 cm ²	30 psi 2 bar				
	25 in ² 160 cm ²	45 psi 3 bar				
	12.5 in ² 80 cm ²	75 psi 5 bar				
	6 in ² 40 cm ²	220 psi 15 bar				
Pressure balancing	C _v = 0.12 to 5 K _{vS} = 0.1 to 4	Without balancing diaphragm				
	C _v = 7.5 to 37 K _{vS} = 6.3 to 32	With balancing diaphragm				
Pressure tapping over a connected control line	External control line · Pressure tapping directly at the valve body (special version)					
Control line connection	G ¼ - with ¼ NPT adapter -					

¹⁾ Larger nominal sizes on request

²⁾ For unbalanced version with FKM diaphragm and FKM soft seal

³⁾ 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	
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, 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. $2 \times \text{NPS}$ ($2 \times \text{DN}$).



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).

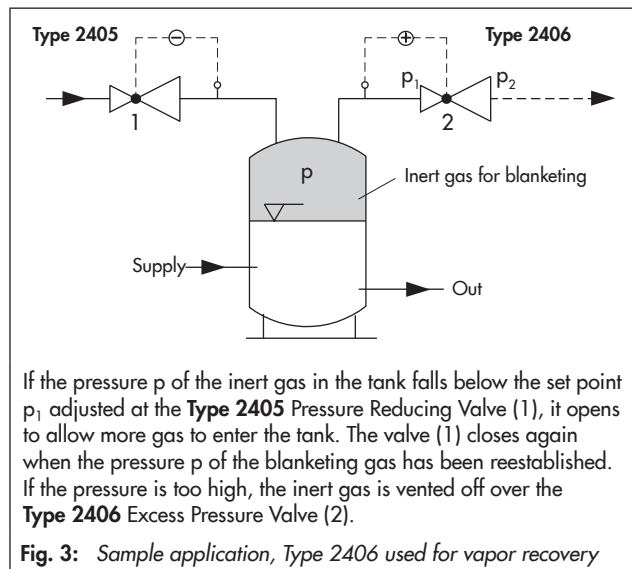
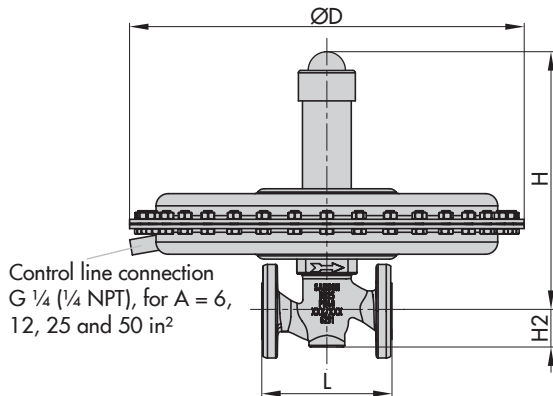


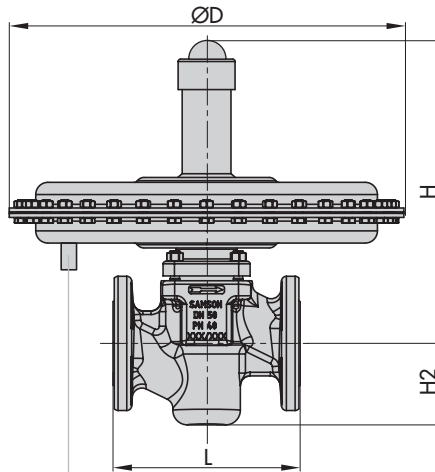
Fig. 3: Sample application, Type 2406 used for vapor recovery

Dimensional drawings

NPS $\frac{1}{2}$ to 1 (DN 15 to 25)



NPS $1\frac{1}{2}$ and 2 (DN 40 and 50)



Control line connection G $\frac{1}{4}$ ($\frac{1}{4}$ NPT),
for A = 100 and 186 in²

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 $\frac{1}{4}$ to $\frac{1}{4}$ -18 NPT (order no. 0230-3417) must be ordered separately.

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 ³⁾	7.25 ³⁾	7.25	8.75	10.00
				mm	184 ³⁾	184 ³⁾	184	222	254
	Height H2 ²⁾	Class 300	inch	7.50	7.62	7.75	9.25	10.50	
			mm	190	194	197	235	267	
			inch	1.73 (2.10)	1.73	1.73 (2.76)	2.83 (3.62)	2.83 (3.86)	
			mm	44 (53)	44	44 (70)	72 (92)	72 (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 = 19.3" (490 mm), A = 186 in ² (1200 cm ²)					
	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 ² (640 cm ²)			ØD = 19.3" (490 mm) A = 186 in ² (1200 cm ²)		
	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 ² (640 cm ²)					
	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 ² (320 cm ²)					
	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 ² (320 cm ²)					
	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 ² (160 cm ²)					
	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 ² (80 cm ²)					
	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 ² (40 cm ²)					
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 ² (40 cm ²)						
Set point range	0.075 to 0.25 psi 5 to 15 mbar			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			

1) Body made of A216 WCC and A351 CF8M: +10 %

2) Values for body made of A351 CF8M in parentheses

3) Not for Class 125

Specifications subject to change without notice



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