

Self-operated Regulators Series 2371



Excess Pressure Valves for food processing and pharmaceutical industries

Type 2371-00 · With pneumatic set point adjustment
Type 2371-01 · With mechanical set point adjustment

Application

Excess pressure valves for set points **0.3 to 6 bar** (5 to 90 psi) · K_{VS} **2.5 to 10** (C_v 3 to 12) · **DN 15 to DN 50** (NPS ½ to 2) · For liquids and gases from **-10 to +130 °C** (14 to 266 °F) · Max. operating pressure **10 bar** (150 psi)

The valve opens as the inlet pressure rises



Special features

- Proportional regulators for use in the food processing and pharmaceutical industries
- Wetted inside surfaces with a smooth or polished finish
- Stainless steel 1.4404 (316L)
- FDA-approved materials
- Angle-style valve body

The regulators have a body free of cavities. Both versions can optionally be fitted with a pneumatic stem locking facility to lift up the plug and to keep the valve open during CIP (Cleaning in Place) or SIP (Sterilization in Place).

A mechanical stem locking facility is also available for Type 2371-01.

The control properties of the excess pressure valve are not affected when the stem locking facility is disengaged.

A test bore allows the diaphragm to be monitored for leakage.

Versions

Excess pressure valve with a diaphragm for controlling the inlet pressure p_1 to the set point adjusted. The set point of Type 2371-00 is adjusted pneumatically. The set point of Type 2371-01 is adjusted by the set point spring.

Angle valve · Version in full-mold cast body · DN 15 to DN 50 (NPS ½ to 2) · Plug with metal sealing or optionally special plug with soft sealing.

Maximum pressure 10 bar (150 psi) · Clamp to attach actuator housing

Connections

Standard: Welding ends acc. to DIN 11850 Series 2

Special version: Welding ends according to BS 4825, ISO 2037 (SMS) or DIN EN ISO 1127 · Flanges according to DIN EN 1092-1 · Threaded connections according to DIN 11887, SMS 1146, ISO 2853 (IDF) · Clamp connections according to ISO 2852, DIN 32676 or BS 4825

Special versions

Body made of 1.4435, other materials on request · Body with two inlet ports · Body with DN 65 end connections · Smaller K_{VS} coefficients available on request



Fig. 1 · Type 2371-00



Fig. 2 · Type 2371-01 with mechanical stem locking

Principle of operation

The process medium flows through the valve body (1) in the direction indicated by the arrow. The position of the valve plug (3) determines the flow rate across the cross-sectional area released between the plug and the valve seat (2).

The valve opens when the pressure p_1 upstream of the valve rises above the adjusted set point pressure. The resulting inlet pressure p_1 depends on the flow rate.

The test bore (11) in the housing indicates when the diaphragm (4/4.1) leaks or when a diaphragm ruptures.

Type 2371-01 - Version with mechanical set point adjustment (Fig. 3)

The valve is normally closed by the positioning springs (7). The valve starts to open when the inlet pressure p_1 applied to the diaphragm (4) and the resulting force exceed the force of the springs.

The set point is adjusted by an Allen key (8 mm), which is inserted through the adjustment opening (6.1) on top of the housing onto the set point screw (6). The blanking plug must first be removed. If necessary, the set point screw (6) can be secured by the locking screw (12) in the upper plug section (5) to prevent the set point screw from loosening due to vibrations which would change the set point.

Turning the set point screw clockwise causes the spring plate (7.1) to move upwards and increases the spring force and the set point. Turning the set point screw counterclockwise relieves the spring tension, reducing the set point.

Type 2371-00 - Version with pneumatic set point adjustment (Fig. 4)

The valve is normally closed by the set point pressure (p_c).

When the inlet pressure p_1 applied to the diaphragm (4.1) exceeds the set point pressure p_c , the force exerted on the diaphragm by the pressure of the medium makes the diaphragm move. As a result, the plug (3) moves out of the normally closed position and the valve opens.

As the inlet pressure p_1 drops, the resulting force reduces again. The valve is closed when the pressure falls below the set point pressure p_c .

- 1 Valve body
- 2 Seat
- 3 Plug
- 4 Diaphragm (Type 2371-01)
- 4.1 Double diaphragm (Type 2371-00)
- 5 Upper plug section
- 6 Set point screw
- 6.1 Adjustment opening with blanking plug
- 7 Positioning spring(s)
- 7.1 Spring plate
- 8 Actuator housing (mechanical set point adjustment)
- 9 Clamp fitting
- 10 Actuator housing (pneumatic set point adjustment)
- 11 Test bore
- 12 Locking screw
- p_c Set point pressure
- p_1 Inlet pressure (upstream pressure)
- p_2 Outlet pressure (downstream pressure)

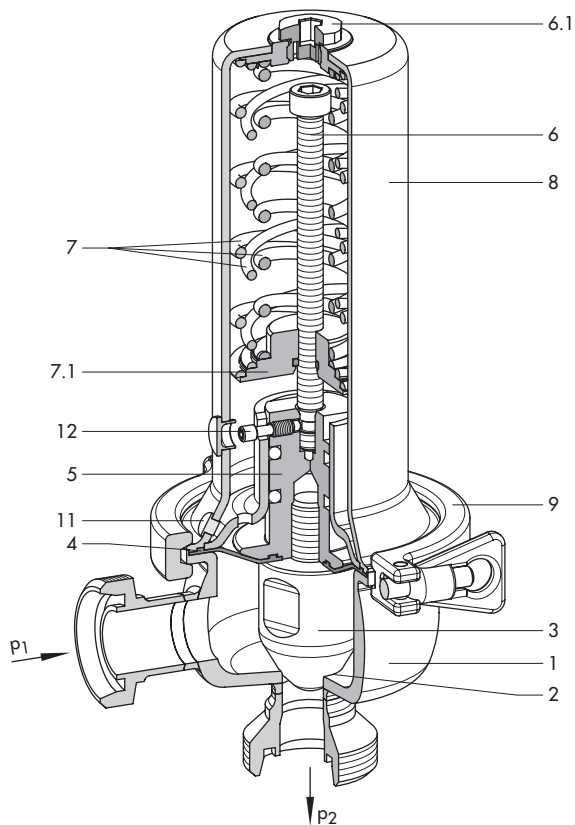


Fig. 3 · Type 2371-01 with mechanical set point adjustment

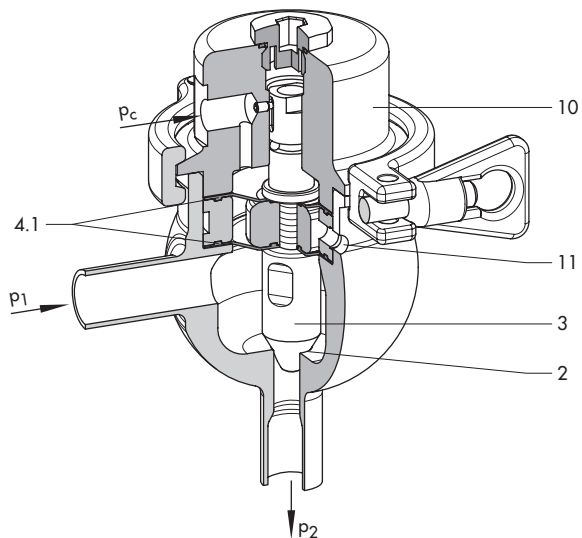


Fig. 4 · Typ 2371-00 with pneumatic set point adjustment

Stem locking (Fig. 5)

The version with stem locking facility is designed to keep the plug in the open position. This allows safe and effective cleaning (CIP or SIP) while the valve is open.

The stem can be locked pneumatically or mechanically.

Pneumatic stem locking

(for Type 2371-00/Type 2371-01)

The housing of the stem locking (10.1) is connected to the excess pressure valve (Type 2371-00) over the adjustment opening in the actuator housing (10). The connecting pin (14) links the internal piston (13) to the upper plug section (5) of the excess pressure valve.



To lock the stem, a pressure must be applied to the p_v port which is equal to $p_v \geq p_c + 0.5$ bar. This pressure causes the piston to be lifted which opens the valve. The piston returns to its original position when the pressure p_v is removed and the pressure p_c causes the valve to take on its control function again.

The pneumatic stem locking can also be used in the regulator with mechanical set point adjustment (Type 2371-01) in a similar manner. In this case, a pressure of 6 bar must be applied to the p_v port to lift the piston (13). This pressure merely needs to be disconnected to allow the regulator to function again.

Mechanical stem locking (for Type 2371-01)

The regulator with mechanical set point adjustment can also be fitted with a manually operated stem locking.

In this case, the lever on top of the actuator housing must be actuated manually to open the valve and locked it in position.



The control properties of the excess pressure valve are not affected when the stem locking facility is disengaged.

Installation

The regulator has an angle-style valve body.

- Install the valve into the pipeline without any tension.

Observe the following points:

- The valve must be installed with actuator housing facing upwards and the inlet port in the horizontal position.
- The medium must flow through the valve in the direction indicated by the arrow on the valve body (inlet port at the side and outlet port at the bottom).

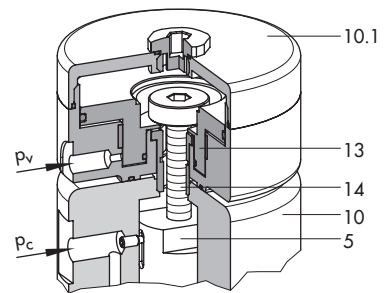


Fig. 5 · Functional diagram of the stem locking

- 5 Upper plug section
- 10 Actuator housing (with pneumatic set point adjustment)
- 10.1 Housing of the stem locking facility
- 13 Piston
- 14 Connecting pin
- p_v Stem locking pressure (G 1/8 connection)
- p_c Set point pressure (G 1/4 connection)

Ordering text

Excess Pressure Valve Type 2371-00/Type 2371-01

Type 2371-00 · Pneumatic set point adjustment

Set point range 0.3 to 6 bar

Type 2371-01 · Mechanical set point adjustment

Set point range 0.3 to 1.2 bar/1.0 to 3.0 bar/2.5 to 4.5 bar/4.0 to 6.0 bar

Nominal size DN ...,

Plug with metal sealing/soft sealing

Type of connections: Threaded connection acc. to .../clamp connection acc. to .../flange connection acc. to .../Welding ends acc. to ...

Stem locking: Pneumatic/mechanical

Table 1 · Technical data · All pressures specified as gauge pressures

Type 2371-... Excess Pressure Valve		DN					NPS					
Nominal size		15	20	25	32	40	50	½	¾	1	1½	2
K_{VS} in m ³ /h C_V in US gal/min		2.5	2.5	2.5	4	6.3	10	3	3	3	7.5	12
K_V or C_V for CIP stem locking ¹⁾		4	4	4	10	16	25	5	5	5	20	30
Set point ranges	Pneumatic SP adjustment	0.3 to 6 bar					5 to 90 psi					
	Mechanical SP adjustment	0.3 to 1.2 bar · 1 to 3 bar · 2.5 to 4.5 bar 4 to 6 bar					5 to 18 psi · 15 to 45 psi · 35 to 65 psi 60 to 90 psi					
Maximum pressure		10 bar					150 psi					
Max. perm. temperatures	Operating temp. range	-10 to +130 °C					14 °F to 266 °F					
	Sterilizing temperature	150 °C up to 30 minutes					300 °F up to 30 minutes					
Leakage rate, in relation to K_{VS} or C_V		Metal sealing: ≤0.05 % · Soft sealing: ≤0.02 %										
Peak-to-valley height and surface	External	$R_a \leq 1.6 \mu\text{m}$, glass bead blasted ²⁾ · $R_a \leq 0.6 \mu\text{m}$, polished										
	Internal	$R_a \leq 0.8 \mu\text{m}$, smooth finish ²⁾ · $R_a \leq 0.6 \mu\text{m}$, polished $R_a \leq 0.4 \mu\text{m}$, satin finish · $R_a \leq 0.4 \mu\text{m}$, mirror finish										

¹⁾ Pneumatic or mechanical · ²⁾ Standard version

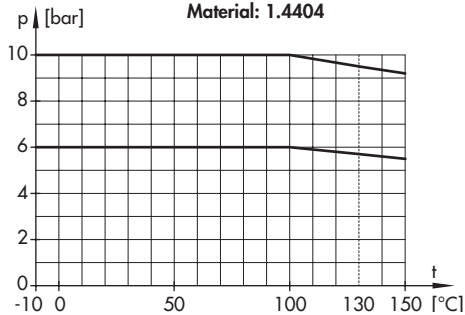
Table 2 · Materials · Material number acc. to DIN EN

Version	DIN	ANSI
Body	1.4404	316L
Plug	With metal sealing	1.4404
	Seat ring for soft sealing	PEEK
Diaphragm	EPDM and PTFE	
Cap	1.4404	316L
Springs	1.4310	301

Table 3 · Connections, max. operating pressure (inlet press.) and temperature ranges · See pressure-temperature diagram 1 2

Connections	Standard	Nominal size mm · inch	Pressure-temperature values		
			Max. inlet pressure	Medium temperature range	
Welding ends	DIN 11850 Series 2	DN 15 to 50	10 bar	-10 to 100 °C 1	
	DIN EN ISO 1127 (Series 1)	1.6 mm	DN 15, 20	10 bar	
		2.0 mm	DN 25 to 40		
		2.6 mm	DN 50		
Threaded connections	BS 4825	NPS 1, 1½, 2	150 psi	14 to 212 °F 2	
	SMS 3008/ISO 2037	DN 25 to 50	10 bar	-10 to 100 °C 1	
	DIN 11887 Type A	DN 15 to 50	10 bar	-10 to 100 °C 1	
		SMS 1146	DN 25 to 50	6 bar	-10 to 100 °C 1
Clamp connections	ISO 2853 (IDF)	NPS 1 to 2	150 psi	14 to 212 °F 2	
	DIN 32676	DN 15 to 50	10 bar	-10 to 100 °C 1	
		ISO 2852	DN 25 to 50	10 bar	-10 to 100 °C 1
Flanges with smooth raised face $R_a \leq 0.8 \mu\text{m}$	DIN EN 1092-1	PN 10	DN 15 to 50	10 bar	-10 to 100 °C 1
		Form B2	PN 6	DN 15 to 50	6 bar
	ASME B 16.5 Form RF (CL 150)	NPS 1 to 2	150 psi	14 to 212 °F 2	

1 Pressure-temperature diagram for materials according to DIN EN · Temperature range extended
Material: 1.4404



2 Pressure-temperature diagram for ANSI materials
Temperature range extended
Material: 316L

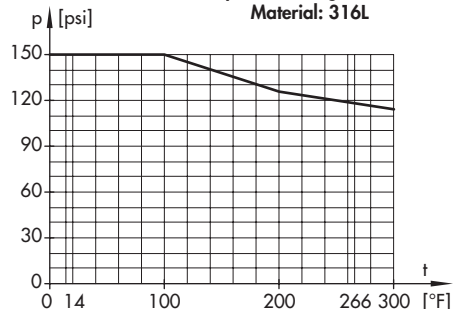


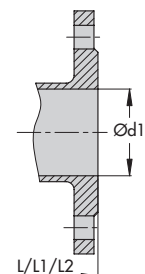
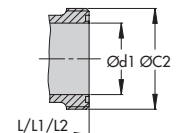
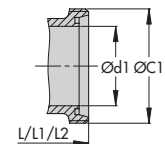
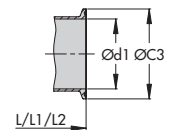
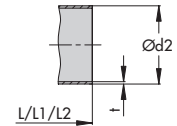
Fig. 6 · Pressure-temperature diagrams
Specifications subject to change without notice.

Dimensions

Dimensions in mm and weights in kg

Cp = Version with pneumatic set point adjustment · **Cr** = Version with mechanical set point adjustment

Valve	DN	15/ ½"	20/ ¾"	25/ 1"	32	40/ 1 ½"	50/ 2"	
Welding ends for pipes acc. to DIN 11850	L (Cp)/L1 (Cr)	70	70	70	105	105	105	
	L2 (Cr)	90	90	90	105	105	105	
	∅ d2	19	23	29	35	41	53	
	t	1.5	1.5	1.5	1.5	1.5	1.5	
Welding ends for pipes acc. to DIN EN ISO 1127 (Series 1)	L (Cp)/L1 (Cr)	70	70	70	105	105	105	
	L2 (Cr)	90	90	90	105	105	105	
	∅ d2	21.3	26.9	33.7	42.4	48.3	60.3	
	t	1.6	1.6	2	2	2	2.6	
Welding ends for pipes acc. to BS 4825	L (Cp)/L1 (Cr)	-	-	70	-	105	105	
	L2 (Cr)			90		105	105	
	∅ d2			25.4		38.1	50.8	
	t			1.6		1.6	1.6	
Welding ends for pipes acc. to SMS 3008/ISO 2037	L (Cp)/L1 (Cr)	-	-	70	105	105	105	
	L2 (Cr)			90	105	105	105	
	∅ d2			25	33.7	38	51	
	t			1.2	1.2	1.2	1.2	
Clamp connections acc. to DIN 32676	L (Cp)/L1 (Cr)	60.3/60	60.3/60	60.3/60	88.9	88.9	88.9	
	L2 (Cr)	90	90	90	88.9	88.9	88.9	
	∅ d1	16	20	26	32	38	50	
	∅ C3	34	34	50.5	50.5	50.5	64	
Clamp connections acc. to BS 4825	L (Cp)/L1 (Cr)	-	-	60.3/60	-	88.9	88.9	
	L2 (Cr)			90		88.9	88.9	
	∅ d1			22.2		34.9	47.6	
	∅ C3			50.5		50.5	64	
Clamp connections acc. to ISO 2852	L (Cp)/L1 (Cr)	-	-	60.3/60	88.9	88.9	88.9	
	L2 (Cr)			90	88.9	88.9	88.9	
	∅ d1			22.6	31.3	35.6	48.6	
	∅ C3			50.5	50.5	50.5	64	
Threaded connections acc. to DIN 11887	L (Cp)/L1 (Cr)	64/60	64/60	64/60	100	100	100	
	L2 (Cr)	90	90	90	100	100	100	
	∅ d1	16	20	26	32	38	50	
	∅ C1	34 x 1/8"	44 x 1/6"	52 x 1/6"	58 x 1/6"	65 x 1/6"	78 x 1/6"	
Threaded connections acc. to SMS 1146	L (Cp)/L1 (Cr)	-	-	55/60	105	105	105	
	L2 (Cr)			90	105	105	105	
	∅ d1			22.6	29.6 ¹⁾	35.6	48.6	
	∅ C2			40 x 1/6"	48 x 1/6"	60 x 1/6"	70 x 1/6"	
37 x 1/8"		45.9 x 1/8"	50.6 x 1/8"	64.1 x 1/8"				
Flanges acc. to DIN EN 1092-1	L (Cp)/L1 (Cr)/L2 (Cr) ¹⁾	90	95	100	105	115	125	
Common dimensions	A (Cp)	80	80	80	110	110	110	
	A (Cr)	95	95	95	110	110	110	
	H	65						
	H1 (Cp)	75	75	75	130	130	130	
	H1 (Cr)	250	250	250	280	280	280	
	H3	≥ 200						
	∅ D	100						
Valve · Weight with welding ends	Cp	Approx. 3 kg				Approx. 11 kg		
	Cr	Approx. 6 kg						
Stem locking · Weight	Approx. 2.5 kg							

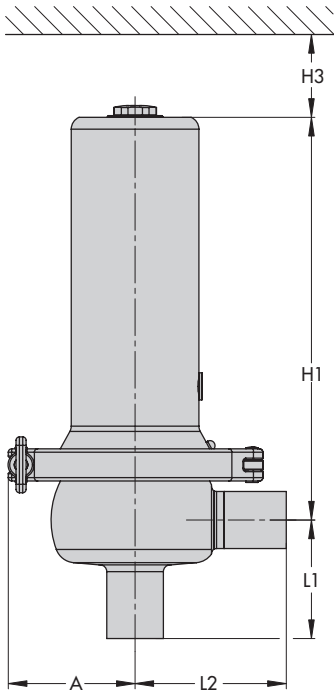


¹⁾ Inside ∅ d1 depending on pipe standard · ²⁾ Acc. to ISO 2853 (IDF): 31.3 mm

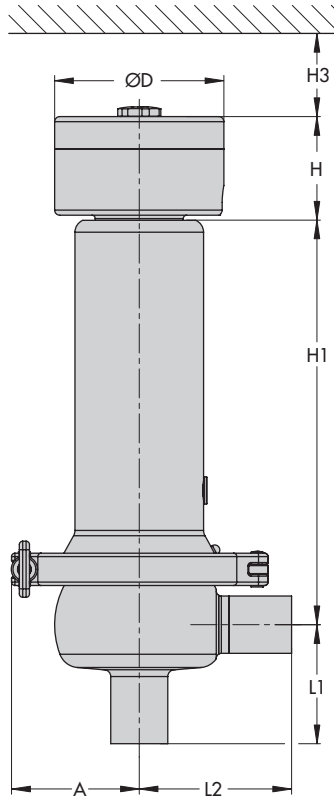
Fig. 7 · Dimensions

Dimensions

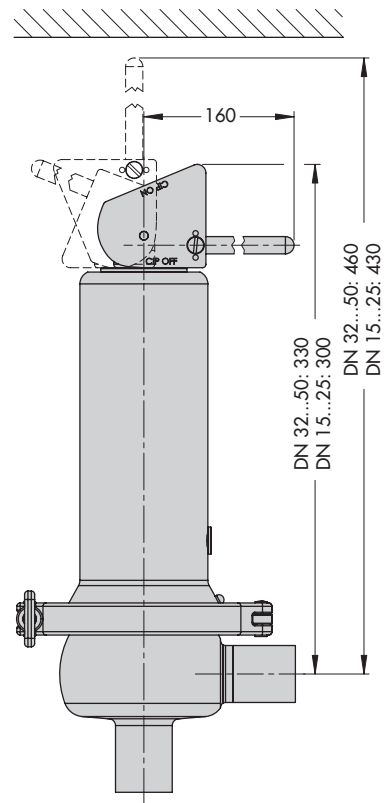
Type 2371-01 · Regulator with mechanical set point adjustment (Cr), without/with stem locking



Without stem locking



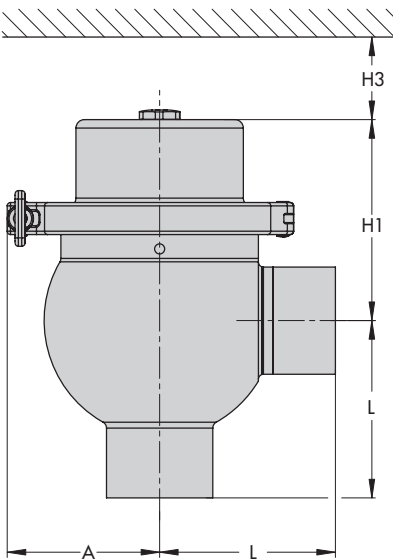
With pneumatic stem locking



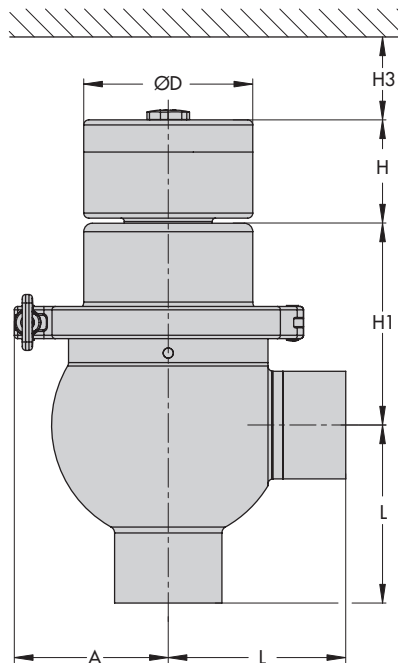
With mechanical stem locking

DN 32...50: 330
 DN 15...25: 300
 DN 32...50: 460
 DN 15...25: 430

Typ 2371-00 · Regulator with pneumatic set point adjustment (Cp), without/with stem locking



Without stem locking



With pneumatic stem locking

The Type 2371-00/01 Regulators in the drawings have welding ends

