DATA SHEET

T 2517 EN

Type 41-73 Universal Excess Pressure Valve

Self-operated Pressure Regulators

Application

Pressure regulators for set points from **0.05** to **28 bar** · Valve sizes **DN 15** to **100** · Pressure rating **PN 16** to **40**
Suitable for liquids, gases and vapors up to **350 °C**

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

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Frictionless plug stem seal with stainless steel bellows
- Control line kit available for tapping the pressure directly at the valve body
- Wide set point range and convenient set point adjustment using a nut
- Exchangeable actuator and set point springs
- Spring-loaded, single-seated valve with upstream and downstream pressure balancing [1] by a stainless steel bellows
- Soft-seated plug for high shut-off requirements
- Low-noise standard plug
- All wetted parts free of non-ferrous metal

Versions

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

– **Type 41-73 · Standard version**

Type 2417 Valve · Valve DN 15 to 100 · Metal-seated plug · Body made of cast iron EN-GJL-250, spheroidal graphite iron EN-GJS-400-18-LT, cast steel 1.0619 or CrNiMo steel 1.4408

Type 2413 Actuator with EPDM rolling diaphragm

Version with additional features

– **Excess pressure valve with increased safety**

Actuator with leakage line connection and seal or two diaphragms and diaphragm rupture indicator

[1] With $K_{VS} \leq 4$: without balancing bellows

Fig. 1: *Type 41-73 Universal Excess Pressure Valve*

Special versions

– Control line kit for tapping the pressure directly at the valve body (accessories)

– With internal parts made of FKM, e.g. for use with mineral oils

– Actuator for remote set point adjustment (autoclave control)

– Bellows actuator for valves in DN 15 to 100 · Set point ranges 2 to 6, 5 to 10, 10 to 22 or 20 to 28 bar

– Valve with flow divider ST 1 for particularly low-noise operation with gases and vapors

– Version entirely of stainless steel

– Stainless Cr steel seat and plug with PTFE soft seal (max. 220 °C) · With EPDM soft seal (max. 150 °C)

SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · samson@samsongroup.com · www.samsongroup.com

Edition December 2022

– Stellite®-faced seat and plug for low-wear operation
– Version for industrial gases
– Free of oil and grease for high-purity applications
– Wetted plastic parts conforming to FDA regulations (max. 60 °C)

Principle of operation (see Fig. 2)

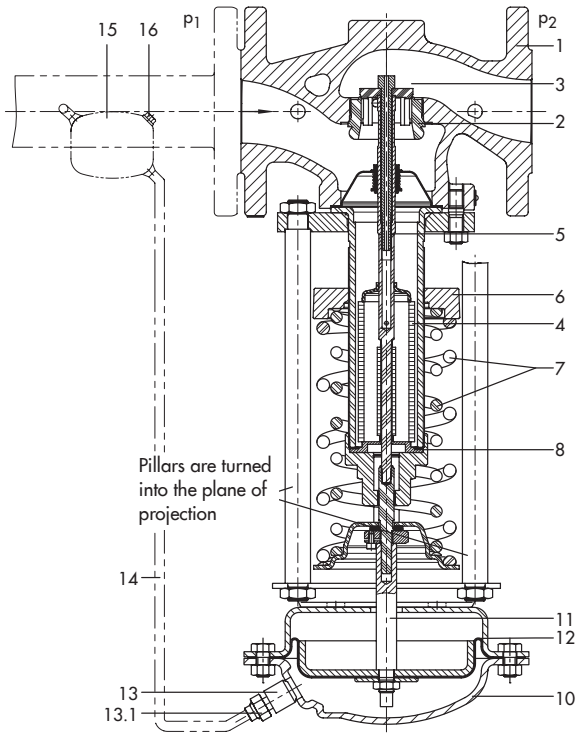
The medium flows through the valve (1) as indicated by the arrow. The position of the plug (3) determines the flow rate across the area released between plug and valve seat (2). The plug stem (5) with the plug (3) is connected to the actuator stem (11) of the actuator (10).

To control the pressure, the operating diaphragm (12) is tensioned by the set point springs (7) and the set point adjuster (6) so that the valve is closed by the force of the set point springs when it is relieved of pressure ($p_1 = p_2$).

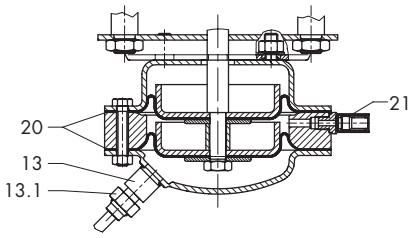
The upstream pressure p_1 to be controlled is tapped upstream of the valve and transmitted over the control line (14) to the operating diaphragm (12) where it is converted into a positioning force. This force is used to move the valve plug (3) according to the force of the set point springs (7). The spring force is adjustable at the set point adjuster (6).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.

The fully balanced valve has a balancing bellows (4). The downstream pressure p_2 acts on the inside of the bellows, whereas the upstream pressure p_1 acts on the outside of the bellows. As a result, the forces produced by the upstream and downstream pressures acting on the plug are balanced out.

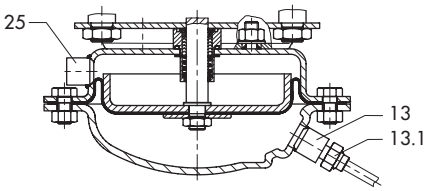
The valves can be supplied with flow divider ST 1. The valve seat must be replaced on retrofitting the flow divider ST 1.



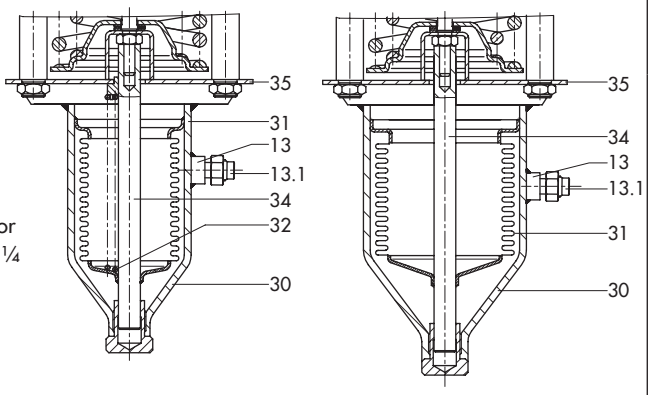
Sectional drawing of Type 41-73 Universal Excess Pressure Valve



Actuator with two diaphragms and diaphragm rupture indicator



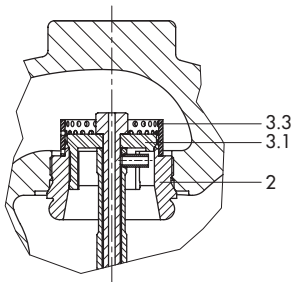
Actuator with leakage line connection



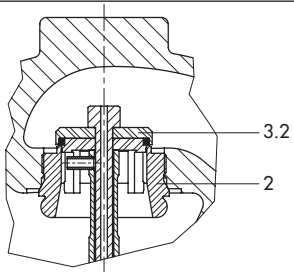
Different versions of Type 2413 Actuator

1	Valve body (Type 2417)	13.1	Screw joint with restriction
2	Seat (exchangeable)	14	Control line
3	Plug (with metal sealing)	15	Compensation chamber
4	Balancing bellows	16	Filler plug
5	Plug stem	20	Diaphragm
6	Set point adjuster	21	Diaphragm rupture indicator
7	Set point springs	25	Leakage line connection G ¼
8	Bellows seal	30	Bellows actuator
10	Type 2413 Actuator	31	Bellows with lower section
11	Actuator stem	32	Additional springs
12	Operating diaphragm with diaphragm plate	34	Bellows stem
		35	Bracket
13	Control line connection G ¼		

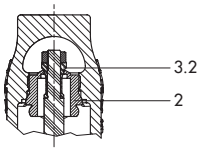
Fig. 2: *Functional diagram of Type 41-73 Universal Excess Pressure Valve*



Plug with metal sealing, with flow divider ST 1



Plug with soft seal



Valve for small flow rates K_{VS} ≤ 4: without balancing bellows

2 Seat
3.1 Metal-seated plug
3.2 Plug with soft seal
3.3 Flow divider

Fig. 3: *Equipment, seat/plug versions*

Table 1: *Technical data · All pressures in bar (gauge)*

Valve	**Type 2417**		
Pressure rating	PN 16, 25 or 40		
Valve size	DN 15 to 50	DN 65 to 80	DN 100
Max. perm. differential pressure Δp	16 bar [2] · 25 bar	16 bar [2] · 20 bar	16 bar
Max. permissible temperature	See pressure-temperature diagram in ▶ T 2500		
Valve plug	Metal seal: 350 °C · PTFE soft seal: 220 °C · EPDM or FKM soft seal: 150 °C · NBR soft seal: 80 °C		
Leakage class according to IEC 60534-4	Metal seal: leakage rate I (≤0.05 % of K_{VS}) Soft seal: leakage rate IV (≤0.01 % of K_{VS})		
Conformity	CE · UKCA · EAC		
Diaphragm actuator	**Type 2413**		
Set point ranges	0.05 to 0.25 bar · 0.1 to 0.6 bar · 0.2 to 1.2 bar 0.8 to 2.5 bar [1] · 2 to 5 bar · 4.5 to 10 bar · 8 to 16 bar		
Max. permissible temperature	Gases 350 °C, however, max. 80 °C at the actuator · Liquids 150 °C, with compensation chamber max. 350 °C · Steam with compensation chamber max. 350 °C		
Bellows actuator	**Type 2413**		
Actuator area	33 cm²	62 cm²	
Set point ranges	10 to 22 bar · 20 to 28 bar	2 to 6 bar · 5 to 10 bar	

1) Version with actuator with two diaphragms: 1 to 2.5 bar
2) PN 16 only

Table 2: *Max. permissible pressure at actuator*

Set point range · Actuator with rolling diaphragm							**Bellows actuator**			
0.05 to 0.25 bar	0.1 to 0.6 bar	0.2 to 1.2 bar	0.8 to 2.5 bar	2 to 5 bar	4.5 to 10 bar	8 to 16 bar	2 to 6 bar	5 to 10 bar	10 to 22 bar	20 to 28 bar
Max. permissible pressure above the set point adjusted at the actuator										
0.6 bar	0.6 bar	1.3 bar	2.5 bar	5 bar	10 bar	10 bar	6.5 bar	6.5 bar	8 bar	2 bar

Table 3: *Materials · Material numbers according to DIN EN*

Valve	**Type 2412**			
Pressure rating	PN 16	PN 25	PN 40	
Max. permissible temperature	300 °C	350 °C	350 °C	350 °C
Body	Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619	Stainless steel 1.4408
Seat	CrNi steel			CrNiMo steel
Plug	CrNi steel			CrNiMo steel
Seal for soft-seated plug	PTFE with 15 % glass fiber · EPDM · NBR · FKM			
Guide bushing	Graphite			
Balancing bellows and bellows seal	Stainless steel 1.4571			
Actuator	**Type 2413**			
Diaphragm cases	1.0332 [2]			
Diaphragm	EPDM with fabric insert [3] · FKM for mineral oils · NBR			

1) In corrosion-resistant version (CrNi steel)
2) Standard version; see Special versions for others

Installation

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

- The direction of flow must correspond with the arrow on the valve body.
- The control line must be adapted to match the onsite conditions and is not delivered with the valve. On customer request, a control line kit for pressure tapping directly at the valve body (see Accessories) is available.

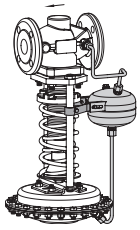
For further details on installation, refer to Mounting and Operating Instructions ▶ EB 2517.

Accessories

Included in the scope of delivery:

- Screw joint with restriction for Ø 6 mm control line.

To be ordered separately:



- Compression-type fittings for e.g. 6, 8 or 10 mm pipe
- Control line kit (optionally with or without compensation chamber) for direct attachment to the valve and actuator (pressure tapped directly at the valve body, for set points ≥ 0.8 bar).
- Compensation chamber for condensation and to protect the operating diaphragm against extreme temperatures. A compensation chamber is required for liquids above 150 °C as well as for steam.

For further details on accessories, refer to ▶ T 2595.

Ordering text

Type 41-73 Universal Excess Pressure Valve

Additional features ...

DN ...

Body material ..., PN ...

Kvs ...

Set point range ... bar

Optionally, accessories ... (▶ T 2595)

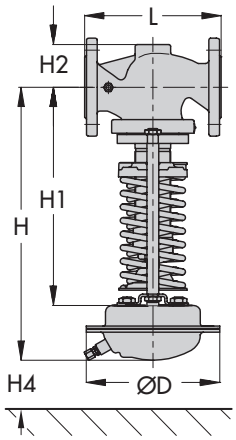
Optionally, special version ...

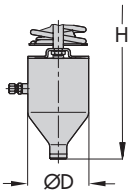
Table 4: *Weight · Compensation chambers (standard version)*

Order no.	Designation	Weight (approx.)
1190-8788	Compensation chamber 0.7 l · Steel	1.6 kg
1190-8789	Compensation chamber 1.5 l · Steel	2.6 kg
1190-8790	Compensation chamber 2.4 l · Steel	3.7 kg

Dimensions (see Table 5)

Type 41-73 Universal Excess Pressure Valve





Type 2413 Bellows Actuator

Actuator with two diaphragms:
Height H + 50 mm

Fig. 4: *Dimensions*

Table 5: *Dimensions in mm and weights in kg*

Excess pressure valve			**Type 41-73**								
Valve size			**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**
Length L			130	150	160	180	200	230	290	310	350
Height H1			335			390			517		540
Height H2		Cast steel	44			72			98		118
		Forged steel	53	–	70	–	92	98	–	128	–
Height H4			100								
Standard version with Type 2413 Actuator with rolling diaphragm											
Set point ranges	0.05 to 0.25 bar	Height H	445			500			627		650
		Actuator	ØD = 380 mm, A = 640 cm²								
		Valve spring force F	1750 N								
	0.1 to 0.6 bar	Height H	445			500			627		650
		Actuator	ØD = 380 mm, A = 640 cm²								
		Valve spring force F	4400 N								
	0.2 to 1.2 bar	Height H	430			480			607		635
		Actuator	ØD = 285 mm, A = 320 cm²								
		Valve spring force F	4400 N								
	0.8 to 2.5 bar [2]	Height H	430			485			612		635
		Actuator	ØD = 225 mm, A = 160 cm²								
		Valve spring force F	4400 N								
	2 to 5 bar	Height H	410			465			592		615
		Actuator	ØD = 170 mm, A = 80 cm²								
		Valve spring force F	4400 N								
	4.5 to 10 bar	Height H	410			465			592		615
		Actuator	ØD = 170 mm, A = 40 cm²								
		Valve spring force F	4400 N								
	8 to 16 bar	Height H	410			465			592		615
		Actuator	ØD = 170 mm, A = 40 cm²								
		Valve spring force F	8000 N								
Weight for version with rolling diaphragm											
SP ranges	0.05 to 0.6 bar	Weight, based on cast iron [1], approx. kg	24.8	25.9		32.5	34.7	38.5	56.1	63.8	73.7
	0.2 to 2.5 bar		20.6	22.8		28.9	31.1	34.9	52.5	60.2	70.1
	2 to 16 bar		13.2	14.3		20.4	23.1	26.4	44.0	51.7	61.6
Version with Type 2413 Bellows Actuator											
Set point ranges	2 to 6 bar	Height H	550			605			732		755
		Actuator	ØD = 120 mm, A = 62 cm²								
		Valve spring force F	4400 N								
	5 to 10 bar	Height H	550			605			732		755
		Actuator	ØD = 120 mm, A = 62 cm²								
		Valve spring force F	8000 N								
	10 to 22 bar	Height H	535			590			717		740
		Actuator	ØD = 90 mm, A = 33 cm²								
		Valve spring force F	8000 N								
	20 to 28 bar	Height H	535			590			717		740
		Actuator	ØD = 90 mm, A = 33 cm²								
		Valve spring force F	8000 N								
Weight for version with bellows actuator											
A = 33 cm²		Weight, based on cast iron [1], approx. kg	18.2	19.3	19.8	25.9	28.1	31.9	48.4	61.6	71.5
A = 62 cm²			22.6	23.7	24.2	30.3	32.5	36.3	60.5	68.2	78.1

[1] +10 % for all other materials

[2] Version with actuator with two diaphragms: 1 to 2.5 bar

Table 6: *K_{VS} coefficients and x_{FZ} values · Terms for noise level calculation according to VDMA 24422 (edition 1.89)*

Valve size	K_{VS} [1] Standard version	x_{FZ}	K_{VS} [1] Special version	x_{FZ}	K_{VS} 1 With flow divider
DN 15			1	0.6	
	4	0.5			3
DN 20			1	0.6	
			4	0.5	
	6.3	0.45			5
DN 25			1	0.6	
	8	0.4	4	0.5	6
DN 32			4 · 8	0.5 · 0.4	
	16	0.4			12
DN 40			4 · 8	0.5 · 0.45	
	20	0.4			15
DN 50			4 · 8	0.5 · 0.4	
	32	0.4			25
DN 65			32 [2]	0.4	
	50	0.4			38
DN 80			32 [2]	0.4	
	80	0.35			42
DN 100			80	0.4	
	125	0.35			66

1) K_{VS} ≤4: valve without balancing bellows
2) Max. permissible Δp: 25 bar

Valve-specific correction terms

ΔL_G · For gases and vapors:

Values as specified in the diagram

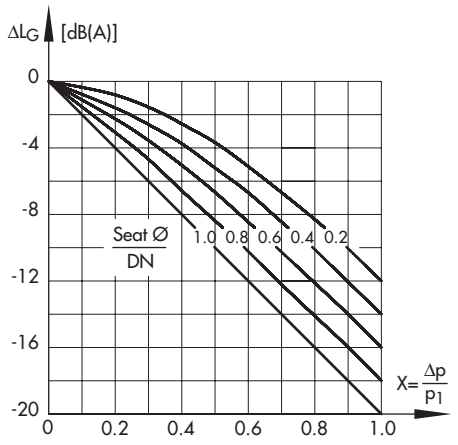


Fig. 5: *Diagram - ΔL_G for gases and vapors -*

ΔL_F · For liquids:

$\Delta L_F = -10 \cdot (x_F - x_{FZ}) \cdot y$

with $x_F = \dfrac{\Delta p}{p_1 - p_V}$ and $y = \dfrac{K_V}{K_{VS}}$

Terms for control valve sizing according to IEC 60534, Parts 2-1 and 2-2:

$F_L = 0.95$; $x_T = 0.75$

x_{FZ} · Acoustical valve coefficient

K_{VS} **1** · When a flow divider ST 1 is installed as a noise-reducing component

Flow characteristic differences between valves with and valves without flow dividers do not occur until the valve has passed through approx. 80 % of its travel range.