DATA SHEET

T 2548 EN

Type 2422/2424 Pressure Reducing Valve

Self-operated Pressure Regulators · ANSI version

Application

Pressure regulators for set points from **0.75** to **35 psi** (0.05 to 2.5 bar) · Valves in **NPS 6** to **10** [1] (DN 150 to 250)
Pressure rating **Class 125** to **300** · Suitable for water, gases and vapors up to **660 °F** (350 °C)

The valve **closes** when the downstream pressure **rises**.

The pressure reducing valves, consisting of a valve and an actuator, control the downstream pressure to an adjustable set point. The medium pressure to be kept constant is transmitted through a control line to the diaphragm of the actuator and consequently the valve plug.

Special features

- Low-maintenance, medium-controlled proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment using a nut
- Exchangeable set point springs and actuator
- Spring-loaded, single-seated valve with upstream and downstream pressures balanced by a stainless steel bellows or by a balancing diaphragm
- Reduced C_V (K_{VS}) coefficients to adapt the regulator to the operating conditions
- Standard low-noise plug · Special version with flow divider ST 1 or ST 3 for further noise level reduction (see Data Sheet ▶ T 8081)

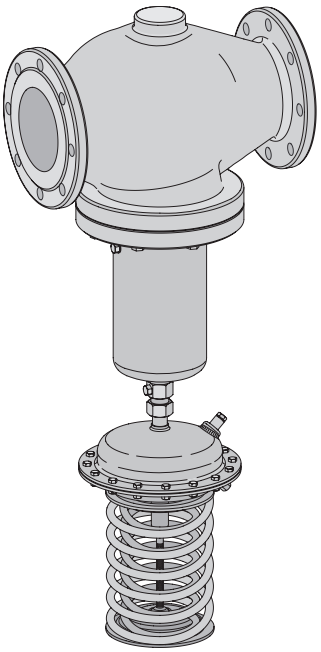

Fig. 1: *Type 2422/2424 Pressure Reducing Valve, valve balanced by a bellows*

Versions

Type 2422/2424 · Pressure reducing valve in sizes NPS 6 to 10 (DN 150 to 250), consisting of:

Type 2422 Valve with soft-seated plug, balanced by a bellows or a diaphragm · Body of cast iron A126B, cast steel A216 WCC or cast stainless steel A351 CF8M · **Type 2424** Actuator with EPDM rolling diaphragm

Special versions

- With flow divider ST 1 or ST 3 for particularly low-noise operation
- Plug with metal seat
- With FKM rolling diaphragm, e.g. for mineral oils or flammable gases
- With NBR rolling diaphragm for flammable gases
- Version completely in stainless steel for pressure rating Class 125 to 300. Details on request
- Actuator with two diaphragms
- With metal cover to protect the set point springs

[1] Valves larger than NPS 10 (DN 250) on request

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

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Principle of operation

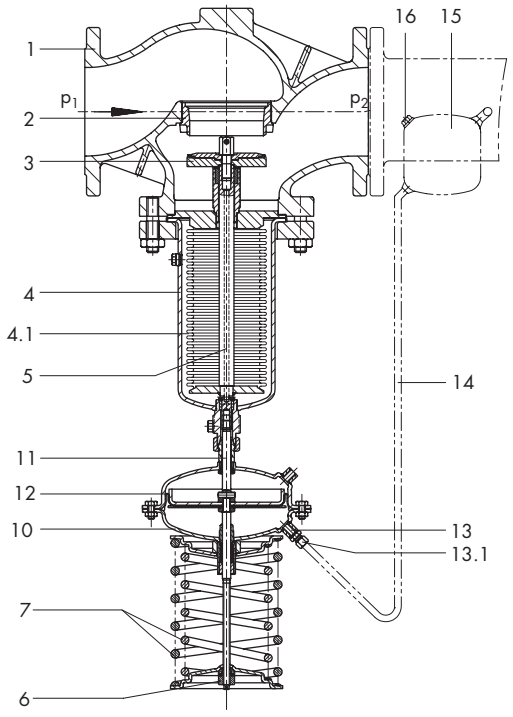
The medium flows through the valve in the direction indicated by the arrow. The position of the plug (3) determines the flow rate across the area released between plug (3) and valve seat (2). The plug stem (5) with the plug is connected to the actuator stem (11) of the actuator (10).

The downstream pressure p_2 is regulated by the set point springs (7) and the set point adjuster (6). When relieved of pressure, the valve is opened by the force of the set point springs.

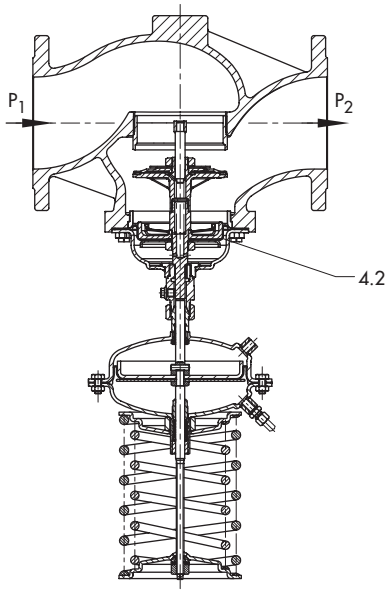
The downstream pressure p_2 to be controlled is tapped downstream of the valve and transmitted over the control line to the operating diaphragm (12) where it is converted into a positioning force. This force is used to move the valve plug (3) according to the force of the set point springs. The spring force is adjustable at the set point adjuster (6). When the force resulting from the downstream pressure p_2 rises above the adjusted pressure set point, the valve closes proportionally to the change in pressure.

The principle of operation of the regulator balanced by a bellows or diaphragm only differs concerning the pressure balancing. The valves balanced by a diaphragm have a balancing diaphragm (4.2) instead of a bellows (4.1). In both cases, the forces created by the upstream and downstream pressures that act on the valve plug are balanced out.

The valves can be supplied with flow divider ST 1 or ST 3. The valve seat must be replaced on retrofitting the flow divider.



Functional diagram of Type 2422/2424
Type 2422 Valve balanced by a bellows



Functional diagram of Type 2422/2424
Type 2422 Valve balanced by a diaphragm

Fig. 2: *Functional diagram of Type 2422/2424 Pressure Reducing Valve*

1	Valve body
2	Seat (exchangeable)
3	Plug
4	Bellows housing
4.1	Balancing bellows
4.2	Balancing diaphragm
5	Plug stem
6	Set point adjuster
7	Set point springs
10	Actuator
11	Actuator stem
12	Operating diaphragm
13	Control line connection G ¼ (with ¼ NPT adapter)
13.1	Screw joint with restriction
14	Control line (to be provided on site)
15	Compensation chamber
16	Filler plug

p_1	Upstream pressure
p_2	Downstream pressure

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

Type 2422 Valve				
Valve size		**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**
Pressure rating		Class 125, 150 or 300		
Max. permissible temperature	Valve body	See pressure-temperature diagram in ▶ T 2500		
	Plug balanced by a bellows	Metal seal: 660 °F (350 °C) · PTFE soft seal: 430 °F (220 °C) · EPDM or FKM soft seal: 300 °F (150 °C) · NBR soft seal: 175 °F (80 °C)		
	Plug balanced by a diaphragm	300 °F (150 °C)		
Leakage class according to IEC 60534-4 or ANSI/FCI 70-2		≤0.05 % of C_V or K_{VS} coefficient		
Compliance		CE · EAC		
Type 2424 Actuator				
Set point ranges		0.75 to 3.5 psi · 1.5 to 8.5 psi · 3 to 14.5 psi · 7 to 20 psi · 14.5 to 35 psi[1)]		
		0.05 to 0.25 bar · 0.1 to 0.6 bar · 0.2 to 1 bar · 0.5 to 1.5 bar · 1 to 2.5 bar[1)]		
Max. perm. pressure at actuator	Actuator area	50 in² · 320 cm²	100 in² · 640 cm²	
	Pressure	43.5 psi · 3 bar	22 psi · 1.5 bar	
Max. permissible temperature		Gases 350 °C, however, max. 175 °F (80 °C) at the actuator · Liquids 300 °F (150 °C), with compensation chamber max. 660 °F (350 °C) · Steam with compensation chamber max. 660 °F (350 °C)		

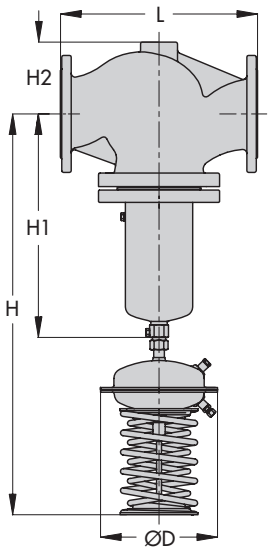
1) Set point ranges above 35 psi (2.5 bar), see ▶ T 2554 (Type 2333 Pressure Reducing Valve)

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

Type 2422 Valve, balanced by a bellows				
Pressure rating		**Class 125**	**Class 150/300**	
Body		Cast iron A126B	Cast steel A216 WCC	Cast stainless steel A351 CF8M
Seat		1.4006		1.4404
Plug		1.4404		1.4404 with PTFE seal
	Seal for soft-seated plug	PTFE · EPDM · FKM · NBR		
Plug stem		1.4301		
Balancing bellows		1.4571		
Bottom section		1.0305		1.4571
Gasket		Graphite on metal core		
Type 2422 Valve, balanced by a diaphragm				
Pressure rating		Class 125	Class 150/300	
Body		Cast iron A126B	Cast steel A216 WCC	Cast stainless steel A351 CF8M
Seat		Red brass [1)]		
Plug (standard version)		Red brass [1)] · With EPDM soft seal or with PTFE soft seal		
Pressure balancing		Balancing cases made of sheet steel DD11 · EPDM balancing diaphragm for liquids and non-flammable gases or NBR diaphragm for flammable gases		
Gasket		Graphite on metal core		
Type 2424 Actuator				
Diaphragm cases		Sheet steel DD11		1.4301
Diaphragm		EPDM with fabric reinforcement · FKM · NBR		
Guide bushing		DU bushing		PTFE
Seals		EPDM · FKM · NBR		

1) Special version: 1.4409

Dimensions · Valve balanced by a bellows



Type 2422 Valve,
balanced by a bellows

Type 2424 Actuator

Fig. 3: *Dimension diagram · Type 2422/2424 Pressure Reducing Valve, balanced by a bellows*

Table 3: *Dimensions and weights · Type 2422/2424,* ***valve balanced by a bellows*** *· The values in parentheses apply to temperatures from 430 °F (220 °C) to 660 °F (350 °C)*

Valve size			**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**
Valve	Length L	Class 125/150	17.75″ · 451 mm	21.4″ · 543 mm	26.5″ · 673 mm
		Class 300	18.6″ · 473 mm	22.4″ · 568 mm	27.9″ · 708 mm
	Height H1		23.2″ · 590 mm (28.4″ · 730 mm)	28.7″ · 730 mm (34.25″ · 870 mm)	
	Height H2, approx.		6.9″ · 175 mm	10.7″ · 270 mm	
Set points	**Valve with actuator**				
0.75 to 3.5 psi 0.05 to 0.25 bar	Height H		44.1″ · 1120 mm (49.6″ · 1260 mm)	49.6″ · 1260 mm (55.1″ · 1400 mm)	
	Actuator		ØD = 15.4″ · 390 mm, A = 100 in² · 640 cm²		
1.5 to 8.5 psi 0.1 to 0.6 bar	Height H		44.1″ · 1120 mm (49.6″ · 1260 mm)	49.6″ · 1260 mm (55.1″ · 1400 mm)	
	Actuator		ØD = 15.4″ · 390 mm, A = 100 in² · 640 cm²		
3 to 14.5 psi 0.2 to 1.0 bar	Height H		44.1″ · 1120 mm (49.6″ · 1260 mm)	49.6″ · 1260 mm (55.1″ · 1400 mm)	
	Actuator		ØD = 15.4″ · 390 mm, A = 100 in² · 640 cm²		
7 to 20 psi 0.5 to 1.5 bar	Height H		40.9″ · 1040 mm (46.4″ · 1180 mm)	46.4″ · 1180 mm (51.9″ · 1320 mm)	
	Actuator		ØD = 11.2″ · 285 mm, A = 50 in² · 320 cm²		
14.5 to 35 psi 1 to 2.5 bar	Height H		40.9″ · 1040 mm (46.4″ · 1180 mm)	46.4″ · 1180 mm (51.9″ · 1320 mm)	
	Actuator		ØD = 11.2″ · 285 mm, A = 50 in² · 320 cm²		
Weight [1]			311 lb · 141 kg	619 lb · 281 kg	740 lb · 336 kg

[1] Valve in Class 125 with actuator. Class 150: +10 %, Class 300: +15 %

Dimensions · Valve balanced by a diaphragm

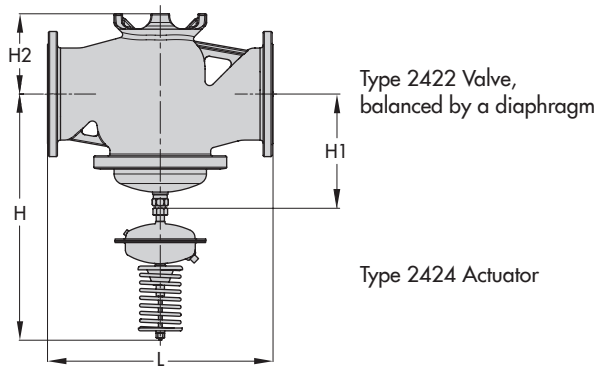


Fig. 4: *Dimension drawing · Type 2422/2424 Pressure Reducing Valve, balanced by a diaphragm*

Table 4: *Dimensions and weights for Type 2422/2424 ·* ***Balanced by a diaphragm***

Nominal size DN		**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**
Valve	Length L Class 125/150	17.75″ · 451 mm	21.4″ · 543 mm	26.5″ · 673 mm
	Length L Class 300	18.6″ · 473 mm	22.4″ · 568 mm	27.9″ · 708 mm
	Height H1	12.2″ · 310 mm	15″ · 380 mm	
	Height H2, approx.	6.9″ · 175 mm	10.7″ · 270 mm	
Set points	**Valve with actuator**			
0.75 to 3.5 psi 0.05 to 0.25 bar	Height H	840 mm	910 mm	
	Actuator	ØD = 15.4″ · 390 mm, A = 100 in² · 640 cm²		
1.5 to 8.5 psi 0.1 to 0.6 bar	Height H	33.1″ · 840 mm	35.9″ · 910 mm	
	Actuator	ØD = 15.4″ · 390 mm, A = 100 in² · 640 cm²		
3 to 14.5 psi 0.2 to 1 bar	Height H	30″ · 760 mm	32.7″ · 830 mm	
	Actuator	ØD = 11.2″ · 285 mm, A = 50 in² · 320 cm² [1]		
7 to 20 psi 0.5 to 1.5 bar	Height H	30″ · 760 mm	32.7″ · 830 mm	
	Actuator	ØD = 11.2″ · 285 mm, A = 50 in² · 320 cm² [1]		
14.5 to 35 psi 1 to 2.5 bar	Height H	30″ · 760 mm	32.7″ · 830 mm	
	Actuator	ØD = 8.9″ · 225 mm · A = 50 in² · 320 cm²		
Weight [2], approx.		220 lb · 100 kg	534 lb · 243 kg	580 lb · 263 kg

[1] Optionally with actuator 100 in² (640 cm²)

[1] Valve in Class 125 with actuator. Class 150: +10 %, Class 300: +15 %

Table 5: *C_V (K_{VS}) coefficients and max. permissible differential pressures Δp_{max}*

Type 2422 Valve, balanced by a bellows							
C_V (K_{VS}) coefficients and max. permissible differential pressures Δp_{max}							
		C_V (K_{VS}) coefficients · Differential pressures			Reduced C_V (K_{VS}) coefficients · Differential pressures		
Valve size		**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**	**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**
Standard C_V (K_{VS}) coefficients	C_V	330	490	585	145	330	330
	K_{VS}	280	420	500	125	280	280
Flow divider ST 1	C_V1	245	370	440	110	245	245
	$K_{VS}1$	210	315	375	95	210	210
Flow divider ST 3	C_V3	165	230	260	70	165	165
	$K_{VS}3$	140	200	220	60	140	140
Max. perm. differential pressure Δp_{max}	psi	175	145	145	230	175	175
	bar	12	10	10	16	12	12

Type 2422 Valve, balanced by a diaphragm				
C_V (K_{VS}) coefficients and max. permissible differential pressures Δp_{max}				
Valve size		**NPS 6 · DN 150**	**NPS 8 · DN 200**	**NPS 10 · DN 250**
C_V/K_{VS} coefficients	C_V coefficient	445	760	930
	K_{VS} coefficient	380	650	800
Max. perm. differential pressure Δp_{max}	ANSI	175 psi	145 psi	
	DIN	12 bar	10 bar	

Installation

- Install valves (balanced by a bellows or diaphragm) with the actuator suspended downward.
- Install pipelines horizontally with a slight downward slope on both sides of the valve to prevent condensed water from collecting.
- The direction of flow must match the direction indicated by the arrow on the body.
- Connect a control line to the actuator from the point of pressure tapping located approx. 39" (1 m) downstream of the valve in the pipe wall or at the point of measurement of the connected plant (with compensation chamber, if necessary).

Accessories

- Screw joints with restriction for connection of the control line e.g. for ¼" or ½" (6 or 12 mm) pipe. The control line must be provided on site.
- Only applicable to valves balanced by a bellows: Compensation chamber for condensation and to protect the operating diaphragm against extreme temperatures. The chamber is required for steam and liquids above 300 °F (150 °C).

For detailed information on accessories refer to Data Sheet ▶ T 2595.

Ordering text

Type 2422/2424 Pressure Reducing Valve
Valve balanced by a bellows or diaphragm
NPS (DN) ..., body material ..., Class …
C_V (K_{VS}) coefficient ..., set point range … psi (bar)
Special version ...
Accessories ...