

T 3015 EN

Type 42-36 Flow Regulator

Series 42 Self-operated Regulators



Application

Flow rate control in district heating systems or large heating networks. · Valves **DN 15 to 250** ¹⁾ · Pressure rating **PN 16 to 40** · Suitable for liquids, gases and vapors from **5 to 150 °C** ¹⁾

The valve **closes** when the flow rate **rises**.

The flow regulator is used to limit the flow rate in the pipeline. The set point for the flow rate is adjusted at the restriction.

Special features

- Low-noise, medium-controlled proportional regulator requiring little maintenance
- Suitable for circuit water, water/glycol mixtures, steam and air as well as other liquids, gases and vapors, provided these do not affect the characteristics of the operating diaphragm.
- Single-seated valve with a plug balanced by a stainless steel bellows or a balancing diaphragm.
- Valve body optionally available in cast iron, spheroidal graphite iron, cast steel, cast stainless steel or forged stainless steel.

Versions

Type 42-36 (Fig. 1) · Regulators for valve sizes DN 15 to 250 ¹⁾ · Type 2423 Valve with integrated restriction for adjusting the flow rate set point · Type 2426 Actuator with high-pressure control line · Flange connections · Balancing bellows made of CrNiMo steel or balancing diaphragm made of EPDM (DN 65 to 250)

The set point ranges for the flow rate based on water listed in Table 2 apply to a differential pressure at the restriction of either 0.2 or 0.5 bar.

Special version

- With actuator with two diaphragms for increased functional safety
- With internal parts made of FKM, e.g. for use with mineral oils
- Liquids and vapors up to 220 °C
- ANSI/JIS version

¹⁾ On request: valves larger than DN 250 for steam and gases · Other temperature ranges



Fig. 1: Type 42-36 Flow Regulator

Accessories

Required accessories, such as compression-type fittings, needle valves, equalizing tanks and control lines, are listed in Data Sheet ▶ T 3095.

Principle of operation

The medium flows through the valve in the direction indicated by the arrow. The flow rate is determined by the free area between the restriction (1.4) adjusted at the set point adjuster (1.1) and the valve plug (3). In a fully balanced valve, the position of the plug is not affected by pressure changes in the medium.

Regulators balanced by a bellows or a diaphragm only differ in the pressure balancing principle applied. Valves balanced by a bellows have a balancing bellows (5), whereas the valves balanced by a diaphragm (DN 65 to 250) have a balancing diaphragm (5.1). The pressure directly downstream of the restriction acts on the outside of the metal bellows or balancing diaphragm. In both cases, the forces created by the upstream and downstream pressures that act on the valve plug are balanced out.

The differential pressure created at the restriction $\Delta p_{\text{restriction}}$ operates the actuator. The pressure upstream of the restriction is transmitted through the control line (18) to the lower diaphragm chamber. The pressure downstream of the restriction passes through the hollow plug stem (7) to the diaphragm stem (6) and into the top diaphragm chamber.

If the flow rate increases, the differential pressure ($\Delta p_{\text{restriction}}$) increases at the restriction and also at the operating diaphragm (12). This additional force causes the set point springs (14) to be pressed together until the forces are balanced out again. The plug starts to close. The cross-section of flow is reduced and the flow rate drops until it reaches the adjusted set point.

Type 42-36 Differential Pressure Regulator with two diaphragms for increased functional safety (see Fig. 2)

An actuator with two diaphragms is always required when an FKM diaphragm is to be used. It is especially suitable for applications with thin oils (e.g. heat transfer oil).

The two diaphragms separate both diaphragm chambers connected to the high-pressure and low-pressure connections. They generate a positioning force from the differential pressure. A mechanical diaphragm rupture indicator (22) is located between the two diaphragms. In the event of a diaphragm rupture, the pressure in the space between the two operating diaphragms starts to increase. This causes the pin in the diaphragm rupture indicator to be pushed outwards and a red ring appears, indicating the diaphragm rupture (response pressure approx. 1.5 bar). The intact operating diaphragm takes on the control task of the ruptured diaphragm.

A pressure switch can be optionally mounted to the actuator to trigger an alarm.

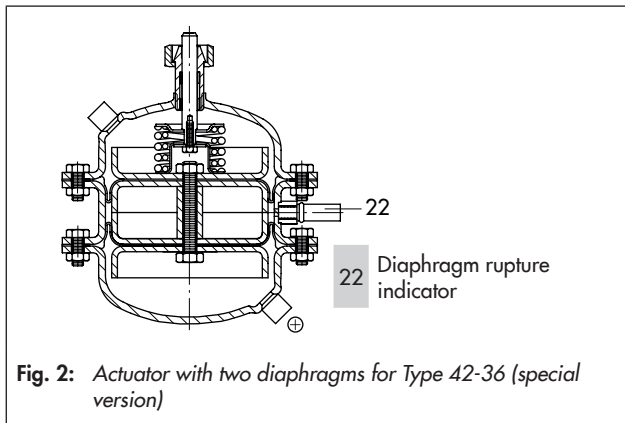
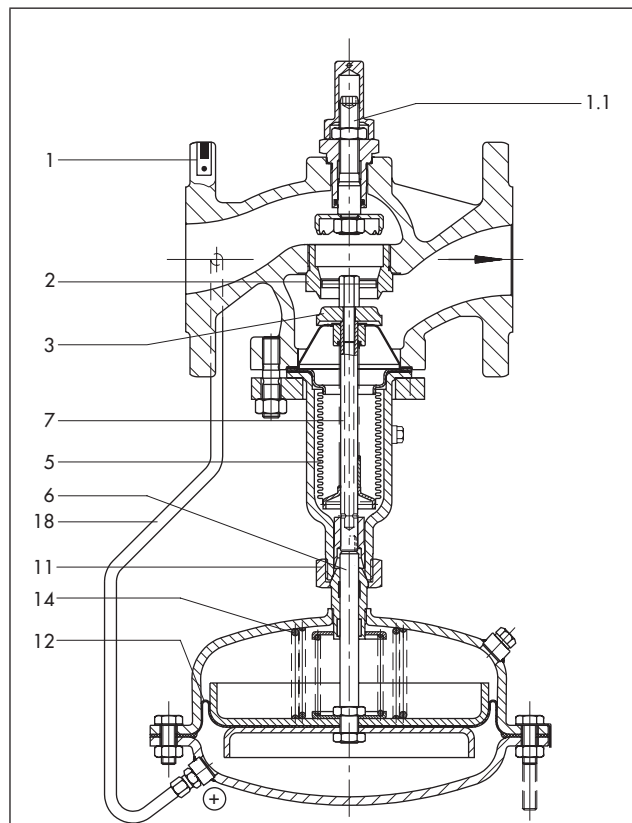
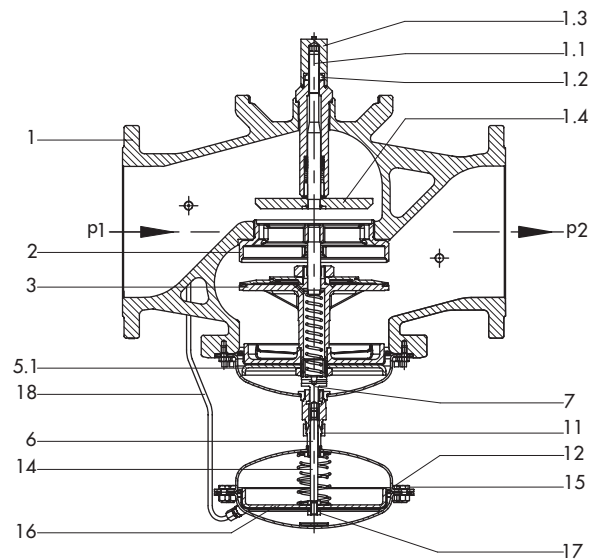


Fig. 2: Actuator with two diaphragms for Type 42-36 (special version)



Type 42-36 balanced by a bellows



Type 42-36 balanced by a diaphragm

1	Type 2423 Valve (balanced by a bellows)	5	Balancing bellows
1.1	Set point adjuster for flow rate	5.1	Balancing diaphragm
1.2	Lock nut	6	Diaphragm stem
1.3	Cap	7	Plug stem
1.4	Restriction	11	Coupling nut
2	Seat	12	Operating diaphragm
3	Plug	14	Set point springs
		18	Control line

Fig. 3: Type 42-36 · Type 2423 Valve balanced by a bellows or diaphragm

Table 1: Technical data

Type 2423 Valve · Balanced by a bellows		DN 15 to 250
Valve size		DN 15 to 250
Pressure rating		PN 16, 25 or 40
Max. perm. temperature	Valve body	See pressure-temperature diagram in ► T 3000
	Actuator	With compensation chamber: steam and liquids up to 220 °C · Without compensation chamber: liquids up to 150 °C, air and nitrogen up to 150 °C ¹⁾
Set point (differential pressure at restriction)		0.2 bar · 0.5 bar
Leakage class according to IEC 60534-4		≤0.05 % of KVS coefficient
Conformity		CE EAC
Refer to Dimensions for the assignment of actuator and valve		
Type 2423 Valve · Balanced by a diaphragm		DN 65 to 250
Valve size		DN 65 to 250
Pressure rating		PN 16, 25 or 40
Max. permissible temperature	Valve body	See pressure-temperature diagram in ► T 3000
	Actuator	Water 150 °C · Air and gases 80 °C
Set point (differential pressure at restriction)		0.2 bar · 0.5 bar
Leakage class according to IEC 60534-4		≤0.05 % of KVS coefficient
Conformity		CE EAC
Refer to Dimensions for the assignment of actuator and valve		

¹⁾ Special version: valve with orifice stem seal and operating diaphragm made of FKM

Table 2: K_{VS} coefficients, x_{FZ} values, flow rate set point ranges for water and max. permissible differential pressures Δp

Type 2423 Valve balanced by a bellows															
Valve size DN	15	20	25	32	40	50	65	80	100	125	150	200	250		
Valve travel	10 mm						16 mm			22 mm					
K_{VS} coefficient	4	6.3	8	16	20	32	50	80	125	190	280	420	500		
x_{FZ} value	0.65	0.6	0.55		0.45	0.4		0.35				0.3			
Flow rate set point ranges for water in m ³ /h															
Diff. pressure across restriction $\Delta p_{restriction}$	0.2 bar	0.05 to 2	0.15 to 3	0.25 to 3.5	0.4 to 7	0.6 to 11	0.9 to 16	2 to 28	3.5 to 35 ¹⁾	6.5 to 63	11 to 80	18 to 120	20 to 180	26 to 220	
	0.5 bar	0.15 to 3	0.25 to 4.5	0.4 to 5.3	0.6 to 9.5	0.9 to 16	2 to 24	3.5 to 40	6.5 to 55	11 to 90	18 to 120	20 to 180	26 to 260	30 to 300	
Max. perm. diff. pressure Δp	25 bar						20 bar		16 bar		12 bar		10 bar		
Type 2423 Valve, balanced by a diaphragm															
Valve size DN	65	80	100	125	150	200	250								
K_{VS} coefficient	50	80	125	250	390	650	800								
x_{FZ} value	0.4		0.35					0.3							
Flow rate set point ranges for water in m ³ /h															
Differential pressure across the restriction $\Delta p_{restriction}$	0.2 bar	2 to 28		3.5 to 35 ¹⁾		6.5 to 63		11 to 120		18 to 180		20 to 320		26 to 350	
	0.5 bar	3.5 to 40		6.5 to 55		11 to 90		18 to 180		20 to 260		26 to 450		30 to 520	
Max. perm. diff. pressure Δp	10 bar						12 bar			10 bar					

¹⁾ 7 to 35 m³/h (160 cm² actuator), 7 to 40 m³/h (320 cm² actuator)

Differential pressure across the valve

The minimum required differential pressure Δp_{min} across the valve is calculated as follows:

$$\Delta p_{min} = \Delta p_{restriction} + \left(\frac{\dot{V}}{K_{VS}} \right)^2$$

Δp_{min}	Minimum differential pressure across the valve in bar
$\Delta p_{restriction}$	Differential pressure created at the restriction for measuring the flow rate in the regulator
\dot{V}	Adjusted flow rate in m ³ /h
K_{VS}	Valve flow coefficient in m ³ /h

Table 3: Materials · Material numbers according to DIN EN

Type 2423 Valve · Balanced by a bellows					
Pressure rating	PN 16	PN 25	PN 16, 25 and 40		
Valve body	Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619	Cast stainless steel 1.4408	Forged stainless steel 1.4571 ¹⁾
Seat	1.4104, 1.4006		1.4404		
Plug	Up to DN 100	1.4104, 1.4006 ²⁾		1.4404	
	DN 125 to 250	1.4301, 1.4404 with PTFE seal			
Plug stem	1.4301				
Metal bellows	1.4571 · DN 125 and larger: 1.4404				
Bottom section	P265GH			1.4571	
Body gasket	Graphite on metal core				
Type 2423 · Balanced by a diaphragm					
Pressure rating	PN 16	PN 25	PN 16, 25 and 40		
Valve body	Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619	Cast stainless steel 1.4408	–
Valve seat	Red brass ^{3) 4)}				
Plug (standard version)	Red brass ^{3) 5)} with EPDM soft seal, max. 150 °C or with PTFE soft seal, max. 150 °C				
Pressure balancing	Balancing cases made of sheet steel DD11 · EPDM balancing diaphragm, max. 150 °C or NBR diaphragm, max. 80 °C				
Type 2426 Actuator					
Diaphragm cases	1.0332		1.4301		
Diaphragm	EPDM ⁶⁾ with fabric reinforcement · Special version for mineral oils: FKM				
Guide bushing	DU bushing		PTFE		
Seals	EPDM/PTFE ⁶⁾				

¹⁾ DN 15, 25, 40 and 50 only

²⁾ Optionally with soft seal with standard K_{VS} coefficients

³⁾ Special version 1.4409

⁴⁾ DN 65 to 100: 1.4006

⁵⁾ DN 65 to 80: 1.4104, DN 100: 1.4006, with metal seal

⁶⁾ Special version for mineral oils: FKM

Application

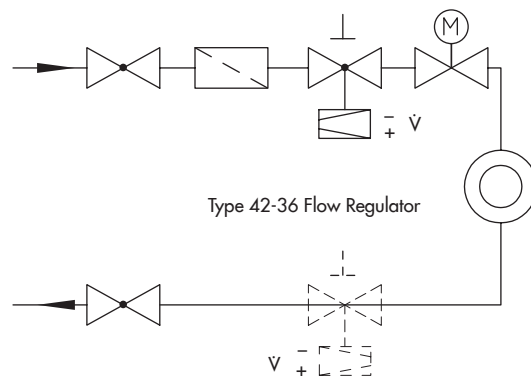


Fig. 4: Sample application for flow rate control in the flow and return flow pipes with Type 42-36

Installation of the regulators

Valve, actuator and control lines are delivered unattached.

Mount the actuator preferably after the valve is installed in the pipeline. It is connected to the bottom section of the valve with a coupling nut (11).

The following points must be observed:

- Install valves in horizontal pipelines.
- The direction of flow must match the arrow on the valve body.
- Install a strainer (e.g. SAMSON Type 2 NI) upstream of the valve.



Permissible mounting positions

- All valve sizes: install the actuator suspended downwards (see photo)
- DN 15 to 80 plus max. 120 °C.: install the actuator either suspended or upright.
- All valve sizes with fixed plug guide plus max. 120 °C: any position possible
- Steam applications: Always install actuator suspended downwards.

Dimensions

Dimensional drawing · Type 2423 Valve balanced by a bellows

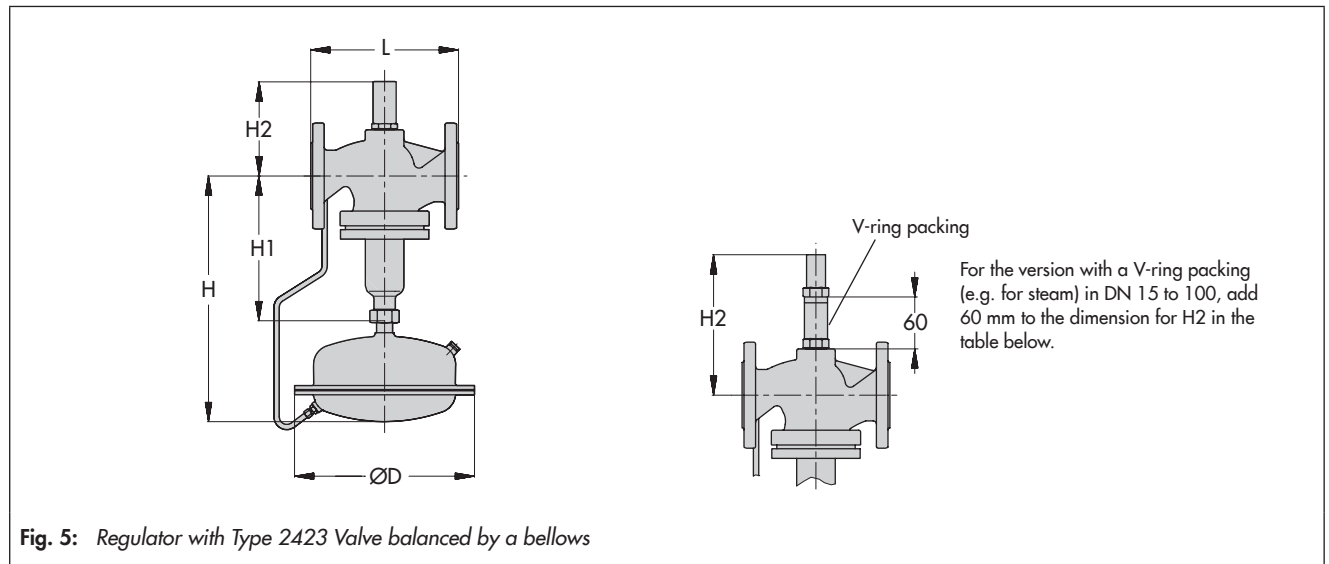


Fig. 5: Regulator with Type 2423 Valve balanced by a bellows

Table 4: Dimensions in mm and weights · Type 2423 Valve balanced by a bellows

Valve size	DN	15	20	25	32	40	50	65	80	100	125	150	200	250	
Length L		130	150	160	180	200	230	290	310	350	400	480	600	730	
Height H1		225						300		355	460	590	730		
Height H2 ¹⁾	1.4571	113	-	130	-	170	176	-							
	Other materials	115			150			175	180	200	250	280	400		
Height H ^{5) 6)}		390						465		520	625	765	895		
Actuator		(ØD = 225 mm, A = 160 cm ²) ²⁾									(ØD = 285 mm, A = 320 cm ²) ³⁾				
Weight for PN 16 ⁴⁾ in kg (approx.)		12	12.5	13.5	20	20.5	23	39	44	59	121	171	425	485	

¹⁾ Version with V-ring packing in DN 15 to 100: +60 mm.

²⁾ Optionally with 320 cm² actuator (DN 65 to 100). For regulators with double adapter Do2 (► T 3019) for DN 65 to 100, actuator 320 cm² recommended.

³⁾ Optionally with 640 cm² actuator

⁴⁾ Valve in PN 25/40: +10 %

⁵⁾ Minimum clearance required to remove the actuator: +100 mm

⁶⁾ Actuator with two diaphragms: Height H +55 mm

Dimensional drawing · Type 2423 Valve balanced by a diaphragm

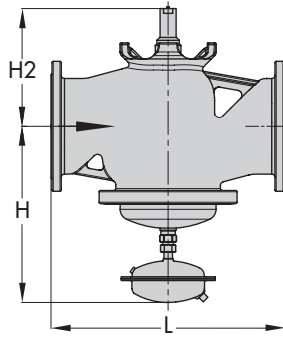


Fig. 6: Regulator with Type 2423 Valve, balanced by a diaphragm

Table 5: Dimensions in mm and weights · Type 2423 Valve balanced by a diaphragm

Valve size	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250
Length L	290	310	350	400	480	600	730
Height H ^{2) 3)}	355		380	450	475	585	
Height H2	195		220	295	325	345	375
Weight for PN 16 ¹⁾ in kg (approx.)							
Type 2423 Valve	34	39	56	65	85	250	270
Type 2426 Actuator	7		20		30		

1) PN 25/40: +10 %

2) Minimum clearance required to remove the actuator: +100 mm

3) Actuator with two diaphragms: Height H +55 mm

Ordering text

Type 42-36 Flow Regulator

DN ...

Valve balanced by a bellows/diaphragm

Body material ...

PN ...

Differential pressure at the restriction 0.2/0.5 bar

Optionally, special version ...

Optionally, accessories ... (► T 3095)