Self-operated Regulators Series 42
Flow Regulator Type 42-36

ANSI version

Application

Regulators for district heating supply systems and large heating systems.

Valves in **NPS** ½ to **10** [1] (DN 15 to 250) · Pressure rating **Class 125** to **300** · Suitable for liquids from **40** to **300 °F (5 °C** to **150 °C)** [2]

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

The regulators have a valve with an adjustable restriction. They control the flow rate according to the set point adjusted at the restriction.

Special features

- Low-noise, self-operated P-regulators requiring little maintenance
- Valve body available in cast iron A 126 B, carbon steel A 216 WCC and cast stainless steel A 351 CF8M
- Suitable for circuit water, water/glycol mixtures up to 30 %, steam and air as well as other liquids, gases and vapors, provided these do not affect the characteristics of the operating diaphragm
- Special version for oil
- Single-seated valve with a plug balanced by a stainless steel bellows

Versions

Type 42-36 (Fig. 1) · Regulators for nominal sizes NPS ½ to 10 [1] (DN 15 to DN 250) · 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

The flow rate set point ranges listed in Table 3 apply to a differential pressure at the restriction of either 3 psi or 7 psi (0.2 or 0.5 bar).

Special versions

– Oil-resistant internal parts made of FKM (FPM)
– JIS version
– Liquids and vapors up to max. 430 °F (220 °C)

Fig. 1 · Type 42-36 Flow Regulator

Ordering text

Flow Regulator **Type 42-36**
NPS … (DN ...), Class ..., body material ...
Differential pressure at the restriction 3 psi (0.2 bar)/ 7 psi (0.5 bar)
Accessories ...
On option, special version ..

[1] Valves in sizes larger than NPS 10 (DN 250) as well as version for steam and gases available on request

[2] Other temperature ranges on request

Principle of operation (Fig. 2)

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 (1.1) and the valve plug (3).

The valve plug is unaffected by pressure changes in the medium since the pressure directly downstream the restriction acts on the outer surface of the metal bellows (5) and the low pressure on the inner side of the bellows. In this way the forces acting on the valve plug are equally balanced.

The differential pressure created at the restriction (orifice) Δp operates the actuator. The pressure upstream of the restriction (1.1) 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 actuator stem and then into the upper diaphragm chamber.

If the flow rate increases, the differential pressure created at the restriction (orifice) Δp increases at the restriction and also at the operating diaphragm (12). If the differential pressure at the operating diaphragm exceeds the set point for the differential pressure at the restriction adjusted at the set point spring, the diaphragm moves together with the plug stem and plug. The cross-section of flow is reduced until the pressure drop created at the restriction and the adjusted differential pressure at the restriction are the same again.

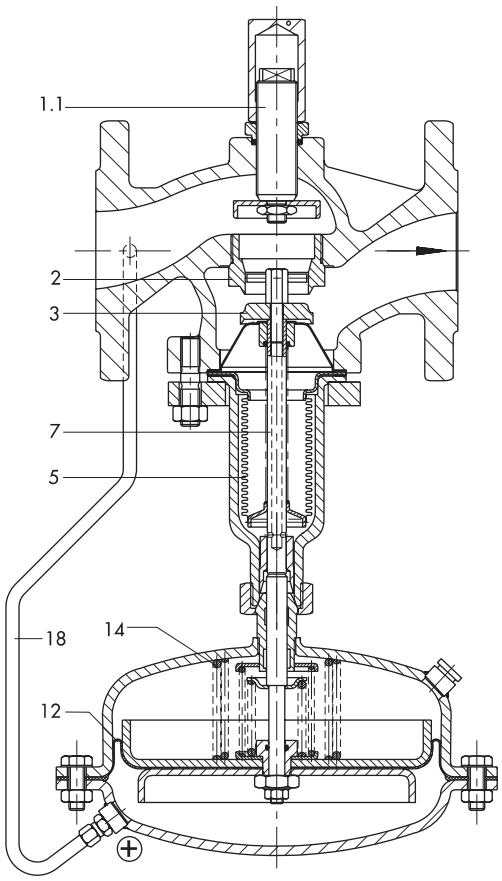

Fig. 2 · Functional diagram of Type 42-36

1.1 Restriction for flow rate set point adjustment
2 Seat
3 Plug
5 Balancing bellows
7 Plug stem
12 Operating diaphragm
14 Set point spring
18 Control line

Pressure-temperature diagram – Materials acc. to ASTM –

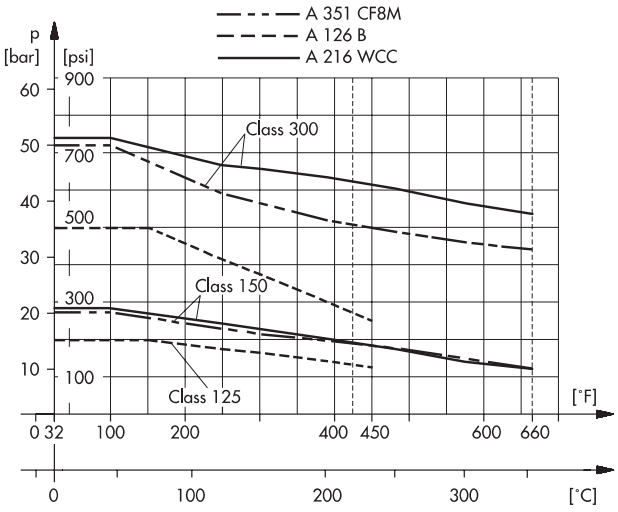

Fig. 3 · Pressure-temperature diagram

Typical application

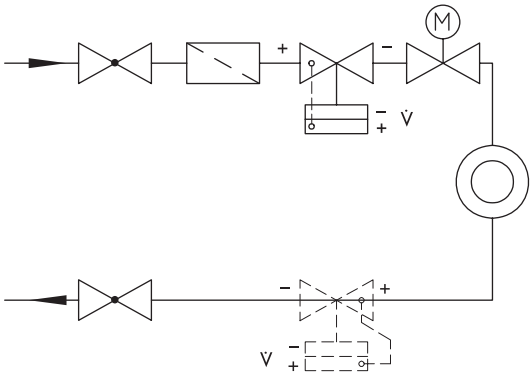

Fig. 4 · Flow rate control in the flow and return flow pipes

Table 1 · Technical data

Type		**42-36**
Nominal size		NPS ½ to 10 · DN 15 to 250
Pressure rating		Class 125, 150 or 300
Max. permissible temperature	Body	See pressure-temperature diagram
	Actuator	With equalizing tanks: Vapors and liquids up to 430 °F (220 °C) Without equalizing tanks: Liquids up to 300 °F (150 °C) · Air and gases up to 175 °F (80 °C)
Set point (differential pressure at restriction)		3 psi · 0.2 bar/7 psi · 0.5 bar
Refer to Table 4 for the assignment of actuators and valves · Dimensions in mm and weights		

Refer to Data Sheet T 2650 EN for more details on the version of **Type 2423** Valve **balanced by a diaphragm**

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

Type 2423 Valve				
Pressure rating		Class 125	Class 150/300	
Valve body		Cast iron A 126 B	Carbon steel A 216 WCC	Cast stainless steel A 351 CF8M
Seat/plug	NPS 4 and smaller (DN 100)	Stainless steel 1.4006/1.4104	1.4112	1.4571
	NPS 6 to 10 (DN 150 to 250)	1.4301, plug with PTFE seal		
Plug stem		Stainless steel 1.4301		
Metal bellows		Stainless steel 1.4571		
Lower part of body		P265GH (1.0305)		1.4301, 1.4305
Body gasket		Graphite on metal core		
Type 2426 Actuator				
Diaphragm cases		Sheet steel DD 11 (StW22)		1.4301
Diaphragm		EPDM with fabric reinforcement [1]		
Guide bushing		DU bushing		

[1] Special version for oils (ASTM I, II, III): FPM (FKM)

Table 3 · Permissible C_V (K_{VS}) coefficients, z values and maximum permissible differential pressures

Nominal size	**NPS**	½	¾	1	1½	2	2½	3	4	6	8	10
	DN	**15**	**20**	**25**	**40**	**50**	**65**	**80**	**100**	**150**	**200**	**250**
Seat Ø		0.9″ (22 mm)			1.6″ (40 mm)		2.6″ (65 mm)		3.5″ (89 mm)	4.9″ (125 mm)	8.1″ (207 mm)	
Travel		0.4″ (10 mm)					0.6″ (16 mm)			0.9″ (22 mm)		
C_V (K_{VS}) coefficient	C_V	5	7.5	9.4	23	37	60	94	145	330	490	590
	K_{VS}	4	6.3	8	20	32	50	80	125	280	420	500
z value		0.65	0.6	0.55	0.45	0.4		0.35			0.3	
Max. perm. diff. pressure Δp in bar		360 psi (25 bar)					290 psi (20 bar)		230 psi (16 bar)	175 psi (12 bar)	145 psi (10 bar)	
Upper diff. pressure [1]		**Flow rate set point ranges for water in US gal/min (m^3/h)**										
3 psi (0.2 bar)	US gal/min	0.2 to 8.8	0.7 to 13	1.1 to 15	2.6 to 48	4 to 70	8.8 to 120	15 to 155	30 to 280	80 to 530	90 to 795	115 to 970
	m^3/h	0.05 to 2	0.15 to 3	0.25 to 3.5	0.6 bis11	0.9 bis16	2 to 28	3.5...35	6.5...63	18...120	20...180	26...220
7 psi (0.5 bar)	US gal/min	0.7 to 13	1.1 to 20	1.8 to 23	4 to 70	8.8 to 105	15 to 175	30 to 240	48 to 400	90 to 800	115 to 1580	132 to 1320
	m^3/h	0.15 to 3	0.25 to 4.5	0.4 to 5.3	0.9 to 16	2 to 24	3.5 to 40	6.5 to 55	11 to 90	20 to 180	26 to 260	30 to 300

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

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

Δp	Differential pressure in (psi) bar
$\Delta p_{restriction}$	Special differential pressure created at the restriction in (psi) bar
$\dot{V}$	Flow rate in US gal/min (m^3/h)
C_V (K_{VS})	Flow coefficient in US gal/min (m^3/h)

Table 4 · Dimensions and weights

Type 2423 Valve with Type 2426 Actuator													
Nominal size		**NPS**	**½**	**¾**	**1**	**1½**	**2**	**2½**	**3**	**4**	**6**	**8**	**10**
		DN	**15**	**20**	**25**	**40**	**50**	**65**	**80**	**100**	**150**	**200**	**250**
Length	Cl 125/150	inch	7.25			8.75	10	10.9	11.75	13.9	17.75	21.4	26.5
		mm	184			222	254	276	298	352	451	543	673
	Cl 300	inch	7.5	7.6	7.75	9.25	10.5	11.5	12.5	14.5	18.6	22.4	27.9
		mm	191	194	197	235	267	292	318	368	473	568	708
Height H1		inch	8.9					11.8		14	23.3	28.7	
		mm	225					300		355	590	730	
Height H2		inch	4.5			5.3		7.7		8.7	11.6	14	15
		mm	115			135		195		220	295	355	380
Height H		inch	15.4					18.3		20.5	30.1		
		mm	390					465		520	765		
Type 2426 Actuator													
Actuator (dimensions)			Ø D = 8.9″ (225 mm) · A = 25 in² (160 cm²) [1]								Ø D = 11.2″ (285 mm) A = 50 in² (320 cm²) [2]		
Type 42-36 Flow Regulator													
Weight [3], approx.		lb	26.4	27.6	29.8	45.2	50.7	86	97	139	377	1138	1299
		kg	12	12.5	13.5	20.5	23	39	44	59	171	425	485

[1] Optionally with actuator 50 in² (320 cm²) for NPS 2½ to 4 (DN 65 to 100). We recommend actuator 50 in² (320 cm²) for regulators with double adapter (see T 3019 EN) in sizes NPS 2½ to 4 (DN 65 to 100) · [2] Optionally with actuator 100 in² (640 cm²)
[3] Add 10 % for A 216 WCC and A 351 CF8M

Dimensional drawing

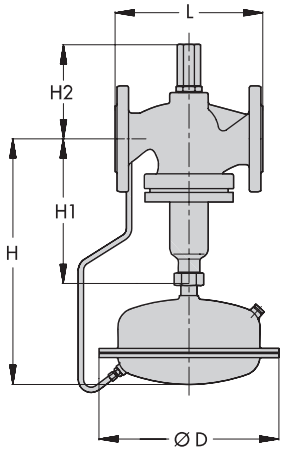

Fig. 5 · Dimensions

Type 42-36 Flow Regulator

Accessories

Refer to the Data Sheet T 3095 EN for any required accessories, e.g. compression-type fittings, needle valves, equalizing tanks and control lines.

Installation

The valve and actuator are delivered in separate packaging. The actuator can be easily mounted before or after the valve is installed using a coupling nut.

The following points need to be observed:

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

Permissible mounting positions

- All nominal sizes: Install the actuator suspended downwards (see photo)
- NPS ½ to 3 (DN 15 to 80)/Up to 250 °F (120 °C): Install the actuator either suspended or upright
- All nominal sizes with fixed plug guide/up to 250 °F (120 °C): Any position possible
- Steam applications: Always install actuator suspended downwards

Further details can be found in EB 3015 EN.

Specifications subject to change without notice

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