

Self-operated Regulators Series 45



Flow Regulator

Type 45-9 · Installation in flow or return flow pipe of a district heating substation

Application

Flow regulators for district heating supply networks, extended pipelines and industrial plants · Upper differential pressure of **0.2** or **0.3 bar** · Nominal pressure **PN 16** or **PN 25** · Valves sizes **DN 15** to **DN 50** · Suitable for liquids up to **150 °C** and gases up to **80 °C**

The valve **closes** as the flow rate rises

The regulator consists of a globe valve with adjustable restriction and an actuator. It controls the flow rate to the set point adjusted at the restriction (orifice).

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Single-seated valve with a plug balanced by a piston
- Wide set point range adjustable at the restriction (orifice) according to a diagram
- Suitable for water and other non-flammable liquids and gases, provided they do not cause the materials used to corrode

Versions (Figs. 1 and 2)

Standard version (Fig. 1) · Flow regulator suitable for installation in flow or return flow pipe of a district heating substation.

Valves in sizes DN 15 to DN 50 made of red brass with welding ends (special version with threaded ends or screwed-on flanges) · Nominal sizes DN 32, 40 and 50 also with flanged valve bodies made of spheroidal graphite iron

With integrated restriction (orifice) for adjustment of the flow rate set point · Optionally for upper differential pressure of either 0.2 or 0.3 bar

Special version · Flow regulator same as standard version and including:

- With external scaled cap for adjusting the flow rate set point (Fig. 2)
- With internal parts resistant to mineral oil (not with PN 16 version) · Other oils on request
- With special K_{VS} coefficient for DN 15

ANSI version available on request.



Fig. 1 · Type 45-9 Flow Regulator (standard version)



Fig. 2 · Type 45-9 Flow Regulator, special version with scaled cap

Principle of operation

The medium flows through the valve in the direction indicated by the arrow. The flow rate is determined by the area released between the restriction (1.2) and valve plug (3).

To control the flow rate, the high pressure upstream of the restriction is transmitted to the high pressure side of the operating diaphragm (7) over a control line (11), while the low pressure downstream of the restriction is transmitted to the low pressure side of the diaphragm through a hole in the valve plug (3).

The differential pressure $\Delta p_{\text{restriction}}$ produced at the restriction is converted into a positioning force at the diaphragm which is used to adjust the position of the plug depending on the force of the set point spring (5).

Installation

The regulator (DN 15 to DN 25) is suitable for installation in horizontal pipes as well as vertical pipes.

Regulators in sizes DN 32 and larger may only be installed horizontal pipes with the actuator pointing downwards.

The following points must be observed:

- The medium must flow through the valve in the direction indicated by the arrow on the valve body.
- Install a strainer (e.g. SAMSON Type 1 NI) upstream of the valve, if possible.

Further details can be found in EB 3128 EN.



Flow rate diagram for water

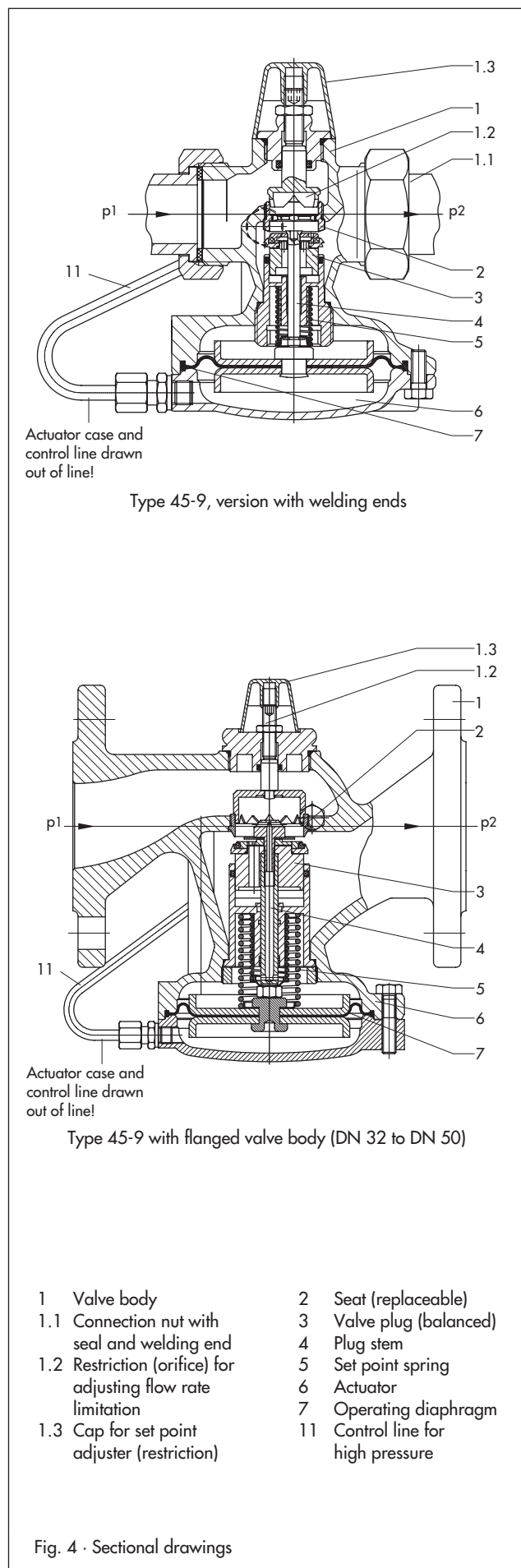
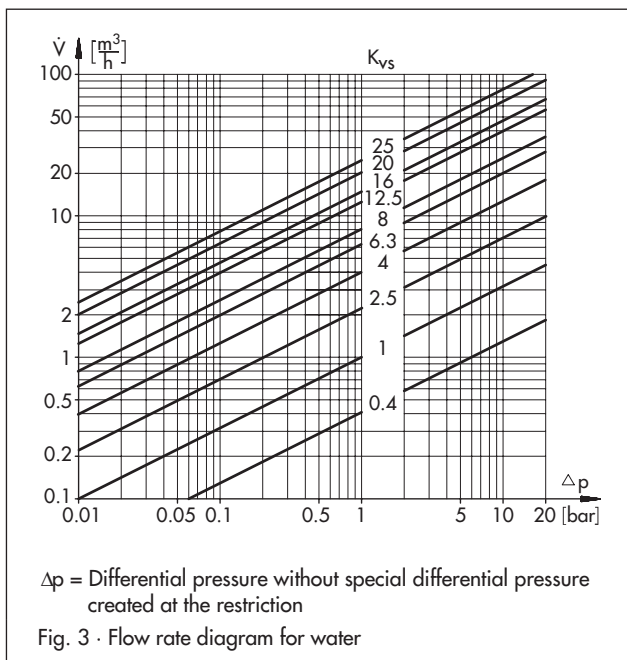


Table 1 · Technical data

Nominal size	DN	15				20	25	32 ²⁾	40 ²⁾	50 ²⁾
K _{VS}		0.4 ¹⁾	1 ¹⁾	2.5	4 ¹⁾	6.3	8	12.5	16	20
Flanged valve		–						12.5	20	25
z value		0.6					0.55	0.5		0.45
Flanged valve		–						0.45	0.45	0.40
Nominal pressure		PN 16/25						PN 25		
Max. perm. differential pressure Δp at valve		10 ³⁾ /20 bar							16 bar	
Max. permissible temperature		For liquids: 130 °C (PN 16)/150 °C (PN 25) · For air and non-flammable gases: 80 °C								
Flow rate set point ranges for water in m³/h										
With upper differential pressure	0.2 bar	–	–	–	0.1...1.3 ⁴⁾	0.1...2.3 ⁴⁾	0.1...3.5 ⁴⁾	0.3...5.8 ⁴⁾	0.4...9.1 ⁴⁾	0.4...14.1 ⁴⁾
	0.3 bar	0.01...0.2	0.02...0.64	0.02...1.2	0.1...2.5	0.1...3.6	0.1...5	0.3...10	0.4...12.5	0.4...15
		–	–	–	0.1...3	–	–	–	–	–

1) Special versions

2) Additional version: Valve with flanged body made of spheroidal graphite iron (EN-JS 1049)

3) For PN 16 version

4) An increase in noise level can be expected when the specified flow rates are exceeded, even if cavitation does not occur.

The minimum differential pressure Δp_{\min} across the valve is calculated as follows: $\Delta p_{\min} = \Delta p_{\text{restriction}} + \left(\frac{\dot{V}}{K_{VS}} \right)^2$

Δp_{\min} Minimum differential pressure in bar across the valve

$\Delta p_{\text{restriction}}$ Differential pressure at the restriction in bar, (differential pressure created at the restriction to measure the flow rate)

\dot{V} Adjusted flow rate in m³/h

K_{VS} Valve flow coefficient in m³/h

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

Body		Red brass CC491K (Rg 5) · Spheroidal graphite iron EN-JS 1049 ¹⁾
Seat		Stainless steel 1.4305
Plug	PN 25	Brass, free of dezincification, with EPDM soft sealing ²⁾
	PN 16	Brass, free of dezincification, and plastic with EPDM soft sealing
Bonnet	PN 25	Red brass CC491K (Rg 5) · Spheroidal graphite iron EN-JS 1049 ¹⁾
	PN 16	Stainless steel 1.4301
Valve spring		Stainless steel 1.4310
Restriction		Brass, free of dezincification
Operating diaphragm		EPDM with fabric reinforcement ²⁾
Sealing rings		EPDM ²⁾

1) Additional version for DN 32, 40 and 50: Valve with flanged body made of spheroidal graphite iron

2) Special version for mineral oil: FPM (FKM)

Ordering text

Flow Regulator Type 45-9

DN ..., PN ...,

Perm. temperature ...°C, K_{VS} ...

With welding ends/threaded ends/flanges/
flanged body in DN 32, 40 and 50

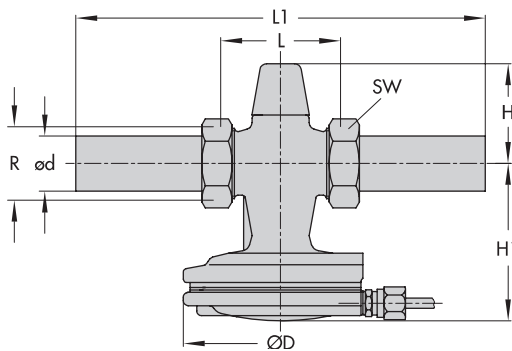
Upper differential pressure 0.2/0.3 bar

On option, special version

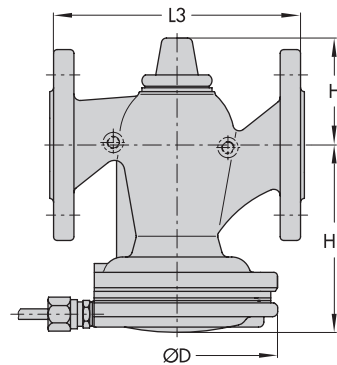
On option, combination

Dimensions in mm

Type 45-9 with connections

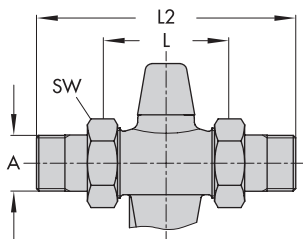


Red brass valve with connection nuts and welding ends (standard version)

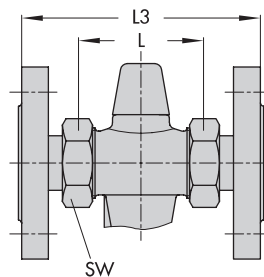


Flanged body version made of spheroidal graphite iron (DN 32, 40 and 50)

Actuator case and control line drawn out of line in both drawings!



Version with threaded ends



Version with flanges

Dimensions in mm · Standard version

Nom. size DN	15	20	25	32	40	50
Connection thread R	G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
Pipe Ø d	21.3	26.8	32.7	42	48	60
Width a. flats SW	30	36	46	59	65	82
Length L	65	70	75	100	110	130
Height H	65			85		
Height H 1	85			105	140	
Ø D	116				160	

The dimensions and weights of valves with flanged bodies (DN 32, 40 und 50) are the same as valves with screwed-on flanges.

Dimensions in mm and weights in kg · Including connections

Nom. size DN	15	20	25	32	40	50
With welding ends						
Length L1	210	234	244	268	294	330
Weight, app. kg	1.6	1.7	1.8	3	5.5	6
With threaded ends						
Length L2	129	144	159	180	196	228
Male thread A	G ½	G ¾	G 1	G 1¼	G 1½	G 2
Weight, app. kg	1.6	1.7	1.8	3	5.5	6
With flanges^{1) 2)} or with flanged body (DN 32 to 50)						
Length L3	130	150	160	180	200	230
Weight, app. kg	3	3.7	4.3	6.2	9.5	11

1) PN 16/25

2) Valves in DN 40 and 50 already have flanges mounted

Fig. 5 · Dimensions

Specifications subject to change without notice.



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