

Series 45 Self-operated Regulators

Type 45-9 Flow Regulator



Installation in flow or return flow pipe of a district heating substation

Application

Flow regulators for district heating systems, extended piping systems and industrial applications.

Differential pressure at the restriction of 0.2 or 0.3 bar

Nominal pressure PN 16 or 25 · Nominal size DN 15 to 50

Suitable for liquids up to 150 °C, air and nitrogen up to 150 °C¹⁾



The valve closes when 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 plug balanced by a piston
- Wide set point range adjustable at the restriction according to a diagram
- Suitable for water and other liquids or gases, provided these do not cause the materials used to corrode

Versions

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

Valve DN 15 to 50 made of red brass with connection nuts and welding ends

Valves in DN 32, 40, and 50 also with flanged body made of spheroidal graphite iron

- With integrated restriction for adjusting the flow rate set point
- Optionally differential pressure at the restriction 0.2 or 0.3 bar

Further versions

- Valve DN 15 to 50 with threaded ends or screw-on flanges
- External scaled cap for adjustment of the flow rate set point (see Fig. 2)
- Internal parts made of FKM, e.g. for use with mineral oils (PN 25 version) · Other oils on request
- With special K_{VS} coefficient in DN 15

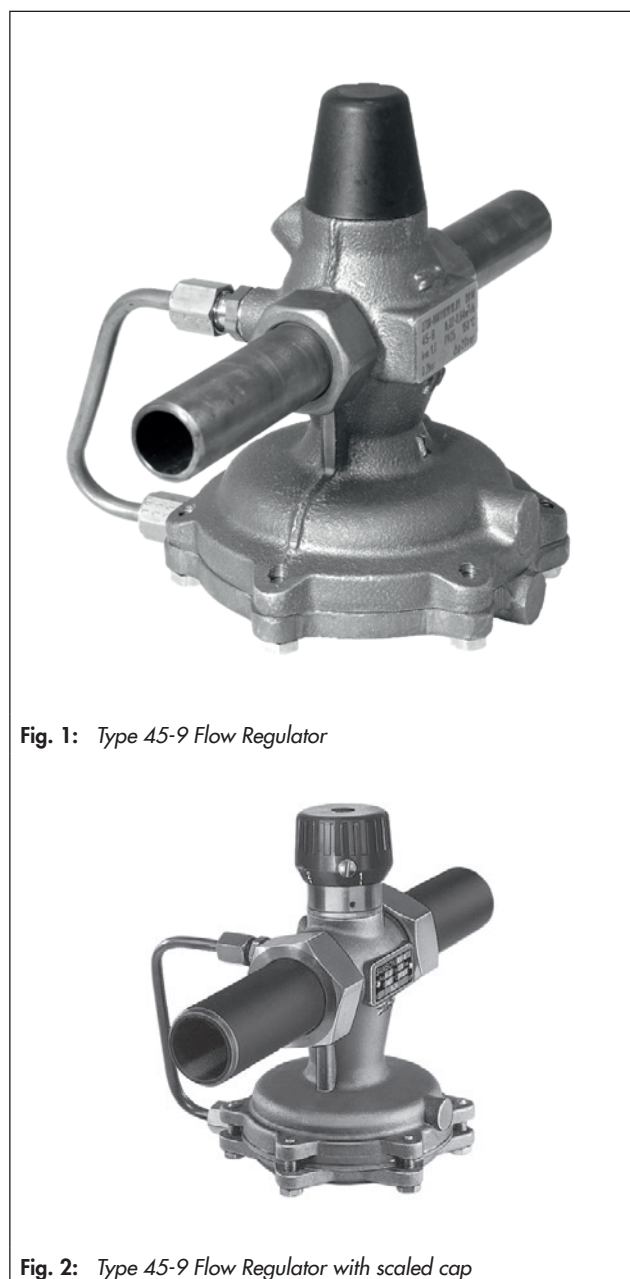


Fig. 1: Type 45-9 Flow Regulator

Fig. 2: Type 45-9 Flow Regulator with scaled cap

¹⁾ Diaphragm and seals made of FKM · PN 25 version

Principle of operation

The medium flows through the valve (1) as indicated by the arrow. The areas released by the restriction (1.2) and the plug (3) determine the flow rate.

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 plug (3). The differential pressure $\Delta p_{\text{restriction}}$ created at the restriction is converted into a positioning force at the diaphragm. This force moves the plug according to the force of the set point spring (5).

Installation

Install the regulator in horizontal pipelines. The actuator faces downward.

The regulator in nominal sizes DN 15 to 25 can also be installed in vertical pipes.

Installation conditions:

- The direction of flow must match the direction indicated by the arrow on the body
- If possible, install a strainer (e.g. SAMSON Type 1 NI) upstream of the valve.

Further details can be found in ► EB 3128.

Flow rate diagram for water

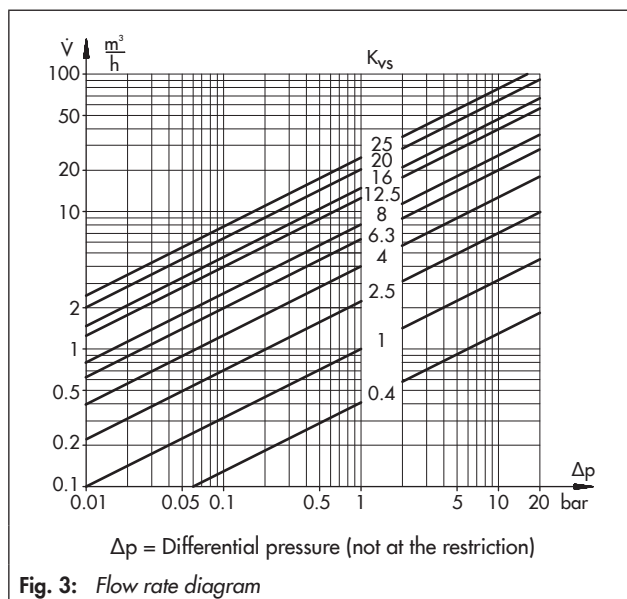


Fig. 3: Flow rate diagram

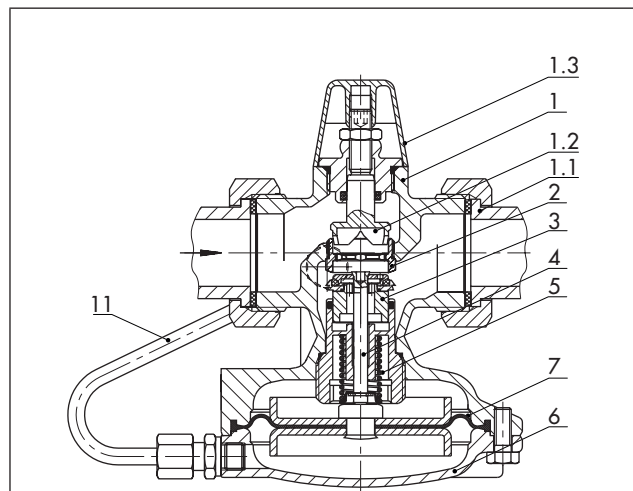


Fig. 4: Type 45-9 with welding ends

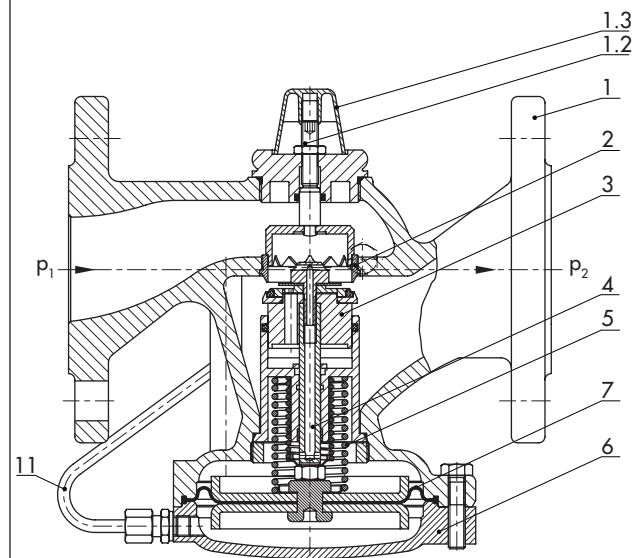


Fig. 5: Type 45-9 with flanged valve body (DN 32 to 50)

- 1 Valve body
- 1.1 Connection nut with seal and welding end
- 1.2 Restriction for adjusting the flow rate limitation
- 1.3 Cap for set point adjuster (restriction)
- 2 Seat
- 3 Plug (balanced)
- 4 Plug stem
- 5 Set point spring
- 6 Actuator
- 7 Operating diaphragm
- 11 Control line for high pressure

Note on Fig. 4 and Fig. 5: Actuator case and control line are turned into the plane of projection. The line is located in front of the body.

Table 1: Technical data

| Nom. size | DN | 15 | | | | 20 | 25 | 32 ²⁾ | 40 ²⁾ | 50 ²⁾ |
|---|---------|---|-----------------|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| | | 0.4 ¹⁾ | 1 ¹⁾ | 2.5 | 4 ¹⁾ | 6.3 | 8 | 12.5 | 16 | 20 |
| K _{VS} coefficient | | 0.4 ¹⁾ | 1 ¹⁾ | 2.5 | 4 ¹⁾ | 6.3 | 8 | 12.5 | 16 | 20 |
| Flanged body | | – | – | – | – | – | – | 12.5 | 20 | 25 |
| x _{FZ} value | | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.55 | 0.5 | 0.5 | 0.45 |
| Flanged body | | – | – | – | – | – | – | 0.45 | 0.45 | 0.40 |
| Nominal pressure | PN | 16/25 | 16/25 | 16/25 | 16/25 | 16/25 | 16/25 | 25 | 25 | 25 |
| Max. perm. diff. pressure Δp across the valve | | 10 ³⁾ /20 bar | | | | | | 16 bar | | |
| Max. permissible temperature | | Liquids: 130 °C (PN 16)/150 °F (PN 25) · Nitrogen and air: 150 °C ⁴⁾ | | | | | | | | |
| Compliance | | CE · EAC | | | | | | | | |
| Flow rate set point ranges for water in m³/h | | | | | | | | | | |
| Differential pressure at restriction Δp _{restriction} | 0.2 bar | – | – | – | 0.1 to 1.3 ⁵⁾ | 0.1 to 2.3 ⁵⁾ | 0.1 to 3.5 ⁵⁾ | 0.3 to 5.8 ⁵⁾ | 0.4 to 9.1 ⁵⁾ | 0.4 to 14.1 ⁵⁾ |
| | | 0.01 to 0.2 | 0.02 to 0.64 | 0.02 to 1.2 | 0.1 to 2.5 | 0.1 to 3.6 | 0.1 to 4.2 | 0.3 to 10 | 0.4 to 12.5 | 0.4 to 15 |
| | 0.3 bar | – | – | – | 0.1 to 3 | – | 0.1 to 5 | – | – | – |

1) Special versions

2) Additional version: Valve with flanged body made of spheroidal graphite iron

3) For PN 16 version

4) Diaphragm and seals made of FKM (PN 25 only)

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

The minimum required 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 valveΔp_{restriction} Differential pressure created at the restriction for measuring the flow rateV̇ Adjusted flow rate in m³/h**Table 2: Materials**

| Body | Red brass CC491K/CC499K (Rg 5) · Spheroidal graphite iron EN-GJS-400-18-LT ¹⁾ | |
|---------------------|--|--|
| Seat | Stainless steel 1.4305 | |
| Plug | PN 25 | Brass, resistant to dezincification, with EPDM soft seal ²⁾ |
| | PN 16 | Brass, resistant to dezincification, and plastic with EPDM soft seal |
| Cover | PN 25 | Red brass CC491K/CC499K (Rg 5) · Spheroidal graphite iron EN-GJS-400-18-LT 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⁾ | |
| Seals | EPDM ²⁾ | |

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

2) Special version in PN 25, e.g. for mineral oils: FKM

Ordering text

Type 45-9 Flow Regulator

DN ..., PN ...

Permissible temperature ... °C, K_{VS} coefficient ...

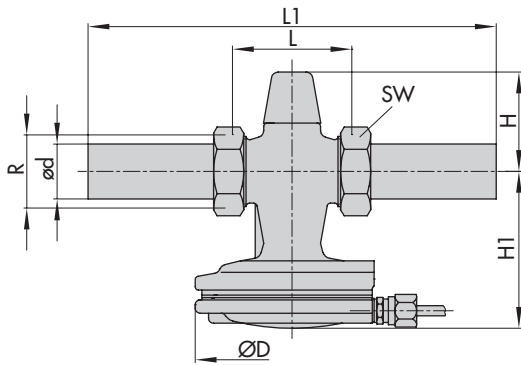
Connection nuts with welding ends, threaded ends, flanges or flanged valve body in DN 32, 40, and 50

Differential pressure at the restriction 0.2 or 0.3 bar

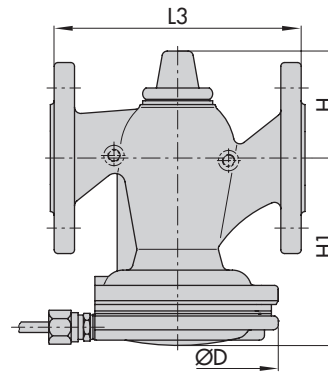
Optionally, special version or combination

Dimensional drawings

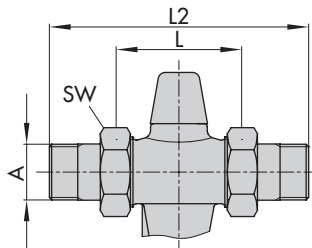
Type 45-9 with connecting parts



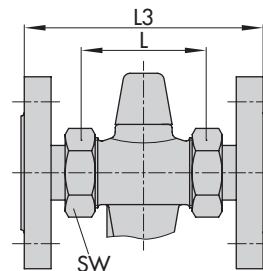
Red brass valve with welding ends (standard version)



Valve made of spheroidal graphite iron with flanges
(DN 32, 40 and 50)



With threaded ends



With screw-on flanges

Table 3: Dimensions in mm · Standard version

| Nominal size | DN | 15 | 20 | 25 | 32 | 40 | 50 |
|-----------------------|----|------|------|------|------|-----|------|
| Connecting thread R | | G ¾ | G 1 | G 1¼ | G 1¾ | G 2 | G 2½ |
| Pipe Ød | | 21.3 | 26.8 | 32.7 | 42 | 48 | 60 |
| Width across flats SW | | 30 | 36 | 46 | 59 | 65 | 82 |
| L | | 65 | 70 | 75 | 100 | 110 | 130 |
| H | | 65 | 65 | 65 | 85 | 85 | 85 |
| H1 | | 85 | 85 | 85 | 105 | 140 | 140 |
| ØD | | 116 | 116 | 116 | 116 | 160 | 160 |

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

Table 4: Dimensions in mm and weights in kg · Including connecting parts

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

¹⁾ PN 16/25

²⁾ Flanges are already mounted on valves in DN 40 and 50.

Specifications subject to change without notice



SAMSON AG · MESS- UND REGELTECHNIK
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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