

## T 3134 EN

### Type 46-5 N Differential Pressure Regulator with Flow Limitation

#### Series 46 Self-operated Regulators

#### Application

Differential pressure regulator with flow limitation for local heat supply and large heating networks. For installation in the return flow pipe

Flow rate set points from **0.1 to 1 m<sup>3</sup>/h** · Pressure rating **PN 10** · Valve size **DN 15** · Differential pressure set point 0.2, 0.3 or 0.5 bar · Suitable for treated water up to **110 °C** and non-flammable gases up to **80 °C**

The valve **closes** when the differential pressure **exceeds** the adjusted set point. The flow rate is limited.

The Type 46-5 N Regulators are self-operated proportional regulators for heating systems. They are used to maintain the differential pressure at the set point of 0.2, 0.3 or 0.5 bar and to limit the flow rate to a value within a range between 0.2 and 1 m<sup>3</sup>/h (standard version) or 0.12 and 0.5 m<sup>3</sup>/h (special version), adjustable at the restriction.

The regulators restrict the flow rate to ensure it does not exceed a certain level. The integrated set point spring determines the differential pressure created at the restriction required to limit the flow rate as well as the differential pressure set point.

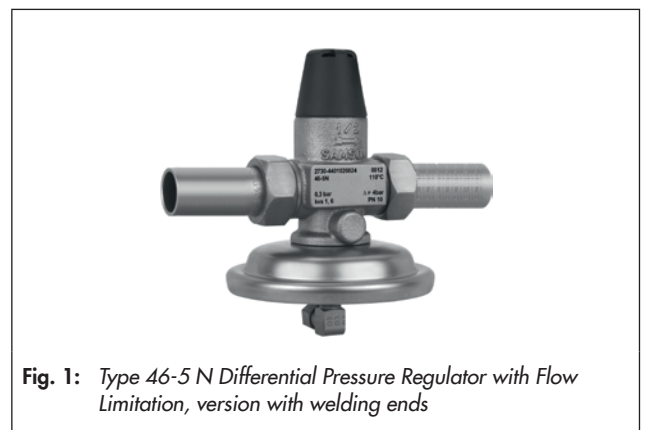
#### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Suitable for water and non-flammable gases
- Especially suitable for local heat supply networks
- Single-seated valve with soft-seated unbalanced plug
- Wide set point range adjustable at the restriction according to a diagram
- Low-noise and reliable regulator

#### Versions

The differential pressure regulator with flow limitation consists of a valve with adjustable restriction to limit the flow rate and an integrated actuator

- Fixed differential pressure set point
- Specially suited for installation in the return flow pipe of a house substation in a local heat supply network
- DN 15 valve with connecting threads according to ISO 228/1-G 3/4 B on both sides for attachment of threaded ends or welding ends
- Closing actuator with integrated low-pressure connection through a hole in the plug and plug stem. High-pressure connection over an external control line



**Fig. 1:** Type 46-5 N Differential Pressure Regulator with Flow Limitation, version with welding ends

#### Accessories

- Threaded ends G 1/2
- Welding ends

## Principle of operation

The medium flows through the valve in the direction indicated by the arrow. The areas released by the restriction (11) and the plug (3) determine the flow rate and the differential pressure  $\Delta p$ .

The high pressure of the plant (flow pipe pressure) is transmitted to the high-pressure side (8) of the operating diaphragm (9) over the external control line (7). The pressure directly downstream of the adjustable restriction is transferred to the low-pressure side of the operating diaphragm (9) through a hole in the plug (3) and the plug stem (4). The differential pressure resulting from both pressures is converted into a positioning force. The valve closes when the positioning force is greater than the force of the integrated set point spring (5). In the reverse case, the valve opens.

The integrated set point spring is fixed at a differential pressure of either 0.2, 0.3 or 0.5 bar. Additionally, it determines the differential pressure created at the restriction required to limit flow rate.

The maximum flow rate (flow limitation) is adjusted at the restriction (11). The cross-section of the valve is changed in such a way that the differential pressure and the differential pressure created at the restriction are identical when the required maximum flow rate exists.

## Pressure conditions in the plant and at the regulator

On selecting the differential pressure set point, note that the differential pressure set point results from the known pressure drop across the fully open plant ( $\Delta p_{\text{plant}}$ ) and the differential pressure created at the restriction ( $\Delta p_{\text{restriction}}$ ).

$$\Delta p_{\text{set point}} = \Delta p_{\text{plant}} + \Delta p_{\text{restriction}}$$

To achieve the maximum flow rate, the differential pressure set point must be at least 0.2 bar higher than that of the plant. If the differential pressure set point is only 0.1 bar higher than the pressure drop across the fully open plant, the maximum flow rate is reduced to 0.7 m<sup>3</sup>/h.

The minimum required differential pressure  $\Delta p_{\text{min}}$  across the valve is calculated as follows:

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

$\Delta p_{\text{min}}$	Minimum differential pressure between the flow and return pipes in bar
$\Delta p_{\text{restriction}}$	Differential pressure created at the restriction for measuring the flow rate in bar
$\Delta p_{\text{set point}}$	Differential pressure set point in bar
$\Delta p_{\text{plant}}$	Differential pressure (pressure loss) when the plant is completely open in bar
$\dot{V}$	Adjusted flow rate in m <sup>3</sup> /h
$K_{VS}$	Valve flow coefficient in m <sup>3</sup> /h

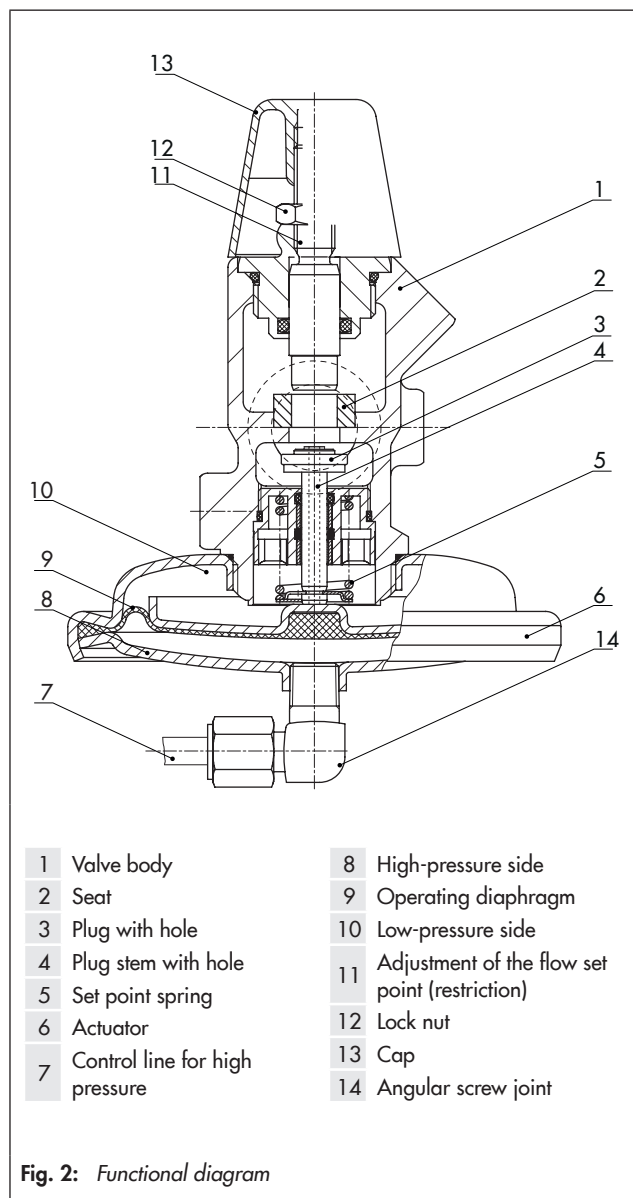


Fig. 2: Functional diagram

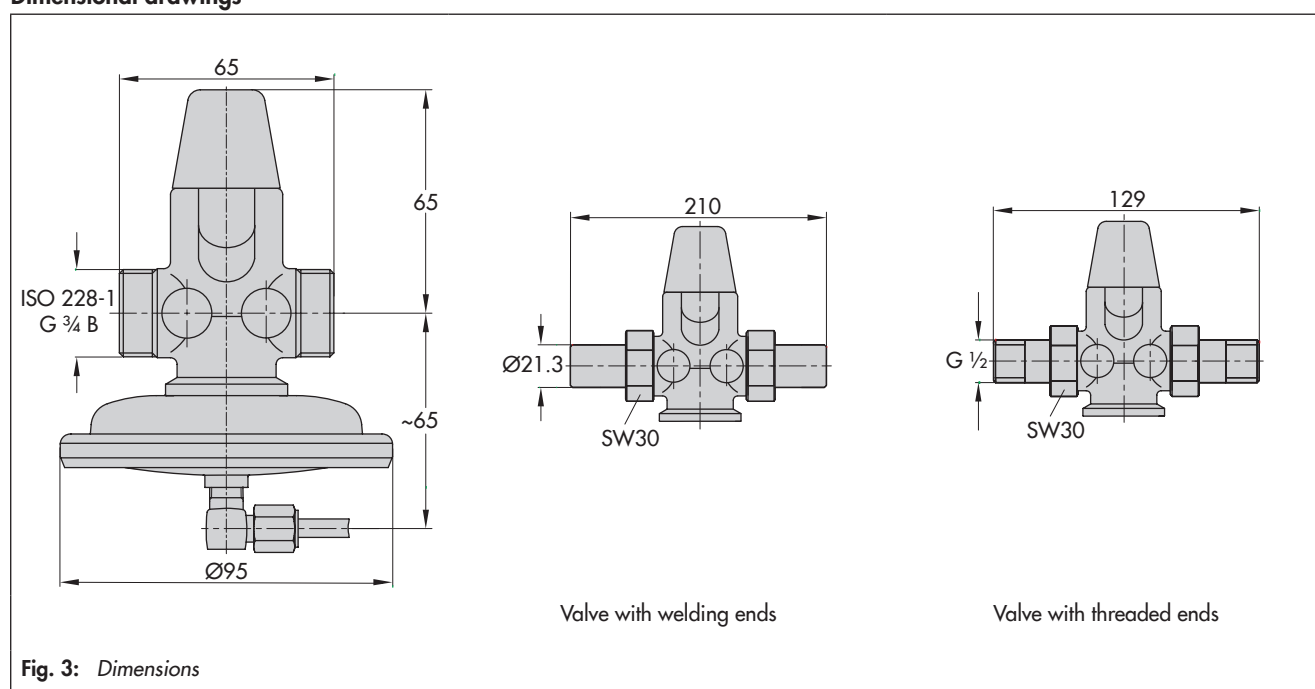
**Table 1:** Technical data · All pressures in bar (gauge)

Valve size	DN 15	
Connection	ISO 228-1 – G ¾ B	
Type of connection	Threaded ends G ½ · Welding ends	
K <sub>VS</sub> coefficient	Standard	2.5
	Special version	1.0
Pressure rating	PN 10	
Max. permissible differential pressure Δp	4 bar	
Max. permissible temperature	Treated water	110 °C
	Non-flammable gases	80 °C
x <sub>FZ</sub> value	0.43	
Flow rate set point range for water with a differential pressure at the restriction of 0.2 bar	Standard	0.2 to 1 m <sup>3</sup> /h
	Special version	0.12 to 0.5 m <sup>3</sup> /h
Differential pressure set point <sup>1)</sup> , optionally	0.2 bar · 0.3 bar · 0.5 bar	
Weight	(approx. kg)	0.85

<sup>1)</sup> To achieve the maximum flow rate, the differential pressure set point must be at least 0.2 bar higher than that of the plant.

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

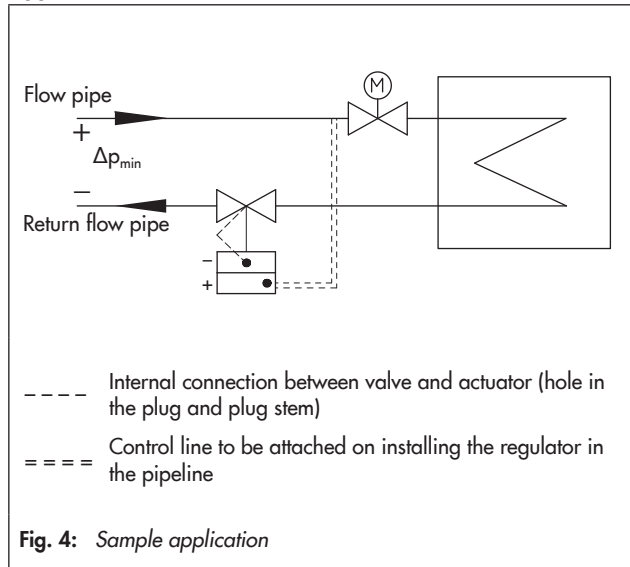
Valve body	CC499K (Rg 5)
Actuator	1.4301
Plug	1.4301 with EPDM seal
Restriction	Brass, free of dezincification
Plug stem	1.4305
Seat	CC499K
Valve spring	1.4310
Diaphragm	EPDM without fabric reinforcement
Threaded ends	Brass
Welding end	1.0037 (St 37-2/S235JR)

**Dimensional drawings**

## Installation

- The direction of flow must match the direction indicated by the arrow on the body
- Installation in horizontal pipelines The actuator faces downward.

## Application



## Ordering text

### Type 46-5 N Differential Pressure Regulator with Flow Limitation

Flow rate set point range for water with a differential pressure at the restriction of 0.2 bar:

- 0.2 to 1 m<sup>3</sup>/h (standard version)
- 0.12 to 0.5 m<sup>3</sup>/h (special version)

Differential pressure set point 0.2, 0.3 or 0.5 bar

Accessories:

- Connecting threads on both sides, with G ½ threaded ends
- Connecting threads on both sides, with welding ends