

# Self-operated Pressure Regulators Series 46

## Differential Pressure and Flow Limiter



**Type 46-5 N** · Differential pressure fixed at 0.2, 0.3, 0.5 bar · For installation in return flow pipe (low-pressure pipe)

### Application

Differential pressure and flow limiter for local heat supply and large heating networks · Flow set points **0.1 to 1 m<sup>3</sup>/h** · Nominal pressure **PN 10** · Nominal size **DN 15** · 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 Regulators are self-operated proportional regulators for heating systems.

They are used to keep differential pressure at the set point of 0.2 bar, 0.3 bar or 0.5 bar, and to limit the flow rate to a value within a range between 0.1 and 1 m<sup>3</sup>/h (standard version) or 0.12 and 0.5 m<sup>3</sup>/h (special version), which is to be set at the restriction. The regulator restricts the flow rate so that it does not exceed a certain level. The integrated set point spring determines the differential pressure at the restriction required to measure the flow rate as well as the differential pressure set point.

### Special features

- Self-operated proportional regulators requiring little maintenance
- Suitable for water and non-flammable gases
- Wide set point range adjustable at the restriction according to a diagram
- Single-seated valve with soft-seated, unbalanced plug
- Especially suitable for local heat supply networks
- Low-noise, low-maintenance and reliable

### Versions

The regulators consist of a valve with adjustable restriction to limit the flow rate and an integrated actuator. The differential pressure set point is fixed.

Differential pressure and flow limiter suitable for installation in the return flow pipe of a local heat supply station · Valve size DN 15 with connecting thread according to ISO 228/1 - G 3/4 B on both sides for attachment of threaded ends, welding ends or soldering ends · Restriction for adjustment of the flow set point

Closing actuator with integrated low-pressure connection through a hole in the plug and plug stem. High-pressure connection over an external control line to be attached on installation.

**ANSI** versions available on request

### Accessories

- Threaded ends G 1/2, welding ends or soldering ends



Fig. 1 · Type 46-5 N Differential Pressure and Flow Limiter, version with soldering ends

## Principle of operation

The medium flows through the valve in the direction indicated by the arrow on the body. Flow rate  $\dot{V}$  and differential pressure  $\Delta p$  are influenced by the areas released by the restriction (11) and the valve plug (3).

The high pressure of the plant (flow pipe pressure) is transmitted to the high-pressure side (8) of the operating diaphragm (9) over an external control line (7) to be attached on installation. The pressure directly downstream of the adjustable restriction (special differential pressure created to measure the flow rate) is transferred onto 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 opposite 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.

Use the restriction (11) to adjust maximum flow rate (flow limitation) by altering the flow cross-section of the valve so that the differential pressure and the special differential pressure created at the restriction are equal at the required flow rate.

## Differential pressure at the valve

When selecting the differential pressure set point  $\Delta p_{\text{set point}}$ , note that it results from the pressure drop of the fully opened plant and the pressure drop at the restriction.

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

To achieve maximum flow, the differential pressure set point must be at least 0.2 bar above the differential pressure of the plant. If the differential pressure set point is only 0.1 bar above the differential pressure of the fully opened plant, maximum flow is limited to 0.7 m<sup>3</sup>/h.

The minimum required differential pressure  $\Delta p_{\text{min}}$  between flow and return flow is calculated from:

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

Table 1 · Technical data

Nominal size	DN 15
Connection	ISO 228/1 - G 3/4 B
Type of end connection	Threaded ends G 1/2 · Welding ends · Soldering ends
$K_{VS}$ coefficient	
Standard version	2.5
Special version	1.0
Nominal pressure	PN 10
Max. perm. diff. pressure $\Delta p$	4 bar
Max. perm. temperature	
Treated water	110 °C
Non-flammable gases	80 °C
z value	0.43
Flow set point range for water, diff. press. at restriction of 0.2 bar	
Standard version	0.1 to 1 m <sup>3</sup> /h
Special version	0.12 to 0.5 m <sup>3</sup> /h
Diff. pressure set point <sup>1)</sup> , optional	0.2/0.3/0.5 bar

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

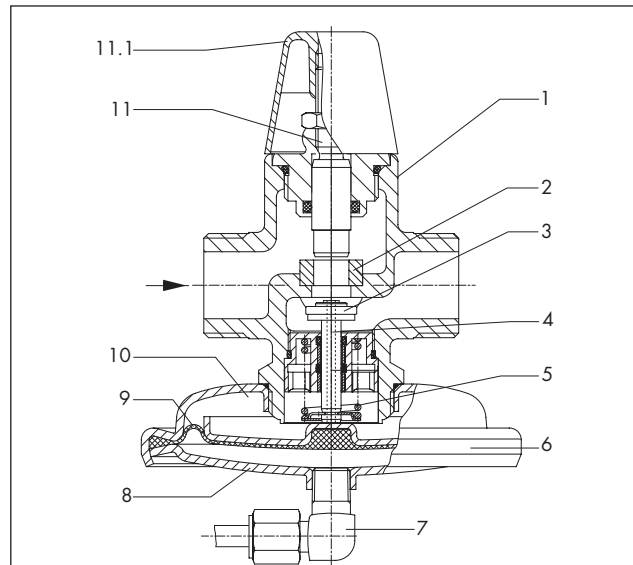


Fig. 2 · Functional diagram

1	Body	8	High-pressure side
2	Seat	9	Diaphragm
3	Plug with hole	10	Low-pressure side
4	Plug stem with hole	11	Adjustment of the flow set point (restriction)
5	Set point spring	11.1	Cover cap for set point adjuster
6	Actuator		
7	Control line for high pressure		

$\Delta p_{\text{min}}$  Minimum differential pressure between flow and return flow pipes in bar

$\Delta p_{\text{set point}}$  Differential pressure set point in bar

$\Delta p_{\text{plant}}$  Differential pressure of fully opened plant

$\Delta p_{\text{restriction}}$  Special differential pressure created at the restriction to measure the flow rate in bar

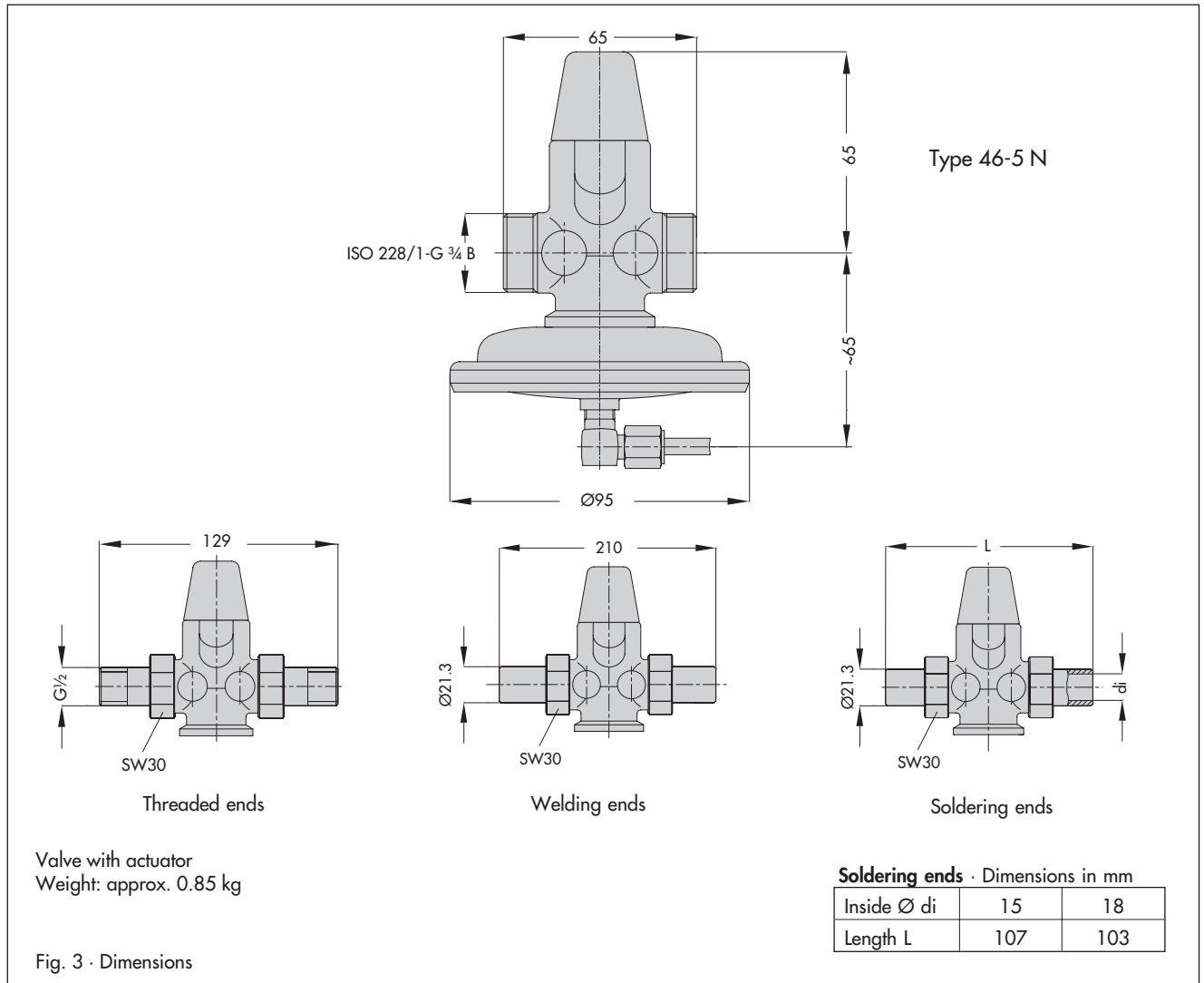
$\dot{V}$  Adjusted flow rate in m<sup>3</sup>/h

$K_{VS}$  Valve flow coefficient in m<sup>3</sup>/h

Table 2 · Materials · Material no. acc. to DIN EN

Body	CC491K (G-CuSn5ZnPb, Rg 5)
Actuator	1.4301 h
Plug	1.4301 with EPDM sealing
Restriction	Brass, resistant to dezincification
Plug stem	1.4305
Seat	CC491K (G-CuSn5ZnPb, Rg 5)
Valve spring	1.4310 K
Diaphragm	EPDM without fabric reinforcement
Threaded ends	Brass
Soldering ends	Red brass
Welding ends	1.0037 (St 37)

## Dimensions



## Installation

Regulator for

- Installation in horizontal pipelines
- Flow direction indicated by the arrow on the body
- Actuator suspended downwards

## Ordering text

Differential Pressure and Flow Limiter Type 46-5 N

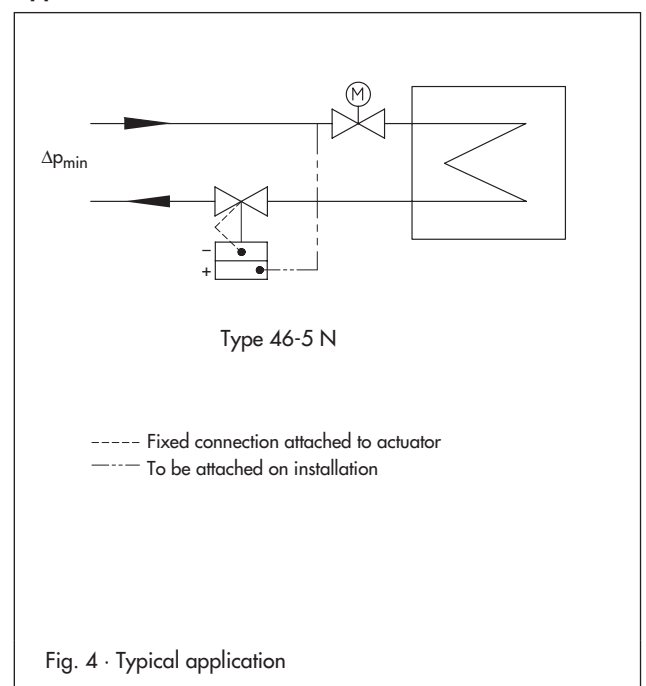
Flow set point range for water with differential pressure created at the restriction of 0.2 bar: 0.1 to 1 m<sup>3</sup>/h (standard version)/0.12 to 0.5 m<sup>3</sup>/h (special version)

Differential pressure set point 0.2 bar/0.3 bar/0.5 bar

Accessories

Connection threads on both sides for attaching threaded ends G 1/2/welding ends/soldering ends

## Application



Specifications subject to change without notice.

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