

# Self-operated Temperature Regulators Series 43



## Temperature Regulators with Hydraulic Controller

### Type 43-8

### Type 43-8 N

#### Application

Temperature regulation of instantaneous water heaters in small district heating units · Valve closes when the temperature rises



The regulators are suitable for use with plate heat exchangers for domestic hot water (DHW) heating, particularly in small residential units. Fast-responding thermostats regulate the water temperature to the desired value without delay while the hydraulic control element closes the control valve immediately after tapping has been completed. This prevents the heated DHW from reheating. In addition, temperature peaks do not occur any longer, preventing scaling (lime deposits) in the heat exchanger.

Moreover, the regulator switches to a reduced idle temperature that prevents the heating water supply lines from cooling off. This ensures that hot water is immediately available for the next tapping.

The connections available as accessories enable operation with or without circulation of the heated DHW.

#### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Control of small instantaneous water heaters
- Compact design
- Easy operation and installation
- Prevention of temperature peaks and reduction of loss during idle operation (reduced idle temperature)
- Stable control already at tapped quantity of 2 l/minute
- Idle temperature regulation
- Fast-responding vapor pressure thermostats

#### Versions

The **Type 43-8** and **Type 43-8 N** Regulators function the same way, the only difference between them being that the technical features of the Type 43-8 N have been tailored to the requirements of local heat supply networks. Its overall height is approx. 20 mm lower than that of the Type 43-8. As a result, the regulators are **not** interchangeable.

The regulators consist of a control thermostat (vapor pressure thermostat), a hydraulic control unit and a valve.



Regulator including accessories and indicated heat exchanger  
**Fig. 1:** Type 43-8 Temperature Regulator with Hydraulic Controller

#### Type 43-8 (43-8 N)

**Type 2430 Vapor Pressure Thermostat** · Set point range 45 to 65 °C · In combination with **Type 2432 Valve (2432 N)**  
Red brass or hot-pressed brass body · DN 15 · PN 25 (PN 16)  
Suitable for liquids up to 130 °C (120 °C) · Permissible differential pressure  $\Delta p = 20$  bar (4 bar) ·  $K_{VS} 2.5$  · Sensor made of CrNiMo steel · Observe mounting position.

**Type 2438 Hydraulic Controller** · Red brass body · Idle temperature approx. 8 K (optionally 15 K) below adjusted set point · Required differential pressure at control element 0.4 to 0.6 bar · PN 16

## Principle of operation (Fig. 2)

Fast-responding vapor pressure sensors are used to regulate the temperature of instantaneous water heaters.

The temperature of the heated DHW creates a pressure in the sensor that corresponds to the actual pressure. This pressure is transferred through the capillary tube (8) to the operating element (13) and converted into a positioning force, which is compared to the force of the set point spring (10). The force ratio causes the plug in the valve (1) to move.

Depending on the travel, an annular gap forms between the seat (2) and the plug (3) that determines the flow rate of the heating water. A temperature increase at the sensor causes the valve plug to close, thus reducing the flow rate of the heating water.

Upon tapping hot water, a pressure difference of  $\Delta p = p_1 - p_2$  is created above the baffle plate (6). The resulting force opposes the force of the compression spring (7) that acts in closing direction and causes the valve (1) to open. Once hot water tapping has been completed, the pressure balance is restored. The force of the compression spring causes the valve plug to move in the closing direction and the heat flow is interrupted. At the same time, the temperature set point of the thermostat drops by approx. 8 K (optionally 15 K) to reach the reduced idle temperature. As a result, reheating with temperature peaks as well as cooling off of the supply lines is prevented. This ensures that hot water is immediately available for the next tapping.

## Vapor pressure thermostat

Thermostat operating according to the vapor pressure principle. Due to the fast response time of approx. 3 s, these thermostats are particularly suitable for use in plate heat exchangers<sup>1)</sup>.

<sup>1)</sup> Other versions on request

## Installation

To fully use the fast response behavior of the sensor (vapor pressure), the sensor must also be installed at the most suitable location. In instantaneous water heater, this location is directly upstream of the outlet where the heated water flows out of the heat exchanger and upstream of the inlet where the hot water flows into the heat exchanger.

- Install the temperature sensor such that the sensor reaches horizontally into the hot water duct when the heat exchanger is mounted, observing a maximum deviation of  $\pm 5^\circ$  from the horizontal position. The notch at the end of the sensor must point upward (see View A).
- Installation only without thermowell.
- Observe a distance of approx. 5 mm between the tip of the sensor and the rear of the housing.
- Install the plate heat exchanger in such a way that the heating water flows vertically between the plates.
- The heat exchanger connections for cold water and (district heating) water return pipe are located at the bottom; the connections for hot water and (district heating) water flow pipe can be located at the top.

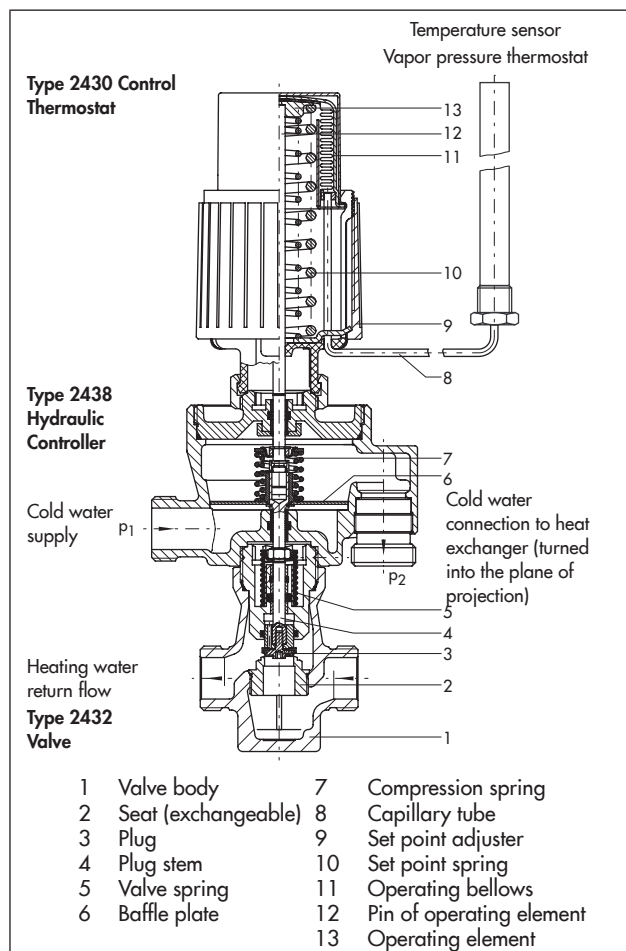


Fig. 2: Functional diagram

## Principle of operation · Vapor pressure thermostat

The temperature sensor is filled with a liquid which evaporates depending on the temperature. As a result, a pressure in proportion to the temperature is created in the sensor. This pressure is transmitted to the operating bellows through the capillary tube and converted into a positioning force. This force moves the valve plug depending on the set point adjustment.

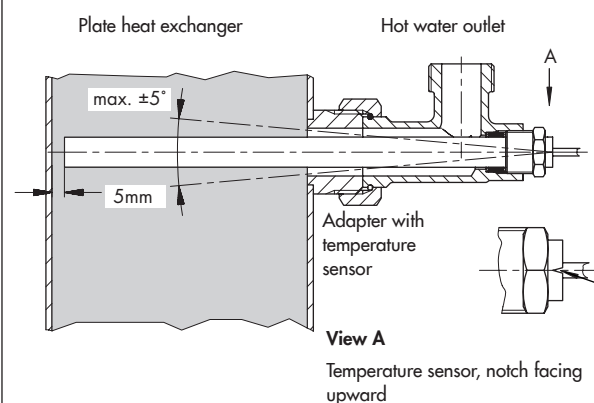


Fig. 3: Installing the sensor

- The ambient temperature at the set point adjuster must not be higher than 35 °C.
- The temperature regulator **cannot** be combined with safety regulators (e.g. STM, STL).

**Table 1: Technical data**

Type 2432 Valve	Type 43-8	Type 43-8 N
Valve size	DN 15	
$K_{VS}$ coefficient	2.5	
Nominal pressure	PN 25	PN 16
Max. perm. differential pressure $\Delta p$	20 bar	6 bar
Max. permissible valve temperature	130 °C	120 °C
Type 2430 Control Thermostat		
Set point range	45 to 65 °C	
Capillary tube	2 m (5 m as special version)	
Max. perm. temperature at the sensor	30 K above the adjusted set point	
Max. perm. temperature at the set point adjuster	35 °C	
Perm. pressure at sensor	PN 40	
Type 2438 Hydraulic Controller		
Required differential pressure (pressure loss) across the control unit on the cold water side	0.4 bar with a tapping rate up to 10 l/minute 0.5 bar with a tapping rate up to 20 l/minute	
Nominal pressure	PN 16	
Idle temperature	Approx. 8 K (optional 15 K) below the adjusted set point	
Min. temperature difference between flow temperature and temperature set point	10 K	
Max. flow rate	20 l/minute	

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

Body	CC499K (red brass, Rg 5)	CW602N (hot-pressed brass)
Valve seat	Stainless steel 1.4305	CW602N
Valve plug	1.4104 and brass, resistant to dezincification, with EPDM soft seal	
Valve spring and spring in Type 2438	Stainless steel 1.4310	
Baffle plate	POM	
Temperature sensor	Copper	
Capillary tube	CrNiMo steel	
Set point adjuster	PETP, glass fiber reinforced	

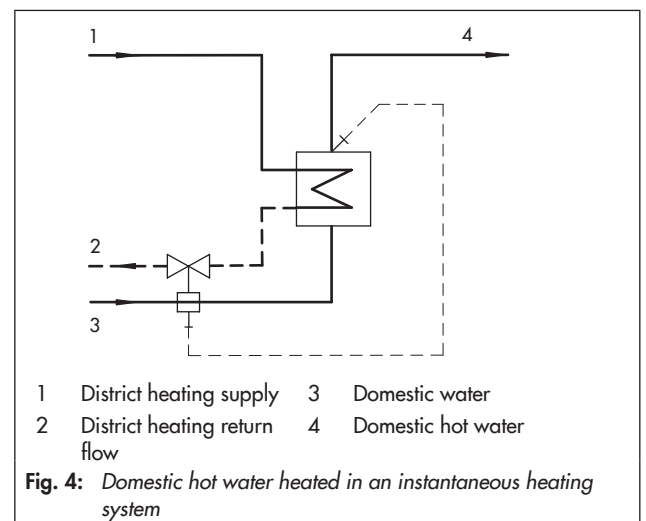
### Application range

The quality of the domestic water to be controlled determines the field of application of the regulator. The water quality must meet the requirements listed below.

**Table 3: Domestic water quality**

DHW	
pH	Min. 7/max. 10
Chloride concentration	Max. 150 mg/l
$\frac{HCO_3^-}{SO_4^{2-}}$	>1.5
Carbonate hardness	Min. 5° dH (German hardness)
Total hardness	Max. 12° dH

### Domestic hot water heated in an instantaneous heating system with Type 43-8



**Fig. 4: Domestic hot water heated in an instantaneous heating system**

## Accessories

### Accessories

**Connecting piece** (1) to hot water tapping point (G 3/4 or G 1) with/without sensor pocket (G 3/4 or G 1) · Including flat gasket · For temperature sensor Ø12, Rg 5

**Cold water supply** · Corrugated pipe (4) with/without circulation pipe connection (2) for connection to heat exchanger (G 3/4 or G 1) · Including flat gasket

**Heating water return pipe** · Double nut (5) made of brass (G 3/4 or G 1) for connection to heat exchanger · Welding end (3) with connection nut · Including flat gasket

### Connecting dimensions for heat exchanger

Heat exchanger connection Double nut (5)	G 3/4	G 1
Distance a in mm	40 to 45	48 to 52 69 to 73
Connection (4) · Corrugated pipe	With/without circulation pipe	

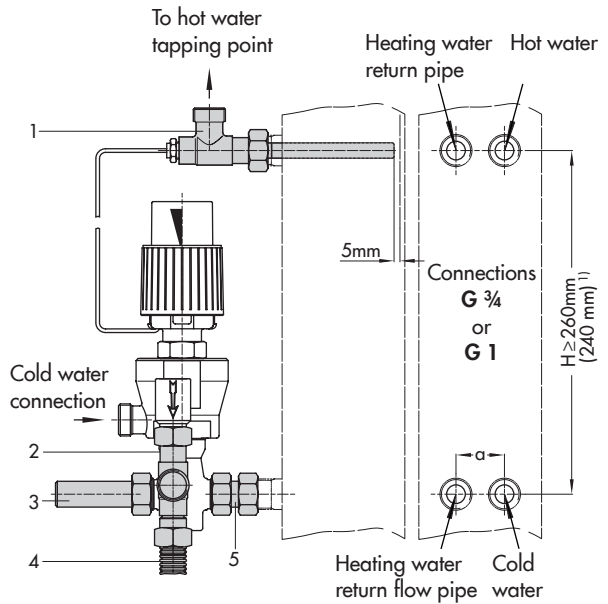
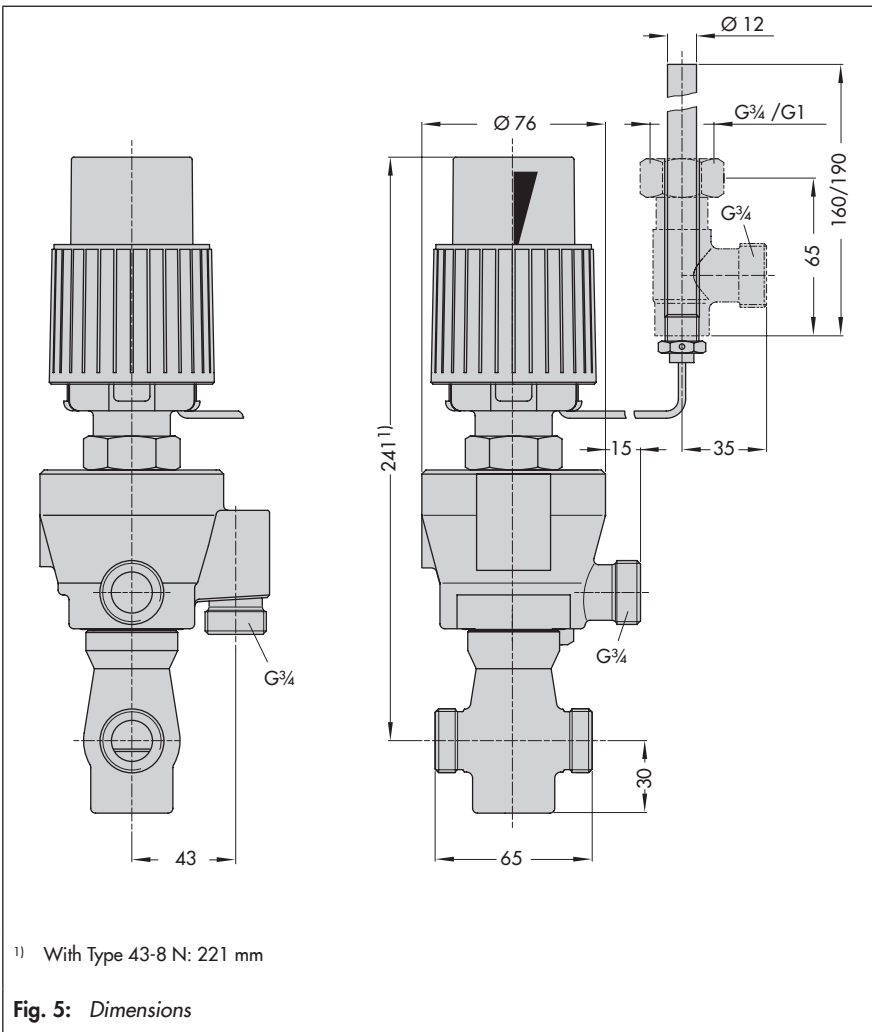


Fig. 6: Regulator with accessories

1) For Type 43-8 N

## Dimensions in mm



1) With Type 43-8 N: 221 mm

Fig. 5: Dimensions

### Ordering text

**Type 43-8/Type 43-8 N**  
 Temperature Regulator with  
 Hydraulic Controller  
 Valve DN 15,  $K_{VS}$  2.5  
 Type ... heat exchanger  
 G 3/4/G 1 heat exchanger  
 connection  
 With/without circulation pipe  
 connection  
 Sensor (160 or 190 mm length)  
 with/without screw gland  
 Optionally, special version ...  
 Optionally, accessories ...

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

T 2178 EN

2018-01-29 · English