

# Series 43 Self-operated Temperature Regulators

## Type 43-3 Temperature Regulator with Three-way Valve



### Application

Temperature regulators for mixing and diverting <sup>1)</sup> service in heating or cooling installations · Temperature set point from 0 to 150 °C · Valves G ½ to G 1 female thread · DN 15 to 50 with welding ends, threaded ends or flanges · PN 25 · Suitable for water up to 150 °C

### Note

Temperature regulators (TR), safety temperature monitors (STM), and safety temperature limiters (STL) tested according to DIN EN 14597 are available.



### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Temperature sensor suitable for installation in any desired position and for operation at high excess temperatures, designed for operating pressures up to 40 bar
- Convenient set point adjustment with a dial
- Three-way valve for mixing and diverting service, flow rate across the port AB independent of the valve plug position
- Suitable for water
- Version with double adapter Do3K for the attachment of additional control thermostats or manual adjuster (► T 2176)

### Versions

The regulators consist of a three-way valve made of red brass and a control thermostat with set point adjuster, capillary tube, and temperature sensor operating according to the adsorption principle.

**Type 43-3** · Temperature regulator with unbalanced three-way valve · Female thread connection G ½ to G 1 · DN 15 to DN 50 for connection nuts with welding ends, threaded ends or flanges · Water resistant · Type 2430 K Control Thermostat

### Safety devices tested according to DIN EN 14597

The register number is available on request. The following versions are available:

Type 43-3 Temperature Regulator (TR) for which the maximum operating pressure must not exceed the maximum permissible differential pressure  $\Delta p$  specified in the technical data. Only SAMSON thermowells can be used for sensors with thermowells.

Further details on the selection application of tested equipment can be found in Information Sheet ► T 2181.

Additionally, **safety temperature monitors (STM)** and **safety temperature limiters (STL)** are available. Further details can be found in Data Sheets ► T 2183 and ► T 2185.

<sup>1)</sup> Used as a diverting valve, only with male thread to attach welding ends, threaded ends, or flanges



Fig. 1: Type 43-3 Temperature Regulator, DN 25, with welding ends

### Accessories

- Thermowell made of copper, PN 40, G ½ or CrNiMo steel, PN 40, G ½
- Combinations available on request

### Special versions

- ANSI version on request
- 5 m capillary tube

**Principle of operation** (see Fig. 2)

The temperature regulators work according to the adsorption principle. The temperature of the measured medium creates a pressure in the sensor which is proportional to the measured temperature. This pressure is transferred through the capillary tube (6) to the operating bellows (9) and converted into a positioning force. This force causes the pin of the operating element (10) to move the plug stem (4) with the valve plug (3). By turning the set point adjuster (8), the point of response is changed over the valve spring (5).

The three-way valve is used only for mixing services with the female thread connection or for mixing or diverting services in the version with male thread connection (DN 15 to 50).

In mixing valves, the process media to be mixed enter at valve ports A and B. The combined flow exits the valve at port AB. The flow rate from A or B to AB is determined by the area released between the seats (2) and plugs (3), i.e. by the position of the plug stem (4). When the temperature rises, port A opens and port B closes.

In diverting valves, in contrast, the process medium enters at the valve port AB and the partial flows exit at ports A or B. The flow rate from AB to A or B is determined by the position of the plug stem. When the temperature rises, port A closes and port B opens.

**Installation**

**Valve**

The valve must be installed in horizontal pipelines. The direction of flow must match the arrow on the valve body. The control thermostat must preferably be suspended to hang downward. Other mounting positions are possible for temperatures up to +110 °C. Make sure that the inlet and outlet flows of the plant are correctly assigned to ports A, B and AB (see Fig. 4).

**Temperature sensor**

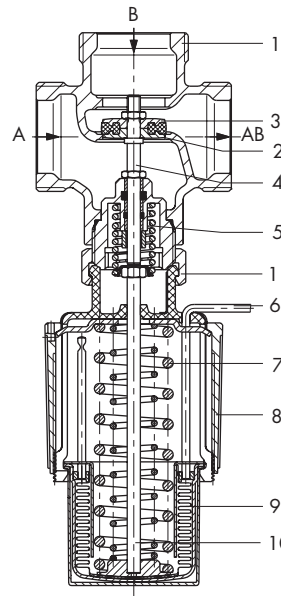
The temperature sensor may be installed in any position. However, make sure its entire length is immersed in the process medium to be controlled. It must be installed in a location where overheating or considerable idling times cannot occur.

Only the combination of the same kind of materials is permitted, e.g. a stainless steel heat exchanger with thermowells made of stainless steel 1.4571.

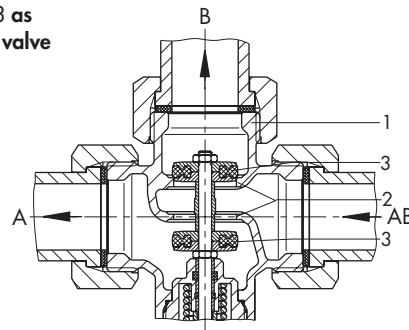
**Capillary tube**

The capillary tube must be run in such a way that the ambient temperature range cannot be exceeded, any deviations in temperature cannot occur and that the tube cannot be damaged. The smallest permissible bending radius is 50 mm.

Type 43-3 as mixing valve



Type 43-3 as diverting valve



- |                             |                             |
|-----------------------------|-----------------------------|
| 1 Valve body                | 7 Set point springs         |
| 2 Valve seat                | 8 Set point adjuster        |
| 3 Valve plug (exchangeable) | 9 Operating bellows         |
| 4 Plug stem                 | 10 Pin of operating element |
| 5 Valve spring              | 11 Coupling nut             |
| 6 Capillary tube            |                             |

Fig. 2: Type 43-3 Temperature Regulator with male thread connection DN 15 to 50

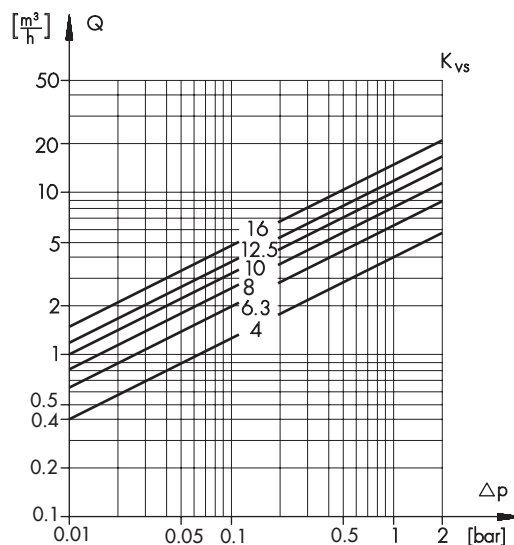
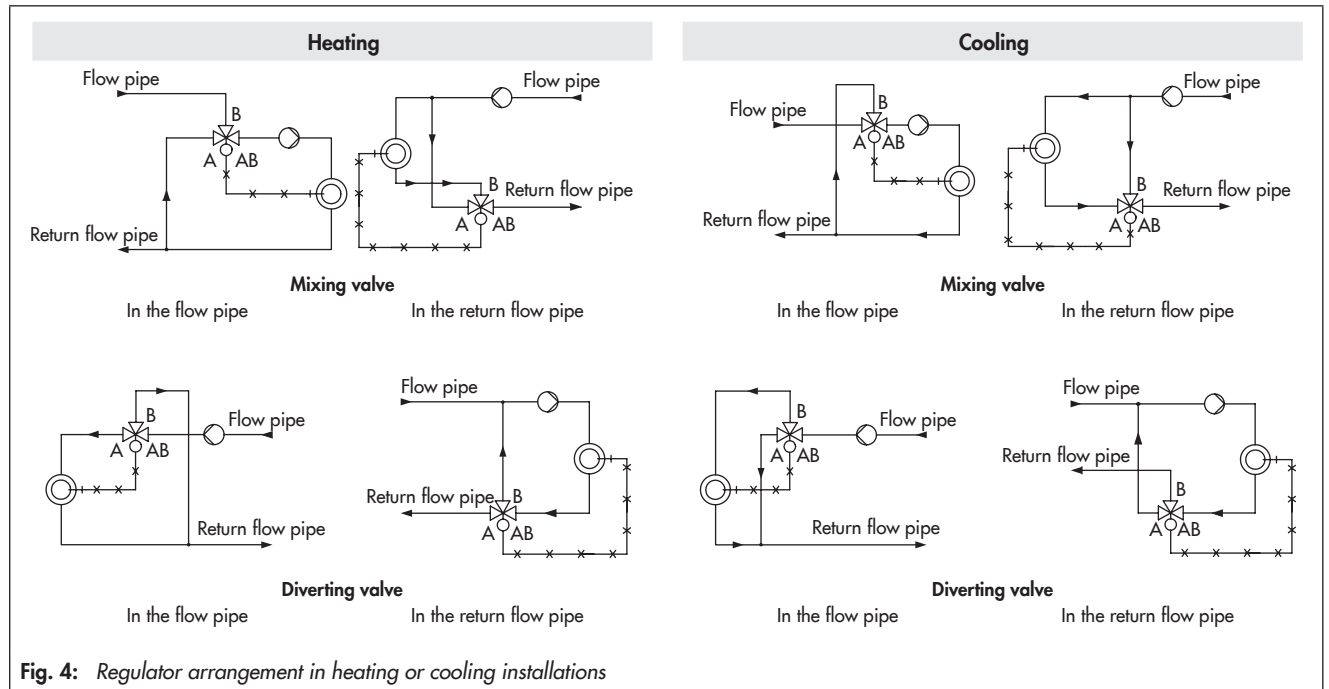


Fig. 3: Flow rate diagram for water

## Examples of arrangements for Type 43-3 Temperature Regulators



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

Type 2433 K Three-way Valve										
Connection	Female thread				Male thread					
Connection size	G	1/2	3/4	1	-					
Valve size	DN	-			15	20	25	32	40	50
Medium	Water									
K <sub>V5</sub> coefficient	4	6.3	8	4	6.3	8	10	12.5	16	
Nominal pressure	PN 25									
Max. perm. differential pressure $\Delta p$ in bar										
Mixing valve	$\Delta p$ when $p$ in B > $p$ in A	4.4	2.6	1.8	4.4	2.6	1.8	0.9	0.6	0.6
	$\Delta p$ when $p$ in A > $p$ in B	4.4	2.6	1.8	4.4	2.6	1.8	0.9	0.6	0.6
Diverting valve	$\Delta p$ when AB to A or B	4.4	2.6	1.8	4.4	2.6	1.8	0.9	0.6	0.6
Max. permissible valve temperature	150 °C									
Compliance	CE · ENEC									
Type 2430 K Control Thermostat										
Set point range (continuously adjustable)	0 to 35 °C, 25 to 70 °C, 40 to 100 °C, 50 to 120 °C or 70 to 150 °C									
Capillary tube	2 m (5 m as special version)									
Max. permissible excess temperature at sensor	50 °C above the adjusted set point									
Max. permissible ambient temperature	80 °C									
Permissible pressure at sensor/thermowell	PN 25/PN 40									
Max. perm. temperature range of medium	0 to +150 °C (with separating piece: -15 to +150 °C)									

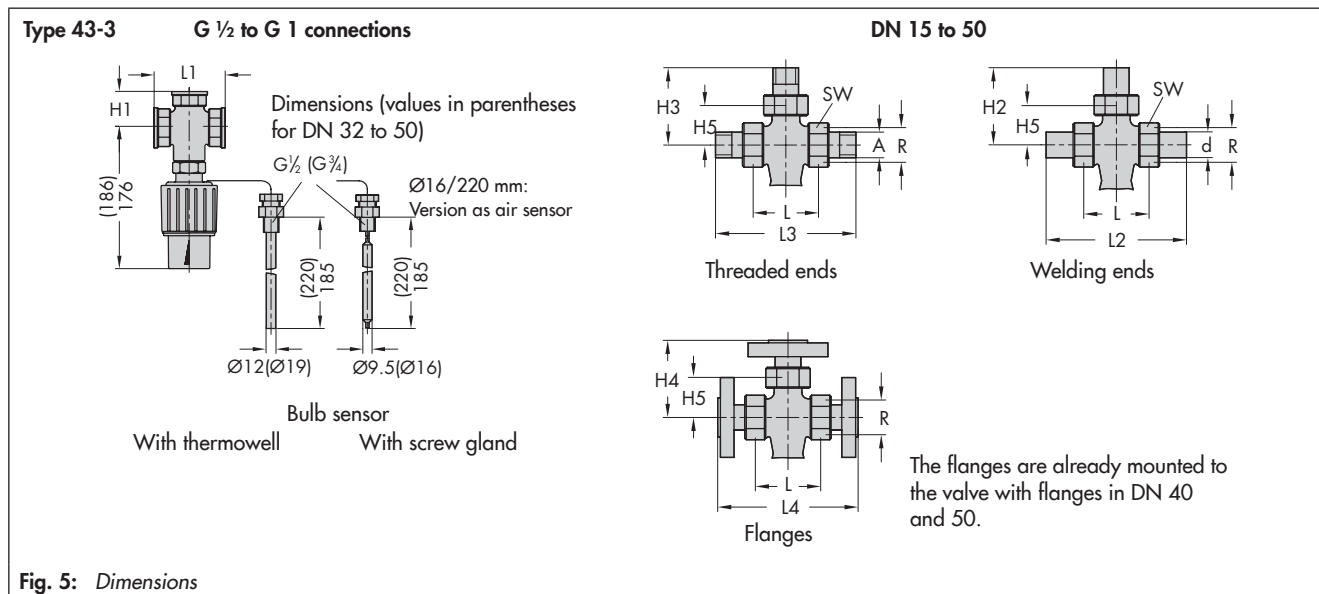
**Table 2:** Materials · Material numbers according to DIN EN

Body	CC499K (Rg 5)
Plug	Brass, resistant to dezincification, CW617N (CuZn40) with EPDM soft seal
Valve spring	Stainless steel 1.4310
Sensor, capillary tube	Copper
Thermowell	Nickel-plated copper or stainless steel 1.4571
Set point adjuster	PTFE, glass fiber reinforced

**Table 3: Dimensions in mm and weights**

Connection	G	½	¾	1	–		
Valve size	DN	15	20	25	32	40	50
Pipe Ø d		21.3	26.9	33.7	42.4	48.3	60.3
Thread size R		G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
AF		30	36	46	59	65	82
L		65	70	75	100	110	130
L1		65	75	90		–	
H1		40	40	40	65	70	75
Weight <sup>1)</sup>	kg (approx.)	1.5	1.6	1.7	2.7	2.8	3.7
Connection nuts with <b>welding ends, threaded ends or flanges</b>							
H5		40		60		65	
Connection nuts with <b>welding ends</b>							
L2		210	234	244	268	294	330
H2		112	122	124	144	157	165
Weight <sup>1)</sup>	kg (approx.)	2	2.3	2.5	3.9	4.2	5.5
Connection nuts with <b>threaded ends (male thread)</b>							
Male thread A		G ½	G ¾	G 1	G 1¼	G 1½	G 2
L3		129	144	159	192	206	228
H3		72	77	82	100	108	114
Weight <sup>1)</sup>	kg (approx.)	2	2.3	2.5	3.9	4.2	5.5
Connection nuts with <b>flanges (PN 16/25)</b>							
L4		130	150	160	180	200	230
H4		70	80	85	100	105	120
Weight <sup>1)</sup>	kg (approx.)	4.1	5.3	6.3	8.7	10.2	13

<sup>1)</sup> Weights for version with bulb sensor and thermowell · Version without thermowell: minus 0.2 kg



**Fig. 5: Dimensions**

**Ordering text**

**Type 43-3** Temperature Regulator with Three-way Valve

Female thread G ...

Male thread for DN ... with connection nuts and welding ends, threaded ends or flanges

Mixing valve/diverting valve

Set point range ... °C

Optionally, special version

Optionally, accessories ...

Specifications subject to change without notice



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