

Self-operated Temperature Regulators Series 43

Temperature Regulators Type 43-1 · Type 43-2



Application

Regulators for district heating supply systems, heat generators, heat exchangers as well as other building and industrial applications

Temperature set points from 0 to 150 °C · Valves G ½ to G 1 DN 15 to DN 50 · Nominal pressure PN 25 · Suitable for liquids up to 150 °C and non-flammable gases up to 80 °C

The valve **closes** when the temperature rises.

Note

Typetested temperature regulators (TR), safety temperature monitors (STM), and safety temperature limiters (STL) are available.



Special features

- Self-operated P regulators requiring little maintenance
- Temperature sensor suitable for installation in any position and for operation at high permissible ambient temperatures (50 K above the adjusted set point), designed for operating pressures up to 40 bar
- Globe valves with a plug balanced by a piston
- Especially suitable for use in district heating supply systems
- For liquids and gases
- Special version: fast-responding thermostat for instantaneous water heaters (see vapor pressure thermostats on page 5)

Versions (Figs. 1 to 4)

The regulators consist of a valve and a control thermostat with set point adjuster, capillary tube and temperature sensor which functions according to the adsorption principle.

Refer to T 2176 EN for versions with double adapter or manual adjuster for attachment of additional control thermostats.

Type 43-1 · Temperature regulator with Type 2431 K Valve G ½ to G1 female thread · Type 2430 K Control Thermostat (sensor optionally available with or without thermowell)

Type 43-2 · Temperature regulator with Type 2432 K Valve DN 15 to DN 50 · Connection nuts with welding ends (special version with threaded ends, flanges or with flanged valve body) Type 2430 K Control Thermostat (sensor optionally available with or without thermowell)

Typetested safety devices

Register numbers are available on request.

Type 43-1 and Type 43-2 Temperature Regulators (TR) whose maximum operating pressures must not exceed the maximum differential pressure Δp specified in the technical data. Only SAMSON thermowells may be used for sensors requiring thermowells.

Details about the selection and application of typetested devices can be found in Information Sheet T 2181 EN.

Safety Temperature Monitors (STM) and Safety Temperature Limiters (STL) are also available. Further details can be found in Data Sheets T 2183 EN and T 2185 EN.

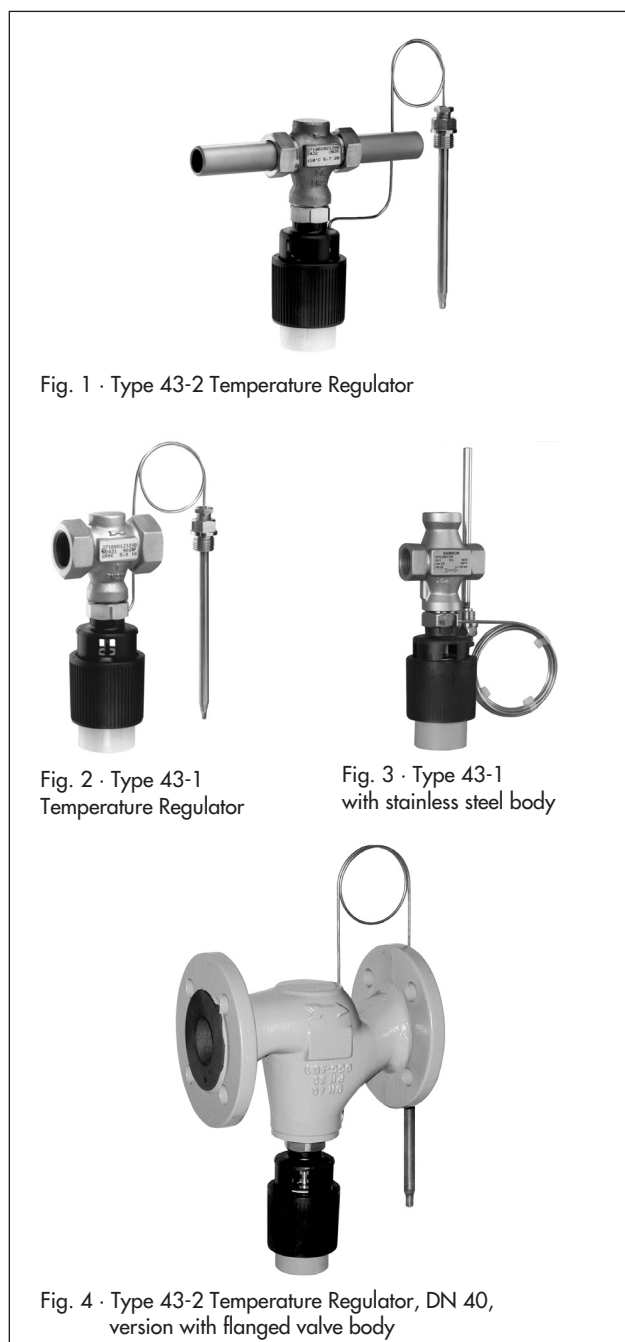


Fig. 1 · Type 43-2 Temperature Regulator

Fig. 2 · Type 43-1 Temperature Regulator

Fig. 3 · Type 43-1 with stainless steel body

Fig. 4 · Type 43-2 Temperature Regulator, DN 40, version with flanged valve body

Accessories

- Thermowell made of:
Copper PN 40
CrNiMo steel PN 40
- Double adapter Do 3K or manual adjuster
- Intermediate insulating piece for insulated pipelines or for medium temperatures down to $-15\text{ }^{\circ}\text{C}$

Special versions

- 5 meter capillary tube
- Reduced K_{VS} for DN 15 or G $\frac{1}{2}$
- Oil-resistant internal parts
- Fast-responding thermostats (see vapor pressure thermostats on page 5) available on request
- ANSI version (see Data Sheet T 2174 EN)
- Stainless steel body for Type 43-1/G $\frac{1}{2}$, G $\frac{3}{4}$ and G1, DN 15 and DN 25
- Flanged body made of EN-JS1049 for Type 43-2

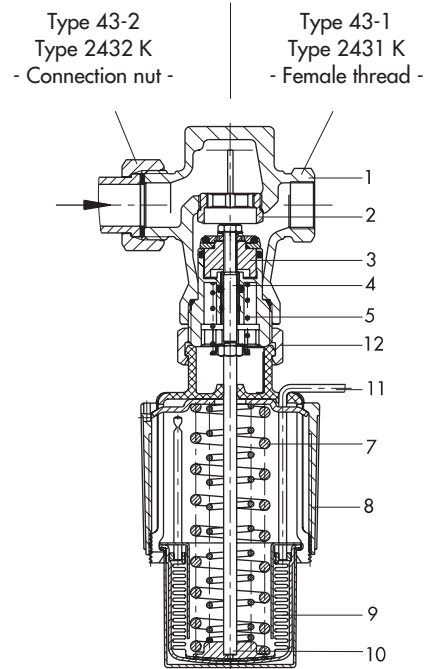
Principle of operation (Figs. 5 and 6)

The temperature regulators work according to the adsorption principle.

The temperature of the medium produces a pressure in the measuring sensor that corresponds to the actual temperature measured. This pressure is transmitted through the capillary tube (11) to the operating element (9) where it is converted into a positioning force. Depending on the adjusted set point, this force acts on the valve plug (3) over the pin of the operating element (10).

The point of response is changed by the set point adjuster (8) to allow the valve plug to move through its full travel range within a higher or lower temperature range measured by the sensor.

The regulators are designed for installations that are heated. The valves close when the temperature rises and the adjusted set point is exceeded.



The left side of the diagram represents Type 2432 K and the right side Type 2431 K. Both regulators work according to the same principle.

Fig. 5 · Type 43-1 and Type 43-2 Temperature Regulators

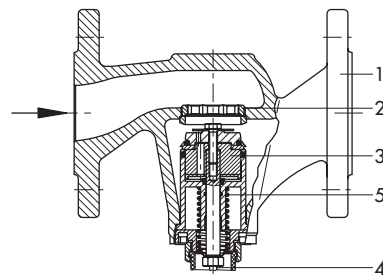


Fig. 6 · Special version of Type 43-2 with flanged valve body

Legend for principle of operation of Type 43-1 and Type 43-2

- | | |
|----|--|
| 1 | Valve body |
| 2 | Valve seat (replaceable) |
| 3 | Valve plug |
| 4 | Plug stem |
| 5 | Valve spring |
| 7 | Positioning spring(s) |
| 8 | Set point adjuster |
| 9 | Operating element |
| 10 | Pin of the operating element |
| 11 | Capillary tube (connection to the sensor) |
| 12 | Coupling nut (connection between thermostat and valve) |

Table 1 · Materials · Material numbers acc. to DIN EN

Valve body	CC491K (red brass Rg 5) · EN-JS1049 (GGG 40.3) ¹⁾	Stainless steel 1.4408 ²⁾
Seat	Stainless steel 1.4301	1.4408
Plug	1.4104 and brass, resistant to dezincification, with EPDM soft sealing ³⁾	1.4408
Valve spring	Stainless steel 1.4310	
Sensor	Capillary tube	Copper
	Thermowell	Copper or stainless steel 1.4310
Set point adjuster	PETP, glass fiber reinforced	

¹⁾ Flanged valve body for Type 43-2

²⁾ Special version for Type 43-1

³⁾ Special version for oils (ASTM I, II, III): FPM (FKM) soft sealing

Table 2 · Technical data · All pressures in bar (gauge)

Type 2431 K Type 2432 K Valve							
Connection ¹⁾ Nominal size	G DN	G ½ 15	G ¾ 20	G 1 25	32	40	50
K _{Vs}	Type 43-1	3.6 ²⁾	5.7	7.2	–	–	–
K _{Vs}	Type 43-2	4 ²⁾	6.3	8	12.5	16	20
Nominal pressure (acc. to DIN 2401)	PN 25						
Max. perm. differential pressure Δp	20 bar				12 bar		
Max. perm. temperature of the valve	150 °C						
Type 2430 K Control Thermostat							
Set point range ³⁾	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 (special version 5 m)						
Max. perm. temperature at the sensor	50 K above the adjusted set point						
Max. perm. ambient temperature range	–20 to 80 °C ⁴⁾						
Perm. pressure at sensor/at thermowell	PN 25 / PN 40						

¹⁾ Type 2431 K Valve: connection G ½ to G 1

²⁾ Special version with K_{Vs} = 0.4, 1.0 or 2.5

³⁾ Other set point ranges on request

⁴⁾ **CAUTION!** For temperatures below the freezing point: **formation of ice** can **damage** the plant and especially the valve.

Installation

Only use the same sort of materials together; thermowells made of stainless steel 1.4571, for example, can be installed in stainless steel heat exchangers.

Valve

Install valves in horizontal pipelines. The control thermostat must be vertically suspended; other installation positions are also possible with temperatures up to 110 °C. The direction of flow must correspond with the arrow on the valve body.

Capillary tube

Install the capillary tube such that it is not exposed to considerable temperature fluctuations and cannot be damaged. Make sure the permissible ambient temperature range is not exceeded. The smallest possible bending radius is 50 mm.

Temperature sensor

The temperature sensor can be installed in any desired position. Nevertheless, make sure its entire length is immersed in the process medium. Choose a point of installation where neither overheating nor considerable idle times occur.

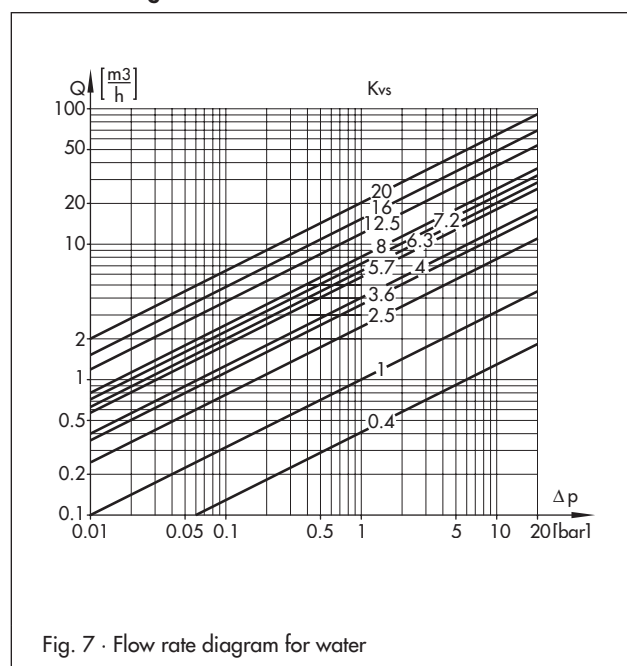
Flow rate diagram for water

Fig. 7 · Flow rate diagram for water

Dimensions

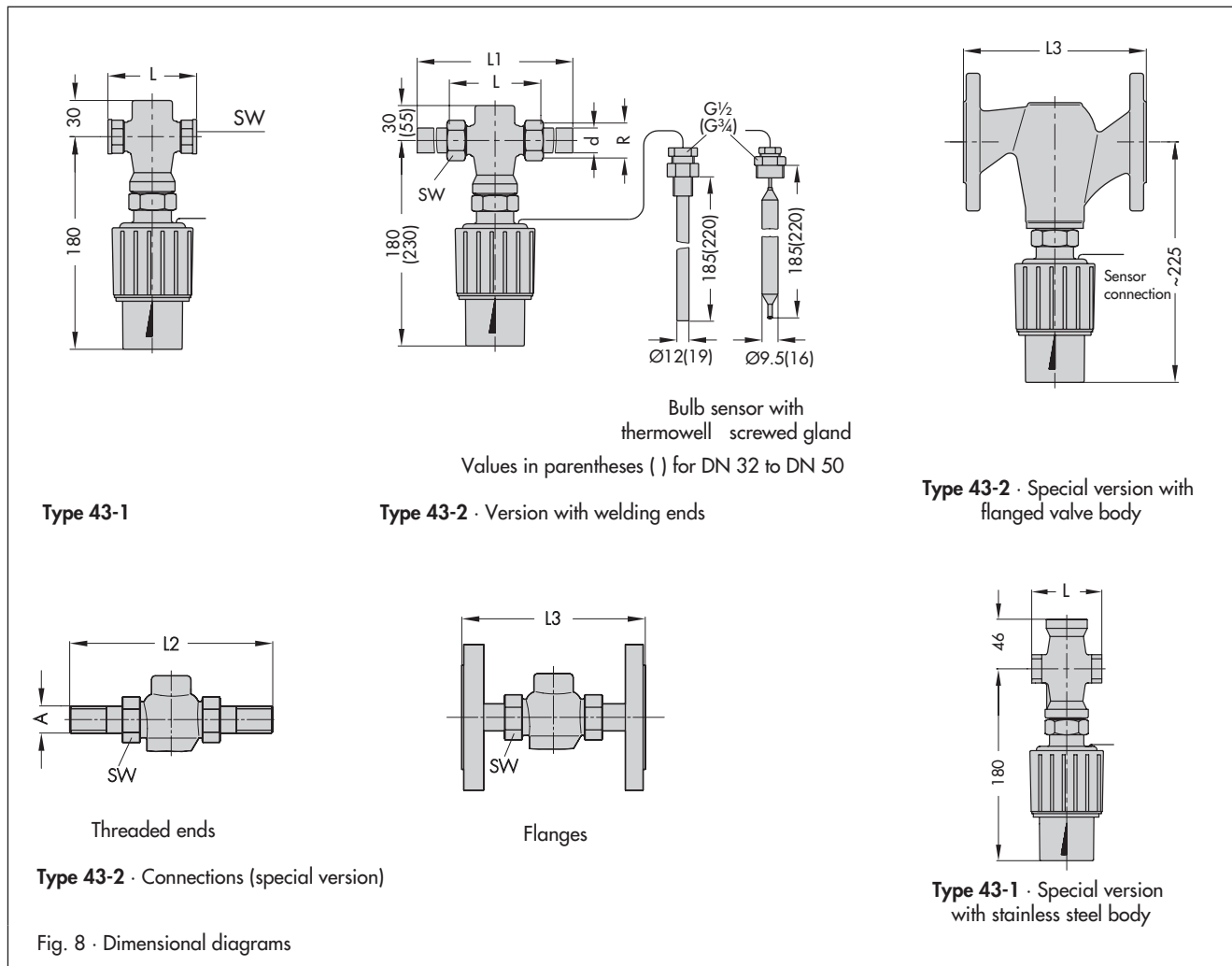


Table 3 · Dimensions in mm and weights in kg

Type 43-1 Temperature Regulator							
Connection	G	1/2	3/4	1			
Length L		65	75	90			
Weight ¹⁾ , approx. in kg		1.4	1.5	1.6			
Width across flats SW		34	34	46			
Type 43-2 Temperature Regulator							
Nominal size DN		15	20	25	32	40	50
Pipe diameter Ød		21.3	26.8	32.7	42	48	60
Connection size R		G 3/4	G 1	G 1 1/4	G 1 3/4	G 2	G 2 1/2
Width across flats SW		30	36	46	59	65	82
Length L		65	70	75	100	110	130
L1 with welding ends		210	234	244	268	294	330
Weight ¹⁾ , approx. in kg		1.7	2	2.3	4.4	5.1	5.9
Special versions							
... with connection nuts and threaded ends							
Length L2		129	144	159	180	196	228
Male thread A		G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
Weight ¹⁾ , approx. in kg		1.7	2	2.3	4.4	5.1	5.9
... with connection nuts and flange connections ²⁾ PN 16/25							
Length L3		130	150	160	180	200	230
Weight ¹⁾ , approx. in kg		3.1	4	4.8	7.6	9.1/9.8 ³⁾	11/14.1 ³⁾

¹⁾ Version without thermowell: minus 0.2 kg · ²⁾ Valve also with flanged body · ³⁾ Flanged valve body

Special version - vapor pressure thermostats -

Fast-responding temperature regulators

Application

Temperature sensors functioning according to the vapor pressure principle are particularly suitable for the use in instantaneous water heaters¹⁾ due to their fast response time of approximately three seconds.

Temperature set points from 45 °C to 65 °C (55 to 75 °C)²⁾ · Type 2430 K Control Thermostat combined with Type 2431 K Valve (Type 43-1) or Type 2432 K Valve (Type 43-2) · G ½ to G 1 · DN 15 to DN 50 · Nominal pressure PN 25 · Sensor made of copper or CrNiMo steel · Special installation position of the sensor must be observed!

¹⁾ Versions for plate heat exchanger on request

²⁾ Special version

Principle of operation

Type 43-1/-2 Temperature Regulator with a sensor functioning according to the vapor pressure principle.

The temperature sensor is partially filled with a liquid which vaporizes at a certain temperature. This process creates a pressure in the sensor which is proportional to the temperature. The pressure is transferred through the capillary tube to the positioning bellows where it is converted into a positioning force. This force moves the valve plug depending on the adjusted set point.

Installation

The sensor is to be installed in the position where the fast response of the vapor pressure sensor can be used optimally. When used in instantaneous water heaters, the sensor must be installed directly upstream of the hot water outlet from the heat exchanger and upstream of the hot water inlet (see Fig. 9).

- Installation **without** thermowell
- The ambient temperature at the set point adjuster of the thermostat must be at least 15 K below the adjusted set point.

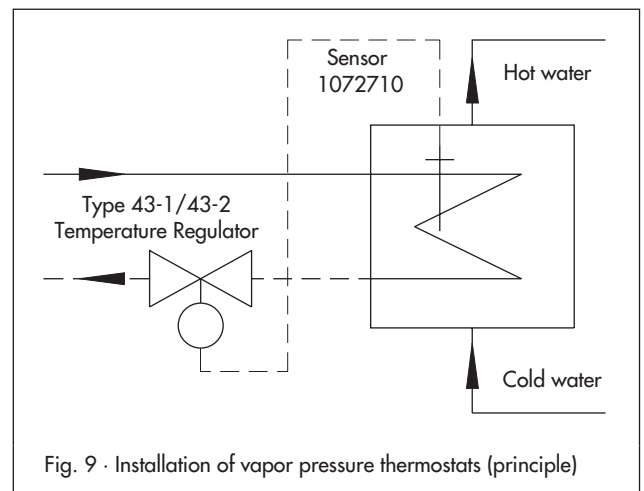


Fig. 9 · Installation of vapor pressure thermostats (principle)

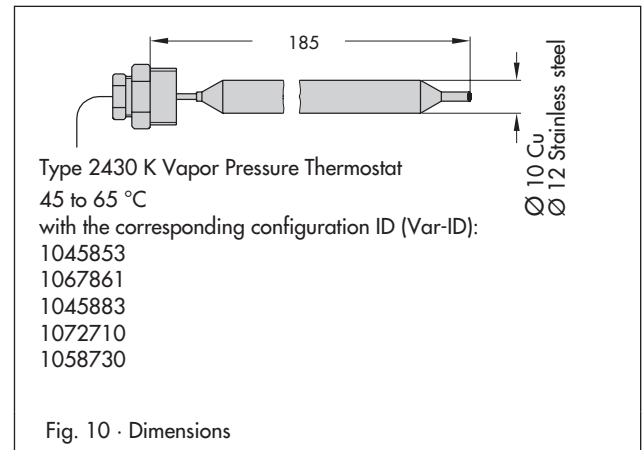


Fig. 10 · Dimensions

- The installation position of the sensor depends on the sensor type (see Table 4).
- Only use the same sort of materials together, sensors made of stainless steel 1.4571, for example, can be installed in stainless steel heat exchangers.

Table 4 · Installation position and materials

Type 2430 K Vapor Pressure Thermostats · 45 to 65 °C						
Plate heat exchangers	Configuration ID (Var-ID)	1058730		1109125 ¹⁾		
	Sensor position	Horizontal	•			
		Tip downwards	-			
		Tip upwards	-			
	Sensor material	Copper	-			
		CrNiMo steel	•			
Sensor connection	G ½		Without			
Capillary tube length	2 m					
Shell-and-tube or coaxial heat exchangers	Configuration ID (Var-ID)	1045853	1067861	1045883	1072710	
	Sensor position	Horizontal	•	•	•	•
		Tip downwards	-	-	•	•
		Tip upwards	•	•	-	-
	Sensor material	Copper	•	-	•	-
		CrNiMo steel	-	•	-	•
Sensor connection	G ½					
Capillary tube length	2 m					

¹⁾ Type 43-8, with instantaneous plate heat exchangers

Ordering text

Temperature Regulator **Type 43-1**

G ...

Set point range ...°C

Body made of red brass/stainless steel

Optionally, special version

Optionally, accessories

Temperature Regulator **Type 43-2**

DN ...

With connection nuts and welding ends/threaded ends/
flanges or flanged valve body

Set point range ...°C

Optionally, special version

Optionally, accessories

Specifications subject to change without notice.



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