

Self-operated Temperature Regulators Series 43

Temperature Regulator Type 43-1 · Type 43-2



ANSI version

Application

Temperature set points from **30 to 300 °F** (0 to 150 °C) · Valves $\frac{1}{2}$ to **1 NPT** · Valve size **NPS $\frac{1}{2}$ to 2** · Pressure rating **Class 250** · Suitable for liquids up to **300 °F** (150 °C) and non-flammable gases up to **175 °F** (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.



Regulators for district heating systems, heat generators, heat exchangers and other building services and industrial plants.

Special features

- Low-maintenance P-regulators requiring no auxiliary energy
- 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 580 psi (40 bar)
- Globe valves with plug balanced by a piston
- Especially suitable for use in district heating systems
- Suitable for liquids and gases
- Special version: fast-responding thermostat for instantaneous water heaters (see details on vapor pressure thermostats)

Versions (Figs. 1 and 3)

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. The valve body is made either of red brass or stainless steel.

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 With $\frac{1}{2}$ to 1 NPT female thread · Special version with stainless steel body · Type 2430 K Control Thermostat (sensor optionally available with or without thermowell)

Type 43-2 · Temperature regulator with Type 2432 K Valve Valve size NPS $\frac{1}{2}$ to 2 · Connection nuts with welding ends (special version with threaded ends or flanges) · 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.



Fig. 1 · Type 43-2 Temperature Regulator



Fig. 2 · Type 43-1 Temperature Regulator



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

Additionally, safety temperature monitors (STM) and safety temperature limiters (STL) are available. Refer to Data Sheets T 2183 EN and T 2185 EN for details.

Accessories

- Thermowell made of:
Copper or CrNiMo steel Class 300
- Double adapter Do 3K or manual adjuster
- Intermediate insulating piece for insulated pipelines or for medium temperatures down to 5 °F (-15 °C)

Special versions

- 16.4 ft (5 m) capillary tube
- Reduced C_v (Kvs) coefficient for NPS 1/2 or 1/2 NPT
- Mineral-oil-resistant internal parts
- Fast-responding thermostats (see details on vapor pressure thermostats) available on request
- Stainless steel body for Type 43-1 with 1/2, 3/4 and 1 NPT

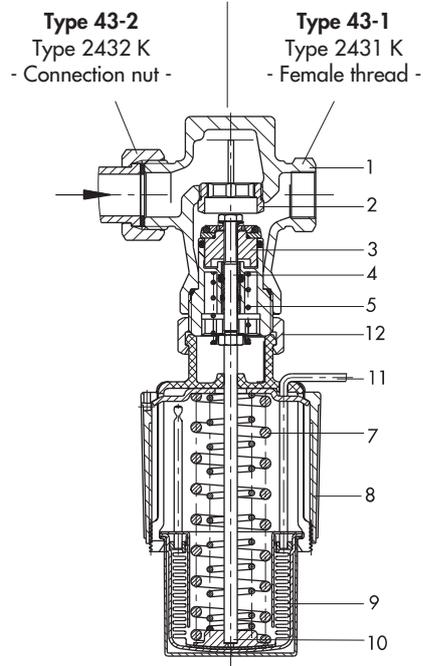
Principle of operation (Fig. 4)

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.



Type 43-1 and Type 43-2 Temperature Regulators

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. 4 · Type 43-1 and Type 43-2 Temperature Regulators

- | | |
|----|--|
| 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 ASTM and DIN EN

Valve body	C83600	Stainless steel A351 CF8M ¹⁾
Seat	Stainless steel 1.4305	A351 CF8M
Plug	1.4305 and brass, resistant to dezincification, with EPDM soft sealing ²⁾	1.4404
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⁾ Special version for Type 43-1

²⁾ Special version for oils (ASTM I, II, III): FPM (FKM) soft sealing

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

Type 2431 K and Type 2432 K Valve						
Type 43-1						
Connection size	½ NPT	¾ NPT	1 NPT			
C _v coefficient	4.3	6.8	8.6	-		
K _{vS} coefficient	3.6 ¹⁾	5.7	7.2			
Type 43-2						
Valve size	NPS ½	NPS ¾	NPS 1	NPS 1¼	NPS 1½	NPS 2
C _v coefficient	4.6	7.3	9.2	14.5	20	23
K _{vS} coefficient	4 ¹⁾	6.3	8	12.5	16	20
Pressure rating	Class 250 ⁴⁾					
Max. perm. differential pressure Δp	290 psi (20 bar)			175 psi (12 bar)		
Max. perm. temperature of valve	300 °F (150 °C)					
Type 2430 K Control Thermostat						
Set point range ²⁾ , continuously adjustable	30 to 95 °F, 75 to 105 °F, 100 to 210 °F, 125 to 250 °F or 160 to 300 °F					
	0 to 35 °C, 25 to 70 °C, 40 to 100 °C, 50 to 120 °C or 70 to 150 °C					
Capillary tube	6.5 ft (2 m), special version in 16.4 ft (5 m)					
Max. perm. temperature at the sensor	50 K above the adjusted set point					
Max. perm. ambient temperature range	-5 °F to 175 °F (-20 to 80 °C) ³⁾					
Perm. pressure at the sensor/ at the thermowell	Class 300					

¹⁾ Special version with C_v = 0.5, 1.2 or 3 (K_{vS} = 0.4, 1.0 or 2.5)

²⁾ Other set point ranges on request

³⁾ Note: For temperatures below the freezing point: **formation of ice** can **damage** the plant and especially the valve.

⁴⁾ Class 150 for body material A351 CF8M

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 230 °F (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 2" (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.

Dimensions

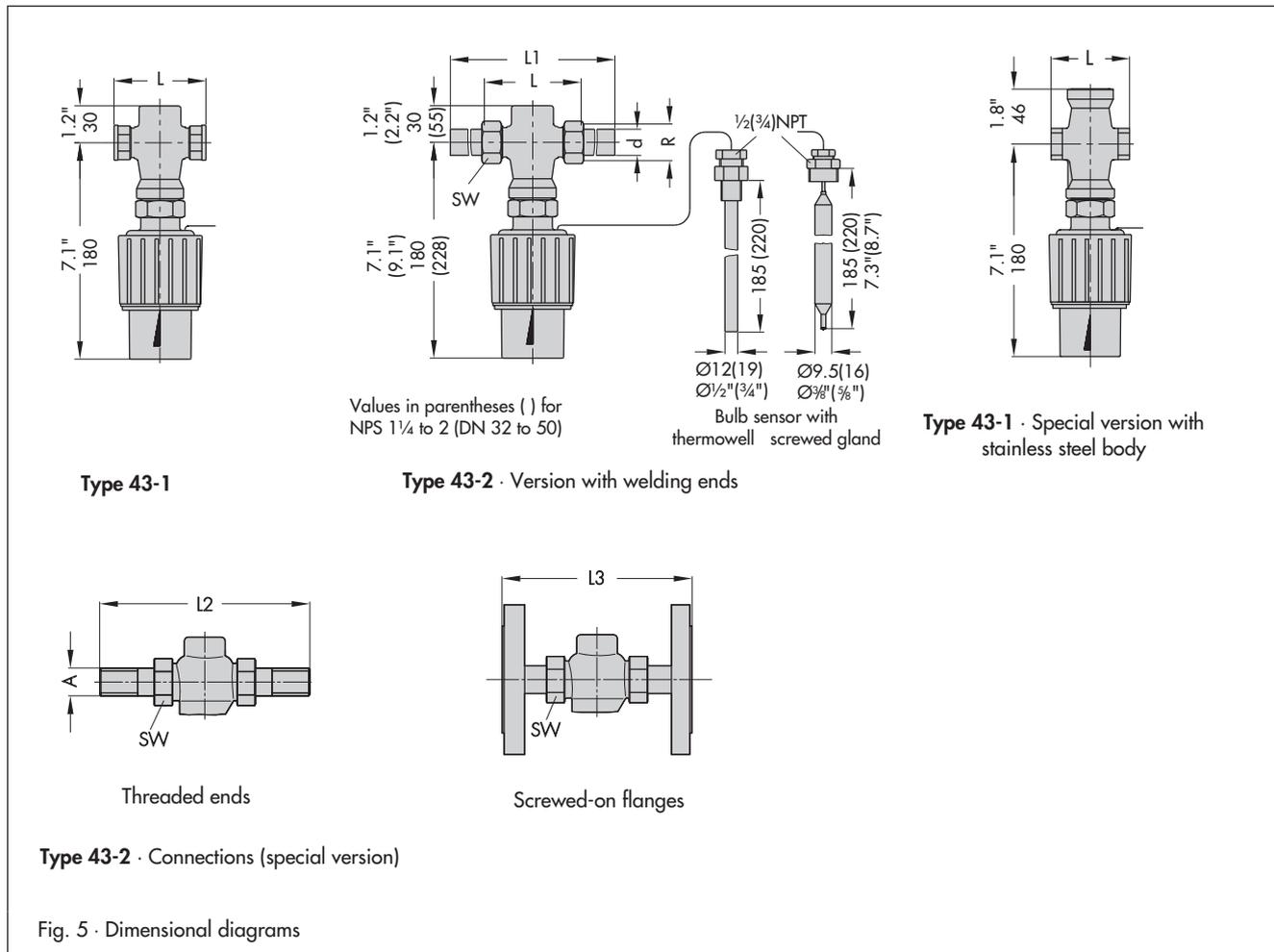


Table 3 · Dimensions and weights

Type 43-1 Temperature Regulator						
Thread size	½ NPT	¾ NPT	1 NPT			
Length L	2.6"/65 mm	2.9"/75 mm	3.6"/90 mm	-		
Weight ¹⁾ , approx.	3.1 lb/1.4 kg	3.3 lb/1.5 kg	3.5 lb/1.6 kg			
Type 43-2 Temperature Regulator						
Valve size	NPS ½	NPS ¾	NPS 1	NPS 1¼	NPS 1½	NPS 2
Pipe diameter Ød	0.84"/21.3 mm	1.05"/26.8 mm	1.29"/32.7 mm	1.65"/42 mm	1.9"/48 mm	2.36"/60 mm
Thread size R	G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
Width across flats SW	1.18"/30 mm	1.42"/36 mm	1.81"/46 mm	2.32"/59 mm	2.56"/65 mm	3.23"/82 mm
Length L	2.6"/65 mm	2.8"/70 mm	3"/75 mm	4"/100 mm	4.3"/110 mm	5.1"/130 mm
L1 with welding ends	8.27"/210 mm	9.22"/234 mm	9.61"/244 mm	10.55"/268 mm	11.57"/294 mm	13"/330 mm
Weight ¹⁾ , approx.	3.7 lb/1.7 kg	4.4 lb/2 kg	5.0 lb/2.3 kg	9.7 lb/4.4 kg	11.3 lb/5.1 kg	13.0 lb/5.9 kg
Special versions						
Version with threaded ends						
Length L2	5.1"/129 mm	5.7"/144 mm	6.3"/159 mm	7.1"/180 mm	7.7"/196 mm	9"/228 mm
Male thread A	G ½	G ¾	G 1	G 1¼	G 1½	G 2
Weight ¹⁾ , approx.	3.7 lb/1.7 kg	4.4 lb/2 kg	5.0 lb/2.3 kg	9.7 lb/4.4 kg	11.3 lb/5.1 kg	13.0 lb/5.9 kg
Version with flanges (Class 150 and 250)						
Length L3	5.1"/130 mm	5.9"/150 mm	6.3"/160 mm	7.1"/180 mm	7.9"/200 mm	9.1"/230 mm
Weight ¹⁾ , approx.	6.8 lb/3.1 kg	8.8 lb/4 kg	10.6 lb/4.8 kg	26.7 lb/7.6 kg	20.1 lb/9.1 kg	24.3 lb/11 kg

¹⁾ Version without thermowell: minus 0.5 lb/0.2 kg

Special version - vapor pressure thermostats -

Fast-responding temperature sensors

Application

Temperature sensors functioning according to the vapor pressure principle are particularly suitable for the use in instantaneous water heaters ¹⁾ due to their fast response time of approximately three seconds.

Temperature set points from 110 to 150 °F (45 to 65 °C) · Type 2430 K Control Thermostat combined with Type 2431 K Valve (Type 43-1) or Type 2432 K Valve (Type 43-2) · ½ NPT to 1 NPT · NPS ½ to 2 · Pressure rating Class 250 · Sensor made of copper or CrNiMo steel · Special installation position of the sensor must be observed!

Principle of operation

Type 43-1 and Type 42-2 Temperature Regulators 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 must 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. 6).

- The ambient temperature must be at least 15 K below the set point adjusted at the thermostat.
- The installation position of the sensor depends on its type.
- Only combine the same kind of materials, e.g. a heat exchanger made of CrNiMo steel only with sensors also made of CrNiMo steel.

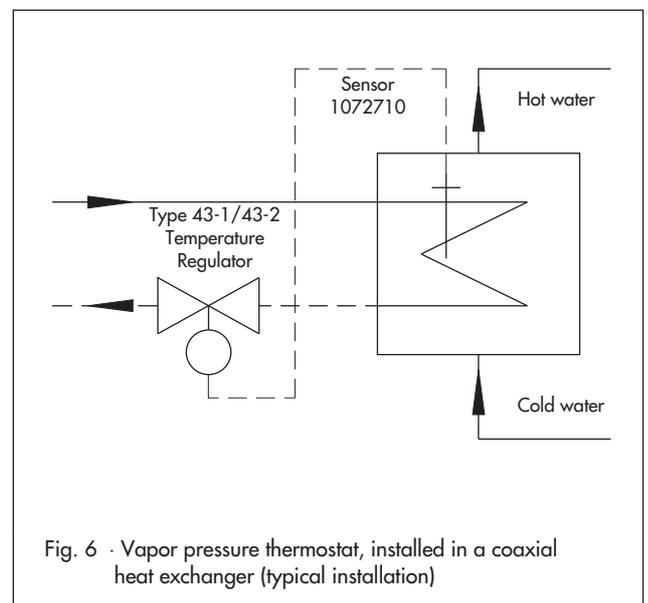
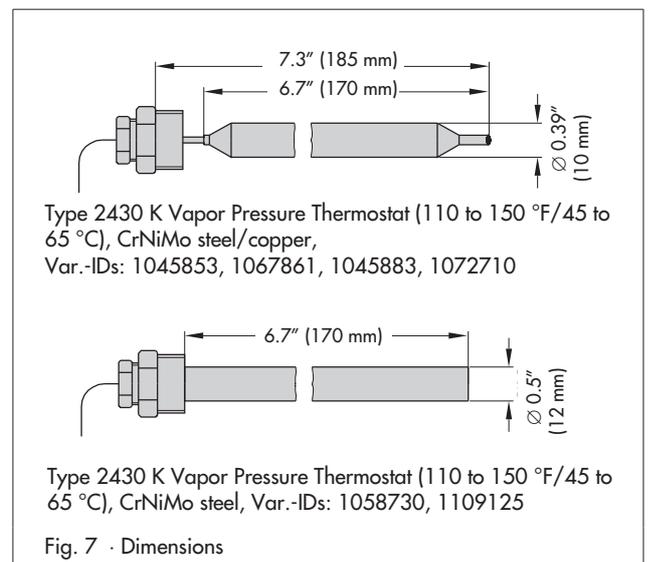


Fig. 6 · Vapor pressure thermostat, installed in a coaxial heat exchanger (typical installation)



Type 2430 K Vapor Pressure Thermostat (110 to 150 °F/45 to 65 °C), CrNiMo steel/copper, Var.-IDs: 1045853, 1067861, 1045883, 1072710

Type 2430 K Vapor Pressure Thermostat (110 to 150 °F/45 to 65 °C), CrNiMo steel, Var.-IDs: 1058730, 1109125

Fig. 7 · Dimensions

Table 4 · Installation position and materials

Type 2430 K Vapor Pressure Thermostats · 110 to 150 °F (45 to 65 °C)						
Plate heat exchangers ¹⁾	Configuration ID (Var.-ID)	1058730		1109125		
	Sensor position	Horizontal			•	
		Tip downwards			-	
		Tip upwards			-	
	Sensor material	Copper			-	
		CrNiMo steel			•	
	Sensor connection, screw gland	G ½		Without		
Capillary tube length	78.7" (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	78.7" (2 m)					

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

Ordering text

Temperature Regulator **Type 43-1**

... NPT

Set point range ...°F (°C)

Body made of red brass/stainless steel

Optionally, special version

Optionally, accessories

Temperature Regulator **Type 43-2**

NPS ...

With welding ends/threaded ends/flanges/flanged body

Set point range ... °F (°C)

Optionally, special version

Optionally, accessories

Specifications subject to change without notice.



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