

Self-operated Temperature Regulators

Series 43



Temperature Regulator with Three-way Valve Type 43-3

ANSI version

Application

Temperature regulators for mixing and flow-diverting ¹⁾ service in heating or cooling installations · Set points from **70 to 300 °F** (0 to 150 °C) · Valves **½ to 1 NPT** · **NPS ½ to 2** (DN 15 to 50) for connection of welding ends, threaded ends or flanges · **Class 250** · Suitable for liquids up to **300 °F** (150 °C)

Note!

Typetested temperature regulators (TR), safety temperature monitors (STM) and safety temperature limiters (SL) 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 580 psig (40 bar)
- Easy set point adjustment on a scale
- Three-way valve for mixing and flow-diverting service, flow across section AB independent from the valve plug position
- Version with double adapter Do3K for the attachment of additional control thermostats or manual adjuster (see Data Sheet T 2176 EN)
- Suitable for heat transfer media - water and oil (ASTM I, II, III).

Versions

The regulators consist of a three-way valve with a control thermostat containing a set point adjustment ring, a capillary tube and a temperature sensor which functions according to the adsorption principle.

Type 43-3 Temperature Regulator (Fig. 1) with an unbalanced Type 2433 K Three-way Valve · Female thread connection ½ to 1 NPT, optionally NPS ½ to 2 (DN 15 to 50) for connection nuts with welding ends, threaded ends or flanges · Oil and water resistant · Type 2430 K Control Thermostat.

Typetested safety devices

Register numbers are available on request.

Type 43-3 Temperature Regulator (TR) whose maximum operating pressure must not exceed the maximum differential pressure Δp specified in the Technical data. For sensors with thermowells, only SAMSON thermowells can be used.

Details about the selection and application of typetested devices can be found in the 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 43-3 Temperature Regulator
NPS 1 with welding ends

Accessories

- Thermowell made of: Copper, Class 300
CrNiMo steel, Class 300
- Combinations available on request

Special versions

- 16.4 ft (5 m) capillary tube

¹⁾ Used as a flow-diverting valve, only with male thread connection for welding ends, threaded ends or flanges

Principle of operation (see Fig. 2)

The temperature of the medium produces a pressure in the sensor, which is proportional to the actual temperature measured. This pressure is transmitted through the capillary tube (6) to the positioning bellows (9), where it is converted into a positioning force. It acts on the valve plug (3) according to the set point adjusted.

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 in sizes NPS 1/2 to 2 (DN 15 to 50).

When used as a **mixing valve**, the media to be mixed enter A and B ports. The combined stream flows off through AB. The flow from A or B to AB is determined by the free area between the seat (2) and the plug (3) and, as a result, depends on the position of the plug stem (4). When the temperature rises, port A opens and port B closes.

When used as a **flow-diverting valve**, the medium enters at AB and the diverted streams flow off at port A or port B. The flow from AB to A or B is determined by the position of the plug stem and the plugs. When the temperature rises, port A closes and port B opens.

Installation

Only the same kind of materials should be combined, for example, a thermowell made of stainless steel 1.4571 installed in a stainless steel heat exchanger.

• Valves

The valves must be installed in horizontal pipelines. The thermostat should preferably hang downwards - other installation positions are possible for temperatures up to 230 °F (110 °C). The medium must flow through the valve in the direction indicated by the arrow on the valve body. The flow direction at ports A, B and AB must correspond with the regulator arrangement specific to the installation (see Fig. 3).

• Capillary tube

The capillary tube must be laid in such a way that the ambient temperature does not exceed the permissible temperature limit, the temperature is kept as even as possible at ambient temperatures of approx. +70 °F (+20 °C) and the tube cannot be damaged. The smallest permissible bending radius is 2" (50 mm).

• Temperature sensor

The temperature sensor can be installed in any desired position. Its whole length must be immersed in the medium to be controlled. The sensor should be installed in a location where overheating or considerable idle times cannot occur.

Ordering text

Temperature Regulator with three-way valve **Type 43-3**

Female thread ... NPT

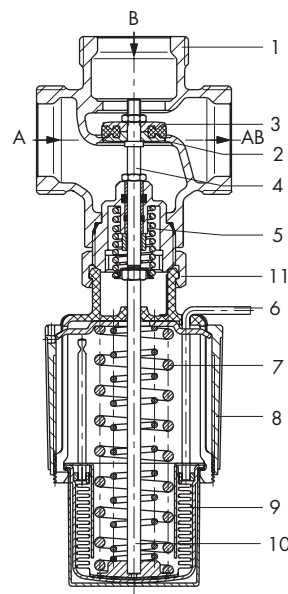
Male thread for NPS (DN) ... with connection nuts and welding ends, threaded ends or flanges

Used as mixing valve/flow-diverting valve

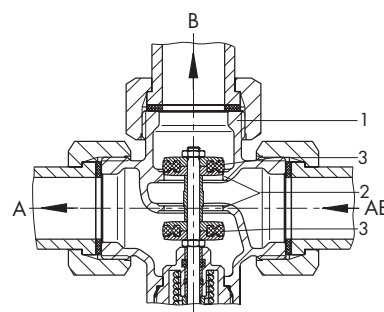
Set point range ... °F (°C)

Optionally, special version

Optionally, accessories



Type 43-3 as mixing valve



Type 43-3 as flow-diverting valve

Fig. 2 · Type 43-3 Temperature Regulator
- NPS 1/2 to 2 (DN 15 to 50) -

- | | |
|------------------|-----------------------------|
| 1 Valve body | 7 Positioning spring(s) |
| 2 Seat | 8 Set point adjustment ring |
| 3 Plug | 9 Positioning bellows |
| 4 Plug stem | 10 Pin of operating element |
| 5 Valve spring | 11 Coupling nut |
| 6 Capillary tube | |

Specifications subject to change without notice.

Examples of arrangements for Type 43-3 Temperature Regulators

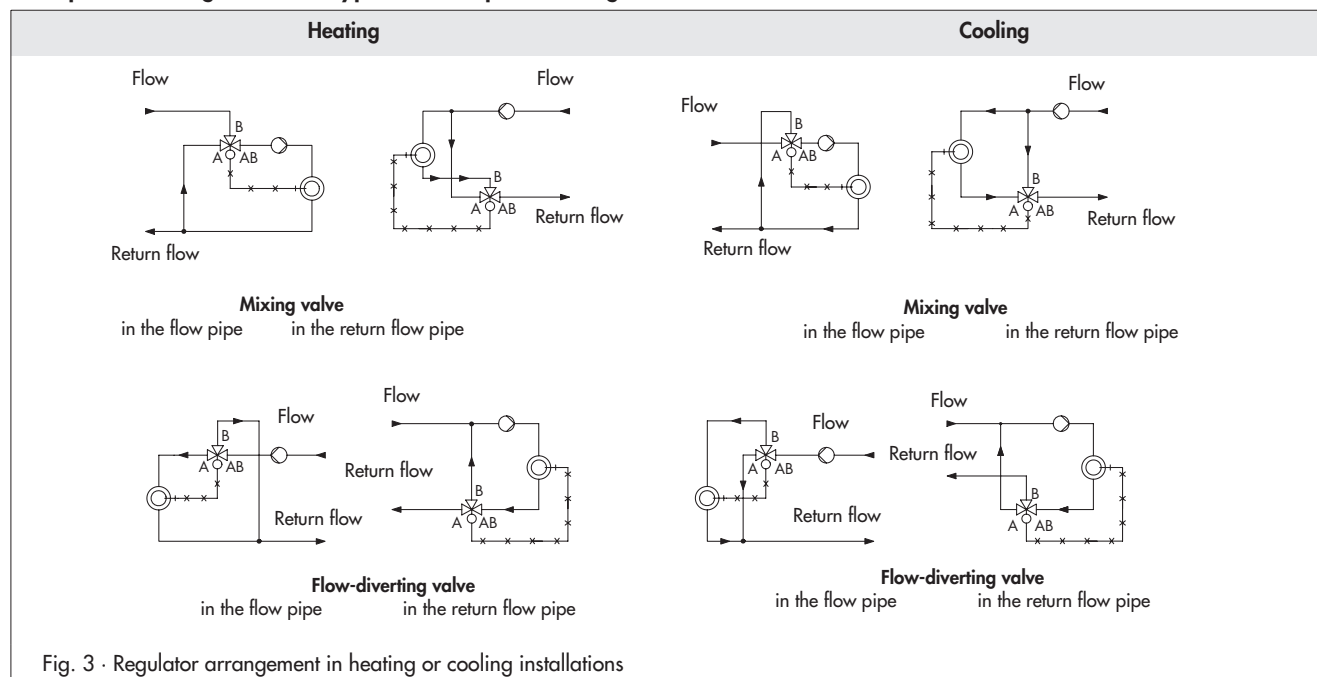


Table 1 · Technical data · All pressures as gauge pressures

Type 2433 K Three-way Valve									
Connection		Female thread			Male thread				
Nominal size	NPT	1/2	3/4	1	-				
	NPS	-			1/2 (DN 15)	3/4 (DN 20)	1 (DN 25)	1 1/4 (DN 32)	1 1/2 (DN 40)
Medium	Water · Oil								
Operated as	Mixing valve			Mixing valve · Flow-diverting valve					
Cv coefficient	5	7.5	9.4	5	7.5	9.4	12	15	20
Kvs coefficient	4	6.3	8	4	6.3	8	10	12.5	16
Nominal pressure	Class 250								
Max. perm. diff. pressure for mixing service	psi	64	38	26	64	38	26	13	9
	bar	4.4	2.6	1.8	4.4	2.6	1.8	0.9	0.6
Max. perm. temperature at the valve	300 °F (150 °C)								
Type 2430 K Control Thermostat									
Set point range, continuously adjustable				30 to 95 °F, 75 to 160 °F, 105 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: 16.4 ft (5 m)					
Max. permissible excess temperature at sensor				120 °F (50 °C) above adjusted set point					
Max. permissible ambient temperature				175 °F (80 °C)					
Permissible pressure at sensor/thermowell				Class 250/Class 300					

Table 2 · Materials · Material numbers according to ASTM and DIN EN

Body		C 83600 (CB491K)
Plug		Dezincification-resistant brass C37700 (CW617N) with EPDM soft sealing
Valve spring		Stainless steel 1.4310
Temperature sensor	Capillary tube	Copper
	Thermowell	Nickel-plated copper or stainless steel 1.4571
Set point adjustment ring		Glass fiber reinforced PETP

Table 3 · Dimensions and weights

Nominal size	NPT	½	¾	1	-		
	NPS	½ (DN 15)	¾ (DN 20)	1 (DN 25)	1¼ (DN 32)	1½ (DN 40)	2 (DN 40)
Male thread version Pipe Ø d	in	0.8	1.1	1.3	1.7	1.9	2.4
	mm	21.3	26.8	32.7	42	48	60
Connection size R	G	¾	1	1¼	1¾	2	2½
Width across flats SW	in	1.2	1.4	1.8	2.3	2.6	3.3
	mm	30	36	46	59	65	82
Length L	in	2.6	2.8	2.6	3.9	4.3	5.1
	mm	65	70	75	100	110	130
Female thread vers. Height H1	in		1.6			2.6	
	mm		40			65	
Length L1	in	2.6	3	3.5		-	
	mm	65	75	90		-	
Weight ¹⁾ , approx.	lb	4	4.3	4.6	7.2	7.5	9.9
	kg	1.5	1.6	1.7	2.7	2.8	3.7
Connection nuts with welding ends, threaded ends or flanges							
Height H5	in		1.6		2.4		2.6
	mm		40		60		65
Connection nuts with welding ends							
Length L2	in	8.3	9.2	9.6	10.6	11.6	13
	mm	210	234	244	268	294	330
Height H2	in	4.4	4.8	4.9	5.7	6.2	6.5
	mm	112	122	124	144	157	165
Weight ¹⁾ , approx.	lb	4.4	5.1	5.5	8.6	9.2	12.1
	kg	2	2.3	2.5	3.9	4.2	5.5
Connection nuts with threaded ends (male thread)							
Male thread A	NPT	½	¾	1	1¼	1½	2
Length L3	in	5.1	5.7	6.3	7.1	7.7	9
	mm	129	144	159	180	196	228
Height H3	in	2.8	3.0	3.2	3.9	4.25	4.5
	mm	72	77	82	100	108	114
Weight ¹⁾ , approx.	lb	4.4	5.1	5.5	8.6	9.2	12.1
	kg	2	2.3	2.5	3.9	4.2	5.5
Connection nuts with flanges							
Length L4	in	5.1	5.9	6.3	7.1	7.9	9.1
	mm	129	150	159	180	200	230
Height H4	in	2.75	3.1	3.3	3.9	4.1	4.7
	mm	70	80	85	100	105	120
Weight ¹⁾ , approx.	lb	11	14.2	13.9	23.3	27.3	34.8
	kg	4.1	5.3	6.3	8.7	10.2	13

¹⁾ Version for version with bulb sensor and thermowell · Version without thermowell: minus 0.44 lb (0.2 kg)

