

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 **30 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)

Versions

The regulators consist of a three-way valve made of red brass 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 · Class 250 · 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.

Accessories

- Thermowell made of copper, Class 300 or CrNiMo steel, Class 300
- Combinations available on request

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



Fig. 1 · Type 43-3 Temperature Regulator
NPS 1 with welding ends

Special versions

- 16.4 ft (5 m) capillary tube
- With intermediate piece for temperature range between 5 and 300 °F (–15 to +150 °C)

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 ½ 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 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 over-heating 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 welding ends, threaded ends or flanges

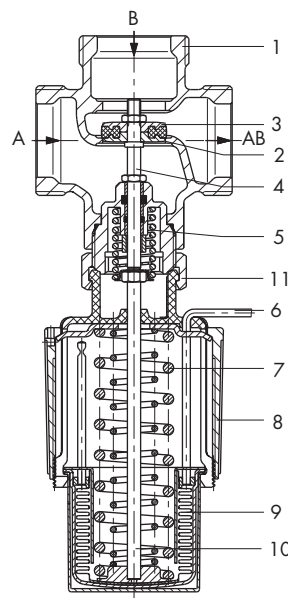
Used as mixing valve/flow-diverting valve

Set point range ... °F (°C)

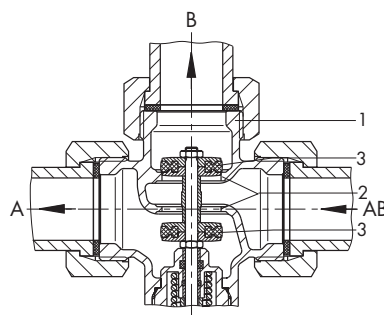
Optionally, special version

Optionally, accessories

Specifications subject to change without notice.



Type 43-3 as mixing valve



Type 43-3 as flow-diverting valve

Fig. 2 · Type 43-3 Temperature Regulator
- NPS ½ to 2 (DN 15 to 50) -

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

Examples of arrangements for Type 43-3 Temperature Regulators

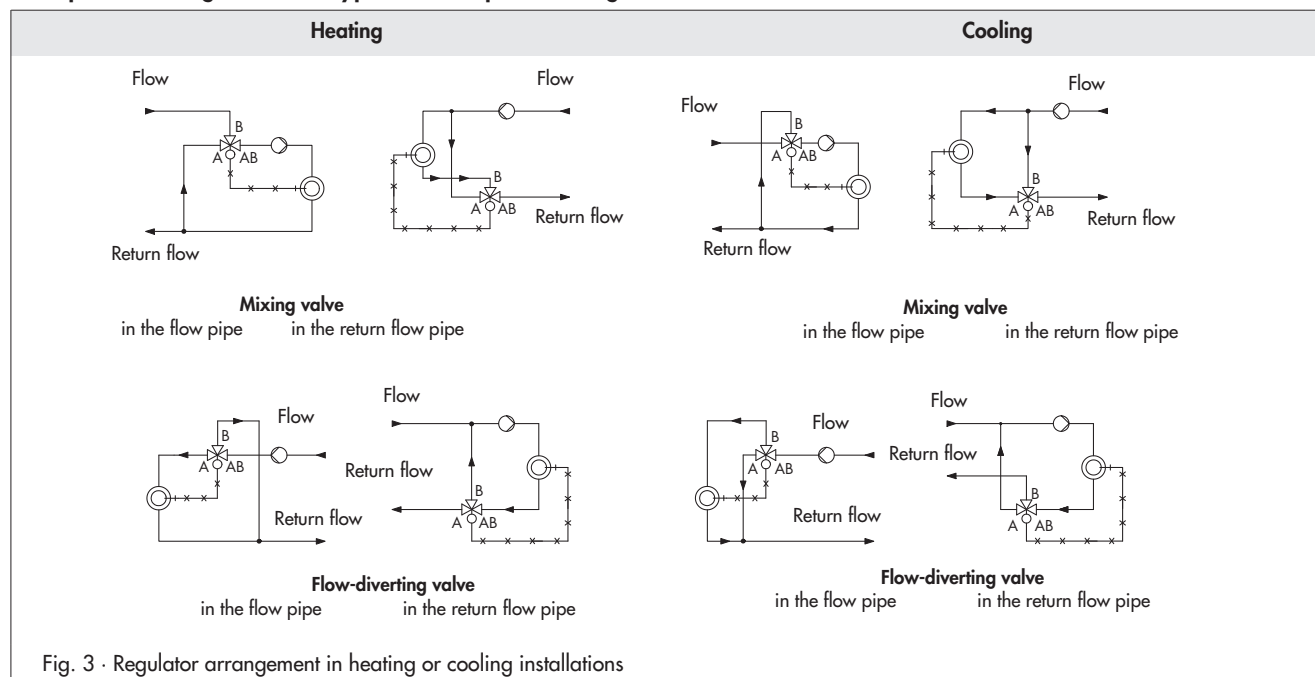


Fig. 3 · Regulator arrangement in heating or cooling installations

Table 1 · Technical data · All pressures in bar and psi (gauge)

Type 2433 K Three-way Valve									
Connection	Female thread			Male thread					
Thread size	½ NPT (G ½)	¾ NPT (G ¾)	1 NPT (G 1)	—					
Valve size	—			NPS ½ (DN 15)	NPS ¾ (DN 20)	NPS 1 (DN 25)	NPS 1¼ (DN 32)	NPS 1½ (DN 40)	NPS 2 (DN 50)
Medium	Water · Oil								
Cv coefficients	5	7.5	9.4	5	7.5	9.4	12	15	20
Kvs coefficients	4	6.3	8	4	6.3	8	10	12.5	16
Pressure rating	Class 250								
Max. permissible differential pressure Δp									
Mixing valve Δp when p in B > p in A	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	13 psi 0.9 bar	9 psi 0.6 bar	9 psi 0.6 bar
Δp when p in A > p in B	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	13 psi 0.9 bar	9 psi 0.6 bar	9 psi 0.6 bar
Diverting valve Δp when AB > A or B	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	64 psi 4.4 bar	38 psi 2.6 bar	26 psi 1.8 bar	13 psi 0.9 bar	9 psi 0.6 bar	9 psi 0.6 bar
Max. perm. valve temperature	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	50 K above adjusted set point
Max. permissible ambient temperature	175 °F (80 °C)
Permissible pressure at sensor/thermowell	Class 250/Class 300
Max. permissible temperature range of medium	30 to 300 °F (0 to +150 °C)
	Special version with intermediate piece: 5 to 300 °F (–15 to +150 °C)

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

Body	C 83600 (Rg 5)	
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

Thread size	½ NPT (G ½)	¾ NPT (G ¾)	1 NPT (G 1)	–		
Valve size	NPS ½ (DN 15)	NPS ¾ (DN 20)	NPS 1 (DN 25)	NPS 1¼ (DN 32)	NPS 1½ (DN 40)	NPS 2 (DN 50)
Pipe Ød	0.8" (21.3 mm)	1.1" (26.8 mm)	1.3" (32.7 mm)	1.7" (42 mm)	1.9" (48 mm)	2.4" (60 mm)
Thread size R	G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
Width across flats SW	1.2" (30 mm)	1.4" (36 mm)	1.8" (46 mm)	2.3" (59 mm)	2.6" (65 mm)	3.3" (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)
Length L1	2.6" (65 mm)	3" (75 mm)	3.5" (90 mm)	–		
Height H1	1.6" (40 mm)	1.6" (40 mm)	1.6" (40 mm)	2.6" (65 mm)	2.8" (70 mm)	3" (75 mm)
Weight ¹⁾ , approx.	3.3 lb (1.5 kg)	1.6 lb (3.5 kg)	3.7 lb (1.7 kg)	5.9 lb (2.7 kg)	6.2 lb (2.8 kg)	8.2 lb (3.7 kg)
With welding ends, threaded ends and flange connections						
Height H5	1.6" (40 mm)			2.4" (60 mm)	2.6" (65 mm)	
With welding ends						
Length L2	8.3" (210 mm)	9.2" (234 mm)	9.6" (244 mm)	10.6" (268 mm)	11.6" (294 mm)	13" (330 mm)
Height H2	112 mm)	122 mm)	124 mm)	144 mm)	157 mm)	165 mm)
Weight ¹⁾ , approx.	2	2.3	2.5	3.9	4.2	5.5
With threaded ends (male thread)						
Male thread A	½ NPT	¾ NPT	1 NPT	1¼ NPT	1½ NPT	2 NPT
Length L3	5.1" (129 mm)	5.7" (144 mm)	6.3" (159 mm)	7.1" (180 mm)	7.7" (196 mm)	9" (228 mm)
Height H3	2.8" (72 mm)	3" (77 mm)	3.2" (82 mm)	4" (100 mm)	4.2" (108 mm)	4.5" (114 mm)
Weight ¹⁾ , approx.	4.4 lb (2 kg)	5.1 lb (2.3 kg)	5.5 lb (2.5 kg)	5.6 lb (3.9 kg)	9.3 lb (4.2 kg)	12.1 lb (5.5 kg)
With flanges PN 16/25						
Length L4	5.1" (130 mm)	6" (150 mm)	6.3" (160 mm)	7.1" (180 mm)	7.9" (200 mm)	9.1" (230 mm)
Height H4	2.8" (70 mm)	3.1" (80 mm)	3.3" (85 mm)	4" (100 mm)	4.1" (105 mm)	4.7" (120 mm)
Weight ¹⁾ , approx.	9 lb (4.1 kg)	11.7 lb (5.3 kg)	13.8 lb (6.3 kg)	19.2 lb (8.7 kg)	22.5 lb (10.2 kg)	28.7 lb (13 kg)

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

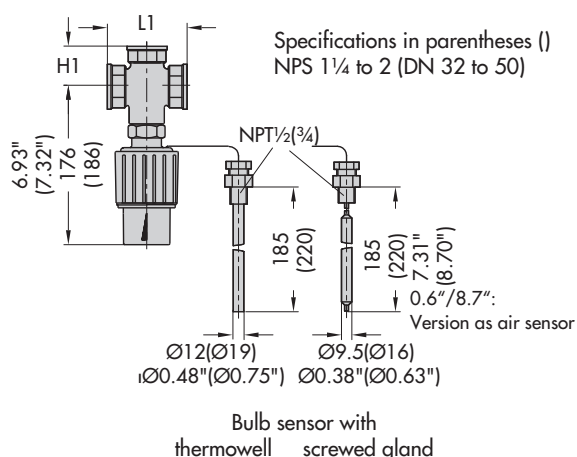
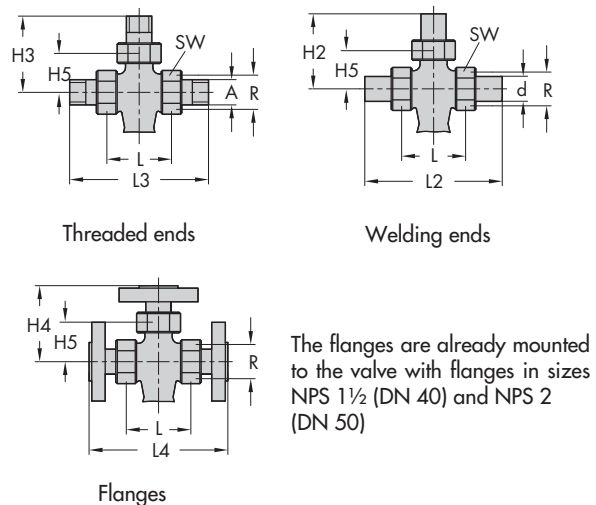
Type 43-3 (½ to 1 NPT connections)**NPS ½ to 2 · DN 15 to 50**

Fig. 4 · Dimensions