Self-operated Temperature Regulators
Series 43

Three-way Valve Type 43-3 · for heating or cooling installations

Application
Temperature regulators for mixing and flow-diverting[1] service
Set points values from **30 °F** to **300 °F (0 °C** to **150 °C)**
Sizes ½" to **2"** female/male NPT or welding ends
Pressure rating ANSI Class 250
For liquids to **300 °F (150 °C)**

The regulators consist of a three-way valve and a thermostat with set point adjuster, capillary tube and temperature sensor.

Features

- Low-maintenance P-regulators requiring no auxiliary energy
- Temperature sensor suitable for installation in any desired position and for operation at high permissible excess temperatures of up to 90 °F (50 °C) above the adjusted set point value, designed for operating pressures up to 580 psig (40 bar)
- Easy set point adjustment
- Three-way valve for mixing and flow-diverting service, flow across section AB independent of the valve plug position
- Version with double adapter Do3 K for the attachment of additional control thermostats or manual adjuster (see Data Sheet T 2176)
- Suitable for heat transfer media - water and oil (ASTM I,II,III)

Standard versions (Fig. 1)
Type 43-3 · with Type 2433 K Valve + Type 2430 K Thermostat
· Body of brass ASTM B62
· Pressure rating ANSI Class 250
· 6.5 ft (2m) capillary tube of copper, sensor of copper

Female NPT threaded ends
For **mixing** service
· Sizes ½" to 1"

Union connections with male NPT threaded or welding ends
For **mixing** or **flow-diverting** service
· Sizes ½" to 2"

Options
– 16 ft (5 m) capillary tube
– Version with oil-resistant seals

Accessories and combinations
– **Thermowells** ANSI Class 300 of copper or stainless steel
– **Double adaptor (Do3 K)** or **Manual adjuster**
(for details see Technical Data Sheet T 2176)
– **Safety Temperature Monitor (STM)** Type 2403
(for details see Technical Data Sheet T 2183)
– **Safety Temperature Limiter (STL)** Type 2439 K
(for details see Technical Data Sheet T 2185)

Fig. 1 · Type 43-3 Temperature Regulator
Version with union connections with welding ends

[1] Only male thread or welding ends possible for flow-diverting valve

For DIN versions see Technical Data Sheet T 2173 E

Principle of operation (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 bellows element (9), where it is converted into a positioning force. Depending on the adjusted set point, this force acts on the pin (10) which moves the plug stem (4) and the valve plug (3).

The three-way valve with female thread connection NPT ½" to 1" is used only for mixing service. Both mixing and flow-diverting service is available with other connections and sizes.

When used as a **mixing valve**, the process media to be mixed enter A and B ports and the combined stream flows out through AB. When the temperature rises, port A opens and port B closes.

When used as a **flow-diverting valv**e, the process media enters port AB and the diverted streams flow out through ports A and B. When the temperature rises, port A closes and port B opens.

Maximum operating pressures

Maximum operating pressures must be within the limits stated in the applicable ANSI standard, but also must not exceed the maximum differential pressure Δp specified in Table 2 "Technical data".

Installation

Only compatible materials should be combined, for example, a thermowell made of stainless steel installed in a stainless steel heat exchanger.

• **Valve**

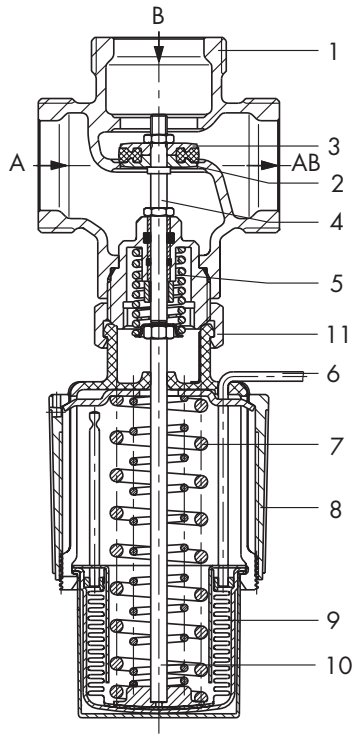
The valves must be installed in horizontal pipelines. The thermostat should preferably hang downwards - other installation positions are possible for temperatures less than 230 °F (110 °C). The medium must flow through the valve in the direction indicated by the arrow on the valve body. The flow direction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

• **Capillary tube**

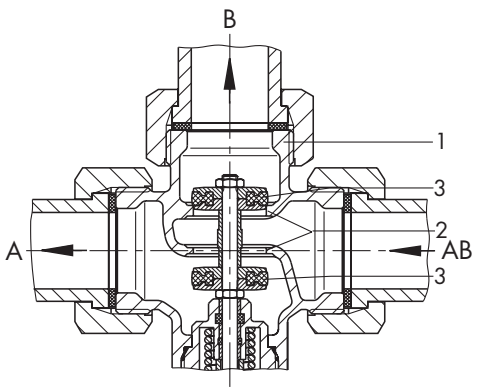
The capillary tube must be laid in such a way that the ambient temperature does not exceed the permissible range, the temperature is kept as stable as possible (e.g. ambient approx. 70 °F (20 °C)) and the tube cannot be damaged. The smallest permissible bending radius is 2" (50 mm).

• **Temperature sensor**

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



Type 43-3 Mixing Valve



Type 43-3 Flow-Diverting Valve

Fig. 2 · Type 43-3 Temperature Regulator
Connections ½" to 2" · 15 to 50 mm

1	Valve body	7	Positioning springs
2	Valve seat	8	Set point adjustment ring
3	Valve plug	9	Bellows element
4	Plug stem	10	Pin of operating element
5	Valve spring	11	Coupling nut
6	Capillary tube		

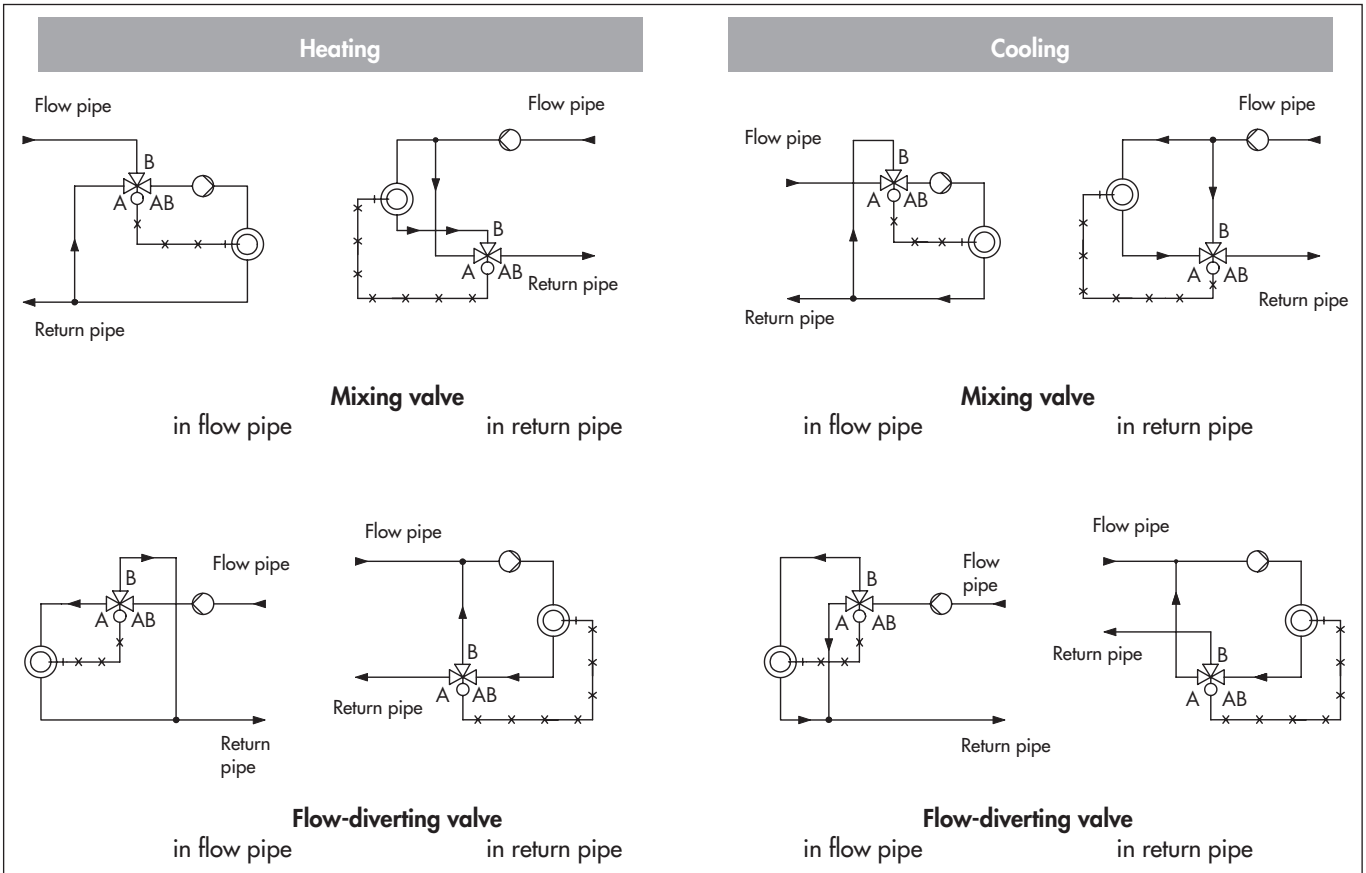


Fig. 3 Regulator arrangment in heated or cooled installations

Table 1 · **Technical data** · All pressures gauge pressure

Type 2433 K Three-way Valve							
Nominal size	in	½″	¾″	1″	1¼″	1½″	2″
End connections	Mixing	Female NPT or Unions with male NPT or welding ends			Union connections with male NPT or welding ends		
	Diverting	Unions with male NPT or welding ends					
Nominal pressure		ANSI Class 250					
C_V value		5	7.5	9.4	12	15	20
K_{VS} value		4	6.3	8	10	12.5	16
Max. permissible differential pressure for mixing service	psig	64	38	26	13	9	
	bar	4.4	2.6	1.8	0.9	0.6	
Max. perm. temperature of the valve		300 °F (150 °C)					
Type 2430 K Thermostat							
Set point range continuously adjustable		30 to 95 °F 75 to 160 °F 105 to 210 °F 125 to 250 °F 160 to 300 °F			0 to 35 °C 25 to 70 °C 40 to 100 °C 50 to 120 °C 70 to 150 °C		
Capillary tube		6.5 ft special version: 16 ft			2 m; special version: 5 m		
Max. perm. excess temperature at sensor		120 °F above adjusted set point			50 °C above adjusted set point		
Max. perm. ambient temperature		175 °F			80 °C		
Max. pressure at sensor/at thermowell		ANSI Class 300					

Table 2 · Materials

Body		Brass ASTM B62 (G-CuSn5ZnPb)
Plug		Brass (CuZn40) with EPDM soft seal [1]
Valve spring		Stainless steel AISI 301 (WN 1.4310)
Sensor	Capillary tube	Copper
	Thermowell	Nickel-plated copper or stainless steel AISI 316 Ti (WN 1.4571)
Set point adjustment ring		Glass fibre-reinforced PETP

[1] Special version with FKM seal for oil service

Table 3a · Dimensions in inches and weights in lbs

Nominal size	in	½"	¾"	1"	1¼"	1½"	2"
Pipe ∅ d	in	0.84	1.05	1.29	1.65	1.89	2.36
Union connection R	G	¾"	1"	1¼"	1¾"	2"	2½"
Width across flats SW	in	1.18	1.42	1.81	2.32	2.56	3.23
Length L	in	2.56	2.76	2.95	3.94	4.33	5.12
Length L1	in	2.56	2.95	3.54	–		
Height H1	in	1.57	1.57	1.57	2.56	2.76	2.95
With union connections and **welding ends**							
Length L2	in	8.27	9.21	9.61	10.55	11.56	12.99
Height H2	in	4.41	4.80	4.88	5.67	6.18	6.49
With union connections and **male threaded ends**							
Male thread A	NPT	½"	¾"	1"	1¼"	1½"	2"
Length L3	in	5.08	5.67	6.26	7.09	7.72	8.98
Height H3	in	2.83	3.03	3.23	3.94	4.25	4.49
Weight [1], approx.	lb	4.4	5.1	5.5	8.6	9.2	12.1

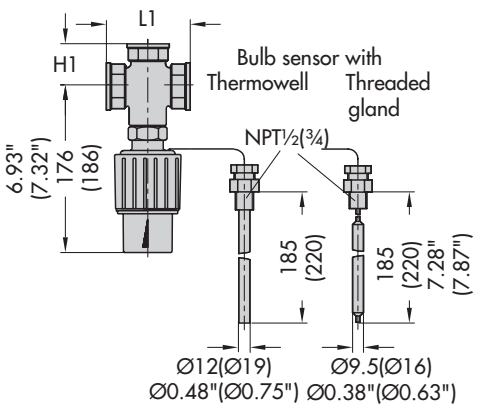
[1] Weight for version with bulb sensor and thermowell; for version without thermowell, subtract 0.4 lb

Table 3b · Dimensions in mm and weights in kg

Nominal size	in	½"	¾"	1"	1¼"	1½"	2"
Pipe ∅ d	mm	21.3	26.8	32.7	42	48	60
Union connection R	G	¾	1	1¼	1¾	2	2½
Width across flats SW	mm	30	36	46	59	65	82
Length L	mm	65	70	75	100	110	130
Length L1	mm	65	75	90	–		
Height H1	mm	40	40	40	65	70	75
With union connections and **welding ends**							
Length L2	mm	210	234	244	268	294	330
Height H2	mm	112	122	124	144	157	165
With union connections and **male threaded ends**							
Male thread A	NPT	½"	¾"	1"	1¼"	1½"	2"
Length L3	mm	129	144	159	180	196	228
Height H3	mm	72	77	82	100	108	114
Weight [1], approx.	kg	2	2.3	2.5	3.9	4.2	5.5

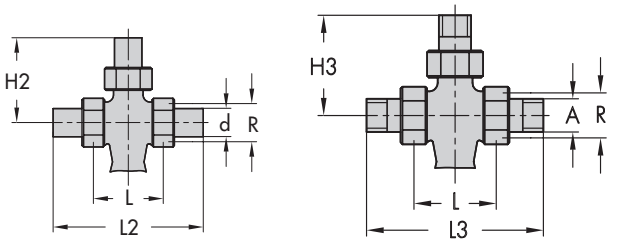
[1] Weight for version with bulb sensor and thermowell; for version without thermowell, subtract 0.2 kg

Type 43-3 - Female NPT ½" to 1"



Dimensions in parentheses ( ) for 1¼" to 2"

Type 43-3 - ½" to 2"



Unions with welding ends

Unions with male threaded ends

Fig. 4 · Dimensions

Ordering information

Temperature Regulator with three-way valve **Type 43-3**
Size ... with connection female NPT / male NPT / welding ends
Set point range ...°**F (°C)**
Optionally, accessories .../ special version ...

Specifications subject to change without notice.

SAMSON CONTROLS INC.
1-105 Riviera Drive
Markham · Ontario · Canada · L3R 5J7
Tel. (905) 474-0354 · Telefax (905) 474-0998

SAMSON CONTROLS INC.
4111 Cedar Boulevard
Baytown · Texas · USA · 77520
Tel. (281) 383-3677 · Telefax (281) 383-3690