

Self-operated Temperature Regulators Series 43



Type 43-1 · Type 43-2 · Valve closes when the temperature rises.

Application

Temperature regulators for heating installations

Set point values from 30 °F to 300 °F (0 °C to 150 °C)

Sizes 1/2" to 2" (15 to 50 mm) female/male NPT or welding ends

Pressure rating ANSI Class 250

For liquids up to 300 °F (150 °C) and gases up to 175 °F (80 °C)

The regulators consist of a valve and a thermostat with a set point adjustment ring, a capillary tube and a 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, designed for operating pressures up to 580 psi (40 bar)
- Easy set point adjustment
- Plug pressure-balanced with piston
- Especially suitable for use in district heating systems
- Suitable for liquids and gases (versions for steam see T 2174)
- Special version: fast-responding thermostats for instantaneous water heaters (see page 3 "Vapour pressure thermostats")

Versions (Figs. 1 and 2)

Type 43-1 · with Type 2431 K Valve + Type 2430 K Thermostat

· Sizes 1/2" to 1" (15 to 25 mm)

· Female NPT threaded connections

· Sensor optionally with or without thermowell

Type 43-2 · with Type 2432 K Valve + Type 2430 K Thermostat

· Sizes 1/2" to 2" (15 to 50 mm)

· Female and male NPT threaded or welding ends

· Sensor optionally with or without thermowell

Special versions

– 16 ft (5 m) capillary tube

– Oil-resistant internal parts

– Fast-acting thermostats (page 3 "Vapour pressure thermostats")

Accessories

– **Thermowells** ANSI Class 300 of copper or stainless CrNiMo steel

– **Double adapter Do3 K** or **manual adjuster**
(For details see Technical Data Sheet T 2176)

– **Safety Temperature Monitors (STM)** Type 2403
(For details see Technical Data Sheet T 2183)

– **Safety Temperature Limiters (STL)** Type 2439 K
(For details see Technical Data Sheet T 2185)

For DIN version see Technical Data Sheet T 2171 E.

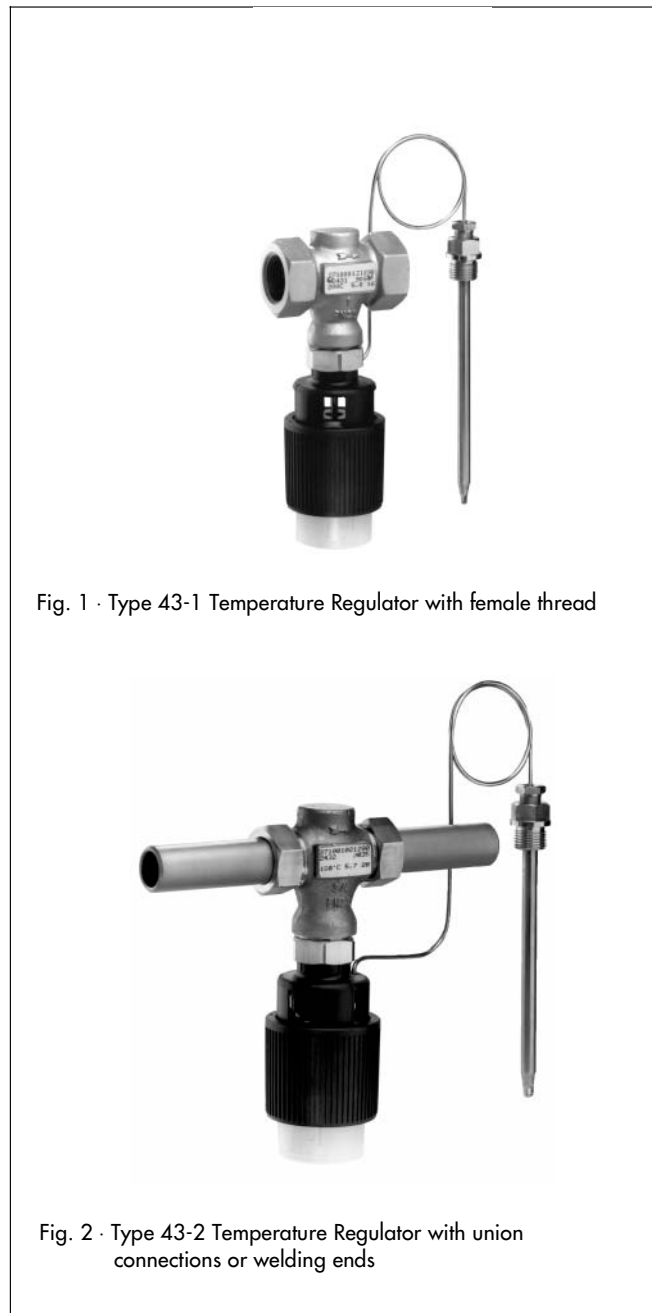


Fig. 1 · Type 43-1 Temperature Regulator with female thread

Fig. 2 · Type 43-2 Temperature Regulator with union connections or welding ends

Principle of operation (Fig. 3)

The temperature of the medium produces a pressure in the measuring sensor, which is proportional 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 pin (10) which moves the plug stem (4) and the valve plug (3). By turning the set point adjustment ring (8), the point of response of the thermostat is changed so that the valve plug travels through its full stroke within a higher or lower temperature range measured by the sensor.

Maximum operating pressures

Maximum operating pressures must be within the limits stated in the applicable ANSI standard, but must not exceed the maximum differential pressure Δp specified in the Table 1 "Technical data".

Installation

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

• Valve

The valves must be installed in horizontal pipelines. The thermostat must hang downwards - other installation positions are also possible at temperatures lower than 230 °F (110 °C). The medium must flow through the valve in the direction indicated by the arrow on the valve body.

• Capillary tube

The capillary tube should be run in such a way that the ambient temperature does not exceed the permissible range. This ambient temperature should be kept as stable as possible, and the tube cannot be damaged. The smallest permissible bending radius is 2" (50 mm).

• Temperature sensor

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

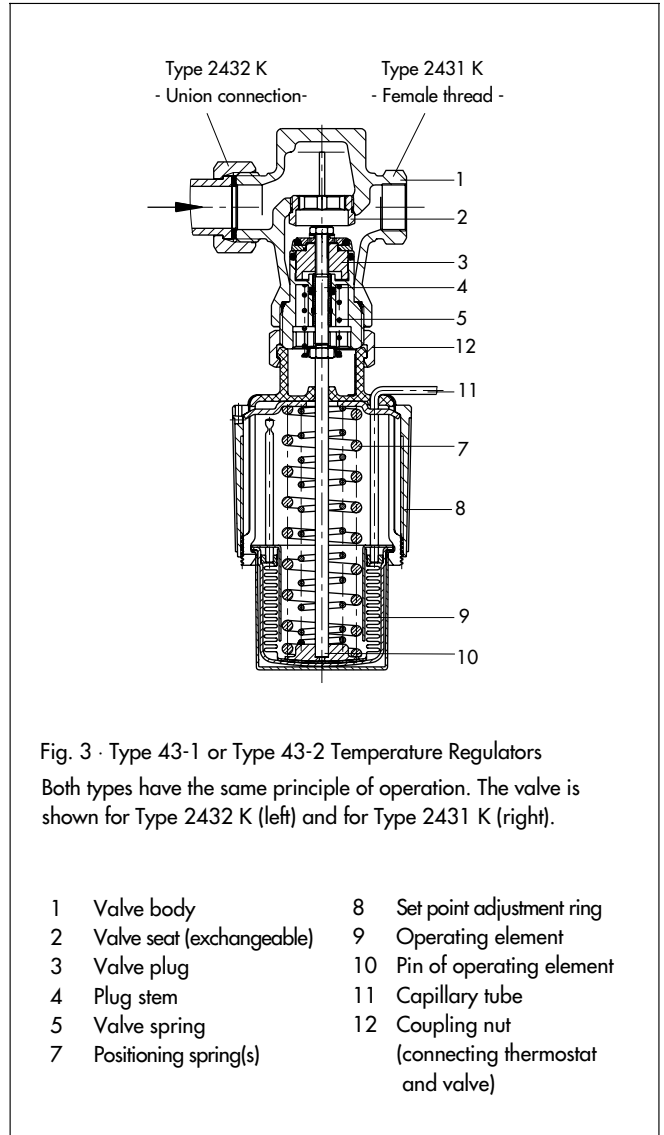


Fig. 3 · Type 43-1 or Type 43-2 Temperature Regulators
Both types have the same principle of operation. The valve is shown for Type 2432 K (left) and for Type 2431 K (right).

- | | |
|-----------------------------|-----------------------------------|
| 1 Valve body | 8 Set point adjustment ring |
| 2 Valve seat (exchangeable) | 9 Operating element |
| 3 Valve plug | 10 Pin of operating element |
| 4 Plug stem | 11 Capillary tube |
| 5 Valve spring | 12 Coupling nut |
| 7 Positioning spring(s) | (connecting thermostat and valve) |

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

Nominal size ¹⁾	in (mm)	1/2" (15)	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)
C _v value		4.2	6.7	8.4	11.7	14.6	18.7
K _{vS} value		3.6	5.7	7.2	10	12.5	16
Nominal pressure		ANSI Class 250					
Max. permissible differential pressure		290 psi (20 bar)			175 psi (12 bar)		
Max. permissible valve temperature		300 °F (150 °C)					

¹⁾ Type 2431 K Control Valve: Nominal size NPT 1/2" to 1" female thread

Type 2430 K Control Thermostat		
Set point ranges ²⁾ , continuously adjustable	30 to 95 °F	0 to 35 °C
	75 to 105 °F	25 to 70 °C
	100 to 210 °F	40 to 100 °C
	125 to 250 °F	50 to 120 °C
	160 to 300 °F	70 to 150 °C
Capillary tube	6.5 ft; special version: 16.4 ft	2 m; special version: 5 m
Max. permissible excess temp. at the sensor	90 °F above the adjusted set point	50 °C above the adjusted set point
Max. perm. ambient temperature range	- 5 to 175 °F	- 20 to +80 °C
Perm. pressure at sensor/at thermowell	ANSI Class 300	

²⁾ Further set point ranges available on request

Table 2 · Materials

Body	Red Brass	ASTM B62	G-CuSn5ZnPb
Plug	Stainless Steel and brass	AISI 430F and brass	WN 1.4104 and brass with EPDM soft seal ¹⁾
Valve spring	Stainless Steel	AISI 430F	WN 1.4310
Sensor Capillary tube	Copper		
Thermowell	Copper, nickel-plated or stainless steel AISI 316 Ti (WN 1.4571)		
Set point adjustment ring	Glass fibre-reinforced polyamide		

¹⁾ With special version for oils (ASTM I, II, III): FKM soft seal

Special version - Vapour pressure thermostat -
Temperature regulator with short time delays

Application

The temperature sensors functioning according to the vapour pressure principle are especially suitable for use in instantaneous water heaters¹⁾ due to their short time constants of approx. 3 seconds.

Temperature set points from **115 to 150 °F (45 to 65 °C)** · Type 2430 K Thermostat combined with Type 2431 K (Type 43-1) or Type 2432 K (Type 43-2) Valve · Female thread **NPT 1/2" to 1" · 1/2" to 2"** · **ANSI Class 250** · Sensor made of copper or stainless CrNiMo steel · Special installation position of the sensor must be observed!

¹⁾ Versions for plate heat exchanger on request

Principle of operation

Type 43-1/2 Temperature Regulator with a **sensor** which functions according to the **vapour pressure principle**.

The temperature sensor is partially filled with a liquid which vaporizes depending on the temperature. This causes a pressure proportional to the temperature to form in the sensor. The pressure is transferred through the capillary tube to the positioning bellows and is converted into a positioning force. It moves the valve plug depending on the set point adjustment.

Installation

- To utilize the fast response characteristics of the vapour pressure sensor, the sensor must always be installed in the best position. In instantaneous water heaters, it should be installed directly in front of the flow outlet from the heat exchanger, yet in front of the hot water inlet (see Fig. 4).
- The ambient temperature must be at least **27 °F (15 °C) below the set point adjusted at the thermostat.**
- The installation position of the sensor depends on its type.
- Only compatible materials should be combined, for example, a sensor of stainless steel installed in a stainless steel heat exchanger.

Installation *without* thermowell only!

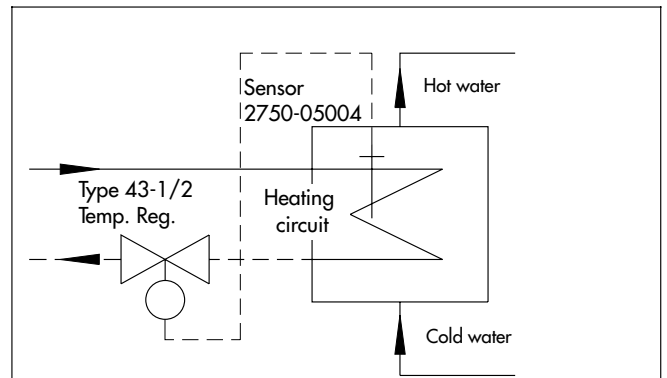


Fig. 4 · Installation position of the vapour pressure thermostat (principle)

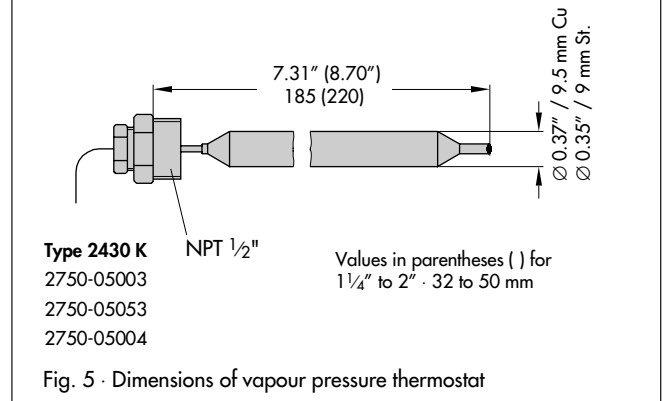


Fig. 5 · Dimensions of vapour pressure thermostat

Table 3 · Installation position - only Type 2430 K Vapour Pressure Thermostat

Prod. Number 2750-05 ...	003	053	004
Sensor position	Horizontal		
	Tip facing upwards		
	Tip facing downwards		

Table 4 · Materials

Type 2430 K Vapour Pressure Thermostat			
Prod. Number 2750-05 ...	003	053	004
Sensor material	Copper		
	Stainless steel		
Sensor connection	NPT 1/2"		

Table 5 · Dimensions and weights

Type 43-1 Temperature Regulator				
Nominal size	NPT	1/2"	3/4"	1"
Length L	in	2.56	2.95	3.55
Weight ¹⁾ , approx.	lb	3.1	3.3	3.5
Length L	mm	65	75	90
Weight ¹⁾ , approx.	kg	1.4	1.5	1.6

Type 43-2 Temperature Regulator							
Nominal size	in	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Pipe diameter d	in	0.84	1.05	1.29	1.65	1.9	2.36
Union connection size R G		3/4	1	1 1/4	1 3/4	2	2 1/2
Width across flats SW	in	1.18	1.42	1.81	2.32	2.56	3.23
Length L	in	2.6	2.8	3.0	4.0	4.3	5.1

With union connections and welding end adaptors							
L1 with welding ends	in	8.27	9.22	9.61	10.6	11.6	13.0
Weight ¹⁾ , approx.	lb	3.8	4.4	5.1	9.7	11.2	13.0

With union connections and male threaded end adaptors							
Length L2	in	5.1	5.67	6.26	7.1	7.72	8.98
Male thread A	NPT	1/2	3/4	1	1 1/4	1 1/2	2
Weight ¹⁾ , approx.	lb	3.8	4.4	5.1	9.7	11.2	13.0

¹⁾ Version without thermowell: minus 0.4 lb

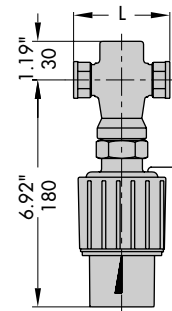
Nominal size	mm	15	20	25	32	40	50
Pipe diameter d	mm	21.3	26.8	32.7	42	48	60
Union connection size R G		3/4"	1"	1 1/4"	1 3/4"	2"	2 1/2"
Width across flats SW	mm	30	36	46	59	65	82
Length L	mm	65	70	75	100	110	130

With union connections and welding end adaptors							
L1 with welding ends	mm	210	234	244	268	294	330
Weight ¹⁾ , approx.	kg	1.7	2	2.3	4.4	5.1	5.9

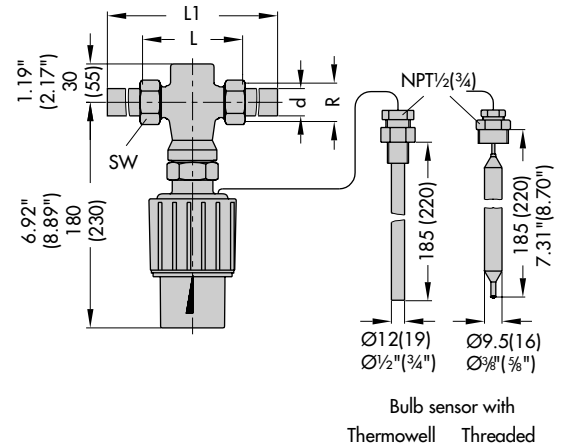
With union connections and male threaded end adaptors							
Length L2	mm	129	144	159	180	196	228
Weight ¹⁾ , approx.	kg	1.7	2	2.3	4.4	5.1	5.9

¹⁾ Version without thermowell: minus 0.2 kg

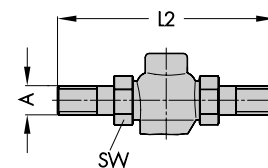
Type 43-1



Type 43-2 - with union connections and welding ends -



- with union connections and threaded ends -



Values in parentheses () for 1 1/4" to 2" · 32 to 50 mm

Fig. 6 · Dimensions

Ordering text

Temperature Regulator **Type 43-1 / 43-2**

NPT ... or

Size ... with connection female / 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

T 2175

T 2175CA