

T 2183 EN

Safety Temperature Monitors (STM) with Type 2403 Safety Thermostat Series 43 Self-operated Temperature Regulators



Application

Safety temperature monitoring of the energy supply to heat generators and heat exchangers by closing the valve

For temperature limits from **60 to 120 °C** · With valves **G ½ to 1** or **DN 15 to 50** · Pressure rating **PN 16 or 25** · **Max. 200 °C**

Safety temperature monitors (STM), with a valve and Type 2403 Safety Thermostat, operate without auxiliary energy and are designed for extended safety according to DIN EN 14597. The safety temperature monitor is used to limit the temperature by closing a SAMSON Series 43 Valve connected to the safety thermostat.

Versions

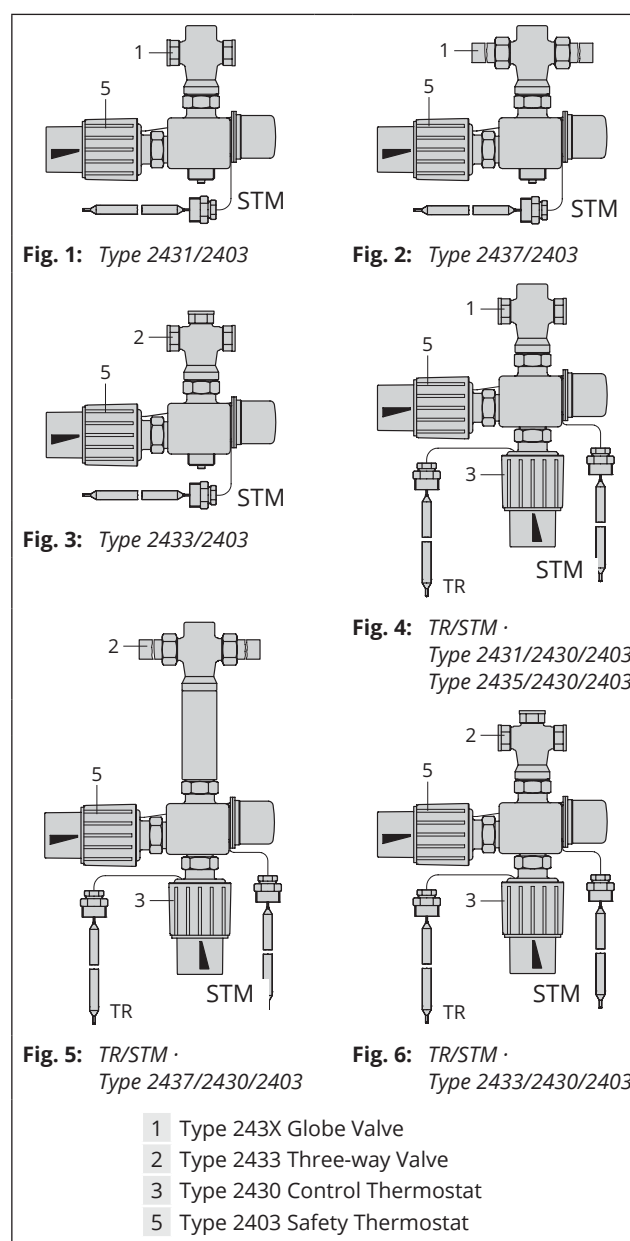
Type 2403 Safety Thermostat consisting of temperature sensor, limit adjustment knob, capillary tube and operating element.

Safety temperature monitors (STM) (Fig. 1 to Fig. 3)

- **Type 2431/2403** · With Type 2431 Globe Valve for G ½ to 1 · PN 25 · Type 2403 STM · 150 °C
- **Type 2433/2403** · With Type 2433 Three-way Valve for G ½ to 1 or DN 15 to 50 · PN 25 · Type 2403 STM · 150 °C
- **Type 2435/2403** · With Type 2435 Globe Valve for G ½ to 1 · PN 25 · Type 2403 STM · 200 °C
- **Type 2432/2403** · With Type 2432 Globe Valve for DN 15 to 50 · PN 25 · Type 2403 STM · 150 °C
- **Type 2437/2403** · With Type 2437 Globe Valve for DN 15 to 50 · PN 25 · Type 2403 STM · 200 °C
- **Type 2436/2403** · With Type 2436 Globe Valve for G ½ to 1 · PN 16 or DN 15 to 50 · PN 25 · Type 2403 STM; valve opens in the event of emergency · 150 °C

Details and technical data of the valves are listed in the following data sheets:

- ▶ T 2171 Type 2431 and Type 2432 Globe Valves
- ▶ T 2172 Type 2435, Type 2436 and Type 2437 Globe Valves
- ▶ T 2173 Type 2433 Three-way Valve



Temperature regulators and safety temperature monitors (TR/STM) (Fig. 4 to Fig. 6) consisting of one of the above listed Type 243X/2403 devices and a Type 2430 Control Thermostat tested according to DIN EN 14597, for example:

- **Type 2431/2430/2403** · With Type 2431 Valve · G ½ to 1 · PN 25 · Type 2430 Control Thermostat and Type 2403 Safety Thermostat

Further versions

- Reduced K_{VS} coefficient in DN 15 or G ½
- Safety temperature monitor with differential pressure/flow rate regulation



Typetesting

The safety temperature monitor is tested by the German technical surveillance association TÜV according to DIN EN 14597 under the type designation 2750-5 and available for plants according to DIN 4747-1, DIN EN 12828 and DIN 4753. The registration number is available on request.

Principle of operation (STM)

The safety temperature monitor mainly consists of a valve and safety thermostat with capillary tube (8) and bulb sensor (9). See Fig. 7.

The safety temperature monitors work according to the vapor pressure principle. The temperature of the medium creates a pressure in the temperature sensor (9)

which is proportional to the measured temperature. This pressure is transferred through the capillary tube (8) to the operating bellows (10) and converted into a positioning force. The force is transferred over the pin (11) of the operating element to the plug stem (4) and plug (3). The position of the plug determines the flow rate of the heat transfer medium across the area released between the seat (2) and plug.

The safety thermostat closes the mounted valve when the temperature reaches the adjusted temperature limit. The safety thermostat resets itself automatically when the temperature has fallen to a value of approx. 5 K below the adjusted limit.

The adjusted temperature limit must have a minimum temperature difference of 15 K to the set point of the temperature regulator.

Principle of operation (TR/STM)

The connection of an additional Type 2430 Control Thermostat converts the safety temperature monitor (STM) into a temperature regulator with safety temperature monitor (TR/STM). When the capillary tube ruptures or there is a leak in the sensor, the spring mechanism reacts to the reduced system pressure and the pin of the operating element (11) closes the valve. The valve cannot be reset. In this case, the Type 2403 Safety Temperature Monitor must be replaced.

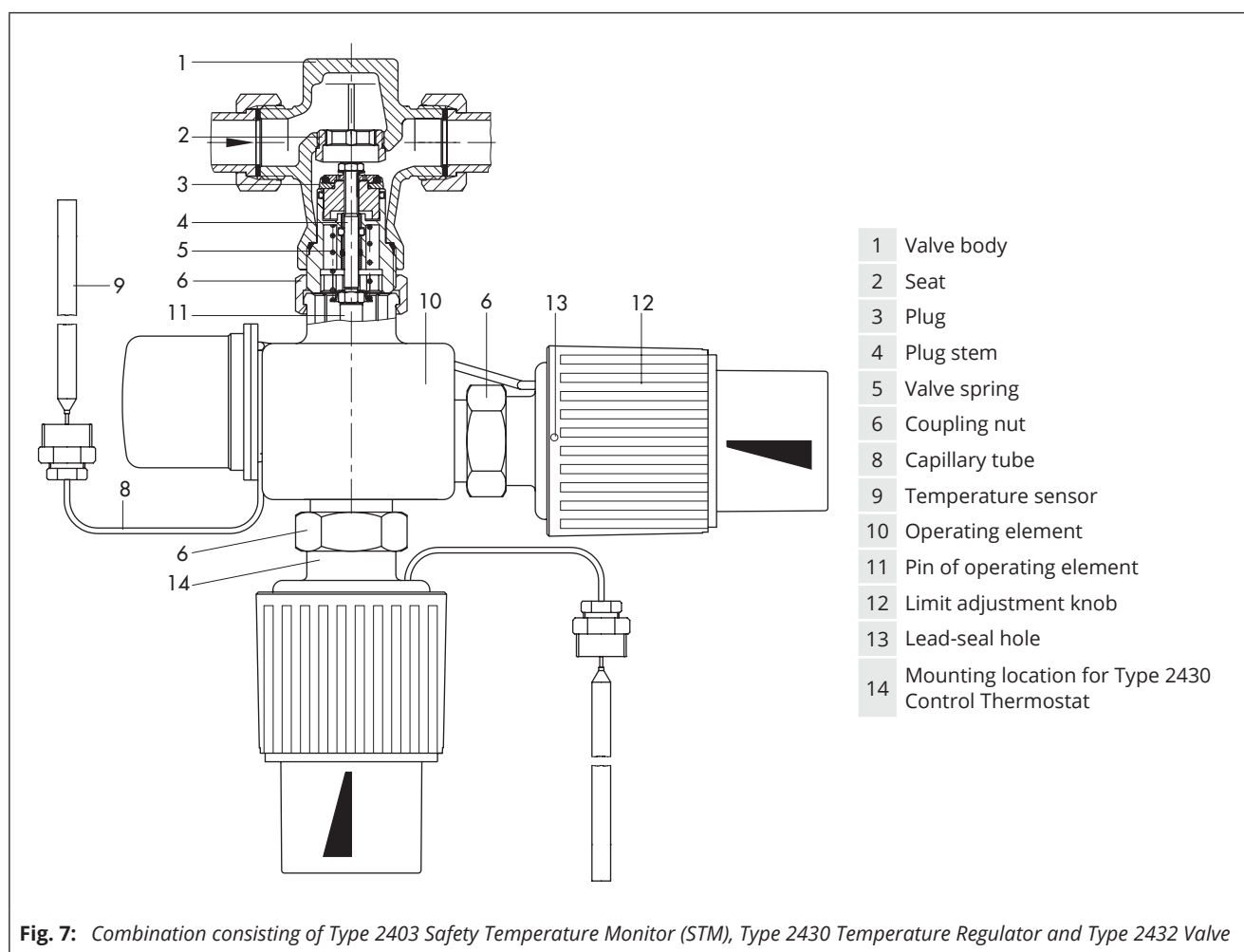


Fig. 7: Combination consisting of Type 2403 Safety Temperature Monitor (STM), Type 2430 Temperature Regulator and Type 2432 Valve

Application

Further details on the application of safety thermostats can be found in Information Sheet ► T 2181.

Installation

– Valve:

Install the valves in horizontal pipelines. The operating element must be suspended to hang downward.

For Types 2431, 2432 and 2433, other mounting positions are possible for temperatures up to 110 °C.

For Type 2436, the operating element must point upward for temperatures up to 110 °C.

– Capillary tube:

Carefully run the capillary tube (8) without bending or twisting it. The smallest permissible bending radius is 50 mm.

Observe the permissible ambient temperatures.

– Temperature sensor:

The mounting position of the temperature sensor depends on the sensor version:

- Sensor horizontal or tip of sensor pointing up
- Sensor horizontal or tip of sensor pointing down

For details on installation ► EB 2183.

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

Valve	Type	2431	2433	2435	2436 ¹⁾		2432 ¹⁾		2437 ¹⁾	
Connection size	G	½ to 1 · Female thread				–	–		–	
Nominal size	DN	–	15 to 50	–	–	32 to 50	15 to 25	32 to 50	15 to 25	32 to 50
Pressure rating	PN	25	25	25	16	25	25		25	
Max. permissible temperature	°C	150	150	200	150		150		200	
Max. permissible differential pressure	p	20	4.4 ²⁾	16	16	8	20	12	16	8
K_{V5} coefficients for										
Connection size	G	½	¾	1	–		–		–	
Nominal size	DN	15	20	25	32		40		50	
K _{V5} coefficients with Type 2433		4	6.3	8	10		12.5		16	
K _{V5} coefficients with Types 2435, 2436 and 2437 ³⁾		3.2	4	5	12.5		16		20	
K _{V5} coefficients with Types 2431 and 2432 ⁴⁾		3.6	5.7	7.2	12.5		16		20	
Type 2403 Safety Thermostat for STM										
Limit range	60 to 75 °C or 75 to 100 °C									
Perm. ambient temperature	Max. 50 °C									
Max. perm. temperature	200 °C									
Perm. temperature at the sensor	25 K above the adjusted limit									
Perm. pressure at sensor	25 bar									
Capillary tube length	5 m									
Conformity										
Type 2430 Control Thermostat for TR/STM										
Set point range	Continuously adjustable: 0 to 35 °C, 25 to 70 °C, 40 to 100 °C, 50 to 120 °C or 70 to 150 °C									
Perm. ambient temperature	0 to 50 °C									
Perm. temperature at the sensor	25 K above the adjusted set point									
Perm. pressure at sensor	25 bar									
Capillary tube length	2 m (5 m as special version)									
Conformity										

¹⁾ DN 15 to 50 also as flanged body valve made of spheroidal graphite iron (EN-GJS-400-18-LT)

²⁾ For values of other nominal sizes, see Data Sheet ► T 2173

³⁾ For special K_{V5} coefficients, see Data Sheet ► T 2172

⁴⁾ For special K_{V5} coefficients, see Data Sheet ► T 2171

Table 2: Materials · Material numbers according to DIN EN

Valve	Type	2431	2432 ¹⁾	2435	2436 ¹⁾	2437 ¹⁾	2433
Body		CC491K/CC499K ²⁾ (red brass Rg 5)					
Seat		Stainless steel 1.4571					Integrated in the body
Valve plug		Stainless steel with brass ⁴⁾ and EPDM soft seal ³⁾					CW617N ⁴⁾ with EPDM soft seal
Valve spring		Stainless steel 1.4310					
Balancing bellows		–	–	Stainless steel 1.4571			–
Type 2403 Safety Thermostat for STM with Type 2430 Control Thermostat for TR							
Connecting element (Type 2403)		PPO with brass connection nut					
Adjustment knob for limit/ set point adjustment		PTFE, glass fiber reinforced					
Sensor		1.4571					
Capillary tube		Copper					

⁵⁾ DN 15 to 50 also as flanged body valve made of EN-GJS-400-18-LT

⁶⁾ Type 2436/G ½ to 1: CW604N (brass)

⁷⁾ Special version for mineral oils (ASTM I, II, III): FKM soft seal

⁸⁾ All brass resistant to dezincification

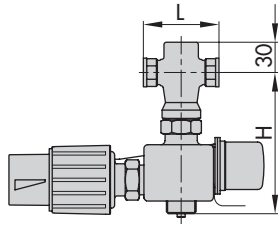
Table 3: Dimensions in mm**Table 3.1:** Type 2431/2403 · Type 2433/2403 · Type 2435/2403 · Type 2436/2403

Connection size		G ½	G ¾	G 1
Face-to-face dimension	L	65	75	90
Type 2431/2403	H	140		
Type 2433/2403	H	140		
	H1	40		
Type 2435/2403	H	220		
Type 2436/2403	H1	145		
	H	46		

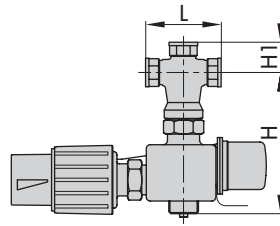
Table 3.2: Type 2432/2403 · Type 2433/2403 · Type 2436/2403 · Type 2437/2403

Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Pipe Ød	d	21.3	26.8	32.7	42	48	60
AF		30	36	46	59	65	82
Length	L	65	70	75	100	110	130
With welding ends	L1	210	234	244	268	294	330
With threaded ends	L2	129	144	159	180	196	228
With flanges	L3	130	150	160	180	200	230
Male thread	A	G ½	G ¾	G 1	G 1 ¼	G 1 ½	G 2
Type 2432/2403	H	140			190		
	H1	30			55		
Type 2433/2403	H	135			145		
	H2	112	122	124	144	157	165
	H3	72	77	82	100	108	114
	H4	72	80	82	105	110	115
Type 2436/2403	H	–			160		
	H1	–			95		
Type 2437/2403	H	220			270		
	H1	30			55		

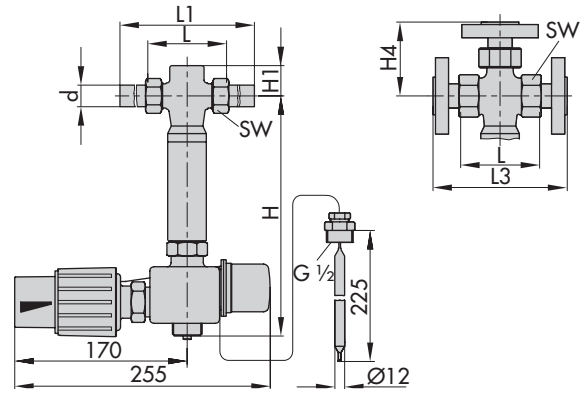
Safety temperature monitors (STM)



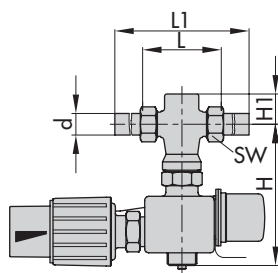
Type 2431/2403
Type 2435/2403



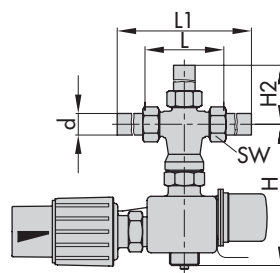
Type 2433/2403
Version with female thread



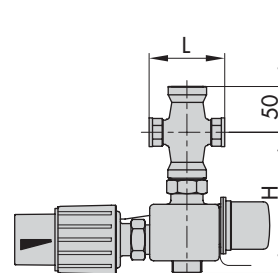
Type 2433/2403
Version with flanges



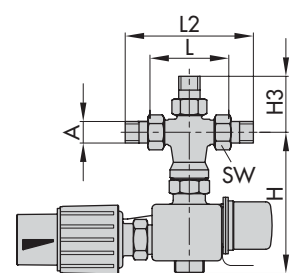
Type 2432/2403
Type 2436/2403



Type 2433/2403
Version with welding ends

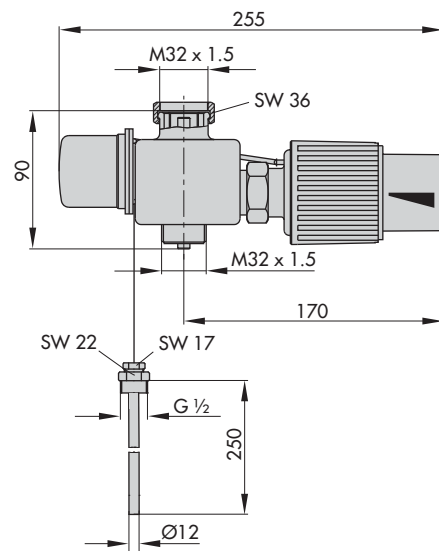
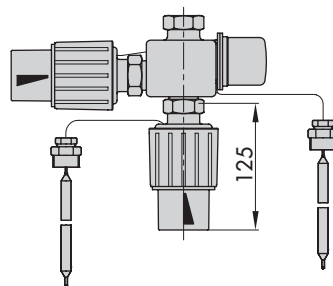


Type 2436/2403
G 1/2 to 1



Type 2433/2403
Version with threaded ends

Temperature regulator with safety temperature monitor (TR/STM)



Type 243X/2430/2403

Table 4: *Weights in kg***Table 4.1:** *Type 2431/2403 · Type 2433/2403 · Type 2435/2403 · Type 2436/2403*

Connection size	G ½	G ¾	G 1
Type 2431/2403	2.0	2.1	2.2
Type 2433/2403	2.2	2.3	2.4
Type 2435/2403	2.5	2.6	2.7
Type 2436/2403	2.4	2.5	2.6

Table 4.2: *Type 2432/2403 · Type 2433/2403 · Type 2436/2403 · Type 2437/2403*

Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Type 2432/2403	With welding ends	2.5	2.8	3.1	5.1	5.8	7.6
	With threaded ends	2.4	2.7	3.0	5.0	5.7	7.5
	With flanges	3.9	4.8	5.6	8.3	9.8	11.6
Type 2433/2403	With welding ends	2.9	3.2	3.4	4.8	5.1	6.4
	With threaded ends	2.9	3.2	3.4	4.8	5.1	6.4
	With flanges	5.0	6.2	7.1	9.6	11	14
Type 2436/2403	With welding ends	-			3.8	4.2	4.6
	With threaded ends				3.8	4.2	4.6
	With flanges				7.0	8.2	9.6
Type 2437/2403	With welding ends	2.7	3.0	3.3	5.5	6.2	8.1
	With threaded ends	2.6	2.9	3.2	5.5	6.2	8.1
	With flanges	4.1	5.0	5.8	8.5	10	12

Ordering text**Type 243X/2403 Safety Temperature Monitor**

- With Type 243X Valve, G ... or DN ... with welding ends, threaded ends or flanges (only with Type 2432, Type 2433, Type 2436 and Type 2437)
- For mixing or diverting service · Only with Type 2433
- PN ...

With Type 2403 Safety Thermostat

- Limit range ... °C
- Version:
 - Sensor horizontal or tip of sensor pointing up
 - Sensor horizontal or tip of sensor pointing down

With Type 2430 Control Thermostat

Optionally, special version

Optionally, accessories ...