Safety Temperature Monitors (STM) with Type 2403 K Safety Thermostat

Type 2432 K/2403 K Temperature Monitor

Mounting and Operating Instructions

EB 2183 EN

Edition November 2016

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

➔ If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersalesservice@samson.de).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website (www.samson.de) > Product documentation. You can enter the document number or type number in the [Find:] field to look for a document.

WARNING!
Damage to health relating to REACH Regulation.
If a SAMSON device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH Regulation, this circumstance is indicated on the SAMSON delivery note.
Information on safe use of the part affected, see ▶ http://www.samson.de/reach-en.html

Definition of signal words

DANGER!
Hazardous situations which, if not avoided, will result in death or serious injury

WARNING!
Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE
Property damage message or malfunction

Note:
Additional information

Tip:
Recommended action

1 General safety instructions

– All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up, and maintenance, must be strictly observed.
– The device must be mounted, started up, or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third persons are not exposed to any danger.
– According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
– The devices comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Devices with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. This declaration of conformity can be provided on request.
– To ensure appropriate use, only use the device in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the device at the ordering stage.
– The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.
– Any hazards that could be caused in the regulator by the process medium, operating pressure or by moving parts are to be prevented by taking appropriate precautions.
– Proper transport, storage, installation, operation, and maintenance are assumed.

Note:
Non-electric valve versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1: 2009, section 5.2, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of Directive 2014/34/EU.
For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14: 2011 (VDE 0165 Part 1).

2 Process medium and scope of application

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

For limit signals from 60 to 120 °C · Valves G ½ to G 1 · DN 15 to DN 50 · Nominal pressure PN 16 or PN 25 · Max. 200 °C

Typetesting:
The safety temperature monitor is tested by the German Technical Inspectorate (TÜV) according to DIN EN 14597 under the type designation 2750-5. The register number is available on request.

3 Transportation and storage

The valve must be carefully handled, transported, and stored. Protect the device against adverse influences, such as dirt, moisture, frost, or high temperatures.

4 Design and principle of operation

See Fig. 1 on page 7.

Safety temperature monitors (STM), with a valve and Type 2403 K Safety Thermostat, operate without auxiliary energy and are designed for extended safety according to DIN EN 14597.

The valve is closed by a spring mechanism when the temperature reaches the adjusted limit, when the capillary tube breaks, or when leakage occurs in the sensor system.

The safety temperature monitor is used to limit the temperature by closing a SAMSON Series 43 Valve connected to the thermostat.

The safety temperature monitor mainly consists of a valve and thermostat with capillary tube and bulb sensor.

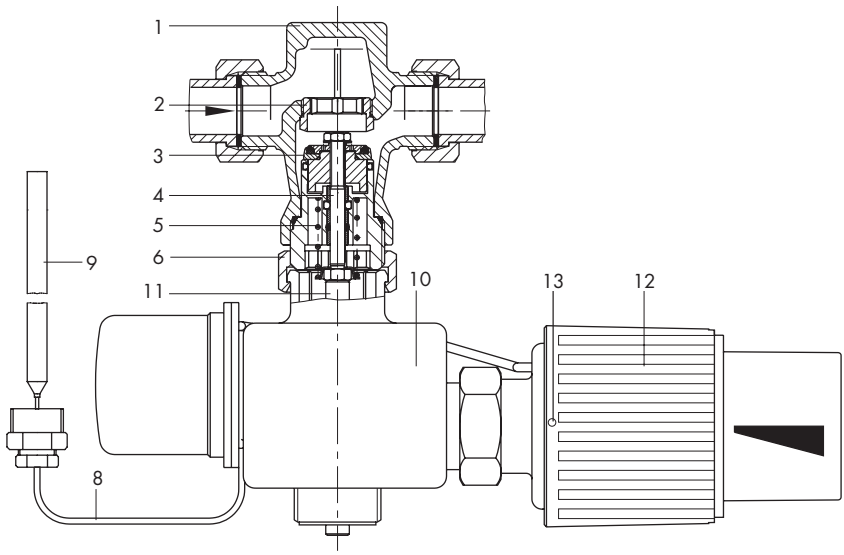
The connection of an additional thermostat converts the safety temperature monitor (STM) into a temperature regulator with safety temperature monitor (TR/STM).

The safety temperature monitor works 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 bellows of the operating element (10) and converted into a positioning force. The force is transferred over the pin (11) to the plug stem (4) of the valve and the plug (3). The position of the valve plug determines the flow rate of the heat transfer medium across the free area between the plug and valve seat (2).

The thermostat closes the valve when the temperature reaches the temperature limit adjusted at the limit adjustment (12). The safety temperature monitor resets itself automatically when the temperature has fallen to a value of approx. 5 K below the adjusted limit.

Note:
When adjusting the limit, the adjusted limit temperature must have a minimum temperature difference of 15 K to the set point of the temperature regulator.

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.



1 Valve body
2 Seat
3 Plug
4 Plug stem
5 Valve spring
6 Coupling nut (tightening torque 20 Nm)
8 Capillary tube
9 Temperature sensor
10 Operating element
11 Pin of operating element
12 Limit adjustment
13 Lead-seal hole

Fig. 1: *Functional diagram of the STM and valve*

5 Installation

See Fig. 1 on page 7.

The safety temperature monitor (STM) is always installed in the plant in combination with a valve or additionally with a temperature regulator to form a TR/STM.

The safety thermostat can be attached to the valve body either before or after the valve is installed in the pipeline.

Connect the operating element (10) to the valve body by tightening the coupling nut (6) with max. 20 Nm tightening torque.

Note:
Make sure the permissible ambient temperature of 50 °C is not exceeded at the site of installation.

- Choose a place of installation that allows you to freely access the regulator even after the entire plant has been completed.
- Install a strainer (e.g. SAMSON Type 2 N) upstream of the regulator.
- Flush the pipeline thoroughly before installing the regulator to ensure that any sealing parts, weld spatter and other impurities carried along by the process medium do not impair the proper functioning of the valve.
- The direction of flow must match the direction indicated by the arrow on the body.

NOTICE
Incorrectly installed regulator
The temperature regulator can be damaged.
- *Make sure the regulator is installed free of stress.*
- *Observe permissible mounting position.*

5.1 Additional components

5.1.1 Strainer (filter)

Install the strainer upstream of the temperature regulator.

- The flow of direction must correspond with the direction indicated by the arrow on the body.
- The filter element must be installed to hang downwards or sideways for applications with steam.

Tip:
Remember to leave enough space to remove the filter element for cleaning.

5.1.2 Shut-off valve

Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe. This allows the plant to be shut down for cleaning and maintenance, and when the plant is not used for longer periods of time.

5.1.3 Thermometer

To check the adjusted limit, we recommend installing a thermometer near the sensor.

5.2 Installing the temperature sensor

WARNING!
Do not separate the thermostat and the operating element (with capillary tube and temperature sensor).

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

Sensor in horizontal position or **with sensor tip pointing up** · Marked by an embossed 'o' on the screw gland.

To help align the sensor in the horizontal position, a marking bead (see Fig. 2) is located on the sensor. This marking must face upward.

Sensor in horizontal position or **with sensor tip pointing down** · Marked by an embossed 'u' on the screw gland. To help align the sensor in the horizontal position, a marking bead (see Fig. 2) is located on the sensor. This marking must face upward.

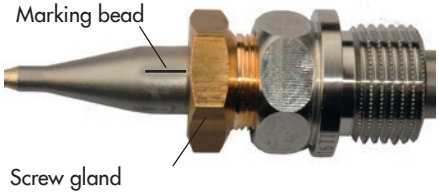


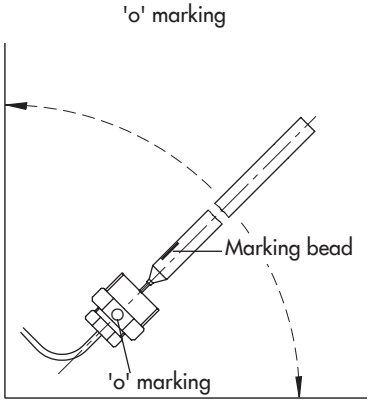
Fig. 2: *Sensor with marking bead*

➔ Weld a welding socket with G ½ female thread at the place of installation.

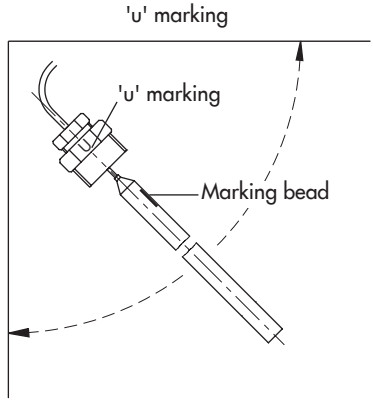
➔ The entire sensor with the marking bead visible must be immersed in the process medium.

➔ It must be installed in a location where overheating or considerable idling times cannot occur.

The screw gland seals off the sensor.



Tip of sensor **in horizontal position** or **pointing up**, with intermediate positions



Tip of sensor **in horizontal position** or **pointing down**, with intermediate positions

Fig. 3: *Installing the temperature sensor*

5.2.1 Capillary tube

Carefully run the capillary tube (8) without bending or twisting it. Avoid locations with considerable ambient temperature fluctuations along the entire length of the tube.

Note:
Do not damage or shorten the capillary tube. Roll up excess tube to form a ring. The smallest permissible bending radius is 50 mm.

6 Operation

6.1 Limit adjustment

Table 1: *Limit adjustment*

Limit value range	Scale intervals 0 1 2 3 4	Limit change per turn
		Approx.
60 to 75 °C	60 °C 75 °C	2.6 °C
75 to 100 °C	75 °C 100 °C	2.2 °C
100 to 120 °C	100 °C 120 °C	2.35 °C

Turn the black plastic adjuster according to the scale to adjust the required limit temperature (see Table 1).

The safety temperature monitor is adjusted to the limit value specified in the order. The setting is lead-sealed. If another value is to be adjusted, turn the black plastic adjuster to adjust the limit as required.

Slowly turn the adjuster clockwise to lower the temperature and counterclockwise to increase it. The limit can also be changed by turning the adjuster according to the specifications (limit change per turn).

Note:
When adjusting the limit, the adjusted limit temperature must have a minimum temperature difference of 15 K to the set point of the temperature regulator.

7 After-sales service

If the temperature deviates considerably from the adjusted limit, the seat and plug may leak due to dirt particles or natural wear. In case of a possible defect, check the regulator and replace it, if necessary.

Malfunctions may occur if the temperature sensor has been installed incorrectly. Ensure that the temperature sensor has been installed correctly.

Contact SAMSON's After-sales Service department for support concerning service or repair work or when malfunctions or defects arise.

E-mail

You can reach the After-sales Service Department at aftersalesservice@samson.

Addresses of SAMSON AG and its subsidiaries

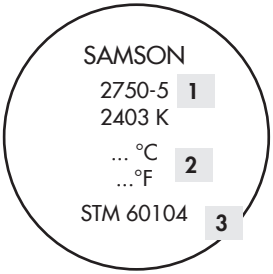
The addresses of SAMSON AG, its subsidiaries, representatives, and service facilities worldwide can be found on the SAMSON website (▶ www.samson.de) in all SAMSON product catalogs or on the back of these Mounting and Operating Instructions.

To assist diagnosis and in case of an unclear mounting situation, specify the following details (so far as possible). See General safety instructions:

- Type and nominal size (valve)
- Configuration ID (valve)
- Limit value range
- Temperature and process medium
- Is a strainer installed?
- Installation drawing showing the exact location of the regulator and all the additionally installed components (shut-off valves, pressure gauge, etc.)

8 Nameplate

Specifications on the scaled cap of the limit adjustment



1 Model no.
2 Range of temperature limit in °C und °F
3 Register number (type test according to DIN EN)

Specifications on the valve

SAMSON		**1**
2710 -	**2**	**3**
4		**5**
6		**7**

1 Type designation (valve)
2 Configuration ID
3 Date of manufacture
4 K_{VS}/C_V coefficient
5 Max. permissible temperature
6 Nominal pressure (valve)
7 Max. permissible differential pressure Δp

Fig. 4: *Nameplate*

9 Technical data

Table 2: *Technical data · All pressures (gauge)*

Type 2403 K Safety Thermostat for STM	
Connection	M32x1.5
Adjustment range of limit value	60 to 75 °C · 75 to 100 °C · 100 to 120 °C
Permissible ambient temperature	Max. 50 °C
Permissible temperature at sensor	25 K above the adjusted limit
Permissible pressure at sensor	25 bar
Capillary tube length	5 m
Compliance	CE · EAC

10 Dimensions

Connection between valve and STM
Tightening torque: 20 Nm

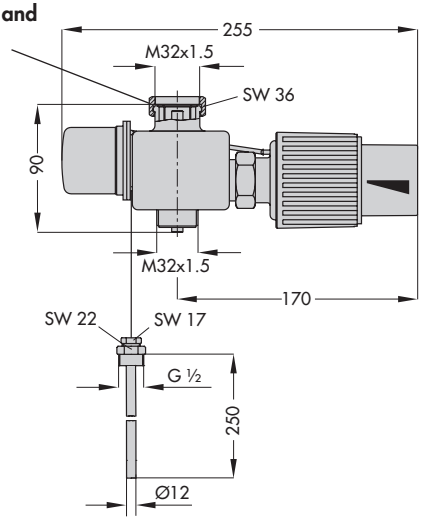


Fig. 5: *Dimensions · 2403 K STM*

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