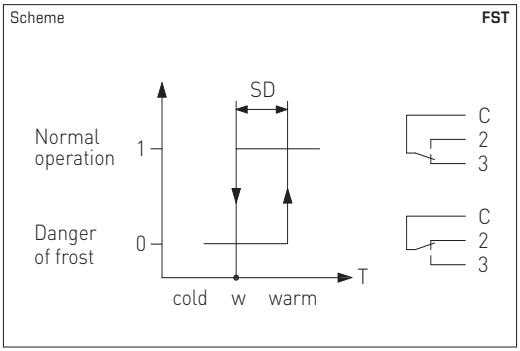
The mechanical frost protection thermostat / frost monitor **THERM**ASREG® **FST** with switching output, fully-active sensor rod, with automatic reset, or with mechanical locking and manual reset, is available with capillaries in lengths of 0.6 m, 1.8 m, 3 m, 6 m, or 12 m. This frost protection monitor is used for air- and water-side temperature monitoring at heat exchangers, water circulation systems, and heating registers to prevent freezing up and to avoid frost damages, e. g. in ventilation and air conditioning ducts. All devices are self-secure with sensor breakage detection. In case of damage to the capillary tube – membrane system, the relay automatically switches to heating function. **FST-3** can also be used for monitoring liquids. The sensor tube can be installed inside an immersion sleeve. Mounting clamps **MK-05-K** are included in the delivery.

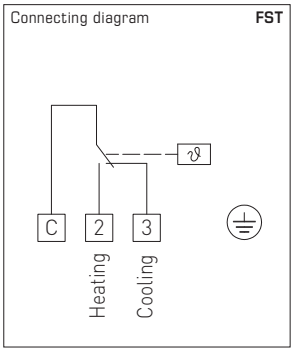
TECHNICAL DATA

Switching capacity:	10 (2) A, AC 250 V; because of gold-plated switching contacts also switching of signal voltages < 24 V
Setting range:	–10...+15 °C / +14 °F...+59 °F, factory setting to w = +5 °C (+41 °F)
Operating difference:	2 ± 1 K (3.6 ± 1.8 °F)
Reproducibility:	± 0.5 K (± 0.9 °F)
Contact:	dust-proof micro switch as single-pole potential-free changeover contact
Sensor responding length:	approx. 40 cm
Length of capillary tube:	see table of types (0.6...12 m)
Resetting:	**FST-xD** automatic **FST-xD-HR** manual
Permissible medium:	**FST-1D/5D/7D/8D** air **FST-3D** water
Ambient temperatures:	maximum operating temperature: +70 °C (+158 °F) minimum operating temperature: w + min. +2 °C (min. +3.6 °F) storage / transport: –30...+70 °C (–22...+158 °F) capillary: max. +150 °C (+302 °F)
Process connection:	by mounting clamps **MK-05-K** (included in the scope of delivery)
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	126 x 90 x 50 mm (Tyr 2)
Cable gland:	M 16 x 1.5; including strain relief
Other materials:	mechanical sheet metal parts: galvanised steel capillary tube: copper capillary tube filling: R 507 switching contacts: Ag / Ni (90% / 10%) gold-plated (3 µm)
Installation length:	arbitrary
Routing:	bending radius > 35mm admissible vibration load ≤ ½g admissible tensile load < 100N
Electrical connection:	0.14 - 2.5 mm²
Protection class:	I (according to EN 60730-1)
Protection type:	**IP 65** (according to EN 60529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU
FUNCTION	Contact C-2: danger of frost / sensor breakage Contact C-3: normal operation
ACCESSORIES	see table

THERMASREG® **FST** Frost protection thermostats, mechanical

Type / WG03B	Temperature Range	Thermal Operating Difference (fixed) approx.	Length of Capillary	Permissible Medium	Item No.
FST-xxD					**TW**
FST-1D *	–10...+15 °C	2 K (± 1 K)	6.0 m	air	1102-1021-0102-000
FST-3D *	–10...+15 °C	2 K (± 1 K)	1.8 m	air / water	1102-1023-0102-000
FST-5D *	–10...+15 °C	2 K (± 1 K)	3.0 m	air	1102-1022-0102-000
FST-7D *	–10...+15 °C	2 K (± 1 K)	12.0 m	air	1102-1025-0102-000
FST-8D	–10...+15 °C	2 K (± 1 K)	0.6 m	air	1102-1024-0102-000
FST-xxD-HR					**TB**
FST-1D-HR *	–10...+15 °C	2 K (± 1 K)	6.0 m	air	1102-1021-1102-000
FST-3D-HR *	–10...+15 °C	2 K (± 1 K)	1.8 m	air / water	1102-1023-1102-000
FST-5D-HR *	–10...+15 °C	2 K (± 1 K)	3.0 m	air	1102-1022-1102-000
FST-7D-HR *	–10...+15 °C	2 K (± 1 K)	12.0 m	air	1102-1025-1102-000
FST-8D-HR	–10...+15 °C	2 K (± 1 K)	0.6 m	air	1102-1024-1102-000
Features:	FST-x**D** FST-x**D-HR**	**TW** = temperature monitor (**automatically switching**) **TB** = temperature limiter (**manual reset**)			





FUNCTION

The switch inside frost protection thermostat **FST** responds (closes contact C - 2) when temperature falls below the preset temperature setpoint over a capillary tube length of at least 40 cm. Simultaneously contact C - 3 breaks and can be used as a signal contact. Resetting (closing contact C - 3) happens automatically when temperature rises above the preset setpoint value again (on type **FST - xR** resetting must be done manually by pressing the reset button).

The **FST** is "intrinsically safe", i.e., in the event of damage to the capillary tube-membrane system, it automatically switches to the heating function. Contact C - 2 closes and therefore can be used as operating contact. The air temperature is detected over the entire sensor length (capillary tube). The gas-filled (R 507) membrane system and the capillary tube constitute one measuring unit, which is mechanically coupled to the microswitch.

Capillary tube: The capillary tube is laid uniformly at the hot side of the air heater to be protected (in case of air coolers in front of the air cooler) at a distance of approx. 5 cm crosswise to the heat exchanger tubes over the entire area. For test purposes, it is recommended to make a loop of approx. 20 cm directly underneath the housing and before entering the air duct. To avoid damaging the capillary tube, a minimum bending radius of 20 mm must be observed. Installation is facilitated by using the mounting clamps available under accessories.

Frost simulation: The frost situation can be simulated and functioning of the device can be tested by dipping the capillary tube testing loop into a pot filled with ice water.

ACCESSORIES		
KRD-04	Capillary tube gland bracket	7100-0030-7000-000
MK-05-K	Mounting clamps (6 pieces) plastic (*= included in the scope of delivery)	7100-0034-1000-000
TH-MS-01	Immersion sleeves, brass, for **FST - 3** Installation length (EL) = 130 mm, flange = 10 mm, R1/2"	7100-0011-5402-000
TH-VA-02	Immersion sleeves, stainless steel **V2A** (1.4301), for **FST - 3** Installation length (EL) = 130 mm, flange = 10 mm, G1/2"	7100-0012-5402-000
WS-03	Weather and sun protection hood, 200 x 180 x 150 mm, stainless steel **V2A** (1.4301)	7100-0040-6000-000

(GB) General notes

Our "General Terms and Conditions for Business" together with the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" (ZVEI conditions) including supplementary clause "Extended Retention of Title" apply as the exclusive terms and conditions.

In addition, the following points are to be observed:

- These instructions must be read before installation and putting in operation and all notes provided therein are to be regarded!
- A suitable weather and sun protection hood must be used when installed outdoors.
- Ensure not to kink or squash the sensor element.
- Devices must only be connected to safety extra-low voltage and under dead-voltage condition. To avoid damages and errors at the device (e.g. by voltage induction) shielded cables are to be used, laying parallel with current-carrying lines is to be avoided, and EMC directives are to be observed.
- This device shall only be used for its intended purpose. Respective safety regulations issued by the VDE, the states, their control authorities, the TÜV and the local energy supply company must be observed. The purchaser has to adhere to the building and safety regulations and has to prevent perils of any kind.
- No warranties or liabilities will be assumed for defects and damages arising from improper use of this device.
- Consequential damages caused by a fault in this device are excluded from warranty or liability.
- These devices must be installed and commissioned by authorised specialists.
- The technical data and connecting conditions of the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.
- In case of any modifications made by the user, all warranty claims are forfeited.
- This device must not be installed close to heat sources (e.g. radiators) or be exposed to their heat flow.
  Direct sun irradiation or heat irradiation by similar sources (powerful lamps, halogen spotlights) must absolutely be avoided.
- Operating this device close to other devices that do not comply with EMC directives may influence functionality.
- This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes.
- Dimensions of enclosures or housing accessories may show slight tolerances on the specifications provided in these instructions.
- Modifications of these records are not permitted.
- In case of a complaint, only complete devices returned in original packing will be accepted.

If the sensor element's admissible load limits are exceeded, ensure to use an adequate support structure

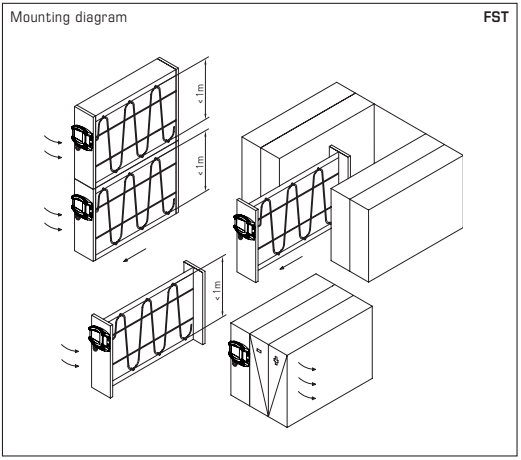
Notes on commissioning:

This device was calibrated, adjusted and tested under standardised conditions. When operating under deviating conditions, we recommend performing an initial manual adjustment on-site during commissioning and subsequently at regular intervals.

Commissioning is mandatory and may only be performed by qualified personnel!

These instructions must be read before installation and commissioning and all notes provided therein are to be regarded!

Mounting diagram **FST**



Notes regarding FST

A preset setpoint value can be lead-sealed at the adjusting screw. It is absolutely necessary to ensure that ambient temperature at the device does not drop below the preset setpoint temperature.

This device must be operated in a non-precipitating pollutant-free ambience.

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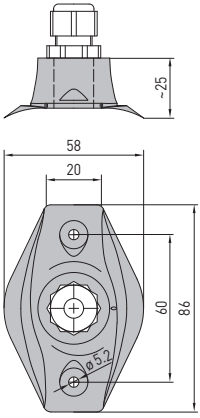
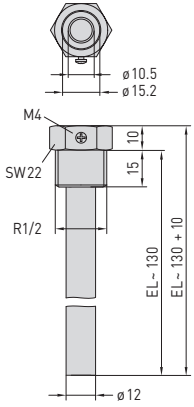
Zubehör
Accessories
Accessoires
Принадлежности

S+S REGELTECHNIK

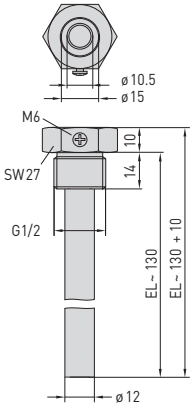
Maßzeichnung **KRD-04**
Dimensional drawing
Plan coté
Габаритный чертеж



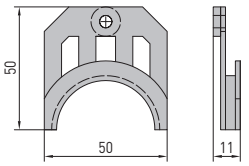
Maßzeichnung **THR-ms-01**
Dimensional drawing
Plan coté
Габаритный чертеж



Maßzeichnung **THR-VA-02**
Dimensional drawing
Plan coté
Габаритный чертеж



Maßzeichnung **MK-05-K**
Dimensional drawing
Plan coté
Габаритный чертеж



WS-03

Wetter- und Sonnenschutz
(optional)

Weather and sun protection hood
(optional)

Protection contre
les intempéries et le soleil
(en option)

Приспособление для защиты от непогоды и
солнечных лучей (опция)