

Frost protection thermostats, mechanical, one-step, with switching output

The mechanical frost protection thermostat/frost monitor THERMASREG® 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. THERMASREG® 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 250V ;
because of gold-plated switching contacts
also switching of signal voltages < 24 V
- Setting range: -10°C...+15°C / 14°F...59°F,
factory setting to w = 5°C (41°F)
- Operating difference:..... 2 ± 1K (3.6 ± 1.8°F)
- Reproducibility:..... ± 0.5 K (± 0.9°F)
- Contact:..... dustproof micro switch
as single-pole potential-free
changeover contact
- Sensor responding length:..... ca. 40 cm
- Length of capillary tube:..... see table of types (0.6...12 m)
- Resetting:..... FST-xD automatic
FST-xD-HR manual
- Permissible medium:..... air (FST-1/5/7/8) ; water (FST-3)
- 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)
- Process connection: by mounting clamps MK-05-K
(included in the scope of delivery)
- Connecting head:..... plastic, material polyamide, 30% glass-globe-reinforced,
colour pure white (similar RAL9010)
- Dimensions: 108 x 72.5 x 70 mm
- Other materials: mechanical sheet metal parts: galvanised steel
capillary tube: copper
capillary tube filling: R507
switching contacts: Ag / Ni (90% / 10%) gold-plated (3µm)
- Installation length: arbitrary
- Electrical connection:..... 0.14 - 2.5 mm²
- Cable gland: M20 x 1.5, including strain relief
- Protection class: I (according to EN 60730-1)
- Protection type:..... IP 65 (according to EN 60529)
- Standards: CE conformity, EMC directive 2004/108/EC,
low-voltage directive 2006/95/EC

FUNCTION:

- Contact:..... C - 3 danger of frost / sensor breakage
C - 2 normal operation

The switch inside frost protection thermostat FST responds (closes contact C - 3) when temperature falls below the preset temperature setpoint over a capillary tube length of at least 40 cm. Simultaneously contact C - 2 breaks and can be used as a signal contact. Resetting (closing contact C - 2) 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).

FST is "intrinsically safe", i.e. in case of damaging the capillary tube – membrane system, it switches automatically to heating function. Contact C - 3 closes and therefore can be used as operating contact. The air temperature is detected over the entire sensor length (capillary tube). The gas-filled (R507) 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 ca. 5 cm crosswise to the heat exchanger tubes over the entire area. For test purposes it is recommended to make a loop of ca. 20cm directly underneath the enclosure and before entering the air duct. To avoid damaging the capillary tube, a minimum bending radius of 20mm 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.



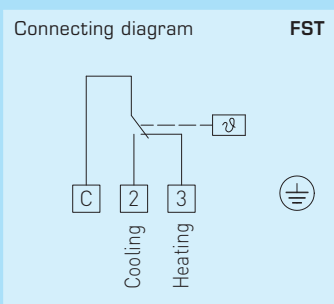
FST-1/5/7/8



FST-1/5/7/8HR

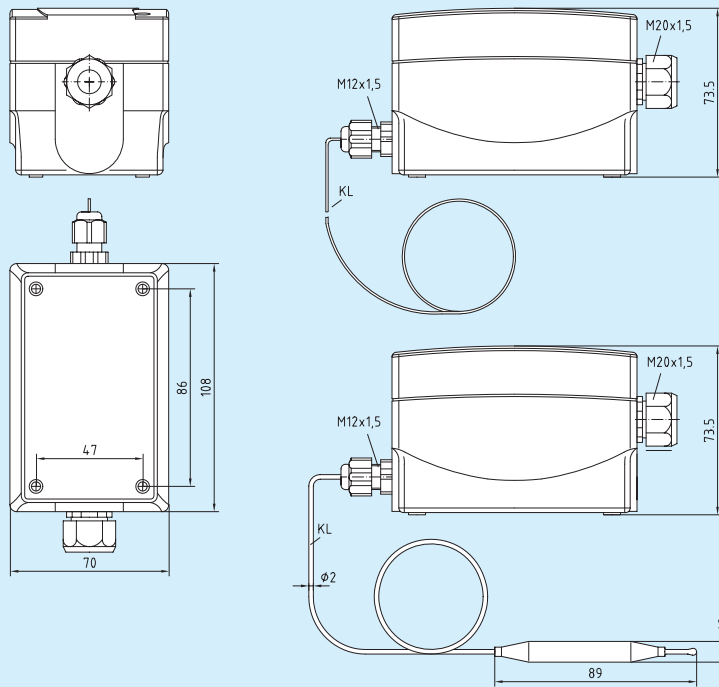


FST-3



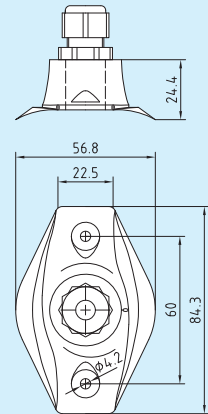
Dimensional drawing

FST-1/5/7/8
FST-3



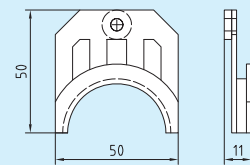
Dimensional drawing

KRD-04



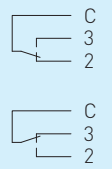
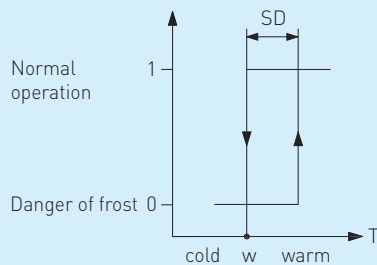
Dimensional drawing

MK-05-K



Scheme

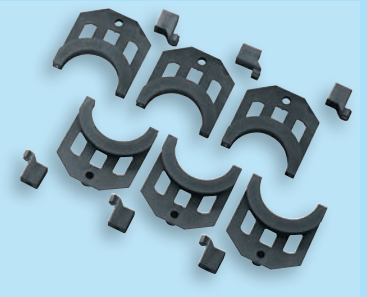
FST



KRD-04



MK-05-K



THERMASREG® FST, one-step, including mounting clamps

Type/WG2	Temperature Range	Steps	Features Control Mode	Length of Capillary	Permissible Medium
FST-1D	-10°C...+15°C	one-step	TW, automatic	6.0 m	air
FST-3D	-10°C...+15°C	one-step	TW, automatic	1.8 m	air / water
FST-5D	-10°C...+15°C	one-step	TW, automatic	3.0 m	air
FST-7D	-10°C...+15°C	one-step	TW, automatic	12.0 m	air
FST-8D	-10°C...+15°C	one-step	TW, automatic	0.6 m	air
FST-1D-HR	-10°C...+15°C	one-step	TB, manual rest	6.0 m	air
FST-3D-HR	-10°C...+15°C	one-step	TB, manual rest	1.8 m	air / water
FST-5D-HR	-10°C...+15°C	one-step	TB, manual rest	3.0 m	air
FST-7D-HR	-10°C...+15°C	one-step	TB, manual rest	12.0 m	air
FST-8D-HR	-10°C...+15°C	one-step	TB, manual rest	0.6 m	air
Accessories:	KRD-04 MK-05-K TH-ms-01 TH-VA-02 Immersion sleeves	Capillary tube gland bracket Mounting clamps (6 pieces) plastic (included in the scope of delivery) Immersion sleeves, brass, for FST-3 Immersion sleeves, stainless steel, for FST-3 see last chapter			
Note:	FST-xD FST-xD-HR	TW = temperature monitor (i.e.: automatically switching) TB = temperature limiter (manual rest)			