

FSK01

Hygrostat for controlling rel. humidity

thermokon
Sensortechnik GmbH

Data Sheet

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Application

Hygrostat (ON-OFF controller) to control the relative air humidity.

It is suitable nearly everywhere, where air humidity has to be controlled or monitored as ventilation and air conditioning, humidification and dehumidification equipment, in offices and computer rooms, foodstuffs and luxury foods, cooling rooms for fruit and vegetables, greenhouses for gardening use, textile industry, paper and printing industry, film industry, hospitals and similar applications.

Security Advice – Caution



The installation and assembly of electrical equipment should only be performed by authorized personnel.

The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90..265 V).

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual



Notes on Disposal

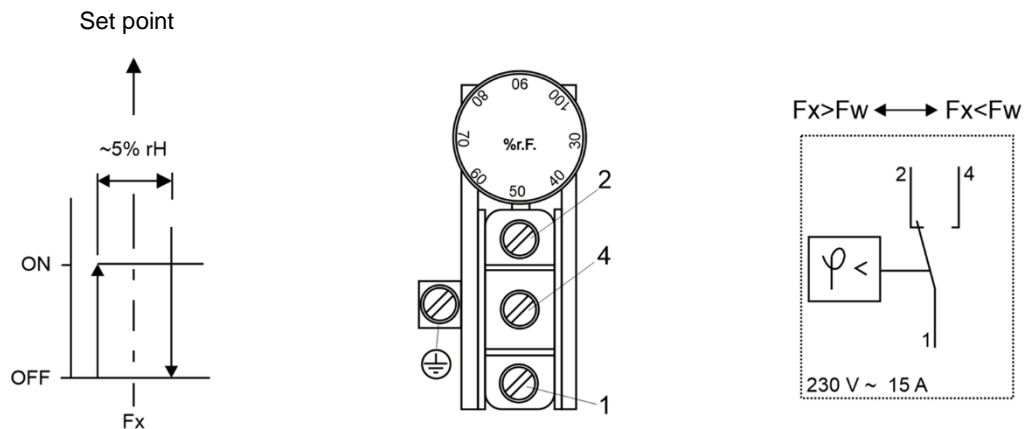
As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most Thermokon products contain valuable materials that should be recycled rather than disposed as domestic waste. Please note the relevant regulations for local disposal.

Technical Data

Measuring values	Humidity
Medium	Air, pressure-less, non aggressive
Output switch contact	Max. switch voltage 250 V ~ ¹⁾
Scale range humidity	30..100% rH
Measuring range humidity	35..95% rH non-condensing
Accuracy humidity	typ. $\pm 3,5\%$ (measuring range $>50\%$ rH), $\pm 4\%$ (measuring range $<50\%$ rH) Medium temperature coefficient $-0,2\% / K @ 20\text{ }^\circ\text{C}$ and 50% rH
Allowable air speed	8 m/sec, if accessory sensor protection is used 15 m/sec
Time constant T63 at $v=2\text{ m/sec}$	120 seconds
Sensor	Polyga® measuring element, water resistant, washable
Switching values	Switching difference 4% rH (at 50% rH) Breaking capacity of the changeover contact: Ohmic load ($\cos \phi=1$): 15 A 230 V ~, inductive load ($\cos \phi=0,7$): 2 A 230V ~ direct voltage: 0,25 A 230 V = at low voltage: 100 mA, 125 V ~ at average air pressure 430 m NN
Adjustment	
Enclosure	ABS, light grey
Protection	IP54 (mounted) according to EN 60529
Cable entry	M20, max. 1,5 mm ²
Connection electrical	Terminal block, max. 1,5 mm ²
Pipe	Stainless steel, length 220 mm, $\varnothing=16\text{ mm}$, contact material silver
Ambient condition	$-30..+60\text{ }^\circ\text{C}$, working temperature $0..+60\text{ }^\circ\text{C}$
Weight	approx. 700 g
Mounting	Slots in the base of the enclosure for duct mounting, console for wall mounting, Mounting position: Sensor vertically with pipe down or horizontally

¹⁾ Caution: 250 V only if no condensate gets into the measuring head - otherwise result may be voltage arcing.

Terminal Connection Plan



Fx	rel. humidity of the air (actual value)
Fw	humidity adjusted with the wheel (set point)
1-2	dehumidify
1-4	humidify

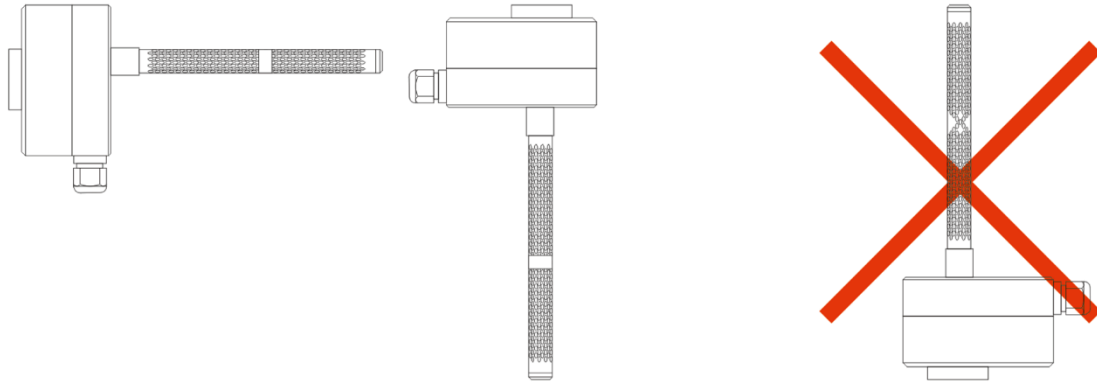
If the rel. humidity decreases below set point value Fw, contact 1-4 will open and contact 1-2 will close (dehumidify).

**When installing the device please ensure, that there is sufficient overcurrent protection (e.g. fuse).
A separation device (e.g. plug or switch) has to be installed.**



Mounting Advices

The hygrostat must not be exposed to any direct water contact, e.g. splash water when cleaning the air-conditioned room. When choosing the mounting place a representative air humidity measurement has to be regarded (measured humidity values at the mounting place should correspond to those of the room as far as possible). The hygrostat should be located within the air flow.



Condensed water must not get into the interior of the enclosure.

Description of the hygrostat

The humidity measuring element consists of several plastic fabric bands each with 90 individual fibres with a diameter of 3µm each. The fibres are provided with hygroscopic characteristics by a special process. The measuring element absorbs and desorbs moisture. The effect, swelling predominantly in longitudinal direction, is supplied to a micro switch with an extremely low switching travel via a suitable lever system. The measuring element responds rapidly and precisely to the change in air humidity. It is possible to adjust the lever system by setting the set point knob so that the micro switch is actuated when the set air humidity is reached.

The fan shaped measuring element is protected by a perforated sensor tube and is exposed to the housing. The hygrostats are designed for pressure-less systems. The mounting position should be chosen such that condensed water cannot get into the interior of the housing. The preferred mounting position is with the „sensor vertically with pipe down“ or „sensor horizontal“ (see mounting advices). In the mounting positions described above, a blanking plate in the sensor tube with a 0,8 mm diameter hole will prevent water getting in.

Operating information: When working within the upper range of operation, possible tolerances (measurement accuracy, switching difference and temperature coefficient) should be observed when adjusting the switch point.

Maintenance

The measuring element is **maintenance-free** in pure ambient air. Aggressive media containing solvent can cause measuring errors and failure, depending on the type and concentration. As with almost all humidity measuring elements, deposits which eventually form a water-repellent film over the sensor are harmful. Such substances are resin aerosols, lacquer aerosols, smoke deposits etc. The water-resistant property of the measuring elements allows cleaning to be carried out in water. Solvents cannot be used for this purpose. A light-duty detergent is recommended, but any residue should always be washed out thoroughly.

A special process ensures that the sensors have good long-term stability. Regeneration is not necessary, but is also not harmful.

Cleaning Process

1. Dip the sensor tube into a receptacle containing clean water (20 °C) and, with a gentle rotating motion, disperse the dirt deposits. If the dirt contains grease deposits, it is recommended that a mild detergent be added to the water. Cleaning should be carried out for no longer than some seconds.
Do not brush or treat with any other cleaning equipment!
Only the sensor tube can be dipped - not the enclosure (the sensor tube is open to the enclosure – 0,8 mm hole).
2. As detergents contain chemical substances, rinse carefully after cleaning.
Cleaning residues will decline the measured results.
3. Air drying. Where a measuring element is moistened with water, the device indicates 100% relative humidity. If necessary, it is possible to carry out sensitive recalibration at the adjusting spindle at the end of the sensor. This should only be done where there are large deviations. Slight movement of the adjusting spindle of a wet element causes the measured value in the dry area to be badly out. Here, there is an intensifying effect of the linearization (factor 6).

The measuring element must not be dried using warm or hot air (hair dryer). Indications of 98..100% relative humidity at the wet element are adequate. The accuracy in the dry area must be determined under normal climatic conditions.

Notes

The water absorption capacity of the air is influenced, amongst other things, by the temperature. This is a physical law (which can be seen from the hx diagram of Mollier). The higher the air temperature, the greater the volume of water vapour that can be absorbed up to saturation point (100% rH). If a hygostat is now calibrated at fluctuating air temperature, there is an irregular, non-homogeneous measured medium and there are automatically calibration errors. The table below shows the influence of the air temperature on air humidity.

	10 °C	20 °C	30 °C	50 °C
10% rH	±0,7% rH	±0,6% rH	±0,6% rH	±0,5% rH
50% rH	±3,5% rH	±3,2% rH	±3,0% rH	±2,6% rH
90% rH	±6,3% rH	±5,7% rH	±5,4% rH	±4,6% rH

If calibration occurs at an air temperature of 20 °C and 50% rH and at a temperature fluctuation of only ±1 K, then there will be a humidity fluctuation in the measured medium (air) of ±3.2% rH.

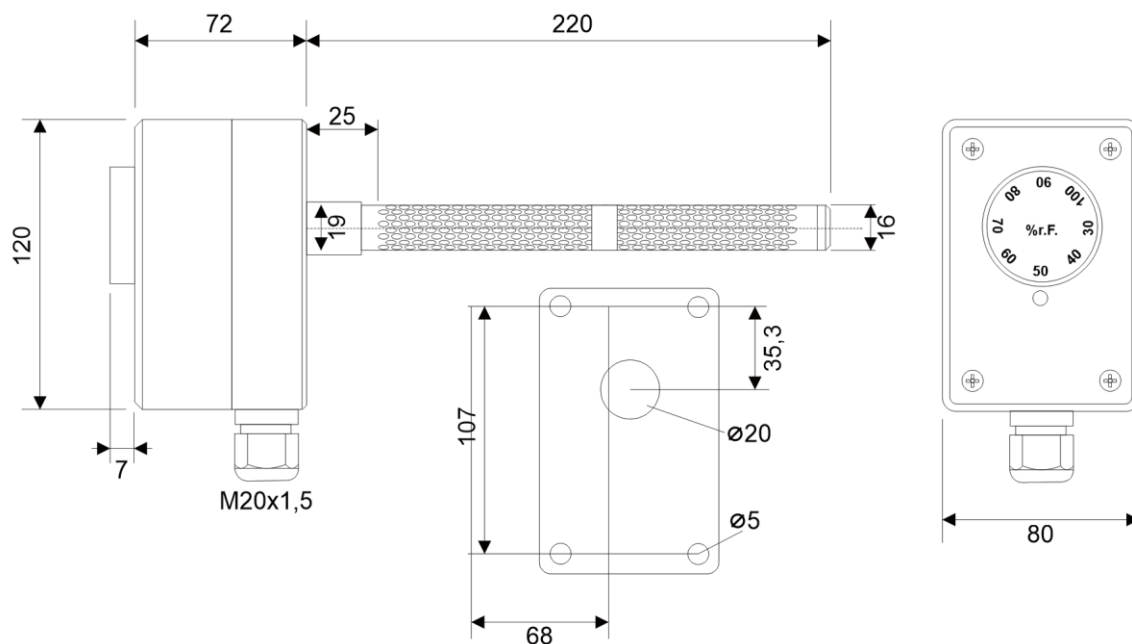
Calibration

Equipment is correctly set by the factory at a room temperature of 23 °C and 50% rel. humidity, relative to the average air pressure of 430 m NN. If, however, subsequent adjustment should be necessary, the following procedure should be observed:

1. Ensure that the ambient humidity and the ambient temperature are constant.
2. If possible, use a psychrometer for checking (no checking equipment with capacitive sensors).
3. Leave the equipment to be checked for at least 1 hour in a constant checking climate.
4. The adjuster screw is at the end of the sensor - fixed with screw securing lacquer. After removing the lacquer, the adjuster screw can be moved. A right-hand rotation means that the measured value goes down, and with a left-hand rotation the measured value goes up. After calibration, the adjuster screw should be secured again.

Note: Moving the adjuster screw will result in an expiration of warranty.

Dimensions (mm)



Accessories (optional)

PTFE-Filter

ArtNo. 429054

Sensor protection (wire mesh) for fan speeds 8..15 m/s

ArtNo. 231169

Wall mounting

ArtNo. 429030

Mounting flange MF19-(TPO)

ArtNo. 527705