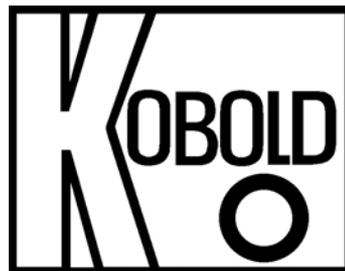


**Operating Instructions
for
Hygrostat**

Model: AFS-G1



1. Contents

1. Contents.....	2
2. Note	3
3. Regulation Use.....	3
4. Operating Principle.....	3
5. Instrument Inspection.....	4
6. Mechanical Connection.....	4
7. Electrical Connection	6
8. Operation / Configuration / Adjustments	7
8.1. Calibration.....	7
9. Technical Information.....	8
10. Maintenance	9
10.1. Cleaning Process.....	9
11. Dimensions	10
12. Declaration of Conformance	11

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2. Note

Please read these operating instructions before unpacking and operating the unit, and follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and with any applicable regulations concerning procedural safety and accident prevention.

When installed in machines, the measuring unit should be used only then when the machines fulfil the EWG-machine guide lines.

3. Regulation Use

Any use of the Hygrostat model: AFS-G1, which exceeds the manufacturers specification, may invalidate its warranty. Therefore any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

4. Operating Principle

The Hygrostat model: AFS-G1 serves as a two-position controller to regulate relative humidity indoors or in air ducts. The humidity sensing element in the sensor comprises several strips of plastic fabric, each with 90 fibres of 3 μm diameter. These plastic fibres undergo a special process to acquire hygroscopic properties, meaning that they will absorb and release humidity. The molecular structure of the fibers change when they absorb water, giving rise to a measurable change in length. The length of the plastic fibres is thus a measure of the relative humidity.

The swelling effect, acting primarily in longitudinal direction, is transferred over a suitable lever system to a microswitch with an extremely small changeover movement.

The measuring element reacts quickly and accurately to the change in air humidity. The setpoint is set with the setpoint button so that the microswitch is actuated by the lever system when the humidity setpoint is reached.

The special treatment of the measuring element ensures that its hygroscopic properties remain stable, and that its sensitivity is maintained until destroyed by external influence. Regeneration found in conventional instruments is not required, but is also not damaging.

The harp-shaped measuring element is protected by a perforated probe tube and is open to the housing. The Hygrostat is designed for use in unpressurized systems.

The humidity measuring equipment is designed with a perforated sensor tube. The humidity and temperature measuring elements are located in the interior of the sensor tube. The humidity measuring element is arranged axially and the temperature measuring element is seated sideways at the top or bottom between the perforation holes.

The measurement accuracy depends on the degree of pollution of the element. The humidity measuring element, in particular, loses its hygroscopic properties if the surface is covered with grease, soot, smoke deposits, paint, resinous substances, etc. By cleaning the elements, their function can be reproduced, but only if no damage is caused by acids, alkaline solutions or other aggressive substances.

5. Instrument Inspection

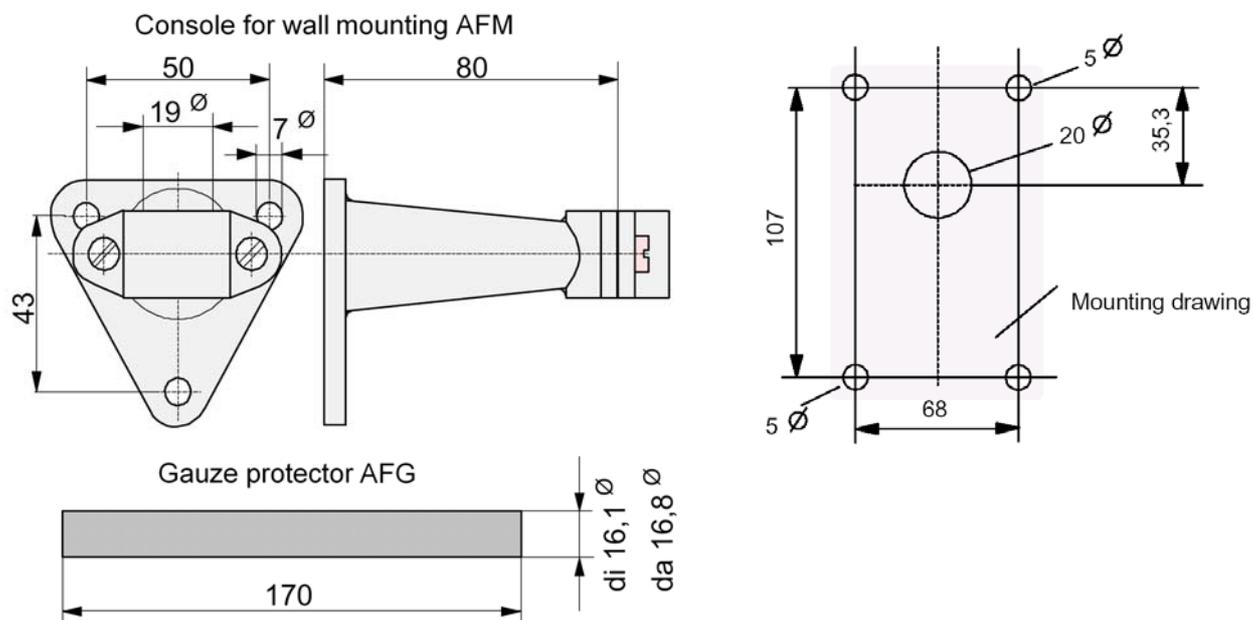
Instruments are inspected before shipping and sent out in perfect condition. In case of damage, please inform your parcel service/ forwarding agent immediately, as they are responsible for damage during transit. Should damage to a device be visible, we recommend a thorough inspection of the delivery packing

Scope of delivery:

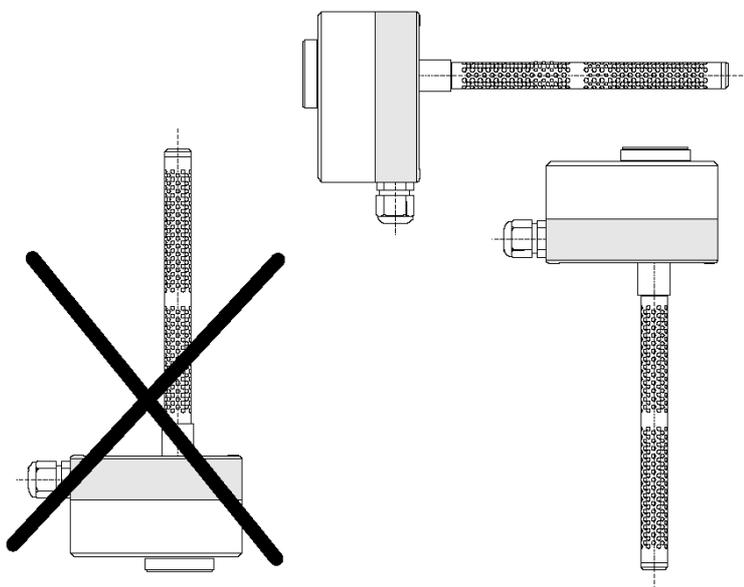
- Hygrostat model: AFS-G1
- Operating Instructions

6. Mechanical Connection

- The Hygrostat must not come into direct contact with water (e.g. splashed water when cleaning the climatic chamber etc.)
- The mounting location should be chosen so that a representative measurement of the air humidity can be guaranteed, i.e. the humidity readings at the mounting location should correspond to those in the room as much as possible.
- The Hygrostat should be exposed to the flow of air.
- The installation position should be chosen to prevent condensed water from entering the housing. The preferred installation position is "sensor vertically pointing downwards" or "sensor horizontal". A blanking plate in the probe with a 0,8mm diameter hole prevents penetration of water in the installation positions described above.

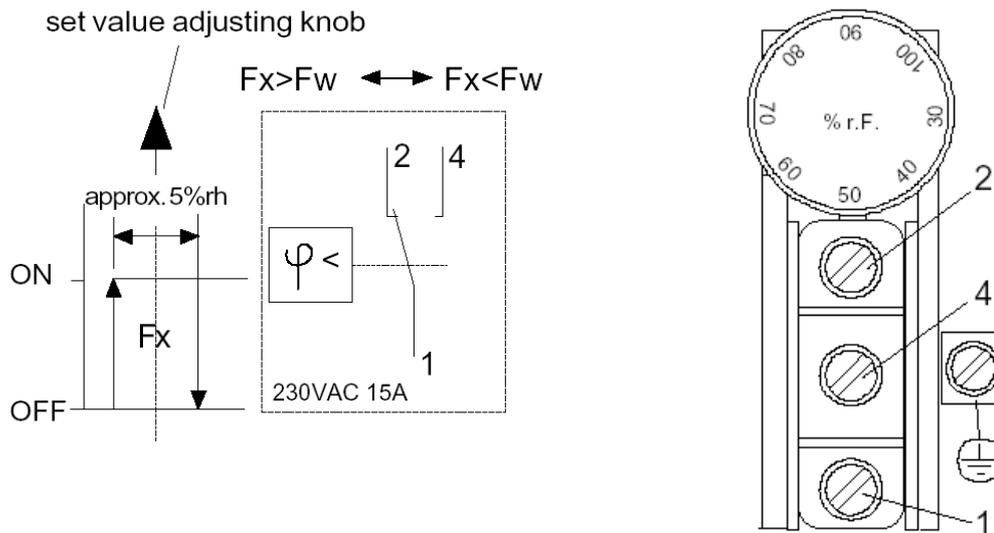


Installation position



7. Electrical Connection

When installing, ensure that there is sufficient overcurrent protection (e. g. fuse) for the device. In addition, a separation device (e. g. plug or switch) must be installed.



- F_x Relative humidity of the air (process value)
- F_w Adjusted humidity at the set value generator (set value)

If the relative humidity F_x falls below the adjusted set value F_w , then contact 1/2 opens and contact 1/4 closes.

8. Operation / Configuration / Adjustments

Attention! With restrictions in the upper range of operation, the possible tolerances (measurement accuracy, switching difference and temperature coefficient) should be observed when adjusting the switch point.

8.1. Calibration

The Hygrostats are factory set at a room temperature of 23°C and 50% relative humidity, relative to the average air pressure of 430m NN.

If however, subsequent adjustment should be necessary, the following procedure should be observed:

- Ensure that the ambient humidity and the ambient temperature are constant.
- If possible, use a psychrometer for checking (do not use equipment with capacitive sensors).
- Leave the equipment to be checked for at least *1 hour in a constant checking climate*.
- 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 again be secured.

Attention! Moving the adjuster screw nullifies the guarantee.

Important: 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 Hygrostat is calibrated at a fluctuating air temperature, there will be an irregular, non-homogeneous measured medium, resulting in calibration errors. The table below shows the influence of the air temperature on air humidity. If, for example, calibration occurs at an air temperature of 20 °C and 50% RH, and at a temperature fluctuation of just ± 1 °K, then there will be a humidity fluctuation in the measured medium (air) of $\pm 3.2\%$ RH.

	10°C	20°C	30°C	50°C
10%rh	$\pm 0,7\%$ rh	$\pm 0,6\%$ rh	$\pm 0,6\%$ rh	$\pm 0,5\%$ rh
50%rh	$\pm 3,5\%$ rh	$\pm 3,2\%$ rh	$\pm 3,0\%$ rh	$\pm 2,6\%$ rh
90%rh	$\pm 6,3\%$ rh	$\pm 5,7\%$ rh	$\pm 5,4\%$ rh	$\pm 4,6\%$ rh

9. Technical Information

Physical details:

Measuring range (scale range):	30...100%RH
Measuring accuracy:	>50%RH: $\pm 3.5\%$ RH <50%RH: $\pm 4.0\%$ RH
Adjustment range (range of operation):	35...100%RH
measuring medium:	air, non-pressurized, non-aggressive

Switch contact

Switching difference (microswitch):	approx. 3...6%RH
Max. voltage:	250 V AC (Caution! 250V only on condition that there is no build-up of condensate in the measuring head – otherwise voltage arcing may result)
Switching capacity of the changeover contact	
Ohmic load ($\cos \varphi = 1$)	15A AC 230V _{AC}
Inductive load ($\cos \varphi = 0,7$):	2A AC 230V
At low voltage:	100mA, 125V _{AC}
Contact material:	silver

General

Allowable ambient temperature:	-30...+60 °C
Allowable working temperature:	0...60 °C
Medium temp. Coefficient:	-0,2% RH/K (Relative to 20 °C and 50%RH)
Allowable air speed:	8m/sec with gauze protection (optional) 15m/sec
Time constant T ₆₃ at v=2m/sec:	120 sec
Sensor length:	220mm
Sensor material:	high-grade steel
Mounting:	Slots in the housing base for duct mounting console for wall mounting (optional)
Mounting position:	sensor vertically downwards or horizontally for conductor cross sections 1.5mm
Connecting terminals:	
Cable connection:	via twist nipple M 20x1,5
Housing:	ABS (Acrylnitril-Butadien-Styrol)
Type of protection:	IP 54
Weight:	approx. 0,7 kg

10. Maintenance

The measuring element is normally 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 that 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 sensors have good long-term stability. Regeneration is not necessary, but is also not harmful.

10.1. 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.

Attention! Do not brush or treat with any other cleaning utensils. Only the sensor tube should be immersed - not the housing.

The sensor tube is open to the housing interior (0.8mm hole)

2. As mild detergents are known to contain chemical substances, rinse carefully after cleaning. Cleaning residue will impair the measured result.
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 will cause the measured value in the dry area to be change greatly. Here, there is an intensifying effect of the linearisation (factor 6). 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.

Attention! The measuring element must not be dried using warm or hot air (hair dryer).

Cleaning should be carried out for no longer than 10 minutes.

11. Dimensions

