

# Channel humidity sensor

with capacitive measuring element,  
for determining the relative air humidity, optionally the temperature

## Characteristics

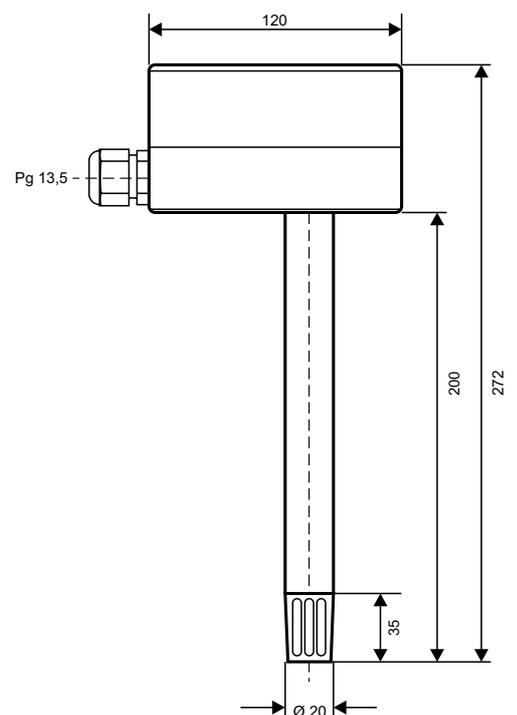
- Measuring range for humidity 0...100 % rh, optional for temperature 0...+40 °C, 0...+50 °C, -10...+90 °C, -30...+60 °C oder 0...+100 °C
- Operating range for humidity +10...+95 % rh, optional for temperature -30...+80 °C
- Measuring medium unpressurized, non aggressive and non condensing air
- Output 0...20 mA oder 0...10 V (3-/4-wire) or 4...20 mA (2-wire)
- Operating voltage 15...30 VDC / 24 VAC
- Measuring accuracy  $\pm 3,5$  % rh, optional for temperature  $\pm 0,8$  K



## Description

The humidity sensor measures the air humidity by means of a humidity dependent capacitor. The capacitive humidity measuring element, manufactured with thin-film technology, is composed of a carrier panel, on which the electrodes are deposited, topped by a hygroscopic polymer layer. The hygroscopic polymer layer absorbs the water molecules out of the medium (air) to be measured, or delivers them and consequently alters the capacity of the capacitor. In the following electronic circuit the alteration of the capacity is processed into the standardised signals 0...20 mA, 0...10 VDC or 4...20 mA by an integrated signal pre-processing. The measuring element is protected by a protecting basket. The sensors are designed for an unpressurized system, the measuring medium is non-aggressive and non-condensing air. Optionally the sensors have a semiconductor temperature sensing device in order to acquire the temperature simultaneously. Its measuring values are also converted into the standardised signals 0...20 mA, 0...10 VDC or 4...20 mA.

The measuring element is maintenance-free, when used in clean air circulation. Aggressive media and media containing solvents can cause, depending on kind and concentration, different measuring errors and failures. Avoid direct exposition to sunbeams. Precipitates, which leave a water-rejecting film on the top of the sensor, (this valid for all kinds of humidity sensors with hygroscopic measuring element) are harmful, as for example resin aerosols, lacquer aerosols, fuigants and so on.



---

## Technical Data

<b><u>Input</u></b>	Humidity measuring range :	0...100 % rh
	Operating range of humidity:	10...95 % rh
	Measuring medium:	air, unpressurized, non aggressive, non condensing
	Measuring temperature ranges: (Option)	0...+40 °C, 0...+50 °C, -10...90 °C, -30...+60 °C, 0...+100 °C
	Operating temperature: (Option)	-30...+80 °C

<b><u>Output</u></b>	Output:	0...20 mA, 0...10 V (3-/4-wire) 4...20 mA (2-wire)
	Max. load (?) for current output:	500 Ohm
	Min. load resistance for voltage output:	10 kOhm
	Self-consumption per range (4-wire):	15 mA

<b><u>Accuracy</u></b>	humidity measuring accuracy:	± 3,5 % rh (between 0...+60 °C)
	Temperature Coeff.:	0,05 % rh/K related to 20 °C and 50 % rF
	half-life value	approx. 10 sec (at v = 2 m/sec)
	temperature measuring accuracy: (Option)	± 0,8 K
	Linearity error:	< 0,5 %

<b><u>Power supply unit</u></b>	Operating voltage:	15...30 VDC - optionally 24 VAC (only with 3- / 4-wire)
---------------------------------	--------------------	--

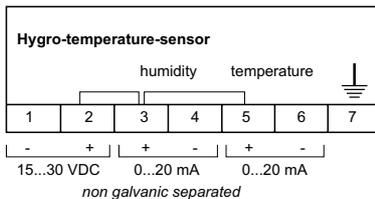
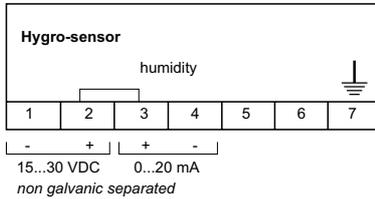
<b><u>Surrounding temperature</u></b>	Permissible ambient temperature:	-30...+80 °C
	Permissible ambient temperature at the case:	-10...+60 °C
	Permissible speed of air:	15 m/sec

<b><u>Dimensions</u></b>	Case:	120 x 80 x 72 mm
	Material of case:	ABS
	Colour of case:	light grey
	Length of sensing device:	200 mm
	Material of sensing device:	aluminium anodized - optionally with ventilated tube to improve aeration
	Degree of Protection:	IP 64
	Weight:	approx. 0,3 kg
	Fixing:	bore holes in bottom of case for channel assembly - optionally with console for wall assembly
	Terminals:	Supply terminals in case for max. 1,5 mm <sup>2</sup>

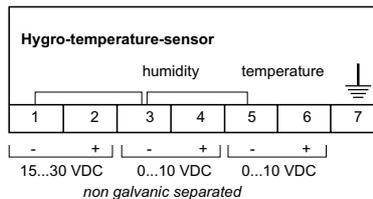
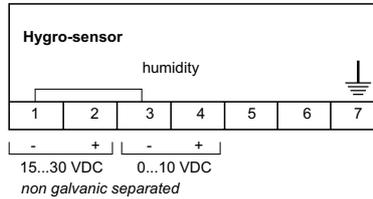
# Operating/Adjustment hints

## Pictures of connections

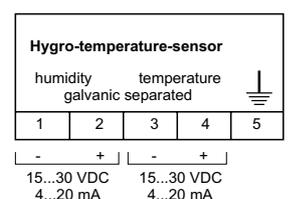
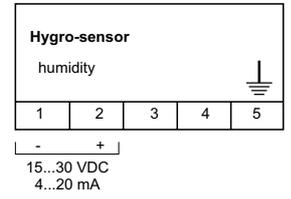
### 4-wire-system



### 3- / 4-wire-system



### 2-wire-system



## Installing hints

Troubles during installations can frequently happen. With correct installation the troubles can be widely prevented. However, some basic rules should be followed:

In order to avoid troubles, an interference elimination according to VDE 0875 and VDE 0874 has to be preformed. Each trouble has to be eliminated basically by its origin. The interference unit here can operate most efficiently. Troubles can also occur at the signal wires by electromagnetic fields. The EMV-law regulates the appropriate preventive actions. All sensors are designed for EN 50081-2 and EN 50082-2 (for industrial purposes). In addition to it, other preventive precautions have to be taken:

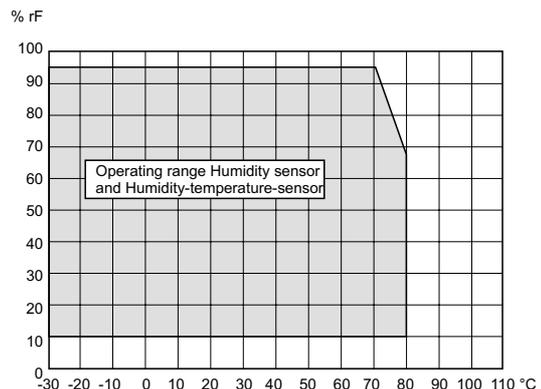
- Inevitable sources of interference should be spatially isolated from the control system.
  - Data- and signal lines must not be placed parallel to control-, system- and power lines.
  - For the data- and signal lines shielded cabel has to be used and the shielding has to be connected to the ground terminal. It should be considered that a forbidden ground circuit with a second connection to ground and fault current should not occur.
  - For the devices with mains supply it is recommended to place a separated line.
  - Consumers as contactors, electrovalves and so on generate induction voltages at the switch process which can cause interferences. There are plenty of protection- and non-interference components which give best results when directly connected to the interference source.
- An appropriate interference elimination has also the positive effect that components as relays, miscrowitches and so on can have a longer life span.

Further difficulties can occur during the installation when signal lines are brought together with common lines. It is definitely to check whether it is allowed. This can cause troubles, especially at the installation of devices from different manufacturers. However, there are also isolating amplifiers which can correct the problem.

## Cleaning hints

The top surface of the measuring element should not be touched. The top surface can be washed with distilled water. Solvents should not be used for cleaning. The correct measuring values are set back after the water is perfectly dried.

## Appropriate range



## Ordering code

**F S X X X X X X XXX**

No.	Input	Output	Operating voltage	Sensing device	Fixing		Measuring range
0	0...100 % rh	0...20 mA	15...30 VDC	aluminium anodized	channel assembly		please signalize
1	0...100 % rh 0...+40 °C	0...10 VDC	24 VAC	with ventilated sensor	with console f. wall assembly		for example 0...+50 °C
2	0...100 % rh 0...+50 °C	4...20 mA					
3	0...100 % rh -10...+90 °C						
4	0...100 % rh -30...+60 °C						
5	0...100 % rh 0...100 °C						