

# Multifunctional humidity and temperature transmitter HYGROPHIL®-K 4326-31

Temperature Range -40 ... +180 °C.

Very easy mounting, fast and easy service and replacement.

On-site-calibration.

Chemical resistance against Cl<sub>2</sub> and SO<sub>2</sub> and other mediums.

Best accuracy over whole temperature range.

Optional pressure tight from 0,01 to 15 bar.



## Application

HYGROPHIL®-K 4326-31 is a combination of a high quality capacitive humidity-sensor and the newest microprocessor technology. These are the guarantee for best accuracy, excellent long-term stability, small hysteresis and high resistance to pollutants. The HYGROPHIL®-K 4326-31 offers easy installation and on-site adjustment. These features guarantee a simple service and a high availability even in harsh industrial applications.

The actual measured or calculate data can be indicated on the optional integrated display.

Some of typical applications are:

- **Chemical industry**
- **High end HVAC**
- **Drying processes**
- **Oven processes**
- **Pharmaceutical industry**
- **Meteorology**
- **Green houses**

## Function

The capacitive humidity sensor is produced in modern thin film technology. Due to careful selection of materials, to state-of-the-art production technology and a long experience in thin film technology, all humidity sensors show an excellent long-term stability, highest reproducibility of the sensor characteristics, are wettable and very resistant to pollution.

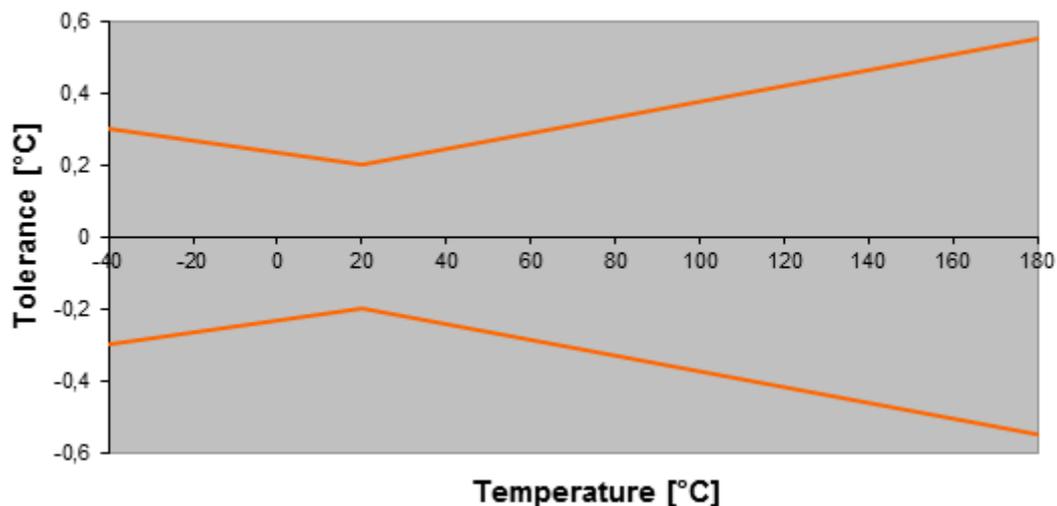
The capacitive humidity sensor is in fact a plate capacitor. A polymer layer is placed between a metal electrode and a coated glass substrate. The dielectric permittivity  $\epsilon$  of the polymer depends on its water content, that means it depends on relative humidity RH.

For an optimal humidity exchange between the polymer layer and the surrounding air, the metal electrode is a porous layer of 0.1 - 1 $\mu$ m. The absence of additional isolation layers leads to a high sensitivity.

- **Measured and calculated values:**  
RH, TT, DT, HT, VP, MH, ...
- **Optional with display**
- **Two analog outputs and serial interface RS 232 or optional RS485**
- **For hard mechanical and chemical stress with a high resistance sensor which can be displaced 20m from the transmitter**
- **Two point calibration**
- **MIN/MAX-function**

## Technical Data

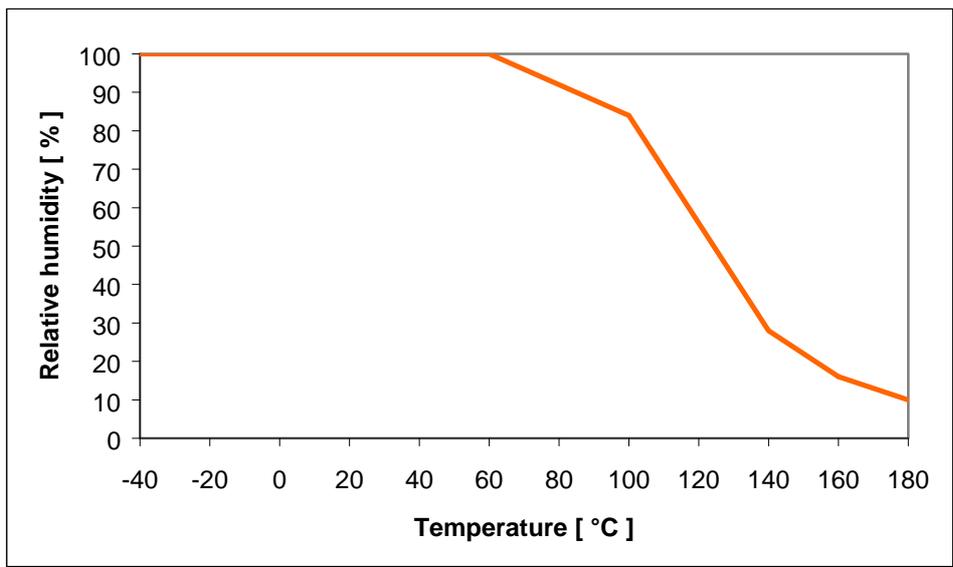
Measured quantities		
<b>Relative humidity</b>		
Humidity sensor	standard or coating (for aggressive mediums)	
Working range	0...100 % RH (confirm to the working range of the humidity sensor, see enclosed diagram)	
Accuracy incl. hysteresis and nonlinearity with:		
- special calibration against certified standards	± 1 % RH (0...90 % RH)	± 2 % RH (90...100 % RH)
- standard calibration	± 2 % RH (0...90 % RH)	± 3 % RH (90...100 % RH)
Guaranteed accuracy limits - GAL 23 according to standard NFX15.113	for range 0-90 % RH 2,35 % RH for range 0-100 % RH 2,96 % RH	
Temperature dependence electronics	typical ± 0,01 % RH/°C	
Temperature dependence sensing probe	typical ± (0,002+0,0002 x RH[%] x ΔT [°C])    ΔT = T - 20°C	
Response time t <sub>90</sub> ( metal grid filter )	< 15s	
<b>Temperature</b>		
Temperature sensor element	Pt 1000 (class A, DIN EN 60751)	
Working range sensing head	-40...180 °C (optional °F)	
Temperature dependence of electronics	typical 0,005 °C/°C	
<b>Accuracy (typical)</b>		



Outputs		
Two analog outputs (Please advise the requested type and value with order)	5 V 0 - 10 V 0 - 20 mA 4 - 20 mA	-1 mA < IL < 1 mA -1 mA < IL < 1 mA RL < 350 Ohm RL < 350 Ohm
Serial interfaces	RS232 or optional RS485	
<b>Values and ranges which can allocate to the analogue outputs</b>		
Relative humidity RH	0 ... 100 %	
Temperature TT	-40 ... 180 °C	
Dew point DT	-80 ... 100 °C ( Frost point FP -80 ... 0 °C )	
Humid temperature HT	0 ... 100 °C	
Water vapor pressure VP	0 ... 1100 mbar	
Mixed humidity MH	0 ... 1000 g/kg	
Absolute Humidity DV	0 ... 700 g/m <sup>3</sup>	
Specific enthalpy h	0 ... 2800 kJ/kg	

<b>General</b>	
supply voltage	SELV 8 ... 48 V DC SELV 12 ... 35 V AC
Current consumption 2 x Voltage output 2 x Current output	for 24 V DC/AC:      typical 40 mA typical 80 mA
Housing / protection class	PC / IP65
Pressure range for pressure tight probe	0,01 ... 15 bar (option)
Cable gland	M16 x 1,5      (optimal with connectors)
Electrical connection	screw terminals max. 1,5 mm <sup>2</sup>
Display (optional)	graphical LCD display (128 x 32 pixels ) with integrated push-buttons for selecting parameters and MIN / MAX function
Sensor protection	sintered stainless steel filter, PTFE or metal grid filter
Alarm outputs	2 x 1 switch contact 250 V AC / 6 A 28 V DC / 6 A
Working and Storage temperature range	-40...+60 °C
Working and Storage temperature range with display	-20...+50 °C
CE compatibility according	EN61000-6-2 EN50081-1      EN61010-1

**Humidity Sensor - Working Range**



The working range of the humidity sensor element is shown in terms of humidity / temperature limits.

Although the sensor would not deteriorate beyond the limits, their performance can only be specified within the limits of the working range.

**High Humidity Calibration**

For applications with a steady climate of > 90%RH we recommend a special high humidity calibration.

**Dimensions**

Sensor	diameter:	12 mm
	filter length:	32 mm
	sensor length:	50 / 200 / 400 mm
Transmitter		135 x 90 x 66,5 mm

## Ordering Guide

HYGROPHIL K 4326-23		SNR: 631	x	731	x	x	x	x	x	x	x	x
<b>Consisting of sensor and transmitter</b>												
Model	Standard	1										
	Coated humidity sensor	2										
Display	NO			0								
	YES			1								
Filter	Sintered stainless steel filter 10 µm					1						
	PTFE					2						
	metal grid filter stainless steel					9						
Connector	Screwed cable gland							0				
	1 plug for power supply and outputs							1				
	1 plug for power/outputs and RS232 via screwed cable gland							2				
	2 plugs for power/outputs and RS485							3				
Calibration	Standard							1				
	High humidity (> 90 % RH)							2				
Interfaces	RS232								2			
	RS232 and limit values								3			
	RS485								4			
Output	0 ... 5 V									1		
	0 ... 10 V									2		
	0 ... 20 mA									3		
	4 ... 20 mA									4		
Cable length	2 m										2	
	5 m										5	
	10 m										0	
	20 m										8	
Sensor length	65 mm											5
	200 mm											1
	200 mm pressure tight with screw thread											2
	400 mm											3
	1000 mm (= max. Length)											9

## Spare parts and accessories

	Order-no.:
Mounting flange (stainless steel)	215743
Power supply 230 VAC for mounting rail, type 5906-7, 24V/300mA	216614
Sintered stainless steel filter, for high mechanical stress and dirt, not considering	217344
PTFE filter 50 µm for high chemical resistance, high temperature to 180 °C	217345
Metal grid filter stainless steel (inside PC cabinet) Suitable for high temperature (180 °C) and for high humidity applications	295420
Test certificate confirm to DIN EN 10204-2.3 ISO 9001	216607

	Order-no.:
Calibration unit horizontal	216301
Calibration unit vertical	215742
Humidity standard 10% RH (box with 5 units)	217364
Humidity standard 35% RH (box with 5 units)	215744
Humidity standard 50% RH (box with 5 units)	222952
Humidity standard 80% RH (box with 5 units)	216608
Humidity standard 95% RH (box with 5 units)	222951



Calibration unit horizontal



Humidity calibration solution with certificate

The humidity transmitters as all other measuring instruments shall be periodically checked and eventually adjusted.

The calibration device allows the sensor probes to be tightly installed so that the measurement is not influenced by the surrounding air. A textile pad is placed in the chamber of the calibration device and is saturated with a solution of a known humidity value. In this manner the humidity transmitter can be accurately calibrated.

Non saturated lithium chloride solutions serve as humidity standards. These solutions are available in sets of five sealed ampoules, which may be stored an indefinite time. The lithium chloride solutions are non-harmful as they do not produce toxic fumes. Skin contact with them is likewise non-harmful. They are dangerous only if swallowed in large quantities.