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HLX211

Humidity and Temperature Sensor for Continuous High Humidity

The HLX211 is dedicated for accurate and long term stable measurement under continuous high humidity (>85 % RH) and condensing conditions in demanding climate control. It features a heated humidity, and an interchangeable temperature (T) probe.

Reliability

Excellent performance of HLX211 even in condensing polluted, aggressive environment is ensured by the combination of IP65/NEMA 4 enclosure, encapsulated electronics inside the humidity probe and the long-term stable HCT01 sensor with proprietary coating.

Versatility

All measured and calculated data is available on the Modbus RTU interface whereas two of the values are available on the analogue voltage or current (3-wire) output. Up to three values can be shown simultaneously on the illuminated display.

Configurable and Adjustable

An optional USB configuration adapter and the free EE-PCS Product Configuration Software facilitate the configuration of the HLX211 as well as the RH and T adjustment. The T probe can also be separately adjusted, the reference can be a high accuracy dry block calibrator.

Applications

- Fruit and vegetable storage
- Cooling, ripening and environmental chambers
- Green houses and incubators
- Mushroom industry

Features

Opening appropriate for 1/2" US conduit fitting

External mounting holes
- » Mounting with closed cover
- » Electronics protected against construction site pollution
- » Easy and fast mounting

Electronics on the bottom of the PCB
- » Optimum protection against mechanical damage during installation

Cast Electronics
- » Mechanical protection
- » Condensation-resistant

Heated sensing head
- » Best performance and long term stability under continious high RH and condensing conditions

Humidity sensor HCT01
- » Protected solder pads
- » Tested according to automotive standard AEC-Q200

Display
- » Shows up to 3 measurands
- » Backlight

Smooth cover surface
- » No accumulation of dust in protruding edges
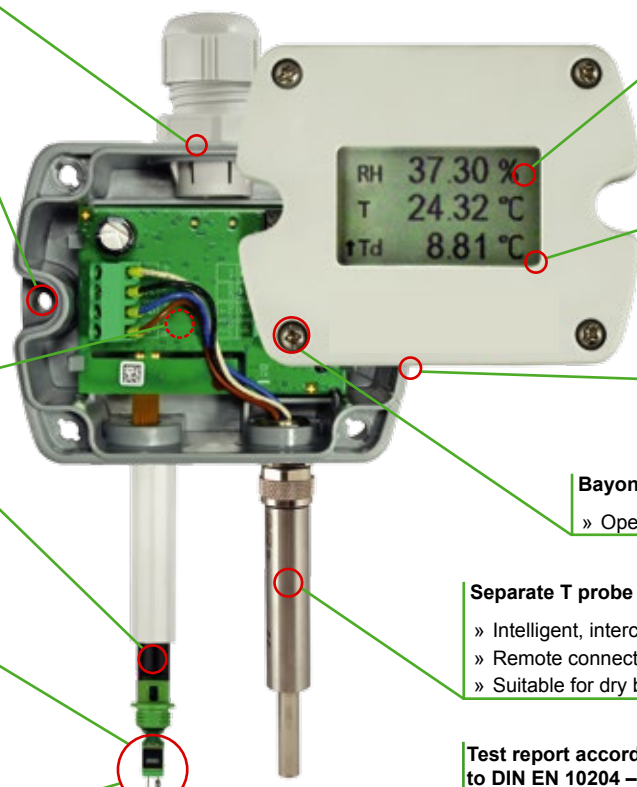
IP65 / NEMA 4 Enclosure

Bayonet Screws
- » Open/closed with a ¼ rotation

Separate T probe HLX07-MT
- » Intelligent, interchangeable T probe
- » Remote connection possible
- » Suitable for dry block calibrator

Test report according to DIN EN 10204 – 3.1
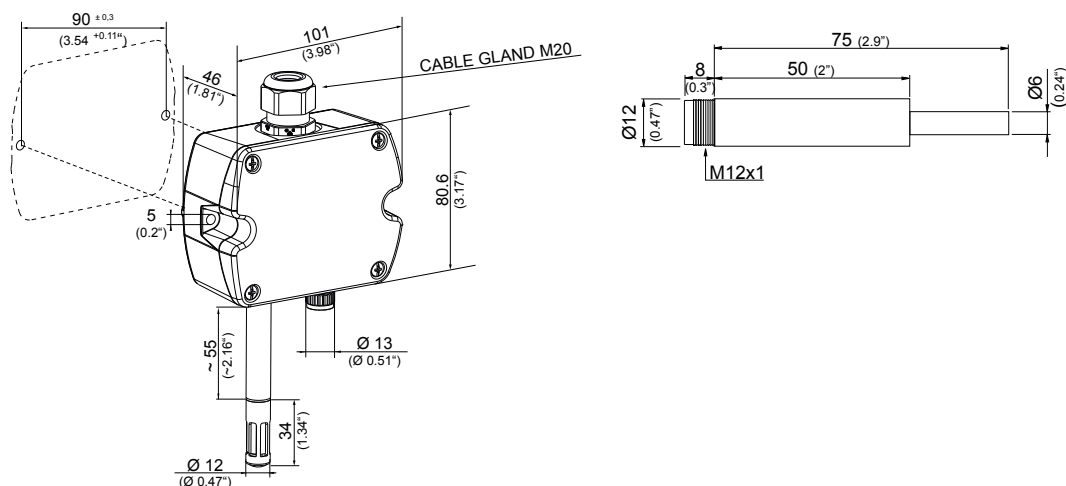
Protective Sensor Coating

The HLX proprietary sensor coating is a hygroscopic layer applied to the active surface of the HCT01 sensing element. The coating extends substantially the life-time and the measurement performance of the sensor in corrosive environment (salts, off-shore applications). Additionally, it improves the sensor's long term stability in dusty, dirty or oily applications by preventing stray impedances caused by deposits on the active sensor surface.
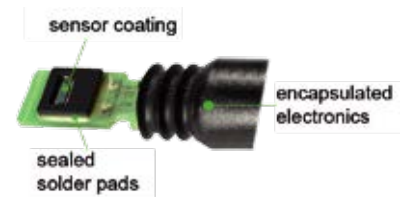
Operation Principle

The humidity probe is continuously heated for avoiding the effects of condensation and high humidity onto the sensing elements, such as corrosion, high humidity drift or stray impedances. Thus, the probe heating leads to outstanding long term stability. Based on the measured RH and T values, the HLX211 calculates the dew point temperature Td whereas the separate, interchangeable T-probe measures the ambient temperature. Ultimately, out of Td and T, the device calculates the relative humidity RH as well as several other parameters like absolute humidity, mixing ratio, wet bulb temperature or enthalpy.

Dimensions in mm (inch)

Technical Data

Measurands

Relative Humidity (RH)

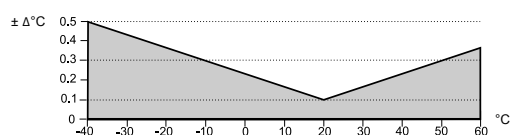|	
Sensor	Sensor HCT01-00D, protected by E+E proprietary coating
Working range	0...100 % RH
RH accuracy[1] (incl. hysteresis, non-linearity and repeatability)	±(1.3 + 0.007*measured value) % RH -5...30 °C (23...86 °F)

Temperature (T)

Sensor	Pt1000 (tolerance class A, DIN EN 60751)
T-accuracy (at 20 °C (68 °F) : ±0,1 °C)	

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[1] Traceable to intern. standards, administrated by NIST, PTB, BEV,...
   The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation).
   The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

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Outputs

Analogue output	0-5 V / 0-10 V	-1 mA < I_L < 1 mA	I_L = load current
(RH: 0...100 %; T: see ordering guide)	0-20 mA / 4-20 mA (3-wire)	R_L ≤ 500 Ohm	R_L = load resistor
Digital interface	RS485, Modbus RTU, max. 32 unit load devices in one bus		

General

Power supply (Class III) 〔Ⅲ〕   15 - 35 V DC[1] or 24 V AC ±20 %

Current consumption at 24 V

	AC		DC	
	without Display	with Display	without Display	with Display
Voltage ouput	max. 38 mA$_{rms}$	max. 49 mA$_{rms}$	max. 13 mA	max. 19 mA
Current ouput	typ. 75 mA$_{rms}$	typ. 85 mA$_{rms}$	max. 34 mA	max. 40 mA
Digital interface	typ. 23 mA$_{rms}$	typ. 40 mA$_{rms}$	typ. 8 mA	typ. 17 mA

Display	1, 2 or 3 lines, user configurable, with backlight
Connection	Screw terminals, max. 1.5 mm2
Enclosure material	Polycarbonate, UL94V-0 (with display UL94HB) approved
T-probe material	Stainless steel 1.4571
Protection class	IP65 / NEMA 4
Cable gland	M20 x 1.5
Electromagnetic compatibility	EN61326-1
(Industrial Environment)	EN61326-2-3
Temperature range	Operation / storage: -40...60 °C (-40...140 °F)
Temperature range with display	Operation: -20...50 °C (-4...122 °F)
	Storage: -20...60 °C (-4...140 °F)

CE

1) USA & Canada: class 2 supply required, max. supply voltage 30V

Ordering Guide

				HLX211		
Hardware	**Model**	humidity + temperature		**M1**		
	Output	0-5 V		**A2**		
		0-10 V		**A3**		
		0-20 mA		**A5**		
		4-20 mA		**A6**		
		RS485 - Modbus RTU[1]				**J3**
	Display[2]	none		**no code**		
		yes		**D2**		
	Temperature probe	Metal HLX07-MT		**AM7**		
Setup analogue outputs	**Output 1**	relative humidity RH	%	**no code**		
		other measurand	(*xx* see Measurand Code below)	**MA*xx***		
	Scaling 1 low	0		**no code**		
		value		**SAL*value***		
	Scaling 1 high	100		**no code**		
		value		**SAH*value***		
	Output 2	temperature	°C	**no code**		
		temperature	°F	**MB2**		
		other measurand	(*xx* see Measurand Code below)	**MB*xx***		
	Scaling 2 low	-40		**no code**		
		value		**SBL*value***		
	Scaling 2 high	60		**no code**		
		value		**SBH*value***		
Setup RS485	**Unit**	metric-SI				**no code**
		non-metric				**U2**

1) Factory setting: Baud rate 9600, Even Parity, Stopbits 1. Other factory settings available upon request. Baud rate choice: 9600 / 19200 / 38400.
   Modbus Map and communication setting: See User Guide and Modbus Application Note
2) Factory setting: For analogue output versions the display shows the measurands selected for output 1 and output 2. For digital output versions the display shows RH and T

Measurand Code

		xx
dew point Td	°C	52
	°F	53
frost point Tf	°C	65
	°F	66
mixing ratio r	g/kg	60
	gr/lb	61
absolute humidity dv	g/m³	56
	gr/ft³	57

		xx
wet bulb temperature Tw	°C	54
	°F	55
water vapour partial pressure e	mbar	50
	psi	51
enthalpy h	kJ/kg	62
	BTU/lb/kg	64

Order Examples

HLX211-M1A6AM7MB60SBL100SBH300

Model:	Humidity + Temperature
Output:	4-20 mA
Display:	none
Temperature probe:	Metal HLX07-MT

Output 1:	relative humidity RH (%)
Scaling 1 low:	0
Scaling 1 high:	100

Output 2:	mixing ratio r (g/kg)
Scaling 2 low:	100
Scaling 2 high:	300

HLX211-M1J3D2AM7U2

Model:	Humidity + Temperature
Output:	RS485
Display:	yes
Temperature probe:	Metal HLX07-MT

Unit:	non-metric

Accessories

- Product configuration software	PCS
- Power supply adapter	V03 (see data sheet Accessories)
- Protection cap for 12 mm (0.47") probe	HA010783
- USB configuration adapter	HA011066
- Cable for T-Probe (M12x1 socket, M12x1 plug)	
- 2 m (6.6 ft)	HA010801
- 5 m (16.4 ft)	HA010802
- 10 m (32.8 ft)	HA010803