

EE211

Humidity and Temperature Sensor for Continuous High Humidity

The EE211 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 EE211 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 E+E 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 EE211 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
- Green houses and incubators
- Cooling, ripening and environmental chambers
- 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 continuous high RH and condensing conditions

E+E 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 1/4 rotation

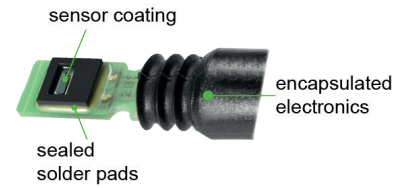
Separate T probe EE07-MT

- » 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 E+E 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 E+E 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.

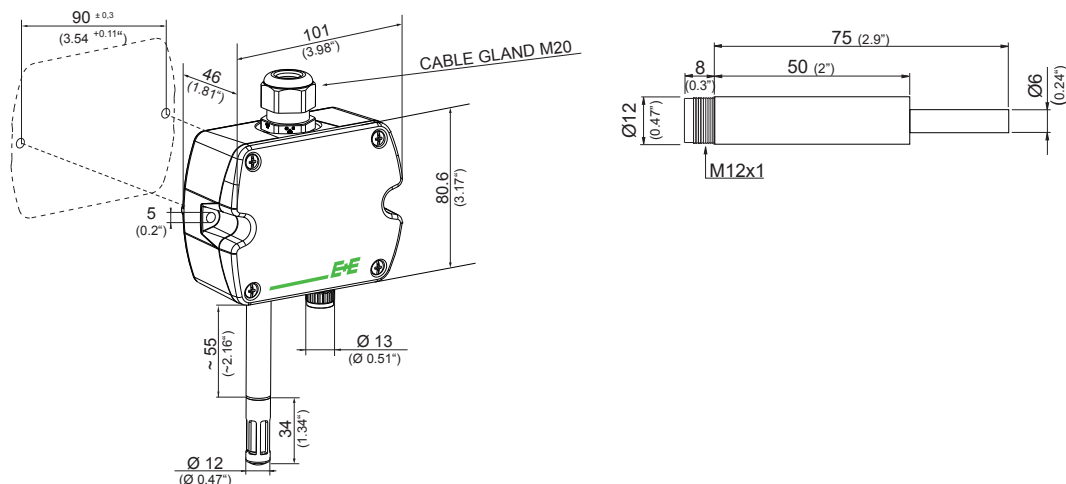


Operation Principle

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 EE211 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.

For details on the operation principle please refer to the EE211 user guide at www.epluse.com/ee211.

Dimensions in mm (inch)



Technical Data

Measurands

Relative Humidity (RH)

Sensor E+E Sensor HCT01-00D, protected by E+E proprietary coating

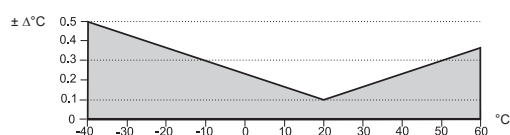
Working range 0...100 % RH

RH accuracy¹⁾ (incl. hysteresis, non-linearity and repeatability) $\pm(1.3 + 0.007 \cdot \text{measured value})$ % RH -5...30 °C (23...86 °F)

Temperature (T)

Sensor Pt1000 (tolerance class A, DIN EN 60751)

T-accuracy (at 20 °C (68 °F) : $\pm 0,1$ °C)



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).

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)  15 - 35 V DC¹⁾ or 24 V AC ±20 %

Current consumption at 24 V

	AC		DC	
	without Display	with Display	without Display	with Display
Voltage output	max. 38 mA _{rms}	max. 49 mA _{rms}	max. 13 mA	max. 19 mA
Current output	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 (Industrial Environment)	EN61326-1 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)



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

Ordering Guide

			EE211		
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 EE07-MT		AM7		
Setup analogue outputs	Output 1	relative humidity RH	%	no code	
		other measurand	(xx see Measurand Code below)	MAxx	
	Scaling 1 low	0		no code	
		value		SALvalue	
	Scaling 1 high	100		no code	
		value		SAHvalue	
	Output 2	temperature	°C	no code	
temperature		°F	MB2		
other measurand		(xx see Measurand Code below)	MBxx		
Scaling 2 low	-40		no code		
	value		SBLvalue		
Scaling 2 high	60		no code		
	value		SBHvalue		
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 at www.epluse.com/ee211

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/m ³	56
	gr/ft ³	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

EE211-M1A6AM7MB60SBL100SBH300

Model: Humidity + Temperature
 Output: 4-20 mA
 Display: none
 Temperature probe: Metal EE07-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

EE211-M1J3D2AM7U2

Model: Humidity + Temperature
 Output: RS485
 Display: yes
 Temperature probe: Metal EE07-MT

Unit: non-metric

Accessories

- Product configuration software
- Power supply adapter
- Protection cap for 12 mm (0.47") probe
- USB configuration adapter
- Cable for T-Probe (M12x1 socket, M12x1 plug)
 - 2 m (6.6 ft)
 - 5 m (16.4 ft)
 - 10 m (32.8 ft)

EE-PCS (free download: www.epluse.com)

V03 (see data sheet Accessories)

HA010783

HA011066

HA010801

HA010802

HA010803