

EE210

Humidity and Temperature Sensor for Demanding Climate Control

The EE210 sensor by E+E Elektronik meets the highest requirements in demanding climate control applications. Besides the accurate measurement of relative humidity (RH) and temperature (T), EE210 calculates various RH related parameters such as dew point, temperature, absolute humidity and mixing ratio. All measured and calculated values are available on the BACnet MS/TP or Modbus RTU interface, two of them are available on the analogue voltage or current outputs, while up to three values can be shown simultaneously on the optional display.

Excellent performance of EE210 in polluted or aggressive environment is ensured by the encapsulated measurement electronics inside the sensing probe and the long-term stable HCT01 sensor with E+E proprietary coating.

EE210 is available as wall or duct mounted version as well as with remote probe. The IP65 / NEMA 4 enclosure minimizes installation costs and provides outstanding protection against contamination and condensation.

With an optional USB configuration adapter, the user can set the RS485 interface parameters, the output scaling and perform one or two point adjustment for RH and T.



Applications

- agriculture
- green houses
- indoor pools
- stables, incubators, hatchers
- storage rooms, cooling chambers
- demanding climate control

Features

Appropriate for US mounting requirements

- » Knockout for 1/2" conduit fitting

External mounting holes

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

Display

- » Selectable display layout
- » Measurands freely selectable
- » Backlight optional

Smooth cover surface

- » No accumulation of dust in protruding edges

Electronics on the underside of the PCB

- » Optimum protection against mechanical damage during installation

IP65 / NEMA 4 Enclosure

Bayonet Screws

- » Open/closed with a 1/4 rotation

Watertight cable outlet

Cast Electronics

- » Mechanical protection
- » Condensation-resistant

E+E Humidity sensor HCT01

- » Long-term stability
- » Protected solder pads
- » Tested according to automotive standard AEC-Q200

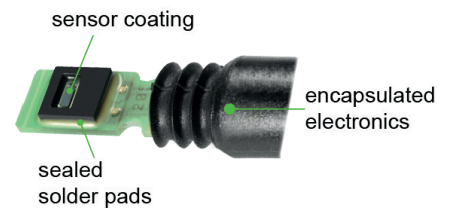
Inspection certificate according DIN EN 10204 – 3.1



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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.



Technical Data

Measured Values

Relative Humidity (RH)

Working range 0...100 % RH

RH accuracy¹⁾ (incl. hysteresis, non-linearity and repeatability)

Wall & duct version:

-15...40 °C (5...104 °F)	≤90 % RH	±(1.3 + 0.003*measured value) % RH
-15...40 °C (5...104 °F)	>90 % RH	± 2.3 % RH
-40...60 °C (-40...140 °F)		±(1.5 + 0.015*measured value) % RH

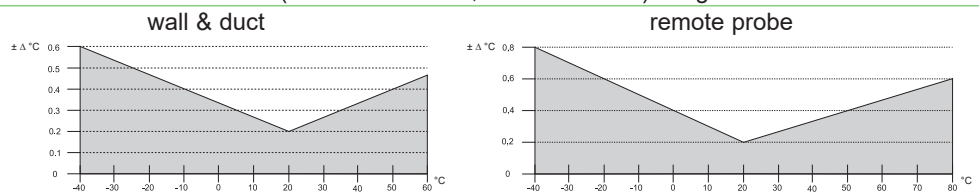
Remote probe version

at 20 °C (68 °F) ±2.5 % RH

Temperature (T)

Sensor Pt1000 (tolerance class B, DIN EN 60751) integrated in HCT01

T-accuracy



Outputs

Analogue output


0-5 V / 0-10 V
4-20 mA (2-wire)
0-20 mA (3-wire)

-1 mA < I_L < 1 mA
R_L ≤ 500 Ohm
R_L ≤ 500 Ohm

Digital output

RS485 (BACnet MS/TP or Modbus RTU), max. 32 EE210 in one bus

General

Power supply (Class III) 

for 4-20 mA, 2-wire 10 V + R_L x 20 mA < V₊ < 30 V DC

for 0-20 mA, 3-wire
for 0-5 V / 0-10 V / RS485 15-35 V DC²⁾ or 24V AC ±20 %

Current consumption at 24 V

Voltage output DC supply max. 12 mA; with display max. 23 mA
AC supply max. 34 mA_{rms}; with display max. 49 mA_{rms}

Current output

2-wire DC supply max. 40 mA; with display max. 40 mA
3-wire DC supply typ. 33 mA; with display max. 44 mA
AC supply typ. 65 mA_{rms}; with display max. 84 mA_{rms}

Digital interface

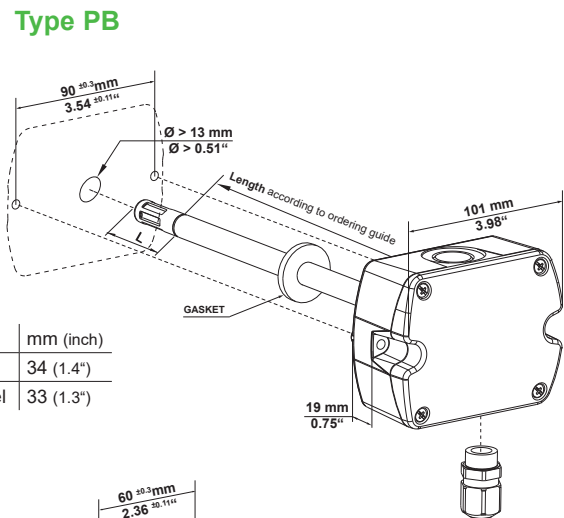
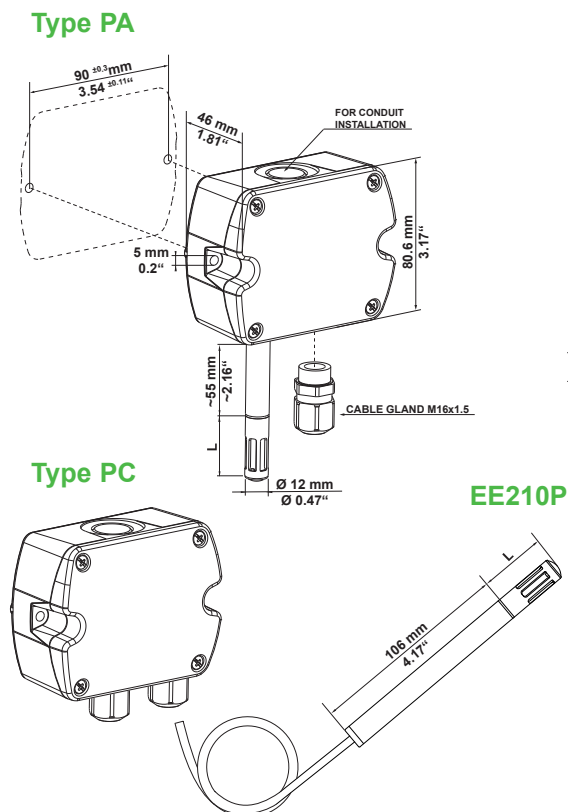
DC supply typ. 5 mA; with display max. 20 mA
AC supply typ. 15 mA_{rms}; with display max. 35 mA_{rms}

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

Display	1, 2 or 3 lines, user configurable, optional with backlight	
Electrical connection	Screw terminals, max. 1.5 mm ²	
Housing material	Polycarbonate, UL94V-0 (with Display UL94HB) approved	
Protection class	IP65 / NEMA 4	
Cable gland	M16 x 1.5	
Probe cable (type PC)	PVC, Ø 4.3 mm, 4 x 0.25 mm ² , Length: 1.5 or 3 m (4.9 or 9.8 ft)	
Electromagnetic compatibility	EN61326-1	EN61326-2-3
	Industrial Environment	
Temperature ranges without display	Working: -40...60 °C (-40...140 °F) (-40...80 °C / -40... 176 °F for probe EE210P) Storage: -40...60 °C (-40...140 °F)	
Temperature ranges with display	Working: -20...50 °C (-4...122 °F) (-40...80 °C / -40... 176 °F for probe EE210P) Storage: -20...60 °C (-4...140 °F)	



Dimensions (mm/inch)



Mounting flange
 in the scope of supply for
 Type PA and PC

Accessories

USB configuration adapter	HA011066
Product configuration software	EE-PCS (free download: www.epluse.com/EE210)
Power supply adapter	V03 (see data sheet Accessories)
Protection cap for 12 mm probe	HA010783

Ordering Guide

MODEL	OUTPUT	TYPE	PROBE LENGTH ²⁾	DISPLAY ³⁾	FILTER (Type A and B)
humidity + temperature	0-5 V (2x)	wall mount (PA)	50 mm (1.97") (B)	without backlight ⁴⁾ (D)	membrane (B)
	0-10 V (3x)	duct mount (PB)	200 mm (7.87") (F)	with backlight ⁵⁾ (E)	stainless steel sintered (D)
	0-20 mA (3-wire) (5x)	remote probe (PC) ¹⁾	Type A and C (x)	none (x)	for type C (x)
	4-20 mA (2-wire) (6x)				
	RS485 (x3)				
EE210-					

Analogue outputs (2x, 3x, 5x, 6x) setup

OUTPUT 1	SCALING 1 ⁷⁾	OUTPUT 2	SCALING 2 ⁷⁾	UNIT
relative humidity ⁶⁾ (Uw)	-40...60 (002)	relative humidity ⁶⁾ (Uw)	-40...60 (002)	metric (M)
temperature (Tx)	-10...50 (003)	temperature (Tx)	-10...50 (003)	non-metric (N)
dew point temperature (TD)	0...50 (004)	dew point temperature (TD)	0...50 (004)	
frost point temperature (TF)	0...100 (005)	frost point temperature (TF)	0...100 (005)	
water vapour partial pressure ⁶⁾ (Ex)	32...122 (076)	water vapour partial pressure ⁶⁾ (Ex)	32...122 (076)	
mixing ratio ⁶⁾ (Rx)	-40...140 (083)	mixing ratio ⁶⁾ (Rx)	-40...140 (083)	
absolute humidity ⁶⁾ (DV)		absolute humidity ⁶⁾ (DV)		
specific enthalpy ⁶⁾ (Hx)		specific enthalpy ⁶⁾ (Hx)		
wet bulb temperature (TW)		wet bulb temperature (TW)		

Digital output (x3) setup⁸⁾

PROTOCOL	BAUDRATE	PARITY	STOPBITS	UNIT
Modbus RTU ⁹⁾ (1)	9600 (A)	odd (O)	1 stopbit (1)	metric (M)
BACnet MS/TP ⁹⁾ (3)	19200 (B)	even (E)	2 stopbit (2)	non-metric (N)
	38400 (C)	no parity (N)		
	57600 ¹⁰⁾ (D)			
	76800 ¹⁰⁾ (E)			
	115200 ¹⁰⁾ (F)			

Remote probe for EE210 Type PC:

MODEL	CABLE LENGTH	FILTER
humidity + temperature (HT)	1.5 m (4.9 ft) (C)	membrane (B)
	3 m (9.8 ft) (E)	stainless steel sintered (D)
EE210P-		

1) The EE210P probe has to be ordered as separate position

2) Selectable probe length only for duct mount version available; see dimensions

3) **Factory setup:**

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

4) Not with output 5x

5) Not with output 6x

6) **Factory Scaling**

relative humidity	0...100 % RH	
water vapour partial pressure	0...200 mbar	0...3 psi
mixing ratio	0...400 g/kg	0...2800 gr/lb
absolute humidity	0...150 g/m ³	0...60 gr/ft ³
specific enthalpy	-50...400 kJ/kg	-10...190 BTU/lb

7) For Tx, TD, TF and TW; see data sheet „Scaling of the outputs“ at www.epluse.com

8) Modbus Map and setup instructions:

See User Guide and Modbus Application Note at www.epluse.com/EE210

9) Product Implementation conformance Statement (PICS) available at www.epluse.com/EE210

10) Only for BACnet

Order Examples

Type PA and PB

EE210-HT3xPAxEB-UwTx005M

Model: Humidity+Temperature
 Output: 0-10 V
 Type: wall mount
 Display: with backlight
 Filter: membrane

Output scaling 1: relative humidity
 Scaling 1: 0...100 % RH
 Output scaling 2: temperature
 Scaling 2: 0...100 °C
 Unit: metric

Type PC

Position 1:

EE210-HT6xPCxxx-UwTx005M

Model: Humidity+Temperature Basic Device
 Output: 4-20 mA
 Type: remote probe (Pos. 2)
 Display: none

Output scaling 1: relative humidity
 Scaling 1: 0...100 % RH
 Output scaling 2: temperature
 Scaling 2: 0...100 °C
 Unit: metric

Position 2:

EE210P-HTCB

Model: Humidity+Temperature Probe
 Cable length: 1.5 m
 Filter: membrane