

# EE210

## Humidity and Temperature Transmitter for Demanding Climate Control

The EE210 transmitter 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 configuration kit, 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

**Electronics on the underside of the PCB**  
 » Optimum protection against mechanical damage during installation

**Bayonet Screws**  
 » Open/closed with a 1/4 rotation

**Cast Electronics**  
 » Mechanical protection  
 » Condensation-resistant

**E+E Humidity sensor HCT01**  
 » Long-term stability  
 » Protected solder pads  
 » Tested according to automotive standard AEC-Q200

**Display**  
 » Selectable display layout  
 » Measurands freely selectable  
 » Backlight optional

**Smooth cover surface**  
 » No accumulation of dust in protruding edges

**IP65 / NEMA 4 Enclosure**

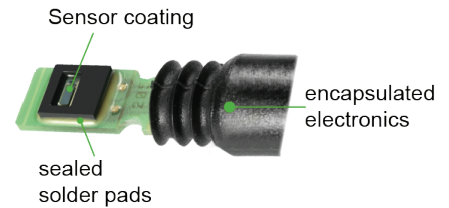
**Watertight cable outlet**



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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)

Sensor	E+E Sensor HCT01-00D	
Working range	0...100 % RH	
RH accuracy <sup>1)</sup> (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	wall & duct	remote probe

### Outputs

Analogue output	0-5 V / 0-10 V	-1 mA < I <sub>L</sub> < 1 mA
	4-20 mA (2-wire)	R <sub>L</sub> ≤ 500 Ohm
	0-20 mA (3-wire)	R <sub>L</sub> ≤ 500 Ohm
Digital output	RS485 (BACnet MS/TP or Modbus RTU), max. 32 EE210 in one bus	

### General

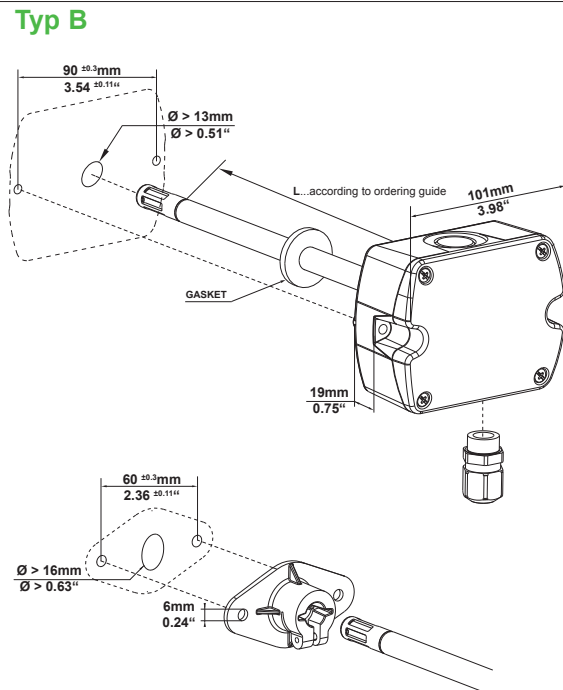
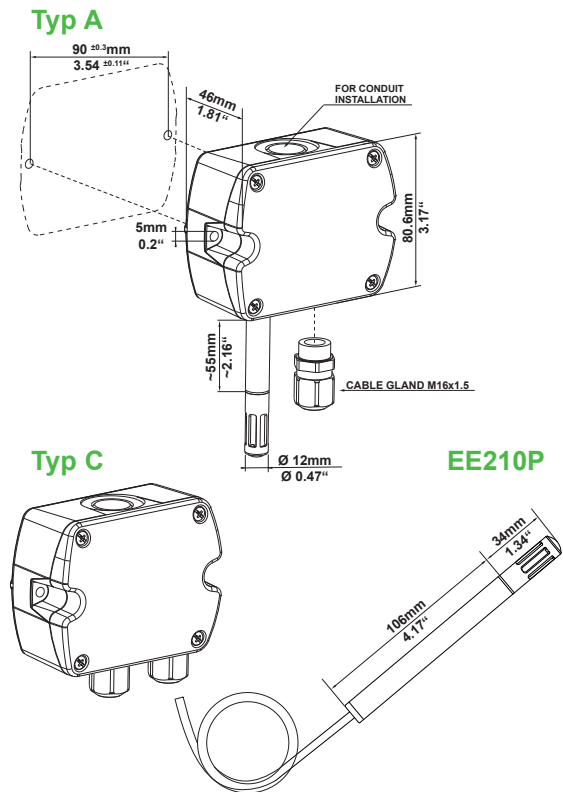
Power supply		
for 4-20 mA, 2-wire	10 V + R <sub>L</sub> x 20 mA < V <sub>+</sub> < 30 V DC	
for 0-20 mA, 3-wire	15-35 V DC <sup>2)</sup> or 24V AC ±20 %	
Current consumption at 24 V		
Voltage output	DC supply max. 12 mA; AC supply max. 34 mA <sub>rms</sub> ;	with display max. 23 mA with display max. 49 mA <sub>rms</sub>
Current output		
2-wire	DC supply max. 40 mA;	with display max. 40 mA
3-wire	DC supply typ. 33 mA; AC supply typ. 65 mA <sub>rms</sub> ;	with display max. 44 mA with display max. 84 mA <sub>rms</sub>
Digital interface	DC supply typ. 5 mA; AC supply typ. 15 mA <sub>rms</sub> ;	with display max. 20 mA with display max. 35 mA <sub>rms</sub>

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
Connection	Screw terminals, max. 1.5 mm <sup>2</sup>
Housing material	Polycarbonate, UL94V-0 (with Display UL94HB) approved
Protection class	IP65 / NEMA 4
Cable gland	M16 x 1.5
Probe cable (type C)	PVC, Ø 4.3 mm, 4 x 0.25 mm <sup>2</sup> , Length: 1.5 or 3 m (4.9 or 9.8 ft)
Sensor protection	E+E Coating
Electromagnetic compatibility	EN61326-1 EN61326-2-3 Industrial Environment
Temperature ranges	Operating: -40...60 °C (-40...140 °F) (-40...80 °C for remote probe EE210P) Storage: -40...60 °C (-40...140 °F)
Temperature ranges with display	Operating: -20...50 °C (-4...122 °F) (-40...80 °C for remote probe EE210P) Storage: -20...60 °C (-4...140 °F)

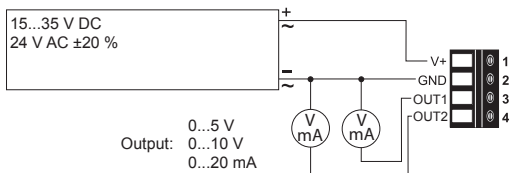


## Dimensions (mm/inch)

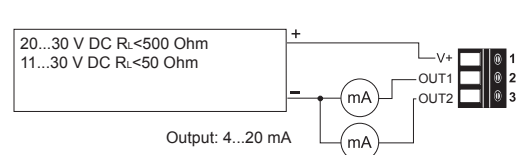


## Connection Diagram

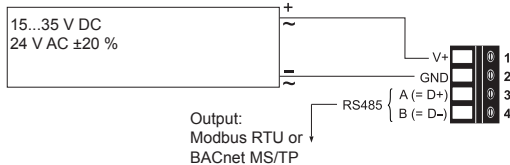
### EE210-HT2/3/5



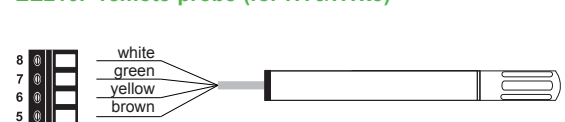
### EE210-HT6



### EE210-HTx3



### EE210P remote probe (for HT6/HTx3)



## Ordering Guide

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

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

OUTPUT 1	SCALING 1 <sup>7)</sup>	OUTPUT 2	SCALING 2 <sup>7)</sup>	UNIT
relative humidity <sup>6)</sup> (Uw)	-40...60 (002)	relative humidity <sup>6)</sup> (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 <sup>6)</sup> (Ex)	32...122 (076)	water vapour partial pressure <sup>6)</sup> (Ex)	32...122 (076)	
mixing ratio <sup>6)</sup> (Rx)	-40...140 (083)	mixing ratio <sup>6)</sup> (Rx)	-40...140 (083)	
absolute humidity <sup>6)</sup> (DV)		absolute humidity <sup>6)</sup> (DV)		
specific enthalpy <sup>6)</sup> (Hx)		specific enthalpy <sup>6)</sup> (Hx)		

### Digital output (x3) setup<sup>8)</sup>

PROTOCOL	BAUDRATE	PARITY	STOPBITS	UNIT
Modbus RTU <sup>8)</sup> (1)	9600 (A)	odd (O)	1 stopbit (1)	metric (M)
BACnet MS/TP <sup>9)</sup> (3)	19200 (B)	even (E)	2 stopbit (2)	non-metric (N)
	38400 (C)	no parity (N)		
	57600 <sup>10)</sup> (D)			
	76800 <sup>10)</sup> (E)			
	115200 <sup>10)</sup> (F)			

### Remote probe for EE210 Type C:

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)
<b>EE210P-</b>		

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 <sup>3</sup>	0...60 gr/ft <sup>3</sup>
specific enthalpy	-50...400 kJ/kg	-10...190 BTU/lb

7) For Tx, TD and TF: see data sheet „Scaling of the outputs“ at [www.epluse.com](http://www.epluse.com)

8) Modbus Map and setup instructions:

See User Guide and Modbus Application Note at [www.epluse.com/EE210](http://www.epluse.com/EE210)

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

10) Only for BACnet

## Order Examples

### Type A and B

#### 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 C

#### 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

## Scope of supply

EE210	Wall mount (Type A)	Duct mount (Type B)	Remote version (Type C)*	EE210-P Remote probe* for Type C	Additionally for models with RS485 interface
EE210 according ordering guide	✓	✓	✓	✓	
Cable gland	✓	✓	✓ (2 pcs.)		✓
Mounting kit	✓	✓	✓		
Mounting flange		✓		✓	
Inspection certificate according to DIN EN10204 - 3.1	✓	✓	✓	✓	
Quick Guide - EE210 RS485 Setup					✓

\* EE210-P is not included in the Scope of Supply of the EE210 Type C

## Accessories

Product configuration adapter	see data sheet <a href="#">EE-PCA</a>
Product configuration software	<a href="#">EE-PCS</a> (free download: <a href="http://www.epluse.com/EE210">www.epluse.com/EE210</a> )
Power supply adapter	<a href="#">V03</a> (see data sheet Accessories)
Protection cap for 12 mm probe	<a href="#">HA010783</a>