EE211

Humidity and Temperature Transmitter 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 probe and an interchangeable temperature probe.

Excellent performance of EE211 even in polluted, aggressive environment is ensured by the combination of completely encapsulated measurement electronics inside the humidity probe and the long-term stable HCT01 sensor with E+E proprietary coating.

The EE211 enclosure is rated IP65/NEMA 4, minimizes installation costs and provides outstanding protection against pollution and condensation. All measured and calculated values are available on the Modbus RTU interface whereas two of the values are available on the analogue voltage or current (3-wire) output. Additionally up to three values can be shown simultaneously on the optional illuminated display.

With the optional product configuration adapter EE-PCA the user can set the Modbus RTU interface parameters, the display format, the measured parameters and the output scaling. Furthermore, the user can perform an one or two point RH and T adjustment. The T probe can also be adjusted separate; for the metal version of the T probe the reference can be a high accuracy dry block calibrator.

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

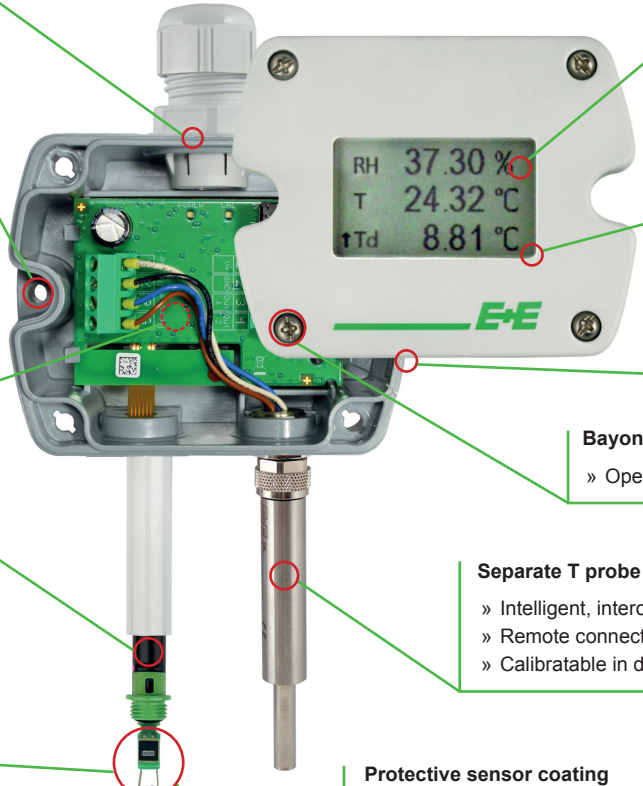
- Mechanical protection
- Condensation-resistant

Heated sensing head

- Best performance and long term stability under continious high RH and condensing conditions

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 ¼ rotation

Separate T probe

- Intelligent, interchangeable T probe
- Remote connection possible
- Calibratable in dry block

Protective sensor coating

The E+E proprietary sensor coating is a protective layer applied to the active surface of the HCT01 sensing element. The coating extends substantially the lifetime and the measurement performance of the E+E sensor in corrosive environment. 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.

Applications

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

Operation principle

The humidity probe is continuously heated for avoiding condensation and high humidity side effects on the sensing elements, which leads to outstanding long term stability.
Based on the measured values humidity and temperature, 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.

Outstanding long term stability under high humidity conditions

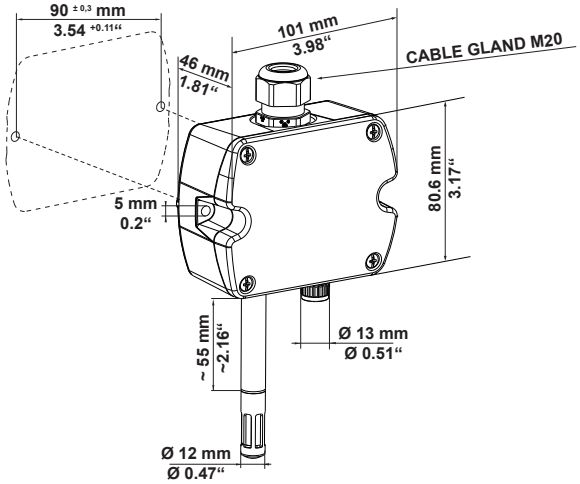
The operation principle of EE211 copes with the causes for poor long-term stability of non-heated sensors at continuously high humidity. The constant over-temperature of the EE211 sensing head (approx. 5 °C = 9 °F) means max. 76 % RH humidity at the sensors and enables following benefits:

- The sensing head of EE211 stays dry even under condensing conditions, which prevents dust and dirt from sticking to the sensor and leads to **outstanding long-term stability**.
- The combination of dry sensing head, E+E proprietary coating of the sensing element and sealed solder pads **minimize the impact of corrosive agents**.
- Maximum humidity of 76 % RH at the sensor **eliminates the drift caused by exposure to continuous high humidity**.

Important:
The humidity related parameters correspond to the location of the T probe. Consequently, the T probe shall be positioned at the place of main interest for RH measurement. In an environmental chamber for instance, the EE211 basic device can be fixed conveniently on the inside wall, while the T probe can be placed in the middle of the chamber using the optional probe cable.

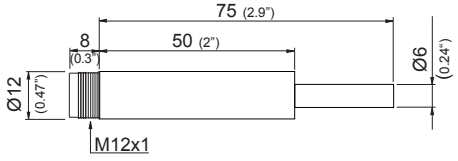
Dimensions (mm/inch)

Basic Device:

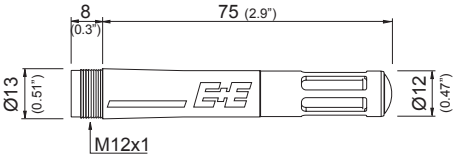


Temperature Probe:

Metal Housing EE07-MT

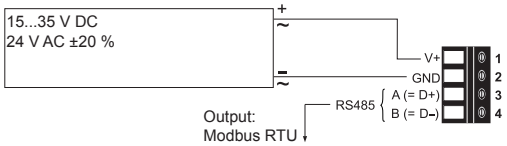


Polycarbonate Housing EE07-PT6

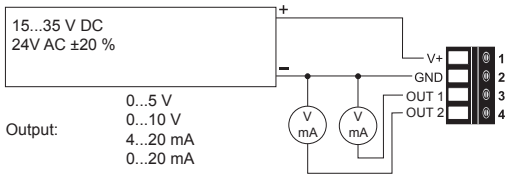


Connection Diagram

EE211-M1J3



EE211-M1A2/3/5/6

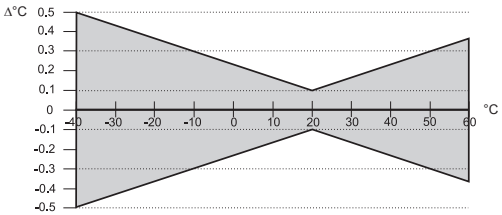


Technical Data

Relative Humidity (RH)

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

Temperature (T)

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

Outputs

Analogue output	0-5 V / 0-10 V	-1 mA < I_L < 1 mA
(RH: 0...100 %; T: see ordering guide)	0-20 mA / 4-20 mA (3-wire)	R_L ≤ 500 Ohm
Digital output	RS485, Modbus RTU, max. 32 EE211 in one bus	

General

Power supply (Class III)	15 - 35 V DC[1] or 24 V AC ±20 %	
Current consumption at 24 V		
Voltage output	DC supply max. 13 mA	with display max. 19 mA
	AC supply max. 38 mA_{rms}	with display max. 49 mA_{rms}
Current output	DC supply max. 34 mA	with display max. 40 mA
	AC supply typ. 75 mA_{rms}	with display typ. 85 mA_{rms}
Digital interface	DC supply typ. 8 mA	with display typ. 17 mA
	AC supply typ. 23 mA_{rms}	with display typ. 40 mA_{rms}
Display	1, 2 or 3 lines, user configurable, with backlight	
Connection	Screw terminals, max. 1.5 mm^2	
Housing material	Polycarbonate, UL94V-0 (with Display UL94HB) approved	
Protection class	IP65 / NEMA 4	
Cable gland	M20 x 1.5	
Sensor protection	E+E coating	
Electromagnetic compatibility	EN61326-1 EN61326-2-3, Industrial Environment	CE
Temperature ranges	Operating / Storage: -40...60 °C (-40...140 °F)	
Temperature ranges with display	Operating: -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 consists of two items to be orders separately: the EE211 basic unit and EE07-xT temperature probe. A third item (T probe extension cable) is optional.

Position 1: EE211 Basic Device

				EE211
Hardware	**Model**	humidity + temperature		**M1**
	Output	0-5 V		**A2**
		0-10 V		**A3**
		0-20 mA		**A5**
		4-20 mA		**A6**
		RS485		**J3**
	Display[1]	none		**no code**
		with backlight		**D2**
Setup - Analogue outputs (not for output J3)	**Output 1**	relative humidity RH	%	**no code**
		other measurand	(**xx** see Measurand Code below)	**MA*xx***
	Scaling 1 low[2]	0		**no code**
		value		**SAL*value***
	Scaling 1 high[2]	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 low	60		**no code**
		value		**SBH*value***
Setup - Modbus RTU (only for output J3)	**Baudrate**	9600		**no code**
		19200		**BD6**
		38400		**BD7**
	Parity	odd		**no code**
		no parity		**PY0**
		even		**PY2**
	Stopbit	1 stopbit		**no code**
		2 stopbit		**BT2**
	Unit	metric-SI		**no code**
		non-metric		**U2**

Measurand Code

		xx
dew point Td	°C	**52**
	°F	**53**
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**

Position 2: EE07-xT Temperature Probe

TYPE	
Polycarbonate - with metal grid filter	**EE07-PT6**
Metal	**EE07-MT**

Position 3 (optional): Cable for EE07, M12x1 socket, M12x1 plug

TYPE	
2 m (6.6 ft)	**HA010801**
5 m (16.4 ft)	**HA010802**
10 m (´32.8 ft)	**HA010803**

1) **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
2) Modbus Map and setup instructions: See User Guide and Modbus Application Note at www.epluse.com/EE211

Order Examples

Position 1: EE211-M1A6MB60SBL100SBH300

Model:	Humidity+Temperature
Output:	4-20 mA
Display:	none
Output scaling 1:	relative humidity RH (%)
Scaling 1 low:	0
Scaling 1 high:	100
Output scaling 2:	mixing ratio r (g/kg)
Scaling 2 low:	100
Scaling 2 high:	300

Position 2: EE07-MT

Type:	Metal

Position 3: HA010802

Type:	5 m (16.4 ft)

Position 1: EE211-M1J3D2BD6U2

Model:	Humidity+Temperature
Output:	RS485
Display:	with backlight
Baudrate:	19200
Parity:	odd
Stopbits:	1 stopbit
Unit:	non-metric

Position 2: EE07-PT6

Type:	Polycarbonate - with metal grid filter

Accessories

- Product configuration adapter	see data sheet EE-PCA
- Product configuration software	EE-PCS (free download: www.epluse.com)
- Power supply adapter	V03 (see data sheet Accessories)
- Protection cap for 12 mm probe	HA010783
- Metal grid filter cap	(HA010106) (see data sheet Accessories)

Scope of supply

EE211 Basic Device

- EE211 according ordering guide
- Cable gland M20 x 1.5
- Mounting materials
- Test report according according to DIN EN10204 - 3.1
- User Guide

EE07 Temperature Probe

- EE07 according ordering guide
- Test report according according to DIN EN10204 - 3.1

Cable for EE07 (optional)