

EE212

Modular Humidity/Temperature Sensor

The EE212 humidity (RH) and temperature (T) sensor with interchangeable sensing module is optimized for demanding climate control applications in most various industries.

Versatility

The EE212 is available for wall or duct mount as well as an outdoor version and features two analogue outputs and optional graphic display. Besides the accurate RH and T measurement, the sensor calculates various humidity related parameters such as dew point temperature, absolute humidity and mixing ratio.

Outstanding Reliability with Patented Sensor Technology

The E+E sensing element with proprietary coating, the wide choice of filter caps and the IP65/NEMA 4X enclosure ensure excellent long-term performance of EE212 even under challenging working conditions. Easy on-site replacement of the sensing module minimizes the down-time for maintenance purposes in heavily polluted or aggressive environment.

Interchangeable, Robust Sensing Module

The injection-moulded sensing module inside the sensing head is mechanically highly stable, easy to handle and requires no tools for replacement. The electronics inside the module is encapsulated and therefore best protected against condensation.

User Configurable and Adjustable

The free EE-PCS Product Configuration Software and an EE optional adapter cable facilitate the configuration and adjustment of the EE212. The configuration includes the measurands assignment (two on the outputs and up to three on the display), the output scale and the display settings.



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/close with a 1/4 rotation

Inspection certificate according DIN EN 10204-3.1

Test report according to DIN EN 10204-2.2

Display

- » Configurable display layout
- » Measurands freely selectable

Smooth cover surface

- » No accumulation of dust in protruding edges

Enclosure

- » IP65/NEMA 4X
- » Protection against contamination and condensation
- » Minimal installation costs
- » Type T13 compatible with radiation shield H010501

EE212M calibrated sensing module

- » State-of-the-art E+E RH/T sensing element with proprietary coating and sealed solder pads
- » Patented sensor technology
- » High mechanical stability
- » Easy handling

Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the sensing elements, their leads and soldering points. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves the sensors' long term stability in dusty, dirty or oily applications by preventing stray impedance caused by deposits on the active sensor surface or on the electrical connections.

Technical Data

Measured values

Relative Humidity

Working range 0...100 %RH

Accuracy¹⁾ (incl. hysteresis, non-linearity and repeatability)

@ 23 °C (73 °F)

$\pm(1.5 + 0.005 \cdot mv)$ %RH

mv = measured value

-15...60 °C (5...140 °F)

$\pm(1.8 + 0.007 \cdot mv)$ %RH

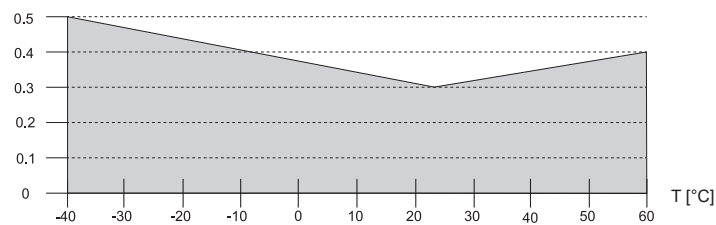
-40...-15 °C (-40...5 °F)

Additional uncertainty ± 0.125 %RH/°C²⁾

Temperature

Accuracy

$\pm \Delta T$ [°C]



Calculated parameters

		from		up to		unit
Dew point temperature	Td	-40	(-40)	60	(140)	°C (°F)
Frost point temperature	Tf	-40	(-40)	0	(32)	°C (°F)
Wet bulb temperature	Tw	0	(32)	60	(140)	°C (°F)
Water vapour partial pressure	e	0	(0)	200	(3)	mbar (psi)
Mixing ratio	r	0	(0)	160	(1200)	g/kg (gr/lb)
Absolute humidity	dv	0	(0)	150	(60)	g/m ³ (gr/ft ³)
Specific enthalpy	h	-40	(-10)	500	(200)	kJ/kg (BTU/lb)

Outputs

Analogue output

0 - 5 V / 0 - 10 V

-1 mA < I_L < 1 mA

4 - 20 mA (2-wire)

R_L ≤ 500 Ω

for Type T13

250 ≤ R_L ≤ 500 Ω recommended

0 - 20 mA (3-wire)

R_L ≤ 500 Ω

General

Power supply class III \triangleleft ³⁾

for 4 - 20 mA (2-wire)

$(10 \text{ V} + R_L \times 20 \text{ mA}) < V_+ < 30 \text{ V DC}$

for Type T13: 24 V DC ± 10 % recommended

for 0 - 20 mA (3-wire)

15 - 35 V DC or 24 V AC ± 20 %

for 0 - 5 V / 0 - 10 V

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}

1) Traceable to international 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 GUM (Guide to the Expression of Uncertainty in Measurement). For Type T13: at 24 V DC and RL=250 Ohm for A6 Versions

2) Deviating from -15 °C (5 °F)

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

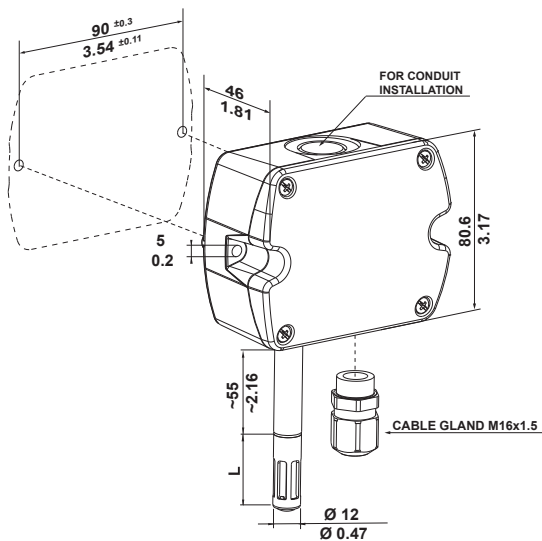
Display	Available for Type T1/T2 1, 2 or 3 lines, user configurable Optional with backlight
Electrical connection	Screw terminals, max. 1.5 mm ²
Enclosure material	Polycarbonate, UL94 V-0 (with Display UL94HB) approved
Protection rating	IP65/NEMA 4X
Cable gland	M16 x 1.5
Electromagnetic compatibility	EN 61326-1:2013 EN 61326-2-3:2013 Industrial Environment FCC Part15 Class A ICES-003 Class A
Temperature ranges	Working: -40...60 °C (-40...140 °F)
Without display	Storage: -40...60 °C (-40...140 °F)
Temperature ranges	Working: -20...50 °C (-4...122 °F)
With display	Storage: -20...60 °C (-4...140 °F)



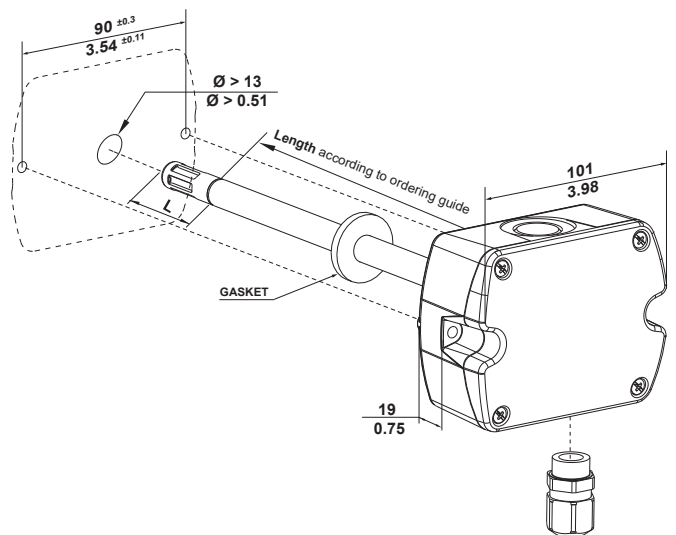
Dimensions

Values in mm (inch)

Type T1



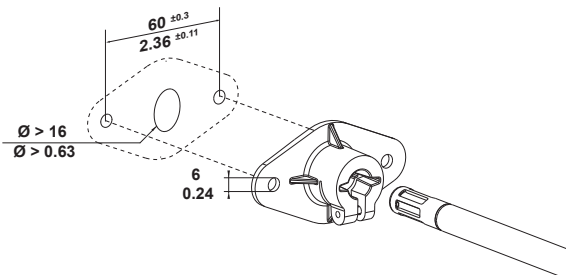
Type T2



L = filter cap	mm (inch)
Membrane	34 (1.4)
Stainless steel	33 (1.3)
Metal grid	33 (1.3)

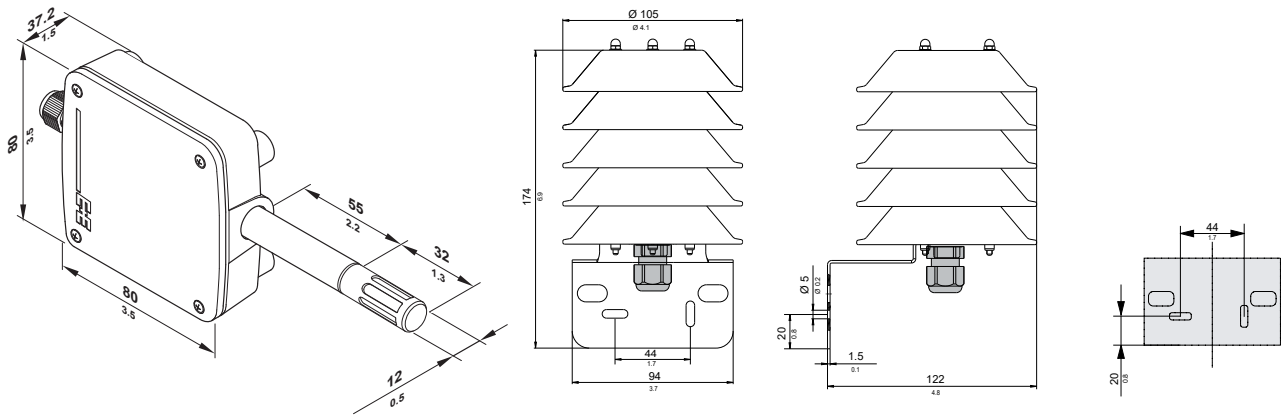
Mounting flange

in the scope of supply for Type T2



Type T13

Radiation Shield HA010501 for Type T13 (needs to be ordered separately)



Ordering Guide

		EE212-		
		T1	T2	T13
Hardware Configuration	Type	Wall mount Duct mount Outdoor		
	Probe length	50 mm (2") 200 mm (4")		L50 L200
	Output	0 - 5 V 0 - 10 V 0 - 20 mA (3-wire) 4 - 20 mA (2-wire)	A2 A3 A5 A6	A3 A6
	Filter	Membrane Metal grid Stainless steel sintered	F2 F3 F4	F3
	Display ¹⁾	No Display Without backlight ²⁾ With backlight ³⁾	no code D1 D2	no code
Setup Analogue Outputs	Output 1	Relative humidity RH [%] Temperature T [°C] Temperature T [°F] Other measurand (xx see measurand code below)	no code MA1 MA2 M	
	Scaling 1 low	0 Value	no code SALValue	
	Scaling 1 high	100 Value	no code SAHValue	
	Output 2	Temperature T [°C] Temperature T [°F] Other measurand (xx see measurand code below)	no code MB2 MBxx	
	Scaling 2 low	-40 Value	no code SBLValue	
	Scaling 2 high	60 Value	no code SBHValue	

1) Factory setup: the display shows the measurands selected for output 1 and output 2.

2) Not with output A5.

3) Not with output A6.

Measurand Code

For Output 1 and 2 in the Ordering Guide



Please note: no mix of SI/US units allowed

Measurand code		MAxx / MBxx
Temperature T	[°C]	1
	[°F]	2
Relative humidity	[%]	10
Water vapor partial pressure e	[mbar]	50
	[psi]	51
Dew point temperature Td	[°C]	52
	[°F]	53
Wet bulb temperature Tw	[°C]	54
	[°F]	55

Measurand code		MAxx / MBxx
Absolute humidity dv	[g/m ³]	56
	[gr/ft ³]	57
Mixing ratio r	[g/kg]	60
	[gr/lb]	61
Specific enthalpy h	[kJ/kg]	62
	[BTU/lb]	64
Frost point temperature Tf	[°C]	65
	[°F]	66

Order Examples

EE212-T2L200A3F4D2

Type: Duct mount
 Probe length: 200 mm (4")
 Output: 0 - 10 V
 Filter: Stainless steel sintered
 Display: With backlight
 Output 1: Relative humidity
 Scaling 1: Low: 0 %RH
 High: 100 %RH
 Output 2: Temperature [°C]
 Scaling 2: Low: -40 °C
 High: 60 °C

EE212-T1A6F2D1MB60SBL0SBH400

Type: Wall mount
 Output: 4 - 20 mA
 Filter: Membrane
 Display: Without backlight
 Output 1: Relative humidity
 Scaling 1: Low: 0 %RH
 High: 100 %RH
 Output 2: Mixing ratio [g/kg]
 Scaling 2: Low: 0 g/kg
 High: 400 g/kg

Ordering Guide EE212M Sensing Module (Spare Part)

		EE212M-
Packaging	Single packed	PK4
	Multipackage (Tray) ¹⁾	PK6

1) Minimum order quantity: 10 pcs

Order Examples Sensing Module

EE212M-PK4

Packaging: Single packed

Accessories

(For further information, see datasheet "Accessories")

USB Configuration Adapter	HA011066
Product Configuration Software	EE-PCS (free download: www.epluse.com/configurator)
Radiation shield for EE212 Outdoor (Type T13)	HA010501
Power supply adapter	V03
Protection cap for 12 mm probe	HA010783