

E+E

—
your partner
in sensor
technology.

+ Datasheet EE212

Modular Humidity and
Temperature Sensor



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QUOTATION

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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. It features two analogue outputs as well as RS485 interface with Modbus RTU protocol 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 minimises the down-time for maintenance purposes in heavily polluted or aggressive environment.

Interchangeable, Robust Sensing Module

The injection-moulded module inside the sensing head is mechanically highly stable and easy to handle. The sensing module with rapidX technology enables quick replacement without tools at any time, even during operation (hot-swap). The electronics inside the module is encapsulated and therefore best protected against condensation.

User Configurable and Adjustable

The free PCS10 Product Configuration Software and an optional stick 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 scaling, RS485 interface settings and the display setup.



EE212 wall mounting (type T1)

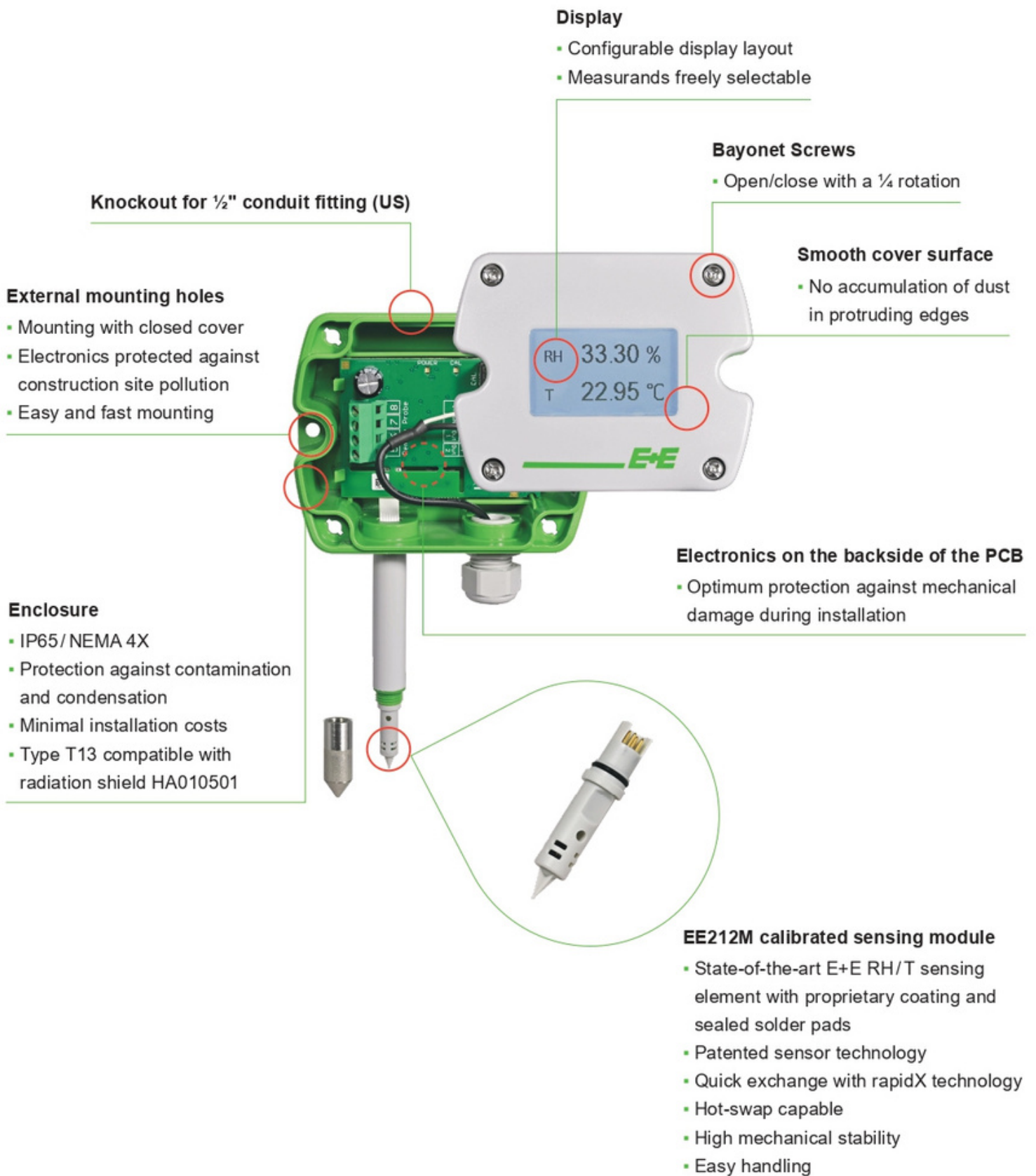


EE212 duct mounting (type T2)



EE212 outdoor (type T13)

Features



Inspection certificate
according to DIN EN 10204-3.1

Test report
according to DIN EN 10204-2.2

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Features

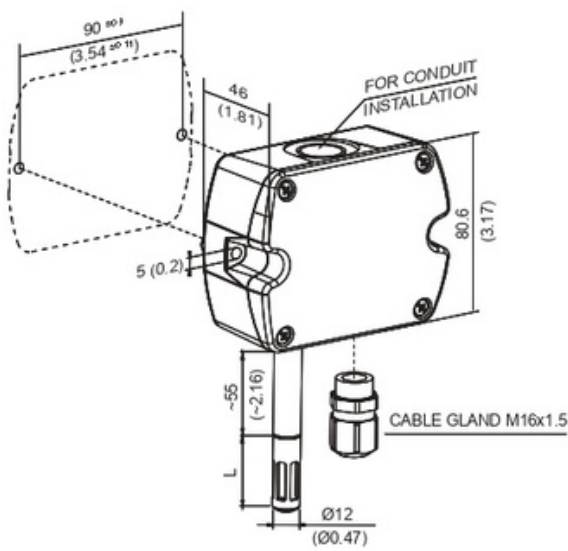
Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. 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.

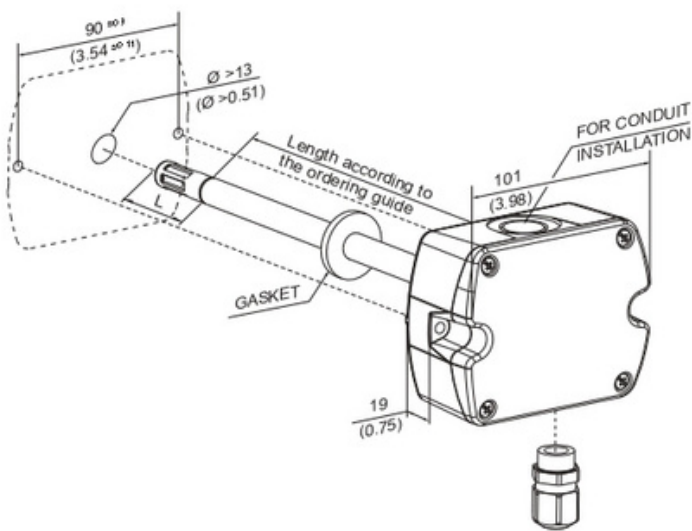
Dimensions

Values in mm / inch

Type T1



Type T2



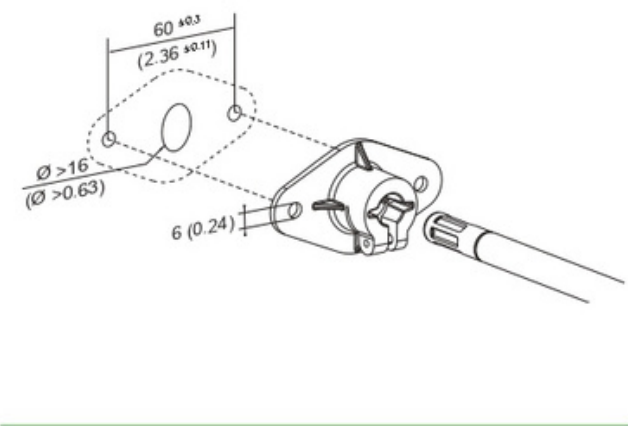
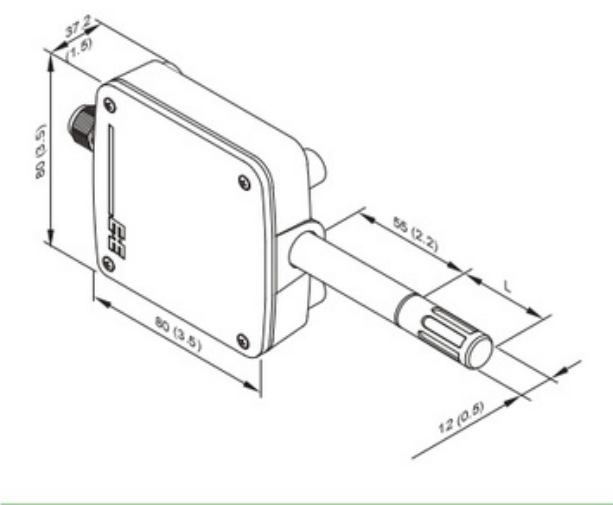
L = filter cap length	mm (inch)
Membrane	34 (1.4)
Stainless steel	33 (1.3)
Metal grid	33 (1.3)

Dimensions

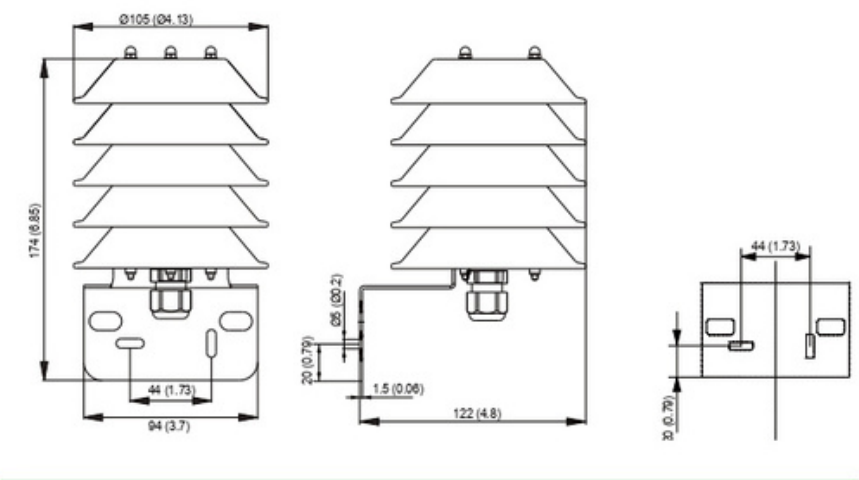
Values in mm/ inch

Type T13

Mounting flange
in the scope of supply for type T2



Radiation shield HA010501 for type T13
needs to be ordered separately



Technical Data

Outputs

Analogue			
Two freely selectable and scalable outputs	0 - 5 V / 0 - 10 V	-1 mA < I _L < 1 mA	I _L = load current
	4 - 20 mA (2-wire)	R _L ≤ 500 Ω	
	0 - 20 mA (3-wire)	250 ≤ R _L ≤ 500 Ω recommended for Type T13 R _L ≤ 500 Ω	R _L = load resistance

Digital	
Digital interface	RS485 (EE212 = 1 unit load)
Protocol	Modbus RTU
Factory settings	Baud rate according to ordering guide, parity even, 1 stop bit, Modbus address 46
Supported Baud rates	9 600, 19 200 and 38 400
Data types for measured values	FLOAT32 and INT16

General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	4 - 20 mA (2-wire)	(10 V + R _L * 20 mA) < V+ < 30 V DC for Type T13: 24 V DC +/- 10 % recommended	
	0 - 5 V / 0 - 10 V 0 - 20 mA (3-wire) RS485	15 - 35 V DC or 24 V AC ±20%	
Current consumption at 24 V	Voltage output	DC supply max. 12 mA AC supply max. 34 mA _{rms}	with display max. 23 mA 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 AC supply typ. 65 mA _{rms}	with display max. 44 mA with display max. 84 mA _{rms}
	Digital interface	DC supply typ. 5 mA AC supply typ. 15 mA _{rms}	with display max. 20 mA with display max. 35 mA _{rms}
Electrical connection	Screw terminals max. 1.5 mm ²		
Cable gland	M16x1.5		
Display ¹⁾	Available for Type T1/T2, 1, 2 or 3 lines, user configurable Optional with backlight		
Temperature ranges		Without display	With display
	Operation	-40...+60 °C (-40...+140 °F)	-20...+50 °C (-4...+122 °F)
	Storage	-40...+60 °C (-40...+140 °F)	-20...+60 °C (-4...+140 °F)
Enclosure	Material Protection rating	PC (Polycarbonate), UL94 V-0 (with Display UL94 HB) approved IP65/ NEMA 4X	
Electromagnetic compatibility	EN 61326-1:2013 FCC Part15 Class A	EN 61326-2-3:2013 ICES-003 Class A	Industrial environment
Conformity	 		

1) For display operation with EE212-xA6 (4 - 20 mA, 2-wire) both outputs must be connected.

Relative humidity (RH)

Measuring range	0... 100 %RH
Accuracy¹⁾ incl. hysteresis, non-linearity and repeatability @ 23 °C (73 °F) -15...+60 °C (5...+140 °F) -40...-15 °C (-40...+5 °F)	±(1.5 + 0.005*mv) %RH ±(1.8 + 0.007*mv) %RH Additional uncertainty ±0.125 %RH/°C ²⁾

mv = measured value

Temperature (T)

Measuring range	-40...+60 °C (-40...+140 °F)
Accuracy	 The graph shows the accuracy of the device across its measuring range. The y-axis represents the temperature difference $\pm \Delta T$ in °C, ranging from 0 to 0.5. The x-axis represents the temperature T in °C, ranging from -40 to 60. The shaded area indicates the maximum error, which is approximately 0.5 °C at -40 °C and 60 °C, and reaches a minimum of about 0.3 °C at 25 °C.

		from		up to		unit	
Dew point temperature	T _d ⁽¹⁾	-40	(-40)	60	(140)	°C	(°F)
Frost point temperature	T _f ⁽²⁾	-40	(-40)	0	(32)	°C	(°F)
Wet bulb temperature	T _w	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)

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Ordering Guide

Feature	Description	Code		
Hardware Configuration		EE212-		
	Type	T1		
			T2	
				T13
	Probe length		L50	
			L200	
	Output	A2		
		A3		
		A5		
		A6		
		J3		
	Filter	F2		
		F3		
		F4		
	Display ¹⁾	No code		No code
		D1		
		D2		
Setup Analogue Outputs	Output 1 measurand	No code		
		MA1		
		MA2		
		MAxx		
	Output 1 scaling low	No code		
		SALValue		
	Output 1 scaling high	No code		
		SAHValue		
	Output 2 measurand	No code		
		MB2		
		MBxx		
	Output 2 scaling low	No code		
		SBLValue		
RS485 Setup	Protocol	P1		
	Baud rate	BD5		
		BD6		
		BD7		
	Units	No code		
		U2		

1) Factory setup: the display shows the measurands selected for output 1 and output 2 for analogue versions, RH and T for digital versions.
2) Not with output A5.
3) Not with output A6.
4) Modbus Map and setup instructions: See User Guide and Modbus Application Note at www.epluse.com/ee212.

Measurand Code

For Output 1 and 2 in the Ordering Guide

Measurand		Unit	Code
			MAxx / MBxx
Temperature	T	°C °F	1 2
Relative humidity		%	10
Water vapour partial pressure	e	mbar psi	50 51
Dew point temperature	Td	°C °F	52 53
Wet bulb temperature	Tw	°C °F	54 55
Absolute humidity	dv	g/m³ gr/ft³	56 57
Mixing ratio	r	g/kg gr/lb	60 61
Specific enthalpy	h	kJ/kg BTU/lb	62 64
Frost point temperature	Tf	°C °F	65 66

Order Example

EE212-T2L200J3F4P1BD7

Feature	Code	Description
Type	T2	Duct mount
Probe length	L200	200 mm (4")
Output	J3	RS485
Filter	F4	Stainless steel sintered
Display	No code	Without display
Protocol	P1	Modbus RTU
Baud rate	BD7	38 400
Units	No code	Metric (SI)

Order Example

EE212-T1A6F2D1MB60SBL0SBH400

Feature	Code	Description
Type	T1	Wall mount
Output	A6	4 - 20 mA
Filter	F2	Membrane
Display	D1	Without backlight
Output 1 measurand	No code	Relative humidity RH [%]
Output 1 scaling low	No code	0 %RH
Output 1 scaling high	No code	100 %RH
Output 2 measurand	MB60	Mixing ratio [g/kg]
Output 2 scaling low	SBL0	0 g/kg
Output 2 scaling high	SBH400	400 g/kg

Ordering Guide Sensing Module

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

1) Minimum order quantity: 10 pcs

Order Example Sensing Module

EE212M-PK4

Feature	Code	Description
Packaging	PK4	Single packed

Accessories

For further information see datasheet [Accessories](#).

Description	Code
USB-C configuration stick	HA011070
PCS10 Product Configuration Software (free download: www.epluse.com/pcs10)	PCS10
Radiation shield for EE212 Outdoor (Type T13)	HA010501
Power supply adapter	V03
Protection cap for Ø12 mm probe	HA010783

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