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technology.



Datasheet EE212

Modular Humidity / Temperature Sensor



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 a BACnet MS/TP or Modbus RTU interface 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 exchange without any tools. 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 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 scaling, RS485 interface settings and the display setup.

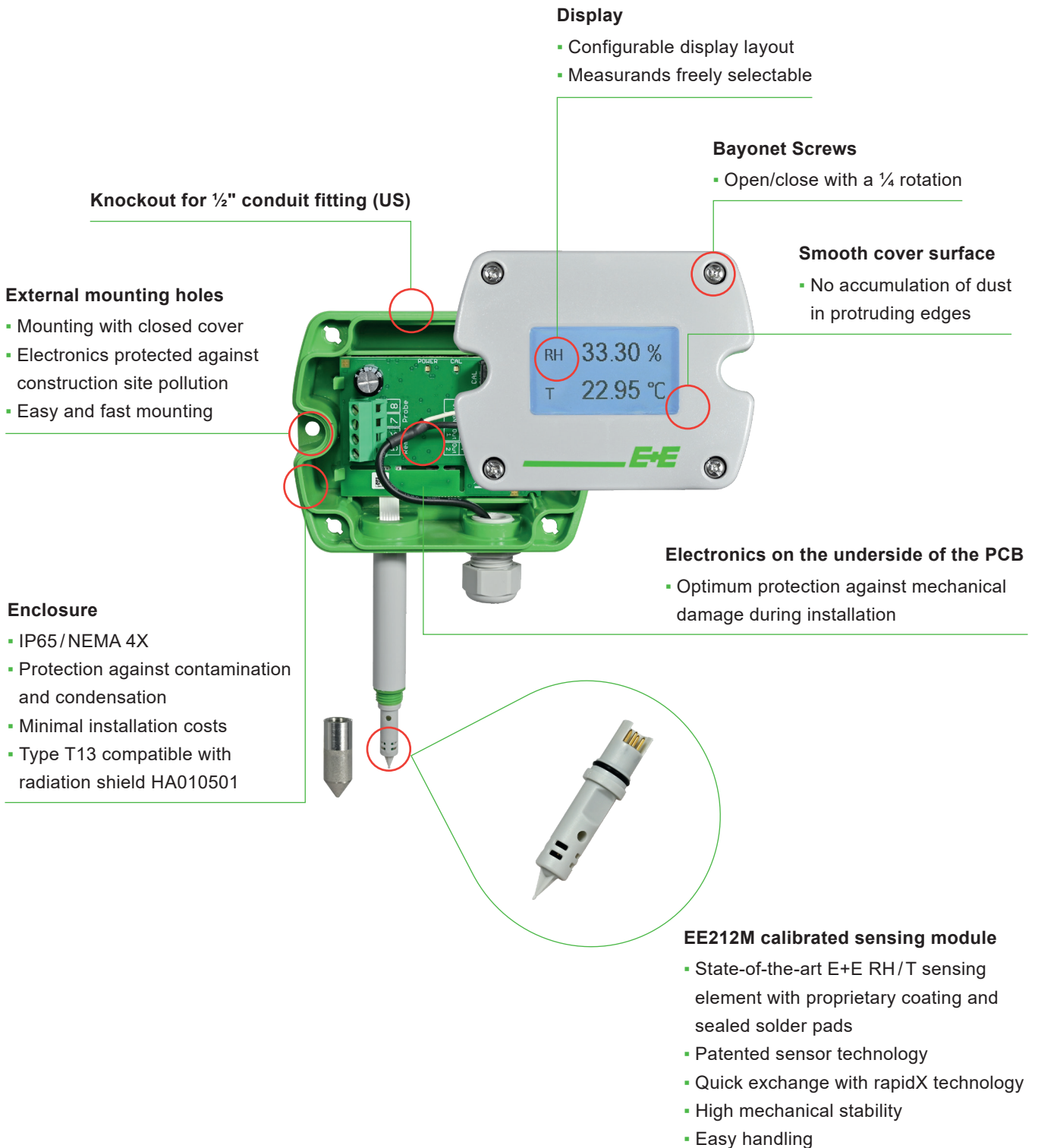


EE212 for wall mounting



EE212 outdoor

Features



Inspection certificate
according to DIN EN 10204-3.1

Test report
according to DIN EN 10204-2.2

Features

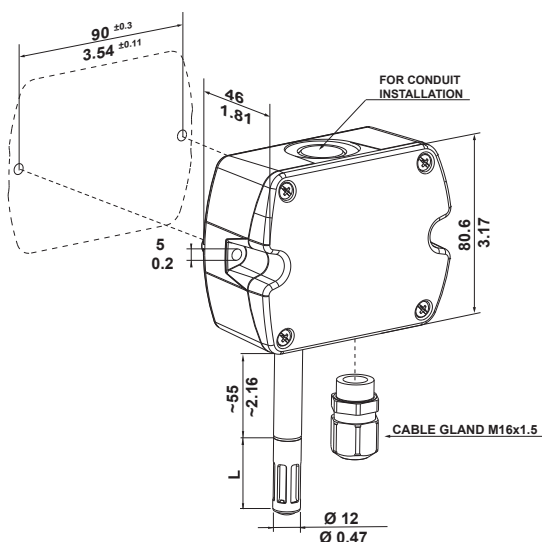
Protective Sensor Coating

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.

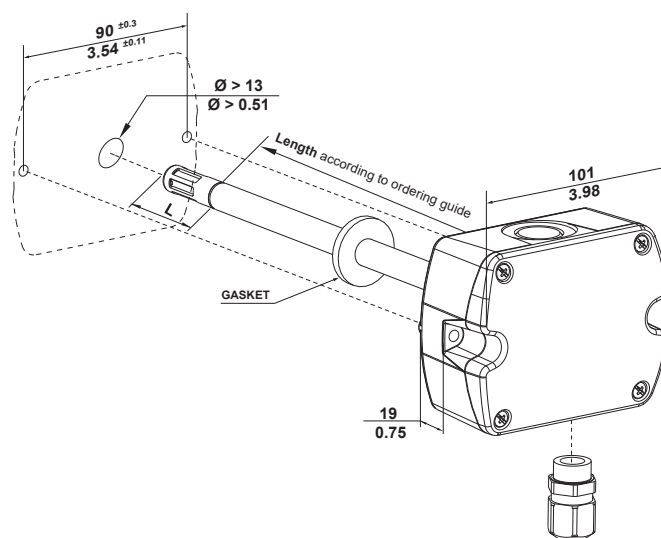
Dimensions

Values in mm/inch

Type T1



Type T2

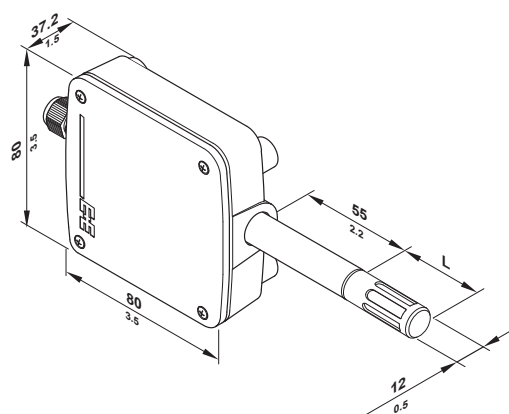


L = filter cap length	mm (inch)
Membrane	34 (1.4)
Stainless steel	33 (1.3)
Metal grid	33 (1.3)

Dimensions

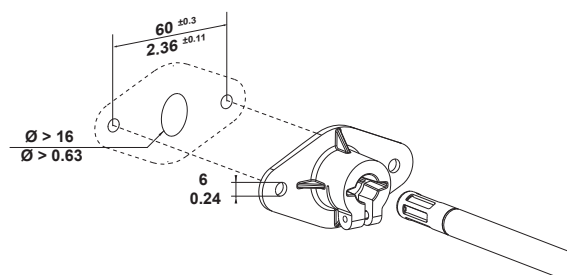
Values in mm/inch

Type T13



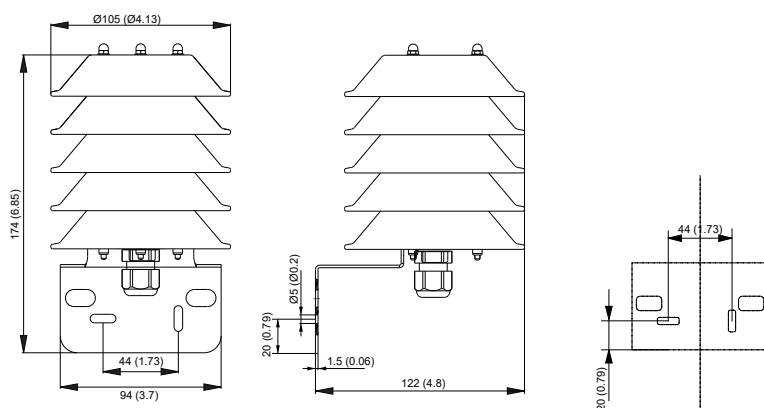
Mounting flange

in the scope of supply for type T2



Radiation shield HA010501 for type T13

needs to be ordered separately



Technical Data

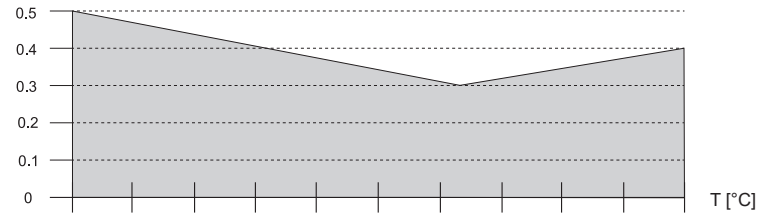
Measurands

Relative humidity (RH)

Measuring range	0...100 %RH
Accuracy ¹⁾ incl. hysteresis, non-linearity and repeatability @ 23 °C (73 °F) -15...+60 °C (5...+140 °F) -40...-15 °C (-40...+5 °F)	$\pm(1.5 + 0.005 \cdot mv) \%RH$ $\pm(1.8 + 0.007 \cdot mv) \%RH$ Additional uncertainty $\pm 0.125 \%RH/^{\circ}C^2$ mv = measured value

- 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 to GUM (Guide to the Expression of Uncertainty in Measurement).
 For Type T13: @ 24 V DC and RL=250 Ω for A6 Versions
 2) Deviating from -15 °C (5 °F)

Temperature (T)

Measuring range	-40...+60 °C (-40...+140 °F)
Accuracy	$\pm \Delta T [^{\circ}C]$ 

Calculated measurands

		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)

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)	$R_L \leq 500 \Omega$	
	0 - 20 mA (3-wire)	250 $\leq R_L \leq 500 \Omega$ recommended for Type T13 $R_L \leq 500 \Omega$	

 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	9600, 19200 and 38400
Data types for measured values	FLOAT32 and INT16
Protocol	BACnet MS/TP
Factory settings	Baud rate according to ordering guide, parity none, 1 stop bit, BACnet address 46
Supported Baud rates	9600, 19200, 38400, 57600, 76800 and 115200

General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	4 - 20 mA (2-wire)	(10 V + $R_L \cdot 20 \text{ mA}$) < V_+ < 30 V DC for Type T13: 24 V DC +/-10 % recommended	
	0 - 5 V / 0 - 10 V	15 - 35 V DC or 24 V AC $\pm 20\%$	
	0 - 20 mA (3-wire) RS485		
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		
Display¹⁾	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.

Ordering Guide

Feature		Description	Code		
Hardware Configuration			EE212-		
	Type	Wall mount	T1		
		Duct mount		T2	
		Outdoor			T13
	Probe length	50 mm (2")		L50	
		200 mm (4")		L200	
	Output	0 - 5 V	A2		
		0 - 10 V	A3		A3
		0 - 20 mA (3-wire)	A5		
		4 - 20 mA (2-wire)	A6		A6
		RS485	J3		
	Filter	Membrane	F2		
		Metal grid	F3		F3
		Stainless steel sintered	F4		
Display ¹⁾	Without display	No code		No code	
	Without backlight ²⁾	D1			
	With backlight ³⁾	D2			
Setup Analogue Outputs	Output 1 measurand	Relative humidity RH [%]	No code		
		Temperature T [°C]	MA1		
		Temperature T [°F]	MA2		
		Other measurand (xx see measurand code)	MAxx		
	Output 1 scaling low	0	No code		
		Value	SAL Value		
	Output 1 scaling high	100	No code		
		Value	SAH Value		
	Output 2 measurand	Temperature T [°C]	No code		
		Temperature T [°F]	MB2		
		Other measurand (xx see measurand code)	MBxx		
	Output 2 scaling low	-40	No code		
		Value	SBL Value		
	Output 2 scaling high	60	No code		
Value		SBH Value			
RS485 Setup	Protocol	Modbus RTU ⁴⁾	P1		
		BACnet MS/TP ⁵⁾	P3		
	Baud rate	9 600	BD5		
		19 200	BD6		
		38 400	BD7		
		57 600 ⁶⁾	BD8		
		76 800 ⁶⁾	BD9		
		115 200 ⁶⁾	BD10		
	Units	Metric (SI)	No code		
Non-metric (US/GB)		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.

5) Product Implementation conformance Statement (PICS) available at www.epluse.com/ee212.

6) Only for BACnet.

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/m ³ gr/ft ³	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

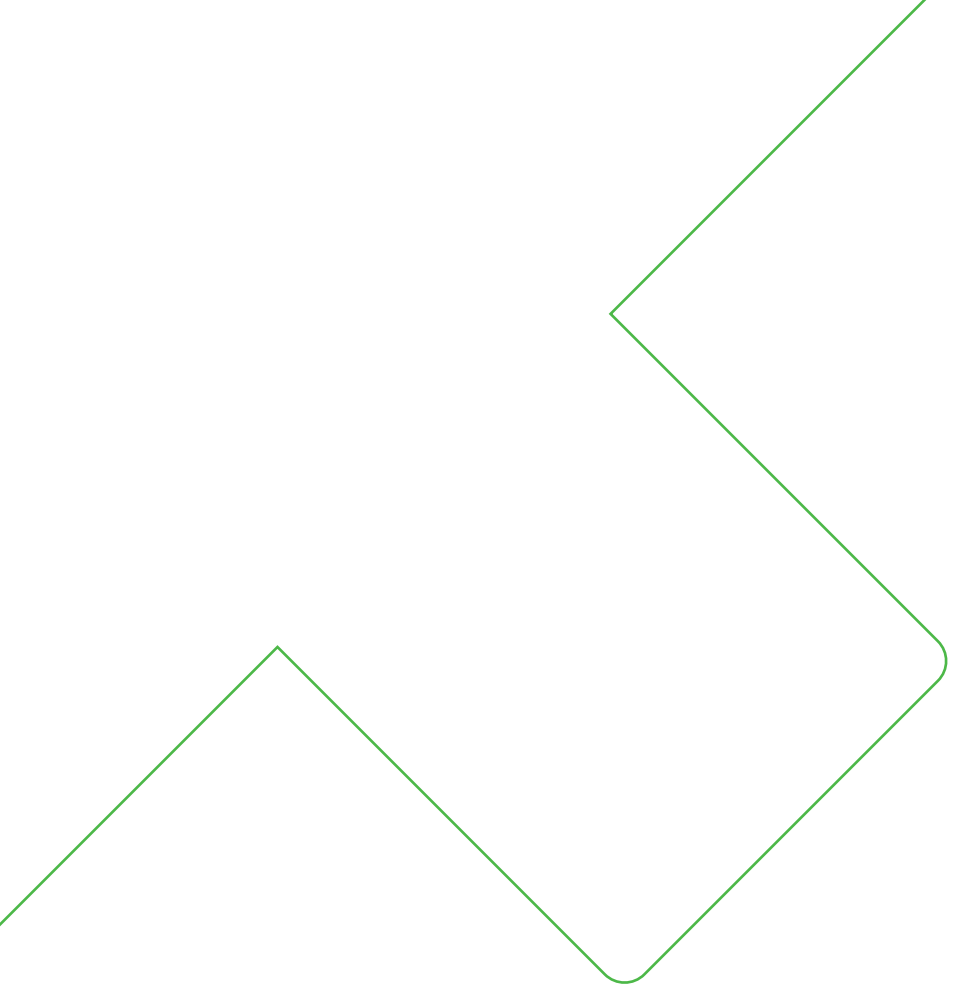
EE212M-PK4

Feature	Code	Description
Packaging	PK4	Single packed

Accessories

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

Accessories	Code
USB Configuration Adapter	HA011066
Product Configuration Software (free download: www.epluse.com/configurator)	EE-PCS
Radiation shield for EE212 Outdoor (Type T13)	HA010501
Power supply adapter	V03
Protection cap for Ø12 mm probe	HA010783



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