# 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 versions 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

The proprietary coating of the E+E sensing element, the wide choice of filter caps and the IP65 / NEMA 4 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 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 ½" 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 ¼ rotation

**Inspection certificate according DIN EN 10204-3.1**

**Display**
» Configurable display layout
» Measurands freely selectable

RH 33.30 %
T 22.95 ℃

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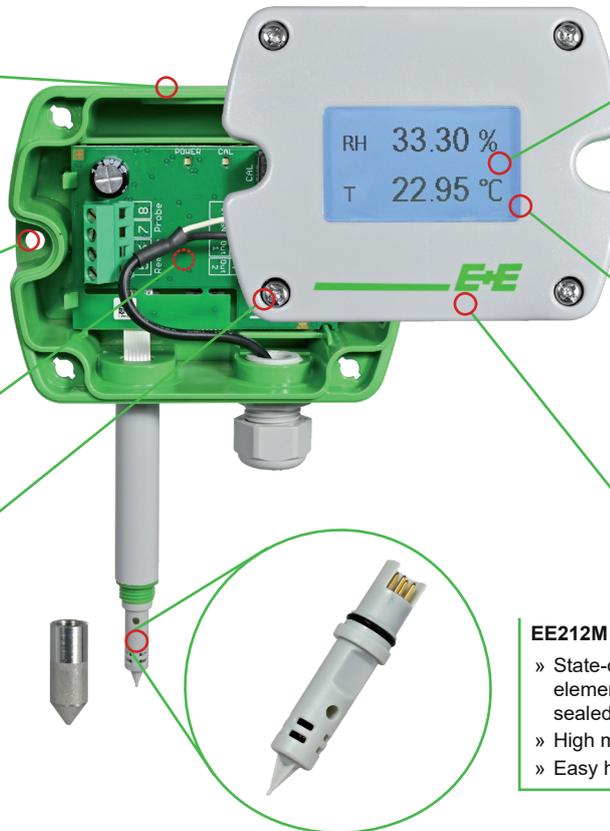» No accumulation of dust in protruding edges

**Enclosure**
» IP65 / NEMA 4
» Protection against contamination and condensation
» Minimal installation costs

**EE212M calibrated sensing module**
» State-of-the-art E+E RH / T sensing element with proprietary coating and sealed solder pads
» High mechanical stability
» Easy handling

## Protective Sensor Coating

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

### Measurands

**Relative Humidity**

| | |
|---|---|
| Working range | 0...100 % RH |
| Accuracy[1] (incl. hysteresis, non-linearity and repeatability) | |
| @ 23 °C (73 °F) | ±(1.5 + 0.005*mv) %RH       mv = measured value |
| -15...60 °C (5...140 °F) | ±(1.8 + 0.007*mv) %RH |
| -40...-15 °C (-40...5 °F) | Additional uncertainty ±0.125 %RH/°C[2] |

**Temperature**

Accuracy
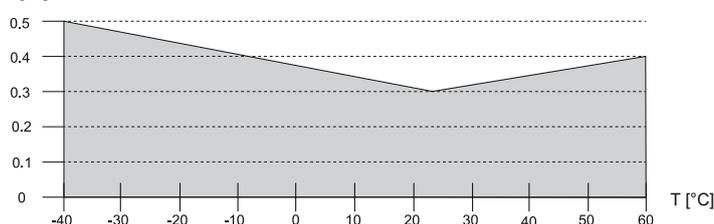


### Outputs

| **Analogue output** | 0 - 5 V / 0 - 10 V | -1 mA < $I_L$ < 1 mA |
|---|---|---|
| | 4 - 20 mA (2-wire) | $R_L$ ≤ 500 Ω |
| | 0 - 20 mA (3-wire) | $R_L$ ≤ 500 Ω |

### General

| Power supply class III ⟨III⟩ | | |
|---|---|---|
| for 4 - 20 mA (2-wire) | (10 V + $R_L$ x 20 mA) < V+ < 30 V DC | |
| for 0 - 20 mA (3-wire) for 0 - 5 V / 0 - 10 V | 15 - 35 V DC[3] or 24 V AC ±20 % | |
| 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$_{rms}$ |
| Display | 1, 2 or 3 lines, user configurable, optional with backlight | |
| Electrical connection | Screw terminals, max. 1.5 mm² | |
| Enclosure material | Polycarbonate, UL94V-0 (with Display UL94HB) approved | |
| Protection rating | IP65 / NEMA 4 | |
| Cable gland | M16 x 1.5 | |
| Electromagnetic compatibility | EN 61326-1:2013       EN 61326-2-3:2013 | |
| | Industrial Environment | |
| | FCC Part15 ClassA       ICES-003 ClassA | CE |
| Temperature ranges without display | Working:   -40...60 °C (-40...140 °F) | |
| | Storage:   -40...60 °C (-40...140 °F) | |
| Temperature ranges with display | Working:   -20...50 °C (-4...122 °F) | |
| | Storage:   -20...60 °C (-4...140 °F) | |

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).
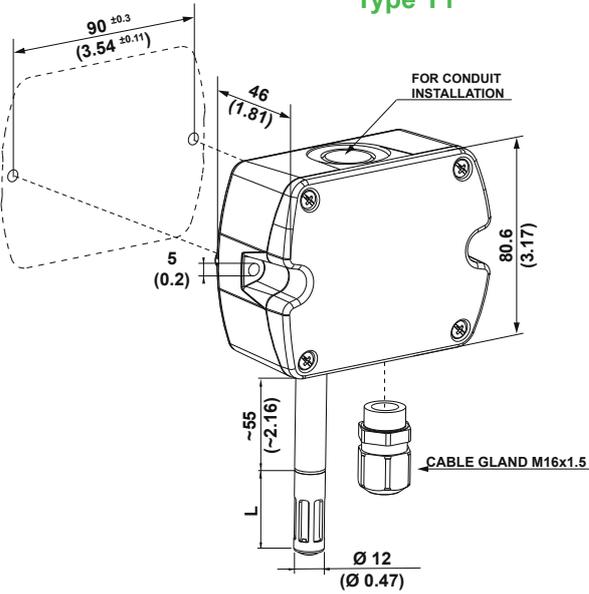2) Deviating from -15 °C (5 °F)
3) USA & Canada class 2 supply required, max. supply voltage 30 V DC

## Dimensions
**Values in mm (inch)**

### Type T1



90 ±0.3
(3.54 ±0.11)

46
(1.81)

**FOR CONDUIT INSTALLATION**

80.6
(3.17)

5
(0.2)

~55
(~2.16)

L

Ø 12
(Ø 0.47)

**CABLE GLAND M16x1.5**

| L = filter cap | mm (inch) |
|---|---|
| Membrane | 34 (1.4) |
| Stainless steel | 33 (1.3) |

### Type T2



90 ±0.3
(3.54 ±0.11)

Ø > 13
(Ø > 0.51)

Length according to ordering guide

L

101
(3.98)

**GASKET**

19
(0.75)
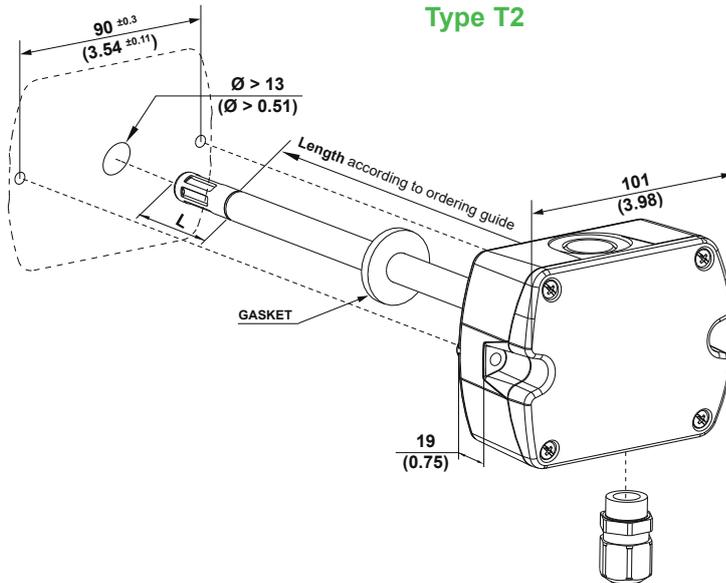
### Mounting flange
in the scope of supply for Type T2



60 ±0.3
(2.36 ±0.11)

Ø > 16
(Ø > 0.63)

6
(0.24)
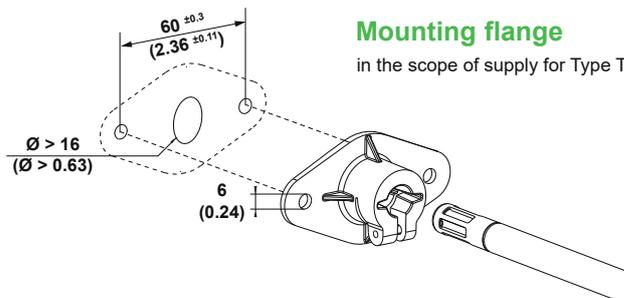
# Ordering Guide

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

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

| 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 |
| | [g/ft$^3$] | 57 |
| Mixing ratio r | [g/kg] | 60 |
| | [g/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) |
| Power supply adapter | V03 |
| Protection cap for 12 mm probe | HA010783 |