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Datasheet EE072

Humidity and Temperature Probe
with Digital Interface



EE072

Humidity and Temperature Probe with Digital Interface

The EE072 probe meets the highest requirements of demanding process and climate control applications such as in agriculture, life stock, food, pharma, clean rooms, outdoor, artificial snow machines and transportation. Besides the measurement of relative humidity (RH) and temperature (T) the EE072 calculates all other humidity related parameters.

Measurement Performance

The high-end E+E humidity sensing element manufactured in state-of-the-art thin film technology stands for outstanding measurement accuracy.

Long-Term Stability

The E+E proprietary coating protects the sensing element against corrosive and electrically conductive pollution. The combination of robust sensing head and fully encapsulated electronics leads to outstanding performance even in harsh and condensing environment.

Versatile and Reliable

With its IP65 stainless steel or polycarbonate enclosure and the wide choice of filter caps, the EE072 tackles even challenging industrial applications.

Easy Installation

The M12x1 connector and the standard-compliant digital communication via Modbus RTU or CANopen facilitate the design-in of the sensor and minimize installation costs.

Configurable and Adjustable

The setup and adjustment of the EE072 can be easily performed with an optional adapter and the free PCS10 Product Configuration Software.



EE072 with polycarbonate enclosure and membrane filter



EE072 with stainless steel enclosure and stainless steel sintered filter

Features



Measurement performance

- High RH / T accuracy
- Temperature compensation
- Calculated variables
 - Dew point (Td)
 - Frost point (Tf)
 - Wet bulb temperature (Tw)
 - Ice bulb temperature (Ti)
 - Water vapour partial pressure (e)
 - Mixture ratio (r)
 - Absolute humidity (dv)
 - Specific enthalpy (h)
- Configurable pressure compensation parameter

Mechanical construction

- Stainless steel or polycarbonate enclosure
- IP65
- Encapsulated electronics

Connection

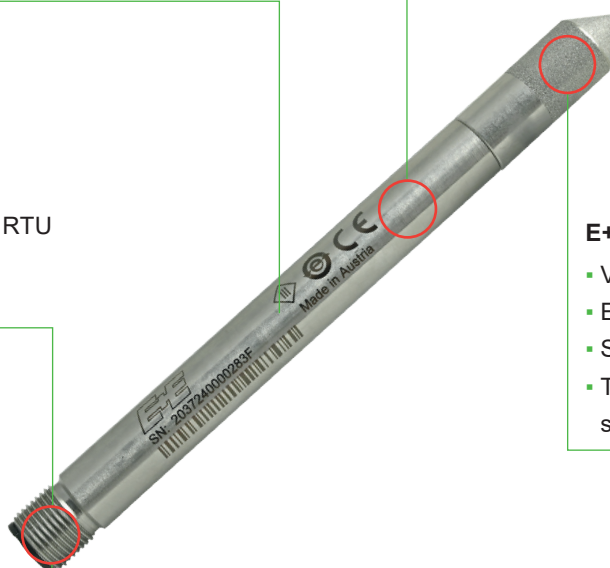
- RS485 with Modbus RTU
- CANopen
- M12x1 connector

E+E RH/T sensing element

- Very robust
- E+E proprietary coating
- Sealed solder pads
- Tested according to automotive standard AEC-Q200

Configurable and adjustable

- Free configuration software



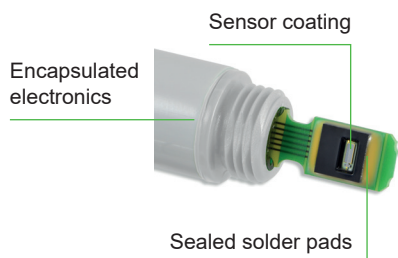
Inspection certificate

According to DIN EN 10204-3.1

Features

Protective Sensor Coating

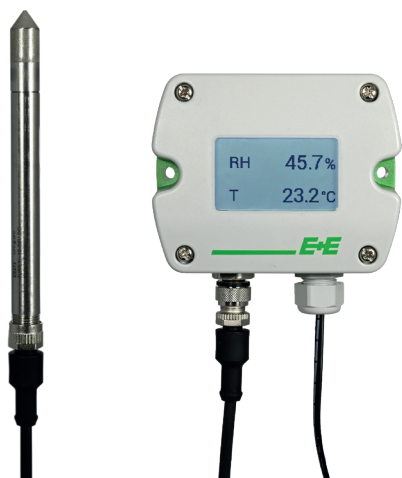
The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves the sensors'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



Sensing head with sensor coating and underfiller

E+E Modular Sensor Platform

The EE072 is compatible with the Sigma 05 host device of the E+E Modular Sensor Platform. Together they become a versatile, plug-and-play RH/T modular sensor with analogue outputs and optional display. Besides EE072, Sigma 05 accommodates also other E+E intelligent sensing probes. See www.epluse.com/sigma05 for further details.

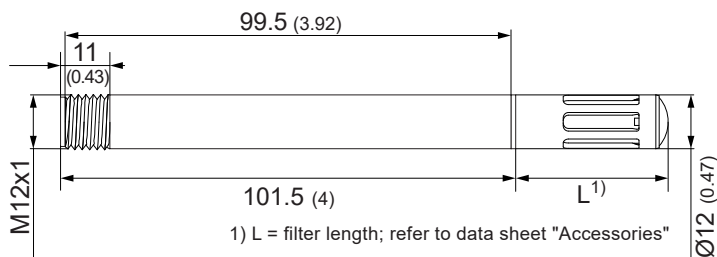


Sigma 05 with EE072

Dimensions

Values in mm (inch)

Probe



Technical Data

Measurands

Relative Humidity (RH)

| | |
|--|--|
| Measuring range | 0...100 %RH |
| Accuracy¹⁾ incl. hysteresis, non-linearity and repeatability | $\pm(1.3 + 0.3 \% \text{ mv}) \%RH$ $\pm 2,3 \%RH$ $\pm(1.5 + 1.5 \% \text{ mv}) \%RH$ |
| RH ≤ 90 % -15...+40 °C (5...+104 °F) | |
| RH > 90 % -15...+40 °C (5...+104 °F) -40...+80 °C (-40...+176 °F) | |
| Response time t₉₀ , typ. @20 °C (68 °F) | ≤15 s with stainless steel grid filter |
| Measuring interval | 1 s |
| Resolution | 0.01 %RH |

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 Modbus, the accuracy is defined at a 12 V DC supply, baud rate 9600, without termination resistor, a polling interval ≥1 s and a flow velocity > 0.2 m/s. For CANopen, the accuracy is defined at a flow velocity > 0.2 m/s.

Temperature (T)

| | |
|------------------------------|-----------------------------|
| Measuring range | -40...+80 °C (-40...176 °F) |
| Accuracy¹⁾ | $\pm \Delta T [^{\circ}C]$ |
| Measuring interval | 1 s |
| Resolution | 0.01 °C |

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 Modbus, the accuracy is defined at a 12 V DC supply, baud rate 9600, without termination resistor, a polling interval ≥1 s and a flow velocity > 0.2 m/s (39 ft/min). For CANopen, the accuracy is defined at a flow velocity > 0.2 m/s (39 ft/min).

Technical Data




Outputs

Digital

| | |
|--|--|
| Digital interface | RS485 (EE072 = 1 unit load) |
| Protocol Factory settings¹⁾ Supported Baud rates Measured data types | Modbus RTU 9 600 Baud, parity even, 1 stop bit, Modbus address 234 9 600, 19 200, 38 400, 57 600, 76 800 and 115 200 FLOAT32 und INT16 |
| Protocol / Profile Connector Factory settings Supported Baud rates | CANopen / device profile CiA 404 M12x1, 5 poles, pin assignment according to CiA 303-1 Data rate 125 kBit/s ²⁾ , node ID 64 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 MBit/s |

- 1) For more details about communication setting see User Manual and Modbus Application Note at www.epluse.com/ee072.
2) For further information on the configuration see software instruction manual and the EDS file (Electronic Data Sheet).

General

| | |
|---|---|
| Power supply class III  USA & Canada: Class 2 supply necessary | 10 - 28 V DC |
| Current consumption , typ. | 3 mA (RS485, without termination resistor) 8 mA (CAN) |
| Storage conditions | -40...80 °C (-40...176 °F) 0...95 %RH, non-condensing |
| Enclosure | Material Polycarbonate RAL 7035 Stainless steel 1.4404 / AISI 316 Protection rating IP65 (when plugged into an appropriate M12x1 socket) |
| Electromagnetic compatibility | EN 61326-1:2013 EN 61326-2-3:2013 Industrial environment FCC Part15 Class B ICES-003 Class B |
| Conformity |   |
| Configuration and adjustment | PCS10 Product Configuration Software Free download from www.epluse.com/pcs10 |

Ordering Guide

| Feature | Description | Code | |
|----------------------|---|---------------|------------|
| | | EE072- | |
| Enclosure material | Polycarbonate (PC) | HS1 | |
| | Stainless steel | HS2 | |
| Temperature accuracy | High | TT1 | |
| | Standard | TT2 | TT2 |
| Filter | Membrane, polycarbonate body | F2 | |
| | Metal grid, polycarbonate body | F3 | |
| | Stainless steel sintered | F4 | |
| | Polytetrafluoroethylene (PTFE) | F5 | |
| | Stainless steel - metal grid (up to 180 °C / 356 °F) | F9 | |
| | PTFE membrane, stainless steel body | F11 | |
| | Catalytic for H ₂ O ₂ sterilisation | F12 | |
| Digital interface | RS485 (Modbus RTU) | J3 | |
| | CANopen | | J8 |

Order Examples

EE072-HS2TT1F4J3

| Feature | Code | Description |
|----------------------|------------|--------------------------|
| Enclosure material | HS2 | Stainless steel |
| Temperature accuracy | TT1 | High |
| Filter | F4 | Stainless steel sintered |
| Digital interface | J3 | RS485 (Modbus RTU) |

EE072-HS1TT2F3J8

| Feature | Code | Description |
|----------------------|------------|--------------------------------|
| Enclosure material | HS2 | Polycarbonate (PC) |
| Temperature accuracy | TT2 | Standard |
| Filter | F3 | Metal grid, polycarbonate body |
| Digital interface | J8 | CANopen |

Accessories

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

| Accessories general | Code |
|--|----------|
| E+E Product Configuration Software (Free download: www.epluse.com/pcs10) | PCS10 |
| Protection cap for the M12 cable socket | HA010781 |
| Protection cap for the M12 plug of EE072 | HA010782 |
| Protection cap for 12 mm (0.47") probe | HA010783 |
| Stainless steel mounting flange | HA010201 |
| Plastic mounting flange | HA010202 |
| M12 Y adaptor | HA030204 |
| Wall mounting clip | HA010211 |
| Radiation shield for probes with Ø12mm (Ø0.47") | HA010502 |
| Drip water protection | HA010503 |

| Accessories Modbus | Code | |
|--|----------------|----------|
| M12 cable connector for self assembly, 4 poles | HA010707 | |
| Modbus configuration adapter | HA011018 | |
| Connection cable M12 - flying leads | 1.5 m (59.06") | HA010819 |
| | 5 m (196.85") | HA010820 |
| | 10 m (393.70") | HA010821 |

| Accessories CAN | Code |
|--|----------|
| M12 cable connector for self assembly, 5 poles | HA010708 |
| CAN configuration adapter | HA011021 |
| Connection cable CAN with 120 Ω termination, M12/1.5 m | HA010850 |



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