E+E

your partner
in sensor
technology.

# Datasheet HTS201

## Room Sensor for Relative Humidity and Temperature


Modbus

www.epluse.com

# HTS201

## Room Sensor for Relative Humidity and Temperature

HTS201 is dedicated for accurate and reliable measurement of relative humidity (RH) and temperature (T) in residential and commercial building automation.

### Outstanding Measurement Performance with Patented Sensor Technology

The E+E RH/T sensing element with proprietary protection ensures excellent long-term performance of the HTS201 over the entire working range and even in dusty and dirty environment. The innovative enclosure avoids false air ingress and significantly reduces self-heating.

### Outputs and Digital Interface

The RH and T measured data is available either on two analogue outputs, or on the digital RS485 interface with Modbus RTU protocol. Additionally, the dewpoint temperature Td is available via Modbus RTU.

### Functional Design, Cost-saving Installation

The elegant enclosure is available in two sizes according to regional standards and features an optional display. The back cover contains just the push-in spring terminals and can be mounted and wired without the front cover containing the electronics. Thus, the active part of the device is not exposed to construction site pollution and can be simply snapped onto the back cover right before commissioning. Besides, the active part can be replaced without tools within seconds.

### Configuration

The digital version with RS485 interface can be set up and configured via PC with the free PCS10 Product Configuration Software and an optional configuration stick.


HTS201 in US format with display


HTS201 in EU format without display



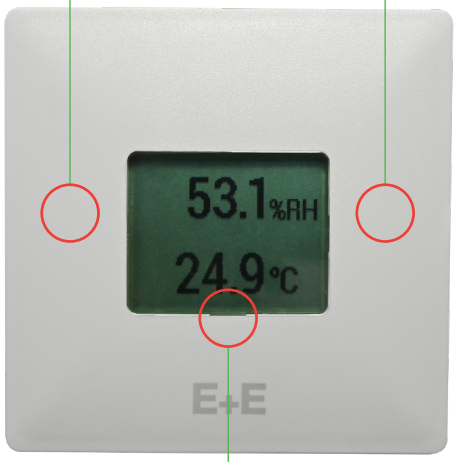
# Features

**Measurement performance**

- High RH/T accuracy
- Excellent long term stability
- State-of-the-art E+E RH/T sensing element
  - Protected by E+E proprietary coating
  - Patented sensor technology

**Enclosure and connection**

- Innovative design avoids false air ingress
- Time saving installation and wiring
  - Snap-on without tools
  - Push-in spring terminals
  - All electronics inside the front cover
- Smooth cover surface
  - Dust repellent
  - Easy cleaning
- EU and US format
- UL94HB approved enclosure material




**Outputs**

- Two analogue outputs
  - 0 - 10 V
  - 4 - 20 mA
- RS485 interface with Modbus RTU
- Large graphic display

**Inspection certificate**

According to DIN EN 10204-3.1
available via E+E certificate service



# 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.

### Accredited Traceable Calibration Certificate

Internationally recognised certificates for the calibration of measuring instruments from accredited laboratories document the traceability of the measurements to the International System of Units (SI). The E+E Elektronik calibration laboratory offers two levels of traceable calibrations.

- As a Designated Institute (DI) of the Republic of Austria, the E+E calibration laboratory maintains Austria's national measurement standards for humidity, dew point temperature, air velocity and $CO_2$. This authorises the E+E calibration laboratory to issue calibration certificates at the level of a National Metrological Institute (NMI).
- The E+E calibration laboratory is accredited by Akkreditierung Austria in accordance with DIN EN ISO/IEC 17025 with the identification number 0608. This allows the laboratory to issue ISO 17025 certificates for the measurands humidity, temperature, dew point temperature, air velocity, flow, pressure and $CO_2$.

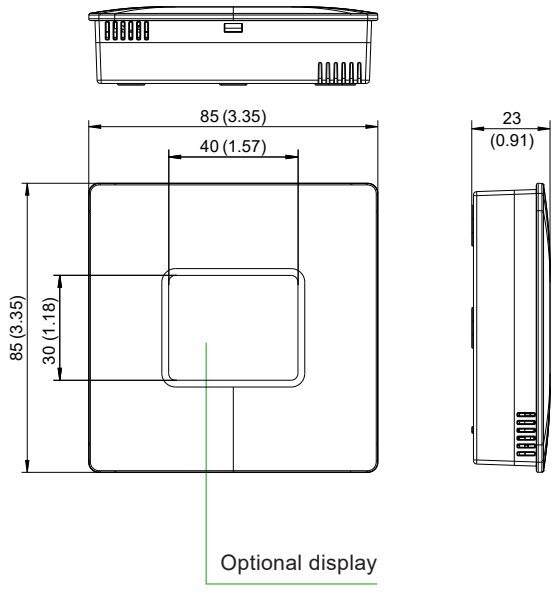
Visit www.epluscal.com for detailed information on calibration and to enquire a certificate of accredited traceable calibration for the HTS201 from the Designated Institute.

# Dimensions

Values in mm (inch)

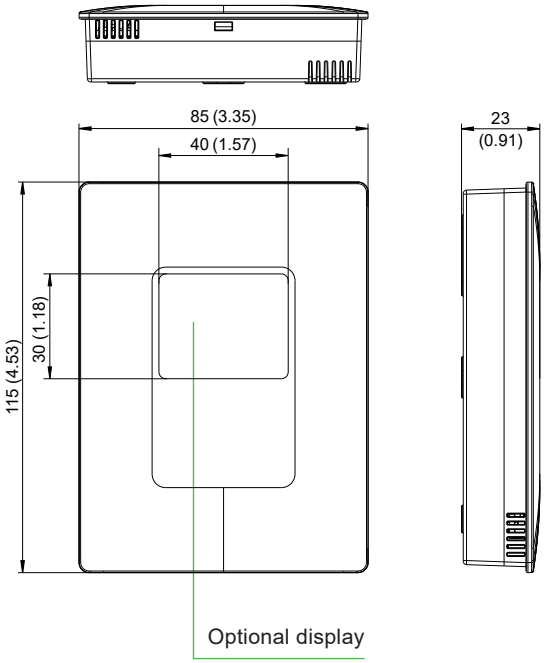
**Enclosure**

EU format




**Enclosure**

US format





# Technical Data

## Measurands

### Relative Humidity (RH)

| | | |
|---|---|---|
| **Measuring range** | 0...100 %RH, non-condensing | |
| **Accuracy**[1)]<br>incl. hysteresis, non-linearity and repeatability<br>**0...100 %RH** | ±(2 + 0.003 * mv) %RH | mv = measured value |
| **Temperature dependency of electronics**, typ. | 0.008 % RH / °C (0.004 %RH / °F) | |
| **Factory calibration uncertainty**[2)]<br>@ 23 °C (73 °F) **≤90 %RH**<br>**>90 %RH** | ±(0.7 + 0.003 * mv) %RH<br>±1 %RH | mv = measured value |

1) Defined against E+E calibration reference at 23 °C (73 °F). With supply voltage 24 V DC, 0.2 m/s (39.4 ft/min) medium flow and load resistor 250 Ω for version with current output.
2) Defined at with a coverage factor k=2, corresponding to a confidence level of 95 %.

### Temperature (T)

| | |
|---|---|
| **Measuring range** | -30...+60 °C (-22...+140 °F) |
| **Accuracy**[1)]<br>**0- 10 V, RS485**<br>**4 - 20 mA (2-wire)** | <br>±0.25 °C (±0.45 °F)<br>±0.38 °C (±0.68 °F) |
| **Temperature dependency of electronics**, typ. | 0.006 °C/°C (0.006 °F/°F) |
| **Factory calibration uncertainty**[2)]<br>@ 23 °C (73 °F) | ±0.1 °C (±0.18 °F) |

1) Defined @ 23 °C (73 °F) against E+E calibration reference. With supply voltage 24 V DC, 0.2 m/s (39.4 ft/min) medium flow and load resistor 250 Ω for version with current output.
2) Defined with a coverage factor k=2, corresponding to a confidence level of 95 %.

### Calculated Physical Quantity

| | | from | up to | unit |
|---|---|---|---|---|
| **Dew point temperature** | Td | -30 (-22) | +60 (+140) | °C (°F) |

## Outputs

### Analogue

| | | | |
|---|---|---|---|
| **T: acc. to ordering guide**<br>**RH: 0...100 %** | 0 - 10 V<br>4 - 20 mA (2-wire) | -1 mA < $I_L$ < 1 mA<br>$R_L$ < (V+ - 10) / 0.02 < 500 Ω | $I_L$ = load current<br>$R_L$ = load resistance |

### Digital

| | |
|---|---|
| **Digital interface** | RS485 (HTS201 = 1 unit load) |
| **Protocol**<br>**Factory settings**<br>**Supported Baud rates**[1)]<br>**Measured data type** | Modbus RTU<br>Baud rate according to ordering guide, 8 data bits, parity even, 1 stop bit, Modbus address 45<br>9 600, 19 200 and 38 400<br>FLOAT32 and INT16 |

1) Ex works: see ordering guide.

# Technical Data

## General

| | | | |
|---|---|---|---|
| **Power supply** class III<br>USA & Canada: Class 2 supply necessary, max. voltage 30 V DC | | | |
| **0 - 10 V, RS485**<br>**4 - 20 mA (2-wire)** | 15 - 35 V DC or 24 V AC ±20 %<br>10 + 0.02 x $R_L$ < V+ < 35 V DC ($R_L$ < 500 Ω) | | $R_L$ = load resistance |
| **Current consumption,** typ. | | **@ 24 V DC** | **@ 24 V AC** |
| | **0 - 10 V** | 6 mA | 14 $mA_{rms}$ |
| | **4 - 20 mA** | Acc. to output current | |
| | **RS485** | 5 mA | 12 $mA_{rms}$ |
| **Electrical connection** | Push-in spring terminals max. 1.5 $mm^2$ (AWG 16) | | |
| **Display** | 1.8" LCD, dot-matrix, 2 lines, visible area 38 x 31 mm (1.5" x 1.2") | | |
| **Humidity range** | | | |
| **Operation** | 0…100 %RH non-condensing | | |
| **Storage** | 0…95 %RH non-condensing | | |
| **Temperature range, operation and storage** | | | |
| **without display** | -30...+60 °C (-22...+140 °F) | | |
| **with display** | -20...+60 °C (-4...+140 °F) | | |
| **Enclosure** | | | |
| **Material** | PC (Polycarbonate), RAL 9003 (signal white), UL94 HB approved | | |
| **Protection rating** | IP30 | | |
| **Electromagnetic compatibility** | EN 61326-1<br>FCC Part15 Class B | EN 61326-2-3<br>ICES-003 Class B | Industrial environment |
| **Shock and vibration** | Tested according to EN 60068-2-64 and EN 60068-2-27 | | |
| **Conformity** | CE UKCA | | |
| **Configuration**[1)] | PCS10 Product Configuration Software (free download) and optional USB-C configuration stick | | |

1) With digital versions only.

# Ordering Guide

| | Feature | Description | Code | |
|---|---|---|---|---|
| | | | HTS201- | |
| Hardware Configuration | Model | RH + T | M1 | |
| | Output | 0 - 10 V | A3 | |
| | | 4 - 20 mA (2-wire) | A6 | |
| | | RS485 | | J3 |
| | Display | Without display | No code | |
| | | Display | D1 | |
| | Design | EU format | No code | |
| | | US format | RG2 | |
| Setup Analogue | Output 1 measurand | RH [%] | No code | |
| | Output 2 measurand | Temperature T [°C] | No code | |
| | | Temperature T [°F] | MB2 | |
| | Output 2 scaling low | 0 | No code | |
| | | Value[1)] | SBL*Value* | |
| | Output 2 scaling high | 50 | No code | |
| | | Value[1)] | SBH*Value* | |
| Setup Digital | Protocol | Modbus RTU[2)] | | P1 |
| | Baud rate | 9 600 | | BD5 |
| | | 19 200 | | BD6 |
| | | 38 400 | | BD7 |
| | Units | Metric (SI) | | No code |
| | | Non-metric (US/GB) | | U2 |
| | Accredited Traceable Calibration Certificate in accordance with DIN EN ISO/IEC 17025 | | see www.eplusecal.com | |

1) -35 °C (-31 °F) ≤ T scaling low < 20 °C (68 °F), 25 °C (77 °F) < T scaling high ≤ 70 °C (158 °F), T scaling high – T scaling low ≥ 20 °C (36 °F).
2) Factory setting: Even parity, 1 stop bit. Modbus Map see User Manual at www.epluse.com/hts201.

# Order Example

## HTS201-M1A3D1

| Feature | Code | Description |
|---|---|---|
| Model | M1 | RH + T |
| Output | A3 | 0 - 10 V |
| Display | D1 | With display |
| Design | No code | EU format |
| Output 1 measurand | No code | RH [%] |
| Output 2 measurand | No code | °C |
| Output 2 scaling low | No code | 0 |
| Output 2 scaling high | No code | 50 |

# Order Example

**HTS201-M1J3P1BD5**

| Feature | Code | Description |
|---|---|---|
| **Model** | **M1** | RH + T |
| **Output** | **J3** | RS485 |
| **Display** | **No code** | Without display |
| **Design** | **No code** | EU format |
| **Protocol** | **P1** | Modbus RTU |
| **Baud rate** | **BD5** | 9600 |
| **Units** | **No code** | Metric (SI) |

# Accessories

For further information see datasheet Accessories.

| Description | Code |
|---|---|
| **E+E Product Configuration Software**<br>(Free download from www.epluse.com/pcs10) | **PCS10** |
| **USB-C configuration stick for HTS201 digital** | **HA011070** |



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