E E ELEKTRONIK HTP201 Humidity and Temperature Probe User Manual

Contents

User Manual

HTP201
Humidity and Temperature Probe with Analogue Outputs

YOUR PARTNER IN SENSOR TECHNOLOGY

ELEKTRONIK® Ges.m.b.H.

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The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

EMC note USA (FCC):
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

EMC note Canada (ICES-003):
CAN ICES-3 (A) / NMB-3 (A)

1 General

This user manual serves for ensuring proper handling and optimal functioning of the device. The user manual shall be read before commissioning the equipment and it shall be provided to all staff involved in transport, installation, operation, maintenance and repair. The user manual may not be used for the purposes of competition without the written consent of E+E Elektronik® and may not be forwarded to third parties. Copies may be made for internal purposes. All information, technical data and diagrams included in these instructions are based on the information available at the time of writing.

Please find this document and further product information on our website at www.epluse.com/htp201.

1.1 Explanation of Symbols

This symbol indicates safety information.
It is essential that all safety information is strictly observed. Failure to comply with this information can lead to personal injuries or damage to property. E+E Elektronik® assumes no liability if this happens.

This symbol indicates instructions.
The instructions shall be observed in order to reach optimal performance of the device.

1.2.1 General Safety Instructions

- Avoid any unnecessary mechanical stress and inappropriate use.
- When replacing the filter cap make sure not to touch the sensing elements.
- The device must be operated with the filter cap on at all times.
- Installation, electrical connection, maintenance and commissioning shall be performed by qualified personnel only.
- Use the HTP201 only as intended and observe all technical specifications.
- Do not use HTP201 in explosive atmosphere or for measurement of aggressive gases.

1.2.2 Intended Use

The HTP201 is intended for highly accurate and cost effective humidity (RH) and temperature (T) measurement in demanding process applications. The RH and T measured data is available on two analogue outputs for voltage (0 – 1 V, 0 – 5 V or 0 – 10 V) or current (4 – 20 mA, 2-wire). In addition, the HTP201 has a passive T output (4-wire), a wide temperature and supply voltage range, making it a universally applicable probe.

The use of the HTP201 in any other way than described in this manual bears a safety risk for people and the entire measurement installation and is therefore not allowed.
The manufacturer cannot be hold responsible for damages as a result of incorrect handling, installation, and maintenance of the equipment.

In order to avoid damage to the instrument or health hazards, the measuring equipment must never be manipulated with tools that are not specifically described in this manual.

The sensor may only be utilized in accordance with the conditions defined in the technical data.
Otherwise, measurement inaccuracies will occur and equipment failures cannot be ruled out.

The steps recommended by the manufacturer for installation, inspections and maintenance work must be observed and carried out for the safety of the user and for the functionality of the equipment.

Unauthorized product modification leads to loss of all warranty claims. This may be accomplished only with an explicit permission of E+E Elektronik®!

1.2.3 Mounting, Start-up and Operation

The HTP201 humidity and temperature probe has been produced under state of the art manufacturing conditions, has been thoroughly tested and has left the factory fulfilling all safety criteria. The manufacturer has taken all precautions to ensure safe operation of the device. The user must ensure that the device is set up and installed in a manner that does not have a negative effect on its safe use.

The user is responsible for observing all applicable safety guidelines, local and international, with respect to safe

installation and operation on the device. This user manual contains information and warnings that must be observed by the user in order to ensure safe operation.

- Mounting, start-up, operation and maintenance of the device may be performed by qualified staff only. Such staff must be authorized by the plant operator to carry out the mentioned activities.
- The qualified staff must have read and understood this user manual and must follow the instructions contained within.
- All process and electrical connections shall be thoroughly checked by authorized staff before putting the device into operation.
- Do not install or start-up a device supposed to be faulty. Make sure that such devices are not accidentally used by marking them clearly as faulty.
- A faulty device may only be investigated and possibly repaired by qualified, trained and authorized staff. If the fault cannot be fixed, the device shall be removed from the process.
- Service operations other than described in this user manual may only be performed by the manufacturer.

Disclaimer of Liability
The manufacturer or their delegated representative is only liable in case of intent or gross negligence. The accountability is limited to the value of the order issued at the time to the manufacturer. The manufacturer is not liable for damages, originated from disregarding the safety instructions or violating the instructions of the manual or operating conditions. Consequential damages are excluded from any liability.

1.3 Environmental Aspects

Products from E+E Elektronik® are developed and manufactured observing of all relevant requirements with respect to environment protection. Please observe local regulations for the device disposal.

For disposal, the individual components of the device must be separated according to local recycling regulations. The electronics shall be disposed of correctly as electronics waste.

2 Scope of Supply

- HTP201 – Humidity and Temperature Probe with Analogue Outputs according to ordering code

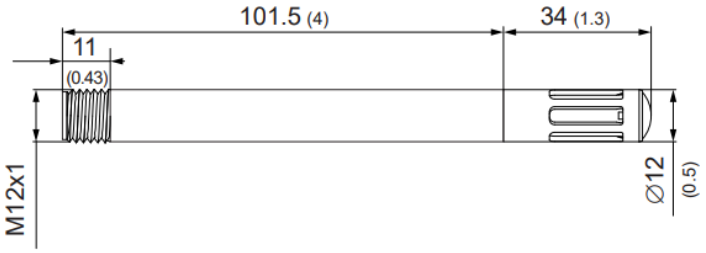
3 Product Description

3.1 General

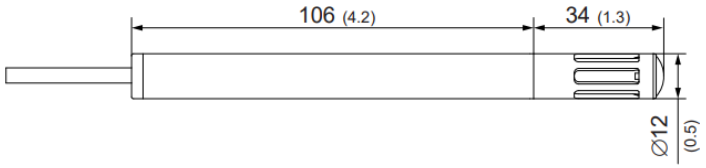
The HTP201 is a robust probe for relative humidity and temperature measurement. Its IP65 rating, the E+E proprietary protective sensor coating and encapsulated electronics make it ideal for highest requirements. The HTP201 is typically implemented in demanding process and climate control applications like in agriculture, life stock, food, pharma or clean rooms. Its stainless steel or polycarbonate enclosure and integrated cable or a threaded connector together with the wide choice of filter caps make it a versatile probe tackling even challenging applications. Installation is simplified by various mounting options which are supported by E+E accessories.

3.2 Dimensions

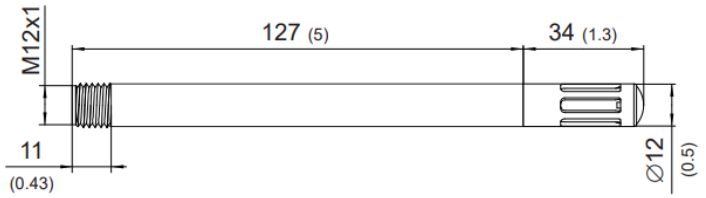
Voltage versions
With connector (Type E9)



With cable (Type E8)



Current versions
With connector (Type E9)



With cable (Type E8)

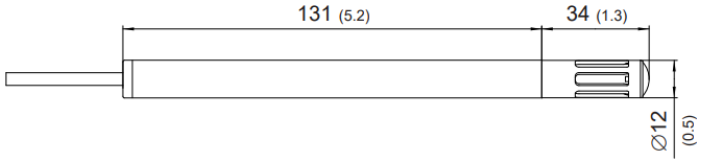


Fig. 1 Dimensions of HTP201 in mm (inch)

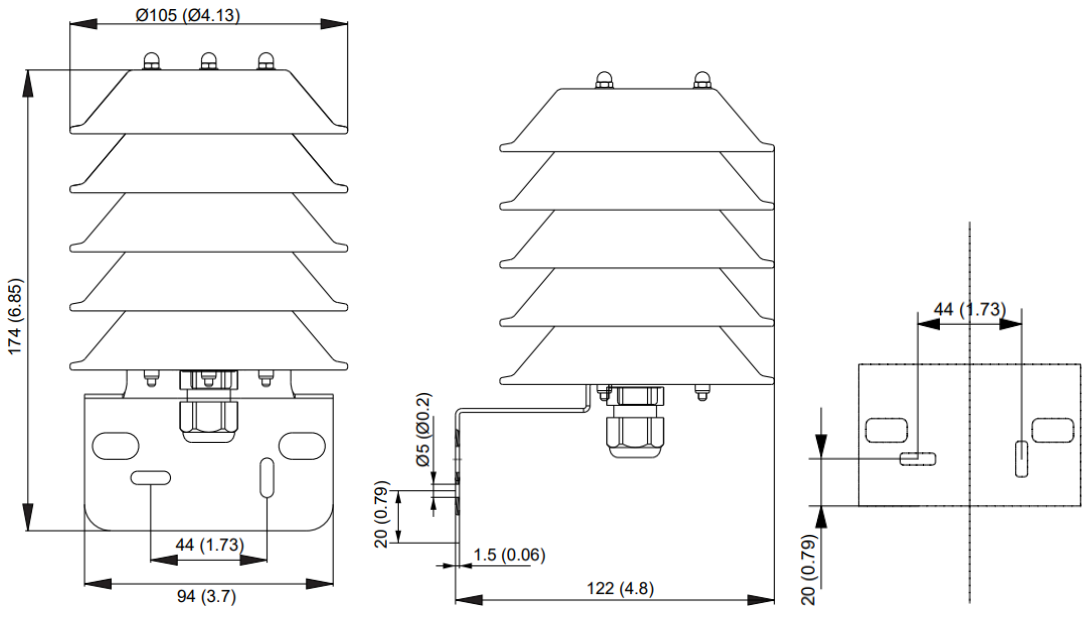
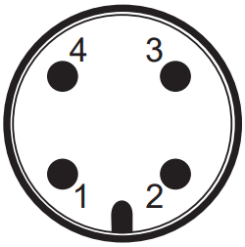


Fig. 2 Dimensions of optional radiation shield (ordering code HA010502) in mm (inch)

Important note:
The manufacturer cannot be held responsible for personal injuries or damage to property as a result of incorrect handling, installation, wiring, power supply and maintenance of the device.

3.3.1 M1 Models (RH + T)

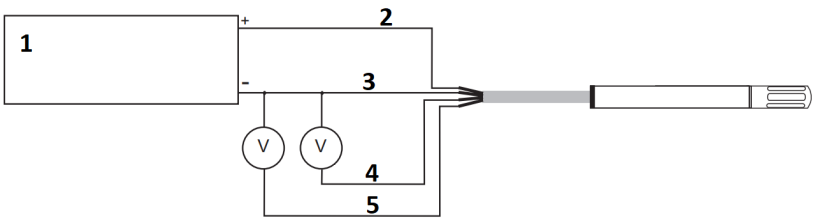
Voltage versions (A1/A2/A3)
With connector (HTP201-M1xE9x)



M12 device plug
front view

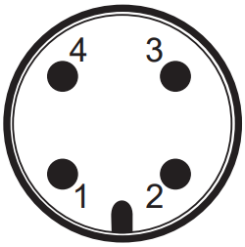
Pin number	Function
1	Supply voltage V+
2	RH
3	GND
4	T

With cable (HTP201-M1xE8x)



1. Supply voltage:
   according to technical data
2. V+ (white)
3. GND (brown)
4. RH (green)
5. T (yellow)

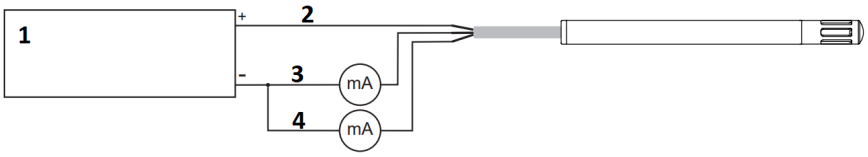
Current version (A6)
With connector (HTP201-M1A6xE9)



M12 device plug
front view

Pin number	Function
1	Supply voltage V+
2	RH
3	not connected
4	T

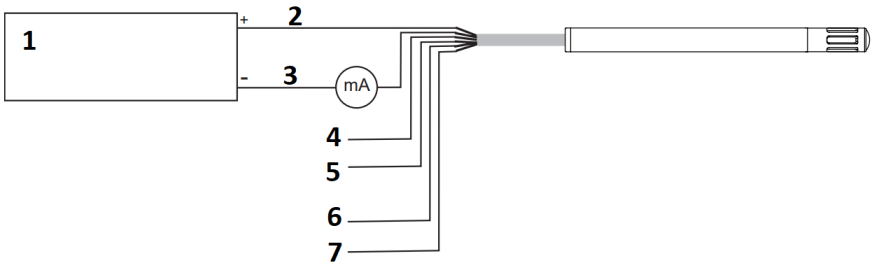
With cable (HTP201-M1A6xE8x)



1. Supply voltage:
   9 – 28 V DC
2. V+ (white)
3. RH (green)
4. T (yellow)

3.3.2 M6 Models (RH + T passive)

Current version (A6)
With connector (HTP201-M6A6xE8x)



1. Supply voltage:
   9V+R_L*20mA<V+<28VDC
2. V+ (white)
3. RH (brown)
4. T passive 1 (pink)
5. T passive 2 (red)
6. T passive 3 (blue)
7. T passive 4 (grey)

4 Installation

4.1 Wall and Ceiling Mount

Best measurement performance is achieved when the entire probe is located inside the environment to be monitored.
In such a case, the HTP201 may be for instance fixed onto a wall with the mounting clip HA010211 (for polycarbonate) or HA010225 (for stainless steel, both not included in the scope of supply, see data sheet “Accessories”), or freely hang from the ceiling on the connection cable.

Fig. 3 Optional wall and ceiling mount (ordering code HA010211)

4.2 Duct Mount

The probe also can be installed into a duct using the plastic flange HA010214 or the stainless steel flange HA010201 (not included in the scope of supply, see data sheet “Accessories”).

Fig. 4 Optional plastic flange
(ordering code HA010214)

Fig. 5 Optional stainless steel flange
(ordering code HA010201)

4.3 Recommendations for accurate Humidity and Temperature Measurement

- In case the HTP201 probe is not entirely located in the environment to be monitored, large temperature differences along the probe will lead to temperature gradients. These will have an influence on the accuracy. Therefore, it is of paramount importance to minimize the temperature gradients. The biggest part of the probe shall be located in the target environment and the rest shall be thermally well insulated.
- For outdoor applications the HTP201 shall be equipped with a radiation shield (HA010502) which provides protection from rain, snow and ice. This also causes a natural ventilation which largely prevents overheating of the probe in the sun and thus a distortion of the measured values.
- Best accuracy is achieved with a velocity of min. 0.2 m/s of the air surrounding the probe. Depending on the installation position, flow direction and flow velocity, the accuracy may decline. The following table gives a concise overview. Please note that the vertical positioning with the sensing element upside is the most sensitive one concerning accuracy. Because of possible self heating due to the sensor electronics, it is crucial to have the indicated air flow velocity.

Flow direction of mediu m		
←	> 0.2 m/s	> 0.2 m/s
→	This type of mounting is not recommend ed	> 0.2 m/s
↑	> 0.2 m/s	This type of mounting is not recommend ed
↓	> 0.2 m/s	> 0.2 m/s

Tab. 1 Mounting position, air velocity and accuracy

5 Maintenance and Service

HTP201 does not require any special maintenance, nevertheless for high accurate measurements especially over

wide RH and T ranges it is recommended to calibrate the probe every 12 months. If needed, the enclosure or the sensing element may be cleaned as described below.

5.1 Cleaning

Use a damp soft cloth to remove deposits of dust or dirt from the exterior of the probe. Do not use any solvents or abrasive cleaning agents.

In case of dusty, oily and polluted environment:

- Use a damp soft cloth to remove deposits of dust or dirt from the exterior of the probe. Do not use any solvents or abrasive cleaning agents.
- The filter cap shall be replaced once in a while with an E+E original one (see below).
- If needed, the sensing element of the humidity probe can be cleaned by the user (see cleaning instructions – www.epluse.com/cleaning-instructions).

5.2 Filter Cap Replacement

In a dusty or polluted environment it might be necessary to replace the filter cap once in a while. In most of the cases, a clogged filter shows visible contamination or dirt. Longer response time of the humidity measurement also indicates a clogged filter cap. In such cases, replace the filter by a new, original one, see chapter 5.5 Spare Parts.

Procedure

- Turn the filter cap counter-clockwise for removing it.
- Install the new filter cap finger tight by turning it clockwise.

While replacing the filter cap take very good care to not touch or rub the sensing element.

5.3 Protection during Site Cleaning Operations

During site cleaning or sterilization process, if the HTP201 remains on the measuring site the sensing head can be protected with the optional protection cap for 12 mm (0.47″) probe (HA010783, see datasheet “Accessories”).
In case the probe is removed from the site, it is recommended to apply the protection cap for the M12 cable socket (HA010781) and the one for the HTP201 M12 plug of (HA010782).

Fig. 6 Protection cap for Ø12 mm (0.47″) probe (ordering code HA010783)

Fig. 7 Protection cap for M12 socket (ordering code HA010781)

Fig. 8 Protection cap for M12 plug (ordering code HA010782)

5.4 Repairs

Repairs may be carried out by the manufacturer only. The attempt of unauthorized repair excludes any warranty claims.

5.5 Spare Parts

Description	**Order code**
Filter caps for probes with Ø12 mm	**Please refer to the datasheet “Accessories”**

6 Accessories

For further information see datasheet **Accessories**.

General	Order code
M12x1 connector, 4 pole socket, for self assembly	**HA010707**
Connection cable, 5 pole, M12x1 plug / socket, shielded, 2 m (6.6 ft) / 5 m (16.4 ft) /10 m (32.8 ft)	**HA010816**/**HA010817**/ **HA010818**
Connection cable, 5 pole, M12x1 socket / free ends, shielded, 1.5 m (4.9 ft) / 5 m (16.4 ft) / 10 m (32.8 ft)	**HA010819**/**HA010820**/ **HA010821**
Plastic mounting flange Ø12 mm (0.47″) black	**HA010214**
Stainless steel flange Ø12 mm	**HA010201**
Plastic wall mounting clip Ø12 mm (0.47″)	**HA010211**
Stainless steel wall mounting clip Ø12 mm (0.47″)	**HA010225**
Protection cap for Ø12 mm (0.47″) probe	**HA010783**
Protection cap for M12 socket	**HA010781**
Protection cap for M12 plug	**HA010782**
Radiation shield with fixed clamping ring (M20x1.5)	**HA010502**

7 Technical Data

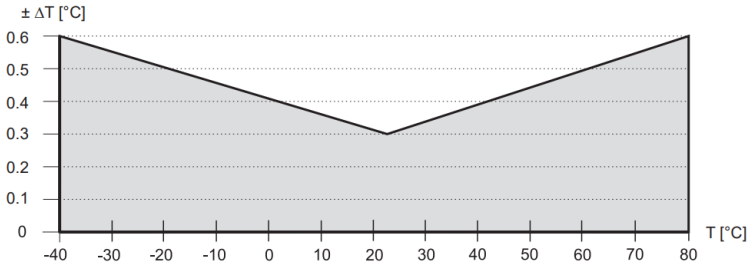
Measurands

Relative humidity (RH)

Measuring range	0…100 % RH
Accuracy[1)] @ 24 V DC, air velocity >0.2 m/s (>39 ft/min), incl. hysteresis, non-linearity and repeatability, curre nt version RL=250 Ω **23 °C (0…100 %RH)** **0…40 °C (0…100 %RH)** **-20…80 °C (0…100 %RH)** **-40…-20 °C (0…100 %RH)**	 ±2.5 %RH ±3 %RH ±4 %RH ±5 %RH

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).

Temperature (T)

Measuring range	-40…+80 °C (-40…+176 °F)
Accuracy Incl. hysteresis, non-linearity and repeatability	

Outputs

Analogue

RH 0…100 % **T -40…+60/80 °C** (see ordering guide)			
Output	0 – 1 V	(-0.1 mA < I_L < 0.1 mA)	
Output	0 – 5 V	(-0.2 mA < I_L < 0.2 mA)	
Output	0 – 10 V	(-1.0 mA < I_L < 1.0 mA)	I_L = load current
Output	4 – 20 mA (2-wire)	$R_L \leq 500\ \Omega$	R_L = load resistance
Output			

T Sensor Passive

With Model M6 only (RH + T passive)	4-wire-connection, T sensor according to ordering guide

General

Power supply class III USA & Canada: Class 2 supply necessary, max. voltage 30 V DC **Output 0 – 1 V** **Output 0 – 5 V** **Output 0 – 10 V** **Output 4 – 20 mA**	3.6 – 30 V DC 10 – 30 V DC 15 – 30 V DC 9 V + R_L * 20 mA < V+ < 28 V DC R_L= load resistance
Current consumption, typ. **Voltage versions** **Current versions**	1.5 mA According to output current
Electrical connection **Plug versions** **Cable versions**	Plug M12x1, 4 poles Cable 1.5 m (4.9 ft) / 3 m (9.8 ft) / 5 m (16.4 ft), PVC Ø4.3 mm, 4 x 0.25 mm² for RH + T with voltage output Ø4.3 mm, 3 x 0.25 mm² for RH + T with current output Ø4.8 mm, 6 x 0.14 mm² for RH + T passive with current output
Storage conditions	-40…+80 °C (-40…+176 °F) 0…95 %RH, non-condensing
Material **Enclosure** **Probe cable (cable versions)**	Polycarbonate (PC) or stainless steel 1.4404 Polyvinyl chloride (PVC)
Protection rating	IP65
Electromagnetic compatibility[1)]	EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class B ICES-003 Class B
Shock and vibration	Tested according to EN 60068-2-64 and EN 60068-2-27
Conformity	CE UKCA

1) Analogue output 0 – 1 V is not protected against surge.

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Documents / Resources

	E E ELEKTRONIK HTP201 Humidity and Temperature Probe [pdf] User Manual HTP201 Humidity and Temperature Probe, HTP201, Humidity and Temperature Probe, Temperature Probe, Probe

References

- E+E epluse.com/cleaning-instructions
- E+E Humidity and Temperature Probe with Analogue Outputs