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+ User Manual HTP201

Humidity and Temperature Probe
with Analogue Outputs



Content

1	General Information	3
1.1	Explanation of Warning Notices and Symbols	3
1.2	Safety Instructions	4
1.2.1	General Safety Instructions	4
1.2.2	Intended Use	4
1.2.3	Mounting, Start-up and Operation	4
1.3	Environmental Aspects	5
1.4	ESD Protection	5
2	Scope of Supply	5
3	Product Description	5
3.1	General	5
3.2	Dimensions	6
3.3	Electrical Connection	6
3.3.1	M1 Models (RH + T)	7
3.3.2	M6 Models (RH + T passive)	7
4	Mounting and Installation	8
4.1	Wall and Ceiling Mount	8
4.2	Duct Mount	9
4.3	Recommendations for accurate Humidity and Temperature Measurement	10
5	Maintenance and Service	10
5.1	Cleaning	10
5.2	Filter Cap Replacement	11
5.3	Protection during Site Cleaning Operations	11
5.4	Repairs	11
5.5	Spare Parts	11
6	Accessories	12
7	Technical Data	12
8	Conformity	14
8.1	Declarations of Conformity	14
8.2	Electromagnetic Compatibility	14
8.3	FCC Part 15 Compliance Statement	14
8.4	ICES-003 Compliance Statement	14

1 General Information

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. E+E Elektronik Ges.m.b.H. does not accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

All information, technical data and diagrams included in this document are based on the information available at the time of writing. It may contain technical inaccuracies and typographical errors. The contents will be revised on a regular basis and changes will be implemented in subsequent versions. The described product(s) and the contents of this document may be changed or improved at any time without prior notice.

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PLEASE NOTE

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

1.1 Explanation of Warning Notices and Symbols

Safety precautions

Precautionary statements warn of hazards in handling the device and provide information on their prevention. The safety instruction labeling is classified by hazard severity and is divided into the following groups:

DANGER

Danger indicates hazards for persons. If the safety instruction marked in this way is not followed, the hazard will very likely result in severe injury or death.

WARNING

Warning indicates hazards for persons. If the safety instruction marked in this way is not followed, there is a risk of injury or death.

CAUTION

Caution indicates hazards for persons. If the safety instruction marked in this way is not followed, minor or moderate injuries may occur.

NOTICE

Notice signals danger to objects or data. If the notice is not observed, damage to property or data may occur.

Informational notes

Informational notes provide important information which stands out due to its relevance.

INFO

The information symbol indicates tips on handling the device or provides additional information on it. The information is useful for reaching optimal performance of the device.

The title field can deviate from "INFO" depending on the context. For instance, it may also read "PLEASE NOTE".

1.2 Safety Instructions

1.2.1 General Safety Instructions

NOTICE

Improper handling of the device may result in its damage.

- 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 must be performed by qualified personnel only.

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.

WARNING

Non-compliance with the product documentation may cause safety risks for people and the entire measurement installation.

The manufacturer cannot be held responsible for damages as a result of incorrect handling, installation and maintenance of the device.

- Do not use HTP201 in explosive atmosphere or for measurement in aggressive gases.
- This device is not appropriate for safety, emergency stop or other critical applications where device malfunction or failure could cause injury to human beings.
- The device may not be manipulated with tools other than specifically described in this manual.

NOTICE

Failing to follow the instructions in this user manual may lead to measurement inaccuracy and device failures.

- The HTP201 may only be operated under the conditions described in this user manual and within the specification included in chapter 7 Technical Data.
- Unauthorised product modification leads to loss of all warranty claims. Modification may be accomplished only with an explicit permission of E+E Elektronik Ges.m.b.H.!

1.2.3 Mounting, Start-up and Operation

The HTP201 has been produced under state of the art manufacturing conditions, has been thoroughly tested and has left the factory after 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 way that does not impair its safe use. The user is responsible for observing all applicable local and international safety guidelines for safe installation and operation of the device. This user manual contains information and warnings that must be observed by the user in order to ensure safe operation.

PLEASE NOTE

The manufacturer or his authorized agent can only be held liable in case of willful or gross negligence. In any case, the scope of liability is limited to the corresponding amount of the order issued to the manufacturer. The manufacturer assumes no liability for damages incurred due to failure to comply with the applicable regulations, operating instructions or the specified operating conditions. Consequential damage is excluded from liability.

⚠ WARNING

Non-compliance with the product documentation may cause accidents, personal injury or property damage.

- Mounting, installation, commissioning, start-up, operation and maintenance of the device may be performed by qualified staff only. Such staff must be authorized by the operator of the facility to carry out the mentioned activities.
- The qualified staff must have read and understood this user manual and must follow the instructions contained within. The manufacturer accepts no responsibility for non-compliance with instructions, recommendations and warnings.
- 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 used accidentally by marking them clearly as faulty.
- A faulty device shall be removed from the process.
- Service operations other than described in this user manual may only be performed by the manufacturer.

1.3 Environmental Aspects

i PLEASE NOTE

Products from E+E Elektronik Ges.m.b.H. are developed and manufactured in compliance with relevant environmental protection requirements. Please observe local regulations for the disposal of the device.



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.

1.4 ESD Protection



The sensing elements and the electronics board are ESD (electrostatic discharge) sensitive components of the device and must be handled as such. Failure to do so may damage the device by electrostatic discharge when touching exposed sensitive components.

2 Scope of Supply

- HTP201 RH / T Probe with Analogue Outputs according to ordering guide

3 Product Description

3.1 General

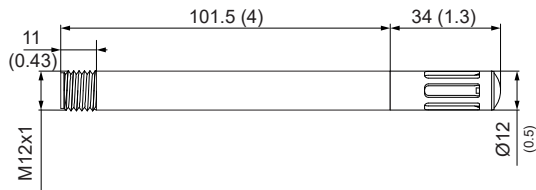
The HTP201 is a robust probe for relative humidity and temperature measurement. Its IP65 rating, the E+E proprietary protective sensor coating and encapsulated electronics make it ideal for highest requirements. The HTP201 is typically implemented in demanding process and climate control applications 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

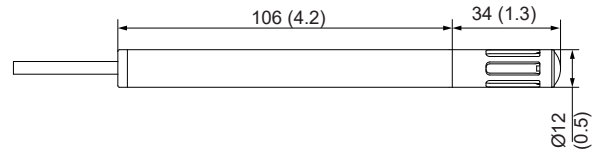
Values in mm (inch)

Voltage versions

With connector (Type E9)

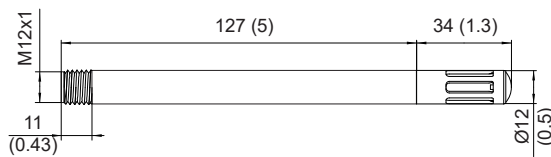


With cable (Type E8)

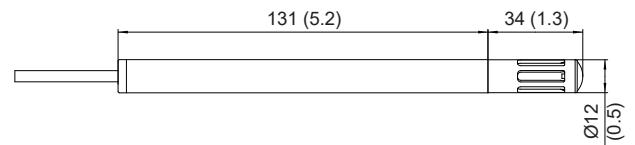


Current versions

With connector (Type E9)

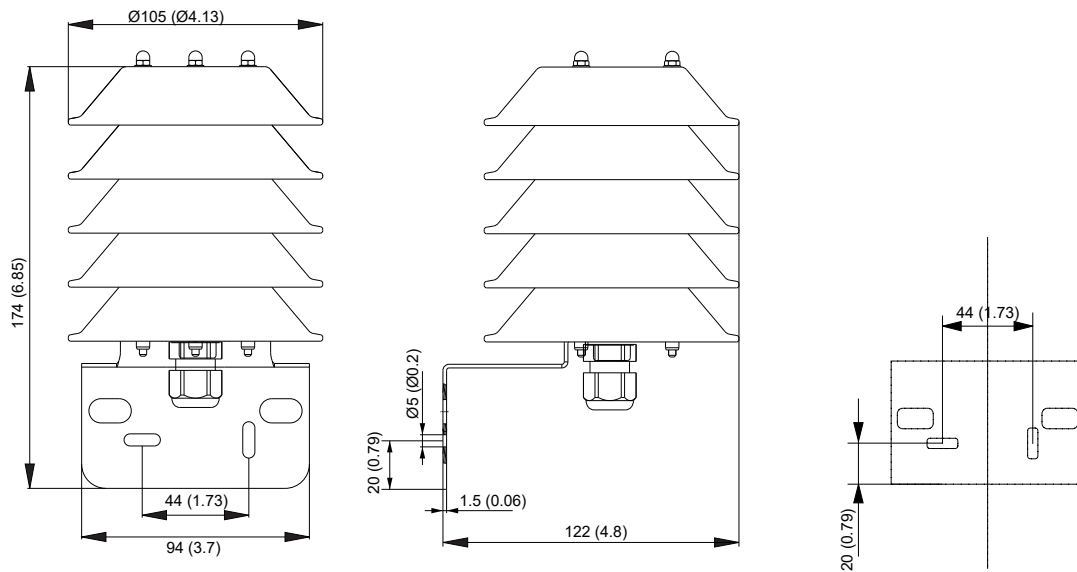


With cable (Type E8)



Radiation shield (optional)

(ordering code HA010502)



3.3 Electrical Connection

⚠ WARNING

Incorrect installation, wiring or power supply may cause overheating and therefore personal injuries or damage to property.

For correct cabling of the device, always observe the presented wiring diagram for the product version used.

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)

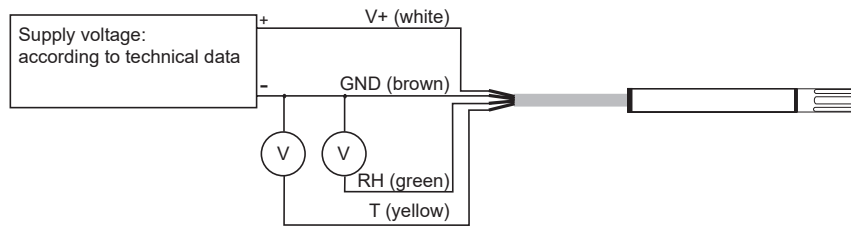
With connector (HTP201-M1xE9x)



M12 device plug front view

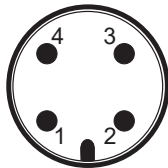
Pin	Assignment
1	Supply voltage V+
2	RH
3	GND
4	T

With cable (HTP201-M1xE8x)



Current version (A6)

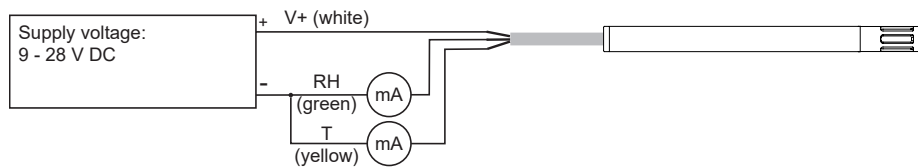
With connector (HTP201-M1A6xE9)



M12 device plug front view

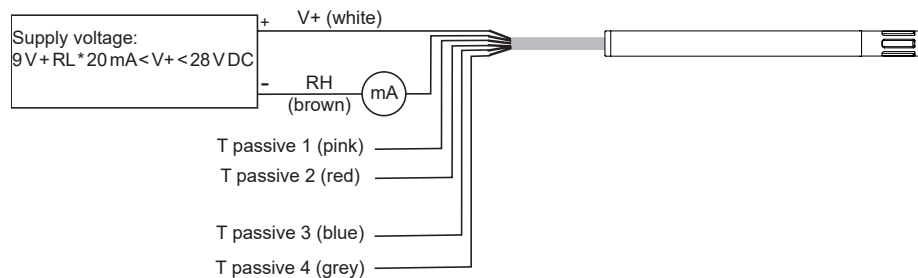
Pin	Assignment
1	Supply voltage V+
2	RH
3	not connected
4	T

With cable (HTP201-M1A6xE8x)



3.3.2 M6 Models (RH + T passive)

Current version (A6) with cable (HTP201-M6A6xE8x)



i PLEASE NOTE

If the measurement of the passive T element is carried out with a 4-wire measurement, there is a residual uncertainty of 0.47Ω . This corresponds to the lead resistance of the circuit board inside the HTP201 sensor from the cable side to the passive T sensor element (the 4-wire measurement is carried out up to the circuit board connection).

To obtain the correct value, the 0.47Ω must be subtracted from the measured resistance value. Another way to eliminate the residual uncertainty is to carry out a 1-point adjustment of the resistance measurement.

4 Mounting and 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, refer to the "Accessories" datasheet), or freely hang from the ceiling on the connection cable.



Fig. 1 Optional wall and ceiling mount (ordering code HA010211)

i PLEASE NOTE

The sensing probe must be mounted horizontally or vertically, pointing downwards. If possible, a drip sheet should be fitted for each mounting.

i PLEASE NOTE

For probe hanging by its cable from the ceiling in applications where condensation is likely to happen it is important to avoid condense water getting from the cable to the probe and into the sensing head. For this use the drip water protection (refer to chapter 6 Accessories).

i PLEASE NOTE

To ensure the best protection against condensing water entering the probe, use the plug version of the HTP201 probe (E9) together with an IP67 connection cable (e.g. HA010816). Whenever possible, form a bow with the cable to allow condensing water to run off so that it does not enter the probe connection.

Hanging Probe

Dimensions in mm (inch)

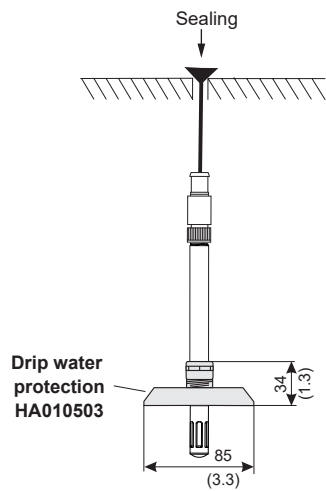


Fig. 2 HTP201 Mounting on the ceiling

4.2 Duct Mount

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



Fig. 3 Optional stainless steel flange (ordering code HA010201)



Fig. 4 Optional plastic flange (ordering code HA010214)

Probe into Separation Wall

Dimensions in mm (inch)

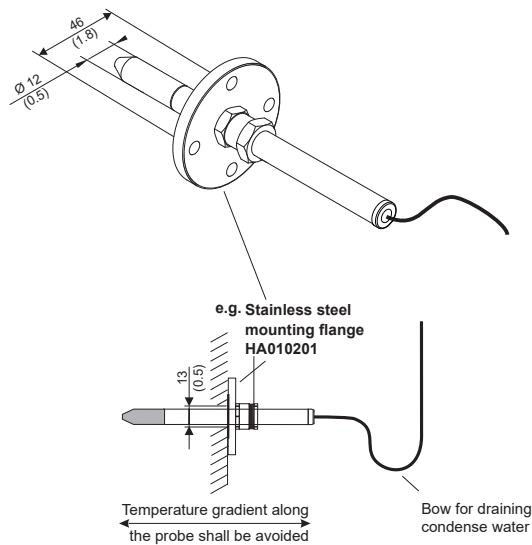




Fig. 5 HTP201 Mounting with flange

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 the medium		
←	>0.2 m/s	>0.2 m/s
→	This type of mounting is not recommended	>0.2 m/s
↑	>0.2 m/s	This type of mounting is not recommended
↓	>0.2 m/s	>0.2 m/s

Tab. 1 Mounting position, air velocity and accuracy

5 Maintenance and Service

The 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. For cleaning instructions please refer to www.epluse.com/htp201.

5.2 Filter Cap Replacement

In case of dusty, oily and polluted environment

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 this case, replace the filter with a new, original one, refer to chapter 5.5 Spare Parts.

Procedure

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

NOTICE

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

5.3 Protection during Site Cleaning Operations

i PLEASE NOTE

- If the HTP201 remains at the measuring site during site cleaning or during a sterilisation process, the measuring head can be protected with the optional protection cap for 12 mm (0.47") probes (HA010783, refer to the "Accessories" datasheet).
- In case the probe is removed from the site, it is recommended that the protection cap for the M12 cable socket (HA010781) and the protection cap for the M12 plug of the HTP201 (HA010782) are fitted.



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	Code
Filter caps for probes with Ø12 mm	Please refer to the Accessories datasheet.

6 Accessories

For further information please refer to the [Accessories](#) datasheet.

Accessories	Code
M12x1 connector, 4 pole socket, for self assembly	HA010707
Connection cable, 5 pole, M12x1 plug / socket, shielded	2 m (6.6 ft) HA010816
	5 m (16.4 ft) HA010817
	10 m (32.8 ft) HA010818
Connection cable, 5 pole, M12x1 socket / free ends, shielded	1.5 m (4.9 ft) HA010819
	5 m (16.4 ft) HA010820
	10 m (32.8 ft) HA010821
Plastic mounting flange Ø12 mm (0.47") black	HA010214
Stainless steel flange Ø12 mm (0.47")	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
Drip water protection	HA010503

7 Technical Data

Measurands

Relative humidity (RH)

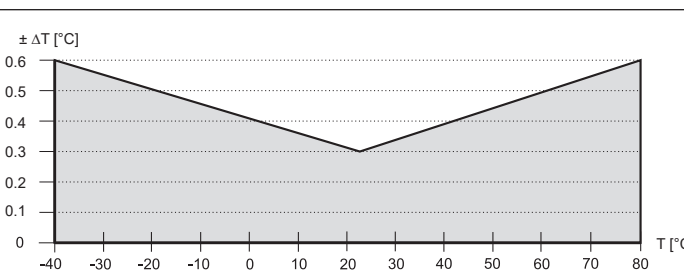
Measuring range	0...100 %RH
Accuracy ¹⁾ @ 24 V DC, air velocity >0.2 m/s (>39 ft/min), incl. hysteresis, non-linearity and repeatability, current version $R_L=250 \Omega$	
23 °C (0...100 %RH)	±2.5 %RH
0...40 °C (0...100 %RH)	±3 %RH
-20...80 °C (0...100 %RH)	±4 %RH
-40...-20 °C (0...100 %RH)	±5 %RH

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	 <p>The graph plots the temperature accuracy $\pm \Delta T$ in degrees Celsius against the temperature T in degrees Celsius. The x-axis ranges from -40 to 80 °C with major ticks every 10 units. The y-axis ranges from 0 to 0.6 °C with major ticks every 0.1 units. The accuracy curve is a V-shape, starting at approximately 0.6 °C at -40 °C, dipping to a minimum of about 0.3 °C at 20 °C, and rising back to approximately 0.6 °C at 80 °C.</p>

Outputs




Analogue

RH 0...100 % T -40...+60/80 °C (refer to the 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)	
Output	4 - 20 mA (2-wire)	R _L ≤ 500 Ω	I _L = load current R _L = load resistance

T Sensor Passive

With Model M6 only (RH + T passive)	4-wire-connection, T sensor according to ordering guide
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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 mm ² for RH + T with voltage output Ø4.3 mm, 3 x 0.25 mm ² for RH + T with current output Ø4.8 mm, 6 x 0.14 mm ² 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		 	

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

8 Conformity

8.1 Declarations of Conformity

E+E Elektronik Ges.m.b.H. hereby declares that the product complies with the respective regulations listed below:



European directives and standards.

and



UK statutory instruments and designated standards.

Please refer to the product page at www.epluse.com/htp201 for the Declarations of Conformity.

8.2 Electromagnetic Compatibility

EMC for industrial / basic environment.

Our sensors are group 1 devices and correspond to class B.

8.3 FCC Part 15 Compliance Statement

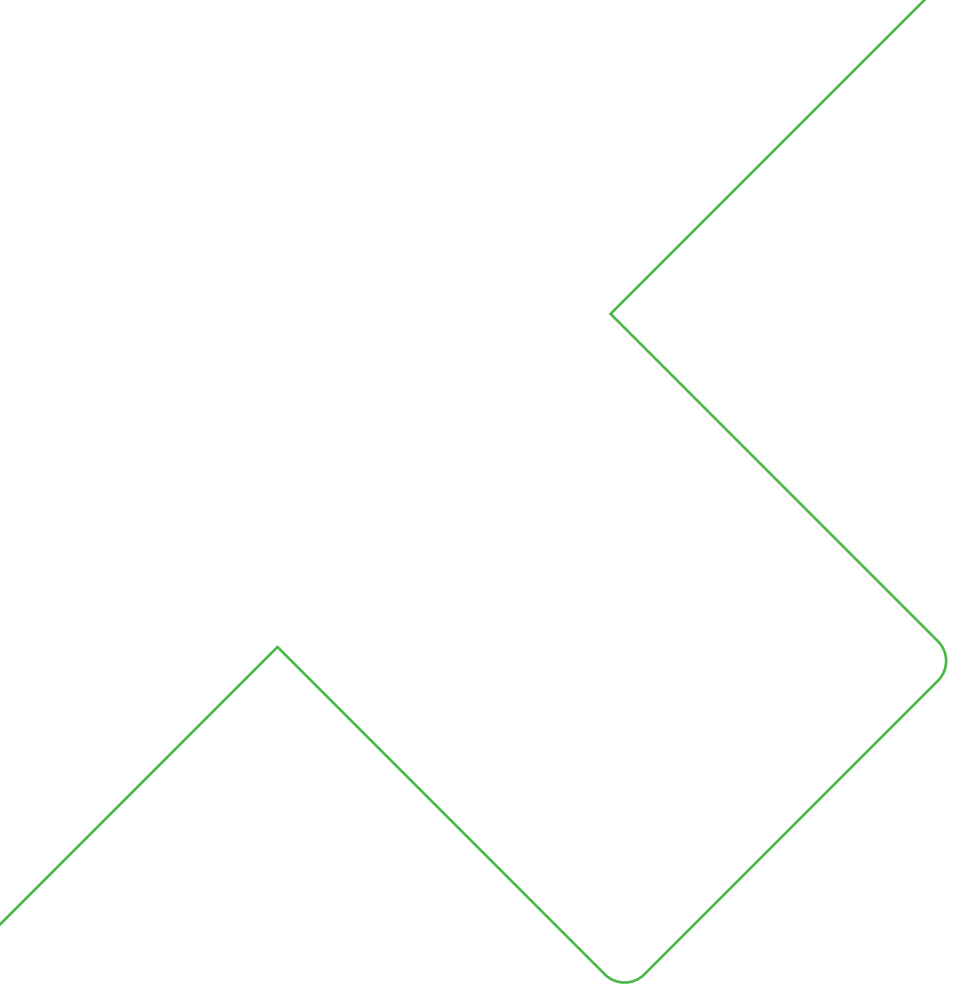
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

8.4 ICES-003 Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.



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