

# + Datasheet HTP501

Digital Humidity and Temperature Probe  
up to 120 °C (248 °F)



# HTP501

## Digital Humidity and Temperature Probe up to 120 °C (248 °F)

The HTP501 is ideal for reliable and cost effective measurement of relative humidity (RH) and temperature (T) in demanding industrial process control applications up to 20 bar (290 psi). Besides the measurement of RH and T, the HTP501 calculates all humidity related physical quantities like dew point temperature (Td), absolute humidity (dv) or mixing ratio (r).

## Outstanding Measurement Performance

The probe employs a high end E+E humidity sensing element which stands for high RH measurement accuracy over the entire T working range -40...120 °C (-40...248 °F). The E+E proprietary coating of the sensing element leads to exceptional long term stability even in harsh environment.

## Versatile and Robust

With its stainless steel probe, protected electronics, IP66 rating and filter caps choice, the HTP501 is suitable for a wide range of demanding applications.

## RS485 Interface

The measured data is available on the RS485 interface with Modbus RTU protocol via flexible high temperature cable with moulded M12 connector.

## Configurable and Adjustable

The free PCS10 Product Configuration Software and the optional adapter facilitate the setup and adjustment of the HTP501.



HTP501-T4



HTP501-T10

# Features

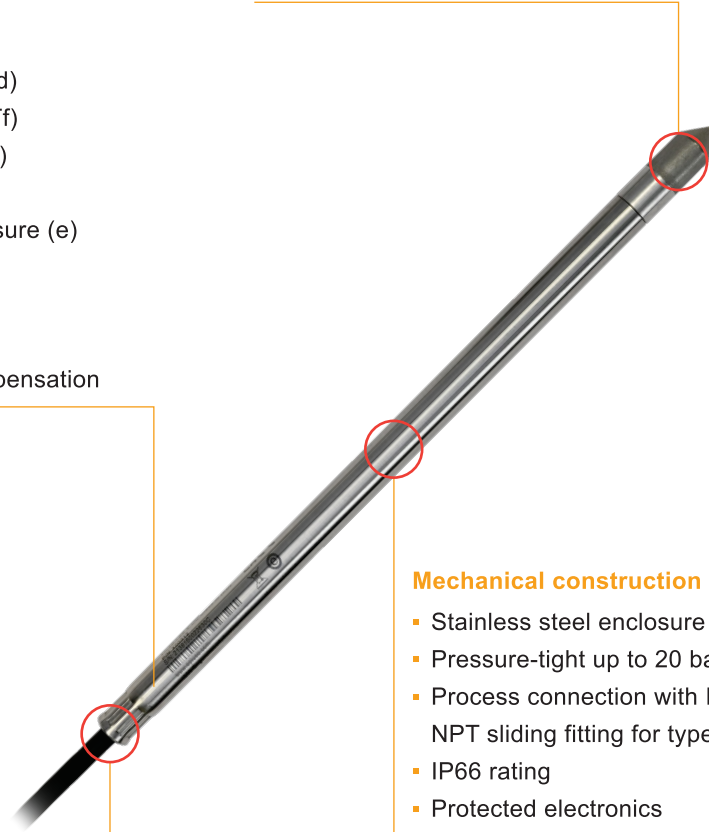


## Measurement Performance

- High RH/T accuracy
- Wide T range: - 40...120 °C (- 40...248 °F)
- Temperature compensation
- Calculated parameters
  - Dew point temperature (Td)
  - Frost point temperature (Tf)
  - Wet bulb temperature (Tw)
  - Ice bulb temperature (Ti)
  - Water vapour partial pressure (e)
  - Mixing ratio (r)
  - Absolute humidity (dv)
  - Specific enthalpy (h)
- Configurable pressure compensation

## RH and T sensing head

- Very robust
- Protected by E+E proprietary coating
- Optional sensor leads protection
- Outstanding long term stability
- Wide choice of filter caps



## Mechanical construction

- Stainless steel enclosure
- Pressure-tight up to 20 bar
- Process connection with ISO or NPT sliding fitting for type T10
- IP66 rating
- Protected electronics

## Interface and connection

- RS485 with Modbus RTU
- Moulded M12x1 connector
- Flexible high temperature cable
- User configurable and adjustable
- Free configuration software

## Inspection certificate

According DIN EN 10204-3.1

# Features

## Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the sensing elements, their leads and soldering points. 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 or on the electrical connections.

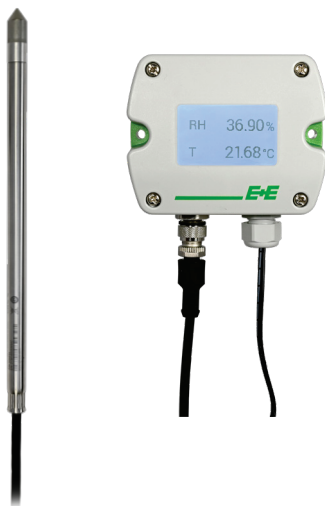
## Sensor Leads Protection

In certain very aggressive applications, the combination of sensor coating and additional protection of the sensing element leads can significantly extend the service life of the sensor. Please contact your E+E representative for details.

## E+E Modular Sensor Platform

The HTP501 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 sensor with interchangeable probe, analogue outputs and optional display. Besides HTP501, Sigma 05 accommodates also other E+E intelligent sensing probes.

See [www.epluse.com/sigma05](http://www.epluse.com/sigma05) for further details.



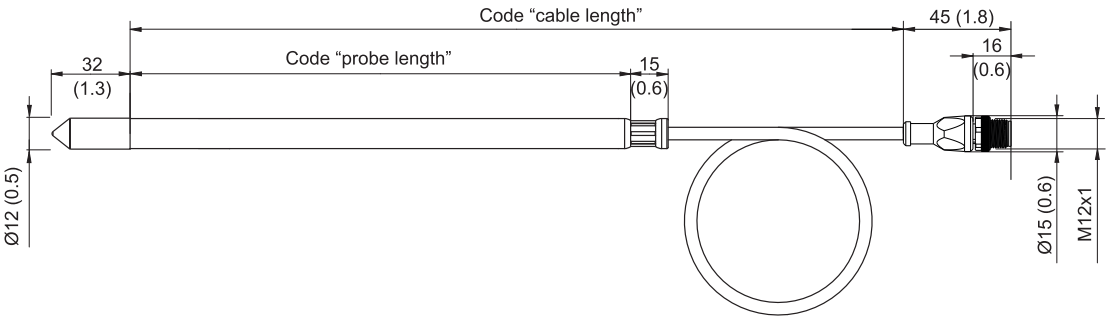
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Sigma 05 polycarbonate enclosure with HTP501

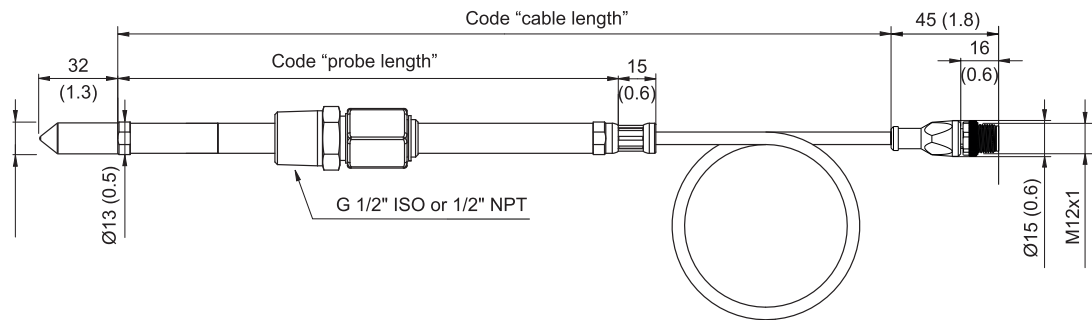
# Dimensions

Values in mm (inch)

## Type T4



## Type T10



# Technical Data

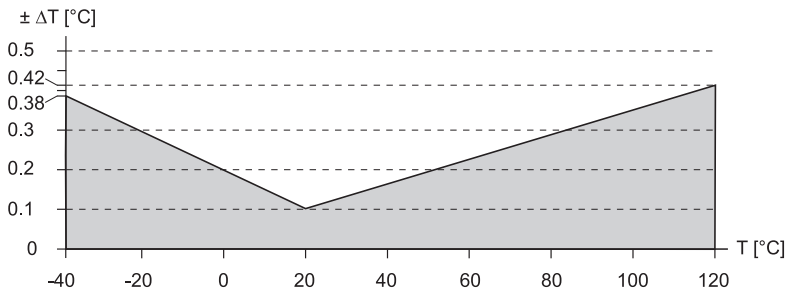
## Measurands

### Relative humidity (RH)

Measuring range	0...100 %RH
Accuracy <sup>1)</sup>	<div><div>-15...+40 °C (5...104 °F), RH ≤ 90 %</div><div>-15...+40 °C (5...104 °F), RH &gt; 90 %</div><div>-25...+70 °C (-13...+158 °F)</div><div>-40...120 °C (-40...+248 °F)</div></div> <div><div><math>\pm(0.95 + 0.0013 \cdot mv) \%RH</math></div><div><math>\pm 1.8 \%RH</math></div><div><math>\pm(1.05 + 0.0084 \cdot mv) \%RH</math></div><div><math>\pm(1.15 + 0.013 \cdot mv) \%RH</math></div></div> <div>mv = measured value</div>
Factory calibration uncertainty <sup>2)</sup> @ 23 °C (73 °F)	<div><div>0...90 %RH</div><div>90...100 %RH</div></div> <div><div><math>\pm(0.7 + 0.003 \cdot mv) \%RH</math></div><div><math>\pm 1 \%RH</math></div></div> <div>mv = measured value</div>
Response time $t_{90}$ @ 20 °C (68 °F)	<15 s

1) Including hysteresis, non-linearity and repeatability.  
Defined against E+E calibration reference.  
2) Defined with an enhancement factor k=2, corresponding to a confidence level of 95 %.

## Temperature (T)

Measuring range	-40...+120 °C (-40...+248 °F)
Accuracy <sup>1)</sup>	$\pm \Delta T$ [°C] 
Factory calibration uncertainty <sup>2)</sup> @ 23 °C (73 °F)	±0.1 °C (±0.056 °F)

1) Defined against E+E calibration reference.





2) Defined at 23 °C with an enhancement factor k=2, corresponding to a confidence level of 95 %.

## Output

### Digital

Digital interface	RS485 (HTP501 = 1 unit load)
Protocol	Modbus RTU
Default settings	Baud rate 9600, parity even, 1 stop bit, Modbus address 69
Supported baud rates	9600, 19200, 38400, 57600, 76800 and 115200
Data types for measured values	FLOAT32 and INT16

## General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	8 - 35 V DC
Power consumption, typ. without termination resistor	40 mW
Electrical connection	M12x1, 4 poles
Pressure working range for pressure-tight probe type T10	0.01...20 bar (0.15...290 psi)
Temperature working range	<div>Probe</div> <div>Cable</div> <div>M12 connector</div> -40...+120 °C (-40...+248 °F) -40...+120 °C (-40...+248 °F) -25...+90 °C (-13...+194 °F)
Storage conditions	-40...+80 °C (-40...+176 °F), 0...95 %RH, non-condensing
Probe material	Stainless steel 1.4404
Cable jacket Please mind the mounting and installing instructions included in the user manual.	HFS 125XL, black, oil and fuel resistant
Protection rating	IP66
Elektromagnetic compability	EN 61326-1      EN 61326-2-3      Industrial Environment FCC Part15 Class A      ICES-003 Class A      DNV-CG-0339
Shock and vibration	Tested acc. to EN 60068-2-64, EN 60068-2-27 and DNV-CG-0339
Conformity	   <sup>1)</sup>
Type approval	DNV Certificate No. TAA00003FA
Configuration and adjustment	PCS10 Product Configuration Software (free download from <a href="http://www.epluse.com/pcs10">www.epluse.com/pcs10</a> ) and configuration adapter

1) DNV scope of approval: please refer to ordering guide.

# Ordering Guide

Feature		Description	Code			
Configuration			HTP501-			
	Approval	Without DNV approval DNV <sup>1)</sup>	No code AP2			
	Type	RH + T probe up to 120 °C (248 °F)	T4		T10	
		Pressure-tight probe up to 20 bar (290 psi) and 120 °C (248 °F)				
	Filter	Metal grid, polycarbonate body	F3		F3	
		Stainless steel sintered	F4	F4	F4	F4
		PTFE (Polytetrafluoroethylene)	F5		F5	
	Probe cable length	2 m (6.6 ft)	K2		K2	
		5 m (16.4 ft)	K5		K5	
		10 m (32.8 ft)	K10		K10	
	Probe length	200 mm (7.9"), DNV approval selectable	L200		L200	
		400 mm (15.7")	L400		L400	
	Process connection	G 1/2" ISO - sliding fitting, Ø13 mm (0.51")			PA23	
		1/2" NPT - sliding fitting, Ø13 mm (0.51")			PA25	
	Sensing element protection	E+E proprietary coating	C1		C1	
		E+E proprietary coating and sensor leads protection		C3		C3

1) DNV approval available for probe length 200 mm (7.9") only

## Order Example

**HTP501-T4F4K2L200C1**

Features	Code	Description
Approval	AP2	DNV
Type	T4	RH + T Probe up to 120 °C
Filter	F4	Stainless steel sintered
Cable length	K2	2 m (6.6 ft)
Probe length	L200	200 mm (7.9")
Sensing element protection	C1	E+E proprietary coating

# Accessories

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

Accessories	Code
Modbus configuration adapter	HA011018
E+E Product Configuration Software (Free download: <a href="http://www.epluse.com/pcs10">www.epluse.com/pcs10</a> )	PCS10
Humidity calibration kit	See data sheet <a href="#">Humidity Calibration Kit</a>
M12 cable connector for self assembly, 4 pole	HA010707
Stainless steel mounting flange	HA010201
Stainless steel wall mounting clip	HA010225
Pressure-tight feedthrough For probe assembly up to 20 bar (290 psi)	
G1/2" ISO Ø12 mm	HA011102
1/2" NPT Ø12 mm	HA011103
G1/2" ISO Ø6 mm	HA011104
1/2" NPT Ø6 mm	HA011105
Y-style splitter M12 - M12	HA030204
Protection cap M12 socket connector	HA010781
Protection cap M12 plug connector	HA010782
Protection cap for Ø12 mm probe	HA010783
Drip water protection	HA010503
SWAGElok fitting for type T4	
ISO	HA011102
NPT	HA011103



