

## EE23

## Humidity / Temperature Sensor for Industrial Applications

The EE23 is optimized for reliable and cost effective use in industrial applications. In addition to highly accurate measurement of relative humidity (RH) and temperature (T), the sensor also calculates the dew point (Td) and the frost point temperature (Tf).

### Measurement Performance

The EE23 employs high-end E+E humidity sensing elements manufactured in state-of-the-art thin film technology, which are the prerequisite for outstanding accuracy.

### Long Term Stability

The E+E proprietary coating protects the sensing elements against corrosive and electrically conductive pollution, which leads to outstanding long-term stability even in harsh environment. With the appropriate choice of filter cap, the EE23 tackles even challenging industrial applications.

### Outputs and Power Supply

The measured data is available on two voltage or current outputs as well as on the display. Additional features like alarm (relay) output and integrated supply module 100...240V AC facilitate the use of the EE23 in a wide range of applications.

### Easy Installation and Service

The modular, three parts design of the IP65 / NEMA 4 enclosure, available in polycarbonate or metal, facilitates easy installation, service and replacement.

The enclosure consists of the back cover with the terminals for wiring, the pluggable active part with the electronics and the probe, and the front cover. Once installed, the active part of EE23 can be plugged on and off without rewiring. The plastic enclosure is appropriate also for mounting onto DIN rails.

### Remote Probe and Accessories

The remote probe with cable length up to 20m (65.6 ft) together with a wide choice of accessories such as mounting flanges or brackets, drip water protection or radiation shield allow for easy integration of the EE23 into any measurement task.

### User Configurable

The user can easily perform a two-point humidity and temperature adjustment. The analogue and alarm outputs can be freely configured.



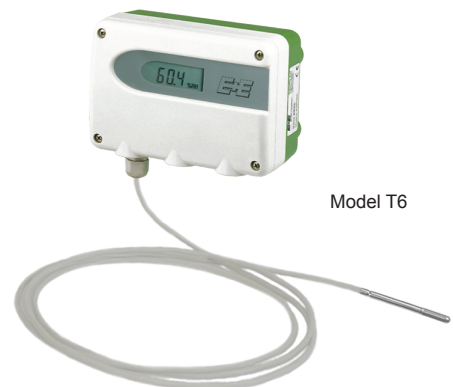
Model T1



Model T2



Model T4/T5



Model T6

## Features

- Temperature range -40...180 °C (-40...356 °F)
- Outstanding long term stability
- Calculation of dew point and frost point temperature
- Easy mounting and maintenance
- Alarm output
- Inspection certificate according to DIN EN 10204 – 3.1

## Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the active surface and leads of the sensing elements. The coating extends substantially the lifetime and the measurement performance of the E+E sensor in corrosive environment. Additionally, it improves the sensor's long term stability in dusty, dirty or oily applications by preventing stray impedances caused by deposits on the active sensor surface.

## Technical Data

### Measurands

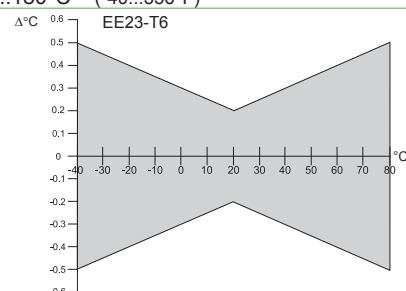
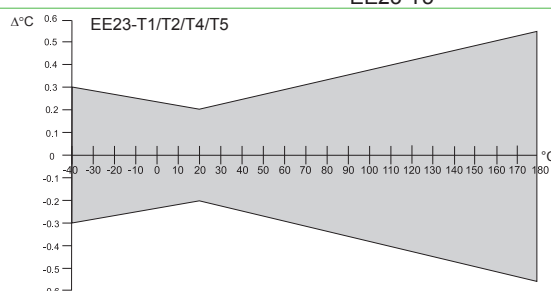
#### Relative Humidity

Working range	0...100% RH		
Accuracy <sup>1)</sup> (including hysteresis, non-linearity and repeatability, traceable to intern. standards, administrated by NIST, PTB, BEV...)			
	<b>EE23-T1/T2/T4/T5</b>	<b>EE23-T6</b>	
-15...40°C (5...104°F)	≤90% RH	± (1.3 + 0.3%*mv) % RH	± (1.8 + 0,3%*mv) % RH
-15...40°C (5...104°F)	>90% RH	± 2.3% RH	± 2.8% RH
-25...70°C (-13...158°F)		± (1.4 + 1%*mv) % RH	± (1.9 + 1%*mv) % RH
-40...180°C (-40...356°F)		± (1.5 + 1.5%*mv) % RH	± (2 + 1.5%*mv) % RH
Temperature dependence electronics	typ. ± 0.015% RH/°C		
Response time $t_{90}$ with metal grid filter at 20 °C (68 °F)	< 15 sec.		

#### Temperature

Probe working range	EE23-T1	-40...60°C	(-40...140°F)
	EE23-T2/T6	-40...80°C	(-40...176°F)
	EE23-T4	-40...120°C	(-40...248°F)
	EE23-T5	-40...180°C	(-40...356°F)

#### Accuracy



Temperature dependence of electronics typ. 0.002°C/°C

### Output Scale Span

		from	up to				units
			EE23-T1	EE23-T2/T6	EE23-T4	EE23-T5	
Humidity	RH	0	100	100	100	100	% RH
Temperature	T	-40 (-40)	60 (140)	80 (176)	120 (248)	180 (356)	°C (°F)
Dew point temperature	Td	-40 (-40)	60 (140)	80 (176)	100 (212)	100 (212)	°C (°F)
Frost point temperature	Tf	-40 (-40)	0 (32)	0 (32)	0 (32)	0 (32)	°C (°F)

### Outputs

0 - 1 V	-0.5 mA < $I_L$ < 0.5 mA
0 - 5 / 0 - 10 V	-1 mA < $I_L$ < 1 mA
0 - 20mA / 4 - 20 mA	$R_L$ < 470 Ohm

### General

Supply voltage	10.5 - 35V DC or 12 - 28V AC
for 0 -1 V / 0 - 5 V outputs	15.0 - 35V DC or 15 - 28V AC
for 0 - 10 V / 0 - 20 mA / 4-20 mA outputs	100...240V AC, 50/60Hz supply module (optional)

Current consumption for voltage output	≤ 25 mA (with alarm module ≤ 35 mA)
for DC supply	≤ 45 mA <sub>eff</sub> (with alarm module ≤ 70 mA <sub>eff</sub> )
for AC supply	

Current consumption for current output	≤ 55 mA (with alarm module ≤ 65 mA)
for DC supply	≤ 100 mA <sub>eff</sub> (with alarm module ≤ 120 mA <sub>eff</sub> )
for AC supply	

Enclosure / protection class	PC or Al Si 9 Cu 3 / IP65; NEMA 4
Cable gland	M16x1.5 cable Ø 4.5 - 10 mm (0.18 - 0.39")
Electrical connection	screw terminals max. 1.5 mm <sup>2</sup> (AWG 16)

Working temperature range of electronics -40...60°C (-40...140°F)

Working temperature range with display -30...60°C (-22...140°F)

Storage temperature range -40...60°C (-40...140°F)

CE compatibility according EN61326-1 EN61326-2-3 ICES-003 ClassB Industrial Environment FCC Part15 ClassB



### Alarm Module<sup>2)</sup>

Output	SPDT-Switch max. 250V AC/8A or 28V DC/8A
	threshold hysteresis
Setting range	10...95% RH 3...15% RH
Setting accuracy	± 3% RH

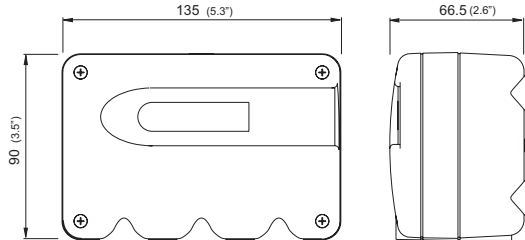
1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

2) only for models T1, T2, T4 and T6.

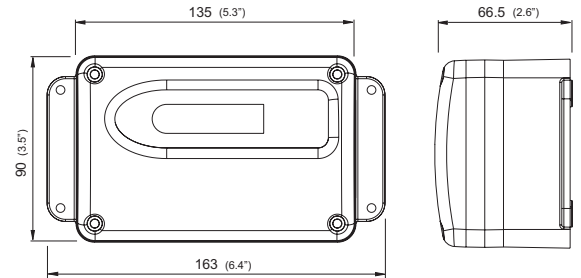
## Dimensions in mm (inch)

### Enclosure:

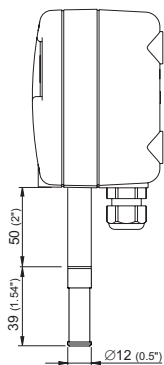
Polycarbonate (PC)



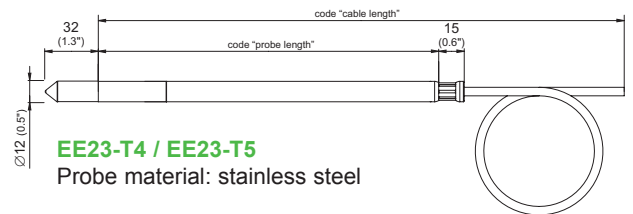
Metal



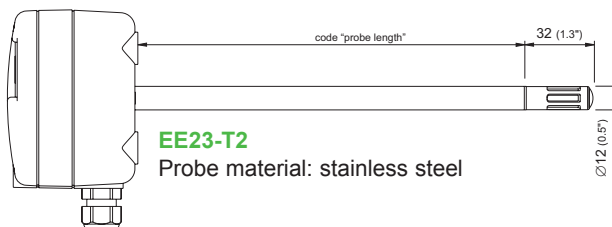
### Probes:



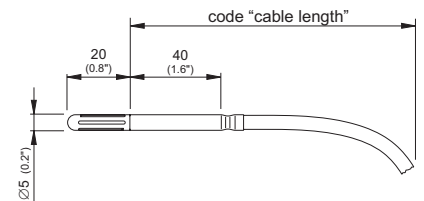
**EE23-T1**  
 Probe material: PC



**EE23-T4 / EE23-T5**  
 Probe material: stainless steel



**EE23-T2**  
 Probe material: stainless steel



**EE23-T6**  
 Probe material: stainless steel

## Accessories (Additional information see data sheet "Accessories")

- Mounting flange (HA010201)
- Mounting flange 5mm for model T6 only (HA010208)
- Bracket for installation onto mounting rails\* (HA010203)
- Drip water protection (HA010503)
- Radiation shield (HA010502)
- Calibration set (see data sheet „Calibration Kit“) (HA0104xx)
- Stainless steel wall mounting clip Ø12 mm (0.5") (HA010225)

\*Note: Only for plastic enclosure

## Ordering Guide

		EE23					
Model <sup>1)</sup>		T1 wall mount	T2 duct mount	T4 remote probe up to 120 °C (248 °F)	T5 remote probe up to 180 °C (356 °F)	T6 miniature probe	
Hardware Configuration	Enclosure	no code HS3					
	Filter	polycarbonate	F3	F3	F3	F3	
		metal (Al Si 9 Cu 3)	no code	no code	no code	no code	
		plastic - metal grid (up to 120 °C / 248 °F)	F5	F5	F5	F5	
		stainless steel sintered	F12	F12	F12	F12	
	Cable length (incl. probe length)	PTFE					
		stainless steel grid (up to 180 °C / 356 °F)					F17
	Probe length	H <sub>2</sub> O <sub>2</sub>					
stainless steel membrane Ø 5 mm							
2 m (6.6 ft)				K2	K2	K2	
5 m (16.4 ft)				K5	K5	K5	
Electrical connection	10 m (32.8 ft)			K10	K10	K10	
	20 m (65.6 ft)			K20		K20	
	40 mm (1.57")					L40	
	65 mm (2.55")		L65	L65	L65		
Optional features	200 mm (7.87")		no code	no code	no code		
	400 mm (15.75")		L400	L400	L400		
	LC Display	D1	D1	D1	D2 <sup>4)</sup>	D1	
	alarm outputs for RH <sup>2)</sup>	AM2	AM2	AM2		AM2	
Setup - Analogue outputs <sup>1)</sup>	Sensor coating	C1	C1	C1	C1		
	integrated power supply 100...240 V AC, 50/60 Hz <sup>3)</sup>	AM3	AM3	AM3	AM3	AM3	
	Output Signal	no code E4					
	Output 1	GA1					
	Scaling 1 low	GA2					
	Scaling 1 high	GA3					
	Output 2	GA5					
	Scaling 2 low	GA6					
	Scaling 2 high	no code MAxx					
	Display mode	no code SALvalue					
relative humidity RH [%]		no code					
other measurand (xx see measurand code below)		MBxx					
value		SBLvalue					
value		SBHvalue					
temperature T [°C]		DT2	DT2	DT2		DT2	
temperature T [°F]		DT3	DT3	DT3		DT3	
other measurand (xx see measurand code below)		DT4	DT4	DT4		DT4	

### Measurand Code

		xx
relative humidity	%	10
temperature	°C	1
	°F	2

		°C	xx
dew point Td	°C		52
	°F		53
frost point Tf	°C		65
	°F		66

1) For T1, T2 T4 and T6 adjustment changes on the electronics board- see operation manual

For T5 adjustment and configuration changes by E+E PCS Software only - see operation manual

2) Alarm output only available with cable glands (plug option is not possible) / combination alarm output and integrated power supply is not possible

3) Integrated power supply includes 2 plugs for power supply and outputs / combination alarm output and integrated power supply is not possible

4) Measurand on display can be selected with push buttons

## Order Example

### EE23-T4HS3F3K2D1GA2SBL0SBH50DT2

Type:	remote probe up to 120 °C (248 °F)	Output Signal:	0-5 V
Enclosure:	metal (Al Si 9 Cu 3)	Output 1	relative humidity [%]
Filter:	plastic - metal grid	Scaling 1 low:	0
Cable length:	2 m (6.6 ft)	Scaling 1 high:	100
Probe length:	200 mm (7.87")	Output 2:	temperature [°C]
Electrical connection:	cable glands	Scaling 2 low:	0
Optional feature:	LC Display	Scaling 2 high:	50
		Display mode:	measurand output 1+2 alternating