

+ Datasheet EE23

Humidity and Temperature Sensor
for Industrial Applications



EE23

Humidity and 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 - 240 V 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 10 m (32.8 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.



Wall mount T1



Duct mount T2



Remote probe T4/T5

Features

Measurement performance

- High RH/T accuracy
- Wide T range from -40 up to +180 °C (- 40...+356 °F)
- Calculation of
 - Dew point temperature (Td)
 - Frost point temperature (Tf)

Enclosure

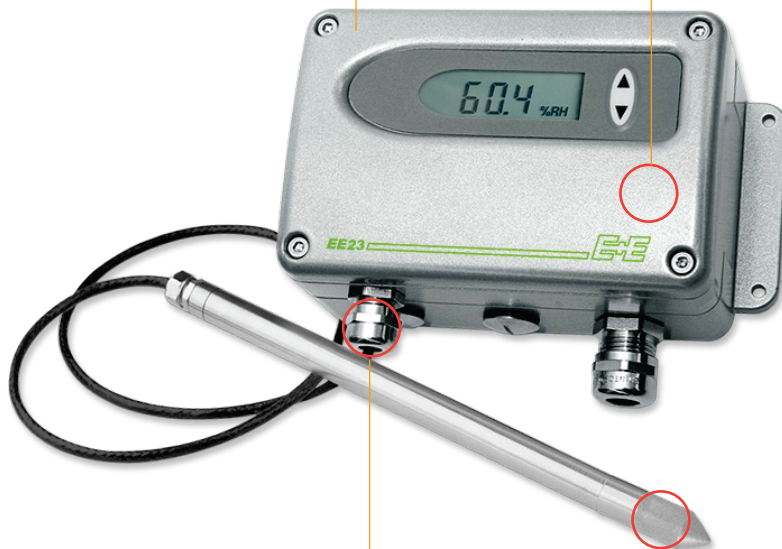
- Polycarbonate or aluminium die-cast
- IP65/NEMA 4(X) protection rating
- Robust and high mechanical stability
- Easy mounting and installation

Types and outputs

- Types for wall mount, duct mount, remote probe
- 2 analogue outputs current / voltage
- Optional alarm output

RH and T sensing head

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



Inspection certificate

According to DIN EN 10204-3.1

Features

Protective Sensor Coating

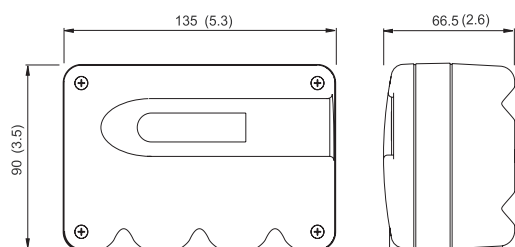
The E+E proprietary sensor coating is a protective layer applied to the sensing elements, their leads and soldering points. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves 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.

Dimensions

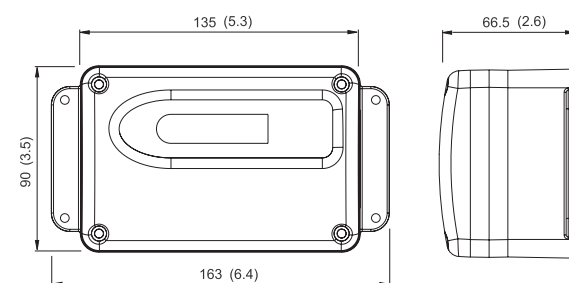
Values in mm (inch)

Enclosure

PC (Polycarbonate)



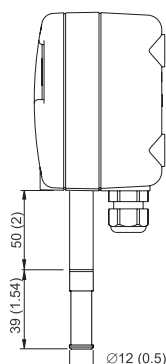
Metal (Aluminium die-cast)



Types

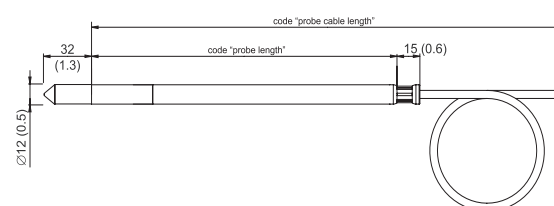
T1: Wall mount

Probe material: PC (Polycarbonate)



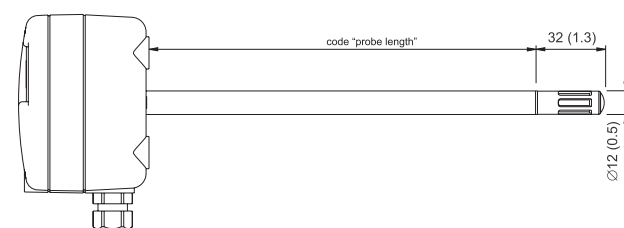
T4/T5: Remote probe

Probe material: Stainless steel



T2: Duct mount

Probe material: Stainless steel



Technical Data

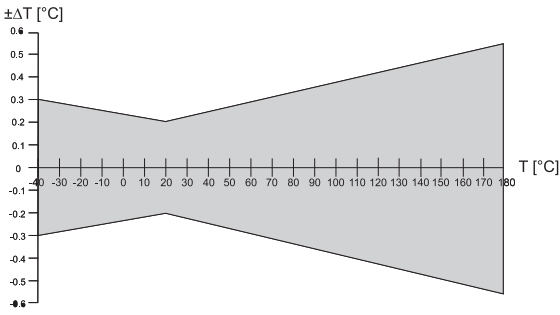
Measurands

Relative humidity

Measuring range	0...100 % RH		
Accuracy ¹⁾	-15...+40 °C (5...104 °F)	≤90 %RH	±(1.3 + 0.3 %*mv) %RH
	-15...+40 °C (5...104 °F)	>90 %RH	±2.3 %RH
	-25...+70 °C (-13...+158 °F)		±(1.4 + 1 %*mv) %RH
	-40...+180 °C (-40...+356 °F)		±(1.5 + 1.5 %*mv) %RH
mv = measured value			
Temperature dependency of electronics, typ.	±0.015 %RH/°C		
Response time t_{90} with metal grid filter, @ 20 °C (68 °F)	<15 s		

1) Including hysteresis, non-linearity and repeatability, traceable to intern. 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)

Working range	EE23-T1 EE23-T2 EE23-T4 EE23-T5	-40...+60 °C (-40...+140 °F) -40...+80 °C (-40...+176 °F) -40...+120 °C (-40...+248 °F) -40...+180 °C (-40...+356 °F)
Accuracy		
Temperature dependence of electronics, typ.	±0.002 °C/°C	

Calculated Quantities

	from	up to					unit
			EE23-T1	EE23-T2	EE23-T4	EE23-T5	
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)




Output

Analogue

Two freely selectable and scalable outputs	0 - 10 V 0 - 20 mA / 4 - 20 mA	-1 mA < I_L < 1 mA R_L < 470 Ω	I_L = load current R_L = load resistance
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Technical Data

General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	15 - 35 V DC or 15 - 28 V AC 100 - 240 V AC, 50/60 Hz (with option AM3)
Current consumption voltage output with DC supply with AC supply	$\leq 25 \text{ mA}$ (with alarm module $\leq 35 \text{ mA}$) $\leq 45 \text{ mA}_{\text{rms}}$ (with alarm module $\leq 70 \text{ mA}_{\text{rms}}$)
Current consumption current output with DC supply with AC supply	$\leq 55 \text{ mA}$ (with alarm module $\leq 65 \text{ mA}$) $\leq 100 \text{ mA}_{\text{rms}}$ (with alarm module $\leq 120 \text{ mA}_{\text{rms}}$)
Electrical connection	Screw terminals max. 1.5 mm^2 (AWG 16)
Cable glands	M16x1.5, for cable $\varnothing 4.5 - 10 \text{ mm}$ (0.18 - 0.39")
Temperature working range Electronics with display	$-40 \dots +60 \text{ }^\circ\text{C}$ ($-40 \dots +140 \text{ }^\circ\text{F}$) $-30 \dots +60 \text{ }^\circ\text{C}$ ($-22 \dots +140 \text{ }^\circ\text{F}$)
Storage temperature range	$-40 \dots +60 \text{ }^\circ\text{C}$ ($-40 \dots +140 \text{ }^\circ\text{F}$)
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class A ICES-003 Class A
Conformity	 

Alarm Module (optional)¹⁾

Output	SPDT-Switch max. 250 V AC/8 A or 28 V DC/8 A
Setting range Threshold Hysteresis	10...95 %RH 3...15 %RH
Setting accuracy	$\pm 3 \text{ %RH}$

1) For types T1, T2, T4 only

Ordering Guide

Features		Description	Code			
Hardware Configuration	Type ¹⁾	Wall mount	EE23-			
		Duct mount	T1	T2	T4	T5
		Remote probe up to 120 °C (248 °F)				
		Remote probe up to 180 °C (356 °F)				
	Enclosure	PC (Polycarbonate)	No code			
		Aluminium die-cast (AlSi9Cu3)	HS3			
	Filter	Plastic - metal grid (up to 120 °C / 248 °F)	F3	F3	F3	F3
		Stainless steel sintered	No code	No code	No code	No code
		PTFE (Polytetrafluoroethylene)	F5	F5	F5	F5
		Stainless steel grid (up to 180 °C / 356 °F)				F9
	Probe cable length (incl. probe length)	2 m (6.6 ft)			K2	K2
		5 m (16.4 ft)			K5	K5
		10 m (32.8 ft)			K10	K10
	Probe length	65 mm (2.55")		L65	L65	L65
		200 mm (7.84")		No code	No code	No code
		400 mm (15.75")		L400	L400	L400
Setup - Analogue outputs ¹⁾	Electrical connection	Standard2)	No code			
		1 plug for power supply and outputs	E4			
	Optional features	LC display	D1	D1	D1	D2 ⁴⁾
		E+E Sensor-Coating	C1	C1	C1	C1
		Alarm outputs for RH3)	AM2	AM2	AM2	
		Integrated power supply 100 - 240 V AC, 50/60 Hz3)	AM3	AM3	AM3	AM3
	Output signal	0 - 10 V	GA3			
		0 - 20 mA	GA5			
		4 - 20 mA	GA6			
	Output 1 measurand	Relative humidity RH [%]	No code			
		Other measurand (xx see measurand code below)	MAxx			
	Output 1 scaling low	0	No code			
		Value	SALValue			
	Output 1 scaling high	100	No code			
		Value	SAHValue			
	Output 2 measurand	Temperature T [°C]	No code			
		Temperature T [°F]	MB2			
		Other measurand (xx see measurand code below)	MBxx			
	Output 2 scaling low	Value	SBLValue			
	Output 2 scaling high	Value	SBHValue			
	Display mode	Measurand output 1 + 2 alternating	DT2	DT2	DT2	
		Measurand output 1	DT3	DT3	DT3	
		Measurand output 2	DT4	DT4	DT4	

1) For T1, T2 and T4 adjustment changes on the electronics board - see User Manual.

For T5 adjustment and configuration changes by E+E PCS Software only - see User Manual.

2) Standard = 2xM16 cable glands, except for AM3 option: 2 plugs for power supply and outputs.

3) With electrical connection standard only (no plug options possible) / combination alarm output and integrated power supply is not possible.

4) Measurand on display can be selected with push buttons.

Measurand Code

For Output 1 and 2 in the Ordering Guide

Measurand	Unit	Code
		MAxx / MBxx
Relative humidity	RH %	10
Temperature	T °C °F	1 2
Dew Point	Td °C °F	52 53
Frost point	Tf °C °F	65 66

Order Example

EE23-T4HS3F3K2D1GA3SBL0SBH50DT2

Feature	Code	Description
Type	T4	Remote probe up to 120 °C (248 °F)
Enclosure	HS3	Aluminium die-cast (AlSi9Cu3)
Filter	F3	Plastic - metal grid
Probe cable length	K2	2 m (6.6 ft)
Probe length	No code	200 mm (7.87")
Electrical connection	No code	Standard
Optional feature	D1	LC display
Output signal	GA3	0 - 10 V
Output 1 measurand	No code	Relative humidity [%]
Output 1 scaling low	No code	0
Output 1 scaling high	No code	100
Output 2 measurand	No code	Temperature T [°C]
Output 2 scaling low	SBL0	0
Output 2 scaling high	SBH50	50
Display mode	DT2	Measurand output 1 + 2 alternating

Accessories

For further information see datasheet [Accessories](#).

Accessories	Code
Mounting flange	HA010201
Bracket for installation onto mounting rails ¹⁾	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

1) For plastic enclosure only

