EE100Ex

Intrinsically Safe Humidity and Temperature Sensor

The EE100Ex intrinsically safe sensor reliably measures relative humidity (RH) and temperature (T) in explosion-hazard areas. It complies with the ATEX (Europe) and IECEx (international) classifications for applications in gas up to Zone 1.

Measurement Performance

With its very robust sensing head, the proprietary sensor protection and encapsulated measurement electronics inside the probe, the EE100Ex stands for best accuracy and long term stability over the working range 0…100 % RH and -40…60 °C (-40...140 °F).

Reliable in Harsh Environment

The entire device can be placed in explosion-hazardous areas. Due to the rugged metal IP65 enclosure and the choice of filter caps, the EE100Ex performs reliably in a wide range of demanding applications such as utility tunnels, hazardous storage rooms or pharmaceutical industry.

Power Supply and Outputs

The device can be powered by any intrinsically safe power source or via Zener barriers. Besides measuring RH and T, the EE100Ex calculates the dew point (Td) and frost point (Tf) temperature. The measured data is available on two galvanically isolated 4…20 mA (2-wire) outputs.

Easy Configuration and Adjustment

The setup of the analogue outputs and as well as the adjustment of the RH and T reading can be easily performed with the optional EE-PCA Product Configuration Adapter and the free EE-PCS Product Configuration Software.

Model T1 - wall mount

Model T3 - fixed remote probe

Features

Approved for installation in gas Zone 1

» ATEX: II 2G Ex ia IIB T4 Gb
» IECEx: Ex ia IIB T4 Ta = -40 °C to 60 °C Gb

E+E sensing element HCT01

» Long-term stability
» Protected solder pads
» Tested according to automotive standard AEC-Q200

Aluminum enclosure

» IP65 protection class
» External mounting holes and grounding connection

Cast electronics

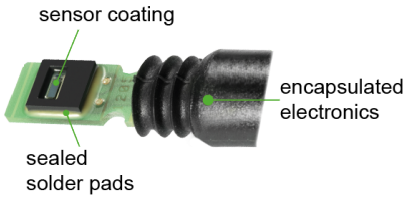
» Mechanical protection
» Condensation-resistant

Interchangeable probe with M12 connector (Model T23)

Inspection certificate according to DIN EN 10204 – 3.1

Protective Sensor Coating

The E+E proprietary sensor coating is a permeable layer applied to the active surface of the RH sensing element. The coating extends substantially the life-time and the measurement performance of the E+E sensor in corrosive environment. Additionally, it improves the long term stability in dusty and dirty applications by preventing stray impedances caused by deposits on the active sensor surface.



Ex - Classifications

Europe (ATEX)

Certificate:	TPS 19 ATEX 038892 0008 X by TÜV SÜD Product Service GmbH
Safety data:	U_i = 28 V; I_i = 100 mA; P_i = 700 mW; C_i = 2.2 nF; $L_i \approx 0$ mH
Ex-Designation:	II 2G Ex ia IIB T4 Gb

International (IECEx)

Certificate:	IECEx TPS 18.0014 X by TÜV SÜD Product Service GmbH
Safety data:	U_i = 28 Vdc; I_i = 100 mA; P_i = 700 mW; C_i = 2.2 nF; $L_i \approx 0$ mH
Ex-Designation:	Ex ia IIB T4 Ta = -40 °C to 60 °C Gb

Technical Data

Measurands

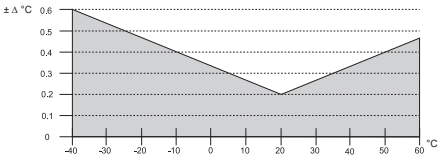
Relative Humidity (RH)

Measurement range	0...100 % RH	
Accuracy[1] (incl. hysteresis, non-linearity and repeatability)		
wall mount model (T1)		
20...30 °C (68...86 °F)	RH ≤ 90 %	±2 % RH
20...30 °C (68...86 °F)	RH > 90 %	±3 % RH
-20...40 °C (-4...104 °F)		±3 % RH
remote probe models (T3, T23)		
at 20 °C (68 °F)		±2.5 % RH

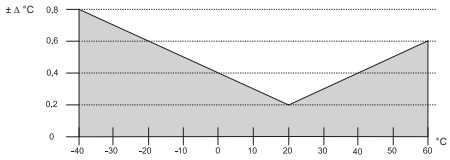
Temperature (T)

Accuracy and measurement range

wall mount (T1)



remote probe (T3, T23)



Calculated parameters[2]	dew point temperature [Td] frost point temperature [Tf]

Output

Analogue outputs	2 x 4...20 mA, 2-wire, user configurable

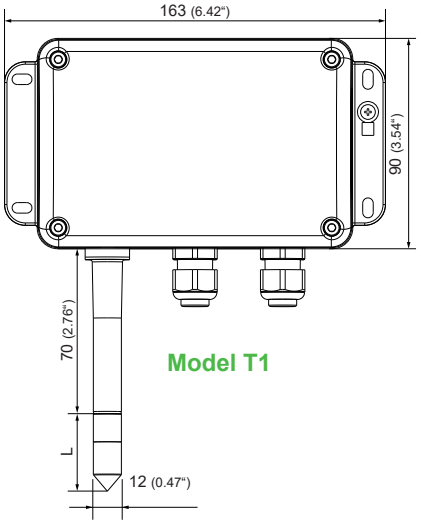
General

Supply voltage U_V	
from intrinsically safety barrier	11 V + R_L * 0.02 A < Uv < 28 V DC (R_L = load resistor)
safety data	Ui=28 V; Ii=100 mA; Pi=700 mW; Ci = 2.2 nF; Li ≈ 0 mH
Electrical connection	screw terminals, max. 1.5 mm²
Cable glands (brass, nickel plated)	M16 x 1.5 for cable diameter 4.5 - 10 mm (0.18“ - 0.39“) M20 x 1.5 for cable diameter 7 - 13 mm (0.28“ - 0.51“)
Protection class (enclosure and probe)	IP65

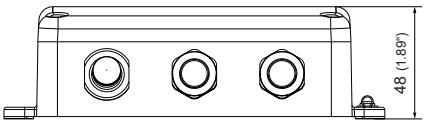
1) Traceable to intern. standards, administrated by NIST, PTB, BEV,... The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement). Accuracy is specified for models T3, T23 with an airflow >0.0m/s, for model T1 with an airflow 0.2 m/s.
2) For the accuracy please use “E+E humidity calculator” or refer to document “Principles of humidity measurement”, available on www.epluse.com

Working temperature ranges		
model T1, T3:		-40...60 °C (-40...140 °F)
model T23:	electronics, probe	-40...60 °C (-40...140 °F)
	M12 probe cable	-25...60 °C (-13...140 °F)
Storage temperature range		-20...60 °C (-4...140 °F)
Material		
enclosure		aluminium (Al Si9 Cu3)
probe		ABS (model T1) polycarbonate (model T3, T23)
Safety area installation		EPL: Gb (Gas - Zone 1)
Ex Certificates		ATEX II 2G Ex ia IIB T4 Gb IECEx Ex ia IIB T4 Ta = -40 °C to 60°C Gb
Electromagnetic compatibility according		EN61326-1 EN61326-2-3 Industrial Environment

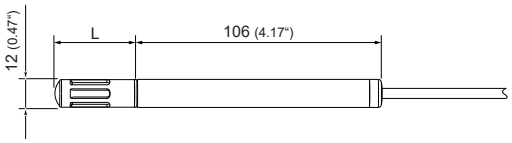
Dimensions in mm (inches)



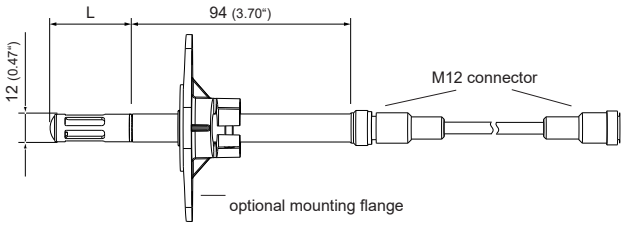
Model T1



Probe of model T3



Probe of model T23



L = filter cap	Length in mm
Membrane filter	34 (1.4“)
Stainless steel sinter filter	33 (1.3“)
PTFE filter	33 (1.3“)

Accessories

Protection cap for 12 mm probe	HA010783
Plastic mounting flange Ø12 mm (0.47“), black	HA010214
Wall mounting plastic clip Ø12 mm (0.47“)	HA010211
Safety barrier, 1-channel, STAHL 9002/13-280-093-001	HA011410
Intrinsically safe supply unit, 1-channel, STAHL 9160/13-11-11	HA011405
Intrinsically safe supply unit , 2-channel, STAHL 9160/23-11-11	HA011406
Sealing plug for unused M16 cable glands	HA011402
Sealing plug for unused M20 cable glands	HA011404
Product Configuration Software	EE-PCS (free download: www.epluse.com/configurator)

Adapter kit for configuration and adjustment consisting of (see datasheet EE-PCA):

Pos. 1: Product Configuration Adapter	EE-PCA
Pos. 2 : Connection cable	HA011068

Ordering Guide

			EE100Ex-		
Hardware	**Model**	wall mount	T1		
		fixed remote probe		T3	
		pluggable interchangeable remote probe			T23
	Filter	membrane	F2		
		stainless steel sintered	F4		
		PTFE	F5		
	Probe cable length[1]	1 m (3.3 ft)		K1	
		2 m (6.6 ft)			K2
		3 m (9.8 ft)		K3	
	Electrical connection	one cable gland M16 x 1.5	E29		
		one cable gland M20 x 1.5	E30		
		two cable glands M16 x 1.5	E22		
		two cable glands M20 x 1.5	E21		
	Ex-approval	ATEX and IECEx	EX8		
Software	**Measurand output 1**[2]	relative humidity RH [%]	MA10		
		temperature T [°C]	MA1		
		temperature T [°F]	MA2		
		dew point Td [°C]	MA52		
		dew point Td [°F]	MA53		
		frost point Tf [°C]	MA65		
		frost point Tf [°F]	MA66		
	Scaling out 1 low	value	SAL value		
	Scaling out 1 high	value	SAH value		
	Measurand output 2	relative humidity RH [%]	MB10		
		temperature T [°C]	MB1		
		temperature T [°F]	MB2		
		dew point Td [°C]	MB52		
		dew point Td [°F]	MB53		
		frost point Tf [°C]	MB65		
		frost point Tf [°F]	MB66		
	Scaling out 2 low	value	SBL value		
	Scaling out 2 high	value	SBH value		

1) cable: fixed for T3 version, pluggable and interchangeable for T23 version (only cable supplied by E+E is allowed).
2) assign the most relevant measurand parameter to output 1. Output 1 must always be connected

Spare parts (only for T23 version)

Replacement probe

		EE100ExP-
Filter	membrane	F2
	stainless steel sintered	F4
	PTFE	F5
M12 probe cable*	2 m (6.6 ft)	HA010826

* Only cable supplied by E+E is permitted.

Order Example

EE100Ex-T1F2E22EX8MA10SAL0SAH100MB1SBL0SBH50

Model:	wall mount
Filter:	membrane
Electrical Connection:	two cable glands M16 x 1.5
Ex-Approval:	ATEX / IECEx
Measurand output 1:	relative humidity RH [%]
Scaling out 1 low:	0
Scaling out 1 high:	100
Measurand output 2:	temperature [°C]
Scaling out 2 low:	0
Scaling out 2 high:	50