

# EE30EX Series



## Humidity/Temperature Transmitter for Intrinsically Safe Applications

EE30EX series transmitters from E+E Elektronik are designed for the accurate measurement of humidity and temperature in the range between 0...100% RH and -40...180°C (-40...356°F). Models for pressure tight installations from 0.01...15 bar (0.15...218psi) complete the range of products.

EE30EX meets the **ATEX requirements** and **IECEX standards** of intrinsically safe machinery:

Applied standards for ATEX:  
**EN50014:1997**  
**EN50020:1994**  
**EN50284:1998**

Applied standards for IECEx:  
**IEC 60079-0:2004**  
**IEC 60079-11:1999**  
**IEC 60079-26:2004**

The EC type examination was carried out by Physikalisch-Technische Bundesanstalt (PTB), the German national institute for science and technology.

The transmitters of EE30EX series consist of:

- EE30EX supply and evaluation unit, classified according to **II (1) G [EEx ia] IIC** subject to EC-type examination certificate **PTB 99 ATEX 2042** and **[EEx ia] IIC** according to **IECEX PTB 05.0031**.
- sensor driver unit and sensor probe, classified according to **II 1/2 G EEx ia IIC T6** subject to EC-type examination certificate **PTB 99 ATEX 2043 X** and **EEx ia IIC T6** according to **IECEX PTB 05.0032X**.

The sensor probe can be employed in zone 0 and in temperature class T6 (apparatus group II, category 1). For EE30EX versions D and E the cable length between sensing probe and sensor driver unit can be up to 10m (32.8ft). The maximum length of the cable between the supply and evaluation unit and the sensor driver unit is 100m (328ft).

The analogue output signals for humidity and temperature are available as current or as voltage.

State-of-the-art microprocessor technology makes both analogue outputs free selectable and scaleable via RS232 serial interface.

Besides measurement of humidity and temperature EE30EX series calculate the values of the following physical quantities:

- |                           |    |
|---------------------------|----|
| - dew point temperature   | Td |
| - frost point temperature | Tf |
| - wet bulb temperature    | Tw |
| - water vapour pressure   | e  |
| - mixing ratio            | r  |
| - absolute humidity       | dv |
| - specific enthalpy       | h  |

These are available on the RS232 serial interface, on the analogue outputs and on the integrated LC display.

The communication with a PC is assisted by an user friendly software, running under MS Windows™ which enables the user to change original factory settings easily.



Model A



Model D



Model E

## Configuration Software

The Configuration Software is used for:

- flexible, easy, and fast setup of the analogue outputs resp. of the RS232 serial interface.
- adjustment of the humidity and temperature outputs.
- exchange of the sensor.

## Typical Applications

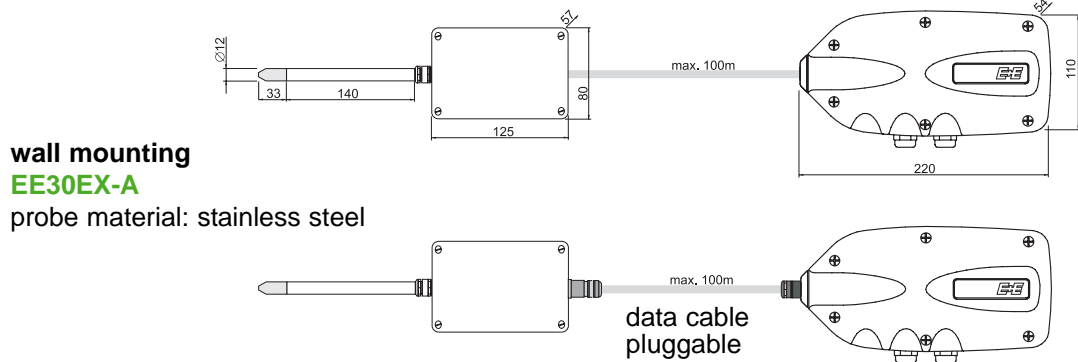
chemical processes  
pharmaceutical applications  
explosive endangered storage rooms

## Features

EC-Type examination according to ATEX  
approved to IECEx  
approved for zone 0  
highest accuracy up to 180°C (356°F)  
traceable calibration  
dew point, absolute humidity,... measurement  
incl. MS Windows™ Software  
interchangeable humidity sensor

## Housing Dimensions (mm)

1m = 3.28ft / 1ft = 0.30m  
1 mm = 0.03937" / 1" = 25.4 mm



**wall mounting**

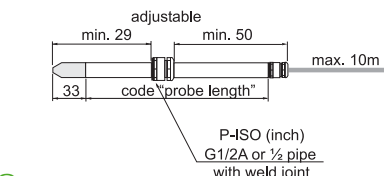
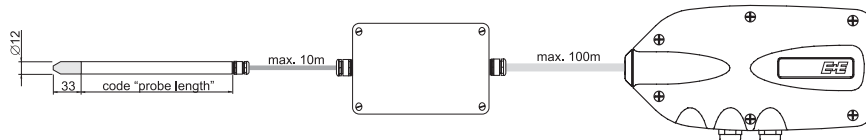
**EE30EX-A**

probe material: stainless steel

**remote probe up to 180°C (356°F)**

**EE30EX-D**

probe material: stainless steel



**pressure tight probe up to 15 bar (218psi)**

**EE30EX-E**

probe material: stainless steel

## Classifications

### Europe:

EU (94/9/EG, ATEX 100a)

- supply and evaluation unit:

**Ex** II (1) G [EEx ia] IIC  
PTB 99 ATEX 2042

- sensor unit:

**Ex** II 1/2 G EEx ia IIC T6  
PTB 99 ATEX 2043 X

- environmental specifications:

T<sub>amb</sub>: -20...+60°C (-4...140°F)  
P<sub>amb</sub>: 0.8...1.1bar (11.6...16psi)

### International:

- supply and evaluation unit:

**Ex** [EEx ia] IIC  
IECEx PTB 05.0031

- sensor unit:

**Ex** EEx ia IIC T6  
IECEx PTB 05.0032X

- environmental specifications:

T<sub>amb</sub>: -20...+60°C (-4...140°F)  
P<sub>amb</sub>: 0.8...1.1bar (11.6...16psi)

**EE30EX**

## Technical Data EE30EX

### Measuring values

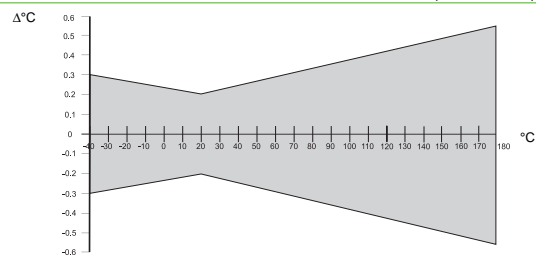
#### Relative humidity

Humidity sensor <sup>1)</sup>	HC1000-400	
Measuring range <sup>1)</sup>	0...100% RH	
Accuracy <sup>2)</sup> (including hysteresis, non-linearity and repeatability, traceable to international standards, administrated by NIST, PTB, BEV...)		
-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	
Temperature dependence electronics	typ. 0.08% RH/°C	
Response time with filter at 20°C / t <sub>90</sub>	< 30 sec.	

#### Temperature

Temperature sensor	Pt1000 (DIN EN 60751, class A)		
Measuring range sensor head	EE30EX-A	-20...60°C	(-4...140°F)
	EE30EX-D	-40...180°C	(-40...356°F)
	EE30EX-E	-40...180°C	(-40...356°F)

Accuracy (typ.)



Temperature dependence typical 0.005°C/°C

#### Max. adjustable Measurement Range <sup>3)</sup>


		from	to	unit
			EE30EX-A	EE30EX-D/E
Humidity	RH	0	100	100
Temperature	T	-40 (-40)	60 (140)	180 (356)
Dew point temperature	Td	-80 (-112)	60 (140)	100 (212)
Frost point temperature	Tf	-80 (-112)	0 (32)	0 (32)
Wet bulb temperature	Tw	0 (32)	60 (140)	100 (212)
Water vapour pressure	e	0 (0)	200 (3)	1100 (15)
Mixing ratio	r	0 (0)	425 (2900)	999 (9999)
Absolute humidity	dv	0 (0)	150 (60)	700 (300)
Specific enthalpy	H	-50 (-15000)	400 (150000)	2800 (999999)

### Outputs

Two freely selectable and scalable outputs	0 - 5 V 0 - 10 V 4 - 20 mA	-1 mA < I <sub>L</sub> < 1 mA -1 mA < I <sub>L</sub> < 1 mA R <sub>L</sub> < 360 Ohm
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Serial interface RS232C

### General

Supply voltage	SELV 24V DC/V AC ± 15%	SELV = Safety Extra Low Voltage
Current consumption	≤ 150mA (24V DC); ≤ 280mA (24V AC)	
Pressure range with pressure tight sensor probe	0.01...15 bar (0.15...218psi)	
System requirements for software	MS Windows™ 98 or later; serial interface	
Housings	supply- and evaluation unit	ABS-plastic / IP65
	sensor driver unit	AlSi12 / IP65
Cable gland	PG 7 and PG 9; for cable diameter 5 - 9 mm (0.2 - 0.35")	
Electrical connection	screw terminals max. 1.5 mm <sup>2</sup> (AWG 16)	
Sensor protection	sintered stainless steel filter, PTFE-filter or metal grid filter	
Temperature range	sensor probe:	according measuring range
	electronic sensor driver device:	-20...60°C (-4...140°F)
	electronic supply- and evaluation device:	-40...60°C (-40...140°F)
	electronic with display:	0...40°C (32...104°F)
Storage temperature range	electronics and sensor head	-30...60°C (22...140°F)
Electromagnetic compatibility according	EN61000-6-4 EN61000-6-2	

<sup>1)</sup> Refer to the working range of the humidity sensor.

<sup>3)</sup> Refer to accuracies of calculated values.

<sup>2)</sup> 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).



## Ordering Guide EE30EX

### Position 1 - Transmitter

		EE30EX-A	EE30EX-D	EE30EX-E			
<b>Hardware Configuration</b>							
<b>Filter</b>	stainless steel sintered filter	3	3	3			
	PTFE Filter <sup>*)</sup>	5	5	5			
	metal grid filter (up to 120°C / 248°F) <sup>1)</sup>	6	6	6			
	stainless steel grid filter (up to 180°C / 356°F)	9	9	9			
	stainless steel filter	7	7	7			
<b>Cable length</b>	2m (6.6ft)		02	02			
	5m (16.4ft)		05	05			
	10m (32.8ft)		10	10			
<b>Probe length</b>	200mm (7.9")		5	5			
	400mm (15.8")		6	6			
<b>Pressure tight</b>	1/2" male thread		HA03	HA03			
<b>Feedthrough</b>	1/2" pipe weld joint		HA05	HA05			
	1/2" NPT thread		HA07	HA07			
<b>Data cable</b>	not pluggable						
	pluggable	P02	P02	P02			
<b>Display</b>	without display						
	with display	D01	D01	D01			
<b>Coating sensor</b>	no						
	yes	HC01	HC01	HC01			
<b>Calibration</b>	standard						
	high-humidity calibration	CA01	CA01	CA01			
<b>Software Configuration</b>							
<b>Physical parameters of outputs</b>	Relative humidity	RH [%]	(A)	Output 1	Select according to Ordering Guide (A - H,J)		
	Temperature	T [°C or °F]	(B)				
	Dew point temperature	Td [°C or °F]	(C)	Output 2			
	Frost point temperature	Tf [°C or °F]	(D)				
	Wet bulb temperature	Tw [°C or °F]	(E)				
	Water vapour partial pres.	e [mbar]	(F)				
	Mixture ratio	r [g/kg]	(G)				
	Absolute humidity	dv [g/m <sup>3</sup> ]	(H)				
	Specific enthalpy	h [kJ/kg]	(J)				
	<b>Type of output signals</b>	0-5V		(2)		Select according to Ordering Guide (2,3,6)	
0-10V			(3)				
4-20mA			(6)				
<b>Measure value units</b>	metric / SI			E01	E01	E01	
	not metric / US						
<b>Scaling of T-output</b>	-40...60 (T02)	-40...120 (T12)	-40...160 (T33)	Output T	Select according to Ordering Guide (Txx)		
	-10...50 (T03)	-20...100 (T14)	-40...180 (T52)				
<b>Scaling of Td-output in °C or °F</b>	0...50 (T04)	+20...120 (T15)	-40...140 (T83)	Output Td	Select according to Ordering Guide (Txx)		
	0...100 (T05)	0...120 (T16)	32...120 (T90)				
	0...60 (T07)	0...80 (T21)	32...140 (T91)	Other T or Td-scaling refer to page 134			
	-30...70 (T08)	-40...80 (T22)	32...180 (T92)				
	-30...120 (T09)	-20...80 (T24)	32...132 (T96)				
	-20...120 (T10)	-20...60 (T25)					
<b>Data cable</b>	maximal 100m (328ft) / transmitter	xxxm	xxxm	xxxm			

\*) to be used for the apparatus group II B only

## Order Example

Position 1 - Transmitter: **EE30EX-E3056HA03P02/BC3-T05-Td14**  
 Humidity/Temperature Transmitter Series EE30EX

Model: For pressure tight installations  
 Filter: stainless steel sintered filter  
 Cable length: 5m (16.4ft)  
 Probe length: 400mm (15.8")  
 Feedthrough: 1/2" male thread  
 Data cable: pluggable  
 Output 1: T  
 Output 2: Td  
 Output signal: 0-10V  
 Scaling of T-output: 0...100°C  
 Scaling of Td-output: -20...100°C

Position 2 - Data cable: **Data cable 60m (196.8ft)**