

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 degC (-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 complies to the following health and safety standards of intrinsically safe machinery:

EN50014:1997
EN50020:1994
EN50284:1998



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:

- supply and evaluation unit, classified according to **II(1)G [EEx ia] IIC** subject to EC-type examination certificate **PTB 99 ATX 2042**.
- sensor driver unit and sensor probe, classified according **II1/2G EEx ia IIC T6** subject to EC-type examination certificate **PTB 99 ATX 2043 X**.

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 acc. ATEX
approved for zone 0
highest accuracy up to 180 degC (356°F)
dew point, absolute humidity,... measurement
incl. MS Windows™ Software
interchangeable humidity sensor

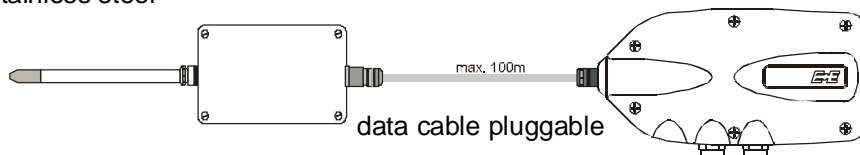
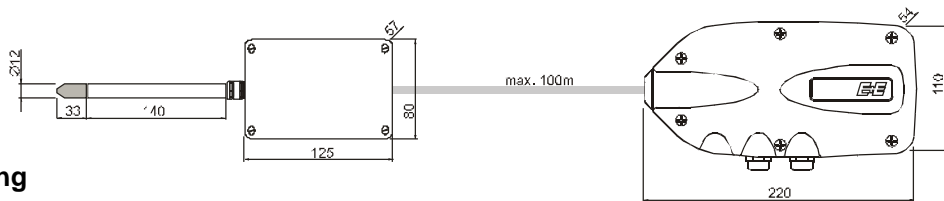
Housing Dimensions (mm)

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

wall mounting

EE30EX-A

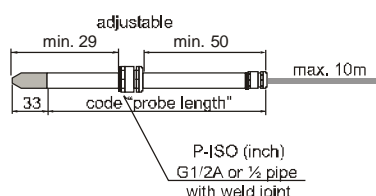
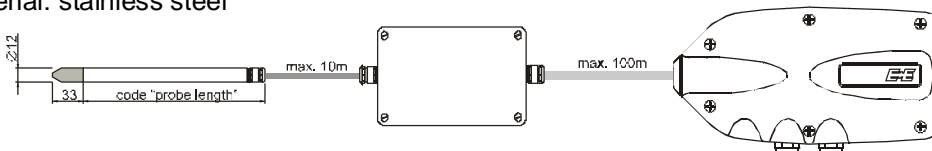
probe material: stainless steel



remote probe up to 180 degC (356°F)

EE30EX-D

probe material: stainless steel



pressure tight probe up to 15 bar (218psi)

EE30EX-E

probe material: stainless steel

Technical Data EE30EX

Measuring values

Relative humidity

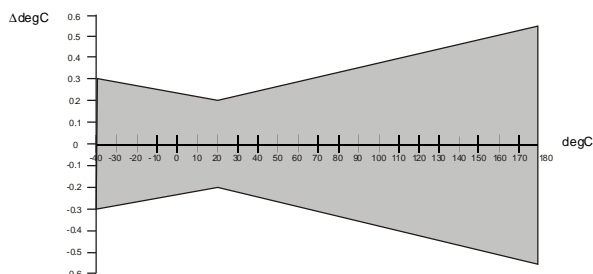
Humidity sensor ¹⁾	HC1000-400	
Measuring range ¹⁾	0...100% RH	
Accuracy incl. hysteresis and nonlinearity		
-with special calibration against certificated standards	± 1% RH (0...90% RH)	± 2% RH (90...100% RH)
-standard calibration	± 2% RH (0...90% RH)	± 3% RH (90...100% RH)
Temperature dependence electronic	typ. 0.06% RH / degC	(typ. 0.03% RH / °F)
Temperature dependence sensor head	typ. 0.03% RH / degC	(typ. 0.02% RH / °F)
Response time with filter at 20 degC / t ₉₀	< 30 sec.	

Temperature

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

Accuracy (typ.)

-40...180 degC (-40...356°F)



Temperature dependence typical 0.005 degC/degC (°F/°F)

Max. adjustable Measurement Range ³⁾

		from	to		unit
			EE30EX-A	EE30EX-D/E	
Humidity	RH	0	100	100	%RH
Temperature	T	-40 (-40)	60 (140)	180 (356)	degC (°F)
Dew point temperature	T _d	-80 (-112)	60 (140)	100 (212)	degC (°F)
Frost point temperature	T _f	-80 (-112)	0 (32)	0 (32)	degC (°F)
Wet bulb temperature	T _w	0 (32)	60 (140)	100 (212)	degC (°F)
Water vapour pressure	e	0 (0)	200 (3)	1100 (15)	mbar (psi)
Mixing ratio	r	0 (0)	425 (2900)	999 (9999)	g/kg (gr/lb)
Absolute humidity	dv	0 (0)	150 (60)	700 (300)	g/m ³ (gr/ft ³)
Specific enthalpy	H	-50 (-15000)	400 (150000)	2800 (999999)	kJ/kg (lbf/lb)

Outputs

Two freely selectable and scalable outputs	0 - 5 V	-1 mA < I _L < 1 mA
	0 - 10 V	-1 mA < I _L < 1 mA
	4 - 20 mA	R _L < 360 Ohm

Serial interface RS232C

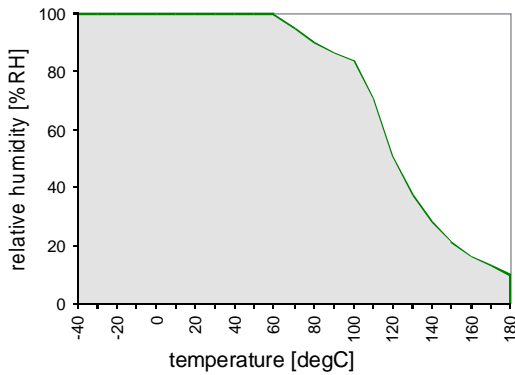
General

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 inch)	
Electrical connection	screw terminals max. 1.5 mm ² (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 degC (-4...140°F)
	electronic supply- and evaluation device:	-40...60 degC (-40...140°F)
	electronic with display:	0...40 degC (32...104°F)
Storage temperature range	electronics and sensor head	-30...60 degC (22...140°F)
Electromagnetic compatibility according	EN61000-6-4 EN61000-6-2	

¹⁾ Refer to the working range of the humidity sensor, page 16.

³⁾ Refer to accuracies of calculated values, page 68.

Working Range Humidity Sensor



The specified working range for the humidity sensor element is shown in terms of humidity/temperature limits.

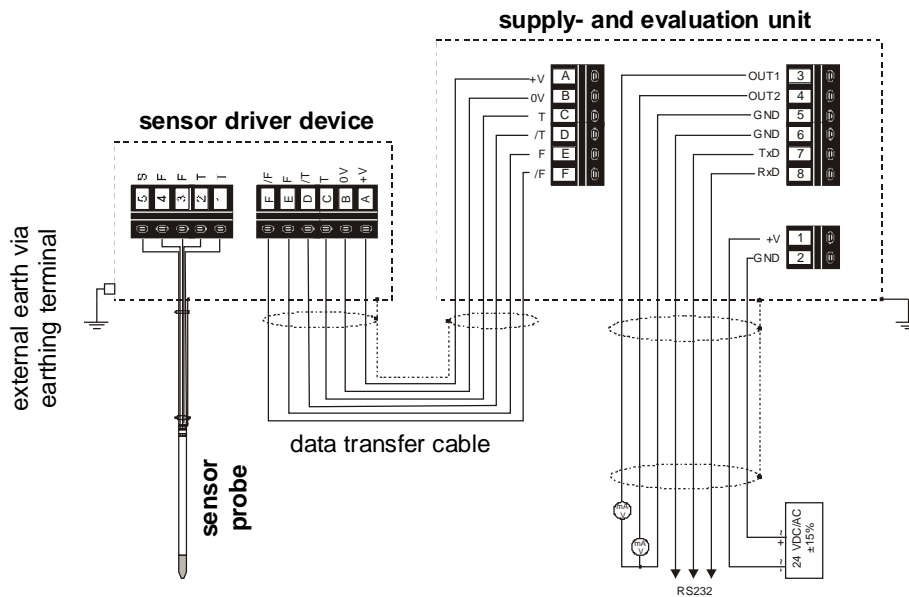
Although the sensors would not deteriorate beyond the limits, their performance can only be specified within the limits for the working range.

-40...180 degC (-40...356°F)

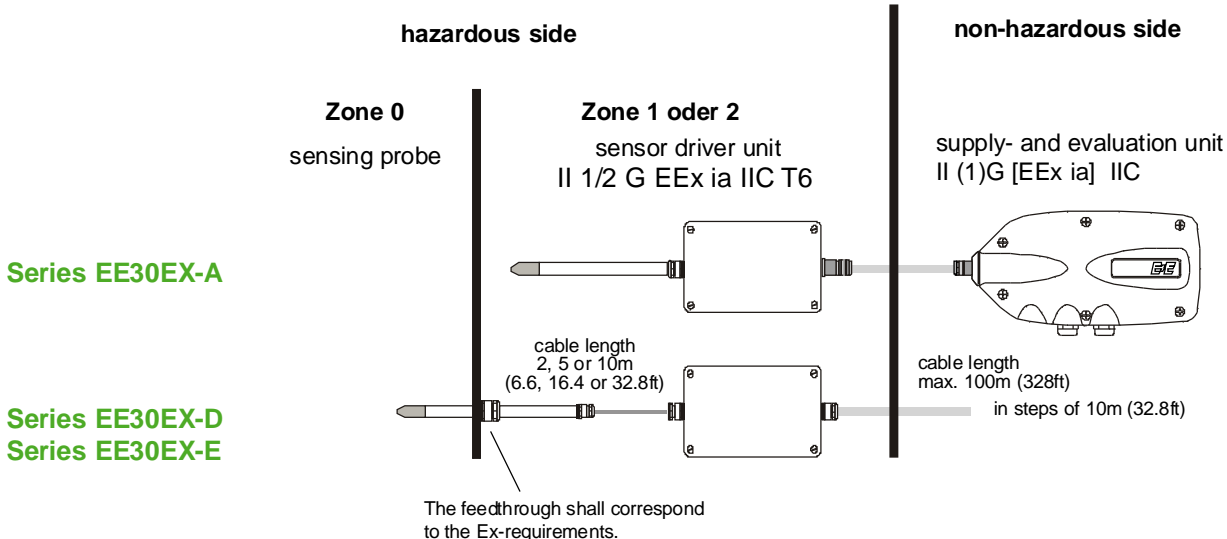
Sensing head with protective coating

For use in heavy polluted or aggressive environment E+E has developed a special protective coating process (order code: HC01). Both humidity and temperature sensor elements are covered with a polymer film. Extensive tests have proved an amazing improvement of the resistance to chemical pollutants which leads to a much better long term stability of the transmitter.

Connection Diagram



Installation



Ordering Guide EE30EX

EE30EX-A EE30EX-D EE30EX-E

Position 1 - Transmitter

Hardware Configuration				EE30EX-A	EE30EX-D	EE30EX-E		
Filter	stainless steel sintered filter		(3)	3	3	3		
	PTFE Filter		(5)	5	5	5		
	metal grid filter (up to 120 degC / 248°F)		(6)	6	6	6		
Cable length	2m (6.6ft)		(02)		02	02		
	5m (16.4ft)		(05)		05	05		
	10m (32.8ft)		(10)		10	10		
Probe length	200mm (7.9 inch)		(5)		5	5		
	400mm (15.8 inch)		(6)		6	6		
Pressure tight	1/2" male thread		(HA03)		HA03	HA03		
Feedthrough	1/2" pipe weld joint		(HA05)		HA05	HA05		
	1/2" NPT thread		(HA07)		HA07	HA07		
Data cable	not pluggable		(no code)					
	pluggable		(P02)	P02	P02	P02		
Display	without display		(no code)					
	with display		(D01)	D01	D01	D01		
Coating sensor	no		(no code)					
	yes		(HC01)	HC01	HC01	HC01		
Calibration	standard		(no code)					
	high-humidity calibration		(CA01)	CA01	CA01	CA01		
Software Configuration								
Physical parameters of outputs	Relative humidity	RH [%]	(A)	Output 1	Select according to Ordering Guide (A - H, J)			
	Temperature	T [degC or °F]	(B)	Output 2	Select according to Ordering Guide (A - H, J)			
	Dew point temperature	Td [degC or °F]	(C)					
	Frost point temperature	Tf [degC or °F]	(D)					
	Wet bulb temperature	Tw [degC or °F]	(E)					
	Water vapour partial pres.	e [mbar]	(F)					
	Mixture ratio	r [g/kg]	(G)					
	Absolute humidity	dv [g/m³]	(H)					
	Specific enthalpy	h [kJ/kg]	(J)					
	Type of output signals	0-5V					(2)	Select according to Ordering Guide (2,3,6)
0-10V			(3)					
4-20mA			(6)					
Measure value units	metric / SI		(no code)	E01	E01	E01		
	not metric / US		(E01)					
Scaling of T-output	-40...60 (T02)	-40...120 (T12)	-40...160 (T33)	Output T	Select according to Ordering Guide (Txx)			
Scaling of Td-output in degC or °F	-10...50 (T03)	-20...100 (T14)	-40...180 (T52)					
	0...50 (T04)	+20...100 (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)					
	-30...70 (T08)	-40...80 (T22)	32...180 (T92)					
	-30...120 (T09)	-20...80 (T24)	32...132 (T96)					
	-20...120 (T10)	-20...60 (T25)						

Position 2 - Data cable

Data cable	maximal 100m (328ft) / transmitter	data cable	xxxm	xxxm	xxxm
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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 inch)
 Feedthrough: 1/2" male thread
 Data cable: pluggable
 Output 1: T
 Output 2: Td
 Output signal: 0-10V
 Scaling of T-output: 0...100 degC
 Scaling of Td-output: -20...100 degC

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