



—
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in sensor
technology.

+ Datasheet EE160

Humidity and Temperature Sensor
for Building Automation



EE160

Humidity and Temperature Sensor for Building Automation

The EE160 is optimized for cost effective, accurate measurement of relative humidity (RH) and temperature (T) in building automation.

Reliable

Best long-term stability even in polluted or aggressive environment is ensured by the encapsulated measurement electronics inside the probe and E+E proprietary coating of the sensing element.

Versatile

The measured data is available on two voltage or current (2-wire) outputs, or on the RS485 interface with Modbus RTU protocol. Additionally, the EE160 features a passive T output and an optional display visualises RH and T values simultaneously.

Functional Design

EE160 is available for wall or duct mount. The IP65/NEMA 4X enclosure minimizes installation costs and provides outstanding protection against contamination and condensation.

Comfortable Configuration and Adjustment

With an optional configuration stick and the free PCS10 Product Configuration Software, the user can set the RS485 interface parameters, the output scaling and perform an offset or two point adjustment for RH and T.



EE160 for wall mounting with display



EE160 for duct mounting without display

Features

Appropriate for US mounting requirements

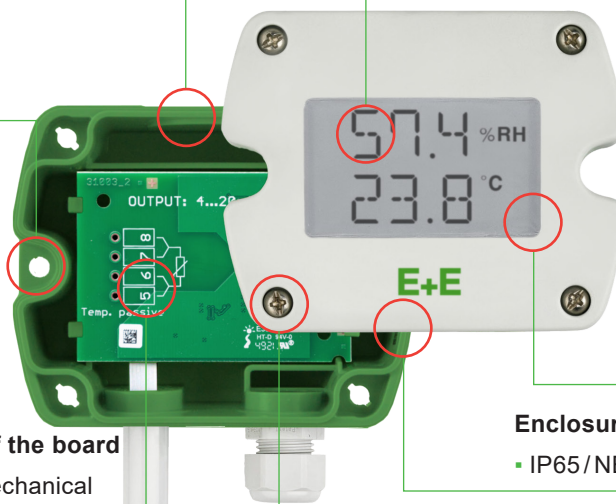
- Knockout for 1/2" conduit fitting

External mounting holes

- Easy and fast mounting with closed cover
- Electronics protected against construction site pollution

Display

- Two display lines for RH and T values
- Unit selection °C/°F according to the order code
- Threshold setting for T using PCS10



Smooth cover surface

- No dust accumulation in protruding edges

Electronics on the backside of the board

- Optimum protection against mechanical damage during installation

Enclosure

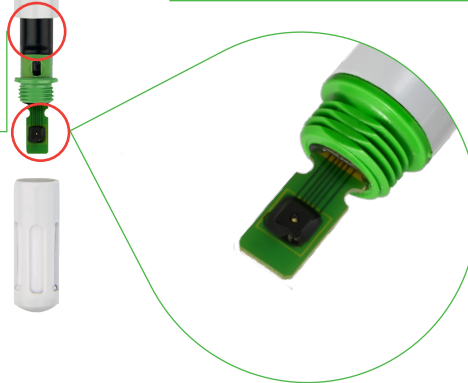
- IP65/NEMA 4X

Bayonet screws

- Open/close with a 1/4 rotation

Encapsulated electronics

- Protected against condensation
- Rugged construction



E+E humidity sensing element

- Very robust
- Protected sensor surface and solder pads
- Patented sensor technology

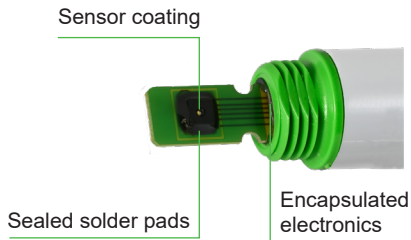
Inspection certificate

According to DIN EN 10204-3.1

Features

Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. 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.

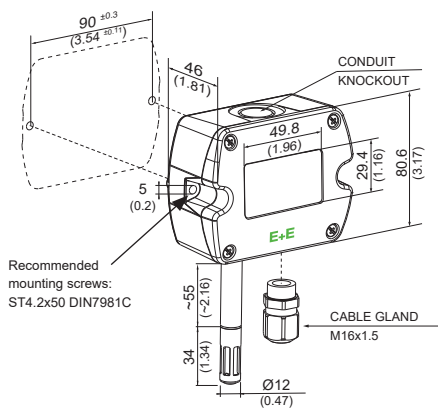


Sensing head with sensor coating and underfiller

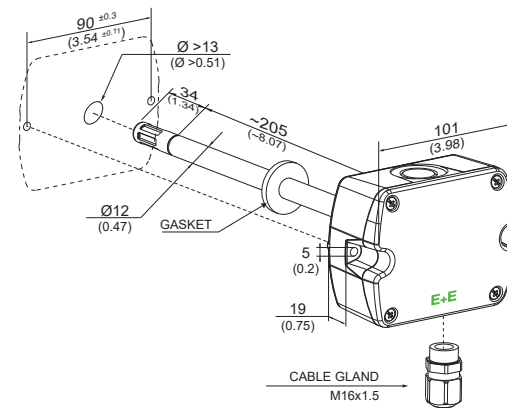
Dimensions

Values in mm (inch)

Type T1 wall mount

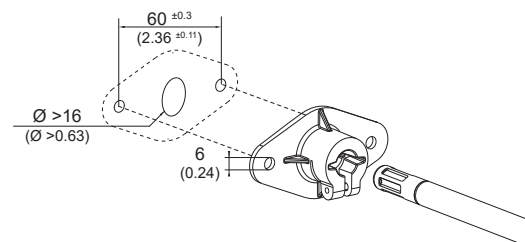


Type T2 duct mount



Mounting flange

in the scope of supply for type T2



Technical Data

Measurands

Relative Humidity (RH)

Measuring range	0...100 %RH, non-condensing	
Accuracy¹⁾ (incl. hysteresis, non-linearity and repeatability)	23 °C ²⁾ (0...100 %RH) ±2 %RH 0...+40 °C (0...100 %RH) ±2.5 %RH -20...+60 °C (0...100 %RH) ±3.5 %RH -40...-20 °C (0...100 %RH) ±4.5 %RH	
Factory calibration uncertainty³⁾	0...90 %RH ±(0.7 + 0.003 * mv) %RH >90...100 %RH ±1 %RH	mv = measured value

- 1) Defined against E+E calibration reference.
- 2) ±0.02 %RH/°C in the range of 23 °C ±10 °C (73.4 °F ± 18 °F)
- 3) Defined at 23 °C (73,4 °F) with an enhancement factor k=2, corresponding to a confidence level of 95 %.

Temperature (T)

Measuring range	-40...+60 °C (-40...+140 °F)	
Accuracy¹⁾		
Factory calibration uncertainty²⁾	±0.1 °C (±0.056 °F)	

- 1) Defined against E+E calibration reference.
- 2) Defined at 23 °C (73,4 °F) with an enhancement factor k=2, corresponding to a confidence level of 95 %.

Outputs

Analogue

RH: 0...100 %, T: see ordering guide	4 - 20 mA (2-wire) 0 - 10 V	$R_L \leq 500 \Omega$ $0 \text{ mA} < I_L < 1 \text{ mA}$	R_L = load resistance I_L = load current
Accuracy @23 °C (68 °F)	± 0.075 % fs		fs = full scale (20 mA, 10 V)

T Sensor Passive




Type acc. to ordering code	4-wire connection
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Digital

Digital interface	RS485 (EE160 = 1 unit load)
Protocol	Modbus RTU
Factory settings	Baud rate acc. to ordering code, parity even, 1 stop bit, Modbus address 245
Supported baud rates	9 600, 19 200, 38 400, 57 600, 76 800 and 115 200
Data types for measured values	FLOAT32 and INT16

Technical Data

General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	4 - 20 mA (2-wire)	(10 V + R _L * 20 mA) < V+ < 35 V DC		
	0 - 10 V RS485	15 - 35 V DC or 24 V AC ±20%		
Current consumption, typ.		4 - 20 mA output	0 - 10 V output	RS485
	24 V DC supply	According to output current, max. 40 mA	<3 mA / <5 mA with Display	5 mA
	24 V AC supply	-	<8 mA _{rms} / <10 mA _{rms} with Display	15 mA _{rms}
Electrical connection	Screw terminals max. 1.5 mm ² (AWG 16)			
Cable gland	M16x1.5			
Display¹⁾	LC display with two lines for RH and T values			
Temperature range		Without display	With display	
	Operation	-40...+60 °C (-40...+140 °F)	-20...+60 °C (-4...+140 °F)	
	Storage	-40...+60 °C (-40...+140 °F)	-20...+60 °C (-4...+140 °F)	
Enclosure Material Protection rating	Polycarbonate (PC), UL94 V-0 approved IP65 / NEMA 4X			
Electromagnetic compatibility	EN 61326-1 FCC Part15 ClassA	EN 61326-2-3 ICES-003 ClassA	Industrial environment	
Conformity	EN 45545-2 (HL3)			

1) For display operation with EE160-MxA6 (4 - 20 mA, 2-wire) both outputs must be connected.

Ordering Guide

Feature	Description	Code		
Hardware configuration		EE160-		
	Model	RH + T	M1	M1
		RH + T + T passive	M8	M1
	Type	Wall mount	T1	
		Duct mount	T2	
	Output	0 - 10 V	A3	
		4 - 20 mA	A6	
		RS485	J3	
	T sensor passive ¹⁾	Pt100 DIN A	TP1	
		Pt1000 DIN A	TP3	
NTC10k		TP5		
Ni1000, TK6180		TP9		
Filter	Membrane	No code		
Display	Without display	No code		
	With display without backlight	D1		
Setup analogue out	Relative humidity	0...100 %RH		
	Temperature ²⁾	T [°C]	No code	
		T [°F]	MB2	
	T scaling low	-40	No code	
		Value	SBLValue	
	T scaling high	60	No code	
		Value	SBHValue	
Setup RS485	Protocol	Modbus RTU ³⁾	P1	
	Baudrate	9600	BD5	
		19200	BD6	
		38400	BD7	
	Units ²⁾	Metric (SI)	No code	
Non-metric (US/GB)		U2		

1) With Model M8 only / T sensor. Details see www.epluse.com/R-T_Characteristics.

2) Can not be changed with PCS10.

3) Modbus map and configuration guide see user manual or Modbus application note at www.epluse.com/ee160.

Order Example

EE160-M8T1A6TP1D1SBL-10SBH50

Feature	Code	Description
Model	M8	RH + T + T passive
Type	T1	Wall mount
Output	A6	4 - 20 mA
T sensor passive	TP1	Pt100 DIN A
Filter	No code	Membrane
Display	D1	With display without backlight
Relative humidity	No code	0...100 %RH
Temperature	No code	T [°C]
Scale T low	SBL-10	-10 °C
Scale T high	SBH50	+50 °C

Order Example

EE160-M1T2J3P1BD5U2

Feature	Code	Description
Model	M1	RH + T
Type	T2	Duct mount
Output	J3	RS485
Filter	No code	Membrane
Protocol	P1	Modbus RTU
Baud rate	BD5	9600
Units	U2	Non-metric

Accessories

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

Accessories	Code
E+E Product configuration software (Free download: www.epluse.com/pcs10)	PCS10
Power supply adapter	V03
Protection cap for Ø12 mm probe	HA010783
USB-C configuration stick	HA011070



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