

E+E

—
your partner
in sensor
technology.

+ Datasheet EE160

Humidity and Temperature Sensor
for Building Automation



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QUOTATION

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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

Electronics on the backside of the board

- Optimum protection against mechanical damage during installation

Encapsulated electronics

- Protected against condensation
- Rugged construction

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

Enclosure

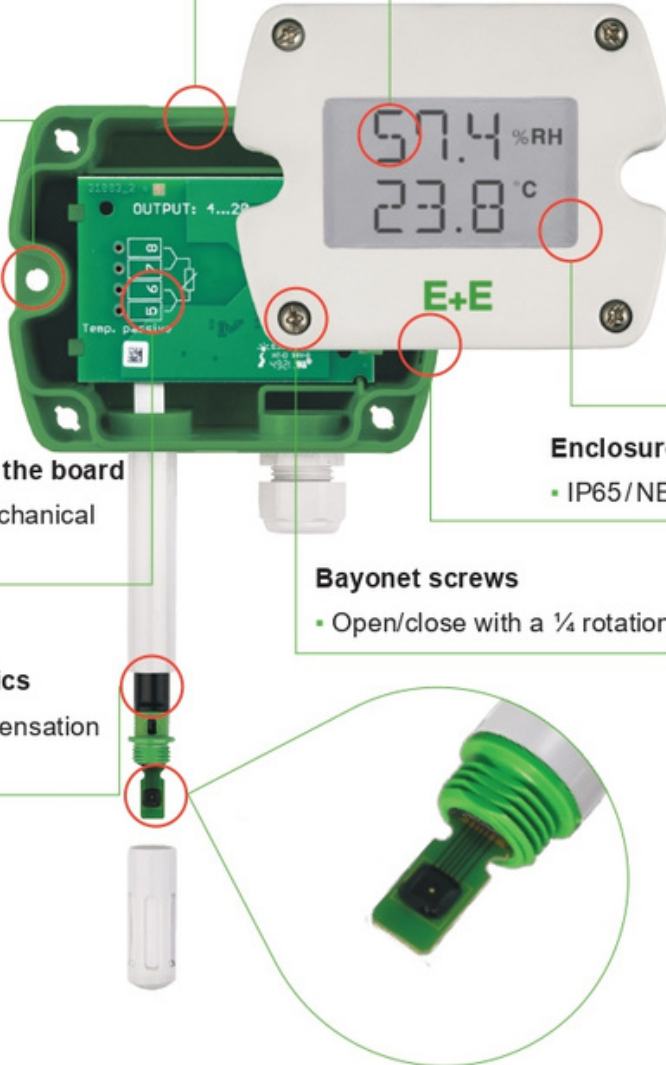
- IP65 / NEMA 4X

Bayonet screws

- Open/close with a 1/4 rotation

E+E humidity sensing element

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



Inspection certificate
According DIN EN 10204-3.1

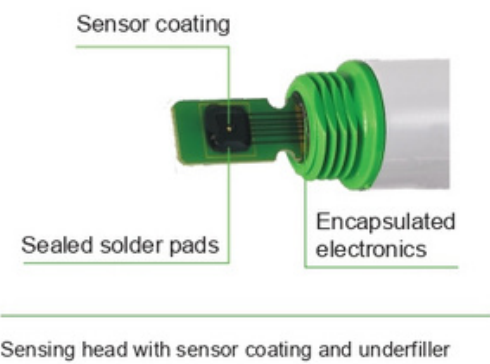
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Features

Protective Sensor Coating

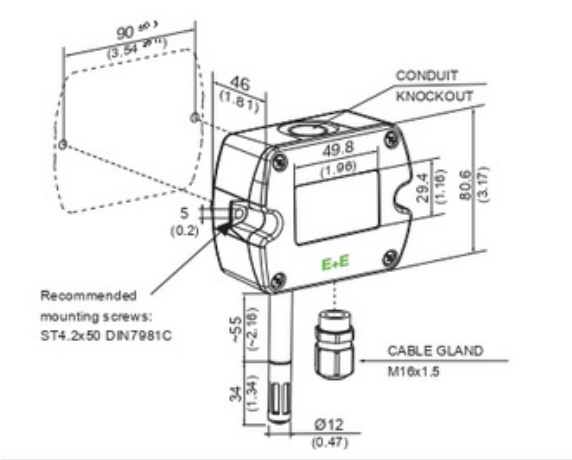
The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves the sensors' long term stability in dusty, dirty or oily applications by preventing stray impedance caused by deposits on the active sensor surface.



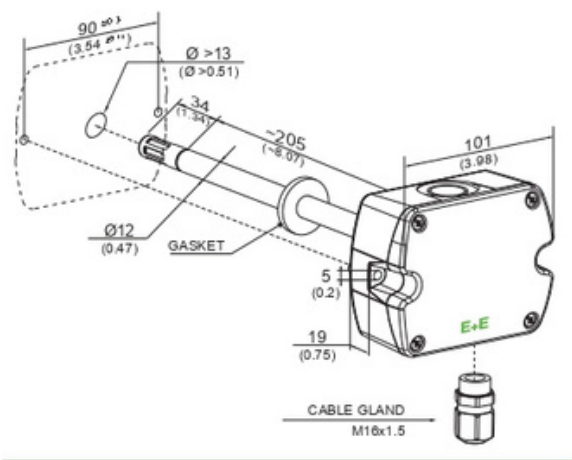
Dimensions

Values in mm (inch)

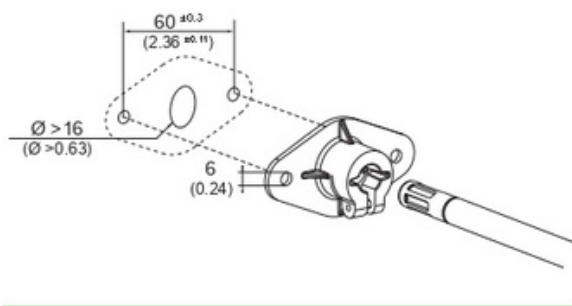
Type T1 wall mount



Type T2 duct mount



Mounting flange in the scope of supply for type T2



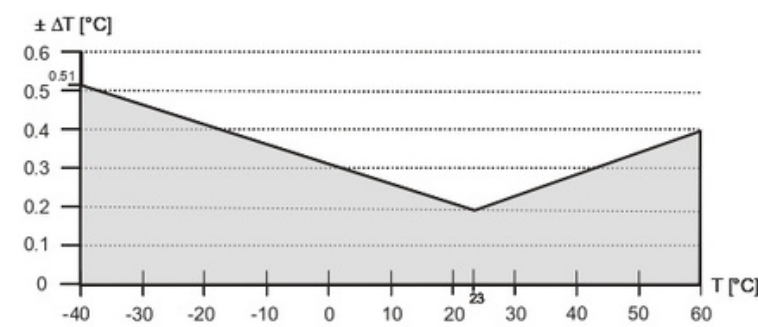
Technical Data

Measurands

Relative Humidity (RH)		
Measuring range	0...100 %RH, non-condensing	
Accuracy ¹⁾ (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 uncertainty ³⁾	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)
Accuracy ¹⁾	
Factory calibration uncertainty ²⁾	±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)	$R_L \leq 500 \Omega$	R_L = load resistance
	0 - 10 V	$0 \text{ mA} < I_L < 1 \text{ mA}$	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

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	
	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	No code		
	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
		19 200			BD6
		38 400			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	9 600
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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