E+E

your partner
in sensor
technology.

Datasheet EE850

CO_2, Humidity and Temperature Duct Sensor

Modbus

BACnet

www.epluse.com

EE850

CO_2, Humidity and Temperature Duct Sensor

The EE850 combines CO_2, relative humidity (RH) and temperature (T) measurement in an innovative enclosure. It is ideal for demand controlled ventilation and building automation. Due to the CO_2 measuring range up to 10 000 ppm and T working range -20...+60 °C (-4...+140 °F), the EE850 can be employed also in demanding climate and process control.

Long-Term Stability

The EE850 incorporates the E+E dual wavelength NDIR CO_2 sensor, which compensates for ageing effects, is highly insensitive to pollution and offers outstanding long term stability. The RH sensing element is protected against dust, dirt and corrosion by the E+E proprietary coating.

High Measurement Accuracy

A multiple point CO_2 and T factory adjustment procedure leads to excellent CO_2 measurement accuracy over the entire T working range.

Functional Design

Installed into a duct, a small amount of air flows through the divided probe to the CO_2 sensing cell located inside the transmitter enclosure and back into the duct. The RH and T sensing elements are placed inside the probe. The functional enclosure facilitates easy and fast mounting of the transmitter with closed cover.

Analogue, Digital and Passive T Outputs

The CO_2, RH and T measured data as well as the calculated dew point temperature (Td) are available on various analogue outputs. Additionally, the RS485 interface with Modbus RTU or BACnet MS/TP protocol supplies also other parameters such as absolute humidity (dv), mixing ratio (r), water vapor partial pressure (e) or enthalpy (h).

Easy Configuration and Adjustment

An optional adapter and the free EE-PCS configuration software facilitate the configuration and adjustment of the EE850.

EE850 duct mount

Features

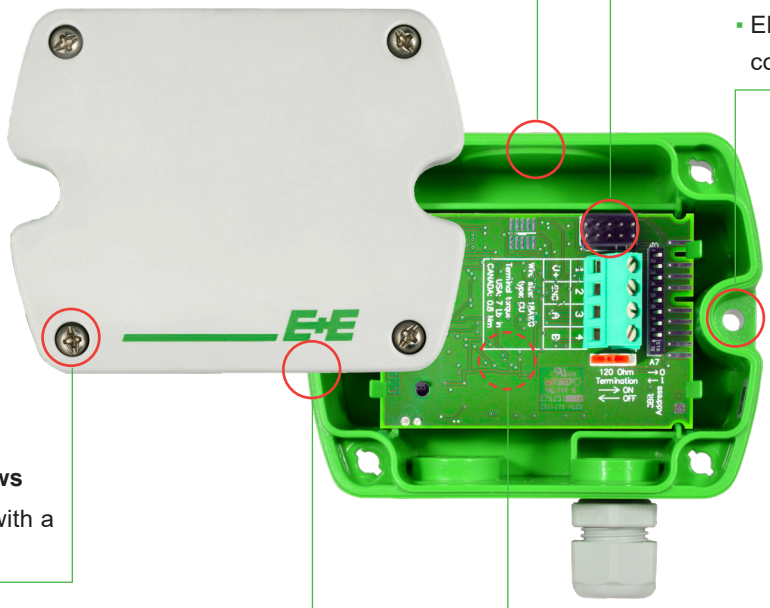
Knockout for ½" conduit-fitting (US)

Service interface

- Configuration and adjustment

External mounting holes

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



Bayonet screws

- Open / close with a ¼ rotation

Enclosure

- IP65 / NEMA 4X

Electronics

- CO_2 auto-calibration
- Temperature compensation
- Excellent resistance to pollution
- Optimum protection against mechanical damage during installation

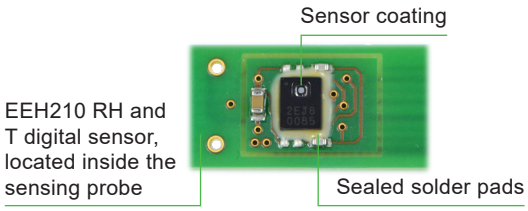
Test report

According to DIN EN 10204-2.2

Features

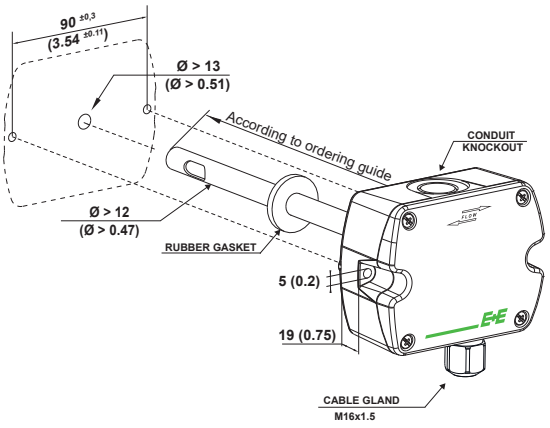
Protective Sensor Coating

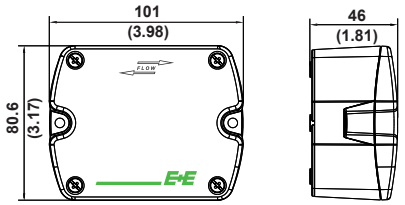
The E+E proprietary sensor coating is a protective layer applied to the sensing elements, their leads and soldering points. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves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



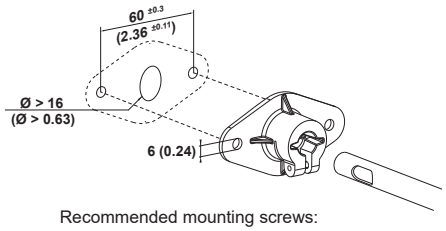
Dimensions

Values in mm (inch)





Mounting flange



Recommended mounting screws:
ST4.2x50 DIN 7981 C

Technical Data

Measurands

CO_2

Measurement principle	Dual wavelength non-dispersive infrared technology (NDIR)
Measuring range	0...2 000 / 10 000 ppm
Accuracy @ 25 °C (77 °F) and 1 013 mbar (14.7 psi) **0...2 000 ppm** **0...10 000 ppm**	 < ±(50 ppm +2 % of measured value) < ±(100 ppm +5 % of measured value)
Temperature dependency, typ. in the range of -20...45 °C (-4...113 °F)	±(1+ CO_2 Konzentration [ppm] / 1 000) ppm/°C
Response time t_{63}, typ.	< 100 s at 3 m/s (590 ft/min) air speed in the duct
Measuring interval	Approx. 15 s
Calibration interval Recommended under normal operating conditions in building automation.	> 5 years

Temperature (T)

Measuring range	-20...+60 °C (-4...+140 °F)
Accuracy @ 24 V DC, 20 °C (68 °F)	±0.3 °C (± 0.5 °F)
Response time t_{63}	< 50 s

Relative humidity (RH)

Measuring range	0...95 %RH
Accuracy @ 20 °C (68 °F)	±3 %RH (20...80 %RH)
Response time t_{63}	< 10 s

Outputs

Analogue

RH: 0...100 % **T: according to ordering guide**	0 - 10 V	-1 mA < I_L < 1 mA	I_L = load current
CO_2 **0...2 000 / 10 000 ppm**	0 - 10 V 4 - 20 mA	-1 mA < I_L < 1 mA R_L < 500 Ω	 R_L = load resistance

T sensor passive

2-wire-connection	T sensor type according ordering guide
Wire resistance (terminal - sensor), typ.	0.4 Ω

Digital

Digital Interface	RS485 (EE850 = 1/10 unit load)
Protocol **Factory settings** **Supported Baud rates** **Measured data types**	Modbus RTU 9 600 Baud, parity even, 1 stop bit, Modbus address 67 9 600, 19 200 und 38 400 FLOAT32 and INT16
Protocol **Factory settings** **Supported Baud rates**	BACnet MS/TP BACnet address 67 9 600, 19 200, 38 400, 57 600, 76 800 und 115 200

Technical Data

General

Power supply class III USA & Canada: Class 2 supply necessary, max. voltage 30 V DC	24 V DC ±20 %	15 - 35 V DC
Current consumption, typ.	15 mA + output current	
Peak current, max..	350 mA für 0.3 s (analogue output) 150 mA for 0.3 s (RS485 interface)	
Minimum air speed in the duct, min.	1 m/s (196 ft/min)	
Electrical connection	Screw terminals max. 2.5 mm^2 (AWG 14)	
Cable gland	M16x1.5	
Working and storage conditions	-20...+60 °C (-4...+140 °F) 0...95 %RH, non-condensing	
Enclosure material	Polycarbonate (PC), UL94 V-0 approved	
Protection rating **Enclosure** **Probe**	IP65 / NEMA 4X IP20	
Electromagnetic compatibility	EN 61326-1 FCC Part15 Class A	EN 61326-2-3 ICES-003 Class A Industrial environment
Conformity	EN 45545-2 (HL3)	CE UKCA

Ordering Guide

	Feature	Description	Code		
			EE850-		
Hardware Configuration	**Model**	CO_2	M10		
		CO_2 + T		M11	
		CO_2 + T + RH			M12
	CO_2 measuring range	0...2 000 ppm	HV1		
		0...10 000 ppm	HV3		
	Output	0 - 10 V	A3	A3	A3
		4 - 20 mA	A6		
		RS485	J3	J3	J3
	T sensor passive[1]	Without T sensor		No code	
		Pt1000 DIN A		TP3	
	Probe length	50 mm (1.97")	L50		
		200 mm (7.87")	No code	No code	No code
Setup Analogue Outputs[1]	**Output 2 measurand**	Temperature T [°C]		No code	No code
		Temperature T [°F]		MB2	MB2
	Output 2 scaling low	0		No code	No code
		Value - within the range -20...60 °C		SBL*Value*	SBL*Value*
	Output 2 scaling high	50		No code	No code
		Value - within the range -20...60 °C		SBH*Value*	SBH*Value*
	Output 3 measurand	Relative humidity RH [%]			No code
		Dew point Td [°C]			MC52
		Dew point Td [°F]			MC53
	Output 3 scaling low	0			No code
		Value - for Td: within the range -20...60 °C (-4...140 °F)			SCL*Value*
	Output 3 scaling high	100			No code
		Value - for Td: within the range -20...60 °C (-4...140 °F)			SCH*Value*
Setup RS485[4]	**Protocol**	Modbus RTU[2]	P1		
		BACnet MS/TP[3]	P3		
	Baud rate	9 600	BD5		
		19 200	BD6		
		38 400	BD7		
		57 600 (only for BACnet)	BD8		
		76 800 (only for BACnet)	BD9		
		115 200 (only for BACnet)	BD10		

1) Not with RS485 output (J3) or 50 mm probe length (L50) / T-Sensor details see www.epluse.com/R-T_Characteristics.
2) Factory setting: Parity even, 1 stop bit; Modbus Map and communication setting: See User Manual and Modbus Application Note at www.epluse.com/ee850.
3) Product Implementation Conformance Statement (PICS) available at www.epluse.com/ee850.
4) Not with analogue output A3 und A6.

Order Example

EE850-M12HV1A3MB2SBL32SBH140

Feature	Code	Description
Model	**M12**	CO_2 + T + RH
CO_2 measuring range	**HV1**	0...2 000 ppm
Output	**A3**	0 - 10 V
Probe length	**No code**	200 mm (7.87")
Output 2 measurand	**MB2**	Temperature T [°F]
Output 2 scaling low	**SBL32**	32 °F
Output 2 scaling high	**SBH140**	140 °F
Output 3 measurand	**No code**	Relative humidity RH [%]
Output 3 scaling low	**No code**	0 %
Output 3 scaling high	**No code**	100 %

EE850-M10HV1A6L50

Feature	Code	Description
Model	**M10**	CO_2
CO_2 measuring range	**HV1**	0...2 000 ppm
Output	**A6**	4 - 20 mA
Probe length	**L50**	50 mm (1.97")

EE850-M12HV3J3P1BD6

Feature	Code	Description
Model	**M12**	CO_2 + T + RH
CO_2 measuring range	**HV3**	0...10 000 ppm
Output	**J3**	Digital interface RS485
Probe length	**No code**	200 mm (7.87")
Protocol	**P1**	Modbus RTU
Baud rate	**BD6**	19 200

Accessories

For further information see datasheet “Accessories”.

Accessories	Code
Configuration adapter cable	**HA011066**
E+E Product configuration software (Free download: www.epluse.com/ee850)	**EE-PCS**
Power supply adapter	**V03**

Company Headquarters &
Production Site

E+E Elektronik Ges.m.b.H.
Langwiesen 7
4209 Engerwitzdorf | Austria
T +43 7235 605-0
F +43 7235 605-8
info@epluse.com
www.epluse.com

Subsidiaries

E+E Sensor Technology (Shanghai) Co., Ltd.
T +86 21 6117 6129
info@epluse.cn

E+E Elektronik France SARL
T +33 4 74 72 35 82
info.fr@epluse.com

E+E Elektronik Deutschland GmbH
T +49 6171 69411-0
info.de@epluse.com

E+E Elektronik India Private Limited
T +91 990 440 5400
info.in@epluse.com

E+E Elektronik Italia S.R.L.
T +39 02 2707 86 36
info.it@epluse.com

E+E Korea Co., Ltd.
T +82 31 732 6050
info.kr@epluse.com

E+E Elektronik Corporation
T +1 847 490 0520
info.us@epluse.com

E+E

your partner
in sensor
technology.

Version v2.8 | 10-2022

www.epluse.com