E+E *YOUR PARTNER IN SENSOR TECHNOLOGY*
ELEKTRONIK®
Ges.m.b.H.

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.

Features

Service interface for configuration and adjustment

Appropriate for US mounting requirements
» Knockout for ½" conduit fitting

External mounting holes
» Easy and fast mounting with closed cover
» Electronics protected against construction site pollution

Electronics
» CO_2 autocalibration
» Temperature compensation
» Excellent resistance to pollution
» Optimum protection against mechanical damage during installation

IP65 / NEMA 4X Enclosure

Bayonet screws
» Open/closed with a ¼ rotation

Test report
» According DIN EN 10204-2.2

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.

sensor coating

sealed solder pads
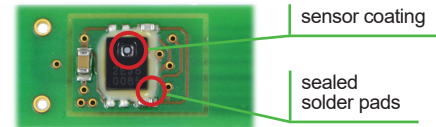
EEH210 RH and T digital sensor, located inside the sensing probe.

Technical Data

Measurands

CO_2

Measurement principle	Dual wavelength non-dispersive infrared technology (NDIR)
Measuring range	0...2 000 / 10 000 ppm
Accuracy at 25 °C (77 °F)	0...2 000 ppm: < ± (50 ppm + 2% of measured value)
and 1013 mbar (14.7 psi)	0...10 000 ppm: < ± (100 ppm + 5% of measured value)
Response time t_{63}	< 100 s at 3 m/s (590 ft/min) air speed in the duct
Temperature dependency, typ.	± (1 + CO_2 concentration [ppm] / 1 000) ppm/°C, for -20...45 °C (-4...113 °F)
Calibration interval[1]	> 5 years
Measuring interval	Approx. 15 s

Temperature

Working range	-20...60 °C (-4...140 °F)
Accuracy at 20 °C (68 °F)	±0.3 °C (±0.54 °F)
Response time t_{63}	< 50 s

Relative Humidity

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

Outputs

Analogue

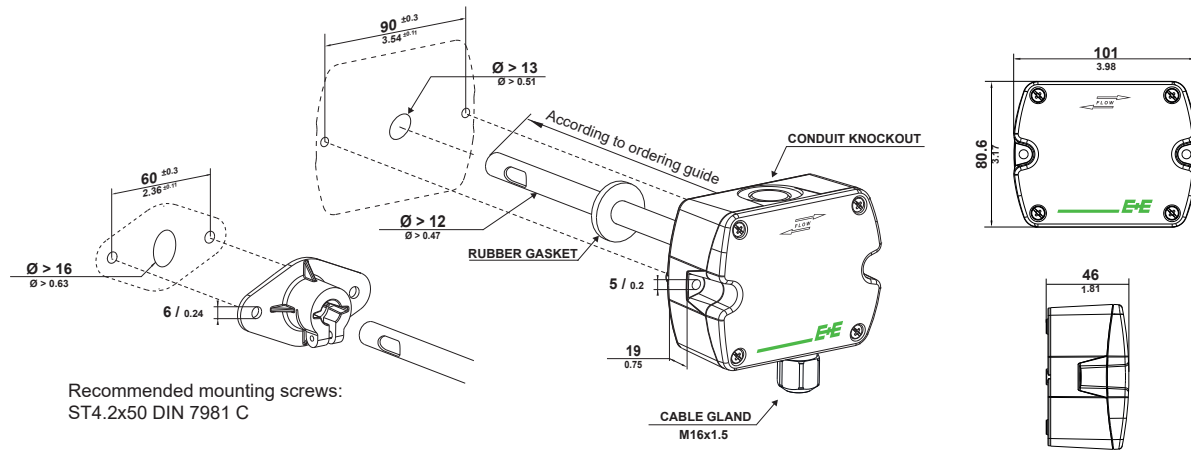|		
CO_2: 0...2 000 / 10 000 ppm	0 - 10 V	-1 mA < I_L < 1 mA
	4 - 20 mA	R_L < 500 Ω
T scale: according ordering guide **RH** scale: 0...100 %RH	0 - 10 V	-1 mA < I_L < 1 mA
Digital Interface Protocol	RS485 (EE850 = 1/10 unit load) Modbus RTU or BACnet MS/TP	
Passive temperature, 2-wire	T sensor type according ordering guide	
Wire resistance (terminal - sensor), typ.	0.4 Ω	

General

Power supply class III ◊2)	24 V AC ± 20 %	15 - 35 V DC
Current consumption, typ.	15 mA + output current	
Current peak, max.	350 mA for 0.3 s (analogue output)	
	150 mA for 0.3 s (RS485 interface)	
Minimum air speed in the duct	1 m/s (196 ft/min)	
Enclosure material	Polycarbonate, UL94 V-0 approved	
Protection rating	Enclosure: IP65 / NEMA 4X	
	Probe: IP20	
Cable gland	M16 x 1.5	
Electrical connection	Screw terminals max. 2.5 mm² (AWG 14)	
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial Environment	
	FCC Part 15 Class A ICES-003 Class A	
Working and storage conditions	-20...60 °C (-4...140 °F) 0...95 %RH, non-condensing	

UK CA   CE

1) Under normal operating conditions
2) USA & Canada class 2 supply required, max. supply voltage 30 V DC

Dimensions
Values in mm / inch

90 ±0.3 / 3.54 ±0.11
Ø > 13 / Ø > 0.51
Ø > 12 / Ø > 0.47
60 ±0.3 / 2.36 ±0.11
Ø > 16 / Ø > 0.63
6 / 0.24
5 / 0.2
19 / 0.75
101 / 3.98
80.6 / 3.17
46 / 1.81

According to ordering guide
CONDUIT KNOCKOUT
RUBBER GASKET
CABLE GLAND M16x1.5

Recommended mounting screws:
ST4.2x50 DIN 7981 C

Ordering Guide

			EE850-		
Hardware configuration	**Model**	CO_2	**M10**		
		CO_2 + T		**M11**	
		CO_2 + T + RH			**M12**
	CO_2 range	0...2 000 ppm		**HV1**	
		0...10 000 ppm		**HV3**	
	Analogue output	0-10 V	**A3**	**A3**	**A3**
		4-20 mA	**A6**		
		RS 485	**J3**	**J3**	**J3**
	T sensor passive[1])	none		**no code**	
		Pt1000A		**TP3**	
	Probe length	50 mm	**L50**		
		200 mm	**no code**	**no code**	**no code**
Setup analogue outputs[1])	**Temperature**	T [°C]		**no code**	**no code**
		T [°F]		**MB2**	**MB2**
	Scale T low	0		**no code**	**no code**
		value - within the range -20...60 °C (-4...140 °F)		**SBL value**	**SBL value**
	Scale T high	50		**no code**	**no code**
		value - within the range -20...60 °C (-4...140 °F)		**SBH value**	**SBH value**
	Relative humidity / dew point	RH [%]			**no code**
		Td [°C]			**MC52**
		Td [°F]			**MC53**
	Scale RH/Td low	0			**no code**
		value - for Td: within the range -20...60 °C (-4...140 °F)			**SCL value**
	Scale RH/Td high	100			**no code**
		value - for Td: within the range -20...60 °C (-4...140 °F)			**SCH value**
Setup RS485[5])	**Protocol**	Modbus RTU[2])		**P1**	
		BACnet MS/TP[3])		**P3**	
	Baud rate	9 600		**BD5**	
		19 200		**BD6**	
		38 400		**BD7**	
		57 600[4])		**BD8**	
		76 800[4])		**BD9**	
		115 200[4])		**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: Even Parity, Stopbits 1; Modbus Map and communication setting: See User Guide and Modbus Application Note at www.epluse.com/ee850
3) Product Implementation Conformance Statement (PICS) available at www.epluse.com/ee850
4) Only for BACnet MS/TP
5) Not with analogue output A3 and A6

Ordering Examples

EE850-M12HV1A3MB2SBL32SBH140

Model:	CO_2 + T + RH
CO_2 range:	0...2 000 ppm
Output:	0 - 10 V
Probe length:	200 mm
Temperature:	T [°F]
Scale T low:	32 °F
Scale T high:	140 °F
RH/Td:	RH [%]
Scale RH low:	0 %
Scale RH high:	100 %

EE850-M10HV1A6L50

Model:	CO_2
CO_2 range:	0...2 000 ppm
Output:	4 - 20 mA
Probe length:	50 mm

EE850-M12HV3J3P1BD6

Model:	CO_2 + T + RH
CO_2 range:	0...10 000 ppm
Output:	RS485
Probe length:	200 mm
Protocol:	Modbus RTU
Baud rate:	19 200

Accessories

(for further information, see data sheet "Accessories")

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

Support Literature

www.epluse.com/ee850