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 4 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 hygroscopic layer applied to the active surface of the RH sensing element. The coating extends substantially the life-time and the performance of the E+E sensor in corrosive environment.

Additionally, it improves the long term stability in dusty and dirty applications by preventing stray impedances caused by deposits on the active sensor surface.

sensor coating

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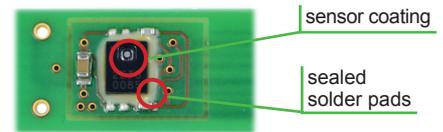
EEH210 RH and T digital sensor, located inside the sensing probe.

Technical Data

Measurands

CO_2

Measurement principle	dual wavelength non-dispersive infrared technology (NDIR)
Measuring range	0...2000 / 5000 / 10000 ppm
Accuracy at 25 °C (77 °F)	0...2000 ppm: < ± (50 ppm +2% of measured value)
and 1013 mbar (14.7 psi)	0...5000 ppm: < ± (50 ppm +3% of measured value)
	0...10000 ppm: < ± (100 ppm +5% of measured value)
Response time t_{63}	< 100 seconds at 3 m/s (590 ft/min) air speed in the duct
Temperature dependency, typ.	± (1 + CO_2 concentration [ppm] / 1000) ppm/°C, for -20...45 °C (-4...113 °F)
Calibration interval [1]	> 5 years
Measuring interval	approx. 15 seconds

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 seconds

Relative Humidity

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

Outputs

Analogue

CO_2: 0...2000 / 5000 / 10000 ppm	0-5 V / 0-10 V	-1 mA < I_L < 1 mA
	4-20 mA	R_L < 500 Ohm
T scale: according ordering guide	0 - 5 V / 0 - 10 V	-1 mA < I_L < 1 mA
RH scale: 0...100 % RH		
Digital Interface	RS485 with max. 32 devices on one bus	
Protocol	Modbus RTU or BACnet MS/TP	
Passive temperature, 2-wire	T sensor type according ordering guide	
Wire resistance (terminal - sensor), typ.	0.4 Ohm	

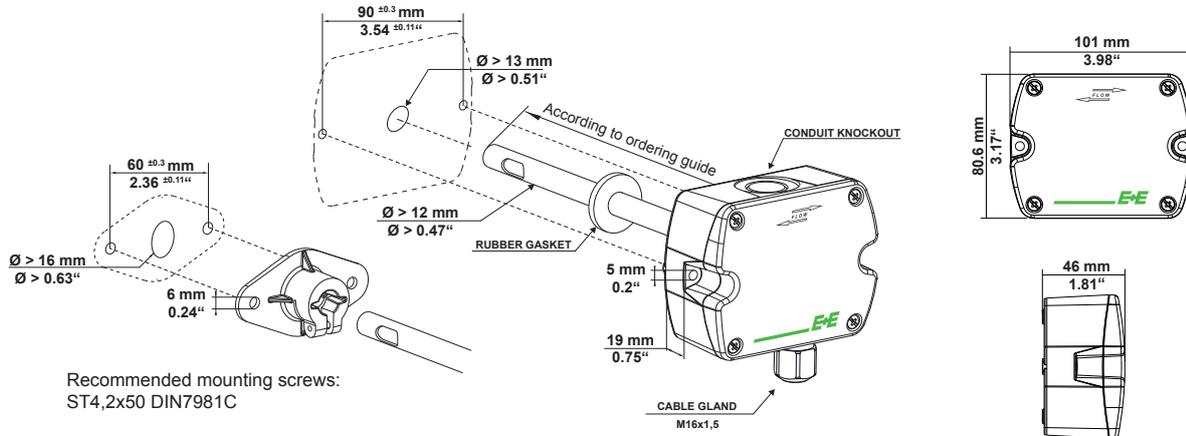## General

Power supply class III	24 V AC ± 20 %	15-35 V DC
Current consumption, typ.	typ. 15 mA + output current	
Current peak, max.	350 mA for 0.3 seconds (analogue output)	
	150 mA for 0.3 seconds (RS485 interface)	
Minimum air speed in the duct	1 m/s (196 ft/min)	
Enclosure material	polycarbonate, UL94V-0 approved	
Protection class	enclosure: IP65 / NEMA 4	
	probe: IP20	
Cable gland	M16 x 1.5	
Electrical connection	screw terminals max. 2.5 mm² (AWG 14)	
Electromagnetic compatibility	EN61326-1 EN61326-2-3 Industrial Environment	
	FCC Part 15 ICES-003 ClassB	
Working and storage conditions	-20...60 °C (-4...140 °F) 0...95 % RH (non-condensing)	

1) under normal operating conditions

CE

Dimensions (mm/inch)

90 ±0.3 mm
3.54 ±0.11"

Ø > 13 mm
Ø > 0.51"

According to ordering guide

CONDUIT KNOCKOUT

101 mm
3.98"

80.6 mm
3.17"

60 ±0.3 mm
2.36 ±0.11"

Ø > 12 mm
Ø > 0.47"

RUBBER GASKET

5 mm
0.2"

Ø > 16 mm
Ø > 0.63"

6 mm
0.24"

19 mm
0.75"

46 mm
1.81"

CABLE GLAND
M16x1,5

Recommended mounting screws:
ST4,2x50 DIN7981C

Ordering Guide

			EE850-		
Hardware configuration	**Model**	CO$_2$ CO$_2$ + T CO$_2$ + T + RH	**M10**	**M11**	**M12**
	CO$_2$ range	0...2000 ppm 0...5000 ppm 0...10000 ppm		**HV1** **HV2** **HV3**	
	Output	0-5 V 0-10 V 4-20 mA RS 485	**A2** **A3** **A6** **J3**	**A2** **A3** **J3**	**A2** **A3** **J3**
	T sensor passive [1]	none Pt1000A NTC10k Ni1000, TK6180		**no code** **TP3** **TP5** **TP9**	
	Probe length	50 mm 200 mm	**L50** **no code**	**no code**	**no code**
Setup analgoue outputs [1]	**Temperature**	T [°C] T [°F]		**no code** **MB2**	**no code** **MB2**
	Scale T low	0 value - within the range -20...60 °C (-4...140 °F)		**no code** **SBL value**	**no code** **SBL value**
	Scale T high	50 value - within the range -20...60 °C (-4...140 °F)		**no code** **SBH value**	**no code** **SBH value**
	Relative humidity / dew point	RH [%] Td [°C] Td [°F]			**no code** **MC52** **MC53**
	Scale RH/Td low	0 value - for Td: within the range -20...60 °C (-4...140 °F)			**no code** **SCL value**
	Scale RH/Td high	100 value - for Td: within the range -20...60 °C (-4...140 °F)			**no code** **SCH value**
Setup RS485 [5]	**Protocol**	Modbus RTU [2] BACnet MS/TP [3]		**P1** **P3**	
	Baud rate	9600 19200 38400 57600 [4] 76800 [4]		**BD5** **BD6** **BD7** **BD8** **BD9**	

1) Not with RS485 output (J3) / 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) Factory setting: No Parity, Stopbits 1; Product Implementation Conformance Statement (PICS) available at www.epluse.com/ee850.
4) Only for BACnet MS/TP.
5) Not with analogue output A2, A3 and A6.

Ordering Examples

EE850-M12HV2A3MB2SBL32SBH140

Model:	CO_2 + T + RH
CO_2 range:	0...5000 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...2000 ppm
Output:	4-20 mA
Probe length:	50 mm

EE850-M12HV3J3P1BD6

Model:	CO_2 + T + RH
CO_2 range:	0...10000 ppm
Output:	RS485
Probe length:	200 mm
Protocol:	Modbus RTU
Baud rate:	19200
Unit:	metric-SI

Accessories (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