

+ Quick Guide

EE850 - CO₂, Humidity and Temperature Duct Sensor

E+E

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in sensor
technology.

PLEASE NOTE

Find this document and further product information on our website at www.epluse.com/ee850.

Electrical Connection

WARNING

Incorrect installation, wiring or power supply may cause overheating and result in personal injury or property damage. Cables must not be under voltage during electrical installation and connection or disconnection, especially at terminal connections on circuit boards. For correct cabling, always observe the presented wiring diagram for the product version used. The manufacturer cannot be held responsible for personal injury or damage to property caused by incorrect handling, installation, wiring, power supply or maintenance of the device.

Hardware

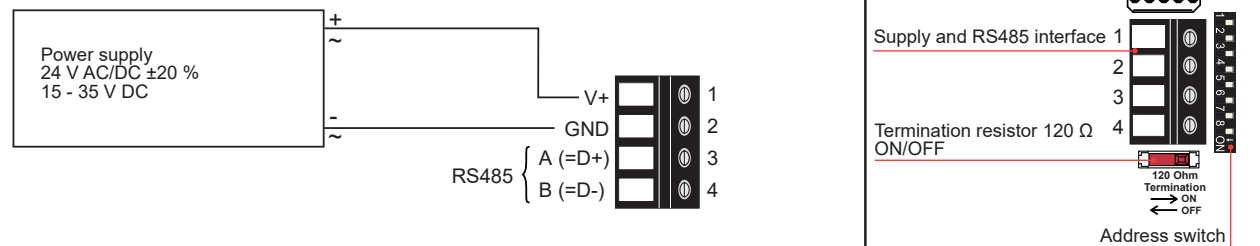
The bus termination shall be realized with 120 Ω resistor (slide switch on the board).

NOTICE

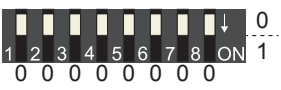
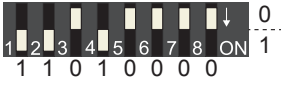
For proper function the power supply must be strong enough to ensure supply voltage within the specified range (see technical data) at any time and at all devices in the bus. This is particularly relevant when using long and thin cables which can cause high voltage drop. Please note that a single digital EE850 requires peak current of 150 mA.

Wiring

Digital interface



Address Setting

Address Switch	Option
	Address setting via PCS10 Product Configuration Software (= factory setting) All DIP switches at position 0 → address has to be set via PCS10 Modbus (slave device): factory setting 67 (permitted values: 1...247). BACnet (master device): factory setting 67 (permitted values: 0...127).
	Address setting via DIP switches Modbus (slave device): Setting the DIP switches to any other address than 0, overrules the Modbus address set via PCS10 (permitted values: 1...247). BACnet (master device): Setting the DIP switches to any other address than 0, overrules the BACnet address set via configuration software. BACnet Note: permitted values are 0...127. The 8th bit of the DIP switches is ignored (ID 127 = 0111 111 _{BIN}). To set address 0 via DIP switches, the 8th bit shall be set to 1 (ID 0 = 1000 0000 _{BIN}). Example: Address set to 11 _{DEC} (0000 1011 _{BIN}).

BACnet Setup

The EE850 PICS (Product Implementation Conformance Statement) is available on the E+E website at www.epluse.com/ee850.

EE850 BACnet factory settings: Address 67 (0x43), Baud rate as ordered via order code, 8 data bits, parity none, 1 stop bit.

Modbus Setup

The measured values are saved as a 32 bit float value and 16 bit signed integer.

EE850 Modbus factory settings: Address 67 (0x43), Baud rate as ordered via order code, 8 data bits, parity even, 1 stop bit.

This Modbus address can be changed by the user in the register 1 (0x00) with function code 0x06. Permitted values are 1...247.

The serial number as ASCII-code is located at read register address 1 - 8 (0x00 - 0x07) and function code 0x03 or 0x04.

The firmware version is located at register address 9 (0x08) and function code 0x03 or 0x04 (bit 15...8 = major release; bit 7...0 = minor release).

Parameter	Unit	Register number ¹⁾ [DEC]	Register address ²⁾ [HEX]
Read register: function code 0x03/0x04			
Temperature	°C	1003	3EA
	°F	1005	3EC
Relative humidity	%	1021	3FC
CO ₂ (average)	ppm	1061	424
CO ₂ (raw)	ppm	1063	426
Water vapour partial pressure	mbar	1101	44C
	psi	1103	44E
Dew point temperature	°C	1105	450
	°F	1107	452
Absolute humidity	g/m ³	1113	458
	gr/ft ³	1115	45A
Mixing ratio	g/kg	1121	460
	gr/lb	1123	462
Specific enthalpy	kJ/kg	1125	464
	ft lb/lb	1127	466
	BTU/lb	1129	468
Frost point temperature	°C	1131	46A
	°F	1133	46C

1) Register number (decimal) starts from 1

2) Register address (hexadecimal) starts from 0

Communication settings (INT16)

Parameter	Register number ¹⁾ [Dec]	Register address ²⁾ [Hex]
Write register: function code 0x06		
Modbus address ³⁾⁴⁾	1	00
Modbus protocol settings ⁴⁾	2	01

1) Register number (decimal) starts from 1.

2) Register address (hexadecimal) starts from 0.

Modbus RTU Example

Master (e.g. PLC)

Request [Hex]:

Modbus address	Function code	Starting address Hi	Starting address Lo	Qty. of registers Hi	Qty. of registers Lo	CRC	
43	03	04	24	00	02	8A	12

Response [Hex]:

Modbus address	Function code	Byte count	Register 1 value Hi	Register 1 value Lo	Register 2 value Hi	Register 2 value Lo	CRC	
43	03	04	0B	00	44	A1	68	AB

Modbus response [Hex]

Byte 3 (Register 1 - Hi)	Byte 4 (Register 1 - Lo)	Byte 1 (Register 2 - Hi)	Byte 2 (Register 2 - Lo)
0B	00	44	A1
MMMM MMMM	MMMM MMMM	EEEE EEEE	EMMM MMMM

Data representation according to IEEE754

Byte 1	Byte 2	Byte 3	Byte 4
44	A1	0B	00
0100 0100	1010 0001	0000 1011	0000 0000
EEEE EEEE	EMMM MMMM	MMMM MMMM	MMMM MMMM

Decimal value: 1288.34375

Parameter	Unit	Scale ³⁾	Register number ¹⁾ [DEC]	Register address ²⁾ [HEX]
Read register: function code 0x03/0x04				
Temperature	°C	100	4002	FA1
	°F	50	4003	FA2
Relative humidity	%	100	4011	FAA
CO ₂ (average)	ppm	1	4031	FBE
CO ₂ (raw)	ppm	1	4032	FBF
Water vapour partial pressure	mbar	10	4051	FD2
	psi	1000	4052	FD3
Dew point temperature	°C	100	4053	FD4
	°F	100	4054	FD5
Absolute humidity	g/m ³	10	4057	FD8
	gr/ft ³	10	4058	FD9
Mixing ratio	g/kg	10	4061	FDC
	gr/lb	10	4062	FDD
Specific enthalpy	kJ/kg	1	4063	FDE
	ft lb/lb	1	4064	FDF
	BTU/lb	1	4065	FE0
Frost point temperature	°C	100	4066	FE1
	°F	100	4067	FE2

3) Examples for factory scaling of stored value

100 is the scale 1:100

(e.g. 2550 is equivalent to 25.5 °C)

50 is the scale 1:50

(e.g.: 2550 is equivalent to 51 °F)

10 is the scale 1:10

(e.g.: 135 is equivalent to 13.5 mbar)

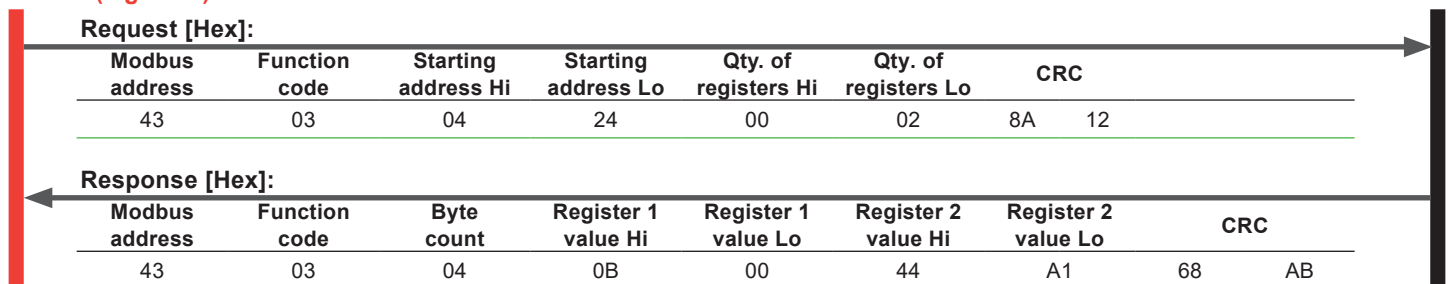
1 is the scale 1:1

(e.g.: 800 is equivalent to 800 ppm)

Device information (INT16)

Parameter	Register number ¹⁾ [Dec]	Register address ²⁾ [Hex]
Read register: function code 0x03/0x04		
Serial number (as ASCII)	1	00
Firmware version	9	08
Sensor name (as ASCII)	10	09

3) If the Modbus address is set via DIP switch the response will be NAK.

4) For Modbus address and protocol settings see Application Note Modbus AN0103 (available at www.epluse.com/ee850).

Modbus response [Hex]			
Byte 3 (Register 1 - Hi)	Byte 4 (Register 1 - Lo)	Byte 1 (Register 2 - Hi)	Byte 2 (Register 2 - Lo)
0B	00	44	A1
MMMM MMMM	MMMM MMMM	EEEE EEEE	EMMM MMMM
Data representation according to IEEE754			
Byte 1	Byte 2	Byte 3	Byte 4
44	A1	0B	00
0100 0100	1010 0001	0000 1011	0000 0000
EEEE EEEE	EMMM MMMM	MMMM MMMM	MMMM MMMM
Decimal value: 1288.34375			

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