USER'S GUIDE

EE10 - HVAC Room Transmitter for Relative Humidity and Temperature with digital RS485 interface
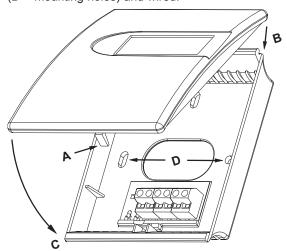
GENERAL

EE10 combines relative humidity (RH) and temperature (T) measurement in one device with modern design. The RH and T measured data is available either on a BACnet or Modbus RTU interface. Additionally, it calculates the dewpoint temperature (Td), absolute humidity (dv), mixing ratio (r), enthalpy (h), frost point temperature (Tf) and water vapor partial pressure (e).

CAUTION

- The device shall not be exposed to extreme mechanical or thermal stress.
- This device is not appropriate for safety, emergency stop or other critical applications where device malfunction or failure could cause injury to human beings.
- The electronics board is an ESD sensitive device, please handle it accordingly and avoid touching it during installation.
- Please allow min. 5 minutes warm up time for the device to reach the specified measurement performance.

DIMENSIONS / MOUNTING

The electronic of EE10 is located in the front cover, which can be easily snapped on/off once the back cover is fixed onto the wall (D = mounting holes) and wired.

OPENING THE ENCLOSURE
Press to release the latch A till the enclosure can be opened. Use a screwdriver or a pen.
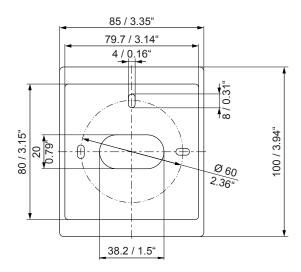
CLOSING THE ENCLOSURE
Set the front cover into flute B, rotate it like C and press it onto the back cover till the latch A snaps in.
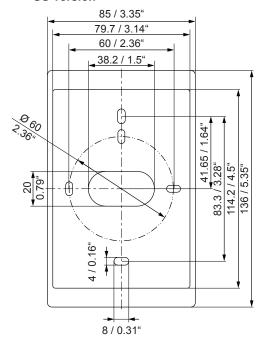
IMPORTANT
In order to protect the front cover and the electronics from typical construction site pollution (such as painting of the walls) the front cover should be snapped on only after the construction works are completed.

As EE10 is generally mounted onto a conduit box, for accurate measurement results it is important to tighten the conduit box for avoiding false air ingress (along the electrical tubes inside the wall) into the EE10 enclosure.
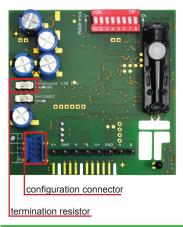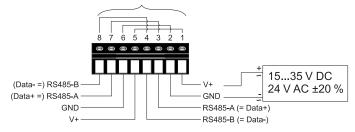
EU version

US version

EE10 DIGITAL INTERFACE

Connection on the electronics board.

(Data- =) RS485-B
(Data+ =) RS485-A
GND
V+

V+
GND
RS485-A (= Data+)
RS485-B (= Data-)

15...35 V DC
24 V AC ±20 %

Screw terminals appropriate for daisy-chain wiring
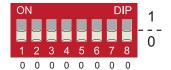
configuration connector

termination resistor

MODBUS AND BACNET

HARDWARE
• The bus termination shall be realized with 120 Ohm resistor, switch on the board.
• **Very important:**

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.

ADDRESS SETTINGS

0 0 0 0 0 0 0 0

Slave address setting via EE-PCS Product Configuration Software:
All switches at position 0 → address has to be set via configuration software
(factory setting: 236...Modbus / 5...BACnet).
Example: Slave address is set via configuration software.

ADDRESS SWITCH

1 1 0 1 0 0 0 0

Slave address setting via Dip-Switch:
Setting the Dip-Switch to any other address than 0 overwrites the slave address set via configuration software.
Example: Slave address set to 11 (=00001011 binary).

BACNET INFOS
Please see **PICS (Product Implementation Conformance Statement)** - available on www.epluse.com/ee10)
Communication factory setting:
Baud rate: 38400   Data bit: 8   Parity: no   Stop bit: 1

MODBUS-MAP
Communication factory setting:
Baud rate: 9600   Data bit: 8   Parity: even   Stop bit: 1

The factory setting for the Slave-ID is 236 as an integer 16Bit value. This ID can be customized in the register 60001 (0x00)
(value margin 1 - 247 permitted).
The serial number as ASCII-code is located at register address 30001-30008.
The firmware version is located at register address 30009.
The measured values are saved as a 32Bit float value from 0x19 to 0x2F.
The required units (metric or non-metric) must be selected in the „Ordering guide", see EE10 data sheet.

FLOAT (read register):

Register address	Communication address	Parameter name	
30026	0x19	temperature	[°C], [°F]
30028	0x1B	relative humidity	[%]
30030	0x1D	water vapour partial pressure	[mbar], [psi]
30032	0x1F	dew point temperature	[°C], [°F]
30036	0x23	absolute humidity	[g/m³], [g/ft³]
30038	0x25	mixing ratio	[g/kg], [gr/lb]
30040	0x27	specific enthalpy	[kJ/kg], [BTU/lb]
30042	0x29	frost point temperature	[°C], [°F]

INFO (read register):

Register address	Communication address	Parameter name
30001	0x00	Serial number
30009	0x08	Firmware version

INTEGER (write register):*

Register address	Communication address	Parameter name
60001	0x00	Slave-ID (modbus addresse)
60002	0x01	Modbus protocol settings*

*For Modbus protocol setting please see Application Note Modbus
(www.epluse.com)

Protocol setting:

Address, baudrate, parity and stop bits can be set via:

1. Configurator software EE-PCS (available on www.epluse.com/)
2. Modbus protocol (please see Application Note Modbus (available on www.epluse.com)

SETUP AND ADJUSTMENT

The EE10 transmitter is ready to use and does not require any configuration by the user. The factory setup of EE10 corresponds to the type number ordered. For ordering guide please see data sheet at www.epluse.com/ee10.

If need, the user can change the factory setup by using the optional Configuration Adapter Cable HA011066 and the E+E Product Configuration Software (EE-PCS).

Configuration Adapter Cable HA011066

The user can change the display settings and perform one or two point adjustment for RH and T.

The free E+E Product Configuration Software (EE-PCS) and can be downloaded from www.epluse.com/configurator.

TECHNICAL DATA

Measured values

Relative Humidity

Working range	0...95 % RH	
Accuracy[1] at 20 °C (68 °F) and U_v=24 V DC		
Analogue (0-10 V, 4-20 mA)	±2 % RH (40...60 % RH)	±3 % RH (10...90 % RH)
Digital (RS485)	±3 % RH (30...70 % RH)	±5 % RH (10...90 % RH)
	Traceable to intern. standards, administrated by NIST, PTB, BEV...	
Temperature dependence	typical 0.06 % RH /°C (0.03 % RH / °F)	

Temperature

Accuracy[1] at 20 °C (68 °F) and U_v=24 V DC	output A3: ±0.25 °C (±0.45 °F)	output A6: ±0.4 °C (±0.72 °F)
	output: J3: ±0.3 °C (±0.54 °F)	

Output

Analogue	0-10 V	-1 mA < I_L < 1 mA
(RH: 0...100 % RH / T: see ordering guide)	4-20 mA (two wires)	R_L < (U_v-10)/0.02 < 500 Ohm
Digital Interface	RS485 with max. 32 devices on one bus	
Protocol	Modbus RTU or BACnet MS/TP	
Temperature passive	please see ordering guide	

General

Voltage supply (U_v)		
0 - 10 V	15 - 40 V DC or 24 V AC ±20%	
4 - 20 mA	10 + 0.02 x R_L < U_v < 28 V DC (R_L < 500 Ohm)	
RS485	15 - 35 V DC or 24 V AC ±20%	
Current consumption		
Analogue (0-10 V, 4-20 mA)	for DC supply: typ. 4 mA / for AC supply: typ. 15 mA$_{eff}$	
Digital (RS485)	for DC supply: typ. 9 mA / for AC supply: typ. 20 mA$_{eff}$	
Electrical connection	screw terminals max. 1.5 mm^2 (AWG 16)	
Housing (polycarbonate)	US Version: UL94V-0 approved / EU Version: UL94HB approved	
Protection class	IP30	
Display	for EE10-M1	Humidity / Temperature alternating
	for EE10-M6	Humidity
CE compatibility according	EN61326-1	
	EN61326-2-3	
Temperature working range	-5...55 °C (23...131 °F)	
Temperature storage range	-25...60 °C (-13...140 °F)	

C E

1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).

- EE10 Transmitter according to ordering guide
- Mounting kit
- Two self-adhesive labels for configuration changes (see user guide at www.epluse.com/relabeling)
- Test report according to DIN EN10204 - 2.2
- Quick Guide - EE10 with digital interface.

ACCESSORIES

USB configuration adapter HA011066
Product configuration software EE-PCS (free download: www.epluse.com/configurator)

USA
FCC notice:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which thereceiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CANADIAN
ICES-003 Issue 5:
CAN ICES-3 B / NMB-3 B