

USER'S GUIDE

EE071 - Humidity and Temperature Probe with Modbus Interface

SCOPE OF SUPPLY

- EE071 probe according to ordering guide
- Inspection certificate according to DIN EN10204 - 3.1

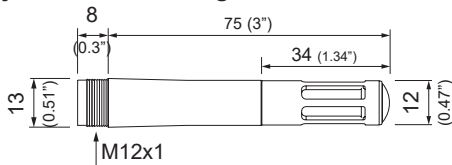
CAUTION

For accurate measurement it is essential that the temperature of the probe and the sensing head is the same as the temperature of the air to measure. Avoid mounting the EE071 transmitter in a way which creates temperature gradients along the probe.

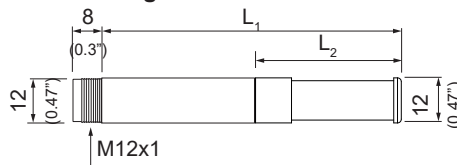
- The device and mainly the sensing head shall not be exposed to extreme mechanical stress.
- The device must be operated with the filter cap on at all times. Do not touch the sensors inside the sensing head.
- While replacing the filter cap (because of pollution for instance) against an original E+E spare one please take very good care to not touch the sensors.

DIMENSIONS

polycarbonate housing - EE071-HTPx



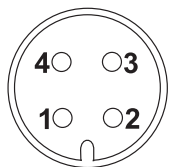
metal housing - EE071-HTMx



Filter	L ₁	L ₂
Stainless steel grid	79.5 mm (3.13")	38.5 mm (1.52")
H ₂ O ₂	73.5 mm (2.89")	33 mm (1.3")

CONNECTION DIAGRAM

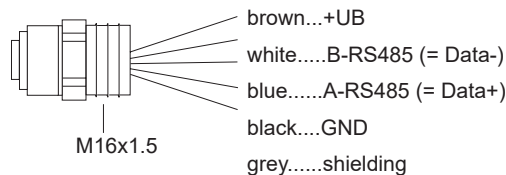
EE071:



Front view

- 1...+UB
- 2...B-RS485 (= Data-)
- 3...A-RS485 (= Data+)
- 4...GND

M12x1 flange (HA010705, Accessories)

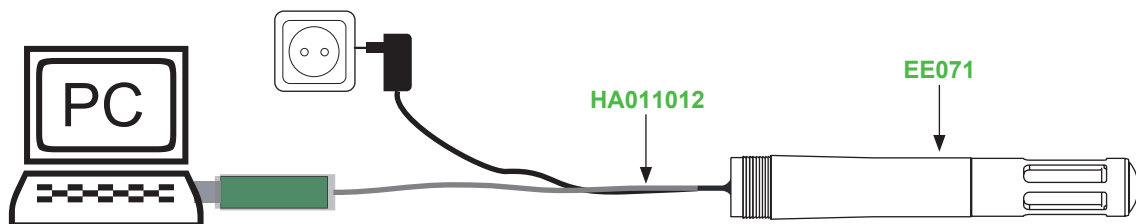


Important:

The metal enclosure of EE071-HTM shall not be connected to the ground (electrical isolation necessary). Alternatively, the GND of the EE071 power supply shall be connected to the earth potential.

SETUP AND ADJUSTMENT

The EE071 is ready to use and does not require any configuration by the user. The factory setup of EE071 corresponds to the type number ordered. For ordering guide please see data sheet at www.epluse.com/EE071. If needed, the user can change the factory setup by using the USB configuration adapter (code HA011012) and the EE-PCS, Product Configuration Software. One can change the digital settings and perform RH and T adjustment.



EE-PCS PRODUCT CONFIGURATION SOFTWARE

1. Download the EE-PCS Product Configuration Software from www.epluse.com/configurator and install it on the PC.
2. Connect the E+E device to the PC using the appropriate configuration cable.
3. Start the EE-PCS software.
4. Follow the instructions on the EE-PCS opening page for scanning the ports and identifying the connected device.
5. Click on the desired setup or adjustment mode from the main EE-PCS menu on the left and follow the online instructions of the EE-PCS.

DIGITAL INTERFACE RS485 / MODBUS RTU

ID address, baud rate, parity and stop bits can be set via:

1. EE-PCS, Product Configuration Software and the appropriate configuration cable.
2. Modbus protocol in the register 60001 (0x00) and 60002 (0x01). See Application Note Modbus AN0103 (available on www.epluse.com/EE071)

The EE071 factory setting for the slave-ID (Modbus address) is 247 as an integer 16 bit value.

The measured values are saved as a 32 bit float value.

The serial number as ASCII-code is located at read register address 30001-30008 (16 bit per address).

The firmware version is located at register address 30009 (bit 15...8 = major release; bit 7...0 = minor release).

32Bit FLOAT (read register):		
Function code + Register number ⁽¹⁾ [Dec]	Register address ⁽²⁾ [Hex]	Parameter name
30026	0x19	Temperature [°C]
30028	0x1B	Temperature [°F]
30030	0x1D	Rel Humidity [%]
30032	0x1F	Abs Humidity [g/m ³]
30034	0x21	Dew Point [°C]
30036	0x23	Dew Point [°F]
30038	0x25	Mixing ratio [g/kg]

16Bit INTEGER (read register): ³⁾		
Function code + Register number ⁽¹⁾ [Dec]	Register address ⁽²⁾ [Hex]	Parameter name
30040	0x27	Temperature [°C]
30041	0x28	Temperature [°F]
30042	0x29	Rel Humidity [%]
30043	0x2A	Abs Humidity [g/m ³]
30044	0x2B	Dew Point [°C]
30045	0x2C	Dew Point [°F]
30046	0x2D	Mixing ratio [g/kg]

16Bit INTEGER (write register):		
Function code + Register number ⁽¹⁾ [Dec]	Register address ⁽²⁾ [Hex]	Parameter name
60001	0x00	Slave-ID

32Bit FLOAT (read & write register):		
Function code + Register number ⁽¹⁾ [Dec]	Register address ⁽²⁾ [Hex]	Parameter name
5001 ⁴⁾	0x1388	Air pressure ⁵⁾

(1) Register number starts from 1

(2) Register address starts from 0

3) Values are stored with a scaling of 1:100 (e.g.: 2550 is equivalent to 25.5°C)

4) Read function code: 0x03 Write function code: 0x10

5) Ambient pressure in mbar, with 2 decimal digits (e.g. 1008.25)

Example of MODBUS RTU command for reading the temperature (float value) T = 26,652524 °C from the register 0x19

Device EE071; slave ID 247 [F7 in Hex]

Reference document, chapter 6.3: http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b.pdf

Request [Hex]: F7 03 00 19 00 02 EB 7B

	Modbus ID address	Function code	Starting address Hi	Starting address Lo	No. of register Hi	No. of register Lo	CRC	
Request [Hex]:	F7	03	00	19	00	02	01	5A

Response [Hex]: F7 03 04 38 5F 41 D5 0A E3

	Modbus ID address	Function code	Byte count	Register 1 value Hi	Register 1 value Lo	Register 2 value Hi	Register 2 value Lo	CRC	
Response [Hex]:	F7	03	04	38	5F	41	D5	0A	81

For decoding of float values (stored according standard IEEE754), please refer to AN0103, chapter 7.

Example

Response [Hex]				Value in decimal
Byte 1 (Register 2 - Hi)	Byte 2 (Register 2 - Lo)	Byte 3 (Register 1 - Hi)	Byte 4 (Register 1 - Lo)	
41	D5	38	5F	26.62524

NOTE:

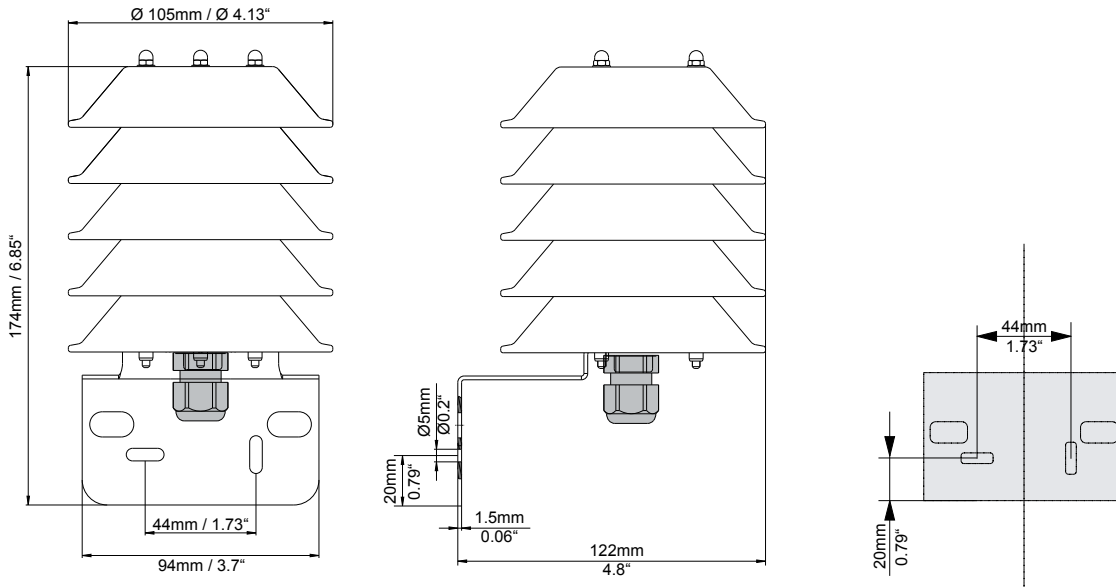
The minimum accepted polling interval by device is 100 ms.

Please note the cycle of measuring of EE071 is one second:

- “measuring mode” = 250 ms. During this time the device read and process the parameters. Any request from master is refused
- “reading mode” = 750 ms. The data are available on register maps for reading from master.

OUTDOOR USE

For outdoor applications EE071 must be used with the optional radiation shield HA010502.



TECHNICAL DATA

(Modification rights reserved)

Measured values

Relative Humidity

Sensor element HCT01-00D

Modbus output range 0.00...100.00 % RH

Accuracy incl. hysteresis and nonlinearity $\pm 2\%$ RH (0...90 % RH) $\pm 3\%$ RH (90...100 % RH)

Temperature dependence $< (0.025 + 0.0003 \times \text{RH})$ [% RH/°C]

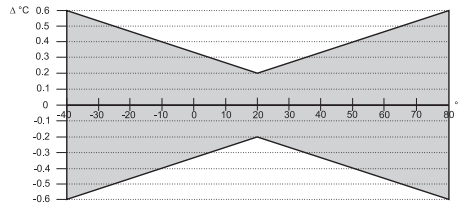
Temperature

Sensor Pt1000

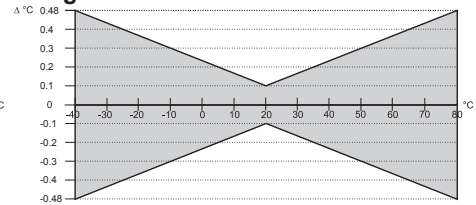
Modbus output range -40.00...+80.00 °C (-40...176 °F)

Accuracy:

Standard



High



General

Supply voltage ^{1) 2)} 4 - 28 V DC

Current consumption typ. 0.4 mA at a measuring rate of 1 sec.

Current pulse during power-up
(with serial resistance 100 Ohm)
at UB 7 V: I_{max} 60 mA; current draw drops below 10 mA within 350 μs
at UB 12 V: I_{max} 110 mA; current draw drops below 10 mA within 400 μs

Warmup Time after Power-Up max. 800ms

Interface / Bus RS485 / Modbus in slavemode

Housing / polycarbonate or stainless steel / IP65

Electromagnetic compatibility ³⁾

EN613226-1

EN61326-2-3

FCC Part 15 Class B

ICES-003 Issue 5 ClassB



Working and storage temperature -40...80°C (-40...176°F)

Max. cable length 100m (328.1ft)

1) For bus operation with terminal resistor (120 Ω) min. UB: 4,5V DC

2) No terminal, pull-up or pull-down resistor integrated in the probe

3) EE071 is not protected against voltage spikes (surge)

MAINTENANCE

When employed in dusty, polluted environment:

- The filter cap shall be replaced as needed with an E+E original one. A polluted filter cap causes longer response time of the device.

Cleaning of the sensing head

- Use in polluted environment might arise the need for cleaning the sensing head and replacing the filter cap. In such a case please see "Cleaning Instructions" at www.eplus.com/EE071.

Calibration and adjustment

Depending on the application and the requirements of certain industries, there might arise the need for periodical humidity calibration (comparison with a reference) or adjustment (bringing the device in line with a reference).

- Calibration and adjustment at E+E Elektronik
Calibration and/or adjustment can be performed in the E+E Elektronik calibration laboratory. For information on the E+E capabilities in ISO or accredited calibration please see www.kalibrierdienst.at.
- Calibration and adjustment by the user
Calibrated salt solutions, please see „Calibration Kit - User Guide“ at www.epluse.com/EE071.

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 the receiver 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

INFORMATION

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