

# Operating Manual

## EASYbus - Sensor Module

### for Relative Air Humidity And Temperature

# EBHT – 1R / 1K / 2K / Kabel

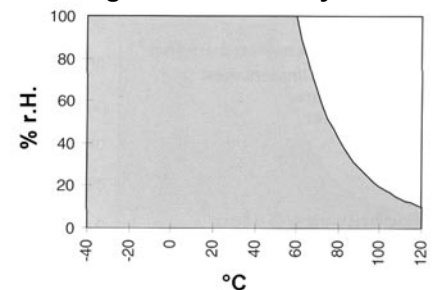
as of V2.8



### Specification:

<b>Measuring range:</b>	relative air humidity:	0.0...100.0 % rel. humidity (temperature compensated)
	temperature:	-40.0...120.0 °C or -40.0...248 °F
<b>Rec. range of application:</b>	standard:	20,0...80,0 %RH
	option high humidity:	5,0...95,0 %RH
<b>Accuracy:</b> (at nominal temperature = 25°C)	relative air humidity:	±1% linearity, 2% hysteresis (at recommended range of application)
	temperature:	0.5% of measured value ±0.1°C
<b>Sensors:</b>	relative air humidity:	cap. polymer sensor
	temperature:	Pt1000
<b>Temperature compensation:</b>	automatic	
<b>Min-/Max-Value Memory:</b>	Min and max measured values are stored	
<b>Output signal:</b>	<b>EASYbus</b> -protocol	
<b>Connection:</b>	2-wire <b>EASYbus</b> , polarity free	
<b>Busload:</b>	1.5 <b>EASYbus</b> -devices	
<b>Adjusting:</b>	via interface or keypress (only with option VO) by input of offset and scale (humidity and temperature)	
<b>Display:</b> (option)	approx. 10 mm high, 4-digit LCD-display	
<b>Ambient conditions for electronics:</b>		
<b>Nominal temperature:</b>	25 °C	
<b>Operating temperature:</b>	-25 to 50 °C (sensor head and tube: -40 to 100°C – for short time up to 120°C)	
<b>Relative humidity:</b>	0 to 95 %RH (non-condensing)	
<b>Storage temperature:</b>	-25 to 70 °C	
<b>Housing:</b>	ABS (IP65)	
<b>Dimensions:</b>	82 x 80 x 55 mm (without elbow-type plug and sensor tube)	
<b>Mounting:</b>	With holes for wall mounting (in housing - accessible after cover has been removed).	
<b>Mounting distance:</b>	50 x 70mm, max. shaft diameter of mounting screws is 4 mm.	
<b>Electrical connection:</b>	elbow-type plug conforming to DIN 43650 (IP65), max. wire cross section: 1.5 mm <sup>2</sup> , wire/cable diameter from 4.5 to 7 mm	
<b>EMC:</b>	The device corresponds to the essential protection ratings established in the Regulations of the Council for the Approximation of Legislation for the member countries regarding electromagnetic compatibility (89/336/EWG). In accordance with EN61326 +A1 +A2 (appendix A, class B), additional errors: < 1% FS. When connecting long leads adequate measures against voltage surges have to be taken.	

**Working area of humidity sensor:**



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## Safety instructions:

This device has been designed and tested in accordance with the safety regulations for electronic devices.

However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification". If the device is transported from a cold to a warm environment condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
2. General instructions and safety regulations for electric, light and heavy current plants, including domestic safety regulations (e.g. VDE), have to be observed.
3. If device is to be connected to other devices (e.g. via PC) the circuitry has to be designed most carefully. Internal connection in third party devices (e.g. connection GND and earth) may result in not-permissible voltages impairing or destroying the device or another device connected.
4. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.

Operator safety may be a risk if:

- there is visible damage to the device
- the device is not working as specified
- the device has been stored under unsuitable conditions for a longer time.

In case of doubt, please return device to manufacturer for repair or maintenance.

### 5. **Warning:**

Do not use this product as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury or material damage.

Failure to comply with these instructions could result in death or serious injury and material damage.

## Disposal instructions:

The device must not be disposed in the regular domestic waste.

Send the device directly to us (sufficiently stamped), if it should be disposed. We will dispose the device appropriate and environmentally sound.

## Assignment of elbow-type plug:

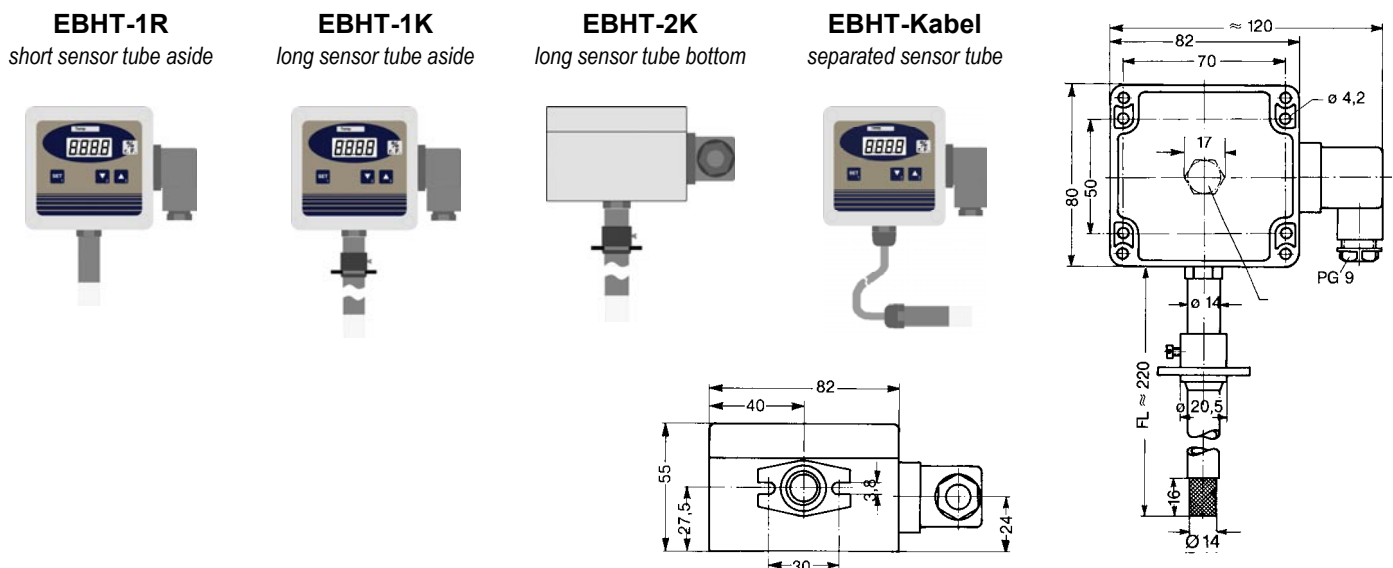
2-wire connection **EASYbus**, no polarity, at terminals 1 and 2

## General installation instructions:

To mount the connection cable (2-wire bus cable) the elbow-type plug screw has to be loosened and the coupling insert has to be removed by means of a screw driver at the position indicated (arrow).

Pull out connection cable through PG glanding and connect to the loose coupling insert as described in the wiring diagram. Replace loose coupling insert onto the pins at the transducer housing and turn cover cap with PG glanding in the direction desired till it snaps on (4 different starting positions at 90° intervals). Re-tighten the screw at the angle plug.

## Design types, dimensions



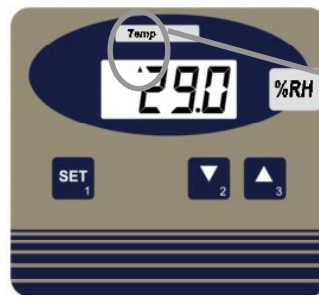
## Display functions (only available for devices with option -VO)

### Currently measured values

During normal operation the **relative air humidity** in [%RH] is displayed alternating to the **temperature** in [°C] or [°F].



display relative air humidity



display temperature

Arrow to Temp indicates temperature display

### Min/Max Value Memory

- |                         |                                       |  |
|-------------------------|---------------------------------------|--|
| watch Min values (Lo):  | press 'down'(2) shortly once          | display changes between 'Lo' and Min values              |
| watch Max values (Hi):  | press 'up'(3) shortly once            | display changes between 'Hi' and Max values              |
| restore current values: | press 'down'(2) or 'up'(3) once again | current values are displayed                             |
| clear Min-values:       | press 'down'(2) for 2 seconds         | Min values are cleared. The display shows shortly 'CLr'. |
| clear Max-values:       | press 'up'(3) for 2 seconds           | Max values are cleared. The display shows shortly 'CLr'. |
- After 10 seconds the currently measured values will be displayed again.

## Error and system messages

Display	Description	Possible fault cause	Remedy
Err.1	measuring range exceeded	Wrong signal	Temperature above 120°C not allowed.
Err.2	Measuring value below measuring range	Wrong signal	Temperature below -40°C not allowed.
Err.7	System fault	Error in device	Disconnect from supply and reconnect. If error remains: return to manufacturer
Err.9	Sensor error	Sensor or cable defective	Check sensor, cable and connections
Er.11	Calculation not possible	Calculation variable missing or invalid	Check temperature
8.8.8.8	Segment test	The transducer performs a display test for 2 seconds after power up. After that it will change to the display of the measuring.	

## Configuration of the device

The configuration of the device is done by means of the PC-software EbxKonfig or EASYBUS-Konfigurator.

The following parameters can be changed:

- Display unit of temperature measuring
- Adjusting of humidity and temperature display (offset and scale correction)
- Setting of the alarm function for humidity and temperature

The adjusting by means of offset and scale is intended to be used to compensate errors of the measurements. It is recommended to keep the scale correction deactivated. The display value is given by following formula:

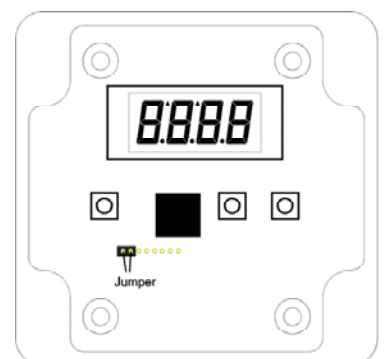
$$value = measured\ value - offset$$

With a scale correction (just for calibration laboratories, etc) the formula changes:

$$value = (measured\ value - offset) * (1 + scale\ adjustment/100)$$

## Configuration at the device (only available for devices with option -VO)

Attention: If **EASYbus** sensor modules are operated by a data acquisition software, there can be problems if the configuration is changed during a running acquisition. Therefore it is recommended not to change configuration values during a running recording and furthermore to protect it against manipulation by unauthorised persons. If the jumper connecting the contacts shown in the figure is removed, the configuration is not accessible, the settings are protected. Never connect the other contacts!



**To configure the parameters proceed like follows:**

1. Press the key 1 (SET) for more than 4 sec's until **'Unit' with temperature arrow** appears in the display.

**I.) 'Unit' with Temp-arrow: Temperature unit**

Enter the desired Temperature unit. All referring settings and displays are done in this unit.

2. Choose the desired unit by pressing 2 (down) or 3 (up) key. Choice between °C and °F (ex works: °C)
3. Enter by pressing key 1 (SET), select next parameter by pressing key 1 again: **'OFFS' without temperature arrow** appears in the display.

**II.) 'OFFS': Offset of humidity measuring (correction of measuring deviations):**

The offset of the measuring will be shifted by this value, the input is in %RH. Calculation: see above.

4. Choose the desired value by pressing 2 (down) or 3 (up) key.  
Max. input range: -5.0...5.0 %RH or 'oFF': offset is deactivated (oFF=0.0%, ex works)
5. Enter by pressing key 1 (SET), select next parameter: **'SCAL' without temperature arrow** appears in the display.

**III.) 'SCAL': Scale of humidity measuring (correction of measuring deviations):**

The scale of the measuring is changed by this value. Calculation: see above.

6. Choose the desired value by pressing 2 (down) or 3 (up) key.  
Max. input range: -5.00...5.00 or 'oFF': scale is deactivated (oFF=0.00, ex works)
7. Enter by pressing key 1 (SET), select next parameter: **'OFFS' with temperature arrow** appears in the display.

**IV.) 'OFFS': with Temp-arrow: Offset of temperature measuring (correction of measuring deviations):**

The offset of the measuring will be shifted by this value, the input is in °C. Calculation: see above.

8. Choose the desired value by pressing 2 (down) or 3 (up) key.  
Max. input range: -5.0...5.0 °C / -9.0...9.0°F or 'oFF': offset is deactivated (oFF=0.0, ex works)
9. Enter by pressing key 1 (SET), select next parameter: **'SCAL' with temperature arrow** appears in the display.

**V.) 'SCAL': with Temp-arrow: Scale of temperature measuring (correction of measuring deviations):**

The scale of the measuring is changed by this value. Calculation: see above.

10. Choose the desired value by pressing 2 (down) or 3 (up) key.  
Max. input range: -2.00...2.00 or 'oFF': scale is deactivated (oFF=0.00, ex works)
11. Enter by pressing key 1 (SET), select next parameter: **'AL.Lo' without temperature arrow** appears in the display.

**VI.) 'AL.Lo': min. alarm-point for humidity-measuring:**

Enter the desired min. alarm-point. At resp. below the value that has been set an alarm message will occur.

12. Choose the desired value by pressing 2 (down) or 3 (up) key. Max. input range: 0.0 to AL.Hi
13. Enter by pressing key 1 (SET), select next parameter by pressing key 1 again: **'AL.Hi' without temperature arrow** appears in the display.

**VII.) 'AL.Hi': max. alarm-point for humidity-measuring:**

Enter the desired min. alarm-point. At resp. above the value that has been set an alarm message will occur.

14. Choose the desired value by pressing 2 (down) or 3 (up) key. Max. input range: AL.Lo to 100.0
15. Enter by pressing key 1 (SET), select next parameter: **'AL.dE' without temperature arrow** appears in the display.

**VIII.) 'AL.dE': alarm-delay for humidity-measuring:**

The alarm will start, when the alarm condition exists for the entered delay time.

16. Choose the desired value by pressing 2 (down) or 3 (up) key. Max. input range: oFF; 0...9999 min.
17. Enter by pressing key 1 (SET), select next parameter: **'AL.Lo' with temperature arrow** appears in the display.

**IX.) 'AL.Lo' with temperature arrow: min. alarm-point for temperature-measuring:**

Enter the desired min. alarm-point. At resp. below the value that has been set an alarm message will occur.

18. Choose the desired value by pressing 2 (down) or 3 (up) key. Input range: -40.0 to AL.Hi °C (AL.Hi with temp.arrow)
19. Enter by pressing key 1 (SET), select next parameter: **'AL.Hi' with temperature arrow** appears in the display.

**X.) 'AL.Hi' with temperature arrow: max. alarm-point for temperature-measuring:**

Enter the desired min. alarm-point. At resp. above the value that has been set an alarm message will occur.

20. Choose the desired value by pressing 2 (down) or 3 (up) key. Input range: AL.Lo...120.0 °C (AL.Lo with temp.arrow)
21. Enter by pressing key 1 (SET), select next parameter: **'AL.dE' with temperature arrow** appears in the display.

**XI.) 'AL.dE' with temperature arrow: alarm-delay for temperature-measuring:**

The alarm will start, when the alarm condition exists for the entered delay time.

22. Choose the desired value by pressing 2 (down) or 3 (up) key. Max. input range: oFF; 0...9999 min.
- Enter by pressing key 1 (set). After pressing 1 again, the instrument will restart, (display shows 8.8.8.8 segment test).

**Notice:** In case an alarm is active, the display will show alternating AL.Lo resp. AL.Hi (without resp. with temperature arrow) and the measured value