

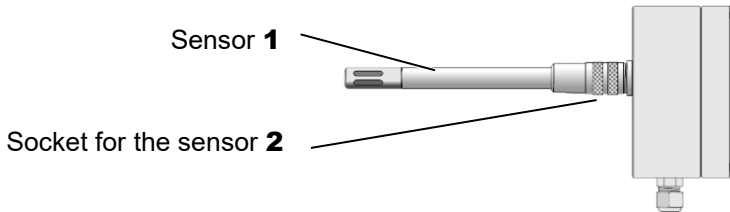
Instruction Manual

Humidity transmitter MH8D46C1Kx

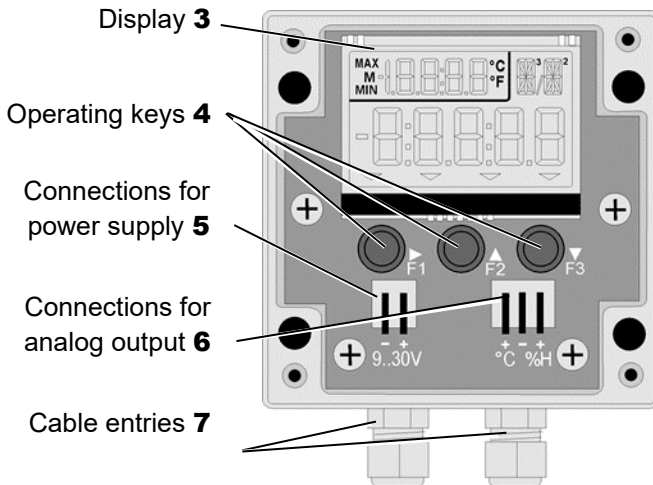
English
V2.1
21.10.2021

1 Global Overview

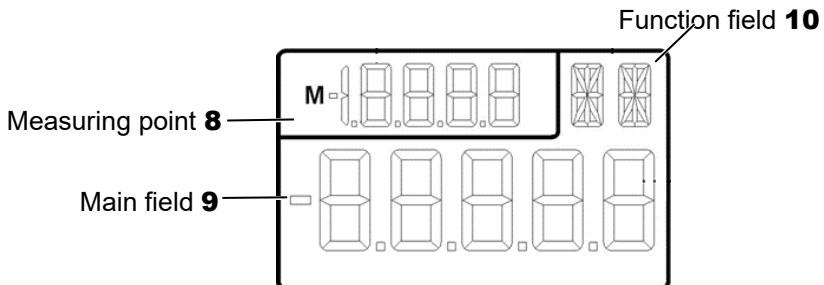
Transmitter side view



General illustration of the transmitter with the cover removed



General illustration of the display



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3 Explanation of Symbols



Safety note



Request



Notice



Result



Reference referring to the general illustration (page 2)

4 Safety Notes

- Please read the instruction manual carefully and pay attention to the safety notes and warnings.
- Do not lay the connecting cables in the vicinity of high voltage lines.
- Make sure to eliminate any electrostatic charge before touching the lines and the transmitter.

4.1 How to avoid Measuring Errors and Product Damages

- When using extensions for the sensors, please make sure that the measurement lines are not installed together with high voltage lines or that the lines are correctly shielded to avoid coupling of interfering signals.
- ☞ In case you operate the device in strong electromagnetic fields , an additional measurement error is likely to occur ($<50\mu\text{V}$ at 3V/m and 1.5m thermocouple). After the irradiation ceases, the device will work again within its technical specifications.

4.2 Intended Use

The humidity transmitter MH8D46C1Kx is a digital humidity – temperature transmitter and is intended to be used for measuring the four climatic parameters temperature, humidity, dew point, and ratio of components. The output of the measuring values occurs via a double analog output.

You will find a detailed overview on the intended use and the possible measuring tasks in the ALMEMO® Manual. In order to avoid measuring errors and product damages, it is recommended to read the corresponding chapter for every measuring task and to pay attention to the associated notes.

Please pay attention to all information and safety notes listed in this manual. Only use the measuring device within the technical specifications (see chapter 12 Technical data, operating conditions, and power supply). Any other use is considered improper usage and may result in damage to property and human injury. In addition, any such usage will result in loss of warranty.

- ☞ → In case of doubt please contact our technical support (Phone 08024-3007-38, Mail help@ahlborn.com).

5 Product

5.1 Standard Delivery

- When unpacking the device, make sure that the measuring instrument is not damaged and that the delivery is complete.

Transmitter MH8D46C1 with digital humidity sensor

Present Instruction Manual

- In case the device was damaged during transport, please keep the packaging material and contact the supplier immediately.

5.2 Description

The transmitter MH8D46C1 is equipped with a purely digital and fully interchangeable temperature-humidity-pressure sensor, which you can easily replace in case of defect or soiling without any loss of accuracy. You can adjust the two analog outputs within the accuracy of 0.1% to 0..10V, 0..20mA, or 4..20mA and scale them to the desired measuring range. Using the 3 operating keys and the display, you can configure the scaling values, the temperature unit, the humidity values, and the limit values. The terminals for the power supply are designed for 9..30V.

Functions

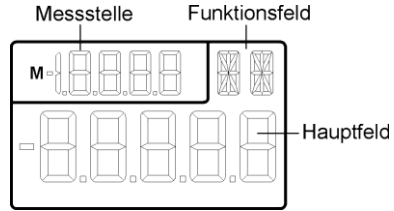
Measuring range	Temperature, rel. humidity, dew point, ratio of components (atmospheric pressure compensated by the measured environmental pressure)
	Analog output °C /°F temperature 0..10V/0..20mA
	Analog output %H / °C / g/kg humidity value 0..10V/0..20mA
Dimension	The temperature output either occurs in the dimensions °C or °F.

5.2.1 Display

The display **3** becomes visible as soon as you open the cover of the transmitter and it is operable as soon as you connect the transmitter to the power supply.

In the field measuring point, the displayed measuring point is labeled.

In the main field, the actual measuring value of the selected measuring point will be displayed. Special operating conditions will be displayed in the main field as well.



In the function field, the dimension of the measuring value will be displayed. During the configuration of the measuring point, a function abbreviation will be displayed.

Function abbreviations in the function field

Function abbreviation	Meaning
°C, °F respectively %H, °C, g/k	Measuring range abbreviation respectively dimension
AS	Start of analog output
AE	End of analog output
V respectively mA	Type of analog output volt respectively milliampere
GH respectively GL	Maximum limit value respectively minimum limit value

Special operating conditions displayed in the main field

Display in the main filed	Meaning
-----	Parameter switched off
d rH (Measuring range abbreviation is flashing)	Sensor broken
Maximum value is flashing	Measured value overrange
Minimum value is flashing	Measured value underrange


5.2.2 Operating Keys

To configure the transmitter, use the three operating keys **4** F1, F2, and F3.

Key function

Operating key	Arrow direction	function
F1	→	Start input (parameter is flashing),select next digit, end input
F2	↑	Select a function Or change the flashing parameter
F3	↓	Select a function Or change the flashing parameter

6 Initial Operation

1. Plug the sensor in the socket **2** on the back of the transmitter and tighten it.
 2. Loosen the four screws on the front of the transmitter.
 3. Remove the cover of the transmitter.
 4. Pass a not less than three pole cable for the analog outputs through the right cable entry **7** and connect it to the terminals of the connection for the analog output **6**.
-  Use the negative pole for both outputs °C and %H.
4. Pass the cable for the power supply through the left cable entry **7** and connect it to the terminal of the connection for the power supply **5**. While doing so, ensure that the polarity is correct.
 5. Tighten the two cable entries **7** to properly seal them.
 6. Select the type of analog output (see chapter 7.7) and, if necessary, scale the analog output (see chapter 7.6).
 7. Put the cover back on and tighten the four screws on the front of the transmitter.

7 Usage

7.1 Connect the Sensor

- Plug the sensor into the socket **2** on the back of the transmitter and tighten it.
- ☞ As circumstances require, you can place the sensor separately from the transmitter using the extension cable ZH 9D46VKxx. You can get a special mounting bracket ZB 8D00W for wall mounting purposes.

7.2 Connect the Analog Outputs

1. Loosen the four screws on the front of the transmitter.
 2. Remove the cover of the transmitter.
 3. Pass a not less than three pole cable for the analog outputs through the right cable entry **7** and connect it to the terminals of the connection for the analog output **6**.
- ☞ Use the negative pole for both outputs °C and %H.
4. Tighten the cable entry **7** to properly seal it.

7.3 Connect the Power Supply

- ☞ For the power supply of the transmitter, a 12V or a 24V mains adapter is needed. The voltage, however, may lie between 9 and 30 VDC.
- ☞ To simplify the connection, the terminal 9...30V can be easily removed. No tools are needed to lock and unlock the terminal.

7 Usage

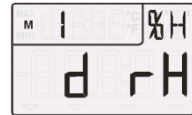
1. Pass a two pole cable for the power supply through the left cable entry **7** and connect it to the terminal of the connections for power supply **5**. While doing so, ensure that the polarity is correct.
2. Tighten the cable entry **7** to properly seal it.

7.4 Select a Measuring Point

1. Press the operating key F1 → to select a measuring point.
 - The measuring point in the field measuring point **8** is flashing.
2. Keep pressing the operating key F2 ↑ until the desired measuring point is displayed.
3. Press the operating key F1 → .
 - The desired measuring point will be displayed and is no longer flashing.

7.5 Set the Measuring Range and the Dimension

For the measuring point M0 (temperature, the dimension can be set to '°C' or '°F'.



For the measuring point M1 (humidity), the following measuring ranges can be set:

relative humidity Dim '%H', abbreviation 'd rH'

dew point Dim '°C', abbreviation 'd dT'

ratio of components Dim 'g/k', abbreviation 'd AH'
(pressure is measured in the digital sensor element)

! The measuring point must be selected.

1. Keep pressing the operating key F2 ↑ until the abbreviation of the measuring range is displayed (e.g. d rH).
2. Press the operating key F1 → .
 - The display in the main field **9** (the abbreviation of the measuring range) and in the function field **10** (the dimension) starts flashing.

3. Keep pressing the operating key F2 ↑ until the desired measuring range is displayed in the main field **9** and the right dimension is displayed in the function field **10**.
4. Press the operating key F1 →.
- The desired measuring range will be displayed and is no longer flashing.

7.6 Scale the Analog Output

To scale a smaller measuring range of e.g. 10 to 60 %RH to the complete analog output of e.g. 10 V you must use the two functions **start of analog output** (abbreviation **AS**) and **end of analog output-Ende** (abbreviation **AE**).



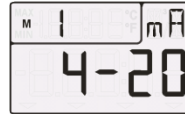
- ! The measuring point must be selected.
 - ! The measuring range must be set.
1. Keep pressing the operating key F2 ↑ until the abbreviation AS is displayed in the function field **10**.
 2. Press the operating key F1 →.
 - The display in the main field **9** starts flashing. The start of the analog output can be set.
 3. Keep pressing the operating key F2 ↑ until the number of the first digit matches the desired value.
 4. Press the operating key F1 → to select the next digit.
 - Repeat the steps 3. and 4. until all digits display the desired value.
 - The display in the main field **9** will stop flashing as soon as you have set all digits and have terminated the entry with the operating key F1 → .
 5. Keep pressing the operating key F2 ↑ until the abbreviation AE is displayed in the function field **10**.
 6. Press the operating key F1 →.

7 Usage

- The display in the main field **9** starts flashing. The end of the analog output can be set.
7. Set the desired value by following steps 3 and 4.

7.7 Set the Type of Analog Output

The setting of the type of analog output 0-10V, 0-20mA, or 4-20mA is determined in the function **V** respectively **mA**.



- ! The measuring point must be selected.
 - ! Keep pressing the operating key F2 ↑ until the function abbreviation mA or V is displayed in the function field **10**.
1. Press the operating key F1 →.
- The display in the main field **9** starts flashing.
2. Keep pressing the operating key F2 ↑ until the desired type of analog output mA or V is displayed in the function field **10** and the desired range 0-10, 0-20, or 4-20 is displayed in the main field **9**.
 3. Press the operating key F1 →.
- The desired type of analog output will be displayed and is no longer flashing.

7.8 Set Limit Values

You can set the maximum and the minimum limit values for both measuring channels to monitor the measured value. In case one of the limit values is exceeded, the display in the main field will start flashing **9**.



- ! The measuring point must be selected.
- ! The measuring range must be set.
- 1. Keep pressing the operating key F2 ↑ until the function abbreviation GH is displayed in the function field **10**.
- 2. Press the operating key F1 →.
- The display in the main field **9** starts flashing. You can now set the maximum limit value.
- 3. Keep pressing the operating key F2 ↑ until the number of the first digit matches the desired value.
- 4. Press the operating key F1 → to select the next digit.
- Repeat the steps 3. and 4. until all digits display the desired value.
- The display in the main field **9** will stop flashing as soon as you have set all digits and have terminated the entry with the operating key F1 → .
- 5. Keep pressing the operating key F2 ↑ until the function abbreviation GL is displayed in the function field **10**.
- 6. Press the operating key F1 →.
- The display in the main field **9** starts flashing. You can now set the minimum limit value.
- 7. Set the desired value by following steps 3 and 4.
- The maximum and minimum limit values are now set and the display in the main field **9** starts flashing in case one of the limit values is exceeded.

7.9 Detect a Sensor Break

In case of a sensor break, the dimension abbreviation in the main field **9**. starts flashing.

7.10 Reset to Factory Settings

1. Disconnect the transmitter from the power supply.

7 Usage

2. Simultaneously press the operating keys F2 ↑ and F3 ↓ while reconnecting the device to the power supply.
 - At the bottom edge of the main field **9** several triangles will be displayed.
3. Disconnect the transmitter from the power supply once again.
4. Reconnect the power supply to the transmitter.
 - The factory settings will be restored.

8 Maintenance and Care

Clean the housing

- ! The transmitter must be disconnected from the power supply.
- If soiled, clean the housing with a damp cloth.



Do not use aggressive detergents or solvents for cleaning.

Calibration and verification

- Make sure that the sensor is checked on a regular basis.
- ☞ For maximum accuracy, the calibration of the sensor should be checked every 6 to 12 months. Applications where the transmitter is exposed to significant pollution may require more frequent verifications. In case of not plausible measured values, it is recommended to perform a factory testing as well.
- ☞ Since all calibration and sensor data is saved on the sensor, calibrations of the humidity sensor can be performed independent from the connection cable and from the ALMEMO® measuring instrument.

9 Questions and Answers

Question	Possible solution
No or faulty display, no operating key response	Check the power supply, disconnect and reconnect the power supply.
The analog signal does not meet your expectations.	Check the selected analog type 10V or 20mA. Also check the scaling values start of analog output and end of analog output.
No response to individual keys	Disconnect and reconnect the device. Send in device to manufacturer.
No measured values	Check for sensor break. Send in sensor to manufacturer.
Sensor break	Check sensor element and cables.

In case we could not answer your question, please contact the technical support (phone: +49 (0)8024/3007-38, e mail: help@ahlborn.com).

10 Warranty

Before leaving the factory, every device has passed several quality tests. For proper functioning, a 2 year warranty is granted beginning with the day of delivery. Before returning the device, please pay attention to the information provided in chapter 9 Questions and Answers. In case of a defect, please use - if possible - the original packing material and attach a precise description of the defect as well as of the corresponding boundary conditions.

The following cases are excluded from warranty:

- Unauthorized interventions and modifications within the device performed by the customer
- Operation outside the indicated environmental conditions applicable for this product
- Use of improper power supply and peripheral devices
- Improper use of the device
- Damage due to electrostatic discharge or lightning
- Disregard of the Instruction Manual

We reserve the right to make changes in product features in favor of technical progress or due to new construction elements..

11 Disposal



The symbol of a crossed-out waste bin implies that the product must be disposed off separately in the European Union.

This applies to the product itself as well as to all accessory

components labeled with this symbol. The products must not be discarded via the unsorted municipal waste

- Dispose off defect rechargeable batteries / empty batteries in accordance with the legal requirements.
- When no longer in use, the product must be disposed off at the collecting point specified for electrical and electronic equipment. In doing so, please observe the local disposal regulations.
- Dispose off the packing material in accordance with local regulations.

12 Technical Data

Default configuration

Measuring inputs	1 input socket for digital temperature-humidity sensor	
Measuring channels	2 channels for temperature and one humidity variable	
Measuring ranges		
Temperature	'd °C' -20.00.. 80.00 °C	
Accuracy	5 to 60°C typ. ±0.2K 5 to 60°C max. ±0,4K -20 to 80°C max. ±0,7K	
Reproducibility	typ. ±0.1K	
Humidity variables	rel. humidity	'd RH' 5.0 .. 98.0 %RH
Accuracy	10 to 90%RH max. ±2.0%RH at 23°C±5K 5 to 98%RH max. ±4%RH at 23°C±5K	
Hysteresis	typ. ±1.0%r.F.	
Dew point	'd dt' -25.0 .. 100.0 °C	
Ratio of components	'd AH' 0.0 .. 500.0 g/kg	
Atmospheric pressure	300..1100mbar	
Accuracy	±2.5mbar (700..1100mbar) at 23°C±5K	
Analog outputs	DAC galvanically isolated.	
	0.0 to 10.0V	load > 100kΩ
	0.0 to 20.0mA	load < 500Ω
Resolution	16 bit	
Accuracy	0.1% of final value	
Temperature drift	10 ppm/K	
Time constant:	100 us	
Equipment	LC display	5st. 7-segm. 15mm, 2st. 16-segm. 9mm
Operation	3 operating keys	

12 Technical Data

Power supply	External	9..30V DC
	Current consumption	approx. 37 mA + 1.5 x I _{OUT}
Housing	Aluminum 100 x 100 x 60 mm (L x W x H), IP65	(with attached sensor tube respectively connection cable)
	sensor	Length 125/265/525mm, tube diameter 12mm
Operating conditions	Operating temperature	-10 to +50 °C (storage temperature: -20 to +60 °C)
	Ambient air humidity	10 to 90 % RH (non condensing)

Subject to technical modifications without prior notice!

13 Declaration of Conformity

We, Ahlborn Mess- und Regelungstechnik GmbH, hereby declare that the transmitter MH8D46C1 bears the CE mark and complies with the regulations of the Low Voltage Directive 2014/35/EU and with the essential protection requirements of the Electromagnetic Compatibility Directive 2014/30/EU.

The following standards were used to evaluate the products:

Safety: EN 61010-1: 2010+A1

EMC: EN 61326-2-3: 2013 Table 2



Unauthorized changes to the device invalidate this declaration.

Subject to technical modifications!

13 Declaration of Conformity

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Despite great care, incorrect information cannot be ruled out.
Technical changes are reserved.

You will find the present and further Instruction Manuals,
as well as the ALMEMO® Manual on **www.ahlborn.com**
under the tab **SERVICE** on **DOWNLOADS**

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Ahlborn Mess- und Regelungstechnik GmbH,
Eichenfeldstraße 1-3, D-83607 Holzkirchen,
Phone +49(0)8024/3007-0, Fax +49(0)8024/30071-0
Internet: <http://www.ahlborn.com>, email: amr@ahlborn.com

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