

D Series Sensors for Humidity and Temperature Measurement With calibrated dModul

Type DW Industrial version for wall mounting Optional display

- dynamic MELA® humidity sensing element
- output of all hx values
- calibrated dModul for humidity and temperature measurement
- in situ alignment
- easy to install
- operating temperatures up to 80°C

The core part of the D Series is the digital calibrated dModul, which processes the measurement values of relative humidity and temperature individually. The values are compared to the calibration values stored in the dModul and communicated digitally to the transmitter electronics, where they are processed to standardised current and voltage signals.

The housings of the industrial versions provide protection in accordance with IP 65. Only a single screw is required to close it securely.

Technical data

Humidity

| | | |
|---|----------------------|-------------|
| measuring element | capacitive MELA FE09 | |
| output range | 0...100 %RH | |
| measuring uncertainty | | |
| 10...90 %RH at 10...40°C | | ±2 %RH |
| < 10 %RH or > 90 %RH at 10...40°C | | ±2.5 %RH |
| influence of temperature <10°C or >40°C | | ±0.05 %RH/K |

Temperature

| | | |
|---|---|-----------|
| measuring element | Pt1000 1/3 DIN | |
| output ranges | 0...+50°C -30...+70°C 0...+100°C further ranges on request | |
| measuring accuracy | | |
| sensors with active temperature signal | | |
| with voltage output at 10...40°C | | ±0.2 K |
| with current output at 10...40°C | | ±0.3 K |
| influence of temperature <10°C or >40°C | | ±0.01 K/K |

Electrical data

| | |
|---|---|
| outputs | 0...1 V 0...10 V 4...20 mA passive temperature outputs on request |
| voltage supply | see type survey |
| consumption of electronics (voltage output) | typ. 7 mA |
| load resistance (voltage output) | ≥10 kΩ |
| load R _L (current output) | $R_L(\Omega) = \frac{\text{voltage supply} - 10 \text{ V}}{0,02 \text{ A}} \pm 50 \Omega$ |
| electromagnetic compatibility | ref. EN 61326-1 and EN 61326-2-3 |

General data

| | | |
|--|-----------------------------------|--------|
| measuring medium | air, pressureless, non-aggressive | |
| max. air speed | | |
| protective cage w. membrane (basic equipment) | | 10 m/s |
| min. air speed | ≥ 0.5 m/s | |
| operating temperatures | -30...+80°C | |
| storage temperatures | -40...+85°C | |
| connection | connecting terminals | |
| wire diameter per connector | max. 1.5 mm² | |
| total diameter cable | 4-8 mm | |
| degree of protection / measuring head | | |
| protective cage w. membrane (basic equipment) | IP 30 | |
| PTFE sinterd filter (optional) | IP 65 | |
| degree of protection / housing | IP 65 | |
| material of housing | PC | |

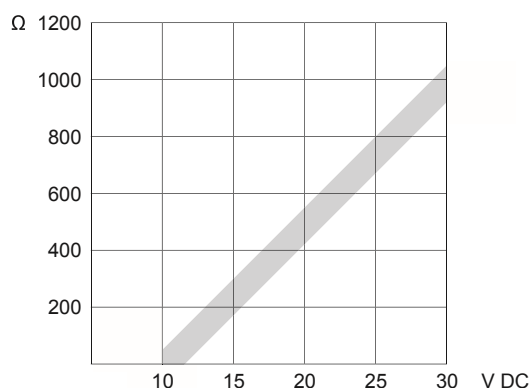
Options

| | |
|---------|---|
| display | 2 lines |
| | 3 digits + 1 decimal place |
| | display approx. 21 x 40 mm ² |
| | digit height approx. 8 mm |

Physical outputs, selectable for two outputs

| | |
|-----------------------|------------------------------|
| relative humidity | 0...100 %RH |
| temperature | -30...+70°C |
| | 0...100°C |
| | 0...50°C |
| | further ranges on request |
| dew point temperature | -20...70°C |
| enthalpy | 0...80 kJ/kg |
| mixing ratio | 0...100 g vapour /kg dry air |
| absolute humidity | 0...20 g/m ³ |
| | or 0...100 g/m ³ |
| wet-bulb temperature | -10...50°C |

Load at current output



Type survey DWF

Humidity sensor

| Type | Housing for wall mounting | Physical value | Output signal corresponds to | Electrical outputs | Voltage supply U _B |
|------|------------------------------|-------------------|---------------------------------|-----------------------|----------------------------------|
| DWF | optional display | relative humidity | 0...100 %RH | 0...1 V | 6...30 V DC 6...26 V AC |
| | | | | 0...10 V | 15...30 V DC 13...26 V AC |
| | | | | 4...20 mA | 10...30 V DC |

Type survey DWK

Humidity and temperature sensor

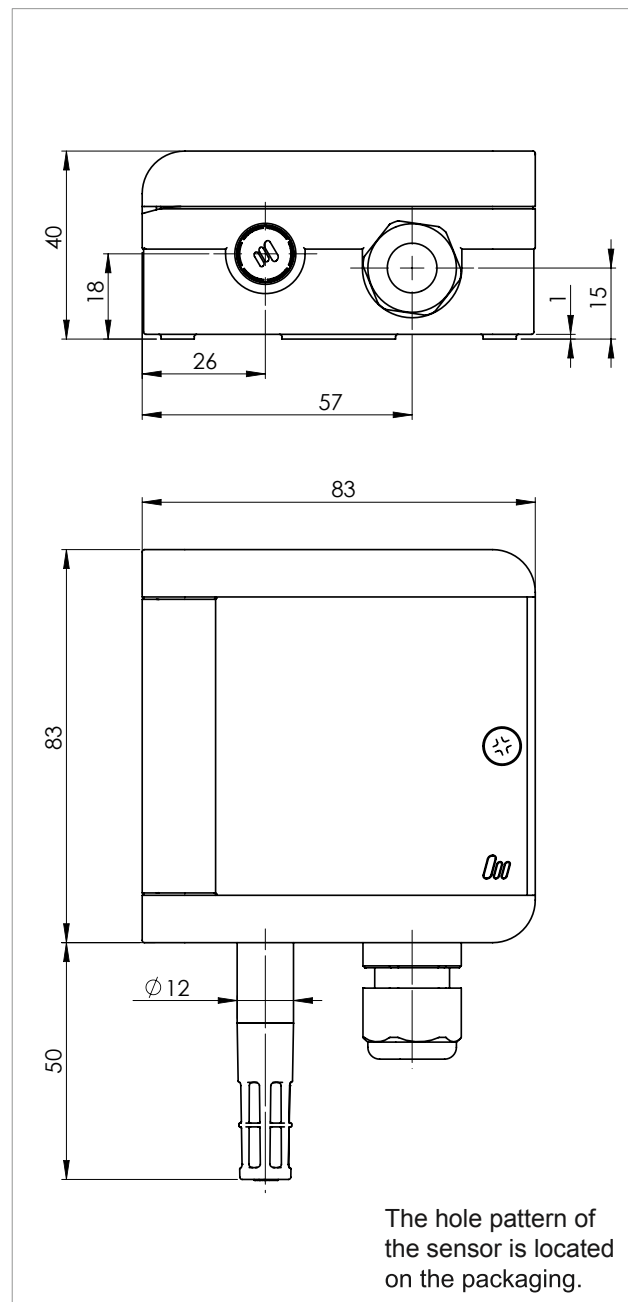
| Type | Housing for wall mounting | Physical value selectable for 2 outputs | Output signal corresponds to | Electrical outputs | Voltage supply U _B |
|------|------------------------------|--|---|-----------------------|----------------------------------|
| DWK | optional display | relative humidity | 0...100 %RH | 0...1 V | 6...30 V DC 6...26 V AC |
| | | temperature | -30...+70°C 0...+100°C 0...+50°C | | |
| | | dew point temperature | -20...70°C | 0...10 V | 15...30 V DC 13...26 V AC |
| | | enthalpy | 0...80 kJ/kg | | |
| | | mixing ratio | 0...100 g vapour /kg dry air | 4...20 mA | 10...30 V DC |
| | | absolute humidity | 0...20 g/m ³ 0...100 g/m ³ | | |
| | | wet-bulb temperature | -10...+50°C | | |

Passive temperature output available on request.

Accessories

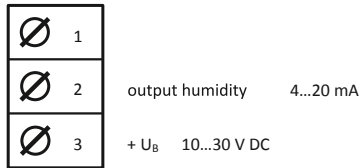
| Product n° | Description |
|--------------------------|--|
| ZE05 | sintered filter made of fine-pored PTFE, IP 65 |
| ZE 31/1-12 ZE 31/1-75 | humidity standard to check the accuracy of the sensor at 12 %RH humidity standard to check the accuracy of the sensor at 75 %RH |
| ZE 31/1-33 ZE 31/1-84 | humidity standard to check the accuracy of the sensor at 33 %RH humidity standard to check the accuracy of the sensor at 84 %RH |
| ZE36 | testing adapter for humidity standards for for sensor tubes Ø 12 mm |

Dimensions

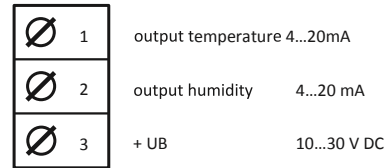


Connection diagrams

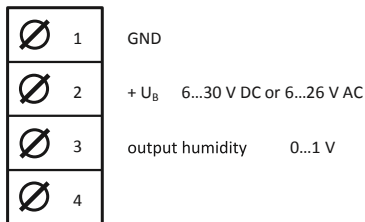
DWF 4...20 mA



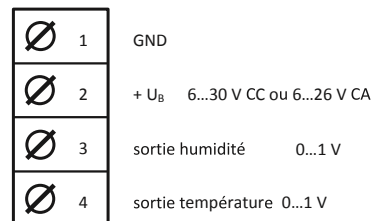
DWK 2 x 4...20 mA



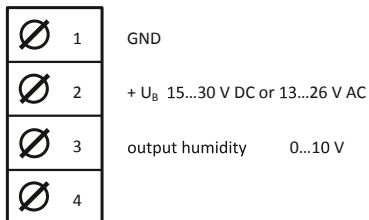
DWF 0...1 V



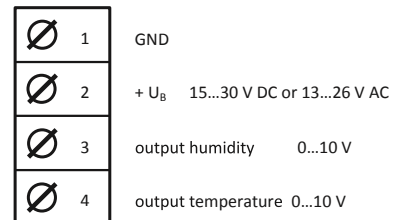
DWK 2 x 0...1 V



DWF 0...10 V



DWK 2 x 0...10 V



ESD protection advice

The sensors of the D Series contain components, which can be damaged by the effects of electrical fields or by charge equalisation when touched.

The following protective measures must be taken when the housing of the sensor is to be opened for connection or in situ alignment:

- Before opening the housing of the sensor, ensure electrical potential equalisation between you and your environment.
- Pay particular attention to ensure that this potential equalisation is maintained while you are working with the opened housing.

In situ alignment

During the in situ alignment the sensor does not necessarily have to be taken out of the control circuit.

We offer humidity standards for alignment of the sensors (page 3: accessories).

Before calibrating the sensor, standards should remain at least 2 hours on the sensors.

The temperature must remain constant during this time. For the correct temperature according to the humidity standard used, please refer to data sheet F5.2 Humidity Standards.

During calibration temperature and humidity must remain constant.

During calibration, especially during storage of data, uninterrupted power supply of the sensor must be provided.

During calibration the following measurement ranges are shown on the display/ are used for calibration:

CH 1: all sensors always: relative humidity, measuring range 0...100 % RH

CH 2: sensors
with relative humidity RH output (CH1)
and temperature °C output (CH2)
the programmed temperature range, unaltered
sensors
with other hx-values outputs
the standard temperature measuring range of -40...85°C

The accuracies shown in the technical data of this data sheet refer exclusively to works calibration.

| Command | | Operation | Transmitter / LED |
|--|---|--|--|
| default attention: all user adjustments will be reset. | possible only when adjustment mode is off. (LED must not be lit.) | press buttons UP and DOWN simultaneously for at least 8 sec. | until LED lights up for 1 sec. |
| calibration mode | | press button DOWN for at least 3 sec. | until LED blinks 1 time per second |
| selection of type of calibration | humidity 1-point-adjustment (offset) | no further command necessary | LED blinks 1 time per second. |
| | humidity 2-point-adjustment lower point at 12 %RH and 20...30°C humidity standard ZE31/1-12 | press button DOWN 1 time shortly | LED blinks twice per second. |
| | humidity 2-point-adjustment upper point at 75 %RH and 20...30°C humidity standard ZE31/1-75 | press button DOWN twice shortly | LED blinks 3 times per second. |
| | temperature 1-point-adjustment | press button DOWN 3 times shortly | LED blinks 4 times per second. |
| Confirmation of selection | | press button UP for at least 3 sec. | until LED lights up permanently |
| adjustment | | buttons UP / DOWN: (press shortly) +/- 0.1 %RH respectively +/- 0.1°C per keystroke | |
| saving | | press button DOWN for at least 3 sec. | until LED is off |
| program termination (at any time) | | press button UP for at least 3 sec. | until LED blinks 6 times and then switches off. |

Mounting instructions

| | |
|------------|--|
| Position | Install the sensor at a place where characteristic levels of humidity occur. The measuring chamber should be located in streaming air. Avoid installation next to heaters, doors or on outer walls. Avoid places exposed to the sun. |
| | Do not position the sensor where ingress of water could occur. |
| | To close the housing securely turn screw until dead stop. |
| | We recommend that you lay the connection lines in a loop so that any water that may be present can run off. |
| | Not reaching the given minimum air speed can lead to measurement errors. |
| Connection | The electrical connection must be carried out by qualified personnel only. |
| | The sensor contains sensitive electrical components. When opening the housing, make sure you comply with the electrostatic discharge precautions (ESD). |
| | Please pay attention to the ohmic resistance according to the operating voltage (see diagram on page 2) when using sensors with a current output. Else measurement errors may occur. |
| | Lines to and from the sensor must not be installed parallel to strong electromagnetical fields. |
| | If there is any chance of an electrical surge, please install surge protection devices. |

User instructions

| | |
|---|--|
| Dew formation | Dew formation and splashes do not damage the sensor, although measurement readings are corrupted until all moisture on and around the sensing element has dried up completely. |
| Cleaning of filters and protective baskets | If necessary, soiled filters can be screwed off and rinsed carefully. Bear in mind the sensors will not measure accurately until filters are completely dry. Please do not touch the highly sensitive humidity sensing element. Please ensure that the temperature sensing element does not touch the sensitive surface of the humidity sensing element. |
| Cleaning of the capacitive humidity sensing element | Loose dust can be carefully cleaned off the humidity sensing element using distilled water or by blowing the dust carefully off. Please do not touch the highly sensitive humidity sensing element. Please ensure that the temperature sensing element does not touch the sensitive surface of the humidity sensing element. |
| Damaging influences | Depending on type and concentration, agents that are corrosive and contain solvents, can result in faulty measurements and can cause the sensor to break down. Substances deposited on the sensor (e. g. resin aerosols, lacuer aerosols, smoke deposits etc.) are damaging as they eventually form a water-repellent film. |

This information is based on current knowledge and is intended to provide details of our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under the most varied conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing industrial rights of protection must be observed. The quality of our products is guaranteed under our General Conditions of Sale. Data sheet DW_EN. Issue: March 2013. Subject to modifications.

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