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CE

D Series
Sensors for
Humidity and Temperature Measurement

Type DI
Room version
Optional display

- **dynamic MELA® humidity sensing element**
- **with integrated measuring chamber**
- **easy to install**
- **operating temperatures up to 60°C**

Technical data

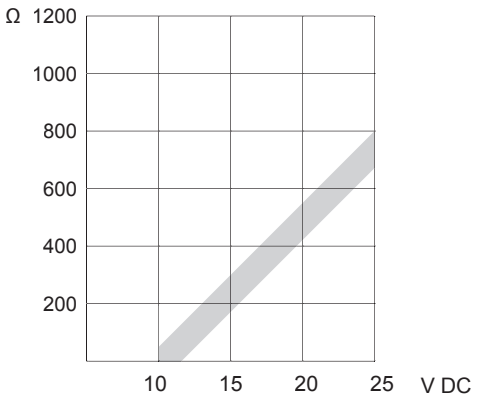
Humidity

measuring element	capacitive MELA FE09
output range	0...100 %RH
measuring uncertainty 40...60 %RH (at 23°C / U_B=24 V DC) 10...40 %RH or 60...90 %RH (at 23°C / U_B=24 V DC)	 ±2.5 %RH ±3 %RH
influence of temperature (ref. to 23°C)	typ. ±0.05 %RH/K

Temperature

measuring element	Pt1000
output ranges	0...+50°C -30...+70°C 0...+100°C further ranges on request
measuring uncertainty (U_B=24 V DC) voltage output 10°C...40°C current output 10°C...40°C	 ±0.25 K ±0.4 K
influence of temperature <10°C or >40°C	typ. ±0.01 K/K

Load at current output



One special feature of the room version is the integral measuring chamber which is separate from the transmitter electronics. This ensures effective ventilation of the humidity and temperature sensing elements.

The measured values are analysed based on individually recorded calibration values in the flash memory and are digitally processed to issue the voltage and current signals.

The room version enclosure has a simple, robust locking mechanism. The transmitter electronics can be found in the upper section of the enclosure. Once the lower section has been installed in the chosen location, the upper section can be mounted and secured at a later date without the use of tools.

Electrical data

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

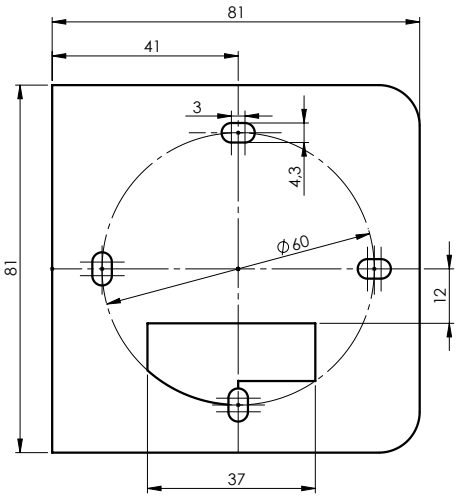
Options

display	2 lines 3 digits + 1 decimal place display approx. 21 x 40 mm² digit height approx. 8 mm

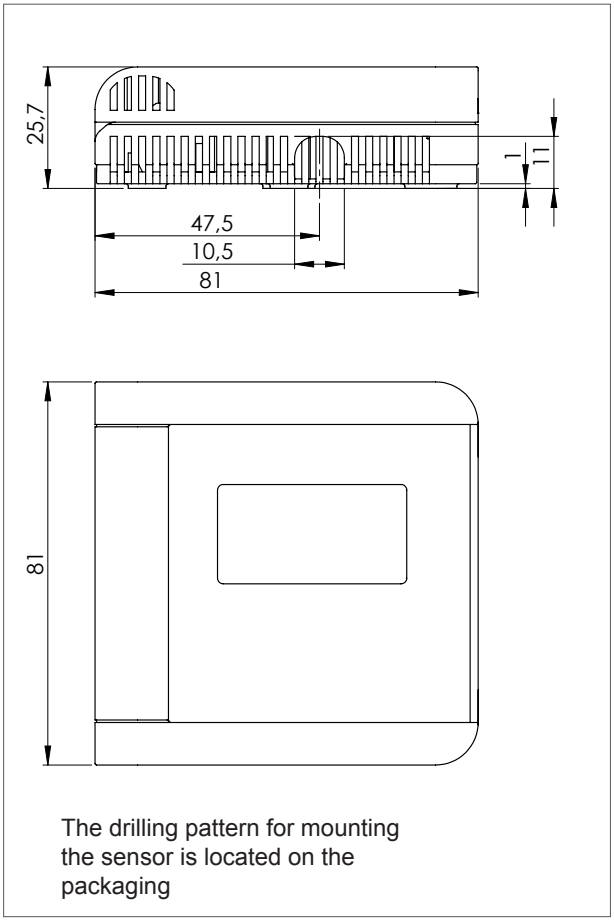
General data

measuring medium	air, pressureless, non-aggressive
operating temperatures	-30...+60°C
storage temperatures	-40...+85°C
connection wire diameter per connector cable diameter → surface cable → in-wall cable see: mounting instructions, page 4	connecting terminals max. 1.5 mm² max. 7 mm (5 mm recommended)
degree of protection	IP 30D
material of housing	ABS
color of housing	RAL 9003 / signal white

Drilling pattern



Dimensions



The drilling pattern for mounting the sensor is located on the packaging

Type survey DIF

Humidity sensor

Type	Housing	Physical variable	Output signal corresponds to	Signal ouput	Voltage-supply U_B
DIF	Room version 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…25 V DC

Type survey DIK

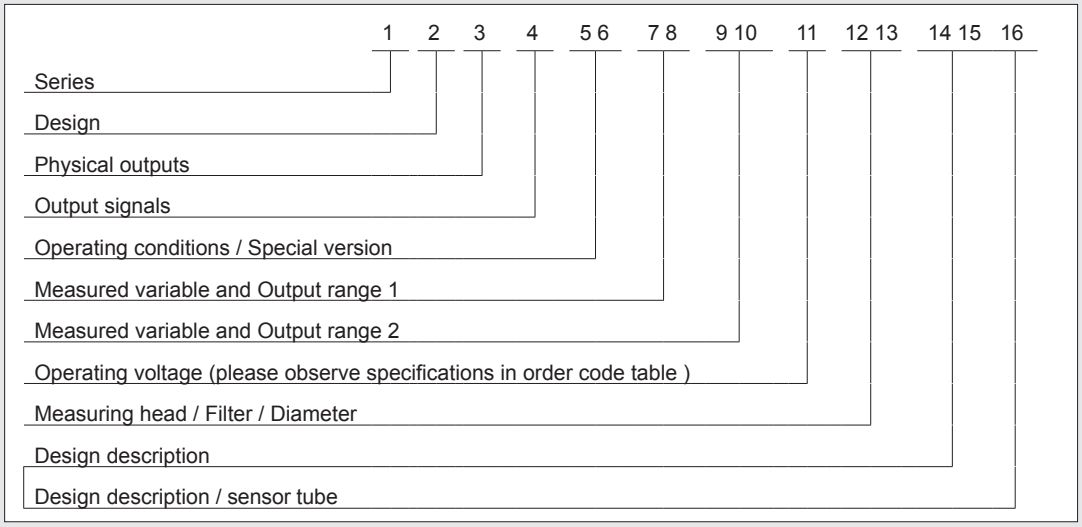
Humidity and temperature sensor

Type	Housing	Physical variable	Output signal corresponds to	Signal ouput	Voltage-supply U_B
DIK	Room version optional display	relative humidity	0…100 %RH	2 x 0…1 V	6…30 V DC 6…26 V AC
		temperature	-30…+70°C 0…+100°C 0…+50°C	2 x 0...10 V	15…30 V DC 13...26 V AC
				2 x 4...20 mA	10…25 V DC

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Product key
D Series

Thanks to the hx-converter the D Series offer a wide range of types.
The product no. of each type consists of a 16-digit alpha numeric code that descibes the sensor
The product key enables you to order the exact type of sensor for your application.



Order codes for the D Series product key

Digit	Technical Data	Options	Order code
1	Series	D Series	D
		Room version	I
3	Physical outputs	Humidity sensor	F
		Sensor with 2 active output signals	K
4	Ouput signals	2x 0…1 V	1
		2x 0…10 V	2
		2x 4…20 mA	3
5 6	Working conditions / special version	Standard	00
7 8	Measured variable and ouput range 1	Relative humidity 0...100 % RH	F1
	and	Temperature -30...70°C	37
9 10	Measured variable and ouput range 2	Temperature 0...100°C	01
		Temperature 0...50°C	05
		No signal	00

Digit	Technical Data	Options	Order code
7 8 **9 10**	Measured value and output range 1 Measured value and ouput range 2 **hx-values (as shown on the right) only available for industrial versions DKK and DWK**	Dew point -20...70°C Td	D2
		Enthalpy 0...80 kJ/kg	H1
		Mixing ratio 0...100 g/ kg dry air	X3
		Absolute humidity 0...100 g/m³	A3
		Absolute humidity 0...20 g/m³	A1
		Wet bulb temperature -10...50°C	W1
		No signal	00
11	Operating voltage	6...30 V DC or 6...26 V AC / Sensors w. 0...1 V output signal	6
		15...30 V DC or 13...26 V AC / Sensors w. 0...10 V output signal	F
		10...25 V DC w. 4...20 mA output signal	A
		Room version without filter	00
		Room version without display -	00 0
		Room version with display -	0D 0

Order example

D I K 2 00 F1 37 F 00 0D 0

Series:
D Series

Design:
Room version

Physical outputs:
2 active ouput signals

Output signals:
2 x 0...10 V

Working conditions / Special version:
Standard

Measured value and ouput range 1:
0...100% RH

Measured value and ouput range 2:
-30...70°C

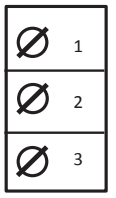
Operating voltage (Please observe specifications in the order code table)
15...30 V DC / 13 ... 26 V AC

Measuring head / Filter / Diameter:
--

Design description / options
room version with display

Connection diagrams

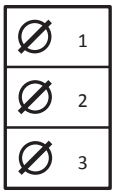
DIF 4...20 mA



+ U_B 10...25 V DC

output humidity 4...20 mA

DIK 2 x 4...20 mA

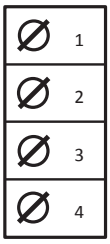


+ U_B 10...25 V DC

output humidity 4...20 mA

output temperature 4...20 mA

DIF 0...1 V DC

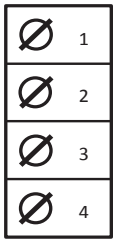


GND

+ U_B 6...30 V DC or 6...26 V AC

output humidity 0...1 V

DIK 2 x 0...1 V DC



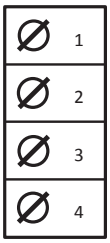
GND

+ U_B 6...30 V DC or 6...26 V AC

output humidity 0...1 V

output temperature 0...1 V

DIF 0...10 V DC

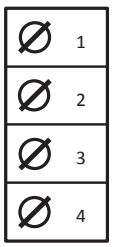


GND

+ U_B 15...30 V DC or 13...26 V AC

output humidity 0...10 V

DIK 2 x 0...10 V DC



GND

+ U_B 15...30 V DC or 13...26 V AC

output humidity 0...10 V

output temperature 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:

- 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.

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.
Mounting on a patress Connection to surface and in-wall cable	When mounting the sensor on a patress, avoid external air getting onto the measuring elements of the sensor by sealing it appropriately. In order to insert the connection cable, prise the pre-cut part of the housing‘s base part open. In order to insert a on-wall cable, the bars of the immerged part of the housings side can be removed.
Opening the housing	Apply a flat-headed screwdriver at the top in the locking slot and press inwards until the housing springs open. 
Connection	The electrical connection must be carried out by properly qualified personnel only.
	The sensor contains sensitive electrical components. When opening the housing, make sure you comply with the electrostatic discharge precautions.
	Please pay attention to the voltage supply-adapted load (see diagram on page 2) when using sensors with a current output.
	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 does not damage the sensor, although measurement readings are corrupted until all moisture on and around the sensing element has dried up completely.
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 DI_E. Issue July 2017. Subject to modifications.

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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**
- **optional USB interface**

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 fully user configurable via optional USB interface
measuring accuracy	
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
voltage supply	see type survey
consumption of electronics (voltage output)	typ. 7 mA
load resistance (voltage output)	≥10 kΩ
load R_L (current output)	$R_L(\Omega) = \frac{\text{voltage supply - 10 V}}{0{,}02\ \text{A}} \pm 50\ \Omega$

Directive about electromagnetic compatibility **2014/30/EU**
DIN EN 61326-1
DIN 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 (with display) (without display)	-30...+80°C -40...+80°C
storage temperatures	-40...+85°C
connection wire diameter per connector total diameter cable	connecting terminals max. 1.5 mm² 4-8 mm
degree of protection / measuring head protective cage w. membrane (basic equipment) PTFE sinterd filter (optional)	 IP 30 IP 65
degree of protection / housing	IP 65
material of housing	PC

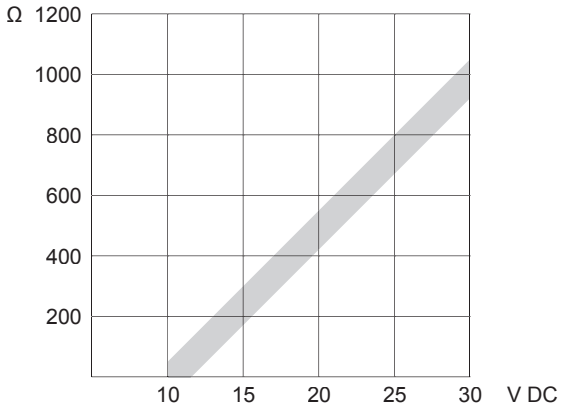
Options

display	2 lines 3 digits + 1 decimal place display approx. 21 x 40 mm² digit height approx. 8 mm

Physical outputs, selectable for two outputs (freely configurable via optional USB interface)

relative humidity	0...100 %RH
temperature	-30...+70°C 0...100°C 0...50°C
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/m³ or 0...100 g/m³
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 ensure galvanic isolation from the power supply

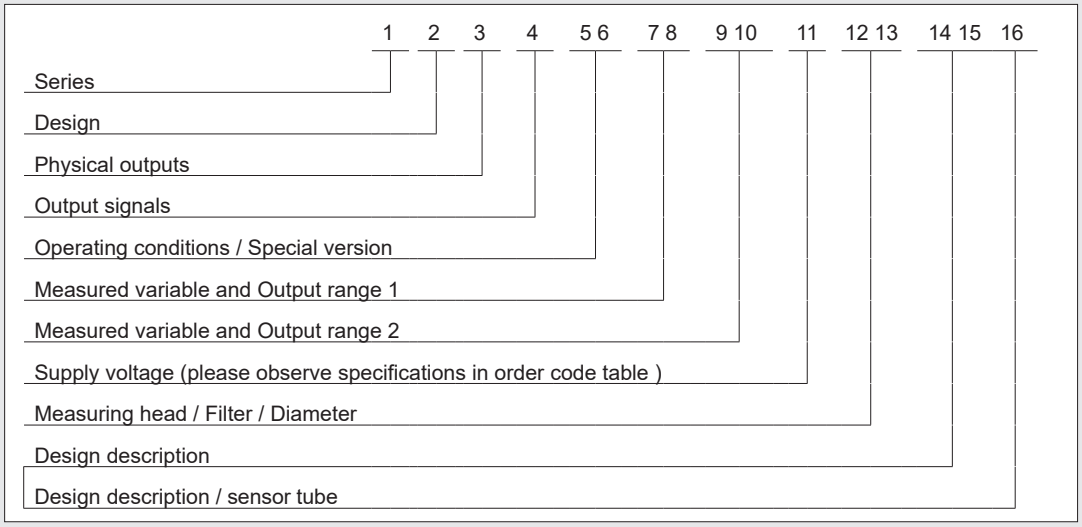
Type survey DWK

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		
		absolute humidity	0…20 g/m³ 0…100 g/m³	4...20 mA	10…30 V DC ensure galvanic isolation from the power supply
		wet-bulb temperature	-10…+50°C		

Product key
D Series

Thanks to the hx-converter the D Series offer a wide range of types.
The product no. of each type consists of a 16-digit alpha numeric code that descibes the sensor.
The product key enables you to order the exact type of sensor for your application.



Order codes for the D Series product key

Digit	Technical Data	Options	Order code
1	Series	D Series	D
		Wall mounting version	W
3	Physical outputs	Humidity sensor	F
		Sensor with 2 active output signals	K
4	Ouput signals	2x 0…1 V	1
		2x 0…10 V	2
		2x 4…20 mA	3
5 6	Working conditions / special version	Standard	00
7 8	Measured variable and ouput range 1	Relative humidity 0...100 % RH	F1
	and	Temperature -30...70°C	37
9 10	Measured variable and ouput range 2	Temperature 0...100°C	01
		Temperature 0...50°C	05
		No signal	00

Digit	Technical Data	Options	Order code
7 8 9 10	Measured value and output range 1 Measured value and ouput range 2 **hx-values (as shown on the right) only available for industrial versions DKK and DWK**	Dew point -20...70°C Td	D2
		Enthalpy 0...80 kJ/kg	H1
		Mixing ratio 0...100 g/ kg dry air	X3
		Absolute humidity 0...100 g/m³	A3
		Absolute humidity 0...20 g/m³	A1
		Wet bulb temperature -10...50°C	W1
		No signal	00
11	Supply voltage	6...30 V DC or 6...26 V AC / Sensors w. 0...1 V output signal	6
		15...30 V DC or 13...26 V AC / Sensors w. 0...10 V output signal	F
		10...30 V DC with galvanic isolation from the power supply / sensors w. 4...20mA output signal	A
12 13	Measuring head / Filter / Diameter	ZE08: protective cage, plastic, w. membrane, Ø 12 mm	08
		ZE05: sintered PTFE filter, IP65, Ø 12 mm	05
14	Sensor tube	Standard	0
		USB interface	U [1]
15 16		Version for wall mounting without display 50 mm sensor tube	01
		Version for wall mounting with display 50 mm sensor tube	D1

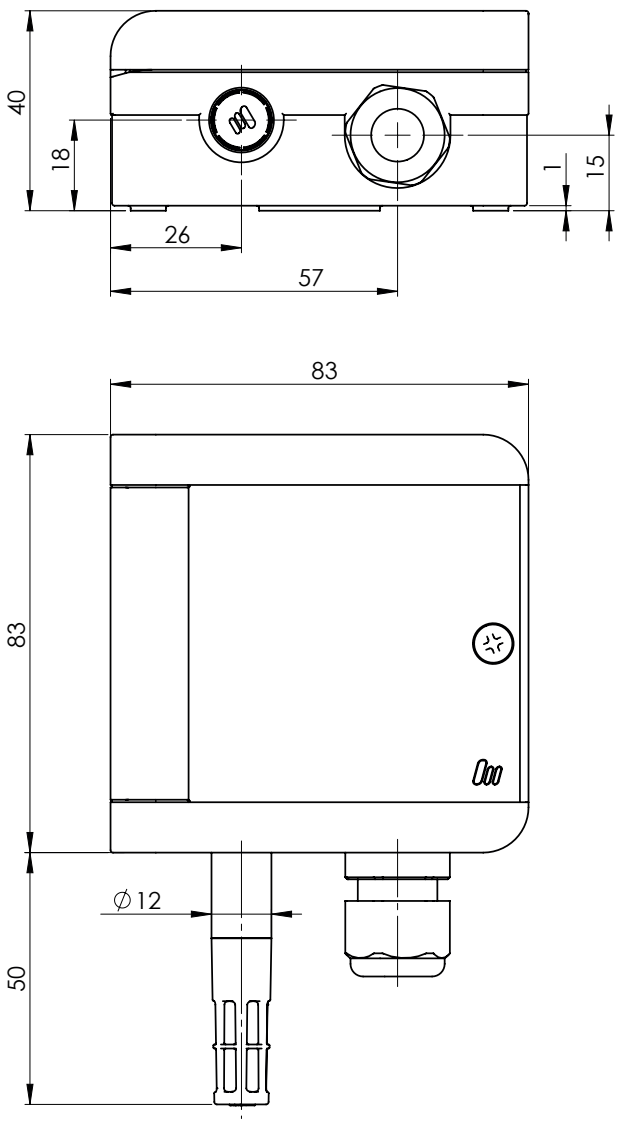
[1] Priority devices available with USB interface:

Product no.	Output signal	Output range 1	Output range 2	Filter options
DWK 2 00 F1 37 F 08 U 01	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	Membrane filter without display
DWK 2 00 F1 37 F 08 U D1	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	Membrane filter with display
DWK 2 00 F1 37 F 05 U 01	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	PTFE filter without display
DWK 2 00 F1 37 F 05 U D1	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	PTFE filter with display
DWK 3 00 F1 37 A 08 U 01	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	Membrane filter without display
DWK 3 00 F1 37 A 08 U D1	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	Membrane filter with display
DWK 3 00 F1 37 A 05 U 01	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	PTFE filter without display
DWK 3 00 F1 37 A 05 U D1	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	PTFE filter with display

Accessories

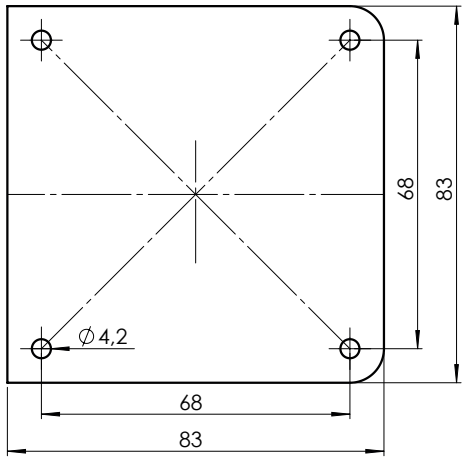
Product n°	Description
ZE05	sintered filter made of fine-pored PTFE, IP 65
ZE 31/1-12 ZE 31/1-75	humidity standard to check the accuracy of the sensor at 12 %RH humidity standard to check the accuracy of the sensor at 75 %RH
ZE 31/1-33 ZE 31/1-84	humidity standard to check the accuracy of the sensor 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



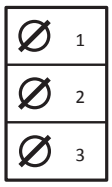
The drilling pattern for mounting the sensor is located on the packaging

Drilling pattern



Connection diagrams

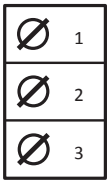
DWF 4...20 mA



output humidity 4...20 mA

+ UB 10...30 V DC ensure galvanic isolation from the power supply

DWK 2 x 4...20 mA



output temperature 4...20mA

output humidity 4...20 mA

+ UB 10...30 V DC ensure galvanic isolation from the power supply

DWF 0...1 V DC

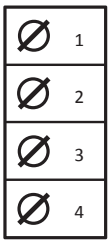


GND

+ U_B 6...30 V DC or 6...26 V AC

output humidity 0...1 V

DWK 2 x 0...1 V DC



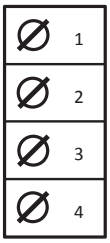
GND

+ U_B 6...30 V CC ou 6...26 V CA

sortie humidité 0...1 V

sortie température 0...1 V

DWF 0...10 V DC

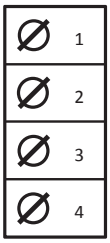


GND

+ U_B 15...30 V DC or 13...26 V AC

output humidity 0...10 V

DWK 2 x 0...10 V DC



GND

+ U_B 15...30 V DC or 13...26 V AC

output humidity 0...10 V

output temperature 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 situalignment:

- 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 (Instruction for transmitters without USB interface)

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 5: 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:

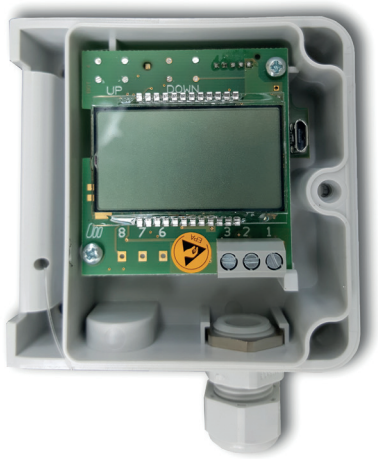
CH 1:	all sensors	always: relative humidity, measuring range 0...100 % RH
CH 2:	sensors with relative humidity RH output (CH1) and temperature °C output (CH2)	the programmed temperature range, unaltered
	sensors with other hx-values outputs	the standard temperature measuring range of -40...85°C

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 humdity 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 humdity 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 DOWN 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

Option: transmitter USB interface

Figure 1



General information:

The following settings can be made using the „Galltec-Mela USB Configuration Software“ and a standard micro USB cable. The transmitter is powered via USB. Except for adjustments, the transmitter requires no power via a power supply unit.

- Change of physically measured values
- Change of analogue output scaling / measuring range
- Change of temperature variables to °C or °F
- Air pressure input
- Single point adjustment of temperature and relative humidity

Download:

Software:	https://www.galltec-mela.de/downloads/EN
System requirements: Software license agreement:	Operating system: Win 10 / Win 8 / Win 7 / Win Vista / Win XP USB Port: USB 2.0 https://www.galltec-mela.de/downloads/EN

Galltec Configuration Manual:	https://www.galltec-mela.de/downloads/EN

Connecting Cable (not part of the standard delivery)



Standard USB micro cable - USB „A“ plug to USB „micro B“

Registration in Windows:

The transmitter is automatically registered in Windows via the USB cable after connecting to the PC. **No drivers are required**. Only one Galltec Mela transmitter can be configured and adjusted at a time.

Warning:	**If the transmitter has current outputs (4-20mA) and an USB interface ensure galvanic isolation between PC and power supply on the connection terminals of the sensor (see separate Galltec Configuration Manual „USB Configuration Manual“ at https://www.galltec-mela.de/downloads/EN).** **We recommend the use of an USB isolator. We successfully tested: https://de.muc89.com/isar520 for that purpose. With this USB isolator please leave the jumpers in the delivery state for the USB full speed mode we use.**

Change of physical measuring values and analogue output scaling:

Based on the measured sizes of relative humidity and temperature you can select the below listed derived physical values.
All temperature values can be displayed in °F or °C.
The scaling of the physical values can be freely selected within the limits below.
The sensor is powered via USB for configuration - no power supply unit is required.

Physical values:		Scaling ranges
Relative humidity	[% RH]	0 %RH .... 100 %RH
Dew point temperature	[°C] / [°F]	-20 °C .... 70 °C -4 °F .... 158 °F
Mixing ratio	[g/kg]	0 g/kg .... 100 g/kg
Enthalpy	[kJ/kg]	0 kJ/kg .... 80 kJ/kg
Absolute humidity	[g/m³]	0 g/m³ .... 100 g/m³
Wet bulb temperature	[°C] / [°F]	-10 °C .... 50 °C 14 °F .... 122 °F
Temperature	[°C] / [°F]	-100 °C .... 200 °C -148 °F .... 392 °F

Air pressure and altitude:

For the following physical values, the air pressure is relevant to obtain a correct reading:

- Mixing ratio [g/kg]
- Enthalpy [kJ/kg]
- Wet bulb temperature [°C/°F]

If a physical value is selected, for which the air pressure is relevant, the input field automatically appears. The air pressure can be entered either directly or indirectly via the altitude (m above sea level).

Adjustment:

The transmitter can be matched to the measuring task by means of adjustment. To do this, supply the transmitter with power via the connection terminal and connect to the PC. This can also be done in situ using a portable computer.

There are two types of adjustment:

1. Offset adjustment: An offset in temperature and / or relative humidity can be entered. Actual values are adjusted by this offset.
2. Adjustment with reference: By entering reference measuring values, sensor readings are adjusted to the reference.

Warning: 	**see warning concerning galvanic isolation previous page**

Information:

The measuring accuracies specified in the technical data refer exclusively to factory adjustments.
The adjustment values in T & RH influence all physical values.

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.

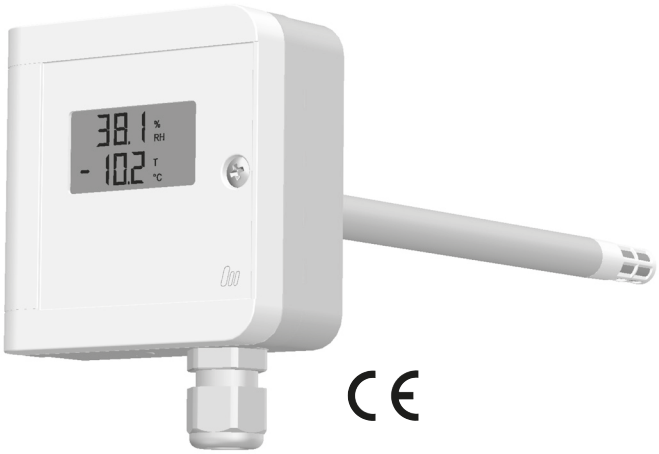
User instructions

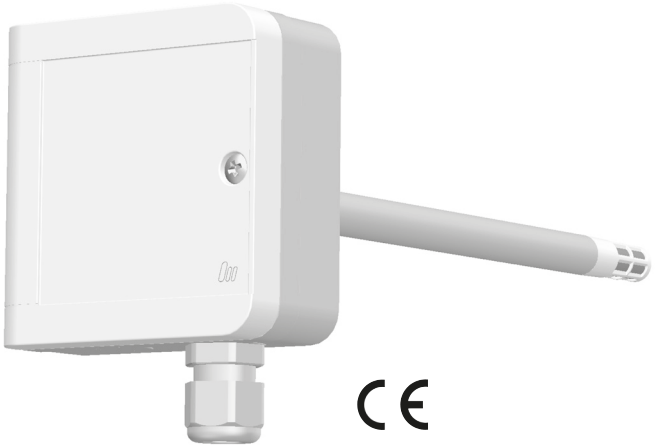
Dew formation	Dew formation and splashes do not damage the sensor, although measurement readings are corrupted until all moisture on and around the sensing element has dried up completely.
Cleaning of filters and protective baskets	If necessary, soiled filters can be screwed off and rinsed carefully. Bear in mind the sensors wil 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_e. Issue: January 2024. Subject to modifications.

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D Series
Sensors for
Humidity and Temperature Measurement
With calibrated dModul

Type DK
Industrial version, duct version
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**
- **optional USB interface**

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
		fully user configurable via optional USB interface
measuring uncertainty		
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
voltage supply	see type survey
consumption of electronics (voltage output)	typ. 7 mA
load resistance (voltage output)	≥10 kΩ
load R_L (current output)	$R_L(\Omega) = \frac{\text{voltage supply - 10 V}}{0{,}02\ \text{A}} \pm 50\ \Omega$

Directive about electromagnetic compatibility **2014/30/EU**
DIN EN 61326-1 issue 07/13
DIN EN 61326-2-3 issue 07/13

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 transformer part/housing (with display) (without display) at the sensor head	 -30...+80°C -40...+80°C -40...+80°C
storage temperatures	-40...+85°C
connection wire diameter per connector total diameter cable	connecting terminals max. 1.5 mm² 4-8 mm
degree of protection / measuring head protective cage w. membrane (basic equipment) PTFE sinterd filter (optional)	 IP 30 IP 65
degree of protection / housing	IP 65
material of housing	PC
Standard length of sensor tube Special lengths	220 mm 48 mm or 140 mm

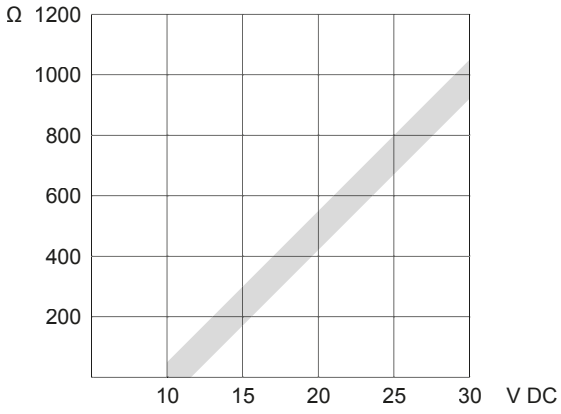
Options

display	2 lines 3 digits + 1 decimal place display approx. 21 x 40 mm² digit height approx. 8 mm

hx Values, selectable for two outputs

relative humidity	0...100 %RH
temperature	-30...+70°C 0...100°C 0...50°C fully user configurable via optional USB interface
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/m³ or 0...100 g/m³
wet-bulb temperature	-10...50°C

Load at current output



Type survey DKF

Humidity sensor

Type	Housing duct version	Physical value	Output signal corresponds to	Electrical outputs	Voltage supply U_B
DKF	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 ensure galvanic isolation from the power supply

Type survey DKK

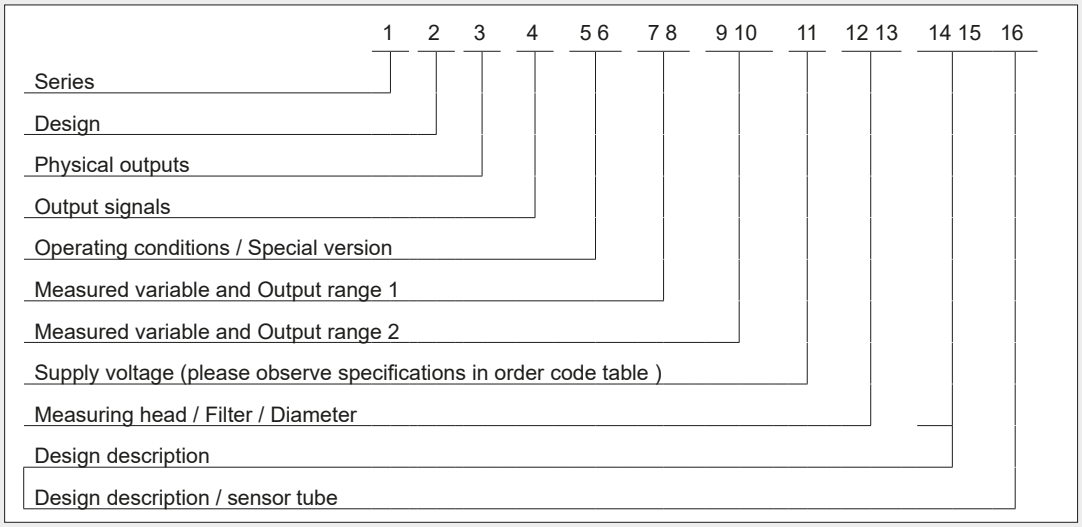
Humidity and temperature sensor

Type	Housing duct version	Physical value selectable for 2 outputs	Output signal corresponds to	Electrical outputs	Voltage supply U_B
DKK	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		
		absolute humidity	0…20 g/m³ 0…100 g/m³		
		wet-bulb temperature	-10…+50°C	4...20 mA	10…30 V DC ensure galvanic isolation from the power supply

www.galltec-mela.de

Product key
D Series

Thanks to the hx-converter the D Series offer a wide range of types.
The product no. of each type consists of a 16-digit alpha numeric code that descibes the sensor
The product key enables you to order the exact type of sensor for your application.



Order codes for the D Series product key

Digit	Technical Data	Options	Order code
1	Series	D Series	D
2	Design	Duct version	K
3	Physical outputs	Humidity sensor	F
		Sensor with 2 active output signals	K
4	Ouput signals	2x 0…1 V	1
		2x 0…10 V	2
		2x 4…20 mA	3
5 6	Working conditions / special version	Standard	00
7 8	Measured variable and ouput range 1	Relative humidity 0...100 % RH	F1
	and	Temperature -30...70°C	37
9 10	Measured variable and ouput range 2	Temperature 0...100°C	01
		Temperature 0...50°C	05
		No signal	00

Digit	Technical Data	Options	Order code
7 8 **9 10**	Measured value and output range 1 Measured value and ouput range 2 **hx-values (as shown on the right) only available for industrial versions DKK and DWK**	Dew point -20...70°C Td	D2
		Enthalpy 0...80 kJ/kg	H1
		Mixing ratio 0...100 g/ kg dry air	X3
		Absolute humidity 0...100 g/m³	A3
		Absolute humidity 0...20 g/m³	A1
		Wet bulb temperature -10...50°C	W1
		No signal	00
11	Supply voltage	6...30 V DC or 6...26 V AC / Sensors w. 0...1 V output signal	6
		15...30 V DC or 13...26 V AC / Sensors w. 0...10 V output signal	F
		10...30 V DC with galvanic isolation from the power supply / sensors w. 4...20mA output signal	A
12 13	Measuring head / Filter / Diameter	ZE08: protective cage, plastic, w. membrane, Ø 12 mm	08
		ZE05: sintered PTFE filter, IP65, Ø 12 mm	05
14	Design description / options	Standard	0
		USB-interface	U [1]
15 16		Duct version without display 220 mm sensor tube	0G
		Duct version with display 220 mm sensor tube	DG

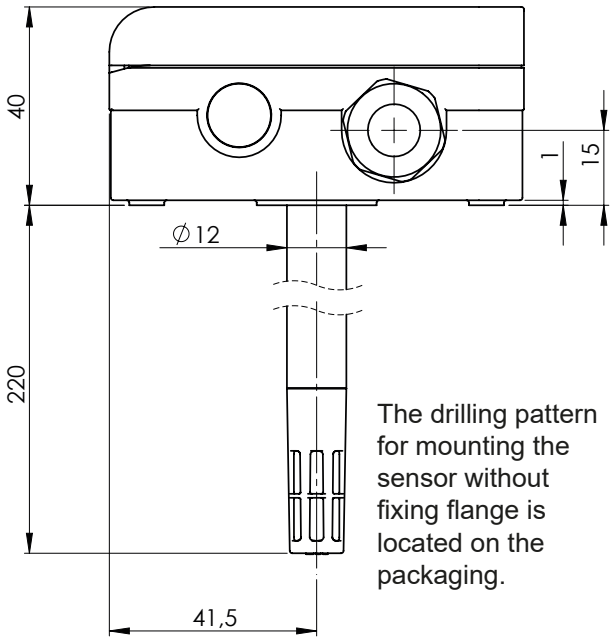
[1] Priority devices available with USB interface:

Product no.	Output signal	Output range 1	Output range 2	Filter options
DKK 2 00 F1 37 F 08 U 0G	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	Membrane filter without display
DKK 2 00 F1 37 F 08 U DG	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	Membrane filter with display
DKK 2 00 F1 37 F 05 U 0G	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	PTFE filter without display
DKK 2 00 F1 37 F 05 U DG	2x 0 … 10 V	0 … 100 % rh	-30° ... +70°C	PTFE filter with display
DKK 3 00 F1 37 A 08 U 0G	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	Membrane filter without display
DKK 3 00 F1 37 A 08 U DG	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	Membrane filter with display
DKK 3 00 F1 37 A 05 U 0G	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	PTFE filter without display
DKK 3 00 F1 37 A 05 U DG	2x 4 … 20 mA	0 … 100 % rh	-30° ... +70°C	PTFE filter with display

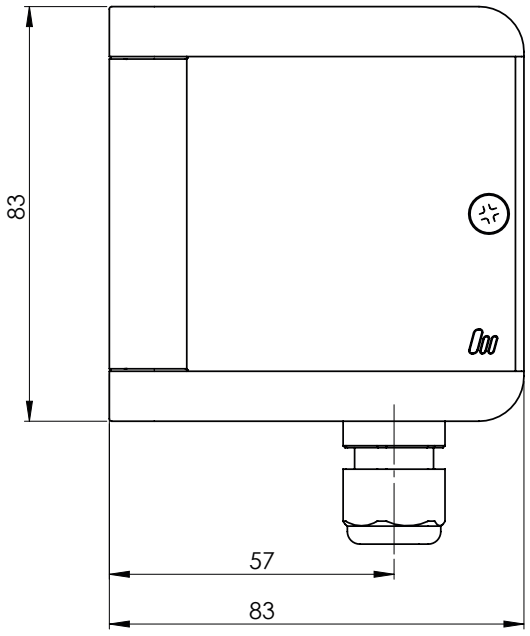
Accessories

Product n°	Description
ZE05	sintered filter made of fine-pored PTFE, IP 65, Ø 12 mm
20.045	fixing flange, synthetic material, with fixing mechanism for easy sensor mounting and removal for sensors Ø 12 mm, with rubber sealing (enclosed in delivery)
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 sensor tubes Ø 12 mm

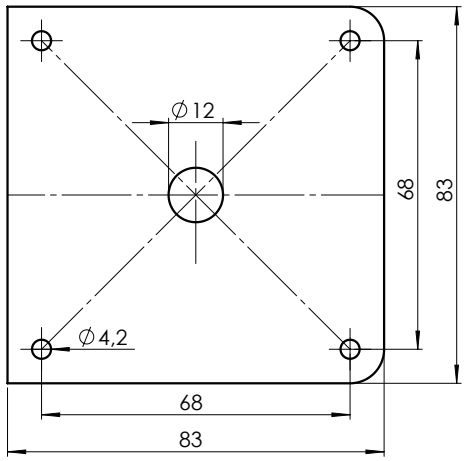
Dimensions



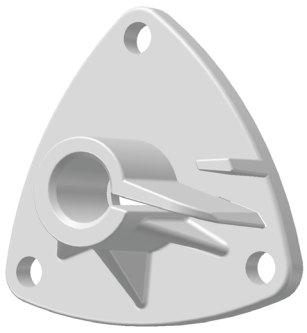
The drilling pattern for mounting the sensor without fixing flange is located on the packaging.



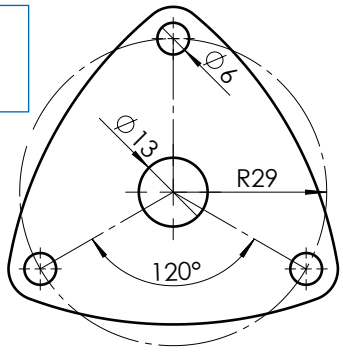
Drilling pattern



Fixing flange

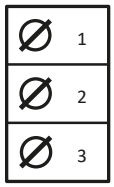


drilling pattern of fixing flange



Connection diagrams

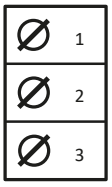
DKF 4...20 mA



2 output humidity 4...20 mA

3 + UB 10...30 V DC

DKK 2 x 4...20 mA

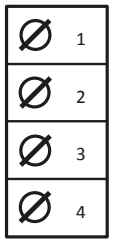


1 output temperature 4...20mA

2 output humidity 4...20 mA

3 + UB 10...30 V DC

DKF 0...1 V DC

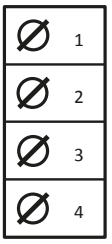


1 GND

2 + U_B 6...30 V DC or 6...26 V AC

3 output humidity 0...1 V

DKK 2 x 0...1 V DC



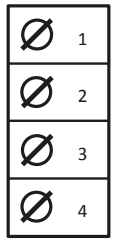
1 GND

2 + U_B 6...30 V DC or 6...26 V AC

3 output humidity 0...1 V

4 output temperature 0...1 V

DKF 0...10 V DC

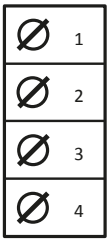


1 GND

2 + U_B 15...30 V DC or 13...26 V AC

3 output humidity 0...10 V

DKK 2 x 0...10 V DC



1 GND

2 + U_B 15...30 V DC or 13...26 V AC

3 output humidity 0...10 V

4 output temperature 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 (Instruction for transmitters without USB interface)

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.

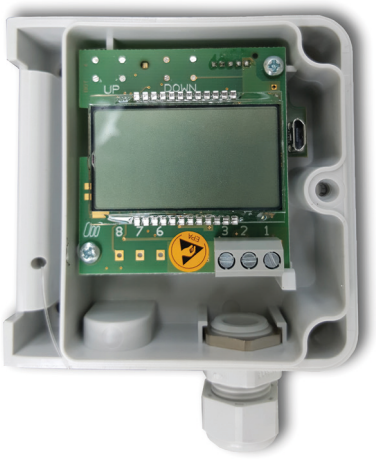
During calibration, especially during storage of data, uninterrupted power supply of the sensor must be provided.

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	selection of adjustment 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 humdity 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 humdity 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 DOWN 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.


UP
DOWN
8 7 6
3 2 1

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.
Fixing flange	The hole pattern of the fixing flange (included in the delivery) is located on the packaging of the sensor. In order to fix the sensor in the flange simply press the clip open (by hand or using tongs). The sensor can be fixed in the flange at any position.
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 dk_en. Issue: April 2020. Subject to modifications.