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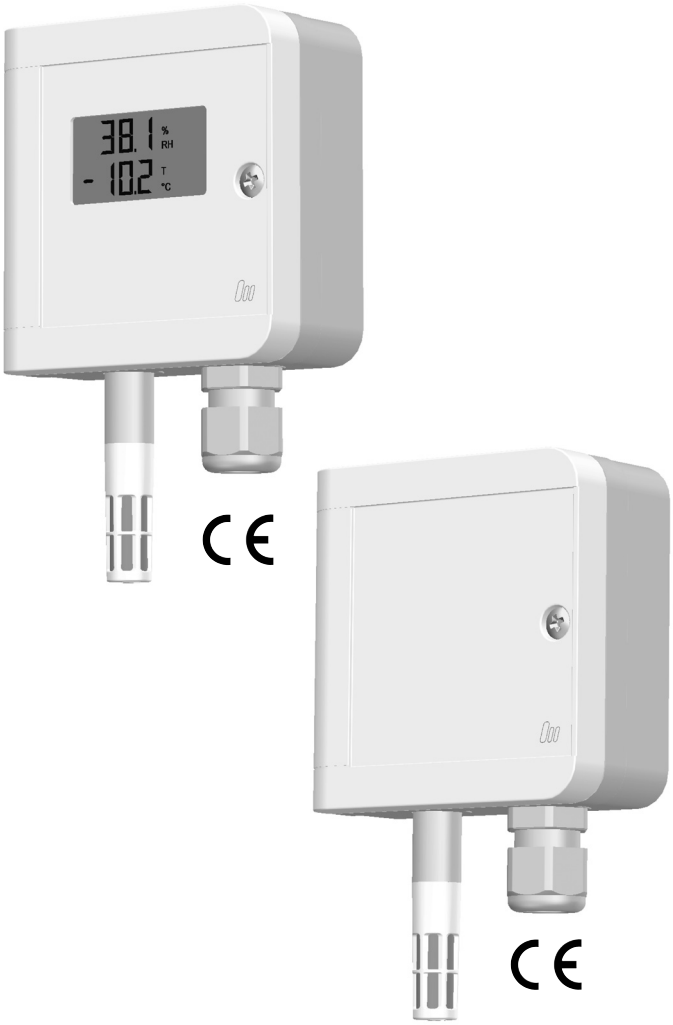


D Series
Sensors for
Humidity and Temperature Measurement
With calibrated dModul

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**

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)	$R_L(\Omega) = \frac{\text{voltage supply - 10 V}}{0{,}02\ \text{A}} \pm 50\ \Omega$
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 (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

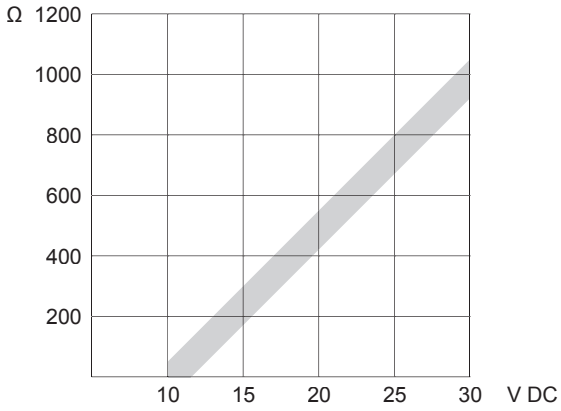
Options

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

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/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

Type survey DWK

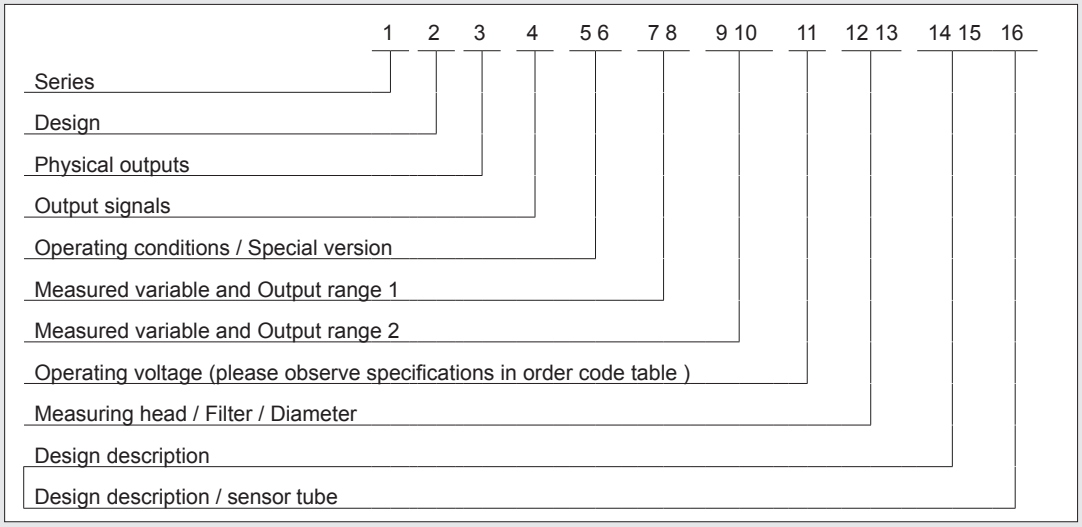
Humidity and temperature sensor

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/m³ 0…100 g/m³		
		wet-bulb temperature	-10…+50°C		

Passive temperature output available on request.

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.

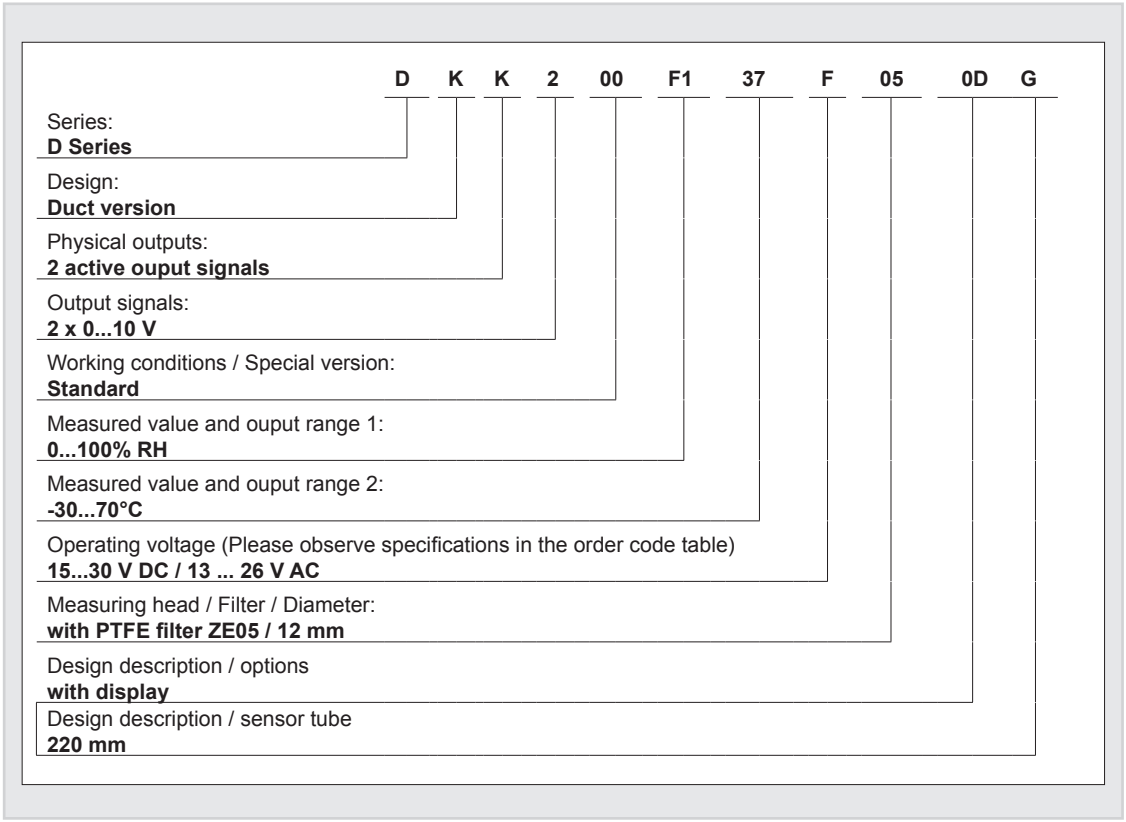


Order codes for the D Series product key

Digit	Technical Data	Options			Order code
1	Series	D Series			D
2	Design	Duct version			K
		Wall mounting version			W
		Room version			I
3	Physical outputs	Humidity sensor			F
		Sensor with 2 active output signals			K
		Sensor with 1 active and 1 passive ouput signal			C
		Temperature sensor			T
4	Ouput signals	2x 0…1 V	or	1 x 0...1 V and 1 x passive	1
		2x 0…10 V	or	1 x 0...10 V and 1 x passive	2
		2x 4…20 mA	or	1 x 4...20 mA and 1 x passive	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
	A survey of passive output signals for temperature is available at the manufacturer. Complete order number on demand.	No signal			00

Digit	Technical Data	Options		Order code
7 8 **9 10** Measured value and ouput range 2 **hx-values (as shown on the right) only available for industrial versions DKK and DWK**	Measured value and output range 1	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...30 V DC for DK and DW w. 4...20 mA output signal 10...25 V DC for DI w. 4...20 mA 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 15 and **16**	Design description / options Sensor tube	Duct version without display	220 mm sensor tube	00 G
		Duct version with display	220 mm sensor tube	0D G
		Version for wall mounting without display	50 mm sensor tube	00 1
		Version for wall mounting with display	50 mm sensor tube	0D 1
		Room version without display	-	00 0
		Room version with display	-	0D 0

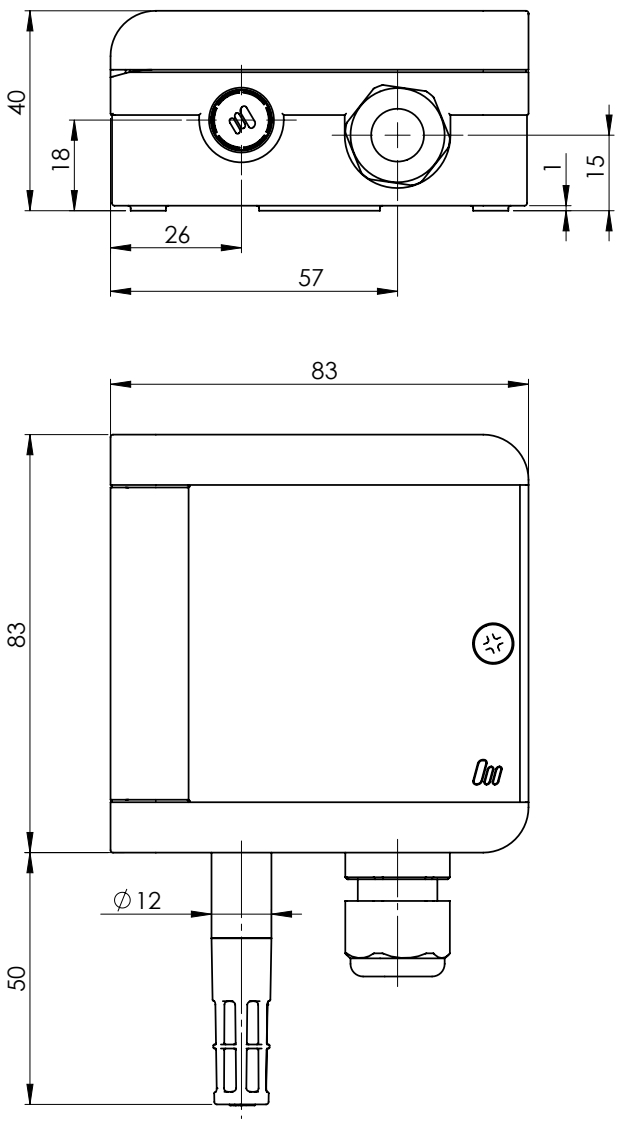
Order example



Accessories

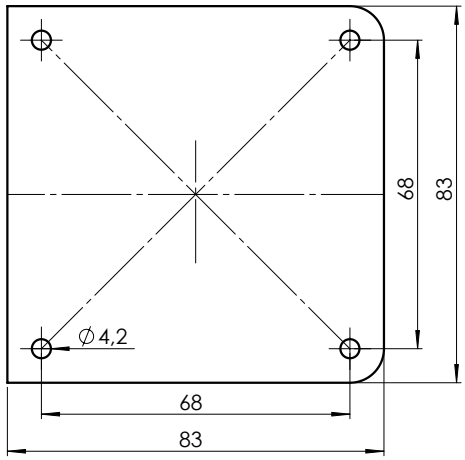
Product n°	Description
ZE05	sintered filter made of fine-pored PTFE, IP 65
ZE 31/1-12 ZE 31/1-75	humidity standard to check the accuracy of the sensor at 12 %RH humidity standard to check the accuracy of the sensor at 75 %RH
ZE 31/1-33 ZE 31/1-84	humidity standard to check the accuracy of the sensor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



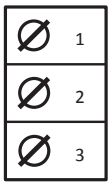
The drilling pattern for mounting the sensor is located on the packaging.

Drilling pattern



Connection diagrams

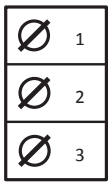
DWF 4...20 mA



output humidity 4...20 mA

+ U_B 10...30 V DC

DWK 2 x 4...20 mA

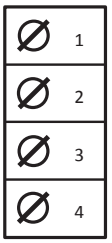


output temperature 4...20mA

output humidity 4...20 mA

+ UB 10...30 V DC

DWF 0...1 V DC

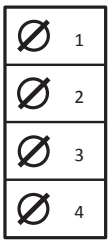


GND

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

output humidity 0...1 V

DWK 2 x 0...1 V DC



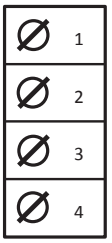
GND

+ 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

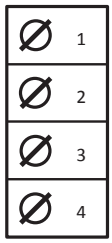


GND

+ 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 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 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 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 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.