

A and B Series

Sensors for Humidity and Temperature

for industrial applications from -80...200°C and up to 25 bar

Description of the Sensor

The sensors of the A and B series with **integrated hx processor** measure humidity by means of a humidity-dependant condenser. The capacitive Mela® humidity measuring element, produced using thinfilm technology, consists of a base plate, on which the electrodes are housed and a hygroscopic polymer layer above it. The hygroscopic polymer layer absorbs water molecules from the medium to be measured (air) or releases them, thereby altering the capacity of the condenser.

The transmitters with the hx processor use the values of the relative humidity and the temperature to calculate the dew point temperature, the enthalpy, the mixing ratio, the absolute humidity or the wet-bulb temperature, in accordance with the laws of physics²⁾. The values are emitted at two analogue outputs with the standardised signals 0...1VDC or 0...10VDC or 4...20mA. The outputs can be configured differently and are defined using the software. Further measuring ranges on request.

The sensor parts and transmitters of the B series are firmly connected. In addition, the installation of a passive temperature element is possible (e.g. Pt100). All further technical features correspond to the ones of the A series.

The scope of delivery includes the sintered high-grade steel filter ZE13. If a better dynamics should be required, we recommend to use the filter type ZE04 together with a PTFE filter which protects the humidity sensing element directly. We recommend to do so in particular at low air speeds and also its increased service life, even under more challenging operating conditions (pollutant impact or permanent humidity > 95 %rh). The use of different filters is not possible. The sensors are designed for unpressurised systems (except the ...HD... version), the measurement medium is non-aggressive air.

Please consult „**application instructions for the sensing elements**“ (product info sheet no. A 1) or check with the manufacturer for further information which you need to bear in mind when using humidity sensors with capacitive sensing elements.

²⁾ The accuracy of the calculated values depends on both the operating point in accordance with the hx diagram and on the primary values measured.

Galltec+Mela® sensors in the A series combine the digital measured value processing with the advantages of our robust industrial sensors which can be used at temperatures up to -80...200°C resp. at pressures up to 25 bar and are ideally suited for demanding industrial applications.

The A series with exchangeable sensor part consist of a calibrated sensor part with 4-pin plug and a transmitter with analog output. Sensor part and transmitter can be combined and matched with each other, according to the physical and mechanical requirements.

The measured humidity and temperature values are calculated in the calibrated sensor part with the calibration values stored there, and are passed on as digital measurement values. The sensor parts are either firmly connected to the transmitter or are exchangeable via plug-in connection and can be readjusted on site using buttons and LED. They can also be factory-calibrated and readjusted using software.

Technical Data for Humidity and Temperature

Humidity

measuring range	0...100%rh
measuring accuracy ¹⁾ 10...90%rh at 23°C	±1.5%rh
at <10%rh or >90%rh	±2%rh
influence of temperature (TK)	±0.02%rh/K
hysteresis	< 1%rh
response time t ₆₃ at v=2m/s	< 10 s

¹⁾ ex works. Depending on the specific range of application a regular recalibration of the sensor parts has to be effected. Higher accuracies on request.

Temperature

measuring element	Pt1000 cl.B
output range	see table page 3
measuring accuracy at 23°C ¹⁾	±0,15K
influence of temperature (TK)	<0.005 K/K

¹⁾ depending on the extension of the output range, max. 0.25 K

Options

Digital display

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

Order designations for fixed sensor parts of B series

Series	B Series	B
Design	duct version	K
	wall mounting	W
	two-piece design	Z
Physical output	two active outputs	K
	one active output, temperature passive	C
	relative humidity active	F
	temperature active	T
Output signal	0...1 V	1
	0...10 V	2
	4...20 mA	3
Special version	operating temperature -40 up to 85°C (standard)	00
	ammonia resistant -40...85°C	11
	operating temperature up to -50...150°C (duct version)	0E
	ammonia resistant -50...150°C (duct version)	1E
	operating temperature up to -80...200°C (two-piece design)	0H
	design thermally decoupled -80...200°C	TH
Output range 1	see table on page 3	
Output range 2	see table on page 3	
Voltage supply	6...30 VDC / 6...26 VAC	6
	15...30 VDC / 13...26 VAC	F
	10...30 VDC	A
Filters for K- and Z-design (filter programme see product info F5.1)	sintered metal filter of stainless steel ZE13 (standard), IP65	13
	stainless steel filter with PTFE membrane ZE26, IP65	26
	open filter of high-grade steel ZE04 and PTFE protection, IP00	94
	stainless steel filter with mounted PTFE filter ZE28	28
Filters for W-design (filter programme see product info F5.1)	protective plastic basket, open, conductive metallized finish	16
	ZE16 with PTFE protection	9G
	ZE16 with inserted filter gauze made of stainless steel (ZE17)	17
	membrane filter ZE20	20
	fine-pored sintered filter of stainless steel	21
Type of connection and characteristics of design	with display	yDx
	length of cable, sensor part ->transmitter 1.5m	1Kx
	special length of cable in m rounded up ²⁾	yyx
	other specialities (special type)	YYY

¹⁾ Operating temperature range = output range of temperature

²⁾ Maximum length is 5m

x Tube length depends on sensor type and special design

General Data

measuring medium	air, non-aggressive	
operating voltage	0...1 V	6...30 VDC / 6...26 VAC
	0...10V	15...30 VDC / 13...26 VAC
	4...20 mA	10...30 VDC
power consumption	< 7 mA	

load R_L (current output) R_L(Ω)= $\frac{\text{supply voltage} - 10 \text{ V}}{0,02 \text{ A}}$ ± 50Ω

load resistance (voltage output) 0...10(1) V ≥ 10 (2) kOhm
admissible ambient temp. on the transmitter -40...85°C
use of duct sensor up to 150°C

(TH up to 200°C) -40...50°C

degree of protectiontransmitter IP65

measuring head (sensor part) (see table)

plug-in connection sensor part ----> transmitter IP67

material of housing
sensor part stainless steel
transmitter pressure die casting of alu

Directive about electromagnetic compatibility **2004/108/EG**

DIN EN 61326-1 issue 10/06

DIN EN 61326-2-3 issue 05/07

Order designations for transmitters of A Series

Series	Transmitter	A
Design	duct version	K
	wall mounting	W
Physical output	two active outputs	K
	relative humidity	F
	temperature active	T
	temperature passive	C
Output signal	0...1 V	1
	0...10 V	2
	4...20 mA	3
Special version	none	00
Output range 1	see table on page 3	
Output range 2	see table on page 3	
Voltage supply	6...30 VDC /6...26 VAC	6
	15...30 VDC / 13...26 VAC	F
	10...30 VDC	A
Filter	none	00
Characteristics of design	with display	0D0
	specialities of design	Yxx

Order designations for exchangeable sensor parts of A Series

Series	S Series	S
Design	stainless steel Ø 15 mm	V
	stainless steel Ø 15 mm, two-piece	Z
Physical output	relative humidity active + temperature active	K
Output signal	digital ASCII Galltec-Mela protocol	A
Special version	operating temperature range -40 up to 85°C (standard) ¹⁾	00
	operating temp. range -50 up to 150°C (duct version) ¹⁾	0E
	operating temperature range -80 up to 200°C (two-piece) ¹⁾	0H
	operating temperature range -60 up to 160°C ¹⁾ and admissible ambient pressure up to 25 bar	HD
Output range H	0...100 % r.H.	F1
Output range T		¹⁾
Voltage supply	3.0 VDC	3
Filter	open filter of stainless steel ZE04 and PTFE protection, IP00	94
	sintered metal filter of stainless steel ZE13 (standard), IP65	13
	stainless steel filter with PTFE membrane ZE26, IP65	26
	cable length of two-piece design 1.5 m (standard)	1Kx
Type of connection and characteristics of design	special cable length of two-piece design ²⁾	yyx
	specialities of design	YYY

Output ranges of B Series with fixed sensor part resp. A Series transmitter (to be specified)

The following physical output parameters are calculated from the humidity and temperature values measured. The tolerances to be expected therefore result from the tolerance limits of the measured values.

humidity	0...100 % r.h.	F1
temperature	-60...160 °C	66
	-80...200 °C	82
	-50...150 °C	59
	-40...85 °C	48
	P100 1/3 DIN cl.B for the B series	C2
	P100 1/3 DIN cl.B in the case of sensor parts SV(Z)KA... for the A series	
dew point	-20...70 °C	D2
enthalpy	0...80 KJ/Kg	H1
Mixing ratio	0...100 g/kg dry air	X3
absolute humidity	0...20 g/m³	A1
wet-bulb temperature	-10...50 °C	W1
no output	output not connected	00

Your configuration

Output 1		
Output 2		

Accessories

Designation	Product no.	Data sheet	Description
ZA 24	as designation	F5.1	Attachment plate for mounting sensors in ducts or wall bushings, for sensor tubes 15 mm
ZA 161/1 with adapter sleeve 00.502	as designation	F5.1	Weather protection <i>recommended for outside use to protect from rainfall and sunlight</i> with adapter sleeve 00.502 also suitable for rod sensors 15 mm
ZE 31/1-12 ZE 31/1-33 ZE 31/1-75 ZE 31/1-84 ZE 31/1-97	as designation	F5.2	Standard humidity to check the accuracy of the sensors at 12 %rh and 25°C Standard humidity to check the accuracy of the sensors at 33 %rh and 25°C Standard humidity to check the accuracy of the sensors at 75 %rh and 25°C Standard humidity to check the accuracy of the sensors at 84 %rh and 25°C Standard humidity to check the accuracy of the sensors at 97 %rh and 25°C
ZE33	as designation	F5.2	Adapter for humidity standard ZE 31/1

User instructions

Installation

The sensors are to be attached in a position representative for the climate measurement.

The position the sensor is mounted in (horizontal, vertical) does not matter. However, it should be mounted in such a way that no water can get into it.

Please note the maximum permissible ambient temperature for the sensor and transmitter when installing it. The transmitters always have to be installed in such a way that the connection plugs are not exposed to a higher temperature either (>85°C).

The duct sensor SVKA.0E... is mounted with an insulation length of at least 134 mm for use at 150°C (refer to dimension drawing).

The tightening torque when installing the pressure-resistant sensors (type SZKA.HD...) may not exceed 25 Nm.

In order to maintain interference immunity in accordance with EN 61326 when it is in use, we recommend to use a screened cable (e.g. **type 8x AWG26 C UL order no. 5339**) for connecting the sensors, and have this fitted into the sensor's EMC heavy-gauge conduit thread by a qualified electrician.

In a clean environment, the sensor is maintenance-free.

The protective filters should only be screwed off carefully to check functioning with the humidity standard. It is important not to touch the highly sensitive sensor element in the process. If necessary, soiled filters can be screwed off and rinsed. When you

screw them back on, bear in mind that sensors will not measure accurately again until they are completely dry. Sensors with integrated PTFE filter be completely and carefully cleaned with distilled water. It is not possible to exchange the PTFE filter on the humidity sensor element. Dust does not cause any harm to the humidity sensor, however, if there is an increased build-up of dust this does affect dynamic performance.

Dew formation and splashes do not damage the sensor, although corrupted measurement readings are recorded until all the moisture on and directly around the sensor element has dried up.

Damaging Influences

Agents that are corrosive and contain solvents, depending upon the type and concentration of the agent, can result in faulty measurements and cause the measuring element to break down. Substances deposited on the sensor are damaging as they form a water-repellent film (this applies to all humidity sensors with hygroscopic measuring elements); e.g. resin aerosols, lacquer aerosols, smoke deposits etc.

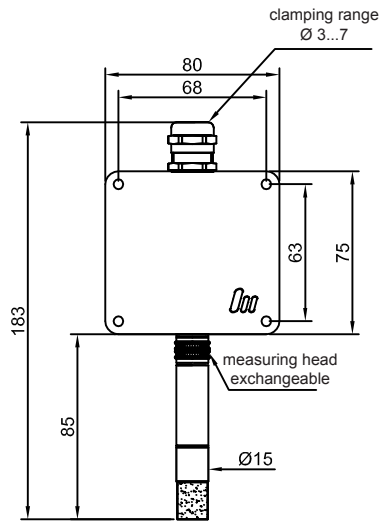
In order to check functioning in the place of installation, we recommend that you use our *ZE31/1-type humidity standard... (accessories)*.

To ensure the given accuracy of the sensors, we recommend a calibration cycle of 6-12 months.

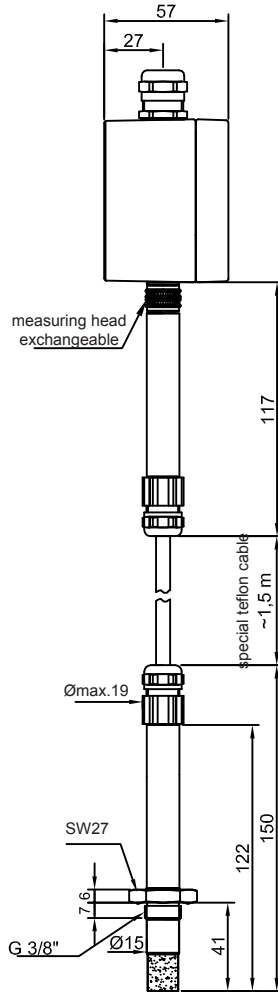
Additional information

Please consult „**application instructions for the sensing elements**“ (product info sheet no. A 1 and B1.1), which you can get from www.galltec-mela.de, for further information which you need to bear in mind when using humidity sensors with capacitive sensing elements.

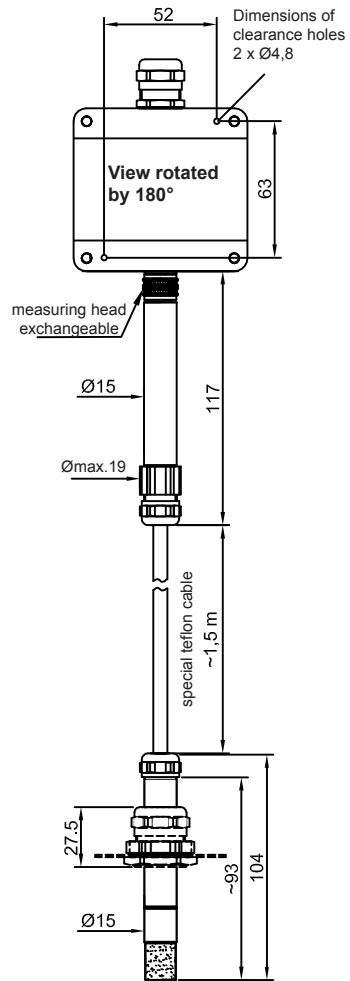
Dimensions A Series



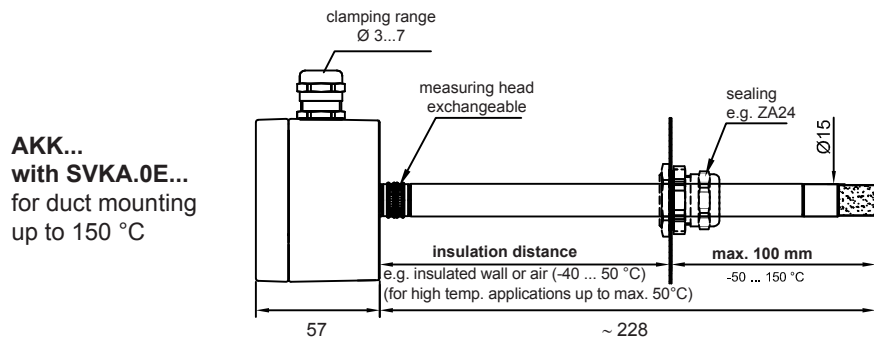
AWK...
with **SVKA.00...**
for wall mounting
-40...85 °C



AWK...
with **SZKA.HD...**
sensor part up to
160 °C and 25 bar

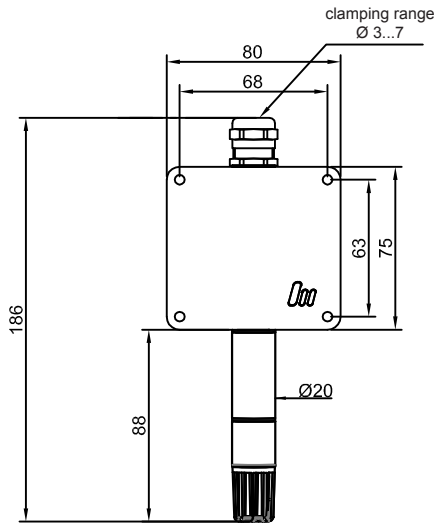


AWK...
with **SZKA.0H...**
sensor part up to
200 °C

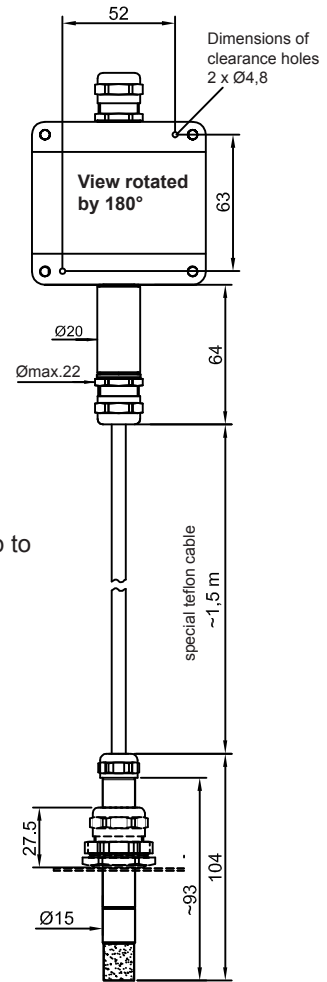


AKK...
with **SVKA.0E...**
for duct mounting
up to 150 °C

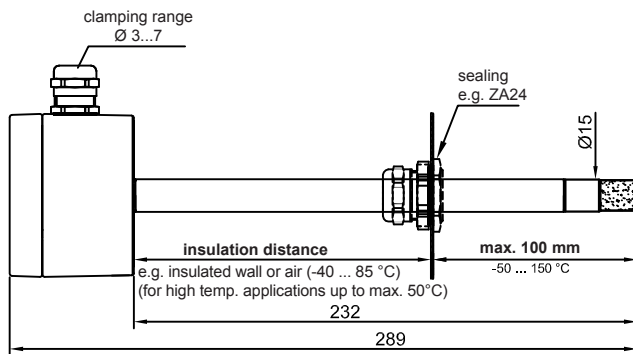
Dimensions B Series



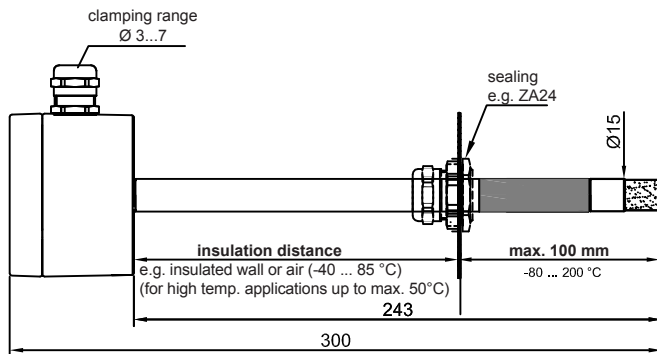
BWxx.00...
for wall mounting
-40...85 °C



BZxx.0H...
sensor part up to
200 °C



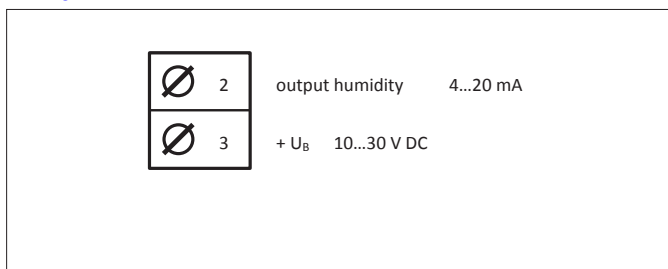
BKxx.0E...
for duct mounting
up to 150 °C



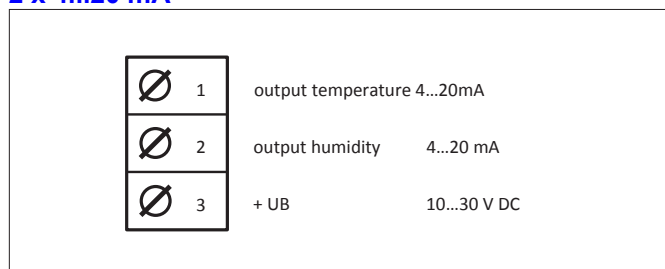
BKxx.TH...
for duct mounting
up to 200 °C

Connection diagrams

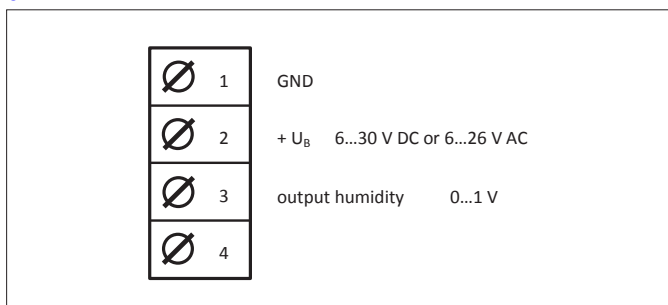
4...20 mA



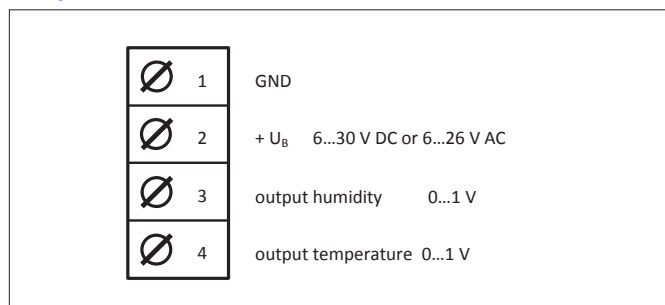
2 x 4...20 mA



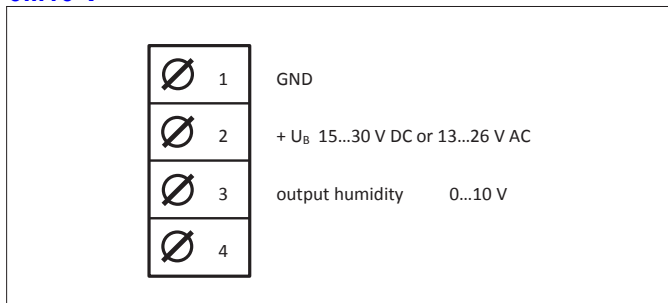
0...1 V



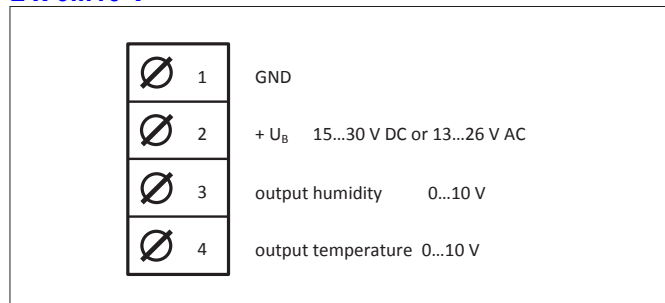
2 x 0...1 V



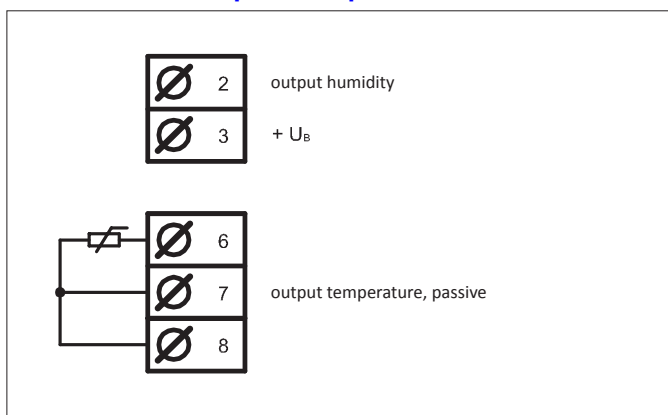
0...10 V



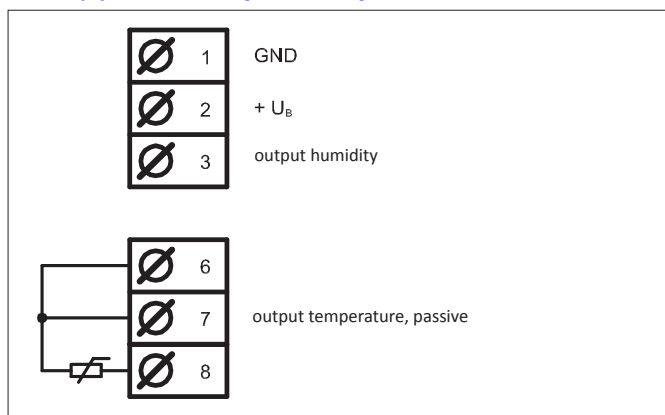
2 x 0...10 V



4...20 mA and temperature passive



0...10(1) V and temperature passive



User instructions for in situ alignment via internal keypad and LED

Humidity adjustment	1-point-adjustment (Offset)	Selection of calibration mode press button DOWN for at least 3 sec. LED lights up 1 time 1-Point-adjustment humidity mode is reached Confirmation: press button DOWN for at least 3 sec. LED lights up permanently For modifying of adjustment value press buttons UP / DOWN: + / - 0.1 %rh Confirmation: press button DOWN for at least 3 sec. The adjustment value is saved. Termination of adjustment mode at any time: press button UP for at least 3 sec.
Humidity adjustment	2-point-adjustment (lower point, 33 %rh) see accessories ZE 31/1-33	Selection of calibration mode press button DOWN for at least 3 sec. LED lights up 1 time press button DOWN 1 time shortly LED lights up 2 times 2-point-adjustment 33% humidity mode is reached Confirmation: press button DOWN for at least 3 sec. LED lights up permanently For modifying of adjustment value press buttons UP / DOWN: + / - 0.1 %rh Confirmation: press button DOWN for at least 3 sec. The adjustment value is saved. Termination of adjustment mode at any time: press button UP for at least 3 sec.
Humidity adjustment	2-point-adjustment (upper point, 75 %rh) see accessories ZE 31/1-75	Selection of calibration mode press button DOWN for at least 3 sec. LED lights up 1 time press button DOWN 2 times shortly LED lights up 3 times 2-point-adjustment 75% humidity mode is reached Confirmation: press button DOWN for at least 3 sec. LED lights up permanently For modifying of adjustment value press buttons UP / DOWN: + / - 0.1 %rh Confirmation: press button DOWN for at least 3 sec. The adjustment value is saved. Termination of adjustment mode at any time: press button UP for at least 3 sec.

Temperature adjustment

1-point-adjustment

A very good thermal coupling between the reference device and the measuring head are the precondition when doing temperature compensation.

Selection of calibration mode

press button **DOWN** for at least 3 sec.

LED lights up 1 time

press button **DOWN** 3 times shortly

LED lights up 4 times

Temperature 1-point-adjustment mode is reached

Confirmation: press button **DOWN** for at least 3 sec.

LED lights up permanently

For modifying of adjustment value press buttons **UP / DOWN: + / - 0.1°C**

Confirmation: press button **DOWN** for at least 3 sec.

The adjustment value is saved.

Termination of adjustment mode at any time: press button **UP** for at least 3 sec.

Restore factory settings

press buttons **UP** and **DOWN** simultaneously for more than **10 sec.**

All user adjustments will be reset.

Mounting instructions

Position

The sensor has to be installed vertically with the measuring head downwards or horizontally. Do avoid positions where water ingress can occur.

We recommend that you lay the connection lines in a loop so that any water that may be present can run off.

Install the sensor at a place where characteristic levels of humidity occur. The sensor tube resp. measuring head should be exposed to the flow of air. Avoid installation next to heaters, doors or on outer walls. Avoid places exposed to the sun.

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).

Pay attention to the load according to the operating voltage when using sensors with a current output.

Lines to and from the sensor must not be installed parallel to strong electromagnetic fields.

If there is any chance of an electrical surge, please install surge protection devices.

User instructions (see also page 3)

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 and protective baskets 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 sensing element.
Cleaning of capacitive 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 in the process.
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 A- und B-Serie_EN. Issue: October 2013. Subject to modifications.
