Transmitter for Humidity and Temperature Measurement
with exchangeable probe

KOBOLD

AFB

A2

- Probe up to +125 °C
- Up to 25 m cable length for remote probe
- Calibrated probe, cabled and exchangeable
- Easy to install
- Output of derived hx values
- In situ alignment
- With USB interface
- Display (optional)

KOBOLD companies worldwide:

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Description

The model AFB can be designed for customer-specific measurement tasks and optimally configured via USB. The probe and transmitter can be used in any combination. This makes them suitable for many installation situations and applications.

Some models in the new series are temperature-resistant up to 125 °C. All models can be supplied with an IP 65 protection category. With this series, a further step towards universal applicability has been made. Thanks to their modular design, the new humidity-temperature transmitters model AFB can be assembled from various transmitter modules and probes at the customer's request. They are therefore suitable for many installation situations and uses.

Possible applications

- Chemical industry
- Clean rooms
- Cooling & Air conditioning
- Cooling & air conditioning in trains
- Drying of tea, corn, meat
- Green house technology
- HVAC
- Maturing of food
- Museums
- Offices & public buildings
- Paint-spray lines
- Paper & Print
- Pharmaceutical industry
- Ship containers
- Storage & transport of fruits, vegetables, meat
- Swimming pools & spa
- Warehousing
- Wine cabinets

Technical Data

Humidity

Measuring range:	0 ... 100 % rh
Measuring uncertainty:	
10 ... 90 % rh at 25 °C max.:	≤ ± 2 % rh
0 ... 10 % rh and 90 ... 100 % rh at 25 °C additional:	≤ ± 0,2 % rh / % rh
Long term stability:	≤ 0,5 % rh / a
Hysteresis:	≤ 1 % rh
Typ. temperature influence at 25 °C:	± 0,02 % rh / K

Temperature

Output ranges

Sensor version	Display	Cable	Configured output range 2 (temperature)
Probe pluggable	yes	no	-30…+80°C
Probe pluggable	no	no	-40…+80°C
Probe pluggable	yes or no	yes	-40…+80°C
Cable probe, pluggable (standard)	yes or no	yes	-40…+80°C
Cable probe, pluggable (high temperature)	yes or no	yes	-40…+125°C

Measuring uncertainty at + 5 ...60 °C:		typ. ± 0.2 K
		max ± 0.35 K
With air speed across sensor with filter:		Vmin (Vmax) in m/sec
AFZ-GE08		≥0.5 (≤ 10)
AFZ-GE05		≥1.5 (≤ 20)
Influence of temperature ref. to +5°C or +60°C:		
- 40 ... 5 °C		≤12mK/K
+ 60...100 °C		≤14mK/K
+100...125 °C additional		≤20mK/K

Electrical Data

Electrical outputs	Voltage supply U_B
2x 0 ... 10 V	15 ... 30 V_{DC} / 13 ... 26 V_{AC}
2x 4 ... 20 mA	10 ... 30 V_{DC} ensure galvanic isolation from the power supply

Consumption of electronics (voltage output):	typ. 7 mA
Load resistance (voltage output):	≥ 10 kΩ
Load R_L (current output):	

$$R_L(\Omega) = \frac{\text{voltage supply} - 10\,V}{0.02\,A} \pm 50\,\Omega$$

Directive about electromagnetic compatibility

	2014/30/EU
DIN EN 61326-1	issue 07/13
DIN EN 61326-2-3	issue 07/13

2 analogue signal outputs (freely configurable via optional USB interface)

Relative humidity:	0...100 %rh
Temperature:	0...+50 °C
	-30...+70 °C
	0...+100 °C
option high temperature:	-40...+125 °C
	others on request
Dew point temperature:	-20... + 70 °C

Enthalpy:	0... 80 kJ/kg
Mixing ratio:	0...100 g/kg dry air
Absolute humidity:	0...20 g/m³ or
	0...100 g/m³
Wet-bulb temperature:	-10...+50 °C

General Data

Measuring medium:	air, pressureless, non-aggressive
Max. air speed:	10 m/s
Protective cage with membrane:	(basic equipment)
Operating temperatures:	
wall mounted device (with display)	-30...+80 °C
wall mounted device (without display)	-40...+80 °C
probe (standard)	-40...+85 °C
probe and cable firmly connected	-40...+80 °C
probe high temperature	-40...+125 °C
Storage temperatures:	- 40 ... + 80 °C

Connection	
connecting terminals:	
wire diameter per connector	max. 1.5 mm²
total diameter cable	4-8 mm
Degree of protection / probe	
with membrane filter ZE08 (basic equipment) IP30	
PTFE sintered filter up to 125°C (optional):	IP65
Degree of protection / housing:	IP 65
Protection class:	III
Material of housing:	PC
Material of probe:	PC
Cable length of remote probe:	2 / 5 / 10 / max. 25 m
Digital display:	2 lines
	3 digits + 1 decimal place
Display:	approx. 21 x 40 mm²
Digit height:	approx. 8 mm

Transmitter	Probe pluggable	Cable probe pluggable	Accessories
For wall mounting with integrated connector	With socket	With cable socket	Connecting cable pluggable on both sides
IP65 80°C 	85°C 85°C Standard protective cage, IP30 with membrane filter (ZE08) IP65 Option PTFE sintered filter, IP65	85°C 125°C 125°C (Image: high temperature version with IP65) 85°C Protective cage, IP30 with membrane filter (ZE08) 125°C IP65 With high temperature version PTFE sintered filter IP65	85°C 80°C IP65 when plugged
With display -30...+80°C Without display -40...+80°C IP65 (when plugged)	4 probe lengths: S, M, L, XL -40...+85°C IP30 with standard protective cage IP65 with PTFE sintered filter (when plugged)	3 probe lengths: S, M, L -40...+125°C (probe + cable) IP30 with standard protective cage IP65 with PTFE sintered filter (when plugged) Cable length 2 m / 5 m / 10 m / 25 m (pluggable in the housing)	Cable socket/ plug Cable length 2 / 5 / 10 / 25 m -40...+80°C

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3

Remote probes

Probe pluggable

(not possible for cable probe high temperature +125°C)

Probe lengths:
S = 78
M = 150
L = 220
XL = 266

for IP65 (PTFE sintered filter)
add another +4 mm

∅12   33

Membrane filter, IP30
-40...+85 °C

-40...+85 °C   85 °C

41

37

PTFE sintered filter, IP65

IP65

S

M

L

XL
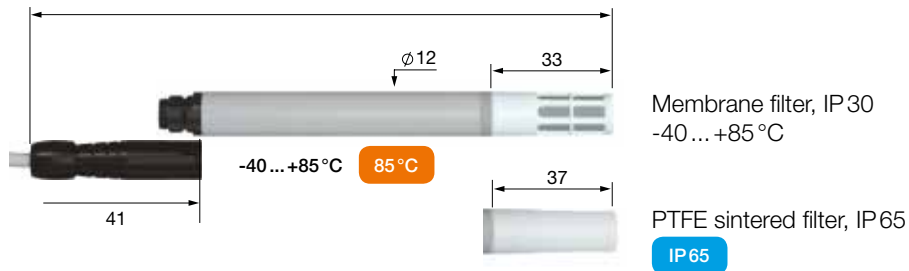
Probe firmly connected with cable (Cable probe pluggable)

Probe lengths:
S = 78
M = 150
L = 220

for IP65 (PTFE sintered filter)
add another +4 mm

∅12   33

Membrane filter
-40...+85 °C, IP30

85 °C

125 °C

37

PTFE sintered filter
-40...+125 °C, IP65

IP65   125 °C

S = 78 mm + 4 mm (for IP65 filter)

M = 150 mm + 4 mm (for IP65 filter)

L = 220 mm + 4 mm (for IP65 filter)

1/09 - 2023
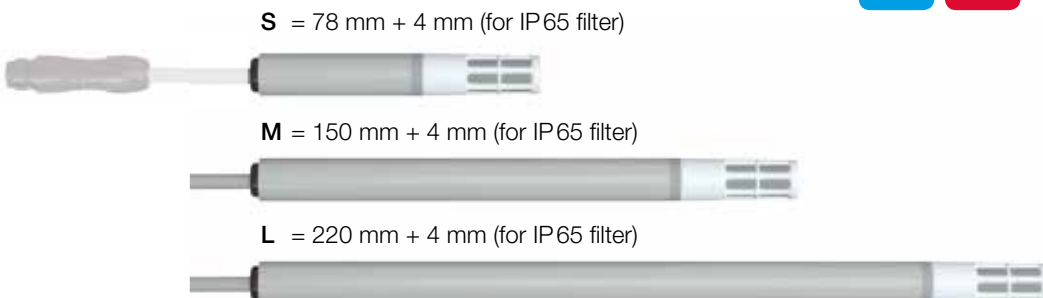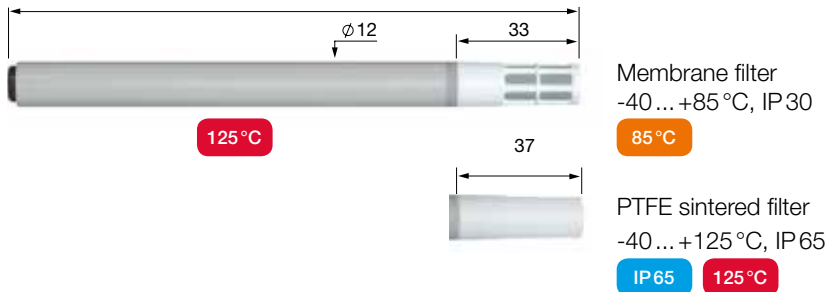
Order Details Model AFB (Example: **AFB-A N N 2 SE08 S0 0**)

Model	Version	Design transmitter	Display/ USB interface	Output signal transmitter[2]
AFB-	**A** = exchangeable probe	**N** = wall mounting with probe plug (without probe / without cable)	**N** = no display/ with USB interface and software **U** = with display/ with USB interface and software	**2** = 2 x 0 ... 10 V (supply 15 ... 30 V_{DC}/ 13 ... 26 V_{AC}) **4** = 2 x 4 ... 20 mA (supply 10 ... 30 V_{DC})

Version probe / filter	Connecting cable, pluggable
<u>Probe pluggable</u> **SE08** = Probe "S" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, IP30 (when plugged) **ME08** = Probe "M" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, IP30 (when plugged) **LE08** = Probe "L" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, IP30 (when plugged) **XE08** = Probe "X" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, IP30 (when plugged) **SE05** = Probe "S" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, IP65 (when plugged) **ME05** = Probe "M" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, IP65 (when plugged) **LE05** = Probe "L" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, IP65 (when plugged) **XE05** = Probe "X" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, IP65 (when plugged)	**S0** = no additional cable **S2** = 2 m connecting cable, cable end with cable plug connector to connect to the probe and cable end with female cable connector to connect to the housing (-40 ... +80 °C) (only for pluggable probe) **S8**[1] = x m special cable length for connecting cable up to +80°C (> 2 m)
<u>Cable probe, pluggable</u> **SE08** = Probe "S" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C probe, cable max. +80 °C, IP30 (2m cable, pluggable in the housing) **ME08** = Probe "M" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, cable max. +80 °C, IP30 (2m cable, pluggable in the housing) **LE08** = Probe "L" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40 ... +85 °C, cable max. +80 °C, IP30 (2m cable, pluggable in the housing) **SE05** = Probe "S" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, cable max. +80 °C, IP65 (2m cable, pluggable in the housing) **ME05** = Probe "M" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, cable max. +80 °C, IP65 (2m cable, pluggable in the housing) **LE05** = Probe "L" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +85 °C, cable max. +80 °C, IP65 (2m cable, pluggable in the housing) **ST05** = Probe "S" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +125 °C (probe + cable), IP65 (2m cable, pluggable in the housing) **MT05** = Probe "M" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +125 °C (probe + cable), IP65 (2m cable, pluggable in the housing) **LT05** = Probe "L" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40 ... +125 °C (probe + cable), IP65 (2m cable, pluggable in the housing)	**K0** = no additional cable. probe with firmly connected cable **K8**[1] = x m special cable length for cable up to +80 °C (> 2 m) **KH**[1] = x m special cable length for cable up to +125 °C (> 2 m)

Option
0 = none
Y = Special version (specify in clear text)

[1] Cable length 5m, 10m, 25m, specify in clear text
[2] Output range 1/ Output range 2 (freely configurable via USB interface): humidity (0..100% r.F) / temperature, factory configured, as output ranges in table in "Technical Details"

Order Details Spare Transmitter Model AFB-T (Example: **AFB-TNN200000**)

Model	Version	Design transmitter	Display/ USB interface	Output signal transmitter / supply	Version probe / filter / connecting cable	Option
AFB-	**T** = spare transmitter for AFB-A	**N** = wall mounting with probe plug (without probe / without cable)	**N** = no display/ with USB interface and software **U** = with display/ with USB interface and software	**2** = 2x 0...10 V / 15...30 V_{DC} / 13...26 V_{AC} **4** = 2x 4...20 mA / 10...30 V_{DC}	**0000** = none	**0** = none **Y** = Special version (specify in clear text)

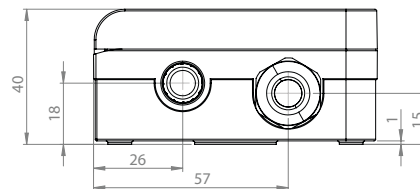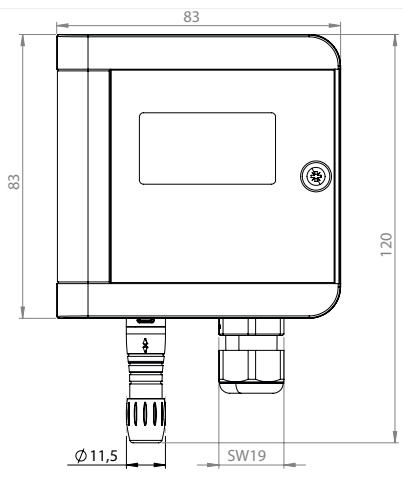Output range 1/ Output range 2 (freely configurable via USB interface)

Order Details Spare Sensor Model AFB-S (Example: **AFB-S000SE08S00**)

Model	Version	Version probe / filter	Connecting cable, pluggable	Option
AFB-	**S000** = Spare sensor for AFB-A	**Probe pluggable** **SE08** = Probe "S" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, IP30 (when plugged) **ME08** = Probe "M" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, IP30 (when plugged) **LE08** = Probe "L" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, IP30 (when plugged) **XE08** = Probe "X" pluggable with cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, IP30 (when plugged) **SE05** = Probe "S" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, IP65 (when plugged) **ME05** = Probe "M" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, IP65 (when plugged) **LE05** = Probe "L" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, IP65 (when plugged) **XE05** = Probe "X" pluggable with cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, IP65 (when plugged)	**S0** = no additional cable **S2** = 2 m connecting cable, cable end with cable plug connector to connect to the probe and cable end with female cable connector to connect to the housing (-40...+80 °C) **S8** = x m special cable length for connecting cable up to +80°C (> 2 m (5m))	**0** = none **Y** = Special version (specify in clear text)
		Cable probe, pluggable **SE08** = Probe "S" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C probe, cable max. +80°C, IP30 (2m cable, pluggable in the housing) **ME08** = Probe "M" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, cable max. +80°C, IP30 (2m cable, pluggable in the housing) **LE08** = Probe "L" with cable connected cable socket. protective cage with membrane filter AFZ-GE08 -40...+85 °C, cable max. +80°C, IP30 (2m cable, pluggable in the housing) **SE05** = Probe "S" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, cable max. +80°C, IP65 (2m cable, pluggable in the housing) **ME05** = Probe "M" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, cable max. +80°C, IP65 (2m cable, pluggable in the housing) **LE05** = Probe "L" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+85 °C, cable max. +80°C, IP65 (2m cable, pluggable in the housing) **ST05** = Probe "S" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+125°C (probe + cable), IP65 (2m cable, pluggable in the housing) **MT05** = Probe "M" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+125°C (probe + cable), IP65 (2m cable, pluggable in the housing) **LT05** = Probe "L" with cable connected cable socket. PTFE sintered filter AFZ-GE05 -40...+125°C (probe + cable), IP65 (2m cable, pluggable in the housing)	**K0** = no additional cable. probe with firmly connected cable **K8** = x m special cable length for cable up to +80°C (> 2 m) **KH** = x m special cable length for cable up to +125°C (> 2 m)	

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Order Details Accessories

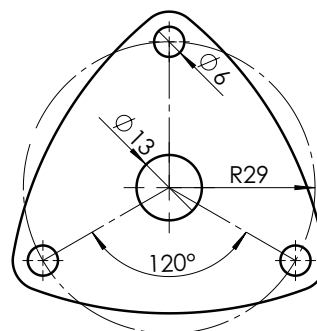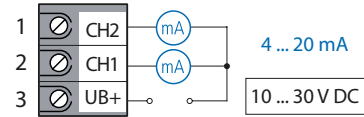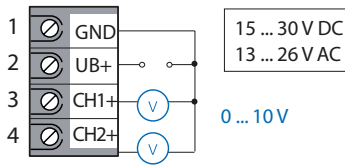| Code	Description	Image
AFZ-GE05	PTFE-sintered filter AFZ-GE05 with O-Ring, IP65 - spare part	
AFZ-GE08	Protective cage made of white plastic with internal membrane - spare part	
AFZ-GA52	Fixing flange for AFB for sensors Ø 12 mm, with rubber sealing	

Dimensions [mm]

Drilling pattern
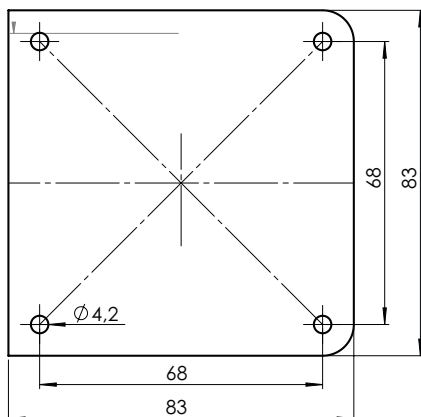
Fixing flange (Accessory)

Drilling pattern
Fixing flange

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7

Connection diagrams

1	GND
2	UB+
3	CH1+
4	CH2+

15 ... 30 V DC
13 ... 26 V AC

0 ... 10 V

1	CH2
2	CH1
3	UB+

4 ... 20 mA

10 ... 30 V DC

Transmitter mit USB Schnittstelle

Allgemeines:

The following settings can be made using the „KOBOLD 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 and Manual

Software System requirements::
Operating system: Win 10 / Win 8 / Win 7 / Win Vista / Win XP
USB-Port: USB 2.0
Software: www.kobold.com/qr/AFB

Connecting Cable
(not part of the standard delivery)
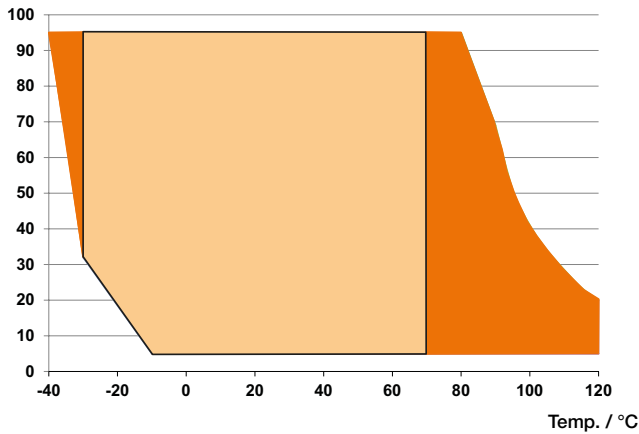
Registration in Windows:

The transmitter is automatically registered in Windows via the USB cable after connecting to the PC. No drivers are required. Only one transmitter can be configured and adjusted at a time.
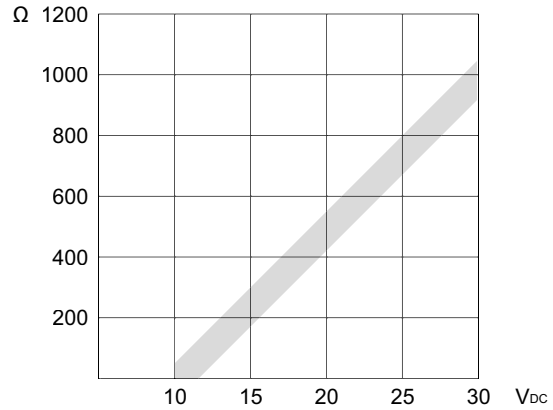
Standard USB micro cable -
USB „A" plug to USB „micro B"

Working range humidity and temperature

rh / %r.h.

- ⬛ Working range
- ⬛ Working range for hx values

Load at current output

Physical measuring values and analogue output scaling

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

Information:

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

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