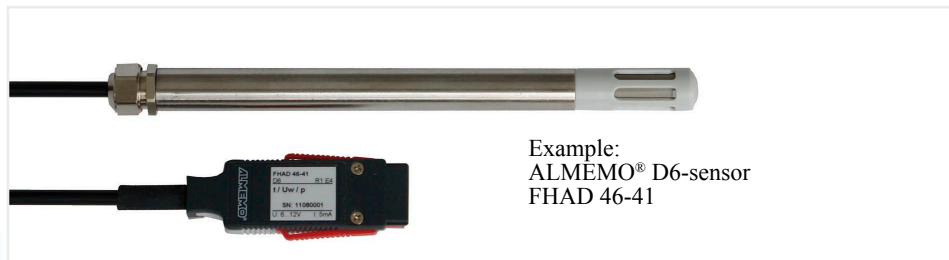## Digital sensor for temperature, humidity, and atmospheric pressure FHAD46-x



Example:
ALMEMO® D6-sensor
FHAD 46-41

Digital sensor for temperature, humidity, and atmospheric pressure FHAD46-x, with ALMEMO® D6 plug with integrated atmospheric pressure sensor for automatic pressure compensation

## Common technical features FHAD 46x

- Digital capacitive humidity sensor with integrated signal processor
- All sensor characteristics and adjustment data are saved in the humidity sensor element itself.
- Humidity sensor element, plug-in : Spare elements are inexpensive; a replacement can be fitted on site quickly and easily by virtually anyone; it will be fully accurate straight away needing no special adjustment.
- *new:* A digital atmospheric pressure sensor integrated in the ALMEMO® D6 plug itself provides automatic pressure compensation for all pressure-dependent humidity variables.
- All relevant ambient parameters are measured with just one sensor.
- *new:* Humidity calculation on the basis of formulae as per Dr. Sonntag and the enhancement factor as per W. Bögel (correction factor fw(t,p) for real mixed gas systems)

This substantially widens the measuring range and improves the accuracy of humidity variable calculations.
- *new:* Humidity variable : Absolute humidity in g/m³
- The humidity variables are calculated from the three primary measuring channels (real measurable variables). temperature, relative humidity, atmospheric pressure
- Freely selectable measurable variables
Four measuring channels are programmed (at our factory).
temperature (°C, T, t), relative humidity (%H, RH, Uw), dewpoint (°C, DT, td), atmospheric pressure (mbar, AP, p)
Other humidity variables can also be selected.
mixture (g/kg, MH, r), absolute humidity (g/m³, AH, dv), vapor pressure (mbar, VP, e), enthalpy (kJ/kg, En, h)
This device can be configured on a PC using USB adapter cable ZA1919AKUV.  (see page 04.05).

## Common technical data FHAD 46x

**Digital temperature / humidity sensor** (including A/D converter)

| | |
|---|---|
| Operative range | depending on sensor type |

**Humidity**

| | |
|---|---|
| Measuring range | 0 to 100 % RH |
| Sensor | CMOSens® technology |
| Accuracy | ±1.8 % RH in range 10 to 90 % RH at nominal temperature |
| Hysteresis | typical ±1 % RH |
| Nominal temperature | +25 °C |
| Sensor operating pressure | Atmospheric pressure |
| Response time $T_{63}$ | typical 8 seconds at +25 °C, 1 m/s (without filter) |

**Temperature**

| | |
|---|---|
| Sensor | CMOSens® technology |
| Accuracy | ±0.3 K at +25 °C |
| | ±0.4 K at +10 to +40 °C |
| | ±1.3 K at -20 to +80 °C |
| Reproducibility | typical ±0.1 K |
| Response time $T_{63}$ | typical 20 seconds (without filter) |

**ALMEMO® connecting cable**

| | |
|---|---|
| PVC;  Length  (see variants)  with ALMEMO® D6 plug | |

**Digital atm. pressure sensor** (integrated in ALMEMO® D6 plug)

| | |
|---|---|
| Measuring range | 700 to 1100 mbar |
| Accuracy | ±2.5 mbar (at 0 to +65 °C) |

**ALMEMO® D6 plug**

| | |
|---|---|
| Refresh rate | 2 seconds for all four channels |
| Supply voltage | 6 to 13 VDC |
| Current consumption | 12 mA |

## Other designs are available on request



Sensor with PTFE filter cap  FHAD 46-3
Water-proof sensor, Sensor plug connection IP67

DAkkS or factory calibration KH9xxx temperature, humidity for digital sensor (see chapter „Calibration certificates").
DAkkS calibration meets all the requirements regarding test resources laid down in DIN EN ISO/IEC 17025.

## Digital sensor for temperature, humidity, and atm. pressure  FHAD46-4AG
## in protective all-weather housing cable length up to 100 meters with ALMEMO® D6 plug
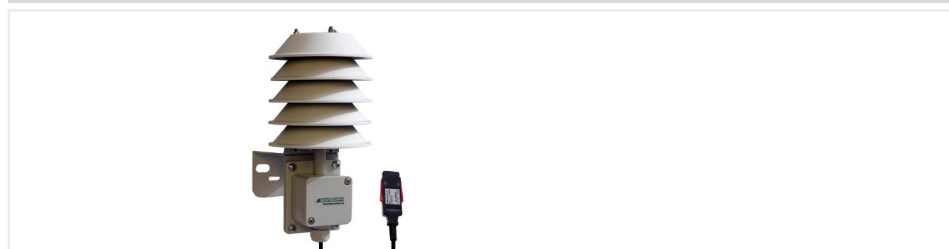


Technical data and variants
(see chapter „Meteorology")

## Digital sensor for temperature, humidity, and atm. pressure  FHAD 46-4x
## Version in stainless steel, with filter cap with ALMEMO® D6 plug



General description
and common technical data  FHAD 46 x

## Technical features

- Four measuring channels are programmed (at our factory).
  - temperature (°C, T, t),
  - relative humidity (%H, RH, Uw),

- dewpoint (°C, DT, td),
- atmospheric pressure (mbar, AP, p)

## Technical data

| | | | |
|---|---|---|---|
| Operative range | -20...+80 °C / 5...98 % RH | Filter cap | Metal-mesh filter, SK7 |
| Mechanical design | | Screw-fit cable gland | Splash-protected |
| Sensor tube | Stainless steel, diameter 12 mm | | |
| | Length  (see variants) | | |

## Variants including manufacturer's test certificate

**Order no.**

Digital sensor for temperature, humidity, and atmospheric pressure, filter cap, stainless steel tube,
with fitted cable and ALMEMO® D6 plug.

| | |
|---|---|
| Sensor length 160 mm, Connecting cable, length  2 meters | **FHAD4641** |
| Sensor length 160 mm, Connecting cable, length  5 meters | **FHAD4641L05** |
| Sensor length 160 mm, Connecting cable, length  10 meters | **FHAD4641L10** |
| Sensor length 270 mm, Connecting cable, length  2 meters | **FHAD4642** |
| Sensor length 270 mm, Connecting cable, length  5 meters | **FHAD4642L05** |
| Sensor length 270 mm, Connecting cable, length  10 meters | **FHAD4642L10** |
| Sensor length 530 mm, Connecting cable, length  2 meters | **FHAD4643** |
| Sensor length 530 mm, Connecting cable, length  5 meters | **FHAD4643L05** |
| Sensor length 530 mm, Connecting cable, length  10 meters | **FHAD4643L10** |
| Replacement sensor element, digital, adjusted, plug-in | **FH0D46** |

## Protective caps

SK7         SK6         SK8

Dimensions :
length approx. 33 mm, diameter 12 mm



| | Designation | Pore size | max. temp.* | Typical Application | Order no. |
|---|---|---|---|---|---|
| SK7 | Metal-mesh filter in PC-housing | 100 µm | 120°C | Universal, for medium, contamination, also high humidity | ZB9600SK7 |
| SK6 | PTFE-Sinterfilter | 50 µm | 180°C | High chemical resistance | ZB9600SK6 |
| SK8 | Stainless steel sinter filter | 10 µm | 180°C | For severe mechanical stress, heavy contamination, strong air flow | ZB9600SK8 |

* Observe application range

## Accessories

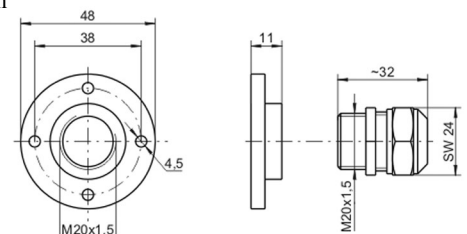Brackets for wall mounting, distance from wall
approx. 40 mm
**ZB9600W**
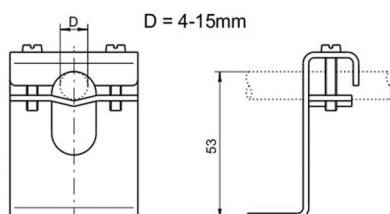
Movable brass screw connection
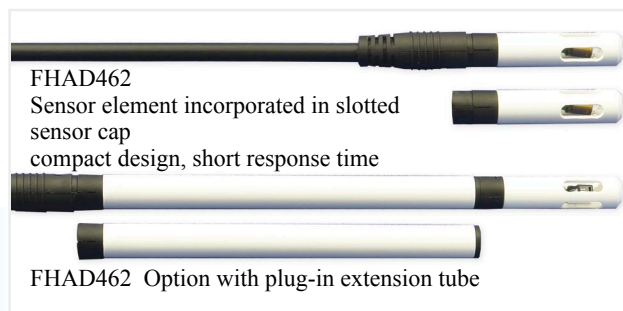with plastic sealing ring
**ZB9600KV20**
Connecting flange for screw
connection,
hole circle 38 mm Ø
**ZB9600F20**

## Digital sensor for temperature, humidity, and atmospheric pressure  FHAD46-2
## Version in plastic, with slotted sensor cap with ALMEMO® D6 plug

**FHAD462**
Sensor element incorporated in slotted sensor cap
compact design, short response time

**FHAD462L00**

**FHAD462**  Option with plug-in extension tube

- Four measuring channels are programmed (at our factory).
  Temperature (°C, T, t),  Relative humidity (%H, RH, Uw)

Dewpoint (°C, DT, td)
Atmospheric pressure (mbar, AP, p).

### Technical data

| | | | |
|---|---|---|---|
| Operative range | -20 to +60 °C / 5 to 98 % RH | Extension tube | Ø 8 mm, length 97 mm |
| Mechanical design | | | |
| Sensor cap | Ø 8 mm, length 36 mm | General description and common technical data see FHAD 46x | |
| Plug connection | Ø approx. 9 mm, IP40 | | |

### Variants including manufacturer's test certificate                                       Order no.

Digital sensor for temperature, atmospheric humidity, and atmospheric pressure, with sensor element in slotted sensor cap, plug connector, including ALMEMO® connecting cable with coupling and ALMEMO® D6 plug.

| | | | |
|---|---|---|---|
| | | Cable stub approx. :  80 mm | |
| | | (incl. sensor element) | **FHAD462L00** |
| Connecting cable, length 2 meters | **FHAD462** | Spare sensor element for FHAD462, digital, enclosed in slotted sensor cover, adjusted | **FH0D462** |
| Connecting cable, length 5 meters | **FHAD462L05** | Extension tube, Ø 8 mm, length 97 mm, | |
| Connecting cable, length 10 meters | **FHAD462L10** | plug-in, for FHAD462 | **ZB0D462VR** |

### Other designs are available on request

Sensor with terminal box  FHD 462 KL for wall mounting
Terminal box with plug-in digital temperature / humidity sensor, cable lengths up to 100 meters

## Digital sensor for temperature, humidity, and atm. pressure  FHAD 46-0
## Uncovered sensor element with ALMEMO® D6 plug
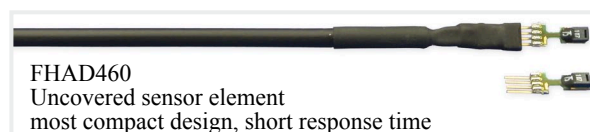
**FHAD460**
Uncovered sensor element
most compact design, short response time

- Four measuring channels are programmed (at our factory).
  Temperature (°C, T, t), Relative humidity (%H, RH, Uw)

Dewpoint (°C, DT, td),
Atmospheric pressure (mbar, AP, p).

### Technical data

| | | | |
|---|---|---|---|
| Operative range | -20 to +80 °C / 5 to 98 % RH | Sensor element (dimensions over all) approx. 6 x 14 x 3 mm | |
| Mechanical design | | Plug connection                       Width approx. 7 mm | |

### Variants including manufacturer's test certificate                                       Order no.

Digital sensor for temperature, humidity, and atmospheric pressure, with uncovered sensor element, plug connector, including ALMEMO® connecting cable with coupling and ALMEMO® D6 plug.

| | | | |
|---|---|---|---|
| | | Connecting cable, length 10 meters | **FHAD460L10** |
| | | Replacement sensor element, digital, | |
| | | adjusted, plug-in | **FH0D46** |
| Connecting cable, length 2  meters | **FHAD460** | | |
| Connecting cable, length 5  meters | **FHAD460L05** | | |