

- Measuring range:
 0 ... 100 % rH,
 -40 ... +180 °C
- Maximum accuracy
 up to 180 °C
- Sensor replacement
 without recalibration
- High degree of resistance
 of sensor to chemicals
- output of measured
 values (rH, °C) and
 deviated values
 (dew point, absolute
 humidity etc.)
 via RS 232
- Pressure-tight version
 0.01...15 bar
- Display
- Sensor coating
- Special calibration



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Model:
 AFK-E



Description

The measuring instruments AFK-E have been designed for the accurate measurement of humidity and temperature in industrial applications. They allow measurements in the range 0...100% rH and between -40°C and +180°C.

A capacitive humidity sensor element with excellent long-term stability, minimum hysteresis and high chemical resistance forms the basis for this highly accurate transmitter series.

The values for humidity and temperature are displayed on two analogue outputs. A scalable and selectable current signal in the range 4 to 20 mA or any voltage signal between 0 and 10 V are available for selection.

This flexibility is achieved with cutting-edge microprocessor technology, whereby the scaling and selection of the output signal is carried out with a user-friendly graphic interface running under MS Windows. The factory setting can thus be changed easily on site by the user.

In addition to measured values for humidity and temperature, the transmitters supplies the following values:

- Dew-point temperature
- Freezing point temperature
- Wet-bulb temperature
- Water-vapour partial pressure
- Mixing ratio
- Absolute humidity
- Specific enthalpy

The measured values are also output to an RS232 serial port for further processing by software.

Application examples

Control

- Humidity of clean rooms
- Air-conditioning cabinets
- Cheese ageing rooms

Drying

- Ceramics
- Bricks
- Wood
- Pharmaceutical products
- Pasta & noodles

Warehousing

- Medicines
- Fruit and vegetables

Technical Details

Characteristic data of humidity sensor

Measuring range: 0...100% rH
(notice operating range of humidity sensor)

Accuracy (including hysteresis, non-linearity and repeatability)
 at -15...+40°C / < 90% rH: ±(1.3 + 0.3% of M.V.) % rH
 at -15...+40°C / > 90% rH: ±2.3% rH
 at -25...+70°C: ±(1.4 + 1% of M.V.) % rH
 at -40...+180°C: ±(1.5 + 1.5% of M.V.) % rH

Temperature dependence of electronics: typically ±0.01% rH/°C

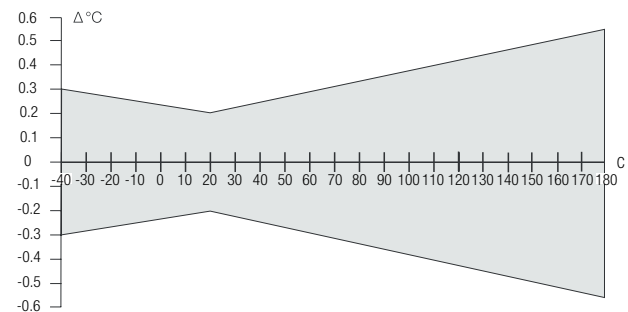
Response time $t_{10/90}$ at 20°C

- without filter: < 6 s
- with st. steel sintered filter: 30 s
- with PTFE filter: 14 s
- with metal screen: 7 s

Characteristic data of temperature sensor

Measuring range: -40...+180°C
 Sensor: Pt 1000
 (DIN EN 60751, category A)

Accuracy:



Temperature dependence of electronics: typ. 0.005°C/°C

Electrical characteristic data

Analogue outputs (selectable and scalable):
 0 - 5 V < 1.0 mA
 0 - 10 V < 1.0 mA
 4 - 20 mA $R_L < 500 \Omega$
 0 - 20 mA $R_L < 500 \Omega$

Switching outputs: 2x1 changeover contact
 250 V_{AC} / 6 A
 28 V_{DC} / 6 A

Supply voltage: SELV 8...35 V_{DC}
 SELV 12...30 V_{AC}

- with optional plug-in power supply unit: 100 - 240 V_{AC}

Current consumption
 • 2 x voltage output: typ. 40 mA with 24 V_{DC/AC}
 • 2 x current output: typ. 80 mA

with plug-in power supply unit:
 • 2 x voltage output: typ. 15 mA
 • 2 x current output: typ. 15 mA

Humidity/Temperature Measuring Instrument

for Industrial Applications, Capacitive Method of Measurement · Model AFK-E



General characteristic Data

Resistance to pressure

- Standard version: atmospheric
- Pressure-tight version: 0.01...15 bar (1/2" Swagelok screwing)

Housing: Aluminium, fixed wall mounting integrated

Electr. connection: screw terminals to max. 1.5 mm²

Sensor protection: stainless steel sintered filter (PTFE filter and metal screen optional)

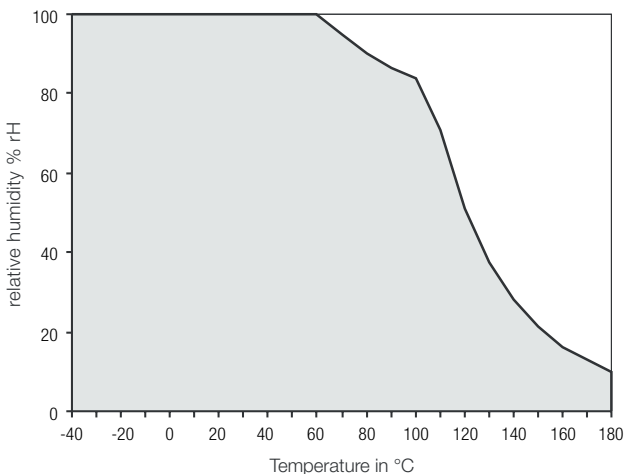
Cable lengths: 2 m, 5 m, 10 m, 20 m (PTFE cable up to 200 °C)

Operating temperature/
storage temperature
electronics: -40...+60 °C without display
-20...+50 °C with display

Electromagnetic compatibility
according to EN 61000-6-2, EN 61000-6-3,
EN 61326-1+A1+A2

Protection class: IP 65

Operating range of humidity sensor *



*The grey area indicates the allowed measuring area for the humidity sensor.

Operating points outside this area do not cause damage to the element, however the specified measuring accuracy cannot be guaranteed.

Communication

Microsoft™ Windows 98™ or higher.

Serial Interface for PC communication: RS 232C

Calculated functions:

The following calculated functions are given out from the transmitter AFK-E out of the measured values for temperature and relative humidity:

Measurement	Standard ranges	max. adjustable ranges
Relative Humidity	rH 0...100 % rH	0...100 % rH
Temperature	T -40...180 °C	-40...180 °C
Dew-point temperature	Td -40...100 °C	-80...100 °C
Freezing point temperature	Tf -40...0 °C	-80...0 °C
Wet-bulb temperature	Tw 0...100 °C	0...100 °C
Water-vapour partial pressure	e 0...1000 mbar	0...1100 mbar
Mixing ratio	r 0...500 g/kg	0...999 g/kg
Absolute humidity	dv 0...600 g/m ³	0...700 g/m ³
Specific enthalpy	H -40...1500 kJ/kg	-50...2800 kJ/kg

These values can be indicated on the display (option) and are also available as analogue outputs. For software processing the measuring values are in addition given out via a serial RS 232 interface.

Options:

Pressure resistant measuring sensor

The pressure resistant measuring sensor can be operated at a maximum pressure of 15 bar. For mounting this measuring sensor a pressure tight duct with a 1/2" thread (Swagelok screwing) is enclosed in the shipment.

Measured value display

The two line LCD can display two measured or two calculated values.

Sensor coating

For strongly contaminated or corrosive atmospheres special coated sensors are available. By means of the polymeric-coating the sensors get a drastically improvement of their chemical resistance and therefore a considerable increase of the long-term stability of the measuring transmitter. Especially for drying processes the use of the coating has been proved and tested.

Cable length

The connection cable between sensor and transmitter is available in the following lengths:
2, 5, 10 and 20 metres.

Special calibration

A special calibration (option Z) to certified standards achieves a higher measuring accuracy. A calibration certificate is included in the shipment.

Accuracy: ±1 % rH (0...90 % rH)
±2 % rH (90...100 % rH)

For applications with a humidity predominantly higher than 95 % rH a special calibration for high humidity can be carried out.

Accessories

● **Dustproof filter covers:**

St. steel sintered filters: for tough industrial applications where the detecting sensors are exposed to strong mechanical and thermal stresses; serviceable to 180°C.

Model AFZ-E1



PTFE filter: for chemically aggressive environments and high temperatures, serviceable to 180°C (not with pressure-tight version)

Model AFZ-E2



Metal screen: with high humidity, danger of moisture condensation or with rapidly alternating humidity cycles, serviceable to 120°C (not with pressure-tight version)

Model AFZ-E3



- **External plug-in power supply unit with 1.5 m cable:** for direct connection to a supply voltage of 100...240 V_{AC}.

Model AFZ-E4



- **RS 232 interface cable:** for configuration and scaling of transmitter, 2 meter

Model AFZ-E5

- **Stainless steel mounting flange:** for installation of humidity sensor in the duct

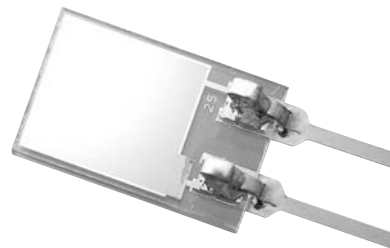
Model AFZ-E6



hole circle: Ø 46 mm
boreholes: 4 x 6 mm

- **Humidity sensor with characteristic data:** for replacing the sensor element without recalibration

Model AFZ-E7



- **Dripping water protection cap (85 mm):** for protection of the sensor element from condensed water in case of hanging mounted sensor.

Model AFZ-E8



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Resistance table for humidity transmitter AFK-E (without sensor coating »P«)

Chemical product	Gas rate up to	harmless	negative effect
Ammonia NH₃	500 ppm	X	
Chlorine Cl₂	5 ppm, 15 mg/m ³	X	
Chlorine methane CH₃Cl			X
Ethanol (liquid, for cleaning) CH₃CH₂OH	10.000 ppm, 19 g/m ³	X	
Ethylene oxide C₂H₄O	20 mg/m ³	X	
Formaldehyde HCHO	6 mg/m ³	X	
Hydrofluoric acid HF			X
Freon 113 C₂Cl₃F₃	5.000 ppm, 39 g/m ³	X	
Isopropanol (liquid, for cleaning) (CH₃)₂CHOH	2.000 ppm, 5.000 mg/m ³	X	
Carbon monoxide CO	400 ppm	X	
Methanol (liquid, for cleaning) CH₃OH	2.000 ppm, 2700 mg/m ³	X	
Ozone O₃	2 mg/m ³	X	
Hydrochloric acid HCl			X
Sulphur dioxide SO₂	100 ppm		X
Nitrogen dioxide NO₂	120 mg/m ³	X	
UV-light	at 300-400 nm and 2 J/cm ² duration of exposure approx. 5 min	X	
Hydrogen peroxide H₂O₂	140 mg/m ³	X	

Insertable in Argon and N₂-Gas with coated sensor

Order Details (Example: AFK-E 1 S 1 K 02 N)

Model	Description	Pressure resistance	Display	Sensor coating	Cable length	Calibration
AFK-E	Humidity measuring instrument	2S = atmospheric 2D = p _{max} : 15 bar	1 = without display 2 = with display	K = not Polymer coated P = Polymer coated	02 = 2 m 05 = 5 m 10 = 10 m 20 = 20 m	N = standard ±2% rH (0...90% rH) Z = special ±1% rH (0...90% rH) H = high humidity for predominantly > 95% rH

Order Details Accessories (Example: AFZ-E 1)

Model	Accessories
AFZ-E	<ul style="list-style-type: none"> 1 = stainless steel sintered filter 2 = PTFE filter 3 = metal screen 4 = external plug-in power supply unit 5 = RS 232 interface cable 6 = stainless steel mounting flange 7 = replacement humidity sensor 8 = dripping water protection cap



Dimensions
for all AFK-E models

