

Dewpoint transmitter to $-90\text{ }^{\circ}\text{C}_{\text{td}}$



SPECIFICATIONS

testo 6781



The transmitter testo 6781 was developed specially for trace humidity measurement in compressed air and in dry air (e. g. in granulate dryers). The international norm ISO 8573 categorizes seven classes of compressed air. High-performance adsorption dryers are required in order to meet the highest quality classes 1 and 2. They can be monitored by the testo 6781 down to very low dewpoints of $-90\text{ }^{\circ}\text{C}_{\text{td}}$.

The newly developed sensor with sol-gel technology is characterized by its condensation-proofness and fast response time, thus guaranteeing highest process security.

Areas of application:

- Dewpoint measurement in compressed air in ISO Classes 1 ($<-70\text{ }^{\circ}\text{C}_{\text{td}}$) and 2 ($<-40\text{ }^{\circ}\text{C}_{\text{td}}$)
- Monitoring of adsorption dryers, granulate dryers and medical compressed air
- Quality assurance for noble gas preparation



SPECIFICATIONS

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- Measurement of dewpoints in the measuring range -90 to $-20\text{ }^{\circ}\text{C}_{\text{td}}$
- New, very condensation-proof sensor with sol-gel technology guarantees highest process security and fast response
- Automatic self-adjustment ensures high accuracy and long reliability
- Optional display with multi-language user menu
- Self-monitoring of the transmitter guarantees high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance



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Technical data

Parameters	
Humidity/trace humidity	
Units	$^{\circ}\text{C}_{td}$, $^{\circ}\text{F}_{td}$, %rF, %RH
Calculated variables	$^{\circ}\text{C}_{tdA}$, $^{\circ}\text{F}_{tdA}$ (normed atmosph. dewpoint), ppmV, g/m ³ , g/ft ³ , g/kg, g/lb
Measuring range	-90 to -20 $^{\circ}\text{C}_{td}$ / -130 to -4 $^{\circ}\text{F}_{td}$
Measurement uncertainty*	-20 $^{\circ}\text{C}_{td}$ to -40 $^{\circ}\text{C}_{td}$: $\pm 1,5\text{K}$ -40 $^{\circ}\text{C}_{td}$ to -60 $^{\circ}\text{C}_{td}$: $\pm 2\text{K}$ -60 $^{\circ}\text{C}_{td}$ to -75 $^{\circ}\text{C}_{td}$: $\pm 2,5\text{K}$
Response time	t63 \leq 3s for switch from -75 $^{\circ}\text{C}_{td}$ to -30 $^{\circ}\text{C}_{td}$ t90 \leq 9s for switch from -75 $^{\circ}\text{C}_{td}$ to -30 $^{\circ}\text{C}_{td}$ t63 \leq 300s for switch from -30 $^{\circ}\text{C}_{td}$ to -75 $^{\circ}\text{C}_{td}$ t90 \leq 1080s for switch from -30 $^{\circ}\text{C}_{td}$ to -75 $^{\circ}\text{C}_{td}$
Autom. self-adjustment	Cycle adjustable: 1 h / 6 h / 12 h / 24 h / 48 h

The determination of measurement uncertainty takes place according to GUM (Guide to the Expression of Uncertainty in Measurement):

For the determination of measurement uncertainty, the accuracy of the measuring instrument (hysteresis, linearity, reproducibility), the uncertainty contribution of the test site as well as the uncertainty of the adjustment site /works calibration are taken into account. For this purpose, the value of $k=2$ of the extension factor, which is usual in measurement technology is used as a basis, which corresponds to a trust level of 95%.

This total view results in an additional dewpoint-dependent and process-dependent inaccuracy contribution of $\pm 0,03\text{K} \times m.v.(\ln\text{ }^{\circ}\text{C}_{td}) + 0,2\text{K} \times (25\text{ }^{\circ}\text{C} - \text{process temperature in }^{\circ}\text{C})$.

Below -75 to -90 $^{\circ}\text{C}_{td}$, an asymmetrical measurement uncertainty of +8.5 K / -2.5 K applies.

Inputs/outputs	
Analog outputs	
Current/accuracy	0 to 20 mA ± 0.03 mA (4-wire) 4 to 20 mA ± 0.03 mA (4-wire)
Output type	0 to 1 V ± 1.5 mV (4-wire) 0 to 5 V ± 7.5 mV (4-wire) 0 to 10 V ± 15 mV (4-wire)
Meas. cycle	1/sec
Resolution	12 bit
Load	max. 500 Ω
Other outputs	
Digital	Mini-DIN for P2A software
Supply	
Voltage supply	20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line Plug connection: M12 5-pin plug**

** Suitable M12 socket available as accessory

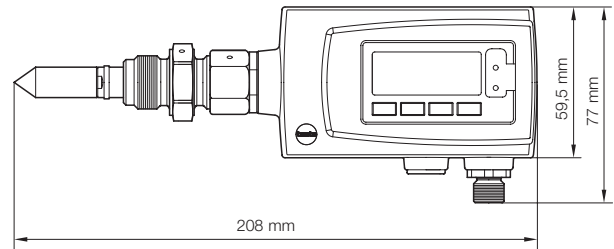
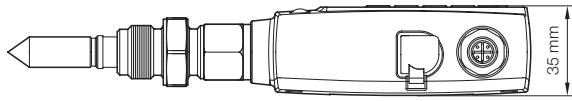
General technical data		
Model		
Material	Metal housing	
Dimensions	208 x 60 x 35 mm	
Weight	0.5 kg	
Display		
Display	optional: 2-line LCD with multi-language operating menu	
Resolution	Measuring range	Resolution
	0 to +100 %RH	0.001
	0.001 to 28 g/kg	0.001
	0.01 to 194 g/lb	0.01
	0 to 31 g/m ³	0.001
	0.001 to 14 g/ft ³	0.001
	0.1 to 9999 ppm(V)	0.1
	-90 to -20 $^{\circ}\text{C}_{td}$	0.1
	-130 to -4 $^{\circ}\text{F}_{td}$	0.1
	-90 to -20 $^{\circ}\text{C}_{tdA}$	0.1
	-130 to -4 $^{\circ}\text{F}_{tdA}$	0.1
	-40 to +70 $^{\circ}\text{C}$	0.01
	-40 to +158 $^{\circ}\text{F}$	0.01
Miscellaneous		
Protection class	IP 65	
EMC	EU guideline 2004/108/EC	

Operating conditions		
	Process temperature	-40 to +70 $^{\circ}\text{C}$ / -40 to +158 $^{\circ}\text{F}$
	Process pressure	max. 50 bar
Without display	Operation temperature	-40 to +70 $^{\circ}\text{C}$ / -40 to +158 $^{\circ}\text{F}$
	Storage temperature	-40 to +80 $^{\circ}\text{C}$ / -40 to +176 $^{\circ}\text{F}$
With display	Operation temperature	-20 to +70 $^{\circ}\text{C}$ / -4 to +158 $^{\circ}\text{F}$
	Storage temperature	-20 to +70 $^{\circ}\text{C}$ / -4 to +158 $^{\circ}\text{F}$



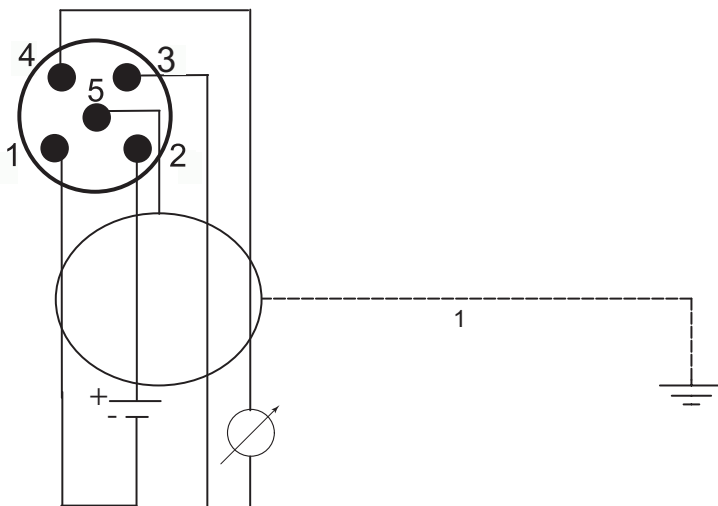
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Technical drawings

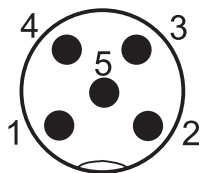


Connection plan

Connection plan 4-wire technology
(0 to 20 mA/4 to 20 mA/0 to 1 V/0 to 5 V/0 to 10 V)



Plug connection M12 (5-pin), plug



Pin	Connection
1	-24 V
2	+24 V
3	+Ch1
4	-Ch1
5	PE



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The following options can be specified for the testo 6781:

AXX	Process connection
BXX	Analog display/supply
CXX	Display / menu language
FXX	Humidity parameter / min limit value / max limit value / hysteresis (pre-set)
KXX	Instruction manual languages
MXX	Protective cap

AXX Measuring range

- A01 Process connection G1/2
- A02 Process connection NPT 1/2"

BXX Analog display/supply

- B02 0 to 1 V (4-wire, 24 VAC/DC)*
- B03 0 to 5 V (4-wire, 24 VAC/DC)*
- B04 0 to 10 V (4-wire, 24 VAC/DC)*
- B05 0 to 20 mA (4-wire, 24 VAC/DC)*
- B06 4 to 20 mA (4-wire, 24 VAC/DC)*

CXX Display / menu language

- C00 without display
- C02 with display/English
- C03 with display/German
- C04 with display/French
- C05 with display/Spanish
- C06 with display/Italian
- C07 with display/Japanese
- C08 with display/Swedish

FXX Humidity parameter / min limit value / max limit value / hysteresis (pre-set)

- F01 $^{\circ}\text{C}_{\text{td}}$ / min / max
- F02 $^{\circ}\text{F}_{\text{td}}$ / min / max
- F03 % RH/Min/Max
- F04 %RH / min / max
- F05 $^{\circ}\text{C}_{\text{td A}}$ / min / max
- F06 $^{\circ}\text{F}_{\text{td A}}$ / min / max
- F07 ppmV / min / max
- F08 g/m^3 / min / max
- F09 g/ft^3 / min / max
- F10 g/kg / min / max
- F11 g/lb / min / max

KXX Instruction manual language

- K01 German/English instruction manual
- K02 French/English instruction manual
- K03 Spanish/English instruction manual
- K04 Italian/English instruction manual
- K05 Dutch/English instruction manual
- K06 Japanese/English instruction manual
- K07 Chinese/English instruction manual
- K08 Swedish/English instruction manual

MXX Protective cap

- M01 Stainless steel cap
- M03 PTFE cap

Example:

Order code for transmitter testo 6781 with the following options:

- Process connection NPT 1/2"
- Analog display/supply 4 to 20 mA (4-wire, 24 VAC/DC)
- without display
- Humidity parameter / min limit value / max limit value / hysteresis g/m^3 / min / max
- Instruction manual language German/English
- Sintered stainless steel cap

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