

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

testo 6781

- 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



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

Technical data

Parameters	
Humidity/trace humidity	
Units	$^{\circ}\text{C}_{\text{td}}$, $^{\circ}\text{F}_{\text{td}}$, %rF, %RH
Calculated variables	$^{\circ}\text{C}_{\text{tdA}}$, $^{\circ}\text{F}_{\text{tdA}}$ (normed atmosph. dewpoint), ppmV, g/m ³ , g/ft ³ , g/kg, g/lb
Measuring range	$-90\text{ to }-20\text{ }^{\circ}\text{C}_{\text{td}}$ / $-130\text{ to }-4\text{ }^{\circ}\text{F}_{\text{td}}$
Measurement uncertainty*	$-20\text{ }^{\circ}\text{C}_{\text{td}}$ to $-40\text{ }^{\circ}\text{C}_{\text{td}}$: $\pm 1,5\text{K}$ $-40\text{ }^{\circ}\text{C}_{\text{td}}$ to $-60\text{ }^{\circ}\text{C}_{\text{td}}$: $\pm 2\text{K}$ $-60\text{ }^{\circ}\text{C}_{\text{td}}$ to $-75\text{ }^{\circ}\text{C}_{\text{td}}$: $\pm 2,5\text{K}$
Response time	$t_{63} \leq 3\text{s}$ for switch from $-75\text{ }^{\circ}\text{C}_{\text{td}}$ to $-30\text{ }^{\circ}\text{C}_{\text{td}}$ $t_{90} \leq 9\text{s}$ for switch from $-75\text{ }^{\circ}\text{C}_{\text{td}}$ to $-30\text{ }^{\circ}\text{C}_{\text{td}}$ $t_{63} \leq 300\text{s}$ for switch from $-30\text{ }^{\circ}\text{C}_{\text{td}}$ to $-75\text{ }^{\circ}\text{C}_{\text{td}}$ $t_{90} \leq 1080\text{s}$ for switch from $-30\text{ }^{\circ}\text{C}_{\text{td}}$ to $-75\text{ }^{\circ}\text{C}_{\text{td}}$
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 $\pm 0,03\text{K} \times \text{m.v.}(\text{in } ^{\circ}\text{C}_{\text{td}}) + 0.2\text{ K} \times (25\text{ }^{\circ}\text{C} - \text{process temperature in } ^{\circ}\text{C})$.

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

Inputs/outputs	
Analog outputs	
Current/accuracy	0 to 20 mA $\pm 0.03\text{ mA}$ (4-wire) 4 to 20 mA $\pm 0.03\text{ mA}$ (4-wire)
Output type	0 to 1 V $\pm 1.5\text{ mV}$ (4-wire) 0 to 5 V $\pm 7.5\text{ mV}$ (4-wire) 0 to 10 V $\pm 15\text{ mV}$ (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**

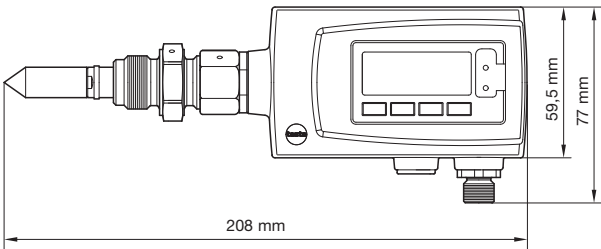
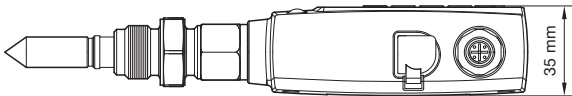
** Suitable M12 socket available as accessory

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/m3	0.001
	0.001 to 14 g/ft3	0.001
	0.1 to 9999 ppm(V)	0.1
	-90 to -20 °Ctd	0.1
	-130 to -4 °Ftd	0.1
	-90 to -20 °CtdA	0.1
	-130 to -4 °FtdA	0.1
	-40 to +70 °C	0.01
	-40 to +158 °F	0.01
Miscellaneous		
Protection class	IP 65	
EMC	EU guideline 2004/108/EC	

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

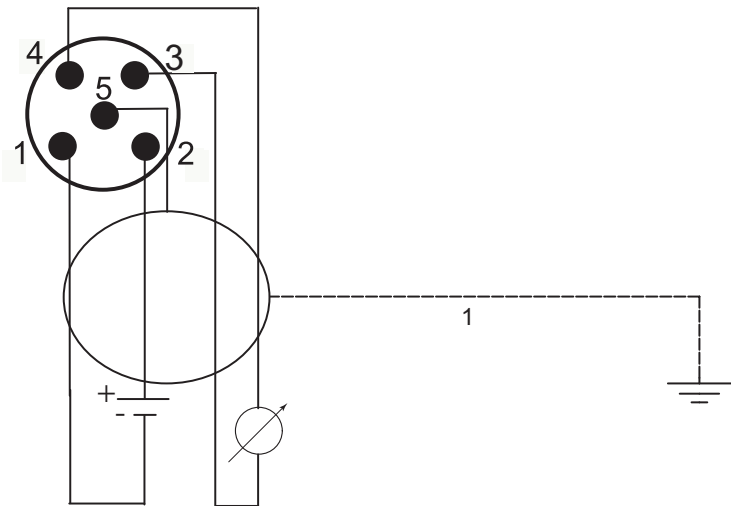
Dewpoint transmitter to -90 °C_{td}

Technical drawings

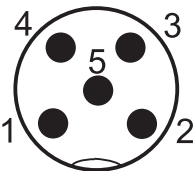


Connection plan

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



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

The following options can be specified for the testo 6781:

AXX	Process connection	AXX	Measuring range	FXX	Humidity parameter / min limit value / max limit value / hysteresis (pre-set)
BXX	Analog display/supply	A01	Process connection G1/2	F01	$^{\circ}\text{C}_{\text{td}}$ / min / max
CXX	Display / menu language	A02	Process connection NPT 1/2"	F02	$^{\circ}\text{F}_{\text{td}}$ / min / max
FXX	Humidity parameter / min limit value / max limit value / hysteresis (pre-set)	BXX	Analog display/supply	F03	% RH/Min/Max
MXX	Protective cap	B02	0 to 1 V (4-wire, 24 VAC/DC)*	F04	%RH / min / max
		B03	0 to 5 V (4-wire, 24 VAC/DC)*	F05	$^{\circ}\text{C}_{\text{td}}$ A / min / max
		B04	0 to 10 V (4-wire, 24 VAC/DC)*	F06	$^{\circ}\text{F}_{\text{td}}$ A / min / max
		B05	0 to 20 mA (4-wire, 24 VAC/DC)*	F07	ppmV / min / max
		B06	4 to 20 mA (4-wire, 24 VAC/DC)*	F08	g/m^3 / min / max
		CXX	Display / menu language	F09	g/ft^3 / min / max
		C00	without display	F10	g/kg / min / max
		C02	with display/English	F11	g/lb / min / max
		C03	with display/German	MXX	Protective cap
		C04	with display/French	M01	Stainless steel cap
		C05	with display/Spanish	M03	PTFE cap
		C06	with display/Italian		
		C07	with display/Japanese		
		C08	with display/Swedish		

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
- Sintered stainless steel cap

0555 6781 A02 B06 C00 F08 M01