

The industrial humidity transmitter

testo 6681 + probe series testo 661x

Optimum adjustment concept thanks to adjustment of the entire signal chain incl. analog adjustment

Profibus, Ethernet, relay and analog outputs allow optimum integration into individual automation systems

Self-monitoring and early warning guarantee high system availability

Calculation and presentation of all relevant humidity parameters

P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance

Display with multi-language display

Robust, easy-to-clean metal housing



%RH

°C

Industrial humidity measurement demands absolute professionalism. Not only in running the system, but also in the measuring technology used. The industrial humidity transmitter testo 6681, combined with the probe series testo 661x fulfils these high demands. The testo 6681 has a number of additional features, above and beyond the properties and benefits of a conventional transmitter, which will delight practitioners. This and other reasons make the

testo 6681 the first choice in drying technology, trace humidity and compressed air process technology, as well as in demanding air conditioning technology, e.g. in cleanrooms.

Technical data testo 6681

Measurement parameters

Humidity

Selectable units	Dependent on probe, available are: relative humidity %RH; normed atm. dewpoint in °CtdA (°Ftd); dewpoint in °Ctd (°Ftd); absolute humidity in g/m ³ (gr/ft ³); degree of humidity in g/kg (gr/lb); enthalpy in kJ/kg (BTU/lb); psychrometer temperature in °Ctw (°Ftw); water vapour partial pressure in hPa/H ₂ O; water content in ppmV; mixture dewpoint H ₂ O ₂ in °Ctm/°Ftm; %RH acc. to WMO; temperature in °C/°F
Measuring range	0 to 100 %RH
Trace humidity	
Selectable units	Dewpoint in °Ctd/°Ftd
Measuring range	-60 to +30 °Ctd / -76 to +86 °Ftd (only with testo 6610)
Temperature	
Selectable units	Temperature in °C/°F
Measuring range	Dependent on probe (testo 661x)

Inputs and outputs

Analog outputs

Quantity	2 channels (analog signal type uniform for both channels, decided when ordering), additional 3rd channel (optional)
Output type	0/4 to 20 mA (2-wire/4-wire) 0 to 1/5/10 V (4-wire)
Measurement rate	1/s
Galvanic isolation	Galvanic isolation of the output signals (2-wire and 4-wire), isolation of supply from outputs (4-wire)
Resolution	12 bit
Accuracy of the analog outputs	0/4 to 20 mA ± 0.03 mA 0 to 1 V ± 1.5 mV 0 to 5 V ± 7.5 mV 0 to 10 V ± 15 mV
Max. load	2-wire: 12 VDC: max. 100 Ω / 24 VDC: max. 500 Ω / 30 VDC: max. 625 Ω; 4-wire: 500 Ω

Further outputs

Ethernet	Optional: module can be fitted as intermediary layer
Profibus-DP	Optional: module can be fitted as intermediary layer, cannot be combined with Ethernet module
Relays	Optional: 4 relays (free allocation to measurement channels or as collective alarm with operating menu/PsA software), up to 250 VDC/3 A (NO/NC)
Other outputs	Mini DIN for Testo P2A software and portable measuring instruments testo 400/650
Supply	
Voltage supply	2-wire: 24 VDC ± 10 % 4-wire: 20 to 30 VAC/DC
Current consumption	max. 300 mA

General technical data







Design

Material	Metal
Dimensions	122 x 162 x 77 mm (without probe)
Weight	1.5 kg (without probe, without Profibus/Ethernet module)
Display	
Display	Optional: 2-line LCD with clear text line and relay status display
Resolution	0.1 %RH / °Ctd / °Ftd / °Ctw / °Ftw or 0.01 °C/°F 1g / kg / g/m ³ / ppm
Operation	
Parameterization	4 operating buttons for display / P2A software
Installation	
Probe connection	Digital probe connection
Miscellaneous	
Protection class	IP65
EMC	2004/108/EG

Operating conditions

	Operating temperature (with integrated relay)	-40 to +60 °C
Without display	Operating temperature	-40 to +70 °C / -40 to +158 °F
	Storage temperature	-40 to +80 °C / -40 to +176 °F
With display	Operating temperature	0 to +50 °C / +32 to +122 °F
	Storage temperature	-40 to +80 °C / -40 to +176 °F
	Measurement medium	Air, nitrogen; more on request: applicationsupport@testo.de

Technical data probe range testo 6610

	testo 6611	testo 6612	testo 6613	testo 6614	testo 6615	testo 6617
						
Type	Wall	Cable	Cable	Heated cable	Cable trace humidity (self-adjustment)	Cable with cover electrode monitoring
Operating range	Room climate probe wall mounting	Process humidity probe duct mounting	Process humidity probe flexible with cable	Humidity probe for high humidity applications / when risk of condensation	Humidity probe for trace humidity / dewpoint (with self-adjustment)	Humidity probe with self-monitoring for sensor-damaging media

Measurement parameters

Humidity

Measuring range***	0 to 100 %RH			see trace humidity	0 to 100 %RH
Measurement uncertainty* (+25 °C)**	testo 6611/12/13: $\pm(1.0 + 0.007 * mv)$ %RH for 0 to 100 %RH / $\pm(1.4 + 0.007 * mv)$ %RH for 90 to 100 %RH; testo 6614: $\pm(1.0 + 0.007 * mv)$ %RH for 0 to 100 %RH; testo 6617: $\pm(1.2 + 0.007 * mv)$ %RH for 0 to 90 %RH / $\pm(1.6 + 0.007 * mv)$ %RH for 90 to 100 %RH +0.02 %RH per Kelvin dependent on the process and electronics temperature (for a deviation of 25 °C / 77 °F)				
Selectable units	%RH; °C _{td} /°F _{td} ; g/m ³ / gr/ft ³ ; g/kg / gr/lb; kj/kg; BTU/lb; °C _{tw} /°F _{tw} ; hPa; inch H ₂ O ₂ ; ppm vol %; %vol; °C _{tm} (H ₂ O ₂) / °F _{tm} (H ₂ O ₂)				
Reproduceability	better than ± 0.2 %RH				
Sensor	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor; soldered			
Response time	t90 max. 10 sec.				
Temperature					
Selectable units	°C/°F				
Measuring range	-20 to +70 °C/ -4 to +158 °F	-30 to +150 °C/ -22 to +248 °F	-40 to +180 °C/-40 to +356 °F	-40 to +120 °C/- 22 to +302 °F	-40 to +180 °C/- 40 to +356 °F
Measurement uncertainty* (at +25 °C / +77 °F)	± 0.15 °C / 0.27 °F (Pt1000 Class AA)			Pt100 Class AA	Pt1000 Class AA
Trace humidity					
Trace humidity	-60 to +30 °C _{td}				
Measurement uncertainty				± 1 K at 0° C _{td} ± 2 K at -40° C _{td} ± 4 K at -50° C _{td}	

General technical data

Probes

Probe shaft	Stainless steel				
Cable	FEP coated				
Plug	Plastic ABS				
Probe dimensions (diameter)	12 mm				
Probe dimensions (probe shaft length)	70/200 mm	200/300/500/ 800 mm	120/200/300/500/ 800 mm	200/500 mm	
Cable length	—	specifically for duct versions	—	1/2/5/10 m	

Operating conditions

Pressure tightness	1 bar positive pressure (probe tip)	PN 10 (probe tip) PN 1 (probe tip)	PN 16 (probe tip)	1 bar positive pressure (probe tip)
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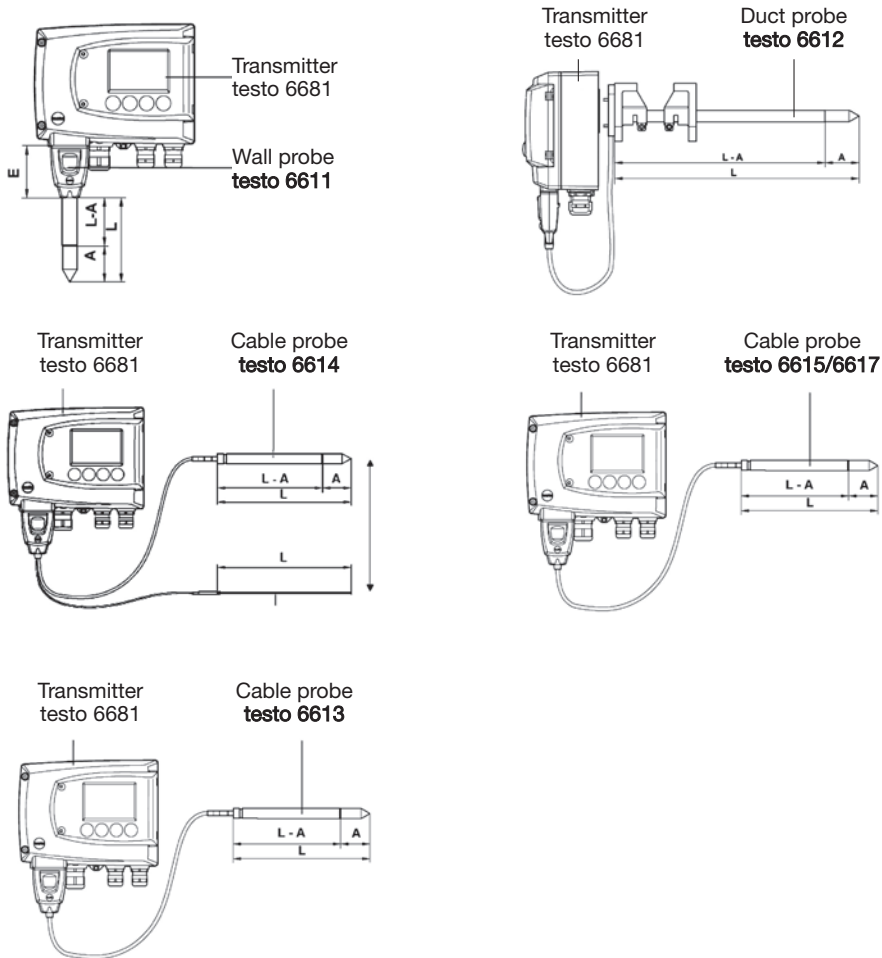
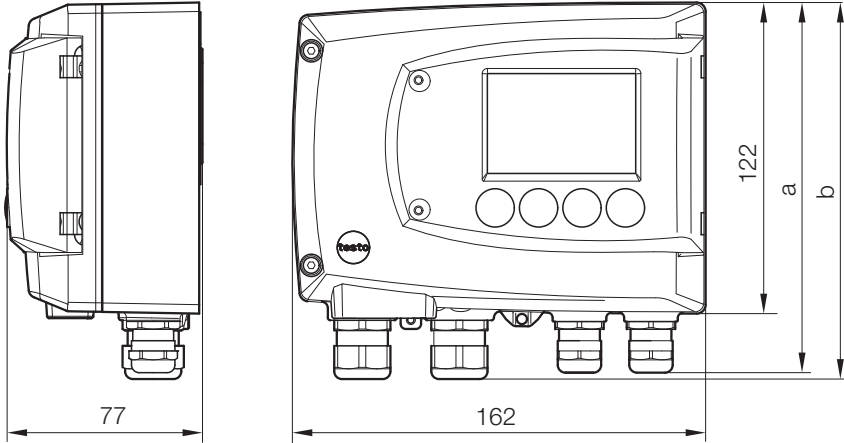
* Other accuracies apply for wall probe length 70 mm combined with a current output (P07):
Operation: 2 channels at 12 mA, without display illumination, relay off, additional measurement error to above values at +25 °C (+77°F), humidity ± 2.5 % RH

**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, reproduceability), 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%.

***For continuous applications in high humidity (>80 %RH at ≤ 30 °C for >12 h, >60 %RH at > 30 °C for >12h), please contact us via www.testo.com. testo 6614 is suitable for high humidity applications.

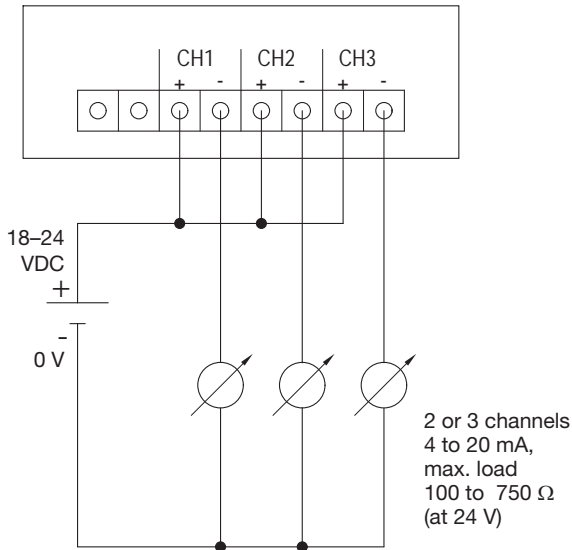
Technical drawings



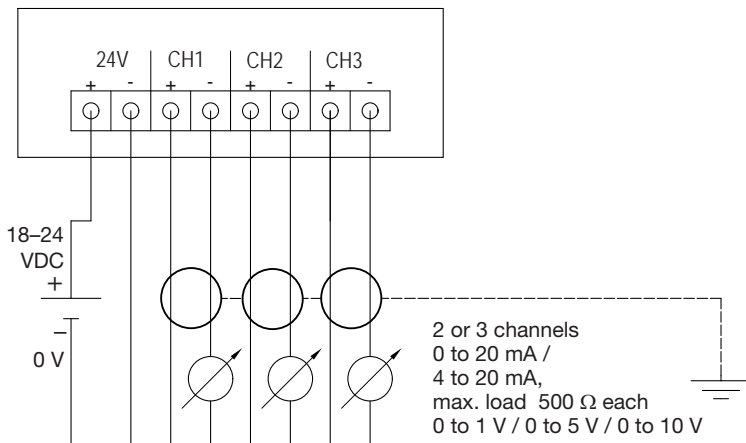
L = Probe length
 L-A = Probe length - length protective cal
 A = 35 mm

Connection plan

Connection plan 2-wire technology (4 to 20 mA)



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)





Options / Ordering example

The following options can be specified for the testo 6681:

Bxx	Analog output / supply
Cxx	Display / menu language
Dxx	Cable entry
Exx	Ethernet
Fxx	Humidity / temperature unit
Gxx	Humidity / temperature unit
Hxx	Relay
Ixx	Humidity / temperature unit (optional)

Bxx Analog output / supply

B01 4 to 20 mA (2-wire, 24 VDC), not possible with relay, Ethernet module or probe testo 6614/6615
 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)
 B77 Profibus-DP

Cxx Display/menu language

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

C02–C08 Clear text language. Operating menu only available with display.

Dxx Cable entry

D01 Cable entry M16 (relay: M20)
 D02 Cable entry NPT ½"
 D03 Cable contact via M plug connection for signal and supply (for optional relay: M20 cable entry)

Exx Ethernet

E00 Without Ethernet module
 E01 With Ethernet module

Fxx Humidity/temperature unit

F01 %RH / min / max
 F02 °C / min / max
 F03 °F / min / max
 F04 °C_{td} / min / max
 F05 °F_{td} / min / max
 F06 g/kg / min / max
 F07 gr/lb / min / max
 F08 g/m³ / min / max
 F09 gr/ft³ / min / max
 F10 ppmV / min / max
 F11 °C_{wb} / min / max (wet bulb)
 F12 °F_{wb} / min / max (wet bulb)
 F13 kJ/kg / min / max (enthalpy in air)
 F14 hPa / max (water vapour partial pressure)
 F15 inch H₂O / min / max (water vapour partial pressure)
 F18 %Vol.

F01–F18 = Channel 1*

Gxx Humidity/temperature unit

G01 %RH / min / max
 G02 °C / min / max
 G03 °F / min / max
 G04 °C_{td} / min / max
 G05 °F_{td} / min / max
 G06 g/kg / min / max
 G07 gr/lb / min / max
 G08 g/m³ / min / max
 G09 gr/ft³ / min / max
 G10 ppmV / min / max
 G11 °C_{wb} / min / max (wet bulb)
 G12 °F_{wb} / min / max (wet bulb)
 G13 kJ/kg / min / max (enthalpy in air)
 G14 hPa / max (water vapour partial pressure)
 G15 inch H₂O / min / max (water vapour partial pressure)
 G18 %Vol.

G01–G18 = Channel 2*

Hxx Relay (not with B01)

H00 Without relay
 H01 4 relay outputs, limit value monitoring
 H02 4 relay outputs, limit values Channel 1 + collective alarm

Ixx Humidity/temperature unit (optional)

I00 no optional 3rd analog output
 I01 %RH / min / max
 I02 °C / min / max
 I03 °F / min / max
 I04 °C_{td} / min / max
 I05 °F_{td} / min / max
 I06 g/kg / min / max
 I07 gr/lb / min / max
 I08 g/m³ / min / max
 I09 gr/ft³ / min / max
 I10 ppmV / min / max
 I11 °C_{wb} / min / max (wet bulb)
 I12 °F_{wb} / min / max (wet bulb)
 I13 kJ/kg / min / max (enthalpy)
 I14 hPa / min / max (water vapour partial pressure)
 I15 inch H₂O / min / max (water vapour partial pressure)
 I16 °C_{tm} / mixture dewpoint for H₂O₂
 I17 °F_{tm} / mixture dewpoint for H₂O₂
 I18 %Vol.

I00–I18 = Channel 3*

* The standard scaling is supplied if "min" and "max" are not specified.

** Plug connection M12, 5-pin plug and socket available as accessories.

Ordering example

Order code for transmitter testo 6681 with the following options:

- Housing with display with menu setting English
- 4 to 20 mA (4-wire)
- Cable entry M16/M20
- Ethernet module
- Factory configuration Channel 1: °C_{tpd} with scaling min 0 °C_{td}, max 100 °C_{td}*
- Factory configuration Channel 2: °C with scaling min -10 °C/-14 °F
- max +70 °C/+158 °F*
- with relay
- without 3rd channel

0555 6681 A01 B06 C02 D01 E01 F03
 F04 0 100 G02 -10 +70 H01 I00



Options / Ordering example

The following options can be specified for the probe testo 661x:

Lxx Probe version
Mxx Protective cap
Nxx Probe shaft length
Pxx Probe length / length mm

Lxx Probe version

L11 Probe 6611 (wall version)
L12 Probe 6612 (duct version up to 150 °C)
L13 Probe 6613 (duct version up to 180 °C)
L14 Probe 6614 (heated cable version)
L15 Probe 6615 (trace humidity cable version)
L17 Probe 6617 (self-monitored cable version)

Protective cap

M01 Stainless steel protective cap
M02 Wire mesh protective filter
M03 PTFE protective cap
M04 Metal protective cap, open
M06 PTFE protective cap with condensate drip hole
M07 PTFE protective cap with condensation protection and condensate drip hole
M08 Protective cap for H₂O₂ atmospheres

Nxx Probe length / length mm

N00 Without cable (only L11)
N01 Probe length 1 m (not for L11, L12)
N02 Probe length 2 m (not for L11, L12)
N05 Probe length 5 m (not for L11, L12)
N10 Probe length 10 m (not for L11, L12)
N23 Probe length 0.6 m, specially for duct versions (only L12)

Pxx Probe length / length mm

P07 Probe length 70 mm (only L11)
P12 Probe length 120 mm (only L13)
P20 Probe length 200 mm
P30 Probe length 300 mm (only L12, L13, L14)
P50 Probe length 500 mm (not with L11)
P80 Probe length 800 mm (only L12, L13)

Ordering example

Order code for probe testo 6613 with the following options:

- Cable probe, -40 to +180 °C
- Sintered stainless steel filter
- Cable length 2 m
- Probe length 300 mm

0555 6610 L13 M01 N02 P30



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