

# The industrial humidity transmitter

**testo 6681 + probe  
series testo 661x**

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

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

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Self-monitoring and early warning guarantee high system availability

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Calculation and presentation of all relevant humidity parameters

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

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Display with multi-language display

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Robust, easy-to-clean metal housing

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%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 <sup>3</sup> (gr/ft <sup>3</sup> ); 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/H2O; water content in ppmV; mixture dewpoint H <sub>2</sub> O <sub>2</sub> in °Ctm/°Ftm; %RH acc. to WMO; temperature in °C/°F
Measuring range	0 to 100 %RH
<b>Trace humidity</b>	
Selectable units	Dewpoint in °Ctd/°Ftd
Measuring range	-60 to +30 °Ctd / -76 to +86 °Ftd (only with testo 6610 L15)
<b>Temperature</b>	
Selectable units	Temperature in °C/°F
Measuring range	Dependent on probe (testo 661x)

## Inputs and outputs

### Analog outputs

Quantity	2, optionally 3 channels (channel freely selectable)
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	500 Ω at 24 VAC/DC

### Further outputs

Ethernet	Optional: module can be fitted as intermediary layer
Relays	Optional: 4 relays (free allocation to measurement channels or as collective alarm with operating menu/PsA software), up to 250 V AC/DC / 3 A (NO/NC)
Other outputs	Mini DIN for Testo P2A software
<b>Supply</b>	
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	1.960 kg (without probe, without Ethernet module)
<b>Display</b>	
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 <sup>3</sup> / ppm
<b>Operation</b>	
Parameterization	4 operating buttons for display / P2A software
<b>Installation</b>	
Probe connection	Digital probe connection
<b>Miscellaneous</b>	
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

# 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: ±(1.0 + 0.007 * mv) %RH for 0 to 100 %RH / ±(1.4 + 0.007 * mv) %RH for 90 to 100 %RH; testo 6614: ±(1.0 + 0.007 * mv) %RH for 0 to 100 %RH; testo 6617: ±(1.2 + 0.007 * mv) %RH for 0 to 90 %RH / ±(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 <sub>td</sub> /°F <sub>td</sub> ; g/m <sup>3</sup> / gr/ft <sup>3</sup> ; g/kg / gr/lb; kj/kg; BTU/lb; °C <sub>tw</sub> /°F <sub>tw</sub> ; hPa; inch H <sub>2</sub> O <sub>2</sub> ; ppm vol %; %vol; °C <sub>tm</sub> (H <sub>2</sub> O <sub>2</sub> )/ °F <sub>tm</sub> (H <sub>2</sub> O <sub>2</sub> )				
Reproduceability	better than ±0.2 %RH				
Sensor	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor; soldered			
Response time	t90 max. 10 sec.				
<b>Temperature</b>					
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/ -40 to +248 °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
<b>Trace humidity</b>					
Trace humidity	-60 to +30 °C <sub>td</sub> / -76 to +86 °F <sub>td</sub>				
Measurement uncertainty				±1 K at 0° C <sub>td</sub> ±2 K at -40° C <sub>td</sub> ±4 K at -50° C <sub>td</sub>	

## 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	–	especially 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

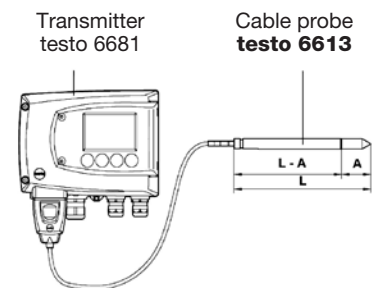
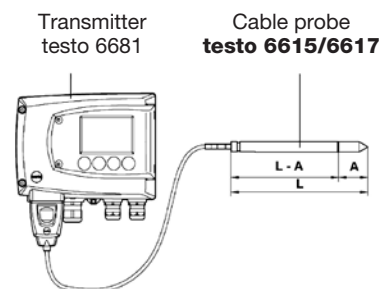
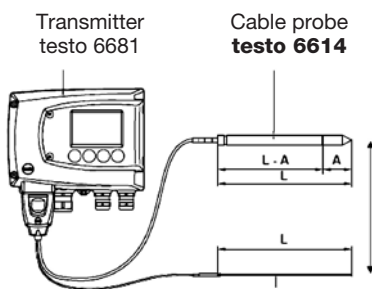
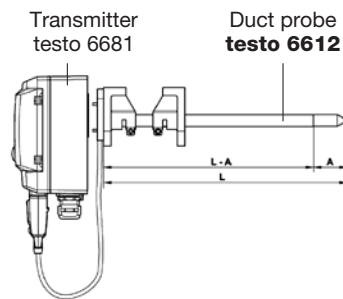
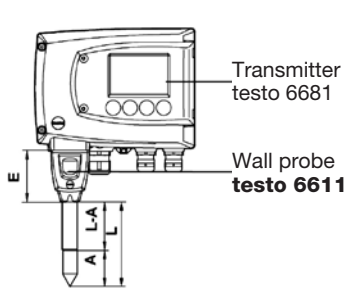
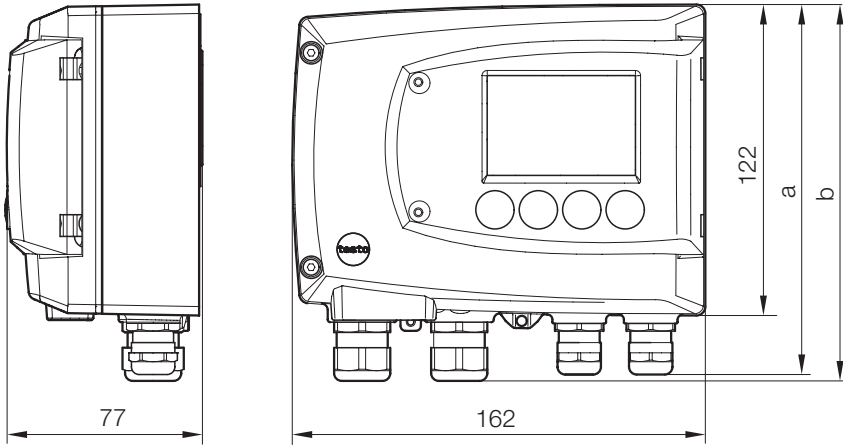
### \*\*The determination of measurement uncertainty takes place according to GUM (Guide to the Expression of Uncertainty in Measurement):

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](http://www.testo.com). testo 6614 is suitable for high humidity applications.

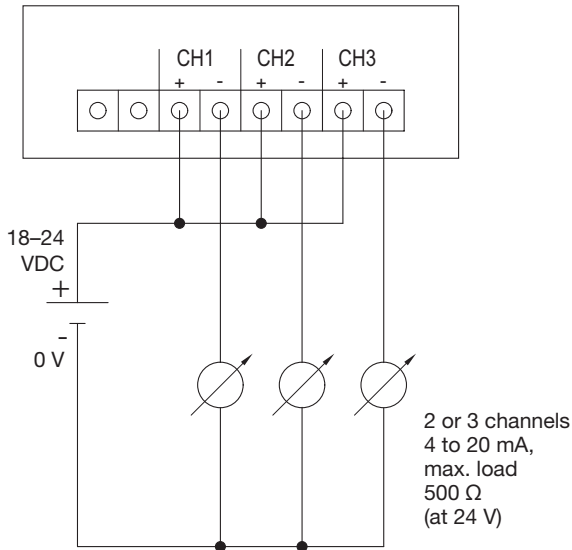
# Technical drawings



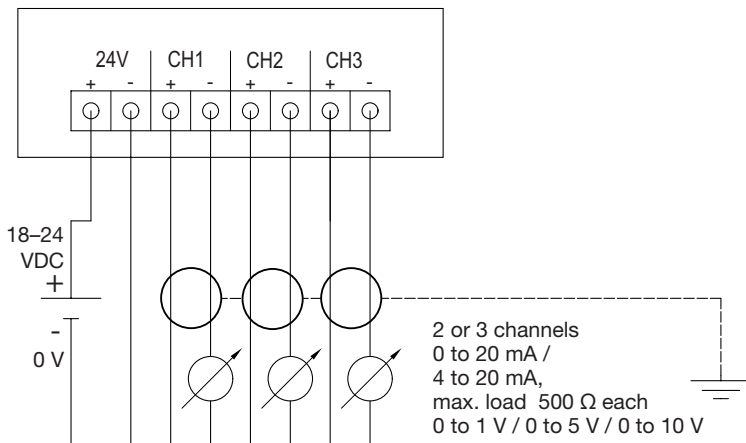
L = Probe length  
 L-A = Probe length - length protective cal  
 A = 35 mm

# 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)

## 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<sub>td</sub> / min / max  
 F05 °F<sub>td</sub> / min / max  
 F06 g/kg / min / max  
 F07 gr/lb / min / max  
 F08 g/m<sup>3</sup> / min / max  
 F09 gr/ft<sup>3</sup> / min / max  
 F10 ppmV / min / max  
 F11 °C<sub>wb</sub> / min / max (wet bulb)  
 F12 °F<sub>wb</sub> / min / max (wet bulb)  
 F13 kJ/kg / min / max (enthalpy in air)  
 F14 hPa / max (water vapour partial pressure)  
 F15 inch H<sub>2</sub>O / 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<sub>td</sub> / min / max  
 G05 °F<sub>td</sub> / min / max  
 G06 g/kg / min / max  
 G07 gr/lb / min / max  
 G08 g/m<sup>3</sup> / min / max  
 G09 gr/ft<sup>3</sup> / min / max  
 G10 ppmV / min / max  
 G11 °C<sub>wb</sub> / min / max (wet bulb)  
 G12 °F<sub>wb</sub> / min / max (wet bulb)  
 G13 kJ/kg / min / max (enthalpy in air)  
 G14 hPa / max (water vapour partial pressure)  
 G15 inch H<sub>2</sub>O / 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<sub>td</sub> / min / max  
 I05 °F<sub>td</sub> / min / max  
 I06 g/kg / min / max  
 I07 gr/lb / min / max  
 I08 g/m<sup>3</sup> / min / max  
 I09 gr/ft<sup>3</sup> / min / max  
 I10 ppmV / min / max  
 I11 °C<sub>wb</sub> / min / max (wet bulb)  
 I12 °F<sub>wb</sub> / min / max (wet bulb)  
 I13 kJ/kg / min / max (enthalpy)  
 I14 hPa / min / max (water vapour partial pressure)  
 I15 inch H<sub>2</sub>O / min / max (water vapour partial pressure)  
 I16 °C<sub>tm</sub> / mixture dewpoint for H<sub>2</sub>O<sub>2</sub>  
 I17 °F<sub>tm</sub> / mixture dewpoint for H<sub>2</sub>O<sub>2</sub>  
 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<sub>td</sub> with scaling min 0 °C<sub>td</sub>, max 100 °C<sub>td</sub>\*
- 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  
 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 H<sub>2</sub>O<sub>2</sub> 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)  
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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