


## The industrial humidity transmitter



**SPECIFICATIONS**  
**testo 6681 + Probe series testo 661x**



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.



**SPECIFICATIONS**  
**testo 6681**

- 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

**Probe series testo 661x**

- Testo humidity sensor guarantees highest long-term stability and accuracy up to  $\pm 1.0$  %RH
- Digital, exchangeable probes for specific applications:  
 testo 6611: Indoor air probes for wall mounting  
 testo 6612: Process climate probes for duct installation  
 testo 6613: Process humidity probes as duct version  
 testo 6614: Humidity probes for high humidity applications  
 testo 6615: Trace humidity probe with self-adjustment  
 testo 6617: Humidity probe with self-monitoring for sensor-damaging media.

Areas of application:

**Stationary humidity measurement in production/process technology:**

- Drying processes:
  - Drying tobacco,
  - Ceramics production
  - Drying roof tiles
- Spray-painting booths
- Food:
  - Maturing cheese
  - Ripening fruit
  - Drying pasta
- Bio research
- Mushroom farming
- Special areas high humidity
- Sterilization processes in H<sub>2</sub>O<sub>2</sub>-atmospheres

**Stationary measurement of indoor ambient conditions:**

- Monitoring comfort levels
- Museums
- Storage of hygroscopic substances
- Storage of electronic components



## The industrial humidity transmitter

### 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/H <sub>2</sub> O; 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
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)

#### 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 <sup>3</sup> / ppm
Operation	
Parameterization	4 operating buttons for display / P2A software
Installation	
Probe connection	Digital probe connection
Miscellaneous	
Protection class	IP65
EMC	2004/108/EG

#### 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

#### 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



## The industrial humidity transmitter

### 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 %RH for 0 to 90 %RH / ±1.4 %RH for 90 to 100 %RH; testo 6614: ±1.0 %RH for 0 to 100 %RH; testo 6617: ±1.2 %RH for 0 to 90 %RH / ±1.6 %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.					
Temperature						
Selectable units	°C/°F					
Measuring range	-20 to +70 °C/ -4 to +158 °F	-30 to +120 °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)	±0.2 °C / 0.38 °F (Pt1000 1/3 Class B)				Pt100 1/3 Class B	Pt1000 1/3 Class B
Trace humidity						
Trace humidity	-60 to +30 °C <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

\*\*Measurement uncertainty calculation according to GUM  
**GUM** (Guide to the Expression of Uncertainty in Measurement): ISO guideline for the calculation of measurement uncertainty, in order to make measurement results comparable worldwide. The following uncertainties are used in the calculation:

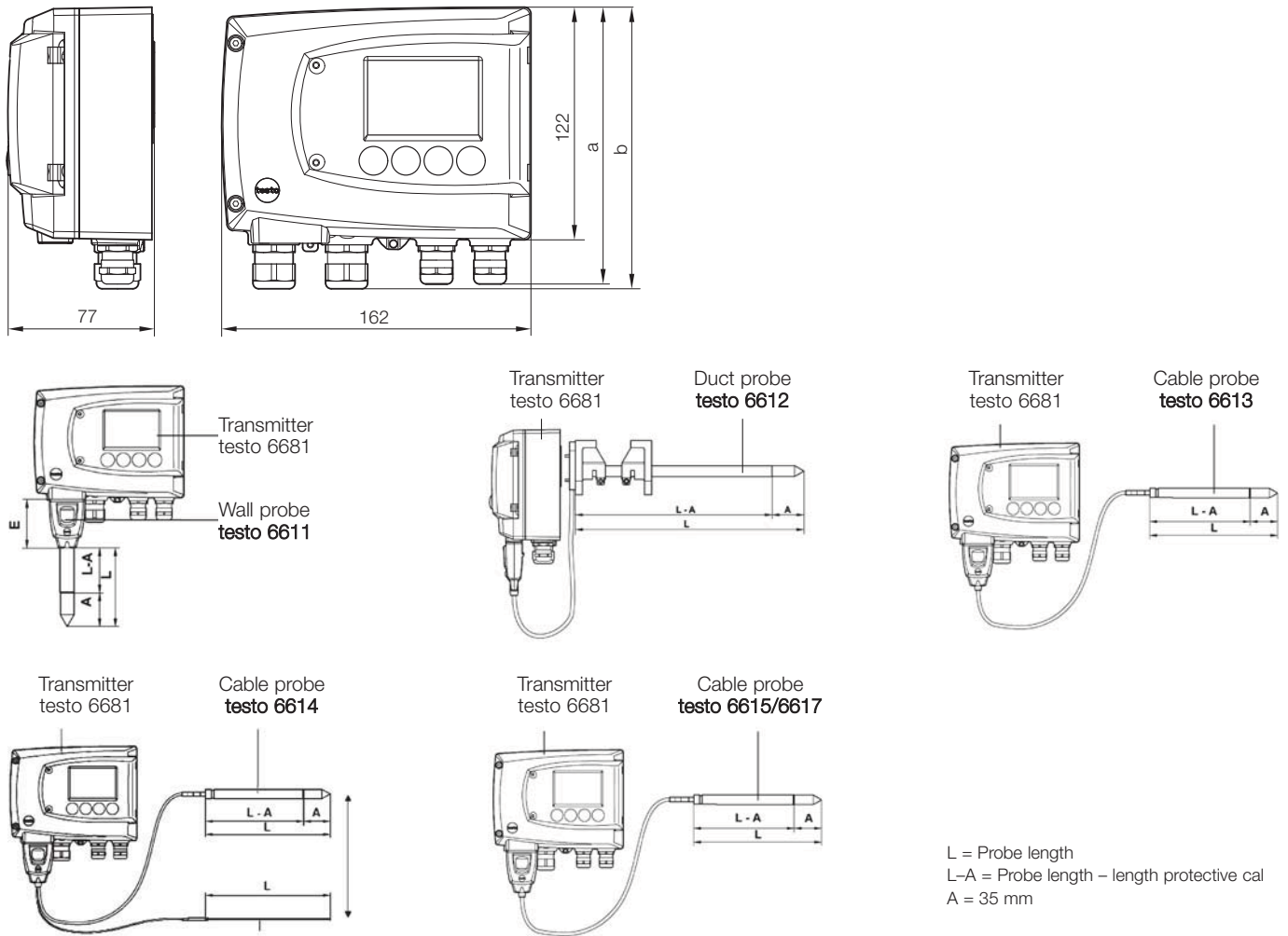
- Hysteresis
- Linearity
- Reproduceability
- Adjustment site/factory calibration
- Uncertainty contribution of the test site

This total view results in an additional uncertainty contribution of ±0.007 x measurement value (in %RH).



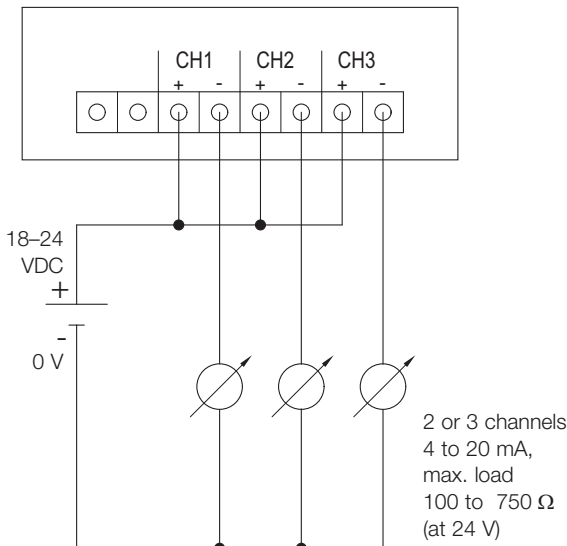
# The industrial humidity transmitter

## Technical drawings

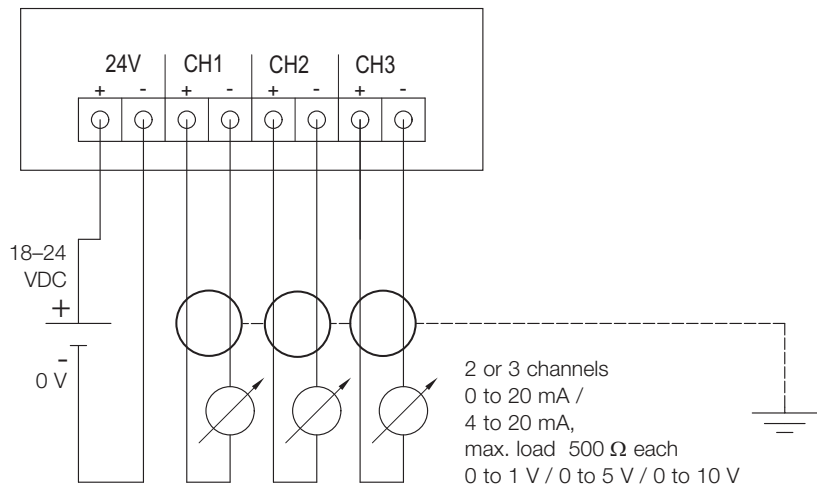


## Connection plan

### 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)



Subject to change without notice.



## The industrial humidity transmitter

The following options can be specified for the testo 6681:

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

K – TEST, s.r.o.  
 Letná 40  
 042 60 Košice  
 Tel/fax.: 055 6253633, 6255159  
 ktest@iol.sk, ktest@ktest.sk  
 www.ktest.sk, www.testo.sk  
 0905 522488

<b>Bxx Analog output / supply</b>
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

<b>Cxx Display/menu language</b>
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

<b>Dxx Cable entry</b>
D01 Cable entry M16 (relay: M20)
D02 Cable entry NPT 1/2"
D03 Cable contact via M plug connection for signal and supply (for optionale relay: M20 cable entry)

<b>Exx Ethernet</b>
E00 Without Ethernet module
E01 With Ethernet module

<b>Fxx Humidity/temperature unit</b>
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.

<b>Gxx Humidity/temperature unit</b>
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.

<b>Hxx Relay</b>
H00 Without relay
H01 4 relay outputs, limit value monitoring
H02 4 relay outputs, limit values Channel 1 + collective alarm

<b>Ixx Humidity/temperature unit (optional)</b>
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.

<b>Kxx Instruction manual language</b>
K01 IM German-English
K02 IM French-English
K03 IM Spanish-English
K04 IM Italian-English
K05 IM Dutch-English
K06 IM Japanese-English
K07 IM Chinese-English

### 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
- Etherne 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
- Instruction manual in Spanish und English

0555 6681 A01 B06 C02 D01 E01 F03 F04 0 100 G02 -10 +70 H01 I00 K03

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

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

<b>Lxx Probe version</b>
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)

<b>Protective cap</b>
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

<b>Nxx Probe length / length mm</b>
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, specially for duct versions (nur L12)

<b>Pxx Probe length / length mm</b>
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)

### 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