

# Humidity transmitter for critical climate applications

## testo 6651

---

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

---

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 the humidity parameters relative humidity absolute humidity and dewpoint.

---

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

---

Display with multi-language display

---

High-quality plastic housing



%RH

°C

Not all measurement problems can be solved with „simple“ transmitters. The testo 6651 meets special challenges.

When combined with the probe series testo 660x, the testo 6651 becomes the first choice in demanding air conditioning technology as well as in many other applications.

# Technical data testo 6651

## Parameters

### Humidity

Units	Relative humidity %RH , °Ctd, °Ftd, g/m <sup>3</sup>
Meas. range	0 to 100 %RH
<b>Temperature</b>	
Units	Temperature in °C / °F
Meas. range	Dependent on probe (testo 660x)

### Inputs and outputs

#### Analog outputs

Quantity	2 channels
Output type	0/4 to 20 mA (2-wire/4-wire) 0 to 1/5/10 V (4-wire)
Measuring 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 (XML or Saveris mode)
Ethernet XML	List of instructions in the instruction manual at <a href="http://www.testo.com/manuals">www.testo.com/manuals</a>
Ethernet Saveris mode	- Circular buffer memory for at least 6,000 up to 12,000 readings. - Measuring cycle adjustable via CFR / Professional Saveris software
Relays	Optional: 4 relays (free allocation to measurement channels or as collective alarm with operating menu/P2A software), up to 250 V AC/DC / 3 A (NO/NC)
Other outputs	Mini DIN for Testo P2A parameterization software

#### Power

Voltage supply	2-wire: 24 VDC ±10 % 4-wire: 20 to 30 VAC/DC
Current consumption	max. 300 mA

## General technical data

### Design

Material	Plastic
Dimensions	122 x 162 x 77 mm (without probe)
Weight	0.675 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 / 0.01 °C/°F / 0.1 °C <sub>td</sub> /°F <sub>td</sub> / 1 g/m <sup>3</sup>
<b>Operation</b>	
Parameterization	Four operating buttons for display / P2A software
<b>Installation</b>	
Cable screw fitting	Standard: PG screw fitting Optional: M16 or M20 M plug connection or optional: NPT 1/2 plug connection
Probe connection	Digital plug connection
<b>Other features</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 series testo 660x

	testo 6601	testo 6602	testo 6603	testo 6604	testo 6605
Type	Wall	Duct	Duct	Cable	Cable
Operating range	Room climate probe wall mounting	Climate probe duct mounting	Process climate probe duct mounting for higher process temperatures	Climate probe with cable	Stainless steel process probe with cable for higher process temperatures

## Measurement parameters

### Humidity

Meas. range***	0 to 100 %RH				
Measurement uncertainty* (+25 °C)**	$\pm(1.7 + 0.007 * \text{mv}) \text{ %RH}$ (0 to 90 %RH) / $\pm(1.9 + 0.007 * \text{mv}) \text{ %RH}$ (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; °Ctd/°Ftd				
Reproduceability	better than $\pm 0.2 \text{ %RH}$				
Long-term drift	$\leq \pm 1 \text{ %rH} / \text{drift per year}$				
Sensor	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor, plug-in	Testo capacitive humidity sensor; soldered
Response time (without protective filter)	t90 max. 10 sec.				
<b>Temperature</b>					
Selectable units	°C/°F				
Sensor	-20 to +70 °C/ -4 to +158 °F	-30 ... +120 °C/ -22 ... +248 °F	-20 ... +70°C/ -4 ... +158 °F	-30 ... +120 °C/ -22 ... +248 °F	
Measurement uncertainty* (at +25 °C / +77 °F)	$\pm 0.15 \text{ °C} / 0.27 \text{ °F}$ (PT1000 Class A)				Pt1000 Class AA

## General technical data

Probe shaft	Plastic ABS			Stainless steel
Cable	FEP coated			
Plug	Plastic ABS			
Probe dimensions (diameter)	12 mm			
Probe dimensions (probe shaft length)	70/200 mm	280 mm	140/280 mm	200/500 mm
Cable length	–	specially for duct versions	1 / 2 m	1 / 2 / 5 m

## Operating conditions

Pressure tightness	without	1 bar positive pressure (probe tip)	PN 10 (probe tip) PN 1 (probe tip)
--------------------	---------	-------------------------------------	---------------------------------------

\* Other accuracies apply for wall probe length 70 mm combined with a current output (P07):

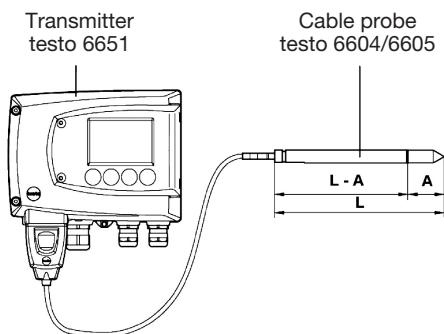
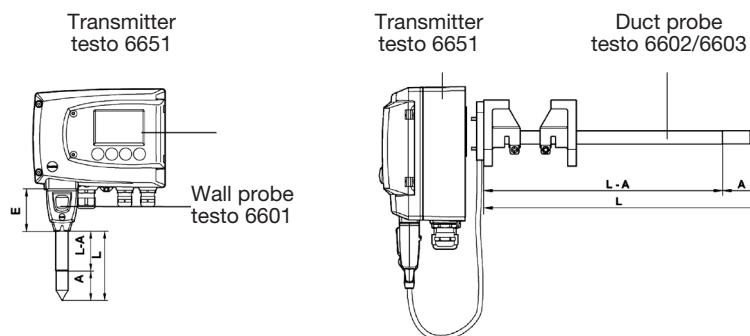
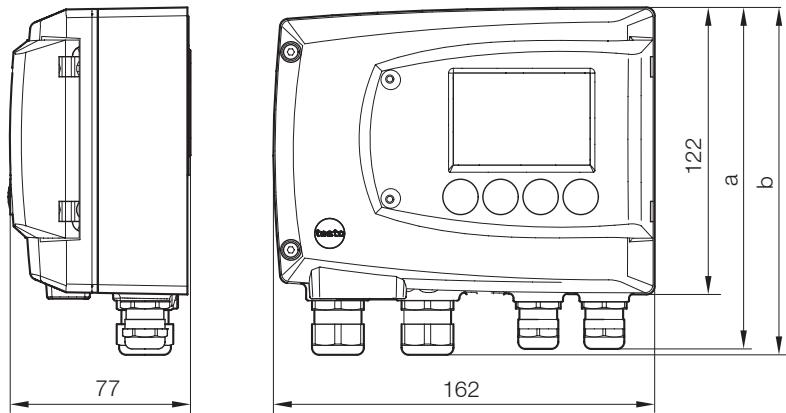
Operation: 2 channels at 12 mA, without display illumination, relay off, additional measurement error to above values at +25 °C (+77°F), humidity  $\pm 2.5 \text{ % RH}$

\*\*For continuous applications in high humidity ( $>80 \text{ %RH}$  at  $\leq 30 \text{ °C}$  for  $>12 \text{ h}$ ,  $>60 \text{ %RH}$  at  $>30 \text{ °C}$  for  $>12\text{h}$ ), please contact us via [www.testo.com](http://www.testo.com).

### \*\*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%.

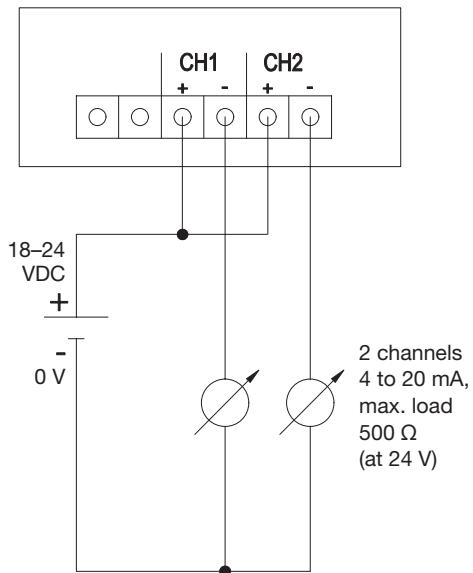
## Technical drawings



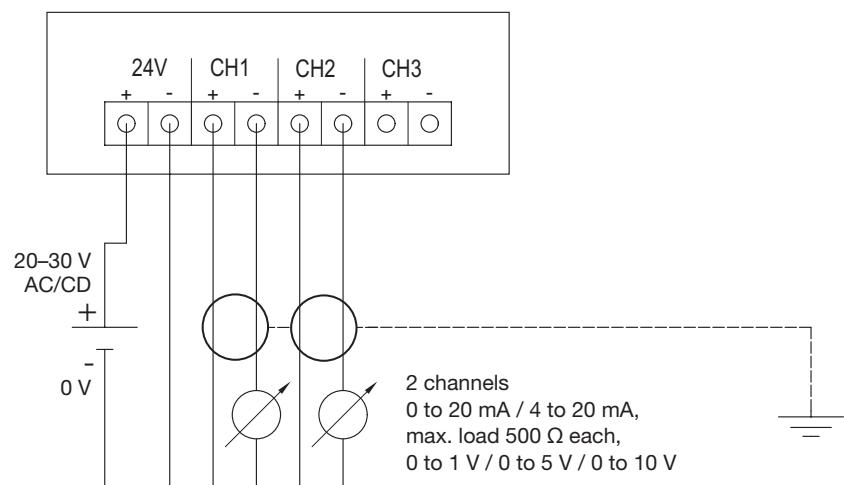
L = Probe length  
 L-A = Probe length – length protective cap  
 A = 35 mm

# 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 6651:

Bxx	Analog output / supply
Cxx	Display / menu language
Dxx	Cable entry
Exx	Ethernet
Fxx	Humidity / temperature unit channel 1
Gxx	Humidity / temperature unit channel 2
Hxx	Relay

## Bxx Analog output/supply

- B01 4 to 20 mA (2-wire, 24 VDC), not possible with relay or Ethernet module
- 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 1/2"
- 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 Channel 1\*

- 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
- F08 g/m<sup>3</sup>

## Gxx Humidity/temperature unit Channel 2\*

- 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

## Hxx Relay

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

## Ordering example

Order code for transmitter testo 6651 with the following options:

- 4 to 20 mA (2-wire)
- Cable entry M16/M20
- Factory configuration channel 1: %RH with scaling min 0 %, max 100 %
- Factory configuration channel 2: °C with scaling min -10 °C/-14 °F, max +70 °C/+158 °F\*
- without relay

0555 6651 A01 B01 C03 D01 E00 F01  
0 100 G02 -10 70 H00

\* The standard scaling is supplied if „min“ and „max“ are not specified.

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

\*\*\* not with code „B01“.

Relay parameterization in commissioning via operating menu (display) or P2A software

# Options / Ordering example

The following options can be specified for the probe testo 660x

Lxx Probe version

Mxx Protective cap

Nxx Probe shaft length

Pxx Probe length / length mm

## Ordering example

Order code for testo 6602 with the following options:

- Duct probe  
(-20 to +70 °C/-4 to 158 °F sufficient)
- Sintered stainless steel probe
- Probe length 280 mm

0555 6600 L02 M01 N23 P28

### Lxx Probe version

L01 Probe 6601 (Wall version)

L02 Probe 6602 (Duct version -20 to 70 °C)

L03 Probe 6603 (Duct version -30 to 120 °C)

L04 Probe 6604 (Duct version -20 to 70 °C)

L05 Probe 6605 (Duct version -30 to 120 °C)

### Mxx Protective cap

M01 Stainless steel protective cap

M02 Wire mesh protective filter

M03 PTFE protective cap

M04 Metal protective cap, open

M05 ABS plastic protective cap, open

### Nxx Probe length / length mm

N00 Without cable (for probe 6601)

N01 Probe length 1 m (for probe 6604/6605)

N02 Probe length 2 m (for probe 6604/6605)

N05 Probe length 5 m (for probe 6605 only)

N10 Probe length 10 m (for probe 6605)

N23 Probe length 0.6 m, especially for duct versions (for probes 6602/6603)

### Pxx Probe length / length mm

P07 Probe length 70 mm (only for L01)

P14 Probe length 140 mm (only for L04)

P20 Probe length 200 mm (only for L01, L05)

P28 Probe length 280 mm (not for L01, L05)

P50 Probe length 500 mm (only L05)

