

Humidity transmitter for critical climate applications

testo 6651

Optimum adjustment concept thanks to adjustment 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 ³
Meas. range	0 to 100 %RH

Temperature

Units	Temperature in °C / °F
Meas. range	Dependent on probe (testo 660x)

Inputs and outputs

Analog outputs

Quantity	2 channels (analog signal type uniform for both 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	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
Relays	Optional: 4 relays (free allocation to measurement channels or as collective alarm with operating menu/P2A software), up to 250 VDC /3 A (NO/NC)
Other outputs	Mini DIN for Testo P2A software and portable measuring instruments testo 400/650
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	0.62 kg (without probe, without Ethernet module)

Display

Display	Optional: 2-line LCD with clear text line and relay status display
Resolution	0.1 %RH / 0.01 °C/°F / 0.1 °C _{td} /°F _{td}

Operation

Parameterization	Four operating buttons for display / P2A software
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Installation

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






Other features

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 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)**	$\pm(1.7 + 0.007 \cdot mv) \%RH$ (0 to 90 %RH) / $\pm(1.9 + 0.007 \cdot mv) \%RH$ (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 $\pm 0.2 \%RH$				
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.				
Temperature					
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	-	specifically 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)
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* Other accuracies apply for wall probe length 70 mm combined with a current output (P07):

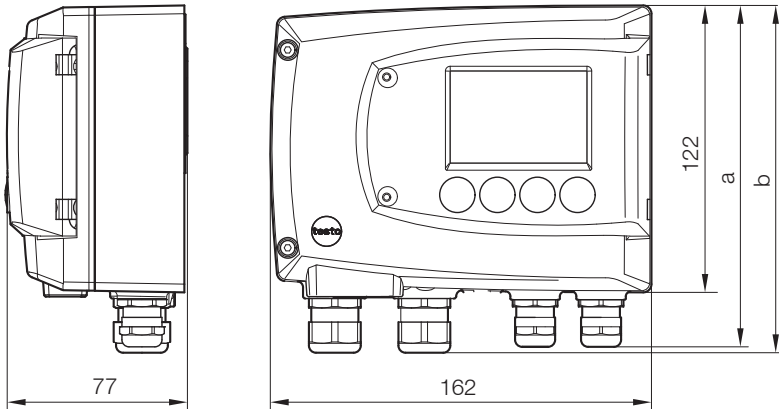
Operation: 2 channels at 12 mA, without display illumination, relay off, additional measurement error to above values at +25 °C (+77°F), humidity $\pm 2.5 \% RH$

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

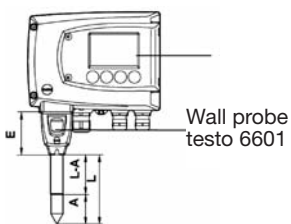
Technical drawings



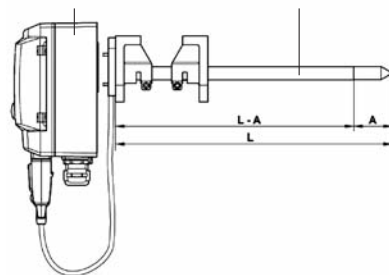
Transmitter
testo 6651

Transmitter
testo 6651

Duct probe
testo 6602/6603

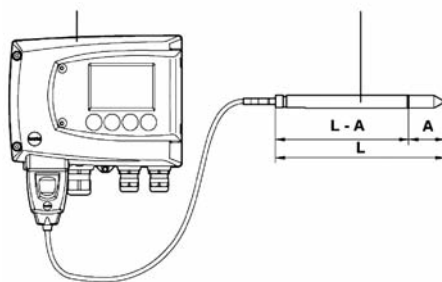


Wall probe
testo 6601



Transmitter
testo 6651

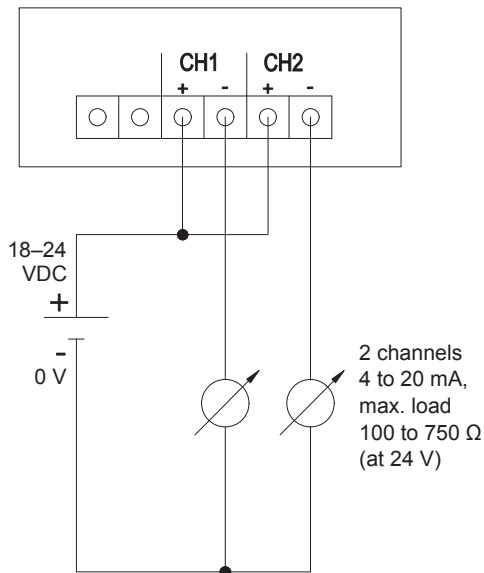
Cable probe
testo 6604/6605



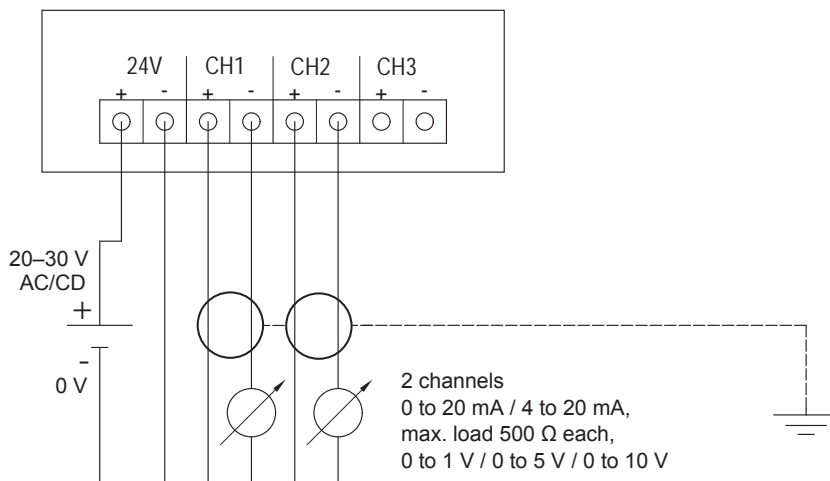
L = Probe length
L-A = Probe length – length protective cal
A = 35 mm

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 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	0 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.

* 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

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 Channel 1*

F01	%RH / min / max
F02	°C / min / max
F03	°F / min / max
F04	°C _{td} / min / max
F05	°F _{td} / min / max
F08	g/m ³

Gxx Humidity/temperature unit Channel 2*

G01	%RH / min / max
G02	°C / min / max
G03	°F / min / max
G04	°C _{td} / min / max
G05	°F _{td} / 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 F01
G02 H00

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 6604/6605)
 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 (only for L01, L05)
 P50 Probe length 500 mm (only L05)