

Humidity transmitter for critical climate applications

testo 6651



%RH

°C

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

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 |
| 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 |
| 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) |

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} / 1 g/m ³ |

Operation

| | |
|------------------|---|
| Parameterization | Four operating buttons for display / P2A software |
|------------------|---|

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 |

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)** | $\pm(1.7 + 0.007 * mv) \%RH$ (0 to 90 %RH) / $\pm(1.9 + 0.007 * mv) \%RH$ (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 | - | especially 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) |
|--------------------|---------|-------------------------------------|---------------------------------------|

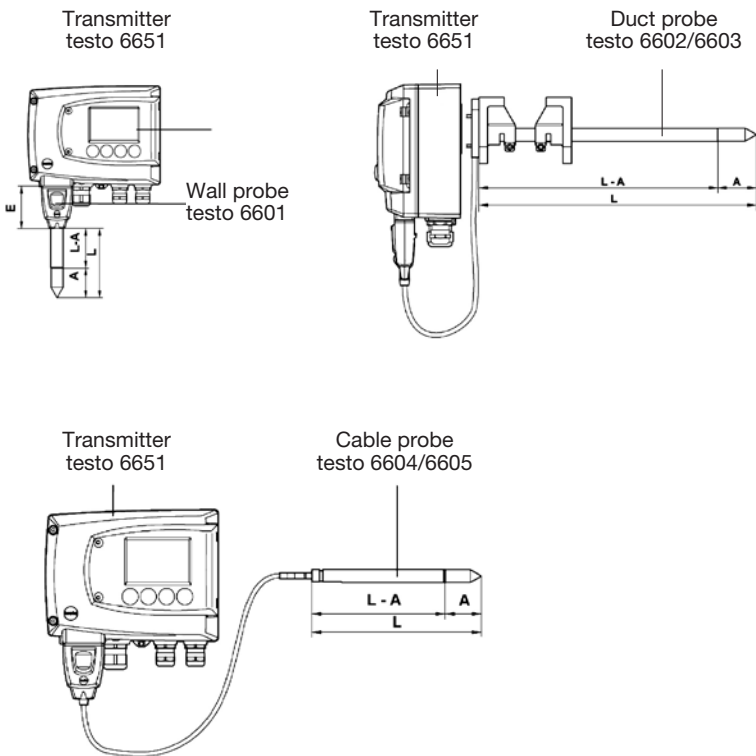
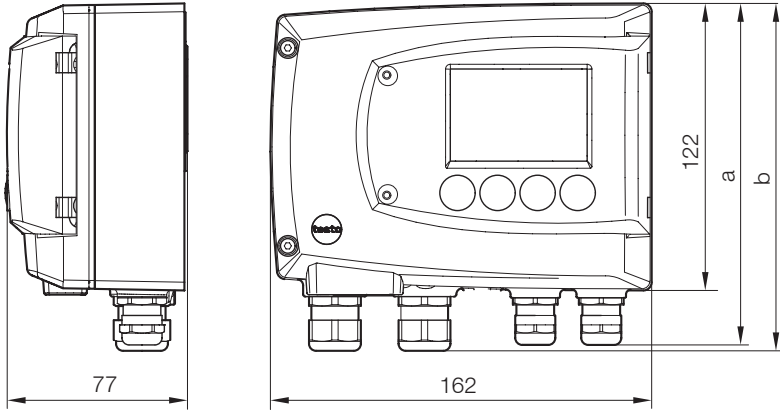
* Other accuracies apply for wall probe length 70 mm combined with a current output (P07):
Operation: 2 channels at 12 mA, without display illumination, relay off, additional measurement error to above values at +25 °C (+77°F), humidity $\pm 2.5 \% RH$

***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%.

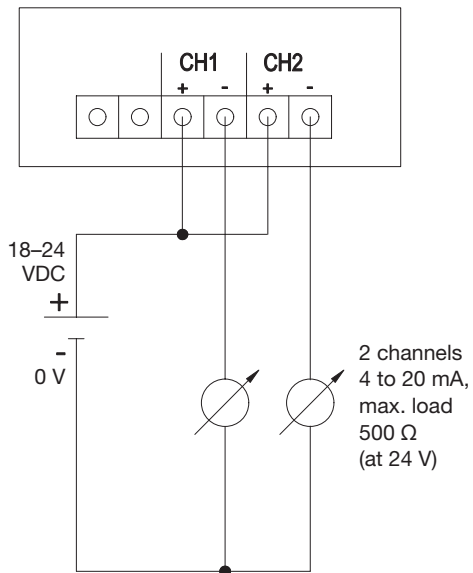
Technical drawings



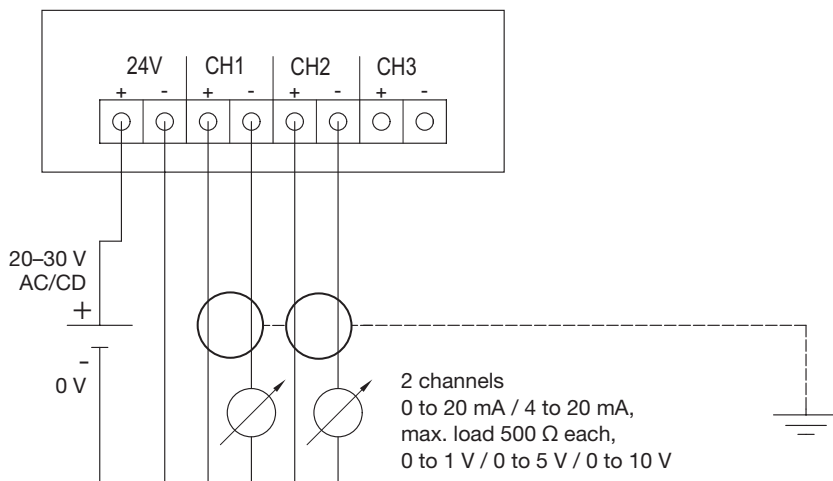
L = Probe length
 L-A = Probe length - length protective cal
 A = 35 mm

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 | 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.

* 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 E00 F01
0 100 G02 -10 70 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 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)

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Subject to change without notice.