



Humidity/temperature measuring instrument

testo 645 - Highly precise measurements for industry



Highly accurate humidity measurement up to ± 1 %RH

Connection of 2 plug-in probes

Measurement of temperature, relative humidity and pressure dewpoint

Internal measurement store (3000 measurement values)

PC software for the analysis, archiving and documentation of the measurement values (option)

Button for Hold, min./max. values, mean value calculation

Convenient data analysis

The highly accurate thermal hygrometer testo 645 has two probe inputs for the connection of an extensive range of probes:

- Channel 1: temperature Type K/J/S, NTC
- Channel 2: combi probe humidity/temperature or temperature probe Pt 100

The measuring instrument automatically displays the measurement parameters temperature, relative humidity, dewpoint, pressure dewpoint, absolute humidity, degree of humidity and enthalpy, and additionally presents the current values, the last measured values, min., max. and mean values at the press of a button.

Measurement data can be stored by measurement site in the testo 645, and analyzed on a PC, or documented using the Testo fast printer (option). The TopSafe (option) is available for tough applications. The measuring instrument, probes and accessories can be stored safely and tidily in the transport case (option).

Technical data

testo 645

testo 645, humidity/temperature measuring instrument, with battery and calibration protocol

Part no. 0560 6450



General technical data

| | |
|------------------|------------------|
| Oper. temp. | 0 to +50 °C |
| Storage temp. | -20 to +70 °C |
| Display | LCD, 4 lines |
| Battery type | Alkali manganese |
| Battery life | 45 h |
| Dimensions | 215 x 68 x 47 mm |
| Weight | 255 g |
| Material/Housing | ABS |
| Warranty | 2 years |

Accuracy of temperature: ± 1 digit at +22°C

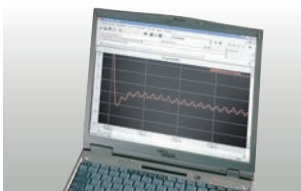
Ni 10000 sensor: meas. range: ...+180°C

Typical battery lives: 9V block (Al-Mn) 20-45h.

The hour times are reduced by a factor of 5 if a 9V rech. battery is used

Calculated humidity parameters: td, g/m³, g/kg, J/g (pressure compensated)

Mains connection and battery recharging in instrument



Save data by measurement site and analyze on a notebook



Connections for temperature probes Type K/J/S, NTC and combi probe humidity/temperature or temperature probe Pt100

Technical data / Accessories

| Sensor type | Meas. range | Accuracy ± 1 digit | Resolution |
|---------------------------|------------------|---|---------------------------|
| Testo humid. sensor, cap. | 0 to +100 %RH | See probe data | 0.1 %RH (0 to +100 %RH) |
| Pt100 | -200 to +800 °C | $\pm 0.1\%$ of mv (+200.1 to +800 °C) ± 0.2 °C (-200 to +200 °C) | 0.1 °C (-200 to +800 °C) |
| Type K (NiCr-Ni) | -200 to +1370 °C | $\pm 0.5\%$ of mv (+60 to +1370 °C) ± 0.3 °C (-200 to +59.9 °C) | 0.1 °C (-200 to +1370 °C) |
| Type S (Pt10Rh-Pt) | -50 to +1700 °C | | |
| Type J (Fe-CuNi) | -40 to +750 °C | | |
| NTC | -50 to +150 °C | | 0.1 °C (-50 to +150 °C) |

Accessories

Part no.

Transport and Protection

| | | |
|--|-----------|--|
| Transport case (plastic) for measuring instrument, probes and accessories for safe and orderly storage | 0516 0445 | |
| TopSafe (indestructible protection case), with bench stand and belt clip | 0516 0440 | |

Printer and Accessories

| | | |
|--|-----------|--|
| Testo fast printer IRDA with wireless infrared interface; 1 roll thermal paper; 4 AA batteries | 0554 0549 | |
| External fast charger for 1-4 AA rech. batteries, incl. 4 Ni-MH rech. batteries with individual cell charging and charge control display, incl. impulse trickle charging, integrated discharge function, with built-in international mains plug, 100-240 V, 300 mA, 50/60 Hz | 0554 0610 | |
| Spare thermal paper for printer (6 rolls), permanent ink measurement data documentation legible for up to 10 years | 0554 0568 | |



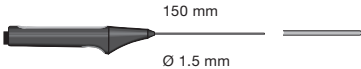
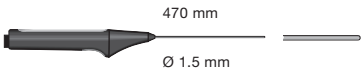
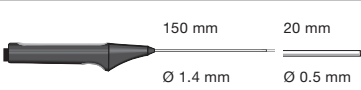
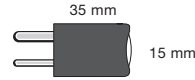
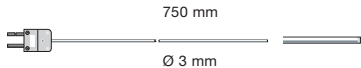
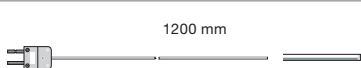

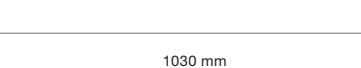
Software and Accessories

| | | |
|---|-----------|--|
| ComSoft Professional Pro software incl. data archiving | 0554 1704 | |
| RS232 cable connects instrument to PC (1.8 m) for data transfer | 0409 0178 | |

Accessories

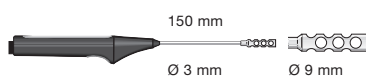
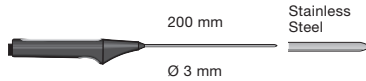
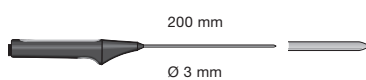



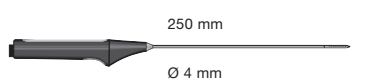


| Additional accessories and spare parts | Part no. | |
|--|-----------------|--|
| Desk-top power supply with international connection options | 0554 1143 | |
| 9V rech. battery for instrument, instead of battery | 0515 0025 | |
| Cable, 1.5 m long, connects probe with plug-in head to meas. instrument, PUR coating material | 0430 0143 | |
| Extension cable, 5 m long, between plug-in head cable and instrument, PUR coating material | 0409 0063 | |
| Adapter for surface humidity measurement, for humidity probes Ø 12 mm locates damp spots on walls, for example | 0628 0012 | |
| Cap for bore holes, for humidity probe Ø 12 mm Measures equilibrium moisture in bore holes | 0554 2140 | |
| Control and adjustment set for Testo humidity probes, salt solution with 11.3% RH and 75.3% RH, incl. adapter for Testo humidity probes | 0554 0660 | |
| Cable, 5 m long, connects probe with plug-in head to measuring instrument, PUR coating material | 0430 0145 | |
| Adapter to connect NiCr-Ni thermocouples and probes with open wire ends | 0600 1693 | |
| Handle for plug-in measuring tip | 0600 5593 | |
| Silicone heat paste (14g), Tmax = +260°C, improves heat transfer in surface probes | 0554 0004 | |
| Spare measuring tip for smelting probe | 0363 1712 | |
| Control/adjustment containers (75.3%RH) for 1 point control and adjustment of instrument | 0554 0638 | |
| testo saline solution pot for checking humidity probes, 33 %RH | 0554 0636 | |
| Calibration Certificates | | |
| ISO calibration certificate humidity Calibration points 11.3 %RH and 75.3 %RH at +25°C | 0520 0006 | |
| ISO calibration certificate/humidity saturated saline solutions: calibration point 11.3%RH | 0520 0013 | |
| ISO calibration certificate/humidity saturated saline solutions, calibration point 75.3%RH | 0520 0083 | |
| DAkkS calibration certificate/humidity electronic hygrometers; calibration points 11.3%RH and 75.3%RH at +25°C | 0520 0206 | |
| DAkkS calibration certificate/humidity saturated saline solutions; calibration point 11.3%RH | 0520 0213 | |
| DAkkS calibration certificate/humidity saturated saline solutions; calibration point 75.3%RH | 0520 0283 | |

Probes

| Probe type | Dimensions Probe shaft/probe shaft tip | Measuring range | Accuracy | t ₉₉ | Part no. |
|--|---|--------------------|-----------------------|-----------------|-----------|
| Type K (NiCr-Ni) | | | | | |
| Quick-action surface probe, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  | -200 to +300 °C | Class 2 ¹⁾ | 3 s | 0604 0194 |
| Fast response immersion/penetration probe, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  | -200 to +400 °C | Class 1 ¹⁾ | 3 s | 0604 0293 |
| Super quick-action immersion/penetration probe for measurements in liquids, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  | -200 to +600 °C | Class 1 ¹⁾ | 1 s | 0604 0493 |
| Super quick-action immersion/penetration probe for high temperatures, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  | -200 to +1100 °C | Class 1 ¹⁾ | 1 s | 0604 0593 |
| Super quick-action immersion/penetration probe for measurements in gases and liquids with a low-mass tip, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  | -200 to +600 °C | Class 1 ¹⁾ | 1 s | 0604 9794 |
| Spare meas. head for pipe wrap probe, TC Type K |  | -60 to +130 °C | Class 2 ¹⁾ | 5 s | 0602 0092 |
| Plug-in measuring tip, 750mm long, flexible, for high temperatures, outer casing: stainless steel 1.4541. Please order handle with Part no. 0600 5593 |  | -200 to +900 °C | Class 1 ¹⁾ | 4 s | 0600 5393 |
| Plug-in measuring tip, 1200 mm long, flexible, for high temperatures, outer casing: stainless steel 1.4541. Please order handle with Part no. 0600 5593 |  | -200 to +900 °C | Class 1 ¹⁾ | 4 s | 0600 5493 |
| Plug-in measuring tip, 550mm long, flexible, for high temperatures, outer casing: Inconel 2.4816. Please order handle with Part no. 0600 5593 |  | -200 to +1100 °C | Class 1 ¹⁾ | 4 s | 0600 5793 |
| Plug-in measuring tip, 1030mm long, flexible, for high temperatures, outer casing: Inconel 2.4816. Please order handle with Part no. 0600 5593 |  | -200 to +1100 °C | Class 1 ¹⁾ | 4 s | 0600 5893 |



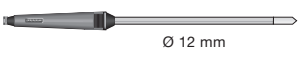
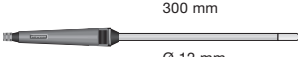

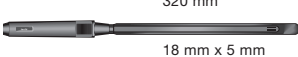


1) According to norm EN 60751, the accuracy of Classes 1 / 2 refers to -40 to +1000/+1200 °C.

Probes





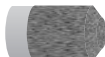

| Probe type | Dimensions Probe shaft/probe shaft tip | Measuring range | Accuracy | t ₉₉ | Part no. |
|---|--|--------------------------------|--|-----------------|-----------|
| Pt100 | | | | | |
| Precision air probe , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  150 mm Ø 3 mm Ø 9 mm | -200 to +400 °C | ±(0.03 °C +0.05% of mv) (0 to +100 °C) ±(0.06 °C +0.1% of mv) (remaining range) | 75 s | 0628 0017 |
| Standard immersion/penetration probe, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  200 mm Ø 3 mm Stainless Steel | -200 to +400 °C | Class A (-100 to +400 °C) Class B (remaining range) | 20 s | 0604 0273 |
| Highly accurate immersion/penetration probe , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  200 mm Ø 3 mm | -200 to +400 °C | ±(0.03 °C +0.05% of mv) (0 to +100 °C) ±(0.06 °C +0.1% of mv) (remaining range) | 30 s | 0628 0015 |
| Flexible precision immersion probe, cable heat-proof up to +300°C , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  1000 mm 50 mm Ø 3.5 mm Ø 6 mm | -100 to +265 °C | 1/10 Class B (0 to 100°C) 1/5 Class B (rem. range) to EN 60751 ²⁾ | 80 s | 0628 0016 |
| Humidity probes | | | | | |
| Standard ambient air probe up to +70°C, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  Ø 12 mm | 0 to +100 %RH -20 to +70 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (remaining range) | 12 s | 0636 9740 |
| Duct humidity/temperature probe, Fixed cable 3 m |  180 mm Ø 12 mm | 0 to +100 %RH -20 to +70 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (remaining range) | 12 s | 0636 9715 |
| Thin humidity probe incl. 4 attachable protection caps for ambient air measurements, measurements in exhaust air ducts and equilibrium moisture measurements , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  250 mm Ø 4 mm | 0 to +100 %RH -20 to +70 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (-20 to -10.1 °C) ±0.5 °C (+50.1 to +70 °C) | 15 s | 0636 2130 |
| Highly accurate reference humidity/temp. probe, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  Ø 21 mm | 0 to +100 %RH -20 to +70 °C | ±1 %RH (+10 to +90 %RH)* ±2 %RH (remaining range) * in the temperature range from +15°C to +30°C ±0.2 °C (+10 to +40 °C) ±0.4 °C (remaining range) | 12 s | 0636 9741 |
| Humidity/temperature probe , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  Ø 21 mm | 0... +100 %RH -20 to +70 °C | ±2 %RH (+2... +98 %RH) ±0.4 °C (+0.1 to +50 °C) ±0.5 °C (-20 to 0 °C) ±0.5 °C (+50.1 to +70 °C) | 12 s | 0636 9742 |

2) According to standard EN 60751, the accuracy of Class A and B refer to -200 to +600 °C.

Probes

| Probe type | Dimensions Probe shaft/probe shaft tip | Measuring range | Accuracy | t ₉₉ | Part no. |
|--|---|--|--|-----------------|-----------|
| Probes Process humidity | | | | | |
| Standard pressure dewpoint probe for measurements in compressed air systems , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  300 mm | 0 to +100 %RH -30 to +50 °C tpd | ±0.9 °C tpd (+0.1 to +50 °C tpd) ±1 °C tpd (-4.9 to 0 °C tpd) ±2 °C tpd (-9.9 to -5 °C tpd) ±3 °C tpd (-19.9 to -10 °C tpd) ±4 °C tpd (-30 to -20 °C tpd) | | 0636 9840 |
| Precision pressure dewpoint probe for measurements in compressed air systems incl. cert. with test point -40°C tpd, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  300 mm | 0 to +100 %RH -60 to +50 °C tpd | ±0.8 °C tpd (-4.9 to +50 °C tpd) ±1 °C tpd (-9.9 to -5 °C tpd) ±2 °C tpd (-19.9 to -10 °C tpd) ±3 °C tpd (-29.9 to -20 °C tpd) ±4 °C tpd (-40 to -30 °C tpd) | | 0636 9841 |
| High humidity level probe w/ heated sensor element, no humidity on sensor, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  300 mm Ø 12 mm | 0 to +100 %RH -20 to +85 °C | ±2.5 %RH (0 to +100 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (-20 to -10.1 °C) ±0.5 °C (+50.1 to +100 °C) * in the temperature range from +10°C to +30°C | 30 s | 0636 2142 |
| Robust high temperature/humidity probe up to +180°C , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  300 mm Ø 12 mm | 0 to +100 %RH -20 to +180 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (+0.1 to +50 °C) ±0.5 °C (remaining range) | 30 s | 0628 0021 |
| Flexible humidity probe (does not retain shape) for measurements in inaccessible places , Plug-in head. connection cable 0430 0143 or 0430 0145 required |  1500 mm 100 mm Ø 12 mm | 0 to +100 %RH -20 to +180 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (+0.1 to +50 °C) ±0.5 °C (-20 to 0 °C) ±0.5 °C (+50.1 to +180 °C) | 30 s | 0628 0022 |
| Probes Material and equilibrium moisture | | | | | |
| Sword probe for measuring humidity and temperature in stacked material, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  320 mm 18 mm x 5 mm | 0 to +100 %RH -20 to +70 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (-20 to -10.1 °C) ±0.5 °C (+50.1 to +70 °C) | 12 s | 0636 0340 |
| Robust humidity probe e.g. for measuring equilibrium moisture or for measurements in exhaust ducts to +120°C, Plug-in head. connection cable 0430 0143 or 0430 0145 required |  300 mm Ø 12 mm | 0 to +100 %RH -20 to +120 °C | ±2 %RH (+2 to +98 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (remaining range) | 30 s | 0636 2140 |
| Probes aw value | | | | | |
| aw value set: pressure-tight precision humidity probe with certificate, measurement chamber and 5 sample bowls (plastic) |  | 0 to +1 aW 0 to +100 %RH -20 to +70 °C | ±0.01 aW (+0.1 to +0.9 aW) ±0.02 aW (+0.9 to +1 aW) ±1 %RH (+10 to +90 %RH) ±2 %RH (0 to +10 %RH) ±2 %RH (+90 to +100 %RH) ±0.4 °C (-10 to +50 °C) ±0.5 °C (remaining range) | | 0628 0024 |
| Reproducibility of aw value ±0.003 | | | | | |
| Measuring chamber completely | | | | | 0554 9860 |

Covering caps

| Caps for humidity probes Ø 12mm and 21mm | Illustration | For humidity probes | Part no. |
|---|---|--|-----------|
| Metal protection cage, Ø 12 mm for humidity probes, for measurement in flow velocities of less than 10 m/s |  Ø 12 mm | 0636 9740, 0636 9715 | 0554 0755 |
| Cap with wire mesh filter, Ø 12 mm | | All humidity probes with Ø 12 mm | 0554 0757 |
| PTFE sintered filter, Ø 21 mm, for corrosive substances, high humidity range (long-term measurements), high velocities |  Ø 21 mm | All humidity probes with Ø 21 mm | 0554 0666 |
| Sintered PTFE filter, Ø 12 mm, for corrosive media, High humidity range (long-term measurements), high flow velocities. |  Ø 12 mm | 0636 9769, 0636 9740, 0636 9715 | 0554 0756 |
| PTFE sintered filter, Ø 12 mm, for corrosive substances, high humidity range (non-stop measurements), high flow speeds |  Ø 12 mm | 0628 0021, 0628 0022, 0636 2140, 0636 2142 | 0554 0758 |
| Stainless steel sintered cap, Ø 21 mm, can be screwed onto humidity probe, protection in case of high mechanical load and high velocities |  Ø 21 mm | All humidity probes Ø 21 mm | 0554 0640 |
| Stainless steel sintered filter, pore size 100 µm, probe protection in dusty atmospheres or higher flow velocities, for measurements at higher flow velocities or in contaminated air |  Ø 12 mm | 0636 9740, 0636 9715 | 0554 0647 |

0981 9634/msp/A/01.2013

Subject to change without notice.