



Committing to the future

2010

## Stationary Measurement Solutions for Air Conditioning, Drying, Cleanrooms and Compressed Air



## The basis of stability – the Testo humidity sensor

For years, Testo has been the first choice when it comes to high-quality humidity transmitters for drying processes critical ambient conditions.

The sensor and signal processing concept has been completely revised based on our

years of experience

Whether high humidity, trace humidity, corrosive media or constant cleanroom conditions: The Testo humidity transmitters testo 6651 and testo 6681 offer optimum accuracy and long-term stability.



Long-term stable, condensation-proof and traceable according to international humidity standards (ILAC / PTB / NIST etc.): The Testo humidity sensor

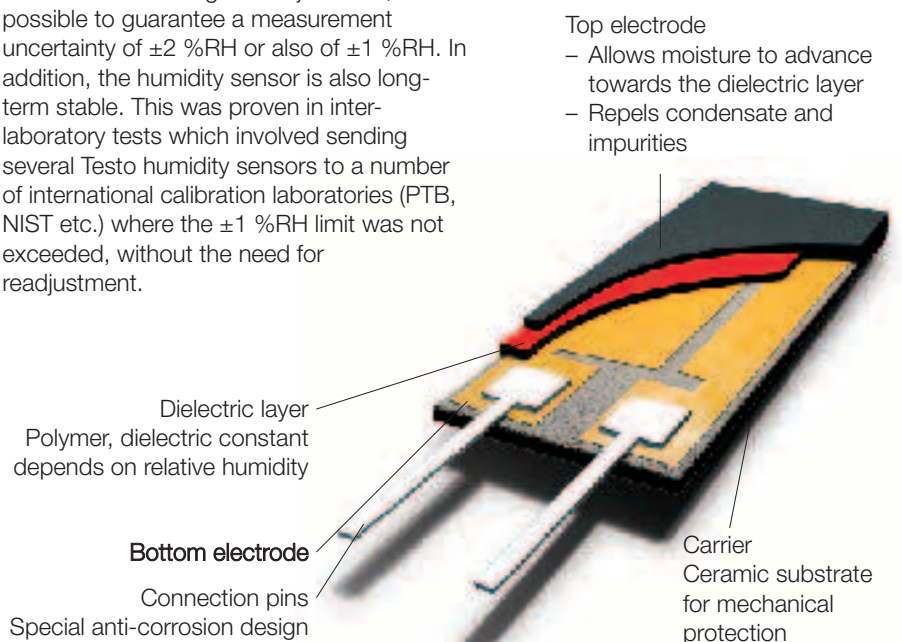


Country	1 Germany	2 France	3 USA	4 Italy	5 England	6 Spain	7 Japan	8 Korea	9 China	10 Germany
Institute	PTB	CETIAT	NIST	IMGC	NPL	INTA	JQA	KRISS	NRCCRM	PTB
Arrival	04/96	10/96	12/96	07/97	09/98	10/98	03/99	05/00	10/00	03/01
Departure	08/96	10/96	05/97	10/97	09/98	10/98	04/00	09/00	12/00	08/01

## Testo's humidity sensor: The heart of the high-quality humidity transmitter

With its humidity sensor, developed more than fifteen years ago and since then continually improved, our attention was focussed from the start on two accuracy parameters, measurement uncertainty and long-term stability. The basic design was developed by Testo and has since been reverse engineered by several manufacturers: a polymer sensitive to humidity serves as a dielectric between two condenser electrodes. However, its distinctive feature is the way in which the individual layers lie perfectly on top of each other. This is particularly clear in the top electrode which has to carry out two tasks which, at first glance, appear to be contradictory: it must be permeable for the water vapour which is to be fed to the polymer dielectric. But it must also be leak-proof, smooth and capable of repelling condensate, oil and dirt particles in order to protect the sensor. This combination has succeeded perfectly in Testo's humidity sensor thanks to extensive research. On account of this design and Testo's highly

stable manufacturing and adjustment, it is possible to guarantee a measurement uncertainty of  $\pm 2$  %RH or also of  $\pm 1$  %RH. In addition, the humidity sensor is also long-term stable. This was proven in inter-laboratory tests which involved sending several Testo humidity sensors to a number of international calibration laboratories (PTB, NIST etc.) where the  $\pm 1$  %RH limit was not exceeded, without the need for readjustment.



# Systematic adjustment

Regular readjustment – even of long-term stable sensor systems – is of vital importance for process precision and cost reduction. If neglected, you run the risk of having to redefine a tighter reference humidity interval after only one or two years with the consequences for operating costs as described in "Precision cuts costs".

It is crucial for those responsible for systems, such as the Facility Manager or maintenance department to have a complete system, suited to the humidity transmitter, which facilitates easy recalibration and adjustment.

At Testo, the system consists of the following components:

1. Humidity transmitter
2. Control and adjustment salt solutions (can be used up to 80 times)
3. Adjustment on site using portable instruments testo 400/650
4. Huminator humidity generator (low-cost presetting of required value in laboratory)

It is possible to carry out readjustment on site using adjustment saline solutions, which are reusable, while the huminator is used for readjustment in laboratories or factories.



Readjustment with adjustment salt solutions



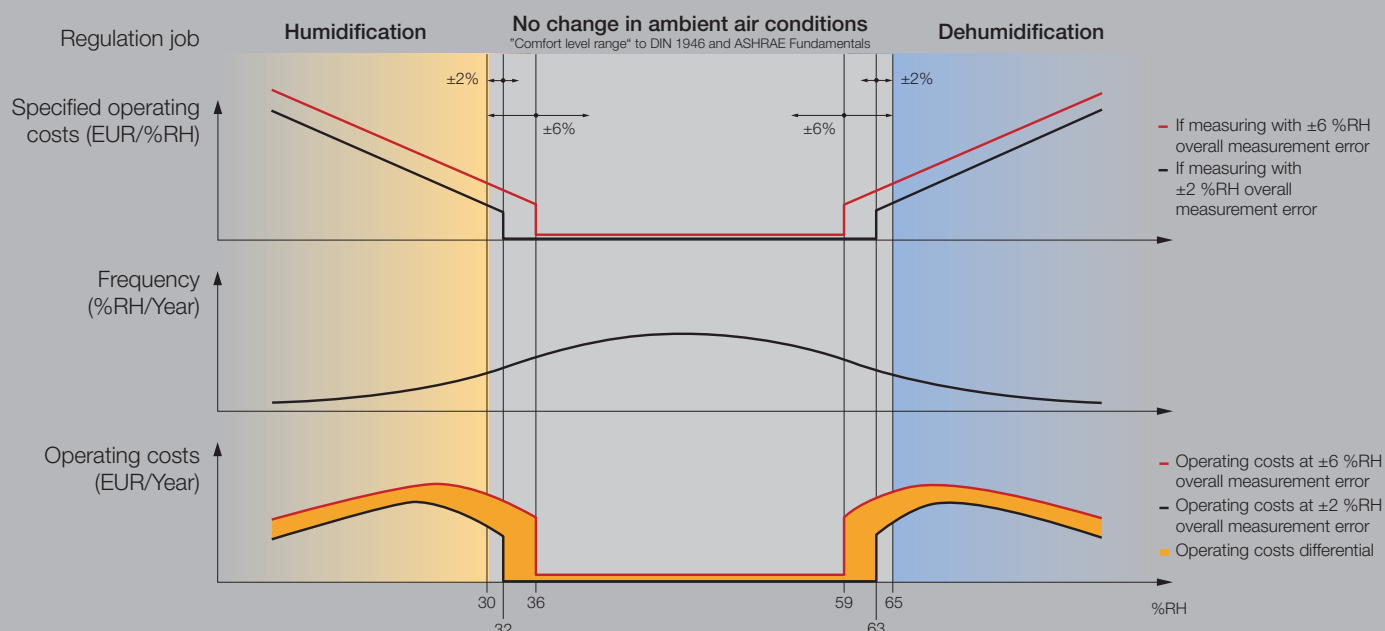
Adjustment on site: fast and accurate via the external interface

## Precision cuts costs

The more accurate the humidity measurement, the lower the cost of running the air conditioning system. According to international standards (ASHRAE Fundamentals, DIN 1946 etc.) air conditioning systems should have air humidity levels of between 30 and 65 %RH. Higher humidity levels must be brought into the required range by dehumidification while lower levels must be subjected to humidification. If a transmitter with an overall

measurement error of  $\pm 2$  %RH (measurement uncertainty including long-term error) is used to measure humidity, running costs will be noticeably lower than if a typical ambient air transmitter with a  $\pm 6$  %RH overall measurement error (uncertainty including long-term error) is used. The diagram shows that the  $\pm 6$  %RH transmitter already has to activate humidification under 36 %RH in order to guarantee a humidity level within the standard comfort level range. Likewise,

dehumidification must be activated from 59 %RH up. This results in operating costs for the year being higher by approximately 20 to 40% when compared to Testo's highly accurate humidity transmitter (Testo hygrotest). This comparison looks even better for high standard transmitters if the target %RH range is more tightly defined; cleanroom applications, for example.

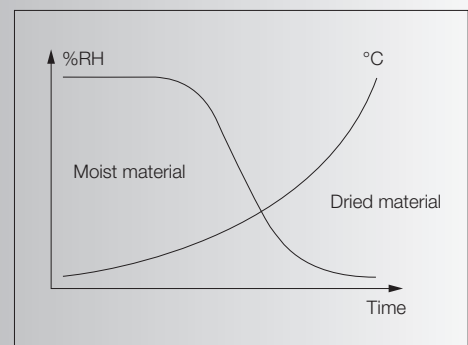


## Overview of contents by application

Stationary measurement technology from Testo is used in a broad spectrum of applications. The most important applications and the instruments suited to them are shown on this page. Also consult the catalogue if you do not find your application in the overview. On the flap behind the title page you will find the overview of contents sorted by product. Or just ask your Testo distribution partner. We are happy to help. In addition to stationary measurement technology, Testo also offers portable measurement technology and data loggers. You will find the cross-references to the corresponding catalogues on the back page.

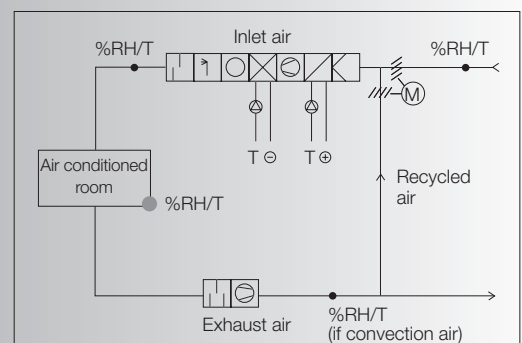
### Drying processes

Humidity transmitters: from page 8



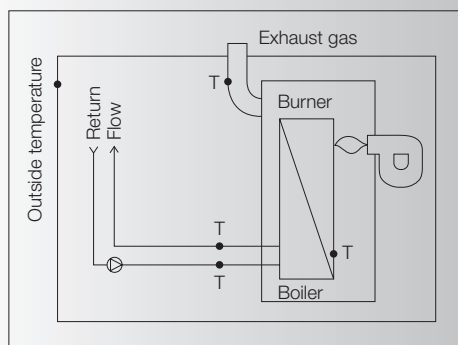
### Climate applications

Humidity transmitters: from page 8  
Differential pressure transmitters: from page 68



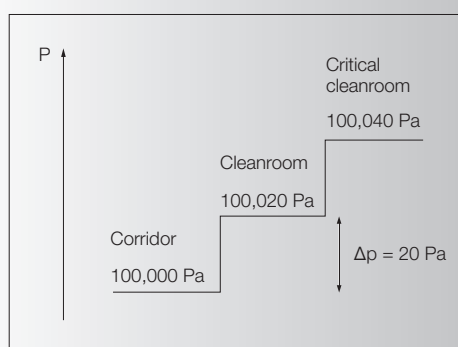
Stationary temperature probes: from page 96  
Temperature transmitter: from page 96

## Stationary temperature measurement



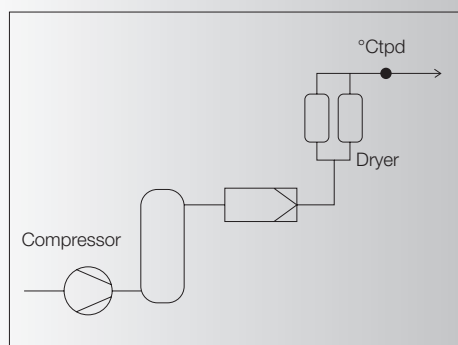
Humidity transmitters: from page 8  
Differential pressure transmitters: from page 68

## Cleanroom



Trace humidity measurement: from page 54  
Compressed air counter testo 6440: from page 82

## Compressed air, dry air and dry gas



## Humidity sensor with an information headstart

Long-term stability and self-diagnosis in the transmitters testo 6651 and testo 6681 guarantee highest system availability. Our objective was to create security for the user. This can avoid immense downtime costs, especially in sensitive applications. The self-diagnosis of the sensors in the new, intelligent humidity measurement transmitters detects anomalies early – before damage can occur. And our tried and tested (patented) humidity sensor has proven its stability not only in thousands of applications worldwide. The accuracy of  $\pm 1$  %RH was confirmed by all renowned calibration laboratories in inter-laboratory tests.

Dr. Hans-Ullrich Demisch,  
Head of Research at testo  
AG



## Humidity measurement – special probes for extreme conditions

### testo 6614 – probes for high humidity

Humidity measurement in the high humidity range is among the most difficult measurement tasks. Unstable measurement values, delayed signal reaction, and sometimes also sensor corrosion are no rarity, if a special solution is not used.

For these applications, Testo has developed a special, heated humidity sensor with the testo 6614. A microclimate which is 5 Kelvin above the process conditions is thus created inside the filter. The considerably lower humidity in the microclimate greatly improves the sensor reaction as well as noticeably reducing the likelihood of corrosion.

Parallel to the heated humidity sensor, the testo 6614 also has an additional temperature probe. This measures the actual process temperature; on this basis the correct process humidity is calculated in the microprocessor of the measurement transmitter, and displayed.



### testo 6615 – probes for trace humidity

Humidity measurement in the lowest humidity range is also very demanding. If normal polymer humidity sensors are used here, the error, measured in dewpoint degrees, soon shows high values.

For the demanding measurement of trace humidity, Testo has developed the testo 6615, which has an integrated trace humidity self-adjustment. The smallest discrepancies are corrected cyclically here, up to trace humidities of  $-60^{\circ}$  dewpoint!



### testo 6617 – humidity probes with early warning for corrosive media

Humidity measurement in corrosive media is often accompanied by a short useful life of the sensor. For this problem too, Testo has developed a ground-breaking innovation: cover electrode monitoring.






Thanks to this measure, the first signs of corrosion are detected and reported early. This early warning allows the measurement probe to be exchanged before the measurement is false or even interrupted. This guarantees optimum system availability!

### Humidity measurement in areas with danger of explosion – testo 6616

Demanding measurements in Ex-areas cannot be carried out with standard probes. For these purposes, transmitters must be used which conform to the ATEX safety requirements. testo 6681 with testo 6616 was designed specially for areas with danger of explosion and is permitted for the protection class ATEX II 1/2 G Ex ia IIC T4/T3. The sensor tip can be used in an explosive area Zone 0 (transmitter Zone 0). The probe thus fulfils the requirements for Ex use in pharmaceutical, chemical and process technology.



## Overview of humidity measurement transmitters testo 6621, testo 6651 and testo 6681

Process requirements		
 <p>testo 6621</p> <p><b>Air conditioning technology:</b> Application in rooms or air conditioning ducts</p>	 <p>Ethernet</p>  <p>testo 6651</p> <p><b>Climate technology and industry:</b> Critical climate, cleanrooms</p>	 <p>Ethernet</p>  <p>testo 6681</p> <p><b>Industry:</b> critical climate, cleanrooms, drying processes, high humidity, trace humidity, humidity in ReturnH<sub>2</sub>O<sub>2</sub> environment etc.</p>
	Areas of application	

### Probe version: testo 6631

Monitoring critical climate in bio-research, e. g. in research greenhouses



## Technical data

		testo 6621	testo 6651	testo 6681
Measuring range	Humidity	0 to 100 %RH (no high humidity processes)	0 to 100 %RH (no high humidity processes)	0 to 100 %RH
	Temperature (dependent on probe)	0 to 100 %RH (not for high humidity processes), duct: -20 to +70 °C (-4 to +158 °F)	-20 to +120 °C (-4 to 248 °F)	-40 to +180 °C (-40 to 356 °F)
Accuracy at +25 °C (+77 °F)	Humidity**	±2.5 %RH (0 to 90 %RH) ±4 %RH (90 to 100 %RH)	±1,7 %RH (0 to 90%RH) ±1,9 %RH (90 to 100 %RH)	up to ±1,0 %RH (0 to 90 %RH) ±1,4 %RH (90 to 100 %RH), Depends on probe
	Temperature	±0.5 °C / 0.9 °F	Pt1000 Class A**** ±0.2 °C / 0.38 °F *	Pt1000 1/3 Class B*** ±0.2 °C / 0.27 °F *
Parameters		°C, °F, %RH	°C/°F, %rF/%RH, °C <sub>td</sub> /°F <sub>td</sub>	°C, °F, %rF, %RH, °C <sub>td</sub> , °F <sub>td</sub> , g/m <sup>3</sup> , gr/ft <sup>3</sup> , g/kg, gr/lb, enthalpy, °C <sub>tw</sub> , °F <sub>tw</sub> , inch H <sub>2</sub> O, ppm(vol), % Vol for H <sub>2</sub> O <sub>2</sub> applications: °C <sub>tm</sub> / °F <sub>tm</sub>
Signal outputs		4 to 20 mA, 2-wire 0 to 1 Volt, 4-wire 0 to 5/10 Volt, 4-wire	4 ... to 20 mA, 2-wire 0/4 to 20 mA, 4-wire 0/4 to 1/5/10 Volt, 4-wire	4 ... to 20 mA, 2-wire (not for testo 6614/6615) 0/4 to 20 mA, 4-wire 0/4 to 1/5/10 Volt, 4-wire
Mounting variants		Wall or duct installation	Wall probe testo 6601 Duct probe testo 6602/6603 Cable probe testo 6604/6605	Wall probe testo 6611 Duct probe testo 6612 Cable probe testo 6613/6614/6615/6617
max. cable length		–	5 m	10 m
Housing		ABS and nickel-plated ABS	ABS, plastic, IP65	Metal, IP65
Interfaces		digital (for 2PA software or testo 400/650)	digital (for 2PA software or testo 400/650), Ethernet (optional intermediary layer)	digital Testo (cf. testo 6651), Profibus (optional intermediary layer), Ethernet (optional intermediary layer)
Special features		External interface for P2A software, adjustability	4 relays (optional), Early warning system (via display or relay collective alarm)	Special probe versions for • Temperature ranges up to +180 °C (+324 °F) • Trace humiditytesto 6615 • High humiditytesto 6614 • Self-diagnosis testo 6617 4 relays (optional), early warning system (via display, relay collective alarm or Profibus)

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

Operation: with 2 channels at 12 mA, without display illumination, relay off, additional measurement inaccuracy to above data at +25 °C (+77 °F), humidity ±2.5 %RH, temperature ±1 °C (1.8 °F)

\*\*For more detailed explanation on the determination of the measurement uncertainty according to GUM, see p. 27

\*\*\*Except testo 6615: Pt100 1/3 class B

\*\*\*\*Excepting testo 6605: PT100 1/3 Class B

## The air conditioning humidity transmitter for applications in rooms or air conditioning ducts

**Adjustable – even  
in this instrument  
class ...**



Matthias Häffner,  
Market Manager  
Testo Germany

... cannot be taken for granted! The fact that this high accuracy is also paired with time-optimized handling – thanks to an external interface – has already delighted many customers!



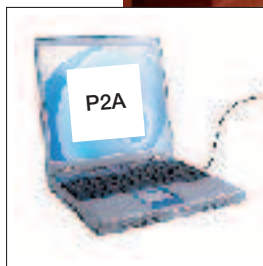
Wall version with display



Fast and accurate adjustment on site  
with the portable instruments testo  
400/testo650



Duct version with display



Convenient operation via the testo P2A  
software (parameterization, adjustment,  
analysis)

# testo 6621 – With external interface for adjustment and commissioning

## Order code

0555 6621 **Axx** **Bxx** **Cxx** **Exx** **Fxx** **Gxx** **Mxx** **Kxx**

**A01** Wall version (not with B01, B05)  
**A02** Duct version  
**A03** Wall version with external probes for 4 to 20 mA analog output (with B01 + B05 only)

**B01** 4 to 20 mA (2-wire, 24 VDC)\*  
**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** 4 to 20 mA (2-wire, 24 VDC)  
**B06** 0 to 1 V (4-wire, 24 VAC/DC)  
**B07** 0 to 5 V (4-wire, 24 VAC/DC)  
**B08** 0 to 10 V (4-wire, 24 VAC/DC)

Two analog outputs each  
(humidity temperature)

Humidity: Analog output;  
Temperature: passive,  
Ni1000

**C00** without display  
**C01** with display

**E01** Housing colour light grey, incl. Testo logo (coloured)  
**E02** Neutral housing, white, without Testo logo  
**E03** Neutral housing, white, incl. Testo logo (black/white)

**F01** Relative humidity (%RH)

\*not available for wall version A01

**G02** Temperature (°C)  
**G03** Temperature (°F)

nur mit B01–B04

**M01** Sintered stainless steel filter  
**M02** Wire mesh protective cap  
**M03** Sintered PTFE filter  
**M04** Metal protective cap, open  
**M05** Plastic cap ABS (open)

not with A01

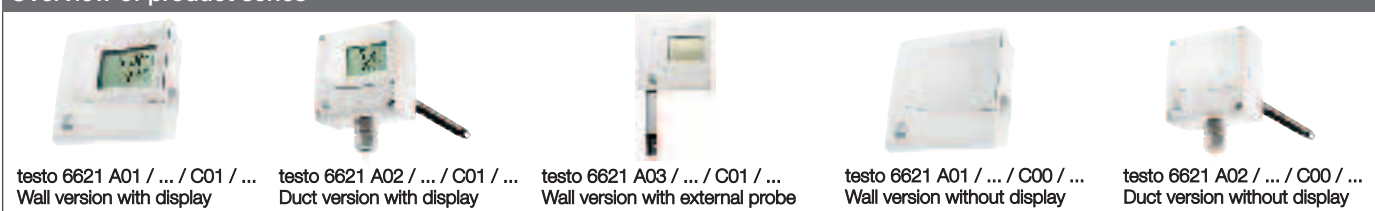
**K01** IM German-English  
**K02** IM French-English  
**K03** IM Spanish-English  
**K04** IM Italian-English  
**K05** IM Dutch-English  
**K06** IM Japanese-English  
**K07** IM Chinese-English

Instruction manual  
language versions

## Ordering examples:

- Duct version with 0 to 10 V outputs, with display, %RH, °C, open plastic cap, instruction manual German-English  
→ 0555 6621 / A02 / B04 / C01 / F01 / G02 / M05 / K01
- wall version with 0 to 1 V outputs, without display, %RH, °F, instruction manual Italian-English  
→ 0555 6621 / A01 / B02 / C00 / F01 / G03 / K04

## Overview of product series

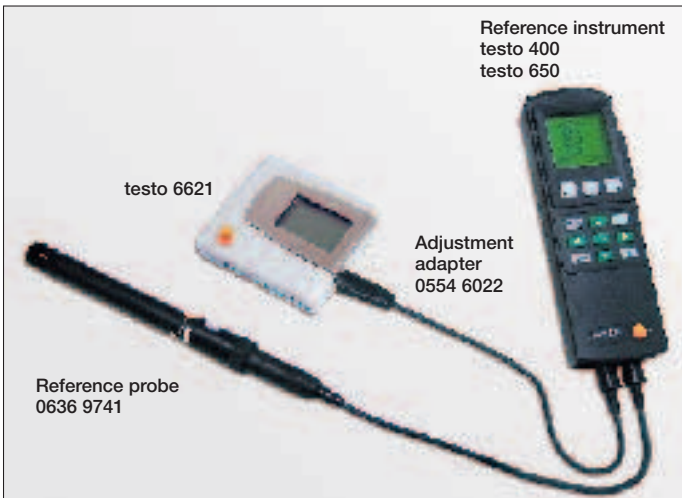


## Technical data

Model		testo 6621 – A01/A03 (wall version)	testo 6621 – A02 (duct version)
Sensor		Testo humidity sensor and NTC temperature sensor, Ni 1000	
Output parameters		Relative humidity % RH and temperature °C or °F (two separate analog outputs)	
Measuring ranges (rel. humidity/temperature)		0 ... to 100% RH (not for high-humidity processes) 0 to +60 °C (32 to +140 °F)	0 ... to 100% RH (not for high-humidity processes) -20 to +70 °C (-4 to +158 °F)
Measuring medium, pressure range		Air in air conditioning systems or air-conditioned rooms, max. 1 bar positive pressure	
Measuring uncertainty for humidity		±2.5 %RH (0 to 90 %RH), ±4 %RH (90 to 100 %RH) Temperature coefficient: 0.05% / K (distance from 25 °C/77°F)	±2.5 %RH (0 to 90 %RH), ±4 %RH (90 to 100 %RH) Temperature coefficient: 0.05% / K (distance from 25 °C/77°F)
Measurement inaccuracy temperature		±0.5 °C / 0.9 °F	
Replaceability of humidity sensor		Through Testo Service	Can be done by customer (s. below, Replacement Sensors), subsequent 2-point adjustment necessary
Analog outputs (two channels each)		Current output: 4 to 20 to 20 mA ±0.05 mA as 2-wire technology (not for wall version) or Voltage output: 0 to 1 V DC ±2.5 mV; 0 to 1 V DC ±12.5 mV; 0 to 10 V ±25 mV as 4-wire technology (please specify order, no on-site adaptation)	
Display, resolution and measuring rate		2-line LCD (optional); humidity resolution: 0,1 %RH, temperature resolution: 0.1 °C / 0.1 °F, meas. rate 1/s	
Voltage supply		For voltage output: 20 ... 30 VDC / VAC	For voltage output: 20 ... 30 VDC / VAC
Housing material + dimensions		ABS, 81 x 81 x 26 mm (silica-free)	ABS, 81 x 81 x 42 mm, see drawing for probe (silica-free)
Application temperature range (housing)		-20 ... +70 °C (-4 to +158 °F) with display: 0 ... +50 °C (32 to +122 °F)	-20 ... +70 °C (-4 to +158 °F) with display: 0 ... +50 °C (32 to +122 °F)
Storage temperature		-40 to +70 °C (-40 to +176 °F)	
Cable screw connections		None (cable entry through rear wall opening or break-out opening on underside)	1 x M16 x 1.5
Weight, IP rating		80 g, IP 30	160 g, IP 65
EMC		According to EC directive 89/336/EEC	
Current consumption	Output	AC or DC	Voltage supply [V]
	2-wire current 4 to 20 mA	DC	20
			24
			30
	4-wire voltage 0 to 10V	DC	24
			30
			20
		AC	24
			30
		Current consumption [mA]	



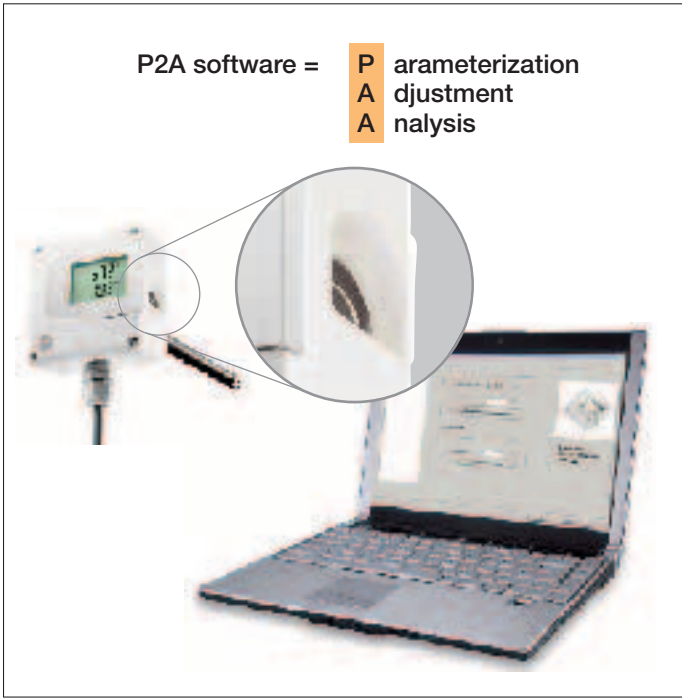
testo 6621 – With external interface for adjustment and commissioning



Adjustment on-site: Fast and precise via the external interface!

Of interest not only to in-house technicians or Facility Managers, but increasingly also to the responsible plant constructors: Which follow-on costs arise as a result of this transmitter?

Good news from Testo: The testo 650 or testo 400 reference instruments can be connected using the adapter 0554 6022 via the external interface – without opening the transmitter. A few operating steps in the testo 400 or testo 650 menu suffice to adjust the testo 6621 transmitter. Conclusion: Saved time and lower operating costs!




Optimum commissioning and adjustment

Thanks to the P2A software, the testo 6621 can be

- freely scaled
- tested (analog outputs)
- adjusted (1-, 2-point and analog channel adjustment)

Historical presentations show which parameter alterations and adjustments have been carried out with the respective PC.

Filter selection (for duct version A02 and wall version A03 only )

				
M01	M02	M03	M04	M05
	Particle load			
Flow velocity	without	fine	coarse	
< 7 m/s	M04/05	M03	M02	
> 7 m/s	M01	M01*	M02*	
* plus condensation protection 0554 0166				

## testo 6631 – Transmitter for greenhouses and laboratories



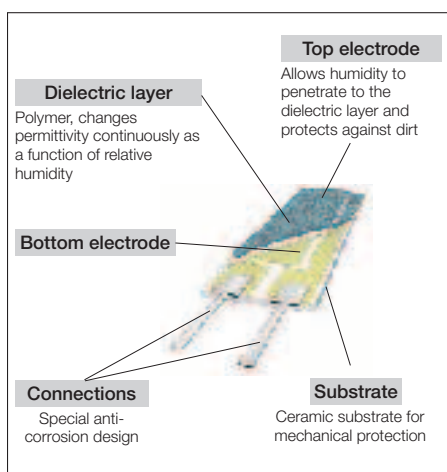
The testo 6631 transmitter was developed specially for monitoring critical ambient conditions in greenhouses, e.g. for research purposes. Precise and reliable humidity measurement is indispensable in these applications, in order to avoid costs caused by failed experiments.

Process security and system availability, among the most important factors in experimental plants, are supported by a number of properties of the testo 6631 bio research transmitter:

- Continuous monitoring of humidity and temperature
- Long-term stability and reliability thanks to precise Testo humidity sensor
- Integrated ventilator allows targeted flow impact onto sensor and helps determine mean conditions within the greenhouse cells.

- Time savings in commissioning and maintenance thanks to
  - parameterization, adjustment and analysis software (P2A)
  - Fast and easy ventilator replacement thanks to ventilator drawer assembly and plug-in cable
  - Exchange of the sensor filter thanks to easily accessible service opening.

- Optimum concept for fast implementation of adjustments and calibrations (1, 2-point as well as analog adjustment)
- Optional two-line display



### The Testo humidity sensor: The heart of the high-quality humidity transmitter

For years, Testo has been the first choice when it comes to high-quality humidity transmitters for critical ambient conditions. The sensor and signal processing concept has been completely revised based on our years of experience

Plant operators, and also constructors, have recognized: Without long-term stability, not only undesired ambient conditions are the result. Operating costs have been proven to increase when humidity measurement is no longer under control.



Long-term stable, condensation-proof and traceable according to international humidity standards (ILAC / PTB / NIST etc.): The Testo humidity sensor

The high level of long-term stability was examined in the course of a 5-year inter-laboratory test by different international calibration laboratories (PTB, CETITAT, NIST etc.) .

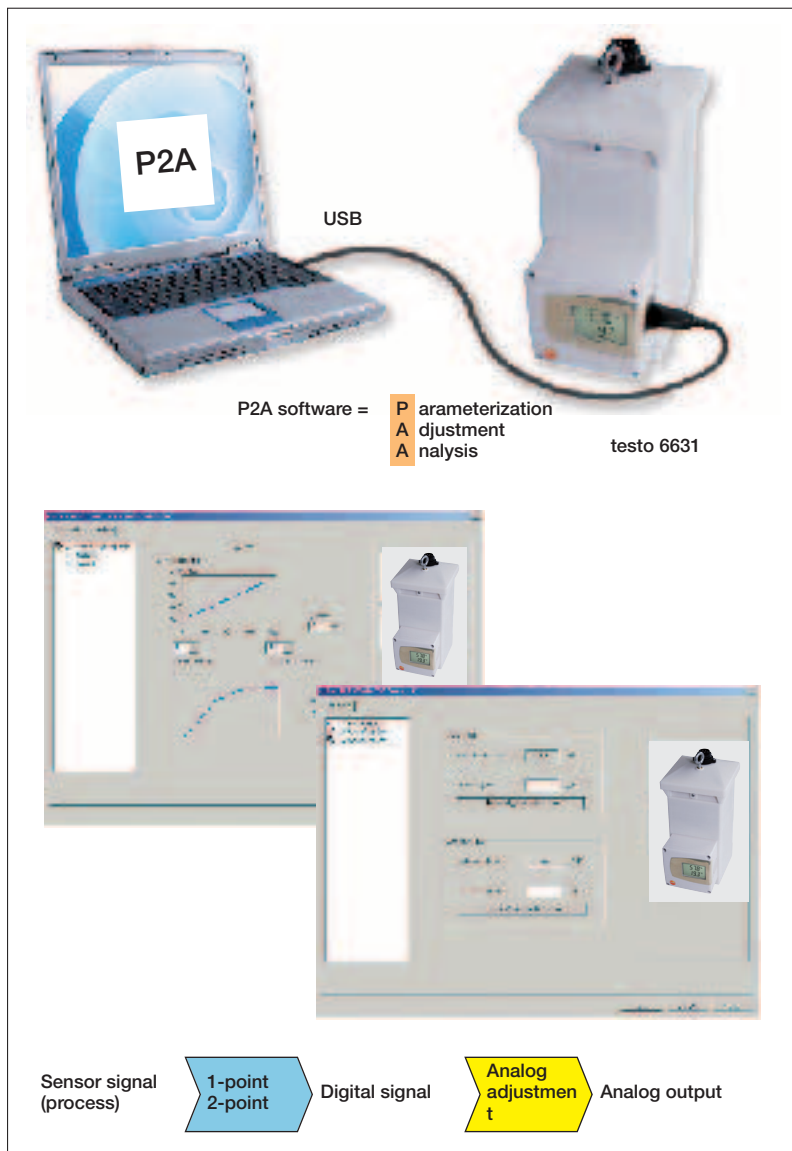
You are on the safe side thanks to the accuracy, stability and reliability of the Testo humidity transmitter!



### Designed to be practical

- Easily accessible service flap for exchanging and cleaning the filter cap
- Fast ventilator replacement thanks to ventilator drawer assembly
- Protection of electronics and sensor from humidity influences (such as sprinkler irrigation).

## testo 6631 – With external interface for adjustment and commissioning



### Parameterization, adjustment and analysis software (P2A software): Optimum procedures and time-savings in commissioning

testo 6631 is delivered ready to use. For professional application, the following functions are available via an easy-to-use software:

- Parameterization of unit and scale
- Adjustment (1-point, 2-point, analog adjustment), s. below
- Reset to factory settings
- Analog output test
- Min./max. value call-up
- Parameterization and adjustment history (all events in the P2A software are registered in the PC)
- Serial number and Firmware version

Whether at the measuring point, in the office or in the laboratory: Your notebook or your PC communicates with the testo 6631 via the external interface and the USB adapter (supplied with the P2A software: 0554 6020).

Complete parameter files can be stored in the PC. The parameterization of spare transmitters or similar measuring points is thus possible with minimal time expenditure.

### Adjustment of the entire signal chain

The adjustment of the entire signal chain is a world innovation in this price class. Using a precise multimeter, analog adjustment helps your measurement process remain continuously stable over the long-term – from the Testo humidity sensor to the analog output of the transmitter.



### Adjustment on-site: Fast and precise via the external interface!

Of interest not only to the system's operators, but increasingly also to its constructors: Which follow-on costs arise as a result of this transmitter?

Good news from Testo: The testo 650 or testo 400 reference instruments can be connected using the adapter 0554 6022 via the external interface – without opening the transmitter. A few operating steps in the testo 400 or testo 650 menu suffice to adjust the testo 6631 transmitter. Conclusion: Saved time and lower operating costs!

# testo 6631 – Transmitter for greenhouses and laboratories

## Technical data testo 6631

<b>Sensor</b>	Testo humidity sensor, plugged. Exchangeable by customer, requires subsequent 2-point adjustment	<b>Application temperature</b>	0 to 50 °C
<b>Meas. range</b>		<b>Storage temperature</b>	-20 to 70 °C
Humidity	0 to 100 %RH (Not for high humidity processes)	<b>Housing/Weight</b>	Plastic, white, UV safe, high chemical resistance; approx. 1000g
Temperature	-10 to 60 °C (Observe operating temperature)	<b>Display</b>	2-line LCD with plain text line, optional
<b>Accuracy</b>		<b>Protection class</b>	Transmitter IP65, Housing IP33
Humidity	±2,5 %RH (0 to 90%); 4,0 %RH (90–100%), applies for M05	<b>Standards</b>	EMC DIN EN 61000-6-2 (Immunity) and DIN EN 61000-6-3 (Emission)
Temperature	0,5 °C	<b>Operation</b>	via P2A software
Self-warming	0.6 °C (with M01 and M03)	<b>Ventilator</b>	
<b>Reaction time</b>	with sintered cap and ventilator running	Max. volume flow	46,80 m³/h / 13 l/s
Humidity	max. 5 s (+63)	Unobstructed blowing noise	30 dB(A)
Temperature	max. 20 s (+63)	Life expectancy	37,500 h (40 °C)
<b>Analog output</b>	2	Ventilator housing / vane	Metal / metal
Temperature	4 to 20 mA (2- or 4-wire)	Bearing system	Slide bearing
Humidity	4 to 20 mA (2- or 4-wire)	Service	Ventilator plug-mounted in base, in order to allow replacement in case of service.
Measuring rate	1/s		
<b>Power supply</b>	20 to 30 V AC/DC		

## Ordering data Accessories

	Part no.	
P2A software (parameterization, adjustment and analysis software for PC), incl. USB cable (PC side) to the Mini-DIN interface (instrument)	0554 6020	
Stainless steel sintered filter, pore size 100 µm, probe protection in dusty atmospheres or higher flow velocities	0554 0647	
Sintered PTFE filter, Ø 12 mm, for corrosive media	0554 0756	
Adjustment adapter (for 1-point adjustment with testo 400 or testo 650)	0554 6022	
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749	
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553	
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555	
ISO calibration certificate humidity, calibration points 11.3 %RH and 75.3 %RH at +25 °C/+77 °F; per channel/instrument	0520 0076	
Cable socket (Euchner) Type: BS 7K	0554 6633	
Cable socket (Amphenol-Tuchel) Type: C016 30D006 100 10	0554 6634	

## Order code testo 6631

0555 6631 Bxx Cxx Fxx Gxx Mxx Kxx

B01 4 to 20 mA (2-wire) with separate ventilator supply  
B06 4 to 20 mA (4-wire) with integrated ventilator supply

C00 without display  
C01 with display

F01 Relative humidity (%RH)

G02 Temperature (°C)  
G03 Temperature (°F)

M01 Sintered stainless steel filter  
M03 Sintered PTFE filter  
M05 Plastic filter

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

### Ordering example testo 6631

4 to 20 mA (2-wire)  
with display  
%RH / °C  
Sintered PTFE filter  
Instruction manual in German + English

→ 0555 6631 B01 / C01 / F01 / G02 / M03 / K01

## Electrical connections

B01		B06	
2-wire transmitter Plug manufacturer Euchner		4-wire transmitter Plug manufacturer Amphenol-Tuchel	
Pin socket**	Cable socket*	Pin socket**	Cable socket*
Type	SD 7K	Eco mate Instrument plug	C01630D0061 0010
DC: Transmitter supply AC: Ventilator supply		AC: Supply transmitter and ventilator	

\*The cable socket is not included in delivery

\*\*built into instrument ex-works

## Humidity transmitters testo 6651 and 6681

With the testo 6651 and testo 6681, Testo presents world innovations which will revolutionize many aspects of stationary humidity measurement.

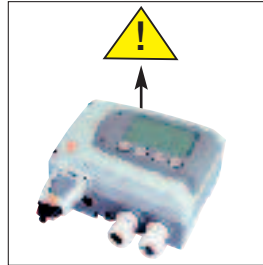
In particular, solutions for safe and service-friendly use are offered, meaning high reliability and operational security for industry:

- exchangeable probes
- early warning reports (preventive maintenance)
- variable possibilities for adjustment

In addition, they also continue to use already existing technology such as the external interface for communication, for example for the parameterization and adjustment software P2A from Testo.

The overview on the next page shows a comparison of the two model series, followed by a detailed description of the individual models.

The two new humidity transmitters are designed for the monitoring of critical climate in process engineering and also in compressed air technology. The demanding measurement is realized with the further developed Testo humidity sensor, with its well-known and highly-valued long-term stability. Unmatched state-of-the-art technology in humidity measurement, with solutions for highest accuracy as well as for special applications (high humidity, humidity in  $H_2O_2$ , trace humidity etc.) is provided. Both instrument series present many new features, among them world innovations such as a professional bus interface in the humidity measurement transmitter testo 6681.



Self-monitoring assures system availability



Digital probes



External test points for analog signals



Profibus DP, now also for humidity transmitters



## Common features + benefits testo 6651 and testo 6681



### Display and control menu

The optional display has an extremely convenient operating menu. With the help of four operating buttons, almost all operations can be carried out which can be conducted using the P2A software. Commissioning, adjustment and analysis are thus possible completely without a – simply on site!

The display not only presents the measurement values and relay status clearly, but also guides the user safely through the operating menu thanks to a clear-text line. A password protects against unauthorized operation. A cover for the buttons can also be installed.

And last but not least: The clear-text can be selected in six languages – optimum for your systems at home and abroad.



### Digital probes: Exchangeable and traceable

The humidity probe in the models testo 6651 and 6681 can be easily exchanged by hand. A readjustment with the measurement transmitter itself is not necessary, since the probe series testo 6600 used in the humidity measurement transmitter testo 6651 not only has a purely digital interface to the measurement transmitter, it is also completely calibrated and adjusted.

Unplug probe 1, plug in probe 2 – continue measuring!

At the same time, Testo fulfils the highest demands, for example those of the pharmaceutical industry. Each probe has its own serial number, a store for the adjustments carried out with it, and its own operational hour counter. This visualizes (via the measurement transmitters operating menu or the P2A software) how long the probe has already been in use, and which settings have been carried out on it (see also P2A software).

### Calibration and adjustment

via operating menu, adjustment buttons and p2A software, testo 6651/6681 offer

- 1-point adjustment
- 2-point adjustment
- adjustment of analog outputs

Thanks to the analog output adjustments, it is possible to eliminate measurement errors which can occur in the transmitter due to the digital-analog conversion – this too, is a world innovation in the field of humidity.

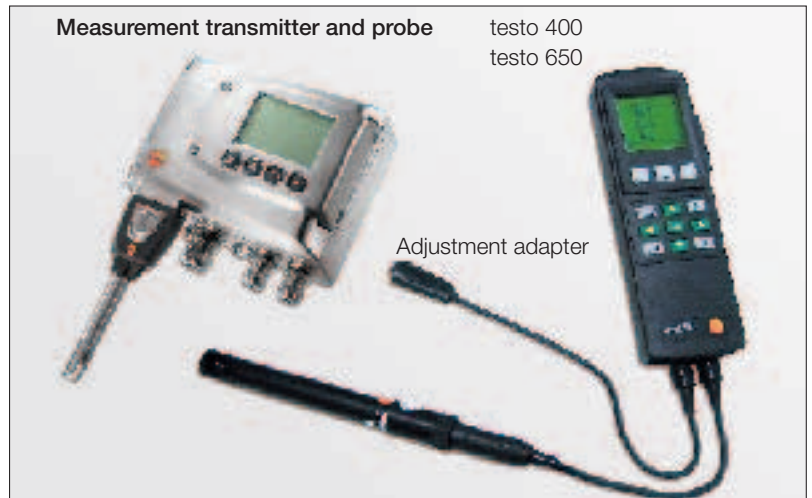
## Common features + benefits testo 6651 and testo 6681

### Direct, on-site adjustment with the testo 400

Regular adjustment goes without saying for every demanding humidity measurement – even if no correction is required after as many as three or four years thanks to the highly stable Testo sensors.

Important for the user: The process (e.g. the air conditioning system.) should not be interrupted by the adjustment procedure. And it is not always ideal to bring a notebook/PC to the location.

For this reason, Testo has equipped the testo 6651 and the testo 6681 with an interface that is easily accessible from the outside. Here, the testo 400 reference handheld instrument or testo 650 (with precision humidity probe) can – via the adapter 0554 6022 – be connected directly to the testo 6651 and testo 6681 transmitters. On the display of the handheld instrument, the humidity and temperature values of both instruments are immediately compared with one another. If the deviation is too high, a few presses of a button are all that are needed and the testo 6651 and testo 6681 are already adjusted (1-point adjustment). You can continue to the next measuring point after just a few minutes.

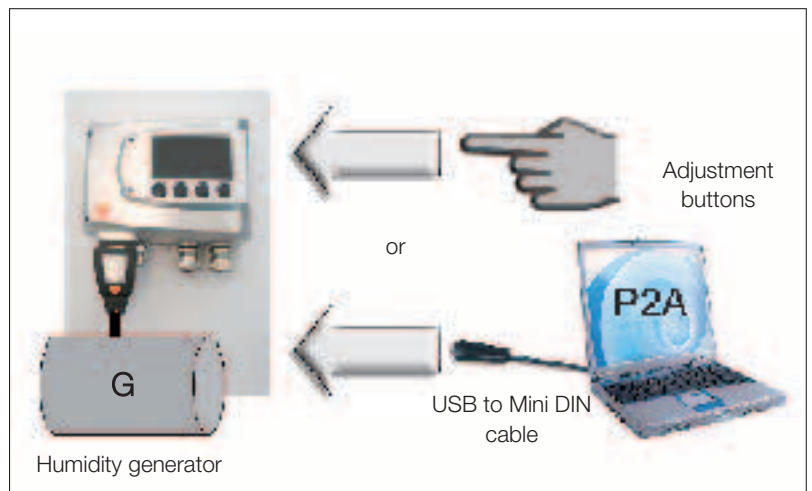


1-point adjustment on site with the portable instrument testo 400 or testo 650 with precision humidity probe and adjustment adapter

### Adjustment via user menu or P2A software

In addition to the various opportunities for calibrating and adjusting the probe together with the transmitter locally (cf. P2A software and user menu), thanks to the testo 6600 digital probe series it is possible to leave the transmitter on site and just exchange the probe and calibrate it in the laboratory.

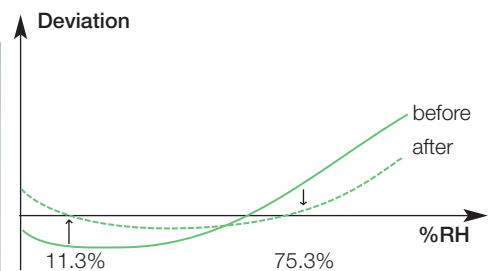
Companies with internal calibration laboratories install at least one testo 6651/6681 transmitter in the lab and use this as the basis for adjustment for a number of probes. After the adjustment, the probes – or probes with an identical design – are once again connected to the original measuring point. Thanks to the probe serial number, you can always trace (e.g. with the P2A software) which probe was connected to the transmitter when and how it was adjusted (1 or 2-point adjustments).



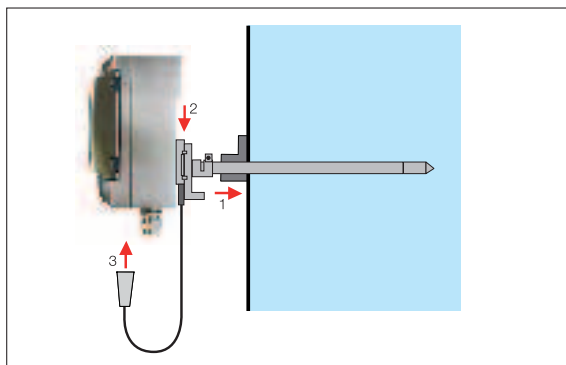
Adjustment via operating menu or testo P2A software

### Two-point adjustment with re-usable salt solutions

Adjustment using two salt solutions is also possible on site. In the outer chamber of these „control/adjustment containers“ is a saturated salt solution. After a period of adjustment, the air in the inside chamber forms equilibrium humidity. In the two standard solutions this is 11.3 % and 75.3 %RH. The average error is smaller in a two-point adjustment than in a one-point adjustment, especially when working in a greater range. The testo control/adjustment containers are also re-usable, so that the costs are kept at a minimum.



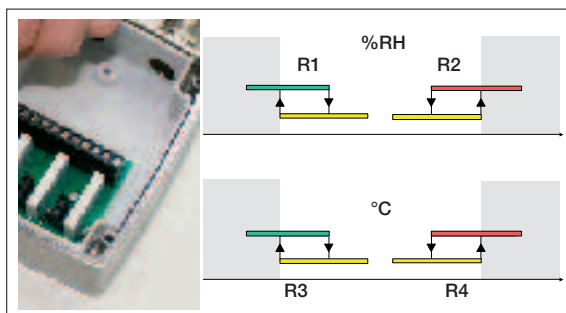
## Common features + benefits testo 6651 and testo 6681



### World first: Duct version with exchangeable probe

For many users, the duct version, in which the probe is classically attached to the rear wall of the measurement transmitter, is the best solution. The measurement transmitter must not be mounted separately, but is held in position by the probe (1).

With the testo 6602/6603 (for testo 6651) as well as the testo 6612 (for testo 6681), Testo has succeeded in patenting and making this version available, also for exchangeable digital probes, for the first time on the world market. The intelligent probe-cable construction means that the measurement transmitter is simply pushed over the end of the probe (2), and the digital probe plug is then plugged in (3).



### Integrated relays (optional)

Thanks to the four power relays (up to 256 VAC, 3A), assemblies of the air conditioning system can be directly switched without taking the detour via a control. At the same time, the relays can be used for local alarming or for reporting limit value violations to a superordinate system.

And not least, the person responsible for the system can be called to the measurement site in time with the help of a collective alarm (cf. self-monitoring).

### Designed to be practical

The main emphasis in the construction of the testo 6651 and testo 6681 was on practicability. Here a few examples:

- Adjustment buttons, test points s. below) and interface should be easily accessible for the specialist, but not for others. This was the reason for designing the "service cover", which frames the display.
- Test points: Do the analog outputs need to be tested when commissioning the instrument? Are analog adjustments to be made at a later date? Instead of disconnecting already existing wiring (and opening the housing), test points were positioned under the service cover, which allow easy access to the analog signals.
- Wiring compartment: Which practitioner is not often frustrated by the minimal space afforded by measurement transmitter manufacturers for wiring? For this reason, Testo has designed a separate wiring compartment with plenty of space. The practitioner will appreciate it.

### Self-monitoring

The testo 6651 and testo 6681 constantly monitors themselves: Their voltage supply, when 100 %RH is reached, any drift in 2-point adjustment etc.

With the testo 6617 probe, the testo 6681 also additionally offers self-monitoring of the sensor.

The reports resulting from this are not only stored with an operational hours stamp – for later analysis – and shown in the display!

With the help of the optional relays, these reports can also be given out as a collective alarm. The person responsible – working as a team with the testo 6651/6681 – can thus always ensure optimum system availability!

## Transmitters with Ethernet – Your benefits at a glance



### Ethernet for transmitters

Testo, as one of the leading suppliers worldwide of measurement technology, offers an Ethernet interface for humidity and differential pressure transmitters.

Now, parallel to the use of analog outputs for regulation purposes, integrated measurement data monitoring from the field to management level (e.g. data from production available in the office) is made possible easily, efficiently and at a competitive price.

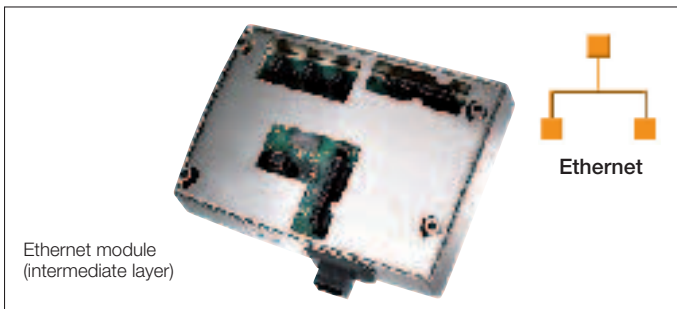
Ethernet is prevalent in almost all office networks so that installation work is kept to a minimum when the humidity transmitter is connected to the network structures already in existence.

### Developed for practical use

The Ethernet module is an "intermediate layer" (sandwich design) which is already built into the testo 6651 and 6681, as well as testo 6351 and testo 6381 transmitters in the factory. It can also be subsequently easily and quickly retrofitted on site.

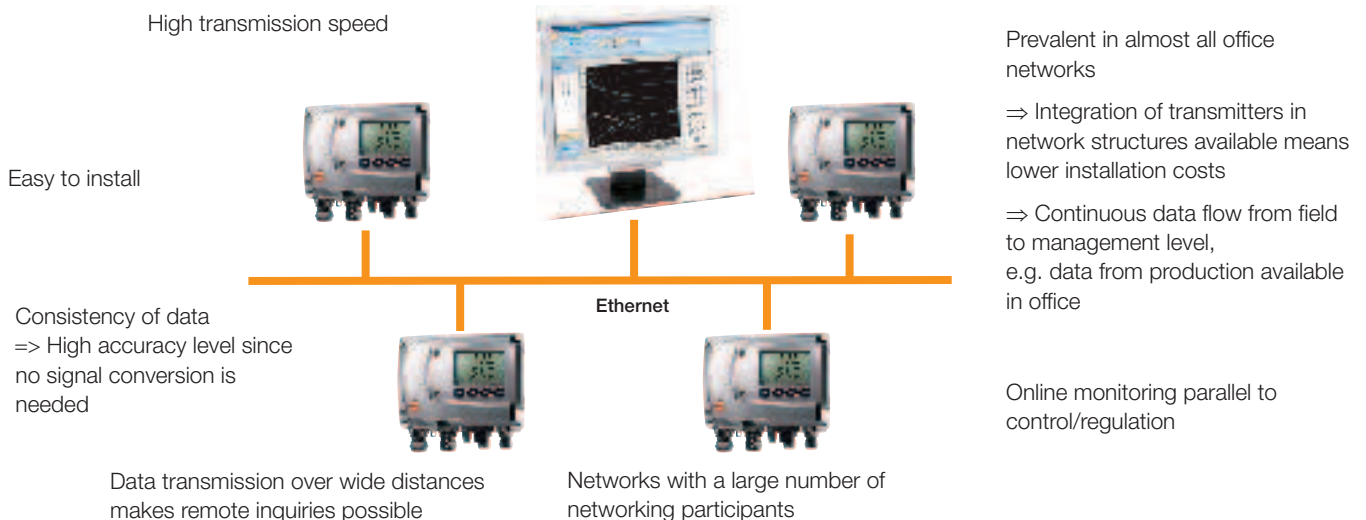
Two LEDs signal the status of the power and LAN connection to the system operator responsible.

By using an Ethernet plug suitable for industry, IP65 housing protection can be guaranteed so that the transmitter withstands the sometimes tough and demanding conditions of industrial processes.



### Process reliability and time saved by measurement data monitoring

Networking transmitters using Ethernet provides considerable benefits in a number of applications such as for monitoring laboratories, warehouses, production rooms, cleanrooms or drying systems. In addition to transmitting the readings signals by analog outputs to a control system, measurement data can also be simultaneously recorded, documented and visualised using Ethernet. If necessary, it is also possible to alert the person responsible for the process.



## Transmitter in customer's system

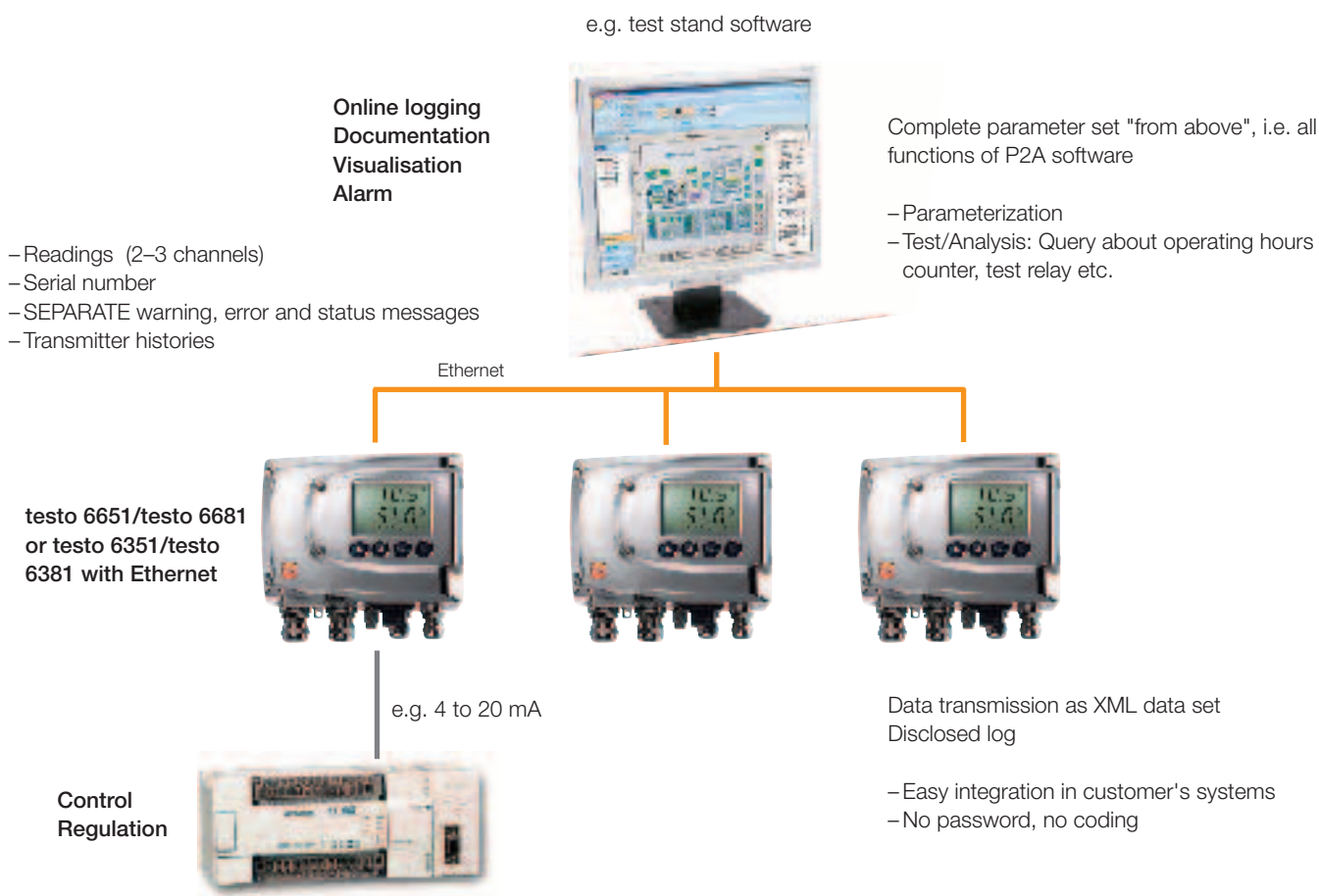
The Ethernet module of the testo 6651/testo 6681 and testo 6351/testo 6381 transmitters can be operated in two modes:

**1. Integration of the transmitter into the measurement data monitoring system testo Saveris** (see Saveris page 126)

**2. Integration of transmitter in customer's system**

If the "Supplied by customer" operating mode is selected in the transmitter's Ethernet module, the intermediate layer functions as an XML server. Data is transmitted as an XML data set. Simple integration into the user's system is possible on account of the disclosed log.

Parameterizations, analyses/tests and queries about the history data in the transmitter can be carried out or called up using Ethernet (data sets) "from above" (using your PC).



	Upgrade module Ethernet intermediate layer	Optional Ethernet module for testo 6651 and testo 6351	Optional Ethernet module for testo 6681 and testo 6381
Interface	RJ45 (Ethernet 10BaseT / 100 Base TX)		
Oper. temp.	-40 to +70 °C		
Oper. humidity	0 to 100 %RH		
Storage temp.	-40 to +80 °C		
Status LEDs (green)	Power LED / LAN connection status		
Housing colour	Metallic	grey	Metallic
Material/Housing	Metal	Metal	Metal
Part no.	0554 6656	Order code E01	Order code E01

## Humidity transmitter testo 6651

### Practice requires digital probes ...



Werner Gäng,  
Head of Sales  
Europe

... and that's why my customers from Malta to Hammerfest are happy to hear that they are now available even in the "middle class".

Their main interest is in system availability (fast probe exchange), but also in calibration without dismantling/dispatch of the transmitter.



Transmitter testo 6651  
without display



Transmitter testo 6651  
with display



## testo 6651 – the humidity measurement transmitter for critical climate applications

Not all measurement problems in air conditioning technology can be solved with "simple" measurement transmitters like the testo 6621. Special challenges are mastered by the testo 6651.

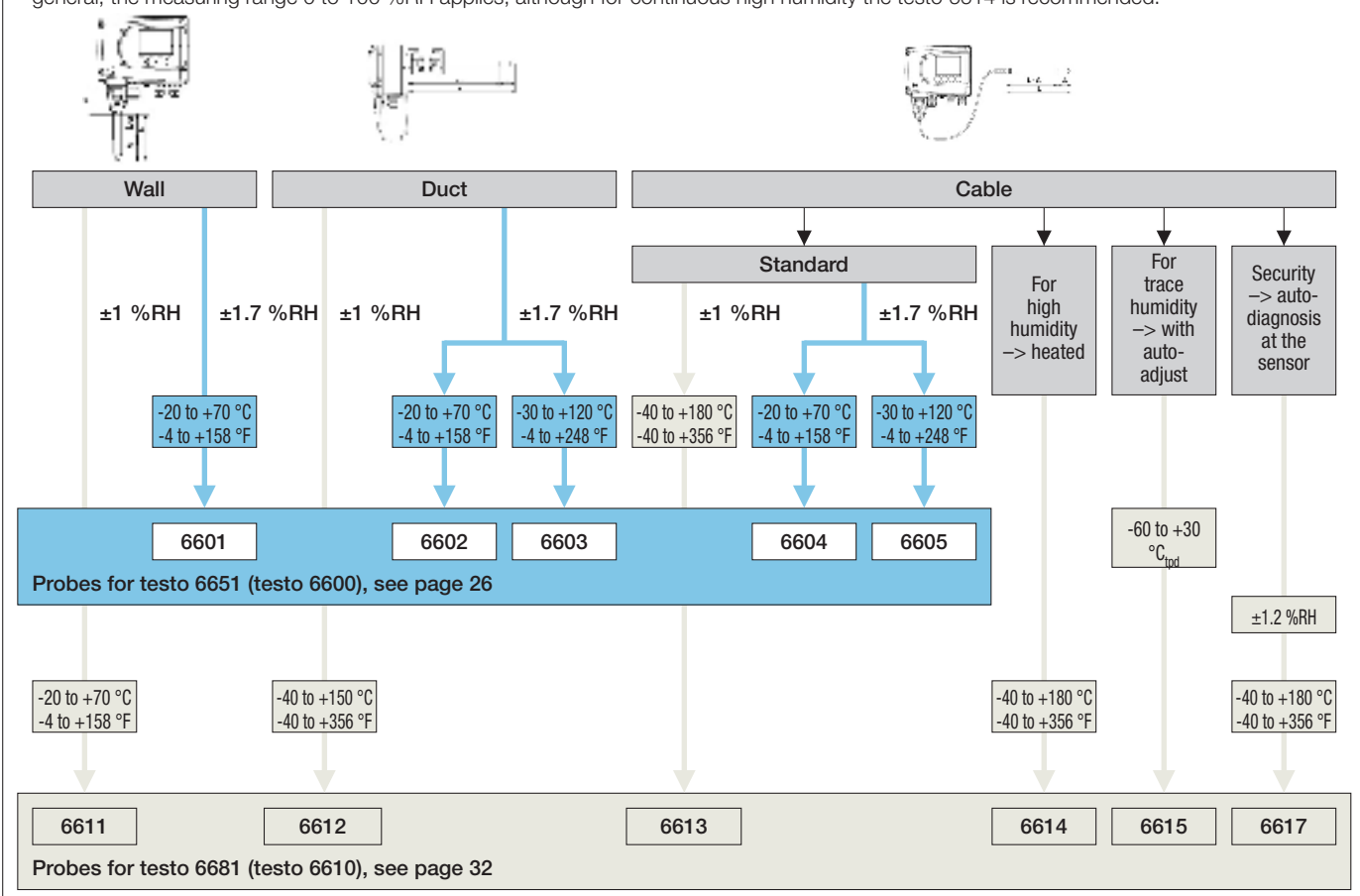
- The probe should be digital and exchangeable. In the testo 6651, even the duct version fulfils this – a world innovation!
- Higher accuracies are required, especially with regard to use over years
- The humidity parameter dewpoint ( $^{\circ}\text{C}_{\text{td}}/^{\circ}\text{F}_{\text{td}}$ ) is to be used, for example in processes in which it is of highest priority that the temperature does not fall below the dewpoint
- Assemblies are to be controlled from the instrument (optional integrated relays)
- Commissioning, adjustment and analysis are to be possible directly in the instrument without software (optional display/operating menu)
- Changes of parameter, adjustments and reports are to be stored in the instrument – with operating hour stamp

This and other features make the testo 6651 the first choice for demanding climate technology, as well as in pasta drying systems, maturation chambers for charcuterie and similar applications.



### Overview of the product range: measurement transmitters testo 6651 and digital probes 6600

Whether the decision is made in favour of a testo 6651 or a testo 6681 depends above all on the choice of probe, in addition to the question of the housing material (6681: metal housing), and the humidity parameters or signals to be used (e.g. professional bus only in testo 6681). In general, the measuring range 0 to 100 %RH applies, although for continuous high humidity the testo 6614 is recommended.





## Product codes for testo 6651 transmitter

The humidity measurement transmitter for critical climate (testo 6651) is generally customer-specifically configured, adjusted and delivered. Please select the measurement transmitter you require step by step.

0555 6651 **A01** **Bxx** **Cxx** **Dxx** **Exx** **Fxx** **Gxx** **Hxx** **Ixx** **Jxx** **Kxx**

- B01** 4 to 20 mA (2-wire, 24 VDC), not possible with relays 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)

- C00** Without display / without operating menu  
**C02** With display & operating menu / English  
**C03** With display & operating menu / German  
**C04** With display & operating menu / French  
**C05** With display & operating menu / Spanish  
**C06** With display & operating menu / Italian  
**C07** With display & operating menu / Japanese  
**C08**

Clear-text language. Operating menu available only with display.

- D01** Cable input M16 (relay: M20)  
**D02** Cable input NPT 1/2"  
**D03** Cable contact via via M plug connection for signal and supply (for optional relays: M20 cable input)\*\*

- E00** without Ethernet module  
**E01** with Ethernet module

- 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
- Channel 1\*

- 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
- Channel 2\*

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

- 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

### Order example for testo 6651 transmitter

Housing with display with menu in English

4 to 20 mA (2-wire)

Cable input M16/M20

Factory setting channel 1:

%RH with scaling min 0 %, max 100 %\*

Factory setting channel 2:

°C with scaling min -10 °C/-14 °F,

max +70 °C/+158 °F\*

without relay

Instruction manual in German and English

→ **0555 6651 A01 / B01 / C03 / D01 / F01 / G02 / -10 / +70 / H00 / K01**

\* Standard scaling is delivered if "min" and "max" are not specified.

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

not with code "B01"  
 Relay parameterization when commissioning via operating menu (display) or P2A software

# Technical data measurement transmitter 6651

GENERAL						
Housing		Plastic (silica-free)				
Dimensions		122 x 162 x 77 mm (without probe)				
Weight		0.62 kg (without probe)				
Display		2-line LCD with clear-text line (optional) and relay status display. Four operating buttons for operating menu.				
Resolution display		0.1 %RH and 0.01 °C / °F; 0.1 °C <sub>td</sub> / °F <sub>td</sub>				
Cable screw fitting		M 16 x 1.5 (2x) with inner diameter 4-8 mm for signal/supply cable (for option D01) M 20 x 1.5 (2x) with inner diameter 6-12 mm for relay cable (for options D01 or D03)				
Probe connection		Digital plug-in connection				
Power supply		2-wire: 24 VDC (12 to 30 VDC) 4-wire: 20 to 30 VAC/DC, 300 mA max. current consumption				
Protection class		IP 65				
EMC		2004/108/EU				
Operating temperature housing		-40 to +70 °C/-40 to +158°F, with display 0 to +50 °C/32 to +122 °F, optimum at +15 to 35 °C/+59 to 95 °F-40 to 60 °C with integrated relay				
Storage temperature		-40 to +80 °C/-40 to +176 °F				
Measurement parameters		Temperature in °C / °F Relative humidity %rF / %RH Dewpoint in °C <sup>td</sup> / °F <sup>td</sup>				
Measurement medium		Air, nitrogen, more on request: applicationsupport@testo.de				
SENSOR (more data see probes)						
Humidity		Testo humid. sensor, cap.				
Reproduceability		better than ±0.5 %RH				
Measurement inaccuracy %RH		cf. probe data				
Probes		6601	6602	6603	6604	6605
Measuring range (Standard scaling)	Humidity	0 to 100 %RH				
	Temperature	-20 to +70 °C/-4 to +158 °F	-20 to +70 °C/-4 to +158 °F	-30 to +120 °C/-22 to +302 °F	-20 to +70 °C/-4 to +158 °F	-30 to +120 °C/-22 to +302 °F
	Dewpoint	-60 to +100 °C <sup>td</sup> or -76 to +212 °F <sup>td</sup>				
Reaction time without protective filter		t 90 max. 10 s				
ANALOG OUTPUT (uniform for all channels, specify when ordering)						
Quantity		2 channels (type: analog signal uniform for both channels, specify when ordering)				
Current/accuracy		4 to 20 mA ±0.03 mA (2-wire) 0 to 20 mA ±0.03 mA (4-wire) 4 to 20 mA ±0.03 mA (4-wire) for heated sensor technology				
Voltage/accuracy		0 to 1 V ±1.5 mV (4-wire) 0 to 5 V ±7.5 mV (4-wire) 0 to 10 V ±15 mV (4-wire)				
Galvanic isolation		Galvanic isolation of output channels (2-wire and 4-wire), isolation of supply to outputs (4-wire)				
Resolution		12 bit				
Maximum load		2-wire    12 VDC: 100 Ohm 24 VDC: 500 Ohm 30 VDC: 625 Ohm 4-wire    500 Ohm				
ADDITIONAL OUTPUTS						
Relays (optional)		4 relays (free allocation to measurement channels or as collective alarm with operating menu/P2A software), up to 250 VAC / 3 A, (NC/C/NO)				
Digital output		Mini DIN for Testo P2A parameterization software and Testo portable instruments 400/650				
Ethernet		Ethernet with Saveris connection or open protocol with XML output. IP address allocation possible via P2A software.				



Ordering options probe range testo 6600

0555 6600 Lxx Mxx Nxx Pxx

- 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 (cable version -20 to 70 °C)
- L05 Probe 6605 (cable version -30 to 120 °C)

- M01 Sintered stainless steel filter
- M02 Wire mesh protective cap
- M03 Sintered PTFE filter
- M04 Metal protective cap, open
- M05 Plastic cap ABS, open

for protective cap selection see p. 46

**Order example for 6602 probe**

Duct probe ( (-20 to +70 °C/-4 to 158 °F are sufficient)

Sintered stainless steel filter

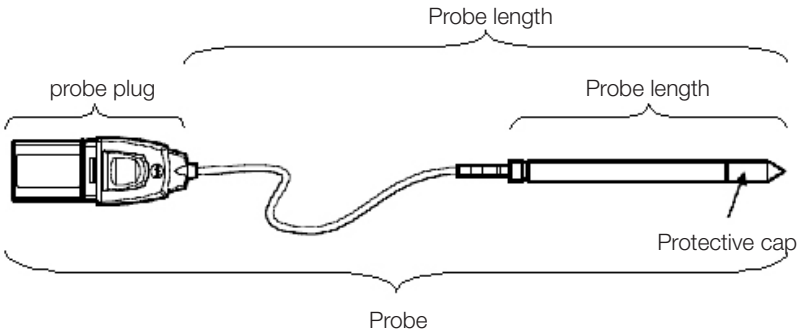
Probe length 280 mm

→ **0555 6600 L02 / M01 / N23 / P28**






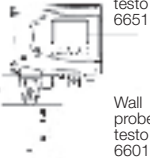
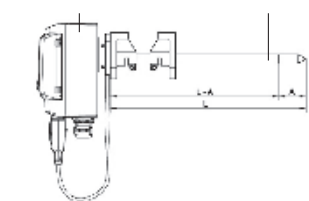
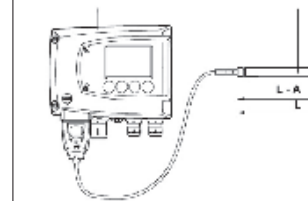
- N00 Without cable (for probe 6601)
- N01 Cable length 1 m (for probes 6604/6605)
- N02 Cable length 2 m (for probes 6604/6605)
- N05 Cable length 5 m (for probe 6605 only)
- N23 Cable length, specially for duct versions (for probes 6602/6603)

	L01	L02	L03	L04	L05
P07 Probe length 70 mm	X	–	–	–	–
P14 Probe length 140 mm	–	–	–	X	–
P20 Probe length 200 mm	X	–	–	–	X
P28 Probe length 280 mm	–	X	X	X	–
P50 Probe length 500 mm	–	–	–	–	X

**Ordering procedure:**  
Transmitters and probes can be ordered independently of each other, (on account of the digital probe interface), cf. order examples above.  
If the transmitter and probe order are to be assembled together, their order codes are combined in the distribution set 0563 6651



# Technical data probe series testo 6600

Model	testo 6601	testo 6602	testo 6603	testo 6604	testo 6605
					
Type	Wall	Duct	Duct	Cable	Cable
Application	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 %rF/%RH, °C <sub>td</sub> /°F <sub>td</sub> , °C/°F					
Measuring range	Humidity	0 to 100 %RH			
	Temperature	-20 to +70 °C/-4 to +158 °F	-30 to +120 °C/-22 to +248 °F	-20 to +70 °C/-4 to +158 °F	-30 to +120 °C/-22 to +248 °F
Material	Probe shaft	Plastic ABS			Stainless steel
	Cable	FEP coated			
	Plug	Plastic ABS			
Measurement inaccuracy*	Humidity: (+25 °C)**	±1.7 %RH (0 to 90%) / ±1.9 %RH (90 to 100%)			
	Humidity: for deviations from the media temperature ±25 °C	+0.02 %RH/K			
	Temperature: at +25 °C / +77 °F	±0.2 °C / 0.38 °F (PT1000 Class A)			±0.15 °C/±0.27 °F (Pt1000 1/3 Class B)
Reproduceability	Humidity	better than ±0.2 %RH			
Probe dimensions	Diameter	12 mm			
	Probe shaft length L	70/200 mm	280 mm	140/280 mm	200/500 mm
Cable length		–	specifically for duct versions	1/2 m	1/2/5 m
Pressure tightness	without	1 bar positive pressure (probe tip) no negative pressure			1 to 10 bar (probe tip) 1 bar (probe end)
Drawings					

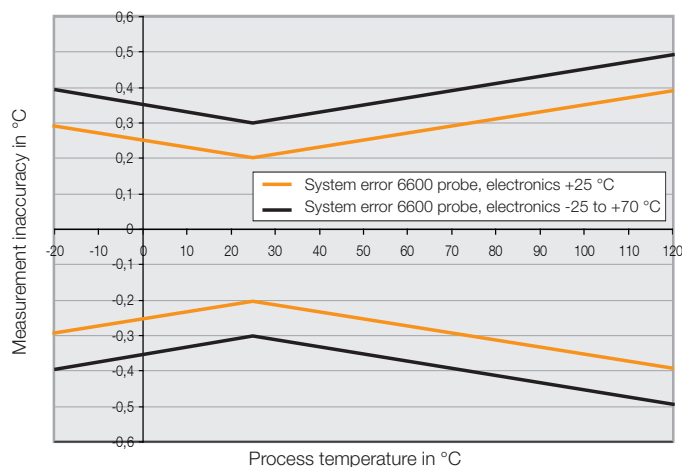
\*\*Determination of measurement uncertainty according to GUM (Guide to the Expression of Uncertainty in Measurement)

The following uncertainty factors are taken into account in determination:

- Hysteresis
- Linearity
- Reproduceability
- Adjustment site/uncertainty of factory calibration

This total view results in an additional humidity-dependent uncertainty of ±0.007 x m.v. (in %RH)

Temperature error dependent on process temperature and electronics temperature



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

Operation: with 2 channels at 12 mA, without display illumination, relay off, additional measurement inaccuracy to above data at +25 °C (+77 °F), humidity ±2.5 %RH, temperature ±1 °C (1.8 °F)

## Humidity transmitter testo 6681

### Preventive Maintenance, Profibus and P2A software ...



Peter Gerst,  
Product Group  
Manager  
Measuring  
Systems at Testo

... will soon no longer be missing, when those responsible for systems use professional humidity transmitters. We are proud to be able to introduce these excellent new products to the world market.



Transmitter testo 6681  
without display



Transmitter testo 6681  
with display



## testo 6681 – the industrial humidity measurement transmitter

Industrial humidity measurement requires absolute professionalism. Not only in the running of the system, but also in the measurement technology used. The industrial humidity transmitter testo 6681 fulfils these high demands.

Over and above the features and benefits of the testo 6651 already described above (digital probes, P2A software etc.), the testo 6681 has a number of additional features, which the practitioner will appreciate.

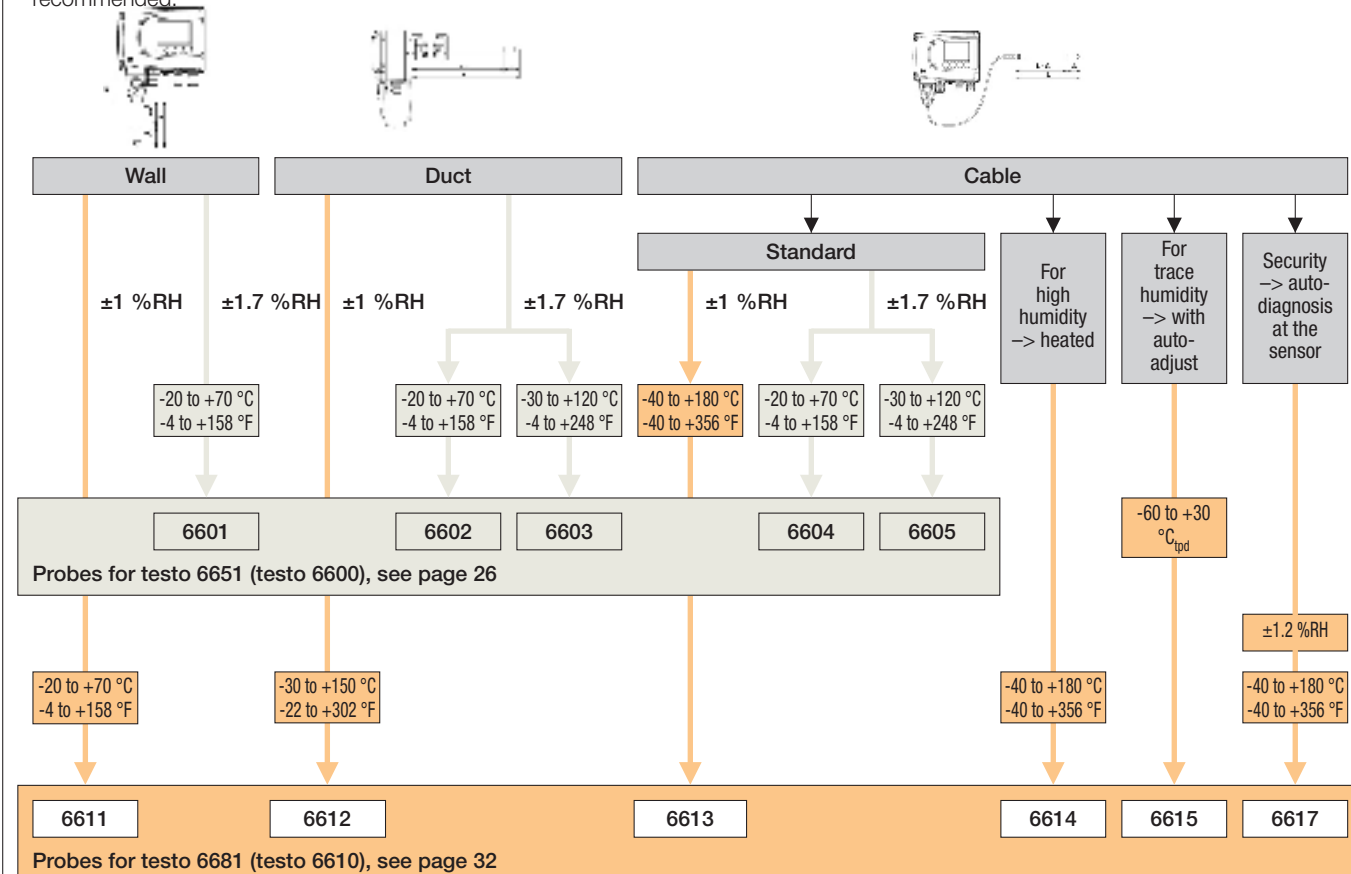
- **Accuracy**, up to  $\pm 1$  %RH
- **Preventative maintenance** via the early warning probe testo 6617
- A number of **humidity parameters**, such as absolute humidity and enthalpy etc.
- An absolutely robust **metal housing**
- A **trace humidity probe** (testo 6615) with auto-adjustment and high accuracy up to  $-60$  °C<sub>tpd</sub>
- A **high humidity probe** (testo 6614), stable even in continuous high humidity processes
- The field bus connection via **Profibus-DP**, a world innovation in humidity measurement

These and other reasons make testo 6681 the first choice in cleanroom technology, in drying technology, trace humidity and compressed air processes and demanding air conditioning technology.



### Overview of the product range: measurement transmitters testo 6681 and digital probes 6610

Whether the decision is made in favour of a testo 6651 or a testo 6681 depends above all on the choice of probe, in addition to the question of the housing material (6681: metal housing), and the humidity parameters or signals to be used (e.g. professional bus only in testo 6681). In general, the measuring range 0 to 100 %RH applies, although for continuous high humidity the testo 6614 is recommended.





## Order code measurement transmitter testo 6681

0555 6681 A01 Bxx Cxx Dxx Exx Fxx Gxx Hxx Ixx Jxx Kxx

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

C00	Without display / without operating menu
C02	With display & operating menu / English
C03	With display & operating menu / German
C04	With display & operating menu / French
C05	With display & operating menu / Spanish
C06	With display & operating menu / Italian
C07	With display & operating menu / Japanese
C08	

D01	Cable input M16 (relay: M20)
D02	Cable input NPT 1/2"
D03	Cable contact via M plug connection for signal and supply (for optional relays: M20 cable input)**

E00	without Ethernet module
E01	with Ethernet module

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.

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.

Clear-text language. Operating menu available only with display.

Channel 1\*

Channel 2\*

H00	Without relay
H01	4 relay outputs, limit value monitoring
H02	4 relay outputs, limit values channel 1 + collective alarm
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.

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

not with B01

Channel 3\*

### Order example for testo 6681 transmitter

Housing with display with menu in English  
 4 to 20 mA (4-wire)  
 Cable input M16/M20  
 Ethernet module  
 Factory setting channel 1:  
 °C<sub>tpd</sub> with scaling min 0 °C<sub>td</sub>, max 100 °C<sub>td</sub> \*  
 Factory setting channel 2:  
 °C with scaling min -10 °C/-14 °F,  
 max +70 °C/+158 °F\*  
 with relay  
 without 3rd channel  
 Instruction manual in Spanish + English

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

\* Standard scaling is delivered if "min" and "max" are not specified.

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

GENERAL									
Housing		Metal (silica-free)							
Dimensions		122 x 162 x 77 mm (without probe)							
Weight		1.5 kg (without probe, without Ethernet module, without Profibus module)							
Display		2-line LCD with clear-text line (optional) and relay status display. Four operating buttons for operating menu.							
Resolution display		0.1 %RH and 0.01 °C / °F; 0.1 °C <sub>td</sub> / °F <sub>td</sub>							
Cable screw fitting (Code D01)		M 16 x 1.5 (2x) with inner diameter 4-8 mm for signal/supply cable (for option D01) M 20 x 1.5 (2x) with inner diameter 6-12 mm for relay cable (for options D01 or D03)							
Probe connection		Digital plug-in connection							
Power supply		2-wire: 24 VDC (12 to 30 VDC) 4-wire: 20 to 30 VAC/DC, 300 mA max. current consumption							
Protection class		IP 65							
EMC		2004/108/EU							
Operating temperature housing		-40 to +70 °C/-40 to +158°F, with display 0 to +50 °C/32 to +122 °F, optimum at +15 to 35 °C/+59 to 95 °F-40 to 60 °C with integrated relay							
Storage temperature		-40 to +80 °C/-40 to +176 °F							
Measurement parameters, calculated parameters		Depending on probe, the following is available: Temperature in °C / °F; relative humidity %rF (%RH); dewpoint in °C <sub>td</sub> (°F <sub>td</sub> ); normed atmospheric dewpoint in °C <sub>tpd</sub> (°F <sub>tpd</sub> ); 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 °C <sub>tw</sub> (°F <sub>tw</sub> ); water vapour partial pressure in hPa / H <sub>2</sub> O; water content in ppm vol / % Vol; mixture dewpoint H <sub>2</sub> O <sub>2</sub> / in °C <sub>tm</sub> / °F <sub>tm</sub> ; %RH nach WMO							
Measurement medium		Air, nitrogen, more on request: applicationsupport@testo.de							
SENSOR (more data see probes)									
Humidity		Testo humid. sensor, cap.							
Reproduceability		better than ±0.5 %RH							
Measurement inaccuracy %RH		cf. probe data							
Probes		6611	6612	6613	6614	6615	6617		
Measuring range		0 to 100 %RH				-60 to +30 °C <sub>td</sub>		0 to 100 %RH	
(Standard scaling)	Humidity								
	Temperature	-20 to +70 °C/-4 to +158 °F	-30 to +120 °C/-22 to +302 °F	-40 to +180 °C/-40 to +356 °F	-40 to +180 °C/-40 to +356 °F	-40 to +120 °C/-40 to +248 °F	-40 to +180 °C/-40 to +356 °F		
Measuring range (Standard scaling)		%RH	°C <sub>tdA</sub>	°F <sub>tdA</sub>	g/m <sup>3</sup>	g/kg	°C <sub>wb</sub>	°F <sub>wb</sub>	
		0 to 100	-80 to +100	-112 to +212	0 to 600	0 to 9500	-40 to +180	-40 to +356	
Reaction time without protective filter		t 90 max. 10 s							
ANALOG OUTPUT (uniform for all channels, specify when ordering)									
Quantity		2 channels (type: analog signal uniform for both channels, specify when ordering) additional 3rd channel (optional)							
Current/accuracy		4 to 20 mA ±0.03 mA (2-wire) 0 to 20 mA ±0.03 mA (4-wire) 4 to 20 mA ±0.03 mA (4-wire) for heated sensor technology							
Voltage/accuracy		0 to 1 V ±1.5 mV (4-wire) 0 to 5 V ±7.5 mV (4-wire) 0 to 10 V ±15 mV (4-wire)							
Galvanic isolation		Galvanic isolation of output channels (2-wire and 4-wire), isolation of supply to outputs (4-wire)							
Resolution		12 bit							
Maximum load		2-wire    12 VDC: 100 Ohm 24 VDC: 500 Ohm 30 VDC: 625 Ohm 4-wire    500 Ohm							
ADDITIONAL OUTPUTS									
Relays (optional)		4 relays (free allocation to measurement channels or as collective alarm with operating menu/P2A software), up to 250 VAC / 3 A, (NC/C/NO)							
Digital output		Mini DIN for Testo P2A parameterization software and Testo portable instruments 400/650 Pro bus-DP (optional as an integratable intermediate layer, cannot be combined with Ethernet module)							
Ethernet		Ethernet with Saveris connection or open protocol with XML output. IP address allocation possible via P2A software.							

## Ordering options probe range testo 6610

0555 6610

Lxx

Mxx

Nxx

Pxx

L11	Probe 6611 (wall version)
L12	Probe 6612 (duct version to 150 °C)
L13	Probe 6613 (cable version to 180 °C)
L14*	Probe 6614 (heated cable version)
L15	Probe 6615 (trace humidity cable version)
L17	Probe 6617 (self-monitored cable version)

M01	Sintered stainless steel filter
M02	Wire mesh protective cap
M03	Sintered PTFE filter
M04	Metal protective cap, open
M06	PTFE filter with drip hole
M07	PTFE filter w. drip hole & condensation protection
M08	Filter for H <sub>2</sub> O <sub>2</sub> environments**

for protective cap selection see p. 46

N00	Without cable
N01	Cable length 1 m
N02	Cable length 2 m
N05	Cable length 5 m
N10	Cable length 10 m
N23	Cable length, specially for duct versions

### Order example for testo 6613 probe

Cable probe, -40 to +180 °C

Sintered stainless steel filter

Cable length 2 m

Probe length 300 mm

→ 0555 6610 L13 / M01 / N02 / P30

} specially for high humidity (testo 6614 only)

L11	L12	L13	L14	L15	L17
X	–	–	–	–	–
–	–	X	X	X	X
–	–	X	X	X	X
–	–	X	X	X	X
–	–	X	X	X	X
–	X	–	–	–	–

	L11	L12	L13	L14	L15	L17
P07	X	–	–	–	–	–
P12	–	–	X	–	–	–
P20	X	X	X	X	X	X
P30	–	X	X	X	–	–
P50	–	X	X	X	X	X
P80	–	X	X	–	–	–

Ordering procedure:

Transmitters and probes can be ordered independently of each other, (on account of the digital probe interface), cf. order examples above. If the transmitter and probe order are to be assembled together, their order codes are combined in the distribution set 0563 6651

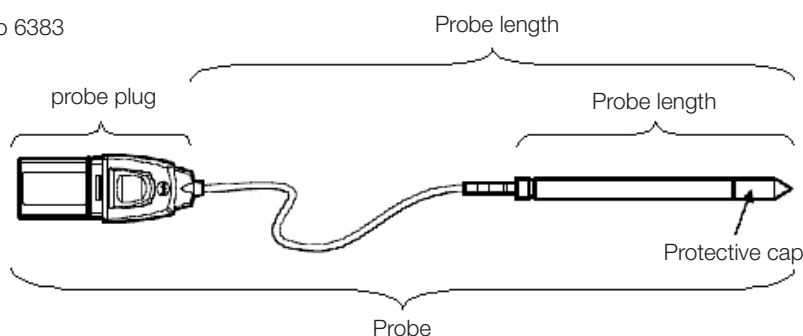
### \*Flow velocity dependency:

At flow velocities >1m/s an additional measurement inaccuracy contribution of ±1,5%RH must be assumed. In order to avoid this error, the use of a condensation protection cap is recommended.







### \*\*H<sub>2</sub>O<sub>2</sub> processes:

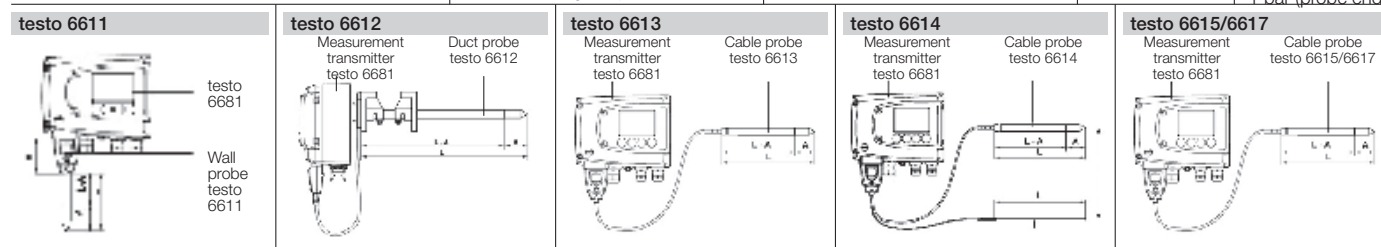
With testo 6681, Testo offers a transmitter which can also be used in hydrogen peroxide processes (H<sub>2</sub>O<sub>2</sub>) – for example in sterilization. The sensor is protected with the help of a special probe (Code M08). The so-called „mixture dewpoint“ °C<sub>tm</sub>/°F<sub>tm</sub> is also displayed.

\*\*\*not in combination with testo 6381 and testo 6383



# Technical data probe range testo 6610

Model	testo 6611		testo 6612	testo 6613	testo 6614	testo 6615	testo 6617
							
Type	Wall		Duct	Cable	Heated cable	Cable trace humidity (self-adjustment)	Cable with cover electrode monitoring
Application	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 / pressure dewpoint (with self-adjustment)	Humidity probe with self-monitoring for sensor-damaging media
Measurement parameters		°C/°F, %rF/%RH, °Ctd/°Ftd, °CtdA/°FtdA, g/m3/gr/ft3, g/kg/gr/lb, kJ/kg, BTU/lb, °Ctw/°Ftw, hPa, inch H2O, ppm vol %, %vol, °Ctm (H2O2)/°Ftm (H2O2)					
Measuring range	Humidity	0 to 100 %RH				-60 to +30 °C <sub>td</sub>	0 to 100 %RH
	Temperature	-20 to +70 °C/-4 to +158 °F		-30 to +150 °C/-22 to +302 °F	-40 to +180 °C/-40 to +356 °F		-40 to +180 °C/-40 to +356 °F
Material	Probe shaft	Stainless steel					
	Cable	FEP coated					
	Plug	Plastic ABS					
Measurement inaccuracy*	Humidity: (+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					
	Humidity: for deviations from the media temperature ±25 °C	+0.02 %RH/K					
	Pressure dewpoint					±1 K at 0° C <sub>td</sub> ±2 K at -40° C <sub>td</sub> ±4 K at -50° C <sub>td</sub>	
	Temperature: 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
Reproduceability	Humidity	better than ±0.2 %RH					
Probe dimensions	Diameter	12 mm					
	Probe shaft length L	70/200 mm	200/300/500/800 mm	120/200/300/500/800 mm	200/500 mm		
Cable length		—	specifically for duct versions	1/2/5/10 m			
Pressure tightness		1 bar positive pressure (probe tip) no negative pressure		1 to 10 bar (probe tip) 1 bar (probe end)		1 to 16 bar (probe tip) 1 bar (probe end)	1 bar positive pressure (probe tip) 1 bar (probe end)

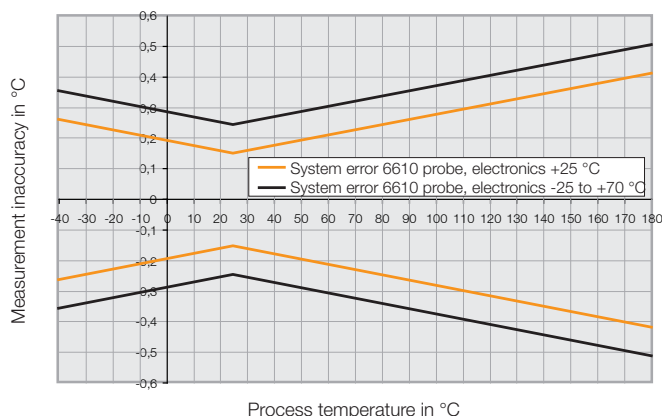


\*\*Determination of measurement uncertainty according to GUM (Guide to the Expression of Uncertainty in Measurement)  
The following uncertainty factors are taken into account in determination:

- Hysteresis
- Linearity
- Reproducibility
- Adjustment site/uncertainty of factory calibration

This total view results in an additional humidity-dependent uncertainty of ±0.007 x m.v. (in %RH)

Temperature error dependent on process temperature and electronics temperature



\*Other accuracies apply for the wall probe with 70 mm length in combination with a current output (P07):  
Operation: with 2 channels at 12 mA, without display illumination, relay off, additional measurement inaccuracy to above data at +25 °C (+77 °F), humidity ±2.5 %RH, temperature ±1 °C (1.8 °F)

## testo 6681 – the industrial humidity measurement transmitter

### Early warning system and self-monitoring – preventive maintenance

Today, professional humidity measurement transmitters are usually reliable links in the humidity regulatory chain. Testo has made a significant contribution to this with the help of the robust, condensation-proof Testo humidity sensor. However, if there are corrosive media in the process, this often means that after a while the sensor ceases to function, accompanied by costly rejects (quality deficiency in the end product) and system downtimes.

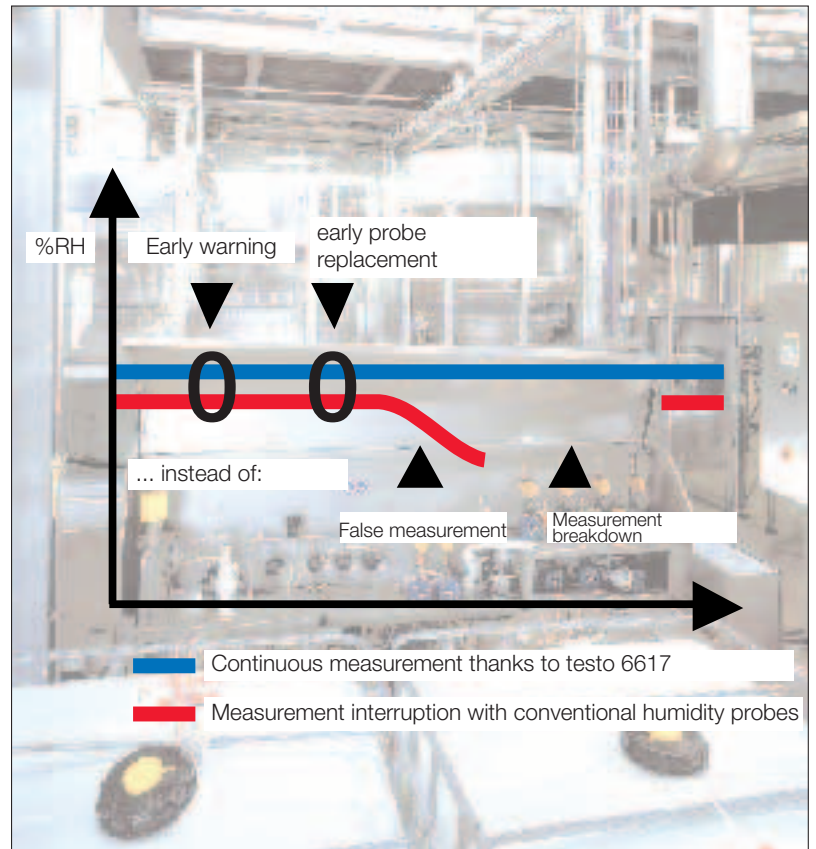
Testo has developed a special solution for these applications: the Testo "early warning humidity probe" testo 6617. This continuously monitors the Testo humidity sensor for any symptoms of beginning corrosion. It recognizes this situation very early. The person responsible for the system is therefore already warned before measurement errors or measurement interruptions occur.

Not only the probe testo 6617 serves as an early warning. The testo 6681 also has numerous self-analyses, such as

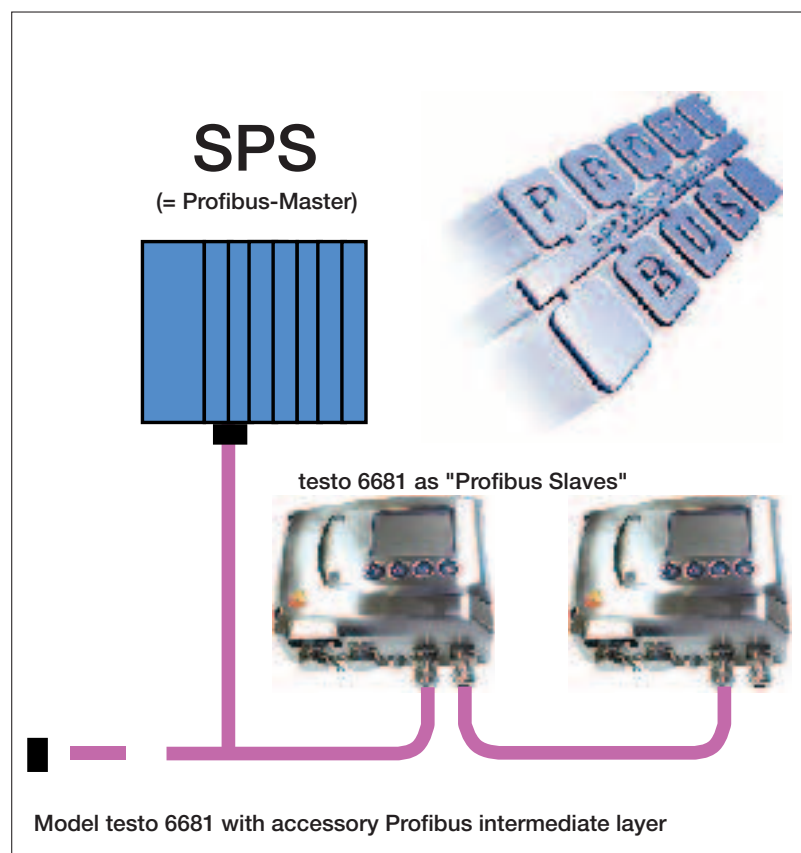
- Warning of excessive duration of condensation
- Warning of suspected drift on basis of 2-point adjustment
- Warning of unsuitable operating voltage etc.
- Warning of too high/low ambient temperature
- Warning of too high/low process temperature
- Warning of sensor adjustment malfunction
- Warning of sensor breakage, sensor short circuit and cable breakage

How are these early warnings passed on to the responsible person? In addition to the clear-text display, one of the four relays can be allocated a "collective alarm". In addition to this, all individual reports can be transferred, as long as the transmitter has the digital field bus communication Profibus-DP, see below.

Thanks to the early warning, the system supervisor can replace the probe early – and without interrupting the measurement. The experts know: the costs saved by such "preventive maintenance" far exceed the investment. The motto is "System Availability".



## testo 6681 – the signal outputs



### Profibus-DP – finally also for humidity applications

As an innovative provider of humidity measurement technology, Testo has made the most common field bus available: Profibus-DP. This has become standard in production automation and is also often used for drying processes or in compressed air technology.

Thanks to an "intermediate layer" (sandwich design), the testo 6681 can be equipped with this communication variant ex-works (Code B77) or later on site (Part no. 0554 6686).

The advantage of the field bus: in addition to the measurement values, all individual reports (i.e. also the numerous self-monitoring reports) can be passed on to the connected control. The relay limit values can also be altered "from above" (see graphic on left), e.g. to suit the current production batch.

### Analog outputs – two or optionally three

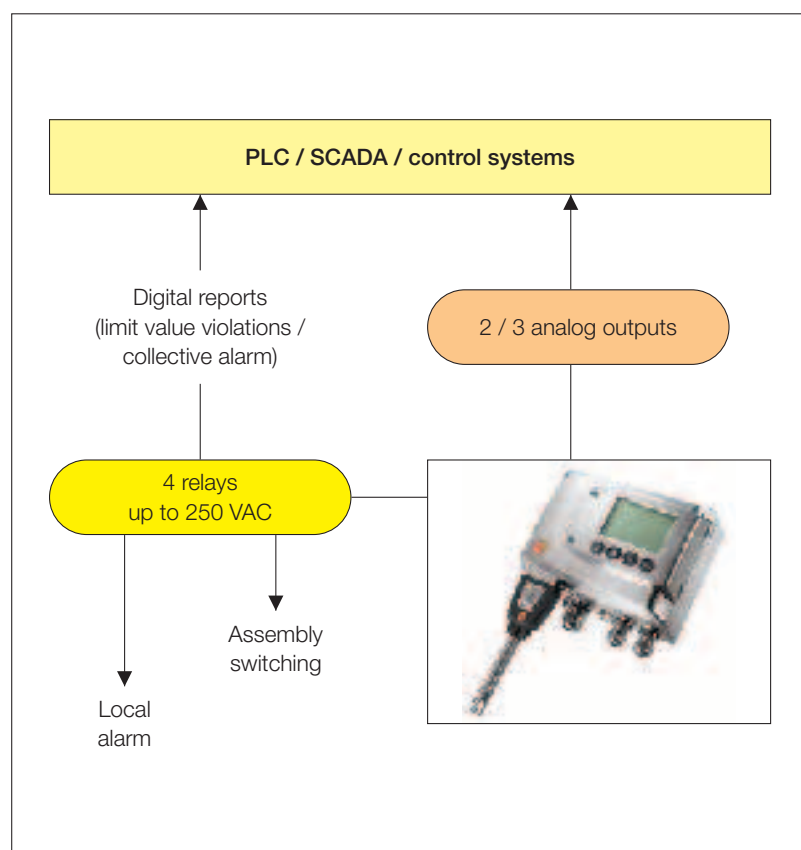
The testo 6681 is also very versatile regarding its analog outputs. In addition to the type of signal (4 to 20 mA two-wire or four-wire, 0 to 1 V, 0 to 5 V, 0 to 10 V, 0 to 20 mA), the number of analog outputs can be selected when ordering. Two or three channels are available. This means, for example, that the dewpoint can also be continuously monitored, in addition to the relative humidity and the temperature, without the need for complicated calculations in the control.

A channel can also be simply duplicated (e.g. 2x "0 to 100 %RH") in order to control an external display separately.

### Integrated relays (optional)

Thanks to the four power relays (up to 256 VAC, 3A), assemblies of the air conditioning system can be directly switched without the "detour" via a control. At the same time, the relays can be used for local alarming or for reporting limit value violations to a superordinate system.

And not least, the person responsible for the system can be called to the measurement site in time with the help of a "collective alarm" (cf. self-monitoring).

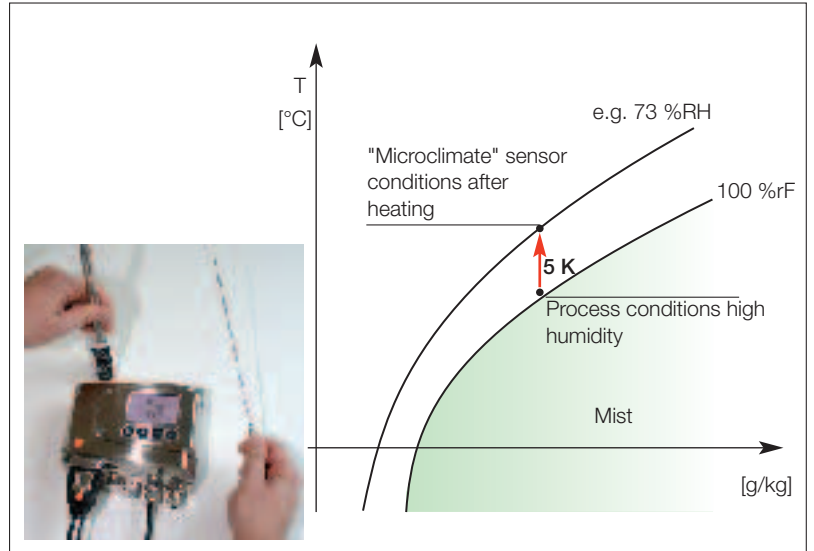


## testo 6681 – high humidity and trace humidity

### High humidity – testo 6614

Processes with high humidity are among the most demanding challenges in measurement technology. In this range, conventional sensors tend to react slowly, while corrosion – high humidity processes often contain corrosive media – can endanger the long-term useability of the sensor.

Testo provides a unique solution for this application with the digital probe testo 6614. The sensor heating creates a highly stable microclimate, in which fast reaction, highly accurate measurement and corrosion-proofness are guaranteed. With the help of an additional temperature probe, the actual process temperature is measured, and the process humidity calculated in the microprocessor. Long-term stability with high accuracy – up to now, this combination was beyond our reach in the high humidity range.



Testo has developed an adjustment method which guarantees highest accuracy in the high humidity range. The 1-point adjustment is in the high humidity range at 94.5 %RH. The control and adjustment salt for high humidity is used especially for the control and adjustment of the high humidity probe testo 6614 in combination with the transmitter testo 6681. Using this method, accuracy is improved especially in the working range above 80 %RH.

### Trace humidity – testo 6615

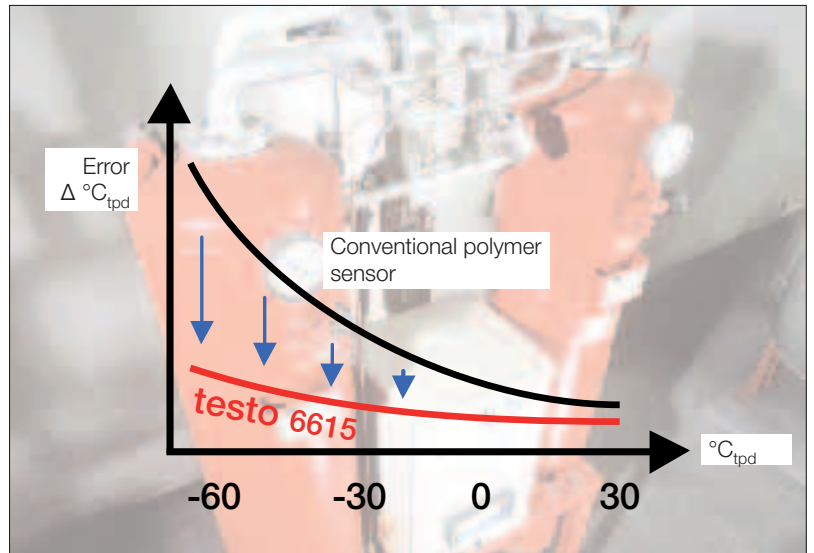
Trace humidity – i.e. very low relative humidity or dewpoint values – is also a very demanding measurement task. Conventional humidity sensors show their limitations here, especially in their measurement accuracy.

Testo has now succeeded in developing a special sensor on the basis of a self-adjustment. With sensational results: Down to low trace humidities of  $-60^{\circ}$  dewpoint (this corresponds to a relative humidity of 0.03 %RH at  $+25^{\circ}\text{C}/77^{\circ}\text{F}$ ), the digital probe testo 6615 still provides highest accuracy.

The appropriate accessories for this application are now also available:

- Prefilter 0554 3311 (for protecting the measurement chamber and sensor)
- Precision measurement chamber 05544 3312 (stainless steel) with adjustable flow-off, for measurements in compressed air up to 35 bar
- Flow-through meter for measurement chamber 0554 3313, for monitoring flow-off from the measurement chamber

With the help of these components, the optimum flow impact of the sensor, at any pressure (up to PN 16) and with optimum contamination protection, can be set. For long-term stable trace humidity measurements in compressed air and dry gases.



Connection of trace humidity probe testo 6615 via measurement chamber and pre-filter

## Notes

## testo 6681: The solution...

### Humidity measurement in $\text{H}_2\text{O}_2$ atmospheres



Dry sterilization places high demands on the humidity transmitter. The testo 6681 works optimally in this tough environment.



The manufacture of sterile products is becoming more and more important. With the testo 6681, humidity and temperature values in a  $\text{H}_2\text{O}_2$  environment can be measured continuously.

The sterile processing of products is playing an increasingly important part in production processes. Hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) is a substance which is used for this kind of application, largely in the food and beverage industry, as well as in pharmaceuticals. The  $\text{H}_2\text{O}_2$  is vaporized in order to keep the products in the processing chamber sterile. In order to carry out this process optimally, it is important to know, and if necessary to regulate, the humidity in the sterilization process. Condensation of the goods to be sterilized usually has to be avoided.

#### The patent-pending Testo solution

As the newest innovation, the humidity transmitter testo 6681 with the newly developed sensor cap M08 and the display version H8 can not only "survive" the tough  $\text{H}_2\text{O}_2$  environment undamaged, it can also continue to measure humidity during the  $\text{H}_2\text{O}_2$  phases.

#### Special protective cap for $\text{H}_2\text{O}_2$ (M08)



The special protective cap M08 is designed for use in an  $\text{H}_2\text{O}_2$  environment. Particularly

advantageous is the fact that, no reduction is caused by the filtration, so that saturation of the filter cannot occur. The protective function is permanently guaranteed. Owing to an innovative concept, the mixture dewpoint can be determined.

#### Display version H2O2



Different concentrations of  $\text{H}_2\text{O}_2$  are used for the sterilization of products. The specification of the (liquid) hydrogen peroxide is made in percentage by weight. This concentration can be entered directly in the display menu.

The mixture dewpoint [ $^{\circ}\text{Ctm}/^{\circ}\text{Ftm}$ ] or the mixture humidity [%rF] is then given via a third analog output.

## ... for continuous humidity measurement in hydrogen peroxide atmospheres

### Dewpoint distance

A serious danger in sterilization consists in the condensation of the  $\text{H}_2\text{O}_2$  vapour. This happens when the process temperature falls below the dewpoint. The difference between process temperature and the dewpoint is referred to as the dewpoint distance.

Example: At a process temperature of 50 °C/122 °F and a dewpoint of 40 °C/104 °F, the dewpoint distance is 10 Kelvin.

### Mixture dewpoint

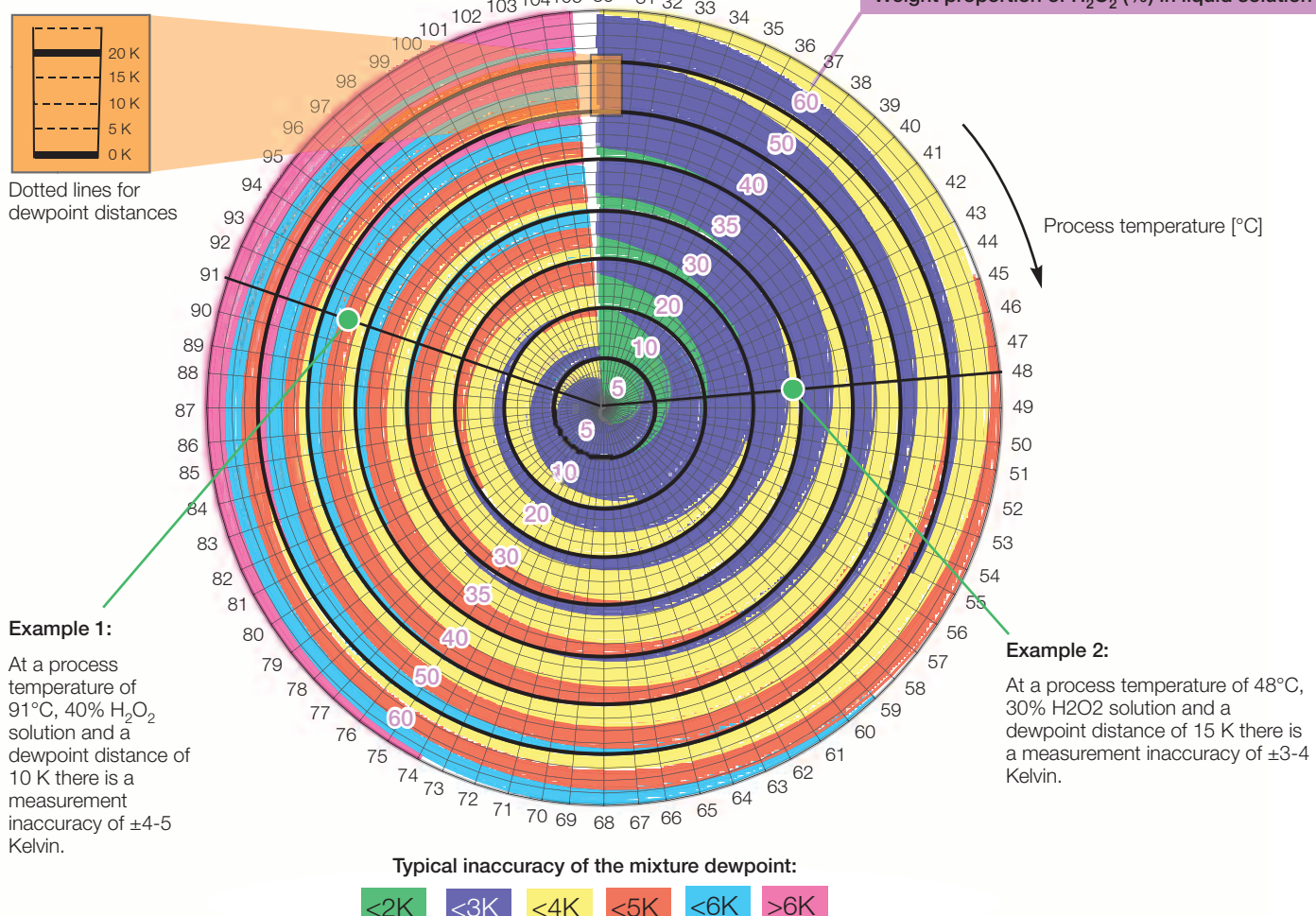
Mixture dewpoint (°C<sub>tm</sub>/°F<sub>tm</sub>) is the dewpoint resulting from the partial vapour pressure mixture of water ( $\text{H}_2\text{O}$ ) and hydrogen peroxide ( $\text{H}_2\text{O}_2$ ). This is the (only) relevant humidity value during the  $\text{H}_2\text{O}_2$  phases.

The testo 6681 allows the measurement of the mixture dewpoint directly in the production process, so that the dewpoint distance (channel 2 minus channel 3) can be monitored even during the  $\text{H}_2\text{O}_2$  phases.

### Accuracy spiral

The measurement inaccuracy of the mixture dewpoint results dependent on the proportion by weight in the liquid solution, the process temperature and the dewpoint distance (process temperature minus mixture dewpoint). This can be seen in the illustrating graphic.

Dewpoint distances in the rings increasing from the middle to the outside from 0 to 20 K respectively:



## testo 6682 – Humidity Transmitter for Explosive Areas

### Highest system availability

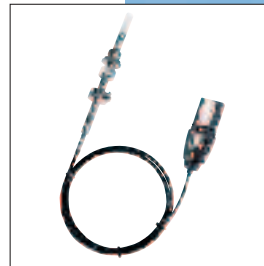


Meinrad Götz,  
Application Engineer

... is our promise even in areas with danger of explosion. The transmitter 6682 with humidity probe testo6616 offers advantages which will delight the user.



The transmitter testo 6682 is for use in explosive areas in Zone 1



The humidity probe testo 6616 is for use in explosive areas in Zone 0



## Your benefits with the testo 6682 humidity transmitter



The new testo 6682 humidity transmitter for Ex applications meets the most stringent requirements for process monitoring in explosive applications for pharmaceutical, chemical and process engineering.

Process safety and system availability are supported by the excellent features of testo 6682 which enthuse those working in the field:

- Highest accuracy and long-term stability of  $\pm 1\%$  RH
- Preventive maintenance through self-monitoring and early warning
- Historical traceability thanks to internal log
- Flexible calibration concept
- Replaceable digital testo 6616 probe
- Display and operating menu for easy operation with parameterization, adjustment and analysis



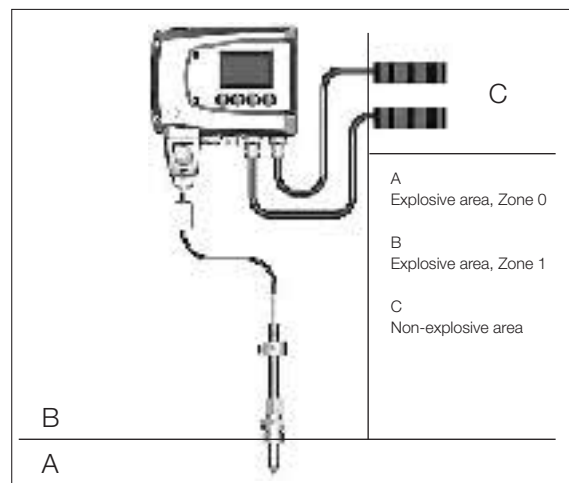
### Ex protection classes

The testo 6682 humidity transmitter is intended for protection class ATEX II 2 (1) G Ex ia [ia] IIC T4, the digital testo 6616 humidity probe for protection class ATEX II 1/2 G Ex ia IIC T4/T3.

The sensor tip can be used in a Zone 0 explosive area, the transmitter in Zone 1.

Basic safety and health requirements are fulfilled by compliance with EN 60079-0:2006, EN 60079-11:2007 as well as EN606079-26:2007 for testo 6616.

II	Instrument group: Use in non-firedamp endangered areas
1/2	Instrument category: Application range Electronics Category 2, Application range Probe shaft Category 1
2 (1)	Instrument category: Instrument can be used in Category 2 and facilitates the connection of instruments which can be used in Category 1
G	Media: For explosive mixtures of air and combustible gases, vapours or mist
Ex	Explosion-proof electrical equipment in accordance with European standards
ia	Ignition protection type: Intrinsic safety
[ia]	[ia] The instrument provides an intrinsic electric circuit for an additional instrument
IIC	The instrument can be used for gases in the IIC gas group
T4/T3	Temperature class T4 or T3

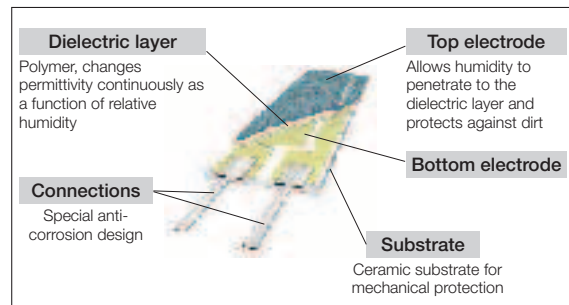


### Testo's humidity sensor: The core piece of high quality humidity transmitters now also for Ex areas

Testo is the first choice when it comes to superior humidity transmitters for a critical climate and drying processes. Using our many years of experience, the sensor concept and signal processing have now been completely overhauled.

Accuracy and long-term stability were tested as part of 5 years of interlaboratory tests by different national calibration laboratories (PTB, CETIAT, NIST etc.). Even without a new adjustment, the  $\pm 1\%$  RH limit was not exceeded.

You are on the safe side thanks to the accuracy, stability and efficiency of the Testo humidity transmitter.



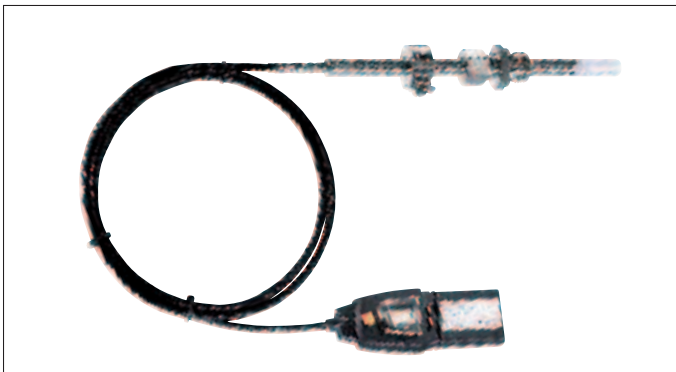
## testo 6682's versatile calibration concept



### Highest process stability through early warnings and self-monitoring

The testo 6682 humidity transmitter has numerous self-analyses available such as a warning if drift is suspected on the basis of 2 point adjustments or incongruous operational voltage. These messages are sent by signal to the display of the person responsible.

Thanks to this early warning system, the person responsible can react promptly and take the necessary measures before the process is interrupted. The keyword is: "System availability".



### Time-optimised handling and traceability thanks to the exchangeable, digital testo 6616 probe

The testo 6616 humidity probe can be easily replaced by hand. Adjustment and calibration data remain saved in the probe.

In order to be able to trace the probe's duration of use and the adjustments carried out, testo 6616 has its own serial number, an operational hours counter as well as an internal log which makes visible, on the transmitter's operating menu, how long the probe has already been in use and which configurations have been made.

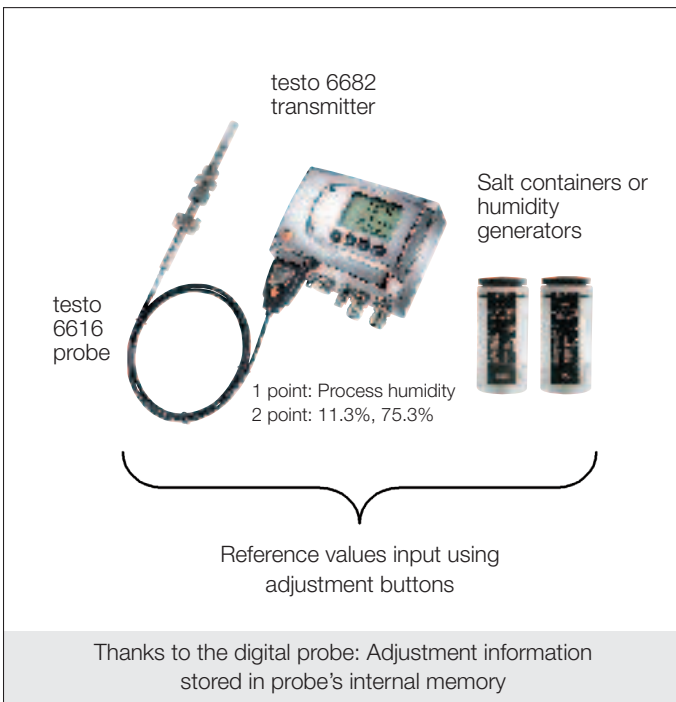


Fig.: 1 and 2 point adjustment

### Time saving and highest precision thanks to a practicable calibration concept

Testo's adjustment concept makes it possible to adjust the complete signal chain from sensor signal (probe) using digital signal (inside transmitter) to analog signal (isolating amplifier output signal)

The operating menu gives you the option of carrying out

- 1 point adjustments
- 2 point adjustments (can be carried out in seconds using adjustment buttons)
- Analog adjustments

Adjustment information is stored digitally in the probe's internal memory. That's how 1 point adjustments as well as 2 point adjustments are made directly on-site or on a different testo 6682 humidity transmitter (e.g. in a calibration laboratory).

### World innovation:

Thanks to analog output adjustments, it is possible to eliminate measurement errors occurring in the transmitter on account of digital analog conversion.

# Technical data / Order codes

Technical data			
		testo 6682 humidity transmitter	testo 6616 humidity probe
Parameters	Humidity	%RH / °C <sub>td</sub> / °F <sub>td</sub> , as well as all the parameters shown in the order code	
	Temperature	°C / °F	
Meas. range	Humidity	0 to 100 %RH	
	Temperature	<div> </div> -30 to +150 °C / -22 to +302 °F Depending on application location and type, for safety reasons there may be a limited measurement range in the explosive area. Please observe separate safety information and the explosion temperature class.	
Accuracy	Humidity	±(1 %RH + 0.007 x reading) für 0 to 90 %RH / ±(1.4 %RH + 0.007 x reading) für 90 to 100 %RH / +0.02 %RH per Kelvin depending on the process and electronics temperature (if deviated from 25 °C / 77 °F)	
	Temperature	±0.15 °C / 0.27 °F (PT1000 1/3 Class B)	
Resolution		0.1% RH or 0.01 °C / 0.01 °F	–
Measuring rate		1/s	–
Power supply		2 wire: 4 to 20 mA, current loop from certified intrinsically safe power units U0 = 28V; I0 = 93 mA; P0 = 650 mW	–
Analog output		4 to 20 mA ± 0.03 mA (2 wire)	–
Analog output Resolution		12 bit	–
Display		2 line LCD with plain text line	–
Application temperature Housing		With display = -20 to +70 °C / +32 to +122 °F	–
Storage temperature		-40 to +80 °C / -40 to +176 °F	–
Housing/Weight		Metal, 2.01 kg / 4.33 lb	0.45kg
Protection class		IP 65, if the transmitter is connected or sealing plugs are inserted in the cable entry point	–
Guidelines, standards, tests		94/9/EG (ATEX), EN 60079-0:2006, EN 60079-11:2007, EU Guideline: 2004/108/EU	EN 60079-0:2006, EN 60079-11:2007, EN 606079-26:2007, 94/9/EG (ATEX), EU Guideline: 2004/108/EU
Warranty		2 years, See <a href="http://www.testo.com/warranty">www.testo.com/warranty</a> for warranty conditions	
Material		Common EU Guideline 89/336/EEC	

## Order codes for testo 6682 transmitter

0555 6682    Axx   Bxx   Cxx   Dxx   Fxx   Gxx   Kxx

B01 4 to 20 mA (2 wire, 24 VDC)

C02 With display & operating menu / English  
C03 With display & operating menu / German  
C04 With display & operating menu / French  
C05 With display & operating menu / Spanish  
C06 With display & operating menu / Italian  
C07 With display & operating menu / Japanese

D01 Cable entry point M16  
D02 Cable entry point NPT 1/2"

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)  
F14 mbar / min / max (water vapour partial pressure)  
F15 inch H<sub>2</sub>O / min / max (water vapour partial pressure)  
F18 %Vol.

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  
G12 °F<sub>wb</sub> / min / max  
G13 kJ/kg / min / max (enthalpy)  
G14 mbar / min / max (water vapour partial pressure)  
G15 inch H<sub>2</sub>O / min / max (water vapour partial pressure)  
G18 %Vol.

K01 German-English Instruction Manual  
K02 French-English Instruction Manual  
K03 Spanish-English Instruction Manual  
K04 Italian-English Instruction Manual  
K05 Dutch-English Instruction Manual  
K06 Japanese-English Instruction Manual  
K07 Chinese-English Instruction Manual

\*Standard scale will be delivered, if "min" and "max" are not specified.

## Order codes for testo 6616 probes

0555 6616    Mxx   Nxx   Pxx

M03 PTFE sintered filter

N01 Probe length, 1 metre  
N02 Probe length, 2 metres  
N05 Probe length, 5 metres  
N10 Probe length, 10 metres

P20 Probe length: 200 mm  
P50 Probe length: 500 mm



## Accessories Testo humidity transmitters

Accessories Testo humidity transmitters	testo 6621	testo 6651	testo 6681	Part no.
<b>Interface and software</b>				
① P2A software (parameterization, adjustment and analysis software for PC), incl. USB cable (PC side) to the Mini-DIN interface (instrument)	✓	✓	✓	0554 6020
<b>Fixings, installation assistance</b>				
② Wall/duct holder (for mounting duct version in duct or for mounting duct version on wall)	✓	✓	✓	0554 6651
Wall/duct holder for fixing the temperature probe of 0555 6614			✓	0699 6656/1
Duct screw connection (aluminium/PVC)		✓	✓	0554 1794
Pressure-tight screw connection G1/2" (st. steel 1.4401) with cutting ring to 16 bar (232 psi). Necessary for fitting probe testo 6615 in the pressure chamber		✓	✓	0554 1795
③ Pressure-tight screw connection G1/2" (st. steel) with PTFE ring to 6 bar (87 psi)		✓	✓	0554 1796
Sensor filters and protective caps (in brackets: order code in the instrument order code)				
④ Stainless steel sintered filter, pore size 100 µm, probe protection in dusty atmospheres or higher flow velocities	✓ (M01)	✓ (M01)	✓ (M01)	0554 0647
Wire mesh filter, probe protection from coarse particles	✓ (M02)	✓ (M02)	✓ (M02)	0554 0757
PTFE sintered filter, Ø 12 mm, for corrosive substances, high humidity range (non-stop measurements), high flow speeds	✓ (M03)	✓ (M03)	✓ (M03)	0554 0758
⑤ Metal protective cap (open), fast reaction time at flow velocities < 7 m/s (not suitable for dusty atmospheres)	✓ (M04)	✓ (M04)	✓ (M04)	0554 0755
Plastic protective cap (open), fast reaction time at flow velocities < 7 m/s (not suitable for dusty atmospheres)	✓ (M05)	✓ (M05)		0192 0265
PTFE sintered filter with 1.5 mm condensate drip hole, ideal for high humidity with condensation protection 0554 0166	–	✓ (M06)	✓ (M06)	0554 9913
H2O2 protective cap	–	–	✓ (M08)	0699 5867/1
Protection from moisture (aluminium) Protects sensor from condensation e.g. in drying systems	–	✓	✓	0554 0166
<b>Dewpoint measurement</b>				
Prefilter, protects measurement chamber and sensor from dirt particles			✓	0554 3311
Precision measurement chamber up to 35 bar (ideal for lowest humidity) for optimum flow impact onto the sensor, with steplessly adjustable flow valve			✓	0554 3312
Flow-through meter for measurement chamber to adjust specific flow impact onto sensor for deviations of the process pressure from the pre-setting of the flow valve			✓	0554 3313
<b>Plug connections</b>				
Plug connection M12 5-pin plug and socket (For signal/supply)	–	✓	✓	0554 6682
<b>Profibus</b>				
⑥ Profibus module for customer installation			✓	0554 6686
⑦ Profibus plug and socket			✓	0554 6683
⑧ Profibus T-piece and Profibus accessories			✓	0554 6687
⑨ Profibus end resistance			✓	0554 6688
<b>Ethernet</b>				
⑩ Ethernet module for installation by customer		✓	✓	0554 6656
⑪ Ethernet plug		✓	✓	0554 6653

\* for duct version only

①



P2A software  
software  
(parameterization,  
adjustment and analysis  
software for PC), incl.  
USB cable (PC side) to  
the Mini-DIN interface  
(instrument)

②



Wall/duct holder (for mounting  
duct version in duct or for  
mounting duct version on wall)

③



Pressure-tight screw  
connection G1/2" (st. steel)  
with PTFE ring to 6 bar (87  
psi)

④



Sintered stainless steel  
cap, Ø 12 mm

⑤



Protective metal mesh, Ø 12  
mm

## Accessories Testo humidity transmitters

Accessories Testo humidity transmitters	testo 6621	testo 6651	testo 6681	testo 6682	Part no.
<b>Adjustment possibilities</b>					
⑫ testo saline pots for control and humidity adjustment of humidity probes, 11.3 %RH and 75.3 %RH with adapter for humidity probe	✓	✓	✓		0554 0660
⑬ Control and adjustment salt for high humidity at 94.5 %RH (testo 6681 with probe testo 6614)			✓		0554 0662
Adjustment adapter (for 1-point adjustment with testo 400 or testo 650)	✓	✓	✓		0554 6022
Reference set (testo 650, 1 %RH probe with certificate)	✓	✓	✓		0699 3556/15
⑭ Extension and adjustment cable, 10 m; for testo 6651/6681 (IP65; Oper. temp. +70 °C)		✓	✓		0554 6610
<b>Supply</b>					
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	✓	✓	✓		0554 1748
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	✓	✓	✓		0554 1749
<b>Spare parts</b>					
Spare sensor system (%RH) for testo 6621 and probe series 6600	✓				0420 0006
<b>External display</b>					
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	✓	✓	✓		5400 7553
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	✓	✓	✓		5400 7555
<b>Calibration</b>					
ISO calibration certificate humidity, Calibration points 11.3 %RH, 50 %RH and 75.3 %RH at +25 °C/+70 °F; per duct/instrument	✓	✓	✓	✓	0520 0176
ISO calibration certificate/humidity, Calibration points freely selectable from 5 to 95 %RH at +15 to +35 °C/+59 to +95 °F or -18 to +80 °C/-0.4 to +176 °F	✓	✓	✓	✓	0520 0066
DKD calibration certificate humidity; Calibration points 11.3 %RH, 50 %RH and 75.3 %RH at +25 °C/+70 °F; per duct/instrument	✓	✓	✓	✓	0520 0276
DKD calibration certificate/humidity, Cal. points freely selectable from 5 to 95%RH at +25°/+77 °F C or +5 to +70°C/+41 to +158 °F	✓	✓	✓	✓	0520 0236
DKD calibration certificate/temperature, Temperature probe; cal. points -20°C; 0°C; +60°C (-4 °F, 92 °F, 140 °F); per channel/instrument	✓	✓	✓	✓	0520 0261

\* for duct version only

⑥



Profibus module for customer installation

⑦



Profibus plug and socket

⑧



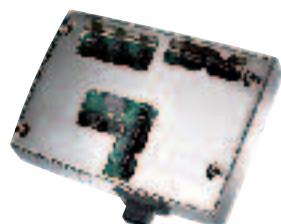
Profibus T-piece and Profibus accessories

⑨



Profibus end resistance

⑩



Ethernet module

⑪



Ethernet plug

⑫



Control and humidity adjustment set

⑬



Control and adjustment salt for high humidity at 94.5 %RH

⑭



Extension and adjustment cable, 10 m

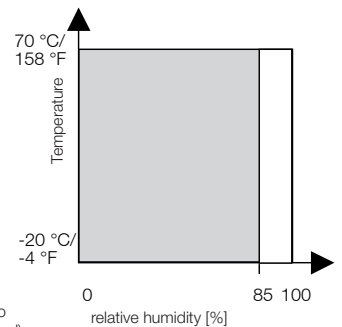
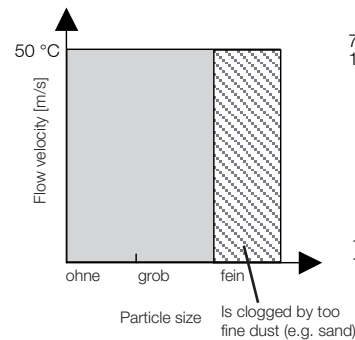
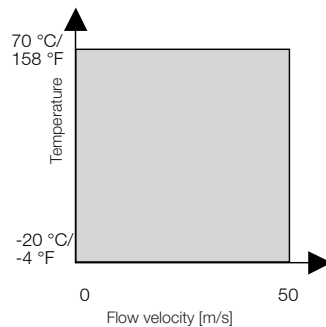
## Filter / protective caps for testo 6621, testo 6651, testo 6681 and hygrotest 600/650



**Code M01 (0554 0647): Stainless steel protective cap (sintered) pore size 100µm**

Special features

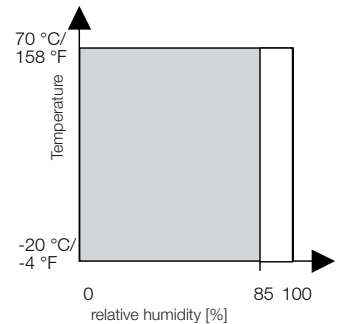
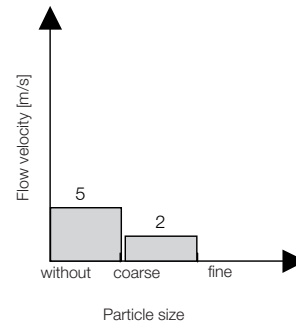
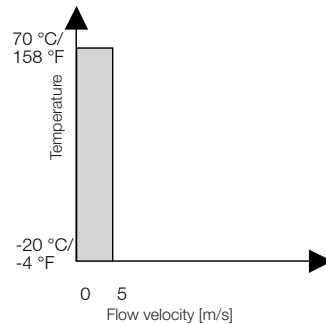
- mechanically robust
- good sensor protection
- easy to clean



**Code M02 (0554 0757): Wire mesh filter protective cap**

Special features

- faster reaction than G1

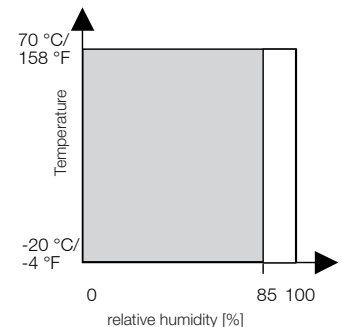
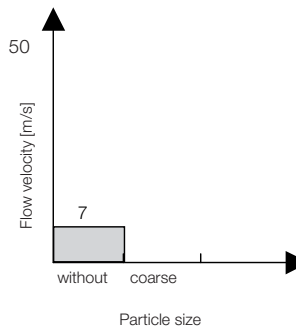
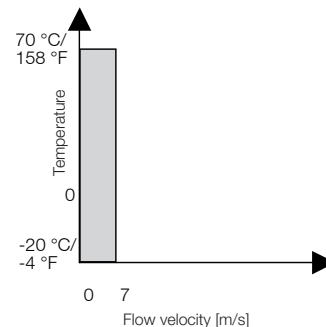


**Code M04 (0554 0755): Metal protective cap (open)**

Fast reaction time, at flow velocities

<7m/s (not suitable for dusty or high humidity atmospheres)

Especially suited to cleanrooms



**Code M08 (0699 5867/1):**

The special protective cap M08 is designed for use in an H<sub>2</sub>O<sub>2</sub> environment. Particularly

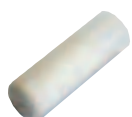
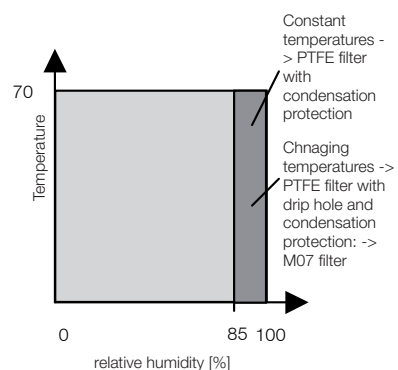
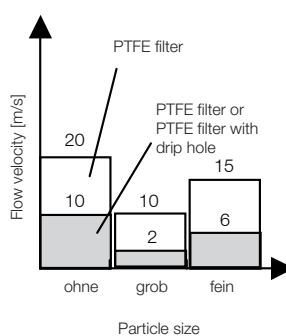
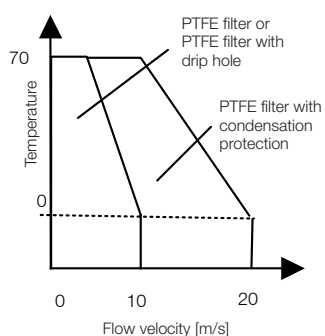
advantageous is the fact that, no reduction is caused by the filtration, so that saturation of the filter cannot occur. The protective function is permanently guaranteed. Owing to an innovative concept, the mixture dewpoint can be determined.

# Filter / protective caps for testo 6621, testo 6651, testo 6681 and hygrotest 600/650



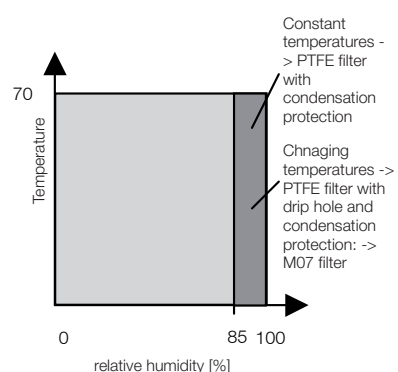
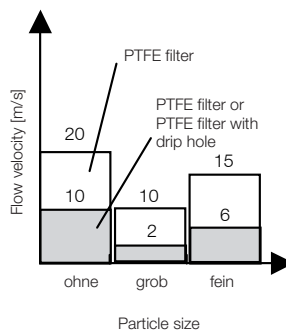
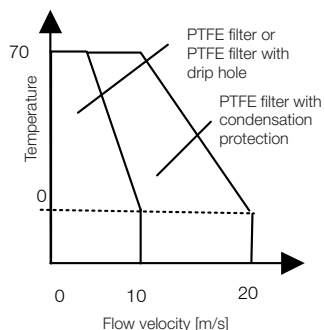
**Code M03 (0554 0758):**  
**Teflon protective cap**

Especially suited to applications with fine, sticky particles.



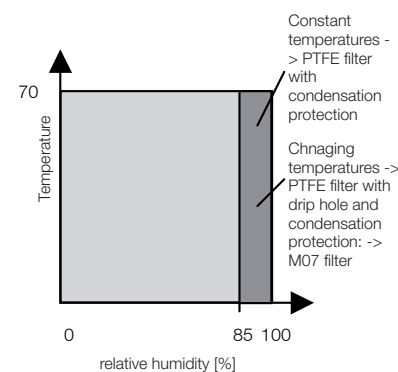
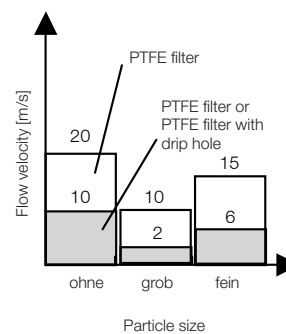
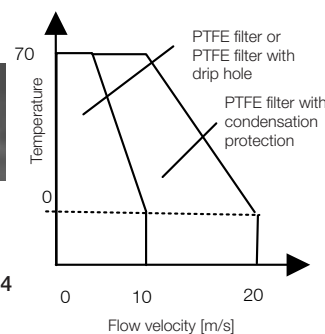
**Code M06 PTFE (0554 9913)**

**PTFE protective cap with condensation drip hole 1.5 mm**



**Code M07 / PTFE**

**PTFE protective cap with condensation protection (0554 0166) and condensation drip hole (0554 9913)**



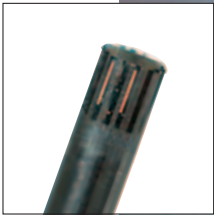


# Compact transmitter for humidity and temperature

## Compact transmitter

The compact transmitter is particularly suitable for stationary humidity measurement in heating and air conditioning ducts. The output signal 0 to 10 V corresponds to 0 to 100%RH. The humidity reading is temperature-compensated over the entire range.

- Splash-proof plastic housing (IP 54)
- Easy and fast installation on the wall or in a duct with pipe clamp screws
- For continuous high humidity applications, please select the heated version (see below)
- Temperature output (Pt100) connected



Testo humidity probe, accurate, long-term stable, temperature resistant, robust



Humidity measurements in HVAC ducts

**Compact transmitter**

Compact transmitter, humidity and temperature

Part no. 6337 9741

Quantity discounts available

Accessories Ordering data	Part no.
Pipe clamp connection for wall mounting	0554 0093
Pipe clamp connection for duct mounting	0401 6331
PTFE sintered filter, Ø 21 mm, for corrosive substances, high flow velocities	0554 0666
ISO calibration certificate humidity , calibration points 11.3 %RH and 75.3 %RH at +25 °C/+77 °F; per channel/instrument	0520 0076

Technical data	
Meas. range	0 to +100 %RH
Oper. temp.	-20 to +70 °C /-4 to +158 °F
Accuracy	±2 %RH (+2 to +98 %RH)
Storage temp.	-40 to +80 °C/-40 to +176 °F
Accuracy/Humidity: at rated temperature of +25°C	
Temperature compensation: 0.03%RH/°C	
Output/Humidity: 0 to 10 V/0 to 1 V/0 to 0.5 V, on request	
Max. load: voltage output: RL greater than 10 KOhm	
Power supply: 18 to 28 V DC, 1.6 m cable for clamping	
A Pt100, DIN IEC 751, Cl. B in 4-wire version (connected), is available to measure temperature	

## Notes

## testo 6721 dewpoint guard up to $-30\text{ }^{\circ}\text{C td}$ : Ideal for compressed air cooling driers

### Monitoring cooling dryers ...



Christoph Edelmann,  
Business Development  
Manager Europe

... is only now really economically possible: thanks to the testo 6721 with its two switch outputs.



Parameterizing, adjustment and analysis software (P2A software): optimum procedures and time-saving in commissioning and maintenance



**Prefilter**  
for oily, contaminated compressed air (for measurement chamber)



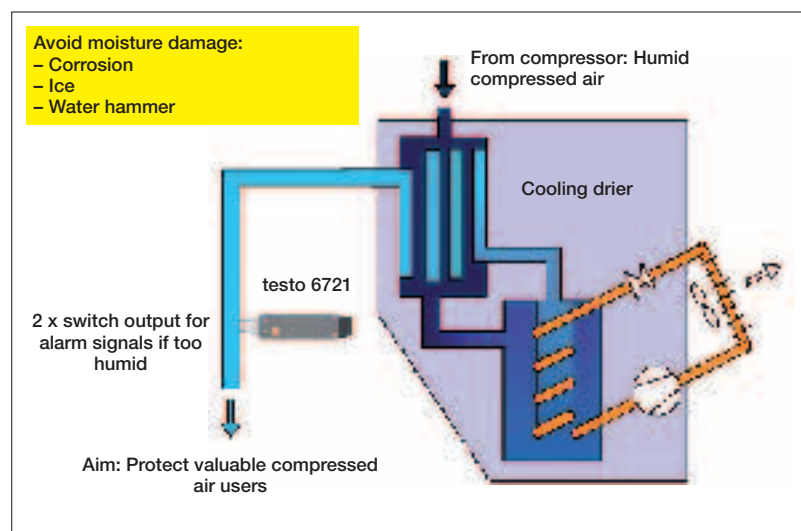
**Cooling coil**  
for process temperatures  $> 35\text{ }^{\circ}\text{C}/> 95\text{ }^{\circ}\text{F}$  (always with measurement chamber)



**Measurement chamber**  
for ideal flow onto sensor (up to 15 bar/217 psi, POM material)



## testo 6721 – The dewpoint guard for everyone



### Avoid moisture damage by monitoring the cooling drier

Excessive moisture in compressed air results in expensive damage: ice, corrosion, material sticking together, water hammer (mechanical damage caused by accelerated water build-up), etc. A good reason for using compressed air driers.

Up to now, monitoring a „simple“ compressed air cooling drier continuously was often not economical. This safety gap is now finally closed thanks to testo 6721: The dewpoint guard for everyone! Whether integrated as a component in a cooling drier or pneumatics machine or built-in by the customer, testo 6721 helps you avoid moisture damage!

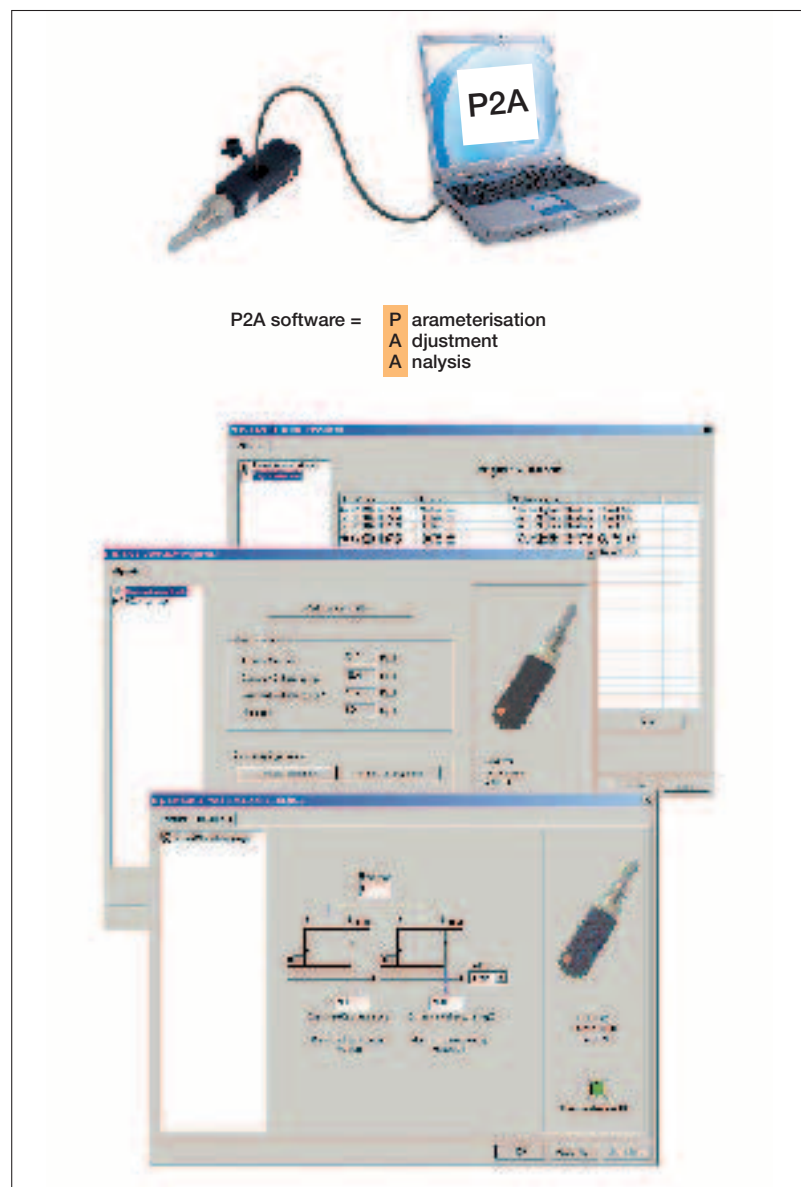
### Parameterisation, adjustment and analysis software (P2A software): optimum operations and time-saving during initial operation and maintenance

Regardless of whether you are at the measurement site, in your office or lab, your notebook or PC can communicate with testo 6721 through the external interface and a USB adapter (included with P2A package 0554 6020).

The parameterisation, adjustment and analysis software (P2A software) offers clarity and supports all information and options with graphics:

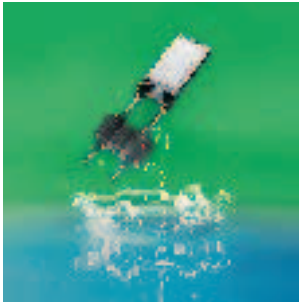
- Unit parameterisation ( $^{\circ}\text{C}_{\text{td}}$  /  $^{\circ}\text{F}_{\text{td}}$ )
- Sets two limit values as well as hysteresis
- Adjustment (1-point): accurate reference required
- Reset to factory setting
- Test switch outputs
- Call up min/max values
- Parameterisation and adjustment history (all P2A software procedures are recorded on PC, without saving in instrument)
- Serial number and firmware version can be called up

You can also save entire parameter files; parameterisation of spare dewpoint guards is thus possible with minimum time spent.



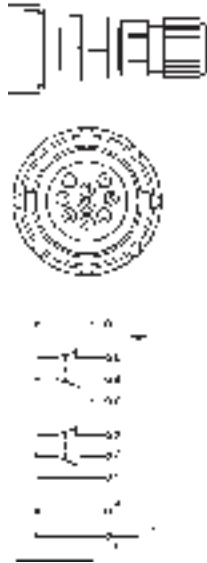
## testo 6721 – Long-term stable and reliable

### Humidity sensor



Testo's humidity sensor: long-term stable, unaffected by condensation and traceable to international humidity standards (ILAC / PTB / NIST etc.). It is adjusted using a highly accurate dewpoint mirror.

### Electrical connection



### Order codes

0555 6721 **Axx** **Fxx** **Kxx**

**A01** Process connection G $\frac{1}{2}$   
**A02** Process connection NPT  $\frac{1}{2}$ "

**F01** Dewpoint °C<sub>td</sub> / LV 1 / LV2 / hysteresis  
**F02** Dewpoint °F<sub>td</sub> / LV 1 / LV2 / hysteresis

**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

Language versions  
of Instruction  
manuals

**Order example:** Dewpoint monitor with G $\frac{1}{2}$  thread, dewpoint in °C<sub>td</sub>, lower limit value at 5 °C<sub>td</sub>, upper limit value at 14 °C<sub>td</sub>, hysteresis = 1 K, German-English Instruction Manual

--> 0555 6721 / A01 / F01 / 5 / 14 / 1 / K01

**Limit values:** Without specification, default limit values are +5 °C<sub>td</sub> / +10 °C<sub>td</sub>, at 1 Kelvin hysteresis (for unit °F: 45 °F<sub>td</sub> / 55 °F<sub>td</sub> / 2 °F hysteresis). They can be set to customer requirements with the help of the Order code, cf. Order example.

### Accessories for process integration

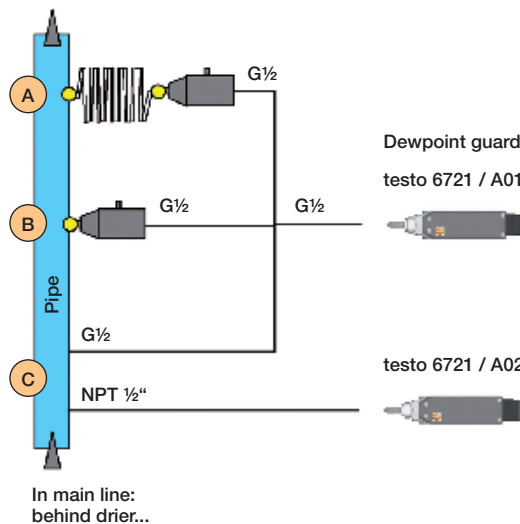
**A** For process temperatures < 10 °C / < 50 °F or > 35 °C / > 95 °F (to 200 °C / to 392 °F): use cooling coil (0554 3304) and measurement chamber (0554 3303)

**B** Use measurement chamber (0554 3303) for fast mounting (no depressurisation prior to installation) and better response time of sensor

**A+B** oily/contaminated media: add prefilter (0554 3311)

**C** If neither A nor B is needed: simply screw directly into the G $\frac{1}{2}$  or NPT $\frac{1}{2}$ " thread. Depressurized pipe is required during installation.

...or decentrally in front of critical consumer



● = Compressed air quick-release device, diameter 7.2 (can be replaced by other types in measurement chamber, inner thread G1/4")

Other on-site alarm devices (light, horn etc.)

PLC digital inputs (digital messages)

Alarm box 0554 6722, incl. power supply



90 x 118 mm

With terminal for mains cable and 5 m cable, 2 alarm lights (with colours green/red), 2 x cable screw-in connection M16 x 1.5

0554 6720 cable (5 m), with special plug on instrument side



# testo 6721: Technical data/Ordering data

Technical data				
Sensor		Testo humidity sensor (with special trace humidity adjustment) and NTC temperature sensor		
Output parameter		Dewpoint ( $^{\circ}\text{C}_{\text{td}}$ or $^{\circ}\text{F}_{\text{td}}$ ) via two switch outputs		
Measurement range/Pressure dewpoint		-30 to +30 $^{\circ}\text{C}_{\text{td}}$ (-22 to +86 $^{\circ}\text{F}_{\text{td}}$ )		
Process conditions (measurement medium, temperature, pressure)		Compressed air (filtered and dry, ISO 8573 Classes 2-4-2), process temperature: 0 to 50 $^{\circ}\text{C}$ (32 to +122 $^{\circ}\text{F}$ ), ideal between 10 and 35 $^{\circ}\text{C}$ , pressure: max. 20 bar (abs.)		
Switch outputs		2 x potential-free, switch voltage 24 VDC / VAC, switch current 0.5 A, optional wiring as NC contact or NO contact, resolution 0.1 $^{\circ}\text{C}_{\text{td}}$ or 0.1 $^{\circ}\text{F}_{\text{td}}$ , measuring rate 1/s		
Limit values (2x) and switch hysteresis (1x)		Free selection within measurement range through Order code, or set using P2A software		
Power supply		24 VAC / VDC (20 to 30 VAC / VDC max.), power consumption 50 mA		
Measurement inaccuracy		$\pm 4 \text{ K} > -30 \text{ }^{\circ}\text{C}_{\text{td}}$ (-22 $^{\circ}\text{F}_{\text{td}}$ ) $\pm 3 \text{ K} > -20 \text{ }^{\circ}\text{C}_{\text{td}}$ (-4 $^{\circ}\text{F}_{\text{td}}$ ) $\pm 2 \text{ K} > -10 \text{ }^{\circ}\text{C}_{\text{td}}$ (+14 $^{\circ}\text{F}_{\text{td}}$ ) $\pm 1 \text{ K} > 0 \text{ }^{\circ}\text{C}_{\text{td}}$ (32 $^{\circ}\text{F}_{\text{td}}$ )		
Interface		Mini DIN interface (serial) for parameterisation/adjustment/analysis through P2A software		
Sensor protection (filter)		Stainless steel sintered filter (12 mm)		
Process connection		G $\frac{1}{2}$ thread (Order code A01) or NPT $\frac{1}{2}$ " thread (Order code A02)		
Housing material, dimensions, IP protection, weight		Plastic PAA GF30, 167 x 33 x 33 mm, IP 65 (with adapter attached or with protective plate at interface), 240 g in weight		
Ambient temperature		0 to +50 $^{\circ}\text{C}$ (32 to +122 $^{\circ}\text{F}$ )		
Storage temperature		-40 to +70 $^{\circ}\text{C}$ (-40 to +158 $^{\circ}\text{F}$ )		
EMC		In accordance with EU guideline 89/336/EEC		
Current consumption	Output	AC or DC	Voltage supply [V]	Current consumption [mA]
	2-wire current 4 to 20 mA	DC	20	20
			24	20
			30	20
		DC	24	7
			30	7
			20	20
	4-wire voltage 0 to 10V	AC	24	22
			30	28

Scale drawing	

Accessories Ordering data	Part no.	
5 m cable with special plug for testo 6721 as well as open line ends	0554 6720	
P2A software (parameterization, adjustment and analysis software for PC), incl. USB cable (PC side) to the Mini-DIN interface (instrument)	0554 6020	
Prefilter, protects measurement chamber and sensor from dirt particles	0554 3311	
Measurement chamber for optimum flow on humidity sensor (standard compressed air connection / G $\frac{1}{2}$ ), up to 15 bar	0554 3303	
Cooling coil, for process media below 10 $^{\circ}\text{C}$ or above 35 $^{\circ}\text{C}$ (to be added to measurement chamber)	0554 3304	
Alarm box for testo 6721 dewpoint monitor, incl. voltage supply	0554 6722	
Stainless steel sintered filter, pore size 100 $\mu\text{m}$ , probe protection in dusty atmospheres or higher flow velocities	0554 0647	
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748	
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749	
ISO calibration certificate with freely selectable adjustment point between -30 and 0 $^{\circ}\text{C}$ td, at 6 bar	0520 0116	
ISO calibration cert./humidity Calibration points freely selectable: 5 to 95 %RH bei -18 to +70 $^{\circ}\text{C}$ / +70 to +90 $^{\circ}\text{C}$ / +15 to +35 $^{\circ}\text{C}$	0520 0106	

## Monitoring trace humidity professionally with testo 6740 up to $-45\text{ }^{\circ}\text{C}$ td

### Reliable technology – professional integration



Bernd Rombach,  
Application  
Engineer

Our customers in industry appreciate our reliable technology. Most customers, especially the "Key Accounts" of course, also expect professional user

consultation. We help to integrate our products optimally into the customer's process.



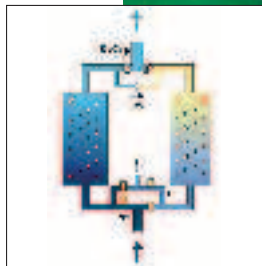
testo 6740 can be screwed directly into the process



The measuring chamber provides optimum flow and fast installation and deinstallation



For process temperatures up to  $+200\text{ }^{\circ}\text{C}$ : pre-fitting of the cooling coil and the measurement chamber



Optimum dryer monitoring and humidity regulation of adsorption dryers

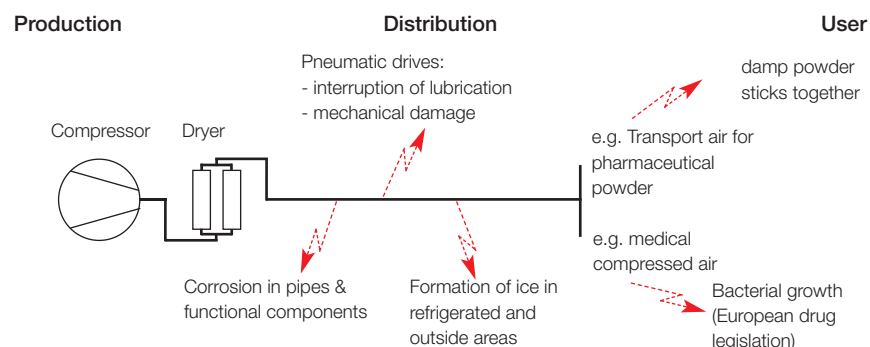


### Optimal for trace humidity measurement

The testo humidity probe is generally adjusted at several points, so that only minimal deviations occur. In addition to this, for trace humidity measurement an adjustment is carried out and documented at  $-40\text{ }^{\circ}\text{C}_{\text{td}}/-40\text{ }^{\circ}\text{F}_{\text{td}}$  (pressure dewpoint) with the help of a highly accurate reference measurement (dewpoint mirror). Reliable and exact measurement values are thus available to the user in the relevant range (to  $-60\text{ }^{\circ}\text{C}_{\text{td}}/-76\text{ }^{\circ}\text{F}_{\text{td}}$ ).

### Monitoring trace humidity, avoiding damage

Compressed air, air and gases are used in all areas of industry. Humidity is usually undesired here, as it causes damage, or can also reduce the quality of the end product, as the diagram below shows.



That's why: reliable trace humidity measurement with testo 6740!



In critical applications, testo 6740 monitors the compressed air humidity directly before the user – e.g. in electronics production.



In high and medium voltage,  $\text{SF}_6$  is used to avoid switch sparking. testo 6740 constantly monitors humidity – this way, the exchange cycles of the expensive gas can be maximized; damage is avoided.

## Assuring quality - lowering costs

### What is compressed air quality?

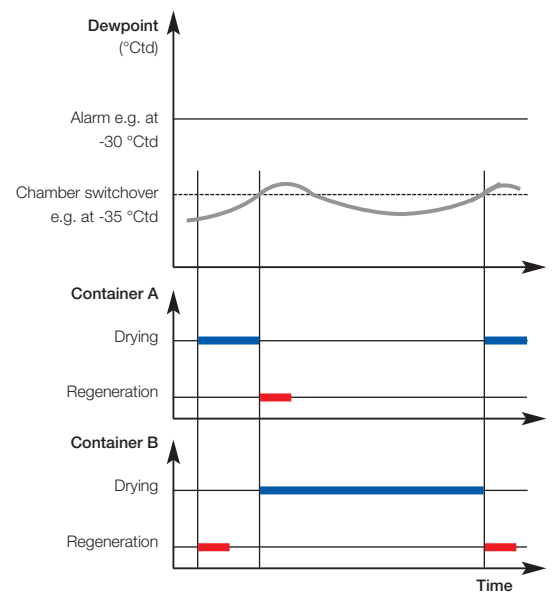
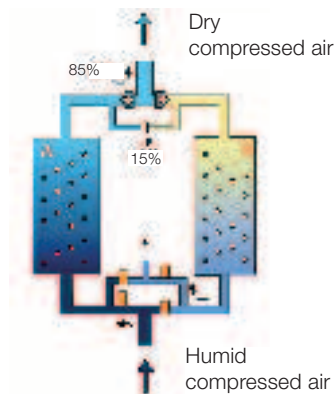
The international norm ISO 8573 determines seven classes of compressed air quality, and prescribes which humidity, which oil content, which particle content etc. the compressed air may contain. Class 1 makes the highest demands. Class 4 is fulfilled, for example, when the pressure dewpoint does not exceed 3 °Ctd or 37 °Ftd or an absolute humidity of 6 g of water vapour per m<sup>3</sup> or 1083 ppm<sub>v</sub> (parts per million by volume). The principle step taken to comply with a quality class consists in the installation of a suitable dryer. Its monitoring and, if needed, regulation, is dealt with by testo 6740.

### How can costs be lowered?

The main purpose of the use of the testo 6740 consists in the monitoring and avoidance of excessively high humidity in networks, in order to avoid damage. This damage leads to considerable costs, especially if the quality of the end product is affected. In addition to this, with the use of adsorption dryers, running costs can be considerably lowered.

### Adsorption dryers:

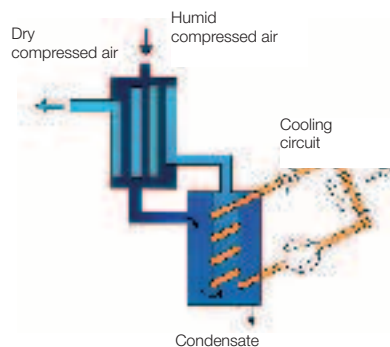
If chamber switchover is humidity-controlled using the testo 6740 rather than time controlled, (see diagram on the right), the dry phases (blue) are normally considerably longer than the regeneration phases (red). During this time no regeneration air must be produced, so that the compressors can be reduced from 100% to about 85% volume flow. This results in significant savings in operating costs.



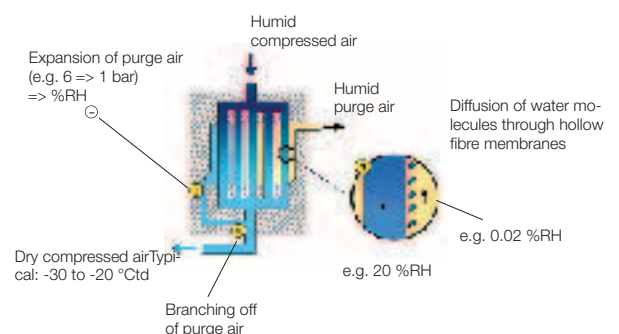
### Cooling dryers and membrane dryers:

Whether cooling dryers or membrane dryers, without continuous monitoring of the dryer, damage can hardly be avoided. Blocked condensate drainage pipes and badly sealed by-pass pipes are directly detected by too high humidity values.

#### Cooling dryer



#### Membrane dryer



ISO 8573	Trace humidity				Typical application
Class	°Ctd	°Ftd	g/m <sup>3</sup>	ppm <sub>v</sub> (at 7 bar)	
1	-70	-94	0.003	0.37	Semicond. prod.
2	-40	-40	0.12	18	Granulate dryers
3	-20	-4	0.88	147	Transport air
4	3	37	5.51	1083	Working/energy air
5	7	44	7.28	1432	
6	10	50	8.93	1756	
7	–	–	–	–	Blow air
Equipment		Compressed air dryer			
Monitoring/ regulation		testo 6740			

# testo 6740 – Features and Benefits

## • Highest reliability

- long-term reliable testo humidity sensor, tried and tested 100,000 times
- demonstrably correct indication of measurement ranges and data
- highest manufacturing quality

## • Calculation of the most important trace humidity variables

- e.g. °Ctd, °CtdA (atmospheric), ppm<sub>v</sub> and absolute humidity

## • Adjustment report

## • Convenient operation

- via the display without additional aids
- without display via the internal interface and scaling adapter software
- local 1-point calibration by manual input of reference value



The optional switch output plug (0554 3302) enables two outputs to be used, whose status is displayed by two LEDs, in addition to the 4...20 mA output.



In adsorption dryers, testo 6740 monitors not only the trace humidity highly reliably, it additionally serves the optimal regulation – resulting in lower operating costs.

Brightly lit 7-segment **display** (opt.)  
- housing can be rotated by 350°

The long-term reliable **Testo humidity sensor** with documentable fine calibration at a trace humidity of -40 °Ctd/-40 °Ftd

## • Analog output 4...20 mA (-wire)

## • 2 limit signal outputs (optional)

- pre- and main alarm as potential-free contact
- 2 LEDs display alarm status

Easy **menu operation** via buttons

- select humidity unit
- alter scaling
- set alarms incl. hysteresis
- carry out 1-point calibration locally
- test analog signal and alarm outputs
- call up historical min./max. values

The right **process connection**

- G1/2 or NPT1/2"
- pressure-tight up to 50 bar (725 psi)
- optional with measurement chamber

## Technical data testo 6740

### Housing

Material	Plastic, polyacrylamide
Dimensions	199.5x37x37 (analog output plug) 203.5x37x37 (limit signal output plug)
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Storage temperature	-40 to +80 °C (-40 to +176 °F)
Protection class	IP 65
Rotation of housing	by 350° (to align display)

### Sensor and sensor protection

Humidity sensor	Testo humidity sensor with documented trace humidity adjustment at -40 °Ctd (-40 °Ftd)
Temperature sensor	NTC
Sensor protection	Stainless steel sintered filter

### Measurement inaccuracy

Humidity	+/- 1 K at 0 °Ctd (32 °Ftd) +/- 3 K at -20 °Ctd (-4 °Ftd) +/- 4 K at -40 °Ctd (-40 °Ftd)
Temperature	+/- 0.5 K (0 to 50 °C/32 to 122 °F)

### Limit signal outputs (optional alarm plug 0554. 3302)

Contacts	2 NO contacts, potential-free, max. 30 V/0.5 A
Switch thresholds	Standard: 6°/12° Ctd, display freely programmable

### Measuring range

Pressure dewpoint temperature	-45 to +30 °Ctd (-49 to +86 °Ftd)
(Trace humidity)	at pressure dewpoints < 0 °Ctpd display of frost point, at > 0 °Ctpd of dewpoint
Temperature	0 to 50 °C (32 to +122 °Ftpd)
Norm. atmospheric dewpoint	-70 to -15 °CtdA (-112 to -5 °FtdA) (at 30 bar rel./435 psi)
(cf. diagram p.70)	-54 to +10 °CtdA (-94 to +50 °FtdA) (at 3 bar rel./43.5 psi)
	-45 to +30 °CtdA (-76 to +86 °FtdA) (at 0 bar rel./0 psi)
Pressure resistance	testo 6740: Up to 50 bar absolute (725 psi) Meas. chamber 0554.3303: up to 15 bar absolute (217 psi)

### Analog output

Signal	4 to 20 mA, 2-wire technology
Scaling	Freely scalable via display/buttons Standard: 4 to 20 mA = -60 to +30 °Ctd
Output units	°Ctpd, °Ftpd, °CtA, °FtA, %RH, ppm <sub>v</sub> , mg/m <sup>3</sup> , °C, °F
Resolution	12 bit
Accuracy	+/- 40 µA

### Supply

Voltage	24 V DC (10 to 30 V DC permitted); with alarm plug (0554 3302) 20 to 28 VDC
Current	21 mA (without alarm plug) 65 mA (with alarm plug)
Max. load	10 V DC: 100 Ohm, 30 VDC: 950 Ohm
EMC	According to guideline 89/336 EWG

## testo 6740: System components, ordering data

### Customer-specifically combinable

Each measurement cell can be optimally equipped. Whether with or without display, with a European G ½ thread or an American NPT ½" thread. Whether with or without switch output. Directly mounted, with a measurement chamber or cooling coil. All combinations are possible, ideal for your requirements.

### The 4 types of the testo 6740 line

	without display	with display
G ½	0555 6741	0555 6743
NPT ½"	0555 6742	0555 6744



Standard: analog output

4 to 20 mA (2-wire)

\*(Online monitoring via testo 54-7 possible, cf. page 139-140)

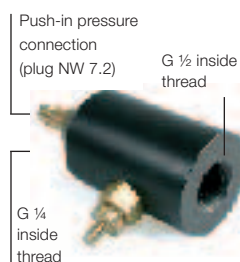
Optional alarm plug (0554 3302):

2 switch output built-in

analog output 4...20 mA (2-wire)

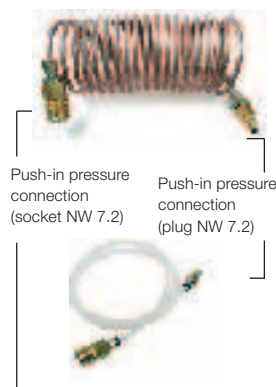
+ 2 switch outputs (potential-free)

+ 2 LED



### Measurement chamber (0554 3303)

for optimum flow past the probe (valve can be adjusted infinitely) and for fast (de)installation (up to 15 bar). Preset at 1 l/min at 7 bar.



### Cooling coil (0554 3304)

for process temperatures 50 to 200 °C/122 to 392 °F (only with measurement chamber)

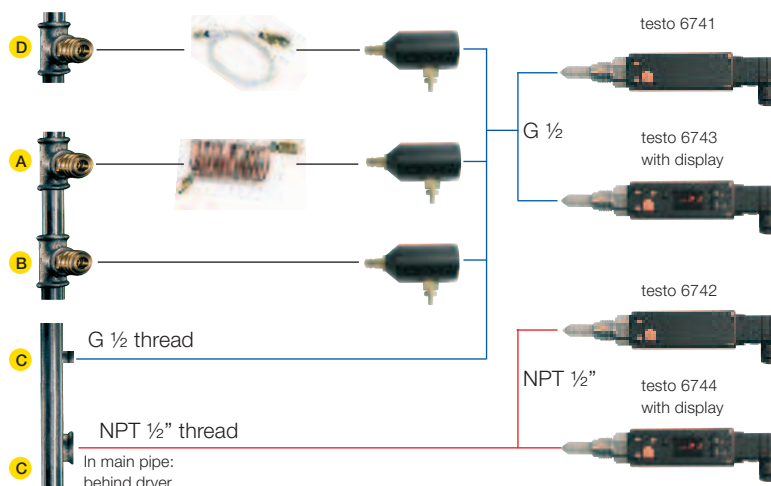
### PTFE hose (0699 2824/4)

for dry air up to +140 °C/284 °F (only with measurement chamber)

Ordering data testo 6740	Part no.
Basic instrument (incl. plug for output analog signal)	
testo 6741, G½ thread, without display	0555 6741
testo 6742, NPT½ thread, without display	0555 6742
testo 6743, G½ thread, with display	0555 6743
testo 6744, NPT½" thread, with display	0555 6744
Accessories	Part no.
Alarm plug: Cable connection plug for power supply/analog output 4 to 20 mA, with 2 floating switch contacts (standard: NO / optional: NC) and 2 LEDs	0554 3302
Measurement chamber for optimum flow on humidity sensor (standard compressed air connection / G ½), up to 15 bar (217 psi)	0554 3303
Cooling coil for process temperatures above 50 °C/122 °F (up to 200 °C), with measurement chamber only	0554 3304
Precision measurement chamber up to 35 bar (ideal for lowest humidity) for optimum flow impact onto the sensor, with steplessly adjustable flow valve	0554 3312
ISO calibration certificate dewpoint, two adjustment points -10/-40 °Ctd at 6 bar	0520 0136
ISO calibration certificate/humidity, Dewpoint meters; calibration points freely selectable from -40 to 0 °Ctpd (-40 to 32 °Ftpd) at 6 bar (-40 to 32 °Ftd) at 87 psi	0520 0116
Basic price	0520 0116
per calibration point	0520 0116
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555
2 m PTFE hose with compressed air connections up to +140 °C/+284 °F (max. 9 bar/130 psi), with measurement chamber only	0699 2824/4
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749
testo 650, reference humidity measuring instrument 0563 6501 with precision pressure dewpoint probe 0636 9841 and connecting line 0430 0143	
2 pressure adjustment device, for on-site adjustment of testo 6743 (from model June 07. Otherwise firmware update necessary), also without reference measurement	0554 3314
Customer-specific instrument parameterization, incl. parameterization protocol	0699 5889/1

### Selection assistance: choose the right components for your application

- A** For process temperatures > 50 °C (up to 200 °C), use cooling coil (0554 3304) & measurement chamber (0554 3303)
- B** Use measurement chamber (0554 3303) for fast installation (no need to switch the system pressureless) and for a better probe reaction time (infinite adjustment of flow past probe)
- C** If neither A nor B are required: simply screw directly into the G½ or NPT ½" thread. Pipe must be pressureless during installation
- D** For dry air, (e.g. granulate dryers, max. 140 °C), a PTFE hose is used and the measurement chamber's valve is opened
- A B** Use a 40 µm filter for oily or dirty media



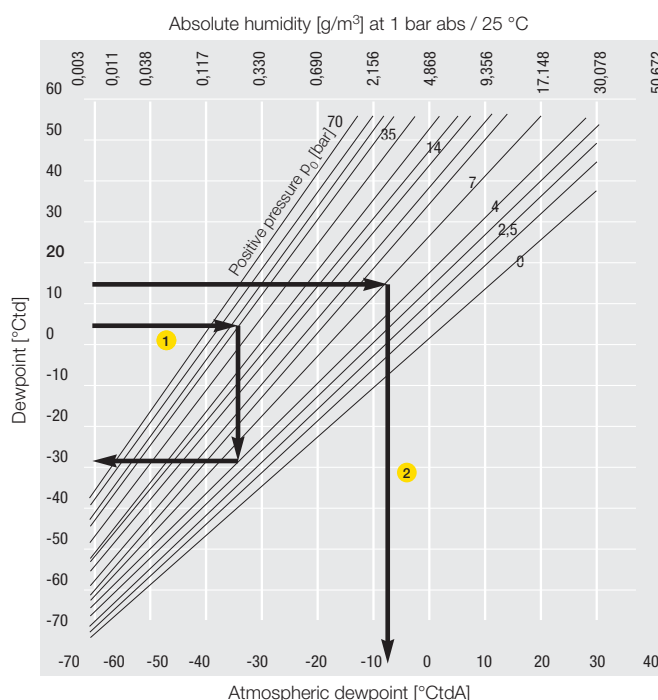
# Dewpoint or atmospheric dewpoint? - Wiring (testo 6740)

## Dewpoint or atmospheric dewpoint?

Atmospheric air is able to store more water vapour than compressed air. If compressed air is cooled down, it already reaches its dewpoint (°Ctd or °Ftd) at higher temperatures, whereas atmospheric air can be cooled down further before condensate is first precipitated (atmospheric dewpoint in °CtdA or °FtdA).

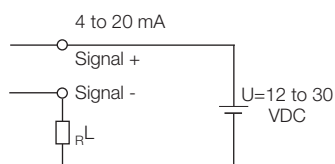
Only the pressure dewpoint is relevant to the monitoring of compressed air systems for trace humidity, because this indicates how far away the „danger threshold“ (= dewpoint) is. Since some users are accustomed to working with an atmospheric dewpoint, however, the testo 6740 allows the choice of the outputs pressure dewpoint and atmospheric dewpoint ( the process pressure is input for the latter).

- 1 Compressed air (35 bar) is relieved to 4 bar. The pressure dewpoint thus falls from 10 °Ctd to -23 °Ctd.
- 2 Compressed air (7 bar) has a pressure dewpoint of 20 °Ctd. This corresponds to an atmospheric dewpoint of -8 °CtdA.

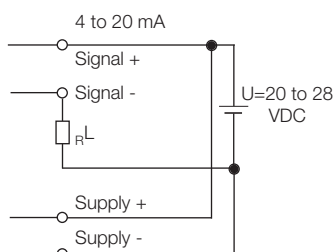


## The electrical wiring

Standard plug (4 to 20 mA, 2-wire)



With switch contact plug  
Order Nr. (0554 3302)  
(4 to 20 mA, 2-wire plus 2 potential-free switch contacts): 8-core cable



ON, if value is > US+HYS  
OFF, if value < US-HYS

ON, if value > LS+HYS  
OFF, if value < LS-HYS

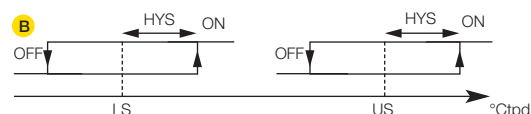
## What is the load R<sub>L</sub>?

The total resistance of the 2-wire connection, consisting of the wire, display and control.

R<sub>L</sub> = Load impedance, external load

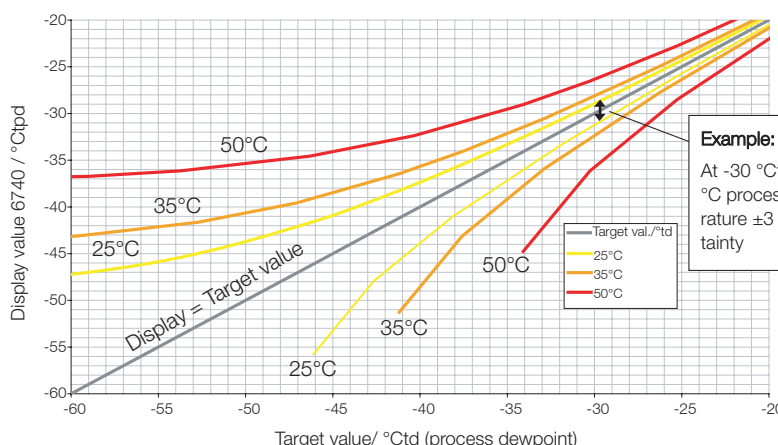
U	A	B
10 V	300 Ohm	–
24 V	650 Ohm	650 Ohm
30 V	950 Ohm	–

LS = Lower Switch US = Upper Switch



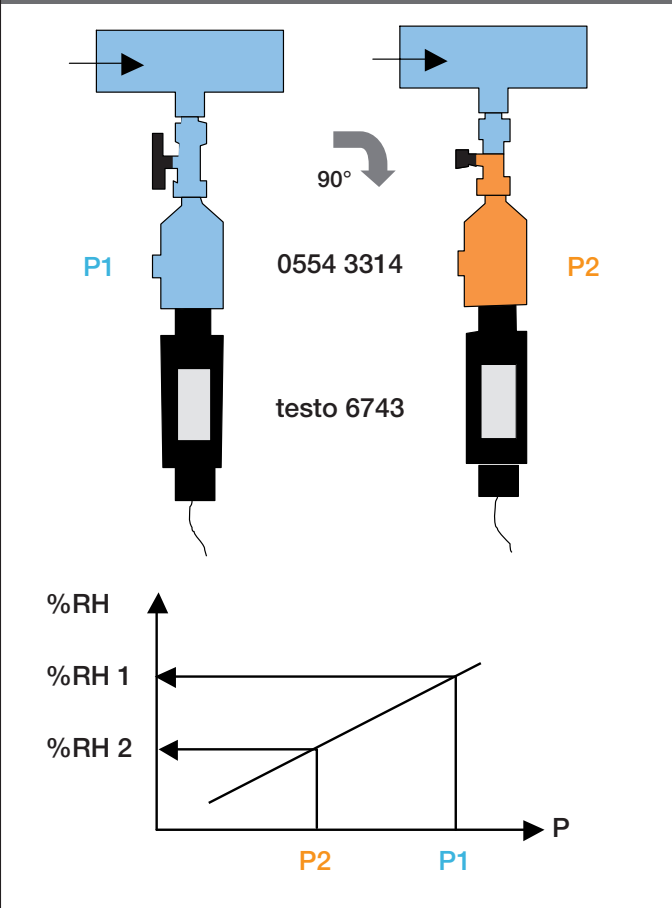
## Measurement uncertainty at diverse process temperatures

As can be seen in the diagram, measurement accuracy depends on the process temperature and pressure dewpoint range. To achieve the best measurement results using testo 6740, a process temperature range of preferably 25 °C and a pressure dewpoint range of greater than -45 °Ctd should be ensured.



## On-site trace humidity adjustment – Now without reference instrument

Diagram of 2-pressure adjustment



### Why adjust on-site?

Dewpoint transmitters, such as testo 6743, monitor compressed air driers continuously. Is the compressed air dry enough? Is there any moisture damage to the compressed air components? Is the final product protected from moisture?

To guarantee long-term accurate and reliable monitoring, dewpoint transmitters are adjusted regularly, i.e. compared with a reliable reference and corrected.

Up to now, this adjustment was usually carried out using a dewpoint mirror. This method requires time-consuming and costly measures: deinstallation of transmitter, purchase and connection of a dewpoint mirror, reference measurement and corrections to the transmitter. With some products, it is even necessary to send the unit to the manufacturer.

### Patented Testo solution: On-site 2-pressure adjustment

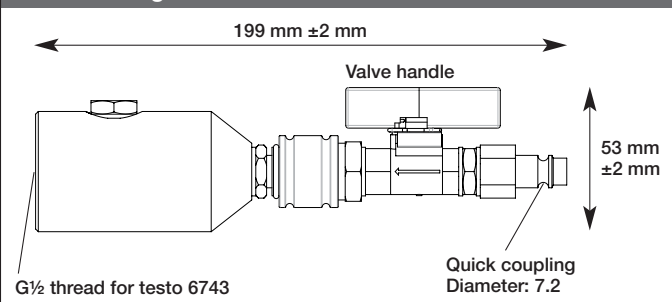
Testo recognises the problem and has developed a cost-saving alternative which does not compromise on accuracy.

This patented procedure makes use of the fact that different humidity values result from different pressure values. The 2-pressure adjustment device 0554 3314 is simply mounted between process and testo 6743\* (compressed air quick couplings). Using the built-in valve, a pressure divider is created which lowers testo 6743\* from process pressure P1 at humidity value %RH 1 to a defined lower pressure level P2. This results in a defined, lower humidity value %RH 2.

Adjustment is then simply confirmed using the operating menu of testo 6743\*. The result is a fast and cost-saving adjustment which is totally convincing on account of its accuracy!

\*From model June 07. For older models, a firmware update is necessary, please consult Testo.

Scale drawing



### Benefits?

- No reference instrument necessary (dewpoint mirrors are very expensive)
- No need to dismantle instrument or send to manufacturer
- One adjustment device is sufficient for any number of measurement points
- High accuracy is achieved quickly

## Notes

## Trace humidity monitoring with testo 6681 and probe 6615 up to -60 °C td

- 

## Technical data testo 6681

GENERAL							
Housing		Metal					
Dimensions		122 x 162 x 77 mm (without probe)					
Weight		1.5 kg (without probe, without Ethernet module, without Profibus module)					
Display		2-line LCD with clear-text line (optional) and relay status display. Four operating buttons for operating menu.					
Resolution display		0.1 %RH and 0.01 °C / °F; 0.1 °C <sup>td</sup> / °F <sup>td</sup>					
Cable screw fitting (Code D01)		M 16 x 1.5 (2x) with inner diameter 4-8 mm for signal/supply cable (for option D01) M 20 x 1.5 (2x) with inner diameter 6-12 mm for relay cable (for options D01 or D03)					
Probe connection		Digital plug-in connection					
Power supply		2-wire: 24 VDC (12 to 30 VDC) 4-wire: 20 to 30 VAC/DC, 300 mA max. current consumption					
Protection class		IP 65					
EMC		2004/108/EU					
Operating temperature housing		-40 to +70 °C/-40 to +158°F, with display 0 to +50 °C/32 to +122 °F, optimum at +15 to 35 °C/+59 to 95 °F-40 to 60 °C with integrated relay					
Storage temperature		-40 to +80 °C/-40 to +176 °F					
Measurement parameters		Depending on probe, the following is available: Temperature in °C / °F; relative humidity %rF (%RH); dewpoint in °Ctd (°Ftd); normed atmospheric dewpoint in °Ctpd (°Ftpd); absolute humidity in g/m3 (gr/ft3); 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 / H2O; water content in ppm vol / % Vol; mixture dewpoint H2O2 / in °Ctm / °Ftm; %RH nach WMO					
Measurement medium		Air, nitrogen, more on request: applicationsupport@testo.de					
SENSOR (more data see probes)							
Humidity		Testo humid. sensor, cap.					
Reproduceability		better than ±0.5 %RH					
Measurement inaccuracy %RH		cf. probe data					
Probes		testo 6615					
Measuring range	Humidity	-60 to +30 °C <sup>td</sup>					
(Standard scaling)	Temperature	-40 to +120 °C/-40 to +248 °F					
Measuring range (Standard scaling)	%RH	°CtdA	°FtdA	g/m³	g/kg	°Cwb	°Fwb
	0 to 100	-80 to +100	-112 to +212	0 to 600	0 to 9500	-40 to +180	-40 to +356
Reaction time without protective filter		t 90 max. 10 s					
ANALOG OUTPUT (uniform for all channels, specify when ordering)							
Quantity		2 channels (type: analog signal uniform for both channels, specify when ordering) additional 3rd channel (optional)					
Current/accuracy		4 to 20 mA ±0.03 mA (2-wire) / 0 to 20 mA ±0.03 mA (4-wire) / 4 to 20 mA ±0.03 mA (4-wire) for heated sensor technology					
Voltage/accuracy		0 to 1 V ±1.5 mV (4-wire) / 0 to 5 V ±7.5 mV (4-wire) / 0 to 10 V ±15 mV (4-wire)					
Galvanic isolation		Galvanic isolation of output channels (2-wire and 4-wire), isolation of supply to outputs (4-wire)					
Resolution		12 bit					
Maximum load		2-wire    12 VDC: 100 Ohm / 24 VDC: 500 Ohm / 30 VDC: 625 Ohm 4-wire    500 Ohm					
ADDITIONAL OUTPUTS							
Relays (optional)		4 relays (free allocation to measurement channels or as collective alarm with operating menu/P2A software), up to 250 VAC / 3 A, (NC/C/NO)					
Digital output		Mini DIN for Testo P2A parameterization software and Testo portable instruments 400/650 Pro bus-DP (optional as an integratable intermediate layer, cannot be combined with Ethernet module)					
Ethernet		Ethernet with Saveris connection or open protocol with XML output. IP address allocation possible via P2A software.					

## Technical data / Ordering options testo 6615

### Order codes testo 6615

0555 6610 **Lxx** **Mxx** **Nxx** **Pxx**

**L15** Probe 6615 (trace humidity cable version)

**M01** Sintered stainless steel filter

**M03** Sintered PTFE filter

**N01** Probe length 1 m

**N02** Probe length 2 m

**N05** Probe length 5 m

**N10** Probe length 10m

**P20** Probe length 200 mm

**P50** Probe length 500 mm

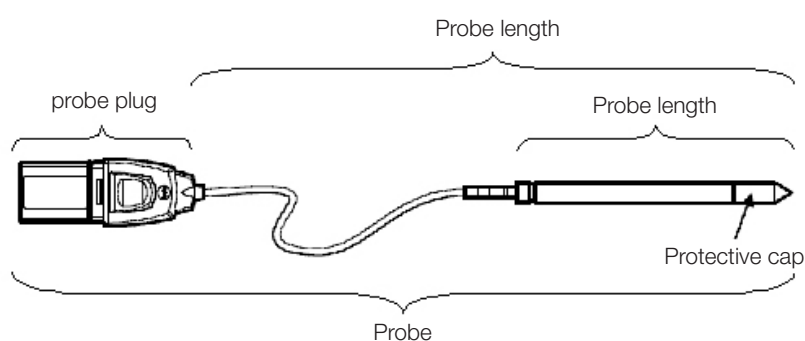
### Ordering process:

Transmitters and probes can be ordered independently of each other (thanks to the digital probe interface), cf. ordering examples above.

If transmitters and probes are to be ordered together, their order codes are combined in the "Sales Set" 0563 6681

### Technical data testo 6615

Type	Cable trace humidity (self-adjustment)	
Application	Humidity probe for trace humidity / pressure dewpoint (with self-adjustment)	
Measurement parameters	°C/°F, %rF/%RH, °Ctd/°Ftd, °CtdA/°FtdA, g/m3/gr/ft3, g/kg/gr/lb, kJ/kg, BTU/lb, °Ctw/°Ftw, hPa, inch H2O, ppm vol %, %vol, °Ctm (H2O2)/°Ftm (H2O2)	
Measuring range	Humidity	-60 to +30 °C <sub>td</sub>
	Temperature	-40 to +120 °C/-22 to +302 °F
Material	Probe shaft	Stainless steel
	Cable	FEP coated
	Plug	Plastic ABS
Measurement inaccuracy	Humidity: for deviations from the media temperature ±25 °C	±0.02 %RH/K
	Pressure dewpoint	±1 K at 0° C <sup>td</sup> ±2 K at -40° C <sup>td</sup> ±4 K at -50° C <sup>td</sup>
	Temperature: at +25 °C / +77 °F	±0,15 °C/±0,27 °F / Pt100 1/3 Class B
Reproduceability	Humidity	better than ±0.2 %RH
Probe dimensions	Diameter	12 mm
	Probe shaft length L	200/500 mm
Cable length		1/2/5/10 m
Pressure tightness		1 to 16 bar (probe tip) 1 bar (probe end)



## Monitoring trace humidity with testo 6781 to $-90\text{ }^{\circ}\text{C td}$

**Always on the safe side regarding compressed air quality...**



Markus  
Langenbacher,  
research project  
manager

Trace humidity in compressed air, air and gases can cause serious damage in industrial processes. Above all, the quality of the end product suffers in addition to defects in machines. Measure trace humidity precisely, and ensure optimum compressed air or gas quality.



Medical compressed air:  
minimum humidity as a  
hygiene requirement



Granulate drying: dry air is  
a prerequisite for product  
quality



Gas technology: humidity  
causes damage and  
reduces the value of the  
gas in the network



## Dewpoint transmitter to -90 °Ctd



The transmitter testo 6781 was developed specially for trace humidity measurement in compressed air and in dry air (e. g. in granulate dryers). The international norm ISO 8573 categorizes seven classes of compressed air. High-performance adsorption dryers are required in order to meet the highest quality classes 1 and 2.

They can be monitored by the testo 6781 down to very low dewpoints of -90 °C<sub>td</sub>.

The newly developed sensor with sol-gel technology is characterized by its condensation-proofness and fast response time, thus guaranteeing highest process security.

### Features and benefits at a glance:

- Measurement of dewpoints in the measuring range -90 to +30 °C<sub>td</sub>, with main applications under -40 °C<sub>td</sub>
- New, very condensation-proof sensor with sol-gel technology guarantees highest process security and fast response
- Automatic self-adjustment ensures high accuracy and long reliability
- Optional display with multi-language user menu

- Self-monitoring of the transmitter guarantees high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance

### Areas of application:

- Dewpoint measurement in compressed air in ISO Classes 1 (<-70 °C<sub>td</sub>) and 2 (<-40 °C<sub>td</sub>)
- Monitoring of adsorption dryers, granulate dryers and medical compressed air
- Quality assurance for noble gas preparation

### The following options can be specified for the testo 6781:

AXX Process connection	FXX Humidity parameter / min limit value / max limit value / hysteresis (pre-set)
BXX Analog display/supply	KXX Instruction manual languages
CXX Display / menu language	MXX Protective cap

Part no. 0555 6781

**Axx** **Bxx** **Cxx** **Fxx** **Kxx** **Mxx**

A01	Process connection G1/2
A02	Process connection NPT 1/2"

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)

C00	without display
C02	with display/English
C03	with display/German
C04	with display/French
C05	with display/Spanish
C06	with display/Italian
C07	with display/Japanese
C08	with display/Swedish

F01	°C <sub>td</sub> / min / max
F02	°F <sub>td</sub> / min / max
F03	% RH/Min/Max
F04	%RH / min / max
F05	°C <sub>td</sub> A / min / max
F06	°F <sub>td</sub> A / min / max
F07	ppmV / min / max
F08	g/m <sup>3</sup> / min / max
F09	g/ft <sup>3</sup> / min / max
F10	g/kg / min / max
F11	g/lb / min / max

K01	German/English instruction manual
K02	French/English instruction manual
K03	Spanish/English instruction manual
K04	Italian/English instruction manual
K05	Dutch/English instruction manual
K06	Japanese/English instruction manual
K07	Chinese/English instruction manual
K08	Swedish/English instruction manual

**This results in a typical order code:**  
0555 6781 AXX BXX CXX FXX KXX MXX

M01	Stainless steel cap
M03	PTFE cap



## Dewpoint transmitter to -90 °Ctd

### Technical data testo 6781

#### Parameters

Humidity/trace humidity	
Units	°C <sub>td</sub> , °F <sub>td</sub> , %rF, %RH
Calculated variables	°C <sub>tdA</sub> , °F <sub>tdA</sub> (normed atmosph. dewpoint), ppmV, g/m <sup>3</sup> , g/ft <sup>3</sup> , g/kg, g/lb
Measuring range	-90 to 30 °Ctd / -130 to 86 °Ftd
Measurement uncertainty*	-20 °C <sub>td</sub> to -40 °C <sub>td</sub> : ±1,5K -40 °C <sub>td</sub> to -60 °C <sub>td</sub> : ±2K -60 °C <sub>td</sub> to -75 °C <sub>td</sub> : ±2,5K
Response time	t63 ≤ 3s for switch from -75 °C <sub>td</sub> to -30 °C <sub>td</sub> t90 ≤ 9s for switch from -75 °C <sub>td</sub> to -30 °C <sub>td</sub> t63 ≤ 300s for switch from -30 °C <sub>td</sub> to -75 °C <sub>td</sub> t90 ≤ 1080s for switch from -30 °C <sub>td</sub> to -75 °C <sub>td</sub>
Autom. self-adjustment	Cycle adjustable: 1 h / 6 h / 12 h / 24 h

\* Determination measurement inaccuracy according to GUM

GUM (Guide to the Expression of Uncertainty in Measurement): ISO guideline for the determination of measurement inaccuracy, in order to make measurements comparable worldwide. The following inaccuracies are used for the determination:

- Hysteresis
- Linearity
- Reproducibility
- Adjustment site/factory calibration
- Test site

This total view results in an additional dewpoint-dependent and process-dependent inaccuracy contribution of ±0.03 K x measurement value (in °Ctd) + 0.2 K x (25 °C - process temperature in °C).

Outside the stated measuring range, a measurement inaccuracy of ±5 K applies (typically).

#### Inputs/outputs

Analog outputs	
Current/accuracy	0 to 20 mA ±0.03 mA (4-wire) 4 to 20 mA ± 0.03 mA (4-wire)
Output type	0 to 1 V ±1.5 mV (4-wire) 0 to 5 V ± 7.5 mV (4-wire) 0 to 10 V ±15 mV (4-wire)
Meas. cycle	1/sec
Resolution	12 bit
Load	max. 500 Ω
Other outputs	
Digital	Mini-DIN for P2A software
Supply	
Voltage supply	20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line

#### General technical data

Model		
Material	Metal housing	
Dimensions	208 x 60 x 35 mm	
Weight	0.5 kg	
Display		
Display	optional: 2-line LCD with multi-language operating menu	
Resolution	<b>Measuring range</b>	<b>Resolution</b>
	0 to +100 %RH	0,001
	0,001 to 28 g/kg	0,001
	0,01 to 194 g/lb	0,01
	0 to 31 g/m3	0,001
	0,001 to 14 g/ft3	0,001
	1 to 42500 ppm(V)	1
	-90 to +30 °Ctd	0,1
	-130 to +86 °Ftd	0,1
	-110 to +30 °CtdA	0,1
	-165 to +86 °FtdA	0,1
	-40 to +70 °C	0,01
	-40 to +158 °F	0,01
Miscellaneous		
Protection class	IP 65	
EMC	EU guideline 2004/108/EC	

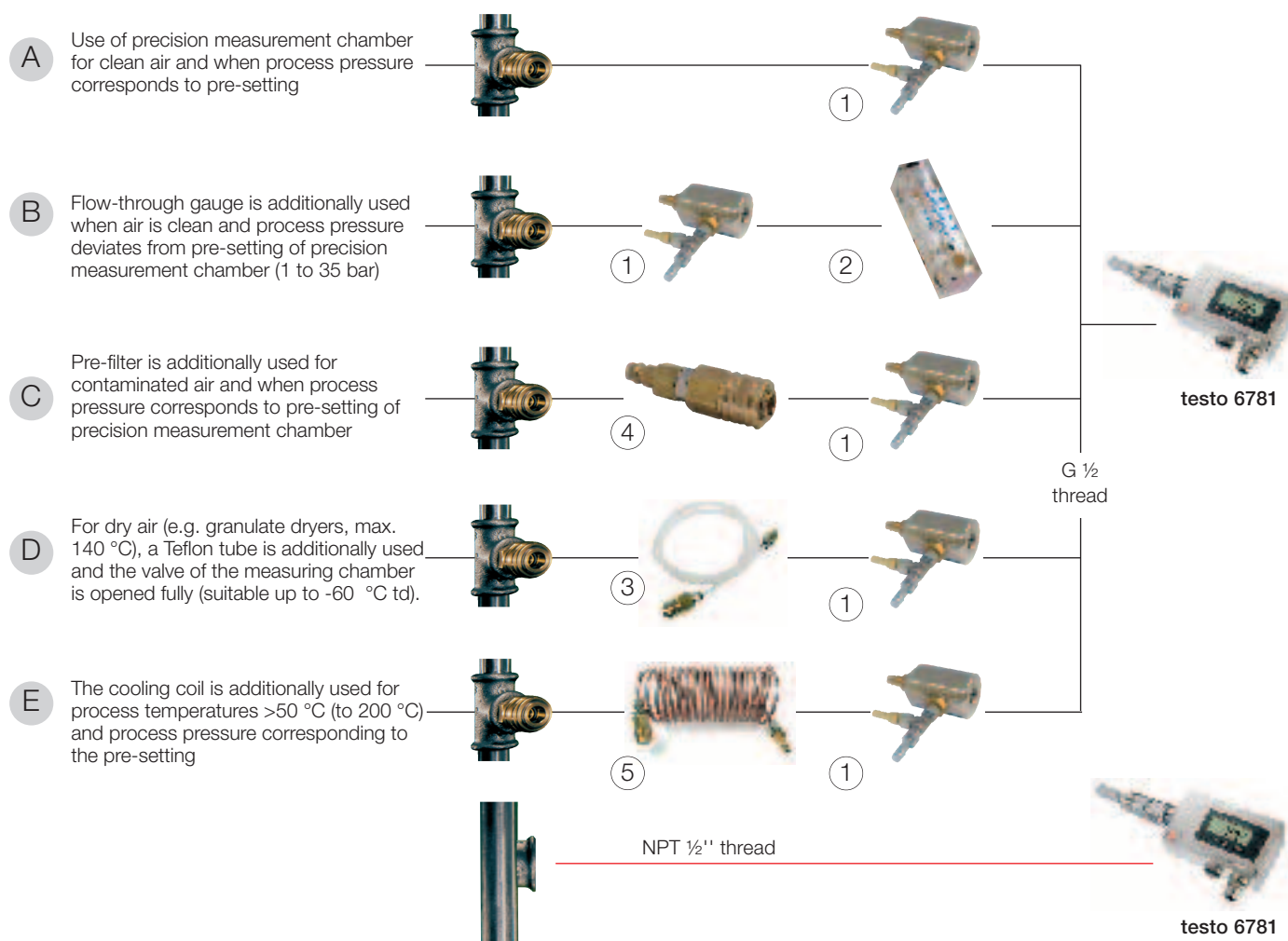
#### Operating conditions

	Process temperature	-40 to +70 °C / -40 to +158 °F
	Process pressure	max. 50 bar
<b>Without display</b>	Operation temperature	-40 to +70 °C / -40 to +158 °F
	Storage temperature	-40 to +80 °C / -40 to +176 °F
<b>With display</b>	Operation temperature	-20 to +80 °C / -4 to +176 °F
	Storage temperature	0 to +50 °C / +32 to +122 °F

## Accessories – tailored to every application

Accessories testo 6781	Part no.	
① Precision measurement chamber up to 35 bar (ideal for lowest humidity) for optimum flow impact onto the sensor, with steplessly adjustable flow valve Valve pre-setting: 1 l/min at 7 bar.	0554 3312	
② Flow-through meter for measurement chamber to adjust specific flow impact onto sensor for deviations of the process pressure from the pre-setting of the flow valve	0554 3313	
③ 2 m PTFE hose with compressed air connections up to +140 °C/+284 °F (max. 9 bar/130 psi), with measurement chamber only	0699 2824/4	
④ Prefilter, protects measurement chamber and sensor from dirt particles	0554 3311	
⑤ Cooling coil for process temperatures above 50 °C/122 °F (up to 200 °C), with measurement chamber only	0554 3304	
Plug connection M12 (socket) for voltage supply	0554 6689	
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748	
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749	
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553	
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555	
ISO calibration certificate pressure dewpoint, two adjustment points -40 °C tpd, -10 °C tpd at 6 bar	0520 0136	
ISO calibration certificate/humidity, Dewpoint meters; calibration points freely selectable from -40 to 0 °C tpd (-40 to 32 °F tpd) at 6 bar	0520 0116	

## Selection assistance for your applications



## Differential pressure transmitter for building climate and cleanroom applications

### Measuring 1 Pa precisely



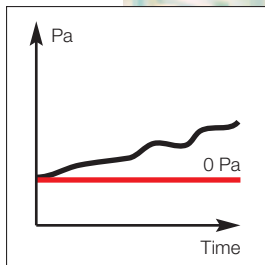
Wolfgang Eiche,  
Product Manager

To be clear of what 1 Pa differential pressure means: our atmospheric pressure is 100,000 Pa! A butterfly flying past causes a change in pressure of 2.5

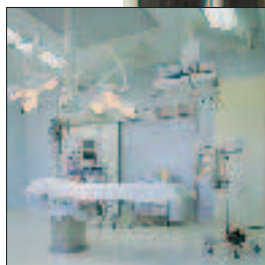
Pa. Hats off to our highly accurate sensor!



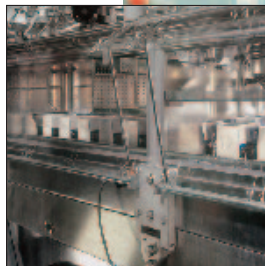
The testo 6383 allows flush installation in a cleanroom wall



The Testo differential pressure transmitters have absolutely no zero-point drift thanks to the automatic zero-point adjustment

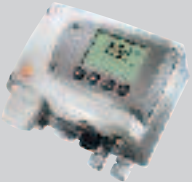


In hospitals and research laboratories, the pressure difference (negative pressure) prevents the spread of germs and dust



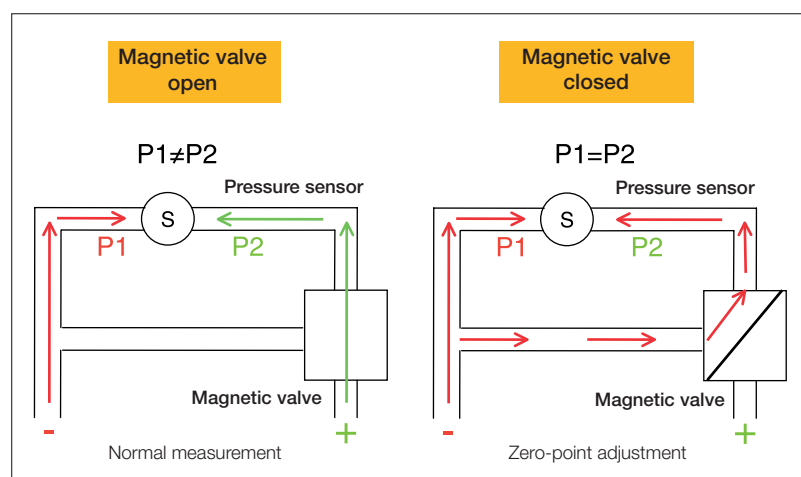
Positive pressure in a filling room maintains the hygiene conditions when filling food and pharmaceuticals

## Overview differential pressure transmitters

	Building climate	Critical climate	Cleanrooms	Filling processes	Drying processes
 testo 6321 (ΔP)					
 testo 6351 (ΔP, m/s, Nm/h)					
 testo 6381 (ΔP, m/s, Nm/h, %RH, °C)					
 testo 6383 (ΔP, %RH, °C)					

### Profit from our advantages:

- Testo offers a unique calibration, validation and qualification concept (more information at [www.testo-industrials-services.de](http://www.testo-industrials-services.de))
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability



Functional principle of the automatic zero-point adjustment of the Testo differential pressure transmitter

### Automatic zero-point adjustment for high accuracy and long-term stability

The zero-point stability of differential pressure transmitters plays a particularly crucial role at lowest pressures (10 Pa or 50 Pa measurement range). Whereas conventional differential pressure transmitters require manual re-adjustment of the zero point, the new transmitter series from Testo is equipped with an automatic microprocessor-controlled zero-point adjustment. It ensures a low level of temperature-dependency of the pressure sensor, guaranteeing the user high accuracy and long-term stability. In the automatic zero-point adjustment, a magnetic valve causes both sides of the pressure sensor to be exposed to the same pressure a cyclic intervals. This guarantees highest accuracy in cleanroom processes!

## Differential pressure transmitter for use in building climate: testo 6321



### Overview of features and advantages

- Measurement of differential pressure
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Various analog outputs allow optimum integration into individual automation systems
- Scalability of the measuring range of +50 percent of the measuring range final value, and free scalability within the measuring range allow optimum adaptation to the control
- Optionally with display

### Areas of application

Application mainly in the area of building climate

- Industrial and commercial buildings, e.g. in production and storage
- Offices and administrative buildings
- Sales areas and exhibition halls
- Museums and libraries
- School buildings, hotels, clinics etc.

### Configuration options testo 6321:

AXX Measuring range  
BXX Analog output/supply  
CXX Display

EXX Housing colour  
FXX Unit  
KXX Language of the instruction manual (for bilingual paper instruction manual)

Part no. 0555 6321 A01 Bxx Cxx Exx Fxx Kxx

A03 0 to 100 Pa  
A05 0 to 10 hPa  
A06 0 to 20 hPa  
A07 0 to 50 hPa  
A08 0 to 100 hPa  
A09 0 to 500 hPa  
A10 0 to 1000 hPa  
A11 0 to 2000 hPa  
A23 -100 to 100 Pa  
A25 -10 to 10 hPa  
A26 -20 to 20 hPa  
A27 -50 to 50 hPa  
A28 -100 to 100 hPa  
A29 -500 to 500 hPa  
A30 -1000 to 1000 hPa  
A31 -2000 to 2000 hPa

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)  
B06 4 to 20 mA (4-wire, 24 VAC/DC)

C00 without display  
C01 with display

E00 Housing colour light grey, incl. Testo logo (coloured)  
E01 Neutral housing, white, without Testo logo  
E02 Neutral housing, white, incl. Testo logo (black/white)

F01 Pa / min / max  
F02 hPa / min / max  
F03 kPa / min / max  
F04 mbar / min / max  
F05 bar / min / max  
F06 mm H<sub>2</sub>O / min / max  
F07 inch H<sub>2</sub>O / min / max  
F08 inch HG / min / max  
F09 kg/cm<sup>2</sup> / min / max  
F10 PSI / min / max

K01 Instruction manual German-English  
K02 Instruction manual French-English  
K03 Instruction manual Spanish-English  
K04 Instruction manual Italian-English  
K05 Instruction manual Dutch-English  
K06 Instruction manual Japanese-English  
K07 Instruction manual Chinese-English

### Example:

Order code for testo 6321 transmitter with the following options:

- Measuring range 0 to 100 Pa
- Analog output 0 to 5 V
- Without display
- Housing colour light grey
- Unit mbar
- Language of instruction manual German/English

→ 0555 6321 A03 B03 C00 E00 F04 K01

# Technical data testo 6321

## Technical data

### Measurement parameters

#### Differential pressure

Measuring range	0 to 100 Pa 0 to 10 hPa 0 to 20 hPa 0 to 50 hPa 0 to 100 hPa 0 to 500 hPa 0 to 1000 hPa 0 to 2000 hPa	-100 to 100 Pa -10 to 10 hPa -20 to 20 hPa -50 to 50 hPa -100 to 100 hPa -500 to 500 hPa -1000 to 1000 hPa -2000 to 2000 hPa
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Measurement uncertainty*	±1.2% of measuring range final value ±0,3 Pa Temperature gain drift: 0.05% of measuring range per Kelvin deviation from nominal temperature 22 °C Zero-point drift: 0% (due to zero-point adjustment)	
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Sensor	Piezoresistive sensor
--------	-----------------------

Autom. zero-point adjustment	via magnetic valve
------------------------------	--------------------

Überlastbarkeit	<b>Measuring range</b>	<b>Overload</b>
	0 to 100 Pa	20000 Pa
	0 to 10 hPa	200 hPa
	0 to 20 hPa	200 hPa
	0 to 50 hPa	750 hPa
	0 to 100 hPa	750 hPa
	0 to 500 hPa	2500 hPa
	0 to 1000 hPa	2500 hPa
	0 to 2000 hPa	2500 hPa
	-100 to 100 Pa	20000 Pa
	-10 to 10 hPa	200 hPa
	-20 to 20 hPa	200 hPa
	-50 to 50 hPa	750 hPa
	-100 to 100 hPa	750 hPa
	-500 to 500 hPa	2500 hPa
	-1000 to 1000 hPa	2500 hPa
	-2000 to 2000 hPa	2500 hPa

### General

#### Housing

Material / colour	ABS / white (RAL 9010) or light grey (silica-free)
-------------------	--

Weight	Approx. 160 g
--------	---------------

#### Display

Display	1-line LCD (optional)
---------	-----------------------

Resolution	<b>Measuring range</b>	<b>Resolution</b>
	0 to 100 Pa	0,1
	0 to 10 hPa	0,01
	0 to 20 hPa	0,01
	0 to 50 hPa	0,01
	0 to 100 hPa	0,1
	0 to 500 hPa	0,1
	0 to 1000 hPa	0,001
	0 to 2000 hPa	0,01
	-100 to 100 Pa	0,1
	-10 to 10 hPa	0,01
	-20 to 20 hPa	0,01
	-50 to 50 hPa	0,01
	-100 to 100 hPa	0,1
	-500 to 500 hPa	0,1
	-1000 to 1000 hPa	0,001
	-2000 to 2000 hPa	0,001

#### Miscellaneous

Protection class	IP65 only when the transmitter is wired and/or sealing plugs are in use
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EMC	EC guideline: 2004/108/EC
-----	---------------------------

Automatic zero-point adjustment	Every 60 seconds ex-works
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### Inputs and outputs

#### Analog outputs

Output type	0 to 1/5/10 V (4-wire) 4 to 20 mA (4-wire)
-------------	---

Measuring rate	1/s
----------------	-----

Resolution	12 bit
------------	--------

Accuracy of the analog outputs	0 to 1 V ±2,5 mV 0 to 5 V ±12,5 mV 0 to 10 V ±25 mV 4 to 20 mA ±0,05 mA
--------------------------------	--

Max. load	500 Ω
-----------	-------

#### Further outputs

other analog outputs	Minin DIN for P2A software (adjustment and parameterization software)
----------------------	---

#### Supply

Voltage supply	20 to 30 V AC/DC
----------------	------------------

Current consumption	30 mA
---------------------	-------

### Operating conditions

Humidity (sensor)	0 to 90 %rF
Temperature (sensor)	-5 to +50 °C
Storage temperature	-40 to +80 °C

\* Measurement inaccuracy according to GUM: ±1.2% of measuring range final value ±0.3 Pa

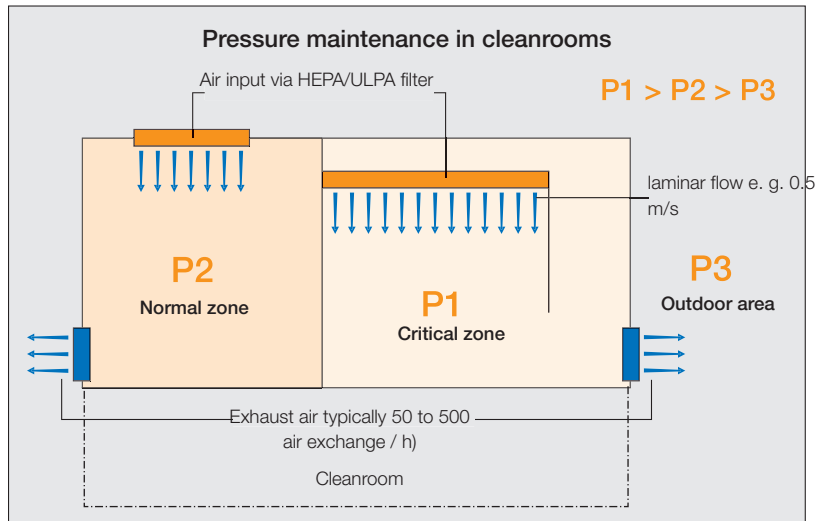
GUM (Guide to the Expression of Uncertainty in Measurement):

ISO guideline for the determination of measurement uncertainty, in order to make measurement results comparable worldwide.

The following variables are taken into account in determining uncertainty:

- Hysteresis
- Linearity
- Reproducibility
- Long-term stability
- Adjustment site/works calibration
- Test site

## Differential pressure monitoring in cleanroom technology



Whether in cleanrooms, greyrooms, OP theatres or filling systems:

Lowest differential pressures must be maintained between different rooms or zones in order to prevent contaminated air from entering.

For this reason, continuous measurement and regulation of these low differential pressures (according to cleanroom norm ISO 14644: 5 - 20 Pa) is required. Annual proof (against zero potential and against adjacent rooms) of this must be provided according to ISO 14644



Defined pressure differences between cleanroom and adjacent rooms ensure quality






Positive pressure in a filling room maintains the hygiene conditions when filling food and pharmaceuticals



In hospitals and research laboratories, the pressure difference (negative pressure) prevents the spread of germs and dust

## Differential pressure transmitter for cleanrooms

	testo 6351	testo 6381	testo 6383
			
Measurement parameters	Differential pressure Flow velocity Volume flow	Differential pressure Flow velocity Volume flow Optional: Humidity/temperature	Differential pressure Optional: humidity/temperature
Selectable measuring ranges	50 Pa to 2000 hPa	10 Pa to 1000 hPa	10 Pa to 10 hPa
Housing	Plastic housing	Metal housing	Flat stainless steel housing for flush wall installation (panel design)
Networking for Ethernet (see page 20)	– Integration of the transmitter into customer's own Ethernet network – Integration of the transmitter into measurement data monitoring systems such as testo Saveris™*		
Application area	Differential pressure monitoring <b>between cleanrooms</b>  Differential pressure monitoring in filling processes  Critical air conditioning technology (VAC systems)	Differential pressure monitoring <b>between cleanrooms</b> (optional: simultaneous measurement of temperature and humidity)  Differential pressure monitoring in filling processes and spray-painting systems  Monitoring drying processes	Differential pressure monitoring <b>between cleanrooms</b> (optional: simultaneous measurement of temperature and humidity)  Monitoring positive and negative pressure in cleanrooms, operating theatres and isolation rooms  Additional monitoring of humidity and temperature in cleanrooms (optional)
Usual installation site in a cleanroom	<b>Normal zone or outside zone</b>	<b>Normal zone or outside zone</b>	<b>Critical zone: Surface flush installation in cleanroom wall</b>

\* Possible for testo 6383 from March 2010



## Differential pressure transmitters for installation in normal zones



### testo 6351 – Overview of features and advantages

- Measurement of differential pressure, flow velocity and volume flow
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability

Plastic housing

Display with multi-language operating menu and optical alarm display

- Ethernet, relay and analog outputs allow optimum integration into individual automation systems

Self-monitoring of the transmitters guarantees high system availability

- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Scalable measuring range by  $\pm 50$  percent of the measuring range final value, and free scalability within the measuring range, allow optimum adaptation to the control requirements

### Areas of application:

- Differential pressure monitoring between cleanrooms
- Differential pressure monitoring in filling processes
- Monitoring differential pressure, volume flow and flow velocities in critical air conditioning technology (VAC systems)

### Configuration options testo 6351

AXX Measuring range  
BXX Analog display/supply  
CXX Display / menu language  
DXX Cable input

EXX Ethernet  
FXX Differential pressure/flow velocity unit (pre-set)  
HXX Relay  
KXX Instruction manual language

Best.Nr. 0555 6351

A01 Bxx Cxx Dxx Exx Fxx Hxx Ixx Jxx Kxx

A02 0 to 50 Pa  
A03 0 to 100 Pa  
A04 0 to 500 Pa  
A05 0 to 10 hPa  
A07 0 to 50 hPa  
A08 0 to 100 hPa  
A09 0 to 500 hPa  
A10 0 to 1000 hPa  
A11 0 to 2000 hPa  
A22 -50 to 50 Pa  
A23 -100 to 100 Pa  
A24 -500 to 500 Pa  
A25 -10 to 10 hPa  
A27 -50 to 50 hPa  
A28 -100 to 100 hPa  
A29 -500 to 500 hPa  
A30 -1000 to 1000 hPa  
A31 -2000 to 2000 hPa

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)

C00 without display  
C02 with display/English  
C03 with display/German  
C04 with display/French  
C05 with display/Spanish  
C06 with display/Italian  
C07 with display/Japanese  
C08 with display/Swedish

D01 Cable input M16 (relay: M20)  
D02 Cable entry NPT 1/2"  
D03 Cable contact via M-plug connection for signal and supply

E00 without Ethernet module  
E01 with Ethernet module

F01 Pa / min / max  
F02 hPa / min / max  
F03 kPa / min / max  
F04 mbar / min / max  
F05 bar / min / max  
F06 mmH<sub>2</sub>O / min / max  
F07 mmH<sub>2</sub>O / min / max  
F08 inch HG / min / max  
F09 kg/cm<sup>2</sup> / min / max  
F10 PSI / min / max  
F11 m/s / min / max  
F12 ft/min / min / max  
F13 m<sup>3</sup>/h / min / max  
F14 l/min / min / max  
F15 Nm<sup>3</sup>/h / min / max  
F16 NI/min / min / max

Scaling: 50% of measuring range  
final value; freely selectable within measuring range

H00 without relay  
H01 4 relay outputs, limit value monitoring  
H02 4 relay outputs, channel 1 limit values and collective alarm

K01 German/English instruction manual  
K02 French/English instruction manual  
K03 Spanish/English instruction manual  
K04 Italian/English instruction manual  
K05 Dutch/English instruction manual  
K06 Japanese/English instruction manual  
K07 Chinese/English instruction manual  
K08 Swedish/English instruction manual

### Example:

Order code for transmitter testo 6351 with the following options:

- Measuring range 0 to 100 Pa
- Analog output / supply 0 to 5 V (4-wire, 24 VAC/DC)
- with display/English
- Cable entry NPT 1/2"
- with Ethernet module
- Differential pressure mbar / min / max
- 4 relay outputs, limit value monitoring
- Instruction manual language German/English

→ 0555 6351 A03 B03 C02 D02 E01 F04 H01 K01

# testo 6351 – Differential pressure and flow velocity

## Technical data testo 6351

Parameters		
Differential pressure		
Measuring range	0 to 50 Pa 0 to 100 Pa 0 to 500 Pa 0 to 10 hPa 0 to 50 hPa 0 to 100 hPa 0 to 500 hPa 0 to 1000 hPa 0 to 2000 hPa	-50 to 50 Pa -100 to 100 Pa -500 to 500 Pa -10 to 10 hPa -50 to 50 hPa -100 to 100 hPa -500 to 500 hPa -1000 to 1000 hPa -2000 to 2000 hPa
Measurement uncertainty*	±0,8% of measurement range final value ±0.3 Pa Temperature gain drift: 0.02% of measuring range per Kelvin deviation from nominal temperature 22 °C Zero point drift: 0% (thanks to cyclic zero-point adjustment)	
Selectable units	Differential pressure in Pa, hPa, kPa, mbar, bar, mmH <sub>2</sub> O, kg/cm <sup>2</sup> , PSI, inch HG, inch H <sub>2</sub> O Calculated variables: Volume flow in m <sup>3</sup> /h, l/min, Nm <sup>3</sup> /h, NI/min Flow velocity in m/s, ft/min	
Sensor	Piezoresistive sensor	
Autom. Zero-point adjustment	via magnetic valve Frequency adjustable: 15 sec, 30 sec, 1 min, 5 min, 10 min	
Overload capacity	<b>Measuring range</b>	<b>Overload</b>
	0 to 50 Pa	20000 Pa
	0 to 100 Pa	20000 Pa
	0 to 500 Pa	20000 Pa
	0 to 10 hPa	200 hPa
	0 to 50 hPa	750 hPa
	0 to 100 hPa	750 hPa
	0 to 500 hPa	2500 hPa
	0 to 1000 hPa	2500 hPa
	0 to 2000 hPa	2500 hPa
	-50 to 50 Pa	20000 Pa
	-100 to 100 Pa	20000 Pa
	-500 to 500 Pa	20000 Pa
	-10 to 10 hPa	200 hPa
	-50 to 50 hPa	750 hPa
	-100 to 100 hPa	750 hPa
	-500 to 500 hPa	2500 hPa
	-1000 to 1000 hPa	2500 hPa
	-2000 to 2000 hPa	2500 hPa

\* Measurement inaccuracy according to GUM: ±0.8% of measurement range final value ±0.3 Pa

GUM (Guide to the Expression of Uncertainty in Measurement):

ISO guideline for the determination of measurement inaccuracy, in order to make measurements comparable worldwide.

The following inaccuracies are used for the determination:

- Hysteresis
- Linearity
- Reproducibility
- Long-term stability
- Adjustment site/factory calibration
- Test site

Inputs/outputs	
Analog outputs	
Quantity	1
Output type	0/4 to 20 mA (4-wire) (24 VAC/DC) 0 to 1/5 to 10 V (4-wire) (24 VAC/DC)
Scaling	Differential pressure: scalable ±50% of measuring range final value; freely scalable within measuring range
Meas. cycle	1/sec
Resolution	12 bit
Max. load	max. 500 Ω
Other outputs	
Ethernet	Optional with Ethernet module
Relay	Optional: 4 relays (free allocation to measurement channels or as collective alarm in operating menu/P2A), up to 250 VAC/3A (NO or NC)
Digital	Mini-DIN for P2A software
Supply	
Voltage supply	20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line

General technical data		
Model		
Material	Plastic housing (silica-free)	
Dimensions	162 x 122 x 77 mm	
Weight	0.7 kg; optional: Ethernet intermediary layer 0.6 kg	
Display		
Display	Optional: 3-line LCD with multi-language operating menu	
Resolution	<b>Measuring range</b>	<b>Resolution</b>
	0 to 50 Pa	0,1 Pa
	0 to 100 Pa	0,1 Pa
	0 to 500 Pa	0,1 Pa
	0 to 10 hPa	0,01 hPa
	0 to 50 hPa	0,01 hPa
	0 to 100 hPa	0,1 hPa
	0 to 500 hPa	0,1 hPa
	0 to 1000 hPa	1 hPa
	0 to 2000 hPa	1 hPa
	-50 to 50 Pa	0,1 Pa
	-100 to 100 Pa	0,1 Pa
	-500 to 500 Pa	0,1 Pa
	-10 to 10 hPa	0,01 hPa
	-50 to 50 hPa	0,01 hPa
	-100 to 100 hPa	0,1 hPa
	-500 to 500 hPa	0,1 hPa
	-1000 to 1000 hPa	1 hPa
	-2000 to 2000 hPa	1 hPa
Miscellaneous		
Protection class	IP 65	
EMC	EU guideline 2004/108/EC	

Operating conditions	
With / without display	Operating temperature -5 to +50 °C / +23 to +122 °F
Storage temperature	-20 to +60 °C / -4 to +140 °F
Process temperature	-20 to +65 °C / -4 to +149 °F

## Differential pressure transmitters for installation in normal zones



### testo 6381 – Overview of features and advantages

- Measurement of differential pressure, flow velocity, volume flow; optional: humidity and temperature
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability
- Low measurement range up to 10 Pa ensures very high precision at lowest pressures
- The robust metal housing protects from tough ambient conditions
- Combination of differential pressure, humidity, and temperature measurement in one instrument saves investment costs (exchangeable digital humidity probe see page 10)
- Display with multi-language operating menu and optical alarm display
- Ethernet, relay and analog outputs allow optimum integration into individual automation systems

- Self-monitoring of the transmitters guarantees high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Scalable measuring range by  $\pm 50$  percent of the measuring range final value, and free scalability within the measuring range, allow optimum adaptation to the control requirements

### Areas of application:

- Differential pressure monitoring between cleanrooms (optional: simultaneous measurement of ambient temperature and humidity)
- Monitoring drying processes
- Differential pressure monitoring in filling processes and spray-painting systems

### Configuration options testo 6381

AXX	Measuring range
BXX	Analog display/supply
CXX	Display / menu language
DXX	Cable input
EXX	Ethernet
FXX	Differential pressure/flow velocity unit (pre-set)
GXX	opt. Analog output for humidity probe

HXX	Relay
IXX	Units channel 3 pre-set (only if opt. humidity probe connection available)
KXX	Instruction manual language

### This results in a typical order code:

0555 6381 AXX BXX CXX DXX EXX FXX GXX HXX IXX KXX

Part no. 0555 6381 A01 Bxx Cxx Dxx Exx Fxx Gxx Hxx Ixx Kxx

A01	0 to 10 Pa
A02	0 to 50 Pa
A03	0 to 100 Pa
A04	0 to 500 Pa
A05	0 to 10 hPa
A07	0 to 50 hPa
A08	0 to 100 hPa
A09	0 to 500 hPa
A10	0 to 1000 hPa
A21	-10 to 10 Pa
A22	-50 to 50 Pa
A23	-100 to 100 Pa
A24	-500 to 500 Pa
A25	-10 to 10 hPa
A27	-50 to 50 hPa
A28	-100 to 100 hPa
A29	-500 to 500 hPa
A30	-1000 to 1000 hPa

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)

C00	without display
C02	with display/English
C03	with display/German
C04	with display/French
C05	with display/Spanish
C06	with display/Italian
C07	with display/Japanese
C08	with display/Swedish

D01	Cable input M16 (relay: M20)
D02	Cable entry NPT 1/2"
D03	Cable contact via M-plug connection for signal and supply

E00	without Ethernet module
E01	with Ethernet module

F01	Pa / min / max
F02	hPa / min / max
F03	kPa / min / max
F04	mbar / min / max
F05	bar / min / max
F06	mmH <sub>2</sub> O / min / max
F07	mmH <sub>2</sub> O / min / max
F08	inch HG / min / max
F09	kg/cm <sup>2</sup> / min / max
F10	PSI / min / max
F11	m/s / min / max
F12	ft/min / min / max
F13	m <sup>3</sup> /h / min / max
F14	l/min / min / max
F15	Nm <sup>3</sup> /h / min / max
F16	NI/min / min / max

Scaling: 50% of measuring range final value; freely selectable within measuring range

G00	without connection possibility for humidity probe
-----	---

G01	% RH/Min/Max
G02	°C/Min/Max
G03	°F/Min/Max
G04	°Ctd / min / max
G05	°Ftd / 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	°Cwb / min / max
G12	°Fwb / min / max
G13	kJ/kg / min / max (enthalpy)
G14	mbar / min / max (water vapour partial pressure)
G15	inch H <sub>2</sub> O / min / max (water vapour partial pressure)
G16	°Ctm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
G17	°Ftm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
G18	% Vol

with connection possibility testo 6610

H00	without relay
H01	4 relay outputs, limit value monitoring
H02	4 relay outputs, channel 1 limit values and collective alarm

I01	% RH/Min/Max
I02	°C/Min/Max
I03	°F/Min/Max
I04	°Ctd/Min/Max
I05	°Ftd/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	°Cwb / min / max
I12	°Fwb / min / max
I13	kJ/kg / min / max (enthalpy)
I14	mbar / min / max (water vapour partial pressure)
I15	inch H <sub>2</sub> O / min / max (water vapour partial pressure)
I16	°Ctm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
I17	°Ftm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
I18	% Vol

only possible when G-Code (from G01) selected

K01	German/English instruction manual
K02	French/English instruction manual
K03	Spanish/English instruction manual
K04	Italian/English instruction manual
K05	Dutch/English instruction manual
K06	Japanese/English instruction manual
K07	Chinese/English instruction manual
K08	Swedish/English instruction manual

# testo 6381 – Differential pressure, humidity, temperature and flow velocity

## Technical data testo 6381

Parameters			
Differential pressure			
Measuring range	0 to 10 Pa 0 to 50 Pa 0 to 100 Pa 0 to 500 Pa 0 to 10 hPa 0 to 50 hPa 0 to 100 hPa 0 to 500 hPa 0 to 1000 hPa		-10 to 10 Pa -50 to 50 Pa -100 to 100 Pa -500 to 500 Pa -10 to 10 hPa -50 to 50 hPa -100 to 100 hPa -500 to 500 hPa -1000 to 1000 hPa
Measurement uncertainty*	±0,5% of measurement range final value ±0.3 Pa Temperature gain drift: 0.02% of measuring range per Kelvin deviation from nominal temperature 22 °C Zero-point: 0% (thanks to cyclic zero-point adjustment)		
Selectable units	Differential pressure in Pa, hPa, kPa, mbar, bar, mmH <sub>2</sub> O, kg/cm <sup>2</sup> , PSI, inch HG, inch H <sub>2</sub> O calculated parameters: volume flow in m <sup>3</sup> /h, l/min, Nm <sup>3</sup> /h, NI/min Flow velocity in m/s, ft/min		
Sensor	Piezoresistive sensor		
Autom. Zero-point adjustment	via magnetic valve Frequency adjustable: 15 sec, 30 sec, 1 min, 5 min, 10 min		
Overload			
Measuring range	Overload	Measuring range	Overload
0 to 10 Pa	20000 Pa	-10 to 10 Pa	20000 Pa
0 to 50 Pa	20000 Pa	-50 to 50 Pa	20000 Pa
0 to 100 Pa	20000 Pa	-100 to 100 Pa	20000 Pa
0 to 500 Pa	20000 Pa	-500 to 500 Pa	20000 Pa
0 to 10 hPa	200 hPa	-10 to 10 hPa	200 hPa
0 to 50 hPa	750 hPa	-50 to 50 hPa	750 hPa
0 to 100 hPa	750 hPa	-100 to 100 hPa	750 hPa
0 to 500 hPa	2500 hPa	-500 to 500 hPa	2500 hPa
0 to 1000 hPa	2500 hPa	-1000 to 1000 hPa	2500 hPa
Inputs/outputs			
Analog outputs			
Quantity	Standard: 1; with optional humidity probe: 3		
Output type	0/4 to 20 mA (4-wire) (24 VAC/DC) 0 to 1/5 to 10 V (4-wire) (24 VAC/DC)		
Scaling	Differential pressure: scalable ±50% of measuring range final value; freely scalable within measuring range		
Meas. cycle	1/sec		
Resolution	12 bit		
Max. load	max. 500 Ω		
Other outputs			
Ethernet	Optional		
Relay	Optional: 4 relays (free allocation to measurement channels or as collective alarm in operating menu/P2A), up to 250 VAC/3A (NO or NC)		
Digital	Mini-DIN for P2A software		
Supply			
Voltage supply	20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line		

Operating conditions	
With / without display	Operation temperature -5 to 50 °C / 23 to 122 °F
	Storage temperature -20 to 60 °C / -4 to 140 °F
	Process temperature -20 to +65 °C / -4 to +149 °F

Parameters						
Humidity/temperature optional						
Probe	testo 6611	testo 6612	testo 6613	testo 6614	testo 6615	testo 6617
Type	Wall	Channel	Channel	Duct heated	Cable trace humidity	Cable with cover electrode monitoring
Parameters	%RH / °C/°F / °C <sub>td</sub> / °F <sub>td</sub> / g/kg / gr/lb / g/m <sup>3</sup> / gr/ft <sup>3</sup> / ppmV / °Cwb / °Fwb / kJ/kg / mbar / inch H <sub>2</sub> O / °Ctm (H <sub>2</sub> O <sub>2</sub> ) / °Ftm (H <sub>2</sub> O <sub>2</sub> ) / % Vol					
Meas. range						
Humidity / trace humidity	0 to 100 %RH				-60 to +30 °C <sub>td</sub>	0 to 100 %RH
Temperature	-20 to +70 °C -4 to +158 °F	-30 to +150 °C -22 to +302 °F	-40 to +180 °C -40 to +356 °F	-40 to +120 °C -40 to +248 °F	-40 to +180 °C -40 to +356 °F	
Measurement uncertainty*						
Humidity	testo 6611	testo 6612	testo 6613	testo 6614	testo 6615	testo 6617
	±1.0 %RH for 0 to 90 %RH / ±1.4 %RH for 90 to 100 % RH			±1.0 %RH for 0 to 100 %RH		±1.2 %RH for 0 to 90 %RH / ±1.6 %RH for 90 to 100 %RH
	for deviations from media temp. ±25 °C: ±0.02 %RH/K					
Dewpoint					±1 K at 0 °C <sub>td</sub> ±2 K at -40 °C <sub>td</sub> ±4 K at -50 °C <sub>td</sub>	
Temp. at +25 °C / +77 °F	±0,15 °C/ 32,2 °F Pt1000 1/3 Class B			±0,15 °C/ 32,2 °F Pt100 1/3 Class B		±0,15 °C/ 32,2 °F Pt1000 1/3 Class B

General technical data			
Model			
Material		Metal housing	
Dimensions		162 x 122 x 77 mm	
Weight		1.96 kg; optional: Ethernet intermediary layer 0.61 kg	
Display			
Display		optional: 3-line LCD with multi-language operating menu	
Resolution			
Differential pressure			
Measuring range	Resolution	Measuring range	Resolution
0 to 10 Pa	0,1 Pa	-10 to 10 Pa	0,1 Pa
0 to 50 Pa	0,1 Pa	-50 to 50 Pa	0,1 Pa
0 to 100 Pa	0,1 Pa	-100 to 100 Pa	0,1 Pa
0 to 500 Pa	0,1 Pa	-500 to 500 Pa	0,1 Pa
0 to 10 hPa	0,01 hPa	-10 to 10 hPa	0,01 hPa
0 to 50 hPa	0,01 hPa	-50 to 50 hPa	0,01 hPa
0 to 100 hPa	0,1 hPa	-100 to 100 hPa	0,1 hPa
0 to 500 hPa	0,1 hPa	-500 to 500 hPa	0,1 hPa
0 to 1000 hPa	1 hPa	-1000 to 1000 hPa	1 hPa
Humidity		0,1 %RH	
Temperature		0,01 °C / 0,01 °F	
Miscellaneous			
Protection class		IP 65	
EMC		EU guideline 2004/108/EC	

\* Measurement inaccuracy according to GUM.

For differential pressure: ±0.8% of measuring range final value ±0.3 Pa

For humidity: Additional humidity-dependent inaccuracy contribution +0.007 \* MW (in %RH).

GUM (Guide to the Expression of Uncertainty in Measurement):

ISO guideline for the determination of measurement inaccuracy, in order to make measurements comparable worldwide.

The following inaccuracies are used for the determination:

- Hysteresis
- Linearity
- Reproducibility
- Long-term stability (only for differential pressure)
- Adjustment site/factory calibration
- Test site

## Differential pressure transmitters for installation in critical zones



### testo 6383 – Overview of features and advantages

- Measurement of differential pressure, optional: humidity and temperature
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability
- Low measurement range up to 10 Pa ensures highest precision at lowest pressures
- Flat housing allows flush surface integration in the cleanroom wall
- Combination of differential pressure, humidity, and temperature measurement in one instrument saves investment costs (exchangeable digital humidity probes see page 10)
- Display with multi-language operating menu and optical alarm display
- Ethernet, relay and analog outputs allow optimum integration into individual automation systems

- Self-monitoring of the transmitters guarantees high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Scalable measuring range by  $\pm 50$  percent of the measuring range final value, and free scalability within the measuring range, allow optimum adaptation to the control requirements

### Areas of application:

- Monitoring positive and negative pressure in cleanrooms, operating theatres and isolation rooms
- Additional monitoring of humidity and temperature in cleanrooms (optional)

### Configuration options testo 6383

AXX	Measuring range	GXX	opt. Analog output for humidity probe connection (probe series testo 6610) units (pre-set)
BXX	Analog display/supply	HXX	Relay
CXX	Display / menu language	IXX	Units channel 3 (pre-set, only if opt. humidity probe connection available)
DXX	Integrated humidity probe	KXX	Instruction manual language
EXX	Ethernet		
FXX	Differential pressure unit (pre-set)		

### This results in a typical order code:

0555 6383 A21 B06 C03 D05 E01 F09 G04 H00 I08 K01

Part no. 0555 6383 **A01** **Bxx** **Cxx** **Dxx** **Exx** **Fxx** **Gxx** **Hxx** **Ixx** **Kxx** EUR 725,-

<b>A01</b> 0 to 10 Pa <b>A02</b> 0 to 50 Pa <b>A03</b> 0 to 100 Pa <b>A04</b> 0 to 500 Pa <b>A05</b> 0 to 10 hPa <b>A21</b> -10 to 10 Pa <b>A22</b> -50 to 50 Pa <b>A23</b> -100 to 100 Pa <b>A24</b> -500 to 500 Pa <b>A25</b> -10 to 10 hPa	<b>B02</b> 0 to 1 V (4-wire, 24 VAC/DC) <b>B03</b> 0 to 5 V (4-wire, 24 VAC/DC) <b>B04</b> 0 to 10 V (4-wire, 24 VAC/DC) <b>B05</b> 0 to 20 mA (4-wire, 24 VAC/DC) <b>B06</b> 4 to 20 mA (4-wire, 24 VAC/DC)	<b>C00</b> without display <b>C02</b> with display/English <b>C03</b> with display/German <b>C04</b> with display/French <b>C05</b> with display/Spanish <b>C06</b> with display/Italian <b>C07</b> with display/Japanese <b>C08</b> with display/Swedish	<b>D00</b> no humidity/temperature probe <b>D04</b> humidity probe integrated in panel <b>D05</b> preparation for external humidity/temperature probe testo 6610	<b>E00</b> without Ethernet module <b>E01</b> with Ethernet module	<b>F01</b> Pa / min / max <b>F02</b> hPa / min / max <b>F03</b> kPa / min / max <b>F04</b> mbar / min / max <b>F05</b> bar / min / max <b>F06</b> mmH <sub>2</sub> O / min / max <b>F07</b> mmH <sub>2</sub> O / min / max <b>F08</b> inch HG / min / max <b>F09</b> kg/cm <sup>2</sup> / min / max <b>F10</b> PSI / min / max	<b>G01</b> %RH / min / max <b>G02</b> °C/Min/Max <b>G03</b> °F/Min/Max <b>G04</b> °Ctd / min / max <b>G05</b> °Ftd / min / max <b>G06</b> g/kg / min / max <b>G07</b> gr/lb / Min/Max <b>G08</b> g/m <sup>3</sup> / min / max <b>G09</b> gr/ft <sup>3</sup> / min / max <b>G10</b> ppmV / min / max <b>G11</b> °Cwb / min / max <b>G12</b> °Fwb / min / max <b>G13</b> kJ/kg / min / max (enthalpy) <b>G14</b> mbar / min / max (water vapour partial pressure) <b>G15</b> inch H <sub>2</sub> O / min / max (water vapour partial pressure) <b>G16</b> °Ctm (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> ) <b>G17</b> °Ftm (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> ) <b>G18</b> % Vol	<b>H00</b> without relay <b>H01</b> 4 relay outputs, limit value monitoring <b>H02</b> 4 relay outputs, channel 1 limit values and collective alarm	<b>I01</b> % RH/Min/Max <b>I02</b> °C/Min/Max <b>I03</b> °F/Min/Max <b>I04</b> °Ctd / min / max <b>I05</b> °Ftd / min / max <b>I06</b> g/kg / min / max <b>I07</b> gr/lb / Min/Max <b>I08</b> g/m <sup>3</sup> / min / max <b>I09</b> gr/ft <sup>3</sup> / min / max <b>I10</b> ppmV / min / max <b>I11</b> °Cwb / min / max <b>I12</b> °Fwb / min / max <b>I13</b> kJ/kg / min / max (enthalpy) <b>I14</b> mbar / min / max (water vapour partial pressure) <b>I15</b> inch H <sub>2</sub> O / min / max (water vapour partial pressure) <b>I16</b> °Ctm (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> ) <b>I17</b> °Ftm (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> ) <b>I18</b> % Vol	<b>K01</b> German/English instruction manual <b>K02</b> French/English instruction manual <b>K03</b> Spanish/English instruction manual <b>K04</b> Italian/English instruction manual <b>K05</b> Dutch/English instruction manual <b>K06</b> Japanese/English instruction manual <b>K07</b> Chinese/English instruction manual <b>K08</b> Swedish/English instruction manual
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Scaling: 50% of measuring range final value; freely selectable within measuring range

only possible when D04 or D05 selected

only possible when D04 or D05 selected

# testo 6383 – Differential pressure, humidity and temperature

## Technical data testo 6383

Parameters			
Differential pressure			
Measuring range	0 to 10 Pa 0 to 50 Pa 0 to 100 Pa 0 to 500 Pa 0 to 10 hPa	-10 to +10 Pa -50 to +50 Pa -100 to +100 Pa -500 to +500 Pa -10 to +10 hPa	
Measurement uncertainty*	±0,3% of measurement range final value ±0.3 Pa Temperature gain drift: 0.02% of measuring range per Kelvin deviation from nominal temperature 22 °C Zero point drift: 0% (thanks to cyclic zero-point adjustment)		
Selectable units	Differential pressure in Pa, hPa, kPa, mbar, bar, mmH <sub>2</sub> O, kg/cm <sup>2</sup> , PSI, inch Hg, inch H <sub>2</sub> O		
Sensor	Piezoresistive sensor		
Autom. Zero-point adjustment	via magnetic valve Frequency adjustable: 15 sec, 30 sec, 1 min, 5 min, 10 min		
Overload	<b>Measuring range</b>	<b>Overload</b>	
	0 to 10 Pa	20000 Pa	
	0 to 50 Pa	20000 Pa	
	0 to 100 Pa	20000 Pa	
	0 to 500 Pa	20000 Pa	
	0 to 10 hPa	200 hPa	
	-10 to 10 Pa	20000 Pa	
	-50 to 50 Pa	20000 Pa	
	-100 to 100 Pa	20000 Pa	
	-500 to 500 Pa	20000 Pa	
	-10 to 10 hPa	200 hPa	

Parameters					
	Humidity/temperature optional				
Probe	Integrated probe	testo 6613	testo 6614	testo 6615	testo 6617
Type		Channel	Duct heated	Cable trace humidity	Cable with cover electrode monitoring
Parameters	%RH / °C/°F / °C <sub>td</sub> / °F <sub>td</sub> / g/kg / gr/lb / g/m3 / gr/ft³ / ppmV / °Cwb / °Fwb / kJ/kg / mbar / inch H <sub>2</sub> O / °Ctm (H <sub>2</sub> O <sub>2</sub> )/°Ftm (H <sub>2</sub> O <sub>2</sub> ) / % Vol				
Meas. range					
Humidity / trace humidity	0 to 100 %RH			-60 to +30 °C <sub>td</sub>	0 to 100 %RH
Temperature	-20 to +70 °C -4 to +158 °F	-40 to +180 °C -40 to +356 °F		-40 to +120 °C -40 to +248 °F	-40 to +180 °C -40 to +356 °F
Measurement uncertainty*					
Humidity	Integrated probe	testo 6613	testo 6614	testo 6615	testo 6617
	±1.0 %RH for 0 to 90 %RH / ±1.4 %RH for 90 to 100 % RH		±1.0 %RH for 0 to 100 %RH		±1.2 %RH for 0 to 90 %RH / ±1.6 %RH for 90 to 100 %RH
	for deviations from media temp. ±25 °C:±0.02 %RH/K				
Dewpoint				±1 K at 0 °C <sub>td</sub> ±2 K at -40°C <sub>td</sub> ±4 K at -50 °C <sub>td</sub>	
Temp. at +25°C / +77°F	±0.15 °C / 32.2 °F Pt1000 1/3 Class B			±0.15 °C/ 32.2 °F Pt100 1/3 Class B	±0.15 °C/ 32.2 °F Pt1000 1/3 Class B

Inputs/outputs	
Analog outputs	
Quantity	Standard: 1; with optional humidity probe: 3
Output type	0/4 to 20 mA (4-wire) (24 VAC/DC) 0 to 1/5 to 10 V (4-wire) (24 VAC/DC)
Scaling	Differential pressure: scalable ±50% of measuring range final value; freely scalable within measuring range
Meas. cycle	1/sec
Resolution	12 bit
Max. load	max. 500 Ω
Other outputs	
Ethernet	Optional
Relay	Optional: 4 relays (free allocation to measurement channels or as collective alarm in operating menu/P2A), up to 250 VAC/3A (NO or NC)
Digital	Mini-DIN for P2A software
Supply	
Voltage supply	20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line

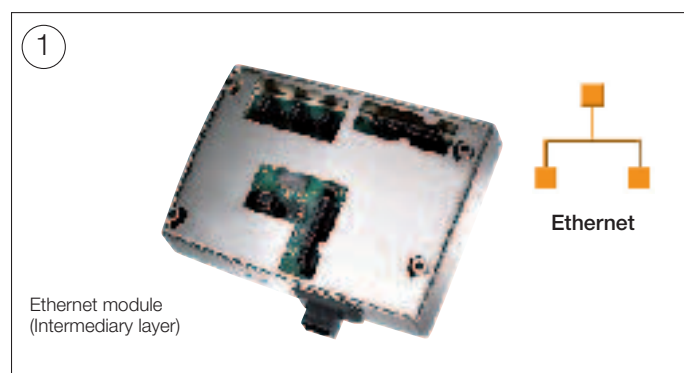
General technical data		
Model		
Material	Front plate stainless steel, housing plastic	
Dimensions	without humidity/temperature: 246 x 161 x 47 mm with humidity/temperature: 396 x 161 x 78 mm	
Weight	Version without humidity: 0.9 kg; Version with integrated humidity probe: 1.35 kg; version with preparation for external humidity probe: 1.26 kg	
Display		
Display	optional: 3-line LCD with multi-language operating menu	
Resolution		
Differential pressure	<b>Measuring range</b>	<b>Resolution</b>
	0 to 10 Pa	0,1 Pa
	0 to 50 Pa	0,1 Pa
	0 to 100 Pa	0,1 Pa
	0 to 500 Pa	0,1 Pa
	0 to 10 hPa	0,01 hPa
	-10 to 10 Pa	0,1 Pa
	-50 to 50 Pa	0,1 Pa
	-100 to 100 Pa	0,1 Pa
	-500 to 500 Pa	0,1 Pa
	-10 to 10 hPa	0,01 hPa
Humidity	0,1 %RH	
Temperature	0,01 °C / 0,01 °F	
Miscellaneous		
Protection class	IP 65	
Operating conditions		
With / without Operation temperature display	-5 to +50 °C / +23 to +122 °F	
Storage temperature	-20 to +60 °C / -4 to +140 °F	
Process temperature	-20 to +65 °C / -4 to +149 °F	

\* Measurement inaccuracy according to GUM. **For differential pressure:** 0.5% of measurement range final value ±0.3 Pa; **For humidity:** Additional humidity-dependent inaccuracy contribution +0.007 \* MW (in %RH). **GUM** (Guide to the Expression of Uncertainty in Measurement): ISO guideline for the determination of measurement inaccuracy, in order to make measurements comparable worldwide. The following inaccuracies are used for the determination: hysteresis, linearity, reproducibility, long-term stability (only for differential pressure), adjustment site/factory calibration, test site.

## Accessories for differential pressure transmitters testo 6321, 6351, 6381 and 6383

Ordering data Accessories	Part no.
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555
① Ethernet module for installation by customer (only for testo 6351 and testo 6381)	0554 6656
Ethernet plug (only for testo 6351 and testo 6381)	0554 6653
P2A software (parameterization, adjustment and analysis software for PC), incl. USB cable (PC side) to the Mini-DIN interface (instrument)	0554 6020
Silicon hose ID 4 transparent	0086 0001 by the metre
Tygon hose ID 4.8 transparent	0086 0031 by the metre
Control and adjustment set consisting of 11.3 %RH and 75.3 %RH saturated salt solutions, can be used several times (only for testo 6381 and testo 6383)	0554 0660
② Extension and adjustment cable, 10 m	0554 6610
Pitot tube, 350 mm long, stainless steel, for measuring flow velocity (only for testo 6351 and testo 6381)	0635 2145
Pitot tube, 1000 mm long, stainless steel, for measuring flow velocity (only for testo 6351 and testo 6381)	0635 2345
TPE outer frame for testo 6383 (without humidity)	0554 6383
TPE outer frame for testo 6383 (with humidity)	0554 6384
Cleaning protective cover for integrated humidity probe of testo 6383	0554 6385
Integrated humidity probe for testo 6383	0636 6610
Adjustment adapter (for 1-point adjustment with testo 400 or testo 650)	0554 6022

### Ethernet intermediary layer testo 6381/6351 for installation by customer



The Ethernet module is an intermediary layer („sandwich“ design), which can be optionally integrated into the transmitters testo 6381/6351 ex-works. It can also be subsequently easily and quickly retrofitted on site. Two LEDs provide the responsible system operator with information on the status of the voltage supply and the LAN connection.

By using an industrial Ethernet plug, IP65 housing protection can be guaranteed, enabling the transmitter to withstand the sometimes rough and demanding conditions in industrial processes

### Adjustment and extension cable for external humidity probes



The cable can be used to carry out an adjustment of a humidity probe from the probe series testo 6610 - either on site or in a laboratory. The cable also serves as an extension between the transmitter and the respective probe.

Advantages of the adjustment and extension cable:

- Flexible installation and maintenance of the humidity probe
- Extension of the normal humidity probe cable by 10 m
- Cable has protection class IP65

## Notes

## Compressed air counter testo 6440

### Saving costs with consumption measurement



Patrick Hermann,  
Application  
Engineer

Almost all our customers are forced to save. In some companies, this means that necessary investments are postponed.

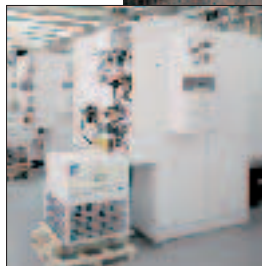
Other, future-oriented companies invest in savings. A classical example of this is compressed air consumption measurement: Only when leakage is detected and consumption is allocated to its originator can high compressed air costs be gradually lowered. And the investment in compressed air counters is quickly paid back in reduced operating costs.



The easy-to-use operating menu enables every parameterization



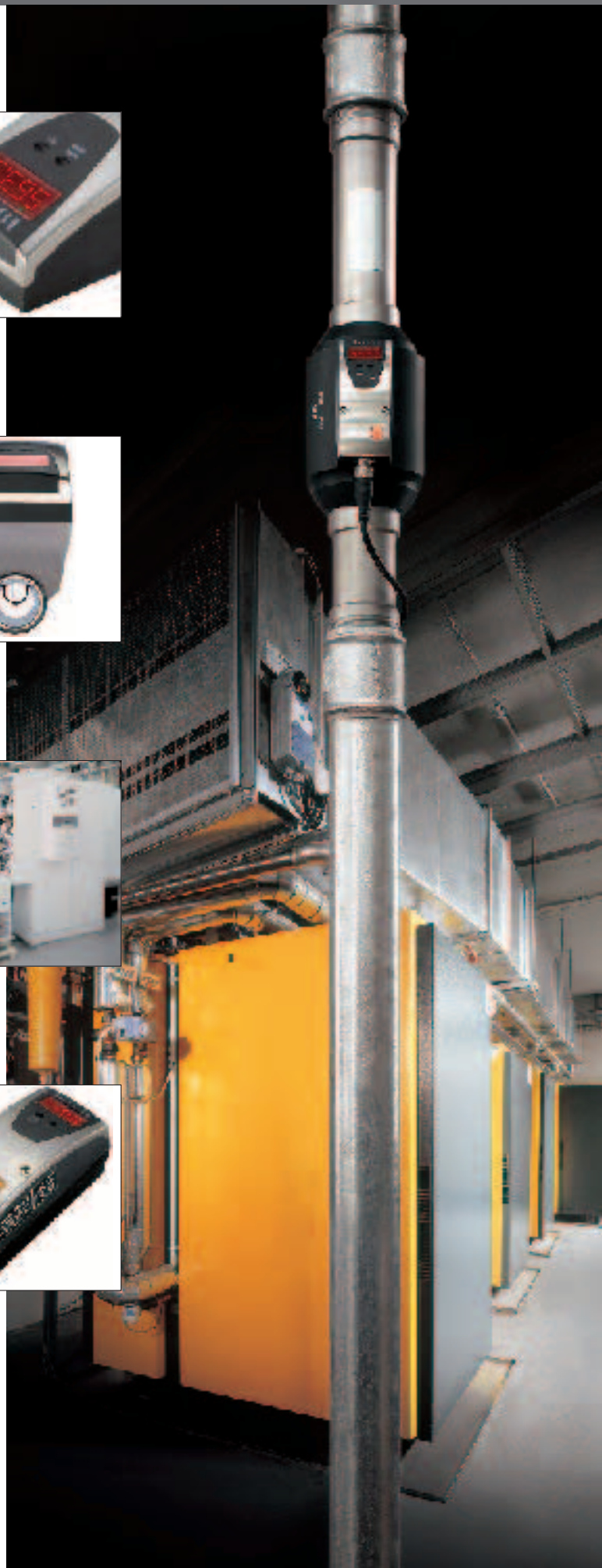
Sensitive and robust at the same time – the ceramic flow-through sensor



Whether leakage detection or cost distribution by originator: The testo 6440 helps to save operating costs



All required signals integrated – from the analog output up to the totaliser

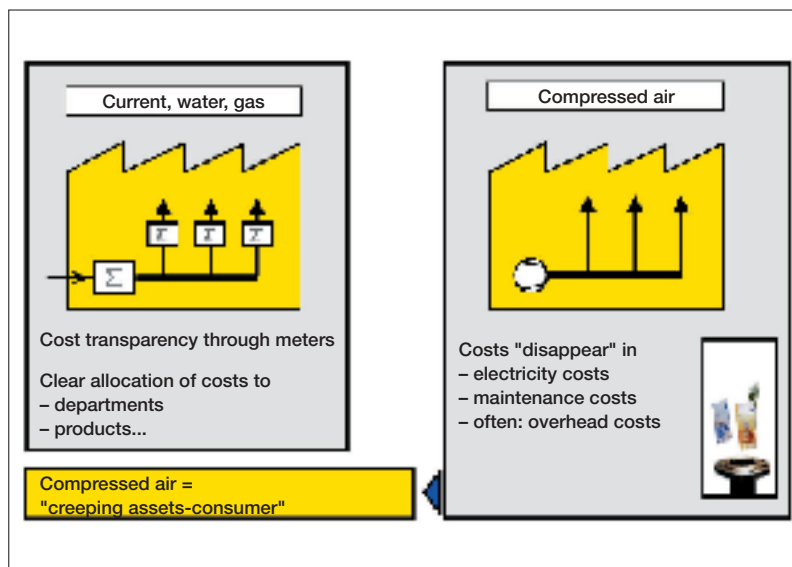


## Saving compressed air costs with testo 6440

### Why does industry need compressed air counters?

For media such as current, water or gases, complete transparency is guaranteed in every industrial company: Central counters reflect the quantities used; decentralized counters show how consumption is distributed.

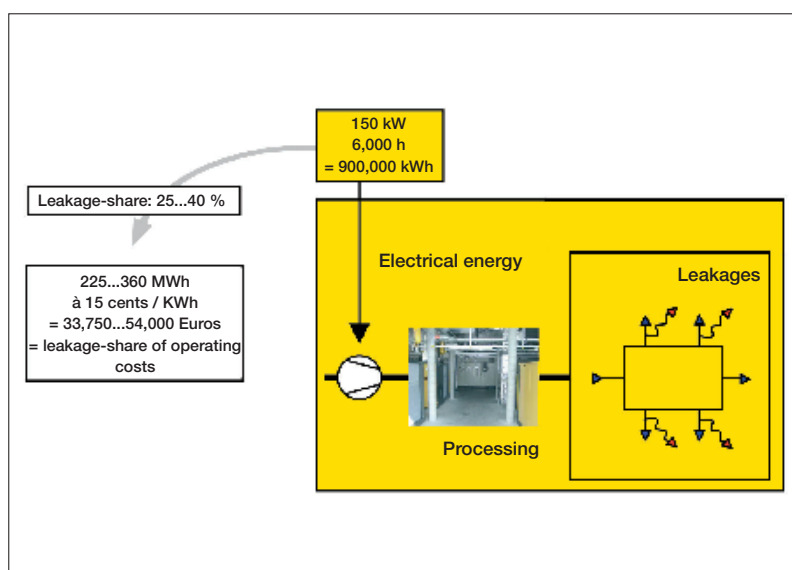
The medium compressed air however, is produced and distributed internally, without knowing how much is used in total and in the individual departments. Without this knowledge, there is no motivation to eliminate leakages or achieve more economical use.



### Leakage - a high cost factor

Independent investigations, for example by the Fraunhofer Institute in the course of the measurement campaign „Compressed air efficiency“, have proven that between 25 and 40% of compressed air produced is wasted through leakage. Leakage holes with a diameter of 3 mm already lead to costs amounting to 3,000 Euro/annum.

If the necessary extra investments are added to the operating costs, the wastage adds up to over 100,000 Euros per year in an average industrial company.

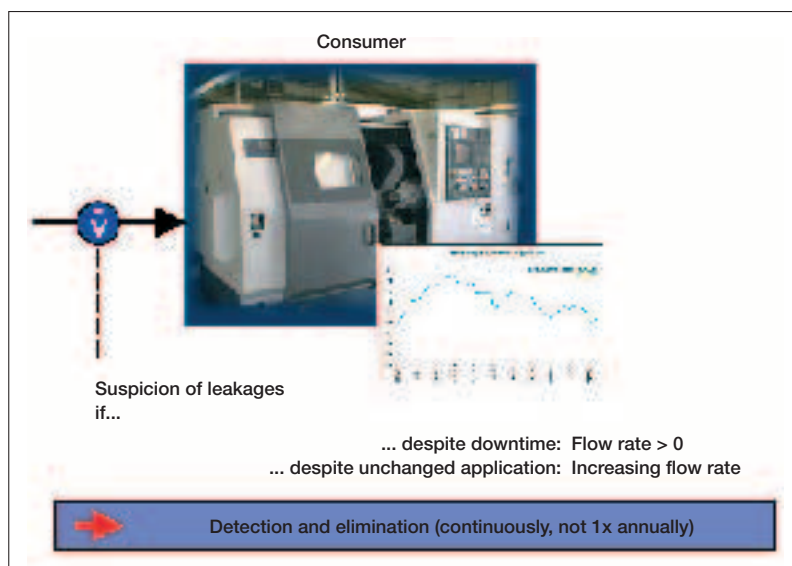


### Leakage detection with the testo 6440

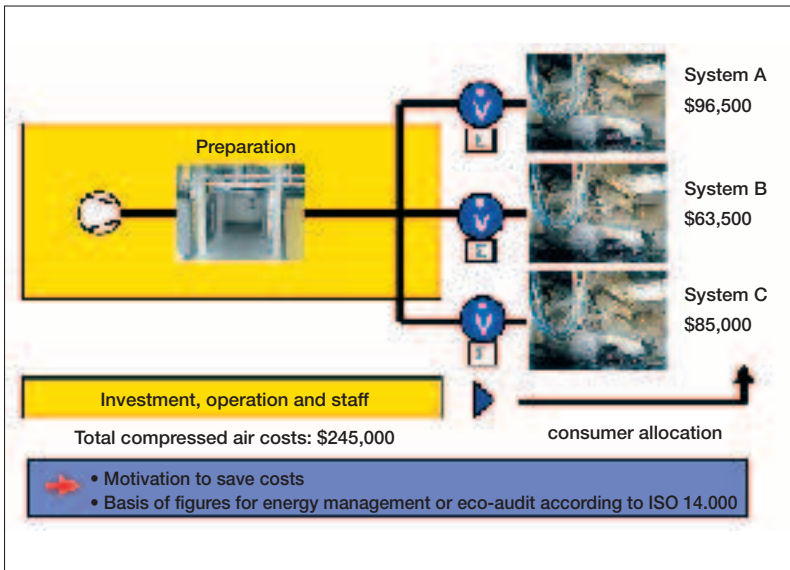
Over 96% of leakages occur in pipes DN50 and smaller. Leaky hoses, fittings, couplings and maintenance units are mainly responsible for this.

Installed in front of a machine or a machine group, the testo 6440 detects the smallest compressed air volume flows. These indicate leakages if they occur when the system is inactive.

It is also an indicator for leakage when known max.-volume flows are exceeded when the user profile is unchanged. The integrated switch outputs of the testo 6440 are thus the best leakage detector in practice.



## Saving compressed air costs with testo 6440

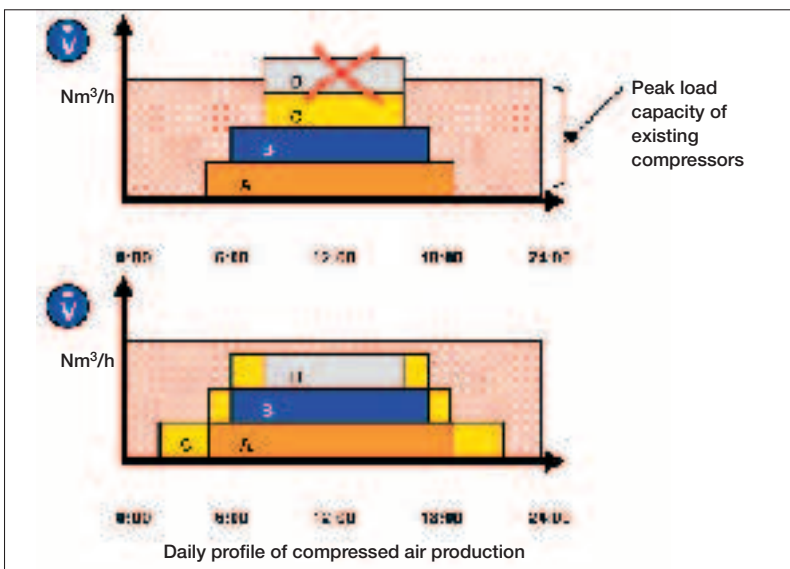


### Lowering costs by consumer-allocation

Compressed air is a profitable, but also very costly energy source. If the high costs are only allocated as a „cost block“, those responsible for the systems have no motivation to try and lower costs.

However, if the compressed air consumption of each system is recorded individually, the person responsible for the system is motivated to reduce leakage and to employ consumption-saving measures.

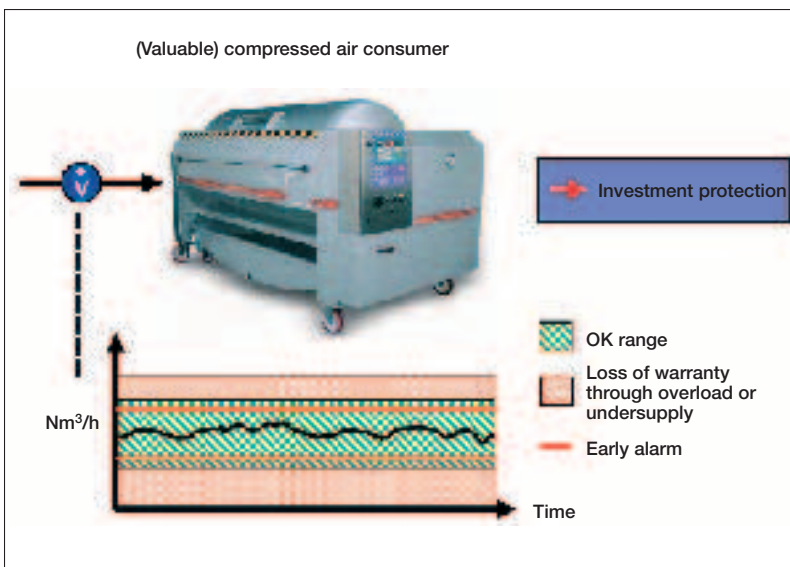
The testo 6440 provides optimal support here, in that it has a built-in totaliser function. The total consumption can be read directly from the instrument or registered in the regulating system via consumption impulses. Consumption-dependant switch outputs are alternatively also available, which can monitor consumption dependently or independently of time.



### Peak load management helps to avoid extended investments

Growth can be expensive: Expanding industrial enterprises (example: new system D) are forced to expand their compressed air production too.

A peak load analysis on the basis of compressed air counters helps to avoid such investments. Since it is known when which consumption occurs, the distribution can be specifically regulated so that the existing capacity of compressed air production is sufficient. The result is considerable savings in the compressors as well as in the pipe system.



### Protecting valuable compressed air consumers from too high or too low supply

Compressed air consumers require a minimal supply in order to provide the desired performance.

Some consumers additionally have to be protected from too high a supply. In some cases, the warranty of the system's manufacturer is even dependent on this.

The testo 6440 performs both tasks optimally thanks to its two switch outputs. For the continuous protection of your investment.

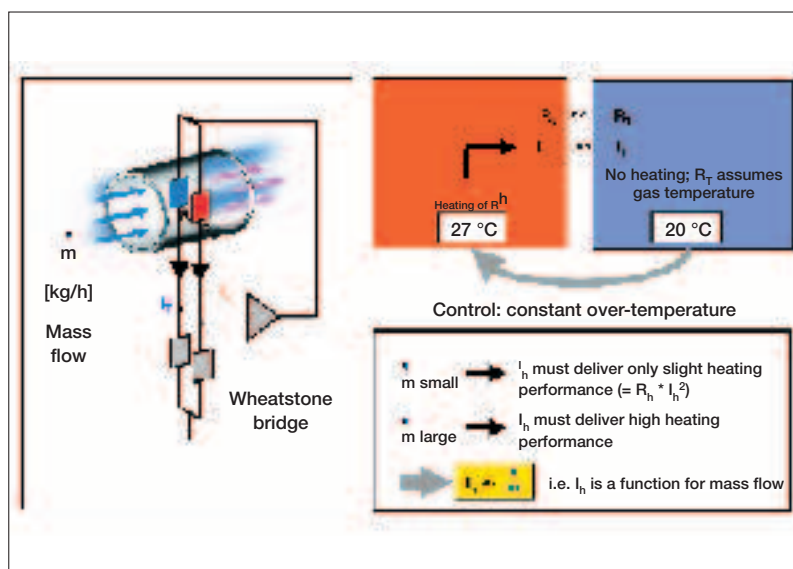
# Compressed air counter testo 6440: The measurement principle

## The optimal measurement principle...

...for compressed air norm volume flow measurement is thermal mass flow measurement. Only this

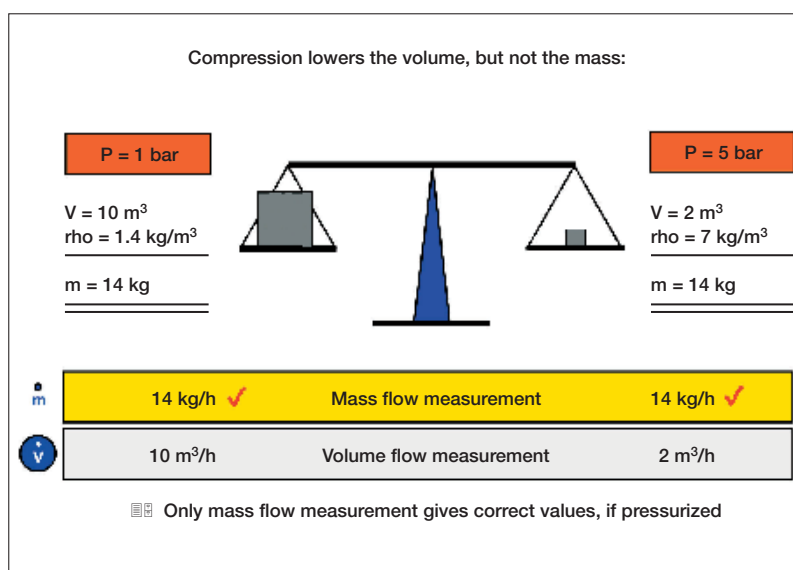
- is independent of process pressure and temperature
- causes no permanent loss of pressure

Two glass-coated ceramic sensors developed specially for demanding compressed air application are exposed to the process temperature and switched with a Wheatstone bridge.



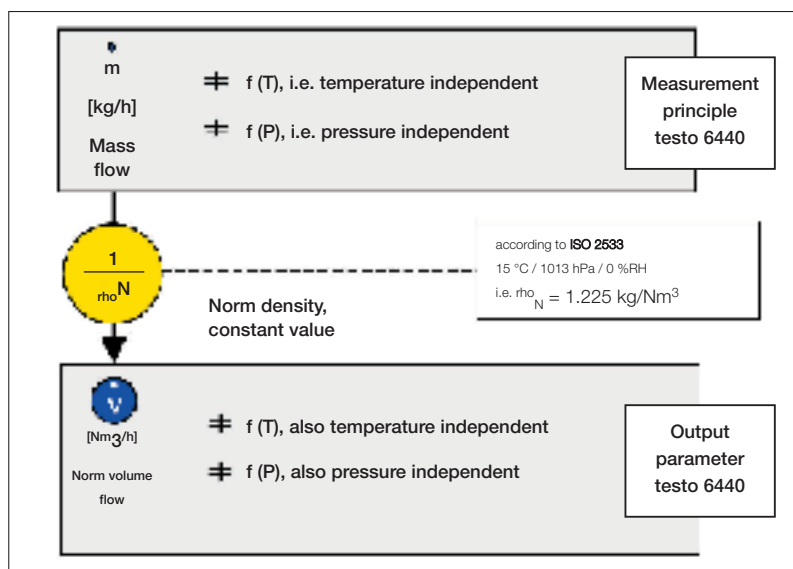
## Why is the measurement of mass flow pressure and temperature independent?

Volume is compressed with rising pressure. The mass, however, remains unchanged, as the adjacent ill. shows. It follows that only mass flow measurement is suitable for use in fluctuating pressure conditions. An influencing by the temperature can also be avoided by means of a compensation. This way, the measurement value can be used optimally in the entire range of process temperature.



## How does mass flow become norm volume flow?

For the compressed air consumer, norm volume flow is the most important flow function. It refers not to the current ambient conditions, but to fixed values; according to ISO 2533, these are the values 15 °C / 1013 hPa / 0 %RH. The testo 6440 divides the mass flow value by the norm density, which is generally 1.225 kg/Nm³. The result is the pressure and temperature independent norm volume flow value. When comparing measurements made with other measurement systems, it must be ensured that all values refer to the same norm conditions; otherwise a conversion calculation is necessary.



## Compressed air counter testo 6440: Instrument and features

Testo offers four compact models for the four most common compressed air DN in industry



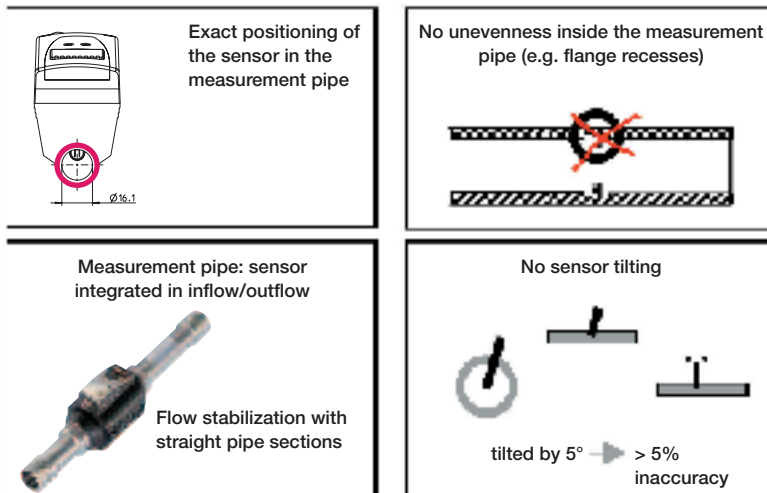
### For all important diameters: the compressed air counter testo 6440

In four diameter sizes, the testo 6440 offers a compact design coupled with integrated high-performance technology, which provides all necessary signal outputs.

The built-in inflow and outflow pipes allow optimum accuracy.

The thermal, glass-coated ceramic sensor offers robustness at the same time as fastest reaction times.

With its superior design, the testo 6440 offers an optimal flow profile



### Superior design from the sensor to the housing

In contrast to the penetration probes used by competitors, the sensor in the testo 6440 has a position in the pipe which is exactly known and always the same. With penetration probes, a tilt out of the vertical of 5° already leads to a measurement inaccuracy of 5%.

In the testo 6440, not only are the inflow and outflow pipes integrated (reduced lengths in DN40/DN50), they also have completely even surfaces (i.e. no flange recesses etc.)

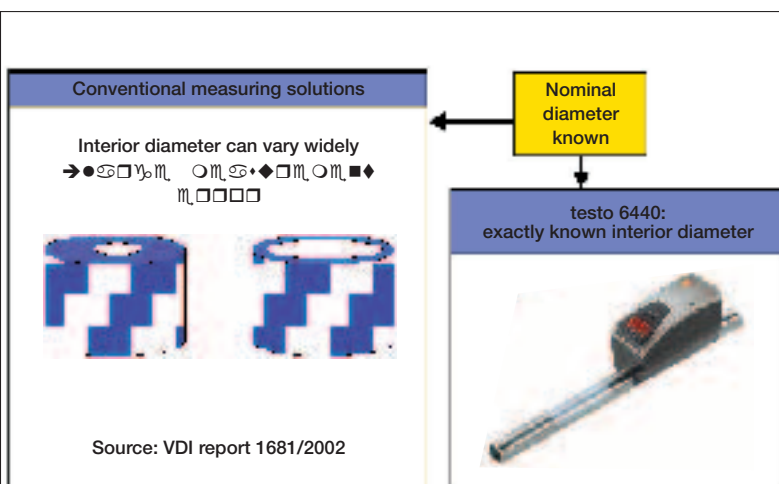
Many clever details in the design of testo 6440 ensure that the flow profile remains constant and that an optimum of accuracy can be achieved.

### Defined interior diameter and volume flow adjustment for highest accuracy

Especially in small diameters, the exact knowledge of the interior diameter plays a deciding part in achieving accurate measurements of norm volume flow.

Commercially available penetration probes measure the flow velocity and calculate the volume flow by multiplication with the cross-section area. As shown in the illustration, even normed pipes can vary in interior diameter to such a degree that inaccuracies of up to 50% are possible.

The testo 6440 has an exactly known diameter – and is adjusted directly according to norm volume flow, and not flow velocity!



# Compressed air counter testo 6440: Operation and signal outputs

## The optimal operation menu: simple - and complete!

You wish to change the physical unit ( $\text{Nm}^3/\text{h}$ ,  $\text{Nm}^3$ ,  $^\circ\text{C}$ )? Signal outputs need to be parameterised? Min./max. values need to be read? The signal is to be dampened or delayed? You want to reset the totaliser? All these functions and many more are combined in one easy-to-use menu.

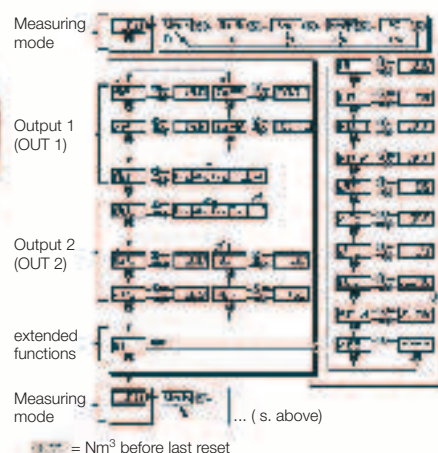
Practice is our yardstick – the LED display is easily legible even in machine halls, it can be rotated by  $180^\circ$ , and the display/operation menu can additionally be switched off or locked.

Simple operation via only 2 operating buttons



Easily legible LED display (Rotatable by  $180^\circ$ )

Menu overview

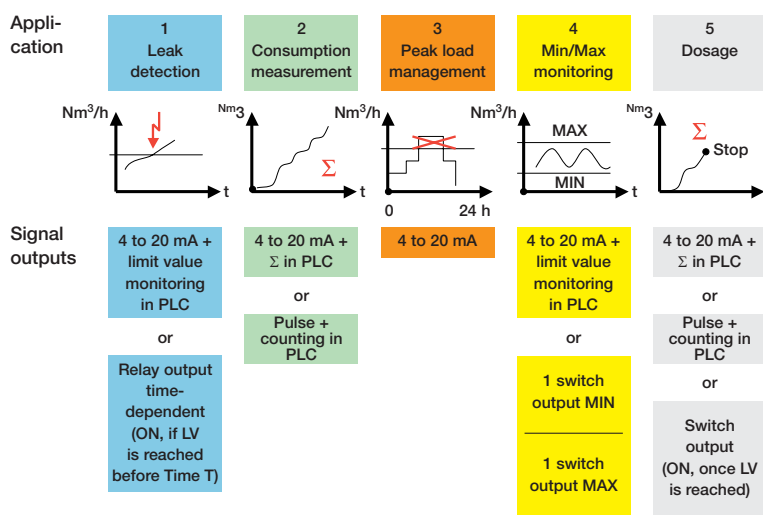


## Highest versatility: testo 6440 offers the required signals for every application

Two signal outputs can be parameterized specific to application (see ill. right and below). This way, all applications can be represented:

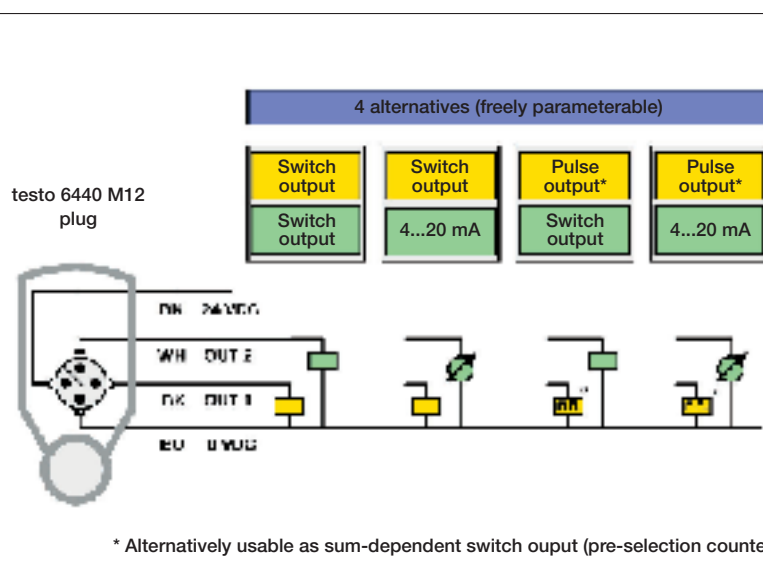
- Consumption measurement (pulse output)
- Consumption monitoring (pre-selection counter, i.e. quantity-dependent switch output, time-dependent or time-independent)
- Leakage monitoring (volume flow-dependent switch output or analog output)
- Flow-through measurement (analog output)

Signal outputs suited to application



## Totaliser without additional evaluation unit

The testo 6440 is equipped with integrated totaliser functions (consumption quantity, e.g. in  $\text{Nm}^3$ ), which can be used either in the display or as pulse outputs or switch outputs. Make the comparison for yourself: other providers need additional, external evaluation units for these important functions. You can save these costly and time-consuming investments and wirings with the testo 6440.





## Compressed air counter testo 6440: Technical data and ordering data / Ordering data

Technical data compressed air counter testo 6440				
	testo 6441	testo 6442	testo 6443	testo 6444
Part no.	0555 6441	0555 6442	0555 6443	0555 6444
Pipe diameter	DN 15 (for 1/2" pipes)	DN 25 (for 1" pipes)	DN 40 (for 1 1/2" pipes)	DN 50 (for 2" pipes)
Measuring range (1:300)	0.25 to 75 Nm <sup>3</sup> /h	0.75 to 225 Nm <sup>3</sup> /h	1.3 to 410 Nm <sup>3</sup> /h	2.3 to 700 Nm <sup>3</sup> /h
Max. display value	90 Nm <sup>3</sup> /h	270 Nm <sup>3</sup> /h	492 Nm <sup>3</sup> /h	840 Nm <sup>3</sup> /h
Measuring stretch: Thread (both sides) / Material (silicon-free)	R 1/2, outer thread Stainless steel 1.4301	R1, outer thread Stainless steel 1.4301	R1 1/2, outer thread Stainless steel 1.4401	R2, outer thread Stainless steel 1.4401
Length measurement pipe	300 mm	475 mm	475 mm (shortened measurement stretches)	475 mm (shortened measurement stretches)
Weight	0.9 kg	1.1 kg	3.0 kg	3.8 kg
Sensor	Thermal glass-coated ceramic sensor			
Accuracy	for compressed air quality classes (ISO 8573: particles – humidity – oil) 1-4-1: ±3% of reading ±0.3% of final value for compressed air quality classes (ISO 8573: particles – humidity – oil) 3-4-4: ±6% of reading ±0.6% of final value			
Reaction time	< 0.1 sec (for damping parameter = 0), delay via operating menu (0 s to 1 s)			
Temperature display	0 to +60 °C, inaccuracy ±2K (32 to +140 °F)			
Display, operation	4-figure alpha-numeric display, two operation buttons, operating menu, LED (4x green for phys. units, 3x yellow for "display x 1,000" or switch status)			
Display units	Nm <sup>3</sup> /h, NI/min, Nm <sup>3</sup> , °C (selected unit displayed by green LED)			
Electrical connection	M12x1 plug, load to 250 mA, short circuit-proof (synchronized), reverse polarity-proof, overload-proof. Testo recommends accessory cable Part no. 0699 3393			
Power supply	19 to 30 VDC, current consumption < 100 mA			
Output signals	Via operating menu, 4 combinations are parameterable			
Pulse output	Consumption meter (value available after reset or power loss due to non-volatile memory), value 1 or 10 Nm <sup>3</sup> (depending on diameter), pulse length 0.02 s to 2 s (depending on unit selected), 24 VDC level			
Analog output	4 to 20 mA (4-wire), max. load 500 Ohm, freely scalable from 0 to end of measuring range			
Switch output	2 switch outputs, parameterable, (dependent on consumption or volume flow, NO contact, NC contact, hysteresis, window), loadable with max. 19 to 30 VDC or 250 mA each, switch status is displayed via 2 LEDs			
Process conditions	0 to +60 °C (32 to +140 °F), PN 16 (max. 16 bar/232 psi), rel. humidity < 90 %RH, air quality ISO 8573: recommended classes 1-4-1			
Ambient temperature	0 to +60 °C (32 to +140 °F)			
Storage temperature	-25 to +85 °C (-13 to +185 °F)			
Resource contact	Materials: stainless steel or zinc coated, PEEK, polyester, viton, anodized aluminium, ceramic			
Housing	PBT (GF 20%), zinc diecast, IP65 / III, silicon-free			
EMC	In accordance with guideline 89/336 EEC			
Standard reference	Standard flow (e.g. Nm/s) and standard volume flow (e.g. Nm <sup>3</sup> /h) are based on DIN ISO 2533, 15 °C, 1013.25 mbar, 0 %RH			

Ordering data	Part no.
testo 6441 Compressed air counter DN 15 / 1/2" *	0555 6441
testo 6442 Compressed air counter DN 25 / 1" *	0555 6442
testo 6443 Compressed air counter DN 40 / 1 1/2" *	0555 6443
testo 6444 Compressed air counter DN 50 / 2" *	0555 6444
Connection cable 5 m long, with M12x1 socket / open wire ends	0699 3393
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555
Customer-specific instrument parameterization, incl. parameterization protocol	0699 5889/1
Compressed air paddle switch for detecting the compressed air flow direction	0699 5913/1
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749
ISO calibration at 5 measurement points, to 250 Nm <sup>3</sup> /h (testo 6441 / 6442)	0520 0174
DKD calibration at 5 measurement points, to 250 Nm <sup>3</sup> /h (testo 6441 / 6442)	0520 0274
ISO calibration at 5 measurement points, to 1600 Nm <sup>3</sup> /h (testo 6443 / 6444)	0520 0184
DKD calibration at 5 measurement points, to 1600 Nm <sup>3</sup> /h (6443 / 6444)	0520 0284

\* a connection cable, e.g. part no. 0699 3393, is required for operation

## Compressed air counter testo 6446/47: for large pipe diameters



### testo 6446 – The convincing standard solution

There are a number of compressed air counters for larger diameters on the market which use a inserted probe. At first glance, these solutions appear attractive because installation is comparatively easy.

However, if the probe is turned by just a few degrees, it causes huge measurement errors. As a result, there are far greater inaccuracies in the field than would appear from looking at the technical data.

Testo has solved this problem with testo 6446: thanks to a mechanically highly accurate measurement block, the thermal sensor is always properly positioned – horizontally, vertically and as regards the tilt angle.



### testo 6447 – With probe removal under pressure

This version offers everything the testo 6446 offers but with probe removal as an extra.

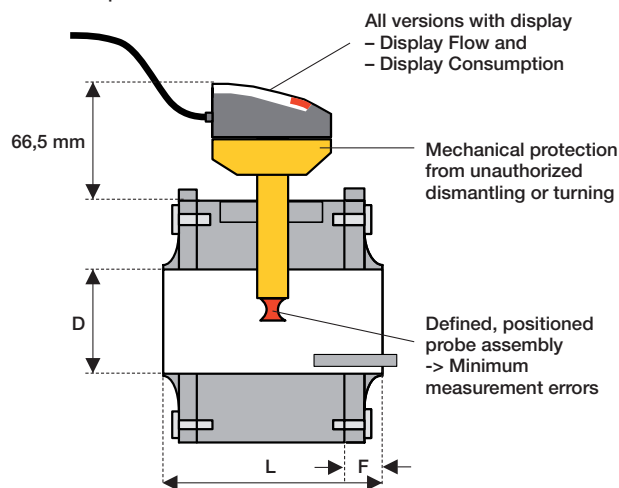
Particularly with large diameters, important compressed air pipelines or even the main line after preparation are involved. System availability is therefore very important. While for this reason for other measurement solutions a bypass is required, in testo 6447 the patented screw connection is simply applied – and the entire sensor including the electronics can be removed, even under pressure.

Recalibration, cleaning, replacement – no system downtime... and that's without a bypass!

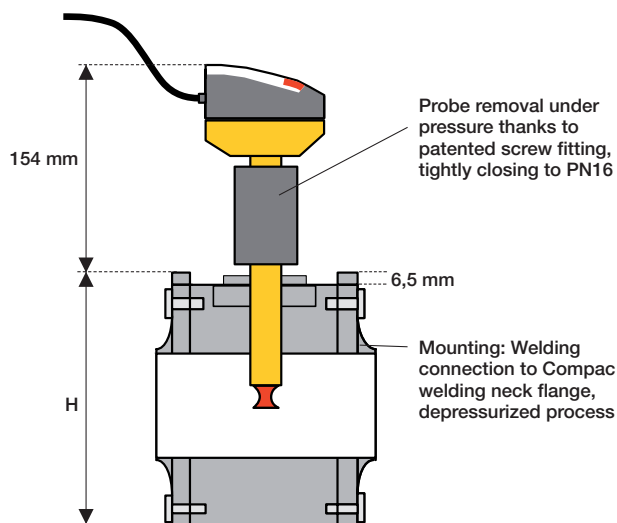
#### 6446

Two outputs can be used simultaneously:

- Pulse output
- Analog output
- Switch output



#### 6447



#### Diameter Data

DN* mm	DN inch	Length Inlet pipe mm (without obstructions)	Length (mm) testo 0699 644x	D mm	F mm	H mm	Length Outlet pipe mm (without obstructions)	Weight (g)*	Pulse value Nm <sup>3</sup> /Pul.	Measurement range Nm <sup>3</sup> /h
65	2½	975	124	70,3	12	125	325	9.300	1	6 to 2.000
80	3	1200	130	82,5	15	141	400	11.560	1	9 to 2.750
100	4	1500	130	107,1	15	165	500	13.740	10	15 to 4.440
125	5	1875	136	131,7	18	205	625	21.620	10	23 to 7.000
150	6	2250	140	159,3	20	235	750	26.400	10	33 to 10.000
200	8	3000	140	207,3	20	290	1000	36.980	10	58 to 17.500
250	10	3750	148	260,4	24	335	1250	49.400	10	92 to 27.500





\*The weights stated refer to testo 6447, for testo 6446, subtract 1000 g.

# Compressed air counter testo 6446/47: Technical data/ordering data

## Technical data of all versions

Sensor	Thermal, glass passivated ceramic sensor
Resource	Compressed air (process conditions, see below), also CO <sub>2</sub> or N <sub>2</sub> on request
Accuracy	for compressed air quality classes (ISO 8573: particle – humidity – oil) 1-4-1: ±3 % of reading ±0.3 % of full-scale value for compressed air quality classes (ISO 8573: particle – humidity – oil) 3-4-4: ±6 % of reading ±0.6 % of full-scale value
Pressure dependency	Does not apply on account of thermal measurement principle (mass flow base)
Temperature dependency	Minimized by stored temperature coefficients
Reaction time	< 0.1 sec (for damping parameter = 0), delay via operating menu (0 s to 1 s)
Temperature display	0 to +60 °C, inaccuracy ±2K (32 to +140 °F)
Display, operation	4-figure alpha-numeric display, two operation buttons, operating menu, LED (4x green for phys. units, 3x yellow for "display x 1,000" or switch status)
Display units	Nm <sup>3</sup> /h, NI/min, Nm <sup>3</sup> , °C (selected unit displayed by green LED)
Electrical connection	M12x1 plug, load to 250 mA, short circuit-proof (synchronized), reverse polarity-proof, overload-proof. Testo recommends accessory cable Part no. 0699 3393
Power supply	19 to 30 VDC, current consumption < 100 mA
Output signals	Via operating menu, 4 combinations are parameterable, cf. page 3
Pulse output	Consumption meter (value available after reset or power loss due to non-volatile memory), value 1 or 10 Nm <sup>3</sup> (depending on diameter), pulse length 0.02 s to 2 s (depending on unit selected), 24 VDC level
Analog output	4 to 20 mA (4-wire), max. load 500 Ohm, freely scalable from 0 to end of measuring range
Switch output	2 switch outputs, parameterable, (dependent on consumption or volume flow, NO contact, NC contact, hysteresis, window), loadable with max. 19 to 30 VDC or 250 mA each, switch status is displayed via 2 LEDs
Process conditions	0 to +60 °C (32 to +140 °F), PN 16 (max. 16 bar/232 psi), rel. humidity < 90 %RH, air quality ISO 8573: recommended classes 1-4-1
Ambient temperature	0 to +60 °C (32 to +140 °F)
Storage temperature	-25 to +85 °C (-13 to +185 °F)
Resource contact	Materials: stainless steel or zinc coated, PEEK, polyester, viton, anodized aluminium, ceramic
Housing	PBT (GF 20%), zinc diecast, IP65 / III
EMC	In accordance with guideline 89/336 EEC
Standard reference	Standard flow (e.g. Nm/s) and standard volume flow (e.g. Nm <sup>3</sup> /h) are based on DIN ISO 2533, 15 °C, 1013.25 mbar, 0 %RH

## Ordering data for Testo Compressed Air Meter

Versions		0699 6446 / ... (standard solution)				0699 6447 / ... (with probe removal under pressure)			
DN* mm	DN inch	Material Steel, Zinc coated		Material Stainless steel		Material Steel, Zinc coated		Material Stainless steel	
65	2½	... / 1		... / 11		... / 1		... / 11	
80	3	... / 2		... / 12		... / 2		... / 12	
100	4	... / 3		... / 13		... / 3		... / 13	
125	5	... / 4		... / 14		... / 4		... / 14	
150	6	... / 5		... / 15		... / 5		... / 15	
200	8	... / 6		... / 16		... / 6		... / 16	
250	10	... / 7		... / 17		... / 7		... / 17	

Order example: A compressed air meter DN 150 with probe removal under pressure and stainless steel has Part no. 0699 6447 / 15

\*Customer-specific diameters between 65 mm and 250 mm are available on request

## Accessories Ordering data

Accessories Ordering data	Part no.	
Connection cable 5 m long, with M12x1 socket / open wire ends	0699 3393	
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553	
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555	
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748	
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749	
Replacement sensor for testo 6446 (incl. ISO calibration certificate, 2-point basis)	0699 6446/31	
Replacement sensor for testo 6447 (incl. ISO calibration certificate, 2-point basis)	0699 6447/31	
Sealing plug for testo 6446	0699 6446/41	
Cable for potential separation, length 5 m	0699 6446/42	
ISO calibration certificate (5 points) for testo 6446/testo 6447 (DN65 to DN250)	0520 0384	
ISO calibration certificate: additional point	0699 6447/22	
DKD calibration certificate: 2-point basis (DN65 to DN250)	0699 6447/23	
DKD calibration certificate: additional point	0699 6447/24	

## Compressed air counter testo 6445

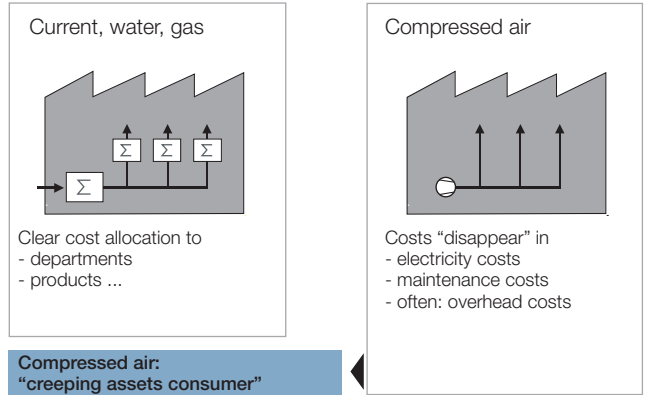
### Application

Why does industry need compressed air counters?

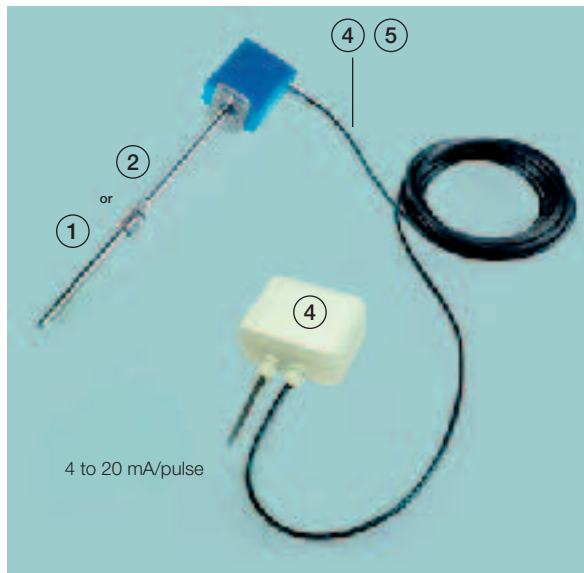
Media such as current, water and gas have complete transparency in every industrial company: main meters reflect the quantities used, while decentralised meters show how consumption is distributed.

Compressed air, on the other hand, is generated internally and distributed without it being known as to how much is consumed in total and in individual areas. Without having this knowledge, however, there is no motivation to repair leaks or to aim for more economical consumption.

In addition, compressed air meters offer the possibility of continuous monitoring for leakage, which accounts for approx. 35 percent of all compressed air consumption.



### Features

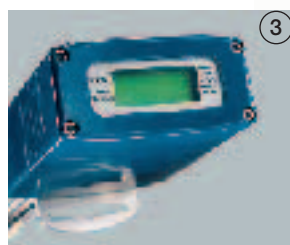


- ① 0699 6445/1 (standard compressed air counter)
- ② 0699 6445/2 (up to 150 Nm/s)
- ③ 0699 6445/3 (display, optional)
  - Totaliser function (volume display)
  - Normalized velocity or vol. flow display
  - Physical units selectable via software [4]
- ④ 0699 6445/4 (distributor box, cable and software)
  - IP 65 distributor box, wall mounting possible
  - RS-232 jack for programming
  - CD with programming software
  - Two cable entries + signal cable (10 m)
  - Internal screw connectors
- ⑤ 0699 6445/5 (10 m cable)

All relevant

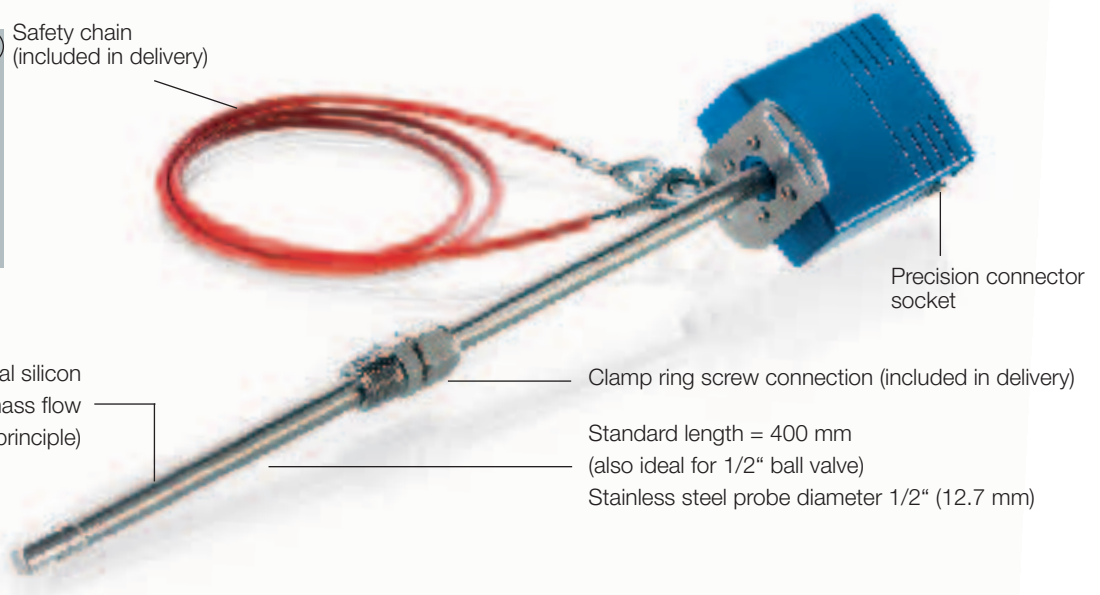
signal outputs on board

- Analog output 4 to 20 mA (4-wire)= normalized velocity value or normalized volume flow value
- Pulse output (consumption)
- Voltage supply 12 to 24 VDC
- RS232 output for parameterisation [4]
- 5-point calibration certificate included (standard)



③ Safety chain (included in delivery)

Robust, thermal silicon chip sensor (mass flow principle)



# Compressed air counter testo 6445

## Selecting a compressed air counter

1

How high is the maximum nominal volume flow in your process?

2

Select appropriate compressed air counter

①

0699 6445/1

4 mA = 0 Nm/s,

20 mA = 80 Nm/s

②

0699 6445/2

4 mA = 0 Nm/s,

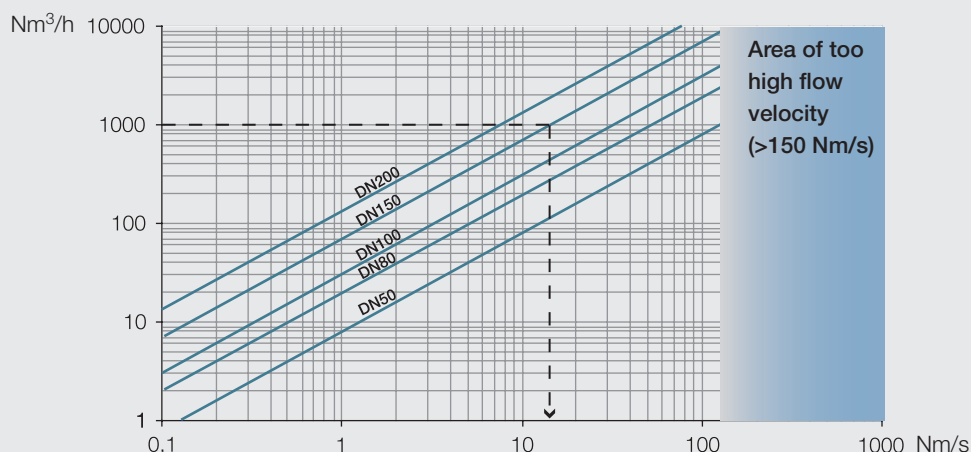
20 mA = 150 Nm/s

### Example

At 1000 Nm<sup>3</sup>/h and with a nominal pipe diameter of DN150, a flow velocity of approx. 15 Nm/s follows. Here, the standard version 0699 6445/1 (up to 80 Nm/s) can be used. Select model 0699 6445/2 between 80 and 150 Nm/s.

### Caution!

The respective nominal diameter was used as the internal diameter in the calculation



## Mechanical assembly

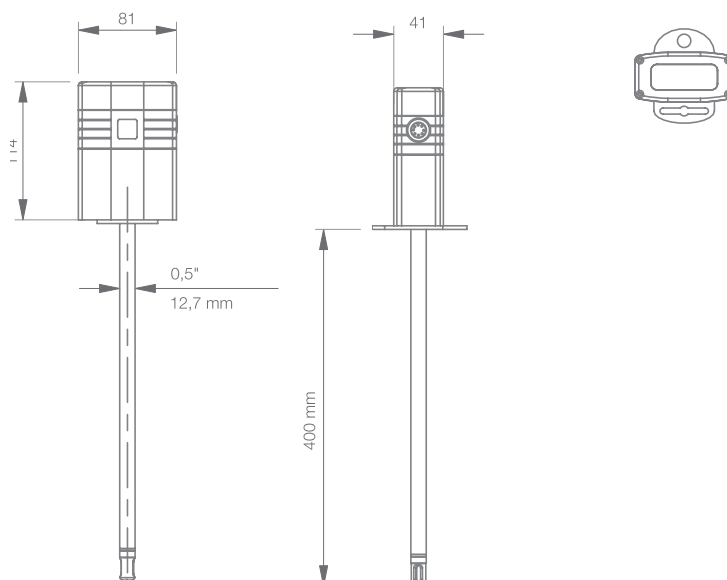
(Observe the operating instructions! These are only brief schematic instructions)

1. Observe straight pipe lengths for upstream/downstream obstacles 20x DN (upstream), 5x DN (downstream)
2. Any desired installation position allowed; min. 2 Nm/s with vertical pipes
3. Depressurize pipe
4. Install the 1/2" clamp ring screw-connection or a 1/2" ball valve
5. Measure the pipe internal diameter for conversion later on:

$$\text{Flow velocity (Nm/s)} \times \frac{\pi}{4} \times (\text{internal diameter})^2 \times \text{blocking factor} = \text{volume flow [Nm}^3\text{/s]}$$

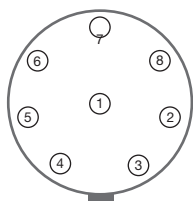
6. Guide in probe up to the middle of the pipe
7. Align exactly; observe volume flow direction arrow
8. Safeguard with clamp screw connection and safety chain

## Dimensions



## Electrical connection

Illustration of socket assignment on instrument (precision connector socket)



Signal	Wire colour	Colour	Contact
0 Volt	Brown		2
+12 to 24 Volt	Red		8
RX	White		1
TX	Green		3
4 to 20 mA -	Blue		7
4 to 20 mA +	Yellow		4
Pulse +	Orange		6
Pulse -	Grey		5
Shield	-		x



## Compressed air counter testo 6445

### Technical data

Sensor	Thermal silicon chip sensor, mass flow principle
Media	Compressed air, air, nitrogen, non-corrosive gases (attention: not approved for use in explosive areas)
Display	Optional, order no. 0699 6445/3, two-line
Measuring range	0 to 80 Nm/s, min. 1 Nm/s (0699 6445/1) or 0 to 150 Nm/s, min. 2 Nm/s (0699 6445/2)
Accuracy	+/- 3 % of reading +/- 0.4 % of final value
Pressure dependency	Measuring principle independent of pressure (mass flow measurement). For flow rates < 10 Nm/s: pressure influence 0.3 % of reading per bar
Temperature dependency	Compensated at 25 °C (+77 °F), for deviating temperatures: 0.1 % of reading/Kelvin
Response time	t <sub>90</sub> approx. 5 seconds
Voltage supply	12 to 24 VDC +/- 10 %, power consumption < 100 mA (starting current briefly 500 mA)
Electrical connection	Precision plug connection for distributor box, (0699 6445/4) or for cable (0699 6445/5)
Analog output	4 to 20 mA = 0 to 80 Nm/s or 0 to 150 Nm/s, 4-wire, max. load = 500 W, max. length 250 m (use shielded cable!)
Pulse output	Floating contact, 12 to 24 V DC switching voltage from external meter, corresponding to S0 meter signal (DIN 43864). Pulse rate is preset, depending on the internal diameter
Digital output	RS232, max. cable length 15 meters, easily accessible in conjunction with distributor box 0699 6445/4
Process conditions	0 to +50 °C/32 ... +122 °F (ideal at 20 to 30 °C), PN 16 (max. 16 bar/232 psi), rel. humidity < 90 % RH (no remaining effect after re-drying), air quality (ISO 8573: Classes 1/4/1)
Ambient temperature	-10 to +60 °C (-14 ... +140 °F)
Storage temperature	-40 to +80 °C. Avoid ice build-up (-40 ... +176 °F)
Normalization reference	Standard flow velocity (e.g. Nm/s) and normalized volume flow (e.g. Nm³/h) are in reference to DIN ISO 2533, 15 °C, 1013.25 mbar, 0 %RH
Weight	Compressed air counter: 840 g, display: 140 g, 10 meter cable: 640 g, clamping screw connection: 100 g
Housing	Aluminium, enamelled. IP 65, however only permitted for use in indoor installations
EMC	EN 50082-1

### Ordering data

Compressed air counter	Part no.
① Compressed air counter to 80 Nm/s	0699 6445/1
② Compressed air counter to 150 Nm/s	0699 6445/2
Accessories	Part no.
③ Display with sum indicator (directly on compressed air counter), order together with no. 1 or 2	0699 6445/3
④ Distributor box for programming (via RS232), with software CD and 10 m of cable	0699 6445/4
⑤ 10 m cable with precision plug connection (in instrument)	0699 6445/5
⑥ Parameterisation in factory, according to the adjusted inner diameter (please state physical units and inner diameter)	0699 6445/6
Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC	5400 7553
Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display	5400 7555
Customer-specific instrument parameterization, incl. parameterization protocol	0699 5889/1
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749
ISO calibration certificate (5 points) for testo 6446/testo 6447 (DN65 to DN250)	0520 0384

### Further options (on request)

Calibration in technical gases (e.g. CO <sub>2</sub> , argon, nitrogen etc.)
Version for low flow velocity (max. 20 Nm/s) or higher pressures (<16 bar)
Probe lengths 300 or 600 mm
Cable input instead of precision connector on compressed air meter

### Product and accessories selection aid

Customer request	Products 0699 6445/..	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
0 to 80 Nm/s		●	●	●				●	●		
0 to 150 Nm/s					●	●				●	●
without display		●		●	●		●		●		●
with display			●			●		●		●	
4 to 20 mA = flow velocity (Nm/s)		●	●	●	●	●	●	●	●	●	●
4 to 20 mA = Norm volume flow (Nm³/h)		●	●	●	●	●	●	●	●	●	●
Pulse output for ext. counters			●	●		●	●	●	●	●	●
Customer-perf. parameterisation			●	●		●	●				
Parameterisation in factory								●	●	●	●

● Example order:  
Compressed air meter 0 to 150 Nm/s with display; one analog output with parameters velocity or volume flow; pulse output; customer-performed parameterisation.  
Order no.: 0699 6445/2 + 0699 6445/3 + 0699 6445/4

● If 0699 6445/4 is ordered, the customer can additionally perform a totaliser reset or enter the correct internal diameter

## Direction switch for loop pipelines



Compressed air paddle switch for detecting the compressed air flow direction

**Part no.** 0699 5913/1

### The suitable accessory for directional information in compressed air pipes

This compressed air paddle switch 0699 5913/1 is used for detecting the flow direction, e.g. especially for the measurement of compressed air consumption in ring pipes.

The directional information in the form of a switch contact is passed on to a control or building control system, which then, in combination with the volume flow information of the tesro 6440, decides whether the cumulative consumption should be added or subtracted.

- For pipe cross-sections: DN ½", ¾", 1", 1 ¼", 1 ½" and 2" (can be shortened by customer)
- Temperature range: -40 to 60 °C (-40 to +140 °F)
- Maximum pressure: 50 bar (725 psi)
- Process thread: ½" NPT outer thread (brass)
- Switch type: hermetically shielded reed contact adjustable in the application range to working and resting contact position
- Electrical data: 1.5 A at 24 VDC, single-pole reed switch
- Connection via wiring housing, polycarbonate with cable screw fitting M16 x 1.5 mm2 max. connection cross-section of the wires
- Easy installation

## Stationary temperature measurement

### Building climate under control – operating costs under control



Jochen Kern,  
Product Manager  
Stationary  
Measurement  
Technology

During the development, manufacture and storage of products, the correct room climate is very important for optimum product quality. In times of rising energy prices and

diminished resources, you need to pay increasing attention to operational costs. A precisely adjusted air conditioning and ventilation system saves energy and operating costs.

With the new Testo transmitters, you can measure humidity, temperature and differential pressure with a high level of accuracy and long-term stability – providing the basis for the efficient regulation of your system!



The temperature transmitter testo 6920 offers a broad selection of temperature sensors



Using the target value regulator, an ideal room temperature can be set



Via the external interface and the P2A software, the measurement data can be analyzed and the transmitter adjusted



## testo 6920 – Temperature transmitter for use in building climate

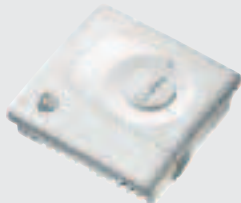
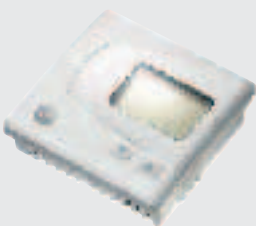
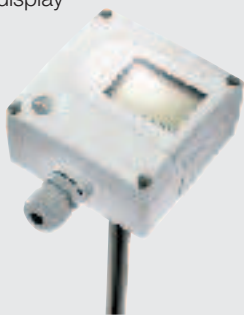



### testo 6920 – Overview of features and advantages

- Optional external interface for parameterization, analysis and adjustment using the P2A software
- 2 housing versions for application as a wall or duct version
- Optional display
- Optional set-point adjuster with adjusting range 10 to 32 °C/50 to 90 °F or - ... 0 ... +
- Temperature available as an analog or passive output

### Areas of application:

- Industrial and commercial buildings, e.g. in production and storage
- Offices and administrative buildings
- Sales areas and exhibition halls
- Museums and libraries
- School buildings, hotels, clinics etc.

Instrument versions testo 6920		Overview of instrument features	
Wall version with target value setter	Wall version with display and buttons	<p><b>Properties</b> - easy operation via P2A software and fast on-site adjustment</p> <p><b>Measurement sensor</b> wide selection of temperature sensors (Pt100/1000, NTC, NI1000)</p> <p><b>Measuring range</b> 0 to +70 °C (active without display) 0 to +50 °C (active with display) -20 to +70 °C (passive sensors)</p> <p><b>Outputs</b> 4 to 20 mA (<math>\pm 0.05</math> mA) 0 to 1 VDC (<math>\pm 2.5</math> mV) 0 to 5 VDC (<math>\pm 12.5</math> mV) 0 to 10 VDC (<math>\pm 25</math> mV) passive output optional</p>	
			
Duct version with display	Duct version without display		
			

Find the humidity transmitter testo 6621 and the differential pressure transmitter 6321 on pages 11 and 70.



## Temperature transmitter testo 6920

The following options can be specified for the testo 6920:

AXX	Version	GXX	Unit
BXX	Analog output/supply	KXX	Language of the instruction manual (for bilingual paper instruction manual)
CXX	Display	WXX	Set-point adjuster
EXX	Housing colour		
SXX	Interface		

Part no. 0555 6920    Axx Bxx Cxx Exx Sxx Gxx Kxx Wxx

A01 Wall version IP30  
A02 Duct version IP65

B01 4 to 20 mA (2-wire, 24 V DC)  
B02 0 to 1 V (4-wire, 20 to 30 V AC/DC)  
B03 0 to 5 V (4-wire, 20 to 30 V AC/DC)  
B04 0 to 10 V (4-wire, 20 to 30 V AC/DC)  
B21 Pt 100 class A passive  
B22 Pt 100 class B passive  
B23 Pt 1000 class B passive  
B24 NI1000 passive  
B25 NTC 5 kohm passive  
B26 NTC 10 kohm passive

C00 Without display  
C01 With display (only for B0x)

E02 Housing colour pure white (RAL9010) without logo  
E03 Housing colour pure white (RAL9010) b&w testo logo

S00 Without external interface  
S01 With external interface (only for B0x)

G00 No unit (only for B2x)  
G01 Temperature (°C) (only for B0x)  
G02 Temperature (°F) (only for B0x)

K01 German/English IM  
K02 French/English IM  
K03 Spanish/English IM  
K04 Italian/English IM  
K05 Dutch/English IM  
K06 Japanese/English IM  
K07 Chinese/English IM

W00 Without set-point adjuster  
W01 With set-point adjuster 10 to 32 °C  
(only for A01 B0x .. G01)  
W02 With set-point adjuster 50 to 90°F  
(only for A01 B0x .. G02)  
W03 With set-point adjuster -..0..+  
(only for A01 B0x C00)  
W04 With set-point adjuster 5k, 10 to 32 °C  
(only for A01 B2x)  
W05 With set-point adjuster 5k, 50 to 90°F  
(only for A01 B2x)  
W06 With set-point adjuster 5k, -..0..+  
(only for A01 B2x)  
W07 With set-point adjuster 10k, 10 to 32 °C  
(only for A01 B2x)  
W08 With set-point adjuster 10k, 50 to 90°F  
(only for A01 B2x)  
W09 With set-point adjuster 10k, -..0..+  
(only for A01 B2x)

### Example:

Order code for testo 6920 transmitter with the following options:

- Duct version IP65
- Analog output Pt 100 class B passive
- Without display
- Housing colour pure white (RAL9010) without logo
- Without external interface
- No unit
- Language of instruction manual German/English
- Without set-point adjuster

→ 0555 6920 A02 B22 C00 E02 S00 G00 K01 W00

# Technical data testo 6920

## Technical data

Parameters	testo 6920 - A01 (wall version)	testo 6920 - A02 (duct version)
<b>Temperature</b>		
Meas. range	0 to +70 °C / +32 to +158 °F	-20 to +70 °C / -4 to +158 °F
Accuracy	±0,5 °C / 0,9 °F	
Selectable units	°C / °F	
Sensor	5 kΩ NTC (active) Pt 100 class A looped through (passive) Pt 100 class B looped through (passive) Pt 1000 class B looped through (passive) NI 1000 looped through (passive) 5 kΩ NTC looped through (passive) 10 kΩ NTC looped through (passive)	

Inputs and outputs		
Analog outputs		
Number of channels	2 channels (temperature)	
Output type	4 to 20 mA (2-wire) 0 to 1/5/10 V (4-wire)	
Meas. cycle	1/s	
Accuracy of analog outputs	4 to 20 mA ±0.05 mA 0 to 1 V ±2.5 m 0 to 5 V ±12.5 mV 0 to 10 V ±25 mV Resistance value of the temperature sensor (passive)	
Supply		
Voltage supply	20 to 30 VDC/VAC 24 VDC ±10 %	
Current consumption		
Output	Supply voltage [V]	Current consumption [mA]
2-wire current 4 to 20 mA	20	20
	24	20
	30	20
4-wire voltage 0 to 10 V	24	7
	30	7
	20	20
	24	22
	30	28

<b>Operating conditions</b>	
Electronics temp. (housing) (with/without display)	Without display: 0 to +70 °C/ +32 to +158 °F (A01) With display: 0 to +50 °C / +32 to +122 °F(A01) Without display: -20 to +70 °C / -4 to +158 °F With display: 0 to +50 °C / +32 to +122 °F
Storage temperature	-40 to +70 °C / -40 to +176 °F
Measuring medium	Air in air-conditioning systems or air-conditioned rooms

		testo 6920 – A01 (Wandvariante)	testo 6920 - A02 (duct version)
General			
Housing			
Material/colour	ABS, pure white (RAL 9010)		
Dimensions	81 x 81 x 26 mm / 3,19 x 3,19 x 1,03"	81 x 81 x 42 mm / 3,19 x 3,19 x 1,66" without probe shaft	
Weight	80 g	160 g	
Display			
Display	1-line, 7-segment		
Resolution	0,1 °C / 0,1 °F		
Operation			
Nominal value adjusting range	10 to 32 °C / 50 to 90 °F / - to 0 to + or via the keys (C01 with W01 or W02) or via P2A (optionally via external interface)		
Assembly			
Cable screw connection	None (cable routed through rear wall opening or  break-out opening on bottom)	1 x M16 x 1.5	
Miscellaneous			
Protection class	IP 30	IP 65	
EMC	According to EC Directive 89/336 EEC, EN 60730-1		

## Stationary temperature measurement

### No competent customer service without consultation!



Roland Lohrer,  
Leiter Complete  
Customer  
Solutions

Testo of course manufactures standard measurement transmitters and temperature probes which are self-explanatory, but our experience is often helpful in finding the

specifically right solution.

Speak to us about your individual product wishes



Surface temperature with  
special cross-band



Screw-in temperature  
probe for use in burners  
and boilers in heating  
systems



Because of the wide range of types, finding the right temperature probe to meet the demands of the process quickly and easily, is usually very difficult.

The selection help "Testo celsius" on Testo's homepage solves this problem in a particularly customer-friendly way, by guiding the user through the selection possibilities with simple questions.

The configurator can be found at [www.testo-celsius.com](http://www.testo-celsius.com)

Just click in!



## Selecting the right type of standard probe

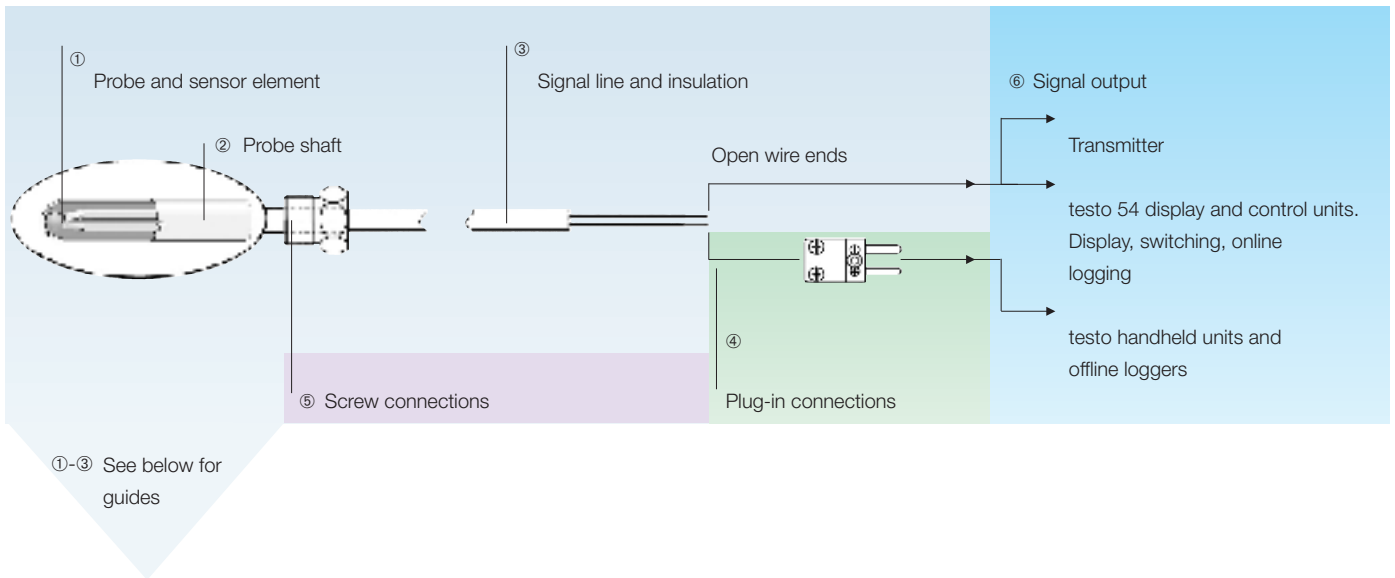
Testo offers a wide range of standard temperature probes. Use the characteristics listed below to choose the one that is suitable for your process media:

in air	in gases	in liquids	on surfaces
<p>in air</p>	<p>in gases</p>	<p>in liquids</p>	<p>on surfaces</p>
<p>non-aggressive gases</p>	<p>aggressive media</p>		
<p><b>Type 04</b> (p. 104) <b>Process temperature probe</b>, fixed line connection, very small probe shaft diameter possible.</p>	<p><b>Type 09</b> (p. 106) <b>Sheathed thermocouple probe</b>, with TC connector for extremely rapid temperature recording. Probe material Inconel</p>	<p><b>Type 02</b> (p. 104) <b>Cable probe</b>, probe shaft diameter 3 mm, connected directly to the signal line.</p>	<p><b>Type 15</b> (p. 108) <b>Screw-on surface TC probe</b> (metal ring) thermocouple Type K</p>
<p><b>Type 11</b> (p. 106) <b>Robust process temperature probe</b>. Connected via plug-in connection (connector Tmax 80 °C/176 °F)</p>	<p><b>Type 10</b> (p. 106) <b>Robust process temperature probe</b> with precision coupling (Tmax. 200 °C/392 °F).</p>	<p><b>Type 03</b> (p. 104) <b>Cable probe</b>, probe shaft diameter 6 mm, connected directly to the signal line.</p>	<p><b>Type 17</b> (p. 108) <b>Rapid-response surface probe</b> (cross-band with probe shaft), thermocouple type K, also for rough surfaces</p>
<p><b>Type 20</b> (p. 110) <b>Ambient temperature probe</b>, plastic housing (also available with integrated transmitter)</p>	<p><b>Type 08</b> (p. 104) <b>Immersion probe</b> for extremely aggressive media, probe shaft and line insulation PFA Tmax. 260°C/500 °F, IP 67</p>	<p><b>Type 04</b> (p. 104) <b>Cable probe</b>. Fixed line connection, very small probe shaft diameter</p>	<p><b>Type 18</b> (p. 108) <b>Robust surface probe</b> (cross-band), with thread M12x1, thermocouple Type K, also for rough surfaces</p>
<p><b>Type 23</b> (p. 110) <b>Air duct temperature probe</b></p>	<p><b>Type 14</b> (p. 108) <b>Screwed probe</b> (thread at front) for hard-to-reach measuring points. Pressure-tight up to 500 bar (7252 psi)</p>	<p><b>Type 06</b> (p. 104) <b>Immersion probe</b> with connecting head, not for use as transmitter (connection clamps to loop through signal)</p>	<p><b>Type 19</b> (p. 110) <b>Magnetic surface probe</b> (cross-band) with PTFE handle, thermocouple Type K, also for rough surfaces</p>
<p><b>Type 24</b> (p. 110) <b>Cold store and storage room temperature probe</b>, with terminals in IP65 housing</p>		<p><b>Type 12</b> (p. 106) <b>Immersion probe</b> with screw thread M8x1, metal precision plug-in coupling (Tmax. 200°C/392 °F), pressure-tight to 500 bar.</p>	<p><b>Type 21</b> (p. 110) <b>Rapid-response surface probe</b> (cross-band) flush front thread M 14x1.5 with lock nuts, thermocouple Type K, also for rough surfaces</p>
		<p><b>Type 13</b> (p. 106) <b>Robust immersion probe</b> with thread M8x1, plug-in connection secured by means of thread, connecting line (Tmax. 80 °C/176 °F), pressure-tight to 500 bar.</p>	

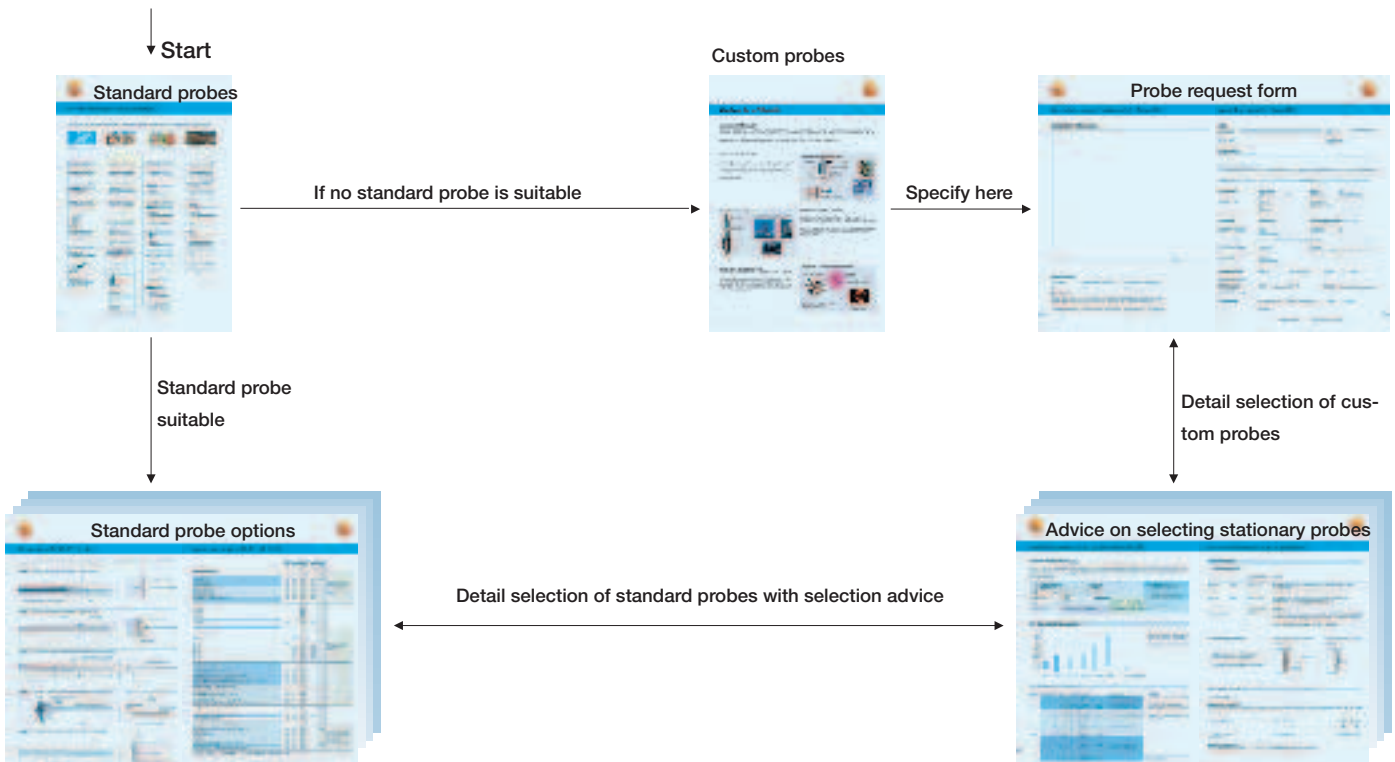
## Selection of the probe components and output devices

This brochure will help you find the right solution quickly. The entire measurement process (from probe to signal output/display) has been broken down into six components (1-6), as the following graphic shows. Each component is assigned a colour that is always used for that component throughout the brochure.

### The six components of the temperature probe solution:



### ①-③ Guides: The quickest way of finding the right solution for components 1, 2 and 3



## Custom temperature probes

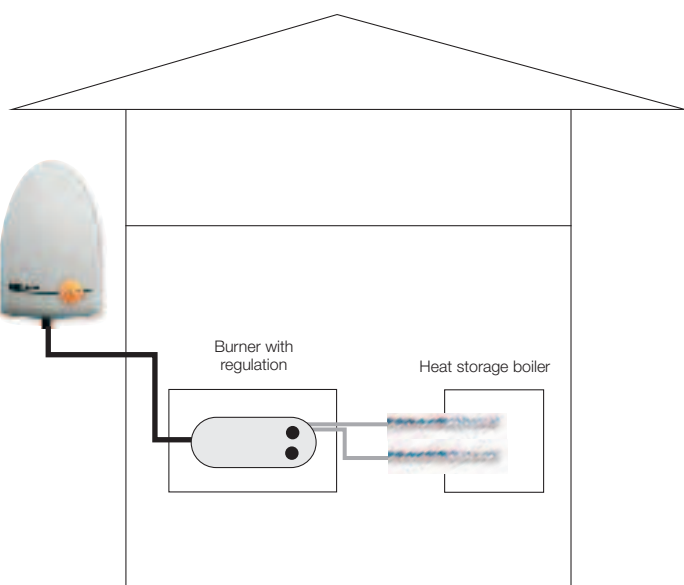
### Custom temperature probes

Do none of the standard temperature probes shown meet your requirements? Or do you already have a clear idea of what your solution should look like? Then open the flap behind page 87 (probe enquiry). Your selection will be assisted by the help and advice offered on pages 84-87. Return the completed probe enquiry to our specialists or ask for advice from our sales team. We will design the stationary probe to your specific measuring requirement. Some examples are shown on this page.

### Example from mechanical engineering

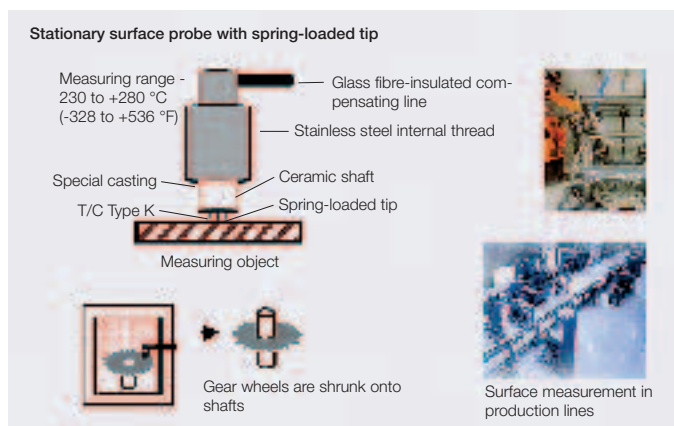
In order to create a secure fitting between a gear wheel and a shaft, the gear wheel is heated in a furnace until it has reached a certain temperature. The gear wheel is then fitted onto the shaft, to which they remain securely joined after cooling down (so-called shrink fit). During this process, the temperature of the gear wheel is checked, for example using a temperature probe attached to a robot arm, in order to achieve optimum results.

The spring-loaded tip of the probe ensures optimal contact.



### Example from automotive engineering

Recording the temperature of brake disks during travel demands very robust materials. It is also extremely important to have excellent contact with the measuring object so that the actual temperature is recorded. This requirement is met optimally by soldering the thermocouple wire into a nickel turned part by means of a flush front solder.



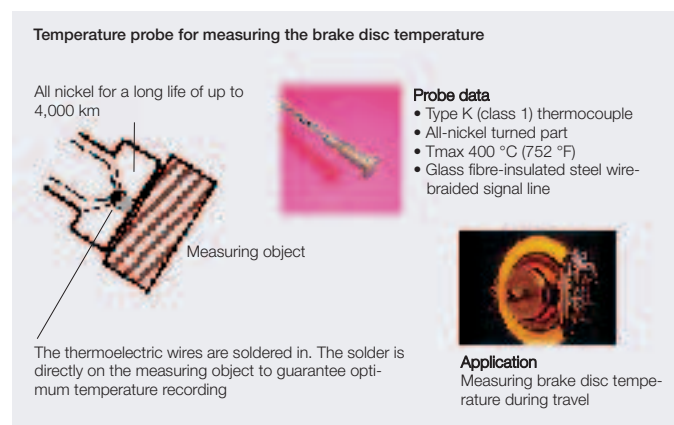
### Example from heating system construction

The regulation and control of a heating system takes place via a temperature comparison. Put simply, the outside temperature and the boiler temperature are compared to one another. Depending on the value recorded, a pump, burner or mixer is switched on or off, for example.

But how does the regulator know which boiler temperature needs to be reached at which outside temperature? The regulator uses a defined „heating curve“. This determines which boiler temperature must be reached depending on the outside temperature measured. This heating curve thus enables the regulator to judge whether the boiler temperature is too high or too low, in which case a reaction then follows, e.g. the burner fires or is switched off, a pump is switched on, etc.

The **testo probe Type 03** is used to measure the water temperature in the heat storage boiler.

The **testo probe Type 20** measures the outside air temperature.



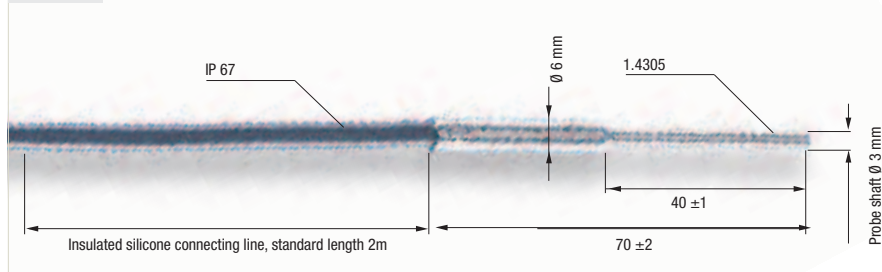
Temperature probe for measuring brake disc temperature

0699 3472

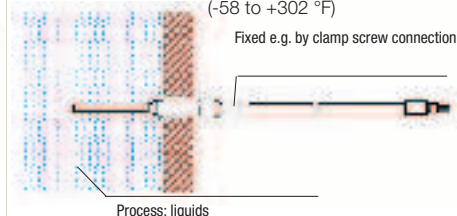
## Overview of probe types 02 / 03 / 04 / 06 / 08

Standard temperature probes can be tailored to your own specific measuring requirements. Just choose the relevant options. You can use the selection assistance to help you choose the options.

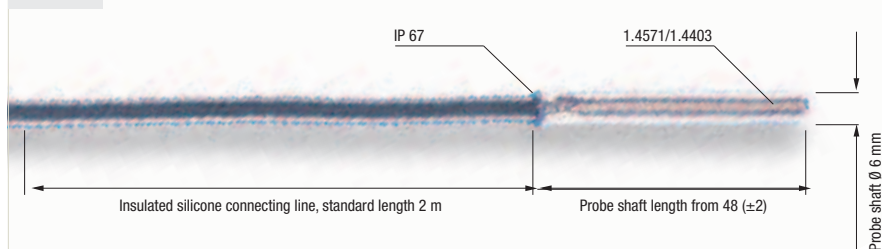
**Type 02** Cable probe, probe shaft (Ø 3 mm), connected directly to the line



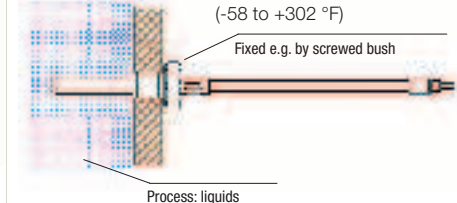
Temperature range: Pt100/Type K/Type J:  
-50 to +180 °C  
(-58 to +356 °F)  
NTC: -50 to +150 °C  
(-58 to +302 °F)



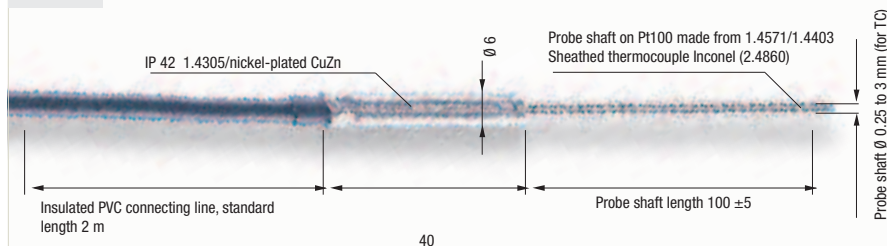
**Type 03** Cable probe, probe shaft (Ø 6 mm), connected directly to the line



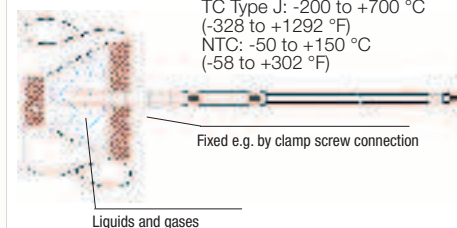
Temperature range: Pt100/Type K/Type J:  
-50 to +180 °C  
(-58 to +356 °F)  
NTC: -50 to +150 °C  
(-58 to +302 °F)



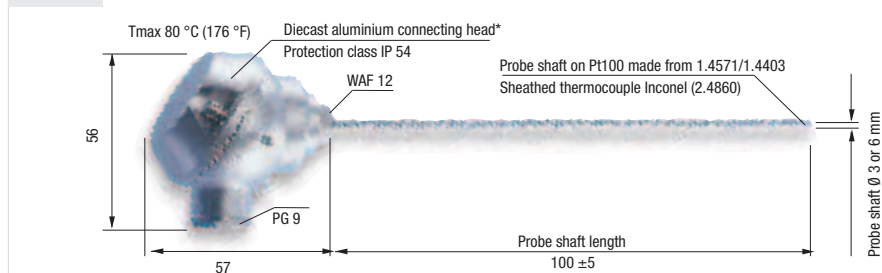
**Type 04** Process temperature probe, probe shaft (Ø very small), connected directly to the line



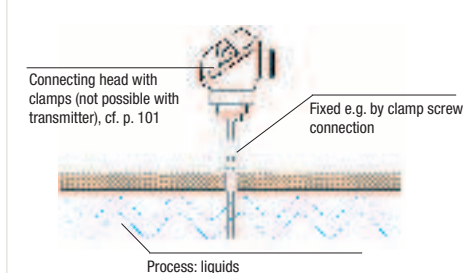
Temperature range: Pt100: -50 to +400 °C  
(-58 to +752 °F)  
TC Type K: -200 to +1200 °C  
(-328 to +2192 °F)  
TC Type J: -200 to +700 °C  
(-328 to +1292 °F)  
NTC: -50 to +150 °C  
(-58 to +302 °F)



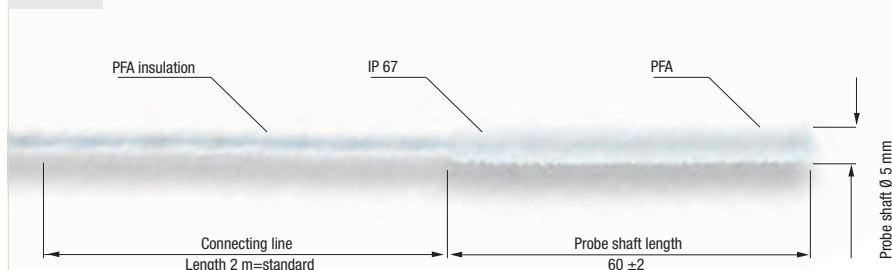
**Type 06** Immersion probe for monitoring in containers, pipelines etc., with connecting head



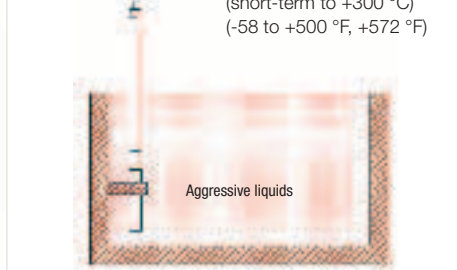
Temperature range: cf. Type 04



**Type 08** Immersion probe for extremely aggressive media, max. temperature +260 °C (+500 °F), IP67



Temperature range: Pt100: -50 to +260 °C  
(short-term to +300 °C)  
(-58 to +500 °F, +572 °F)



## Ordering information for types 02 /03 /04 /06 /08

Selection advice: Light-blue fields cannot be combined with dark-blue fields	Order no.					
	6000 0000 Type 02	6000 0000 Type 03	6000 0000 Type 04	6000 0000 Type 06	6000 0000 Type 08	
<b>Measuring sensors:</b>						Please refer to page 116 for more information on measuring sensors and ranges.
Pt100 class B	A 01	A 01	A 01	A 01	On request	
Pt100 class A	A 02	A 02	A 02	A 02	A 02	
Pt100 1/3 class B	A 03	A 03	A 03	A 03	On request	
Pt100 1/10 class B	A 04	A 04	A 04	A 04	On request	
Type K (NiCr-Ni) class 1			<b>A 05</b>	A 05		
Type K (NiCr-Ni) class 2	A 06	A 06	A 06	A 06		
Type J (Fe-CuNi) class 1			On request	On request		
Type J (Fe-CuNi) class 2	On request	On request	On request	On request		
NTC 5 kOhm (e.g. for testo handheld units)	A 09	A 09	A 09	A 09		
NTC 10 kOhm (e.g. for testo 171 logger)	A 10	A 10	A 10	A 10		
<b>Probe shaft Ø:</b>						
Ø 0.25 mm			B 01			
Ø 0.5 mm			<b>B 02</b>			
Ø 1.0 mm			B 03			
Ø 1.5 mm			B 04			
Ø 1.6 mm (Pt100 class B only)			On request			
Ø 3.0 mm	B 06		B 06	B 06		
Ø 5.0 mm					B 08	
Ø 6.0 mm (for Type 06 Pt100 and NTC only)		B 09		B 09		
<b>Probe shaft length</b>						
48 mm		C 03	C 03	C 03		
60 mm		C 04	C 04	C 04	C 04	
70 mm	C 05	C 05	C 05	C 05		
100 mm		C 06	C 06	C 06		
200 mm		C 08	C 08	C 08		
300 mm		C 09	C 09	C 09		
400 mm		C 10	C 10	C 10		
500 mm		C 11	C 11	C 11		Please refer to page 117 when selecting probe shaft length.
Please indicate other probe shaft lengths in mm		C 99	<b>C 99</b>	C 99		
<b>Connecting line for Pt100 and NTC</b>						
Insulated PVC, Ø 4.5 mm, 4 x 0.14 mm <sup>2</sup>	D 01	D 01	D 01			
Insulated PVC, shielded, Ø 5 mm, 4 x 0.14 mm <sup>2</sup>	D 02	D 02	D 02			
Insulated silicone, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>	D 03	D 03	D 03			
Insulated FEP, Ø 4 mm, 4 x 0.22 mm <sup>2</sup> , shielded	D 04	D 04	D 04			
Insulated glass fibre, external wire braiding, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>	D 05	D 05	D 05			
Insulated PFA, Ø 4 mm, 4 x 0.25 mm <sup>2</sup>	D 06	D 06	D 06		D 06	
<b>Connecting line for thermocouple</b>						Please refer to pages 117-118 for more information.
Insulated PVC, Ø 4 mm, 2 x 0.22 mm <sup>2</sup>	D 11	D 11	D 11			
Insulated PVC, shielded, Ø 5 mm, 2 x 0.25 mm <sup>2</sup>	D 12	D 12	<b>D 12</b>			
Insulated silicone, Ø 4 mm, 2 x 0.25 mm <sup>2</sup>	D 13	D 13	D 13			
Insulated FEP, Ø 4.5 mm, 2 x 0.22 mm <sup>2</sup>	D 14	D 14	D 14			
Insulated glass fibre, external wire braiding, Ø 3.6 mm, 2 x 0.22 mm <sup>2</sup>	D 15	D 15	D 15			
<b>Please indicate length of line (standard = 2 m)</b>	E__m	E__m	E__m		E__m	
<b>Miscellaneous (omit code, if not selected):</b>						
Pt100, NTC "vibration-proof" in thermal conductive paste, Tmax = 200 °C (+392 °F)	F 01	F 01	F 01	F 01	F 01	Please refer to pages 113/118 for more information on plug-in connections.
Metal antikink spring	F 02	F 02	F 02			
<b>Connection plug</b>						
Open wire ends	G 00	G 00	G 00		G 00	
8-pin DIN plug on Testo instrument (not for TC)	G 02	G 02	G 02		G 02	
Miniature TC plug	G 03	G 03	<b>G 03</b>			
Miniature TC coupling	G 04	G 04	G 04			
TC plug	On request	On request	On request			
TC coupling	On request	On request	On request			
Precision plug for testo 171, (only with Code A10)	G 07	G 07	G 07			
DIN round plug Pt100/NTC (for testo 400, 454, 650, 950)	G 08	G 08	G 08		G 08	
DIN round plug TC, 8-pin, with reference junction Type K	G 09	G 09	G 09			

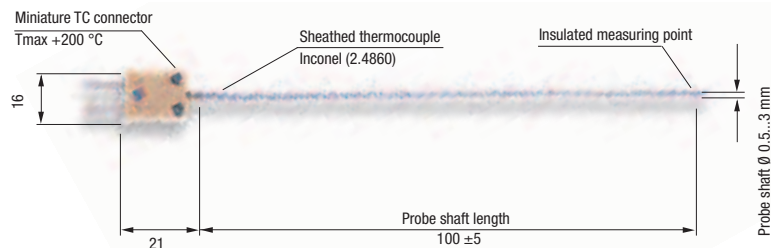
**Sample order:** Order code 6000 0000/Type 04/A 05/B 02/C 99/600/D 12/E 2.5 m/G 03

Process temperature probe type 04, TC type K, class 1, Ø 0.5 mm, probe shaft 600 mm, 2.5 m long cable (PVC shielded), mini TC connector

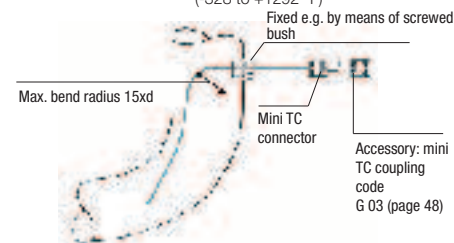
## Overview of probe types 09 /10 /11 /12 /13

The standard temperature probes can be tailored to your own specific measuring requirements. Just choose the relevant options. You can use the selection assistance to help you choose the options.

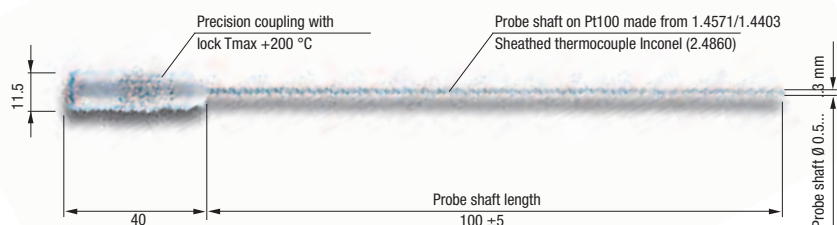
**Type 09** Sheathed thermocouple probe, with TC connector for extremely rapid temperature recording. Probe shaft material Inconel



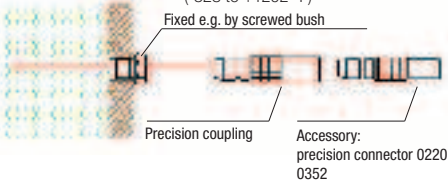
Temperature range: TC Type K:  $-200$  to  $+1000\text{ °C}$   
 $(-328$  to  $+1832\text{ °F})$   
 TC Type J:  $-200$  to  $+700\text{ °C}$   
 $(-328$  to  $+1292\text{ °F})$



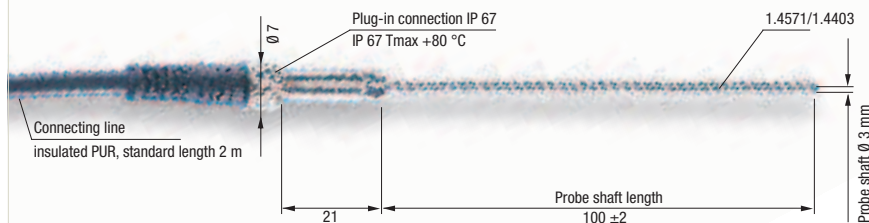
**Type 10** Process temperature probe with precision coupling ( $T_{max}$  200 °C). Probe shaft material Inconel



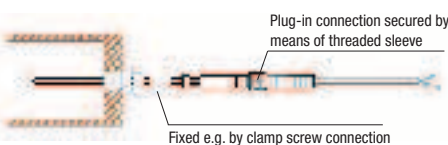
Temperature range: Pt100:  $-50$  to  $+400\text{ °C}$   
 $(-58$  to  $+752\text{ °F})$   
 TC Typ K:  $-200$  to  $+1000\text{ °C}$   
 $(-328$  to  $+1832\text{ °F})$   
 TC Typ J:  $-200$  to  $+700\text{ °C}$   
 $(-328$  to  $+1292\text{ °F})$



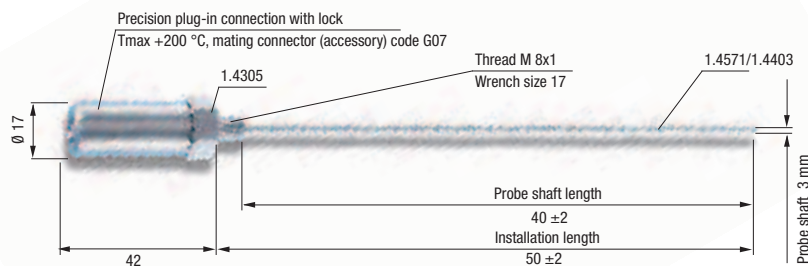
**Type 11** Process temperature probe, connected via plug-in connection (connector  $T_{max}$  80 °C)



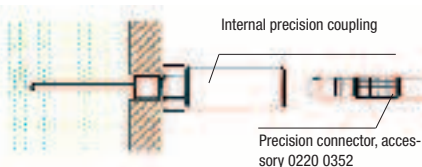
Temperature range: Pt100:  $-50$  to  $+400\text{ °C}$   
 $(-58$  to  $+752\text{ °F})$



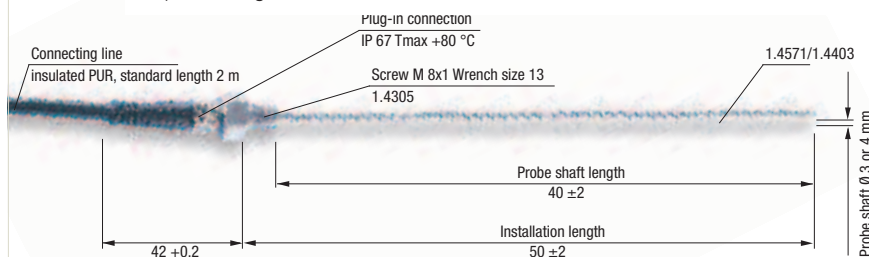
**Type 12** Immersion probe with internal thread M 8x1, pressure tight to 500 bar



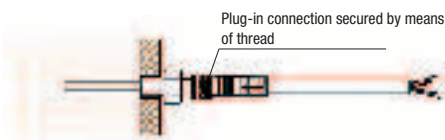
Temperature range: Pt100:  $-50$  to  $+400\text{ °C}$   
 $(-58$  to  $+752\text{ °F})$   
 NTC:  $-50$  to  $+150\text{ °C}$   
 $(-58$  to  $+302\text{ °F})$



**Type 13** Immersion probe with thread M 8x1, plug-in connection secured via thread, connecting line, pressure tight to 500 bar



Temperature range: Pt100:  $-50$  to  $+400\text{ °C}$   
 $(-58$  to  $+752\text{ °F})$   
 NTC:  $-50$  to  $+150\text{ °C}$   
 $(-58$  to  $+302\text{ °F})$



## Ordering information for probe types 09 /10 /11 /12 /13

Order no.	6000 0000 Type 09	6000 0000 Type 10	6000 0000 Type 11	6000 0000 Type 12	6000 0000 Type 13	
Selection advice: Light-blue fields cannot be combined with dark-blue fields						
<b>Measuring sensors:</b>						Please refer to page 116 for more information on measuring sensors and ranges.
Pt100 class B		A 01	A 01	A 01	A 01	
Pt100 class A		A 02	A 02	A 02	A 02	
Pt100 1/3 class B		A 03	A 03	<b>A 03</b>	A 03	
Pt100 1/10 class B		A 04	A 04	A 04	A 04	
Type K (NiCr-Ni) class 1	A 05	A 05				
Type K (NiCr-Ni) class 2	A 06	A 06				
Type J (Fe-CuNi) class 1	On request	On request				
Type J (Fe-CuNi) class 2	On request	On request				
NTC 5 kOhm (e.g. for testo hand-held instruments)		A 09	A 09	A 09	A 09	
NTC 10 kOhm (e.g. for testostor 171 logger)		A 10	A 10	A 10	A 10	
<b>Probe shaft Ø:</b>						
Ø 0.5 mm	B 02	B 02				
Ø 1.0 mm	B 03	B 03				
Ø 1.5 mm	B 04	B 04				
Ø 1.6 mm (Pt100 class B only)		B 05				
Ø 3.0 mm	B 06	B 06	B 06	<b>B 06</b>	B 06	
Ø 4.0 mm		On request			B 07	
Ø 5.0 mm		On request			On request	
<b>Probe shaft length</b>						Please refer to page 117 when choosing the probe shaft length.
40 mm	C 02	C 02	C 02	C 02	C 02	
100 mm	C 06	C 06	C 06	C 06	C 06	
200 mm	C 08	C 08	C 08	C 08	C 08	
300 mm	C 09	C 09	C 09	C 09	C 09	
400 mm	C 10	C 10	C 10	C 10	C 10	
500 mm	C 11	C 11	C 11	<b>C 11</b>	C 11	
Please indicate other probe shaft lengths in mm	C 99	C 99	C 99	C 99	C 99	
<b>Connecting line for Pt100 and NTC</b>						Please refer to pages 117/118 for more information.
Insulated PUR with free end, length 2.0 m			D 07		D 07	
Insulated PUR with free end, length 5.0 m			D 08		D 08	
Insulated PUR with free end, length 7.5 m			D 09		D 09	
Insulated PUR with free end, length 10.0 m			D 10		D 10	
<b>Miscellaneous (omit code, if not selected):</b>						
Pt100, NTC "vibration-proof" in thermal conductive paste, Tmax = 200 °C (+392 °F)		F 01	F 01	F 01	F 01	
<b>Connection plug</b>						Please refer to pages 113/118 for more information on plug-in connections.
Open wire ends			G 00		G 00	
8-pin mini DIN plug on Testo instrument (not for TC)			G 02		G 02	
Precision plug connection (for testo 171 only, Code A10)			G 07**		G 07**	
DIN round plug Pt100/NTC (for testo 400, 454, 650, 950)			G 08		G 08	

**Sample order:** Order code type 6000 0000/Type 12/A 03/B 06/C 11

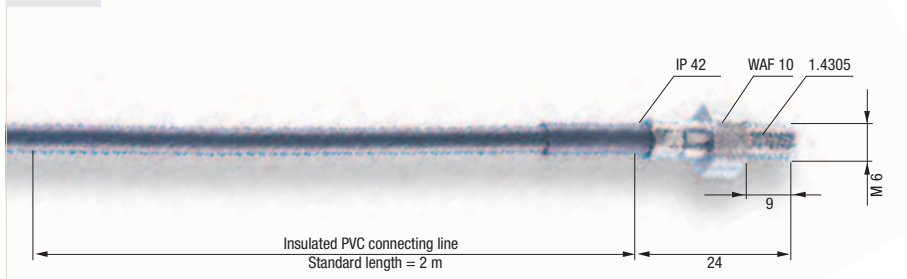
Probe type 12 with precision coupling Pt100, 1/3 class B, probe shaft Ø 3 mm, 500 mm length

\*\* no coupling, with connector only

## Overview of probe types 14 /15 /17 /18

The standard temperature probes can be tailored to your own specific measuring requirements. Just choose the relevant options. You can use the selection assistance to help you choose the options.

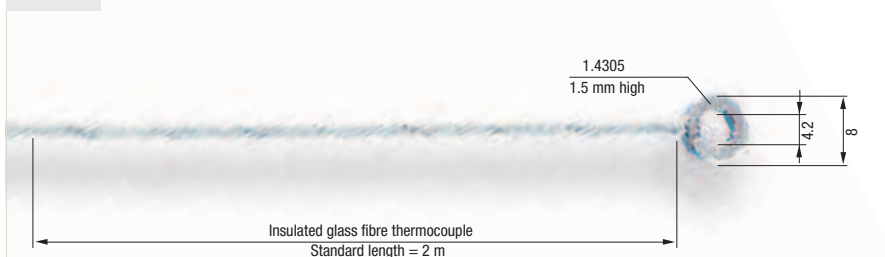
**Type 14** Screwed probe for hard-to-reach measuring points, pressure tight to 500 bar



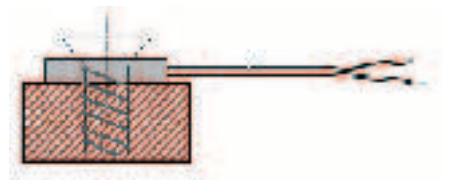
Temperature range: Pt100/NTC: -50 to +80 °C  
(-58 to +176 °F)



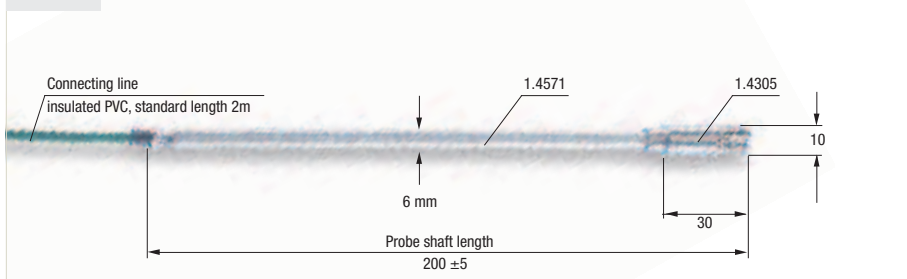
**Type 15** Screw-on surface T/C probe (metal ring)



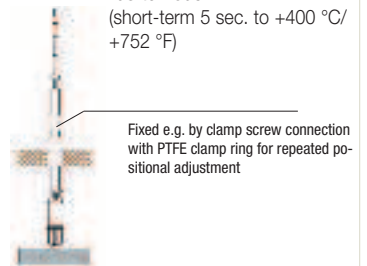
Temperature range: TC Type K/Type J:  
-200 to +400 °C  
(-328 to +752 °F)



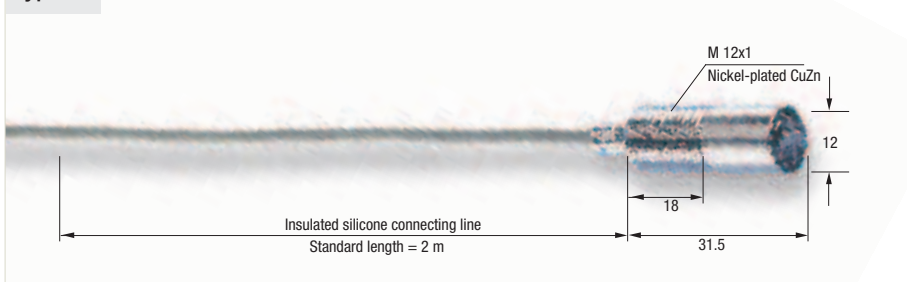
**Type 17** Surface probe (cross-band) with probe shaft



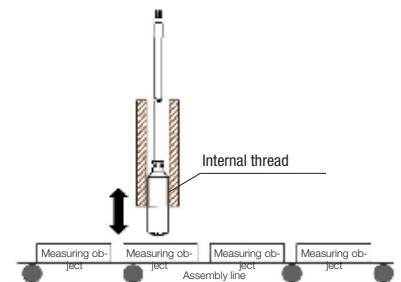
Temperature range: TE Typ K: -50 to +180 °C/  
-58 to +356 °F  
(short-term 5 sec. to +400 °C/  
+752 °F)



**Type 18** Surface probe (cross-band) with thread M 12x1 (e.g. robot arm)



Temperature range: cf. Type 17



## Ordering information for types 14 /15 /17 /18

Order no.	6000 0000	6000 0000	6000 0000	6000 0000
	Type 14	Type 15	Type 17	Type 18
Selection advice: Light-blue fields cannot be combined with dark-blue fields				
<b>Measuring sensors:</b>				
Pt100 class B	A 01			
Pt100 class A	A 02			
Pt100 1/3 class B	A 03			
Pt100 1/10 class B	A 04			
Type K (class 1)		A 05		
Type K (class 2)			A 06	<b>A 06</b>
Type J (class 1)		On request		
NTC 5 kOhm (e.g. for testo hand-held instruments)	A 09			
NTC 10 kOhm (e.g. for testostor 171 logger)	A 10			
<b>Probe shaft length</b>				
100 mm			C 06	
200 mm			C 08	
300 mm			C 09	
400 mm			C 10	
500 mm			C 11	
Please always indicate other probe shaft lengths in mm			C 99	
<b>Connecting line for Pt100 and NTC</b>				
Insulated PVC, Ø 4.5 mm, 4 x 0.14 mm <sup>2</sup>	D 01			
Insulated PVC, shielded, Ø 5 mm, 4 x 0.14 mm <sup>2</sup>	D 02			
Insulated silicone, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>	D 03			
Insulated FEP, Ø 4 mm, 4 x 0.22 mm <sup>2</sup> , shielded	D 04			
Insulated glass fibre, external wire braiding, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>	D 05			
Insulated PFA, Ø 4 mm, 4 x 0.25 mm <sup>2</sup>	D 06			
<b>Connecting line for thermocouple</b>				
Insulated PVC, Ø 4 mm, 2 x 0.22 mm <sup>2</sup>			D 11	<b>D 11</b>
Insulated PVC, shielded, Ø 5 mm, 2 x 0.25 mm <sup>2</sup>			D 12	D 12
Insulated silicone, Ø 4 mm, 2 x 0.25 mm <sup>2</sup> , shielded			D 13	D 13
Insulated FEP, Ø 4 mm, 2 x 0.22 mm <sup>2</sup>			D 14	D 14
Insulated glass fibre, external wire braiding, Ø 3.6 mm, 2 x 0.22 mm <sup>2</sup>		D 25*	D 15	D 15
<b>Please indicate length of line (standard = 2 m)</b>	E__m	E__m	E__m	E__m
<b>Miscellaneous (omit code, if not selected):</b>				
Pt100, NTC "vibration-proof" in thermal conductive paste, Tmax = 200 °C (+392 °F)	F 01			
Metal antikink spring	F 02		F 02	F 02
<b>Connection plug</b>				
Open wire ends	G 00	G 00	G 00	G 00
8-pin mini DIN plug on Testo instrument (not for TC)	G 02			
Miniature TC plug		G 03	G 03	<b>G 03</b>
Miniature TC coupling		G 04	G 04	G 04
TC plug		On request	On request	On request
TC coupling		On request	On request	On request
Precision plug (for testo 171, Code A10)	G 07			
DIN round plug Pt100/NTC (for testo 400, 454, 650, 950)	G 08			
DIN round plug TC, 8-pin, with reference junction for type K only		G 09	G 09	G 09

**Sample order: Order code 6000 0000/Type 18/A 06/D 11/E 2.0/G 03**

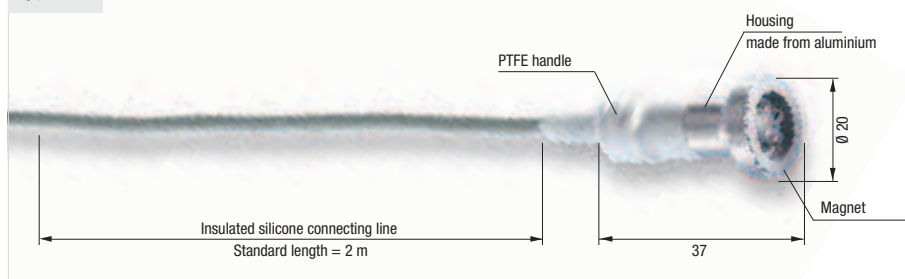
Surface probe type 18 with sensor TC type K, class 2 and internal thread, PVC connecting line (length 2.0 m) and mini TC connector

\*without external wire braiding  
Ø oval 1.8 x 1.2 mm,  
2 x 0.2 mm

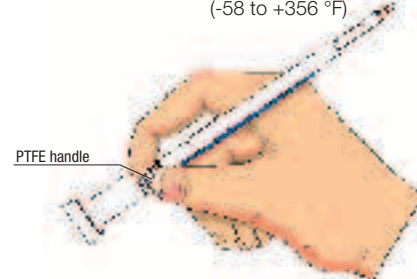
## Overview of probe types 19 /20 /21 /23 /24

The standard temperature probes can be tailored to your own specific measuring requirements. Just choose the relevant options. You can use the selection advice to help you choose the options.

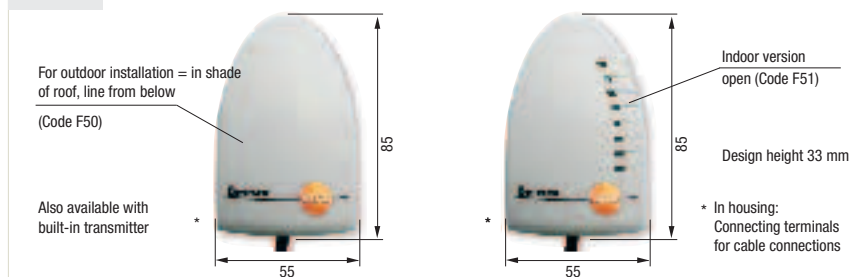
### Type 19 Magnetic surface probe (cross-band) with PTFE handle



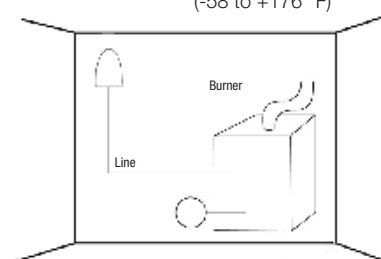
Temperature range: TC Type K: -50 to +180 °C (-58 to +356 °F)



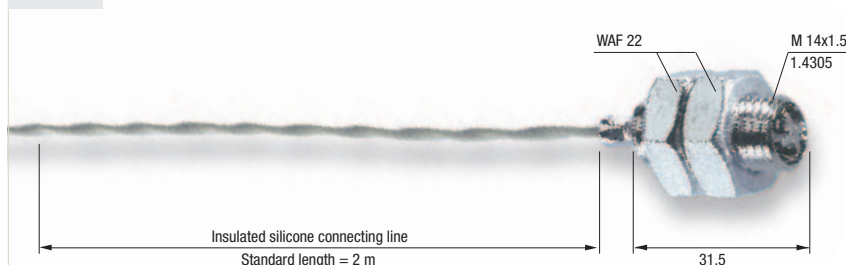
### Type 20 Ambient temperature probe, plastic housing, cast probe



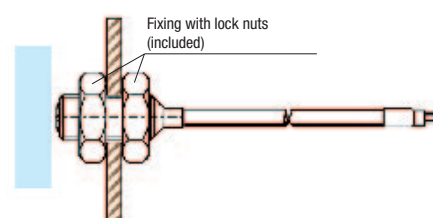
Temperature range: Pt100/NTC: -50 to +80 °C (-58 to +176 °F)



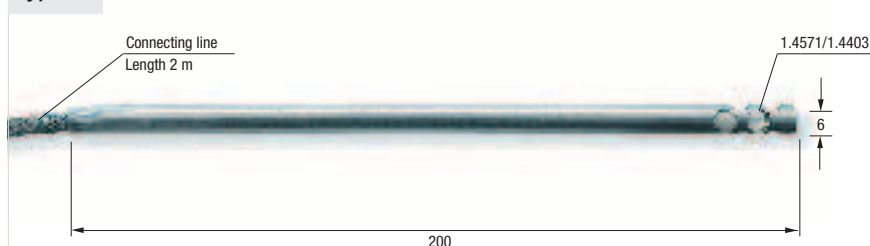
### Type 21 Surface probe (cross-band), flush front thread M 14x1.5 with lock nuts



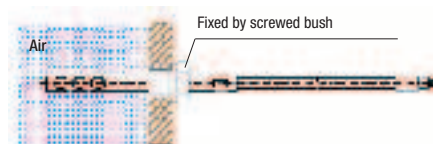
Temperature range: TC Type K: -50 to +180 °C (-58 to +356 °F)



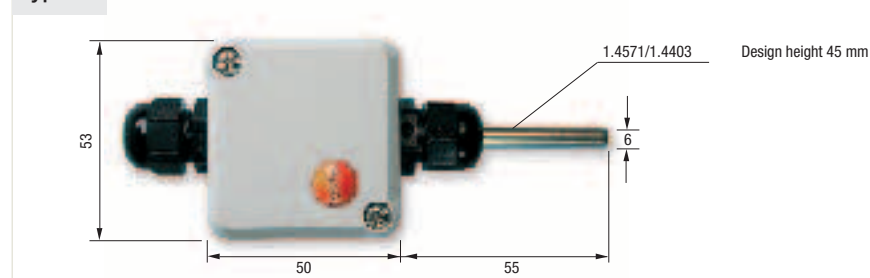
### Type 23 Air duct temperature probe



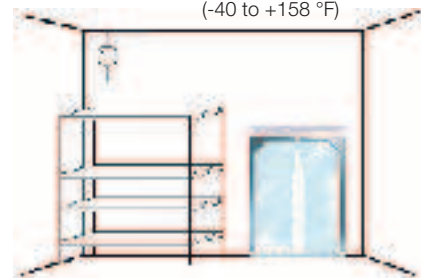
Temperature range: Pt100/Type K/Type J: -50 to +400 °C (-58 to +752 °F)  
NTC: -50 to +150 °C (-58 to +302 °F)



### Type 24 Cold store and storage room temperature probe, with terminals in IP65 housing



Temperature range: Pt100/NTC: -40 to +70 °C (-40 to +158 °F)



## Ordering information for probe types 19 /20 /21 /23 /24

Selection advice: Light-blue fields can not be combined with dark-blue fields	Order no.	6000 0000	6000 0000	6000 0000	6000 0000	6000 0000	
		Type 19	Type 20	Type 21	Type 23	Type 24	
<b>Measuring sensors:</b>							Please refer to page 116 for more information on measuring sensors and ranges.
Pt100 class B			A 01		A 01	A 01	
Pt100 class A			A 02		<b>A 02</b>	A 02	
Pt100 1/3 class B			A 03		A 03	A 03	
Pt100 1/10 class B			A 04		A 04	A 04	
Type K (class 1)			On request		A 05		
Type K (class 2)	A 06	On request	A 06	A 06			
Type J (class 1)		On request			On request		
Type J (class 2)		On request			On request		
NTC 5 kOhm (e.g. for testo hand-held instruments)			A 09		A 09	A 09	
NTC 10 kOhm (e.g. for testostor 171 logger)			A 10		A 10	A 10	
<b>Probe shaft Ø:</b>							
Ø 4.0 mm						On request	
Ø 5.0 mm						On request	
Ø 6.0 mm (Pt100 only)					<b>B 09</b>	B 09	
<b>Probe shaft length</b>							Please refer to page 117 when choosing the probe shaft length.
40 mm						C 02	
200 mm					C 08		
Please indicate other probe shaft lengths in mm					<b>C 99</b>		
<b>Connecting line for Pt100 and NTC</b>							Please refer to pages 117/118 for more information.
Insulated PVC, Ø 4.5 mm, 4 x 0.14 mm <sup>2</sup>			D 01		D 01		
Insulated PVC, shielded, Ø 5 mm, 4 x 0.14 mm <sup>2</sup>			D 02		D 02		
Insulated silicone, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>	D 03	D 03			<b>D 03</b>		
Insulated FEP, Ø 4 mm, 4 x 0.2 mm <sup>2</sup> , shielded		D 04			D 04		
Insulated glass fibre, external wire braiding, Ø 4.5 mm, 4 x 0.25 mm <sup>2</sup>		D 05			D 05		
Insulated PFA, Ø 4 mm, 4 x 0.25 mm <sup>2</sup>		D 06			D 06		
<b>Connecting line for thermocouple</b>							
Insulated PVC, Ø 4 mm, 2 x 0.22 mm <sup>2</sup>	D 11	On request	D 11	D 11			
Insulated PVC, shielded, Ø 5 mm, 2 x 0.25 mm <sup>2</sup>	D 12	On request	D 12	D 12			
Insulated silicone, Ø 4 mm, 2 x 0.25 mm <sup>2</sup> , shielded	D 13	On request	D 13	D 13			
Insulated FEP, Ø 4 mm, 2 x 0.22 mm <sup>2</sup>	D 14	On request	D 14	D 14			
Insulated glass fibre, external wire braiding, Ø 3.6 mm, 2 x 0.22 mm <sup>2</sup>	D 15	On request	D 15	D 15			
<b>Please indicate length of line (standard = 2 m)</b>	E__m	E__m	E__m	E__m			
<b>Miscellaneous (please select 1):</b>							
Outdoor version		F 50					
Indoor version		F 51					Please refer to pages 113/118 for more information on plug-in connections
<b>Connection plug</b>							
Open wire ends	G 00	G 00	G 00	G 00			
8-pin mini DIN plug on Testo instrument (not for TC)		G 02		G 02			
Miniature TC plug	G 03	On request	G 03	G 03			
Miniature TC coupling	G 04	On request	G 04	G 04			
TC plug	On request	On request	On request	On request			
TC coupling	On request	On request	On request	On request			
Precision plug (for testo 171, code A10)		G 07		G 07			
DIN round plug Pt100/NTC		G 08		<b>G 08</b>			
DIN round plug TC, 8-pin, with reference junction for Type K only	G 09	On request	G 09	G 09			

**Sample order: Order code 6000.0000 /Type 23/ A 02 / B 09 / C 99 / 250 / D 03 / E 12.5 / G 08**

Air temperature probe type 23, Pt100 probe (class A), probe shaft Ø 6 mm, probe shaft length 250 mm, 12.5 m silicone line, with DIN round connector

## Lines



### Thermal and equalising lines for thermocouple probes

Equalising lines (AGL) are used to extend thermocouples and must be laid from the probe connection to the reference point (equalising socket, measurement location switch, measuring instrument). Equalising lines consist of plus and minus conductors which have the same thermoelectric property as the thermocouple in the range from -50 °C to +200 °C (-58 to +392 °F). A thermocouple line (TCL) should be used for other temperatures.

Probe lines with sheath are used:

- for large distances between probe and measuring instrument
- if there are strong alternating fields near the probe line

Probe lines without sheath are used:

- for short connections between probe and measuring instrument
- if there is no risk of electrical interference on the probe line.

### Thermal and equalizing lines (cut goods)

Corresponding to DIN IEC 584, white limb minus, colour limb (in TC code colour) plus

Illustration	Material and description	Type	Part no.	Standard probe code	
	<b>AGL</b> PVC insulation, separately and together, Outer diameter ~4mm, flexible lead 2x 0.22mm <sup>2</sup> Tmax. +105°C (+221 °F)	Type K (NiCr-Ni)	0230 2009	D 11	
	<b>AGL</b> PVC insulation, separately and together, sheathed Outer diameter ~5mm, flexible lead 2x 0.25mm <sup>2</sup> Tmax. +80°C (+176 °F)	Type K (NiCr-Ni)	0230 2011	D 12	
	<b>AGL</b> Silicone insulation, separately and together Outer diameter ~4mm, flexible lead 2x 0.25mm <sup>2</sup> , Tmax. +180°C (+356 °F)	Type K (NiCr-Ni)	0230 2015	D 13	
	<b>AGL</b> PTFE insulation, separately and together, shielded Outer diameter 4mm, flexible lead 2x 0.22mm <sup>2</sup> , Tmax. +205°C (+401 °F)	Type K (NiCr-Ni)	0230 2025	D 14	
	<b>TEL</b> Double fiberglass insulation, sheathed Outer diameter ~3.6mm, flexible lead 2x 0.22mm <sup>2</sup> , Tmax. +400°C, Class 2 (+752 °F)	Type K (NiCr-Ni)	0362 0230	D 15	
	<b>TEL</b> Fiberglass insulation, separately and together, outer diameter ~1mm, oval 1.4 x 0.9mm, wire diameter 2 x 0.2mm, Tmax. +400°C, Class 1 (+752 °F)	Type K (NiCr-Ni)	0362 0221	On Request	
	<b>TEL</b> Fiberglass insulation, separately and together, outer diameter ~2mm, oval 2.1 x 1.2mm, wire diameter 2 x 0.5mm, Tmax. +400°C, Class 1 (+752 °F)	Type K (NiCr-Ni)	0362 0222	On Request	
	<b>TEL</b> PTFE insulation, separately and together, outer diameter 1.4 x 2mm, wire diameter 2 x 0.2mm, Tmax. +260°C (+500 °F)	Type K (NiCr-Ni)	0362 0240	On Request	
	<b>TEL</b> PTFE insulation, separately and together, outer diameter ~2mm, oval 1.5 x 2.3mm, cores 2 x 0.13mm, Tmax. +260°C, Class 1 (+500 °F)	Type K (NiCr-Ni)	0362 0236	On Request	

Caution! A supplement will be charged for small quantities.

Other thermocouples and equalising lines (Type J, L, T and S) available on request. Please specify type of cable and quantity.

### Measurement and control lines (cut goods) for Pt100/NTC

Illustration	Material and description	Type	Part no.	Standard probe code	
	PTFE insulation, separately and together, sheathed, Outer diameter ~4.0mm, wires: 4x 0.22mm <sup>2</sup> , Tmax. +205°C (+401 °F)	Copper	0230 0031	D 04	
	Separately PTFE insulation, together silicone insulation Outer diameter ~4.5mm, wires: 4x 0.25mm <sup>2</sup> , Tmax. +180°C (+356 °F)	Copper	0230 0022	D 03	
	PVC insulation, separately and together, sheathed, Outer diameter ~5.0mm, wires: 4x 0.14mm <sup>2</sup> , Tmax. +80°C (+176 °F)	Copper	0230 0024	D 02	
	Separately PVC insulation, together PUR insulation Outer diameter ~4.5mm, wires: 4x 0.14mm <sup>2</sup> , Tmax. +80°C (+176 °F)	Copper	0230 0025	D 01	
	Separately PVC insulation, together PUR insulation Outer diameter ~5.0mm, wires: 8x 0.14mm <sup>2</sup> , Tmax. +80°C (+176 °F)	Copper	0230 0033	On Request	
	Separately PVC insulation, together PUR insulation, sheathed, Outer diameter ~5mm, wires: 8x 0.14mm <sup>2</sup> , Tmax. +80°C (+176 °F)	Copper	0230 0035	On Request	

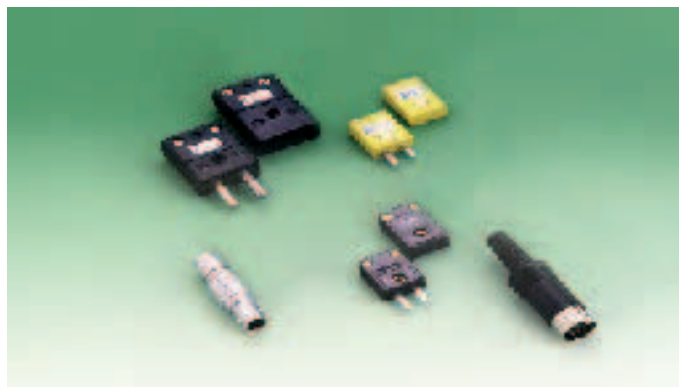
Caution! A supplement will be charged for small quantities.

## Plug-in and screw-in connections

### Plug-in and screw-in connections

Precision plug-in connections for temperature and low-voltage measuring chains

See also the help for selecting screw and plug-in connections provided on page 118.



### Clamp screw connections

To install thermocouple and Pt100 probes; pressure-tight with PTFE clamp ring to 6 bar (87 psi); pressure-tight with stainless steel tapered ring up to 50bar (725 psi)

Illustration	Material	Thread	Diameter (L/EL)	Clamping	Part no.	
	Stainless Steel	M 8x1	1.5mm (26/8)	PTFE clamp ring	0400 6181	
	Stainless Steel	M 8x1	3mm (26/8)	PTFE clamp ring	0400 6183	
	Zinc-coated steel	M 8x1	1.5mm (26/8)	PTFE clamp ring	0400 6161	
	Zinc-coated steel	M 8x1	3mm (26/8)	PTFE clamp ring	0400 6163	
	Zinc-coated steel	M 8x1	1.5mm (26/8)	St. steel clamp ring	0400 6171	

Spare clamp or PTFE rings available on request. Please specify type of screw-in connection and quantity.

### Reducers

To adapt screw-in connections to thread available

Illustration	Material	Thread (R1 x R2)	L	Part no.	
	Stainless Steel	M 8x1 G 1/4"	18mm	0170 0238	
	Stainless Steel	M 8x1 G 1/2"	23mm	0170 0240	

### Thermocouple plug-in connections, Type K

Made of nylon reinforced with fibreglass; for higher temperatures; Tmax. +200 °C/+392 °F (-100 °C/-148 °F); ceramic plug on request

Illustration	Description	Part no. (For TC Type K only)	Standard probe code	
	1 Plug for miniature TC plug-in connection	0220 0094	G 03	
	2 Coupling for miniature TC plug-in connection	0220 2094	G 04	
	3 Connection clip for miniature TC plug-in connection	On request		
	4 Plug for standard series TC plug-in connections	0220 0093	G 05	
	5 Coupling for standard series TC plug-in connections	0220 2093	G 06	
	6 DIN round plug, 8 pin (plastic housing, black); Pt100/NTC	0220 0059	G 08	
	7 DIN round plug, 8 pin (plastic housing, black); TC, Type K with reference point	0409 0160	G 09	
	8 Precision plug-in connector for type 10/12 (for Pt100/NTC*)	On request		



# Signal output with temperature transmitter testo 55

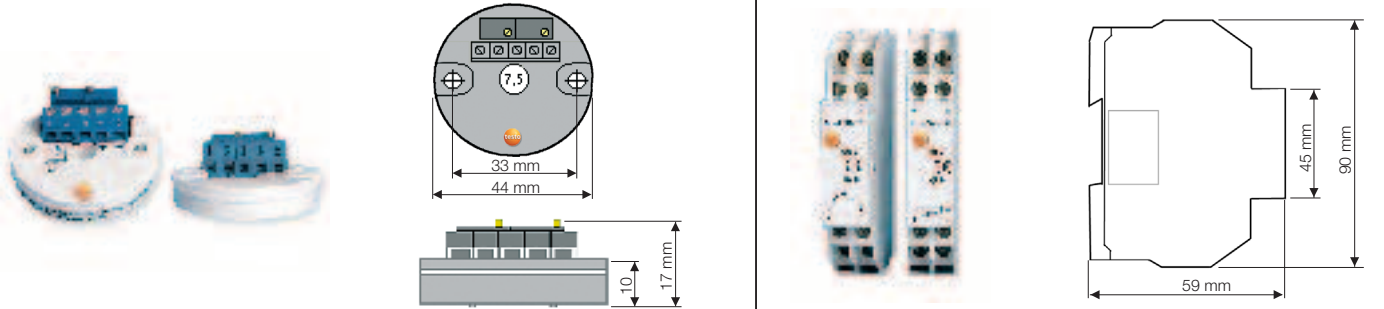
Thermocouples and Pt100 can offer standard signal output 4 to 20 mA with the help of transmitters. 4 mA corresponds to the lower end of the scale, 20 mA to the upper end. This “2-wire technology” supplies both power and signal transmission simultaneously via just two cores. The output signal for Pt100 is linear in relation to the temperature and for thermocouples linear in relation to the thermoelectric voltage (in mV) according to DIN IEC 584-1. Choose the ordering options (right) which optimally meet your requirements . An RS484 version (Code L04) is also available.

## Specifications

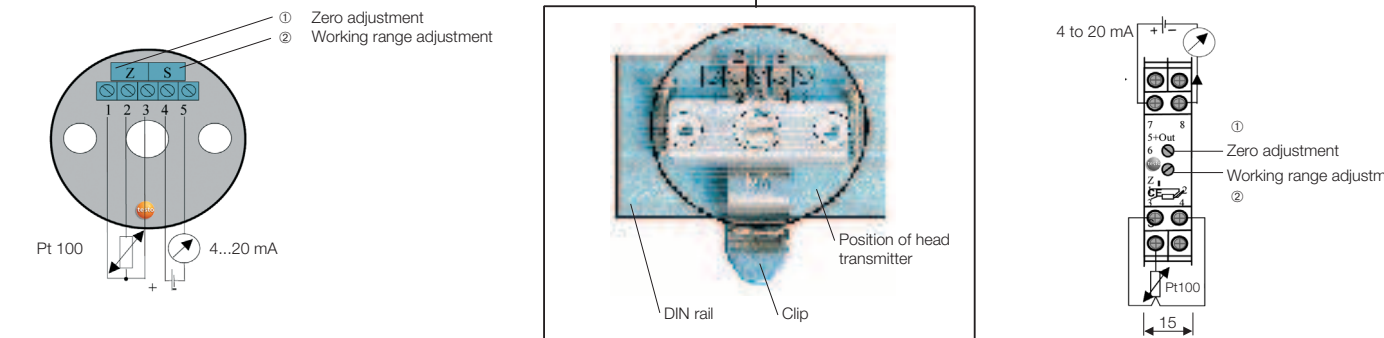
### Head transmitter

### DIN rail transmitter

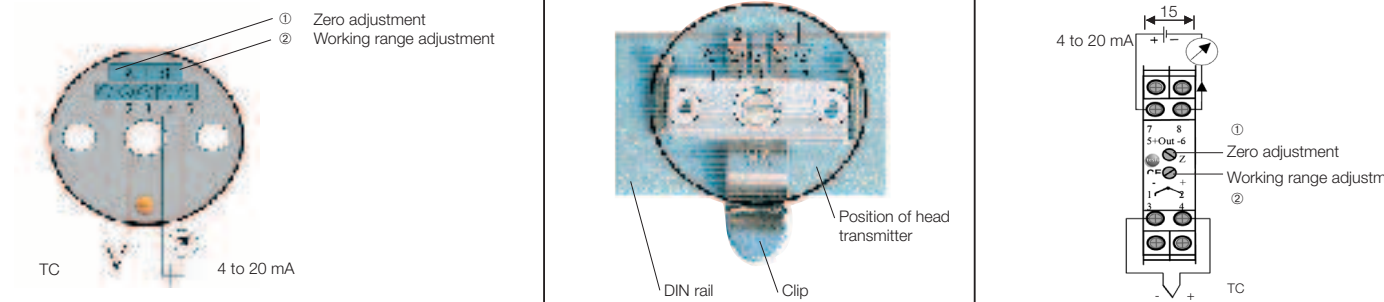
Input	Pt100, 3-conductor terminal	TC Type T/C, J, L, T, K, N	Pt100, 3-conductor terminal	TC Type J, L, T, K, N
Measuring range (p. 49)	range within -50...550 °C	-5 mV...55 mV	range within -50...550 °C	-5 mV...55 mV
Accuracy	± 0.15 % of working range	± 0.5 % to ± 1.0 % of working range	± 0.15 % of working range	± 0.5 % to ± 1.0 % of working range
Output	4...20 mA, 2 wire	4...20 mA, 2 wire	4...20 mA, 2 wire	4...20 mA, 2 wire
Linearity	temperature-linear output	mV linear output	temperature-linear output	mV linear output
Power supply	6.5 to 32 VDC	6.5 to 32 V DC	6.5 to 32 V DC	6.5 to 32 V DC
Installation	in DIN B or larger connecting head or with clip on DIN rail, see below centre	in DIN B or larger connecting head or with clip on DIN rail, see below centre	DIN rail EN 50022, 35 mm	DIN rail EN 50022, 35 mm



## Pt 100



## Thermocouple



Code L 01, head transmitter

Code L 02, head transmitter with clip for assembly on DIN rail

Code L 03, DIN rail transmitter

## Signal output with temperature transmitter testo 55

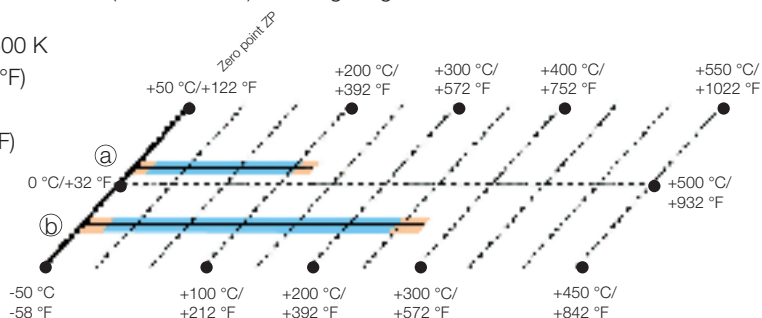
### Definition of transmitter scales

The transmitters offered here are configured specifically for your measuring requirements using your parameters. Please observe the "scaling rules".

### Pt 100 transmitter

Possible options (indicate when ordering): Zero point between -50...+50 °C (-58...+122 °F), working ranges 50 to 500 K

- (a) Example: Zero point 10 °C, working ranges 50 to 500 K  
Measuring range +10 °C to +210 °C (+50 to +410 °F)
- (b) Example: Zero point -25 °C, working range 300 K  
Measuring range -25 °C to +275 °C (-13 to +527 °F)



Precision adjustment:

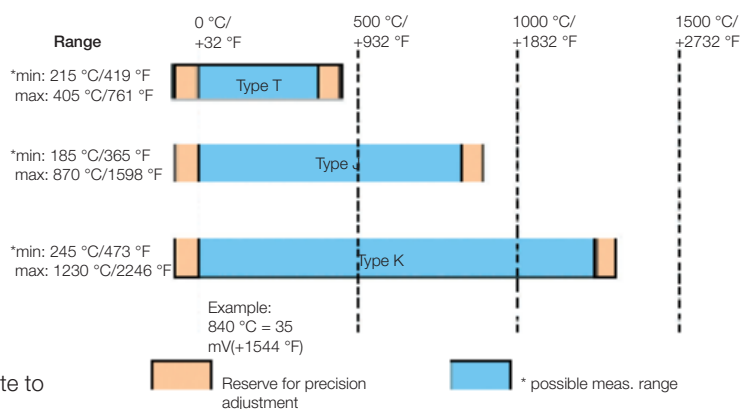
The zero point and range can be adjusted on site by up to 10 % of the range per potentiometer.

### Thermocouple transmitters

The measuring ranges of thermocouples are defined in 5 mV steps from 10 mV...50 mV according to thermoelectric voltages. The temperature range you choose (e.g. 0 to 800 °C for type K) is adapted and expanded on the basis of these 5 mV steps (in this example to 840 °C which corresponds to 35 mV). The zero point is generally 0 °C.



The maximum values in °C correspond to the maximum input voltages (-5 mV...+55 mV) which the transmitter can process. (Thermoelectric voltage according to IEC 584-1)



Precision adjustment:

The zero point and range can be adjusted by potentiometer on site to  $\pm 5$  mV.

### Selecting and ordering transmitters testo 55 (Part no. 6055 9999)

Give a measuring range that is as precise and as small as possible, as the accuracy of the signal output depends on the working range. Please remember not to utilise the whole of your measuring range for the working range, as it must still be possible to make adjustments to the transmitter up to the maximum values of the measuring range.

Input signal sensor element	Model	Housing for head or RS485 transmitter*
Pt 100 class B	A 01	Head transmitter
Pt 100 class A	A 02	Head transmitter with clip
Pt 100 1/3 class B	A 03	DIN rail transmitter
Pt 100 1/10 class B	A 04	RS485 transmitter*
Type K class 1	A 05	
Type K class 2	A 06	
Type J class 1*	A 07	
Type J class 2*	A 08	
0 to 1 V	A 91	
0 to 10 V	A 92	
0 to 20 mA	A 93	
4 to 20 mA	A 94	

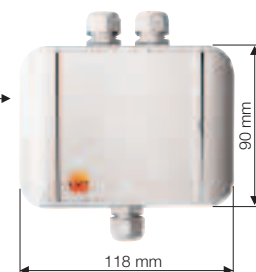
only for RS484 (Code L04)

Please give temperature range from .../to... °C in clear text

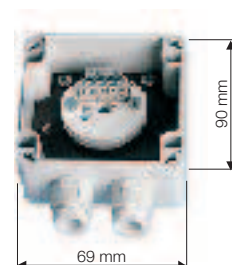
### Housing for head or RS485 transmitter\*

- No housing M 01
- Plastic housing M 02

\* a metal housing is also available on request



Housing for RS485 transmitter



Housing for head transmitter

Please note: The transmitter testo 55 includes neither the temperature probe nor a connection cable.

Sample order: Order code 6055.9999/A 02/50/150/L 02/M 01

Head transmitter for Pt 100 Class A probe with DIN rail clip, temperature range +50 to +150 ° -122 to +302 °F, no housing

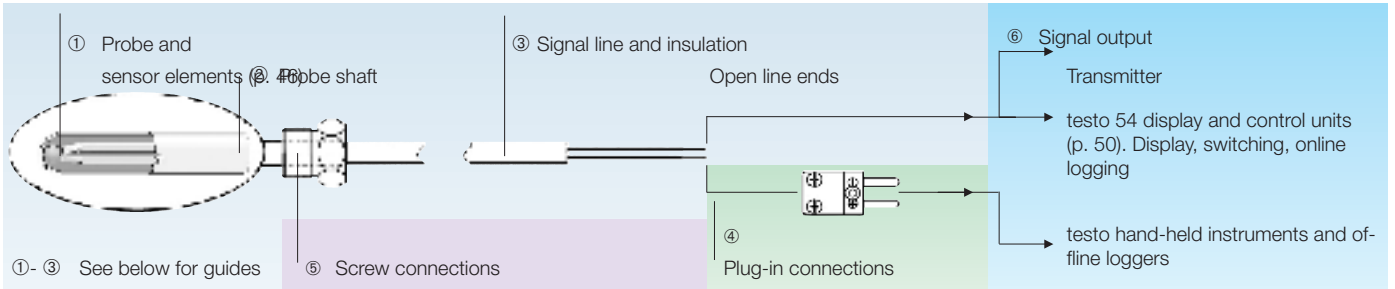
## Selection assistance temperature probes and overview

### Overview of probe components 1-6

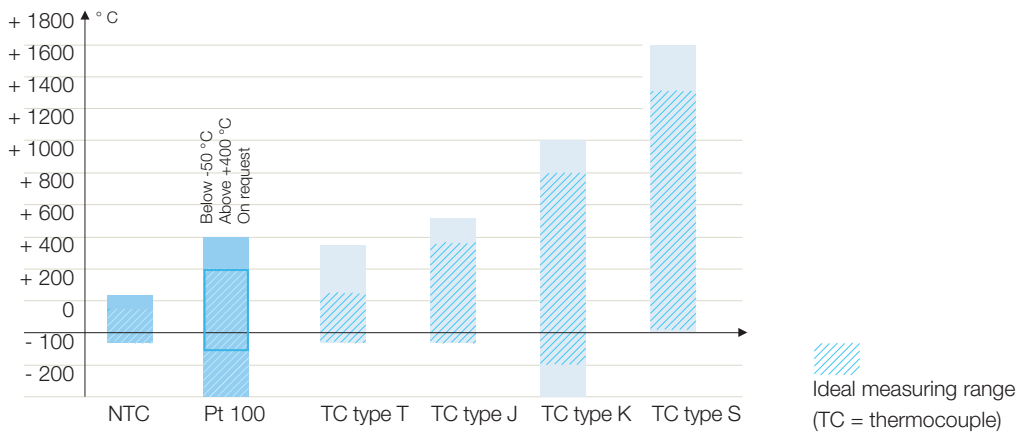
The following pages give some advice for when you come to choose each of the temperature probe components. For an overview of components (1 - 6), see also the graphic below. You can optimally select from both the standard probes and the custom temperature probes. The codes D01, G08 etc. will help you define the different versions quickly and correctly.

If you cannot find the right probe, you have the following possibilities:

1. Celcius configurator ([www.testo-celcius.com/configurator/probes](http://www.testo-celcius.com/configurator/probes)), 2. Checklist for recording data for probe definition



### ① a Measuring range of sensor element



### ② b Accuracy and response times

Order code	Measuring sensor	Range °C	Class	Tolerances	Response times t <sub>99</sub> **
A 01	NTC	-50...+400	B	± 0.3 °C ± 0.005 x t <sub>tl</sub>	10 s in water (probe shaft Ø 1.6 mm)
On request	Pt 100	-200...+600	B	± 0.3 °C ± 0.005 x t <sub>tl</sub>	10 s in water (probe shaft Ø 1.6 mm)
A 02	Pt 100	-50...+400	A	± 0.15 °C ± 0.002 x t <sub>tl</sub>	15 s in water (probe shaft Ø 3 mm)
On request	Pt 100	-200...+600	A	± 0.15 °C ± 0.002 x t <sub>tl</sub>	15 s in water (probe shaft Ø 3 mm)
A 03		-50...+200	1/3 B	± 0.1 °C ± 0.0017 x t <sub>tl</sub>	130 s in air (probe shaft Ø 1.6 mm)
A 04		0...+100	1/10 B	± 0.03 °C ± 0.0005 x t <sub>tl</sub>	150 s in air (probe shaft Ø 3 mm)
On request	Type T	-40...+350	1	± 0.5 °C or <sup>1)</sup> ± 0.001 x t <sub>tl</sub>	1.5 sec. in water (probe shaft Ø 0.5 mm) 3 s in water (probe shaft Ø 3 mm) 40 s in air (probe shaft Ø 0.5 mm) 70 s in air (probe shaft Ø 3 mm)
A 05	Type K	-40...+1000	1	± 1.5 °C or <sup>1)</sup> ± 0.004 x t <sub>tl</sub>	
A 06	Type K	-40...+1200	2	± 2.5 °C or <sup>1)</sup> ± 0.0075 x t <sub>tl</sub>	
On request	Type K	-200...+40	3	± 2.5 °C or <sup>1)</sup> ± 0.015 x t <sub>tl</sub>	
A 07	Type J	-40...+750	1	± 1.5 °C or <sup>1)</sup> ± 0.004 x t <sub>tl</sub>	7 s in water (probe shaft Ø 3 mm) 66 s in air (probe shaft Ø 3 mm)
A 08	Type J	-40...+750	2	± 2.5 °C or <sup>1)</sup> ± 0.0075 x t <sub>tl</sub>	
On request	Type S	0...+1500	2	± 2.5 °C or <sup>1)</sup> ± 0.0025 x t <sub>tl</sub>	
A 09/A10	NTC (Standard)*	-50...-25.1 -25...+74.9 +75...+150	-	± 0.4 °C ± 0.2 °C ± 0.5 % Of value	7 s in water (probe shaft Ø 3 mm) 66 s in air (probe shaft Ø 3 mm)
		-30...-20.1 -20...0 +0.1...+75 +75.1...+275	-	± 1 °C ± 0.6 °C ± 0.5 °C ± 0.5 °C + 0.2 % Of value	
On request	NTC (high temp.)				

<sup>1)</sup> the higher value applies

\* NTC are not standardized  
A09: 5K Ohm, e.g. for testo hand-held instruments  
A10: 10K Ohm, e.g. for logger 171

** Temperature probe	in water	in air	on a surface
Type 14	68 s	90 s	
Type 15			approx. 45 s
Type 17			approx. 3 s
Type 18			approx. 3 s
Type 19			approx. 150 s
Type 20		approx. 20 s	
Type 21			approx. 3 s
Type 23		approx. 15 s	

# Selection assistance temperature probes

## ② Selecting probe shafts

### ② a Probe shaft materials

Material	Material no.	Temp. range in cont. operation	Application
Stainless steel	1.4305	-200...+550 °C	Limited resistance to chemicals. Used in the paint, soap, paper and textile industries.
Stainless steel	1.4571	-200...+700 °C	Resistant to non-oxidising acids and media containing chloride.
Inconel 600	2.4816	-200...+1150 °C	Areas of application include furnace construction, chemical industry, food industry, plastics industry. Very resistant to halogens and chlorine.
PTFE		-190...+260 °C (briefly 300 °C) 150 °C	(PTFE)/PFA is resistant to almost all chemicals. The surface is non-adhesive.
Halar coating			A special plastic coating for the probe shaft is available for applications involving particularly aggressive media. The coating offers optimal protection against organic and inorganic substances and corrosion. The coating is impermeable (gas-tight) to steam and gases. Heat resistance up to 150 °C is guaranteed.

### ② b Probe shaft/Installation length dimensions

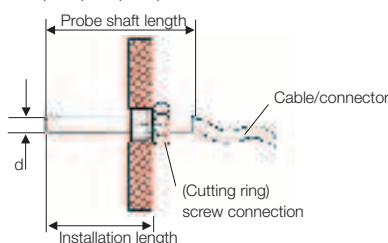
Since the medium to be measured normally has a lower temperature at the process wall, the installation length should be correspondingly long in order to avoid incorrect readings.

Probe shaft without fixed thread

Shown here: Type 03

Also applies to Type 02, 04, 06, 08,

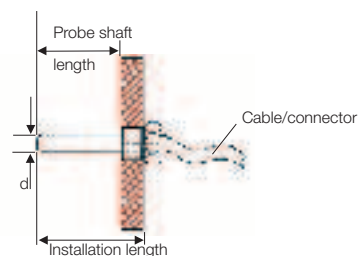
09, 10, 11, 17, 23



Probe shaft with fixed thread

Shown here: Type 13

Applies also to Type 12 and 24



## ③ Selecting lines and insulation (see page 112 for all lines including article numbers)

### ③ a Connection type

#### Four-wire technology (Pt100/NTC)

Standard probes are supplied in four-wire technology. This means that a wire-related influence cannot affect the parameter. Two-wire and three-wire formats can be achieved by wiring cores locally in parallel or are available on request.



4-wire connection  
Standard



3-wire connection



2-wire connection

#### For thermocouples only

Compensating lines (AGL) are sufficient where wire temperatures are between -50 °C and 200 °C (-58 to +392 °F).

Thermocouple lines (TEL) are required for wire temperatures below -50 °C or above 200 °C (-58 to +392 °F).




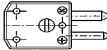





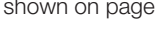
Selection assistance temperature probes

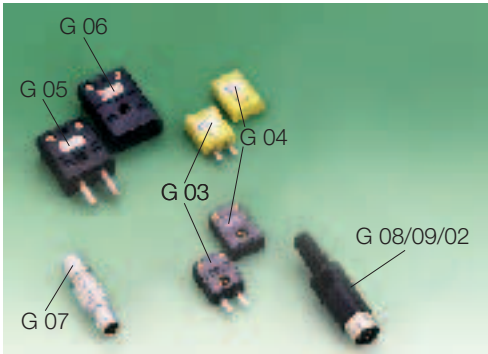
③ b Line insulation. A shielded line is normally recommended (see page 112 for photos and how to order by the metre)

Material	Temperature range	Temperature range	Mechanical properties	Other properties	Order code, Pt100/NTC lines		Order code, thermocouple lines	
	Insulation static	Insulation moving			without shielding	with shielding	without shielding	with shielding
PVC/PUR	-20 to +80 °C (-4 to +176 °F) -20 to +105 °C (for D11*)	+5 to +70 °C (+41 to +158 °F) +5 to +90 °C (at D11*)	Moderate protection	Standard applications, low cost	D 01	D 02	D 11	D 12
Silicone	-50 to +180 °C (-58 to +356 °F)	-25 to +180 °C (-13 to +356 °F)	Flexible, easy to seal, susceptible to damage	Resistant to moisture and temperature	D 03	on request	D 13	on request
FEP	-100 to +205 °C (-148 to +401 °F)	-30 to +205 °C (-22 to +401 °F)	Very robust, less flexible	Resistant to moisture, tem- perature and chemicals	on request	D 04	on request	D 14
PFA/PTFE	-100 to +260 °C (-148 to +500 °F)	-30 to +250 °C (-22 to +482 °F)	Very robust, less flexible	Resistant to moisture, tem- perature and chemicals	D 06	on request	on request	on request
Glass fibre	-25 to +400 °C (-13 to +752 °F)	+20 to +400 °C (+68 to +752 °F)	Best high temperature properties	Susceptible to moisture	on request	D 05	on request	D 15

④ Selecting plug-in connections and couplings

The plug-in connections shown can be selected according to the type of stationary probe (cf. ordering overviews in the probe options). The codes (e.g. G07) are indicated for these plug-in connections and for selecting custom stationary probes (see query for customized temperature probes). If only a single part or replacement part is to be ordered, please refer to the order numbers on page 113.

	G 02	8-pin mini DIN plug
	G 03	Miniature TC connector, glass fibre-reinforced (up to +200 °C/+392 °F)
	G 04	Miniature TC coupling, glass fibre-reinforced (up to +200 °C/+392 °F)
	G 05	TC connector
	G 06	TC coupling
	G 07	Precision plug-in connector, 5-pin, for testo 171 (NTC 10KΩ)
	G 08	DIN round connector (8-pin) Pt100/NTC
	G 09	DIN round connector (8-pin), TC type K with reference junction
	on request	Ceramic connector

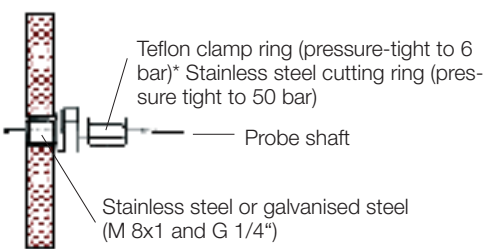


⑤ Clamp screw connections and screwed bushes

There are two basic options for mechanical installation: using a clamp screw connection or by welding in a probe. The order numbers are shown on page 113.

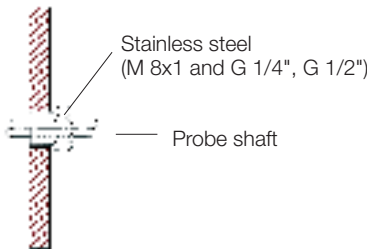
Clamp screw connection

For pressure-tight installation of TC and Pt100/NTC probes (not for types 08, 14, 15, 17, 18, 19, 20, 21)



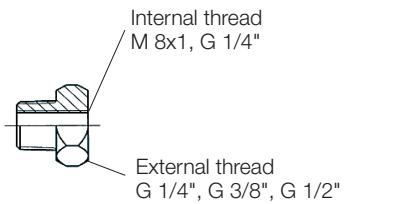
Screwed bush

For welding in, glueing in and soldering of probes (not for types 08, 14, 15, 17, 18, 19, 20, 21)



Reducing piece

For adapting screw connections to the existing thread

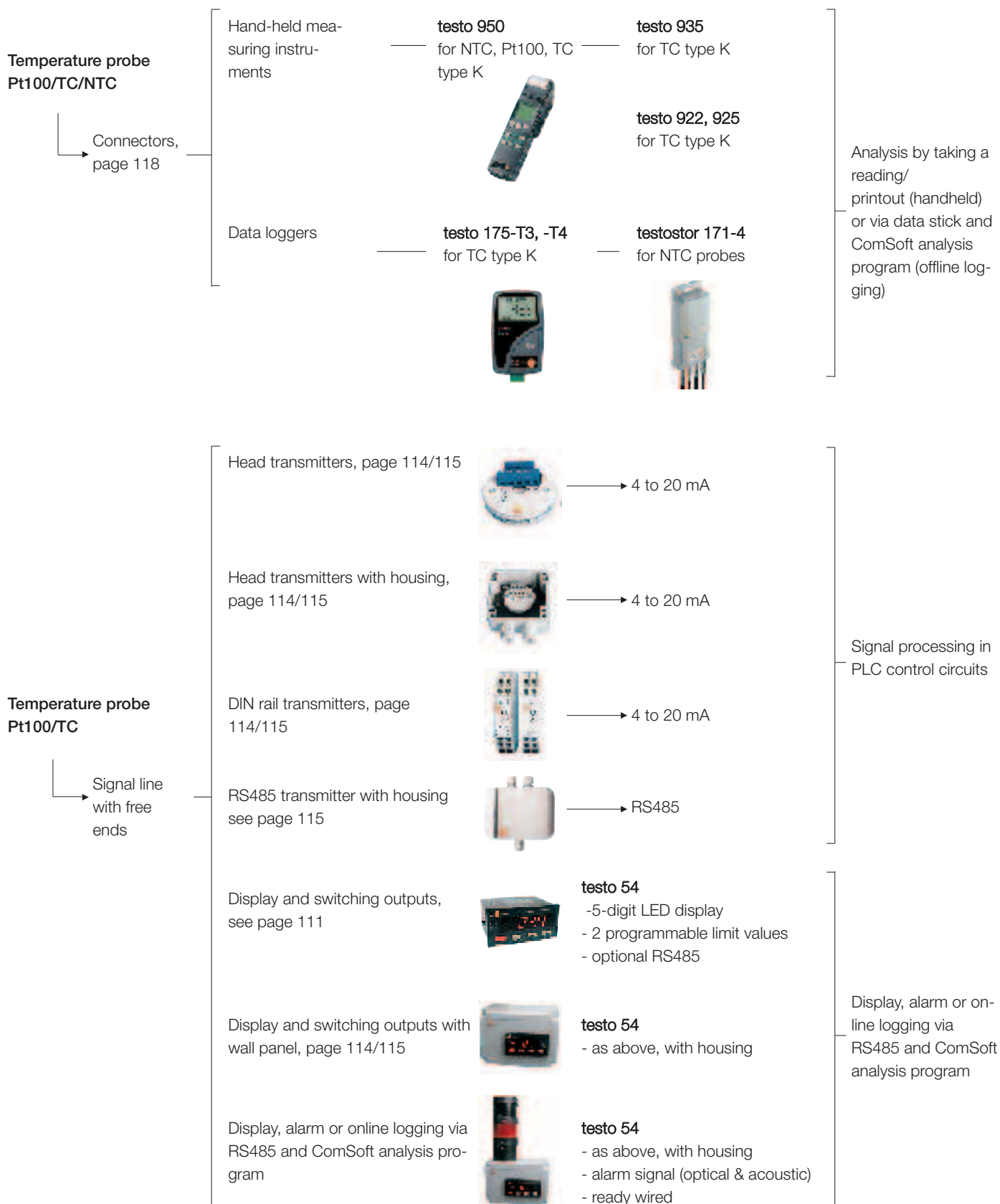


\* The Teflon clamp ring can be sealed tight and reopened several times. The stainless steel cutting ring, however, only shuts tight once (due to deformation).

## Selection assistance temperature probes

### ⑥ Selecting the signal output

Temperature readings can be output in a variety of ways: using a transmitter, a display with or without alarm outputs, a hand-held instrument or a logger. Below is a summary of the options.



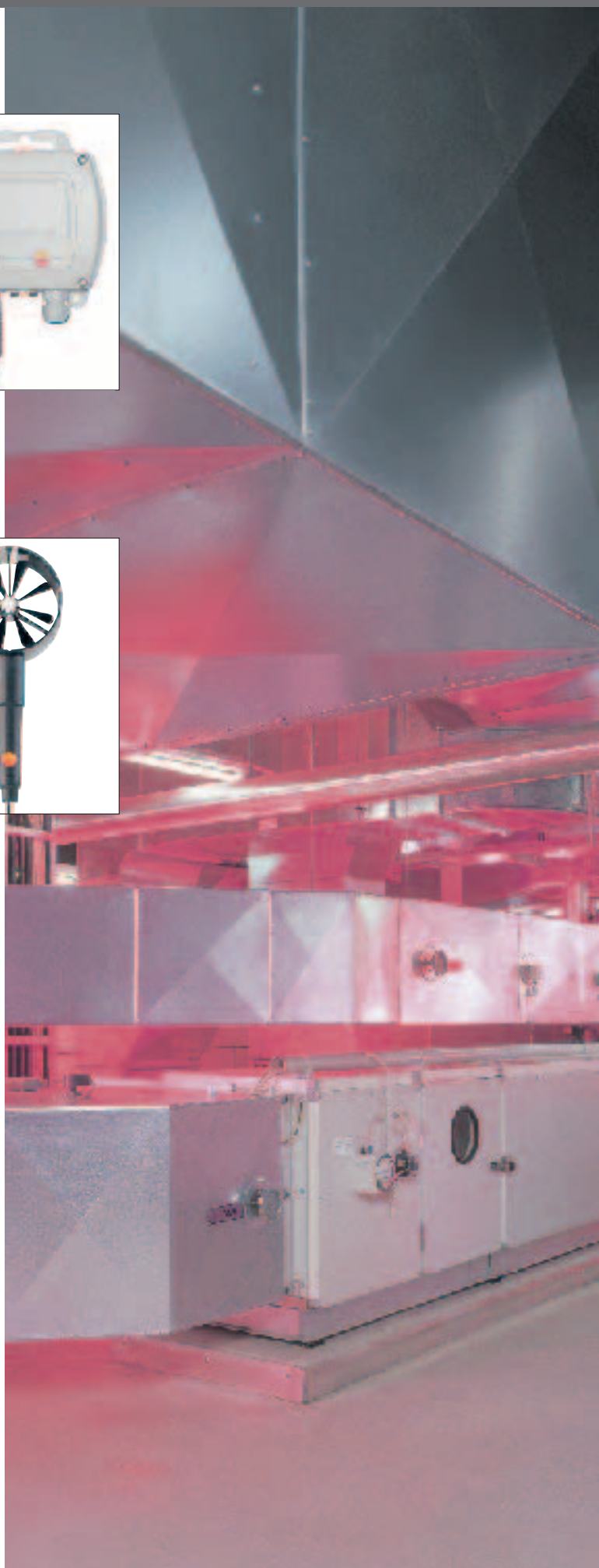
## Stationary flow velocity measurement



Modular flow velocity  
transmitter for stationary  
use



Testo offers a selection of  
various flow velocity probes



## Modular flow velocity transmitters

### The versatile flow velocity transmitter

The flow velocity transmitter can be used in conjunction with the air flow velocity probes of the Testo reference class (vane, hot bulb, and hot wire probes). In addition to this, the instrument offers very high flexibility, especially in the selection of the measurement ranges and the field of application. This makes it ideal for test benches, for example. The air flow velocity as well as the air volume flow, expressed in different units, are available to the user. This means that the possibility of a consumption measurement is also given. Variable norm signals 0(4) to 20mA or 0 to (10)V offer the ideal interface for connection to superordinate controls.

Two display versions with, among other things, switch outputs and an RS485 interface are optionally available. Output channels for flow velocity and temperature with a common earth complete the spectrum (for thermal probes and vanes with thermocouples only).

The transmitter thus offers the ideal solution for your air flow velocity (HVAC) applications.

#### Technical data

Voltage supply	24VDC (15 to 30VDC)
Current consumption	50...120mA (depending on probe connected)
Analog outputs	Two outputs (temperature optional), with common earth, defined according to NAMUR NE43
Analog interface	0(4) to 20mA; 0 to 10V customer-specifically configured
Galvanic isolation	Yes (supply to analog output)
Resolution	~5µA (12 Bit PWM)
Accuracy	0.02mA / 1.5mV or 15mV
Drift analog output	typically 0.3µA/K
Housing	ABS, grey RAL 7035, 130x105 (140)x52mm
Protection class	IP65 (on request), IP 54 (with probe connected)
EMC	According to guideline 89/336 EEC
Ambient temperature	0 to 60 °C (+32 to +140 °F)

All data are based on an ambient temperature of approx. 22 °C



The transmitter for air flow velocity – flexible and customer-specific

#### Flow velocity transmitter

Flow velocity transmitter without display for plug-in probes

**Part no.** 0699 5100/1

#### Configuration unit

Scaling unit for flow velocity transmitters

**Part no.** 0699 5100/12

#### Configuration unit

Mobile configuration unit for flow velocity transmitters 0699 5100/1 for the configuration and parameterization of the flow velocity transmitter. Comparable with the configuration unit for hygrotest (0554 9916), however no batteries are necessary.

- Selection of connectable probes
- Alteration of scale for both channels
- Alteration of measurement units
- Input of absolute pressure (for thermal probes)
- Input of duct surface area (for volume flow measurements)
- Various diagnosis functions

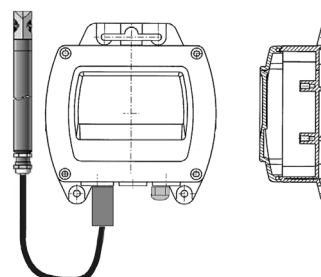
#### Optional displays:

There are two display versions, similar to the H2 (programmable display only), and H5 (additional RS485 and switch outputs) versions in the hygrotest transmitter.

The transmitters can also be programmed (probe type, scaling, unit, absolute pressure input etc.)

0699 5100/10 Measurement value display and programming function

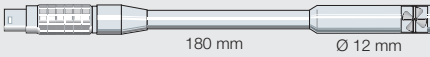
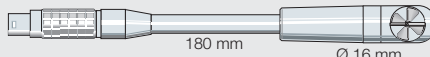
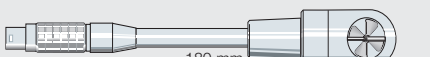

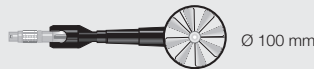
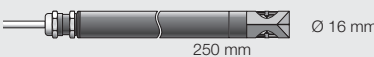

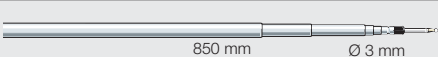
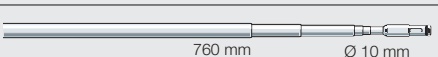
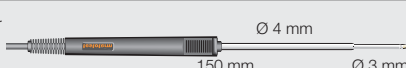

0699 5100/11 Measurement value display, programming function, switch inputs and RS485





## Flow velocity transmitter including probes

The flow velocity transmitter consists of the measuring instrument, probe cable and the respective probe. The flow velocity transmitter with an optional temperature output is available with the following probes:

Probes	Illustration	Probe type	Meas. range	Accuracy	Part no.
Vane probe, Ø 12 mm, can be attached to handle 0430 3545 or telescopic handle 0430 0941	 180 mm Ø 12 mm	Vane	+0.6 to +20 m/s Oper. temp. -30 to +140 °C (-22 to +284 °F)	±(0.2 m/s ±1% of mv) (+0.6 to +20 m/s)	0635 9443*
Vane/temperature probe, Ø 16 mm, attachable to 0430 3545 handle or 0430 0941 telescopic handle	 180 mm Ø 16 mm	Vane Type K (NiCr-Ni)	+0.4 to +60 m/s -30 to +140 °C (-22 to +284 °F)	±(0.2 m/s ±1% of mv) (+0.4 to +40 m/s) ±(0.2 m/s +2% of mv) (+40.1 to +50 m/s)	0635 9540*
Vane/temperature probe, Ø 25 mm, can be attached to 0430 3545 handle or 0430 0941 telescopic handle	 180 mm Ø 25 mm	Vane Type K (NiCr-Ni)	+0.4 to +40 m/s -30 to +140 °C (-22 to +284 °F)	±(0.2 m/s ±1% of mv) (+0.4 to +40 m/s)	0635 9640*
Bendable vane probe (can be bent by 90°), Ø 60 mm, attachable to handle 0430 3545 or telescopic handle 0430 0941, for meas. on ventilation outlets	 Ø 60 mm	Vane	+0.25 to +20 m/s Oper. temp. 0 to +60 °C (32 to +140 °F)	±(0.1 m/s ±1.5% of mv) (+0.25 to +20 m/s)	0635 9440*
Bendable vane probe (can be bent by 90°), Ø 100 mm, attachable to handle 0430 3545 or telescopic handle 0430 0941, for measurements on ventilation outlets	 Ø 100 mm	Vane	+0.2 to +15 m/s Oper. temp. 0 to +60 °C (32 to +140 °F)	±(0.1 m/s ±1.5% of mv) (+0.1 to +15 m/s)	0635 9340*
Vane probe, Ø 16 mm, for stationary assembly, 3 m cable (PVC)	 250 mm Ø 16 mm		+0.4 to +60 m/s Oper. temp. 0 to +70 °C (32 to +158 °F)	±(0.2 m/s ±1% of mv) (+0.4 to +60 m/s)	0628 0036
Robust hot bulb probe, Ø 3 mm, for measurements in the lower velocity range, 2m cable (PVC)	 150 mm Ø 3 mm		0 to +10 m/s -20 to +70 °C (-4 to +158 °F)	±(0.03 m/s ±5% of mv) (0 to +10 m/s)	0628 0035
Robust hot bulb probe, Ø 3 mm, with handle and telescopic handle for measurements in the lower velocity range	 850 mm Ø 3 mm	Hot bulb NTC	0 to +10 m/s -20 to +70 °C (-4 to +158 °F)	±(0.03 m/s ±5% of mv) (0 to +10 m/s)	0635 1049
Quick-action hot wire probe, Ø 10 mm, with telescopic handle, for measurements in the lower velocity range with direction recognition	 760 mm Ø 10 mm	Hot wire NTC	0 to +20 m/s -20 to +70 °C (-4 to +158 °F)	±(0.03 m/s ±4% of mv) (0 to +20 m/s)	0635 1041
Affordable, robust hot bulb probe, Ø 3 mm, for measurements in the lower velocity range, with handle	 150 mm Ø 4 mm Ø 3 mm	Hot bulb NTC	0 to +10 m/s -20 to +70 °C (-4 to +158 °F)	±(0.03 m/s ±5% of mv) (0 to +10 m/s)	0635 1549
Comfort level probe for measuring degree of turbulence, with telescopic handle and stand. Fulfills EN 13779 requirements	 890 mm Ø 90 mm	Hot wire NTC	0 to +5 m/s 0 to +50 °C (32 to +122 °F)	±(0.03 m/s ±4% of mv) (0 to +5 m/s)	0628 0009

\* Attention: can only be used in connection with handle 0430 3545, telescope 0430 0941 or plug-in head cable 0409 0045

Option: metal housing

Accessories: Vane probes	Part no.
Cable, 1.5 m long, for connecting vane probes with plug-in head to the measuring instrument	0409 0045

### Order code (example)

The order code results from the following components:

- 1) Basic number 0555 4444
- 2) Flow velocity transmitter 0699 5100/1 as well as the information on the analog output (V or mA) and the scaling
- 3) Probe order number, e.g.. 0628 0035
- 4) Order number accessories vane probes, e.g. 0430 0941

The total price results from the individual positions.

## Flow velocity transmitter including probes

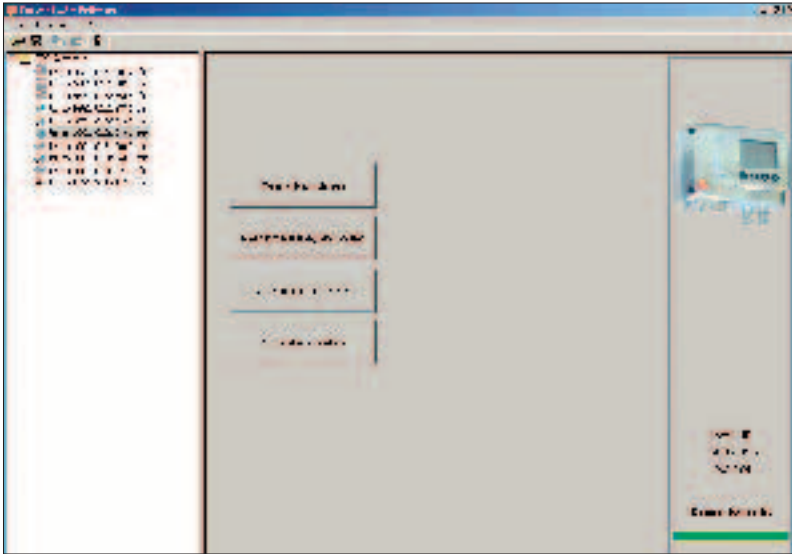
### Flow velocity transmitter (Part no. 0699 5100/1 + Part no. probe)

Ordering suggestions (Set price)	Part no. probe
High temperature vane measurement probe Ø 25 mm, +0.6 to +20 m/s, -40 to +350 °C; Connection cable approx. 1.80 m, fixed – plus probe cable	0635 6045
Vane measurement probe, Ø 12 mm, plug-in, +0.6 to +20 m/s – plus probe cable	0635 9443
Vane/temperature probe, Ø 16 mm, plug-in, +0.4 to +60 m/s, -30 to +140 °C – plus probe cable	0635 9540
Vane/temperature measurement probe, Ø 25 mm, plug-in, +0.4 to +40 m/s, -30 to +140 °C – plus probe cable	0635 9640
Bendable vane probe, Ø 60 mm, plug-in, +0.25 to +20 m/s – plus probe cable	0635 9440
Bendable vane probe, Ø 100 mm, plug-in, +0.2 to +15 m/s – plus probe cable	0635 9340
Vane probe, Ø 16 mm, for stationary assembly, 3 m cable (PVC), +0.4 to +60 m/s	0628 0036
Robust hot bulb probe, Ø 3 mm, for measurements in the lower velocity range, 2m cable (PVC) , 0 to +10 m/s , -20 to +70 °C	0628 0035
Affordable, robust hot bulb probe, Ø 3 mm, for measurements in the lower velocity range, with handle ; 0 to +10 m/s, -20 to +70 °C	0635 1549
Robust hot bulb probe, Ø 3 mm, with handle and telescopic handle for measurements in the lower velocity range ; 0 to +10 m/s , -20 to +70 °C	0635 1049
Quick-action hot wire probe, Ø 10 mm, with telescopic handle, for measurements in the lower velocity range with direction recognition ; 0 to +20 m/s , -20 to +70 °C	0635 1041
Comfort level probe; 0 to +5 m/s, 0 to +50 °C	0628 0009

\* Attention: can only be used in connection with handle 0430 3545, telescope 0430 0941 or plug-in head cable 0409 0045

Option: metal housing

## P2A software for testo transmitter



### Software for parameterization, adjustment and analysis

Optimum procedures from the point of view of the user – that is the central idea of the new measurement transmitter software P2A from Testo. The name stands for

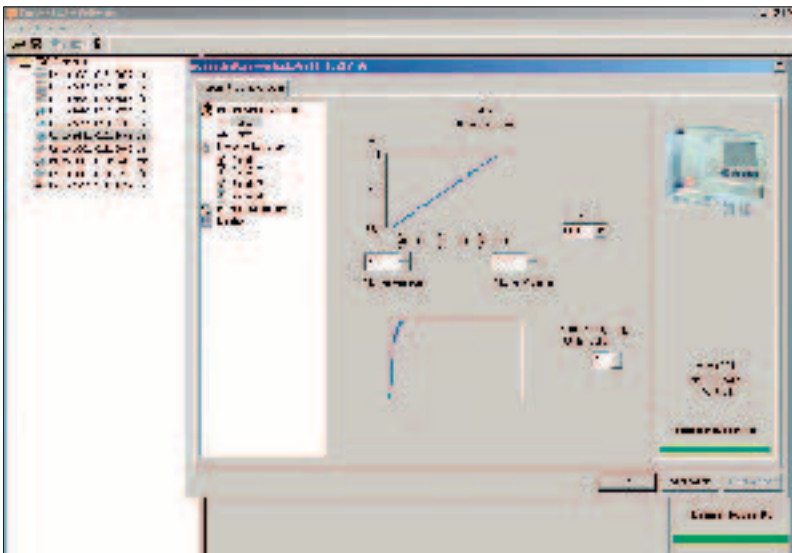
P – Parameterization

A – Adjustment

A – Analysis

All new (and future) Testo measurement transmitters communicate with this software, the connection of the PC (via external or easily accessible interfaces) being extremely easy. And: The P2A software only needs to be bought once – all further updates are free of charge!

An additional advantage is the supply of the measurement transmitter via USB. Parameterization or analysis can thus be carried out without the need for wiring – e.g. at a desk or in a workshop.



### P2A software: Parameterization and file management

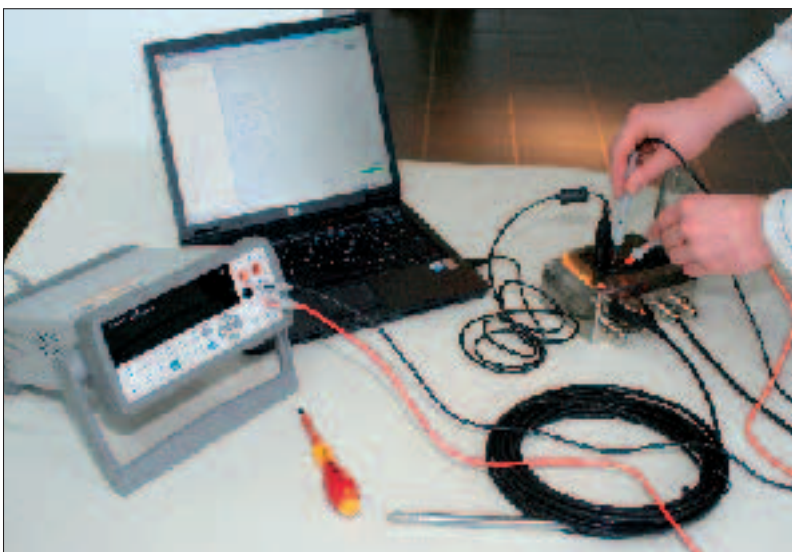
In the course of commissioning, the scaling of the analog channels, the limit values of the (optional) relays, the signal damping etc. are set. The P2A software supports all these procedures with convenient menus which are extensively supported graphically.

Are several measurement sites intended to have the same parameters? No problem – the parameter sets can be transferred by simple drag and drop. This saves considerable time in larger installations.

### P2A software: Adjustment

In addition to the 1-point adjustment (offset) and the 2-point adjustment (with the help of the saline solution pots or a humidity generator), the P2A software supports the analog adjustment of each analog channel. Using a precise multimeter, the entire measurement chain (including the digital-analog converter) can thus be adjusted.

Unique: adjustment histories present in detail who carried out which adjustment when, and at which reference values. This provides uninterrupted documentation, independently of whether the adjustments were carried out with (any) P2A software, the operating menu or the adjustment buttons.



## P2A software for testo transmitter

### P2A software: Analysis and histories

Optimum for error detection or optimization: the analysis tools of the P2A software. The analog and relay signals can be tested and the min./max. values can be displayed.

But how can you look into the past?

#### 1. Parameterization history

All re-scaling, changes of the physical unit etc. are shown here.

#### 2. Adjustment history, divided into

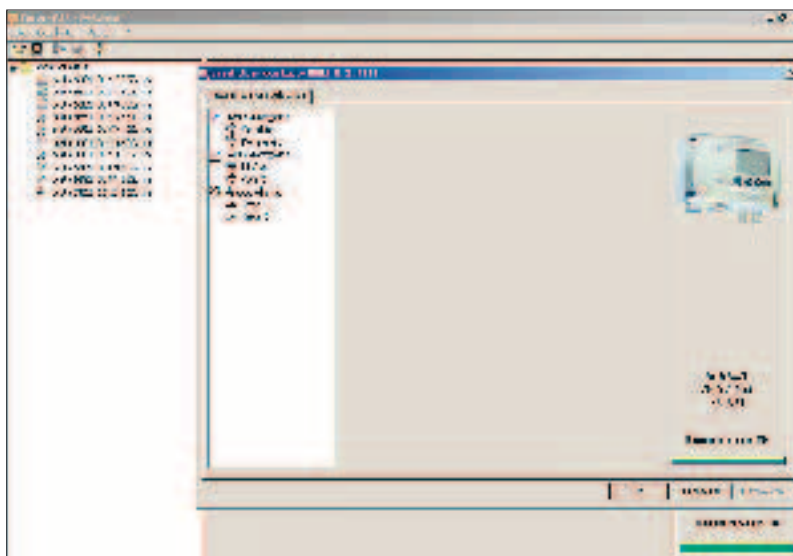
I. 1-point adjustment

II. 2-point adjustment

III. Analog adjustment

#### 3. History of all early warnings/error reports (not for testo 6621)

All warning, error and status reports, which the transmitter has created, are displayed.



The adjustment history is simply and clearly presented in the P2A software

In the testo 6621, all entries (i.e. all parameterizations and adjustments) are stored and clearly displayed in the respective P2A software used.

The transmitters testo 6651 and 6681 also have internal operational hour counters and wrap-around memories, which always store the last 180 entries.

## testo Saveris™ – Measurement data monitoring

In industrial processes, exact temperature and humidity values are crucial.

In a number of applications, testo Saveris helps to collect these values wirelessly by Ethernet, to store them securely and to present them. A selection of alarms which can be used flexibly, support those responsible for the system in keeping the values in the required range.

### Typical applications:

- Monitoring of storage and production climate
- Monitoring of humidity values, e.g. in climate cabinets
- Monitoring of temperatures, e.g. in heat treatment or in climat cabinets



The Saveris wireless and Ethernet probes stand out thanks to their reliable transfer of measurement data by wireless and LAN structure.



The testo Saveris base saves all measurement values in its long-term memory, and sends optical and audible alarm reports, e.g. by SMS.

**Now new!**



The testo analog coupler enables the integration of all transmitters with standardized current/voltage interfaces, e. g. 4 to 20 mA

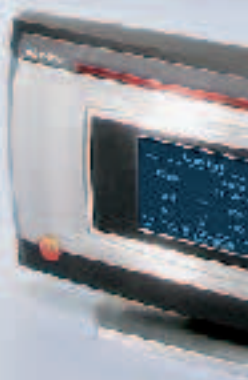
### Note on the radio frequencies

868 MHz: EU countries and certain other countries (e.g. CH, NOR)

2.4 GHz: non-EU countries (country list can be called up under [www.testo.com/saveris](http://www.testo.com/saveris))



The network-capable testo Saveris software offers a central overview of the measurement data, and uninterrupted documentation.



## for climate applications in industrial processes



### Saveris set 1

Set 1: 868 MHz, consisting of base 0572 0120, 3 NTC radio probes without display 0572 1110, mains unit for base 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 1, 868 MHz

Part no. 0572 0110

Set 1: 2.4 GHz, consisting of base 0572 0160, 3 NTC radio probes without display 0572 1150, mains unit for base 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 1, 2.4 GHz

Part no. 0572 0150

### Saveris set 2

Set 2: 868 MHz, consisting of base 0572 0120, 5 NTC radio probes with display 0572 1120, router 0572 0119, 2 mains units for base and router 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 2, 868 MHz

Part no. 0572 0111

Set 2: 2.4 GHz, consisting of base 0572 0160, 5 NTC radio probes with display 0572 1160, router 0572 0159, 2 mains units for base and router 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 2, 2.4 GHz

Part no. 0572 0151

### Saveris set 3

Set 3: 868 MHz, consisting of base 0572 0121 incl. GSM module for SMS alarm, aerial with magnetic base 0554 0525, 5 NTC radio probes with display 0572 1120, router 0572 0119, 2 mains units for base and router 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 3, 868 MHz

Part no. 0572 0112

Set 3: 2.4 GHz, consisting of base 0572 0161 incl. GSM module for SMS alarm, aerial with magnetic base 0554 0525, 5 NTC radio probes with display 0572 1160, router 0572 0159, 2 mains units for base and router 0554 1096 and SBE software 0572 0180 incl. USB cable

### Set 3, 2.4 GHz

Part no. 0572 0152

## testo Saveris™ System overview

### testo Saveris radio probe

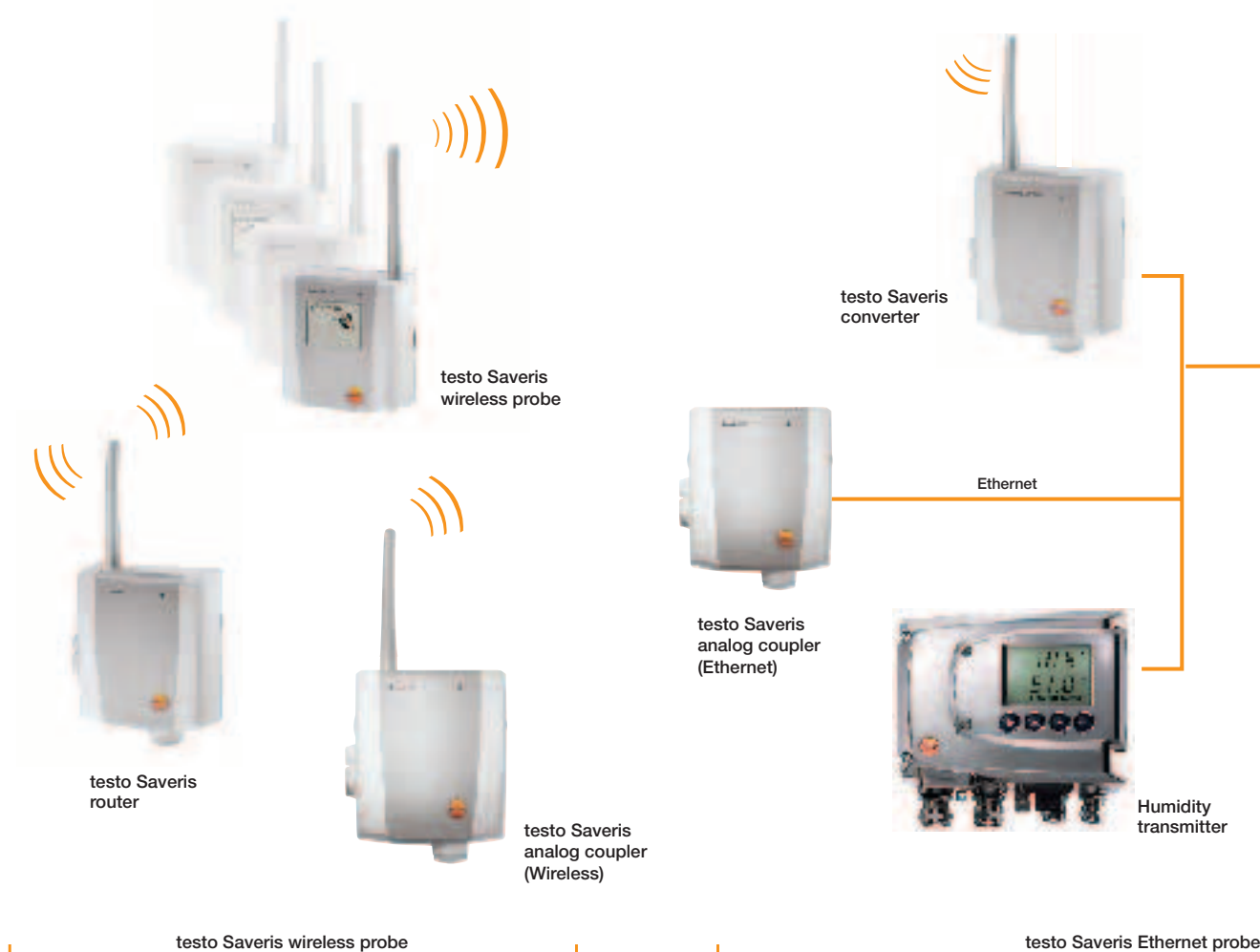
Probe versions with internal and external temperature and humidity sensors allow the adaptation to every application. The radio probes are available with or without a display as an option. The memory in the probe ensures that the measurement data is not lost in the event of an interference in the radio link. Current measurement data, the battery status and the quality of the radio link are shown in the display.

### testo Saveris router

The radio link can be improved or lengthened with poor structural conditions by using a router. Naturally several routers are possible in the testo Saveris system, but several routers are not connected in series.

Through the connection of a converter to an Ethernet jack, the signal of a radio probe can be converted into an Ethernet signal. This combines the flexible connection of the radio

probe with the use of the existing Ethernet even over long transmission paths.



### testo Saveris analog coupler

The two versions of the analog coupler (wireless/Ethernet) allow the inclusion of further measurement parameters into the testo Saveris monitoring system, by integrating all transmitters with standardized current/voltage interfaces, e. g. 4 to 20 mA or 0 to 10 V.

### Humidity transmitter testo 6651/6681

Thanks to the integration of the humidity transmitter, measurement data monitoring is possible parallel to the control. This provides the solution for highest accuracy as well as for special applications (high humidity, trace humidity etc.) in compressed air, drying and air conditioning technology.

Find out more at [www.testo.com/transmitter](http://www.testo.com/transmitter)

### testo Saveris Ethernet probe

In addition to the wireless probes, probes can be used which are directly connectable to the Ethernet. This allows the existing LAN infrastructure to be used, making data transfer from the probe to the base possible, even over long distances.

By connecting a converter to an Ethernet socket, the signal from a wireless probe can be converted to an Ethernet signal. This combines the flexible positioning of a wireless probe with the use of the existing Ethernet even over long transfer distances.

## testo Saveris™ System overview

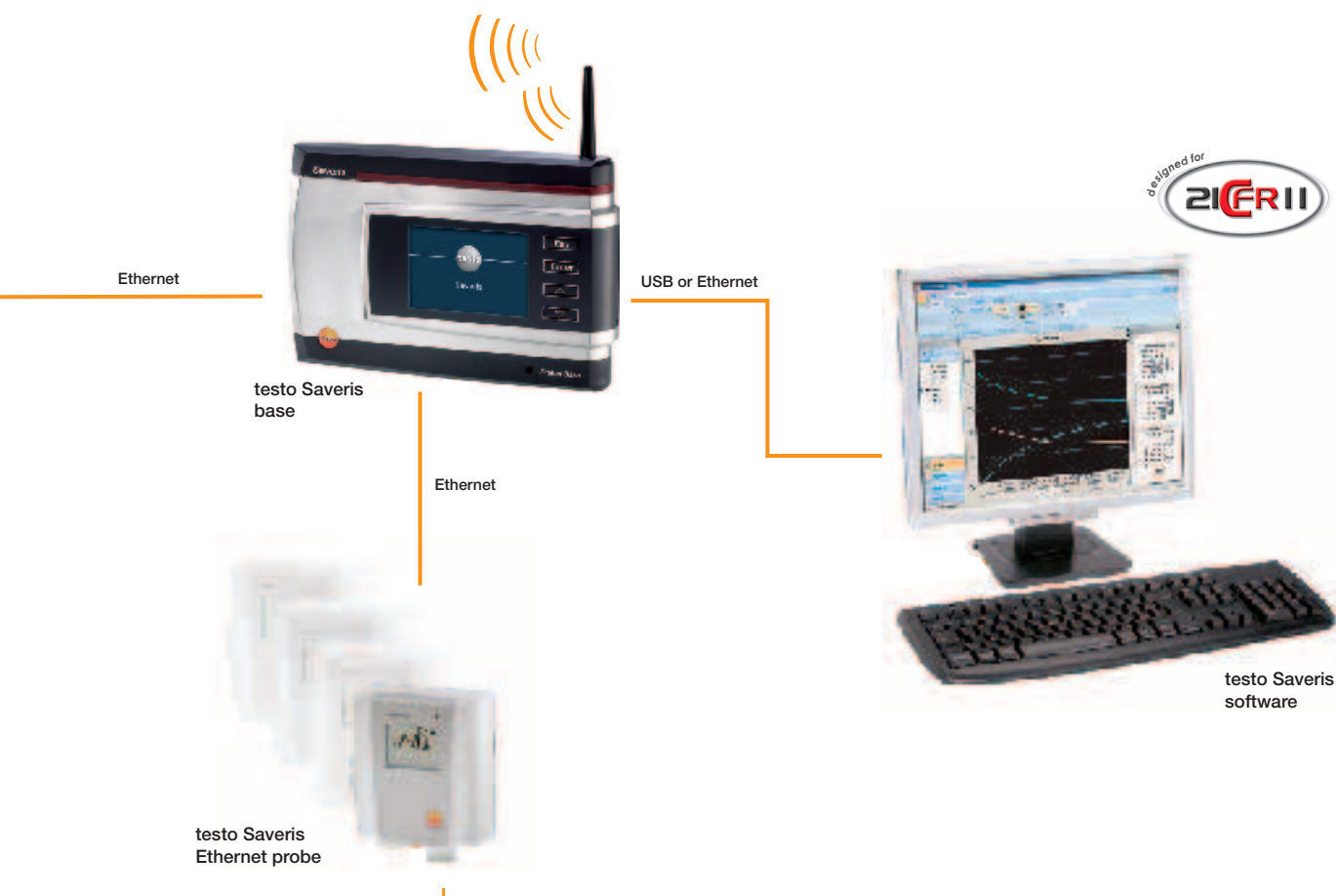
### testo Saveris base

The base is the heart of testo Saveris and can save 40,000 readings per measurement channel independent of the PC. This corresponds to around one year of memory capacity at a measuring rate of 15 minutes. The system data and alarms are visible via the display of the Saveris base.

### testo Saveris software

The testo Saveris software offers simple operation and an intuitive user interface. The Saveris software is available in two different versions: as the basic version SBE (Small Business Edition) or the PROF (Professional) software version with diverse additional options, or as a CFR version. The CFR software fulfils the

requirements of 21 CFR Part 11 of the FDA, and is thus validatable.








Overview of software versions	SBE	PROF	CFR
Simple installation and configuration	•	•	•
Diagrams/tables/alarm overview/PDF reports	•	•	•
Calendar management	•	•	•
Representation of probe groups	•	•	•
Transmission of alarms (e-mail, SMS, relay)	•	•	•
Comprehensive alarm management		•	•
Automatic refresh of measurement data ("Online mode")		•	•
Measurement data on background photo of locations		•	•
Integration into network (client server)		•	•
Conform to 21CFR11 (validatable)			•
Electronic signature			•
Audit trail			•
Allocation of access rights on 3 user levels			•



## testo Saveris™ Components: Radio probes






Probe versions with internal and external temperature sensors and with humidity sensors allow the adaptation to every application. The radio probes are available with or without a display as an option. Current measurement data, the battery status and the quality of the radio link are shown in the display.

		°C / °F					
		NTC internal	NTC internal	NTC external	TC external	Pt 100 external	
Radio							
		<b>Saveris T1</b> Radio probe with internal NTC	<b>Saveris T2</b> Radio probe with external probe connection and internal NTC, door contact	<b>Saveris T3</b> 2-channel radio probe with 2 external TC probe connections (Choice of TC characteristics)	<b>Saveris Pt</b> Radio probe with 1 external Pt100 probe connection		
	Internal sensor	Probe type	NTC	NTC			
		Meas. range	-35 to +50 °C	-35 to +50 °C			
Accuracy		±0.4 °C (-25 to +50 °C) ±0.8 °C (remaining range)	±0.4 °C (-25 to +50 °C) ±0.8 °C (remaining range)				
Resolution		0.1 °C	0.1 °C				
External probe	Probe type		NTC	TC type K TC type T	TC type J TC type S	Pt100	
	Meas. range (Instrument)		-50 to +150 °C	-195 to +1350 °C -200 to +400 °C	-100 to +750 °C 0 to +1760 °C	-200 to +600 °C	
	Accuracy (Instrument)		±0.2 °C (-25 to +70 °C) ±0.4 °C (remaining range)	±0.5 °C or 0.5% of mv		at 25 °C ±0.1 °C (0 to +60 °C) ±0.2 °C (-100 to +200 °C) ±0.5 °C (remaining range)	
	Resolution (Instrument)		0.1 °C	0.1 °C / TC type S 1 °C		0.01 °C	
Conn.			NTC via mini-DIN socket, door contact connection cable included in delivery (1.80 m)	2 TCs via TC socket, max. difference in potential 2 V		1 Pt100 via mini-DIN socket	
Dimensions (housing):		80 x 85 x 38 mm					
Weight		Approx. 240 g					
Battery life (Type: 4 AA batteries)		Battery life at +25 °C, 3 years; for freezer applications, 3 years with L91 Photo lithium Energizer batteries)					
Material/Housing		Plastic					
Protection class		IP68		IP54		IP68	
Radio frequency		868 MHz / 2.4 GHz					
Measuring rate		Standard 15 min, 1 min to 24 h can be set					
Conformity with standards		DIN EN 12830					
Oper. temp.		-35 to +50 °C		-20 to +50 °C			
Storage temp.		-40 to +55 °C					
Display (optional)		LCD, 2 lines; 7-segment with symbols					
Transmission distance		approx. 300 m free field at a frequency of 868 MHz, approx. 100 m free field at a frequency of 2.4 GHz					
Wall bracket		included					

Ordering data Wireless probes	Part no.		Part no.	
	Version without display		Version with display	
	868 MHz	2.4 GHz	868 MHz	2.4 GHz
Saveris T1 Radio probe with internal NTC	0572 1110	0572 1150	0572 1120	0572 1160
Saveris T2 Radio probe with external probe connection and internal NTC, door contact	0572 1111	0572 1151	0572 1121	0572 1161
Saveris T3 2-channel radio probe with 2 external TC probe connections (Choice of TC characteristics)	0572 9112	0572 9152	0572 9122	0572 9162
Saveris Pt Radio probe with 1 external Pt100 probe connection	0572 7111	0572 7151	0572 7121	0572 7161

The alkali manganese batteries AA (0515 0414) are included in these ordering data (analog coupler excluded). Saveris probes are delivered with a calibration protocol of the factory adjustment data. Calibration certificates must be ordered separately.

# testo Saveris™ Components: Radio probes

		°C / °F and %RH				mA and V		
	%RH NTC external		%RH NTC internal		%RH NTC external		mA V internal	
								
Radio	Saveris H2D Wireless humidity probe		Saveris H3 Humidity radio probe		Saveris H4D Wireless probe with 1 external humidity probe connection		Saveris U1 Wirelss probe with current/ voltage output	
Internal sensor	Probe type		NTC		Humidity sensor		1 channel: current/voltage input	
	Meas. range		-20 to +50 °C		0 to 100 %RH		2-wire: 4 to 20 mA, 4-wire: 0/4 to 20 mA, 0 to 1/5/10 V, load: max. 160 Ω at 24 V DC	
	Accuracy		±0.5 °C		±3 %RH		Current ±0.03 mA / 0.75 µA Voltage 0 to 1 V ±1.5 mV/39 µV Voltage 0 to 5 V ±7.5 mV / 0.17 mV Voltage 0 to 10 V ±15 mV / 0.34 mV ±0.02% of. m.v./K deviating from nominal temperature 22 °C	
	Resolution		0.1 °C		0.1 °C / 0.1 °C td			
External probe	Probe type		NTC		Humidity sensor			
	Meas. range (Instrument)		-20 to +50 °C		0 to +100 %RH*		-20 to +70 °C 0 to +100 %RH*	
	Accuracy(Instrument)		±0.5 °C		to 90 %RH: ±2 %RH > 90 %RH: ±3 %RH		±0.2 °C see probes	
	Resolution (Instrument)		0.1 °C		0.1% / 0.1 °C td		0.1 °C 0.1% / 0.1 °C td	
Conn.		non-exchangeable stump probe		1 x external humidity probe mini DIN socket		2 or 4-wire current/ voltage output  Service interface mini DIN for adjustment		
Dimensions (housing):		85 x 100 x 38 mm		80 x 85 x 38 mm		Approx. 85 x 100 x 38 mm		
Weight		Approx. 256 g		Approx. 245 g		Approx. 240 g		
Battery life (Type: 4 AA batteries)		Battery life at +25 °C, 3 years; for freezer applications, 3 years with L91 Photo lithium Energizer batteries)					Supply: Mains unit 6.3 V DC, 2 to 30 V DC max. 25 V AC	
Material/Housing		Plastic						
Protection class		IP54		IP42		IP54		
Radio frequency		868 MHz / 2.4 GHz						
Measuring rate		Standard 15 min, 1 min to 24 h can be set						
Oper. temp.		-20 to +50 °C						
Storage temp.		-40 to +55 °C						
Display (optional)		LCD, 2 lines; 7-segment with symbols					(no display)	
Transmission distance		approx. 300 m free field at a frequency of 868 MHz, approx. 100 m free field at a frequency of 2.4 GHz						
Wall bracket		included						

\*not for continuous high-humidity applications

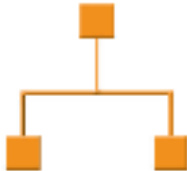



Ordering data Wireless probes	Part no.	Part no.	Part no.	Part no.
	Version without display		Version with display	
	868 MHz	2.4 GHz	868 MHz	2.4 GHz
Saveris H3 Wireless probe with internal humidity sensor	0572 6110	0572 6150	0572 6120	0572 6160
Saveris H2D Wireless probe with external humidity sensor 2%RH, radio frequency 868 MHz (with display)			0572 6122	0572 6162
Saveris H4D Wireless humidity probe with external probe connection, radio frequency 868 MHz (with display)			0572 6124	0572 6164
Saveris U1 Analog coupler with 1 current/voltage output (order mains unit separately)	0572 3110	0572 3150		

The alkali manganese batteries AA (0515 0414) are included in these ordering data (analog coupler excluded). Saveris probes are delivered with a calibration protocol of the factory adjustment data. Calibration certificates must be ordered separately.



## testo Saveris™ Components: Ethernet probes






The existing LAN infrastructure can be used through the Ethernet probe. This allows the data transfer from the probe to the base, even over long distances. Ethernet probes have a display.

 <b>Ethernet</b>		°C			
		<div><div>NTC</div><div>externa</div><div></div><div>Saveris T1E</div><div>Ethernet probe with 1 external probe connection NTC</div></div>	<div><div>TC</div><div>externa</div><div></div><div>Saveris T4E</div><div>4-channel Ethernet probe with 4 external TC probe connections</div></div>	<div><div>Pt 100</div><div>externa</div><div></div><div>Saveris PtE</div><div>Ethernet probe with external Pt100 probe connection</div></div>	
Internal sensor					
External probe	Probe type	NTC	TC type K	TC type J	Pt100
	Meas. range (Instrument)	-50 to +150 °C	-195 to +1350 °C	-100 to +750 °C	-200 to +600 °C
	Accuracy (Instrument)	±0.2 °C (-25 to +70 °C) ±0.4 °C (remaining range)	TC type T -200 to +400 °C	TC type S 0 to +1760 °C	at 25 °C ±0.1 °C (0 to +60 °C) ±0.2 °C (-100 to +200 °C) ±0.5 °C (remaining range)
	Resolution (Instrument)	0.1 °C	0.1 °C / TC type S 1 °C		0.01 °C
Conn.	1 x NTC via mini DIN socket		4 TCs via TC socket, max. difference in potential 50 V		1 Pt100 via mini-DIN socket
Mini-DIN service interface for adjustment is accessible externally					
Dimensions (housing):	Approx. 85 x 100 x 38 mm				
Weight	Approx. 220 g				
Power	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE				
Buffer battery	Li-ion				
Material/Housing	Plastic				
Protection class	IP54				
Measuring rate	2 s to 24 h				
Oper. temp.	-20 to +60 °C				
Storage temp.	-40 to +60 °C				
Power consumption	PoE Class 0 (typical ≤ 3 W)				
Display (optional)	LCD, 2 lines; 7-segment with symbols				
Wall bracket	included				

Ordering data Ethernet probes	Part no.
Saveris T1E Ethernet probe with 1 external probe connection NTC	0572 1191
Saveris T4 E 4-channel Ethernet probe with 4 external TC probe connections (With display)	0572 9194
Saveris Pt E Ethernet probe with external Pt100 probe connection (With display)	0572 7191
Saveris H1 E Humidity Ethernet probe 1 % (With display)	0572 6191
Saveris H2 E Humidity Ethernet probe 2 % (With display)	0572 6192
Saveris H4E Ethernet humidity probe with external probe connection (with display)	0572 6194
Saveris U1E Etheret analog coupler with 1 current/voltage output	0572 3190

Saveris probes are delivered with a calibration protocol of the factory adjustment data. Calibration certificates must be ordered separately. Mains units are not included in delivery.

# testo Saveris™ Components: Ethernet probes

		°C / °F and %rF				mA and V				
		%RH	NTC	%RH	NTC	%RH	NTC	mA	V	
		external		external		external		internal		
<div></div> <div>Ethernet</div>		<div></div> <div>Saveris H1E</div> <div>Humidity Ethernet probe 1%</div>		<div></div> <div>Saveris H2E</div> <div>Humidity Ethernet probe 2 %</div>		<div></div> <div>Saveris H4E</div> <div>Ethernet probe with external humidity probe connection</div>		<div></div> <div>Saveris U1E</div> <div>Ethernet probe with current/voltage</div>		
		Probe type						1 channel: current/voltage		
		Meas. range						2-wire: 4 to 20 mA, 4-wire: 0/4 to 20 mA, 0 to 1/5/10V, load: max. 160 Ω at 24 V DC		
		Accuracy						Current ±0,03 mA / 0.75 µA Voltage 0 to 1 V ±1.5 mV / 39 µV Voltage 0 to 5 V ±7.5 mV / 0.17 mV Voltage 0 to 10 V ±15 mV / 0.34 mV ±0.02% of. m.v./K deviating from nominal temperature 22 °C		
		Resolution								
Internal sensor	Probe type									
	Meas. range (Instrument)									
	Accuracy (Instrument)									
	Resolution (Instrument)									
External probe	Probe type		NTC		Humidity sensor		NTC		Humidity sensor	
	Meas. range (Instrument)		-20 to +70 °C		0 to 100 %RH*		-20 to +70 °C		0 to 100 %RH*	
	Accuracy (Instrument)		±0.2 °C (0 to +30 °C) ±0.5 °C (remaining range)		to 90 %RH: ±(1 %RH + 0.7 % of mv) at +25 °C > 90 %RH: ±(1.4 %RH + 0.7 % of mv) at +25 °C		±0.2 °C (0 to +30 °C) ±0.5 °C (remaining range)		to 90 %RH: ±(1 %RH + 0.7 % of mv) at +25 °C > 90 %RH: ±(1.4 %RH + 0.7 % of mv) at +25 °C	
	Resolution (Instrument)		0.1 °C		0.1% / 0.1 °C td		0.1 °C		0.1% / 0.1 °C td	
Conn.						1 x external Ethernet humidity probe mini DIN socket		1 x 2- or 4-wire current/voltage		
		Mini-DIN service interface is accessible externally								
Dimensions (housing):		Approx. 85 x 100 x 38 mm								
Weight		Approx. 230 g				Approx. 254 g		Approx. 240 g		
Power		6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE								
Buffer battery		Li-ion								
Material/Housing		Plastic								
Protection class		IP54								
Measuring rate		2 s to 24 h								
Oper. temp.		-20 to +60 °C								
Storage temp.		-40 to +60 °C								
Power consumption		PoE Class 0 (typical ≤ 3 W)								
Display (optional)		LCD, 2 lines; 7-segment with symbols						no display		
Wall bracket		included								

\*not for continuous high-humidity applications

Sintered caps for Saveris H1 E, H2 E and H2 D Ethernet probes	Illustration	Part no.
Metal protective cap (open), fast reaction time at flow velocities < 7 m/s (not suitable for dusty atmospheres), for measurement in flow velocities of less than 10 m/s		0554 0755
Stainless steel sintered filter, pore size 100 µm, probe protection in dusty atmospheres or higher flow velocities		0554 0647
Wire mesh filter, probe protection from coarse particles		0554 0757
Sintered PTFE filter, Ø 12 mm, for corrosive media, High humidity range (long-term measurements), high flow velocities.		0554 0756
testo saline pots for control and humidity adjustment of humidity probes, 11.3 %RH and 75.3 %RH with adapter for humidity probe, quick checks or calibration of humidity probe		0554 0660



## testo Saveris™ Components: Base, Router, Converter and accessories

Base	Part no.	Saveris router	Part no.
Saveris base, radio frequency 868 MHz	0572 0120	Saveris router, 868 MHz, radio transmission medium	0572 0119
Saveris base, radio frequency 868 MHz, GSM module integrated (for SMS alarm)	0572 0121	Saveris router, 2.4 GHz, radio transmission medium	0572 0159
Saveris base, radio frequency 2.4 GHz	0572 0160	Saveris converter	Part no.
Saveris base, radio frequency 2.4 GHz, GSM module integrated (for SMS alarm)	0572 0161	Saveris converter, 868 MHz, converts the radio transmission medium to Ethernet	0572 0118
No mains units or aerials with magnetic base are contained in this ordering data.		Saveris converter, 2.4 GHz, converts the radio transmission medium to Ethernet	0572 0158
		No mains units are contained in this ordering data.	
Power supply	Part no.	Software	Part no.
Battery for radio probe (4 AA alkali manganese mignon batteries)	0515 0414	SBE software, incl. USB connecting cable base-PC	0572 0180
Battery for radio probe for use below -10 °C (4 Energizer L91 Photo lithium)	0515 0572	PROF software, incl. USB connecting cable base-PC	0572 0181
100-240 V AC / 6.3 V DC international mains unit for mains operation or battery charging in instrument	0554 1096	CFR software, incl. Ethernet connection cable PC to Base	0572 0182
Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A)	0554 1749	Saveris adjustment software incl. connection cable for wireless and Ethernet probes	0572 0183
Mains unit (desk-top) 110 to 240 VAC/24 VDC (350mA)	0554 1748		
Other features	Part no.	Calibration Certificates	Part no.
Magnetic foot aerial (dualband) with 3 m cable, for base with GSM module (not suitable for USA, Canada, Chile, Argentina, Mexico)	0554 0524	ISO calibration certificate/temperature Temperature probes; calibration points -8 °C; 0 °C; +40 °C per channel/instrument (suitable for Saveris T1/T2)	0520 0171
Magnetic foot aerial (quadband) for base with GSM module	0554 0525	ISO calibration certificate/temperature Temperature probes; calibration points -18 °C; 0 °C; +60 °C; per channel/instrument (not suitable for Saveris T1/T2)	0520 0151
Alarm module (visual + acoustic), can be connected to base alarm relay, Ø 70 x 164 mm, 24 V AC/DC / 320 mA, perm. light: red, perm. tone: buzzer approx. 2.4 kHz (Mains unit 0554 1749 required)	0572 9999 ID-Nr. 0699 6111/1	DKD calibration certificate/temperature Temperature probes; calibration points -20 °C; 0 °C; +60 °C; per channel/instrument (not suitable for Saveris T1/T2)	0520 0261
Programming adapter (from mini-DIN to USB) for Ethernet probe and converter (necessary if no DHCP server available)	0440 6723	ISO calibration certificate humidity Humidity probe, calibration points 11.3 %RH and 75.3 %RH at +25 °C/+77 °F; per channel/instrument	0520 0076
		DKD calibration cert./humidity Humidity probe, calibration points 11.3 %RH and 75.3 %RH at +25 °C; per channel/instrument	0520 0246

### Magnetic foot aerial (dualband)



Magnetic foot aerial (dualband) with 3 m cable, for base with GSM module (not suitable for USA, Canada, Chile, Argentina, Mexico)

Part no. 0554 0524

### Alarm module



Alarm module (visual + acoustic), can be connected to base alarm relay, Ø 70 x 164 mm, 24 V AC/DC / 320 mA, perm. light: red, perm. tone: buzzer approx. 2.4 kHz (Mains unit 0554 1749 required)  
ID-Nr. 0699 6111/1

Part no. 0572 9999

### Software versions



SBE software, incl. USB connecting cable base-PC

Part no. 0572 0180

PROF software, incl. USB connecting cable base-PC

Part no. 0572 0181

CFR software, incl. Ethernet connection cable PC to Base

Part no. 0572 0182

# testo Saveris™ Technical data



## Technical data

Technical data	Saveris-Base
Memory	40,000 values per channel (total max. 10,160,000 values)
Dimensions	225 x 150 x 49 mm
Weight	Approx. 1510 g
Protection class	IP42
Material/Housing	Diecast zinc / plastic
Radio frequency	868 MHz / 2.4 GHz
Power supply (absolutely necessary)	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, power consumption < 4 W
Rech. batt.	Li-ion battery (for data back-up and for emergency SMS if power supply fails)
Oper. temp.	-10 to +50 °C
Storage temp.	-40 to +60 °C
Display	graphical display, 4 control keys
Interfaces	USB, radio, Ethernet
Connectable radio probe	max. 15 probes can be directly connected via radio interface, max. 150 total via radio / router / converter / Ethernet, max. 254 channels
Alarm relay	max. 1 A, max. 30 W, max. 60/25 V DC/AC, NC or NO contact
GSM module	850 / 900 / 1800 / 1900 MHz not valid for Japan and South Korea
Set up	Table base and wall bracket included

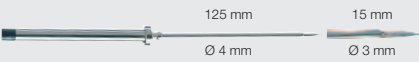
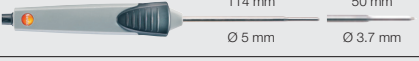


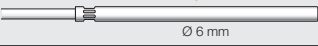
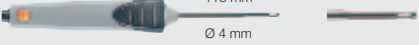
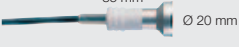

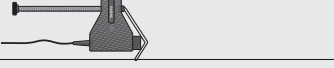

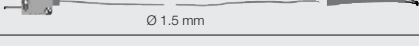
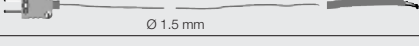
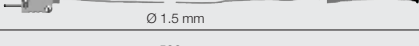
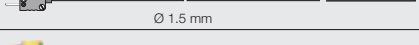

## Technical data

Technical data	Saveris router	Saveris converter
Dimensions	Approx. 85 x 100 x 38 mm	Approx. 85 x 100 x 35 mm
Weight	Approx. 180 g	Approx. 190 g
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, power consumption < 0.5 W	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE, power consumption < 2 W
Oper. temp.	-20 to +50 °C	-20 to +50 °C
Storage temp.	-40 to +60 °C	-40 to +60 °C
Material/Housing	Plastic	Plastic
Protection class	IP54	IP54
Interfaces	Radio	Radio, Ethernet
Connectable radio probe	max. 5	max. 15
Wall bracket	included	included



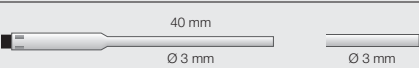
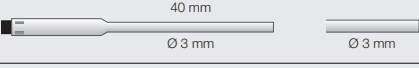
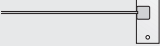
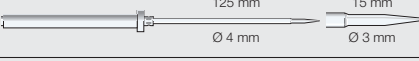
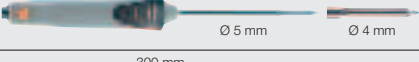
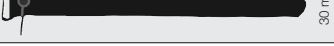


## testo Saveris™ Accessories: External temperature probes

Pt100	Plug-in probes	Illustration	Meas. range	Accuracy	t99	Part no.
	Robust, Pt100 stainless steel food probe (IP65)		-50 to +400 °C	Class A (-50 to +300 °C), Class B (remaining range)	10 s	0609 2272 Conn.: Fixed cable
	Robust, waterproof Pt100 immersion/penetration probe		-50 to +400 °C	Class A (-50 to +300 °C), Class B (remaining range)	12 s	0609 1273 Conn.: Fixed cable
Connection cable for unlimited Pt100 stationary probes with screw terminals (4-wire technology), max. cable length: 20 m						0554 0213



TC	Plug-in probes	Illustration	Meas. range	Accuracy	t99	Part no.
	Stationary probe with stainless steel sleeve, TC Type K		-50 to +205 °C	Class 2*	20 s	0628 7533 Conn.: Fixed cable 1.9 m
	Robust air probe, T/C Type K		-60 to +400 °C	Class 2*	25 s	0602 1793 Conn.: Fixed cable 1.2 m
	Magnetic probe, adhesive force approx. 20 N, with magnets, for measurements on metal surfaces, TC Type K		-50 to +170 °C	Class 2*	150 s	0602 4792 Conn.: Fixed cable
	Magnetic probe, adhesive force approx. 10 N, with magnets, for higher temp., for measurements on metal surfaces, TC Type K		-50 to +400 °C	Class 2*		0602 4892 Conn.: Fixed cable 1.6 m
	Pipe wrap probe for pipe diameter 5 to 65 mm, with exchangeable measuring head. Meas. range short-term to +280°C, TC Type K		-60 to +130 °C	Class 2*	5 s	0602 4592 Conn.: Fixed cable 1.2 m
	Pipe wrap probe with Velcro strip, for temperature measurement on pipes with diameter up to max. 120 mm, Tmax +120°C, TC Type K		-50 to +120 °C	Class 1*	90 s	0628 0020 Conn.: Fixed cable 1.5 m
	Thermocouple with TC adapter, flexible, 800mm long, fibre glass, TC Type K		-50 to +400 °C	Class 2*	5 s	0602 0644
	Thermocouple with TC adapter, flexible, 1500mm long, fibre glass, TC Type K		-50 to +400 °C	Class 2*	5 s	0602 0645
	Thermocouple with TC adapter, flexible, 1500mm long, PTFE, TC Type K		-50 to +250 °C	Class 2*	5 s	0602 0646
	Immersion tip, flexible, TC Type K		-200 to +1000 °C	Class 1*	5 s	0602 5792
	Immersion measurement tip, flexible, for measurements in air/exhaust gases (not suitable for measurements in smelters), TC Type K		-200 to +1300 °C	Class 1*	4 s	0602 5693

\*According to standard EN 60584-2, the accuracy of Class 1 refers to -40 to +1000 °C (Type K), Class 2 to -40 to +1200 °C (Type K), Class 3 to -200 to +40 °C (Type K).

NTC	Plug-in probes	Illustration	Meas. range	Accuracy	t99	Part no.
	Stub probe, IP 54		-20 to +70 °C	±0.2 °C (-20 to +40 °C) ±0.4 °C (+40.1 to +70 °C)	15 s	0628 7510
	Stationary probe with aluminium sleeve, IP 65		-30 to +90 °C	±0.2 °C (0 to +70 °C) ±0.5 °C (remaining range)	190 s	0628 7503* Conn.: Fixed cable 2.4 m
	Accurate imm./pen. probe, 6m cable, IP 67		-35 to +80 °C	±0.2 °C (-25 to +74.9 °C) ±0.4 °C (remaining range)	5 s	0610 1725* Conn.: Fixed cable 6 m
	Accurate immersion/penetration probe, cable: 1.5 m long, IP 67		-35 to +80 °C	±0.2 °C (-25 to +74.9 °C) ±0.4 °C (-35 to -25.1 °C) ±0.4 °C (+75 to +80 °C)	5 s	0628 0006* Conn.: Fixed cable 1.5 m
	Wall surface temperature probe, e.g. to prove damage in building material		-50 to +80 °C	±0.2 °C (0 to +70 °C)	20 s	0628 7507 Conn.: Fixed cable 3 m
	Stainless steel NTC food probe (IP65) with PUR cable		-50 to +150 °C <sup>2)</sup>	±0.5% of mv (+100 to +150 °C) ±0.2 °C (-25 to +74.9 °C) ±0.4 °C (remaining range)	8 s	0613 2211* Conn.: Fixed cable 1.6 m
	Waterproof NTC immersion/penetration probe		-50 to +150 °C	±0.5% of mv (+100 to +150 °C) ±0.2 °C (-25 to +74.9 °C) ±0.4 °C (remaining range)	10 s	0613 1212 Conn.: Fixed cable 1.2 m
	Pipe wrap probe with Velcro for pipe diameter to max. 75 mm, Tmax. +75°C, NTC		-50 to +70 °C	±0.2 °C (-25 to +70 °C) ±0.4 °C (-50 to -25.1 °C)		0613 4611 Conn.: Fixed cable 1.5 m

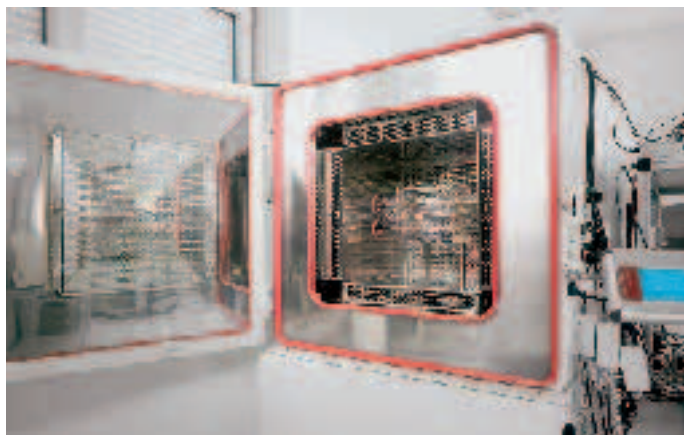
\* Probe tested to EN 12830 for suitability in the transport and storage sectors

2) Long-term meas. range +125°C, short-term +150°C (2 minutes)

%RH	Plug-in probes	Illustration	Meas. range	Accuracy	Part no.
	Humidity / Temperature Probe 12mm		-20 to +70 °C, 0 to +100 %RH	±0.3 °C, ±2 %RH (2 to 98 %RH)	0572 6172
	Humidity / Temperature Probe 4 mm		0 to +40 °C, 0 to +100 %RH	±0.3 °C, ±2 %RH (2 to 98 %RH)	0572 6174

The specified accuracy class of the Saveris radio and Ethernet probe is achieved using these external probes.

## testo Saveris™ Examples of applications



### Documentation and alarms

During production and quality assurance, temperatures and humidity values must be recorded in many applications using a monitoring system:

- Heating cabinets
- Refrigerators
- Conditioning chambers/cabinet
- Storage climate
- Production climate...

When limit values are exceeded, an alarm should be issued; in addition the data should be safely stored and centrally compiled into reports for evaluations and proof. testo Saveris is ideally suited for these requirements.



### Avoiding incorrect humidity values in production and storage

Reiner Lippert, Technical Director  
Technocell Dekor GmbH & Co. KG

"With the testo Saveris measurement system, I am certain the the storage of our valuable products is always performed in the appropriate climate. I am immediately alarmed in the event of a breach of limit values."

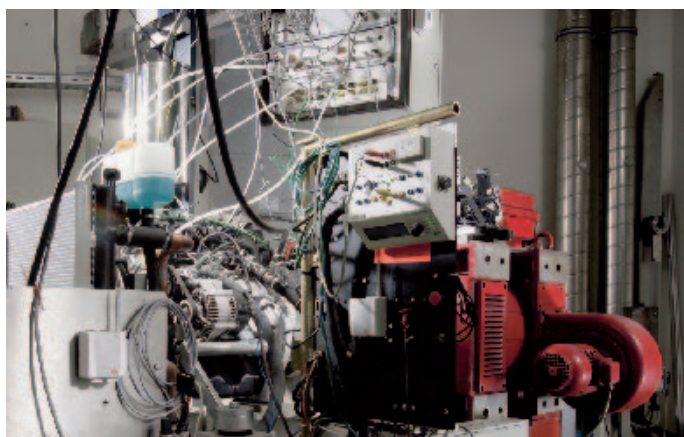


### Protect valuable investments

When storing sensitive goods, like in the area of server rooms, it is imperative to ensure ideal temperatures (and often also humidity values).

testo Saveris monitors the limit values, sends an SMS or e-mail in the event of an alarm and centrally saves all values.

Thanks to the radio probes, no complex cabling is required. Alternatively, Ethernet probes are also available that rely on the existing IT network for the transmission.



### Recording of series of measurements

- in Research & Development
- in Production & Quality assurance

Jan Konietzny, Head of Department for  
Product Development, Irmischer Automobilbau GmbH & Co. KG

"With testo Saveris, I have the perfect overview over all temperature and humidity data in processes and in the environment. This saves valuable time."





## Current/voltage data logger with display

### testo 175-S1/-S2

The data logger testo 175 can be connected, for example, to the analog output loop of a transmitter to log and monitor current signals.

The testo 175 current/voltage data logger shows the scaled signal from the transmitter directly on the display. Scaling is via ComSoft. The display supplies a fast overview on site of the current reading, the last value saved, Min/Max values and the number of values exceeded.

- Easy operation, convenient analysis
- Non-volatile memory for secure data even if battery is spent
- Data is read out without interrupting the measurement series

#### testo 175-S1

Current/voltage data logger, 1 channel, with external terminal pins, wall holder and calibration protocol

**Part no. 0563 1759**

#### testo 175-S2

Current/voltage data logger with display, 1 channel, with external terminal pins, wall holder and calibration protocol

**Part no. 0563 1761**

Accessories Ordering data	Part no.
Fast testo 575 printer, incl. 1 roll of thermal paper and batteries, infrared thermal line printer with graphics function	0554 1775
Spare thermal paper for printer (6 rolls)	0554 0569
Spare thermal paper for printer (6 rolls), measurement data documentation legible for up to 10 years	0554 0568
Label thermal paper (Testo patent) for testo 575 printer (6 rolls), can be applied directly	0554 0561
testo 580 data collector set with RS232, readout holders included, for testo 175/177 data loggers	0554 1778
testo 581 alarm signal output, floating, for testo 175/177, forwards information efficiently when limits are exceeded to e.g. horns, lamps, PLC etc.	0554 1769
ComSoft 4 - Basic Set with RS232 interface for testo 175, Basic software with diagram and table function, incl. desk-top holder, PC connection cable	0554 1759
testo 580 data collector set with USB, readout holders included, for testo 175/177 data loggers	0554 1764
ComSoft 4 - Basic Set with USB interface for testo 175, Basic software with diagram and table function, incl. desk-top holders, PC connection cable	0554 1766
ComSoft 3 - Professional with data management, incl. database, analysis and graphics function, data analysis, trend curve	0554 0830
ComSoft 3 - For requirements to CFR 21 Part 11, incl. database, analysis and graphics function, data analysis, trend curve (w/o interface)	0554 0821
RS232 interface for testo 175/177 incl. desk-top holders, PC connection cable, (please also order for ComSoft 3 - Professional)	0554 1757
USB interface, for testo 175/177 incl. desk-top holders, PC conn. cable, (Please order with ComSoft 3 - Professional)	0554 1768
Ethernet adapter, RS232 - Ethernet incl. software driver, mains unit, facilitates data communication in network	0554 1711
Lock for wall holder for testo 175/177 data loggers	0554 1755
Battery, 3.6 V/0.8 Ah 1/2 AA, for testo 175-T3/175-H1/175-H2/175-S1	0515 0175
Calibration Certificates	Part no.
ISO calibration certificate/electrical, calibration in measurement ranges 0 to 20 mA; 4 to 20 mA; 0 to 1 V; 0 to 10 V	0520 1000



On site: Fast non-contact data collection (400 data/s), read out centrally on PC and analysis with testo 580



Logging current of a transmitter signal

#### Recommended Set: testo 175-S2, starter set with alarm switch output

Current/voltage data logger with display, 1 channel, with external terminal clips, wall holder and calibration protocol	0563 1761
testo 581 alarm signal output, floating, for testo 175/177	0554 1769
Lock for wall holder for testo 175/177 data loggers	0554 1755
ComSoft 4 - Basic Set with USB interface for testo 175	0554 1766







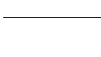

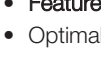
#### Technical data

Ext. chann. (fixed)	1	
Meas. range	0 to +1 V 0 to +10 V	0 to +20 mA +4 to +20 mA
Accuracy ±1 digit	±0.002 V (0 to +1 V) ±0.02 V (+1 to +10 V)	±0.05 mA (0 to +20 mA) ±0.05 mA (+4 to +20 mA)
Resolution	0.001 V (0 to +1 V) 0.01 V (+1 to +10 V)	0.01 mA (0 to +20 mA) 0.01 mA (+4 to +20 mA)
Memory	16000	
Oper. temp.	-10 to +50 °C	
Storage temp.	-40 to +70 °C	
Battery type	Lithium battery	
Weight	80 g	
Dimensions	82 x 52 x 30 mm	
Battery life: 2.5 years with measuring cycle of 15 min (-10 to +50 °C)		
Measuring cycle: 1s to 24 h		
Software: Microsoft Windows 95b / 98 / ME / NT4-Sp4 / 2000 / XP		

## Process display with testo 54: display, switch and network, online logging, alarm

Does the reading have to be available in legible form immediately beside the location or even on a remote switch cabinet? Is an alarm to be triggered or an assembly activated when a certain alarm level is reached?

The resistance thermometers (Pt100 and others) and thermocouples (types K, J, T, S and others) can be displayed directly on the testo 54 displays. All you need to do to see the reading in a clear, legible form is select the input type and scale on site in the well structured user menu. Other types (54-2, -4, -7) are used for displaying analog signals (4 to 20 mA or 0 to 10 V DC)

Overview of types		Inputs		Supply	Memory	Totaliser (sum function)	Outputs			
Types	Order no.	Thermocouple type B/E/J/K/N/R/S/T resistance thermometer 0...400 / 0...4000 Ohm millivolt input 0...100/-100...+100 mV	4...20mA 0...20 mA 0...10 V -10...+10 V +2...+10 V	Voltage	Min./Max. readings memory	ideal for flow- through ap- plication	2 relay * outputs	24 V DC/50 mA ** auxiliary power out- put	RS485 output for online monitoring cf. page 88	
	54-1AC 5400 7551	✓	—	②	✓	—	—	✓	—	
	54-2AC 5400 7553	—	✓	②	✓	—	✓	✓	—	
	54-3DC 5400 6554	✓	—	①	✓	—	✓	—	—	
	54-3AC 5400 7554	✓	—	②	✓	—	✓	✓	—	
	54-5DC 5400 6531	Pt100 only	—	①	✓	—	—	—	—	
	54-7DC 5400 6555	—	✓	①	✓	✓	✓	—	✓	
	54-7AC 5400 7555	—	✓	②	✓	✓	✓	✓	✓	
	54-8DC 5400 6556	✓	—	①	✓	—	✓	—	✓	
	54-8AC 5400 7556	✓	—	②	✓	—	✓	✓	✓	

① 20 to 30 VDC

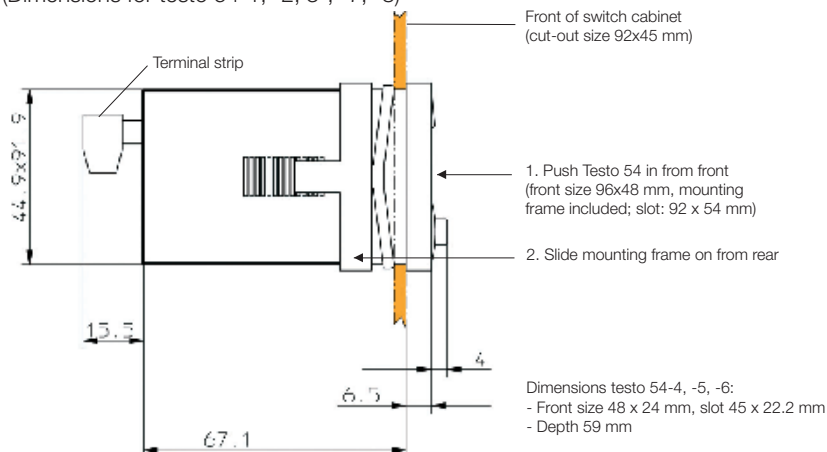
② 100 to 250 VAC, 50/60 Hz

### • Features

- Optimal illumination even in dark surroundings (engine rooms etc.)
- \* Relay outputs (54-2, 54-3, 54-7, 54-8) can be activated directly with 90 to 250 V AC/300 V DC, max. 3 A, min. 30 mA
- \*\* Auxiliary energy output 24 V DC: replaces mains unit in two-wire transmitters (4 to 20 mA) or supplies power to alarm light, for example
- Data saved for 10 years (EEPROM): scaling limits, input type and other parameters stored securely
- IP 65 from front (when installed)
- Key locking possible
- Very easy installation (see illustration below)
- Load testo 54: 225 Ω
- The process displays testo 54 have 5-figure 7-segment displays

Very easy installation

(Dimensions for testo 54-1, -2, 3-, -7, -8)



Front view (here testo 54-2AC)

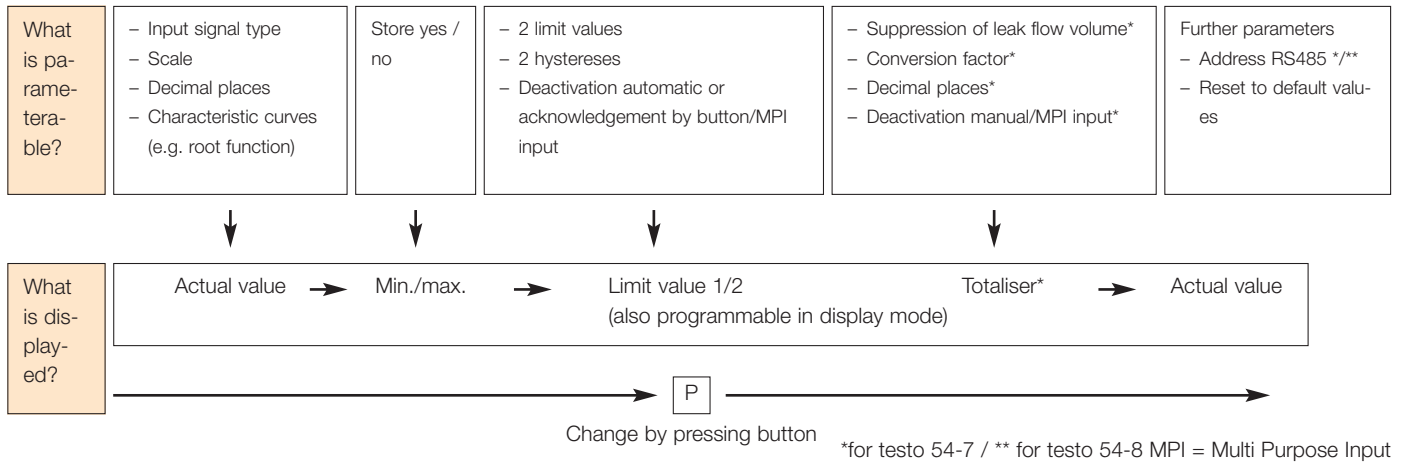


Rear view (here testo 54-2AC)



## Process display with testo 54: display, switch and network, online logging, alarm

Convenient operating menu (testo 54-1/-2/-3/-7/-8), key locking possible



### Easy wall mounting

Wall panel mounting is not always possible or practicable. The wall panel or alarm column allows the testo 54 displays to be mounted directly beside the measuring point or at other suitable locations. The alarm column is supplied fully wired incl. clamp connection block (duplicated switch outputs for external alarm) and a 3 m power cable. The initial alarm is an optical signal, the main alarm an acoustic signal. Both alarm levels can be acknowledged using the keys or the MPI input (digital).



The two relay outputs of the testo 54 enable decentralized alarms when limit values are exceeded, e.g. with the help of the alarm column



Ideal for integration in a wall panel: testo 54



Alarm column with integrated audible and visual alarm



Wall panel (180x130x100)  
inc. 3x cable entry  
M 20x1.5  
ID-Nr. 0699 5809

## The optimum process units for your application

Application	Supply	24 V mains unit	Housing in mm	Connection cable	Display unit	Alarm proces- sing	Miscellaneous	Part no.
Supply of a 2, 3, 4-wire measurement transmitter, measurement value display, LV-signalling	24 VDC	0.5 A	W 180/H 130/D 100	Sensor: 2-core 5 m	testo 54 - 2DC	Built-in alarm, Lamp red / Horn	–	0699 6152/1
Supply of a testo 6740, measurement value display, LV-signalling	24 VDC	0.5 A	W 180/H 130/D 100	Sensor: 8-core 5 m	testo 54 - 2DC	Built-in alarm, Lamp red / Horn	Additional alarm plug 0554 3302	0699 6152/1
Temperature measurement Pt100 or TC, measurement value display, LV-signalling	24 VDC	0.5 A	W 180/H 130/D 100	–	testo 54 - 3DC	Built-in alarm, Lamp red / Horn	–	0699 6152/2
Temperature measurement Pt100 or TC, measurement value display, LV-signalling, online monitoring	24 VDC	0.5 A	W 180/H 130/D 100	–	testo 54 - 8DC	Built-in alarm, Lamp red / Horn	Measurement value forwarding: RS485	0699 6152/4
Supply of a 2-wire measurement transmitter, measurement value display, LV-signalling, online monitoring	24 VDC	0.5 A	W 180/H 130/D 100	–	testo 54 - 7DC	Built-in alarm, Lamp red / Horn	Measurement value forwarding: RS485	0699 6152/3
Temperature Pt100 or TC, measurement value display, LV-signalling, online monitoring	24 VDC	0.5 A	W 180/H 130/D 125	2.5 m	testo 54 - 8DC	Built-in alarm, Lamp red / Horn	–	0699 6152/4
Supply of a 2-wire measurement transmitter, measurement value display, LV-switching	230 VAC	–	W 180/H 130/D 100	–	testo 54 - 2AC	Built-in alarm, Lamp red / Horn	Housing: 0699 5809/1; alarm for- warding to external	54007553
Alarm lamp buzzer	24 VDC	0.5 A	W 180/H 130/D 100	–	–	Built-in alarm, Lamp red / Horn	external alarm	0699 6111/1

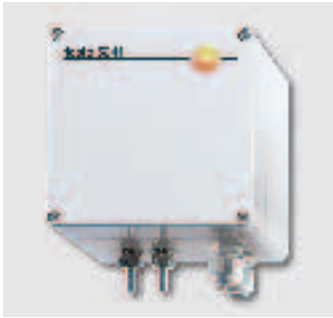


Appendix

The following products are to be discontinued in the longer term, however they are still available at present. If required, please contact Testo Application Support.

To contact our Application Support (CCS): Tel. +49 7653 681 650

Discontinued products	Part no.
Humidity transmitters	
hygrotest 600	0555 0600
hygrotest 650	0555 0650
Differential pressure transmitters	
testo 6341 – ΔP transmitter 0 to 10 Pa, automatic zeroing, without display	0555 6341
testo 6342 – ΔP transmitter 0 to 50 Pa, without display	0555 6342
testo 6343 – ΔP transmitter 0 to 10 Pa, automatic zeroing, with display	0555 6343
testo 6344 – ΔP transmitter 0 to 50 Pa, with display	0555 6344
Trendows XP – Online Monitoring Software	



testo 6341



testo 6343

W - wall

D - duct

P - probe with cable

Hygrotest 600



W - Wall mounting

D - Duct mounting

P - Probe with cable

Hygrotest 650



## Notes



# Testo: At Your Service

Monitoring Instruments for Food Production, Transport and Storage  
Measurement Engineering for Restaurants, Catering and Supermarkets  
Measurement Engineering for Air Conditioning and Ventilation  
Measurement Engineering for Heating and Installation  
Measurement Solutions for Emissions, Service and Thermal Processes  
Measurement Solutions for Refrigeration Technology  
Stationary Measurement Solutions for Air Conditioning, Drying, Cleanrooms and Compressed Air  
Measurement Solutions for Production, Quality Control and Maintenance  
Measurement Solutions for Climate Applications in Industry  
Reference Measurement Technology for Industry

Measuring Instruments For Temperature  
Measuring Instruments for Humidity  
Measuring Instruments For Velocity  
Measuring Instruments for Pressure and Refrigeration  
Multi-Function Measuring Instruments  
Measuring Instruments for Flue Gas and Emissions  
Measuring Instruments for RPM, Analysis, Current/Voltage  
Measuring Instruments For Indoor Air Quality, Light And Sound  
Stationary Measurement Technology Humidity / Differential Pressure / Temperature / Process Displays  
Stationary Measurement Technology Compressed Air Humidity / Compressed Air Consumption

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Trendows XP	Online monitoring software



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