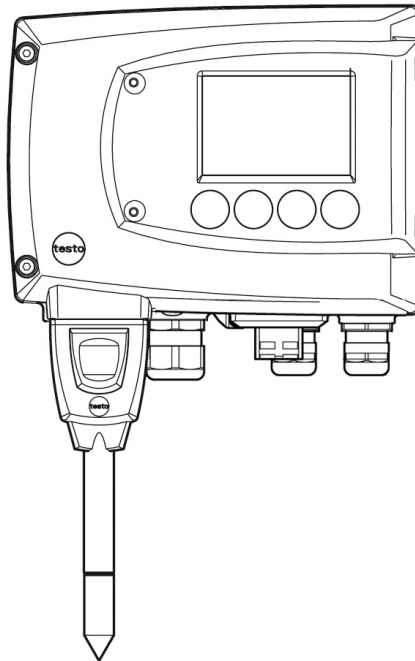




**testo 6681 Ethernet · Humidity transmitter
with Ethernet module
testo 6610 · Probes
P2A software · Parameterizing, adjusting and analyzing
software**

Instruction manual Volume 1

en



Safety and the environment

Avoiding electrical hazards

- ▶ Never use the instrument and connected probes to measure on or near live parts!
- ▶ Damaged mains cables must only be replaced by authorized personnel.
- ▶ Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.
- ▶ You must always comply with the regulations applicable in your country to the opening and repair of electrical equipment.

Avoiding personal injury/damage to equipment

- ▶ Installation, setting and calibration work must only be carried out by qualified and authorized personnel!
- ▶ Only open the instrument when this is expressly described in the instruction manual for installation, maintenance or repair purposes.
- ▶ Observe the permissible storage, transport and operating temperatures.
- ▶ Never store or operate the product with solvents and do not use any desiccants.
- ▶ Do not use the instrument for control purposes at the same time as operating or servicing the transmitter.
- ▶ Only operate the product properly, for its intended purpose and within the parameters specified in the technical data. Do not use force.
- ▶ Carry out only the maintenance and repair work that is described in the documentation. Follow the prescribed steps when doing so. Use only OEM spare parts from Testo.

Any additional work must only be carried out by authorized personnel. Otherwise Testo will not accept any responsibility for the proper functioning of the instrument after repair and for the validity of certifications.

Protecting the environment

- ▶ Send the product back to Testo at the end of its useful life. We will ensure that it is disposed of in an environmentally friendly manner.

About this document

- ▶ Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Keep this document to hand so that you can refer to it when necessary. Hand this documentation on to any subsequent users of the product.
- ▶ The following conventions are followed in this document:

**Character/
display:**

Explanation/example



With the signal word **Warning!**:

Warns against hazards which could result in serious physical injury if the precautionary measures indicated are not taken, e.g.:

De-energize the mains connection before connecting the transmitter!



With the signal word **Caution!**:

Warns against hazards which could result in minor physical injury or damage to equipment if the precautionary measures indicated are not taken, e.g.:

Observe the permissible operating temperature!



Important information, e.g.:

Administrator rights are required to install the program under Windows®7, 8 and 10.



Aim of action, e.g.:

➤ **Assembling the instrument at the process connection:**



Requirement that must be met, e.g.:

✓ USB drivers are installed.

Character/ display:	Explanation/example
1	<p>Steps are numbered if a certain sequence of actions must be followed, e.g.:</p> <ol style="list-style-type: none"> 1 Loosen and remove housing screws. 2 Remove the upper part of housing.
▪	<p>A step is not numbered if there are no further steps or if the step is optional, e.g.:</p> <p style="padding-left: 40px;">Insert probe connector into socket of testo 6681 until it engages.</p>
" to "	<p>Example entries are in inverted commas, e.g.:</p> <p>The value "0" results in</p>
Bold type	<p>Elements of the program interface or instrument display, e.g.:</p> <p>The instrument designation appears in the instrument/parameter file list.</p> <p>Select Main Menu Channel 1 and confirm with SET.</p>
...>...	<p>Functions/paths within a menu, e.g.:</p> <p>Start > All Programmes > Testo > P2A Software.</p>
[]	<p>Buttons which start an action, e.g.:</p> <p>Confirm the software key with [OK].</p>
CAPITAL LETTERS	<p>Keys on the instrument or keypad, e.g.:</p> <p>Press ESC.</p>

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1 Transmitter

1.1 Specifications

1.1.1 Functions and use

The testo 6681 humidity transmitter with Ethernet module is used in conjunction with plug-in, adjusted probes from the testo 6610 range.



Please refer to *volume 2, chapter 2* for information about commissioning, operating and maintaining the testo 6610 probe.

The testo 6681 humidity transmitter is suitable for the following applications with Ethernet networking, for example:

- Process instrumentation
- Clean rooms
- Test benches
- Drying processes
- Production and storage air quality
- Complex room climate applications.

In addition to the signal transmission of the readings to a control unit via analog outputs, the measurement data can simultaneously be recorded, documented and visualized via Ethernet. Furthermore, it is possible to issue an alarm for those responsible for the process, if necessary.

1.1.2 Scope of delivery

The scope of delivery of the testo 6681 humidity transmitter includes the following:

- Key cover
- Rear panel bracket
- Ethernet module

1.1.3 Accessories

The following accessories are available for the testo 6681 humidity transmitter:

- Protection caps for probes
- Mains unit
- P2A software (parameterizing, adjusting and analyzing software)
- Assembly accessories.



Information about accessories and their order numbers can be found in *volume 2, chapter 4.2* or on the website at www.testo.com.

1.1.4 Technical Data

Parameters

- Humidity (various variables and units)
- Temperature (°C/°F)

Measuring range

- Depends on probe

Accuracy

- Depends on probe

Resolution

- 0.1 % RH or 0.1 °C/0.1 °F

Meas. cycle

- 1/s

Interface

- Mini-DIN for P2A software (parameterizing and adjusting software)

Voltage supply

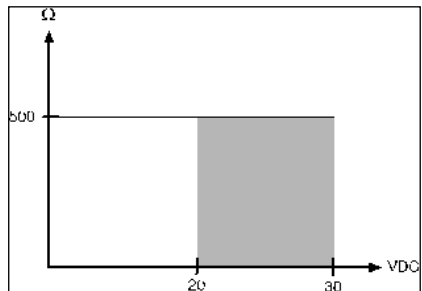
- 4-wire (separate signal and supply lines):
20 - 30 V AC/DC,
300 mA power consumption

Maximum load

- 4-wire: 500 Ω (power output)

Analogue output*

- 0 to 1 V ± 1.5 mV (4-wire) or



- 0 to 5 V ± 7.5 mV (4-wire) or
- 0 to 10 V ± 15 mV (4-wire) or
- 0 to 20 mA ± 0.03 mA (4-wire) or
- 4 to 20 mA ± 0.03 mA (4-wire)

Resolution of analog output

- 12 bit

Relay

- 4 relays, 250 V AC/DC, 3 A (optional)

Display

- 2-line LCD with plain text line (optional)

Housing operating temperature

- -40 to +70 °C/-40 to +158 °F, with display from 0 to 50 °C/+32 to +122 °F
- With integrated relay: -40 - +60 °C

Operating humidity

- 0...100 %rF

Storage temperature

- - 40 to 80 °C/-40 to +176 °F

Housing, weight

- Metal: 1.960 kg
- Ethernet module: 0.610 kg

Protection class

- IP 65 only if the transmitter is wired properly (closed cable entries), Ethernet connector, Harting PushPull connector and humidity probe are inserted and/or sealing plug is inserted.

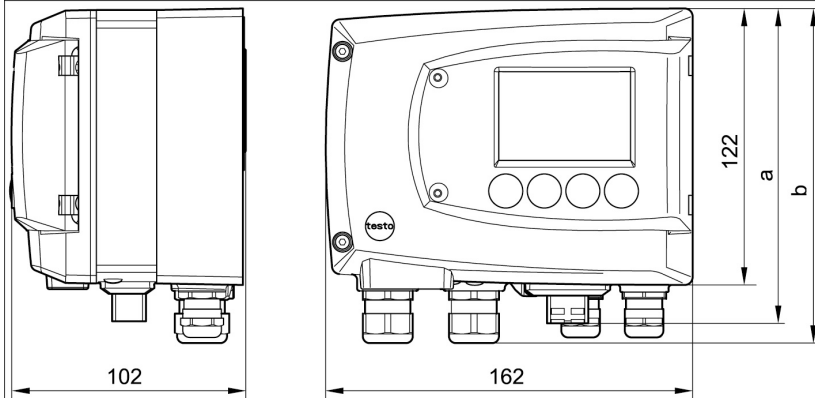
Directives, standards and tests

- EC Directive: 2014/30/EC
- DIN 14644-4

Ethernet module

- Interface:
 - 1 x mini DIN
 - 1 x RJ45 (Ethernet 10 BatesT/100 BaseTX)
- LED:
 - 2 x green

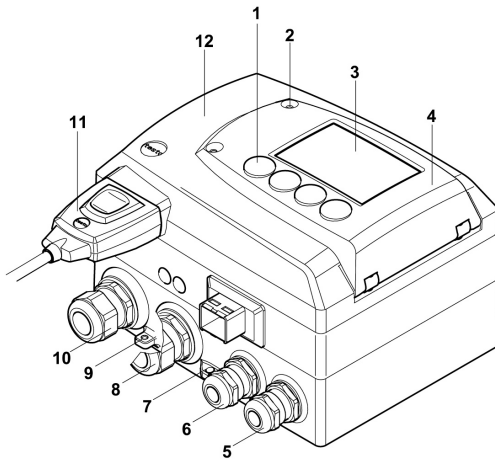
1.1.5 Dimensions



Dimensions in mm	a	b
With M 20 cable couplings	144	147
With NPT cable couplings	144	144
With M plug-in connections	143	

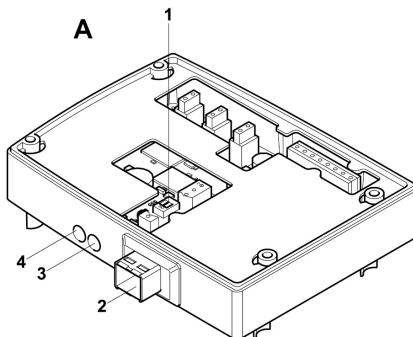
1.2 Product description

1.2.1 At a glance



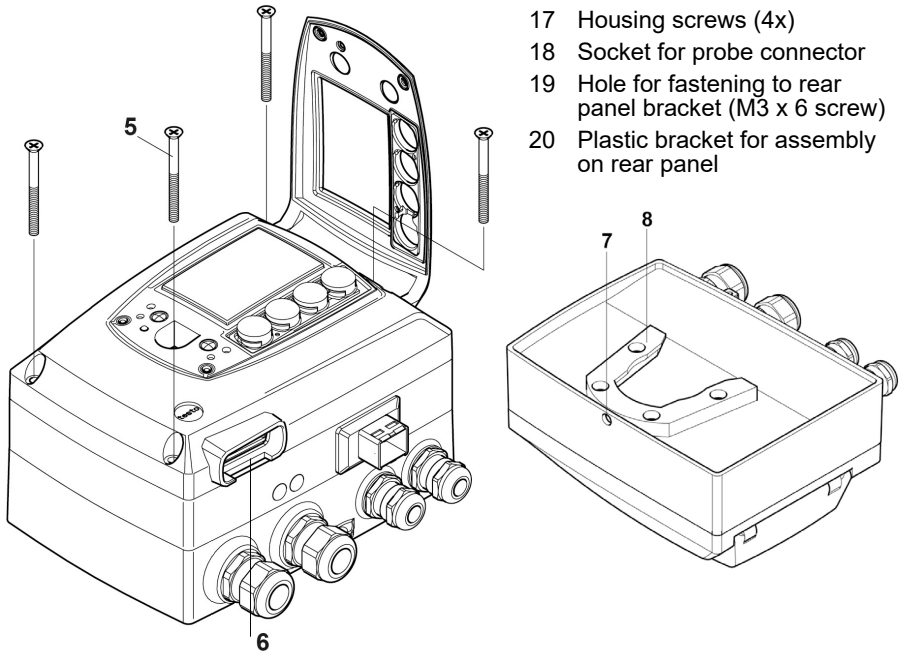
- 1 Keys (with optional display)
- 2 Service flap screw connection (self-locking, 2x)
- 3 Display (optional)
- 4 Service flap
- 5 M 16 x 1.5 screw connection*, e.g. analog outputs
- 6 M 16 x 1.5 screw connection*, e.g. voltage supply
- 7 Eyelet for measuring point panel
- 8 M 20 x 1.5 screw connection*, e.g. relay R 3 and R 4
- 9 Earthing/PE connection
- 10 M 20 x 1.5 screw connection*, e.g. relay R 1 and R 2
- 11 Probe connector (testo 6610)
- 12 Upper part of housing

* Alternatively, NPT cable couplings or M plug-in connections are available



A Ethernet module

- 13 DIP switch
- 14 Ethernet port
- 15 LED: LAN connection status
- 16 LED: Supply



1.2.2 Usable probes

The testo 6681 humidity transmitter can be used with the following probes:

Probe	Article no.	Characteristic
testo 6611	0555 6610-L11	Wall probe version; accuracy to $\pm 1\%$ RH; temperature range -20 °C to $+70\text{ °C}$ / -4 to $+158\text{ °F}$
testo 6612	0555 6610-L12	Duct probe version; accuracy to $\pm 1\%$ RH; temperature range -30 °C to 150 °C / -22 to $+302\text{ °F}$
testo 6613	0555 6610-L13	Cable probe version; accuracy to $\pm 1\%$ RH; temperature range -70 °C to $+180\text{ °C}$ / -94 to $+356\text{ °F}$
testo 6614	0555 6610-L14	Heated cable probe version; accuracy to $\pm 1.0\%$ RH; temperature range -40 °C to $+180\text{ °C}$ / -40 to $+356\text{ °F}$
testo 6615	0555 6610-L15	Trace humidity cable probe version; dew point to -60 °Ctd temperature range -40 °C to $+120\text{ °C}$ / -40 to $+248\text{ °F}$
testo 6617	0555 6610-L17	Cable with cover electrode monitoring probe version; accuracy to $\pm 1.2\%$ RH; temperature range -40 °C to $+180\text{ °C}$ / -40 to $+356\text{ °F}$

1.2.3 Display and keypad

The display option allows the testo 6681 humidity transmitter to be operated via the display and four keys.

The LCD display consists of two 7-segment lines for displaying readings and units and of an information line (for status messages, for example).

The brightness and contrast of the display and the background lighting (permanent or off) can be changed via the user menu or the P2A software.

1.2.4 Service interface

Behind the service flap is the parameterizing socket (mini-DIN) as an interface to the P2A software.

1.2.5 Relay board (option)

This has a floating switch capacity of 250 V AC/3 A. The switching limits and hysteresis can be set via the display or the P2A software. Further features include:

- Function of changeover contacts (NC/NO contacts) freely selectable
- 12 terminals for a total of 4 relays.



If no relays are available, settings for monitoring limit values or alarms can still be controlled via the display. The alarm status will be shown on the display.



Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.

1.2.6 Analog outputs

For analog outputs, the testo 6681 has either

- 2 or optionally 3 current outputs of 4 to 20 mA/0 to 20 mA (4-wire) or
- 2 or optionally 3 voltage outputs of 0 to 1 V/0 to 5 V/0 to 10 V (4-wire).

The transmitter can be ordered with a third analog output as an option.

1.2.7 Parameters

The following parameters are displayed:

- Relative humidity in %RH (technical)
- Relative humidity in % WMO* (calculation according to the WMO standard)
- Temperature °C and °F
- Dewpoint in °Ctd and °Ftd
- Absolute humidity in g/m³ and gr/ft³
- Degree of humidity in g/kg and gr/lb
- Enthalpy in kJ/kg and BTU/lb
- Psychrometer temperature in °Ctw and °Ftw
- Water vapour partial pressure in hPa and "H₂O (inch H₂O)
- Water content in ppmvol and % vol
- Dewpoint of H₂O₂ mixture in °Ctm and °Ftm
- Mixture humidity H₂O₂ in %RH_m

*It is possible that condensation appears as of a displayed humidity starting from 70 % and is shown on the display. This unit is used in meteorology, for example. According to the WMO, the Magnus coefficient is used for sub-cooled water in the calculation of relative humidity.



Calculated humidity variables correspond to the medium of air. With other gases/gas compositions, deviations may occur, e.g. with the enthalpy

1.2.8 Scaling

There are three types of min./max. values:

1 The measuring range

The maximum sensor performance is in this range. Values outside of the measuring range are displayed via messages, for example. Refer to table (see below) for the measuring range.

2 Standard scaling

The output signals are assigned to this measuring range as standard:

- during delivery if no entries are made in the order code
- after exchanging the unit, the measuring range recorded in the instrument is applied as standard.



The transmitter even retains its scaling with the voltage disconnected.

Refer to table (see below) for the measuring range.

3 The maximum settings for the manual scaling

- the values are not expressly given in the table. The maximum limits can be calculated as follows:

X = difference between MIN. and MAX. value of the standard scaling

(Max. value of standard) + (50 % of X)

(Min. value of standard) - (50 % of X)

- It is thus possible to scale beyond the measuring range, e.g. for the adjustment of the scaling limits to standard values of a PLC. However, the physical measurement range limits are the deciding factor when defining alarms.

Parameter	Unit	Probe	Measuring range Physical at 1013 hPa		Standard scaling MUF measuring range	
			MIN	MAX	MIN	MAX
			Temperature	°C	6611	-20
	°F	6611	-4	+158	-4	+158
	°C	6612	-30	+150	-30	+150
	°F	6612	-22	+302	-22	+302
	°C	6613	-70	+180	-40	+180
	°F	6613	-94	+356	-40	+356
	°C	6614, 6617	-40	+180	-40	+180
	°F	6614, 6617	-40	+356	-40	+356
	°C	6615	-40	+120	-40	+120
	°F	6615	-40	+248	-40	+248
relative humidity	% RH		0	+100	0	+100
WMO relative humidity	% RH		0	+100	0	+100
Mixture humidity H ₂ O ₂	% RH _m		0	100	0	100
Dewpoint	°Ctd	6611	-20	+70	-80	+100
	°Ftd	6611	-4	+158	-112	+212
	°Ctd	6612, 6613, 6614, 6617	-20	+100	-80	+100
	°Ftd	6612, 6613, 6614, 6617	-112	+212	-112	+212
	°Ctd	6615	-60	+30	-80	+100
	°Ftd	6615	-148	+212	-112	+212
Mixture dewpoint (H ₂ O ₂)	°Ctm		-20	+100	-20	+100
	°Ftm		-4	+212	-4	+212
Absolute humidity	g/m ³	all probes	0	600	0	2000
	gr/ft ³		0	250	0	800
Degree of humidity	g/kg	all probes	0	13300	0	9500
	gr/lb		0	93000	0	66500
Enthalpy	kJ/kg		-40	99999	-40	8000
	BTU/lb		-18	43000	-18	3500
Psychrometer temperature	°Ctw		-40	100	-40	180
	°Ftw		-58	210	-40	356

Parameter	Unit	Probe	Measuring range Physical at 1013 hPa		Standard scaling MUF measuring range	
			MIN	MAX	MIN	MAX
			Water content	ppm vol H ₂ O		0
	% vol		0	100	0	100
Water vapour partial pressure	hPa		0	1000	0	7000
	inchH ₂ O		0	400	0	2800

1.2.9 Alarm handling

For upper and lower alarm limits, individual alarms as well as collective alarms can be specified. If the collective alarm function is activated, an alarm is triggered as soon as the alarm limit of an alarm is exceeded, if this alarm is assigned to the collective alarm.

The testo 6681 monitors limit values using relays. If a reading is outside the limit values, a relay to be specified by the user is switched.

If the reading reverts to more than a specified hysteresis below or above the limit value, the alarm is cancelled.

In addition, information about the occurrence of error/status messages can be provided by means of a collective alarm relay, see *chapter 1.5, Status, warning and error messages*.



If multiple alarm messages are activated at the same time, the last alarm is shown. If the alarm is cancelled again, the previous messages are no longer shown.



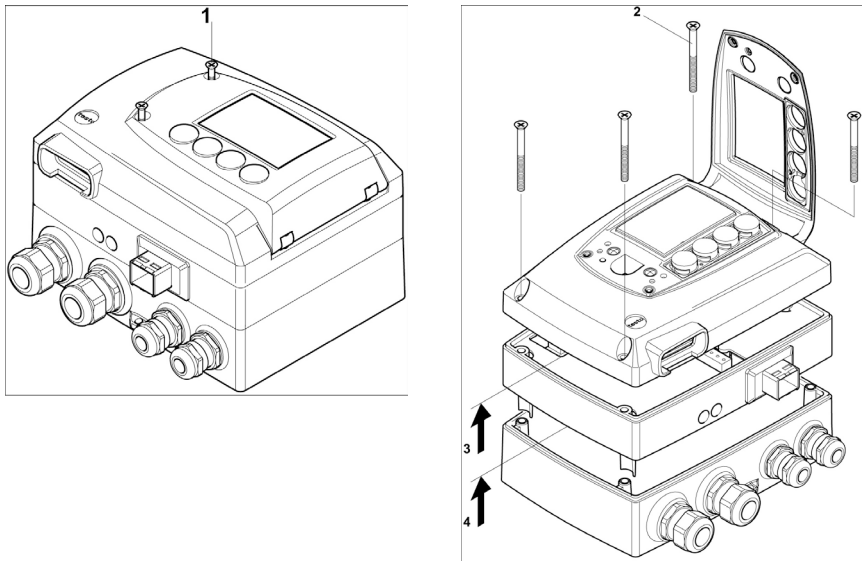
Example:

If the condensation of the probe begins, the "Condensation" message appears on the display and the "Start" status display. If the condensation is over, the status display changes from "Start" to "End".

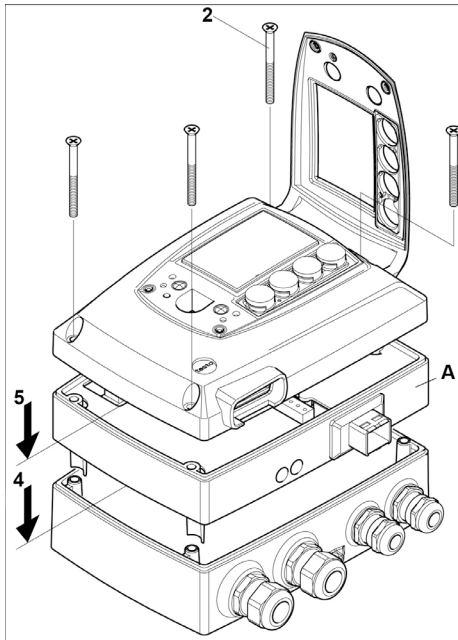
1.3 Commissioning

1.3.1 Insert Ethernet module (Order no. 0554 6656)

The Ethernet module can be ordered retroactively as an accessory. It can easily be installed in the testo 6681 humidity transmitter.



- ✓ The probe connector must be disconnected.
- 1 Loosen screw connection **(1)** of service flap and open the flap.
 - 2 Loosen and remove housing screws **(2)**.
 - 3 Remove upper part of housing **(3)** and place on a clean surface.



- 4 Place Ethernet module **(A)** on lower part of instrument **(4)**.



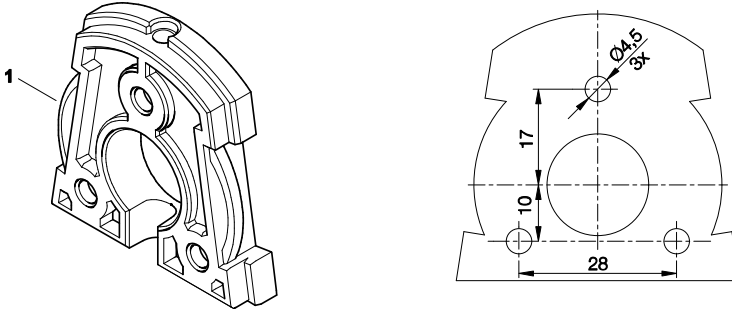
If necessary, manually set the address using the rotary encoder switches (see *chapter 1.3.3.6* before fixing the instrument in place.

- 5 Set on upper part of instrument **(5)** and fix in place using housing screws **(2)**.

1.3.2 Assembling the instrument

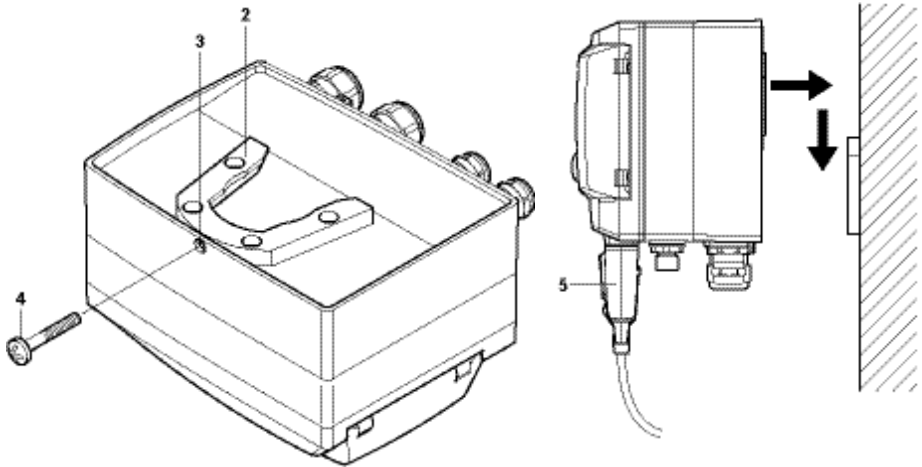
1.3.2.1 Wall mounting (for testo 6611/6613/6614/6615/6617 probes)

➤ Attaching rear panel bracket



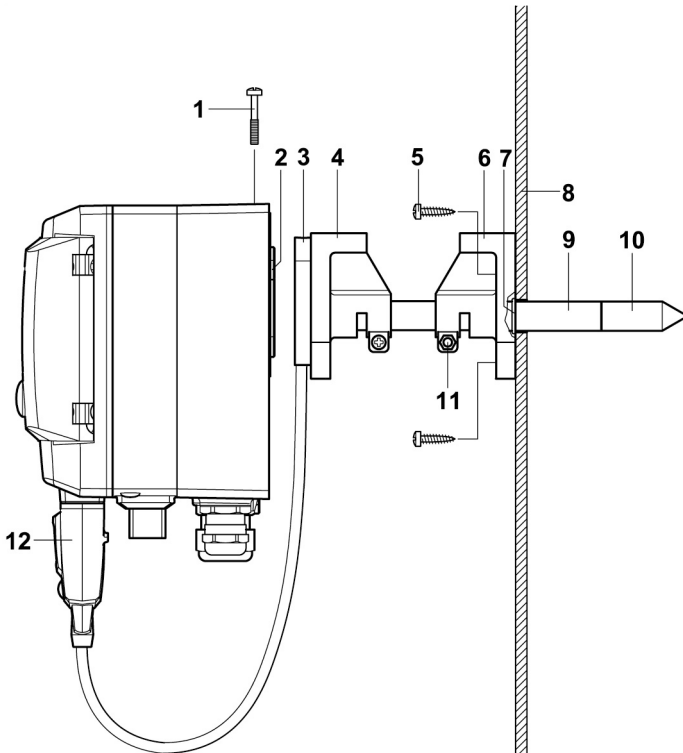
- 1 Remove locking screw (item **(4)** of drawing on page 21) and detach rear panel bracket from plastic bracket (item **(2)** of drawing on page 21).
- 2 Hold rear panel bracket in assembly position and mark the three drill holes.
- 3 Drill three holes ($\varnothing 5$ mm) and insert dowels where necessary.
- 4 Screw on rear panel bracket.
Remember that the clamping brackets **(1)** must face the wall.

➤ **Fastening instrument to rear panel bracket**



- 1 Slide plastic bracket **(2)** on the back of instrument onto rear panel bracket until it engages (see arrows).
- 2 Insert screw **(4)** through hole **(3)** and screw into rear panel bracket.
- 3 Insert probe connector **(5)** into socket until it engages.

1.3.2.2 Duct mounting (for testo 6612 probes)



- 1 Hold wall/duct bracket (order no. 0554 6651) **(6)** against duct wall **(8)** and mark drill holes for wall/duct bracket and probe shaft.
- 2 Drill a hole (\varnothing 12,5 mm) in the duct wall to feed through the probe shaft.
- 3 Fasten wall/duct bracket **(6)** to duct wall with screws **(5)**.
- 4 Push probe shaft **(9)** with filter **(10)** through the middle hole of the mounting bracket.



The wall/duct bracket **(6)** has an O-ring **(7)** to seal it against the duct. Feed the probe shaft **(9)** carefully through the wall/duct bracket so that the O-ring is not damaged.

- 5 Fix the correct position of the probe shaft **(9)** with screw **(11)** and mark (insert probe shaft as far as possible).

- Slide plastic bracket **(2)** on the back of the transmitter onto bracket **(3, 4)** until it engages.

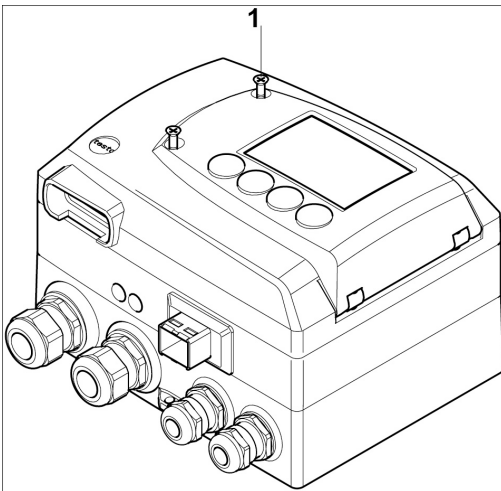


Take the weight of the transmitter into account. Ensure that the brackets **(4, 6)** are fastened securely.

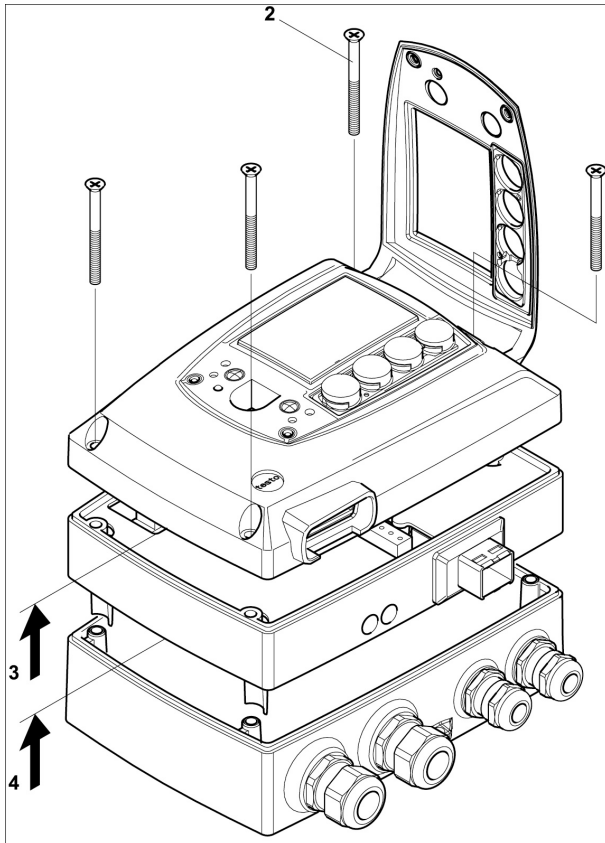
- Insert screw **(1)** through hole on the top of the instrument and screw into bracket **(3)**.
- Insert probe connector **(12)** into socket until it engages.

1.3.3 Connecting the instrument

➤ Opening the instrument



- Loosen screw connection **(1)** of service flap and open the flap.



- 2 Loosen and remove housing screws (2).



Important.

The Ethernet module (A) is already separated from the upper and lower parts of the instrument when the housing screws (2) are removed.

- 3 Remove upper part of housing (3) and place on a clean surface.
- 4 Remove Ethernet module (A) from lower part of housing (4) and also place on a clean surface.



Warning!

Electrical voltage.

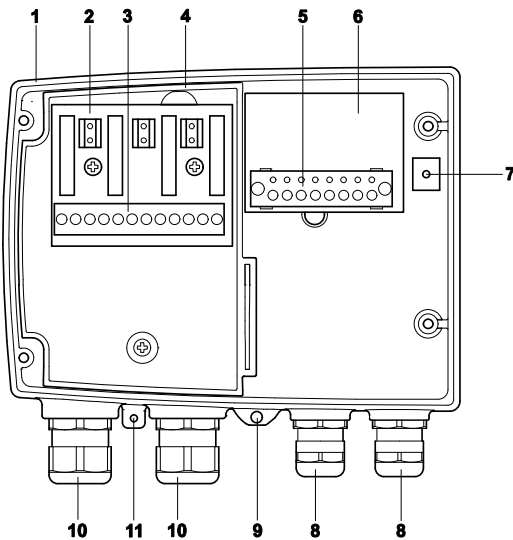
Danger of short-circuit!

De-energize the mains connection before connecting the transmitter!



Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.

1.3.3.1 Overview of terminals



- 1 Lower part of housing
- 2 Relay board (option)
- 3 Relay terminals
- 4 Insulating trough for relay board
- 5 Terminal strip for voltage supply and analog outputs*
- 6 Terminal board
- 7 Earthing terminal (internal)

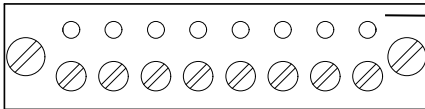
- 8 M 16 x 1.5 screw connection**
- 9 Earthing terminal (external)
- 10 M 20 x 1.5 screw connection*
- 11 Eyelet for measuring point panel

** Alternatively, NPT cable coupling or M plug-in connection.

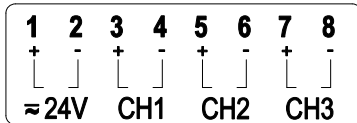


The following description of the terminals refer to this overview and its numbering.

1.3.3.2 Connecting voltage supply and analog outputs

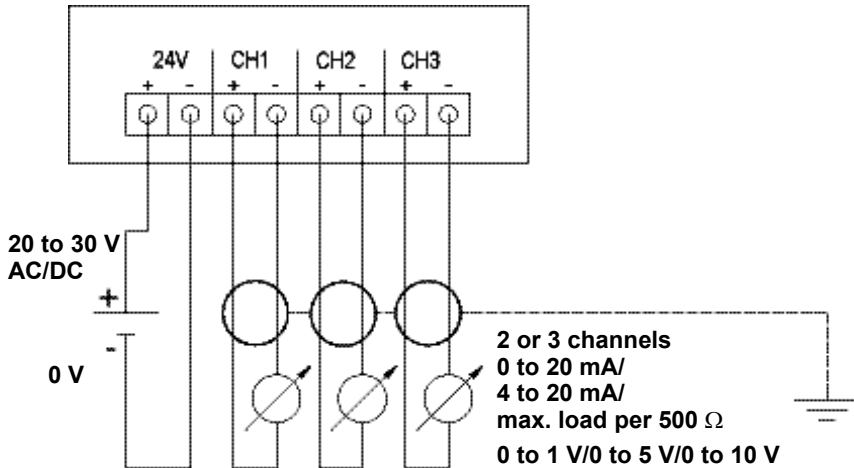


Terminal strip for voltage supply and analog outputs (item **(5)** of **Overview of terminals**, chapter 1.3.3.1).



- 1 Feed cable with voltage supply and analog signal lines through opened M 16 x 1.5 screw connection (item **(8)** in Overview of terminals, *chapter 1.3.3.1*).
- 2 Strip the cable ends, clamp wire end ferrules on and screw down onto voltage terminals.
- 3 Close M 16 x 1.5 screw connection (item **(8)** in Overview of terminals, *chapter 1.3.3.1*).

Wiring diagram for 4-wire system (0 to 20 mA/4 to 20 mA/0 to 1 V/0 to 5 V/0 to 10 V)



Requirement for the connecting cable of the supply:

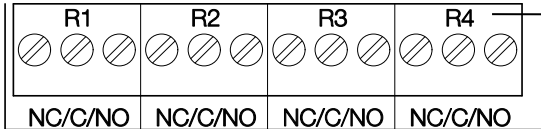
- Insulated with cross-section of at least 0.25 sq. mm.
- The supply line must be secured against exceeding 8 A.
- An OFF switch must be installed in an easily accessible position close by and be marked as such.

- 1 Feed connection cables of the two, or optionally three, channels through opened M 16 x 1.5 screw connection (item **(8)** in *Overview of terminals, chapter 1.3.3.1*.
- 2 Strip the cable ends, clamp wire end ferrules on and screw to channel terminals as shown in diagram.
- 3 Close M 16 x 1.5 screw connection (item **(8)** in *Overview of terminals, chapter 1.3.3.1*.

1.3.3.3 Connecting the relay outputs



Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.



Relay terminal strip (item **(3)** of *Overview of terminals, chapter 1.3.3.1*).

There is the option of twelve terminals for a total of four relays. The designations NC/C/NO (normally closed contact/root or pin/normally open contact) are etched on the surface of the board.

Using M screw connection

- 4 Feed connection cables for the relays through opened M 20 x 1.5 screw connection (item **(10)** of *Overview of terminals, chapter 1.3.3.1*).
- 5 Strip cable ends and clamp on wire end ferrules.
- 6 Connect relays according to chosen function (NC/NO) (see diagrams below; relay 1 is shown as an example of a connection).

Using plug-in connections (optional)



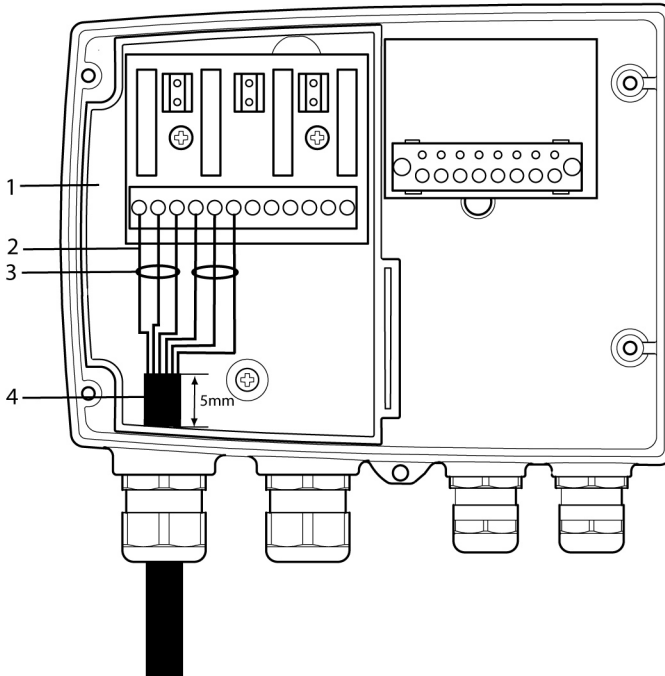
Only insert or disconnect the plug-in connection when the voltage is disconnected.

- 1 Clean the connector of the probe line and the coupling of any foreign matter.



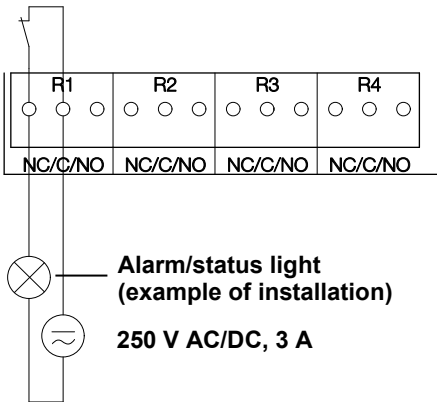
Do not disconnect the connector of the probe line from the instrument for extended periods to protect against contamination.

Connection note



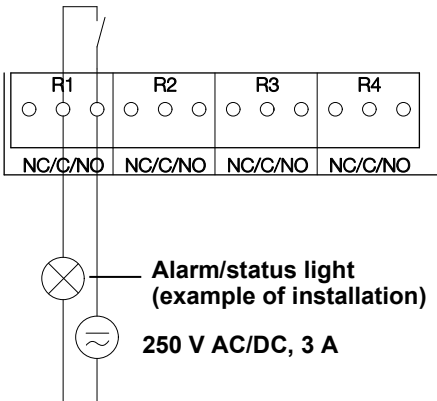
- For the connection, a double-insulated mains cable (sheathed cable) with a cross-section of at least 1.5 sq. mm must be used.
- Cable connection (2) may not be routed in a loop within the tray (1).
- In order to protect from electrical shock if the wire severs or falls out, 3 wires must always be bound together with a cable tie (3).
- The insulation of the cable must be fed at least 5 mm (4) into the tray.

Use of relay as NC contact (NC = normally closed)



The busy light (alarm/status light) is permanently on until the relay opens or the circuit is interrupted. This circuit can therefore be used to monitor the functionality of the alarm circuit, as a cable break, for instance, is indicated by the busy light going off.

Use of relay as NO contact (NO = normally open)



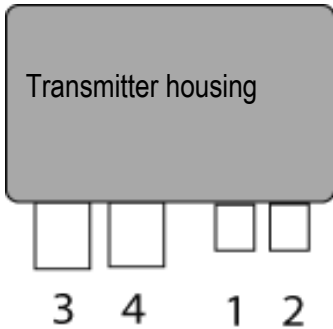


The busy light (alarm/status light) only comes on when the relay is switched (closed). Monitoring the functionality of the alarm circuit is therefore not possible with this switching operation.

- 2 Close M 20 x 1.5 screw connection (item **(10)** in *Overview of terminals, chapter 1.3.3.1*).

1.3.3.4 Plug-in connection option

As an option, the M screw connections of the signal and supply lines can be replaced with plug-in connections that are installed at the housing (see Fig. 1 and 2). The relay cabling occurs via standard cable entries and PG screw connections, see Fig. 3 and 4



Plug-in connections for power supply and channels
M12 plug-in connection (5-pin) socket (1)

View of the plug-in connections in the installed state from outside.



Pin	Assignment.
1	V 24 -
2	V 24 +
3	+ Ch 1
4	- Ch 1
5	PE

M12 plug-in connection (5-pin) connector (2)



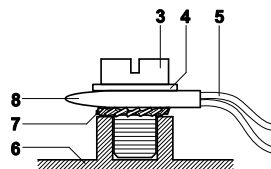
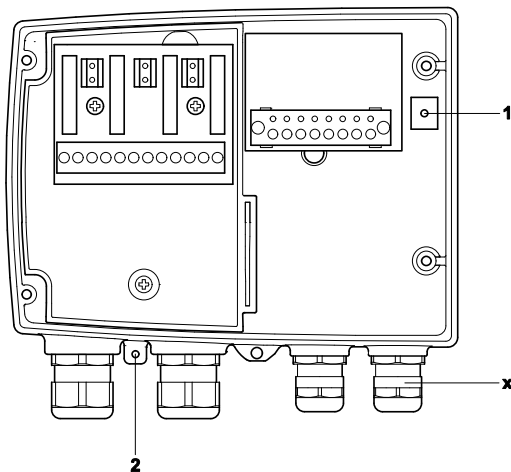
Pin	Assignment.
1	- Ch 2
2	+ Ch 2
3	+ Ch 3
4	- Ch 3
5	PE

1.3.3.5 Creating the PE/earthing terminal

As the testo 6681 has a metal housing, we recommend that the instrument be earthed. This can be done using the earthing terminal within the instrument (1) or the earthing terminal outside of the instrument (2).



Only use the external earthing terminal in dry interiors.



Using the earthing terminal within the instrument

- 1 Guide PE line (yellow-green) **(5)** through the cable coupling **(x)** and fit cable lug **(8)**. Fix this to the side of the instrument **(6)** using M 5 screw **(3)**, washer **(4)** and snap ring **(7)** on the internal earthing terminal **(1)**.
- 2 Place the other cable end on an appropriate (PE) earth conductor, e.g. an earthing bar.

Using an earthing terminal outside of the instrument

- 1 Use shielded cable **(5)** with cable lug **(8)**. Fix this in place using M 5 screw **(3)**, washer **(4)** and snap ring **(7)** on the external earthing terminal **(2)**.
- 2 Place the other cable end on an appropriate (PE) earth conductor, e.g. an earthing bar.

1.3.3.6 **Setting the Ethernet module**

Using a DIP switch the Ethernet module can be switched between two main functions:

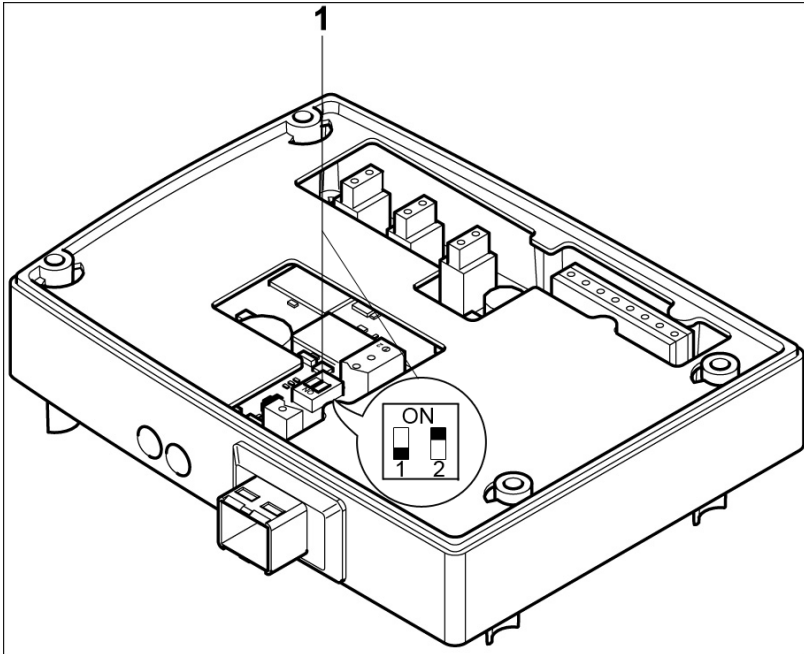
- Saveris subscriber function (DIP switch No 1 = on)
testo 6681 is used as a testo Saveris component.
- XML server function (DIP switch No. 1 = off)
integration of the testo 6681 into the customer's Ethernet system.



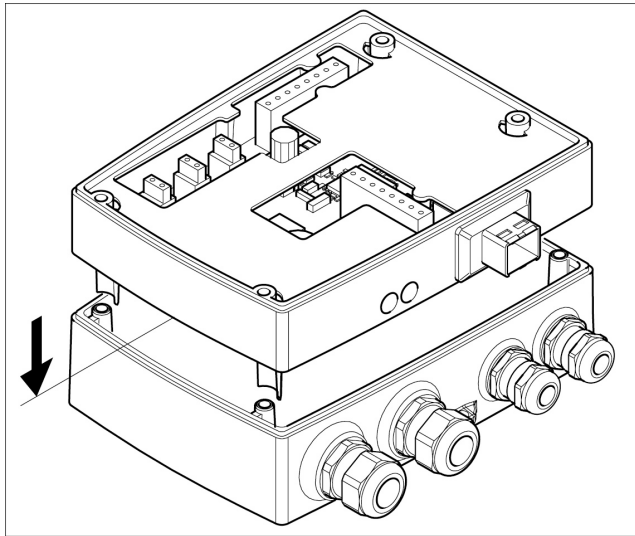
Important:

On delivery, the testo 6681 with Ethernet module is in Saveris mode (switch setting "on").

- ✓ The testo 6681 must be disconnected from the Ethernet network.

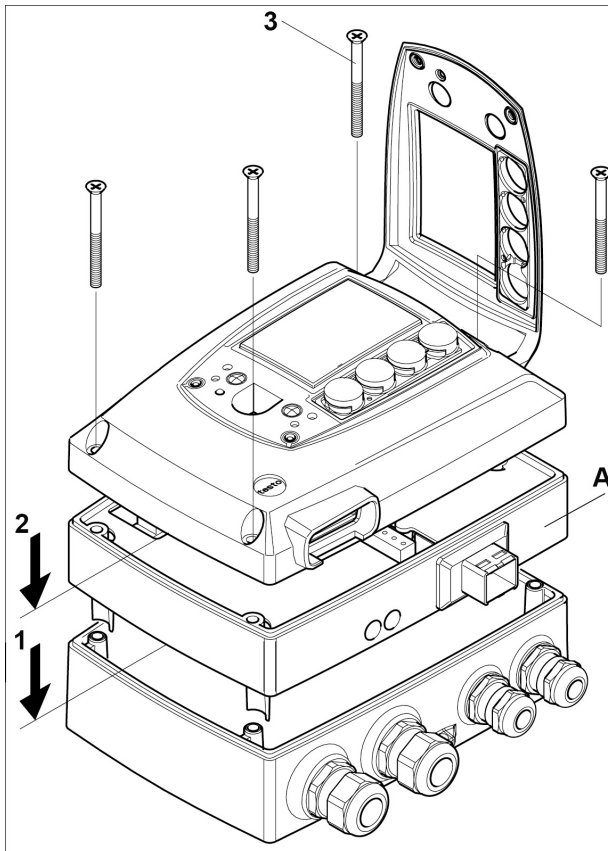


- 1 Open transmitter (see Section *Connecting the instrument, chapter 1.3.3*).
- 2 Set the DIP switch no. 1 (1) on the Ethernet module.
In the illustration: DIP switch no. 1 off, DIP switch no. 2 on
- 3 Set Ethernet module on lower part of housing (**see arrow**).

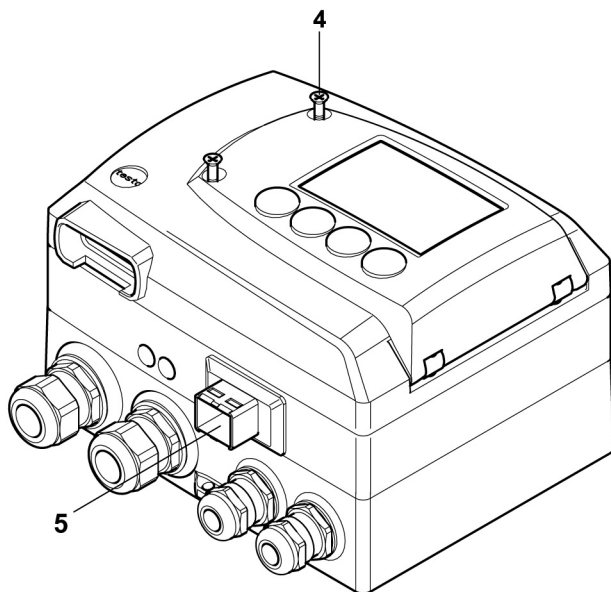


- 4 For the configuration of the Ethernet module, see following chapter.
- 5 If you do not wish to perform a configuration, close the transmitter (see chapter 5).

1.3.3.7 Closing the instrument



- 1 Place Ethernet module **(A)** on lower part of instrument **(1)**.
- 2 Set on upper part of instrument **(2)** and fix in place using housing screws **(3)**.



- 3 Close the service flap and tighten screws (4).
- 4 Connect the Ethernet network cable to the transmitter via the Ethernet socket (5).

1.3.4 Ethernet communication

1.3.4.1 Types of operation

In general, the Ethernet module performs two functions:

- a corresponding testo 6681 becomes a Saveris subscriber
- a corresponding testo 6681 can be integrated into any Ethernet systems

1.3.4.2 Network connection

- Connect the Ethernet network cable to the transmitter via the Ethernet socket.



The network cable may not be connected directly to the telephone network (ISDN).

In order to guarantee the IP protection, an RJ 2.5 Harting Push-Pull plug must be used.

1.3.4.3 LED status displays

Characteristic	LED 1	LED 2
Colour	green	green
Status display for	Voltage supply	LAN connection
Status: off	No voltage supply	No LAN connection
Status: stays on	Voltage supply present	LAN connection present
Status: flashes		Data transfer

1.3.4.4 testo 6681 as Saveris subscriber

Set the IP address

- ✓ Network cable must be connected.

The IP address of the transmitter can either be set via the P2A software (transmitter accessories) or via the configuration menu of testo Saveris™ (testo Saveris™ Startup Wizard).

- Set IP address with the P2A software (see Chapter 3.3) or with the testo Saveris™ Startup Wizard (see instruction manual).

Using Saveris

- Start Saveris software (see instruction manual **Measurement data monitoring with testo Saveris**)



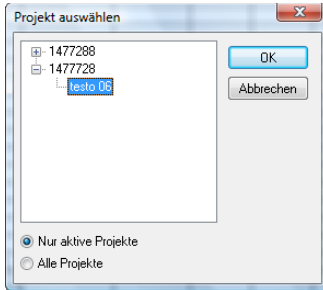
Ensure that the Saveris software is not already open, for example in multi-user operation under Windows® Vista.

If multiple clients are installed in a network, make sure that no simultaneous changes are made to the system configuration by the clients during simultaneous operation of the clients.

1. [Start] | All Programs | Testo |

- **Select Saveris Professional Client** (full version).
The entry is available if Saveris Professional Client is installed
- **Select Saveris Viewer** (limited functionality).
The entry is available if Saveris Professional Viewer is installed

- The **Testo Saveris software** program window is opened with the **Select project** dialogue.



i If the software will not start, check whether the **testo tdassvcs** service is started in the service management of the operating system and restart it, if needed.

2. Select the
 - **Only active projects** option if the data from a running project should be opened
 - **All projects** option if the data from a completed project should be opened.
 3. In the tree structure, select the project that is to be opened.
 4. Confirm with **[OK]**.
- The **Testo Saveris software** program window is shown with the selected data record in the foreground.

1.3.4.5 Integration into customer's Ethernet system

Precondition



The user should be familiar with the structure of an XML document. Furthermore, enough knowledge should be available that this type of document can be downloaded and decoded via an Internet connection with the aid of a programming/script language

Interface

The communication takes place according to the client/server principle, whereby the Ethernet module takes on the role of the server:

The XML interface will be approached via a URL. The URL consists of the IP address of the Ethernet module, the path for the XML document and, depending on the URL, with a clearly defined parameter. If a parameter is missing or an incorrect value is transferred, the Ethernet module sends back a simple error message.

Example:

IP address = 254.169.100.100
URL for serialnumber.xml:
`http://254.169.100.100/data/getserialnumber`

If a parameter is required, a "?" (question mark) is always in the first place after the URL then the parameter is transferred to the common query string form (name=value).

Example:

IP address = 254.169.100.100
URL for / identification.xml:
`http://254.169.100.100/data/getidentification?param=0` (compare table xml codes)

After calling up the compound URL, if everything was correct, an XML document is returned. With faulty parameters a simple HTML answer comes that points out the reason that an XML answer could not be given.

If an XML document is to be loaded on the server, access is provided by means of a POST request

Example of an upload via the program wget:
IP address = 254.169.100.100
URL for / deviceident.xml:
`H:/wget/wget-complete-stable/wget--post-file=C:/usersettings.xml 193.168.1.5/config/setusersettings`

The Ethernet module supports reading out of

- Readings
- Instrument type (testo 6681)
- Firmware date and version (testo 6681)
- Status and status messages (testo 6681)

- Alarm messages (testo 6681)
- Service hour counter (testo 6681 and probe)

as well as the reading and writing of the:

- Adjustment data (testo 6681)
- Configuration data of analog outputs (testo 6681)
- Configuration data of relays (testo 6681)
- User settings (testo 6681)

XML codes (download)

The table of xml codes is available for download at www.testo.com/download-center (registration required)

URL	Description	Parameter	Answer (see Appendix)
/data/getserialnumber	Read off serial number of connected transmitter		serialnumber.xml
/data/getidentification	Read off type of connected transmitter/ probe	param=0 (for transmitter) param=1 (for probe)	identification.xml
/data/getversion	Read off firmware version of connected transmitter		version.xml
/data/getfirmwaredate	Read off firmware date of connected transmitter		firmwaredate.xml
/data/getonlinevalue	Read off online values of connected transmitter		onlinevalue.xml
/data/getviewchannels	Read off view channels of connected transmitter		viewchannels.xml
/data/getstatus	Read off status of connected transmitter		status.xml
/data/getlaststatusmessage	Read off last status message of connected transmitter		laststatusmessage.xml
/config/gethourscount	Read off service hour counter of transmitter or probe	param=0 (for transmitter) param=1 (for probe)	hourscount.xml
/config/getusersettings	Read off settings of transmitter		usersettings.xml
/config/getcalibration	Read off adjustment data of transmitter	param=0 (adjustment set 1) param=1 (adjustment set 2) param=2 (adjustment set 3)	calibration.xml
/config/getredefinition	Read off relay information of transmitter	param=0 (relay 1) param=1 (relay 2)	redefinition.xml

URL	Description	Parameter	Answer (see Appendix)
		param=2 (relay 3) param=3 (relay 4)	
/config/getheatertime	Read off sensor heating information		heatertime.xml
/config/getoptions	Read off options of transmitter		options.xml
/config/getcollectivealarm	Read off alarm messages of transmitter		collectivealarm.xml

Upload XML documents

URL	Description	Parameter	Post	Answer (see Appendix)
/config/setusersettings	Perform settings of testo 6681		usersettings	usersettings.xml
/config/setcalibration	Set adjustment data of transmitter	param=0 (adjustment set 1) param=1 (adjustment set 2) param=2 (adjustment set 3)	calibration.xml	calibration.xml
/config/setredefinition	Set relay information of transmitter	param=0 (relay 1) param=1 (relay 2) param=2 (relay 3) param=3 (relay 4)	redefinition.xml	redefinition.xml
/config/setheatertime	Set sensor heating information		heatertime.xml	heatertime.xml
/config/setoptions	Set options of transmitter		options.xml	options.xml
/action/setresetm	Not yet implemented		resetm.xml	

Description of the XML elements

General elements

XML tag	Description	Type
measurement_value	Parent element. Contains the child elements value, unit, resolution	
value	Reading	Numerical, decimal number
unit	Unit	ASCII
number_values	Qty.	Numerical, whole number

Elements in calibration.xml

XML tag	Description	Type
calibration_data	Base element. Contains the child elements unit, attenuation, cal_reserved, cal_offset, cal_scale.	
unit	See general elements	
attenuation	Damping (0 - 15)	Numerical, whole number
cal_offset	Offset	Numerical, decimal number
cal_scale	Parent element. Contains the child elements cal_minscale, cal_maxscale	
cal_minscale	Scaling value	Numerical, decimal number
cal_maxscale	Scaling value	Numerical, decimal number

Elements in collectivealarm.xml

XML tag	Description	Type
colalarmtable	Base element. Contains the child elements alarm_numbers, alarm	
alarm_numbers	Number of alarm messages	Numerical, whole number
alarm	Parent element. Contains the child elements alarm_event, alarm_state	
alarm_event	Type of alarm	ASCII
alarm_state	Status of the alarm 0 = alarm inactive 1 = alarm active	Numerical, whole number

Elements in deviceident.xml

XML tag	Description	Type
ident	Base element. Contains the child element device_id	
device_id	ID of transmitter or probe	Numerical, whole number

Elements in firmwaredate.xml

XML tag	Description	Type
firmware_date	Base element. Contains the child elements year, month, day	
year	Year	Numerical, whole number
month	Month	Numerical, whole number
day	Day	Numerical, whole number

Elements in heatertime.xml

XML tag	Description	Type
heatertime	Base element. Contains the child element heatertimeoff	
heatertimeoff	Time sensor heating off in min	Numerical, whole number

Elements in hourscount.xml

XML tag	Description	Type
hourcount	Base element. Contains the child element hours	
hours	Service hour counter in h	Numerical, whole number

Elements in identification.xml

XML tag	Description	Type
ident	Base element. Contains the child element device_id	
device_id	Transmitter type	Numerical, whole number

Elements in laststatusmessage.xml

XML tag	Description	Type
mufmsg	Base element. Contains the child elements msg, sn, hours	
msg	Status message	ASCII
sn	Serial number	ASCII, 8 characters
hours	Service hour counter in h	Numerical, whole number

Elements in onlinevalue.xml

XML tag	Description	Type
online_values	Base element. Contains the child elements number_values, measurement_value	
number_values	See general elements	
measurement_value	See general elements	

Elements in options.xml

XML tag	Description	Type
options	Base element. Contains the child elements device_options, production_options, country_option, option_counter	
device_options	See device_options description	Numerical, whole number
production_options	See production_options description	Numerical, whole number

Elements in redefinition.xml

XML tag	Description	Type
relay_data	Base element. Contains the child elements relay_channel,	

	relay_number, relay_status, sw_point_character, sw_point_value, hysteresis_value	
relay_channel	Measurement channel linked to the relay	Numerical, whole number
relay_number	Relay number (0 - 2)	Numerical, whole number
relay_status	Status of relay 0 = off 1 = on	Numerical, whole number
sw_point_charact	Switch point: Switch point: 0 = low-limit monitoring 1 = high-limit monitoring	Numerical, whole number
sw_point_value	Switch point	Numerical, decimal number
hysteresis_value	Hysteresis	Numerical, decimal number

Elements in serialnumber.xml

XML tag	Description	Type
serialnumber	Base element. Contains the child element number	
number	Serial number	ASCII, 8 characters

Elements in status.xml

XML tag	Description	Type
mufstatus	Base element. Contains the child elements statemsg, staterel, statecounter	
statemsg	Status message See statemsg description	Numerical, whole number
staterel	Status relay See staterel description	Numerical, whole number
statecounter	Counter	Numerical, whole number

Elements in usersettings.xml

XML tag	Description	Type
usersettings	Base element. Contains the child elements pressure, h2o2, setting_display, backlight, contrast, language, disp_msg, h2o2_prozess	
pressure	Absolute pressure	Numerical, decimal number
h2o2	H2O2 value	Numerical, decimal number
setting_display	Auto OFF background lighting 0 -> background lighting auto OFF 1 -> background lighting stays on	Numerical, whole number
backlight	Brightness of background lighting 0 - 9 (0 = off, 9 = max.)	Numerical, whole number
contrast	Display contrast 0 - 9 (0 = min., 9 = max.)	Numerical, whole number
language	Language 0 ->GERMAN 1 ->ENGLISH 2 ->FRENCH 3 ->SPANISH 4 ->ITALIAN 5 ->JAPANESE	Numerical, whole number
disp_msg	Status messages display 0 = off 1 = on	Numerical, whole number
h2o2_prozess	H2O2 process 0 = via H2O2 water 1 = process with evaporated H2O2	Numerical, whole number

Elements in version.xml

XML tag	Description	Type
firmware_version	Base element. Contains the child element version	
version	Firmware version:	ASCII, 6 characters

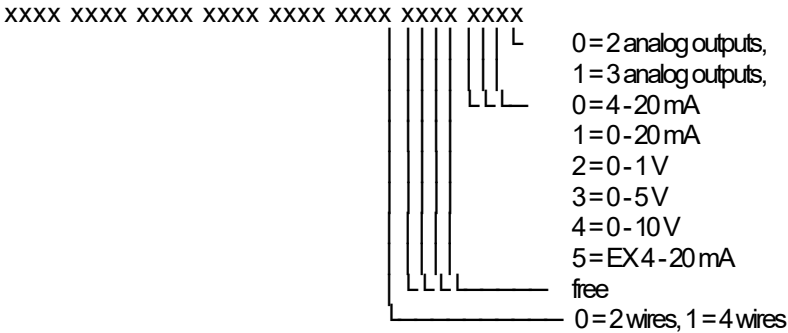
Elements in viewchannels.xml

XML tag	Description	Type
view_channels	Base element. Contains the child elements number_values, view_channel	
number_values	See general elements	
view_channel	Parent element. Contains the child elements channel_info, measurement_value, meas_status	
channel_info	Parent element. Contains the child elements connector_info, channel_type	

XML tag	Description	Type
measurement_value	See general elements	
meas_status	Parent element. Contains the child elements min, max, mean	
connector_info	Channel (transmitter/probe)	ASCII
channel_type	Parameter details	ASCII
min.	Minimum reading	Numerical, decimal number
max.	Maximum reading	Numerical, decimal number
mean	Mean value	Numerical, decimal number

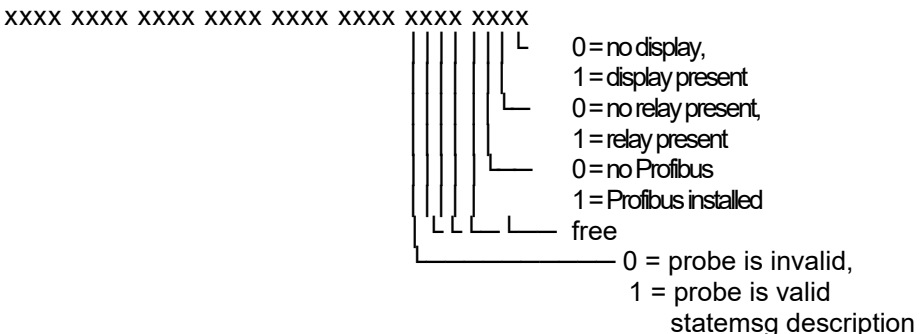
production_options description

Content of production_options is a double word type number (32 bit). The individual hardware options are bit-coded here.



device_options description

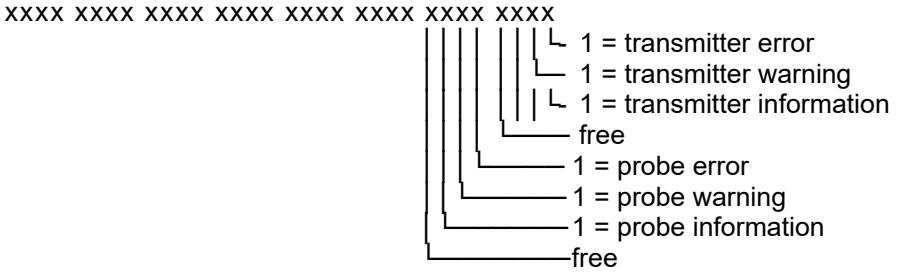
Content of device_options is a double word type number (32 bit). The individual instrument options are bit-coded here.



Content of statemsg is a double word type number (32 bit). The individual status messages are bit-coded here.

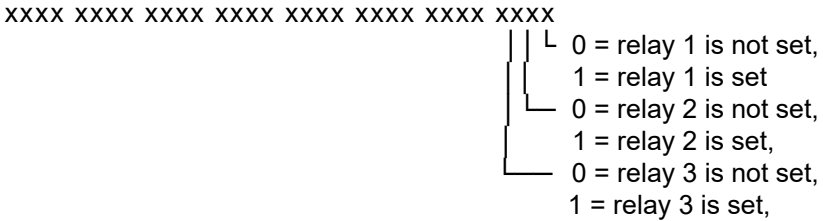
If statemsg = 0 there are no new messages.

If statemsg != 0:



staterel description

Content of staterel is a double word type number (32 bit). The individual relay states are bit-coded here.



xml files Appendix

Note: "xxxx" = text message

calibration.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<calibration_data>
  <unit>%rF</unit>
  <attenuation>1</attenuation>
  <cal_offset>0.000000</cal_offset>
  <cal_scale>
    <cal_min_scale>0.000000</cal_min_scale>
    <cal_max_scale>0.000000</cal_max_scale>
  </cal_scale>
</calibration_data>
```

collectivealarm.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<colalarmtable>
  <alarm_numbers>4</alarm_numbers>
  <alarm>
    <alarm_event>xxxx</alarm_event>
    <alarm_state>0</alarm_state>
  </alarm>
  <alarm>
    <alarm_event>xxxx</alarm_event>
    <alarm_state>0</alarm_state>
  </alarm>
  <alarm>
    <alarm_event>xxxx</alarm_event>
    <alarm_state>0</alarm_state>
  </alarm>
  <alarm>
    <alarm_event>xxxx</alarm_event>
    <alarm_state>0</alarm_state>
  </alarm>
</colalarmtable>
```

deviceident.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<ident>
  <device_id>31</device_id>
</ident>
```

firmwaredate.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<firmware_date>
  <year>2008</year>
  <month>3</month>
  <day>28</day>
</firmware_date>
```

heatertime.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<heatertime>
  <heatertimeoff>60</heatertimeoff>
</heatertime>
```

hourscount.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<hourcount>
  <hours>68</hours>
</hourcount>
```

identification.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<ident>
  <device_id>31</device_id>
</ident>
```

laststatusmessage.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<mufmsg>
  <msg>xxxx</msg>
  <serialnumber>00123456</serialnumber>
  <hours>163</hours>
</mufmsg>
```

onlinevalue.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<online_values>
  <number_values>3</number_values>
  <measurement_value>
    <value>23.7</value>
    <unit>°C</unit>
  </measurement_value>
```

```
<measurement_value>
  <value>42.4</value>
  <unit>%rF</unit>
</measurement_value>
<measurement_value>
  <value>9.5</value>
  <unit>td°C</unit>
</measurement_value>
</online_values>
```

options.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<options>
  <device_options>00000011</device_options>
  <production_options>xxxx</production_options>
</options>
```

redefinition.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<relay_data>
  <relay_channel>0</relay_channel>
  <relay_number>0</relay_number>
  <relay_status>0</relay_status>
  <sw_point_charact>0</sw_point_charact>
  <sw_point_value>0.0</sw_point_value>
  <hysteresis_value>0.0</hysteresis_value>
</relay_data>
```

serialnumber.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<serialnumber>
  <number>0012345</number>
</serialnumber>
```

xml files Appendix

```
<!ELEMENT serialnumber (number)>
<!ELEMENT number (#PCDATA)>
```

```
<!ELEMENT ident (device_id)>
<!ELEMENT device_id (#PCDATA)>
```

```
<!ELEMENT firmware_version(version)>
<!ELEMENT version (#PCDATA)>
```

```
<!ELEMENT firmware_date (year, month, day)>
<!ELEMENT year (#PCDATA)>
<!ELEMENT month (#PCDATA)>
<!ELEMENT day (#PCDATA)>
```

```
<!ELEMENT channel_info (connector_info, channel_type)>
<!ELEMENT connector_info (#PCDATA)>
<!ELEMENT channel_type (#PCDATA)>
```

```
<!ELEMENT online_values (number_values, (measurement_value)*)>
<!ELEMENT number_values (#PCDATA)>
<!ELEMENT measurement_value (value, unit)>
<!ELEMENT value (#PCDATA)>
<!ELEMENT unit (#PCDATA)>
```

```
<!ELEMENT view_channels (number_values, (view_channel)*)>
<!ELEMENT view_channel (channel_info, measurement_value,
meas_status)>
<!ELEMENT meas_status (min, max, mean)>
<!ELEMENT min (#PCDATA)>
<!ELEMENT max (#PCDATA)>
<!ELEMENT mean (#PCDATA)>
```

```
<!ELEMENT hourcount (hours)>
<!ELEMENT hours (#PCDATA)>
```

```
<!ELEMENT usersettings (pressure, h2o2, setting_display, backlight,
contrast, language, disp_msg, h2o2_prozess)>
<!ELEMENT pressure (#PCDATA)>
<!ELEMENT h2o2 (#PCDATA)>
<!ELEMENT setting_display (#PCDATA)>
<!ELEMENT backlight (#PCDATA)>
```

```
<!ELEMENT contrast (#PCDATA)>
<!ELEMENT language (#PCDATA)>
<!ELEMENT disp_msg (#PCDATA)>
<!ELEMENT h2o2_prozess (#PCDATA)>

<!ELEMENT calibration_data (unit, attenuation, cal_offset, cal_scale)>
<!ELEMENT attenuation (#PCDATA)>
<!ELEMENT cal_offset (#PCDATA)>
<!ELEMENT cal_scale (cal_minscale, cal_maxscale)>
<!ELEMENT cal_minscale (#PCDATA)>
<!ELEMENT cal_maxscale (#PCDATA)>

<!ELEMENT relay_data (relay_channel, relay_number, relay_status,
sw_point_character, sw_point_value, hysteresis_value)>
<!ELEMENT relay_channel (#PCDATA)>
<!ELEMENT relay_number (#PCDATA)>
<!ELEMENT relay_status (#PCDATA)>
<!ELEMENT sw_point_character (#PCDATA)>
<!ELEMENT sw_point_value (#PCDATA)>
<!ELEMENT hysteresis_value (#PCDATA)>

<!ELEMENT heatertime (heatertimeoff)>
<!ELEMENT heatertimeoff (#PCDATA)>

<!ELEMENT options (device_options, production_options)>
<!ELEMENT device_options (#PCDATA)>
<!ELEMENT production_options (#PCDATA)>

<!ELEMENT colalarmtable (alarm_numbers, (alarm)*)>
<!ELEMENT alarm_numbers (#PCDATA)>
<!ELEMENT alarm (alarm_event, alarm_state)>
<!ELEMENT alarm_event (#PCDATA)>
<!ELEMENT alarm_state (#PCDATA)>

<!ELEMENT mufstatus (statemsg, staterel, statecounter, reserved)>
<!ELEMENT statemsg (#PCDATA)>
<!ELEMENT staterel (#PCDATA)>
<!ELEMENT statecounter (#PCDATA)>

<!ELEMENT mufmsg (msg, sn, hours)>
<!ELEMENT msg (#PCDATA)>
<!ELEMENT sn (#PCDATA)>
<!ELEMENT hours (#PCDATA)>
```

status.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<mufstatus>
  <statemsg>0</statemsg>
  <staterel>0</staterel>
  <statecounter>1</statecounter>
</mufstatus>
```

usersettings.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<usersettings>
  <pressure>1013.0</pressure>
  <h2o2>0.0</h2o2>
  <setting_disp>1</setting_disp>
  <backlight>3</backlight>
  <contrast>5</contrast>
  <language>0</language>
  <disp_msg>1</disp_msg>
  <h2o2_prozess>0</h2o2_prozess>
</usersettings>
```

version.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<firmware_version>
  <version>V1.10</version>
</firmware_version>
```

viewchannels.xml

```
<?xml version="1.0" encoding="UTF-8" ?>
<view_channels>
  <number_values>2</number_values>
  <view_channel>
    <channel_info>
      <connector_info>Probe</connector_info>
      <channel_type>Temperature</channel_type>
    </channel_info>
    <measurement_value>
      <value>23.7</value>
      <unit>°C</unit>
    </measurement_value>
    <meas_status>
      <min>23.6</min>
      <max>23.7</max>
      <mean>23.7</mean>
    </meas_status>
  </view_channel>
  <view_channel>
    <channel_info>
      <connector_info>Probe</connector_info>
      <channel_type>Humidity</channel_type>
    </channel_info>
    <measurement_value>
      <value>42.5</value>
      <unit>%rF</unit>
    </measurement_value>
    <meas_status>
      <min>41.7</min>
      <max>43.0</max>
      <mean>43.0</mean>
    </meas_status>
  </view_channel>
</view_channels>
```

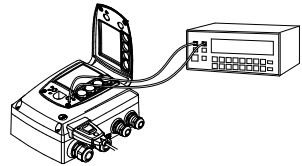
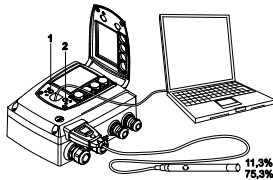

1.3.5 Adjusting the instrument

The testo adjusting concept allows the entire signal chain from the sensor signal (probe) and the digital signal (within the transmitter) through to the analog signal (transmitter output signal) to be adjusted (see diagram).

1-point adjustment

2-point adjustment

Analog adjustment



Adjustment via

- P2A software
- User menu

Adjustment 11.3 % RH and
75.3 % RH via

- Adjustment keys (1, 2)
 - P2A software
- Adjustment 20 % rH and
80 % rH via
- User menu

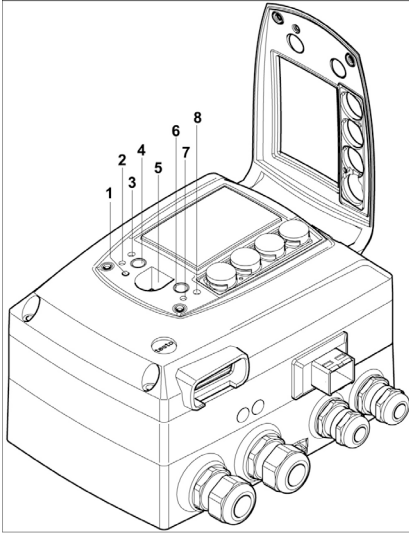
Adjustment using a precise
multimeter and transmission
of analog reference value in

- P2A software or
- User menu

Either the 1-point adjustment or 2-point adjustment is suitable for adjusting the sensor signal - digital signal chain.

The testo 6681 transmitter has digital probes whose adjustment information is stored in the probes' internal memory. Both 1-point and 2-point adjustments can thus be carried out on another testo 6681 (e.g. in the calibration laboratory).

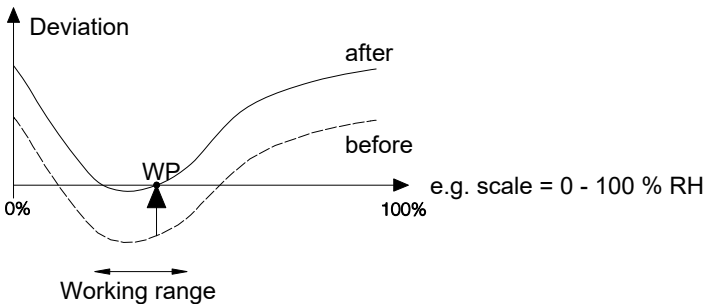
1.3.5.1 Overview: Adjustment keys and test contacts



- 1 Status LED
- 2 Contact ch. 1 +
- 3 Contact ch. 1 -
- 4 Adjust key 11.3 %
- 5 Service interface
- 6 Adjust key 75.3 %
- 7 Contact ch. 2 +
- 8 Contact ch. 2 -

1.3.5.2 1-point adjustment (Offset)

In the 1-point adjustment, the reading at the working point is raised to the reference value so that there is no longer any deviation in the working point. The reference condition can be measured using a precise reference device or be created in an air conditioning cabinet.



The advantage of the 1-point adjustment is the good measuring result in the working range. But the further away the measurement is from the working point, the greater the deviation can become. The 1-point adjustment should therefore only be used for a relatively narrow measuring range (working range), e.g. clean room applications, air conditioning applications for storage and similar.

The 1-point adjustment can be performed

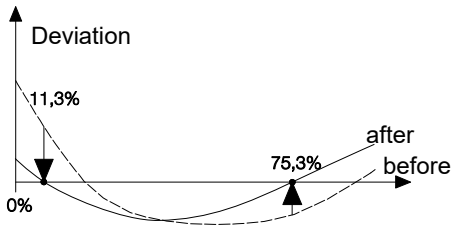
- via the user menu (see *chapter 1.4.6.9*) or
- via the P2A software (see volume 2, chapter 3).



Please note that the 1-point adjustment is generally performed on the basis of the % RH and °C/°F parameters.

1.3.5.3 2-point adjustment

With the 2-point adjustment, the parameter is adjusted to the reference value at the two standard adjustment points 11.3 % RH and 75.3 % RH or 20 % RH and 80 % RH. The reference conditions are created either by using Testo humidity adjustment set (order no. 0554 0660, only for adjustment points 20 %RH and 80 %RH) or in the humidity generator.



In the 2-point adjustment, the deviations between the reading and the nominal value are minimized across the entire measuring range. The 2-point adjustment is therefore recommended for large working ranges, e.g. in drying processes.

The 2-point adjustment can be performed

- via P2A software (see volume 2, chapter 3) or
- using the adjustment keys under the service flap, see description of how to proceed below.

The 2-point adjustment for the adjustment points 20 %RH and 80 %RH is carried out via the user menu.



A 2-point adjustment cancels any previous 1-point adjustment.



Adjustment with the standard Testo adjustment salt pots is not suitable for the testo 6614 (heated for high-humidity applications) and testo 6615 (trace humidity) probes. The reference conditions should be generated in a humidity generator to adjust these probes.

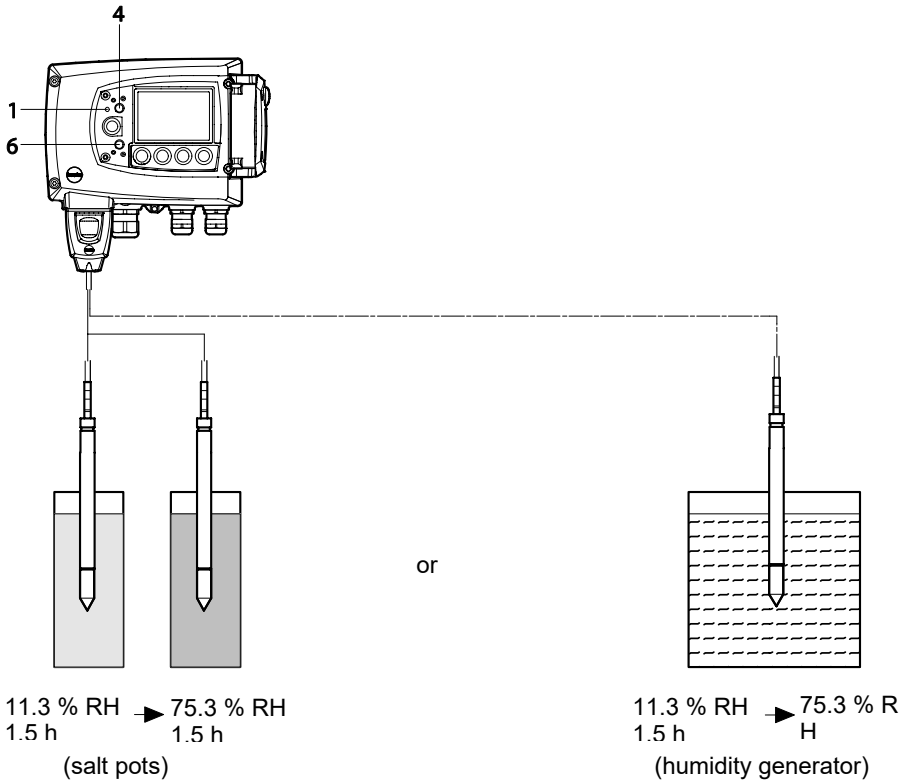
In addition, these probes can also be adjusted at a third adjustment point by Testo Service.

- testo 6614: third adjustment point at 90 % RH
- testo 6615: third adjustment point at -40 °Ctd/-40 °Ftd.

➤ Adjusting testo 6681 using adjustment keys



The 2-point adjustment for the adjustment points 20 %RH and 80 %RH is carried out via the user menu.



✓ The service flap of the testo 6681 is open.

- 1 Expose the humidity probe of the testo 6681 to the reference condition of 11.3 % RH for at least 1.5 hours at 25 °C.
- 2 After this equalization period, press the 11.3 % adjustment key **(4)** for at least 10 seconds with something like a ball-point pen that is not too sharp. The LED **(1)** flashes when the adjustment process begins. At the same time, the **2-point adjustment 11.3 %** status message appears on the display

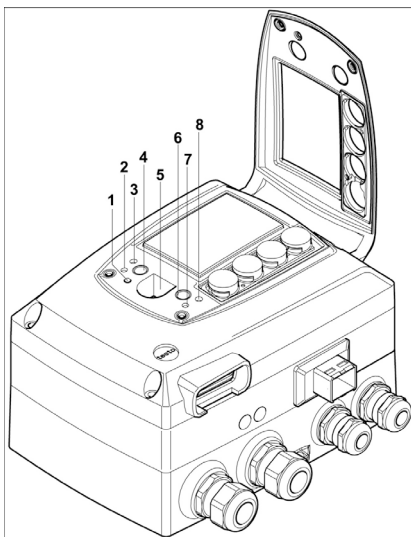
Completion of the adjustment is signalled by the LED **(1)** coming on permanently and the **Probe reset** status message is shown.

- Carry out the adjustment analogously for the reference condition 75.3 % RH. Press on the 75.3 % RH adjustment key **(6)** to do this.

3 Close the service flap.

1.3.5.4 Analog output adjustment

The purpose of adjusting the analog outputs is to adjust the signal chain from the digital signal (within the transmitter) to the analog outputs. The signal type that was appointed for the transmitter is adjusted respectively for each channel (e.g. 4 to 20 mA or 0 to 1 V, etc.)



- 1 Status LED
- 2 Contact ch. 1 +
- 3 Contact ch. 1 -
- 4 Adjust key 11.3 %
- 5 Service interface
- 6 Adjust key 75.3 %
- 7 Contact ch. 2 +
- 8 Contact ch. 2 -

➤ **Analog outputs 1 and 2 adjusted**

- ✓ A precise multimeter (minimum resolution of 6.5 digits, accuracy of 100 μ A, e.g. Agilent 34401A) is available.



If only a simple multimeter is available, the analog outputs may not be adjusted.

- ✓ The service flap is open.
 - 1 Connect the inputs of the multimeter with the contacts **(2)** and **(3)** for channel 1 or with contacts **(7)** and **(8)** for channel 2.
 - 2 Transfer the reference analog value measured with the multimeter to the P2A software (see *volume 2, chapter 3*) or enter it via the user menu (see *chapter 1.4.6.9*).
 - 3 Disconnect connections between multimeter and contacts of the testo 6681 and close service flap.

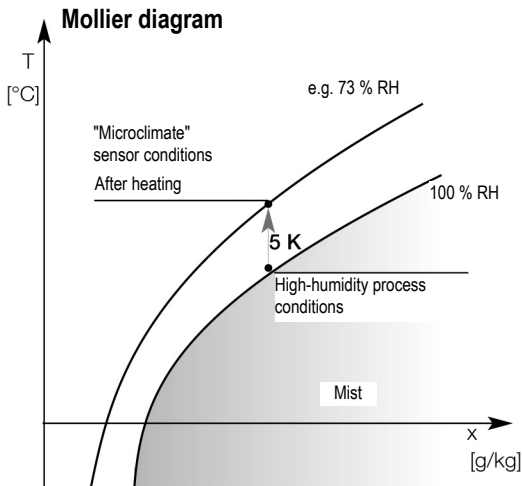
➤ **Adjusting analog output 3 (optional)**



If the optional third analog output is to be adjusted, a cable connection to measure the analog value must be installed. Do this by proceeding as follows:

- 1 Open transmitter (see *chapter 1.3.3*).
- 2 Connect measuring cable to the terminals of the third analog output and guide through the cable coupling and out of the transmitter.
- 3 Reassemble upper part of transmitter.
- 4 Connect cable ends to the inputs of the multimeter.
- 5 Transfer the reference analog value measured with the multimeter to the P2A software (see *volume 2, chapter 3*) or enter it via the user menu (see *chapter 1.4.6.9*).
- 6 Remove the upper part of the transmitter, detach the cable connections for the adjustment of the 3rd analog output and reassemble the transmitter.

1.3.5.5 High-humidity adjustment for testo 6614



With the testo 6614, the rear of the Testo humidity sensor is heated, creating a microclimate around the sensor (within the filter) that is constantly 5 K warmer than the actual process conditions. As can be seen in the Mollier diagram, this reduces the relative humidity at the sensor from around 100 % RH to a lower value, e.g. 73 % RH. In this range, the reaction time of the sensor is noticeably shorter than in the condensation range and the risk of the sensor corroding is also reduced. Using the separate temperature probe, the testo 6681 transmitter compensates the microclimate conditions and displays the process readings.

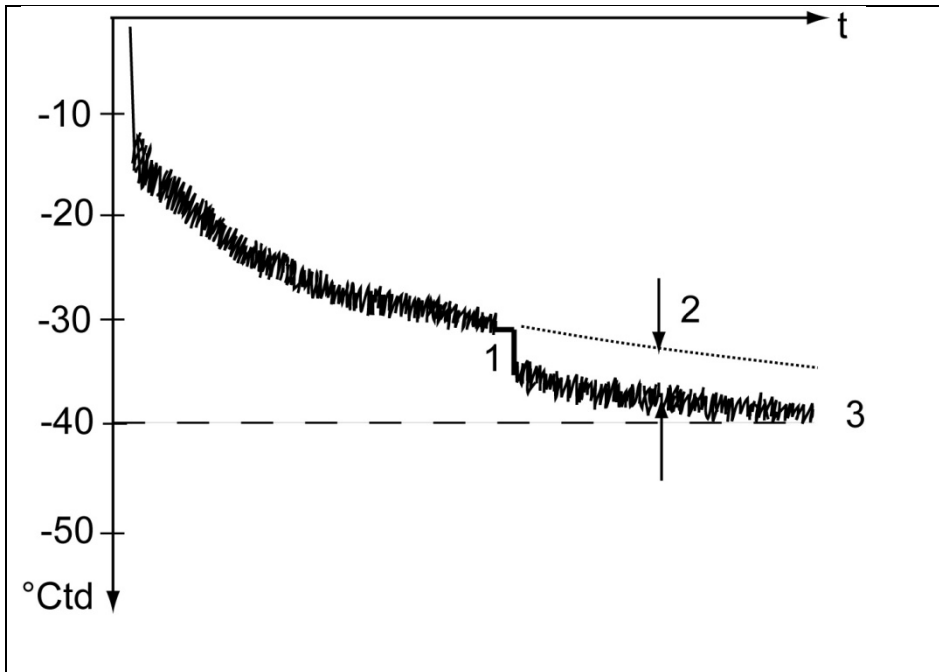


The reference conditions (11.3 % RH and 75.3 % RH) for the 2-point adjustment of the testo 6614 should be generated in a humidity generator, as humidity adjustment sets cannot be used due to the heat generated. The adjustment can also be carried out at a third adjustment point (90 % RH) by Testo Service so that optimum accuracy is also achieved in the high humidity ranges.

1.3.5.6 Self adjustment of testo 6615 trace humidity probe

Conventional trace humidity probes show a steep rise in measuring uncertainty at low humidities. In the trace humidity probe of the testo 6615, these measuring uncertainties are corrected by means of an automatic self-adjustment process. This means that extremely accurate measuring results are also attained to $-60\text{ }^{\circ}\text{Ctd}$.

To this end, a temperature sensor is fitted on the back of the testo 6615 which is used as a heater. A humidity and temperature value pair is taken in both the unheated and heated state. The deviation of the probe obtained from these pairs of values is automatically corrected.



The graph shows the effect of the self-adjustment, e.g. during the Init. phase.

- 7 Self-adjustment
- 8 Correction of measurement value
- 9 Process dew point temperature

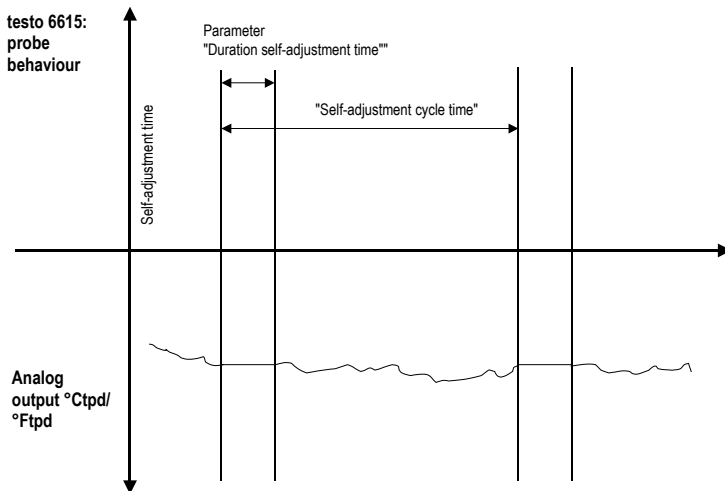
For the effectiveness of the self-adjustment the following prerequisites are decisive over the duration of the self-adjustment.

- The process temperature should not vary by more than 0.5K
- The dew point temperature should remain stable, as far as possible
- The process pressure should not vary excessively



If these prerequisites cannot be fulfilled, the values obtained during the last successful self-adjustment will be maintained.

All adjustment processes are saved in the history of the transmitter, see chapter 3.3.5 Transmitter history.



The heating time and storing of cycles can be edited in the P2A software; for example, they can be deactivated by setting the two parameters to "0".



Important:

- Deactivating the adjustment function of the testo 6615 will reduce measuring accuracy and should therefore be restricted to the shortest possible length of time.
- During the heating phase, the relay and analog outputs, the display value and output value are "frozen", see diagram above. **Self-adjustment active** is shown in the display until it has finished. The factory setting for self-adjustment time (incl. heating time, calculation time, cooling time) requires 30 minutes daily. The cycle time can be edited via the operating menu or the P2A software.
- In the factory setting, a **third adjustment point** (-40 °Ctd) is approached for the testo 6615 in addition to the 2-point adjustment.
This special adjustment can be performed again by your Testo Service team if necessary.

1.4 Operation

1.4.1 Relationship between user menu and mini-DIN socket is active

The testo 6681 can be parameterized using either the user menu or the P2A software (see *volume 2, chapter 2*).



The testo 6681 humidity transmitter can only be operated via the display and keypad if the display option is available.

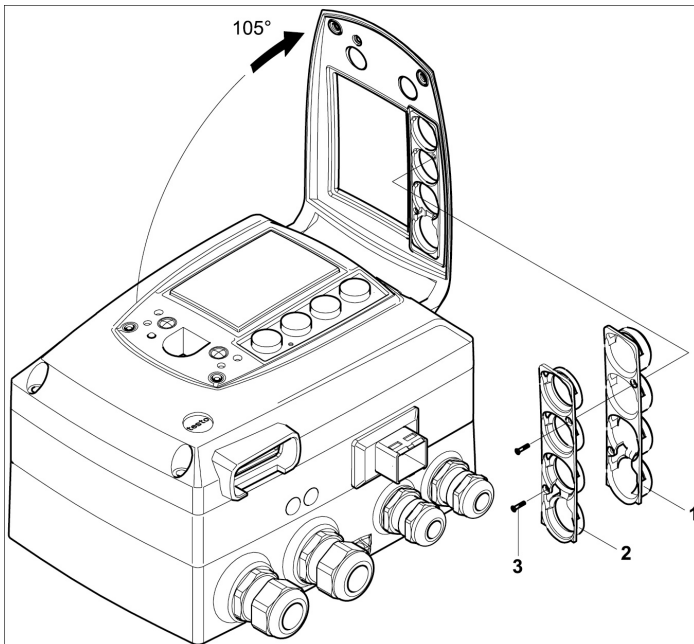
If the testo 6681 is connected to the P2A software, the user menu is blocked for the duration of the communication. The message **Service plug** is shown in the display of the testo 6681. As soon as the P2A software is disconnected, the user menu is accessible again.

1.4.2 Key cover

To prevent unauthorized operation of the keys, the standard key frame can be replaced with a key cover.

If the key cover has been assembled, the service flap must be opened for operation (see Section *Opening the instrument*, chapter 1.3.3).

➤ Attaching the key cover



✓ The service flap is open, see *Opening the instrument*, chapter 1.3.3.

- 1 Undo screws **(3)** and remove key frame **(2)**.
- 2 Insert key cover **(1)** into service flap and tighten screws **(3)**.
- 3 Close and screw down the service flap.

1.4.3 Password protection

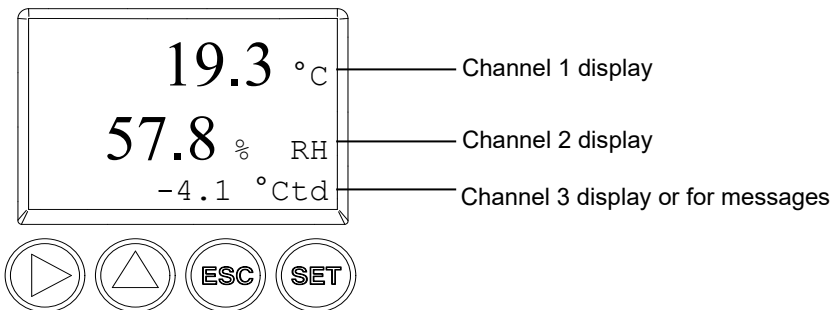
The user menu can be protected with a four-digit numerical code (see *Editing Main Menu Settings, chapter 1.4.6.5*) so that access to the user menu is denied to unauthorized persons not familiar with this numerical code.

If the password protection is not to be used, the numerical code "0000" must be entered. This is also the status upon delivery.

1.4.4 Structure of user menu

At the main menu level, the user menu comprises the following:

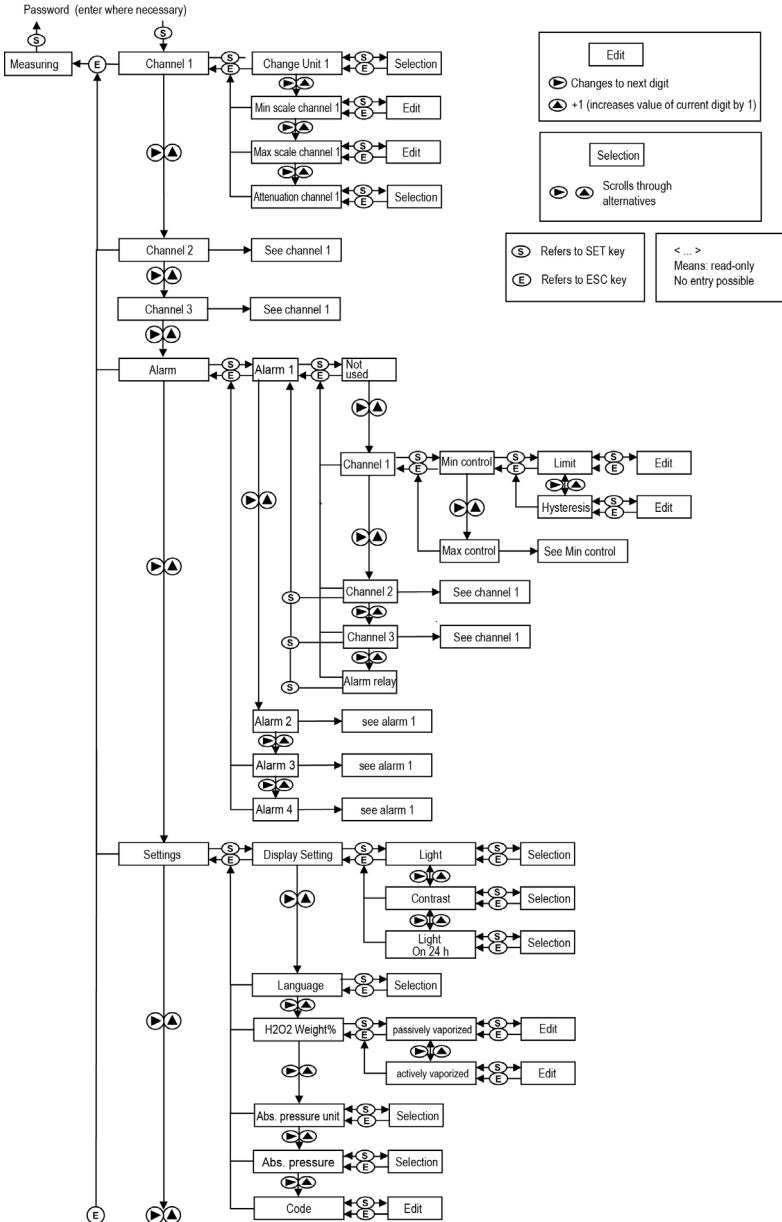
- **Main menu of channel 1**
- **Main menu of channel 2**
- **Main menu of channel 3 (if this option is available)**
- **Main Menu Alarm**
- **Editing Settings main menu**
- **Analysis main menu**
- **Main Menu Messages**
- **Ident main menu**
- **Adjustment main menu**
- **Reset main menu**



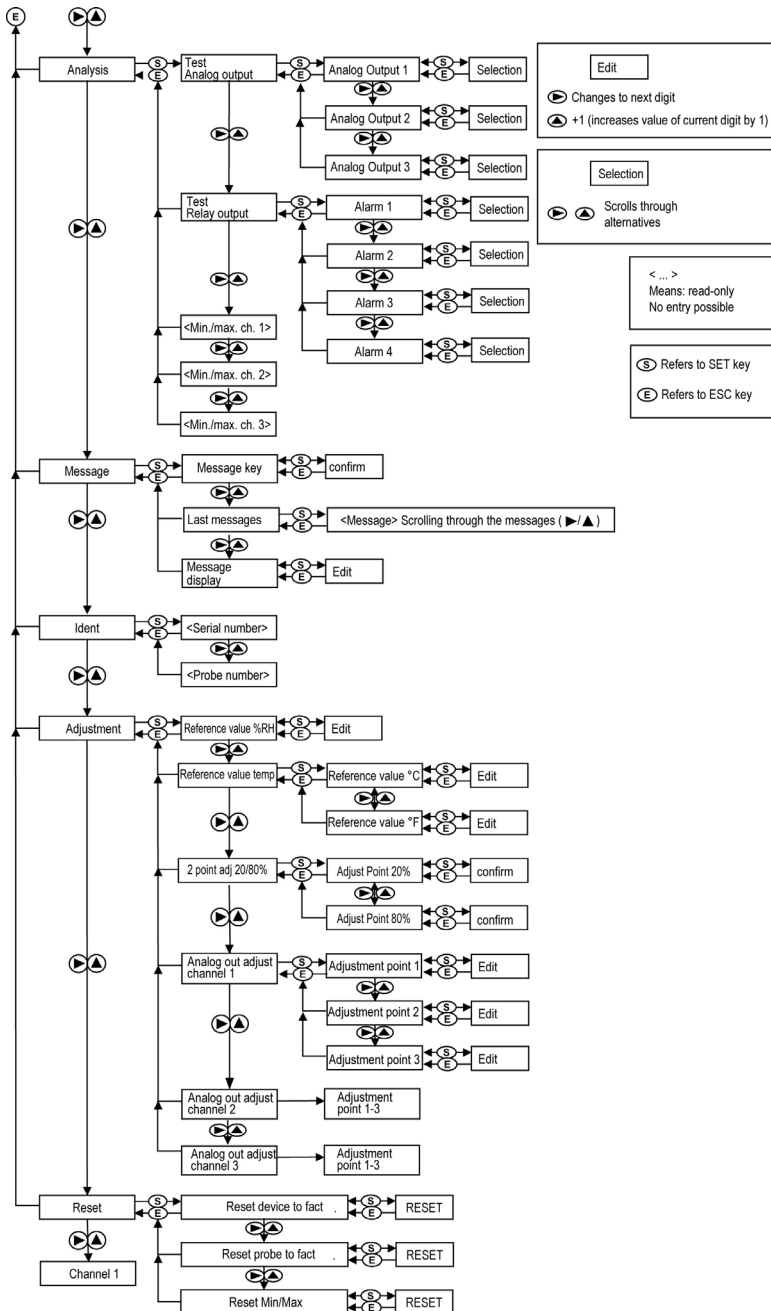
Four keys enable the user to navigate/scroll through the menus and enter/amend values and settings:

Key	Function/description
SET	<ul style="list-style-type: none">- In Measuring Mode: changes to parameterization- In Parameterizing Mode: confirms a selection or setting
ESC	<ul style="list-style-type: none">- Leaves a menu (without modifying any settings)
▶	<ul style="list-style-type: none">- Selecting: scrolls through menus (downwards) or selectable alternatives- Editing: changes to next digit (to the right)
▲	<ul style="list-style-type: none">- Selecting: scrolls through menus (upwards) or selectable alternatives- Editing: increases the value of the current digit by 1

1.4.5 Overview of the testo 6681 user menu



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1.4.6 The individual main menus

1.4.6.1 Editing main menu of channel 1

An overview is given in *Overview of the testo 6681 user menu, chapter 1.4.5*).

You can perform basic settings for channel 1.

- 1 In Measuring Mode, press SET, select **Main Menu Channel 1** using ► or ▲ and confirm selection with SET.

One of the following parameters can now be selected using ► or ▲, after which the selection must be confirmed with SET:

- **Channel 1 unit**

The parameter for this channel is selected.

Selection: % RH, °C, °F, °Ctd, °Ftd, g/m³, gr/ft³, g/kg, gr/lb, kJ/kg, BTU/lb, °Ctw, °Ftw, "H₂O, hPa, ppm_{vol}, % Vol, °Ctm, °Ftm.

Edit/select parameter with ► or ▲, confirm with SET or abort input with ESC.

- **Scale minimum for channel 1**

The lower scale limit is edited;

Unit as selected above (example: 4 mA = 0 % RH).

Editing the value: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

- **Scale maximum for channel 1**

The upper scale limit is edited;

Unit as selected above (example: 20 mA = 100 % RH).

Editing the value: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

- **Signal delay ("Damping") for channel 1**

The analog signal can be delayed ("Damping"); a time constant is selected for this (1 = no delay; 15 = longest delay).

Edit/select parameter using ► or ▲, confirm with SET or cancel entry via ESC.

- 2 Continue to **Main Menu Channel 2** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.4.6.2 Editing main menu of channel 2

See channel 1.

1.4.6.3 Editing main menu of channel 3 (if this option is available)

See channel 1.

1.4.6.4 Editing Main Menu Alarm

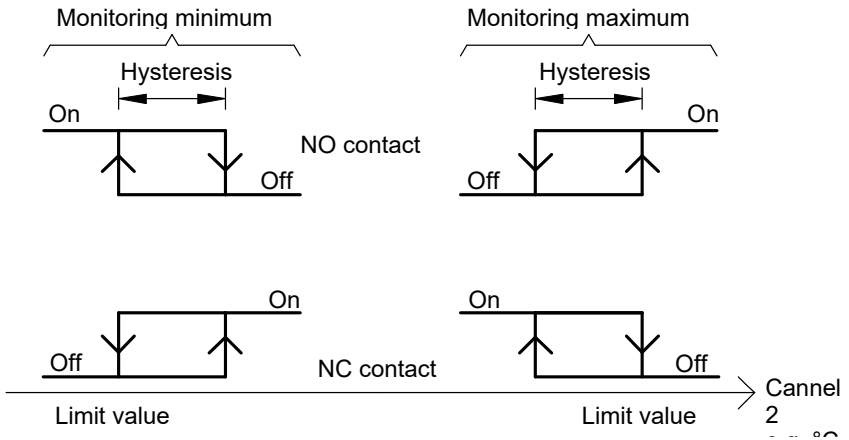
With the alarm, the relays, available as options, are programmed. In addition, the alarm statuses are shown on the display (top right) (even without relays). You can choose whether the alarm is to be used to monitor limit values or as a collective alarm. If an alarm is to be used to monitor limit values, you can choose between monitoring the minimum or maximum value and set a limit value and hysteresis for each alarm.

- 3 In Measuring Mode, press SET, select **Main Menu Alarm** using ► or ▲ and confirm selection with SET.

Four alarms can be parameterized.

- 4 Select **Alarm x** using ► or ▲ and confirm selection with SET.

➤ **Using alarm to monitor limit values**



- 1 Select **Channel x** (e.g. "Channel 1") using ► or ▲ and confirm selection with SET.
- 2 Select **Max control** or **Min control** with ► or ▲ (see graphic).
- 3 Press SET and edit **limit value** and **hysteresis**: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 4 Return to **Channel x** by pressing ESC.
- 5 Return to **Alarm x** by pressing ESC.
- 6 Change to the other relays using ► or ▲ and perform settings in the same way.

➤ **Using alarm as collective alarm or not using it at all**

If the collective alarm is assigned to an alarm, the relay is switched as soon as (at least) one of the warning or error messages of the testo 6681 transmitter (or the connected testo 6610 probe) is activated.



Note:

The messages affecting the collective alarm can only be selected in the P2A software, see *volume 2, chapter 2*.

- ✓ Alarm is selected (see previous steps 1 and 2).
- 1 Specify with ► or ▲ whether **Alarm x** is to be used as the **Alarm relay** or is to be **not used**. Confirm selection with SET and return to **Alarm x**.

- 2 Change to another alarm using ► or ▲ and perform settings in the same way.
- 3 Continue to **Main Menu Settings** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.4.6.5 Editing Main Menu Settings

You can edit instrument settings and other settings.

In Measuring Mode, press SET, select **Main Menu Settings** using ► or ▲ and confirm selection with SET.

You can edit settings for:

- Display
- Language
- H2O2 proportion by weight entry (optional with 3rd analog output)
Unit: %
- Absolute pressure unit
Selection: bar, psi, mPa, hPa
- Absolute pressure
Unit as selected above.
- Code

➤ Editing display settings

You can set the brightness and contrast of the display.

- 1 Select **Display Settings** using ► or ▲ and confirm selection with SET.
- 2 Select **Backlight** or **Contrast** using ► or ▲ and confirm selection with SET.

One of the following parameters can now be selected using ► or ▲, after which the selection must be confirmed with SET:

- **Backlight**
The display illumination is changed.
Edit/select parameter with ► or ▲, confirm with SET or cancel entry with ESC (the effect of the change in parameter can be seen during input).
- **Contrast**
The brightness difference between the display background and the displayed values is changed.

Edit/select parameter with ► or ▲, confirm with SET or cancel entry with ESC (the effect of the change in parameter can be seen during input).

• **Backlight on 24 h**

Using ► or ▲ select **On** or **Off** and confirm with SET.

- Off: The display light switches off automatically if no button was pressed for 30 seconds.

- On: The display light is activated

3 Go back to **Display Settings** by pressing ESC and continue to **Language** using ► or ▲.

➤ **Selecting language**

You can select the language for the plain text line in the display.

- Press SET, select required language with ► or ▲, confirm selection with SET and return to **Language**.



Only choose a language that you can understand well.

➤ **Editing H₂O₂ proportion by weight (optional with 3rd analog output)**

This menu is only used to parameterize humidity measurements in H₂O₂ atmospheres (e.g. in sterilization processes) and determines whether °Ctm, °Ftm or %rFm is the output parameter.

4 Select **H₂O₂ Weight Proportion** using ► or ▲ and confirm selection with SET.

The selection **H₂O₂ passively vaporized** or **H₂O₂ actively vaporized** in the submenu describes whether H₂O₂ is created through evaporation or is actively evaporated in the process.

5 Select **H₂O₂ passively vaporized** or **H₂O₂ actively vaporized** using ► or ▲ and confirm with SET.

6 Editing proportion by weight of H₂O₂ in % (% H₂O₂ proportion by weight in the liquid end solution): Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

7 Using ESC return to **H₂O₂ proportion by weight** and continue to **Absolute pressure unit** using ► or ▲.

➤ **Selecting absolute pressure unit (Abs. pressure unit)**

This parameter determines the humidity variables, standardised atmospheric dewpoint (°CtA, °FtA), relative humidity (g/kg or gr/lb) and water content (ppm_{vol} or % vol).

- 1 Press SET, select desired unit (selection: bar, psi, mPa, hPa) using ► or ▲ confirm selection with SET or cancel with ESC.
- 2 Continue to **Absolute Pressure** with ► or ▲.

➤ **Editing absolute pressure (Abs. pressure value)**

You can set a value for the process absolute pressure.

- 1 Using ► or ▲, select **Abs. pressure value** and confirm selection with SET.

The absolute pressure is displayed.

- 2 Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 3 Press SET and return to **Abs. pressure value**.
- 4 Return to **Main Menu Settings** by pressing ESC.
- 5 Continue to **Main Menu Analysis** using ► or ▲ or return to Measuring Mode by pressing ESC.

➤ **Editing code settings**

You can set the access code (password).



If a code other than "0000" (factory setting) is set, the transmitter can only be operated once this code has been entered via the menu.

- 1 Select **Code** using ► or ▲ and confirm selection with SET.
- 2 Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 3 Return to **Code** by pressing ESC.

1.4.6.6 Editing Analysis main menu

You can test the functionality of analog and relay outputs. In addition, you can read off the minimum and maximum values (since the last voltage supply or reset of the min./max. values).

➤ Testing functionality of analog outputs



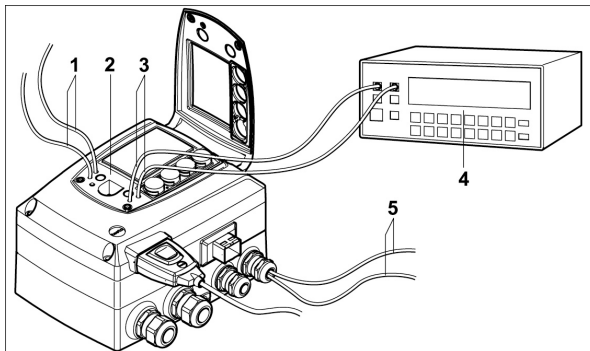
This function affects the analog outputs directly, not only the test contacts.

- 1 In Measuring Mode, press SET, select **Main Menu Analysis** using ► or ▲ and confirm selection with SET.

Test Analog Output is shown.

- 2 Press SET, choose between **Analog Output 1, 2, 3** with ► or ▲.
- 3 Press SET, scroll one digit to the right using ►, increase value of digit by 1 using ▲. Any analog output value can be predefined, e.g. for an analog output of 4 to 20 mA, the value "6.0 mA". Confirm with SET or abort entry with ESC.
- 4 Accept setting by pressing SET and test with multimeter (minimum requirement: resolution of 6.5 digits, accuracy of 100 nA):

Analog output 1 or 2: Via test contacts under service flap, see diagram.



- 1 Channel 1 test contacts
- 2 Service interface
- 3 Channel 2 test contacts
- 4 Multimeter
- 5 Ends of channel 3 cables

Analog output 3: Connect measuring cables to terminals for channel 3, guide measuring cables out of housing and perform measurement outside of the transmitter, see diagram.

- 5 Return to **Test Analog Output** using ESC and continue to **Test Relay Output** using ► or ▲.

➤ **Testing functionality of relay outputs**

- 1 Press SET, choose between **Alarm 1, 2, 3, 4** with ► or ▲.
- 2 Press SET.

The relay can now be tested. You can choose between **OFF** and **ON** using ► or ▲. If **ON** is chosen, the NO contact is closed, the NC contact opened. If **OFF** is chosen, the NC contact is closed, the NO contact opened.

- 3 To test, route a measuring cable from the relay terminals (see *chapter 1.3.3.3*) out of the transmitter to a multimeter (resistance measurement) or continuity tester.
- 4 Return to **Test Relay Output** by pressing either SET (starts relay test) or ESC (exits the menu without relay test).

➤ **Reading off min./max. values of channels**

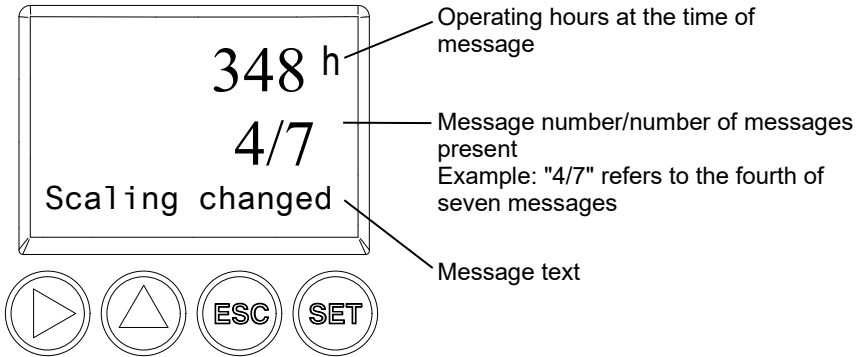


To reset the max./min. values, see chapter 1.4.6.10.

- 1 Read off the min./max. values of the three channels by pressing ► or ▲ one after the other and return to **Main Menu Analysis** using ESC.
- 2 Continue to **Main Menu Message** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.4.6.7 Editing Message main menu

Messages can be confirmed/acknowledged, the last messages can be called up and the display of the messages can be switched on or off.



Using the P2A software (see *volume 2, chapter 3*) you can predefine which of the messages are to be shown in the display.

- 1 In Measuring Mode, press SET, select **Main Menu Message** using ► or ▲ and confirm selection with SET.
- 2 Confirm **Confirm message** using SET.
- 3 Select **Last messages** using ► or ▲ and confirm with SET.
- 4 Scroll between the messages recorded so far using ► or ▲ and press ESC to return to **Last messages**.
- 5 Continue to **Display of message** with ► or ▲.

ON: Measurements are shown on the display in Measuring Mode.

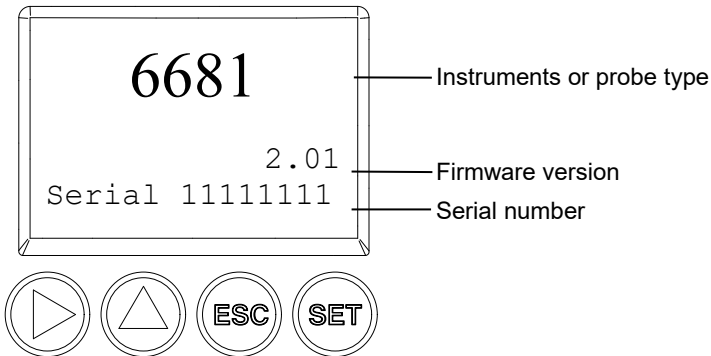
OFF: No messages shown on display.

- 6 Select **ON** or **OFF** using ► or ▲ and confirm selection with SET.
- 7 Return to **Main Menu Message** by pressing ESC.
- 8 Continue to **Main Menu Ident** using ► or ▲ or return to Measuring Mode by pressing ESC.



An overview of the messages can be found in *chapter 1.5, Status, warning and error messages*.

1.4.6.8 Calling up Main Menu Ident



The serial numbers of the transmitter and probe can be read off.

- 1 In Measuring Mode, press SET, select **Main Menu Ident** using ► or ▲ and confirm selection with SET.

The type, firmware version and serial number of the transmitter are displayed.

- 2 Press ESC to return to the **Main Menu Ident** or read off the type, firmware version and serial number of the probe using ► or ▲ and then press ► or ▲ to return to the **Main Menu Ident**.
- 3 Continue to **Main Menu Adjustment** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.4.6.9 Editing Adjust main menu

A reference value can be entered for both relative humidity (RH) and temperature (°C/°F) for the 1-point adjustment. Please refer to the description in *chapter 1.3.5.2*.

In addition, the analog outputs can be adjusted. See *chapter 1.3.5.4* for instructions on how to do this.



The 2-point adjustment for the adjustment points 20 %RH and 80 %RH is carried out via the user menu.

For the adjustment points 11.3 %RH and 75.3 %RH, the 2-point adjustment is carried out via the adjustment buttons or the P2A software, see *chapter 1.3.5.3* or *volume 2, chapter 3*.

➤ Enter reference value for 1-point adjustment



Please also refer to *chapter 1.3.5.2*.

- 1 In Measuring Mode, press SET, select **Main Menu Adjust** using ► or ▲ and confirm selection with SET.

Reference value % RH is displayed.

- 2 Press SET, edit value: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or cancel entry with ESC.
- 3 Continue to **Reference value temp** with ► or ▲.
- 4 Press SET and **Reference value °C** is displayed.
- 5 Press SET, edit value: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 6 Continue to **Reference value °F** with ► or ▲.
- 7 Press SET, edit value: Scroll one digit to the right using ►, increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 8 Continue to **Analog Adj. Ch. 1** with ► or ▲.
- 9 Continue with the adjustment of the analog outputs (see below, step 2) or press ESC to return to **Main Menu Adjustment**.
- 10 Continue to **Main Menu Reset** using ► or ▲ or return to Measuring Mode by pressing ESC.

➤ Performing the 2-Points-Adjustment for 20% RH and 80 % RH

- 1 In the Measuring Mode press SET, select **main menu Adjust** with ► or ▲ and confirm selection with SET.
- 2 Continue to **2Pt Adjust 20/80%** with ► or ▲.
- 3 Press SET.
- 4 Continue to **Adj. Point 20%** or **Adj. Point 80%** with ► or ▲
- 5 Confirm selection with SET.
- 6 The red LED ADJ flashes

In the display **2Pt Adjust 20/80%**, **1-point adjustment**, **Probe reset** appears consecutively.

The adjusted measurement values appear after probe reset.

➤ **Performing analog adjustment**



Please refer to *chapter 1.3.5.4*.

- 1 In Measuring Mode, press SET, select **Main Menu Adjust** using ► or ▲ and confirm selection with SET.



Each channel is adjusted at three points in the analog range (at 10 %; 50 %; 90% of the analog scale).

- 2 Select **Analog Adj. Ch. 1** using ► or ▲ and confirm with SET.
- 3 Select **Adj. Point 1** using ► or ▲.
- 4 Press SET. Read off multimeter display (e.g. 5.601 mA) and enter this value in the user menu. Do this by scrolling one digit to the right using ► and increasing the value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 5 Select **Adj. Point 2** using ► or ▲.
- 6 Press SET. Read off multimeter display (e.g. 12.001 mA) and enter this value in the user menu. Do this by scrolling one digit to the right using ► and increasing the value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 7 Select **Adj. Point 3** using ► or ▲.
- 8 Press SET. Read off multimeter display (e.g. 18.401 mA) and enter this value in the user menu. Do this by scrolling one digit to the right using ► and increasing the value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
- 9 Continue to **Analog Adj. Ch. 2 or 3** with ► or ▲ (repeat steps 3 to 8).
- 10 Return to **Main Menu Adjust** by pressing ESC.
- 11 Continue to **Main Menu Reset** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.4.6.10 Editing Reset main menu

You can reset the factory settings for the following:

- Instrument
- Sensor/probe
- Min./max. values



Resetting to the factory settings means resetting to the order specification, i.e. the specific condition at the time of supply to the customer.

- 1 In Measuring Mode, press SET, select **Main Menu Reset** using ► or ▲ and confirm selection with SET.

Reset device to factory settings is displayed.

- 2 Select the setting to be reset using ► or ▲ and confirm selection with SET.

Reset Completed is displayed.

- 3 Press ESC or SET to return to reset setting and press ESC to return to **Main Menu Reset**.
- 4 Continue to **Main Menu Channel 1** using ► or ▲ or return to Measuring Mode by pressing ESC.

1.5 Status, warning and error messages



To achieve optimum operational reliability (machine availability), the transmitter provides the following via the user menu (see *chapter 1.4*) or the P2A software (see *volume 2, chapter 2*):

- Status messages,
- Warning messages and
- Error messages

for either the testo 6681 or the connected testo 661x probe as applicable.

All messages are stored in the transmitter with an operating hours stamp. Use the user menu (see *chapter 1.4.6.7*) or P2A software (see *volume 2, chapter 2*) to view the message history.

In the transmitter, the last 160 messages are stored in a ring memory, but there is no restriction in the P2A software.

1.5.1 Status messages

Status messages show the current operating mode of the testo 6681.

Message	Display	Description
00300	New limit value	The limit value has been changed or shifted
00301	Scaling changed	The scaling has been changed
00500	Transmitter reset:	The transmitter was reset to the factory settings and is restarted.
0052F	Reset Min/Max	Resets all saved Min/Max values for all channels
02506	Probe connection	A probe has been connected
01D19	Service plug	The Mini-DIN socket is connected to: the USB adapter for P2A software, the adjustment adapter or the service plug (is not recorded/no number)
00307	User Setting Change	User Setting Change: General settings were changed for the transmitter.
02d07	Probe disconnected	No probe is connected
02104	Analog out adjust	An analog adjustment has been made

Message	Display	Description
02101	1-point adjustment	A 1-point adjustment is performed.
02102	2-point adjustment 11.3%	As part of the 2-point adjustment, an adjustment is performed at 11.3 % RH
02103	2-point adjustment 75.3%	As part of the 2-point adjustment, an adjustment is performed at 75.3 % RH
02120	2-point adjustment 20 %	As part of the 2-point adjustment, an adjustment is performed at 20 % RH
02130	2-point adjustment 80 %	As part of the 2-point adjustment, an adjustment is performed at 80 % RH
02105	Self-adjustment active	For testo 6615 probe only: The probe performs an automatic self-adjustment
02518	Probe reset	Probe reset: The probe performs a reset

1.5.2 Warning messages

Warning messages show an early warning or a current malfunction which may negatively impact measuring.

Message	Display	Cause	Remedying of fault
02101	2-point adjustment drift*	In the 2-point adjustment, corrections repeatedly occur in the same direction; this may indicate a sensor drift	Send the probe into Testo Service
00E00	T ambient high**	The ambient temperature exceeds the permissible temperature for the transmitter	Take necessary measures to lower ambient temperature, e.g. through venting or cooling
00E01	T ambient low**	The ambient temperature is below the permissible temperature for the transmitter	Take necessary measures to raise ambient temperature, e.g. through heating
00E02	Supply voltage low**	The supply voltage is below the minimum voltage required for the transmitter	Ensure sufficient voltage supply

Message	Display	Cause	Remedying of fault
00E00	T process high**	The process temperature exceeds the temperature designated for the probe	Remove the probe from the process and take any necessary measures to lower the process temperature
02806	Condensation*	100 % RH has been reached, condensation developing	Take measures to reduce process humidity
02807	Values less than 0 % RH**	The adjustment or sensor is faulty	Check adjustment (via P2A adjustment history, perform 2-point adjustment where necessary) If the problem persists, contact Testo Service
02809	Sensor early warning*	For testo 6617 probe only: The cover electrode of the sensor is damaged; this may soon cause the sensor to break	Carry out visual inspection If the mirror-like surface of the sensor is dirty or damaged, contact Testo Service

* Early warning

** Current malfunction

1.5.3 Transmitter error messages

Error messages show a current malfunction.

Message	Display	Cause	Remedying of fault
03401	No probe signal	The probe communication is interrupted	Ensure that the probe connector is fully engaged in the transmitter. If communication still cannot be established, contact Testo Service
03508	Wrong probe	The connected probe is not compatible with the present transmitter	Use a compatible probe Note: The 660x probes match the 665x transmitter, and the 661x probes the 668x transmitter
01528	Watchdog error	Due to a processor error, the transmitter performs an automatic restart	If the problem occurs frequently, contact Testo Service
0300A	% RH sensor short-circuit	Short-circuit in humidity sensor	Contact Testo Service
0300B	%RH sensor broken	The humidity sensor is damaged (sensor broken)	Contact Testo Service
0300C	T sensor short-circuit	Short-circuit in temperature sensor	Contact Testo Service
0300D	T sensor broken	The temperature sensor is damaged (sensor broken)	Contact Testo Service
03105	Self-adjustment error	For testo 6615 probe only: The automatic self-adjustment was faulty	Contact Testo Service

1.5.4 Status codes in cyclical service

1.5.4.1 Status codes for error messages

Message (Hexadecimal code)	Description	Cause
0x08	No communication	- No probe connected - Wrong probe connected - Communication with probe interrupted
0x10	No sensor signal	- Breakage of the sensor - Short-circuit humidity sensor - Short-circuit temperature sensor
0x0C	Transmitter malfunction	- Supply voltage to low - Ambient temperature to high - Ambient temperature to low - Transmitter is restarted

1.5.5 Handling alarm messages

Shown on the display ¹	Can be used for collective alarm ²	Message start/end
Limit value	x	x
Scaling changed	x	x
Transmitter reset	x	x
Reset Min/Max		x
Transmitter refresh		x
Probe connection		
Service plug		
User Setting Change		x
Probe disconnected		
Analog out adjust		x
1-point adjustment	x	x
2-point adjustment 11.3%	x	x
2-point adjustment 75.3%	x	x
Probe self-adjustment	x	x
Probe reset	x	x

Shown on the display ¹	Can be used for collective alarm ²	Message start/end
2-point adjustment drift*	x	
T ambient high**	x	
T ambient low**	x	
Supply voltage low**	x	
T process high**	x	
Condensation*	x	
Values less than 0 % RH**	x	
Sensor early warning*	x	
No probe signal	x	
Wrong probe		
Watchdog error	x	
% RH short-circuit	x	
%RH sensor broken	x	
T short-circuit	x	
T sensor broken	x	
Self-adjustment error		

- 1 If multiple messages/alarms are activated at the same time, only the last message/alarm is shown. If this is cancelled, the other messages that are still active are no longer displayed.
- 2 The message can be assigned the collective alarm function, which means that the collective alarm is activated as soon as at least one of the messages assigned to it is activated. The collective alarm can be assigned to each of the 4 optional relays. The collective alarm is then always the same, as it can only be defined once.

Execute **Confirm message** function (via control keys at transmitter):

- The message/alarm is no longer shown on the display. If multiple messages/alarms are active at the same time, all are reset simultaneously.
- If at least one message is assigned to the collective alarm, the collective alarm is reset. If the collective alarm is set on a relay, the relay is also reset, meaning switched to its neutral position.

1.5.6 Namur fault conditions

If the faults named in the following table occur, the analog outputs output special values that enable a general fault warning in the higher-level control system. The values correspond to the "Namur" industry standard.

Display message	Class	Analog output				
		0 - 20 mA	4 - 20 mA	1 V	5 V	10 V
No probe signal	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
Wrong probe	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
Watchdog error	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
Values < 0 %RH	Underrange	0 mA	3.8 mA	0 V	0 V	0 V
Condensation	Overrange	20.5 mA	20.5 mA	1.2 V	5.5 V	11 V
%RH short-circuit	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
%RH sensor broken	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
T short-circuit	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
T sensor broken	Error	21 mA	21 mA	1.2 V	5.5 V	11 V
Probe disconnected	Error	21 mA	21 mA	1.2 V	5.5 V	11 V

1.6 Maintenance and cleaning

1.6.1 Maintaining the instrument

We recommend that the adjustment and settings of the transmitter be checked at regular intervals using the

- User menu (*chapter 1.4*) or
- P2A software (*volume 2, chapter 2*)

Convenient "remote monitoring" of the transmitter can be implemented, for example by using a relay as a collective alarm (see *chapter 1.4.6.4*) whose messages are forwarded to a local alarm transmitter (horn, light) or PLC.

1.6.2 Cleaning the instrument

- Only clean the instrument carefully with a moist cloth.
- Do not use aggressive cleaning agents.
- Do not use any solvents
- Do not touch or damage the sensor.



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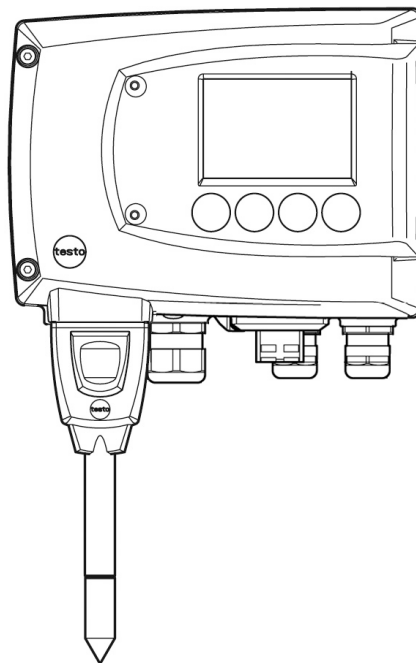
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**testo 6681 Ethernet· Humidity transmitter
with Ethernet module
testo 6610 · Probes
P2A software · Parameterizing, adjusting and analyzing
software**

Instruction manual Volume 2

en



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2 testo 6610 probe

2.1 Specifications

2.1.1 Functions and use

The plug-in, adjusted probes from the testo 6610 range are used in conjunction with the testo 6681 humidity transmitter.

These measuring units are suitable for the following applications, for example:

- Process instrumentation
- Clean rooms
- Test benches
- Drying processes
- Production and storage air quality
- Complex room climate applications.

2.1.1.1 Digital probes:

The probes are adjusted in the factory and transmit their adjustment data to the internal memory of the testo 6681 transmitter. The information is transmitted between the probe and transmitter in a purely digital form. The probes can therefore be disconnected from the transmitter for adjustment or servicing while the transmitter itself can remain at the measuring point.



Hint:

We recommend in this case that a probe of the same type be inserted into the transmitter immediately in order to be able to continue measuring with minimal interruption.

The transmitter identifies the probe and records that a probe was connected in the history.



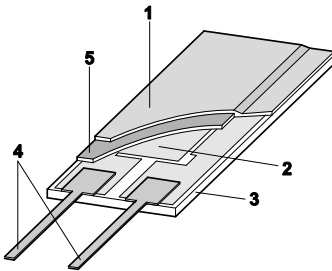
The testo 6681 transmitter cannot be run with the testo 6600 probes; testo 6610 probes must be used.

2.1.1.2 The Testo humidity sensor

With the Testo humidity sensor, which has been in successful use and continually improved for more than twenty years, the focus has from the very beginning been on both accuracy parameters, namely measuring uncertainty and long-term stability.

The capacitive humidity sensor is in principle a plate capacitor consisting of two electrically conductive plates (electrodes **(1)** and **(2)**, see diagram below) opposite each other.

A humidity-sensitive polymer (**5**) serves as the dielectric. The special feature lies in the perfect way the individual layers are matched to each other. This is evident particularly in the top electrode, which has to perform two tasks that, at first glance, appear contradictory: it must be completely permeable to the water vapour that is to be fed into the polymer dielectric, but at the same time it must be impervious, smooth and repellent to condensate, oil and dirt in order to protect the sensor.



- 1 Cover electrode
- 2 Bottom electrode
- 3 Substrate
(Ceramic substrate for mechanical protection)
- 4 Connections
(protected against corrosion)
- 5 Dielectric layer



The humidity sensor cannot be exchanged by the customer. The humidity sensor may not be damaged or touched. Contamination and damage lead to an impairment of the measurement and the measuring accuracy.

2.1.1.3 Self-diagnosis

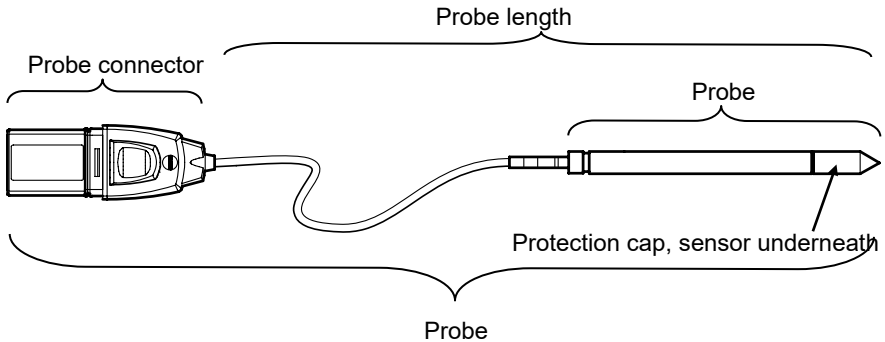
The probes in the testo 6610 range monitor their functionality themselves and report the following faults:

- Sensor breaks
- Sensor short-circuit
- Condensation
- The condensation message is issued at a reading of 100 % RH and deactivated once the readings are within the valid range.
- Error message with drift at the adjustment points
- Value for relative humidity less than 0 % RH.
The trigger threshold is set at -2 % RH. This means that an error message is only issued once a clear effect is discernible.
- Early warning when sensor corrosion is starting to develop
The testo 6617 probe is able to signal the first signs of corrosion. The probe can thus be changed at an early stage without interrupting the machine availability.
- Self-adjustment (testo 6615 only)
- Excess temperature
Error message if the permissible process temperature is exceeded

2.1.2 Design of the probe

The probes of the testo 6610 range are made up of the following components (included in delivery):

- Probe connector
- Probe shaft with protection cap and sensors (% RH and °C or °F)
- Mounting bracket (for testo 6612 duct version)
- Probe cable (testo 6612 to 6617, 6622, 6623 duct and cable version), bend radius minimum \varnothing 50 mm



2.1.3 Accessories

The following accessories are available for probes in the testo 6610 range:

- Filters and protection caps (see chapter 2.2.1.4, Filters)
- Calibration certificates according to ISO and DAkkS (see chapter 4.2, Accessories and spare parts).

2.2 Product description

2.2.1 Overview of probe and filter types

2.2.1.1 Probe version



A detailed description of the probe versions can be found from *chapter 2.2.2* onwards.

The following probe versions are available for the testo 6681 humidity transmitter:

Version	Article no.	Characteristic
testo 6611	0555 6610-L11	Wall probe version; accuracy to $\pm 1\%$ RH; temperature range $-20\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}/-4$ to $+158\text{ }^{\circ}\text{F}$
testo 6612	0555 6610-L12	Duct probe version; accuracy to $\pm 1\%$ RH; temperature range $-30\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}/-22$ to $+302\text{ }^{\circ}\text{F}$
testo 6613	0555 6610-L13	Cable probe version; accuracy to $\pm 1\%$ RH; temperature range $-70\text{ }^{\circ}\text{C}$ to $+180\text{ }^{\circ}\text{C}/-94$ to $+356\text{ }^{\circ}\text{F}$
testo 6614	0555 6610-L14	Heated cable probe version; accuracy to $\pm 1\%$ RH; temperature range $-40\text{ }^{\circ}\text{C}$ to $+180\text{ }^{\circ}\text{C}/-40$ to $+356\text{ }^{\circ}\text{F}$
testo 6615	0555 6610-L15	Trace humidity cable probe version; Dew point measurement to $-60\text{ }^{\circ}\text{Ctd}$; temperature range $-40\text{ }^{\circ}\text{C}$ to $+120\text{ }^{\circ}\text{C}/-40$ to $+248\text{ }^{\circ}\text{F}$
testo 6617	0555 6610-L17	Cable with cover electrode monitoring probe version; accuracy $\pm 1.2\%$ RH; temperature range $-40\text{ }^{\circ}\text{C}$ to $+180\text{ }^{\circ}\text{C}/-40$ to $+356\text{ }^{\circ}\text{F}$

2.2.1.2 Determining the accuracy/measuring uncertainty

The entries for the measuring uncertainty for the probe are determined in accordance with GUM (Guide to the Expression of Uncertainty in Measurement/DIN V ENV 13005). All parts that make up the measuring uncertainty given by Testo are listed below. When comparing the measuring uncertainty/accuracy between manufacturers, which components are included is to be taken into account. In many cases, not all elements that contribute to measuring uncertainty are assessed, for example if the error contribution of the production adjustment is shown separately or not at all.

The measuring uncertainty of the probe includes the sensor and its electronics as well as the output of the digital measuring signal:

1. **Linearity including scatter** Systematic error and scattering of the components (due to manufacturing tolerances)

2. **Hysteresis** Hysteresis indicates the maximum deviation of the readings that are obtained when you set the same value for the parameter, once coming from a smaller value, once coming from a larger value (humidity sensors actually have no hysteresis, but rather very slow adjustment effects that appear to be hysteresis when considered only for a short period.)

3. **Reproducibility** Repeatability (scattering of the readings in the event of the same parameter being entered successively)

4. **Production adjustment area** The measuring uncertainty of the reference instruments of the adjustment area (including the reference instrument) in production

5. **Uncertainty of the testing** Uncertainty of the procedure for determining points 1 and 2.

2.2.1.3 Ordering options for testo 6610 probes (0555 6610)

Order code	Characteristic
Lxx Probe type	
L 11	Probe 6611
L 12	Probe 6612
L 13	Probe 6613
L 14	Probe 6614
L 15	Probe 6615
L 17	Probe 6617
Mxx Protective filter	
M 01	Stainless steel sintered filter
M 02	Metal wire protection cap
M 03	Sintered PTFE filter
M 04	Open metal protection cap
M 05	ABS plastic cap (open)
M 06	PTFE filter with drip hole
M 07	PTFE filter with drip hole and condensation protector
M 08	Filter for H ₂ O ₂ atmospheres
Nxx Cable length	
N 00	Without cable (testo 6611)
N 01	1 m cable length (testo 6613, 6614, 6615, 6617)
N 02	2 m cable length (testo 6613, 6614, 6615, 6617)
N 05	5 m cable length (testo 6613, 6614, 6615, 6617,)
N 10	10 m cable length (testo 6613, 6614, 6615, 6617,)
N 23	Cable length specifically for duct versions (testo 6612)
Pxx Probe length	
P 07	Probe length approx. 70 mm (testo 6611)
P 12	Probe length approx. 120 mm (testo 6613)
P 20	Probe length approx. 200 mm (testo 6611, 6612, 6613, 6614, 6615, 6617)
P 30	Probe length approx. 300 mm (testo 6612, 6613, 6614)
P 50	Probe length approx. 500 mm (testo 6612, 6613, 6614, 6615, 6617)
P 80	Probe length approx. 800 mm (testo 6612, 6613)

2.2.1.4 Filters

One of the following filters or protection caps can be used for each probe version:

Filter*	Article no.**	Characteristic	Length A (mm)
M 01	0554 0647	Stainless steel sintered filter	33
M 02	0554 0757	Metal wire protection cap	40,3
M 03	0554 0759	Sintered PTFE filter	35
M 04	0554 0755	Open metal protection cap	35
M 05	0192 0265	Open ABS plastic cap	25
M 06	0554 9913	PTFE filter with drip hole	35
M 07	0554 9913 + 0554 0166	PTFE filter with drip hole and condensation protector	35 55
M 08	0554 6000	Filter for H ₂ O ₂ atmospheres	35

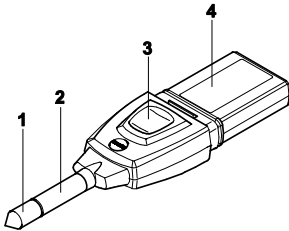
* When ordering the probe, please use this filter code, cf. *chapter 2.2.1.3, Ordering options for testo 6610 probes (0555 6610)*.

** When purchasing a replacement (filters only), please use this order number

2.2.2 testo 6611 wall probe

The wireless testo 6611 probe is inserted into the testo 6681 humidity transmitter that is mounted on the wall and ready-wired.

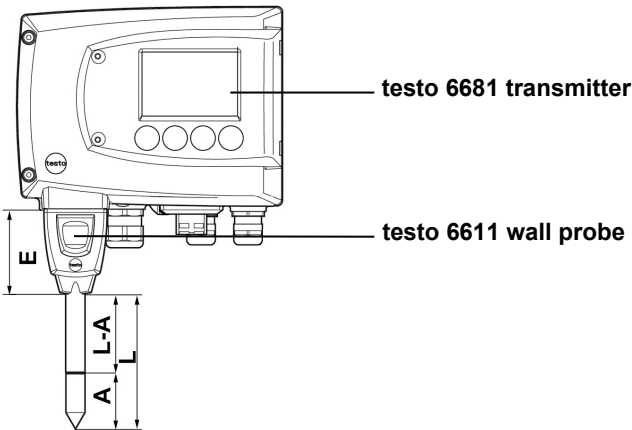
At a glance



- 1 Filter (including: humidity and temperature sensor)
- 2 Probe shaft
- 3 Key
- 4 Connector

Application

- Monitoring and regulating the production and storage air quality when manufacturing and storing hygroscopic products
- Meeting the top accuracy requirements
- Clean room applications for which a metal housing is required.



Technical Data

Parameters

- Humidity (% RH/°Ctd/°Ftd), etc.
- Temperature

Measuring range

- Humidity: 0 to 100 % RH¹
- Temperature: - 20 to 70 °C/-4 to +158 °F

Material

- Probe shaft: Stainless steel
- Connector: ABS plastic

Accuracy (at 25 °C/77 °F)*

Length 200 mm

Humidity

- ±1.0 % RH / drift per year
- ± (1.0 % RH + 0.007 x reading) for 0 to 90 % RH
- ± (1.4 % RH + 0.007 x reading) for 90 to 100 % RH
- 0.02 % RH/K, dependent upon the process temperature (with a deviation of 25 °C/+77 °F)
- 0.02 % RH/K, dependent upon the electronics temperature (with a deviation of 25 °C/+77 °F)
- Temperature
- ±0.15 °C (0.27 °F)
- with slope PT1000 class AA

* Refer to the charts below for the correlation between temperature and accuracy.

- Length 70 mm
- As with length of 200 mm, but with additional measuring error, specified for the operating mode 2 channels at 12 mA, without display light, relay off:
- Humidity: +1.6 % RH (additional)
- Temperature: +0.6 °C (1.1 °F) in addition

Reproducibility

- Better than ±0.2 % RH

Sensor

Response time without protective filter: t 90 max. 15 sec.

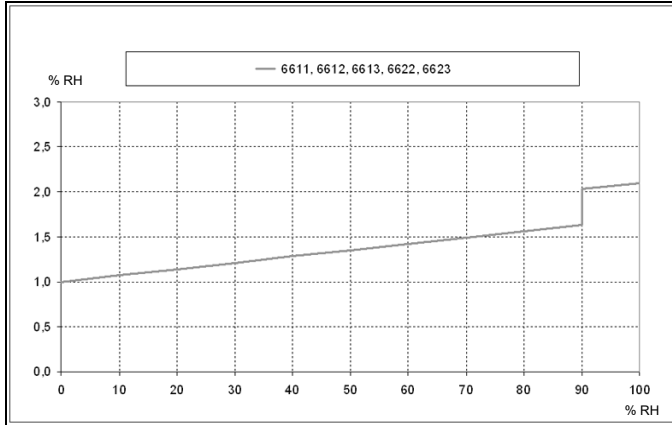
Probe dimensions

- Diameter of probe shaft: 12 mm
- E = 55 mm
- L = approx. 70 mm or 200 mm
- L – A = 35 mm or 165 mm
- A, see Table *Filters*, chapter 2.2.1.4.

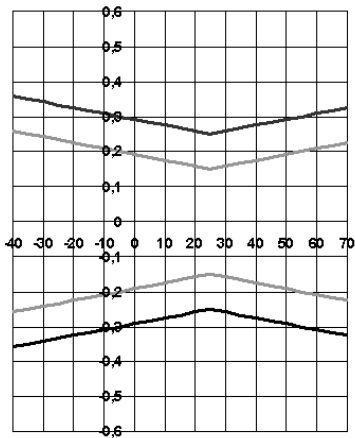
¹ For constant use in high humidity (> 80% rF at ≤ 30°C for > 12 h, > 60% rF at > 30°C for > 12 h), please contact us via www.testo.com/service-contact

Measuring accuracy of testo 6611 wall probe

Humidity error according to amount $|\pm\% \text{RH}|$ as a factor of process humidity



Temperature error as a factor of process temperature and temperature of electronics

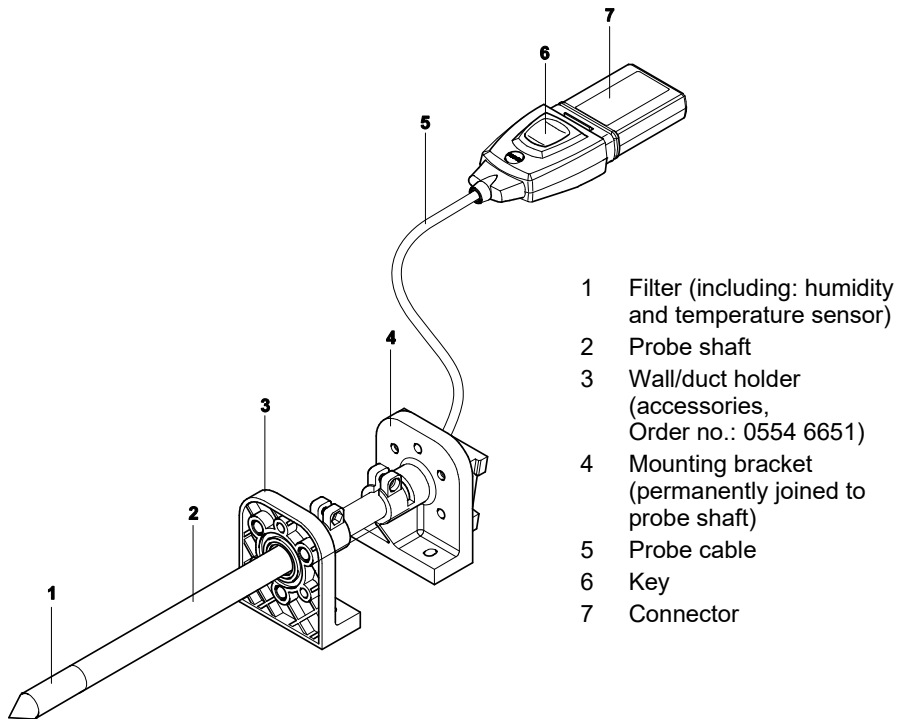


— System error 6681 + probe, electronics 25 °C/+77 °F
 - - - System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

2.2.3 testo 6612 duct probe

The testo 6612 probe measures the humidity and temperature in air ducts.

At a glance

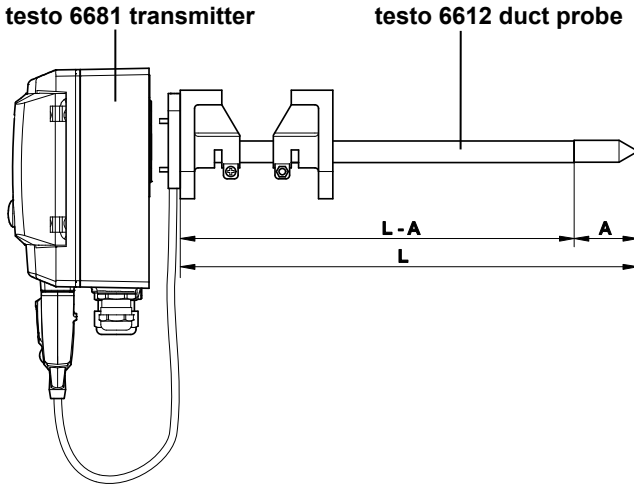


In the event of overpressures, the probe may become a projectile.

For assembly, see **Pressure resistance** on the following page.

Application

- Monitoring and regulating the production and storage air quality in air ducts when manufacturing and storing hygroscopic products
- Meeting the top accuracy requirements
- Air duct applications for which a metal housing is required.



Technical Data

Parameters

- Humidity (% RH/°Ctd/°Ftd), etc.
- Temperature

Measuring range

- Humidity: 0 to 100 % RH²
- Temperature: - 30 to +150 °C/-22 to +302 °F

Material

- Probe shaft: Stainless steel
- Line: Sheathed, FEP
- Connector: ABS plastic

Accuracy (at 25°C/77°F)*

Humidity

- ±1.0 % RH / drift per year
 - ± (1.0 % RH + 0.007 x reading) for 0 to 90 % RH
 - ± (1.4 % RH + 0.007 x reading) for 90 to 100 % RH
 - 0.02 % RH/K, dependent upon the process temperature (with a deviation of 25 °C/+77 °F)
 - 0.02 % RH/K, dependent upon the electronics temperature (with a deviation of 25 °C/+77 °F)
 - Temperature
 - ±0.15 °C (0.27 °F)
- Slope PT1000 class AA
- * Refer to the charts below for the correlation between temperature and accuracy.

Reproducibility

- Better than ±0,2 % RH

² For constant use in high humidity (> 80% rF at ≤ 30°C for > 12 h, > 60% rF at > 30°C for > 12 h), please contact us via www.testo.com/service-contact

Sensor

Response time without protective filter: t_{90} max. 15 sec.

Probe dimensions

- Diameter of probe shaft: 12 mm
- L = approx. 200/300/500/800 mm
- L – A = 165/265/465/765 mm
- A, see Table *Filters, chapter 2.2.1.4.*

Cable length incl. probe shaft and filter

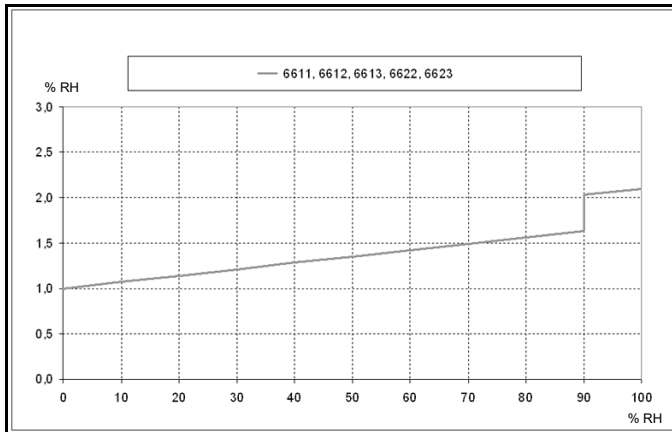
- Customized for duct version

Pressure resistance

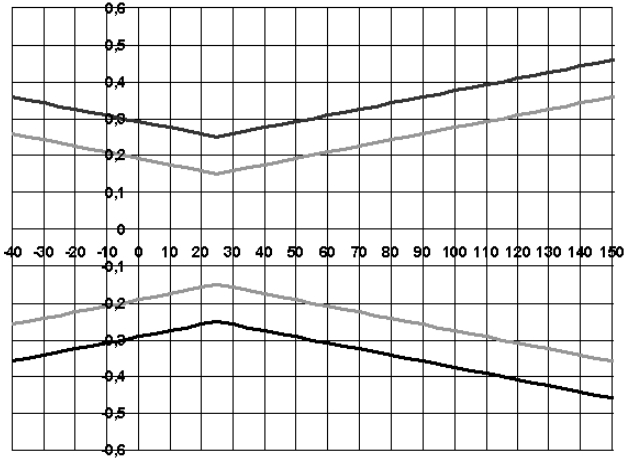
- PN 10 (probe tip)**
- ** If installing probe under pressure, please use cutting ring screw connection (order no. 0554 1795).

Measuring accuracy of testo 6612 duct probe

Humidity error according to amount $|\pm\% \text{ RH}|$ as a factor of process humidity



Temperature error as a factor of process temperature and temperature of electronics

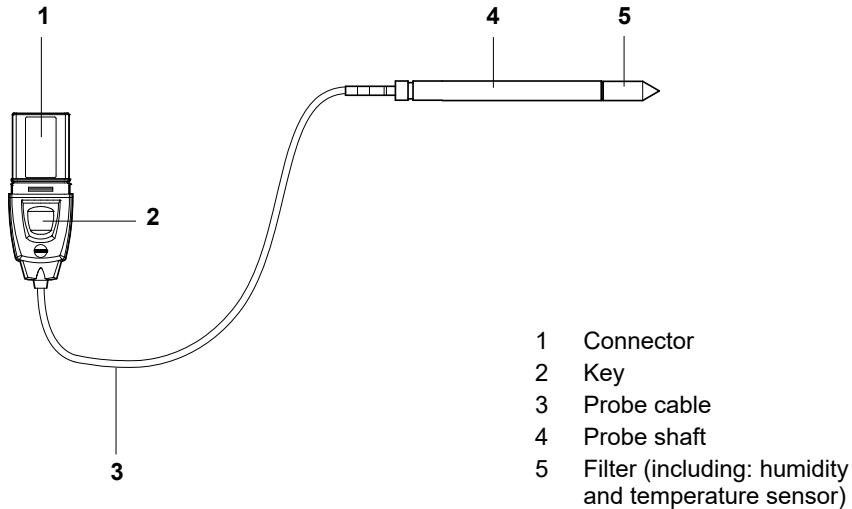


— System error 6681 + probe, electronics 25 °C/+77 °F
 — System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

2.2.4 testo 6613 cable probe

The testo 6613 probe is used when the spatial separation of the transmitter and probe is required.

At a glance



In the event of overpressures, the probe may become a projectile.

For assembly, see **Pressure resistance** on the following page.

Application

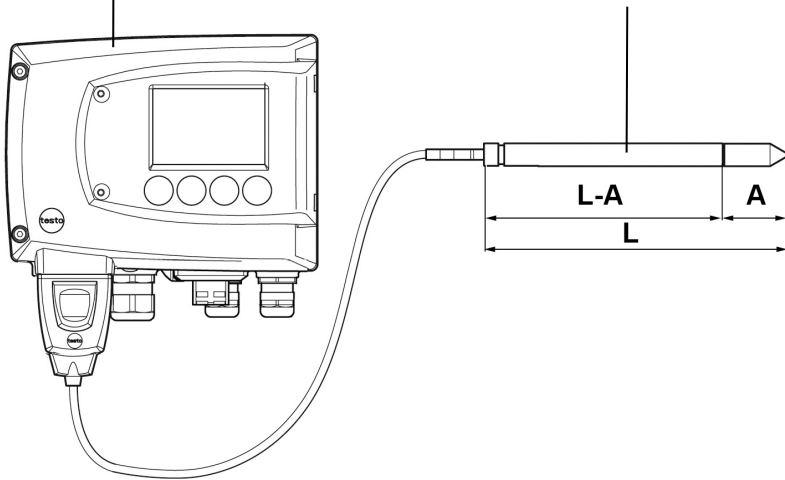
- Monitoring and regulating industrial humidity processes (apart from high-humidity processes), e.g. food production, storing fruit
- Monitoring the production and storage air quality when manufacturing and storing hygroscopic products
- Meeting the top accuracy requirements
- Clean room applications
- Applications for which a sturdy metal housing is required.



We recommend that the testo 6614 (heated) probe be used for continuous high-humidity processes.

testo 6681 transmitter

testo 6613 cable probe



Technical Data

Parameters

- Humidity (% RH/°Ctd/°Ftd), etc.
- Temperature

Measuring range

- Humidity: 0 to 100 % RH³
- Temperature: -70 to +180 °C/-94 to +356 °F

Material

- Probe shaft: Stainless steel
- Line: Sheathed, FEP
- Connector: ABS plastic

Accuracy (at 25 °C/77 °F)*

Humidity

- ±1.0 % RH / drift per year
- ± (1.0 % RH + 0.007 x reading) for 0 to 90 % RH
- ± (1.4 % RH + 0.007 x reading) for 90 to 100 % RH
- 0.02 % RH/K, dependent upon the process temperature (with a deviation of 25 °C/+77 °F)
- 0.02 % RH/K, dependent upon the electronics temperature (with a deviation of 25 °C/+77 °F)

Temperature

- ±0.15 °C (0.27 °F)

Slope PT1000 class AA

- * Refer to the charts below for the correlation between temperature and accuracy.

Reproducibility

³ For constant use in high humidity (> 80% rF at ≤ 30°C for > 12 h, > 60% rF at > 30°C for > 12 h), please contact us via www.testo.com/service-contact

- Better than $\pm 0,2$ % RH

Sensor

Response time without protective filter: t_{90} max. 15 sec.

Probe dimensions

- Diameter of probe shaft: 12 mm
- L = approx. 120/200/300/500/800 mm
- L – A = 85/165/265/465/765 mm
- A, see Table *Filters*, chapter 2.2.1.4.

Probe length incl. probe shaft and filter

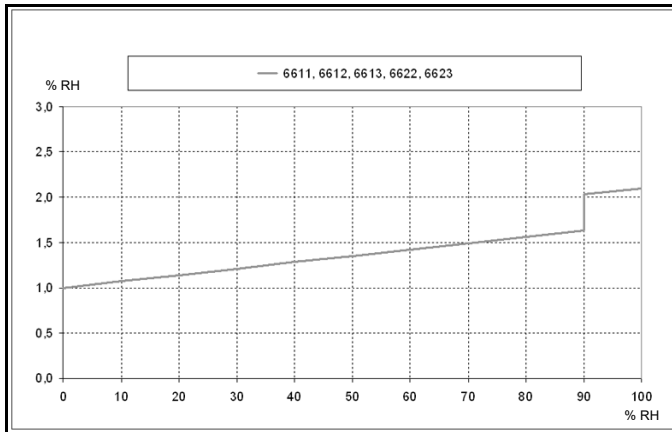
- 1/2/5/10 m

Pressure resistance**

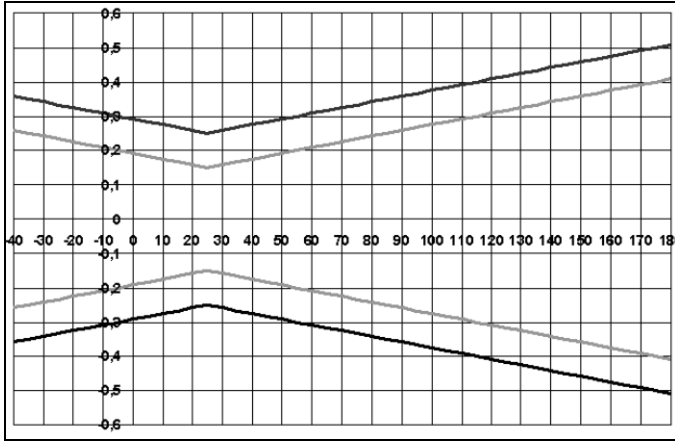
- PN 10 (probe tip)
 - PN 1 (if end of probe/cable is involved in process)
- ** If installing probe under pressure, please use cutting ring screw connection (order no. 0554 1795).

Measuring accuracy of testo 6613 cable probe

Humidity error according to amount $|\pm\%$ RH| as a factor of process humidity



Temperature error as a factor of process temperature and temperature of electronics



— System error 6681 + probe, electronics 25 °C/+77 °F
 — System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

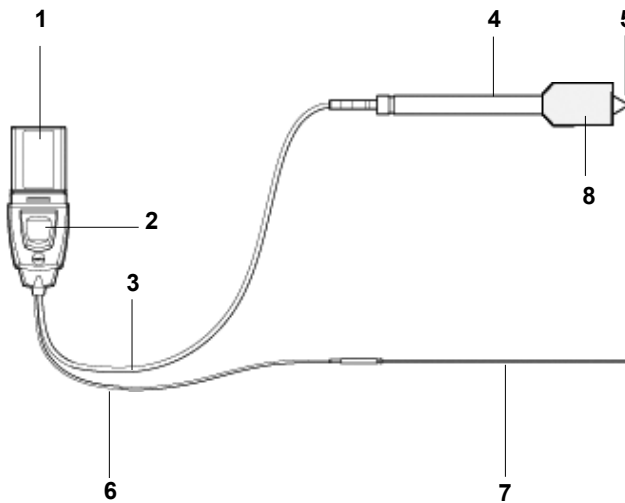
2.2.5 testo 6614 heated cable probe

The testo 6614 heatable probe is suitable for use in high-humidity processes in which there is the possibility of condensation for the probe.



Please also see *volume 1, chapter 1.3.3.5* for the functional principle of the testo 6614.

At a glance



- 1 Connector
- 2 Key
- 3 Probe cable
- 4 Probe shaft
- 5 Filter (including:
humidity and
temperature sensor)
- 6 Cable for temperature
probe
- 7 Temperature probe
- 8 Condensation protection
(0554 0166/0554 0117)

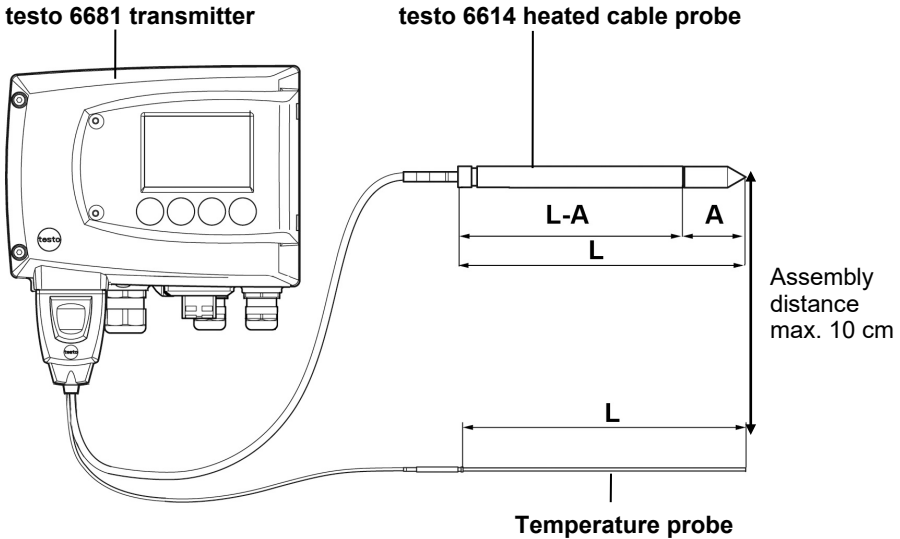


In the event of overpressures, the probe may become a projectile.

For assembly, see **Pressure resistance** on the following page.

Application

- Monitoring and regulating high-humidity processes, e.g. drying (ceramics, tobacco, wood, food) and maturing (cheese, fruit).
- At flow velocities > 1 m/s, an additional measuring uncertainty, not higher than +1.5 % RH, is to be expected. To prevent this error and ensure the highest measuring accuracy: Use condensation protector 0554 0166.



Technical Data

Parameters

- Humidity (% RH/°Ctd/°Ftd), etc.
- Temperature

Measuring range

- Humidity: 0 to 100 % RH
- Temperature: - 40 to +180 °C/-40 to +356 °F

Material

- Probe shaft: Stainless steel
- Line: Sheathed, FEP
- Connector: ABS plastic

Accuracy (at 25 °C/77 °F)*

- Humidity (values valid when used with Condensation protector 0554 0166)
 - ±1.0 % RH / drift per year
 - ± (1.0 % RH + 0.007 x reading) for 0 to 100 % RH
 - 0.02 % RH/K, dependent upon the process temperature (with a deviation of 25 °C/+77 °F)
 - 0.02 % RH/K, dependent upon the electronics temperature (with a deviation of 25 °C/+77 °F)
- Temperature
 - ±0.15 °C (0.27 °F)

Slope PT1000 class AA

* Refer to the charts below for the correlation between temperature and accuracy.

Reproducibility

- Better than ± 0.2 % RH

Sensor

Response time without protective filter: t_{90} max. 15 sec. Probe dimensions

- Diameter of probe shaft: 12 mm
- Diameter of temp. probe: 3 mm
- L = approx. 200/500 mm
- L – A = 165/465 mm
- A, see Table *Filters, chapter 2.2.1.4.*

Probe length incl. probe shaft and filter

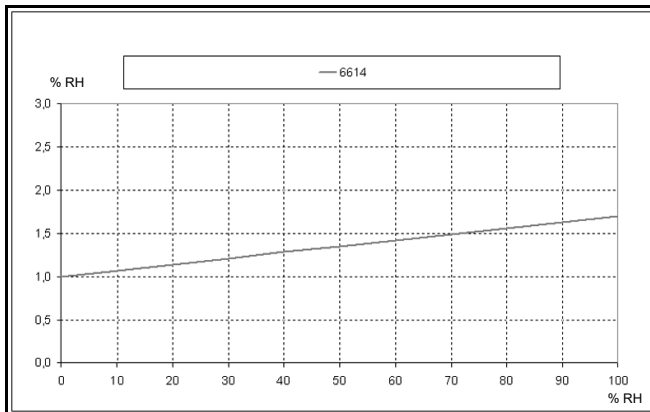
- 1/2/5/10 m

Pressure resistance**

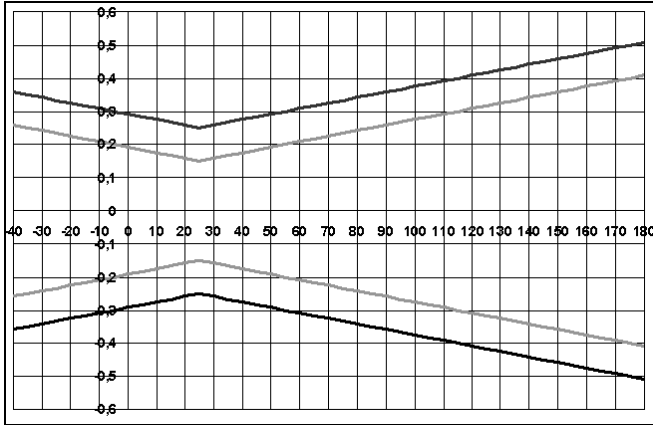
- PN 10 (probe tip)
- PN 1 (if end of probe/cable is involved in process)
- ** If installing probe under pressure, please use cutting ring screw connection (order no. 0554 1795).

Measuring accuracy of heated testo 6614 cable probe

Humidity error according to amount $|\pm\% \text{ RH}|$ as a factor of process humidity



Temperature error as a factor of process temperature and temperature of electronics



— System error 6681 + probe, electronics 25 °C/+77 °F
 — System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

2.2.6 testo 6615 trace humidity cable probe (self-adjustment)

The testo 6615 probe corrects deviations in measurements by means of self-adjustment. This has a particular significance with low humidity values (in dewpoint range).

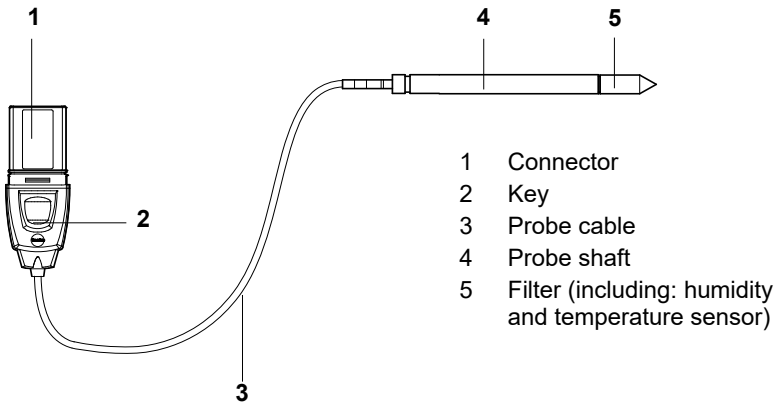


Please also see *volume 1, chapter 1.3.5.6* for the functional principle of the testo 6615.

Only use testo 6615 with sintered PTFE filter (art. no. 0554 0759) or sintered stainless steel filter (art. no. 0554 0647).

During the self-adjustment phase the signal values of the analog outputs remain on hold, meaning they are frozen for the duration.

At a glance



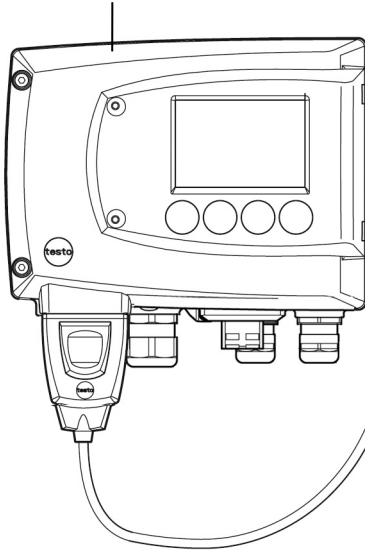
In the event of overpressures, the probe may become a projectile.

For assembly, see **Pressure resistance** on the following page.

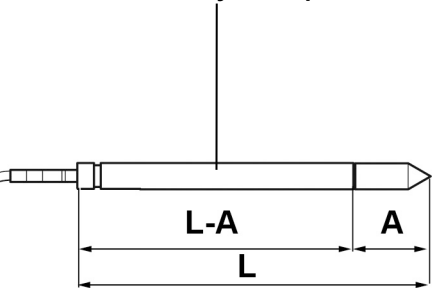
Application

- Monitoring and regulating trace humidity processes (compressed air with adsorption or membrane driers and plastic granulate driers)
- Used when spatial separation of transmitter and probe is required.

testo 6681 transmitter



testo 6615 trace humidity cable probe



Technical Data

Parameters

- Dewpoint (°Ctd/°Ftd), etc.
- Temperature

Measuring range

- Dewpoint: - 60 to + 30 °Ctd/-148 to +212 °Ftd
- Temperature: - 40 to +120 °C, -40 to +248 °F
- (Temp. durability up to +180 °C/+356 °F)

Material

- Probe shaft: Stainless steel
- Line: Sheathed, FEP
- Connector: ABS plastic

Accuracy (at 25 °C/77 °F)*

Humidity

- ± 1.0 % RH / drift per year

Dewpoint

- ± 1 K at 0 °Ctd/+32 °F
- ± 2 K at -40 °Ctd/-40 °F
- ± 4 K at -50 °Ctd/-58 °F
- ± 6 K at -60 °Ctd/-76 °F

Dependent on the process temperature (deviation of 25 °C/77 °F)

- $\pm 0,1$ Ktf/K at -40 °C...25 °C / -40 °F...+77 °F
- $\pm 0,2$ Ktf/K at 25 °C...50 °C / 77 °F...+122 °F
- $\pm 0,4$ Ktf/K at 50 °C...120 °C / +122 °F...+248 °F

Temperature

- ± 0.15 °C (0.27 °F)

Slope PT100 class AA

* Refer to the charts below for the correlation between temperature and accuracy.

Sensor

Response time without protective filter: t_{90} max. 15 sec.

Probe dimensions

- Diameter of probe shaft: 12 mm
- L = approx. 200/500 mm
- L – A = 165/465 mm
- A, see Table Filters, *chapter 2.2.1.4.*

Cable length incl. probe shaft and filter

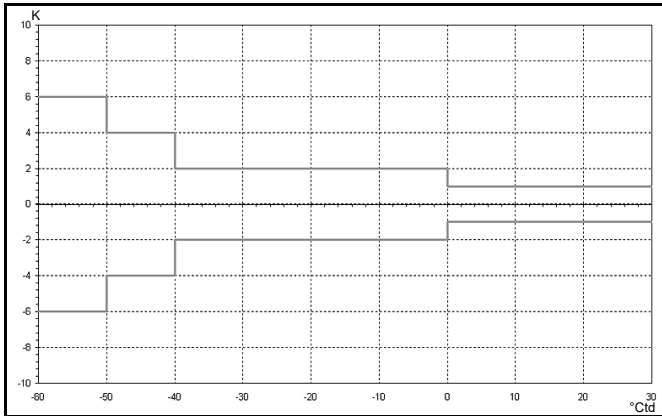
- 1/2/5/10 m

Pressure resistance

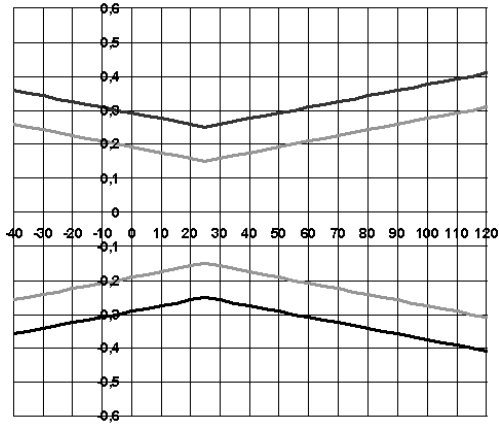
- PN 16 (probe tip)**
- ** If installing probe under pressure, please use cutting ring screw connection (order no. 0554 1795).

Measuring accuracy of testo 6615 trace humidity cable probe

Dewpoint error according to amount $\pm\%$ RH as a factor of process dewpoint



Temperature error as a factor of process temperature and temperature of electronics

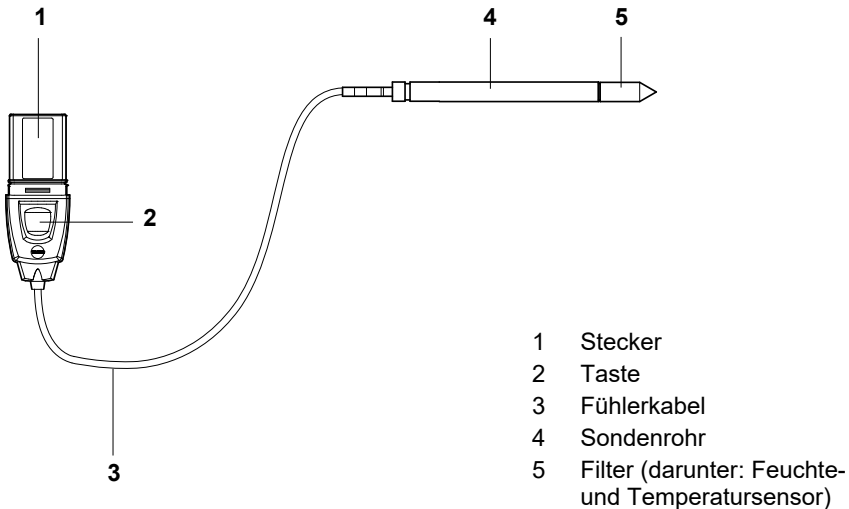


— System error 6681 + probe, electronics 25 °C/+77 °F
 — System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

2.2.7 testo 6617 cable probe (self-monitoring)

The testo 6617 probe is used if spatial separation of the transmitter and probe is required, particularly for media (gases, vapours) which can jeopardize/damage the humidity sensor (the testo 6617 has a self-monitoring and early-warning function for such applications).

At a glance



In the event of overpressures, the probe may become a projectile.

For assembly, see **Pressure resistance** on the following page.

Application

- Monitoring and regulating industrial humidity processes involving corrosive media (apart from high-humidity processes) with the exception of applications with HCL, HF and other acids and acidifiers in larger concentrations (SO₂, SO₃, NO₂)
- Meeting the top accuracy requirements
- Applications for which a sturdy metal housing is required.

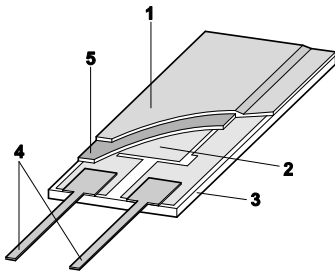


This probe does NOT have a longer life with exposure to aggressive media than the testo 6613, for example. However, early warning of damage to the sensor is given so that machine failures can be avoided.

2.2.7.1 Self-monitoring of cover electrode

Use in harsh ambient conditions with aggressive media in some cases incurs the risk of damage to the sensor.

Damage to the sensor is generally reflected by incorrect readings which occur a long time before the sensor is wrecked. If this damage to the sensor is not spotted until too late, high costs can be incurred due to unusable readings or machine shutdowns and waiting times until the sensor is replaced.



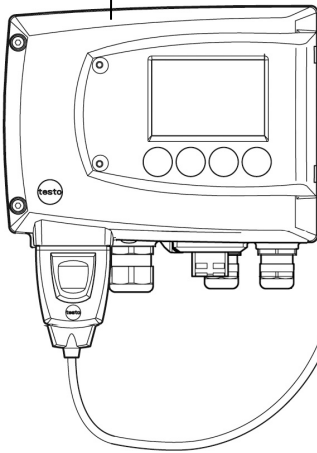
- 1 Cover electrode
- 2 Bottom electrode
- 3 Substrate
(Ceramic substrate for mechanical protection)
- 4 Connections
(protected against corrosion)
- 5 Dielectric layer

The testo 6617 has a unique self-monitoring function. This allows early detection of damage to the sensor, e.g.:

- Mechanical damage (e.g. scratches)
- Damage from aggressive gases (e.g. acids in aerosol form)
- Welling or detachment of polymer layer due to effects of solvents.

Once the self-monitoring reaches the specific limit value, the probe warning message "Sensor early warning" is issued.

testo 6681 transmitter



testo 6617 cable probe (self-monitoring)



Technical Data

Parameters

- Humidity (% RH/°Ctd/°Ftd)
- Temperature

Measuring range

- Humidity: 0 to 100 % RH⁴
- Temperature: - 40 to +180 °C/-40 to +356 °F

Material, weight

- Probe shaft: Stainless steel
- Line: Sheathed, FEP
- Connector: ABS plastic

Accuracy (at 25 °C/77 °F)*

Humidity

- ±1.0 % RH / drift per year
- ± (1.2 % RH + 0.007 x reading) for 0 to 90 % RH
- ± (1.6 % RH + 0.007 x reading) for 90 to 100 % RH

- 0.02 % RH/K, dependent upon the process temperature (with a deviation of 25 °C/+77 °F)
- 0.02 % RH/K, dependent upon the electronics temperature (with a deviation of 25 °C/+77 °F)

Temperature

- ±0.15 °C (0.27 °F)

Slope PT1000 class AA

- * Refer to the charts below for the correlation between temperature and accuracy.

Reproducibility

- Better than ±0,2 % RH

Sensor

Response time without protective filter: t 90 max. 15 sec.

Probe dimensions

- Diameter of probe shaft: 12 mm
- L = approx. 200/500 mm
- L – A = 165/465 mm
- A, see Table Filters, *chapter 2.2.1.4.*

⁴ For constant use in high humidity (> 80% rF at ≤ 30°C for > 12 h, > 60% rF at > 30°C for > 12 h), please contact us via www.testo.com/service-contact

Probe length incl. probe shaft and filter

- 1/2/5/10 m

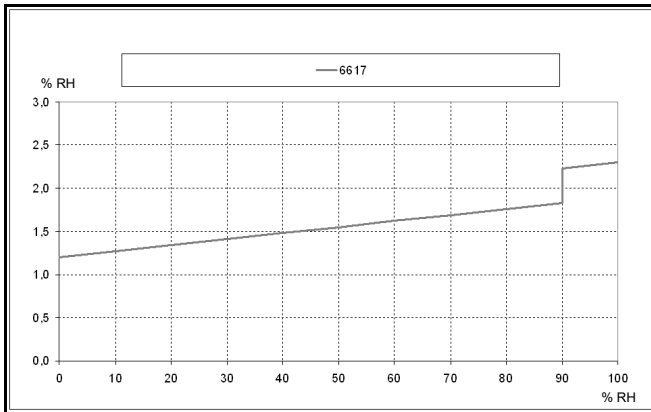
** If installing probe under pressure, please use cutting ring screw connection (order no. 0554 1795).

Pressure resistance

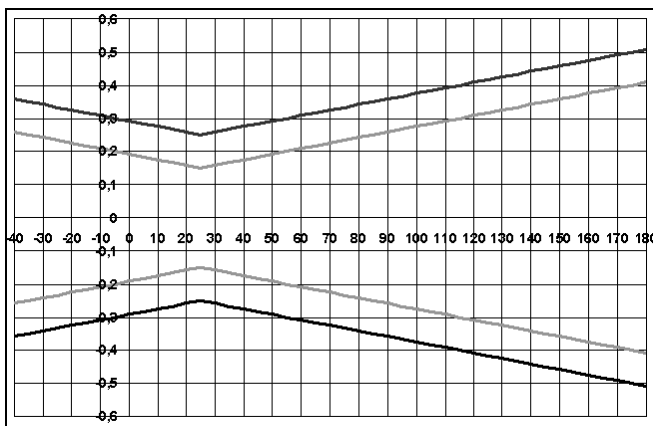
- PN 10 (probe tip)**

Measuring accuracy of testo 6617 cable probe (self-monitoring)

Humidity error according to amount $|\pm\% \text{ RH}|$ as a factor of process humidity



Temperature error as a factor of process temperature and temperature of electronics



— System error 6681 + probe, electronics 25 °C/+77 °F
 — System error 6681 + probe, electronics -25 °C to +70 °C/-13 to +158 °F

2.3 Commissioning

2.3.1 Installing the probe

2.3.1.1 Installing the testo 6611 wall probe

The testo 6611 probe (wall version) simply has to be inserted into the socket of the testo 6681 transmitter.

2.3.1.2 Installing the testo 6612 duct probe

A description of the duct mounting of the testo 6612 probe can be found in *volume 1, chapter 1.3.2.2*.

2.3.1.3 Installing testo 6613/6614/6615/6617 probes

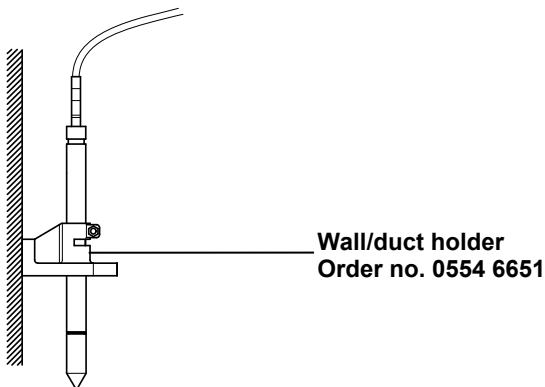
If used with these probes, the testo 6681 transmitter is mounted on the wall, see *volume 1, chapter 1.3.2.1 Commissioning*.

Install probe according to the application and the measuring and spatial conditions, cf. cases A1 to C below



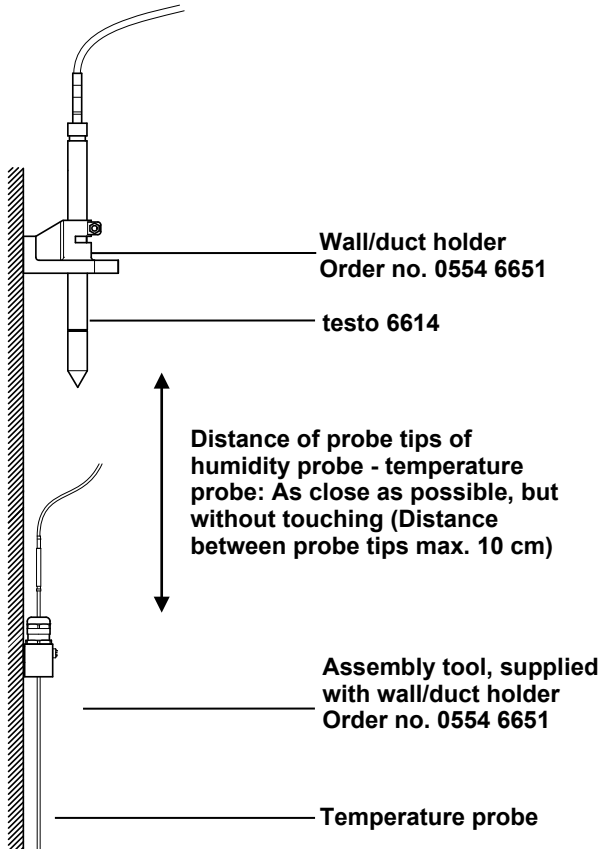
In processes with which condensate forms at the humidity probe, install the probe vertically (filter points downwards).

A 1 Wall mounting of probe

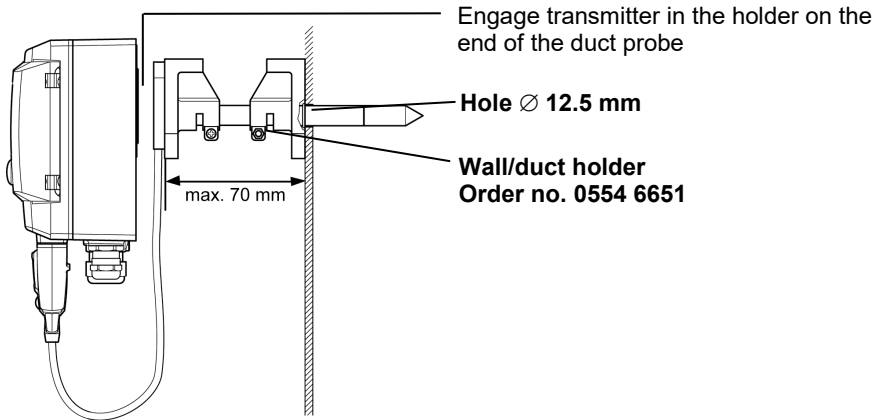


A 2 Wall mounting of testo 6614 heated probe

When mounting the testo 6614 heated probe version, the temperature probe must be secured as close to the humidity probe as possible (max. 10 cm). An appropriate assembly tool is supplied with the testo 6614.



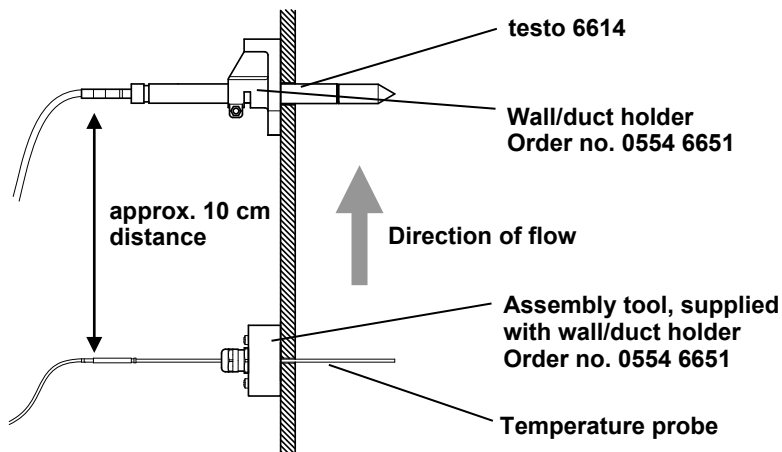
B 1 Duct mounting of probe



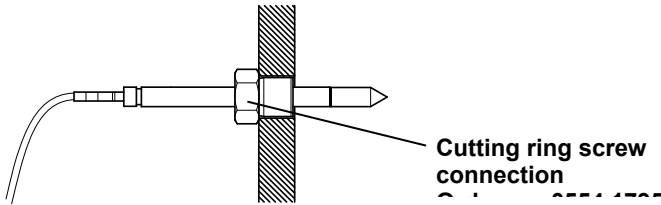
Only atmospheric processes up to approx. 1 bar positive pressure. Alternatively, the single-hole duct holder (order no. 0554 1793) can also be used.

B 2 Duct mounting of testo 6614 heated probe

When mounting the testo 6614 heated probe version, the temperature probe must also be secured at a distance of approximately 10 cm from the humidity probe. An appropriate assembly tool is supplied with the testo 6614.



C Process mounting



- During installation, ensure that the probe cannot be damaged during operation.



For the testo 6614 (heated probe version), please use the cutting ring screw connection, order no. 0400 6193, to assemble the temperature probe.

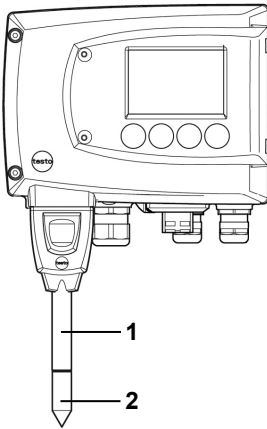
2.3.2 Connecting/removing the probe to/from the transmitter

- Insert probe connector into socket of testo 6681 until it engages. The testo 6681 identifies which probe is connected.
- To remove the probe, the lock release button on the probe must be pressed so that this can be removed.

3 Maintenance and cleaning

3.1.1 Replacing filters/protection caps

3.1.1.1 Replacing the filter/protection cap for testo 6611 wall version



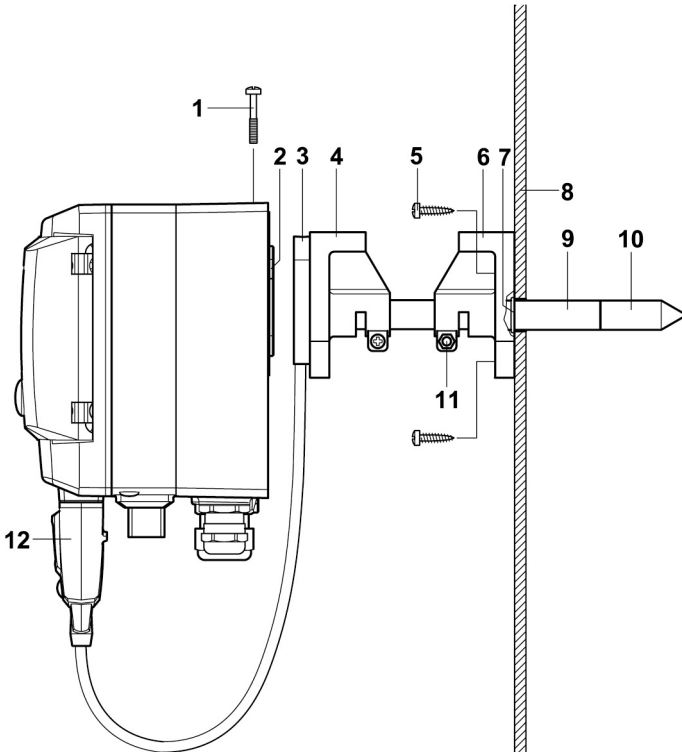
Do not damage the sensors when exchanging the filter/the protection cap and do not touch their surfaces!

- 1 Unscrew defective filter/protection cap **(2)** from probe shaft **(1)**.
- 2 Screw new filter/protection cap onto probe shaft.



Screw on protection cap by hand, i.e. do not tighten it using a tool.

3.1.1.2 Replacing the filter/protection cap for testo 6612 duct version



Do not damage the sensors when exchanging the filter/the protection cap and do not touch their surfaces!



Hint:

Mark the insertion length of the probe shaft near the screw (11).

- 1 Undo screw (11) and pull shaft probe (9) together with filter/protection cap (10) from the wall/duct holder (6).
- 2 Unscrew defective filter/protection cap from probe shaft and screw on new filter/protection cap.



Screw on protection cap by hand, i.e. do not tighten it using a tool.

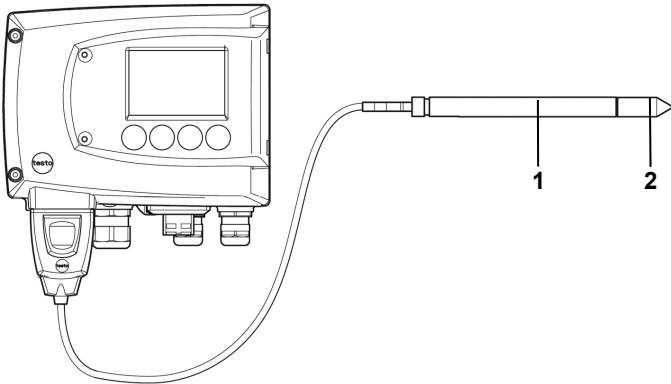
- 3 Replace O-ring (7) if necessary. Push probe shaft into duct as far as the marking and fix position with screw (11).

3.1.1.3 Replacing the filter/protection cap for cable versions



The following descriptions applies to these probes:

- testo 6613
- testo 6614
- testo 6615
- testo 6617



Do not damage the sensor when exchanging the filter/the protection cap and do not touch its surface!

- 1 Unscrew defective filter/protection cap (2) from probe shaft (1).
- 2 Screw new filter/protection cap onto probe shaft.



Screw on protection cap by hand, i.e. do not tighten it using a tool.

3.1.2 Cleaning the instrument and filter/protection cap

- Only clean the instrument carefully with a moist cloth.
- Do not use aggressive cleaning agents.
- Do not use any solvents.
- Unscrew cap or protection cap to clean, clean with compressed air and replace. Take care not to damage the sensor!

3.1.3 Replacing the sensor

Thanks to the probe concept (digital, plug-in), all probes can be changed in situ within seconds if necessary, generally without any interruption to the operation of the machine.



To maintain the extremely high accuracy of the testo 6610 probe, customers are not able to replace the sensor.

Please contact your Testo Service team for this.

4 Parameterizing, adjusting and analyzing software (P2A software)

4.1 Specifications

The P2A software is used for the parameterizing, adjustment and analysis of testo transmitters. The following applies:

- Generally, all testo transmitters (as of 2007) are supported.
- For each newly purchased Testo transmitter, a free software upgrade must be installed possibly, containing the instrument drivers for all transmitters which are connectable at that time.
- This upgrade can be downloaded free of charge at any time from the Testo homepage www.testo.com/download-center (requires registration).

The software must only be bought one time, even for owners of several testo transmitters.

4.1.1 Functions and use

In the P2A software, two different file types are used: The instrument and the parameter file.

Instrument file

The parameters of a particular transmitter are stored in its so-called instrument file. Using this file, the parameters can be edited and the instrument can be tested and adjusted.

Instrument files also contain the respective histories in addition to the parameter data, i.e. "log books" are kept for the previous parameterizations, adjustments and messages (see *chapter 3.3.5*).



Instrument files are ".cfm" format files.

Parameter file

Parameter files are not tied to a specific individual transmitter and contain only parameter data/no history data.

If you use various instruments of the same type, you can create parameter files once (e.g. by saving the appropriate instrument file as the parameter file) and transmit these onto the other instruments.



Parameter files are ".cfp" format files.

4.1.2 System requirements

Operating system

- Windows® 7
- Windows® 8
- Windows® 10

Computer

The computer must fulfil the requirements of the respective operating system. The following requirements must additionally be fulfilled:

- Interface USB 1.1 or higher
- Graphic resolution min. 1024 x 768



Date and time settings are automatically taken over from the computer. The administrator must ensure that the system time is regularly synchronized with a reliable time source, in order to guarantee the authenticity of the data.

Software

The P2A software must be purchased and installed separately from the transmitter. If it is a new software version, the transmitter is already supported completely. Older P2A software versions can be updated via the P2A software upgrade.

4.1.3 Scope of delivery

Included in the scope of delivery are:

- P2A software
- USB driver



When working with the parameterizing, adjusting and analyzing software (P2A software), previous knowledge of Windows® operating systems is assumed.

4.2 First steps

4.2.1 Installing the software/driver



Administrator rights are required for installation.

4.2.1.1 Installing P2A software



Without the input of a licence key, the software will run only as a demo version (time limit 30 days).

- 1 You can download the software under the following link:
<https://www.testo.com/download-center>
If the installation program does not start automatically:
> Open download folder and start P2A.exe.
- 2 Follow the instructions of the installation wizard.
- 3 Click on **[Finish]** to complete the software installation.

Installing USB driver

- 1 You can download the USB driver under the following link:
<https://www.testo.com/download-center> (Testo USB driver)
If the installation program does not start automatically:
> Open download folder and start USBDriver.exe.
- 2 Follow the instructions of the installation wizard.
- 3 Click on **[Finish]** to complete the software installation.

4.2.1.2 P2A software upgrade

1. Download and store P2A software upgrade from www.testo.com/download-center (requires registration).
2. Select folder into which the downloaded Zip file was stored, and unzip the file.
3. Start file **P2A upgrade.exe**.
4. Follow instructions from installation assistant.

4.2.2 Starting the software

4.2.2.1 Starting the program

- > Click on **All Programs** (Windows®7, Windows®8, Windows®10) | **Testo** | **P2A- Software**.

i In Windows Vista/Windows 7 the window **User account control** is opened when starting the software the first time.

- > Click on **Accept**.
-

The program window is opened (see *chapter 3.3.1*).

4.2.2.2 Establishing a connection with the instrument

Multiple instruments can be attached, however only one connection is active at all times.

- ✓ USB driver is installed (see *chapter 3.2.1*).

- 1 Start the P2A software.
- 2 Connect adapter (supplied with the P2A software) to the service interface of the instrument (see *volume 1, chapter 1.2.4*).
- 3 Connect instrument/adapter to the PC via the USB interface.
The instrument file of the attached instrument is shown in the file list.

4.2.2.3 Activating the connection with the instrument

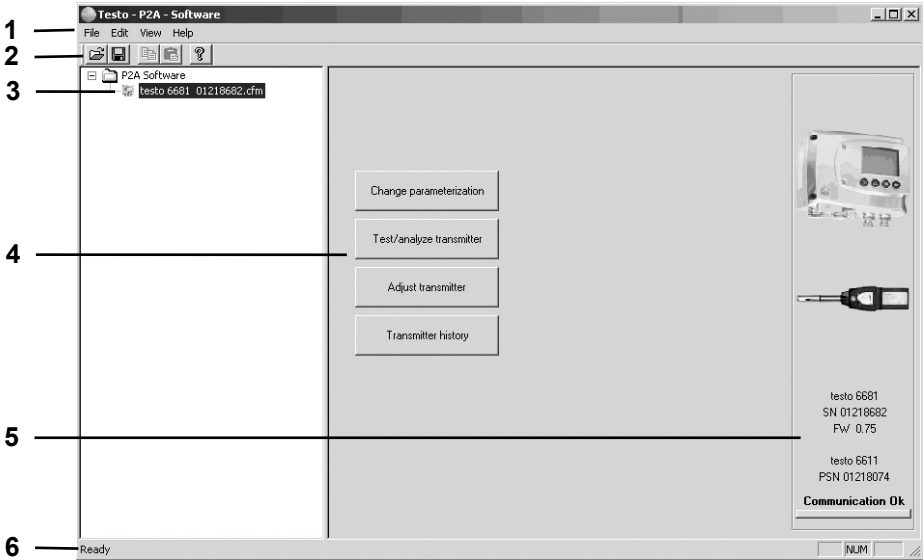
- Click on the desired instrument file.

The selected file is marked in colour and the connection with the instrument is activated.

If a connection with the instrument is established when the program is started, the corresponding instrument file is marked automatically.

4.3 Using the software

4.3.1 User interface






1 Menu bar:

Menu	Command	Explanation
File	Open	Shows the Windows dialogue for searching and opening files.
	Save as	Saves the parameters of an instrument or parameter file under a new name.
Edit	Copy	Copies the parameters of the marked instrument or parameter file in the cache.
	Paste	Pastes the parameters from the cache in the marked instrument or parameter file.
View	Toolbar Status bar	Activates/deactivates the toolbar or status bar.

Menu	Command	Explanation
?	Check instrument connections	Checks the connections to a connected instrument without the instrument having to be activated.
	Service	A text file with the most important information on the computer and the software is opened via Display service data .
	About	Shows the version number of the P2A software.

2 Toolbar:
Shows the Windows-compliant icons for editing.

3 File list:

Icon	File	Explanation
	Instrument file	Instrument file Connection to the instrument has been established. <Type> <Serial number>.cfm File name should not be changed.
	Instrument file	Instrument file Connection to the instrument has not been established.
	Parameter file	<Type> <Serial number> <Date> <Time>.cfp File name can be changed. The name can be selected freely, but it is recommended that you retain the reference to the instrument. Parameter files are always marked red; the parameter values they contain are only forwarded to the instrument after being transmitted to the instrument file.

4 Function buttons:

[Change parameterization] see *chapter 3.3.2*

[Test/analyze transmitter] see *chapter 3.3.3*

[Adjust transmitter] see *chapter 3.3.4*

[Transmitter history] see *chapter 3.3.5*

Dialogues on editing and testing the instrument are opened by means of the buttons.

5 File information:

	Shown in the window
If an instrument file is selected	Type, serial number, firmware version of the instrument or probe.
If a parameter file is selected	Type, serial number and firmware version of instrument for which the parameter file was created.
Connection status	Green = connection is active, Red = connection is inactive.

6 Status bar:

Shows the current status when editing via the menu bar.

4.3.2 Editing instrument/parameter file

4.3.2.1 Changing instrument/parameter file

✓ The desired instrument/parameter file is marked.

1 Click on **[Change parameterization]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Change parameterization** register.

If the parameters were transmitted from other parameter files into the instrument file, a message is shown with which you can transmit the new parameters to the connected instrument using **[Yes]**.

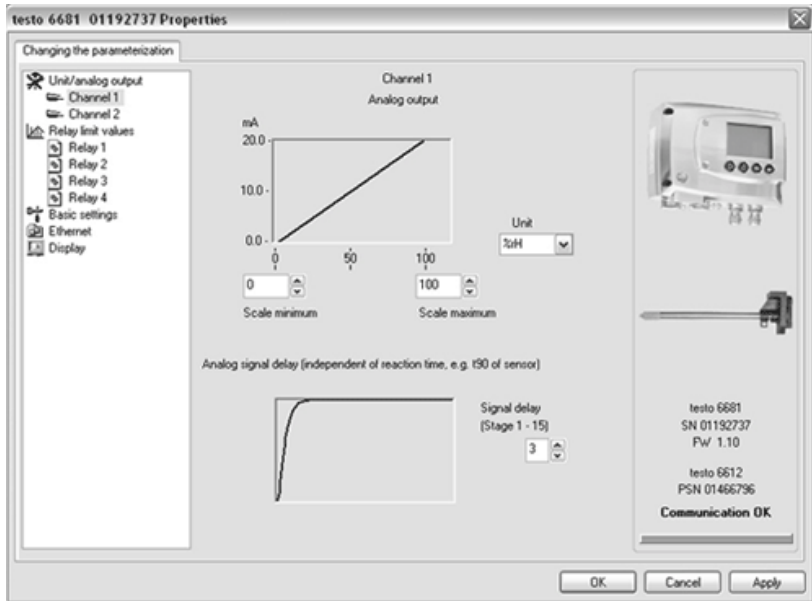
If the parameters should not be transmitted, click on **[No]**.

2 Change or enter parameters in the corresponding fields.

Unit/analog output

Explanation

All analog outputs are parameterized in this mask.



Unit/analog output (graphic)

Unit: 0 to 1 V/5 V/10 V or 4 to 20 mA.


Vertical: Current version of the analog output (cannot be changed).

Horizontal: Min./max. scale end points of selected unit.

The curve changes in accordance with the entered value of scale minimum and maximum.

Scale minimum/maximum

The endpoints of the scaling can be selected up to the stored scale minimum and maximum. In the process, scaling can take place beyond the measuring range in order to adjust the analog output to the customer system, see *volume 1, chapter 1.2.8*.

Field	Explanation
Unit	<p>Selection of the physical unit.</p> <p>When changing the unit, standard values are set for scale minimum and maximum (see transmitter instruction manual for the scale final values).</p> <p>Caution!</p> <p>When changing the phys. unit, the relay limit values are set to the assigned default values.</p>
Signal delay (graphic)	<p>Curve changes according to the set signal delay.</p>
Signal delay	<p>Time interval in stages of 1 to 15: 1 = no delay 15 = longest delay.</p> <p>The signal delay is added to the reaction time of the sensor. The signal delay shows averaging over the time interval of the selected stage in seconds:</p> <p>Example Stage 10 = average of the readings from the last 10 seconds.</p>
	<p>The delay of the signal in relation to the change in the process is also significantly influenced by the selection of the particle filter.</p>

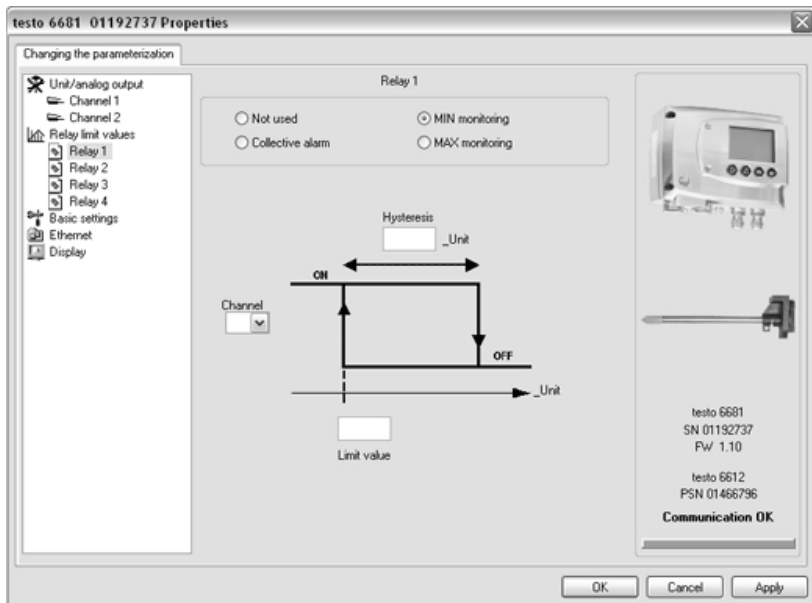
Relay limit values 1 to 4

Explanation

In this mask, the relays or display alarms are parameterized



Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.




Relay x Four relays are available (optional).

Not used Relay is not used.
Hysteresis image and input options are hidden.

Collective alarm A relay can be used as a collective alarm detector in the event that selected messages appear. See below for selection of the messages.

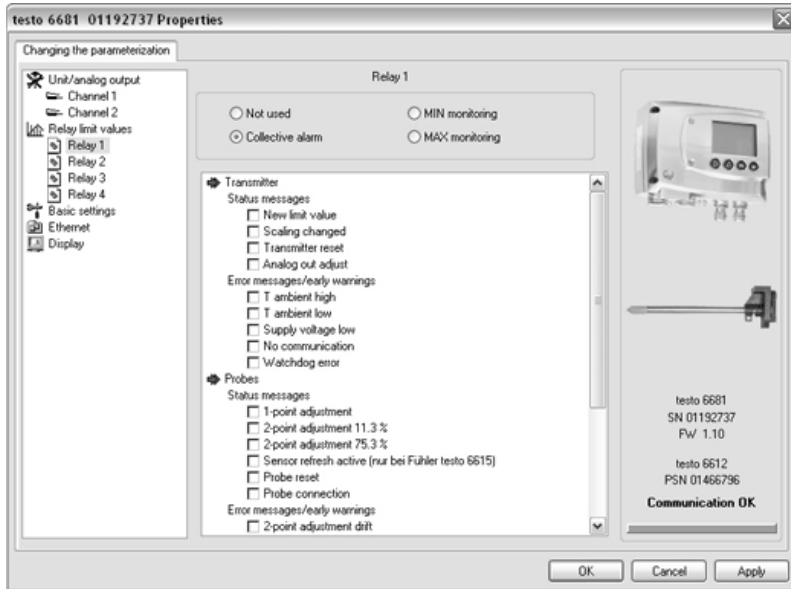
MIN monitoring If switched to ON (NO contact) or OFF (NC contact) under the limit value; in the event of a subsequent exceeding of **limit value plus hysteresis**, it is switched to OFF (NO contact) or ON (NC contact).

Field	Explanation
MAX monitoring	If switched to ON (NO contact) or OFF (NC contact) above the limit value; in the event of a subsequent undershooting of limit value minus hysteresis , it is switched to OFF (NO contact) or ON (NC contact).
	The graphic display in the centre of the screen refers to the relay wiring as a NO contact (ON).
Hysteresis	To avoid switching cycles.
Channel	Selection of the channel that is to be monitored.
Limit value	Values for the limits of the unit selected in Unit/analog output ; 1 decimal place. When changing the phys. unit, the relay limit values are set to the default values.

Collective alarm

Explanation

Selection of the messages (error, etc.) that should result in a collective alarm (OR linkage).



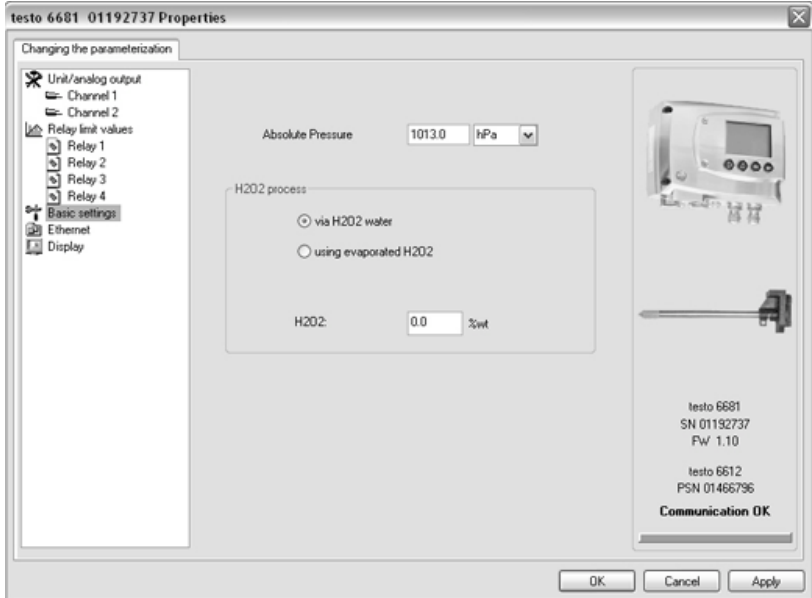
List field with checkboxes

Selection of which messages generated in the transmitter should be signalled as the collective alarm via the corresponding relay.

Basic settings

Explanation

Setting the absolute pressure and selection of the H₂O₂ evaporation process for the parameter °C_{tm}.



Absolute pressure

The absolute pressure is included in the calculation of the following units:

- °C_{tdA} or °F_{tdA}
- g/kg or gr/lb
- ppmv/% vol.

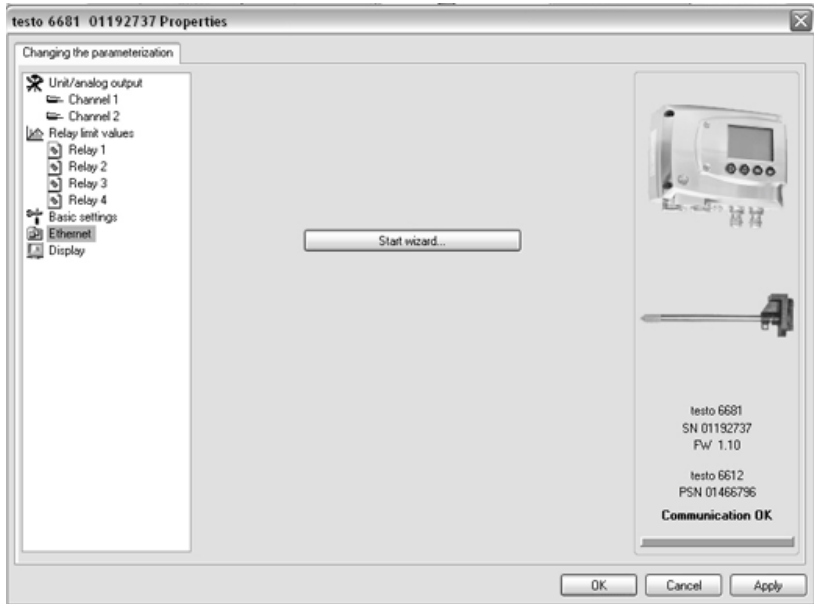
H2O2 process

The calculation of the mixture dewpoint unit °C_{tm} is dependent upon the type of the evaporation process:

- with passive vaporization: H₂O₂ solution evaporates (Ü via H₂O₂ water)
- with active vaporization: H₂O₂ solution is evaporated over a heated metal plate (Ü with evaporated H₂O₂)
- Input field: Entering the weight proportion of the liquid H₂O₂ compared to water in %.

Ethernet**Explanation**

Networking the transmitters via Ethernet. For a multitude of applications, measurement data can be simultaneously recorded, documented and visualized.



Start wizard... Address allocation for testo 6681 with Ethernet module

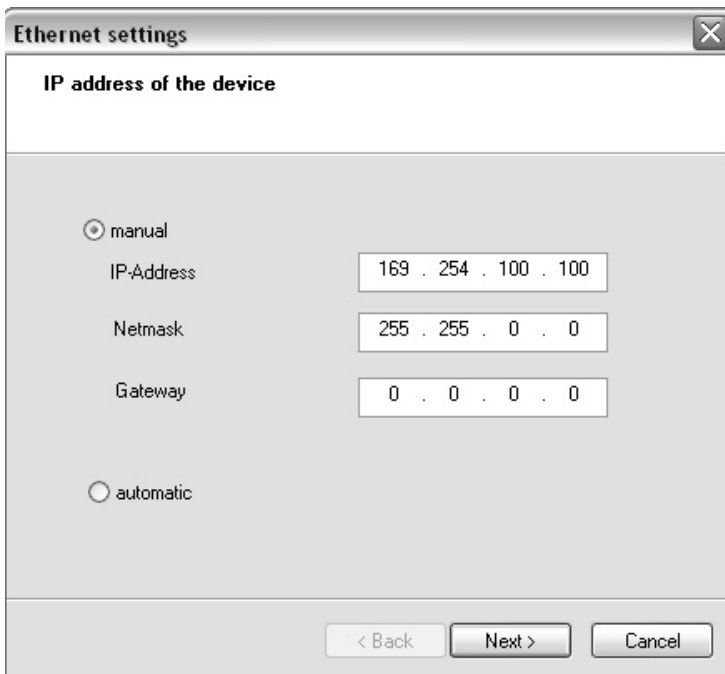
IP address Transmitter IP address



Before the automatic allocation of the IP address, the network cable must be connected to the transmitter (see *Vol 1, Chap. 1.3.4.4*).

If the instrument is being used as a Saveris participant:

- Saveris Base must be functional.
- Saveris-Base must be connected to the network.



IP address of the device Address allocation for testo 6681 with Ethernet module

- Manual**
- Define IP address of the transmitter
 - Enter netmask
 - Enter gateway

Automatic Automatic allocation of the IP address

IP address **Saveris base IP address**



Only when using the transmitter Ethernet modules in Saveris mode

Ethernet settings

IP address of the base

manual 10 . 10 . 244 . 228

DNS entry [Empty field]

DHCP Option x - Server

< Back Next > Cancel

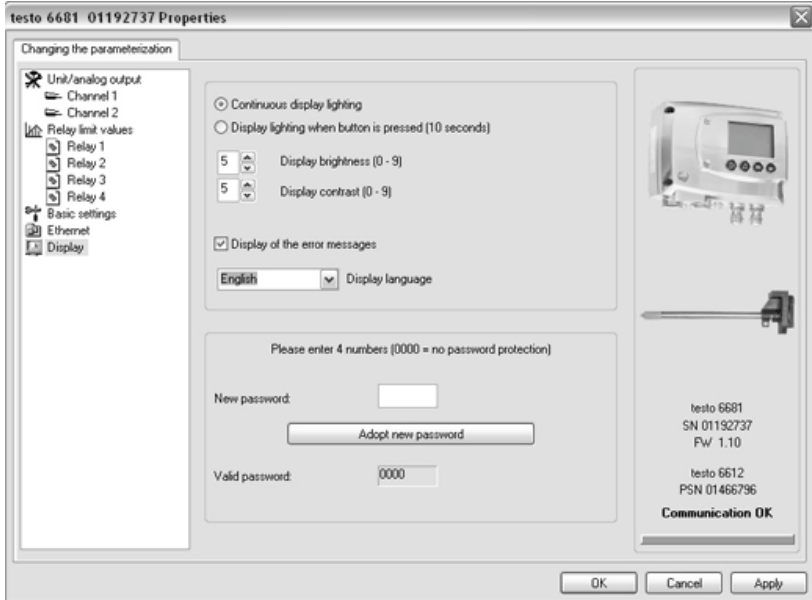
IP address of the base **Address allocation of the Saveris base.**

- Manual**
- Take IP address from the menu window "InfoBase" of the Saveris base
 - Enter IP address

Display

Explanation

Setting the display functions (if a display is available on the transmitter).



Continuous display lighting

Display lighting is permanently switched on.

Display lighting when button is pressed (10 seconds)

When a particular button on the instrument is pressed, the display lights up for 10 seconds.

Display brightness (0 to 9)

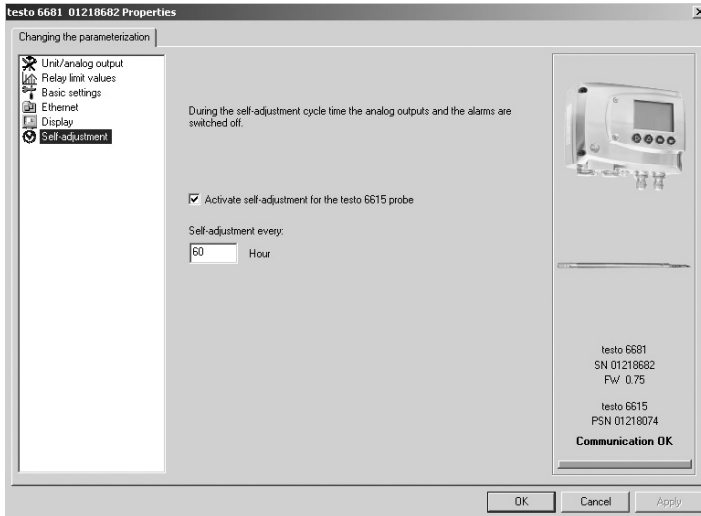
Setting the brightness between 0 and 9:
0 = dark
9 = light.

Display contrast (0 to 9)

Setting the contrast between 0 and 9:
0 = lower contrast
9 = higher contrast.

Field	Explanation
Display language	Selection of the language.
New password	The password consists of four numbers, each of which must be between 1 and 9. If the password protection is not to be used, the numerical code "0000" must be entered.
Adopt new password	Button for confirming the new password.
Valid password	Display of the current password.

Self-adjustment	Explanation
	Parameterizing of testo 6615 probe, if this is used. (See <i>volume 1, chapter 1.3.3.6 and 2.2.6</i>).



Activate self-adjustment Perform adjustment of testo 6615 probe (auto-correction). The automatic self-adjustment is switched on, which means the probe performs an offset adjustment every x hours. The frequency is given in hours.

Self-adjustment every

Setting the cycletime in which the self-adjustment is to be performed.



In order to receive reliable readings during the calibration or equalization period of the probe, testo recommends the shortest possible cycle time. A longer cycle time can be set in continuous operation.

Start self-adjustment

Start self adjustment at a defined time outside the cycle time.

- 3 Click on **[Apply]**.

Changes are saved.

4.3.2.2 Saving parameters

Parameters can be saved in new parameter files.

- 1 Mark instrument/parameter file
- 2 Click on **File > Save as** in the menu bar.
- 3 Select storage location and enter the file name.
- 4 Click on **[Save]**.

The new parameter file is shown in the file list.

Only the parameters are saved from an instrument file, the history data are not adopted.



The original name (Instrument type, Serial number) is suggested with the current date/time as standard, e.g. "testo 6681 01234578 061120 1403.cfp".

For a standard installation, the files are saved under "C:\Documents and Settings\All Users\Shared Documents\P2A Software". The path can differ depending on the version of the operating system.

4.3.2.3 Open parameter file

All parameter files stored in the standard directory path are automatically displayed in the file list when the software is started.

You can also open parameter files that are stored in other directories.

- 1 Click on **File > Open** in the menu bar.
- 2 Select the storage location and click on the requisite file.
- 3 Click on **[Open]**.

The selected file is opened. This can be changed and saved (see *chapter 3.3.2.2*).

4.3.2.4 Copying and pasting parameters

The parameters of a parameter file can be transmitted to an instrument file or another parameter file from the same instrument type.

- 1 Select file whose parameters are to be copied.
- 2 Click on **Edit > Copy** in the menu bar.
- 3 Select the file which is to be modified.
- 4 Click on **Edit > Paste** in the menu bar.

The parameters are transmitted to the file.



You can also use the common keyboard shortcuts for copying and pasting, i.e. CTRL C and CTRL V.

Parameters can also be transmitted using drag & drop, where you drag the icon of the parameter file onto the icon of the target instrument file.

4.3.2.5 Deleting instrument/parameter file

Instrument/parameter files can be deleted from the file list.

- 1 Click on the file that is to be deleted with the right mouse button.
- 2 Select the command **Delete** in the context menu.

The instrument or parameter file is deleted from the list.

4.3.3 Analyzing/testing the transmitter

In this section, you can test the outputs of the connected instrument, read off the limit values and reset the parameters to the factory settings.

The function is only available for instrument files.

4.3.3.1 Analyzing/testing the instrument

- ✓ The required instrument file is marked.

- 1 Click on **[Test/analyze transmitter]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Test/analyze transmitter** register.

- 2 Perform action:

Action	Explanation
Carry out factory reset:	Reset the unit, limit value and hysteresis parameters to factory settings (see <i>chapter 3.3.3.2</i>)
Test analog output:	Test channel 1/2/3 (optional) (see <i>chapter 3.3.3.3</i>).
Test switch outputs:	Manually switch relays 1 to 4 to test for proper function (see <i>chapter 3.3.3.3</i>).
Min./max. values display:	Overview of the minimum and maximum values measured since the last reset of the transmitter (see <i>chapter 3.3.3.4</i>).

- 3 Click on **[OK]** or **[Cancel]** to close the dialogue.

4.3.3.2 Carry out factory reset

- ✓ The required instrument file is marked.

- 1 Click on **[Test/analyze transmitter]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Test/analyze transmitter** register.

- 2 Mark **Transmitter test**.

Current operating hours are shown.

- 3 Confirm control query to perform the reset.

The values are reset to the customer-specific factory settings.

- 4 Click on **[OK]** or **[Cancel]** to close the dialogue.

4.3.3.3 Testing channel 1/2/3 analog output

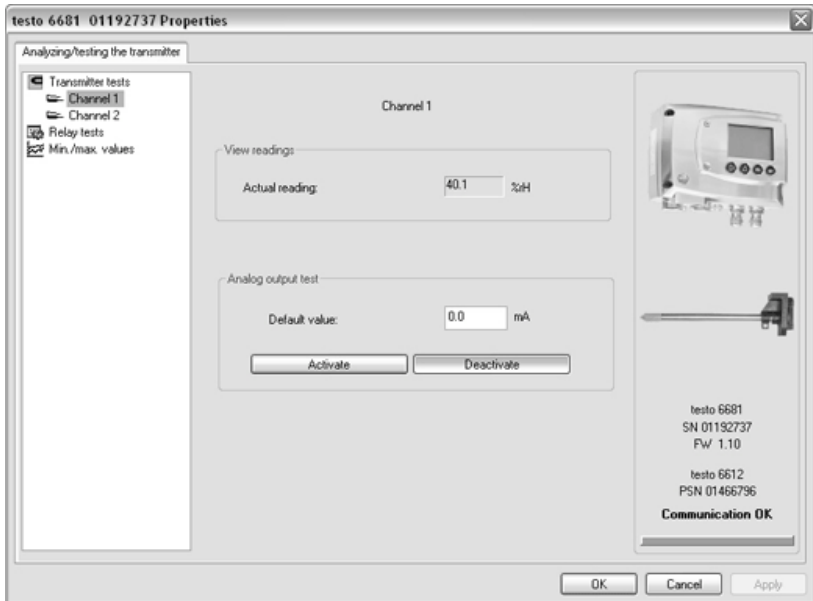
✓ The required instrument file is marked.

1 Click on [Test/analyze transmitter].

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Test/analyze transmitter** register.

2 Mark channel and test values.

Field/button	Explanation
	Checking the analog outputs (see <i>volume 1, chapter 1.4.6.6</i>).



Current reading

Readings are updated every second.

Unit

Unit according to the type of analog output.

Default value

Freely definable output value for the respective type of analog output (V or mA), 1 decimal place.

[Activate]	<p>The entered default value is forwarded to the corresponding analog output and to the test contacts by clicking.</p> <p>A warning informs that the value is being transmitted to the connected instrument in the event of existing cabling. Now check the analog output using a precise multimeter.</p>
------------	---

Field/button	Explanation
--------------	-------------

[Deactivate]	<p>Finish entering the electrical variables at the analog output.</p> <p>The analog output returns to the Current reading again.</p>
--------------	---

- 3 Click on **[OK]** or **[Cancel]** to close the dialogue.
The analog output returns to Measuring Mode again.

4.3.3.4 Testing switch output relays 1 to 4

- ✓ The required instrument file is marked.

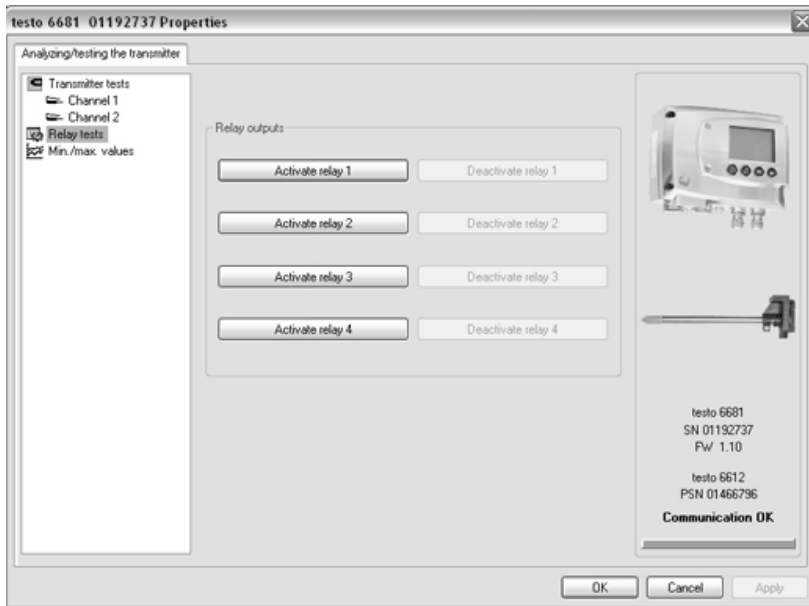
- 1 Click on **[Test/analyze transmitter]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Test/analyze transmitter** register.

- 2 Mark **Relay tests** and test the values.

Field/button	Explanation
--------------	-------------

	Check the relay function (see <i>volume 1, chapter 1.4.6.6</i>).
--	---



[Activate relay n] Close contact.

A warning informs that the value is being transmitted to a connected PLC, external display, etc. in the event of existing cabling.

[Deactivate relay n] Open contact.

A warning informs that the value is being transmitted to a connected PLC, external display, etc. in the event of existing cabling.

3 Click on **[OK]** or **[Cancel]** to close the dialogue.

The analog output returns to Measuring Mode again.

4.3.3.5 Displaying min./max. values

The transmitter saves the minimum or maximum value for each channel (measured since the last voltage supply or since the last manual reset).

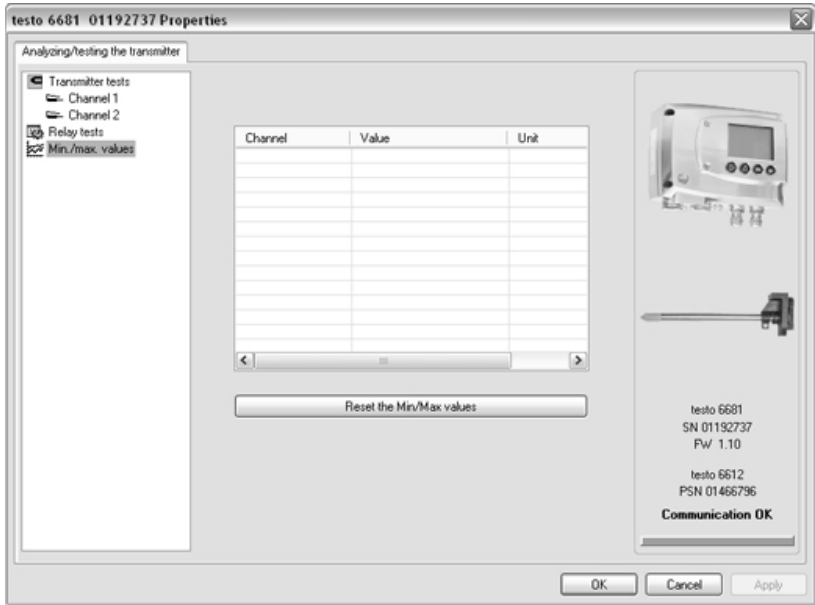
✓ The required instrument file is marked.

1 Click on **[Test/analyze transmitter]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Test/analyze transmitter** register.

2 Mark **Min./max. values**.

Field/button	Explanation
	View the min./max. values of each channel.



Channel	Min./max. of channel 1/2/3 (optional)
Value	Min. or max. value, 1 decimal place.
Unit	Unit selected in Unit/analog output .

3 Reset **Min./max. values**.

4 Click on [**Reset the min./max. values**].

5 Confirm control query to perform the reset.

The values are reset to the default settings.

6 Click on [**OK**] or [**Cancel**] to close the dialogue.

4.3.4 Adjusting the transmitter

This function is used to adjust an attached instrument. The following adjustments may be carried out using the software:

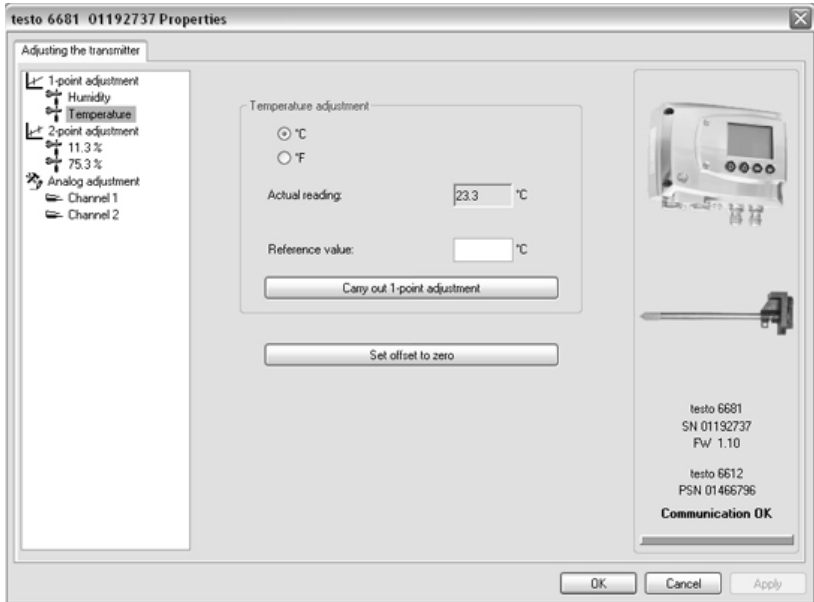
- 1-point adjustment (offset)
- 2-point adjustment (upper and lower adjustment point)
- Analog adjustment (entry via assistant/wizard).

Also see *volume 1, chapter 1.3.3* for this.

4.3.4.1 1-point adjustment

- 1 Expose the reference measuring instrument and the instrument to be adjusted to the same constant conditions and wait for equalization period to lapse.
- 2 Mark the instrument file of the connected instrument.
- 3 Click on **[Adjusting the transmitter]**.
The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Adjusting the transmitter** register.
- 4 Enter reference value and click on **[Carry out 1-point adjustment]**.
- 5 Confirm confirmation request
The adjustment is carried out.

Field	Explanation
-------	-------------



°C/°F	Selection of the unit; only for temperature adjustment.
-------	---

Current reading	Reading in °C/°F or % RH. Readings are updated every second.
-----------------	---

Reference value	Entry of the read-off value from the reference measuring instrument. Permissible entries: max. 5 % RH deviation max. 2 K (°C) deviation
-----------------	--

- Click on [Set offset to zero] to reset a transmitted reference value. The current reading is used again.

6 Click on [OK] or [Cancel] to close the dialogue.

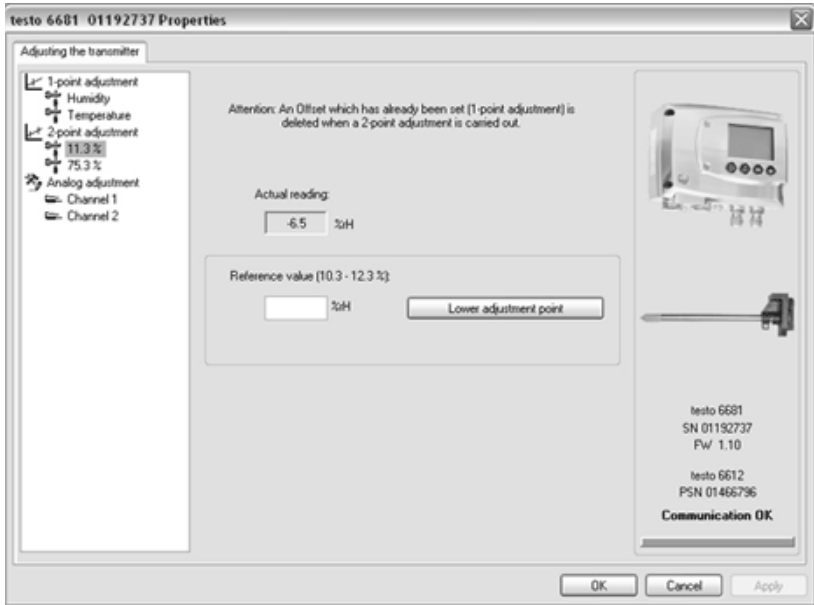
4.3.4.2 2-point adjustment



Also see *volume 1, chapter 1.3.3.3*.

- 1 Expose the reference measuring instrument and the instrument to be adjusted to the same constant conditions and wait for equalization period to lapse.
- 2 Mark the instrument file of the connected instrument.
- 3 Click on **[Adjusting the transmitter]**.
The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Adjusting the transmitter** register.
- 4 Mark **11.3 %**, enter the reference value for the lower adjustment point and click on **[Lower adjustment point]**.
The adjustment is carried out.
- 5 Mark **75.3 %**, enter the reference value for the upper adjustment point and click on **[Upper adjustment point]**.
The adjustment is carried out.

Field	Explanation
-------	-------------



Actual reading	Reading in % RH. Readings are updated every second.
----------------	--

Reference value	Entry of the read-off value from the reference measuring instrument. Permissible entries: Lower adjustment point 10.3 to 12.3 % RH Upper adjustment point 74.3 to 76.3 % RH.
-----------------	---

6 Click on **[OK]** or **[Cancel]** to close the dialogue.

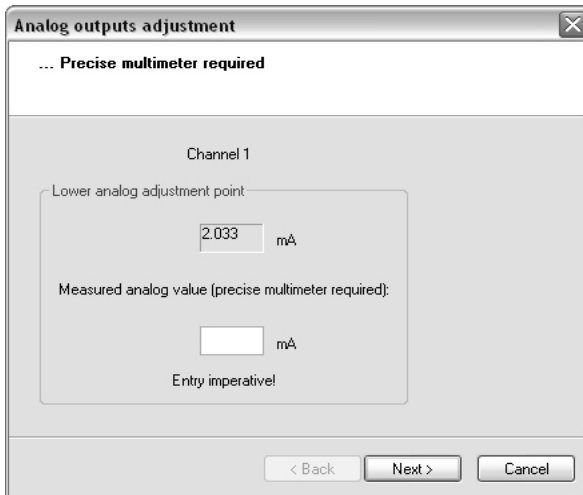
4.3.4.3 Adjusting the analog output

- 1 Connect precision multimeter (see *volume 1, chapter 1.3.3.4*).
- 2 Mark the instrument file of the connected instrument.
- 3 Click on **[Adjusting the transmitter]**.

The **Properties of <Instrument type> <Serial number>** dialogue is opened with the **Adjusting the transmitter** register.

- 4 Click on **[Start wizard...]** and follow the instructions of the wizard.
The adjustment is performed when the wizard is closed.

Field	Explanation
-------	-------------



Default value	The analog output value is given at the output:
	Lower adjustment point: 10 % of the max. value
	Centre adjustment point: 50% of the max. value
	Upper adjustment point: 90 % of the max. value.

Measured analog value	Required field: Entry of the value read off at the multimeter.
-----------------------	---

4.3.5 Transmitter history

Parameterizations, adjustment processes and messages that have occurred are registered in the transmitter with an operating hours stamp.

In the history overviews (explained later in more detail), past processes and events can be made visible.

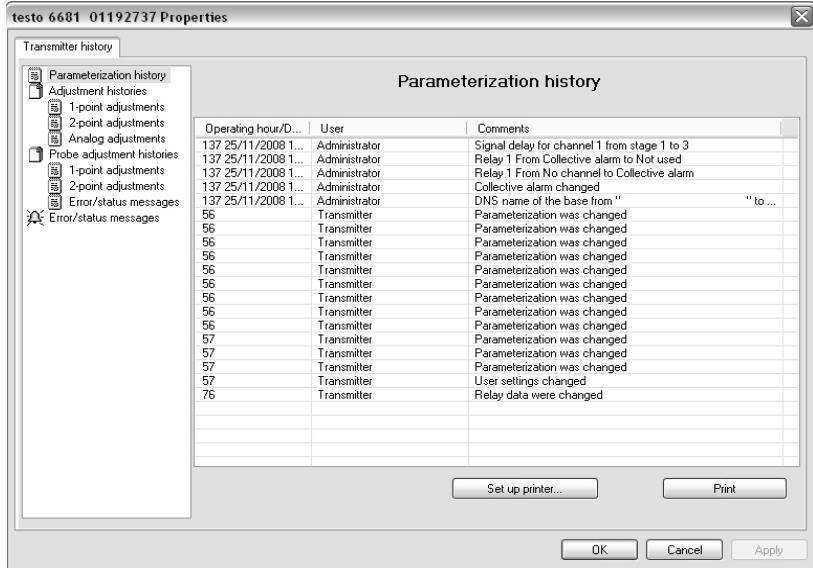


For parameter changes or adjustments that are performed directly at the instrument (via the user menu), "Transmitter" is entered in the **User** field and only the operating hour is entered in the **Date/time** field instead of operating hour/date/time.

For entries that are performed using the P2A software, the name of the user logged into Windows appears in the **User** field, while the operating hour is shown in the **Date/time** field.

- 1 Mark the instrument file of the connected instrument.
- 2 Click on **[Transmitter history]** button.
The "**Properties of <Instrument type> <Serial number>**" dialogue is opened with the **Transmitter history** register.
- 3 Click on the required entry in the list to change the display.

Parameterization history **Explanation**



Date/time Format of the PC time is adopted from the settings of the operating system.

User Name with which the user is logged into the operating system.
 "MUF" (= transmitter) if the change was performed at the instrument.

Operating hours/date/time Operating hour/time stamp at which the change at the instrument was performed.

Comments Type of parameter change, e.g. "Unit of channel 2 from °F to °C".

Adjustment histories

Explanation

Operating hour/Date/Time	User	Serialno. P...	Refe...	Actu...	Unit	Offs...	Offs...
450	Transmitter	01466796	----	----	%H	0.00	58.47
432	Transmitter	01466796	----	----	%H	58.47	0.00
432	Transmitter	01466796	----	----	%H	0.00	0.00
432	Transmitter	01466796	----	----	%H	0.00	0.00
432	Transmitter	01466796	----	----	%H	0.00	0.00

Selection: 1-point adjustments/2-point adjustments/Analog adjustments.

Date/time	Format of the PC time is adopted from the settings of the operating system.
User	Name with which the user is logged into the operating system. "MUF" (= transmitter) if the change was performed at the instrument.
Operating hours/date/time	Operating hour/time stamp at which the change at the instrument was performed.
Serial no. Probe	Serial number of the probe.
Reference value	If no changes were performed, no value is displayed.

Column	Explanation
Unit	Unit during the adjustment.
Actual value before adjustment	1-point adjustment: If no changes were performed, no value is displayed.
Offset from	1-point adjustment: Value before the adjustment.
Offset to	1-point adjustment: Value after the adjustment.
Offset	2-point adjustment: Difference between target and actual value reported by instrument.
Channel	Analog adjustment: Channel 1 to n.
Specification	Analog adjustment: Actual value.
Reading	Analog adjustment: Reference value entered.
Offset	Analog adjustment: Deviation at time of adjustment.

Error/status messages Explanation

Operating hour	Serialno. Probe	Message	Type of message
55	01192737	Supply voltage low start	Error messages/early warnings
55	01192737	Supply voltage low start	Error messages/early warnings
415	01466796	Probe connection	Status messages
415	01466796	Probe disconnected	Error messages/early warnings
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
415	01466796	Probe connection	Status messages
417	01466796	Probe connection	Status messages
417	01466796	Probe connection	Status messages
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417	01466796	Probe connection	Status messages
417	01466796	Probe connection	Status messages
417	01466796	Probe connection	Status messages
417	01466796	Probe connection	Status messages
418	01466796	Probe connection	Status messages
427	01466796	Probe connection	Status messages
436	01466796	Probe connection	Status messages
442	01466796	Probe connection	Status messages
446	01466796	Probe connection	Status messages
450	01466796	Probe connection	Status messages
450	01466796	Probe connection	Status messages

The table is shown only for error and status messages that were generated in the transmitter and were transferred and saved there via the connection to the P2A software.

Date/time Format of the PC time is adopted from the settings of the operating system.

Operating hours Operating hour at which the message appeared in the instrument.

User "MUF" (= transmitter) because the message was generated in the transmitter.

Message e.g. "Wrong probe". A non-compatible probe was connected.

Type of message e.g. early warning, status message.

To print out the history data, click on **[Print]**.



The printing job is automatically sent to the default printer for the operating system.

The printout can be edited using **[Set up printer...]**.

4 Click on **[OK]** or **[Cancel]** to close the dialogue.

5 Tips and assistance

5.1 Questions and answers

Question	Possible causes/solutions
Connection to instrument cannot be established	Check connection cable/plug contacts
A message appears on the display	See <i>volume 1, chapter 1.5</i> .
Malfunction (with or without display)	Analysis using the P2A software, see <i>chapter 3.3.3</i> .
Undo adjustment	<p>A 1-point temperature/humidity adjustment can be reset to the current reading using [Set offset to zero].</p> <p>The actual values before the adjustment can be read out from the corresponding history table.</p> <p>2-point adjustments and analog adjustments can only be undone by means of a factory reset.</p>
When does a stable current reading appear?	After approx. 20 seconds

If we could not answer your question, please contact your dealer or Testo Customer Service. For contact data, see back of this document or web page www.testo.com/service-contact.

5.2 Accessories and spare parts



An overview of the probes that can be used with the testo 6681 can be found in *volume 1, chapter 1.2.2*.

Designation	Article no.
Ethernet	
Ethernet module	0554 6656
Ethernet plug	0554 6653
Interface and software	
P2A software (parameterizing, adjusting, analyzing) incl. USB adapter	0554 6020
Fastenings, assembly aids	
Wall/duct bracket with M3 screw for fastening the transmitter to the probe and the probe to the wall/duct	0554 6651
Pressure-tight G 1/2" screw connection with cutting ring up to 16 bar	0554 1795
Pressure-tight G 1/2" screw connection with PTFE ring up to 6 bar	0554 1796
Plug-in connections	
Set of M12 plug-in connections (connector and socket) for power and signal lines	0554 6682

Designation	Article no.
Dewpoint measurement (only with testo 6615)	
Preliminary filter to protect measurement chamber and sensors against contamination	0554 3311
Precision chamber with adjustable inflow	0554 3312
Sensor filters and protective caps	
Stainless steel sintered filter	0554 0647
Wire mesh filter	0554 0757
Sintered PTFE filter	0554 0759
Protection cap made of metal (open)	0554 0755
PTFE protection cap with drip hole	0554 9913
Condensation protector	0554 0166
Filter for H ₂ O ₂ atmospheres	0554 6000
H ₂ O ₂ protection cap	0699 5867/1
Adjustment equipment	
Humidity adjustment set (11.3/75.3 % RH)	0554 0660
Extension and calibration cable	0554 6610
Supply	
Mains unit (desktop, wall-mounted)	0554 1748
Mains unit (top-hat rail mounting)	0554 1749
Calibration	
Standard ISO calibration certificate, transmitter + probes	0520 0176
Special ISO calibration certificate, transmitter + probes	0520 0066
Standard DAkkS calibration certificate, transmitter + probes	0520 0276
Special DAkkS calibration certificate, transmitter + probes	0520 0236
ISO calibration certificate humidity, probes	0520 0076
DAkkS calibration certificate temperature, probes	0520 0261

5.2.1 Ordering options for testo 6681 transmitter (0555 6681)

Order code	Characteristic
Axx Version	
A01	Currently no further selection of variants
Bxx Analog output	
B02	0 to 1 V (4-wire, 24 VAC/DC)
B03	0 to 5 V (4-wire, 24 VAC/DC)
B04	0 to 10 V (4-wire, 24 VAC/DC)
B05	0 to 20 mA (4-wire, 24 VAC/DC)
B06	4 to 20 mA (4-wire, 24 VAC/DC)
Cxx Display	
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
Dxx Cable entry	
D01	M16 PG screw connection (with relay, also M20)
D02	Cable entry NPT 1/2"
D03	Plug-in connections for power and signal lines
Exx Ethernet module	
E00	without Ethernet module
E01	with Ethernet module
Fxx Channel 1 Unit	
F01	% RH/Min/Max
F02	°C/Min/Max
F03	°F/Min/Max

Order code	Characteristic
F04	°Ctd/Min/Max
F05	°Ftd/Min/Max
F06	g/kg /Min/Max
F07	gr/lb /Min/Max
F08	g/m ³ /Min/Max
F09	gr/ft ³ /Min/Max
F10	ppm _{Vol} /min/max
F11	°C _{wb} /Min/Max (wet bulb)
F12	°F _{wb} /Min/Max (wet bulb)
F13	kJ/kg /Min/Max (enthalpy)
F14	hPa /Min/Max (water vapour partial pressure)
F15	inch H2O/Min/Max (water vapour partial pressure)
F18	% Vol / min / max
Gxx	
Channel 2 Unit	
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 ³ /Min/Max
G09	gr/ft ³ /Min/Max
G10	ppm _{Vol} /min/max
G11	°C _{wb} /Min/Max (wet bulb)
G12	°F _{wb} /Min/Max (wet bulb)
G13	kJ/kg /Min/Max (enthalpy)
G14	hPa /Min/Max (water vapour partial pressure)
G15	inch H2O/Min/Max (water vapour partial pressure)
G18	% Vol / min / max
Hxx	
Relay	
H00	without relay
H01	4 relay outputs, limit value monitoring

Order code	Characteristic
H02	4 relay outputs, channel 1 limit values and collective alarm
Ixx	
Optional 3rd analog output	
I00	no optional 3rd analog output
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 ³ /Min/Max
I09	gr/ft ³ /Min/Max
I10	ppm _{Vol} /min/max
I11	°C _{wb} /Min/Max (wet bulb)
I12	°F _{wb} /Min/Max (wet bulb)
I13	kJ/kg /Min/Max (enthalpy)
I14	hPa /Min/Max (water vapour partial pressure)
I15	inch H ₂ O/Min/Max (water vapour partial pressure)
I16	°C _{tm} (H ₂ O ₂ mixture dewpoint)
I17	°F _{tm} (H ₂ O ₂ mixture dewpoint)
I 18	% Vol / min / max
I19	%RH _m (mixture humidityfor H ₂ O ₂)

5.2.2 Ordering options for testo 6610 probes (0555 6610)

Order code	Characteristic
Lxx	
Probe type	
L 11	Probe 6611
L 12	Probe 6612
L 13	Probe 6613
L 14	Probe 6614
L 15	Probe 6615
L 17	Probe 6617
Mxx	
Protective filter	
M 01	Stainless steel sintered filter
M 02	Metal wire protection cap
M 03	Sintered PTFE filter
M 04	Open metal protection cap
M 06	PTFE filter with drip hole
M 07	PTFE filter with drip hole and condensation protector
M 08	Filter for H ₂ O ₂ atmospheres
Nxx	
Cable length	
N 00	Without cable (testo 6611)
N 01	1 m cable length (testo 6613, 6614, 6615, 6617)
N 02	2 m cable length (testo 6613, 6614, 6615, 6617)
N 05	5 m cable length (testo 6613, 6614, 6615, 6617)
N 10	10 m cable length (testo 6613, 6614, 6615, 6617)
N 23	Cable length specifically for duct versions (testo 6612)
Pxx	
Probe length	
P 07	Probe length approx. 70 mm (testo 6611)
P 12	Probe length approx. 120 mm (testo 6613)
P 20	Probe length approx. 200 mm (testo 6611, 6612, 6613, 6614, 6615, 6617)
P 30	Probe length approx. 300 mm (testo 6612, 6613, 6614)

Order code	Characteristic
P 50	Probe length approx. 500 mm (testo 6612, 6613, 6614, 6615, 6617)
P 80	Probe length approx. 800 mm (testo 6612, 6613)



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