

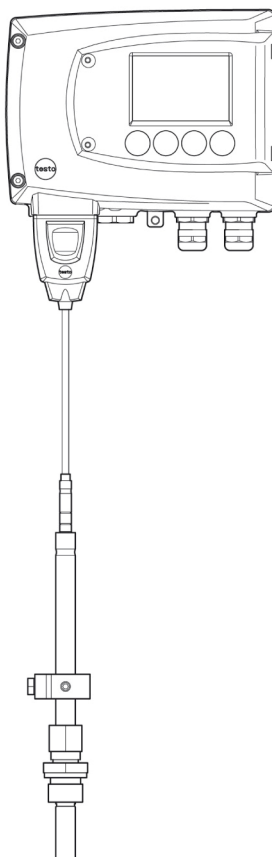


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**testo 6682 Humidity transmitters**  
**testo 6616 Probes**  
**For use in areas with risk of explosion according to**  
**Directive 94/9/EC (ATEX)**

**Instruction manual**

**en**



## **Notes for installation**

- ▶ Observe the installation and safety instructions from the instruction manual.
- ▶ Perform the installation according to the manufacturer's specifications and the valid standards and regulations.
- ▶ Only use the instruments in measurement substances against which the materials that come in contact with the medium are sufficiently resistant.
- ▶ Observe the maximum process conditions according to the instruction manual at hand.
- ▶ Observe the regulations for the interconnection of intrinsically safe circuits according to EN 60079-14 (proof of intrinsic safety).
- ▶ Close unused entry openings with suitable sealing plugs.
- ▶ Properly install the housing cover and cable entries to maintain the housing protection class.
- ▶ Integrate the transmitter and the probe into the equipotential bonding.
- ▶ Avoid an electrostatic charge, e.g. due to friction, cleaning, maintenance or similar.
- ▶ Only clean plastic surfaces with a moist cloth.

# Safety

Installation, electrical connection, commissioning, operation and maintenance of the measuring system can only be performed by trained personnel authorized by the system operator. The trained personnel must have read and understood this instruction manual and follow the directions specified within it. Changes and repairs can only be performed on the instrument if this is permitted according to the instruction manual.

If using the measuring system in areas with risk of explosion, the corresponding national standards and specifications are to be complied with. Separate safety instructions are included with the measuring system and are an inherent part of this documentation. The installation specifications, connected loads and safety instructions contained must be observed. The trained personnel must be sufficiently skilled. The measuring and safety-related requirements for the measuring points are to be complied with.

## 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 exactly. Use only OEM spare parts from testo.

# Environment

## 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 **Ex protection!**:

Safety instructions for using in area with risk of explosion. For this, also observe the separate safety instructions for electrical operating equipment for areas with risk of explosion.



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® 2000, XP and Vista.

Character/ display:	Explanation/example
➤	Aim of action, e.g.: ➤ <b>Assembling the instrument at the process connection:</b>
✓	Requirement that must be met, e.g.: ✓ The service flap is open.
1.	Steps are numbered if a certain sequence of actions must be followed, e.g.: 1. Loosen and remove housing screws. 2. Remove the upper part of housing.
▪	A step is not numbered if there are no further steps or if the step is optional, e.g.: ▪ Insert probe connector into socket of testo 6682 until it engages.
" ... "	Example entries are in inverted commas, e.g.: The value "0" results in ....
<b>Bold type</b>	Elements of the program interface or instrument display, e.g.: The instrument designation appears in the <b>instrument/parameter file list</b> . Select <b>Main Menu Channel 1</b> and confirm with SET.
CAPITAL LETTERS	Keys on the instrument or keypad, e.g.: Press ESC.

# Contents

<b>1</b>	<b>TRANSMITTER.....</b>	<b>9</b>
1.1	Specifications.....	9
1.1.1	Functions and use.....	9
1.1.2	Scope of delivery.....	9
1.1.3	Accessories.....	10
1.1.4	Technical data.....	10
1.1.5	Dimensions .....	11
1.1.6	EC declaration of conformity for testo 6682.....	12
1.2	Product description.....	13
1.2.1	At a glance .....	13
1.2.2	Usable probes .....	14
1.2.3	Display and keypad.....	14
1.2.4	Analog outputs .....	14
1.2.5	Parameters.....	15
1.2.6	Scaling .....	15
1.3	Commissioning .....	17
1.3.1	Wall mounting .....	17
1.3.2	Connecting the instrument .....	19
1.3.3	Adjusting the instrument.....	25
1.4	Operation .....	32
1.4.1	Key cover .....	32
1.4.2	Password protection.....	33
1.4.3	Structure of user menu.....	33
1.4.4	Overview of the testo 6682 user menu.....	35
1.4.5	The individual main menus .....	37
1.5	Status, warning and error messages.....	48
1.5.1	Status messages.....	48
1.5.2	Transmitter warning messages .....	49
1.5.3	Error messages.....	50
1.6	Maintenance and cleaning.....	51
1.6.1	Maintaining the instrument.....	51
1.6.2	Cleaning the instrument .....	51

<b>2</b>	<b>TESTO 6616 PROBES .....</b>	<b>52</b>
2.1	Specifications.....	52
2.1.1	Functions and use.....	52
2.1.2	Scope of delivery .....	54
2.1.3	Accessories.....	55
2.2	Product description.....	55
2.2.1	Filter .....	55
2.2.2	testo 6616 cable probe .....	56
2.2.3	EC declaration of conformity for testo 6616.....	61
2.3	Commissioning .....	62
2.3.1	Installing the probe.....	62
2.3.2	Connecting/removing the probe to/from the transmitter .....	64
2.4	Maintenance and cleaning.....	65
2.4.1	Exchanging filter protection cap for testo 6616 probe .....	65
2.4.2	Cleaning the instrument and filter protection cap .....	66
2.4.3	Exchanging probe .....	66
<b>3</b>	<b>TIPS AND ASSISTANCE .....</b>	<b>67</b>
3.1	Questions and answers .....	67
3.2	Accessories and spare parts .....	68
3.2.1	Ordering options for testo 6682 transmitter (0555 6682).....	69
3.2.2	Ordering options for testo 6616 probes (0555 6616).....	71

# 1 Transmitter

## 1.1 Specifications

### 1.1.1 Functions and use

The testo 6682 humidity transmitter is used in conjunction with the plug-in, adjusted testo 6616 probe.



Please refer to Chapter *testo 6616 probe*, page 52 for information about commissioning, operating and maintaining the testo 6616 probe.

The testo 6682 humidity transmitter is suitable for the following applications, for example:

- Ex areas: see separate safety instructions and model inspection certification
- Process instrumentation
- Clean rooms
- Test benches
- Drying processes
- Production and storage air quality
- Complex room climate applications.

### 1.1.2 Scope of delivery

The scope of delivery of the testo 6682 humidity transmitter includes the following:

- Transmitter
- Key cover
- Rear panel bracket
- Calibration protocol
- Operating instructions
- Transmitter safety instructions

## 1.1.3 Accessories

The following accessories are available for the testo 6682 humidity transmitter:

- Protection caps for probes
- Assembly accessories



Information about accessories and their order numbers can be found in Chapter *Accessories and spare parts*, page 68 or on the website at [www.testo.com](http://www.testo.com).

## 1.1.4 Technical data

### Parameters

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

### Measuring range

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

### Accuracy

- $\pm 1\%$  RH;  $\pm 0.15\text{ °C}/\pm 0.30\text{ °F}$

### Resolution

- 0.1 % RH; 0.01 °C/0.01 °F

### Meas. cycle

- 1/sec

### Voltage supply

- 2-wire: 4 to 20 mA, current loop from certified, intrinsically safe power supply units:  
 $U_0 = 28\text{ V}$   
 $I_0 = 93\text{ mA}$   
 $P_0 = 650\text{ mW}$

### Analog output

- 4 to 20 mA  $\pm 0.03\text{ mA}$  (2-wire)
- (plus fault through supply isolator)

### Resolution of analog output

- 12 bit

### Display

- 2-line LCD with plain text line

### Housing operating temperature

- with display from -20 to 70 °C/  
- -4 to + 158 °F

### Storage temperature

- -40 to 80 °C/-40 to +176 °F

### Materials

- Housing: chrome plated die-cast zinc
- Display: Plastic
- Keypad: Plastic
- Housing screws: Stainless steel
- Screws rear wall fixture: Galvanized steel
- Rear wall fixture: Plastic
- Screws: Galvanized brass
- Plugs: Metal
- Earth terminal: Stainless steel
- Sealing rings: Plastic
- Label cover: PET

### Weight

- 2.01 kg/4.33 lb

**Protection class**

- IP 65 only if the transmitter is wired and/or seal plugs are inserted and the probe is plugged in

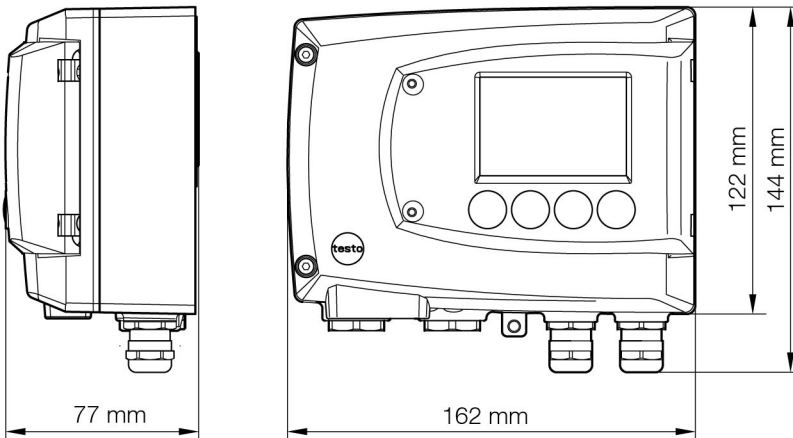
**Directives, standards and tests**

- 94/9/EC (ATEX)
- EC Directive: 2004/108/EC

**Warranty**

- Duration: 2 years
- Warranty conditions, see [www.testo.com/warranty](http://www.testo.com/warranty)

## 1.1.5 Dimensions



## 1.1.6 EC declaration of conformity for testo 6682



### EG-Konformitätserklärung

### EC declaration of conformity

Für die nachfolgend bezeichneten Produkte:

We confirm that the following products:

#### **Messumformer/ Transmitter Testo 6682**

EG – Baumusterprüfbescheinigung / EC – Type Examination Certificate:  
**PTB 08 ATEX 2010**

Best. Nr.: / Order No.: 0555 6682

wird bestätigt, daß sie den wesentlichen Schutzanforderungen entsprechen, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit (2004/108/EG) sowie der ATEX Richtlinie (94/9/EG) festgelegt sind.

*corresponds with the main protection requirements which are fixed in the EEC "Council Directive 2004/108/EC on the approximation of the laws of the member states relating to electromagnetic compatibility" and the ATEX directive (94/9/EC). The declaration applies to all samples of the above mentioned product.*

Zur Beurteilung der Erzeugnisse wurden folgende Normen herangezogen:

*For assessment of the product following standards have been called upon:*

**Angewandte harmonisierte Standards:**  
*Applied harmonized standards:*

**EN 61326-1:2006 class B  
EN 61326-1:2006 table 2  
EN 60079-0:2006  
EN 60079-11:2007**

**Qualitätssicherung Produktion / Production Quality Assessment:**  
**PTB 08 ATEX Q003**

**Kenn-Nr. Der benannten Stelle / Notified Body number : 0102**

Diese Erklärung wird für:

*This declaration is given in responsibility for:*

**Testo AG  
Postfach / P.O. Box 1140  
79849 Lenzkirch / Germany  
www.testo.com**



abgegeben durch / by:

Herr Walleser Mr. Walleser  
(Name) (name)

Vorstand Managing Director  
(Stellung im Betrieb des Herstellers) (Position in the company of the manufacturer)

Lenzkirch, 16.09.2008  
(Ort, Datum / place, date)

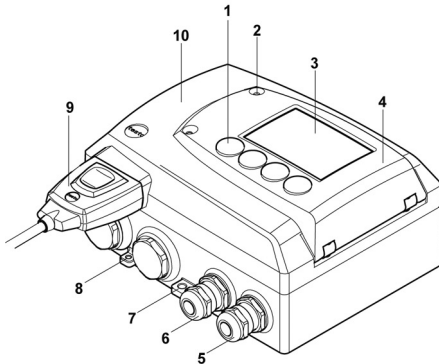
(Rechtsgültige Unterschrift / Legally valid signature)

Der Hersteller betreibt ein zertifiziertes Qualitätssicherungssystem nach DIN ISO 9001

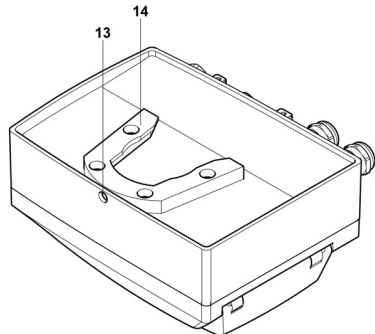
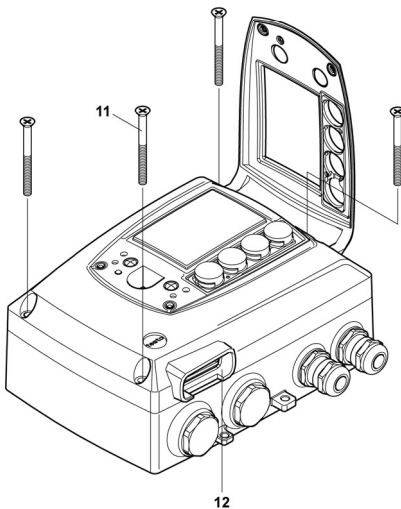
*The manufacturer operates a certified quality assurance system according to DIN ISO 9001*

# 1.2 Product description

## 1.2.1 At a glance



- 1 Keys (with display)
- 2 Service flap screw connection (self-locking, 2x)
- 3 Display
- 4 Service flap
- 5 M 16 x 1.5 screw connection, cable entry
- 6 M 16 x 1.5 screw connection, cable entry
- 7 Earthing/PE connection
- 8 Eyelet for measuring point panel
- 9 Probe connector (testo 6616)
- 10 Upper part of housing



- 11 Housing screws
- 12 Socket for probe connector

- 13 Hole for fastening to rear panel bracket (M3 x 6 screw)
- 14 Plastic bracket for assembly on rear panel

# 1.2.2 Usable probes

The testo 6682 humidity transmitter can be used with the testo 6616 probe:

Probes	Article no.	Characteristic
testo 6616	0555 6616	<b>Cable</b> probe version; accuracy to $\pm 1\%$ RH; temperature range $-30\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ / $-22$ to $+302\text{ }^{\circ}\text{F}$ , sensor soldered

# 1.2.3 Display and keypad

The testo 6682 humidity transmitter is operated via four keys together with the display.

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

Brightness and contrast of the display can be changed via the user menu.

# 1.2.4 Analog outputs

As analog outputs the testo 6682 has 2 current outputs of 4 to 20 mA (2-wire), where channel 1 is used for the supply.



**Ex protection!**

The testo 6682 transmitter is intended for use in areas with risk of explosion. The analog outputs (simultaneously also power supply) can only be operated using certified, intrinsically safe power supply units.

## 1.2.5 Parameters

The following parameters are calculated:

- Relative humidity in %RH (technical)
- Relative humidity in % WMO\* (calculation according to the WMO standard)
- Temperature °C and °F
- Dewpoint or pressure dewpoint in °Ctd and °Ftd\*
- Absolute humidity in g/m<sup>3</sup> and gr/ft<sup>3</sup>
- 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 "H<sub>2</sub>O
- Water content in ppm<sub>vol</sub> and % vol
- Dewpoint of H<sub>2</sub>O<sub>2</sub> mixture in °Ctm and °Ftm.

\*It is possible that condensation appears as early as a displayed humidity starting from 70 % and is shown on the display.

## 1.2.6 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. Measuring range, see table (below).

### 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.

## 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.

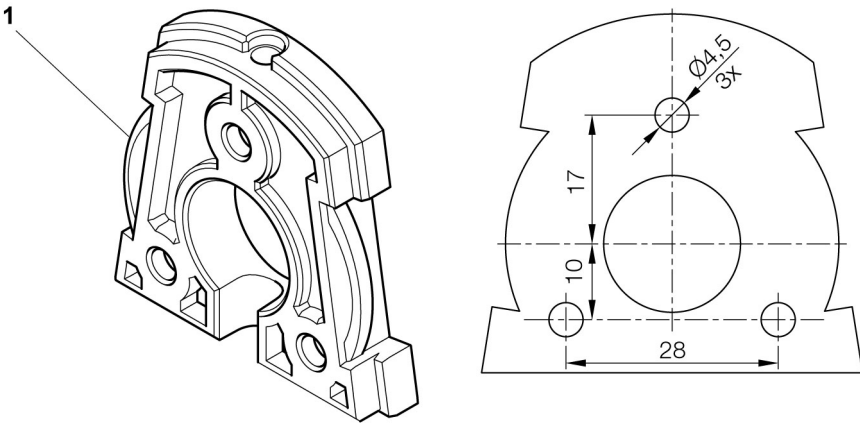
**Measuring ranges with testo 6616 probe**

Parameter	Unit	Measuring range, physical at 1013 hPa		Standard scaling MUF measuring range	
		MIN	MAX	MIN	MAX
Temperature	°C	-30	+150	-20	+150
	°F	-22	+302	-4	+302
Relative humidity	% RH	0	+100	0	+100
WMO relative humidity	% RH	0	+100	0	+100
Dewpoint/pressure dewpoint	°Ctd	-20	+100	-20	+100
	°Ftd	-4	+212	-4	+212
Absolute humidity	g/m <sup>3</sup>	0	600	0	2000
	gr/ft <sup>3</sup>	0	250	0	800
Degree of humidity	g/kg	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
Water content	ppm vol H <sub>2</sub> O	0	99999	0	99999
	% vol	0	40	0	40
Water vapour partial pressure	hPa	0	1000	0	7000
	inchH <sub>2</sub> O	0	400	0	2800

# 1.3 Commissioning

## 1.3.1 Wall mounting

### ➤ Attaching rear panel bracket

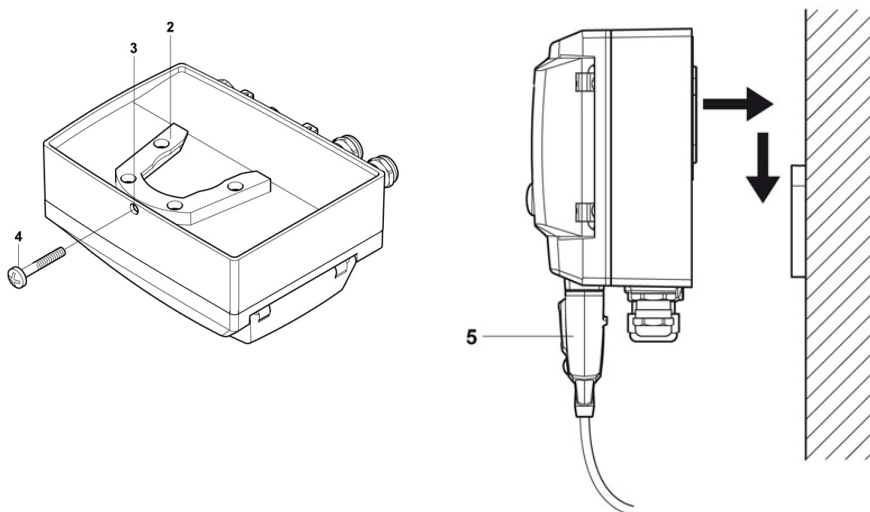


### Ex protection!

Observe the general protective measures when working in areas with risk of explosion.

1. Remove locking screw (item **(4)** of drawing on page 18) and detach rear panel bracket from plastic bracket (item **(2)** of drawing on page 18).
2. Hold rear panel bracket in assembly position and mark the three drill holes.
3. Drill three holes ( $\varnothing 5$  mm) and insert dowels.
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 Connecting the instrument



### Ex protection!

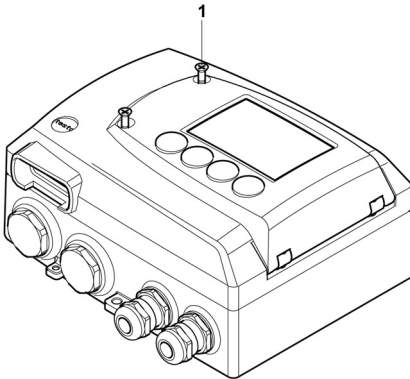
Each of the two channels of the testo 6682 must be provided with a certified transmitter power supply unit that provides a category ia circuit.

The technical data of the transmitter power supply unit must not exceed the following Ex-relevant data:

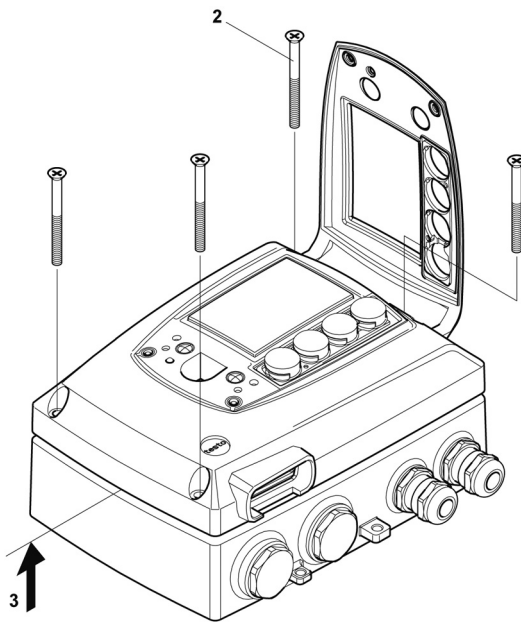
- $U_0 = 28 \text{ V}$
- $I_0 = 93 \text{ mA}$
- $P_0 = 650 \text{ mW}$ .

For correct operation, the terminal voltage at the transmitter must not fall below 16 V with 20 mA loop current.

### ➤ Opening the instrument



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



2. Loosen and remove housing screws (2).
3. Remove upper part of housing from lower part (3) and place on a clean surface.



**Warning!**

Electrical voltage.

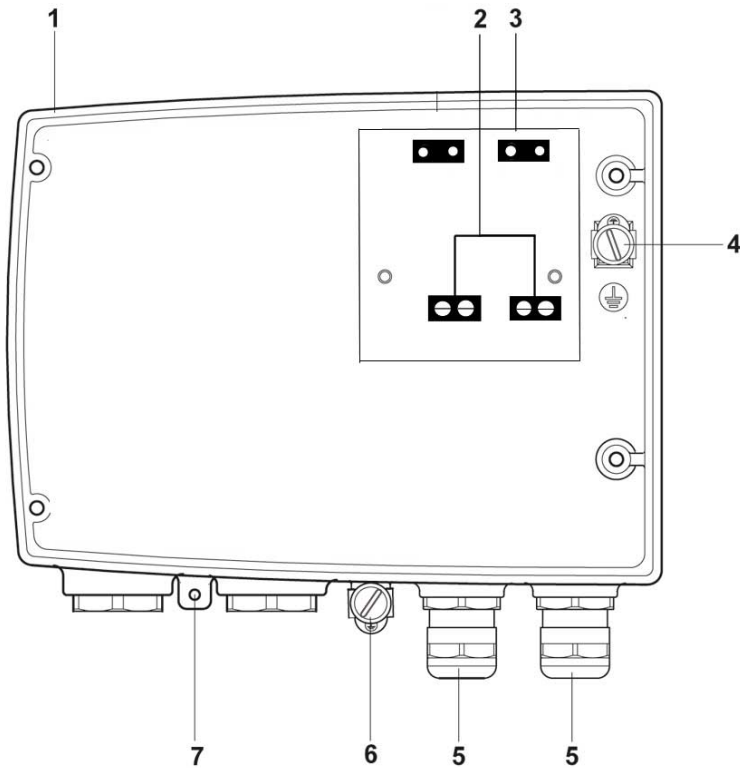
Danger of injury!

De-energize the power supply before connecting the transmitter!



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

### 1.3.2.1 Overview of terminals

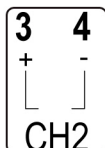
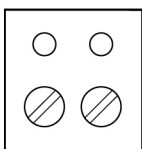
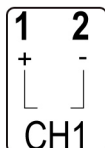
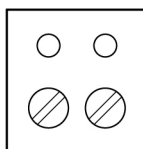


- 1 Lower part of housing
- 2 Terminal strips for voltage supply and analog outputs
- 3 Terminal board
- 4 Earthing terminal (internal)
- 5 M 16 x 1.5 screw connection
- 6 Earthing terminal (external)
- 7 Eyelet for measuring point panel



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

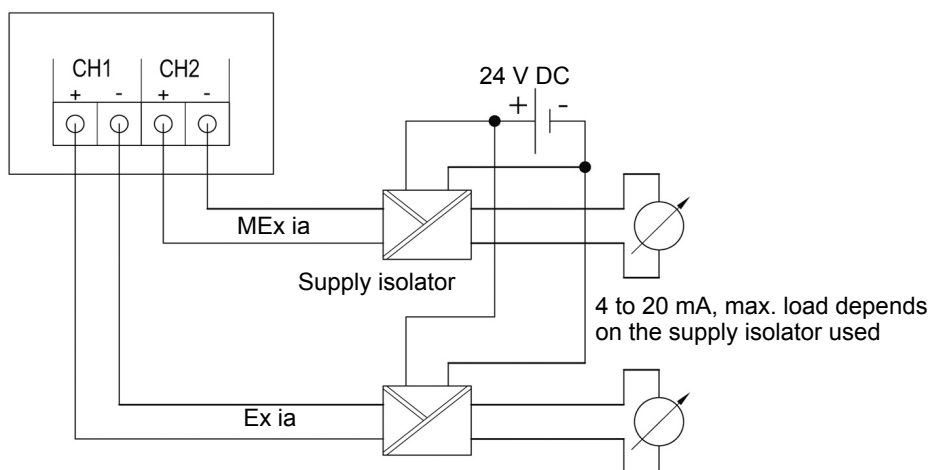
### 1.3.2.2 Connecting voltage supply and analog outputs



Terminal strips for current loop/analog output (item **(2)** (see *Chapter Overview* of terminals, page 21))

1. Feed cable with voltage supply and analog signal lines from certified power supply unit through opened M 16 x 1.5 screw connection (item **(5)** (see *Chapter Overview* of terminals, page 21)).
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 **(5)** (see *Chapter Overview* of terminals, page 21)).

#### Wiring diagram for 2-wire system (4 to 20 mA)



### 1.3.2.3 Creating the PE/earthing terminal



#### Ex protection!

The testo 6682 must be integrated into the equipotential bonding. Observe the following instructions for this.

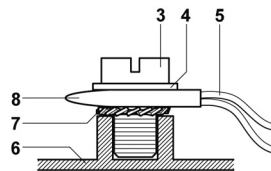
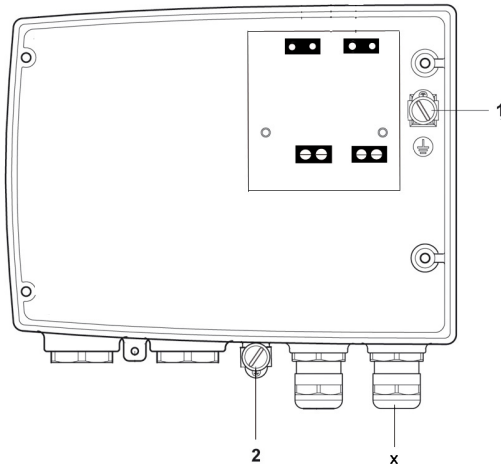
Integrate the metal housing of the testo 6682 into the equipotential bonding to prevent the danger of an electrostatic charge. This can be done using the earthing terminal within the instrument **(1)** or the earthing terminal outside of the instrument **(2)**.



Only use the external earthing terminal in dry interiors.



Tighten unused clamp screw connection so that it is not lost.



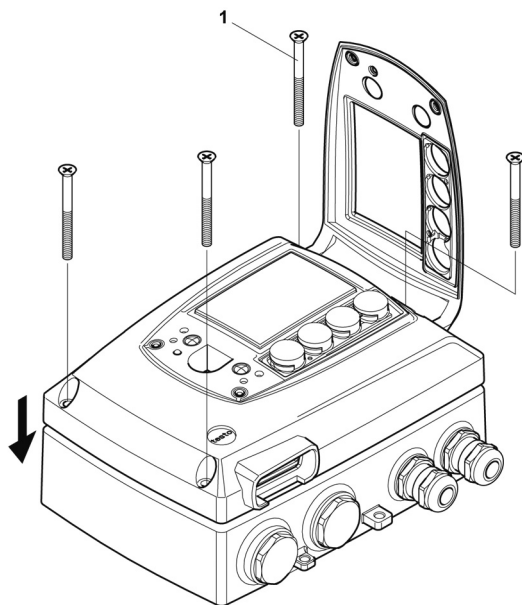
### Using the earthing terminal within the instrument

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.

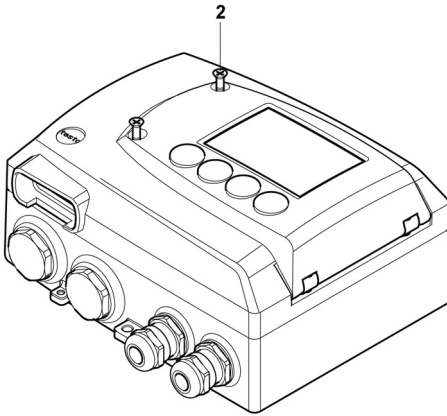
### Using an earthing terminal outside of the instrument

1. Use PE line (yellow/green) **(5)** with cable lug **(8)**. Fix this 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.

### 1.3.2.4 Closing the instrument



1. Place upper part of instrument on top of lower part (see arrow) and fix in place with housing screws **(1)**.



2. Close the service flap and tighten screws (2).

### 1.3.3 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 (supply isolator output signal) to be adjusted (see diagram).

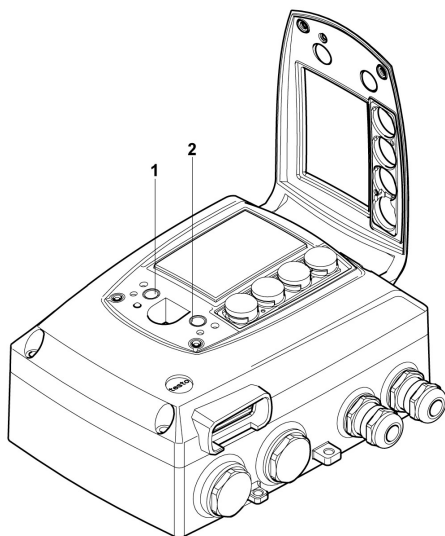
1-point adjustment	2-point adjustment	Analog adjustment
	<p>1-point: Process humidity 2-point: 11.3 %, 75.3 %</p>	<p>Ex ia</p> <p>24 V DC</p> <p>Load</p> <p>Supply isolator</p> <p>Multimeter</p> <p>12.34 mA</p>
Adjustment via user menu	Adjustment via adjustment keys (1, 2)	Adjustment using a precise multimeter and transmission of analog reference value to the user menu

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

The testo 6682 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 6682 (e.g. in the calibration laboratory).

Adjustment of the analog outputs is only logical in combination with the testo 6682 transmitter used at the measuring point and the installed supply isolator.

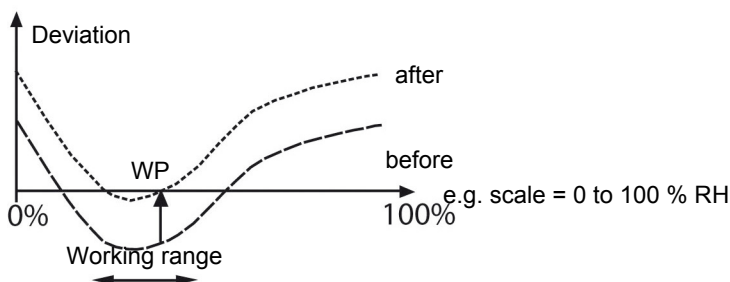
### 1.3.3.1 Overview: Adjustment keys



- 1 Adjust key 11.3 %
- 2 Adjust key 75.3 %

### 1.3.3.2 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 here using a precise handheld instrument or 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. 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.



### Ex protection!

For the 1-point adjustment, the reference conditions must be known.

If you determine these with a measuring instrument, this instrument must be suitable and approved for the current Ex application.

Observe the safety instructions of the reference instrument used!

The 1-point adjustment is performed via the user menu (see Chapter *Editing Adjust main* menu page 44).



### Important:

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

### 1.3.3.3 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.

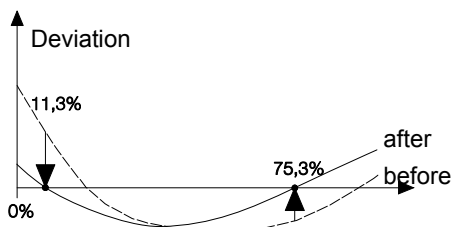
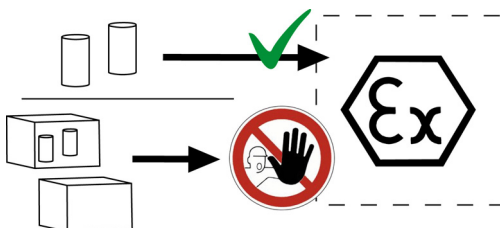
The reference conditions are reached either by using the testo humidity adjustment set (order no. 0554 0660, consisting of humidity pots 0554 0635 (11.3 %), 0554 0636 (33 %) and 0554 0637 (75.3 %)) or in the humidity generator.



### Ex protection!

In Ex area Zone 1 and Zone 2, only use the following humidity pots: 0554 0635 (11.3 %), 0554 0636 (33 %) or 0554 0637 (75.3 %).

Remove humidity pots from the packaging (cardboard box and styrofoam) outside of the Ex area. **Do not bring the packaging into the Ex area.**

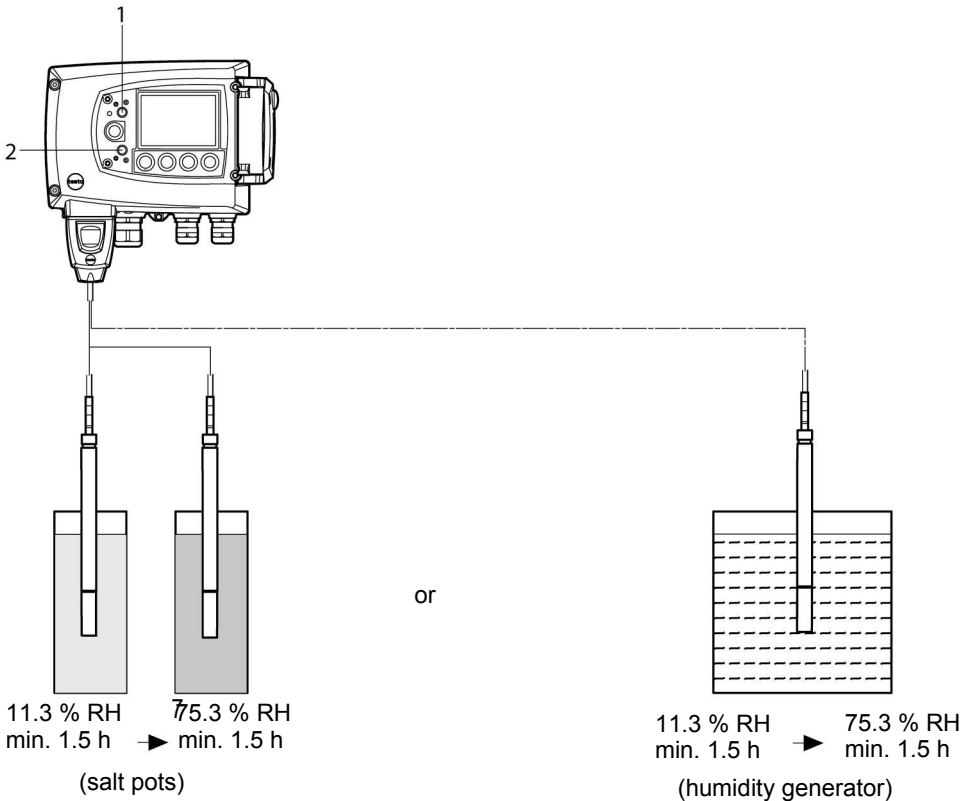


In the 2-point adjustment, the deviations between the reading and the nominal value are minimized across the entire measuring range. The 2-point adjustment is therefore recommended for large working ranges, e.g. in drying processes.

The 2-point adjustment can be performed using the adjustment keys under the service flap, see description of how to proceed below.

A previous 1-point adjustment is undone by a 2-point adjustment.

➤ **Adjusting testo 6682 using adjustment keys**



- ✓ The service flap of the testo 6682 is open (see Chapter *Opening the instrument*, page 19).
- 1. Expose the humidity probe of the testo 6682 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 (1) for at least 10 seconds with something like a ball-point pen that is not too sharp. The **2-point adjust 11.3 %** status message appears on the display

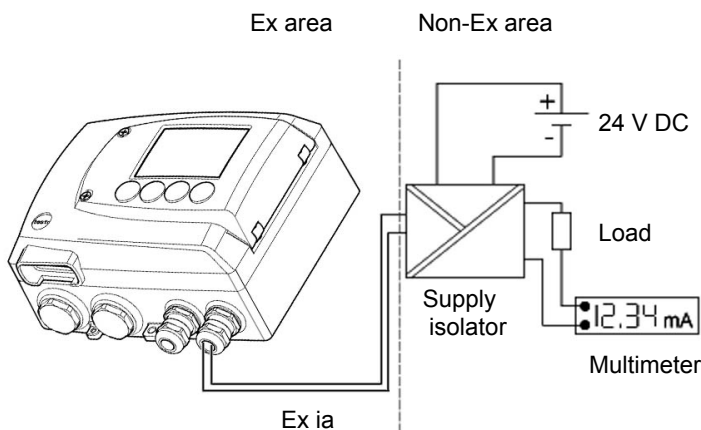
Successful adjustment is signalled by the **Probe reset** status message.

- Carry out the adjustment analogously for the reference condition 75.3 % RH. Press on the 75.3 % RH adjustment key (2) to do this.

3. Close the service flap.

### 1.3.3.4 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. This adjustment is only logical in combination with the testo 6682 transmitter used at the measuring point and the installed supply isolator.



#### ➤ Analog outputs 1 and 2 adjusted

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



**Important:**

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

1. Loop multimeter (mA) into the current loop downstream of the supply isolator (**in non-Ex area**).
2. Activate adjustment menu and select the first adjustment point. Wait at least 30 sec for the adjustment of the analog output.
3. Enter the first reference or analog value measured with the multimeter via the user menu (see Chapter *Editing Adjust main* menu page 44).

4. Perform the second and third adjustment points (step 2 and 3) specified by the user menu in accordance with the adjustment.
5. Remove the multimeter from the current loop and close the current loop again.

# 1.4 Operation

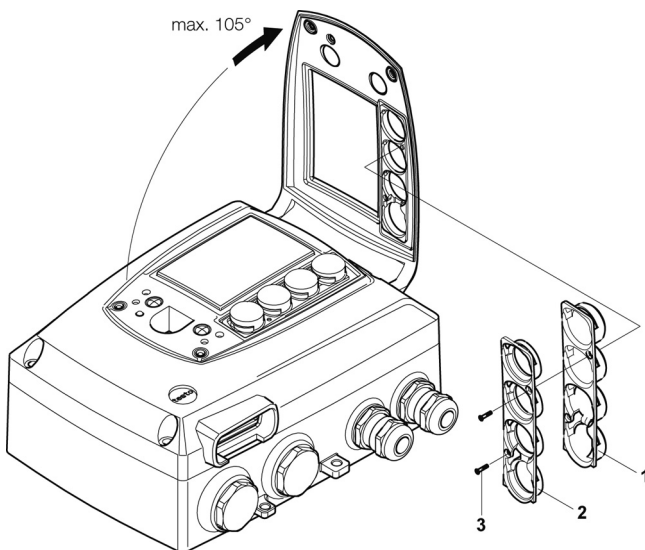
The testo 6682 can be parameterized via the integrated user menu.

## 1.4.1 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 Chapter *Opening the instrument*, page 19).

### ➤ Attaching the key cover



- ✓ The service flap is open (see Chapter *Opening the instrument*, page 19).
- 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.

## 1.4.2 Password protection

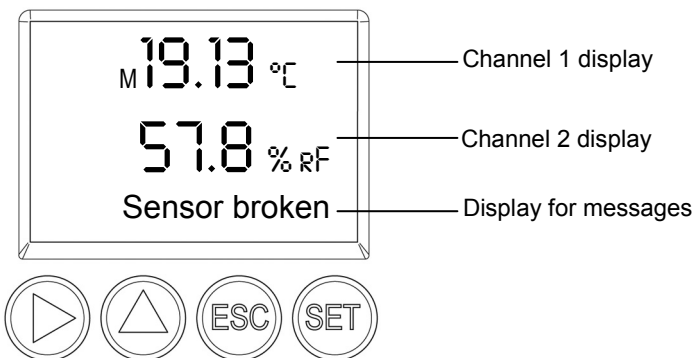
The user menu can be protected with a four-digit numerical code (see Chapter *Editing code settings*, page 40) so that access to the user menu is denied to unauthorized persons not familiar with this numerical code.

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

## 1.4.3 Structure of user menu

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

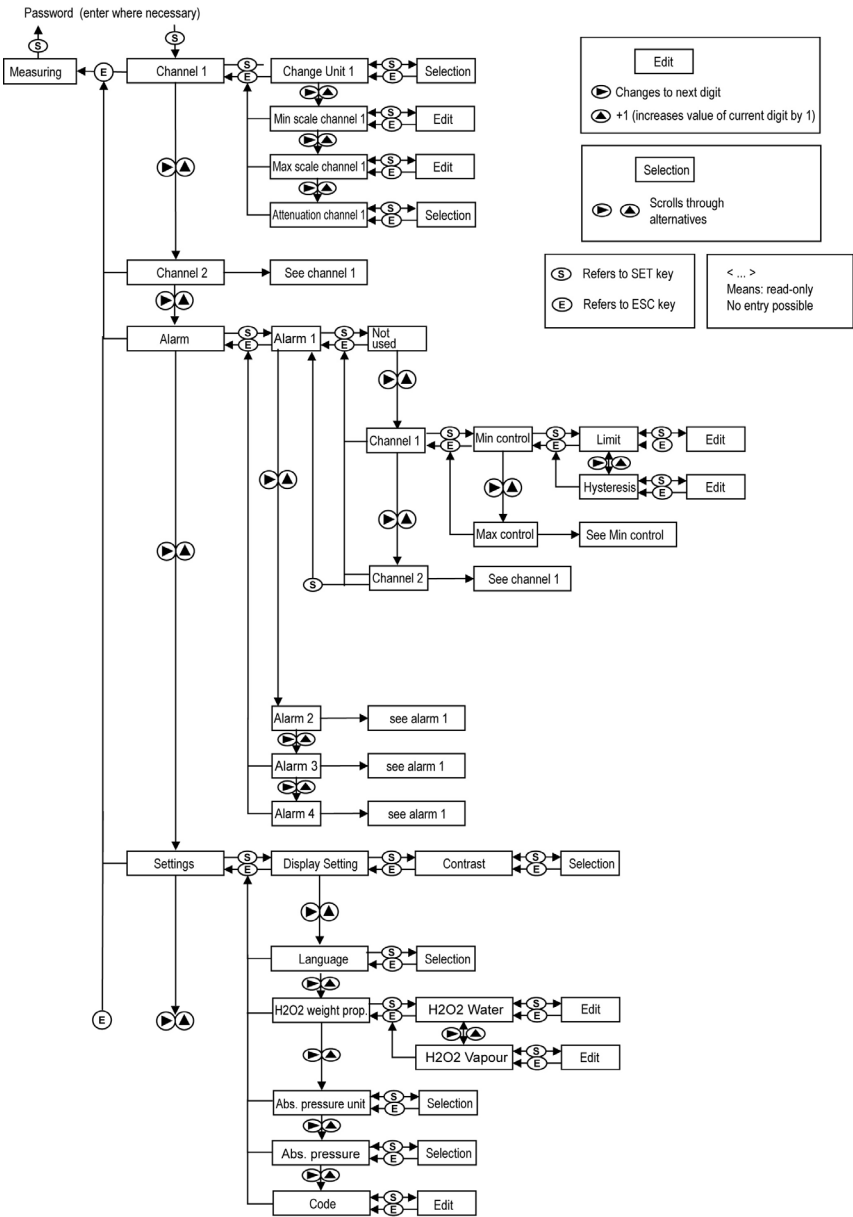
- **Main menu of channel 1**
- **Main menu of channel 2**
- **Alarm menu**
- **Editing Settings main menu**
- **Analysis main menu**
- **Main Menu Messages**
- **Ident main menu**
- **Adjustment main menu**
- **Reset main menu.**

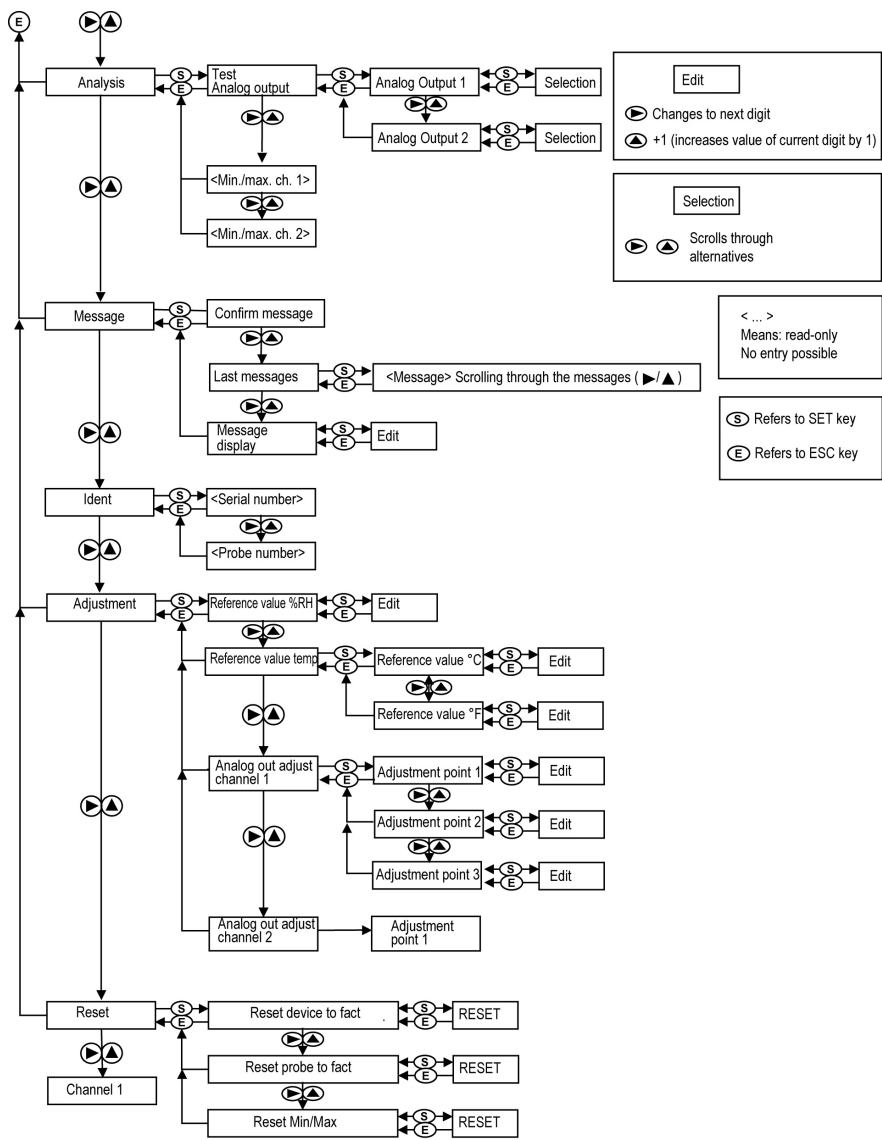


Four keys enable the user to navigate/scroll through the menus and enter/amend values and settings:

Key	Function/description
SET	<div><div>- In Measuring Mode: changes to parameterization</div><div>- In Parameterizing Mode: confirms a selection or setting</div></div>
ESC	<div><div>- Leaves a menu (without modifying any settings)</div></div>
▶	<div><div>- Selecting: scrolls through menus or selectable alternatives</div><div>- Editing: changes to next digit (to the right)</div></div>
▲	<div><div>- Selecting: scrolls through menus or selectable alternatives</div><div>- Editing: increases the value of the current digit by 1</div></div>

# 1.4.4 Overview of the testo 6682 user menu





## 1.4.5 The individual main menus

### 1.4.5.1 Editing Main Menu Channel 1

An overview is given in *Overview of the testo 6682 user menu* (see page 35).

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: % rF, % RH, % HR, °C, °F, °Ctd, °Ftd, g/m<sup>3</sup>, gr/ft<sup>3</sup>, g/kg, gr/lb, kJ/kg, BTU/lb, °Ctw, °Ftw, "H<sub>2</sub>O, hPa, ppm<sub>vol</sub>, % Vol, °Ctm, °Ftm, °Ctpd, °Ftpd.

- 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 ("Attenuation") for channel 1**

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

Unit: sec.

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

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

### 1.4.5.2 Editing main menu of channel 2

See channel 1.

### 1.4.5.3 Processing main menu Alarm

The alarm stati are shown in the display. The alarms are used to monitor limit values, and can be viewed via the main menu **Messages**. For limit value monitoring, a selection can be made between minimum and maximum monitoring, and a limit value and a hysteresis can be set per alarm.

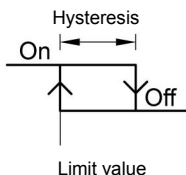
3. Press SET in measurement mode, select **main menu Alarm** with ► or ▲, and confirm selection with SET.

Four alarms can be parameterized.

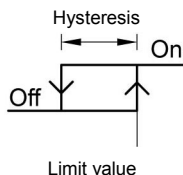
4. Select **Alarm x** with ► or ▲, and confirm selection with SET.

Alarm zur Grenzwertüberwachung einsetzen:

Minimum monitoring



Maximum monitoring



5. Select **Channel x** with ► or ▲ (e. g. "Channel 1"), and confirm selection with SET.
6. Select **max control** or **min control** with ► or ▲ (see graphic).
7. Press SET and edit **limit** as well as **Hysteresis**: Go 1position to the right with ►, and increase value by 1 with ▲ . Confirm with SET or cancel entry with ESC.
8. Return to **Channel x** with ESC.
9. Return to **Alarm x** with ESC.
10. Return to **main menu Alarm** with ESC, continue to **main menu Settings** with ► or ▲.

### 1.4.5.4 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  
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. With ► or ▲ select **Contrast** and confirm the selection with SET.
3. Edit/select parameter with ► or ▲, confirm with SET or abort input with ESC (the effect of the change in parameter can be seen during input).
4. With ESC return to **Display settings** and use ► or ▲ to continue to **Language**.

#### ➤ 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 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. With ESC return to **Code** and use ► or ▲ to continue to **Abs. pressure unit**.

### ➤ Editing H<sub>2</sub>O<sub>2</sub> proportion by weight (optional with 3rd analog output)

1. This menu is only used to parameterize humidity measurements in H<sub>2</sub>O<sub>2</sub> atmospheres (e.g. in sterilization processes) and determines whether °C<sub>tm</sub> or °F<sub>tm</sub> is the output parameter.
2. Select **H<sub>2</sub>O<sub>2</sub> Weight Proportion** using ► or ▲ and confirm selection with SET.  
The selection **H<sub>2</sub>O<sub>2</sub> Water** or **H<sub>2</sub>O<sub>2</sub> Vapour** in the submenu describes whether H<sub>2</sub>O<sub>2</sub> is created through evaporation or is actively evaporated in the process.
3. Select **H<sub>2</sub>O<sub>2</sub> Water** or **H<sub>2</sub>O<sub>2</sub> Vapour** using ► or ▲ and confirm with SET.
4. Editing proportion by weight of H<sub>2</sub>O<sub>2</sub> in % (% H<sub>2</sub>O<sub>2</sub> 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.
5. Go back to H<sub>2</sub>O<sub>2</sub> by pressing ESC and continue to **Absolute pressure unit** using ► or ▲.

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

This parameter determines the humidity parameters relative humidity (g/kg or gr/lb) and water content (ppm<sub>vol</sub> 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.

### 1.4.5.5 Editing Analysis main menu

You can check the function of the analog outputs. In addition, you can read off minimum and maximum readings (since the last voltage supply).

### ➤ Testing functionality of analog outputs



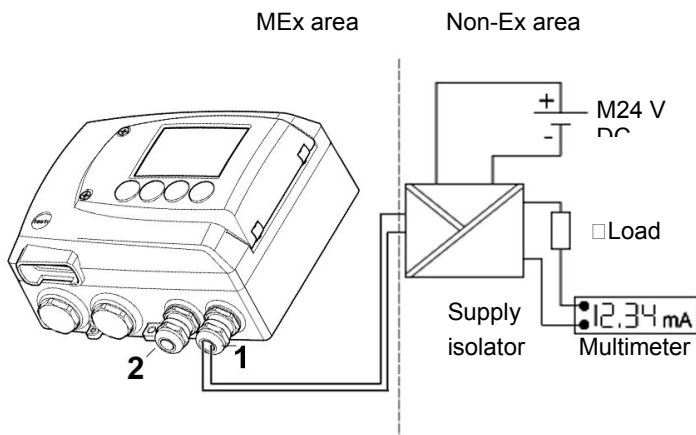
Important:

This function directly affects the analog outputs.

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** 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):



- 1 Channel 1 at supply isolator
- 2 Channel 2 at supply isolator

5. Return to **Test Analog Output** using ESC and continue to **Min/Max** using ► or ▲.

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

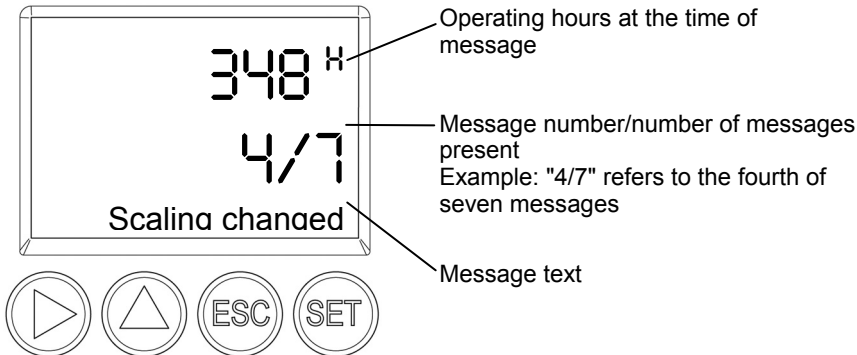


To reset the max./min. values, see Chapter *Editing Reset main* menu, page 47

6. Read off the min./max. values of the two channels in succession by pressing ► or ▲ and return to **Main Menu Analysis** using ESC.
7. Continue to **Main Menu Message** using ► or ▲ or return to Measuring Mode by pressing ESC.

### 1.4.5.6 Editing Message main menu

The last messages can be called up and the display of the messages can be switched on or off.

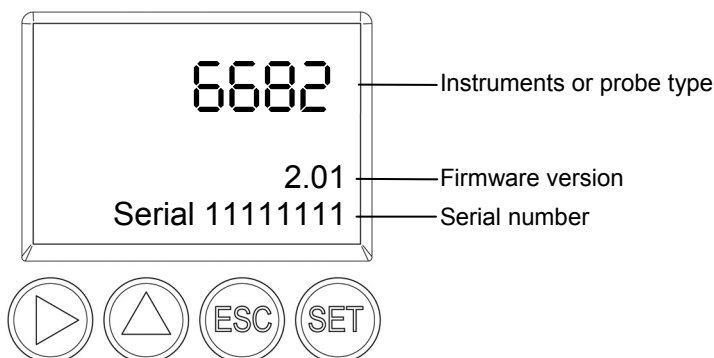


1. In Measuring Mode, press SET, select **Main Menu Message** using ▶ or ▲ and confirm selection with SET.
2. Confirm **Confirm message** using SET.
3. Select **Last messages** using ▶ or ▲ and confirm with SET.
4. Scroll between the messages recorded so far using ▶ or ▲ and press ESC to return to **Last 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 *Status, warning and error messages*, page 48.

### 1.4.5.7 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 Adjust** using ► or ▲ or return to Measuring Mode by pressing ESC.

### 1.4.5.8 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-point adjustment (offset)*, page 26.

In addition, the analog outputs can be adjusted (also see Chapter *Closing the instrument*, page 24



The 2-point adjustment cannot be performed via the user menu. This is done using the adjustment buttons (see page 25)

➤ **Enter reference values for 1-point adjustment**



Please also refer to Chapter *1-point adjustment* (offset), page 26.

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 C°** with ► or ▲.
4. 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.
5. Continue to **Reference value °F** with ► or ▲.
6. 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.
7. Continue to **Analog Adj. Ch. 1** with ► or ▲.
8. Continue with the adjustment of the analog outputs (see below, step 2) or press ESC to return to **Main Menu Adjustment**.
9. Continue to **Main Menu Reset** using ► or ▲ or return to Measuring Mode by pressing ESC.

➤ **Performing analog adjustment**



Please refer to Chapter *2-point* adjustment, page 27

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

**Reference value % RH** is displayed.



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** with ► or ▲.
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** 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.

### 1.4.5.9 Editing Reset main menu

You can reset the factory settings for the following:

- Instrument
- Probes
- 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 *Operation*, page 32).

- Status messages,
- Warning messages and
- Error messages

for either the testo 6682 transmitter or the connected testo 6616 probe as applicable.

All messages can be stored in the transmitter with an operating hours stamp. Use the user menu (see Chapter *Editing Message main* menu, page 43) to view the message history.

## 1.5.1 Status messages

Status messages show the current operating mode of the testo 6682.

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.
03001	Probe disconnected	No probe is connected
02104	Analog out adjust	An analog adjustment has been made
0052F	Reset Min/Max	Resets all saved Min/Max values for all channels
02506	Probe connection	A probe has been connected
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
02101	1-point adjustment	A 1-point adjustment is performed.

Message	Display	Description
02102	2-point adjustment 1.3 %	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
02518	Probe reset	Probe reset: The probe performs a reset

## 1.5.2 Transmitter 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	Take measures to ensure sufficient voltage supply
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. If the problem persists, contact Testo Service

\* Early warning

\*\* Current malfunction

### 1.5.3 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: Probe 6616 belongs to transmitter 6682
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

## 1.5.4 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.

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

# 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 (see Chapter *Operation*, page 32).

## 1.6.2 Cleaning the instrument



### Ex protection!

- The instrument must be cleaned carefully only with a moist cloth to prevent an electrostatic charge.
- Do not use aggressive cleaning agents.
- Do not use any solvents.

## 2 testo 6616 probes

### 2.1 Specifications

#### 2.1.1 Functions and use



Important information/**Ex protection!**:

The testo 6616 probe can only be operated with the testo 6682 transmitter.

The plug-in, adjusted testo 6616 probe is used together with the testo 6682 humidity transmitter and is suitable for use in areas with risk of explosion.

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

- Areas with risk of explosion
- 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 6682 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:

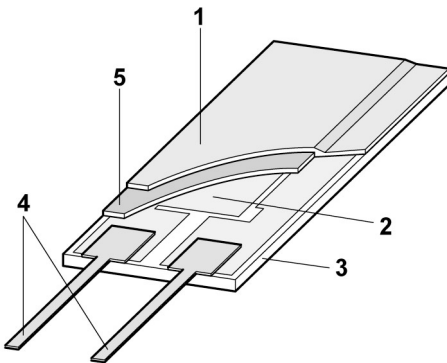
We recommend in this case that a probe of the same type be inserted into the transmitter immediately in order to be able to continue measuring with minimal interruption.

### 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 ten 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

### 2.1.1.3 Self-diagnosis

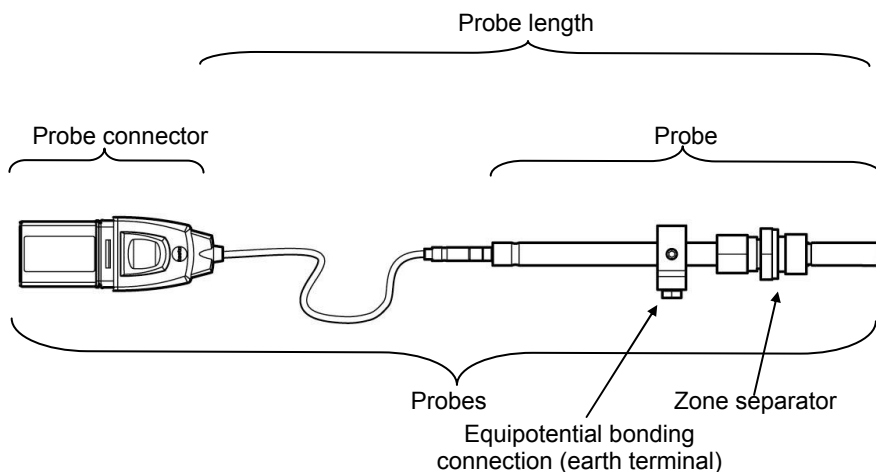
The testo 6616 probe monitors its functionality itself and reports the following faults:

- 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.
- Value for relative humidity less than 0  
The trigger threshold is set at -3 % RH. This means that an error message is only issued once a clear effect is discernible.

## 2.1.2 Scope of delivery

The scope of delivery of the testo 6616 probe includes:

- Probe connector
- Probe shaft with filter and sensors (% RH and °C or °F)
- Probe cable
- Zone separator
- Earth terminal
- testo 6616 safety instructions
- Calibration protocol



### 2.1.3 Accessories

The following accessories are available for the testo 6616 probe:

- Filters and protection cap (see Chapter Accessories and spare parts, page 68)
- Calibration certificate in accordance with ISO and DKD (see Chapter Accessories and spare parts, page 68)
- Wall bracket

## 2.2 Product description

### 2.2.1 Filter

The following filters can be used for the testo 6616 probe:

Filter*	Article no.**	Characteristic	Length A (mm)
M 03	0554 0758	Sintered PTFE filter as protection cap	35
-	0554 9913	PTFE filter with drip hole	35

\* When ordering the probe, please use this filter code, cf. Chapter Ordering options for testo 6682 transmitter (0555 6682), page 69.

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

## 2.2.2 testo 6616 cable probe

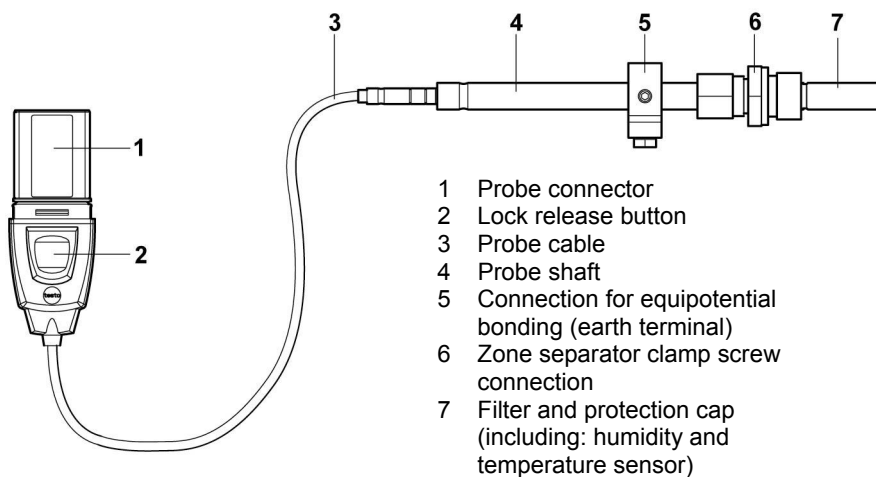
When using the zone separator (0554 1795) the probe shaft can be located in Zone 0 of an area with risk of explosion.



### Ex protection!

The separate safety instructions for electrical operating equipment for areas with risk of explosion must also be observed here

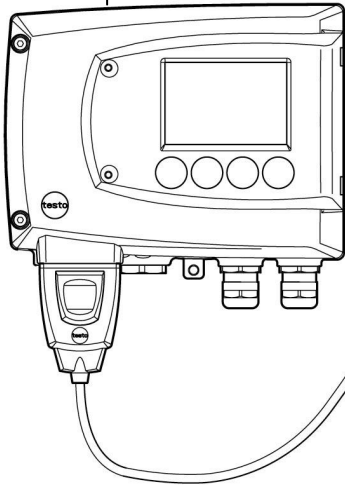
### At a glance



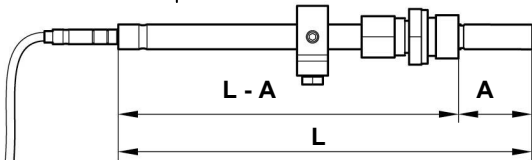
### Application

- Monitoring and regulating industrial humidity processes (apart from high-humidity processes) in areas with risk of explosion
- 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.

testo 6682 transmitter



testo 6616 cable probe



## Technical data

### Parameters

- Humidity
- Temperature

### Meas. range\*

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



Depending on the location and method of use in the area with risk of explosion, the measuring range there may be limited for safety reasons. Observe the ambient/operating conditions in the separate safety instructions in this regard.

### Materials

- Plug: Plastic
- Cable: Plastic
- Probe shaft: Stainless steel
- Earth terminal: Stainless steel
- Zone separation: Stainless steel
- Protective cap: PTFE
- Sensor: Stainless steel /glass

### Accuracy (at 25 °C/77 °F)\*

- Humidity
- $\pm (1.0 \% \text{ RH} + 0.007 \times \text{reading})$  for 0 to 90 % RH
- $\pm (1.4 \% \text{ RH} + 0.007 \times \text{reading})$  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
- $\pm 0.15$  °C (0.27 °F)
- Slope PT1000 1/3 class B
- \* Refer to the charts below for the correlation between temperature and accuracy.

---

#### **Reproducibility**

- Better than  $\pm 0.5$  % RH

---

#### **Sensor**

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

---

#### **Probe dimensions**

- Probe shaft diameter: 12 mm
- L = approx. 200/500 mm
- L – A = 165/465 mm
- A, see Table Filter, page 55.

---

#### **Probe length incl. probe shaft and filter**

- 1/2/5/10 m

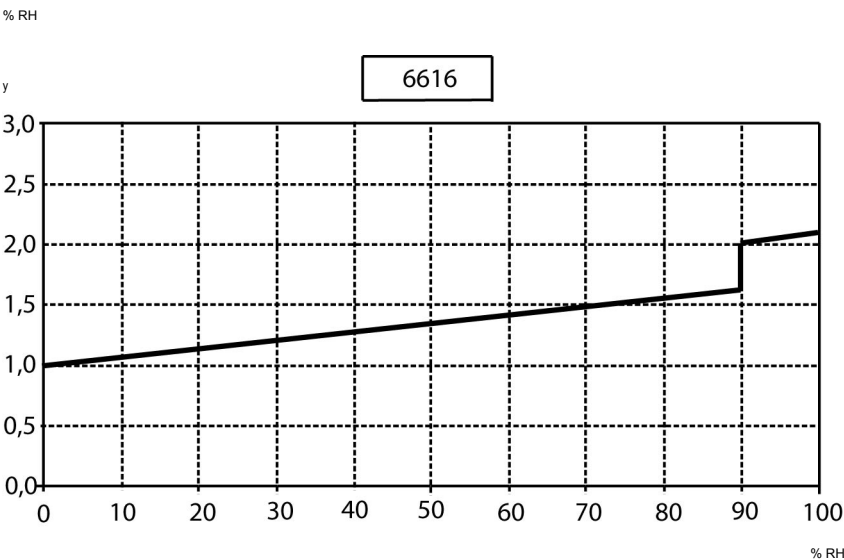
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#### **Pressure resistance**

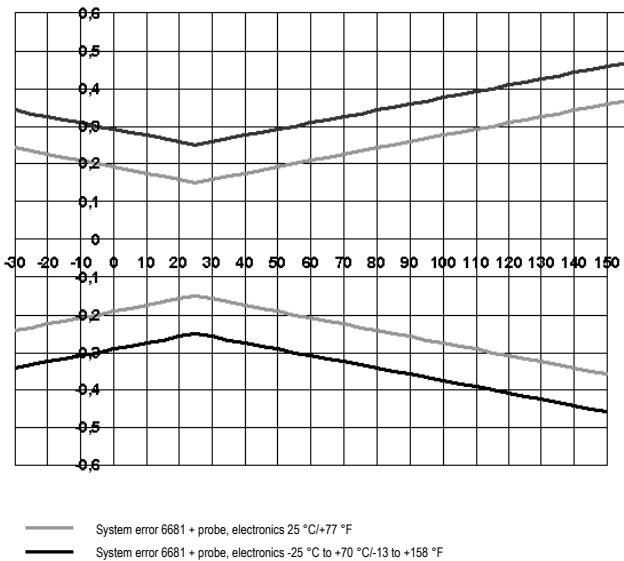
- PN 10 (probe tip): in connection with clamp ring screw connection 0554 1795
- PN 1 (probe end/cable)

Measuring accuracy of testo 6616 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



## 2.2.3 EC declaration of conformity for testo 6616



### EG-Konformitätserklärung

### EC declaration of conformity

Für die nachfolgend bezeichneten Produkte:

We confirm that the following products:

#### **Feuchtefühler / Humidity sensor Testo 6616**

EG – Baumusterprüfbescheinigung / EC – Type Examination Certificate:  
**PTB 08 ATEX 2011 X**

Best. Nr.: / Order No.: 0555 6616

wird bestätigt, daß sie den wesentlichen  
Schutzanforderungen entsprechen, die in der  
Richtlinie des Rates zur Angleichung der  
Rechtsvorschriften der Mitgliedstaaten über die  
elektromagnetische Verträglichkeit  
(2004/108/EG) sowie der ATEX Richtlinie  
(94/9/EG) festgelegt sind.

*corresponds with the main protection requirements which  
are fixed in the EEC  
"Council Directive 2004/108/EC on the approximation of  
the laws of the member states relating to electromagnetic  
compatibility" and the ATEX directive (94/9/EC).  
The declaration applies to all samples of the above  
mentioned product.*

Zur Beurteilung der Erzeugnisse wurden folgende  
Normen herangezogen:

*For assessment of the product following standards have  
been called upon:*

**Angewandte harmonisierte Standards:**  
*Applied harmonized standards:*

**EN 61326-1:2006 class B**  
**EN 61326-1:2006 table 2**  
**EN 60079-0:2006**  
**EN 60079-11:2007**  
**EN 60079-26:2007**

**Qualitätssicherung Produktion / Production Quality Assessment:**  
**PTB 08 ATEX Q003**

**Kenn-Nr. Der benannten Stelle / Notified Body number : 0102**

Diese Erklärung wird für:

*This declaration is given in responsibility for:*

**Testo AG**  
**Postfach / P.O. Box 1140**  
**79849 Lenzkirch / Germany**  
**www.testo.com**



abgegeben durch / by:

**Herr Walleser** Mr. Walleser  
(Name) (name)

**Vorstand** Managing Director  
(Stellung im Betrieb des Herstellers) (Position in the company of the manufacturer)

**Lenzkirch** 16.09.2008  
(Ort, Datum / place, date)

(Rechtsgültige Unterschrift / Legally valid signature)

Der Hersteller betreibt  
ein zertifiziertes  
Qualitätssicherungssystem  
nach DIN ISO 9001  
The manufacturer operates  
a certified quality assurance  
system according  
to DIN ISO 9001

## 2.3 Commissioning

### 2.3.1 Installing the probe

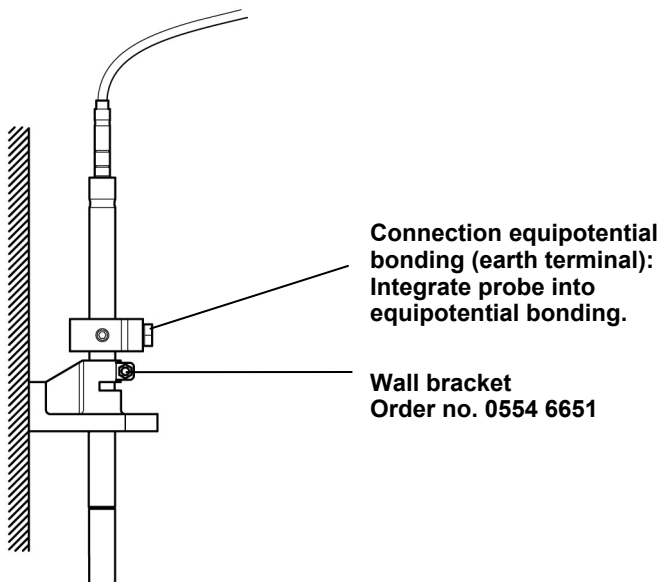
- ✓ The testo 6682 transmitter is operated with the testo 6616 probe.
- Install probe according to the application and the measuring and spatial conditions.



Important:

In processes with > 85 % RH, install the probe in a vertical position (filter pointing downwards).

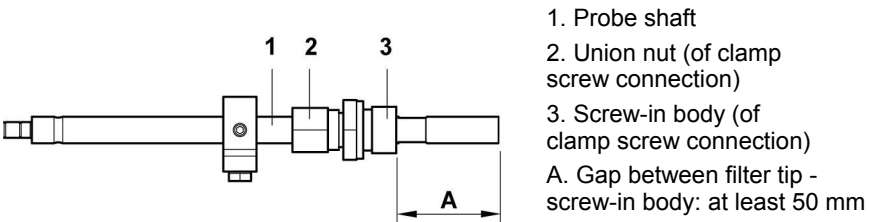
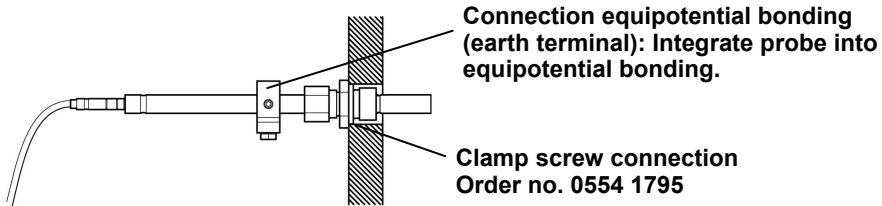
#### A Wall mounting of probe



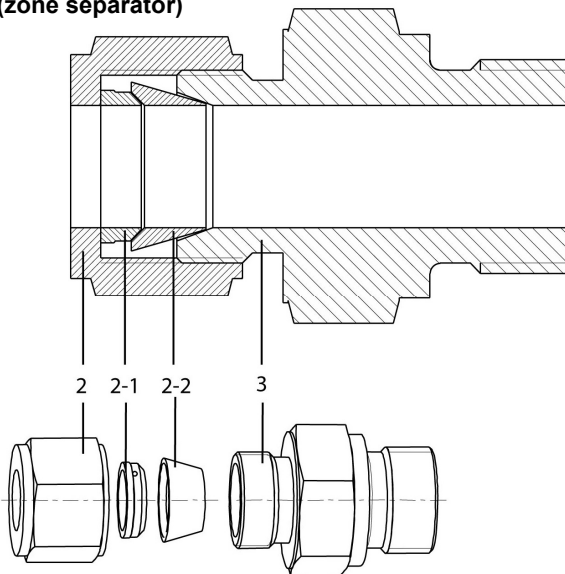
#### Ex protection!

Wall mounting is only suitable for use in Zone and Zone<sup>o</sup>2 in areas with risk of explosion.

## B Process mounting



### Clamp screw connection (zone separator)



**Ex protection!**

Clamp screw connection 0554 1795 must be used if using the probe shaft in Zone 0.

**Caution!**

Ensure that the probe shaft ((1) is not damaged, as otherwise the danger of leakage exists and it may no longer be possible to guide the probe shaft via the union nut (2).

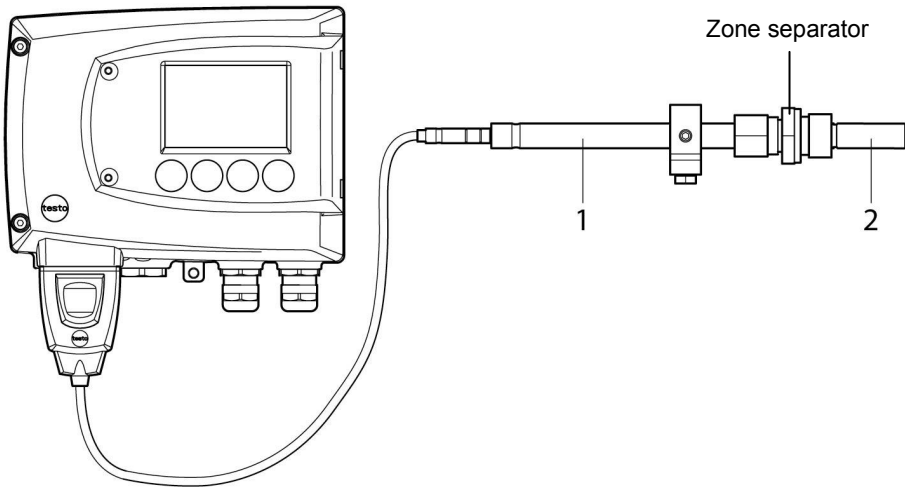
1. Screw the screw-in body (3) into the process so that gas and pressure tightness are ensured.
2. Guide the probe through the clamp screw connection. The gap between the filter tip and the screw-in body must be at least 50 mm.
3. Tighten union nut (2) by hand.
4. Mark the position of the screw-in body and union nut and tighten union nut an additional 1 1/4 rotations using a spanner.
5. Create equipotential bonding.

## 2.3.2 Connecting/removing the probe to/from the transmitter

- Insert probe connector into socket of testo 6682 until it engages. The testo 6682 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.

## 2.4 Maintenance and cleaning

### 2.4.1 Exchanging filter protection cap for testo 6616 probe



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

1. Remove probe from area with risk of explosion.



**Ex protection!**

Prevent an electrostatic charge!

2. Unscrew defective filter protection cap (2) from probe shaft (1).
3. Screw new filter protection cap onto probe shaft.  
Only use approved filter protection cap.



Screw filter protection cap on by hand.

## 2.4.2 Cleaning the instrument and filter protection cap



**Ex protection!**

Only perform cleaning work in Ex-free room.

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

## 2.4.3 Exchanging probe

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

# 3 Tips and assistance

## 3.1 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 Chapter Status, warning and error messages, page 48
Undo adjustment	<p>A 1-point temperature/humidity adjustment can be reset to the current reading using <b>[Set offset to zero]</b>.</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 details see the rear side of this document or the web page [www.testo.com/service-contact](http://www.testo.com/service-contact)

# 3.2 Accessories and spare parts

Designation	Article no.
<b>Fastenings, assembly aids</b>	
Wall/duct bracket for fastening the transmitter to the probe and the probe to the wall/duct	0554 6651
Pressure-tight G 1/2" clamp screw connection up to 10 bar	0554 1795
<b>Sensor filters and protective caps</b>	
Sintered PTFE filter as protection cap	0554 0758
PTFE filter with drip hole	0554 9913
<b>Adjustment equipment</b>	
Humidity adjustment set (11.3/75.3 % RH)	0554 0660
<b>Calibration</b>	
Standard ISO calibration certificate, transmitter only	0520 1000
Standard DKD calibration certificate, transmitter only	0520 1200
Standard ISO calibration certificate, transmitter + probes	0520 0176
Special ISO calibration certificate, transmitter + probes	0520 0066
Standard DKD calibration certificate, transmitter + probes	0520 0276
Special DKD calibration certificate, transmitter + probes	0520 0236

### 3.2.1 Ordering options for testo 6682 transmitter (0555 6682)

Order code	Characteristic
<b>Axx</b>	<b>Version</b>
A01	Currently no further selection of variants
<b>Bxx</b>	<b>Analog output</b>
B01	4 to 20 mA (via intrinsically safe supply isolator)
<b>Cxx</b>	<b>Display</b>
C02	with display/English
C03	with display/German
C04	with display/French
C05	with display/Spanish
C06	with display/Italian
<b>Dxx</b>	<b>Cable entry</b>
D01	PG screw connection M16
D02	Cable entry NPT 1/2"
<b>Fxx</b>	<b>Channel 1 Unit</b>
F01	% RH/Min/Max
F02	°C/Min/Max
F03	°F/Min/Max
F04	°Ctd/Min/Max
F05	°Ftd/Min/Max
F06	g/kg /Min/Max
F07	gr/lb /Min/Max
F08	g/m <sup>3</sup> /Min/Max
F09	gr/ft <sup>3</sup> /Min/Max
F10	ppm <sub>Vol</sub> /min/max
F11	°C <sub>wb</sub> /Min/Max (wet bulb)
F12	°F <sub>wb</sub> /Min/Max (wet bulb)
F13	kJ/kg /Min/Max (enthalpy)
F14	hPa /Min/Max (water vapour partial pressure)
F15	inch H2O/Min/Max (water vapour partial pressure)
F18	%Vol/Min/Max

Order code	Characteristic
<b>Gxx</b>	<b>Channel 2 Unit</b>
G01	% RH/Min/Max
G02	°C/Min/Max
G03	°F/Min/Max
G04	°Ctd/Min/Max
G05	°Ftd/Min/Max
G06	g/kg /Min/Max
G07	gr/lb /Min/Max
G08	g/m <sup>3</sup> /Min/Max
G09	gr/ft <sup>3</sup> /Min/Max
G10	ppm <sub>Vol</sub> /min/max
G11	°C <sub>wb</sub> /Min/Max (wet bulb)
G12	°F <sub>wb</sub> /Min/Max (wet bulb)
G13	kJ/kg /Min/Max (enthalpy)
G14	hPa /Min/Max (water vapour partial pressure)
G15	inch H <sub>2</sub> O/Min/Max (water vapour partial pressure)
G18	%Vol/Min/Max



Further languages can be requested from testo AG if needed.

### 3.2.2 Ordering options for testo 6616 probes (0555 6616)

Order code	Characteristic
<b>Mxx</b>	<b>Protective filter</b>
M 03	Sintered PTFE filter as protection cap
<b>Nxx</b>	<b>Probe length</b>
N 01	Probe length 1 m
N 02	Probe length 2 m
N 05	Probe length 5 m
N 10	Probe length 10 m
<b>Pxx</b>	<b>Probe head length</b>
P 20	Probe head length approx. 200 mm
P 50	Probe head length approx. 500 mm

