testo 6381 · differential pressure transmitter

testo 6610 · Probes

P2A software · Parameterizing, adjusting and analyzing software

Instruction manual Volume 1
1 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 for opening and repairing electrical equipment.

Avoiding personal injury and 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 temperature.
> Do not store the product together with solvents. 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 any force.
> Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original 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.
2 About this document

Protecting the environment

> At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.

2 About this document

Use

> Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.

> 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.

⚠️ WARNING
Indicates potential serious injuries

⚠️ CAUTION
Indicates potential minor injuries

Symbols and writing standards

<table>
<thead>
<tr>
<th>Representation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Basic or further information.</td>
<td></td>
</tr>
<tr>
<td>1. ...</td>
<td>Action: more steps, the sequence must be followed.</td>
</tr>
<tr>
<td>2. ...</td>
<td></td>
</tr>
<tr>
<td>&gt; ...</td>
<td>Action: a step or an optional step.</td>
</tr>
<tr>
<td>- ...</td>
<td>Result of an action.</td>
</tr>
</tbody>
</table>

Menu

Elements of the program interface.

[OK]

Buttons of the program interface.

... | ... Functions/paths within a menu.

“...” Example entries
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4.6. Maintenance and cleaning

  4.6.1. Maintaining the instrument

  4.6.2. Cleaning the instrument
4 Transmitter

4.1. Specifications

4.1.1. Functions and use

The testo 6381 transmitter is used together with the plug-in, adjusted probes from the testo 6610 family.

Please refer to volume 2, testo 6610 probes, page 73 for information about commissioning, operating and maintaining the testo 6610 probe.

The testo 6381 transmitter is suitable for the following applications, amongst others:

- Clean rooms
- Test benches
- Drying processes
- Filling processes
- Painting systems
- Monitoring flow velocities or volumetric flow rates in air conditioning systems

4.1.2. Scope of delivery

The scope of delivery of the testo 6381 transmitter includes the following:

- Key cover
- Rear panel bracket
- Instruction manual
- Calibration report
- CD-ROM with operating instructions (PDF), configuration files for Ethernet module and P2A update (this can only be used in conjunction with the P2A software, which has to be ordered separately).

4.1.3. Accessories

The following accessories are available for the testo 6381 transmitter, amongst others:

- Protection caps for probes
4.1.4. Technical data

Parameters

- Differential pressure
- Temperature
- Humidity

Differential pressure accuracy

The specifications are only valid if the positive pressure is applied at the positive pressure connection.

- 0.5 % of measuring range, additional 0.3 Pa intrinsic error
- $T_{K \text{ slope drift}} = 0.02\%$ of measuring range per degree Kelvin of deviation from nominal temperature 22 °C
- $T_{K \text{ zeroing drift}} = 0 \%$, as zeroing with solenoid valve

Humidity and temperature accuracy

- Depends on probe

---

1 Measuring uncertainty in accordance with GUM: ±0.8 % of measuring range final value ±0.3 Pa.

GUM (Guide to the Expression of Uncertainty in Measurement): ISO guideline for determining the measuring uncertainty in order to render global measurement results comparable.

The following uncertainties are used during the inquiry:

- Hysteresis
- Linearity
- Reproducibility
- Adjustment area/factory calibration
- Test location

2 Minor mixtures of the media may occur at the positive and negative pressure side due to the automatic zeroing cycle.
Humidity and temperature measuring range
• Depends on probe

Pressure measuring range, resolution and overload of differential pressure

<table>
<thead>
<tr>
<th>Pressure measuring range depending on version ordered</th>
<th>Resolution</th>
<th>Overload</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 50 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>0 to 50 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>0 to 100 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>0 to 500 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>0 to 10 hPa</td>
<td>0.01 hPa</td>
<td>200 hPa</td>
</tr>
<tr>
<td>0 to 50 hPa</td>
<td>0.01 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>0 to 100 hPa</td>
<td>0.1 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>0 to 500 hPa</td>
<td>0.1 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>0 to 1000 hPa</td>
<td>1 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>-10 to 10 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>-50 to 50 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>-100 to 100 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>-500 to 500 Pa</td>
<td>0.1 Pa</td>
<td>20,000 Pa</td>
</tr>
<tr>
<td>-10 to 10 hPa</td>
<td>0.01 hPa</td>
<td>200 hPa</td>
</tr>
<tr>
<td>-50 to 50 hPa</td>
<td>0.01 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>-100 to 100 hPa</td>
<td>0.1 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>-500 to 500 hPa</td>
<td>0.1 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>-1000 to 1000 hPa</td>
<td>1 hPa</td>
<td>2500 hPa</td>
</tr>
</tbody>
</table>

Upon delivery and following a factory reset the readings are shown in the display in the unit that was ordered via the KMAT option Fxx, see Ordering options for 6381 transmitter (0555 6381), page 148.

Humidity and temperature resolution
• 0.1 % RH or 0.01 °C/0.01 °F

Meas. cycle
• 1/sec
Interface
• Mini-DIN for P2A software (parameterizing and adjusting software) and handheld testo 400/650
• optional: Ethernet module

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

Maximum load
• 4-wire: 500 Ω (power output)

Maximal load
• 4-wire: 10 kΩ (voltage output)

Analog 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)

Operating temperature
• -5 to 50 °C/23 to 122 °F

Storage temperature
• -20 to 60 °C/-4 to +140 °F

Process temperature
• -20 to 65 °C/-4 to 149 °F

Oper. humidity
• 0 to 90 % RH

Housing, weight
• Metal, 1.960 kg
• Optional Ethernet module: 0.610 kg

Protection class
• IP 65 only if the transmitter is wired and/or sealing plugs are inserted

Directives, standards and tests
• EC Directive: 2004/108/EC

Warranty
• Duration: 2 years
• Warranty conditions: see website www.testo.com/warranty
4.1.5. **Dimensions**

Dimensions in mm

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>with M20 cable couplings</td>
<td>144</td>
<td>147</td>
</tr>
<tr>
<td>With NPT cable coupling</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>With M plug-in connection</td>
<td>143</td>
<td></td>
</tr>
</tbody>
</table>

4.2. **Product description**

4.2.1. **At a glance**

1. Keys (only with optional display)
2. Service flap screw connection (self-locking, 2 pcs.)
3. Display (optional)
4. Service flap
5. Negative pressure connection
6. Positive pressure connection, marked with a red washer
7. Lower part of housing
8. M 16 x 1.5 screw connection*, e.g. analog outputs
9 M 16 x 1.5 screw connection*, e.g. voltage supply
10 Earthing/PE connection
11 M 20 x 1.5 screw connection*, e.g. R3 and R4 relays
12 Eyelet for measuring point panel
13 M 20 x 1.5 screw connection*, e.g. R1 and R2 relays
14 Probe connector (testo 6610)
15 Upper part of housing
* Alternatively, NPT cable couplings or M plug-in connections are available
16 Housing screws
17 Socket for probe connector
4.2.2. Usable probes

The testo 6381 transmitter can be used with the following probes:

<table>
<thead>
<tr>
<th>Probes</th>
<th>Article no.</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>testo 6611</td>
<td>0555 6610-L11</td>
<td><strong>Wall</strong> probe version; accuracy to ±1 % RH; temperature range -20 to +70 °C/-4 to +158 °F, sensor plugged in</td>
</tr>
<tr>
<td>testo 6612</td>
<td>0555 6610-L12</td>
<td><strong>Duct</strong> probe version; accuracy to ±1 % RH; temperature range -30 to +150 °C/-22 to +302 °F, sensor soldered</td>
</tr>
<tr>
<td>testo 6613</td>
<td>0555 6610-L13</td>
<td><strong>Cable</strong> probe version; accuracy to ±1 % RH; temperature range -40 to +180 °C/-40 to +356 °F, sensor soldered</td>
</tr>
<tr>
<td>testo 6614</td>
<td>0555 6610-L14</td>
<td><strong>Heated cable</strong> probe version; accuracy to ±1.0 % RH; temperature range -40 to +180 °C/-40 to +356 °F, sensor soldered</td>
</tr>
<tr>
<td>testo 6615</td>
<td>0555 6610-L15</td>
<td><strong>Trace humidity cable</strong> probe version; accuracy ±1 K at 0 °Ctd/+32 °Ftd; temperature range -40 to 120 °C/-40 to +248 °F, sensor soldered</td>
</tr>
<tr>
<td>testo 6617</td>
<td>0555 6610-L17</td>
<td><strong>Cable with cover electrode monitoring</strong> probe version; accuracy to ±1.2 % RH; temperature range -40 to 180 °C/-40 to +356 °F, sensor soldered</td>
</tr>
</tbody>
</table>
4.2.3. **Display and keypad**

The display option allows operation of the testo 6381 transmitter 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.

4.2.4. **Service interface**

The parameterizing socket (mini-DIN) is located behind the service flap as an interface to the P2A software or Testo handheld instrument (testo 400/testo 650).

4.2.5. **Relay board (option)**

This has a floating switch capacity of 250 V AC/3 A. The switching limits and hysteresis as well as the function as relay for the collective alarm 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.

4.2.6. **Analog outputs**

As analog outputs, the testo 6381 has either

- 1 or optionally 3 current outputs of 0 to 20 mA (4-wire)/4 to 20 mA (4-wire) or
- 1 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 three analog outputs as an option.

The optional three channels are galvanically isolated.
4.2.7. **Parameters**

The following parameters are displayed:

- Differential pressure in Pa, hPa, kPa, mbar, bar, mmH₂O, kg/cm², PSI, inch HG, inch H₂O
- Volumetric flow rate in m³/h, l/min, Nm³/h, NL/min
- Flow in m/s, ft/min
- Relative humidity in % RH (technical)
- Relative humidity in % WMO* (calculation according to the WMO standard)
- Degree of humidity in g/kg and gr/lb
- Absolute humidity in g/m³ and gr/ft³
- Water content in ppm (vol) and % vol
- Psychrometer temperature in °C<sub>tw</sub> and °F<sub>tw</sub>
- Enthalpy in kJ/kg and BTU/lb
- Water vapour partial pressure in hPa and H₂O
- Dewpoint temperature in °C<sub>td</sub> and °F<sub>td</sub>
- Standardized dewpoint in °C<sub>tdA</sub>, standardized at atmospheric pressure (1013 hPa); precondition: Absolute process pressure.

* 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, amongst others. When calculating the relative humidity the Magnus coefficient with undercooled water is used in accordance with WMO.

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculated humidity variables correspond to the medium of air. With other gases/gas compositions, deviations may occur, e.g. with the enthalpy.</td>
</tr>
</tbody>
</table>

- Dewpoint of H₂O₂ mixture in °C<sub>tm</sub> and °F<sub>tm</sub>
- Temperature °C and °F

---

3 Calculated
4 To prevent fluctuating flow rate values at the zero point (depressurized), the flow rate values are only calculated as of differential pressures > 0.2 Pa or > 0.1 % of the respective measuring range (whichever is the greater). With smaller differential pressures, the flow rate value remains at 0.00 m/s.
4.2.8. 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. 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 maximum limits can be calculated as follows:
     \[ X = \text{difference between MIN. and MAX. value of the standard scaling} \]
     \[ (\text{Max. value of standard}) + (50 \% \text{ of } X) \]
     \[ (\text{Min. value of standard}) - (50 \% \text{ of } X) \]
   - 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.

   With the alarm definition, however, the physical measuring range limits are decisive.

<table>
<thead>
<tr>
<th>Measuring range/standard scaling</th>
<th>Maximum scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 50 Pa</td>
<td>-5 to 15 Pa</td>
</tr>
<tr>
<td>0 to 50 Pa</td>
<td>-25 to 75 Pa</td>
</tr>
<tr>
<td>0 to 100 Pa</td>
<td>-50 to 150 Pa</td>
</tr>
<tr>
<td>0 to 500 Pa</td>
<td>-250 to 750 Pa</td>
</tr>
<tr>
<td>0 to 10 hPa</td>
<td>-5 to 15 hPa</td>
</tr>
<tr>
<td>0 to 50 hPa</td>
<td>-25 to 75 hPa</td>
</tr>
<tr>
<td>0 to 100 hPa</td>
<td>-50 to 150 hPa</td>
</tr>
<tr>
<td>Measuring range/standard scaling</td>
<td>Maximum scaling</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>0 to 500 hPa</td>
<td>-250 to 750 hPa</td>
</tr>
<tr>
<td>0 to 1000 hPa</td>
<td>500 to 1500 hPa</td>
</tr>
<tr>
<td>-10 to 10 Pa</td>
<td>-20 to 20 Pa</td>
</tr>
<tr>
<td>-50 to 50 Pa</td>
<td>-100 to 100 Pa</td>
</tr>
<tr>
<td>-100 to 100 Pa</td>
<td>-200 to 200 Pa</td>
</tr>
<tr>
<td>-500 to 500 Pa</td>
<td>-1000 to 1000 Pa</td>
</tr>
<tr>
<td>-10 to 10 hPa</td>
<td>-20 to 20 hPa</td>
</tr>
<tr>
<td>-50 to 50 hPa</td>
<td>-100 to 100 hPa</td>
</tr>
<tr>
<td>-100 to 100 hPa</td>
<td>-200 to 200 hPa</td>
</tr>
<tr>
<td>-500 to 500 hPa</td>
<td>-1000 to 1000 hPa</td>
</tr>
<tr>
<td>-1000 to 1000 hPa</td>
<td>-2000 to 2000 hPa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Probes</th>
<th>Physical measuring range at 1013 hPa</th>
<th>Standard scaling of transmitter measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>6611</td>
<td>-20</td>
<td>+70</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>6611</td>
<td>-4</td>
<td>+158</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>6612</td>
<td>-30</td>
<td>+150</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>6612</td>
<td>-22</td>
<td>+302</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>6613, 6614, 6617</td>
<td>-40</td>
<td>+180</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>6613, 6614, 6617</td>
<td>-40</td>
<td>+356</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>6615</td>
<td>-40</td>
<td>+120</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>6615</td>
<td>-40</td>
<td>+248</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>°C&lt;sub&gt;td&lt;/sub&gt;</td>
<td>6611</td>
<td>-20</td>
<td>+70</td>
</tr>
<tr>
<td></td>
<td>°F&lt;sub&gt;td&lt;/sub&gt;</td>
<td>6611</td>
<td>-4</td>
<td>+158</td>
</tr>
<tr>
<td>Physical measuring range at 1013 hPa</td>
<td>Standard scaling of transmitter measuring range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>°C&lt;sub&gt;td&lt;/sub&gt;</strong> 6612, 6613, 6614, 6617</td>
<td>-20</td>
<td>+100</td>
<td>-80</td>
<td>+100</td>
</tr>
<tr>
<td><strong>°F&lt;sub&gt;td&lt;/sub&gt;</strong> 6612, 6613, 6614, 6617</td>
<td>-4</td>
<td>+212</td>
<td>-112</td>
<td>+212</td>
</tr>
<tr>
<td><strong>°C&lt;sub&gt;td&lt;/sub&gt;</strong> 6615</td>
<td>-60</td>
<td>+30</td>
<td>-80</td>
<td>+100</td>
</tr>
<tr>
<td><strong>°F&lt;sub&gt;td&lt;/sub&gt;</strong> 6615</td>
<td>-76</td>
<td>+86</td>
<td>-112</td>
<td>+212</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Absolute humidity</th>
<th>g/m³</th>
<th>gr/ft³</th>
<th>all probes</th>
<th>0</th>
<th>600</th>
<th>0</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>all</td>
<td></td>
<td>probes</td>
<td>0</td>
<td>250</td>
<td>0</td>
<td>800</td>
</tr>
</tbody>
</table>

| relative humidity | % RH | all probes | 0 | 100 | 0 | 100 |

| WMO relative humidity | % RH | 0 | 100 | 0 | 100 |

<table>
<thead>
<tr>
<th>Mixture dewpoint (H₂O₂)</th>
<th>°C&lt;sub&gt;tm&lt;/sub&gt;</th>
<th>-20</th>
<th>+100</th>
<th>-20</th>
<th>+100</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F&lt;sub&gt;tm&lt;/sub&gt;</td>
<td>-4</td>
<td>+212</td>
<td>-4</td>
<td>+212</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of humidity</th>
<th>g/kg</th>
<th>all probes</th>
<th>0</th>
<th>13300</th>
<th>0</th>
<th>9500</th>
</tr>
</thead>
<tbody>
<tr>
<td>gr/lb</td>
<td>all probes</td>
<td>0</td>
<td>93000</td>
<td>0</td>
<td>66500</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enthalpy</th>
<th>kJ/kg</th>
<th>-40</th>
<th>99999</th>
<th>-40</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTU/lb</td>
<td>-18</td>
<td>43000</td>
<td>-18</td>
<td>3500</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psychrometer temperature</th>
<th>°C&lt;sub&gt;tw&lt;/sub&gt;</th>
<th>-40</th>
<th>100</th>
<th>-40</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F&lt;sub&gt;tw&lt;/sub&gt;</td>
<td>-58</td>
<td>210</td>
<td>-40</td>
<td>356</td>
<td></td>
</tr>
</tbody>
</table>

| Water content | ppm (vol) H₂O | 0 | 99999 | 0 | 99999 |
| water content | % vol | 0 | 100 | 0 | 100 |

| Water vapour partial pressure | hPa | 0 | 1000 | 0 | 7000 |
| water vapour partial pressure | inchH₂O | 0 | 400 | 0 | 2800 |
4.2.9. **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 6381 monitors limit values with the help of 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 Status, warning and error messages, page 61

---

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.

---

4.3. **Commissioning**

4.3.1. **Assembling the instrument**

4.3.1.1. **Wall mounting (for testo 6611, 6613, 6614, 6615, 6617 probes)**

**Attaching rear panel bracket**

1. Remove locking screw (see item (4) of drawing below) and detach rear panel bracket from plastic bracket (see item (2) of drawing below).
2. Hold rear panel bracket in assembly position and mark the three drill holes.
3. Drill three holes (Ø 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.
### 4.3.1.2. 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 (Ø 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).
6. 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.

7. Insert screw (1) through the hole on the top of the instrument and screw into bracket (3).

8. Insert probe connector (12) into socket until it engages.

### 4.3.2. Connecting the instrument

**Opening the instrument**

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 from lower part (3) and place on a clean surface.

⚠️ **WARNING**

**Electrical voltage**

**Danger of injury!**

> De-energize the mains connection before connecting the transmitter.

ℹ️ Only have the transmitter wired and connected by authorized personnel with the voltage disconnected.
4.3.2.1. 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.
4.3.2.2. Connecting voltage supply and analog outputs

Terminal strip for voltage supply and analog outputs, item (5) of overview of terminals, page 25

1. Feed cable with voltage supply and analog signal lines through opened M 16 x 1.5 screw connection (item (8) in the overview of terminals, page 25).

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 the overview of terminals, page 25).

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 mm², maximum 2.7 mm² without wire end sleeves.
- The supply line must be secured against exceeding 0.5 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 one, or optionally three, channels through opened M 16 x 1.5 screw connection (item (8) in the overview of terminals, page 25).

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 the overview of terminals, page 25).

4.3.2.3. 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

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 PG screw connection

1. Feed connection cables for the relays through opened M 20 x 1.5 screw connection (item (10) of overview of terminals).

2. Strip cable ends and clamp on wire end ferrules.

3. 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.

4. 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 mm² must be used.
- Cable connection (2) may not be routed in a loop within the tray (1).
- It is recommended that you always tie 3 cores to one another using 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)

1. Alarm/status light (example of installation)
2. 250 V AC/DC, 3 A

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)

1. Alarm/status light (example of installation)
2. 250 V AC/DC, 3 A
4 Transmitter

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.

5. Close M 20 x 1.5 screw connection (item (10) in overview of terminals).

4.3.2.4. Plug-in connection option

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

![Transmitter housing](image)

**Plug-in connections for power supply and channels**

M12 plug-in connection (5-pin) socket (item 1)

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

<table>
<thead>
<tr>
<th>PIN</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V 24-</td>
</tr>
<tr>
<td>2</td>
<td>V 24+</td>
</tr>
<tr>
<td>3</td>
<td>+ Ch1</td>
</tr>
<tr>
<td>4</td>
<td>- Ch1</td>
</tr>
<tr>
<td>5</td>
<td>PE</td>
</tr>
</tbody>
</table>
M12 plug-in connection (5-pin) connector (item 2)

<table>
<thead>
<tr>
<th>PIN</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>- Ch2</td>
</tr>
<tr>
<td>2</td>
<td>+ Ch2</td>
</tr>
<tr>
<td>3</td>
<td>+ Ch3</td>
</tr>
<tr>
<td>4</td>
<td>- Ch3</td>
</tr>
<tr>
<td>5</td>
<td>PE</td>
</tr>
</tbody>
</table>

4.3.2.5. Creating the PE/earthing terminal

As the testo 6381 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 shielded cable (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 functional earth, 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 functional earth, e.g. an earthing bar.

4.3.2.6. 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).

4.3.2.7. 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).

<table>
<thead>
<tr>
<th>1-point adjustment</th>
<th>2-point adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="1-point adjustment" /></td>
<td><img src="image2.png" alt="2-point adjustment" /></td>
</tr>
</tbody>
</table>

Adjustment via
- testo 400/650 handheld instrument with adjustment adapter
- P2A software
- User menu

Adjustment via
- Adjustment keys (1, 2)
- P2A software
### 4.3.2.8. Overview: Adjustment keys and test contacts

<table>
<thead>
<tr>
<th>Analog adjustment</th>
<th>n-point adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Analog adjustment diagram" /></td>
<td><img src="image2" alt="n-point adjustment diagram" /></td>
</tr>
</tbody>
</table>
| Adjustment using a precise multimeter and transmission of analog reference value in  
  • User menu or  
  • P2A software | Adjustment using a precise pressure sensor and transmission of analog reference value in  
  • User menu or  
  • P2A software |

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

The testo 6381 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 6381 (e.g. in the calibration laboratory).
4.3.2.9. **1-point adjustment (offset - humidity/temperature)**

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 handheld instrument (e.g. testo 400/650 with precision humidity probe) 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 Editing Main Menu Adjust, page 59) or
- via the P2A software (see volume 2, 1-point adjustment, page 135) or
- directly by means of a Testo handheld instrument (testo 400/650) (see description of how to proceed below).

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

**Adjusting testo 6381 using testo handheld instrument**

✓ The service flap is open, a testo 400/650 handheld instrument with a precision humidity probe is ready.
1. Connect testo handheld instrument 400/650 (1) with connected humidity reference probe (3) (order no. reference set 0699 3656/20) to the service interface (5) of the testo 6381 via the adjustment adapter (2) (connected to probe socket 1 of the handheld instrument).

2. Expose the humidity probe (4) of the testo 6381 and the reference probe (3) to the same reference conditions (e.g. in the humidity generator) and allow climatic conditions to equalize.

3. Switch on the testo 400/650. The two-part display of the handheld instrument will show the values of the transmitter on the left, and the values of the reference probe on the right. The humidity and temperature values are adjusted to the reference probe using the **Probe > Probe Adjustment** menu item on the testo 400/650. The 1-point adjustment is performed for both the humidity and the temperature.
4. Disconnect the adjustment adapter (2) from the service interface (5).

5. Close the service flap.

4.3.2.10. 2-point adjustment (humidity/temperature)

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 created either by using testo adjustment salt pots (order no. 0554 0660) 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.

The 2-point adjustment can be performed

- via P2A software (see volume 2, 2-point adjustment, page 136)
- using the adjustment keys under the service flap, see description of how to proceed below.

---

A previous 1-point adjustment is undone during a 2-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 6381 using adjustment keys

11.3 % RH ⇒ 75.3 % RH or 11.3 % RH ⇒ 75.3 % RH
1.5 h 1.5 h 1.5 h 1.5 h
(salt pots) (humidity generator)

✓ The service flap of the testo 6381 is open:

1. Expose the humidity probe of the testo 6381 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. After about 10 seconds, 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.
3. Carry out the adjustment analogously for the reference condition 75.3 % RH. Press the 75.3 % RH adjustment key (6) to do this.
4. Close the service flap.
4.3.2.11. **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-

**Adjusting analog outputs 1 and 2 (optional)**

- ✓ With testo 6381 with current output: Load of max. 500 Ω is connected to channel that is to be adjusted (see Plug-in connections for power supply and channels, page 30)

- ✓ A precise multimeter (minimum requirement: resolution 6.5 digits, at least 5-times more accurate than the 6381) is available.

- **i** If only a simple multimeter is available, the analog outputs must 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 into the P2A software (see volume 2, Adjusting the
analog output, page 139) or enter it via the user menu (see Performing analog adjustment, page 60).

3. Disconnect connections between the multimeter and the contacts of the testo 6381 and close the 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 Opening the instrument, page 23).
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 (see Closing the instrument, page 32).
4. Connect cable ends to the inputs of the multimeter.
5. Transfer the reference analog value measured with the multimeter into the P2A software (see volume 2, Adjusting the analog output, page 139) or enter it via the user menu (see Performing analog adjustment, page 60).
6. Remove the upper part of the transmitter, detach the cable connections for the adjustment of the 3rd analog output and reassemble the transmitter.

4.3.2.12. n-point adjustment (pressure)

With an n-point adjustment, the parameters at the 3-6 measurement points are adjusted to the reference value. The reference conditions are obtained by using a precise pressure sensor that should be 5-times more accurate than the transmitter.

1. Positive pressure connection
2. Negative pressure connection
3. Pressure sensor

The number of measuring points is set to 3 by the factory and can only be changed using the P2A software (see n-point adjustment page 138)
The n-point adjustment must always be carried out to its full extent and in good time at all selected measurement points.

✓ A precise pressure sensor (5-times more accurate than the transmitter, e.g. DPC precision pressure sensor from testo industrial services) is available.

1. Connect the positive output of the pressure sensor (3) to the positive pressure connection of the transmitter (1) and the negative output of the pressure sensor (3) to the negative pressure connection of the transmitter (2).

2. Transfer the reference pressure value created with the pressure sensor into the P2A software (see volume 2, n-point adjustment, page 138) or enter it via the user menu (see Performing the pressure adjustment, page 60).

3. Repeat step 2 for all of the measuring points.

4. Disconnect connections between the pressure sensor and the pressure connections of the testo 6381.

4.3.2.13. 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 6381 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.

### 4.3.2.14. Self adjustment of testo 6615 trace humidity probe

Conventional trace humidity probes show a steep rise in measuring uncertainty at low humidities. In the testo 6615 trace humidity probe, 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 °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 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".

- 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.
- 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.

### 4.4. Operation

#### 4.4.1. Relationship between user menu and mini-DIN socket is active

The testo 6381 can be parameterized using either the user menu or the P2A software (see volume 2, Parameterizing, adjusting and analyzing software (P2A software) page 113).

- The testo 6381 transmitter can only be operated via the display and keypad if the display option is available.
  
  If the testo 6381 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 6381. As soon as the P2A software is disconnected, the user menu is accessible again.

#### 4.4.2. 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.
Attaching the key cover

The service flap is opened, see Opening the instrument, page 23.

1. Unscrew 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.

4.4.3. **Password protection**

The user menu can be protected with a four-digit numerical code (see Editing Main Menu Settings, page 52) 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.

4.4.4. **Structure of user menu**

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

- Main Menu Channel 1
- Main menu of channel 2 (if this option is available)
- Main menu of channel 3 (if this option is available)
• Main Menu Alarm
• Main Menu Settings
• Main Menu Analysis
• Main Menu Messages
• Main Menu Ident
• Main Menu Adjust
• Main Menu Reset

1 Channel 1 display
2 Channel 2 display
3 Channel 3 display or for messages

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

<table>
<thead>
<tr>
<th>Key</th>
<th>Function/description</th>
</tr>
</thead>
</table>
| SET | • In Measuring Mode: changes to parameterization  
     • In Parameterizing Mode: confirms a selection or setting |
| ESC | • Leaves a menu (without modifying any settings) |
| ▶ | • Selecting: scrolls through menus (downwards) or selectable alternatives  
    • Editing: changes to next digit (to the right) |
| ▲ | • Selecting: scrolls through menus (upwards) or selectable alternatives  
    • Editing: increases the value of the current digit by 1 |
4.4.5. Overview of the testo 6381 user menu
4 Transmitter
4.4.6. The individual main menus

4.4.6.1. Editing main menu of channel 1

An overview is given in Overview of the testo 6381 user menu, page 46).

You can perform basic settings for channel 1.

1. In the Measuring Mode press SET, select Main Menu Channel 1 with ► 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.
     Edit/select parameter with ► or ▲, confirm with SET or abort entry with ESC.

   • Scale minimum for channel 1:
     The lower scale limit is edited; Unit as selected above.
     Editing the value: Scroll one digit to the right using ► and 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.
     Editing the value: Scroll one digit to the right using ► and 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)
     Edit/select parameter with ► or ▲, confirm with SET or abort entry with ESC.

2. Continue to the main menu with ► or ▲ or return to Measuring Mode with ESC.

4.4.6.2. Editing Main Menu Channel 2 (if this option is available)

See channel 1.
4.4.6.3. **Editing Main Menu Channel 3 (if this option is available)**

See channel 1.

4.4.6.4. **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.

In addition, every alarm can be linked to a clearly visible visual alarm (display background lighting flashes).

An alarm delay between 0 and 240 seconds can still be assigned to every alarm used for limit value monitoring so that both the corresponding relay effect and the visual alarm are delayed. If the alarm status goes out within the set alarm delay time, neither the visual alarm nor a relay connection is triggered.

With an alarm status present, the visual alarm and all relay outputs can be reset by means of acknowledgement. The triggering of a new alarm cannot be enabled until after the alarm status goes out.

1. In the Measuring Mode press **SET**, select **Main Menu Alarm** with ▶ or ▲ and confirm selection with **SET**.

   - Four alarms can be parameterized.

2. Select **Alarm x** with ▶ or ▲ and confirm selection with **SET**.

**Using alarm to monitor limit values**

**NO contact**

<table>
<thead>
<tr>
<th>Monitoring minimum</th>
<th>Monitoring maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
</tbody>
</table>

- Limit value
- Hysteresis
- On
- Off
3. Select **Channel x** (e.g. "Channel 1") with ▶ or ▲ and confirm selection with SET.

4. Select **Max control** or **Min control** with ▶ or ▲ (see graphic).

5. Press SET and edit **Limit value** as well as **Hysteresis**: Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

6. Select **Visual alarm** with ▶ or ▲. Select YES or NO with ▶ or ▲. Confirm with SET or abort entry with ESC.

7. Press SET and edit **Alarm delay**: Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲ (0 to 240 seconds possible). Confirm with SET or abort entry with ESC.

8. Return to **Channel x** with ESC.

9. Return to **Alarm x** with ESC.

10. 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 an alarm is assigned to the collective alarm, the relay is switched and a visual alarm can be issued via the display as soon as (at least) one of the warning or error messages of the testo 6381 transmitter (or the connected testo 6610 probe) becomes active.

The messages affecting the collective alarm can only be selected in the P2A software, see volume 2, Using the software, page 116

✔ Alarm is selected (see previous steps 1 and 2).

1. Use ▶ or ▲ to determine whether **Alarm x** should be used as a **Collective alarm** or **not used**. Confirm selection with SET.

2. If collective alarm is selected: Select **Visual alarm** with ▶ or ▲. Select YES or NO with ▶ or ▲. Confirm with SET and return to **Alarm x**.
4. Change to another alarm using ▶ or ▲ and perform settings in the same way.

5. Return to Main Menu Alarm with ESC.

5. Continue to Main Menu Settings with ▶ or ▲ or return to Measuring Mode with ESC.

4.4.6.5. 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
- Code
- Units
  - Absolute pressure
  - Area
  - Temperature
- Standard data
  - Absolute pressure
  - Temperature
- Pressure process data
  - Absolute pressure
  - Humidity
  - Temperature
  - Cross-section
  - Pitot tube factor
  - Correction factor
- Humidity process data
  - H2O2 percentage by weight
  - Humidity process pressure

Editing display settings

You can set the brightness and contrast of the display.

1. Select Display Settings with ▶ or ▲ and confirm selection with SET.
2. Select **Backlight** or **Contrast** with ▶ 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 24h on**
  Select **On** or **Off** using ▶ or ▲ and confirm with **SET**.
  Off: The display light switches off automatically if no button was pressed for 10 seconds.
  On: The display light is activated

3. Return to **Display Settings** with **ESC** 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** with ▶ or ▲ and confirm selection with **SET**.
2. Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with **SET** or abort entry with **ESC**.
3. Return to Code with ESC and use► or ▲ to continue to Change parameters.

Select unit (Change unit)
This setting affects the displayed unit of all readings.
1. Select Change parameters with ► or ▲, confirm selection with SET or cancel with ESC.
2. Select Change unit with ► or ▲, confirm selection with SET or cancel with ESC.
3. Select the required variable (absolute pressure/temperature) with ► or ▲, confirm selection with SET or cancel with ESC.
4. Select the required unit with ► or ▲, confirm selection with SET or cancel with ESC.
5. Return to Change unit with ESC and continue to Standard data with ► or ▲.

Editing standard data
Setting individual values for the standard data to calculate the volumetric flow rate.
1. Select Standard data with ► or ▲, confirm selection with SET or cancel with ESC.
2. Select the required variable (absolute pressure/temperature) with ► or ▲, confirm selection with SET or cancel with ESC.
3. Scroll one digit to the right using ► and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
4. Return to Standard data with ESC and use ► or ▲ to continue to Pressure process data.

Editing pressure process data
Setting of the process data for the Pitot tube calculation.
1. Select Pressure process data with ► or ▲ and confirm selection with SET.
2. Select the required variable (absolute pressure/humidity/temperature/cross-section/Pitot tube factor/correction factor) with ► or ▲, confirm selection with SET or cancel with ESC.
3. Scroll one digit to the right using ► and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
4. Return to Pressure process data with ESC and use ► or ▲ to continue to Humidity process data.
Editing Humidity process data

This menu is only used to parameterize humidity measurements in \( \text{H}_2\text{O}_2 \) atmospheres (e.g. in sterilization processes) and determines whether °Ctm or °Ftm is the output parameter.

1. Select Humidity process data with ▶ or ▲ and confirm selection with SET.
2. Select H202 weight prop. with ▶ or ▲, confirm selection with SET or cancel with ESC.

   The selection H2O2 water or H2O2 vapour in the submenu describes whether H2O2 is generated by means of evaporation or is actively vaporized in the process.

3. Select H2O2 water or H2O2 vapour with ▶ or ▲ and confirm with SET.
4. Edit proportion by weight of the H2O2 in % (% H2O2 proportion by weight in the liquid initial solution): Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
5. Return to H202 weight prop. with ESC and use ▶ or ▲ to continue to Humidity process pressure.
6. Select Humidity process pressure with ▶ or ▲ and confirm selection with SET.
7. Edit humidity process pressure: Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.
8. Return to Change parameters with ESC.
9. Return to Main Menu Settings with ESC.

4.4.6.6. Editing Main Menu Analysis

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 the Measuring Mode press SET, select main menu Analysis with ▶ or ▲ and confirm selection with SET.
- Test Analog Output is shown.
2. Press **SET** and choose between **Analog output 1, 2, 3** with ▶ or ▲.

3. Press **SET**, scroll one digit to the right using ▶ and 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 6.5 digits, at least 2-times more accurate than the 6381) as follows:

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

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.

6. Return to **Test Analog Output** with **ESC** and use ▶ or ▲ to continue to Test Relay Output.

### Testing functionality of the pressure sensor (Test pressure sensor)

- This function is only required to calibrate the pressure sensor.

### Testing functionality of relay outputs

1. Press **SET** and 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 Connecting the relay outputs, page 27) out of the transmitter to a multimeter (resistance measurement) or continuity tester.

4. Return to Test Relay Output with 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 Editing Reset main menu, page 61

1. Read off the min./max. values of the three channels in succession with ▶ or ▲ and return to the Main Menu Analysis with ESC.

2. Continue to Main Menu Message with ▶ or ▲ or return to Measuring Mode with ESC.

**4.4.6.7. 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.

1. Operating hours at the time of message

2. Message code (see Status, warning and error messages, page 61).

3. Message text

4. Message number (example: "4/7" refers to the fourth of seven messages)

5. Number of messages present (example: "4/7" refers to the fourth of seven messages)

Using the P2A software (see volume 2, Parameterizing, adjusting and analyzing software (P2A software), page 113) you can predefine whether messages are to be shown in the display.

1. In the Measuring Mode press SET, select Main Menu Message with ▶ or ▲ and confirm selection with SET.

2. Confirm Confirm message using SET.

3. Select Last messages with ▶ or ▲ and confirm with SET.
4. Scroll between the warning and error messages recorded so far using ▶ or ▲ and return to Last messages using ESC.
5. Select Information with ▶ or ▲ and confirm with SET.
6. Scroll between the status messages recorded so far using ▶ or ▲ and return to Information using ESC.
7. Continue to Display of message with ▶ or ▲.
   ON: Measurements are shown on the display in Measuring Mode.
   OFF: No messages shown on display.
8. Select ON or OFF with ▶ or ▲ and confirm selection with SET.
9. Return to Main Menu Message with ESC.
10. Continue to Main Menu Ident with ▶ or ▲ or return to Measuring Mode with ESC.

An overview of the messages can be found in Status, warning and error messages, page 61

4.4.6.8. Calling up Main Menu Ident

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

1. In the Measuring Mode press SET, select Main Menu Ident with ▶ or ▲ and confirm selection with SET.

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

This information is required when servicing.
2. Return to Main Menu Ident with ESC or read off the type, firmware release, build number and serial number of the probe with ▶ or ▲ and then return to Main Menu Ident with ▶ or ▲.

3. Continue to Main Menu Adjust with ▶ or ▲ or return to Measuring Mode with ESC.

4.4.6.9. Editing Main Menu Adjust

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 1-point adjustment (offset - humidity/temperature), page 35

Reference values for pressure can be entered for the n-point adjustment. Please refer to the description in n-point adjustment (pressure), page 40

In addition, the analog outputs can be adjusted. Also see Analog output adjustment, page 39 for instructions on how to do this.

The 2-point adjustment cannot be performed via the user menu. This is done using the adjustment buttons or the P2A software, see 2-point adjustment (humidity/temperature), page 37 or volume 2, 2-point adjustment, page 136

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Enter reference value for 1-point adjustment

Please also refer to 1-point adjustment (offset - humidity/temperature), page 35

1. In the Measuring Mode press SET, select main menu Adjust with ▶ or ▲ and confirm selection with SET.

   - Reference value % RH is displayed.

2. Press SET, edit value: Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

3. Continue to Reference value temp with ▶ or ▲.

4. Press SET, Reference value °C or Reference value °F is displayed.

5. Press SET, edit value: Scroll one digit to the right using ▶ and increase value of digit by 1 using ▲. Confirm with SET or abort entry with ESC.

6. Continue to Analog Adj. Ch. 1 with ▶ or ▲.

7. Continue with the adjustment of the analog outputs (see below, step 2) or press ESC to return to main menu Adjust.
8. Continue to main menu Reset with ▶ or ▲ or return to Measuring Mode with ESC.

**Performing analog adjustment**

Please refer to Analog output adjustment, page 39

1. In the Measuring Mode press SET, select main menu Adjust with ▶ 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 with ▶ or ▲ and confirm with SET.
3. Use ▶ or ▲ to select Adj. Point 1.
4. Press SET. Read off multimeter display (e.g. 5601 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. Use ▶ or ▲ to select Adj. Point 2.
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. Use ▶ or ▲ to select Adj. Point 3.
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. With ▶ or ▲ continue to Analog Adj. Ch. 2 or 3 (repeat steps 3 to 8).
10. Return to main menu Adjust with ESC.
11. Continue to main menu Reset with ▶ or ▲ or return to Measuring Mode with ESC.

**Performing the pressure adjustment**

Please refer to n-point adjustment (pressure), page 40

1. In the Measuring Mode press SET, select main menu Adjust with ▶ or ▲ and confirm selection with SET.

   The pressure adjustment can be performed at 3 to 6 adjustment points.

2. Select Adjust Pressure with ▶ or ▲ and confirm with SET.
3. Use ▶ or ▲ to select Adj. Point 1.
4. Press SET. Read off pressure sensor display (e.g. 30.1 Pa) 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. Repeat steps 1 to 4 for adjustment points 2 to 6.

6. Return to main menu Adjust with ESC.

7. Continue to main menu Reset with ▶ or ▲ or return to Measuring Mode with ESC.

4.4.6.10. 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 the Measuring Mode press SET, select Main Menu Reset with ▶ 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. Return to the reset setting with ESC or SET and return to Main Menu Reset with ESC.

4. Continue to Main Menu Channel 1 with ▶ or ▲ or return to Measuring Mode with ESC.

4.5. Status, warning and error messages

To achieve optimum operational reliability (machine availability), the transmitter shows the following via the user menu or the P2A software

- Status messages
- Warning messages
- Error messages

The status and warning messages for the respective testo 6610 probes connected to the transmitter can be evaluated via the P2A software.
All messages are stored in the transmitter with an operating hours stamp. Use the user menu (see Editing Message main menu, page 57) or the P2A software (see volume 2, Transmitter history, page 140) to view the message history.

In the transmitter, the last 60 status messages and the last 120 error and warning messages are stored in a ring memory. There is no limit in the P2A software.

### 4.5.1. Status messages

Status messages show the current operating status of the testo 6381.

<table>
<thead>
<tr>
<th>Message</th>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02506</td>
<td>Sensor initialization</td>
<td>Message appears while the transmitter is starting up. If the message disappears, the transmitter is ready for operation.</td>
</tr>
<tr>
<td>01D19</td>
<td>Service plug</td>
<td>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)</td>
</tr>
<tr>
<td>00300</td>
<td>New limit value</td>
<td>The limit value has been changed or shifted</td>
</tr>
<tr>
<td>00301</td>
<td>Scaling changed</td>
<td>The scaling has been changed</td>
</tr>
<tr>
<td>00500</td>
<td>Transmitter reset</td>
<td>The transmitter was reset to the factory settings and is restarted.</td>
</tr>
<tr>
<td>0052F</td>
<td>Reset Min/Max</td>
<td>Resets all saved Min/Max values for all channels</td>
</tr>
<tr>
<td>02518</td>
<td>Probe reset</td>
<td>Probe reset: The probe performs a reset</td>
</tr>
<tr>
<td>00503</td>
<td>Reset device to fact</td>
<td>A factory reset of the transmitter was performed</td>
</tr>
<tr>
<td>02503</td>
<td>Reset probe to fact</td>
<td>A factory reset of the probe was performed</td>
</tr>
<tr>
<td>00530</td>
<td>Change solenoid valve</td>
<td>The solenoid valve should be changed</td>
</tr>
<tr>
<td>00307</td>
<td>User Setting Change</td>
<td>User Setting Change: General settings were changed for the transmitter.</td>
</tr>
<tr>
<td>Message</td>
<td>Display</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>00117</td>
<td>Adjustment DeltaP</td>
<td>An n-point adjustment was performed.</td>
</tr>
<tr>
<td>02104</td>
<td>Analog adjustment</td>
<td>An analog adjustment has been made</td>
</tr>
<tr>
<td>02101</td>
<td>1-point adjustment</td>
<td>A 1-point adjustment is performed.</td>
</tr>
<tr>
<td>02102</td>
<td>2-point adjustment</td>
<td>As part of the 2-point adjustment, an adjustment is performed at 11.3 % RH</td>
</tr>
<tr>
<td>02103</td>
<td>2-point adjustment</td>
<td>As part of the 2-point adjustment, an adjustment is performed at 75.3 % RH</td>
</tr>
<tr>
<td>02105</td>
<td>Self-adjustment active</td>
<td>For testo 6615 probe only: The probe performs an automatic self-adjustment</td>
</tr>
</tbody>
</table>

### 4.5.2. Warning messages

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

<table>
<thead>
<tr>
<th>Message</th>
<th>Display</th>
<th>Cause</th>
<th>Remedying of fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>00809</td>
<td>Pressure too high**</td>
<td>The process pressure exceeds the pressure intended for the transmitter</td>
<td>Remove the transmitter from the process and take any necessary measures to lower the pressure</td>
</tr>
<tr>
<td>00E00</td>
<td>T ambient high**</td>
<td>The ambient temperature exceeds the permissible temperature for the transmitter</td>
<td>Take necessary measures to lower ambient temperature, e.g. through venting or cooling</td>
</tr>
<tr>
<td>00E01</td>
<td>T ambient low**</td>
<td>The ambient temperature is below the permissible temperature for the transmitter</td>
<td>Take necessary measures to raise ambient temperature, e.g. through heating</td>
</tr>
<tr>
<td>00E04/00E05</td>
<td>Supply voltage low**</td>
<td>The supply voltage is below the minimum voltage required for the transmitter</td>
<td>Take measures to ensure sufficient voltage supply</td>
</tr>
<tr>
<td>Message</td>
<td>Display</td>
<td>Cause</td>
<td>Remedying of fault</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>02822</td>
<td>T process high**</td>
<td>The process temperature exceeds the temperature designated for the probe</td>
<td>Remove the probe from the process and take any necessary measures to lower the process temperature</td>
</tr>
<tr>
<td>02821</td>
<td>T process low**</td>
<td>The process temperature is below the temperature designated for the probe</td>
<td>Take necessary measures to raise process temperature</td>
</tr>
<tr>
<td>0081C</td>
<td>Alarm 1**</td>
<td>Depending on the parameterization of the relays</td>
<td>Depending on the parameterization of the relays</td>
</tr>
<tr>
<td>0081D</td>
<td>Alarm 2**</td>
<td>Depending on the parameterization of the relays</td>
<td>Depending on the parameterization of the relays</td>
</tr>
<tr>
<td>0081E</td>
<td>Alarm 3**</td>
<td>Depending on the parameterization of the relays</td>
<td>Depending on the parameterization of the relays</td>
</tr>
<tr>
<td>0081F</td>
<td>Alarm 4**</td>
<td>Depending on the parameterization of the relays</td>
<td>Depending on the parameterization of the relays</td>
</tr>
<tr>
<td>02900</td>
<td>2-point adjustment drift*</td>
<td>In the 2-point adjustment, corrections repeatedly occur in the same direction; this may indicate a sensor drift</td>
<td>Send the probe into Testo Service</td>
</tr>
<tr>
<td>02806</td>
<td>Condensation*</td>
<td>100 % RH has been reached, condensation developing</td>
<td>Take measures to reduce process humidity</td>
</tr>
<tr>
<td>02807</td>
<td>Values less than 0 % RH**</td>
<td>The adjustment or sensor is faulty</td>
<td>Check adjustment (via P2A adjustment history, perform 2-point adjustment where necessary). If the problem persists, contact Testo Service</td>
</tr>
</tbody>
</table>
**4.5.3. Transmitter error messages**

Error messages show a current malfunction.

<table>
<thead>
<tr>
<th>Message</th>
<th>Display</th>
<th>Cause</th>
<th>Remediing of fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>02809</td>
<td>Sensor early warning*</td>
<td>For testo 6617 probe only: The cover electrode of the sensor is damaged; this may soon cause the sensor to break</td>
<td>Carry out visual inspection. If the mirror-like surface of the sensor is dirty or damaged, contact Testo Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Early warning</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>** Current malfunction</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message</th>
<th>Display</th>
<th>Cause</th>
<th>Remediing of fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>03401</td>
<td>No probe signal</td>
<td>The probe communication is interrupted</td>
<td>Ensure that the probe connector is fully engaged in the transmitter. If communication still cannot be established, contact Testo Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03508</td>
<td>Wrong probe</td>
<td>The connected probe is not compatible with the present transmitter</td>
<td>Use a compatible probe Note: Probe 661x for transmitter 638x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01505</td>
<td>Watchdog error</td>
<td>Due to a processor error, the transmitter performs an automatic restart</td>
<td>If the problem occurs frequently, contact Testo Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0300A</td>
<td>% RH short-circuit</td>
<td>Short-circuit in humidity sensor</td>
<td>Contact Testo Service</td>
</tr>
<tr>
<td>0300B</td>
<td>% RH sensor broken</td>
<td>The humidity sensor is damaged (sensor broken)</td>
<td>Contact Testo Service</td>
</tr>
<tr>
<td>0300C</td>
<td>T short-circuit</td>
<td>Short-circuit in temperature sensor</td>
<td>Contact Testo Service</td>
</tr>
<tr>
<td>0300D</td>
<td>T sensor broken</td>
<td>The temperature sensor is damaged (sensor broken)</td>
<td>Contact Testo Service</td>
</tr>
</tbody>
</table>
4.5.4. Handling alarm messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Display</th>
<th>Cause</th>
<th>Remedying of fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>03105</td>
<td>Self-adjustment error</td>
<td>For testo 6615 probe only: The automatic self-adjustment was faulty</td>
<td>Contact Testo Service</td>
</tr>
<tr>
<td>03106</td>
<td>Adjustment error</td>
<td>The adjustment of the probe was faulty</td>
<td>Contact Testo Service</td>
</tr>
<tr>
<td>01115</td>
<td>Low adjustment temperature</td>
<td>The ambient temperature is too low during the pressure adjustment</td>
<td>Take necessary measures to raise ambient temperature, e.g. through heating</td>
</tr>
<tr>
<td>01116</td>
<td>High adjustment temperature</td>
<td>The ambient temperature is too high during the pressure adjustment</td>
<td>Take necessary measures to lower ambient temperature, e.g. through venting.</td>
</tr>
<tr>
<td>03000</td>
<td>Heat function defective</td>
<td>For testo 6614 probe only: Heat function defective</td>
<td>Contact Testo Service</td>
</tr>
</tbody>
</table>

5 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.

6 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.

7 The message is shown upon the occurrence of the event causing the message as well as when closing. Two entries appear in the history in the P2A software: Message text_start and Message text_end.
<table>
<thead>
<tr>
<th>Shown on the display&lt;sup&gt;5&lt;/sup&gt;</th>
<th>Can be used for collective alarm&lt;sup&gt;6&lt;/sup&gt;</th>
<th>Additional message end&lt;sup&gt;7&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm 2</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Alarm 3</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Alarm 4</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Transmitter reset</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Reset Min/Max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter refresh</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>User Setting Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog adjustment</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>1-point adjustment</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2-point adjustment</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>2-point adjustment 11.3%</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>2-point adjustment 75.3 %</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Probe reset</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2-point adjustment drift</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>T ambient high</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>T ambient low</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Supply voltage low</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>T process high</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>T process low</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Condensation</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Values less than 0 % RH</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Sensor early warning</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>No probe signal</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Watchdog error</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>% RH short-circuit</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>% RH sensor broken</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>T short-circuit</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>T sensor broken</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Perform the Confirm message function (acknowledgement of the alarm via the control keys on the transmitter):

- The message/alarm is no longer shown on the display and the optical alarm goes out, where applicable. 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.

### 4.5.5. 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.

<table>
<thead>
<tr>
<th>Status message in the display</th>
<th>Display value in display</th>
<th>Class</th>
<th>Analog output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 to 20 mA</td>
</tr>
<tr>
<td>No probe signal</td>
<td>None</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>Wrong probe</td>
<td>None</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>Values &lt; 0 %RH</td>
<td>uuuuu</td>
<td>Underrange</td>
<td>0 mA</td>
</tr>
<tr>
<td>Condensation</td>
<td>ooooo</td>
<td>Overrange</td>
<td>20.5 mA</td>
</tr>
<tr>
<td>% RH short-circuit</td>
<td>-----</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>% RH sensor broken</td>
<td>-----</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>T short-circuit</td>
<td>-----</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>T sensor broken</td>
<td>-----</td>
<td>Error</td>
<td>21 mA</td>
</tr>
<tr>
<td>T process low</td>
<td>uuuuuu</td>
<td>Underrange</td>
<td>0 mA</td>
</tr>
</tbody>
</table>
4.6. Maintenance and cleaning

4.6.1. Maintaining the instrument

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

- User menu (Operation, page 43) or
- P2A software (volume 2, Parameterizing, adjusting and analyzing software (P2A software), page 113)

Convenient "remote monitoring" of the transmitter can be implemented, for example by using a relay as a collective alarm (see Using alarm as collective alarm or not using it at all, page 51) whose messages are forwarded to a local alarm transmitter (horn, light) or PLC.

4.6.2. Cleaning the instrument

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