Differential pressure transmitter with humidity/temperature option

testo 6381

Measurement of differential pressure, flow velocity, volume flow; optional: humidity and temperature

Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability

Low measurement range up to 10 Pa ensures very high precision at lowest pressures

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

The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance

Configurable alarm management with adjustable response delay and alarm acknowledgement

The differential pressure transmitter testo 6381 was developed specially for monitoring differential pressure in the measuring range from 10 Pa to 1000 hPa. In cleanroom technology, the maintenance of positive pressure prevents the entry of contaminated air. In addition to this, the flow velocity or the volume flow can be calculated from the measurement of the differential pressure in a Pitot tube. Thanks to an optional probe from the probe series 6610, the additional recording of humidity and temperature with one instrument is also possible.

The testo 6381 is particularly outstanding thanks to the automatic zero-point adjustment which ensures high accuracy and long-term stability.

The integrated self-monitoring and early warning function also guarantees the operator high system availability.
### Technical data

#### Parameters

<table>
<thead>
<tr>
<th>Differential pressure</th>
<th>Measuring range</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 Pa</td>
<td>0 to 10 Pa</td>
<td>-10 to 10 Pa</td>
</tr>
<tr>
<td>0 to 50 Pa</td>
<td>-50 to 50 Pa</td>
<td></td>
</tr>
<tr>
<td>0 to 100 Pa</td>
<td>-100 to 100 Pa</td>
<td></td>
</tr>
<tr>
<td>0 to 500 Pa</td>
<td>-500 to 500 Pa</td>
<td></td>
</tr>
<tr>
<td>0 to 10 hPa</td>
<td>-10 to 10 hPa</td>
<td></td>
</tr>
<tr>
<td>0 to 50 hPa</td>
<td>-50 to 50 hPa</td>
<td></td>
</tr>
<tr>
<td>0 to 100 hPa</td>
<td>-100 to 100 hPa</td>
<td></td>
</tr>
<tr>
<td>0 to 500 hPa</td>
<td>-500 to 500 hPa</td>
<td></td>
</tr>
<tr>
<td>0 to 1000 hPa</td>
<td>-1000 to 1000 hPa</td>
<td></td>
</tr>
</tbody>
</table>

#### Measurement uncertainty*<sup>1</sup>

- ±0.5% of measurement range final value
- ±0.3 Pa

Temperature gain drift: 0.03% of measuring range per Kelvin deviation from nominal temperature 22 °C

Zero-point: 0% (thanks to cyclic zero-point adjustment)

#### Selectable units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential pressure</td>
<td>Pa, kPa, mbar, mmH₂O, kg/cm², PSI, inchHG, inch H₂O</td>
</tr>
<tr>
<td>Calculated parameters</td>
<td>Volume flow in m³/h, l/min, Nm³/h, Nl/min</td>
</tr>
<tr>
<td>Flow velocity in m/s, ft/min</td>
<td></td>
</tr>
</tbody>
</table>

#### Sensor

Piezoresistive sensor

#### Autom. zero-point adjustment

Via magnetic valve

Frequency adjustable: 15 sec, 30 sec, 1 min, 5 min, 10 min

#### Overload

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>0 to 50 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>0 to 100 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>0 to 500 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>0 to 10 hPa</td>
<td>20000 hPa</td>
</tr>
<tr>
<td>0 to 50 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>0 to 100 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>0 to 500 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>0 to 1000 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>-10 to 10 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>-50 to 50 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>-100 to 100 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>-500 to 500 Pa</td>
<td>20000 Pa</td>
</tr>
<tr>
<td>-10 to 10 hPa</td>
<td>200 hPa</td>
</tr>
<tr>
<td>-50 to 50 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>-100 to 100 hPa</td>
<td>750 hPa</td>
</tr>
<tr>
<td>-500 to 500 hPa</td>
<td>2500 hPa</td>
</tr>
<tr>
<td>-1000 to 1000 hPa</td>
<td>2500 hPa</td>
</tr>
</tbody>
</table>

<sup>1</sup> The determination of measurement uncertainty takes place according to GUM (Guide to the Expression of Uncertainty in Measurement):

For the determination of measurement uncertainty, the accuracy of the measuring instrument (hysteresis, linearity, reproducibility), the uncertainty contribution of the test site as well as the uncertainty of the adjustment site (works calibration) are taken into account. For this purpose, the value of k=2 of the extension factor, which is usual in measurement technology is used as a basis, which corresponds to a trust level of 95%.

### Parameters

#### Humidity/temperature option

<table>
<thead>
<tr>
<th>Probe</th>
<th>testo 6611</th>
<th>testo 6612</th>
<th>testo 6613</th>
<th>testo 6614</th>
<th>testo 6615</th>
<th>testo 6617</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Wall</td>
<td>Channel</td>
<td>Channel</td>
<td>Duct heated</td>
<td>Cable trace humidity</td>
<td>Cable with cover electrode monitoring</td>
</tr>
<tr>
<td>Parameters</td>
<td>%RH / °C/°F / °Ctd / °Ftd / g/kg / gr/lb / g/m³ / gr/ft³ / ppmV / °Cwb / °Fwb / kJ/kg / mbar / inch H₂O / °Ctm (H₂O₂) / °Ftm (H₂O₂) / % Vol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meas. range</td>
<td>0 to 100 %RH</td>
<td>40 to +30 °C td</td>
<td>0 to 100 %RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>-20 to +70 °C</td>
<td>-4 to +158 °F</td>
<td>-20 to +180 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 to +150 °C</td>
<td>22 to +302 °F</td>
<td>-40 to +356 °F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-40 to +248 °F</td>
<td>-40 to +180 °C</td>
<td>-40 to +356 °F</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Measurement uncertainty*<sup>1</sup>

- ±1 K at 0°C td
- ±2 K at -40°C td
- ±4 K at -50°C td

#### Meas. range

<table>
<thead>
<tr>
<th>Temperature at +25°C / +77°F</th>
<th>±0.15 °C / 32.2 °F Pt100 Class AA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>±0.15 °C / 32.2 °F Pt100 Class AA</td>
</tr>
</tbody>
</table>

#### Inputs/outputs

**Analog outputs**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Standard: 1; with optional humidity probe: 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output type</td>
<td>5/4 to 20 mA (4-wire) (24 VAC/DC) 0 to 1/5/10 V (4-wire) (24 VAC/DC)</td>
</tr>
<tr>
<td>Scaling</td>
<td>Differential pressure: scalable ±50% of measuring range final value; freely scalable within measuring range</td>
</tr>
<tr>
<td>Meas. cycle</td>
<td>1/sec</td>
</tr>
<tr>
<td>Resolution</td>
<td>12 bit</td>
</tr>
<tr>
<td>Max. load</td>
<td>max. 500 Ω</td>
</tr>
</tbody>
</table>

**Other outputs**

<table>
<thead>
<tr>
<th>Ethernet</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay</td>
<td>Optional: 4 relays (free allocation to measurement channels or as collective alarm in operating menu/P2A), up to 250 VAC/3A (NO or NC)</td>
</tr>
<tr>
<td>Digital</td>
<td>Mini-DIN for P2A software</td>
</tr>
</tbody>
</table>

**Supply**

| Voltage supply | 20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line |

<sup>1</sup> For deviations from media temp. ±25 °C: ±0.02 %RH/K
testo 6381 – Differential pressure transmitter with humidity/temperature option

**Technical data / Technical drawings / Connection plan**

### General technical data

**Model**
- Material: Metal housing
- Dimensions: 162 x 122 x 77 mm
- Weight: 1.96 kg; optional: Ethernet intermediary layer 0.61 kg

**Display**
- Optional: 3-line LCD with multi-language operating menu

**Resolution**
- **Differential pressure**
  - Measuring range
    - 0 to 10 Pa: 0.1 Pa
    - 0 to 50 Pa: 0.1 Pa
    - 0 to 100 Pa: 0.1 Pa
    - 0 to 500 Pa: 0.1 Pa
    - 0 to 10 hPa: 0.01 hPa
    - 0 to 50 hPa: 0.1 hPa
    - 0 to 500 hPa: 0.1 hPa
    - 0 to 1000 hPa: 1 hPa
    - -10 to 10 Pa: 0.1 Pa
    - -50 to 50 Pa: 0.1 Pa
    - -100 to 100 Pa: 0.1 Pa
    - -500 to 500 Pa: 0.1 Pa
    - -1000 to 1000 Pa: 1 hPa
- **Humidity**
  - 0.1 %RH
- **Temperature**
  - 0.01 °C / 0.01 °F

**Miscellaneous**
- **Protection class**: IP 65
- **EMC**: EU guideline 2004/108/EC
- **Connection nipple**: Ø 6 mm --> suitable hoses 4 mm + 4.8 mm

**Operating conditions**
- With / without display
  - Operation temperature: -5 to 50 °C / 23 to 122 °F
  - Storage temperature: -20 to 60 °C / -4 to 140 °F
  - Process temperature: -20 to +65 °C / -4 to +149 °F
The following options can be specified for the testo 6381:

**AXX** Measuring range
- A01 0 to 10 Pa
- A02 0 to 50 Pa
- A03 0 to 100 Pa
- A04 0 to 500 Pa
- A05 0 to 10 hPa
- A06 0 to 50 hPa
- A07 0 to 100 hPa
- A08 0 to 500 hPa
- A09 0 to 1000 hPa
- A10 0 to 1000 hPa
- A21 -10 to 10 Pa
- A22 -50 to 50 Pa
- A23 -100 to 100 Pa
- A24 -500 to 500 Pa
- A25 -100 to 100 hPa
- A26 -500 to 500 hPa
- A27 -1000 to 1000 hPa

**BXX** Analog display/supply
- B02 0 to 1 V (4-wire, 24 VAC/DC)
- B03 0 to 5 V (4-wire, 24 VAC/DC)
- B04 0 to 10 V (4-wire, 24 VAC/DC)
- B05 0 to 20 mA (4-wire, 24 VAC/DC)
- B06 4 to 20 mA (4-wire, 24 VAC/DC)

**CXX** Display / menu language
- C00 without display
- C02 with display/English
- C03 with display/German
- C04 with display/French
- C05 with display/Spanish
- C06 with display/Italian
- C07 with display/Japanese
- C08 with display/Swedish

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

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

**FXX** Differential pressure/flow velocity unit (pre-set)
- F01 Pa / min / max
- F02 hPa / min / max
- F03 kPa / min / max
- F04 mbar / min / max
- F05 bar / min / max
- F06 mmH₂O / min / max
- F07 inch H₂O / min / max
- F08 inch HG / min / max
- F09 kg/cm² / min / max
- F10 PSI / min / max
- F11 m/s / min / max
- F12 ft/min / min / max
- F13 m³/h / min / max
- F14 l/min / min / max
- F15 Nm³/h / min / max
- F16 Nl/min / min / max

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

**GXX** Opt. analog output for humidity probe connection (probe series testo 6610) units (pre-set)
- G00 without connection possibility for humidity probe testo 6610
- G01 % RH/Min/Max
- G02 °C/Min/Max
- G03 °Ftd/Min/Max
- G04 °Ctd/Min/Max
- G05 °Ftd/Min/Max
- G06 g/kg / min / max
- G07 gr/lb / Min/Max
- G08 g/m³ / min / max
- G09 g/m³ / min / max
- G10 ppmV / min / max
- G11 °Cwb / min / max
- G12 °Fwb / min / max
- G13 kJ/kg / min / max (enthalpy)
- G14 mbar / min / max (water vapour partial pressure)
- G15 inch H₂O / min / max (water vapour partial pressure)
- G16 °Ctm / min / max (mixture dewpoint for H₂O₂)
- G17 °Ftm / min / max (mixture dewpoint for H₂O₂)
- G18 % Vol

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

**IXX** Units channel 3 (pre-set, only if opt. humidity probe connection available)**
- I01 % RH/Min/Max
- I02 °Ctd/Min/Max
- I03 °Ftd/Min/Max
- I04 °Ctd/Min/Max
- I05 °Ftd/Min/Max
- I06 g/kg / min / max
- I07 gr/lb /Min/Max
- I08 g/m³ / min / max
- I09 g/m³ / min / max
- I10 ppmV / min / max
- I11 °Cwb / min / max
- I12 °Fwb / min / max
- I13 kJ/kg / min / max (enthalpy)
- I14 mbar / min / max (water vapour partial pressure)
- I15 inch H₂O / min / max (water vapour partial pressure)
- I16 °Ctm / min / max (mixture dewpoint for H₂O₂)
- I17 °Ftm / min / max (mixture dewpoint for H₂O₂)
- I18 % Vol

**Ordering example**

Order code for transmitter testo 6381 with the following options:
- Measuring range -100 to 100 Pa
- Analog output 4 to 20 mA (4-wire, 24 VAC/DC)
- Without display
- Cable contact via M-plug connection for signal and supply
- With Ethernet module
- Differential pressure Pa / -100 / 100
- Opt. analog output for humidity probe connection testo 6610/ units %RH / 0 / 100
- Without relay
- Unit channel 3 °C / -20 / 70

0555 6381 A23 B06 C00 D03 E01 F01 -100 100 G01 0 100 H00 L02 0 100

**Subject to change without notice.**

For more information, visit [www.testo.com](http://www.testo.com)