

**1 Description**


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 order to keep the cleanroom conditions constant, the transmitter additionally calculates the parameters volume flow and flow velocity from the measured differential pressure. 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.

**Areas of application:**

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

- Measurement of differential pressure, flow velocity, volume flow; optional: humidity and temperature
- Automatic zero-point adjustment guarantees high, temperature-independent accuracy and long-term stability
- Low measurement range up to 10 Pa ensures very high precision at lowest pressures
- The robust metal housing protects from tough ambient conditions
- Display with multi-language operating menu and optical alarm display
- Ethernet, relay and analog outputs allow optimum integration into individual automation systems
- Self-monitoring of the transmitter and early warning function guarantee high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance
- Scalability of  $\pm 50$  percent of the measuring range final value and free scalability within the measuring range
- Configurable alarm management with adjustable response delay and alarm acknowledgement

**2 Technical data**

| Parameters                   |  |   |
|------------------------------|--|---|
| <b>Differential pressure</b> |  |   |
| Measuring range              | 0 to 10 Pa<br>0 to 50 Pa<br>0 to 100 Pa<br>0 to 500 Pa<br>0 to 10 hPa<br>0 to 50 hPa<br>0 to 100 hPa<br>0 to 500 hPa<br>0 to 1000 hPa  | -10 to 10 Pa<br>-50 to 50 Pa<br>-100 to 100 Pa<br>-500 to 500 Pa<br>-10 to 10 hPa<br>-50 to 50 hPa<br>-100 to 100 hPa<br>-500 to 500 hPa<br>-1000 to 1000 hPa |
| Measurement uncertainty*     | ±0,5% of measurement range final value<br>±0,3 Pa<br>Temperature gain drift: 0.02% of measuring range per Kelvin deviation from nominal temperature 22 °C<br>Zero-point: 0% (thanks to cyclic zero-point adjustment)   |   |
| Selectable units             | Differential pressure in Pa, hPa, kPa, mbar, bar, mmH <sub>2</sub> O, kg/cm <sup>2</sup> , PSI, inch HG, inch H <sub>2</sub> O<br>calculated parameters: volume flow in m <sup>3</sup> /h, l/min, Nm <sup>3</sup> /h, NI/min<br>Flow velocity in m/s, ft/min |   |
| Sensor                       | Piezoresistive sensor  |   |
| Autom. Zero-point adjustment | via magnetic valve<br>Frequency adjustable: 15 sec, 30 sec, 1 min, 5 min, 10 min   |   |
| Overload                     | <b>Measuring range</b>   | <b>Overload</b>   |
|                              | 0 ... 10 Pa  | 0,1 Pa  |
|                              | 0 ... 50 Pa  | 0,1 Pa  |
|                              | 0 ... 100 Pa   | 0,1 Pa  |
|                              | 0 ... 500 Pa   | 0,1 Pa  |
|                              | 0 ... 10 hPa   | 0,01 hPa  |
|                              | 0 ... 50 hPa   | 0,01 hPa  |
|                              | 0 ... 100 hPa  | 0,1 hPa   |
|                              | 0 ... 500 hPa  | 0,1 hPa   |
|                              | 0 ... 1000 hPa   | 1 hPa   |
|                              | -10 ... 10 Pa  | 0,1 Pa  |
|                              | -50 ... 50 Pa  | 0,1 Pa  |
|                              | -100 ... 100 Pa  | 0,1 Pa  |
|                              | -500 ... 500 Pa  | 0,1 Pa  |
|                              | -10 ... 10 hPa   | 0,01 hPa  |
|                              | -50 ... 50 hPa   | 0,01 hPa  |
|                              | -100 ... 100 hPa   | 0,1 hPa   |
|                              | -500 ... 500 hPa   | 0,1 hPa   |
|                              | -1000 ... 1000 hPa   | 1 hPa   |

\* Measurement inaccuracy according to GUM.

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

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

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

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

The following inaccuracies are used for the determination:

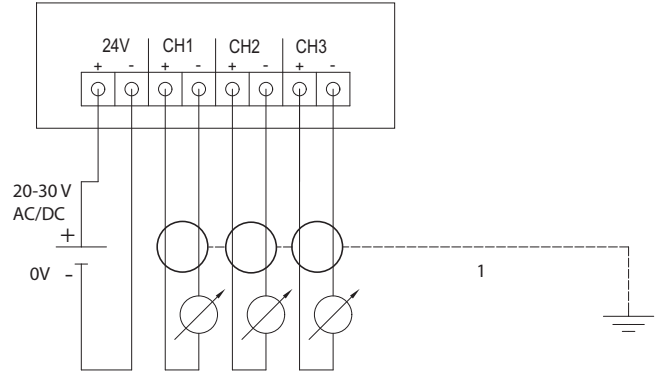
- Hysteresis
- Linearity
- Reproducibility
- Long-term stability (only for differential pressure)
- Adjustment site/factory calibration
- Test site

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

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

**3 Allgemeine Technische Daten / Anschlussbelegung**
**General technical data**

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


**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 |

**4 Technical drawings**
