We measure it. testo

# 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

hPa

%RH

°C

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 automatioc 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

### Differential pressure

| | | |
|---|---|---|
| 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: 0.03% of measuring range per Kelvin deviaton 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, $mmH_2O$, $kg/cm^2$, PSI, inch HG, inch $H_2O$<br>calculated parameters: volume flow in $m^3/h$, l/min, $Nm^3/h$, Nl/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 | Measuring range | Overload |
|---|---|---|
| | 0 to 10 Pa | 20000 Pa |
| | 0 to 50 Pa | 20000 Pa |
| | 0 to 100 Pa | 20000 Pa |
| | 0 to 500 Pa | 20000 Pa |
| | 0 to 10 hPa | 200 hPa |
| | 0 to 50 hPa | 750 hPa |
| | 0 to 100 hPa | 750 hPa |
| | 0 to 500 hPa | 2500 hPa |
| | 0 to 1000 hPa | 2500 hPa |
| | -10 to 10 Pa | 20000 Pa |
| | -50 to 50 Pa | 20000 Pa |
| | -100 to 100 Pa | 20000 Pa |
| | -500 to 500 Pa | 20000 Pa |
| | -10 to 10 hPa | 200 hPa |
| | -50 to 50 hPa | 750 hPa |
| | -100 to 100 hPa | 750 hPa |
| | -500 to 500 hPa | 2500 hPa |
| | -1000 to 1000 hPa | 2500 hPa |

* **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, reproduceability), 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 optional

| 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 / $°C_{td}$ / $°F_{td}$ / g/kg / gr/lb / $g/m^3$ / $gr/ft^3$ / ppmV / °Cwb / °Fwb / kJ/kg / mbar / inch $H_2O$ / °Ctm ($H_2O_2$)/°Ftm ($H_2O_2$) / % Vol | | | | | |

**Meas. range**

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

**Measurement uncertainty***

| Humidity | testo 6611 | testo 6612 | testo 6613 | testo 6614 | testo 6615 | testo 6617 |
|---|---|---|---|---|---|---|
| | ±(1.0 + 0.007 * mv) %RH for 0 to 100 %RH / ±(1.4 + 0.007 * mv) %RH for 90 to 100 %RH | | | ±(1.0+ 0.007 * mv) %RH for 0 to 100 %RH | | ±(1.2 + 0.007 * mv) %RH for 0 to 90 %RH / ±(1.6 + 0007 * mv) %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/ 32.2 °F Pt1000 Class AA | | | | ±0.15 °C/ 32.2 °F Pt100 Class AA | ±0.15 °C/ 32.2 °F Pt1000 Class AA |

## Inputs/outputs

### Analog outputs

| | |
|---|---|
| Quantity | Standard: 1;<br>with optional humidity probe: 3 |
| Output type | 0/4 to 20 mA (4-wire) (24 VAC/DC)<br>0 to 1/5/10 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 |
| **Other outputs** | |
| 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 |
| **Supply** | |
| Voltage supply | 20 to 30 VAC/DC, 300 mA current consumption, galvanically separate signal and supply line |

# Technical data / Technical drawings / Connection plan

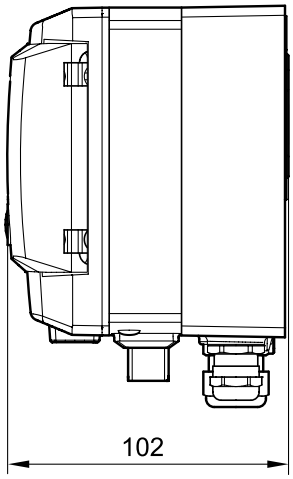
## General technical data

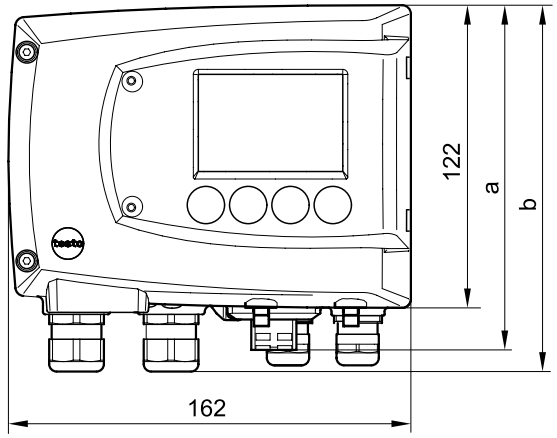
| | | |
|---|---|---|
| **Model** | | |
| Material | Metal housing | |
| Dimensions | 162 x 122 x 77 mm | |
| Weight | 1.96 kg; optional: Ethernet intermediary layer 0.61 kg | |
| **Display** | | |
| Display | optional: 3-line LCD with multi-language operating menu | |
| Resolution | | |
| Differential pressure | Measuring range | Resolution |
| | 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 | |
| **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

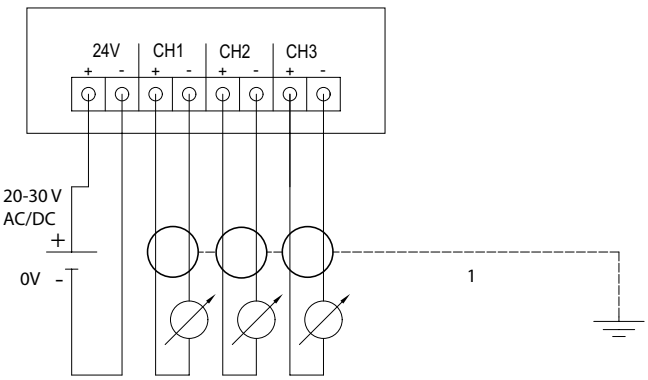
| | | |
|---|---|---|
| With / without display | Operation temperature | -5 to 50 °C / 23 to 122 °F |
| | Storage temperature | -20 to 60 °C / -4 to 140 °F |
| | Process temperature | -20 to +65 °C / -4 to +149 °F |

## Technical drawings




## Connection plan



# Options / Ordering example

**The following options can be specified for the testo 6381:**

AXX Measuring range
BXX Analog display/supply
CXX Display / menu language
DXX Cable input
EXX Ethernet
FXX Differential pressure/flow velocity unit (pre-set)
GXX Opt. analog output for humidity probe connection (probe series testo 6610) units (pre-set)
HXX Relay
IXX Units channel 3 pre-set (only if opt. humidity probe connection available)

### 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 |
| A07 | 0 to 50 hPa |
| A08 | 0 to 100 hPa |
| A09 | 0 to 500 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 | -10 to 10 hPa |
| A27 | -50 to 50 hPa |
| A28 | -100 to 100 hPa |
| A29 | -500 to 500 hPa |
| A30 | -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*

| | |
|---|---|
| F01 | Pa / min / max |
| F02 | hPa / min / max |
| F03 | kPa / min / max |
| F04 | mbar / min / max |
| F05 | bar / min / max |
| F06 | mm$H_2O$ / min / max |
| F07 | inch $H_2O$ / min / max |
| F08 | inch HG / min / max |
| F09 | kg/cm$^2$ / min / max |
| F10 | PSI / min / max |
| F11 | m/s / min / max |
| F12 | ft/min / min / max |
| F13 | m$^3$/h / min / max |
| F14 | l/min / min / max |
| F15 | Nm$^3$/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 | °F/Min/Max |
| G04 | °Ctd / min / max |
| G05 | °Ftd / min / max |
| G06 | g/kg / min / max |
| G07 | gr/lb /Min/Max |
| G08 | g/m$^3$ / min / max |
| G09 | gr/ft$^3$ / min / max |
| G10 | 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 $H_2O$ / min / max (water vapour partial pressure) |
| G16 | °Ctm / min / max (mixture dewpoint for $H_2O_2$) |
| G17 | °Ftm / min / max (mixture dewpoint for $H_2O_2$) |
| G18 | % Vol |

(G01–G18 with connection possibility testo 6610)

### 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 | °C/Min/Max |
| I03 | °F/Min/Max |
| I04 | °Ctd/Min/Max |
| I05 | °Ftd/Min/Max |
| I06 | g/kg / min / max |
| I07 | gr/lb /Min/Max |
| I08 | g/m$^3$ / min / max |
| I09 | gr/ft$^3$ / min / max |
| I10 | 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 $H_2O$ / min / max (water vapour partial pressure) |
| I16 | °Ctm / min / max (mixture dewpoint for $H_2O_2$) |
| I17 | °Ftm / min / max (mixture dewpoint for $H_2O_2$) |
| I18 | % Vol |

**only possible when G-Code (from G01) selected

### 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

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