

# testo 6381

## Differential pressure transmitter with humidity & temperature option



### SPECIFICATIONS

#### testo 6381

The testo 6381 differential pressure transmitter 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 ensures the operator maximum uptime.

#### Typical applications:

- 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



### SPECIFICATIONS

#### 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 down to 10 Pa ensures very high precision at lowest pressures
- The robust metal housing protects against 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 ensure maximum uptime
- P2A software for programming, 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



## Differential pressure transmitter with humidity/temperature option

## Technical data

Parameters		
<b>Differential pressure</b>		
Measuring range	0 to 10 Pa 0 to 50 Pa 0 to 100 Pa 0 to 500 Pa 0 to 10 hPa 0 to 50 hPa 0 to 100 hPa 0 to 500 hPa 0 to 1000 hPa	-10 to 10 Pa -50 to 50 Pa -100 to 100 Pa -500 to 500 Pa -10 to 10 hPa -50 to 50 hPa -100 to 100 hPa -500 to 500 hPa -1000 to 1000 hPa
Measurement uncertainty*	±0,5% of measurement range final value ±0.3 Pa Temperature gain drift: 0.02% of measuring range per Kelvin deviation from nominal temperature 22 °C 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 calculated parameters: volume flow in m <sup>3</sup> /h, l/min, Nm <sup>3</sup> /h, NI/min Flow velocity in m/s, ft/min	
Sensor	Piezoresistive sensor	
Autom. Zero-point adjustment	via magnetic valve 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	Self-check 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)/°Ftm (H <sub>2</sub> O) / % 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 -4 to +158 °F	-30 to +150 °C -22 to +302 °F	-40 to +180 °C -40 to +356 °F	-40 to +120 °C -40 to +248 °F	-40 to +180 °C -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 ±2 K at -40 °C td ±4 K at -50 °C td	
Temp. at +25°C / +77°F	±0,15 °C/ 32,2 °F Pt1000 1/3 Klasse B			±0,15 °C/ 32,2 °F Pt100 1/3 Class B		±0,15 °C/ 32,2 °F Pt1000 1/3 Klasse B

Inputs/outputs	
<b>Analog outputs</b>	
Quantity	Standard: 1; with optional humidity probe: 3
Output type	0/4 to 20 mA (4-wire) (24 VAC/DC) 0 to 1/5 to 10 V (4-wire) (24 VAC/DC)
Scaling	Differential pressure: scalable ±50% of measuring range final value; 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



# Differential pressure transmitter with humidity/temperature option

## Technical data

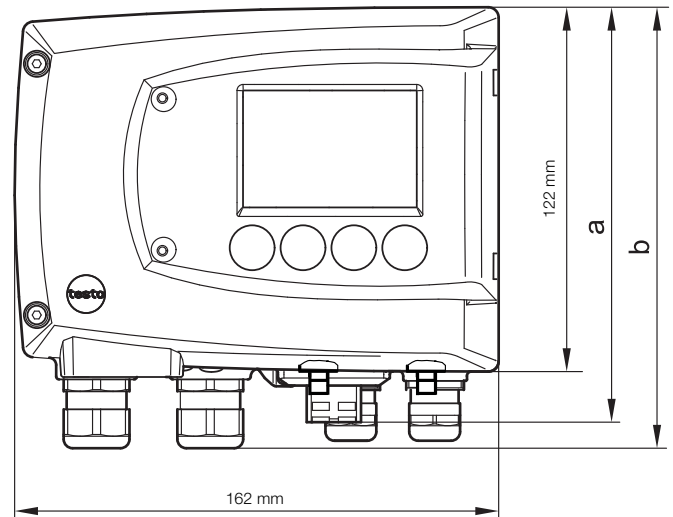
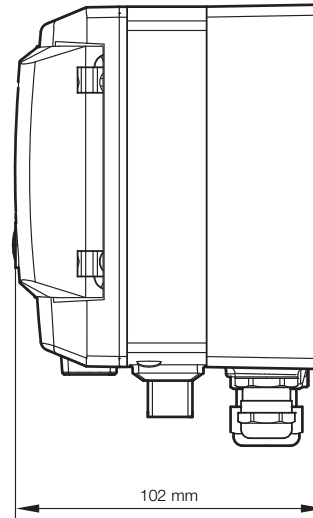
### General technical data

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	

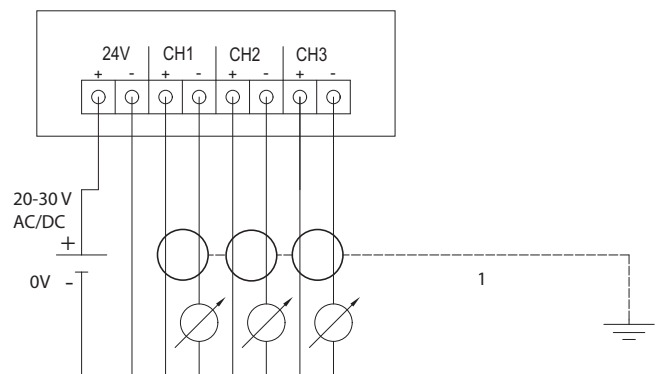
### Operating conditions

With / w/out 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



## Power / Analog output connections





# Differential pressure transmitter with humidity/temperature option

The following options can be specified for the testo 6381:

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

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

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 <sup>3</sup> / min / max
G09	gr/ft <sup>3</sup> / 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 <sub>2</sub> O / min / max (water vapour partial pressure)
G16	°Ctm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
G17	°Ftm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
G18	% Vol

**NOTE:** please ensure each testo 6381 Transmitter has at least one Series 6610 digital probe specified for it

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)

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

**LXX** Probe Series 6610... Required, not an option

0555 6610 **Lxx** **Mxx** **Nxx** **Pxx**

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

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 <sup>3</sup> / min / max
I09	gr/ft <sup>3</sup> / 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 <sub>2</sub> O / min / max (water vapour partial pressure)
I16	°Ctm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
I17	°Ftm / min / max (mixture dewpoint for H <sub>2</sub> O <sub>2</sub> )
I18	% Vol

L11	Probe 6611	Wall	-4 to +158 F (-20 to +70 C)
L12	Probe 6612	Duct	-22 to +302 F (-30 to +150 C)
L13	Probe 6613	Cable	-40 to +356 F (-40 to +180 C)
L14	Probe 6614	Heated probe	-40 to +356 F (-40 to +180 F)
L15	Probe 6615	Trace humidity	-60 to +100 tpd
L17	Probe 6617	Self-check	-40 to +356 F (-40 to +180 C)
L11H	Probe 6611	Wall	High Accuracy -40 to +356 F (-40 to +180 C)
L13H	Probe 6613	Cable	High Accuracy -40 to +356 F (-40 to +180 C)

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

KXX	Instruction manual language
K01	German/English instruction manual
K02	French/English instruction manual
K03	Spanish/English instruction manual
K04	Italian/English instruction manual
K05	Dutch/English instruction manual
K06	Japanese/English instruction manual
K07	Chinese/English instruction manual
K08	Swedish/English instruction manual

M01	Sintered stainless steel filter
M02	Wire mesh protective cap
M03	Sintered Teflon filter
M04	Metal protective cap, open
M05	Plastic protective cap ABS, open
M06	Teflon filter with drip hole
M07	Teflon filter with drip hole and condensation protection
M08	Filter for H <sub>2</sub> O <sub>2</sub> environments

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	mmH <sub>2</sub> O / min / max
F07	mmH <sub>2</sub> O / min / max
F08	inch HG / min / max
F09	kg/cm <sup>2</sup> / min / max
F10	PSI / min / max
F11	m/s / min / max
F12	ft/min / min / max
F13	m <sup>3</sup> /h / min / max
F14	l/min / min / max
F15	Nm <sup>3</sup> /h / min / max
F16	NI/min / min / max

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

		L11	L12	L13	L14	L15	L17	L11H %	L13H
P07	Probe length 2.7 in (70 mm)	X	-	-	-	-	-	-	-
P14	Probe length 5.5 in (140 mm)	-	-	X	-	-	-	-	-
P20	Probe length 7.9 in (200 mm)	X	X	X	X	X	X	X	X
P30	Probe length 11.8 in (300 mm)	-	X	X	-	-	-	-	-
P50	Probe length 19.7 in (500 mm)	-	X	X	X	X	X	-	-
P80	Probe length 31.5 in (800 mm)	-	X	X	-	-	-	-	-

		High Accuracy	
		Wall	Cable
		L11H	L13H
N00	No cable	X	-
N01	Cable length 3.3 ft (1 m) for probes 6613, 6614, 6615, 6617	-	X
N02	Cable length 6.6 ft (2 m) for probes 6613, 6614, 6615, 6617	-	-
N05	Cable length 16.4 ft (5 m) for probes 6613, 6614, 6615, 6617	-	-
N10	Cable length 32.8 ft (10 m) for probes 6613, 6614, 6615, 6617	-	-
N23	Cable length less than 1 m for duct version probe 6612 only	-	X