



Committing to the future

testo 6781

Trace Humidity Monitoring up to $-90\text{ }^{\circ}\text{C}_{\text{td}}$
New, condensation-proof sensor with sol-gel technology



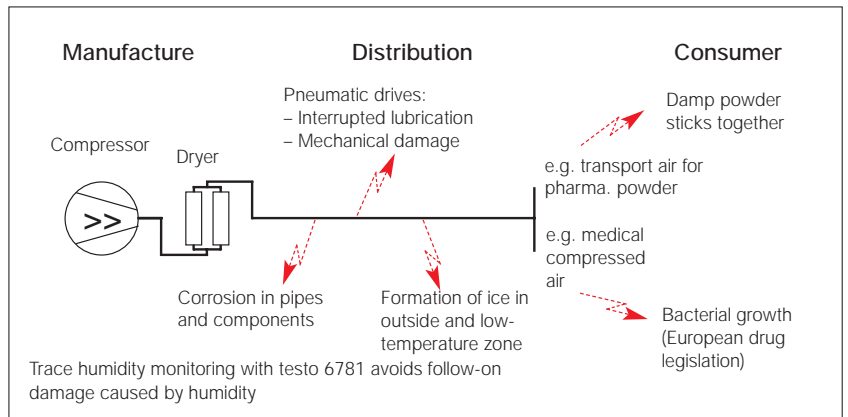
Highest compressed air quality requirements

Monitor trace humidity, avoid damage

Air, compressed air and gases are used in all areas of industry. Humidity is normally undesirable because it can cause damage or impair the quality of the end product, as the adjacent graphic shows.

Optimizing the regulation of adsorption dryers

The regeneration cycle can be reduced by controlling the parameter trace humidity ($^{\circ}\text{C}_{td}$). That saves energy costs!



What is compressed air quality?

The international standard ISO 8573 defines seven classes of compressed air quality and defines the humidity, the oil content, the particle content etc. which the compressed air is allowed to have. Class 1 represents the highest requirements. Class 2, for example, is fulfilled when the pressure dewpoint does not exceed $-40\text{ }^{\circ}\text{C}_{td}$ or $-40\text{ }^{\circ}\text{F}_{td}$, or an absolute humidity of 0.12 g of water vapour per m^3 or 18 ppm_v (parts per million by volume) (see table on right).

The main way of ensuring compliance with a quality class involves installing a suitable dryer (e. adsorption dryer). Its monitoring and, where appropriate, its control, is handled by the testo 6781.

| ISO 8573 Class | Trace humidity | | | | Typical application |
|----------------|-------------------------|-------------------------|-----------------------|---------------------------|----------------------|
| | $^{\circ}\text{C}_{td}$ | $^{\circ}\text{F}_{td}$ | g/m^3 | ppm_v (at 7 bar) | |
| 1 | -70 | -94 | 0,003 | 0,37 | Semi-conductor prod. |
| 2 | -40 | -40 | 0,12 | 18 | Granule dryer |
| 3 | -20 | -4 | 0,88 | 147 | Transport air |
| 4 | 3 | 37 | 5,51 | 1083 | Working/energy air |
| 5 | 7 | 44 | 7,28 | 1432 | |
| 6 | 10 | 50 | 8,93 | 1756 | |
| 7 | - | - | - | - | Blow air |

Action: Compressed air drying
Monitoring/controlling: testo 6781

Applications in the monitoring of compressed air quality



Compressed air systems: dryer monitoring to avoid damage caused by humidity



Medical compressed air: minimum humidity as a hygiene requirement



Granulate drying: dry air is a requirement for product quality



Gas engineering: humidity causes damage and reduces the value of the gas in the system

Pressure dewpoint transmitter testo 6781 up to $-90\text{ }^{\circ}\text{C}_{\text{td}}$



- Measurement of dewpoints in the measuring range -90 to $+30\text{ }^{\circ}\text{C}_{\text{td}}$
- New, very condensation-proof sensor with sol-gel technology guarantees highest process security and fast response
- Display with multi-language user menu.
- Automatic self-adjustment ensures high accuracy and long reliability
- Self-monitoring guarantees high system availability
- The P2A software for parameterization, adjustment and analysis saves time and costs in commissioning and maintenance

Areas of application:

- Pressure dewpoint measurement in the ISO Classes 1 ($<-70\text{ }^{\circ}\text{C}_{\text{td}}$) and 2 ($<-40\text{ }^{\circ}\text{C}_{\text{td}}$)
- Monitoring of adsorption dryers, granulate dryers and medical compressed air
- Quality assurance for noble gas preparation

Configuration options for the testo 6781

Axx Process connection
Bxx Analog display/supply
Cxx Display

Fxx Humidity parameter / min limit value / max-limit value / hysteresis (pre-set)
Kxx IM languages (for bilingual printed IMs)
Mxx Protective filter

Order no. 0555 6781 **A01** **Bxx** **Cxx** **Fxx** **Kxx** **Mxx**

A01 Process connection G1/2
A02 Process connection NPT 1/2"

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)

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

F01 $^{\circ}\text{C}_{\text{td}}$ / min / max
F02 $^{\circ}\text{F}_{\text{td}}$ / min / max
F03 % RH/Min/Max
F04 %RH / min / max
F05 $^{\circ}\text{C}_{\text{tdA}}$ / min / max
F06 $^{\circ}\text{F}_{\text{tdA}}$ / min / max
F07 ppmV / min / max
F08 g/m^3 / min / max
F09 g/ft^3 / min / max
F10 g/kg / min / max
F11 g/lb / min / max

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

This results in a typical ordering code:
0555 6781 AXX BXX CXX FXX KXX MXX

M01 Sintered stainless steel cap
M03 Sintered Teflon filter

Pressure dewpoint transmitter testo 6781 up to $-90\text{ }^{\circ}\text{C}_{td}$

Technical data testo 6781

| Parameters | |
|---|---|
| Trace humidity (further calculated humidity parameters see configuration options p. 3) | |
| Measuring range | -90 to $30\text{ }^{\circ}\text{C}_{td}$ |
| Measurement uncertainty* | $-10\text{ }^{\circ}\text{C}_{td}$ to $25\text{ }^{\circ}\text{C}_{td}$: $\pm 2\text{K}$ $-40\text{ }^{\circ}\text{C}_{td}$ to $-10\text{ }^{\circ}\text{C}_{td}$: $\pm 1\text{K}$ $-60\text{ }^{\circ}\text{C}_{td}$ to $-40\text{ }^{\circ}\text{C}_{td}$: $\pm 2\text{K}$ $-75\text{ }^{\circ}\text{C}_{td}$ to $-60\text{ }^{\circ}\text{C}_{td}$: $\pm 3\text{K}$ $-75\text{ }^{\circ}\text{C}_{td}$ to $-90\text{ }^{\circ}\text{C}_{td}$: $> \pm 3\text{K}$ |
| Response time | $t_{63} < 3\text{s}$ for switch from -70 to $-40\text{ }^{\circ}\text{C}_{td}$ $t_{63} < 300\text{s}$ for switch from -40 to $-70\text{ }^{\circ}\text{C}_{td}$ |
| Inputs/outputs | |
| Analog outputs | |
| Current/accuracy | 0 to $20\text{ mA} \pm 0.03\text{ mA}$ (4-wire) 4 to $20\text{ mA} \pm 0.03\text{ mA}$ (4-wire) |
| Voltage/accuracy | 0 to $1\text{ V} \pm 1.5\text{ mV}$ (4-wire) 0 to $5\text{ V} \pm 7.5\text{ mV}$ (4-wire) 0 to $10\text{ V} \pm 15\text{ mV}$ (4-wire) |
| Load | max. $500\text{ }\Omega$ |
| Meas. cycle | 1/sec |
| Resolution | 12 bit |
| Other outputs | |
| Digital output | Mini-DIN for P2A software |
| Supply | |
| Voltage supply | 20 to 30 VAC/DC , 300 mA current consumption galvanically separate signal and supply line |

| General technical data | | |
|-----------------------------|---|-------------------|
| Housing | | |
| Material | Metal housing | |
| Dimensions | $208 \times 60 \times 35\text{ mm}$ | |
| Weight | 0.5 kg | |
| Display | | |
| Display | optional: 2-line LCD with multi-language operating menu | |
| Resolution | Measuring range | Resolution |
| | -40 to $70\text{ }^{\circ}\text{C}$ | 0.1 |
| | -40 to $158\text{ }^{\circ}\text{F}$ | 0.1 |
| | -90 to $30\text{ }^{\circ}\text{C}_{td}$ | 0.1 |
| | -130 to $86\text{ }^{\circ}\text{F}_{td}$ | 0.10 to 100% |
| | RH | 0.1 |
| | -110 to $30\text{ }^{\circ}\text{C}_{td}\text{A}$ | 0.1 |
| | -165 to $86\text{ }^{\circ}\text{F}_{td}\text{A}$ | 0.1 |
| | 1 to 42500 ppm(V) | 1 |
| | 0 to 31 g/m^3 | 0.001 |
| | 0.001 to 14 g/ft^3 | 0.001 |
| | 0.001 to 28 g/kg | 0.001 |
| | 0.01 to 194 g/lb | 0.01 |
| Miscellaneous | | |
| Protection class | IP 65 | |
| EMC | EU guideline 2004/108/EC | |
| Operating conditions | | |
| Operation temperature | -40 to $70\text{ }^{\circ}\text{C}$ | |
| Storage temperature | -40 to $80\text{ }^{\circ}\text{C}$ | |
| Process pressure | max. 50 bar | |

* **Determination of measurement inaccuracy according to GUM** (Guide to the Expression of Uncertainty in Measurement)

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

The following inaccuracies are used for the determination:

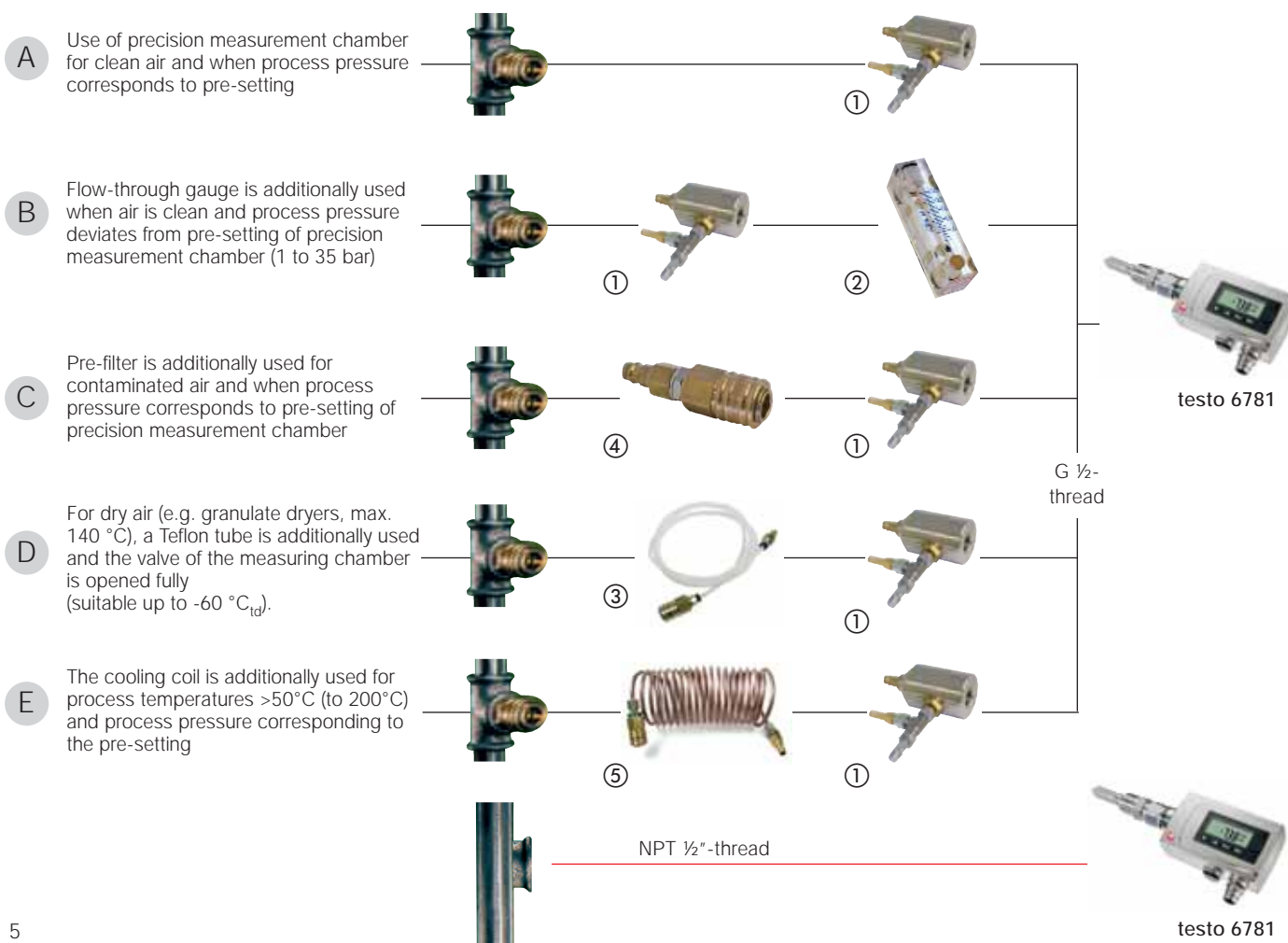
- Hysteresis
- Linearity
- Reproducibility
- Adjustment site/factory calibration
- Test site

This total view results in an additional dewpoint-dependent and process-dependent inaccuracy contribution of $\pm 0.03\text{ K} \times \text{measurement value (in } ^{\circ}\text{C}_{td}) + 0.2\text{ K} \times (25\text{ }^{\circ}\text{C} - \text{process temperature in } ^{\circ}\text{C})$

Accessories – tailored to every application

| Accessories for testo 6781 | Order no. |
|---|-------------|
| ① Precision measurement chamber up to 35 bar (ideal for lowest humidity) for optimum flow impact onto sensor with freely adjustable flow valve Pre-setting of valve: 1 l/min at 7 bar | 0554 3312 |
| ② Flow-through gauge for precision measurement chamber for adjusting specific flow impact onto sensor when process pressure deviates from pre-setting of flow valve | 0554 3313 |
| ③ 2 m Teflon hose with compressed air connections up to +140 °C / +284 °F (max. 9 bar / 130psi), only with measurement chamber (only up to -60 °C _{td}) | 0699 2824/4 |
| ④ Preliminary filter to protect measurement chamber and sensors against contamination | 0554 3311 |
| ⑤ Cooling coil for process temperatures higher than 50 °C (up to 200 °C), only with measurement chamber | 0554 3304 |
| Mains unit (desktop instrument) 110 to 240 VAC/24 VDC (350 mA) | 0554 1748 |
| Mains unit (top-hat rail mounting) 90 to 264 VAC/24 VDC (2.5 A) | 0554 1749 |
| Process display testo 54-2 AC, two relay outputs (to 250 VAC / 300 VDC, 3A), mains supply 90 to 230 VAC | 5400 7553 |
| Process display testo 54-7 AC, two relay outputs (to 250 VAC / 300 VDC, 3 A), mains supply 90 to 260 VAC, with RS485 output for online monitoring and with totalizer display | 54007555 |
| Certificates | |
| ISO calibration certificate, two adjustment points -10/-40 °C _{tpd} at 6 bar | 0520 0136 |
| Humidity ISO calibration certificate, pressure dewpoint measuring instruments, freely selectable calibration points from -40 to 0 °C _{tpd} at 6 bar (-40 to 32 °F _{tpd}) at 87 psi | 0520 0116 |

Selection assistance for applications



Optimizing processes and saving time in commissioning and maintenance

On-site adjustment

The Testo transmitters are delivered ready to use. For professional application, the following functions are available via the easy-to-use software

- Parameterization of unit and scale
- Sensor adjustment (1-point) and adjustment of the analog outputs
- Parameterization and adjustment history of all activities of the P2A software are registered in the PC

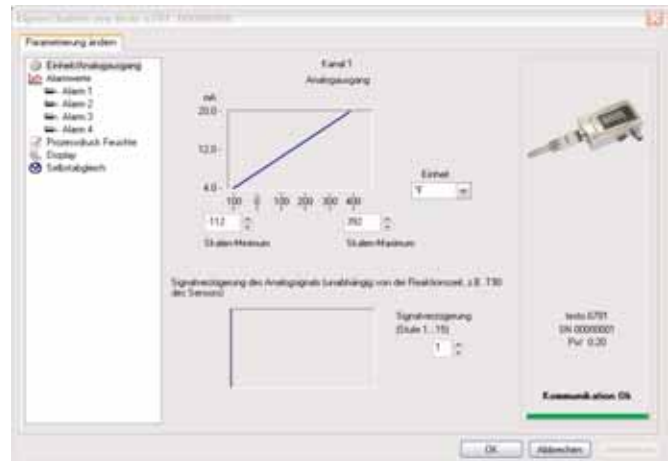
P2A software

A selected working point can be easily adjusted by manually entering a reference value.

Just a few operating steps are sufficient in the P2A software to carry out the adjustment.

Conclusion: Saved time and lower operating costs!

P2A software = **P**arameterization
Adjustment
Analysis



Using the P2A software, unit and scale can be easily parameterized, for example.

Integrate the testo 6781 into testo Saveris™

The measurement data monitoring system measures temperature and humidity values in the environment and in processes.



find out more at: www.testo.com/saveris

In industrial processes, exact temperatures, humidity values and pressure relationships play a crucial role.

In a multitude of applications, testo Saveris helps to collect, safely store and present these data wirelessly or via Ethernet. A selection of alarms that can be used flexibly supports the responsible parties to keep the values in the required range.

Now new:
Integrate the testo 6781 into testo Saveris™ using the testo Saveris analog coupler



- Integration of transmitters for all measurement parameters with standardized current and voltage interfaces, e. g. 4 to 20 mA, 0 to 10 V
- testo Saveris analog coupler available as a wireless or Ethernet version