Industrial Measuring Devices

A Passion for Precision
The highly demanding and complex measuring tasks of today can only be mastered with high-precision devices. The special requirements placed on hand-held measuring devices are the result of the spectrum of physical measurements that are to be measured, as well as the decisions that are based on this measured data. Architects, specialists and surveyors, engineers, climate experts and many other professionals bear the responsibility for people, technology, goods and processes. Whether you are investigating or recording the temperature of a surface without contact, the dew point temperature of air on walls, the moisture content of oil, air pressure or air flow, Lufft hand-held devices are easy to operate and – above all – precise!
The **XA1000 hand-held-measuring device** is an all-round device that fulfils the highest demands. Various high-precision climatic measuring technology sensors can be alternatively connected. The measurement results are displayed in high resolution colour displays both in graphic and numeric formats. The integrated data recorder allows the measurement results to be transferred to a computer; for this purpose the Lufft software SmartGraph3 is ready and waiting.

The **XP Series** consists of hand-held measuring devices for specialists. The highest temperature precision combined with the most modern handling of measured data. This also applies to airflow, temperature and relative humidity, as well as CO2. The ideal hand-held measuring device for any measuring task.

The **XC Series** rounds off the diverse range of hand-held measuring devices. A special option is the combination of temperature/relative humidity with (infrared) surface temperature in order to identify areas affected by dampness e.g. in the walls of buildings.

The **OPUS20 Dataloggers** are the stationary equivalent of the X-Series hand-held measuring devices. Many of the sensors offered can be used with both X-Series and OPUS20 Dataloggers. The devices are available with built-in sensors as well as with external sensors (intelligent) that can be connected. The OPUS20 are LAN capable and are configured and analyzed using SmartGraph3.

Functionality and Product Specs
With the **Lufft I-Box**, measurement instruments such as the data logger OPUS20 can easily be integrated into corporate networks. The “plug-and-play” solution gives a uniform query to live data from different instruments. Thus, all data can be clearly displayed. In addition, an application for controlling alarms is included. The applications can be extended to suit individual needs.

The **Software**
SmartGraph3 manages and files measured data from both hand-held measuring devices and dataloggers. The managing of data can be carried out in real time (LAN datalogger) or also in cyclical readouts of the monitoring network. The configuration section of SmartGraph3 allows the measuring components to be setup for their respective applications. If the scope of operation of SmartGraph is not adequate for a special application, then we offer the optional Software MCPS7 which fulfils all customer requirements up to and including customer-specific solutions.

**Brand of the Century**
As the only measurement technology company in its segment, Lufft was presented with this special award in 2012 as recognition for its uncompromising quality within the temperature measurement technology during its 100 year company history.

**Calibration** rounds off the quality requirements. Measuring devices without a measuring log lack traceability. The reference measurement in conjunction with reference norms ensures that your measuring device remains your reliable supplier of measured data throughout its entire period of use. Lufft is DKD-Labor certified for temperature, relative humidity, air pressure and airflow.
As tasks increase so do requirements. Lufft’s sophisticated measuring technology is more than a match for today’s high demands.
Lufft's hand-held measuring device product range is comprehensive and can be implemented in a full spectrum of various application areas. By using the table below you will be able to get an overview of the most important device features. This will enable you to find the right device from the various series that best meets your needs. Take your time and compare the range of functions offered with those of competitors’ products and you will discover that Lufft is in a class of its own.

The physical measurements offered are the most important factor when selecting a hand held device for various applications. For this purpose we have compiled a concise table to be used as a general overview. More detailed information regarding our measuring devices and connectable sensors can be found in the technical descriptions on the following pages.

### Functions

<table>
<thead>
<tr>
<th>Functions and Features of Lufft Measuring Devices</th>
<th>XA1000</th>
<th>XP100</th>
<th>XP101</th>
<th>XP200</th>
<th>XP400</th>
<th>XC200</th>
<th>XC250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour TFT-LCD (QVGA)</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
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<tr>
<td>Colour display</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Legible in sunlight</td>
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<td>Illumination dimmable</td>
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<td>☐</td>
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<tr>
<td>Touch operation</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>SmartGraph3 support (USB)</td>
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<tr>
<td>Firmware update possible online</td>
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<td>Firmware update possible offline</td>
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<td>☐</td>
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<tr>
<td>Interface for SDI and digital sensors</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>Data storage (200 data files/1Mio measured values)</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Low power design (&gt;24h@4xAA)</td>
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<tr>
<td>Intuitive operation</td>
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<tr>
<td>Graphical user interface</td>
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<tr>
<td>Big figures</td>
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<tr>
<td>Integrated sensors</td>
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</tbody>
</table>

### Measurement Categories

What you can measure with Lufft measuring devices - now and in the future.

<table>
<thead>
<tr>
<th>Measurement Categories</th>
<th>XA1000</th>
<th>XP100</th>
<th>XP101</th>
<th>XP200</th>
<th>XP400</th>
<th>XC200</th>
<th>XC250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C /°F)</td>
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<td>☐</td>
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<td>☐</td>
<td>☐</td>
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<tr>
<td>Air temperature</td>
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<td>☐</td>
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<td>☐</td>
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<tr>
<td>Surface temperature</td>
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<td>Infrared temperature (non-contact)</td>
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<tr>
<td>Dew point temperature of the air</td>
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<td>Dew point temperature on walls</td>
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<td>Humidity % RH</td>
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<tr>
<td>Absolute humidity</td>
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<tr>
<td>Airflow (m³/s)</td>
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<tr>
<td>Absolute pressure</td>
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<td>Air pressure</td>
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<td>CO₂</td>
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<tr>
<td>CO₂ concentration (ppm)</td>
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</tbody>
</table>
The multi-talented device on the measuring technology scene. One device instead of several – universal and flexible thanks to its digital sensor interface.
Without a doubt the XA Series represents the advanced technology in Lufft’s measuring device product range – a specially advanced device generation that utilises luminous colour displays and works with intelligent sensors. With the help of SmartGraph3, the recorded data taken from your measuring campaigns can be archived and analysed clearly.

The Smartphone for measurement technology – this was the requirement for the product development of the XA1000.

The ergonomic-optimised hand-held measuring device automatically recognises each connected sensor. The colour display reacts to your touch; alternatively the control pad below the display can be used to control the functions. In addition to the high-resolution representation of the measured values, the measuring curves can also be analysed in chronological sequence on the display.

As a special feature, the XA1000 comes with all possible calculations that can be determined with the help of the measured physical measurements: Dew point, wet-bulb temperature, absolute humidity, enthalpy and much more.

The Windows compatible SmartGraph3 software is included in delivery and in addition provides a clear representation and simple compilation of all measured data. This full-featured software can display measured values in both tables and graphs and possesses standard functions such as print and export, as well as zoom and scroll tools for specific, graphical analysis.

The saving of measuring campaigns is an important (functional) feature of portable hand-held measuring devices especially due to the frequent change of locations. The XA1000 permits the management of measured values at virtually any number of locations. This allocation of recorded measurements during analyses is made possible by SmartGraph3.

A complete package: the XA1000 is specially engineered for the requirements in the areas of heating/air conditioning and ventilation to measure temperature, humidity and air flow.
Measuring on the Go

- TFT colour display, legible in sunlight
- Capacitive touch operation
- Sampling rate 1s
- Data recording of up to 3 channels in parallel
- Graphical analysis with standard deviation resolution
- Integrated Flash memory for 200 recording blocks with maximum length of 3 hours
- USB port for data transfer to SmartGraph3 (included in delivery)
- Various languages selectable
- Measuring temperature, humidity, airflow via external digital sensors
- Integrated air pressure measurement
- Numerous calculated measurements
- Online firmware update

Robust technology in a sophisticated design.
Precision and reliability in one – made by professionals for professionals.
Hand-held Measuring Device XA1000 “All-in-ONE”

“All-rounder” in the measurement technology segment. A universal measuring device for professionals with the inclusion of exchangeable SDI Sensors. Highly precise measurements of temperature and relative humidity. Integrated air pressure sensor, online/offline data recording. Equipment test certificate, can be calibrated.

Order No. 5900.00

Technical data
- Dimensions: 170 x 62 x 34 mm
- Weight: ca. 205g

Storage conditions
- Permitted ambient temperature: -20...60°C
- Permitted rel. humidity: <90% RH non-condensing

Operating conditions
- Permitted rel. humidity: <90% RH (20g/m³) non-condensing
- Permitted altitude above sea level: 4000m

Power supply
- Power supply: 4 Alkaline LR6 AA 1.5V / USB 5V
- Active power consumption: Approx. 400mW
- Battery life passive: Approx. 1 year
- Battery life active: Min. 24 hours
- Sensor power supply: 5.5V ± 10% DC, max. 200mA

Data storage
- Integrated data storage: Up to 200 gauges taking approx. 1 mill. values

Interface
- USB: Cable and SmartGraph3 software included

Resolution
- Definition of measured values: 2 decimal places

Display
- Control: Touch screen, capacitive
- Technology: TFT, resolution 240x320, 65k colours, very good contrast due to Piezoresistive technology
- Surface, toughened glass: Degree of hardness: 7, scratch-resistant

Integrated air pressure sensor
- Measuring range (full accuracy): 800...1,100mbar
- Accuracy at 25°C, 1013.25mbar: 0.5mbar
- Long-term stability: typ. - 1mbar/year
- Measurement resolution: 0.0024mbar
- Measuring principle: Piezoresistive

Calculated measurement categories for external temperature/humidity sensors
- Mathematical: MIN/MAX/AVG/HOLD
- Temperature (°C/°F)
- Rel. humidity (% RH)
- Rel. humidity of ice (% RH)
- Water vapour density (absolute humidity) g/m³
- Dew point temperature (°C/°F)
- Frost point temperature (°C/F)
- Mixing ratio at saturation (100%) g/kg
- Volume fraction of water vapour /mass fraction of water vapour (%)
- Wet-bulb temperature (°C/°F)
- Ice-bulb temperature (°C/F)
- Specific Enthalpy (mass of air) kJ/kg
- Saturation vapour pressure above ice/water (hPa)
- Vapour pressure (hPa)
- Vapour particle pressure (hPa)
- Air density kg/m³

Calculated measurement categories for external airflow sensors
- Operating airflow volume - various units: (m³/s), (m³/h), (l/min)
- Standard airflow volume: DIN 1343 (°C, 1013.25hPa), ISO 2533 (15°C, 1013.25hPa), DIN 1945 (20°C, 1013.25hPa)
- Various units: (m³/s), (m³/min), (l/min)

Compatibility
- Sensor/probe: all SDI/digital sensors (temperature, humidity, SDI airflow, air pressure integrated)

Accessories
- Extension and/or connecting cable for digital sensor, 2m: 8120.KAB2
- Extension and/or connecting cable for digital sensor, 10m: 8120.KAB10

The most precise and flexible all-rounder instrument for professional applications-easy to handle and robust. Allows various intelligent sensors to be connected with automatic recognition, saves measuring campaigns, allows all climate data to be calculated and archived on a computer for further evaluation by SmartGraph3 software.

Compatible sensors for XA1000

<table>
<thead>
<tr>
<th>Temperature/humidity</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital TFF20</td>
<td>24</td>
</tr>
<tr>
<td>Allround SDI</td>
<td>24</td>
</tr>
<tr>
<td>5 mm diameter SDI</td>
<td>25</td>
</tr>
<tr>
<td>High temperature SDI</td>
<td>25</td>
</tr>
<tr>
<td>High-precision Temperature/Humidity Sensor</td>
<td>26</td>
</tr>
</tbody>
</table>

Airflow/temperature
- SDI (0...20m/s) 27
- SDI (0...20m/s) 27

CO₂
- CO₂ Sensor 26
A high utility item combining elegant design with ease of use.

X(pert) P(rofessional) Series

XP100

- TFT LCD, anti-glare colour display
- Capacitive touch screen
- Sampling rate 1s
- Data recording
- Graphical analysis including standard deviation
- Integrated flash memory with space for up to 200 data blocks, or up to three hours continuous recording
- USB port for data transfer to Smartgraph 3 (included in delivery)
- Multilingual interface
- Online firmware update
Hand-held measuring device XP100 for measuring temperature (-200…+800°C)

High-precision hand-held device for PT100 temperature sensors. Suitable for measuring tasks requiring a high degree of precision. Mini USB port with software and online data collection. 25 languages available, accuracy is 0.01°C across the full measuring range. Solely for use with PT100 sensors.

<table>
<thead>
<tr>
<th>Hand-held device XP100</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very exact temperature measuring device (±0.01°C). Ideal as a reference device and for comparison measurements in service or as part of ISO9000 tasks. We recommend a DAkkS calibration certificate for traceability to international standards.</td>
<td>5810.00</td>
</tr>
</tbody>
</table>

Technical data

- Dimensions: 170 x 62 x 34 mm
- Weight: Approx. 205g

Storage conditions

- Permitted ambient temperature: -20...60°C
- Permitted rel. humidity: <90% RH non-condensing

Operating conditions

- Permitted rel. humidity: <90% RH non-condensing

Power supply

- Power supply: 4 Alkaline LR6 AA 1.5V / USB 5V
- Active power consumption: Approx. 400mW
- Battery life passive: Approx. 1 year
- Battery life active: Min. 24 hours

Data storage

- Integrated data storage: Up to 200 data/approx. 1 Mio measured values

Interface

- USB: Cable and SmartGraph3 software included in delivery

Resolution

- Definition of measured values: 3 decimal places

Display

- Control: Touch screen, capacitive
- Technology: TFT, resolution 240x320, 65k colours, very good contrast, suitable for sunlight
- Surface: Toughened glass
  - Degree of hardness: 7, scratch-resistant

Accessories

- Extension and/or connecting cable for digital sensor, 2m: 8120.KAB2
- Extension and/or connecting cable for digital sensor, 10m: 8120.KAB10
- Power supply adapter: 8120.NT
- Connector for third-party sensors: 3120.50

More Information Lufft X-Series

www.lufft-xseries.com
X(pert) P(rofessional) Series

- TFT LCD, anti-glare colour display
- Capacitive touch screen
- Sampling rate 1s
- Data recording
- Graphical analysis including standard deviation
- Integrated flash memory with space for up to 200 data blocks, or up to three hours continuous recording
- USB port for data transfer to Smartgraph 3 (included in delivery)
- Multilingual interface
- Online firmware update

Ideal as reference standard
Temperature measuring device XP101
0.005°C accuracy

High-precision reference measurement standard for industrial temperature calibrations. Suitable as temperature reference in block calibrators, climate chambers or liquid baths. Mini USB interface with software, online data collection.

<table>
<thead>
<tr>
<th>Hand-held device XP101</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>The most accurate handheld device (0.005°C) for temperature. Ideal as reference standard. Excellent stability through multiple annealing cycles. Sensor characteristic curve is determined individually and is saved in the device. Integrated root 2 function for determination of the sensor self-heating, plus automatic elimination of parasitic thermovoltage. For traceability to national standards a DAkkS calibration certificate is attached.</td>
<td>5810.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Dimensions</th>
<th>170 x 62 x 34 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Approx. 205g</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Measurement range</td>
<td>-150…450°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.005°C at 0.005°C otherwise -40…+200°C 0.02°C</td>
<td></td>
</tr>
<tr>
<td>Measuring technique</td>
<td>Four terminal sensing</td>
<td></td>
</tr>
<tr>
<td>Reaction time</td>
<td>10s</td>
<td></td>
</tr>
<tr>
<td>Measuring current in normal operation</td>
<td>1 mA DC with duty cycle of 50% = 0.50 mA, 1.85 measurements/sec. Automatic elimination of thermo voltage</td>
<td></td>
</tr>
<tr>
<td>Measuring current “root 2 function</td>
<td>1 mA DC with duty cycle of 33% = 0.30 mA, 1.25 measurements/sec. Automatic elimination of thermo voltage</td>
<td></td>
</tr>
<tr>
<td>Integrated sensor characteristic curves</td>
<td>DIN EN IEC 60751 / ITS-90 or XP101-mode</td>
<td></td>
</tr>
</tbody>
</table>

| Storage conditions | Permitted ambient temperature | -20...60°C |
| Permitted rel. humidity | <90% RH non-condensing |
| Operating conditions | Permitted rel. humidity | <90% RH non-condensing |
| Permitted altitude above sea level | 4000m |
| Power supply | Power supply | 4 Alkaline LR6 AA 1.5V / USB 5V |
| Active power consumption | Approx. 400mW |
| Battery life passive | Approx. 1 year |
| Battery life active | Min. 24 hours |
| Data storage | Sensor power supply | 5.5V ± 10% DC, max. 200mA |
| Integrated data storage | Up to 200 data/approx. 1 Mio measured values |
| Interface | USB | Cable and SmartGraph3 software included in delivery |
| Resolution | Definition of measured values | 3 decimal places |
| Display | Control | Touch screen, capacitive |
| Technology | TFT, resolution 240x320, 65k colours, very good contrast, suitable for sunlight |
| Surface, toughened glass | Degree of hardness: 7, scratch-resistant |
| Accessories | Extension and/or connecting cable for digital sensor, 10m Power supply adapter | 8120.KAB10 8120.NT 8120.NT |

PT100 (immersion) probe, long

<table>
<thead>
<tr>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>Precision PT100, ceramic sensor, bifilar coiled, mineral insulated version</td>
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</table>

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Dimensions, probe</th>
<th>300 x 4 mm</th>
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</thead>
<tbody>
<tr>
<td>Dimensions, housing</td>
<td>119 x 27 x 35 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>120g</td>
<td></td>
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<tr>
<td>Protective housing</td>
<td>IP40</td>
<td></td>
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<tr>
<td>Max. permitted operating temperature</td>
<td>PUR cable and handle can be used up to 80°C</td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>XP100, XP101</td>
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</tbody>
</table>

High quality wooden case and PT100 ceramic sensor are included in delivery.
X(pert) P(rofessional) Series

- Genuine glass surface with high resolution colour display

Components:
- TFT LCD, anti-glare colour display
- Capacitive touch screen
- Sampling rate 1s
- Data recording simultaneously on up to 3 channels
- Graphical analysis including standard deviation
- Integrated flash memory with space for up to 200 data blocks, or up to three hours continuous recording
- USB port for data transfer to Smartgraph 3 (included in delivery)
- Multilingual interface
- Numerous dimensions calculated
- Online firmware update
Hand-held measuring device XP200/XP201 for measuring temperature and humidity

X-pert range for humidity and temperature measurements in climate and environmental technology.

<table>
<thead>
<tr>
<th>Hand-held measuring device XP200</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature and humidity measuring device compatible with various intelligent sensors. 5820.00</td>
<td></td>
</tr>
</tbody>
</table>

**Technical data**
- Dimensions: 170 x 62 x 34 mm
- Weight: Approx. 205g

**Storage conditions**
- Permitted ambient temperature: -20...60°C
- Permitted rel. humidity: <90% RH non-condensing

**Operating conditions**
- Permitted rel. humidity: <90% RH (20g/m³) non-condensing
- Permitted altitude above sea level: 4000m

**Power supply**
- Power supply: 4 Alkaline LR6 AA 1.5V / USB 5V
- Active power consumption: Approx. 400mW
- Battery life passive: Approx. 1 year
- Battery life active: Min. 24 hours

**Data storage**
- Sensor power supply: 5.5V ± 10% DC, max. 200mA
- Integrated data storage: Up to 200 data/approx. 1 Mio measured values

**Interface**
- USB: Cable and SmartGraph3 software included

**Resolution**
- Definition of measured values: 2 decimal places

**Display**
- Control: Touch screen, capacitive
- Technology: TFT, resolution 240x320, 65k colours, very good contrast due to Piezoresistive technology
- Surface, toughened glass: Degree of hardness: 7, scratch-resistant

**Integrated air pressure sensor**
- Measuring range (full accuracy): 800...1,100mbar
- Accuracy at 25°C, 1013.25mbar: 0.5mbar
- Long-term stability: typ. - 1mbar/year
- Measurement resolution: 0.024mbar
- Measuring principle: Piezoresistive

**Calculated measurement categories for external temperature/humidity sensors**
- Mathematical: MIN/MAX/AVG/HOLD
- Temperature (°C/°F)
- Rel. humidity (% RH)
- Rel. humidity of ice (% RH)
- Water vapour density (absolute humidity) g/m³
- Dew point temperature (°C/°F)
- Frost point temperature (°C/°F)
- Mixing ratio at saturation (100%) g/kg
- Volume fraction of water vapour /mass fraction of water vapour (%)
- Wet-bulb temperature (°C/°F)
- Ice-bulb temperature (°C/°F)
- Specific Enthalpy (mass of air) kJ/kg
- Saturation vapour pressure above ice/water (hPa)
- Water vapour particle pressure (hPa)
- Air density kg/m³

**Accessories**
- Extension and/or connecting cable for digital sensor, 2m: 8120.KAB2
- Extension and/or connecting cable for digital sensor, 10m: 8120.KAB10

**Compatible sensors for XP200**

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatur/humidity</td>
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<tr>
<td>Digital TFF20</td>
</tr>
<tr>
<td>High-precision Temperature/Humidity Sensor</td>
</tr>
<tr>
<td>Allround SDI</td>
</tr>
<tr>
<td>5 mm diameter SDI</td>
</tr>
<tr>
<td>High temperature SDI</td>
</tr>
<tr>
<td>CO₂</td>
</tr>
</tbody>
</table>

More Information Lufft X-Series

www.lufft-xseries.com
Flow measurements with time chart on a high resolution display

XP400

- TFT LCD, anti-glare colour display
- Capacitive touch screen
- Sampling rate 1s
- Data recording simultaneously on up to 3 channels
- Graphical analysis including standard deviation
- Integrated flash memory with space for up to 200 data blocks, or up to three hours continuous recording
- USB port for data transfer to Smartgraph 3 (included in delivery)
- Multilingual interface
- Current measurement via external, digital sensors
- Integrated atmospheric pressure measurement ability
- Numerous dimensions calculated
- Online firmware update
Hand-held measuring device XP400 for measuring airflow

Ideal for volume measurements, air intake and air discharge measurements in climate measuring technology. Data memory and software.

### Hand-held measuring device XP400

#### Technical data
- **Dimensions**: 170 x 62 x 34 mm
- **Weight**: Approx. 205g

#### Storage conditions
- Permitted ambient temperature: -20...60°C
- Permitted rel. humidity: <90% RH non-condensing

#### Operating conditions
- Permitted rel. humidity: <90% RH (20g/m³) non-condensing
- Permitted altitude above sea level: 4000 m

#### Power supply
- Power supply: 4 Alkaline LR6 AA 1.5V / USB 5V
- Active power consumption: Approx. 400mW
- Battery life passive: Approx. 1 year
- Battery life active: Min. 24 hours
- Sensor power supply: 5.5V ± 10% DC, max. 200mA

#### Data storage
- Integrated data storage: Up to 200 data/approx. 1 Mio measured values

#### Interface
- USB: Cable and SmartGraph3 software included in delivery

#### Resolution
- Definition of measured values: 2 decimal places

#### Display
- Control: Touch screen, capacitive
- Technology: TFT, resolution 240x320, 65k colours, very good contrast due to Piezoresistive technology
- Surface, toughened glass: Degree of hardness: 7, scratch-resistant

#### Integrated air pressure sensor
- Measuring range (full accuracy): 800...1,100mbar
- Accuracy at 25°C,1013.25mbar: 0.5mbar
- Long-term stability: typ. - 1mbar/year
- Measurement resolution: 0.024mbar
- Measuring principle: Piezoresistive

#### Calculated measurement categories for external airflow sensors
- Operating airflow volume - various units: (m³/s), (m³/min), (l/min)
- Various units: (m³/s), (m³/min), (m³/h), (l/min)

#### Accessories
- Extension and/or connecting cable for digital sensor, 2m
- Extension and/or connecting cable for digital sensor, 10m

#### Compatible sensors for XP400

<table>
<thead>
<tr>
<th>Category</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow/SDI</td>
<td>27</td>
</tr>
<tr>
<td>Temperature</td>
<td>27</td>
</tr>
</tbody>
</table>

More Information Lufft X-Series

www.lufft-xseries.com
Measuring devices with high resolution display

- Two lines color display with large digits
- Accurate measurement of temperature and relative humidity
- Calculation of dew point temperature of the ambient air
- Calculation of mixed ratio
- Display of MAX, MIN, HOLD, AVG and ACT, easily selectable
- Easy-to-use touch operations (capacitive)
- USB interface for SmartGraph3 software
- Easy to use
- Calibration certificate
Hand-held measuring device XC200 for measuring temperature and humidity

The powerful and compact handheld device with state-of-the-art and robust design. Excellent accuracy. The high-resolution color screen displays rel. humidity, temperature and dew point. Excellent readability. The calibration function (offset correction) guarantees the long-term use without compromising the accuracy.

<table>
<thead>
<tr>
<th>Hand-held measuring device XC200</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excellent accuracy of temperature and relative humidity. Display of calculations and statistical functions. Adjustment of local pressure and local height possible. Calibration function and offset correction. Including a calibration certificate. USB interface with SmartGraph3 software.</strong></td>
<td>5700.00</td>
</tr>
</tbody>
</table>

**Technical data**

- **Dimensions**: 170 x 60 x 35 mm
- **Weight**: Approx. 250g
- **Temperature Sensor**: NTC
  - **Measurement range**: -20...50°C
  - **Accuracy**: ± 0.2°C (0...40°C) otherwise ± 0.4°C
  - **Resolution**: 0.1°C
- **Humidity Sensor**: Capacitive
  - **Measurement range**: 0...100% RH
  - **Accuracy**: ± 2% RH
  - **Resolution**: 0.1% RH
- **Calculations**: Dew point temperature °C or °F
  - Absolute humidity g/m³
  - Mixed ratio g/kg or gr/lb
- **Functions**: Statistical calculations MAX, MIN, HOLD, AVG, ACT, Temperature correction and humidity correction factors (offset)
  - Power saving functions

**Storage conditions**

- **Permitted ambient temperature**: -20...60°C
- **Permitted rel. humidity**: <95% RH non-condensing

**Operating conditions**

- **Permitted ambient temperature**: -20°C...50°C
- **Permitted rel. humidity**: <90% RH
- **Permitted altitude above sea level**: 3000m

**Power supply**

- **Power consumption**: 5.5V ± 10% DC, max 200mA
- **Active power consumption**: Approx. 70mA
- **Passive power consumption**: Approx. 40μA
- **Battery life**: Approx. 24h (2.6Ah battery capacity)

**Warranty**

- **12 months**

**Accessories**

- **Case for hand-held-measuring device**: 5800.BAG
- **Stainless steel sinter filter**: 5120.212

More Information Lufft X-Series

www.lufft-xseries.com
(e)XC(lusiv) Series

- Precision of the xc200 combined with a high-precision pyrometer (+/-0.5 °C @ 0°C ... 50°C)
- Noncontact temperature measurement
- Continuous measurand output of the thermopile to the LCD
- Adjustable emmissivity, to adapt to different surfaces
- Pyrometer is laser assisted
- Configurable condensation/dew alarm with contact-free measurings (Application: e.g. detect molds)
- Two lines color display with large digits
- Accurate measurement of temperature and relative humidity
- Calculation of dew point temperature of the ambient air
- Calculation of mixed ratio
- Display of MAX, MIN, HOLD, AVG and ACT, easily selectable
- Easy-to-use touch operations (capacitive)
- USB interface for SmartGraph3 software
- Calibration certificate
The powerful and compact handheld device with state-of-the-art and robust design. Excellent accuracy. The high-resolution color screen displays rel. humidity, temperature and dew point. Excellent readability. The calibration function (offset correction) guarantees the long-term use without compromising the accuracy.

Special features: Contact-free temperature measurement

<table>
<thead>
<tr>
<th>Hand-held measuring device XC250</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent accuracy of temperature and relative humidity, Contact-free temperature measurement. Display of calculations and statistical functions. Adjustment of local pressure and local height possible. Calibration function and offset correction. Including a calibration certificate. USB interface with SmartGraph3 software.</td>
<td>5725.00</td>
</tr>
</tbody>
</table>

### Technical data

<table>
<thead>
<tr>
<th>Element</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>170 x 60 x 35 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 250g</td>
</tr>
</tbody>
</table>

### Temperature Sensor

<table>
<thead>
<tr>
<th>Principle</th>
<th>NTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>-20...50°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.2°C (0...40°C) otherwise ± 0.4°C</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1°C</td>
</tr>
</tbody>
</table>

### Surface temperature

<table>
<thead>
<tr>
<th>Principle</th>
<th>Thermopile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>-70 ... 380 °C</td>
</tr>
<tr>
<td>Unit</td>
<td>°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.5°C (0...50°C) otherwise ± 4°C</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Humidity Sensor

<table>
<thead>
<tr>
<th>Principle</th>
<th>Capacitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>0...100% RH</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 2% RH</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1% RH</td>
</tr>
</tbody>
</table>

### Calculations

- Dew point temperature °C or °F
- Absolute humidity g/m³
- Mixed ratio g/kg or gr/lb
- Statistical calculations MAX, MIN, HOLD, AVG, ACT.
- Temperature correction and humidity correction factors (offset)

### Storage conditions

- Permitted ambient temperature: -20...60°C
- Permitted rel. humidity: <95% RH non-condensing

### Operating conditions

- Permitted ambient temperature: -20°C...50°C
- Permitted rel. humidity: <90% RH

### Power supply

- Power consumption: 5.5V ± 10% DC, max 200mA
- Stromaufnahme aktiv: Approx. 70mA
- Stromaufnahme passiv: Approx. 40μA
- Batterielebensdauer: Approx. 24h (2.6Ah battery capacity)

### Warranty

12 months

### Accessories

- Case for hand-held-measuring device
- Stainless steel sinter filter

More Information Lufft X-Series
www.lufft-xseries.com
PT100 immersion probe

**Technical data**
- Dimensions, probe, short: 150 x 3 mm
- Dimensions, probe, long: 300 x 3 mm
- Dimensions, housing: 119 x 27/35 mm
- Weight: 100g/120g
- Protective housing: IP40
- Max. permitted operating temperature: PUR cable and handle can be used up to 80°C
- Storage temperature: -40°C...60°C

**Temperature**
- Measurement range: -40...400°C
- Accuracy: ±0.15 + 0.002 x t
- Measuring technique: Four terminal sensing
- Reaction time: 10 s

**Compatibility**
- XP100

**Accessories**
- Extension cable for sensor, 2m

---

PT100 (immersion) probe, long

**Order No.** 3120.540

**Technical data**
- Dimensions, probe: 300 x 4 mm
- Dimensions, housing: 119 x 27/35 mm
- Weight: 120g
- Protective housing: IP40
- Max. permitted operating temperature: PUR cable and handle can be used up to 80°C

**Temperature**
- Measurement range: -40...400°C
- Accuracy: ±0.03 + 0.002 x t
- Measuring technique: Four terminal sensing
- Reaction time: 10 s

**Compatibility**
- XP100

**Accessories**
- Extension and/or connecting cable for digital sensor, 2m

---

PT100 stainless steel food probe

**Order No.** 3120.550

**Technical data**
- Dimensions, probe: 150 x 4 mm
- Dimensions, housing: 110 x 16 mm
- Weight: 220g
- Protective housing: IP65
- Max. permitted operating temperature: PUR cable and handle can be used up to 80°C
- Lagertemperatur: -40°C...60°C

**Temperature**
- Measurement range: -40...400°C
- Accuracy: ±0.03 + 0.002 x t
- Measuring technique: Four terminal sensing
- Reaction time: 10 s
- Cable length: Approx. 1m

**Compatibility**
- XP100
### PT100 surface probe

**Order No.** 3120.600

**Technical data**
- **Dimensions, probe**: 150 x 4.5 mm
- **Dimensions, housing**: 119 x 27/35 mm
- **Weight**: 120g
- **Protective housing**: IP40
- **Max. permitted operating temperature**: PUR cable and handle can be used up to 80°C

**Temperature**
- **Measurement range**: -50 ... 400 °C
- **Accuracy**: ±0.3 + 0.005 x t
- **Reaction time t90**: Approx. 30s
- **Measuring technique**: Four terminal sensing

**Compatibility**
- XP100

**Accessories**
- Extension and/or connecting cable for digital sensor, 2m 8120.KAB2

---

### Immersion probe

**Order No.** 3120.560

**Technical data**
- **Dimensions, probe**: 150 x 4 mm
- **Dimensions, housing**: 119 x 27/35 mm
- **Weight**: 120g
- **Protective housing**: IP40
- **Max. permitted operating temperature**: PUR cable and handle can be used up to 80°C
- **Storage temperature**: -40 … 80 °C

**Temperature**
- **Measurement range**: -40 … 400 °C
- **Accuracy**: ±0.03 + 0.002 x t
- **Reaction time t90**: Approx. 30s
- **Measuring technique**: Four terminal sensing

**Compatibility**
- XP100

**Accessories**
- Extension and/or connecting cable for digital sensor, 2m 8120.KAB2

---

### Temperature probe

**Order No.** 8160.TF

**Technical data**
- **Dimensions**: Length 50mm, Ø 6mm
- **Output signal**: Resistance
- **Weight**: 370g
- **Cable length**: 50m
- **Protection type**: IP68
- **Connector**: COMBICON Phönix
- **Operating temp.**: -50...150°C
- **Operating rel. humidity**: 0...100% RH
- **Accuracy**: Class A

**Temperature**
- **Principle**: PT100
- **Measuring range**: -50 ... 150 °C
- **Accuracy**: ±0.2K@80°C

---

More Information Lufft X-Series
www.lufft-xseries.com
### Allround SDI Temperature/Humidity Sensor

**Order No.** 9130.540

#### Technical Data

- **Dimensions**
  - Sensor: Length 74 mm, Ø 12 mm
  - Housing: 117 x 38 mm
- **Weight**
  - Approx. 80 g
- **Protection**
  - Housing/Sensor: IP40
  - Sensor head: plastic mesh
- **Permitted operation temp.**
  - 0...30°C
- **Permitted humidity**
  - 0...100% RH
- **Storage temperature**
  - -20...60°C
- **Storage humidity**
  - 20...80% RH

#### Relative Humidity

- **Measurement range**
  - 0...100% RH
- **Accuracy**
  - ± 2% (0...90%), ± 3% (90...100%) RH
- **Resolution**
  - 0.1% RH
- **Principle**
  - Capacitive

#### Temperature

- **Measurement range**
  - -20...70°C
- **Accuracy (20°C)**
  - ± 0.2°C
- **Accuracy (-10...50°C)**
  - ± 0.4°C otherwise ± 0.5°C
- **Resolution**
  - 0.1°C
- **Principle**
  - NTC

#### Compatibility

- XA1000, XP200

#### Accessories

- Stainless steel sinter cap
- Calibration salt 11.3% RH
- Calibration salt 32.8% RH
- Calibration salt 52.9% RH
- Calibration salt 75.3% RH
- Calibration salt 90.1% RH
- Calibration adapter

---

### Digital TFF20

**Order No.** 8120.TFF

#### Technical Data

- **Dimensions**
  - Length 85 mm, Ø 12 mm
- **Weight**
  - Approx. 50 g
- **Protection**
  - Polycarbonate / IP65
- **Permitted operation temp.**
  - 0...50°C
- **Permitted humidity**
  - 0...100% RH
- **Storage temperature**
  - -20...60°C
- **Storage humidity**
  - 20...80% RH

#### Relative Humidity

- **Measurement range**
  - 0...100% RH
- **Accuracy**
  - ± 2% (0...90%), ± 3% (90...100%) RH
- **Resolution**
  - 0.01% RH
- **Principle**
  - Capacitive

#### Temperature

- **Measurement range**
  - -40...80°C
- **Accuracy (20°C)**
  - ± 0.1°C
- **Accuracy (0...40°C)**
  - ± 0.2°C otherwise ± 0.5°C
- **Resolution**
  - 0.01°C
- **Principle**
  - PT1000, Class A, DIN EN 60751

#### Absolute Humidity

- **Measurement range**
  - 0...300 g/m³
- **Unit**
  - g/m³

#### Dew Point Temp.

- **Measurement range**
  - -40...80°C

#### Mixing Ratio

- **Measurement range**
  - 0...550 g/kg

#### Compatibility

- XA1000, XP200, OPUS20E

#### Accessories

- Stainless steel sinter cap
- Extension and/or connecting cable for digital sensor, 2m
- Calibration salt 11.3% RH
- Calibration salt 32.8% RH
- Calibration salt 52.9% RH
- Calibration salt 75.3% RH
- Calibration salt 90.1% RH
- Calibration adapter

---

More Information Lufft X-Series

[www.lufft-xseries.com](http://www.lufft-xseries.com)
Temperature/Humidity Sensor

**SDI Temperature-/Humidity Sensor with 5mm Diameter**

**Order No.** 9130.520

*Compact, slim temperature-/humidity sensor in stainless steel protective tube. With a diameter of only 5mm, the sensor is suitable for applications in measurement areas that are difficult to access.*

<table>
<thead>
<tr>
<th>Technical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions sensor tube</td>
<td>Length 250mm, Ø 5mm</td>
</tr>
<tr>
<td>Dimensions housing</td>
<td>117 x 38mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 85g</td>
</tr>
<tr>
<td>Protection Housing/sensor IP40</td>
<td>sensor head: screwable, stainless steel cap, PTFE filter</td>
</tr>
<tr>
<td>Permitted operation temp.</td>
<td>0...50°C</td>
</tr>
<tr>
<td>Permitted humidity</td>
<td>0...100% RH</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20...60°C</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>20...80% RH</td>
</tr>
</tbody>
</table>

**Relative Humidity**

- **Measurement range**: 0...100% RH
- **Accuracy**: ± 2 % (0...90 %), ± 3 % (90...100 %) RH
- **Resolution**: 0.1% RH
- **Principle**: Capacitive

**Temperature**

- **Measurement range**: -40...100°C
- **Accuracy**: ± 0.2°C at 20°C otherwise ± 0.7°C
- **Resolution**: 0.1°C
- **Principle**: PT1000 (tolerance class B, DIN EN 60751)

**Compatibility**

- **XA1000, XP200**

**Accessories**

- Extension and/or connecting cable for digital sensor, 2m 8120.KAB2
- Calibration salt 11.3% RH 5700.113
- Calibration salt 32.8% RH 5700.328
- Calibration salt 52.9% RH 5700.529
- Calibration salt 75.3% RH 5700.753
- Calibration salt 90.1% RH 5700.901
- Calibration adapter 5700.A06

**SDI High Temperature-/Humidity Sensor**

**Order No.** 9130.530

*Stainless steel sensor equipped with a Teflon probe is especially suitable for high temperature/humidity measurements.*

<table>
<thead>
<tr>
<th>Technical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions sensor tube</td>
<td>Length 250mm, Ø 12mm</td>
</tr>
<tr>
<td>Dimensions housing</td>
<td>117 x 38mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 200g</td>
</tr>
<tr>
<td>Protection Housing/sensor IP40</td>
<td>sensor head: stainless steel sinter filter</td>
</tr>
<tr>
<td>Permitted operation temp.</td>
<td>0...50°C</td>
</tr>
<tr>
<td>Permitted humidity</td>
<td>0...100% RH</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20...60°C</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>20...80% RH</td>
</tr>
</tbody>
</table>

**Relative Humidity**

- **Measurement range**: 0...100% RH
- **Accuracy**: ± 2 % (0...90 %), ± 3 % (90...100 %) RH
- **Resolution**: 0.1% RH
- **Principle**: Capacitive

**Temperature**

- **Measurement range**: -40...180°C (grip of sensing probe up to 80°C)
- **Accuracy**: ± 0.2°C at 20°C otherwise ± 0.7°C
- **Resolution**: 0.1°C
- **Principle**: PT1000 (tolerance class B, DIN EN 60751)

**Compatibility**

- **XA1000, XP200**

**Accessories**

- Extension and/or connecting cable for digital sensor, 2m 8120.KAB2
- Calibration salt 11.3% RH 5700.113
- Calibration salt 32.8% RH 5700.328
- Calibration salt 52.9% RH 5700.529
- Calibration salt 75.3% RH 5700.753
- Calibration salt 90.1% RH 5700.901
- Calibration adapter 8120.ADAP

More Information Lufft X-Series
www.lufft-xseries.com
**Temperature/Humidity Sensor**

<table>
<thead>
<tr>
<th>High-precision Temperature/Humidity Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-precision Temperature/Humidity Sensor</strong></td>
<td><strong>8130.TFF</strong></td>
</tr>
</tbody>
</table>

**Technical data**
- Measurement accuracy incl. reproducibility and hysteresis:
  - Humidity*: 15...30°C: ±0.5% RH
  - 0...50°C: ±0.8% RH
  - -20...80°C: ±2.5% RH

**Temperature**
- Measuring range: -20...80°C
- Operating temperature: -20...80°C
- Storage temperature: -10...60°C (non-condensing)
- Principle: NTC
- Accuracy: 0.15°C between 0…+70°C, otherwise 0.25°C

**Relative humidity**
- Principle: Resistive-electrolytic
- Measuring range: 0...100%

**Housing**
- Material: PVDF black
- Mechanical sensor protection: Standard polyethylene dust filter

**Compatibility**
- XA1000, XP200, OPUS20E

**Accessories**
- Calibration salt 11.3% RH: 5700.113
- Calibration salt 32.8% RH: 5700.328
- Calibration salt 52.9% RH: 5700.529
- Calibration salt 75.3% RH: 5700.753
- Calibration salt 90.1% RH: 5700.901
- Calibration adapter: 5700.A13

* The humidity accuracy refers to the nominal values of Novasina humidity standards, which refer to the Greenspan Report.

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**CO₂ Sensor**

<table>
<thead>
<tr>
<th>CO₂ Sensor</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CO₂ Sensor</strong></td>
<td><strong>7120.CO2</strong></td>
</tr>
</tbody>
</table>

**Technical data**
- Dimensions: Length 96 mm, Ø 18.5 mm
- Operating temp.: -40...60°C
- Operating humidity range: 0...100% RH (non-condensing)
- Admissible air pressure: 850...1100hPa
- Storage temp.: -40...60°C
- Storage humidity: 0...100% RH (non-condensing)
- Storage pressure: 700...1100hPa
- Temperature dependency: typ. 1ppm CO₂ | °C (-20...45°C)
- Outputs: Digital RS485-BUS
- Power supply: 4.75...7.5V DC, max. 350mA for 0.05s
- Electrical connection: Connector M12
- Electromagnetic compatibility (Industrial environment): EN61326-1
  - EN61326-2-3

**CO₂**
- Principle: Dual wavelength, non-dispersive infrared technology (NDIR)
- Measuring range: 0...5000 ppm
- Accuracy: at 25°C and 1013mbar: < ±50ppm +3% of measuring value (for averaging output)

**Housing**
- Material: Plastic PC
- Protection level: IP65

**Compatibility**
- XA1000, XP200

**Accessories**
- Y Connector for Temperature/Humidity and CO₂ sensor (IAQ-Indoor Air Quality Measurement): 8120.STY

The CO₂ probe is designed for use in harsh, demanding OEM applications. A multiple point CO₂ and temperature adjustment procedure leads to excellent CO₂ measurement accuracy over the entire temperature working range, ideal for use in agriculture or outdoors for instance. The probe incorporates the dual wavelength NDIR CO₂ sensor, which compensates for aging effects, is highly insensitive to pollution and stands for outstanding long term stability. The measured data range of up to 10000ppm is available on the Modbus or on the E2 digital interface.

An optional kit facilitates easy configuration and adjustment. The measurement interval can be set according to the application requirements, by this the average current consumption can be reduced to 120μA for battery-operated devices.

More Information Lufft X-Series
www.lufft-xseries.com
## SDI Airflow-/Temperature Sensor (0...2m/s) (0...20m/s)

### Technical data

**Dimensions**
- Sensor tube: Length 200mm, Ø 6mm
- Housing: 117 x 38mm

**Weight**
- Approx. 200g

**Protection**
- Housing: plastic (ABS) IP40
- Sensor head: stainless steel

**Permitted operation temp.**
- 0...50°C

**Permitted humidity**
- 0...95% RH

**Storage temperature**
- -20...60°C

**Storage humidity**
- 20...80% RH

### Airflow

**Measurement range**
- 0...2m/s

**Accuracy**
- ± (0.08m/s + 1% of measured value)

**Resolution**
- 0.01 m/s

**Principle**
- Hot film anemometer

### Temperature

**Measurement range**
- -20...70°C

**Accuracy**
- ± 0.7°C in the range 0...+50°C

**Resolution**
- 0.1°C

**Principle**
- NTC

### Compatibility
- XA1000

### Accessories
- Extension and/or connecting cable for digital sensor, 2m

---

## More Information Lufft X-Series

www.lufft-xseries.com
Eliminate Fatal Consequences

OPUS 20 Datalogger: threshold values always under control
### Lufft OPUS20 Functions

<table>
<thead>
<tr>
<th>Functions</th>
<th>THI 8120.00</th>
<th>THIP 8120.10</th>
<th>TCO 8120.20</th>
<th>Lufft OPUS20 E 8120.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply battery</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Power supply USB</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Power supply LAN (POE)</td>
<td>☐ (optional)</td>
<td>☐ (optional)</td>
<td>☐ (optional)</td>
<td>☐ (optional)</td>
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<tr>
<td>Measured data storage</td>
<td>3,200,000</td>
<td>3,200,000</td>
<td>3,200,000</td>
<td>3,200,000</td>
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<tr>
<td>Typical battery life</td>
<td>&gt; 1 year</td>
<td>&gt; 1 year</td>
<td>&gt; 4 months</td>
<td>&gt; 4 months</td>
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<tr>
<td>LC-display</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>One-button operation</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>1-point calibration by user/operator</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>°C/°F switchable</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Optical/acoustical alarm</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Date/time</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Records Min/Max/Avg.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>SmartGraph 3 evaluation software</td>
<td>☐</td>
<td>☐</td>
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<table>
<thead>
<tr>
<th>Measurement Categories</th>
<th>THI 8120.00</th>
<th>THIP 8120.10</th>
<th>TCO 8120.20</th>
<th>Lufft OPUS20 E 8120.30</th>
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<tbody>
<tr>
<td>Temperature</td>
<td></td>
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<tr>
<td>Air temperature</td>
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<td>PT100</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Thermocouple</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>Humidity</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
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<td>☐</td>
<td>☐</td>
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<td>Absolute humidity</td>
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<td>Dew point temperature</td>
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<td>Barometric air pressure</td>
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<tr>
<td>CO₂ Concentration</td>
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<td></td>
</tr>
<tr>
<td>CO₂ Concentration</td>
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<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>External BUS-enabled digital sensor</td>
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<td></td>
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<tr>
<td>TFF20</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>External analog Input</td>
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<tr>
<td>Sensor input voltage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sensor input electric current</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Function Table Software</th>
<th>THI 8120.00</th>
<th>THIP 8120.10</th>
<th>TCO 8120.20</th>
<th>Lufft OPUS20 E 8120.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical representation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Numerical data (measured value display)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Print function</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Export function for measured values (e.g. Excel)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Gathered printouts of all measurement sites</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Administration of up to 255 measuring devices</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

* via external BUS-enabled sensor, optionally, max. 4 sensors with one OPUS20E
** via external analog sensors, optionally, 2 separate analog inputs
*** near analog/digital conversion of 0…1V, 0/4 … 20 ma possible

---

**THI**

**THIP**

**TCO**

**Lufft OPUS20 E**
The only LAN datalogger with built-in sensors and the highest precision

For climate monitoring in buildings and the control of all climate-sensitive production processes, in electronic data-processing centres, control cabinets, wind turbines, storage rooms and museums.

The OPUS20 runs on batteries or can be powered via USB. Alternatively, you have the possibility to power the device via POE (Power over Ethernet).
Finally available: Lufft’s precise Climate Station for interior applications – an essential data collector for all calibration laboratories.

<table>
<thead>
<tr>
<th>Lufft OPUS20 THIP Temperature, Relative Humidity, Air Pressure</th>
<th>Order-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lufft OPUS20 THIP Temperature / Rel. Humidity / Air Pressure</td>
<td>8120.10</td>
</tr>
<tr>
<td>(neutral without Lufft-Logo 8120.10N)</td>
<td></td>
</tr>
<tr>
<td>Lufft OPUS20 THIP Temperature / Rel. Humidity / Air Pressure PoE</td>
<td>8120.11</td>
</tr>
<tr>
<td>(neutral without Lufft-Logo 8120.11N)</td>
<td></td>
</tr>
</tbody>
</table>

**Technical data**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>length 166 mm, width 78 mm, depth 32 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement rate</td>
<td>10/30s, 1/10/12/15/30min, 1/3/6/12/24h</td>
</tr>
<tr>
<td>Storage rate</td>
<td>1/10/12/15/30min, 1/3/6/12/24h</td>
</tr>
<tr>
<td>Construction</td>
<td>plastic housing</td>
</tr>
<tr>
<td>Operation life (battery)</td>
<td>&gt; 1 Year</td>
</tr>
<tr>
<td>Data storage</td>
<td>16 MB, 3,200,000 measured values</td>
</tr>
<tr>
<td>LC-Display</td>
<td>size 90x64 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 250g</td>
</tr>
<tr>
<td>Included in delivery</td>
<td>PC-Windows Software SmartGraph 3 for graphical and numerical representation of measured values / instruction manual / data cable / battery / DIN rail bracket</td>
</tr>
<tr>
<td>Interface</td>
<td>USB, LAN</td>
</tr>
<tr>
<td>Power supply</td>
<td>4 x LR6 AA Mignon, USB, (PoE opt.)</td>
</tr>
<tr>
<td>Max. operation temperature</td>
<td>-20...50°C</td>
</tr>
<tr>
<td>Max. rel. humidity</td>
<td>0...-95% RH≤20g/m³ (non condensing)</td>
</tr>
<tr>
<td>Max. altitude</td>
<td>10,000 m above sea level</td>
</tr>
<tr>
<td>Temperature</td>
<td>Principle NTC</td>
</tr>
<tr>
<td>Measurement range</td>
<td>-20...50°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.3°C (0...-40°C), otherwise 0.5°C</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1°C</td>
</tr>
<tr>
<td>Rel. humidity</td>
<td>Principle capacitive</td>
</tr>
<tr>
<td>Measurement range</td>
<td>0...100% RH</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±2% RH</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1% RH</td>
</tr>
<tr>
<td>Air pressure</td>
<td>Measurement range 300...1,300 hPa abs.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>700...1,100 mbar at 25°C ±0.5 hPa</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 hPa</td>
</tr>
<tr>
<td>Accessories</td>
<td>4 x LR6 AA Mignon</td>
</tr>
<tr>
<td></td>
<td>8120.SV1</td>
</tr>
<tr>
<td></td>
<td>Power supply adapter</td>
</tr>
<tr>
<td></td>
<td>8120.NT</td>
</tr>
</tbody>
</table>

**Temperature**

- Principle: NTC
- Measurement range: -20...50°C
- Accuracy: ±0.3°C (0...-40°C), otherwise 0.5°C
- Resolution: 0.1°C

**Rel. humidity**

- Principle: capacitive
- Measurement range: 0...100% RH
- Accuracy: ±2% RH
- Resolution: 0.1% RH

**Air pressure**

- Measurement range: 300...1,300 hPa abs.
- Accuracy: 700...1,100 mbar at 25°C ±0.5 hPa
- Resolution: 0.1 hPa

**Accessories**

- 4 x LR6 AA Mignon
- 8120.SV1
- Power supply adapter
- 8120.NT
The amount of carbon dioxide has been virtually constant at 280 ppm (parts per million) – i.e. 280 gas molecules per million air molecules – the last ten thousand years. However in recent years, this measured value has been increasing rapidly at approx. 2% per year.

A high level of CO₂ in the air within a room causes headaches, tiredness and lack of concentration. The regulation on CO₂ concentration was established in order to evaluate IAQ (Indoor Air Quality). Normal atmospheric air in so-called ‘clean air areas’ has a level of 360 ppm and approx. 500 ppm in urban areas. The limit of 1,000 ppm (“Pettenkofer Figure”) is still seen as being adequate indoor-air quality, which is especially important when regarding all meetings and conference rooms, as well as schools and open-plan offices.

As a guideline for school rooms in the USA the limit of 1,000 ppm applies; for workplaces the occupational exposure limit is 5,000 ppm.

### Lufft OPUS20 TCO
Temperature, Rel. Humidity, CO₂

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Dimensions</th>
<th>length 166 mm, width 78 mm, depth 32 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measurement rate</td>
<td>10/30s, 1/10/12/15/30min, 1/3/6/12/24h</td>
</tr>
<tr>
<td></td>
<td>Storage rate</td>
<td>1/10/30/60min, 1/3/6/12/24h</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>plastic housing</td>
</tr>
<tr>
<td></td>
<td>Operation life (battery)</td>
<td>&gt; 4 month</td>
</tr>
<tr>
<td></td>
<td>Data storage</td>
<td>16 MB, 3,200,000 measured values</td>
</tr>
<tr>
<td></td>
<td>LC-Display</td>
<td>size 90x64 mm</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>approx. 250g</td>
</tr>
<tr>
<td></td>
<td>Included in delivery</td>
<td>PC-Windows Software SmartGraph3 for graphical and numerical representation of measured values / instruction manual / data cable / battery</td>
</tr>
<tr>
<td></td>
<td>Interface</td>
<td>USB, LAN</td>
</tr>
<tr>
<td></td>
<td>Power supply</td>
<td>4 x LR6 AA Mignon, USB (POE opt.)</td>
</tr>
<tr>
<td></td>
<td>Max. operation temp.</td>
<td>-20...50°C</td>
</tr>
<tr>
<td></td>
<td>Max. rel. humidity</td>
<td>0...95% RH; 20°C/60% (non condensing)</td>
</tr>
<tr>
<td></td>
<td>Max. altitude</td>
<td>10,000 m above sea level</td>
</tr>
</tbody>
</table>

| Temperature | Principle | NTC |
| Rel. Humidity | Measurement range | -20...50°C |
|               | Accuracy | ±0.3°C (0...40°C), otherwise 0.5°C |
| CO₂ | Measurement range | 0...5,000 ppm |
|               | Accuracy | ±50 ppm +3% of measured value (at 20 °C and 1,013 mbar) |
|               | Resolution | 1 ppm |
|               | Long-term stability | 20 ppm/a |

| Accessories | 4 x LR6 AA Mignon | 8120.SV1 |
|            | Power supply adapter | 8120.NT |
Lufft OPUS20E
for External Sensors

With up to 10 external channels/sensors per OPUS20E.

The OPUS20E offers the highest flexibility and is excellent value for money. It allows the connection of up to 4 external temperature and relative humidity sensors, as well as 2 further analogue sensors. Intelligent BUS sensors can be integrated via the OPUS20E’s RS485 interface (e.g. particle counter).

Air flow and differential pressure sensors are typically connected to the OPUS20E via analogue inputs as opposed to the maximum of 4 external temperature or humidity sensors that can be integrated via a digital BUS protocol.

In connection with its LAN capabilities, the OPUS20E is able to realize universal measurement networks in real time. For standard applications the SmartGraph 3 comes into play, and in order to fulfill the 21 CFR 11 guidelines the well-established and proven MCPS7 software is available.

### Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Length 180mm, width 78mm, depth 32mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement rate</td>
<td>10/30s, 1/10/12/15/30min, 1/3/6/12/24h</td>
</tr>
<tr>
<td>Storage rate</td>
<td>1/10/12/15/30min, 1/3/6/12/24h</td>
</tr>
<tr>
<td>Construction</td>
<td>Plastic housing</td>
</tr>
<tr>
<td>Operation life (battery)</td>
<td>&gt; 1 Year</td>
</tr>
<tr>
<td>Data storage</td>
<td>16 MB, 3,200,000 measured values</td>
</tr>
<tr>
<td>LC-Display size</td>
<td>90x64 mm</td>
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<tr>
<td>Weight</td>
<td>approx. 250g</td>
</tr>
<tr>
<td>Included in delivery</td>
<td>PC-Window Software SmartGraph 3 for graphical and numerical representation of measured values / Instructions / data cable / battery / WAGO connector / DIN rail bracket</td>
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<tr>
<td>Interface</td>
<td>USB, LAN</td>
</tr>
<tr>
<td>bus interface</td>
<td>RS 485</td>
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<tr>
<td>Power supply</td>
<td>4 x LR6 AA Mignon, USB, (POE opt.)</td>
</tr>
<tr>
<td>Max. operation temperature</td>
<td>-20...50°C</td>
</tr>
</tbody>
</table>

### Input voltage 0-1V

- **Measurement range**: 0 ... 1V
- **Accuracy**: ± 200uV ± 0.1% of measured value
- **Resolution**: < 500uV

### Current measurement

- **Measurement range**: 2-wires: 4 ... 20mA, 3-wires: 0 ... 20mA
- **Accuracy**: ± 4uA ± 0.1% of measured value
- **Resolution**: < 5uA
- **Resistance**: approx. 50 Ohm

### Thermocouple K

- **Measurement range**: -200°C ... 1200°C
- **Accuracy**: ± 1°C ± 0.5% of measured value at -200°C ... 0°C, ± 1°C ± 0.2% of measured value at 0°C ... 1200°C
- **Resolution**: < 0.2°C

### Compatible sensors for OPUS20E

<table>
<thead>
<tr>
<th>Temperature/Humidity</th>
<th>Digitale TFF20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td>Transducers with display</td>
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</tr>
<tr>
<td>Flow</td>
<td>Flow transmitters</td>
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</tr>
<tr>
<td>Differential pressure</td>
<td>Differential pressure transmitters</td>
<td></td>
</tr>
<tr>
<td>Particle</td>
<td>Particle counters</td>
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</tr>
<tr>
<td>CO₂</td>
<td>CO₂ transmitters</td>
<td></td>
</tr>
</tbody>
</table>

With up to 10 external sensors connectable per OPUS20E.
Lufft OPUS20E
Configurations Examples

Network with up to 200 channels

The OPUS20E is equipped with an analogue input that allows the connection of 2 sensors with voltage and current output, or rather PT100 temperature sensors in 3 and 4 wire technology.

At the same time up to 4 Lufft temperature/humidity sensors can be connected to the datalogger via a serial input.

Each fully equipped OPUS20E is a 10 channel datalogger that can record various data. It also allows data to be retrieved online and offline.

### Lufft OPUS20E for External Sensors

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Order-No.</th>
</tr>
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<tbody>
<tr>
<td>Thermocouple J</td>
<td>Measurement range</td>
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<tr>
<td></td>
<td>Accuracy</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resolution</td>
</tr>
<tr>
<td>Thermocouple S</td>
<td>Measurement range</td>
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<td></td>
<td>Accuracy</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Resolution</td>
</tr>
<tr>
<td>PT100</td>
<td>Measurement range</td>
</tr>
<tr>
<td></td>
<td>Accuracy</td>
</tr>
<tr>
<td></td>
<td>Resolution</td>
</tr>
</tbody>
</table>

### Accessories

- 4 x LR6 AA Mignon 8120.SV1
- Power supply adapter 8120.NT
- Y Connector 8120.STY
- Extension and/or connecting cable for digital sensor, 2m 8120.KAB2
- Extension and/or connecting cable for digital sensor, 10m 8120.KAB10
- Extension and/or connecting cable for digital sensor, 25m 8120.KAB25
- Plug multipoint socket for analog sensortechnology access 8120.STE
- Temperature/ humidity sensor (see page 24) 8120.TFF
- High-precision Temperature/Humidity Sensor (see page 26) 8130.TFF

With up to 10 channels per datalogger transfering data in realtime.
Power supply via POE.
## Comparison of SmartGraph3 / MCPS7 for Lufft OPUS 20-Series

<table>
<thead>
<tr>
<th>Feature</th>
<th>SmartGraph3 (included in delivery)</th>
<th>MCPS7 (price on request)</th>
<th>Lufft I-Box</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configuration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanning network</td>
<td>[ ]</td>
<td>[ ]</td>
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</tr>
<tr>
<td>Management of OPUS devices in various projects</td>
<td>[ ]</td>
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<tr>
<td>Selection of sensors out of the sensor library</td>
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<tr>
<td>User-definable sensors</td>
<td>[ ]</td>
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</tr>
<tr>
<td>Defining measurement and storage rates</td>
<td>[ ]</td>
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<tr>
<td>Configuration of alarm limits</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Installation assistant</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Extensible and adaptable</td>
<td>[ ]</td>
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<td>*[ ]</td>
</tr>
<tr>
<td><strong>Data storage</strong></td>
<td></td>
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<tr>
<td>Storage of data during online measurements</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>Linking of individual files, saving of partial measurements</td>
<td>[ ]</td>
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<tr>
<td>Automatic resumption of data recording after network failure or power cut</td>
<td>[ ]</td>
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<tr>
<td>Importing of non-recorded measured values after network failure</td>
<td>[ ]</td>
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<tr>
<td><strong>Data transfer</strong></td>
<td></td>
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<tr>
<td>Direct connection via USB online/offline</td>
<td>[ ]</td>
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<tr>
<td>LAN-TCP/IP online and memory readout</td>
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<tr>
<td>Incorporation of further systems e.g. particle counter</td>
<td>[ ]</td>
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<tr>
<td>Data forwarding to e.g. control units or GLT</td>
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<tr>
<td><strong>Alarm</strong></td>
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<tr>
<td>Colour changes in display</td>
<td>[ ]</td>
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<tr>
<td>Alarm window (Pop-up)</td>
<td>[ ]</td>
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<tr>
<td>Log entry of events (audit trail)</td>
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<tr>
<td>Alarm notification via SMS or e-mail</td>
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<tr>
<td>Alarm actions (e.g. to switch on/off relays…)</td>
<td>[ ]</td>
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</tr>
<tr>
<td><strong>Exporting measured values</strong></td>
<td></td>
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<tr>
<td>Manual</td>
<td>[ ]</td>
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<tr>
<td>Automatic during an online measurement</td>
<td>[ ]</td>
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<tr>
<td>Data transfer to remote databases</td>
<td>[ ]</td>
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<tr>
<td>Send Measurement Data via Email</td>
<td>[ ]</td>
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</tr>
<tr>
<td>Providing Measurement Data in JSON format</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Providing Measurement Data in CSV format</td>
<td>[ ]</td>
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<tr>
<td><strong>User administration (21 CFR 11)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access controlled by password</td>
<td>[ ]</td>
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<tr>
<td>Password history</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>User groups</td>
<td>[ ]</td>
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<tr>
<td>Audit trail</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>Electronic record, electronic signature</td>
<td>[ ]</td>
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<tr>
<td><strong>Visualisation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Screen layouts freely definable</td>
<td>[ ]</td>
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<td>[ ]</td>
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<tr>
<td>Y/T-diagramme</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Trend, bar, digital and numererical representation</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Calculation of statistical values (Min, Max, Med, Variance, Standard deviation)</td>
<td>[ ]</td>
<td>[ ]</td>
<td>*[ ]</td>
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<tr>
<td>Client-server operation</td>
<td>[ ]</td>
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</tr>
<tr>
<td>Process monitoring</td>
<td>[ ]</td>
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<tr>
<td>Web server</td>
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<tr>
<td><strong>Reporting</strong></td>
<td></td>
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<tr>
<td>Reports with own logos</td>
<td>[ ]</td>
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<tr>
<td>Reports in Excel pages</td>
<td>[ ]</td>
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<tr>
<td>Customer-specific evaluations over any number of time periods</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>Display live data in web browser</td>
<td>[ ]</td>
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<tr>
<td><strong>Customer specific adaption</strong></td>
<td></td>
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<tr>
<td>Support of customer specific measurement devices</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Data transfer in customer specific systems</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>Hardware and Housing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Din rail and cabinet mountable</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Headless operation (without monitor, keyboard, mouse)</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Power supply (power over ethernet or power supply unit)</td>
<td>[ ]</td>
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</tr>
<tr>
<td>Designed for uninterrupted service and long-term usage</td>
<td>[ ]</td>
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</tr>
<tr>
<td><strong>External climate data</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Reference data acquisition from DWD (German official weather service)</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Reference data acquisition from Open Weather Map</td>
<td>[ ]</td>
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</tr>
</tbody>
</table>

* enabled with App from the Lufft I-BOX App-Store
** enabled with customer specific App
Looking for an „open solution“? Do you want to realise your own special application with the measurement data?

Your Gateway for the Perfect Solution to Your Problem:

Lufft I-BOX App-Store

Software modules: ready-made or custom-built for you
The Lufft I-BOX Hardware

Lufft I-BOX

<table>
<thead>
<tr>
<th>Order-No.</th>
<th>8200.00</th>
</tr>
</thead>
</table>

Technical data

<table>
<thead>
<tr>
<th>Lufft I-BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>Network</td>
</tr>
<tr>
<td>Connections</td>
</tr>
<tr>
<td>LEDs / push buttons</td>
</tr>
<tr>
<td>Power supply and power consumption</td>
</tr>
</tbody>
</table>

Temperature

| Installed side-by-side: 0 ... 65°C, installed separately: 0 ... 70°C |

Humidity

| 0 ... 90% relative humidity, non-condensing |

Accessories

| Plug-in power supply unit 8120.NT24 |
| Power supply for DIN rail 8160.11084 |

With the Lufft I-Box, measuring instruments – such as the data logger OPUS20 – are easily integrated into corporate networks. The plug-and-play system provides standardized interrogation of live data from a variety of measuring instruments. This means that all data can be clearly displayed. In addition, the scope of supply includes an application for controlling alarms. The applications can be upgraded as required to suit individual needs. The Lufft I-BOX - the interface for industrial use.

- Easy commissioning
- Configuration and remote maintenance via browser interface
- User access protection
- Alarms by email
- Detailed help function
- Applications upgradeable as required
- 2 year warranty
- Increased interference immunity for the industrial environment
- Prepared for rail mounting
- Power consumption < 2.0 W
- Transmission of measured values to the corporate network
- Prepared for rail mounting

App The Lufft APP development is also becoming increasingly important for your business application.

More Information
Lufft I-BOX
www.lufft-i-box.com
Temperature logger with integrated USB-interface and automatic PDF-creation

Memory for 60,000 measurements, useable without software (default settings with 5 minutes interval), automatic PDF creation (no drivers required), optional software download), free adjustable recording interval 30 seconds up to 24 hours (via Software Log Connect), battery lifetime > 2 years (recording interval >15 minutes), status- and alarm-LEDs, includes wall mount.

<table>
<thead>
<tr>
<th>Temperature PDF Datalogger</th>
<th>Order-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF Datalogger</td>
<td>8121.00</td>
</tr>
</tbody>
</table>

Technical data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>100 x 19 x 19 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>70 g</td>
</tr>
<tr>
<td>Measurement range</td>
<td>-40...+70°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.5°C (-10...+40°C)</td>
</tr>
<tr>
<td>Power supply</td>
<td>1/2 AA size 3.6 Volt</td>
</tr>
<tr>
<td>Battery lifetime</td>
<td>&gt; 3 years (time interval &gt;15min)</td>
</tr>
</tbody>
</table>
Temperature/Humidity logger with integrated USB interface and automatic PDF creation

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Order-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDF Datalogger</strong></td>
<td>8122.00</td>
</tr>
<tr>
<td>Dimensions</td>
<td>100 x 19 x 19 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>70 g</td>
</tr>
<tr>
<td>Measurement range</td>
<td>-40...+70°C, 0...99% RH</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1°C/0.1%</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.5°C (-10...40°C) ± 3% (40...60% RH)</td>
</tr>
<tr>
<td>Power supply</td>
<td>1/2 AA size 3.6 Volt</td>
</tr>
<tr>
<td>Battery lifetime</td>
<td>&gt; 2 years (time interval &gt;15min)</td>
</tr>
</tbody>
</table>

Memory for 60,000 measurements, useable without software (default settings with 5 minutes interval), automatic PDF creation (no drivers required), optional software download, free adjustable recording interval 30 seconds up to 24 hours (via Software Log Connect), battery lifetime > 2 years (recording interval >15 minutes), status- and alarm-LEDs, includes wall mount.
When it comes to evaluation, have the works!

With the aid of powerful software, hand-held measuring devices are turning into archives.
Software SmartGraph3 for Lufft Hand-held Devices and OPUS20-Series

SmartGraph3 for OPUS20-Series

- An OPUS20 datalogger is automatically recognised and added as a “network device”.
- In addition to its data-readout function, the software possesses a recording mode that enables parallel recording to be displayed on the computer.
- The data from any desired number of OPUS20 devices can be read out simultaneously.
- The zoom function allows for quick analysis of critical time periods.
- The exporting of measured data in csv format enables it to be imported into Excel.
- The device configuration can be printed out in order to check installation parameters.
- Alarm limits – like the measured data – are chronologically managed at various times so that when changes in alarm limits occur, they can be retraced.
- Automatic data readout of all measured data is supported.

SmartGraph3 for Hand-held Measuring Devices

- A Lufft hand-held measuring device is automatically recognised and added by means of a USB interface.
- In addition to its data-readout function, the software possesses a recording mode that enables parallel recording to be displayed on the computer.
- The zoom function allows for quick analysis of critical time periods.
- The exporting of measured data in csv format enables it to be imported into Excel.
- Different measurement campaigns are archived in their respective accounts.
- All measurements recorded by the hand-held measuring device (also calculated values) are transferred to SmartGraph3.
No place for coincidence. Anyone who records data in real time should not be satisfied with an “off the rack” solution only. Lufft has never done this and never will.

We have even put a lot of thought into the representation and evaluation of your measured data, and have developed special software that offers users numerous advantages and possibilities.

Data errors can be reduced to a minimum by means of clear processing and representation.
Centralized Representation
Measurements are, to some extent, recorded every second: average values accumulate in the data logger, minimum and maximum values are observed, raw data is transferred to the central computer. Recording data in real time means that you have a large amount of data administration and at the same time have to arrange various measuring categories and points in a clear fashion. Some users are only interested in particular rooms, others want to have an overview of the particle sensors.

Consequently, a standard representation setup is simply insufficient. Instead of this, user-specific software is necessary such as MCPS7, which enables the free configuration of graphic or numeric representation, or bar graphs; thus allowing you to incorporate and present comparable measuring categories in the same diagram.

In addition, MCPS7 has an integrated web server that visualizes all the defined diagrams and places them in the intra-/extranet for other users. All you need is a password from the administrator.

Evaluation
The manual and automatic data export in the ASCII format offers the user additional advantages that exceed those of a standard display. There is also the possibility to define several formulae in MCPS7. In addition to this, daily, monthly and annual reports offer a simple overview of the trends of the measured values. Furthermore, so-called MKT calculations supply special information – such as the median values of recorded temperature data (Mean Kinetic Temperature) – which is required in the pharmaceutical industry.

Finally, in the audit trail of the MCPS7 package (21CFR compliant) all events are recorded: from system start and end, to user administration, changes to the device configuration, alarm messages plus confirmation text, the log-in and out of users, as well as sensor breakages and system crashes.
Competent Qualification and Calibration
Imprecise measurements can have expensive repercussions. Therefore, Luft products are tested according to the motto “To trust is good, to control is better”. Our products have to pass special tests that exceed that of conventional ones; firstly through a special type of qualification, both in production and at the customer, and secondly with the help of our DKD certified calibration, which ensures incorruptible results.

Qualification
A reliable monitoring system has to fulfil the highest requirements regarding preciseness and robustness. This is guaranteed by a test report that is provided by the manufacturer with each sensor. In addition to this, at Luft the acquisition and analogue conversion of data is carried out in a special high resolution (16- or 32 bit technology), so that the preciseness of the sensors is retained.

A further quality feature is the local display that visualises measured values without losses due to rounding and with the same accuracy. At the same time identical measurement information is stored by central software in the archive. These quality requirements can be additionally tested during so-called “factory inspections” or audits of the customer’s production plant. Finally, there is an acceptance conducted in the plant and the highly sensitive goods are sent, sometimes travelling around half the globe.

Calibration
Imprecise measurements can have expensive economical repercussions, and for this reason a periodical adjustment of the sensors (justification), as well as a special comparison measurement (calibration) are of the utmost importance. During regular calibration a reference point measurements is compared with a reference standard, which normally has a much higher accuracy than the measurement under test. This round robin test is always a closed test, because these reference standards – whether directly or indirectly – have an accuracy that is based on and can be traced back to the official norm. In order to calibrate more than one point, various conditions are generated on site according to customer requirements e.g. 3 different values for relative humidity. Such applications are indeed qualitative very sophisticated, and as such require specially trained personnel with profound experience in climatologic measurement technology; especially when dealing with the setup of comparison measurements regarding adjustment times.

The following applies to both qualification and calibration: there is a standard guideline, but no uniform procedure. Therefore, each user defines via the IQ/OQ his special requirements that have to be observed in both procedures respectively.

Incidentally, Luft is also striving for the accreditation for an air flow measurement laboratory in the short-term future to add to its existing DKD laboratories for temperature, relative humidity and air pressure.

www.dkdlab.info
www.dakks-lab.info

A further “on-site qualification”, also known as the first calibration, is frequently conducted after the installation of the system. The requirements of “electronic records” (21 CFR 11) differentiates between the following types of qualification: Design Qualification (DQ), occurs during the requirement specification- and technical specification phase

• Installation Qualification (IQ), technical on-site acceptance such as an inspection of the wiring on the basis of the interface diagrams
• Operation Qualification (OQ), testing of the measurement chain from the sensor to the software, validation of the measurement chain, testing the accuracy of the sensor
• Performance Qualification (PQ), ensures the reliability during the products “life cycle”

Qualification can only be done by qualified and experienced professionals. We ensure that you have excellent measuring technology experts at your side for such a task.
The triple point of water (balance of all 3 physical states solid, liquid and gas) is used to represent the International Temperature Scale and for the highest precision of temperature measurements in the milli-Kelvin range.
How reliable are your Measurements?

Every sensor has to take a break once in a while. Each measuring unit fluctuates slightly during its operating time. This is not a question of a fault or a unit’s functional efficiency, but a recognized phenomenon by all parties in this branch. A minimal fluctuation in precision occurs even with Lufft sensors; and our sensors are especially durable modules that are continually placed under extreme conditions (measuring CO2 in incubators, humidity measurements in tropical conditions, e.g. at the equator).

Lufft, as a member of the Deutsche Kalibrierdienst (DKD), uses the prescribed reference norms from the Physikalisch-Technischen Bundesanstalt (PTB) for recalibration.

We offer an excellent service for each product:
Free comprehensive consultation that is tailor-made to suit your calibration needs, as well as free online management of certificates at www.dkd-lab.info / www.dakks-lab.info

E-mail to kalibrierung@lufft.de – and you can start managing your calibration certificates online straight away.

Content of our Service:
- Creation of certificates with new deliveries
- Calibrated leasing devices for the period of calibration
- Controlling of test materials over the entire lifetime

Absolute pressure
Calibration content:
700...1200 mbar
Pressure medium: air
(measurement uncertainty 0.15 mbar)

Temperature
Calibration content:
0.010°C at triple point of water (measurement uncertainty 5mK)
0.00°C at ice point (measurement uncertainty 10mK)
-40...+200°C in water bath (measurement uncertainty 15mK)
-40...+100°C in climate chamber (measurement uncertainty 100mK)

Airflow
Calibration content:
0.1...55m/s in wind tunnel
Airflow medium: air
(measurement uncertainty of 0.7% of measured value, at least 0.02m/s)

Relative humidity
Calibration content:
5...98% at 5...95°C (measurement uncertainty as of 0.2%)

Dew point/humidity generators
Calibration content:
-20...+95°C dew point temperature (measurement uncertainty of 80 mK)
5...98% at 5...95°C of humidity generator
(measurement uncertainty as of 0.2%)
G. Lufft Mess-und Regeltechnik GmbH

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Germany

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Germany

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Fax: +49 711 51822-41

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