Sensors and hygrostats
for humidification systems

Climate and process humidification
for industry, manufacturing processes, public buildings and offices
The basis of a reliable and precise control of air humidity

Application-oriented control – no coincidence from the very beginning.

The air humidity in a room has a decisive influence on the room climate and thus has a major impact on the well-being of people. Even sensitive production processes or the storage of hygroscopic materials, such as paper, wood or fabric, can be optimised by controlling the air humidity.

How stable and precise this control can be during operation depends mainly on the recording of the humidity values. The selection and placement of suitable sensors and hygrostats therefore plays a special role in the configuration of the overall system.

Our portfolio includes a diverse selection of sensors and hygrostats for different application needs for installation in rooms or ducts. All sensors are compatible with the controls of the HygroMatik steam humidifiers and support the current international technical market standards. Five basic considerations serve as a simplified decision-making aid.

### 1. Continuous or single-stage control?

<table>
<thead>
<tr>
<th>Continuous control</th>
<th>Single-stage control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue data acquisition and continuous</td>
<td>Setpoint with fixed hysteresis as digital</td>
</tr>
<tr>
<td>control signal transmission</td>
<td>switching threshold</td>
</tr>
</tbody>
</table>

### 2. Which method is used for measurement?

<table>
<thead>
<tr>
<th>Capacitive measurement</th>
<th>Absorptive measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in humidity values are directly recorded and immediately converted into a control signal change. A PI controller integrated in the humidifier control prevents overriding and thus enables extremely precise real-time humidity control.</td>
<td>This method corresponds to the natural behaviour of moisture absorption and leads to a damped, sliding control behaviour.</td>
</tr>
</tbody>
</table>

### 3. Sensor position: in room or duct?

Depending on the application and the required humidification method, the sensors and hygrostats are mounted in the room or in a ventilation duct (supply air or exhaust air). The following types can be distinguished accordingly:

<table>
<thead>
<tr>
<th>Room sensors</th>
<th>Room hygrostats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact recording of the relative humidity in the room for proportional control</td>
<td>Simple solution if a humidity range only needs to be roughly maintained, e.g. in storage rooms</td>
</tr>
<tr>
<td>E.g. in combination with direct room humidification</td>
<td>As additional safety device in connection with room sensors for monitoring a maximum value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duct sensors</th>
<th>Special duct sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and process humidification, e.g. for sensitive production areas such as lacquering</td>
<td>With a second control signal, which indicates the relative humidity as well as the absolute humidity, the moisture content can be measured independent of temperature</td>
</tr>
<tr>
<td>Can either be integrated into the building control system or connected directly to the humidifier as a stand-alone solution</td>
<td>Version including isolation amplifier: for ex-areas, i.e. areas with a high risk of explosion, e.g. due to dust</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow monitors</th>
<th>Differential pressure switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable continuous control of the air differential pressure for air conditioning and ventilation systems</td>
<td>Flow monitoring in the duct</td>
</tr>
<tr>
<td>For safety-related monitoring in air conditioning systems, e.g. reporting fan interruptions and filter clogging</td>
<td>Can either be integrated into the building control system or connected directly to the humidifier as a stand-alone solution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leakage monitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection against water leaks in data centres, offices, laboratories and specific rooms</td>
</tr>
</tbody>
</table>
HygroMatik

DIF (0-10V)

Room humidity sensor, capacitive
Specially designed for comfort air conditioning in e.g. offices.
Extremely precise with integrated measuring chamber. Easy mounting with clip-in cover.

Technical specifications
- Power supply: 15-30 VDC
- Operating conditions: -10°-60 °C, 0-100% RH
- Dimensions: 81 x 81 x 26 mm
- Article number: E-0610190
- Article number: E-0610200

HygroMatik DW

Room humidity sensor, capacitive
Especially suitable for precise measurements with increased environmental requirements such as production facilities. Easy to install due to installation-friendly housing.
With fx processor, USB interface and integrated calibrated dModule. On-site calibration via keys and readout via LED display possible.

Technical specifications
- Power supply: 15-30 VDC
- Operating conditions: -30°-70 °C, 0-100% RH
- Protection class: IP65 (housing), IP30 (sensor element)
- Dimensions: 83 x 133 x 40 mm
- Article number: E-0610192
- Article number: E-0610194

CAREL DPP Sensor

Active temperature / humidity sensor, capacitive
Specially developed for the precise measurement of high humidity levels.
Also available are models with RS485 connection with CAREL Modbus protocol.

Technical specifications
- Power supply: 12/24 VAC -10/15%, 13-26 VAC, 7mA
- Operating conditions: -10-60 °C, -20-70 °C, 0-100% RH, no dew
- Protection class: IP55 (housing), IP54 (sensor element)
- Dimensions: 98 x 170 x 44 mm
- Article number: DPPC 21 0000 (analogue output: selection 0...1 V/-0,5...1 VDC/4...20 mA)
- Article number: DPPC 21 2000 (analogue output: 0...10 VDC)

Decision aid

<table>
<thead>
<tr>
<th>1-stage or continuous</th>
<th>Method</th>
<th>Display</th>
<th>Precision</th>
<th>Sensor, Hygrostat</th>
<th>Product range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>continuous capacitive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik DIF (0-10V)</td>
</tr>
<tr>
<td>continuous capacitive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik DW</td>
</tr>
<tr>
<td>1-stage absorptive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL DPP Sensor</td>
<td></td>
</tr>
<tr>
<td>1-stage absorptive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL DPP Sensor</td>
<td></td>
</tr>
<tr>
<td>Duct system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>continuous capacitive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik DIF (0-10V)</td>
</tr>
<tr>
<td>continuous capacitive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik DIF (0-10V)</td>
</tr>
<tr>
<td>continuous capacitive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL DPP Sensor</td>
<td></td>
</tr>
<tr>
<td>continuous absorptive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik FG80</td>
</tr>
<tr>
<td>continuous absorptive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL DPP Sensor</td>
<td></td>
</tr>
<tr>
<td>1-stage absorptive</td>
<td></td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor</td>
<td>HygroMatik HG80 (KF1)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL Air flow monitor</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL Differential pressure switch</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>x ✓ ✓ ✓</td>
<td>✓</td>
<td>Sensor CAREL Leakage monitor</td>
<td></td>
</tr>
</tbody>
</table>

How precise should the measurement be?

<table>
<thead>
<tr>
<th>* Precision</th>
<th>Working area</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ ✓</td>
<td>10-90% RH</td>
<td>-10°-60 °C</td>
</tr>
<tr>
<td>✓</td>
<td>0-100% RH</td>
<td>-20°-70 °C</td>
</tr>
<tr>
<td>✓ ✓ ✓</td>
<td>0-100% RH</td>
<td>-30°-80 °C</td>
</tr>
<tr>
<td>✔</td>
<td>✔ ✔ ✔</td>
<td>✔ ✔ ✔</td>
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<td>✔ ✔ ✔</td>
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<td>✔ ✔ ✔</td>
<td>✔ ✔ ✔</td>
<td>✔ ✔ ✔</td>
</tr>
</tbody>
</table>

4. Integrated measured value display
In some application areas it is useful that the measured values can be displayed and read directly at the sensor, e.g. if a humidifier is difficult to access or as an additional comfort feature.

5. How precise should the measurement be?

Table for precision levels:
- ✓: +/- 5%
- ✔: +/- 2%
- ✔ ✔: +/- 0.5%
- ✔ ✔ ✔: +/- 0.2%

Decision aid table:

- ✓ ✓ ✓: Suitable for comfort air conditioning
- ❌: Not suitable

* Precision Working area Temperature
- ✓ ✓: +/- 5% 10-90 % RH -10°-60 °C
- ✓: +/- 5% 0-100 % RH -20°-70 °C
- ✓ ✓ ✓: +/- 2% 0-100 % RH -30°-80 °C

5. How precise should the measurement be?

Table for precision levels:
- ✓ ✓ ✓: Suitable for comfort air conditioning
- ❌: Not suitable

Decision aid table:

- ✓ ✓ ✓: +/- 5% 10-90 % RH -10°-60 °C
- ✓: +/- 5% 0-100 % RH -20°-70 °C
- ✓ ✓ ✓: +/- 2% 0-100 % RH -30°-80 °C

- ✓ ✓: +/- 5% 10-90 % RH -10°-60 °C
- ✓: +/- 5% 0-100 % RH -20°-70 °C
- ✓ ✓ ✓: +/- 2% 0-100 % RH -30°-80 °C

- ✓ ✓ ✓: +/- 5% 10-90 % RH -10°-60 °C
- ✓: +/- 5% 0-100 % RH -20°-70 °C
- ✓ ✓ ✓: +/- 2% 0-100 % RH -30°-80 °C
HygroMatik DKF (0-10V)

Duct humidity sensor, capacitive
Especially suitable for precise humidity control in HVAC systems. Equipped with an hx-processor for the values of RH and temperature to calculate the dew point, enthalpy, mixing ratio, absolute humidity or wet bulb temperature. Integrated calibrated dModule and on-site calibration via keys and readout via LED display possible. Easy to install due to assembly-friendly housing.

Technical specifications
- Power supply: 15-30 VDC, 13-26 VAC, 7mA
- Operating conditions: -30°-80°C, 0-100% RH
- Protection class: IP65 (housing), IP30 (sensor element)
- Installation: in the air duct
- Output signal: 1 x 0...10 V
- Dimensions: 83 x 83 x 260 mm

Article number: E-0610184 without display
Article number: E-0610202 with display

HygroMatik DKK (0-10V)

Special sensor, capacitive
Especially suitable for precise humidity control in HVAC systems. Equipped with an hx-processor for the values of RH and temperature to calculate and control signal output of the dew point, enthalpy, mixing ratio, absolute humidity or wet bulb temperature. Integrated calibrated dModule and on-site calibration via keys and readout via LED display. Easy to install due to assembly-friendly housing.

Technical specifications
- Power supply: 15-30 VDC, 13-26 VAC, 7mA
- Operating conditions: -30°-80°C, 0-100% RH
- Protection class: IP65 (housing), IP30 (sensor element)
- Installation: in the air duct
- Output signal: 2 x 0...10 V
- Dimensions: 83 x 83 x 260 mm

Article number: E-0610182 with display

Room systems

HygroMatik HygroSwitch

Room hygrostat, absorptive
For controlling air humidification and dehumidification in office and server rooms by means of an integrated two-point controller for controlling relative humidity.

Technical specifications
- Switch contact: 200-250 VAC, max. 2A
- Operating conditions: 0-60°C, 40-90% RH
- Protection class: IP30D (housing)
- Installation: in the room
- Dimensions: 81 x 81 x 28 mm

Article number: E-0610186 without setting wheel
Article number: E-0610188 with setting wheel inside

HygroMatik Hygrostat

Room hygrostat, absorptive
For humidification in office and server rooms using 1-stage humidity control.

Technical specifications
- Switch contact: 200-250 VAC, max. 3A
- Operating conditions: 0-40°C, 20-90% RH
- Protection class: IP20 (housing)
- Installation: in the room
- Dimensions: 76 x 76 x 34 mm

Article number: UCHU MM 0000
CAREL DPD Sensor

Active temperature / humidity sensor, capacitive

Suitable for air conditioning systems. Also available are models with RS485 connection with CAREL and Modbus protocol.

Technical specifications

- Power supply: 12/24 VAC -10/15%, 9-30 VDC ±10%
- Operating conditions: -10-60°C, -20-70°C, <100% RH, no dew
- Protection class: IP55 (housing), IP54 (sensor element)
- Installation: in the air duct
- Output signal: 2 x analogue output with same signal type -0.5...1 V, 0...1 V, 0...10 V, 4...20 mA
- Serial interfaces: RS485 (specific model)
- Dimensions: 98 x 105 x 336 mm

Article number: DPDC 21 0000 (analogue output: selection 0...1 V/-0.5...1 VDC/4...20 mA)
Article number: DPDC 21 2000 (analogue output: 0...10 VDC)

FG80

Duct humidity sensor, absorptive

Designed for natural relative humidity and temperature measurement in air ducts.

With robust Polyga® humidity measuring element. Excellent for use in high humidity applications and when long-term stability and a long operating time are required.

Resistance output up to 10kOhm.

Technical specifications

- Power supply: 15-30 VDC
- Operating conditions: -30°-80°C, 0-100% RH
- Protection class: IP65 (housing), IP64 (sensor element)
- Installation: in the air duct
- Output signal: 1 x 0...10 V
- Dimensions: 80 x 120 x 300 mm

Article number: E-0610151 FG80AC (0...10V)
Article number: E-0610196 FG80J (4...20mA)

HygroMatik FK C3 EX/8

Special sensor for ex-areas, capacitive

Developed for explosion-hazardous areas and high operating temperatures.

Equipped with a robust die-cast aluminium housing with a stainless steel or aluminium sensor element for measuring relative humidity and temperature in air and other non-aggressive gases for an operating temperature range up to 200°C.

Technical specifications

- Power supply: 13-24 VDC, 100mA
- Operating conditions: -40°-80 °C, 0-100% RH
- Protection class: IP65 (housing), IP30 (sensor element)
- Installation: in the air duct
- Output signal: 1 x 4...20 mA
- Dimensions: 80 x 75 x 288 mm

Article number: B-0610171

HygroMatik HG80 (KF1)

Hygrostat, absorptive

Designed for natural relative humidity two-point control or maximum monitoring in the duct.

With robust Polyga-Mela® humidity sensor element. With one or two switch-over contacts (HG80 or HG80-2) and internal rotary knob (HG80). Scale range 30-100% RH.

Technical specifications

- Switch contact: 200-250 VAC, max. 15A
- Operating conditions: 0°-80°C, 0-100% RH
- Protection class: IP54
- Installation: in the air duct
- Dimensions: 80 x 120 x 300 mm

Article number: E-0611100

HygroMatik HG80 (KF1)
CAREL

Leakage detector

Detects the presence of water in the room.
The leakage detector is generally used for protection against water leaks in data centres, offices, laboratories and specific rooms.
It consists of a detector (in the control cabinet) and a sensor band (at the monitoring point).
If the sensor comes into contact with water, the alarm status is immediately triggered on the detector by switching the relay.

Article number: FLOE 00 0010
Article number: FLOS 00 0000 (sensor for punctual measurement, in connection with FLOE 00 0010)
Article number: FLOR 00 0000 (sensor band for area measurement, in connection with FLOE 00 0010)

CAREL

Air flow monitor

Suitable for non-aggressive air or gas flows within the distribution ducts in air conditioning and ventilation systems.
The air flow monitor signals missing or reduced flow in the duct by activating a switch.
- Galvanised plate floor
- Sealed ABS housing
- IP65 (on the outside of the duct), in accordance with standard EN 60529, protection class I - EN 60335-1

Article number: DCFL 00 0100

CAREL

Differential pressure switch

For controlling the air differential pressure for filters, fans, air ducts, air conditioning and ventilation systems. The differential pressure control is particularly suitable for safety monitoring in air conditioning systems to signal the fan stop and filter clogging.
It is used in rooms with non-aggressive and non-flammable air and gas. It comes with mounting kit.

Technical specifications
Switch contact: 250 VAC, 1,5A
Protection class: IP54
Dimensions: 65 x 91 x 57 mm

Article number: DCPD 01 0100
50-500 Pa, with mounting kit
Article number: DCPD 01 1100
20-200 Pa, with mounting kit

CAREL

Humidity sensors

Duct systems
Our service for 100% customer satisfaction

- Long availability for replacement parts
- Technical hotline +49 4193 895-293
  or hotline@hygromatik.com
- HygroMatik distributes in more than 45 countries
- Operating manuals, planning data and information
  on workshop events available online at
  www.hygromatik.com