The EE23 series stands for multifunctionality, highest accuracy, easy mounting and service. The new IP65 waterproof housing concept is based on three modules:
- back module with connectors
- middle module which accommodates the electronics
- cover module with optional display

It offers easy installation and the possibility for fast exchange of the sensor unit for service purposes.

For use in harsh industrial environments all models of the EE23 are available in a robust metal housing.

The EE23 can be employed in all common applications by choosing the appropriate housing combination.

- **Model A / B:** wall / duct mounting
- **Model C:** remote sensing probe has a working temperature range –40...120°C (-40...248°F)
- **Model H:** with remote miniature probe for concealed mounting (e.g. in museums) or in tight spaces.

The high quality HC series humidity sensor elements and newest microprocessor technology are the guarantee for:
- best accuracy over the whole working range
- display and output of relative humidity, temperature, dew point and frost point temperature
- small hysteresis
- excellent long term stability
- highest resistance to pollutants.

Easy configuration of the humidity and temperature outputs is made possible by the innovative design of the EE23 electronics. One can select between various current or voltage output signals.

One can very easily perform a two point humidity and temperature adjustment on site by using two push buttons on the PCB. The three modules concept makes it also possible to perform a loop calibration according to FDA (Food and Drug Administration) recommendations.

Further options are the integrated display, cable outlets via connectors, sensor coating and an hygrostate output for control and alarm purposes.
## Typical Applications
- high end HVAC
- climate chambers
- process technology
- dryers
- clean rooms
- green houses
- stocks
- meteorology

## Field Calibration
The three modules housing design allows a fast and easy dismounting of the EE23 for humidity field calibration. No interruption of the measurement is necessary for loop calibration which is essential for the calibration procedure recommended by FDA (Food and Drug Administration).

1. EE23 back module mounted on the wall
2. EE23 extension cable (can be ordered separately)
3. EE23 middle module mounted in the calibrator
4. Humidity reference system (e.g. HUMOR 20)

Utilization of the extension cable enables the user to perform full loop calibration as recommended by FDA.

## Two Point Adjustment
With an easy routine the user can perform a fast and accurate two point adjustment of relative humidity and temperature.

## Display
The actual measured data can be indicated on the optional integrated display. It is possible to choose between relative humidity (RH), temperature (T), dew point (Td), frost point (Tf) or an alternating display of two values.

## Alarm Output
Simple control applications can be solved by the optional alarm output of the EE23. The user can set threshold and hysteresis by potentiometers.

## Integrated power supply
A power supply, integrated in the back module of the housing, can be ordered optionally (100...240V AC, 50/60Hz; ordering code V01). The power supply V01 is available for both polycarbonate and metal housing and comes standard with two plugs for supply and outputs to allow an easy connection.
Dimensions in mm

Housing:

polycarbonate housing

metal housing

For use in harsh industrial environments all models of the EE23 are available in a robust metal housing. The very smooth surface and the rounded outlines allow for the use in clean rooms as well.

Models:

EE23-xAx
Wall mounting
Probe material: PC

EE23-xCx
Remote probe up to 120°C (248°F)
Probe material: stainless steel

EE23-xBx
Duct mounting
Probe material: stainless steel

EE23-xHx
Remote miniature probe
Probe material: stainless steel
## Measured quantities

### Relative humidity

<table>
<thead>
<tr>
<th>Humidity sensor</th>
<th>Working range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE23-xA/B/Cx</td>
<td>0...100% RH</td>
<td>± (1.3 + 0.3% * mv) % RH</td>
</tr>
<tr>
<td>EE23-xHx</td>
<td></td>
<td>± 2.3% RH</td>
</tr>
</tbody>
</table>

### Working range

-15...40°C (5...104°F): ± (1.3 + 0.3% \* mv) % RH
-15...40°C (5...104°F): ± 2.3% RH
-25...70°C (-13...158°F): ± (1.4 + 1% \* mv) % RH
-40...120°C (-40...248°F): ± (1.5 + 1.5% \* mv) % RH

### Temperature dependence electronics

typ. ± 0.015% RH/°C

### Response time with metal grid filter at 20°C / tₚ

< 15 sec.

### Temperature

<table>
<thead>
<tr>
<th>Temperature sensor element</th>
<th>Working range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE23-xA/B/Cx</td>
<td>-40...60°C</td>
<td>± (1.4 + 1% * mv) % RH</td>
</tr>
<tr>
<td>EE23-xHx</td>
<td>-40...80°C</td>
<td>± 1.9% RH</td>
</tr>
</tbody>
</table>

### Outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Range</th>
<th>Current Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1 V</td>
<td>0 - 5 V</td>
<td>-0.5 mA &lt; I &lt; 0.5 mA</td>
</tr>
<tr>
<td>0 - 10 V</td>
<td></td>
<td>-1 mA &lt; I &lt; 1 mA</td>
</tr>
</tbody>
</table>

### Max. adjustable output scaling

#### Humidity

<table>
<thead>
<tr>
<th>RH</th>
<th>EE23-A</th>
<th>EE23-B, H</th>
<th>EE23-C</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>% RH</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Temperature

<table>
<thead>
<tr>
<th>T</th>
<th>-40 (-40)</th>
<th>60 (140)</th>
<th>80 (176)</th>
<th>120 (248)</th>
<th>°C (°F)</th>
</tr>
</thead>
</table>

#### Dew-point temperature

<table>
<thead>
<tr>
<th>Td</th>
<th>-40 (-40)</th>
<th>60 (140)</th>
<th>80 (176)</th>
<th>100 (212)</th>
<th>°C (°F)</th>
</tr>
</thead>
</table>

#### Frost-point temperature

<table>
<thead>
<tr>
<th>Tf</th>
<th>-40 (-40)</th>
<th>0 (32)</th>
<th>0 (32)</th>
<th>0 (32)</th>
<th>°C (°F)</th>
</tr>
</thead>
</table>

### General

Supply voltage
- for 0 - 1 V, 0 - 5 V outputs: 10.5 - 35V DC or 12 - 28V AC
- for 0 - 10 V, 0 - 20 mA and 4-20 mA outputs: 15.0 - 35V DC or 15 - 28V AC (optional 100...240V AC, 50/60Hz)

Current consumption for voltage output with alarm module:
- for DC supply: ≤ 35 mA
- for AC supply: ≤ 60 mA

Current consumption for current output with alarm module:
- for DC supply: ≤ 60 mA
- for AC supply: ≤ 110 mA

### Housing / protection class

PC or Al Si 9 Cu 3 / IP65; Nema 4

### Cable gland

M16x1.5, cable Ø 4.5 - 10 mm (0.18 - 0.39")

### Electrical connection

screw terminals max. 1.5 mm² (AWG 16)

### Working temperature range of electronics

-40...60°C (-40...140°F)

### Working temperature range with display

-30...60°C (-22...140°F)

### Storage temperature range

-40...60°C (-40...140°F)

---

1) Refer to the working range of the humidity sensor
2) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement).
3) Refer to ordering guide
4) Refer to accuracies of calculated values (page 152)
5) Connection plugs refer to ordering guide
Connecting Diagram

Humidity Sensor - Working Range

The working range of the humidity sensor element is shown in terms of humidity / temperature limits.

Although the sensors would not deteriorate beyond the limits, their performance can only be specified within the limits of the working range.

Sensor Coating

Operation in heavily polluted and/or corrosive environments is typical for many industrial processes and can lead to drift or damage of the humidity sensor and thus to false measured values. The unique protective coating developed by E+E for the sensing probe (ordering code: HC01) brings a significant improvement on the long-term stability of the transmitter in very dirty and aggressive environments.

Connecting Diagram
**Hardware Configuration**

<table>
<thead>
<tr>
<th><strong>Housing</strong></th>
<th>metal housing</th>
<th>polycarbonate housing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>humidity + temperature</td>
<td></td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>wall mounting</td>
<td>duct mounting</td>
</tr>
<tr>
<td><strong>Filter</strong></td>
<td>membrane filter 5mm</td>
<td>stainless steel sintered filter</td>
</tr>
<tr>
<td><strong>Cable length (incl. probe length; models C and H only)</strong></td>
<td>2m (6.6ft)</td>
<td></td>
</tr>
<tr>
<td><strong>Probe length (models B and C only)</strong></td>
<td>65mm (2.6&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>no display</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm output</strong></td>
<td>no alarm output</td>
<td></td>
</tr>
<tr>
<td><strong>Plug</strong></td>
<td>standard cable 1 gland M16x1.5; cable Ø 4.5 - 10 mm (0.18 - 0.39&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Software Configuration**

<table>
<thead>
<tr>
<th><strong>Physical</strong></th>
<th>relative humidity RH [%]</th>
<th>(A) temperature T [°C or °F]</th>
<th>(B) dew-point temperature Td [°C or °F]</th>
<th>(C) frost-point temperature Tf [°C or °F]</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of output signals</strong></td>
<td>0 - 1V</td>
<td>(1)</td>
<td>0 - 5V</td>
<td>(2)</td>
<td>0 - 10V</td>
</tr>
</tbody>
</table>

**Temperature unit**

<table>
<thead>
<tr>
<th>°C</th>
<th>°F</th>
<th>E01</th>
<th>E01</th>
</tr>
</thead>
</table>

**Scaling of T-outputs**

<table>
<thead>
<tr>
<th>°C or °F</th>
<th>T02</th>
<th>T12</th>
<th>T15</th>
<th>T11</th>
<th>T09</th>
<th>T05</th>
<th>T07</th>
<th>T10</th>
<th>T08</th>
<th>T11</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40...60</td>
<td>-40...120</td>
<td>-40...248</td>
<td>T02</td>
<td>T12</td>
<td>T15</td>
<td>T11</td>
<td>T09</td>
<td>T05</td>
<td>T10</td>
<td>T08</td>
</tr>
<tr>
<td>-10...50</td>
<td>-10...120</td>
<td>-10...248</td>
<td>T03</td>
<td>T03</td>
<td>T12</td>
<td>T12</td>
<td>T09</td>
<td>T05</td>
<td>T10</td>
<td>T08</td>
</tr>
<tr>
<td>0...100</td>
<td>0...120</td>
<td>0...248</td>
<td>T04</td>
<td>T04</td>
<td>T05</td>
<td>T07</td>
<td>T07</td>
<td>T07</td>
<td>T07</td>
<td>T07</td>
</tr>
<tr>
<td>0...200</td>
<td>0...200</td>
<td>0...248</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
<td>T06</td>
</tr>
<tr>
<td>0...300</td>
<td>0...300</td>
<td>0...248</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
<td>T08</td>
</tr>
<tr>
<td>0...400</td>
<td>0...400</td>
<td>0...248</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
<td>T10</td>
</tr>
<tr>
<td>0...500</td>
<td>0...500</td>
<td>0...248</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
<td>T11</td>
</tr>
<tr>
<td>0...600</td>
<td>0...600</td>
<td>0...248</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
<td>T12</td>
</tr>
</tbody>
</table>

**Display mode**

<table>
<thead>
<tr>
<th>M12</th>
<th>M12</th>
<th>M01</th>
<th>M01</th>
<th>M02</th>
<th>M02</th>
</tr>
</thead>
</table>

**Order Example**

- filter caps
- external power supply unit
- display + housing cover in metal
- display + housing cover in polycarbonate
- mounting flange
- mounting flange 5mm (for model H only)
- bracket for installation onto mounting rails
- spare part sensor
- drip water protection
- calibration set
- extension cable for field calibration
- radiation shield

*Note: Only for plastic housing, not for metal housing