EE33-M

EE33-M is optimized for reliable measurement under demanding weather conditions. Besides accurate measurement of relative humidity (RH) and temperature (T), the device calculates all additional physical quantities like dew point temperature, absolute humidity and mixing ratio. A dual heating system prevents condensation on the RH sensor, on the sensing probe and on the filter cap, which leads to extremely short response time and fast recovery after condensing conditions. The measuring principle with separate RH and T probes enables precise continuous measurement even at permanent high humidity.

The proprietary E+E coating protects the RH sensor and its leads against corrosive and electrically conductive pollution. The probes are compatible with modern, ventilated radiation shields, like the LAM630.

With an optional connecting cable and the EE-PCS software (included in scope of supply) the user can easily perform an adjustment or a configuration of the outputs.

**Typical Applications**

- meteorology
- wind turbine generators
- road icing warning
- off-shore measurements

**Features**

- monolithic RH sensor
- precise measurement close to condensation
- condensation prevention through dual heating
- protection against pollution and corrosion
- calculation of additional physical quantities

**Monolithic Humidity Sensor**

The heart of EE33-M is the monolithic HMC01 sensor, developed and manufactured in thin-film technology by E+E Elektronik. HMC01 combines the moisture and heating element on a single substrate. Condensation is prevented by controlled heating of the sensor. The proprietary E+E coating protects the sensor and its leads against pollution and corrosion.

**Radiation Shield**

In order to minimize the impact of rain, snow, ice and solar radiation on the measurement the EE33-M must be mounted inside a radiation shield.

The radiation shield LAM630 is suitable for mounting onto a mast with 30-35mm diameter. Forced ventilation is provided by the control unit STEG6003. Up to 4 probes can be mounted using cable glands (Ø 18-25 mm).
Network Compatibility / Ethernet Interface

The optional RS485 interface (order code N) allows for building a network of up to 32 transmitters. The measurement data can be collected in a shared database and made available for all kinds of further processing.

Connection Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard</td>
<td>3x M16 x 1.5</td>
<td><img src="image" alt="standard" /></td>
</tr>
<tr>
<td>plug option C03</td>
<td>Lumberg RKC 5/7</td>
<td><img src="image" alt="plug option C03" /></td>
</tr>
<tr>
<td>plug option C06</td>
<td>Lumberg RSC 5/7</td>
<td><img src="image" alt="plug option C06" /></td>
</tr>
<tr>
<td>plug option C08</td>
<td>Lumberg RKC 5/7</td>
<td><img src="image" alt="plug option C08" /></td>
</tr>
</tbody>
</table>

Dimensions (mm)

**Housing**

- Height: 90 (3.5"")
- Width: 135 (5.3"")
- Depth: 66.5 (2.6")

**Humidity probe**

- Height: 39 (1.54")
- Width: 93 (3.66")
- Depth: 53 (2.09")
- Code “cable length”

**EE33-PFTM**

- Probe material: stainless steel
- Adapter material: polyoxymethylene
- Cable gland: polycarbonate

JLC International, Inc.
Phone: 215-340-2850
Fax: 215-340-3670

958 Town Center, New Britain, PA 18901
jlcusa@jlcinternational.com
www.jlcinternational.com
Technical Data

Measurement values

Relative humidity

Humidity sensor
heated, monolithic HMC01

Working range
0...100% RH

Accuracy (including hysteresis, non-linearity and repeatability)

-15...40°C (5...104°F)
0...90% RH ± (1.3 + 0.3%*mv) % RH
>90% RH ± 2.3% RH

-25...70°C (-13...186°F)
0...90% RH ± (1.4 + 1%*mv) % RH
>90% RH ± 2.3% RH

-40...180°C (-40...356°F)
0...90% RH ± (1.5 + 1.5%*mv) % RH

Temperature dependence of electronics typ. ± 0.01% RH/°C (0.0055% RH/°F)

Response time t90 at 20°C (68°F) < 15s

Temperature

Temperature sensor
Pt1000 DIN A

Working range sensing head
-40...180°C (-40...248°F)

Accuracy

Temperature dependence of electronics typ. ± 0.005°C/°C

External temperature probe
Pt1000 (DIN A)

Outputs

Two freely selectable and scaleable analogue outputs
0 - 1V -1mA < IL < 1mA
0 - 5V -1mA < IL < 1mA
0 - 10V -1mA < IL < 1mA
-4 - 20mA RL < 500 Ohm
0 - 20mA RL < 500 Ohm

Digital interface
RS232
optional: RS485

Max. adjustable measurement range

<table>
<thead>
<tr>
<th>Humidity</th>
<th>RH</th>
<th>min.</th>
<th>max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>0</td>
<td>100</td>
<td>(%)</td>
<td>RH</td>
</tr>
<tr>
<td>Td</td>
<td>-40 (-40)</td>
<td>180 (248)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>Tf</td>
<td>-40 (-40)</td>
<td>32 (0)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>Tw</td>
<td>0 (32)</td>
<td>100 (212)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>0</td>
<td>1100 (15)</td>
<td>mbar (ps)</td>
<td></td>
</tr>
<tr>
<td>r</td>
<td>0</td>
<td>999 (9999)</td>
<td>g/kg (gr/lb)</td>
<td></td>
</tr>
<tr>
<td>dv</td>
<td>0</td>
<td>700 (300)</td>
<td>g/m³ (gr/lft³)</td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>0</td>
<td>2800 (99999)</td>
<td>kJ/kg (Btu/lb)</td>
<td></td>
</tr>
</tbody>
</table>

General

Supply voltage
8...35V DC
12...30V AC

Current consumption
- 2x voltage output for 24V DC/AC: typ. 40mA / 80mA
- 2x current output typ. 80mA / 160mA

System requirements for software
WINDOWS 2000 or later; serial interface

Housing / protection class
Polycarbonate / IP65

Cable gland
M16 x 1.5

Electrical connection
screw terminals up to max. 1.5mm² (AWG 16)

Working and storage temperature range of electronics
-40...60°C (-40...140°F)

Electromagnetic compatibility according to
EN61326-1
EN61326-2-3

Industrial Environment

1) Refer to the working range of the humidity sensor.
2) Can be easily changed by software.
3) Refer to accuracies of calculated values (www.epluse.com/feuchtemessung).

*) 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).
Working Range Humidity Sensor

The grey area shows the allowed measurement range for the humidity sensor. Operating points outside of this range do not lead to destruction of the sensor, but the specified measurement accuracy cannot be guaranteed.

Connection Diagram

Scope of Supply

- EE33-M Transmitter according to Ordering Guide
- Operation Manual
- EE-PCS Product Configuration Software
- Inspection certificate according to DIN EN 10204 - 3.1
- Data logging and visualization software, only for option N
- Cable connector RKC 5/7 for customer assembly, only for option C03 or C08
- Cable connector RSC 5/7 for customer assembly, only for option C06 or C08
- Y-junction for network connection, only for option N or C08
- M16 cable gland, only for option C03, C06 or C08

Accessories / Replacement Parts (For further information, see data sheet „Accessories“)

- PTFE stainless steel filter
- Exchange membrane for PTFE stainless steel filter
- Stainless steel grid filter
- Interface cable for plug option C06
- RS485 Kit (HW + SW) for network
- Mounting set for mast with Ø 34 - 54 mm
- Radiation shield LAM630 with control unit
- Calibration-Kit
- Configuration adapter
- E+E Product Configuration Software

EE33-M Transmitter according to Ordering Guide
- HA010114
- HA010114ME
- HA010109

RS485 Kit (HW + SW) for network
- HA010311
- HA010601

Mounting set for mast with Ø 34 - 54 mm
- HA010213

Radiation shield LAM630 with control unit
- HA010508

- Calibration-Kit
- Configuration adapter
- E+E Product Configuration Software

see data sheet „Humidity Calibration Kit“
see data sheet „EE-PCA“
EE-PCS (download at www.epulse.com/configurator)
# Ordering Guide

<table>
<thead>
<tr>
<th>Hardware Configuration</th>
<th>EE33-PFTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter</td>
<td>PTFE stainless steel filter</td>
</tr>
<tr>
<td>Cable length</td>
<td>1 m</td>
</tr>
<tr>
<td></td>
<td>2 m</td>
</tr>
<tr>
<td>Probe length</td>
<td>according to „Dimensions“</td>
</tr>
<tr>
<td>Interface</td>
<td>RS232</td>
</tr>
<tr>
<td></td>
<td>RS485</td>
</tr>
<tr>
<td>Plug</td>
<td>cable glands</td>
</tr>
<tr>
<td></td>
<td>1 plug for power supply and outputs</td>
</tr>
<tr>
<td></td>
<td>2 plugs for power supply / outputs and RS485 network</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software Configuration</th>
<th>Output 1</th>
<th>Output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative humidity</td>
<td>RH [%]</td>
<td>A</td>
</tr>
<tr>
<td>Temperature</td>
<td>T [°C]</td>
<td>B</td>
</tr>
<tr>
<td>Dew point temperature</td>
<td>Td [°C]</td>
<td>C</td>
</tr>
<tr>
<td>Frost point temperature</td>
<td>Tf [°C]</td>
<td>D</td>
</tr>
<tr>
<td>Wet bulb temperature</td>
<td>Tw [°C]</td>
<td>E</td>
</tr>
<tr>
<td>Water vapour partial pres.</td>
<td>e [mbar]</td>
<td>F</td>
</tr>
<tr>
<td>Mixing ratio</td>
<td>r [g/kg]</td>
<td>G</td>
</tr>
<tr>
<td>Absolute humidity</td>
<td>dv [g/m³]</td>
<td>H</td>
</tr>
<tr>
<td>Specific enthalphy</td>
<td>h [kJ/kg]</td>
<td>J</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of output signal</th>
<th>Output 1</th>
<th>Output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1V</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>0-5V</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>0-10V</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>4-20mA</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>0-20mA</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured value units</th>
<th>Output 1</th>
<th>Output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>metric / SI</td>
<td></td>
<td>A - J</td>
</tr>
<tr>
<td>non metric / US</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T-scaling (T / Td / Tf / Tw) for output 1 + 2</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40...60°C</td>
<td></td>
</tr>
<tr>
<td>-30...70°C</td>
<td>008</td>
</tr>
<tr>
<td>-20...80°C</td>
<td>024</td>
</tr>
</tbody>
</table>

### Order Example

**EE33-PFTM2022N/AB3-002**

**Hardware Configuration:**
- Filter: PTFE stainless steel filter
- Cable length: 2m
- Probe length: 65mm
- Interface: RS485
- Plug: cable glands

**Software Configuration:**
- Output 1:
  - Relative humidity
- Output 2:
  - Temperature
- Type of output signal:
  - Measured value units: metric / SI
- T-scaling: -40...60°C