The UL listed EE310 is optimized for best reliability in industrial applications up to 180 °C (356 °F) and 20 bar (290 psi). In addition to highly accurate measurement of the relative humidity (RH) and temperature (T), the device calculates all other humidity related parameters.

**Measurement Performance**
The EE310 employs high-end E+E humidity sensing elements manufactured in state-of-the-art thin film technology, which are the prerequisite for outstanding measurement accuracy.

**Long-Term Stability**
The E+E proprietary coating protects the sensing elements against corrosive and electrically conductive pollution, which leads to outstanding long-term stability even in harsh environment. With the appropriate choice of filter cap, the EE310 tackles even challenging industrial applications.

**Versatility**
The EE310 is available for wall or duct mount as well as with remote probe. It features an UL Type 4 polycarbonate enclosure which facilitates installation and maintenance. The enclosure can accommodate a 100…240 V AC supply unit or various interface modules.

**Outputs**
The measured data is available on two analogue outputs, on the RS485 interface with Modbus RTU protocol and on the alarm (relay) outputs.

**Configurable and Adjustable**
The configuration and the RH and T adjustment of the EE310 can be performed using the free EE-PCS Product Configuration Software via the USB interface.

**Features**
- **Enclosure**
  - UL Type 4 protection class
  - easy mounting and service
- **Probe**
  - working range up to 180°C (356 °F)
  - and 20 bar (290 psi)
  - protective coating for sensing elements
- **Outputs**
  - 2 analogue outputs current / voltage
  - error indication according NAMUR
  - Modbus RTU
  - 2 alarm outputs
  - configurable via software
- **USB Service Interface**
  - configuration, adjustment and firmware update
  - 4 status LEDs
- **Inspection certificate according to DIN EN 10204 – 3.1**
Protective sensor coating (option C1)

The E+E proprietary sensor coating is a protective layer applied to the active surface and leads of the sensing elements. The coating substantially extends the lifetime and the measurement performance of the E+E sensor in corrosive environment (salts, off-shore applications). Additionally, it improves the sensor’s long term stability in dusty, dirty or oily applications by preventing stray impedances caused by deposits on the active sensor surface.

Dimensions in mm (inch)

ENCLOSURE

PROBES

T1: Wall mount

T5: Remote probe up to 180 °C (356 °F)

T2: Duct mount

T10: Pressure tight probe up to 20 bar (300 psi)

Technical Data

Measurands

Relative humidity (RH)

Working range 0...100 % RH

Accuracy\(^1\) (incl. hysteresis, non-linearity and repeatability)

\([-15...40 \, ^\circ \text{C} (5...104 \, ^\circ \text{F}), RH <90 \, \%]\)

\([-15...40 \, ^\circ \text{C} (5...104 \, ^\circ \text{F}), RH >90 \, \%]\)

\([-25...70 \, ^\circ \text{C} (-13...158 \, ^\circ \text{F})]\)

\([-40...180 \, ^\circ \text{C} (-40...356 \, ^\circ \text{F})]\)

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

Response time < 15 s with metal grid filter at 20 °C (68 °F) / t\(_{90}\)

1) Traceable to intern. standards, administrated by NIST, PTB, BEV,...

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).
Temperature (T)

**Working range sensing probe**
- T1, wall: -40... 60 °C (-40...140 °F)
- T2, duct: -40... 80 °C (-40...176 °F)
- T5, remote: -40... 180 °C (-40...356 °F)
- T10, pressure tight: -40... 180 °C (-40...356 °F)

**Accuracy**

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

**Calculated parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>From</th>
<th>Probe T1</th>
<th>to</th>
<th>Probe T2</th>
<th>to</th>
<th>Probe T5, T10</th>
<th>to</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dew point temperature Td</td>
<td>-40</td>
<td>60 (140)</td>
<td>80</td>
<td>(176)</td>
<td>100</td>
<td>(212)</td>
<td>°C</td>
<td>(°F)</td>
</tr>
<tr>
<td>Frost point temperature Tf</td>
<td>-40</td>
<td>0 (32)</td>
<td>0</td>
<td>(32)</td>
<td>0</td>
<td>(32)</td>
<td>°C</td>
<td>(°F)</td>
</tr>
<tr>
<td>Wet bulb temperature Tw</td>
<td>0</td>
<td>60 (140)</td>
<td>80</td>
<td>(176)</td>
<td>100</td>
<td>(212)</td>
<td>°C</td>
<td>(°F)</td>
</tr>
<tr>
<td>Water vapour partial pressure e</td>
<td>0</td>
<td>200</td>
<td>500</td>
<td>(7.5)</td>
<td>1100</td>
<td>(15)</td>
<td>mbar (psia)</td>
<td></td>
</tr>
<tr>
<td>Mixing ratio r</td>
<td>0</td>
<td>425</td>
<td>999</td>
<td>(99999)</td>
<td>999</td>
<td>(99999)</td>
<td>g/kg (gr/lb)</td>
<td></td>
</tr>
<tr>
<td>Absolute humidity dv</td>
<td>0</td>
<td>150</td>
<td>300</td>
<td>(120)</td>
<td>700</td>
<td>(300)</td>
<td>g/m³ (gr/ft³)</td>
<td></td>
</tr>
<tr>
<td>Specific enthalpy h</td>
<td>0</td>
<td>400</td>
<td>1000</td>
<td>(375000)</td>
<td>2800</td>
<td>(99999)</td>
<td>kJ/kg (Btu/lb)</td>
<td></td>
</tr>
</tbody>
</table>

**Outputs**

- Two analogue outputs freely selectable and scalable: 0 - 1 / 5 / 10 V, -1 mA < IL < 1 mA
- 4 - 20 mA, 3-wire, R<sub>L</sub> < 500 Ohm

**Digital interface / protocol (option J3)**
- RS485 / Modbus RTU, max. 32 unit load devices on one bus (EE310 = 1 unit load; factory settings: 9600 bps, parity even, stop bit 1 / slave-ID 231)

**General**

**Power supply**

- 8...35 V DC (LPS) max. 2 W *)
- indoor use: 12...30 V AC, 50/60 Hz (Class 2 supply) max. 4 VA *)
- outdoor use: 12...16 V AC, 50/60 Hz (Class 2 supply) max. 5 VA **) including 2 voltage or current outputs
- 100...240 V AC, 50/60 Hz (Class 3) max. 5 VA **) including 2 voltage or current outputs

- *) including 2 voltage or current outputs and relay option AM2 or AM6
- **) including 2 voltage or current outputs

**Pressure range for pressure tight probe**
- 0.01...20 bar (0.15...300 psi)

**Probe material**
- stainless steel 1.4404 / AISI 316L

**Enclosure material**
- polycarbonate, UL94-V0 approved

**Protection class**
- IP65

**Electrical connection**
- screw terminals max. 1.5 mm² (AWG 16)

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

**Working range remote sensing probe cable**
- -40...150 °C (-40...302 °F)

**Electromagnetic compatibility**
- EN61326-1, EN61326-2-3, ICES-003 Class A
- Industrial Environment, FCC Part 15 Class A

**Compliance**

**United States:**
- UL Listed, CCN QUYX, Under UL 61010-1, Process Control Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class A

**Canada:**
- UL Listed, CCN QUYX7, Under CSA C22.2 No. 61010-1, Signal Equipment; Industry Canada Compliant, ICES-003

**Two alarm outputs**
- changeover contact
- 250 V AC / 6 A, conductor temperature rating min. 90 °C (194 °F)
- 28 V DC / 6 A, conductor temperature rating min. 90 °C (194 °F)

**System requirements for EE-PCS software**
- Windows XP or higher; USB port

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1) Degree of pollution 2, overvoltage category II, altitude up to 3000 m (9843 ft).
2) IP65 not evaluated by UL.
3) Valid only with liquid-tight 1/2" conduit fitting (E24) and cable glands. Not valid with M12 plug (E4, E5, E6, E12), conduit fitting E23, option AM2 and AM3.
Ordering Guide

**Type**
- wall mount
- duct mount
- remote probe up to 180 °C (356 °F)
- pressure tight probe up to 20 bar (300 psi)

**Filter**
- plastic - metal grid (only up to 120 °C / 248 °F)
- stainless steel sintered PTFE
- stainless steel - metal grid H₂O,

**Cable length** (incl. probe length)
- 0.5 m (1.64 ft)
- 2 m (6.6 ft)
- 5 m (16.4 ft)
- 10 m (32.8 ft)
- 20 m (65.6 ft)

**Probe length**
- 65 mm (2.55”)
- 200 mm (7.87”)
- 400 mm (15.75”)

**Process connection**
- 1/2” ISO thread PA23
- 1/2” NPT thread PA25

**Hardware configuration**
- cable glands
- 1 plug for power supply and outputs 1)
- 1 cable gland / 1 plug for Modbus RTU (requires option J3) 1)
- 2 plugs for power supply / outputs and for Modbus RTU (requires option J3) 1)
- 3 plugs for power supply / outputs and Modbus RTU (requires option J3) 1)
- conduit fitting 2)
- liquid-tight 1/2” conduit fitting 2)

**Electrical connection**
- cable glands
- 1 plug for power supply and outputs 1)
- 1 cable gland / 1 plug for Modbus RTU (requires option J3) 1)
- 2 plugs for power supply / outputs and for Modbus RTU (requires option J3) 1)
- 3 plugs for power supply / outputs and Modbus RTU (requires option J3) 1)
- conduit fitting 2)
- liquid-tight 1/2” conduit fitting 2)

**Optional features**
- RS485 module - Modbus RTU
- sensor coating
- alarm outputs with cable glands for NFPA79 applications 3)
- integrated power supply 100…240 V AC, 50/60 Hz for NFPA79 applications 3) 4)
- integrated power supply 100…240 V AC, 50/60 Hz with liquid-tight 1/2” conduit fitting 3)
- alarm outputs with liquid-tight 1/2” conduit fitting 3)

**Setup - analogue outputs**

<table>
<thead>
<tr>
<th>Output 1</th>
<th>Relative humidity RH [%]</th>
<th>Other measurand (xx see measurand code below)</th>
<th>no code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 2</td>
<td>Temperature T °C</td>
<td>Other measurand (xx see measurand code below)</td>
<td>no code</td>
</tr>
</tbody>
</table>

**Measurand Code** for output 1 and 2 in the ordering guide

<table>
<thead>
<tr>
<th>Measurand Code</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH</td>
<td>%</td>
</tr>
<tr>
<td>T</td>
<td>°C</td>
</tr>
<tr>
<td>Tw</td>
<td>°C</td>
</tr>
<tr>
<td>Te</td>
<td>°F</td>
</tr>
<tr>
<td>Td</td>
<td>°C</td>
</tr>
<tr>
<td>Tf</td>
<td>°F</td>
</tr>
<tr>
<td>r</td>
<td>g/kg</td>
</tr>
<tr>
<td>dv</td>
<td>g/m³</td>
</tr>
<tr>
<td>de</td>
<td>g/lb</td>
</tr>
<tr>
<td>ep</td>
<td>mbar</td>
</tr>
<tr>
<td>ep(°F)</td>
<td>psi</td>
</tr>
<tr>
<td>ep(kg/cm²)</td>
<td>lb/in²</td>
</tr>
<tr>
<td>en</td>
<td>BTU/lb</td>
</tr>
</tbody>
</table>

1) For indoor use only
2) For indoor use in dry location only
3) Combination of alarm output (AM2/AM6), and integrated power supply (AM3 / AM5) is not possible. NFPA = National Fire Protection Association
4) Integrated power supply for NFPA79 applications only. (AM3) includes 2 plugs for power supply and outputs, other plug options are not possible.
5) Both analogue outputs shall be either voltage or current.

**Notes**
- JLC International, Inc.
  - Phone: 215-340-2850
  - Fax: 215-340-3670
  - 958 Town Center, New Britain, PA 19801
  - jlcusa@jlcinternational.com
  - www.jlcinternational.com
Order Example

EE310-AP1T5E24J3C1GA3GB3SBL-40SBH180

Approval: AP1  UL listing cULus QUYX.E500367
Type: T5  remote probe up to 180 °C (356 °F)
Filter: no code  stainless steel sintered filter
Cable length: no code  2 m (6.6')
Probe length: no code  200 mm (7.87')
Electrical connection: E24  liquid-tight 1/2" conduit fitting
Optional features: J3  module - Modbus RTU
                     C1  sensor coating
Output 1: no code  relative humidity %
Output Signal 1: GA3  0-10 V
Scaling 1 low: no code  0
Scaling 1 high: no code  100
Output 2: no code  temperature T [°C]
Output Signal 2: GB3  0-10 V
Scaling 2 low: SBL-40  -40
Scaling 2 high: SBH180  180

Accessories (see data sheet "Accessories")

- Mounting flange stainless steel HA010201
- Drip water protection HA010503
- Bracket for installation onto mounting rails 1) HA010203
- Mounting bracket for remote probe HA010211
- Humidity calibration kit see data sheet „Humidity calibration kit“
- Stainless steel wall mounting clip Ø 12 mm (0.5") HA010225

1) Two pieces are necessary for each EE310.