The EE431 duct and immersion sensor measures reliably the temperature (T) in air and liquids and is optimized for building automation, HVAC and process control.

**Analogue, Digital and Passive Outputs**
The T measured data is available on the voltage or current output, as well as on the RS485 interface with Modbus RTU or BACnet MS/TP protocol. In addition, EE431 features a wide choice of sensing elements for passive T measurement.

**Easy Installation**
The device can be mounted either with the plastic mounting flange or via external mounting holes at the enclosure. The innovative immersion well is dedicated for measurement in liquids and allows for fast and safe replacement of the sensor. The EE431 with RS485 interface is appropriate for daisy-chain wiring.

**Configurable and Adjustable**
An optional adapter and the free EE-PCS Product Configuration Software facilitate the setup and adjustment of the EE431.

### Features

- **External mounting holes**
  - Mounting with closed cover
  - Protection against construction site pollution

- **Bayonet screws**
  - Open/closed with a ¼ rotation

- **Mounting flange**
  - Clamp ring
    - No direct screwing onto probe
    - Inclined screw for easy installation
  - Special sealing
    - Foam gasket for good tightness
    - No scratching of probe due to alignment notch

- **Immersion well**
  - Innovative mounting spring
    - For securing the probe inside the well
    - No fastening screw, no tools required

### Technical Data

#### Active Output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>probe duct sensor: -40...+110 °C (-40...+230 °F) probe immersion sensor: -40...+150 °C (-40...+302 °F) electronics: -40...+70 °C (-40...+158 °F)</td>
</tr>
<tr>
<td>Sensing element</td>
<td>Pt1000 class A, DIN EN60751</td>
</tr>
<tr>
<td>Analogue output</td>
<td>0-10 V, -1 mA &lt; I_l &lt; 1 mA, 4-20 mA (two-wire), R_L &lt; 500 Ω</td>
</tr>
<tr>
<td>Digital interface</td>
<td>RS485 with max. 32 unit load devices on one bus</td>
</tr>
<tr>
<td>Protocol</td>
<td>Modbus RTU or BACnet MS/TP</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.3 °C (±0.54 °F) at 20 °C (68 °F) ±0.2 °C (±0.36 °F) at 20 °C (68 °F) (optional only for analogue output)</td>
</tr>
<tr>
<td>Supply voltage (Class III)</td>
<td>15-35 V DC or 24 V AC ±20% for RS485 and 0-10 V output 10 V DC + R_L x 20 mA &lt; V+ &lt; 35 V DC for 4-20 mA output</td>
</tr>
</tbody>
</table>

**Test report according to DIN EN 10204 – 2.2**
Current demand (typ.)
- analogue: 5 mA (DC) / 12 mAeff (AC)
- RS485: 3.5 mA (DC) / 12 mAeff (AC)

Electromagnetic compatibility: EN61326-1, EN61326-2-3

Passive Output

Operating temperature (probe)
- -40...+110 °C (-40...+230 °F) for immersion sensor with Pt and Ni T-sensors
- -40...+150 °C (-40...+302 °F) for immersion sensor

T sensing elements:

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Nominal Resistance</th>
<th>Sensitivity</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100 DIN B</td>
<td>R0: 100 Ω</td>
<td>TC: 3.85 x 10^-3/°C</td>
<td>DIN EN 60751</td>
</tr>
<tr>
<td>Pt1000 DIN B</td>
<td>R0: 1000 Ω</td>
<td>TC: 3.85 x 10^-3/°C</td>
<td>DIN EN 60751</td>
</tr>
<tr>
<td>NTC1.8k</td>
<td>Rss: 1.8 kΩ ± 0.2 K</td>
<td>Basel: 3500 K ± 1.0 %</td>
<td>-</td>
</tr>
<tr>
<td>NTC2.2k</td>
<td>Rss: 2.252 kΩ ± 0.2 K</td>
<td>Basel: 3977 K ± 0.3 %</td>
<td>-</td>
</tr>
<tr>
<td>NTC10k B3950</td>
<td>Rss: 10 kΩ ± 0.5 %</td>
<td>Basel: 3989 K (Basel: 3950 K ± 1.0 %)</td>
<td>-</td>
</tr>
<tr>
<td>NTC10k B3435</td>
<td>Rss: 10 kΩ ± 1 %</td>
<td>Basel: 3435 K</td>
<td>-</td>
</tr>
<tr>
<td>KTY81-210</td>
<td>Rss: 1980-2020 Ω</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>N1000 TK6180 DIN B</td>
<td>R0: 1000 Ω</td>
<td>TC: 6180 ppmK</td>
<td>DIN 43760</td>
</tr>
<tr>
<td>N1000 TK5000 DIN B</td>
<td>R0: 1000 Ω</td>
<td>TC: 5000 ppmK</td>
<td>DIN 43760</td>
</tr>
</tbody>
</table>

Measurement current typ.:
- < 1 mA (according technical data of the specific T-sensing element)

T-sensor connection:
- two-wire

General

Insulation resistance (probe):
- > 100 MQ at 20 °C (68 °F)

Response time τ<sub>63</sub>:
- < 1 min, duct sensor at 3 m/s (590 ft/min) air velocity
- < 30 s, immersion sensor in liquid water bath

Probe material:
- stainless steel (1.4571 / 316Ti)

Enclosure material:
- polycarbonate, UL94-V0 approved, T-range: -40...+110 °C (-40...+230 °F)

Protection class:
- IP65 / NEMA 4

Cable gland:
- M16x1.5, M12x1.5 , UL94-V2

Electrical connection:
- screw terminals, max. 2.5 mm² (0.004 in²)

Storage temperature:
- -30...+70 °C (-22...+158 °F)

Working and storage humidity:
- 5...95 % RH, non condensing

Immersion well:

Material:
- brass nickel-plated stainless steel (tube: 1.4571 / 316Ti, mounting thread: 1.4404 / 316L)

Pressure rating:
- 15 bar (218 psi), brass
- 25 bar (363 psi), stainless steel

Max. flow speed:
- brass:
  - 50 mm (1.97") 26 m/s (515 ft/min)
  - 100 mm (3.94") 12 m/s (2362 ft/min)
  - 135 mm (5.31") 6 m/s (1181 ft/min)
- stainless steel:
  - 50 mm (1.97") 29 m/s (5708 ft/min)
  - 100 mm (3.94") 15 m/s (2653 ft/min)
  - 135 mm (5.31") 9 m/s (1771 ft/min)
- 25 bar (363 psi):
  - 50 mm (1.97") 1 m/s (197 ft/min)
  - 100 mm (3.94") 0.5 m/s (95 ft/min)

Dimensions mm (inch):

- Plastic mounting flange
- Immersion well:
  - Ø>9 (Ø>0.35)

According to ordering guide „Probe length”
According to ordering guide „Immersion well”
### Ordering Guide

#### Position 1 - Temperature Sensor

<table>
<thead>
<tr>
<th>Model</th>
<th>active</th>
<th>passive</th>
<th>Output</th>
<th>M3</th>
<th>M7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-10 V</td>
<td></td>
<td>4-20 mA</td>
<td>A3</td>
<td>J3</td>
</tr>
<tr>
<td></td>
<td>RS485</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-sensor passive</td>
<td>Pt100 DIN B</td>
<td></td>
<td>Pt1000 DIN B</td>
<td>TP2</td>
<td></td>
</tr>
<tr>
<td>(see <a href="http://www.epluse.com/R-T_Characteristics">www.epluse.com/R-T_Characteristics</a>)</td>
<td>NTC 1.8k</td>
<td></td>
<td>NTC 10k, B3950</td>
<td>TP4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ni1000, TK6180 DIN B</td>
<td></td>
<td>KTY81-210</td>
<td>TP7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NTC 10k, B3435</td>
<td></td>
<td>Ni1000, TK5000 DIN B</td>
<td>TP9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NTC 2.2k</td>
<td></td>
<td></td>
<td>TP11</td>
<td></td>
</tr>
<tr>
<td>Probe length</td>
<td>65 mm (2.56&quot;)</td>
<td></td>
<td>L65</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>115 mm (4.53&quot;)</td>
<td></td>
<td>L115</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>150 mm (5.91&quot;)</td>
<td></td>
<td>L150</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 mm (11.81&quot;)</td>
<td></td>
<td>L300</td>
<td></td>
<td></td>
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<tr>
<td>Accuracy</td>
<td>±0.3 °C</td>
<td></td>
<td>±0.2 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>no code</td>
<td></td>
<td>no code</td>
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<tr>
<td>Unit</td>
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<td></td>
<td>°F</td>
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<td></td>
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<td>MA2</td>
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<td></td>
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<tr>
<td>Scale T low</td>
<td>0</td>
<td></td>
<td>no code</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>value (within working range)</td>
<td></td>
<td>SAL value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale T high</td>
<td>50</td>
<td></td>
<td>no code</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>value (within working range)</td>
<td></td>
<td>SAH value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol</td>
<td>Modbus RTU¹)</td>
<td></td>
<td>P1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BACnet MS/TP²)</td>
<td></td>
<td>P3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baud rate</td>
<td>9.600</td>
<td></td>
<td>BD5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.200</td>
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<td>BD6</td>
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<td></td>
<td>38.400</td>
<td></td>
<td>BD7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>57.600³)</td>
<td></td>
<td>BD8</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>76.800³)</td>
<td></td>
<td>BD9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

³) Only for BACnet MS/TP

#### Position 2 - Mounting Accessories

**Plastic mounting flange HA401101**

**Immersion well: R½" ISO:**

<table>
<thead>
<tr>
<th>length (L)</th>
<th>50 mm (1.97&quot;)</th>
<th>100 mm (3.94&quot;)</th>
<th>135 mm (5.31&quot;)</th>
<th>285 mm (11.22&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>brass</td>
<td>HA400101</td>
<td>HA400104</td>
<td>HA400102</td>
<td>HA400103</td>
</tr>
<tr>
<td>stainless steel</td>
<td>HA400201</td>
<td>HA400204</td>
<td>HA400202</td>
<td>HA400203</td>
</tr>
</tbody>
</table>

**Immersion well: ½" NPT:**

<table>
<thead>
<tr>
<th>length (L)</th>
<th>50 mm (1.97&quot;)</th>
<th>100 mm (3.94&quot;)</th>
<th>135 mm (5.31&quot;)</th>
<th>285 mm (11.22&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>brass</td>
<td>HA400111</td>
<td>HA400114</td>
<td>HA400112</td>
<td>HA400113</td>
</tr>
<tr>
<td>stainless steel</td>
<td>HA400211</td>
<td>HA400214</td>
<td>HA400212</td>
<td>HA400213</td>
</tr>
</tbody>
</table>
### Order Example

#### Position 1:
**EE431-M3J3L300P3BD7**  
Model: active  
Output: RS485  
Probe length: 300 mm  
Protocol: BACnet MS/TP  
Baud rate: 38.400

#### Position 2:
**HA400113**  
Immersion well: ½” NPT, brass, 285 mm (11.22”)

#### Position 1:
**EE431-M7TP11L65**  
Model: passive  
T-sensor passive: NTC 10k, B3950  
Probe length: 65 mm (2.56”)

#### Position 2:
**HA400201**  
Immersion well: R½” ISO, stainless steel, 50 mm (1.97”)

### Accessories

- Product configuration adapter  
  - for analogue output  
  - for digital output - USB configuration adapter  
- Product configuration software  
  - EE-PCS (free download: www.epluse.com/configurator)  
- Power supply adapter  
- Conduit adapter, M16x1.5 to 1/2”  
  - see data sheet EE-PCA  
  - HA011066  
  - HA011110  
  - V03 (see data sheet Accessories)