The EE300Ex intrinsically safe transmitter measures reliably relative humidity (RH) and temperature (T) in explosion hazard areas. It complies with the classifications for Europe (ATEX), International (IECEX), USA / Canada (FM) and China (NEPSI) for flammable gas and dust applications. The EE300Ex it is also certified for gas applications according Korean (KC) and Japan (TIIS) certifications.

The entire device can be placed in the explosion endangered area. The remote sensing probe allows for classification up to T6.

Measurement performance
The well proven E+E humidity sensors and competence in calibration allow for highly accurate and long term stable measurement over the full range 0...100 % RH and -40...180 °C (-40...356 °F), with pressure rating up to 300 bar (4351 psi).

Besides the RH and T measurement, the EE300Ex calculates all humidity related parameters such as dew point temperature (Td), frost point temperature (Tf), absolute humidity (dv) or mixing ratio (r).

Moisture in oil measurement
The EE300Ex with ATEX, IECEX, NEPSI and KC approval is suitable also for measuring water content (x) in ppm and water activity (aw) in isolation, lubrication and hydraulic oils. Typical applications include oil purifiers and online monitoring of lubrication and hydraulic oils.

Supply and outputs
The device can be powered by any intrinsically safe supply unit or via Zener barriers. The measured or calculated data is available on two 4…20 mA, 2-wire outputs and on the LCD display.

Robust, functional design
The stainless steel enclosure and sensing probe are suitable for harsh environment in challenging industrial applications. The EE300Ex design facilitates the installation as well as the replacement of the measuring section (electronics and probe) without time consuming wiring.

Typical Applications
- chemical process control
- pharmaceutical applications
- explosive / hazardous storage rooms
- flour mills
- oil purifiers

Features
- gas and dust in zone 0 / 20 and Div. 1
- stainless steel enclosure and probe
- best accuracy up to 180 °C (356 °F)
- pressure tight up to 300 bar (4351 psi)
- inspection certificate according to DIN EN 10204 – 3.1
Protective sensor coating

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 long term stability in dusty or dirty applications by preventing stray impedances caused by deposits on the active sensor surface.

Models

<table>
<thead>
<tr>
<th>Model</th>
<th>pressure range</th>
<th>working range</th>
<th>Ø-probe mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - wall mount</td>
<td>0.1...20 bar (1.5...300 psi)</td>
<td>-40...60 °C (-40...140°F)</td>
<td>12 (0.47)</td>
</tr>
<tr>
<td>E - remote probe, 20 bar</td>
<td>0.1...20 bar (1.5...300 psi)</td>
<td>-40...180 °C (-40...356°F)</td>
<td>12 (0.47)</td>
</tr>
<tr>
<td>E - remote probe with sliding fitting for assembly / disassembly under pressure</td>
<td>0.1...20 bar (1.5...300 psi)</td>
<td>-40...180 °C (-40...356°F)</td>
<td>13 (0.51)</td>
</tr>
<tr>
<td>M - remote probe, 300 bar</td>
<td>0.01...300 bar (0.15...4351 psi)</td>
<td>-40...180 °C (-40...356°F)</td>
<td>12 (0.47)</td>
</tr>
<tr>
<td>U - remote probe for sensor retraction tool PN250</td>
<td>0.01...250 bar (0.15...3626 psi)</td>
<td>-40...180 °C (-40...356°F)</td>
<td>12/15 (0.47/0.59)</td>
</tr>
</tbody>
</table>

Dimensions in mm (inches)

<table>
<thead>
<tr>
<th>Model</th>
<th>length of filter</th>
<th>mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>stainless steel sintered filter</td>
<td>33 (1.3&quot;)</td>
<td></td>
</tr>
<tr>
<td>PTFE-filter</td>
<td>33 (1.3&quot;)</td>
<td></td>
</tr>
<tr>
<td>stainless steel grid filter</td>
<td>39 (1.5&quot;)</td>
<td></td>
</tr>
<tr>
<td>oil filter</td>
<td>32 (1.26&quot;)</td>
<td></td>
</tr>
</tbody>
</table>
Technical Data EE300Ex

Measurands

Relative humidity
Measuring range 0...100 % RH
Accuracy (including hysteresis, non-linearity and repeatability, traceable to international standards, administered by NIST, PTB, BEV...)
-15...40 °C (5...104 °F) ±90 % RH ± (1.3 + 0.3%*mv) % RH
-25...70 °C (-13...158 °F) >90 % RH ± 2.3 % RH
mv = measured value
-40...180 °C (-40...356 °F) ≤90 % RH ± (1.3 + 0.3%*mv) % RH
Temperature dependence electronics typ. 0.03 % RH/°C
Response time t90 < 30 sec. with stainless steel filter at 20 °C (68 °F)

Temperature
Measuring range
-15...40 °C (5...104 °F) ≤90 % RH ± (1.3 + 0.3%*mv) % RH
-25...70 °C (-13...158 °F) >90 % RH ± 2.3 % RH
-40...180 °C (-40...356 °F) ≤90 % RH ± (1.3 + 0.3%*mv) % RH

Accuracy

Temperature dependence of electronics typical 0.005 °C/°C

Calculated parameters

<table>
<thead>
<tr>
<th>From</th>
<th>Wall Mount</th>
<th>Up To</th>
<th>Remote Probe</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Td -40 (-40)</td>
<td>60 (140)</td>
<td>100 (212)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>Tf -40 (-40)</td>
<td>60 (140)</td>
<td>100 (212)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>Tw 0 (32)</td>
<td>60 (140)</td>
<td>100 (212)</td>
<td>°C (°F)</td>
<td></td>
</tr>
<tr>
<td>e 0 (0)</td>
<td>200 (3)</td>
<td>1100 (15)</td>
<td>mbar (psia)</td>
<td></td>
</tr>
<tr>
<td>r 0 (0)</td>
<td>425 (2900)</td>
<td>999 (9999)</td>
<td>kg/g (gr/lb)</td>
<td></td>
</tr>
<tr>
<td>dv 0 (0)</td>
<td>150 (60)</td>
<td>700 (300)</td>
<td>g/m² (gr/ft²)</td>
<td></td>
</tr>
<tr>
<td>H 0 (0)</td>
<td>400 (150000)</td>
<td>2800 (99999)</td>
<td>kJ/kg (Btu/lb)</td>
<td></td>
</tr>
<tr>
<td>aw 0</td>
<td>-</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x 0</td>
<td>-</td>
<td>100000</td>
<td>ppm</td>
<td></td>
</tr>
</tbody>
</table>

Outputs
freely selectable and scalable outputs 2 x 4-20 mA (2-wire) galvanically isolated Rr = (Vcc-9V)/20mA Output 1 must be connected!

General
Supply voltage \( V_{cc,\text{min}} = (9 + R_L * 0.02) \) VDC \( V_{cc,\text{max}} = 28 \) V DC \( R_L = \) load resistor
Current consumption max 20 mA per channel
Protection class of housing IP65 / Nema 4
Cable gland M16 for cable diameter 5 - 10 mm (0.2” - 0.4”)
M20 for cable diameter 10 - 14 mm (0.4” - 0.6”)
Electrical connection screw terminals max. 1.5 mm² (AWG 16)
Working temperature range probe electronics without display -40...60 °C (-40...140 °F)
electronics with display -20...60 °C (-4...140 °F)
Storage temperature range electronics and probe -20...60 °C (-22...140 °F)
Electromagnetic compatibility EN61326-1 EN61326-2-3 ICES-003 ClassB Industrial Environment FCC Part15 ClassB
Material enclosure stainless steel 1.4404 probe cable stainless steel 1.4404 probe (without filter) stainless steel 1.4301

1) 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).

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# Ex - Classifications

## Europe (ATEX)
- **Certificate:** TPS 13 ATEX 38892 003 X by TÜV SÜD Product Service GmbH
- **Safety factors:** 
  - $U_i = 28\text{V}$; $I_i = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2.2\text{nF}$; $L_i = 0\text{mH}$
- **Ex-Designation:**
  - Transmitter without display: II 1 G Ex ia IIC T4 Ga / II 1 D Ex ia IIC T80°C Da
  - Transmitter with display: II 2 G Ex ia IIC T4 Gb / II 1 G Ex ia IIB T4 Ga
  - Remote probe: II 1 G Ex ia IIC T6-T1 Ga / II 1 D Ex ia IIC T80°C...220°C Da

## International (IECEx)
- **Certificate:** IECEx FMG 14.0017 X by FM Approvals
- **Safety factors:** 
  - $6.4\text{ Vdc} \leq U_i \leq 28\text{Vdc}$; $I_i = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2.2\text{nF}$; $L_i = 0\text{mH}$
- **Ex-Designation:**
  - Transmitter without display: Ex ia IIC T4 Ta = -40°C to 60°C Ga / Ex ia IIC T131°C Da
  - Transmitter with display: Ex ia IIC T4 Ta = -40°C to 60°C Gb / Ex ia IIB T4 Ta = -40°C to 60°C Ga
  - Remote probe: Ex ia IIC T6-T1 Ta = -70°C to 200°C Ga / Ex ia IIC T80°C Da

## China (NEPSI)
- **Certificate:** Cert NO. GYJ16.1417X by NEPSI
- **Safety factors:** 
  - $U_i = 28\text{Vdc}$; $I_i = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2.2\text{nF}$; $L_i = 0\text{mH}$
- **Ex-Designation:**
  - Transmitter without display: Ex ia IIC T4 Ga, Ex iaD 20 T131
  - Transmitter with display: Ex ia IIC T4 Gb, Ex ia IIB T4 Ga
  - Remote probe: Ex ia IIC T1~T6 Ga, Ex iaD 20 T80

## Japan (TIIS)
- **Certificate:** Nr. TC22061 by TIIS
- **Safety factors:** 
  - $U_i = 28\text{Vdc}$; $I_i = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2.2\text{nF}$; $L_i = 0\text{mH}$
  - $T_a = -40°C$ to $60°C$
- **Ex-Designation, only for gas:** IIC T4 Gb

## Korea (KC)
- **Remote probe**
  - **Certificate:** 17-AV4BO-0107X by KCs
  - **Safety factors:** 
    - $6.4\text{ Vdc} \leq U_i \leq 28\text{Vdc}$; $I_i \leq 100\text{mA}$; $P_i \leq 700\text{mW}$; $C_i \leq 2.2\text{nF}$; $L_i = 0\text{mH}$
  - **Ex-Designation, only for gas:**
    - Transmitter: Ex ia IIC T4 (Ta = -40°C ~ +60°C)
    - Remote probe: Ex ia IIC T6~T1 (Ta = -70°C ~ +200°C)
- **Wall mount**
  - **Certificate:** 16-AV4BO-0364X by KCs
  - **Safety factors:** 
    - $6.4\text{ Vdc} \leq U_i \leq 28\text{Vdc}$; $I_i \leq 100\text{mA}$; $P_i \leq 700\text{mW}$; $C_i \leq 2.2\text{nF}$; $L_i = 0\text{mH}$
  - **Ex-Designation, only for gas:** Ex ia IIC T4 (Ta = -40°C ~ +60°C)
USA (FM)

Certificate: No. FM17US0302X by FM Approvals
Safety factors: 6.4 Vdc ≤ Vmax (or Ui) ≤ 28Vdc; Imax (or li) = 100mA; Pi = 700mW;
Ci = 2.2nF; Li = 0mH

Ex-Designation:
Equipment Group I: EE300Ex without display
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C
- Class I, Zone 0, AEix ia IIC T4 Ta = -40°C to +60°C Ga; Entity – M1_139080; IP65
- Zone 20, AEix ia IIC T131°C Ta = -40°C to +60°C Da; Entity – M1_139080; IP65
Remote Probe:
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6…T1; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6…T1
- Class I, Zone 0, AEix ia IIC T6…T1 Ga; Entity – M1_139080; IP65
- Zone 20, AEix ia IIC T80°C Da; Entity – M1_139080; IP65

Equipment Group II: EE300Ex with display
- Class I, Division 1, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C; Entity – M1_139080
- Class I, Division 2, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C
- Class I, Zone 0, AEix ia IIC T4 Ta = -40°C to +60°C Ga; Entity – M1_139080
- Zone 20, AEix ia IIC T131°C Ta = -40°C to +60°C Da; Entity – M1_139080; IP65
Remote Probe:
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6…T1; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6…T1
- Class I, Zone 0, AEix ia IIC T6…T1 Ga; Entity – M1_139080; IP65
- Zone 20, AEix ia IIC T80°C Da; Entity – M1_139080; IP65

CANADA (FM)

Certificate: No. FM17CA0154X by FM Approvals
Safety factors: 6.4 Vdc ≤ Vmax (or Ui) ≤ 28Vdc; Imax (or li) = 100mA; Pi = 700mW;
Ci = 2.2nF; Li = 0mH

Ex-Designation:
Equipment Group I: EE300Ex without display
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C
- Zone 0, Ex ia IIC T4 Ta = -40°C to +60°C Ga; Entity – M1_139080; IP65
- Zone 20, Ex ia IIC T131°C Ta = -40°C to +60°C Da; Entity – M1_139080; IP65
Remote Probe:
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6…T1; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6…T1
- Zone 0, Ex ia IIC T6…T1 Ga; Entity – M1_139080; IP65
- Zone 20, Ex ia IIC T80°C Da; Entity – M1_139080; IP65

Equipment Group II: EE300Ex with display
- Class I, Division 1, Groups C, and D; T4 Ta = -40°C to +60°C; Entity – M1_139080
- Class I, Division 2, Groups A, B, C, D, E, F and G; T4 Ta = -40°C to +60°C
- Zone 0, Ex ia IIB T4 Ta = -40°C to +60°C Ga; Entity – M1_139080; IP65
- Zone 20, Ex ia IIC T131°C Ta = -40°C to +60°C Da; Entity – M1_139080; IP65
Remote Probe:
- Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6…T1; Entity – M1_139080; IP65
- Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6…T1
- Zone 0, Ex ia IIC T6…T1 Ga; Entity – M1_139080; IP65
- Zone 20, Ex ia IIC T80°C Da; Entity – M1_139080; IP65

The USA and Canada approvals are valid for air and gas measurement only.
# Ordering Guide EE300Ex-HT

## Hardware Configuration

<table>
<thead>
<tr>
<th>Model</th>
<th>Wall Mount</th>
<th>Remote Probe up to 20 bar (290 psi)</th>
<th>Remote Probe up to 300 bar (4351 psi)</th>
<th>Remote Probe for Sensor Retraction Tool PN250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display 1)</td>
<td>Without Display</td>
<td></td>
<td></td>
<td>with display</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>2 x M16 Cable Gland</td>
<td>1/2&quot; NPT Conduit Adapter</td>
<td>2 x M20 Cable Gland</td>
<td></td>
</tr>
<tr>
<td>Probe Cable</td>
<td>Wall Mount</td>
<td>1 m (3.3 ft)</td>
<td>2 m (6.6 ft)</td>
<td>5 m (16.4 ft)</td>
</tr>
<tr>
<td>Probe Length</td>
<td>Wall Mount</td>
<td>65 mm (2.56&quot;)</td>
<td>200 mm (7.9&quot;)</td>
<td>300 mm (11.8&quot;)</td>
</tr>
<tr>
<td>Feedthrough (Probe Fitting)</td>
<td>Without Probe Fitting</td>
<td>1/2 ISO - Cut-in Fitting; 12 mm (0.47&quot;)</td>
<td>1/2 Weld Cut-in Fitting; 12 mm (0.47&quot;)</td>
<td>1/2 NPT - Cut-in Fitting; 12 mm (0.47&quot;)</td>
</tr>
<tr>
<td>Filter</td>
<td>Stainless Steel Sintered PTFE 3)</td>
<td></td>
<td></td>
<td>Stainless Steel Grid H2O2 3)</td>
</tr>
<tr>
<td>Sensor Protection</td>
<td>Without Coating</td>
<td></td>
<td></td>
<td>with Coating 4)</td>
</tr>
<tr>
<td>Ex-Certification</td>
<td>ATEX (Europe)</td>
<td>IECEx (International)</td>
<td>NEPSI (China)</td>
<td>FM (Canada)</td>
</tr>
<tr>
<td>Output 1 6)</td>
<td>Relative Humidity</td>
<td>Other Measurand 7)</td>
<td>select according &quot;Measurand Code&quot; below</td>
<td>select according data sheet &quot;Scaling Outputs&quot;</td>
</tr>
<tr>
<td>Output 2</td>
<td>Temperature</td>
<td>Other Measurand 7)</td>
<td>select according &quot;Measurand Code&quot; below</td>
<td>select according data sheet &quot;Scaling Outputs&quot;</td>
</tr>
<tr>
<td>Measurand Code</td>
<td>Relative Humidity</td>
<td>Temperature</td>
<td>Dew Point Temperature</td>
<td>Frost Point Temperature</td>
</tr>
</tbody>
</table>

### Measures Code

<table>
<thead>
<tr>
<th>Measure/Device</th>
<th>Ex</th>
<th>Hx</th>
<th>AW</th>
<th>Xm</th>
<th>Xk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity</td>
<td>UW</td>
<td>select according &quot;Measurand Code&quot; below</td>
<td>select according data sheet &quot;Scaling Outputs&quot;</td>
<td>select according &quot;Measurand Code&quot; below</td>
<td>select according data sheet &quot;Scaling Outputs&quot;</td>
</tr>
<tr>
<td>Temperature</td>
<td>Tx</td>
<td>absolute humidity</td>
<td>specific enthalphy</td>
<td>water activity 9)</td>
<td>water content in mineral transformer oil 9)</td>
</tr>
<tr>
<td>Dew Point Temperature</td>
<td>TD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frost Point Temperature</td>
<td>TF</td>
<td></td>
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</tr>
<tr>
<td>Wet Bulb Temperature</td>
<td>TW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Vapour Partial Pressure</td>
<td>Ex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) No display possible for environments with combustible dust, fibers and flyings and in gases with EPL Ga IIC (Groups A, B)  
2) Not possible with sliding fitting (Code F, H)  
3) May not be used in EPL Ga IIC (Gas Groups A, B)  
For approval KC (Korea) not allowed in IIC Zone 0  
For approval TIIS (Japan) not allowed in models A, E, M and U  
4) Not appropriate for moisture in oil measurement  
5) Not allowed for approval KC (Korea) models A, E, M and U  
6) Assign to output 1 the most relevant measurand  
7) For approval TIIS (Japan), models A, E, M and U maximum temperature working range is -40...60 °C (-40...140 °F)  
8) Maximum number code allowed for approval TIIS (Japan) is 170.
Order Example

Example 1:

**EE300EX-HT6SMDBHAD1AT/MTx052UW001**

- **Model:** remote probe up to 300 bar (4351 psi)
- **Display:** with display
- **Electrical Connection:** 2 x M16 cable gland
- **Probe Cable:** 10 m (32.8 ft)
- **Probe Length:** 200 mm (7.9)
- **Zone feedthrough:** stainless steel sintered
- **Filter:** with coating
- **Ex-Certification:** ATEX
- **Units:** metric
- **Output 1:** temperature
- **Output 2:** relative humidity
- **Scaling Output 1:** -40...180 °C
- **Scaling Output 2:** 0...100 % RH

Example 2:

**EE300EX-HT6SAxBxxxIxFM/NTx083TD083**

- **Model:** wall mount
- **Display:** without display
- **Electrical Connection:** 2 x M16 cable gland
- **Probe Cable:** wall mount
- **Probe Length:** wall mount
- **Zone feedthrough:** without probe fitting
- **Filter:** stainless steel grid
- **Sensor Protection:** without coating
- **Ex-Certification:** USA (FM)
- **Units:** non metric
- **Output 1:** temperature
- **Output 2:** dew point temperature
- **Scaling Output 1:** -40...140 °F
- **Scaling Output 2:** -40...140 °F

Accessories

- Blank cover for housing base
- Safety barrier, 1-channel, STAHL 9002/13-280-093-001
- Intrinsically safe supply unit, 1-channel, STAHL 9160/13-11-11
- Intrinsically safe supply unit, 2-channel, STAHL 9160/23-11-11
- Sealing plug for unused M16 cable glands
- Sealing plug for unused M20 cable glands
- Ball valve with 1/2 ISO female thread, Ex certified
- Sensor retraction tool PN250
- Sensor retraction tool PN40

**HA011401**
**HA011410**
**HA011405**
**HA011406**
**HA011402**
**HA011404**
**HA011403**
**ZM-WA-025-040-EST**
**BG-WA-103-045-EST**