



User Manual



EE300Ex

HUMIDITY / TEMPERATURE

SENSOR

E+E Elektronik Ges.m.b.H. doesn't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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EMC note USA (FCC):

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

EMC note Canada (ICES-003):

CAN ICES-3 (A) / NMB-3 (A)

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1 General

This user manual is part of the scope of supply and serves for ensuring proper handling and optimal functioning of the device.

The user manual shall be read before commissioning the equipment and it shall be provided to all staff involved in transport, installation, operation, maintenance and repair.

The user manual may not be used for the purposes of competition without the written consent of E+E Elektronik® and may not be forwarded to third parties. Copies may be made for internal purposes. All information, technical data and diagrams included in these instructions are based on the information available at the time of writing.

1.1 Explanation of Symbols



This symbol indicates safety information.

It is essential that all safety information is strictly observed. Failure to comply with this information can lead to personal injuries or damage to property. E+E Elektronik® assumes no liability if this happens.



This symbol indicates instructions.

The instructions shall be observed in order to reach optimal performance of the device.



This symbol indicates regulations that must be observed in hazardous areas at risk of explosion.

1.2 Safety Instructions

1.2.1 General safety instructions



- Avoid any unnecessary mechanical stress and inappropriate use.
- When replacing the filter cap make sure not to touch the sensing elements.
- For sensor cleaning and filter cap replacement please see "Cleaning instructions" at www.epluse.com.
- Installation, electrical connection, maintenance and commissioning shall be performed by qualified personnel only.

1.2.2 Mounting, start-up and operation

The device has been produced under state of the art manufacturing conditions, has been thoroughly tested and has left the factory fulfilling all safety criteria.

The manufacturer has taken all precautions to ensure safe operation of the device. The user must ensure that the device is set up and installed in a manner that does not have a negative effect on its safe use.

The user is responsible for observing all applicable safety guidelines, local and international, with respect to safe installation and operation on the device. This user manual contains information and warnings that must be observed by the user in order to ensure safe operation.

- Mounting, start-up, operation and maintenance of the device may be performed by qualified staff only.
- Such staff must be authorized by the plant operator to carry out the mentioned activities.
- The qualified staff must have read and understood this user manual and must follow the instructions contained within.
- All process and electrical connections shall be thoroughly checked by authorized staff before putting the system into operation.
- Do not install or start start-up a device supposed to be faulty. Make sure that such devices are not accidentally used by marking them clearly as faulty.
- A faulty device may only be investigated and possibly repaired by qualified, trained and authorized staff. If the fault cannot be fixed, the device shall be removed from the system.
- Service operations other than described in this operating manual may only be performed by the manufacturer.

1.3 Environmental Aspects



Products from E+E Elektronik® are developed and manufactured observing of all relevant requirements with respect to environment protection. Please observe local regulations for the device disposal.



For disposal, the individual components of the device must be separated according to local recycling regulations. The electronics shall be disposed of correctly as electronics waste.

1.4 ESD Protection

The sensing elements and the electronics board are ESD (electrostatic discharge) sensitive components of the device and must be handled as such. The failure to do so may damage the device by electrostatic discharges when touching exposed sensitive components.

1.5 Scope of Supply

- EE300Ex according to ordering guide
- User manual
- Inspection certificate according to DIN EN 10204-3.1

1.6 Accessories

1.6.1 EE300Ex-M1 Humidity and Temperature Sensor

Blind front cover for housing base	HA011401
Safety barrier, 1-channel, STAHL 9002/13-280-093-001	HA011410
Intrinsically safe supply unit, 1-channel, STAHL 9160/13-11-11	HA011405
Intrinsically safe supply unit , 2-channel, STAHL 9160/23-11-11	HA011406
Sealing plug for unused M16 cable glands	HA011402
Sealing plug for unused M20 cable glands	HA011404
Ball valve with 1/2 ISO female thread, ATEX certified	HA011403
Sensor retraction tool PN250	ZM-WA-025-040-EST
Sensor retraction tool PN40	BG-WA-103-045-EST
Product configuration adapter (see data sheet EE-PCA)	EE-PCA
Connection cable for EE-PCA	HA011068

1.6.2 EE300Ex-M3 Temperature sensor

Blind front cover for housing base	HA011401
Safety barrier, 1-channel, STAHL 9002/13-280-093-001	HA011410
Intrinsically safe supply unit, 1-channel, STAHL 9160/13-11-11	HA011405
Intrinsically safe supply unit , 2-channel, STAHL 9160/23-11-11	HA011406
Sealing plug for unused M16 cable glands	HA011402
Sealing plug for unused M20 cable glands	HA011404
Product configuration adapter (see data sheet EE-PCA)	EE-PCA
Connection cable for EE-PCA	HA011068

2 Product description

2.1 General

The EE300Ex-M1 and the EE300Ex-M3 intrinsically safe sensors are intended for the measurement of relative humidity (RH) and temperature (T) or temperature alone, in the explosion hazard areas, in gas and dust up to Zone 0/20. The entire device can be placed in the explosion endangered area.

The sensor may only be powered by an intrinsically safe power supply device or protective barriers. It features a 2 wire 4...20 mA design and has two individually scalable analogue outputs.

In addition to the measured RH and T, the EE300Ex-M1 calculates also the following parameters:

- Absolute humidity dv
- Wet-bulb temperature Tw
- Specific enthalpy h
- Dew point temperature Td
- Frost point temperature Tf
- Mixing ratio r
- Water vapour partial pressure e



Besides measurement in the air, the EE300Ex-M1 with ATEX or IECEx approval is also suitable for measuring water content (X) in ppm and water activity (aw) in isolation, lubrication and hydraulic oils.

EE300Ex-M1 humidity and temperature sensor types:

Type	Pressure range	Temperature range	Probe Ø)
T1 Wall mount	ambient	-40...60 °C (-40...140 °F)	12 mm (0.47")
T7 Remote probe with cut-in fitting, pressure tight	0.1...20 bar (1.5...300 psi)	-40...180 °C (-40...356 °F)	12 mm (0.47")
T9 Remote probe with cut-in fitting, pressure tight	0.01...300 bar (0.15...4 351 psi)	-40...180 °C (-40...356 °F)	12 mm (0.47")
T10 Remote probe with sliding fitting for assembly / disassembly under pressure, pressure tight	0.1...20 bar (1.5...300 psi)	-40...180 °C (-40...356 °F)	13 mm (0.51")
T22 Remote probe for sensor retraction tool PN250, pressure tight	0.01...250 bar (0.15...3 626 psi)	-40...180 °C (-40...356 °F)	12 mm (0.47")

EE300Ex-M3 temperature sensor models:

Type	Pressure range	Temperature range	Probe Ø)
T1 Wall mount	ambient	-40...60 °C (-40...140 °F)	6 mm (0.24")
T24 Remote probe	0.1...20 bar (1.5...300 psi)	-70...200 °C (-94...392 °F)	6 mm (0.24")

Disclaimer

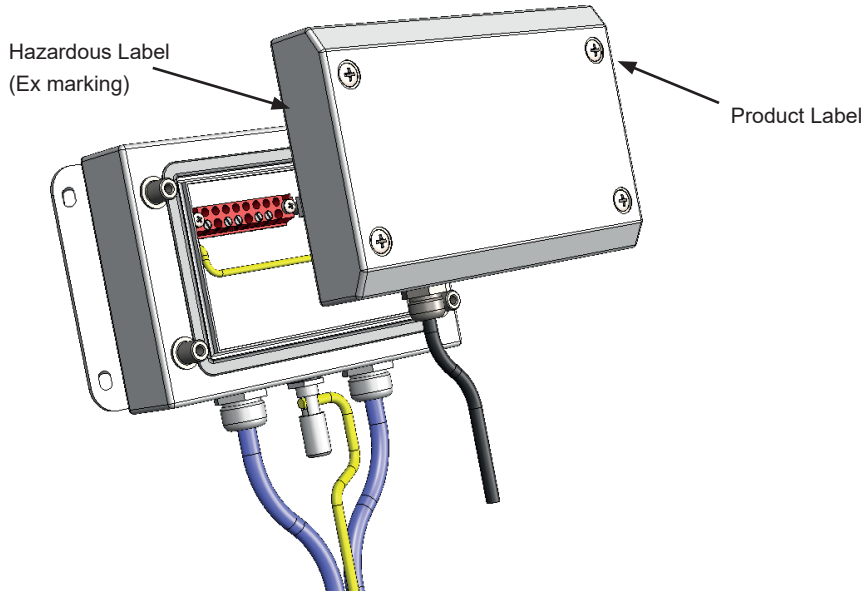
The manufacturer cannot be held responsible for damages as a result of incorrect handling, installation and maintenance of the device. Unauthorized modifications of the product lead to loss of all warranty claims.

The manufacturer or his authorized agent can be only be held liable in case of willful or gross negligence. In any case, the scope of liability is limited to the corresponding amount of the order issued to the manufacturer. The manufacturer assumes no liability for damages incurred due to failure to comply with the applicable regulations, operating instructions or the operating conditions. Consequential damages are excluded from the liability.

2.2 EE300Ex labelling

Each EE300Ex is characterized for one certification. The sensor has two labels. The “product label” shows the ordering code and type of the Ex Certificate. The “hazardous label” shows the Ex marking and the certificate number. See the examples below.

EE300Ex with IECEx, USA or Canada labeling must not be installed in the European Union.



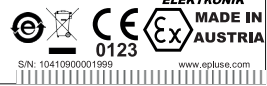
ATEX hazardous label (for EE300Ex without display)

E+E Elektronik A-4209 Engerwitzdorf	
TPS 13 ATEX 38892 003 X	
II 1 G Ex ia IIC T4 Ga	Ui = 28V Ii = 100mA
II 1 D Ex ia IIIC T80°C Da	Pi = 700mW Ci = 2,2nF
Electrical Data - See Manual	Li = negligibly small
-40°C ≤ Ta ≤ 60°C	Series: F 072015



ATEX product label (Example)

HUMIDITY / TEMPERATURE SENSOR	
EE300Ex-M1A6HS2T10D0E2K5L200PA25F4C1EX1	
CH1: RH: 4-20mA = 0...100 %RH	
CH2: T: 4-20mA = 0...100 °C	
Supply: (9 + RL * 0,02)VDC...28VDC	
S/N: 10410900001999	www.epluse.com



IECEx hazardous label (for EE300Ex without display)

E+E Elektronik A-4209 Engerwitzdorf	
IECEx FMG 14.0017 X	6,4Vdc ≤ Ui < 28Vdc
Ex ia IIC T4 Ga	Ii = 100mA Pi = 700mW
Ex ia IIIC T131°C Da	Ci = 2,2nF
Electrical Data - See Manual	Li = negligibly small
-40°C ≤ Ta ≤ 60°C	Series: F 072015

IECEx product label (Example)

HUMIDITY / TEMPERATURE SENSOR	
EE300Ex-M1A6HS2T10D0E2K5L200PA25F4C1EX2	
CH1: RH: 4-20mA = 0...100 %RH	
CH2: T: 4-20mA = 0...100 °C	
Supply: (9 + RL * 0,02)VDC...28VDC	
S/N: 10410900001999	www.epluse.com



USA hazardous label (for EE300Ex without display)

E+E Elektronik A-4209 Engerwitzdorf	
FM17US0302X	
CL I,II,III DIV 1 GP ABCDEFG T4	
CL I,II,III DIV 2 GP ABCDEFG T4	
CL 0 Ex ia IIC T4 Ga	ZN 20 AEx ia IIIC T131°C Da
Ta = -40°C to 60°C, Entity - M1_1309080, IP65	
Series: F	122017



USA product label (Example)

HUMIDITY / TEMPERATURE SENSOR	
EE300Ex-M1A6HS2T10D0E2K5L200PA25F4C1EX3	
CH1: RH: 4-20mA = 0...100%RH	
CH2: T: 4-20mA = 0...100°C	
Supply: (9 + RL * 0,02)VDC...28VDC	
S/N: 10410900001999	www.epluse.com



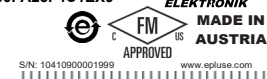
CANADA hazardous label (for EE300Ex without display)

E+E Elektronik A-4209 Engerwitzdorf	
FM17CA0154X	
CL I,II,III DIV 1 GP ABCDEFG T4	
CL I,II,III DIV 2 GP ABCDEFG T4	
ZN 0 Ex ia IIC T4 Ga	ZN 20 Ex ia IIIC T131°C Da
Ta = -40°C to 60°C, Entity - M1_1309080, IP65	
Series: F	122017



CANADA product label (Example)

HUMIDITY / TEMPERATURE SENSOR	
EE300Ex-M1A6HS2T10D0E2K5L200PA25F4C1EX9	
CH1: RH: 4-20mA = 0...100%RH	
CH2: T: 4-20mA = 0...100°C	
Supply: (9 + RL * 0,02)VDC...28VDC	
S/N: 10410900001999	www.epluse.com



2.3 Certification

EUROPE:

The EE300Ex sensor fulfills the **ATEX Directives** on intrinsically safe operating equipment.

Applied standards for ATEX:







- **EN 1127-1:2011**
- **EN 60079-0:2012**
- **EN 60079-11:2012**

The EU-Type Examination has been carried out by TÜV SÜD Product Service GmbH.

Certified to EU-Type Examination **TPS 13 ATEX 38892 003 X**.

Entity parameters $U_i = 28V$; $I_i = 100mA$; $P_i = 700mW$; $C_i = 2,2nF$; $L_i \approx 0mH$

Ex-Designation

Sensor without display  II 1G Ex ia IIC T4 Ga /  II 1D Ex ia IIIC T80°C Da
Sensor with display  II 2G Ex ia IIC T4 Gb /  II 1G Ex ia IIB T4 Ga
Remote probe  II 1G Ex ia IIC T6-T1 Ga /  II 1D Ex ia IIIC T80°C...200°C Da

Working temperature range for the probes:

Specification of the temperature class „TKG“ for use in gas area exposed to explosion hazards and „TKD“ for use in dust area exposed to explosion hazards as a function of the ambient temperature „Tamb“ for the humidity and temperature probe and the temperature probe:

TKG	TKD	Humidity and Temperature Probe	TKG	TKD	Temperature Probe
T6	80°C	-40°C ≤ Tamb ≤ +60°C	T6	80°C	-70°C ≤ Tamb ≤ +60°C
T5	95°C	-40°C ≤ Tamb ≤ +75°C	T5	95°C	-70°C ≤ Tamb ≤ +75°C
T4	130°C	-40°C ≤ Tamb ≤ +110°C	T4	130°C	-70°C ≤ Tamb ≤ +110°C
T3	195°C	-40°C ≤ Tamb ≤ +175°C	T3	195°C	-70°C ≤ Tamb ≤ +175°C
T2	200°C	-40°C ≤ Tamb ≤ +180°C	T2	220°C	-70°C ≤ Tamb ≤ +200°C
T1	200°C	-40°C ≤ Tamb ≤ +180°C	T1	220°C	-70°C ≤ Tamb ≤ +200°C

INTERNATIONAL:

Applied Standard for IECEx:

- **IEC 60079-0:2011**
- **IEC 60079-11:2011**

The Certificate of Conformity has been carried out by FM Approvals.

Certificate No.: **IECEx FMG 14.0017 X**

Entity parameters: $6.4 Vdc \leq U_i \leq 28Vdc$; $I_i = 100mA$; $P_i = 700mW$; $C_i = 2,2nF$; $L_i = 0mH$

Ex-Designation

Sensor without display Ex ia IIC T4 Ga / Ex ia IIIC T131°C Da
Sensor with display Ex ia IIC T4 Gb / Ex ia IIB T4 Ga
Remote probe Ex ia IIC T6-T1 Ga / Ex ia IIIC T80°C Da

Humidity and temperature probe:

- T6 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 60^{\circ}C (140^{\circ}F)$
- T5 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 75^{\circ}C (167^{\circ}F)$
- T4 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 110^{\circ}C (230^{\circ}F)$
- T3 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 175^{\circ}C (347^{\circ}F)$
- T2 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 180^{\circ}C (356^{\circ}F)$
- T1 temperature class based on $-40^{\circ}C (-40^{\circ}F) \leq Ta \leq 180^{\circ}C (356^{\circ}F)$

Temperature probe:

- T6 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$
- T1 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$

USA:

Applied Standard for the U.S. NEC 500, NEC505 and 506:

- FM Class 3600 2011
- FM Class 3610 2015
- FM Class 3611 2016
- FM Class 3810 2005
- ANSI/ISA 61010-1 2012
- ANSI/ISA 60079-0 2013
- ANSI/ISA 60079-11 2014
- ANSI/IEC 60529 2004

The Certificate of Conformity has been carried out by FM Approvals.

Certificate No.: **FM17US0302X**

Entity parameters:

$6.4 \text{ Vdc} \leq V_{\text{max}} \text{ (or } U_i) \leq 28 \text{ Vdc}$; $I_{\text{max}} \text{ (or } I_i) = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2,2\text{nF}$; $L_i = 0\text{mH}$

Ex-Designation NEC 500 (Division)*Sensor without display*

Class I, II, III, Division 1, Groups ABCDEFG; T4 Ta = -40°C to $+60^{\circ}\text{C}$; Entity – M1_139080; IP65

Class I, II, III, Division 2, Groups ABCDEFG; T4 Ta = -40°C to $+60^{\circ}\text{C}$

Sensor with display

Class I, Division 1, Groups CD; T4 Ta = -40°C to $+60^{\circ}\text{C}$; Entity – M1_139080

Class I, Division 2, Groups ABCD; T4 Ta = -40°C to $+60^{\circ}\text{C}$; Entity – M1_139080

Remote probe

Class I, II, III, Division 1, Groups ABCDEFG; T6...T1; Entity – M1_139080; IP65

Class I, II, III, Division 2, Groups ABCDEFG; T6...T1

Humidity and temperature probe:

- T6 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$
- T1 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$

Temperature probe:

- T6 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$
- T1 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$

Ex-Designation NEC 505/506 (Zone)

Sensor without display

Class I, Zone 0, AEx ia IIC T4 Ta = -40°C to +60°C Ga; Entity – M1_139080; IP65

Zone 20, AEx ia IIIC T131°C Ta = -40°C to +60°C Da; Entity – M1_139080; IP65

Sensor with display

Class I, Zone 0, AEx ia IIB T4 Ta = -40°C to +60°C Ga; Entity – M1_139080

Class I, Zone 1, AEx ia IIC T4 Ta = -40°C to +60°C Gb; Entity – M1_139080

Remote probe

Class I, Zone 0, AEx ia IIC T6...T1 Ga; Entity – M1_139080; IP65

Zone 20, AEx ia IIIC T80°C Da; Entity – M1_139080; IP65

Humidity and temperature probe:

- T6 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$
- T1 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$

Temperature probe:

- T6 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$
- T1 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$

Canada:

Applied Standard for Canada CEC Section 18 and Annex J:

- CSA-22.2 No. 0-M91 R2006
- CAN/CSA-22.2 No. 61010-1 2012
- CSA-22.2 No. 157-92 2016
- CAN/CSA-22.2 No. 60079-0 2015
- CAN/CSA-22.2 No. 60079-11 2014
- CSA-C 22.2 No. 142-M1987 R2004
- CSA-C 22.2 No. 213 2015
- CSA-C 22.2 No. 60529 R2010

The Certificate of Conformity has been carried out by FM Approvals.

Certificate No.: **FM17CA0154X**

Entity parameters:

$6.4 \text{ Vdc} \leq V_{\text{max}} \text{ (or } U_i) \leq 28 \text{ Vdc}$; $I_{\text{max}} \text{ (or } I_i) = 100\text{mA}$; $P_i = 700\text{mW}$; $C_i = 2,2\text{nF}$; $L_i = 0\text{mH}$

Ex-Designation CEC Annex J (Division)

Sensor without display

Class I, II, III, Division 1, Groups ABCDEFG; T4 Ta = -40°C to +60°C; Entity – M1_139080; IP65

Class I, II, III, Division 2, Groups ABCDEFG; T4 Ta = -40°C to +60°C

Sensor with display

Class I, Division 1, Groups CD; T4 Ta = -40°C to +60°C; Entity – M1_139080

Class I, Division 2, Groups ABCD; T4 Ta = -40°C to +60°C; Entity – M1_139080

Remote probe

Class I, II, III, Division 1, Groups ABCDEFG; T6...T1; Entity – M1_139080; IP65

Class I, II, III, Division 2, Groups ABCDEFG; T6...T1

Humidity and temperature probe:

- T6 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$
- T1 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$

Temperature probe:

- T6 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$
- T1 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$

Ex-Designation CEC Section 18 (Zone)

Sensor without display

Zone 0, Ex ia IIC T4 Ta = -40°C to $+60^{\circ}\text{C}$ Ga; Entity – M1_139080; IP65

Zone 20, Ex ia IIIC T131°C Ta = -40°C to $+60^{\circ}\text{C}$ Da; Entity – M1_139080; IP65

Sensor with display

Zone 0, Ex ia IIB T4 Ta = -40°C to $+60^{\circ}\text{C}$ Ga; Entity – M1_139080

Zone 1, Ex ia IIC T4 Ta = -40°C to $+60^{\circ}\text{C}$ Gb; Entity – M1_139080

Remote probe

Zone 0, Ex ia IIC T6...T1 Ga; Entity – M1_139080; IP65

Zone 20, Ex ia IIIC T80°C Da; Entity – M1_139080; IP65

Humidity and temperature probe:

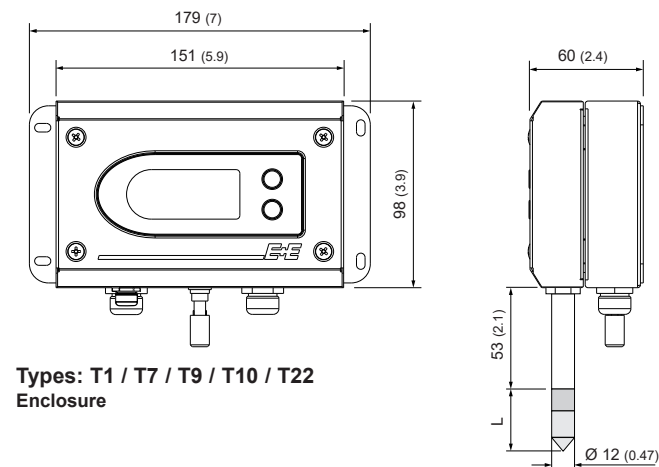
- T6 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$
- T1 temperature class based on $-40^{\circ}\text{C} (-40^{\circ}\text{F}) \leq T_a \leq 180^{\circ}\text{C} (356^{\circ}\text{F})$

Temperature probe:

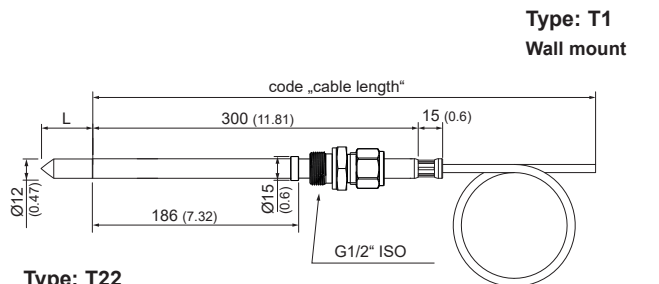
- T6 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 60^{\circ}\text{C} (140^{\circ}\text{F})$
- T5 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 75^{\circ}\text{C} (167^{\circ}\text{F})$
- T4 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 110^{\circ}\text{C} (230^{\circ}\text{F})$
- T3 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 175^{\circ}\text{C} (347^{\circ}\text{F})$
- T2 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$
- T1 temperature class based on $-70^{\circ}\text{C} (-94^{\circ}\text{F}) \leq T_a \leq 200^{\circ}\text{C} (392^{\circ}\text{F})$

2.4 Dimensions (mm / inch)

2.4.1 EE300Ex-M1: Humidity and Temperature Sensor



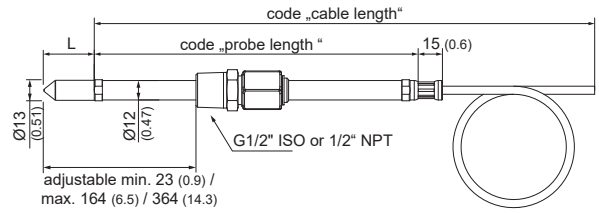
Types: T1 / T7 / T9 / T10 / T22
Enclosure



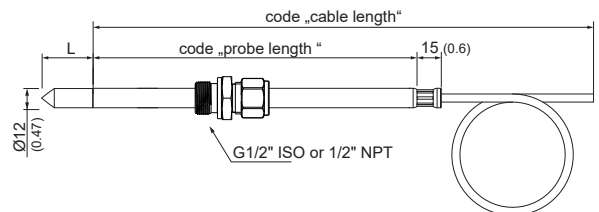
Type: T1
Wall mount

Type: T22
Remote probe for sensor retraction tool PN250

L - length of filter	mm (inch)
Stainless steel sintered filter	33 (1.3")
PTFE filter, H ₂ O ₂ filter	33 (1.3")
Stainless steel grid filter	39 (1.5")
Oil filter	32 (1.26")



Type: T10
Remote probe 20 bar (300 psi) with sliding fitting for assembly / disassembly under pressure



Types: T7 / T9
Remote probe T7: 20 bar (300 psi)
Remote probe T9: 300 bar (4351 psi) with weld or cut-in fitting

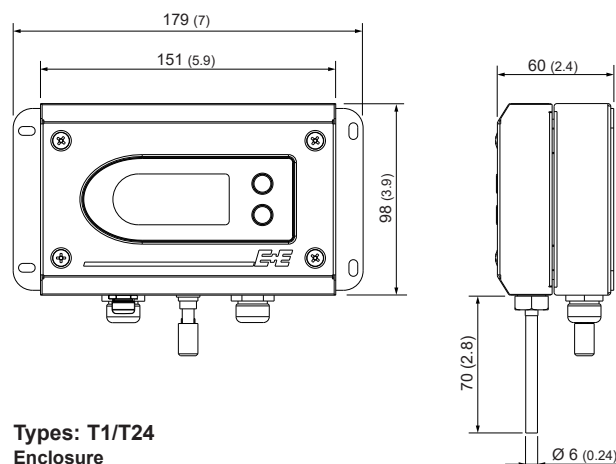


Pressure-tight probe up to 300 bar (4 351 psi) has leak rate A according to EN 12266-1

Pressure-tight probe up to 20 bar (300 psi) has leak rate B according to EN 12266-1

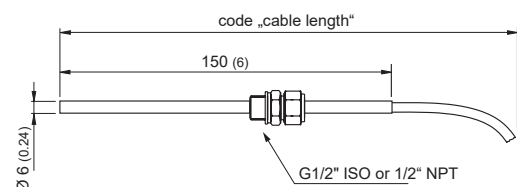
Leak rate can lead to gas accumulation in the enclosure

2.4.2 EE300Ex-M3: Temperature Sensor



Types: T1/T24
Enclosure

Type: T1
Wall mount



Type: T24
Remote probe 0.1...20bar (1.5...300psi) with cut-in fitting

3 Installation

3.1 General



The EE300Ex is certified according to ATEX 2014/34/EU Directive, IECEx Scheme, National Electrical Code ANSI-NFPA 70 (NEC®) and Canadian Electrical Code (CSA C22.1).



The use of the EE300EX in explosion hazard areas is only permitted under following atmospheric conditions:

-20 °C (-4°F) ≤ T ≤ 40 °C (104 °F)
0.8 bar (12 psi) ≤ p ≤ 1.1 bar (16 psi)
air normally 21 % (v/v)

The EE300Ex may be employed beyond above atmospheric conditions range only observing EN 1127-1 and only in line with the manufacturer's instructions.



The EE300Ex may only be supplied by intrinsically safe power supply devices or via protective barriers. This applies also for the case when just the probe is located inside the explosion hazard area.

The rules for wiring intrinsically safe electrical circuits according to EN 60079-14, EN 60079-25, IEC 60079-14, IEC 60079-25 (proof of intrinsic safety in the system description) as well as all applicable national regulations must be strictly observed. For the U.S., Canada refer to the Control Drawing M1_1309080 (page 51) and ANSI/ISA RP12.6.01, NEC and CEC.



The intrinsically safe circuitry shall include an overvoltage protection device if the analysis according EN 1127-1 reveals a risk of lightning strike.

Requirements for the installation of overvoltage protection devices are set in European Normative EN 60079-25. For the U.S., Canada refer to ANSI/ISA RP12.6.01, NEC and CEC.



The manufacturing date of each EE300Ex is shown on the hazardous product label, at the bottom right corner, as follows:

WWYYYY

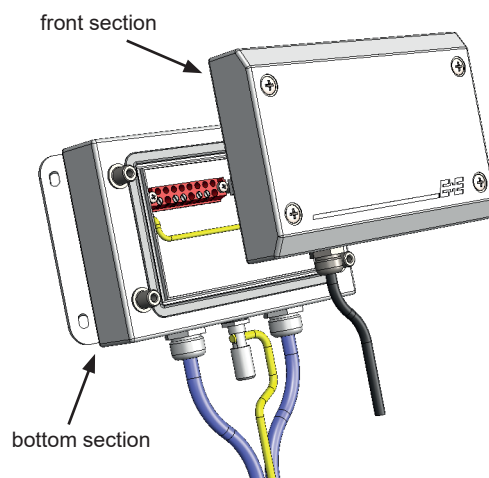
WWweek of the year

YYYY.....year

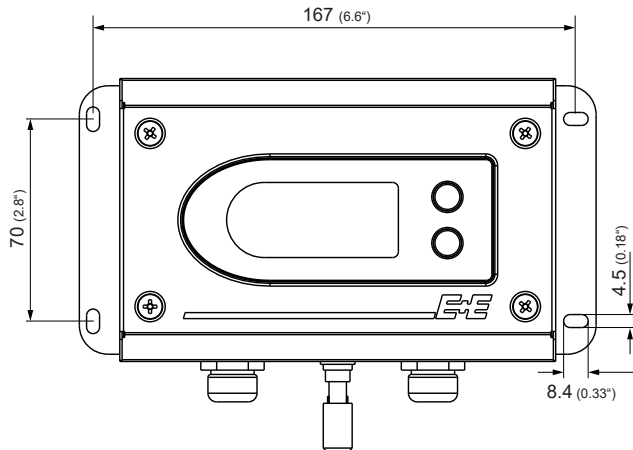
3.2 Enclosure

The EE300Ex features has a modular design and consists of:

- Bottom section with the connection and grounding terminals
- Front section with the electronics and the probe



3.2.1 Drilling pattern for installing the enclosure (mm/inch)



To mount the bottom section use
4 screws diameter < 4.5 mm (0.18")



When the front section has been removed from the hazard area, e.g. for calibration, the empty bottom section shall be protected against dirt and electrostatic charge with the blind front cover HA011401 (see accessories).



Unused cable glands shall be closed with appropriate sealing plugs (see accessories).

3.3 Assembly in category 1 (Zone 0 / 20); Division 1



Only intrinsically safe power supply devices are approved to supply EE300Ex in category 1 or Division 1.



In areas belonging to gas group IIC or Class I, Division 1, Group A, B, it must be ensured that during installation and operation, the possibility of impact and friction sparks has been excluded in rarely occurring fault situations.



Work on open sensor must only be performed if it is guaranteed that no explosive atmosphere is present.



In category 1 or Division 1, the sensor line should be laid in an earthed metallic protective hose. With Group III or Class II, III, ensure that there are no dust or fibers and flyings deposits in the protective tube.



CH1 and CH2 must be galvanically isolated from one another during operation.



There is no display permitted in the gas hazard area EPL Ga for Group IIC or Class I, Division 1, group A, B and in the dust hazard area for groups IIIA, IIIB and IIIC or Class II, III.



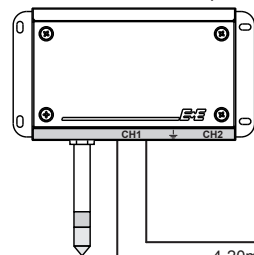
The probe for wall mount is not permitted to be used for Zone or Division bushing.

EE300Ex (wall mount) 1 channel via intrinsically safe power supply device:

Hazardous location T4...T1

Zone 0 / 20
no display with EPL Da; Db, Dc
and Ga IIC

Division 1
no display in Class II, III and
Class I, Division 1, Group A, B



Unclassified location

intrinsically safe
sensor supply unit

Control

Power supply

EE300Ex (with remote probe) 2 channels via intrinsically safe power supply device:

Hazardous location T6...T1

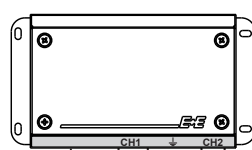
Zone 0 / 20
Division 1
Class I,II,III
Group A, B, C, D, E, F, G

up to T6 if EE300Ex is in
unclassified location.



Zone 1 2 / 21 22
Division 2
Class I,II,III
Group A, B, C, D, E, F, G

The bushing must conform to the hazard requirements of a Zone or Division implementation. The supplied screw connection meets this requirement!



Unclassified location

intrinsically safe
sensor supply unit

Control

Power supply

3.4 Assembly in categories 2 and 3 (Zone 1 , 2 / 21 , 22); Division 2



Only intrinsically safe power supply devices and protective barriers are approved to supply EE300Ex in category 2 and 3 or Division 2.



No display is permitted in the dust hazard area (Group III) or Class II, III.

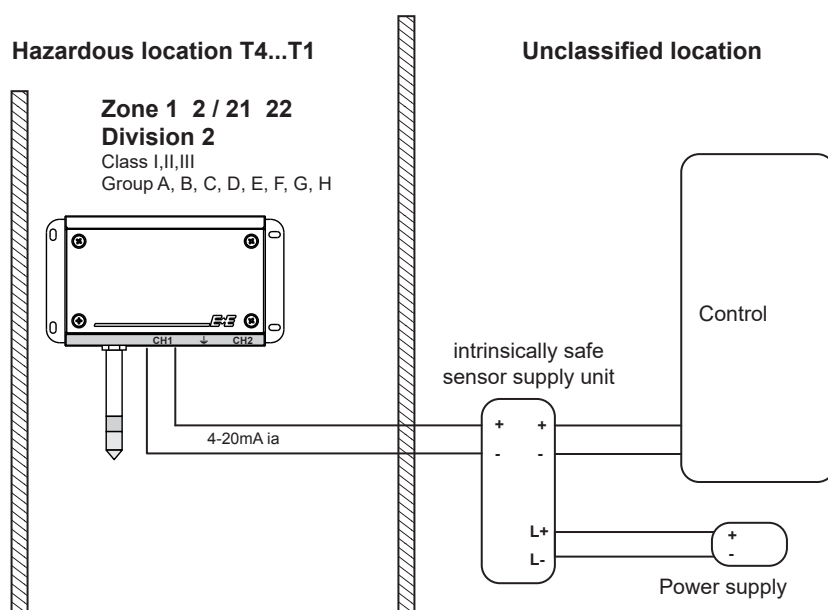


CH1 and CH2 must be galvanically isolated from one another during operation.

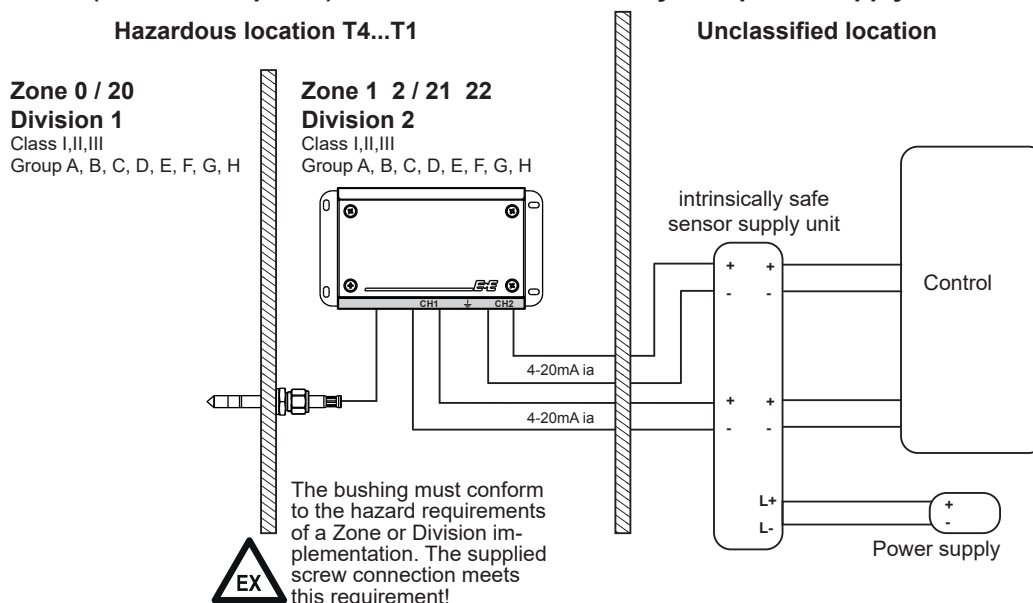


The probe for wall mount is not permitted to be used for Zone or Division bushing.

EE300Ex (wall mount) 1 channel via intrinsically safe power supply device:



EE300Ex (with remote probe) 2 channels via intrinsically safe power supply device:



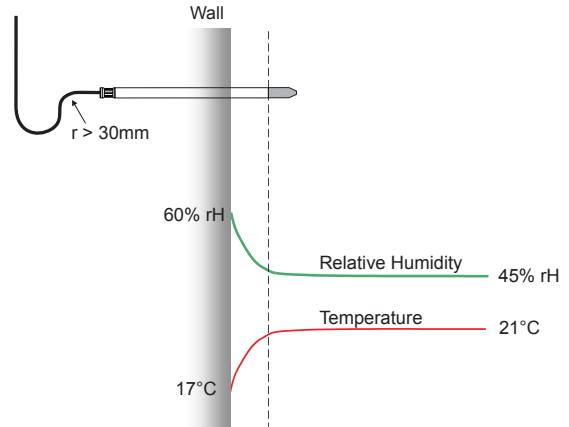
3.5 Probe mounting



The probe of the EE300EX sensor shall be located at the most representative location for the RH and T of the process to be monitored.

For accurate measurement it is of paramount importance to avoid temperature gradients along the probe.

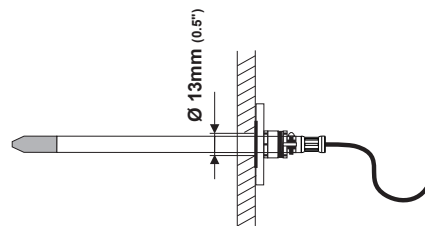
Whenever possible, install the entire probe inside the environment to monitor. If the probe is installed into a wall, then isolate thermally the backend of the probe looking out of the wall.



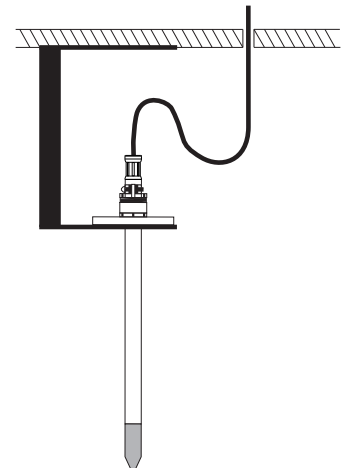
The probe shall be mounted horizontally or vertically, with the tip of the probe pointing downwards.

In applications where condensation is likely to happen:

- The cable shall form a drip loop close to the probe.
- Use the drip water protection (see datasheet accessories, code HA010503) for vertically mounted probe.



Horizontal mounting



Ensure appropriate mechanical stability and sealing of the probe mounting taking into account specific influences at the site, such as vibrations, shocks or temperature changes.



The probe and the cabling shall be handled and installed to avoid electrostatic charges. (e.g. metal hose)



Filter caps

The following filter caps offer good protection against electrostatic discharge for explosion group IIB, but are not permitted for use in EPL Ga IIC or Class I, Division 1, Group A, B:

- Membrane filter (order code F2)
- PTFE filter (order code F5)
- Membrane on stainless steel body (order code F10)
- PTFE on stainless steel body (order code F11)
- H₂O₂ filter (order code F12)

The following filter caps are permitted for use in EPL Ga IIC or Class I, Division 1, Group A, B:

- Stainless steel sintered (order code F4)
- Stainless steel grid (order code F9)
- Oil (order code F13)

3.5.1 Probe feedthrough with cut-in fitting



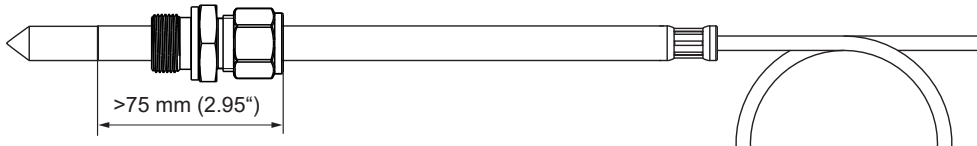
The feedthrough with cut-in fitting (ordering code PA20, PA21, PA22) can be used as Zone or Division bushing. For this, the tightness of its mounting into the Zone separation wall must correspond to IP67.

Once mounted, the cut-in fitting creates a permanent clamping-ring onto the probe.



Safety instructions for pressure-tight feedthrough:

- Do not assemble the probe and tighten the feedthrough if the plant is under pressure.
 - The plant must not be vented by releasing the nut (A).
 - Use appropriate seal on conical probe threads.
 - Never rotate the screw connection body (B) but hold the screw connection body (B) securely and turn the nut (A).
 - Avoid unnecessary disassembly of pipe screw connections.
 - Position the cut in fitting $>75\text{ mm}$ ($2.95''$) from the end of the filter cap to the end of the fitting!
- For a probe length of 65 mm a cut in fitting is not possible.



Installation instructions:

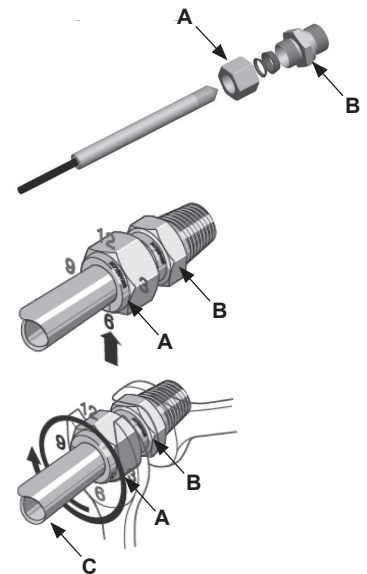
- Tighten the nut (A) finger-tight.
- Mark the nut (A) at 6 o' clock position.
- Hold the screw connection body (B) tight and tighten the nut (A) with $1\frac{1}{4}$ turns till 9 o'clock position.

Assembly with high pressure applications and applications with a high security factor:

- Tighten the nut (A) until the probe (C) can no longer be turned by hand and moved axially in the feedthrough.
- Mark the nut (A) at 6 o' clock position.
- Hold the screw connection body (B) tight and tighten the nut (A) with $1\frac{1}{4}$ turns to 9 o'clock position.

Re-mounting:

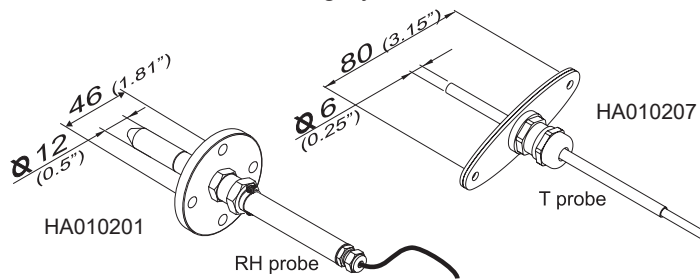
- Slide the measurement probe with clamping ring into the fitting as far as it goes.
- Tighten the nut finger-tight, then tighten by approx. a $\frac{1}{4}$ turn using a spanner.



3.5.2 Mounting flange



The optional mounting flange (see datasheet accessories) may not be used as Zone or Division bushing. When installed with the mounting flange, the hazard areas on the filter cap side and at the cable outlet side must be of the same category.



3.5.3 Ball valve and sliding fitting

The optional ball valve HA011403 (ATEX certified) allows for the probe to be mounted or removed without interrupting the process to be monitored.



Only ball valve approved for use in explosion hazard areas are permitted.

The two metal sealing rings (see figure) shall be replaced with new ones after each removal of the probe.

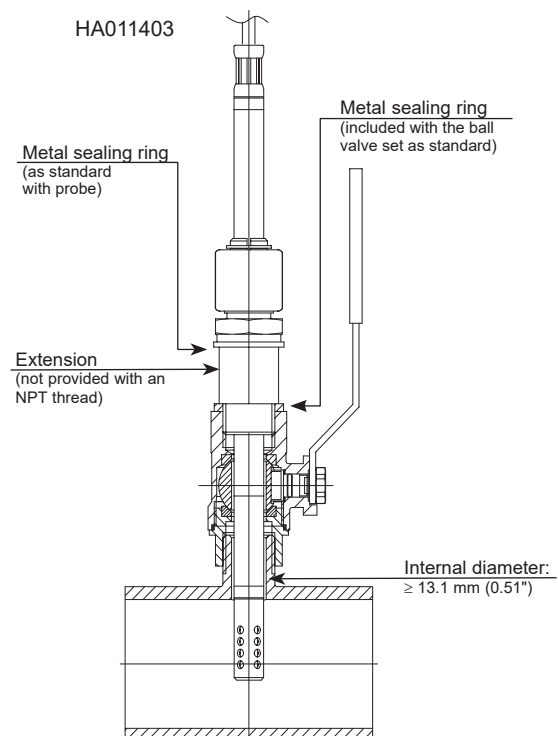
MOUNTING THE PROBE:

The process temperature may not deviate from the mounting temperature by more than $\pm 40^\circ\text{C}$ (104°F). The maximum permitted process pressure during mounting is 10 bar (145 psi).

- Mount the probe onto the ball valve with the ball valve closed.
- Open the ball valve.
- Slide the probe through the ball valve into the process to the desired immersion depth. For rather high process pressure a manual pressing tool might be needed for sliding easily the probe into the process.
- For secure probe installation the closing nut shall be tightened with a torque of 30 Nm. If a torque wrench is not available, turn first the closing nut by hand as tight as possible, then turn another approx. 50° using a suitable open-ended spanner.

A lower tightening torque means lower clamping force of the clamp sleeve. Consequently there is a risk for the probe being pushed out by the process pressure.

An excessive tightening torque may cause permanent deformation of the clamping sleeve and of the probe. This makes the removal and re-mounting difficult or even impossible.



REMOVING THE PROBE:



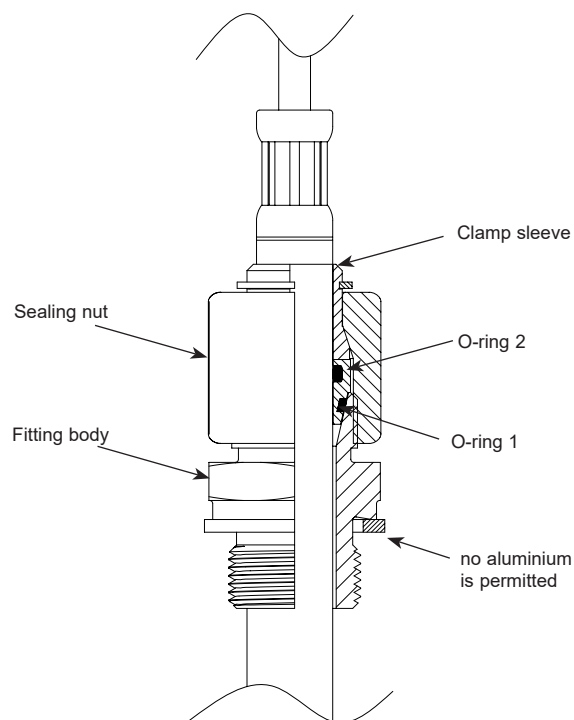
- Hold the probe firmly in place. While doing so, do not bend the probe cable.
- Release slowly closing-nut using a spanner only until the process pressure pushes out the probe. Do not release completely the closing-nut!



- After the probe has been pushed all the way back, close the ball valve.
- The probe can be now removed from the ball valve.

During mounting and removal, ensure that o-ring 1 is correctly installed.

Replace a damages o-ring by an original new one, order code HA050308, o-ring type: 13x1.5mm (0.5"x 0.06") - FKM-60.



3.5.4 The optional probe retraction tool



The operating instructions of the probe retraction tool must be strictly observed.

The probe of the EE300EX model T22 can be installed into a pressurized environment up to 250 bar using the sensor retraction tools ZM-WA-025-040-EST or BG-WA-103-045-EST.

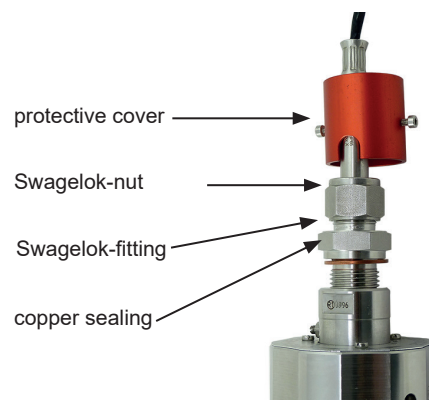
The scope of supply of the EE300EX model T22 includes the copper sealing for the Swagelok feedthrough.



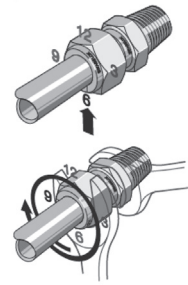
Make sure that the sensor retraction tool is in the "SERVICE" position (see manual of the sensor retraction tool).

- Before installing the sensor, dismount the closing plug 1/2" using a hexagonal 10 mm wrench and "park" it at the thread hole M10 designed for that purpose.

- Insert the probe with the copper sealing, the Swagelok union nut, the Swagelok fitting and protective cover into the probe retraction tool as far as it goes.



- Fasten the Swagelok ½" fitting of the sensor retraction tool with appropriate wrench. Do not forget the copper sealing!
- Close the Swagelok union nut with cutting ring finger-tight by hand. Then adjust the probe.
- Use the appropriate wrench to tighten the union nut (A) just firmly enough that the screw connection (B) cannot be moved manually. Mark the nut at the 6 o' clock position.
- Hold the screw connection body (B) tight and tighten the union nuts (A) with 1 ¼ turns to the 9 o' clock position.
- Mounting the protective cover for the Swagelok feedthrough:
 1. Push the protective cover down to the adjusting device. The screws shall point to the flat area.
 2. Tighten the M3 screws.



4 Electrical connections

4.1 General



It is essential that installation, electrical connection, commissioning, operation and maintenance in explosion hazard areas are only carried out by trained specialist staff authorised to do so by the system operator.



The installation shall be performed according to NEC or CEC and to the Control Drawing M1_1309080 (page 50).



The installation in an explosion hazard area shall comply with EN 60079-14, EN 60079-25 or IEC 60079-14, IEC 60079-25. Repair and maintenance shall be performed according to EN 60079-17 or IEC 60079-17 and EN 60079-19 or IEC 60079-19. All relevant national regulations shall be strictly observed.



Installation in the U.S. shall be performed according ANSI / ISA RP 12.6.01-2003 and the National Electrical Code (NEC). Installation in Canada shall comply with the Canadian Electrical Code (CEC).



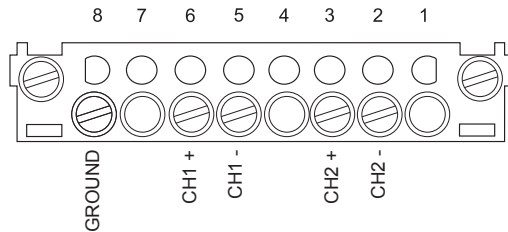
The EE300Ex sensor is a loop powered (2-wire) device, both channels (outputs) are galvanic isolated. **For proper operation, Channel 1 (CH1) must always be connected.** Channel 2 (CH2) may be connected only if necessary.



Cable ends shall be fitted with the appropriate wire-end sleeves. While connected to the terminals, the air gap must be min 2mm (0.08") between the wires and min. 6mm (0.2") between CH1 and CH2.

Do not shorten or extend the probe cable. Changing the length of the probe cable has a strong negative effect onto the measurement performance and may lead to EE300EX failure.

4.2 Terminal assignment



4.3 Grounding and potential equalization



The EE300Ex shall be integrated into the potential equalization to avoid hazards from electrostatic charges. The grounding shall comply with EN60079-14, EN60079-25 or IEC60079-14, IEC60079-25. A remote probe shall also be grounded using a screw connection with a maximum of 1 MΩ in the potential equalization.



The ground conductor or the potential equalization connection must have a cross-section of 4 mm² (0.06 in²) for the external grounding. Stranded wires shall be fitted with suitable wire-end sleeves.



The resistance of the ground connection of the intrinsically safe barrier shall be max. 1 Ohm.



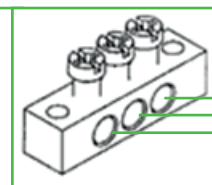
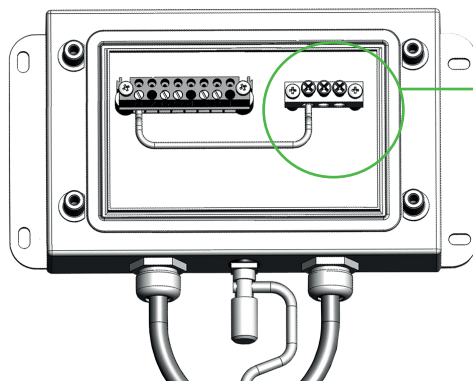
For installation in the U.S. use internal ground connection. The wire cross-sectional must comply with NEC Section 250.122.

External grounding:

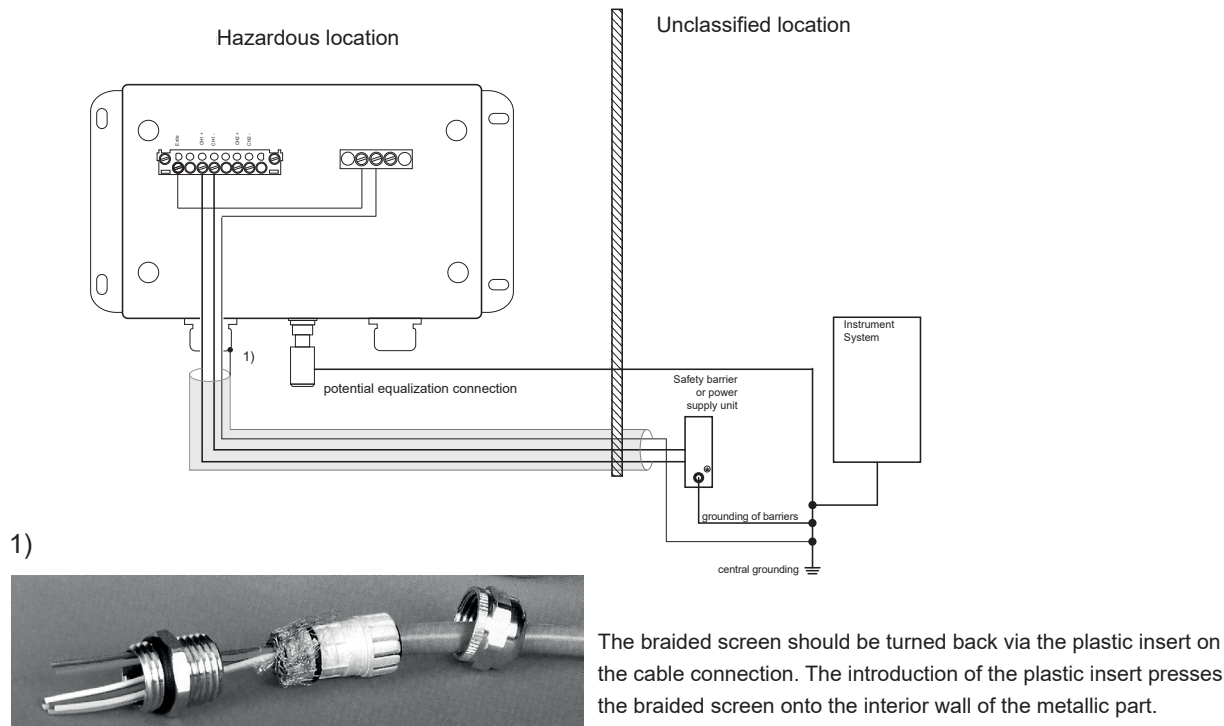


Cable cross-section
maximum 4mm² (0.06in²)

Internal grounding:



Cable cross-section
maximum 10 mm² (0.2 in²)



4.4 Connection cable



A shielded cable shall be used. The shield must be grounded only at one end, at the EE300Ex side.

The connection cable shall comply to the following specifications for ATEX, as required by EN60079-14 and EN60079-25:

- Maximum cross-section 1.5mm² (0.02in²)
- Single stranded wire diameter ≥ 0.1mm (0.004")
- Test voltage wire-wire ≥ 500V AC eff.
- Test voltage wire-shield (if a cable with shield is used): ≥ 500V AC eff.
- Cable inductivity, cable capacity and conductor resistance are to be evaluated during the proof of intrinsic safety.
- Flame resistance acc. to IEC60332-1-2

Example of cable meeting above requirements: ÖLFLEX® EB CY from LAPP KABEL

Additional requirements if both channels (CH1, CH2) are connected with a common cable:

- The test voltage wire-wire ≥ 1000 V AC eff.
- The radial thickness of the insulation ≥ 0.2 mm (0.008").
- The conductor insulation shall withstand 500 V AC eff.

4.5 Calculation of the maximum cable length

Intrinsically safe power supply device STAHL 9160/13-11-11 (order code HA011405)

Technical data for EE300Ex

Supply voltage: $U_{Bin} = 9V + R_L \cdot 0.02A$
 Max. current: $I_{out\ max} = 20mA$

Technical data for STAHL 9160/13-11-11

Nominal operating voltage: $U_N = 24\ V$
 Input voltage for sensor: $U_S = 16\ V$
 Max. load: $R_L = 600\ \Omega$

Example: Calculation of maximum cable length

Cable 0.75mm² (0.01in²): $R_{\text{cable}} = 0.0267 \Omega/\text{m}$
 Load resistor: $R_L = 200 \Omega$
 Input voltage for sensor: $V_S = 16 \text{ V}$
 Min. supply voltage EE300Ex: $V_{\text{Bmin}} = 9\text{V} + 200\Omega * 0.02\text{A} = 13\text{V}$

Maximum voltage drop on cable: $V_{\text{cable}} = V_S - V_{\text{Bmin}} = 16\text{V} - 13\text{V} = 3\text{V}$

Total cable resistance: $R_{\text{cable total}} = R_{\text{cable}} * L_{\text{total}} * 2$ (supply and return line)

$V_{\text{drop}} = R_{\text{cable total}} * I_{\text{out max}} =$
 $= R_{\text{cable}} * L_{\text{total}} * 2 * I_{\text{out max}}$
 Transform in accordance with L_{total} $L_{\text{total}} = V_{\text{drop}} / (I_{\text{out max}} * 2 * R_{\text{cable}})$
 $L_{\text{total}} = 3\text{V} / (0.02\text{A} * 2 * 0.0267\Omega/\text{m})$

$L_{\text{total}} = 2800\text{m}$ maximum cable length



Caution: This is the maximum length without allowing the intrinsic safety area. Cable capacity and inductivity may reduce the cable length.

4.6 Selecting a suitable Intrinsically safe supply unit for ATEX Zone concept

Example for evidence of the intrinsic safety in accordance with EN 60079-14:2008 12.2.5.2, EN 60079-25:2010 13.1. CH1 and CH2 are galvanically isolated. The proof of intrinsic safety shall be performed with appropriate equipment.

Example: Installation in Zone 0 of the EE300Ex without display

Connection cable length: 300 m (984 ft)

Explosion group: IIC

Temperature class: T4

CH1 and CH2 connected by one single cable.

Intrinsically safe power supply device STAHL 9160/13-11-11 (see accessories)

(Extract from the EC-Type Examination Certificate)

Certified according to:

II 3 (1) G Ex nA nC [ja Ga] IIC T4 Gc (certificate number: DMT 03 ATEX E 010 X)

II (1) D [Ex ia Da] IIIC (certificate number: DMT 03 ATEX E 010 X)

Entity parameters:

$U_0 = 27 \text{ V}$
 $I_0 = 88 \text{ mA}$
 $P_0 = 576 \text{ mW}$
 $C_0 \text{ IIC} = 90 \text{ nF}$
 $C_0 \text{ IIB} = 705 \text{ nF}$
 $L_0 \text{ IIC} = 2.3 \text{ mH}$
 $L_0 \text{ IIB} = 17 \text{ mH}$

Technical data for the connection cable:

Cable type: ÖLFLEX® EB CY from Lapp Kabel
 Cable cross-section: 4 x 0.75 mm² (0.06x0.01 in²)
 Operating capacity: 110 nF/km
 Inductivity: 0.65 mH/km

Cable capacity for 300m (984ft): $CK = 0.3\text{km} * 110\text{nF}/\text{km} = 33\text{nF}$

Cable inductivity for 300m (984ft): $LK = 0.3\text{km} * 0.65\text{mH}/\text{km} = 0.195\text{mH}$

Technical data for EE300Ex (extract from the EU-Type Examination Certificate):

Certified according to:

⊕ Ex II 1G Ex ia IIC T4 Ga
II 1D Ex ia IIIC T80°C Da



Entity parameters:

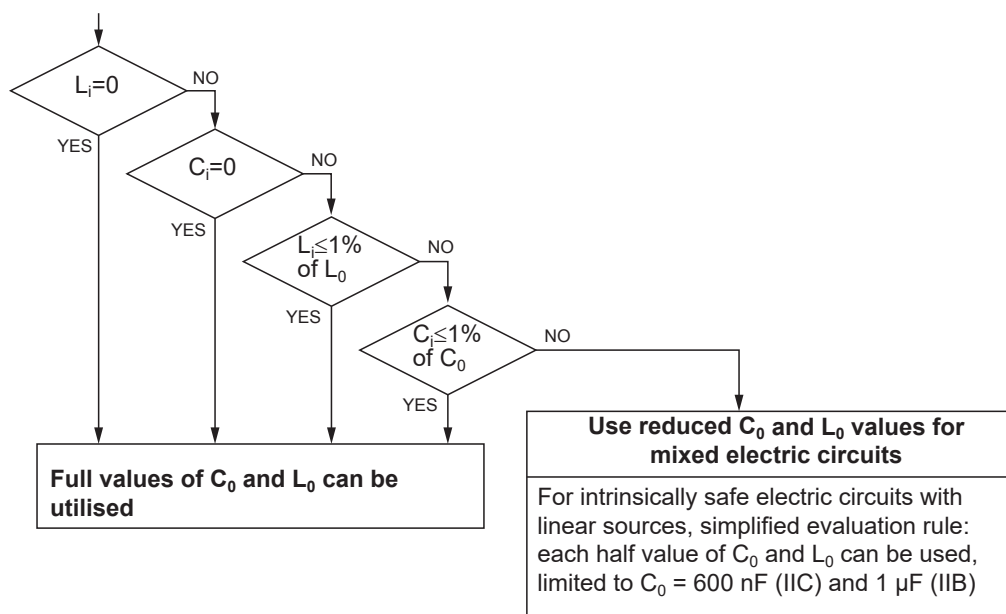
$U_i = 28V$
 $I_i = 100mA$
 $P_i = 700mW$
 $C_i = 2.2nF$
 $L_i = \text{negligibly small}$

Proof of the intrinsic safety according EN 60079-11:2012 EN 60079-25:2010 (Appendix A)

$U_0 = 27V \leq U_i = 28V \rightarrow \text{ok}$
 $I_0 = 88mA \leq I_i = 100mA \rightarrow \text{ok}$
 $P_0 = 576mW \leq P_i = 700mW \rightarrow \text{ok}$
 $C_0 = 90nF \geq 2.2nF + 33nF \rightarrow \text{ok}$
 $L_0 = 2.3mH \geq 0mH + 0.195mH \rightarrow \text{ok}$

Conclusion: The protection level of the intrinsically safe current circuit is met.

Proof of the intrinsic safety according EN 60079-11:2012, EN 60079-25:2010 (Appendix A)



$L_i = \text{negligibly small} \rightarrow \text{no reduced } C_0 \text{ and } L_0 \text{ values are required.}$

4.7 Configuration adapter

The on-board service interface is dedicated for the EE300EX configuration and for the RH and T adjustment. This is possible by the optional EE-PCA Product Configuration Adapter and HA011068 connection cable. Refer to datasheet EE-PCA and HA011068 user manual.

The EE-PCS configurator software and the drivers are available for download free of charge at <http://www.epluse.com/en/service-support/download-center/>



The configuration or adjustment of EE300Ex may not be performed in the hazard area.



CH1 and CH2 must be disconnected while using the configuration adapter.



When the front section has been removed from the hazard area, e.g. for calibration, the empty bottom section shall be protected against dirt and electrostatic charge with the blind front cover HA011401 (see accessories).

4.8 Calibration of the current loop



For the calibration of the current loop in explosion hazard areas only approved multimeters are permitted. During the measurement with these multimeters the requirements of the system description (the proof of intrinsic safety) shall be observed

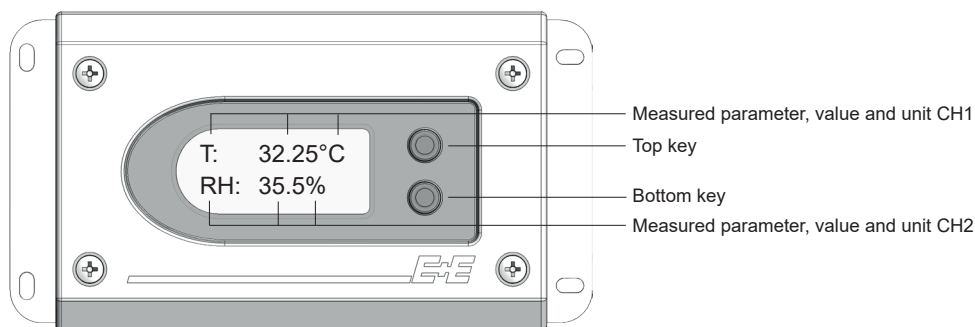
5 Display (optional)



Display is not permitted in the gas hazard area for EPL Ga IIC or Class I, Division 1, Group A, B and in the dust hazard area for IIIA, IIIB and IIIC or Class II, III

The display shows the measured parameter on the outputs CH1 (top row) and CH2 (bottom row), according the ordering code.

The top key change the visualization of the calculated parameter on the top row. The bottom key change the visualization of the calculated parameter on the bottom row. Changing the display visualization do not change the parameter on the output CH1 and CH2.



6 Maintenance



It is essential that operation and maintenance in explosion hazard areas are only performed by trained specialist personnel authorised to do so by the system operator.



Maintenance and repair work in explosion hazard areas must comply with the requirements of EN 60079-17 or IEC 60079-17, EN 60079-19 or IEC 60079-19 and with all the relevant national regulations.



In the U.S. maintenance and inspection must comply with ANSI / ISA RP12.6.01-2003 and the NEC requirements.

In Canada maintenance and inspection must comply with the CEC requirements.

6.1 Filter cap replacement

When employed in dusty, polluted environment, the filter cap shall be replaced once in a while with an E+E original one. A polluted filter cap causes longer response time.



When replacing a filter cap, ensure that the sensor is NOT touching the filter cap!

6.2 Cleaning the EE300EX sensor

6.2.1 Cleaning the enclosure



Gently wipe the enclosure and the display with a soft damp cloth. Do not use detergents or abrasive means.

6.2.2 Cleaning the probe

If needed, the sensing head of the probe can be cleaned. For cleaning instructions please see www.epluse.com/ee300ex



When replacing a filter cap, ensure that the sensor is NOT touching the filter cap!

6.3 Configuration, Adjustment and Calibration

Refer to the data sheet EE-PCA Product Configuration Adapter and to the user manual HA011068 connection cable.

Definitions

Adjustment: the specimen is brought in line with the reference

Calibration: the specimen is compared with a reference and its deviation from the reference is documented

6.4 Display error messages

Error 1 = RH sensing element damaged

Error 2 = Condensation on the RH sensor element

Error 3 = T sensing element damaged

Error 4 = Short circuit at the T sensing element

7 Technical Data

7.1 EE300Ex-M1 Humidity and Temperature Sensor

Measurands

Relative humidity

Measuring range 0...100 % RH

Accuracy¹⁾

(including hysteresis, non-linearity and repeatability, traceable to international standards, administrated by NIST, PTB, BEV...)

-15...40 °C (5...104 °F)	≤90 % RH	± (1.3 + 0.3%*mv) % RH
-15...40 °C (5...104 °F)	>90 % RH	± 2.3 % RH
-25...70 °C (-13...158 °F)		± (1.4 + 1%*mv) % RH
-40...180 °C (-40...356 °F)		± (1.5 + 1.5%*mv) % RH

mv = measured value

Temperature dependence electronics, typ.

0.03 % RH/°C

Response time t_{90}

< 30 s with stainless steel filter at 20 °C (68 °F)

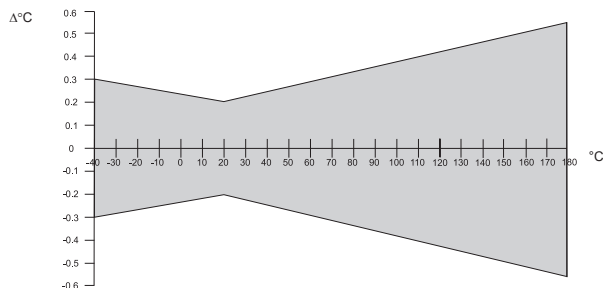
Temperature

Measuring range

Wall mount: -40...60 °C (-40...140 °F)

Remote probe: -40...180 °C (-40...356 °F)

Accuracy



Temperature dependence of electronics, typ.

0.005 °C/°C

Calculated parameters

		from	up to		Units
			wall mount	remote probe	
Dew point temperature	Td	-40 (-40)	60 (140)	100 (212)	°C (°F)
Frost point temperature	Tf	-40 (-40)	60 (140)	100 (212)	°C (°F)
Wet bulb temperature	Tw	0 (32)	60 (140)	100 (212)	°C (°F)
Water vapour pressure	e	0 (0)	200 (3)	1 100 (15)	mbar (psi)
Mixing ratio	r	0 (0)	425 (2900)	999 (9999)	g/kg (gr/lb)
Absolute humidity	dv	0 (0)	150 (60)	700 (300)	g/m³ (gr/ft³)
Specific enthalpy	h	0 (0)	400 (150 000)	2 800 (999 999)	kJ/kg (Btu/lb)
Water activity	aw	0	-	1	1
Water content	X	0	-	100 000	[ppm]

Outputs

Freely selectable and scalable outputs

2 x 4-20 mA (2-wire) galvanically isolated
Output 1 must be connected!

$R_L = (V_{cc} - 9V) / 20mA$

General

Supply voltage	$V_{cc\ min} = (9 + R_L \cdot 0.02) V\ DC$	$V_{cc\ max} = 28 V\ DC$	$R_L = \text{load resistor}$
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	according measuring range	
	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	EN 61326-1	EN 61326-2-3	ICES-003 ClassB
	Industrial Environment	FCC Part15 ClassB	
Material	Enclosure	stainless steel 1.4404	
	Probe cable	PTFE	
	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).

7.2 EE300Ex-M3 Temperature Sensor

Measurand

Temperature

Temperature sensor

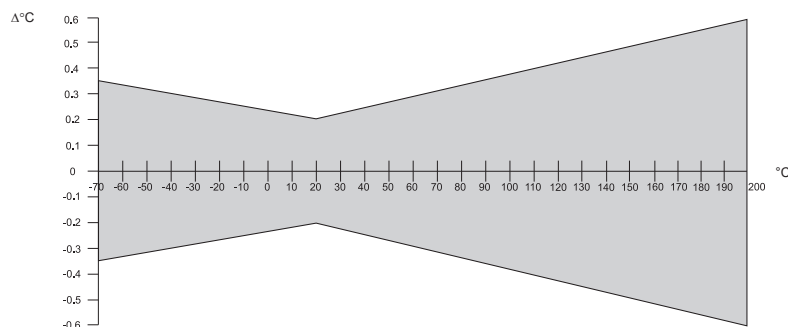
Pt1000 (Tolerance class A, DIN EN 60751)

Measuring range

Wall mount: -40...60 °C (-40...140 °F)

Remote probe: -70...200 °C (-94...392 °F)

Accuracy¹⁾



Temperature dependence of electronics, typ.

0.005 °C/°C

Outputs

Scalable analogue output

4-20 mA (2-wire)

$R_L = (V_{CC} - 9V) / 20mA$

General

Supply voltage

$V_{CC \min} = (9 + R_L \cdot 0.02) \text{ V DC}$

$V_{CC \max} = 28 \text{ V DC}$ $R_L = \text{load resistor}$

Current consumption

Max. 20 mA

Temperature range

Probe

according measuring range

Electronics

-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)

Material

Enclosure

stainless steel 1.4404

Probe cable

PTFE

Probe

stainless steel 1.4541

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)

Electromagnetic compatibility according

EN 61326-1

EN 61326-2-3

ICES-003 ClassB

Industrial Environment

FCC Part15 ClassB



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).



Product Service

(13)

Schedule

(14) **EU-Type Examination Certificate TPS 13 ATEX 38892 003 X**

Rev. 01

(15) Description of equipment:

The intrinsically safe devices EE300Ex-M1 (for the measurement of relative humidity (RH) and temperature (T)) and EE300Ex-M3 (temperature measurement only) are dedicated for the use in hazardous gas areas up to Zone 0 and hazardous dust areas up to Zone 20. With the EE300Ex-M1, the physical values dew point temperature (Td), frost point temperature (Tf), etc. can also be determined. Devices of this series can be operated as wall mount with fixed probe or with a remote probe, connected with a fixed cable.

The Humidity / Temperature Sensor EE300Ex may only be supplied by an associated apparatus with intrinsically safe connectors. The intrinsically safe power supply and data output is carried out on an isolated 2-wire 4...20 mA interface. The device contains two galvanic isolated 2-wire channels, whereas channel 2 can only be operated together with channel 1.

Outside the hazardous area the configuration and adjustment of the EE300Ex can be performed with the associated HA011068 connection cable, a configuration device and a PC.

Technical data:

Humidity / Temperature Sensor EE300Ex	
Input voltage (Ui)	28 V
Input power (Pi)	700 mW (per channel, with linear source)
Input current (Ii)	100 mA
Input capacitance (Ci)	2,2 nF
Input inductance (Li)	negligible small
Ambient temperature electronics	$-40 \leq T_{amb} \leq +60^{\circ}\text{C}$
Ambient temperature of combined humidity and temperature probe	$-40 \leq T_{amb} \leq +180^{\circ}\text{C}$
Ambient temperature of temperature probe	$-70 \leq T_{amb} \leq +200^{\circ}\text{C}$
Protection class	IP65

Connection cable HA011068	
Maximum voltage (Um)	250 VAC
Supply voltage	5 VDC (USB)
Communication	USB or RS232
Ambient temperature	$-40 \leq T_{amb} \leq +40^{\circ}\text{C}$
Protection class	IP20

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TÜV®





Product Service

Application temperature of the probes:

Specification of the temperature class "TKG" for use in gas explosion hazardous areas and the temperature "TKD" for use in dust explosion hazardous areas depending on the ambient temperature "T_{amb}" with respect to the temperature and humidity probe.

TKG	TKD	Humidity and Temperature Probe	TKG	TKD	Temperature Probe
T6	80°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +60^{\circ}\text{C}$	T6	80°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +60^{\circ}\text{C}$
T5	95°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +75^{\circ}\text{C}$	T5	95°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +75^{\circ}\text{C}$
T4	130°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +110^{\circ}\text{C}$	T4	130°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +110^{\circ}\text{C}$
T3	195°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +175^{\circ}\text{C}$	T3	195°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +175^{\circ}\text{C}$
T2	200°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +180^{\circ}\text{C}$	T2	220°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +200^{\circ}\text{C}$
T1	200°C	$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +180^{\circ}\text{C}$	T1	220°C	$-70^{\circ}\text{C} \leq T_{\text{amb}} \leq +200^{\circ}\text{C}$

Models:

Model	
EE300Ex-M1: Measurement of relative humidity (RH) and temperature (T) EE300Ex-M3: Temperature measurement only	
T1 Wall mount with fixed probe	T7, T9, T10, T15, T22, T24 Remote probe with fixed cable The code number after the T stands for the probe type.
	
D0: without display D1: with display	D0: without display D1: with display
Type of connection (measuring channels): E13: Conduit Adapter (metal) E32: M12-Plug (plastic) E2, E15, E17, E18, E19, E20, E21, E22: cable gland (metal)	Type of connection (measuring channels): E13: Conduit Adapter (metal) E32: M12-Plug (plastic) E2, E15, E17, E18, E19, E20, E21, E22: cable gland (metal)
K0	Kx: cable length [m]: 0,2 m to 10 m
Lx: probe length [mm]: 50 mm / 70 mm	Lx: probe length [mm]: 65 mm to 1000 mm

(16) Test report: 71386133, 713030081, 713031470 and 713156472

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Product Service

(17) Special conditions for safe use:

- In dust explosive areas (IIIA, IIIB, IIC) and in gas explosive areas (IIC) with Zone 0 the models with display and the models with M12 connections must not be used.
- The plastic filter caps must not be used in gas explosive areas of group IIC in Zone 0.
- The sensor element must be covered with one of the provided filter caps.
- The sensor pipe of the remote probe is not electrically conductively connected with the housing of the main unit and must therefore be grounded separately. In addition, in potentially explosive areas of Zone 0, the cable to the remote sensor must be installed in a metallic and earthed conduit.
- The configuration and adjustment of the EE300Ex is only permitted with the associated HA011068 connection cable outside the hazardous area. When the HA011068 is connected to the EE300Ex, CH1 and CH2 must not be connected.
- In case of optional use of the second measuring channel, both channels must be galvanically isolated from each other.

(18) Essential health and safety requirements:

met by standards

According to article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they have been issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

This EU-type examination certificate according to Directive 2014/34/EU is a new issue of the EC-type examination certificate according to Directive 94/9/EC dated from 2013-03-05, including the 1st supplement dated from 2014-04-16 and today's additional changes. Details are recorded in the confidential report 713156472.

Certification body
Ridlerstraße 65, 80339 München

München, 30.09.2019

Dipl.-Phys. Andreas Pfeil

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9 EU Declaration of Conformity

YOUR PARTNER IN SENSOR TECHNOLOGY



ELEKTRONIK®
Ges.m.b.H.

EU - DECLARATION OF CONFORMITY

(According to ISO/IEC 17050-1)

Product(s) Type	From Version:	Measure:	Output signal:
EE300Ex-M1yyy EE300Ex-M3yyy yyy order code	201107_1 201108_1 201115_1	humidity / dewpoint / water activity / temperature	4-20mA



CE 0123

E+E ELEKTRONIK Ges.m.b.H
Langwiesen7
4209 Engerwitzdorf / AUSTRIA

EU-TYPE-EXAMINATION CERTIFICATE:

TPS 13 ATEX 38892 003 X

EE300Ex without display: II 1G Ex ia IIC T4 Ga II 1D Ex ia IIIC T80°C Da
EE300Ex with display: II 2G Ex ia IIB T4 Gb II 1G Ex ia IIC T4 Ga
EE300Ex remote probe: II 1G Ex ia IIC T6-T1 Ga II 1D Ex ia IIIC T80°C...220°C Da

The EU-Type-Examination was issued by TÜV SÜD Product Service GmbH (notified body No 0123), Ridlerstraße 65, 80339 München / Germany.

We declare under our sole responsibility that these products (see product table above) correspond to the following regulations and their subsequent modifications:

Directive Ref.	Directive area
2014/30/EU	Electromagnetic compatibility
2014/34/EU	Equipment and protective systems in potentially explosive atmospheres
2011/65/EU	RoHS

The products conform with the following standards or standardized documents:

Standard	Year of ratification	Standard	Year of ratification
EN 1127-1	2011	EN 61326-1	2013
EN 60079-0	2012 / A11:2013	EN 61326-2-3	2013
EN 60079-11	2012	EN 50581	2012

Designed for use in industrial environment.

Affixing of the CE marking (for the first time): 2013

Test Report: Conformity_EE300Ex_04.docx

Modification: Change order code, Replace EC- to EU-Type-Examination

Engerwitzdorf, October 28th, 2019

DI Timelthaler Wolfgang
(business manager)

Birkbauer Martin
(Ex-authorised person)

File: Declaration of conformity EE300Ex_03.docx

10 IECEx Certification of Conformity - COC

for more information see <http://www.iecex.com/>
or our website <http://www.epluse.com/ee300ex>

11 FM Certificate USA

CERTIFICATE OF CONFORMITY		 <small>Member of the FM Global Group</small>
1.	HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS	
2.	Certificate No:	FM17US0302X
3.	Equipment: (Type Reference and Name)	EE300Ex-series Humidity and Temperature Transmitter
4.	Name of Listing Company:	E+E ELEKTRONIK Ges.m.b.H
5.	Address of Listing Company:	Langwiesen 7 Engerwitzdorf 4209 Austria
6.	The examination and test results are recorded in confidential report number: 3049300 dated 2 nd October 2017	
7.	FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents: FM Class 3600:2011, FM Class 3610:2015, FM Class 3611:2016, FM Class 3810:2005, ANSI/ISA 61010-1:2012, ANSI/ISA 60079-0:2013, ANSI/ISA 60079-11:2014, ANSI/IEC 60529:2004	
8.	If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.	
9.	This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.	
10.	Equipment Ratings: Intrinsically Safe for Class I, II, III Division 1, Groups A, B, C, D, E, F, and G hazardous (classified) locations in accordance with drawing M1_1309080, Nonincendive for Class I, II, III Division 2, Groups A, B, C, D, E, F, and G hazardous (classified) locations, Intrinsically Safe for Class I, Zone 0, Group IIC hazardous (classified) locations in accordance with drawing M1_1309080, Intrinsically Safe for Class II and III, Zone 20, Group IIIC hazardous (classified) locations in accordance with drawing M1_1309080, IP65 with an ambient temperature	
Certificate issued by:		
		17 September 2019
J. E. Marquedant VP, Manager, Electrical Systems		Date
To verify the availability of the Approved product, please refer to www.approvalguide.com		
<u>THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE</u>		
FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com		
F 347 (Mar 16)		Page 1 of 7

SCHEDULE



US Certificate Of Conformity No: FM17US0302X

rating of -40°C to +60°C.

11. The marking of the equipment shall include:

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_1309080; 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, AEx ia IIC T4 Ta = -40°C to +60°C Ga; Entity – M1_1309080; IP65

Zone 20, AEx ia IIIC T131°C Ta = -40°C to +60°C Da; Entity – M1_1309080; IP65

Remote Probe:

Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6...T1; Entity – M1_1309080; IP65

Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6...T1

Class I, Zone 0, AEx ia IIC T6...T1 Ga; Entity – M1_1309080; IP65

Zone 20, AEx ia IIIC T80°C Da; Entity – M1_1309080; IP65

Equipment Group II: EE300Ex with display

Class I, Division 1, Groups C, and D; T4 Ta = -40°C to +60°C; Entity – M1_1309080

Class I, Division 2, Groups A, B, C and D; T4 Ta = -40°C to +60°C; Entity – M1_1309080

Class I, Zone 0, AEx ia IIB T4 Ta = -40°C to +60°C Ga; Entity – M1_1309080

Class I, Zone 1, AEx ia IIC T4°C Ta = -40°C to +60°C Gb; Entity – M1_1309080

Remote Probe:

Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6...T1; Entity – M1_1309080; IP65

Class I, II, III, Division 2, Groups A, B, C, D, E, F and G; T6...T1

Class I, Zone 0, AEx ia IIC T6...T1 Ga; Entity – M1_1309080; IP65

Zone 20, AEx ia IIIC T80°C Da; Entity – M1_1309080; IP65

12. **Description of Equipment:**

General - The EE300Ex transmitter is designed for gauge measurements of temperature and humidity in air. All signal outputs are available on two 4 to 20 mA analog outputs.

Construction - The EE300Ex transmitter consists of a single compartment electronics housing. The enclosure is of stainless steel and has an integrated or remote humidity and/or temperature sensor.

The EE300Ex transmitter is designed for use with the Product Configuration Adapter (PCA) and Connection cable (HA011068) in non-hazardous locations for software configuration.

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US Certificate Of Conformity No: FM17US0302X

Ratings - The EE300Ex transmitter operates at 6.4-28 Vdc (700mW). The transmitters are rated for use in an ambient temperature range of -40°C to +60°C. The transmitter probe is rated for use in a process temperature range of -70°C to +200°C.

Equipment Group I: EE300Ex without display

EE300EX-M1A6HS2T1D0aK0L50PA0bcEX3d

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

b = Filter; F2, F4, F5, F9, F10, F11, F12 or F13

c = Sensor Protection; C0 or C1

d = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

EE300EX-M1A6HS2aD0bcdefgEX3h

a = Model; T7, T9, T10, T15 or T22

b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10

d = Probe Length; L65, L100, L200, L300, L400, L600; L800 or L1000

e = Zone Feedthrough (probe fitting): PA0, PA20, PA21, PA22, PA28, PA23 or PA25

f = Filter; F2, F4, F5, F9, F10, F11, F12 or F13

g = Sensor Protection; C0 or C1

h = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-40°C < Ta < 60°C
T5	-40°C < Ta < 75°C
T4	-40°C < Ta < 110°C
T3	-40°C < Ta < 175°C
T2	-40°C < Ta < 180°C
T1	-40°C < Ta < 180°C

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US Certificate Of Conformity No: FM17US0302X

EE300EX-M3A6HS2T1D0aK0L70PA0EX3b

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
b = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

EE300EX-M3A6HS2aD0bcdeEX3f

a = Model; T24
b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10
d = Probe length; L150
e = Zone Feedthrough (probe fitting): PA0, PA26 or PA27
f = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-70°C < Ta < 60°C
T5	-70°C < Ta < 75°C
T4	-70°C < Ta < 110°C
T3	-70°C < Ta < 175°C
T2	-70°C < Ta < 200°C
T1	-70°C < Ta < 200°C

Equipment Group II: EE300Ex with display

EE300EX-M1A6HS2T1D1aK0L50PA0bcEX3d

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
b = Filter; F2, F4, F5, F9, F10, F11, F12 or F13
c = Sensor Protection; C0 or C1
d = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

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US Certificate Of Conformity No: FM17US0302X

EE300EX-M1A6HS2aD1bcdefgEX3h

- a = Model; T7, T9, T10, T15 or T22
 b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
 c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10
 d = Probe Length; L65, L100, L200, L300, L400, L600; L800 or L1000
 e = Zone Feedthrough (probe fitting); PA0, PA20, PA21, PA22, PA28, PA23 or PA25
 f = Filter; F2, F4, F5, F9, F10, F11, F12 or F13
 g = Sensor Protection; C0 or C1
 h = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-40°C < Ta < 60°C
T5	-40°C < Ta < 75°C
T4	-40°C < Ta < 110°C
T3	-40°C < Ta < 175°C
T2	-40°C < Ta < 180°C
T1	-40°C < Ta < 180°C

EE300EX-M3A6HS2T1D1aK0L70PA0EX3b

- a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
 b = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

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US Certificate Of Conformity No: FM17US0302X

EE300EX-M3A6HS2aD1bcdeEX3f

a = Model; T24

b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10

d = Probe length; L150

e = Zone Feedthrough (probe fitting): PA0, PA26 or PA27

f = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-70°C < Ta < 60°C
T5	-70°C < Ta < 75°C
T4	-70°C < Ta < 110°C
T3	-70°C < Ta < 175°C
T2	-70°C < Ta < 200°C
T1	-70°C < Ta < 200°C

13. Specific Conditions of Use:

Equipment Group I: EE300Ex without display

- Filter options F2, F5, F10, F11 and F12 are not allowed in Groups A or B for Division 1 and EPL Ga IIC for Zone 0.
- The EE300Ex Remote Probe is approved for in air applications only.
- The serial software configuration port of the EE300EX may only be used with the Product Configuration Adapter (PCA) and Connection cable (HA011068).

Equipment Group II: EE300Ex with display

- The EE300Ex Remote Probe is approved for in air applications only.
- The serial software configuration port of the EE300EX may only be used with the Product Configuration Adapter (PCA) and Connection cable (HA011068).

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

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US Certificate Of Conformity No: FM17US0302X

16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
2 nd October 2017	Original Issue.
30 th November 2017	<u>Supplement 2:</u> Report Reference: – RR211141 dated 30 th November 2017. Description of the Change: Updated standard editions to the latest revisions, added options for electrical connections, added option for probe fitting and converted certificate to new format.
17 th September 2019	<u>Supplement 3:</u> Report Reference: – RR219895 17 th September 2019. Description of the Change: Change to model code structure, manual format, new model code for configuration connection cable and optional gasket for 300bar probe construction.

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12 FM Certificate Canada



CERTIFICATE OF CONFORMITY

1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** FM17CA0154X
3. **Equipment:** EE300Ex-series
(Type Reference and Name) Humidity and Temperature Transmitter
4. **Name of Listing Company:** E+E ELEKTRONIK Ges.m.b.H
5. **Address of Listing Company:** Langwiesen 7
Engerwitzdorf 4209
Austria
6. The examination and test results are recorded in confidential report number:
3049300 dated 2nd October 2017
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:
CSA-C22.2 No. 0-M91:R2006, CSA-C22.2 No. 142-M1987:R2004, CSA-C22.2 No. 157-92:2016,
CSA-C22.2 No. 213:2015, CSA-C22.2 No. 60529:R2010, CAN/CSA-C22.2 No. 60079-0:2015,
CAN/CSA-C22.2 No. 60079-11:2014, CAN/CSA-C22.2 No. 61010-1:2012
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
10. **Equipment Ratings:**
Intrinsically Safe for Class I, II, III Division 1, Groups A, B, C, D, E, F, and G hazardous locations in accordance with drawing M1_1309080, Nonincendive for Class I, II, III Division 2, Groups A, B, C, D, E, F, and G hazardous locations, Intrinsically Safe for Class I, Zone 0, Group IIC hazardous locations in accordance with drawing M1_1309080, Intrinsically Safe for Class II and III, Zone 20, Group IIIC hazardous locations in accordance with

Certificate issued by:



J.E. Marquedant
VP, Manager - Electrical Systems

17 September 2019
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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Canadian Certificate Of Conformity No: FM17CA0154X

drawing M1_1309080, IP65 with an ambient temperature rating of -40°C to +60°C.

11. The marking of the equipment shall include:

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_1309080; 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_1309080; IP65

Zone 20, Ex ia IIIC T131°C Ta = -40°C to +60°C Da; Entity – M1_1309080; IP65

Remote Probe:

Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6...T1; Entity – M1_1309080; 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_1309080; IP65

Zone 20, Ex ia IIIC T80°C Da; Entity – M1_1309080; IP65

Equipment Group II: EE300Ex with display

Class I, Division 1, Groups C, and D; T4 Ta = -40°C to +60°C; Entity – M1_1309080

Class I, Division 2, Groups A, B, C and D; T4 Ta = -40°C to +60°C; Entity – M1_1309080

Zone 0, Ex ia IIB T4 Ta = -40°C to +60°C Ga; Entity – M1_1309080

Zone 1, Ex ia IIC T4 Ta = -40°C to +60°C Gb; Entity – M1_1309080

Remote Probe:

Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; T6...T1; Entity – M1_1309080; 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_1309080; IP65

Zone 20, Ex ia IIIC T80°C Da; Entity – M1_1309080; IP65

12. **Description of Equipment:**

General - The EE300Ex transmitter is designed for gauge measurements of temperature and humidity in air. All signal outputs are available on two 4 to 20 mA analog outputs.

Construction - The EE300Ex transmitter consists of a single compartment electronics housing. The enclosure is of stainless steel and has an integrated or remote humidity and/or temperature sensor.

The EE300Ex transmitter is designed for use with the Product Configuration Adapter (PCA) and Connection cable (HA011068) in non-hazardous locations for software configuration.

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Canadian Certificate Of Conformity No: FM17CA0154X

Ratings - The EE300Ex transmitter operates at 6.4-28 Vdc (700mW). The transmitters are rated for use in an ambient temperature range of -40°C to +60°C. The transmitter probe is rated for use in a process temperature range of -70°C to +200°C.

Equipment Group I: EE300Ex without display

EE300EX-M1A6HS2T1D0aK0L50PA0bcEX9d

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

b = Filter; F2, F4, F5, F9, F10, F11, F12 or F13

c = Sensor Protection; C0 or C1

d = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

EE300EX-M1A6HS2aD0bcdefgEX9h

a = Model; T7, T9, T10, T15 or T22

b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10

d = Probe Length; L65, L100, L200, L300, L400, L600; L800 or L1000

e = Zone Feedthrough (probe fitting); PA0, PA20, PA21, PA22, PA28, PA23 or PA25

f = Filter; F2, F4, F5, F9, F10, F11, F12 or F13

g = Sensor Protection; C0 or C1

h = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-40°C < Ta < 60°C
T5	-40°C < Ta < 75°C
T4	-40°C < Ta < 110°C
T3	-40°C < Ta < 175°C
T2	-40°C < Ta < 180°C
T1	-40°C < Ta < 180°C

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Canadian Certificate Of Conformity No: FM17CA0154X

EE300EX-M3A6HS2T1D0aK0L70PA0EX9b

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
b = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

EE300EX-M3A6HS2aD0bcdeEX9f

a = Model; T24
b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10
d = Probe length; L150
e = Zone Feedthrough (probe fitting): PA0, PA26 or PA27
f = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-70°C < Ta < 60°C
T5	-70°C < Ta < 75°C
T4	-70°C < Ta < 110°C
T3	-70°C < Ta < 175°C
T2	-70°C < Ta < 200°C
T1	-70°C < Ta < 200°C

Equipment Group II: EE300Ex with display

EE300EX-M1A6HS2T1D1aK0L50PA0bcEX9d

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32
b = Filter; F2, F4, F5, F9, F10, F11, F12 or F13
c = Sensor Protection; C0 or C1
d = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

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Canadian Certificate Of Conformity No: FM17CA0154X

EE300EX-M1A6HS2aD1bcdefgEX9h

a = Model; T7, T9, T10, T15 or T22

b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10

d = Probe Length; L65, L100, L200, L300, L400, L600; L800 or L1000

e = Zone Feedthrough (probe fitting); PA0, PA20, PA21, PA22, PA28, PA23 or PA25

f = Filter; F2, F4, F5, F9, F10, F11, F12 or F13

g = Sensor Protection; C0 or C1

h = Software Code: 22 to 44 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-40°C < Ta < 60°C
T5	-40°C < Ta < 75°C
T4	-40°C < Ta < 110°C
T3	-40°C < Ta < 175°C
T2	-40°C < Ta < 180°C
T1	-40°C < Ta < 180°C

EE300EX-M3A6HS2T1D1aK0L70PA0EX9b

a = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

b = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	P _i	L _i	C _i
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA

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Canadian Certificate Of Conformity No: FM17CA0154X

EE300EX-M3A6HS2aD1bcdeEX9f

a = Model; T24

b = Electrical Connection; E2, E13, E15, E17, E18, E19, E20, E21, E22 or E32

c = Probe – Cable Length; K0.2, K0.5, K1, K2, K3, K5 or K10

d = Probe length; L150

e = Zone Feedthrough (probe fitting): PA0, PA26 or PA27

f = Software Code: 7 to 10 Digits (Not Safety Relevant)

Entity parameters:

Terminals	Vmax or Ui	I _{max} or I _i	Pi	Li	Ci
CH 1: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF
CH 2: + and -	6.4Vdc ≤ Ui ≤ 28Vdc	100mA	0.7W	0mH	2.2nF

Remote probe - Temperature Code:

T-Code	Ambient Temperature
T6	-70°C < Ta < 60°C
T5	-70°C < Ta < 75°C
T4	-70°C < Ta < 110°C
T3	-70°C < Ta < 175°C
T2	-70°C < Ta < 200°C
T1	-70°C < Ta < 200°C

13. Specific Conditions of Use:

Equipment Group I: EE300Ex without display

1. Filter options F2, F5, F10, F11 and F12 are not allowed in Groups A or B for Division 1 and EPL Ga IIC for Zone 0.
2. The EE300Ex Remote Probe is approved for in air applications only.
3. The serial software configuration port of the EE300EX may only be used with the Product Configuration Adapter (PCA) and Connection cable (HA011068).

Equipment Group II: EE300Ex with display

1. The EE300Ex Remote Probe is approved for in air applications only.
2. The serial software configuration port of the EE300EX may only be used with the Product Configuration Adapter (PCA) and Connection cable (HA011068).

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals Canadian Certification Scheme.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

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Canadian Certificate Of Conformity No: FM17CA0154X

16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
2 nd October 2017	Original Issue.
30 th November 2017	<u>Supplement 2:</u> Report Reference: – RR211141 dated 30 th November 2017. Description of the Change: Updated standard editions to the latest revisions, added options for electrical connections, added option for probe fitting and converted certificate to new format.
17 th September 2019	<u>Supplement 3:</u> Report Reference: – RR219895 17 th September 2019. Description of the Change: Change to model code structure, manual format, new model code for configuration connection cable and optional gasket for 300bar probe construction.

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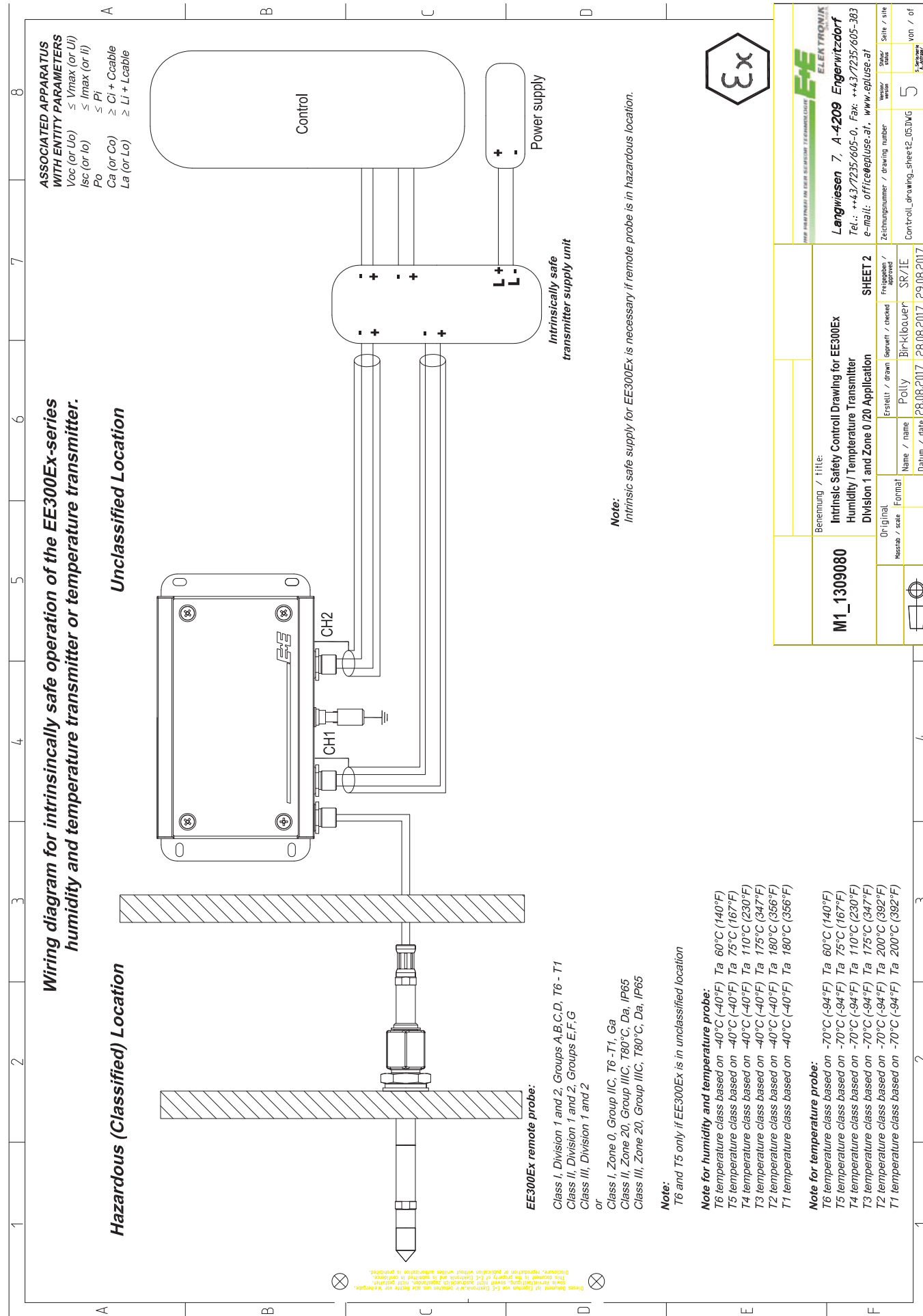
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