IECEx / ATEX addendum for

- IFC 300 F / PF (Signal converter)
- TIDALFLUX 2000 (Sensor)
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1.1 Safety instructions from the manufacturer

1.1.1 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.1.2 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective “Standard Terms and Conditions” which form the basis for the sales contract shall also apply.

1.1.3 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer can not accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.
1.1.4 Warnings and symbols used

Safety warnings are indicated by the following symbols.

**DANGER!**
This warning refers to the immediate danger when working with electricity.

**DANGER!**
This warning refers to the immediate danger of burns caused by heat or hot surfaces.

**DANGER!**
This warning refers to the immediate danger when using this device in a hazardous atmosphere.

**DANGER!**
These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator’s plant.

**WARNING!**
Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator’s plant.

**CAUTION!**
Disregarding these instructions can result in damage to the device or to parts of the operator’s plant.

**INFORMATION!**
These instructions contain important information for the handling of the device.

**LEGAL NOTICE!**
This note contains information on statutory directives and standards.

• **HANDLING**
This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

⇒ **RESULT**
This symbol refers to all important consequences of the previous actions.

1.1.5 Manufacturer

The instrument is developed and manufactured by:
KROHNE Almeter
Kerkeplaat 12
3313 LC Dordrecht
The Netherlands

For information, maintenance or service please contact your nearest local KROHNE representative.
1.2 Safety instructions for the operator

**WARNING!**

- Do not change the device. Unauthorised changes affect the explosion safety of the devices.
- The prescriptions and regulations as well as the electrical data described in the EC type examination certificate must be obeyed.
- Beside the instructions for electrical installations in non-hazardous locations according to the applicable national standard (equivalent to HD 384 or IEC 60364, e.g. VDE 0100), especially the regulations in EN/IEC 60079-14 “Electrical installations in hazardous locations”, equivalent national standard (e.g. DIN VDE 0165 Part 1).
- Installation, establishment, utilisation and maintenance are only allowed to be executed by personnel with an education in explosion safety!

These additional instructions are an extension to the handbook. All technical information as described in the handbook is applicable, when not specifically excluded, completed or replaced by the instructions in these additional instructions.
1.3 Approvals

The flowmeter system consists of a flow sensor and a signal converter. The approval numbers are:

**IFC 300 / PF:**
- DEKRA 12 ATEX 0235 X
- IECEx DEK. 12.0079 X

**TIDALFLUX 2000:**
- DEKRA 12 ATEX 0235 X
- IECEx DEK. 12.0079 X

**INFORMATION!**
*All type examination certificates can be downloaded from the website.*

**EN/IEC 60 079**

<table>
<thead>
<tr>
<th>EN/IEC number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60 079-0: 2009</td>
<td>General requirements / Protection by enclosures</td>
</tr>
<tr>
<td>IEC 60 079-0: 2007</td>
<td></td>
</tr>
<tr>
<td>EN 60 079-1: 2007</td>
<td>Flameproof enclosure &quot;d&quot;</td>
</tr>
<tr>
<td>IEC 60 079-1: 2007</td>
<td></td>
</tr>
<tr>
<td>EN 60 079-5: 2007</td>
<td>Powder filling &quot;q&quot;</td>
</tr>
<tr>
<td>IEC 60 079-5: 2007</td>
<td></td>
</tr>
<tr>
<td>EN 60 079-7: 2007</td>
<td>Increased safety &quot;e&quot;</td>
</tr>
<tr>
<td>IEC 60 079-7: 2006</td>
<td></td>
</tr>
<tr>
<td>EN 60 079-11: 2012</td>
<td>Intrinsic safety &quot;i&quot;</td>
</tr>
<tr>
<td>IEC 60 079-11: 2006</td>
<td></td>
</tr>
<tr>
<td>IEC 60 079-11: 2011</td>
<td></td>
</tr>
<tr>
<td>EN 60 079-26: 2007</td>
<td>Equipment with equipment protection level Ga</td>
</tr>
<tr>
<td>IEC 60 079-26: 2006</td>
<td></td>
</tr>
</tbody>
</table>
1.4 TIDALFLUX 2000

The TIDALFLUX 2000 is certified as group II, category 2G equipment for gas hazardous areas zone 1 and 2, group IIC, temperature class T6.

The TIDALFLUX 2000 contains following circuits:

Connection box with terminals for:

- **Electrodes** (terminals 1, 2, 3, 4 = n.c.), in type of protection Intrinsic safety (Ex ia):
  \[ U_i = 20 \text{ V}, \quad I_i = 175 \text{ mA}, \quad C_i = 0 \text{ nF}, \quad L_i = 0 \text{ mH}. \]

- **Field coils** (terminals 7, 8, 9 = n.c.), in type of protection Increased safety (Ex e):
  \[ U_n = 40 \text{ V} \text{ (switched DC voltage, alternately +40 and -40 V maximum)}, \]
  \[ I_n = 125 \text{ mA} \text{ (injected square wave current)}. \]

Terminal compartment with terminals for:

- **RS 485** (terminals C-, D, D-), in type of protection Intrinsic safety (Ex ia):
  \[ U_o = 14 \text{ V}, \quad I_o = 189 \text{ mA}, \quad P_o = 0.662 \text{ W}, \quad C_o = 730 \text{ nF}, \quad L_o = 1 \text{ mH}. \]

- **Power supply** (terminals L, N, PE), in type of protection Increased safety (Ex e):
  \[ U_n = 100...230 \text{ VAC or 24 VAC/DC or 12 VDC}. \]

The electrode circuit as intrinsically safe circuit shall, from the safety point of view, be considered to be connected to ground. The cable glands for the electrode and the RS 485 circuits are - as intrinsic safe circuits - marked with blue O-rings.

**Ex marking TIDALFLUX 2000 :**

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Ex marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN200...300</td>
<td>(II 2 G) Ex d e ia [ia] IIC T6 Gb</td>
</tr>
<tr>
<td>DN350...1800</td>
<td>(II 2 G) Ex d e ia [ia] IIC T6 Gb</td>
</tr>
</tbody>
</table>

**NOTE:** The level electronics CLC-300 which is placed in the IFC 300 housing above the TIDALFLUX sensor may not be used in another scope than it is intended for.
1.5 IFC 300 F / PF

The IFC 300 F/PF is certified as group II, category 2G equipment, if fitted without Ex ia signal in/outputs or as a group II, category 2(1)G equipment, if fitted with Ex ia signal inputs/outputs. It is therefore suitable for installation in gas hazardous areas zone 1 or 2, gas group IIC, temperature class T6.

Additionally, The Ex ia signal in/outputs of the converter may run or originate from a zone 0 gas hazardous area.

In the IFC 300 F / PF signal converter the following types of protections are used:

Converter housing, terminal compartment:
- Power supply (terminals L, N, PE or L+, L-), in type of protection Increased safety (Ex e):
  Un = 100...230 VAC or 24 VAC/DC or 12...24 VDC.
- Signal I/O (terminals A, A+, A-, B, B-, C, C-, D and D-), in type of protection Increased safety (Ex e) or - optional - Intrinsic safety (Ex ia).

For certain versions of the signal converter the terminals A, A+, A-, B, B-, C, C-, D and D- are additionally in type of protection Intrinsic safety. Consult the table with CG numbers in the handbook of the IFC 300 for details.

Converter housing, electronics compartment: Ex d (Flameproof enclosure)

Console:
- Field current circuit, in type of protection Increased safety (Ex e), terminals 7 and 8, U < 40 V [switched DC voltage, alternately +40 and -40 V], I = 125 mA [injected square wave current]. The field current source is protected by 2 TR5 fuses, rated value 160 mA. The maximum prospective short circuit current is restricted to 35 A.
- Electrode terminals, in type of protection Intrinsic safety (Ex ia), terminals 1, 2, 20, 3, 30. Uo = 14 V, Io = 70 mA, Po = 300 mW, linear characteristics Co = 430 nF, Lo = 2 mH.
- Measuring sensor circuits (RS 485; E,C,D), in type of protection intrinsic safety Ex ia II C with the following maximum values:
  Terminals E, C, D; Uo = 8V, Io = 108 mA, Po = 220 mW, Co = 1000 nF, Lo = 2 mH.
1.6 Marking labels (examples)

Figure 1–1: Example of a nameplate for the sensor

1. Additional info, website and recycling logo
2. Name and address of the manufacturer and CE marking with number(s) of notified body (bodies)
3. Type designation with serial number, manufacturing date and country of origin
4. OK/GKL values (measuring sensor constants), size (mm/inches), field frequency
5. Materials of wetted parts, electric values and protection category
6. PED data type I/II/III or SEP
7. Ambient temperature data and Ex specific remarks / warning
8. ATEX / IECEx marking for gas and dust
9. ATEX / IECEx certificate numbers

INFORMATION!
Remark about factory sealed enclosure applies to DN200...300.
Figure 1-2: Example of a nameplate for the converter

1. Additional info, website and recycling logo
2. CE marking with number[s] of notified body (bodies)
3. Name and address of the manufacturer
4. Type designation with serial / CG number, manufacturing date and country of origin
5. GK/GKL values, size [mm/Inches], field frequency and Electronic Revision number
6. Electric values and protection category
7. Ambient temperature data and Ex specific remarks / warning
8. ATEX / IECEx marking for gas and dust
9. ATEX / IECEx certificate numbers
The temperature limits apply under the following conditions:

- The instrument is installed and operated in accordance with the installation directions given in the installation and operating instructions.
- The instrument is not heated up by any additional heat radiation (direct solar radiation, heat from adjacent plant parts) so causing it to operate above the permissible ambient temperature range.
- Insulation is not hindering free ventilation of the signal converter housing.

2.1 TIDALFLUX 2000

- The TIDALFLUX 2000 F is suitable for an ambient temperature range of -20...+60°C and a process temperature of max. 60°C.

2.2 IFC 300 F / PF

The signal converter IFC 300 F / PF is suitable for an ambient temperature range of -20...+60°C and a process temperature of max. 60°C.
In the case of field versions, the electrical connection between the sensor TIDALFLUX 2000 and the signal converter IFC 300 F / PF is established via a signal cable, a field current cable and a RS 485 cable. The field current cable is no part of the supply and must be supplied by the user. It must be according EN/IEC 60079-14 clause 9.3 and 11.3 (Increased safety). The signal cable is part of the supply.

3.1 Signal cable A

The signal cable A is a double screen shielding cable, according to EN IEC 60079-14 clause 12.2.2 (Intrinsic safety).

![Figure 3-1: Construction of signal cable A](image)

1. Stranded drain wire [1] for the inner shield [10], 1.0 mm² Cu / AWG 17 (not insulated, bare)
2. Insulated wire [2], 0.5 mm² Cu / AWG 20
3. Insulated wire [3], 0.5 mm² Cu / AWG 20
4. Outer sheath
5. Insulation layers
3.2 Signal cable B

The signal cable B is a triple screen shielding cable, according to EN/IEC 60079-14 clause 12.2 (intrinsic safety).

![Diagram of signal cable B]

**Figure 3-2: Construction of signal cable B**

1. Stranded drain wire for the inner shield (10), 1.0 mm² Cu / AWG 17 (not insulated, bare)
2. Insulated wire (2), 0.5 mm² Cu / AWG 20 with stranded drain wire (20) of shield
3. Insulated wire (3), 0.5 mm² Cu / AWG 20 with stranded drain wire (30) of shield
4. Outer sheath
5. Insulation layers
6. Stranded drain wire (6) for the outer shield (60), 0.5 mm² Cu / AWG 20 (not insulated, bare)

3.3 Equipotential bonding

- As the Ex ia electrode circuits of the flow sensors are effectively grounded through the conductive liquid in the measuring tube, an equipotential bonding system must exist over the whole area in which the electrode circuits, including their wiring, are installed, conform EN/IEC 60 079-14 clause 12.2.4.
- The flowmeter TIDALFLUX 2000, the electrode cable and the IFC 300 F / PF signal converter must all be included in the equipotential bonding system of the hazardous area. If a single separate conductor is used for equipotential bonding then this conductor must have a cross-section of at least 4 mm² copper.
- The separate equipotential bonding conductor between flow sensor and converter can be left out if by other means (e.g. over bonding conductors over the metal piping system) a high level of assurance that potential equalization exists between flow sensor TIDALFLUX 2000 and converter IFC 300 F / PF is reached.
3.4 Signal cable connections

Figure 3-3: Connection diagram for signal cable type A (DS)
① Connection box of converter
② I/O connection box of sensor
③ Connection box of sensor
④ Connect the outer screens via strain reliefs

Figure 3-4: Connection diagram for signal cable type B (BTS)
① Connection box of converter
② I/O connection box of sensor
③ Connection box of sensor
④ Connect the outer screens via strain reliefs
4.1 Installation instructions

For IFC 300 F / PF and TIDALFLUX 2000:
When used in a potentially explosive atmosphere, requiring the use of apparatus of equipment
category 2G, certified cable entry devices must be used that is suitable for the application and
correctly installed.
Unused openings must be closed with suitable certified closing elements.
To avoid voltage and current addition, the intrinsically safe circuits must be separated and wired
to EN/IEC 60 079-14.

**INFORMATION!**

- The internal field coil fuses of an IFC 300 electronic unit fulfil the above-mentioned
  requirement with respect to breaking capacity. The prospective short circuit current for the
  field coil circuit is limited to 35 A.
- The clamping range for M20x1.5 cable glands is Ø 6...12 mm, the clamping range for M16x1.5
  is Ø 6...10 mm.

**Delivery of IFC 300 F / PF:**
- Connection compartment with:
  - two M20x1.5 Ex e cable glands for power circuit and signal I/O and one Ex e certified
    M20x1.5 stopping plug, or
  - three M20x1.5 Ex e cable gland, the 3rd cable gland for field bus connections.
- Connection box with:
  - two M20x1.5 Ex e cable glands for electrode and field circuit and one M16x1.5 Ex e cable
    gland for RS 485 circuit.

**Delivery of TIDALFLUX 2000:**
- Connection compartment with:
  one M20x1.5 Ex e cable gland for power circuit, one M16x1.5 Ex e cable gland for RS 485
  circuit and one M20x1.5 Ex e stopping plug.
- Connection box with:
  two M20x1.5 Ex e cable glands for electrode and field circuit.
4.2 Connection of TIDALFLUX 2000

The flow sensor and the signal converter must be incorporated in the equipotential bonding system of the installation. This can be established internally by connection of the protective earth (PE) conductor of the mains supply system to the internal PE clamp, or externally, by connecting a separate equipotential bonding conductor between the two external PE-clamps (size M5). A separate bonding conductor must have a cross-sectional area of at least 4 mm².

The electronics compartment of the TIDALFLUX 2000 is provided in type of protection “flameproof enclosure” Ex d. The threaded joints of the cover and the housing have a tight fit due to the requirements of protection “flameproof enclosure” Ex d. Screw the covers on and off with care and never use excessive force!

The terminal compartment is in type of protection “increased safety” Ex e. Screw the covers on and off with care and never use excessive force!

Keep the screw-threads free of dirt and well-greased (e.g. with PTFE grease). The grease will help to prevent the threads from locking due to corrosion. To unscrew the covers, first release the interlocking devices (one at each cover). Therefore unscrew the M4 head screw with internal hexagon socket set using a HEX or Allen key no. 2.5 until the interlocking device can be turned. After the covers are screwed back onto the housing, make sure that the interlocking devices are properly refitted.

**WARNING!**
Allow the electronics to de-energize before opening the electronics compartment of the flow converter housing. Wait at least 35 minutes for T6 before opening.

**CAUTION!**
The TIDALFLUX 2300 sensor and converter need both a separate power supply.

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Figure 4-1: Electrical connections

1. Unscrew interlocking head screw
2. Turn cover counter-clockwise and remove
3. Open / close safety lid of mains supply section
4. Mains supply & signal / data terminals
Description of connections

Data for connection on all Ex e terminals:
stripping length for wires: 8 mm, torque for screws: 0.6 - 0.8 Nm.

**INFORMATION!**
*For more detailed information on connections, refer to the instruction manual of the TIDALFLUX 2300*
4.3 Connection of IFC 300 F / PF

The flow sensor and the signal converter must be incorporated in the equipotential bonding system of the installation. This can be established internally by connection of the protective earth (PE) conductor of the mains supply system to the internal PE clamp, or externally, by connecting a separate equipotential bonding conductor between the two external PE-clamps [size M5]. A separate bonding conductor must have a cross-sectional area of at least 4 mm².

The electronics compartment of the IFC 300 F / PF is provided in type of protection “flameproof enclosure” Ex d. The threaded joints of the cover and the housing have a tight fit due to the requirements of protection “flameproof enclosure” Ex d. Screw the covers on and off with care and never use excessive force !

The terminal compartment is in type of protection “increased safety” Ex e. Screw the covers on and off with care and never use excessive force !

Keep the screw-threads free of dirt and well-greased (e.g. with PTFE grease). The grease will help to prevent the threads from locking due to corrosion.
To unscrew the covers, first release the interlocking devices (one at each cover). Therefore unscrew the M4 head screw with internal hexagon socket set using a HEX or Allen key no. 2.5 until the interlocking device can be turned. After the covers are screwed back onto the housing, make sure that the interlocking devices are properly refitted.

**WARNING!**
*Allow the electronics to de-energize before opening the electronics compartment of the flow converter housing. Wait at least 35 minutes for T6 before opening.*

![Figure 4-3: Electrical connections](image-url)

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Function, electrical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>L, N</td>
<td>Connections for mains supply, Type of protection Ex e, 100...230 VAC, +10%/-15%, 22 VA 12...24 VDC, +30%/-10% (short-time: -25%), 12 W 24 VAC, +10%/-15%, 22 VA 24 VDC, +30%/-25%, 12 W Um = 253 V</td>
</tr>
<tr>
<td>L+, L-</td>
<td></td>
</tr>
<tr>
<td>A, A-, A+</td>
<td>Connections for signal I/Os [PELV circuits], Type of protection Ex e or Ex ia, dependent on the specific version of the signal converter ordered. Consult the tables with CG numbers for details.</td>
</tr>
<tr>
<td>B, B-</td>
<td></td>
</tr>
<tr>
<td>C, C-</td>
<td></td>
</tr>
<tr>
<td>D, D-</td>
<td></td>
</tr>
</tbody>
</table>
Data for connection on all Ex e terminals:

stripping length for wires: 8 mm, torque for screws: 0.6 - 0.8 Nm.

The exact I/O-configuration for circuits A, B, C and D is order-specific and can be determined by the CG number shown on the converter. Therefore check the data on the back of electronics unit of the signal converter. The CG number contains 10 characters of which the last three characters (XYZ) determine the configuration of the I/O circuits:

<table>
<thead>
<tr>
<th>CGxx</th>
<th></th>
<th></th>
<th></th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos 1..4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

determine I/O circuits

The wiring of instruments has to be in accordance with the requirements as specified in the relevant national or international standard for electrical installations in hazardous areas, e.g. EN/IEC 60079-14. Section 9 (wiring systems) of this standard applies to all types of protection. Section 11 (additional requirements for type of protection “e” - increased safety) and section 12 (additional requirements for type of protection “i” - intrinsic safety) apply to respectively Ex e and Ex ia performed connection (terminal) compartments.
### 4.4 Input/output connections

- IFC 300 converters are available in versions with intrinsically safe (Ex i) or non-intrinsically safe (non-Ex i) inputs/outputs (I/O). Details of both versions (CG. no’s and connection of terminals) are listed in the IFC 300 handbook.

- The versions with non-Ex i I/O are listed in the IFC 300 handbook (title: alterable input/output versions). The version basic I/O is also with non-Ex i I/O. The electrical data of the I/O circuits with non-Ex i I/O are:
  \[ U_n < 32 \text{ VDC and } I_n \leq 100 \text{ mA}. \]

- The versions with Ex i inputs/outputs are listed in the IFC 300 handbook (title: Fixed, non-alterable input/output versions), except the IFC 300 version basic I/O, last digits of CG. no. 100. This version is always with non-Ex i I/O. The electrical data of the versions with Ex i I/O are listed below.

The following signal I/O connections are available as intrinsically safe:

<table>
<thead>
<tr>
<th>I/O PCB</th>
<th>CG nr. [XYZ]</th>
<th>I/O functions</th>
<th>I/O functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex i I/O</td>
<td>300, 310, 320, 330, 340</td>
<td>Current output 4...20 mA with HART passive [C and C-]</td>
<td>Ex ia IIC [ U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 1.0 \text{ W} ] [ C_i = 10 \text{ nF}, L_i = \text{negligibly low} ]</td>
</tr>
<tr>
<td></td>
<td>200, 210, 220, 230, 240, 300, 310, 320, 330, 340, D30, D40, E30, E40</td>
<td>Pulse/status output [D and D-]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200, 210, 220, 230, 240</td>
<td>Current output 4...20 mA with HART active [C and C-]</td>
<td>Ex ia IIC [ U_o = 21 \text{ V}, I_o = 90 \text{ mA}, P_o = 0.5 \text{ W} ] [ C_o = 90 \text{ nF}, L_o = 2.0 \text{ mH} ] [ C_o = 110 \text{ nF}, L_o = 0.5 \text{ mH} ]</td>
</tr>
<tr>
<td>Ex i Option</td>
<td>220, 320, D20, E20</td>
<td>Current output 4...20 mA passive [A and A-]</td>
<td>Ex ia IIC [ U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 1.0 \text{ W} ] [ C_i = 10 \text{ nF}, L_i = \text{negligibly low} ]</td>
</tr>
<tr>
<td></td>
<td>210, 220, 310, 320, D10, D20, E10, E20</td>
<td>Pulse/status output / control input [B and B-]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>210, 310, D10, E10</td>
<td>Current output 4...20 mA active [A and A-]</td>
<td>Ex ia IIC [ U_o = 21 \text{ V}, I_o = 90 \text{ mA}, P_o = 0.5 \text{ W} ] [ C_o = 90 \text{ nF}, L_o = 2.0 \text{ mH} ] [ C_o = 110 \text{ nF}, L_o = 0.5 \text{ mH} ]</td>
</tr>
</tbody>
</table>
The I/O circuits titled “Ex i I/O” and “Ex i Option” are always provided with type of protection Intrinsic Safety [Ex ia]. The I/O-circuits “Fieldbus I/O Profibus-PA” as well as “Fieldbus I/O Foundation Fieldbus” can be provided with type of protection Intrinsic Safety.

Up to a maximum of 4 intrinsically safe (Ex ia) in-/outputs are possible. All intrinsically safe circuits are galvanically insulated with respect to earth and each other. To avoid summation of voltages and current, the wiring of these “Ex ia”-circuits must be sufficiently separated, e.g. in accordance with the requirements of standard EN/IEC 60079-14, clause 12.2. The “Ex ia” signal in-/outputs may only be connected to other “Ex ia” or “Ex ib” approved devices (e.g. intrinsically safe isolation amplifiers), even if such devices are installed in a non-hazardous location!

Connection to non-“Ex i” devices cancels the “Ex ia” properties of the flowmeter.

Terminals L and N (or L+ and L-) for connection of the mains supply are not available with type of protection "intrinsic safety". To achieve the necessary separation distances according to EN/IEC 60079-11 between the non-“Ex i” and “Ex i” circuits, the mains terminals are provided with a semi-circular protection cover with a "snap-in" lock. This cover MUST be closed before establishing the power supply to the converter.

**INFORMATION!**
For converters with an “Ex e” terminal compartment, the compartment can be opened in an energized state for short periods of time, to access the intrinsically safe terminals for possible checks. However, the semi-circular insulation cover over the non-intrinsically safe mains supply terminals L and N (or L+ and L-) MUST be kept closed.

**INFORMATION!**
More detailed information about the connections can be found in the handbook of the converter.

<table>
<thead>
<tr>
<th>I/O PCB</th>
<th>Cg nr. (XYZ)</th>
<th>I/O functions</th>
<th>I/O functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex i Option 2</td>
<td>230, 330, D30, E30, 240, 340, D40, E40</td>
<td>current input, passive (A and A-)</td>
<td>Ex ia IIC U_i = 30 V, I_i = 100 mA, P_i = 1,0 W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse/status output - Control input (B and B-)</td>
<td>C_i = 10 nF, L_i = negligibly low</td>
</tr>
<tr>
<td></td>
<td>240, 340, D40, E40</td>
<td>current input, active (A and A-)</td>
<td>Ex ia IIC U_o = 24,1 V I_o = 99 mA, P_o = 0,6 W</td>
</tr>
<tr>
<td>Fieldbus I/O</td>
<td>D00, D10, D20, D30, D40</td>
<td>Profibus-PA (C and C-, D and D-)</td>
<td>Ex ia IIC U_i = 24 V I_i = 380 mA, P_i = 5.32 W</td>
</tr>
<tr>
<td></td>
<td>E00, E10, E20, E30, E40</td>
<td>Foundation Fieldbus (C and C-, D and D-)</td>
<td>C_i = 5 nF L_i = 10 μH</td>
</tr>
</tbody>
</table>

Suitable for connection to an intrinsically safe fieldbus in accordance with the FISCO model.
5.1 Maintenance

The flowmeters are maintenance free with respect to the flowmetering properties. Within the scope of periodic inspections required for electrical equipment installed in hazardous areas it is recommended to check the housing for signs of damage or corrosion. This is especially important for following Ex d electronic compartments:

- In case of replacement of one (or more) of the four M6 hexagon socket head cap screws with which the converter housing of the IFC 300 F / PF or the TIDALFLUX 2000 is connected to the wall mounting support or to the connection box of the flow sensor, equivalent types must be used, that are M6x16 hexagon socket head cap screws to EN ISO 4762, steel quality A2-70 or A4-70.
- If needed, contact the manufacturer for information on the dimensions of the flameproof joints.

5.2 Before and after opening

**WARNING!**

*The following instructions must always be carefully followed, if the housing of the signal converter has to be opened respectively closed again.*

**Before opening:**
- Make absolutely sure that there is no explosion hazard!
- Gas-free certificate!
- Make sure that all connecting cables are safely isolated from all external sources!
- Allow the electronics to de-energize before opening the electronics compartment of the converter housing. Wait at least 35 minutes for T6.

When the instructions above are strictly followed, the display cover (includes glass window) of the electronics compartment may be removed. First unscrew the head screw with an internal hexagon socket set [size M4] of the interlocking device by a No. 2.5 Allen key until the cover, can rotate freely.

**After opening:**
- Before the cover is screwed back onto the housing, the screw-thread must be clean and well-greased with an acid and resin-free grease, e.g. PTFE grease.
- Screw the cover as tight as possible into the housing by hand, until it cannot be opened by hand anymore. Fixate the screw of the interlocking device tight with the No. 2.5 Allen key.
5.3 Replacement of mains fuse

**WARNING!**
Before starting the work refer to Before and after opening on page 22.

- Pull the display unit of the mounting frame using the two metal levers left and right and turn display unit carefully aside.
- Unscrew the two screws size M4 that hold the mounting frame with the electronics unit.
- Carefully pull the mounting frame with the electronics unit almost completely out of the housing, disconnect the long rectangular (14-pole) blue connector at the back-end of the electronics unit. Now carefully remove the unit from the housing.
- The mains fuse is located in a fuse holder at the back-end of the electronics unit. The specifications must be as follows:

<table>
<thead>
<tr>
<th>Fuse type: 5 x 20 mm (H) according to IEC 60127</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
</tr>
<tr>
<td>12...24 VDC</td>
</tr>
<tr>
<td>24 VAC/DC</td>
</tr>
<tr>
<td>100...230 VAC</td>
</tr>
</tbody>
</table>

**WARNING!**
Before reassembling the unit refer to Before and after opening on page 22.

- Reassemble the unit in reverse order.
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