Addendum for hazardous areas. These additional instructions are an extension to the OPTISONIC 6300 quick start and handbook.
## CONTENTS

1 Introduction

1.1 Safety instructions for the operator ................................................................. 3
1.2 Approval ............................................................................................................. 3
1.3 OPTISONIC 6000 xxxxxx-Ex ............................................................................. 3
1.4 UFC 300 F(/i)-Ex ............................................................................................ 4
1.5 Marking labels (examples) ................................................................................. 5

2 Temperature limits

2.1 General ............................................................................................................. 7
2.2 UFC 300 F(/i)-Ex ............................................................................................ 7
2.3 OPTISONIC 6000 xxxxxx-Ex ............................................................................. 7

3 Connection of separate systems

3.1 General ............................................................................................................. 8
3.2 Cable marking .................................................................................................. 8
3.3 Cable parameters ............................................................................................. 8
3.4 Equipotential bonding .................................................................................... 8
   3.4.1 Signal converter ....................................................................................... 8
   3.4.2 Flow sensor .............................................................................................. 8
3.5 Signal cable connections .............................................................................. 9

4 Electrical connections

4.1 General ........................................................................................................... 11
4.2 Non-“Ex ia” I/O connections .......................................................................... 13
4.3 “Ex ia” I/O connections ................................................................................. 14

5 Maintenance

5.1 Maintenance .................................................................................................. 16
5.2 Before and after opening ............................................................................... 16
5.3 Replacement of mains fuse .......................................................................... 17
5.4 Exchange of electronics unit ....................................................................... 18
   5.4.1 Field version .......................................................................................... 19

6 Notes .................................................................................................................. 21
1.1 Safety instructions for the operator

**WARNING!**

- Do not change the device. Unauthorized changes may 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 standard (equivalent to HD-IEC 60364), especially the regulations in EN/IEC 60079-14 “Electrical installations in hazardous locations” or equivalent national standard (e.g. DIN VDE 0165 Part 1) must be strictly followed.
- Installation, establishment, utilization and maintenance are only allowed to be executed by personnel with an education in explosion safety!

These additional instructions are an extension to the standard documentation and only apply to the Explosion protected versions of the devices described in this document. All technical information as described in the standard documentation is applicable, when not specifically excluded, completed or replaced by the instructions in these additional instructions.

1.2 Approval

The ultrasonic flowmeters are manufactured according to the European directive 2014/34/EU and IECEx 02 Certification Systems. The flowmeters are approved for installation and use in hazardous classified locations of Zone 1 and 2 and are in accordance with the European standards of the EN/IEC 60079 series. They have approval number:

OPTISONIC 6000 xxxxxx-Ex sensor: KIWA 17ATEX0034 X / IECEx KIWA 17.0017X
UFC 300 F(/i)-Ex converter: KIWA 18ATEX0007 X / IECEx KIWA 18.0003X

The QPS approval covers the applicable standards: UL/FM/CSA/ISA.

The original project ID is LR1338-9.

1.3 OPTISONIC 6000 xxxxxx-Ex

The OPTISONIC 6000 xxxxxx-Ex is a clamp-on ultrasonic flow sensor and has intrinsically safe transducer circuits. It is available in three sizes (xxxxxx = small, medium or large), designed for the size of the pipeline on which the flow sensor is installed.

It is marked with the explosion safety code:

II 2 G Ex ia IIC T6...T4
II 2 G Ex ia IIC T6...T2 (XT versions)

The intrinsically safe transducer connections of the OPTISONIC 6000 xxxxxx-Ex are connected to an associated device and have the following maximum values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( U_i )</td>
<td>8.5 V</td>
</tr>
<tr>
<td>( I_i )</td>
<td>250 mA</td>
</tr>
<tr>
<td>( P_i )</td>
<td>( \leq 0.531 \text{ W} )</td>
</tr>
<tr>
<td>( C_i )</td>
<td>( \leq 4.5 \text{ nF} )</td>
</tr>
<tr>
<td>( L_i )</td>
<td>( \leq 400 \mu \text{H} )</td>
</tr>
</tbody>
</table>
1.4 UFC 300 Fl/i)-Ex

The UFC 300 Fl/i)-Ex is the separate version of the ultrasonic signal converter and has intrinsically safe connections to the ultrasonic flow sensor in separate version. The ultrasonic signal converter is either provided with increased safety or intrinsically safe in-/outputs that are located in the terminal compartment, which can either be configured as "Ex db" or "Ex eb". The converter is marked with one of the following codes:

- II 2[1] G Ex db [ia] IIC T6 Gb or II 2 G Ex db eb [ia] [ia Ga] IIC T6 Gb for the terminal compartment of the signal converter housing in type of protection increased safety "Ex eb" according to EN/IEC 60079-7.
- II 2[1] G Ex db [ia] IIC T6 Gb or II 2 G Ex db [ia] [ia Ga] IIC T6 for the terminal compartment of the signal converter housing designed as flameproof enclosure "Ex db" according to EN/IEC 60079-1. The customer must provide "Ex db" approved cable glands in accordance with the European Directive 2014/34/EU.

The terminal compartment contains the connecting terminals for the mains supply and in-/outputs. It has three M20 x 1.5 - 6H cable/conduit entry holes for use with appropriate cable glands, blind plugs or conduit adapters ("Ex eb" or "Ex db" approved).

**WARNING!**

"Ex db" approved cable glands / blind plugs are not part of the standard delivery package and must be provided by the customer or explicitly ordered at the manufacturer.

When conduits are used, the terminal compartment must be a flameproof enclosure "Ex db" according to EN/IEC 60079-1. The conduits must be sealed by "Ex db" approved sealing devices, e.g. a stopping box with setting compound, directly at the conduit entrances.

The intrinsically safe transducer output connections have the following values:

| \(U_0 = 8.2\) V | \(I_0 = 190\) mA | \(P_0 = 390\) mW | \(C_0 = 1.4\) µF or 0.76 µF | \(L_0 = 0.5\) mH or 1.4 mH |
1.5 Marking labels (examples)

See the examples of the marking labels (i.e. data stickers) below of respectively the measuring sensor, the cable box (only for large version) and the UFC 300 FI/I-Ex ultrasonic signal converter.

**Figure 1-1:** Example ATEX marking OPTISONIC 6000 xxxxxx on the sensor type plate

**Figure 1-2:** Example ATEX marking OPTISONIC 6000 xxxxxx- on the cable box type plate

**Figure 1-3:** Example IECEx marking OPTISONIC 6000 xxxxx on the measuring sensor type plate

**Figure 1-4:** Example IECEx marking OPTISONIC 6000 xxxxxx on the cable box type plate

1. Name and address of the manufacturer
2. Type designation and manufacturing date of the flowmeter & CE sign with number(s) of notified body / bodies
3. Temperature medium and calibration data
4. Ex specific remarks and circuit info
5. Protection class and Tag no.
6. Ambient temperature (depends on version)
7. Ex logo, marking ATEX/IECEx and Certificate number
The type plates of the QPS approved flowmeters look similar, but have a QPS logo on it. This is also applicable for the IECEx approved flowmeters. These type plates contains the IECEx certificate number.

### ATEX / IECEx markings, Certificate number and ambient temperature data
1. Ex specific remarks and circuit info
2. Ex specific warnings
3. Mains supply data
4. Electronic Revision number
5. Type / serial number(s) of the corresponding sensor(s)
6. Additional info (e.g. website and environmental markings)
7. Name and address of the manufacturer

The type plates of the QPS approved flowmeters look similar, but have a QPS logo on it. This is also applicable for the IECEx approved flowmeters. These type plates contains the IECEx certificate number.

### INFORMATION!
For more information on type plates (and/or IO data sticker) and connection data, consult the applicable manual and quick start documents.
2.1 General

Due to the influence of the process temperature, ultrasonic flow sensors in a separate version with type designation OPTISONIC 6000 xxxxxx-Ex are not allocated to any fixed temperature class. For the temperature classification table refer to OPTISONIC 6000 xxxxxx-Ex on page 7. The temperature limits apply under the following conditions:

- The instrument is installed and operated in accordance with the installation directions given in the quickstart and handbook.
- 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 ultrasonic signal converter housing.

2.2 UFC 300 FI/i)-Ex

The UFC 300 FI/i)-Ex ultrasonic signal converter in separate version is not influenced by the temperature of the process medium, because it is installed on a distance of the pipe-line and thus not physically connected to the pipe-line. The UFC 300 FI/i)-Ex signal converter has a temperature classification of T6 (85°C). The permissible ambient temperature is dependent on the material that the electronics housing is made of, namely:

- die-casted aluminum: -40...+65°C
- die-casted stainless steel: -40...+60°C

2.3 OPTISONIC 6000 xxxxxx-Ex

The OPTISONIC 6000 xxxxxx-Ex clamp-on ultrasonic flow sensor has the following maximum process temperatures at the maximum ambient temperature $T_a$ of 70°C.

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Maximum process temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6</td>
<td>80 ①</td>
</tr>
<tr>
<td>T5</td>
<td>95</td>
</tr>
<tr>
<td>T4</td>
<td>120 ②</td>
</tr>
<tr>
<td>T3</td>
<td>195 ③</td>
</tr>
<tr>
<td>T2</td>
<td>200 ③</td>
</tr>
</tbody>
</table>

① $T_a$ max. = 60°C
② XT version: 130°C
③ XT versions only
3 CONNECTION OF SEPARATE SYSTEMS

3.1 General

The electrical connection between the ultrasonic flow sensor and the signal converter is established with MR 02 - RGX 316 Triax signal cable. The ends of the coaxial cables are provided with SMB plugs. The signal cable is provided with the system.

3.2 Cable marking

Please refer to Signal cable connections on page 9 for the connection of the different versions.

3.3 Cable parameters

The maximum permitted total capacitance and inductance for the connecting cable is:

\[ C_L = 1.29 \, \mu F \text{ or } 0.79 \, \mu F \]
\[ L_L = 0.1 \, \text{mH} \text{ or } 0.8 \, \text{mH} \]

The cable supplied with the instrument has the following parameters:

- distributed capacitance \( C_C [\text{core/screen}] = 94 \, \text{pF/m} \)
- distributed inductance \( L_C [\text{core/screen}] = 0.24 \, \mu \text{H/m} \)

**INFORMATION!**

The standard length of the signal cable is 5 meter. In case a longer length is required, please contact your local representative for detailed information.

3.4 Equipotential bonding

3.4.1 Signal converter

The UFC 300 F(i) Ex ultrasonic signal converter must always be incorporated within the equipotential bonding system of the installation in the hazardous classified location. For this purpose it must be connected to the external U-clamp screw terminal (size M5) on the wall-mounting device.

The separate bonding conductor must be at least 4 mm\(^2\) (11 AWG) or 2.5 mm\(^2\) (14 AWG) in case it is mechanically protected, see HD-IEC 60364. Make sure that the core of the bonding wire is properly mounted under the U-clamp of the external M5 terminal and that the screw is tightly fixed.

3.4.2 Flow sensor

The intrinsically safe transducer circuits of the flow sensor are galvanically isolated from earth, therefore an equipotential bonding conductor between the flow sensor and the signal converter does not have to be connected.
3.5 Signal cable connections

See the pictures below for details.

Figure 3-1: Connecting the signal cable to the rail (small and medium version)
1. Connect the green cable to “DOWN”
2. Connect the blue cable to “UP”
3. Turn the screws clockwise to secure the cap

Figure 3-2: Connections in cable box (large version)
1. Connect the blue cable to the UP rail
2. Connect the green cable to the DOWN rail
3. Make connections in cable box
4. Cable to converter
5. Turn the screws clockwise to secure the caps
Field version

Figure 3-3: Construction of field version

1. Cover, electronics compartment
2. Cover, terminal compartment for power supply and inputs/outputs
3. Connectors for power
4. Connectors for inputs/outputs
5. Connectors for sensor cable
6. Cover, sensor terminal compartment

Figure 3-4: Connect the signal cable in case of stainless steel / XT version.

1. Put in the connector
2. Turn knob to secure the connector
A = positioning notch in connector (female) on cable
B = positioning cam in connector (male) on sensor device
4.1 General

The display cover seals the electronics compartment of the converter housing and provides type of protection “flameproof enclosure” according to EN/IEC 60079-1. The terminal compartment is default in type of protection “increased safety” ("Ex eb") and can optionally be performed as flameproof enclosure ("Ex db"). The threaded joints formed by the covers and housing are a tight fit due to the requirements for type of protection “flameproof enclosure”. 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 DQ internal hexagon socket set using a No. 3 Allen key 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 and 10 minutes for T5 before opening.*

---

**Terminals**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Function, electrical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>L, N</td>
<td>Connections for mains supply, always non-Ex i 100...230 V AC, +10%/-15%, 22 VA, 50/60 Hz 12...24 V DC, +30%/-10%, 12 W 24 V AC, +10% /-15%, 22 VA, 50/60 Hz 24 V DC, +30%/-25%, 12 W U_m = 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), non-“Ex ia” or “Ex iac”, are dependent on the specific version of the UFC 300 converter ordered. Consult the tables with CG37 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>
The exact I/O-configuration for circuits A, B, C and D is order-specific and can be determined by the CG37 number shown on the I/O sticker inside the terminal compartment. Therefore check the data on the back of the UFC 300 electronics unit. The CG37 number contains 10 characters of which the last three characters (XYZ) determine the configuration of the I/O circuits:

<table>
<thead>
<tr>
<th>CG37</th>
<th>Pos 1...4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>determine I/O circuits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For schematic overviews of the CG37 numbers, refer to “Ex ia” I/O connections on page 14 and refer to Non-“Ex ia” I/O connections on page 13. These overviews do not show all details. The exact connection diagram of a specific UFC 300 signal converter can be found on the sticker inside the terminal compartment.

For use in gaseous hazardous areas: The chosen cable glands must have the appropriate type of protection for the terminal compartment that is increased safety (Ex eb) or flameproof enclosure (Ex db). They MUST be suitable for the conditions of use and correctly installed.

The flowmeter with the terminal compartment in type of protection increased safety “Ex eb” is factory supplied with two “Ex eb” approved cable glands and one “Ex eb” approved blanking element (i.e. stopping plug).

**WARNING!**
The flowmeter with the terminal compartment performed as flameproof enclosure “Ex db” is supplied with one “Ex db” approved stopping plug and two temporary plugs. The temporary plugs are only intended for sealing the housing against the entry of dust, moisture or else during transport, handling and storage. These temporary plugs must be replaced by suitable “Ex db” approved cable glands, stopping plugs or conduit adapters with sealing devices before the flowmeter is put into operation. Unused openings must be sealed by suitable certified plugs.

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.
4.2 Non-"Ex ia" I/O connections

The following non-intrinsically safe I/O (inputs/outputs) are available:

<table>
<thead>
<tr>
<th>I/O PCB</th>
<th>Input/output functions, $U_n &lt; 32$ V DC, $I_n &lt; 100$ mA, $U_m = 253$ V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic I/O</td>
<td>Current Output, active or passive, with HART</td>
</tr>
<tr>
<td></td>
<td>Status Output / Control Input</td>
</tr>
<tr>
<td></td>
<td>Status Output</td>
</tr>
<tr>
<td></td>
<td>Pulse / Status Output</td>
</tr>
<tr>
<td>Modular I/O</td>
<td>Current Output, active or passive, with HART</td>
</tr>
<tr>
<td></td>
<td>Pulse / Status Output, active or passive, highC or Namur</td>
</tr>
<tr>
<td>Modular carrier with 1 or 2 I/O modules</td>
<td>Each module: 1 out of following 3 in-/output functions:</td>
</tr>
<tr>
<td></td>
<td>Current Output, active or passive</td>
</tr>
<tr>
<td></td>
<td>Pulse / Status Output, active or passive, highC or Namur</td>
</tr>
<tr>
<td></td>
<td>Control Input, active or passive, highC or Namur</td>
</tr>
</tbody>
</table>

The options separated by "/" are software selectable (can be changed by the user)
The options separated by "or" are hardware versions (must be ordered as such)
All outputs are passive unless otherwise indicated
HighC means High Current input/output, Namur means that the in-/outputs are according to the NAMUR NE43 standard

Overview of the possible combinations, defined by characters XYZ of the CG37 number

<table>
<thead>
<tr>
<th>Characters XYZ</th>
<th>Name of I/O circuits</th>
<th>Terminals A, A+, A+</th>
<th>Terminals B, B-</th>
<th>Terminals C, C-</th>
<th>Terminals D, D-</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Basic I/O</td>
<td>CO</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>488 to 4LL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SQ/CI</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>588 to 5LL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>688 to 6LL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>788 to 7LL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>888 to 8LL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>A88 to ALL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>B88 to BLL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>C88 to CLL</td>
<td>Modular I/O</td>
<td>CO(a) over A+</td>
<td>SO</td>
<td>SO</td>
<td>P0/S0</td>
</tr>
</tbody>
</table>

Many combinations possible

Used abbreviations for in-/output functions: CO = Current Output, PO = Pulse Output, SO = Status Output, CI = Control Input, PA = Profibus PA, FF = Foundation Fieldbus, DP = Profibus DP, RS485 = RS485 Modbus, n.c. = not connected.
All in-/outputs are passive unless otherwise noted as active with extension (a).
4.3 “Ex ia” I/O connections

The following intrinsically safe I/O connections are available:

<table>
<thead>
<tr>
<th>I/O PCB</th>
<th>I/O functions</th>
<th>Ex ia IIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex ia -IO</td>
<td>Current output + HART communication</td>
<td>Ex ia IIC</td>
</tr>
<tr>
<td></td>
<td>pulse / status output</td>
<td>Uᵢ = 30 V, Iᵢ = 100 mA, Pᵢ = 1.0 W</td>
</tr>
<tr>
<td></td>
<td>current output, active + HART</td>
<td>Cᵢ = 10 nF, Lᵢ = negligibly low</td>
</tr>
<tr>
<td></td>
<td>communication</td>
<td></td>
</tr>
<tr>
<td>Ex ia -Option</td>
<td>Current output</td>
<td>Ex ia IIC</td>
</tr>
<tr>
<td></td>
<td>Pulse / status output / Control</td>
<td>Uᵢ = 30 V, Iᵢ = 100 mA, Pᵢ = 1.0 W</td>
</tr>
<tr>
<td></td>
<td>Input</td>
<td>Cᵢ = 10 nF, Lᵢ = negligibly low</td>
</tr>
<tr>
<td></td>
<td>current output, active</td>
<td></td>
</tr>
</tbody>
</table>

The I/O circuits titled “Ex ia -IO” and “Ex ia -option” are always provided with type of protection Intrinsic Safety [Ex ia].

Up to a maximum of 4 intrinsically safe [Ex ia] in-/outputs are possible. All intrinsically safe circuits are galvanically isolated 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.

The “Ex ia” 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 ia” 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 ia” and “Ex ia” 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 eb” 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.

<table>
<thead>
<tr>
<th>Characters XYZ</th>
<th>Name of I/O circuits</th>
<th>Terminals A, A-, A+</th>
<th>Terminals B, B-</th>
<th>Terminals C, C-</th>
<th>Terminals D, D-</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Ex ia -IO</td>
<td>n.c.</td>
<td>n.c.</td>
<td>CO[a]</td>
<td>P0/S0</td>
</tr>
<tr>
<td>300</td>
<td></td>
<td>n.c.</td>
<td>n.c.</td>
<td>CO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>210</td>
<td>Ex ia -IO with</td>
<td>CO(a)</td>
<td>P0/S0/CI</td>
<td>CO[a]</td>
<td>P0/S0</td>
</tr>
<tr>
<td></td>
<td>Ex ia -Option</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td></td>
<td>CO</td>
<td>P0/S0/CI</td>
<td>CO[a]</td>
<td>P0/S0</td>
</tr>
<tr>
<td>310</td>
<td></td>
<td>CO(a)</td>
<td>P0/S0/CI</td>
<td>CO</td>
<td>P0/S0</td>
</tr>
<tr>
<td>320</td>
<td></td>
<td>CO</td>
<td>P0/S0/CI</td>
<td>CO</td>
<td>P0/S0</td>
</tr>
</tbody>
</table>

Used abbreviations for in-/output functions: CO = Current Output, PO = Pulse Output, SO = Status Output, CI = Control Input, n.c. = not connected

All in-outputs are passive unless otherwise noted as active with extension (a).
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 flameproof converter housing and covers for signs of damage or corrosion.

For information about the flameproof joints please contact your KROHNE representative.

The four M6 bolts to screw the MH300-Ex housing have a strength of 700 MPa

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 and 10 minutes for T5 before opening.

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 internal hexagon socket set (size M4) of the interlocking device by a No. 3 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 onto the housing by hand, until it cannot be opened by hand anymore. Fixate the screw of the interlocking device tight with the No. 3 Allen key.
5.3 Replacement of mains fuse

**WARNING!**

Before commencing the work, refer to Before and after opening on page 16, then continue as follows:

- Pull the display unit of the mounting frame 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 electronics unit out of the housing, until the MCX-connectors are accessible and can be disconnected from the sensor driver PC-board. Now carefully remove the unit from the housing, while keeping the coaxial cables down, and close to the housing wall.
- The mains fuse is located in a fuse holder at the back-end of the electronics unit on the top printed circuit board (power supply PCB). The specifications must be as follows:

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Electrical data</th>
<th>KROHNE part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>12...24 V DC</td>
<td>250 V / 2 A T</td>
<td>5060200000</td>
</tr>
<tr>
<td>24 V AC/DC</td>
<td>250 V / 2 A T</td>
<td>5060200000</td>
</tr>
<tr>
<td>100...230 V AC</td>
<td>250 V / 0.8 A</td>
<td>5080850000</td>
</tr>
</tbody>
</table>

**WARNING!**

Before reassembling the unit, refer to Before and after opening on page 16, then:

- Reassemble the unit in reverse order.
5.4 Exchange of electronics unit

Before opening the converter housing:

**WARNING!**
*Before commencing the work, refer to Before and after opening on page 16, then continue as follows:*

**DANGER!**
*All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!*

**WARNING!**
*Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.*

**INFORMATION!**
*Make notes of important specific data, before exchanging the electronics. Menu settings are stored on the circuit board (or backplane), that is fixed to the housing. After exchange of electronics unit and power-up, the following start up screen appears: Load all data?*

- Select yes
  - if in the screen appears “**load sensor data**”, the electronics units were not fully compatible. You can proceed by selecting yes. Note that all settings need to be checked and changed. Only the sensor calibration data are loaded.
  - if in the screen appears “**load no data**”, all data have been lost. Contact your local representative.
5.4.1 Field version

DANGER!
All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Perform the following procedures:

- Unscrew the display cover of the electronics compartment by hand, by turning it counter clockwise ①.
- Remove the display by using two screwdrivers ②.
- Unscrew the two M4 screws ③ at the electronics unit ④.
- Pull the two metal pullers ⑤ at the left and right of the display, using a screwdriver or similar tool and partially pull out the electronics unit.

CAUTION!
Please pay attention that the same amount of force is applied on both pullers, otherwise the connector at the backside can be damaged.
DANGER!
Electrostatic discharge (ESD) can damage electronic parts. Make sure to discharge yourself by wearing a wrist strap. If no wrist strap is available, ground yourself by touching a metal surface that is grounded.

- Remove the MCX -connectors 6 from the electronics unit 4.
- Check compatibility between the removed and new electronics unit 4, by checking the power voltage.
- Slide the new electronics unit 4 partially back into the housing.
- Mount the MCX -connectors back onto the electronics unit 4.
- Push the metal pullers 5 back to their original position.
  Don’t use excessive force, otherwise the connector at the backside can be damaged!
- Screw the electronics unit back to the housing.
- Re-install the display and make sure not to kink the display’s flat ribbon cable.
- Replace cover and tighten by hand.
- Connect power.
KROHNE – Process instrumentation and measurement solutions

- Flow
- Level
- Temperature
- Pressure
- Process Analysis
- Services

Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.: +49 203 301 0
Fax: +49 203 301 10389
info@krohne.com

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com