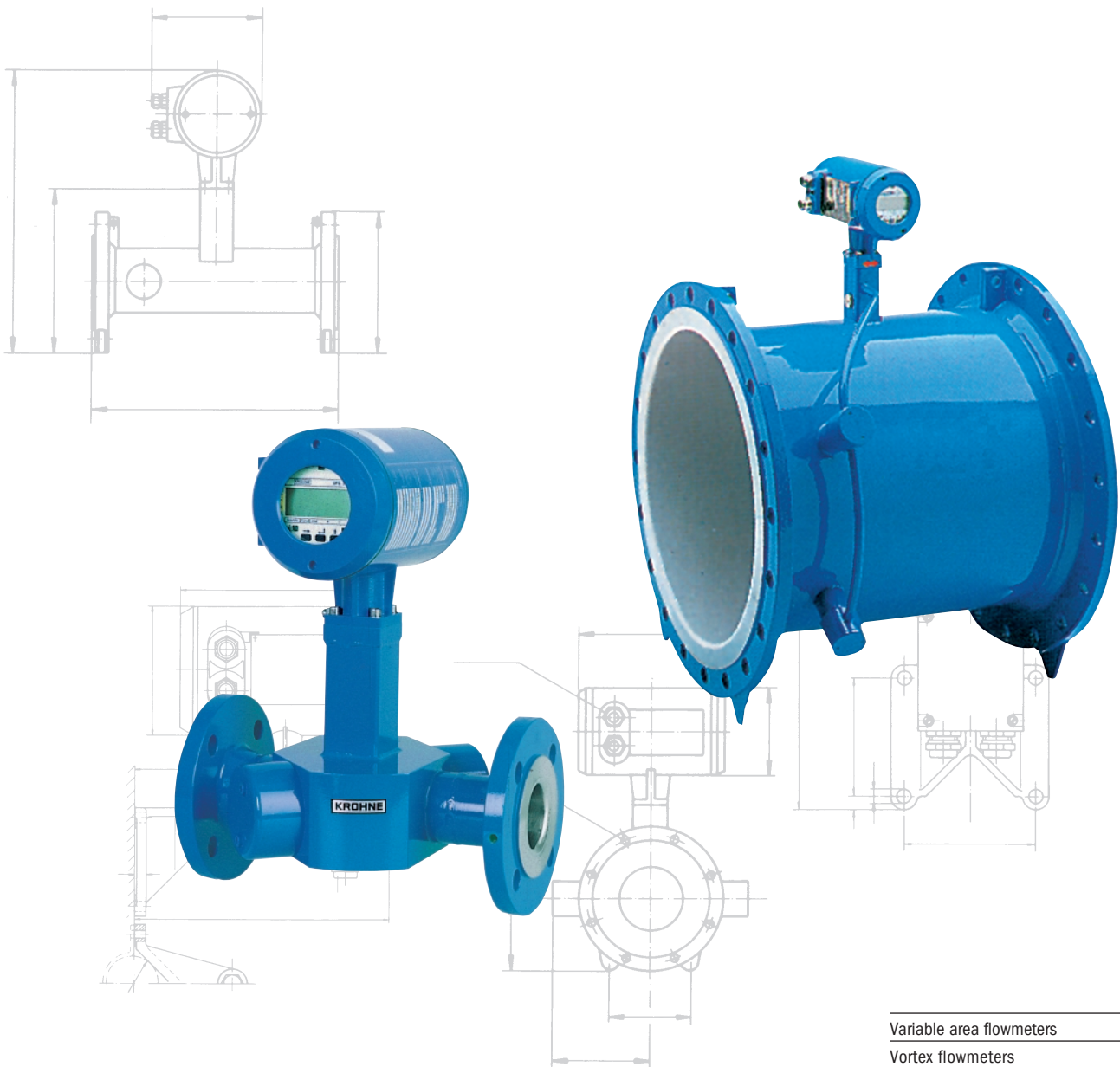


Addition to the installation and operating instructions UFM 500 K - EEx ATEX

**Ultrasonic
compact flowmeter**



Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

Level measuring instruments

Communication technology

Engineering systems & solutions

Pressure and temperature

WARNING !

No changes may be made to the devices. Unauthorized changes might affect the explosion safety of the devices.

These additional instructions are an extension to the standard Installation and Operating Instructions and only applies for the EEx version of the UFM 500 K compact ultrasonic flowmeter. All technical information described in the standard Installation and Operating Instructions are applicable, when not specifically excluded or replaced by the instructions in these additional instructions.

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Be sure to follow these instructions !

IMPORTANT !

- 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 of HD 384 or IEC 364, e.g. VDE 0100), **especially** the regulations in **EN 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 !**

1. SYSTEM COMPONENTS

1.1 General information

The Altosonic UFM 500 K-EEEx ultrasonic compact flowmeter is in accordance with the European Directive 94/9 EC (ATEX 100a) and approved for hazardous classified locations of Zone 1 and 2 by the PTB conform to the European Standards of the EN 500xx series. The UFM 500 K-EEEx has the following approval number.

PTB 01 ATEX 2015 X

The UFM 500 K-EEEx compact flowmeter is designed for ambient temperatures (i.e. T_a) in the range of -40°C up to $+60^{\circ}\text{C}$. The maximum allowed process liquid (medium) temperature is restricted by the combustible atmosphere that (possibly) surrounds the apparatus, determined by the temperature class of the atmosphere, see Table 1 below.

Temperature class	Maximum process liquid temperature		
	$T_a \leq 40^{\circ}\text{C}$	$T_a \leq 50^{\circ}\text{C}$	$T_a \leq 60^{\circ}\text{C}$
T6	80°C	80°C	80°C
T5	95°C	95°C	95°C
T4	130°C	130°C	125°C
T3	180°C	165°C	125°C

Table 1: Temperature classification of the UFM 500 K-EEEx.

The UFM 500 K-EEEx ultrasonic compact flowmeter consists of the UFC 500-EEEx signal converter, which is screwed on top of the UFS 500-EEEx primary head (i.e. measuring unit). The compact flowmeter is marked with one of the codes below:

Standard (default) version:

- **II 2G EEx de [ib] IIC T6...T3** for the terminal compartment of the signal converter housing in type of protection increased safety "e" according to EN 50019 (see also Section 1.3).

Optional version (only if explicitly ordered!):

- **II 2G EEx d [ib] IIC T6...T3** for the terminal compartment of the signal converter housing designed as flameproof enclosure "d" according to EN 50018 (see also Section 1.3)

1.2 UFS 500-EEEx primary head

The UFS 500-EEEx primary head is the measuring unit of the compact flowmeter and contains the ultrasonic sensors (a multiple of two opposite transducers) in type of protection intrinsic safety category "ib" according to EN 50020. All sensor circuits (only internal circuits) are wired by separate coaxial cables and connected through SMB connectors marked by number from 1 through 4. The UFC 500-EEEx signal converter (described in the next section) is mounted on top of the primary head by four hexagon socket head cap screws size M6.

The intrinsically safe "ib" ultrasonic sensor circuits inside the UFS 500...-EEEx primary head have the following maximum values (i.e. entity parameters):

- Maximum input voltage : $U_i = 13.1 \text{ V}$
- Maximum input current : $I_i = 600 \text{ mA}$
- Maximum internal capacitance : $C_i = 7.7 \text{ nF}$ (maximum, 2 sensor circuits)
- Maximum internal inductance : $L_i = 134 \text{ }\mu\text{H}$ (maximum, 2 sensor circuits)

NOTE:

The intrinsic safe sensor circuits of the UFM 500K-EEEx compact flowmeter are **only internal circuits** and not accessible for the customer. The above data (entity parameters) as well as in Section 1.3.1 on the next page are therefore **for information only**.

1.3 UFC 500-Ex signal converter

The UFC 500-Ex signal converter consists of a cylindrical housing made of die-casted aluminum. It has of two separate compartments, divided from each other by an integrated wall with casted flameproof terminal feed-through. The interconnecting part to the primary head at the bottom of the housing contains a flameproof wire or coaxial cable feed-through. The housing is closed on both ends by a cylindrical cover with M115x2-6g screw-thread and O-ring sealing. The signal converter housing has an ingress protection degree in accordance with the EN 60529 of at least IP 67. The two compartments are described in detail below.

1.3.1 Electronics compartment

The electronics compartment accommodates the UFC 500-Ex electronic unit. The compartment is designed with type of protection flameproof enclosure "d" in accordance with EN 50018. It is closed by a flameproof display cover with glass window, which is glued and additionally mechanical supported by a screwed in back-up ring made of aluminum.

The UFC 500-Ex electronics unit is inserted into the electronics compartment with the help of two sliding rubbers that position and fixate the unit at the front inside the housing. Two M4 screws mount the unit and a third M4 screw fixates the brass earth strip at the back-end of the printed circuit board with integrated voltage/current limiting circuit (i.e. front-end PCB). The three screws are screwed to the integrated wall in-between terminal and electronics compartment. The integrated voltage/current limiting circuit provides the ultrasonic sensors inside the primary head with type of protection intrinsic safety "ib" according to EN 50020.

The voltage/current limiting circuit has the following maximum values (i.e. entity parameters):

- Maximum output voltage : $U_o = 8.72 \text{ V}$
- Maximum output current : $I_o = 380 \text{ mA}$
- Maximum allowed external capacitance : $C_o = 1.2 \mu\text{F}$
- Maximum allowed external inductance : $L_o = 0.17 \text{ mH}$

1.3.2 Terminal compartment

The terminal compartment accommodates seven M4 clamp terminals for connection of the power supply and the signal output circuits (binary and current outputs). Figure 1 on the next page shows the terminal arrangement. The terminals are separated from each other by insulation plates (nine in total, from which one at each end of the row).

In the following section the electrical connection of the mains supply power and the signal output circuits is described (this information only concerns the Ex-relevant subjects).

The terminal compartment (standard in type of protection increased safety "e") is standard equipped with two metal cable glands.

As an option (must be explicitly ordered!) the terminal compartment can be provided as a flameproof enclosure "d", in case the customer wants to use pre-certified "Ex d" cable glands or conduits.

Note: Ex d certified cable glands are no part of the standard delivery, they must be provided by the customer himself or ordered explicitly.

For flameproof conduit systems, the terminal compartment must have type of protection flameproof enclosure "d" according to EN 50018. The conduits must be sealed by "Ex d" approved (within the ATEX 100a directive) sealing devices (i.e. stopping box) directly at the conduit entrances of the as flameproof enclosure performed terminal compartment.

2. ELECTRICAL CONNECTION

NOTE:

All the connecting cables that enter the terminal compartment of the UFC 500-EEEx signal converter (i.e. power supply, current and binary in-/outputs cables) are not intrinsically safe !

The arrangement of the terminals in the terminal compartment is shown in Figure 1 below.

For mains voltages above 50 Vac the PE conductor must be connected to the PE-terminal in the terminal compartment.

To connect external devices to the current and binary output terminals, the wiring requirements for the specific type of protection of the terminal compartment (standard: increased safety "e", special version: flameproof enclosure "d") must be respected, see the EN 60079-14 or corresponding national standard.

2.1 Potential equalization

The UFM 500 K-EEEx ultrasonic compact flowmeter must always be connected to the equipotential bonding system of the hazardous area. For this purpose the internal PE-terminal (over the PE-conductor of the mains) or the external PE-terminal may be used. The external PE-terminal is placed halfway converter housing and primary head.

A separate bonding conductor must be at least 4 mm², or 2,5 mm² if mechanical protected, see clause 413 of HD 384.4.41 or IEC 364-4-41 for additional information.

When the UFM 500 K-EEEx is incorporated in the equipotential bonding system, make sure that the core of the bonding wire is properly mounted under the U-clamp of the PE-terminal and that the screw is tightly fixed.

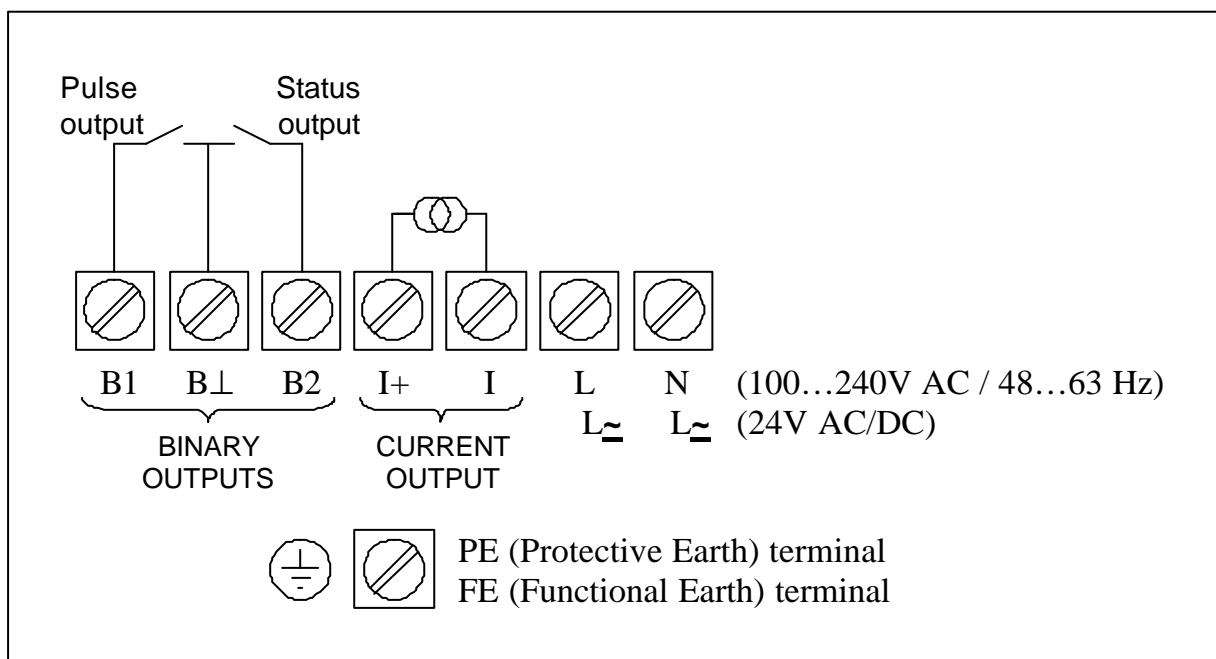


Figure 1: Arrangement of terminals in terminal compartment.

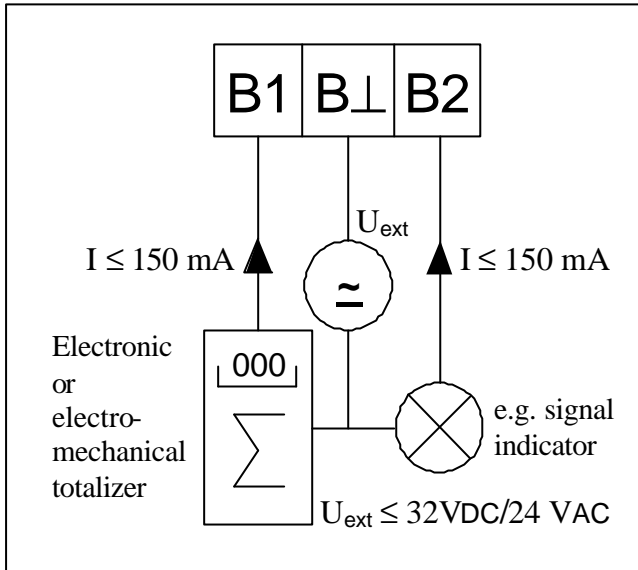


Figure 2: Passive pulse/status output.

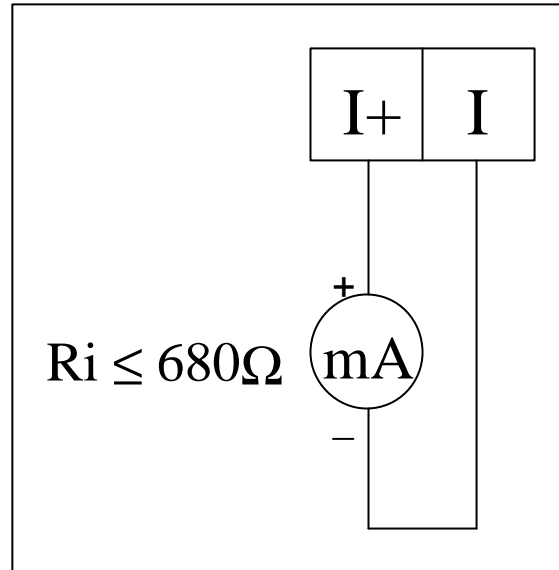


Figure 3: Active current output.

NOTE:

The status output (terminals B1, B⊥ and B2) can only be configured as passive outputs, the current output (terminals I+ and I) can only be configured as active output.

2.2 Operation of the signal converter

The UFC 500-EEx signal converter unit of the UFM 500 K-EEx compact flowmeter is equipped with a display unit that contains magnetic Hall sensors. These Hall sensors enable the settings of the UFC 500-EEx signal converter electronics to be set resp. reset with the help of the with the apparatus delivered bar magnet without opening the flameproof signal converter housing in the hazardous area. Consult the standard Installation and Operating Instructions (Part B) for the program functions of the software of the UFC 500-EEx electronics unit.

3. CONNECTING CABLES

NOTE:

The below described cables are shown in the connection diagram on the following page.

Cable A:

Signal cable for current output and binary in-/outputs (pulse and status output). This cable type must be in accordance with clause 9 of the EN 60079-14 "Electrical installations in hazardous locations" or an equivalent national standard (e.g. DIN VDE 0165 Part 1).

Cable B:

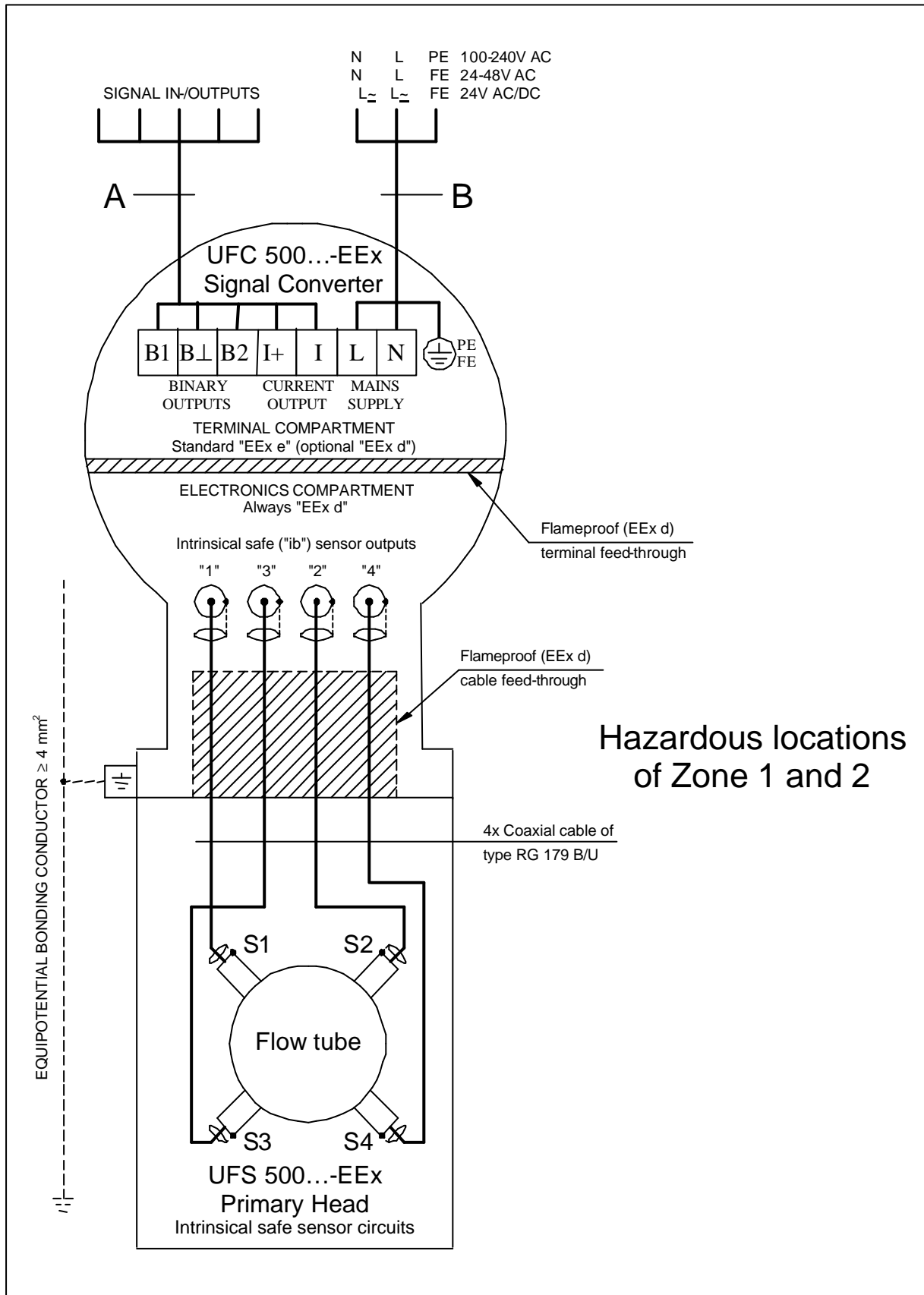
Mains power supply cable. This cable type must also be in accordance with clause 9 of the EN 60079-14 "Electrical installations in hazardous locations" or an equivalent national standard (e.g. DIN VDE 0165).

Rated voltage:	≥ 500 V
Examples:	H07...-, H05...- to HD 21.S2 or HD22.S2

Separate bonding conductor

Minimum cross-sectional area:	4 mm ²
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4. CONNECTION DIAGRAM



5. SERVICE

5.1 Replacement of electronics unit or mains fuse(s)

IMPORTANT !

The following instructions **must be followed carefully**, if the flameproof UFM 500 K-Ex signal converter housing 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 the mains and low-voltage circuits!**
- ◆ Allow the prescribed waiting time to elapse before opening the housing:
 - 20 minutes for temperature class T6
 - 11 minutes for temperature class T5

When the instructions above are strictly followed, the cover of the electronics compartment may be removed. First unscrew the hexagon socket head cap screw of the interlocking device by a hollow-head screw wrench **size 3**, until the cover can rotate freely. Unscrew the cover with the special plastic wrench (black) that is supplied with the apparatus.

After opening:

- ◆ The brass grounding strip at the back of the electronics unit **must** be securely screwed to the housing (back-end of electronics compartment) by screw **C** (see Figure 5 below). The electronics unit is screwed into the electronics compartment by two screws **B**. Before screws **B** and **C** can be accessed, the display unit must be removed via screws **A**.
- ◆ Before the cover is screwed back into the housing, the screw-thread must be **clean and well-greased with an acid and resin-free grease**, e.g. silicone grease.
- ◆ Screw the cover into the housing. Screw the hexagon socket head cap screw of the interlocking device tight.

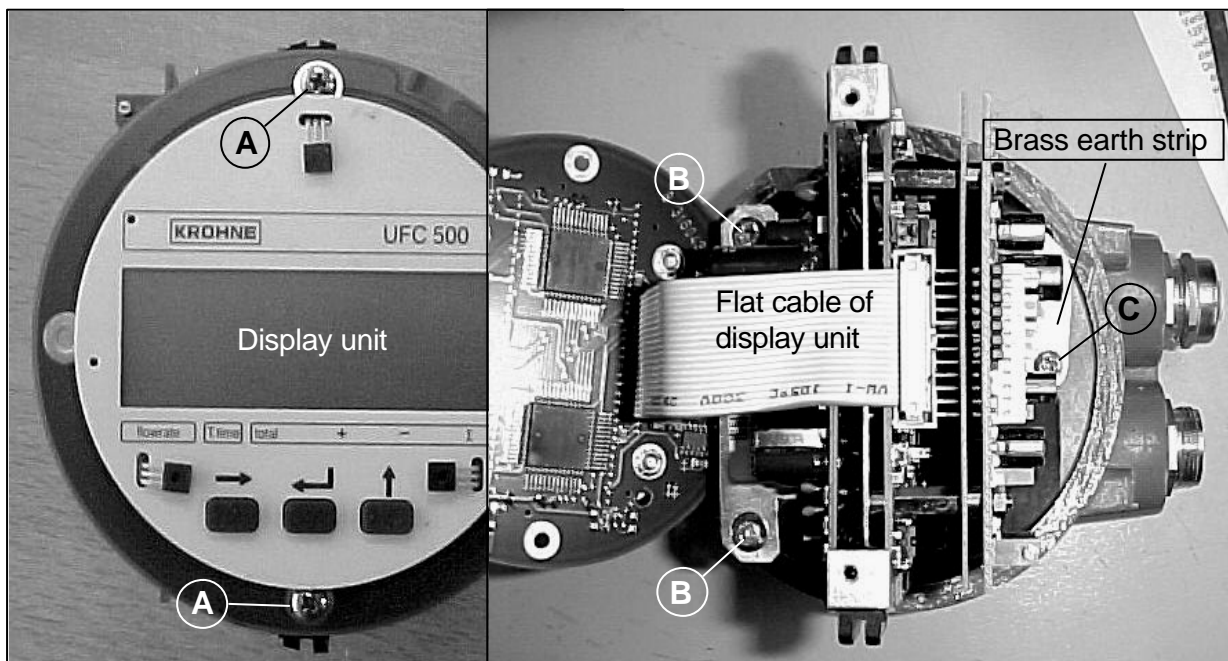


Figure 5: Display unit (left) / Electronics unit after removal of display unit (right).

5.1.1 Replacement of electronics unit

See the standard Installation and Operating Instructions for detailed information about resetting and reprogramming the new electronics unit after replacement. Important customer specific data (like the value of the internal totalizer) should be noted before replacing the electronics unit !

Before commencing work, **note the instructions in Section 4.1 ("Before opening")**. Then continue as follows:

1. Loosen the interlocking device and remove the cover of the electronics compartment.
2. Unscrew the two screws **A** (see figure 5 in section 4.1) of the display unit and turn display unit carefully aside or remove the unit completely by taking out the flat cable connector.
3. Unscrew the two mounting screws **B** of the electronics unit as well as screw **C**, which fixes the brass earth strip at the back of the housing. A screwdriver with a long shaft (200 mm) can best be used to unscrew **C** (e.g. screwdriver type **Philips No. 2**).
4. Pull the electronics unit carefully out of the converter housing, till the SMB connectors of the coaxial cables can be unplugged easily. Then remove the complete electronics unit and replace it with a new one.
5. Check on the new electronics unit if the voltage setting (only applicable for AC supplies) and mains fuse rating are correct. Change the voltage setting (see Section 3.1.3) or exchange the mains fuse (see Section 3.1.2) if necessary.
6. Carefully insert the electronics unit till the numbered SMB connectors can be connected to the corresponding numbered SMB receptacles on the electronics unit. Then mount the unit completely into the housing and fix the screws. First **C**, then **B** and finally screw the display unit on the electronics via screws **A**, after the flat cable connector is connected.
7. Screw the cover of the electronics compartment back into the housing.

Note the instructions of section 4.1 ("After opening") during reassembling.

IMPORTANT !

Carefully keep the coaxial cables to the side of the housing, while inserting the electronics unit into respectively removing it from the converter housing. This is to prevent damaging of the coaxial cables !

5.1.2 Replacement of mains fuse(s)

a) AC versions 115/230 V AC and 100/200 V AC

Before commencing work, **note the instructions in Section 4.1 ("Before opening")**. Then continue as follows:

1. Loosen the interlocking device and remove the cover of the electronics compartment.
2. Unscrew the two screws **A** (see figure 5 in section 4.1) of the display unit and turn the display unit carefully aside.
3. The fuse-holder, in which the mains fuse in accordance with IEC 127-2 size $\varnothing 5 \times 20$ mm, (breaking capacity high) is mounted, is now accessible to replace the defect mains fuse **F1** by a new fuse with the **same rating**. The rating depends on the voltage setting of the power supply unit. (**T200mA** for 100 or 115V AC and **T125mA** for 200 or 230 V AC). See also the yellow sticker that is glued on the mains transformer as shown in Figure 6 on the next page.
4. Reassemble the unit in reverse order (points 2 and 1).

Note the instructions of section 4.1 ("After opening") during reassembling.

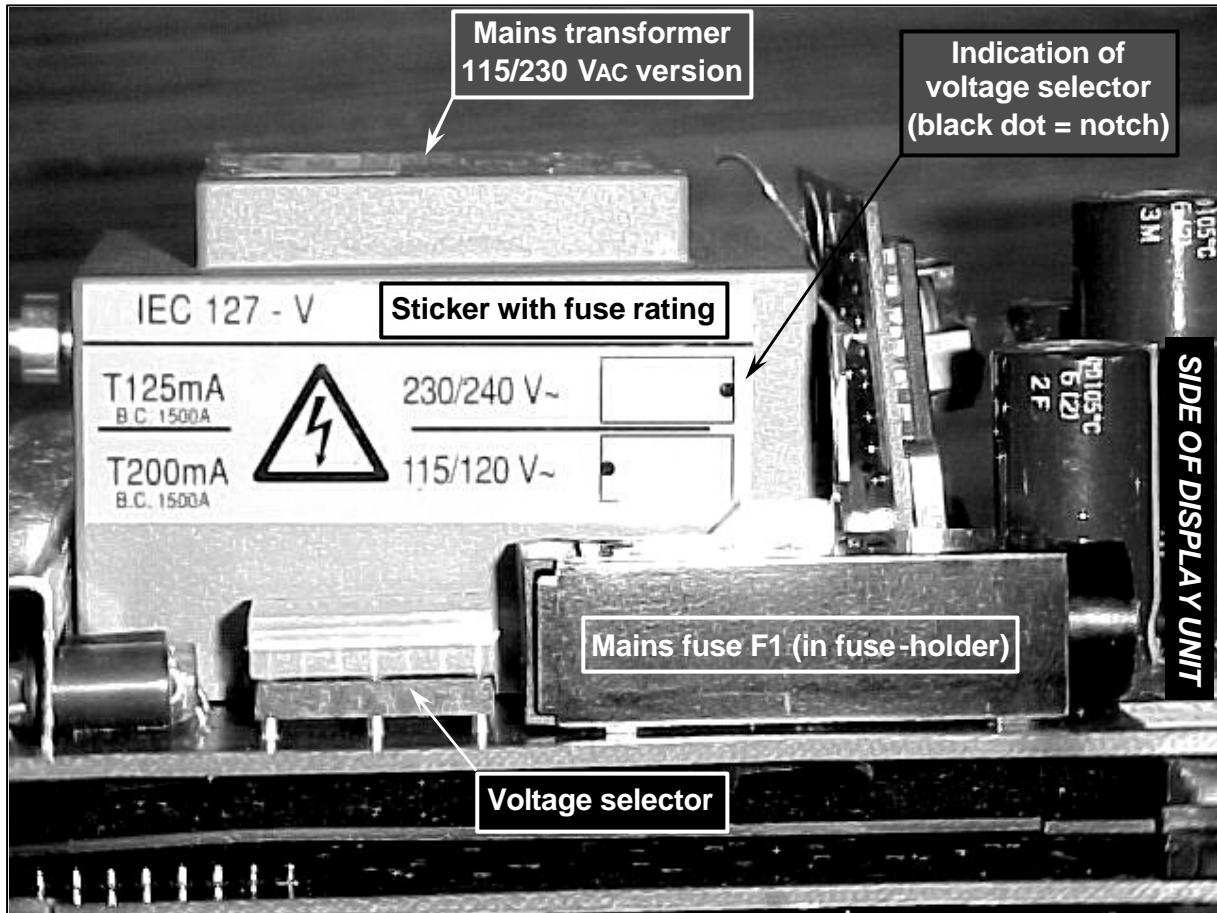


Figure 6: Power supply version 115/230 V AC.

b) 24 V AC/DC version

Before commencing work, **note the instructions in Section 4.1 ("Before opening")**. Then continue as follows:

1. Loosen the interlocking device and remove the cover of the electronics compartment.
2. Unscrew the two screws **A** (see figure 5 in section 4.1) of the display unit and disconnect the display unit via the flat cable connector (see the right picture of Figure 5 on the previous page).
3. Unscrew the brass earth strip (screw **C**) with the and the mounting screws **B** of the electronics unit. Pull the unit out until the SMB connectors of the coaxial cables can be disconnected from the electronics. Then take out the complete electronics unit. Be careful with the coaxial cables, so that they do not damage while removing the electronics unit from the flow converter housing.
4. The mains fuses F1 and F2 (see Figure 7 on the next page) can be replaced now. The 24 V AC/DC power supply uses two sub-miniature fuses rated **T1.25A** in accordance with IEC 127-3 publication.
5. Reassemble in reverse order (points 3 through 1).

Note the instructions of section 4.1 ("After opening") during reassembling.

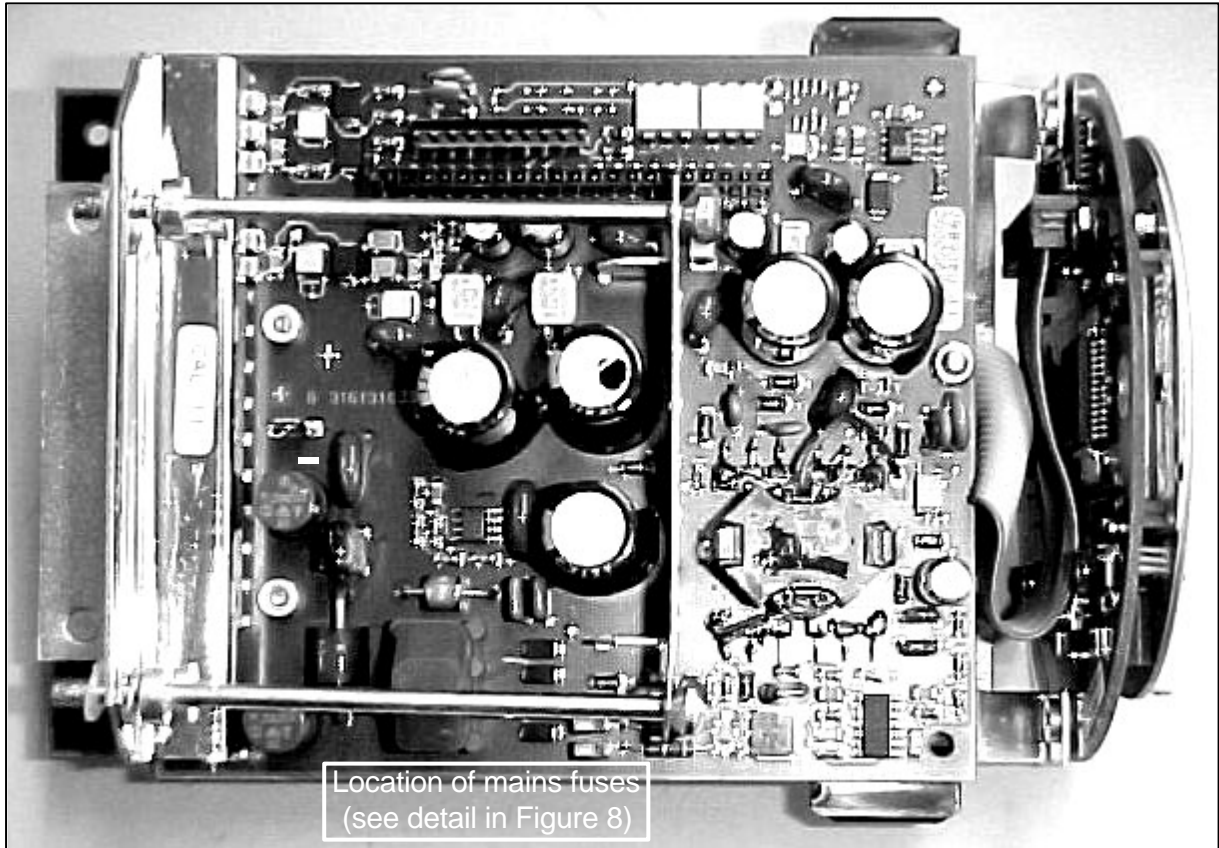


Figure 7: UFC 500-EEx electronics unit with 24 V AC/DC power supply.

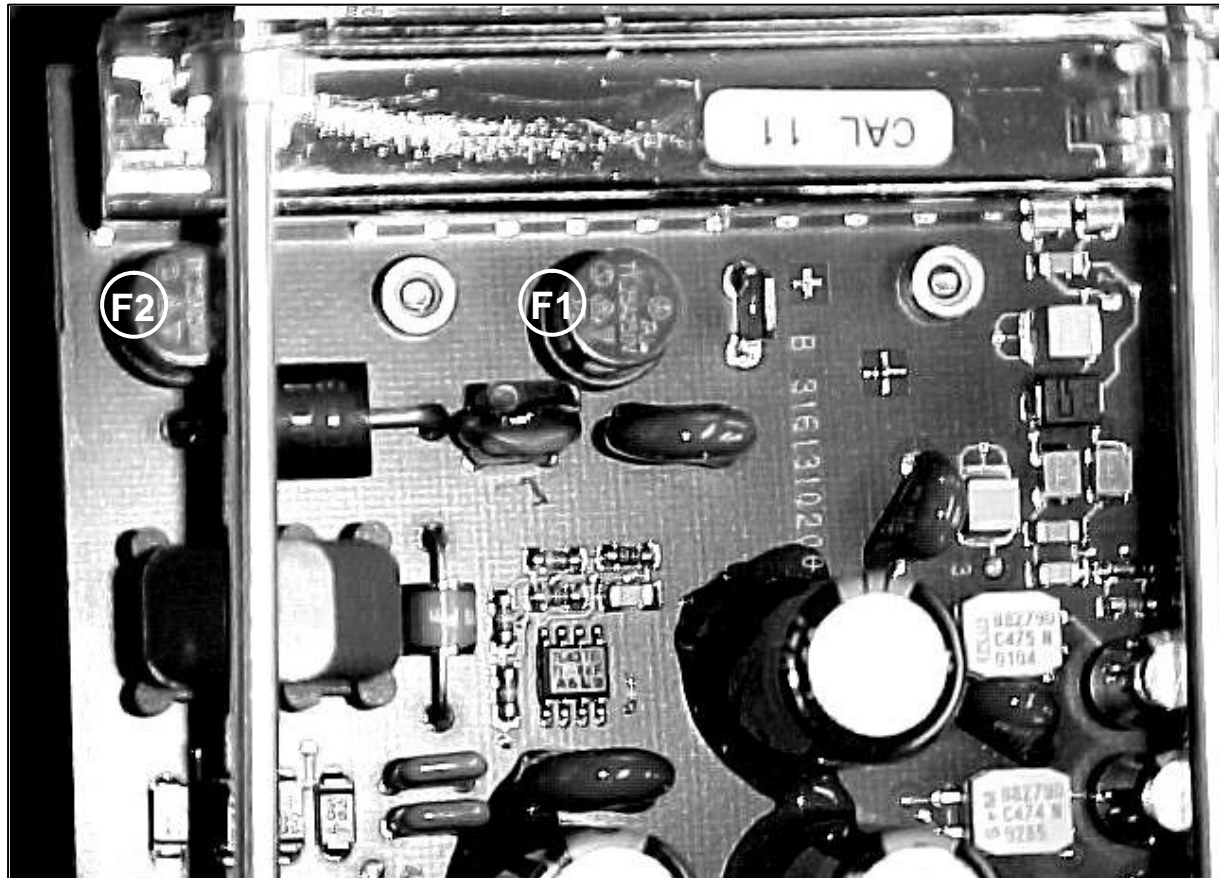


Figure 8: Location of fuses F1, F2 on 24 V AC/DC unit.

5.1.3 Changing power supply voltage (not for 24 V AC/DC version)

Before commencing work, **note the instructions in Section 4.1 ("Before opening")**. Then continue as follows:

1. Loosen the interlocking device and remove the cover of the electronics compartment.
2. Unscrew the two screws **A** (see figure 5 in section 4.1) of the display unit and turn display unit carefully aside or remove the unit completely by taking out the flat cable connector.
3. Unscrew the two mounting screws **B** of the electronics unit as well as screw **C**, which fixes the copper earth strip at the back of the housing. A screwdriver with a long shaft (200 mm) can best be used to unscrew **C** (e.g. screwdriver type **Philips No. 2**).
4. Pull the electronics unit carefully out of the converter housing, till the SMB connectors of the coaxial cables can be unplugged easily. Then remove the complete electronics unit.
5. The voltage setting of the power supply can be changed by turning the dummy dual-in-line block (i.e. **voltage selector**, see Figure 6 on page 6) over 180° in its socket. The position of the notch on the dummy dual-in-line block indicates the voltage setting. Also see the sticker that is mounted on the mains transformer (see Figure 6).
6. Carefully insert the electronics unit back into the housing until the numbered SMB connectors can be connected to the corresponding numbered SMB receptacles on the electronics unit. Then mount the unit completely into the housing and fix the screws. First **C**, then **B** and finally screw the display unit on the electronics via screws **A**, after the flat cable connector is connected.
7. Screw the cover of the electronics compartment back into the housing.

Note the instructions of section 4.1 ("After opening") during reassembling.

IMPORTANT !

Carefully keep the coaxial cables to the side of the housing, while inserting or removing the electronics unit into respectively from the converter housing. This is to prevent damaging of the coaxial cables !

6. SPARE PARTS

UFC 500-EEEx electronics unit	Krohne part no.	Type of mains fuse(s)	Krohne part no.
230 Vac	2.10680.00.00	T125H250V (to IEC 60127-2)	5.06627.00.00
115 Vac		T200H250V (to IEC 60127-2)	5.05678.00.00
200 Vac	2.10681.03.00	T125H250V (to IEC 60127-2)	5.06627.00.00
100 Vac		T200H250V (to IEC 60127-2)	5.05678.00.00
24 Vac/dc	2.10681.00.00	T1.25A 250V (to IEC 60127-3)	5.09080.00.00

7. MAINTENANCE

The UFM 500 K-EEEx ultrasonic compact flowmeters are maintenance free with regard to the flowmetering properties.

Within the scope of the periodical inspections, which are required for electrical apparatus that are installed and used in hazardous classified locations, it is recommended to check the flameproof converter housing on signs of corrosion.

8. EC-TYPE EXAMINATION CERTIFICATE

Translation in English.

<p>Translation by <u>Krohne Altimeter</u> Original language: <u>German</u></p> <p>Physikalisch-Technische Bundesanstalt PTB Braunschweig und Berlin</p> <p style="text-align: center;">Schedule</p> <p>(13)</p> <p>(14) EC-Type Examination Certificate PTB 01 ATEX 2015 X</p> <p>(15) <u>Description of the equipment</u></p> <p>The ultrasonic compact flowmeter type UFM 500 K-EEx is used for measuring, counting and displaying the flowrate of flammable or non-flammable liquids. The alternative type designation is UL 500 K/.../...-EEx.</p> <p>The range of the maximum ambient temperature for the variants is: Type UFM (UL) 500 K/.../...-EEx : -40 °C ... + 60 °C Type UFM (UL) 500 K/.../...-EEx : -20 °C ... + 60 °C</p> <p>The relationship between temperature class and maximum medium temperature in dependency of the ambient temperature of both variants is shown in following tables:</p> <p>Type UFM (UL) 500 K / ... / ... -EEx:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Temperature class</th> <th colspan="2">Maximum Medium Temperature [°C]</th> </tr> <tr> <th>$T_a \leq 40\text{ °C}$</th> <th>$T_a \leq 50\text{ °C}$</th> </tr> </thead> <tbody> <tr> <td>T6</td> <td>80</td> <td>80</td> </tr> <tr> <td>T5</td> <td>95</td> <td>95</td> </tr> <tr> <td>T4</td> <td>130</td> <td>130</td> </tr> <tr> <td>T3</td> <td>180</td> <td>165</td> </tr> </tbody> </table>	Temperature class	Maximum Medium Temperature [°C]		$T_a \leq 40\text{ °C}$	$T_a \leq 50\text{ °C}$	T6	80	80	T5	95	95	T4	130	130	T3	180	165	<p>Type UFM (UL) 500 K / ... / ... -EEx:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Temperature class</th> <th colspan="2">Maximum Medium Temperature [°C]</th> </tr> <tr> <th>$T_a \leq 40\text{ °C}$</th> <th>$T_a \leq 50\text{ °C}$</th> </tr> </thead> <tbody> <tr> <td>T6</td> <td>80</td> <td>80</td> </tr> <tr> <td>T5</td> <td>95</td> <td>95</td> </tr> <tr> <td>T4</td> <td>130</td> <td>120</td> </tr> <tr> <td>T3</td> <td>160</td> <td>120</td> </tr> </tbody> </table> <p><u>Electrical data</u></p> <p>Type UFM (UL) 500 K / ... / ...-EEx :</p> <table style="width: 100%;"> <tr> <td style="width: 60%;">Power supply (terminals L, N, PE)</td> <td style="width: 40%;">AC-Version 1</td> </tr> <tr> <td></td> <td>240 V -16/+8%, 55 mA</td> </tr> <tr> <td></td> <td>230 V ± 13%, 53 mA</td> </tr> <tr> <td></td> <td>220 V -9/+18%, 50 mA</td> </tr> <tr> <td></td> <td>120 V -16/+8%, 110 mA</td> </tr> <tr> <td></td> <td>115 V ± 13%, 105 mA</td> </tr> <tr> <td></td> <td>110 V -9/+18%, 100 mA</td> </tr> </table>	Temperature class	Maximum Medium Temperature [°C]		$T_a \leq 40\text{ °C}$	$T_a \leq 50\text{ °C}$	T6	80	80	T5	95	95	T4	130	120	T3	160	120	Power supply (terminals L, N, PE)	AC-Version 1		240 V -16/+8%, 55 mA		230 V ± 13%, 53 mA		220 V -9/+18%, 50 mA		120 V -16/+8%, 110 mA		115 V ± 13%, 105 mA		110 V -9/+18%, 100 mA
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<p>Translation by <u>Krohne Altimeter</u> Original language: <u>German</u></p> <p>Physikalisch-Technische Bundesanstalt PTB Braunschweig und Berlin</p> <p style="text-align: center;">EC-Type Examination Certificate</p> <p>(1)</p> <p>(2) Equipment or protective system intended for use in potentially explosive atmospheres - Directive 94/9/EC</p> <p>(3) EC-Type Examination Certification number: PTB 01 ATEX 2015 X</p> <p>(4) Equipment: ultrasonic compact flowmeter type UFM 500 K/.../...-EEx resp. type UL 500 K/.../...-EEx</p> <p>(5) Manufacturer: Krohne Altimeter</p> <p>(6) Address: NL-3313 LC Dordrecht</p> <p>(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.</p> <p>(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.</p> <p>The examination and test results are recorded in the confidential report PTB Ex 01-20262.</p> <p>(9) Compliance with the Essential Health and safety requirements has been assured by compliance with:</p> <p style="text-align: center;">EN 50014:1997+A1+A2 EN 50018:1994 EN 50019:1994 EN 50020:1994</p> <p>(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.</p> <p>(11) This EC-Type Examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment or protective system.</p> <p>(12) The marking of the equipment shall include the following:</p> <p style="text-align: center;"> II 2G EEx d [ib] IIC T6...T3 resp. EEx de [ib] T6...T3 resp. EEx d [atib] IIC T6...T3 resp. EEx de [atib] IIC T6...T3 </p> <p>Certification department Explosion safety Braunschweig, March 20, 2001 by order of</p> <p style="text-align: right;">Dr.-Ing. U. Johannsmeyer Regierungsdirektor</p>	<p style="text-align: right;">page 1/4</p> <p>EC-Type Examination Certificates without signature and seal have no validity. This EC-Type Examination Certificate may only be distributed in complete form. Excerpts or Changes require the permission of the Physikalisch-Technische Bundesanstalt. Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig</p>
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<p>Translation by Krohne Altometer Physikalisch-Technische Bundesanstalt Braunschweig und Berlin Schedule to EC-Type Examination Certificate PTB 01 ATEX 2015 X</p>	<p>Original language: German PTB</p>
<p>F-PA, F-FF</p> <p>in type of protection Intrinsic safety EEx ia IIC resp. EEx ib IIC/IIB only for connection to certified intrinsically safe circuits, with following maximum values: $U_i = 30\text{ V}$ $I_i = 300\text{ mA}$ $P_i = 4,2\text{ W}$ $C_i = 5\text{ nF}$ $L_i =$ neglectable small</p>	
<p>DC-I</p> <p>in type of protection Intrinsic safety EEx ia IIC resp. EEx ib IIC</p> <p>Maximum values: $U_o = 23,5\text{ V}$ $I_o = 98\text{ mA}$ $P_o = 0,6\text{ W}$ Characteristic: linear $C_o = 127\text{ nF}$ $L_o = 4\text{ mH}$</p> <p>in converter, in type of protection EEx ib IIC</p>	
<p>Sensor circuits (Connections CON1 till 4)</p> <p>The intrinsically safe signal circuits are securely galvanically separated from the non-intrinsically safe circuits on basis of a rated peak voltage of 375 V.</p>	
<p>(16) <u>Test report</u> PTB Ex 01-20262</p> <p>(17) <u>Special conditions for safe use</u></p>	
<p>1. It must be guaranteed that the connection facility for the equipotential bonding conductor is securely connected with the equipotential bonding system of the hazardous area</p> <p>2. Before the flameproof enclosure is to be opened, a waiting time (see nameplate) has to be respected after switching off the flowmeter. The waiting time is depending on the temperature class: T6: 20 min., T5: 11 min.</p>	
<p>(18) <u>Essential health and safety requirements</u> fulfilled by above mentioned standards</p> <p>Certification department Explosion safety, By order:</p>	
<p>Dr.-Ing. U. Johannsmeyer Regierungsdirektor</p> <p>Braunschweig, March 20, 2001</p>	<p>page 4/4</p> <p>EC-Type Examination Certificates without signature and seal have no validity. This EC-Type Examination Certificate may only be distributed in complete form. Excerpts or Changes require the permission of the Physikalisch-Technische Bundesanstalt. Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig</p>

<p>Translation by Krohne Altometer Physikalisch-Technische Bundesanstalt Braunschweig und Berlin Schedule to EC-Type Examination Certificate PTB 01 ATEX 2015 X</p>	<p>Original language: German PTB</p>
<p>AC-Version 2</p> <p>200 V -15/+10%, 61 mA 100 V -15/+10%, 122 mA</p> <p>AC-Version 3</p> <p>48 V ±13%, 275 mA 24 V ±13%, 550 mA</p> <p>AC/DC-Version</p> <p>24 V -25%/+33%, 440 mA</p> <p>(terminals L₁, L₂, FE</p> <p>Pulse In/Outputs (terminals B1, B-, B2)</p> <p>Current output (terminals I+, I)</p> <p>Sensor circuits (Connections CON1 till 4)</p> <p>All circuits are to be regarded as connected with each other</p>	
<p>Type UFM (UL) 500 K / i / ...-EEx:</p> <p>Power supply (terminals 1L, 0L, FE)</p> <p>Signal circuits</p> <p>Module: P-SA, FA-ST</p>	
<p>$U_i = 24\text{ V DC}$ $U_i = 24\text{ V AC}$ Internal fuse $I_n \leq 1,25\text{ A}$</p> <p>depending on modules mounted</p> <p>in type of protection Intrinsic safety EEx ia IIC resp. EEx ib IIC, only for connection to certified intrinsically safe circuits, with following maximum values: $U_i = 30\text{ V}$ $I_i = 250\text{ mA}$ $P_i = 1,0\text{ W}$ $C_i = 5\text{ nF}$ $L_i =$ neglectable small</p>	
<p>Internal connections in type of protection EEx ib IIC</p>	
<p>Dr.-Ing. U. Johannsmeyer Regierungsdirektor</p> <p>Braunschweig, March 20, 2001</p>	<p>page 3/4</p> <p>EC-Type Examination Certificates without signature and seal have no validity. This EC-Type Examination Certificate may only be distributed in complete form. Excerpts or Changes require the permission of the Physikalisch-Technische Bundesanstalt. Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig</p>



EG-Baumusterprüfbescheinigung

- (1) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - Richtlinie 94/9/EG
- (3) EG-Baumusterprüfbescheinigungsnummer

PTB 01 ATEX 2015 X

- (4) Gerät: Ultraschall-Kompakt-Durchflussmesser Typ UFM 500 K/...-EEEx bzw. Typ UL 500 K/...-EEEx
- (5) Hersteller: Krohne Allomater
- (6) Anschrift: NL-3313 LC Dordrecht
- (7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

(9) Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 01-20262 festgehalten. Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997+A1+A2 EN 50018:1994 EN 50019:1994 EN 50020:1994

(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:
Ex II 2 G EEx d [ib] IIC T6...T3 bzw. EEx de [ib] IIC T6...T3 bzw. EEx d [ia/ib] IIC T6...T3
 Zertifizierungsstelle Explosionsschutz
 im Auftrag Braunschweig, 20. März 2001

Johannes Meyer
 Dr.-Ing. U. Johannsmeyer
 Regierungsdirektor

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Anlage

(14) **EG-Baumusterprüfbescheinigung PTB 01 ATEX 2015 X**

- (15) Beschreibung des Gerätes
 Der Ultraschall-Kompakt-Durchflussmesser Typ UFM 500 K/...-EEEx dient zur Messung, Zählung und Anzeige des Durchflusses flüssiger brennbarer und nicht brennbarer Medien. Die alternative Typenbezeichnung lautet Typ UL 500 K/...-EEEx.

Der Bereich der höchstzulässigen Umgebungstemperatur beträgt für die Ausführungen Typ UFM (UL) 500 K/...-EEEx : - 40 °C ... + 60 °C
 Typ UFM (UL) 500 K/...-EEEx : - 20 °C ... + 60 °C

Die Zuordnung der Temperaturklasse zur höchstzulässigen Mediumtemperatur in Abhängigkeit von der Umgebungstemperatur für beide Ausführungen ist den folgenden Tabellen zu entnehmen:

Typ UFM (UL) 500 K/...-EEEx :

Temperaturklasse	Höchstzulässige Mediumtemperatur [°C]	
	$T_u \leq 40$ °C	$T_u \leq 60$ °C
T6	80	80
T5	95	95
T4	130	125
T3	180	125

Typ UFM (UL) 500 K/...-EEEx :

Temperaturklasse	Höchstzulässige Mediumtemperatur [°C]	
	$T_u \leq 40$ °C	$T_u \leq 60$ °C
T6	80	80
T5	95	80
T4	130	80
T3	160	80


Elektrische Daten

Typ UFM (UL) 500 K/...-EEEx :

Versorgungsstromkreis (Klemmen L, N, PE)

- AC-Version 1**
- 240 V -16/+8 %, 55 mA
- 230 V ±13 %, 53 mA
- 220 V -9/+18 %, 50 mA
- 120 V -16/+8 %, 110 mA
- 115 V ±13 %, 105 mA
- 110 V -9/+18 %, 100 mA

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Physikalisch-Technische Bundesanstalt
 Braunschweig und Berlin
 Anlage zur EG-Baumusterprüfbescheinigung PTB 01 ATEX 2015 X

AC-Version 2
 200 V -15/+10 %, 61 mA
 100 V -15/+10 %, 122 mA

AC-Version 3
 48 V ±13 %, 275 mA
 24 V ±13 %, 550 mA

AC/DC-Version
 24 V -25/+33 %, 440 mA

(Klemmen L₁, L₂, FE)

Impuls-Eip-/Ausgänge
 (Klemmen B1, B-, B2)
 $U \leq 36 \text{ V}; I \leq 150 \text{ mA}$
 $U_m = 250 \text{ V AC}$

Stromausgang
 (Klemmen H-, I-)
 $U \leq 18 \text{ V}; I \leq 22 \text{ mA}$
 $U_m = 250 \text{ V AC}$


Meßstromkreise
 (Anschlüsse CON 1 bis 4)
 geräteintern in Zündschutzart Eigensicherheit EEx ib IIC

Alle Stromkreise sind als miteinander verbunden zu betrachten.

Typ UFM (UL) 500 Ki / i /...-EEx :
 Hilfsenergie $U_N = 24 \text{ V DC} \quad +30\%/-25\%, 8 \text{ W}$
 (Anschlüsse 1L, 0L, FE) $U_N = 24 \text{ V AC/DC} \quad +10\%/-15\%, 11 \text{ VA}, 48...63 \text{ Hz}$
 Interne Absicherung $I_N \leq 1,25 \text{ A}$
 $U_m = 250 \text{ V}$


Signalstromkreise
 je nach Modulbestückung:

Modul:
PS-A, FA-ST
 in Zündschutzart Eigensicherheit EEx ia IIC
 bzw. EEx ib IIC
 nur zum Anschluß an beschleunigte eigensichere Stromkreise
 mit folgenden Höchstwerten:
 $U_i = 30 \text{ V}$
 $I_i = 250 \text{ mA}$
 $P_i = 1,0 \text{ W}$
 $C_i = 5 \text{ nF}$
 L_i vernachlässigbar klein



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Physikalisch-Technische Bundesanstalt
 Braunschweig und Berlin
 Anlage zur EG-Baumusterprüfbescheinigung PTB 01 ATEX 2015 X

F-PA, F-FF
 in Zündschutzart Eigensicherheit EEx ia IIC
 bzw. EEx ib IIC/IIB
 nur zum Anschluß an beschleunigte eigensichere Stromkreise
 mit folgenden Höchstwerten:
 $U_i = 30 \text{ V}$
 $I_i = 300 \text{ mA}$
 $P_i = 4,2 \text{ W}$
 $C_i = 5 \text{ nF}$
 L_i vernachlässigbar klein

DC-I
 in Zündschutzart Eigensicherheit EEx ia IIC
 bzw. EEx ib IIC

Höchstwerte:
 $U_o = 23,5 \text{ V}$
 $I_o = 98 \text{ mA}$
 $P_o = 0,6 \text{ W}$
 Kennlinie: linear
 $C_o = 127 \text{ nF}$
 $L_o = 4 \text{ mH}$

Meßstromkreise
 geräteintern in Zündschutzart Eigensicherheit EEx ib IIC
 (Anschlüsse CON 1 bis 4)



Die eigensicheren Signalstromkreise sind von den nichteigensicheren Stromkreisen bis zu
 einem Scheitelwert der Nennspannung von 375 V sicher galvanisch getrennt.

(16) Prüfbericht PTB Ex 01-20262

(17) Besondere Bedingungen
 1. Es ist sicherzustellen, daß der Anschluß für den Potentialausgleichsleiter mit dem Potential-
 ausgleich des explosionsgefährdeten Bereiches sicher verbunden ist.
 2. Zum Öffnen der druckfesten Kapselung ist nach dem Abschalten des Durchflusssmessers
 eine Wartezeit einzuhalten (Warnschild). Diese ist wie folgt abhängig von der Temperatur-
 klasse: T6...20 min; T3...11 min.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen
 erfüllt durch die vorgenannten Normen

Braunschweig, 20. März 2001


 Zertifizierungsstelle Explosionschutz
 Im Auftrag

 Dr.-Ing. U. Johannmeyer
 Regierungsdirektor

EG-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
 Diese EG-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
 Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.
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9. DECLARATION OF CONFORMITY

KROHNE

Altometer

EC - Declaration of Conformity

We

Krohne Altometer,
Kerkeplaat 12
3313 LC Dordrecht
The Netherlands

declare under our sole responsibility that the product

compact ultrasonic flowmeter type **UFM 500 K / ... / ... -EEx**

fulfills the requirements of following EC directives:

- ATEX directive 94/9/EC
- EMC directive 89/336/EC

The UFM 500 K-EEx flowmeter is designed and manufactured conform following harmonised standards:

- EN 50 014 : 1997 + A1 + A2
- EN 50 018 : 1994
- EN 50 019 : 1994
- EN 50 020 : 1994

- EN 50 081-1
- EN 50 082-2
- EN 61 010-1

The UFM 500 K-EEx flowmeter is examined and type-approved under EC-type of examination certificate PTB 01 ATEX 2015 X.

Our Quality system is assessed by KEMA Registered Quality b.v., identification no. 0344.





Dordrecht, 16-01-2002



L. IJmker
General Manager



UFM500K-EEx CE-declaration

10. DATA PLATE

	KROHNE	Kerkeplaat 12 3313 LC Dordrecht The Netherlands		0344	
Altometer					
Type	UFM 500 K -EEEx				
	PTB 01 ATEX 2015 X		Year of production		
	II 2G EEx d <input type="text"/> [ib] IIC T6...T3 <input type="text"/>				
Ambient temperature -40 .. +60°					
See EC-Type Examination Certificate for permissible medium temperatures					
No.	<input type="text"/>				
Power	<input type="text"/>	Vac <input type="text"/>	% <input type="text"/>	Vdc <input type="text"/>	<input type="text"/>
48-63 Hz, 13 VA				8W	<input type="text"/>

Intrinsically safe circuits: Sensor circuits, internal connection
 Waiting time before opening of flameproof enclosure:
 T6 ≥ 20 min., T5 ≥ 11 min.

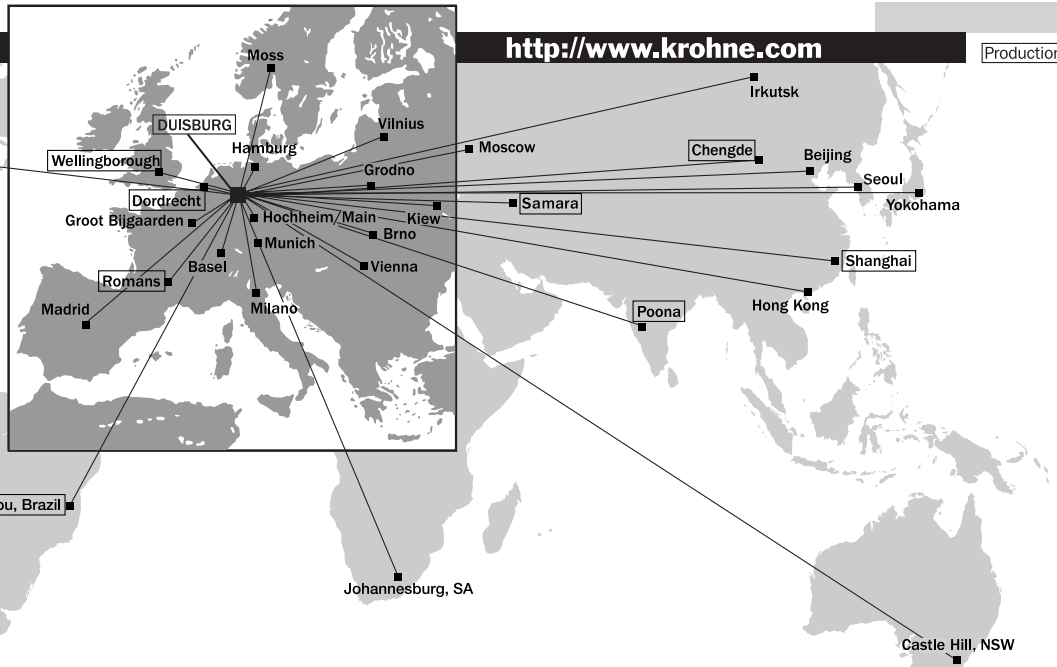
Nom. meter size	DN	<input type="text"/>
Nom. pressure prim.	PN	<input type="text"/>
Primary const.	GK	<input type="text"/>
Full scale		<input type="text"/>
NON INTRINSICALLY SAFE CIRCUITS		
Current (mA) term. I/ I+	<input type="text"/>	R _L (KΩ) ≤ <input type="text"/>
Pulses term. B1/ B ⊥	<input type="text"/>	
Control - Status	B2/ B ⊥	
Degree of protection IEC 60529 IP67		
Options	<input type="text"/>	
	<input type="text"/>	

	Tag No. <input type="text"/>	
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<http://www.krohne.com>

Production

KROHNE



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Hungary	Taiwan
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