

Ultrasonic Flow Meter, model FLC-UFL

EN



Ultrasonic Flow Meter, model FLC-UFL



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Prior to starting any work, read the operating instructions!  
Keep for later use!

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# 1. General information

## 1. General information

### 1.1 Introduction

- This document provides a guide to the field wiring of the FLC-UFL series ultrasonic gas flow meters in hazardous areas where explosion safety regulations apply.
- All field wiring in the FLC-UFL series flow meters is Intrinsically Safe (IS). This means that the energy to the terminals must be limited by the use of suitable zener barriers, isolators or other means.
- In this document we will recommend certain barriers, isolators and supplies that are suitable. This is however not an exhaustive list. In addition, intrinsic safety sets certain limits on parameters (inductance and capacitance) of the user wiring. This is rarely of concern unless very long wiring runs are used, but the user must ensure that the wiring used is within these maxima.
- For the electrical parameters required for intrinsic safety refer to the ATEX/IECEX Control Drawing 81500909 and chapter 4 of the document Safety Instructions FLC-UFL series flow meter.
- In addition to the requirements and recommendations of this document national and local wiring regulations should be observed. Refer also to the document Safety Instructions FLC-UFL series flow meter prior to installation of the field wiring. The Safety Instructions FLC-UFL series flow meter document provides essential safety information for the installation and operation of the ultrasonic gas flow meter. It contains information for correct installation of this product. It also contains important instructions to prevent accidents and serious damage during installation, commissioning and operation.
- Before installing the product read and understand this document. Strictly follow the safety instructions and warnings.

### 1.2 Explanation of symbols



#### **WARNING!**

... indicates a potentially dangerous practives situation that can result in serious injury or death, if not avoided.

# 1. General information



## ATTENTION!

... indicates potential hazardous or unsafe operations that can result in minor personal injury or damage of product or property. It is also used to indicate operations or practices that can cause the product to operate in an unexpected way or provide results that are outside the specification limits.



## SPECIFIC INFORMATION FOR EXPLOSION SAFETY

... is used where specific important information is given in order to comply with explosion safety regulations.

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### 1.3 References

The last version of the referenced document is leading, unless otherwise specified.

#### [1] FLC-UFL Series Safety instructions

Author: Euromisure

Document Code: 81500907 FLC-UFL Series Safety Instructions.

#### [2] FLC-UFL Series Operating Instructions

Author: Euromisure

Document Code: 81500908 FLC-UFL Series Operating Instructions.

### Abbreviations

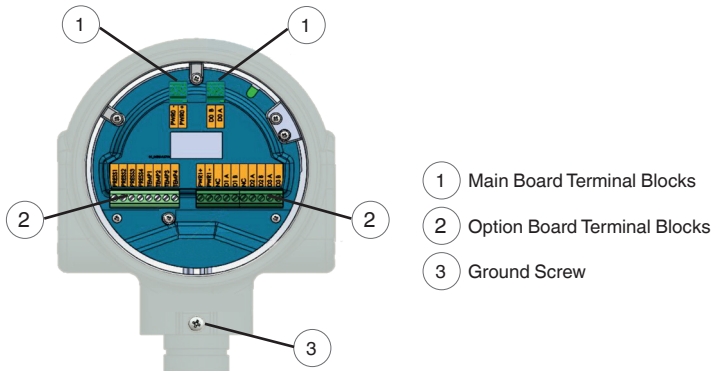
<b>ATEX</b>	ATmosphère Explosive	<b>ISO</b>	International Organization for Standardization
<b>CSA</b>	Canadian Standard Associations	<b>LVD</b>	Low Voltage Directive
<b>EMC</b>	Electromagnetic Compatibility	<b>OIML</b>	Organisation Internationale de Métrologie Légale
<b>FM</b>	Factory Mutual	<b>PCBA</b>	Printed Circuit Board Assembly
<b>IEC</b>	International Electrotechnical Commission	<b>SPU</b>	Signal Processing Unit
<b>IECEX</b>	International Electrotechnical Commission certification scheme for Explosive atmospheres	<b>USM</b>	Ultrasonic Flow Meter
<b>IS</b>	Intrinsic Safety	-	-

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## 2. FLC-UFL series field wiring compartment

### 2. FLC-UFL series field wiring compartment

Remove the back cover of the FLC-UFL flow meter to access the field wiring terminals. The wiring compartment is shown in the below Figure.



- Main Board terminal blocks will be supplied on all units.
- The Option Board terminal blocks will depend on the options provided.
- The wiring compartment is provided with four M20 or ½" NPT size cable gland entries.
- The screw terminals will accept wire size from 24 AWG to 10 AWG (0.2 mm<sup>2</sup> to 6 mm<sup>2</sup>).



#### **WARNING!**

Refer to the document Safety Instructions UIM Series Flowmeter prior to installation of the field wiring.



#### **SPECIFIC INFORMATION FOR EXPLOSION SAFETY**

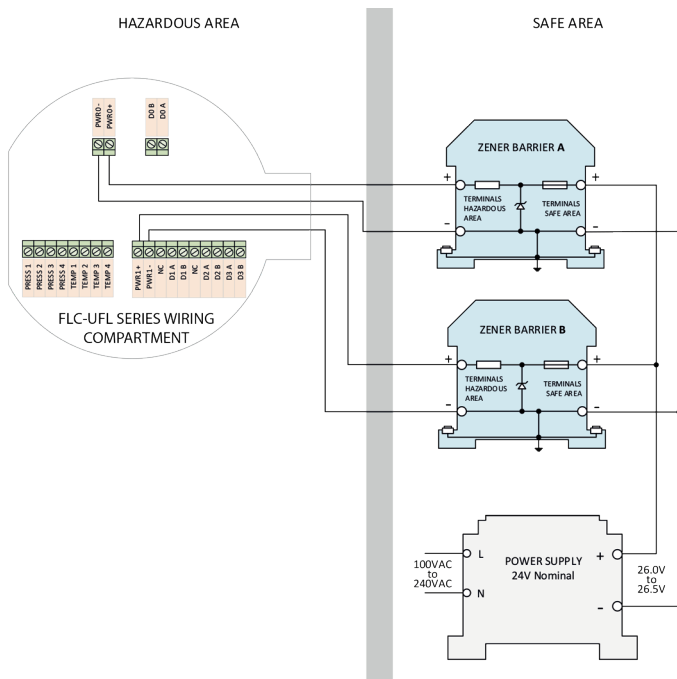
The recommended zener barriers, power supplies or isolators are for guidance only. It is the responsibility of the installer to ensure that the zener barriers, power supplies or isolators meet the local explosion safety requirements.

## 3. Power wiring recommendations

### 3. Power wiring recommendations

If the FLC-UFL series flow meter is installed in a hazardous area suitable safety barriers must be used between the supply voltages and the FLC-UFL flow meter. The wiring diagram for the FLC-UFL flow meter main power to PWR0+ and PWR0- terminals is shown in Figure 3.1. Zener Barrier A, in the safe area, limits the energy to terminal PWR0+ and PWR0- to safe levels. If an Option Board is included a separate zener barrier (Zener Barrier B) is required for the power connections the Option Board power terminals PWR1+ and PWR1- as shown in the following Figure.

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## 3. Power wiring recommendations

Alternatively dual zener barrier may be used for both the main and option supplies.

The power supplies of the FLC-UFL series flow meters are isolated, so it is not required to use an isolated supply.

### EN 3.1 Recommended zener barriers and power supplies

Recommended zener barriers		
Manufacturer	Description	Part number
<b>Single channel</b>		
MTL (EATON)	Solenoid/Alarm driver, 300 Ohm max	MTL5525
Stahl	Safety Barriers for Positive Polarity, 268 Ohm Max	9001/01-252-100-141
Allen-Bradley	Zener Barrier, 1-Ch, 327 Ohm Max	937ZH-DPBN-1
Pepperl+Fuchs	Zener Barrier, 1-Ch, 327 Ohm Max	Z728
Turck	Zener Barrier, 1-Ch, 333 Ohm Max	MZB28P
<b>Dual Channel</b>		
Allen-Bradley	Zener Barrier, 2-Ch, 327 Ohm Max	937ZH-DPBN-2
Pepperl+Fuchs	Zener Barrier, 2-Ch, 327 Ohm Max	Z779
Turck	Zener Barrier, 2-Ch, 333 Ohm Max	MZB79P

Recommended power supplies		
Manufacturer	Description	Part number
TRACO Power	TBL Series, 15 W, 24...28 V	TBL 015-124
TDK-Lambda	DRB Series, 15 W, 24...28 V	DRB15-24-1
TDK-Lambda	DPP15 Series, 15 W, 22.5...28.5V	DRB15-24-1
Schneider Electric	15 W, 24 V nom, 22.2...28.8 V adjustable	ABL8MEM24006



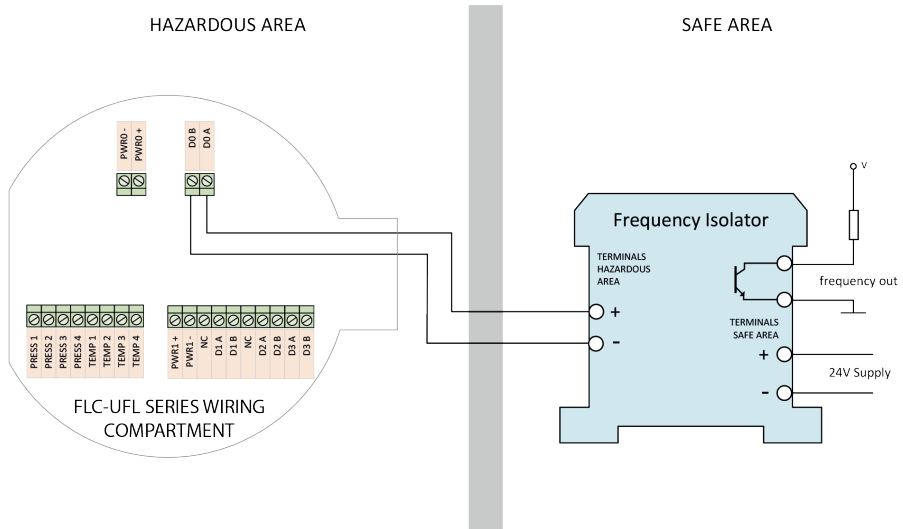
## 4. I/O Wiring Recommendations

### 4. I/O Wiring Recommendations

#### 4.1 Standard (Main Board) Frequency/Pulse Output (terminals D0A and D0B)

The standard Frequency Output on terminals D0A and D0B is an open collector type and is not galvanically isolated from the system ground. An isolating repeater or isolated frequency converter is therefore recommended, to meet both the isolation and safety requirements.

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Where the frequency isolator provides a choice of input types select one suitable for open collector or dry contact input.

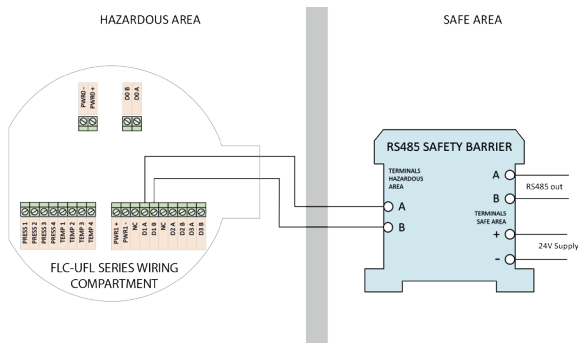
## 4. I/O Wiring Recommendations

### 4.2 Recommended frequency isolators

Recommended frequency isolators		
Manufacturer	Description	Part number
<b>Single channel</b>		
GM International	Frequency-Pulse Isolating Repeater	D1035S
Turck	Isolating switching amplifier	IM1-12EX-T
Allen-Bradley	Switch Amplifier, Transistor Output with Splitter	937TH-DISTS-DC1
<b>Dual Channel</b>		
Turck	Isolating switching amplifier	IM1-22EX-T
Allen-Bradley	Switch Amplifier Transistor Output	937TH-DISAT-DC2

### 4.3 I/O Option Board RS485 Communication Port (terminals D1A and D1B)

The RS485 port on the I/O Option Board is isolated so an isolating barrier is not necessarily required. However most industrial barriers also provide isolation. A switch on the UIM Series flowmeter allows the user to add a 120  $\Omega$  terminating resistor if required. Refer to the UIM Series installation, operating and maintenance manual for details.



## 4. I/O Wiring Recommendations

### 4.4 Recommended RS485 barriers

Recommended RS485 barriers		
Manufacturer	Description	Part number
GM International	RS422 / RS485 Isolating Repeater	D1061S
R. Stahl	Fieldbus Isolating Repeater (suitable for zone 1)	9185/11-35-10s

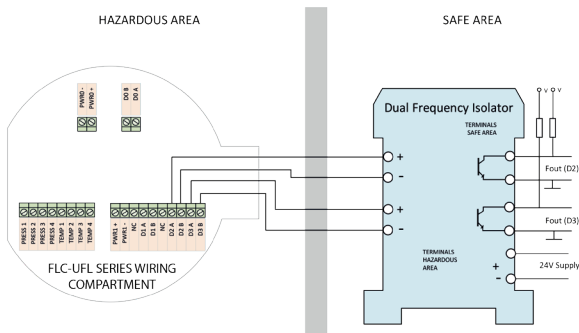


#### ATTENTION!

When using the D1061S from GM! it should be wired via its RS232 port on the safe area side. When using the RS485 port it will result in loss of data and communication timeouts.

### 4.5 I/O Option Board Isolated Frequency/Pulse Outputs (terminals D2A and D2B/D3A and D3B)

There are two optically isolated frequency, pulse or status outputs provided on the I/O Option Board. The outputs are open collector type. As these outputs are isolated, isolating barriers are not strictly necessary. However, many industrial barriers are isolating including the ones recommended below, and these may of course be used.



The wiring in the above figure shows a dual barrier, of course two single barriers may be used.

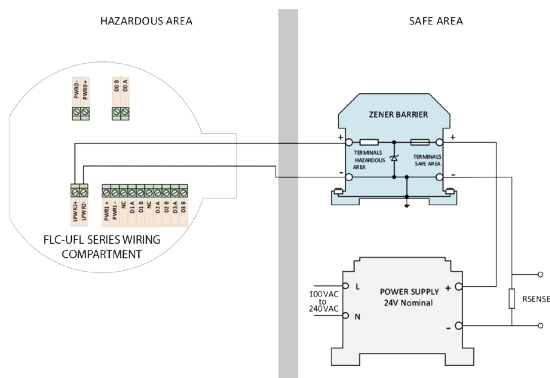
## 4. I/O Wiring Recommendations

### 4.6 Recommended frequency barriers/isolators

Recommended frequency barriers/isolators		
Manufacturer	Description	Part number
<b>Single channel</b>		
GM International	Frequency-Pulse Isolating Repeater	D1035S
Turck	Isolating switching amplifier	IM1-12EX-T
Allen-Bradley	Switch Amplifier, Transistor Output with Splitter	937TH-DISTS-DC1
<b>Dual Channel</b>		
Turck	Isolating switching amplifier	IM1-22EX-T
Allen-Bradley	Switch Amplifier Transistor Output	937TH-DISAT-DC2

### 4.7 4-20 mA Option Board (slot 2 option 01-0203)

The 4-20 mA option is a two-wire loop powered configuration. Typical wiring is shown in the following figure. The sense resistor is usually between 50 and 250  $\Omega$ .



## 4. I/O Wiring Recommendations

### 4.8 Recommended zener barriers

Recommended zener barriers		
Manufacturer	Description	Part number
Stahl	Safety Barriers for Positive Polarity, 268 Ohm Max	9001/01-252-100-141
Allen-Bradley	Zener Barrier, 1-Ch, 327 Ohm Max	937ZH-DPBN-1
Pepperl+Fuchs	Zener Barrier, 1-Ch, 327 Ohm Max	Z728
Turck	Zener Barrier, 1-Ch, 333 Ohm Max	MZB28P

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