

Ultrasonic Flow Meter

Series 6



Manual
Safety Instructions



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1 General Information

1.1 About these Instructions

This manual contains safety instructions for installation, operation, and maintenance of the Ultrasonic Flow Meter (UFM) Series 6, models Q.Sonic^{atom}, Q.Sonic^{plus}, CheckSonic, Vx.Sonic and FlareSonic. In addition to providing essential information for proper operation and maintenance of the product, this manual offers important instructions to prevent accidents and serious damage in all stages of the product's lifespan; pre-commissioning, daily operations, and trouble-free maintenance. Before using any of the products please read this manual carefully, familiarise yourself with the operation of the product, and strictly follow the instructions.

If you have any questions, or need further details on specific matters concerning this product, please do not hesitate to contact one of our staff members by email at aftersales@elster-instromet.com (or see more contact information on page 2).

This document only contains *safety* information for an Elster Series 6 UFM. For *general* information, please refer to the Operation and Maintenance Manual for your particular flow meter (latest valid revision). Please also consider reading the following Series 6 UFM information: Wiring Instructions, Shipping and Storage, and Modbus Protocol. These documents are available online at <http://www.docuthek.com/>.

⇒ Please also refer to [Appendix I – References](#) for a complete list of reference materials.

1.2 Limitation of Liability

This manual is based on the latest information available. It is provided subject to alterations. We reserve the right to change the construction and/or configuration of our products at any time without obligation to update previously shipped equipment.

The warranty provisions stipulated in the manufacturer's *Terms of Delivery* are applicable to the product. The manufacturer shall have no obligation in the event that:

- Repair or replacement of equipment or parts is required through normal wear and tear, or by necessity in whole or part by catastrophe, or the fault or negligence of the purchaser;
- The equipment, or parts, have been maintained or repaired by someone other than an authorized representative of the manufacturer, or have been modified in any manner without prior express written permission of the manufacturer;
- Non-original parts are used;
- Equipment is used improperly, incorrectly, carelessly or not in line with its nature and/or purpose;
- Use of this product with unauthorized equipment or peripherals, including, but not necessarily limited to, cables, testing equipment, computers, voltage, etc.

The manufacturer is not responsible for the incidental or consequential damages resulting from the breach of any express or implied warranties, including damage to property, and to the extent permitted by law, damage for personal injury.



Read through these Safety Instructions carefully before beginning any work.

The manufacturer assumes no liability for loss and malfunctions that result from non-compliance with these instructions.

We reserve the right to make technical changes within the scope of improving performance characteristics and continuous development of the device.

Current warranty conditions in the General Terms and Conditions are available on our website:

<http://www.elster-instromet.com/en/general-terms-of-business>

2 Text Labelling

This manual employs consistent visual cues and standard text formats to help you easily locate and interpret information. This information will help you quickly identify relevant content.

2.1.1 Presentation of Safety and Risk Instructions

Hazard Warnings

Hazard warnings indicate hazardous situations which may result in material damage and bodily harm or even death if disregarded. Hazard warnings are described below:



DANGER WORD!

Type of danger / consequences in case of non-compliance

Avoiding danger

Safety Instructions

Safety instructions include notes and information which if disregarded may lead to functions not working correctly or not working at all. Safety instructions are described below:



Safety instruction (optional)

Safety instruction text

Tips and Recommendations

Tips include notes and information that make it easier for the user. Tips are described below:



Heading (optional)

Hint text

2.1.2 Paragraph Formats

- ▶ This triangle prompts you for an action.
- ✓ This character will show you the immediate result of your action.

Example

Multi-row examples are marked by two continuous blue lines and the keyword “Example”.

2.1.3 Character Formats

Example	Use
⇒ See Chapter 3.3 Hazardous Situations (p.15)	References to additional information are marked with an arrow. If the arrow refers to information within the document, these references are formatted as hyperlinks in blue font. You can go directly to the corresponding section by clicking on the blue text.
www.docuthek.com	links (Hyperlink)

Table 1: Character formats

3 Application and Operation

3.1 System

The ultrasonic flow meter comprises of the following main parts as listed below and seen in Figure 3-1. The flow cell (in yellow) is the part of the ultrasonic flow meter that is mounted in the piping system. All other components are mounted on the flow cell.

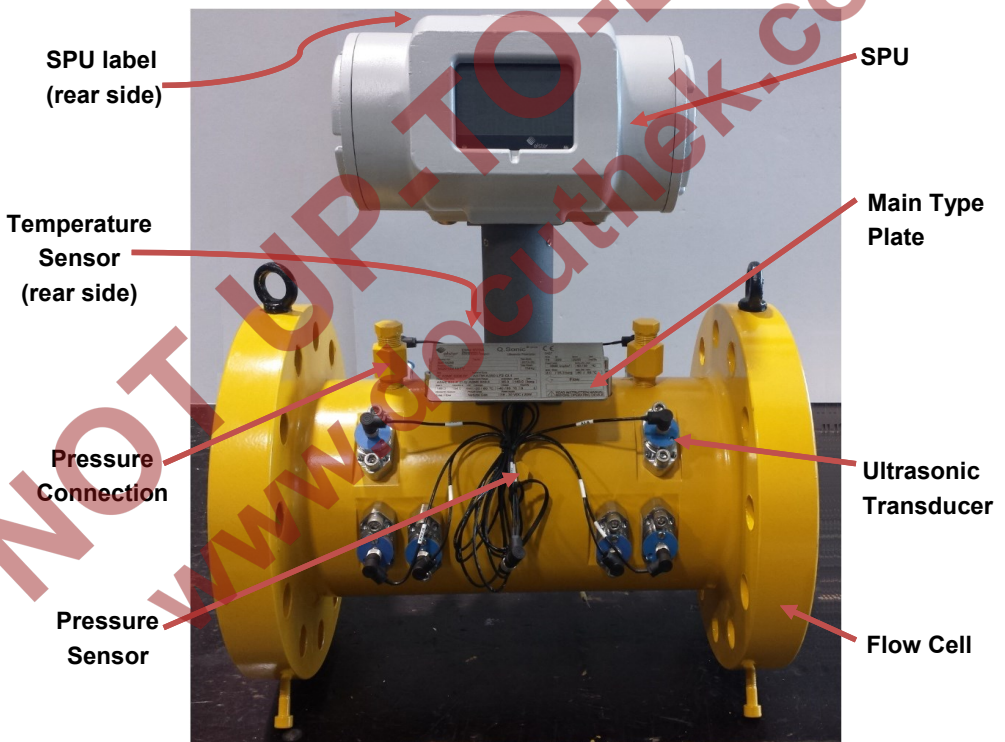


Figure 3-1: Example of an Elster Ultrasonic Gas Flow Meter

Flow Meter components:

- The **Signal Processing Unit (SPU)** – houses the flow meter electronics.
- Two **Ultrasonic Transducers** per flow measurement path.
- The spoolpiece (**Flow Cell**) designed for gas flow measurement.
- An optional **Pressure Sensor**.
- An optional **Temperature Sensor**.
- p_m (or p_r) **Pressure Connection** (for flow pressure); one or two (provided with adapter piece).
- The **SPU Label** (see subsequent sections)
- The **Main Type Plate**



Caution!

The ultrasonic flow meter is intended for flow measurement as indicated on the SPU label and the flow meter (main) type plate. Never exceed any limitations for use!



Tip!

This document provides essential details for safe installation and maintenance of the ultrasonic flow meter, including a non-exhaustive list of safety prescriptions provided in ⇒ [Annex C – Safety Prescriptions](#) (p. 33).

It is also required to read and understand all other documentation of your flow meter; please see the reference list ⇒ [Appendix I – References](#) at the back of this manual. Alternatively, most documents are available online at <http://www.docuthek.com/>.

The ultrasonic flow meter is to be operated on the local display or by “remote control”, for example, by means of a PC with the SonicExplorer software, as part of your specific flow meter.

3.2 SPU

The Signal Processing Unit (SPU) houses the flow meter electronics and comprises the following user interfaces:

- SPU label (see the following paragraphs)
- Electrical user connections (⇒ see Chapter 4 [Installation](#) and Chapter 5 [Electrical Parameters](#))
- Local display (see the Operation and Maintenance manual of your particular flow meter, latest valid version)

3.2.1 SPU - Special Conditions for Safe Use

Contact the manufacturer for information on the dimensions of the flameproof joints.

The enclosure is provided with special fasteners of property class A2-70. These special fasteners are only available from Elster.

For FM approved products refer to ⇒ [Annex A – Control Drawing \(FM\)](#) for particular requirements.

3.2.2 SPU – Label

The ultrasonic flow meter is available with approval for use in hazardous areas according to ATEX, IECEx, FM Approval, or CSA. Always refer to the actual label information on your flow meter as well as this manual for correct use.

Each SPU label comprises:

- Our company name and address
- Type of ultrasonic flow meter
- Model SPU
- Serial number
- Power: 18-30 VDC / 20Wmax
- Year-Month
- Warning: Read instruction manual before operating device

- Additional label information depending on the applicable approval (see following label examples)

Please see below for an explanation of each label type using an Ultrasonic Flow Meter Series 6 Q.Sonic^{Plus} model as an example.

ATEX Certification

The explosion proof housing has the following ATEX certification information:

- Classification: Ex II 2 G Ex d ia [ia] IIB+H2 T6 Gb IP66
- $-50\text{ °C} \leq T_{amb} \leq +60\text{ °C}$
- ATEX markings: E II 2 G X 0044
 - 0044 is the Notified Body number of DEKRA Certification B.V.
- ATEX certificate reference: DEKRA 11ATEX0170 X
- Warning: Read instruction manual before operating device

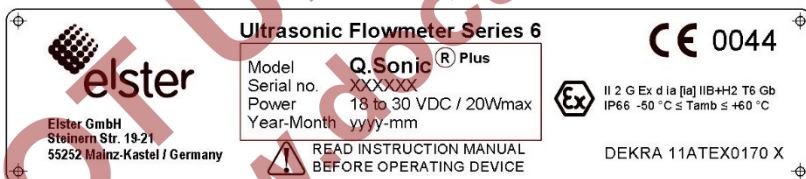


Figure 3-2: Example of an ATEX Label

IECEX Certification

The explosion proof housing has following IECEX certification information:

- Classification: Ex d ia [ia] IIB+H2 T6 Gb IP66
- $-40\text{ °C} \leq T_{amb} \leq +60\text{ °C}$
- IECEX certificate reference: IECEX DEK11.0062 X
- Warning: Read instruction manual before operating device

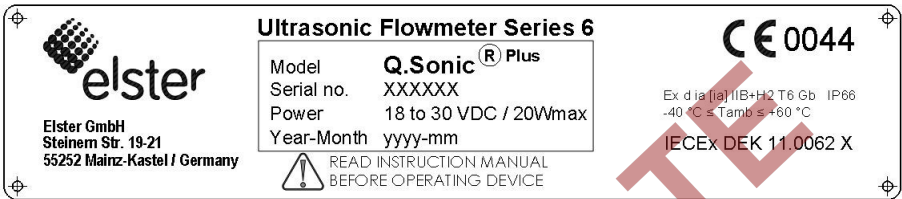


Figure 3-3: Example of an IECEx Label

FM Certification

The explosion proof housing has the following FM certification information:

- Explosion proof for Class I, Division 1, Group A, B, C and D
- Intrinsically safe for Class I, Division 1, Group A, B, C and D
- $T_a = -40\text{ }^{\circ}\text{F}$ to $140\text{ }^{\circ}\text{F}$ ($-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$), T6
- Type 4X
- “FM approved” mark
- Installation requirement: Seal fitting required within 1.5 inches of enclosure
- Warning: Read Instruction Manual (Control Drawing: 03.304.001.003.05/2) before operating device. A copy of the control drawing is available in ⇒ [Annex A – Control Drawing \(FM\)](#) (p.29).

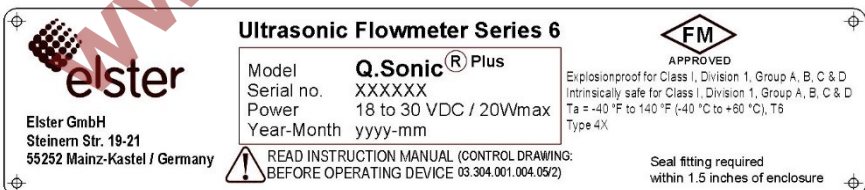


Figure 3-4: Example of an FM Label

CSA Certification

The explosion proof housing has the following CSA certification information:

- Explosion proof for Class I, Division 1, Group B, C and D T6
- Ex d ia [ia] IIB + H2 T6
- $-50\text{ }^{\circ}\text{C} \leq \text{Tamb} \leq +60\text{ }^{\circ}\text{C}$
- Type 4X
- IP66
- CSA 13.70001043
- Installation requirement: Seal all conduit within 1.50 inches in group B & C
- Warnings:
 - Substitution of components may impair intrinsic safety.
 - Read Instruction Manual (control drawing: 03.304.001.004.05/2) before operating device.
A copy of the control drawing is available in
⇒ [Annex B – Control Drawing \(CSA\)](#) (p.31)

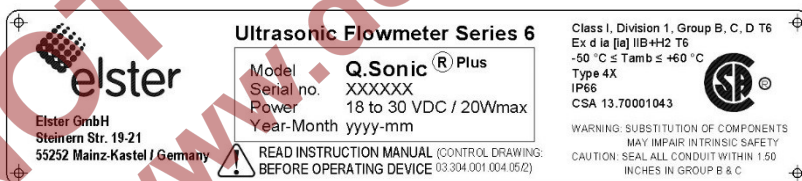


Figure 3-5: Example of a CSA Label



WARNING!

Always refer to the label on the product itself for the correct information for your particular product. Do not use or keep the product outside of its specifications.

3.3 Hazardous Situations

- Read the instruction manual before operating device.
- Never open the explosion proof box with the electronics inside when meter is energized.
- Do not open the enclosure if explosive atmosphere may be present.
- Use the ultrasonic flow meter only for its intended application. Never use it outside of its intended application or limits.
- It is not allowed to perform repair and maintenance activities on an operating flow meter. The meter is pressurized and is used for dangerous media. Removing / exchanging parts during operation can cause severe harm or even death.
- The meter can be used for media within a specified range.
- Take care of proper grounding of the meter.
- To prevent water entering the electronics enclosure, firmly tighten the box when closing. Make sure O-rings on the covers are correctly fitted and in good condition.
- Take care that no dirt / particles are present on the gasket on the back compartment before closing.
- Also: ⇒ Please see [Annex C – Safety Prescriptions](#).

3.4 Storage and Transportation

The back and main compartments of the electronics enclosure may be equipped with a silica gel bag in the explosion safe box. Before powering up, take the silica gel bag out of its enclosure.

Always store or transport the meter with a silica gel bag in the back and main compartments, to absorb excessive humidity. Replace the silica gel with a fresh one before it is saturated. Check on a regular basis (e.g. monthly).

**WARNING!**

Obey the rules and regulations that apply to hazardous area operations and those with respect to custody transfer regulations (sealing).

4 Installation

4.1 General

It is the user's responsibility to ensure that the installation complies with appropriate regulations, including those required by applicable certifications.

It is highly recommended to install the meter on a vibration free location. Continuous vibration or shocks may have negative effects on the construction of the flow meter.

More information on installation of the ultrasonic flow meter in the pipeline is provided in the Operation and Maintenance manual of your particular flow meter (latest valid revision).

This chapter provides information on the electrical user connections available on the SPU (see Figure 3-1). For additional wiring information see document: UFM Series 6 Wiring Instructions, listed in ⇨ [Appendix I – References](#) at the back of this manual.

4.2 Wiring

User connections are available in the back compartment of the SPU. The transducers and optional pressure and temperature sensors are already factory connected.

The electronics enclosure is provided with five M20 or ½" NPT size cable gland entries available to the user, as seen in Figure 4-2.

Select and install the glands according to all applicable requirements, such as those stated in:

- National and local regulations;
- the SPU documentation (this manual, order specification stating the type of entry holes) and on the SPU label;
- the certificate and manual of the glands;
- Specifications of the user wiring.

It is recommended to use suitable armoured shielded cable to provide protection against mechanical damage and electrical interference.



Important!

Use a cable with suitable resistance, diameter, cores and length.

If your ultrasonic flow meter is FM approved (see the SPU label), these special remarks are also applicable:

- Installations shall comply with the relevant requirements of the latest edition of the National Electrical Code (ANSI/NFPA 70). Installations shall comply with the latest edition of the manufacturer's instruction manual.
- For intrinsically safe installation in the United States of America, electrical equipment connected to the Associated Apparatus shall not use or generate more than 250 volts rms.
- For guidance on installations in the United States of America, see ANSI/ISA-RP12.06.01, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
- Tampering and replacement with non-factory components may adversely affect the safe use of the system.
- Seal fitting is required within 1.5 inches of enclosure.
- Warning: See control drawing: 03.304.001.003.05/2 before operating device. A copy of the control drawing is available in
⇒ [Annex A – Control Drawing \(FM\)](#) (p.29).

**WARNING!**

- Do not perform any modification of the products supplied.
- The volume of the SPU enclosure to fit user glands is less than 2 liters.
- Unused gland entries must be fitted with suitable certified stopping plugs.
- Before use ensure unused entries contain suitable certified plugs (and not temporary or transportation plugs).
- The connection between each gland or stopping plug and the enclosure must comply with the NEMA or IP class and the temperatures indicated on the SPU (e.g. by using a suitable IP washer).
- During transport and storage the electronics enclosure back and main compartment may contain a bag of silica gel to absorb excessive humidity. Remove the bags before powering the SPU.

4.3 System Specifications

Power connection (TB1):

- 18 – 30VDC, 20 Watt maximum. 24 V Nominal.
- Cable max. 700m, max. 5 Ohm/wire
- Built-in surge protection
- Maximum cable core 2.5 mm²

**WARNING!**

For compliance with **EN-IEC 61010** (also harmonized under EU Low Voltage directive 2006/95/EC) the SPU requires an external power supply, limited-energy (< 30 Vdc max. 8A), and reinforced insulation between input and output by the safety transformer and appropriate distance between components on the PCB.

Do not open the rear compartment when device is energized.

The electronics requires a (preferably) 24VDC (nominal) power supply. A combined power supply and communication cable between the electronics enclosure and the external equipment can be used. For example; 2x2 wire (min. Ø 0.5 mm) twisted-pair max. 700m, max. 5Ω/wire. Armoured shielded cable is recommended to provide protection against mechanical damage and electrical interference.

**Cathodic Protection!**

In case the ultrasonic flow meter body is connected to a cathodic protection system, **DO NOT CONNECT** the ground of the external power supply to the ground (GND) of the field terminal power connection (TB1).

4.3.1 DSL / Network Connections (TB2 & J4)

- DSL Network / Ethernet connections
- Power over Ethernet
- Maximum cable core 1.5 mm²

4.3.2 Outputs / Communication (TB3)

- Two configurable opto-coupler outputs, max 30VDC @ 12mA.
- Two isolated passive/active 4...20mA analogue outputs, 16 bit resolution.
- Two opto-coupler outputs, max 30VDC @ 12mA (shared with analogue outputs.)
- Two RS232/RS485 (software configurable) ports:
 - Cable: 3 x 2 wire (min 0.5 mm²), shielded max. 15m, max. 2,5 Ohm/wire
 - Programmable up to 38400 bps.
- Maximum cable core 1.5 mm²

IS Inputs (optional) (TB4/TB5). For electrical parameters, refer to ⇒ [Chapter 4.4 Field Terminal Board](#) (p.21)

- Two isolated passive/active 4...20mA analogue inputs, 16 bit resolution.
- Maximum cable core 1.5 mm²

4.4 Field Terminal Board

The field terminal board in the back compartment of the electronics enclosure is for customer connections.



Figure 4-1: Field Terminal Board in Electronics Enclosure

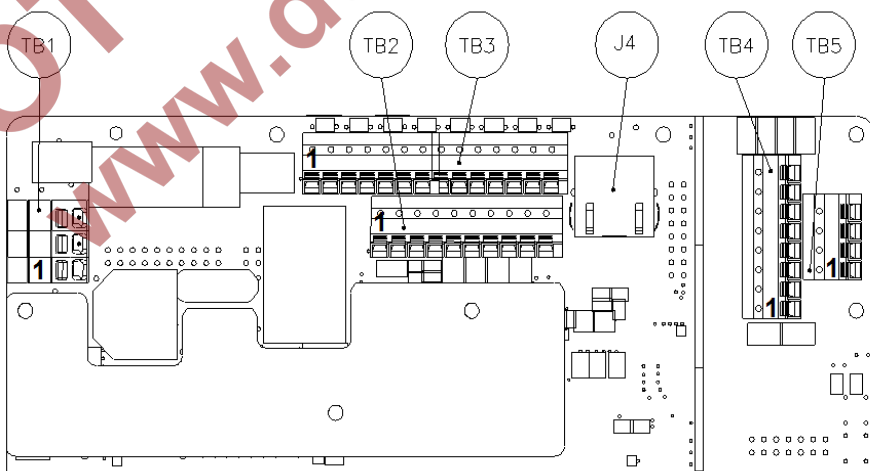


Figure 4-2: Field Terminal Board with Labelled Connections

4.6 Pressure Connection

All forged meters bodies sizes 3" (DN80) to 12" (DN300) are supplied with ½" NPT Pr adapters and ½" NPT blind plugs. Adapters and plugs are sealed with PTFE tape and hydrotested with the meter body. After the hydrotest, adapters and plugs are painted together with the meter body. Where necessary, seals on Pm (Pr) point adapter (at both ends) and the blind plug should be replaced with appropriate sealant for the application. Hold the Pr point adapter with a 30mm wrench while removing the blind plug or fitting new connections.



Attention!

ALWAYS CHECK NEWLY MADE CONNECTIONS FOR LEAKS.
Please see Figure 4-3.



These places need to be checked for leaks when a new pressure connection has been made.

Figure 4-3: Example of Pressure connection with Pressure Adapter

4.7 Maintenance

For maintenance refer to the UFM Series 6 Operation and Maintenance Manual for your particular meter (latest valid revision). ⇨ Please see [Appendix I – References](#) for a complete list of resources.

5 Electrical Parameters

Intrinsically Safe	
Field Terminal Board (see Figure 4-2)	
Terminals IS_opt_C1, IS_opt_C2	<p>4-20 mA connection with HART, label "IS_opt_C1" and "IS_opt_C2" circuit (terminals P+ and P-) (for p_m flow pressure sensor)</p> <p>In type of protection intrinsic safety, with the following maximum values:</p> <p> $U_o = 23.1 \text{ V}$ $I_o = 109 \text{ mA}$ $P_o = 629 \text{ mW}$ $L_o = 1 \text{ mH}$ $C_o = 0.1 \text{ }\mu\text{F}$ </p>
Terminals IS_opt_A1, IS_opt_A2, IS_opt_A3, IS_opt_A4	<p>4-wire PT 100 (external) temperature sensor input with label "IS_opt_A1", "IS_opt_A4", "IS_opt_A2" and "IS_opt_A3" circuit (terminals I+, I-, U+ and U-):</p> <p>In type of protection intrinsic safety, with the following maximum values:</p> <p> $U_o = 5.9 \text{ V}$ $I_o = 9.8 \text{ mA}$ $P_o = 15 \text{ mW}$ $L_o = 10 \text{ mH}$ $C_o = 0.5 \text{ }\mu\text{F}$ </p>

Intrinsically Safe	
Terminals IS_opt_B1, IS_opt_B3	<p>Namur pulse input #1, with label “IS_opt_B1” and “IS_opt_B3” circuit (terminals Z1+ and Z1-):</p> <p>In type of protection intrinsic safety, with the following maximum values:</p> <p> $U_o = 9.1 \text{ V}$ $I_o = 37 \text{ mA}$ $P_o = 84 \text{ mW}$ $L_o = 10 \text{ mH}$ $C_o = 0.5 \mu\text{F}$ </p>
Terminals IS_opt_B2, IS_opt_B4	<p>Namur pulse input #2, with label “IS_opt_B2” and “IS_opt_B4” circuit (terminals Z2- and Z2+):</p> <p>In type of protection intrinsic safety, with the following maximum values:</p> <p> $U_o = 9.1 \text{ V}$ $I_o = 37 \text{ mA}$ $P_o = 84 \text{ mW}$ $L_o = 10 \text{ mH}$ $C_o = 0.5 \mu\text{F}$ </p>

Table 2: Intrinsically Safe Parameters

Non- Intrinsically Safe	
Terminals TB1 1,2,3	<p>Power supply connection ($U_m = 250\text{V}$) pins:</p> <ol style="list-style-type: none"> 3. +24VDC nom. (18 - 30 VDC, 20 W) 2. 0 V 1. Do not connect (\Rightarrow see Chapter 4 Installation [p.16])
Terminals TB2, TB3 and J4	<p>Non-IS data circuits ($U_m = 250\text{V}$)</p> <p>TB2: DSL / Network connections</p> <p>TB3: Output / Communication ports</p> <p>J4: Ethernet</p>

Table 3: Non - Intrinsically Safe Parameters

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Appendix I – References

All references listed below can be obtained from Elster. Additionally, most references are available online at: <http://www.docuthek.com/>.

- [1]** UFM Series 6 Q.Sonic^{plus} Operation and Maintenance Manual
SAP Ref.: 73023467
Doc. No.: 10000050188 (last valid revision)
- [2]** UFM Series 6 CheckSonic Operation and Maintenance Manual
SAP Ref.: 73023471
Doc. No.: 10000050192 (last valid revision)
- [3]** UFM Series 6 Q.Sonic^{max} Operation and Maintenance Manual
SAP Ref.: 73023477
Doc. No.: 10000051506 (last valid revision)
- [4]** UFM Series 6 Wiring Instructions
SAP Ref.: 73023470
Doc. No.: 10000050191 (last valid revision)
- [5]** UFM Series 6 Shipping and Storage Manual
SAP Ref.: 73023469
Doc. No.: 10000050190 (last valid revision)
- [6]** UFM Series 6 Safety Instructions
SAP Ref.: 73023465
Doc. No.: 10000050186 (last valid revision)
- [7]** UFM Series 6 Modbus Protocol
SAP Ref.: 73023466
Doc. No.: 10000050187 (last valid revision)

- [8]** UFM Series 6 Transducer Exchange at Atmospheric Conditions
SAP Ref.: 73023472
Doc. No.: 03.200.001.001/02/2 (last valid revision)
- [9]** Retraction Tool NG Transducers
SAP Ref.: 73023473
Doc. No.: 03.203.101.001.02/2 (last valid revision)
- [10]** UFM Series 6 Exchanging PCB boards in TIP
SAP Ref.: 73023474
Doc. No.: 03.303.101.000.02/2 (last valid revision)
- [11]** UFM Series 6 Exchanging Boards at the Rear Compartment of the SPU
SAP Ref.: 73023475
Doc. No.: 03.302.101.000.02/2 (last valid revision)
- [12]** External VDSL Range Extender User Manual
SAP Ref.: 73023483
Doc. No.: 10000050357 (last valid revision)
- [13]** UFM Series 6 SonicExplorer Software Application Manual
SAP Ref.: 73023308
Doc. No.: 10000050563 (last valid revision)

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Annex A – Control Drawing (FM)

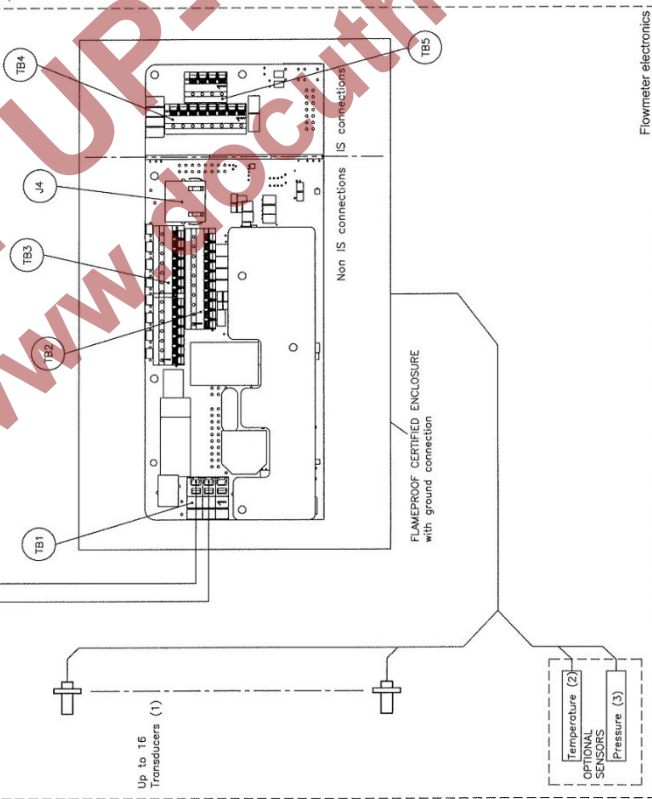
Drawing 03.304.001.003.05/2 (FM Approved)

NON-HAZARDOUS LOCATION

Power supply
24VDC
Um = 250V

HAZARDOUS LOCATION

Ex-proof for Class I, Division 1, Group A,B,C & D
Ex-proof for Class II, Division 1, Groups E,F,G & H
T_a = -50 °F to 147 °F (-40 °C to 60 °C), T_b
Type EX



- (1) Suitable transducer types
NG, RS, Ra-Ti, K, L, P, N, Ti, GS60-P, Zg-Ra.1
- (2) Suitable temperature sensor type T-NG
(Pt500) [SAFcode: 903-205-101-001]
- (3) Suitable pressure sensor type P-NG
(SAFcode: 903-204-101-001)

Installation requirements

1. For intrinsically safe installation in the U.S., electrical equipment connected to the Associated Apparatus shall not use or generate more than 250 volts
2. For guidance on U.S. installations, see ANSI/ISA-RP12.08.01, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
3. Intrinsically safe components must be installed in accordance with the manufacturer's instructions and with non-factory components may adversely affect the safety of the installation.
4. Installation in the United States shall be in accordance with the manufacturer's instruction and the National Electrical Code® (ANSI/NFPA 70).
5. Sizing fitting requires within 1.5 inches of enclosure.

NON Intrinsically safe terminal connections

- TB1 (Power connection): 18 - 30 VDC, 20 Watt maximum, 24VDC nominal.
- TB2 (Ethernet, VDSL)
- TB3 (I/O)
- J4 (Ethernet)

Intrinsically safe terminal connections

- TB4 4-WIRE PT100 temperature sensor input
U_o = 5.9 V; I_b = 9.5 mA; P_o = 15 mW; L_o = 10 mH; C_o = 0.5 uF
- Pin Label
1 IS-op_A4
2 IS-op_A3
3 IS-op_A2
4 IS-op_A1
5 PT100 U+
- Signal (for external temperature sensor)
- 4-20 mA connection with HART
U_o = 23.1 V; I_b = 109 mA; P_o = 629 mW; L_o = 1 mH; C_o = 0.1 uF
- Pin Label
1 IS-op_C1
2 IS-op_C2
3 Analogue input 4-20mA + / HART
4 Analogue input 4-20mA + / HART
- Signal (for pm flow pressure sensor)
- TB5 Harmonic pulse input
U_o = 6.1 V; I_b = 37 mA; P_o = 84 mW; L_o = 10 mH; C_o = 0.5 uF
- Pin Label
1 Signal
2 IS-op_B4
3 IS-op_B3
4 IS-op_B2
5 IS-op_B1
- IS pulse input 2+ (Z2+)
IS pulse input 1- (Z1-)
IS pulse input 2- (Z2-)
IS pulse input 1+ (Z1+)

Item	Qty	Description	Manufacturer	Part	Remarks
1	1	Flowmeter electronics	Elster		

Drawn	Rev	Appr	Rev	Appr	Rev	Appr	Rev
1	1	1	1	1	1	1	1

Control drawing - FM
Ultrasonic Flowmeter Series 6

Scale: A3
Drawing no.: 03.304.001.003.05/2
Sheet: 1

Elster
Flowmeter electronics
www.elster.com

REVISIONS:
NO DISCREPANCY TO THIRD PARTIES WITHOUT WRITTEN CONSENT OF ELSTER WDMA

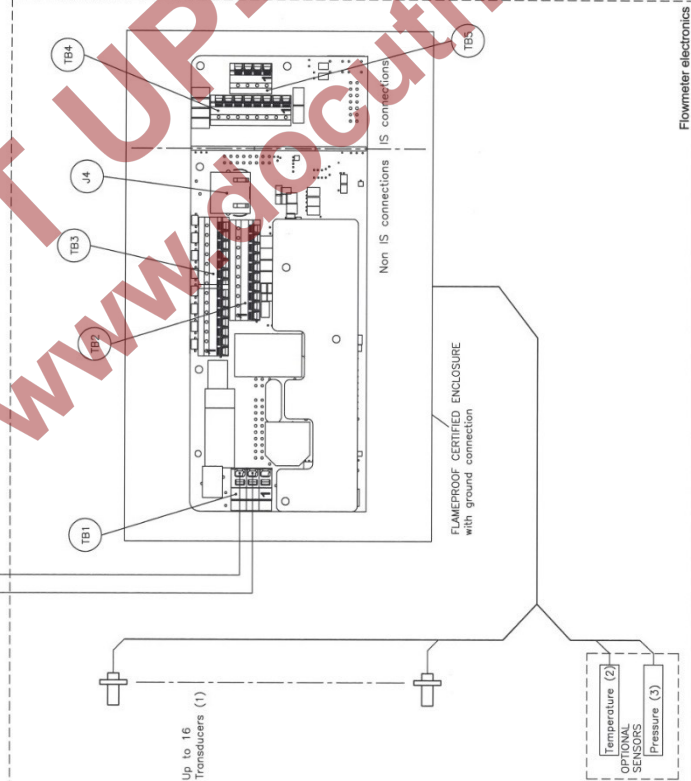
Certified Product
No modifications permitted

Annex B – Control Drawing (CSA)

Drawing 03.304.001.004.05/2 (CSA Approved)

NON-HAZARDOUS LOCATION

Power supply
24VDC
 $U_m = 250V$



(1) Suitable transducer types
NG, Rb5, Rb-Ti, K, L, P, N, Ti, CS60-P, Zg-Rb1

Installation requirements

1. Refer to CEC Part I for installation of the final product
2. Tampering and replacement with non-factory components may adversely affect the safe use of the system.
3. Seal fitting required within 1.5 inches of enclosure in GROUP B & C.

HAZARDOUS LOCATION

Class I, Division 1, Group B, C, D T6
Ex d ia [ia] IIB+H2 T6
-50 °C ≤ Tamb ≤ +60 °C
Type 4X
IP66 / IP 67

NON Intrinsically safe terminal connections

TB1 (Power connection); 18 - 30 VDC, 20 Watt maximum. 24VDC nominal.
Pin 1 not connected

TB2 (Ethernet, VDSL)

TB3 (I/O)

J4 (Ethernet)

Intrinsically safe terminal connections

Pin	Label	Signal (for external temperature sensor)
6	IS_opl_A4	PT100 \pm
7	IS_opl_A2	PT100 \pm
8	IS_opl_A2	PT100 \pm
5	IS_opl_A1	PT100 \pm

4-20 mA connection with HART

Voc = 23.1 V; Iac = 109 mA; Po = 629 mW; La = 1 mH; Ca = 0.1 μ F

4-WIRE PT100 temperature sensor input

Voc = 5.9 V; Iac = 9.8 mA; Po = 15 mW; La = 10 mH; Ca = 0.5 μ F

Pin	Label	Signal (for pin foot pressure sensor)
6	S_opl_C2	Analogous input 4-20 mA \pm HART
7	S_opl_C1	Analogous input 4-20 mA \pm HART

Nomur pulse input
Voc = 9.1 V; Isc = 37 mA; Po = 84 mW; La = 10 mH; Ca = 0.5 uF

Pin	Label	Signal
4	IS_opt_B4	IS pulse input 2+ (Z2+)
3	IS_opt_B3	IS pulse input 1- (Z1-)
2	IS_opt_B2	IS pulse input 2- (Z2-)
1	IS_opt_B1	IS pulse input 1+ (Z1+)

3	2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Certified Product
No modifications permitted

Annex C – Safety Prescriptions

Ultrasonic Flow Meter Series 6

This annex includes a non-exhaustive list of important safety prescriptions for a Series 6 Ultrasonic Flow Meter. At dispatch the latest version of this Annex is attached to the UFM. For safety reasons it is required to read and understand the entire document to which this Annex belongs: UFM Series 6 Safety Instructions. Ref: 73023465 (last valid revision).

Safety Prescriptions - Ultrasonic Flow Meter Series 6

- Read the instruction manuals before handling or operating the device! See ⇒ [Appendix I – References](#) at the back of this manual for a list of all available information.
- Storage and transportation (also refer to the UFM Series 6 Shipping and Storage Manual. Ref: 73023469):
 - Use a fork-lift or fork-truck for transportation, loading and unloading of the packed ultrasonic gas flow meter. The wooden cover of the box is not suitable for the use of strap belts and a crane.
 - If the package has been removed from the product, lifting and moving may only be carried out using suitable, properly fitted lifting lugs.
 - Take care that the meter will be installed on a vibration free location. Continuous vibration or shocks may have disadvantageous effect on the construction of the flow meter.
 - The back and main compartments of the electronics enclosure may be provided with a silica gel bag in the Explosion proof box. Before powering, take the silica gel bag out of the enclosure.
 - Always store or transport the meter with a silica gel bag in the SPU box, to absorb excessive humidity. Replace the silica gel with a fresh one before it is saturated. Check on a regular basis (e.g. monthly).
- All forged meters bodies sizes 3" (DN80) to 12" (DN300) are supplied with ½" NPT Pr adapters and ½" NPT blind plugs. Adapters and plugs are sealed with PTFE tape and hydrotested with meter body. After that hydrotest, adapters and plugs are painted together with meter body. Where necessary, seals on Pm

- (Pr) point adapter (at both ends) and the blind plug shall be replaced with appropriate sealant for the application. Hold Pr point adapter with 30mm wrench while removing blind plug or fitting new connections. ALWAYS CHECK NEWLY MADE CONNECTIONS FOR LEAKS.
- IT IS NOT ALLOWED TO DO A HYDROTEST WHEN TRANSDUCERS ARE INSTALLED ON THE ULTRASONIC FLOW METER. Water can be trapped between the transducers and the spoolpiece. It is very hard to remove this afterwards. This water can cause the ultrasonic flow meter to operate incorrectly.
- Installation, maintenance and replacement may only be carried out by qualified personnel under safe conditions.
- Always use a gas detector during servicing of the meter!
- Obey the rules and regulations that apply to hazardous area operations and those with respect to custody transfer regulations (sealing).
- Pressurized parts involved. When executing any work, comply with the regulations that are specifically stipulated applicable to pressurized installations in a possible explosive danger area (as the case may be).
- Explosion proof box with the electronics inside may never be opened when meter is energized.
- Do not open the enclosure when explosive atmosphere may be present (see label & manual).

- Use the ultrasonic meter only for its intended application. Restrict to media and pressure & temperature limits. Never use an ultrasonic meter outside of these limits (for information see name plate).
- It is not allowed to perform repair and maintenance activities on an operating ultrasonic meter. The meter is pressurized and is used for dangerous media. Removing / exchanging parts during operation can cause severe harm or even death.
- When a non-retractable transducer needs to be taken out of the flow cell, the meter and the process line must be de-pressurized and have ambient temperature suitable to handle.
- In case of retractable transducers, it is only allowed to exchange these retractable transducers during operation of the meter when the procedure for exchanging transducers, as described in the manual from the manufacturer, is strictly followed.
- Be careful when removing transducers, media from the process line may still come out. This media can be poisonous, inflammable or dangerous in a different kind. Take the necessary precautions to avoid these dangerous situations.
- If any doubts arise about the type of transducers / manual please contact manufacturer: aftersales@elster-instromet.com or your local agent.
- When the meter needs to be taken out of the process line, this process line must be de-pressurized.
- The meter can be used for media with high or low temperatures, within the specified range. Any contact with the meter can cause severe harm.

- Always use the correct tools and parts. Never use pneumatically powered tools, electrically powered tools or hydraulically powered tools to perform retraction of an Ultrasonic Transducer.
- Always leak test the meter after installation.
- Take care of proper grounding of the meter.
- To prevent water entering the flameproof certified box, firmly tighten the box when closing.
- Take care of preventive inspection of the meter (environment - & weather influence).



ATTENTION!

Removing Internal Coating and Tape

BEFORE INSTALLATION REMOVE CONSERVING COATING INSIDE SPOOLPIECE.

Before this ultrasonic gas flow meter was shipped a conservative protection layer was applied on the inside of the meter. It was applied immediately after the internal of the meter had been in contact with the atmosphere (oxygen) and should be removed prior to installing the meter in-line or calibration. **The face of the transducers is not coated.**

The face of some particular transducers might be protected against the coating by means of tape that can be removed easily. Prior to installation of the flow meter verify there is no tape.

Types of coatings that may be applied in the spoolpiece of an ultrasonic flow meter:

VCI Foam:

Vapour Corrosion Inhibitor (VCI) foam has been applied if its type reference is mentioned above. The foam needs to be removed before installation. The foam itself is not harmful and can be thrown away as standard garbage. It is recommended to use gloves when handling the foam.

Tectyl:

Tectyl coating has been applied if its type reference is mentioned above. To remove Tectyl coating use cloth and a solvent (e.g. solvent thinner). Avoid the use of chlorinated or highly aromatic solvents. If the Tectyl layer is dried out removal of it will take some effort. Do not clean the face of the transducer with solvent. If cleaning of the transducer is needed, which should not be the case, use only a dry cloth.

Oil:

Oil coating has been applied if its type reference is mentioned above. Removal of oil is not really needed. Because it is not dried out, the gas-flow will certainly remove the present layer. However, it is preferred to remove it using cloth and a solvent. Do not clean the face of the transducer with solvent. If cleaning of the transducer is needed, which should not be the case, use only a dry cloth.