

# Safety Instructions

## Prosonic M

### FMU40, FMU41, FMU42, FMU44

PROFIBUS PA, FOUNDATION Fieldbus

NEPSI: Ex ia IIC T4...T6 Ga/Gb



Document: XA00437F-C

Safety instructions for electrical apparatus for explosion-hazardous areas →  3



# Prosonic M FMU40, FMU41, FMU42, FMU44

PROFIBUS PA, FOUNDATION Fieldbus

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<b>Associated documentation</b>	<p>This document is an integral part of the following Operating Instructions:</p> <ul style="list-style-type: none"> <li>■ PROFIBUS PA: <ul style="list-style-type: none"> <li>■ BA00238F/00</li> </ul> </li> <li>■ FOUNDATION Fieldbus: <ul style="list-style-type: none"> <li>■ BA00239F/00</li> </ul> </li> </ul>										
<b>Supplementary documentation</b>	<p>Explosion-protection brochure: CP00021Z/11</p> <p>The Explosion-protection brochure is available:</p> <ul style="list-style-type: none"> <li>■ In the download area of the Endress+Hauser website: <ul style="list-style-type: none"> <li><a href="http://www.endress.com">www.endress.com</a> -&gt; Downloads -&gt; Media Type: Documentation -&gt; Documentation Type: Brochures and catalogs -&gt; Text Search: CP00021Z</li> </ul> </li> <li>■ On the CD for devices with CD-based documentation</li> </ul>										
<b>Manufacturer's certificates</b>	<p><b>NEPSI Declaration of Conformity</b></p> <p>Certificate number: GYJ17.1464X</p> <p>Affixing the certificate number certifies conformity with the following standards (depending on the device version):</p> <ul style="list-style-type: none"> <li>■ GB3836.1-2010</li> <li>■ GB3836.4-2010</li> <li>■ GB3836.20-2010</li> </ul>										
<b>Manufacturer address</b>	<p>Endress+Hauser SE+Co. KG Hauptstraße 1 79689 Maulburg, Germany Address of the manufacturing plant: See nameplate.</p>										
<b>Extended order code</b>	<p>The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.</p> <p><b>Structure of the extended order code</b></p> <table border="0" style="margin-left: 40px;"> <tr> <td style="text-align: center;">FMU4x</td> <td style="text-align: center;">-</td> <td style="text-align: center;">*****</td> <td style="text-align: center;">+</td> <td style="text-align: center;">A*B*C*D*E*F*G*..</td> </tr> <tr> <td style="text-align: center;"><i>(Device type)</i></td> <td></td> <td style="text-align: center;"><i>(Basic specifications)</i></td> <td></td> <td style="text-align: center;"><i>(Optional specifications)</i></td> </tr> </table> <p>* = Placeholder At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.</p> <p><i>Basic specifications</i></p> <p>The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available. The selected option of a feature can consist of several positions.</p> <p><i>Optional specifications</i></p> <p>The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).</p>	FMU4x	-	*****	+	A*B*C*D*E*F*G*..	<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>
FMU4x	-	*****	+	A*B*C*D*E*F*G*..							
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>							

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

#### Extended order code: Prosonic M



The following specifications reproduce an extract from the product structure and are used to assign:

- This documentation to the device (using the extended order code on the nameplate).
- The device options cited in the document.

#### Device type

FMU40, FMU41, FMU42, FMU44

#### Basic specifications

Position 1 (Approval)		
Selected option		Description
FMU4x	I	NEPSI Ex ia IIC T4...T6 Ga/Gb

Position 3 (Power Supply; Output)		
Selected option		Description
FMU4x	D, K, Q	2-wire; PROFIBUS PA
	F, L, R	2-wire; FOUNDATION Fieldbus

Position 4 (Operation)		
Selected option		Description
FMU4x	1	W/o display, via communication
	2	4-line display VU331, Envelope curve display on site
	3 <sup>1)</sup>	Prepared for FHX40, remote display (accessory)

1) Only in connection with Position 5 (Housing) = A, Y

Position 5 (Housing)		
Selected option		Description
FMU4x	A	F12 Alu, coated, IP68 NEMA6P
	D	T12 Alu, coated, IP68 NEMA6P + OVP, separate conn. compartment, OVP = overvoltage protection
	Y	Special version F23

#### Optional specifications

No options specific to hazardous locations are available.

- Safety instructions: General**
- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
    - Be suitably qualified for their role and the tasks they perform
    - Be trained in explosion protection
    - Be familiar with national regulations
  - For installation, use and maintenance of the device, users must also observe the requirements stated in the Operating Instructions and the standards:
    - GB50257-2014: "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering".
    - GB3836.13-2013: "Explosive atmospheres, Part 13: Equipment repair, overhaul and reclamation".
    - GB3836.15-2000: "Electrical apparatus for explosive gas atmospheres, Part 15: Electrical installations in hazardous area (other than mines)".
    - GB3836.16-2006: "Electrical apparatus for explosive gas atmospheres, Part 16: Inspection and maintenance of electrical installation (other than mines)".
    - GB3836.18-2010: "Explosive atmospheres, Part 18: Intrinsically safe system".
  - Install the device according to the manufacturer's instructions and national regulations.
  - Avoid electrostatic charging:
    - Of plastic surfaces (e.g. housing, sensor element, special varnishing, attached additional plates, ..)
    - Of isolated capacities (e.g. isolated metallic plates)
  - Refer to the temperature tables for the relationship between the permitted ambient temperature for the electronics housing, depending on the range of application and the temperature class.

**Safety instructions:  
Special conditions**

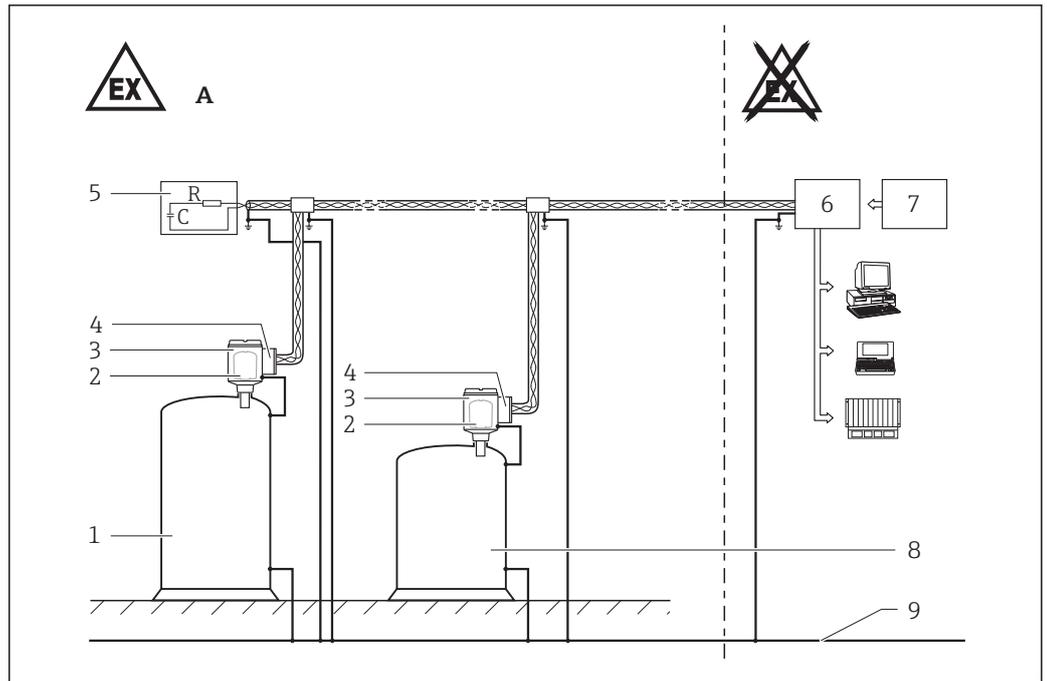
Permitted ambient temperature range at the electronics housing:  
 $-40\text{ °C} \leq T_a \leq +80\text{ °C}$

- Observe the information in the temperature tables.
- In the event of additional or alternative special varnishing on the housing or other metal parts:
  - Observe the danger of electrostatic charging and discharge.
  - Do not rub surfaces with a dry cloth.

*Device type FMU42, FMU44*

Avoid electrostatic charging of the sensor (e.g. do not rub dry and install outside the filling flow).

## Safety instructions: Installation



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### 1

- A Zone 1
- 1 Tank, hazardous area Zone 0
- 2 Electronic insert
- 3 Housing
- 4 only Basic specification, Position 5 (Housing) = D:  
Terminal module with integrated overvoltage protector
- 5 Permitted terminating resistor Ex ia IIC
- 6 Certified associated apparatus (FISCO model)
- 7 Power supply
- 8 Tank, hazardous area Zone 1
- 9 Potential equalization

- Continuous service temperature of the connecting cable:  $\geq T_a + 5 \text{ K}$ .
- When the device is connected to an intrinsically safe circuit Ex ib, the type of protection changes to Ex ib. Do not operate intrinsically safe circuits Ex ib in Zone 0.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.

#### Basic specification, Position 5 (Housing) = A, Y

- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least  $500 \text{ V}_{\text{rms}}$ .
- Option:
  - Remote display, e.g. FHX40 (Observe Safety Instructions)
  - Service interface: Commubox with associated ToF cable (Observe Safety Instructions)

#### Basic specification, Position 5 (Housing) = D

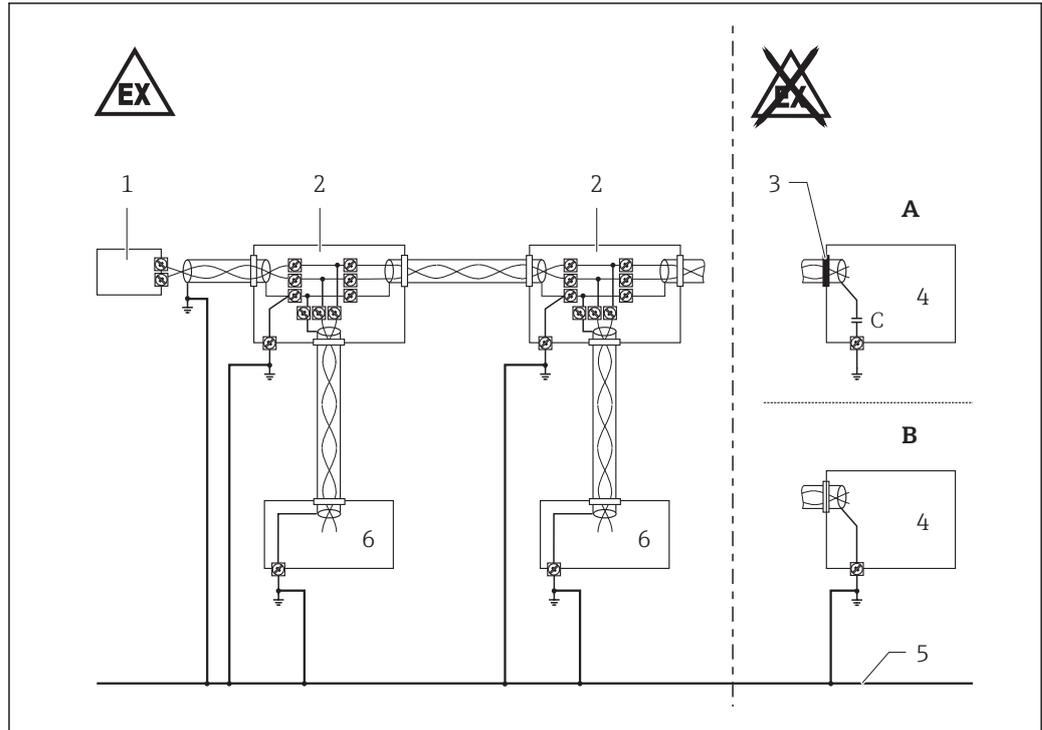
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength to earth is limited by 600 V electrode arresters.
- Option (only for service purposes):
  - Service interface: Commubox with associated ToF cable (Observe Safety Instructions)

#### Basic specification, Position 5 (Housing) = Y

- Install only in areas without vibration.
- Install only within vertical mounting position.

### Potential equalization

Grounding the screen, see the following figure.



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- A Version 1: Use small capacitors (e.g. 1 nF, 1 500 V dielectric strength, ceramic). Total capacitance connected to the screen may not exceed 10 nF.
- B Version 2
- 1 Terminating resistor
- 2 Distributor/T box
- 3 Screen insulated
- 4 Supply unit/Segment coupler
- 5 Potential equalization (secured in high degree)
- 6 Field device

**Safety instructions: Zone 0**

- In the event of potentially explosive vapor/air mixtures, only operate the device under atmospheric conditions.
  - Temperature: -20 to +60 °C
  - Pressure: 80 to 110 kPa (0.8 to 1.1 bar)
  - Air with normal oxygen content, usually 21 % (V/V)
- If no potentially explosive mixtures are present, or if additional protective measures have been taken, the device may also be operated under non-atmospheric conditions in accordance with the manufacturer's specifications.
- Only use the device in media to which the wetted materials have sufficient durability (e.g. process connection seal).
- Associated devices with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.

**Temperature tables**

**Zone 1 - Application**

 Observe the permitted temperature range.

Temperature class	Ambient temperature T <sub>a</sub> (ambient)	Process temperature T <sub>p</sub> (process)
T6	-40 to +60 °C	max. 80 °C
T5	-40 to +75 °C	
T4	-40 to +80 °C	

**Connection data**

Power supply and signal circuit with protection type: intrinsic safety Ex ia IIC, Ex ia IIB.

FISCO-Modell or ENTITY concept (individual interconnection) with the following maximum values

*Basic specification, Position 5 (Housing) = A, Y*

Power supply	
$U_o = 17.5\text{ V}$	or $U_o = 24\text{ V}$
$I_o = 500\text{ mA}$	$I_o = 250\text{ mA}$
$P_o = 5.5\text{ W}$	$P_o = 1.2\text{ W}$
$L_i = 10\text{ }\mu\text{H}$	
$C_i = 5\text{ nF}$	
Leakage current $\leq 50\text{ }\mu\text{A}$	

*Basic specification, Position 5 (Housing) = D*

Power supply	
$U_o = 17.5\text{ V}$	or $U_o = 24\text{ V}$
$I_o = 273\text{ mA}$	$I_o = 250\text{ mA}$
$P_o = 1.2\text{ W}$	$P_o = 1.2\text{ W}$
$L_i = 10\text{ }\mu\text{H}$	
$C_i = 5\text{ nF}$	
Leakage current $\leq 50\text{ }\mu\text{A}$	

**Option**

Remote display, e.g. FHX40:

Power supply and signal circuit with protection type: intrinsic safety Ex ia IIC, Ex ia IIB.

*Basic specification, Position 5 (Housing) = A, Y*

Power supply
$U_o = 4.2\text{ V}$
$I_o = 34\text{ mA}$
$P_o = 36\text{ mW}$
effective inner inductance $L_i = \text{negligible}$
effective inner capacitance $C_i = \text{negligible}$
Characteristic curve: linear

Connecting the Commubox service interface with the associated ToF cable

*Basic specification, Position 5 (Housing) = A, Y and Basic specification, Position 5 (Housing) = D (only for service purposes)*

Commubox output + ToF cable						
$U_o = 3.74\text{ V}$						
$I_o = 9.9\text{ mA}$						
$P_o = 9.2\text{ mW}$						
effective inner inductance $L_i = \text{negligible}$						
effective inner capacitance $C_i = \text{negligible}$						
Characteristic curve: linear						
For material group IIC:						
▪ permitted outer inductance $L_o \leq 340\text{ mH}$						
▪ permitted outer capacitance $C_o \leq 100\text{ }\mu\text{F}$						
When interconnected to a Prosonic M, the following results apply:						
	$L_o =$	0.15 mH	0.5 mH	1 mH	2 mH	5 mH
For material group IIC	$C_o =$	$\leq 8\text{ }\mu\text{F}$	$\leq 7\text{ }\mu\text{F}$	$\leq 5.5\text{ }\mu\text{F}$	$\leq 5\text{ }\mu\text{F}$	$\leq 4\text{ }\mu\text{F}$
For material group IIB	$C_o =$	10 $\mu\text{F}$				



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