

Safety Instructions

Prosonic S FDU90, FDU91, FDU91F, FDU92, FDU93, FDU95

II 3 G Ex ec IIC T5 Gc

II 3 G Ex ec IIC T6 Gc

II 3 D Ex tc IIIC Txx°C Dc



Prosonic S FDU90, FDU91, FDU91F, FDU92, FDU93, FDU95

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About this document



This document has been translated into several languages. Legally determined is solely the English source text.

The document translated into EU languages is available:

- In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Manuals and Datasheets -> Type: Ex Safety Instruction (XA) -> Text Search: ...
- In the Device Viewer: www.endress.com -> Product tools -> Access device specific information -> Check device features



If not yet available, the document can be ordered.

Associated documentation

This document is an integral part of the following Operating Instructions:

TI00396F/00

Supplementary documentation

Explosion-protection brochure: CP00021Z/11

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

EU Declaration of Conformity

Declaration Number:
EG05024

The EU Declaration of Conformity is available:

In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Declaration -> Type: EU Declaration -> Product Code: ...

EU type-examination certificate

Certificate number:
EG 05 024

List of applied standards: See EU Declaration of Conformity.

Manufacturer address	Endress+Hauser SE+Co. KG Hauptstraße 1 79689 Maulburg, Germany Address of the manufacturing plant: See nameplate.
Other standards	Among other things, the following standards shall be observed in their current version for proper installation: <ul style="list-style-type: none"> ■ IEC/EN 60079-14: "Explosive atmospheres - Part 14: Electrical installations design, selection and erection" ■ EN 1127-1: "Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology"
Extended order code	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.

Structure of the extended order code

FDU9x	-	*****	+	A*B*C*D*E*F*G*..
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>

* = Placeholder

At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Basic specifications

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.

Optional specifications

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).

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 S



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

FDU90, FDU91, FDU91F, FDU92

Basic specifications

Position 1 (Approval)		
Selected option		Description
FDU90	G	ATEX II 3 G Ex ec IIC T5 Gc
	H	ATEX II 3 D Ex tc IIIC Txx°C Dc
FDU91 FDU91F FDU92	G	ATEX II 3 G Ex ec IIC T6 Gc
	H	ATEX II 3 D Ex tc IIIC Txx°C Dc

Position 4 (Heater)		
Selected option		Description
FDU90 FDU91	A	W/o
	B	Connection to 24VDC Note Technical Information FMU90! (Temperature compensation)

Optional specifications

No options specific to hazardous locations are available.

Device type

FDU93, FDU95

Basic specifications

Position 1 (Approval)		
Selected option		Description
FDU93	G	ATEX II 3 G Ex ec IIC T6 Gc
FDU95	H	ATEX II 3 D Ex tc IIIC Txx°C Dc

Position 2 (Temperature, Blocking Distance, Material)		
Selected option		Description
FDU95	1	-40...+80°C/176°F; 70cm/2.3ft; membrane 316L, PE coated
	2	-40...+130°C/266°F; 90cm/2.9ft; membrane 316L

Optional specifications

No options specific to hazardous locations are available.

Safety instructions:
General

- The device is intended to be used in explosive atmospheres as defined in the scope of EN IEC 60079-0 or equivalent national standards. If no potentially explosive atmospheres are present or if additional protective measures have been taken: The device may be operated according to the manufacturer's specifications.
- 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
- Comply with the installation and safety instructions in the Operating Instructions.
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Only use the device in media to which the wetted materials have sufficient durability.

- Avoid electrostatic charging:
 - Of plastic surfaces (e.g. enclosure, 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 enclosure, depending on the range of application and the temperature class.
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

**Safety
instructions:**

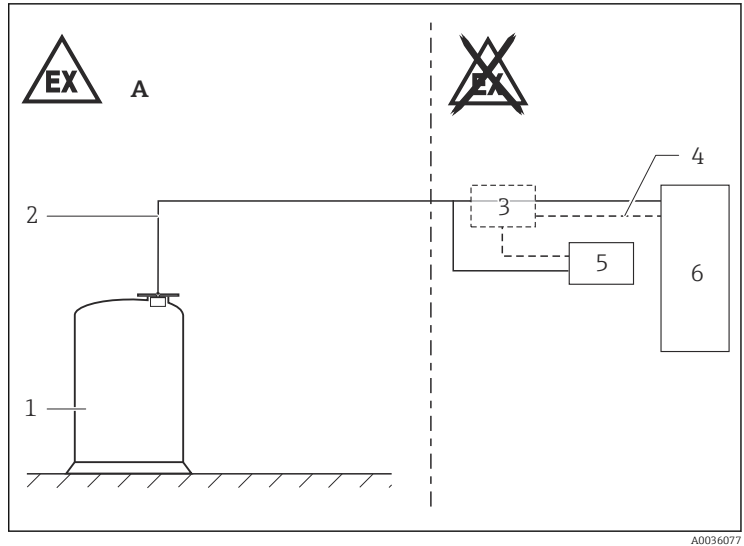
Special conditions

In the event of additional or alternative special varnishing on the enclosure or other metal parts:

- Observe the danger of electrostatic charging and discharge.
- Do not rub surfaces with a dry cloth.

**Safety
instructions:
Installation**

Electric connection of the sensor Prosonic FDU9x to the analysing unit
Prosonic S

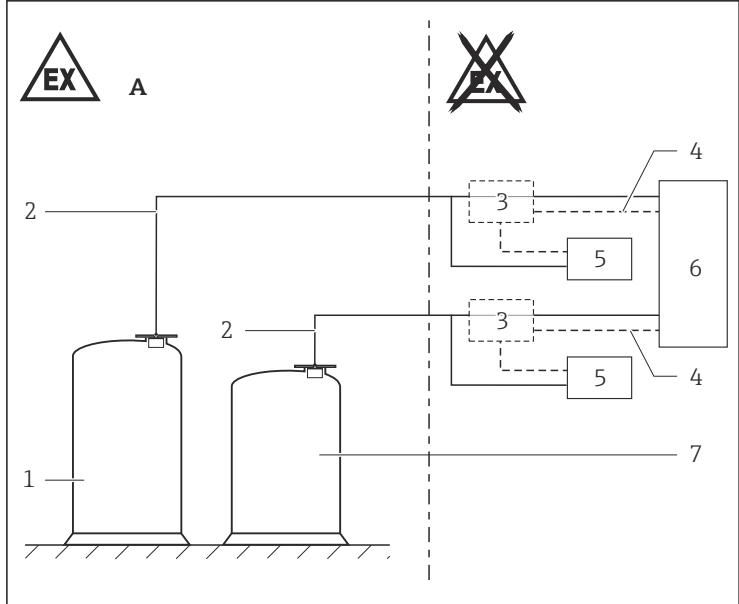


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 1

- A Zone 2
- 1 Tank, hazardous area Zone 2
- 2 Electric connection
- 3 Optional: Terminal box
- 4 Electric connection via terminal box
- 5 External power supply for sensors with heating
- 6 Analysing and controlling unit

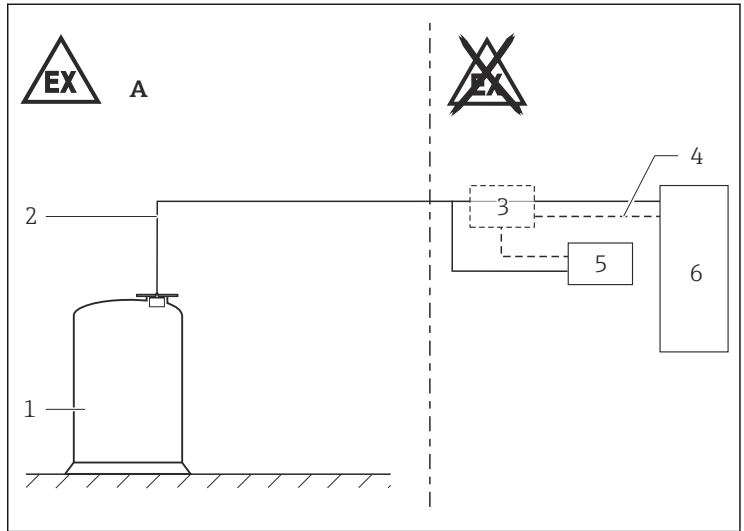
Electric connection of two sensors Prosonic FDU9x to the analysing unit Prosonic S



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2

- A Zone 2
- 1 Tank 1, hazardous area Zone 2
- 2 Electric connection
- 3 Optional: Terminal box
- 4 Electric connection via terminal box
- 5 External power supply for sensors with heating
- 6 Analysing and controlling unit
- 7 Tank 2, hazardous area Zone 2

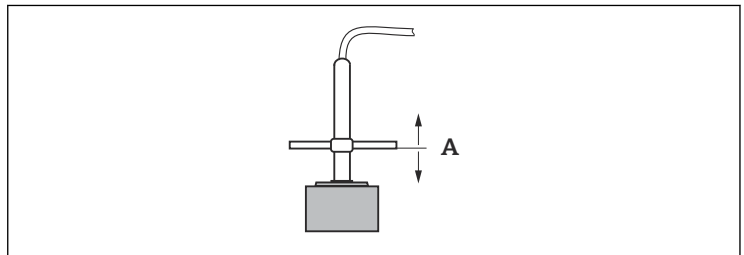


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3

- A Zone 22
- 1 Tank, hazardous area Zone 22
- 2 Electric connection
- 3 Optional: Terminal box
- 4 Electric connection via terminal box
- 5 External power supply for sensors with heating
- 6 Analysing and controlling unit

Installation with alignment unit



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4

- A Zone 22

- Install the device so that an ingress protection of at least IP68 is achieved.
- The sensor can be mounted using the alignment device FAU40.
- When using plastic accessories check the suitability for explosion hazardous areas. Observe the instructions concerning electrostatic charging.
- Versions with NPT adapter are intended for connection to a conduit which is suited for the type of protection. The adapter has to be connected to the local grounding system either directly via the metallic conduit or by other measures.
- In potentially explosive atmospheres: Do not disconnect electrical connections when energized.

Device type FDU90

Device group IIC/IIB

For usage of the sensor in explosion hazardous areas due to combustible gases, mists or vapours: Avoid electrostatic charging of the sensor.

Device group III, Application in dust

- For usage of the sensor in explosion hazardous areas due to combustible mixtures of dust in air the sensor shall be mounted surrounded by metallic or electrically conductive surfaces in a retracted or shielded position, e.g. within a nozzle.
- Any accessory is required to be electrically conductive and earthed.

Device type FDU91

The sensor must be mounted in a protected position, if mechanical stress is to be expected.

Device type FDU91F

Sensor enclosure consists of conductive material and is connected as well as the membrane and the mounting connection to the earth lead of the sensor cable, which must be connected to the local grounding system of the plant.

Device type FDU92

The sensor must be mounted in a protected position, if mechanical stress is to be expected.

Device group IIC

For usage of the sensor in explosion hazardous areas due to combustible gases, mists or vapours: Avoid electrostatic charging of the sensor.

Device group III, Application in dust

- For usage of the sensor in explosion hazardous areas due to combustible mixtures of dust in air the sensor shall be mounted surrounded by metallic or electrically conductive surfaces in a retracted or shielded position, e.g. within a nozzle.
- Any accessory is required to be electrically conductive and earthed.

Device type FDU93, FDU95

- Sensor enclosure consists of conductive material and is connected as well as the membrane and the mounting connection to the earth lead of the sensor cable, which must be connected to the local grounding system of the plant.
- The sensor can be screwed into a durable plastic flange with conductive cladding, a durable unclad plastic flange with a surface resistance = $10^9 \Omega$ or a metal flange.
- When using a clad plastic flange: Install the plastic surface outside the medium flow.
- The cladding must be included in the potential equalization. Preferably use conductive or metallic flanges.

Temperature tables

	Device type			
	FDU90	FDU91, FDU91F, FDU92	FDU93	FDU95
Process temperature T_p (process)	max. +60 °C	max. +80 °C	max. +80 °C	max. +80 °C

Zone 2 - Application

Temperature class	Permitted ambient temperature range			
	Device type			
	FDU90	FDU91 <i>with Basic specification, Position 4 =</i>	FDU91F FDU92 FDU93 FDU95	
		A	B	
T6	-	-40 to +60 °C	-40 to +40 °C	-40 to +60 °C
T5	-40 to +60 °C	-40 to +80 °C	-40 to +60 °C	-40 to +80 °C
T4	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C ¹⁾
T3 (if applicable T2, T1)	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C ¹⁾

1) Functional limitation due to temperature fuse

Zone 22 - Application

	Permitted ambient temperature range			
	Device type			
	FDU90 FDU91	FDU91F FDU92 FDU93	FDU95 <i>with Basic specification, Position 2 =</i>	
			1	2
Max. surface temperature at an ambient temperature of 40 °C	+80 °C	+80 °C	+80 °C	+120 °C
Max. surface temperature at an ambient temperature of $T_{\max}^{1)}$	+100 °C	+100 °C	+100 °C	+165 °C
Permitted ambient temperature range	-40 to +60 °C	-40 to +80 °C	-40 to +80 °C	-40 to +130 °C

1) Temperature appears on the nameplate

Connection data Performance limits

Emmission/signal circuit (FMU90, FMU95 to FDU9x)

	Device type					
	FDU90	FDU91	FDU91F	FDU92	FDU93	FDU95
Transmission voltage	$\leq 55 V_{\text{eff}}$	$\leq 55 V_{\text{eff}}$	$\leq 55 V_{\text{eff}}$	$\leq 55 V_{\text{eff}}$	$\leq 55 V_{\text{eff}}$	$\leq 55 V_{\text{eff}}$
Sending frequency (20 °C)	90.0 kHz	43.0 kHz	42.0 kHz	30.5 kHz	27.3 kHz	17.1 kHz
Max. power consumption (eff. long-term power)	0.9 W	0.4 W	0.9 W	0.9 W	0.7 W	0.7 W

NTC power supply (FMU90, FMU95 to FDU9x)

	Device type				
	FDU90	FDU91	FDU91F FDU92	FDU93	FDU95
Power supply	$\leq 12 V$	$\leq 12 V$	$\leq 12 V$	$\leq 12 V$	$\leq 12 V$
Max. power consumption (eff. long-term power)	$\leq 0.4 \text{ mW}$	$\leq 0.4 \text{ mW}$	$\leq 0.4 \text{ mW}$	$\leq 0.4 \text{ mW}$	$\leq 0.4 \text{ mW}$
External power supply for heating circuit	$\leq 26.4 V_{\text{AC}}$ or V_{DC}	$\leq 26.4 V_{\text{AC}}$ or V_{DC}	-	-	-



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