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71570372
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Safety Instructions
Prosonic S FDU90, FDU91, FDU91F, FDU92, FDU93, FDU95

Ex ma IIC T* Gb
Ex ta/tb IIIC T** Da/Db
Ex tb IIIC T** Db

Segurança
INMETRO
TÜVRheinland
OCP 0004

Endress+Hauser
People for Process Automation

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.

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

Certificate of Conformity

Certificate number:
TÜV 13.0893 X

Affixing the certificate number certifies conformity with the following standards (depending on the device version):

- ABNT NBR IEC 60079-0:2013
- ABNT NBR IEC 60079-18:2007
- ABNT NBR IEC 60079-31:2011

Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany

Address of the manufacturing plant: See nameplate.

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*..
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = 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	7	INMETRO Ex ma IIC T5 Gb INMETRO Ex ta/tb IIIC T** Da/Db INMETRO Ex tb IIIC T** Db
FDU91 FDU91F FDU92	7	INMETRO Ex ma IIC T6 Gb INMETRO Ex ta/tb IIIC T** Da/Db INMETRO Ex tb IIIC T** Db

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.

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

FDU93, FDU95

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
FDU93 FDU95	7	INMETRO Ex ma IIC T6 Gb INMETRO Ex ta/tb IIIC T** Da/Db INMETRO Ex tb IIIC T** Db

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

Optional specifications

No options specific to hazardous locations are available.

Safety instructions: General

- Comply with the installation and safety instructions in the Operating Instructions.
- 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
- 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)

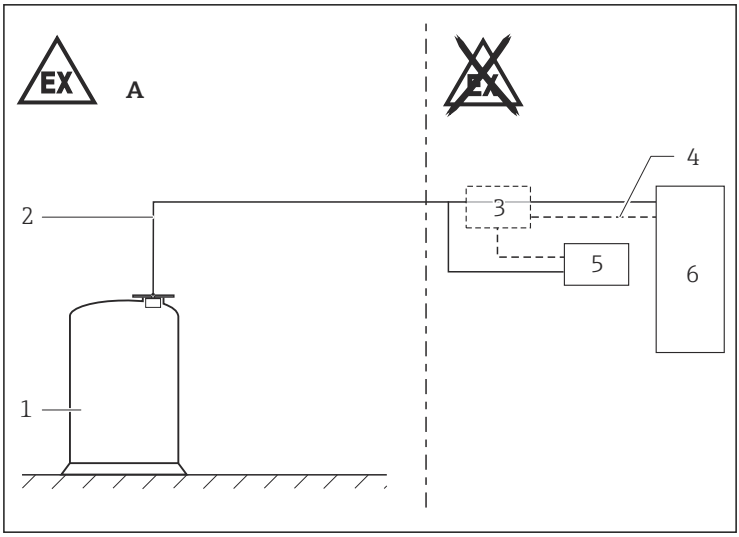
Safety instructions: Special conditions

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

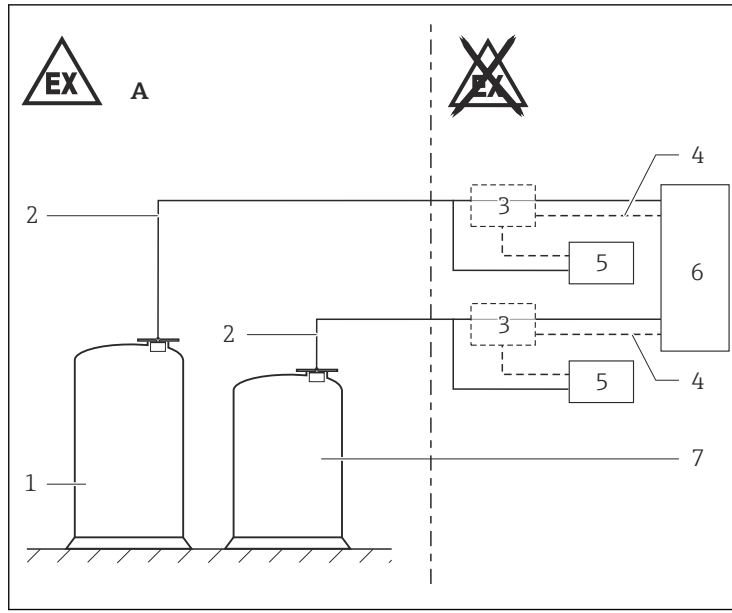
Electric connection of the sensor Prosonic FDU9x to the analysing unit Prosonic S



1

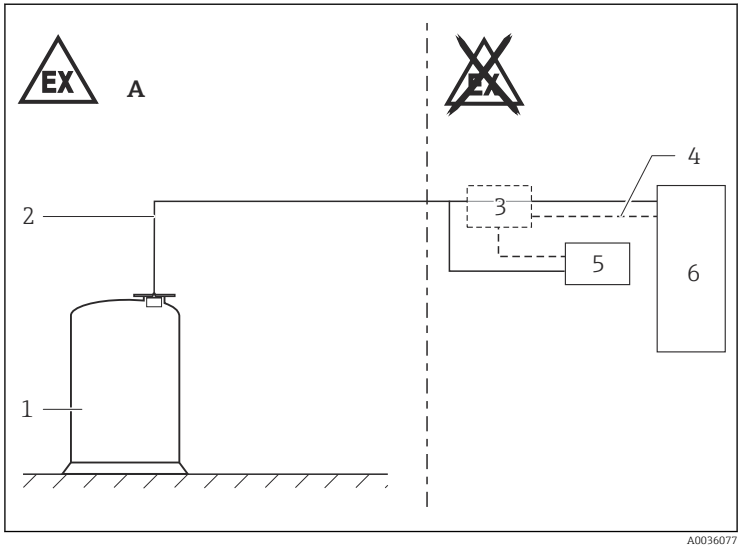
A Zone 1
1 Tank, hazardous area Zone 1
2 Electric connection
3 Optional: Terminal box (applied by user)
4 connected directly or via terminal box
5 External power supply
(only Device type FDU90, FDU91 with Basic specification, Position 4 = B)
6 Analysing and controlling unit

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



2

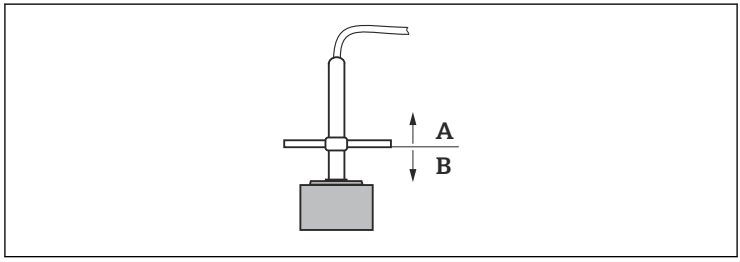
A Zone 1
1 Tank, hazardous area Zone 1
2 Electric connection
3 Optional: Terminal box (applied by user)
4 connected directly or via terminal box
5 External power supply
(only Device type FDU90, FDU91 with Basic specification, Position 4 = B)
6 Analysing and controlling unit
7 Tank, hazardous area Zone 1



3

A Zone 21
1 Tank, hazardous area Zone 20
2 Electric connection
3 Optional: Terminal box (applied by user)
4 connected directly or via terminal box
5 External power supply
(only Device type FDU90, FDU91 with Basic specification, Position 4 = B)
6 Analysing and controlling unit

Installation with alignment unit



4

A Zone 21
B Zone 20

- 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.

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 Ω 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 1 - Application

Temperature class	**Permitted ambient temperature range**			
	Device type			
	FDU90	**FDU91** *with Basic specification, Position 4 =*		**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
T3	−40 to +80 °C	−40 to +80 °C	−40 to +80 °C	−40 to +80 °C

Zone 20/21 - Application

Device type	Sensor in Zone 20		Sensor in Zone 21		Permitted ambient temperature range
	Max. surface temperature at max. ambient temperature				
	T_a = 40 °C	$T_a = T_{max}$	T_a = 40 °C	$T_a = T_{max}$	
FDU90, FDU91 *with Basic specification, Position 4 = A*	100 °C	100 °C	80 °C	100 °C	−40 to +80 °C
FDU90, FDU91 *with Basic specification, Position 4 = B*	110 °C	110 °C	80 °C	100 °C	−40 to +80 °C
FDU91F, FDU92 FDU93, FDU95	100 °C	100 °C	80 °C	100 °C	−40 to +80 °C

Connection data

Performance limits

	Device type			
	FDU90	FDU91, FDU91F, FDU92	FDU93	FDU95
Max. working pressure [1]	0.4 MPa	0.4 MPa	0.3 MPa	0.15 MPa

1) outside explosion hazard atmospheres at 20 °C

Emmission/signal circuit (FMU90, FMU95 to FDU9x)

	Device type					
	FDU90	FDU91	FDU91F	FDU92	FDU93	FDU95
Transmission voltage	≤ 55 V_{eff}	≤ 55 V_{eff}	≤ 55 V_{eff}	≤ 55 V_{eff}	≤ 55 V_{eff}	≤ 55 V_{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	≤ 12 V	≤ 12 V	≤ 12 V	≤ 12 V	≤ 12 V
Max. power consumption (eff. long-term power)	≤ 0.4 mW	≤ 0.4 mW	≤ 0.4 mW	≤ 0.4 mW	≤ 0.4 mW
External power supply for heating circuit	≤ 26.4 V_{AC} or V_{DC}	≤ 26.4 V_{AC} or V_{DC}	–	–	–

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