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71423886
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Safety Instructions
Prosonic S
FDU90, FDU91, FDU91F, FDU92, FDU93, FDU95

EAC: 2Ex nA IIC T6...T3 Gc
Ex tc IIIC T55...95°C Dc

Document: XA01818F-A
Safety instructions for electrical apparatus for explosion-hazardous areas → 3

Endress+Hauser
People for Process Automation

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

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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 -> Media Type: Documentation -> Documentation Type: Brochures and catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

Certificate of Conformity TP TC 012/2011

Inspection authority:
LLC NANIO CCVE (ООО «НАНИО ЦСВЭ»)

Certificate number:
TC RU C-DE.AA87.B.00875

Affixing the certificate number certifies conformity with the following standards (depending on the device version):
- GOST 31610.0-2014 (IEC 60079-0:2011)
- GOST IEC 60079-31-2010

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, FDU93

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
FDU90 FDU91 FDU91F FDU92	M	EAC 2Ex nA IIC T6...T3 Gc
FDU9x	N	EAC Ex tc IIIC T55...95°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.

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

FDU95

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
FDU95	N	EAC Ex tc IIIC T55...95°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...+150°C/302°F; 90cm/2.9ft; membrane 316L

Optional specifications

No options specific to hazardous locations are available.

Safety instructions: General

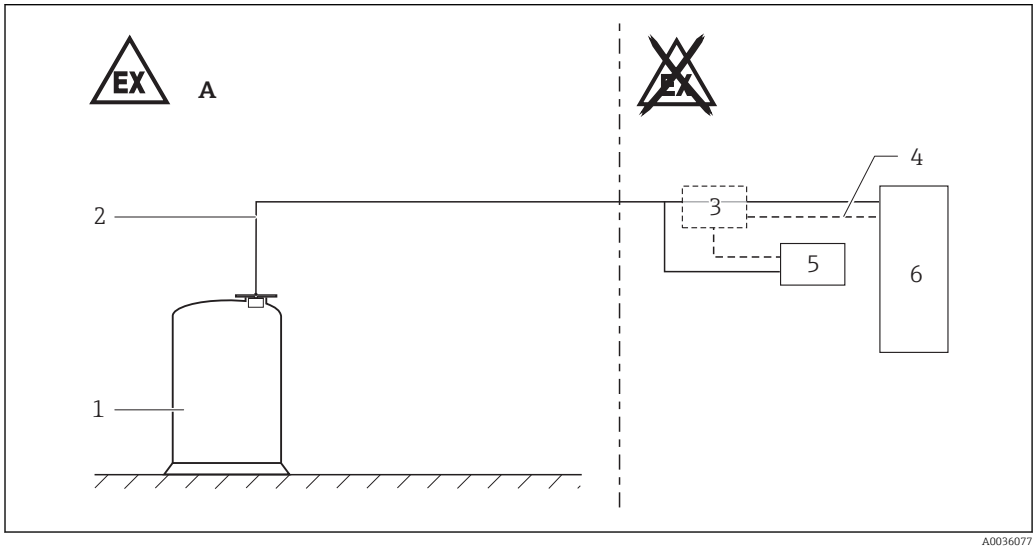
- Comply with the installation and safety instructions in the Operating Instructions.
- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
  - Be suitably qualified for their role and the tasks they perform
  - Be trained in explosion 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. 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.
- 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 housing or other metal parts:

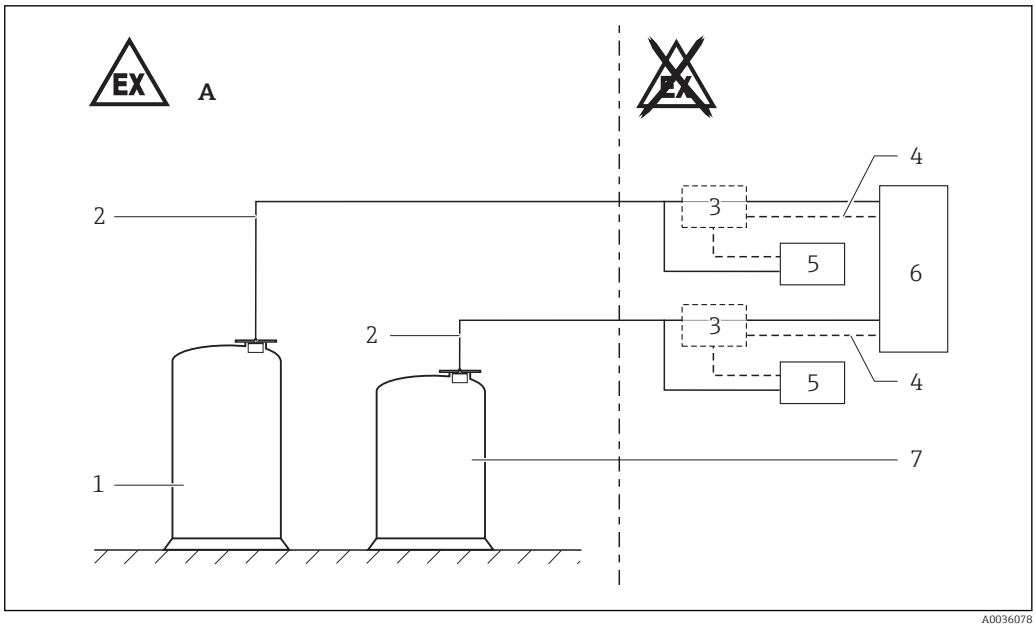
- Observe the danger of electrostatic charging and discharge.
- Do not rub surfaces with a dry cloth.

Safety instructions: Installation



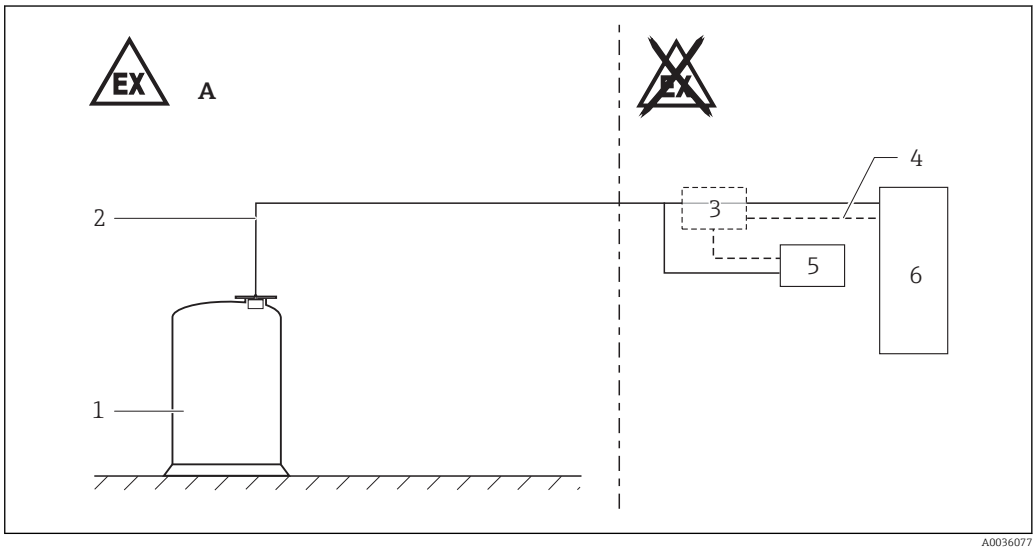
1

A Zone 2
1 Tank, Zone 2
2 Electric connection of the sensor
3 Optional: Terminal box
4 Electric connection of the sensor via terminal box
5 Only Device type FDU90, FDU91 with Basic specification, Position 4 (Heater) = B: External power supply
6 Analysing and controlling unit



2

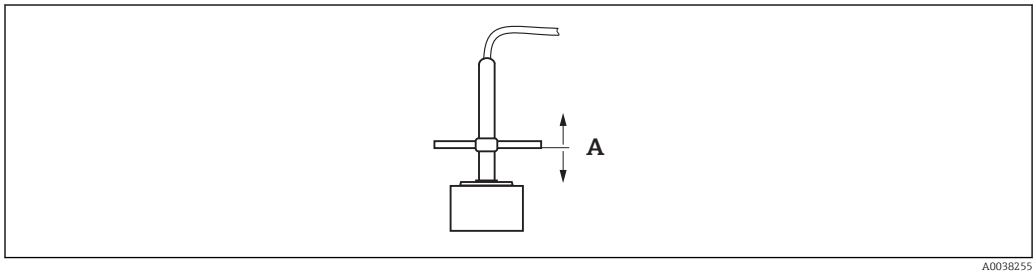
A Zone 2
1 Tank, Zone 2
2 Electric connection of the sensor
3 Optional: Terminal box
4 Electric connection of the sensor via terminal box
5 Only Device type FDU90, FDU91 with Basic specification, Position 4 (Heater) = B: External power supply
6 Analysing and controlling unit
7 Tank, Zone 2



3

A Zone 22
1 Tank, Zone 22
2 Electric connection of the sensor
3 Optional: Terminal box
4 Electric connection of the sensor via terminal box
5 Only Device type FDU90, FDU91 with Basic specification, Position 4 (Heater) = B: External power supply
6 Analysing and controlling unit

Installation with alignment unit



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.

FDU90
Category IIC and IIB:
For usage of the sensor in explosion hazardous ares due to combustible gases, mists or vapours: Avoid electrostatic charging of the sensor.

FDU91
The sensor must be mounted in a protected position, if mechanical stress is to be expected.

FDU91F
Sensor housing 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.

FDU92
- The sensor must be mounted in a protected position, if mechanical stress is to be expected.
- Category IIC:
  For usage of the sensor in explosion hazardous ares due to combustible gases, mists or vapours: Avoid electrostatic charging of the sensor.

FDU93, FDU95
- Sensor housing 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 with Basic specification, Position 2 (Temperature; Blocking Distance; Material) = 1*
Process temperature T_p (process)	max. +60 °C	max. +80 °C	max. +80 °C

Zone 2 - Application

Temperature class	Permitted ambient temperature range			
	Device type			
	FDU90	*FDU91 with Basic specification, Position 4 (Heater)*		*FDU91F FDU92 FDU93*
		= 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 22 - Application

	Device type			
	FDU90 FDU91	*FDU91F FDU92 FDU93*	*FDU95 with Basic specification, Position 2 (Temperature; Blocking Distance; Material)*	
			= 1	*= 2*
Maximum surface temperature at the maximum permissible ambient temperature of 40 °C	80 °C	80 °C	80 °C	120 °C
Maximum surface temperature at the maximum permissible ambient temperature of T_{max} [1]	100 °C [2]	100 °C [2]	100 °C [2]	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
2) Including 5 °C safety margin

Connection data

Performance limits

Emmission/signal circuit (FMU90, FMU95 to FDU9x)

	Device type					
	FDU90	*FDU91*	*FDU91F*	*FDU92*	*FDU93*	*FDU95 with Basic specification, Position 2 (Temperature; Blocking Distance; Material) = 1*
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 with Basic specification, Position 2 (Temperature; Blocking Distance; Material) = 1*
Power supply	≤ 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
External power supply for heating circuit	≤ 26.4 V_{AC} or V_{DC}	≤ 26.4 V_{AC} or V_{DC}	–	–

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