

Safety Instructions

Prosonic S

FDU90/91/91F/92/93/95

Ex ma IIC T5 Gb (FDU90)

Ex ma IIC T6 Gb (FDU91/91F/92/93/95)

Ex ta/tb IIIC T* Da/Db IP65

Ex tb IIIC T* Db IP65

TÜV 13.0893 X



Document: XA01343F-A

Safety instructions for electrical apparatus for explosion-hazardous areas

Prosonic S

FDU90, FDU91, FDU91F, FDU92, FDU93, FDU95

Associated Documentation

This document is an integral part of the following Operating Instructions:
TI00396F/00

The Operating Instructions which are supplied and correspond to the device type apply.

Supplementary Documentation

Explosion-protection brochure:
CP00021Z/11

Designation

Explanation of the labelling and type of protection can be found in the explosion protection brochure.

Designation of type of protection

Ex ma IIC T5 Gb (only FDU90)
Ex ma IIC T6 Gb (except FDU90)
Ex ta/tb IIIC T* Da/Db IP65
Ex ta IIIC T* Db IP65

* →  7 (Temperature tables)

Applied standards

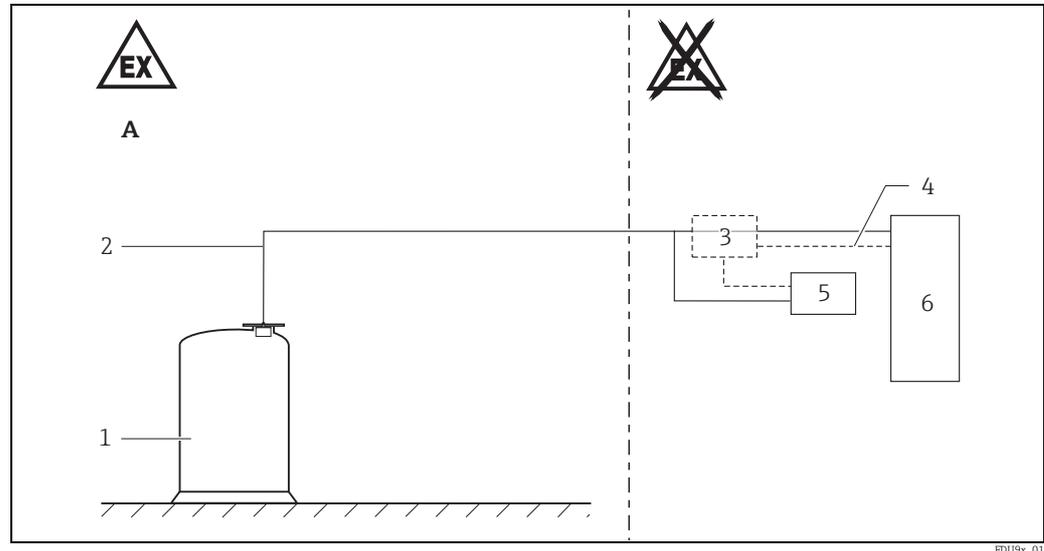
ABNT NBR IEC 60079-0 :2008
ABNT NBR IEC 60079-18:2007
IEC 60079-31:2008

Safety instructions:
General

Housing protection: IP65

- Install the device according to the manufacturer's instructions and any other valid standards and 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)

Safety instructions:
Installation



 1

A Zone 1

1 Tank; Zone 1

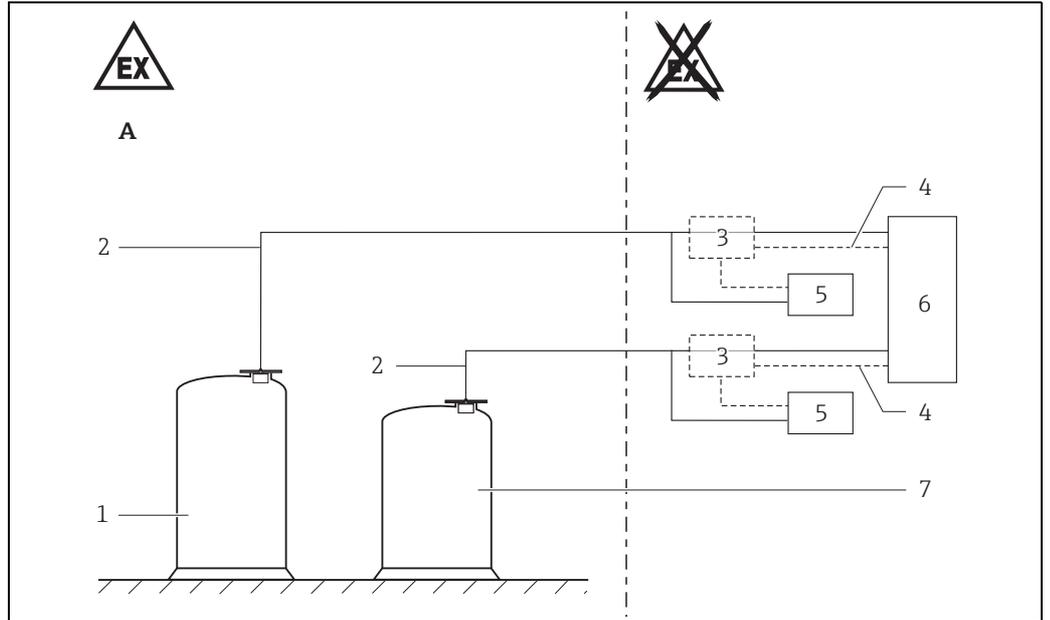
2 Electric connection of the sensor FDU9x to the analysing and controlling unit FMU90, FMU95

3 Optional: Terminal box (applied by user)

4 Connection of the sensor: directly or via terminal box

5 External power supply for sensors with heating

6 Analysing and controlling unit FMU90, FMU95

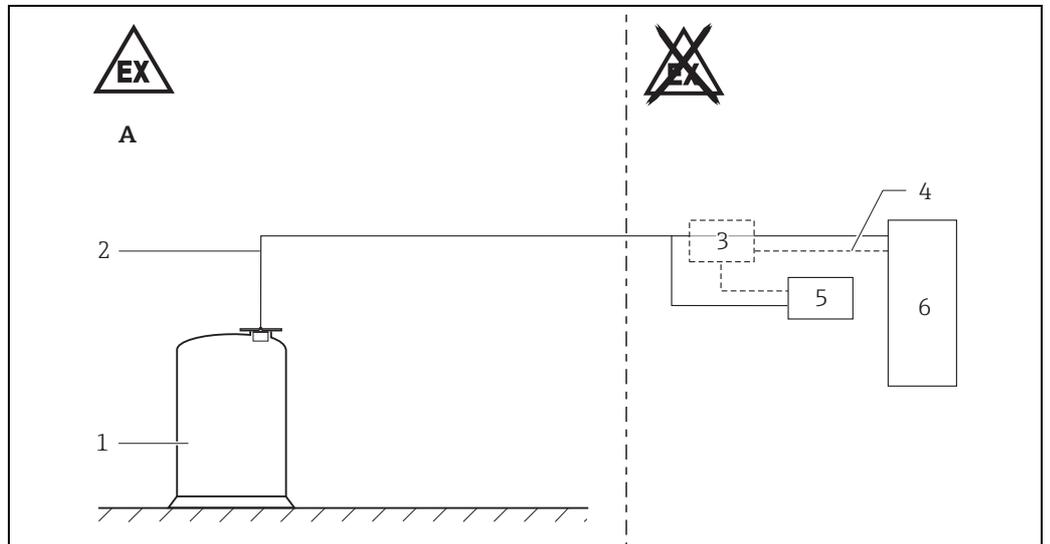


FDU9x_02



A Zone 1

- 1 Tank; Zone 1
- 2 Electric connection of two sensors FDU9x to the analysing and controlling unit FMU90, FMU95
- 3 Optional: Terminal box (applied by user)
- 4 Connection of the sensor: directly or via terminal box
- 5 External power supply for sensors with heating
- 6 Analysing and controlling unit FMU90, FMU95
- 7 Tank; Zone 1



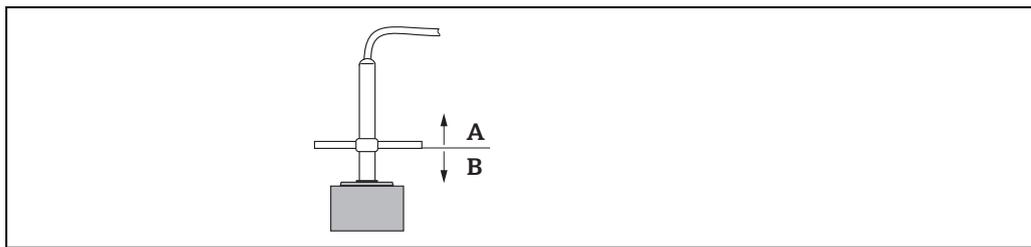
FDU9x_01



A Zone 21, Zone 22

- 1 Tank; Zone 20
- 2 Electric connection of the sensor FDU9x to the analysing and controlling unit FMU90, FMU95
- 3 Optional: Terminal box
- 4 Connection of the sensor
- 5 External power supply for sensors with heating
- 6 Analysing and controlling unit FMU90, FMU95

Installation with alignment unit



 4

A Zone 21, Zone 22
B Zone 20

- Comply with the installation and safety instructions in the Operating Instructions.
- Do not operate the device outside the specified electrical and thermal parameters.
- Only install the devices in media for which the wetted materials have sufficient durability.
- 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.

FDU90

- For usage of the sensor in explosion hazardous areas due to combustible gases, mists or vapours of the category IIC and IIB: 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

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

FDU93/95

- The ultrasonic 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.
- Include the plating in the potential equalization. Preferably, use conductive or metallic flanges.
- 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.

Temperature tables

	Maximum process temperature
FDU90	+60 °C
FDU91/91F, FDU92/93, FDU95-J1...	+80 °C

Zone 1 - Application

	Temperature class			
	T6	T5	T4	T3
Permissible range of ambient temperature				
FDU90-E..A. (without heating)	-	-40 °C to +60 °C	-40 °C to +80 °C	-40 °C to +80 °C
FDU90-E..B. (with heating)	-	-40 °C to +60 °C	-40 °C to +80 °C	-40 °C to +80 °C
FDU91-E..A. (without heating)	-40 °C to +60 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
FDU91-E..B. (with heating)	-40 °C to +40 °C	-40 °C to +60 °C	-40 °C to +80 °C	-40 °C to +80 °C
FDU91F-E..., FDU92-E..., FDU93-J..., FDU95-J1...	-40 °C to +60 °C	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C

Zone 20/21 - Application

	Maximum surface temperature at ambient temperature				Permissible range of ambient temperature
	T _a = 40 °C	T _a = T _{max}	T _a = 40 °C	T _a = T _{max}	
	Sensor in Zone 20		Sensor in Zone 21		
FDU90-E..A. (without heating)	100 °C	100 °C	80 °C	100 °C	-40 °C to +80 °C
FDU90-E..B. (with heating)	110 °C	110 °C	80 °C	100 °C	-40 °C to +80 °C
FDU91-E..A. (without heating)	100 °C	100 °C	80 °C	100 °C	-40 °C to +80 °C
FDU91-E..B. (with heating)	110 °C	110 °C	80 °C	100 °C	-40 °C to +80 °C
FDU91F-E..., FDU92-E..., FDU93-J..., FDU95-J1...	100 °C	100 °C	80 °C	100 °C	-40 °C to +80 °C

Connection data

	Maximum working pressure*
FDU90/91/91F, FDU92	0.4 MPa
FDU93	0.3 MPa
FDU95-J1	0.15 MPa

* outside explosion hazard atmospheres at 20 °C

Electrical performance limits

Emission/signal circuit: FMU90, FMU95 to FDU9x

	Transmission voltage	Power consumption (eff. long-term power)	Sending frequency (20 °C)
FDU90	≤ 55 V _{eff}	0.9 W	90.0 kHz
FDU91	≤ 55 V _{eff}	0.4 W	43.0 kHz
FDU91F	≤ 55 V _{eff}	0.9 W	42.0 kHz
FDU92	≤ 55 V _{eff}	0.9 W	30.5 kHz
FDU93	≤ 55 V _{eff}	0.7 W	27.3 kHz
FDU95-J1	≤ 55 V _{eff}	0.7 W	17.1 kHz

NTC power supply: FMU90, FMU95 to FDU9x

	Power supply	Power consumption (eff. long-term power)	External power supply for heating circuit
FDU90	≤ 12 V	≤ 0.4 mW	≤ 26.4 V AC or DC
FDU91	≤ 12 V	≤ 0.4 mW	≤ 26.4 V AC or DC
FDU91F	≤ 12 V	≤ 0.4 mW	–
FDU92	≤ 12 V	≤ 0.4 mW	–
FDU93	≤ 12 V	≤ 0.4 mW	–
FDU95-J1	≤ 12 V	≤ 0.4 mW	–



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