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Safety Instructions
Tank Side Monitor NRF590

EAC: 1Ex d [ia Ga] IIC T6 Gb X

Document: XA01409F-A
Safety instructions for electrical apparatus for explosion-hazardous areas → 3

Endress+Hauser
People for Process Automation

Tank Side Monitor NRF590

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Associated documentation

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

- BA00256F/00
- BA00257F/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:
ЕАЭС RU C-DE.AA87.B.00206/19

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 60079-1-2011
- GOST 31610.11-2014 (IEC 60079-11:2011)

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

NRF590	–	**********	+	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: Tankside Monitor

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

NRF590

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
NRF590	Q	EAC 1Ex d [ia Ga] IIC T6 Gb X

Optional specifications

No options specific to hazardous locations are available.

Safety instructions: General

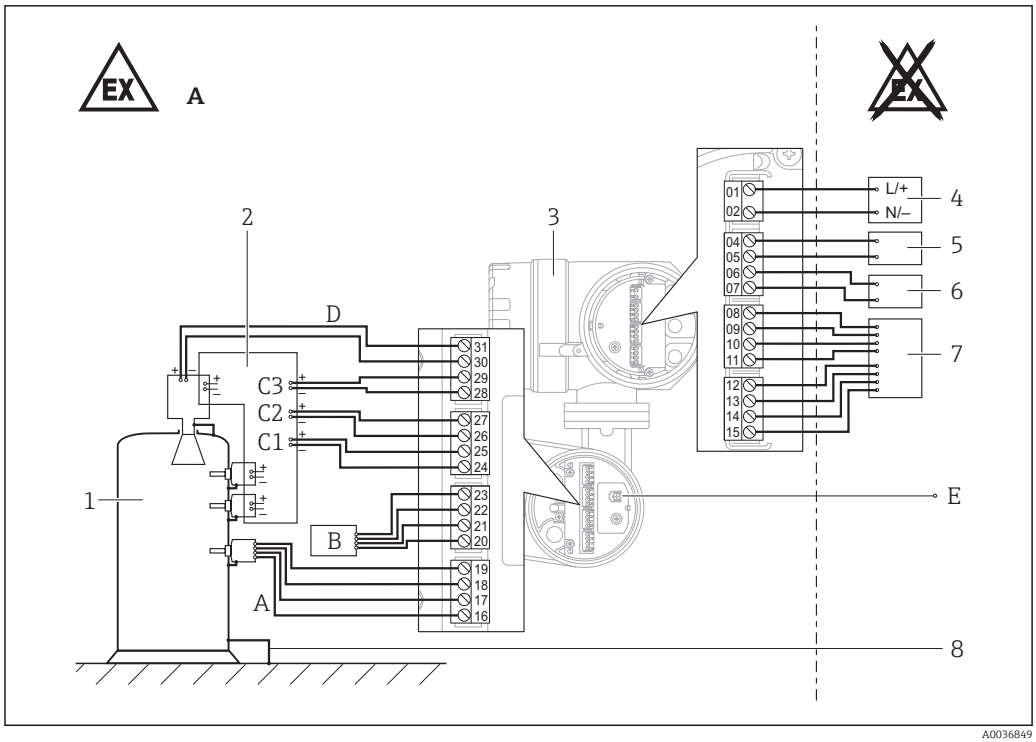
- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
  - Be suitably qualified for their role and the tasks they perform
  - Be trained in explosion protection
  - Be familiar with national regulations
- Install the device according 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:
$-40\ °C \leq T_a \leq +60\ °C$

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

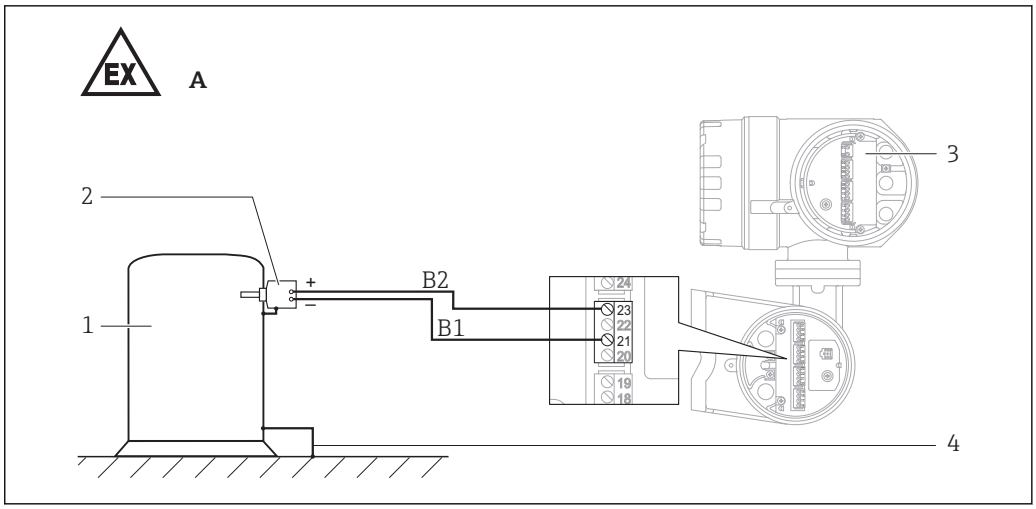


1

A Zone 1
1 Tank; Hazardous area Zone 0
2 Multidrop HART BUS
3 Housing
4 Circuit 1, Power source
5 Circuit 2, Digital I/O 1
6 Circuit 3, Digital I/O 2
7 Circuit 4, Communication
8 Potential equalization

- A-D Intrinsic safe circuits (→ 9, "Connection data" chapter)
- E Service Port (→ 9, "Connection data" chapter)

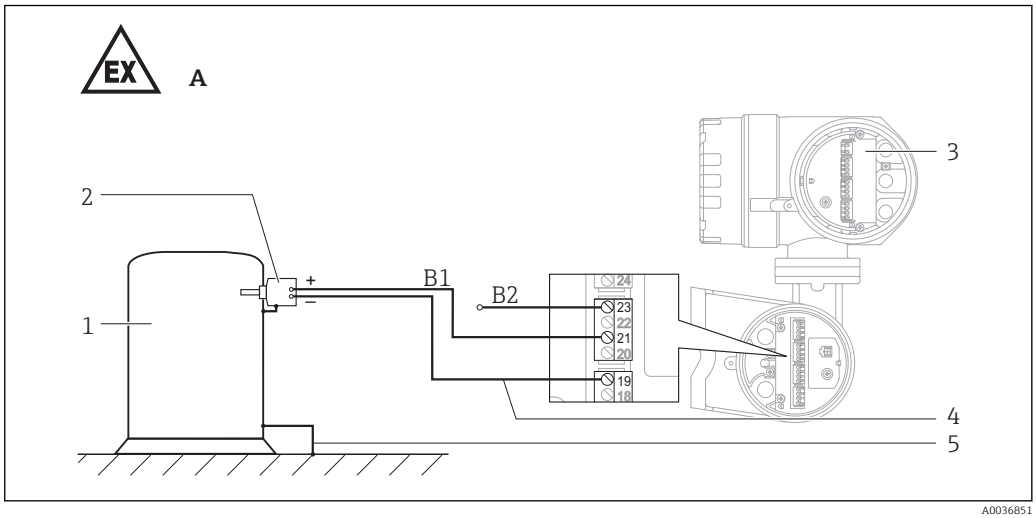
For additional information regarding shielding and installation in combination with intrinsic safe sensors (e.g. Micropilot S) refer to associated operation instructions (BA).



2

A Zone 1
1 Tank; Hazardous area Zone 0
2 Passive 4 to 20 mA device
3 Housing
4 Potential equalization

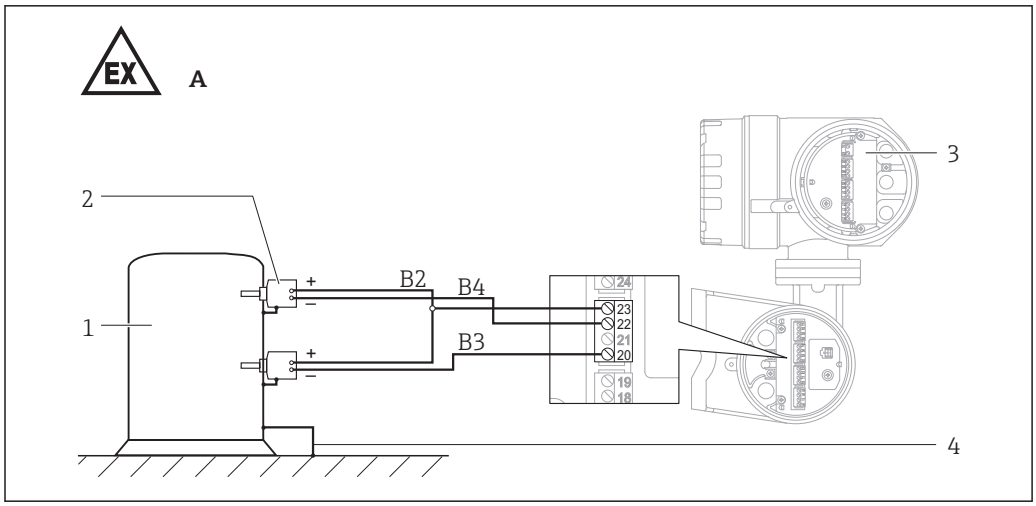
B Intrinsic safe circuits (→ 9, "Connection data" chapter)



3

A Zone 1
1 Tank; Hazardous area Zone 0
2 Active 4 to 20 mA device
3 Housing
4 Reference potential
5 Potential equalization

B Intrinsic safe circuits (→ 9, "Connection data" chapter)



4

A Zone 1
1 Tank; Hazardous area Zone 0
2 Device with switch output
3 Housing
4 Potential equalization

B Intrinsic safe circuits (→ 9, "Connection data" chapter)

- Seal unused entry glands with approved Ex d sealing plugs.
- After aligning (rotating) the housing, retighten the fixing screw (see Operating Instructions).
- Continuous service temperature of the connecting cable: ≥ T_a +5 K.
- Circuits 1, 2, 3 and 4 are non-intrinsic safe circuits containing potentially hazardous potentials and energies. Appropriate precautions must be taken at all times.
- All cabling, glands, and adapters used on circuits 1, 2, 3 and 4 must be Ex d approved.
- The circuits A, B, C and D are intrinsic safe circuits (type of protection Ex ia IIC or Ex ia IIB). Only certified intrinsically safe equipment is allowed to be connected.

Intrinsic safety

- When the device is connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIC and IIB, the type of protection changes to Ex ib IIC and Ex ib IIB.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- The intrinsically safe input and output power circuits of the device are isolated from ground. The dielectric strength to earth is limited by 600 V electrode arresters.

Potential equalization

Integrate the device into the local potential equalization.

Connection data

Device with integrated intrinsic safe 4 to 20 mA input
(for circuit B → 2, 7, → 3, 7 and → 4, 8):

	Ports	Electrical data	Ex ia IIC combined external capacitance/inductance	Ex ia IIB combined external capacitance/inductance
A RTD Circuit [1]	**16 to 19**	U_o = 5.1 V I_o = 31.3 mA P_o = 30.3 mW	C_o = 3 100 nF L_o = 2.0 mH	C_o = 14 µF L_o = 5.0 mH
B IS Option Circuit B1 IS 4 to 20 mA Input B2 Power Circuit B3 digital Input 1 B4 digital Input 2	**20 to 23:** 21 23 (+) 20 22			
B1, B3, B4 Inputs [2]	**21, 20, 22** passive: Port 23 (+)	U_i = 30 V I_i = 65 mA P_i = 800 mW	C_o = 60.0 nF L_o = 0.15 mH	C_o = 200 nF L_o = 5.0 mH
B1, B3, B4 Inputs [1] (Linear characteristic)	**21, 20, 22** aktive: Port (–) [3]	U_o = 5.1 V I_o = 1.0 mA P_o = 1.2 mW	C_o = 3 700 nF L_o = 1.0 mH	C_o = 20 µF L_o = 1.0 mH
B2 Power Circuit [1]	**23 (+)** Port (–) [3] or 20, 21, 22 (Inputs)	U_o = 29.8 V I_o = 95 mA P_o = 708 mW	C_o = 68 nF L_o = 62 µH	C_o = 390 nF L_o = 0.5 mH
C HART Circuit [1]	**24, 26, 28 (+),** **25, 27, 29 (–)** [3]	U_o = 29.8 V I_o = 95 mA P_o = 707 mW	C_o = 68 nF L_o = 62 µH	C_o = 390 nF L_o = 0.5 mH
D Power Circuit [1]	**30 (+), 31 (–)**	U_o = 29.8 V I_o = 95 mA P_o = 708 mW	C_o = 68 nF L_o = 62 µH	C_o = 390 nF L_o = 0.5 mH
E Service Port [1]		U_o = 5.1 V I_o = 31.2 mA P_o = 30.2 mW	C_o = 3 100 nF L_o = 2.0 mH	C_o = 14 µF L_o = 5.0 mH

1) The circuit has a negligible effective internal capacitance and inductance
2) The values given are valid for connection to active devices (→ 3, 7, → 4, 8).
If passive (loop powered) devices are connected the entity values of circuit B2 apply (→ 2, 7).
3) The intrinsic safe reference potential (–) is available on all of the following terminals: 19, 25, 27, 29, 31

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