

# Safety Instructions


## Oil leak detector

### NAR300

Ex ia (float sensor)

Ex ia [ia Ga] (transmitter)

Document: XA01839G-A

Safety instructions for electrical apparatuses used in explosion-hazardous areas →  3

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# Oil leak detector

## NAR300

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|                                    |  |                               |   |                                  |   |                   |                      |  |                               |  |                                  |
|------------------------------------|--|-------------------------------|---|----------------------------------|---|-------------------|----------------------|--|-------------------------------|--|----------------------------------|
| <b>Associated documentation</b>    | <p>This document is an integral part of the following Operating Instructions:</p> <ul style="list-style-type: none"> <li>■ BA00402G (NAR300 system)</li> <li>■ BA00403G (NAR300 system high temperature)</li> </ul>  |                               |   |                                  |   |                   |                      |  |                               |  |                                  |
| <b>Supplementary documentation</b> | <p>Installation guidelines</p> <p>JNIOSH-TR-No.44: "User guidelines for factory explosion-proof equipment (2012)"</p>  |                               |   |                                  |   |                   |                      |  |                               |  |                                  |
| <b>Manufacturer's certificates</b> | <p><b>Certification</b></p> <p>Approval no.:<br/>CML 18JPN8362X</p> <p>Approval numbers are given for the certification of the following standards (depending on the device version).</p> <ul style="list-style-type: none"> <li>■ JNIO SH-TR-46-1: 2015 (IEC60079-0:2011 Ed. 6)</li> <li>■ JNIO SH-TR-46-6: 2015 (IEC60079-11:2011 Ed. 6)</li> <li>■ IEC 60079-25:2010 Ed 2.0</li> </ul>  |                               |   |                                  |   |                   |                      |  |                               |  |                                  |
| <b>Manufacturer address</b>        | <p>Endress+Hauser Yamanashi Co., Ltd.</p> <p>406-0846</p> <p>862-1 Mitsukunugi, Sakaigawa-cho, Fuefuki-shi, Yamanashi</p>  |                               |   |                                  |   |                   |                      |  |                               |  |                                  |
| <b>Extended order code</b>         | <p>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.</p> <p><b>Structure of the extended order code</b></p> <table style="margin-left: auto; margin-right: auto; border: none;"> <tr> <td style="text-align: center;">NAR300</td> <td style="text-align: center;">–</td> <td style="text-align: center;">*****...*****</td> <td style="text-align: center;">+</td> <td style="text-align: center;">A*B*C*D*E*F*G*...</td> </tr> <tr> <td style="text-align: center;"><i>(Device type)</i></td> <td></td> <td style="text-align: center;"><i>(Basic specifications)</i></td> <td></td> <td style="text-align: center;"><i>(Optional specifications)</i></td> </tr> </table> <p>* = Placeholder<br/>At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.</p> <p><i>Basic specifications</i></p> <p>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.</p> <p><i>Optional specifications</i></p> <p>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).</p> <p>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.</p> | NAR300                        | – | *****...*****                    | + | A*B*C*D*E*F*G*... | <i>(Device type)</i> |  | <i>(Basic specifications)</i> |  | <i>(Optional specifications)</i> |
| NAR300                             | –  | *****...*****                 | + | A*B*C*D*E*F*G*...                |   |                   |                      |  |                               |  |                                  |
| <i>(Device type)</i>               |  | <i>(Basic specifications)</i> |   | <i>(Optional specifications)</i> |   |                   |                      |  |                               |  |                                  |

**Extended order code: NAR300**

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*

NAR300

*Basic specifications*

| Specification code 1 (approval) |   |             |
|---------------------------------|---|-------------|
| Selected option                 |   | Description |
| NAR300                          | 2 | JPN Ex      |

| Specification code 2 (type) |   |  |
|-----------------------------|---|--|
| Selected option             |   | Description  |
| NAR300                      | 1 | Float sensor: Ex ia IIB T5 Ga  |
|                             | 5 | Float sensor + transmitter: Ex ia [ia Ga] IIB T4 Gb                            |
|                             | 6 | High-temperature float sensor + transmitter: Ex ia [ia Ga] IIB T4 Gb           |
|                             | 9 | Other float forms (2x cylinder type, dumbbell-type, no vibrionic sensor, etc.) |

| Specification code 3 (output) |   |                       |
|-------------------------------|---|-----------------------|
| Selected option               |   | Description           |
| NAR300                        | 2 | Two-wire current loop |



Output represents output of the transmitter.

| Specification code 4 (signal line) |   |  |
|------------------------------------|---|--|
| Selected option                    |   | Description  |
| NAR300                             | A | 6 m (19.69 ft)   |
|                                    | B | 10 m (32.8 ft)   |
|                                    | C | 15 m (49.21 ft)  |
|                                    | D | 20 m (65.62 ft)  |
|                                    | E | 25 m (82.02 ft)  |
|                                    | F | 30 m (98.46 ft)  |
|                                    | Y | Length other than A through F that is 100 m (328.08 ft) or shorter |



Signal line represents the length of the signal cable between the float sensor and the transmitter.

| Specification code 5 (external conductor entrance) |   |   |
|--|---|---|
| Selected option                                    |   | Description   |
| NAR300   | A | Not selected  |
|  | B | G1/2  |
|  | C | NPT1/2  |
|  | F | M20   |
|  | Y | Entrances other than those above that meet standards such as ISO, JIS, ANSI and DIN |

*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.
- 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 sensor and/or transmitter, 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**

|   |                              |                             |
|---|------------------------------|-----------------------------|
| Ambient temperature range for NAR300 transmitter          | All specifications           | -20 to 60 °C (-4 to 140 °F) |
| Medium temperature range (pit water) for the float sensor | NAR300-21 / NAR300-25        | -20 to 60 °C (-4 to 140 °F) |
|   | NAR300-26 (high temperature) | -20 to 85 °C (-4 to 185 °F) |

 Ensure that pit water does not freeze.

For safe handling of a converter (associated intrinsically safe device) connected to NAR300, adhere to the following conditions.

Below are combinations of NAR300 with NRR261 or NRR262.

| Converter version                  | NRR261- |     | NRR262- | NOTICE!  |
|------------------------------------|---------|-----|---------|--|
|                                    | 4**     | 5** | 4*      |  |
| NAR300-21****                      |         |     |         | Installation in hazardous locations:<br>Float sensor; Ex ia IIB T5 Ga<br>Transmitter; Ex ia [ia Ga] IIB T4<br>SIL specifications |
| NAR300-25****                      |         |     |         |  |
| NAR300-26****                      |         |     |         |  |
| : Connectible<br>: Not connectible |         |     |         |  |

The maximum external inductance ( $L_o$ ) and maximum external capacitance ( $C_o$ ) of the intrinsically safe circuit and the maximum inductance ( $L_w$ ) and maximum capacitance ( $C_w$ ) of an external connection cable are shown below.

$$C_w < C_o - 0 \text{ nF (Ci)} = 0.083 \text{ } \mu\text{F}$$

and

$$L_w < L_o - 48 \text{ } \mu\text{H (Li)} = 2.3 \text{ mH}$$

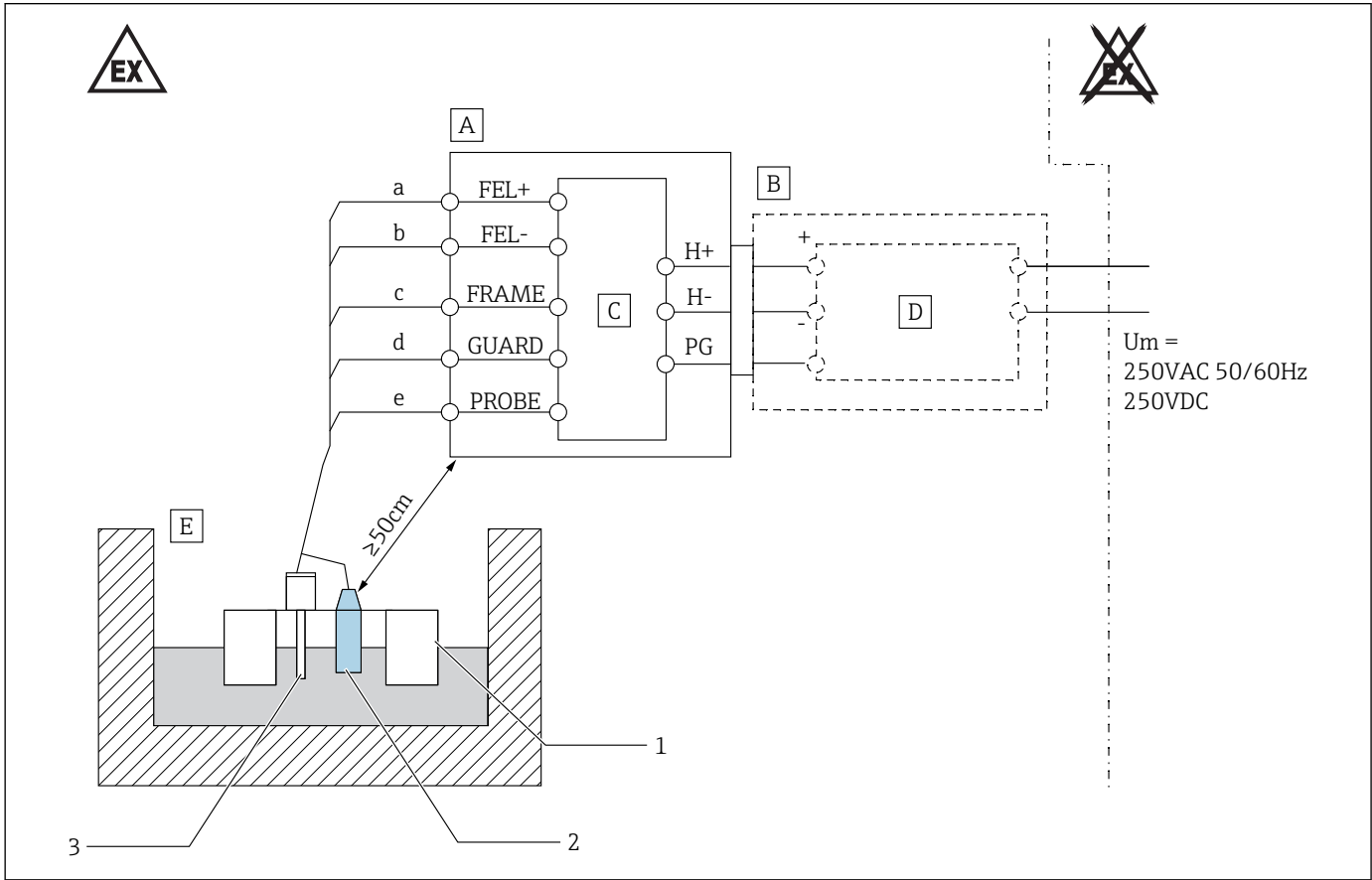
For the above conditions, also see the explosion safety instruction manuals for the converters in the following table.

| Converter version        | Approval no.   | Explosion safety instruction manual | Remarks  |
|--------------------------|----------------|-------------------------------------|--|
| NRR261-4**<br>NRR261-5** | CML 18JPN8362X | XA01840G-*                          | Installation in hazardous locations<br>NAR261-4; Ex db ia [ia Ga] IIB T4 Gb<br>NAR261-5; Ex db [ia Gb] IIB T6 Gb<br>SIL specifications |
| NRR262-4*                | CML 18JPN8362X | XA01841G-*                          | Installation in non-hazardous locations<br>[Ex ia Gb] IIB<br>SIL specifications  |

- The cable that connects the oil leak detector and a converter must have a heat-resistant temperature of at least 70 °C (158 °F).
- Install the float sensor and the oil leak detector's main unit at least 500 mm (19.69) apart, and use the cable that is included with the float sensor (30 m (98.43 ft) or shorter) as the connecting cable.
- A vibronic sensor that is installed onto a float sensor cannot be replaced or repaired individually. If it becomes damaged or it malfunctions, replace the entire float sensor system.
- When combining NAR300 with NRR261, because the built-in non-IS circuit of the NRR261 enclosure is Ex d, wiring should comply with national laws and regulations. See XA01840G for details on cable glands and reducers (adapters).
- For the oil leak detector (intrinsic safety device), converter (associated intrinsic safety device) and their connecting wiring, ensure that no current or voltage is generated that could impair the intrinsic safety function of the intrinsic safety circuit by electromagnetic induction or electrostatic induction.

**Safety instructions:**  
**Installation**

Use Oil leak detector NAR300 by configuring it as shown below.



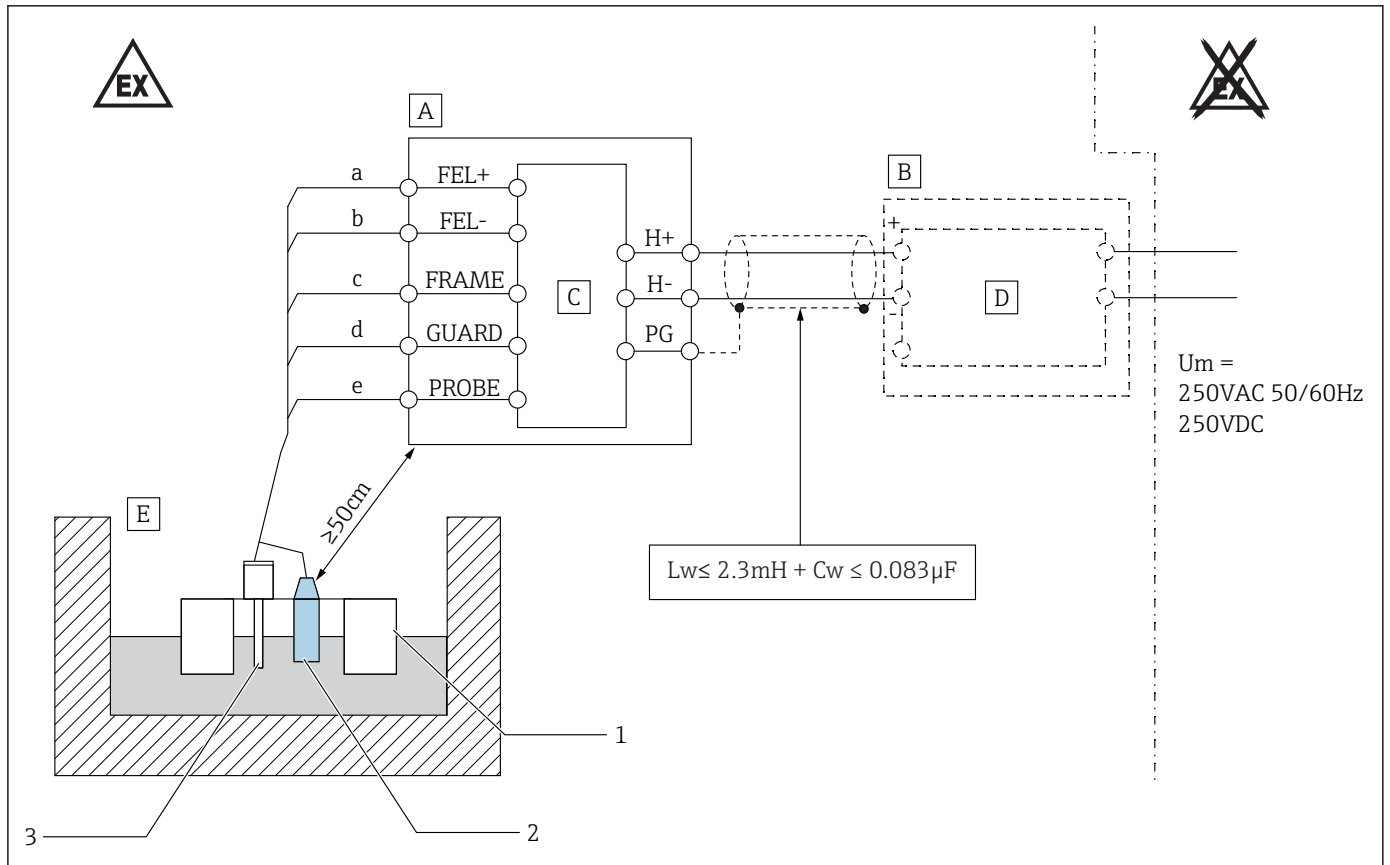
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1 NAR300-21\*\*\* (float sensor only) - NRR261-4\*\* wiring

- A Intrinsically safe enclosure
- B Ex d enclosure
- C Transmitter
- D Converter (associated intrinsic safety device)
- E Float sensor
- a Red
- b Blue
- c Yellow
- d Black
- e White
- 1 Float
- 2 Conductivity sensor
- 3 Vibrionic sensor

**i** See XA01840G for details on Converter NRR261-4\*\*\*.





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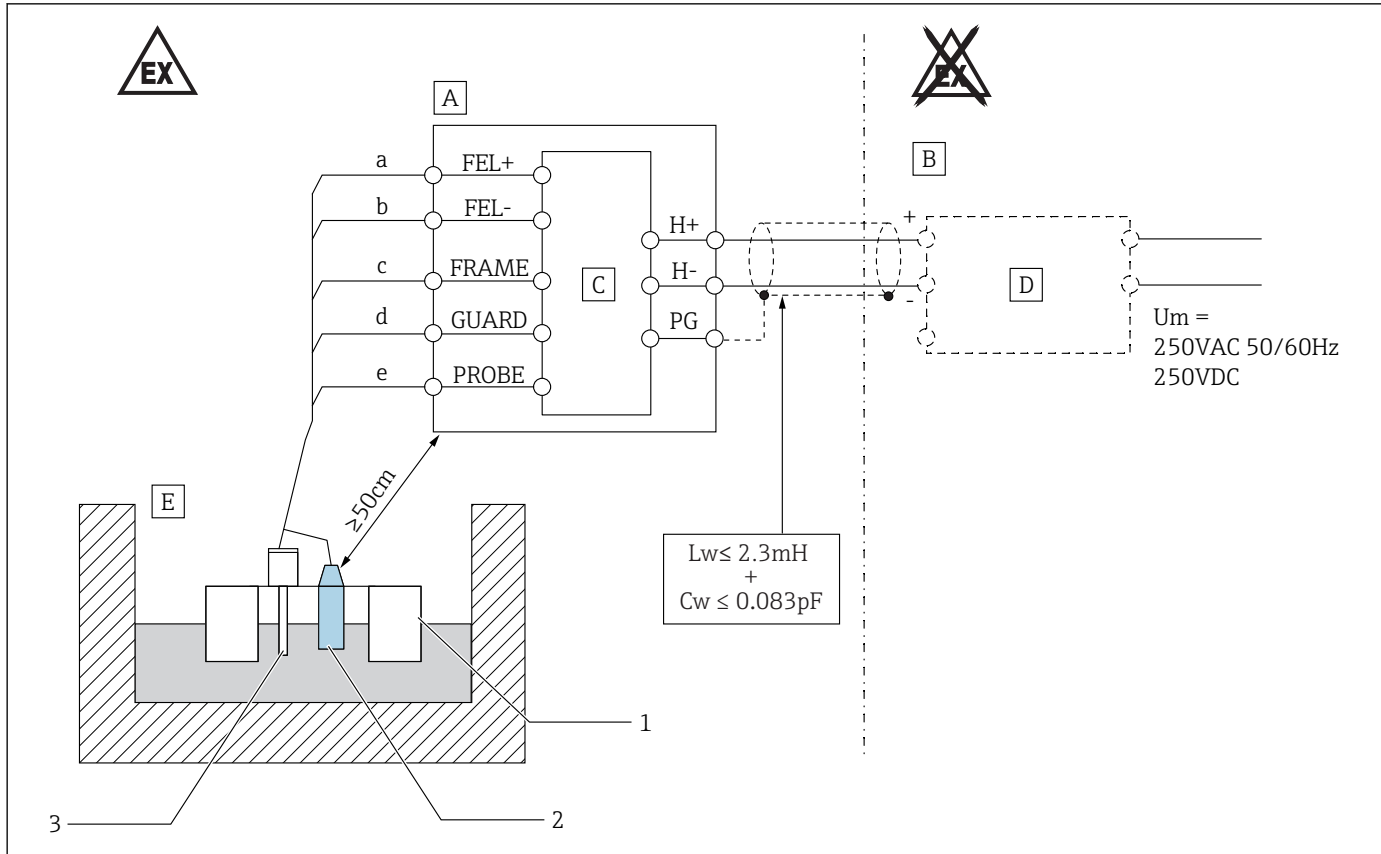
2 NAR300-25/6\*\*\*\* (float sensor + transmitter) - NRR261-5\*\* wiring

- A Intrinsically safe enclosure
- B Ex d enclosure
- C Transmitter
- D Converter (associated intrinsic safety device)
- E Float sensor
- a Red
- b Blue
- c Yellow
- d Black
- e White
- 1 Float
- 2 Conductivity sensor
- 3 Vibrionic sensor

**i** NAR300-26\*\*\*\* (high-temperature version)

- Vibrionic sensor is not installed.
- There is no wiring for FEL+ and FEL-.

See XA01840G for details on Converter NRR261-55\*\*.



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3 NAR300-25/6\*\*\*\* (float sensor + transmitter) - NRR262-4\*\* wiring

- A Intrinsically safe enclosure
- B Ex d enclosure
- C Transmitter
- D Converter (associated intrinsic safety device)
- E Float sensor
- a Red
- b Blue
- c Yellow
- d Black
- e White
- 1 Float
- 2 Conductivity sensor
- 3 Vibrionic sensor

**i** NAR300-26\*\*\*\* (high-temperature version)

- Vibrionic sensor is not installed.
- There is no wiring for FEL+ and FEL-.

See XA01841G for details on Converter NRR262-4\*\*.

See BA00402G or BA00403G for details on the following wiring arrangements.

- Wiring between NAR300 and NRR261 or NRR262
- Wiring between NAR300's transmitter and float sensor

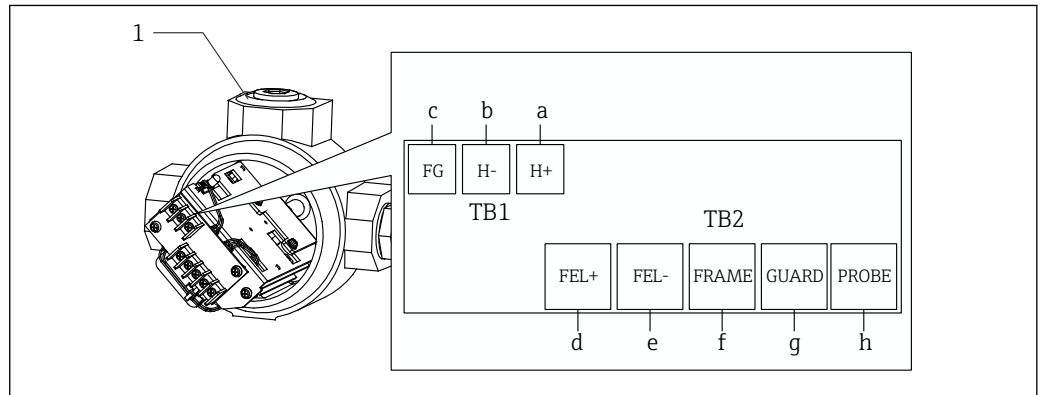
**Safety instructions: Zone 0**

- In the event of potentially explosive vapor/air mixtures, only operate the device under atmospheric conditions.
  - Temperature: -20 to +60 °C
  - Pressure: 80 to 110 kPa (0.8 to 1.1 bar)
  - Air with normal oxygen content, usually 21 % (V/V)
- If no potentially explosive mixtures are present, or if additional protective measures have been taken, the device may also be operated under non-atmospheric conditions in accordance with the manufacturer's specifications.

Connection data

Basic specifications

Connect the float sensor cable for NAR300-21\*\*\*\* to the corresponding terminal on NRR261-4\*\* repeater (transmitter) (see figure below). Terminals (a) through (c) are converter connection terminals, and terminals (d) through (h) are float sensor connection terminals.



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4 Repeater terminals for NAR300-25/26\*\*

- 1 Intrinsically safe terminal
- a Blue 1 (already wired at shipping), screw (M3)
- b Blue 2 (already wired at shipping), screw (M3)
- c Green, screw (M3)
- d Red, screw (M3)
- e Blue, screw (M3)
- f Yellow, screw (M3)
- g Black, screw (M3)
- h White, screw (M3)

| Terminal symbol |       | Wire color | Intrinsic safety parameter   | Remarks  |
|-----------------|-------|------------|--|--|
| a               | H+    | -          | $U_i = 28\text{ V}$<br>$I_i = 85\text{ mA}$<br>$P_i = 595\text{ mW}$<br>$C_i = 0\text{ nF}$<br>$L_i = 48\text{ }\mu\text{H}$ |  |
| b               | H-    |            |  |  |
| c               | FG    |            |  |  |
| d               | FEL+  | Red        | $U_o = 13\text{ V}$<br>$I_o = 46.8\text{ mA}$<br>$P_o = 152\text{ mW}$<br>$C_o = 250\text{ nF}$<br>$L_o = 58.3\text{ mH}$    | Connection with a float sensor's vibronic sensor<br>There is no wiring for NAR300-26*** (high temperature) |
| e               | FEL-  | Blue       |  |  |
| f               | FRAME | Yellow     | -  | Connection with the float sensor's conductivity sensor   |
| g               | GUARD | Black      |  |  |
| h               | PROBE | White      |  |  |



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