

# Safety Instructions


## Converter NRR261

### for oil leak detector NAR300


Ex db ia [ia Ga] (NRR261-4<sup>\*\*</sup>)

Ex db [ia Gb] (NRR261-5<sup>\*\*</sup>)

Document: XA01840G-A

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# Converter NRR261 for 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.: 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>▪ JNIOHSH-TR-46-1: 2015 (IEC60079-0:2011 Ed. 6)</li> <li>▪ JNIOHSH-TR-46-2: 2018 (IEC60079-1:2014 Ed. 7)</li> <li>▪ JNIOHSH-TR-46-6: 2015 (IEC60079-11:2011 Ed. 6)</li> <li>▪ IEC60079-25: 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 border="0" style="margin-left: 40px;"> <tr> <td style="text-align: center;">NRR261</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 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>	NRR261	–	*****...*****	+	A*B*C*D*E*F*G*...	<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>
NRR261	–	*****...*****	+	A*B*C*D*E*F*G*...							
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>							

**Extended order code: NRR261**

-  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*

NRR261

*Basic specifications*

Specification code 1 (approval)		
Selected option		Description
NRR261	4	JPN Ex; Built-in transmitter type: Ex db ia [ia Ga] IIB T4 Gb
	5	JPN Ex; Separate transmitter type: Ex db [ia Gb] IIB T4 Gb

Specification code 2 (power supply)		
Selected option		Description
NRR261	A	90 to 25 V <sub>AC</sub> 50/60 Hz
	B	22 to 26 V <sub>DC</sub>

Specification code 3 (external conductor entrance)		
Selected option		Description
NRR261	A	G3/4 x2 (Ex d), G1/2 x1 (Ex ia)
	K	G1/2 x2 (Ex d), G1/2 x1 (Ex ia)
	Q	NPT3/4 x2 (Ex d), NPT1/2 x1 (Ex ia)
	R	NPT1/2 x2 (Ex d), NPT1/2 x1 (Ex ia)
	U	M25 x2 (Ex d), M20 x1 (Ex ia)
	W	M20 x2 (Ex d), M20 x1 (Ex ia)
	Y	Special specifications

-  Cable glands come with a G → NPT or G → M adapter, except for G3/4 and G1/2.

*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**

- The ambient temperature range for Converter NRR261 is -20 to 60 °C (-4 to 140 °F).
- Connect the external grounding terminal to class A grounding ( $\leq 10 \Omega$ ) by the shortest practicable rout.
- Ensure that the power supply and generic devices do not exceed 250 V<sub>AC</sub> 50/60 Hz or 250 V<sub>DC</sub> in both normal and abnormal situations.
- For safe handling of an Oil leak detector NAR300 (intrinsically safe device) that is connected to a Converter NRR261, adhere to the following conditions.

Converter version	NAR300			Remarks
	21****	25****	26****	
NRR261-4**	✔	✘	✘	Installation in hazardous locations Ex db ia [ia Ga] IIB T4 Ga SIL specifications
NRR261-5**	✘	✔	✔	Installation in hazardous locations Ex db [ia Gb] IIB T4 Gb SIL specifications
✔ : Connectible ✘ : Not connectible				

The maximum external inductance (Lo) and maximum external capacitance (Co) of the intrinsically safe circuit and the maximum inductance (Lw) and maximum capacitance (Cw) of an external connection cable are shown below.

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

and

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

For the above conditions, also see the safety instructions for the converters in the following table.

Converter version	Approval no.	Explosion safety instruction manual	Remarks
NAR300-2**	CML 18JPN8362X	XA01839G-*	Installation in hazardous locations Float sensor; Ex ia IIB T5 Ga Transmitter; Ex ia [ia Ga] IIB T4 SIL specifications

**Ex d enclosure**

- After de-energizing, delay 10 minutes before opening the cover for the terminal compartment and electrical compartment.
- Only the following certified cable entry devices can be used. The "standard" version in the table below is installed on the products.

*Cable gland*

Type	Brand	Remarks
KXBF 20* , KXBF 25* *	EX Kokusan Co., Ltd.	Standard
SFLU10-*-* , SFLU20-*-*	SAFTEC Corporation	Optional
E1WF / ***-M20/M25/M32	Shimada Electric Co., Ltd.	Optional
EXTC-16M*	Shimada Electric Co., Ltd.	Optional
OSNJ-A2FF 20*/25*/32*	OSCG Co., Ltd.	Optional

**Reducer (adapter)**

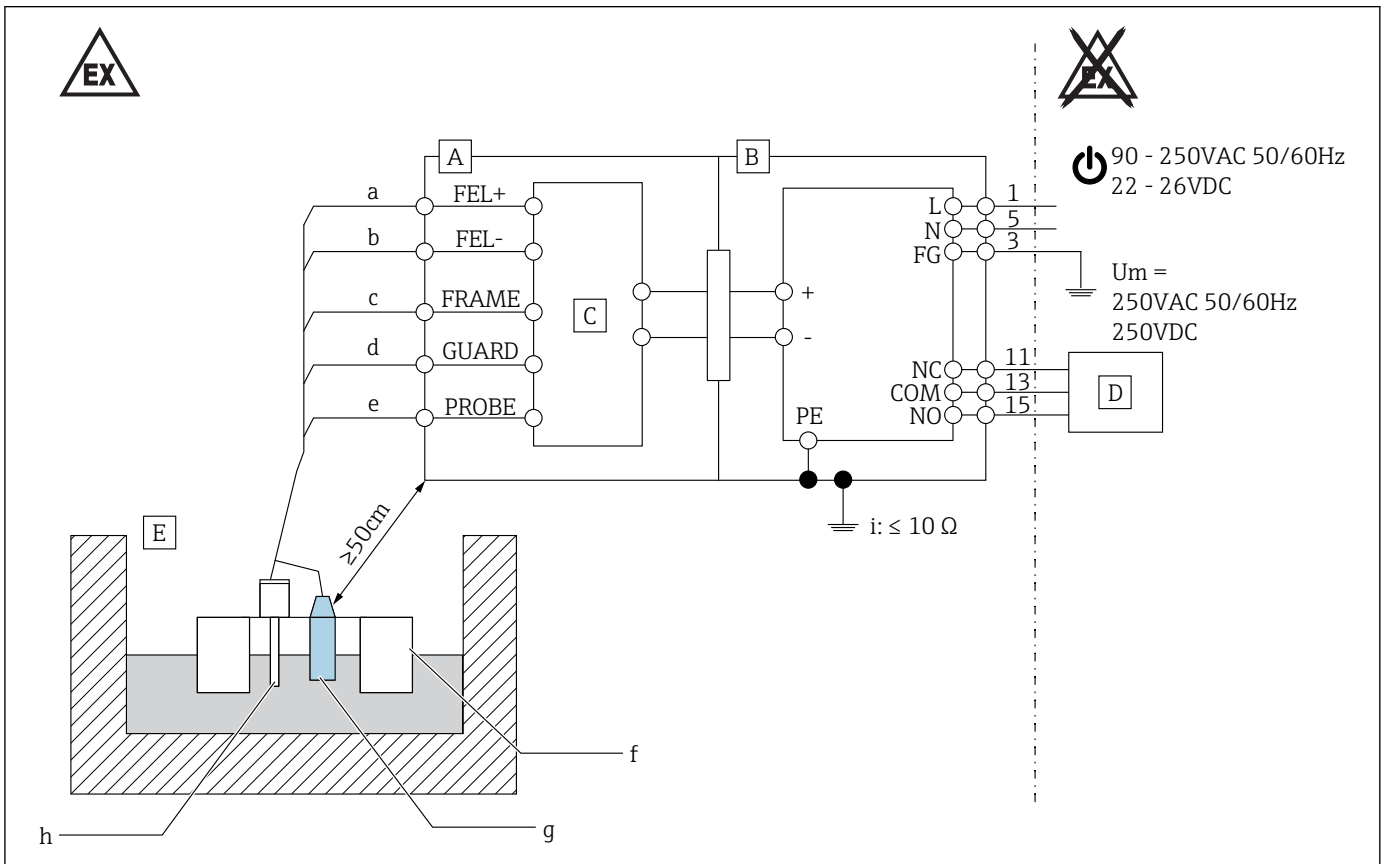
A reducer is required when installing cable glands. Use a reducer provided by Endress+Hauser.

- The Oil leak detector (intrinsic safety device), converter (associated intrinsic safety device) and these 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.
- Fuse F1 ratings are as follows:
  - NRR261-\*A\* (AC type): 250 V 0.5 A,  $\varnothing$ 5 X 20
  - NRR261-\*B\* (DC type): 250 V 0.5 A,  $\varnothing$ 5 X 20



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

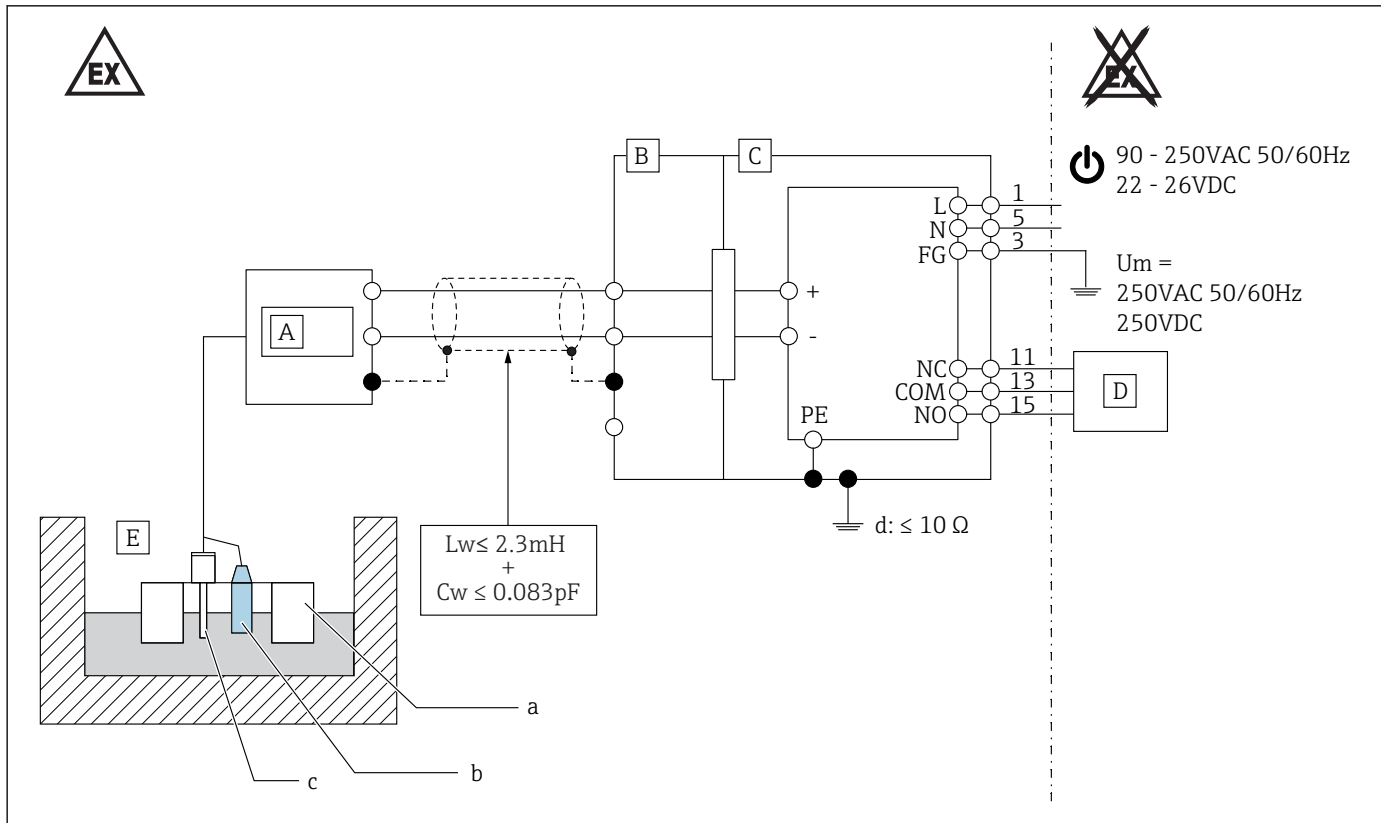
Use Converter NRR261 by configuring it as shown below.



1 NRR261-4\*\* and NAR300-21\*\*\* wiring

- A Intrinsically safe enclosure
- B Ex d enclosure
- C Transmitter
- D Non-IS device
- E Float sensor
- a Red
- b Blue
- c Yellow
- d Black
- e White
- f Float
- g Conductivity sensor
- h Vibrionic sensor
- i Class A grounding

 See XA01839G for details on Float sensor NAR300-21\*\*\*.



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2 NRR261-5\*\* and NAR300-25/6\*\*\*\* wiring

- A Transmitter
- B Intrinsically safe enclosure
- C Ex d enclosure
- D Non-IS device
- E Float sensor
- a Float
- b Conductivity sensor
- c Vibronic sensor
- d Class A grounding

- See XA01839G for details on Float sensor NAR300-25\*\*\* and NAR300-26\*\*\*.
  - See BA00402G or BA00403G for details on the following wiring arrangements.
    - Wiring between NAR300 and NRR261 or NRR262
    - Wiring between the transmitter of NAR300 and the float sensor

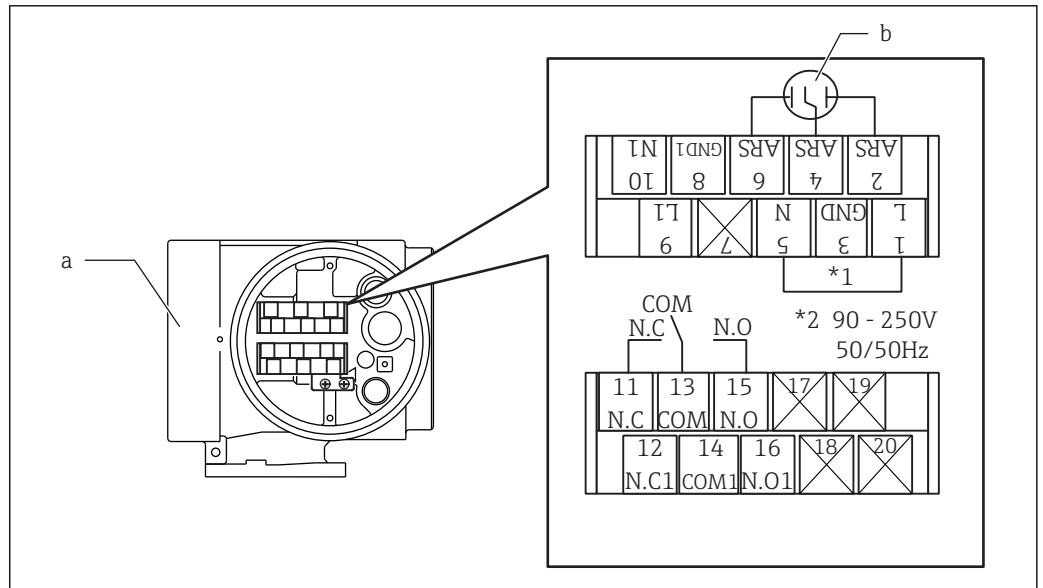
#### Safety instructions: Zone 0

- 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

NRR261-4/5\*\* pressure-resistant terminal connection



3 Ex d terminal

a NRR261

b Power supply arrester (installed)



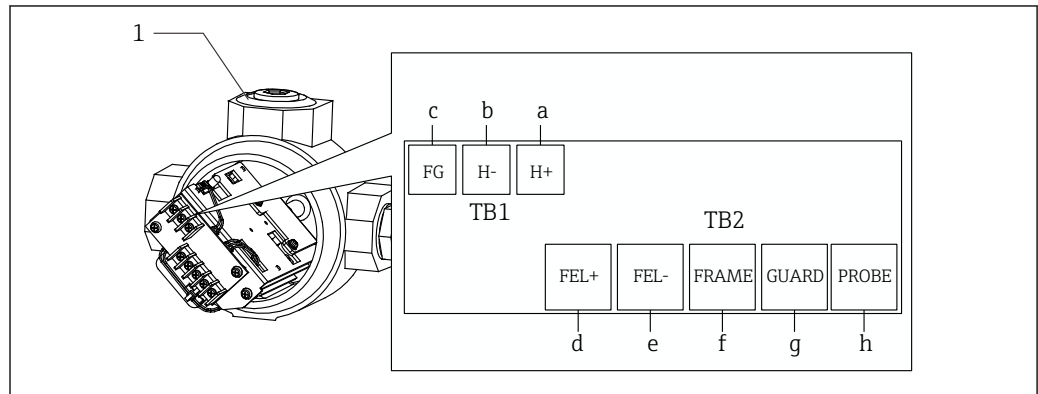
1\*: GND: Connected when using a power cable with FG.

2\*: When the power supply is 22 to 26 V<sub>DC</sub>, a terminal number "L" is "+" (plus) and "N" is "-" (minus).

Terminal symbol		Rating	Remarks
1	L	90 to 250 V <sub>AC</sub> , 50/60 Hz Um = 250 V <sub>AC</sub> /250 V <sub>DC</sub>	NRR261-4A* or NRR261-5A*
3	GND		
5	N		
1	+	22 to 26 V <sub>DC</sub> Um = 250 V <sub>AC</sub> /250 V <sub>DC</sub>	NRR261-4B* or NRR261-5B*
5	-		

NRR261-4\*\* intrinsically safe terminal connection

Connect the cable for Float sensor NAR300-21\*\*\*\* to the corresponding terminal on the NRR261-4\*\* transmitter.



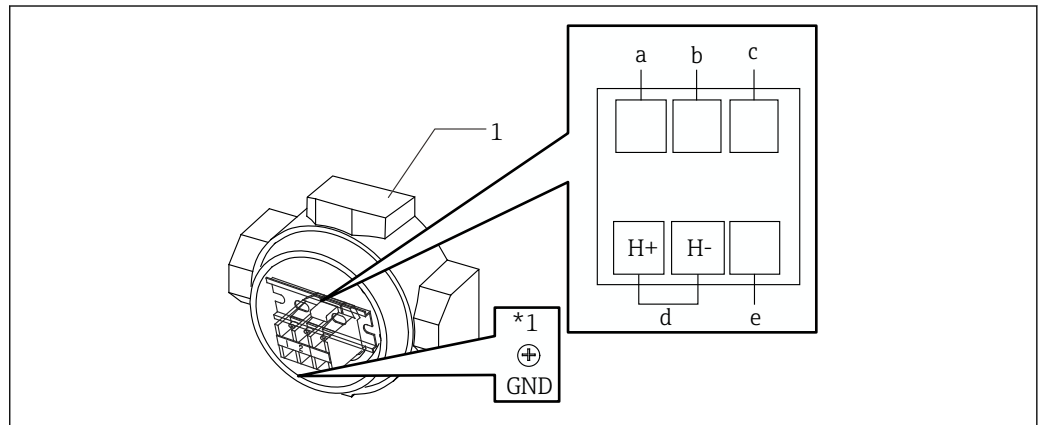
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4 NRR261-4\*\* transmitter terminal

- 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
d	FEL+	Red	$U_0 = 13\text{ V}$ $I_0 = 46.8\text{ mA}$ $P_0 = 152\text{ mW}$ $C_0 = 250\text{ nF}$ $L_0 = 58.3\text{ mH}$	Connection with the float sensor's vibronic sensor 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		

NRR261-5\*\* intrinsically safe terminal connection



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5 Terminals in an intrinsically safe terminal box

- 1 Intrinsically safe terminal box
- a Blue 1 (already wired at shipping), screw (M4)
- b Blue 2 (already wired at shipping), screw (M4)
- c No connection, screw (M4)
- d Input from the transmitter, screw (M4)
- e No connection, screw (M4)

**i** \*1: Normally, only FG on NAR300-25/6\*\*\*\* is shielded; however, depending on the installation environment, either only the GND of the NRR261-5\*\* container or both of the GND are connected.

Terminal symbol		Intrinsic safety parameter
d	H+	$U_0 = 28\text{ V}$ $I_0 = 85\text{ mA}$ $P_0 = 595\text{ mW}$ $C_0 = 83\text{ nF}$ $L_0 = 2.4\text{ mH}$
	H-	

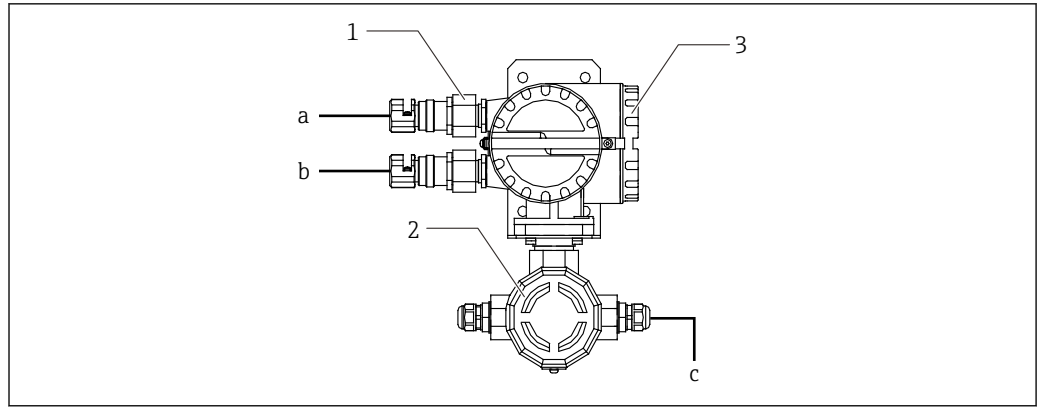


# Converter NRR261 for oil leak detector NAR300

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Attachment: Cable gland



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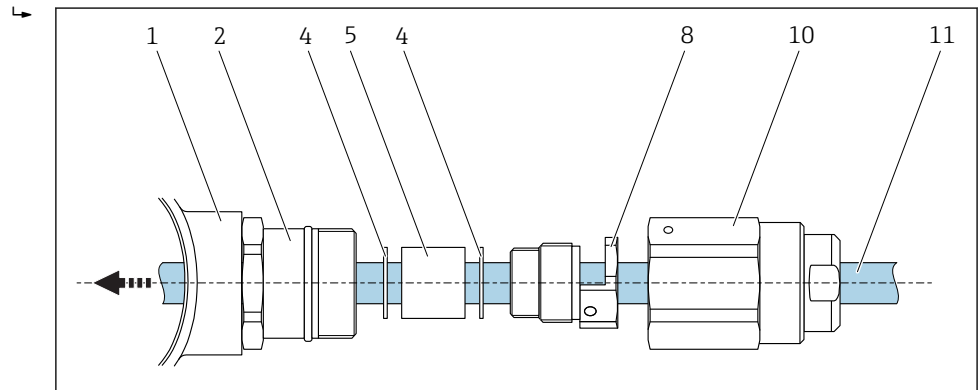
6 NAR261 cable gland

- 1 Cable gland
- 2 Intrinsically safe terminal compartment
- 3 Ex d terminal compartment
- a Alarm output
- b AC or DC power supply
- c NAR300 connection cable

Cable gland installation procedure

**i** A cable gland is installed on NRR261-4\*\* or NRR261-5\*\* at the factory before shipping.

1. Remove union nut/B. coupling (10).
2. Remove washer (4), packing (5) and packing gland (8), and pass through cable (11) as shown below.



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- 1 Terminal box
- 2 Cable gland
- 4 Washer
- 5 Packing
- 8 Packing gland
- 10 Union nut /B. coupling
- 11 Cable



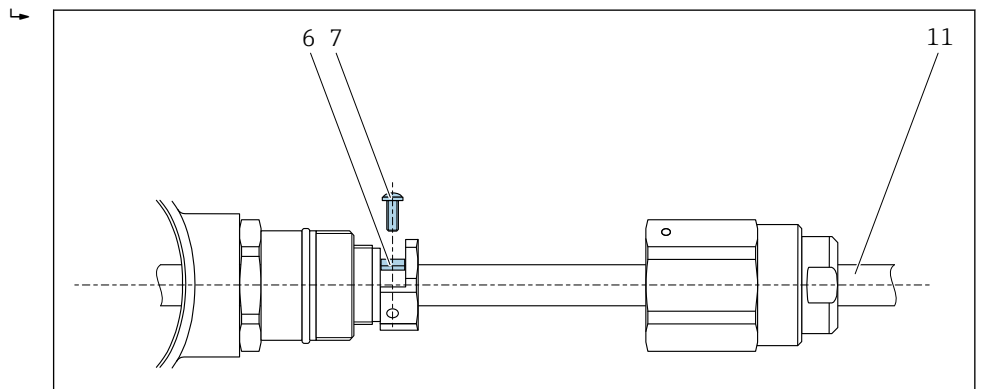
*Cable gland M20*

Cable diameter (mm)		Packing inner diameter (mm)	Tightening torque (N·m)
Minimum	Maximum		
ø 7.0	ø 8.0	ø 8.0	15
ø 8.1	ø 9.0	ø 9.0	18
ø 9.1	ø 10.0	ø 10.0	18
ø 10.1	ø 11.0	ø 11.0	20
ø 11.1	ø 12.0	ø 12.0	20

*Cable gland M25*

Cable diameter (mm)		Packing inner diameter (mm)	Tightening torque (N·m)
Minimum	Maximum		
ø 11.1	ø 12.0	ø 12.0	20
ø 12.1	ø 13.0	ø 13.0	23
ø 13.1	ø 14.0	ø 14.0	23
ø 14.1	ø 15.0	ø 15.0	25
ø 15.1	ø 16.0	ø 16.0	25

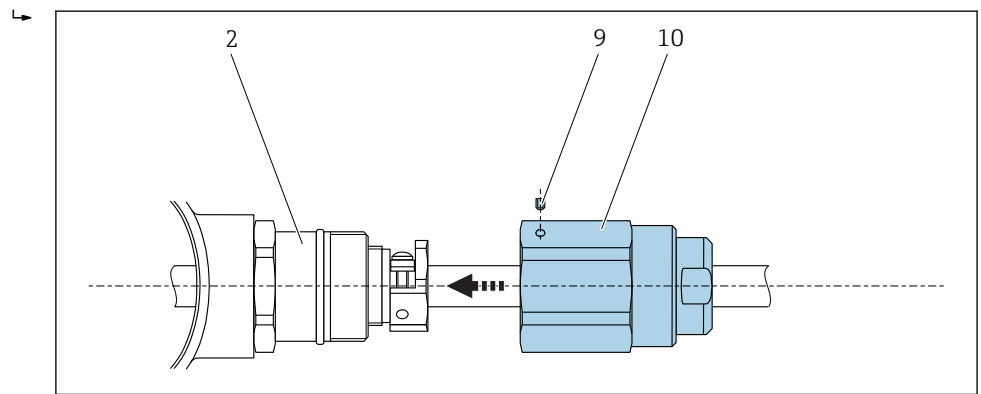
4. Secure the cable (11) firmly with clamp (6) and set screws (7). In this case the tightening torque is 1 Nm.



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- 6 Clamp
- 7 Set screw
- 11 Cable

5. Screw the union nut/B. coupling (10) onto cable gland (2) and tighten the lock screw (9) using a hexagon wrench (nominal 1.5).



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- 2 Cable gland  
9 Lock screw  
10 Union nut/B. coupling (G 1/2)

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