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Safety Instructions
Oil leak detector NAR300

Ex ia (float sensor)
Ex ia [ia Ga] (transmitter)

Endress+Hauser
People for Process Automation

Oil leak detector
NAR300

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Associated documentation

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

- BA00402G (NAR300 system)
- BA00403G (NAR300 system for high temperature)

Supplementary documentation

Installation guidelines

JNIOSH-TR-No.44: "User guidelines for factory explosion-proof equipment (2012)"

Manufacturer's certificates

Certification

Approval no.:
CML 18JPN8362X

Approval numbers are given for the certification of the following standards (depending on the device version).

- JNIOSH-TR-46-1: 2020 (IEC60079-0:2017 Ed. 7)
- JNIOSH-TR-46-6: 2015 (IEC60079-11:2011 Ed. 6)
- IEC 60079-25:2020-6 Ed 3.0

Manufacturer address

Endress+Hauser Yamanashi Co., Ltd.

406-0846

862-1 Mitsukunugi, Sakaigawa-cho, Fuefuki-shi, Yamanashi

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

NAR300	–	*****....*****	+	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: 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	Float sensor for high temperature + Transmitter: Ex ia[ia Ga] IIB T4 Gb
	9	Other float forms (2x cylinder type, dumbbell-type, no tuning fork sensor, etc.)

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

The output represents the output of the transmitter (sensor I/F Ex box).

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	100 m (328.08 ft) or less in length and other than A to F above

The signal line represents the length of a signal cable between the float sensor and the transmitter (sensor I/F Ex box).

Specification code 5 (external conductor inlet)		
Selected option		**Description**
NAR300	A	Not selected
	B	G1/2
	C	NPT1/2
	F	M20
	Y	Inlets 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.
- Environmental conditions: overvoltage category II, Pollution degree 2

Safety instructions: Special conditions

Ambient temperature range for NAR300 transmitter	All specifications	−20 to 60 °C (−4 to 140 °F)
Float sensor's measured object (pit water) temperature	NAR300-21 / NAR300-25	−20 to 60 °C (−4 to 140 °F)
	NAR300-26 (high temperature)	−20 to 100 °C (−4 to 212 °F)

Ensure that pit water does not freeze.

For safe handling of a converter (intrinsic safety-related device) connected to NAR300, adhere to the following conditions.

The combinations of NAR300 with NRR261 or NRR262 are as follows:

Converter	**NRR261-**		**NRR262-**	**Notes**
Transmitter	**4****	**5****	**4***	
NAR300-21****	✓	✗	✗	Installation in hazardous locations: Float sensor; Ex ia IIB T5 Ga Transmitter; Ex ia [ia Ga] IIB T4 SIL specifications
NAR300-25****	✗	✓	✓	

Converter	NRR261-		NRR262-	Notes
Transmitter	4**	5**	4*	
NAR300-26****	☒	☑	☑	

☑ : Connectible
☒ : Not connectible

The allowable inductance (Lo) and allowable capacitance (Co) of an intrinsically safe circuit, as well as the maximum inductance (Lw) and the maximum capacitance (Cw) of an external connection cable, are as follows:

Cw < Co - 0 nF (Ci) = 0.083 µF
and
Lw < Lo - 48 µH (Li) = 2.3 mH

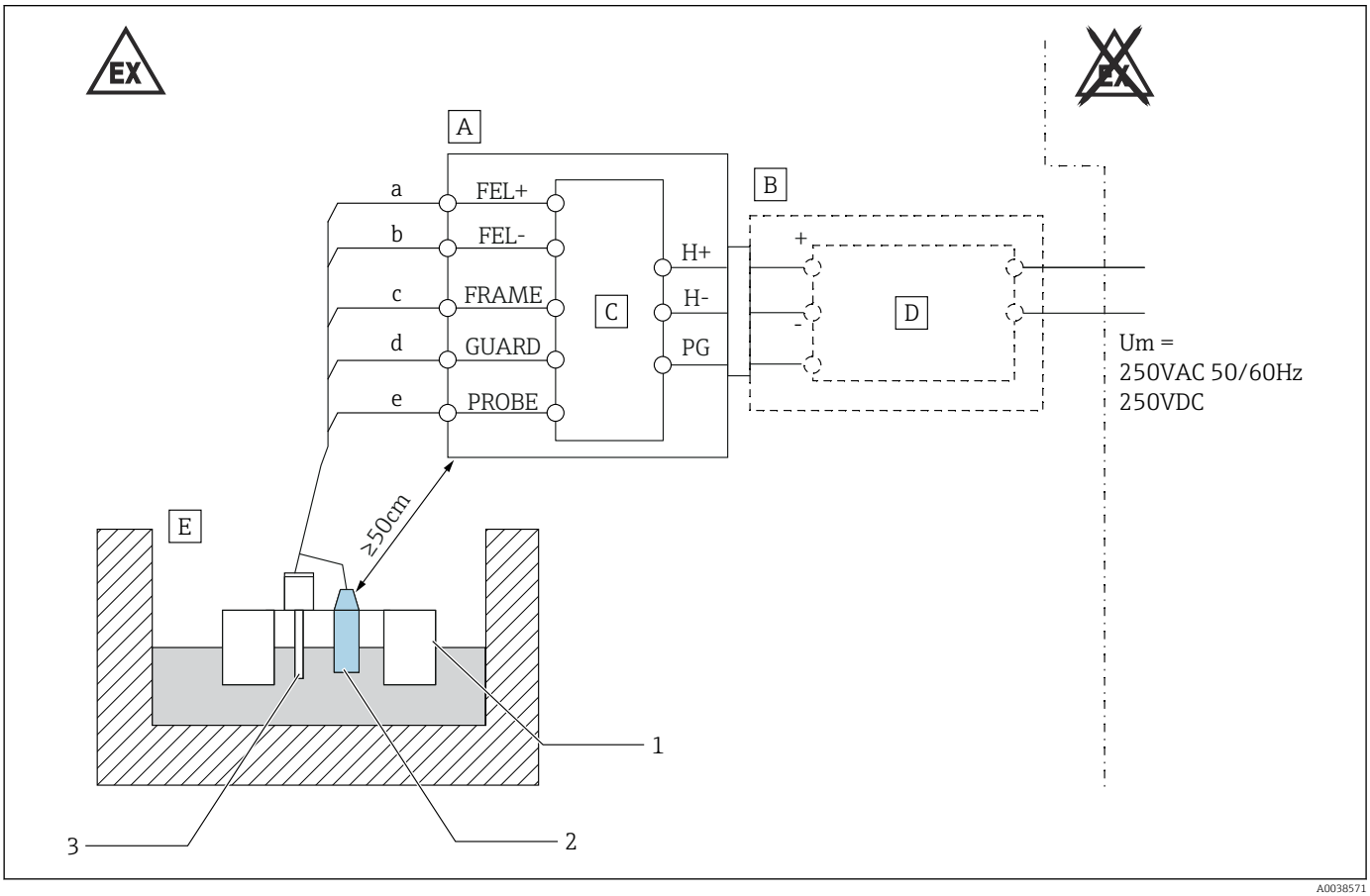
For the above conditions, also refer to the explosion safety instruction manuals for the converters in the following table.

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

- To connect an oil leak detector and a converter, use a cable that can withstand a temperature of at least 70 °C (158 °F).
- Install a float sensor and the main unit of an oil leak detector 500 mm (19.69) apart, and use the connection cable that is included with the float sensor (30 m (98.43 ft) or less).
- A tuning fork 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. Refer to XA01840G for details on cable glands and reducers (adapters).
- For the oil leak detector (intrinsically safe device), converter (intrinsic safety-related 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

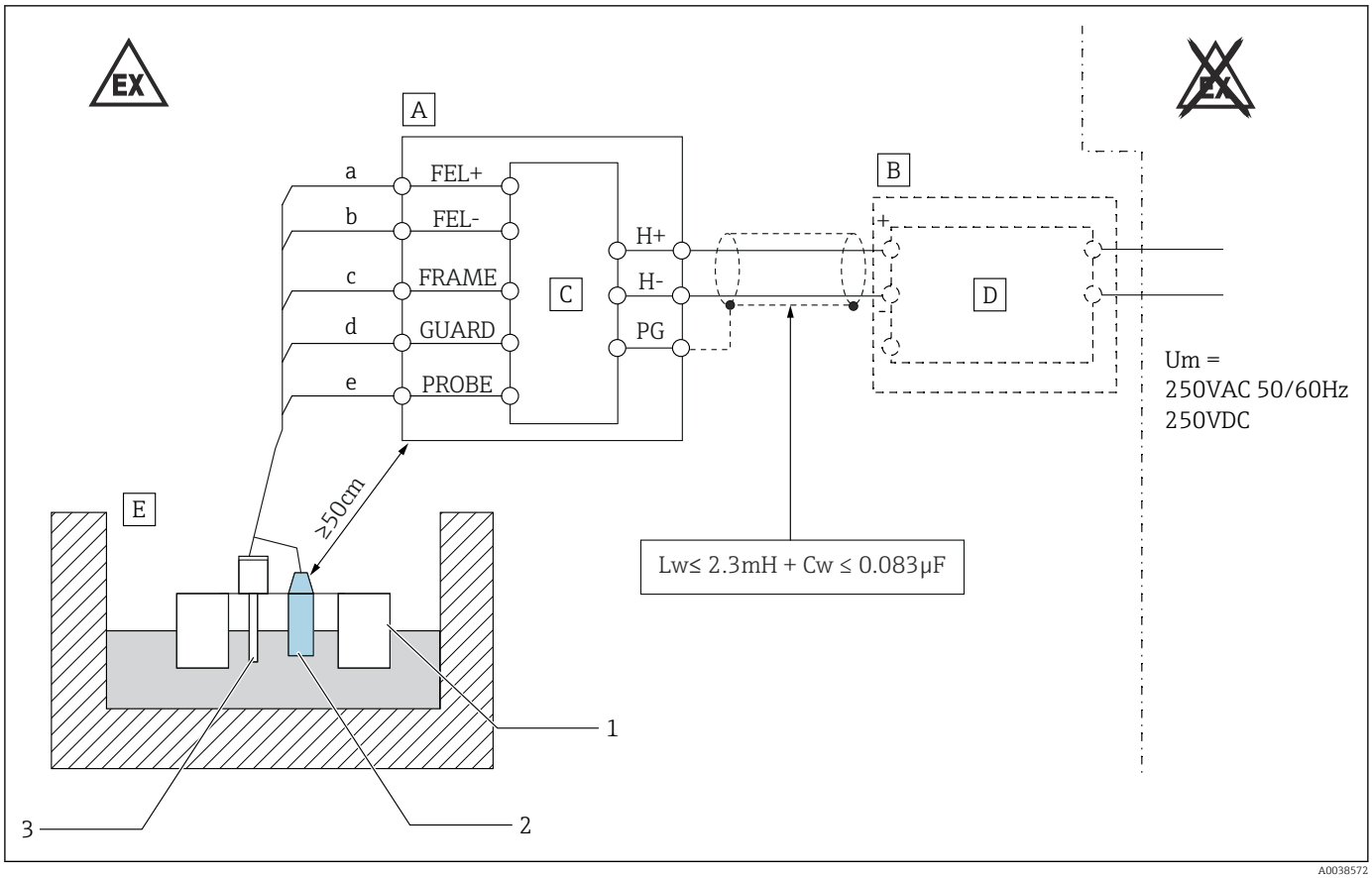
Use oil leak detector NAR300 by configuring it as shown below.



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

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

Refer to XA01840G for details on Converter NRR261-4***.

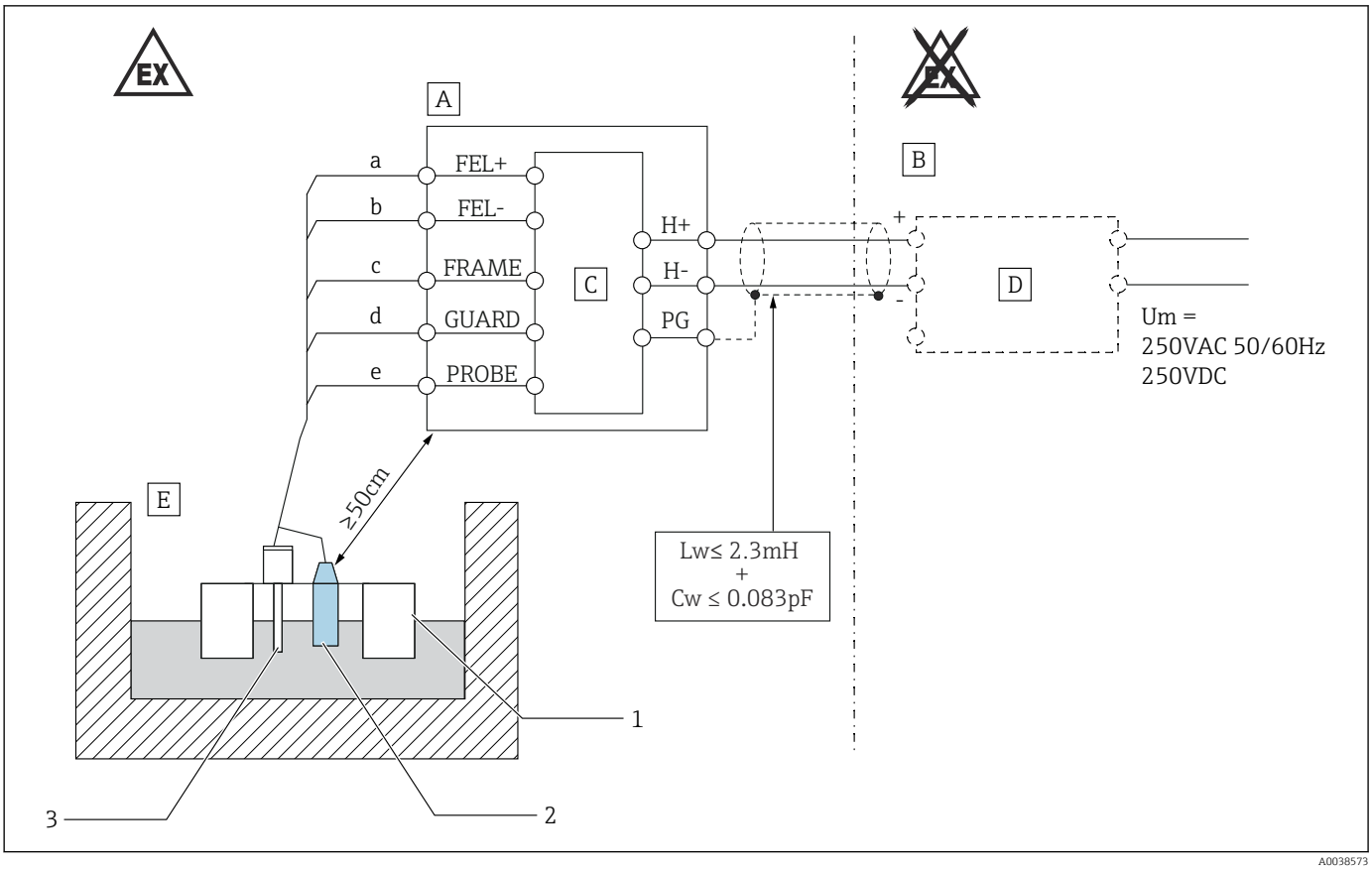


2 *NAR300-25/6**** (float sensor + transmitter) - NRR261-5** wiring*

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

NAR300-26** (high-temperature version)**
- Tuning fork sensor is not installed.
- There is no wiring for FEL+ and FEL-.

Refer to XA01840G for details on Converter NRR261-55**.



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

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

NAR300-26** (high-temperature version)**
- Tuning fork sensor is not installed.
- There is no wiring for FEL+ and FEL-.

Refer to XA01841G for details on Converter NRR262-4**.

Refer to BA00402G or BA00403G for details on the following wiring arrangements.

- Wiring between NAR300 and NRR261 or NRR262
- Wiring of NAR300, transmitter, and float sensor

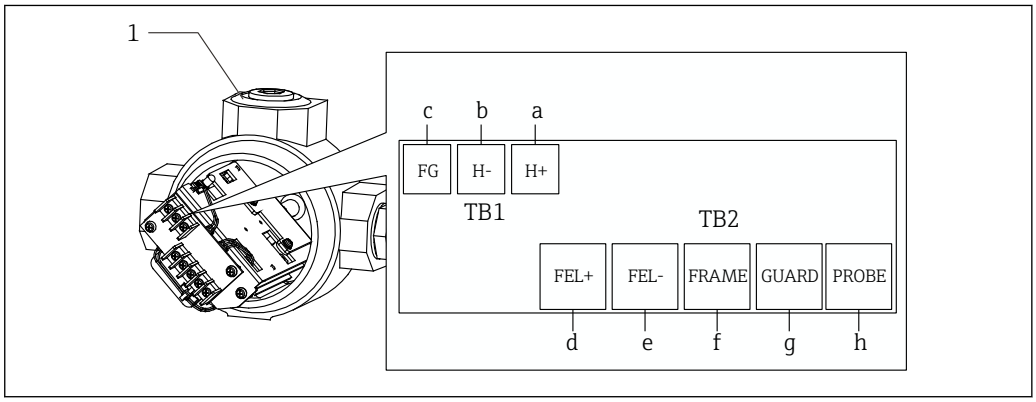
Safety instructions: Zone 0

- 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 the NRR261-4** transmitter (sensor I/F Ex box) (see diagram below). Terminals (a) through (c) are converter connection terminals, and terminals (d) through (h) are float sensor connection terminals.



4 *Transmitter terminals for NAR300-25/26***

1 Ex [ia] terminal
a Blue 1 (already wired at shipping)/Thread (M3)
b Blue 2 (already wired at shipping)/Thread (M3)
c Green/Thread (M3)
d Red/Thread (M3)
e Blue/Thread (M3)
f Yellow/Thread (M3)
g Black/Thread (M3)
h White/Thread (M3)

Terminal symbol		Wire color	Intrinsic safety parameter	Remarks
a	H+	-	Ui = 28 V Ii = 93 mA Pi = 650 mW Ci = 0 nF Li = 48 µH	
b	H-			
c	FG			
d	FEL+	Red	Uo = 13 V Io = 46.8 mA Po = 152 mW Co = 250 nF Lo = 58.3 mH	Connecting with the tuning fork sensor of a float 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		

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