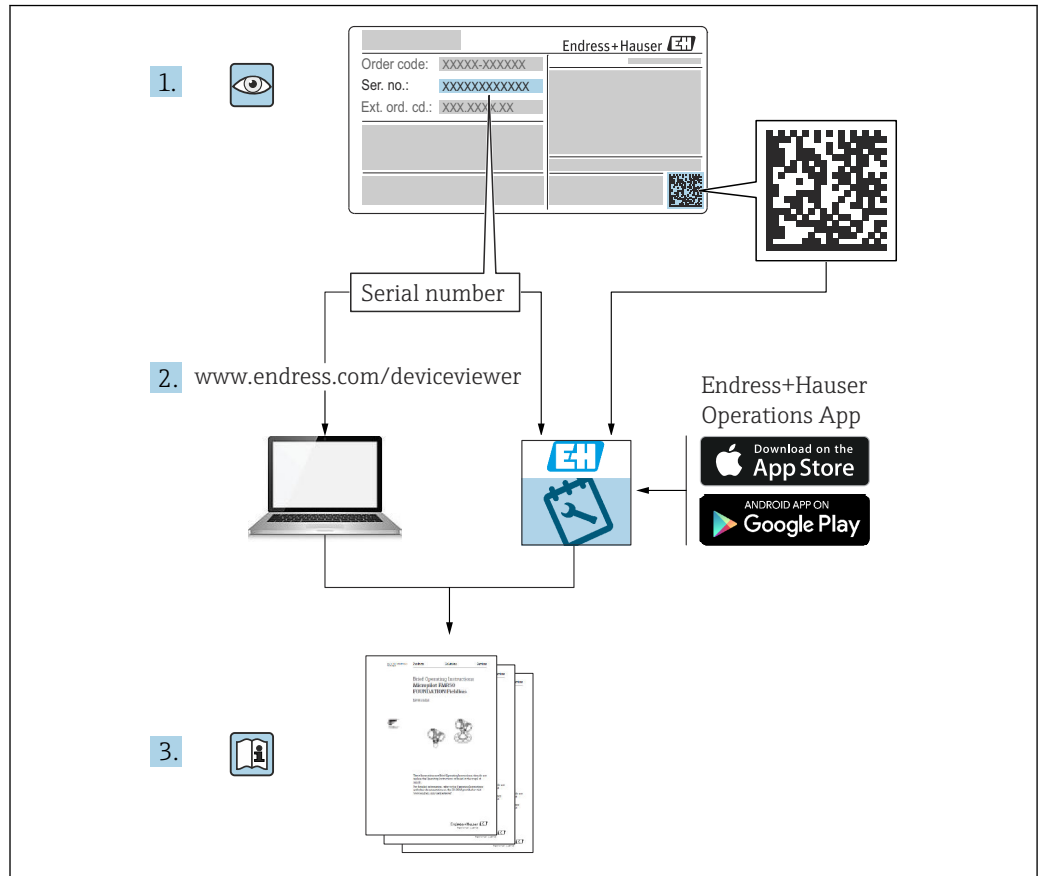


Operating Instructions

NAR300 system

Oil leak detector float sensor





A0023555

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1 Document information

1.1 Document function

These Operating Instructions contain all the information required in the various life cycle phases of the device: from product identification, incoming acceptance and storage, to installation, connection, operation and commissioning, through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct and alternating current
	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Protective earth (PE) Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: ■ Interior ground terminal: protective earth is connected to the mains supply. ■ Exterior ground terminal: device is connected to the plant grounding system.

1.2.3 Tool symbols



Phillips head screwdriver



Flat blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench

1.2.4 Symbols for certain types of information and graphics



Permitted

Procedures, processes or actions that are permitted



Preferred

Procedures, processes or actions that are preferred



Forbidden

Procedures, processes or actions that are forbidden



Tip

Indicates additional information



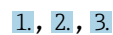
Reference to documentation



Reference to graphic



Notice or individual step to be observed



Series of steps



Result of a step



Visual inspection



Operation via operating tool



Write-protected parameter

1, 2, 3, ...

Item numbers

A, B, C, ...

Views



Safety instructions

Observe the safety instructions contained in the associated Operating Instructions



Temperature resistance of the connection cables

Specifies the minimum value of the temperature resistance of the connection cables

1.3 Additional documentation

The following documentation types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads):



For an overview of the scope of the associated Technical Documentation, refer to the following:

W@M Device Viewer (www.endress.com/deviceviewer): Enter the serial number on the nameplate.

1.3.1 Technical Information (TI)

Planning aid

This document contains all technical data related to the device, as well as an overview of accessories and other products that can be ordered for the device.

1.3.2 Brief Operating Instructions (KA)

Instructions for using the system for the first time

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.3.3 Operating Instructions (BA)

Operating Instructions contain all the information required for all stages in the device life cycle (from product identification, incoming acceptance, storage, mounting, connection, operation, and setting to troubleshooting, maintenance, and disposal).

1.3.4 Safety Instructions (XA)

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.



The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

2 Safety-related basic instructions

2.1 Basic safety instructions

2.1.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

Applications and measured materials

Equipment intended for use in hazardous locations, sanitary applications, or high-risk applications due to process pressure have the corresponding label attached to their nameplates.

To ensure that the device remains in proper condition for the operation time:

- ▶ Only use the device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ▶ Check the nameplate to ensure that the ordered equipment has the correct specifications for the certification-related area (example: explosion proof, safety of pressure vessels).
- ▶ If the device is not operated at an atmospheric temperature, compliance with the relevant basic conditions specified in the relevant device documentation is absolutely essential.
- ▶ Provide permanent protection for the equipment against corrosion caused by environmental effects.
- ▶ Do not exceed the limit values in "Technical Information."

The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to local/national regulations.

2.4 Operational safety

Risk of injury!

- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The operator is responsible for interference-free operation of the device.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers:

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories from the manufacturer.

Hazardous area

To eliminate danger to persons or the facility when the device is used in the hazardous area (e.g. explosion protection):

- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these instructions.

2.5 Product safety

This device was designed in accordance with GEP (Good Engineering Practice) to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. It meets the general safety standards and legal requirements.

2.5.1 CE mark

This measuring system meets the legal requirements of the applicable EU Directive. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser affixes the CE mark to this equipment as a sign of guarantee that this equipment has successfully passed testing.

3 Product description

The NAR300 system is designed to be installed in a pit within an oil retaining dike, a plant, or a sump pit near a pump yard, where it can provide the ultimate in leak detection function for oils, such as petrochemicals and vegetable oils. The system utilizes two different detection principles, conductivity and tuning fork, to monitor detection status individually. With a two-stage alarm logic process, it has an extremely low false alarm rate, and this ensures the safety of the tank yard with an accurate yet simple device configuration.

NOTICE

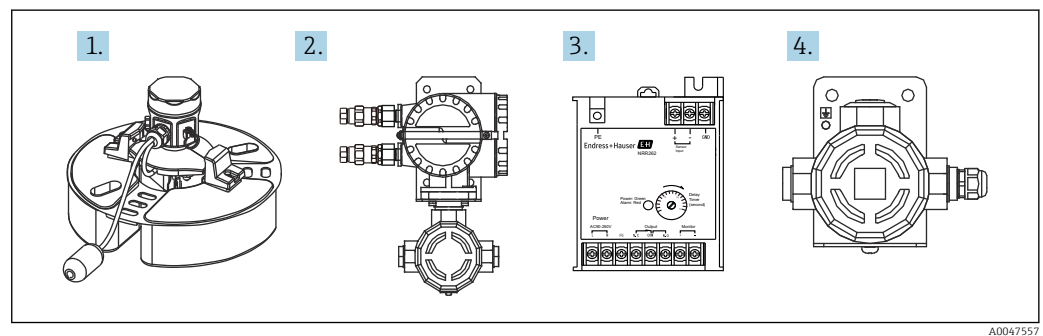
TIIS specifications

These Operating Instructions are not intended for products with TIIS specifications.

- If you are using a product with TIIS specifications, download and refer to BA00403G/JA/23.22-00 or an earlier version from our website (www.endress.com/downloads).

3.1 Product design

The NAR300 system is configured in combination with mainly the following products.



1 Product design

- 1 Float sensor NAR300
- 2 Ex d [ia] converter NRR261
- 3 Ex [ia] converter NRR262
- 4 Ex [ia] sensor I/F Ex box

3.2 Technical data

3.2.1 Float sensor NAR300

Item	Description
Protection class	IP67 (outdoor installation)
Power supply	Supplied by a sensor I/F Ex box or NRR261 (integrated type with NAR300 sensor I/F Ex box)
Wetted material	■ Float: SUS316L, conductivity sensor: SUS316+PTFE ■ Tuning fork sensor: equivalent to SUS316L
Detection sensitivity ¹⁾	■ Water-filled pit: 10 ± 1 mm (0.04 in) with kerosene at the time of factory shipping ■ Empty pit: 50 ± 5 mm (0.17 in) with kerosene

Item	Description
I/O cable	Dedicated shielded cable (PVC) as well as with cable float (Standard 6 m (19.69 ft))
Weight	Approx. 2.5 kg (5.5 lb) (including the 6 m (19.69 ft) dedicated shielded cable (PVC))

- 1) Set with oil (kerosene: approx. 0.8 in density), lower-layer water (water: approx. 1.0 in density), static liquid surface state, and/or without surface tension.

3.2.2 Ex [ia] sensor I/F Ex box

Item	Description
Protection class	IP67 (outdoor installation)
Power supply	Supplied by NRR261 or NRR262
Cable entry	■ NAR300 (float sensor) side: G1/2, with cable gland ■ NRR261 or NRR262 (converter) side: G1/2, NPT1/2, M20
Weight	3.2 kg (7.1 lb)
Materials	Housing/cover: aluminum casting

3.2.3 Ex d [ia] converter NRR261

Item	Description
Protection class	IP67 (outdoor installation)
Permissible power-supply voltage range	■ AC power supply type: 90 to 250 V_{AC}, 50/60 Hz ■ DC power supply type: 22 to 26 V_{DC} (built-in power supply arrester)
Maximum power consumption	■ AC power supply type: 2 VA ■ DC power supply type: 3 W
Output	■ Contact output: 1SPDT ■ Maximum contact rating: 250 V_{AC}, 1 A, 100 VA or 100 V_{DC}: 1 A, 25 W ■ Fail-safe function: activated when the power supply is turned off and under frozen conditions (refer to "Alarm output operation table")
Cable entry	■ G3/4 x2 (Ex d), G1/2 x1 (Ex ia) ■ G1/2 x 2 (Ex d), G1/2 x 1 (Ex ia) ■ NPT3/4 x2 (Ex d), NPT1/2 x1 (Ex ia) ■ NPT1/2 x2 (Ex d), NPT1/2 x1 (Ex ia) ■ M25 x2 (Ex d), M20 x1 (Ex ia) ■ M20 (Ex d), M20 x1 (Ex ia) ■ JPNEx explosion-proof specifications are equipped with cable gland model SFLU
Lightning arrester	Built-in (power supply arrester)
Weight	Approx. 10 kg (22 lb)
Materials	Housing/cover: aluminum casting

3.2.4 Ex [ia] converter NRR262

Item	Description
Protection class	IP20 (indoor installation), installed in non-hazardous locations
Permissible power-supply voltage range	■ AC power supply type: 90 to 250 V_{AC}, 50/60 Hz ■ DC power supply type: 22 to 26 V_{DC} (built-in power supply arrester)
Maximum power consumption	■ AC power supply type: 2 VA ■ DC power supply type: 3 W

Item	Description
Output	▪ Contact output: 1SPDT ▪ Maximum contact rating: 250 V_{AC}, 1 A, 100 VA or 100 V_{DC}: 1 A, 25 W ▪ Fail-safe function: activated when the power supply is turned off and under frozen conditions (refer to "Alarm output operation table")
Lightning arrester	Built-in (power supply arrester)
Weight	Approx. 0.6 kg (1.3 lb)
Materials	Housing: plastic

3.3 Process conditions

3.3.1 Float sensor NAR300 / sensor I/F Ex box

Item	Description
Requirements for substance detection	▪ Density is 0.7 g/cm³ or higher but less than 1.0 g/cm³ ▪ Floats in water (if the density is 0.9 g/cm³ or higher, the viscosity should be 1 mPa·s or higher. Water ≈ 1 mPa·s) ▪ Water-insoluble ▪ Non-conductive ▪ Liquid ▪ Low affinity to water (a layer of the detected substance must form on the water surface)
Operating temperature	▪ Ambient temperature: -20 to 60 °C (-4 to 140 °F) ▪ Measured liquid temperature: 0 to 60 °C (32 to 140 °F)
Requirements for pit water	▪ Density is 1.0 g/cm³ or higher but less than 1.13 g/cm³ (however, only when kinematic viscosity is 1 mm²/sec)¹⁾ ▪ Non-freezing ▪ Electric conductivity of 10 μS/cm or higher (up to 100 kΩ·cm) ▪ Cannot be used on the sea surface or in places that may be penetrated by seawater
Other requirements	▪ Promptly remove any debris that adheres to the sensor unit. ▪ Ensure that there is no caked-on mud (dried solids), etc. ▪ Avoid use in an environment where the float sensor may become submerged or constantly wet. ▪ Avoid installation environments that may cause the float sensor to tilt or change the draft line. ▪ Install a breakwater or other similar means to protect against cross-currents and waves.

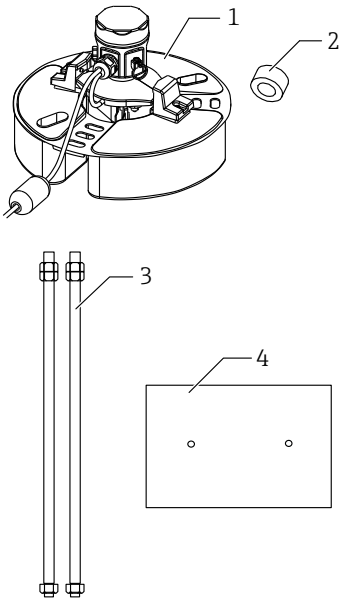
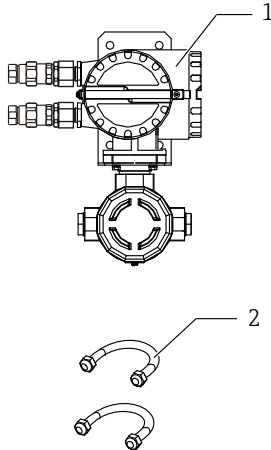
- 1) Sensitivity will vary when the specific gravity of water in the lower layer is different from the factory-setting environment, such as when antifreeze is used.

3.3.2 Connector cable (connection to converter NRR261/NRR262 from sensor I/F Ex box)

Item	Description
Connector cable	Maximum inductance: 2.3 mH, maximum capacitance: 83 nF Reference case: use of KPEV-S (instrumentation cable) C = 65 nF/Km, L = 0.65 mH/km CW/C = 0.083 μF / 65 nF = 1.276 km....1 LW/L = 2.3 mH / 0.65 mH = 3.538 km....2 Maximum extended cable length: 1.27 km The maximum cable length is either 1 or 2, whichever is shorter (round down instead of rounding off)
Operating temperature	-20 to 60 °C (-4 to 140 °F)

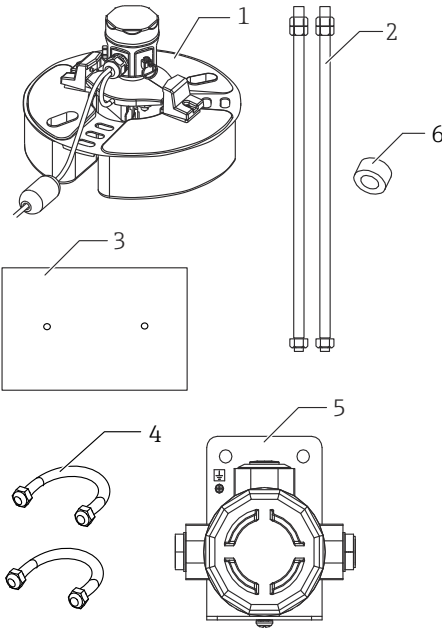
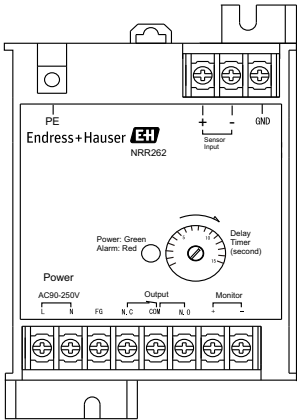
3.4 Delivery example by order code

Delivery example 1

Float sensor order code	Converter order code
NAR300- * 1 * * 2 / 3 A	NRR261-A/B/C/4
 1 Float sensor 2 Check tool (accessory) 3 Float guide (bar) packaged separately 4 Weight (packed at the bottom of the box with the converter)	 1 NRR261 2 U-bolt

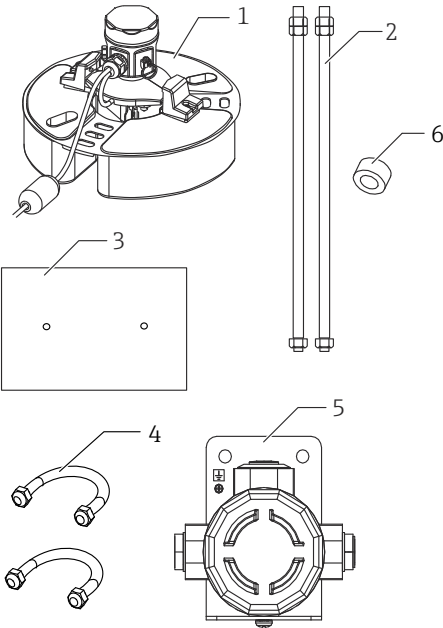
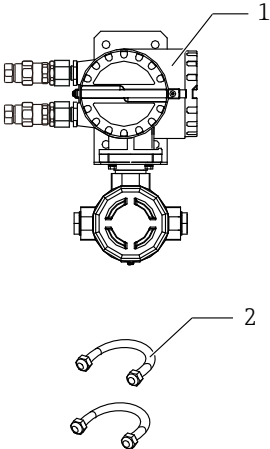
 A cable gland (waterproof connection) is only included with the sensor I/F Ex box or NRR261 with JPNEx specifications.

Delivery example 2

Float sensor order code	Converter order code
NAR300- * 5* * 2/3*	NRR262
 1 Float sensor 2 Float guide (bar) packaged separately 3 Weight (packed at the bottom of the box with the converter) 4 U-bolt 5 Sensor I/F Ex box 6 Check tool (accessory)	

- 
- The sensor I/F Ex box is included in the order code NAR300-x5xxxx. The intrinsically safe system is used in combination with NRR262.
 - A cable gland (waterproof connection) is only included with the sensor I/F Ex box or NRR261 with JPNEx specifications.

Delivery example 3

Float sensor order code	Converter order code
NAR300- * 5** 2/3*	NRR261 - 5**
 1 Float sensor 2 Float guide (bar) packaged separately 3 Weight (packed at the bottom of the box with the converter) 4 U-bolt 5 Sensor I/F Ex box 6 Check tool (accessory)	 1 NRR261 2 U-bolt

- 
- The sensor I/F Ex box is included in the order code NAR300 - x5xxxx. The Ex d [ia] system is used in combination with NRR261 - 5**.
 - A cable gland (waterproof connection) is only included with the sensor I/F Ex box or NRR261 with JPNEx specifications.

3.5 Detection sensitivity

If the electrode tip is pulled out of the lower layer of water due to increased oil layer thickness, water may cling onto the electrode tip like an icicle even if the electrode tip is in oil. This may raise the detection sensitivity point by 1 to 2 mm (0.04 to 0.08 in). When an accurate sensitivity check is required, apply a small amount of neutral detergent to the electrode tip to keep water from clinging to the electrode.

- Water-filled pit: set to $10\ (0.39) \pm 1\ \text{mm}\ (0.04\ \text{in})$ with kerosene at the time of shipment from the factory
- Empty pit: $50\ (1.97) \pm 5\ \text{mm}\ (0.2\ \text{in})$ with kerosene

 The setting was established under the following conditions: oil (kerosene: approx. specific gravity 0.8), lower-layer water (water: approx. specific gravity 1.0), static liquid surface level, and without surface tension.

3.6 Pit water

3.6.1 Do not use in seawater

The oil leak detector is not designed for use in seawater. The following problems may occur if it is used in seawater:

- Failed or delayed alarm when overturned by waves
- Delayed alarm caused by generation of a bypass circuit between the conductivity sensor and the float body due to salt coating
- Corrosion of the float sensor caused by seawater

3.6.2 Special pit water

- If the float sensor is used in certain special pit water, such as pit water containing solvents, it may become corroded or damaged.
- It cannot measure highly hydrophilic liquids, such as alcohol.

3.6.3 Pit water with high electrical resistance

Use in pit water with high electrical resistance, such as in a steam drain or pure water, may activate the alarm. Ensure that the conductivity of pit water is at least $10\ \mu\text{S}/\text{cm}$ (but not more than $100\ \text{k}\Omega\cdot\text{cm}$).

Example, pure water: 1 to $0.1\ \mu\text{S}/\text{cm}$ (1 to $10\ \text{M}\Omega\cdot\text{cm}$)

3.6.4 Frozen pit water

If ice forms in the pit, the alarm may be triggered (fail-safe function). Implement anti-freeze measures to prevent freezing.

3.7 Gasoline application

If the substance to be detected is gasoline, or if the system is to be used in an atmosphere that is constantly exposed to volatile oil vapor, contact your nearest Endress+Hauser Sales Center and order the gasoline application specifications under special specifications.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

Upon receipt of the goods, check the following:

- Are the order codes on the delivery note and the product label identical?
- Are the goods undamaged?
- Do the nameplate data match the ordering information on the delivery note?
- If required (see nameplate): Are the Safety Instructions (XA) enclosed?

 If one or more of these conditions are not satisfied, contact your Endress+Hauser Sales Center or distributor.

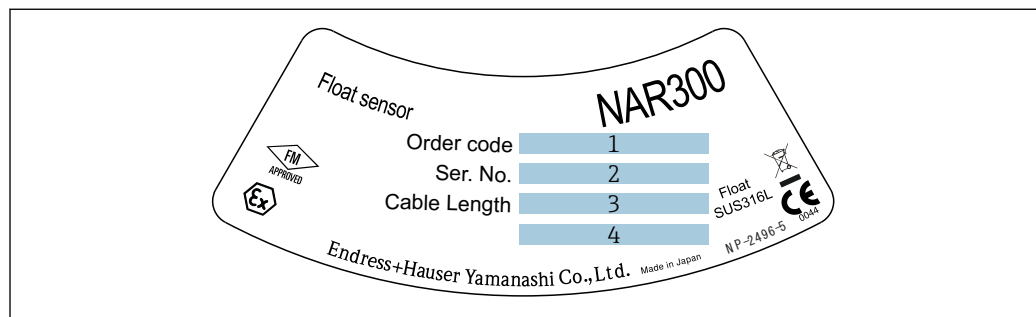
4.2 Product identification

The following options are available for identification of the device:

- Nameplate specifications
- Extended order code on the delivery note (including details of the device specification codes)
- Entering the serial number from the nameplate in *W@M Device Viewer* (www.endress.com/deviceviewer) will display all the information about the device.

 Note that the information on a nameplate may be changed without notice when credentials and certificates are updated.

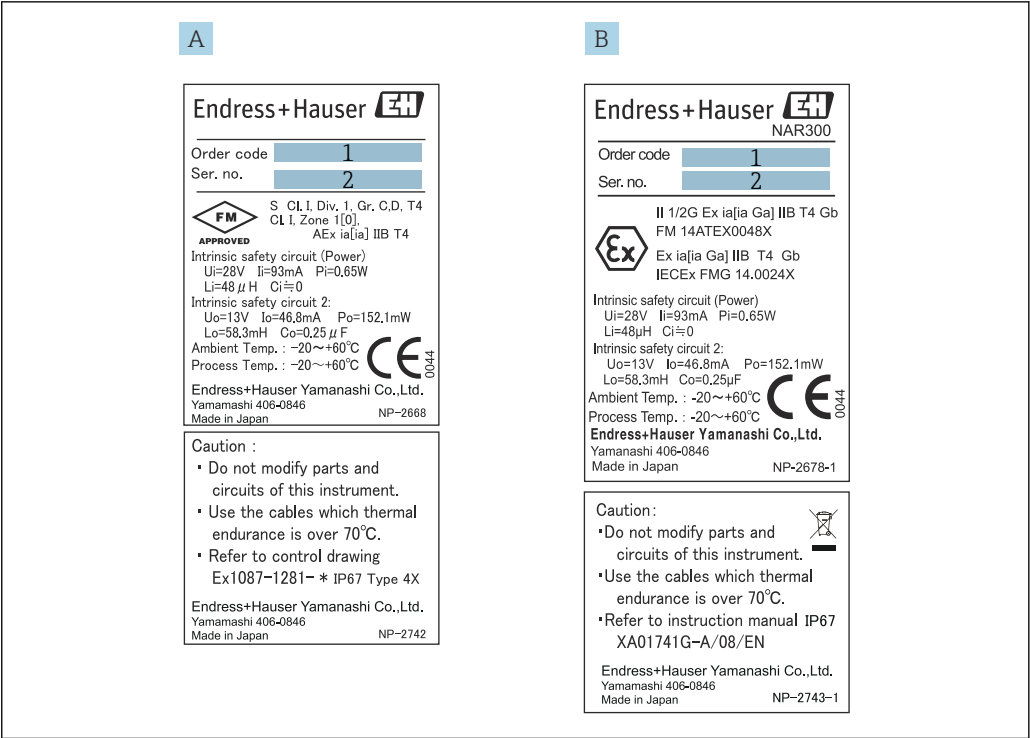
4.2.1 Nameplate specifications



A0038619

 2 NAR300 model nameplate

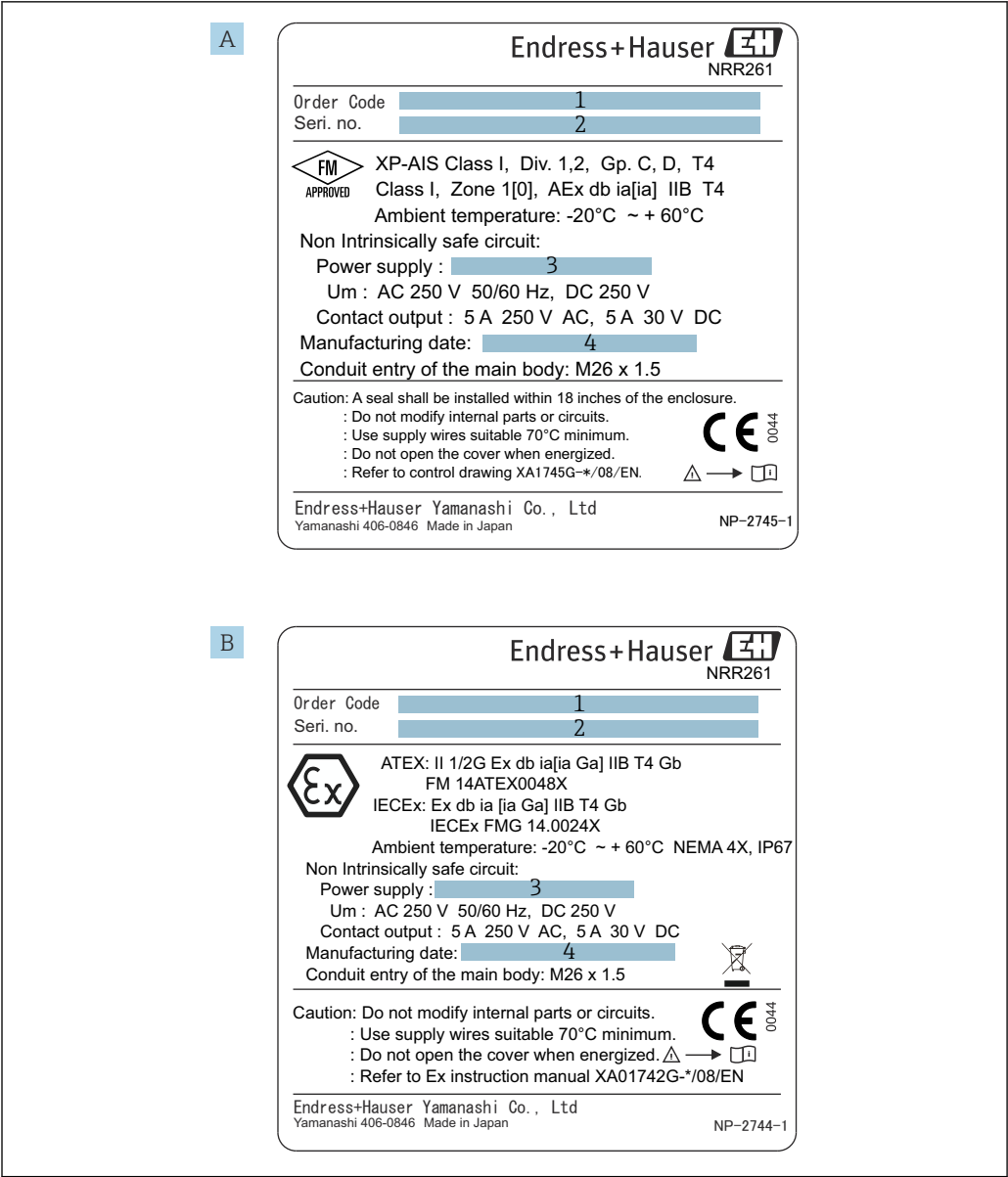
- 1 Order code
- 2 Serial number
- 3 Cable length (order code 040)
- 4 Explosion-proof performance



A0039861

3 Nameplate for NAR300

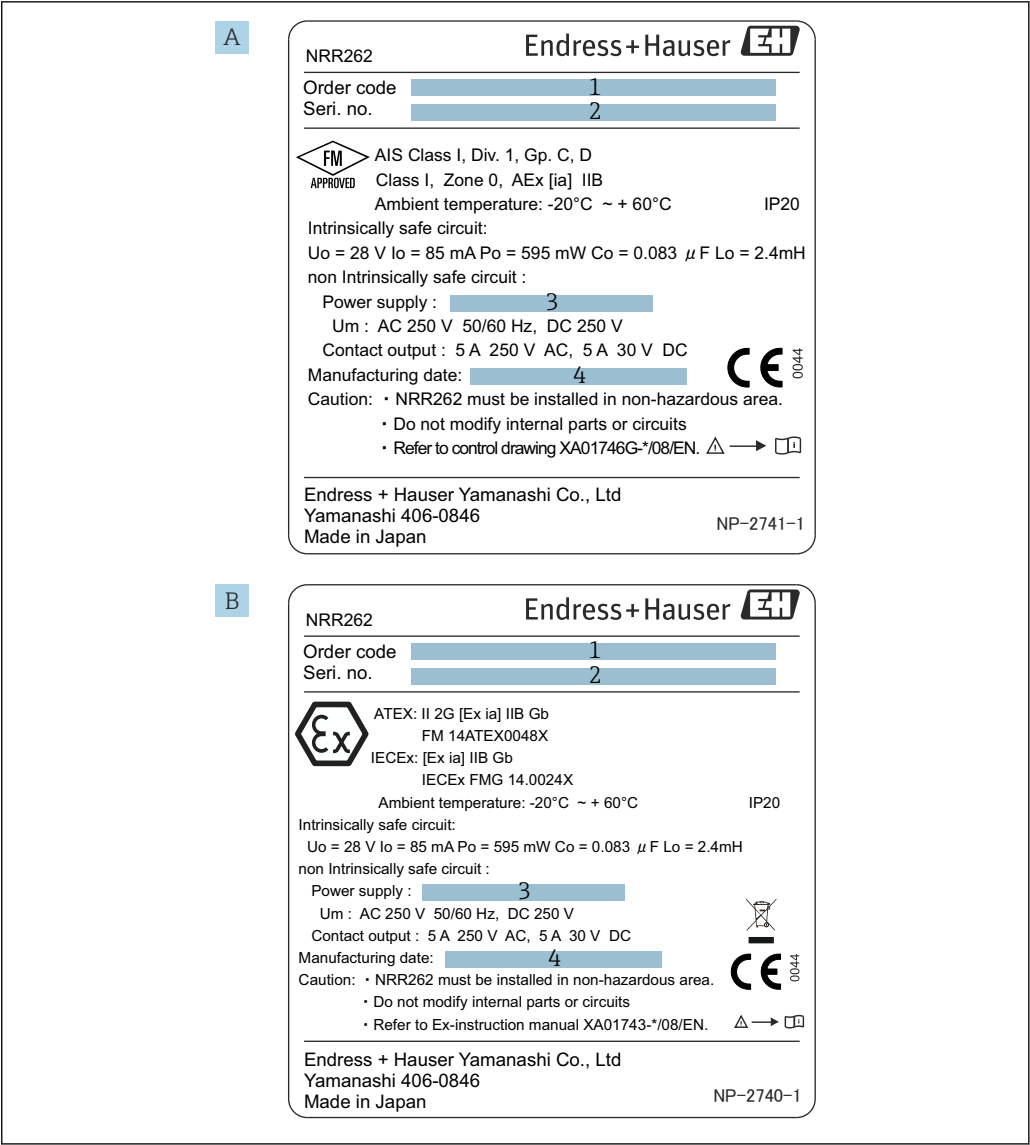
- A NAR300 nameplate for FM
- B NAR300 nameplate for ATEX / IECEx
- 1 Order code
- 2 Serial number



A0039862

 4 Nameplate for NRR261

- A NRR261 nameplate for FM (NAR300 integrated type)
B NRR261 nameplate for ATEX / IECEX (NAR300 integrated type)
1 Order code
2 Serial number
3 Power supply voltage
4 Manufacturing date



A0039864

5 Nameplate for NRR262

- A NRR262 nameplate for FM
B NRR262 nameplate for ATEX / IECEx
1 Order code
2 Serial number
3 Power supply voltage
4 Manufacturing date

A

Endress+Hauser

NAR300

Order code: 1

Ser. no.: 2

漏油検出器 (Order code 参照)

防爆性能 Ex ia[ia Ga] IIB T4 Gb

本安回路(電源回路):

Ui = 28 V, Ii = 93 mA, Pi = 0.65 W,

Li = 48 μH, Ci: 無視できる値

本安回路 2:

Uo = 13 V, Io = 38 mA, Po = 123.5 mW,

Lo = 80 mH, Co = 0.25 μF

周囲温度: -20~+60℃

被測定物温度: -20~+ 60℃

エンドレスハウザー山梨株式会社

Made in Japan

NP-2766

注意:

・機器内部の部品及び配線の変更、改造等を行わないで下さい。

・許容温度70℃以上のケーブルを使用して下さい。

・防爆注意事項説明書(XA01839G)を参照して下さい。

エンドレスハウザー山梨株式会社

Made in Japan

NP-2767

B

Endress+Hauser

NRR261

Order code: 1

Ser. no.: 2

変換器 / Converter:

防爆型式 / Ex model(Order code 参照/Refer to Order code)

防爆性能 / Protection class :

Ex db ia[ia Ga] IIB T4 Gb

非本安回路 / Non intrinsic safety circuit:

電源 / Supply: 3

許容電圧 / Um: AC 250 V 50/60 Hz, DC 250 V

周囲温度 / Ambient temperature : -20 ~ +60 °C

被測定物温度 / Medium temperature: -20 ~ +60 °C

製造日/Manufacturing date: 4

注意: ・機器内部の部品及び配線の変更、改造等を行わないで下さい。

・許容温度70℃以上のケーブルを使用して下さい。

・通電中は容器の蓋を開けないで下さい。

・防爆注意事項説明書(XA01840G)を参照して下さい。

警告: 容器の開放は、電源遮断後10分以上経過してから行って下さい。

Cauton: Do not modify internal parts or circuits.

・Use supply wires suitable for 70°C minimum.

・Do not open the cover when energized.

・Refer to Ex-instruction manual (XA01840G).

△ → □

WARNING: AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING.

IP67

エンドレスハウザー山梨株式会社

Endress+Hauser Yamanashi Co.,Ltd.

Yamanashi 406-0846

Made in Japan

NP-2768

C

Endress+Hauser

NRR261

Order code: 1

Ser. no.: 2

変換器 / Converter

防爆型式 / Ex model(Order code 参照/Refer to Order code)

防爆性能 / Protection class : Ex db [ia Gb] IIB T6 Gb

本安回路 / Intrinsically safe circuit

Uo = 28 V Io = 85 mA Po = 595 mW

Co = 0.083 μF Lo = 2.4 mH

非本安回路 / Non Intrinsically safe circuit

電源: 3

Power supply:

許容電圧: AC 250 V 50/60 Hz, DC 250 V

Maximum voltage(Un):

周囲温度 / Ambient temperature -20 ~ +60 °C

製造日/Manufacturing date: 4

注意: ・機器内部の部品及び配線の変更、改造等を行わないで下さい。

・許容温度70℃以上のケーブルを使用して下さい。

・通電中は容器の蓋を開けないで下さい。

・防爆注意事項説明書(XA01840G)を参照して下さい。

警告: 容器の開放は、電源遮断後10分以上経過してから行って下さい。

Cauton: Do not modify internal parts or circuits.

・Use supply wires suitable for 70°C minimum.

・Do not open the cover when energized.

・Refer to Ex-instruction manual (XA01840G).

△ → □

WARNING: AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING.

IP67

エンドレスハウザー山梨株式会社

Endress+Hauser Yamanashi Co.,Ltd.

Yamanashi 406-0846

Made in Japan

NP-2769

A0039865

6 NAR300/NRR261 nameplates

- A NAR300 nameplate for JPN Ex
- B NRR261 nameplate for JPN Ex (NAR300 integrated type)
- C NRR261 nameplate for JPN Ex (NAR300 separate type)
- 1 Order code
- 2 Serial number
- 3 Power supply voltage
- 4 Manufacturing date

NRR262

Endress+Hauser

Order code 1

Ser. no. 2

変換器 / Converter : (Order Code 参照) / (Refer to Order Code)

防爆性能 / Protection class : [Ex ia Gb] IIB Ta 60 °C

本安回路 / Intrinsically safe circuit :

Uo = 28 V, Io = 85 mA, Po = 595 mW, Co = 0.083 μF, Lo = 2.4 mH

非本安回路 / Non Intrinsically safe circuit :

電源 / Power supply: 3

許容電圧(Um): AC 250 V 50/60 Hz, DC 250 V

周囲温度 / Ambient temperature : -20 ~ +60 °C

製造日/Manufacturing date: 4

注意: ・NRR262は、非危険場所に設置してください。

・機器内部の部品及び配線の変更、改造等を行わないでください。

・防爆注意事項説明書(XA01841)を参照してください。

Note: ・NRR262 must be installed in non-hazardous area.

・Do not modify internal parts or circuits.

・Refer to Ex-instruction manual (XA01841G).

△ → □

IP20

エンドレスハウザー山梨株式会社

Endress+Hauser Yamanashi Co.,Ltd.

Yamanashi 406-0846

Made in Japan

NP - 2770

A0039866

7 NRR262 nameplate for JPN Ex

- 1 Order code
- 2 Serial number
- 3 Power supply voltage
- 4 Manufacturing date

4.3 Manufacturer address

Endress+Hauser Yamanashi Co., Ltd.
406-0846
862-1 Mitsukunugi, Sakaigawa-cho, Fuefuki-shi, Yamanashi

4.4 Storage and transport

4.4.1 Storage conditions

- Storage temperature: -20 to +60 °C (-4 to 140 °F)
- Store the device in its original packaging.

4.4.2 Transport

NOTICE

The housing may become damaged or dislodged.

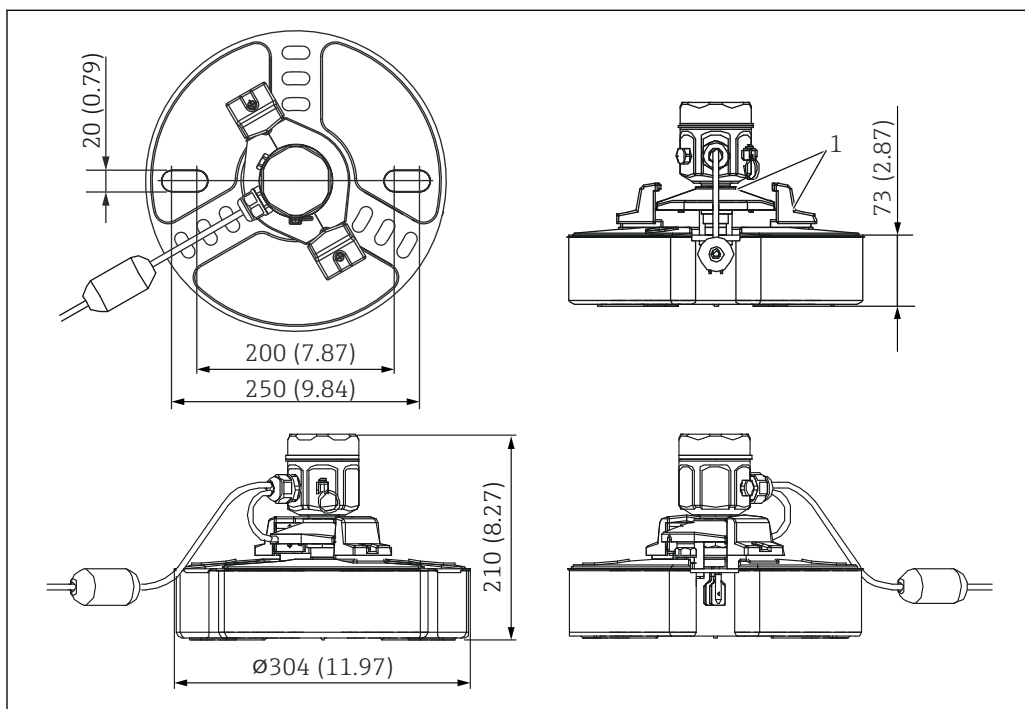
Risk of injury

- ▶ When transporting the device to the measuring point, either use the device's original packaging or hold by the process connector.
- ▶ Secure a hoisting device (such as a hoisting ring or a lifting eye bolt) to the process connector, not to the housing. Pay attention to the device's center of gravity to prevent unexpected tilting.
- ▶ Comply with the safety precautions and transportation conditions for devices that weigh 18 kg (39.6 lbs) or more (IEC61010).

5 Installation

5.1 NAR300 system dimensions

5.1.1 Dimensions of NAR300 float sensor



A0039876

8 Outline of float sensor NAR300. Unit of measurement mm (in)

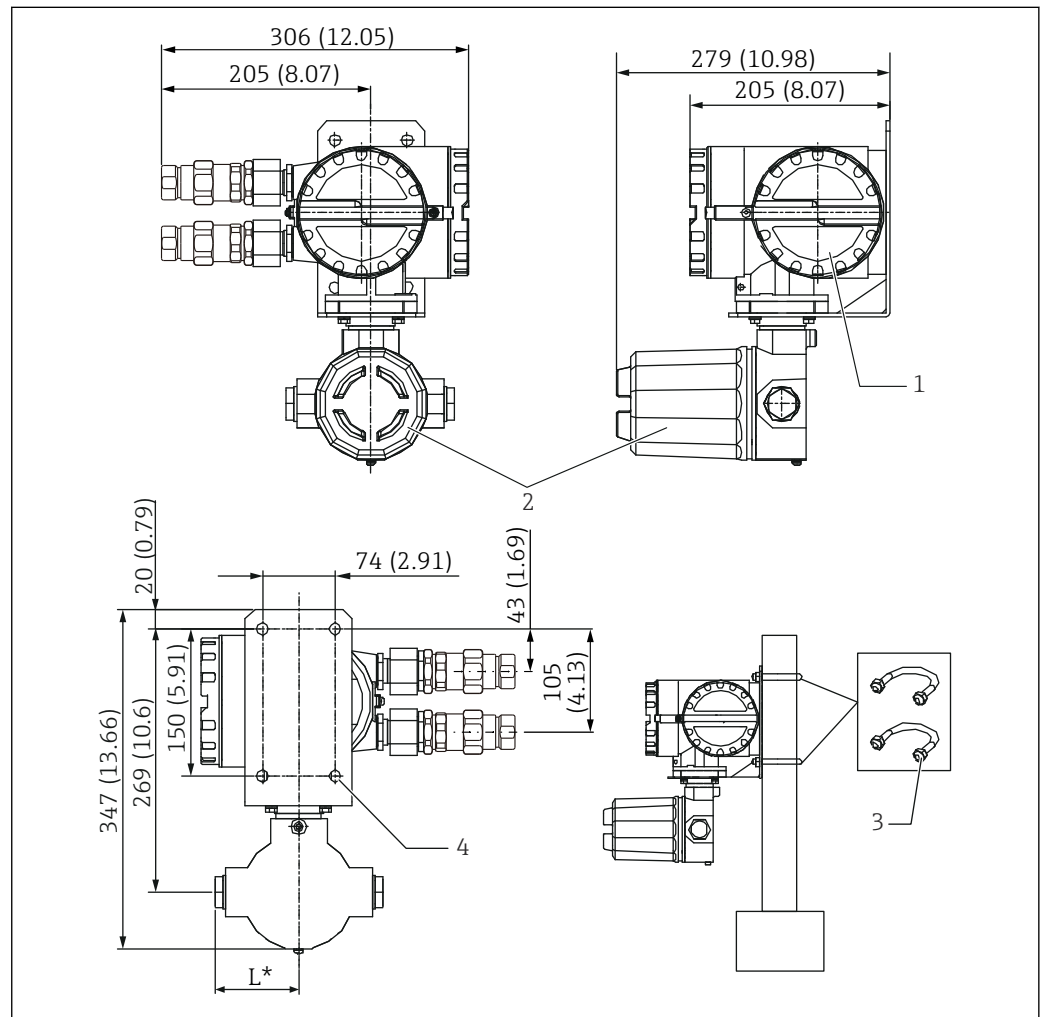
1 Float sensor cover

5.1.2 Dimensions of Ex d [ia] converter NRR261

Only NRR261 with JPN Ex explosion-proof specifications are delivered with a cable gland (external diameter of compatible cables: $\phi 12$ to 16 mm (0.47 to 1.02 in)).

Use the order code of Ex d [ia] converter NRR261 to specify the conduit connection port.

Normally, Ex d [ia] converter NRR261 is mounted on a tank yard's pipe and secured in place with a U-bolt (JIS F 3022 B 50 type). It can also be mounted directly onto walls (requires 4 $\phi 12$ mm (0.47 in) holes and M10 securing nuts and bolts (not included in the delivery)).



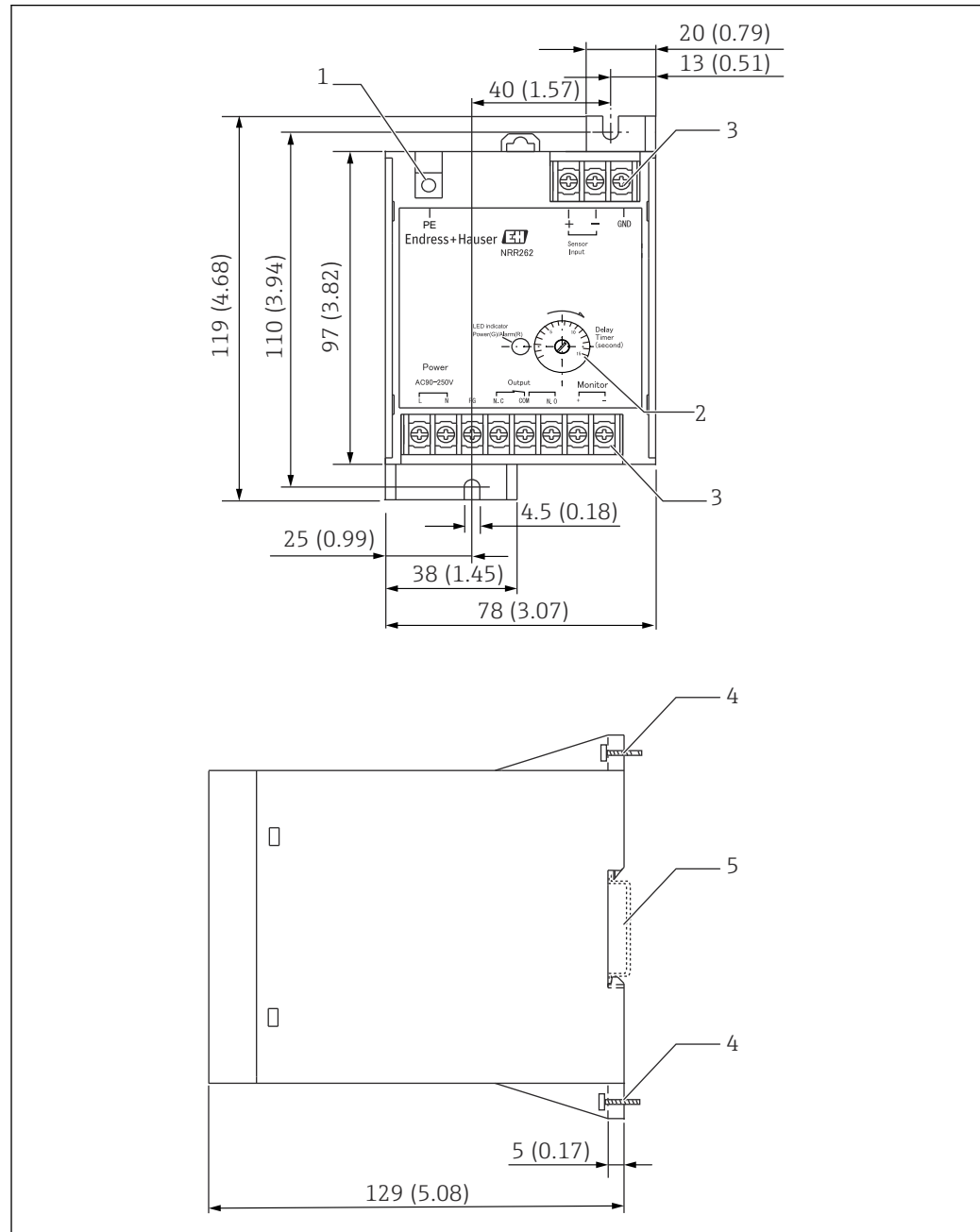
A0039880

9 Outline of NRR261. Unit of measurement mm (in)

- 1 Ex d-side terminal
- 2 Ex [ia]-side terminal
- 3 U-bolt (JIS F3022 B50 material: iron (chromate), 2 nuts and 2 flat washers included)
- 4 4 $\phi 12$ holes
- L G1/2: 85 mm (3.35 in), NPT1/2: 97 mm (3.82 in), M20: 107 mm (4.21 in)

5.1.3 Dimensions of Ex [ia] converter NRR262

NRR262 is designed for indoor installation, such as in instrument rooms, and it can be mounted easily with two M4 screws. In addition, "one-touch" snap-in mounting is possible using a DIN rail EN50022 (not included in the delivery). This rail-mounting method is convenient for mounting multiple converters in a row or for when additional converters are scheduled to be installed in the future.

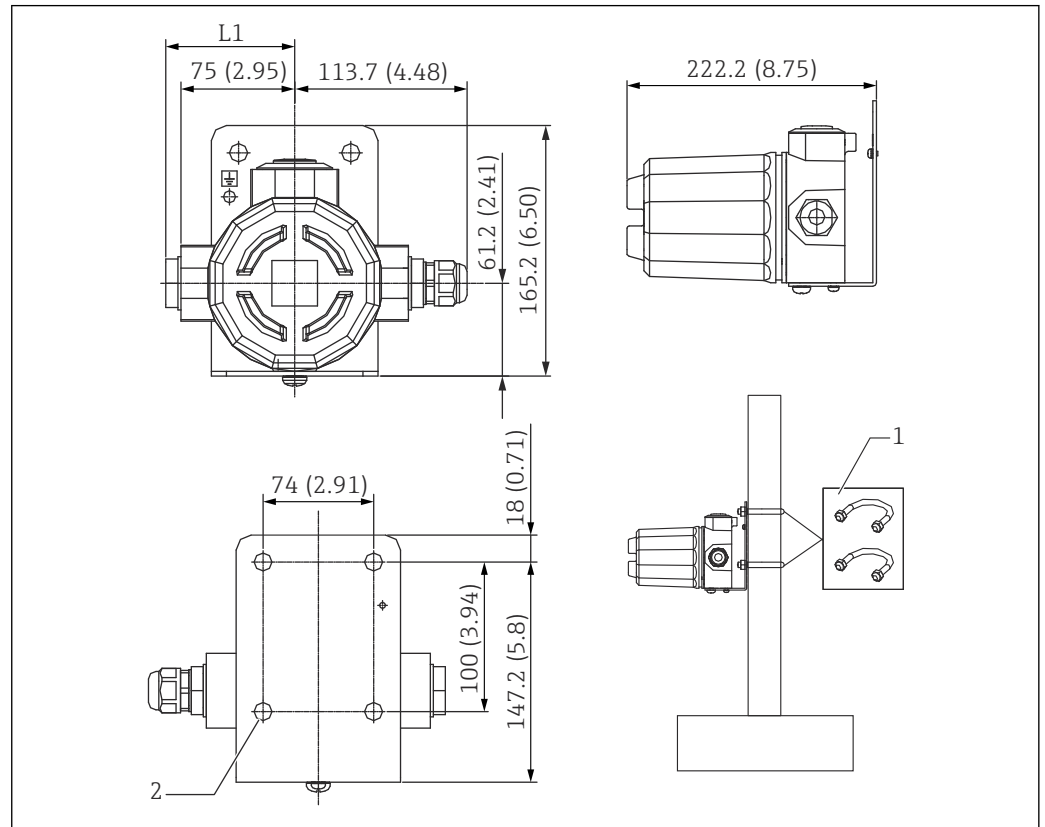


10 Outline of NRR262. Unit of measurement mm (in)

- 1 Screw (M4) for protective grounding
- 2 Delay trimmer
- 3 Screw (M3)
- 4 Screw (M4)
- 5 DIN rail: complies with EN50022

5.1.4 Dimensions of Ex [ia] sensor I/F Ex box

The Ex [ia] sensor I/F Ex box is used in combination with Ex d [ia] converter NRR261 or Ex [ia] converter NRR262 to convert signals from the float sensor into electric current signals. Normally, it is mounted on a tank yard's pipe and secured in place with a U-bolt (JIS F 3022 B 50 type). It can also be mounted directly onto walls (requires 4 $\phi 12$ mm (0.47 in) holes and M10 securing nuts and bolts (not included in the delivery)).



11 Ex [ia] sensor I/F Ex box dimensions. Unit of measurement mm (in)

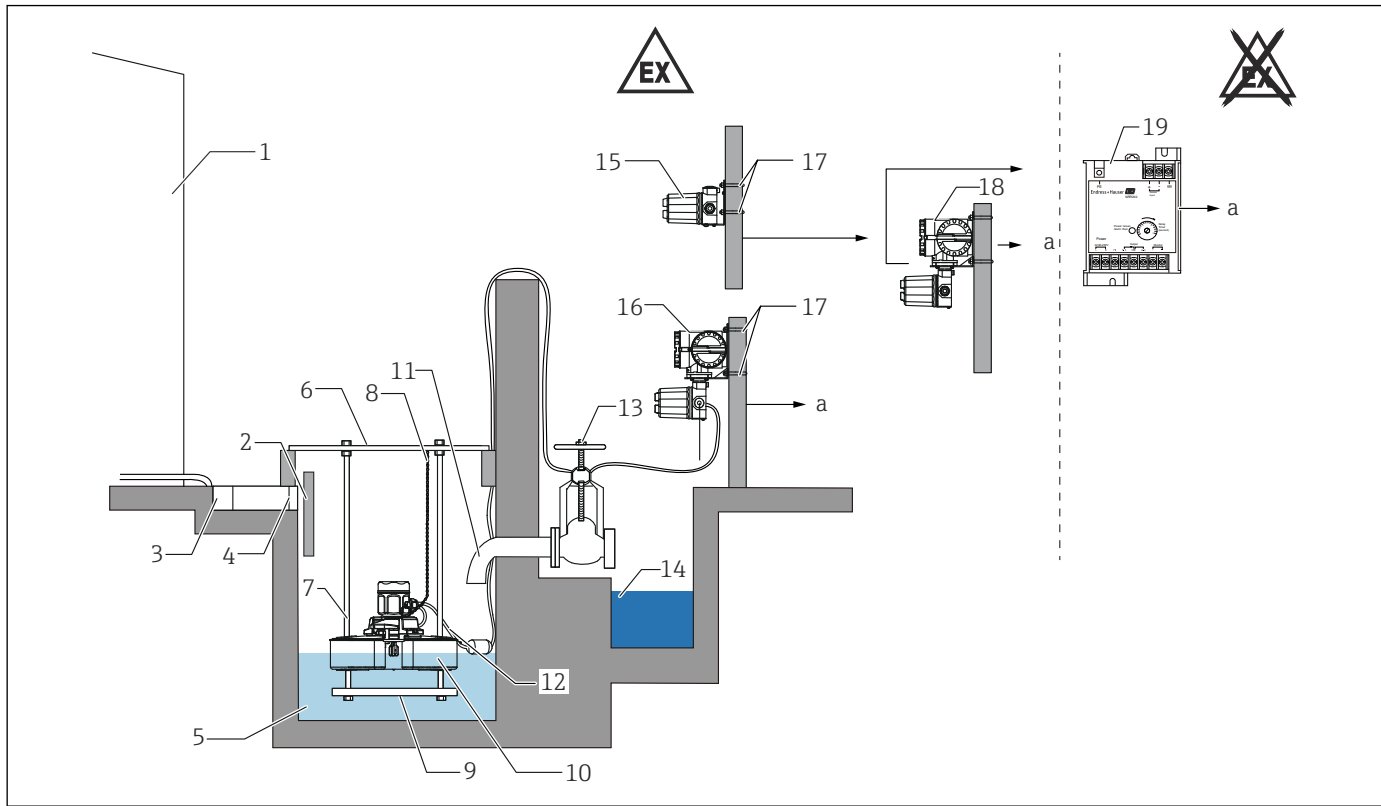
L1 G1/2 / NPT1/2: 85 mm (3.35 in), M25: 107 mm (4.21 in)

1 U-bolt (JIS F3022 B50 material: iron (chromate), 2 nuts and 2 flat washers included)

2 4 $\phi 12$ mm (0.47 in) holes

i Use the order code of float sensor NAR300 to specify the conduit connection port.

5.2 Installation conditions



A0039877

12 NAR300 + NRR26x

- a Alarm output*
- 1 Tank*
- 2 Divider*
- 3 U-shaped groove*
- 4 Screen*
- 5 Pit*
- 6 Pit cover*
- 7 Float guide*
- 8 Chain*
- 9 Weight*
- 10 Float sensor NAR300*
- 11 Discharge nozzle (100 mm (3.94 in) or longer)*
- 12 Dedicated cable (included with NAR300)*
- 13 Valve*
- 14 Drainage groove*
- 15 Ex [ia] sensor I/F Ex box*
- 16 NRR261 (Ex d [ia] converter) (integrated type)*
- 17 U-bolt (JIS F3022 B50)*
- 18 NRR261 (Ex d [ia] converter) (separate type)*
- 19 NRR262 (Ex [ia] converter)*

i To ground the barrier, either connect it to the tank or use the shielded wire for the remote cable. Refer to "Electrical connection" for more information on using the shielded wire for the remote cable.

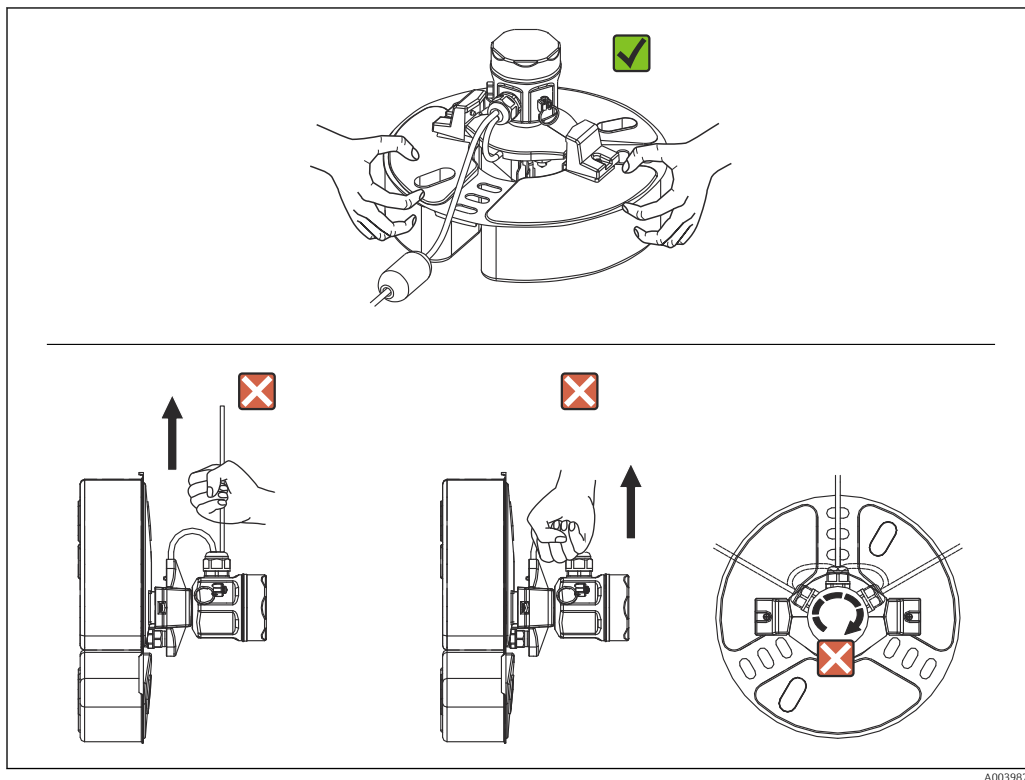
5.2.1 Installation and mounting precautions

1. To prevent snow and debris from entering the pit, installing a waste guard, roof, or other covering is recommended. If snow accumulates on the float sensor, each 50 g of accumulation will cause an increase in the draft line by 1 mm (0.04 in), resulting in reduced sensitivity. In addition, if there is a risk of the ambient temperature exceeding 50 °C (122 °F), install an awning to protect the float sensor from direct sunlight. Mount a covering above the top of the pit inlet to avoid submerging the float sensor housing if the pit water overflows due to heavy rainfall. If the float sensor becomes submerged, malfunctions or damage may result.
2. If the float sensor becomes off-balance (tilted by approx. 3 ° or more), it may cause faulty operation or a delayed alarm. Use a float guide as much as possible, and also pay attention to the way the cables and chains are laid out.
3. Install a screen at the pit's inlet to remove any debris. If debris or foreign matter clogs the sensor unit or inside the pit, it may cause malfunctions. Inspect and clean the screen regularly.
4. Attach a chain to the ring on the side of the float sensor head in advance for added convenience. However, each 50 g of increased load on the float will increase the draft line by 1 mm (0.04 in), resulting in reduced sensitivity. If using a chain to anchor the float, do not forcibly pull on the chain during inspection.
5. If the pit is completely filled with water, no oil layer will form even when oil is leaking. Ensure that the water is drained as necessary so that an oil layer can form.
6. Do not forcibly pull or grab and carry the cable as it may cause malfunctions or compromised waterproofing.
7. Bend the top of the discharge nozzle downward by 100 mm (3.94 in) or more when the valve is kept open so that an oil layer can form. Failure to do so may cause oil to drain from the pit before it can form a detectable layer on the water surface, resulting in a delayed alarm or detection failure. For pits without a discharge nozzle, such as the one shown in the diagram above, install an oil-water separation divider so that an oil layer can form.
8. Depending on the liquid flowing into the pit, install a divider to prevent waves, crosscurrents, or liquid from splashing on top of the float.
9. If the pit is too large, divide the pit using an oil separator. Oil leakage cannot be detected unless there is significant outflow of oil in proportion to the surface area.
10. NAR300, NRR261, and sensor I/F Ex box must be installed at least 50 cm (1.64 ft) apart from each other.

5.3 Mounting the NAR300 system

5.3.1 Handling precautions

When transporting NAR300, be sure to hold the float with both hands. Avoid holding the parts as shown in the diagram below, and do not lift by the top of the float sensor. In addition, do not rotate the housing. Doing so may cause device failure.



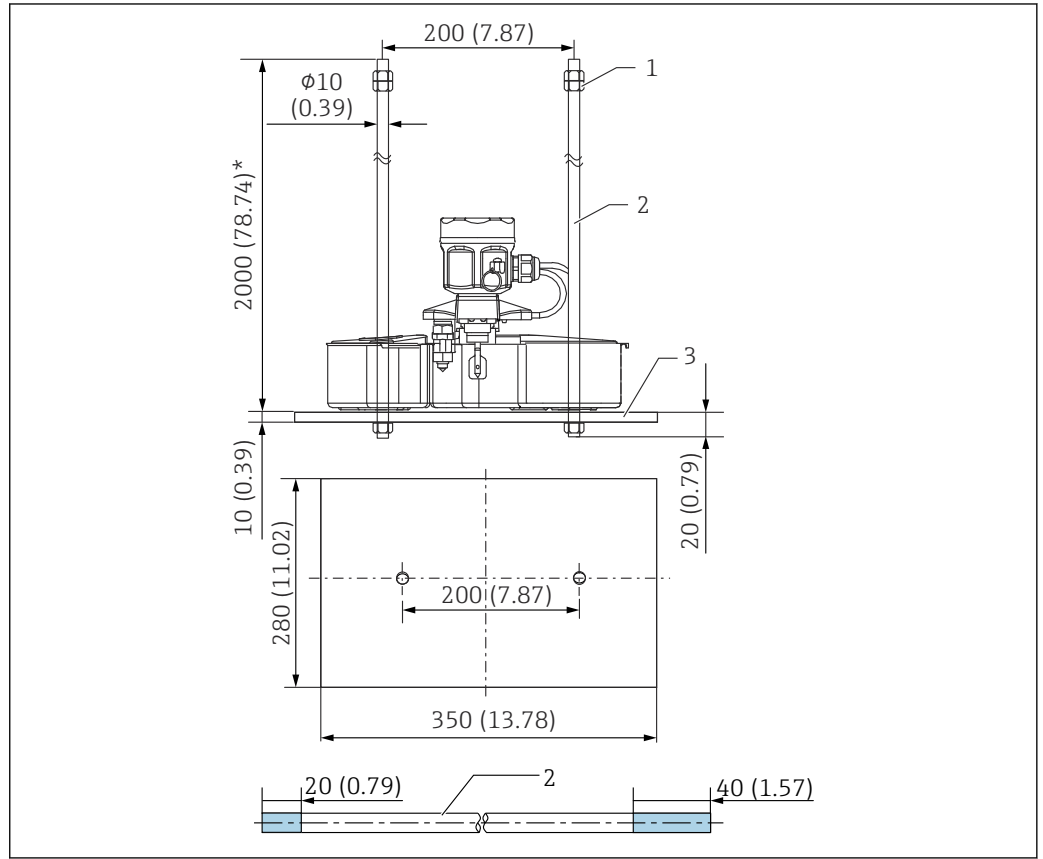
A0039878

13 Handling the NAR300

5.3.2 Mounting the float guide

If you ordered a device that is equipped with a float guide, install the float horizontally. Remove any debris or stones so that the float sensor can land horizontally.

The float guide is 2 000 mm (78.74 in) in size. If a length shorter than 2 000 mm (78.74 in) is required for use, cut it to size. If a float guide longer than 2 000 mm (78.74 in) is required, contact your nearest Endress+Hauser service center or distributor.



14 NAR300, float guide. Unit of measurement mm (in)

- 1 Nut (M10)
- 2 Float guide
- 3 Weight

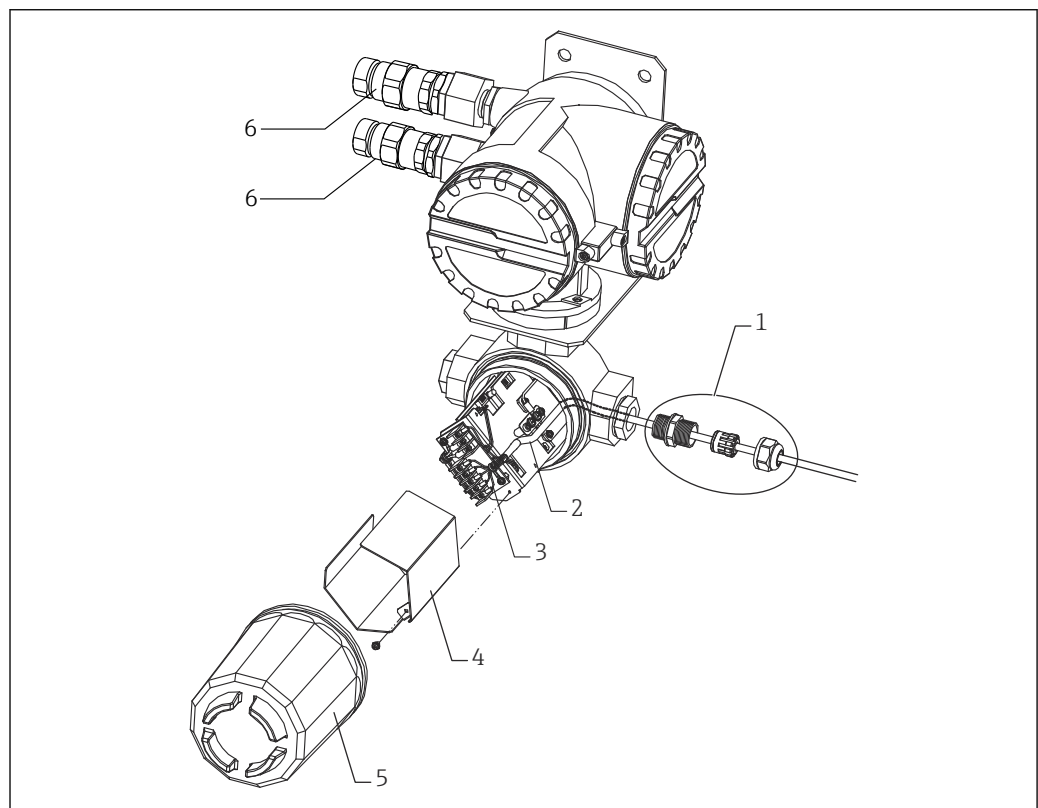
i The 20 mm (0.73 in) and 40 mm (1.57 in) of the float guide in the diagram indicate the lengths of thread grooves.

5.3.3 NRR261-4xx (integrated type) cable mounting

Mounting procedure

1. Remove the intrinsically safe terminal box cover [5] and the circuit board guard [4].
2. Pass the float sensor cable [2] through the cable gland [1] and the cable entry of the intrinsically safe terminal box.
3. Connect the cable to the terminal block (refer to "Electrical connection").
4. Tighten the main unit of the cable gland and the seal nut.
↳ Tightening torque (main unit, seal nut): approx. 1.96 N·m (20 kgf·cm)
5. Secure the cable in place with the cable holder [3].
6. Replace the circuit board guard and close the cover of the intrinsically safe terminal box.

This completes the mounting procedure.



A0039881

15 NRR261-4xx cable mounting

- 1 Cable gland (waterproof connection)
- 2 Float sensor cable
- 3 Cable holder
- 4 Circuit board guard
- 5 Intrinsically safe terminal box cover
- 6 Cable gland (Ex d) (supplied with JPN Ex specifications only)

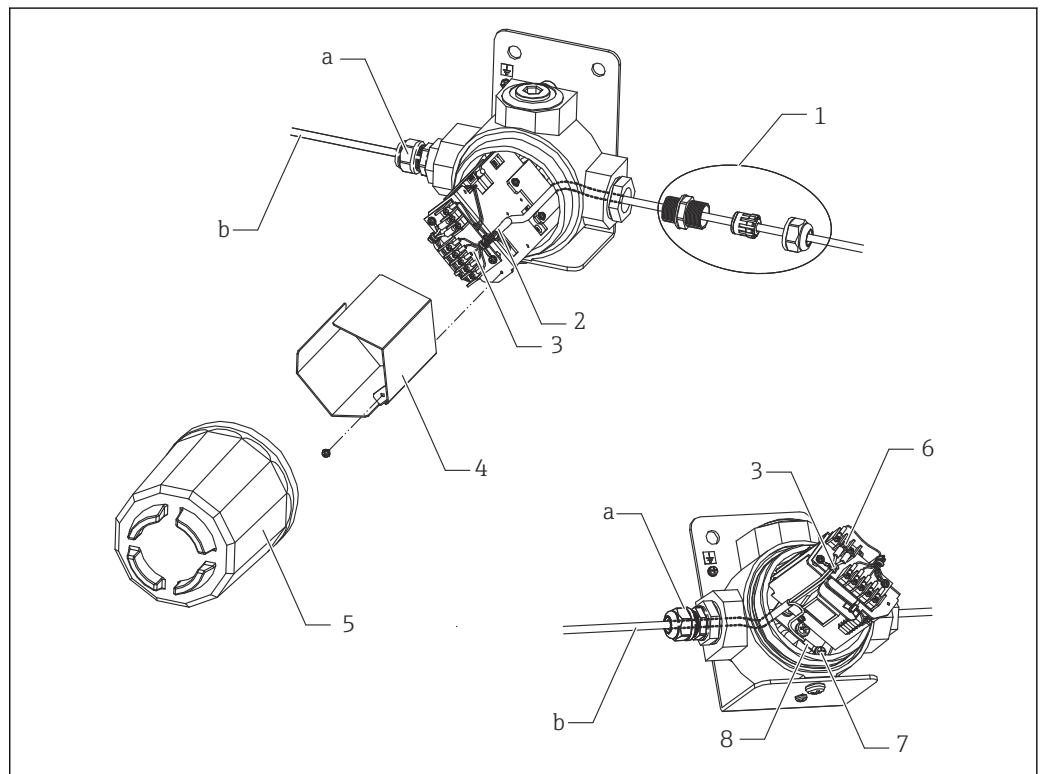
i Since the cable gland [1] shown in the diagram is not supplied with products that do not have JPN Ex specifications, a waterproof cable gland that is IP67 or higher must be procured separately.

5.3.4 NAR300-x5xxxx and sensor I/F Ex box cable mounting

Mounting procedure

1. Remove the intrinsically safe terminal box cover [5] and the circuit board guard [4].
2. Pass the float sensor cable [2] through the cable gland [1] and the cable entry of the intrinsically safe terminal box.
3. Connect the cable to the terminal block (refer to "Electrical connection").
4. Tighten the main unit of the cable gland [1] and the seal nut.
 ↳ Tightening torque (main unit, seal nut): approx. 1.96 N·m (20 kgf·cm)
5. Pass the NRR262/NRR261 connecting cable through the cable entry of the terminal box, and connect it to the terminal block.
6. Secure the cable in place with a cable holder [3].
7. Replace the circuit board guard and close the cover of the intrinsically safe terminal box.

This completes the mounting procedure.



16 NAR300-x5xxxx and sensor I/F Ex box cable mounting

- a Cable gland
- b Shielded cable for NRR261/262 (must be procured separately)
- 1 Cable gland (waterproof connection)
- 2 Float sensor cable
- 3 Cable holder
- 4 Circuit board guard
- 5 Intrinsically safe terminal box cover
- 6 Screw (M3) for shielded cable
- 7 Screw (M5)
- 8 Shielded cable gland

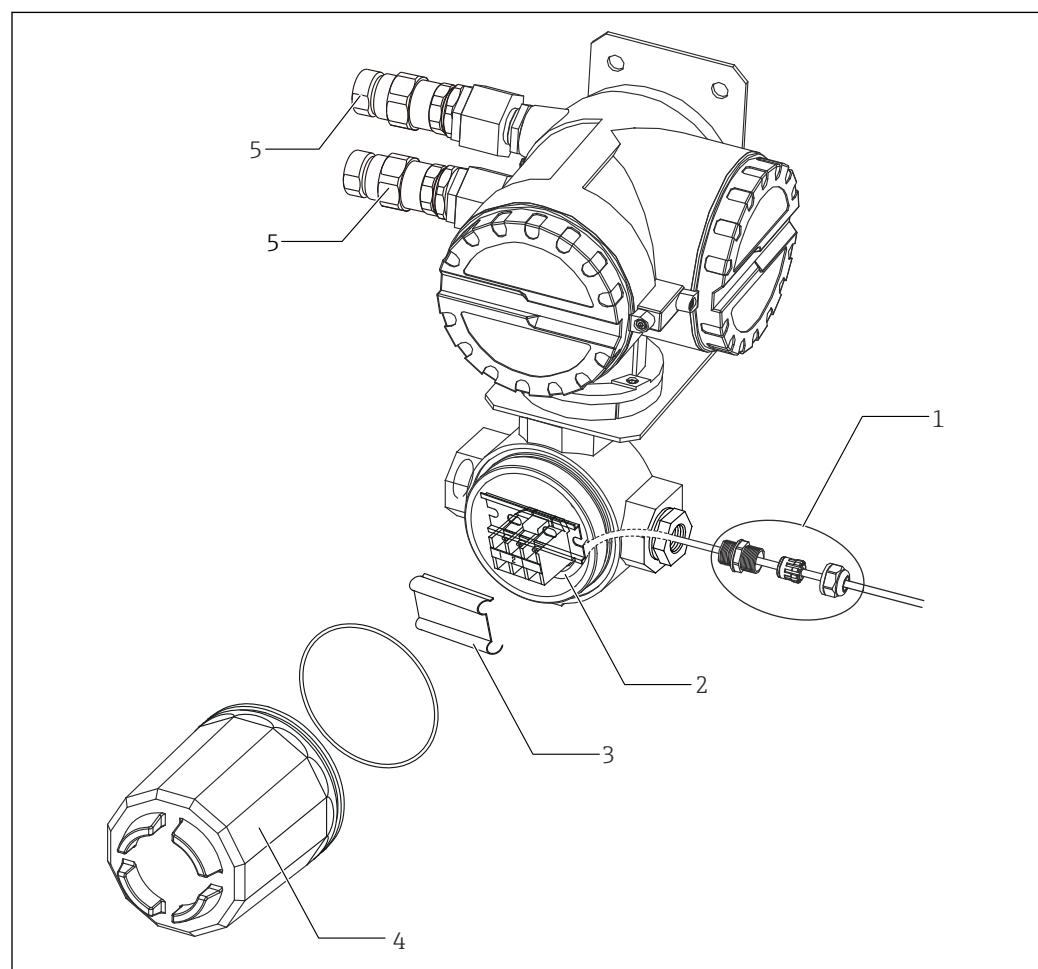
i Since the cable gland a shown in the diagram is not supplied with products that do not have JPN Ex specifications, a waterproof cable gland that is IP67 or higher must be procured separately.

5.3.5 NRR261-5xx cable mounting

Mounting procedure

1. Remove the intrinsically safe terminal box cover [4] and the terminal block cover [3].
2. Pass the float sensor cable [2] through the cable gland [1] and the cable entry of the intrinsically safe terminal box.
3. Connect the cable to the terminal block (refer to "Electrical connection").
4. Mount the cable gland [1] according to the operating instructions.
5. Secure the cable in place with the cable holder.
6. Replace the terminal block cover and close the cover of the intrinsically safe terminal box.

This completes the mounting procedure.



A0039883

17 NRR261-5xx cable mounting

- 1 Cable gland (waterproof connection)
- 2 Float sensor cable
- 3 Terminal block cover
- 4 Intrinsically safe terminal box cover
- 5 Cable gland (Ex d) (supplied with JPN Ex specifications only)

i Since the cable gland [1] shown in the diagram is not supplied with products that do not have JPN Ex specifications, a waterproof cable gland that is IP67 or higher must be procured separately.

5.4 Adjustment

5.4.1 Verification of detection sensitivity with actual liquid

Verification of detection sensitivity when the lower layer is water and the upper layer is oil

If the electrode tip is pulled out of the lower layer of water due to increased oil layer thickness, water may cling onto the electrode tip like an icicle even if the electrode tip is in oil. This may raise the detection sensitivity point by 1 to 2 mm. When an accurate sensitivity check is required, apply a small amount of neutral detergent to the electrode tip to keep water from clinging to the electrode.

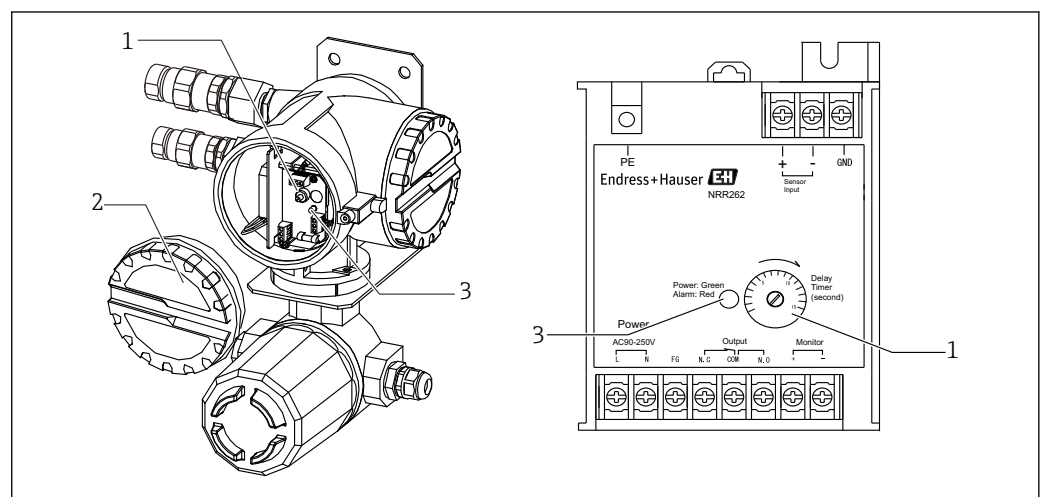
Verification of oil layer thickness with a transparent container

Exercise caution as a reading error may occur due to the liquid's surface tension, liquid adhesion to the container wall, and for other reasons.

5.4.2 Adjustment of alarm output

Only the delay operation time (ON delay) setting of the alarm output relay can be adjusted on the converter. Time can be set using the delay trimmer. In NRR261, the delay trimmer can be found by turning off the power and opening the main unit's cover. In NRR262, the delay trimmer is found on the case surface. Match the setting to the necessary delay time in units of seconds. Delayed activation is used to prevent a false alarm by recognizing an alarm condition that continues over a certain period of time as an alarm while not outputting an alarm when the alarm condition stops within the delay time setting. This can be set up to a maximum of 15 seconds for SIL specifications.

-  A response delay time in the detection circuit of approximately 6 seconds is always added to the delay time of the delay trimmer.
- Open the NRR261 main unit cover after the power has been turned off for at least 10 minutes.



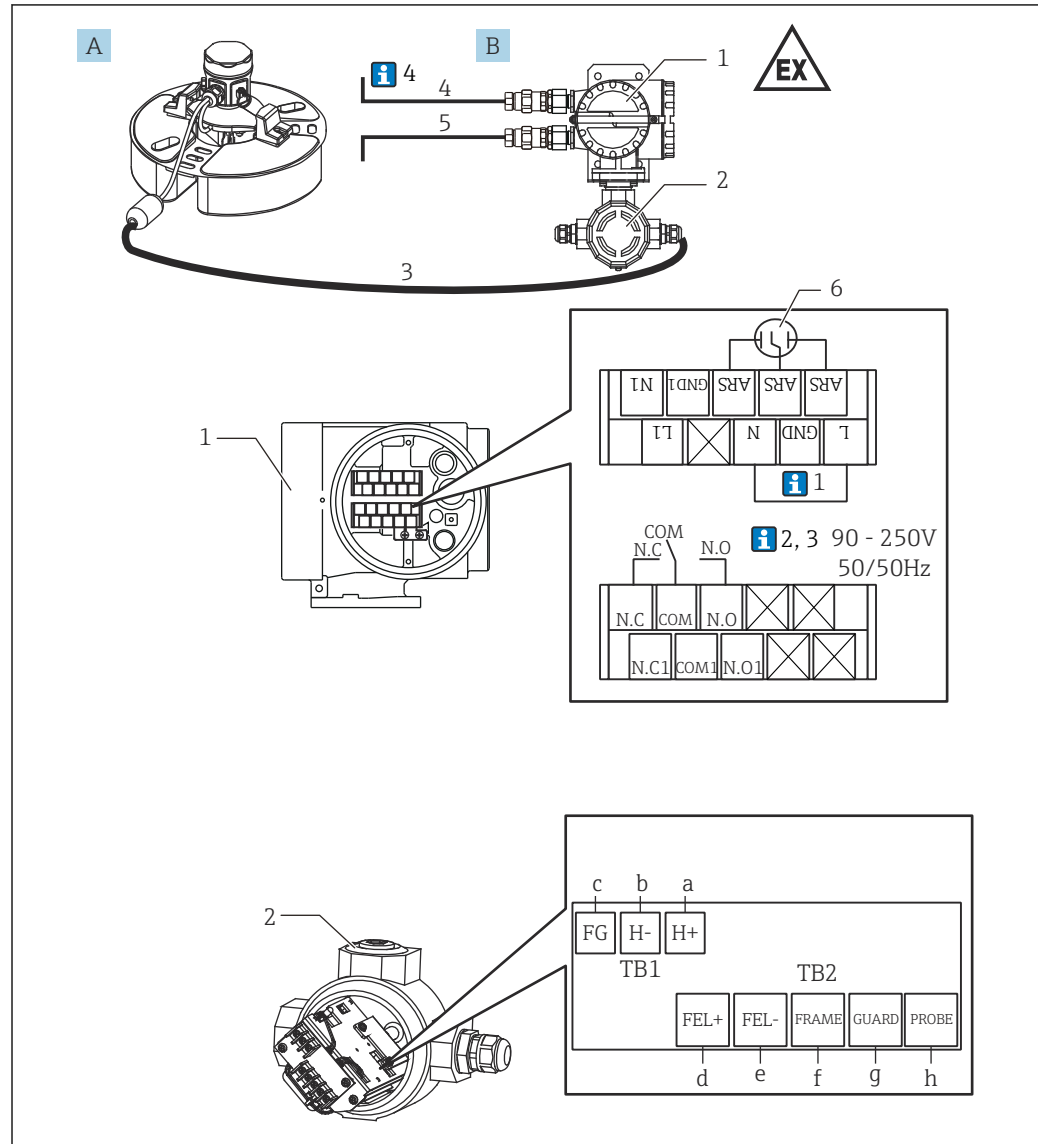
A0039891

 18 Alarm output relay

- 1 Delay trimmer
- 2 Cover
- 3 LED power (green) / alarm (red)

6 Electrical connection

6.1 NRR261-4/A/B/C wiring



A0039887

19 Wiring of Ex d [ia] converter NRR261-4/A/B/C

- A Float sensor NAR300-x1xxxx
- B Ex d [ia] converter NRR261 (integrated type)
- a Blue 1 (already wired upon delivery), screw (M3)
- b Blue 2 (already wired upon delivery), screw (M3)
- c Green, screw (M3)
- d Red, screw (M3)
- e Blue 3, screw (M3)
- f Yellow, screw (M3)
- g Black, screw (M3)
- h White, screw (M3)
- 1 Ex d terminal
- 2 Ex [ia] terminal
- 3 Using an Ex [ia]-dedicated connection cable (6 to 30 m (19.69 to 98.43 ft): included with the product depending on the option code)

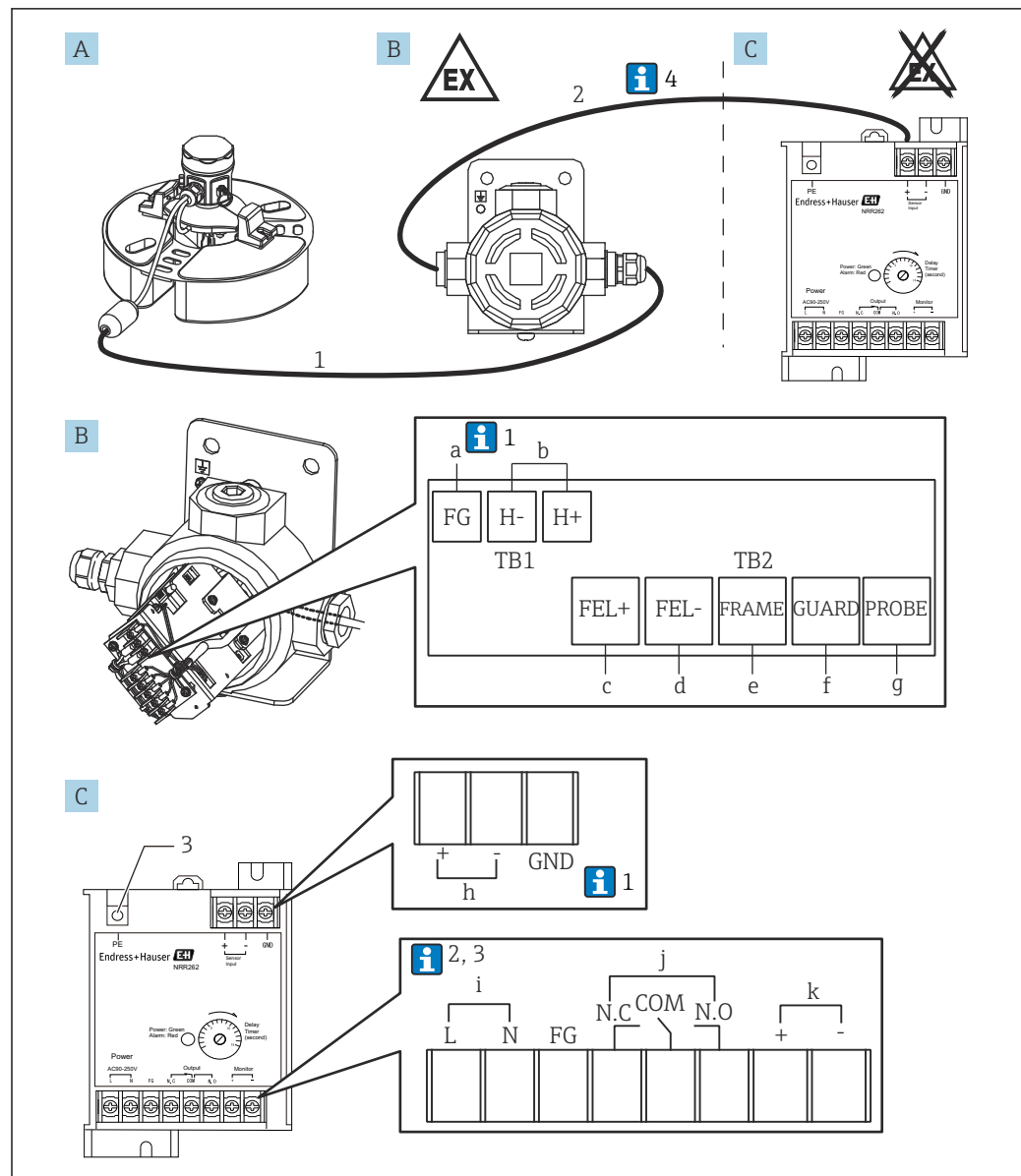
- 4 Power supply: AC/DC
- 5 Alarm output: alarm/PLC/DCS, etc.
- 6 Power supply arrester (installed)



Below, the numbers correspond to the description in the diagram.

1. GND between "L" and "N" of NRR261 is connected when an AC cable with FG is used.
2. When using a 22 to 26 V_{DC} power supply, the terminal number "L" becomes positive (+) and "N" becomes negative (-).
3. To maintain Ex [ia] performance, ensure that the power supply voltage does not exceed 250 V_{AC} 50/60 Hz during normal times and 250 V_{DC} during emergencies.
4. Cable (3) for connecting NAR300 and NRR261 is included with NAR300. Alarm output cable (4) from NRR261 and power supply cable (5) to NRR261 are not included and must be procured by the customer. For more details on connection cables, refer to "Process conditions."

6.2 NRR262-4/A/B/C wiring



A0039888

20 Wiring of Ex [ia] converter NRR262-4/A/B/C

- A Float sensor NAR300-x5xxxx (sensor I/F Ex box is also included in the code)
- B Sensor I/F Ex box
- C Ex [ia] converter NRR262
- a Green, screw (M3) (see Note 1 below)
- b Output to NRR262, screw (M3)
- c Red, screw (M3)
- d Blue, screw (M3)
- e Yellow, screw (M3)
- f Black, screw (M3)
- g White, screw (M3)
- h Input from sensor I/F Ex box, screw (M3)
- i Power supply: AC/DC, screw (M3)
- j Alarm output, screw (M3)
- k Checking monitor output, screw (M3)

- 1 Using an Ex [ia]-dedicated connection cable (6 to 30 m (19.69 to 98.43 ft): included with the product depending on the option code)
- 2 Cable for sensor I/F Ex box and NRR262 (must be procured by the customer)
- 3 For protective grounding, screw (M4)



Below, the numbers correspond to the description in the diagram.

1. Normally, only the FG of a sensor I/F Ex box is connected to the cable's shielded wire; however, depending on the installation environment, either the GND of NRR262 alone or both the FG of the sensor I/F Ex box and the GND of NRR262 are connected.
2. When using a 22 to 26 V_{DC} power supply, the terminal number "L" becomes positive (+) and "N" becomes negative (-).
3. To maintain Ex [ia] performance, ensure that the power supply voltage does not exceed 250 V_{AC} 50/60 Hz during normal times and 250 V_{DC} during emergencies..
4. While cable (1) for connecting NAR300 and sensor I/F Ex box is included with the device, cable (2) for connecting sensor I/F Ex box and NRR262 is not included with the device and must be procured by the customer. For more details on connection cables, refer to "Process conditions."

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90 - 250V
50/50Hz

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A0039889

- | | |
|---|---|
| A | Float sensor NAR300-x5xxxx (sensor I/F Ex box is also included in the code) |
| B | Sensor I/F Ex box |
| C | Ex d [ia] converter NRR261 (separate type) |
| a | Green, screw (M3) (see Note 1 below) |
| b | Output to NRR261-3/5xx, screw (M3) |
| c | Red, screw (M3) |
| d | Blue 1, screw (M3) |
| e | Yellow, screw (M3) |
| f | Black, screw (M3) |
| g | White, screw (M3) |
| h | Blue 2, screw (M4) (already wired upon delivery) |
| i | Blue 3, screw (M4) (already wired upon delivery) |
| j | Input from sensor I/F Ex box, screw (M4) |
| 1 | Using an Ex [ia]-dedicated connection cable (6 to 30 m (19.69 to 98.43 ft): included with the product depending on the option code) |
| 2 | Cable for sensor I/F Ex box and NRR261 (must be procured by the customer) |
| 3 | Power supply: AC/DC |
| 4 | Alarm output: alarm/PLC/DCS, etc. |

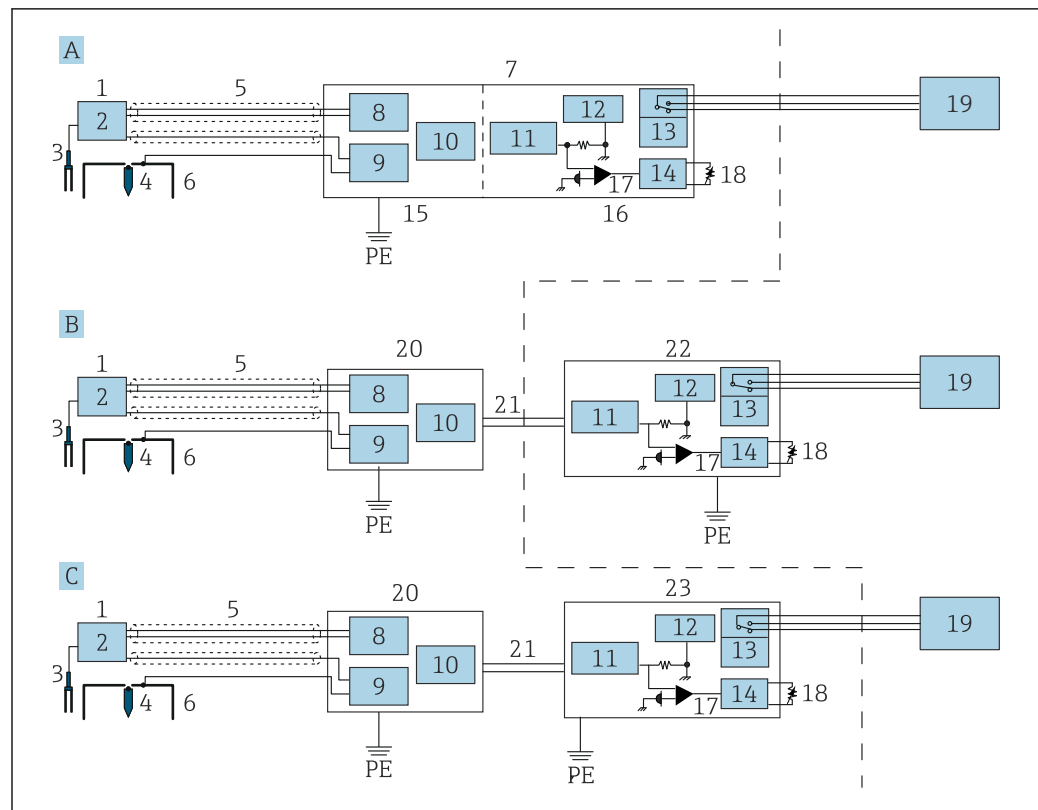
- 5 *Ex d terminal*
- 6 *Intrinsically safe terminal*
- 7 *Power supply arrester (installed), screw (M3)*



Below, the numbers correspond to the description in the diagram.

1. Normally, only the FG of a sensor I/F Ex box is connected to the cable's shielded wire; however, depending on the installation environment, either the GND of NRR261 alone or both the FG of the sensor I/F Ex box and the GND of NRR261 are connected.
2. GND between "L" and "N" of NRR261 is connected when an AC cable with FG is used.
3. When using a 22 to 26 V_{DC} power supply, the terminal number "L" becomes positive (+) and "N" becomes negative (-).
4. To maintain Ex [ia] performance, ensure that the power supply voltage does not exceed 250 V_{AC} 50/60 Hz during normal times and 250 V_{DC} during emergencies.
5. Cable (1) for connecting NAR300 and sensor I/F Ex box is included with NAR300. Cable (2) for connecting sensor I/F Ex box and NRR262, alarm out cable (3) from NRR261, and power supply cable (4) for NRR261 are not included and must be procured by the customer. For more details on connection cables, refer to "Process conditions."

6.4 Wiring diagram



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22 Wiring diagram

- A Explosion proof-type converter system (integrated type)
- B Intrinsically safe-type converter system (separate type)
- C Intrinsically safe, explosion proof-type converter (separate type)
- PE Protective earth (protective grounding)
- 1 Float sensor NAR300
- 2 Tuning fork drive unit
- 3 Tuning fork
- 4 Conductivity detection electrode (sensor)
- 5 Dedicated cable
- 6 Conductivity detection electrode (float)
- 7 Converter NRR261 (integrated type)
- 8 Liquid detection circuit
- 9 Conductivity detection circuit
- 10 Current output circuit
- 11 Safety barrier
- 12 Power supply circuit
- 13 Relay
- 14 Delay circuit
- 15 Ex [ia] circuit
- 16 Ex d circuit
- 17 Current detection
- 18 Delay trimmer
- 19 Alarm
- 20 Sensor I/F Ex box
- 21 Current signal
- 22 Converter NRR262
- 23 Converter NRR261 (separate type)

6.5 Alarm activation principle

An oil leak detection signal detected by NAR300 float sensor is converted into an electric current signal inside the converter or sensor I/F Ex box. The signal is then connected to the current detection circuit through the intrinsically safe safety barrier inside the converter. In the current detection circuit, the presence or absence of an oil leak alarm signal is determined based on the size of the current value, and the alarm out relay is turned ON/OFF through the operation delay circuit. The alarm delay circuit is equipped with a trimmer that can be used to set the delay time. Fail-safe operation is also available for relay contact point output, which is explained in the following "Alarm output operation table."

Alarm output operation table

NRR261/NRR262 terminals		Between NC and COM	Between NO and COM
State	Non-alarm	Open contact point	Closed contact point
	Oil leak alarm	Closed contact point	Open contact point
	Power OFF		
	Frozen liquid		

NAR300 current value	
Non-alarm	12 mA
Oil leak alarm	16 mA
Other trouble	< 10 mA or 14 mA <

7 Diagnostics and troubleshooting

7.1 Fail-safe (alarm is output when there is no oil leak)

The following situations may cause an alarm to be output even when there is no oil leak.

Item	Description
Frozen pit water	An alarm is activated when the conductivity sensor detects an insulator due to frozen pit water.
Tilted float sensor	If the float sensor floating on pit water becomes tilted so much that the conductivity sensor is no longer submerged under water, an alarm will be activated, as the sensor will detect air as an insulator. An alarm will also be activated if the tuning fork sensor detects liquid in an empty pit before the conductivity sensor detects air as an insulator.
Debris at the bottom of an empty pit	When substances with a certain degree of strength, such as a piece of Styrofoam, are present at the bottom of an empty pit and the water level rises as a result of rain, resulting in such substances to come in contact with the tip of tuning fork sensor, an alarm will be activated, as the tuning fork sensor will recognize the substance as a detected substance (liquid) and the conductivity sensor will detect insulator (air). An alarm will also be activated when the conductivity sensor becomes covered by plastic sheets, bags, and other insulators, as the conductivity sensor will detect the insulator and the tuning fork sensor will detect liquid (water).
Sensor buried in mud	If the float sensor is buried under mud and the mud becomes dry and solid, the tuning fork sensor will recognize it as liquid and the air layer created by the dessicated mud will be recognized as an insulator by the conductivity sensor, which will result in alarm activation.
Snow covering the sensor	If snow accumulates on the sensor unit in an empty pit, an alarm will be activated, as the snow will be recognized as an insulator by the conductivity sensor and as a liquid by the tuning fork sensor.
Essentially pure water in pit	In pit water with large electrical resistance, such as drain water, an alarm will be activated, as the conductivity sensor will recognize it as an insulator.

7.2 Delayed alarm (alarm is not output when there is an oil leak)

The following situations may prevent an alarm from being output even when there is an oil leak.

Item	Description
Cross-currents and waves on liquid surface	If wind and other elements cause the leaked oil surface to be very choppy, destabilizing the oil layer and pit water, the conductivity sensor will detect the pit water and no alarm will be activated.
Tilted float sensor	If the float becomes significantly tilted as a result of snow, debris, or an animal landing on one side of the float or the float becoming tangled in or tugged by a cable or a chain, no alarm will be activated, as the conductivity sensor will detect the pit water under the oil layer and the tuning fork sensor will be displaced from the oil layer.
Sunk float sensor	If snow, debris, or an animal lands on the float, the float will sink and an alarm will not be activated, as the conductivity sensor will detect the pit water under the oil layer.
Moist debris, etc.	An alarm will not be activated if conductivity is generated as a result of moist debris or algae coming in contact between the conductivity sensor and earth (float body or ground).

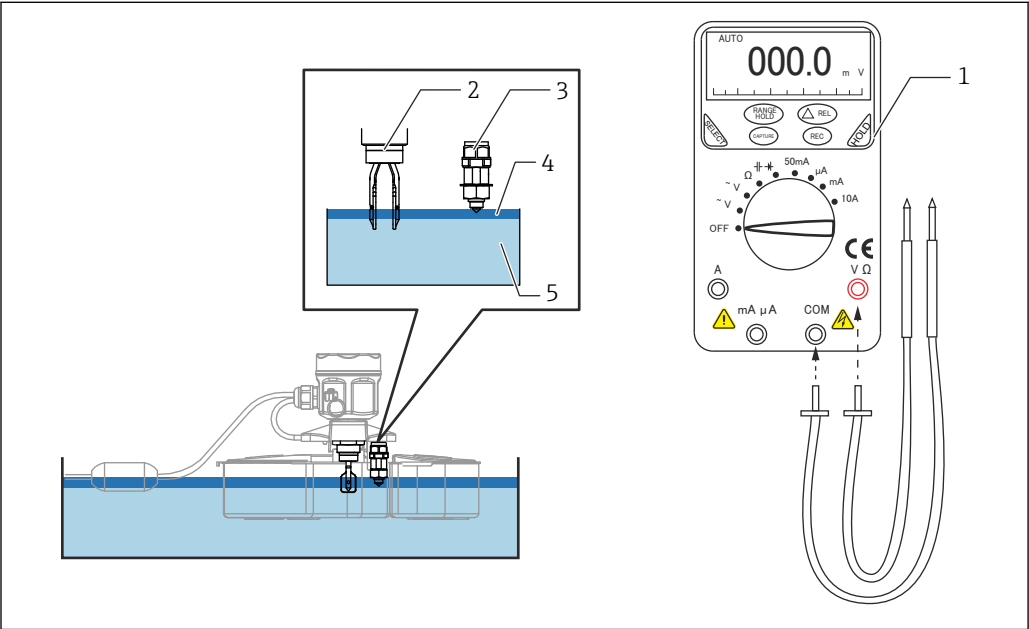
Item	Description
Oil leak during snowfall	No alarm will be activated if there is snow floating on the oil layer surface, as the conductivity sensor will recognize water due to the moisture from the melted snow.
Pit water density change	Using an antifreeze to prevent freezing will cause an alarm delay, as the float will rise due to increased density of pit water, resulting in reduced detection sensitivity.

7.3 Operation check

To perform an operation check, assign one person to operate the float sensor and another person to check the operation of the on-site sensor I/F Ex box or Ex d converter NRR261. Avoid electrostatic charge on the float.

Items to prepare

Digital voltmeter, rag, neutral detergent, a cup containing kerosene

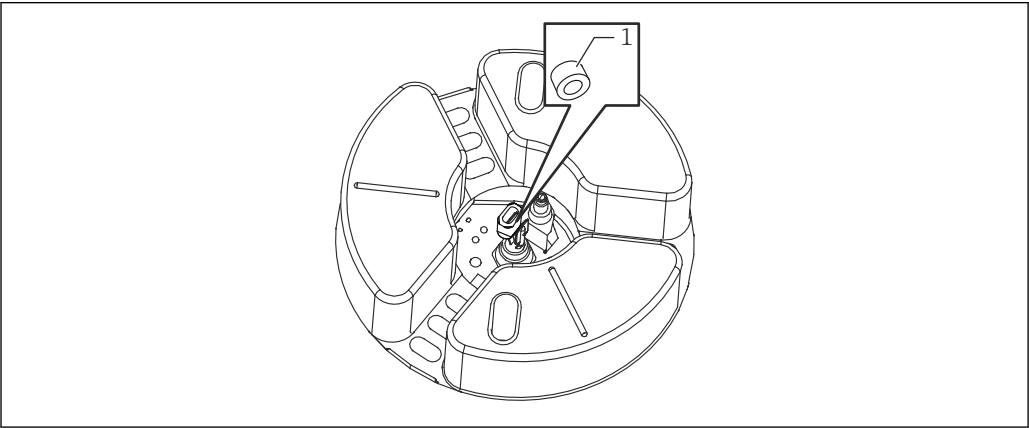


23 Sensor operation check

- 1 Digital multimeter
- 2 Tuning fork sensor
- 3 Conductivity sensor
- 4 Oil
- 5 Water

Check tool (accessory)

Operation check in which a check tool (accessory) is used is a simplified method, and therefore the binding force may weaken over time. If this occurs, either increase the binding force by gently pressing down with a hand or order an operation checker (specialty tool) (see "Operation checker (specialty tool)" in the next section).

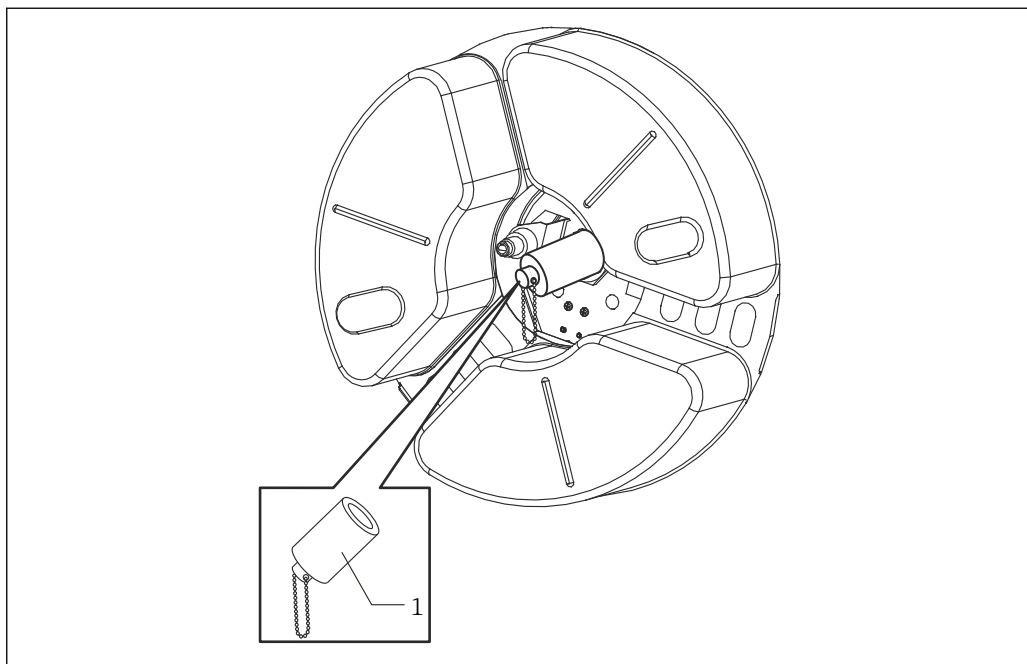


24 Check tool (accessory)

- 1 Check tools

Operation checker (specialty tool)

Mount the operation checker by screwing it in the tuning fork unit. The operation checker can be ordered under Item No. 71137732.

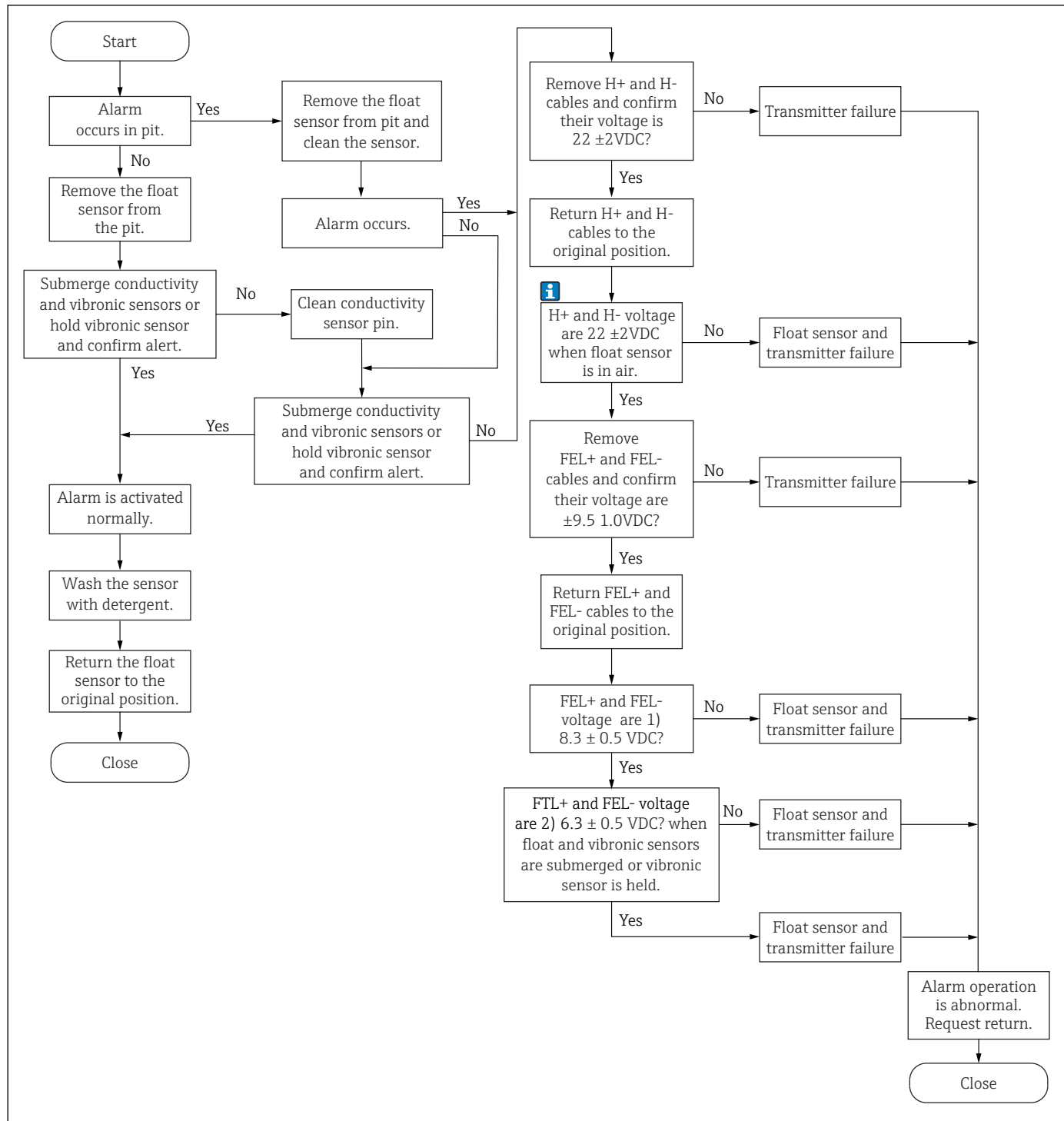


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25 Operation checker (specialty tool)

1 Operation checker

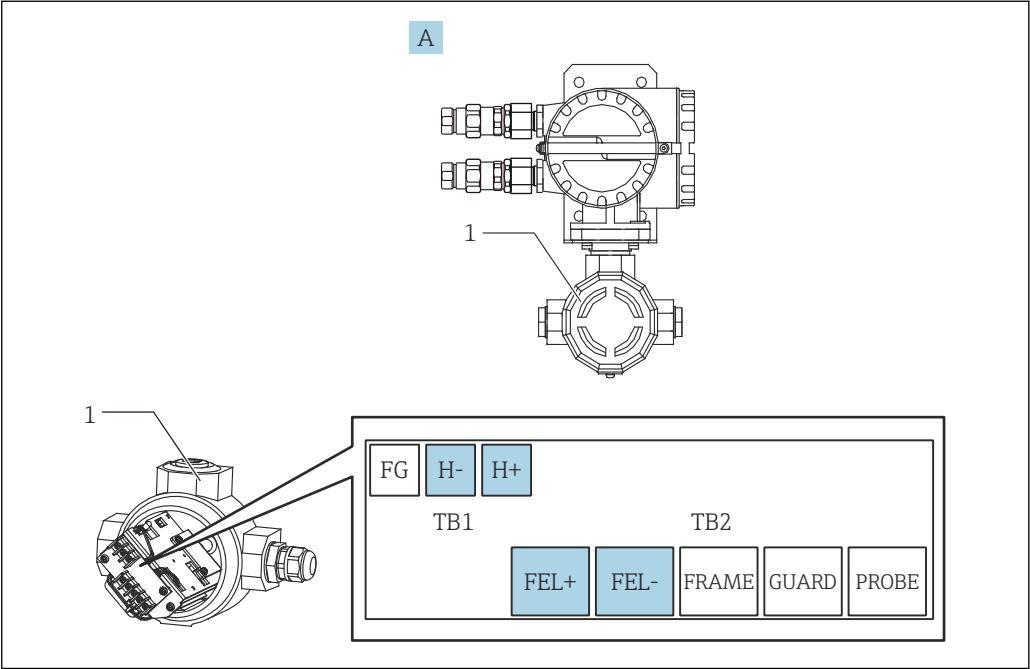
7.3.1 Operation check flowchart



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i The voltage upon turning on the power supply is $DC20 \pm 1V$ in ATEX, IECEx, FM, and JPN Ex specifications, but this will change to $DC18 \pm 2V$ after several seconds.

Before performing an alarm operation check, take measures to prevent the alarm system from being affected even when an oil leak alarm is activated. For the operation check process, see "Operation check flowchart" in the previous section. The diagram below shows the checkpoints for the voltage checks indicated in the flowchart.



A0039896

- 26 Intrinsically safe terminal box
- A Ex d converter NRR261 (integrated type)
- 1 Ex [ia] terminal
- H- Blue
- H+ Blue
- FEL+ Red
- FEL- Blue

7.3.2 Converter / alarm system problems

Item	Description
LED is lit red: Normal alarm activation	An alarm is activated despite the fact that sensor voltage has not been detected. If there is no issue with the wiring between the converter and the sensor I/F Ex box, replace the converter.
LED is lit green: There is no alarm signal from the sensor	If an alarm has been activated in this condition, check the resistance value on the alarm activation output terminal of the converter by following the steps below: 1. Turn off the power supply to the alarm activation system. 2. Disconnect the alarm activation output line from the converter. 3. Check to ensure that the LED is continuously lit green. 4. Measure the resistance values between 1: COM and NO and 2: COM and NC. The converter is working properly if it is 1: 0Ω (short) and 2: at least several MΩ (open). If this is not the case, replace the converter.
LED is not lit: The converter is not turned on	If rated voltage is present between the L and N terminals of the converter, replace the converter. If the voltage between the L and N terminals cannot be measured, check the power supply source or power supply cable.

7.4 **Cleaning the conductivity sensor unit**

Normally, NAR300 checks the conduction state between the electrode tip and the float body; if there is conduction, it recognizes "water" and if there is no conduction, it recognizes "oil or air." Since the electrode holder is connected to the float body, it determines that "water" is present if a conduction state is established between the electrode tip and the holder. This prevents the alarm from being activated, resulting in a malfunction. Clean the area between the electrode tip and the holder regularly to maintain a non-conductive state.

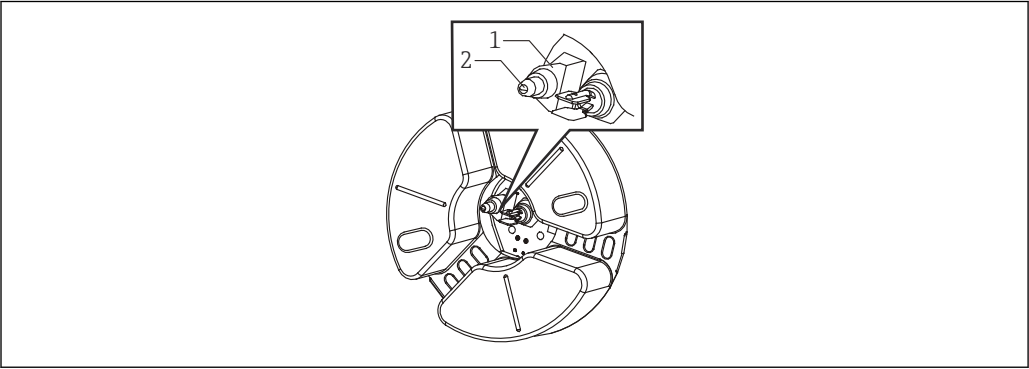
Items to prepare

- Rag
- Neutral detergent

Cleaning procedure

1. Remove the NAR300 sensor from the pit.
2. Using a rag, clean from the electrode tip of the conductivity sensor (metal portion) to the electrode holder (metal portion) to remove any moss, algae, or dust that has become attached.
3. Clean the entire electrode unit using a properly diluted neutral detergent.

This completes the cleaning procedure.



A0039897

27 *Sensor cleaning*

- 1 *Electrode holder*
- 2 *Electrode tip*

7.5 **Firmware history**

Date	Software version	Changes	Documentation	
			Operating instructions	Technical information
11.2003	V1.40	Initial software	BA027N/08/ja/02.04	TI045N/08/ja/01.05
04.2015	V1.50	SIL2 obtained	BA00402G08JA17.16	TI00045G08JA16.16

8 Maintenance

8.1 Maintenance work

No special maintenance work is required.

8.1.1 Exterior cleaning

When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing or the seals.

8.1.2 Periodic maintenance

While the NAR300 float sensor is not easily affected by deposits or adhered material, conduct overall periodic inspections of the cable and wiring, etc., semi-annually along with an operation check as follows.

- Inspect and clean the sensor and the pit periodically as clogging caused by debris, foreign matter and algae may result in a malfunction. To clean the float sensor, wipe it with a soft cloth that has been soaked in water.
- Remove any accumulated debris, sand or snow on the float sensor periodically as they can lower the draft position and cause changes in sensitivity.
- Check operation after ensuring that the cables are not damaged and that there are no wiring issues (loose terminal screw, etc.).

8.2 Endress+Hauser services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service or device tests.



Your Endress+Hauser Sales Center can provide detailed information on the services.

9 Repair

9.1 General information on repairs

9.1.1 Repair concept

The Endress+Hauser repair concept assumes that the devices have a modular design and that repairs can be done by the Endress+Hauser Service Department or specially trained customers.

Spare parts are contained in suitable kits. They also come with relevant replacement instructions.

For more information on service and spare parts, contact the Service Department at Endress+Hauser.

9.1.2 Repairs to Ex-approved devices

WARNING

Incorrect repair can compromise electrical safety!

Explosion hazard!

- ▶ Only specialist personnel or the manufacturer's service team may carry out repairs on Ex-certified devices in accordance with national regulations.
- ▶ Relevant standards and national regulations on hazardous areas, safety instructions and certificates must be observed.
- ▶ Only use original spare parts from the manufacturer.
- ▶ Please note the device designation on the nameplate. Only identical parts may be used as replacements.
- ▶ Carry out repairs according to the instructions.
- ▶ Only the manufacturer's service team is permitted to modify a certified device and convert it to another certified version.

9.2 Spare parts

Some replaceable device components are clearly listed on the overview label found on the terminal unit cover.

The spare parts overview label contains the following information:

- List of major device spare parts (including ordering information for the spare parts)
- URL of *W@M Device Viewer* (www.endress.com/deviceviewer):

All spare parts for the device are listed together with their order codes so that you can order them. If available, users can also download the associated Installation Instructions.

9.3 Endress+Hauser services

Endress+Hauser offers a wide range of services.



Your Endress+Hauser Sales Center can provide detailed information on the services.

9.4 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
<http://www.endress.com/support/return-material>
↳ Select the region.
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

9.5 Disposal

Observe the following notes during disposal:

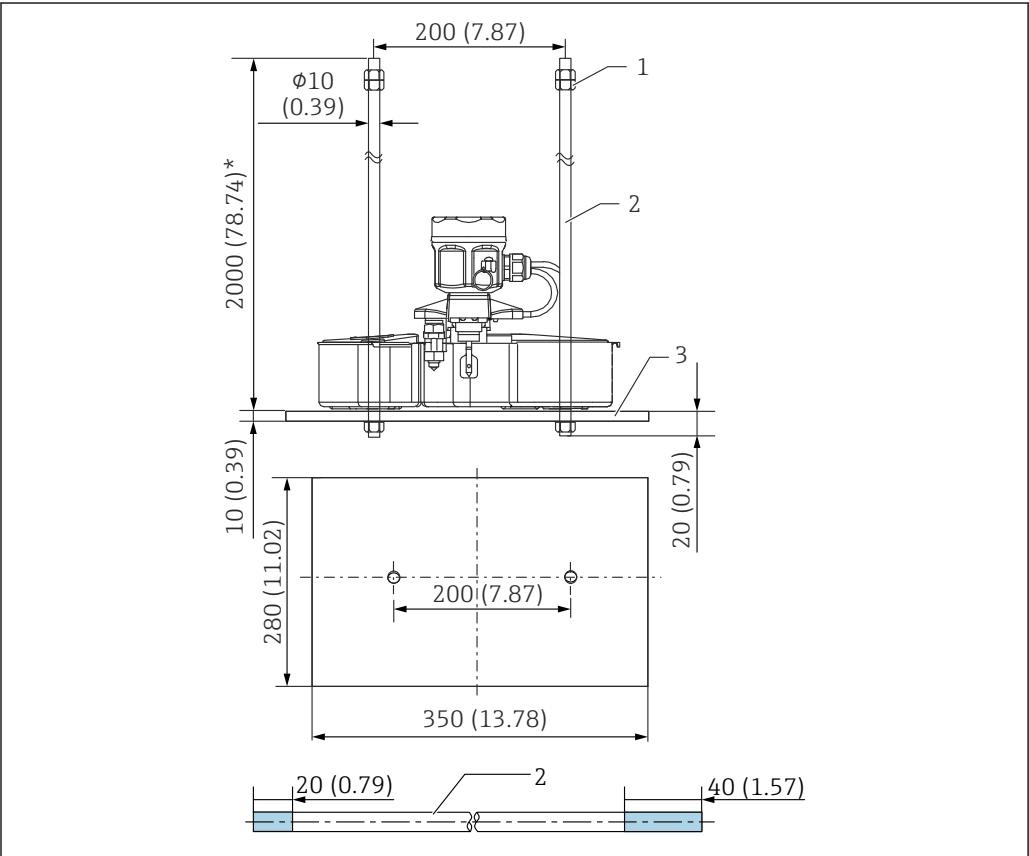
- Observe valid federal/national regulations.
- Ensure proper separation and reuse of the device components.

10 Accessories

10.1 Float guide

NAR300 may be mounted on a float guide that has been installed for existing products (CFD10, CFD30, UFD10, NAR291, NAR292).

The float guide is 2 000 mm (78.74 in) in size. If a length shorter than 2 000 mm (78.74 in) is required for use, cut it to size. If a float guide longer than 2 000 mm (78.74 in) is required, contact your nearest Endress+Hauser service center or distributor.



28 Float guide. Unit of measurement mm (in)

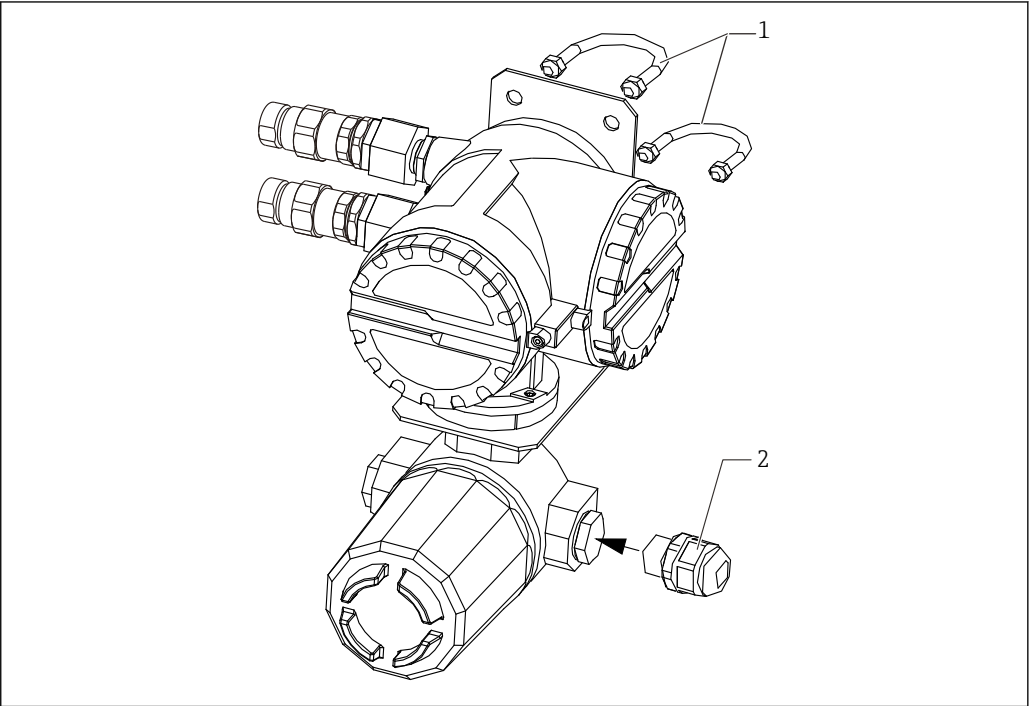
- 1 Nut (M10)
- 2 Float guide
- 3 Weight

Name	Delivered quantity	Materials
Float guide	2	SUS304
Weight	1	SS400 or SUS304 options available for selection
Nut (M10)	6	SUS304

i The 20 mm (0.73 in) and 40 mm (1.57 in) of the float guide in the diagram indicate the lengths of thread grooves.

10.2 U-bolt / cable gland (waterproof connection for JPNEx)

A U-bolt (JIS F3022 B50) is used when mounting the converter. Have a pipe with an internal diameter of 50A (2B φ60.5 mm (198.5 in)) ready. Tighten and secure the cable gland after inserting the cable from NAR300.



A0039892

- 29 U-bolt / cable gland
- 1 U-bolt (JIS F3022 B50)
 - 2 Cable gland (waterproof connection)

Name		Delivered quantity	Materials
U-bolt		2	Iron (chromate)
U-bolt accessory	Nut	4	
	Flat washer	4	
Cable gland (waterproof connection)		1	Nylon

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