



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Operating Instructions

NAR300 System

Oil Leak Detector

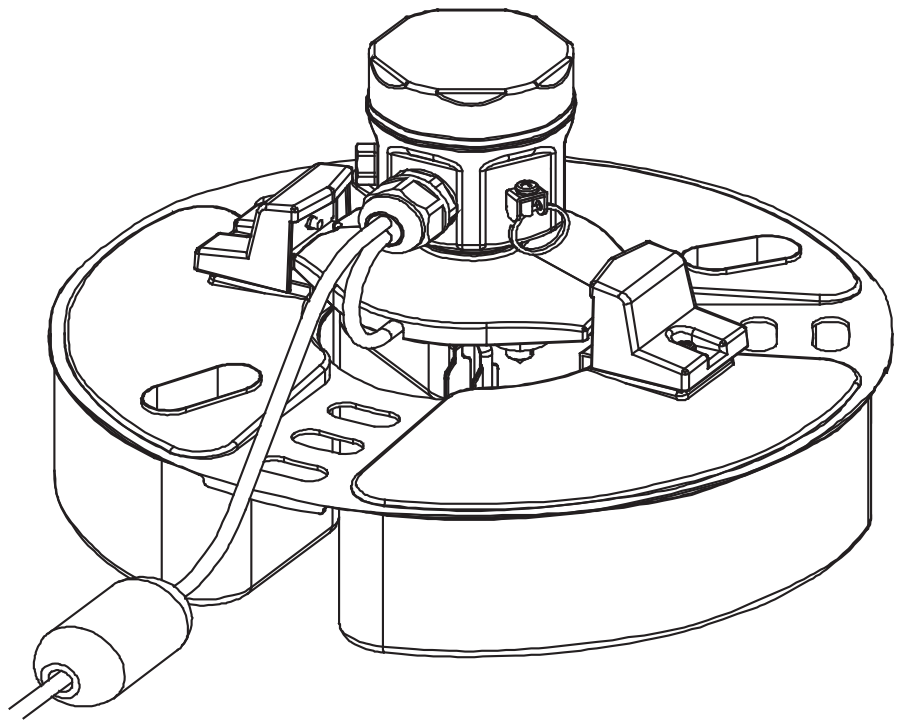


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1 Safety instructions

1.1 Designated use

The Oil Leak Detector NAR300 System uses two types of detection principles: conductivity sensor and Vibration sensor.

his system is set up in a pit, dike or plant, or sump pit near the pump yard, where it provides the ultimate leak detection function for petrochemicals or vegetable oils.

Flame proof System:

Alarm output transmitted to Host controller via connected Transmitter NRR261 (outdoor installation) and e.g. level transmitter with switching input

Intrinsically safe System:

Direct alarm output to host controller when connected in combination with Transmitter NRR262 (indoor installation).

1.2 Installation, commissioning and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility.
- Personnel must absolutely and without fail read and understand this Operating Manual before carrying out its instructions.
- The instrument may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system is to be grounded.
- Please observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.

1.3 Notes for Handling

Power cable

- Use cables recommended by Endress+Hauser.
- Be sure to ground the cables. For details, refer to "Electrical Connections" and "Installation"

Grounding

- Do not remove a ground terminal or wire power is on.
- For details, refer to "Electrical Connections"

External connection

If external connections are required, before connecting the device to an external control circuit, provide protective grounding

Caution!

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



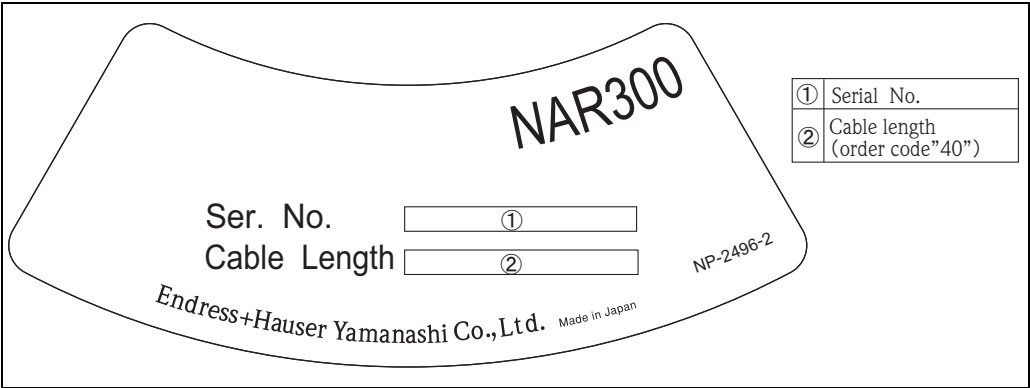
1.4 Notes on safety conventions and symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding symbol in the margin.

Symble	Meaning
	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument
	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument
	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned
	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate, it can be installed in an explosion hazardous area
	Explosion hazardous areas Symbol used in drawings to indicate explosion hazardous areas. – Devices located in and wiring entering areas with the designation “explosion hazardous areas” must conform with the stated type of protection
	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. – Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas
	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied
	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied
	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system
	Protective grounding (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment
	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice

2 Identification

2.1 Float sensor NAR300 Nameplate



Information on the nameplate of the Float Sensor NAR300

NRR261-2xx

Endress+Hauser



NRR261

Order Code

NRR261-

①

Ser. No:

②

漏油検出装置

NR30261

③

Exd [ia] IIB T4

本安回路 2:

Uo≤13V

Io≤38mA

Po≤123.5mW

Co≤0.25μF

Lo≤80mH

非本安回路:

電 源:

④

許容電圧: AC250V 50/60Hz, DC250V

周囲温度: 60℃

被測定物温度: 60℃



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。

・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。

・取扱説明書 (BA1027) を参照して下さい。



IP67

エンドレスハウザー山梨株式会社

Yamanashi 406-0846

Made in Japan

NP - 2478-2

①	SAP code
②	Serial No.
③	Explosion-proof type
④	Power supply

Ex d[ia] system (NAR300-11xxxx+NRR261-2xx system)

NRR262-2x

Endress+Hauser



NRR262

Order Code

NRR262-

①

Ser. No:

②

Oil Leak Detect System

NR30262

Oil Leak Detector NAR300-1

Protection class Ex ia IIB T4

Intrinsic safety circuit 2:

Uo≤13V

Io≤38mA

Po≤123.5mW

Co≤0.25μF

Lo≤80mH

Ambient Temperature: 60℃

Medium Temperature: 60℃



Endress+Hauser Yamanashi Co.,Ltd.

Made in Japan

NP-2535-1

Cautions:

・Do not modify parts and circuits of this instrument.

・Use the cables which thermal endurance is over 70℃.

・Refer to instruction manual (BA027)

Endress+Hauser Yamanashi Co.,Ltd.

Made in Japan

NP-2536-1

①	SAP code
②	Serial No.

NRR262-2x

Endress+Hauser



NRR262

Order Code

NRR262-

③

Ser. No:

②

漏油検出装置

NR30262

変換器

NRR262-1

防爆性能

Ex ia IIB T4

本安回路:

Uo≤28V

Io≤93mA

Po≤0.65W

非本安回路:

電 源:

④

許容電圧: AC250V 50/60Hz, DC250V

周囲温度: 60℃

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下さい。

・許容温度70℃以上のケーブルを使用して下さい。

・取扱説明書 (BA1027) 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

Yamanashi 406-0846

NP-2480-2

①	SAP code
②	Serial No.
③	Power supply

Ex [ia] system (NAR300-13xxxx+NRR262-2x system)

6

Endress + Hauser

Endress+Hauser NAR300 Order Code NAR300-15A ① Ser. No: ② Oil Leak Detector (Refer to Order code) Protection class Ex ia IIB T4 Intrinsic safety circuit (Power) $U_i=28V$ $I_i=93mA$ $P_i=0.65W$ $L_i=48\mu H$ $C_i=0$ Intrinsic safety circuit 2: $U_o=13V$ $I_o=38mA$ $P_o=123.5mW$ $L_o=80mH$ $C_o=0.25\mu F$ Ambient Temperature : 60°C Medium Temperature : 60°C Endress+Hauser Yamanashi Co.,Ltd. Made in Japan NP-2597	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30px; text-align: center;">①</td> <td>SAP code</td> </tr> <tr> <td style="text-align: center;">②</td> <td>Serial No.</td> </tr> </table> Caution : - Do not modify parts and circuits of this instrument. - Use the cables which thermal endurance is over 70°C. - Refer to instruction manual (Ex572-829XJ) Endress+Hauser Yamanashi Co.,Ltd. Made in Japan NP-2598	①	SAP code	②	Serial No.
①	SAP code				
②	Serial No.				

Ex [ia] Sensor I/F Ex box, Extended type (NAR300-15xxxx)

NRR262-2x							
Endress+Hauser NRR262 Order Code NRR262-2 ① Ser. No: ② 変換器 / Converter : (Order Code 参照) / (Refer to Order Code) 防爆性能 / Protection class : [Ex ia] IIB 本安回路 / Intrinsically safe circuit : $U_o=28V$, $I_o=93mA$, $P_o=0.65W$, $C_o=0.083\mu F$, $L_o=3.05mH$ 非本安回路 / non Intrinsically safe circuit : 電源 / Power supply: ③ 許容電圧 (Um) : AC250V 50/60Hz, DC250V 周囲温度 / Ambient temperature : 60°C 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、改造等は行わないでください。 ・ 防爆注意事項説明書 (Ex581-838XJ) を参照して下さい。 Note : ・ NRR262 must be installed in non-hazardous area. ・ Do not modify internal parts or circuits. ・ Refer to Ex-instruction manual (Ex581-838XJ). → エンドレスハウザー山梨株式会社 Endress+Hauser Yamanashi Co.,Ltd. Made in Japan Yamanashi 406-0846 NP - 2573-1	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30px; text-align: center;">①</td> <td>SAP code</td> </tr> <tr> <td style="text-align: center;">②</td> <td>Serial No.</td> </tr> <tr> <td style="text-align: center;">③</td> <td>Power supply</td> </tr> </table>	①	SAP code	②	Serial No.	③	Power supply
①	SAP code						
②	Serial No.						
③	Power supply						

Ex [ia] transmitter, Extended type (NRR262-2x)

NRR261-3xx

Endress+Hauser



NRR261

Order Code NRR261-3

①

Ser. No.:

②

変換器

NRR261-3

③

Converter

防爆性能

Ex d[ia] IIB T4

Protection class

本安回路: Intrinsically safe circuit

Uo=28V Io=93mA Po=0.65W

Co=0.083 μF Lo=3.05mH

非本安回路: non Intrinsically safe circuit

電源: ④

Power supply:

許容電圧: AC250V 50/60Hz, DC250V

Maximum voltage (Um):

周囲温度: 60°C

Ambient temp.:

IP67

CE

注意:

・機器内部の部品及び配線の変更、改造等は行わないでください。

・許容温度70°C以上のケーブルを使用してください。

・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。

・防爆注意事項説明書 (Ex581-832XJ) を参照して下さい。

Note

・Do not modify internal parts or circuits.

・Use heat-resistant cable 70°C or more.

・Wait 10 minutes after power shut off when opening cover.

・Refer to Ex-instruction manual (Ex581-832XJ).

△→□

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 - 2572-1

①	SAP code
②	Serial No.
③	Ex-proof model
④	Power supply

Ex d[ia] transmitter, Extended type (NRR261-3xx)

2.2.2 Transmitter NRR261

10	Approval:									
	2	Ex d [ia] IIB T4, TIIS (NAR300)								
	3	TIIS, Ex d [ia] IIB T4 ((NAR300 separate type)								
	9	Special version, TSP-no. to be spec.								
20	Power Supply:									
	A	90-250VAC								
	B	22-26VDC								
	Y	Special version, TSP-no. to be spec.								
30	Cable Entry:									
	A	G3/4 x 2 (Ex d)								
	B	NPT3/4 x 2 (Ex d)								
	D	M25 x 2 (Ex d)								
	E	G PF3/4 x 2 (Ex d) , G PF 1/2 x 1 (Ex ia)								
	K	G PF1/2 x 2 (Ex d) , G PF 1/2 x 1 (Ex ia)								
	Y	Special version, TSP-no. to be spec.								
NRR261-										Complete product designation

2.2.3 Transmitter NRR262

10	Approval:									
	2	Ex ia IIB T4, TIIS (NAR300)								
	9	Special version, TSP-no. to be spec.								
20	Power Supply:									
	A	90-250VAC 50/60Hz								
	B	22-26VDC								
	Y	Special version, TSP-no. to be spec.								
NRR262-										Complete product designation

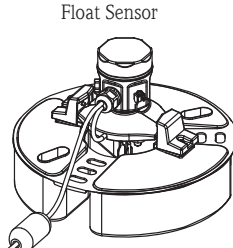
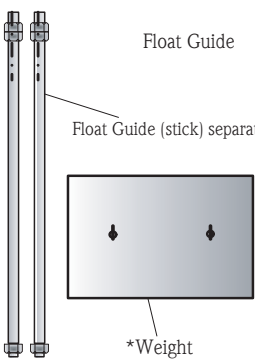
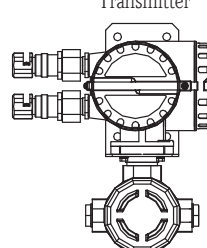
2.3 Scope of delivery

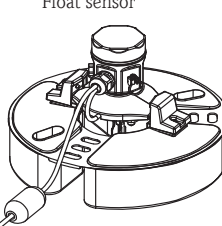
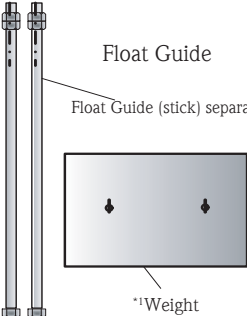
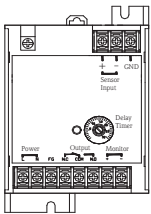
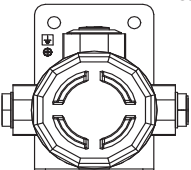
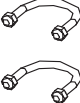
- Instrument according to the version ordered
- Operating manual (this manual)

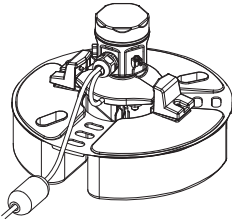
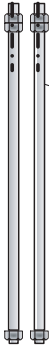
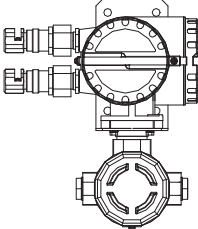
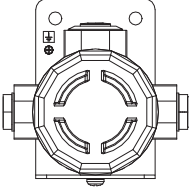
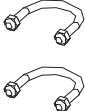
2.4 Operating Manual (BA01027G, this booklet)

Describe the installation and commissioning of the Oil Leak Detector NAR300.

3 Delivery example of each Order Code

Float Sensor order code	Transmitter order code
NAR300 - x 1 x x 2 or 3 A	NAR261 - 2 x x
 Float Sensor Check tool  Float Guide Float Guide (stick) separate packing *Weight *(This weight is set in the bottom of Transmitter packing box)	 Transmitter  Cable gland  U bolt for mounting

Float sensor order code	Transmitter order code
NAR300 - x 3 or 5 x x 2 or 3 A	NAR262 - 2 x x
 Float sensor Check tool  Float Guide Float Guide (stick) separate packing *¹Weight *¹(this weight is packed in bottom of box with transmitter)	 Transmitter ^{*2}Sensor I/F Module Box   Cable gland  U bolt for mounting ^{*2} included in order code NAR300-13xxxx or NAR300-15xxxx. Ex [ia] system is used with Transmitter NRR 262-2x.

Float sensor order code	Transmitter order code
NAR300 - 1 5 x x 2 or 3 A	NRR261 - 3 x x
Float sensor  Check tool  Float guide  Float guide bar (separate packing from weight)  Weight : (this weight packed in bottom of box with transmitter) 	Transmitter  Cable gland  mounting U bolt  *Sensor I/F Ex box  Cable gland  mounting U bolt  * included in order code NAR300-15xxxx. Ex d[ia] system is used with Transmitter NRR261-3x.

4 Operating conditions

4.1 Detection Sensitivity

Depending on actual condition, water may sometimes cling to the electrode, even though the sensor is floating on oil above the water (see figure 3). In such case, oil detection sensitivity may be affected by 1 to 2 mm. When absolute precision is required we recommend coating the electrode with a mild detergent in order to keep water from clinging to the electrode.

4.2 Water-filled pits

Not for use in salt -water pits

The Float Sensor NAR300 is not designed for use in salt-water. If used in salt-water the following abnormal performance may occur:

- Failure to output an alarm if overturned by waves
- Salt content may create a short between float sensor and probe, causing alarm delay
- Failure due to salt-water corrosion

Pits with liquids other than water

When using the Float Sensor on particular liquids such as a solvent blend, it may be corroded and damaged.

High electrical resistance water in pit

When using the Float Sensor on high electrical resistance water such as a steam drain or pure water, an alarm may ring. Electric conductivity should be $\geq 10 \mu\text{ S/cm}$ and $\leq 100\text{k}\Omega \cdot \text{cm}$.

As an example:

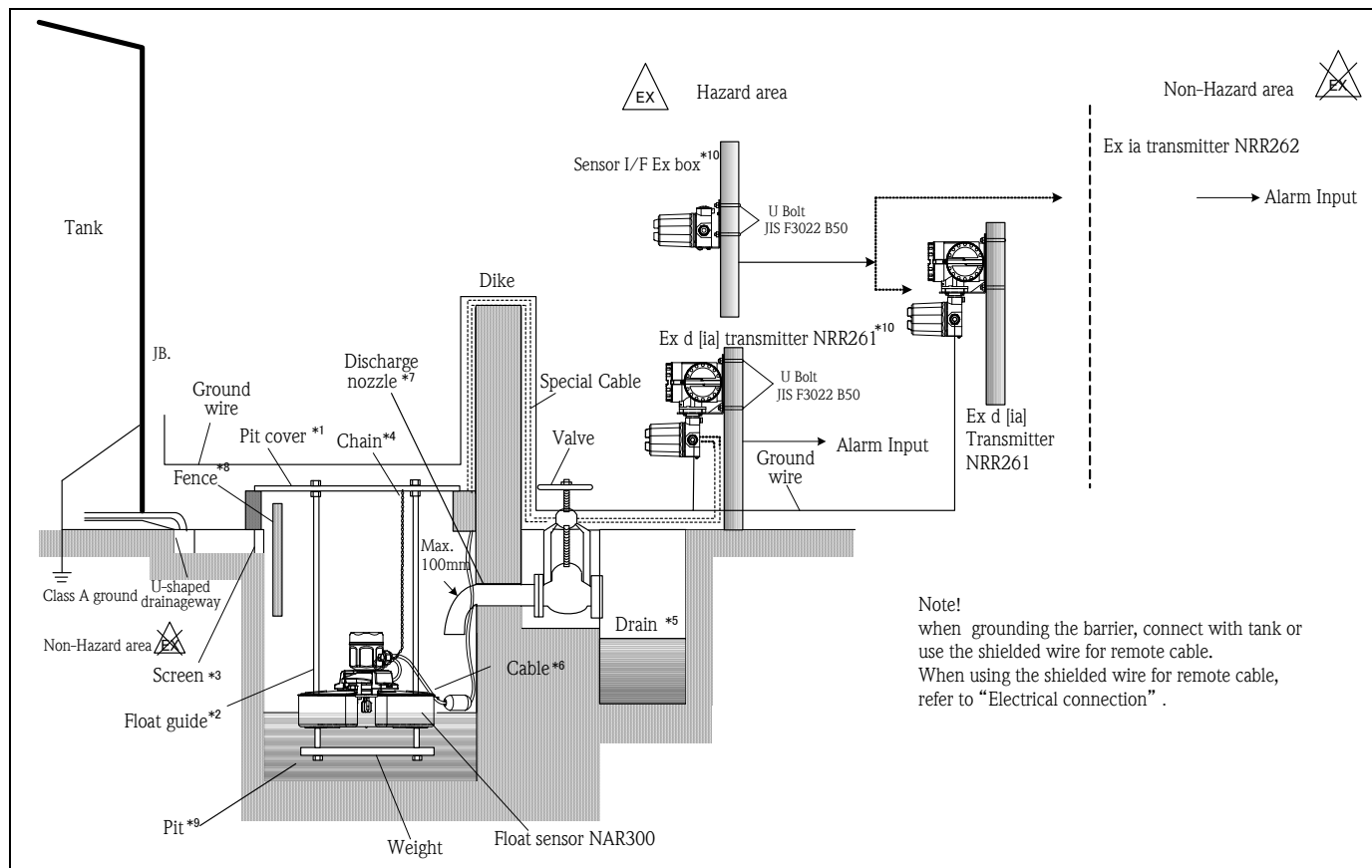
Pure water - 1 to $0.1 \mu\text{ S/cm}$ (1 to $10\text{M}\Omega \cdot \text{cm}$)

The water freezing in a pit

When water in the pit freezes, the alarm may ring (fail safe function).

Please implement countermeasures to prevent freezing.

5 Installation



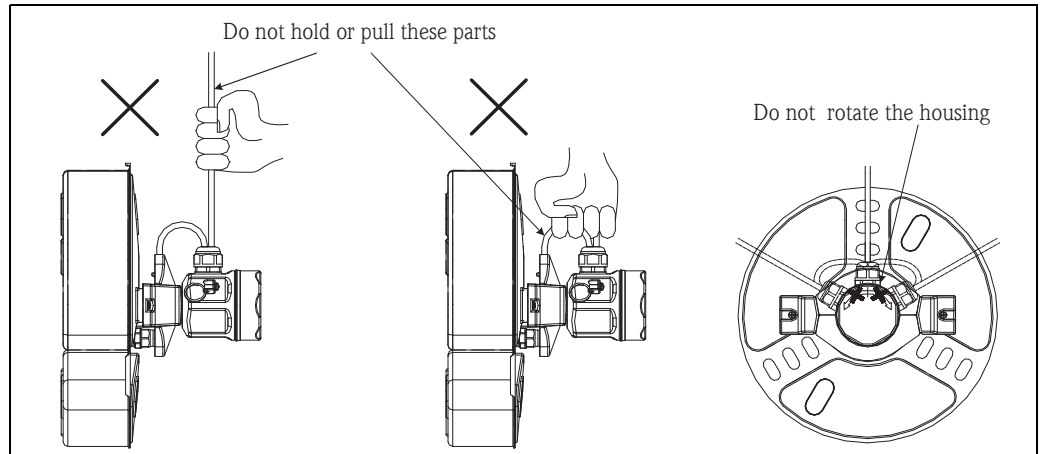
Notes regarding installation and mounting

1. Take precautions to prevent rubbish or snow from entering the pit, e.g. rubbish guard, roof, cover etc. If snow accumulates on the Float Sensor NAR300, it will float lower in the water and reduce oil detection sensitivity. When ambient temperatures rise above 50 °C, set up a sunshade to block direct sunlight. Mount covers higher than the top of the pit to avoid submerging the Float Sensor NAR300 during heavy rains. If the float sensor is submerged it may not perform as intended.
2. The Float Sensor NAR300 may not perform as intended if it becomes unbalanced by more than about 3 degrees horizontally. Use float guides as recommended to keep balance, and take care that chains and cables are not tangled in the float or guides.
3. We recommend mounting a screen at the water inlet to prevent rubbish from entering the pit. Conduct periodical inspections/cleaning to maintain optimal performance of the system.
4. It may be convenient to attach a lifting chain to the float sensor head for inspecting. In the case the weight of the chain should be less than 50 grams, else it may affect the balance of the float sensor. Do not use excessive force when pulling the chain.
5. When the pit becomes completely filled with water, even if an oil leak occurs, an oil layer cannot form on the surface of the water due to overflowing from the pit.
6. Do not pull the sensor by its signal cable. Pulling the signal cable may damage the sensor.
7. When the drain valve is kept continuously open, it should be formed such that it curves downward at least 100mm. Failure to do so may cause any oil to discharge from the pit before it can form a detectable layer on the water surface, resulting in a delayed alarm condition or failure to detect. In the case of a pit without discharge nozzle as illustrated above, install water-fence or other mechanism such that oil will form a detectable layer on the water surface.
8. If necessary, set up a divider to prevent extreme waves, crosscurrents, or water splashing onto the float sensor.
9. If the pit is too wide, it may not allow a detectable oil layer to form on the water surface. In this case install a divider to reduce the surface area such that a detectable oil layer will form.
10. Mount the NAR300, NRR261 and I/F Ex box at least 50 cm apart.

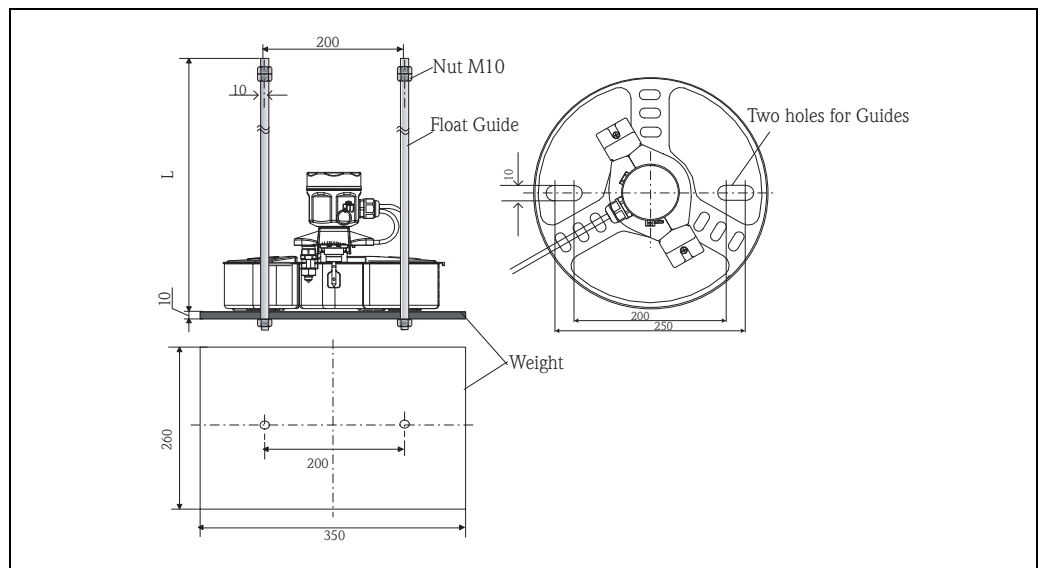
5.1 Float sensor NAR300

5.1.1 Handling Instructions

Do not carry the float sensor by holding the cable as below fig.
When carrying it, please make sure to hold it with both hands.
When lifting and holding the sensor, take care not to remove the top cover.

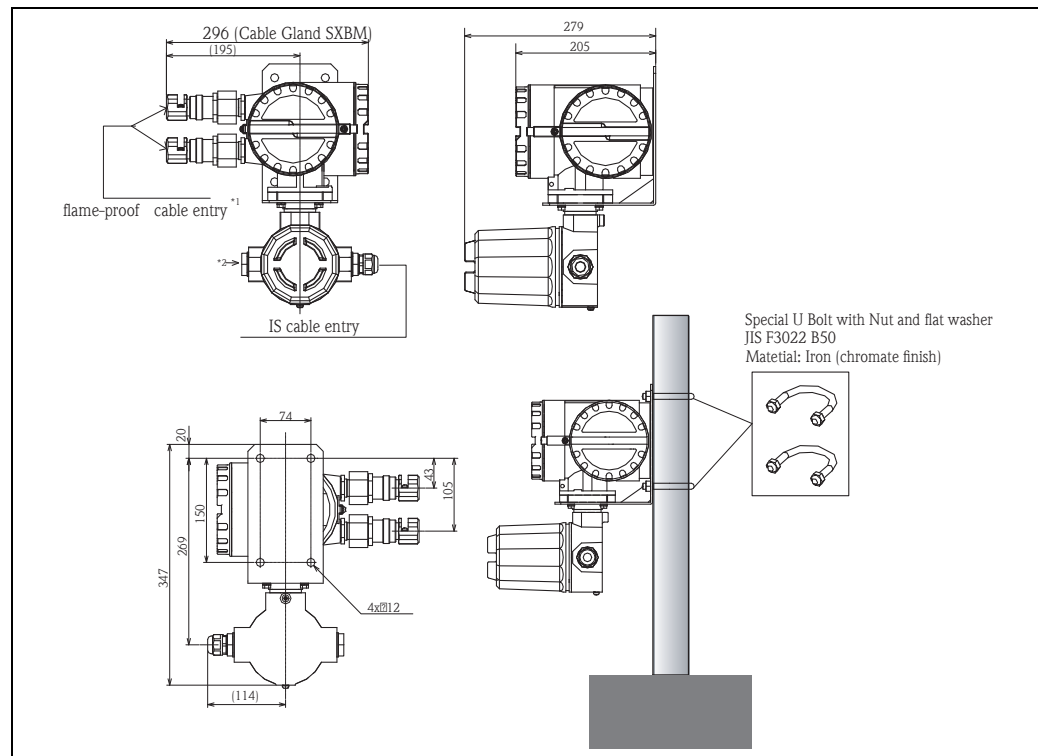


5.1.2 Float guide mounting



The Float Sensor NAR300 can install in the float guide for our existing products (CFD10, CFD30, UFD10, NAR291, NAR292)

5.2 Transmitter NRR261



*1: Only if the order is TIIS flame-proof specification, it comes with the cable gland .

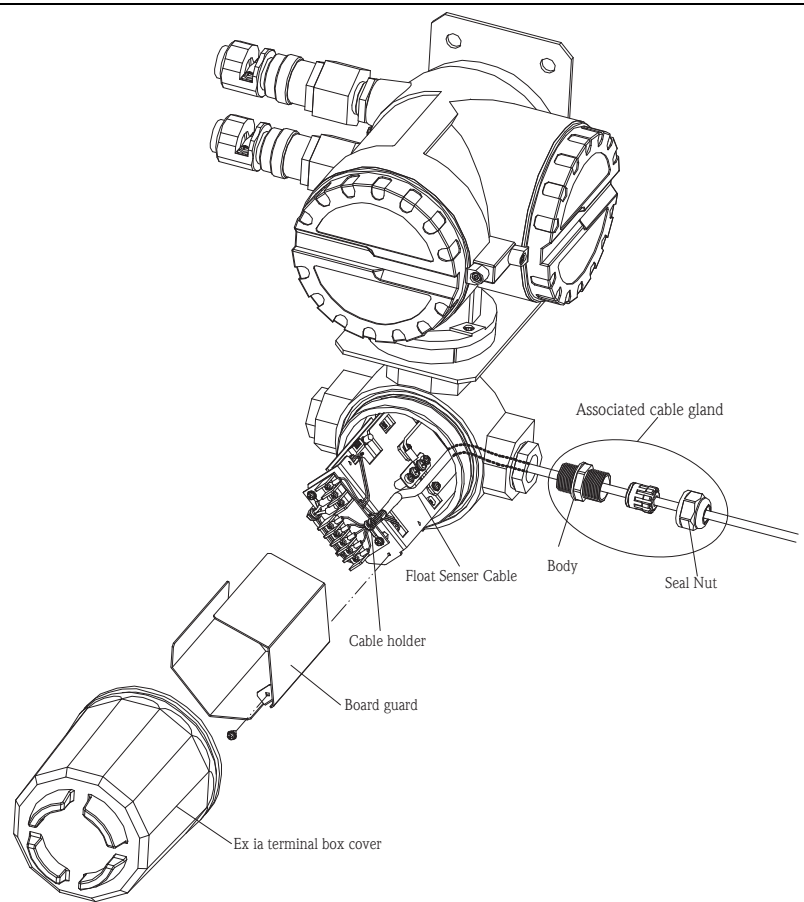
Adjusted cable external diameter: Φ 12 to 16 mm.

*2: Please select the cable entry from Transmitter NRR261 order code (page 10).

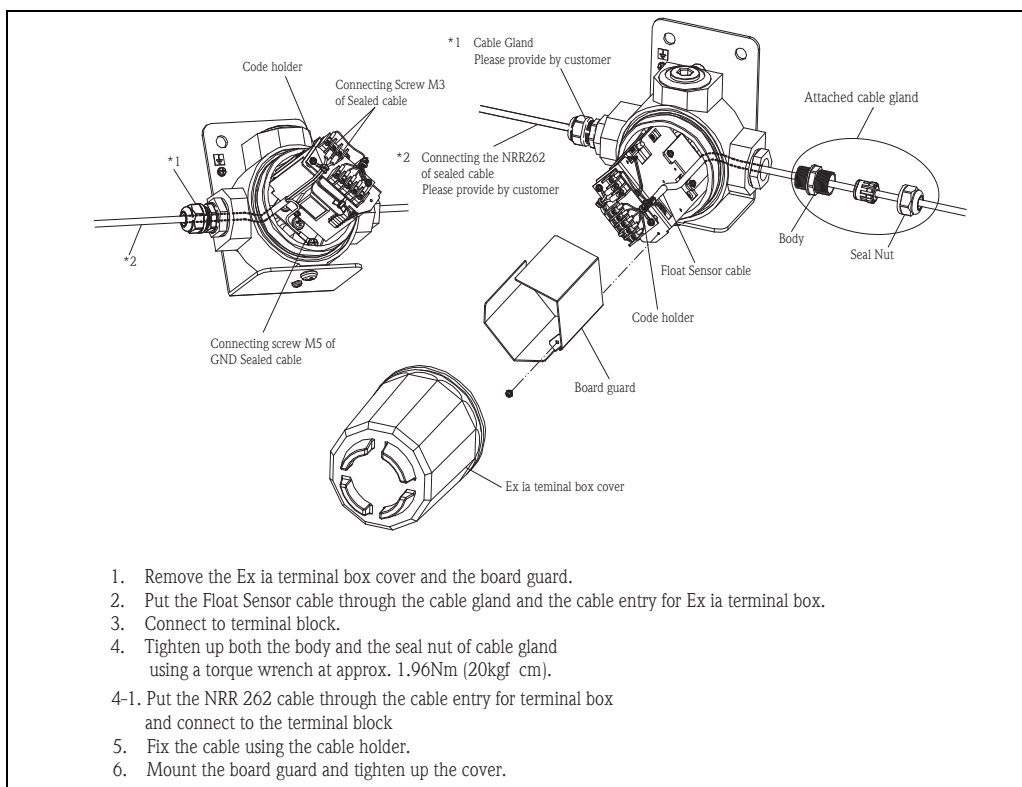
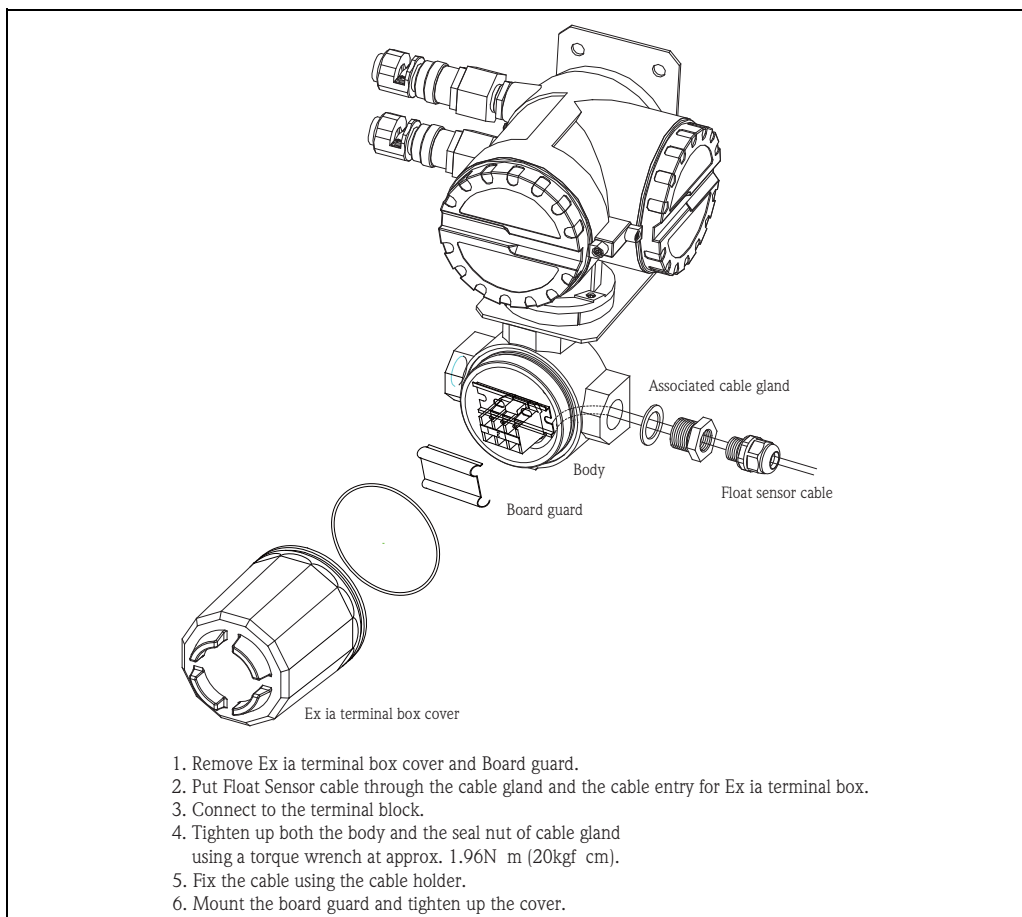
Transmitter NRR261 is usually fixed to a pipe in tank yard using a mounting U bolt (JIS F3022 B 50). The NRR261 is can be mounted directly on wall surface (4 x Φ 12 mm, fixing Bolts M10 and Nuts).

5.2.1 Wiring

NRR261-2xx



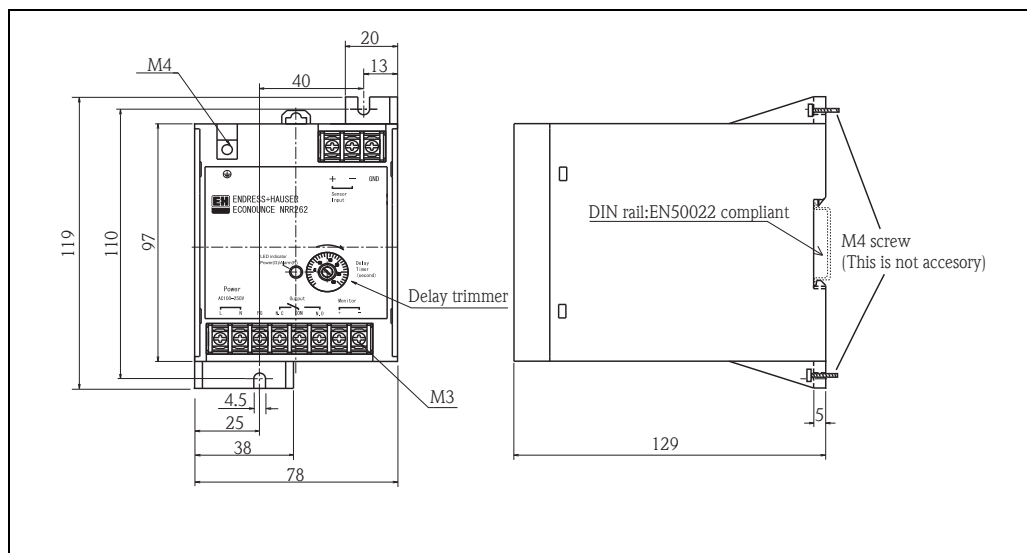
1. Remove Ex ia terminal box cover and Board guard.
2. Put Float Sensor cable through the cable gland and the cable entry for Ex ia terminal box.
3. Connect to the terminal block.
4. Tighten up both the body and the seal nut of cable gland using a torque wrench at approx. 1.96N m (20kgf cm).
5. Fix the cable using the cable holder.
6. Mount the board guard and tighten up the cover.

NAR300-15xxxx wiring, Sensor I/F Ex box**NRR261-3xx, transmitter**

5.3 Transmitter NRR262

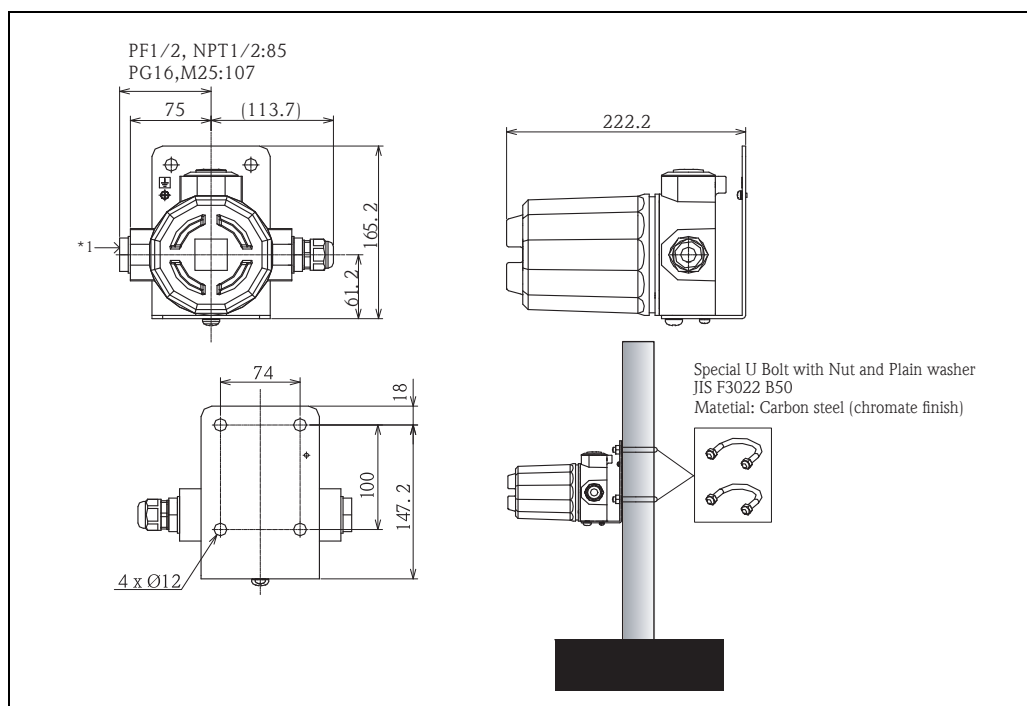
The NRR262 sets up indoors such as in an instrument room and can be installed easily using two M4 screws.

It is possible to install with of simple one-touch snap-in function by using DIN rail EN50022. When installing multiple transmitters consecutively and having a plan to install more, this rail mounting is convenient.



5.4 Sensor I/F Ex box

The Sensor I/F Ex box is used in combination with Transmitter NRR262 to translate the signals from Float Sensor. The Ex box usually mounts on a pipe in tank yard and tighten up using U bolt (JIS f 3022 B50). Also, it is possible to mount directly on wall surface (4 x Φ 12 mm, using fixing Bolts M10 and Nuts).



*1: Please select the cable entry from the Sensor I/F Ex box order code (page 9).

6 Electrical connection

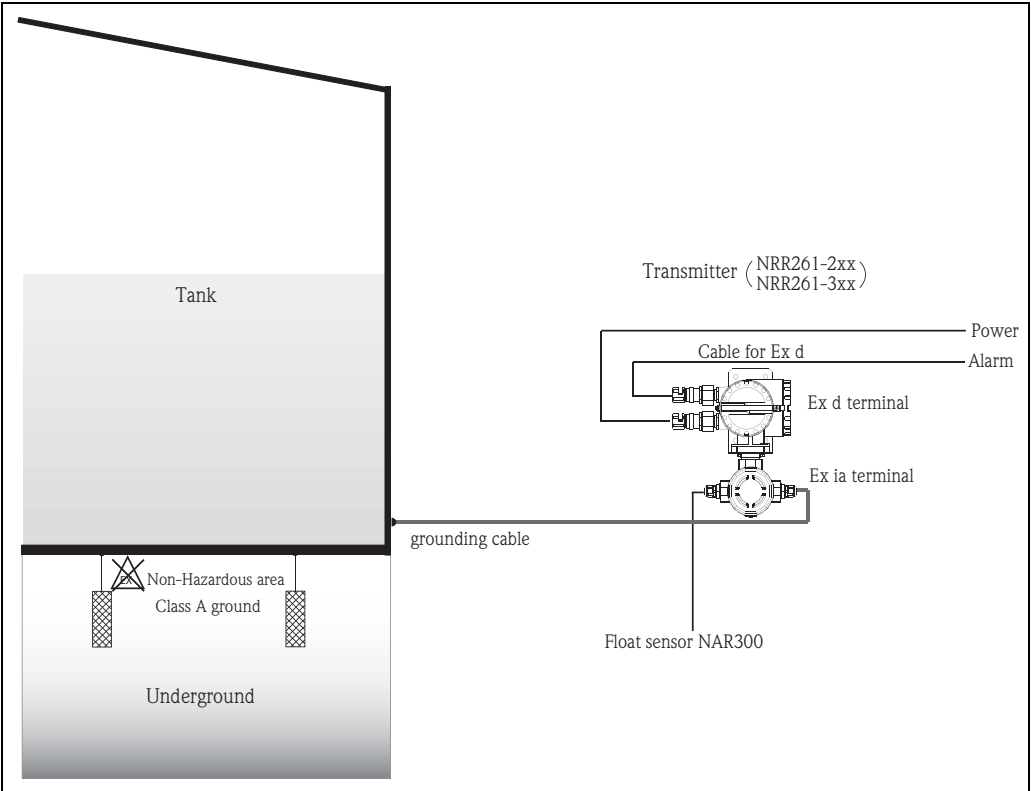
When using float sensor NAR300 Ex ia together with transmitter NRR261 Ex d[ia], it is necessary to ground the NRR261 to a safety barrier per the following procedure.

Note!
The grounding cable for safety barrier should be connected independent of any other devices or purpose, according to “Class A grounding” standards.

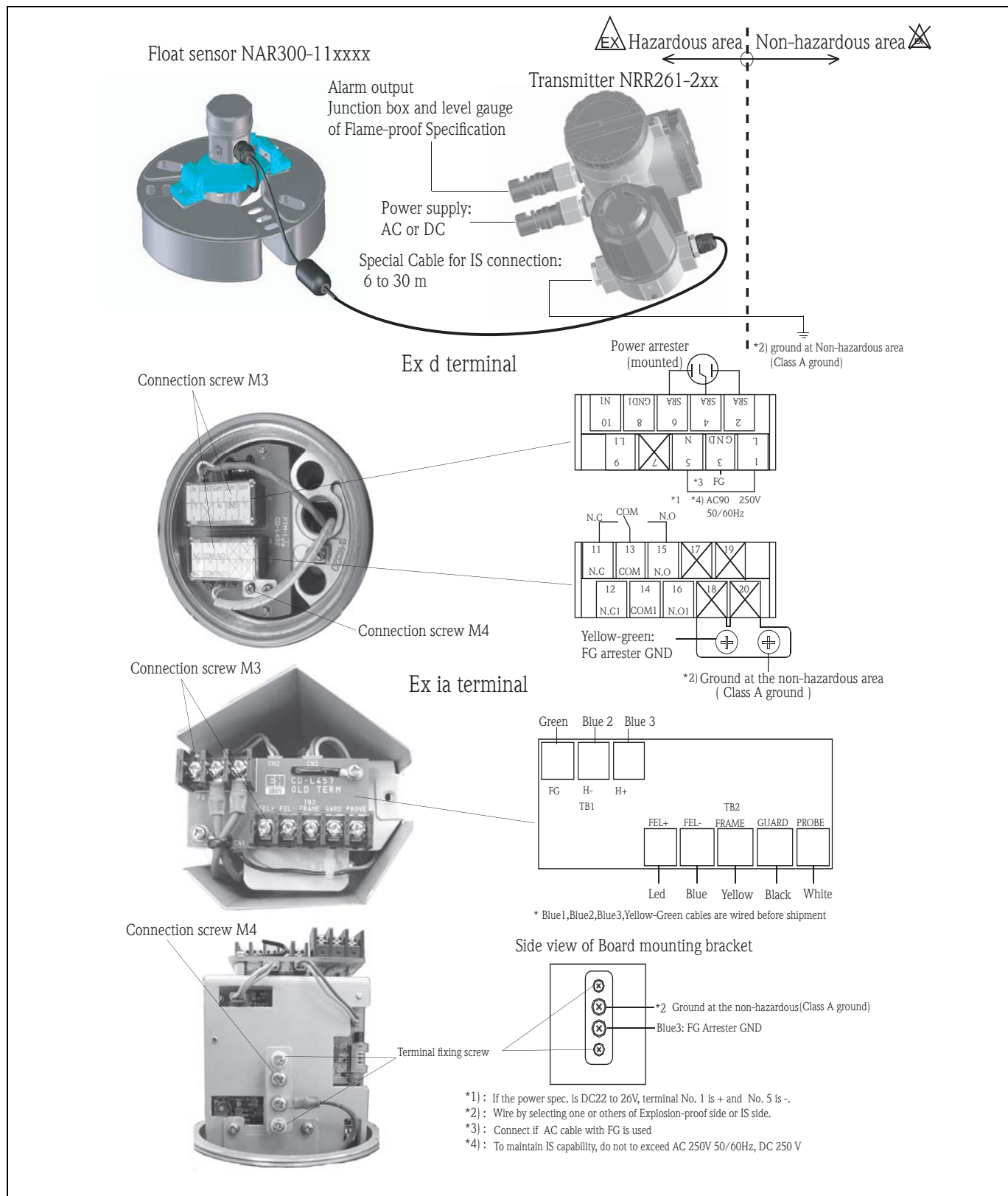
Use a conductive grounding wire with cross-sectional dimensions at least 2 mm².
In an instrumentation room, a field device with Class A ground may be connected in common with the communication cable shield.

"Class A ground" general description	
Ground resistance value	10 Ω
Grounding cable	Tensile strength : more 1.04kN and Metallic wire or copper wire (more 2.6 mm in diameter)

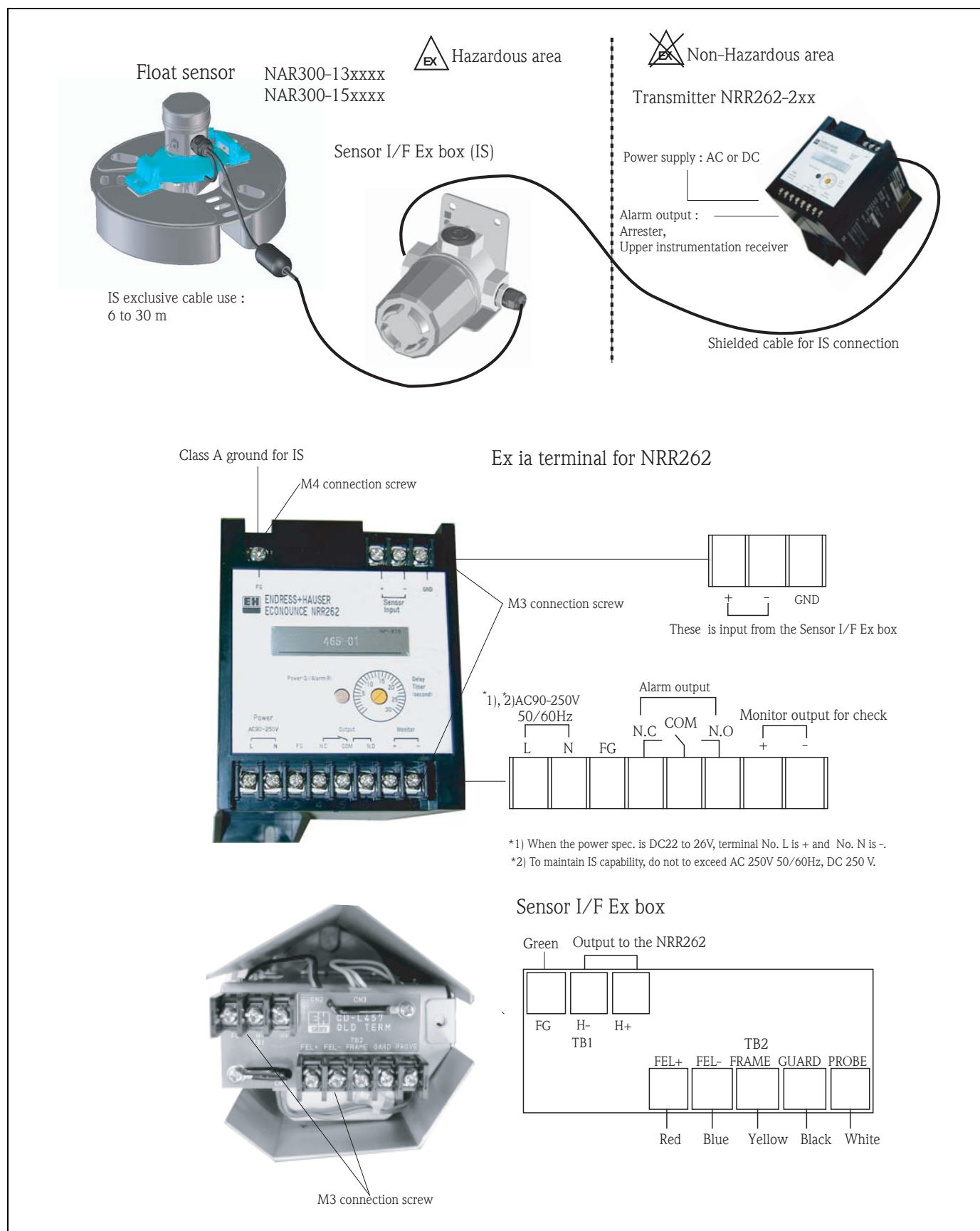
6.1 Grounding cable



6.2 Transmitter NRR261 -2xx



6.3 Transmitter NRR262-2x

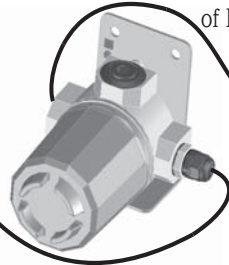


6.4 Transmitter NRR261-3xx

Float sensor NAR300 - 15xxxx



Sensor I/F Ex box

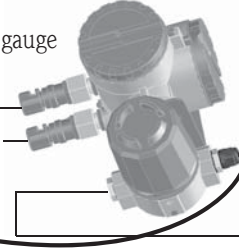


Special Cable for IS connection:
6 to 30 m

Alarm output :
Junction box and level gauge
of Ex d Specification

Power supply:
AC or DC

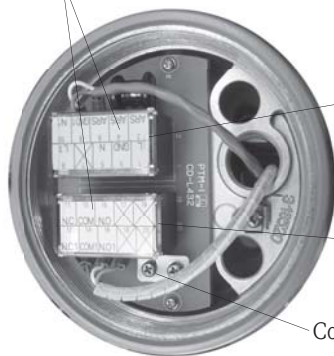
Transmitter NRR261-3xx



*2) ground at Non-hazardous area
(Class A ground)

Connection screw M3

Ex d terminal

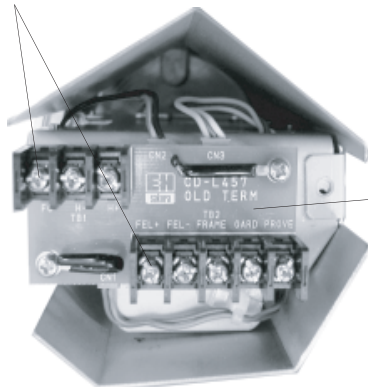


Connection screw M4

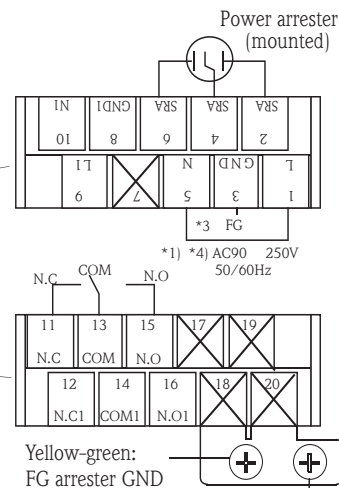
Ex ia terminal



Connection screw M3



Sensor I/F Ex box



*2) Ground at the non- hazardous area
(Class A ground)

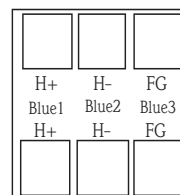
*1) : If the power spec. is DC22 to 26V, terminal No. 1 is + and No. 5 is -

*2) : Wire by selecting one or others of Explosion-proof side or IS side.

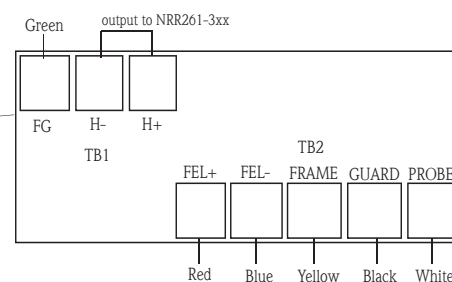
*3) : Connect if AC cable with FG is used

*4) : To maintain IS capability, do not to exceed AC 250V 50/60Hz, DC 250 V

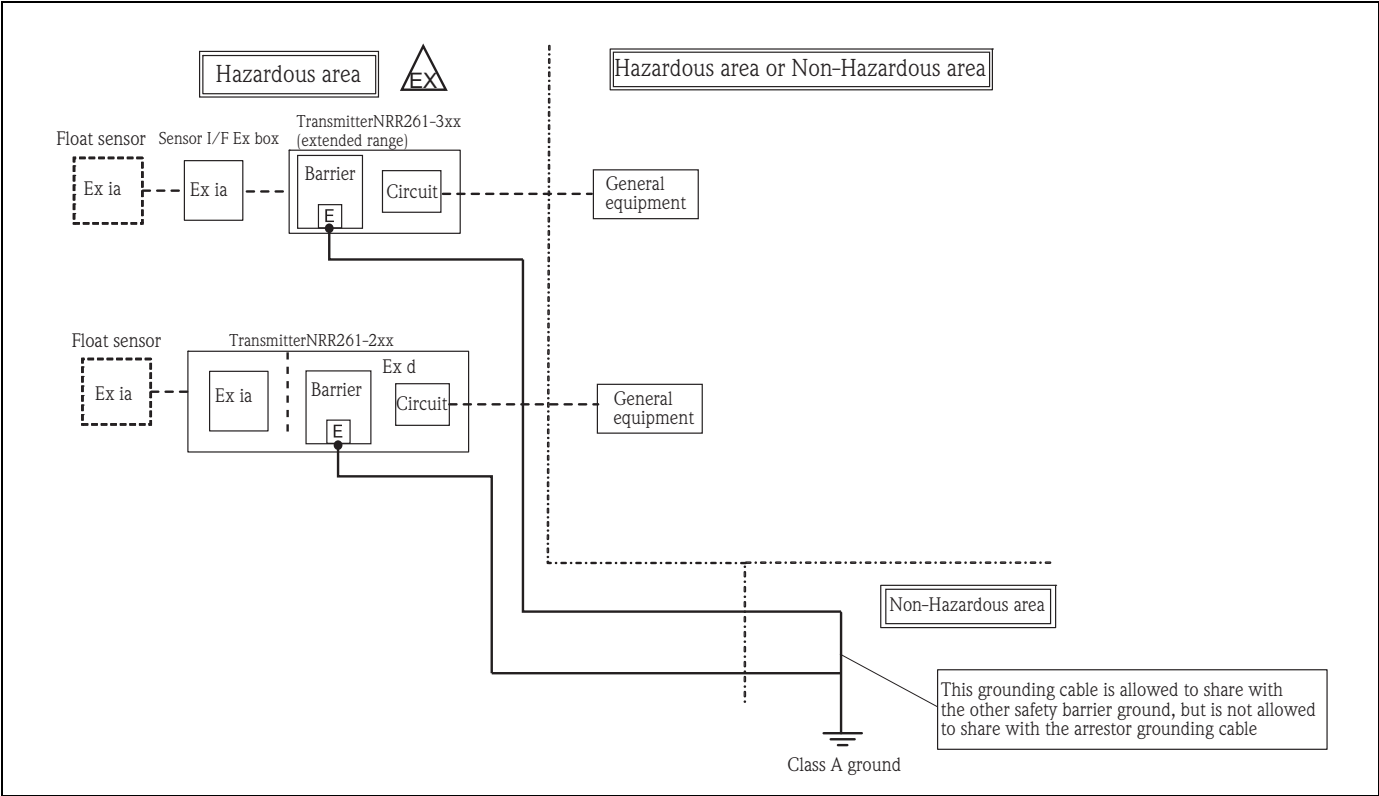
Blue1, Blue2, Blue3, Yellow green are wired before shipment



FG: Ground at the non-hazardous area
(Class A ground)



6.5 Connection diagram



6.6 Principle of Alarm operation

The oil leak detection signal detected on the float sensor NAR300 is converted into 8mA (alarm OFF), 16mA (alarm ON) at the current output circuit in the transmitter or the Sensor I/F Ex box and is connected to the current detection circuit through IS safety barrier.

In the current detection circuit, the presence or absence of the oil leak alarm signal is judged according to the current value size and turns the alarm output relay ON or OFF through the operation delayed circuit.

The operation delayed circuit has the delay time setting trimmer and possible to set the time of approx.1 to 30 sec. (furthermore, 6 sec. delay time on detection circuit is added). In the relay contacts output, the fail-safe performance is available. Please refer to the below table.

Alarm output operating table

Condition	NRR262 N.C to COM	NRR262 N.O to COM
	NRR261 N.C to COM Terinal 11, 13	NRR261 N.O to COM Terminal 13, 15
Oil leak alarm	Contact Close	Contact Open
Power OFF	Contact Close	Contact Open
Broken	Contact Close	Contact Open
Liquid freezing	Contact Close	Contact Open
Vibration failure	Contact Close	Contact Open
Non-alarm	Contact Open	Contact Close

7 Adjustment

7.1 Transmitter adjustment

7.1.1 Alarm output relay

The delay time (ON delay) is set by time setting trimmer. In the delay performance, when continuous alarm condition continues for a certain period of time, it is judged as the alarm output. When operating within the set time, it is not judged as the alarm output. This function is used to prevent the false alarm.

Note!

Response delay time of approx. 6 sec. is always added to the detection circuit except for delay time by the trimmer.

Caution!

In the NRR261, please open the body cover only after power has been off for 10 minutes.

Transmitter NRR261

The trimmer is visible by opening the body cover.

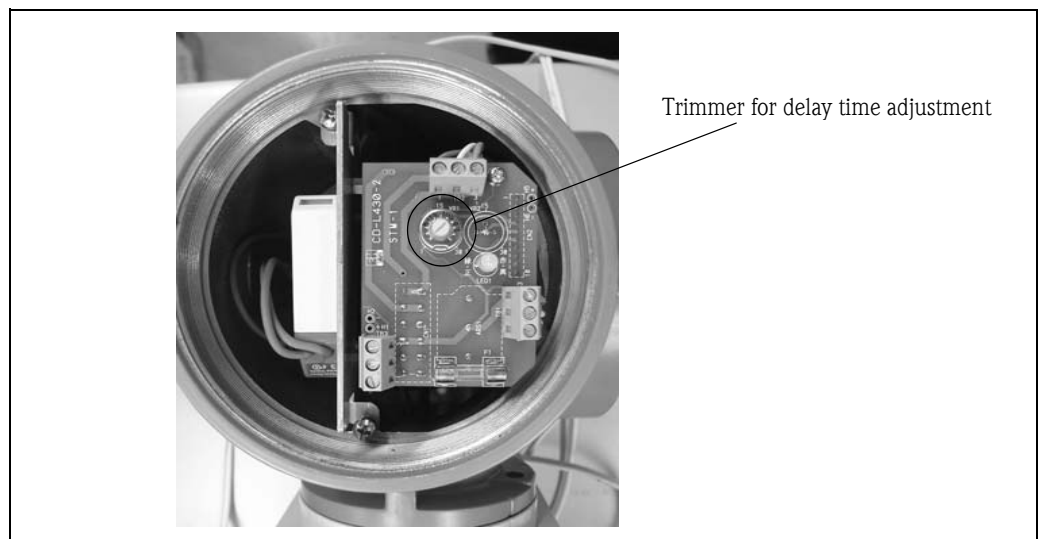


Fig. 13 Trimmer of Transmitter NRR261

Transmitter NRR262

There is a trimmer on the surface of case and it is available to set up necessary delay time. The settable delay time value is 1 to 30 sec. (internally approx. 6 sec. of the delay time are added to this time).

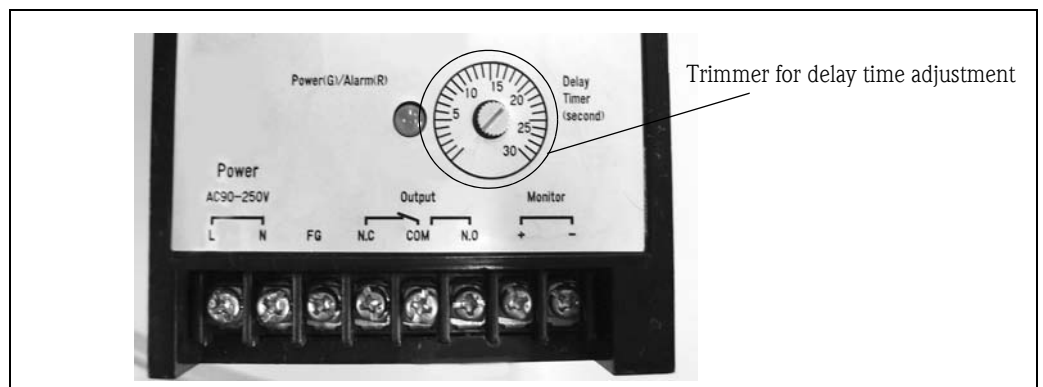


Fig. 14 Trimmer of Transmitter NRR262

8 Maintenance

Please conduct the overall periodic inspections preferably semiannually or at least annually in conjunction with the below operation check.

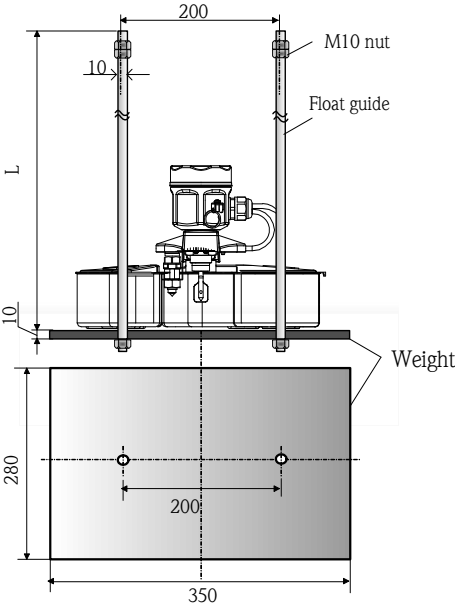
Periodic inspections item

- Please carry out the periodic inspections and cleaning because mechanical error can occur when the sensors or pit are clogged up by trash, foreign materials and moss. Also, when cleaning the sensor, wipe out using a soft cloth dipped in water.
- When trash, sand and snow are accumulated on the float sensor, please remove them because the water line sensitivity changes.
- Please check that there is no cable breakage or wiring trouble (loosening of the screw), then carry out the operation check.

9 Accessory

9.1 Float guide

Note!
When mounting the float guide weight, set it up horizontally. Remove trash and stones on the pit bottom before mounting the Float Sensor. The length of float guide is 2m (standard), Please contact your Endress+Hauser representative.

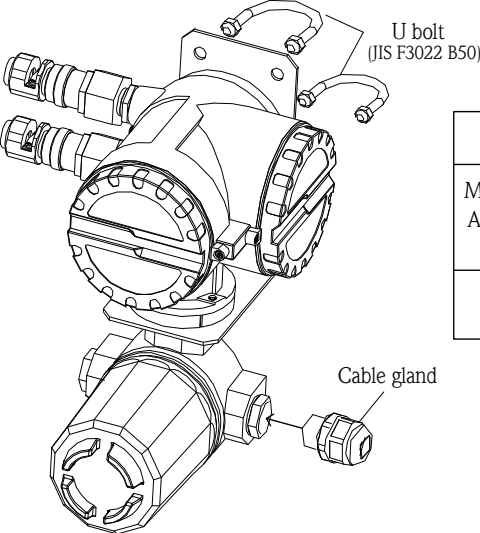


The diagram illustrates the float guide assembly. It shows a central float sensor unit mounted on a horizontal weight plate. Two vertical float guides are attached to the sensor unit, extending upwards. Dimensions are provided: the distance between the guides is 200 mm, the distance from the sensor unit to the guides is 10 mm, the total height of the assembly is L, the weight plate is 280 mm high and 350 mm wide, and the distance between the mounting holes on the weight plate is 200 mm. Labels include 'M10 nut', 'Float guide', 'Weight', and '10'.

Name	Delivery quantity	Material
Float guide	2	SUS304
Weight	1	SS400 SUS304
M10 nut	6	SUS304

9.2 U bolt and Cable gland

U bolt (JIS F3022 B50) is used for mounting the transmitter. Please prepare a pipe of nominal 50A (2B Φ60.5 mm).
Tighten and fix the cable gland after inserting a cable from the float sensor NAR300.



The diagram shows the transmitter assembly. A U bolt (JIS F3022 B50) is used to secure the transmitter to a pipe. A cable gland is shown attached to the transmitter. Labels include 'U bolt (JIS F3022 B50)' and 'Cable gland'.

Name	Delivery quantity	Material
Mounting U bolt	2	Carbon steel (chromate)
Accessory : Nut	4	
: Washer	4	
Cable gland	1	Nylon

10 Troubleshooting

10.1 Fail safe (alert when not oil leak)

The alarm may be output by the below reason, even if the oil leak does not occur.

Condition	Detail description
Water freezing in a pit	– When the water in pit freezes, the conductivity sensor judges it as an insulator
Float sensor tilt	– With the float sensor floating on the water in a pit, when the conductivity sensor tilts and rises out of the water, the sensor judges it as "an insulator (air)". – In case of the empty pit and the same condition (tilt) as the above, vibration sensor detects a liquid first, and conductivity sensor detects insulator (air).
Trash on the bottom of an empty pit	– When the water level rises because of rain from empty pit and materials with a certain level of strength such as broken styrofoam are at the end of tuning-folk sensor, the sensor judges it as a liquid and the conductivity sensor detects an insulator (air). – When the conductivity sensor is covered with insulators such as a vinyl sheet or plastic bag, the conductivity sensor detects an insulator (air) and the vibration sensor detects a liquid (water).
Sensor buried in mud	– When the float sensor is buried in mud, and it hardens and dries, the vibration sensor judges it as a liquid and the conductivity sensor detects an insulator (air) by air space of field moisture loss.
Snow covering the sensor	– In the empty pit, when the sensor is covered with snow, the conductivity sensor detects an insulator and the vibration sensor detects a liquid.
Water in pit which close equivalent to pure	– In case of the water in pit has high resistance such as drain water, the conductivity sensor detects an insulator.

10.2 Alarm delay (no alert when oil leak)

The alarm may be not output by the below reason, even if the oil leak occurs.

Condition	Detail description
Wave and convection on liquid level	– When the water and oil layer in pit is not stable because of a deep-surge of strong wind, the conductivity sensor detects the water in pit.
Float sensor tilt	– When the float sensor is tilted heavily to one side by snow, trash or animal on the float sensor or tangles of cable or chain, the conductivity sensor detects the water under oil layer and the vibration sensor dose not alert because it is out of the oil layer.
Sinking of the float sensor	– When the float sensor sinks by weight of snow, trash or animal on the float, the conductivity sensor detects the water under oil layer and does not alert.
Trash containing water	– When trash or algae containing water contact between the conductivity sensor and earth, the conductivity sensor detects the water and does not alert.
Oil leak when it is snowing	– When snow is floating on oil layer surface, the conductivity sensor detects the water by snowmelt.
Density change of the water in pit	– When using an antifreeze fluid to prevent freeze, detection sensitivity is lower than usual and causes the alarm delay because the density of the water in a pit increases and the sensor float comes up.

10.3 Alarm other than Oil leak detection or Fail safe (breaking, freezing)

Note!

When performing the following work, please be sure to consult a service person from your Endress+Hauser representative.

10.3.1 Segmentation of trouble spot

In case of the IS construction system:

Please measure the voltage between "Sensor Input" + and - terminal in the Transmitter NRR262 using Tester.

In case of the Flame-proof construction system:

Please measure the voltage between "TB-1" H+ and H- terminal in the Sensor I/F Ex box using Tester.

Condition	Countermeasure
0±0.5 V : without system power	- There is not the power supply for the sensor. - There is the cause of false alarm in the transmitter or upper alarm system side. *In case of IS construction, it is the same problem if the wiring between transmitter NRR262 and a Sensor I/F Ex box shorts out. - Please check the LED color on the transmitter. - Please proceed to the next section "10.3.2 Problem between Transmitter and Alarm system"
17.5±0.5 V: normal alarm condition	- Alarm signal is input on the transmitter. - There is the cause for false alarm in a lower detection system from the board of the Sensor I/F Ex box to the float sensor. - Please proceed to the next section "10.3.3 Problem between Sensor I/F Ex box board and Sensor problem"
20.7±0.5 V: Voltage when the empty pit	- The detection signal for empty pit is input on the transmitter. - The false alarm is generated by the transmitter. - Please replace the transmitter.
23.2±0.5 V: the breaking between Transmitter NRR262 and Sensor I/F Ex box	- No electrical load on system is detected. - Please check a electrical continuity of the transmitter NRR262 and a Sensor I/F Ex box.

10.3.2 Problem between Transmitter and Alarm system

Please check the status lamp (LED).

Condition	Countermeasure
LED red luminescent : normal alarm	Even though the voltage for sensor is not detected, the alarm is output. If there is not any wiring problem between transmitter and Sensor I/F Ex box, please replace transmitter.
LED green luminescent : alarm signal from sensor is not output	- When the alarm is output in condition of the left column, please check the resistance value on the alarm output terminal in the transmitter in the following order. - Power off in the alarm system - Remove the wire for alarm output from transmitter. - Check that LED is emitting light (green) continuously - Measure the resistance value between NO (or NC) and COM, If it is 0Ω (short) or over (open), transmitter is normal. Otherwise it needs to replace the transmitter.

Condition	Countermeasure
LED (not lit): transmitter is power-off	■ If the regular voltage is measured between terminal L and N on the transmitter, replace the transmitter. ■ If the regular voltage is not measured between terminal L and N on the transmitter, check the power supply and power cable in the transmitter.

10.3.3 Problem between Sensor I/F Ex box and Sensor

Each independent signal sent from conductivity and vibration sensor is combined in Sensor I/F Ex box board and recognized as a oil leak alarm for the first time.

In consequence, when the setting condition and detection output logic for each sensors are not consistent with each other, it is the failure of complete sensor unit.

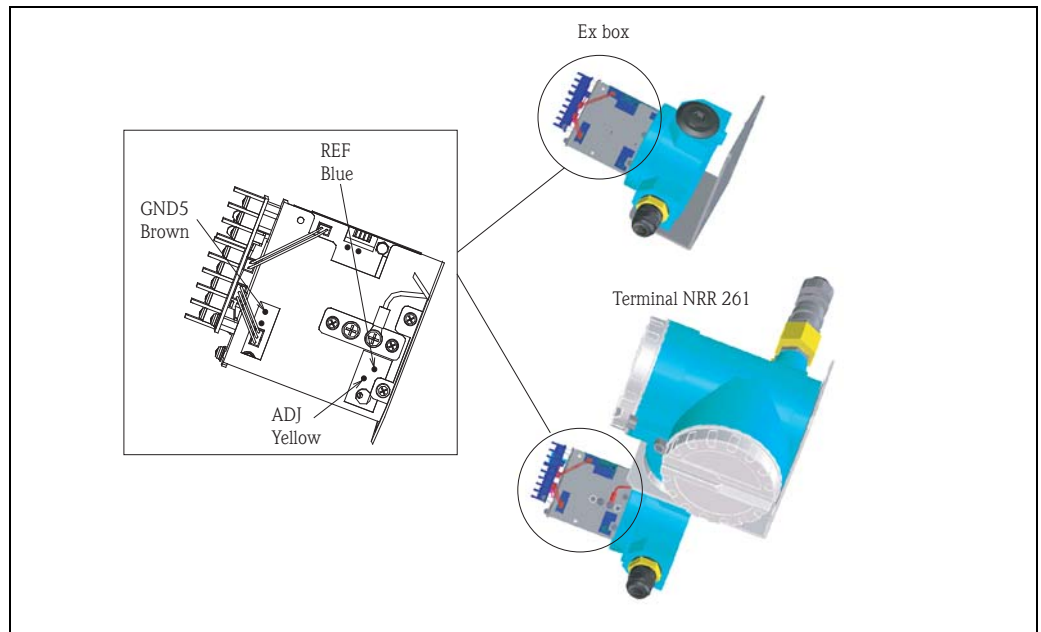
Note!

Before checking the false alarm of the Float Sensor NAR300, please make sure the condition is not in oil leak detection or fail safe.

Please make sure to remove the oil film on electrode of conductivity sensor and the trash in vibration sensor.

1. Remove the board guard after removing the cover of transmitter NRR261 (IS terminal box) or Sensor I/F Ex box.
2. When the conductivity and vibration sensors are movable, measure the direct voltage.

Conductivity sensor	Two terminals on backside of board: GND5 brown, ADJ yellow For example: When detecting oil or air : $DC1.0 \pm 0.3V$ When detecting water: $DC 5.0 \pm 0.3V$ Two terminals on backside of board: GND5 brown, REF blue Conductive threshold: $DC1.5 \pm 0.3V$ *Refer to the below fig.15 "IS terminal box " Note! When bordering on the conductive threshold, when it is below, oil or air are detected. When it is above, water is detected.
Vibration sensor	Between board terminal FEL+ and FEL- When detecting the liquid: $6.3 \pm 0.5V$ When detecting the empty pit: $8.3 \pm 0.5V$ When breaking of cable: $9.4 \pm 0.5V$ Note! When liquid detect voltage is over the above range , check the value of (empty pit detected voltage) – (liquid detected voltage) that it is within $1.3V \sim 3.0V$. If the value is in this range , it is normal.



10.4 Operation check

Note!

Avoid static electricity charge to float sensor NAR300.

Preparation tool: digital temperature, non waven textile, mild detergent, kerosene

Open person operates float sensor NAR300, while another person operates transmitter NRR261 or NRR262.



A glass of kerosene



Digital voltmeter



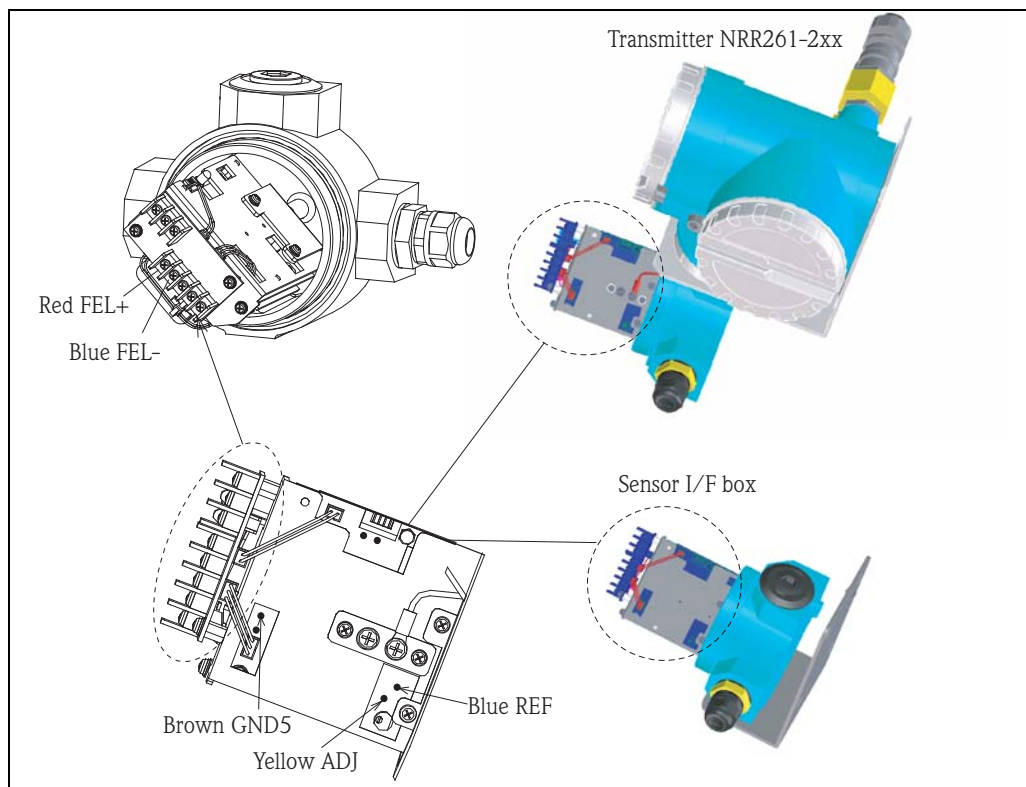
Float sensor NAR300

Caution!

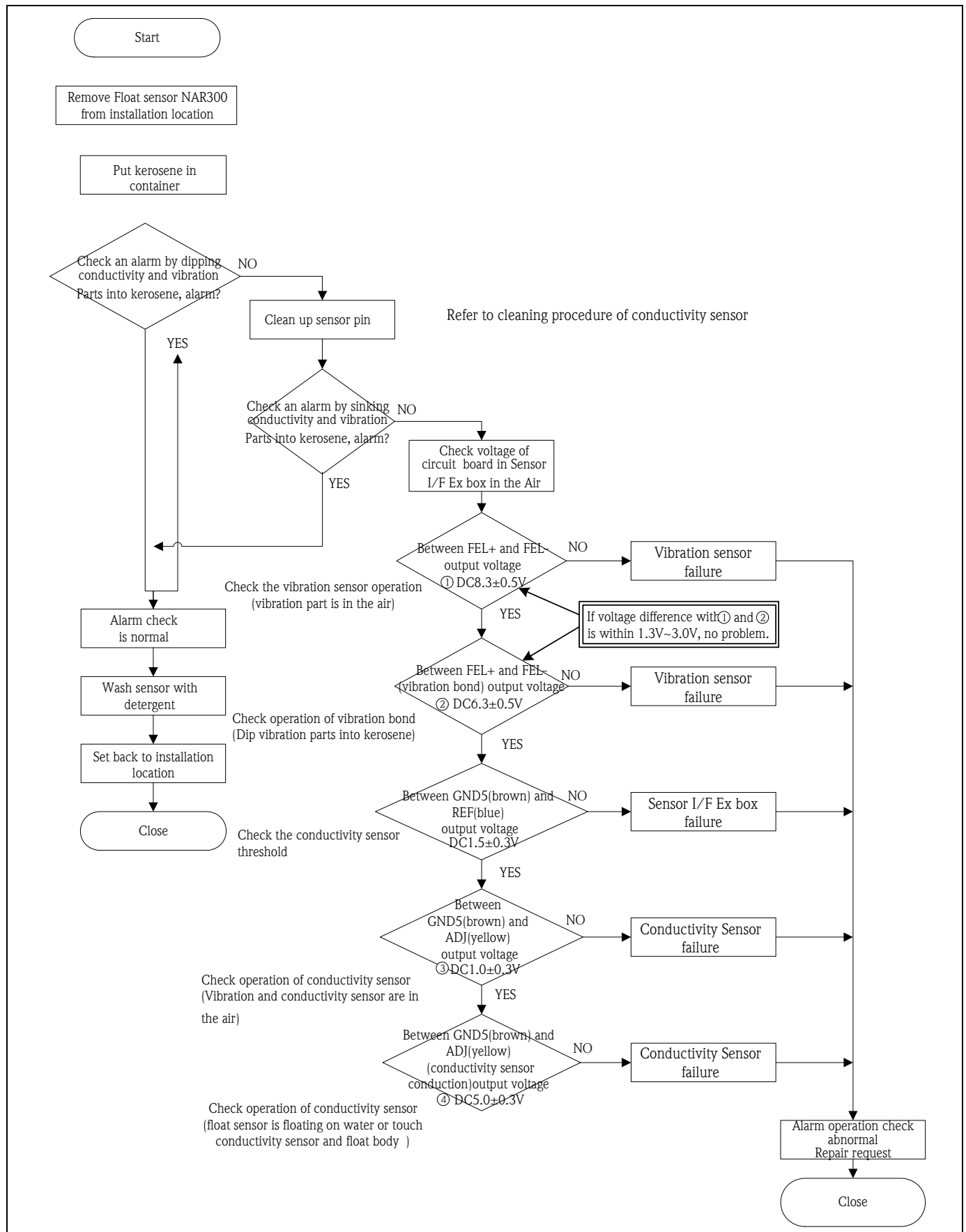
Before testing the Oil Leak Detector system, be sure that an alarm will not cause any unintended effect an the Plant Operations.

Please refer to "Flowchart for Operation check" of next page about operation check detail.

This chart is check point for voltage check described on the flowchart.



10.4.1 Flowchart for Operation check



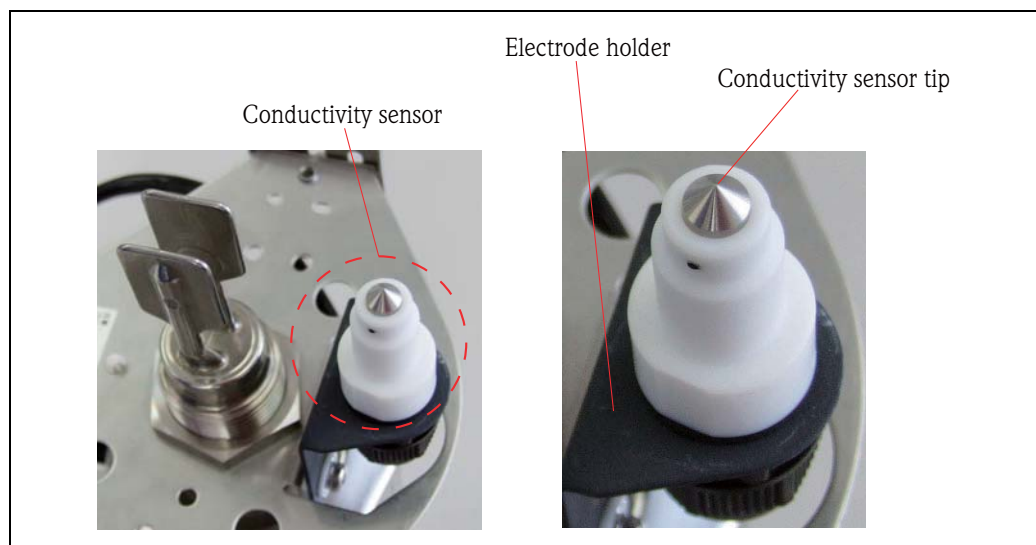
10.5 Cleaning procedure for conductivity sensor

10.5.1 Preparation tool

- nonwoven textile
- mild detergent

10.5.2 Cleaning

1. Remove NAR300 sensor from pit.
2. clean from electrode tip to electrode holder on conductivity sensor with nonwoven textile and remove adherent moss, algae or rubbish. In addition, clean whole electrode up used mild detergent.



Note!

Usually check the conduction state between electrode tip and float body on NAR300 and if it have conduction, it is "water", if it is not conduction , it is determined "Oil or Air".

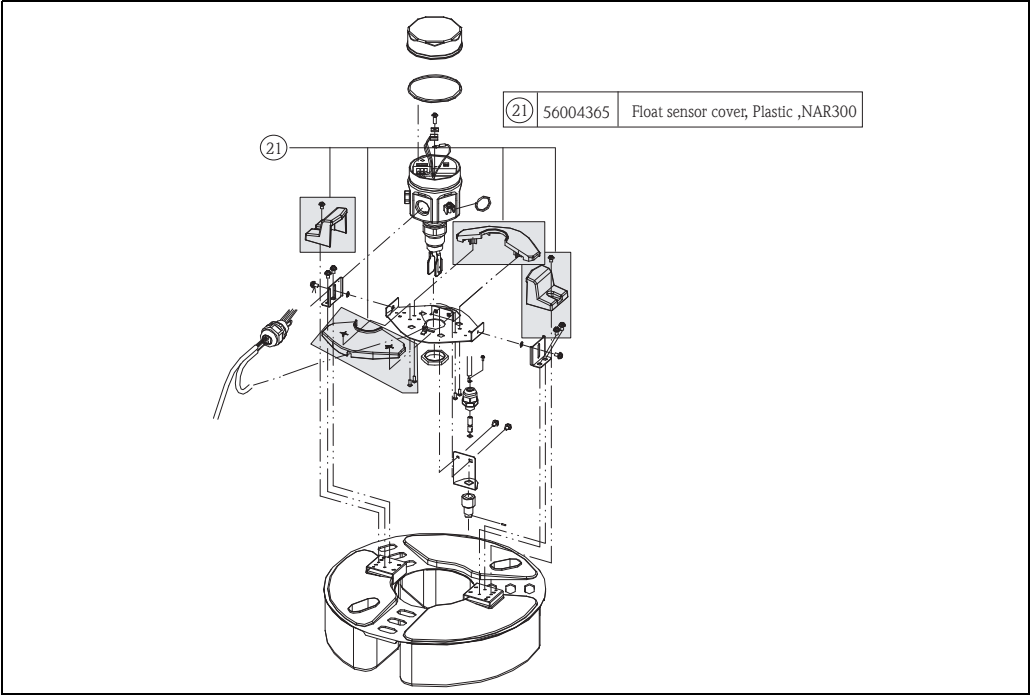
Electrode holder is connected with float body. An alarm may cause malfunction because if electrode and holder go into conduction state, the sensor consider there is "Water".

Clean between electrode and holder periodical and keep the non-conduction state on.

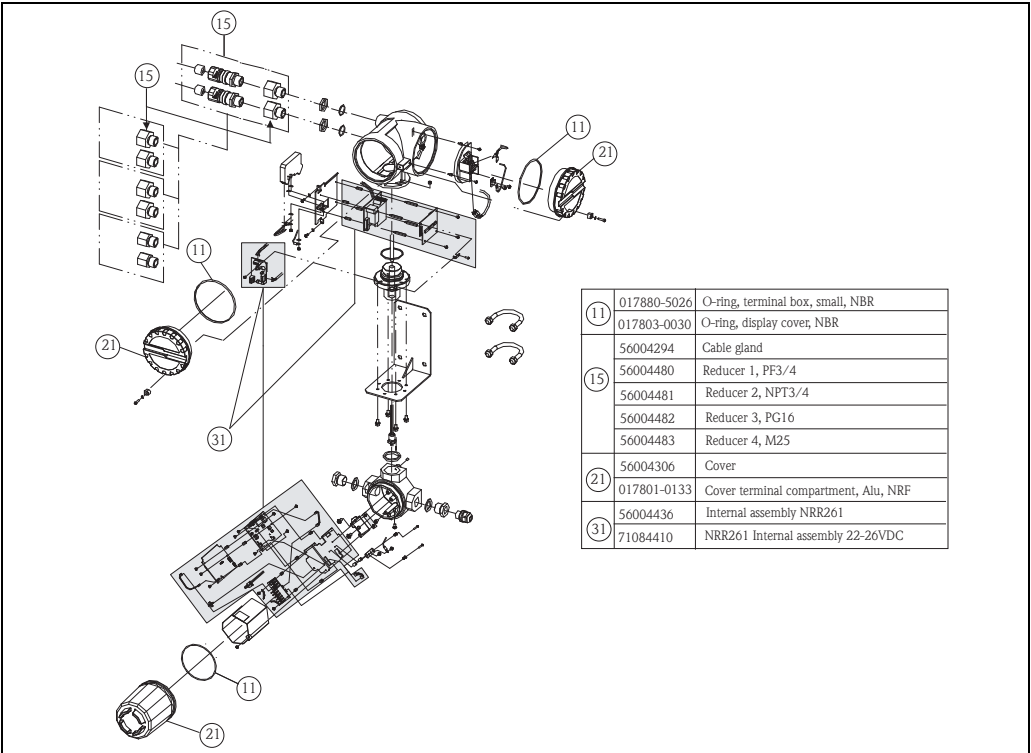
10.6 Spare Parts

Spare parts that you can order from your Endress+Hauser representative for the Oil Leak detector NAR300 System are shown with their order number in the diagram below. For more information on service and spare parts, contact the Service Department at Endress+Hauser representative.

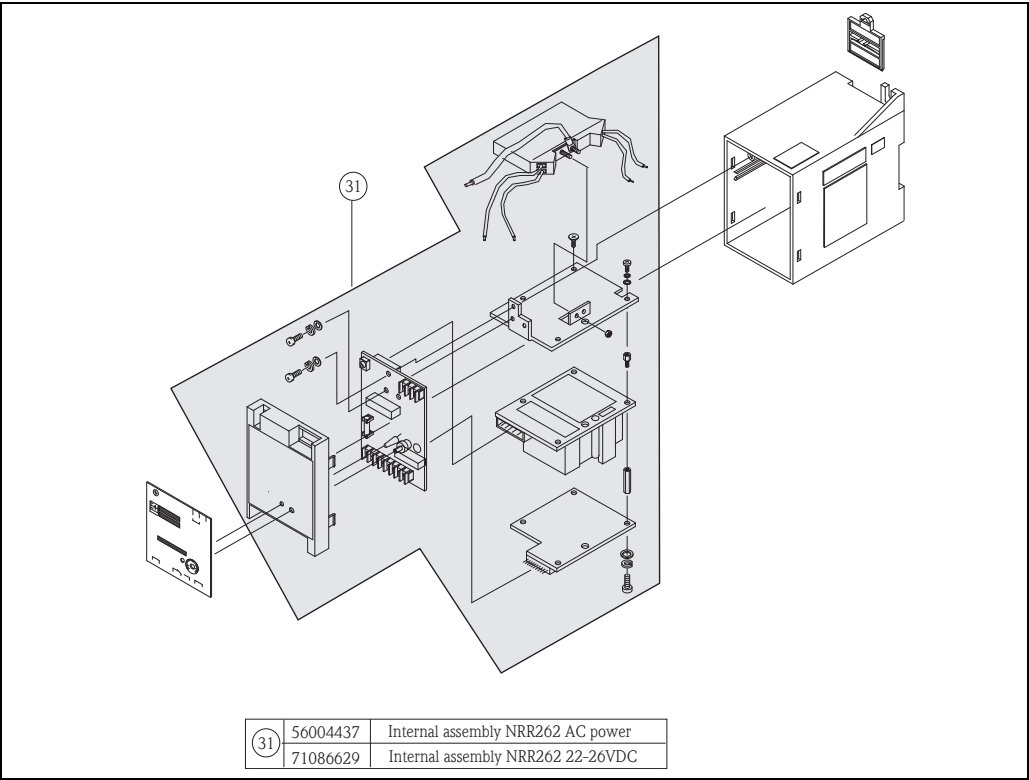
10.6.1 Float sensor NAR300



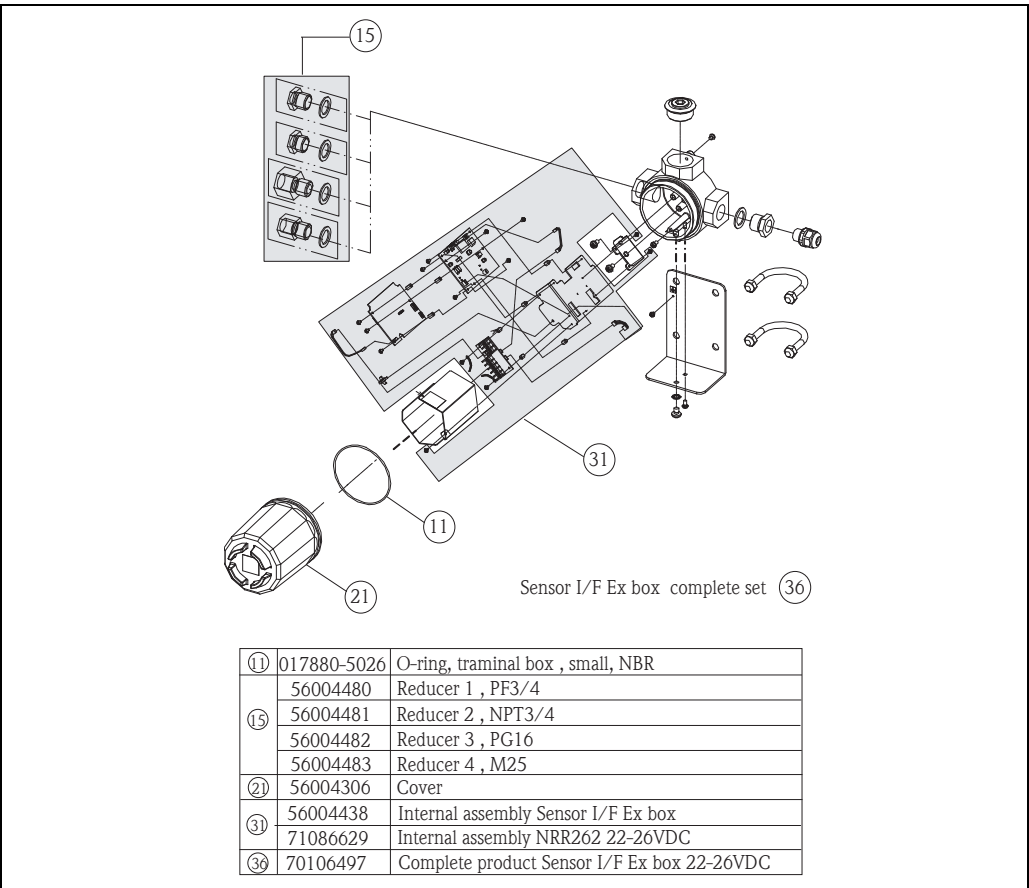
10.6.2 Transmitter NRR261



10.6.3 Transmitter NRR262



10.6.4 Sensor I/F Ex box



10.7 Return

The following procedures must be carried out before the Oil Leak Detector NAR300 system is sent to Endress+Hauser for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Endress +Hauser transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example, safety data sheet as per EN 91/155/EEC.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, poisonous, carcinogenic, radioactive, etc.

A copy of the "**Declaration of Contamination**" is included at the end of this operating manual.



Caution!

- No instrument should be sent back for repair without all dangerous material being completely removed first, e.g. in scratches or diffused through plastic.
- Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel (burns, etc.). Any costs arising from this will be charged to the operator of the instrument.

10.8 Disposal

In case of disposal, please separate the different components according to their material consistency.

10.9 Software history

Software version / Date	Software changes	Documentation changes
OILEYE CI/ST V. 1.40/11.03	Original software.	

10.10 Contact addresses of Endress+Hauser

The addresses of Endress+Hauser are given on the back cover of this operating manual. If you have any questions, please do not hesitate to contact your Endress+Hauser representative.

11 Technical data

11.1 Float sensor NAR300

Protection class	IP67 (outdoor installation)
Power Supply	by transmitter
Wetted material	Float sensor: SUS316 Conductive sensor: SUS316 and PTFE vibration sensor: SUS316
Detection sensitivity*1	Water-filled pit: 10 +/- 1mm, alarm setting before delivery with kerosene Empty pit: 50 +/- 5mm, alarm setting before delivery with kerosene
I/O cable	Exclusive PVC shield cable, including cable float (6m standard)
Weight	Approx. 2.5kg (including 6m (PVC) cable).

*1: Kerosene (relative density approx. 0.8 g/cm³), on water (relative density approx. 1.0 g/cm³), static level condition, no surface tension.

11.2 Sensor I/F Ex box

Protection class	IP67 (for outside installation)
Power Supply	NRR262 or NRR262
output signal	Approximately 7 to 16mA
Cable entry	NAR300 (Float sensor): G1/2 with a cable gland x1 NRR261 or NRR262 (Transmitter): G1/2 thread x1
Weight	Approximately 3.2kg

11.3 Transmitter NRR261

Protection class	IP67 (for outside installation)
Power Supply	90 to 250VAC, 50/60Hz 22 to 26VDC
Power consumption	20VA/2W
Input	Approximately 7 to 16mA from NAR300 / Sensor I/F Ex box
Output	Contact output :1SPDT contact rate : 250VAC, 1A, 100VA, 100VDC : 1A, 25W Delay setting: 1 to 30 seconds (add 6 seconds as base delay) Failsafe function: available if broken wire, power fail, frozen sensor, vibration sensor failure (see alarm output table on page 7)
Cable entry	Ex d side: G 3/4 x 2, TIIS Ex specified cable glands model SXBM Exi side: G 1/2 x 1, with cable gland
Arrester	AV3P-2, built-into power supply
Weight	Approximately 10 kg

11.4 Transmitter NRR262

Protection class	IP20 (for outside installation)
Power Supply	90 to 250VAC, 50/60Hz 22 to 26VDC
Power consumption	20VA/2W
Input	Approximately 7 to 16mA from NAR300 / Sensor I/F Ex box
Output	Contact output :1SPDT contact rate : 250VAC, 1A, 100VA, 100VDC : 1A, 25W Delay setting: 1 to 30 seconds (add 6 seconds as base delay) Failsafe function: available if broken wire, power fail, frozen sensor, vibration sensor failure (see alarm output table on page 7)
Arrester	AV3P-2, built-into power supply
Weight	Approximately 0.6 kg

Declaration of contamination

Dear customer,

Because of legal determinations and for the safety of our employees and operating equipment, we need this "Declaration of contamination" with your signature before your order can be handled. Please, include the completely filled in declaration with the device and the shipping documents in any case. Add also safety sheets and / or specific handling instructions if necessary.

Type of device / sensor:	_____	Serial no.:	_____
Medium / concentration:	_____	Temperature:	_____ Pressure: _____
Cleaned with:	_____	Conductivity:	_____ Viscosity: _____

Warning hints for medium used (mark the appropriate hints)



☐
radioactive



☐
explosive



☐
caustic



☐
poisonous



☐
harmful to
health



☐
biologically
hazardous



☐
inflammable



☐
safe

Reason for return

Company data

Company:	_____	Contact person:	_____
	_____		_____
	_____	Department:	_____
Address:	_____	Phone:	_____
	_____	Fax / e-mail:	_____
	_____	Your order no.:	_____

I hereby certify that the returned equipment has been cleaned and decontaminated acc. to good industrial practices and is in compliance with all regulations. This equipment poses no health or safety risks due to contamination.

(Place, date)

(Company stamp and legally binding signature)

For more Endress+Hauser product please visit: www.ainstru.com

Mail: Sales@ainstru.com

WWW.endress.com/worldwide

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People for Process Automation