



Level Electrode

NRG 10-52

NRG 16-52

EN (USA)
English

Original Installation &
Operating Manual

850696-00

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Content of this Manual

Product:

- Level Electrode NRG 10-52, NRG 16-52

First edition:

BAN 850696-00/08-2021 cm

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Scope of supply, product package

NRG 10-52

- 1 Level electrode NRG 10-52
- 1 Installation & Operating Manual

NRG 16-52

- 1 Level electrode NRG 16-52
- 1 Installation & Operating Manual

How to use this Manual

This Installation & Operating Manual describes the correct use of NRG 10-52, NRG 16-52 level electrodes. It applies to persons who integrate this equipment in control systems, install, bring into service, operate, maintain and dispose of this equipment. Anyone carrying out the above-mentioned activities must have read this Installation & Operating Manual and understood its contents.

- Read this Manual in full and follow all instructions.
- Please also read the instructions for use of any accessories.
- The Installation & Operating Manual is part of the product package. Keep it in an easily accessible location.

Availability of this Installation & Operating Manual

- Make sure this Installation & Operating Manual is always available to the operator.
- If you pass on or sell the equipment to a third party, please also hand over the Installation & Operating Manual.

Illustrations and symbols used

1. Action to be taken
- 2.

-
- Lists
 - ◆ Bullet points in lists

A Keys to illustrations



Additional information



Read the relevant Installation & Operating Manual

Hazard symbols in this Manual



Danger zone, dangerous situation

Types of warning

DANGER

Warning of a dangerous situation that results in death or serious injury.

WARNING

Warning of a dangerous situation that may possibly result in death or serious injury.

CAUTION

Warning of a situation that may result in minor or moderate injury.

ATTENTION

Warning of a situation that results in damage to property or the environment.

Specialist terms, abbreviations

Here, we explain some abbreviations, specialist terms, etc., which are used in this Manual.

NRGT .. / NRR.. / NRS.. / URS .. / URB .. / SRL .. / etc.

Equipment and type designations of GESTRA AG.

SELV

Safety Extra Low Voltage

Operating point (of the plant)

The operating point describes the operating parameters within which a plant or boiler is operated in its nominal range. In a steam boiler, for example, these parameters would be output, pressure, and temperature.

The design data may be a lot more stringent, however.

A boiler that is operated at 145 psi (10 bar) and 356°F (180°C) may be designed to withstand a pressure of 870 psi (60 bar) and a temperature of 527°F (275°C), for example, which is therefore not necessarily its operating point.

Usage for the intended purpose

In combination with NRS 1-.. level switches, the NRG 10-52, NRG 16-52 level electrode indicates when up to four different water levels have been reached. The level electrode and level switches are installed in steam boilers and hot water installations or in condensate and feedwater tanks, e.g., as a water level controller with MIN/MAX alarm.

When used as intended, the level electrode can be combined in a circuit with the following level switch: NRS 1-56.

Applicable directives and standards

The equipment has been tested and approved for use in the scope governed by the following directives and standards:

Standards:

- UL 60730-1 and CAN/CSA E60730-1
General Requirements for Automatic Electrical Controls
- UL 60730-2-15 and CAN/CSA E60730-2-15
Requirements for Automatic Electrical Water Level Sensing Controls

Improper use



There is a danger of death due to explosion if the equipment is used in potentially explosive atmospheres.

Do not use the equipment in potentially explosive atmospheres.



Do not bring any equipment into service that does not have its own specific rating plate.

The rating plate indicates the technical features of the equipment.

Basic safety information



Danger to life from scalding! Do not remove the level electrode under pressure. Steam or hot water can spurt forcefully out of the equipment.

- Only remove the level electrode at **0 psi (0 bar) boiler pressure**.



Risk of severe burns! Do not perform work on a level electrode that is still hot. The level electrode gets very hot during operation.

- Allow the level electrode to cool.
- Always wait for the level electrode to cool before performing any installation and maintenance work.



There is a risk of electric shock during work on electrical systems.

- Always switch off the voltage to the plant before performing connection work.
- Check that the plant is not carrying live voltage before commencing work.



Danger to life! Hot steam or hot water can suddenly escape from a faulty NRG 10-52, NRG 16-52 level electrode.

Shocks and impacts during transport or installation can result in damage to or leaks in the level electrode, causing pressurized hot steam or hot water to escape through the pressure relief hole.

- To prevent damage during transport and installation, do not expose the electrode rod to major shocks or impacts.
- Before and after installation, check that the level electrode is completely undamaged.
- Check that the level electrode is not leaking when bringing into service.



Attempts to repair the equipment will cause the plant to become unsafe.

- The NRG 10-52, NRG 16-52 level electrode may only be repaired by the manufacturer, GESTRA AG.
- Only replace faulty equipment with identical equipment from GESTRA AG.

Required personnel qualifications

Activity	Personnel	
Integration in control system	Specialist staff	Plant designer
Installation/ electrical connection/ bringing into service	Specialist staff	The equipment may only be installed, wired and brought into service by qualified and competent staff.
Operation	Boiler service technician	Staff trained by the plant operator.
Maintenance work	Specialist staff	Fitting and maintenance work may only be performed by authorized staff who have undergone specific training.
Refits	Specialist staff	Persons trained by the plant operator to work with pressure and temperature.

Notes on product liability

The manufacturer cannot accept any liability for damages resulting from improper use of the equipment.

Function

The level electrode uses the conductivity of the water to measure the level. The switchpoints for the various water levels are determined by the length of the respective electrode rods.

The level electrode is installed inside steam boilers and tanks or outside in a level pot. For internal installation, a protective tube provided on site ensures reliable function (see section **Installation examples** on p. 19).

The level electrode can be installed in a single protective tube or level pot together with a GESTRA level electrode for water level limitation or for use as a high level alarm.

Safety information

The equipment may only be installed, wired and brought into service by qualified and competent staff.

Fitting and maintenance work may only be performed by authorized staff who have undergone specific training.

Technical data

NRG 10-52, NRG 16-52

Service pressure

NRG 10-52: 87 psi at 327 °F (6 bar at 164 °C)
NRG 16-52: 464 psi at 460 °F (32 bar at 238°C)

Mechanical connection

Thread 1" - 11.5 NPT

Materials

Screw-in body 1.4404 / F316L
Electrode rods 1.4571, X6CrNiMoTi17-12-2
Insulation, spacer PTFE
Five-pole connector 3.2161 G AISi8Cu3

Lengths supplied

39.37 in (1000 mm), 59.05 in (1500 mm)

Electrical connection

Five-pole connector, cable glands PG 11

Protection

IP 65 according to EN 60529
NEMA type 1 according to NEMA 250

Admissible ambient temperature

Max. 158 °F (70 °C)

Weight

Approx. 3.53 lb (1.6 kg) [NRG 16-52 L = 39.37 in (1000 mm)]

Transport temperature

-4 °F ... 176 °F (-20 °C ... +80 °C) (<100 hours), only switch on after a defrosting period of 24 hours.

Storage temperature

-4 °F ... 158 °F (-20 °C ... +70 °C), only switch on after a defrosting period of 24 hours.

Other information

Incorporated Type 1 action operating control, passive sensor
Pollution degree 3, impulse voltage 500 V

Rating plate, identification






Equipment designation		Safety information	
NRG 10-52			Betriebsanleitung beachten See installation instructions Voir instructions de montage
			Disposal information
1-11,5NPT	1.4404/F316L	IP65	
	87psi (6bar) 327°F (164°C) Tamb = 158°F (70°C)	Mat-No.:	
GESTRA AG • Münchener Straße 77		28215 Bremen • Made in Germany	
Manufacturer	Area of application	Pressure rating, thread type, material number	

Fig. 1



	Input rating: Up to 5Vss 
	Ambient temperature: 32-158°F (0-70°C)
	Environmental rating: NEMA 1
	Wiring: Use Copper Conductors Only, Use 60/75°C Conductors, Use No.18-16 AWG Wire Size Only.
	Use with accessory: NRS 1-52, NRS 1-53, NRS 1-54, NRS 1-55, NRS 1-56

Fig. 2

Overall view of the NRG 10-52, NRG 16-52

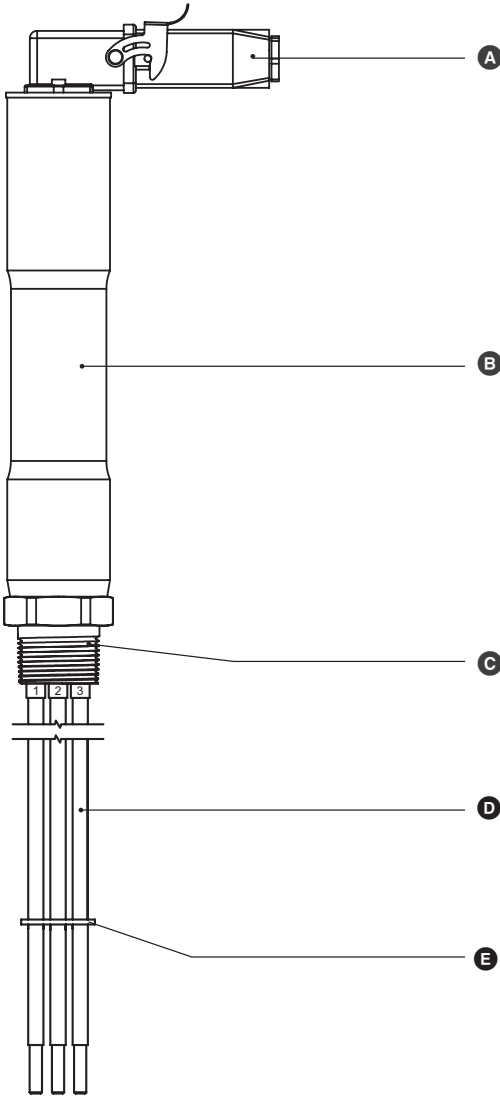


Fig. 1

Key

- A** Five-pole connector
- B** Cover tube
- C** Electrode thread
- D** Electrode rods
- E** Spacer

Dimensions

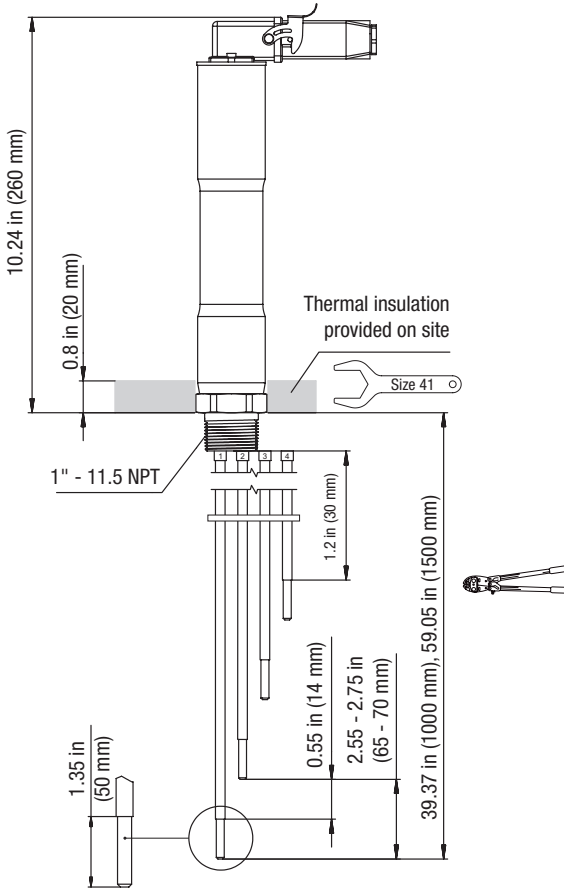


Fig. 3

NRG 1..-52 with five-pole connector

Preparing for installation



If the equipment is to be installed outdoors, outside the protection of a building, environmental influences may adversely affect function.

- Pay attention to the admissible ambient conditions in the technical data, see page 12.
- Do not operate the equipment if the temperature is below freezing.
 - ◆ At temperatures below freezing, use a suitable heat source (e.g., control cabinet heater, etc.).
- Connect all parts of the plant to a central grounding point to prevent equalizing currents.
- Use a cover to protect the equipment from direct sunlight, condensation and heavy rain.
- Use UV-resistant cable ducts for routing the connecting cable.
- Take further measures to protect the equipment from lightning, insects and animals, and salty air.

You will need the following tools:

- Open-ended wrench size 41
- Scriber
- Bolt cutter
- Flat file

Installation

DANGER



Danger to life! Escaped hot steam can cause scalding.

Hot steam or hot water can escape suddenly if the level electrode is unscrewed under pressure.

- Reduce the boiler pressure to 0 psi (0 bar) and check the pressure before unscrewing the level electrode.
- Only remove the level electrode at 0 psi (0 bar) boiler pressure.

WARNING



The hot level electrode can cause severe burns.

The level electrode gets very hot during operation.

- Always let the level electrode cool down before performing installation and maintenance work.
- Only remove level electrodes that have cooled down.



Note

- An NRG 10-52, 16-52 level electrode can be installed in a single protective tube or level pot [inside diameter 3.94 in(100 mm)] together with a GESTRA level electrode, and a compact level switch or transmitter. If the level limiting electrode is installed inside the vessel, it must be at least 1.57 in (40 mm) away from the upper pressure relief hole.
- Check the boiler standpipe and flange during the preliminary boiler inspection.
- Installation examples can be found on pages 19 and 20.
- If installed outdoors, the level electrode **must** be equipped with a GESTRA weatherproof hood.

ATTENTION



Incorrect installation can lead to malfunctions in the plant or the level electrode.


- Always install the level electrode in a vertical position.
- Take care not to bend electrode rods during installation!
- Avoid subjecting electrode rods to hard impacts.
- Ensure a minimum of 1.2 in (30 mm) for the electrode tip insulation.
- Do **not** install the upper part of the level electrode cover tube **ⓑ** in the boiler's thermal insulation!
- Do not coat the electrode thread with conductive paste or grease!
- Make sure there is a creepage path of at least 0.55 in (14 mm) between the electrode tips and ground (flange, tank wall). **Figs. 5, 6**
- Ensure minimum clearances when installing the electrode.

Installation

Installing the NRG 10-52, NRG 16-52, step 1

1. Determine the measured lengths of the electrode tips, enter the dimensions in the **Functions table** and mark with a scribe.
2. Cut electrode tips ① ② ③ ④ with a bolt cutter.
2. Deburr the end faces of the electrode tips.
3. Strip off 1.95 in (50 mm) of the PTFE insulation from the lower end of the electrode tip. Make sure that the remaining insulation measures at least 1.2 in (30 mm), measured from the lower edge of the screw thread, see **Fig. 3**.

Functions table

Function	Function Please enter function!	Electrode rod / terminal	Length [mm] Please enter length!
Electrode body	Functional ground		
e.g., MIN alarm		1	
e.g., pump off		2	
e.g., pump on		3	
e.g., MAX alarm		4	

Montage

Installing the NRG 10-52, NRG 16-52, step 2

- Make sure that the internal and external threads are in perfect condition.
- Do not apply more than three windings of PTFE insulating tape around the electrode thread.

WARNING

Do not use too much tape. Do not use fitting lubricants or pastes.

- Fit the electrode and tighten first with your hand and then with a size 41 open-ended wrench. Do not use a pipe wrench.
- Recommendations for tightening torques cannot be given due to the conical/parallel type of connection.
- Avoid tightening excessively; part of the electrode thread should always remain visible.



The electrode body does not “sit” on the flange, i.e. the underside of the hexagon is not in contact with the flange (also see **Fig. 4**). If it is in contact, the internal thread is outside tolerance. In this case, the flange must be replaced.

After the electrode has been installed with PTFE sealing tape, you must ensure there is adequate electrical contact between the electrode and the boiler wall.

To do this, after installation measure the resistance between the electrode body and the boiler with a multimeter.

The reading must be < 10 ohms.

If the reading is > 10 ohms, connect the electrode to the boiler wall using a band grounding clamp. (The band grounding clamp is available as an optional accessory)

Next, measure the resistance again.

The value must be < 10 ohms and entered as followed:

Measured resistance: _____ ohms

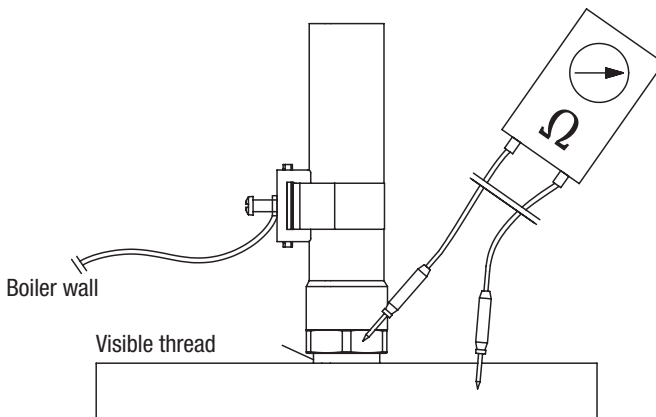


Fig. 4

Installation examples with dimensions

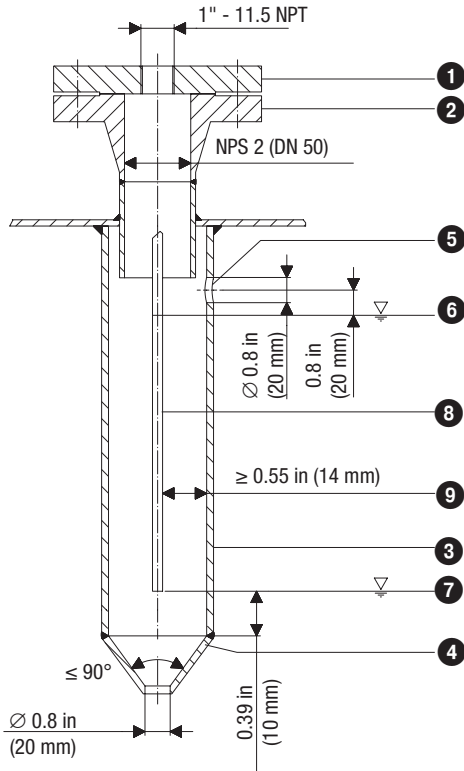


Fig. 5 Protective tube (provided on site) if electrode is used as an internal water level limiter

Installation example with dimensions

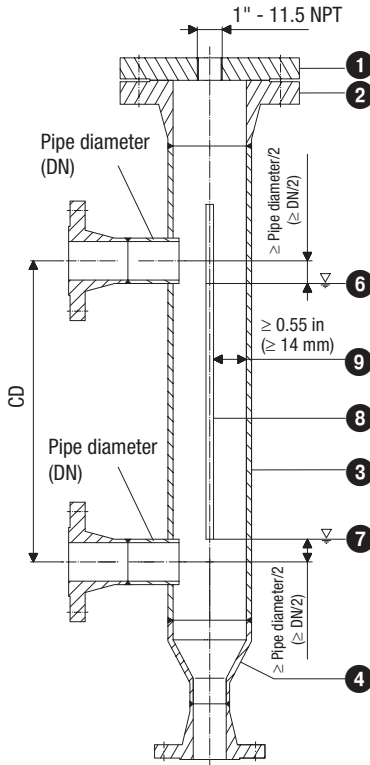


Fig. 6 Level pot for external use

Key

- 1 Flange
 - 2 Perform preliminary inspection of standpipe and flange during the boiler inspection
 - 3 Protective foam tube/level pot
 - 4 Reducer
 - 5 Pressure relief hole
 - 6 High water HW
 - 7 Low water LW
 - 8 Electrode tip
 - 9 Electrode spacing ≥ 0.55 in (≥ 14 mm) (air gap and creepage path)
- CD Center distance

Electrical connection

Five-pole connector of the NRG 10-52, NRG 16-52

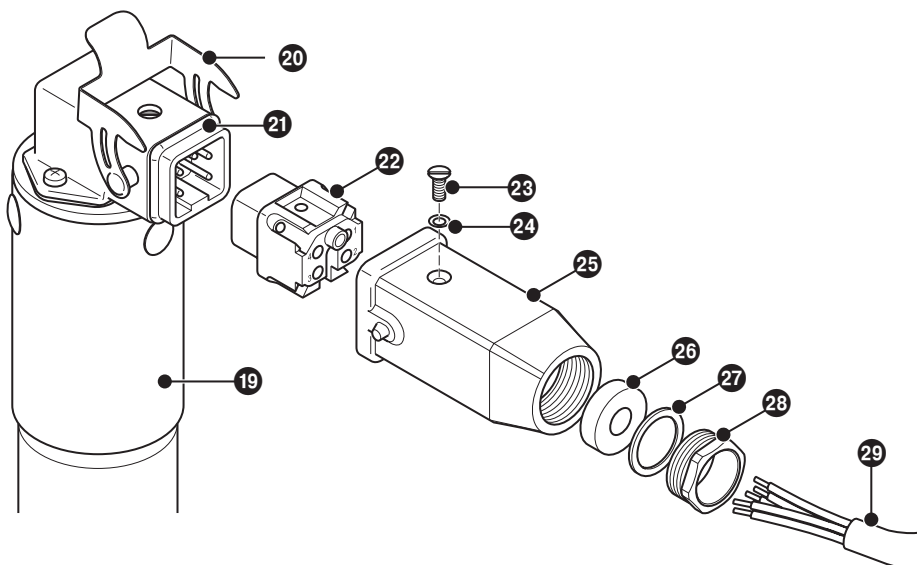


Fig. 7

Key

- | | | | |
|----|--------------------------------------|----|-------------------------|
| 19 | Level electrode NRG 10-52, NRG 16-52 | 25 | Upper part of connector |
| 20 | Retaining bracket | 26 | Gasket |
| 21 | Lower part of connector | 27 | Ring |
| 22 | Contact block | 28 | Cable gland |
| 23 | Screw | 29 | Control cable |
| 24 | Sealing ring | | |

Tools

- Flat blade screwdriver 3/32 in (2.4 mm)

Electrical connection

Connecting the level electrode

Use a shielded, multi-core TC-ER control cable with minimum wire size AWG18, e.g., OELFLEX CONTROL TM CY 5G1, to connect the level electrode. Max. length 328 ft (100 m).

Connect the shield **just once** to the central grounding point (CGP) in the control cabinet.

Assigning the five-pole connector of the NRG 10-52, NRG 16-52

1. Swing the retaining bracket 20 up and detach the upper part of the connector 25 from the level electrode.
2. Undo the screw 23 and press the contact block 22 out of the upper part of the connector 25. Take care not to lose the sealing ring 24.
3. Unscrew the cable gland 28.
4. Pull the cable 29 through the cable gland 28, ring 27, gasket 26 and upper part of the connector 25.
5. Connect the terminals (Fig. 8) in the contact block 22 according to the **Functions table on page 17**.
6. Press the contact block 22 into the upper part of the connector 25.
7. Insert the screw 23 in the hole once more (with sealing ring 24) and tighten. This secures the contact block 22 in the upper part of the connector 25.
8. Tighten the cable gland 28.
9. Insert the upper part of the connector 25 in the lower part 21 and fasten by swinging the retaining bracket 20 down.

Terminals in the contact block

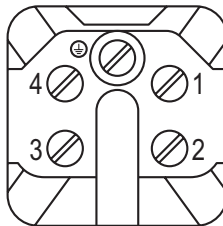


Fig. 8



Attention

- Please pay attention to the Installation and Operating Manual of the NRS 1-56 level switch.
- Route the connecting cables to the level electrode separately from power lines.
- Check the connection of the shield to the central grounding point (CGP) in the control cabinet.

Bringing into service, fault indications and troubleshooting

You can find information on bringing into service, faults and troubleshooting in the Installation & Operating Manual of the NRS 1-56 level switch.

Taking out of service

DANGER



Danger to life! Escaped hot steam can cause scalding.

Hot steam or hot water can escape suddenly if the level electrode is unscrewed under pressure.

- Reduce the boiler pressure to 0 psi (0 bar) and check the pressure before unscrewing the level electrode.
- Only remove the level electrode at **0 psi (0 bar) boiler pressure**.

WARNING



The hot level electrode can cause severe burns.

The level electrode gets very hot during operation.

- Always let the level electrode cool down before performing installation and maintenance work.
- Only remove level electrodes that have cooled down.

Proceed as follows:

1. Reduce the boiler pressure to 0 psi (0 bar).
2. Allow the level electrode to cool to room temperature.
3. Switch off the supply voltage.
4. Pull out the connector.
5. Then remove the level electrode.

Disposal

Dispose of the level transmitter in accordance with statutory waste disposal regulations.

Returning decontaminated equipment



If products have come into contact with media that are hazardous to health, they must be drained and decontaminated before being returned to GESTRA AG.

The term 'media' can refer to solid, liquid or gaseous substances or mixtures, as well as radiation.

GESTRA AG can accept returned products only if accompanied by a completed and signed return note and also a completed and signed declaration of decontamination.



The return confirmation and declaration of decontamination must be attached to the outside of the return package, as processing will otherwise be impossible and the products will be returned to the sender at their expense.

Please proceed as follows:

1. Let GESTRA AG know about the return beforehand by e-mail or phone.
2. Wait until you have received the return confirmation from GESTRA.
3. Fill out the return confirmation (including declaration of decontamination) and send it with the products to GESTRA AG.

UL components

The level electrode is registered under XACN.E513189.

For your notes

For your notes

For your notes



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