GESTRA®

Level Electrode

NRG 16-4

EN
English

Original Installation &
Operating Manual

818596-06

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Usage for the intended purpose

The level electrode NRG 16-4 in conjunction with level switch NRS 1-.. is designed to signal a water level limit and used in steam boiler plants and (pressurized) hot-water installations or in condensate and feedwater tanks, e. g. as water level limiter with MIN/MAX alarm.

The level electrode is designed for use in conjunction with the following level switches: NRS 1-52, NRS 1-53, NRS 1-54 and NRS 1-55 or NRS 1-1, NRS 1-2, NRS 1-3 and NRS 1-5.

Function

The electrode operation is based on the conductive measuring principle using the electrical conductivity of the water for signalling water level. The length of the electrode rod determines the switchpoint for the water level limit.

The level electrode is installed inside steam boilers, vessels or in an external level pot. If the electrode is installed inside the boiler or vessel, a protection tube provided on side ensures correct functioning. (see section **Examples of installation** on page 10).

The level electrode can be installed together with one GESTRA level electrode for water level limiting or for high-level alarm in a single protection tube or external level pot.

Safety note

The equipment must only be installed, wired and commissioned by qualified and competent staff.

Retrofitting and maintenance work must only be performed by qualified staff who - through adequate training - have achieved a recognised level of competence.

Danger

When loosening the electrode steam or hot water might escape!
This presents the risk of severe scalding all over the body!
It is therefore essential not to dismantle the electrode unless the boiler pressure is verified to be 0 bar.

The electrode becomes hot during operation.
Risk of severe burns to hands and arms.
Before carrying out installation and maintenance work make sure that the equipment is cold.

Attention

The name plate specifies the technical features of the equipment. Do not commission or operate any item of equipment that does not bear its specific name plate.

Improper use

Application in potentially explosive areas

The level electrode NRG 16-4 is a simple item of electrical equipment as specified in EN 60079-11 section 5.7. The equipment must be equipped with approved Zener barriers if used in potentially explosive areas. Applicable in Ex zones 1, 2 (1999/92/EC). The equipment does not bear an Ex marking.

Technical data

NRG 16-4

Operating pressure
PN 40, 32 bar at 238 °C
Mechanical connection
Screwed G $^{3}/_{8}$ A or G ¾ A to ISO 228-1
Materials
Screw-in body: 1.4571, X6CrNiMoTi17-12-2
Electrode rod: 1.4571, X6CrNiMoTi17-12-2
Insulation: PTFE
Four-pole connector: polyamide (PA)
Lengths available
500 mm, 1000 mm, 1500 mm
Electrical connection
Four-pole connector, cable glands M 16
Protection
IP 65 to EN 60529
Max. admissible ambient temperature
Max. 70 °C
Weight
approx. 0.5 kg

Scope of supply

NRG 16-4
1 Level electrode NRG 16-4, PN 40
1 Joint ring 17 x 21 form D to DIN 7603, 2.4068, bright annealed or joint ring 27 x 32, form D, DIN 7603, 2.4068, bright annealed
1 Installation manual

Example name plate/marking

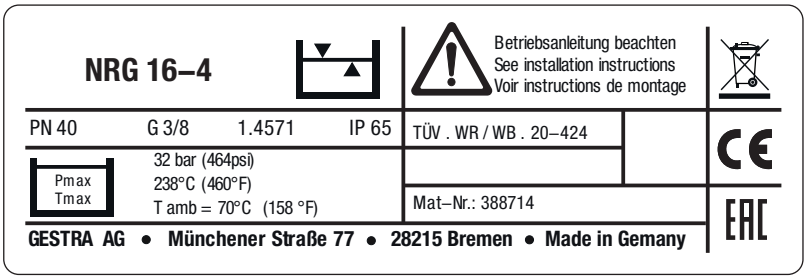

Fig. 1

Installation

Note

- The level electrode NRG 16-4 can be installed together with one GESTRA level electrode, one compact level switch or transmitter in a single protection tube or external level pot (inside diameter DN100). **Fig. 5 - 8.** If the level limiting electrode is installed inside the vessel, it must be at least 40 mm away from the upper vent hole.
- For the approval of the boiler standpipe the relevant regulations must be considered.
- Refer to page 10 for typical installation examples.
- The angle of inclination of the electrode must not exceed 45°, with the length of the electrode rod being limited to 500 mm.
- If installed outdoors the level electrode **must** be equipped with a GESTRA weather protection cover.

Attention

- The seating surfaces of the standpipe or the flange provided on the vessel must be accurately machined, see **Fig. 3**.
- Do not bend electrode tip when mounting.
- Do not subject electrode to physical shocks.
- At least 30 mm of the insulating tube must remain on the electrode tip.
- Use only the supplied joint ring.
  NRG 16-4: 17 x 21, form D, DIN 7603, 2.4068, bright annealed or joint ring 27 x 32, form D, DIN 7603, 2.4068, bright annealed
- Do not lag electrode body above the hexagonal section.
- Do not insulate electrode thread with hemp or PTFE tape!
- Do not apply conductive paste or grease to the electrode thread!
- Make sure that the air distance between the electrode tip and earth (flange, vessel wall) is not less than 14 mm. **Fig. 5 - 8.**
- Observe the minimum withdrawal distance when installing the electrode!
- The specified torques must be strictly observed.

Tools

- Open-end spanner A. F. 22 or 36 mm, DIN 3110, ISO 3318
- Scriber
- Bolt cutter
- Flat file, medium cut, DIN 7261, form A

Dimensions NRG 16-4

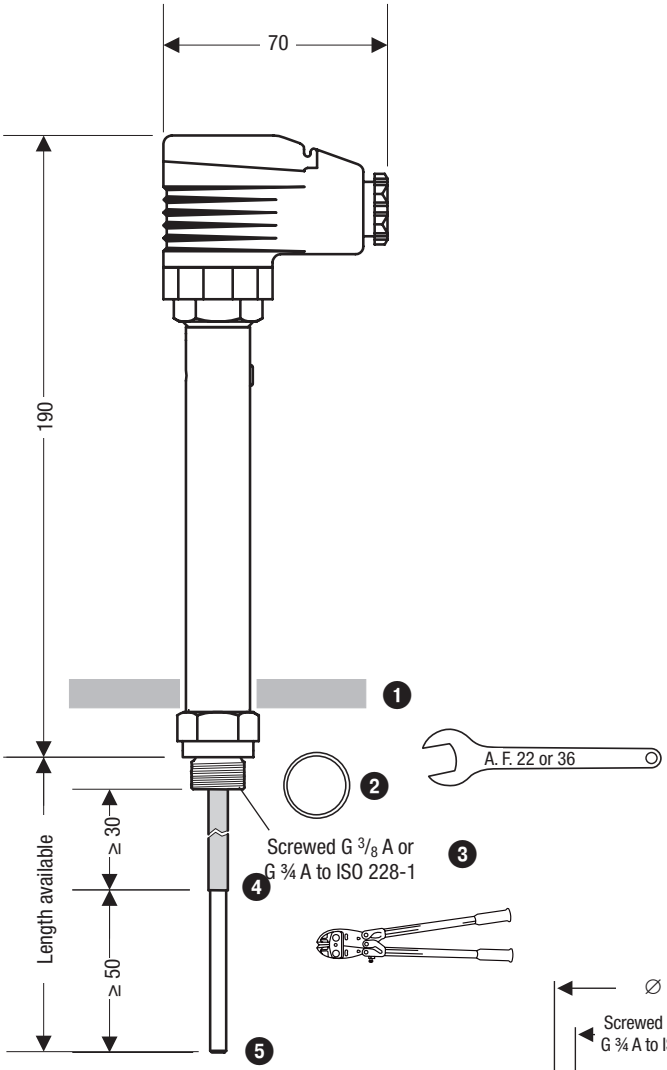

Fig. 2
NRG 16-4 with four-pole connector

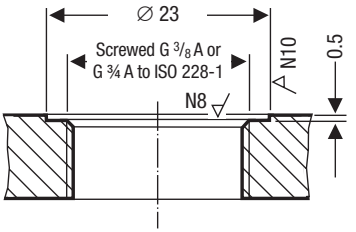

Fig. 3

Installation - continued -

NRG 16-4, step 1

1. Determine the length of the electrode tip.
2. Cut the electrode tip to length and deburr the face of the electrode tip end.
3. Strip off 50 mm of PTFE insulation from the ends of the electrode tips. Make sure that the remaining insulation is at least 30 mm long, measured from the lower edge of the screwed connection.

NRG 16-4, step 2

4. Check seating surfaces. **Fig. 3**
5. Place supplied joint ring ❷ onto seating surface of the threaded standpipe or flange. **Fig. 3**
6. Apply a light smear of heat resistant silicone grease (e.g. WINIX® 2150) to electrode thread ❸.
7. Screw level electrode into threaded standpipe or flange and tighten with an open-end spanner A. F. 22 or 36 mm. The torque required **when cold is 63 Nm.**

Key

❶ Thermal insulation, provided on site, d = 20 mm (outside of thermal insulation of steam boiler)

❷ NRG 16-4: Joint ring 17 x 21, form D, DIN 7603, 2.4068, bright annealed or joint ring 27 x 32, form D, DIN 7603, 2.4068, bright annealed

❸ Electrode thread

❹ Insulation of electrode tip

❺ Electrode tip

Examples of installation

NRG 16-4

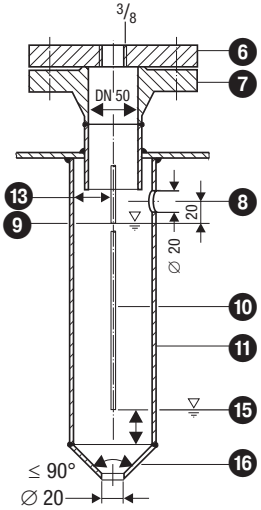

Fig. 5 Protection tube (provided on site) for installation inside the boiler

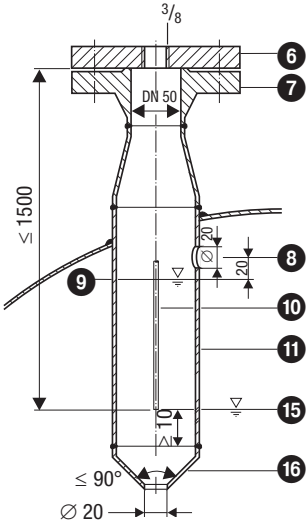

Fig. 6 Protection tube (provided on site) for installation inside the boiler

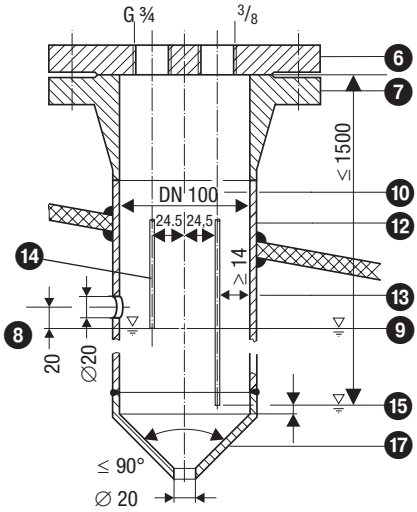

Fig. 7 Protection tube (provided on site) for installation inside the boiler and in combination with other GESTRA equipment

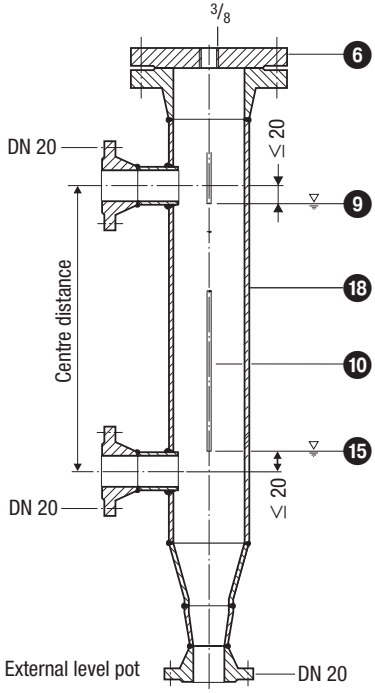

Fig. 8 External level pot

Examples of installation - continued -

Key

❻ Flange PN 40, DN 50, EN 1092-1 (single electrode)
Flange PN 40, DN 100, EN 1092-1 (combination of electrodes)

❼ For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.

❽ Vent hole Provide vent hole as close to the boiler wall as possible!

❾ High water (HW)

❿ Electrode tip d = 5 mm

⓫ Protection tube DN 80 (in France according to AFAQ ≥ DN 100)

⓬ Protection tube DN 100

⓭ Distance between electrode rods and protection tube ≥ 14 mm

⓮ Distance between electrode tips (NRG 1..-50 or NRG 1...-51) ≥ 14 mm (creepage distances and clearances)

⓯ Low water LW

⓰ Reducer DIN 2616-2, K-88.9x3.2-42.4 x 2.6 W

⓰ Reducer DIN 2616-2, K-114.3x3.6-48.3 x 2.9 W

⓲ Level pot ≥ DN 80

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Electrical connection

NRG 16-4 with four-pole connector

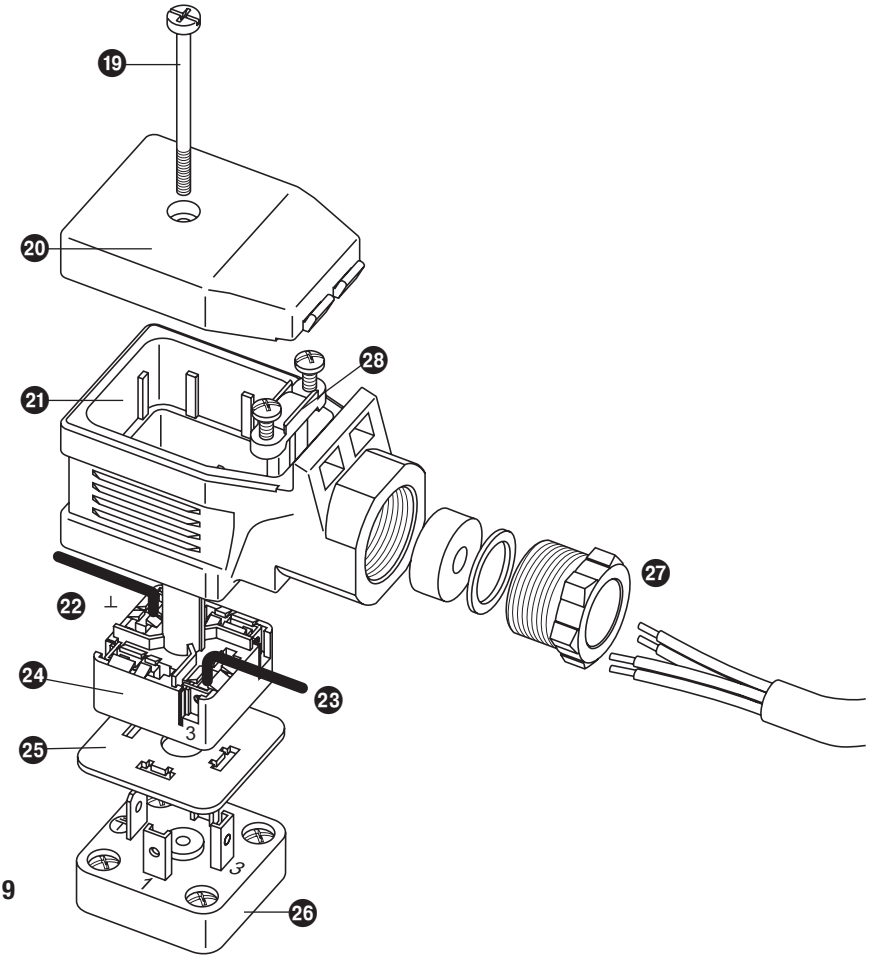

Fig. 9

Key

- 19 Screw
- 20 Lid
- 21 Upper part of terminal box
- 22 Terminal ⊥ for connecting functional earth
- 23 Terminal 3 for connecting the electrode tip
- 24 Connecting plate
- 25 Sealing element
- 26 Contact plate of level electrode
- 27 Cable gland
- 28 Cable strain relief

Electrical connection - continued -

Connection of level electrode

To connect the level electrode use screened multi-core control cable with a min. conductor size 0.5 mm², e. g. LiYCY 4 x 0.5 mm², max. length: 100 m.

Connect the screen **only once** to the central earthing point **(CEP) in the control cabinet**.

Connect terminals 3 and ⊥ in the connecting plate ㉔.
3 = Electrode tip
⊥ = Functional earth

NRG 16-4, connecting the four-pole connector

1. Undo screw ⑲. **Fig. 9**
2. Remove upper part ㉑ of the terminal box from the level electrode but leave insulating plate ㉕ on contact plate ㉖.
3. Remove cover ⑳.
4. Press connecting plate ㉖ out of the upper part of the terminal box ㉑.

The upper part of the terminal box can be turned in steps of 90°.

5. Detach cable gland ㉗ and cable clamp ㉘ from the upper part of the terminal box ㉑.
6. Run cable through cable gland ㉗ and upper part of the terminal box ㉑ and wire terminals of the connecting plate ㉔ in accordance with wiring diagram.
7. Press connecting plate ㉔ into the upper part of the terminal box and align cable.
8. Fix cable with cable strain relief ㉘ and cable gland ㉗ firmly into position.
9. Replace cover ⑳ and insert screw ⑲.
10. Put upper part of the terminal box onto the level electrode and fix it with screw ⑲.
11. If several level electrodes are installed in a steam boiler or vessel, please note the type of electrode and its function on the four-pole connector.

Attention

- Please observe the instructions given in the installation & operating manual for the NRS 1-52, NRS 1-53, NRS 1-54 and NRS 1-55 or NRS 1-1, NRS 1-2, NRS 1-3 and NRS 1-5.
- Make sure that connecting cables leading to the level electrode are segregated and run separately from power cables.
- Check the connection of the screen to the central earthing point (CEP) in the control cabinet.

Tools

- Screwdriver, size 1
- Screwdriver, size 2.5, completely insulated according to VDE 0680-1

Commissioning, fault indication and troubleshooting

For additional information on commissioning procedures and troubleshooting refer to the installation & operating manuals for level switch NRS 1-52, NRS 1-53, NRS 1-54 and NRS 1-55 or NRS 1-1, NRS 1-2, NRS 1-3 and NRS 1-5!

Removing and disposing of the level electrode

Danger

When loosening the electrode steam or hot water might escape!
This presents the risk of severe scalding all over the body!
It is therefore essential not to dismantle the electrode unless the boiler pressure is verified to be 0 bar.

The electrode becomes hot during operation.
Risk of severe burns to hands and arms.
Before carrying out installation and maintenance work make sure that the equipment is cold.

Removing and disposing of level electrode NRG 16-4

1. Undo screw ⓳. **Fig. 22**
2. Detach upper part ㉑ of the terminal box on the level electrode.
3. Before removing the equipment make sure that is is neither hot nor under pressure.

For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.

Declaration of Conformity; Standards and Directives

You can find details on the conformity of the equipment and the applicable standards and directives in the Declaration of Conformity and associated certificates.

You can download the Declaration of Conformity from www.gestra.com and request relevant certificates by writing to the following address:

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Modifications to the equipment not approved by us will invalidate the Declarations of Conformity and certificates.

Agencies all over the world: **www.gestra.com**

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