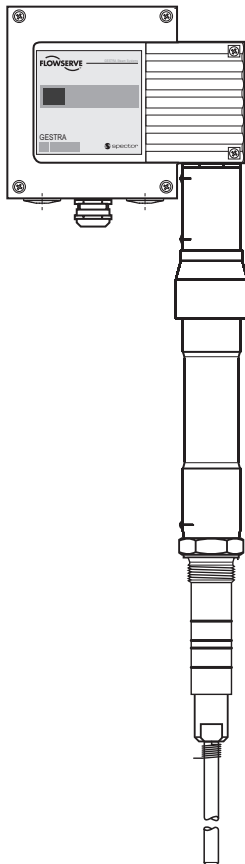


NRG 1...-50 with four-pole connector



NRG 111-50F with terminal box made from aluminium

## Water Level Limiter

### Level Electrode

### NRG 16-50, NRG 17-50, NRG 19-50, NRG 111-50

#### Description

The level electrodes NRG 1...-50 are used in conjunction with level switch NRS 1-50 as water level limiters for steam boiler plants and (pressurised) hot water installations.

Water level limiters switch off the heating when the water level falls below the set minimum level (low water).

#### Function

When the water level falls below the low level, the level electrode is exposed and a low level alarm is triggered in the level switch NRS 1-50. This switchpoint "Low water level (LW)" is determined by the length of the electrode tip. The electrode operation is based on the conductive measuring principle using the electrical conductivity of the water for signalling water level.

The self-monitoring function ensures that an alarm will also be triggered if the electrode insulation is contaminated or has developed a leak and/or if there is a malfunction in the electrical connection.

The level electrode is installed inside steam boilers, vessels or inlet lines of hot-water systems. The protection tube provided on site ensures the function.

One level electrode NRS 1...-50 can be installed together with one GESTRA level electrode, one level switch or transmitter for water level control and high level alarm in one single protection tube or level pot.

If the level electrode is installed in a level pot outside the boiler, make sure that the connecting lines are rinsed regularly. In addition, the logic unit SRL is required to monitor the purging times and the purging sequence.

If the connecting lines for steam  $\geq 40$  mm and water  $\geq 100$  mm the installation is considered as "inside". In this case the purging process does not have to be monitored.

#### Directives and Standards

##### Pressure Equipment Directive (PED) 97/23/EC

Water level limiters are safety accessories as defined in the Pressure Equipment Directive (PED). The level electrode NRG 1...-50 in conjunction with level switch NRS 1-50 is EC type approved according to EN 12952/EN 12953. These Directives state, among other things, the requirements made on limiting systems and equipment for steam boiler plants and (pressurised) hot-water installations.

##### Functional Safety acc. to IEC 61508

The level electrodes NRG 1...-50, NRG 16-36 are certified acc. to IEC 61508 only if used in combination with level switch NRS 1-50. This standard describes the functional safety of safety-related electrical/electronic/programmable electronic systems.

##### VdTÜV Bulletin "Wasserstand 100" (= Water Level 100)

The level electrodes NRG 1-50, NRG 1...-11 and NRG 16-36 in conjunction with the level switch NRS 1-50 are type approved according to the VdTÜV Bulletin "Water Level 100".

##### ATEX (Atmosphère Explosible)

The level electrodes NRG 1...-50, NRG 1...-11 and NRG 16-36 are simple items of electrical equipment as specified in EN 60079-11 section 5.7. According to the European Directive 94/9/EC 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. The suitability of the Zener barriers is certified in a separate document. Note that the requirements of the IEC 61508 are not met if the NRG 1...-50, NRG 1...-11 and NRG 16-36 + Zener barriers + NRS 1-50 are interconnected!

#### Technical Data

##### Service pressure

NRG 16-50, PN 40, 32 bar at 238 °C  
 NRG 17-50, PN 63, 60 bar at 275 °C  
 NRG 19-50, PN 160, 100 bar at 311 °C  
 NRG 111-50, PN 320, 183 bar at 357 °C

##### Mechanical connection

Screwed  $\frac{3}{4}$ " to EN ISO 228-1 (NRG 16-50, NRG 17-50, NRG 19-50)  
 Screwed 1" to EN ISO 228-1 (NRG 111-50)

##### Materials

Sheath: 1.4301 X5 CrNi18-10  
 Screw-in body: 1.4571 X6 CrNiMoTi 17-12-2 (NRG 16-50, NRG 17-50, NRG 19-50)  
 Screw-in body: 1.4529, X1NiCrMoCuN25-20-7 (NRG 111-50)  
 Measuring electrode: 1.4571 X6 CrNiMoTi 17-12-2 (NRG 16-50, NRG 17-50, NRG 19-50)  
 Measuring electrode: 1.4122, X39CrMo17-1 (NRG 111-50)  
 Electrode tip: 1.4401 X5 CrNiMo 17-12-2  
 Electrode insulation: Gylon® (NRG 16-50, NRG 17-50, NRG 19-50)  
 Electrode insulation: special ceramic (NRG 111-50)  
 NRG 1...-50: Four-pole connector: polyamid (PA)  
 NRG 1...-50F: Terminal box 3.2161 G AISi8Cu3

##### Lengths supplied

500 mm, 1000 mm, 1500 mm, 2000 mm, 2500 mm, 3000 mm

##### ph value

Max. admissible: 10 (NRG 111-50)

##### Electrical connection

NRG 1...-50: Four-pole connector, cable gland M16  
 NRG 1...-50F: Aluminium terminal box, cable gland M20

##### Protection

IP 65 to DIN EN 60529

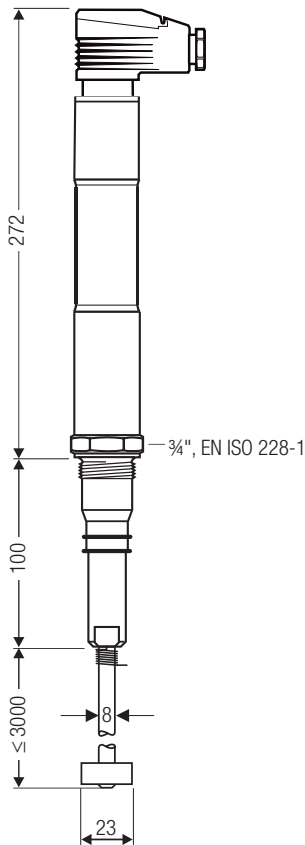
##### Max. admissible ambient temperature

70 °C

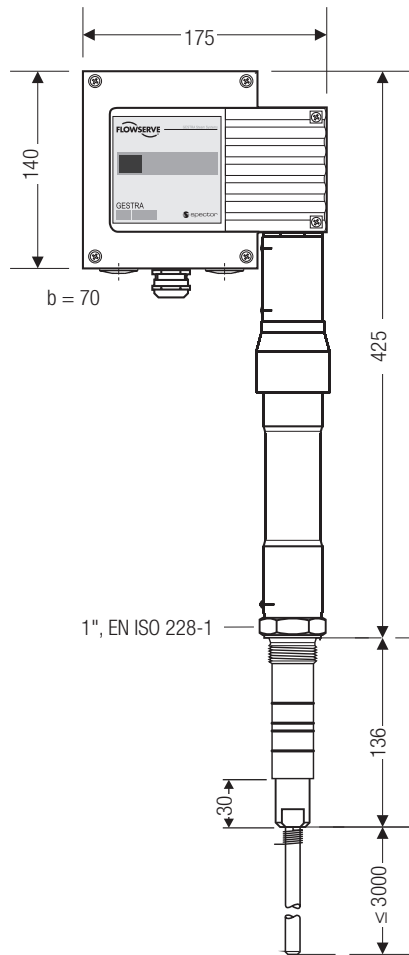
##### Weight

Approx. 1.2 kg (without extension)  
 (NRG 16-50, NRG 17-50, NRG 19-50)  
 Approx. 1.8 kg (without extension)  
 (NRG 111-50)

## Dimensions



**Fig. 1** NRG 16-50, NRG 17-50, NRG 19-50 with four-pole connector and measuring surface extension



**Fig. 2** NRG 111-50F with terminal box made from aluminium

## Important Notes

### Electrical Connection

To connect the level electrode(s) please use:

- For level switch NRS 1-50 with response sensitivity 10  $\mu\text{S}$ : Screened multi-core control cable, min. conductor size 0.5  $\text{mm}^2$ , e.g. LiYCY 4 x 0.5  $\text{mm}^2$ , max. length 100 m.
- For level switch NRS 1-50 with response sensitivity 0.5  $\mu\text{S}$ : Double-screened multi-core low-capacitance data cable, min. conductor size 0.5  $\text{mm}^2$ , **LiZYCY PiMF 2 x 2 x 0.5  $\text{mm}^2$ , max. length 30 m.**

### Installation

- **One** level electrode NRG 1...-50 can be installed together with one GESTRA level electrode, one level switch or transmitter for water level control or high level alarm in one single protection tube or level pot (inside diameter 100 mm). If the electrode NRG 1...-50 is installed inside the vessel, it must be at least 40 mm away from the upper vent hole.
- The installation of two water-level limiting electrodes NRG 1...-50 in one single standpipe is not allowed!
- The angle of inclination of the electrode must not exceed 45°, with the length of the electrode rod being limited to 1000 mm.
- If the level switch NRS 1-50 has a response sensitivity of 0.5  $\mu\text{S}/\text{cm}$  please use a measuring surface extension.
- For outdoor installations please use level electrode NRG 1...-50 F. Level electrodes with this suffix (F) feature a terminal box made from aluminium.

### Order & Enquiry Specification

GESTRA Level electrode NRG 1...-50

PN....., connection....., inspection.....

Length supplied .....mm

## Water Level Limiter

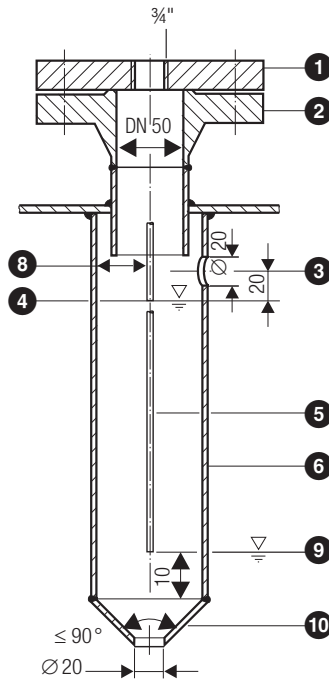
Level Electrode

**NRG 16-50, NRG 17-50,  
NRG 19-50, NRG 111-50**

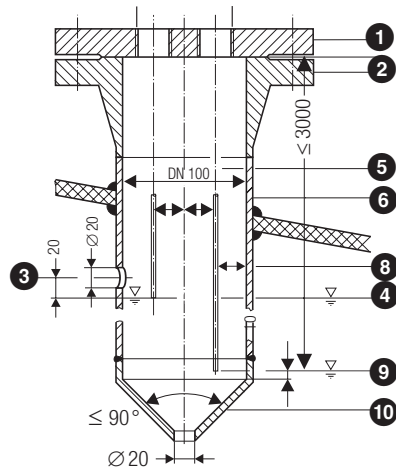
### Key

- 1 Flange PN 40, PN 63, PN 160, DN 50 or DN 100, DIN 2501-1 (NRG 16-50, NRG 17-50, NRG 19-50)  
Flange PN 250, DN 80, DIN 2501-1 (NRG 111-50)
- 2 For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.
- 3 Vent hole
- 4 High water (HW)
- 5 Electrode rod  $d = 8$  mm
- 6 Protection tube DN 80, DN 100
- 8 Electrode distance  $\geq 14$  mm
- 9 Low water (LW)
- 10 Reducer DIN 2616-2, K-88.9 x 3.2- 42.4 x 2.6 W

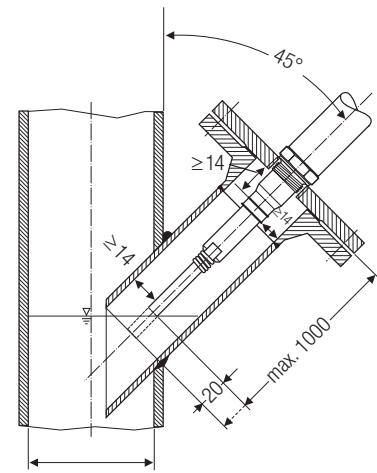
## Examples of installation



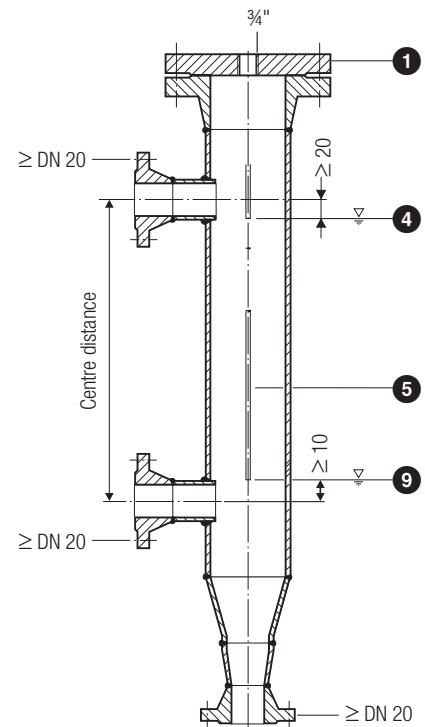
**Fig. 3** Protection tube if electrode is used as internal water-level limiter



**Fig. 5** Protection tube if electrode is used as internal water level-limiter combined with water level control or high-water alarm



**Fig. 4** Inclined installation in inlet lines (HW installations) or in steam boiler



**Fig. 6** Level pot DN 80 if water level limiter is installed outside the boiler

Supply in accordance with our general terms of business.

**GESTRA AG**

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