

GESTRA Steam Systems

Product Range B1

Self-Monitoring Level-Control Electrodes

NRG 16-11
NRG 17-11
NRG 19-11
NRG 16-11
NRG 17-11
NRG 19-11

Description

The level electrode NRG 1...-11 detects the minimum liquid level (low level alarm) in a steam boiler. The operation of the electrode is based on the conductivity measuring principle using the electrical conductivity of water for signalling one liquid level:

- Low level alarm (MIN alarm)

The NRG 1...-11 is designed for use in conjunction with level switch NRS 1-7 as a self-monitoring level limiter with periodic self-checking (SMART) feature.

Application in steam and pressurised hot-water plants in accordance with TRD 604, sheet 1 and sheet 2 (24h/72h operation) as well as EN 12952 and EN 12953.

The electrical equipment meets the requirements of the Regulations for Protection Circuits DIN VDE 0116.

Function

The water level limiter comprises a level electrode type NRG 1...-11 and a level switch type NRS 1-7. The level electrode NRG 1...-11 consists of two concentrically arranged electrodes (measuring electrode and compensating electrode) which are isolated from each other by special insulating seals.

The level limiter operation is based on the conductive measuring principle using the electrical conductivity of water for signalling water level. During normal, trouble-free operation the level electrode tip is immersed in boiler water and no low level alarm is given. A low level alarm will only be raised if the electrode tip is exposed for more than 3 seconds. A low level alarm will also be activated if the insulating seals placed between the electrodes and the body are no longer pressure tight, allowing water to penetrate into the body. However in this instance the alarm is caused by a malfunction of the electrode, and confirmation should always be done by checking if there is water in the gauge glass. The equipment combination NRG 1...-11 and NRS 1-7 provides fail safe protection against a first fault in accordance with TRD 604.

System Components

NRS 1-7

Level switch **NRS 1-7**. Two channel level limiter (redundancy) with periodic self-checking routine to EN 50156-1.

Design

NRG 1...-11:

Screwed 3/4" to ISO 228-1.

Technical Data

Type approval

TÜV · WB · 01-354
EG 01 202 931-B-01-0077

Service pressure

NRG 16-11: 32 bar at 238 °C
NRG 17-11: 60 bar at 275 °C
NRG 19-11: 100 bar at 311 °C

Connection

Screwed 3/4" to ISO 228-1

Materials

Stem 1.4571 X6CrNiMoTi17-12-2
Measuring electrode: 1.4401, X5CrNiMo17-12-2
Electrode insulation: Gylon®
Terminal box: 3.2161 G AISi8Cu3 (optional)

Lengths available

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

Cell constant C

0.13 cm⁻¹ **with** measuring surface extension
0.3 cm⁻¹ **without** measuring surface extension

Response sensitivity

10 µS/cm at 25 °C, cell constant 0.3 cm⁻¹
0.5 µS/cm at 25 °C, cell constant 0.13 cm⁻¹

Electrical connection

Four-pole connector, cable gland M 16 (PG 9)

Protection

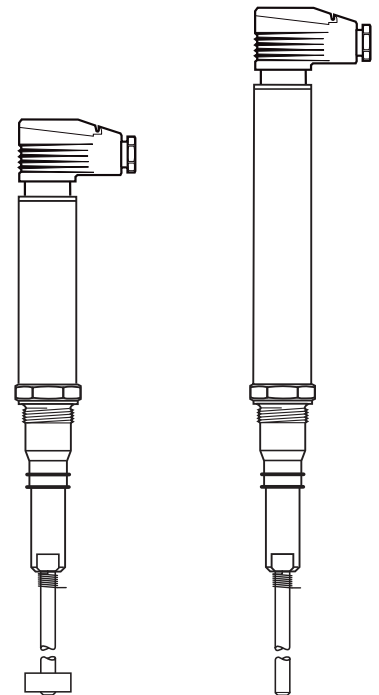
IP 65 to EN 60529

Max. admissible ambient temperature

Max. 70 °C

Weight

Approx. 1.1 kg



NRG 16-11
with measuring surface
extension (optional)

NRG 17-11, NRG 19-11

Key

- 1 Flange PN 40, PN 63, PN 160, DN 50, DIN 2501-1
Flange PN 40, PN 63, PN 160, DN 100, DIN 2501-1
- 2 For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.
- 3 Vent hole
Provide vent hole as close as possible to the boiler wall!
- 4 High water (HW)
- 5 Electrode rod $d = 8 \text{ mm}$
- 6 Protection tube DN 80
- 7 Protection tube DN 100
- 8 Electrode distance $\geq 14 \text{ mm}$
- 9 Low water (LW)
- 10 Reducer DIN 2616, part 2
K-88.9 x 3.2-42.4 x 2.6 W

Examples of Installation

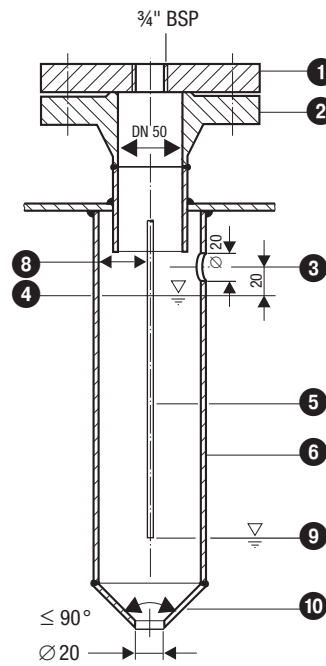


Fig. 1

Protection tube (to be provided on site),
if the electrode PN 40, PN 63 is installed inside the boiler

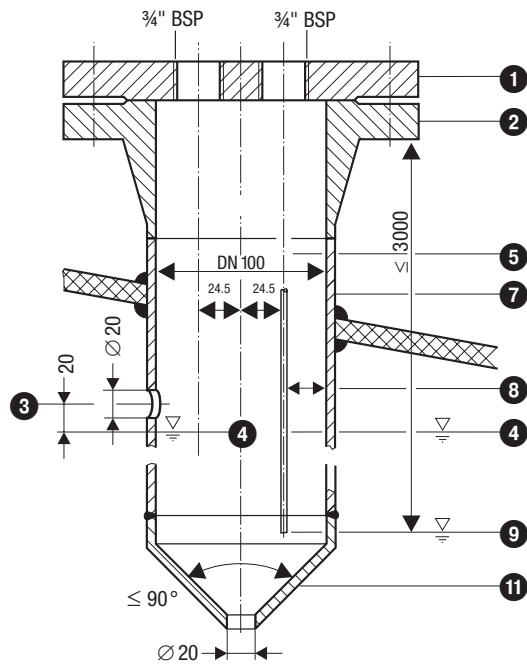


Fig. 2

Protection tube for level electrode NRG 16-11 / NRG 17-11
combined with NRG 16-12 / NRG 17-12, PN 40, PN 63

Examples of Installation

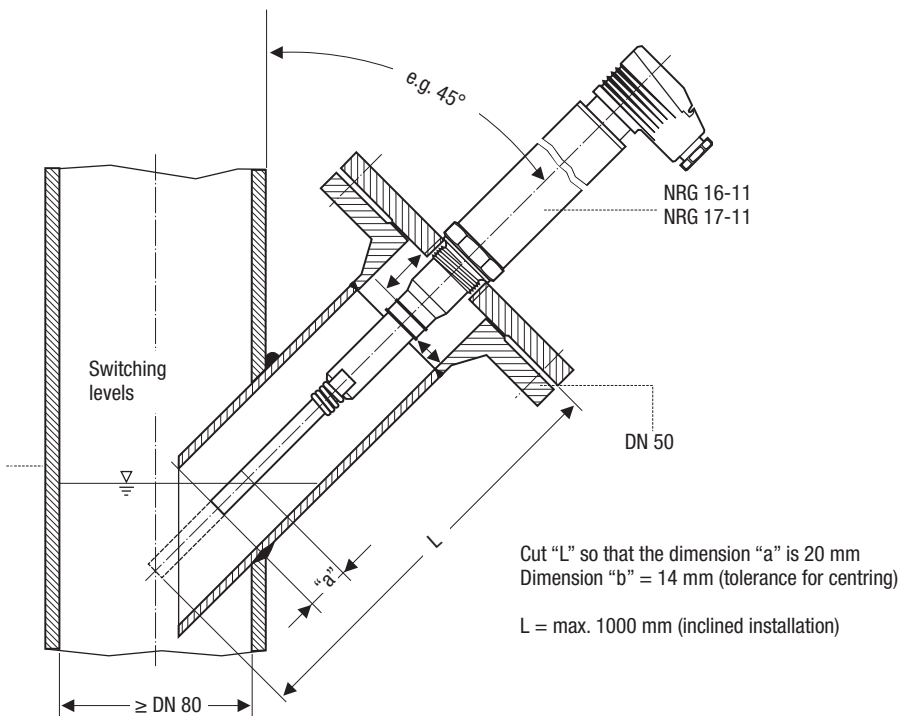


Fig. 3

Laterally inclined installation of electrode in a rising feed main of a pressurized hot-water plant

Important Notes

Note that screened four-core cable, e.g. I-Y(St)Y 2 x 2 x 0.8 or LIYCY 4 x 0.5 mm² is required for wiring the electrode.

Max. length 100 m with conductivities from 10 µS/cm.
Max. length 30 m with conductivities from 0.5 µS/cm.
Max. length 15 m with conductivities from 0.5 µS/cm and application of the ancillary unit URN 1 (24 V DC).

The electrode is unreservedly suitable for installation inside shell boilers and water-tube boilers series HK manufactured by Thyssen-Henschel.

If the electrode shall be installed in other types/makes of boiler, a performance test must be carried out on site before commissioning the equipment, and the proper interaction of boiler and limiter must be verified by the relevant TÜV expert.

The electrode shall be installed vertically or with a lateral inclination of 45°. If the electrode is installed with an inclination the electrode length must not exceed 1000 mm.

Installation directly inside the steam boiler is recommended as this provides operational and maintenance cost savings. In this case a protection tube (≥ DN 80 mm) is required.

In pressurized hot-water plants the electrode may also be installed in the feed main (≥ DN 80) in a position inclined by 45°.

When the electrode is installed inside the boiler, a protection tube I.D. ≥ 100 mm (Water Level 100) must be provided. According to Fig. 2 a minimum distance of at least 40 mm between the electrode and the upper vent hole must be observed when installing the electrode.

If the electrode is installed in an external chamber, purging of the chamber is required at regular intervals. For this purpose the GESTRA logic unit for monitoring type SRL 6 is available.

Please note

- The installation of two low-level limiters in one standpipe is **not** allowed according to TRD!
 - For the approval of the boiler standpipe observe the relevant regulations.
 - When mounting the electrode laterally make sure that the inclination angle does not exceed 45° and that the length of the electrode rod is limited to 1000 mm.
- Fig. 3**
- If the electrode is installed outdoors, it **must** be provided with a weather-proof cover supplied by GESTRA.

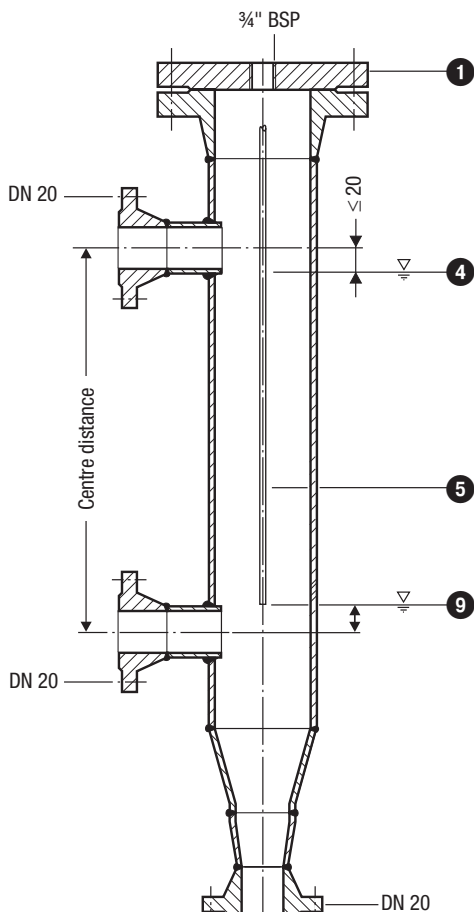


Fig. 4

External chamber type III for installation of electrode outside of boiler, PN 160.

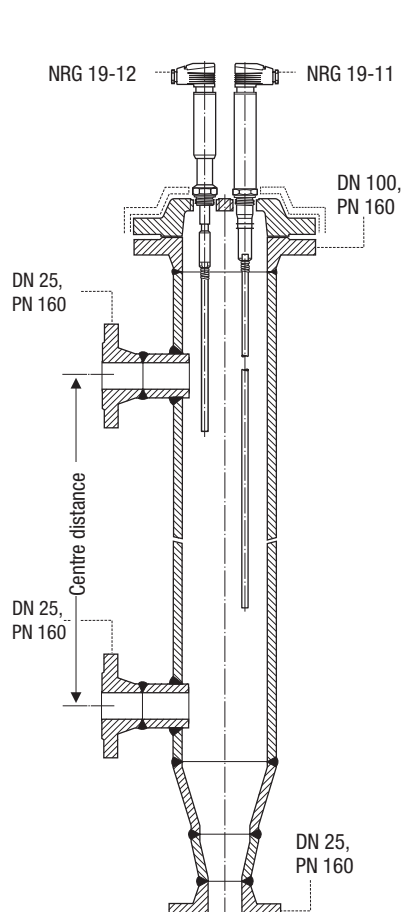


Fig. 5

External chamber type XIII for installation of two electrodes outside of boiler.

Self-Monitoring Level-Control
Electrodes
NRG 16-11
NRG 17-11
NRG 19-11

Order and Enquiry Specifications

GESTRA self-monitoring level-control electrode for self-monitoring high water-level limiter according to TRD 604 and TRD 602:

- Level-control electrode type NRG 16-11.....
PN 40, connection
Inspection.....
Cell constant C
Length.....mm
- Level-control electrode type NRG 17-11.....
PN 63, connection
Inspection.....
Cell constant C
Length.....mm
- Level-control electrode type NRG 19-11.....
PN 160, connection
Inspection.....
Cell constant C
Length.....mm

The following test certificates can be issued on request, at extra cost:

In accordance with EN 10204-2.1, -2.2 and -3.1B.

All inspection requirements have to be stated with the order. After supply of the equipment certification cannot be established. For tests and inspection charges please consult us.

Ancillary Equipment

- Logic unit type SRL 6 for monitoring purging cycles (electrode installed in external measuring pot).
- Weather-proof protective cover for outdoor installation.

ATEX (Atmosphère Explosible)

The equipment constitutes a simple item of electrical equipment as defined in DIN EN 50020 section 5.4. According to the European Directive ATEX 94/9/EC the equipment may only be used in potentially explosive atmospheres if it is provided with approved Zener barriers. 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.

PED (Pressure Equipment Directive)

The equipment fulfills the requirements of the Pressure Equipment Directive 97/23/EC. NRG 16-11, NRG 17-11, NRG 19-11 applicable with fluids of group 2. With CE marking.

Supply in accordance with our general terms of business.

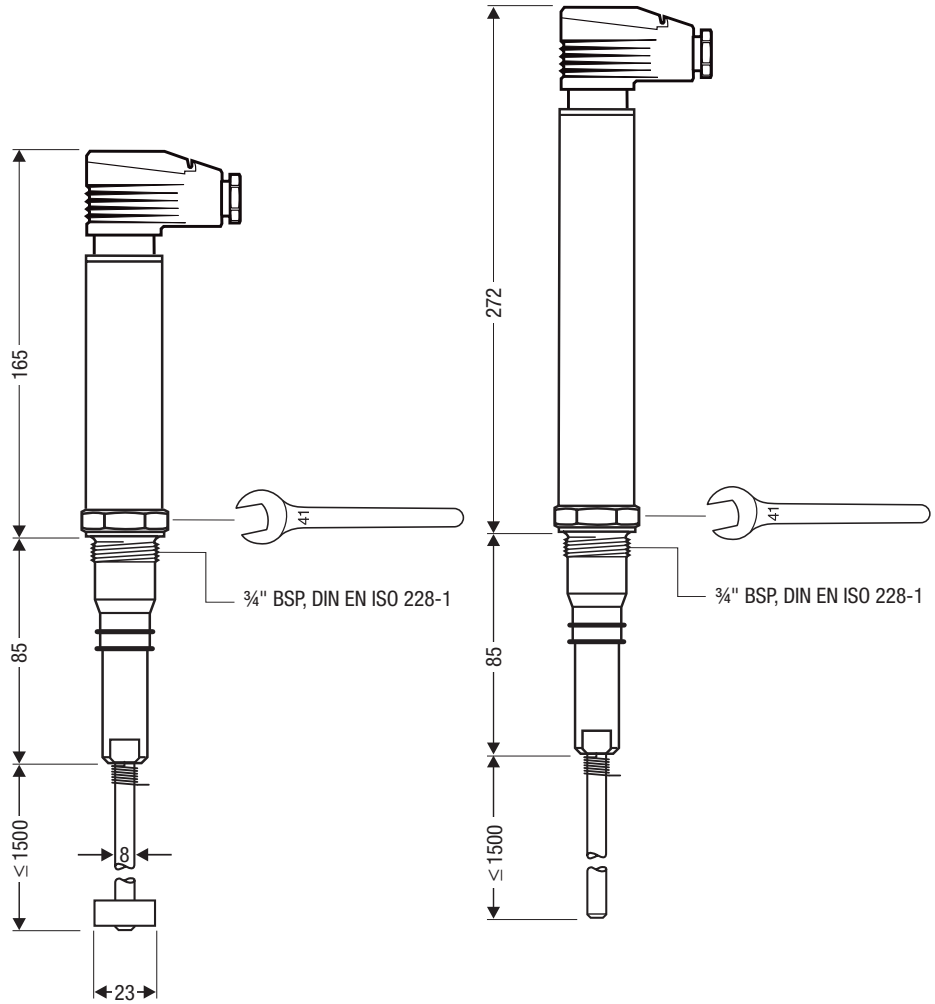


Fig. 6
NRG 16-11 with measuring surface extension

Fig. 7
NRG 17-11, NRG 19-11 without measuring surface extension

GESTRA AG

Münchener Straße 77, 28215 Bremen, Germany
Telefon +49 421 3503-0, Telefax +49 421 3503-393
E-mail info@de.gestra.com, Web www.gestra.de

