GESTRA Steam Systems

Product Range B1

Self-Monitoring Level-Control Electrodes
NRG 16-12
NRG 17-12
NRG 19-12

NRG 16-12
NRG 17-12
NRG 19-12

Description

The level electrodes NRG 16-12, NRG 17-12 and NRG 19-12 detect the max. liquid level (high 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:

- High level alarm

The NRG 1...-12 is designed for use in conjunction with level switch NRS 1-8 as a self-monitoring level limiter with periodic self-checking (SMART) feature.

Application in steam and pressurized 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 on Protection Circuits DIN VDE 0116.

Function

The water level limiter comprises a level electrode type NRG 1...-12 and a level switch type NRS 1-8. The level electrode NRG 1...12 consists of a pressure-tight measuring electrode. The electrode is insulated with a special plastic seal.

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 cavities between the body, tube and stud. 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...-12 and NRS 1-8 provides fail safe protection against a first fault in accordance with TRD 604.

System Components

NRS 1-8
Level switch **NRS 1-8**. Two channel level limiter (redundancy) with periodic self-checking routine to DIN VDE 0116.

Design

NRG 1...-12:
Screwed ¾" BSP to ISO 228-1.

Technical Data

Type approval
TÜV· 01-02-0112

Service pressure
NRG 16-12: 32 bar at 238 °C
NRG 17-12: 46 bar at 260 °C
NRG 19-12: 100 bar at 311 °C

Connection
Srewed ¾" BSP, ISO 228-1

Materials
Stem: 1.4571 X6CrNiMoTi17-12-2
Measuring electrode: 1.4401, X5CrNiMo17-12-2
Electrode insulation: PEEK
Terminal box: polyamide (PA)

Lengths available
500 mm
1000 mm
1500 mm

Cell constant C
0.13 cm^{-1} **with** measuring surface extension
0.3 cm^{-1} **without** measuring surface extension

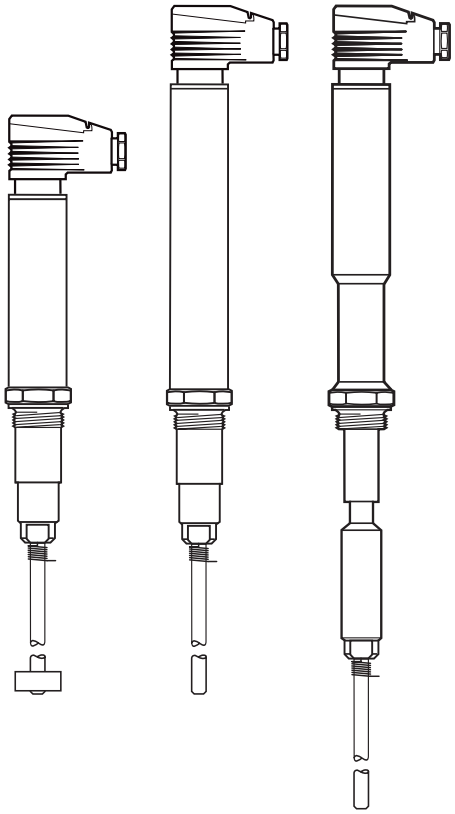
Response sensitivity
10 µS/cm at 25 °C, cell constant 0.3 cm^{-1}
0.5 µS/cm at 25 °C, cell constant 0.13 cm^{-1}

Terminal box
Four-pin 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 16-12 with measuring surface extension (optional)

NRG 17-12

NRG 19-12

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 mm
6. Protection tube DN 80
7. Protection tube DN 100
8. Electrode distance ≥ 14 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

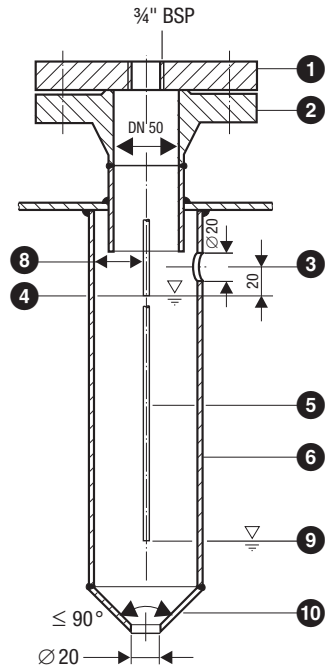


Fig. 1

NRG 16-12 / NRG 17-12 – installation of high-level alarm electrode inside the boiler

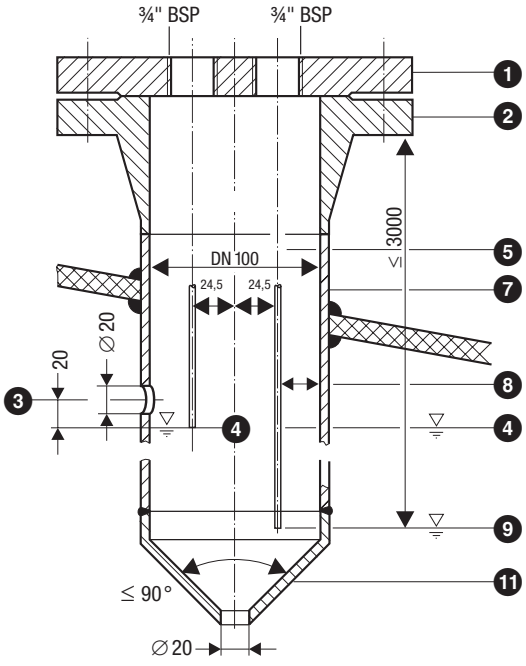
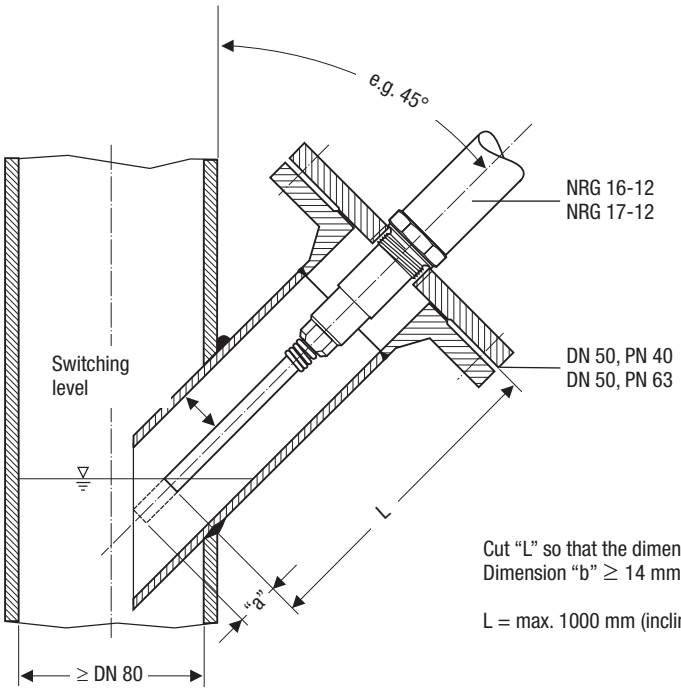


Fig. 2

Combination with internal protection tube

Examples of Installation



Cut "L" so that the dimension "a" is 20 mm
Dimension "b" ≥ 14 mm (tolerance for centring)

L = max. 1000 mm (inclined installation)

Fig. 3

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

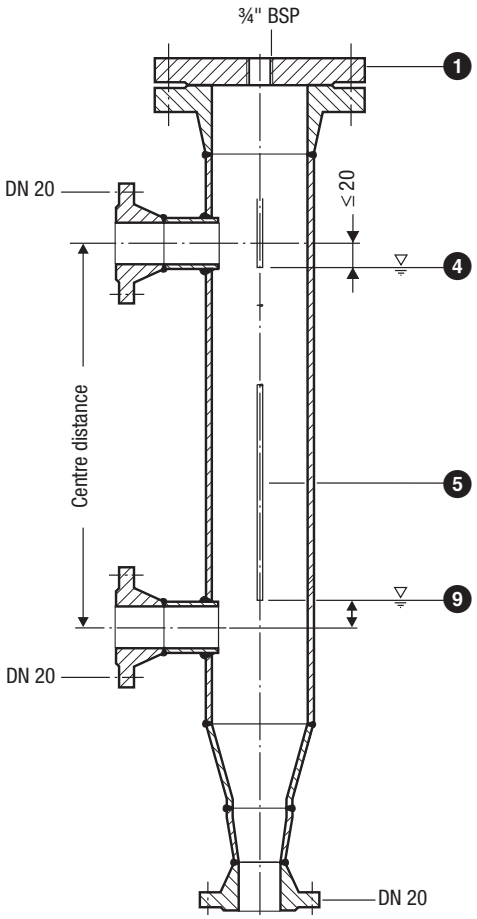


Fig. 4

External chamber type III for installation of a high-level electrode outside of boiler.

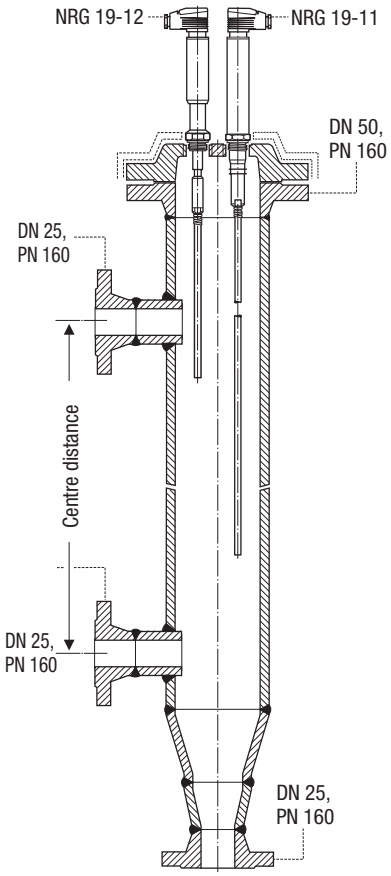


Fig. 5

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

Important Notes

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

Max. cable length 100 m with water conductivity from 10 µS/cm.

Max. cable length 30 m with water conductivity from 0.5 µS/cm.

Max. cable length 15 m with water conductivity from 0.5 µS/cm when used in conjunction with inverter URN1 (24 V d.c.).

The installation of electrodes inside the boiler is only approved for shell-type boilers.

For other boiler types the trouble-free interaction and correct operation of the steam boiler and the low level alarm must be approved by the competent Technical Supervisory Association (in Germany: TÜV).

The electrode shall be installed vertically or with a lateral inclination of 45°.

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 50) in a position inclined by 45°.

Combination electrodes must be installed vertically.

When the electrode is installed inside the boiler, a protection tube I.D. ≥ 100 mm (Water Level 100) must be provided.

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

- For the approval of the boiler standpipe the relevant regulations must be considered.
- The inclination angle of the electrode must not exeed 45°. The max. length of the electrode rod is 1000 mm. **Fig. 3**
- If the electrode is installed outdoor, it must be provided with a weather-proof cover supplied by GESTRA.

Self-Monitoring Level-Control Electrodes

NRG 16-12
NRG 17-12
NRG 19-12

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 16-12.....
  PN 40, connection .....
  Inspection.....
  Cell constant C .....
  Length.....mm
- Level-control electrode type NRG 17-12.....
  PN 63, connection .....
  Inspection.....
  Cell constant C .....
  Length.....mm
- Level-control electrode type NRG 19-12.....
  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).
- If the electrode is installed outdoor, it must be provided with a weather-proof cover supplied by GESTRA. Alternatively the electrode can be provided with a terminal box made from aluminium.

ATEX (**At**mosphère **Ex**plosible)

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.

Supply in accordance with our general terms of business.

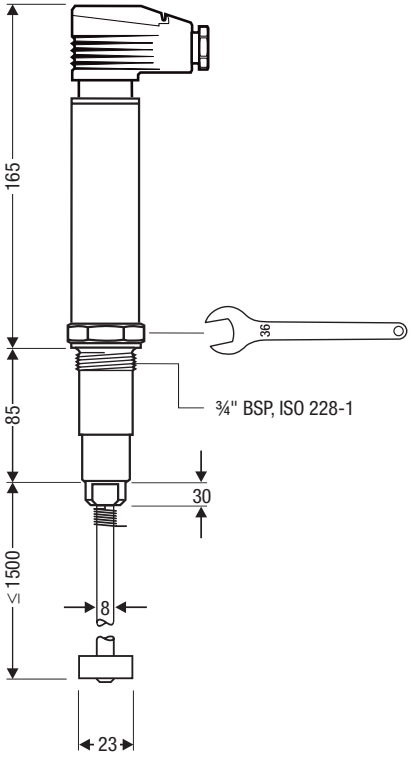


Fig. 6 *NRG 16-12 with measuring surface extension (cell constant 0.13)*

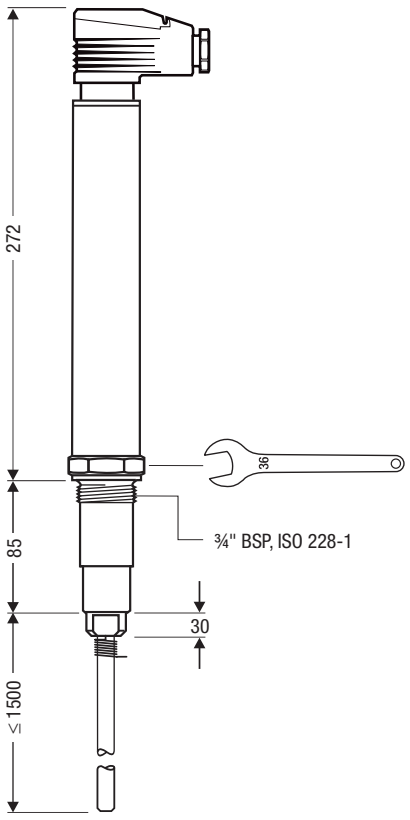


Fig. 7 *NRG 17-12 without measuring surface extension*

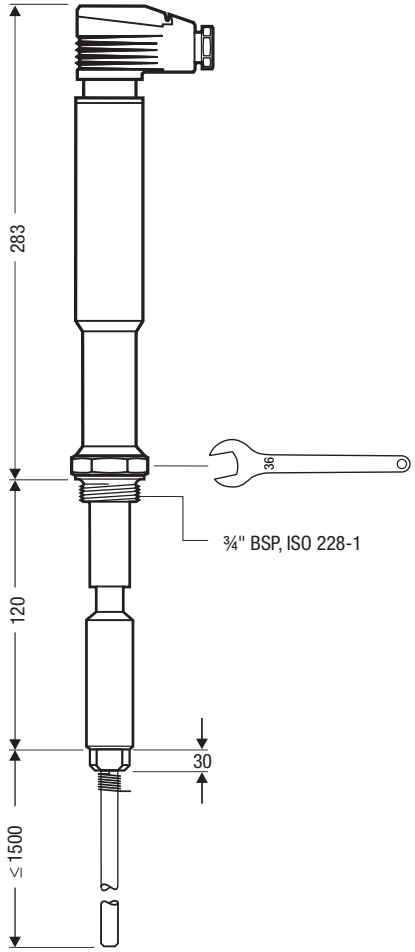


Fig. 8 *NRG 19-12 without measuring surface extension*

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