

GESTRA Steam Systems

NRS 1-2

EN
English

Installation Instructions 818780-03

Level Switch
NRS 1-2

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Important Notes

Usage for the intended purpose

Use level switch NRS 1-2 only in conjunction with GESTRA level electrodes NRG 16-4, NRG 1...-52, ER 50 and ER 56.

Safety note

The equipment must only be installed and commissioned by qualified and adequately trained personnel.

Maintenance and retrofitting must only be performed by entrusted personnel who – through adequate training – have achieved a recognised level of competence.



Danger

The terminal strips of the NRS 1-2 are live during operation.

This presents the danger of electric shock!

Cut off power supply before attaching or detaching the housing lid and the terminal strips of the equipment.

LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)

The equipment meets the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

ATEX (Atmosphere Explosible)

According to the European Directive 94/9/EC the equipment must **not** be used in potentially explosive areas.



Note

The level electrodes NRG 16-4, NRG 1...-52, ER 50 and ER 56 are simple items of electrical equipment as defined 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 on the Declaration of Conformity / Declaration by the Manufacturer

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity / Declaration of Manufacturer are available in the Internet under www.gestra.de/documents or can be requested from us.

Explanatory Notes

Scope of supply

NRS 1-2

1 Level switch NRS 1-2
1 Installation manual

Description

Level switch for indicating one high and one low liquid level (MIN alarm, MAX alarm), designed for use with GESTRA level electrodes NRG 16-4, NRG 1...-52, ER 50 and ER 56. Application in steam and (pressurised) hot water plants according to TRD 602 and TRD 604, sheet 1 and sheet 2.

Function

The level switch NRS 1-2 has one channel and is designed for signalling one MAX and one MIN alarm. The level switch has a manual test function. The button "TEST LW" can simulate a malfunction in the level electrode. As a precaution in case of a power failure the normally closed contacts will trigger an alarm in the event of power failure. The level switch features the following four operating modes:

- Normal operation (no running dry, no high water)
- MIN alarm (running dry)
- MAX alarm (high water)
- Alarm (malfunction in level switch or level electrode)

Two red LEDs indicate low water (LW), high water (HW) or system error alarm.

Components

NRG 16-4

Level electrode **NRG 16-4**, PN 40

ER 50

Level electrode **ER 50**, **NRG 10-52**, PN 6

ER 56

Level electrode **ER 56**, **NRG 16-52**, PN 40

Design

NRS 1-2

Plug-in unit in plastic case for installation in control cabinets. The terminals in the case are accessible after loosening two screws and unplugging the unit from its base.

To avoid confusion with other plug-in units of the GESTRA range, inserts are fitted in the bases so that only the correct unit may be plugged into each base.

The plug-in unit may be snapped onto a 35 mm supporting rail or screwed into position on a mounting panel.

Technical Data

NRS 1-2

Approval no.

TÜV · WR/WB · 08-302

Note:

TÜV · WR/... for NRS 1-1, 1-2, 1-5,

TÜV.../WB... for NRS 1-3;

The type approval allows the combination of a water level controller and a water level limiter in conjunction with the associated level electrodes.

Input

Three connections for two electrode rods and earth

Output

Two volt-free relay contacts,

contact rating 250 V, 500 W, 3 A resistive with a service life of 4×10^5 switching cycles or 0.35 A inductive with 2×10^6 switching cycles.

Contact material: silver, hard-gold plated

Sensitivity of response (electrical conductivity of water at 25 °C)

> 0.5 ... < 1000 $\mu\text{S/cm}$ or > 10 ... < 10000 $\mu\text{S/cm}$

Electrode voltage

11 V AC, free of direct voltage

Indicators and adjustors

1 LED for MAX alarm, 1 LED for MIN alarm, 1 button for simulating a MIN alarm

Supply voltage

24 V, 110 V, 120 V, 220 V, 240 V, 50 to 100 Hz (please indicate voltage when ordering).

When using the ancillary unit URN 1 the equipment can also be supplied with 24 V DC.

Power consumption

Approx. 3.5 VA

Protection

IP 40

Admissible ambient temperature

0 °C to 50 °C

Housing material

Base: Noryl SE 1-GFN 2 UL 94 VO, black

Cover: R-ABS UL 94 VO, light grey

Weight

Approx. 0.8 kg

Technical Data - continued -

Name plate / marking




Equipment designation	 Betriebsanleitung beachten See installation instructions Voir instructions de montage		NRS 1-2 b
Supply voltage	230 V	50 Hz	3,5 VA
Sensitivity of response		0,5µS/cm	IP 40
Mat.Nr.: 056390			
GESTRA AG Bremen			

Fig. 1

Dimensions

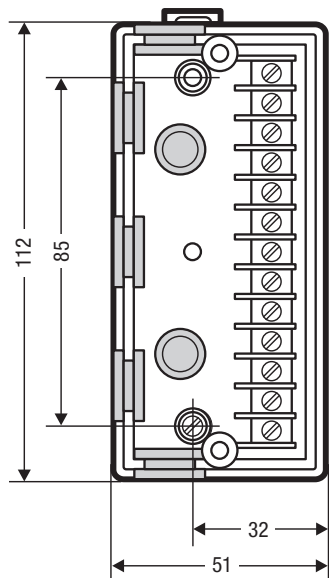


Fig. 2

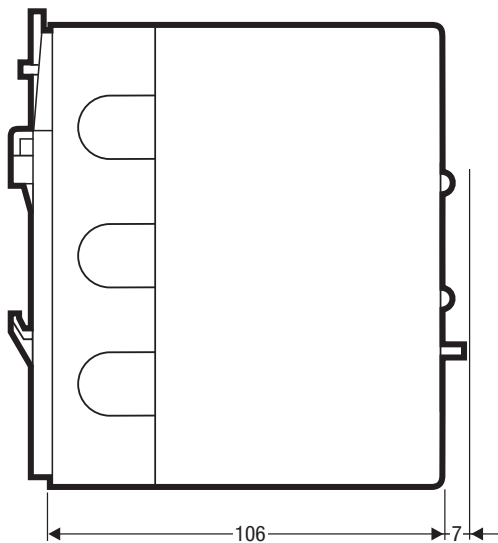


Fig. 3

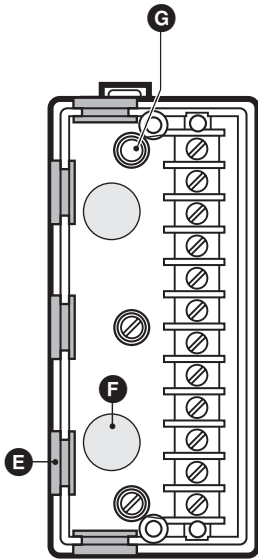


Fig. 4

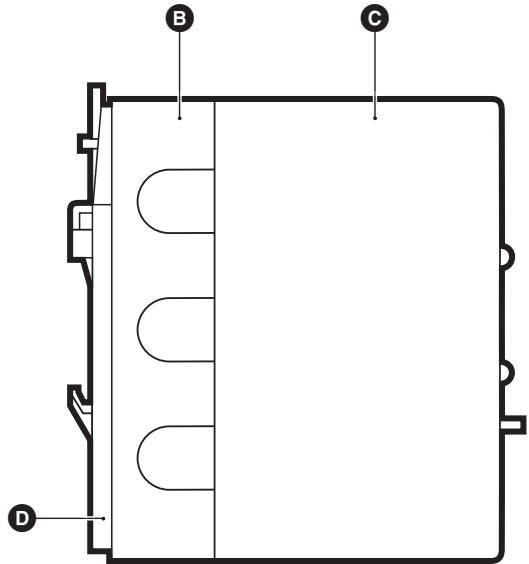


Fig. 5

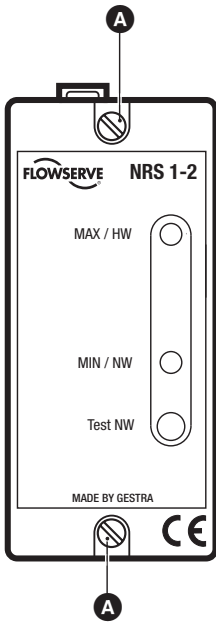


Fig. 6

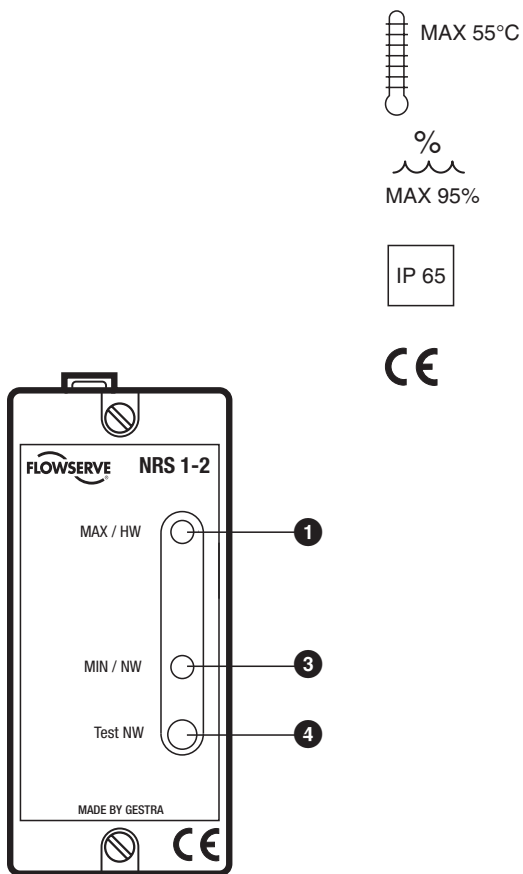


Fig. 7

Design / Functional Elements

Key

- A** Cover screws
- B** Base
- C** Upper part
- D** Mounting clip
- E** Cable entry (soft seal)
- F** Cable entry (marked in housing)
- G** Fixing hole $d = 4.3 \text{ mm}$

- 1** Red LED for MAX alarm
- 2** Red LED for MIN alarm
- 3** Button "TEST LW" for simulating a MIN alarm

Installation

NRS 1-2

On supporting rail (with mounting clip)

1. Clip level switch onto supporting rail.
2. Loosen cover screws **A** and detach cover **C** from its base **B**.
3. Select cable entry **E** and remove corresponding seal.

On mounting panel

1. Loosen cover screws **A** and unplug cover **C** from its base **B**.
2. Unscrew mounting clip **D**.
3. Drill the hole **G** marked in the base to \varnothing 4.3 mm.
4. Select cable entry **E** / **F** and remove corresponding seal.
5. Fasten base with two screws M4 onto mounting panel.



Attention

- To provide sufficient ventilation, ensure a minimum spacing of 20 mm between adjacent units.

Tools

- Screwdriver (5.5/100)

Key

- A** Cover screws
- B** Base
- C** Cover
- D** Mounting clip
- E** Cable entry (soft seal)
- F** Cable entry (marked in housing)
- G** Hole $d = 4.3$ mm
- H** Supporting rail 35 x 15 mm to DIN EN 50022

Examples of installation

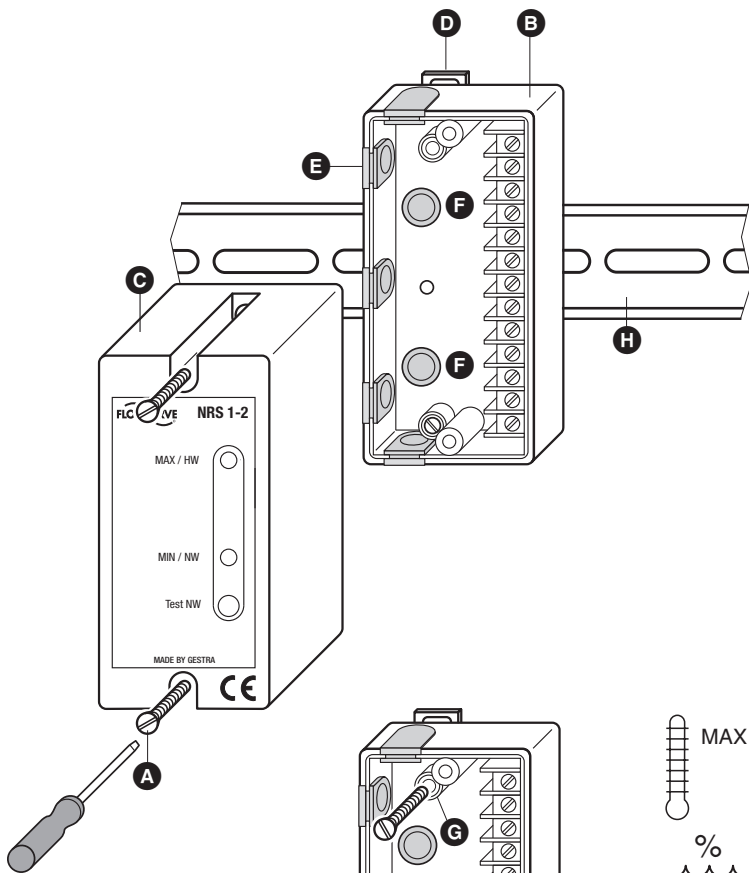


Fig. 8

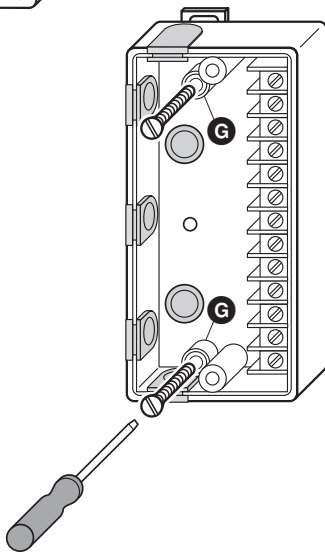


Fig. 9

MAX 55°C

%
MAX 95%

IP 65

CE

Electrical Connection

NRS 1-2

Cable required for wiring to the electrode: four-core screened cable, e. g. I-Y(St)Y 2 x 2 x 0.8 or LIYCY 4 x 0.5².

Max. cable length 100 m with a conductivity from 10 $\mu\text{S}/\text{cm}$.

Max. cable length 30 m with a conductivity from 0.5 $\mu\text{S}/\text{cm}$.

Max. cable length 15 m with a conductivity from 0.5 $\mu\text{S}/\text{cm}$ when used in conjunction with inverter URN 1 (24 V d. c.)



Note

- If the terminal for the low-level (MIN) alarm is not connected, provide terminals 11 and 12 with a wire bridge, as otherwise the LED MIN indicating low water level would be permanently illuminated.
- Connect screen only to terminal 8 of the level switch.
- The sensitivity is indicated on the name plate.
- The rated supply voltage is indicated on the name plate.
- When switching off inductive loads, voltage spikes are produced that may impair the operation of control and measuring systems. Inductive loads should therefore be provided with commercial arc suppressor RC combinations, e. g. 0.1 $\mu\text{F}/100 \Omega$.

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680-1.

Wiring diagram

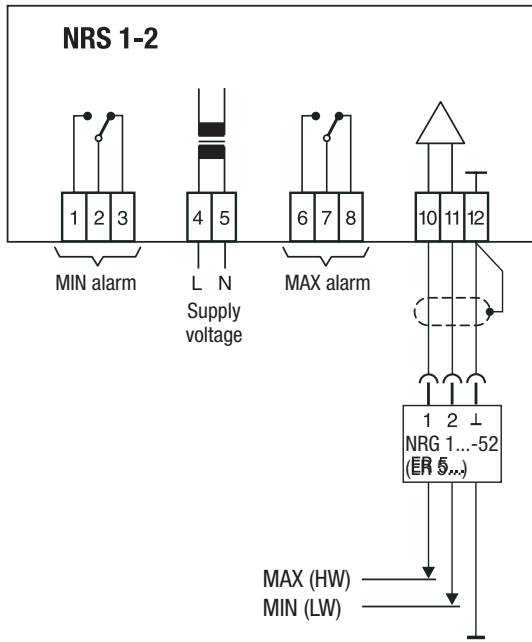
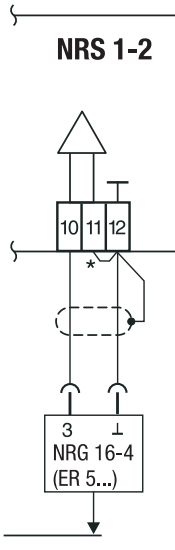


Fig. 10



*Drawn position of contacts:
deenergized / alarm*

* Wire link, please observe note on page 14!

Fig. 11

Commissioning

Checking electrical connection

Check that the NRS 1-2 and the associated level electrode are wired in accordance with the wiring diagram, **Fig. 10, Fig. 11**.

Applying supply voltage

Apply supply voltage to level switch NRS 1-2.

Performance Test

Limit switch MIN / MAX

1. When the electrodes are connected but exposed, the LED "MIN" must be illuminated.
2. When the electrodes are submerged the LED "MAX" must be illuminated. When pressing button "TEST" the LED "MIN" must also light up.
3. To simulate the condition "electrode submerged" short circuit the corresponding electrode terminal with terminal 12.
4. The electrode is supplied with 11 V AC \pm 20 %. When the electrodes are exposed this voltage can be measured between the electrode tips and the earth connection by using a high-resistance instrument (100 k Ω /V).



Note

- For troubleshooting consult section "Operational Malfunctions" on pages 17/18.

Operational Malfunctions

Fault-finding list for troubleshooting

Level electrode submerged – Low level alarm

Fault: The level switch signals a low level (MIN) alarm before the water level in the steam boiler has reached the low level (MIN) switchpoint.

Remedy: Check the length of the low level (MIN) electrode rod. Measure the conductivity of the process or boiler water and compare the readings with the specification on the level switch. Make sure that the level switch and the electrode are wired in accordance with the wiring diagram, **Fig. 10, Fig. 11**.

Fault: The water level is above the low level (MIN) switchpoint but the red LED ② is still illuminated or goes out only after quite a while.

Remedy: Check if the protection tube is provided with a vent hole. If the electrode is installed in an external measuring pot, check the position of the shut-off valves.

Fault: The red LED ② is illuminated but the water level is above the low level (MIN) switchpoint.

Remedy: A control channel in the level switch has failed. Replace the level switch.

Low water level – no alarm is raised

Fault: The water level has dropped below the low level (MIN) switchpoint but the red LED ② does not light up.

Remedy: Check if the protection tube is provided with a vent hole. If the electrode is installed in an external measuring pot, check the position of the shut-off valves.

Electrode exposed – high-level alarm

Fault: The level switch indicates a high-level (MAX) alarm before the level in the boiler has reached the high level (MAX) mark.

Remedy: Check length of the high-level (MAX) electrode tip. Make sure that the level switch and the electrode are wired in accordance with wiring diagram, **Fig. 10, Fig. 11**.

Operational Malfunctions – continued –

Fault-finding list for troubleshooting – continued –

Fault: After lowering the water level below the high-level (MAX) mark, the red LED ❶ is still illuminated or goes out only after quite a while.

Remedy: Check whether a vent hole has been provided in the protection tube. If the electrode is fitted in a measuring pot outside the boiler, check the position of shut-off valves.

Fault: The red LEDs ❶ is illuminated without the level having reached the high-level (MAX) mark.

Remedy: A control channel in the level switch has failed. Replace the level switch.

High water level reached – no alarm is raised

Fault: The water level is above the high level (MAX) switchpoint but the red LED ❶ is not illuminated.

Remedy: Check whether a vent hole has been provided in the protection tube. If the electrode is fitted in a measuring pot outside the boiler, check the position of shut-off valves. Measure the conductivity of the boiler water and compare the readings with the specification on the level switch.

If faults occur that are not listed above, please contact our Technical Services or agency in your country.

Decommissioning



Danger

The terminal strips of the NRS 1-2 are live during operation.

This presents the danger of electric shock!

Cut off power supply before attaching or detaching the housing lid and the terminal strips of the equipment.

Disposal

Remove the level switch and separate the waste materials in accordance with the material specification.

Electronic components (boards) must be disposed of separately.

For the disposal of the level switch observe the pertinent legal regulations concerning waste disposal.

For your notes



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