

GESTRA Steam Systems

Product Range B1

Level Switch

NRS 1-7
Self-Monitoring Low-Level Alarm
with Periodic Self-Checking Routine to DIN VDE 0116
NRS 1-7


Purpose and Application

Self-monitoring low water-level limiter with periodic self-checking feature to be used in conjunction with the GESTRA level electrodes types NRG 16-11, PN 40, NRG 16-11S, PN 40, NRG 17-11, PN 63, NRG 19-11, PN 160 or NRG 111-11, PN 320. The equipment combination detects the low water level (low-level alarm).

The equipment meets the German regulations for use in steam-boiler plants operating in accordance with TRD 602 and TRD 604 sheet 1 and sheet 2 as well as EN 12952 and EN 12953.

Design

NRS 1-7

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 units may be snapped onto a 35 mm supporting rail or screwed into position on a mounting panel.

Function

The level switch type NRS 1-7 is a two-channel unit provided with an automatic self-checking circuitry in accordance with DIN VDE 0116 (directives for protection circuits). The self-checking is effected periodically. The test includes the checking of the cable between electrode and level switch and the self-checking circuitry (redundancy). The output relays are not influenced by the internal tests.

In addition to this self-checking routine, the level switch can also be tested manually by pushing the button "TEST 1" simulating a defect in the electrode. The test switch "TEST 2/INSPECTION" is provided for checking the function of the checking circuitry.

As the circuit of the relay contacts of the level switch is normally closed, alarm will also be signalled in the event of a mains failure.

The level switch can signal the following three operating conditions:

- Normal operation (correct level)
- Alarm (low level)
- Alarm (defect in level switch or electrode)

The green LED indicates mains ON. The alarm state low level or malfunction of the system is indicated by two red LEDs. The failure of one channel (loss of redundancy) is signalled by the illumination of a single red LED.

The combination of electrode NRG 16-11, NRG 16-11 S, NRG 17-11, NRG 19-11 or NRG 111-11 and level switch NRS 1-7 provides fail-safe protection against a first fault, i. e. the system will still continue to provide the safety function even after the occurrence of a first fault.

System Components

Level electrode NRG 16-11, PN 40, NRG 16-11S, PN 40, NRG 17-11, PN 63, NRG 19-11, PN 160, NRG 111-11, PN 320 as low-level limiter.

Technical Data

Type-approval no.

TÜV · WB · 01-354
EG 01 202 931-B-01-0077
EG 01 202 931-B-01-0075

Input

Four terminals for the connection of one level electrode type NRG 16-11, PN 40
type NRG 16-11S, PN 40
type NRG 17-11, PN 63
type NRG 19-11, PN 160
type NRG 111-11, PN 320

Output

Two volt-free relay contacts (mounted in series in the case of design "b");
max. contact rating: 250 V, 300 W, 3 A resistive with a life of 5×10^5 switching cycles or 0.35 A inductive with a life of 2×10^6 cycles;
contact material silver, hard-gold plated

Delay of response

Set at our factory to 3 s
(up to 25 s – TÜV approval required)

Sensitivity

10 $\mu\text{S}/\text{cm}$ at 25 °C when used in conjunction with level electrode without measuring surface extension (cell constant $C = 0.3$).

0.5 $\mu\text{S}/\text{cm}$ at 25 °C when used in conjunction with level electrode with measuring surface extension (cell constant $C = 0.13$), see data sheet NRG 16-11, NRG 111-11).

Indicators and adjustors

Two LEDs "Alarm"
One LED "Operation"
One button "TEST 1"
One switch "TEST 2/INSPECTION"

Mains supply

230 V $\pm 10\%$, 50/60 Hz (please state voltage when ordering)

Special voltage: 115 V $\pm 10\%$, 50/60 Hz or 24 V $\pm 10\%$, 50/60 Hz;

24 V d.c. supply also possible with the ancillary unit type URN-1.

Power consumption

5 VA

Protection

Design NRS 1-7 IP 40 to EN 60529

Permissible ambient temperature

0 °C – 55 °C

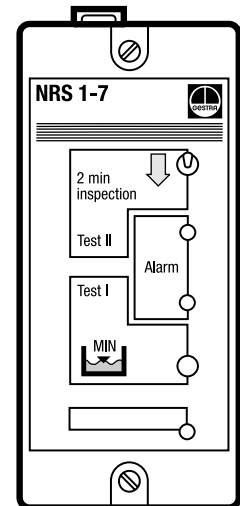
Case materials

Base: Noryl SE 1-GFN 2 UL 94 V0, black
Cover: R-ABS UL 94 V0, stone grey

Approx. weight

0.6 kg

CE marking 0525



NRS 1-7

Level Switch

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Important Notes

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 µS/cm.

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

Max. cable length 15 m with a conductivity from 0.5 µS/cm when used in conjunction with inverter URN 1 (24V d.c.).

When mounting the electrode into steam or pressurized hot-water boilers the relevant regulations must be considered.

The burner-protection circuit should be fused with 2.5 A anti-surge fuse or according to TRD regulations (e.g. 1.0 A for 75 hrs.)

The level switch itself is **not** interlocking. Interlocking and resetting have to be ensured on site by providing a secondary circuit (safety chain) in the control cabinet.

Order and Enquiry Specifications

GESTRA level switch for self-monitoring low-level alarm in accordance with TRD 602, TRD 604, EN 12952 and EN 12953:

- Level switch type NRS 1-7b in a plastic case for installation in control cabinets;

Delay of response s

Conductivity µS/cm

Mains supply V Hz

ATEX

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).

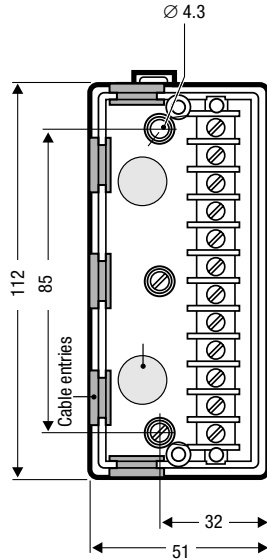
The equipment does not bear a CE marking.

The suitability of the Zener barriers is certified in a separate document.

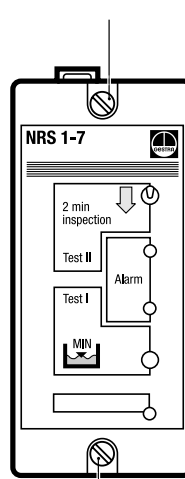
Supply in accordance with our general terms of business.

Dimensions

Base with terminals

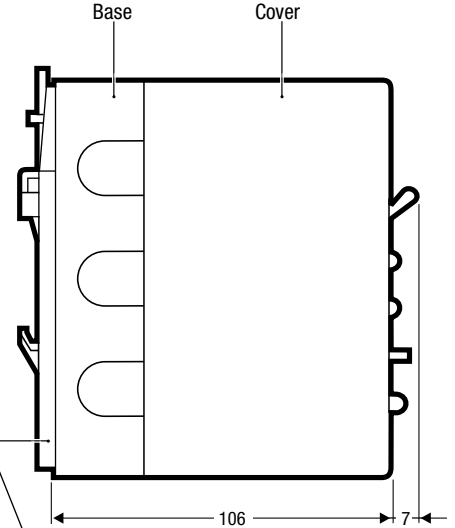


Front view



Screws to fasten cover to base

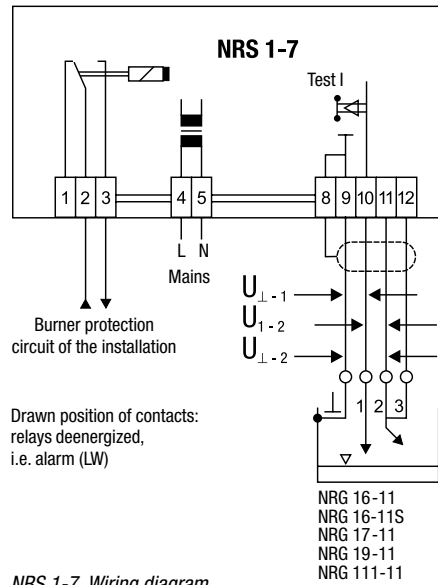
Side view



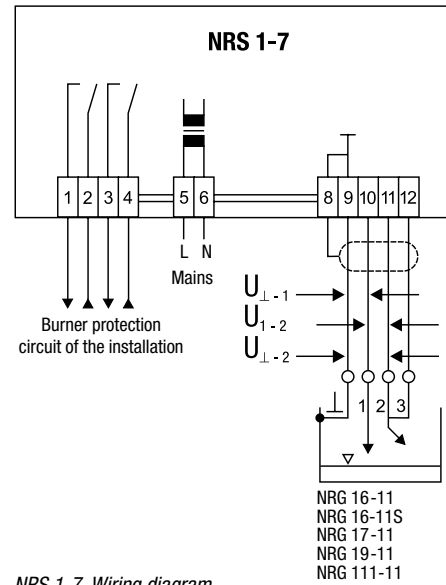
Mounting clip for 35 mm supporting rail to EN 60715

NRS 1-7b

Wiring Diagrams



NRS 1-7 Wiring diagram (Europe/international)



NRS 1-7 Wiring diagram (France)

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