

GESTRA Steam Systems

Product Range B1

Switching Controller

NRS 1-9
Combined Water Level Controller and Self-Monitoring
Low Water-Level Limiter with Periodic Self-Checking
NRS 1-9

Purpose and Application

This combined switching controller is for on-off feedwater control, high-level alarm, and self-monitoring low water-level limiter with periodic self-checking feature to be used in conjunction with the combination electrode NRG 16-36.

The equipment meets the German regulations for use in steam-boiler plants operating without constant supervision (TRD 604).

Design

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.

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

Field enclosures for several plug-in units are available on request.

Operation

The low water-level limiter part of the switching controller is a two channel circuit provided with an automatic periodic self-checking logic unit, in accordance with DIN 57116/VDE 0116 (regulations on protection circuits for firing equipment of furnaces). The two channels are designed to monitor the operation of each other. If one channel fails, an alarm signal is initiated and switches the output contacts to shut off the heat supply to the boiler. The periodic self-checking logic unit checks the integrity of the cable between the electrode and the switching controller, and the two channel circuits for malfunction. This is done automatically every 40 seconds by the triggering of a test alarm pulse through the circuit. Unless it finds a fault, this internal test does not interfere with the output contacts of the controller and therefore the boiler operation is not interrupted. In addition, there is a secondary checking device to monitor the operation of the periodic self-checking logic unit. If no test pulse alarm is triggered, the secondary checking device will initiate an alarm signal and switches the output contacts to shut off the heat supply to the boiler.

A manual test push button is also provided. When the push button "Test I" is pressed, it simulates a fault in the electrode. There is also a test switch "Test II/Inspection" for checking the function of the self-checking circuitry.

The output contact relays of the switching controller are of the normally close type and will therefore signal alarm condition in the event of a mains failure.

The combined switching controller can signal the following four operating conditions:

- Normal operation (feedwater control)
- Alarm (high water level)
- Alarm (low water level)
- Alarm (fault in switching controller or level electrode)

A green LED indicates mains supply ON. Low water-level alarm or malfunction of the low water-level limiter part is indicated by two red LEDs. The failure of one channel (loss of redundancy) is signalled by the lighting-up of one red LED. Another green LED indicates feedwater pump running. High water level alarm is signalled by another red LED.

The combination of electrode NRG 16-36 and switching controller NRS 1-9 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.

Technical Data

Type-approval No.

TÜV-WR/WB-94-370

Input

Eight terminals for the connection of one combination electrode NRG 16-36, PN 40

Output
Low water-level limiter part

Two volt-free relay contacts

Level controller part

One volt-free working contact for feedwater control on/off.

One volt-free relay contact for "high-level alarm".

Contact material silver, hard-gold plated.

Max. contact rating with switching voltages of 24 V, 115 V and 240 V a.c.: 4 A resistive, 0.75 A inductive, $\cos \varphi$ 0.5.

Max. contact rating with a switching voltage of 24 V d.c.: 4 A.

Delay of response

Low water-level limiter part: set at our factory to 1 or 3 s (up to 25 s possible).

High water-level alarm and controller parts: set at our factory to 2 s.

Sensitivity

 Range 1: 10 μ S/cm at 25 °C

 Range 2: 0.5 μ S/cm at 25 °C

Selection between the two ranges by code switch.

Indicators and adjustors

One green LED "Mains supply on"

Two red LEDs "Low water-level alarm"

One button "Test I"

One test switch "Test II/Inspection"

One green LED "Feedwater control on"

One red LED "High water-level alarm"

One four-pole code switch

Mains supply

220/240 V, 50/60 Hz

(please state voltage when ordering)

Special voltage: 115 V, ± 10 %, 50/60 Hz or 24 V ± 10 %, 50/60 Hz; 24 V d.c. supply also possible with the inverter type URN-1.

Protection

IP 20 in acc. with DIN 40050

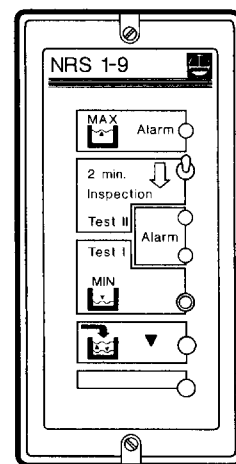
Permissible ambient temperature

0 to 55 °C

Case materials

Base: Noryl SE 1-GFN2 UL 94 VO, black

Cover: R-ABS UL 94 VO, stone grey



Level switching controller NRS 1-9b

Switching Controller

NRS 1-9

Combined Water Level Controller and Self-Monitoring Low Water-Level Limiter with Periodic Self-Checking

Important Notes

Cable required for wiring to the electrode: Two four-core overall screened cables, minimum conductor size 0.5 mm².

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 URN 1b (24 V d.c.).

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

The burner-protection circuit must be fused with 2.5 A (anti-surge fuse).

The switching controller does not have its own lock-out circuit. Lock-out and manual reset facilities are to be provided externally in the burner panel safety chain circuit.

Order and Enquiry Specifications

GESTRA level switching controller for on-off feedwater control, high water-level alarm and self-monitoring low water-level limiter with periodic self-checking:

Level switching controller type NRS 1-9b in a plastic case for installation in control cabinets.

Delay of response (low water-level limiter)

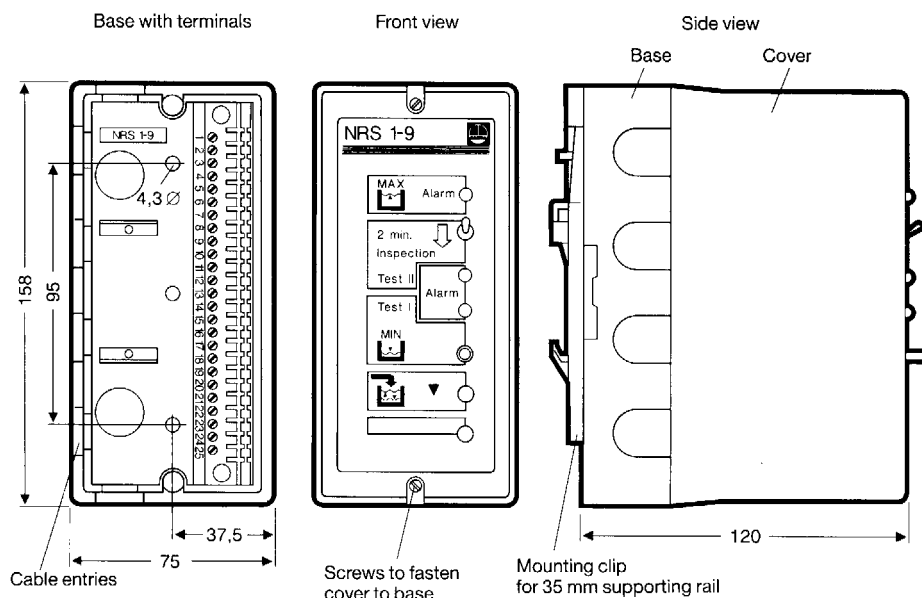
Mains supplyV.....Hz

Associated Equipment

Self-monitoring combination electrode type NRG 16-36

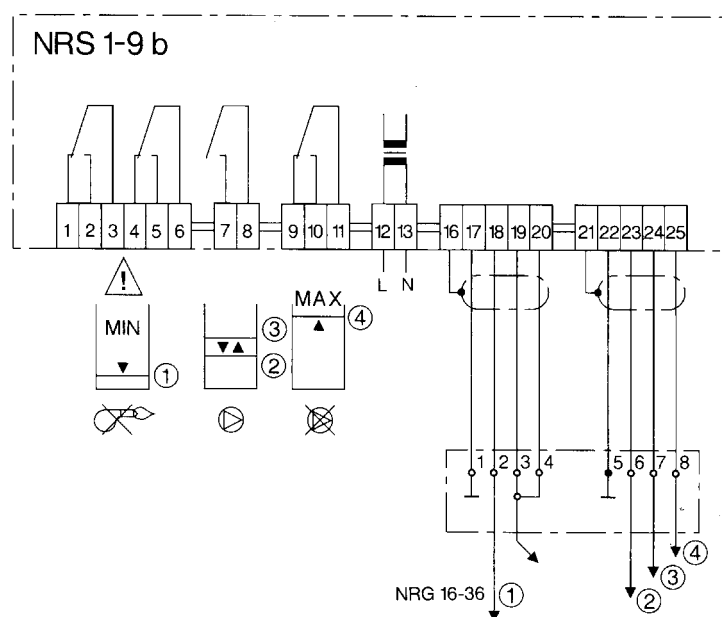
Supply in accordance with our general terms of business.

Dimensions



Dimensions of switching controller type NRS 1-9b

Wiring Diagram



Wiring diagram for switching controller type NRS 1-9b

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