

## Level Switch NRS 1-56

### Description

The NRS 1-56 level switch can be used in conjunction with various conductive level electrodes as an on-off level control system in pressurised steam and hot-water plants and in condensate and feedwater tanks.

The NRS 1-56 level switch also indicates two alarm states, which can be configured as MIN and MAX.

The NRS 1-56 level switch can be connected to the following level electrodes: NRG 1.-52 (4-rod electrode), 4 x NRG 16-4 (1-rod electrode), NRG 16-36 (4-rod electrode).

### Function

The NRS 1-56 level switch measures using the conductivity principle and makes use of the electrical conductivity of the water to do this.

The level switch is designed for different conductivities and for connection to four electrode rods in total.

The level switch functions as an interval level control system (inlet/discharge, switchable), and also indicates when the water reaches two independent alarm states, which can be configured as MIN or MAX.

The switchpoints for water level control and for the MIN or MAX levels are determined by the length of the respective electrode rods.

For water level control, the level switch recognises whether the electrode rods are immersed or out of the water and, depending on which function is set, it switches the controller output contact, which then turns the feedwater pump on or off, for example. The Pump LED lights up when the level switch has switched the feedwater pump on, for example.

### Behaviour in the event of MIN/MAX water level alarms

When the MIN or MAX water level is reached, the level switch recognises that the corresponding electrode rod is immersed or no longer immersed. When the deenergising delay has elapsed, the relevant Alarm 1/2 output contact is switched. The alarm 1/2 LED simultaneously lights up red.

### Alarm simulation

A button is pressed to begin a test sequence. During the test sequence, the MIN or MAX alarm is simulated.

### Behaviour in the event of error messages

If faults occur in the level electrode and/or the electrical connection, the integrated relays are de-energised.

Alarm and fault indications are displayed by LEDs.

### Technical data

#### Supply voltage

- 24 V DC +/-20 %

#### Power consumption

- Max. 2 VA

#### Current input

- Max. 0.2 A

#### Required external fuse

- 0.5 A M

#### Inputs for connecting level electrodes

- 4 x inputs for level electrodes: NRG 10-52, NRG 16-52; NRG 16-36, NRG 16-4, four-pin with shield

#### Electrode voltage

- 5 Vss

### Sensitivity (water conductivity at 25 °C) - switchable

- > 0.5 µS/cm < 1,000 µS/cm

or

- > 10 µS/cm < 10,000 µS/cm

### Alarm 1/Alarm 2 outputs

- 2 x volt-free relay contacts, contact material AgNi0.15, AgSnO2
- Maximum switching current - 8 A at 250 V AC / 30 V DC -  $\cos \varphi = 1$

Inductive loads must have interference suppression (RC combination) as specified by the manufacturer

### Deenergising delay of Alarm 1/2 outputs

- Factory default setting 3 seconds

### Pump output

- 1 x volt-free relay contact, contact material AgNi0.15, AgSnO2
- Maximum switching current - 8 A at 250 V AC / 30 V DC -  $\cos \varphi = 1$

Inductive loads must have interference suppression (RC combination) as specified by the manufacturer

### Indicators and controls

- 1 x button for initiating the test function
- 1 x multicolour LED "ON" (green, red) -
  - ◆ green = running
  - ◆ red = power up, malfunctions or internal error
- 1 x red "Alarm 1" LED for indicating a MIN/MAX alarm
- 1 x red "Alarm 2" LED for indicating a MIN/MAX alarm
- 1 x green "Pump" LED for indicating the ON/OFF pump status
- 1 x 4-pole code switch for setting the function and sensitivity

### Protection class

- III Safety Extra Low Voltage

### IP rating to EN 60529

- Housing: IP 40
- Terminal strips: IP 20

### Electrical safety

- Degree of contamination 2 for installation in control cabinet with protection rating IP 54, fully insulated

### Admissible ambient conditions

- Service temperature: 0 °C - 55 °C (0 °C - 55 °C at power-on)
  - Storage temperature: - 20 °C - 70 °C \*
  - Transport temperature: - 20 °C - 80 °C \* (< 100 hours)
  - Air humidity: max.95 %, non-condensing
- \* Only switch on after a 24-hour defrosting period

# Level Switch NRS 1-56

## Housing

- Housing material: Lower section of black polycarbonate (glass-fibre reinforced), front of grey polycarbonate
- 2 x 8-pole terminal strips, removable separately
- Max. cross-section per screw terminal:
  - ◆ 1 x 4.0 mm<sup>2</sup> solid, or
  - ◆ 1 x 2.5 mm<sup>2</sup> stranded with sleeve, or
  - ◆ 2 x 1.5 mm<sup>2</sup> stranded with sleeve
- Housing attachment: Mounting clip on support rail TH 35 (to EN 60715)

## Weight

- Approx. 0.2 kg

## Applicable directives:

The NRS 1-56 level switch has been tested and approved for use in the scope governed by the following directives and standards:

- Directive 2014/68/EU Pressure Equipment Directive
- Directive 2014/35/EU Low Voltage Directive
- Directive 2014/30/EU EMC Directive
- Directive 2011/65/EU RoHS II Directive

## Important notes

### Connecting the 24 V DC power supply

The NRS 1-56 level switch is supplied with 24 V DC. A safety power supply unit that delivers a Safety Extra Low Voltage (SELV) must be used to supply the equipment with 24V DC.

Use an M 0.5 A fuse as an external fuse.

### Connecting the output contacts

Use a T 2.5 A fuse to protect the switching contacts.

### Connecting the level electrodes

Use a shielded, multi-core control cable with a minimum conductor size of 0.5 mm<sup>2</sup>, e.g. LYCY 5 x 0.5 mm<sup>2</sup>.

Maximum cable length = 100 m.

Route connecting cables separately from power cables.

Please note our general terms of business.

## How to order

### Level switch

#### Type:

- NRS 1-56

#### Stock code:

3011641

## Dimensions

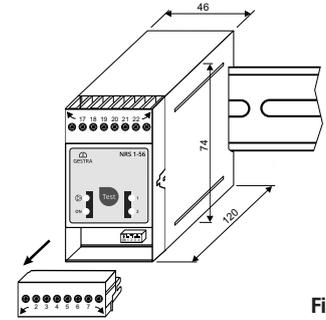
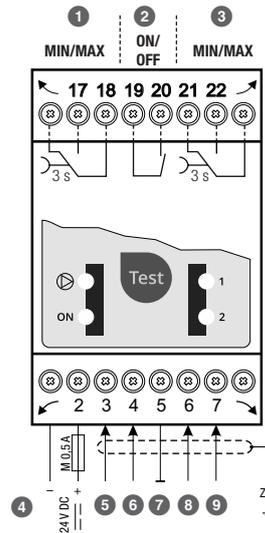


Fig. 1

## Wiring diagram



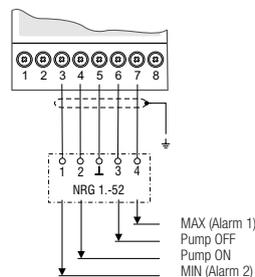
## Key

- 1 Alarm 2 MIN / MAX relay output
- 2 Pump/output contact
- 3 Alarm 1 MIN / MAX relay output
- 4 Supply voltage 24 V DC (M 0.5 A)
- 5 Alarm 2 (MIN / MAX) electrode rod
- 6 Pump 2 electrode rod (pump ON for inlet control)
- 7 Functional earth (tank for reference electrode)
- 8 Pump 1 electrode rod (pump OFF for inlet control)
- 9 Alarm 1 (MIN / MAX) electrode rod

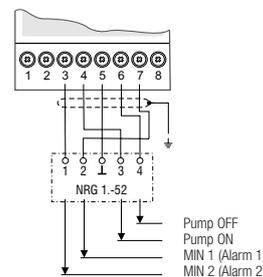
Fig. 2

## Inlet control - various level electrodes connected

MIN/MAX alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm)



MIN1/MIN2 alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm)



MIN/MAX alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm) with 4 x NRG 16-4

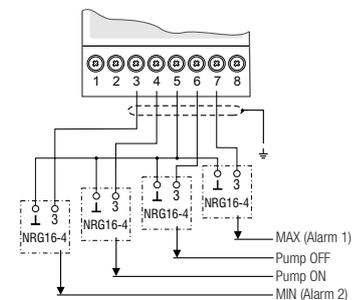
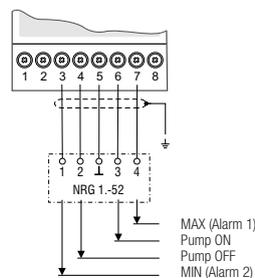


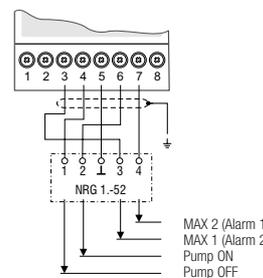
Fig. 3

## Discharge control - various level electrodes connected

MIN/MAX alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm)



MAX1/MAX2 alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm)



MAX alarm and pump (ON/OFF) / sensitivity (> 10 µS/cm) with NRG 16-36

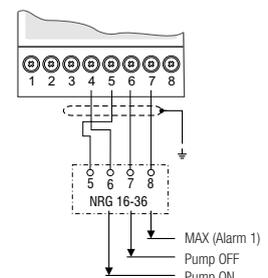


Fig. 4

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