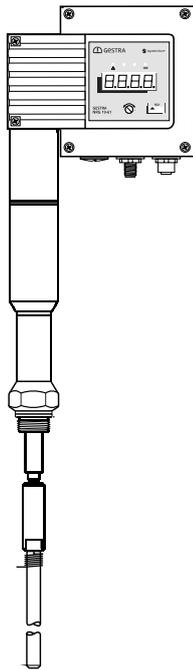
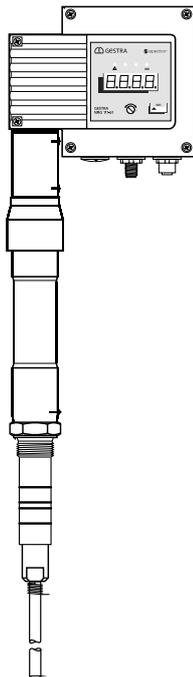

 NRG 16-61,
NRG 17-61


NRG 19-61



NRG 111-61

Level Electrodes

NRG 16-61
NRG 17-61
NRG 19-61
NRG 111-61

System description

In combination with the URS 60 / URS 61 safety control unit, NRG 1x-61 level electrodes are suitable for safety functions up to SIL 3.

They are elements of a safety circuit up to a rating of SIL 3 as per EN 61508 in the SPECTORconnect system, and can transmit alarm notifications.

The level electrode uses the principle of conductive measurement and monitors itself. This means that a fault in the electrical connection or electronic measuring equipment triggers an alarm.

Alarms and error messages are displayed by LEDs or an operating unit. They are also saved in the level electrode and transferred to the URS 60 / URS 61 safety control unit using the CANopen protocol.

The NRG 1x-61 can indicate the maximum fill level in electrically conductive fluid:

- A level with a switchpoint.
- A safety high-level limiter prevents the defined maximum high water (HW) level from being exceeded, e.g. by switching off the feedwater supply.

Visualisation and operation take place via the URB 60 or SPECTORcontrol.

Function

Conductive level measurement based on the conductivity measurement principle. Some liquid substances are conductive, i.e. electric current can flow through them. To ensure this method functions reliably, the substance being measured must have a certain minimum conductivity.

The conductive measuring process delivers two findings:

- Electrode rod immersed or electrode rod not immersed, or in other words switchpoint reached or not reached.

Before installation, the length of the electrode rod must be adapted to match the point at which switching must take place, e.g. "pump OFF" or "control valve CLOSED" or - if there is a risk to downstream heating surfaces in the steam generating unit - "firing, burner OFF".

Behaviour in the event of an alarm

- If the water rises above the maximum level, the level electrode is immersed and the URS 60 / URS 61 safety control unit triggers an alarm.
- If an additional electrode is installed, the insulated section between the measuring electrode and earth is automatically monitored. If the value is below the admissible resistance value, the safety circuit is interrupted and burner switch-off is initiated.

Automatic self-test

An automatic self-test periodically monitors the safety and function of the level electrode and measured value acquisition.

The data are transferred to the URS 60 / URS 61 safety control unit in the form of a Black Channel data telegram via the CANopen protocol using a CAN bus to ISO 11898, and saved there.

Technical data

Model and mechanical connection

- NRG 16-61 NRG 17-61 Thread G $\frac{3}{4}$ A, EN ISO 228-1
- NRG 19-61 Thread G $\frac{3}{4}$ A, EN ISO 228-1
- NRG 111-61 Thread G1 A, EN ISO 228-1

Nominal pressure rating, admissible service pressure and temperature

- NRG 16-61 PN 40 32 bar (g) at 238 °C
- NRG 17-61 PN 63 46 bar (g) at 260 °C
- NRG 19-61 PN 160 100 bar (g) at 311 °C
- NRG 111-61 PN 320 183 bar (g) at 357 °C

Materials

- Terminal box 3.2581 G AISi12, powder-coated
- Sheath 1.4301 X5 CrNi 18-10
- Electrode extension 1.4401 X5 CrNiMo 17-12-2
- Electrode insulation
 - ◆ NRG 16-61, NRG 17-61 PEEK
 - ◆ NRG 19-61 PEEK and PTFE
 - ◆ NRG 111-61 Special ceramic

Screw-in body:

- ◆ NRG 16-61, NRG 17-61, NRG 19-61 1.4571, X6CrNiMoTi17-12-2
- ◆ NRG 111-61 1.4529, X1NiCrMoCuN25-20-7

pH value

- NRG 111-61 Maximum admissible = 10

Electrode lengths supplied

- 500 mm, 1000 mm, 1500 mm
- The electrode extension can be shortened

Conductivity range at 25 °C

- NRG 16-61, NRG 17-61, NRG 19-61 0.5 μ S/cm to 10,000 μ S/cm
- NRG 111-61 0.1 μ S/cm to 100 μ S/cm, with measuring surface extension

Sensitivity

- 0.1 μ S/cm at an immersion depth of 5 mm, with measuring surface extension

Supply voltage

- 24 V DC \pm 20 %

Power consumption

- max. 7 VA

Current input

- max. 0.3 A

Internal fuse

- T2A

Level Electrodes

NRG 16-61

NRG 17-61

NRG 19-61

NRG 111-61

Safety cutout at excessive ambient temperature

- Shutoff takes place at an excessive ambient temperature of $\geq 75\text{ °C}$

Electrode voltage

- Approx. 2 VSS at no load

Input/output

- Interface for CAN bus to ISO 11898, CANopen, insulated
- M12 CAN bus connector, 5-pole, A-coded
- M12 CAN bus socket, 5-pole, A-coded

Indicators and controls

- 1 x 4-digit green 7-segment display for showing status information
- 1 x red LED for indicating an alarm
- 1 x green LED for indicating OK
- 1 x rotary knob IP65 with button for menu navigation and test function

Protection class

- III Safety Extra Low Voltage (SELV)

IP rating to EN 60529

- IP 65

Admissible ambient conditions

- Service temperature: $0\text{ °C} - 70\text{ °C}$
- Storage temperature: $-40\text{ °C} - 80\text{ °C}$
- Transport temperature: $-40\text{ °C} - 80\text{ °C}$
- Air humidity: $10\% - 95\%$ non-condensing

Weight

- NRG 16-61, NRG 17-61, NRG 19-61 approx. 2.1 kg
- NRG 111-61 approx. 2.7 kg

Admissible installation positions

- Vertical
- Oblique to a maximum inclination of 45° . In this case, the length of the electrode rod is limited to 1000 mm maximum.

Applicable directives:

NRG 16-61, NRG 17-61, NRG 19-61 and NRG 111-61 level electrodes have been tested and approved for use in the area governed by the following directives and standards:

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

Please note our terms of sale and delivery.

Notes for planning

A shielded, multi-core, twisted-pair control cable, e.g. UNITRONIC® BUS CAN $2 \times 2 \times \dots \text{ mm}^2$ or RE-2YCYV-fl $2 \times 2 \times \dots \text{ mm}^2$ must be used as the bus line.

Pre-wired control cables (with plug and coupling) are available as accessories in various lengths.

The baud rate (transfer rate) is determined by the cable length between the bus terminal devices, and the wire cross-section is determined by the overall power input of the measuring sensors.

0.2 A at 24 V is required per sensor. With five sensors, there is therefore a voltage drop of approx. 8 V per 100 m when using cables of 0.5 mm^2 . In this case, the system is operating at its limits.

With five or more sensors and a cable length of $\geq 100 \text{ m}$, the wire cross-section needs to be doubled to 1.0 mm^2 .

At larger distances of $> 100 \text{ m}$, the 24 V DC supply can also be connected on site.

If a level electrode is installed in a lockable level pot outside the boiler, the connecting pipes must be flushed regularly. An SRL 6-60 monitoring unit is additionally required to monitor the flushing times and flushing process.

How to order:

Level electrode

Type:	Stock code:		
NRG 16-61	38410..	xx	
NRG 17-61	38420..	xx	
NRG 19-61	38430..	xx	
NRG 111-61	38440..	xx	

Installed length L (mm)			xx
L1	+	L2	
NRG 16-/17-61		0	40
L1 = 90 mm		500	41
		1000	42
NRG 19-61		1500	43
L1 = 140 mm			
NRG 111-61			
L1 = 136 mm			
Measuring surface extension			82

Fig. 1

Additional modules:

- Safety control unit URS 60
- Safety control unit URS 61
- Visual display and operating unit URB 60 or SPECTORcontrol
- Monitoring unit SRL 6-60

Dimensions

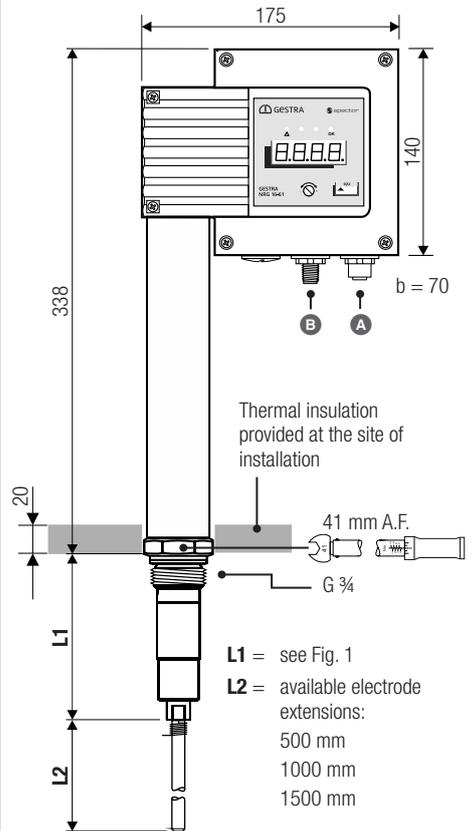


Fig. 2

Connections

- A M12 CAN bus socket, 5-pole, A-coded
- B M12 CAN bus connector, 5-pole, A-coded

Wiring diagram of CAN bus system

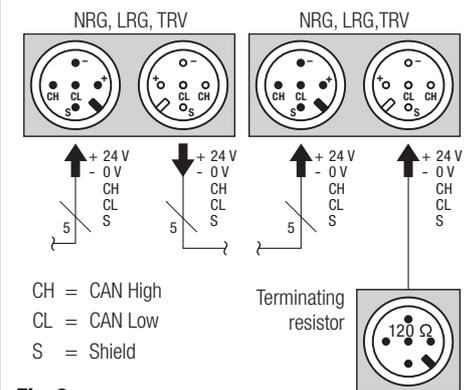


Fig. 3

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