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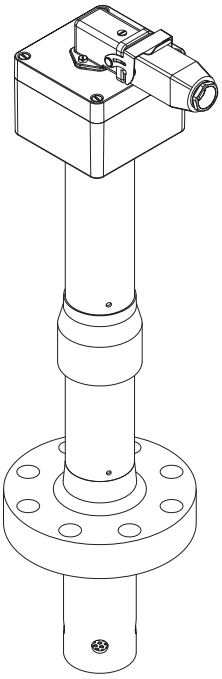

Level Electrode

NRG 29

EN
English

Installation & Operating Manual

851115-00

Contents

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Intended use

The NRG 29 level electrode is used to measure the water level in condensate lines. In combination with the NRS 2-4 level switch, the electrode is used as a limit switch with MAX alarm for draining turbines, for example.

Function

The level electrode with NRV 2-30 electronic circuit board uses the capacitance measurement principle and converts the changes in level into a level-dependent voltage signal.

The electrode is designed to be self-monitoring, i.e. a leaking insulator will result in a fault indication.

In combination with the NRS 2-4 level switch, the level electrode detects when the maximum level has been reached. Combined in this way, it can be used in power plants as part of a controlled drainage system.

Safety note

The equipment may only be installed, wired and brought into service by qualified and competent staff.

Retrofitting and maintenance work may only be performed by authorised staff who have undergone specific training.

Danger

Steam or hot water can escape when the electrode is unscrewed!
Risk of severe scalding all over the body!
Only dismantle the electrode when the boiler pressure is 0 bar.

The electrode is hot during operation!
Risk of severe burns to hands and arms.
Make sure that equipment is cold before carrying out installation and maintenance work.

Attention

The name plate indicates the technical features of the equipment. Do not bring into service or operate any equipment that does not bear its own specific rating plate.

Improper use

Use in potentially explosive atmospheres

Do **not** use the equipment in potentially explosive atmospheres.

Technical data

NRG 29

Level electrode
pressure and temperature ratings

Admissible operating pressure	bar	100
	psi	1451
Admissible operating temperature	°C	311
	°F	592

Mechanical connection

Electrode	Special flange	Identical design to
NRG 29	PN 160/DN 50	MRV 19
NRG 29 N	PN 160/DN 50 with tongue and groove	MRV 19 N
NRG 29 L	PN 160/DN 50	MRV 19 L

Material of electrode and adapter flange
1.5415

Materials of other parts in contact with fluid

Protective tube	1.0345
Strainer	1.4571
Electrode rod insulation	Special ceramic
Flange seal	See table, **Fig. 3**

Fluid conductivity
0.01-200 µS/cm

pH value
Maximum admissible: 10

Weight
Level electrode

NRG 29:	approx. 8.2 kg
NRG 29 N:	approx. 8.3 kg
NRG 29 L:	approx. 4.1 kg

Adapter flange for MRV 19 replacement:	approx. 6.3 kg
Adapter flange for MRV 19 N replacement:	approx. 6.2 kg
Adapter flange for MRV 19 L replacement:	approx. 2.1 kg

Electronic circuit board NRV 2-30
supply voltage
12 V DC+/-10%

Output
U_M = 0 - 10V DC

Housing
Terminal box: painted aluminium.

Electrical connection
Six-pin connector, cable glands Pg 11

Protection
IP 54 to EN 60529

Admissible ambient temperature
0 °C to + 70 °C

Technical data

Product package

NRG 29
1 level electrode NRG 29
2 Kammprofile gaskets
1 adapter flange with fitting materials
1 Installation & Operating Manual

Example name plate/identification

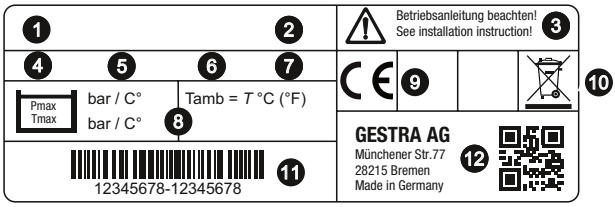


Fig. 1

1. Equipment designation
2. Function symbol
3. Safety note
4. Nominal pressure rating
5. Connection thread
6. Material of screw-in thread
7. IP rating
8. Maximum pressure and temperature ratings
9. Mark of conformity
10. Disposal information
11. Material number-serial number
12. Manufacturer

Installation

Dimensions of the NRG 29

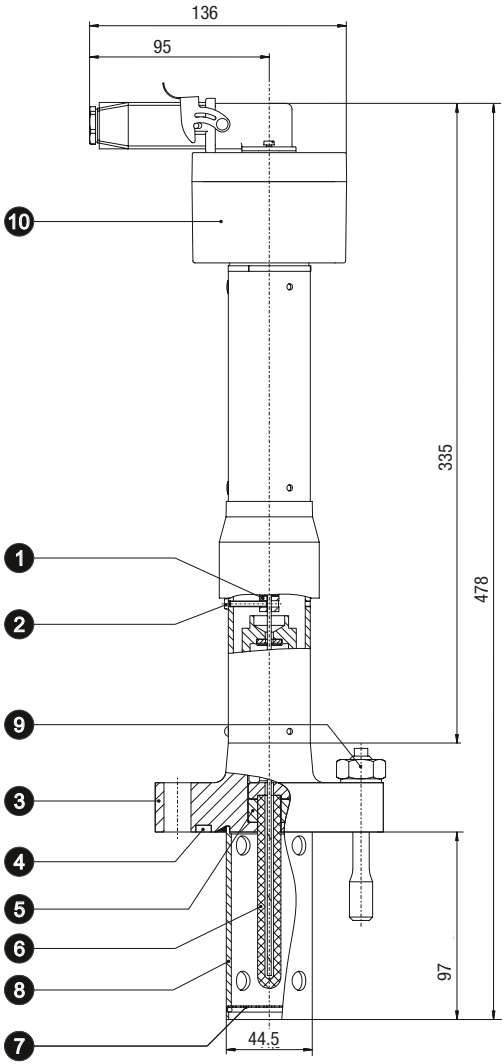


Fig. 2

Key

1. Transport lock
2. Locking screw
3. Flange
4. Groove for gasket
5. Stuffing box
6. Measurement electrode
7. Strainer
8. Protective tube
9. Expansion pin
10. Terminal box with electronic circuit board

Note

- Dimensional check required before installation: The insertion depth and inside diameter of the weld-on coupling must match the dimensions of the drawing in **Fig. 3**.
- For plants with a monitoring system, the relevant regulations must be complied with. For on-site connections, see the Technical Data and Installation & Operating Manual.
- The Kammprofile gasket has a serrated core with a layer of graphite on both sides. It must not be removed.

Attention

- Handle the level electrode with care and do not drop it.
- Do not subject the electrode rod to hard impacts.
- Only use the supplied gasket.
- Coat the thread of the expansion pin with lubricant (e.g. OKS 217) and insert.
- Do not insulate the electrode body along with the pipe!
- If the level electrode is removed for maintenance, it must be stored vertically.

NRG 29

1. Check the sealing surfaces. Clean the sealing surface of the flange.
2. Insert the gasket in the groove in the weld-on coupling.
3. Insert the level electrode in such a way that the connector on the terminal box is facing down.
4. Tightening torques:

   NRG 29 and NRG 29 N: Tighten the expansion pins crosswise evenly to 100 Nm, then evenly to 250 Nm. Tighten to 250 Nm once again after roughly one day of use.

   NRG 29 L: Tighten the expansion pins crosswise evenly to 40 Nm.
   Tighten to 40 Nm once again after roughly one day of use.
5. Fully unscrew the locking screw ❷ of the transport lock ❶.

Tools

- Open-ended spanner to DIN 3110, ISO 3318

  Size:
  NRG 29 / 29 N: Size 36
  NRG 29 L: Size 22

Installation examples

Dimensions for installation

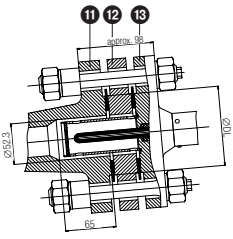
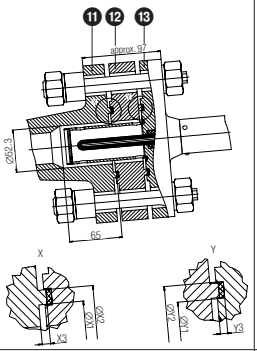
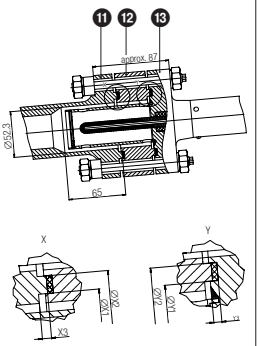
		NRG 29	NRG 29 N	NRG 29 L
Flange:				
Pitch circle ∅	mm	145	145	95
Hole ∅	mm	26	26	14
No. of holes	qty.	4	4	8
Electrode flange thickness	mm	30	30	25.5
DL Sealing strip ∅	mm	102	n/a	n/a
Y1 Groove inside ∅	mm	n/a	72	60
Y2 Groove outside ∅	mm	n/a	88	76
Y3 Groove depth	mm	n/a	3.5	3.5
X1 Tongue inside ∅	mm	n/a	73	61
X2 Tongue outside ∅	mm	n/a	87	75
X3 Tongue height	mm	n/a	4	4
Gasket		1.7335/graphite	1.5415/graphite	1.7335/graphite

Fig. 3

Key

⓫ Coupling provided on site

⓬ Adapter flange

⓭ Electrode flange

Electrical connection

Connecting the level electrode

To connect the equipment, please use a shielded, multi-core control cable with a minimum conductor size of 0.5 mm^2, e.g. LiYCY 4 x 0.5 mm^2, maximum length 500 m.

Connect the shield to the CEP (central earthing point) at the control cabinet end. Wire the terminal strip as shown in the wiring diagram. **Fig. 5**

The shield must be galvanically isolated from the safety wire potential.

Attention

- Please refer to the Installation & Operating Manuals of the NRS 2-4 level switch.
- Route the connecting cable to the level electrode separately from power lines.

Tools

- 6 mm screwdriver, fully insulated to EN IEC 60900

Electrical connection continued

NRV 2-30

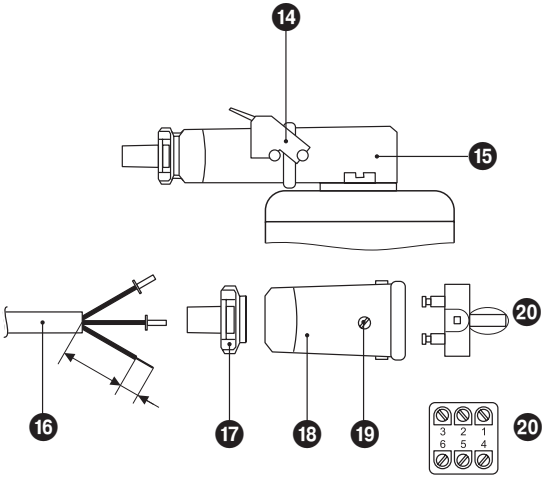


Fig. 4

Wiring diagram

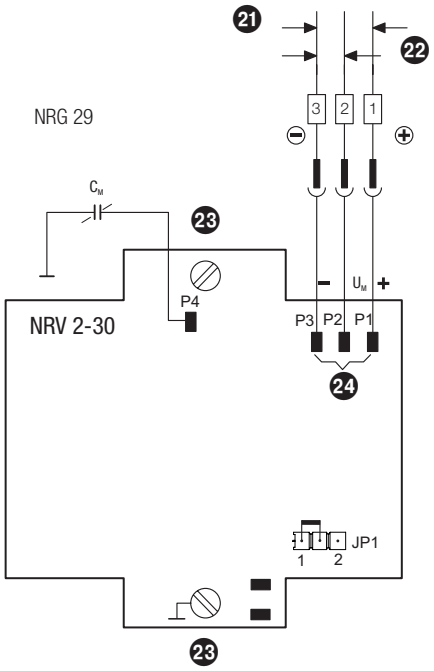


Fig. 5

Electrical connection continued

NRV 2-30, wiring the terminal strips

1. Push the retaining bracket ⓮ up and pull the upper part of the connector ⓲ off the level electrode.
2. Unscrew the screw ⓳ and push the contact insert ⓴ out of the upper part of the connector ⓲.
3. Unfasten the cable gland ⓱.
4. Guide the cable ⓰ through the cable gland ⓱, ring, gasket and upper part of the connector ⓲.
5. In the contact insert ⓴, wire the terminals as shown in **Fig. 5**.
6. Press the contact insert ⓴ into the upper part of the connector ⓲.
7. Re-insert the screw ⓳ into the hole and tighten. This secures the contact insert ⓴ in the upper part of the connector ⓲.
8. Tighten the cable gland ⓱.
9. Insert the connector upper part ⓲ in the connector lower part ⓯ and pull the retaining bracket ⓮ down to secure.

Key

⓮ Retaining bracket
⓯ Connector lower part
⓰ Cable
⓱ Cable gland
⓲ Connector upper part
⓳ Screw
⓴ Contact insert
㉑ Supply voltage 12 V DC
㉒ Measuring voltage 0 – 10 V DC
㉓ Screws of electronic circuit board
㉔ Connection pins

Bringing into service

Note

The NRG 29 level electrode and NRS 2-4 (MAX) level switch make up one functional unit and can therefore only be operated and checked together.

You can find information on bringing into service, faults and how these can be remedied in the Installation & Operating Manual for the NRS 2-4 level switch.

Switching on the supply voltage

Please check that the level electrode is connected as shown in the wiring diagram (**Fig. 5)** and switch on the supply voltage of the connected NRS 2-4 level switch.

Checking the switching function

Check the “High Level (MAX)” switching function. To do this, fill the plant above the set maximum water level. The “High Level (MAX)” LED on the NRS 2-4 level switch must light up and the relevant function must be initiated in the sequential circuit.

Troubleshooting

Danger

The terminal strip of the level switch is live during operation!
There is a risk of serious injury due to electric shock.
Always cut off power to the equipment and ensure it is **not live** before working on the terminal strip (installation, removal connecting lines) and before pulling out the 19" slide in unit.

Attention

Please check the following before diagnosis:

Supply voltage:
Is the level electrode supplied with the voltage specified on the name plate?

Wiring:
Does the wiring conform to the wiring diagram?

Indications, diagnosis and remedies

Error indications on the NRS 2-4 level switch		
Indication	**Fault**	**Diagnosis and remedies**
Operation LED does not light up.	No supply voltage.	Switch on the supply voltage. Check all electrical connections.
Faulty level electrode LED and **High Level MAX** LED light up	The locking screw on the level electrode has not been removed.	Remove the locking screw.
	Faulty level electrode (insulator, stuffing box).	On the NRS 2-4, measure the voltage at C18/A18. On the NRG 29, measure the voltage at terminals 2 and 3. If the voltage is ≥ 9 V, replace the level electrode.
Cable malfunction LED lights up	Faulty connecting cable to the level electrode (short circuit, open circuit).	On the NRS 2-4, measure the voltage at C18/A18. On the NRG 29, measure the voltage at terminals 2 and 3. If the voltage is ≤ 1 V, check the connecting cable/electrical connection.

Checking voltages

Check the supply and measuring voltages of the level electrode. These voltages can be measured on the level electrode or the level switch. **Fig. 5**

Voltages	**Diagnosis**
12 V DC	Supply voltage
≤ 0 V – 1 V DC	Faulty connecting cable to the level electrode (short circuit, open circuit).
= 1 V – 4 V DC	Level electrode no longer immersed
= 4 V – 7 V DC	Level electrode submerged, High Level (MAX)
≥ 9 V DC	Faulty level electrode (insulator, stuffing box)

Troubleshooting continued

Replacing the electronic circuit board

1. Push the retaining bracket ⓮ up and pull the upper part of the connector ⓲ off the level electrode. **Fig. 4**
2. Undo the four cover screws and remove the cover from the terminal box.
3. Detach all cables from the connection pins.
4. Fully unscrew the screws ㉓ and take out the electronic circuit board. **Fig. 5**
5. Insert a new electronic circuit board and screw the screws ㉓ back in.
6. Reconnect all cables to the connection pins.
7. Put the cover back on the terminal box and tighten the four cover screws.
8. Insert the connector upper part ⓲ in the connector lower part ⓯ and pull the retaining bracket ⓮ down to secure.

Maintenance

Safety note

The equipment may only be installed, wired and brought into service by qualified and competent staff.

Retrofitting and maintenance work may only be performed by authorised staff who have undergone specific training.

Danger

Steam or hot water can escape when the level electrode is unscrewed!
Risk of severe scalding all over the body!
Only remove the level electrode when the boiler pressure is 0 bar.

The level electrode is hot during operation!
Risk of severe burns to hands and arms.
Make sure that equipment is cold before carrying out installation and maintenance work.

Note

■ If the level electrode is removed for maintenance, it must be stored vertically.

Checking the ceramic insulator

The ceramic insulator of the measurement electrode ❼ must be inspected for cracks after no more than two years.

To do this, remove the electrode. The equipment may only be installed and removed by qualified specialist staff.

Undo the snap ring for the strainer ❽ **Fig. 2** and take it out. If you see cracks in the insulator, replace the level electrode.

If you do not see any cracks, reinsert the strainer ❽ and secure it with the snap ring. Reinstall the electrode. Pay attention to the notes in the “Installation” section on page 9.

Removing and disposing of the level electrode

Removing and disposing of the NRG 29 level electrode

1. Switch off the supply voltage.
2. Push the retaining bracket ⓮ up and pull the upper part of the connector ⓲ off the level electrode. **Fig. 4**
2. Make sure the equipment is not hot or under pressure before dismantling it.

Dispose of the level electrode in accordance with statutory waste disposal regulations.

Declaration of Conformity; Standards and Directives

You can find details on the conformity of the equipment and the relevant standards and directives, where applicable, in the Declaration of Conformity and associated certificates or approvals.

The valid Declaration of Conformity is available to download at www.gestra.com.
You can request the associated certificates and approvals by writing to the following address:

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28215 Bremen
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Modifications to the equipment not approved by us will invalidate the Declarations of Conformity, certificates and approvals.

In the event of malfunctions or faults that cannot be remedied with the aid of this Installation & Operating Manual, please contact our service centre or authorised agent in your country.

You can find our authorised agents around the world at: **www.gestra.com**

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