FLOWSERVE GESTRA

GESTRA Steam Systems

NRGS 11-2
NRGS 16-2

GB

Installation Instructions 810366-01

Level Electrode Types
NRGS 11-2, NRGS 16-2

spector compact

Contents

Contents continued

Important Notes

Usage for the intended purpose

Use level electrodes NRGS 11-2 and NRGS 16-2 only for indicating liquid levels.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff. Retrofitting and maintenance work must only be performed by qualified staff who – through adequate training – have achieved a recognised level of competence.

Danger

When loosening the electrode steam or hot water might escape.
This presents the danger of severe scalds to the whole body.
It is essential not to mount or dismantle the electrode unless the boiler pressure is verified to be 0 bar. The electrode becomes hot during operation. Touching the hot equipment presents the risk of severe burns to hands and arms. All installation and maintenance work must only be performed when the equipment is cold.

The terminal strip of the NRGS 11-2, NRGS 16-2 is live during operation.
This presents the danger of electric shock.
Cut off power supply before fixing or removing the housing cover.

Attention

The name plate specifies the technical features of the equipment. Note that any piece of equipment without its specific name plate must neither be commissioned nor operated.

ATEX (Atmosphère Explosible)

According to the European Directive 94/9/EC the equipment must not be used in potentially explosive areas.

Explanatory Notes

Scope of supply

NRGS 11-2
1 Compact system type NRGS 11-2
1 Joint ring (of stainless steel 1.4301) D 33 x 39 to DIN 7603
1 Installation manual

NRGS 16-2
1 Compact system type NRGS 16-2
1 Joint ring (of stainless steel 1.4301) D 33 x 39 to DIN 7603
1 Installation manual

Explanatory Notes continued

System description

The compact system NRGS 11-2, NRGS 16-2 works according to the conductivity measurement principle. With the NRGS 11-2, NRGS 16-2 a maximum of 3 levels can be signalled in conductive liquids:

■ Low level alarm, pump ON, pump OFF with a normally open contact

The NRGS 11-2 / NRGS 16-2 has its level switch integrated in the electrode case for the control of all functions. An external switching device is **not** required.

The NRGS 11-2 / NRGS 16-2 has two electrode tips for the detection of low water level. The signalling of the low-level alarm is effected via two separate switching channels.

Function

The conductivity of the liquid is used to signal the liquid level. Some liquids are conductive, which means that they allow an electric current to flow through them. For the safe functioning of this device a minimum conductivity of the liquid to be measured is required.
The conductivity measurement method can detect two conditions: electrode tip submerged or exposed, meaning switchpoint reached or not reached. Before installation, the length of the electrode tip must be cut to the required switching levels, e. g. for max./min. alarm, controlling of a valve or pump.

Designs

NRGS 11-2: Screwed design 1" BSP, EN ISO 228-1, PN 6.
NRGS 16-2: Screwed design 1" BSP, EN ISO 228-1, PN 40. **Fig. 1**

Technical Data

NRGS 11-2, NRGS 16-2

Type approval n°
TÜV · WR/WB · 02-392

Max. service pressure
NRGS 11-2: 6 bar g at 159 °C, NRGS 16-2: 32 bar g at 238 °C

Connections
Screwed 1", EN ISO 228-1

Materials

Terminal box	Die cast aluminium 3.2161 G AlSi8Cu3
Stem	S.S. 1.4571 CrNiMoTi17-12-2
Housing	1.4571
Flange	Forget steel 1.0460 C22.8
Measuring electrodes	S.S. 1.4571 CrNiMoTi17-12-2
Electrode insulation	PTFE
Spacer disc	PTFE

Technical Data continued

NRGS 11-2, NRGS 16-2 continued

Lengths supplied
500 mm
1000 mm
1500 mm

Mains supply
230 V +/– 10 %, 50/60 Hz
115 V +/– 10 %, 50/60 Hz
24 V +/– 10 %, 50/60 Hz (option)

Power consumption
5 VA

Fuse
Thermal fuse T_{max} = 102 °C

Sensitivity
Range 1: 10 µS/cm
Range 2: 0.5 µS/cm

Electrode voltage
10 V_{ss}

Output
4 volt-free relay contacts for low level alarm, 1 normally open contact (e.g. for pump).
Max. contact rating with a switching voltage of 24 V, 115 V and 230 V a. c.: resistive 4 A, inductive 0.75 A at cos φ 0.5.
Max contact rating with a switching voltage of 24 V d. c.: 4 A.
Contact material: silver, hard-gold plated.

Indicators and adjustors
2 red LEDs for signalling “Low water”,
1 green LED for signalling “Pump ON”,
1 four-pole code switch for changing sensitivity,
1 button “TEST” for checking low-level alarm
1 button “RESET” for resetting the low-level alarm

Cable entry
Cable gland with integral cable clamp
M 16 (PG 9)
M 20 (PG 16)

Protection
IP 65 to DIN 40050

Max. admissible ambient temperature
70 °C

Weight
approx. 0.8 kg

Technical Data continued

Corrosion resistance

Provided that the equipment is used for its intended purpose, its safety is not impaired by corrosion.

Sizing

The body must not be subjected to sharp increases in pressure. Welds and flanges of the electrode are designed to withstand dynamic loading (bending and alternating stress). The dimensional allowances for corrosion reflect the latest state of technology.

Name plate / marking

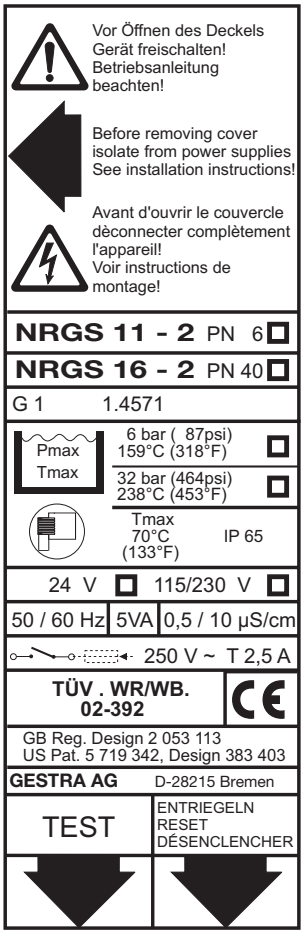


Fig. 1

Dimensions

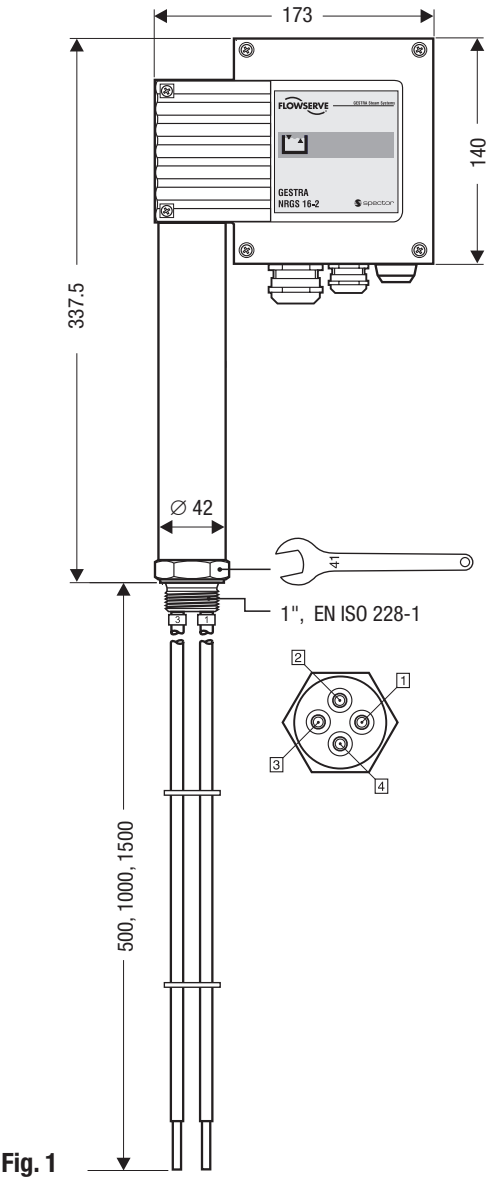


Fig. 1

Design

NRGS 11-2, NRGS 16-2

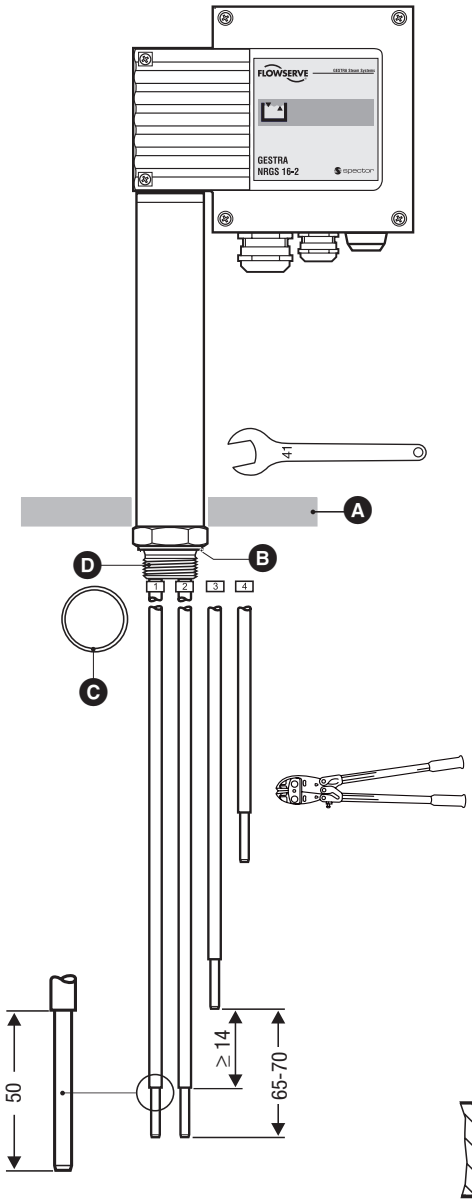


Fig. 2

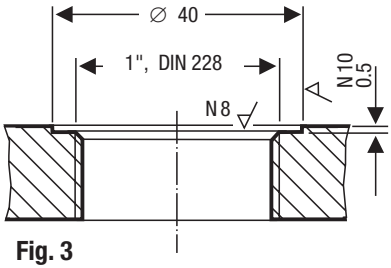


Fig. 3

Functional Elements

NRGS 11-2, NRGS 16-2

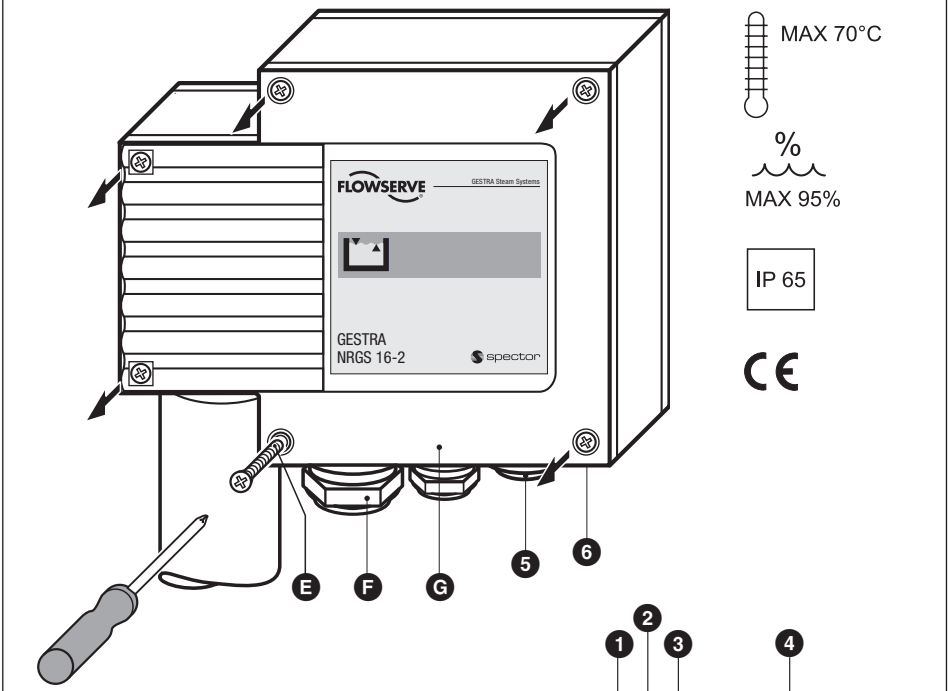


Fig. 4

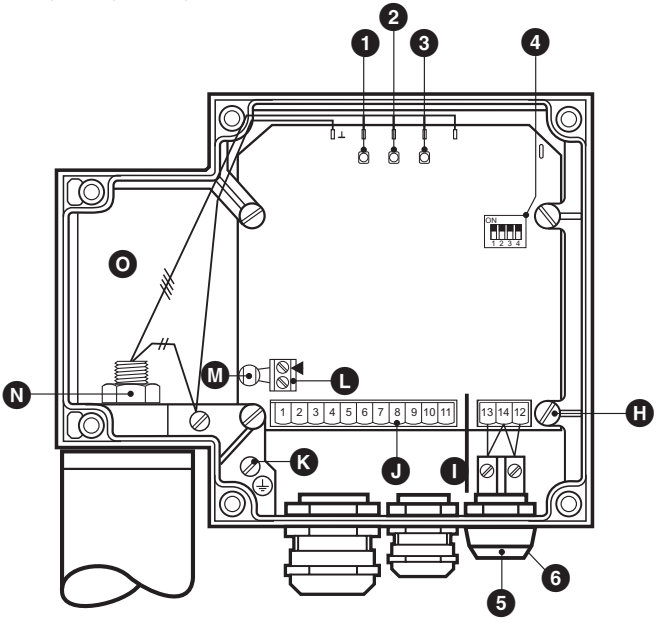


Fig. 5

Design / Functional Elements continued

Key

1. LED „Low-level alarm“
2. LED “Low-level alarm”
3. LED “Pump ON”
4. Code switch “Measuring range”
5. Button “TEST”
6. Button “RESET”

A. Thermal insulation, provided on site, ∅ = 20 mm (outside of thermal insulation of steam boiler)
B. Seating surface
C. Joint ring (of stainless steel 1.4301) D 33 x 39 to DIN ISO 7603
D. Electrode thread 1", EN ISO 228-1
E. Housing screws M4
F. Cable entry PG 9 / PG 11
G. Housing cover
H. Fixing screws for cover plate
I. Separating segment
J. Terminal strip
K. PE connection
L. Terminal strip ‘Test’
M. Thermal fuse T_{max} 102 °C
N. Plug
O. Cover plate

Installation

NRGS 11-2, NRGS 16-2

1. Determine required measuring lengths of electrode tips and enter data in **table 1, Fig. 2.**
2. Cut electrode tips [1], [2], [3] and [4] accordingly.
   The electrode tips [1] and [2] (low level limiter) must have the same length.
3. Deburr faces of electrode tips.
4. Strip off 50 mm of PTFE insulation from the ends of electrode tips.
5. Check seating surfaces of threads or flange provided on vessel or boiler standpipe. **Fig. 3**
6. Place joint ring Ⓒ onto seating surface Ⓑ of electrode **Fig. 2**. Use only joint ring (of stainless steel 1.4301) D 33 x 39 to DIN 7603 supplied with electrode.
7. Apply a light smear of silicone grease (e. g. DOW Corning 111 Compound) to electrode thread Ⓓ.
8. Screw level electrode into threads or flange provided on vessel or boiler standpipe and tighten with a 41 mm open-end spanner. The torque required is 140 Nm when cold.

Table 1

Function	Function	Electrode tip	Length [mm]
Low-level alarm		1	
Low-level alarm		2	
e. g. Pump ON		3	
e. g. Pump OFF		4	

Enter data here!

Attention

- The seating surfaces of the threads or flange provided on the vessel or boiler standpipe must be accurately machined. **Fig. 3**
- Do not bend electrode tip when mounting.
- Do not lag electrode body.

Note

- For the approval of the boiler standpipe with connecting flange the relevant local and national regulations must be considered.
- See four examples of installation on page 13.

Tools

- Open-end spanner 41 mm A. F.
- Bolt cutter
- Hacksaw
- Flat file, medium cut

Examples of installation

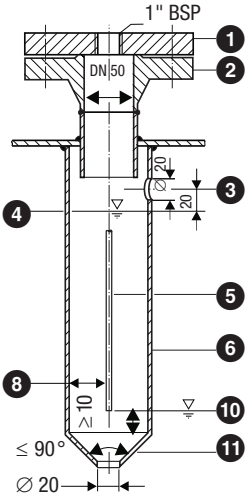


Fig. 6

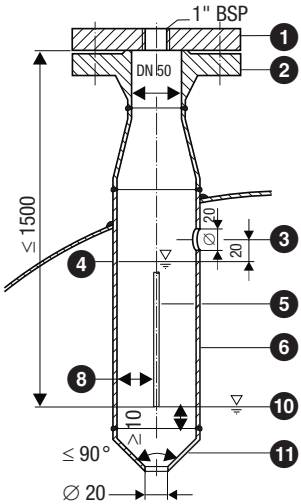


Fig. 7

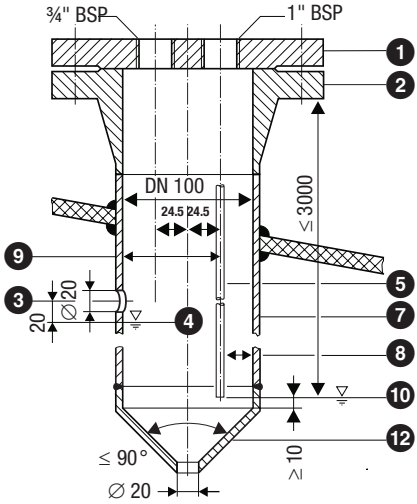


Fig. 8

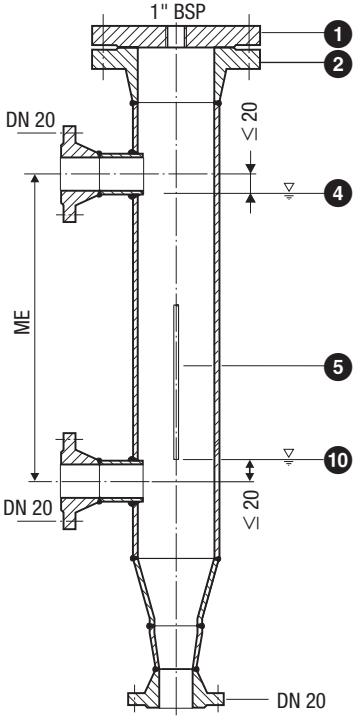


Fig. 9

Key

1. Flange PN 40, DN 50 (2"), DIN 2527
   Flange PN 40, DN 100 (4"), DIN 2527
2. For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.
3. Vent hole
4. High water (HW)
5. Electrode tip ∅ = 5 mm
6. Protection tube DN 80
7. Protection tube DN 100
8. Electrode distance ≥ 14 mm
9. Electrode distance ≥ 40 mm
10. Low water (LW)
11. Reducer K-88.9 x 3.2 – 42.4 x 2.6 W to DIN 2616, part 2
12. Reducer K-114.3 x 3.6 – 48.3 x 2.9 W to DIN 2616, part 2

Wiring

NRGS 11-2, NRGS 16-2

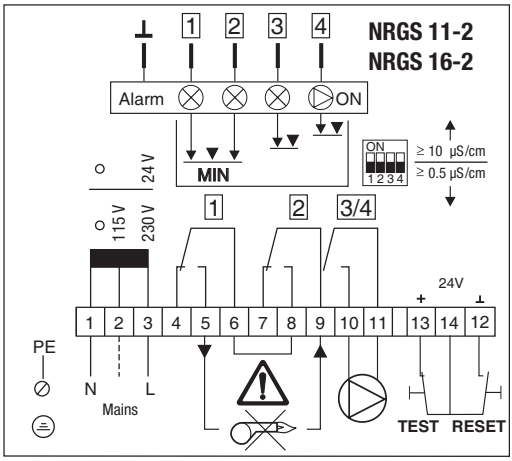
Use multi-core flexible control cable with min. conductor size 1.5 mm² for wiring.

1. Unscrew screws Ⓔ, remove housing cover Ⓖ **Fig. 4**
2. Unscrew union nuts of cable entry Ⓕ.

The electrode terminal can be turned through +/- 180°.

3. Loosen plug Ⓝ with 17 mm open-end spanner but do not remove. **Fig. 5**
4. Turn electrode terminal into desired direction (+/- 180°).
5. Tighten plug Ⓝ slightly.
6. Remove terminal strip Ⓙ from board.
7. Connect terminal strip according to wiring diagram, connect PE connection Ⓚ.
8. Plug in terminal strips Ⓙ.
9. Install cable entry Ⓕ.
10. Replace housing cover Ⓖ, fasten screws Ⓔ and install cable entry.

Wiring diagram



Relays are shown in the "power-off" position (alarm condition)

Fig. 10

Attention

- Fuse supply cables with T 2.5 A.

Tools

- Screwdriver for cross head ("Phillips") screws, size 1
- Screwdriver for slotted screws, size 2.5; completely insulated according to VDE 0680
- Open-end spanner 17 mm A. F.

Basic Settings

Factory setting

The compact system is delivered with the following default factory settings:

- Measuring range $\geq$ 10 µS/cm²

Switch selection of measuring range

The measuring range can be switch selected between ≥ 0.5 µS/cm und ≥ 10 µS/cm by means of the code switch ❹:

1. Unscrew screws Ⓔ at the electrode terminal, remove cover Ⓖ, **Fig. 4, Fig. 5**
2. Undo screws Ⓗ and remove cover plate Ⓞ.

   Code switch 1 – 4 OFF 

   Measuring range $\geq$ 0.5 µS/cm.

   Code switch 1 – 4 ON 

   Measuring range $\geq$ 10 µS/cm.

3. Put cover plate Ⓞ in place and use screws Ⓗ to fix it.
4. Replace cover Ⓖ and fasten screws Ⓔ.

Attention

- Do not damage the electronic components when setting the code switch.

Tools

- Screwdriver for cross head (“Phillips”) screws, size 1
- Screwdriver for slotted screws, size 2.5; completely insulated according to VDE 0680

Commissioning

Warning

The terminal strip of the NRGS 11-2, NRGS 16-2 is live during operation.
This presents the danger of electric shock.
Cut off power supply before removing or replacing housing cover.

Wiring check

1. Check whether the system NRGS 11-2, NRGS 16-2 has been wired according to wiring diagram **Fig. 10**.
2. Check whether mains supply corresponds to the wiring of the equipment.

Application of mains voltage

1. Switch on mains supply and check the correct functioning of the equipment at the corresponding switchpoints.
   LEDs ❶, ❷, ❸ are provided for visual check of switchpoints. **Fig. 5**

Remove housing cover ❻ to check LEDs ❶, ❷, ❸. See **Fig. 4 and 5**

Check assignment of switching functions

1. Check the switching function “Low level alarm” of the electrode tips 1 and 2.
   For this test the level in the vessel must fall below the low level mark.
   The low-level alarm must then be activated by the level switch.
2. Check the switching functions “Pump ON” and “Pump OFF”. **See table 1**.

Check low-level alarm

The function of the low-level alarm can be simulated by pushing the button “TEST” ❺ . **Fig. 5**
The low-level alarm must then be activated.

Operation

Resetting low-level alarm

You can reset an activated low-level alarm by pushing the RESET button ❻. **Fig. 5**

Troubleshooting

Fault finding list

Level has exceeded switchpoint “High Water” – no function

Fault: Mains voltage has not been applied.
Remedy: Apply mains voltage. Wire equipment according to the wiring diagram.

Fault: The thermal fuse has been triggered.
Remedy: In case of defective thermal fuse the mains voltage has not been connected to terminal ❶:
Replace defective thermal fuse (Order No. 051629)
The ambient temperature must not exceed 70 °C.

Fault: The electric conductivity is too low.
Remedy: Set code switch ❹ to ≥ 0.5 µS/cm.

Fault: The electrode housing does not have earth connection to the boiler.
Remedy: Clean seating surfaces and insert metal joint ring (of stainless steel 1.4301) 33 x 39 to DIN 7603. Do not insulate compact system with hemp or PTFE tape!

Fault: Electronic board is defective.
Remedy: Replace board, Order No. 391556 (115/230 V a.c.), 391636 (24 V a.c.).

Level has fallen below switchpoint “Low Water” – no function

Fault: The electrode tips have earth contact.
Remedy: Change installation position.

Fault: The vent hole in the protection tube does not exist, is obstructed or flooded.
Remedy: Check protection tube and, if necessary, provide vent hole.

Fault: The isolating valves of the external measuring pot (optional extra) are closed.
Remedy: Open isolating valves.

Switchpoint has been reached – incorrect function

Fault: The switching function has not been correctly allocated. Electrode tips have been cut to the wrong size.
Remedy: Identify electrode supply wire and reconnect accordingly.

If faults occour that are not listed above, please contact our subsidiary or agency in your country.

Annex

Declaration of conformity CE

We hereby declare that the equipment **NRGS 11-2** and **NRGS 16-2** conform to the following Euopean guidelines:

- LV guideline 73/23/eec version 93/68/eec
- EMC guideline 89/336/eec version 93/68/eec
- LV standard EN 50178
- EMC standard EN 50 081-2, EN 50 082-2

This declaration is no longer valid if modifications are made to the equipment without consultation with us.

Bremen, 3rd January 2005
GESTRA AG

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