



Conductivity Electrode

LRG 16-4

EN
English

Original Installation Instructions
818854-02

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Important notes

Usage for the intended purpose

The conductivity electrode LRG 16-4 together with the conductivity switch LRS 1-.. or conductivity controller LRR 1-.. is designed for measuring and monitoring electrical conductivity in conductive fluids.

If used as conductivity limiter or continuous blowdown controller in steam boilers, the conductivity electrode LRG 16-4 can be used with the following equipment:

Conductivity switch LRS 1-50

Conductivity controller LRR 1-50

Conductivity controller LRR 1-52

To guarantee a trouble-free operation observe the requirements made on water as specified in the pertinent TRD and EN regulations.

The equipment must only be used within the admissible pressure and temperature ratings.

Function

The conductivity electrode LRG 16-4 is used in combination with the following equipment as conductivity limiter and continuous blowdown controller in steam boilers:

Conductivity switch LRS 1-50

Conductivity controller LRR 1-50

Conductivity controller LRR 1-52

In addition the equipment can monitor conductivity in condensate and feedwater systems and in cooling and cleaning water.

The conductivity electrode works according to the conductivity measurement principle and, in conjunction with conductivity switches or controllers, monitors the conductivity in conductive fluids.

A short circuit or wire breakage in the conductivity electrode will trigger an error message in the conductivity switch or controller.

Important notes - continued -

Safety note

The equipment must only be installed, wired 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 conductivity electrode steam or hot water might escape!
This presents the risk of severe scalding all over the body!
It is therefore essential not to dismantle the conductivity electrode unless the boiler pressure is verified to be 0 bar.

The conductivity electrode becomes hot during operation.

Risk of severe burns to hands and arms.

Before carrying out installation and maintenance work make sure that the equipment is cold.



Attention

The name plate specifies the technical features of the equipment. Do not commission or operate any item of equipment that does not bear its specific name plate.

Directives and standards

EU Pressure Equipment Directive 2014/68/EU

The conductivity control and monitoring equipment LRG 1.-..., LRS 1.-..., LRR 1-5. meet the safety requirements of the Pressure Equipment Directive (PED). The conductivity control & monitoring equipment is EC type approved according to EN 12952/EN 12953. These Directives state, among other things, the requirements made on limiting systems and equipment for steam boiler plants and (pressurised) hot-water installations.

VdTÜV Bulletin "Water Monitoring 100"

The conductivity electrode LRG 16-4 in conjunction with the following conductivity switches and controllers is type approved according to VdTÜV Bulletin "Water Level 100": LRS 1-50, LRR 1-50 and LRR 1-52.

The VdTÜV Bulletin "Water Monitoring 100" states the requirements made on water monitoring equipment.

ATEX (Atmosphère Explosible)

The conductivity electrode LRG 16-4 is a simple item of electrical equipment as specified in EN 60079-11 section 5.7. According to the European Directive 2014/34/EU the equipment must be equipped with approved Zener barriers if used in potentially explosive areas. Applicable in Ex zones 1, 2 (1999/92/EC). The equipment is not Ex marked.

Note on the Declaration of Conformity / Declaration by the Manufacturer **CE**

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity and Declaration of Manufacturer are available in the Internet under www.gestra.com → documents or can be requested from us.

Technical data

LRG 16-4

Service pressure

PN 40, 32 bar at 238°C

Mechanical connection

Screwed G 3/8 A, ISO 228

Materials

Screw-in body: 1.4571, X6CrNiMoTi17-12-2

Measuring electrode: 1.4571, X6CrNiMoTi17-12-2

Insulation PTFE

Four-pole connector: polyamide (PA)

Length of measurement & installation

100, 300, 400, 500, 600, 800, 1000 and 1200 mm

Cell constant

1 cm⁻¹

Electrical connection

Four-pole connector, cable gland M 16

Protection

IP 65 to DIN EN 60529

Admissible ambient temperature

Max. 70°C

Weight

Approx. 0.5 kg

Approvals:

TÜV certificate

VdTÜV Bulletin "Wasserüberwachung 100" (= Water Monitoring 100):

Requirements made on water level monitoring equipment

Type approval no. TÜV . WÜL . xx-017, xx-018 (see name plate)

Scope of supply

LRG 16-4

1 Conductivity electrode LRG 16-4

1 Joint ring 17 x 21, form D, DIN 7603, 2.4068, bright annealed

1 Installation manual

Name plate / marking






Equipment designation			Safety note		
LRG 16-4				Betriebsanleitung beachten See installation instructions Voir instructions de montage	
			Disposal note		
PN 40	G 3/8	1.4571	IP 65	DN	NL=
			TÜV . WÜL . XX - 017 / XX - 018		
32 bar (464psi)			Mat-Nr.:		
238°C (460°F)			CE		
T amb = 60°C (140 °F)			Type approval no.		
GESTRA AG			D-28215 Bremen		
Manufacturer	Application range	Pressure rating, thread type, material number, protection			

Fig. 1

Installation

Dimensions LRG 16-4

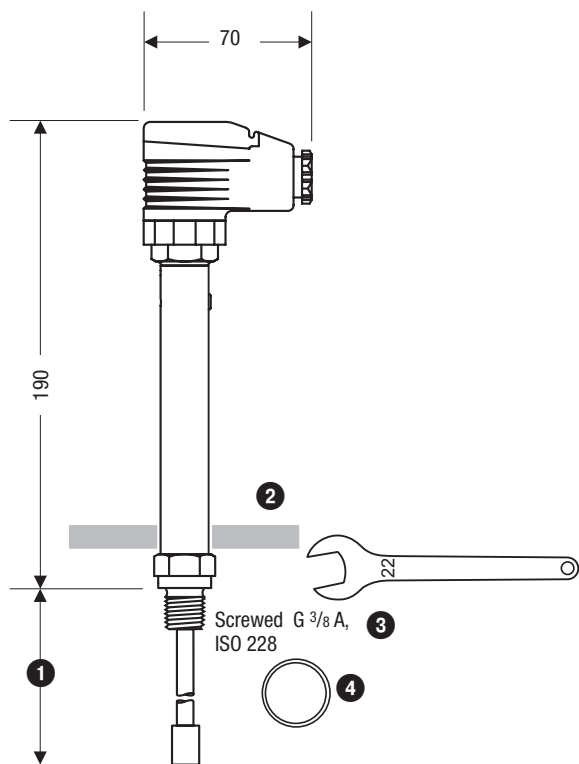


Fig. 2
LRG 16-4 with four-pole connector

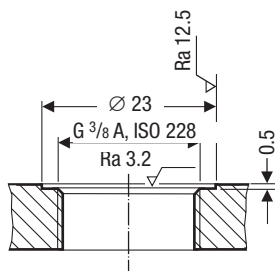


Fig. 3

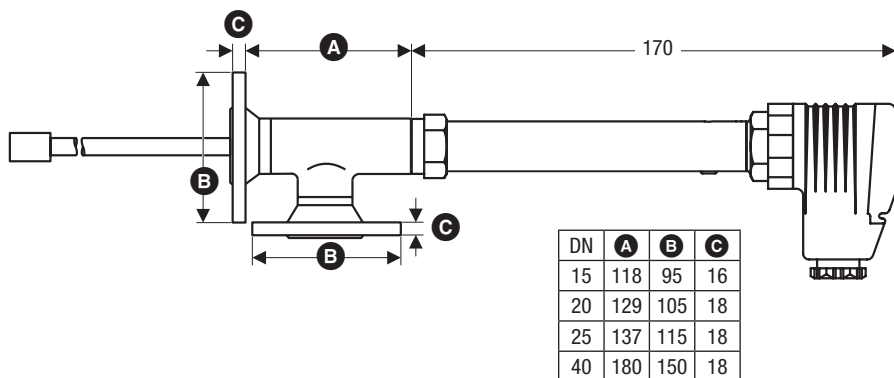


Fig. 4 LRG 16-4 with T-type connector



Note

- For the approval of the boiler standpipe the relevant regulations must be considered.
- Refer to pages 10 and 11 for typical installation examples.
- If installed outdoors the level electrode **must** be equipped with a GESTRA weather protection cover.



Attention

- Install conductivity electrode horizontally or with a vertical inclination. The measuring surface must be permanently submerged.
- The seating surfaces of the standpipe or the flange provided on the vessel must be accurately machined, see **Fig. 3**.
- Do not subject measuring electrode to physical shocks.
- Use only the supplied ring joint 17 x 21, form D, DIN 7603, made from 2.4068, bright annealed!
- Do not lag electrode body above the hexagonal section.
- Do not insulate electrode thread with hemp or PTFE tape!
- Do not apply conductive paste or grease to the electrode thread!
- Provide a spacing of **approx. 40 mm** between the lower end of the measuring electrodes and the boiler wall, the smoke tubes and any other metallic fittings and the low water level (LW).
- Observe the specified tightening torque.

Mounting conductivity electrode

1. Check seating surfaces. **Fig. 3**
2. Place the supplied ring joint **4** onto the seating surface of the threaded standpipe or flange.
3. Apply a light smear of heat resistant silicone grease (e. g. WINIX® 2150) to the electrode thread **3**.
4. Screw conductivity electrode into threaded standpipe and tighten with an open-end spanner A. F. 22 mm. The torque required **when cold is 63 Nm**.

Key

- | | |
|---|--|
| 1 Measuring length and length of installation | 3 Electrode thread G $\frac{3}{8}$ A, ISO 228 |
| 2 Thermal insulation, provided on site, d = 20 mm, (outside of thermal insulation of steam boiler) | 4 Joint ring 17 x 21, form D, DIN 7603, 2.4068, bright annealed |

Tools

- Open-end spanner 22 mm A. F.

Examples of installation

LRG 16-4

Conductivity monitoring and continuous boiler blowdown, direct installation of conductivity electrode via T-type connector and connection of a continuous blowdown valve

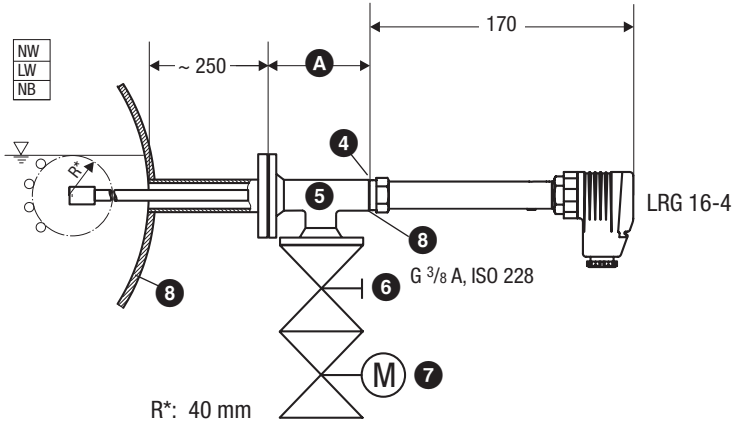


Fig. 5

Conductivity monitoring, direct installation of conductivity electrode via flanged standpipe on the side of the boiler or installation of electrode in an external level pot

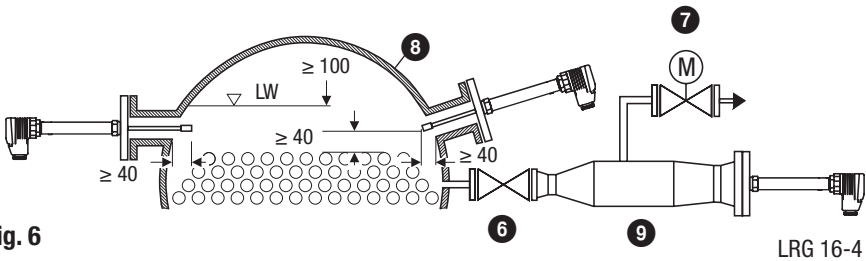


Fig. 6

Examples of installation - continued -

LRG 16-4 - continued -

Conductivity monitoring and continuous boiler blowdown, installation of conductivity electrode in top blowdown line via separate level pot

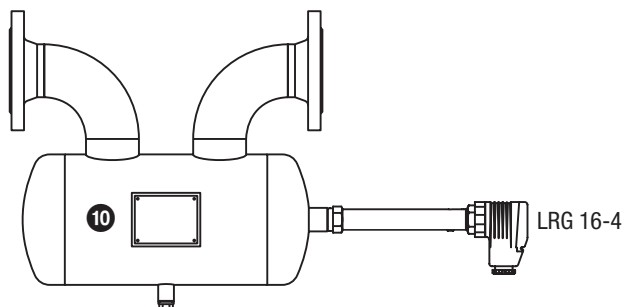


Fig. 7

Key

- 4 Joint ring 17 x 21, form D, DIN 7603, 2.4068, bright annealed
- 5 T-piece connector
- 6 Shut-off valve GAV
- 7 Continuous blowdown valve BAE
- 8 Boiler drum
- 9 Level pot 3 MF 88.0
- 10 Level pot 4 DB 372

Electrical connection

LRG 16-4 with four-pole connector

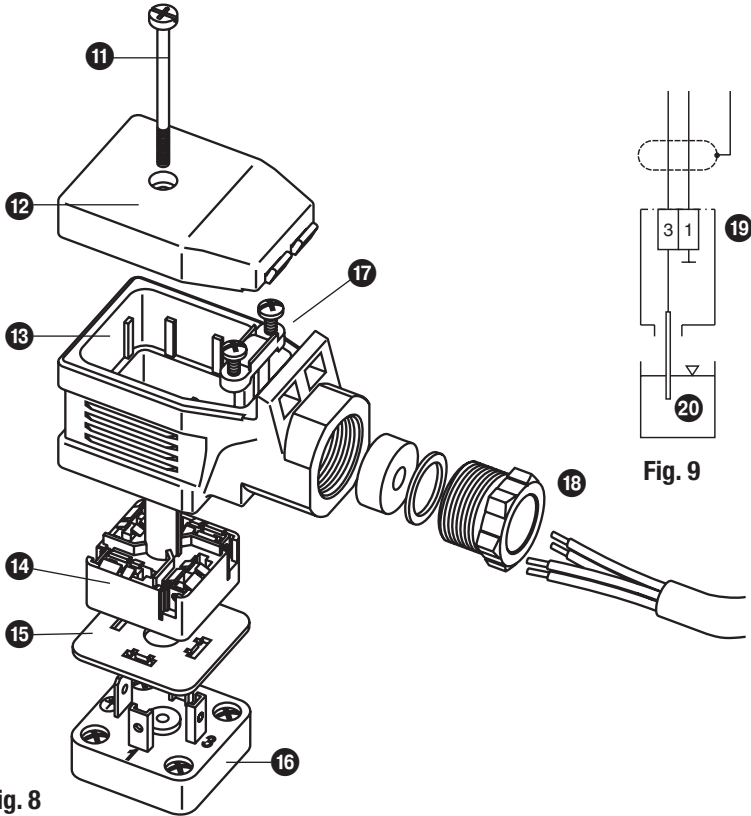


Fig. 8

Key

- | | |
|-------------------------------|--|
| 11 Screws M 4 | 16 Contact plate of conductivity electrode |
| 12 Cover | 17 Cable strain relief |
| 13 Upper part of terminal box | 18 Cable gland M 16 (PG 9) |
| 14 Connecting plate | 19 Wiring of terminals |
| 15 Insulating plate | 20 Measuring electrode |

Tools

- Screwdriver, size 1
- Screwdriver, size 2.5, completely insulated according to DIN VDE 0680-1

Connecting the conductivity electrode

To connect the conductivity electrode use screened multi-core control cable with a min. conductor size 0.5 mm², e.g. LiYCY 3 x 0.5 mm².

Connect the screen **only once** to the central earthing point (**CEP**) in the control cabinet. Wire the terminals on the connecting plate according to Fig. 9.

Max. cable length between conductivity electrode and controller: 30 m, with conductivities from 1 to 10 µS/cm: max. 10 m.

LRG 16-4, connecting the four-pole connector

1. Loosen screws ⑪. Fig. 8
2. Remove upper part ⑬ of the terminal box from the level electrode but leave insulating plate ⑮ on contact plate ⑯.
3. Remove cover ⑫.
4. Press connecting plate ⑭ out of the upper part of the terminal box ⑬.
The upper part of the terminal box can be turned in steps of 90°.
5. Detach cable gland ⑱ and cable strain relief ⑰ from upper part ⑬ of the terminal box.
6. Run cable through cable gland ⑱ and upper part of the terminal box ⑬ and wire terminals of the connecting plate ⑭ in accordance with wiring diagram ⑲.
7. Press connecting plate ⑭ into the upper part of the terminal box and align cable.
8. Fix cable with cable strain relief ⑰ and cable gland ⑱ firmly into position.
9. Replace cover ⑫ and insert screw ⑪.
10. Put upper part of the terminal box onto the level electrode and fix it with screw ⑪.
11. If several electrodes are installed in a steam boiler or vessel, please note the type of electrode and its function on the four-pole connector.



Attention

- Please observe the installation & operating manuals for the conductivity switch LRS 1-50 and the conductivity controllers LRR 1-50 and LRR 1-52.
- Make sure that connecting cables leading to the equipment are segregated and run separately from power cables.
- Check the connection of the screen to the central earthing point (**CEP**) in the control cabinet.

Troubleshooting

Indication, diagnosis and remedy



Attention

Before carrying out the fault diagnosis please check:

Supply voltage:

Is the conductivity switch / controller supplied with the mains voltage specified on the name plate?

Wiring:

Is the wiring in accordance with the wiring diagram?

Malfunctions	
Conductivity switch / controller does not work accurately.	
Error	Remedy
Indicated conductivity reading is larger than the measured reference value.	Reduce the correction factor CF.
Indicated conductivity reading is smaller than the measured reference value.	Increase the correction factor CF.
Measuring result cannot be adjusted by changing the correction factor.	Remove conductivity electrode and clean measuring surface.

Conductivity switch / controller does not work	
Error	Remedy
Power failure.	Switch on supply voltage. Check all electrical connections.
The earth connection to the vessel is interrupted.	Clean seating surfaces and screw in the conductivity transmitter together with the joint ring 17 x 21, form D, DIN 7603 (made from 2.4068), bright annealed. Do not insulate the electrode with hemp or PTFE tape!
Conductivity electrode defective, measured value too low. Electrode lines interrupted or measuring surface exposed.	Check connection of electrode lines. If necessary, replace equipment. Check water level and installation.
Conductivity electrode defective, measured value too high. Short circuit in electrode lines.	Check connection of electrode lines. If necessary, replace equipment.



Attention

- For commissioning and troubleshooting also observe the installation & operating manuals for LRS 1-50, LRR 1-50 and LRR 1-52.

Maintenance

Safety note

The equipment must only be installed, wired 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 conductivity electrode steam or hot water might escape! This presents the risk of severe scalding all over the body! It is therefore essential not to dismantle the conductivity electrode unless the boiler pressure is verified to be 0 bar.

The conductivity electrode becomes hot during operation. Risk of severe burns to hands and arms.

Before carrying out installation and maintenance work make sure that the equipment is cold.

Cleaning measuring electrode

1. Loosen screws **11**. Fig. 8
2. Detach upper part of the terminal box **13** from the conductivity electrode.
3. Before removing the equipment make sure that it is neither hot nor under pressure.

Cleaning the measuring electrode (measuring surface):

- Wipe off non-adhesive deposits with a grease-free cloth.
- To remove adhesive deposits use emery cloth (medium grain).

Re-install the conductivity electrode. Observe the notes given in section "Installation" and "Electrical Connection".

Removing and disposing of the conductivity electrode

Remove and discard conductivity electrode LRG 16-4.

1. Loosen screw **11**. Fig. 8
 2. Detach upper part of the terminal box **13** from the conductivity electrode.
 3. Before removing the equipment make sure that it is neither hot nor under pressure.
- For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.



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