GESTRA Steam Systems

LRG 16-4

GB

Installation Instructions 818854-00

Conductivity Electrode LRG 16-4

Contents

Contents - continued -

Page

Important Notes

Usage for the intended purpose

Use conductivity electrode LRG 16-4 only in conjunction with control units LRR 1-5, LRR 1-6 as conductivity controller or in conjunction with control units LRS 1-5, LRS 1-6 as conductivity switch.

Safety Notes

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 risk of severe scalding all over the body!
It is therefore essential not to dismantle the electrode unless the boiler pressure is verified to be 0 bar.
The electrode becomes hot during operation.
This presents the risk of severe burns to hands and arms.
Before carrying out installation and maintenance work make sure that the valve is cold.

ATEX (Atmosphère Explosible)

The equipment constitutes a simple item of electrical equipment as defined in DIN EN 50020 section 5.4. According to the European Directive 94/9/EC 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 does not bear an Ex marking.
The suitability of the Zener barriers is certified in a separate document.

Explanatory Notes

Scope of supply

LRGT 16-4

1 Conductivity electrode LRG 16-4

1 Joint ring 17 x 21 form D to DIN 7603, made from 1.4301, bright annealed

1 Installation manual

Description

The LRG 16-4 in combination with equipment LRR 1-5, LRR 1-6, LRS 1-5 or LRS 1-6 detects the electrical conductivity of process or boiler water The conductivity electrode LRG 16-4 in conjunction with the equipment LRR 1-5, LRR 1-6, LRS 1-5 or LRS 1-6 constitutes a functional unit.

The equipment combination is designed for use in automatically operated installations, e. g. in compliance with the directives for operation without constant supervision to TRD 604 (24 h operation).

Function

The conductivity electrode LRG 16-4 works according to the conductivity measurement principle.

The measuring current generated in the conductivity controller LRR 1-5, LRR 1-6 or the conductivity switch LRS 1-5, LRG 1-6 flows via the measuring sensor through the fluid. The current flowing between the measuring sensor and measuring chamber is conductivity proportional due to a constant measuring surface and distance.

The measuring current is analyzed in the conductivity controller and – depending on its calibration – evaluated as conductivity value. The measuring current energizes the limit relay in the conductivity switch.

Technical Data

LRG 16-4

Max. operating pressure
LRG 16-4: 32 bar

Max. operating temperature
LRG 16-4: 238 °C

Mechanical connection
Screwed G 3/8" to ISO 228-1

Materials
Electrode screw-in body: 1.4571, X6CrNiMoTi17-12-2
Electrode rod insulation: PTFE
Electrode rod: 1.4571, X6CrNiMoTi17-12-2

Length of measurement & installation
100, 300, 400, 500, 600, 800, 1000 and 1200 mm

Cell constant C
1 cm^{-1}

Admissible conductivity range
From 1 µS/cm

Terminal box
Four-pole connector, cable glands M 16 (PG 11) with integral cable clamp

Protection
IP 65 to DIN EN 60529

Max. admissible ambient temperature
70 °C

Storage & transport temperature
– 40 up to + 80 °C

Weight
Approx. 0.5 kg

Technical Data - continued -

Name plate / Marking

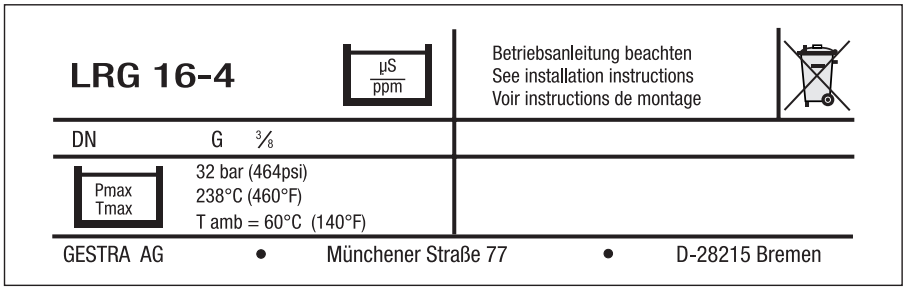


Fig. 1

Corrosion resistance

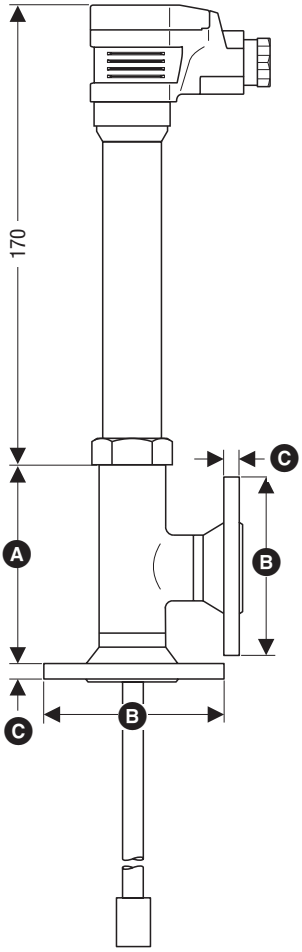
If the equipment is used for the intended purpose, its safety is not impaired by corrosion.

Sizing

The body is not designed for pulsating loads. The dimensional allowances for corrosion and anti-corrosive additives reflect the present state of the art.

Technical Data - continued -

Dimensions



DN	A	B	C
15	118	95	16
20	129	105	18
25	137	115	18
40	180	150	18

Fig. 2

Dimensions - continued -

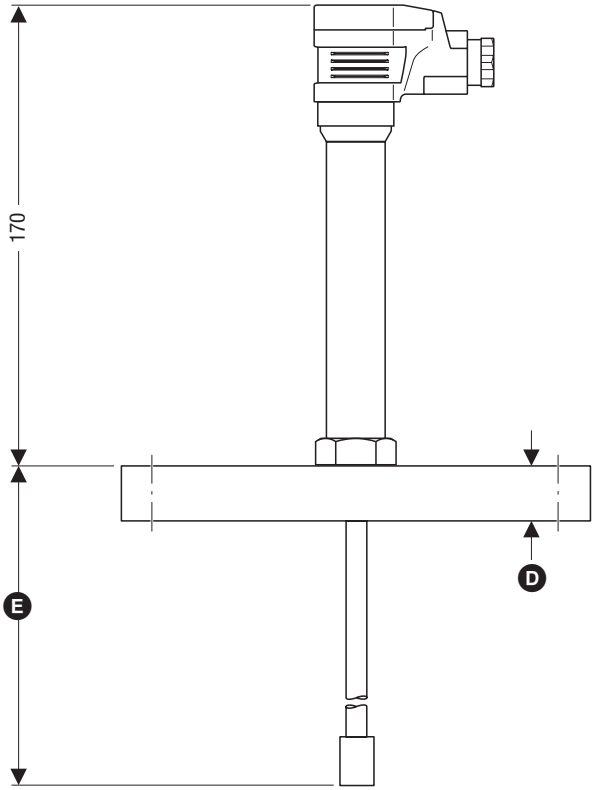
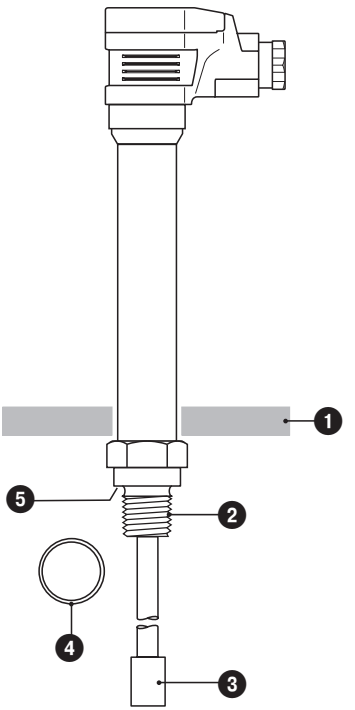


Fig. 3

DN	D	E
50	20	100
		300
		400
		500
		600
		800
		1000
		1200
100	24	100
		300
		400
		500
		600
		800
		1000
		1200

Design

LRG 16-4



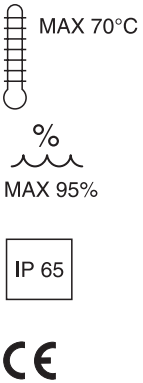


Fig. 4

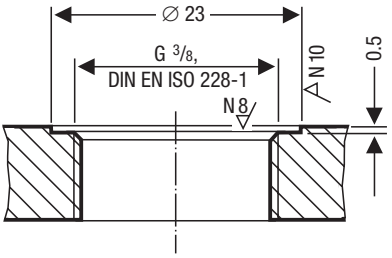


Fig. 5

Functional Elements

LRG 16-4

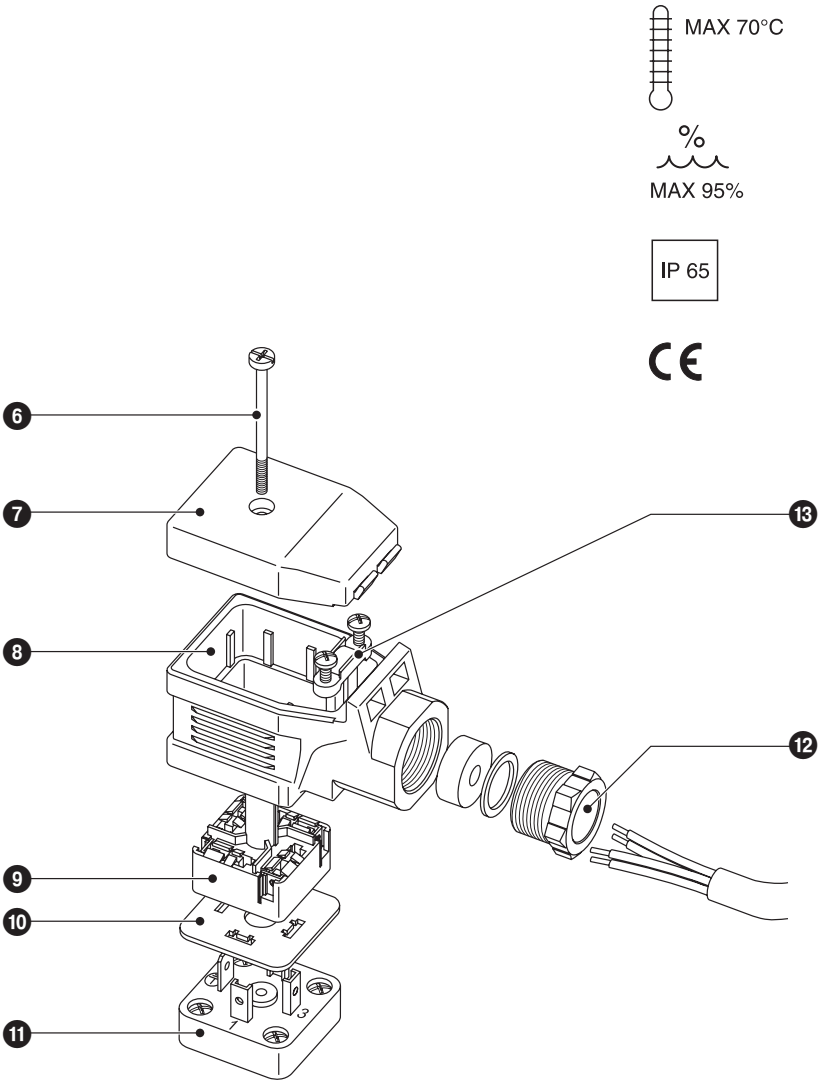


Fig. 6

Technical Data / Design / Functional Elements

Key

1. Thermal insulation, provided on site, d = 20 mm (outside of thermal insulation of steam boiler)
2. Electrode thread
3. Measuring surface
4. Joint ring 17 x 21 form D to DIN 7603, made from 1.4301, bright annealed
5. Seating surface
6. Screw M 4
7. Cover
8. Upper part of the terminal box
9. Connecting plate
10. Insulating plate
11. Contact plate of level electrode
12. Cable gland M 16 (PG 11)
13. Cable strain relief

Installation

LRG 16-4

1. Check seating surfaces. **Fig. 4, Fig. 5**
2. Place joint ring ❹ onto seating surface ❺ of the electrode. **Fig. 4**
3. Apply a light smear of silicone grease (e.g. Molykote® 111) to electrode thread ❷.
4. Screw electrode into threads or flange provided on vesssel and tighten with a 22 mm open-end spanner. The torque required **when cold is 63 Nm**.

Attention

- The seating surfaces of the standpipe or the flange provided on the vessel must be accurately machined, see **Fig. 5**.
- Do not bend electrode tip when mounting.
- Use only the supplied ring joint 17 x 21, form D to DIN 7603, made from 1.4301, bright annealed!
- Do not lag electrode body above the hexgonal section. **Fig. 3, Fig. 4**
- Do not insulate electrode thread with hemp or PTFE tape.

Note

- For the approval of the boiler standpipe the relevant regulations must be considered.
- Refer to page 14 for typical installation examples.

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680
- Open-end spanner A. F. 22, DIN 3110, ISO 3318

Molykote® 111 is a registered trademark of DOW Corning Corp., Midland Michigan, USA

Examples of installation LRG 16-4

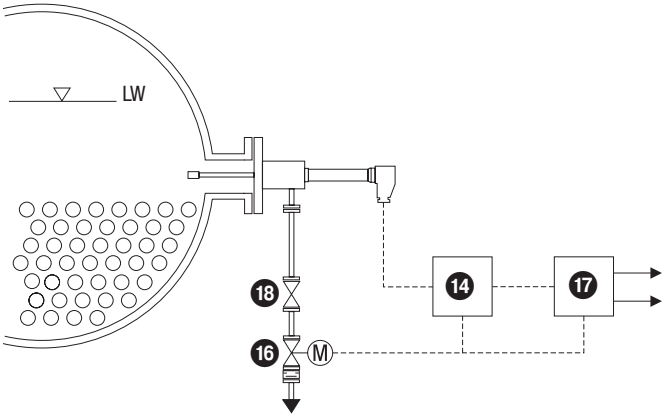


Fig. 7

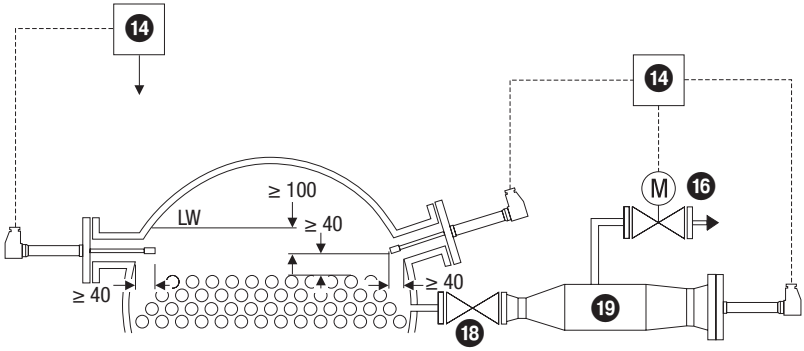


Fig. 8

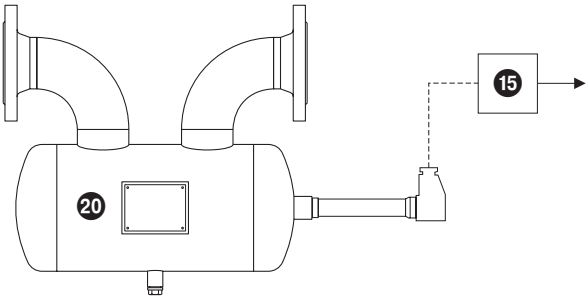


Fig. 9

Key

⓮ Control unit LRR 1-5 or LRR 1-6 as conductivity controller

⓯ Control unit LRS 1-5 or LRS 1-6 as conductivity switch

⓰ Continuous blowdown valve BAE ...

⓱ Limit switch URS 2

⓲ Shut-off valve GAV

⓳ Level pot “3 MF 88.9”

⓴ Level pot “4 DB 372”

Electrical Connection

LRG 16-4

Electrical connection with four-pole connector.
Note that screened four-core cable, e. g. I-Y(St)Y 2 x 2 x 0.8 or LIYCY 4 x 0.5 mm^2 is required for wiring to the electrode.

1. Undo screw ❻. **Fig. 6**
2. Take terminal box off the electrode but leave insulating plate ❿ on contact plate ⓫.
3. Remove cover ❼.
4. Press connecting plate ❾ out of upper part of the terminal box ❽.

   The upper part of the terminal box can be turned in steps of 90°.
5. Detach cable gland ⓬ and cable clamp ⓭ from upper part of the terminal box ❽.
6. Run cable through cable gland ⓬ and upper part of the terminal box ❽ and wire terminals of the connecting plate ❾ in accordance with wiring diagram.
7. Press connecting plate ❾ into the upper part of the terminal box and align cable.
8. Fix cable with cable clamp ⓭ and cable gland ⓬.
9. Re-attach cover ❼ and insert screw ❻.
10. Put upper part of the terminal box onto the electrode and fix it with screw ❻.

Tools

- Screwdriver for cross head screws, size 1
- Screwdriver for slotted screws, size 2.5, completely insulated according to DIN VDE 0680-1

Electrical Connection - continued -

Wiring diagram

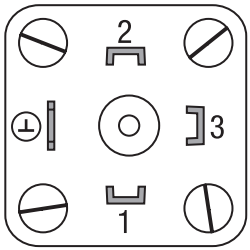


Fig. 10

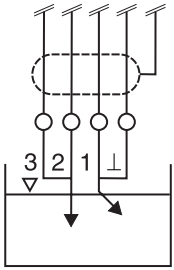


Fig. 11

Commissioning

Checking electrical connection

Make sure that the LRG 16-4 and its associated control unit LRR 1-5, LRR 1-6, LRS 1-5 or LRS 1-6 is wired according to the wiring diagram.

Applying mains voltage

Apply mains voltage to conductivity controller LRR 1-5, LRR 1-6 or conductivity switch LRS 1-5, LRS 1-6.

Operation

LRG 16-4

Operation in conjunction with conductivity controller LRR 1-5, LRR 1-6 for controlling a continuous blowdown valve (e. g. GESTRA BAE...). Operation in conjunction with conductivity switch LRS 1-5 or LRS 1-6 as limit switch.

Note

- To analyse and eliminate malfunctions refer to section “Fault finding list for trouble-shooting” on page 19.

Operation Malfunctions

Fault finding list for troubleshooting

Conductivity electrode submerged - no function

Fault 022: The electrode body does not have earth connection to the boiler.
Remedy: Clean sealing surfaces and insert metal joint ring as shown in the drawing.
Do not insulate the electrode with hemp or PTFE tape!

Fault 029: No voltage applied to control unit.
Remedy: Apply mains voltage. Connect equipment according to wiring diagram.

Conductivity reading implausible - malfunction

Fault 037: Conductivity reading of the control unit below actual conductivity value.
Remedy: Apply mains voltage. Wire equipment according to wiring diagram.
Remedy: Perform and/or correct the manual temperature compensation.
Remedy: Check length and place of installation of the electrode.
Remedy: Dirt deposits on measuring surface. Clean measuring surface.

Fault 038: Conductivity reading of the control unit above actual conductivity value.
Remedy: Apply mains voltage. Connect equipment according to wiring diagram.
Remedy: Perform and/or correct the manual temperature compensation.
Remedy: Measuring surface makes contact with the vessel.
Check length and place of installation of the electrode.

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

Decommissioning

Danger

Risk of severe burns and scalds to the whole body!
Before installing the electrode make sure that the vessel or the external pot are depressurised (0 bar) and cooled down to room temperature (20 °C).

Disposal

Dismantle the equipment and separate the waste materials (see **Technical Data**).
For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

FLOWSERVE GESTRA

Agencies all over the world:

www.gestra.de

España

GESTRA ESPAÑOLA S.A.
Luis Cabrera, 86-88
E-28002 Madrid
Tel. 0034 91 / 5 15 20 32
Fax 0034 91 / 4 13 67 47; 5 15 20 36
E-mail: aromero@flowserve.com

Great Britain

Flowserve GB Limited
Abex Road
Newbury, Berkshire RG14 5EY
Tel. 0044 16 35 / 46 99 90
Fax 0044 16 35 / 3 60 34
E-mail: gestraukinfo@flowserve.com

Italia

Flowserve S.p.A.
Flow Control Division
Via Prealpi, 30
I-20032 Cormano (MI)
Tel. 0039 02 / 66 32 51
Fax 0039 02 / 66 32 55 60
E-mail: infoitaly@flowserve.com

Polska

GESTRA POLONIA Spolka z.o.o.
Ul. Schuberta 104
PL - 80-172 Gdansk
Tel. 0048 58 / 3 06 10 - 02
0048 58 / 3 06 10 - 10
Fax 0048 58 / 3 06 33 00
E-mail: gestra@gestra.pl

Portugal

Flowserve Portuguesa, Lda.
Av. Dr. Antunes Guimarães, 1159
Porto 4100-082
Tel. 00351 22 / 6 19 87 70
Fax 00351 22 / 6 10 75 75
E-mail: jtavares@flowserve.com

USA

Flowserve GESTRA U.S.
2341 Ampere Drive
Louisville, KY 40299
Tel. 001 502 / 267-2205
FaxL 001 502 / 266-5397
E-mail: FCD-Gestra-USA@flowserve.com

GESTRA AG

P. O. Box 10 54 60, D-28054 Bremen
Münchener Str. 77, D-28215 Bremen
Telephone 0049 (0) 421 35 03 - 0
Fax 0049 (0) 421 35 03 - 393
E-Mail gestra.ag@flowserve.com
Internet www.gestra.de

GESTRA

818854-00/908cm · 2008 GESTRA AG · Bremen · Printed in Germany