



**FLOWSERVE**

GESTRA

**GESTRA Steam Systems**

**LRG 16-9**

**EN**

English

**Installation Instructions 818867-00**

Conductivity Electrode  
LRG 16-9

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## Important Notes

### Usage for the intended purpose

Use conductivity electrode LRG 16-9 only in conjunction with conductivity switch LRS 1-7 for measuring the electrical conductivity of electrically conductive liquids.

### 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 conductivity electrode steam or hot water might escape. This presents the danger of severe scalding. It is therefore essential not to remove the conductivity electrode unless the system pressure is verified to be 0 bar. The conductivity electrode becomes hot during operation. Touching the hot equipment presents the risk of severe burns to hands and arms. All installation, removal and maintenance work must only be performed when the system 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

#### LRG 16-9

1 Conductivity electrode LRG 16-9

1 Joint ring 21 x 26, form D, DIN 7603, 1.4301, bright annealed

1 Installation manual

### Description

The conductivity electrode LRG 16-9 is designed for use with conductivity switch LRS 1-7 as conductivity monitoring and control system. The electrical conductivity of

- Condensate,
- Boiler feedwater,
- Cooling and cleaning water,
- Boiler water

is monitored. In steam boiler plants the conductivity monitoring & control system is used as limit switch and continuous blowdown controller.

### Function

The conductivity electrode LRG 16-9 in conjunction with the conductivity switch LRS 1-7 measures the electrical conductivity in conductive liquids.

The integrated resistance thermometer enables the conductivity electrode LRG 16-9 to measure the fluid temperature.

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

## Technical Data

### LRG 16-9

#### Type approval

TÜV.WÜL.xx-xxx

#### Service pressure

PN 40, max. 32 bar at 238 °C

#### Mechanical connection

Screwed 1/2, to ISO 228-1

#### Cell constant

0.5 cm<sup>-1</sup>

#### Materials

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

Measuring electrode: 1.4571, X6CrNiMoTi17-12-2

Electrode rod insulation: PTFE

#### Electrical connection

M 12 sensor connector, 5 poles, A coded

#### Protection

IP 65 to DIN EN 60529

#### Ambient temperature at terminal box

Max. 70 °C

#### Weight

Approx. 0.3 kg

### 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 latest state of the art.

### Name plate / Marking


|                       |  |   |              |       |                           |
|-----------------------|--|---|--------------|-------|---------------------------|
| Equipment designation | <b>LRG 16-9</b>                                  |  |              |       |                           |
|                       | PN 40  | G 1/2"  | 1.4571       | IP 65 | Connection,<br>protection |
| Manufacturer          | 32 bar   | 238°C   | T amb = 70°C |       |                           |
|                       | GESTRA AG · Münchener Straße 77 · D-28215 Bremen |   |              |       |                           |

Fig. 1

Dimensions LRG 16-9

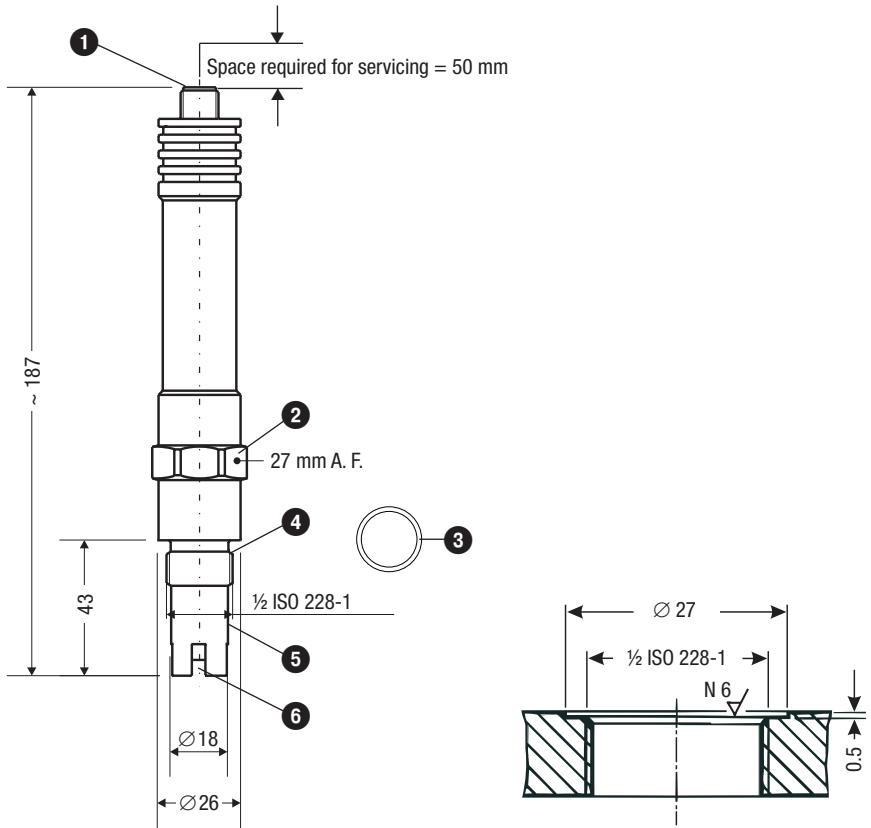
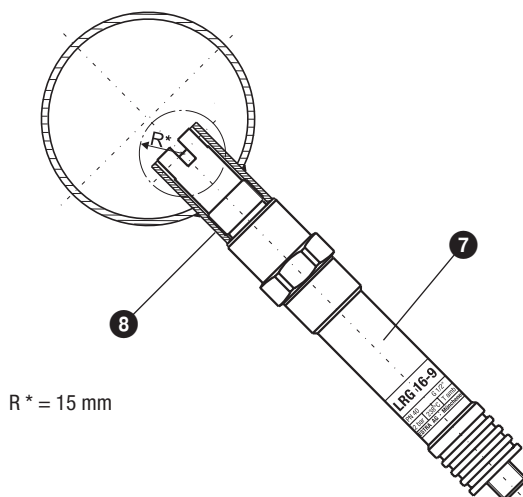


Fig. 2 LRG 16-9

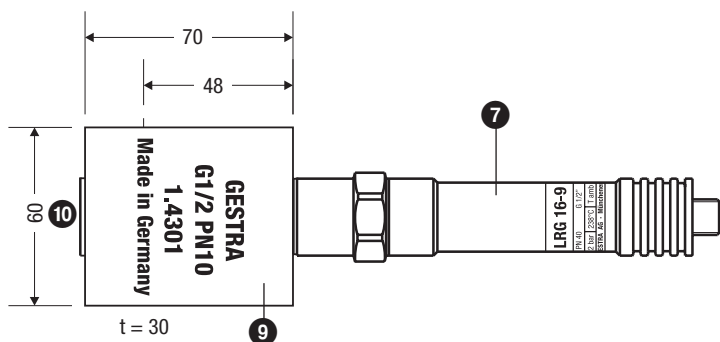
## Dimensions and examples of installation

### LRG 16-9



**Fig. 3**

Conductivity electrode LRG 16-9 with on-site socket end for installation in pipes.



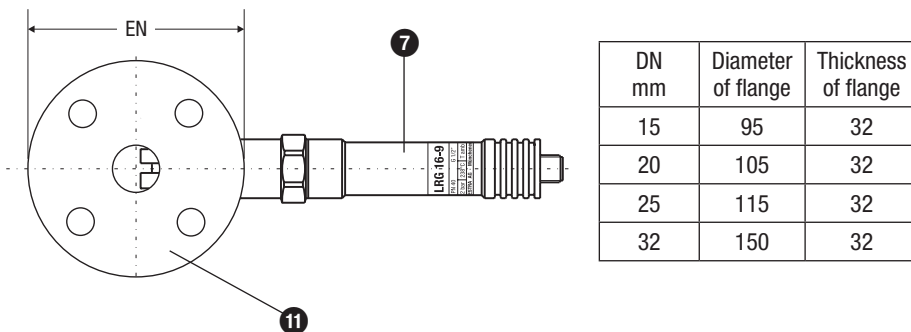
**Fig. 4**

Conductivity electrode LRG 16-9 with measuring chamber for installation in pipes.



## Dimensions and examples of installation - continued -

### LRG 16-9 - continued -



**Fig. 5**

Conductivity electrode LRG 16-9 with mounting flange for sandwiching between flanges.

### Key

- ① M 12 Sensor connector, 5 poles A coded
- ② Hexagonal part A. F. 27 mm
- ③ Joint ring 21 x 26 form D to DIN 7603, made from 1.4301, bright annealed
- ④ Screw-in thread ½ to ISO 228-1
- ⑤ Measuring tube
- ⑥ Measuring surface
- ⑦ Conductivity electrode LRG 16-9
- ⑧ Socket end to EN 10241, heavy design, screwed ½ to ISO 228, length 37 mm, provided on site
- ⑨ Measuring chamber, ½, PN 10, made from 1.4301
- ⑩ Drain plug
- ⑪ Mounting flange PN 40, DIN 2527 with female thread ½

## Installation

### Installation Notes


The conductivity electrode is designed for installation in pipes. The conductivity electrode is installed in a socket end, a measuring chamber or a mounting flange. Measuring chamber and mounting flange available as optional extra. When installing the conductivity electrode please consider a min. space of 50 mm required for servicing and removing the conductivity electrode.



#### Attention

- Make sure that the sealing surface of the screwed connection is accurately machined.
- Use only the supplied ring joint 21 x 26, form D, DIN 7603, made from 1.4301, bright annealed!
- Do not insulate screw-in thread with hemp or PTFE tape.
- Install electrode horizontally or with a vertical inclination. The measuring surface must be permanently submerged.
- Observe the specified tightening torque.
- Leave a space of **approx. 15 mm** between the lower end of the measuring tube and the wall of the pipe.
- Do not cut the measuring electrode and the measuring tube!

### Mounting conductivity electrode

1. Check sealing surface of screwed connection (see **Fig. 2**). If necessary, re-finish.
2. Put joint ring  supplied with the electrode onto the seating surface of the conductivity electrode.
3. Apply a light smear of silicone grease to the electrode thread.
4. Screw in conductivity electrode and fasten it with an open-end spanner 27 mm A. F. The torque required for tightening when cold is 110 Nm.

## Electrical Connection

### Connecting conductivity electrode LRG 16-9

The conductivity electrode LRG 16-9 and the conductivity switch LRS 1-7 are equipped with M 12 sensor connectors with 5 poles and A coded; for connection see **Fig. 6 and Fig. 7**. For connecting the equipment control cable assemblies (with plug and connector) of various lengths are available as add-on equipment.

**Note that the recommended control cable is not UV-resistant and, if installed outdoors, must be protected by a UV-resistant plastic tube or cable duct.**

If the above-mentioned control cable assembly is not used, a screened five-core control cable, e. g. Ölflex 110 CH, manufactured by Lapp, 5 x 0.5 mm<sup>2</sup> or LiYCY 5 x 0.5 must be used for wiring.

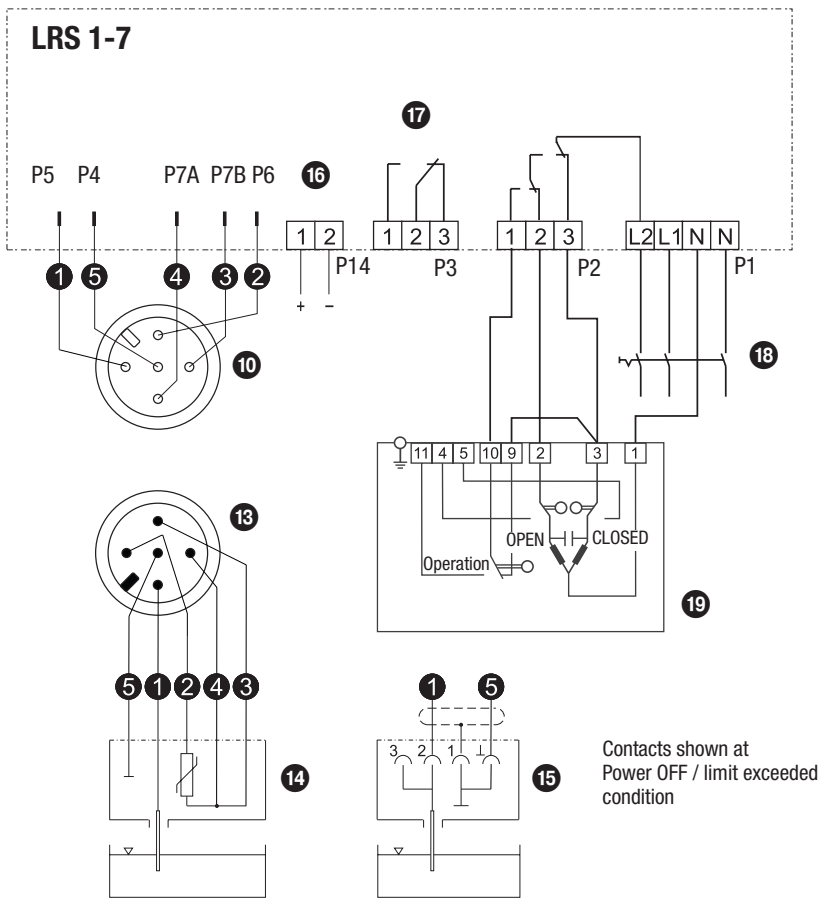
Max. cable length between conductivity electrode and switch: 30 m, with conductivities from 0.5 to 10 µS/cm: max. 10 m.



#### Attention

- If the above-mentioned control cable assembly is not used, the connecting line must be provided with a connector and a screened jack according to the wiring diagram **Fig. 6 and Fig. 7**.
- Connect screen **only** in the jack (on electrode).

**Wiring diagram for conductivity switch LRS 1-7 (continuous blowdown control)**

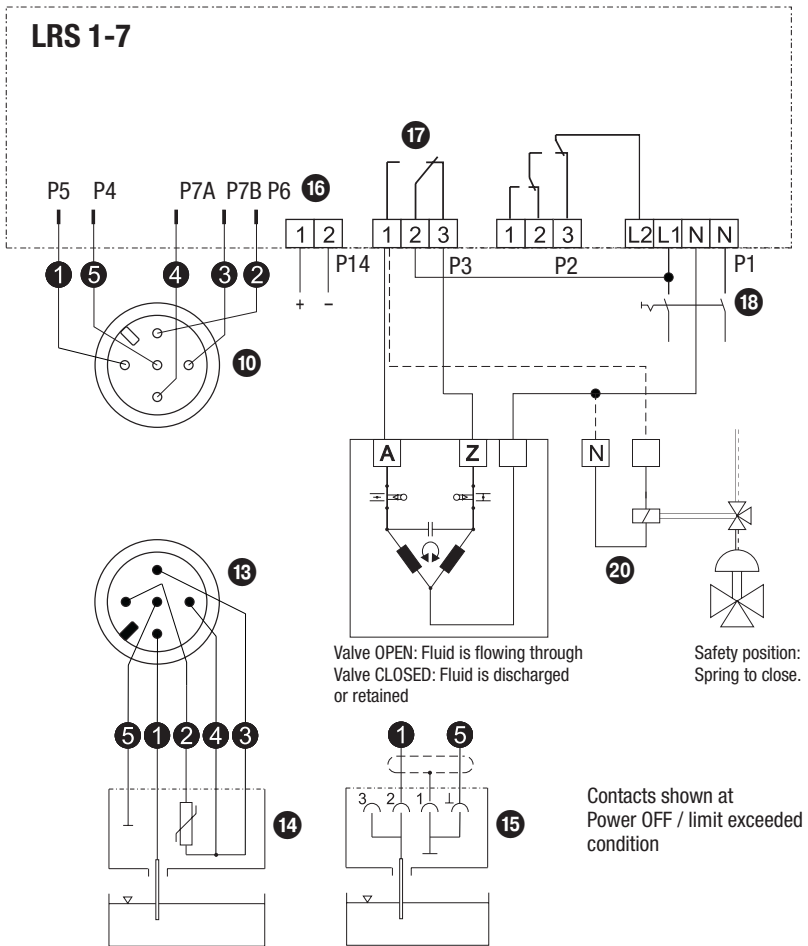


**Fig. 6**

- 10** M 12 sensor jack, 5 poles, A coded
- 13** M 12 sensor connector, 5 poles, A coded (conductivity electrode)
- 14** Conductivity electrode LRG 16-9
- 15** Conductivity electrode ERL 16, LRG 16-4 (without Pt 100)
- 16** Current output 4-20 mA, load max. 500 Ω (option)
- 17** Limit contact MAX
- 18** Disconnector
- 19** Continuous blowdown valve (actuator) BAE

L2 must remain live after the burner (stand-by operation) is shut down until the continuous blowdown valve is motored to close. L1 and L2 must be connected to an external conductor of the same phase.

**Wiring diagram for conductivity switch LRS 1-7 (water monitoring)**



**Fig. 7**

- 10 M 12 sensor jack, 5 poles, A coded
- 13 M 12 sensor connector, 5 poles, A coded (conductivity electrode)
- 14 Conductivity electrode LRG 16-9
- 15 Conductivity electrode ERL 16, LRG 16-4 (without Pt 100)
- 16 Current output 4-20 mA, load max. 500 Ω (option)
- 17 Limit contact MAX
- 18 Disconnecter
- 20 Electric or pneumatic three-way valve

## Maintenance



### Danger

When loosening the conductivity electrode steam or hot water might escape. This presents the danger of severe scalding. It is therefore essential not to remove the conductivity electrode unless the system pressure is verified to be 0 bar.

The conductivity electrode becomes hot during operation. Touching the hot equipment presents the risk of severe burns to hands and arms. All installation, removal and maintenance work must only be performed when the system is cold.

Risk of severe burns and scalds to the whole body!

## Cleaning measuring electrode

The conductivity electrode may only be installed and removed by qualified personnel. Observe note in chapter "Installation" on page 10.

Before cleaning the measuring electrode decommission and remove the conductivity electrode.

Clean the conductivity electrode.

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

## Decommissioning

### Disposal

Dismantle the conductivity electrode and separate the waste materials, using the material specification as a reference. Electronic component parts such as the circuit board must be disposed of separately! For the disposal of the conductivity electrode 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.

## **Annex**

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

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 is available in the Internet under [www.gestra./de/documents](http://www.gestra./de/documents) or can be requested from us.



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