

## GESTRA Steam Systems

## Product Range B1

### Conductivity Electrode with CAN bus, CANopen protocol

**LRG 16-40**  
**LRG 16-41**  
**LRG 17-40**

**LRG 16-40**  
**LRG 16-41**  
**LRG 17-40**

#### Description

The conductivity electrodes LRG 16-40, LRG 16-41, LRG 17-40 consist of a TDS (= Total Dissolved Solids) monitoring electrode for conductivity measurement, a temperature sensor for detecting the fluid temperature and a conductivity transmitter that is fully integrated in the terminal box.

The conductivity electrodes LRG 16-40, LRG 17-40 work according to the conductometric measurement principle and use **two** electrodes. The conductivity electrode LRG 16-41 also uses the conductometric measurement principle but works with **four** electrodes. All three electrode types monitor the electrical conductivity of electrically conductive fluids.

Together with the TDS controller LRR 1-40 and an operating device type URB or SPECTORcontrol the conductivity electrode LRG can be used as conductivity limiter and continuous blowdown controller in steam boilers and (pressurized) hot water plants or as conductivity meter in condensate and feedwater systems.

The conductivity electrodes LRG 16-40, LRG 17-40 are particularly well suited for steam boilers with low TDS content, e.g. in steam regenerators, high-pressure boilers or condensate vessels.

The conductivity electrode LRG 16-41 is designed for industrial boiler plants up to PN 40 and max. admissible conductivities of 8000 / 6000 µS/cm according to TRD/EN.

The data exchange between the conductivity electrode LRG, the control and operating equipment and other devices is effected by the CAN bus to ISO 11898, using the CANopen protocols.

#### Function

##### LRG 16-40, LRG 17-40

A measuring current of variable frequency flows through the fluid and creates a potential gradient between the measuring electrode and the measuring tube. The potential gradient is evaluated as measuring voltage  $U_U$ .

##### LRG 16-41

The conductivity electrode consists of two current and two voltage electrodes. The current electrodes send the measuring current  $I_U$  with a fixed frequency into the fluid, thereby creating a potential gradient between these electrodes. This potential gradient is then detected by the voltage electrodes and evaluated as measuring voltage  $U_U$ .

#### Function - continued -

Thanks to this process insulating layers and polarization effects will be compensated.

##### LRG 16-40, LRG 16-41 and LRG 17-40

The electrical conductivity is a non-linear function of temperature that increases as the temperature rises. For the compensation of the measured values one of the following three procedures can be applied:

- Temperature compensation Auto: The conductivity electrode records the specific conductivity/temperature curve of the respective fluid and, based on the data obtained, performs the compensation.
- Temperature compensation Norm: The conductivity/temperature curves of 11 normally used conditioning agents are stored in the electrode and can be selected.
- Temperature compensation Linear: A fixed temperature coefficient (Tk) is used to correct the measured conductivity value linearly.

An error message is initiated by:

- Internal short circuit or wire breakage,
- Excessively high temperatures in the terminal box,
- Interruption of the data transfer.

#### Technical Data

**Test approval no.**  
TÜV . WÜL . xx-007

**Service pressure**  
LRG 16-40, LRG 16-41: 32 bar at 238 °C  
LRG 17-40: 60 bar at 275 °C

**End connection**  
Screwed 1", ISO 228-1

**Materials**  
Electrode screw-in body: 1.4571, X6CrNiMoTi17-12-2  
Measuring electrode(s): 1.4571, X6CrNiMoTi 17-12-2  
Electrode rod insulation: PTFE  
Terminal box 3.2161 G AISi8Cu3  
LRG 16-40, LRG 17-40: Measuring tube & screw 1.4571, X6CrNiMoTi17-12-2  
LRG 16-40, LRG 16-41: Spacer disks PEEK  
LRG 17-40: Spacer disks PEEK HT

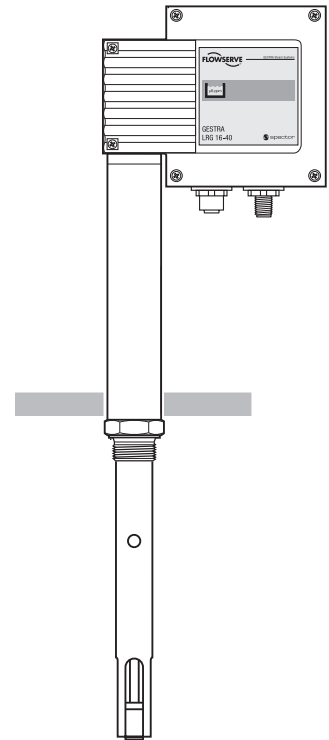
**Temperature sensor**  
Resistance thermometer Pt 1000

P. T. O.

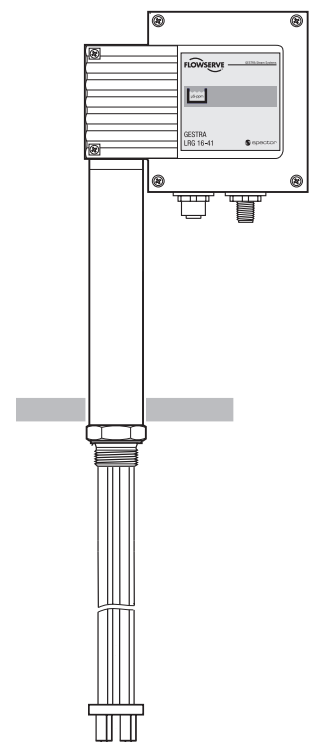
#### Important Notes

The conductivity electrode is equipped with M 12 sensor connectors. For connecting bus devices control cable assemblies of various lengths are available as accessories. Note that the recommended control cables are not UV-resistant and, if installed outdoors, must be protected by a UV-resistant plastic tube or cable duct. If you do not want to use the control cable assemblies use screened multi-core twisted-pair control cable for the bus line, e.g. UNITRONIC® BUS CAN 2 x 2 x ... mm<sup>2</sup> or RE-2YCYV-fl 2 x 2 x ... mm<sup>2</sup>. The cable length dictates the baud rate (data transfer rate) between the bus nodes, and the total power consumption of the sensor dictates the conductor size.

S 8	S 9	S 10	Baud rate	Cable length	Number of pairs and conductor size [mm <sup>2</sup> ]
OFF	ON	OFF	250 kBit/s	125 m	2 x 2 x 0.34
<b>Factory setting</b>					
ON	ON	OFF	125 kBit/s	250 m	2 x 2 x 0.5
OFF	OFF	ON	100 kBit/s	335 m	2 x 2 x 0.75
ON	OFF	ON	50 kBit/s	500 m	on request, depending on bus configuration
OFF	ON	ON	20 kBit/s	1000 m	
ON	ON	ON	10 kBit/s	1000 m	



LRG 16-40, LRG 17-40



LRG 16-41

## Conductivity electrode

**LRG 16-40**

**LRG 16-41**

**LRG 17-40**

### Technical Data - continued -

#### Measuring length / length of installation

LRG 1...-40: 200, 300, 400, 500, 600, 800, 1000 mm  
LRG 16-41: 180, 300, 380, 500, 600, 800, 1000 mm

#### Conductivity measuring range

LRG 16-40, LRG 17-40: 0.5 – 12000 µS/cm at 25 °C /  
0.25 – 6000 ppm (parts per million)  
(Preferred control range 500 µS/cm / 250 ppm)  
LRG 16-41: 100 – 10000 µS/cm at 25 °C /  
50 – 500 ppm (parts per million)

#### Input/output

CAN bus interface with power supply 18-36 V DC, short-circuit protected

#### Data exchange

CAN bus to ISO 11898, CANopen protocol

#### Temperature compensation

Type of temp. compensation adjustable via URB or SPECTORcontrol

#### Power consumption

3.8 W

#### Fuse

Electronic thermal fuse Tmax = 85 °C,  
Hysteresis –2 K

#### Indicators and adjustors

Two LEDs for internal status messages  
One 10-pole code switch for node-ID and baud rate settings

#### Electrical connection

M 12 sensor connector, sensor jack, 5 poles, A coded

#### Protection

IP 65 to DIN EN 60529

#### Ambient temperature

Max. 70 °C

#### Weight

Approx. 2.5 kg

### Order & Enquiry Specification

GESTRA Conductivity electrode LRG 16-40  
PN 40, screwed 1", two-electrode measuring system  
Measuring length / length of installation .....mm

GESTRA Conductivity electrode LRG 17-40  
PN 63, screwed 1", two-electrode measuring system  
Measuring length / length of installation .....mm

GESTRA Conductivity electrode LRG 16-41  
PN 40, screwed 1", four-electrode measuring system  
Measuring length / length of installation .....mm

### Associated equipment

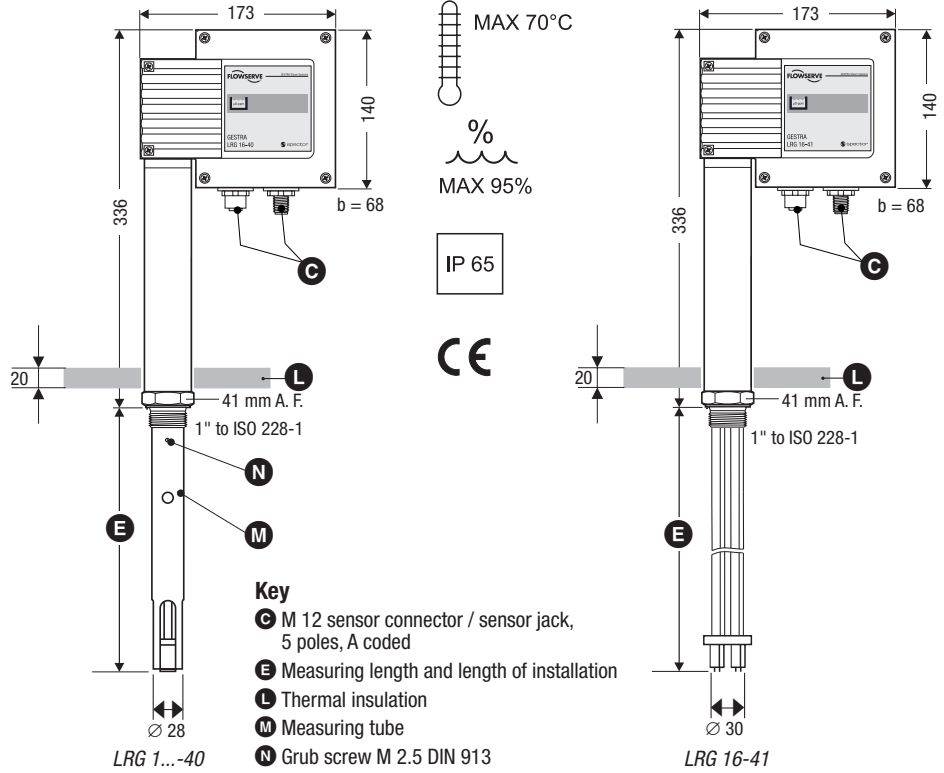
GESTRA Control unit LRR 1-40  
GESTRA Operating unit URB or Spectorcontrol

### ATEX (Atmosphère Explosible)

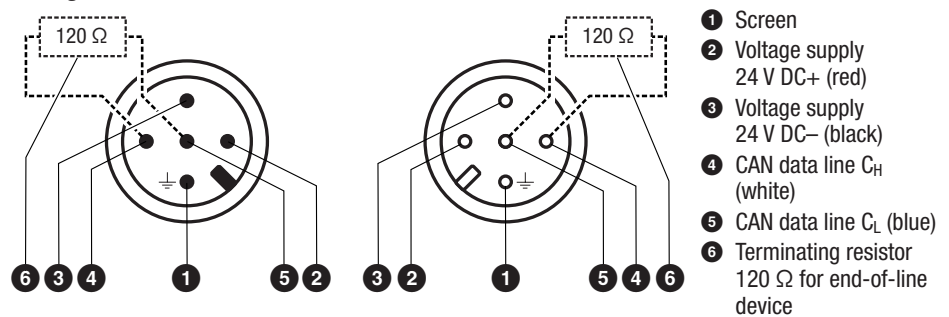
According to the European Directive 94/9/EC the equipment must not be used in potentially explosive areas.

Supply in accordance with our general terms of business.

### Dimensions

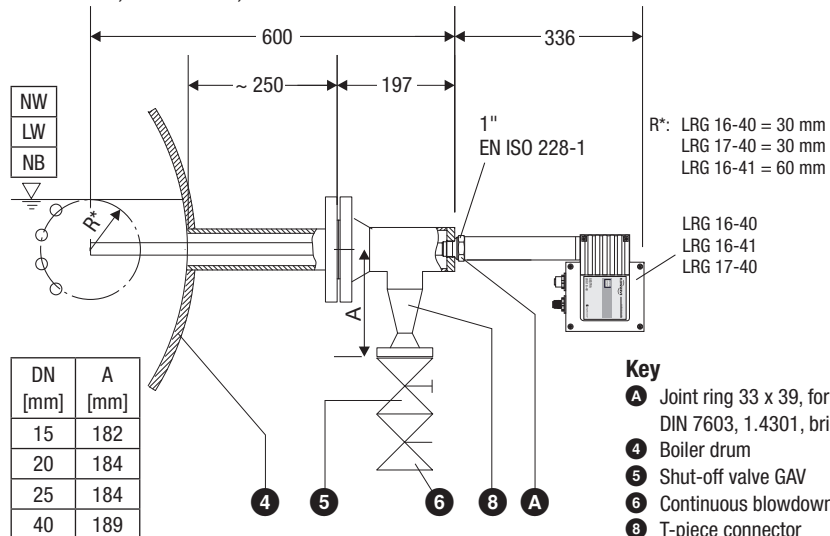


### Wiring the sensor connectors



### Example of Installation

LRG 16-40, LRG 16-41, LRG 17-40 used for continuous blowdown control



## GESTRA AG

P. O. Box 10 54 60, D-28054 Bremen  
Münchener Str. 77, D-28215 Bremen

Telephone +49 (0) 421 35 03 - 0, Fax +49 (0) 421 35 03 - 393

E-mail gestra.ag@flowsolve.com, Internet www.gestra.de

**FLowsolve**

GESTRA

**Distributor : Energy Technology Co., Ltd.**

Tel.: +66 2 721 3860 - Fax.: +66 2 721 3869 - E-mail: sales@energytechnology.co.th - http:// www.energytechnology.co.th