



Conductivity Electrode

LRG 16-40

LRG 16-41

LRG 17-40



CANopen

EN
English

Original Installation Instructions
818524-04

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Important Notes

Usage for the intended purpose

Use conductivity electrodes LRG 16-40, LRG 16-41, LRG 17-40 only for measuring the electrical conductivity of liquid fluids.

For conductivity limiting or continuous boiler blowdown the conductivity electrodes LRG 16-40, LRG 16-41, LRG 17-40 must only be used in conjunction with TDS controller LRR 1-40 and an operating terminal & display unit type URB or SPECTOR*control*.

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

Use the equipment only within its specified pressure and temperature limits.

Any other use is deemed as not being in compliance with the intended purpose. The user shall be solely responsible for the associated risk. The manufacturer shall not be liable for any damage resulting from improper usage.

Safety note

The equipment must only be installed and commissioned by qualified staff.

Maintenance and service work must only be performed by adequately trained persons who have a recognized level of competence.



Danger

When loosening the electrode steam or hot water might escape.

This presents the danger of severe scalding. It is therefore essential not to remove or install the electrode unless the boiler pressure is verified to be zero.

The electrode is hot during operation. This presents the danger of severe burns to hands and arms. Installation and maintenance work should only be carried out when the system is cold.

ATEX (Atmosphère Explosible)

According to the European Directive 2014/34/EU the equipment must **not** be used in explosion-risk areas.

Note on the Declaration of Conformity / Declaration by the Manufacturer C E

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 / Declaration of Manufacturer are available in the Internet under www.gestra.de/documents or can be requested from us.

Explanatory Notes

Scope of supply

LRG 16-40

- 1 Level electrode type LRG 16-40
- 1 S. S. joint ring \varnothing 33 x 39, form D, DIN 7603 (made of 2.4068), bright annealed
- 1 Terminating resistor 120 Ω
- 1 Installation manual

LRG 16-41

- 1 Level electrode type LRG 16-41
- 1 S. S. joint ring \varnothing 33 x 39, form D, DIN 7603 (made of 2.4068), bright annealed
- 1 Terminating resistor 120 Ω
- 1 Installation manual

LRG 17-40

- 1 Level electrode type LRG 17-40
- 1 S. S. joint ring \varnothing 33 x 39, form D, DIN 7603 (made of 2.4068), bright annealed
- 1 Terminating resistor 120 Ω
- 1 Installation manual

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 SPECTOR^{control} 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 $\mu\text{s}/\text{cm}$ 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_i 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 –

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

The electrical conductivity is a function of temperature. To relate the measured values to a reference temperature the resistance thermometer integrated in the electrode measures the fluid temperature. The electrical conductivity is calculated from the measuring voltages U_U and U_I and – through temperature compensation – is based on a reference temperature of 25 °C.

The electrical conductivity is a non-linear function of temperature. 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.

The auto-curve temperature compensation is suitable for boilers operating with variable pressure, which means that the boiler does not have a fixed working pressure (e. g. low load 10 bar, full load 15 bar). The system detects in steps of 10 °C all temperatures and conductivity values from 100 °C to the service temperature. For this purpose the boiler must reach its working pressure (with variable pressure operation: max. allowable working pressure). If the standard curve is not suitable for variable pressure operation, use can be made of the recorded curve.

- **Temperature compensation NORM:** The conductivity/temperature curves of 11 normally used conditioning agents are stored in the electrode and can be selected.

The standard curve temperature compensation is suitable for boilers operating with variable pressure, which means that the boiler does not have a fixed working pressure (e.g. low load 10 bar, full load 15 bar). The standard curves of feedwater conditioning agents with different basic conductivities compensate for the influence of the temperature on readings within the operating range.

- **Temperature compensation LINEAR:** A fixed temperature coefficient (T_k) is used to correct the measured conductivity value linearly.

The coefficient value (default setting: 2.1 % / °C) is normally used for steam boilers operating with constant pressure. The conductivity is ascertained at an ambient temperature of 25 °C. The cell constant can be modified in order to calibrate the value measured by the electrode. The gradient can be verified at operating pressure with the aid of a calibrated conductivity meter.

At regular intervals the conductivity electrode LRG 1x-40 sends a data telegram via CAN-bus to the controller with the following information:

- Measured conductivity value, referred to 25 °C as actual value (X),
- Measuring range / adaptation of actual value output,
- Alarm: self-monitoring of electrode supply cables,
- Alarm: temperature sensor defective,
- Alarm: excessively high temperature in terminal box.

A short circuit in the cables leading to the measuring electrode, the measuring tube and the resistance thermometer or the interruption of the data transmission via CAN bus will be indicated by a malfunction message.

A sensor monitors the temperature in the terminal box and indicates a malfunction if the limit value is exceeded.

System components

LRR 1-40

Digital switching controller for conductivity electrode LRG

Functions: Conductivity limiter, continuous blowdown controller

Data exchange via CAN bus to ISO 11898 using CANopen protocol

URB 1, URB 2

Operating & display unit

Functions: Parameterization, indication via LCD display

Data exchange via CAN bus to ISO 11898 using CANopen protocol

Technical Data

LRG 16-40, LRG 16-41, LRG 17-40

Type approval no.

TÜV.WÜL.xx-007

Service pressure

LRG 16-40: 32 bar at 238 °C

LRG 16-41: 32 bar at 238 °C

LRG 17-40: 60 bar at 275 °C

Connection

Screwed 1" to ISO 228-1

Materials

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

Measuring electrode(s): 1.4571, X6CrNiMoTi17-12-2

Electrode insulation: PTFE

Terminal box: 3.2161 G AISi8Cu3

LRG 16-40, LRG 17-40: Measuring tube, measuring screw: 1.4571, X6CrNiMoTi17-12-2

LRG 16-40, LRG 16-41: Spacer disc PEEK

LRG 17-40: Spacer disc PEEK HT

Length of installation / measuring length (do not cut!)

LRG 16-40, LRG 17-40: 200, 300, 400, 500, 600, 800, 1000 mm

LRG 16-41: 180, 300, 380, 500, 600, 800, 1000 mm

Temperature sensor

Resistance thermometer PT 1000

Conductivity measuring range

LRG 16-40, LRG 17-40: 0.5 – 12000 $\mu\text{S}/\text{cm}$ at 25 °C / 0.25 – 6000 ppm (parts per million) *)

Preferred measuring range up to 500 $\mu\text{S}/\text{cm}$

LRG 16-41: 100 – 10000 $\mu\text{S}/\text{cm}$ at 25 °C / 50 – 5000 ppm (parts per million) *)

Measuring cycle

1 sec.

Time constant T (ascertained by using the two-bath method))

LRG 16-40, LRG 17-40: Temperature: 9 sec.

Conductivity: 14 sec.

LRG 16-41: Temperature: 11 sec.

Conductivity: 19 sec.

Input/Output

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

Data exchange

CAN-bus to ISO 11898, CANopen protocol



Note

*) The electrical conductivity is measured in $\mu\text{S}/\text{cm}$. For ppm (parts per million) use the following conversion: 1 $\mu\text{S}/\text{cm}$ = 0.5 ppm.

Temperature compensation

Type of temp. compensation can be adjusted with URB or SPECTOR*control*:

- Temperature compensation AUTO:
with conductivity/temperature curve characteristic of the installation.
- Temperature compensation NORM: *)
with standard conductivity/temperature curve.
- Temperature compensation LINEAR:
with set temperature coefficient (Tk).

*) The NORM (standard) conductivity / temperature curves can be set via the operating & display units SPECTOR*control* and URB.

Norm curve	Conditioning agent	Basic conductivity at 25 °C
1	NaOH (Caustic soda)	260 µS/cm
2	NaOH (Caustic soda)	1080 µS/cm
3	NaOH (Caustic soda)	5400 µS/cm
4	NaOH (Caustic soda)	11000 µS/cm
5	Na ₃ PO ₄ (Trisodium phosphate)	190 µS/cm
6	Na ₃ PO ₄ (Trisodium phosphate)	1100 µS/cm
7	Na ₃ PO ₄ (Trisodium phosphate)	5900 µS/cm
8	Na ₃ PO ₄ (Trisodium phosphate)	11200 µS/cm
9	Na ₂ SO ₃ (Sodium sulphite)	980 µS/cm
10	Dipolique 444	200 µS/cm
11	Levoxin	195 µS/cm

Power consumption

3.8 W

Fuse

Electronic thermal fuse Tmax 85 °C, hysteresis -2K.

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, 5 poles, A coded

M 12 sensor jack, 5 poles, A coded

Protection

IP 65 to EN 60529

Ambient temperature

Max. 70 °C

Weight

Approx. 2.5 kg

Name plate / marking











   <p>Betriebsanleitung beachten See installation instructions Voir instructions de montage</p>	<p>Safety note</p>	   <p>Betriebsanleitung beachten See installation instructions Voir instructions de montage</p>
<p>LRG 16 - 40</p>	<p>Equipment designation</p>	<p>LRG 16 - 41</p>
<p>Leitfähigkeitselektrode Conductivity electrode Electrode de mesure de conductibilité</p>		<p>Leitfähigkeitselektrode Conductivity electrode Electrode de mesure de conductibilité</p>
<p>PN40 G1 1.4571 IP65</p>	<p>Pressure rating, thread type, material number</p>	<p>PN40 G1 1.4571 IP65</p>
 <p>P_{max} 32 bar (464psi) T_{max} 238°C (460°F)</p>  <p>T_{amb} = 70°C (158 °F)</p>	<p>Pressure/temperature rating</p>	 <p>P_{max} 32 bar (464psi) T_{max} 238°C (460°F)</p>  <p>T_{amb} = 70°C (158 °F)</p>
<p>0,25-6000ppm 0,5-12000µS/cm</p>	<p>Measuring range</p>	<p>50-5000ppm 100-10000µS/cm</p>
<p>18-36 V DC</p>	<p>Power rating</p>	<p>18-36 V DC</p>
<p>IN/OUT: CAN-Bus</p>		
<p>Node ID: _ _ _ _</p>		
<p>TÜV.WÜL. xx - 007</p>	<p>CE marking</p>	<p>TÜV.WÜL. xx - 007</p>
<p>GESTRA AG Münchener Str. 77 D-28215 Bremen</p>	<p>Disposal note Manufacturer</p>	<p>GESTRA AG Münchener Str. 77 D-28215 Bremen</p>
<p>VS-Nr.:</p>	<p>Mat-Nr.:</p>	<p>VS-Nr.:</p>
		<p>Mat-Nr.:</p>

Fig. 1

Dimensions

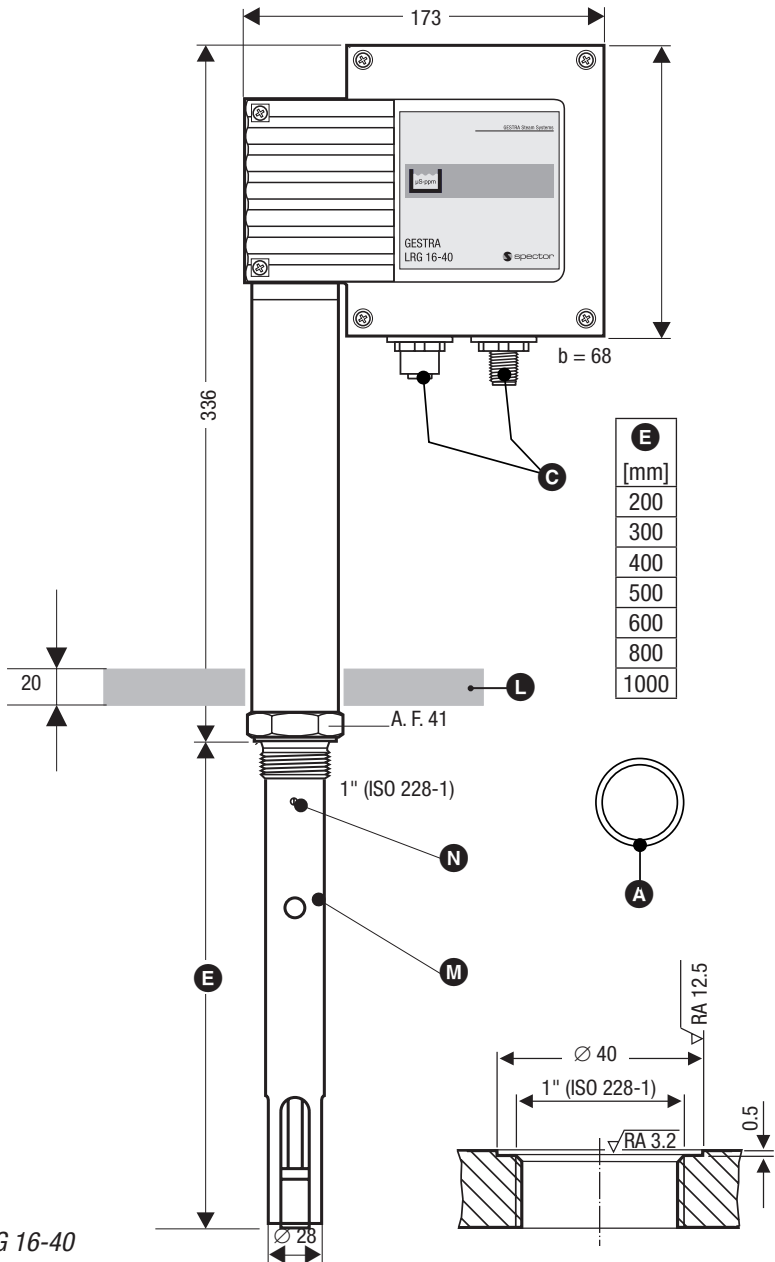


Fig. 2 LRG 16-40

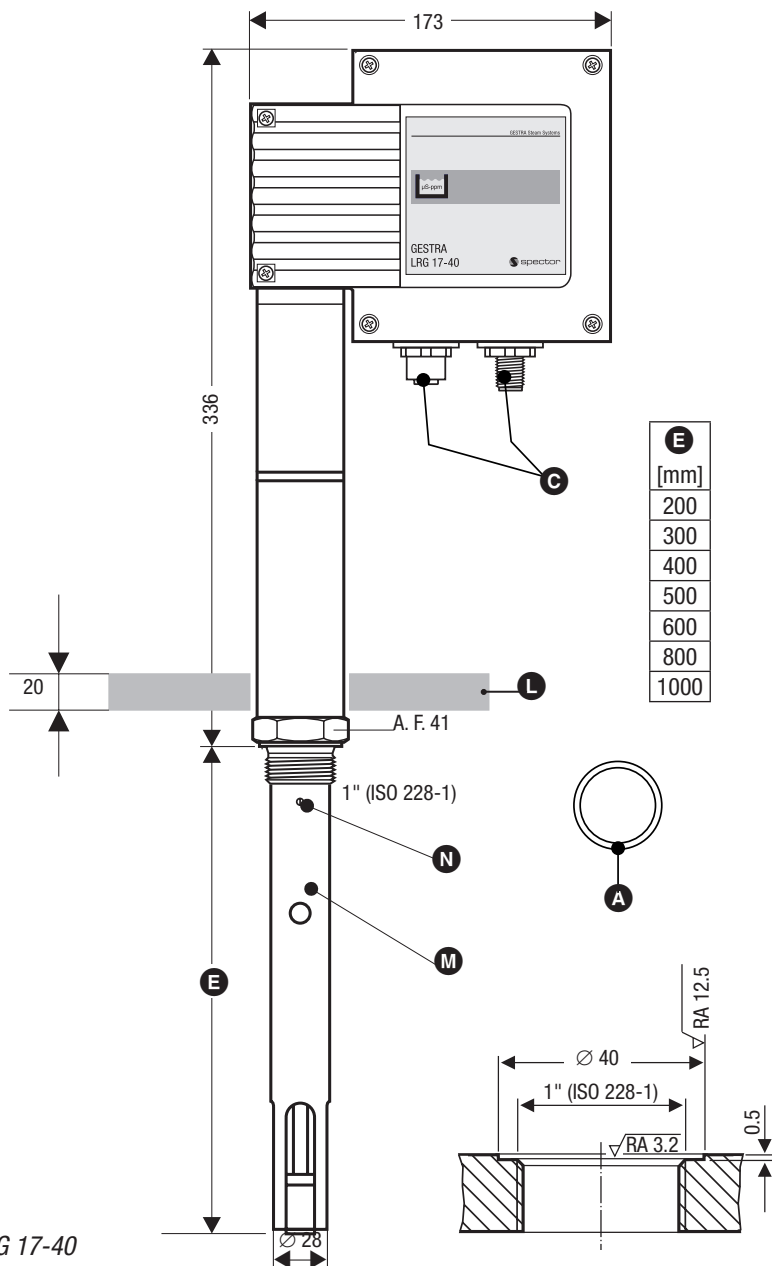


Fig. 3 LRG 17-40

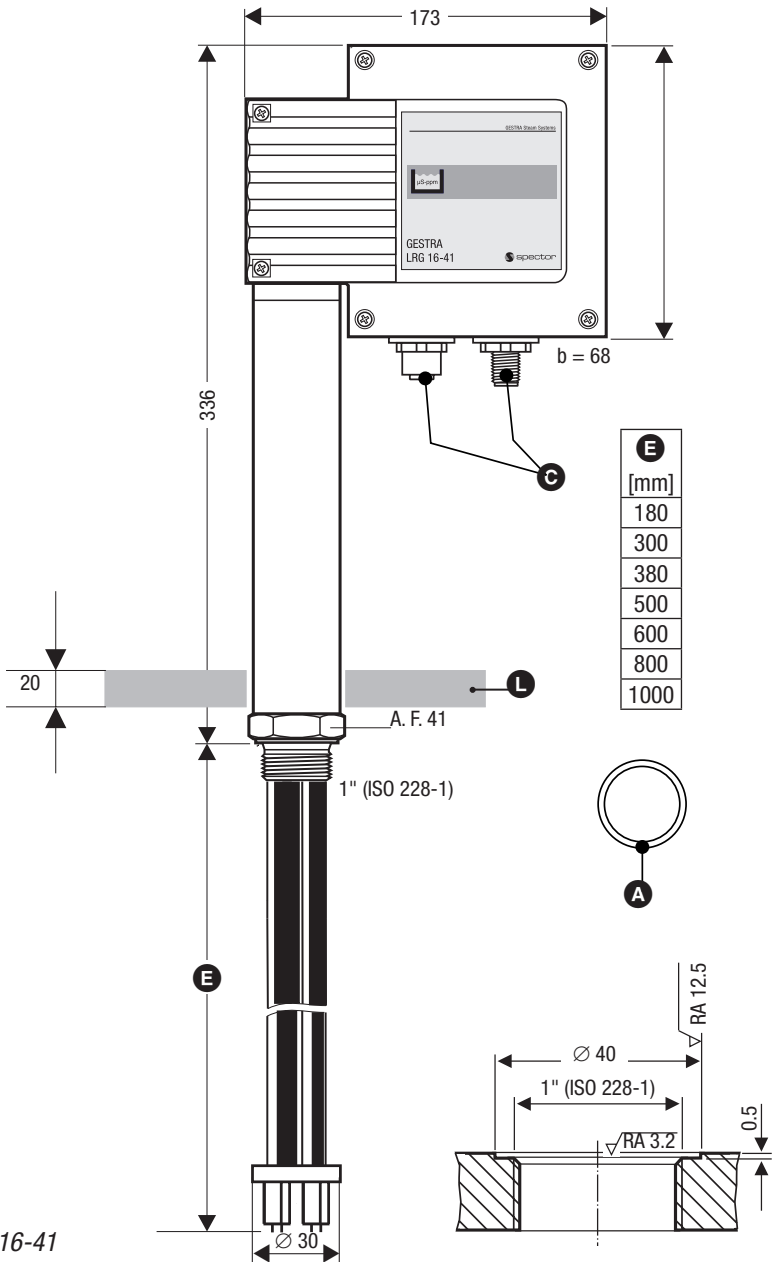


Fig. 4 LRG 16-41

Functional Elements

LRG 16-40, LRG 16-41, LRG 17-40

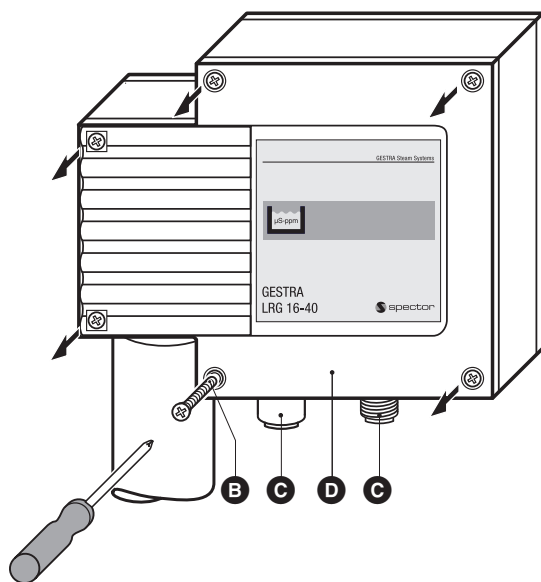


Fig. 5

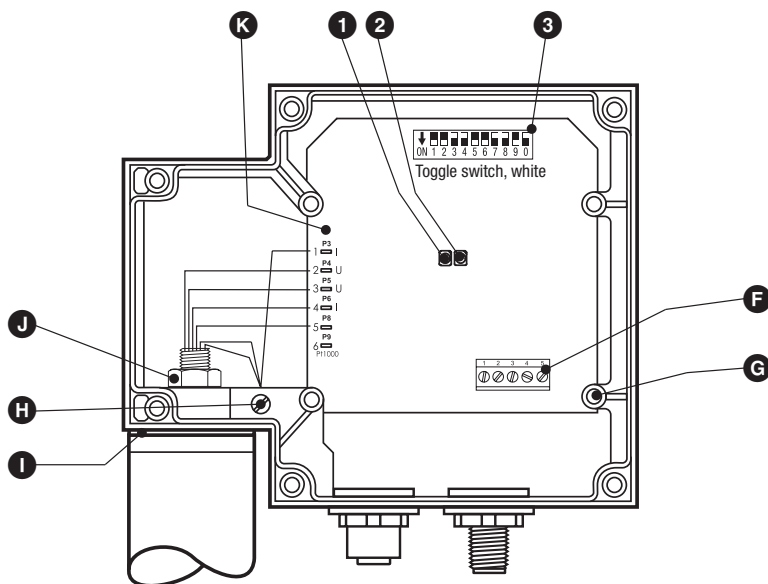


Fig. 6 LRG 16-40 (Shown without cover plate)

Key

- ① LED 1 (green)
- ② LED 2 (red)
- ③ Code switch

- Ⓐ Joint ring \varnothing 33 x 39, form D, DIN 7603, material: 2.4068, bright-annealed
- Ⓑ Cover screws (cross recess head screws M4)
- Ⓒ M 12 sensor connector / jack, 5 poles, A coded
- Ⓓ Cover
- Ⓔ Length of installation and measuring length
- Ⓕ Terminal strip
- Ⓖ Fixing screws for electronic circuit board
- Ⓗ Connection for functional earth
- Ⓘ Gasket
- Ⓙ Fixing nut for terminal box
- Ⓚ Terminal lugs for electrode wires, functional earth
- Ⓛ Thermal insulation
- Ⓜ Measuring tube
- Ⓝ Set screw M 2.5 DIN 913

Installation

Installation notes



Attention

- The seating surfaces and threads on the vessel and mounting flange must be accurately machined.
- Use only the supplied ring joint $\varnothing 33 \times 39$, form D, to DIN 7603, material: 2.4068, bright-annealed!
- Do not insulate the threads with hemp or PTFE tape!
- Install electrode horizontally or with a vertical inclination. The measuring surface must be permanently submerged.
- The specified torques must be strictly observed.
- Do not lag the electrode body.

LRG 16-40, LRG 17-40

- Provide a spacing of approx. **30 mm** between the lower end of the measuring tube and the boiler wall, the smoke tubes and any other metallic fittings as well as the low water level.
- Do **not** cut the measuring electrode and the measuring tube!

LRG 16-41

- Provide a spacing of approx. **60 mm** between the lower end of the measuring tube and the boiler wall, the smoke tubes and any other metallic fittings as well as the low water level.
- Do **not** cut the measuring electrodes!
- Avoid subjecting the electrode to shocks.



Note

- For the approval of the boiler standpipe the relevant local and national regulations must be observed.
- Three examples of installation are shown on pages 17 and 18.

Mounting conductivity electrode

1. Check seating surfaces of threads or mounting flange provided on vessel or boiler standpipe (see **Fig. 2, 3, 4**). If necessary rework the surfaces according to the specifications indicated in the drawing.
2. Place joint ring **A** onto the seating surface of the conductivity electrode.
3. Apply a light smear of silicone grease to the electrode thread.
4. Screw conductivity electrode into thread or flange provided on vessel or boiler standpipe and tighten with an open-end spanner A. F. 41 mm. The torque required when cold is 150 Nm.

Example of Installation

Conductivity metering, direct installation of electrode via lateral flanged connection

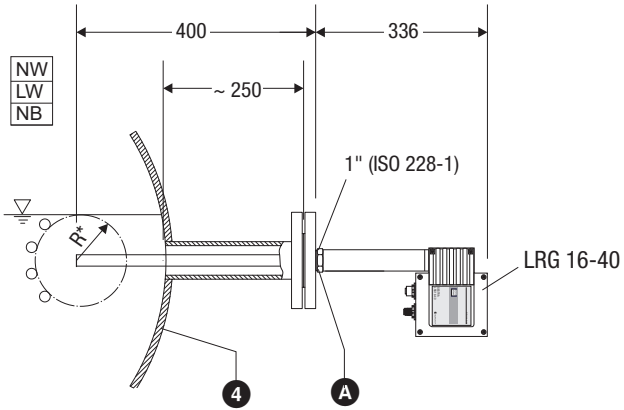


Fig. 7

R*: LRG 16-40, LRG 17-40 R = 30 mm
 LRG 16-41 R = 60 mm

Conductivity metering and continuous boiler blowdown, direct installation of electrode via measuring pot and connection of continuous blowdown valve

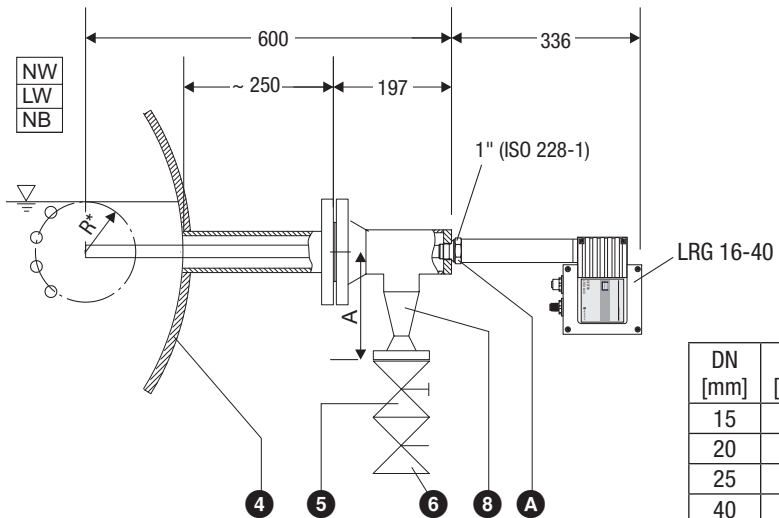


Fig. 8

R*: LRG 16-40, LRG 17-40 R = 30 mm
 LRG 16-41 R = 60 mm

DN [mm]	A [mm]
15	182
20	184
25	184
40	189

Example of Installation – continued –

Conductivity metering and continuous boiler blowdown, installation of electrode in top blowdown line via separate measuring pot

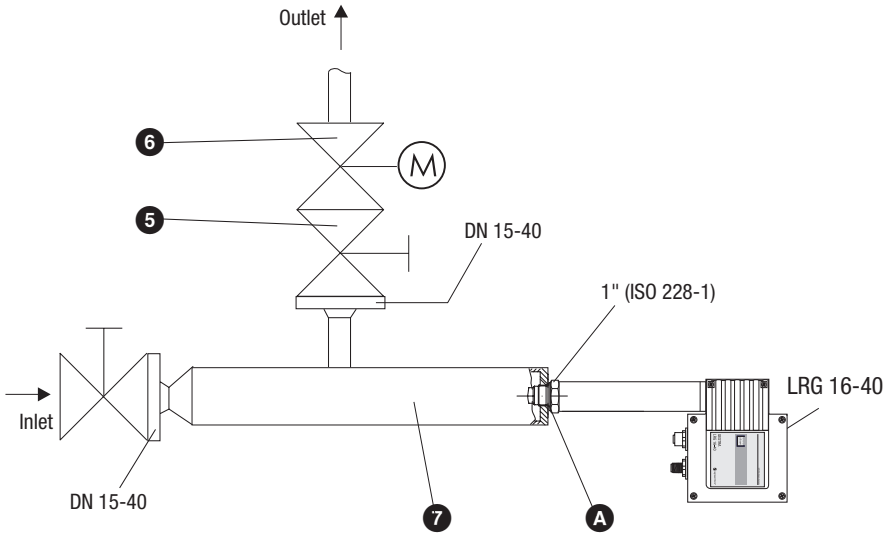


Fig. 9

Key

- A** Joint ring \varnothing 33 x 39, form D, DIN 7603, material: 2.4068, bright-annealed
- 4** Boiler drum
- 5** Shut-off valve GAV
- 6** Continuous blowdown valve BAE
- 7** Measuring pot
- 8** T-type connecting piece

Tools

- Open-end spanner A. F. 18 (19) mm
- Open-end spanner A. F. 41 mm
- Screwdriver for socket-head cap screws size 1.3
- Screwdriver for cross recess head screws, size 1 and 2

Wiring

LRG 16-40, LRG 16-41, LRG 17-40

The terminal box is screwed to the electrode and secured by a self-locking fixing nut.

Before wiring you can turn the terminal box by max. $\pm 180^\circ$ into the desired direction (cable outlet).

Bus cable


The conductivity electrode is equipped with M12 sensor connectors (5 poles, A-coded), assignment see **Fig. 10**. Control cable assemblies (with connector and coupler) of various lengths are available as accessories.

Note that the recommended control cables are not UV-resistant and 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 – e.g. UNITRONIC® BUS CAN 2 x 2 x...mm² or Li 2YCY 2 x 2 x...mm² as bus cable or the pre-assembled control cable that is available as accessory.

The baud rate (data transfer rate) dictates the cable length 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 ²]
OFF	ON	OFF	250 kBit/s	125 m	2 x 2 x 0.34
Factory setting					
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	available on demand (depends on bus configuration)
OFF	ON	ON	20 kBit/s	1000 m	
ON	ON	ON	10 kBit/s	1000 m	

The baud rate is set via code switches  (S8 to S10), **Fig. 6**. Default factory setting of conductivity electrode LRG: baud rate 250 kbit/s (cable length 125 m).

For longer cable lengths reduce baud rate accordingly. Make sure that all bus nodes feature the same settings.



Note

The max. baud rates and cable lengths indicated above are based on empirical values obtained by GESTRA. In certain cases it may be necessary to reduce the baud rate in order to ensure operational safety.

The design and preparation of the data cable is an important factor for the electro-magnetic compatibility (EMC) of the equipment. Wiring should therefore be carried out with special care.

If you do not use the preassembled control cable, connect the connector and the jack for the CAN bus lines according to the wiring diagram, **Fig. 10**.

Assignment of sensor connectors

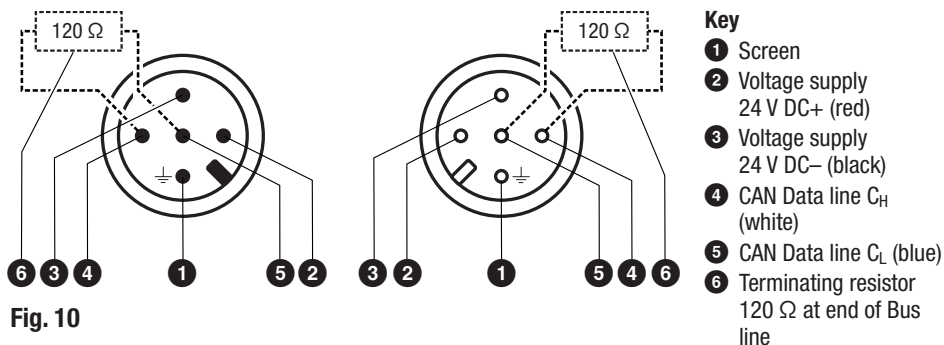


Fig. 10



Attention

- Wire equipment in series. Star-type wiring is not permitted!
- Connect the screen of the bus line to pin 1, **Fig. 10**.
- Connect screens of bus lines such that electrical continuity is ensured and connect them to the central earthing point (CEP) in the control cabinet.
- If equipotential bonding currents (outdoor installations) are to be expected, disconnect the screens from the central earthing point.
- If two or more system components are connected in a CAN bus network, the first and the last devices must be provided with a terminating resistor 120 Ω (electrode pin 4: C_H, pin 5: C_L; control unit terminal 2: C_L, terminal 4: C_H)
- The CAN bus data line must not be interrupted during operation.
In the event of an interruption an alarm message will be generated.

Wiring diagram for CAN Bus system (example)

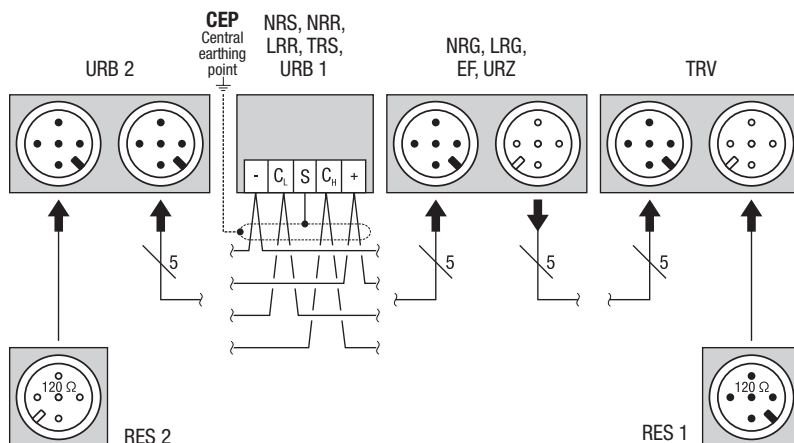


Fig. 11

Wiring diagram of conductivity electrode LRG 16-40, LRG 17-40

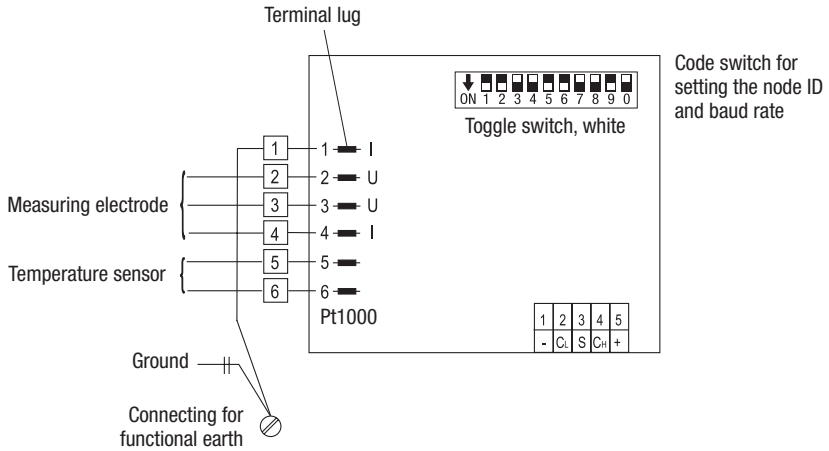


Fig. 12

Wiring diagram of conductivity electrode LRG 16-41

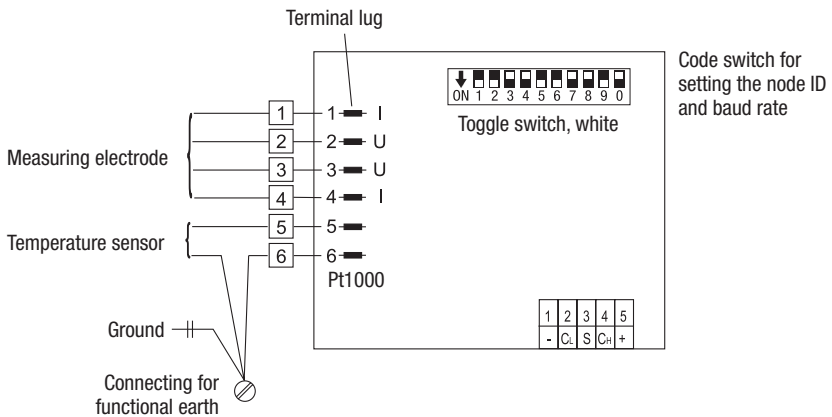


Fig. 13

CAN Bus voltage supply

To guarantee the troublefree operation of a CAN bus system make sure that the voltage supply is of sufficient magnitude.

Please use the follow table to check the voltage supply of your bus system.

Control devices with voltage supply	Qty.	x	Power output per equipment	=	Sum 1
		x	6 W	=	W

Sensor, transmitter, control units, operating & display unit URB 1	Qty.	x	Power input per equipment	=	Sum
		x	3 W	=	W
Operating & display unit URB 2		x	5 W	=	W
Sum 2				=	W

If **sum 2** exceeds **sum 1** feed the CAN bus with 24 V DC from a separate stabilised safety power supply unit (e. g. SITOP Smart 24 V 2.5 A).

The power supply unit must feature electrical isolation for protection against dangerous contact voltage. To ensure safe electrical isolation the separating equipment must meet the requirements for double or reinforced isolation as specified in DIN EN 50178 or DIN 61010-1 or DIN EN 60730-1 or DIN EN 60950.

The power supply unit must be provided with an overcurrent protective device according to EN 61010-1.

The CAN bus supply must then not be connected to the control units (terminals 1 and 5).

Tools

- Screwdriver for cross-recess head screws, size 1
- Screwdriver for slotted screws, size 2.5, completely insulated acc. to VDE 0680-1
- Open-end spanner A. F. 12 mm
- Open-end spanner A. F. 18 (19) mm

Basic Settings

CAN bus

All devices (level, conductivity) are interconnected via CAN bus. The CANopen protocol is used for the data exchange between the equipment groups. All devices have an electronic “address” – the node ID. The four-core bus cable serves as power supply and data highway for high-speed data exchange.

The CAN address (node ID) can be set between **1 and 123**.

The conductivity electrode LRG has already been configured at our works for operation with other GESTRA components and can be used straight away without having to set the node ID.

Node ID

Should it be necessary to establish other node IDs please take the interdependence of the equipment into consideration and assign the node IDs for the individual group components according to the following table:

Control unit URZ 40a Continuous blowdown valve BAE 46, BAE 47	Control device LRR 1-40	Conductivity electrode LRG 1x-40	Reserved
X – 1	X	X + 1	X + 2
49	50	51	52
		Factory setting	

Reserved area

Factory settings

The conductivity electrode features the following factory set default values:

- Baud rate: 250 kbit/s (125 m bus cable length)
- Node ID: 051

Enter the assigned node ID on the name plate.

Establishing / changing node ID

In order to enable communication within the CAN bus system, each item of equipment (e.g. controller) must have a unique node ID.

Terminal box open:

1. Use a thin blade screwdriver to set the node ID via code switches ③ S1 – S7. Use the table as reference.
2. Replace terminal cover ④ and fasten cover screws ⑤ tightly.
3. Enter the adjusted node ID on the name plate.
4. If necessary (refer to installation instructions) change the node ID of the control equipment LRR 1-40.



Attention

The same node ID must not be used for more than one item of equipment in the CAN bus system. The node ID 0 is not permissible.

Node-ID, Baud rate

In a CAN bus system a maximum of 123 nodes (devices) can be managed. Each node has its own address (node ID). This address can be set via a 10-pole code switch ③, Fig. 4.



Toggle switch, white

		Node ID	51
S1	ON	1	
S2	ON	2	
S3	OFF	4	
S4	OFF	8	
S5	ON	16	
S6	ON	32	
S7	OFF	64	

(Factory setting)



Toggle switch, white

		Node ID	71
S1	ON	1	
S2	OFF	2	
S3	ON	4	
S4	ON	8	
S5	OFF	16	
S6	OFF	32	
S7	ON	64	

(Example)

S 8	S 9	S 10	Baud rate	Cable length
OFF	ON	OFF	250 kBit/s	125 m
Factory setting				
ON	ON	OFF	125 kBit/s	250 m
OFF	OFF	ON	100 kBit/s	335 m
ON	OFF	ON	50 kBit/s	500 m
OFF	ON	ON	20 kBit/s	1000 m
ON	ON	ON	10 kBit/s	1000 m

Commissioning

Check wiring

Before commissioning the equipment please check:

- Is the wiring of all CAN bus devices in accordance with the wiring diagrams?
- Is the polarity of the bus line always correct?
- Are the bus lines of the first and last devices provided with 120 Ω terminating resistors?

Apply mains voltage

- Apply mains voltage to control unit LRR 1-40 or apply bus supply voltage.
- The green LED **1** Fig. 6 lights up and goes out approx. every 5 s. The data exchange is continuous.

Setting parameters

Use operating device URB or SPECTOR*control* to configure, parameterize, operate and show the control parameters of the conductivity electrode.

Malfunctions

Fault finding list for troubleshooting

Equipment does not work

Fault: No voltage supply, no function.

Remedy: Check voltage supply and wiring.

Fault: The electronic circuit board is defective.

Remedy: Replace electronic circuit board.

Only the red LED 2 is flashing

Fault: Conductivity electrode defective (internal connecting wires are short circuited or interrupted, insulating seal defective).

Remedy: Replace conductivity electrode.

Fault: Measuring surface of conductivity electrode is exposed.

Remedy: Check installation and make sure that the measuring surface is submerged.

Fault: The measuring surface is contaminated and therefore an incorrect actual value is indicated (ascertained by reference measurement).

Remedy: Remove conductivity electrode and clean measuring surface.

Fault: Dirt deposits on the measuring surface cause MAX or MIN alarms although the actual value is between these limits (reference measurement).

Remedy: Remove conductivity electrode and clean measuring surface.

Fault: The earth connection to the vessel is interrupted. No function.

Remedy: Clean seating surfaces and screw in the equipment together with the supplied joint ring \varnothing 33 x 39, form D, DIN 7603 (material: 2.4068, bright-annealed). Do not insulate the electrode with hemp or PTFE tape!

Green LED 1 and red LED 2 are flashing alternately

Fault: The thermal fuse has been triggered.

Remedy: Check installation. The ambient temperature must not exceed 70°C. As soon as the temperature falls below the max. admissible limit, the equipment switches back to operating mode.

Fault: The fluid temperature sensor is either short circuited or interrupted.

Remedy: Replace conductivity electrode.

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

Fault finding list for troubleshooting – continued –

Green LED 1 and red LED 2 are not illuminated

Fault: The electrode and the control unit cannot communicate.

Remedy: Check 24 V bus supply, wiring, node ID, baud rate and terminating resistors.
If modifications have to be made, switch off the mains voltage and switch it on again after about 5 sec.

Cleaning measuring electrode

The equipment must only be installed and removed by qualified and competent staff.

For more information refer to chapter “Installation” on page 16.

Before cleaning the measuring electrode(s), decommission and remove the conductivity electrode. We recommend cleaning the electrode at least once a year, e. g. as part of maintenance work.

LRG 16-41

Clean the electrode rods.

LRG 16-40, LRG 16-41, LRG 17-40

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

Replacing electronic circuit board

1. Undo cover screws **E** and remove terminal cover **D**.
2. Pull the electrode wires out of the terminal lugs **K** on the circuit board.
Remove terminal strip **F**.
3. Undo earth connection **H**.
4. Unscrew the fixing screws **G** of the electronic circuit board and take out the circuit board. The circuit board is available as spare part type LRV 1-41 for LRG 16-40, LRG 17-40 and type LRV 1-43 for LRG 16-41.
5. Install the new electronic circuit board in reverse order.



Note

When ordering spare parts please state the material number and the length indicated on the name plate LRG/LRGT.

After replacing the electronic circuit board carry out reference measurements in order to check the conductivity readings indicated by the operating device URB or SPECTOR*control*.

If deviations occur correct the cell constant of the electrode. Observe the installation instructions of URB or SPECTOR*control*.

Decommissioning

Replacing conductivity electrode

1. Switch off power supply for all control units of the CAN bus system.
2. Undo cover screws **B** and remove terminal cover **D**.
3. Unplug terminal strip **F**.
4. Remove conductivity electrode.
5. Install and connect new conductivity electrode.
6. Apply supply voltage to all control units.



Danger

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



Attention

The CAN-bus data line must not be interrupted during operation. Before removing bus cables from the terminal strip make sure that all connected devices are out of service. If data lines of equipment sending data are interrupted a malfunction message will be generated.

Disposal

Remove the conductivity electrode and separate the waste materials in accordance with the material specification.

Electronic components (boards) must be disposed of separately.

For the disposal of the conductivity electrode observe the pertinent legal regulations concerning waste disposal.

For your notes

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Agencies all over the world: www.gestra.de

GESTRA AG

Münchener Straße 77

28215 Bremen

Germany

Telefon +49 421 3503-0

Telefax +49 421 3503-393

E-mail info@de.gestra.com

Web www.gestra.de