GESTRA®

Conductivity Switch

LRS 1-50

EN (USA)
English

Original Installation &
Operating Manual
850704-01

Contents

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- Conductivity Switch LRS 1-50

First edition:

BAN 850704-00/09-2021cm

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LRS 1-50

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1 adhesive sign for ppm
1 Installation & Operating Manual

How to use this Manual

This Installation & Operating Manual describes the correct use of the LRS 1-50 conductivity switch. It applies to persons who integrate this equipment in control systems, install, bring into service, operate, maintain and dispose of this equipment. Anyone carrying out the above-mentioned activities must have read this Installation & Operating Manual and understood its contents.

- Read this Manual in full and follow all instructions.
- Please also read the instructions for use of any accessories.
- The Installation & Operating Manual is part of the product package. Keep it in an easily accessible location.

Availability of this Installation & Operating Manual

- Make sure this Installation & Operating Manual is always available to the operator.
- If you pass on or sell the equipment to a third party, please also hand over the Installation & Operating Manual.

Illustrations and symbols used

1. Action to be taken
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- Lists
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Additional information

Read the relevant Installation & Operating Manual

Hazard symbols in this Manual

Danger zone, dangerous situation

Types of warning

⚠ DANGER

Warning of a dangerous situation that results in death or serious injury.

⚠ WARNING

Warning of a dangerous situation that may possibly result in death or serious injury.

⚠ CAUTION

Warning of a situation that may result in minor or moderate injury.

⚠ ATTENTION

Warning of a situation that results in damage to property or the environment.

Specialist terms, abbreviations

Here, we explain some abbreviations, specialist terms, etc., which are used in this Manual.

NRGT .. / NRR.. / NRS.. / URS .. / URB .. / SRL .. / etc.

Equipment and type designations of GESTRA AG.

SELV

Safety Extra Low Voltage

Operating point (of the plant)

The operating point describes the operating parameters within which a plant or boiler is operated in its nominal range. In a steam boiler, for example, these parameters would be output, pressure, and temperature.

The design data may be a lot more stringent, however.

A boiler that is operated at 145 psi (10 bar) and 356°F (180°C) may be designed to withstand a pressure of 870 psi (60 bar) and a temperature of 527°F (275°C), for example, which is therefore not necessarily its operating point.

Usage for the intended purpose

The LRS 1-50 conductivity switch is used in combination with LRG 1.-.. conductivity electrodes as a limit switch, e.g., in steam boilers and hot water installations or in condensate and feedwater tanks. The conductivity switch indicates when a MIN and MAX conductivity has been reached. The LRS 1-50 is classified as an operating control in accordance with UL 60730-1.

When used as intended, the LRS 1-50 conductivity switch can be combined in a circuit with the LRG 16-4 and LRG 16-9 conductivity electrodes.

Improper use

There is a danger of death due to explosion if the equipment is used in potentially explosive atmospheres.

Do not use the equipment in potentially explosive atmospheres.

Do not bring any equipment into service that does not have its own specific rating plate.

The rating plate indicates the technical features of the equipment.

Basic safety information

There is a risk of electric shock during work on electrical systems.

- Always switch off the voltage to the plant before performing connection work.
- Check that the plant is not carrying live voltage before commencing work.

Attempts to repair the equipment will cause the plant to become unsafe.

- The LRS 1-50 conductivity switch may only be repaired by the manufacturer, GESTRA AG.
- Only replace faulty equipment with identical equipment from GESTRA AG.

Required personnel qualifications

Activity	Personnel	
Integration in control system	Specialist staff	Plant designer
Installation/electrical connection/ bringing into service	Specialist staff	The equipment may only be installed, wired and brought into service by qualified and competent staff.
Operation	Boiler service technician	Staff trained by the plant operator.
Maintenance work	Specialist staff	Fitting and maintenance work may only be performed by authorized staff who have undergone specific training.
Refits	Specialist staff	Persons trained by the plant operator to work with pressure and temperature.

Notes on product liability

The manufacturer cannot accept any liability for damages resulting from improper use of the equipment.

Function

The **LRS 1-50 conductivity switch**, in conjunction with the LRG 1.-.. conductivity electrode, measures conductivity in conductive fluids. The conductivity electrode used is the LRG 16-4 conductivity electrode, or the LRG 16-9 with integrated resistance thermometer for monitoring the fluid temperature.

When the **LRG 1.-.. conductivity electrode** is connected, a reference measurement is taken and a correction factor **CF** is adjusted to adapt the conductivity measurement to the specific conditions of the installation.

When a resistance thermometer is connected, the temperature of the water is measured as well as its conductivity. This enables the change in conductivity caused by rising water temperatures to be compensated and based on the standardized reference temperature of 77 °F (25 °C).

To do this, the temperature of the water is measured in the conductivity switch and the conductivity reading is automatically compensated as a function of the adjusted temperature coefficient **tC** (%/°C). If the temperature changes, thanks to linear temperature compensation the reading is referenced to 77 °F (25 °C) over the entire measuring range, and indicated as an actual value on the 7-segment LED display.

The MIN/MAX limits can be varied as desired within the measuring range.

If the MIN or MAX limit is reached, the MIN or MAX output contact switches and the MIN or MAX LED lights up. It switches back when the value is above or below the preset hysteresis.

Faults in the conductivity electrode or electrical connection and setting errors are shown on the 7-segment LED display. In the event of a malfunction, the MIN and MAX alarm is triggered.

If faults occur only in the LRS 1-50 conductivity switch, the MIN and MAX alarm is triggered and the system is restarted.

Parameters can be changed and the MIN/MAX alarm simulated by turning the rotary knob.

Electrical conductivity is measured in µS/cm. In some countries, ppm (parts per million) is used as well. Conversion 1 µS/cm = 0.5 ppm. You can set the conductivity switch to the required unit.

Safety information

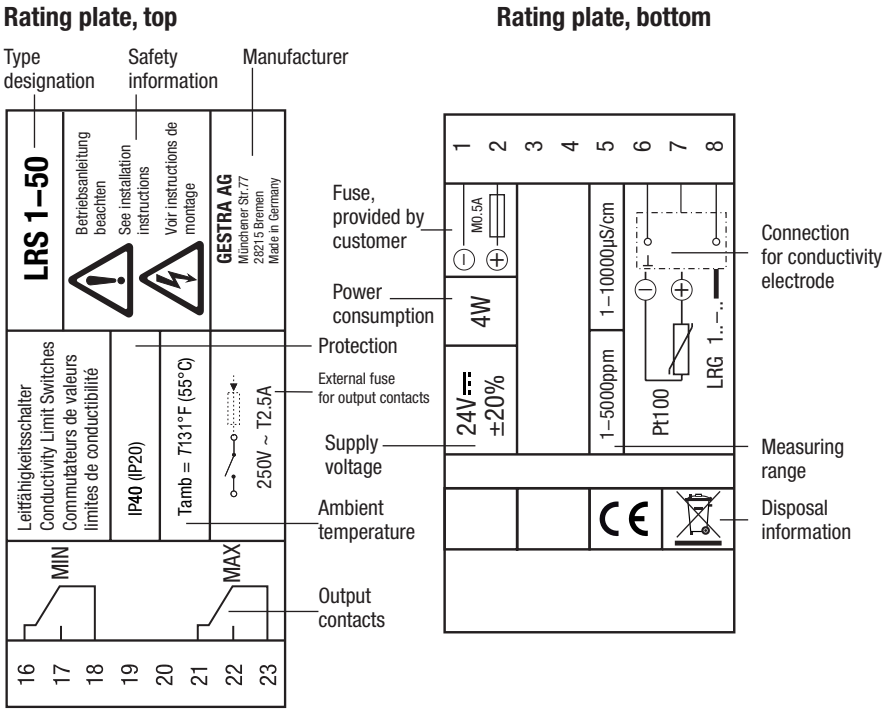
The equipment may only be installed, wired and brought into service by qualified and competent staff.

Fitting and maintenance work may only be performed by authorized staff who have undergone specific training.

Technical data

Supply voltage
24 VDC +/– 20%; PELV / CLASS2
Fuse
External M0.5A (medium time-lag)
Power consumption
4 W
Connecting a conductivity electrode
1 input for LRG 16-4 conductivity electrode (cell constant 1 cm^{-1}), 2-pole with shield,
1 input for LRG 16-9 conductivity electrode (cell constant 0.5 cm^{-1}), with integrated resistance thermometer Pt100, 5-pole with shield.
Measuring voltage
0.8 Vss, pulse duty factor tv = 0.5, frequency 20-10000 Hz.
Measuring range
1 to 10000 µS/cm at 77 °F (25 °C) or 1 to 5000 ppm at 77 °F (25 °C)
Switching hysteresis
MIN limit: + 3% of set MIN limit
MAX limit: – 3% of set MAX limit
Outputs
2 volt-free relay contacts, 8 A 250 V AC / 30 V DC cos φ = 1.
Inductive loads must have interference suppression (RC combination) as specified by the manufacturer.
Indicators and controls
1 rotary knob with integrated push-button for testing the MIN/MAX alarm and setting the parameters,
1 4-digit 7-segment LED display,
2 red LEDs for MIN/MAX alarm,
1 4-pole code switch for configuration.
Terminal box
Terminal box material: base of black polycarbonate, front of gray polycarbonate
Wire size: 1 x AWG12 (4.0 mm^2) solid, or
1 x AWG14 (2.5 mm^2) stranded with sleeve acc. to DIN 46228 or
2 x AWG16 (1.5 mm^2) stranded with sleeve acc. to DIN 46228 [min. ∅ 0.004 in (0.1 mm)]
Terminal strips can be removed separately
Terminal box attachment: Mounting clip on support rail TH 35, EN 60715
Electrical safety
Pollution degree 2, overvoltage category II according to UL 60730-1
Protection
Terminal box: IP 40 according to EN 60529
Terminal strip: IP 20 according to EN 60529
As a UL open type, the equipment must be installed in a control cabinet.
Weight
Approx. 0.44 lb (0.2 kg)
Ambient temperature
at power-on 32 ° ... 131 °F (0 ° … 55 °C)
in operation 14 ° … 131 °F (-10 ° … 55 °C)
Transport temperature
-4 ° … 176 °F (-20 ° … +80 °C) (<100 hours),
only switch on after a defrosting period of 24 hours.
Storage temperature
-4 ° … 158 °F (-20 ° … +70 °C), only switch on after a defrosting period of 24 hours.
Relative humidity
Max. 95%, non-condensing
Other information
Incorporated type 1 action operating control
Pollution degree 2, impulse voltage DC supply = 500 V, AC output = 2500 V

Example rating plate/identification



c UL us OPERATING CONTROL E513189	Input rating: 24VDC, 4W
	Output rating : Pilot duty B300 / R300
	Ambient temperature: 32–131°F (0–55°C)
	Wiring: Use Copper Conductors Only, Use 60/75°C Conductors, Use No.18-16 AWG Wire Size Only, Tightening: Torque 0.79Nm or 7lb in.
	Use with accessory: LRG 16–4, LRG 16–9

Fig. 1

Factory default settings

Conductivity Switch LRS 1-50

- MAX switchpoint AL.Hi = 3000 ppm (6000 µS/cm)
- MIN AL.Lo = 250 ppm (500 µS/cm)
- Switching hysteresis: +/– 3% (factory default)
- Correction factor CF: 1
- Temperature compensation inP: No
- Temperature coefficient tC: 2.1% / °C
- Damping FiLt: oFF
- Password PW: oFF
- Code switch ⓫: All switches OFF.

⚠ DANGER

There is a risk of electric shock during work on electrical systems.

- Switch off the voltage to the plant before you install the equipment.
- Check that the plant is not carrying live voltage before commencing work.

Dimensions of the LRS 1-50

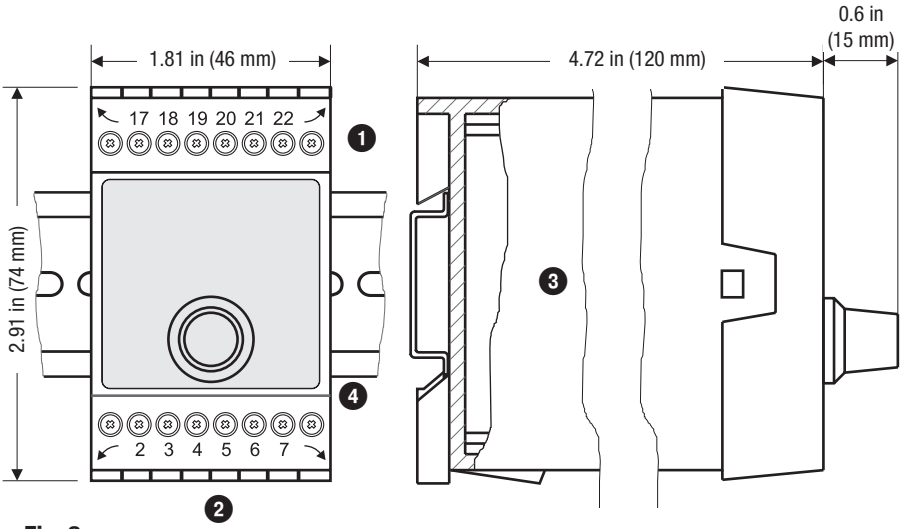


Fig. 2

Key

1. Upper terminal strip
2. Lower terminal strip
3. Terminal box
4. Support rail TH 35, EN 60715

Preparing for installation

If the control cabinet is to be installed outdoors, outside the protection of a building, environmental influences may adversely affect function.

- Pay attention to the admissible ambient conditions in the technical data, see page 12.
- Do not operate the equipment if the temperature is below freezing.
  - At temperatures below freezing, use a suitable heat source (e.g., control cabinet heater, etc.).
- Connect all parts of the plant to a central grounding point to prevent equalizing currents.
- Use UV-resistant cable ducts for routing the connecting cable.
- Take further measures to protect the equipment from lightning, insects and animals, and salty air.

You will need the following tools:

- Screwdriver size 1/8 in (3.2 mm)

Installing the LRS 1-50 conductivity switch

The LRS 1-50 conductivity switch snaps onto a TH 35, EN 60715 support rail in a control cabinet. **Fig. 2** ❹

⚠ DANGER

There is a risk of electric shock during work on electrical systems.

- Switch off the voltage to the plant before you install the equipment.
- Check that the plant is not carrying live voltage before commencing work.

1. Switch off the voltage to the plant and secure any surrounding equipment in the control cabinet that is live, so it cannot be touched.
2. Carefully press the unit onto the support rail until the holder clips into place.

In the control cabinet: Electrically connecting the conductivity switch

Wiring diagram of conductivity switch LRS 1-50

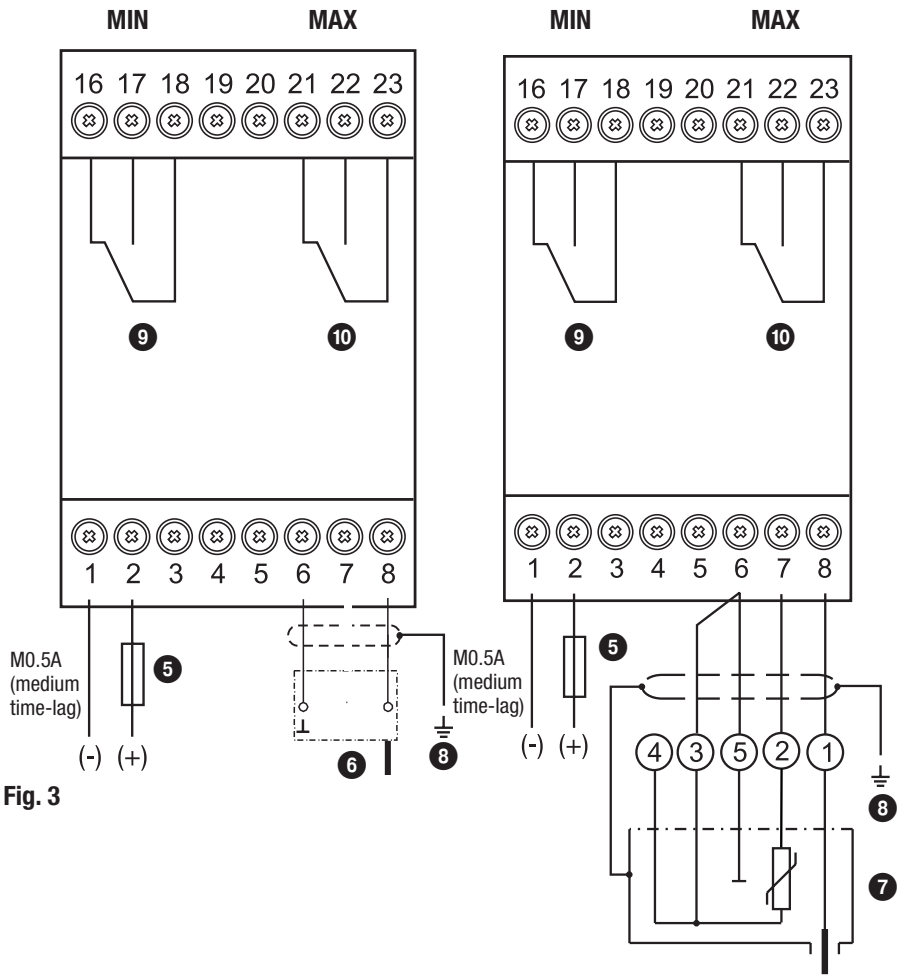


Fig. 3

Key

- **5** Connection of supply voltage 24 V DC with 0.5A medium time-lag fuse provided by customer
- **6** Conductivity electrode LRG 1.-..
- **7** Conductivity electrode LRG 16-9 with integrated resistance thermometer
- **8** Central grounding point (CGP) in control cabinet
- **9** MIN output contact
- **10** MAX output contact

In the control cabinet: Electrically connecting the conductivity switch

Supply voltage connection

The equipment is supplied with 24 V DC (PELV / CLASS2) and has an external 0.5A medium time-lag fuse. Please use a safety power supply unit with protective electrical isolation.

This power supply unit must provide a level of isolation against dangerous contact voltages that at least meets the requirements for double or reinforced insulation in accordance with standard UL 60730-1.

Connecting the output contacts

Connect the upper terminal strip ❶ (terminals 16-23) according to the desired switching functions. Provide the output contacts with an external 2.5A slow blow fuse.

Switching off inductive loads produces surges that can have a major adverse effect on open and closed-loop control systems. Connected inductive loads must therefore have interference suppression (RC combination) as specified by the manufacturer.

If used as a conductivity limiter, the LRS 1-50 conductivity switch does not interlock automatically when the MAX limit is exceeded.

If the installation requires an interlock, this must be implemented in the downstream (safety) circuit.

Connecting the LRG 16-4 conductivity electrode

Use a shielded TC-ER control cable with minimum wire size AWG18 e.g., OELFLEX CONTROL TM CY 3G1, to connect the equipment.

Connect the terminal strip as shown in the wiring diagram in **Fig. 3.**
Connect the shield to the central grounding point (CGP) in the control cabinet.

Route the connecting cable between items of equipment separately from power lines.

Connecting the LRG 16-9 conductivity electrode

The LRG 16-9 conductivity electrode is equipped with an M12 A-coded, 5-pole sensor connector, see **Fig. 3** for assignment. A pre-wired control cable (with connector and socket) is available in various lengths as an accessory for connecting the equipment.

To connect the LRS 1-50 conductivity switch, please remove the connector and wire the terminal strip as shown in the wiring diagram in **Fig. 3.** Generalized wire colors cannot be provided here, because the cables originate from different manufacturers. Please take the cable pin assignment into consideration before connection.

Connect the shield to the central grounding point (CGP) in the control cabinet.

If you are not using the pre-wired control cable, lay a shielded TC-ER control cable with minimum wire size AWG18, e.g., OELFLEX CONTROL TM CY 5G1, as a connecting cable. In addition, connect a socket, e.g., Binder series 713 99-0436-58-05, to the control cable at the electrode end.

Route the connecting cable between items of equipment separately from power lines.

Attention

- Do not use unused terminals as support terminals.

In the plant:
Electrically connecting the conductivity electrode

Connecting the LRG 16-4 conductivity electrode

Use a shielded TC-ER control cable with minimum wire size AWG18 e.g., OELFLEX CONTROL TM CY 3G1, to connect the equipment.

Connect the terminal strip as shown in the wiring diagram in **Fig. 3.**
Connect the shield to the central grounding point (CGP) in the control cabinet.

The cable length between the conductivity electrode/resistance thermometer and conductivity switch is max. 98.43 ft (30 m), or max. 32.81 ft (10 m) with a conductivity of 0.5-5 ppm (1-10 µS/cm).

Route the connecting cable between items of equipment separately from power lines.

Connecting the LRG 16-9 conductivity electrode

The LRG 16-9 conductivity electrode is equipped with an M12 A-coded, 5-pole sensor connector, see **Fig. 3** for assignment. A pre-wired control cable (with connector and socket) is available in various lengths as an accessory for connecting the equipment.

This control cable is not UV-resistant and must be protected with a UV-resistant plastic tube or cable duct if installation is outdoors.

To connect the LRS 1-50 conductivity switch, please remove the connector and wire the terminal strip as shown in the wiring diagram in **Fig. 3.** Generalized wire colors cannot be provided here, because the cables originate from different manufacturers. Please take the cable pin assignment into consideration before connection.

Connect the shield to the central grounding point (CGP) in the control cabinet.

If you are not using the pre-wired control cable, lay a shielded TC-ER control cable with minimum wire size AWG18, e.g., OELFLEX CONTROL TM CY 5G1, as a connecting cable. In addition, connect a socket, e.g., Binder series 713 99-0436-58-05, to the control cable at the electrode end.

The cable length between the conductivity electrode and switch is max. 98 ft (30 m), or max. 32 ft (10 m) with a conductivity of 0.5-5 ppm (1-10 µS/cm).

Route the connecting cable between items of equipment separately from power lines.

Attention

- Please bring the equipment into service as described in the LRG 16-4, LRG 16-9 Installation & Operating Manuals.
- Route the connecting cable between items of equipment separately from power lines.
- Check the connection of the shield to the central grounding point (CGP) in the control cabinet.

Changing the factory default settings

Changing the unit of measurement

Electrical conductivity measurement is set to µS/cm as default. In some countries, ppm (parts per million) is used instead. Conversion 1µS/cm = 0.5 ppm. Set the desired unit using the code switch ⓫. This setting will then apply to all conductivity readings and set values.

To change the setting, proceed as follows:

- Insert a screwdriver between the terminal strip and the front frame, at the arrow markings on the right and left.
- Release the terminal strip on the right and left by turning the screwdriver in the direction of the arrow.
- Detach the terminal strip.
- Set switch S4 of the code switch ⓫ to ON = ppm (parts per million)
- Insert the lower terminal strip.
- Switch the supply voltage back on. The equipment restarts.

Attention

Do **not** move switches S1, S2 and S3 on the code switch ⓫!

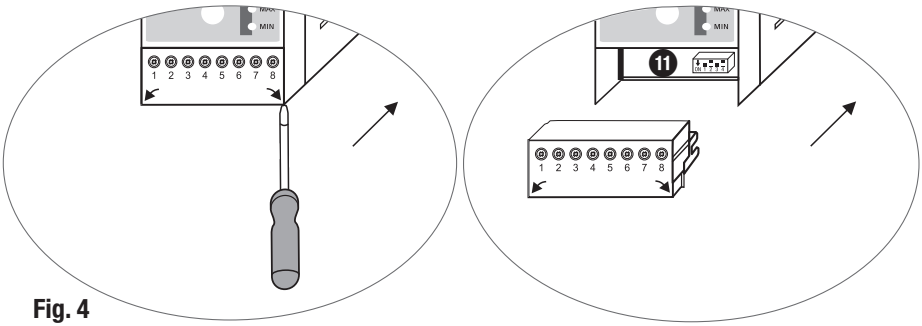


Fig. 4

Operating the conductivity switch

Meaning of codes on the 7-segment display

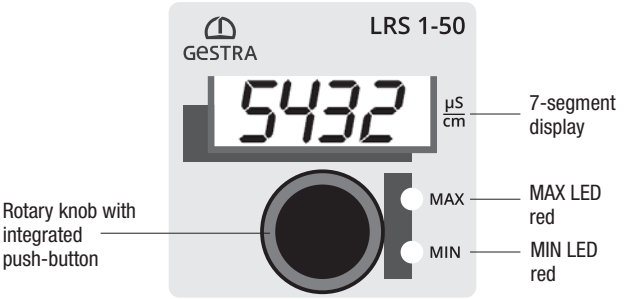


Fig. 5

Code	Meaning		
Indicated when rotary knob is turned clockwise:			
AL.Hi	Alarm High	MAX switchpoint	Adjustable from 0.5 to 5000 ppm (1 to 9999 µS/cm)
AL.Lo	Alarm Low	MIN switchpoint	
CAL	Electrode calibration	Electrode calibration, last reading is shown	
CF	Correction factor	Adjustable from 0.05 to 5.000 in increments of 0.001	
inP	Input for Pt100	Temperature compensation YES (no)	
tC	Temperature coefficient	T_k 0.0 – 3.0% per °C, adjustable in increments of 0.1	
tESt	Test	Test of output relays	
FiLt	Filter	Switching the filter on/off (damping)	
PW	Password	on = password protection is enabled oFF = password protection is disabled	
	Factory default settings	1902 (cannot be changed)	

Indicated in parameterization mode		
quit	Quit	Entry is not confirmed
done	Done	Entry is confirmed

Indicated in the event of errors		
E.001	Error	Faulty temperature sensor, temperature reading too low
E.002	Error	Faulty temperature sensor, temperature reading too high
E.005	Error	Faulty measured value acquisition, reading too low
E.006	Error	Faulty measured value acquisition, reading too high
E.013	Error	MIN switchpoint higher than MAX switchpoint

Bringing into service

Setting parameters

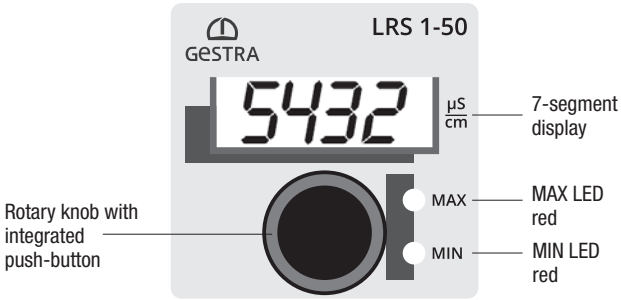


Fig. 5

Starting		
Action	**Indication**	**Function**
Switch on supply voltage. Electrode immersed, conductivity between MIN and MAX.	7-segment display shows software and equipment version	System test, takes approx. 3 s.
	7-segment display shows actual value	Switch to operating mode

Setting parameters		
Action	**7-segment display**	**Function**
Turn rotary knob until desired parameter is shown	Display toggles between parameter and saved value.	The parameter is selected
Press and hold the push-button (on rotary knob)	First digit (000**0**) flashes.	Parameterization mode active. You can change the first digit.
Turn rotary knob	A new value is displayed.	Turning clockwise increases the value, turning counterclockwise reduces the value.
Briefly press the push-button. The digit increases with each press	2nd, 3rd or 4th digit flashes (from right to left).	2nd, 3rd or 4th digit can now be changed using the rotary knob. Turning clockwise increases the value, turning counterclockwise reduces the value
If you take no further action:	quit is briefly displayed. After this, the display toggles between the parameter and the old value.	The system automatically returns to parameter settings and your entry is not confirmed.
When your entries are complete: Press and hold the push-button	done is briefly displayed. After this, the display toggles between the parameter and the new value.	Your entry is confirmed and the system automatically returns to parameter settings.
Turn the rotary knob until the next parameter is shown. Or turn the rotary knob until the actual value is displayed. Or after 30 s, the actual value is displayed automatically.		

If **password protection** is enabled, you must enter the password before changing a parameter. See section on password protection.

Bringing into service

Setting switchpoints and parameters

Setting the MIN/MAX switchpoints	
Action	**Function**
Select parameter AL.Lo, enter and save the desired conductivity.	The MIN switchpoint is set between 1 and 5000 ppm or 1 and 9999 µS/cm
Select parameter AL.Hi, enter and save the desired conductivity.	The MAX switchpoint is set between 1 and 5000 ppm or 1 and 9999 µS/cm

Conductivity electrode LRG 1.-..: Setting the correction factor CF	
Select correction factor CF, enter and save the required value. Alternatively, use calibration function CAL (from software version "S-13" onward).	Once service temperature is reached, measure the conductivity of a water sample [at 77 °F (25 °C)]. Change the correction factor in increments until the indicated actual value matches the reference reading. This adapts the conductivity measurement to the specific conditions of the installation, or compensates for deviations during operation.

Conductivity electrode LRG 16-9 with resistance thermometer	
Switching on temperature compensation	
Select setting inP and turn the rotary knob clockwise. YES appears. Save the setting.	
Setting the temperature coefficient tC	
Select temperature coefficient tC, enter and save the desired percentage.	Once service temperature is reached, measure the conductivity of a water sample [at 77 °F (25 °C)]. Change the temperature coefficient in increments until the indicated actual value matches the reference reading.
If necessary: Select correction factor CF, enter and save the required value.	During operation, the indicated conductivity may differ from the reference reading, e.g., due to dirt deposits. In this case, change the correction factor in increments until the indicated actual value matches the reference reading.

Operation, alarm and test

Checking indications and the function of the MIN/MAX output contacts

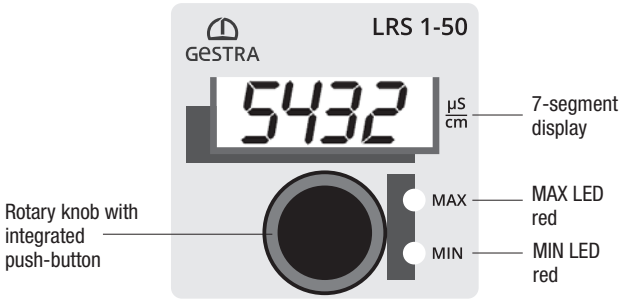


Fig. 5

Operation		
Action	**Indication**	**Function**
Conductivity between MIN and MAX.	The actual value is shown on the 7-segment display. MIN and MAX LEDs are not lit.	MIN output contacts 16/18 open, 17/18 closed. MAX output contacts 21/23 open, 22/23 closed.

MIN alarm		
Conductivity below MIN switchpoint.	MIN LED lights up red	MIN output contacts 16/18 closed, 17/18 open.

MAX alarm		
Conductivity above MAX switchpoint.	MAX LED lights up red	MAX output contacts 21/23 closed, 22/23 open.

Test of MIN alarm and MAX alarm		
Action	**Indication**	**Function**
In operating mode: Conductivity between MIN and MAX Select Test parameter. Press and hold push-button. 7-segment display: Test flashes.	MAX LED lights up red for 3 seconds	MAX output contact 21/23 closed, 22/23 open.
	MIN and MAX LEDs are not lit for 1 second	MIN output contact 16/18 open, 17/18 closed. MAX output contact 21/23 open, 22/23 closed.
	MIN LED lights up red for 3 seconds	MIN output contact 16/18 closed, 17/18 open.
Test complete, release push-button. 7-segment display: Test is displayed.	Note: If you continue holding the push-button, the test sequence will start again. You can cancel the test sequence at any time by releasing the push-button.	
Turn the rotary knob until the actual value is displayed. Or after 30 s, the actual value is displayed automatically.		

Operation, alarm and test

Password protection

The option of password protection for parameters is available as of software version “S-13”. The default password is 1902 and cannot be changed.

Enabling password protection		
Action	**Display**	**Function**
Turn rotary knob until PW is shown.	The display toggles between the parameter name and the parameter value.	Parameter is selected.
Press and hold the push-button (on rotary knob).	PASS	Password entry is required.
Release the push-button, then press and hold it again.	First digit (000**0**) flashes.	Enter the password, starting with the digit on the right.
Turn the rotary knob clockwise or counterclockwise to enter the required digit.	000X	Enter the first digit.
Briefly press the push-button.	The second digit from the right flashes (00**0**X).	You can enter the second digit.
Repeat the last two steps until the password has been entered in full.	The entered password (XXXX) is shown	Enter the password in full.
Press and hold the push-button.	donE	The correct password has been entered. The parameter can be edited.
	FAiL	The wrong password has been entered. The parameter is still password-protected.
	quit	Timeout. The system returns to parameter settings. Password entry is discontinued.
Once disabled, password protection is reactivated after 30 minutes of no activity (i.e., rotary knob is not turned), and the password must be entered again. The parameters are password-protected when the equipment is restarted, if password protection was previously enabled.		

Operation, alarm and test

Calibration

Calibration		
Action	**Display**	**Function**
Turn rotary knob until CAL is shown.	CAL is shown.	Calibration is selected.
Press and hold the push-button (on rotary knob)	The last reading is shown and the digit on the right flashes (xxxX).	Enter the conductivity, starting with the digit on the right.
Turn the rotary knob clockwise or counterclockwise to enter the required digit.	xxxX	Enter the first digit.
Briefly press the push-button.	The second digit from the right flashes (xxXx).	You can enter the second digit.
Repeat the last two steps until you have entered the conductivity in full.	The entered conductivity (xxxx) is shown.	Enter the conductivity in full.
	quit	Timeout. The system returns to parameter settings. Entry has been discontinued due to a lack of activity.
Press and hold the push-button (on rotary knob).	donE	The new calibration value has been applied and a CF value calculated on this basis.
	CF.Er	CF value is outside the admissible range. The previous calibration has been retained.

Fault indications and troubleshooting

Indications, diagnosis and corrective action

Attention

Please check the following before fault diagnosis:

Supply voltage:
Is the conductivity switch supplied with the voltage specified on the rating plate?

Wiring:
Does the wiring conform to the wiring diagram?

Error codes on the 7-segment display		
Error code	**Error**	**Corrective action**
E.001	Faulty temperature sensor, temperature reading too low	Check resistance thermometer and LRG 16-9 conductivity electrode and replace if necessary. Check electrical connection (short circuit, open circuit?).
E.002	Faulty temperature sensor, temperature reading too high	
E.005	Faulty conductivity electrode, reading too low.	Check conductivity electrode and replace if necessary. Check electrical connection.
E.006	Faulty conductivity electrode, reading too high.	Check conductivity electrode and replace if necessary. Check electrical connection.
E.013	MIN switchpoint higher than MAX switchpoint	Reset switchpoints
E.097	Walkthrough application error	Internal error. Replace equipment.
E.098	Walkthrough test error	Internal error. Replace equipment.
E.099	Internal test error	Internal error. Replace equipment.
In the event of a malfunction, the MIN and MAX alarm is triggered.		

Attention

- For further troubleshooting, please refer to the LRG 16-4, LRG 16-9 Installation & Operating Manuals.

Note

In the event of a fault in the conductivity switch, the MIN and MAX alarm is triggered and the equipment restarts.
If the process repeats itself continuously, the equipment must be replaced.

Further information

Action against high-frequency interference

High-frequency interference can be caused by out-of-phase switching operations. If such interference occurs and results in sporadic failure, we recommend taking the following action to suppress interference:

- Provide inductive loads with RC combinations as specified by the manufacturer.
- Route the connecting cables to the conductivity electrode separately from power lines.
- Increase the distance from sources of interference.
- Check that the shield is correctly connected. Check the shield of items of equipment with the aid of the Installation & Operating Manuals. If equalizing currents are likely (outdoor installations), connect the shield on one side only.
- Suppress HF interference using hinged-shell ferrite rings.

Taking out of service

Proceed as follows:

- Switch off the supply voltage and **cut off power** to the equipment.
- Detach the upper and lower terminal strips **Fig. 6**
  - Insert a screwdriver between the terminal strip and the front frame, at the arrow markings on the right and left.
  - Release the terminal strip on the right and left by turning the screwdriver in the direction of the arrow.
  - Detach the terminal strip.
- Release the white slider holder at the bottom of the unit and detach the unit from the support rail

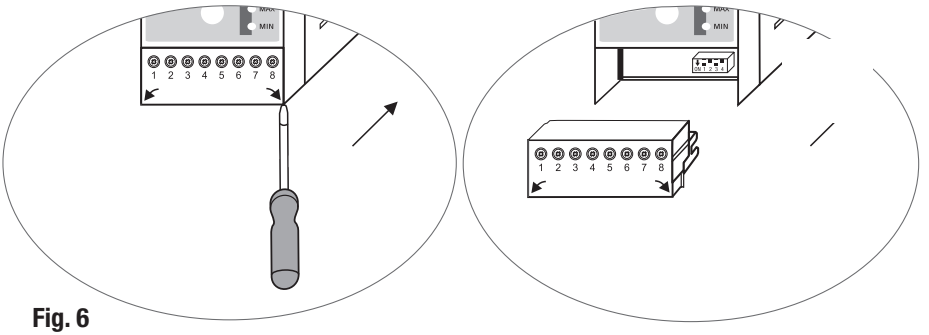


Fig. 6

Disposal

Dispose of the conductivity switch in accordance with statutory waste disposal regulations.

UL components

The LRS 1-50 conductivity switch is registered under XACN.E513189.

Declaration of Conformity
Standards and directives

Please see our Declaration of Conformity and associated certificates for details on the conformity of our equipment and the applicable standards and directives.

You can download the Declaration of Conformity online at www.gestra.com or request certificates from the following address:

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Modifications to the equipment not approved by us will invalidate Declarations of Conformity and certificates.

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