GESTRA®

Conductivity Controller

LRR 1-60

EN
English

Installation & Operating Manual

819692-01

Contents

Contents

Content of this Manual

Product:

Conductivity Controller LRR 1-60

First edition:

BAN 819692-00/08-2019cm

Applicable documents:

Installation & Operating Manual BAN 819692-01 for URB 60 Visual Display and Operating Unit

You can find the latest Installation & Operating Manuals on our website:
http://www.gestra.com

Scope of delivery/Product package

- 1 x Conductivity Controller LRR 1-60
- 1 x Installation & Operating Manual

How to use this Manual

This Installation & Operating Manual describes the correct use of the LRR 1-60conductivity controller. It applies to all persons who integrate this equipment into 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 given.
- 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
2.

- Lists
  - ◆ Bullet points in lists

Ⓐ Keys to illustrations

	Additional information
	Read the relevant Installation & Operating Manual

Hazard symbols in this Manual

	**Danger zone/Dangerous situation**
	**Danger of death from electric shock**

Types of warning

⚠ DANGER

Warning of a dangerous situation that will result 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 will result in damage to property or the environment.

Specialist terms/Abbreviations

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

Blowdown controller

A blowdown controller is a conductivity controller with special features for actuating continuous blowdown valves on steam boilers. It can also be used as a conductivity controller in other types of system.

Continuous blowdown

Continuous and/or periodic removal of a certain (defined) quantity of boiler water via a continuous blowdown valve, e.g. BAE46 or BAE47.

To determine the total dissolved solids (TDS) in the boiler water, its electrical conductivity is measured in µS/cm, although some countries also use ppm (parts per million) as the unit of measurement.

Conversion: 1 µS/cm = 0.5 ppm.

Operating position of the continuous blowdown valve

It is common practice to use the continuous blowdown valve to remove a certain amount of water from the boiler to keep the TDS within the desired limits. This means that the valve must be slightly open during operation, so that this amount of water can be discharged (valve in OPERATING position).

This operating position can be adjusted and the amount of boiler blowdown can be established with the aid of the valve capacity charts.

Intermittent blowdown

Intermittent blowdown is achieved by the abrupt opening of the intermittent blowdown valve for a period of around 3 seconds.

Time-based pulse/interval actuation of the intermittent blowdown valve optimises the removal of sludge from the boiler. The interval between the intermittent blowdown pulses can be set between 1 and 200 h (intermittent blowdown interval). The duration of intermittent blowdown can be set between 1 and 10 seconds. For large boilers, repeated intermittent blowdown pulses may be required. Repetition can be set between 1 and 10 with an interval of 1-10 seconds (pulse interval).

Flushing the continuous blowdown valve

The continuous blowdown valve can be flushed automatically to prevent it from sticking. In this case, the continuous blowdown valve is actuated at intervals (flushing interval) and opened for a certain time (flushing time). After the flushing time, the valve moves to the position set by the control.

Standby mode (conductivity control)

To prevent loss of water, continuous blowdown control and automatic intermittent blowdown (if enabled) can be disabled in standby mode or when the burner is switched off. The continuous blowdown valve moves to CLOSED position, triggered by an external control command. The MIN/MAX limits and monitoring function remain active in standby mode.

When the equipment is back in normal mode, the continuous blowdown valve returns to the control position. An intermittent blowdown pulse is also triggered (if automatic intermittent blowdown is enabled and a blowdown interval and blowdown time have been set).

Specialist terms/Abbreviations

CAN (Controller Area Network) bus

Data transmission standard and interface for connecting electronic equipment, sensors and control systems. Data can be sent and received.

TRV .. / NRG .. / LRG .. / SRL ..

GESTRA equipment and type designations, see page 9.

PhotoMOS output

PhotoMOS are a special kind of semiconductor relay, which use a light-emitting diode on the input side that is optically coupled to an output transistor. This type of electrically non-conductive connection makes sure the input and output circuits are electrically isolated from each other.

PI controller

Controller with proportional (P) and integral (I) control.

SELV

Safety Extra Low Voltage

Usage for the intended purpose

The LRR 1-60 conductivity controller can be used together with the LRG 16-60, LRG 16-61 and LRG 17-60 conductivity electrodes as a conductivity controller in steam boilers and hot water installations, and in condensate and feedwater tanks. The conductivity controller indicates when MAX or MIN conductivity has been reached, opens or closes a continuous blowdown valve and can actuate an intermittent blowdown valve.

Configuration, operation and visual display

The equipment is configured and operated and information is viewed via the URB 60 visual display and operating unit.

Possible equipment combinations

Conductivity controller	Conductivity electrode	Visual display and operating unit
LRR 1-60	LRG 16-60 LRG 16-61 LRG 17-60	URB 60

Fig. 1

Key to Fig. 1:

LRR = conductivity controller

LRG = conductivity electrode

URB = visual display and operating unit

To ensure the proper use of equipment during all types of use, please also read the Installation & Operating Manuals for the system components used.

- You will find the latest Installation & Operating Manuals for the system components named in **Fig. 1** on our website:
  http://www.gestra.com

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.

Basic safety notes

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

- Always switch off the voltage to the equipment before performing work on the terminal strips.
- Check that the plant is not carrying live voltage before commencing work.

Faulty equipment jeopardises plant safety.

- If the LRR 1-60 conductivity controller does not behave as described on pages 23 to 24, it may be faulty.
- Perform failure analysis.
- 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	Electrician/installer
Operation	Boiler service technician	Staff trained by the plant operator
Maintenance work	Specialist staff	Electrician
Refits	Specialist staff	Plant construction

Fig. 2

Notes on product liability

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

Function

The LRR 1-60 conductivity controller is a 3-point stepping controller. It cyclically evaluates the data telegrams from a conductivity electrode (e.g. LRG 16-60, LRG 16-61 or LRG 17-60).

The conductivity controller indicates when MAX or MIN conductivity has been reached, opens or closes a continuous blowdown valve with operating position function, and can actuate an intermittent blowdown valve.

The data are transferred to an ISO 11898 CAN bus via the CANopen protocol.

Function tests and failure diagnosis are performed using the URB 60 visual display and operating unit.

The data telegrams contain the following information:

- Conductivity values of electrodes and the temperature of the fluid
- Fault indications on the occurrence of faults in electronic or mechanical parts

Behaviour when MIN/MAX conductivity is reached

If the minimum or maximum conductivity is reached, the appropriate output contact is opened.

Possible combinations of functions and equipment

Combining the LRR 1-60 conductivity controller with the conductivity electrodes and the URB 60 visual display and operating unit provides the following functions:

Conductivity controller	LRR 1-60
Function	
Evaluation of CAN bus data telegrams from connected LRG 16-60, LRG 16-61 or LRG 17-60 conductivity electrodes.	●
3-point stepping controller with proportional plus integral control (PI controller) and actuation of an electrically operated continuous blowdown valve.	●
MAX alarm when the conductivity limit is exceeded.	●
MIN alarm when conductivity drops below the minimum limit. Alternatively, MIN relay for automatic intermittent blowdown.	●
The valve position can be displayed if a potentiometer is connected (in the control valve). The valve position is then shown on the URB 60 visual display and operating unit.	●
Actual value output 4-20 mA	●
Volt-free input 24 V DC (standby) for inputting an external command: Control OFF/Valve CLOSED/Intermittent blowdown OFF	●

Fig. 3

Technical data

Supply voltage

- 24 V DC +/-20%

Power consumption

- Max. 5 W

Current input

- Max. 0.3 A

Required external fuse

- M0.5A

Input/output

- Interface for CAN bus to ISO 11898, CANopen, insulated

Inputs

- 1 x analogue input for potentiometer 0-1000 Ω, two-wire connection (indication of valve position)
- 1 x volt-free input 24 V DC (standby) for inputting an external switching command
  Control OFF/Valve CLOSED/Intermittent blowdown OFF

Outputs

Continuous blowdown valve (CLOSED/OPEN)

MIN/MAX alarm or
MAX alarm and MIN relay as automatic intermittent blowdown

- 4 x volt-free relay contacts (changeover relays)
- Maximum switching current - 8 A at 250 V AC / 30 V DC - cos φ = 1
- Contact material AgNi0.15, AgSnO2
- Inductive loads must have interference suppression (RC combination) as per the manufacturer's specification

Analogue output

- 1 x actual value output 4-20 mA, e.g. for an actual value display
- Max. load resistance 500 Ω

Technical data

Indicators and controls

- 1 x multicolour LED (orange, green, red)
  - ◆ orange = power up
  - ◆ green = running
  - ◆ red = malfunction
- 1 x 4-pole code switch for setting the controller group and baud rate

Protection class

- II double insulated

IP rating to EN 60529

- Terminal box: IP 40
- Terminal strips: IP 20

Electrical safety

- Pollution degree 2 for installation in control cabinet with protection rating IP 54, fully insulated

Admissible ambient conditions

- Service temperature: - 10 °C – 55 °C (0 °C – 55 °C at power-on)
- Storage temperature: - 20 °C – 70 °C *
- Transport temperature: - 20 °C – 80 °C (< 100 hours) *
- Air humidity: max. 95%, non-condensing

* Only switch on after a 24-hour defrosting period

Terminal box

- Terminal box material: Lower section of black polycarbonate (glass-fibre reinforced), front of grey polycarbonate
- 2 x 15-pole terminal strips, removable separately
- Max. cross-section per screw terminal:
  - ◆ 1 x 4.0 mm^2 solid, or
  - ◆ 1 x 2.5 mm^2 stranded with sleeve, or
  - ◆ 2 x 1.5 mm^2 stranded with sleeve
- Terminal box attachment: Mounting clip on support rail TH 35 (to EN 60715)

Weight

- Approx. 0.5 kg

Example name plate/Identification LRR 1-60

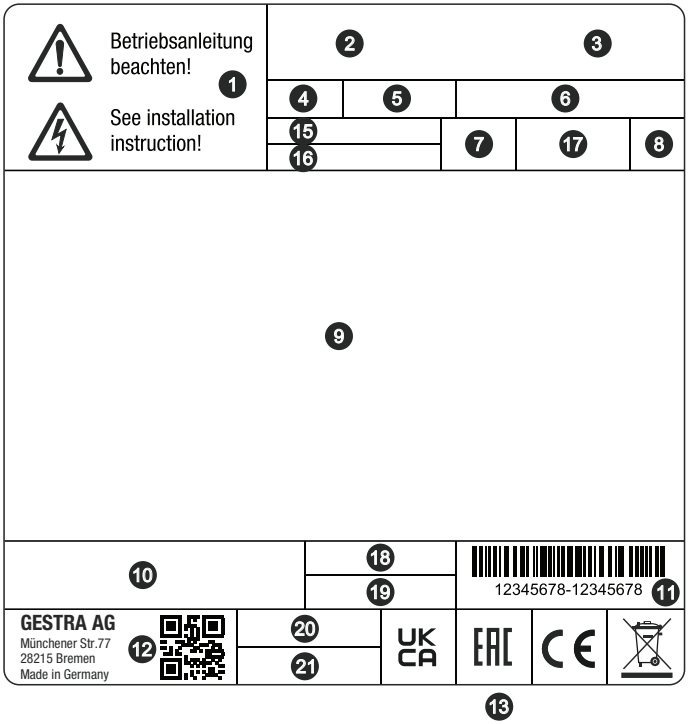


Fig. 4

1. Safety note
2. Equipment function
3. Equipment designation
4. Power consumption
5. IP rating
6. Operating data (maximum ambient temperature)
7. Power supply
8. Protection class
9. Wiring diagram
10. Component type approval
11. Material number-serial number
12. Manufacturer
13. Component type approval
14. Disposal information

Optional information

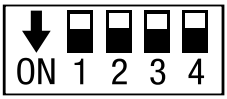
15. Measuring range in µS/cm
16. Measuring range in ppm
17. Cutout relay
18. Information on functional safety
19. Marking for limiters (STL) or monitors (STM)
20. Field for set limit value
21. Mode of operation in accordance with EN 60730-1

The date of production is printed on the side of the equipment.

Factory settings

The conductivity controller is delivered ex-works with the following settings:

- Baud rate: 50 kbit/s (max. cable length 1000 m)
- Controller group: 1
- Code switch setting: Sliding switch, white (1 to 4 = OFF)



Configuring the controller group and baud rate,
see page 22, Fig. 8.

- MAX switchpoint: 6000 µS/cm
- MIN switchpoint: 500 µS/cm
- Reset hysteresis: MAX limit 3% of set limit (factory default)
- Set point: 3000 µS/cm
- Proportional band (Pb): ± 20% of set point
- Reset time (Ti): 0 seconds
- Neutral zone: ± 0% of set point (factory-set to off)
- Valve runtime: 360 seconds
- Controlled operation: Automatic
- MIN relay function: MIN alarm
- 24h flushing: On
- Flushing interval: 0 hours
- Flushing time: 180 seconds. The set time takes effect twice. The valve moves to OPEN for 180 seconds and to CLOSED for 180 seconds.
- Operating position 0%

With actuation of an intermittent blowdown valve (MIN relay function = automatic intermittent blowdown)

- Intermittent blowdown interval: 24 hours
- Intermittent blowdown time: 3 seconds
- Number of intermittent blowdown pulses: 1
- Pulse interval: 2 seconds

Functional elements and dimensions

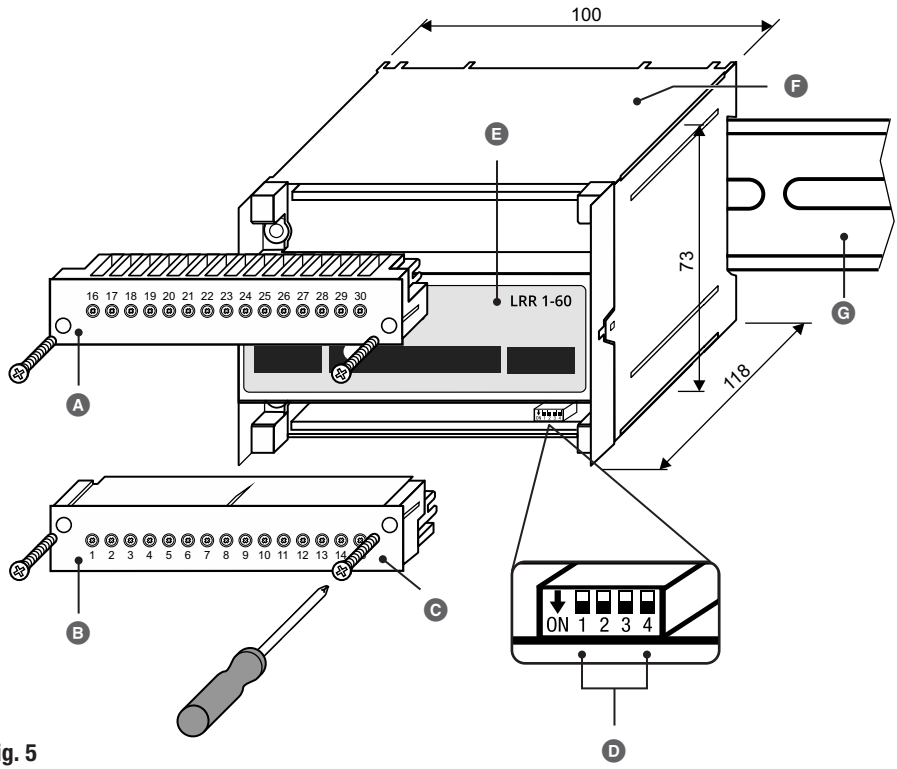


Fig. 5

- **A** Upper terminal strip
- **B** Lower terminal strip
- **C** Screws (M3)
- **D** 4-pole code switch, for setting the controller group and baud rate
- **E** Front membrane with status LED, see page 23
- **F** Terminal box
- **G** Support rail TH 35

The code switch can be accessed by disconnecting and removing the lower terminal strip.

Equipment settings, see page 22.

Installing the LRR 1-60 conductivity controller

The LRR 1-60 conductivity controller snaps onto a TH 35 support rail in the control cabinet.

⚠ 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. Before you install the equipment, switch off the voltage to the plant or secure the surrounding equipment in the control cabinet, if live, so it cannot be touched.
2. Carefully press the unit onto the support rail until the holder clips into place.

Electrical connection safety notes

⚠ DANGER

Incorrectly connecting the conductivity controller or any associated components is a danger to plant safety.

- Connect the conductivity controller and all associated components as shown in the wiring diagram Fig. 6 in this Manual.
- Do not used unused terminals as jumpers or support terminals.

Wiring diagram of LRR 1-60 conductivity controller

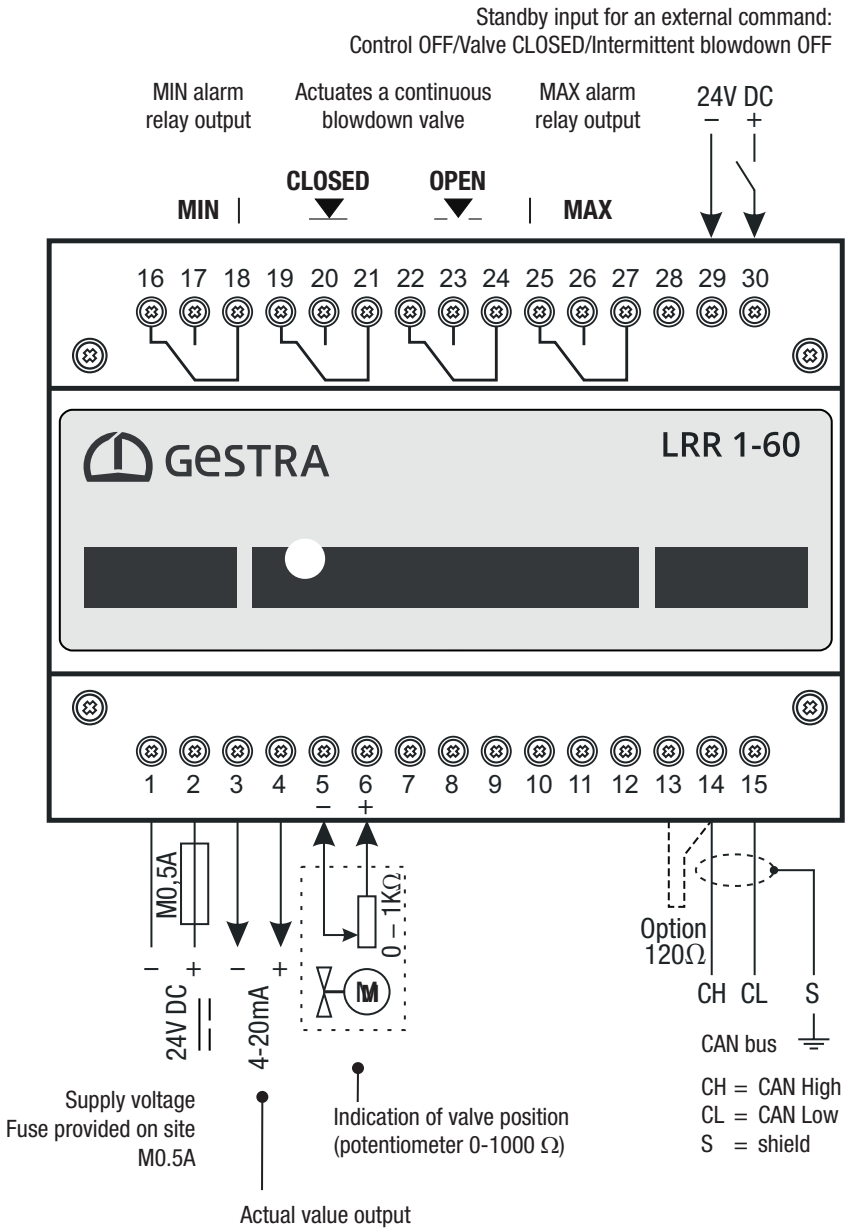


Fig. 6

Electrical connection

Bus line, cable length and cross-section

- Use a shielded, multi-core, twisted-pair control cable, e.g. UNITRONIC® BUS CAN 2 x 2 x .. mm² or RE-2YCYV-fl 2 x 2 x .. mm² as the bus line.
- Pre-wired control cables (with connector and coupling) are available as accessories in various lengths.
- The baud rate is determined by the line length (transfer rate) between the bus terminal devices, and the conductor size is determined by the overall current input of the measuring sensors.
- As far as possible, route the bus line separately from power lines and protected from environmental influences.

Connecting the 24 V DC power supply

- The LRR 1-60 conductivity controller is supplied with 24 V DC.
- A safety power supply unit that delivers a Safety Extra Low Voltage (SELV) must be used to supply the equipment with 24 V DC.
- Use an M0.5A fuse as an external fuse.

Connecting the MIN/MAX/CLOSED/OPEN output contacts

- Connect the outputs as shown in the wiring diagram in Fig. 6.
- Only use the terminals specified in the wiring diagram.
- Use a T2.5A fuse to protect the switching contacts.

Notes on connecting inductive loads

All connected inductive loads, such as contactors and actuators, must have interference suppression using RC combinations as per the manufacturer's specifications.

Connecting the actual value output (4-20 mA)

- Please note the load resistance of max. 500 Ω.
- Use a shielded, multi-core, twisted-pair control cable with a minimum conductor size of 0.5 mm², e.g. LIYCY 2 x 0.5 mm².
- Maximum cable length = 100 m.
- Route connecting cables separately from power lines.

Connecting the standby input (24 V DC)

- 24 V DC input, for external command: Control OFF, Valve CLOSED, Intermittent blowdown OFF.
- Maximum cable length = 30 m.

Connecting the potentiometer (0-1000 Ω)

- Use a shielded, multi-core, twisted-pair control cable with a minimum conductor size of 0.5 mm², e.g. LIYCY 2 x 0.5 mm².
- Maximum cable length = 100 m.
- Route connecting cables separately from power lines.

Wiring diagram of CAN bus system

Example

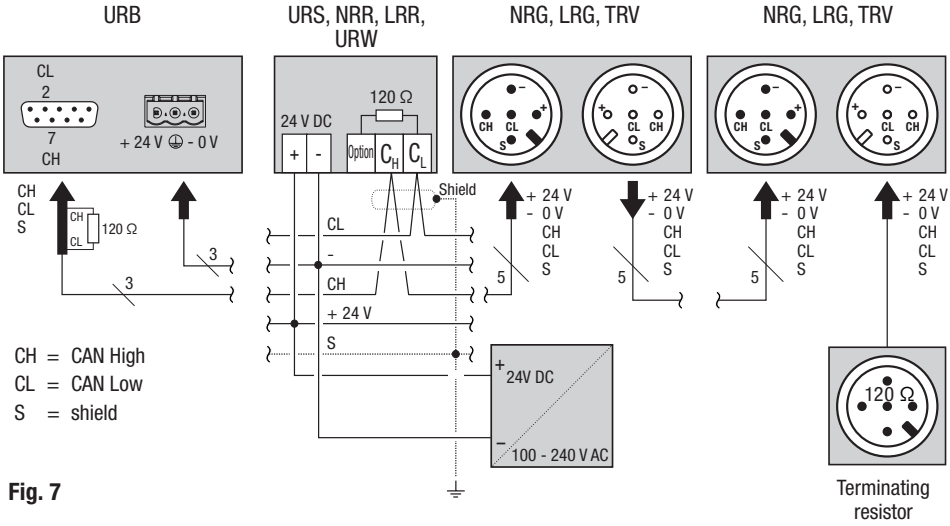


Fig. 7

Important notes on connecting the CAN bus system

- A dedicated 24 V DC SELV power supply unit that is isolated from connected loads must be used to supply the SPECTOR*connect* system.
- Make sure wiring is in line, not in a star!
- Use a central earth to prevent differences in potential between plant parts.
  - Connect the bus line shields to one another all the way along, and connect to the central earthing point (CEP).
- If two or more system components are connected in a CAN bus network, a 120 Ω terminating resistor must be connected to the **first** and **last** devices between terminals C_L/C_H.
- The LRR 1-60 conductivity controller is equipped with an internal terminating resistor.
  To activate the internal terminating resistor in the LRR 1-60 conductivity controller, insert a jumper between the terminals (“Option 120Ω” and “CH”).
- The CAN bus network must not be interrupted during operation!
  If it is, an alarm is triggered.

Changing the equipment settings

⚠ DANGER

Danger of death from electric shock if live connections on terminal strips are touched.

- Always switch off the voltage to the equipment before performing work on the terminal strips.
- Check that the plant is not carrying live voltage before commencing work.

You can change the baud rate and controller group of the conductivity controller LRR 1-60 at any time using code switch Ⓓ (see **Fig. 5)** .

Make changes before installing the conductivity controller, when access is easier.

You will need the following tools:

- Size 2.5 slotted screwdriver, fully insulated
- Size 1 slotted screwdriver, fully insulated

Proceed as follows:

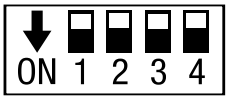
1. Switch off the supply voltage to the equipment or plant.
2. Unscrew and pull off the lower terminal strip, see **Fig. 5**.
3. Set code switch Ⓓ (see **Fig. 5)** as desired,
   see page 22, **Fig. 8**.
4. When your changes are complete, put the terminal strip back on and screw in place.

Changing the equipment settings

For operation, you must define the controller group and baud rate for the conductivity controller on code switch Ⓓ **Fig. 5**. The desired controller functions are achieved by connecting the different conductivity electrodes and configuring the URB 60 visual display and operating unit as appropriate.

Set the same baud rate for all bus nodes.

Code switch Ⓓ - sliding switch, white



Configuring the controller group and baud rate

LRR 1-60 Conductivity controller

Code switch Ⓓ					
S1	**S2**	**S3**	**S4**	**Configuration**	**ID**
OFF	OFF			**Controller group 1 (default)**	50
OFF	ON			Controller group 2	55
ON	OFF			Controller group 3	70
ON	ON			Controller group 4	75
		OFF		**Baud rate 50 kbit/s (default)**	
		ON		Baud rate 250 kbit/s	
			OFF	**Reserve (default)**	
			ON	Reserve	

Fig. 8

Configure the conductivity controller as described in the Installation & Operating Manual of the URB 60 visual display and operating unit.

- You will find the latest Installation & Operating Manuals for the system components named in **Fig. 1** on our website: http://www.gestra.com

Bringing into service – starting, operation and alarm

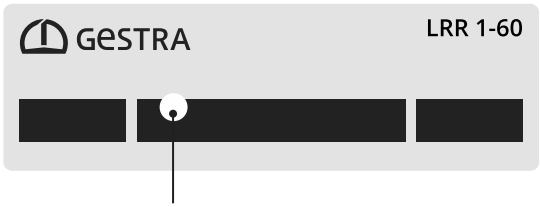


Fig. 9

Multicolour LED (orange/green/red),
orange = power up/green = running/red = malfunction

The MIN relay is configured as the MIN alarm on the URB 60

Startup

During startup, all the relays of the LRR 1-60 3-point stepping conductivity controller are de-energised and the LED lights up orange.

Normal operation

During normal operation, when the supply voltage is on and the measured conductivity is within the MIN and MAX switchpoints, the MIN and MAX relays of the controller are energised. The LED lights up green.

Alarm

If the conductivity value is below the set MIN limit or above the set MAX limit, the appropriate relay (MIN/MAX) of the controller is de-energised and indicates that MIN/MAX conductivity has been reached. The LED lights up green.

The output relays (CLOSED/OPEN) of the LRR 1-60 3-point stepping conductivity controller that actuate the BAE continuous blowdown valve are energised or de-energised, as required.

See following page for more configurations.

Bringing into service – starting, operation and alarm

The MIN relay is configured for automatic intermittent blowdown on the URB 60.

Startup

During startup, all the relays of the LRR 1-60 3-point stepping conductivity controller are de-energised and the LED lights up orange.

Normal operation

During normal operation, when the supply voltage is on and the measured conductivity is within the MIN and MAX switchpoints, the MAX relay of the controller is energised. The MIN relay, which is configured for automatic intermittent blowdown, is de-energised in the normal state and only energised during an intermittent blowdown pulse. The LED lights up green.

Alarm

If the conductivity value is above the set MAX limit, the MAX relay of the controller is de-energised and signals a MAX alarm. The LED lights up green.

Behaviour in the event of a malfunction

In the event of a malfunction, the LED lights up red and the MIN/MAX relays become de-energised. The OPEN/CLOSED relays behave as described in the tables on page 24.

Faulty equipment jeopardises plant safety.

- If the LRR 1-60 conductivity controller does not behave as described on this page, it may be faulty.
- Perform failure analysis.
- Only replace faulty equipment with identical equipment from GESTRA AG.

System malfunctions

Causes

System malfunctions occur if CAN bus components have been incorrectly installed or configured, if the equipment has overheated, if there is interference in the supply network or if electronic components are faulty.

Check the installation and configuration before systematic troubleshooting

Installation:

- Check that the installation location complies with the admissible ambient conditions in terms of temperature, vibration, interference sources, etc.

Wiring:

- Does the wiring conform to the wiring diagrams?
- Is the bus line polarity correct throughout?
- Is a 120 Ω terminating resistor connected to the terminal devices of the CAN bus line?

Controller group and baud rate configuration on the conductivity controller:

- Are the controller group and baud rate correctly set on code switch Ⓓ?

Configuration of electrodes:

- Are the electrodes correctly set and has the measuring range been calibrated?

Baud rate:

- Is the cable length correct for the set baud rate?
- Is the baud rate identical for all devices?

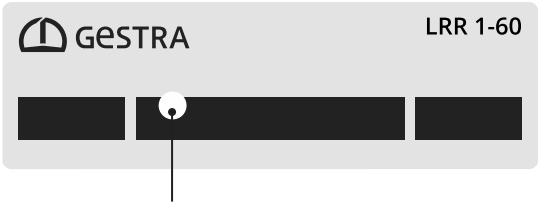
⚠ DANGER

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

- Always switch off the voltage to the equipment before working on the terminal strips (installation, electrical connection, disassembly).
- Disconnect all poles of the supply cable from the mains and secure so they cannot be switched back on.
- Check that the plant is not carrying live voltage before commencing work.
- Interrupting the CAN bus during operation triggers an alarm.

System malfunctions

Multicolour LED (orange/green/red),



orange = power up/green = running/red = malfunction

Fig. 10

Indication of malfunctions in the conductivity controller LRR 1-60 (MIN relay configured as MIN alarm)					
Type of fault/malfunction	**Relay**				**LED**
	MIN	**MAX**	**CLOSED**	**OPEN**	
Breakdown in CAN bus communication Electrode failure	De-energised	De-energised	Energised	De-energised	Red
Interruption to power supply	De-energised	De-energised	De-energised	De-energised	Off

Indication of malfunctions in the LRR 1-60 conductivity controller (MIN relay configured for automatic intermittent blowdown)					
Type of fault/malfunction	**Relay**				**LED**
	MIN	**MAX**	**CLOSED**	**OPEN**	
Breakdown in CAN bus communication Electrode failure	Automatic intermittent blowdown timer running in the background	De-energised	Energised	De-energised	Red
Interruption to power supply	De-energised	De-energised	De-energised	De-energised	Off

What to do in the event of system malfunctions

In the event of malfunctions or faults that cannot be remedied with the aid of this Installation & Operating Manual, please contact our service centre or authorised agent in your country.

Taking out of service

1. Switch off the supply voltage and the voltage to the equipment.
2. Check that the equipment is not live.
3. Unscrew and pull off the upper and lower terminal strips, see **Fig. 5** Ⓐ; Ⓑ
4. Release the slider holder on the base of the equipment, and detach the LRR 1-60 conductivity controller from the support rail.

Disposal

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

Returning decontaminated equipment

If products have come into contact with media that are hazardous to health, they must be drained and decontaminated before being returned to GESTRA AG.

Such media include solid, liquid or gaseous substances, mixtures of these, or radiation.

GESTRA AG can accept returned products only if accompanied by a completed and signed return note and also a completed and signed declaration of decontamination.

The return confirmation and declaration of decontamination must be attached to the returned goods and be accessible from the outside. Otherwise, the goods cannot be dealt with and will be returned, carriage unpaid.

Please proceed as follows:

1. Let GESTRA AG know about the return beforehand by e-mail or phone.
2. Wait until you have received the return confirmation from GESTRA.
3. Fill out the return confirmation (and declaration of decontamination) and send it with the products to GESTRA AG.

Declaration of Conformity
Standards and Directives

You can find details on the conformity of the equipment and the applicable standards and directives in the Declaration of Conformity and associated certificates.

You can download the Declaration of Conformity from www.gestra.com and request relevant certificates by writing to the following address:

GESTRA AG
Münchener Straße 77
28215 Bremen
Germany
Tel. +49 421 3503 0
Fax +49 421 3503 393
e-mail info@de.gestra.com
Website www.gestra.com

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

For your notes

For your notes

For your notes

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www.gestra.com

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