



Safety Control Unit

URS 60

URS 61

EN
English

Original Installation &
Operating Manual

819634-00

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Content of this Manual

Product:

- Safety control unit URS 60
- Safety control unit URS 61

First edition:

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Scope of delivery/Product package

- 1 x Safety control unit URS 60 or URS 61
- 1 x Installation & Operating Manual

How to use this Manual

This Installation & Operating Manual describes the correct use of URS 60 and URS 61 safety control units. 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 equipment 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

A 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 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.

IEC 61508

International standard IEC 61508 describes both the type of risk assessment and actions taken to provide appropriate safety functions.

SIL (safety integrity level)

Safety integrity levels SIL 1 to 4 are used to quantify risk reduction. SIL 4 is the highest level of risk reduction. International standard IEC 61508 forms the basis for establishing, testing and operating technical safety systems.

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 ...

Equipment and type designations of GESTRA AG, see page 10.

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.

SELV

Safety Extra Low Voltage

Usage for the intended purpose

URS 60 and URS 61 safety control units can be used in combination with various safety sensors of types NRG 1..., NRG 2..., LRG 1... and TRV 5... to act as safety limiters for steam boiler systems and water boilers.

The equipment can be used as:

- Water level limiters, in combination with level electrode NRG 1x-60 / NRG 26-61.
Water level limiters switch off the heating when the water drops below the set minimum level.
- Safety high level limiters, in combination with level electrode NRG 1x-61 / NRG 26-61.
Safety high level limiters switch off the feedwater supply when the water exceeds the set maximum level.
- Conductivity limiters, in combination with conductivity electrode LRG 1x-6x.
Conductivity limiters switch off the heating when conductivity exceeds the set maximum level.
- Safety temperature monitors/limiters, in combination with temperature transmitter TRV 5-60.
Safety temperature limiters or monitors switch off the heating when the maximum admissible temperature is reached. Method of operation TYPE 2.BKP (+JV, with external lock) to EN 60730-1.
- The above functions may be combined.
- Monitoring logic unit SRL 6-60 is available for monitoring the regular, separate flushing process when level electrodes are used in external measuring pots.
- Visualisation and operation take place via a choice of operating terminals: the URB60 and SPECTOR*control*.

Usage for the intended purpose

Applicable directives and standards

The URS 60 / URS 61 safety control unit has been tested and approved for use in the scope governed by the following directives and standards:

Directives:

- | | |
|------------------------|---------------------------------|
| ■ Directive 2014/68/EU | EU Pressure Equipment Directive |
| ■ Directive 2014/35/EU | Low Voltage Directive |
| ■ Directive 2014/30/EU | EMC Directive |
| ■ Directive 2011/65/EU | RoHS II Directive |

Standards:

- | | |
|------------------|--|
| ■ EN 12953-09 | Shell boilers, requirements for limiting devices |
| ■ EN 12952-11 | Water-tube boilers, requirements for limiting devices |
| ■ EN 14597 | Temperature control devices and temperature limiters for heat generating systems |
| ■ DIN EN 60730-1 | Automatic electrical controls – Part 1:
General requirements |
| ■ EN 61508 | Functional safety of electronic systems |

Standards documents:

- VdTÜV Bulletin BP WASS 0100-RL
Requirements for water level control and limiting equipment
- VdTÜV Bulletin BP WAUE 0100-RL
Requirements for the testing of monitoring equipment
- VdTÜV Bulletin BP TEMP 0100-RL
Requirements for the testing of temperature monitors and limiters

Technical rules for steam boilers - as a knowledge base:



This Manual occasionally refers to the TRD regulations as a knowledge base.

These regulations have not been in force since 1 March 2019 and are no longer updated. They are replaced by the TRBS (German Technical Rules for Industrial Health & Safety).

Always observe the current regulations (EU directives, EN standards, information from employers' liability insurance associations, etc.) in order to comply with the current state of the art.

Usage for the intended purpose

Admissible accessories, dependent on the required safety integrity level

In accordance with EU Pressure Equipment Directive 2014/68/EU, standards EN12952, EN12953, EN14597 and EN 61508 and the technical rules of VdTÜV Bulletin W100, WÜ100, the URS 60 / URS 61 safety control unit can be operated with the following accessories, as suitable for the required safety integrity level.

	Water level limiter	Safety high level limiter	Conductivity limiter	Temperature limiter	Operating unit	Monitoring logic unit
SIL 3 to EN 61508	NRG 16-60 NRG 17-60 NRG 19-60 NRG 111-60	NRG 16-61 NRG 17-61 NRG 19-61 NRG 111-61	–	TRV 5-60	URB 60 SPECTOR <i>control</i>	SRL 6-60
SIL 2 to EN 61508	NRG 26-61 NRG 16-60 NRG 17-60 NRG 19-60 NRG 111-60	NRG 26-61 NRG 16-61 NRG 17-61 NRG 19-61 NRG 111-61	LRG 16-60 LRG 16-61 LRG 17-60	TRV 5-60	URB 60 SPECTOR <i>control</i>	SRL 6-60

Fig. 1

Key to Fig. 1:

NRG = level electrode

LRG = conductivity electrode

TRV = temperature transmitter

URB = visual display and operating unit

SRL = monitoring logic unit



To ensure the proper use of equipment in all applications, you must also read the operating instructions for the sensors and operating units used.

- You will find the current operating instructions for the safety sensors and operating units in Fig. 1 on our website:
<http://www.gestra.com/documents/brochures.html>

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 system is not carrying live voltage before commencing work.



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

- Do not repair the URS 60 / URS 61 safety control unit.
- 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
Setup work	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.

Functional safety, safety integrity level (SIL)

The URS 60 / URS 61 safety control unit is suitable for safety functions up to SIL 3.

It is an element of a safety circuit up to SIL 3 as per EN 61508 in the SPECTOR*connect* system, and can process alarm information from up to four safety sensors.

Combinations with accessories constitute a type B subsystem. The technical and safety characteristics in Fig. 4 are based on the URS 60 / URS 61 safety control unit including output contacts.

Breakdown of safety function failure rates

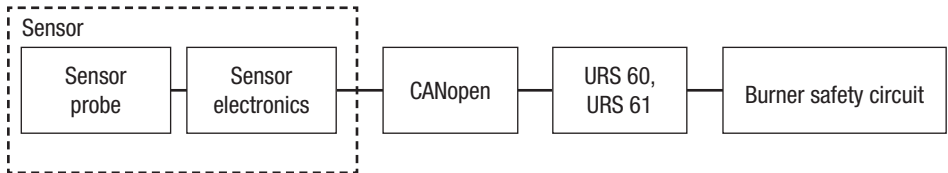


Fig. 3

The CANopen interface is a “Black Channel” type, and can be ignored during calculation due to the low failure rate of < 1FIT.

Perform an annual function test

Check the function of the URS 60 / URS 61 safety control unit at least once annually by triggering the safety circuit ($T_1 = 1$ year). You can check the function either by pressing buttons 1-4 (see page 29) or by exceeding the limit values.

Reliability data to EN 61508

Description	Characteristic values
Safety integrity level	SIL 3
Architecture	1oo1
Type of device	Type B
Hardware error tolerance	HFT = 0
Overall failure rate for dangerous undetected failures	$\lambda_{DU} < 20.0 * 10^{-9}$ 1/h
Overall failure rate for dangerous detected failures	$\lambda_{DD} < 2000 * 10^{-9}$ 1/h
Safe failure fraction	SFF > 99.0 %
Test interval	T1 = 1 year
Probability of failure on demand	PFDD < 20.0 * 10 ⁻⁵
Diagnostic coverage. Percentage of dangerous failures detected by a test.	DC > 99.0 %
Mean time to failure	MTTF _D > 90 a
Diagnostic interval	T2 = 1 hour
Performance level (to ISO 13849)	PL = d
Probability of failure per hour	PFH < 20 * 10 ⁻⁹ 1/h
Ambient temperature as a basis for calculation	Tu = 45 °C
Mean time to repair	MTTR = 0 (no repair)
Fraction of undetected dangerous failures that have a common cause	beta = 2 %
Fraction of detected dangerous failures that have a common cause	beta d = 1 %

Fig. 4

Function

The URS 60 / URS 61 safety control unit cyclically evaluates data telegrams from up to four safety sensors of types NRG 1..., NRG 2..., LRG 1... and TRV 5. The data are transferred to an ISO 11898 CAN bus via the CANopen protocol and saved. The safety functions are monitored by cyclical self-tests. The two integrated relays are switched off in the event of alarms or failures. Function tests and failure diagnosis can be conducted using either the control unit or the operating terminal.

The data telegrams contain the following information:

- Alarms from sensors if limit values are exceeded
- Error signals in the event of faults in electronic or mechanical parts
- Excessive temperature in the sensor terminal boxes

Behaviour on the occurrence of alarms

When level, temperature or conductivity alarms are received, both output contacts are opened after a power-off delay, and this interrupts the safety circuit (fail-safe position). In this case, the safety control unit does not lock independently; this function must be implemented in the downstream circuit. The URS 60 or URS 61 can only activate one safety circuit (heating or pump) at any one time.

The safety circuit is interrupted without delay if the following error messages are received:

- Fault in sensors (negative self-test, excessively high temperature in terminal box)
- Fault in control unit (negative self-test)
- Communication failure

Behaviour on the occurrence of error messages

Cyclical self-tests monitor the safety functions of the equipment in the safety control unit and sensors. Error messages are updated with each self-test. If there are no faults, the malfunction indication is automatically deleted and the output contacts are closed once more. Alarms and error messages are displayed by LEDs or an operating unit.

In addition, you can choose to display alarms on an external signalling device via signalling outputs, either with or without a delay. Faults are always indicated without a delay, however.

Alarm simulation

You can simulate alarms by pressing the button or via external 24 V DC signals.

Monitoring flushing processes

If a level electrode is installed in a lockable level pot outside the boiler, the connecting pipes must be flushed regularly. During this flushing, no water level is measured in the level pot for up to five minutes. Therefore, the URS 60 / URS 61 safety control unit bridges the level electrode as prompted by an SRL 6-60 monitoring logic unit, and monitors the maximum bridging time.

If the steam pipe is ≥ 40 mm and the water pipe is ≥ 100 mm, installation is regarded as internal. In this case, upstream monitoring of flushing processes can be dispensed with.

Function

Possible combinations of functions and equipment

The following common functional combinations are achieved by connecting the sensors and safety control units in one circuit:

Abbreviations used in Fig. 5 and Fig. 6

SLLL	=	safety low level limiter
STL/STM	=	safety temperature limiter/safety temperature monitor
SHLL	=	safety high level limiter
SCL	=	safety conductivity limiter

URS 60

e.g. heating safety circuit			
Function 1	Function 2	Function 3	Function 4
SLLL 1 with level electrode NRG 1x-60			
SLLL 1 with level electrode NRG 1x-60	SLLL 2 with level electrode NRG 1x-60 NRG 26-61		
SLLL 1 with level electrode NRG 1x-60	SLLL 2 with level electrode NRG 1x-60 NRG 26-61	STL (STM) 1 with temperature transmitter TRV 5-60	SCL 1 with conductivity electrode LRG 1x-6x
SLLL 1 with level electrode NRG 1x-60	SLLL 2 with level electrode NRG 1x-60 NRG 26-61	STL (STM) 1 with temperature transmitter TRV 5-60	
SLLL 1 with level electrode NRG 1x-60	SLLL 2 with level electrode NRG 1x-60 NRG 26-61	SHLL 1 with level electrode NRG 1x-61 NRG 26-61	STL (STM) 1 with temperature transmitter TRV 5-60
SLLL 1 with level electrode NRG 1x-60	SLLL 2 with level electrode NRG 1x-60 NRG 26-61	STL (STM) 1 with temperature transmitter TRV 5-60	STL (STM) 2 with temperature transmitter TRV 5-60
STL (STM) 1 with temperature transmitter TRV 5-60	STL (STM) 2 with temperature transmitter TRV 5-60		
STL (STM) 1 with temperature transmitter TRV 5-60	STL (STM) 2 with temperature transmitter TRV 5-60	STL (STM) 3 with temperature transmitter TRV 5-60	STL (STM) 4 with temperature transmitter TRV 5-60

Fig. 5

Function

URS 61

e.g. safety circuit for feedwater pump

Function 1	Function 2	Function 3	Function 4
SHLL 1 with level electrode NRG 1x-61 NRG 26-61			
SHLL 1 with level electrode NRG 1x-61 NRG 26-61	STL (STM) 1 with temperature transmitter TRV 5-60		
SHLL 1 with level electrode NRG 1x-61 NRG 26-61			
SHLL 1 with level electrode NRG 1x-61 NRG 26-61	STL (STM) 2 with temperature transmitter TRV 5-60	STL (STM) 3 with temperature transmitter TRV 5-60	
SCL 1 with conductivity electrode LRG 1x-6x			
STL (STM) 3 with temperature transmitter TRV 5-60			
STL (STM) 3 with temperature transmitter TRV 5-60	STL (STM) 4 with temperature transmitter TRV 5-60		
STL (STM) 5 with temperature transmitter TRV 5-60	STL (STM) 6 with temperature transmitter TRV 5-60	STL (STM) 7 with temperature transmitter TRV 5-60	STL (STM) 8 with temperature transmitter TRV 5-60

Fig. 6



Further connections are possible and permitted.

Technical data

Supply voltage

- 24V DC +/-20 %

Power consumption

- max. 7 VA

Current input

- max. 0.3 A

Internal fuse

- T2A

Input/output

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

Safety circuit output

- 2 volt-free changeover contacts, connected externally in series. Contact material AgNi
- Maximum switching current at switching voltages of 24 V AC/DC, 115 V AC and 230 V AC: resistive/ inductive 6 A
- Connected contactors must have interference suppression (RC combination) as per the manufacturer's specification

Required external fuse for safety circuit

- T 2 A or T 1 A (T = slow blow) for (TRD 604 *), 72 hrs of operation
* see page 9

Signal output

- 4 PhotoMOS outputs for external signalling, with or without delay
- 24 DC, max. current load 100 mA, NO characteristic

Test input

- 4 opto-coupler inputs for external test triggering, high active, 24 V DC +/- 20 %

Output relay switch-off delay

- Factory default setting 3 seconds.
- Option of 10 seconds and 15 seconds

Indicators and controls

- 4 x buttons for operation/for initiating test function in sensor
- 4 x green LEDs for indicating the active channels
- 4 x red LEDs for indicating a malfunction/alarm
- 3 x yellow LEDs for indicating internal errors and external sensor errors
- 1 x 10-pole code switch for setting the number of limiters, the delay and baud rate

Technical data

Protection class

- II double insulated

IP rating to EN 60529

- Housing: IP 40
- Terminal strip: IP 20

Admissible ambient conditions

- Service temperature: 0 °C – 55 °C - installed in control cabinet
- Storage temperature: -40 °C – 80 °C
- Transport temperature: -40 °C – 80 °C
- Air humidity: 10 % – 95 %, non-condensing
- Altitude: up to 2000 m

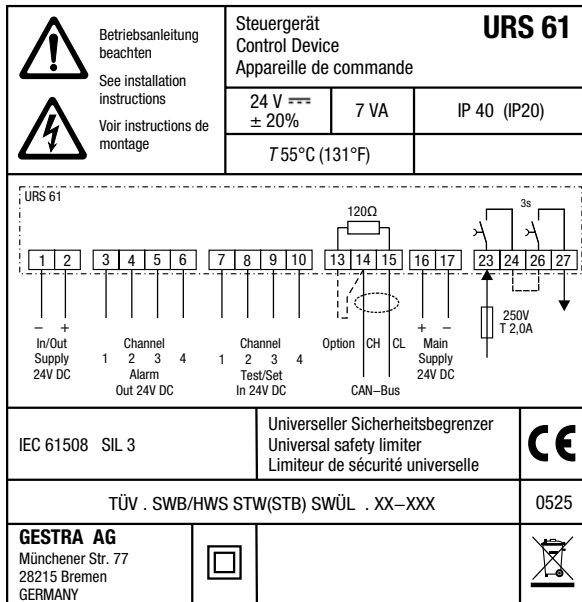
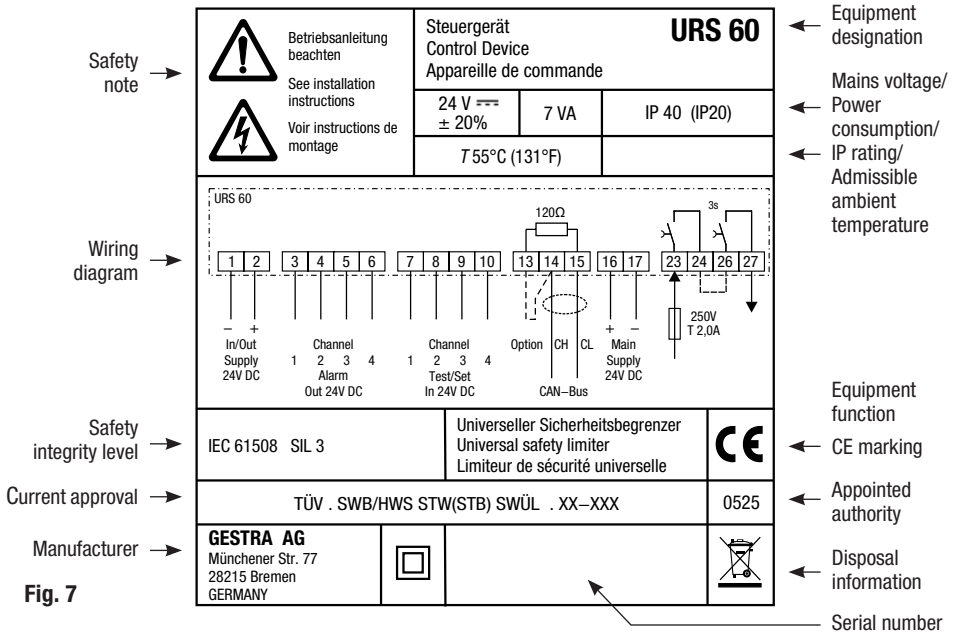
Body

- Body 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 mm² solid or
 - ◆ 1 x 2.5 mm² stranded with sleeve, or
 - ◆ 2 x 1.5 mm² stranded with sleeve
- Body attachment: Mounting clip on support rail TH 35 (to EN 60715)
- Installation in control cabinet (IP54) required

Weight

- Approx. 0.4 kg

Name plate/identification of URS 60 / URS 61



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

Factory settings

Safety control unit URS 60

- Baud rate: 50 kBit/s (max. cable length 1000 m)
- Signalling delay: OFF
- Configuration:
Operation e.g. with two level electrodes NRG 1x-60
- Code switch setting, sliding switch, white



Safety control unit URS 61

- Baud rate: 50 kBit/s (max. cable length 1000 m)
- Signalling delay: OFF
- Configuration:
Operation e.g. with one level electrode NRG 1x-61
- Code switch setting, sliding switch, white



Functional elements and dimensions

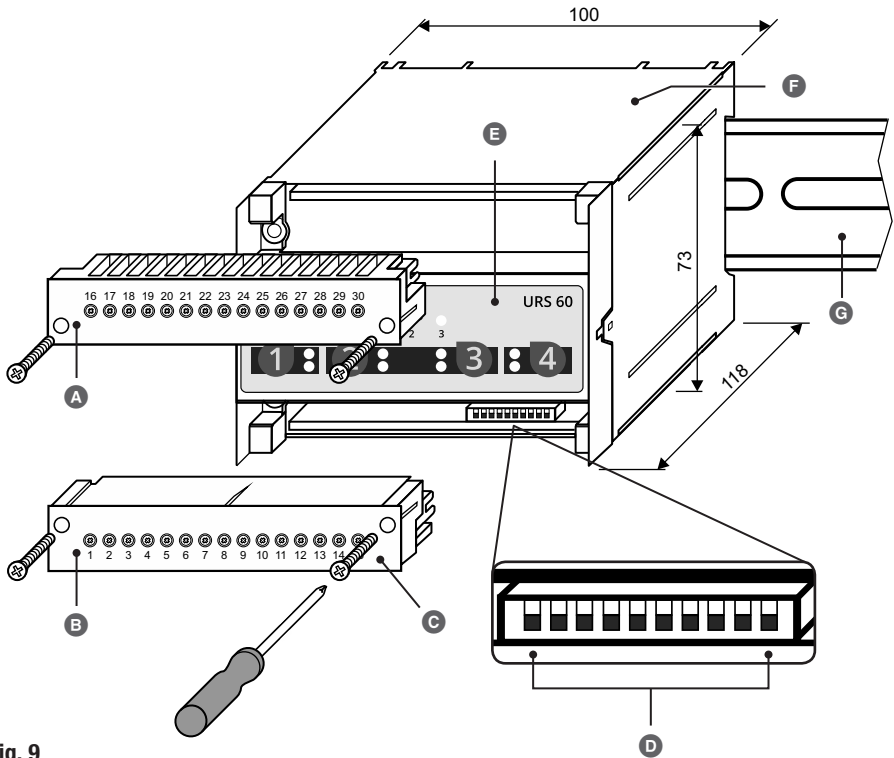


Fig. 9

- A** Upper terminal strip
- B** Lower terminal strip
- C** Fastening screws (M3)
- D** 10-pole code switch, for setting the number of limiters, the delay and baud rate
- E** Front membrane with buttons and LEDs, see page 29
- F** Body
- G** Support rail TH 35



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

Equipment settings, see page 27.

Installing the URS 60 / URS 61 safety control unit

The URS 60 / URS 61 safety control units are clipped onto a TH 35 support rail in a control cabinet.

DANGER



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

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

1. Switch off the voltage to the system, 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.

Wiring diagram of the URS 60 / URS 61 safety control unit

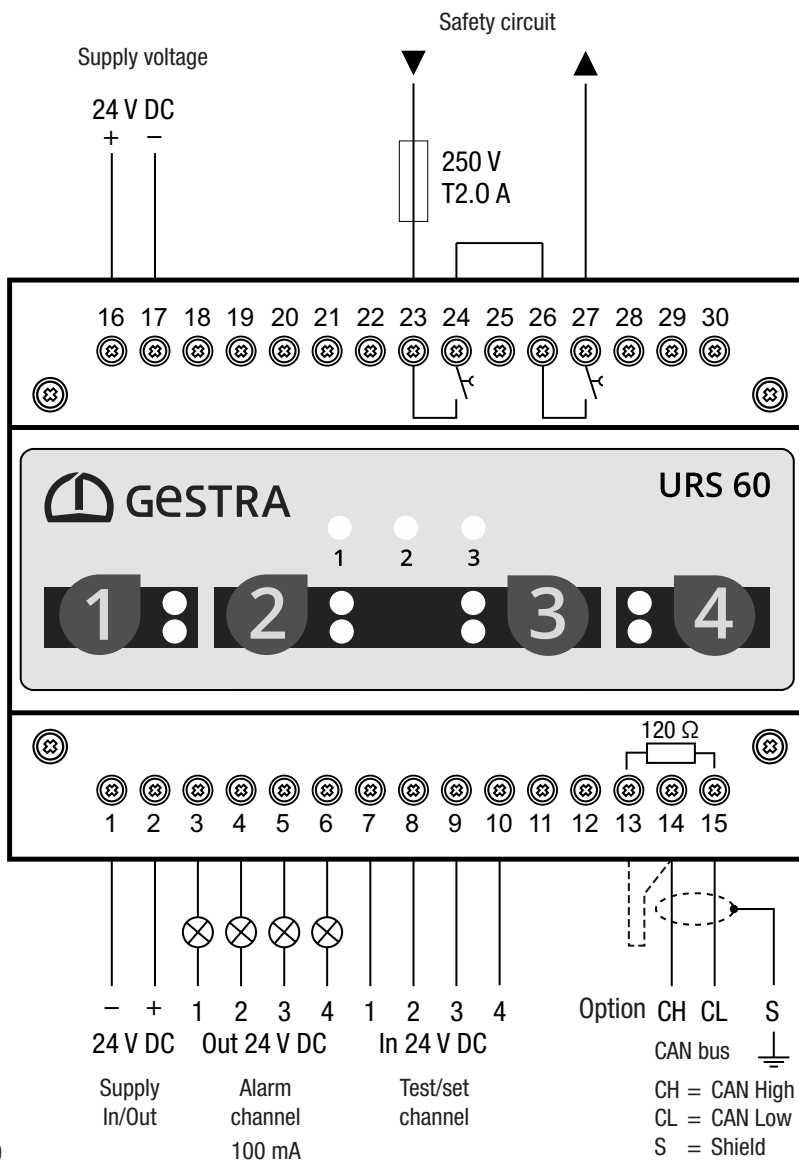


Fig. 10



The URS 61 is connected as shown in the wiring diagram for the URS 60.

Electrical connection

Bus line, cable length and cross-section

- 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 must be used as the bus line.
- Pre-wired control cables (with plug and coupling) are available as accessories in various lengths.
- The baud rate (transfer rate) is determined by the cable length between the bus terminal devices, and the wire cross-section is determined by the overall power input of the measuring sensors.
- As far as possible, route the bus line separately from power lines and protected from environmental influences.

Connecting the 24V DC power supply

- The URS 60 / URS 61 is supplied with 24V DC.
- A safety power supply unit that delivers a Safety Extra Low Voltage (SELV) must be used to supply the equipment with 24V DC.

Connecting the 24V DC I/O interface

- The I/O interface can be supplied with power either from the supply voltage of the safety control unit (see above) or via a separate 24 V DC voltage.
- The signalling outputs and test inputs are wired using single-core wires e.g. H07V-U.

Instructions for connecting the safety circuit

- Connect the safety circuit to terminals 23, 24 and 26, 27.
- If using the equipment as a water level limiter to TRD, EN 12952/EN 12953, you must connect the output contacts of the two monitoring channels to terminals 24 and 26 using a wire bridge.
- Use a T2A or T1A (T = slow-blow) fuse (TRD 604, 72 hrs. of operation) to protect the switching contacts of the safety circuit.
- If the installation requires a lockout function, this must be implemented in the downstream (safety) circuit. This circuit must conform to the requirements of EN 50156.

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.

Wiring diagram of CAN bus system

Example

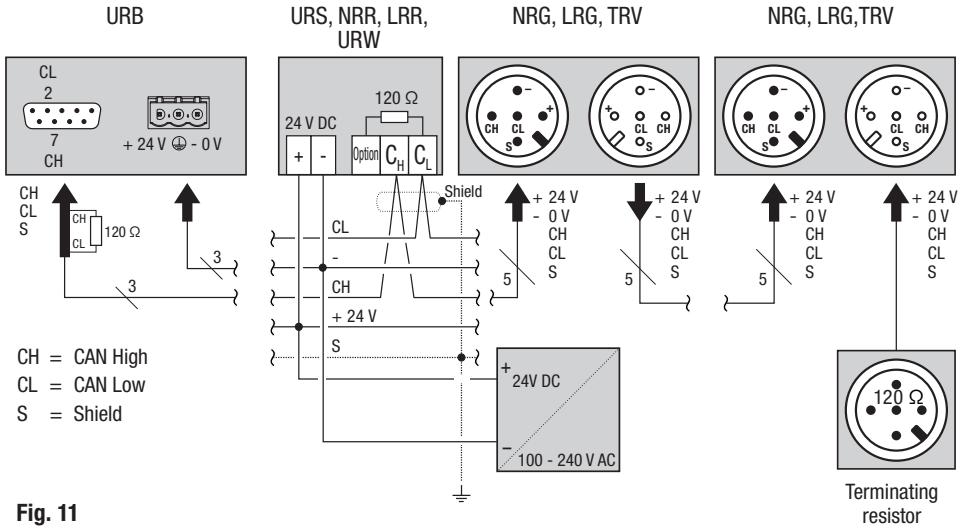


Fig. 11

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 SPECTORconnect system.
- Make sure wiring is in line, not in a star!
- Avoid potential differences in system parts by connection to a central earthing point.
 - ◆ Connect the bus line shields to one another all the way along, and connect them 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** units.
- The URS 60 / URS 61 safety control units have an internal terminating resistor. To activate this internal terminating resistor in the URS 60 / URS 61 units, insert a bridge between the terminals (“Option” and “CH”).
- Only **one** URS 60 and **one** URS 61 control unit may be used in the CAN bus network.
- The CAN bus network must not be interrupted during operation!
If it is, an alarm is triggered.

Changing the equipment settings

DANGER



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 system is not carrying live voltage before commencing work.

You can change the factory settings of URS 60 / URS 61 safety control units at any time.




Make changes before installing the safety control unit, when access is easier.

You will need the following tools:


- Slotted screwdriver, size 2.5
- Phillips screwdriver, size 1

Proceed as follows:

1. Unscrew and pull off the lower terminal strip, see **Fig. 9**.
2. Set the code switch  (see **Fig. 9**) as desired, see page 27 and 28.
3. Put the terminal strip back on and screw in place.

Changing the baud rate




Set the baud rate using the code switch  **Fig. 9** (S9), see page 28.
You must set the same baud rate for all bus participants.

Changing the equipment settings

The URS 60 / URS 61 safety control units are designed for up to four limiter functions for monitoring water level, temperature and conductivity. You can connect level electrodes NRG 1x-6x or NRG 26-61, temperature transmitter TRV 5-60 and conductivity electrode LRG 1x-6x.

For operation, you must define the number of limiter functions you wish the control units to work with. Set the limiting function you require by connecting the various sensors for level, temperature and conductivity and by assigning the necessary parameters.

With the lower terminal strip removed:


Using a thin-blade screwdriver, configure the code switch  (see Fig. 9) using switches S1 to S10 as shown in the table. Next, re-install the terminal strip and tighten the fastening screws.

Code switch - sliding switch, white



Configuring the limiter function

URS 60 / URS 61 safety control unit


Code switch 								Limiter functions 1 to 4 (see Fig. 5)				
S1	S2	S3	S4	S5	S6	S7	S8	>	1	2	3	4
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	>				
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	>	Active			
ON	ON	ON	ON	OFF	OFF	OFF	OFF	>	Active	Active		
ON	ON	ON	ON	ON	ON	OFF	OFF	>	Active	Active	Active	
ON	ON	ON	ON	ON	ON	ON	ON	>	Active	Active	Active	Active
Factory setting of URS 60												
ON	ON	ON	ON	OFF	OFF	OFF	OFF	>	Active	Active		
Factory setting of URS 61												
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	>	Active			

Changing the equipment settings

Configuring the delay time and baud rate

Use S9 to change the baud rate from 50 kBit/s to 250 kBit/s, and S10 to delay the signalling outputs (see table below).

URS 60 / URS 61 safety control unit

Code switch 		Configuration	
S9	S10	Signalling delay *	Baud rate
Factory setting			
OFF	OFF	OFF	50 kBit/s
OFF	ON	ON	50 kBit/s
ON	OFF	OFF	250 kBit/s
ON	ON	ON	250 kBit/s

* The delay is the relay switch-off delay of 3 seconds set ex-works (10 seconds or 15 seconds optional).



When defining limiter functions 1 to 4, please also pay attention to the operating instructions of the relevant sensors.

Bringing into service – start, operation, alarm and test

LEDs 1 to 3 (yellow), indication of system malfunctions, see page 32

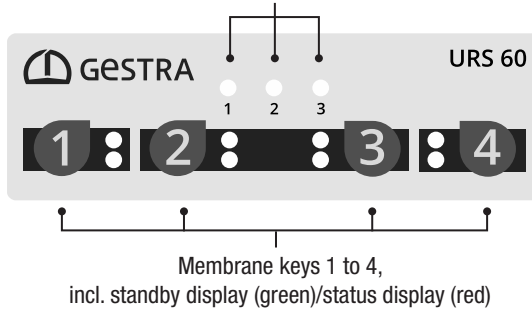


Fig. 12

Assignment of button/signal LED/limiter:

- Button 1/LED 1: Limiter 1
- Button 2/LED 2: Limiter 2
- Button 3/LED 3: Limiter 3
- Button 4/LED 4: Limiter 4

The following table is based on four activated limiter functions.

Start		
Switch on supply voltage.	All LEDs light up	The system is started and tested. The output contacts open. The signal outputs close (lamp test).
Operation		
Limiters 1 – 4 do not signal an alarm	Signal LEDs 1 – 4 light up green	The output contacts close, the signal outputs open.
Alarm		
Limiters 1 – 4, one or more signal an alarm	Signal LED 1, 2, 3, 4, one or more flash red rapidly	The switch-off delay is running, the signal output closes with/without a delay.
	Signal LED 1, 2, 3, 4, one or more light up red	The delay time has elapsed, the output contacts open. The signal outputs close.
Test of limiters 1 – 4		
In operating mode: Press button 1, 2, 3 or 4 and hold until the end of the test. The limiters must behave as if there were an alarm.	Signal LED 1, 2, 3 or 4 flash red rapidly	Alarm simulation in limiters 1 – 4. The switch-off delay is running, the signal output closes with/without a delay.
	Signal LED 1, 2, 3 or 4 lights up red	The delay time has elapsed, the output contacts open. The signal output closes. The test ends.

Bringing into service – start, operation, alarm and test



In the event of an alarm, the URS 60 / URS 61 control units do not lock automatically.

If the installation requires a lockout function, this must be implemented in the downstream (safety) circuit. This circuit must conform to the requirements of EN 50156.



Faulty equipment jeopardises system safety.

- If the URS 60 / URS 61 control unit does not behave as described above in the “Alarm” and “Test of limiters 1-4” tables, it may be faulty.
 - Perform failure analysis.
 - Do not repair the URS 60 / URS 61 safety control unit.
 - Only replace faulty equipment with identical equipment from GESTRA AG.
-

Checking installation and function

Monitoring the switching points

The switching points for low water, high water and MAX temperature must be checked by reaching these water levels and temperature limits. In this case, the equipment must behave as if there were an alarm.

The switching points must be checked when the equipment is brought into service and each time the sensors are changed. MAX conductivity is checked by means of regular manual reference measurements (e.g. every 72 hours) and test triggering.

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?

Control unit configuration:

- Are the limiter function, delay time and baud rate correctly set on code switch **Ⓧ**?

Sensor configuration:

- Are the sensors set to the correct limiter number 1,2,3,4,5,6,7,8?

Baud rate:

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

DANGER

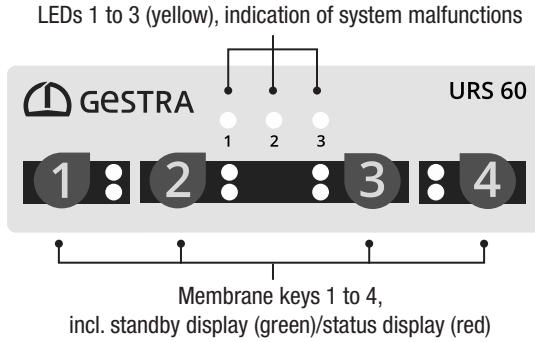


There is a risk of electric shock during work on electrical systems.

- You must 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 system is not carrying live voltage before commencing work.
- Interrupting the CAN bus during operation triggers an alarm.

System malfunctions

Indication of system malfunctions



Assignment of signal LED/button/limiter:

LED 1/button 1: Limiter 1

LED 2/button 2: Limiter 2

LED 3/button 3: Limiter 3

LED 4/button 4: Limiter 4

Indication of communication failures in limiter 1 – 4			LED 1 lights up yellow
Limiters 1 – 4	Signal LEDs 1 – 4	Description	Remedy
Communication failures in one or more limiters.	One or more LEDs flash green rapidly.	The output contacts open without a delay. The relevant signal output is closed.	Check the following points: <ul style="list-style-type: none"> ■ The wiring ■ The baud rate ■ The sensor limiter numbers Pay attention to the notes on page 31.

Indication of malfunctions in limiter 1 – 4			LED 1 lights up yellow
Limiters 1 – 4	Signal LEDs 1 – 4	Description	Remedy
One or more limiters are malfunctioning.	One or more LEDs flash green slowly.	The output contacts open without a delay. The relevant signal output is closed.	Check the error display of the relevant sensor. Pay attention to the relevant operating instructions. If the sensor itself does not indicate a fault, the ID has been assigned to another sensor in duplicate.

System malfunctions

Indication of equipment malfunctions in the URS 60 / URS 61			LED 2 lights up yellow
URS 60 / URS 61	Signal LEDs 1 – 4	Description	Remedy
The configuration is incorrect or the function is not working correctly.	Current status.	The output contacts open without a delay. The relevant signal output is closed.	Check the configuration of the URS 60 / URS 61 and connected sensors. Pay attention to the notes on page 31. Replace faulty units with an identical unit.

Indication of overheating in limiter 1 – 4			LED 1 + 3 light up yellow
Limiters 1 – 4	Signal LEDs 1 – 4	Description	Remedy
One or more limiters indicate overheating.	One or more LEDs flash green slowly.	The output contacts open without a delay. The relevant signal output is closed.	Check the installation location of the relevant sensor. Insulate the sensor flange against radiated heat.

What to do in the event of system malfunctions

Checking installation and function

Monitoring the switching points

The switching points for low water, high water and MAX temperature must be checked by reaching these water levels and temperature limits. In this case, the equipment must behave as if there were an alarm.

The switching points must be checked when the equipment is brought into service and each time the sensors are changed. MAX conductivity is checked by means of regular manual reference measurements and test triggering.



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.


Emergency mode

Emergency mode for water level limiter systems

If the URS 60 / URS 61 is working with two level electrodes NRG 1x-60 (water level limiter system), the equipment can continue working with **one** level electrode in emergency mode under constant supervision upon the failure of one electrode, in accordance with (TRD 401*,) EN 12952 and EN 12953.

* see page 9

The following settings are required:

1. Remove the faulty electrode from the CANopen bus system (connect the plug and socket of the connecting cable together).
2. Switch off the voltage to the equipment and unscrew the lower terminal strip.
3. Now activate the required limiter function via code switch  Fig. 9 .
4. Put the terminal strip back on and screw securely in place.

Important notes on emergency mode

- Enter the start of emergency mode in the boiler log.
- The system must be supervised constantly when running in emergency mode!
- Replace the faulty level electrode immediately.
- Enter the end of emergency mode in the boiler log.

Taking out of service

1. Switch off the supply voltage and switch off the voltage to the equipment.
2. Check that the equipment is not live.
3. Unscrew and pull off the lower terminal strip, see **Fig. 9 A; B**
4. Release the slider holder on the base of the equipment, and detach the URS 60 / URS 61 safety control unit from the support rail.

Disposal

Dispose of the safety control unit in accordance with statutory waste disposal regulations.

Returning decontaminated devices

Products that come into contact with hazardous media must be drained and decontaminated before being returned or sent back to GESTRA AG.

The term media can refer to solid, liquid or gaseous substances or mixtures, as well as radiation.

GESTRA AG only accepts returned products with a filled-out and signed return note, along with a filled-out and signed decontamination declaration.



The return confirmation and decontamination declaration must be attached to the outside of the return package, as processing will otherwise be impossible and the products will be returned to the sender at their expense.

Please proceed as follows:

1. Inform GESTRA AG of the return package via phone or e-mail.
2. Wait until you have received the return confirmation from GESTRA.
3. Fill out the return confirmation (including decontamination declaration) and send it with the products to GESTRA AG.

EU Declaration of Conformity

We hereby declare that the URS 60 / URS 61 safety control units conform to the following European Directives:

- Directive 2014/68/EU EU Pressure Equipment Directive
- Directive 2014/35/EU Low Voltage Directive
- Directive 2014/30/EU EMC Directive
- Directive 2011/65/EU RoHS II Directive

Please see our Declaration of Conformity for details on the conformity of our equipment with European Directives.

The current Declaration of Conformity can be found online at www.gestra.com or can be requested from us.

For your notes







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