URB 1

GB

Installation Instructions 810375-03

Operating Terminal and Display Unit URB 1

spector bus CANopen

FLOWSERVE

Flow Control Division

Contents

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Wiring Diagram

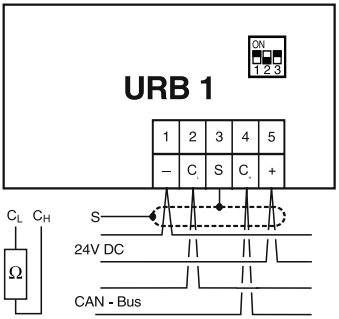
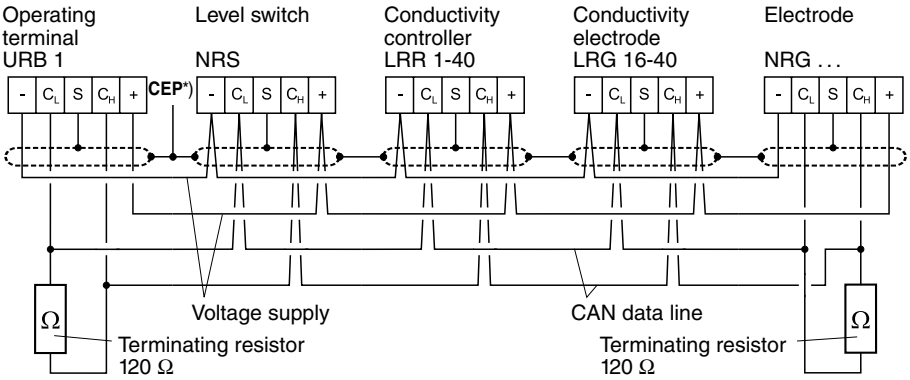


Fig.1 Terminating resistor 120 Ω, Paired cable



*) CEP = central earthable point

Fig. 2

Functional Elements

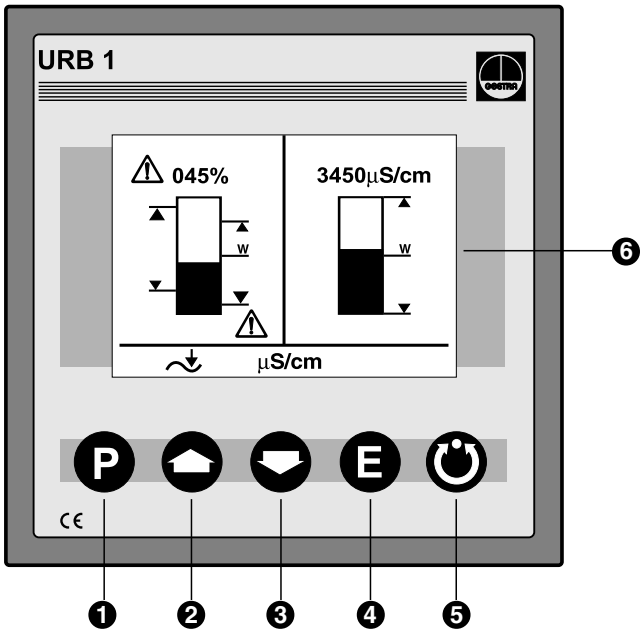


Fig. 3

Functional Elements

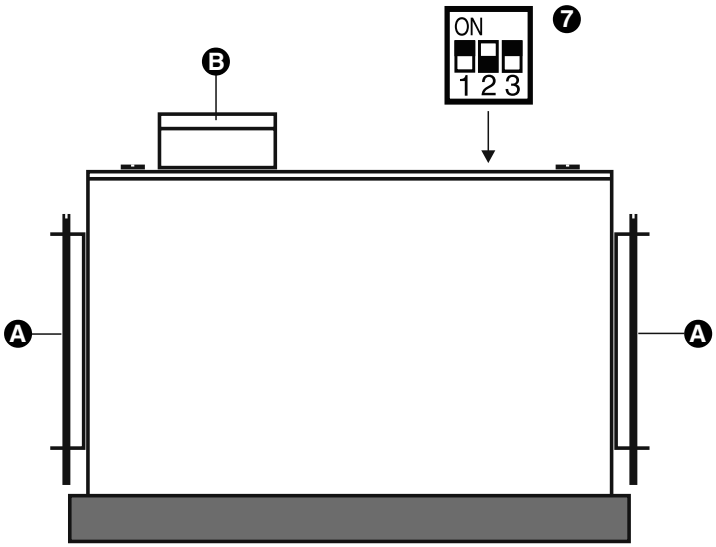


Fig. 4

Key

❶ Program button for switching between operating mode and parameterisation mode

❷ Increase button

❸ Decrease button

❹ Enter button

❺ Manual / automatic button

❻ Illuminated LCD display, resolution 128 x 64 pixels

❼ Code switch for baud rate setting

Ⓐ Fixing screws for panel mounting

Ⓑ Five-pole connector

Important Notes

Usage for the intended purpose

Use operating terminal & display unit URB 1 only in conjunction with GESTRA Spector bus systems (CANopen).

Safety Note

Use operating terminal and display unit URB 1 only for operating and viewing GESTRA CAN bus systems.

The equipment must only be installed by qualified staff.
Qualified staff are those persons who – through adequate training in electrical engineering, the use and application of safety equipment in accordance with regulations concerning electrical safety systems, and first aid & accident prevention – have achieved a recognised level of competence appropriate to the installation and commissioning of this device.

Explanatory Notes

Scope of supply

URB 1

1 Operating terminal and display unit URB 1 (in plastic case)

2 Fixing screws for panel mounting

1 Installation manual

System description

The URB 1 is a user-friendly operating terminal and display unit for GESTRA CAN bus systems using the CANopen protocol. The equipment makes retrieving and processing standard functions of associated system components very easy.

In addition, the URB 1 simplifies the parameterisation procedure: The switchpoints, proportional band and response sensitivity can be adjusted by means of the keypad regardless of the actual level. The energizing and de-energizing times of the relays can be set individually for their respective switchpoints.

The following tables specifiy the GESTRA systems that can be displayed by the URB 1.

Explanatory Notes – continued –

System description – continued –

Standard display information	Level					Conductivity
	NRS 1-40	NRS 1-41	NRS 1-42	NRS 2-40	NRR 2-40	LRR 1-40
Actual value (bar chart)				●	●	●
Actual value (numerical value)				●	●	●
Switchpoint (symbol)			●	●	●	●
High level alarm (electrode HW)			●	●	●	●
Low level alarm (electrode LW)			●	●	●	●
Manual/automatic operation				●	●	●
Stand-by mode						●
Unit [µS/cm] or [ppm]						●
Low level limit	●					
High level limit		●				
Alarm (warning triangle) ⚠	●	●				

Further display information	Level					Conductivity
	NRS 1-40	NRS 1-41	NRS 1-42	NRS 2-40	NRR 2-40	LRR 1-40
Actual value (continuous)				●	●	●
Switchpoints			●	●	●	●
Setpoint					●	●
Deviation					●	●
Valve position					●	●
Intermittent blowdown						●
Intermittent blowdown interval						●
Purging pulse 24 h						●
Current CAN bus addresses	●	●	●	●	●	●

Function

The URB 1 communicates with other GESTRA system components via a designated CAN bus using the CANopen protocol to DIN ISO 11898.

The URB 1 can also be used to operate and display further system components during operation.

- Capacitance level switch type NRS 2-40 CANopen
- Level controller type NRR 2-40 CANopen
- Conductivity level switch type NRS 1-42 CANopen
- Low-level alarm to TRD 604/EN type NRS 1-40 CANopen
- High-level alarm to TRD 604/EN type NRS 1-41 CANopen
- Conductivity controller and limiter to TRD 604/EN type NRS 1-41 CANopen

Explanatory Notes – continued –

Technical data

Type approval no.
TÜV · 98-399 (level)
TÜV · WÜL · 02-007 (conductivity)

Input
Power supply: 18 V – 36 V DC
Interface for CAN bus using CANopen protocol to DIN ISO 11898

Output
Interface for CAN bus using CANopen protocol to DIN ISO 11898

Indicators and adjustors
1 illuminated display, resolution: 128 x 64 pixels
5 push buttons
1 three-pole code switch for baud rate setting

Supply voltage
18 V – 36 V DC

Protection
Front panel: IP 54 to DIN EN 60529
Back: IP 00 to DIN EN 60529

Admissible ambient temperature
0 °C – 55 °C

Case material
Front face: Aluminium with polyester membrane
Casing: Noryl GFN 2 SE 1, glass-fibre reinforced

Weight
Approx. 0.3 kg

Installation

URB 1

Panel mounting

1. Provide panel cut-out, dimensions: $92^{+0.8}$ x $92^{+0.8}$.
2. Install URB 1 using the fixing clips supplied with the equipment.

Tool

■ Screwdriver (5.5/100)

Wiring

Note that multi-core control cable with conductors linked in pairs, e. g. UNITRONIC® BUS CAN 2 x 2 x .. mm² or RE-2YCYV-fl 2 x 2 x .. mm² .

The baud rate (data transfer rate) dictates the cable length between the bus nodes and the total power consumption of the sensors dictates the conductor size.

S 8	S 9	S 10	Baud rate	Cable length	Number of pairs and conductor size [mm²]
OFF	**ON**	**OFF**	**250 kBit/s**	**125 m**	2 x 2 x 0,34
Factory settings					
ON	ON	OFF	125 kBit/s	250 m	2 x 2 x 0,5
OFF	OFF	ON	100 kBit/s	335 m	2 x 2 x 0,75
ON	OFF	ON	50 kBit/s	500 m	on request, dependent on bus configuration
OFF	ON	ON	20 kBit/s	1000 m	
ON	ON	ON	10 kBit/s	1000 m	

The baud rate is set via a code switch. Reduce baud rate if cable is longer than specified in the table above. Make sure that all bus nodes feature the same settings.

To protect the switching contacts fuse circuit with 2.5 A (anti-surge fuse) or according to TRD regulations (1.0 A for 72 hrs operation).

When a max. cable length of more than 125 m (up to 1000 m) is desired, make sure to modify the baud rate accordingly. Refer to pages 75 and 76 for more details.

Wiring diagram

For wiring diagram refer to page 4.

Attention

- Wire equipment in series. Star-type wiring is not permitted.
- Interlink screens of control cables such that electrical continuity is ensured and connect them **once** to the central earthing point (CEP).
- If more than one system component is connected to a CAN bus network provide the first and last equipment with a terminating resistor of 120 Ω, **Fig. 2**
- The CAN bus line must **not** be interrupted while operating with one or more system components.

  Any interruption will open the control circuit!

  If the switching controller has to be replaced be sure to remove first the terminal strips Ⓑ, **Fig. 4**

  Note: Make sure that all system components connected are *not operating* before removing the CAN bus line from the terminal strip!

Wiring – continued –

Note

- Connect screen only to terminal 3, ensuring electrical continuity and connect equipment once to the central earthing point (CEP).
- The loop resistance must be under 10 Ω.
- The rated voltage is stated on the name plate.
- Despite correct wiring H.F. interference caused by the installation may lead to system breakdowns and malfunction messages. If necessary refer to the **fault finding lists of the respective bus equipment**.

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680

Basic Settings

CAN-Bus

All level and conductivity controllers and associated electrodes are interconnected by means of a CAN bus using the CANopen protocol. Every item of equipment features an electronic address (node ID). The four-core bus cable serves as power supply and data highway for high-speed data exchange.

The CAN address (node ID) can be set between **60** and **123**.

The URB 1 is configured at our works and ready for service with other GESTRA system components without having to set the node ID.

If several systems of the same kind are to communicate in one CAN bus network, be sure to assign one node ID for each individual system component (e. g. controller). Refer to page 75 and 76 for more information.

Node ID for GESTRA bus-based device URB 1

URB 1 (1)	
X	
60	Factory setting

Reserved	LRR 1-40	LRG 16-40	Reserved	
X - 1	X	X + 1	X + 21	
	50	51		Factory setting

reserved area

Example: Conductivity monitoring and control

Reserved	NRS 2-40	NRR 2-40	NRG 26-40	Reserved	
X - 2	X - 1	X	X + 1	X + 2	
	38	39	40		Factory setting

reserved area

Example: Level monitoring and control

Factory set default values

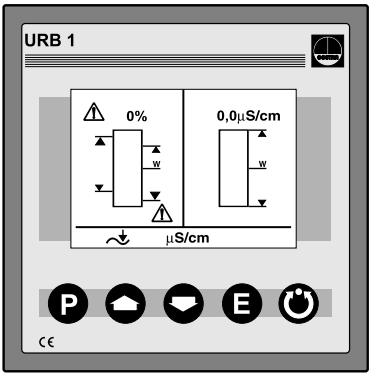
The URB 1 features the following factory default settings:

- Baud rate: **250 kb/s**
- Node ID: **060** (Do not change this node ID unless required; highest permissible setting: 123)

Basic Settings – continued –

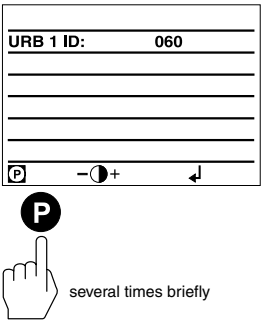
Adjusting display brightness

The brightness of the LCD display can be adjusted as necessary.

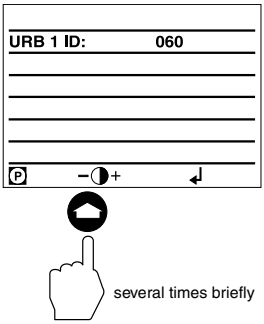


Press and hold the button P for a few seconds.

The URB 1 enters the address parameterisation mode.



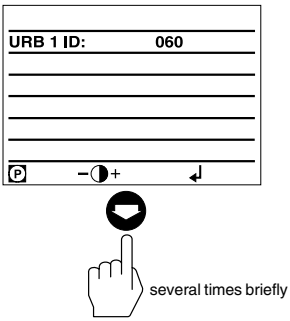
Press button ⌃ several times to reduce the brightness.



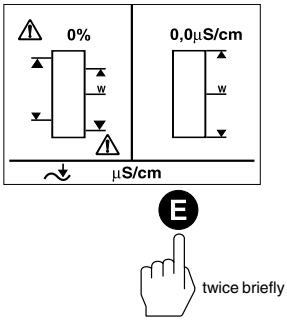
Basic Settings – continued –

Adjusting display brightness – continued –

Press button ▼ several times to increase the brightness.



Press button E briefly to save settings and return to the main window.

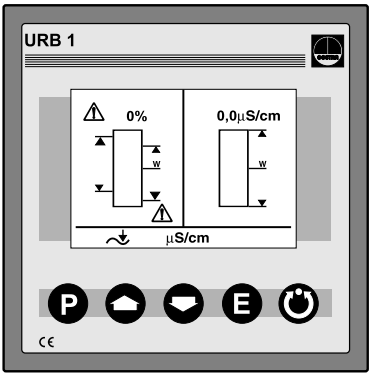


Changing factory set node ID of the URB 1 / Adjusting & changing node ID

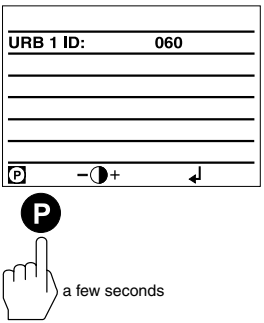
The factory set node ID of the URB 1 is “060”. Node IDs **below** this value are reserved for other GESTRA bus components.

If additional operating terminals type URB 1 are used in a CAN bus system, you have to set their node IDs to values **above** “060”.

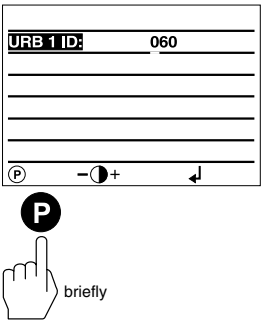
Note that the newly established node IDs must not be identical with node IDs of other bus components.



Press and hold button Ⓟ for a few seconds to enter the address parameterisation mode.



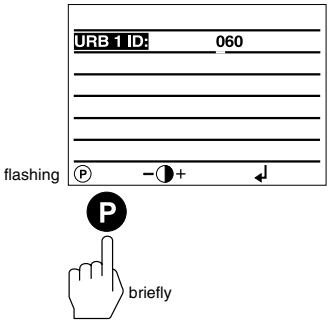
Press button Ⓟ briefly to activate the line selection mode.



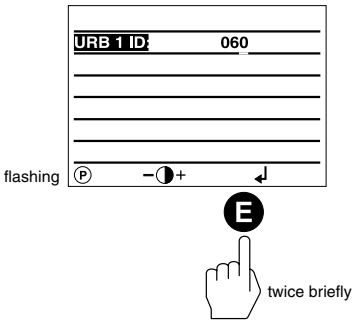
Changing factory set node ID of the URB 1 / Adjusting & changing node ID – continued –

Press button P briefly to activate the line editing mode.

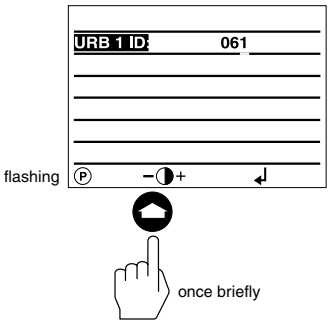
Use button ▲ or ▼ to increase or decrease the first digit.



Press button E briefly to move the cursor two steps further.



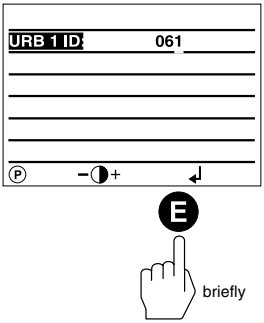
Press button ▲ once briefly to select the digit “1”.



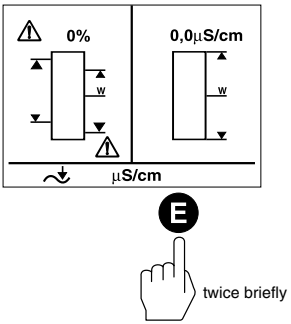
Changing factory set node ID of the URB 1 / Adjusting & changing node ID – continued –

Press button E briefly to activate the line selection mode.

In our example the node ID was set to "061".



Press button E twice briefly to save settings and return to the main window.



Possibilities to display bus devices

The URB 1 can display only **one** level monitoring device, **one** low-level alarm, **one** high-level alarm and **one** conductivity monitoring device per vessel (e. g. steam boiler or feedwater deaerator).

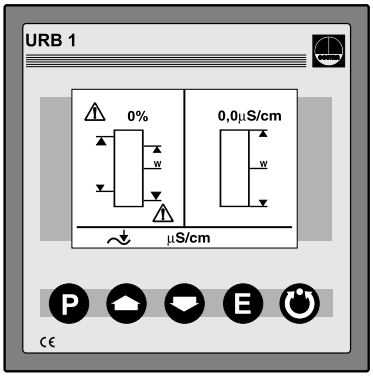
If the monitoring systems of more than one vessel are to be displayed, provide **one URB 1 per vessel.**

Setting / changing node IDs of bus-based equipment

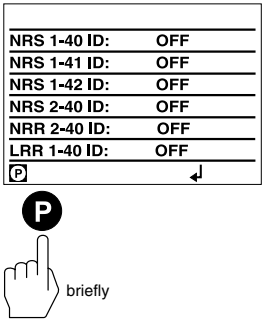
The standard default node ID setting of all bus devices that can be displayed is “OFF”. This setting acts as a wild card for all bus devices which are not displayed with the URB 1.

For each bus device that shall be displayed by the URB 1 a node ID has to be established manually.

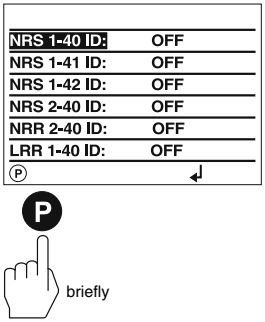
We recommend to accept the factory set node IDs of GESTRA bus devices. For the relevant node ID setting please refer to the corresponding installation manual of the device.



Press button P briefly to show the address list and activate the parameterisation mode.

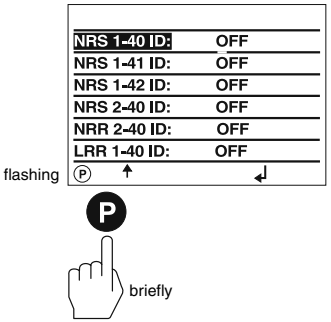


Press button P briefly to activate the line selection mode.

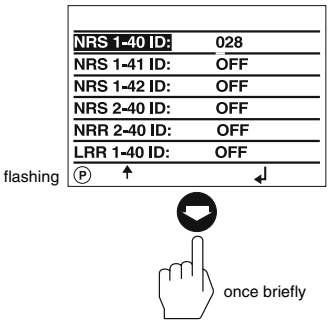


Setting / changing node IDs of bus-based equipment – continued –

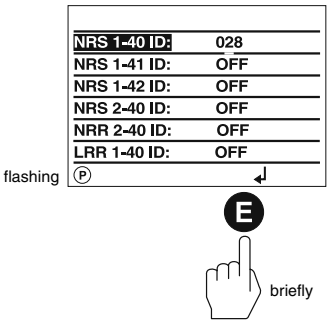
Press button P briefly to activate the line editing mode.
Use button ▲ or ▼ to increase or decrease the first digit.



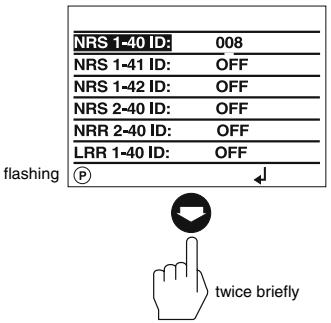
Press button ▼ once briefly to select the digit “0”.



Press button E briefly to move the cursor one step further.

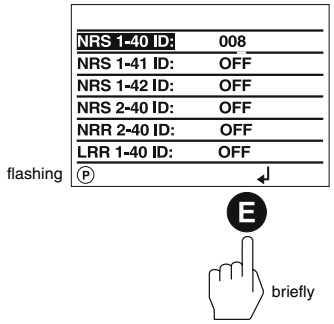


Press button ▼ twice briefly to select the digit “0”.

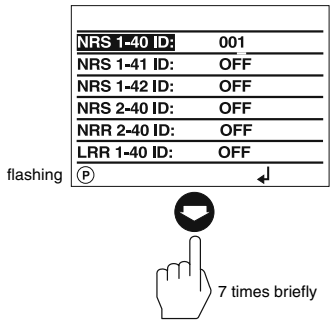


Setting / changing node IDs of bus-based equipment – continued –

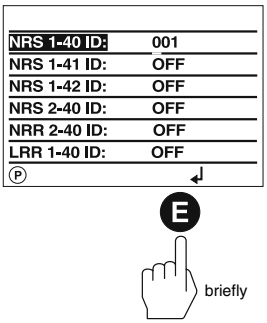
Press button E briefly to move the cursor one step further.



Press button ▼ seven times briefly to select the digit “1”.

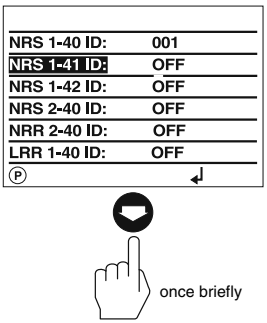


Press button E briefly to activate the line selection mode.



Press button ▼ once briefly to move to the next line.

The node ID of the NRS 1-41 can now be adjusted.

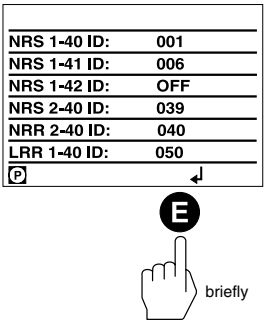


Setting / changing node IDs of bus-based equipment – continued –

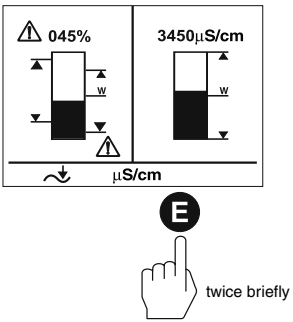
Press button E briefly to activate the parameterisation mode.

In this example the node IDs of all bus devices have already been adjusted.

If the display of the NRS 1-42 is required set the node IDs of the NRS 2-40 and NRR 2-40 to “OFF”.



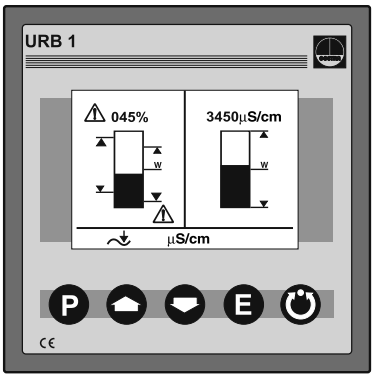
Press button E twice briefly to save the settings and return to the main window.



Visual display / Parameterisation of bus devices

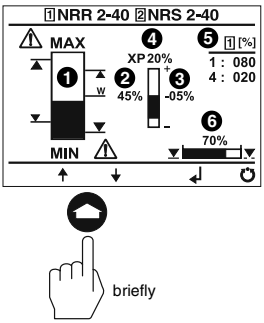
The split-screen display window shows which GESTRA bus devices can be indicated:

- High-level limiter type NRS 1-41
- Low-level limiter type NRS 1-40
- Level switch type NRS 2-40
- Level controller type NRR 2-40
- Conductivity controller type LRR 1-40



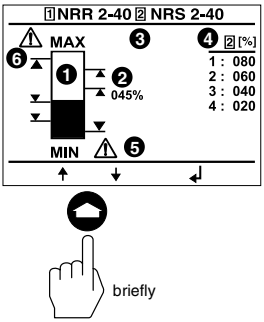
Press button briefly to enter the display window of the level controller NRR 2-40.

1. Actual level (graphical representation)
2. Actual level (percentage)
3. Setpoint deviation
4. Proportional band X_p
5. Switchpoints NRR 2-40
6. Valve position



Press button briefly to enter the display window of the level switch NRS 2-40.

1. Actual level (graphical representation)
2. Actual level (percentage)
3. Control unit 2 highlighted
4. Switchpoints for control unit 2
5. Low-level signal
   (flashes in the event of an LW alarm)
6. High-level signal
   (flashes in the event of an HW alarm)



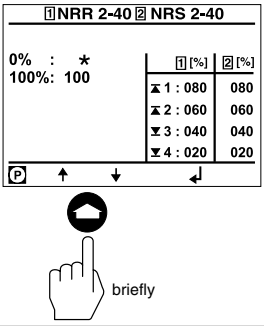
LW = low water (limiter NRS 1-40)

HW = high water (limiter NRS 1-41

Visual display / Parameterisation of bus devices – continued –

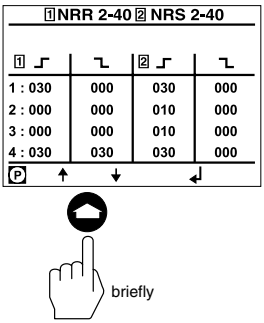
Press button briefly to enter the parameterisation mode for the following settings:

- 0 % – 100 % calibration NRG 26-40
- Switchpoints NRR 2-40
- Proportional band NRR 2-40
- Switchpoints NRS 2-40



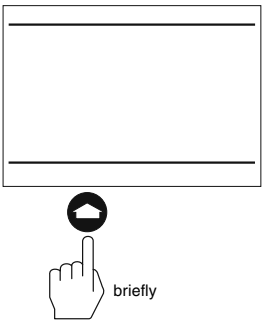
Press button briefly to enter the parameterisation mode for the following settings:

- Relay energizing delay times
- Relay de-energizing delay times



Press button briefly to enter the error messages window.

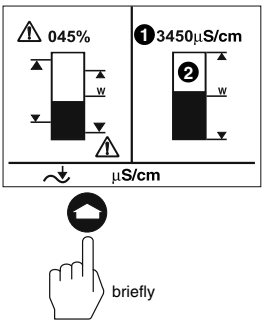
For more information see section **Malfunction, Troubleshooting, Fault Finding List** on pages 72 and 74.



Press button briefly to return to the main window.

❶ Actual conductivity value

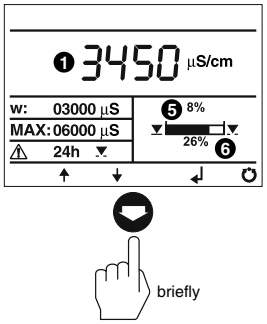
❷ Actual conductivity (graphical representation)



Visual display / Parameterisation of bus devices – continued –

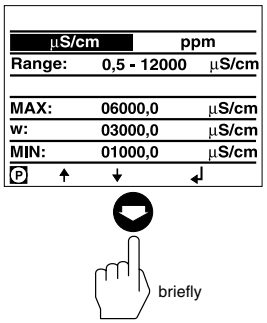
Press button briefly to enter the display window of the conductivity controller LRR 1-40.

1. Actual conductivity value
2. Conductivity setpoint
3. MAX conductivity value
4. 24 h purging pulse for continuous blowdown valve
5. Operating position of continuous blowdown valve
6. Valve position of continous blowdown valve



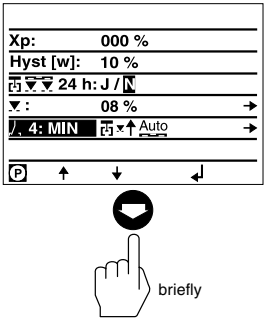
Press button briefly to enter the parameterisation mode for the following settings:

- µS/cm or ppm
- Indication range of actual value graphical representation
- MAX conductivity value
- Setpoint
- MIN conductivity value



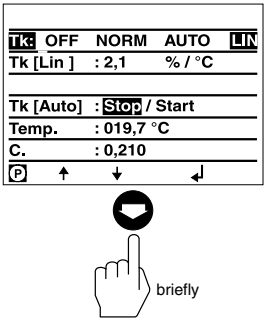
Press button briefly to enter the parameterisation mode for the following settings:

- Proportional band X_p
- Controller hysteresis
- 24 h purging pulse for continuous blowdown valve
- Operating position of intermittent blowdown valve
- Relay contact 4: MIN limit / Automatic intermittent boiler blowdown



Press button briefly to enter the parameterisation mode for the following settings:

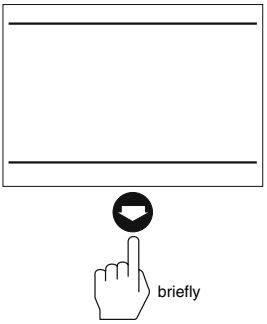
- Linear temperature compensation **LIN**
- Automatic temperature compensation **AUTO**
- Standard curve temperature compensation **NORM**
- Temperature compensation disabled **OFF**



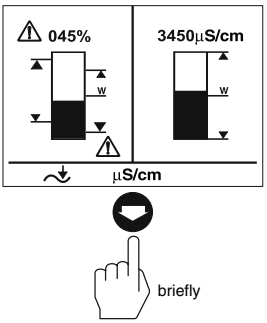
Visual display / Parameterisation of bus devices – continued –

Press button briefly to enter the error messages window.

For more information refer to section **Malfunction, Troubleshooting, Fault Finding List** on pages 72 and 74.



Press button briefly to return to the main window.

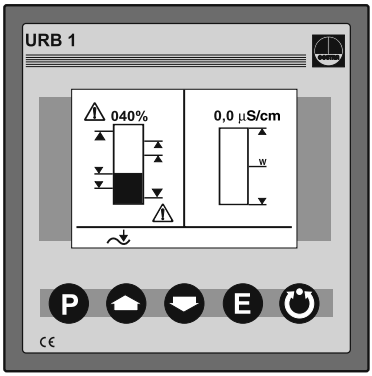


Visual display / Parameterisation of bus devices – continued –

The split-screen display window shows which GESTRA bus devices can be indicated:

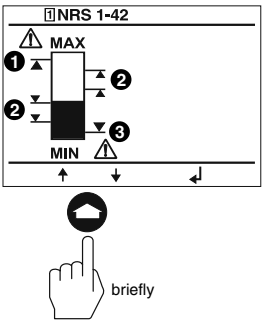
- Level switch type NRS 1-42

This window appears if, as in our example, only the NRS 1-42 is displayed.



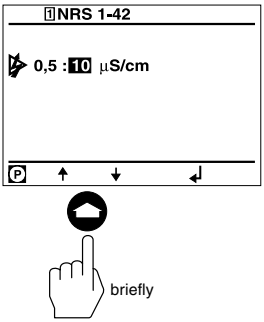
Press button briefly to enter the display window of the level switch NRS 1-42.

1. HIGH LEVEL switchpoint
2. Switchpoints
3. LOW LEVEL switchpoint



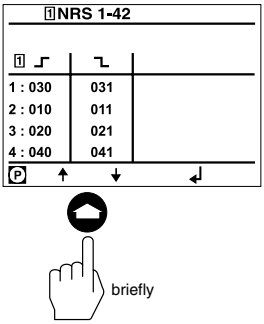
Press button briefly to select either of the following two settings:

- Minimum conductivity of the fluid 0.5 µS/cm
- Minimum conductivity of the fluid 10 µS/cm



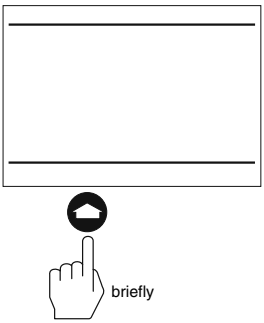
Visual display / Parameterisation of bus devices – continued –

Press button briefly to enter the parameterisation mode for the following settings:
- Relay energizing delay times
- Relay de-energizing delay times



Press button briefly to enter the error messages window.

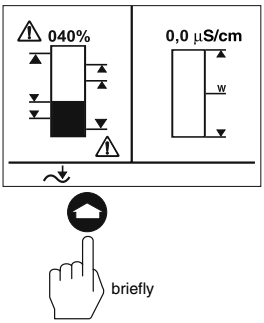
For more information please refer to section **Malfunction, Troubleshooting, Fault Finding List** on pages 72 and 74.



Press button briefly to return to the main window.

In this example only the bus device NRS 1-42 is displayed.

If the node IDs of the bus devices NRS 2-40 and NRR 2-40 have been established such that the equipment can be displayed on the URB 1, the indication of these devices will take priority over the NRS 1-42 and the display window of the NRS 1-42 will be blanked.

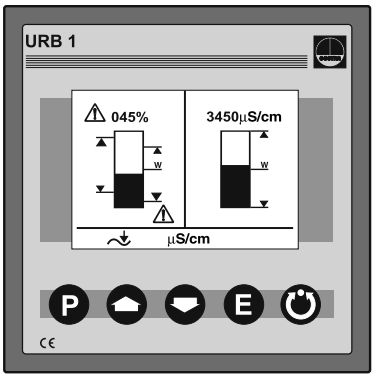


0 %/100 % calibration for capacitance level monitoring system

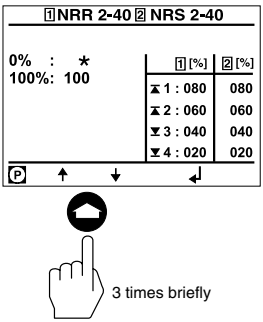
The split-screen main window shows which GESTRA bus devices can be displayed:

- High level limiter NRS 1-41
- Low level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40

Before commissioning the installation establish the measuring range of the capacitance level electrode NRG 26-40 by calibrating the 0 % and 100 % settings.

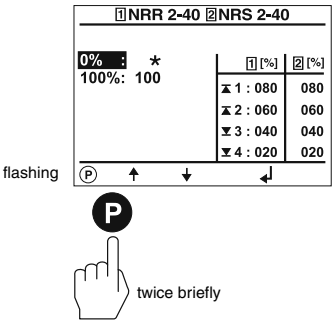


Press button ⏏ three times briefly to enter the window for calibrating the 0 % and 100 % settings.



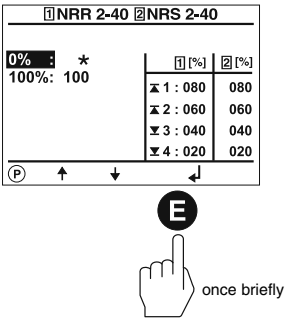
Press button Ⓟ twice briefly to enter the line editing mode.

Lower the water level in the vessel to 0 %.

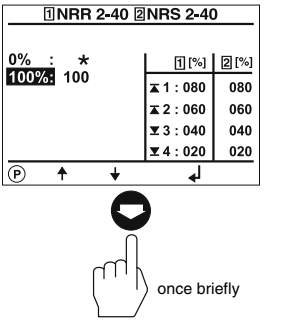


0 %/100 % calibration for capacitance level monitoring system – continued –

Press button E briefly to save the 0 % level setting.



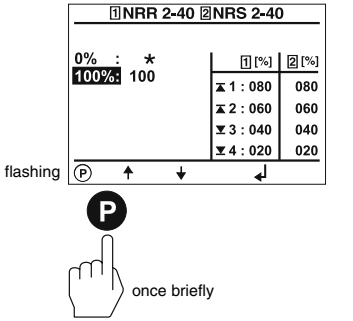
Press button ⌄ once briefly.



Press button P once briefly to activate the line editing mode.

Raise the water level in the vessel to 100 %.

If, for practical reasons, it is not possible to raise the water level to 100 % please proceed as follows:



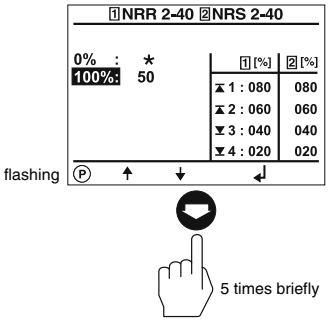
0 %/100 % calibration for capacitance level monitoring system – continued –

Press button ▼ five times briefly.

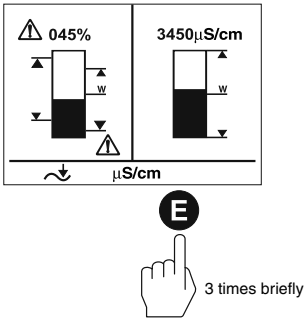
Pressing the ▼ button in program mode will decrement the calibration level in steps of 10 to a minimum of 50 %.

In our example the calibration level is 50 %.

This calibration method saves time and prevents the loss of feedwater.



Press button E three times briefly to enter the main window.

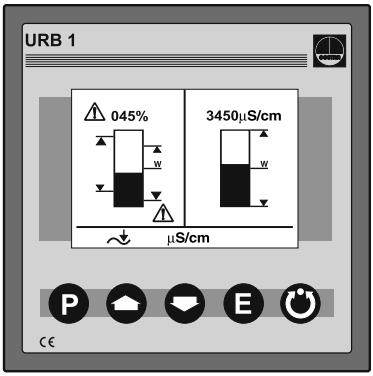


Calibrating the feedback potentiometer of an external control valve

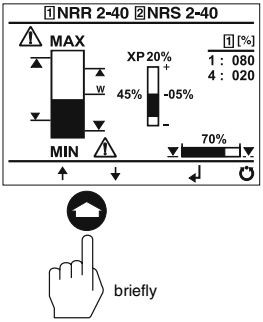
The split-screen window shows which GESTRA bus devices can be displayed:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40

Before commissioning the installation calibrate the 0 % (CLOSED) and 100 % (OPEN) range of the feedback potentiometer of an external control valve.

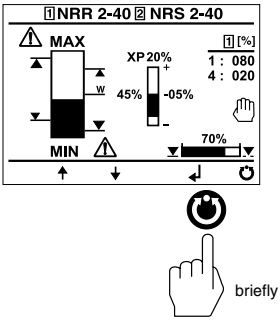


Press button briefly to enter the display window of the level controller NRR 2-40.



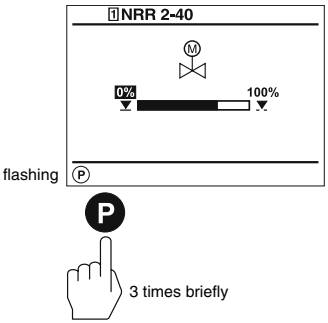
Press button briefly to activate the manual mode.

Pressing button or in this mode allows the manual opening or closing of an external control valve.

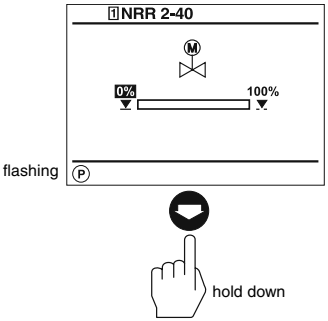


Calibrating the feedback potentiometer of an external control valve – continued –

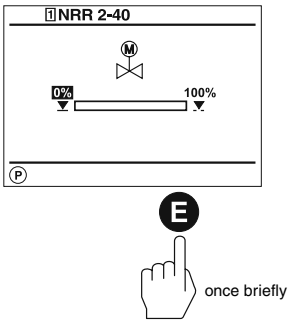
Press button P three times briefly to activate the line editing mode for calibrating the signal of the feedback potentiometer.



Press and hold down button ▼ until the control valve is closed.

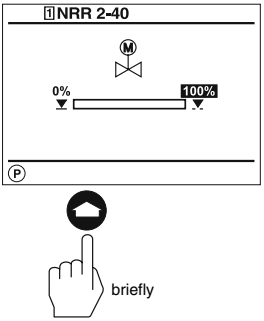


Press button E once briefly to save the current resistance value of the feedback potentiometer as 0 % setting (valve closed).

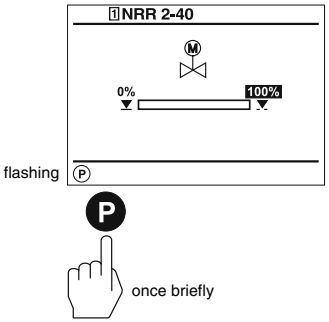


Calibrating the feedback potentiometer of an external control valve – continued –

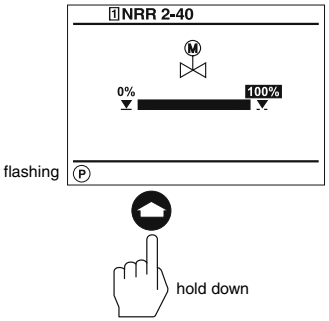
Press button ⌂ briefly to select the calibration of the 100 % setting.



Press button P once briefly to activate the line editing mode for calibrating the signal of the feedback potentiometer.

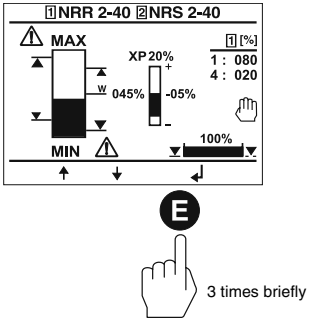


Press and hold down button ⌂ until the control valve is open.

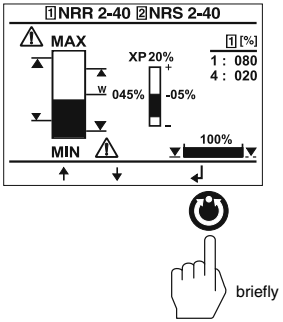


Calibrating the feedback potentiometer of an external control valve – continued –

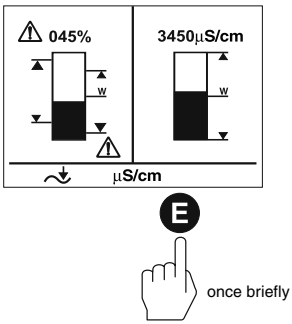
Press button E three times briefly to save the current resistance value of the feedback potentiometer as 100 % setting (valve OPEN).



Press button briefly to deactivate the manual mode.



Press button E once briefly to return to the main window.



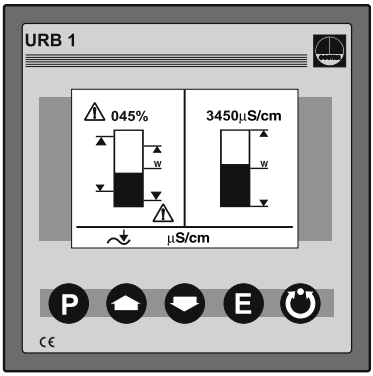
Establishing switchpoints and proportional coefficient X_p

The split-screen main window shows which GESTRA bus devices can be indicated:

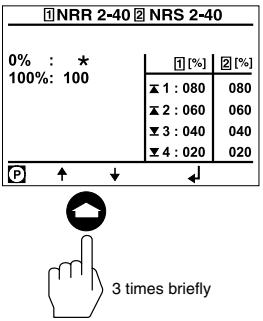
- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity electrode LRR 1-40

Before commissioning the installation establish proportional band and the MAX/MIN switchpoints for the level controller NRR 2-40.

For level switch NRS 2-40 you can establish four switchpoints.

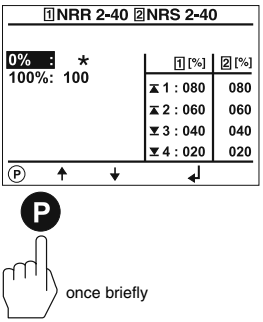


Press button ⏶ three times briefly to enter the window where you can establish the switchpoints and the X_p value.



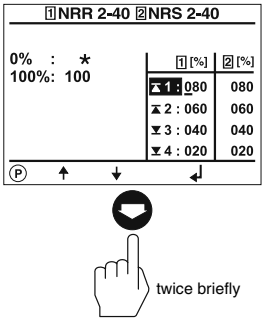
Press button Ⓟ once briefly to activate the line editing mode.

Use button ⏶ or ⏷ to scroll back and forth through the lines

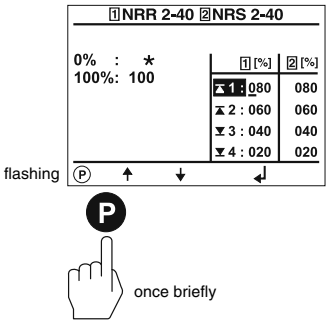


Establishing switchpoints and proportional coefficient X_p – continued –

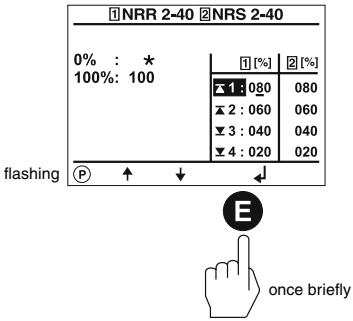
Press button ⬭ twice briefly to select the switchpoint 1 (MAX switchpoint) of the NRR 2-40.



Press button P once briefly to activate the line editing mode.



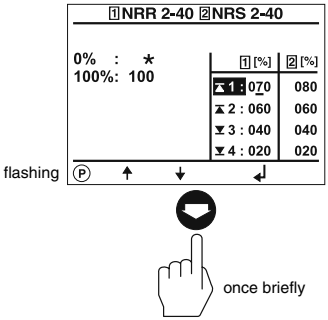
Press button E once briefly to move to the next digit in the same line.



Establishing switchpoints and proportional coefficient X_p – continued –

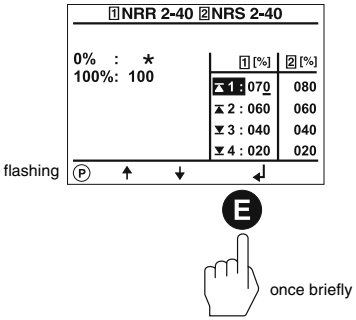
Press button ▼ once briefly.

In our example switchpoint 1 (MAX switchpoint) shall be established at **70 %**.



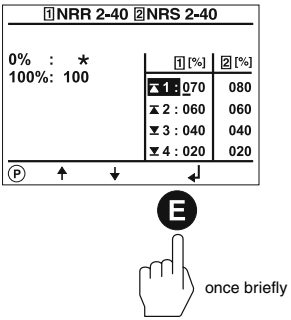
Press button E once briefly.

The last digit in the line is selected and remains “0” for our example switchpoint MAX **70 %**.



Press button E once briefly to deactivate the line editing mode.

Press button ▼ to go to the next line.

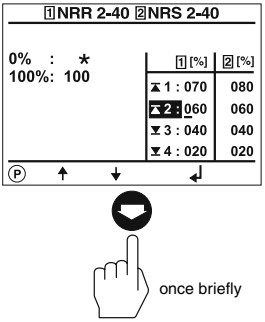


Establishing switchpoints and proportional coefficient X_p – continued –

Press button ⬭ once briefly.

Switchpoint 2 marks the upper limit of the proportional band for the level controller NRR 2-40.

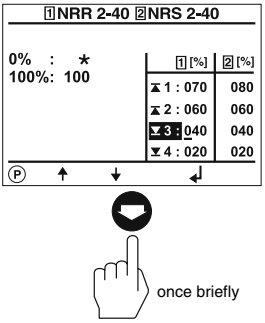
The difference between switchpoint 2 and switchpoint 3 gives the proportional band X_p. The example setting corresponds to proportional band of 20 % (060 - 040). Note that the proportional band **must** be greater than “0”.



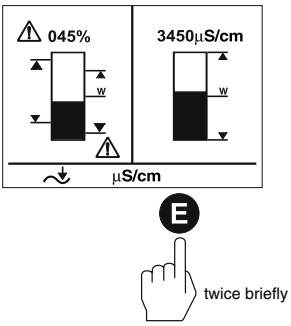
Press button ⬭ once briefly.

Switchpoint 3 marks the lower limit of the proportional band for the level controller NRR 2-40.

The proportional coefficient and the MIN switchpoint of the NRR 2-40 as well as the switchpoints of the NRS 2-40 can be adjusted as described above.



Press button E twice briefly to return to the main window.



Basic Settings – continued –

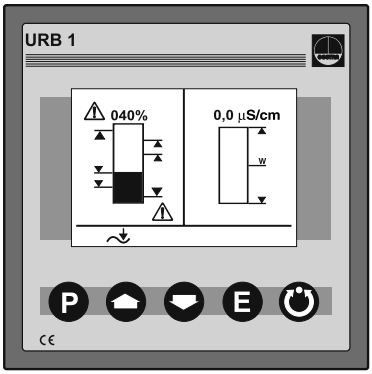
Adjusting sensitivity of response

The split-screen window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 1-42
- Conductivity controller LRR 1-40

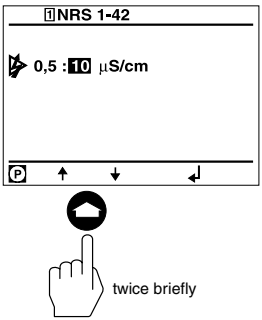
Before commissioning the installation adjust the response sensitivity of the NRS 1-42.

The response sensitivities of the high-level and low-level limiters are factory set and cannot be changed.



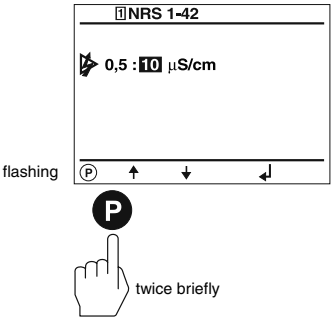
Press button ▲ twice briefly to select either of the following two response sensitivities:

- 0.5 µS/cm
- 10 µS/cm



Press button P twice briefly to activate the line editing mode.

Use buttons ▲ and ▼ to toggle between the two settings.

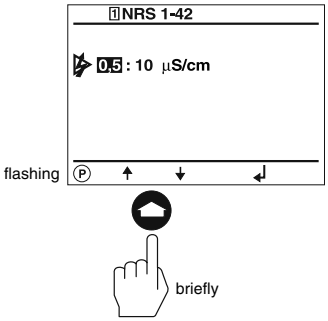


Basic Settings – continued –

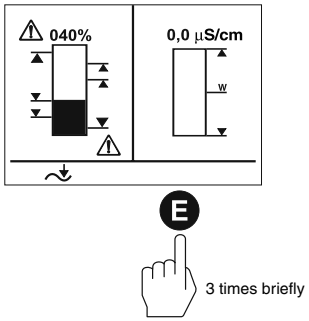
Adjusting sensitivity of response – continued –

Press button ⏏ briefly.

In our example the response sensitivity **0.5 µS/cm** has been selected.



Press button E three times briefly to save the setting and return to the main window.



Basic Settings – continued –

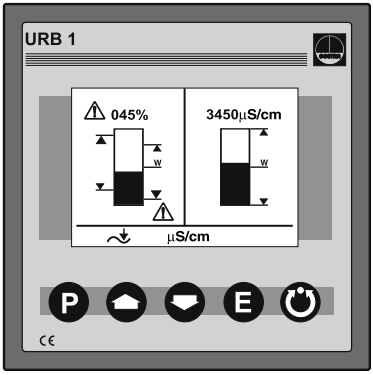
Setting relay delay times

The split-screen window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40

Before commissioning the installation set the relay delay times for the individual switchpoints.

Note that the relay delay times of the low-level and high-level limiters are factory set and <u>cannot</u> be changed with the URB 1.

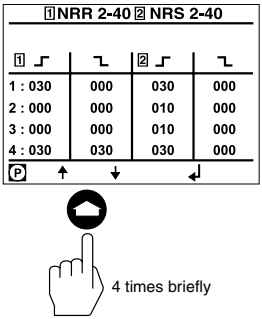


Press button ▲ four times briefly to enter the window for setting the relay delay times of the switchpoints.

The symbol ⌐ stands for relay energizing delay.

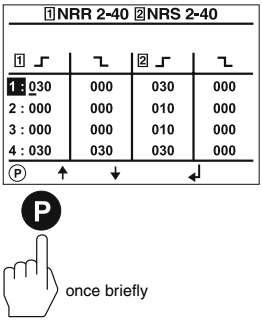
The symbol ¬ stands for relay de-energizing delay.

A number, for instance “001” corresponds to a delay time of 100 *m*sec. The value “030” corresponds to 3 sec and the max. value “255” corresponds to 25.5 sec.



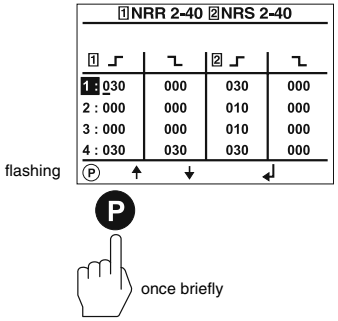
Press button P once briefly to activate the line editing mode.

Use button ▲ or ▼ to scroll back and forth through the lines.



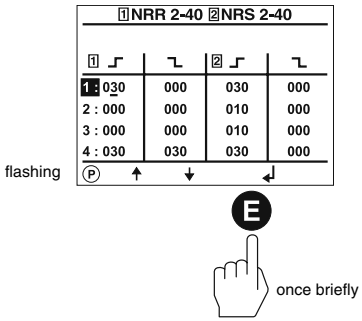
Setting relay delay times – continued –

Press button **P** once briefly to activate the line editing mode.



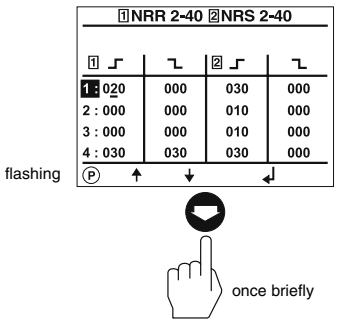
Press button **E** once briefly.

Press button **E** to move to the next digit in the same line.



Press button ▼ once briefly.

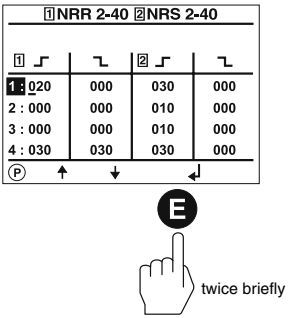
In our example the digit “2” has been selected.



Setting relay delay times – continued –

Press button E twice briefly to deactivate the line editing mode.

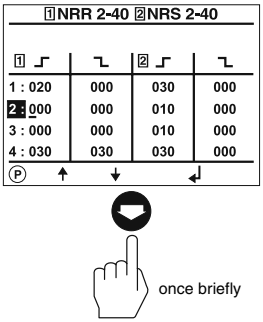
In our example the relay delay time for the MAX switchpoint of the NRR 2-40 is **2 sec.**



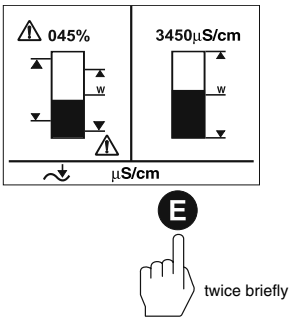
Press button ▼ once briefly.

Switchpoint 2 and switchpoint 3 of the NRR 2-40 mark the upper and lower limit of the proportional band. The relay energizing and de-energizing delays **cannot** be adjusted and feature the number “000”.

The relay delay times of all other switchpoints can be adjusted as described above.



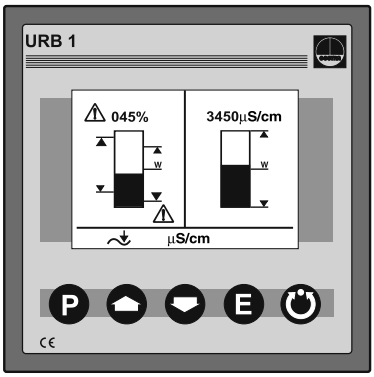
Press button E twice briefly to save the settings and return to the main window.



Adjusting conductivity controller

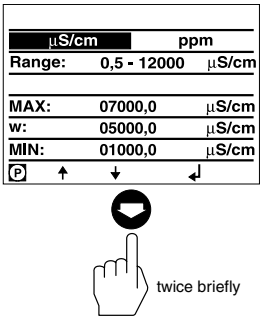
The split-screen main window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40



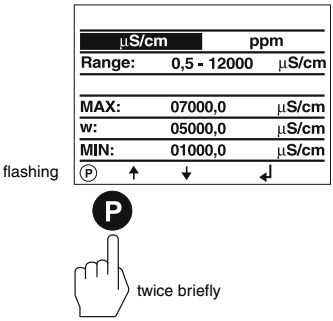
Press button ⏷ twice briefly to enter the parameterisation mode for the following settings:

- µS/cm or ppm
- Indicating range of actual value graphics
- Max. conductivity
- Setpoint
- Min. conductivity



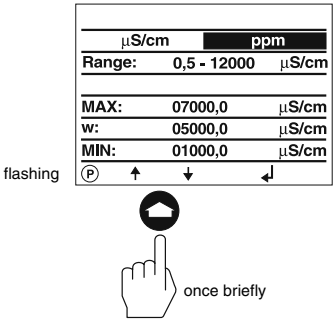
Press button Ⓟ twice briefly to activate the line editing mode.

Use button ⏶ or ⏷ to scroll back and forth through the lines.



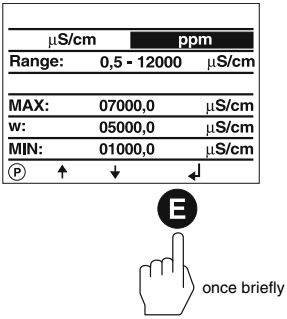
Adjusting conductivity controller – continued –

Press button ▲ once briefly to select the desired unit of measurement (here: ppm).



Press button E once briefly to deactivate the line editing mode.

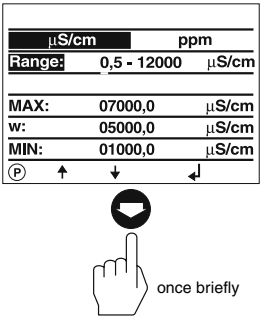
All conductivity values metered will now be indicated in [ppm].



Press button ▼ once briefly.

In this line you can calibrate the graphical representation (bar chart) of the conductivity value shown in the main window. This setting will also calibrate the actual value output (4 - 20 mA).

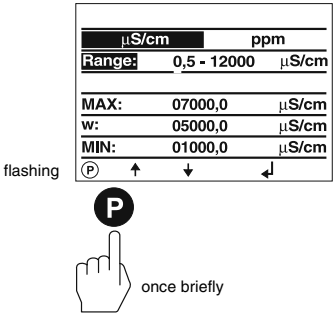
First ascertain the conductivity measuring range used in your installation (e. g. **0.5 µS/cm up to 20 µS/cm**).



Press button P once briefly to activate the line editing mode.

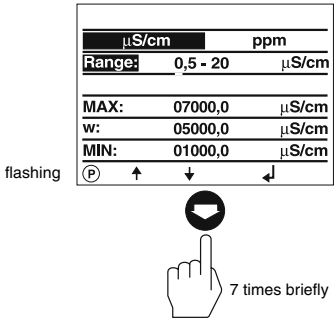
You can choose between the following ranges:

- 0.5 to 20 µS/cm
- 0.5 to 100 µS/cm
- 0.5 to 200 µS/cm
- 0.5 to 500 µS/cm
- 0.5 to 1000 µS/cm
- 0.5 to 2000 µS/cm
- 0.5 to 6000 µS/cm
- 0.5 to 12000 µS/cm

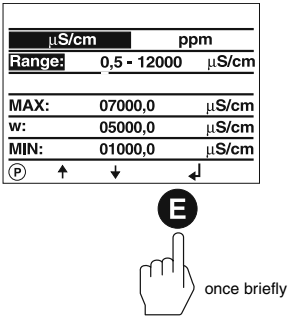


Adjusting conductivity controller – continued –

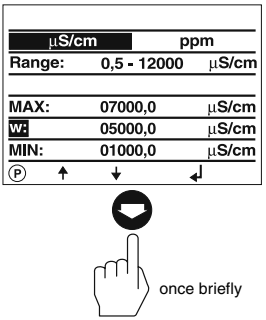
Press button ▼ seven times briefly to select the range 0.5 to 20 µS/cm.



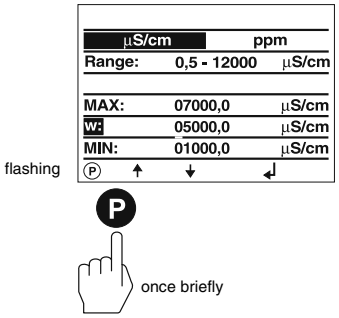
Press button E once briefly to deactivate the line editing mode.



Press button ▼ once briefly to enter the line where the conductivity setpoint of the LRR 1-40 can be adjusted.

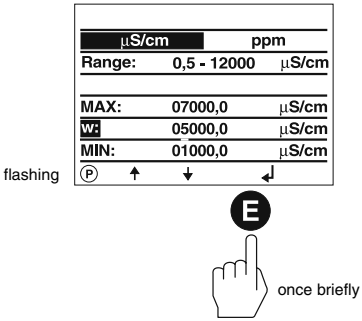


Press button P once briefly to activate the line editing mode.

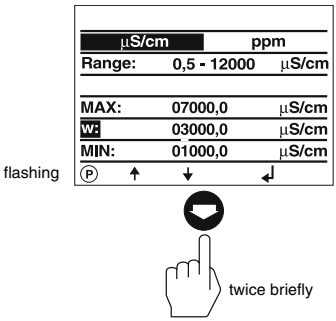


Adjusting conductivity controller – continued –

Press button E once briefly to move the cursor one step further.

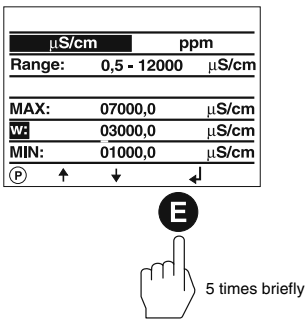


Press button ▼ twice briefly to select the digit “3”.



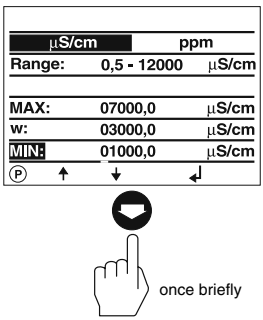
Press button E five times briefly.

In our example a conductivity setpoint of 3000 µS/cm has been adjusted.



Press button ▼ once briefly to enter the line where the MIN conductivity limit of the LRR 1-40 can be adjusted.

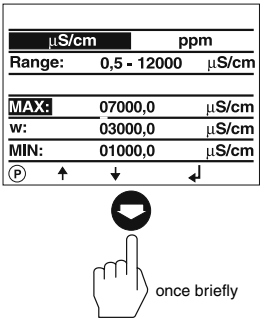
The MIN switchpoint of the LRR 1-40 can be adjusted in the same way as the conductivity setpoint.



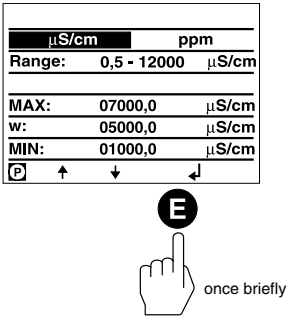
Adjusting conductivity controller – continued –

Press button ▼ once briefly to enter the line where the MAX conductivity limit of the LRR 1-40 can be adjusted.

The MAX switchpoint of the LRR 1-40 can be adjusted in the same way as the conductivity setpoint.

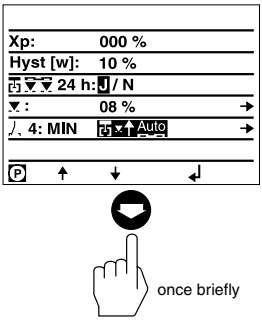


Press button E once briefly to deactivate the line editing mode.



Press button ▼ once briefly to enter the parameterisation window for the following settings:

- Proportional band X_p
- Control hysteresis
- 24 h purging pulse for continuous blowdown valve
- Operating position of intermittent blowdown valve
- Relay contact 4 / automatic intermittent boiler blowdown

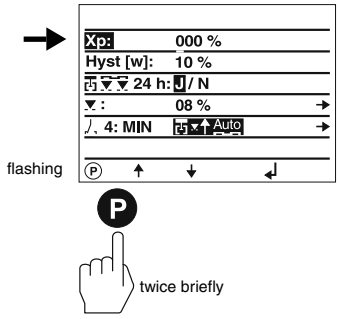


Press button P twice briefly to activate the line editing mode.

In this line you can set the proportional band X_p.

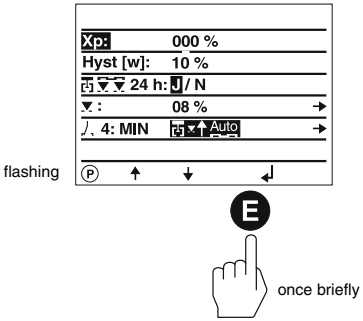
X_p = 0: Two-position (on-off) control

X_p > 0: Modulating control

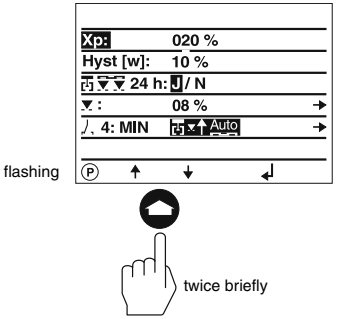


Adjusting conductivity controller – continued –

Press button E once briefly to move the cursor one step further.

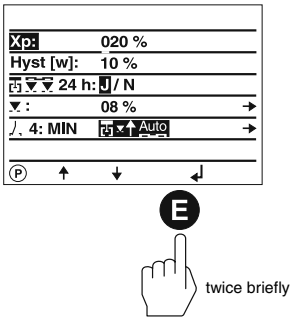


Press button ▲ twice briefly to select the digit “2”.



Press button E twice briefly.

In our example the proportional band X_p was set to 20 %.

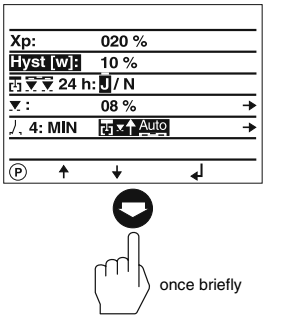


Press button ▼ once briefly to enter the line where the control hysteresis of the LRR 1-40 can be adjusted.

The hysteresis can be adjusted within a range of 0 % – 25 %.

The control hysteresis of the LRR 1-40 can be adjusted the same way as the proportional band X_p.

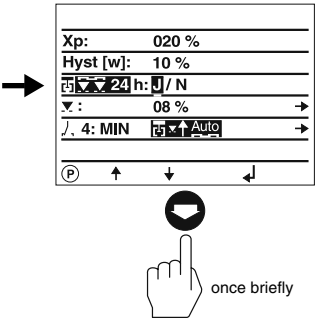
If $X_p > 0$ this function is deactivated.



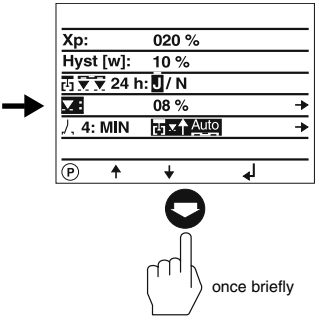
Adjusting conductivity controller – continued –

Press button ▼ once briefly to enter the line where the 24 h purging pulse for the continuous blowdown valve can be adjusted.

Use buttons ▲ and ▼ to enable or, respectively, disable the 24 h purging pulse.



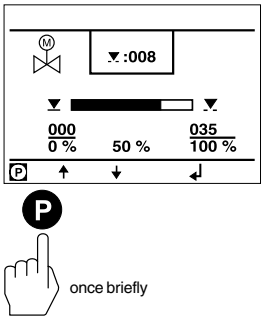
Press button ▼ once briefly to enter the line where the operating position of the continuous blowdown valve can be changed.



Press button P once briefly to enter the window where the operating position and the feedback potentiometer of the continuous blowdown valve can be adjusted.

If $X_p > 0$ the operating position setting is deactivated.

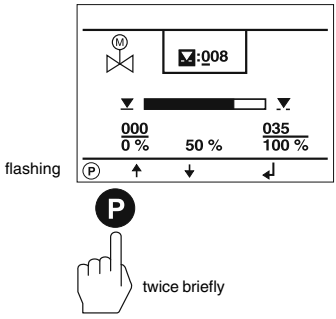
The window shows also the reference values (in %) as indicated by the scale of the GESTRA continuous blowdown valve BAE (000 = 0 %, 035 = 35 %) and the current position of the continuous blowdown valve (in %).



Press button P twice briefly to activate the line editing mode.

Use button ▲ or ▼ to change the values of the digits. Press E to go to the next digit.

The value 008 corresponds to an opening position of 8 %. (Max. opening position 25 %)

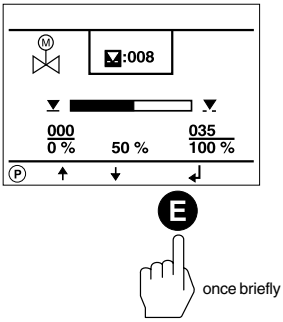


Basic Settings – continued –

Adjusting conductivity controller – continued –

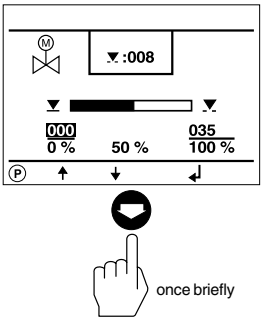
Press button E once briefly.

The value 008 = 8 % operating position is now selected.

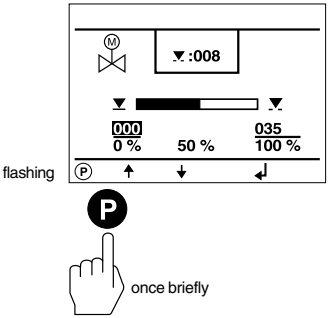


Press button ▼ once briefly.

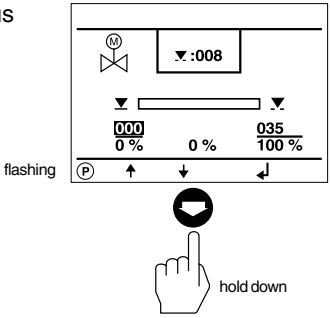
In this line you can establish the 0 % value of the feedback potentiometer of the continuous blowdown valve.



Press button P once briefly to activate the line editing mode.



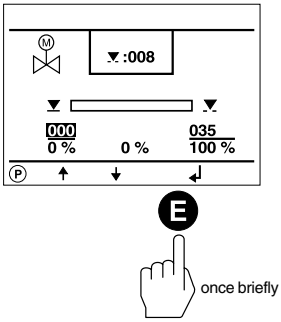
Press and hold down button ▼ until the continuous blowdown valve is closed.



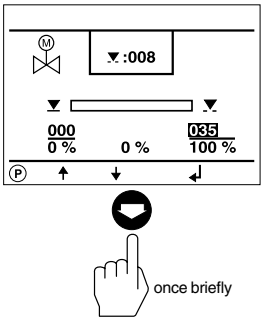
Adjusting conductivity controller – continued –

Press button **E** once briefly.

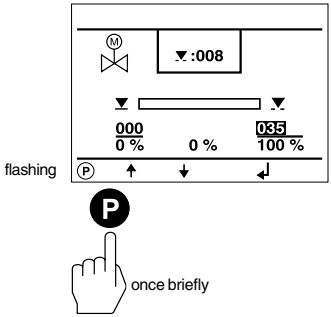
The current resistance value of the feedback potentiometer is saved as 0% position (valve CLOSED).



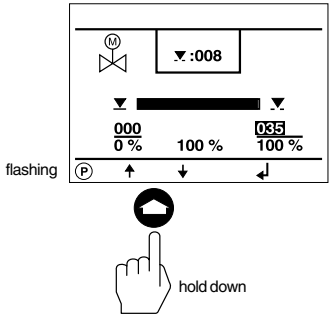
Press button ▼ once briefly to activate the 100% adjustment position.



Press button **P** once briefly to activate the line editing mode.



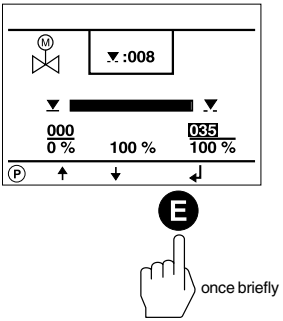
Press and hold down button ▲ until the continuous blowdown valve is completely open.



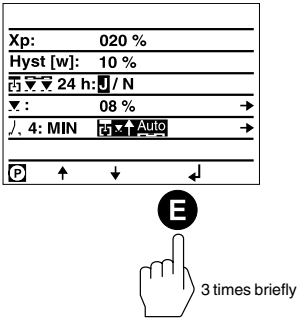
Adjusting conductivity controller – continued –

Press button E once briefly.

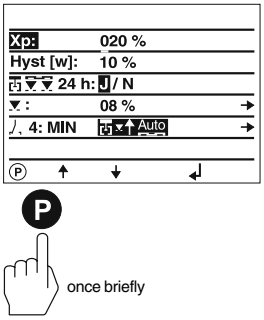
The current resistance value of the feedback potentiometer is now saved as 100% position (valve OPEN).



Press button E three times briefly.



Press button P once to activate the line selection mode.

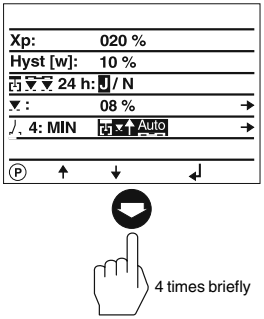


Press button ▼ four times briefly.

In this line you can decide whether you want to use relay contact 4 (LRR 1-40) for MIN alarm or for automatic intermittent boiler blowdown.

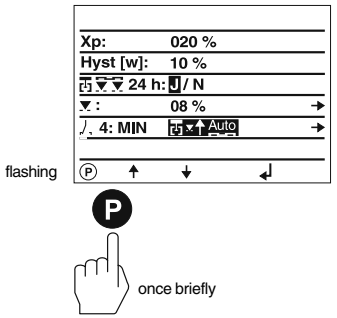
The relay contact 4 of the LRR 1-40 is located across terminals „**28**“, „**29**“ and „**30**“.

Please observe the wiring diagram of the LRR 1-40.



Adjusting conductivity controller – continued –

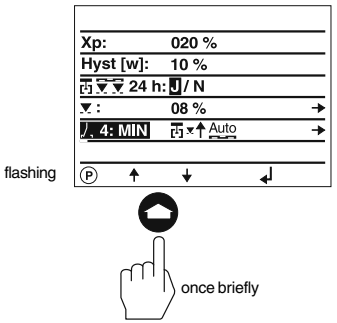
Press button P once briefly to activate the line editing mode.



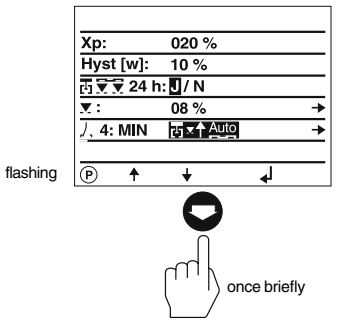
Press button ▲ once briefly to activate relay contact 4 for establishing MIN alarm.

The relay contact 4 of the LRR 1-40 is located across terminals „**28**“, „**29**“ und „**30**“.

Please observe the wiring diagram of the LRR 1-40.

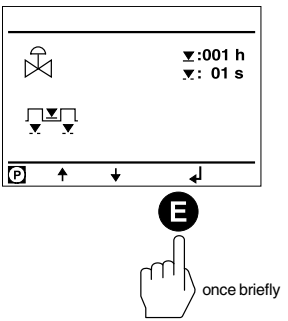


Press button ▼ once briefly to activate the automatic intermittent blowdown function.



Press button E once briefly to enter the window where the following parameters can be set:

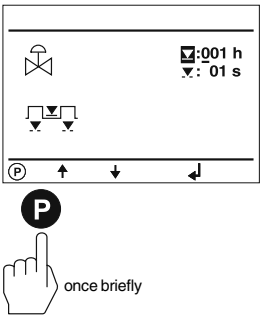
- Frequency of the intermittent blowdown (in hours)
- Duration of the intermittent blowdown (in seconds)



Adjusting conductivity controller – continued –

Press button Ⓟ once briefly to activate the line selection mode.

The **frequency of the intermittent blowdown** can be adjusted in the line editing mode in the same way as the proportional band X_p.

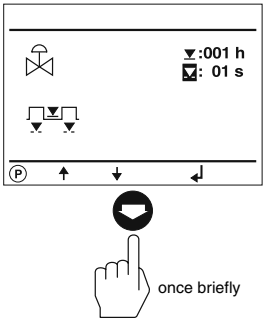


Adjusting conductivity controller – continued –

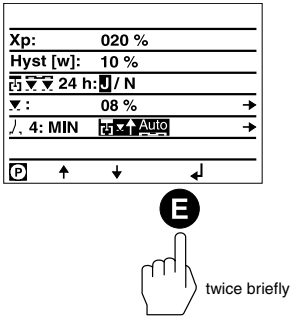
Press button ▼ once briefly.

The **duration of the intermittent blowdown** can be adjusted in the line editing mode in the same way as the proportional band X_p.

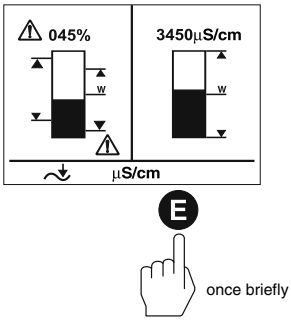
In our example the blowdown frequency was set to 1 hour and the blowdown duration to 1 second.



Press button E twice briefly to accept the configuration.



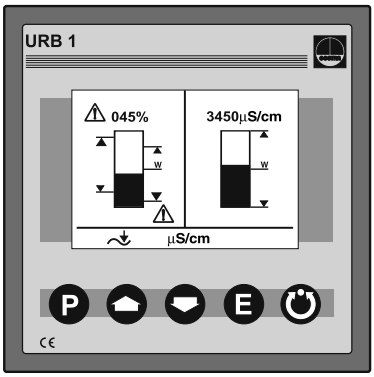
Press button E once briefly to return to the main window.



Adjusting LIN (linear) temperature compensation

The split-screen main window shows which GESTRA bus devices can be indicated:

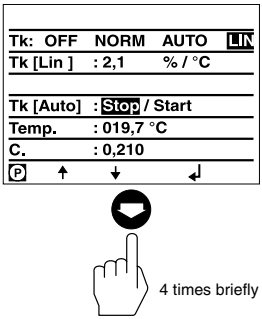
- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40



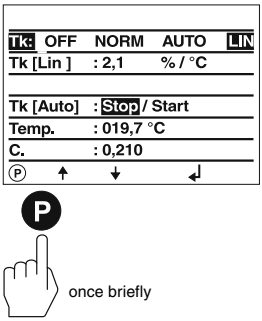
Press button ⏷ four times briefly to enter the window where the following parameters can be set:

- Linear temperature compensation [%/°C]
- Recording a temperature curve
- Cell constant C of the conductivity electrode

The factory set default setting is “TK:LIN”.



Press button Ⓟ once briefly to activate the line editing mode.

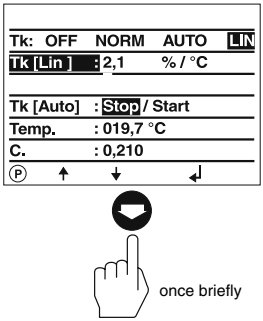


Adjusting LIN (linear) temperature compensation – continued –

Press button ▼ once briefly to enter the line where the linear temperature compensation [%/°C] can be adjusted.

The factory set gradient 2.1 [%/°C] is normally used for steam boilers operating with constant pressure.

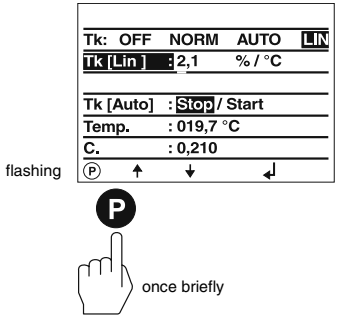
When the boiler is at full working pressure compare the indicated value with the reading of a calibrated conductivity meter – the two values must tally.



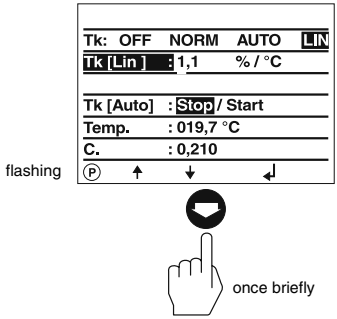
Press button ▼ once briefly to activate the line editing mode.

If the reading of the calibrated conductivity meter does not tally the value indicated by the URB 1 the compensation gradient has to be changed until the two values agree.

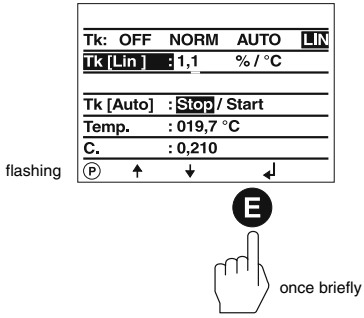
Example: With a gradient of 1.9 %/°C the two readings tally.



Press button ▼ once briefly to select the digit “1”.

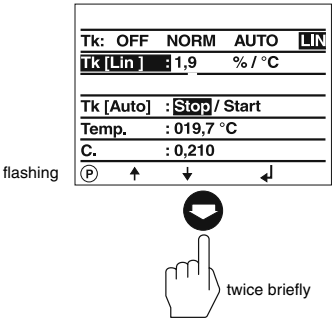


Press button E once briefly to move the cursor one step further.



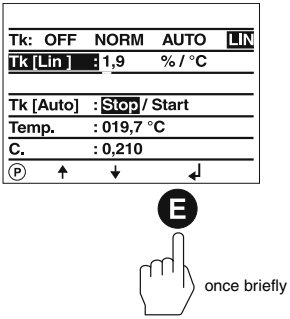
Adjusting LIN (linear) temperature compensation – continued –

Press button ⌄ twice briefly to select the digit “9”.

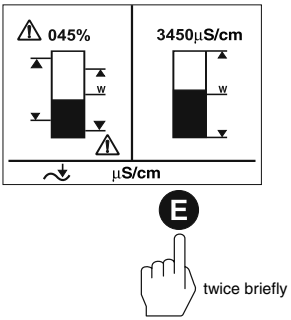


Press button E once briefly to accept the configuration.

In our example a gradient of 1.9 %/°C was adjusted.



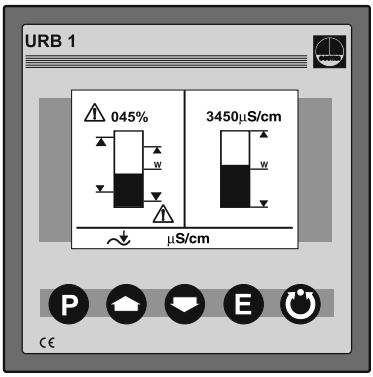
Press button E twice briefly to return to the main window.



Adjusting NORM (standard curve) temperature compensation

The split-screen main window shows which GESTRA bus devices can be indicated:

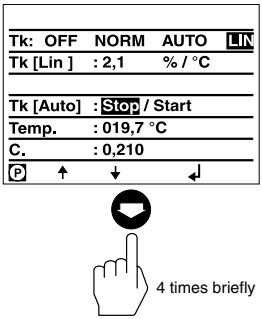
- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40



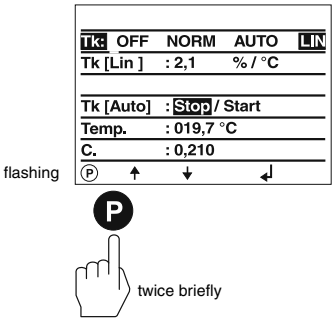
Press button ▼ four times briefly.

The NORM (standard curve) temperature compensation is suitable for steam boilers operating with variable pressures, which means that the steam boilers do not feature fixed working pressures/ temperatures (e. g. low load 10 bar, peak load 15 bar).

The standard curves of 11 feedwater conditioning agents with different conductivities compensate the thermal influences of the measurement within the rated operating range. In our example we have started from the factory set “TK:LIN” mode.



Press button Ⓟ twice briefly to activate the line editing mode.

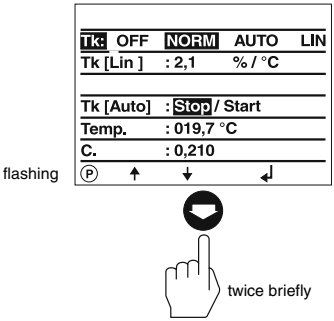


Adjusting NORM (standard curve) temperature compensation – continued –

Press button ▼ twice briefly to select the function NORM.

The function NORM allows the retrieval of 11 different standard curves stored in the URB 1. The curves are applicable for different feedwater conditioning agents with different basic conductivities.

For more information see Annex (page 77).

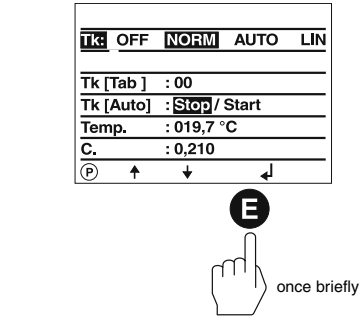


Press button E once briefly to activate the line editing mode.

In this window the following parameters can be set:

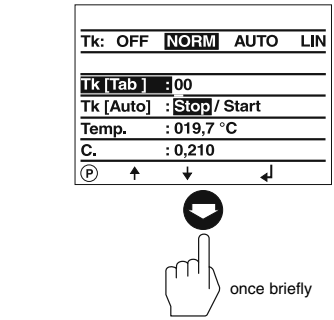
- Standard curve temperature compensation [% / °C]
- Recording/adding a temperature curve
- Cell constant of the conductivity electrode

Our example shows the **factory setting** "00", which means that **no** standard curve has been selected and activated.

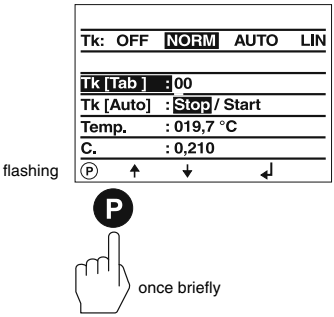


Press button ▼ once briefly to enter the line where you can select a standard curve.

For more information see Annex (page 77).

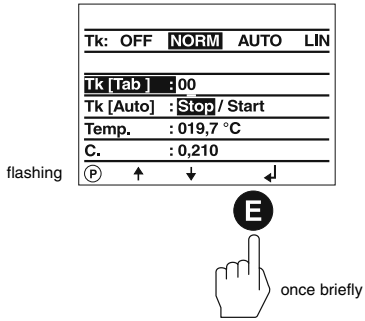


Press button P once briefly to activate the line editing mode.

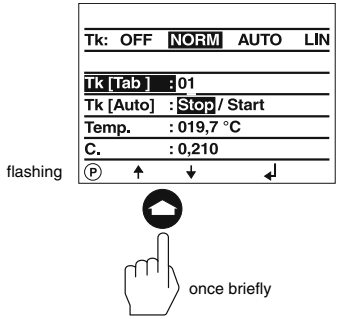


Adjusting NORM (standard curve) temperature compensation – continued –

Press button E once briefly to move the cursor one step further.



Press button ▲ once briefly to select the digit “1”.

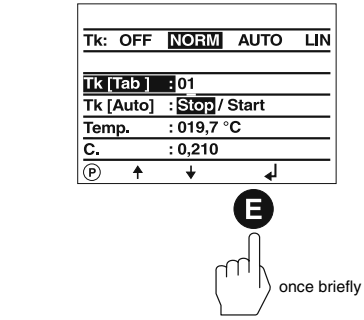


Press button E once briefly to accept the configuration.

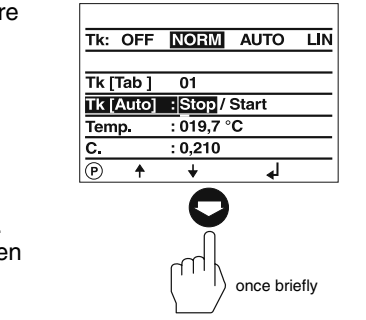
The standard curve “01” is now active.

The temperature values of the standard curve “01” are based on the conditioning agent caustic soda with a basic conductivity of 260 µS/cm at 25 °C.

For more information see Annex (page 77).

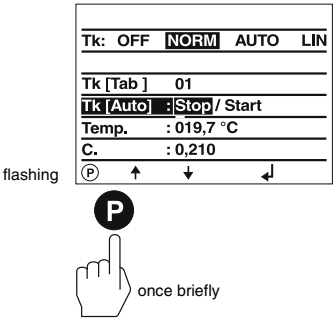


Press button ▼ once briefly to enter the line where you can start recording the temperature/ conductivity curve that is characteristic of your steam boiler.
The temp./conductivity values recorded by the system cover the whole room temp. to service temp. range.
In case of variable pressure operation we recommend that you also record the AUTO curve.
If the standard curves are not suitable you can then still use the AUTO curve.

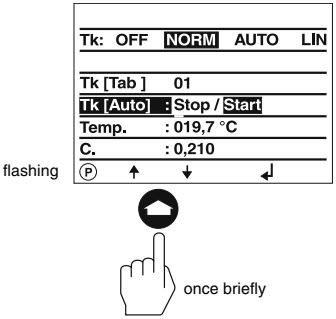


Adjusting NORM (standard curve) temperature compensation – continued –

Press button P once briefly to activate the line editing mode.



Press button ⌂ once briefly to select the function “start”.

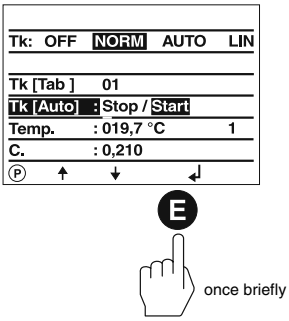


Press button E once briefly to finish the configuration.

Raise temp./ pressure until the steam boiler settles at full working pressure (in case of variable pressure operation until the highest operating pressure is reached).

The LRR 1-40 will now record the temperature/conductivity values and saves them as AUTO curve in the URB 1.

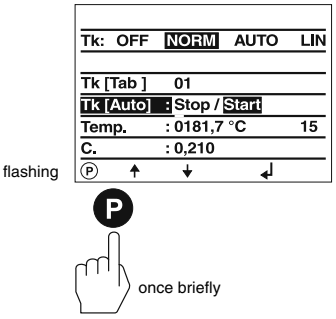
The number of recorded temp./conductivity values is indicated in the line “Temp.”.



Press button P once briefly.

The recording of the AUTO curve is finished once the steam boiler has reached its working pressure.

In our example 15 temp./conductivity values were recorded. A temperature of 181.7 °C was detected at the measuring point of the conductivity electrode LRG 16-40, which corresponds to a boiler pressure of 10.3 bar.



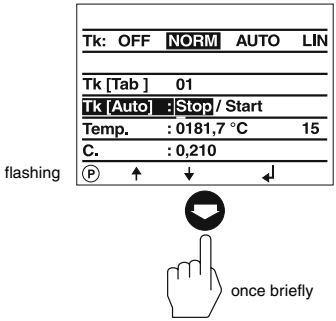
Adjusting NORM (standard curve) temperature compensation – continued –

Press button ▼ twice briefly to select the function “Stop”.

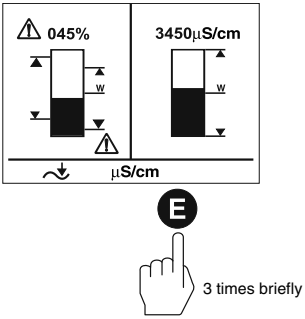
The recording of the temperature/ conductivity values is now finished.

The boiler specific AUTO curve can be activated on the display “TK:AUTO”.

For more information see page 77.



Press button E three times briefly to return to the main window.

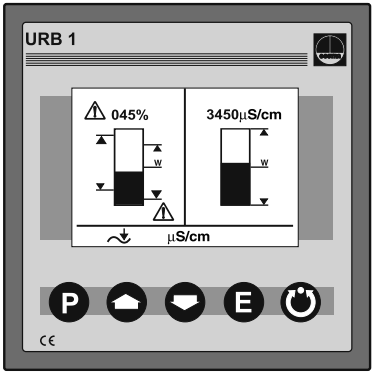


Basic Settings – continued –

Enabling AUTO temperature compensation

The split-screen main window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40

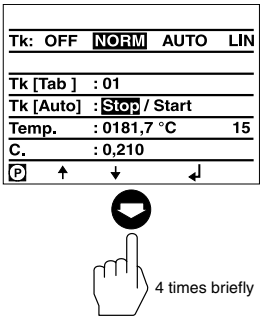


Press button ⏷ four times briefly.

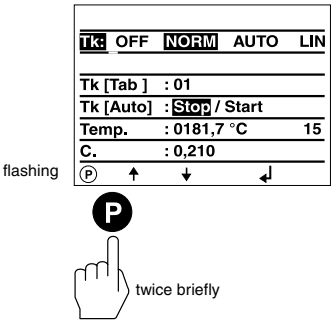
The AUTO curve temperature compensation is suitable for steam boilers operating with variable pressures, which means that the steam boilers do not feature fixed working pressures/temperatures (e. g. low load 10 bar, peak load 15 bar).

The procedure for recording an AUTO curve is described on pages 63 to 65.

In our example we have started from the setting “TK:NORM”.

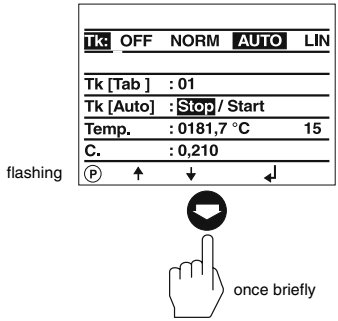


Press button Ⓟ twice briefly to activate the line editing mode.



Enabling AUTO temperature compensation – continued –

Press button ▼ once briefly to select the function “Auto”.

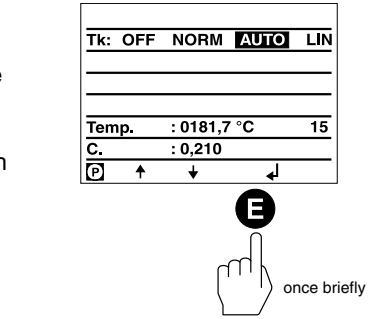


Press button E once briefly to finish the configuration.

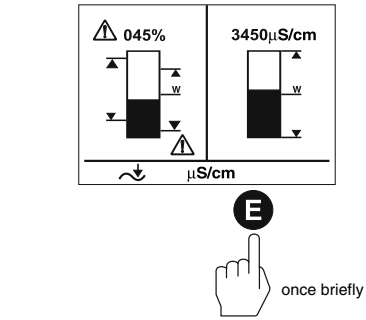
In our example we have activated an AUTO curve with 15 temp./conductivity values which has been recorded and stored in the URB 1.

A new AUTO curve can always be recorded which will then overwrite the old one.

The procedure of recording an AUTO curve has been described on pages 63 to 65.



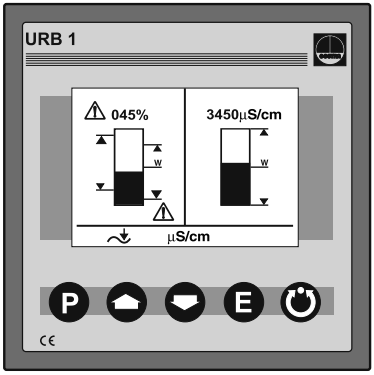
Press button E once briefly to return to the main window.



Disabling temperature compensation

The split-screen main window shows which GESTRA bus devices can be indicated:

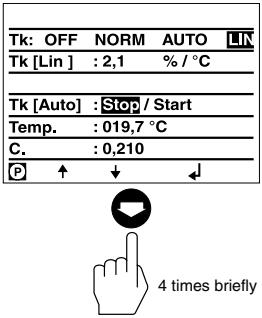
- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40



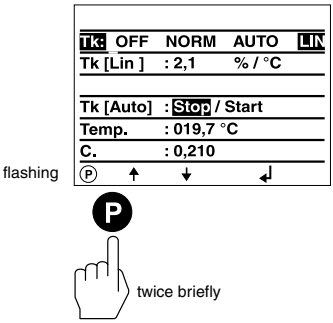
Press button ⏷ four times briefly.

Some industrial applications may require disabling the temperature compensation. Note that with this mode all conductivity values displayed by the URB 1 are **absolute** readings of the current conductivity.

In our example we start from the factory set “TK:LIN” mode.

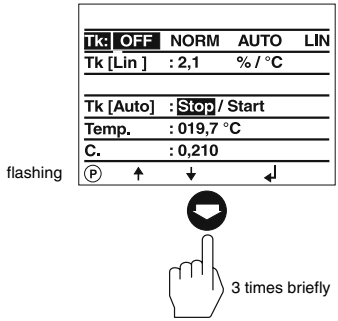


Press button Ⓟ twice briefly to activate the line editing mode.



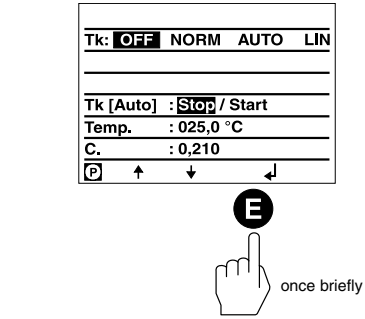
Disabling temperature compensation – continued –

Press button ▼ three times briefly to select the function “OFF”.

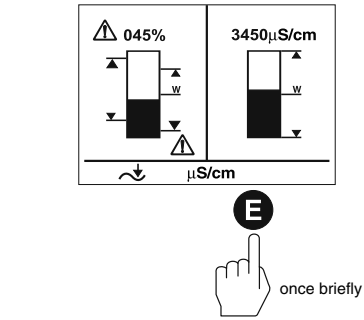


Press button E once briefly to save settings and finish the configuration.

The temperature compensation is now disabled.



Press button E once briefly to return to the main window.

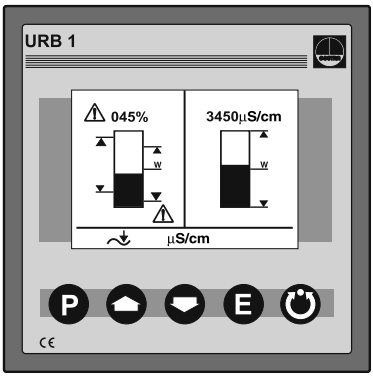


Operation

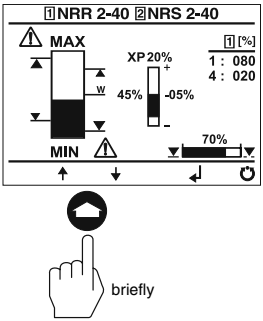
Manual operation via external control valve

The split-screen main window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40



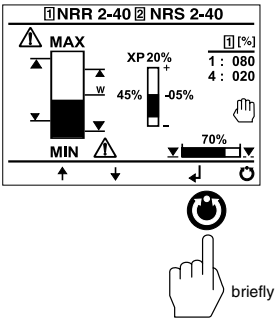
Press button briefly to enter the display window of the level controller NRR 2-40.



Press button briefly to activate the manual mode.

Use buttons and in this mode to manually open and close an external control valve.

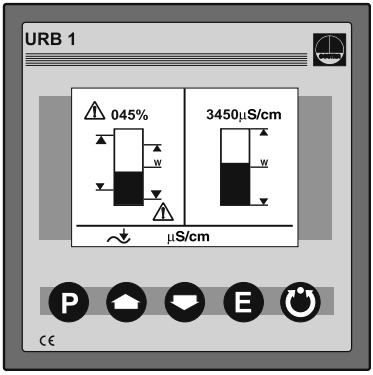
Press button a second time to disable the manual mode and to move the control valve back into the position dictated by the controller NRR 2-40.



Stand-by operation with the steam boiler disconnected

The split-screen main window shows which GESTRA bus devices can be indicated:

- High-level limiter NRS 1-41
- Low-level limiter NRS 1-40
- Level switch NRS 2-40
- Level controller NRR 2-40
- Conductivity controller LRR 1-40

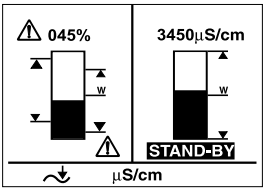


Use an **external switch** to enable the stand-by mode of the conductivity control.

After switching off the burner of the steam boiler you can deactivate the control of the continuous and intermittent blowdown valves in order to avoid loss of boiler water (stand-by operation).

After returning to normal operation the continuous blowdown valve moves into the control position and an intermittent blowdown pulse is given (if activated).

Please take the wiring diagram of the installation manual for the LRR 1-40 into consideration.

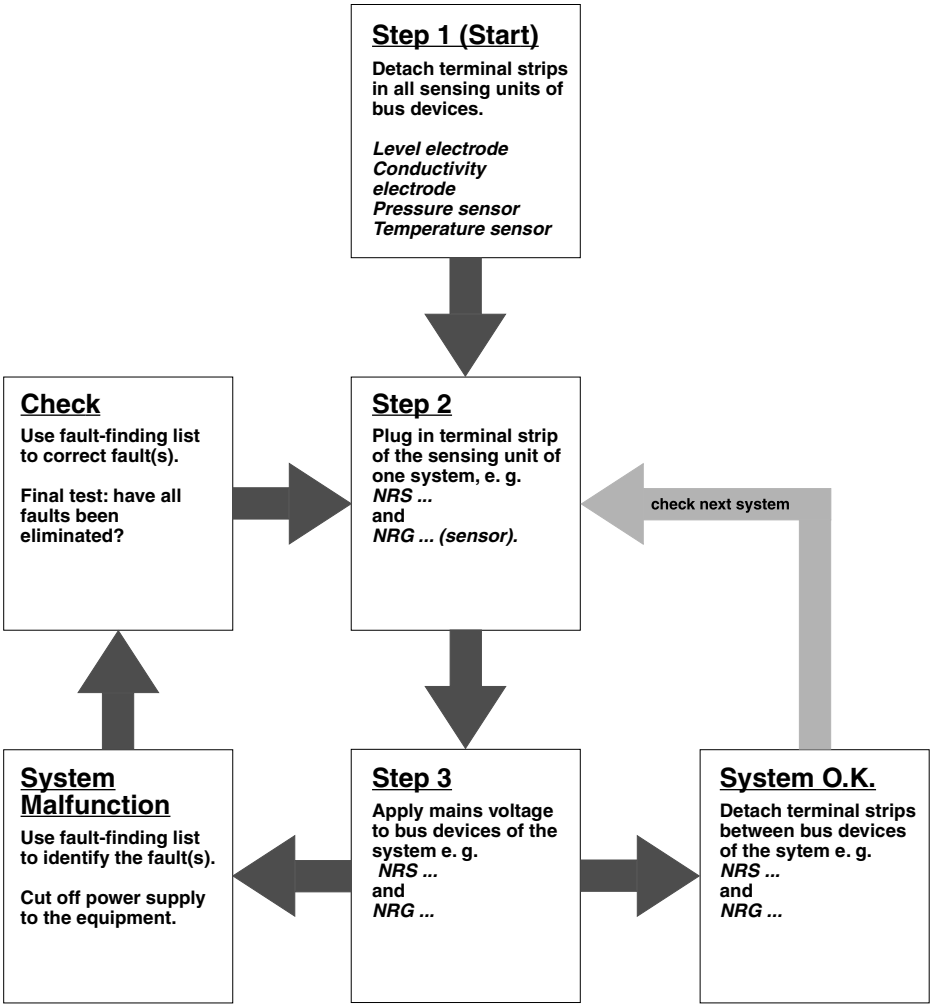


System Malfunctions

Troubleshooting

The sources of malfunctions occurring in CAN bus systems operating with several bus-based stations must be analysed systematically since faulty components or incorrect settings can give rise to negative interactions with intact bus devices in the CAN bus system. These unwanted interactions can cause error messages in fully functional bus devices, which will make fault detection even more difficult.

We recommend the following systematic fault location procedure:



System Malfunctions – continued –

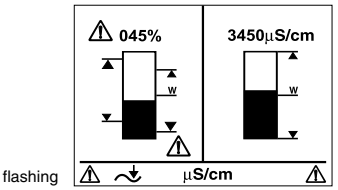
Fault Finding List

The data communication in the CAN bus line is disrupted.

Check that the CAN bus line has been wired according to the wiring diagram.

Check that the CAN bus line is not interrupted due to conductor breakage.

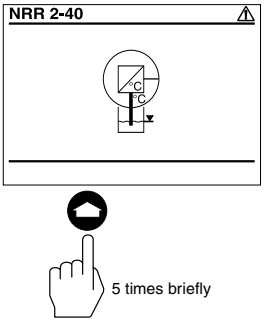
Check that the controllers and electrodes feature the correct node IDs.



The thermal fuse of one of the level electrodes has been triggered.

Check that the level electrode has been mounted as specified in the installation manual.

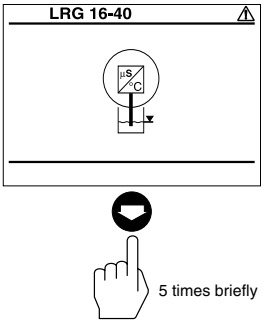
Check whether external influences have caused built-up of heat in the electrode casing.



The thermal fuse of the conductivity electrode has been triggered.

Check that the conductivity electrode has been mounted as specified in the installation manual.

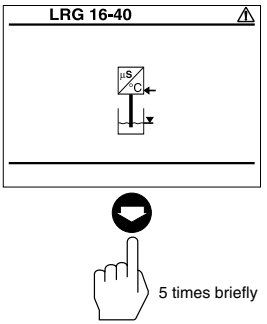
Check whether external influences have caused built-up of heat in the electrode casing.



The conductivity electrode is defective.

The temperature sensor of the conductivity electrode is short circuited or interrupted.

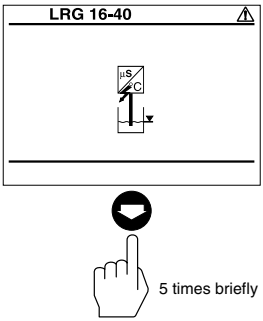
Replace conductivity electrode LRG 16-40.



The conductivity electrode is defective.

The internal connecting cables of the conductivity electrode are short circuited or interrupted.

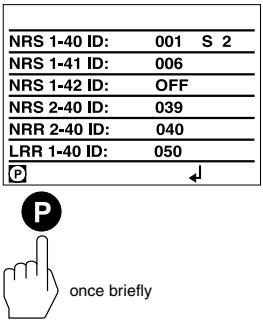
Replace conductivity electrode LRG 16-40.



The CAN bus communication of a controller is disrupted.

Check that the controller and the level or conductivity electrode have been mounted as specified in the wiring diagram.

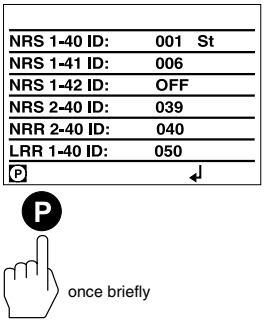
In our example there is a disruption in the CAN bus communication of the low-water level electrode 2 type NRG 16-40.



The CAN bus communication of a controller is disrupted.

Check that the controller and the level or conductivity electrode have been mounted as specified in the wiring diagram.

In our example there is a disruption in the CAN bus communication of the switching controller type NRS 1-40.



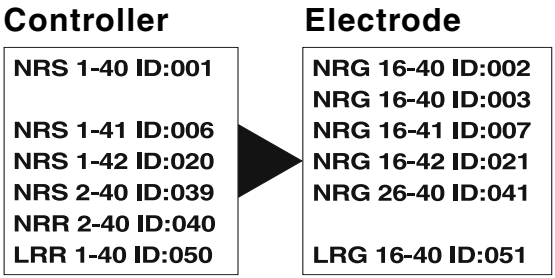
If faults occur that are not listed above, please contact our subsidiary or agency in your country.

Annex

Establishing / changing node ID

If several systems of the same kind are to communicate in one CAN bus network establish one node ID for each individual system (e. g. controller).

Factory set node IDs



The individual node IDs must be adjusted manually on the respective devices. Please observe the relevant installation instructions.

Attention

■ Do **not** assign the same node ID twice within the CAN bus network.

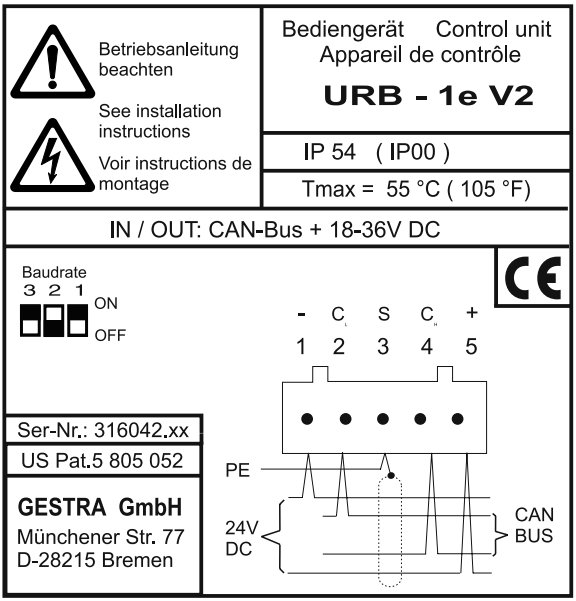


Fig. 5 Rear panel of the URB 1

S8	S9	S0	Baud rate	Cable length
OFF	***ON***	OFF	250 kBit/s	125 m
ON	***ON***	OFF	125 kBit/s	250 m
OFF	OFF	***ON***	100 kBit/s	335 m
ON	OFF	***ON***	50 kBit/s	500 m
OFF	***ON***	***ON***	20 kBit/s	1000 m
ON	***ON***	***ON***	10 kBit/s	1000 m

Fig. 6 Default factory setting 250 kBit/s

Table: Standard Curves

No.	Conditioning agent	Basic conductivity [mS/cm] at 25 °C
1	Caustic soda	260
2	Caustic soda	1080
3	Caustic soda	5400
4	Caustic soda	11000
5	Trisodiumphosphate	190
6	Trisodiumphosphate	1100
7	Trisodiumphosphate	5900
8	Trisodiumphosphate	11200
9	Sodium sulfite	980
10	Dipolique 444	200
11	Levoxin	195

Declaration of conformity CE

We hereby declare that the equipment **URB 1** conforms to the following European guidelines:

- LV directive 73/23/eec version 93/68/eec
- EMC guideline 89/336/eec version 93/68/eec

which are based on the following harmonised standards:

- LV standard EN 50178
- EMC standard EN 50081-2, EN 50082-2

This declaration is no longer valid if modifications are made to the equipment without consultation with us.

Bremen, 23rd May 2002
GESTRA GmbH

Dipl.-Ing. Stefan Bode
(Academically qualified engineer)
Head of R & D Dept. Electronics

i. V.
Dipl.-Ing. Lars Bohl
(Academically qualified engineer)
Quality Assurance Manager

Key

Ⓐ Fixing screw for panel mounting

Example of Installation

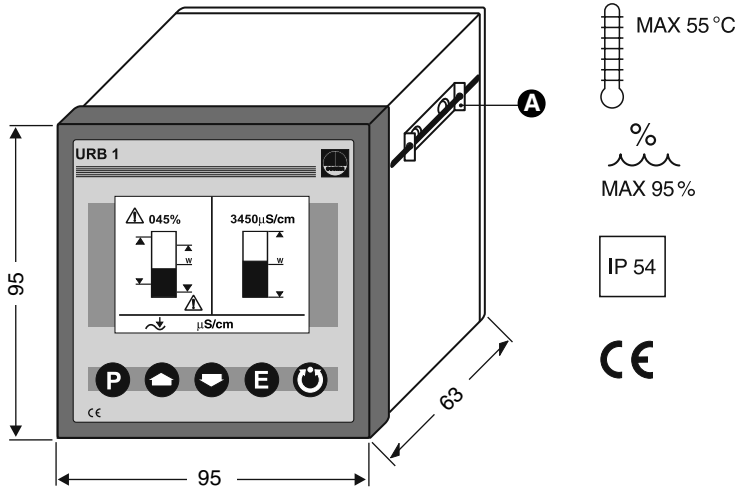


Fig. 7

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Great Britain

Flowserve Flow Control (UK) Ltd.
Burrel Road, Haywards Heath
West Sussex RH 16 1TL
Tel. 00 44 14 44 / 31 44 00
Fax 00 44 14 44 / 31 45 57
E-mail: sales@flowserve.com

France

Flowserve Flow Control S. A. S.
10 Avenue du Centaure, BP 8263
F-95801 CERGY PONTOISE CEDEX
Tél. 00.33.1 / 34 43 26 60
Fax 00.33.1 / 34 43 26 87
E-mail: contact@gestra.fr

España

GESTRA ESPAÑOLA S.A.
Luis Cabrera, 86-88
E-28002 Madrid
Tel. 00 34 91 / 5 152 032
Fax 00 34 91 / 4 136 747; 5 152 036
E-mail: gestra@gestra.es

Italia

Flowserve S.p. A
Divisione Italgestra
Via Prealpi, 30 – 20032 Cormano (MI)
Tel. 00 39 02 / 66 32 51
Fax 00 39 02 / 66 32 55 60
E-mail: info@italgestra.it

Portugal

Flowserve Portuguesa, Lda.
Av. Dr. Antunes Guimarães, 1159
Porto 4100-082
Tel. 0 03 51 22 / 6 19 87 70
Fax 0 03 51 22 / 6 10 75 75
E-mail: gestra@gestra.pt

GESTRA GmbH
Postfach 10 54 60, D-28054 Bremen, Münchener Str. 77, D-28215 Bremen
Telefon +49 (0) 421 35 03 - 0, Telefax +49 (0) 421 35 03 - 393
E-Mail gestra.gmbh@flowserve.com, Internet www.gestra.de

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