



Level Switch Type

NRS 2-40



CANopen

EN
English

Original Installation Instructions
810371-05

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Important Notes

Usage for the intended purpose

Use level switch NRS 2-40 in conjunction with level electrode NRG 26-40 only for monitoring and regulating the level of conductive liquids.

Safety note

The equipment must only be installed and commissioned by qualified and adequately trained personnel. Maintenance and retrofitting must only be performed by entrusted personnel who – through adequate training – have achieved a recognised level of competence.



Danger

The terminal strip of the NRS 2-40 is live during operation. This presents the danger of electric shock!

Cut off power supply before mounting or removing the terminal strips and the housing cover.



Attention

The name plate specifies the technical features of the equipment.

Note that any piece of equipment without its specific name plate must neither be commissioned nor operated.

LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)

The equipment meets the requirements of the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

ATEX (Atmosphère Explosible)

According to the European Directive ATEX 2014/34/EU the equipment must **not** be used in potentially explosive atmospheres.

Explanatory Notes

Scope of supply

NRS 2-40

- 1 Level switch type NRS 2-40 (plug-in unit in plastic case with box terminals)
- 1 Terminating resistor 120 Ω
- 1 Installation & Operating manual

Description

Use level switch type NRS 2-40 in combination with level electrode type NRG 26-40 for level monitoring. The level switch has the following functions:

- Four liquid levels with one switchpoint each.
- High-level alarm, low-level alarm, pump ON, pump OFF, with one switchpoint each.
- Continuous level monitoring within control band defined by two preset limits.
- Actual-value output 4-20 mA
- Contact multiplication by connecting in parallel a second level switch NRS 2-40 without actual value output.

The level data are transmitted via CAN-bus from the electrode NRG 26-40 to the level controller or further system components.

Function

At regular intervals the level electrode type NRG 26-40 sends a data telegram to the level switch NRS 2-40. The data transfer is effected by means of a CAN bus according to DIN ISO 11898. The transferred measuring data are then evaluated and assigned to the manually adjusted switchpoints. To guarantee the correct functioning and safety of the system the data transmitting cycle is constantly monitored by the level switch. When the CAN bus line is interrupted the level switch sends a visual signal to indicate a malfunction and the relays 1 and 4 will be instantaneously de-energized (alarm position).

Additional functions, e.g. (de)-energizing delay times of the output relays (1 to 25 sec.) can be adjusted with the control terminal and display unit URB 1 / URB 2.

System components

NRG 26-40

Level electrode NRG 26-40, PN 40

Design

NRS 2-40

Enclosure made from insulating material with box terminals for installation in control cabinets.

The terminals are externally accessible.

Mounting on a standardised supporting rail TS 35 x 15 DIN EN 50022.

External dimensions: 73 x 100 x 118

Technical data

NRS 2-40

Type approval no.

NRS 2-40: TÜV · XX-399

Input / Output

Interface for CAN bus to DIN ISO 11898 using CANopen

Output – voltage supply for electrodes

Power supply 24 V DC, short-circuit protected

Analogue output 4 – 20 mA, load 500 Ω for display of actual value.

4 volt-free relay contacts.

Max. contact rating with switching voltages of 24 V AC,

115 V AC and 230 V AC: 4 A resistive, 0.75 A inductive at $\cos \varphi$ 0.5

Max. contact rating with a switching voltage of 24 V DC: 4 A.

Contact material: silver, hard-gold plated

Interference suppression

Provide contactor with an external RC combination (100 Ω / 47nF)

Relay de-energizing delay

Output “MIN”, “MAX” 3 s

Indicators and adjustors

1 red LED for switchpoint “High level” (MAX)

1 red LED for switchpoint “Low level” (MIN)

2 green LEDs for switchpoints “PUMP ON” and “PUM OFF”

1 green LED “Power”

1 red LED “Bus fault”

1 ten-pole code switch for node ID and baud rate settings

4 pushbuttons

Supply voltage

230 V \pm 10 %, 50/60 Hz

115 V \pm 10 %, 50/60 Hz (option)

Power consumption

10 VA

Protection

Case: IP 40 to DIN ISO 60529

Terminal strip: IP 20 to DIN ISO 60529

Admissible ambient temperature

0 °C to 55 °C

Enclosure material

Front panel: polycarbonate, grey

Case: polycarbonate, black

Weight

Approx. 0.8 kg

Corrosion resistance

If the equipment is used for its intended purpose, its safety is not impaired by corrosion.

Name plate / marking




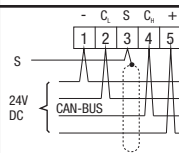
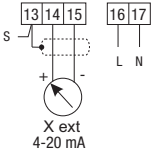



 Betriebsanleitung beachten See installation instructions  Voir instructions de montage	Steuergerät control device appareil de commande		NRS 2-40		
	Node ID: _____				
IN / OUT: CAN-Bus 18-36 V DC		230V~ -15/+10%	5VA	IP 40 (IP20)	
		Tamb = 55 °C (131 °F)			
					
		NRG 26-40		NRS 2-40	
					
		TÜV . WR . xx-399			
GESTRA AG Münchener Str. 77 D-28215 Bremen		Seriennummer			

Fig. 1

Dimensions

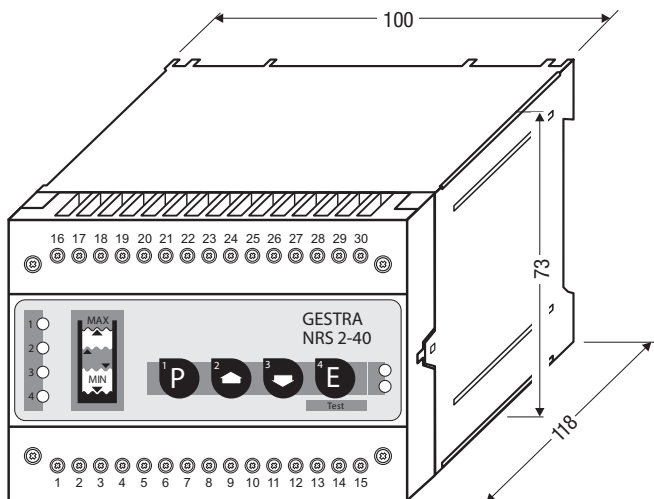


Fig. 2

Design

NRS 2-40

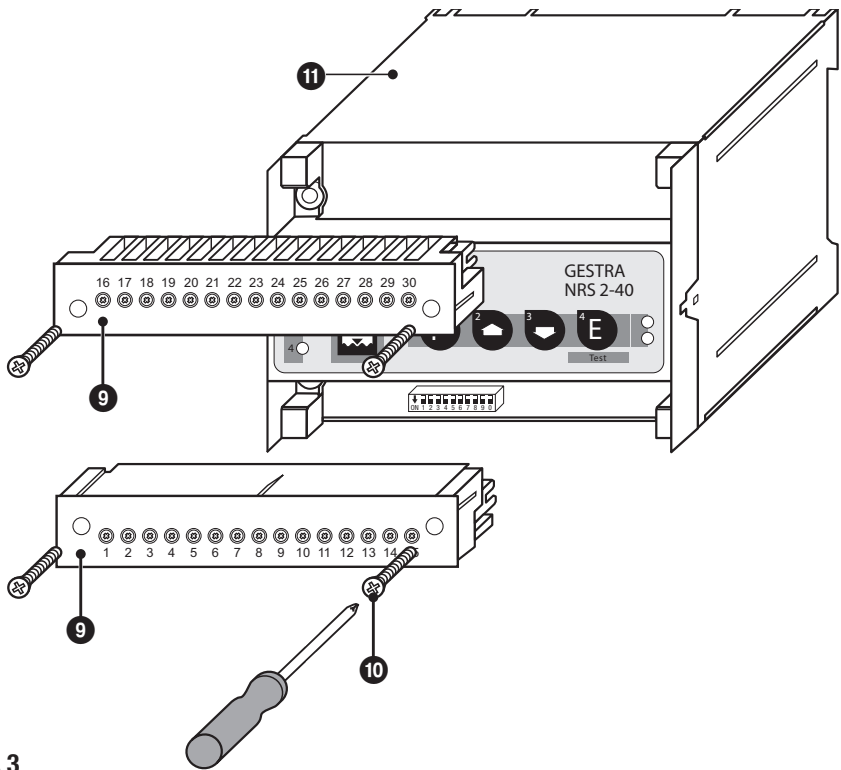


Fig. 3

Functional Elements

NRS 2-40

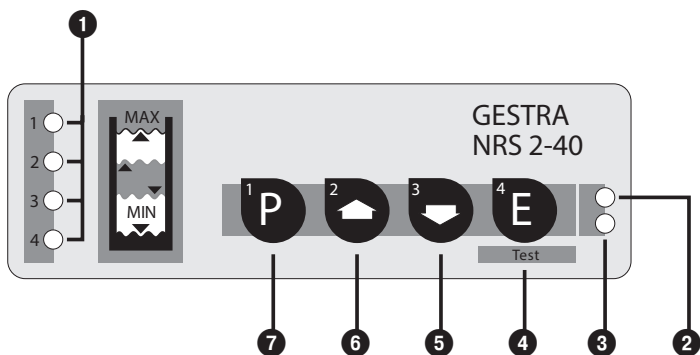


Fig. 4

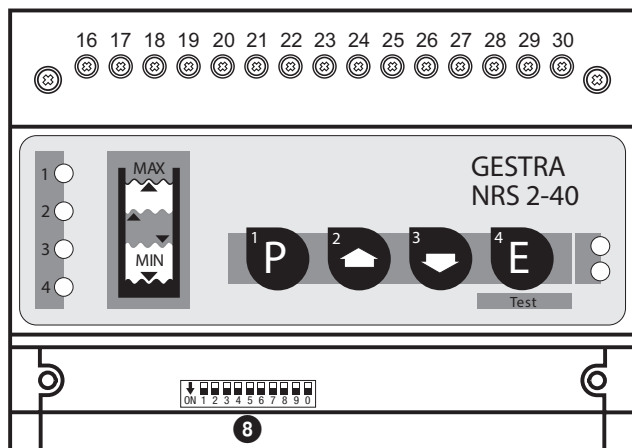


Fig. 5

Design / Functional Elements / Installation

Key

	Discharge control	Fill control	Malfunction
1 Indicator LEDs			
LED 1 – switchpoint 1	High-level alarm	High-level alarm	Multifunction
LED 2 – switchpoint 2	Pump ON	Pump OFF	Multifunction
LED 3 – switchpoint 3	Pump OFF	Pump ON	Multifunction
LED 4 – switchpoint 4	Low-level alarm	Low-level alarm	Multifunction
2 LED “Bus status”			
3 LED “Power”			
4 Enter button / test mode			
5 Decrease button			
6 Increase button			
7 Program button			
8 Code switch, 10 poles			
9 Terminal strip			
10 Screws for terminal strip			
11 Enclosure			
12 Supporting rail TS 35 x 15 to DIN EN 50022			

Installation

NRS 2-40

Installation on mounting rail

1. Clip control unit onto mounting rail 35 x 15 mm (DIN EN 50022).
2. Align control unit, **Fig. 7**

Tools

- Screwdriver (5.5/100)

Example of installation

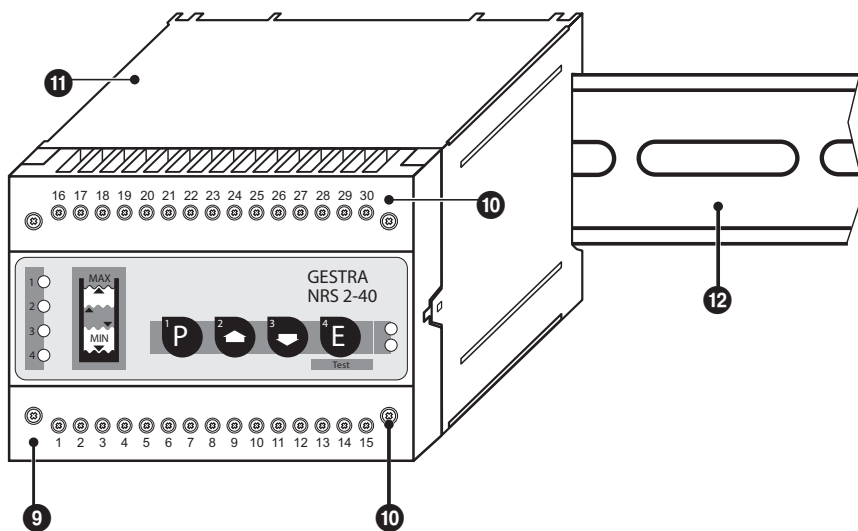


Fig. 6

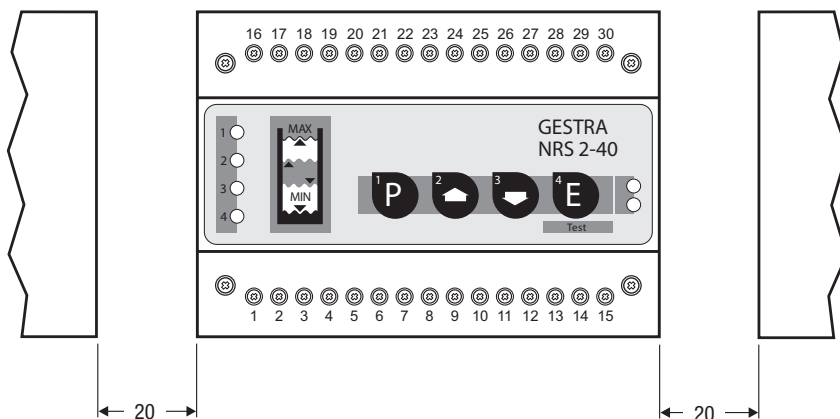


Fig. 7

Electrical Connection

Control cable

NRS, NRR, LRR, TRS, URB 1

Note that screened multi-core twisted-pair control cable is required for the BUS line, e.g. UNITRONIC® BUS CAN 2 x 2 x ... mm² or RE-2VCYV-fl 2 x 2 x ... mm².

Control cable assemblies (2 x 2 x 0.32 mm² with connector and coupler) of various lengths are available as optional extra.

NRG, LRG, EF, URZ, TRV, URB 2

The equipment is fitted with a sensor-connector union (5 poles, A-coded). For the connection of the BUS devices control cable assemblies (with connector and coupler) of various lengths are available as optional extra.

Note that the recommended control cables are not UV resistant and, if installed outdoors (apart from URB 2), must be protected by a UV resistant plastic jacket or a cable duct.

The baud rate (data transfer rate) dictates the cable length and conductor size of the cable between the bus nodes. The total power consumption must also be taken into account when selecting the conductor size. The total power consumption is calculated from the number of bus nodes.

If the cable length between the steam boiler and the control cabinet exceeds 15 m, we recommend that you fit a branching box that is resistant to electromagnetic interference (stock code no. 1501214) and to use a control cable with a larger conductor size for the distance to the control cabinet.

S 8	S 9	S 10	Baud rate	Cable length	Number of pairs and conductor size [mm ²]
OFF	ON	OFF	250 kBit/s	125 m	2 x 2 x 0.32
Factory setting					
ON	ON	OFF	125 kBit/s	250 m	2 x 2 x 0.5
OFF	OFF	ON	100 kBit/s	335 m	2 x 2 x 0.75
ON	OFF	ON	50 kBit/s	500 m	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 the code switch ⑨. Make sure that all bus nodes have the same settings.



Note

- The max. baud rates and cable lengths indicated above are based on empirical values obtained by GESTRA. In certain cases it may be necessary to reduce the baud rate in order to ensure trouble-free operation.
- The design of the data cable has a strong influence on the electromagnetic immunity (EMC). Take special care when connecting the equipment.
- If you do not use the control cable assemblies connect the connectors and jacks for the control cables as indicated in the assignment diagram for sensor connector unions.

CAN bus voltage supply

To ensure troublefree operation the CAN bus system must be supplied with sufficient voltage. Please use the following table to check the voltage supply of your bus system.

Control units with voltage supply	Qty.	X	Power rating per equipment	=	Sum
		X	6 W	=	W
Please enter data!			Sum 1	=	W
Measuring transducers, transmitters, control units, operating & display unit URB 1	Qty.	X	Power rating per equipment	=	Sum
		X	3 W	=	W
Operating & display unit URB 2		X	5 W	=	W
Please enter data!			Sum 2	=	W

If sum 2 exceeds sum 1, the CAN bus voltage must be supplied by a separate, stabilised safety power supply unit (e.g. SITOP smart 24 V, 2.5 A) with 24 V DC.

The power supply unit must be electrically isolated from dangerous contact voltages, meeting at least the requirements on double or reinforced isolation acc. to DIN EN 50178 or DIN 61010-1 or DIN EN 60730-1 or DIN EN 60950 (safe isolation).

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



Attention

If a safety power supply unit (e.g. SITOP smart, 24 V, 2.5 A) is used for the voltage supply of the CAN bus do not tap the supply voltage from the terminals 1 and 5 of the GESTRA control devices.

Wiring diagram

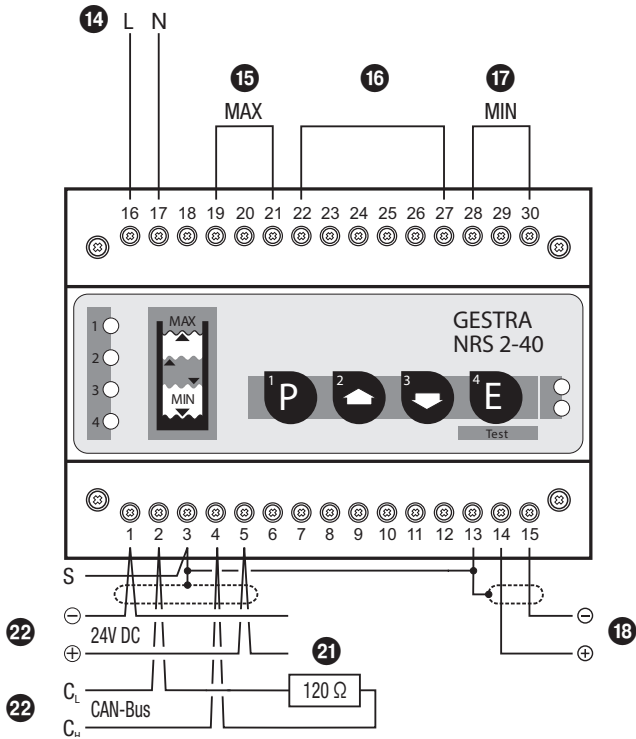


Fig. 8

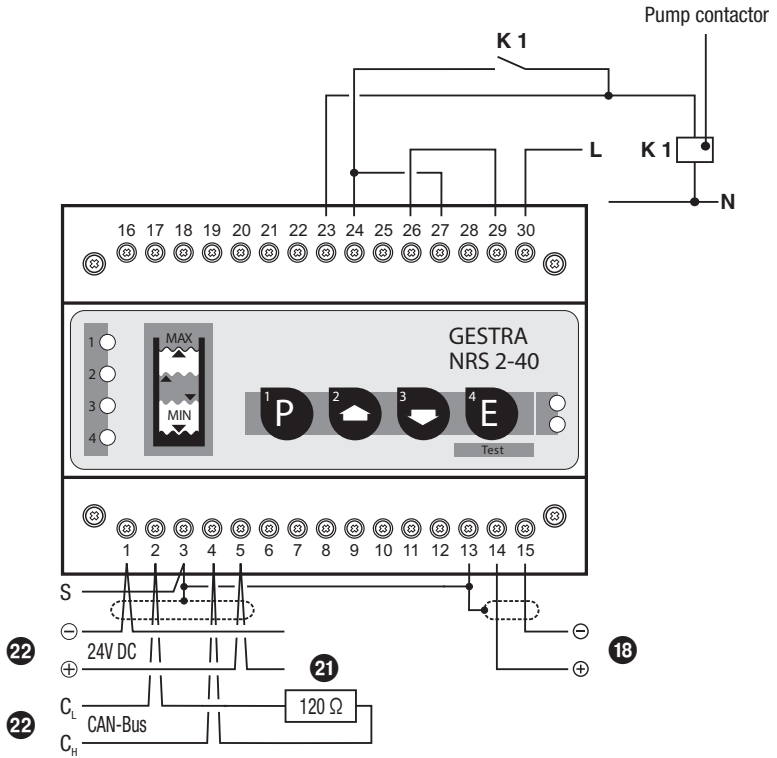


Fig. 9

Discharge control – Pump OFF at low level (MIN)

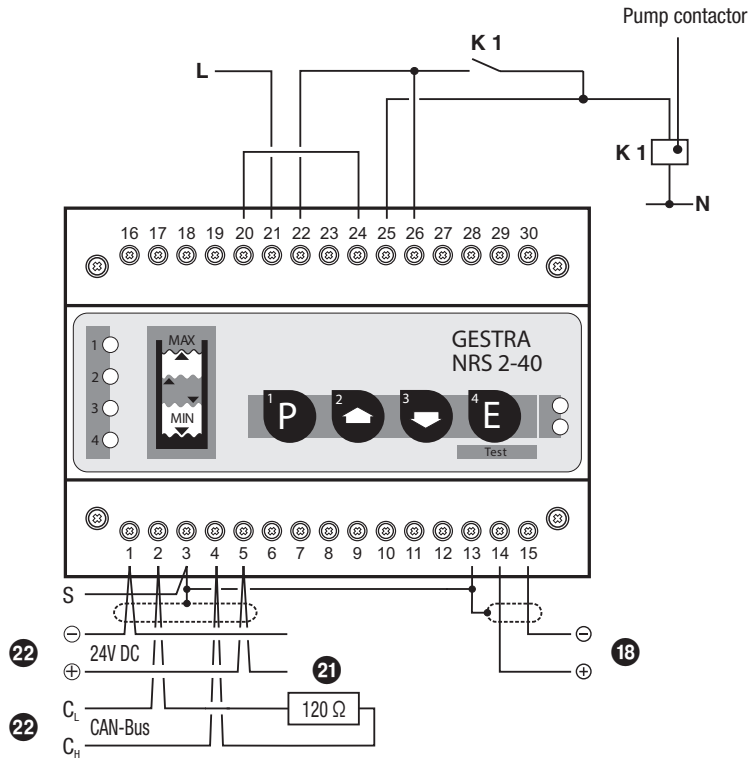


Fig. 10

Fill control – Pump OFF at high level (MAX)

Electrical Connection – continued –

Key

- 14 Mains voltage
- 15 MAX limit contact (MAX alarm)
- 16 Pump control
 - Fill control: ▾ = Pump OFF
 ▿ = Pump ON
 - Discharge control: ▾ = Pump ON
 ▿ = Pump OFF
- 17 MIN limit contact (MIN alarm)
- 18 Actual value output 4-20 mA
- 21 Terminating resistor 120 Ω, RES 1 or RES 2
- 22 Twisted pair control cable for CAN bus line
- 23 Valve actuator
- 24 Feedback potentiometer 1000 Ω actuator

CAN bus wiring diagram

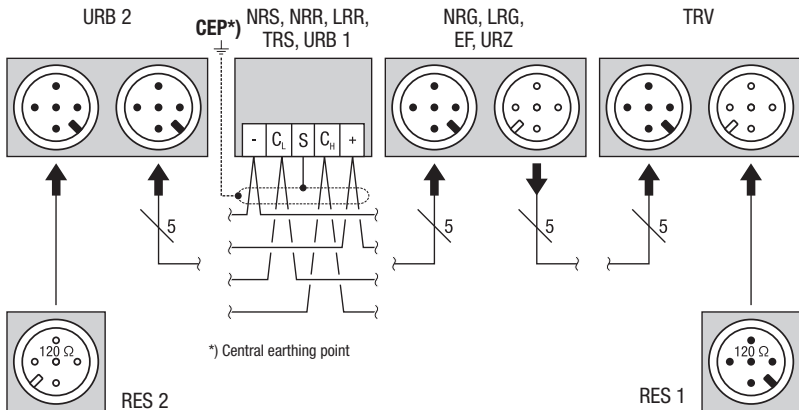


Fig. 14



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 equipotential currents may occur, e.g. in outdoor installations, separate the screen from the central earthing point (CEP).
- To protect the switching contacts fuse circuit with 2.5 A (slow blow) or according to TRD regulations (1.0 A for 72 hrs operation).
- 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. 12, Fig. 13**
- The CAN bus line must **not** be interrupted while operating with one or more system components.

In the event of an interruption the safety circuit will be opened!

If the switching controller has to be replaced first remove the terminal strips ⑨, **Fig. 3**

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



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.
- When switching off inductive loads, voltage spikes are produced that may impair the operation of control and measuring systems. Connected contactors must therefore be provided with RC combinations, e. g. 0.1 μF / 100 Ω.
- Despite correct wiring system failure and malfunction messages may occur because of high frequency malfunctions caused by the system. For more information refer to the section “**Troubleshooting**”.

Tools

- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680-1

Basic Settings

CAN bus

All level and conductivity controllers and associated electrodes are interconnected by means of a CAN bus adopting 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 **1** and **123**.

The equipment 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 and probe) acc. to the table on page 21.

If the length of the CAN bus cable exceeds 125 m, use code switch ③ (Fig. 18) to change the switch positions.

Note: The baud rate must be identical for all items of equipment!

For more information refer to the section **“Basic Settings – Code switch settings”**.

Basic Settings – continued –

Node ID

Low-level limiter

NRS 1-40	NRG 16-40 (1)	NRG 16-40 (2)	Reserved	Reserved	
X	X + 1	X + 2	X + 3	X + 4	
1	2	3			Factory setting

Safety system for steam boilers with superheater

NRS 1-40.1	NRG 16-40 (1)	NRG 16-40 (2)	TRV 5-40	Limiter 4	
X	X + 1	X + 2	X + 3	X + 4	
1	2	3	4		Factory setting

Safety system (e.g. pressurised hot-water generating unit)

NRS 1-40.1	NRG 16-40 (1)	NRG 16-40 (2)	Limiter 3	Limiter 4	
X	X + 1	X + 2	X + 3	X + 4	
1	2				Factory setting

Safety system (e.g. pressurised hot-water generating unit)

NRS 1-40.2	TRV 5-40 (1)	TRV 5-40 (2)	Limiter 3	Limiter 4	
X	X + 1	X + 2	X + 3	X + 4	
6	7	8	9	10	Factory setting
	TRS 5-40 (1)	TRS 5-40 (2)			
	X + 1 + 90	X + 2 + 90			
	98	98			

High-level alarm

NRS 1-41	NRG 16-41	Reserved	Reserved	Reserved	
X	X + 1	X + 2	X + 3	X + 4	
6	7	8	9	10	Factory setting

Further components

SRL 40		
X = Sensor (low-level limiter / high-level alarm) + 2		Factory setting
ORT 6		
98		Factory setting

On-off level control

Reserved	NRS 1-42	NRG 16-42	
X - 1	X	X + 1	
19	20	21	Factory setting

Modulating level control

URZ 40	NRS 2-40	NRR 2-40	NRG 26-40	Reserved	
X - 2	X - 1	X	X + 1	X + 2	
38	39	40	41	42	Factory setting

Automatic continuous blowdown control

EF 1-40	LRR 1-40	LRG 1-4...	Reserved	
X - 1	X	X + 1	X + 2	
49	50	51	52	Factory setting

Operating unit

URB 1, URB 2		
60		Factory setting

Factory setting

The level switch features the following factory set default values:

- Baud rate: **250 kb/s**
- Control equipment: **1**
- Node ID: **039**
- Control equipment: **2**
- Node ID: **040**
- Switchpoint 1: **80 %**
- Switchpoint 2: **60 %**
- Switchpoint 3: **40 %**
- Switchpoint 4: **20 %**
- Relay with energizing delay switchpoint 1: **1 s**
- Relay with energizing delay switchpoint 2: **1 s**
- Relay with energizing delay switchpoint 3: **1 s**
- Relay with energizing delay switchpoint 4: **1 s**
- Relay with de-energizing delay switchpoint 1: **3 s**
- Relay with de-energizing delay switchpoint 2: **1 s**
- Relay with de-energizing delay switchpoint 3: **1 s**
- Relay with de-energizing delay switchpoint 4: **3 s**

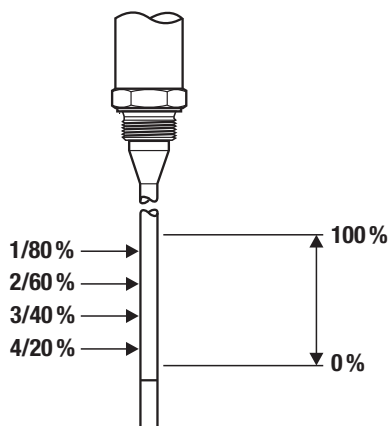


Fig. 15

Assigning / changing 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, limiter). In most cases it is sufficient to commission the equipment with the GESTRA default factory setting.

Detach the lower terminal strip ⑨ (Fig. 6) in order to change the code switch ⑧ settings.



Attention

- We recommend that you commission the CAN bus equipment with their GESTRA default factory settings.
- Make sure that no node ID is used twice in the CAN bus network!

Code switch settings



		Node ID	39
S1	ON	1	
S2	ON	2	
S3	ON	4	
S4	OFF	8	
S5	OFF	16	
S6	ON	32	
S7	OFF	64	

Fig. 16 (Factory setting)



		Node ID	74
S1	OFF	1	
S2	ON	2	
S3	OFF	4	
S4	ON	8	
S5	OFF	16	
S6	OFF	32	
S7	ON	64	

Fig. 17 (Example)

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

Fig. 18 (Factory setting: 250 kBits/s)

Commissioning

Using the operating & display unit URB...

If you use the operating unit URB... make all adjustments via its user interface.

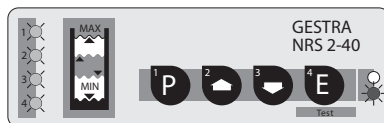
NRS 2-40

Apply power to the unit.

The four indicator LEDs flash rapidly.

The LED "Power" lights up.

The system test cycle takes about 2 sec.



Measuring range

A Desired measuring range [mm]

B Max. measuring range

C Lowest measuring point

Establish the measuring range **A** for your level monitoring application.

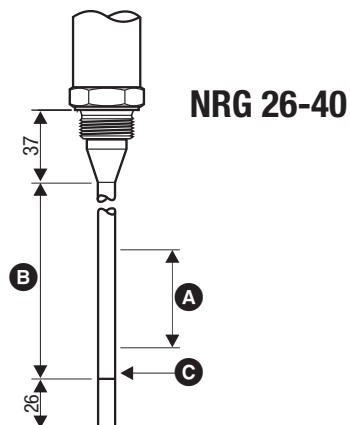


Fig. 20

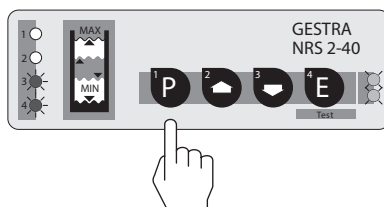
Establishing measuring range

Press button **P** for 3 sec.

Lower the liquid level in the vessel until the lower limit of the measuring range **A** is reached.

Use button **↩** if you want to establish the upper limit of the desired control range first.

If two control devices are used only one has to be adjusted.

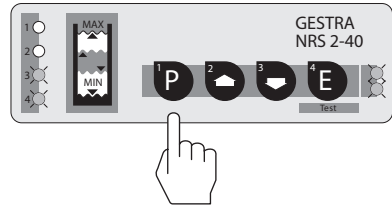


Establishing measuring range – continued –

Press button **P** briefly.

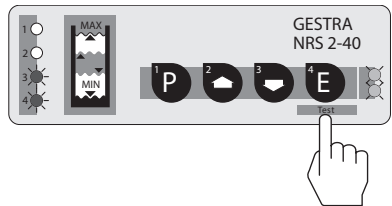
Note:

In the event of a system malfunction, the LED(s) “Bus status” and/or “Power” will be flashing **rapidly** when in program mode. Quit program mode and analyse the system malfunction and analyse the system malfunction (see pages 36 – 42).



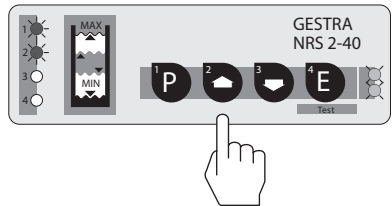
Press button **E** briefly.

The lower limit of the measuring range is now saved.



Press button **P** briefly.

Raise liquid level until the upper limit of the desired measuring range **A** is reached.

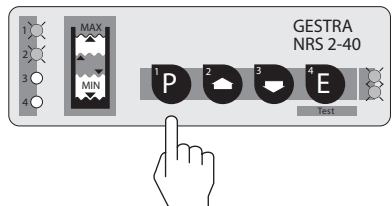


Press button **P** briefly.

Wait for 30 seconds before continuing the procedure.

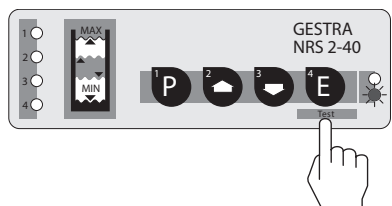
To compensate for short-term fluctuations of the liquid level a filter is integrated in the preamplifier of the electrode.

If you confirm the setting too early not the exact 100 % value will be saved.



Press button **E** twice briefly.

The upper limit of the desired measuring range is now saved. The NRS 2-40 is back in operating mode.



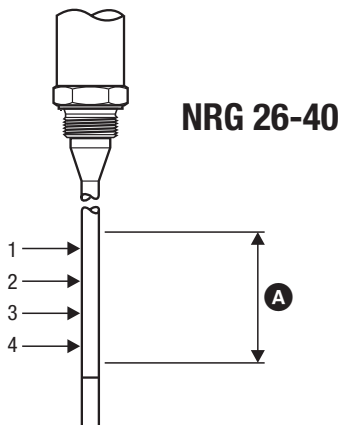


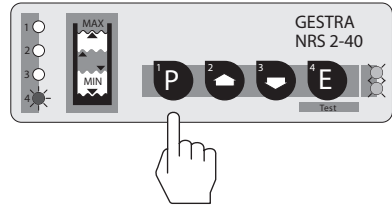
Fig. 21 You can establish four switchpoints within the selected measuring range.

Establishing switchpoints

Press button **P** briefly.

Raise or lower the liquid level in the vessel until the desired value is reached.

Use button **↺** if you want to establish a different switchpoint first.

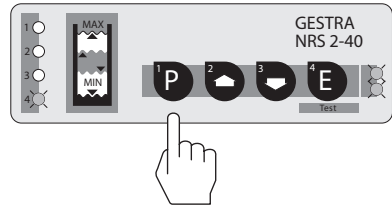


Press button **P** briefly.

Lower or raise liquid level until switchpoint 4 within the adjusted control range is reached.

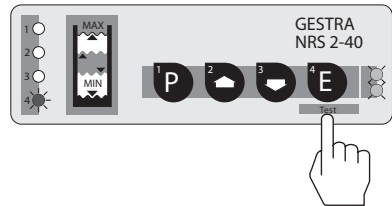
Note:

In the event of a system malfunction the LED(s) “Bus status” and/or “Power” will be flashing **rapidly**.



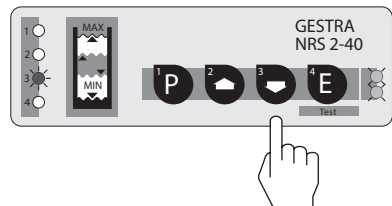
Press button **E** briefly.

Switchpoint 4 is now saved.



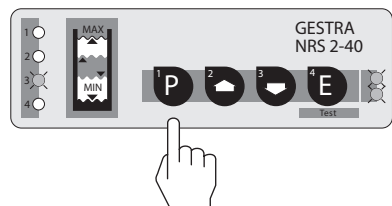
Press button **↺** briefly.

Switchpoint 3 is now active.



Press button **P** briefly.

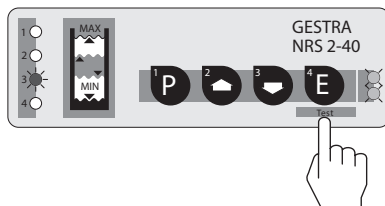
Raise liquid level until switchpoint 3 within the adjusted control range is reached.



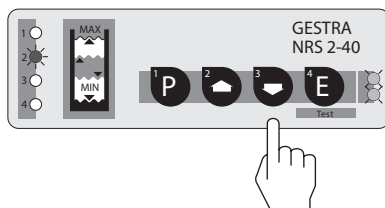
Commissioning – continued –

Establishing switchpoints – continued –

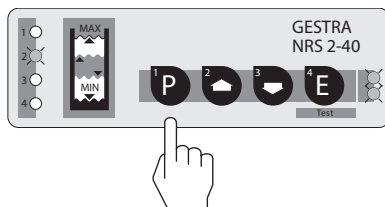
Press button **E** briefly.
Switchpoint 3 is now saved.



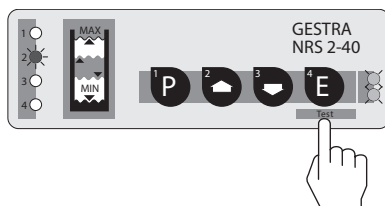
Press button **2** briefly.
Switchpoint 2 is now active.



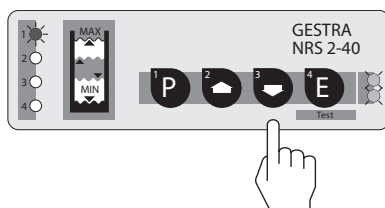
Press button **P** briefly.
Raise liquid level until switchpoint 2 within
the adjusted measuring range is reached.



Press button **E** briefly.
Switchpoint 2 is saved.



Press button **1** briefly.
Switchpoint 1 is now active.

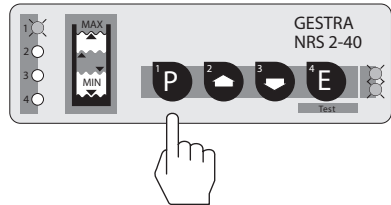


Commissioning – continued –

Establishing switchpoints – continued –

Press button **P** briefly.

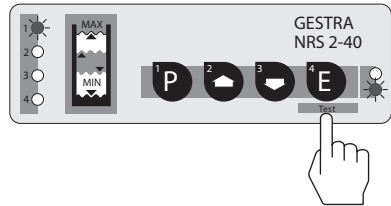
Raise liquid level until switchpoint 1 within the adjusted measuring range is reached.



Press button **E** twice briefly.

Switchpoint 1 is saved.

The NRS 2-40 is again in operating mode.



Operation

NRS 2-40

Normal operation – switching controller is working.

All LEDs go out as soon as the setpoint is reached.

The LED “Power” is illuminated.

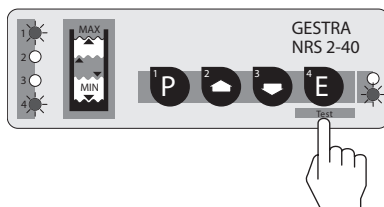


Test

NRS 2-40

Press button **E** briefly.

The test mode (relay test) is now active for 5 seconds.



Hold down button **E**.

LED 4 goes out.

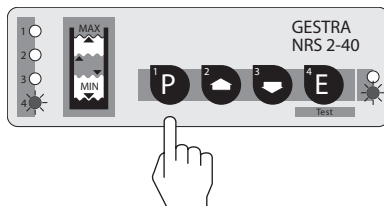
A MIN alarm is simulated for switchpoint 4.



Hold down button **P**.

LED 1 goes out.

A MAX alarm is simulated for switchpoint 1.

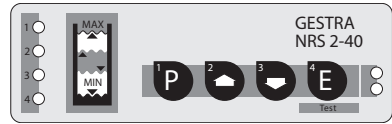


Alarm

NRS 2-40

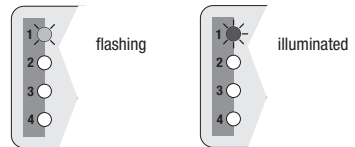
There are two alarm conditions:

- **High-level alarm (MAX alarm)**
- **Low-level alarm (MIN alarm)**



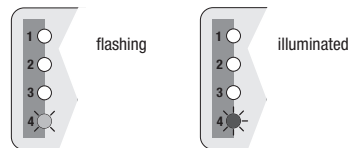
High-level (MAX) alarm

LED 1 changes after the de-energizing delay from rapid flashing to lighting.



Low-level (MIN) alarm

LED 4 changes after the de-energizing delay from rapid flashing to lighting.



Malfunctions

Fault-finding list for troubleshooting

Device fails to work – indication of malfunction

Fault: In spite of correct wiring and commissioning of the equipment an interference signal is indicated.

Remedy: The interference signal is caused by H. F. interferences coming from the installation. For interference suppression of the voltage supply we supply ferrite rings, stock code 147253. The 230 V supply lines should be looped through the ferrite ring five to ten times. If several controllers are used in the system, they can be fed from the interference suppressed supply lines. For the interference suppression of the bus line we supply hinged-shell ferrite rings, stock code 147254. The hinged-shell ferrite rings are clamped onto the bus line close to the terminal strip of the controller.

Device fails to work – no function

Fault: LED "Power" does not light up.

Remedy: Apply power. Connect the equipment according to the wiring diagram.

Device does not work properly

Fault: Incorrect function at analogue output.

The following actual value indicator shows incorrect values.

Remedy: Correct the switchpoint settings and the active measuring range settings of the electrode.

Fault: Switchpoints and actual value indication drift continuously towards 100 %.

Remedy: Deposits have accumulated on the electrode rod.
Remove the level electrode and clean the electrode rod.

Fault: A high-level alarm is raised although the liquid level is below high level.

Remedy: Deposits have accumulated on the electrode rod: Clean the electrode rod.
Defective electrode insulation: Replace level electrode.

Fault: Liquid level below switchpoint "LOW LEVEL", device fails to switch.

Remedy: Check installation of level electrode and vent hole in the protection tube.
If an external measuring pot is used make sure to open the isolating valves.

Fault: "HIGH-LEVEL" switchpoint exceeded – no indication.

Remedy: Level switch defective. Replace equipment.

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

System Malfunctions



Danger

The terminal strip of the equipment is live during operation.

This presents the danger of electric shock.

Cut off power supply before mounting or removing the terminal strips or the housing cover.

NRS 2-40

Faulty installation and/or configuration of CAN bus components, excessive temperatures in the devices, defective electronic component parts or electromagnetic interferences of the supply system can result in system malfunctions. In the event of a system malfunction the safety circuit (terminal 25 and 29) is instantly interrupted.

There are four system malfunctions that might occur in the level electrode and the switching controller.

- Max. admissible temperature in electrode terminal box exceeded
- No or faulty communication between controller and electrode
- Fault in CAN bus
- Failure of 24 V power supply unit built in switching controller NRS 2-40

The automatic self-testing routine checks the switching controller every 3 seconds and the sensors (e.g. the level electrodes) every 10 seconds. During each self-testing routine the error messages will be stored in the switching controller. The error messages remain stored until the cause of the fault(s) is eliminated. If a malfunction is detected the signal output of the switching controller (terminals 7 and 8) will be opened and closed as a function of the triggering pulse. As part of the automatic self-testing routine the function of the output relays will also be checked every 6 hours.

System Malfunctions – continued –



Danger

The terminal strip of the equipment is live during operation.

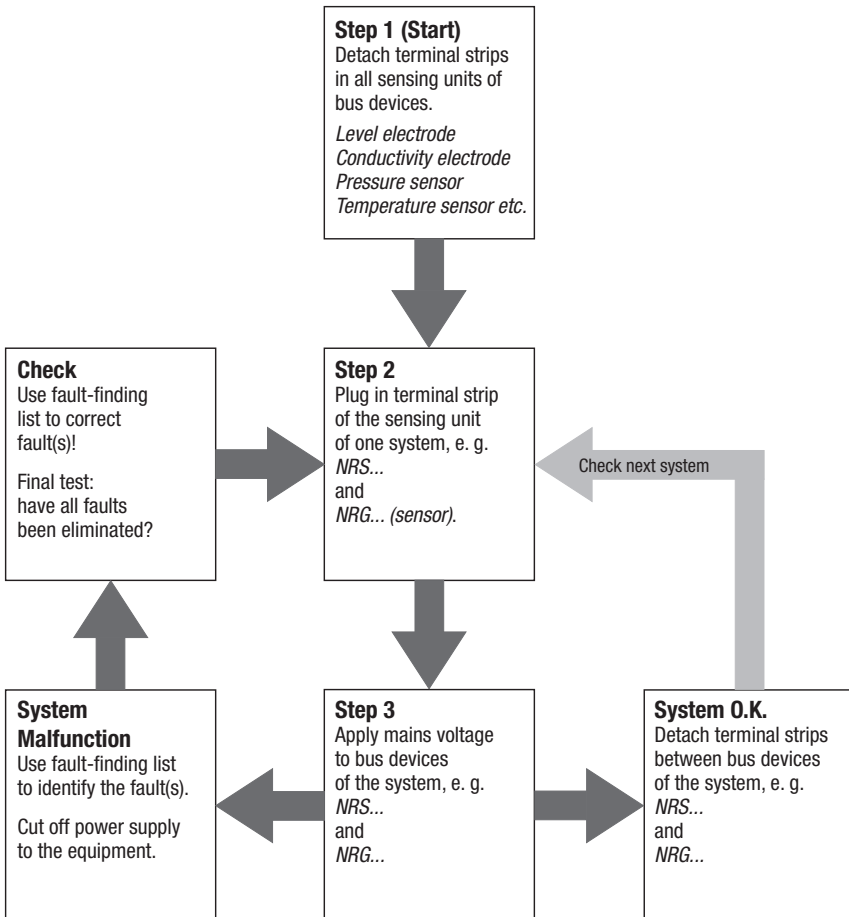
This presents the danger of electric shock.

Cut off power supply before mounting or removing the terminal strips or the housing cover.

Systematic malfunction analysis

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 finding procedure:

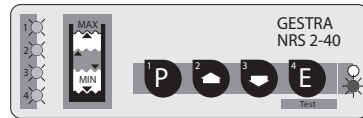


System Malfunctions – continued –

System malfunction 1

LEDs flashing slowly

**The four indicator LEDs flash slowly.
High/low-level alarm**



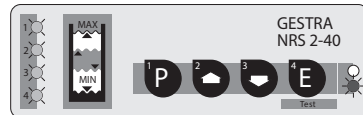
Fault: The max. admissible temperature in the electrode terminal box is exceeded.
Remedy: Insulate electrode flange to protect the equipment against heat radiation.

As soon as the temperature drops below the max. admissible limit the equipment automatically returns to normal operation.

System malfunction 2

LEDs flashing rapidly

**The four indicator LEDs flash rapidly.
High/low-level alarm**

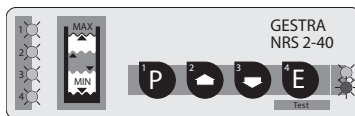


Fault: The CAN bus line between the nodes is interrupted.
Remedy: Check wiring and terminals. Restart system

Fault: Incorrect node ID(s).
Remedy: Set correct nodes ID(s), referring to section “Basic Adjustments” or “Annex”.
Disconnect the system from its power supply. After 5 sec. apply power and restart system.

System malfunction 3

LED “Bus status” flashes slowly.



LED flashing slowly

Fault: Malfunction in CAN bus.

Abhilfe: Restart system.

LED “Bus status” flashes slowly.

High/low-level alarm



LED flashing slowly

Fault: Data transfer in CAN bus interrupted.

Remedy: The bus cables have to be correctly connected according to the wiring diagram (observe polarity!). Make sure that all **end-of-line nodes** are provided with 120 Ω terminating resistors, referring to the wiring diagram.

Disconnect the system from its power supply. After 5 sec. apply power and restart system.

Fault: The baud rate of one or more nodes is not set correctly.

Remedy: Check baud rate settings of all bus nodes. The baud rates **must be identical**. Refer to section “Annex” for more details.

Disconnect the system from its power supply. After 5 sec. apply power and restart system.

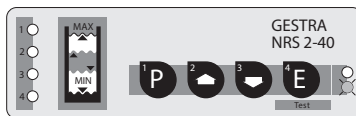
Fault: The overall length of the bus cable does not correspond to the selected baud rate.

Remedy: Change baud rate settings of all nodes according to the indications specified in “Annex”.

Disconnect the system from its power supply. After 5 sec. apply power and restart system.

System malfunction 4

LED “Power” flashes slowly.



LED flashing slowly

Fault: The power supply unit (PSU) is overloaded and may be misused for other components.

Remedy: Check load of power supply unit. Be sure to use the PSU only for the voltage supply of bus-based network components.

Disconnect the system from its power supply. After 5 sec. apply power and restart system.

Fault: Power supply unit defective.

Remedy: Replace power supply unit.

Decommissioning



Danger

The terminal strip of the equipment is live during operation. This presents the danger of electric shock. Cut off power supply before mounting or removing the terminal strip and the housing cover.

Disposal

Remove the equipment and separate the waste materials in accordance with the material specification. Electronic components (boards) must be disposed of separately. For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

Annex

Note regarding Declaration of Conformity / Declaration of Manufacturer **CE**

For more information on the conformity of the equipment to European directives, please refer to our Declaration of Conformity or our Declaration of Manufacturer. You can ask for a copy of the current Declaration of Conformity / Declaration of Manufacturer or you can find them at www.gestra.de/dokumente.

For your notes



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