FLOWSERVE GESTRA

GESTRA Steam Systems

NRG 26-40

GB

Installation Instructions 810274-03

Level Electrode NRG 26-40

spector bus CANopen

Contents

Contents - continued -

Page

Important Notes

Usage for the intended purpose

Use level electrode NRG 26-40 only in conjunction with switching controller NRS 2-40 or level controller NRR 2-40 for signalling levels in electrically conductive or non-conductive liquids.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff.
Retrofitting and maintenance work must only be performed by qualified staff who – through adequate training – have achieved a recognised level of competence.

Danger

When loosening the electrode steam or hot water might escape!
This presents the risk of severe scalding all over the body!
It is therefore essential not to dismantle the level electrode unless the boiler pressure is verified to be 0 bar.

The level electrode becomes hot during operation.
This presents the risk of severe burns to hands and arms.
Before carrying out installation and maintenance work make sure that the valve is cold.

If the internal ceramic insulation breaks, hot steam can escape through the lateral vent hole in the electrode body.
This presents the risk of severe scalding all over the body!
Do not stay near the electrode during operation.

Attention

The name plate specifies the technical features of the equipment. Note that any item of equipment without its specific name plate must neither be commissioned nor operated.

ATEX (Atmosphère Explosible)

According to the European Directive 94/9/EC the equipment must not be used in potentially explosive areas.

Explanatory Notes

Scope of supply

NRG 26-40

1 Level electrode NRG 26-40
1 Joint ring D 27 x 32 DIN 7603, stainless steel 1.4301, bright annealed
1 Installation manual

Explanatory Notes - continued -

Description

The level electrode NRG 26-40 works according to the capacitance measurement principle.

The NRG 26-40 is used for signalling different levels in conductive and non-conductive liquids:

■ Water level maintained within the control band defined by two preset limits

Use level electrode NRG 26-40 in combination with level switch NRS 2-40 or further system components. The level data are transferred to the level switch or another component via the CAN data bus, using the CANopen protocol.

Function

The principle of capacitance measurement is applied to determine the level. The electrode rod and the vessel wall form a capacitor. If the level of the dielectric located between the two capacitor plates changes, the current which flows through the plates changes proportionally to the level. A dielectric is defined as an insulating substance, which excludes many liquids such as water. In order to receive a useful measuring result the measuring rod, which is completely submerged in the liquid, must be completely insulated. After calibration of the zero point/measuring range (0 % –100 %) of the control unit, the level can be read off from a remote display unit. The level measuring range can be changed during operation.

At regular intervals the level electrode NRG 26-40 sends a data telegram to the level switch NRS 2-40 or level controller NRR 2-40. The data transfer is effected by means of a CAN bus according to DIN ISO 11898 using the CANopen protocol.

System components

NRS 2-40
Digial switching controller for level electrode NRG 26-40.
Functions: Four liquid levels with one switchpoint each, MAX alarm, MIN alarm, pump ON, pump OFF with one switchpoint each, liquid level continuously within the predefined control band of the electrode.
Data exchange: CAN bus to ISO 11898 via CANopen protocol.

NRR 2-40
Digial level controller for level electrode NRG 26-40.
Functions: Four liquid levels with one switchpoint each, MAX alarm, MIN alarm, pump ON, pump OFF with one switchpoint each, liquid level continuously within the predefined control band of the electrode.
Data exchange: CAN bus to ISO 11898 via CANopen protocol.

URB 1, URB 2
Operating & display unit.
Functions: Parameterization and visual indication via LCD display.
Data exchange: CAN bus to DIN ISO 11898 via CANopen protocol.

Design

NRG 26-40:
Screwed design ¾" to EN ISO 228-1. **Fig. 2**

Technical Data

NRG 26-40

Type approval
TÜV · WR · XX-399 (see name plate)

Service pressure
32 bar g at 238 °C

Mechanical connection
Screwed ¾" to EN ISO 228-1

Materials
Case 3.2161 G AlSi8Cu3
Rod 1.4571 CrNiMoTi17-12-2
Measuring electrode 1.4571 CrNiMoTi17-12-2
Electrode insulation PTFE

Length supplied / measuring range
see **Fig. 2**

Supply voltage
18 – 36 V DC

Power consumption
65 mA

Fuse
Thermal fuse T_{max} = 80 °C

Hysteresis
–2 K

Data exchange
CAN bus to DIN ISO 11898, CANopen protocol

Attenuation of signal output
19 seconds

Indicators and adjustors
1 10-pole code switch for node ID and Baud rate setting
1 green LED “Communication CAN bus”
1 red LED “Malfunction in bus”

Electrical connection
M 12 sensor connector, 5 poles, A coded,
M 12 sensor jack, 5 poles, A coded

Protection
IP 65 to DIN EN 60529

Max. admissible ambient temperature
70 °C

Weight
Approx. 2.5 kg

Technical Data - continued -

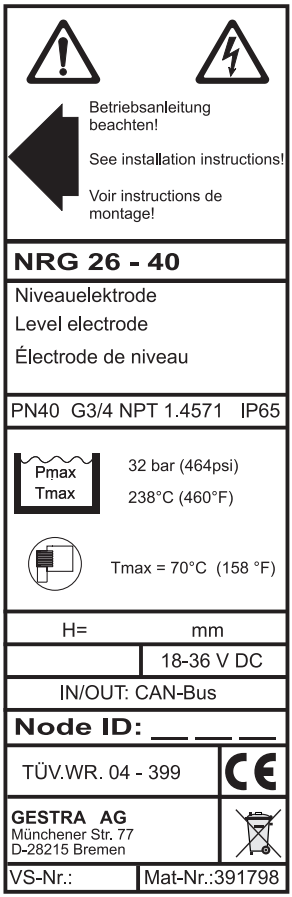
Corrosion resistance

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

Sizing

The body must not be subjected to sharp increases in pressure. Welds and flanges are designed to withstand dynamic loading (bending and alternative stress). The dimensional allowances for corrosion and anti-corrosive additives reflect the latest state of technology.

Name plate / marking

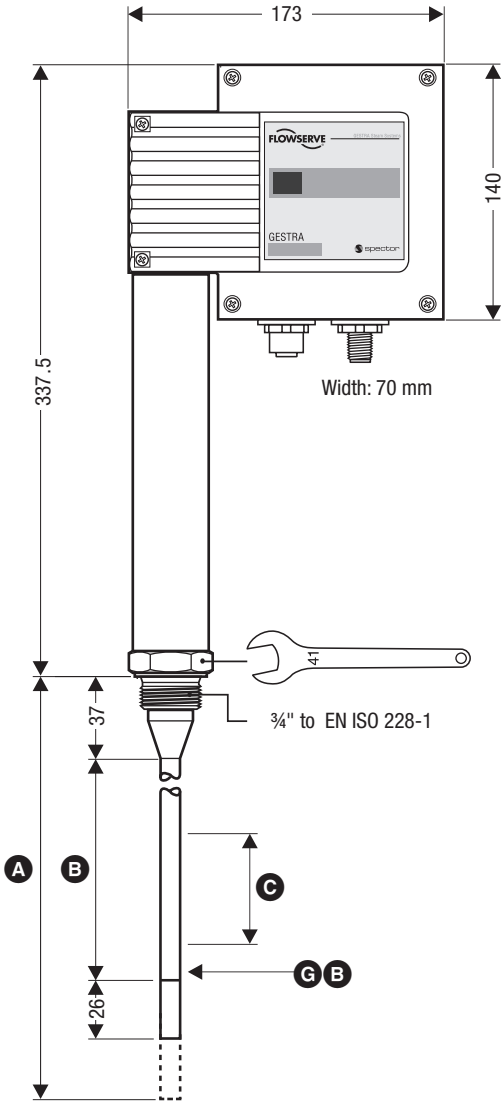


Equipment designation

Fig. 1

Technical Data - continued -

Dimensions



A	B
373	300
477	400
583	500
688	600
794	700
899	800
1004	900
1110	1000
1214	1100
1319	1200
1423	1300
1528	1400
1636	1500
2156	2000

Fig. 2

Design

NRG 26-40

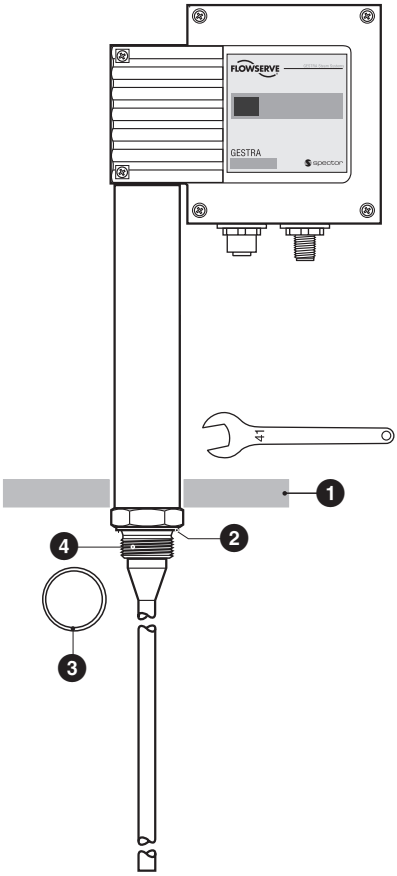


Fig. 3

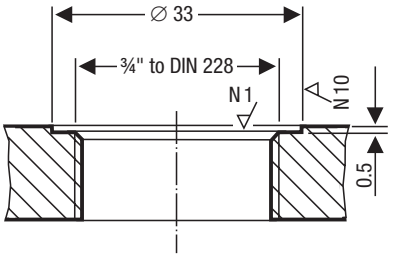
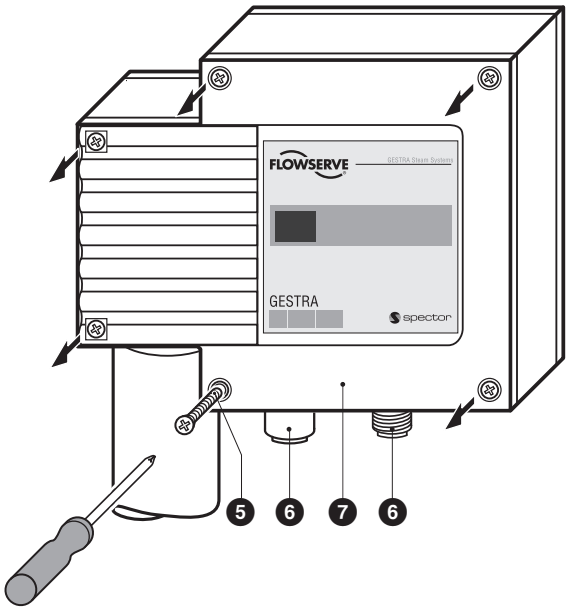


Fig. 4

Functional Elements

NRG 26-40



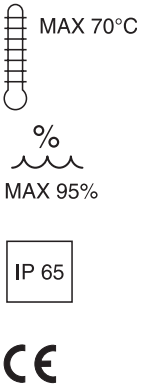


Fig. 5

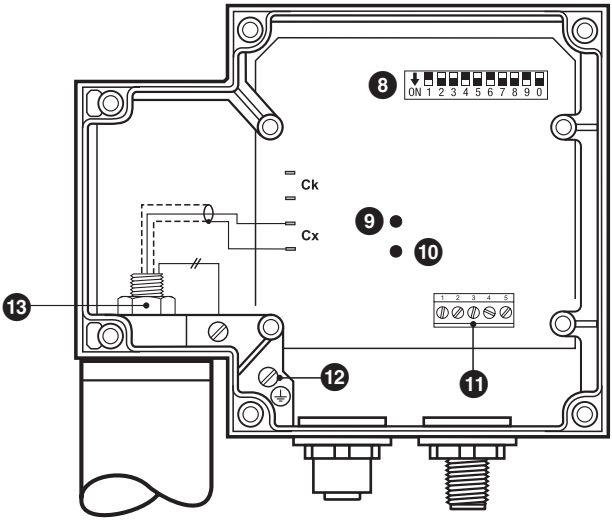


Fig. 6

Design / Functional Elements - continued -

Key

1. Thermal insulation, provided on site, d = 20 mm (outside of thermal insulation of steam boiler)
2. Seating surface
3. Joint ring D 27 x 32 DIN 7603, stainless steel 1.4301, bright annealed
4. Electrode thread ¾" to EN ISO 228-1
5. Housing screws M 4
6. M 12 sensor connector, 5poles, A coded, M 12 sensor jack, 5poles, A coded
7. Housing cover
8. Code switch, 10 poles
9. Green LED “CAN bus communciation”
10. Red LED “Malfunction in bus”
11. Terminal strip
12. PE connection
13. Nut

A. Max. length of installation at 238 °C
B. Measuring range
C. Adjustable control range
D. Lower measuring point

Installation

NRG 26-40

1. Check seating surfaces of threads or flange provided on vessel or boiler standpipe. **Fig. 4**
2. Place joint ring ❸ onto seating surface ❷ of the electrode. **Fig. 3**
3. Apply a light smear of silicone grease (e.g. Molykote® 111) to electrode thread ❹.
4. Screw level electrode into threads or flange provided on vesssel and tighten with a 41 mm open-end spanner. The torque required when cold is **160 Nm.**
5. When mounting two electrodes in one flange install the first electrode as described under item 4. Before installing the second electrode loosen nut ⓭, unscrew PE connection and remove cable connectors from circuit board. Screw electrode in place. Slightly tighten nut ⓭.
   Install PE connection ⓬ and fix cable connectors.

Attention

- The seating surfaces of the standpipe or the flange provided on the vessel must be accurately machined, see **Fig. 4**.
- Do not bend electrode tip when mounting
- Use only the supplied joint ring (of stainless steel 1.4301) D 33 x 39 DIN 7603.
- Do not lag electrode body above the hexgonal section.
- Do not insulate electrode thread with hemp or PTFE tape.

Note

- For the approval of the boiler standpipe the relevant regulations must be considered.
- Refer to page 13 for four typical installation examples.

Tools

- Open-end spanner A. F. 19 mm
- Open-end spanner A. F. 41 mm

Molykote® 111 is a registered trademark of DOW Corning Corp., Midland Michigan, USA

Installation - continued -

Examples of Installation

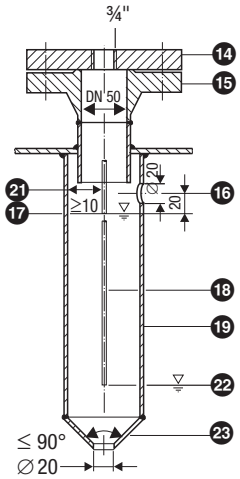


Fig. 7

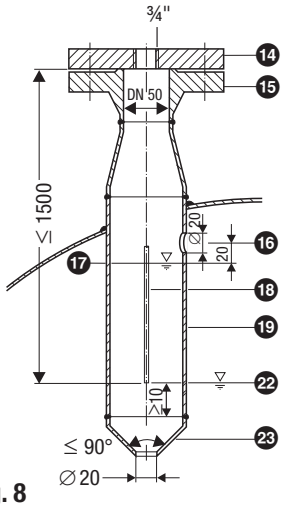


Fig. 8

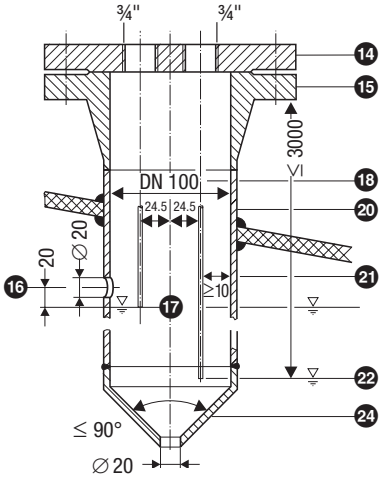


Fig. 9

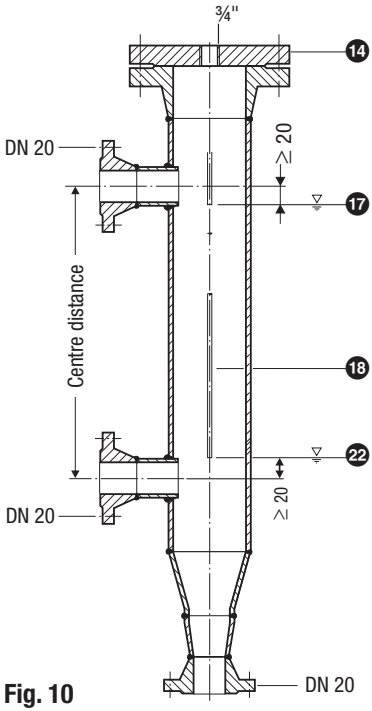


Fig. 10

Installation - continued -

Key

⓮ Flange PN 40, DN 50, DIN 2527
Flange PN 40, DN 100, DIN 2527

⓯ For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.

⓰ Vent hole Provide vent hole as close to the boiler wall as possible!

⓱ High water HW

⓲ Electrode rod d = 15 mm

⓳ Protection tube DN 80

⓴ Protection tube DN 100

㉑ Electrode distance ≥ 14 mm

㉒ Low water LW

㉓ Reducer DIN 2616-2, K - 88.9 x 3.2 - 42.4 x 2.6 W

㉔ Reducer DIN 2616-2, K-114.3 x 3.6 - 48.3 x 2.9 W

Electrical Connection

Aligning terminal box

1. Unscrew screws ❺ and remove housing cover ❼. **Fig. 5**
2. Loosen nuts ⓭ with 19 mm spanner. Do not remove them! **Fig. 6**

The electrode terminal box can now be turned through +/– 180°.

3. Turn electrode terminal box into desired position (+/– 180°).
4. Tighten nuts ⓭ with a torque of **25 Nm**.
5. Set node ID (see **"Basic Settings", "Configuring level electrode"**).
6. Re-attach housing cover ❼ and fix it with screws ❼.

Note

■ Wire the control cable according to the wiring diagram with connector and coupler.

Control cable

NRS, NRR, LRR, TRS, URB 1
To wire the equipment, multi-core twisted-pair control cable **must** be used for the bus line, e. g. UNITRONIC® BUS CAN 2 x 2 x ... mm² or RE-2YCYV-fl 2 x 2 x ... mm².
Control cable assemblies (2 x 2 x 0.32 mm² cable with plug and connector) of various lengths are available as add-on equipment.

NRG, LRG, EF, URZ, TRV, URB 2
The equipment is fitted with sensor plug-in connectors (5 poles, A-coded). For connecting the bus devices control cable assemblies (with plug and connector) of various lengths are available as add-on equipment.
Note that the recommended control cables are not UV-resistant and must be protected by a UV-resistant plastic tube or cable duct if the equipment is installed outdoors (except for URB 2).
The baud rate (data transfer rate) dictates the cable length and size between the bus nodes. The total power consumption must also be taken into consideration when selecting the conductor size. The total power consumption is obtained 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 1501214) and 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 [mm²]
OFF	**ON**	**OFF**	**250 kBit/s**	**125 m**	2 x 2 x 0.34
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, depending on bus configuration
OFF	ON	ON	20 kBit/s	1000 m	
ON	ON	ON	10 kBit/s	1000 m	

Set baud rate via code switch ❽. Make sure that all bus nodes feature 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 operational safety.
- The type and design of the data cable has a strong influence on the electromagnetic compatibility (EMC) of the equipment. 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 plug-in unions.

CAN bus voltage supply

To ensure the troublefree operation of the CAN bus system make sure that the voltage supply for all bus devices is sufficient.

Please use the following table to check the voltage supply of your bus system.

Control units with voltage supply	Qty.	x	Power output per item	=	Sum
		x	6 W	=	W
	Please enter data.		Sum 1	=	W
Sensor, transmitter, control units, operating & display unit URB 1	Qty.	x	Power consumption per item	=	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 supply the CAN bus with 24 V DC coming from a separate and stabilized safety power supply unit (e. g. SITOP Smart 24 V 2.5 A).

The power supply unit must be electrically isolated from dangerous contact voltages and must meet 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.

SITOP smart is a registered trademark of Siemens AG, Munich

Electrical Connection - continued -

Wiring diagram

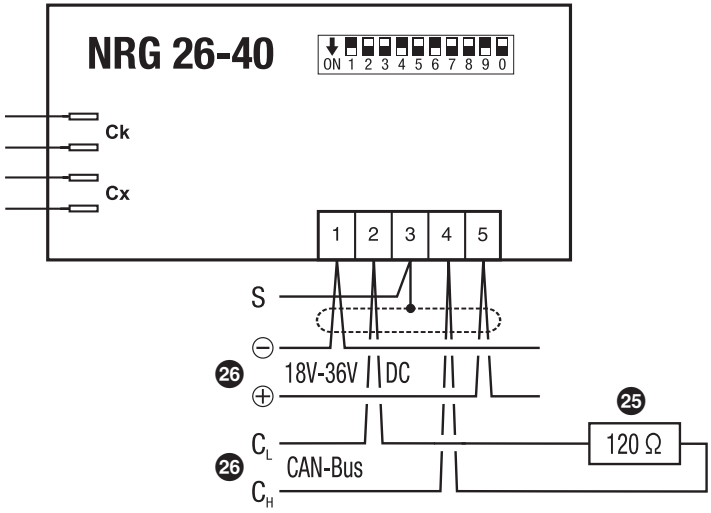
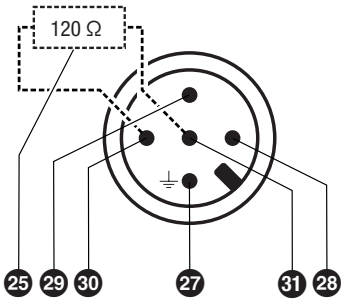


Fig. 11

Electrical Connection - continued -

Wiring diagram for the sensor plug-in connections



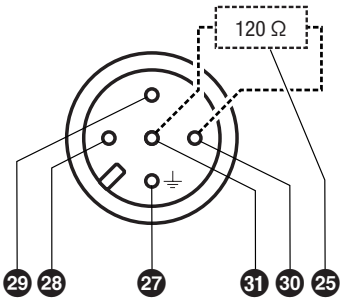


Fig. 12

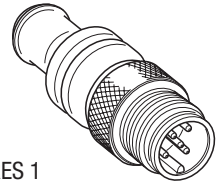


Fig. 13 RES 1

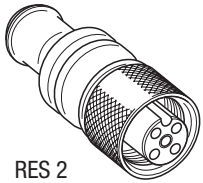


Fig. 14 RES 2

Key

- 25 Terminating resistor 120 Ω, RES 1 or RES 2
- 26 CAN bus line, twisted pair control cable
- 27 Pin 1: Screen
- 28 Pin 2: Power supply 24 V DC+ (red)
- 29 Pin 3: Power supply 24 V DC– (black)
- 30 Pin 4: CAN data line C_H (white)
- 31 Pin 5: CAN data line C_L (blue)

CAN bus wiring diagram

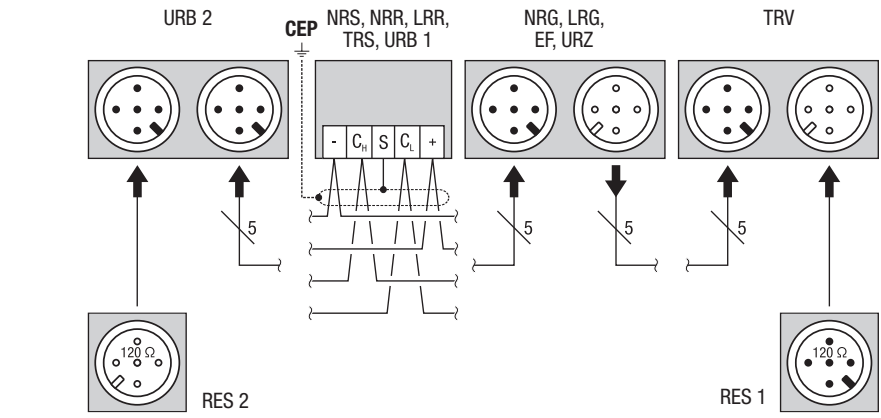


Fig. 15

Attention

- Wire equipment in series. Star-type wiring is not permitted!
- Link screens of control cables such that electrical continuity is ensured and connect them **once** to the central earthing point (CEP). If equipotential bonding currents are to be expected, for instance in outdoor installations, make sure that the screen is separated from the central earthing point (CEP).
- To protect the switching contacts fuse circuit with T 2.5 A or according to TRD regulations (1.0 A for 72 h operation).
- If two or more system components are connected in a CAN bus system, provide the first and the last device with a terminating resistor of 120 Ω, **Fig. 13, Fig. 14**
- Note that in a CAN bus network only **one** water-level limiting system may be used.
- Do **not** interrupt the CAN bus network during operation with one or more system components!

  If the CAN bus network is interrupted the saftey circuit will be opened.

  Before taking the CAN bus line from the terminal strip, make sure that all connected system components are out of service.

Electrical Connection - continued -

Note

- The loop resistance must be below 10 Ω.
- The rated voltage is indicated on the name plate.
- When switching off inductive loads, voltage spikes are produced that may impair the operation of control and measuring systems. Provide connected contactors with RC combinations, e. g. 0.1 µF/100 Ω.
- Even in correctly wired systems high frequency interference caused by the installation can lead to system outages and malfunction alarms. For more information please refer to the fault-finding list in the section **Troubleshooting**.

Tools

- Screwdriver for cross head screws, size 1
- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680
- Open-end spanner A. F. 19 mm

Basic Settings

Bus cable

All devices (level, conductivity) are interconnected via CAN bus. The CANopen protocol is used for the data exchange between the equipment groups. All devices have an electronic address – the 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 - 99**.

The control unit NRS 1-40 has already been configured at our works for operation with other GESTRA components and can be used straight away without having to set the node ID.

If several identical systems are to communicate in a CAN bus network, set a different node ID for each system (e. g. limiter, controller, etc).

If the length of the CAN bus cable exceeds 125 m change the settings of the code switch ❽.

For more information on switch positions see **Basic Settings / Switch positions**.

Basic Settings - continued -

Node ID

Water 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. hot-water generating units)

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. hot-water generating units)

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			
	97	98			

High level alarm

NRS 1-41	NRG 16-41	Reserved	Reserved	Reserved	
X	X – 1	X + 2	X + 3	X + 4	
6	5	8	9	10	Factory setting

Further components

SRL 40		
X = (sensor: level limiter // hi 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 continous blowdown control

EF 1-40	Reserved	LRR 1-40	LRG 1-4...	Reserved	
X – 2	X – 1	X	X + 1	X + 2	
48	49	50	51	52	Factory setting

Control unit

URB 1, URB 2		
60		Factory setting

Basic Settings - continued -

Factory setting

The level electrode features the following factory set default values:

- Baud rate: **250 kB/s**
- Measuring sensitivity: **10 µS/cm**
- Node ID: **041**

Establishing / changing node ID

If several identical systems are to communicate in a CAN bus network, set a different node ID for each system (e. g. limiter, controller, etc).

1. Unscrew screws ❺ and take off housing cover ❼.
2. Set code switch ❽ as requested. Please observe the table “Code switch settings” on page 23.
3. Re-attach housing cover ❼ and fix it with screws ❼.

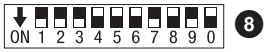
Attention

- We recommend that you commission the CAN bus devices with the default factory setting.
- Do not use a node ID for more than one piece of equipment in the CAN bus system.

Code switch settings

		Node ID	41
S 1	***ON***	1	
S 2	OFF	2	
S 3	OFF	4	
S 4	***ON***	8	
S 5	OFF	16	
S 6	***ON***	32	
S 7	OFF	64	

Fig. 16 (Factory setting)



		Node ID	71
S 1	***ON***	1	
S 2	***ON***	2	
S 3	***ON***	4	
S 4	OFF	8	
S 5	OFF	16	
S 6	OFF	32	
S 7	***ON***	64	

Fig. 17 (Example 1)

S 8	S 9	S 0	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 kBit/s)

Basic Settings - continued -

Measuring ranges

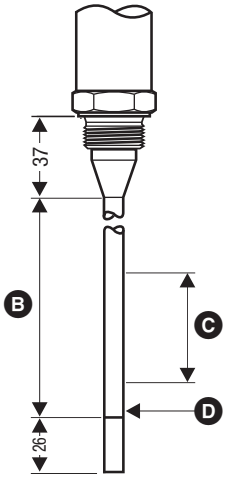


Fig. 19

Key

- **B** Measuring range at 25 °C
- **C** Adjustable control range [mm]
- **D** Lower measuring point

Commissioning

Checking electrical connection

Check that the electrode NRG 26-40 is connected to the level switch NRS 2-40 or the level controller NRR 2-40 according to the wiring diagram. **Fig. 11, Fig. 15**

Applying mains voltage

Apply mains voltage to the control unit NRS 2-40 or the level controller NRR 2-40.

Operation

Level electrode with CAN bus

Use in conjunction with level switch NRS 2-40 in steam and pressurised hot water plants in accordance with TRD 401, TRD 602, TRD 604, EN 12952, EN 12953 or according to other national regulations.

Note

- To analyse and eliminate malfunctions refer to section “Fault finding list for trouble-shooting” on pages 27 – 28.

Setting the attenuation of the level controller

If the liquid level varies considerably for a short time during operation change the attenuation of the level signal. The default factory setting for the attenuation is 19 seconds.

1. Unscrew screws ❺ and take off housing cover ❼.
2. Write down the node ID and baud rate settings. Unplug the CAN bus connector.
3. Set code switch ❽ S 1 to ON and S 2 to S 7 to OFF.

S 1	S 2	S 3	S 4	S 5	S 6	S 7
ON	OFF	OFF	OFF	OFF	OFF	OFF

4. Set the desired attenuation via code switches S8 to S10.

S 8	S 9	S 10	Attenuation [s]
OFF	OFF	OFF	3
ON	OFF	OFF	5
OFF	ON	OFF	7
ON	ON	OFF	9
OFF	OFF	ON	15
ON	OFF	ON	19*)
OFF	ON	ON	25
ON	ON	ON	29

*) Factory settings

5. Plug in the CAN bus connector.
   Green LED 1 illuminated: The new attenuation setting has been accepted.
   Red LED 2 illuminated: New attenuation setting has not been accepted. Repeat the setting or replace the electronic circuit board.
6. Unplug the CAN bus connector. Set the original node ID and baud rate.
   Plug in the CAN bus connector. The level electrode NRG 26-40 works now with the new attenuation setting.
7. Re-attach housing cover ❼ and fix it with screws ❺.

Malfunctions

Fault finding list for troubleshooting

Equipment does not work – no function

Fault 001: The thermal fuse has been triggered.
Remedy: The ambient temperature must not exceed 70 °C.

Fault 008: In spite of correct wiring and commissioning of the equipment an error message is indicated.
Remedy: The error message is caused by the high-frequency interference coming from the system. For interference suppression we supply ferrite rings, stock code # 147253. The 230 V supply lines should be looped five to ten times through the ferrite ring. If several controllers are used in one 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 and next to the housing cover of the level electrode.

Fault 016: LED “Power” is not illuminated.
Remedy: Apply mains voltage. Connect electrode according to wiring diagram.

Fault 022: The electrode body does not have earth connection to the boiler.
Remedy: Clean sealing surfaces and insert metal joint ring D 33x39 to DIN 7603, made from 1.4301. Do **not** insulate level electrode with hemp or PTFE tape!

Fault 023: LED ❾ is not flashing. No data exchange.
Remedy: Check level switch/controller. Connect electrode according to wiring diagram.

Equipment does not work correctly

Fault 019: The vent hole in the protection tube does not exist, is obstructed or flooded.
Remedy: Check protection tube and, if necessary, provide vent hole.

Fault 024: The electrode was installed without a protection tube. The protection tube serves as reference electrode.
Remedy: Install a protection tube.

Fault 025: The desired zero point of the control range is outside of the measuring range of the electrode. The electrode is too short.
Remedy: Replace level electrode. Select suitable electrode length.

Fault 026: The electrode rod is covered with dirt deposits.
Remedy: Remove level electrode and clean the electrode tip with a wet cloth.

Fault 027: The internal insulation of the electrode rod is damaged.
Remedy: Replace level electrode.

Fault finding list for troubleshooting - continued -

Fault 020: The isolating valves of the external measuring pot (optional extra) are closed.
Remedy: Open isolating valves.

Fault 028: The level electrode responds too sluggishly to changes in the liquid level.
Remedy: Correct the attenuation setting.

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

Decommissioning

Danger

Risk of severe burns and scalds to the whole body!

Before installing the level electrode make sure that the vessel or the external pot are depressurised (0 bar) and cooled down to room temperature (20 °C).

Disposal

Dismantle the level electrode and separate the waste materials, using the specifications in the table “Materials” as a reference.
Electronic component parts such as the circuit board must be disposed of separately!

For the disposal of the level electrode observe the pertinent legal regulations concerning waste disposal.

Annex

Declaration of conformity CE

We hereby declare that the equipment **NRG 26-40** conforms to the following European guidelines:

- Low Voltage Directive 73/23/eec version 93/68/eec
- EMC Directive 89/336/EC version 93/68/EC
- ATEX Directive 94/9/EC of 23 March 1994

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

Bremen, 3rd January 2005
GESTRA AG

i. V. U. Bledschun

Dipl.-Ing. Uwe Bledschun
(Academically qualified engineer)
Head of Design Dept.

i. V.

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

For your notes

FLOWSERVE GESTRA

Agencies all over the world:

www.gestra.de

España

GESTRA ESPAÑOLA S.A.
Luis Cabrera, 86-88
E-28002 Madrid
Tel. 00 34 91 / 5 15 20 32
Fax 00 34 91 / 4 13 67 47; 5 15 20 36
E-mail: aromero@flowserve.com

Great Britain

Flowserve GB Limited
Abex Road
Newbury, Berkshire RG14 5EY
Tel. 00 44 16 35 / 46 99 90
Fax 00 44 16 35 / 3 60 34
E-mail: gestraukinfo@flowserve.com

Italia

Flowserve S.p.A.
Flow Control Division
Via Prealpi, 30
I-20032 Cormano (MI)
Tel. 00 39 02 / 66 32 51
Fax 00 39 02 / 66 32 55 60
E-mail: infoitaly@flowserve.com

Polska

GESTRA POLONIA Spolka z.o.o.
Ul. Schuberta 104
PL - 80-172 Gdansk
Tel. 00 48 58 / 3 06 10 - 02
00 48 58 / 3 06 10 - 10
Fax 00 48 58 / 3 06 33 00
E-mail: gestra@gestra.pl

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: jtavares@flowserve.com

USA

Flowserve GESTRA U.S.
2341 Ampere Drive
Louisville, KY 40299
Tel.: 00 15 02 / 267 2205
Fax: 00 15 02 / 266 5397
E-mail: dgoodwin@flowserve.com

GESTRA AG

P. O. Box 10 54 60, D-28054 Bremen
Münchener Str. 77, D-28215 Bremen
Telephone +49 (0) 421 35 03 - 0
Fax +49 (0) 421 35 03 - 393
E-Mail gestra.ag@flowserve.com
Internet www.gestra.de

GESTRA

810274-03/408cm · 1998 GESTRA AG · Bremen · Printed in Germany