



Level Transmitter

# NRGT 26-2

**EN (USA)**  
English

Original Installation & Operating  
Manual

**850688-00**

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## Content of this Manual

### Product:

- Level transmitter NRG 26-2

### First edition:

BAN 850688-00/05-2021cm

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## Scope of delivery/Product package

- 1 Level transmitter NRG 26-2
- 1 Installation & Operating Manual

### Required accessories for NRG 26-2 when installing for the first time

- 1 Cable jack Binder series 713 99-0436-58-05

# How to use this Manual

This Installation & Operating Manual describes the correct use of the NRGT 26-2 level transmitter. It applies to persons who integrate this equipment in control systems, install, bring into service, operate, maintain and dispose of this equipment. Anyone carrying out the above-mentioned activities must have read this Installation & Operating Manual and understood its contents.

- Read this Manual in full and follow all instructions.
- Please also read the instructions for use of any accessories.
- The Installation & Operating Manual is part of the product package. Keep it in an easily accessible location.

## Availability of this Installation & Operating Manual

- Make sure this Installation & Operating Manual is always available to the operator.
- If you pass on or sell the equipment to a third party, please also hand over the Installation & Operating Manual.

# Illustrations and symbols used

1. Action to be taken
- 2.

- Lists
  - ◆ Bullet points in lists

## A Keys to illustrations



Additional  
information



Read the relevant  
Installation & Operating Manual

# Hazard symbols in this Manual



Danger zone/Dangerous situation

## Types of warning

### **DANGER**

Warning of a dangerous situation that results in death or serious injury.

---

### **WARNING**

Warning of a dangerous situation that may possibly result in death or serious injury.

---

### **CAUTION**

Warning of a situation that may result in minor or moderate injury.

---

### **ATTENTION**

Warning of a situation that results in damage to property or the environment.

---

## Specialist terms / Abbreviations

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

**NRGT .. / NRR.. / NRS.. / URS .. / URB .. / SRL .. / etc.**

Equipment and type designations of GESTRA AG.

**SELV**

Safety Extra Low Voltage

### **Operating point (of the plant)**

The operating point describes the operating parameters within which a plant or boiler is operated in its nominal range. In a steam boiler, for example, these parameters would be output, pressure, and temperature.

The design data may be a lot more stringent, however.

A boiler that is operated at 145 psi (10 bar) and 356°F (180°C) may be designed to withstand a pressure of 870 psi (60 bar) and a temperature of 527°F (275°C), for example, which is therefore not necessarily its operating point.

## Usage for the intended purpose

### Use as a water level controller

The NRGT 26-2 level transmitter can be used to continually measure the water level in steam boiler and hot-water plants, or in condensate and feedwater tanks. The calibrated measuring range from 0% to 100% constitutes the linear profile of the 4-20 mA current output. The NRGT 26-2 is classified as operating control in accordance with UL60730-1.

### Influence of the fluid to be monitored

- The NRGT 26-2 level transmitter can be used in fluids with different conductivity. However, a conductivity of less than 100  $\mu\text{S}/\text{cm}$  has a major influence on the measured capacitance, which is why it is extremely important to recalibrate the measuring range (see page 30) at the operating point\* and after a cold start.

*\* Operating point of the plant, see page 7.*

- To achieve the best possible reproducibility and maintain high-quality measurements (see "Technical data" on page 14), the sensor must be installed in a level pot – when installed inside a protective tube (see „Example of installation with dimensional specification for NRGT 26-2" on page 24 ff.).
- The dielectric constant of the fluid to be monitored may require an adjustment to the measurement frequency if it deviates significantly from that of the usual water ( $\epsilon_r = 80$ ). Please contact GESTRA AG Service about this.

### Applicable directives and standards

The NRGT 26-2 level transmitter has been tested and approved for use in the scope governed by the following directives and standards:

#### Standards:

- UL 60730-1 and CAN/CSA E60730-1 General Requirements for Automatic Electrical Controls
- UL 60730-2-15 and CAN/CSA E60730-2-15 Requirements for Automatic Electrical Water Level Sensing Controls

## Usage for the intended purpose

### Permitted system components

According to UL60730-2-15, the NRGT 26-2 level electrode can be regarded as an operating control, which delivers the measured water level via the 4-20 mA output. Any electronic control unit with an input for a 4-20 mA unit signal can be connected and used for analysis.



To ensure proper use in all applications, please also read the Installation & Operating Manuals for the system components used.

- You can find the latest Installation & Operating Manuals for other system components on our website:  
<http://www.gestra.com>

### Improper use



**There is a danger of death due to explosion if the equipment is used in potentially explosive atmospheres.**

Do not use the equipment in potentially explosive atmospheres.



**Do not bring any equipment into service that does not have its own specific name plate.**

The name plate indicates the technical features of the equipment.

## Basic safety information



**Danger to life from scalding if the level electrode is removed under pressure. Steam or hot water can spurt forcefully out of the equipment.**

- Only remove the level electrode at **0 psi (0 bar) boiler pressure**.



**Risk of severe burns if work is performed on level electrode that is still hot. The level electrode becomes very hot during operation.**

- Allow the level electrode to cool.
- Always wait for the level electrode to cool before performing any installation and maintenance work.



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

- Always switch off the voltage to the plant before performing connection work.
- Check that the plant is not carrying live voltage before commencing work.



**Danger to life from a faulty NRG 26-2 level electrode due to the sudden escape of hot steam or hot water.**

Shocks and impacts during transport or installation can result in damage to or leaks in the level electrode, causing pressurized hot steam or hot water to escape through the pressure relief hole.

- To prevent damage during transport and installation, do not expose the electrode rod to major shocks or impacts.
- Before and after installation, check that the level electrode is completely undamaged.
- Check that the level electrode is not leaking when bringing into service.



**Attempts to repair the equipment will cause the plant to become unsafe.**

- The NRG 26-2 level electrode may only be repaired by the manufacturer, GESTRA AG.
- Only replace faulty equipment with identical equipment from GESTRA AG.

## Required personnel qualifications

Activity	Personnel	
Integration in control system	Specialist staff	Plant designer
Installation/ electrical connection/ bringing into service	Specialist staff	The equipment may only be installed, wired and commissioned by qualified and competent staff.
Operation	Boiler service technician	Staff trained by the plant operator.
Maintenance work	Specialist staff	Maintenance and refits may only be performed by authorized staff who have undergone specific training.
Refits	Specialist staff	Persons trained by the plant operator to work with pressure and temperature.

**Fig. 1**

## Notes on product liability

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

## Function

The NRG 26-2 level transmitter uses the capacitance measurement principle and converts level data into a level-dependent 4-20 mA current signal. The 0-100% measuring range can be scaled based on the effective length of the electrode rod.

### Automatic self-test

An automatic self-test periodically monitors the safety and function of the level transmitter and measured value acquisition.

Faults in the electrical connection or electronic measuring equipment trigger an error indication on the display, and the current output is set to 0 mA.

### Transmitter function

The transmitter function is the ability of the electrode to provide a scalable measuring range on the 4-20 mA current output interface and to make this available to one or more recipients for analysis.

These devices do not have any controlling or limiting functions.

Level transmitters can be installed on the inside of steam boilers, tanks or feed lines of hot-water plants. A protective tube installed on the system ensures reliable function. They can also be installed in an external level pot that communicates with the boiler.

A capacitive NRG 26-2 level transmitter can be installed in the same protective tube or level pot as a conductive NRG 1x-50 or NRG 1x-51 level electrode.

### Display and signals; see page 33 / 36

The NRG 26-2 level transmitter has a green 4-digit, 7-segment display for showing readings, status information and error codes. A red and a green LED indicate the operating status.

## Function

### Behavior when powered on

The display alternately shows the software version, the type and then the scaled level reading.

### Behavior in normal operation (no errors)

The display shows the scaled level reading (3 digits + 1 decimal place), e.g., 050.3, and converts the level data into a level-dependent current signal from 4-20 mA.



The scale of the 0-100% measuring range is factory-set to maximum for the electrode length used. This way, meaningful level readings can be obtained immediately after installation.

### Adjusting the measuring range when bringing into service (CAL.L, CAL.P or CAL.H)

When bringing into service, however, the measuring range should be adapted in line with the sight glass. Do this using the parameters CAL.L, CAL.P or CAL.H, see page 30 - 31. This is the only way to gain all the benefits of high-resolution readings in the sight glass range.

### Behavior in the event of malfunctions

The error state or malfunction is indicated by an error code shown continuously on the display, e.g., E.005. For more on error codes, see page 37.

Every time there is a malfunction, 0 mA is output via the current output.



#### **Electrode malfunctions are acknowledged automatically**

When the malfunction is corrected, the indication disappears from the display, and the NRGT 26-2 level transmitter returns to normal operation.



The tables on pages 34 - 35 clearly show the relationship between the equipment status, the display, and the status LEDs.

### Setting parameters and changing default settings

If necessary, you can adapt the electrode parameters to suit conditions at the plant. You can set parameters and change default settings using a rotary knob on the terminal box, see page 29.

## Technical data

### Design and mechanical connection

- NGRT 26-2 Thread 3/4"-14 NPT, see Fig. 5

### Nominal pressure rating, permitted service pressure and temperature

- NGRT 26-2 464 psi at 460°F (32 bar at 238°C)

### Materials

- Terminal box 3.2581 G AISi12, powder-coated
- Cover tube 1.4301 X5 CrNi 18-10
- Electrode rod insulation PTFE
- Screw-in body 1.4404 / F316L

### Max. electrode length at 460°F (238°C)

- NGRT 26-2

<b>Max. electrode length:</b>	14.70 inch (373 mm)	18.80 inch (477 mm)	22.95 inch (583 mm)	27.10 inch (688 mm)	31.25 inch (794 mm)	35.40 inch (899 mm)	39.55 inch (1004 mm)
<b>Measuring range:</b>	11.80 inch (300 mm)	15.75 inch (400 mm)	19.70 inch (500 mm)	23.65 inch (600 mm)	27.60 inch (700 mm)	31.50 inch (800 mm)	35.50 inch (900 mm)
<b>Max. electrode length:</b>	43.70 inch (1110 mm)	47.80 inch (1214 mm)	51.95 inch (1319 mm)	56.05 inch (1423 mm)	60.20 inch (1528 mm)	64.45 inch (1636 mm)	84.90 inch (2156 mm)
<b>Measuring range:</b>	39.37 inch (1000 mm)	43.30 inch (1100 mm)	47.25 inch (1200 mm)	51.20 inch (1300 mm)	55.10 inch (1400 mm)	59.05 inch (1500 mm)	78.75 inch (2000 mm)



**Do not shorten** the electrode rod.

## Technical data

## Measurement quality

The information below applies to a compensated fluid conductivity range from 100-10000  $\mu\text{S/cm}$  based on 77°F (25°C).

- Reading error:                                +/- 1%    from the set measuring range at the operating point
- Resolution of reading on display:        0.1%
- Resolution for internal processing:    15 bits    with sign (16 bits)
- Resolution of 4-20 mA output:        15 bits    equivalent to 0.49  $\mu$ A/digit

**Supply voltage**

- 24 V DC +/-20% SELV / PELV / CLASS2

### Power consumption

- Max. 7 W

### Current input

- Max. 0.3 A

**Internal fuse**

- T2A (slow blow)

### Safety cutout at excessive ambient temperature

- Shutdown at excessive ambient temperature takes place at  $T_{amb.} = 167^{\circ}\text{F}$  ( $75^{\circ}\text{C}$ )

### Analog output

- 1 actual value output 4-20 mA, proportional to level, galvanically isolated
- Maximum output load 500  $\Omega$
- M12 connector, 5-pole, A-coded

## Indicators and controls

- 1 green 4-digit, 7-segment display for showing status information
- 1 red LED for indicating the error state
- 1 green LED for indicating the OK state
- 1 rotary knob IP65 with button for menu navigation and test function

Protection class	
------------------	--

- III Safety Extra Low Voltage SELV / PELV / CLASS2

## IP rating

- NEMA type 3R, 3RX and 5
- IP 65 to EN 60529

## Other information

- Independently mounted Type 1 action operating control
- Pollution degree 2, impulse voltage 330 V

## Technical data

### Permitted ambient conditions

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- Service temperature: 32-158°F (0-70°C)
- Storage temperature: -40-176°F (-40-80°C)
- Transport temperature: -40-176°F (-40-80°C)
- Air humidity: 10% - 95%, non-condensing

### Weight (dependent on length of electrode)

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




- NRGT 26-2 approx. 3.96 lb (1.8 kg) with 11.81 inch (300 mm) measuring range

### Permitted installation positions

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- Vertical
- Maximum inclination of 45°. In this case, the length of the electrode rod is limited to maximum 27.1 inch (688 mm)
- A protective tube [NPS 2 (DN 50)] is required for internal installation

# Name plate/identification of the NRG T 26-2

Safety note →	 <div>Betriebsanleitung beachten See installation instructions Voir instructions de montage</div>	
Equipment designation →	<b>NRGT 26-2</b>	
Equipment function →	Niveautransmitter Level Transmitter Transmetteur de niveau	
Nominal pressure rating, connection thread, material of screw-in body →	3/4-14NPT    1.4404/F316L    IP65	← IP rating
Permitted service pressure, permitted temperature →	<div>464psi (32bar) 460°F (238°C)</div> <div>T158°F (70°C)</div>	
Permitted ambient temperature →		
Measuring range →	H= _____ mm	
Power consumption →	7W    24V === ±20%	← Supply voltage
Actual value output →	OUT: 4-20mA / 500Ω	
Current approval →		← CE marking
		← Appointed authority
Manufacturer →	<div><b>GESTRA AG</b> Münchener Str. 77 28215 Bremen Made in Germany</div> <div></div> <div></div>	← Disposal information
Serial number →	<div>↑</div> Protection class	


 <b>LISTED</b> OPERATING CONTROL E513189	Input voltage: 24VDC
	Input power: 7W
	Output rating: 4-20mA
	Ambient temperature: 158°F (70°C)
	Environmental rating: NEMA Type 3R / 3RX / 5

Fig. 2



The date of production is stamped on the screw-in body of the level transmitter.

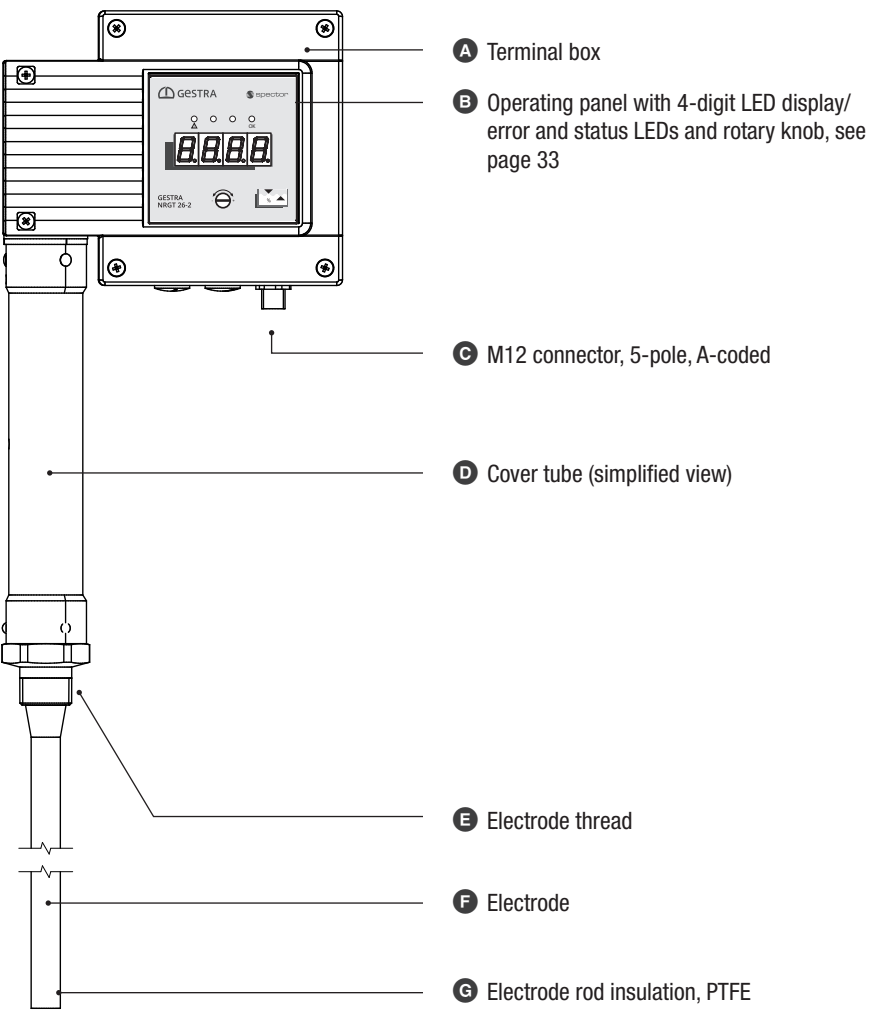
# Factory settings

The NRGT 26-2 level transmitter is delivered ex works with the following settings.

Menu display	Parameter values	Unit	
CAL.L	Variable	0%	Raw value (hex) approx. 50 mV
CAL.P	Variable	25%	Raw value (hex)
CAL.H	Variable	100%	Raw value (hex) approx. 2.0 V
FiLt	0005	Seconds	

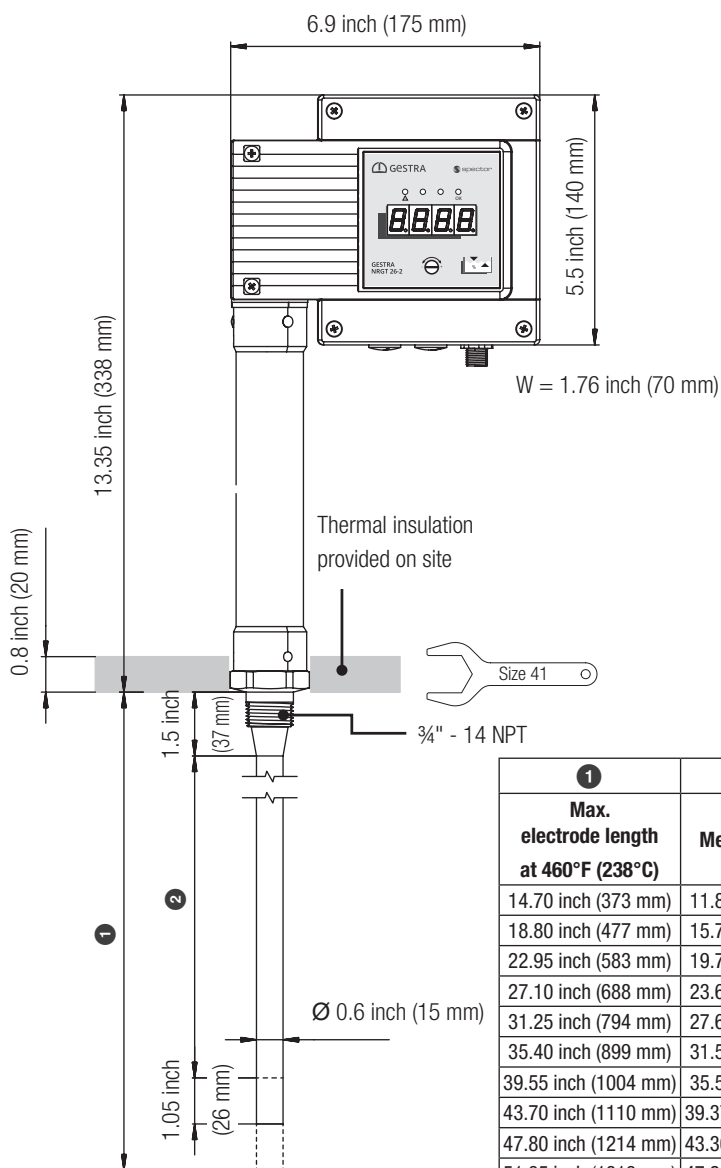
**Fig. 3**

# Overall view of the NRGT 26-2



**Fig. 4**

## Dimensions of the NRGT 26-2



**Fig. 5** All lengths and diameters in inches  
(mm)

①	②
Max. electrode length at 460°F (238°C)	Measuring range
14.70 inch (373 mm)	11.80 inch (300 mm)
18.80 inch (477 mm)	15.75 inch (400 mm)
22.95 inch (583 mm)	19.70 inch (500 mm)
27.10 inch (688 mm)	23.65 inch (600 mm)
31.25 inch (794 mm)	27.60 inch (700 mm)
35.40 inch (899 mm)	31.50 inch (800 mm)
39.55 inch (1004 mm)	35.50 inch (900 mm)
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47.80 inch (1214 mm)	43.30 inch (1100 mm)
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60.20 inch (1528 mm)	55.10 inch (1400 mm)
64.45 inch (1636 mm)	59.05 inch (1500 mm)
84.90 inch (2156 mm)	78.75 inch (2000 mm)

## Preparing for installation



**If the equipment is to be installed outdoors, outside the protection of a building, environmental influences may adversely affect function.**

- Pay attention to the permitted ambient conditions in the technical data, see page 16.
- Do not operate the equipment if the temperature is below freezing.
  - ◆ At temperatures below freezing, use a suitable heat source (e.g., control cabinet heater, etc.).
- Connect all parts of the plant to a central ground point to prevent equalizing currents.
- Use a cover to protect the equipment from direct sunlight, condensation and heavy rain.
- Use UV-resistant cable ducts for routing the connecting cable.
- Take further measures to protect the equipment from lightning, insects and animals, and salty air.

**You will need the following tools:**

### **NRGT 26-2**

- Size 41 open-ended wrench, see page 20.

## Installation

### DANGER



#### **Danger to life from scalding caused by escaping hot steam.**

Hot steam or water can escape suddenly if the level electrode is unscrewed under pressure.

- Reduce the boiler pressure to 0 psi (0 bar) and check the pressure before unscrewing the level electrode.
- Only remove the level electrode at 0 psi (0 bar) boiler pressure.

### WARNING



#### **The hot level electrode can cause severe burns.**



The level electrode becomes very hot during operation.

- Always let the level electrode cool down before performing installation and maintenance work.
- Only remove level electrodes that have cooled down.

### ATTENTION



#### **Incorrect installation can lead to malfunctions in the plant or the level electrode.**

- Do not shorten the electrode rod.
- Take care not to bend the level electrode during installation.
- Do not subject the electrode rod to hard impacts.
- Do **not** install the body  or upper part of the cover tube  of the electrode in the boiler's thermal insulation!
- Do not install in the screwed socket.
- Pay attention to the minimum clearances when installing the level electrode, see installation example in Fig. 7
- To prevent current leaks, maintain a minimum distance of 0.56 inch (14 mm) between the electrode and ground (flange or tank wall).
- For internal installation, check the boiler standpipe and flange during the preliminary boiler inspection.
- If the NRG 26-2 is to be installed obliquely, the maximum inclination of the level electrode is 45°, and the length of the electrode rod is then limited to maximum 27.1 inch (688 mm).

## Installation

### Installing the NRG T 26-2

- Make sure that the internal and external threads are in perfect condition.
- Do not apply more than three windings of PTFE insulating tape around the electrode thread.

#### **WARNING**

Do not use too much tape. Do not use fitting lubricants or pastes.

- Fit the electrode and tighten first with your hand and then with a size 41 open-ended wrench. Do not use a pipe wrench.
- Recommendations for tightening torques cannot be given due to the conical/parallel type of connection.
- Avoid tightening excessively; part of the electrode thread should always remain visible.



The electrode body does not “sit” on the flange, i.e. the underside of the hexagon is not in contact with the flange (also see **Fig. 6**). If it is in contact, the internal thread is outside tolerance. In this case, the flange must be replaced.

After the electrode has been installed with PTFE sealing tape, you must ensure there is adequate electrical contact between the electrode and the boiler wall.

To do this, after installation measure the resistance between the electrode body and the boiler with a multimeter.

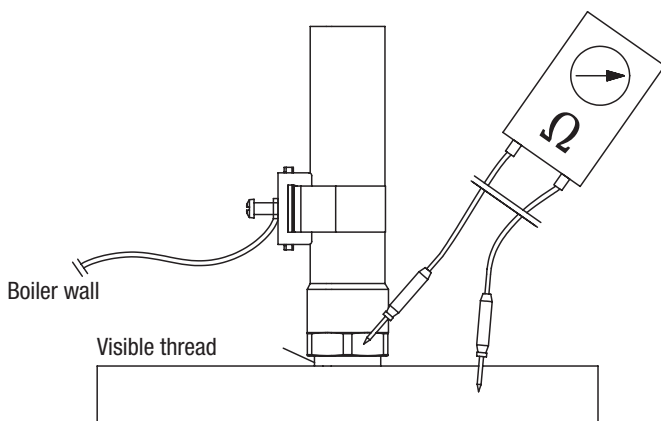
The reading must be  $< 10$  ohms.

If the reading is  $> 10$  ohms, connect the electrode to the boiler wall using a band grounding clamp. (The band grounding clamp is available as an optional accessory)

Next, measure the resistance again.

The value must be  $< 10$  ohms and entered as followed:

Measured resistance: \_\_\_\_\_ ohms



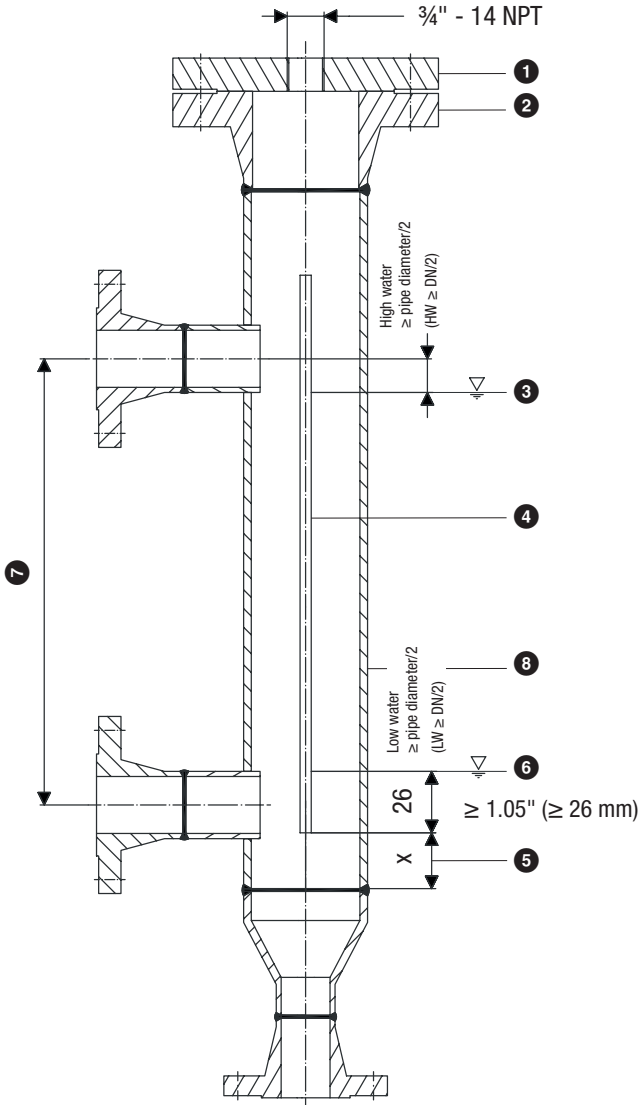
**Fig. 6**

## Example of installation with dimensional specification for NRG 26-2

### Level pot for external use.

Illustration not to scale.

Key, see page 25



**Fig. 7**

All lengths and diameters in inches (mm)

## Example of installation with dimensional specification for NRG T 26-2

### Key Fig. 12 to Fig. 8

- ❶ Blind flange with  $\frac{3}{4}$ " tapped NPT threads
- ❷ Mating flange, RFWN
- ❸ Highest possible HW mark
- ❹ Electrode rod
- ❺ Minimum dimension (x) = 0.4 inch (10 mm) below the maximum electrode length (for electrode length, see page 20)
- ❻ Lowest possible LW mark (upper bound of measuring range)
- ❼ Center distance of standpipe
- ❽ Level pot

## Aligning the terminal box

If necessary, you can orientate the display in the desired direction by rotating the terminal box.



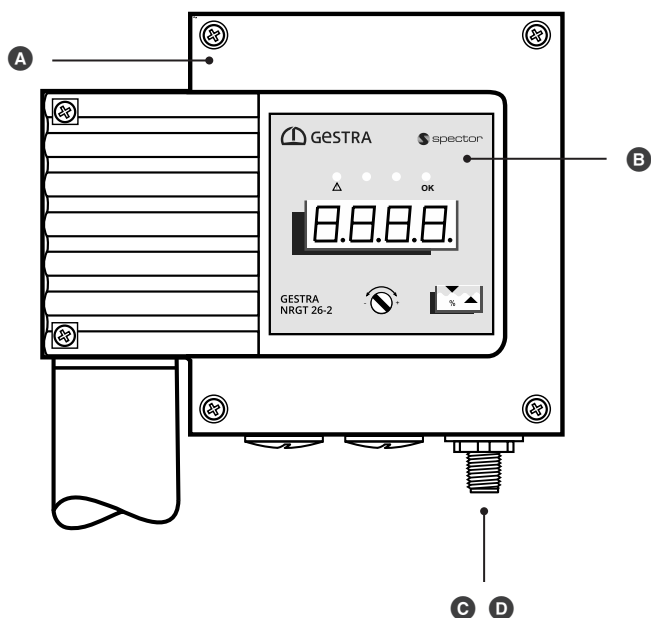
### ATTENTION



**Rotating the terminal box  $\geq 180^\circ$  will damage the internal wiring of the NRG T 26-2 level transmitter.**

- Never rotate the terminal box more than 180 degrees in either direction.
-

## Functional elements of the NRGT 26-2



**Fig. 8**

- A** Terminal box
- B** Operating panel with 4-digit LED display/malfunction and status LEDs and rotary knob, see page 33
- C** M12 connector, 5-pole, A-coded
- D** Use a shielded, multi-core TC-ER control cable with minimum wire size AWG 18, e.g., OELFLEX CONTROL TM CY 5G1.

**Fig. 7**

## Electrical connection

### Notes on electrical connection

- Use a shielded, multi-core TC-ER control cable with minimum wire size AWG 18, e.g., OELFLEX CONTROL TM CY 5G1.

### Connecting the 24 V DC power supply

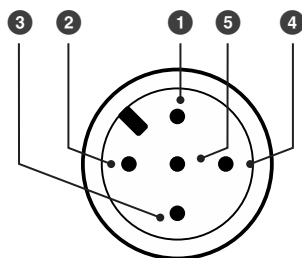
- The NRGT 26-2 level transmitter is supplied with 24 V DC.
- A safety power supply unit that delivers a Safety Extra Low Voltage (SELV / PELV / CLASS2) and is isolated from connected loads must be used to supply the equipment with 24 V DC.

### Connecting the actual value output (4-20 mA)

- Please note the maximum output load of 500  $\Omega$ .
- Maximum cable length = 328 feet (100 m)

### Pin assignment of the M12 connector for non pre-wired control cables

If non pre-wired control cables are used, you must wire the cable to match the pin assignment of the M12 connector.



1	S	Shield
2	+24 V	Power supply
3	-0 V	Power supply
4	+20 mA	Data line
5	-20 mA	Data line

Fig. 9

Connector

## Bringing into service

- Before bringing into service, check that the level transmitter is correctly connected.
- Then switch on the supply voltage.

### Change the default settings if necessary

#### You will need the following tools

- Flathead screwdriver, size 3 / 32 inch (2.4 mm)

#### Notes for bringing into service for the first time



When bringing into service, the measurement range 0-100 % is scaled at the factory to a maximum for the electrode length in question.


After installation, first set the measurement range to meaningful values to suit your plant.

Transmitter must be connected to a 4 - 20 mA load on the output (if not, error message E.013 is shown).

Error message E.001 is indicated if electrode is exposed.

## Bringing into service

### Selecting and setting a parameter:

1.  Using a screwdriver, turn the rotary knob counterclockwise or clockwise until the desired parameter appears on the display. The set value is displayed after approx. 3 seconds.

The display alternates between the set parameter and its actual value, e.g., Filt. → “value” → Filt.


**The following parameters are shown one after the other when you turn the knob clockwise:**


“Actual value” → °C.in → CAL.L → CAL.P → CAL.H → Filt → diSP → “actual value”

**Key to parameters, see page 30.**



If you do not enter anything for 30 seconds, the display automatically returns to the actual value.

2.  Once you have selected a parameter, press and hold the rotary knob until the current value of this parameter flashes on the display.


3.  Set the desired value.  
**- / +** Reducing/increasing the value

**Each parameter has an individual, permitted value range.**

By pressing the knob briefly, you can jump to the next digit. This is a more convenient way of making large changes to values.



If you do not set a parameter within 10 seconds, the process is aborted (“quit”) and the old parameter value is retained.

4.  Save your settings by pressing the rotary knob for approx. 1 second.  
The message “donE” is shown and the parameter appears on the display once more.

## Bringing into service

### Key to parameters:

- 099.9 = actual value display, the current measured level based on the 0-100% calibration
- °C.in = display ambient temperature of terminal box
- CAL.L = lower limit calibration to 0%
- CAL.P = calibrate measuring range to an intermediate value above 25% (alternative to CAL.H)
- CAL.H = upper limit calibration to 100%
- Filt = filter constant
- diSP = initiate a display test

### Notes on calibration



#### **Always perform calibration with the boiler fluid at the operating point**

If you set the measuring range while the fluid is cold, the settings will change when heat takes effect and will then need to be corrected at the operating point.

### Calibration to the lower limit of the active measuring range “CAL.L” (0% calibration value)



**Bring the level to 0% and perform calibration.**

### **Pay attention to the setting instructions on page 29 and proceed as follows:**

1. Reduce the level of water in the boiler to the 0% limit of the desired measuring range.
2. Select the parameter “**CAL.L**”. The old value appears in hexadecimals after approx. 3 seconds.
3. Press and hold the rotary knob until the new value is displayed.
4. Save your settings by pressing the rotary knob for approx. 1 second.
5. Continue with calibration “**CAL.P**” or “**CAL.H**”.

## Bringing into service

### Independent rapid calibration at a water level of > 25% of the active measuring range “CAL.P”



This parameter enables partial filling of the boiler, as an alternative to complete filling. The value set for partial filling is extrapolated to 100% of the boiler level.

#### Pay attention to the setting instructions on page 29 and proceed as follows:

1. Increase the level of water in the boiler to > 25% of the desired measuring range.
2. Select the parameter “**CAL.P**”. The old value appears in hexadecimals in approx. 3 seconds.
3. Press and hold the rotary knob until the value (e.g., 0025) appears. The last digit flashes.
4. Set the desired reading > 25% to match the set level.
5. Save your settings by pressing the rotary knob for approx. 1 second.

### Calibration to the upper limit of the active measuring range “CAL.H” (100% calibration value)



Calibration with “CAL.H” ensures the best possible accuracy for setting the measuring range.

#### Pay attention to the setting instructions on page 29 and proceed as follows:

1. Raise the water level in the boiler to the 100% limit of the desired measurement range.
2. Select the parameter “**CAL.H**”. The old value appears in hexadecimals in approx. 3 seconds.
3. Press and hold the rotary knob until the new value is displayed.
4. Save your settings by pressing the rotary knob for approx. 1 second.

### Setting the filter constant “Filt”



Here, you can set a time constant to smooth the output signal for the level controller and the display.

#### Pay attention to the setting instructions on page 29 and proceed as follows:

1. Select the parameter “**Filt**”. First of all, the current filter constant is displayed.
2. Press and hold the rotary knob until the current time constant flashes on the display.
3. Set the desired time constant (1 to 30 seconds).
4. Save your settings by pressing the rotary knob for approx. 1 second.

## Bringing into service

### Manually initiating a display test

**Pay attention to the setting instructions on page 29 and proceed as follows:**

1. Select the parameter “**diSP**”.
2. Press and hold the rotary knob until the display test starts and “....” is shown.
3. The following numbers and decimal points run across the display from right to left:  
“...., **1, 2, 3, 4, 5, 6, 7, 8, 9, ....**”
4. Check that all numbers and decimal points are displayed correctly.  
The display test runs automatically until it has finished, and cannot be interrupted.
5. The display test ends with “**donE**”.

### Replacing faulty equipment



**Faulty equipment is a danger to plant safety.**

- If numbers or decimal points are displayed incorrectly or not at all, you must replace the level transmitter with an identical one from GESTRA AG.

### Checking the level display by raising or reducing the level



**Incorrectly installed or bent level electrodes result in a loss of function that can jeopardize plant safety.**

**Proceed as follows when bringing into service and when replacing level electrodes:**

- Check the level display by raising and lowering the fluid to different levels within the measuring range of the level electrode. Always perform this check with the plant at its operating point.
- Never start up any plant that has not passed the above tests.
- The NRG 26-2 level transmitter may only be repaired by the manufacturer, GESTRA AG.
- Only replace faulty equipment with identical equipment from GESTRA AG.

### Checking function by initiating a test

Check function by initiating the test feature with the rotary knob, see page 35, Test table.

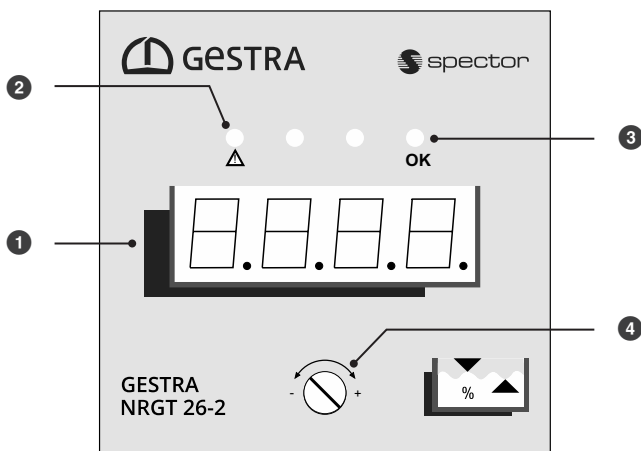


Fig. 10

### Operating panel:

- ❶ Display of actual value/error code/limit value, green, 4 digits
- ❷ LED 1, error, red
- ❸ LED 2, function OK, green
- ❹ Rotary knob for operation and settings

### Priority of the various indications



Errors are displayed based on their priority. Indications with higher priority are shown continuously before those with low priority. If several indications need attention, the display does not alternate between them.

### Priority of error code display

Higher-priority error codes overwrite lower-priority ones on the display! See page 37 ff. for indications based on the error code table.

## Starting, operation and testing

### Cross-reference of display and LEDs to the operating state of the level transmitter:

Starting		
Switch on the supply voltage	All LEDs light up - Test <b>Display:</b> S-xx = software version t-08 = equipment type NRGT 26-2	The system is started and tested. The LEDs and display are tested.

Normal operation		
The electrode rod is immersed within the set measuring range	<b>Display:</b> e.g., 047.3 <b>LED 2:</b> Operating LED lights up green	The current level is displayed as a % of the calibrated measuring range.

See the following pages for more information and tables.

Behavior in the event of a malfunction (error code display)		
On the occurrence of an error	<b>Display:</b> e.g., E005	An error code is displayed continuously, error codes see page 37
	<b>LED 1:</b> Error LED lights up red	There is an active malfunction
	<b>LED 2:</b> Operating LED is OFF	An error is present
■ In the event of a malfunction or error state, an analog value of 0 mA is output.		



#### Electrode malfunctions are acknowledged automatically

When a malfunction is corrected, the indication also disappears from the display and the level transmitter returns to normal operation.

# Starting, operation and testing

Test		
Checking the safety function via simulation in operating mode		
<b>In operating mode:</b> Press the rotary knob on the NRG T 26-2 and hold until the end of the test:  With each test, the equipment function toggles between levels 0% and 100%, and the actual value output delivers the corresponding 4 mA or 20 mA signal.	<b>Display:</b> 0000 (%) or 0100 (%)	The test simulates water falling below the LW mark or rising above the HW mark.  The simulated reading is displayed for each test.
	<b>LED 2:</b> Operating LED lights up green	Test function is active
	<b>LED 1:</b> Error LED is OFF	No error
	<ul style="list-style-type: none"><li>■ The current output can be simulated and tested</li><li>■ The test ends when the rotary knob is released</li></ul>	



**Faulty equipment is a danger to plant safety.**

- If the level transmitter does not behave as described above, the equipment may be faulty.
- Perform failure analysis.
- The NRG T 26-2 level transmitter may only be repaired by the manufacturer, GESTRA AG.
- Only replace faulty equipment with identical equipment from GESTRA AG.

## System malfunctions

### Causes

System malfunctions occur as the result of incorrect installation, overheated equipment, interference in the supply network, or faulty electronic components.

### Check the installation and configuration before systematic troubleshooting!

#### Installation:

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

#### Wiring:

- Does the wiring conform to the wiring diagrams?
- Does the 4-20 mA current loop have the correct polarity and is it closed?
- Is the 4-20 mA current loop below the overall output load of 500  $\Omega$ ?

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### ATTENTION

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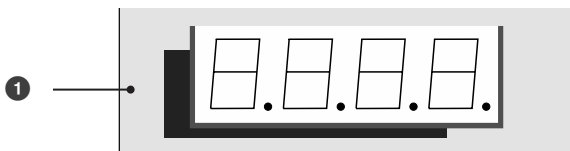


**An open circuit in the 4-20 mA current loop can cause a plant shutdown and a malfunction is indicated.**

- Bring the plant into a safe operating state before commencing work on the installation.
  - Switch off the voltage to the plant and secure so that it cannot be switched back on.
  - Check that the plant is not carrying live voltage before commencing work.
-

# System malfunctions

## Indication of system malfunctions using error codes



**Fig. 11**      **1** Display of actual value/error code/limit value, green, 4 digits

Error code display			
Error code	Internal designation	Possible errors	Remedy
<b>E.001</b>	MinCh1Err	Channel 1 reading below minimum, possible internal open circuit	Is the level electrode no longer immersed? Check installation location. If necessary, replace level transmitter
<b>E.002</b>	MinCh2Err	Channel 2 reading below minimum, possible internal open circuit	Is the level electrode no longer immersed? Check installation location. If necessary, replace level transmitter
<b>E.003</b>	MaxCh2Err	Channel 2 reading above maximum, possible internal open circuit	Replace level transmitter
<b>E.004</b>	Ch1Ch2DiffErr	Difference between channels 1 and 2 exceeds 10% error tolerance, internal short circuit	Replace level transmitter
<b>E.005</b>	MaxCh1Err	Channel 1 reading above maximum, possible internal open circuit	Replace level transmitter
<b>E.006</b>	MinTSTCh1Err	Channel 1 reading internal capacitance (47pF)	Replace level transmitter
<b>E.007</b>	MaxTSTCh1Err	Channel 1 reading reference capacitance (1nF    47pF)	Replace level transmitter
<b>E.008</b>	MinTSTCh2Err	Channel 2 reading internal capacitance (47pF)	Replace level transmitter
<b>E.009</b>	MaxTSTCh2Err	Channel 2 reading reference capacitance (1nF    47pF)	Replace level transmitter
<b>E.010</b>	PWMTSTCh1Err	Channel 1 reading with disabled measurement signal	Replace level transmitter
<b>E.011</b>	PWMTSTCh2Err	Channel 2 reading with disabled measurement signal	Replace level transmitter
<b>E.012</b>	FreqErr	Measurement signal frequency	Replace level transmitter

## System malfunctions

Error code display			
Error code	Internal designation	Possible errors	Remedy
E.013	VMessErr	4-20 mA analog output error	Check wiring and output load
E.014	ADSReadErr	16-bit AD converter is not responding	Replace level transmitter
E.015	UnCalibErr	Factory calibration invalid (not measuring range calibration)	Replace level transmitter
E.016	PlausErr	Measuring range plausibility error	Check measuring range calibration, repeat if necessary
E.017	ENDRVErr	Second shutdown path of 4-20 mA analog output faulty	Replace level transmitter
E.019	V6Err	System voltage 6 V outside tolerance	Replace level transmitter
E.020	V5Err	System voltage 5 V outside tolerance	Replace level transmitter
E.021	V3Err	System voltage 3 V outside tolerance	Replace level transmitter
E.022	V1Err	System voltage 1 V outside tolerance	Replace level transmitter
E.023	V12Err	System voltage 12 V outside tolerance	Replace level transmitter
E.025	ESMG1Err	µC error	Replace level transmitter
E.026	BISTErr	µC periphery self-test error	Replace level transmitter
E.027	OvertempErr	PCB temperature, ambient temperature > 75°C	Check installation location. Reduce ambient temperature of terminal box (cool if necessary)

All error codes E 018 to E 024 not listed here are available as reserves



Virtually all of the aforementioned error codes can be caused by electromagnetic interference. This is less likely to be the case in the event of permanent errors, but should be considered for sporadic error indications.

## System malfunctions

### Common application and usage errors

#### The 0% and 100% measuring range limits are clearly outside the sight glass level.

Possible causes if no error indications are present	Remedy
The measuring range is incorrectly set.	<ul style="list-style-type: none"> <li>■ Check the measuring range calibration.</li> <li>■ Repeat calibration if necessary.</li> </ul>

#### The characteristic of the measurement signal in the measuring range is reproducible, but not linear.

Possible causes if no error indications are present	Remedy
<p>For internal installation: The level electrode was installed without a protective tube.</p> <p>The protective tube is required as a counter electrode.</p>	<ul style="list-style-type: none"> <li>■ Install a protective tube.</li> </ul>

#### The characteristic of the displayed reading appears implausible compared with the level trend in the sight glass.

Possible causes if no error indications are present	Remedy
For internal installation: The pressure relief hole is clogged or flooded, or may even be missing completely.	<ul style="list-style-type: none"> <li>■ Check the protective tube.</li> <li>■ If necessary, add a pressure relief hole.</li> </ul>
The stop valves of an externally mounted level pot (option) are closed.	<ul style="list-style-type: none"> <li>■ Inspect the stop valves, open if necessary.</li> </ul>

#### A correctly set electrode that has been in operation for a long period delivers increasingly imprecise readings.

Possible causes if no error indications are present	Remedy
Increased soiling due to build-up of deposits on the electrode rod.	<ul style="list-style-type: none"> <li>■ Remove the level electrode and clean the electrode rod with a damp cloth.</li> </ul>

#### A connected electronic control unit (diagnostic tester) indicates alarms, e.g., MIN or MAX, even though the level visible in the sight glass remains within the permitted measuring range limits.

Possible causes if no error indications are present	Remedy
<ul style="list-style-type: none"> <li>■ The measuring range is incorrectly set.</li> <li>■ The electrode or level pot/protective tube is soiled.</li> </ul>	<ul style="list-style-type: none"> <li>■ Calibrate the measuring range at the operating point.</li> <li>■ Inspect the electrode and level pot/protective tube for soiling and clean if necessary.</li> </ul>

## System malfunctions

### The display or controller reacts to changes of level too slowly or too quickly.

Possible causes if no error indications are present	Remedy
Damping coefficient "FiLt" is not at an optimal setting.	Correct damping coefficient "FiLt".

### The equipment fails to work. No display and LEDs do not light up.

Possible causes if no error indications are present	Remedy
Supply voltage failure.	<ul style="list-style-type: none"> <li>■ Switch on the supply voltage.</li> <li>■ Check all electrical connections.</li> </ul>

### The equipment fails to work. The display is on and the LEDs light up.

Possible causes if no error indications are present	Remedy
The ground connection to the tank is interrupted.	<ul style="list-style-type: none"> <li>■ Measure the resistance and attach a band grounding clamp (see page 23) if necessary and ensure it is correctly seated.</li> </ul>

### Flashing values from t-71 to t-75 appear on the display

Possible causes	Remedy
<p>The ambient temperature of the electrode terminal box is high, between 159.8-167°F (71-75°C)</p> <p>If the temperature rises above 167°F (75°C), the error code E.027 (Overtemp Err) appears and the 0 mA current output causes a fault shutdown.</p>	<ul style="list-style-type: none"> <li>■ Reduce the ambient temperature around the terminal box, e.g., by cooling.</li> </ul>

## System malfunctions

### Checking installation and function

When you have remedied system malfunctions, perform a function test as follows.

- Check the level display by raising and lowering the fluid to different levels within the measuring range of the level electrode. Always perform this check with the plant at its operating point.
- Also check that the level remains within the MIN and MAX limits when limit indicators are connected.
- Check the switchpoints when bringing into service and every time the NRG 26-2 level transmitter is replaced.



System malfunctions in the NRG 26-2 level transmitter result in an output of 0 mA at the analog output.

**If you require assistance, please tell us the error code that is indicated.**



In the event of malfunctions or errors that cannot be remedied with the aid of this Installation & Operating Manual, please contact our service center or authorized agent.

## Taking out of service

### DANGER



#### **Danger to life from scalding caused by escaping hot steam.**

Hot steam or water can escape suddenly if the level electrode is unscrewed under pressure.

- Reduce the boiler pressure to 0 psi (0 bar) and check the boiler pressure before unscrewing the level electrode.
- Only remove the level electrode at **0 psi (0 bar) boiler pressure**.

### WARNING



#### **The hot level electrode can cause severe burns.**

The level electrode becomes very hot during operation.

- Always let the level electrode cool down before performing installation and maintenance work.
- Only remove level electrodes that have cooled down.

#### **Proceed as follows:**

1. Reduce the boiler pressure to 0 psi (0 bar).
2. Allow the level electrode to cool to room temperature.
3. Switch off the supply voltage.
4. Pull out the connector.
5. Then remove the level electrode.

## Cleaning the electrode of the level transmitter

### Cleaning interval

We recommend cleaning the electrode at least once a year, e.g., during maintenance work, or possibly more often depending on operating conditions.



Before cleaning the electrode rod, take the level transmitter out of service and remove it, see page 42.

### Disposal

Dispose of the level transmitter in accordance with statutory waste disposal regulations.

### Returning decontaminated equipment



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

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

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



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

**Please proceed as follows:**

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

### UL Listed components

The NRG 26-2 level electrode is cULus listed under XACN.E513189



You can find our authorized agents around the world at: **[www.gestra.com](http://www.gestra.com)**

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