Contents

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About this document

Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, safety and the exchange of parts. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

Target group

This instruction manual is directed to trained personnel. The contents of this manual must be made available to the qualified personnel and implemented.

Symbols used

Information, note, tip: This symbol indicates helpful additional information and tips for successful work.

Note: This symbol indicates notes to prevent failures, malfunctions, damage to devices or plants.

Caution: Non-observance of the information marked with this symbol may result in personal injury.

Warning: Non-observance of the information marked with this symbol may result in serious or fatal personal injury.

Danger: Non-observance of the information marked with this symbol results in serious or fatal personal injury.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

1 **Sequence of actions**
Numbers set in front indicate successive steps in a procedure.

Disposal
This symbol indicates special instructions for disposal.

Authorised personnel

All operations described in this documentation must be carried out only by trained and authorized personnel.

During work on and with the device, the required personal protective equipment must always be worn.

Appropriate use

The NivoTec 9000 is suitable for measured value indication in 4 ... 20 mA signal current circuits.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

Warning about incorrect use

Inappropriate or incorrect use of this product can give rise to application-specific hazards, e.g. vessel overfill through incorrect mounting or adjustment. Damage to property and persons or environmental contamination can result. Also, the protective characteristics of the instrument can be impaired.

General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The operating company is responsible for the trouble-free operation of the instrument. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operating company has to implement suitable measures to make sure the instrument is functioning properly.

During the entire duration of use, the operating company is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by us. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by us must be used.

To avoid any danger, the safety approval markings and safety tips on the device must also be observed.

Installation and operation in the USA and Canada

This information is only valid for USA and Canada. Hence the following text is only available in the English language.

Installations in the US shall comply with the relevant requirements of the National Electrical Code (NEC - NFPA 70) (USA).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code (CEC Part I) (Canada).

Product description

Configuration

Scope of delivery

The scope of delivery encompasses:

- NivoTec 9000
- Integrated display and adjustment module
- Mounting accessories (optional)
- Documentation
  - This operating instructions manual
  - If necessary, further certificates

Information:
Optional instrument features are also described in this operating instructions. The respective scope of delivery results from the order specification.

Type label

The type label contains the most important data for identification and use of the instrument:

- Instrument type
- Information about approvals
- Configuration information
- Technical data
- Serial number of the instrument
- QR code for device identification
- Manufacturer information

Documents and software

Further information can be found on our homepage.

There you will find the documentation and further information about the device.

Principle of operation

Application area

The NivoTec 9000 is suitable as measured value indication with 4 ... 20 mA current loops. The instrument can be connected at any point to the 4 ... 20 mA signal cable. Separate, external energy is not required.

The measured value indication is carried out in the NivoTec 9000 integrated in the display and adjustment module.

Sensors

The NivoTec 9000 is suitable for connection to any 4 ... 20 mA sensor.

Furthermore, the NivoTec 9000 can be used as an external display for any four-wire sensor.

Product description

Connection

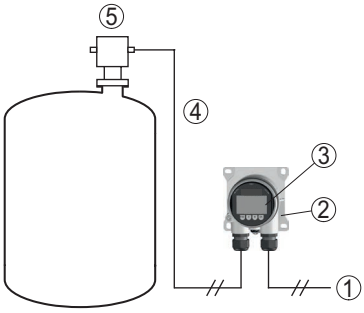


Fig. 1: Connection of NivoTec 9000 to the sensor

1 Voltage supply/Signal output sensor
2 NivoTec 9000
3 Display and adjustment module
4 4 ... 20 mA signal cable
5 Sensor

Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Product description

Storage and transport temperature

- Storage and transport temperature see chapter "*Technical data - Ambient conditions*"
- Relative moisture 20 ... 85 %

Technical data

Technical data

Materials and weights

Materials	
– Housing	Aluminium die-casting AlSi10Mg, powder-coated (Basis: Polyester)
– Seal between housing and housing lid	Silicone
– Inspection window in housing cover	Polycarbonate, coated
– Cable gland/Seal insert	PA/NBR
– Ground terminal	316L
Materials for carrier rail mounting	
– Adapter plate, housing side	316
– Adapter plate, carrier rail side	Zinc die casting
– Mounting screws	316
Materials for tube mounting	
– Brackets	StSt
– Mounting screws	StSt
Weight without mounting elements	
– Aluminium housing	approx. 0.7 kg (1.543 lbs)
Weight mounting elements	
– Brackets for tube mounting	approx. 0.4 kg (0.882 lbs)
– Adapter plate for carrier rail mounting	approx. 0.5 kg (1.102 lbs)

Torques

Max. torque for NPT cable glands and Conduit tubes	
– Aluminium housing	50 Nm (36.88 lbf ft)

Signal and supply circuit

Operating voltage max.	35 V DC
Voltage drop with current value 4 ... 20 mA	
– Without lighting	max. 2.2 V
– With lighting	max. 3.2 V

Technical data

Current range	3.5 ... 22.5 mA[1)]
Overcurrent resistance	100 mA
Fuse	Power supply side
Reverse voltage protection	Available
Functional safety	SIL non-reactive

Current measurement (reference temperature 20 °C)	
Measuring range loop current	3.5 ... 22.5 mA
Deviation	±0.1 % of 20 mA
Temperature coefficient	±0.1 % of the span/10 K
Interval	250 ms

Display and adjustment module	
Display element	Display with backlight
Measured value indication	
– Number of digits	5
Adjustment elements	
– 4 keys	***[OK]***, ***[->]***, ***[+]***, ***[ESC]***
Protection rating	
– unassembled	IP20
– Mounted in the housing without lid	IP40
Materials	
– Housing	ABS
– Inspection window	Polyester foil
Functional safety	SIL non-reactive

Ambient conditions	
Storage and transport temperature	-40 ... +80 °C (-40 ... +176 °F)
Ambient temperature	
– without display and adjustment module	-40 ... +80 °C (-40 ... +176 °F)

[1)] If the loop current is not sufficient for operation, the display remains dark. When the measured values are outside the measuring range, a message is displayed instead of the measured value.

Technical data

– With display and adjustment module	-20 ... +70 °C (-4 ... +158 °F)

Process conditions

Vibration resistance	4 g at 5 ... 200 Hz according to EN 60068-2-6 (vibration with resonance)
Vibration resistance with carrier rail mounting	1 g at 5 ... 200 Hz according to EN 60068-2-6 (vibration with resonance)
Shock resistance	100 g, 6 ms according to EN 60068-2-27 (mechanical shock)

Electromechanical data

Options of the cable entry	
– Cable entry	M20 x 1.5, ½ NPT
– Cable gland	M20 x 1.5, ½ NPT
– Blind plug	M20 x 1.5; ½ NPT
– Closing cap	½ NPT
Connection terminals	
– Type	Spring-loaded terminal
– Stripping length	8 mm
Wire cross-section of the connection cable (according to IEC 60228)	
– Massive wire, stranded wire	0.2 ... 2.5 mm² (AWG 24 ... 14)
– Stranded wire with end sleeve	0.2 ... 1.5 mm² (AWG 24 ... 16)

Electrical protective measures

Protection rating	
– Housing (Aluminium)	IP66/IP68 (0.2 bar) acc. to IEC 60529, type 6P acc. to NEMA
Connection of the feeding power supply unit	Networks of overvoltage category III
Altitude above sea level	
– by default	up to 2000 m (6562 ft)
– with connected overvoltage protection	up to 5000 m (16404 ft)
Pollution degree[1)]	4
Protection class	II

[1)] When used with fulfilled housing protection

Technical data

Dimensions

NivoTec 9000, aluminium housing

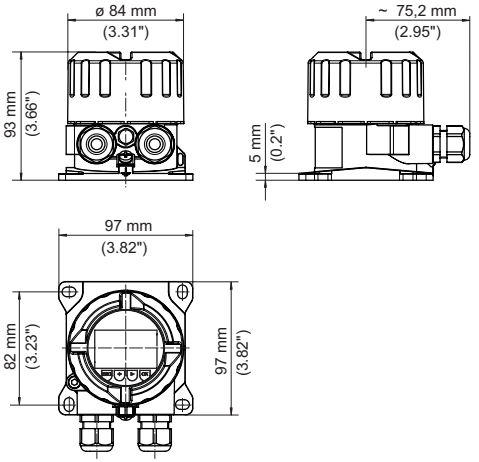


Fig. 2: NivoTec 9000 with Aluminium housing

Mounting elements

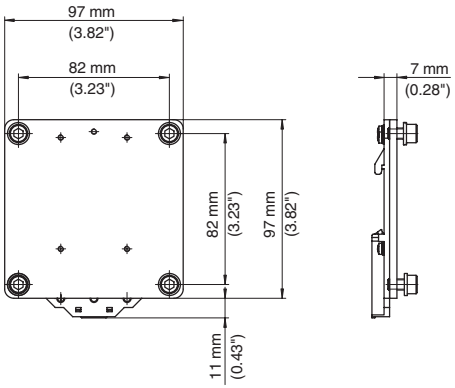


Fig. 3: Adapter plate for carrier rail mounting of NivoTec 9000

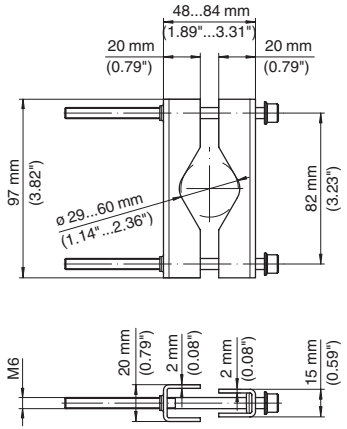


Fig. 4: Brackets for tube mounting of NivoTec 9000

General instructions

Installation position

NivoTec 9000 functions in any installation position.

Protection against moisture

Protect your instrument against moisture ingress through the following measures:

- Use a suitable connection cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland or plug connector
- Lead the connection cable downward in front of the cable entry or plug connector

This applies mainly to outdoor installations, in areas where high humidity is expected (e.g. through cleaning processes) and on cooled or heated vessels.

Note:
Make sure that during installation or maintenance no moisture or dirt can get inside the instrument.

To maintain the housing protection, make sure that the housing lid is closed during operation and locked, if necessary.

Mounting instructions

Wall mounting

The NivoTec 9000 is suitable for wall mounting.

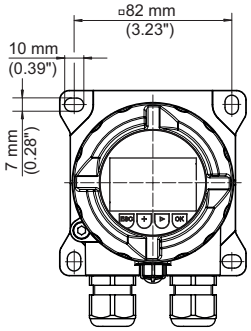


Fig. 5: Drilling dimensions for NivoTec 9000 for wall mounting

Carrier rail mounting

The version for carrier rail mounting according to EN 50022 is supplied with unassembled mounting accessories. The kit consists of an adapter plate and four mounting screws M6 x 12.

The adapter plate is screwed to the base of NivoTec 9000 by the user.

Mounting

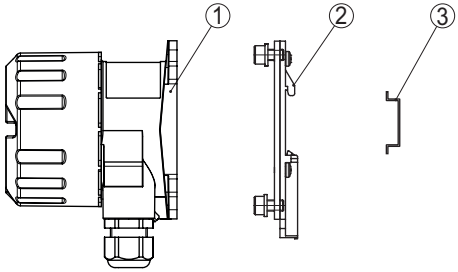


Fig. 6: NivoTec 9000 for carrier rail mounting

1 Base
2 Adapter plate with screws M6 x 12
3 Carrier rail

Tube mounting

The NivoTec 9000 for tube mounting is supplied with unassembled mounting accessories. The kit consists of two pairs of mounting brackets and four mounting screws M6 x 100.

The mounting brackets are screwed to the base of NivoTec 9000 by the user.

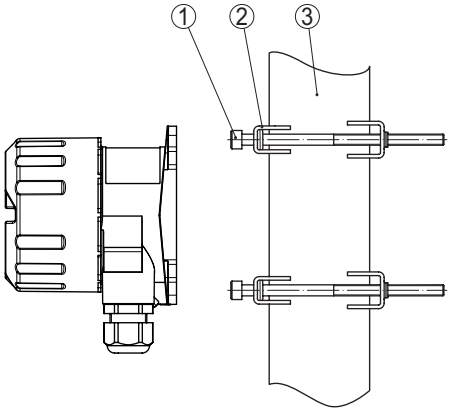


Fig. 7: NivoTec 9000 for tube mounting

1 4 screws M6 x 100
2 Mounting brackets
3 Tube (diameter 1" to 2")

Connecting to power supply

Preparing the connection

Safety instructions

Always keep in mind the following safety instructions:

- Carry out electrical connection by trained, qualified personnel authorised by the plant operator
- If overvoltage surges are expected, overvoltage arresters should be installed

Warning:
Only connect or disconnect in de-energized state.

Voltage supply

Power supply and current signal are carried on the same two-wire cable. The voltage supply range can differ depending on the sensor version.

The data for power supply are specified in chapter "*Technical data*".

Note:
Power the instrument via an energy-limited circuit (power max. 100 W) acc. to IEC 61010-1, e.g.

- Class 2 power supply unit (acc. to UL1310)
- SELV power supply unit (safety extra-low voltage) with suitable internal or external limitation of the output current

Keep in mind the following additional factors that influence the operating voltage:

- Output voltage of the power supply unit can be lower under nominal load (with a sensor current of 20.5 mA resp. 22 mA in case of fault signal)
- Voltage loss on the NivoTec 9000 (see supply circuit in chapter "*Technical data*")

You can find information on the load resistance in chapter "*Technical data*", (voltage supply of the respective sensor)

Connection cable

The instrument is connected with standard two-wire cable without shielding. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, shielded cable should be used.

Use cable with round cross-section. To ensure the seal effect of the cable gland (IP protection rating), find out which cable outer diameter the cable gland is suitable for. Use a cable gland fitting the cable diameter.

You can find an overview of the cable glands in chapter "*Technical data*".

Connecting to power supply

Cable glands

Metric threads
In the case of instrument housings with metric thread, the cable glands are screwed in at the factory. They are sealed with plastic plugs as transport protection.

You have to remove these plugs before electrical connection.

NPT thread
In the case of instrument housings with self-sealing NPT threads, it is not possible to have the cable entries screwed in at the factory. The free openings for the cable glands are therefore covered with red dust protection caps as transport protection.

Prior to setup you have to replace these protective caps with approved cable glands or close the openings with suitable blind plugs.

Max. torque for all housings, see chapter "*Technical data*".

Cable screening and grounding

If shielded cable is necessary, we recommend connecting the cable shield on both ends to ground potential. In the NivoTec 9000, the shield should be connected directly to the internal ground terminal.

In electroplating plants as well as plants for cathodic corrosion protection it must be taken into account that significant potential differences exist. This can lead to unacceptably high currents in the cable screen if it is grounded at both ends.

Connection technology and steps

Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

Connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

Information:
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

Connection procedure

Proceed as follows:

1. Unscrew the housing lid
2. If a display and adjustment module is installed, remove it by turning it slightly to the left
3. Loosen compression nut of the cable gland and remove blind plug

Connecting to power supply

4. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
5. Insert the cable into the sensor through the cable entry

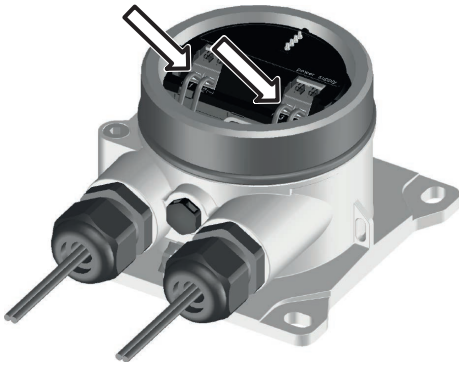


Fig. 8: Connection steps 5 and 6

6. Insert the wire ends into the terminals according to the wiring plan

Information:
Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver, the terminal opening is then free. When the screwdriver is released, the terminal closes again.

You can find further information on the max. wire cross-section under "*Technical data - Electromechanical data*".

7. Check the hold of the wires in the terminals by lightly pulling on them
8. Connect the shielding to the internal ground terminal, connect the external ground terminal to potential equalisation
9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable
10. Reinsert the display and adjustment module, if one was installed
11. Screw the housing lid back on

Connecting to power supply

Wiring plan

Wiring plan

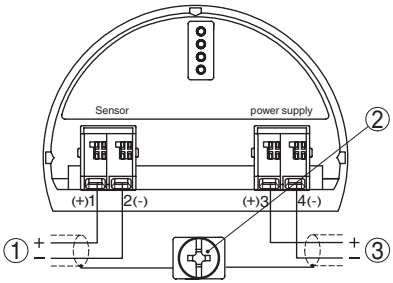


Fig. 9: Wiring plan NivoTec 9000 for 4 ... 20 mA sensors

1 To the sensor
2 Terminal for connection of the cable screening
3 Processing system/PLC/Voltage supply

Connection four-wire sensor

Four-wire sensor

The following illustration shows the simplified the connection of NivoTec 9000 to a four-wire sensor with active 4 ... 20 mA output.

There terminals 1 and 4 on NivoTec 9000 must be bridged (see following illustration):

Connecting to power supply

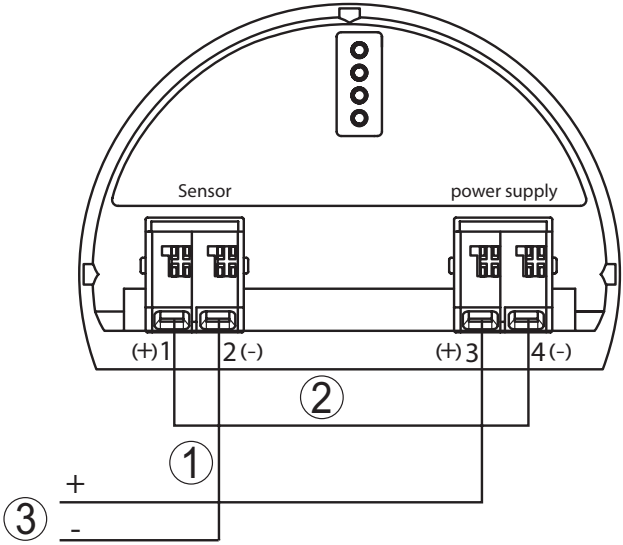


Fig. 10: Connection of NivoTec 9000 as external display to a four-wire sensor with active 4 ... 20 mA output

1 Bridge
2 NivoTec 9000
3 Four-wire sensor with active current output

The following illustration shows the simplified connection of NivoTec 9000 to a four-wire sensor with active 4 ... 20 mA output and an additional processing system/PLC.

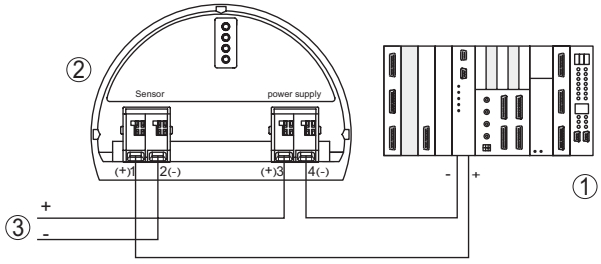


Fig. 11: Connection of NivoTec 9000 as external display to a four-wire sensors with active 4 ... 20 mA output with additional processing system/PLC

1 Processing system/PLC
2 NivoTec 9000
3 Four-wire sensor with active current output

Connection example

The following illustrations show the connection of NivoTec 9000 with a 4 ... 20 mA/HART sensor and processing system/ PLC/voltage supply.

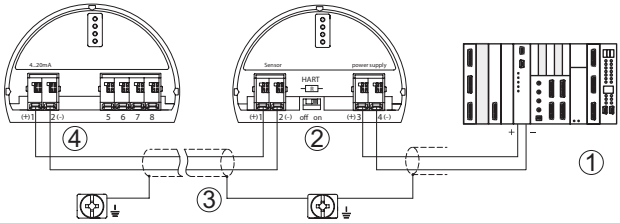


Fig. 12: Connection example 4 ... 20 mA sensor and processing system/ PLC

1 Processing system/PLC/Voltage supply
2 NivoTec 9000
3 Connection cable
4 4 ... 20 mA sensor

Switch-on phase

After connecting the instrument to power supply or after a voltage recurrence, the instrument carries out a self-check for approx. 10 s:

- Internal check of the electronics
- Indication of the instrument type, hardware and software version, measurement loop name on the display or PC
- Indication of a status message on the display or PC

The duration of the warm-up phase depends on the connected sensor.

Then the actual measured value is displayed. You can find further information on the display in chapter "*Measured value indication - Selection national language*".

Insert display and adjustment module

Mount/dismount display and adjustment module

The display and adjustment module can be inserted into the NivoTec 9000 and removed again at any time. It is not necessary to interrupt the power supply.

Note:
The operation of a display and adjustment module with integrated Bluetooth function is not supported by NivoTec 9000.

Proceed as follows for mounting the display and adjustment module:

1. Unscrew the housing lid
2. Place the display and adjustment module in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)
3. Press the display and adjustment module onto the electronics and turn it to the right until it snaps in
4. Screw housing lid with inspection window tightly back on

Disassembly is carried out in reverse order.

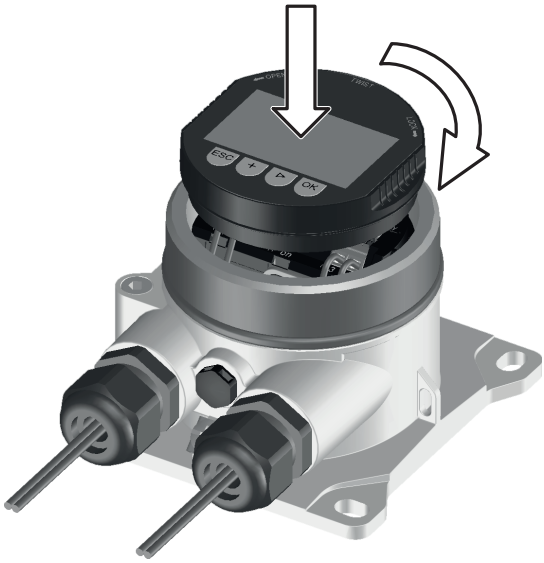


Fig. 13: Mounting of the display and adjustment module

Adjustment system

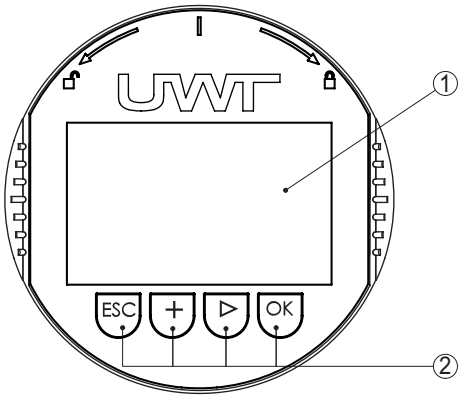


Fig. 14: Display and adjustment elements

1 LC display
2 Adjustment keys

Key functions

- ***[OK]*** key:
  - Move to the menu overview
  - Confirm selected menu
  - Edit parameter
  - Save value
- ***[->]*** key:
  - Change measured value presentation
  - Select list entry
  - Select menu items
  - Select editing position
- ***[+]*** key:
  - Change value of the parameter
- ***[ESC]*** key:
  - Interrupt input
  - Jump to next higher menu

Adjustment system

The instrument is operated via the four keys of the display and adjustment module. The individual menu items are shown on the LC display. You can find the function of the individual keys in the previous illustration.

Time functions

When the ***[+]*** and ***[->]*** keys are pressed quickly, the edited value, or the cursor, changes one value or position at a time. If the key is pressed longer than 1 s, the value or position changes continuously.

When the ***[OK]*** and ***[ESC]*** keys are pressed simultaneously for more than 5 s, the display returns to the main menu. The menu language is then switched over to "*English*".

Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with ***[OK]*** will not be saved.

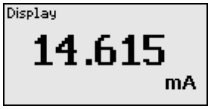
Measured value indication - Selection of national language

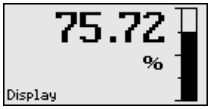
Measured value indication

With the ***[->]*** key you can move between two different views:

First view: Display value 1 in big lettering, TAG number

Second view: Display value 1, a bargraph corresponding to the 4 ... 20 mA value, TAG number

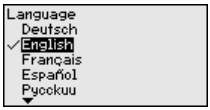




During the initial setup of an instrument shipped with factory settings, use the "***OK***" key to get to the menu "*National language*".

Selection of national language

This menu item is used to select the national language for further parameter adjustment. You can change the selection via the menu item "*Setup - Display, Menu language*".

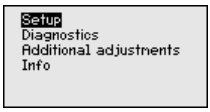


With the "***OK***" key you move to the main menu.

Parameter adjustment - NivoTec 9000

Main menu

The main menu is divided into four areas with the following functions:



Setup: Settings, e.g. to measurement loop name, damping, scaling

Diagnosis: Information on the device status

Additional adjustments: Reset, copy display settings

Info: Instrument name, instrument version, date of manufacture, instrument features

Setup

For optimum adjustment of the instrument, the individual submenu items should be selected one after the other in the main menu item "*Setup*" and provided with the correct parameter values.

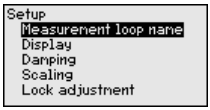
Setup - Measurement loop name

In the menu item "*Measurement loop name*" you edit a twelve digit measurement loop designation label.

You can enter an unambiguous designation for the measured value, e.g. the measurement loop name or the tank or product designation. In digital systems and in the documentation of larger plants, a singular designation must be entered for exact identification of individual measuring points.

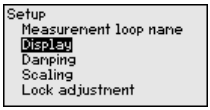
The character set comprises the following ASCII signs with extension according to ISO 8859-1:

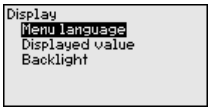
- Letters from A ... Z
- Numbers from 0 ... 9
- Special characters such as +, -, /, - etc.



Setup - Display, menu language

This menu item allows a change of the national language.





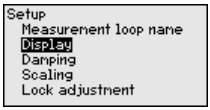
The following languages are available:

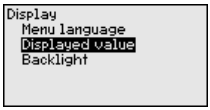
- German
- English
- French
- Spanish
- Russian
- Italian
- Dutch
- Portuguese
- Turkish
- Polish
- Czech
- Chinese
- Japanese

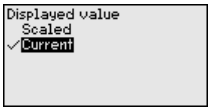
Setup - Display, indication value

In this menu item you can define the way measured values are indicated on the display.

Setup



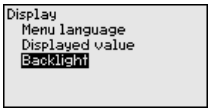


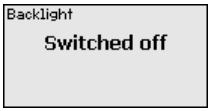


The default setting for the display value is "*Current*".

Setup - Display, lighting

The display and adjustment module has a backlight for the display. In this menu item you can switch on the lighting. You can find the required operating voltage in chapter "*Technical data*".





The lighting is switched off in delivery status.

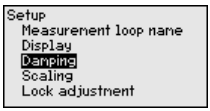
Note:
The lighting switches off automatically when the current in the signal circuit is lower than 4 mA.

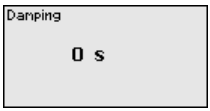
It switches on automatically when the current in the signal circuit is 4 mA or higher.

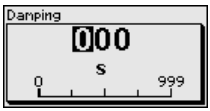
Setup - Damping

To damp process-dependent measured value fluctuations, set an integration time of 0 ... 999 s in this menu item. The increment is 0.1 s.

The entered integration time has effect on the current value and display.





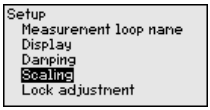


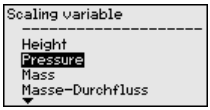
Factory setting is 0 s.

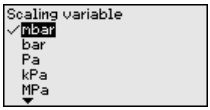
Setup - Scaling

In the menu item "*Scaling variable*" you define the scaling variable and unit of the measured value on the display, e.g. volume in l.

In addition to the offered standard units, there is the possibility, to create a user-defined unit.

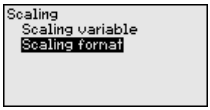


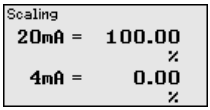




Furthermore, via menu item "*Scaling format*" you define the position of the comma and the assignment of the measured value for 0 % and 100 %.

Setup



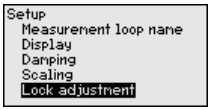


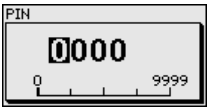
Lock/unlock setup - Adjustment

In the menu item "*Lock/unlock adjustment*", you can protect the instrument parameters against unauthorized modification. The PIN is activated/deactivated permanently.

With active PIN, only the following adjustment functions are possible without entering a PIN:

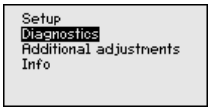
- Select menu items and show data
- Read data from the sensor into the display and adjustment module

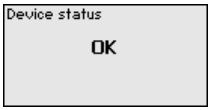




Diagnostics - Device status

In this menu item, the device status is displayed.

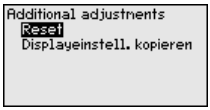




In case of instrument failure, an error code with text message is displayed. You can find information on cause and rectification in chapter "*Diagnosis and service*".

Additional settings - Reset

After a reset, certain parameter adjustments made by the user are reset.



The following table shows the default values of the instrument. Depending on the instrument version or application, all menu items may not be available or some may be differently assigned:

Reset - Setup

Menu item	Parameter	Default value
Measurement loop name		Display
Display	Language	English Order-specific

Setup

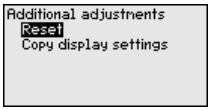
Menu item	Parameter	Default value
	Displayed value	Signal current
	Backlight	Switched off
Damping	Integration time	0 s
Scaling	Scaling size	%
	Scaling format	20 mA correspond to 100.00 % 4 mA correspond to 0.00 %
Lock adjustment		Released

Additional adjustments - Copy display settings

This function copies the following display settings.

The following parameters or settings are saved:

- All parameters of the menu "*Setup*"

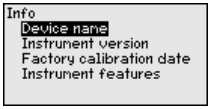


The copied data are permanently saved in the display and adjustment module. They remain even in case of voltage loss.

Note:
Before the data are stored in the instrument, they are checked to make sure they match the instrument. For this purpose, the instrument type of the source data as well as the target instrument are displayed. Storage takes place only after approval.

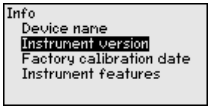
Info - Instrument name

In this menu item, you can read out the instrument name and the instrument serial number:



Info - Instrument version

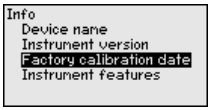
In this menu item, the hardware and software version of the sensor is displayed.



Setup

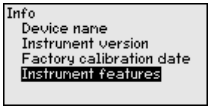
Info - Factory calibration date

In this menu item, the date of the factory calibration of the instrument as well as the date of the last change of sensor parameters is displayed via the PC.



Info - Instrument features

In this menu item, instrument features such as approvals, electronics, housing as well as others are displayed.



Diagnostics and servicing

Maintenance

Maintenance

If the device is used properly, no special maintenance is required in normal operation.

Cleaning

The cleaning helps that the type label and markings on the instrument are visible.

Take note of the following:

- Use only cleaning agents which do not corrode the housings, type label and seals
- Use only cleaning methods corresponding to the housing protection rating

Diagnostics

Sensors

The device supports the self-monitoring and diagnosis of the connected sensors. Status and fault messages are indicated via the display and adjustment module.

You can find a detailed overview of this function in the operating instructions of the respective sensor.

External display and adjustment unit

Code **Text message**	**Cause**	**Rectification**
S003 CRC-error	CRC error during self-check	Carry out a reset Send instrument for repair
F014 Sensor input: Short-circuit	Short-circuit or sensor current > 21 mA	Check cable Check sensor
F015 Sensor input: Line break	Line break or sensor current < 3.6 mA	Check cable Check sensor, probably already in the run-in period
S021 Scaling: Span too small	Scaling span too small	Carry out a fresh scaling, increase the distance between min. and max. scaling.
S022 Scaling: Value too high	Scaling value too high	Check scaling values and correct, if necessary
F034 EEPROM: CRC error	EEPROM: CRC error	Switch the instrument off and on Carry out reset to default setting Send instrument for repair
F035 ROM: CRC error	ROM: CRC error	Switch the instrument off and on Carry out reset to default setting Send instrument for repair

Diagnostics and servicing

Code Text message	Cause	Rectification
F037 RAM defective	Error of the RAM in the internal data memory	Switch the instrument off and on Carry out reset to default setting Send instrument for repair
F040 General hardware error	Hardware error	Switch the instrument off and on Carry out reset to default setting Send instrument for repair

Rectify faults

Reaction when malfunction occurs

The operator of the system is responsible for taking suitable measures to rectify faults.

4 ... 20 mA signal

Connect a multimeter in the suitable measuring range according to the wiring plan. The following table describes possible errors in the current signal and helps to eliminate them:

Error	Cause	Rectification
4 ... 20 mA signal not stable	Fluctuating measured value	Set damping
4 ... 20 mA signal missing	Electrical connection faulty	Check connection, correct, if necessary
	Voltage supply missing	Check cables for breaks; repair if necessary
	Operating voltage too low, load resistance too high	Check, adapt if necessary
Current signal greater than 22 mA, less than 3.6 mA	Sensor electronics defective	Replace device or send in for repair depending on device version

Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

How to proceed if a repair is necessary

If a repair should be necessary, please contact your contact person.

Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic media etc.

Take note of chapters "*Mounting*" and "*Connecting to voltage supply*" and carry out the listed steps in reverse order.

Disposal

Pass the instrument on to a specialised recycling company and do not use the municipal collecting points.

Remove any batteries in advance, if they can be removed from the device, and dispose of them separately.

If personal data is stored on the old device to be disposed of, delete it before disposal.

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

Certificates and approvals

Conformity

The device complies with the legal requirements of the applicable country-specific directives or technical regulations. We confirm conformity with the corresponding labelling.

The corresponding conformity declarations can be found on our homepage.

Due to the design of its process fittings, the device does not subject of EU pressure device directive if it is operated at process pressures ≤ 200 bar.

NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 53 – Compatibility of field devices and display/adjustment components

For further information see www.namur.de.

Supplement

Trademark

All the brands as well as trade and company names used are property of their lawful proprietor/originator.

LEVEL. UP TO THE MAX.

Printing date:

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.
Subject to change without prior notice

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