

# Instruction Manual for the Transmitter NivuMaster L2



Firmware Version: 2.0.x

Revised Instruction Manual

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measure analyse optimise

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### **Translation**

If the device is sold to a country in the European Economic Area this technical description must be translated into the language of the country in which the device is to be used.

Should the translated text be unclear, the original instruction manual (German) must be consulted or a member company of the NIVUS group must be contacted for clarification.

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## Revision History

Rev.	Modifications	Responsible Editor	Date
06	Transmitter without display/keypad and PC handheld programmer generally removed (various places in the document); R-Series sensor added at the relevant places in the document; NIVUS addresses updated; Chap. "Revision History" added; Chap. "Approvals and Certificates" updated; Various changes in content, document structure and layout	MoG	2023-07-13
05	Skipped	--	--
04	Skipped	--	--
03	Declaration of Conformity added	IM	2007-07-23
02	Various	DR	2007-05-21
01	Type L2 with keypad added	IM	2006-09-18
00	New creation of the instruction manual on the basis of the German-language instruction manual	DBi	2004-10-18

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## General

### 1 About this Manual



#### **Important Notice**

*READ CAREFULLY BEFORE USE.  
KEEP IN A SAFE PLACE FOR LATER REFERENCE.*

This instruction manual is for the NivuMaster L2 transmitter and serves its intended use. This instruction manual is oriented exclusively to qualified expert personnel.

Read this instruction manual carefully and completely prior to installation or connection since it contains relevant information on this product. Observe the notes and particularly follow the warning notes and safety instructions.

If you should have problems to understand information contained within this instruction manual either contact a member company of the NIVUS group or one of the distributors for further support. The member companies of the NIVUS group cannot be held responsible for damage to persons or material due to incorrectly understood information in this instruction manual.

#### 1.1 Applicable Documentation

For the installation and operation of the complete system extra instruction manuals or technical descriptions may be required apart from this manual.

- Instruction Manual for NivuMaster Series Ultrasonic Sensors
- Technical Description and Mounting Instruction for R-Series Sensors

These manuals are provided with the auxiliary units or sensors and/or are available as download on the NIVUS homepage.

#### 1.2 Signs and Definitions used

Representation	Meaning	Remarks
	(Action) Step	Execute action steps. Should action steps be numbered observe the specified order of the steps.
	Cross-reference	Refers to further or more detailed information.
	Refers to a documentation	Refers to an accompanying documentation.
>Text<	Parameter or menu	Indicates a parameter or a menu that is to be selected or is described.

Tab. 1 Structural elements within the manual

## Safety Instructions

### 2 Used Symbols and Signal Words

#### 2.1 Information on the Valuation of Accident Levels



The general warning symbol indicates the risk of personal injuries or death. In the text section the general warning symbol is used in combination with the signal words described below.

**DANGER**

**Warning in high degree of risk**



Indicates a high-risk, **imminently** hazardous situation which will result in death or serious injury if not avoided.

**WARNING**

**Warning in medium degree of risk and personal injury**



Indicates a **possible** danger with medium risk which may result in a life-threatening situation or (severe) bodily injury if not avoided.

**CAUTION**

**Warning in personal injury or property damage**



Indicates a possible danger with moderate risk which may result in minor or moderate personal injury or property damage if not avoided.

**WARNING**

**Danger by electric voltage**



Indicates a medium-risk, **imminently** hazardous situation caused by electric shock which will result in death or (serious) injury if not avoided.



**Important Notice**

Contains information that needs to be highlighted.

Indicates a potentially harmful situation that may damage the product or something in its environment if not avoided.



**Note**

Contains tips or information.

## 2.2 Warning Notices on the Device (optional)



### **General Warning Notice**

*This symbol refers the operator or user to content in this manual.*

*Consideration of the information contained herein is necessary to maintain the protection provided by the unit for installation and in operation.*



### **Protective earth connection**

*This symbol refers to the protective conductor terminal of the device.*

*Depending on the type of installation, the unit may only be operated with a suitable protective earth connection in accordance with applicable laws and regulations.*

## 3 Special safety and Precautionary Measures

When working with the NIVUS equipment, the following safety and precautionary measures must be observed and followed generally and at all times. These warnings and notes are not repeated for each description within the document.

### **WARNING**



#### **Germ Contamination**

*Due to the frequent use of the sensors in the waste water sector, parts can be contaminated with dangerous germs. Therefore, appropriate precautions must be taken when coming into contact with cables and sensors.*

*Wear protective clothing.*

### **WARNING**



#### **Observe Occupational Safety Regulations!**

*Before and during mounting works, compliance with all work safety regulations must always be ensured.*

*Disregarding may lead to personal injury.*

### **WARNING**



#### **Do not disable Safety Devices!**

*It is strictly forbidden to disable the safety devices or to change their mode of operation.*

*Disregarding may result in personal injury or damage to the system.*

### **WARNING**



#### **Disconnect the System from Mains Power**

*Disconnect the system from the mains power before starting maintenance, cleaning and/or repair work (only by qualified personnel).*

*Disregarding may lead to electric shock.*



#### **Commissioning only by qualified Personnel**

*The entire measuring system may only be installed and commissioned by qualified personnel.*

## 4 Warranty

The device was functionally tested prior to shipping. When used for the intended purpose (see Chap. "6 Intended Use") and in compliance with the instruction manual, the applicable (see Chap. "1.1 Applicable Documentation") and the safety information and instructions contained therein, no functional restrictions are to be expected and flawless operation should be possible.

⇒ Please also refer to the following chapter "5 Disclaimer".



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### **Limitation of Warranty**

*In case of disregarding the safety notes and instructions in this document, the companies of the NIVUS-Group reserve the right to limit the warranty.*

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## 5 Disclaimer

The companies of the NIVUS-Group assume no liability

- for consequential damages resulting from **a change** in this document. The companies of the NIVUS-Group reserve the right to change the contents of the document including this disclaimer without prior notice.
- for personal injury or damage to property resulting from **failure to comply** with the **applicable regulations**. For connection, commissioning and operation of the sensors, all information and higher-level legal regulations of the country (in Germany e.g. the VDE regulations), such as valid Ex regulations as well as the safety and accident prevention regulations applicable to the respective individual case shall be observed.
- for personal injury or damage to property resulting from **improper handling**. For safety and warranty reasons, all work on the equipment that goes beyond the installation and connection measures may only be carried out by NIVUS personnel or by persons or companies authorised by NIVUS.
- for personal injury or damage to property resulting from the operation of the equipment in a **technically faulty** condition.
- for personal injury or damage to property resulting from **improper use**.
- for personal injury or damage to property resulting from failure to observe the **safety instructions** in this instruction manual.
- for missing or incorrect readings due to **improper installation or faulty parameterisation/programming** and for any consequential damage resulting therefrom.

## 6 Intended Use



### Note

*The device is intended exclusively for the purpose mentioned below. Any other use beyond this, any conversion or modification of the instrument without written agreement with the companies of the NIVUS-Group is considered improper use.*

*The companies of the NIVUS-Group are not liable for any damage resulting from this. The operator alone bears the risk.*

The NivuMaster L2 transmitter incl. associated sensor system is designed for ultrasonic and radar sensors to detect distance, volume and level.

The NivuMaster L2 is designed and produced according to the current state of the art and the recognised safety rules at the time of publication of this document.

Nevertheless, risks of personal injury or damage to property cannot be completely ruled out.

The permissible maximum limit values in Chapter "17 Specifications" must be observed. All cases of use deviating from these limit values, which have not been approved by NIVUS GmbH in writing, are excluded from the liability of the NIVUS-Group.

## 7 Ex Protection

The NivuMaster L2 transmitter can be used in conjunction with Ex-approved P-series or R-series sensors for use in areas with explosive atmospheres of zone 1 (in some cases also zone 0). Here, the Ex-approved sensors are installed directly in the Ex zone, while the transmitter must be installed in non-Ex areas.

The connection diagrams can be found in the corresponding instruction manual or technical description / installation instructions for the sensors.

### Sensor Approvals



See "Instruction Manual for NivuMaster Series Ultrasonic Sensors" or "Technical Description and Mounting Instruction for R-Series Sensors".



### Validity of the Ex Approvals

*The Ex approval is only valid in conjunction with the corresponding marking on the nameplate of transmitter and the connected sensors.*



### Declarations of Conformity and Test Certificates

*For installation and commissioning, the declarations of conformity and test certificates of the approving body as well as the applicable national regulations must be strictly observed. When using sensors from other manufacturers, the operator must carry out a system assessment in accordance with EN 60079-25!*

## 8 Duties of the Operator

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### **Important Notice**

*In the EEA (European Economic Area), the national transposition of the Framework Directive (89/391/EEC) as well as the associated individual directives and, in particular, the Directive (2009/104/EC) concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, must be observed and complied with.*

*In Germany, the Ordinance on Industrial Safety and Health must be complied with.*

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Obtain the local **operating licence** and observe the associated conditions. In addition, you must comply with environmental protection requirements and local legal requirements for the following:

- Safety of personnel (accident prevention regulations)
- Safety of work equipment (protective equipment and maintenance)
- Product Disposal (Waste Management Act)
- Materials Disposal (Waste Management Act)
- Cleaning (Cleaning Agents and Disposal)

### **Connections**

As the operator, before activating the device, make sure that the local regulations (e.g. for the electrical connection) have been observed during installation and commissioning.

### **Keep the Instruction Manual for future Reference**

Keep the instruction manual in a safe place and ensure that it is always available and can be consulted by the user of the product.

### **Hand over the Instruction Manual**

When selling the transmitter, this instruction manual must be handed over with it. The manual is part of the standard delivery.

## 9 Requirements for the Personnel

Installation, commissioning and maintenance may only be carried out by personnel who fulfil the following conditions:

- Qualified personnel with appropriate training
- Authorisation by plant operator



### **Qualified Personnel**

*in the sense of these instructions or the warnings on the product itself are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the qualifications appropriate to their job, such as*

- I. Training and instruction or authorisation to switch circuits and devices/systems on and off, to earth and to label them in accordance with the standards of safety technology.*
  - II. Training or instruction in accordance with safety technology standards in maintenance and use of appropriate safety equipment.*
  - III. First Aid Training*
-

## Delivery, Storage and Transport

### 10 Scope of Delivery

The standard delivery of the NivuMaster L2 comprises:

- Transmitter NivuMaster L2 (according to delivery documents)
- Connection cable (software available for download free of charge on the NIVUS website)
- Operating manual with declarations of conformity (printed or as a link to the NIVUS download centre); it contains all the necessary information for operating the NivuMaster L2.

Check additional accessories according to the order against the delivery note.



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#### **Associated Sensors**

*Corresponding sensors must be ordered separately.*

---

### 11 Inspection upon Receipt

Check the delivery for completeness and apparent intactness immediately after receipt . Report any transport damage immediately to the delivering carrier. Also send a written report to NIVUS GmbH in Eppingen.

Incomplete deliveries must be addressed in writing within two weeks to your responsible representative or directly to the head office in Eppingen.



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#### **Observe the two-week deadline**

*Complaints received later will not be recognised.*

---

### 12 Storage

Observe the minimum and maximum values for external conditions such as temperature and humidity according to Chapter "17 Specifications".

Protect the instrument from corrosive or organic solvent vapours, radioactive radiation and strong electromagnetic radiation.

### 13 Transport

Protect the transmitter from strong impacts, shocks, jolts or vibrations.

Otherwise, the same conditions apply with regard to external influences as for storage (see Chap. "12 Storage").

## 14 Return

In the event of a return, send the unit to NIVUS GmbH in Eppingen carriage paid and in the original packaging.

Items that have not been sufficiently franked will not be accepted!

In general, a return note (incl. RMA return number) must be requested from the NIVUS customer service before returning the goods. Without this RMA number, the incoming goods cannot be assigned accordingly.



See Chap. "38.2 Customer Service Information".

## Product Specification

### 15 Product Construction and Overview



Fig. 15-1 Device structure NivuMaster L2

#### 15.1 Enclosure dimensions

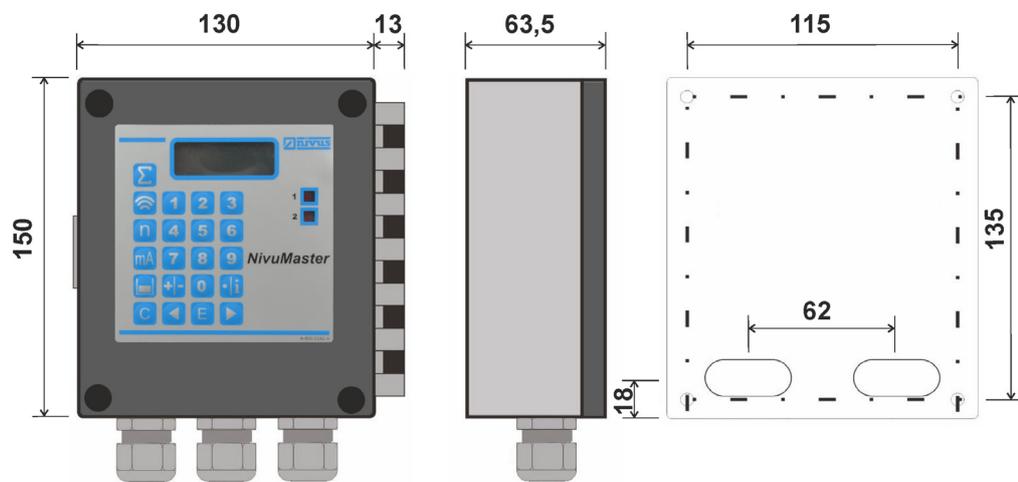


Fig. 15-2 Dimensions [mm] NivuMaster L2

## 15.2 Connectable Sensors

The following sensors can be connected to the NivuMaster L2 transmitter:

- P-Series Ultrasonic Sensors:  
Types P03, P06, P10, P15, P25 and P40



- R-Series Radar Sensors:  
Types R08 and R16



## 16 Device ID

The information in this instruction manual only applies to the NivuMaster L2 transmitter according to Chap. "18 Equipment".

The nameplate is affixed to the side of the enclosure and contains the following information:

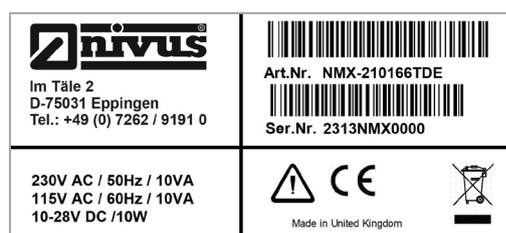
- Name and address NIVUS GmbH
- CE Label
- Marking of the series and type with article number and serial number
- Year of manufacture: the first four digits of the serial number refer to the year of manufacture and the week number (2313.....)
- Power Supply

It is important for all queries and spare parts orders that the article number and serial number of the respective device are specified correctly. This is the only way to ensure proper and fast processing.



### Note

*Check by means of the nameplates whether the supplied device corresponds with your order.*



**Fig. 16-1 Nameplate NivuMaster L2**

➡ The Declarations of Conformity can be found at the end of this instruction manual.

## 17 Specifications

<b>Supply Voltage</b>	115 V AC / 230 V AC +5 % / -10 % 50/60 Hz 10...28 V DC
<b>Fuses</b>	50 mA at 200...230 V AC 100 mA at 90...120 V AC
<b>Power Consumption</b>	10 W maximum power (typical 5 W)
<b>Measurement Range</b>	0.077 m to 40 m; depending on the sensor
<b>Measurement Uncertainty</b>	6 mm or 0.25 % of the measured range (the larger value is valid); in combination with sensor Type R08 / R16: 2 mm
<b>Resolution</b>	1 or 2 mm or 0.1 % of the measured range (the larger value is valid – depending on the sensor); in combination with sensor Type R08 / R16: 1 mm
<b>Rate Response</b>	Fully adjustable
<b>Wall mount enclosure</b>	Material: ABS base, polycarbonate cover, flammability class UL94HB Weight: approx. 1000 g Dimensions: 143x150x63.5 mm (WxHxD)
<b>Protection</b>	IP66
<b>Cable Entry</b>	Cable entries on the underside: 3x M20; suitable for cable diameters 6...12 mm
<b>Ex Approval</b>	In connection with NivuMaster P-Series sensors incl. the corresponding Zone 1 approval
<b>Temperature (Electronics)</b>	-20 °C to +50 °C
<b>Echo Processing</b>	DATEM ( <b>D</b> igital <b>A</b> daptive <b>T</b> racking of <b>E</b> cho <b>M</b> ovement) software, password-protected, non-volatile RAM
<b>Inputs</b>	1 sensor can be connected (P-Series or R-Series)
<b>Outputs</b>	- Analogue output: 0/4...20 mA galvanically isolated (up to 150 V), Load 1 kOhm (adjustable), Resolution 0.1 % - Relay outputs: 2 potential-free change-over contacts 10 mA/12 V DC to 2 A/240 V AC with resistive load - Digital output: via RS232 interface full duplex
<b>Programming</b>	Via keypad and display PC programming via RJ12 Western socket (RS232)

Tab. 2 Specifications

### Transducers



The structure and description of the associated sensors as well as their technical data can be found in the corresponding instructions or technical descriptions.

## 18 Equipment

### 18.1 Device Versions

The available device versions of the NivuMaster are listed in the following table. These are shown in the article number on the nameplate (see nameplate on page 17).

<b>NM</b>	NivuMaster L2				
	<b>Type</b>	L2; Level; Trend; IP66 Enclosure with keypad and display			
	<b>X-</b>	Relays: free programmable Alarm Functions			
	<b>Hardware</b>	Relay	Output	Input	Measurement
			0/4-20 mA	0/4 mA	Channel
	<b>2101 66T</b>	2	1	0	1
		<b>Language / Menus</b>			
		<b>DE</b>	German		
		<b>EN</b>	English		
		<b>FR</b>	French		
<b>NM</b>	<b>X-</b>	<b>2101 66T</b>			

Fig. 3 Type key transmitter NivuMaster L2

## Functional Description

### 19 Area of Use

The NivuMaster L2 is an ultrasonic and radar measurement device for detecting fill levels. There are free programmable relays available for measurement data output.

When connecting an **ultrasonic sensor**, the transmitter sends a transmission impulse to the sensor. The ultrasonic sensor, mounted vertically to the material surface, generates an ultrasonic impulse. The sound is reflected by the measured medium, received as an echo by the sensor and transmitted to the NivuMaster L2. The NivuMaster calculates the distance from the sensor to the medium to be measured from the transit time between sending and receiving the echo. The calculated value can then be output in the desired form (e.g. as level or distance).

When a **radar sensor** is connected, the transit time of the radar signals is determined indirectly by mixing the transmitted and reflected radar signals. The distance is determined indirectly via the intermediate frequency that results when the current transmission frequency and reception frequency are superimposed. This frequency difference is converted into a signal spectrum and the distance is calculated.

### 20 Functional Description

The DATEM software for echo analysis is used for reliable measurement. Blanking false echoes is very easy because of the simple selection option of the "right echo". Depending on the sensor type, the NivuMaster L2 can measure in a range from 0.125 m to 40 m.

The relays are freely programmable and can be programmed for various alarm functions or as a simple pump exchange. The NivuMaster L2 has a galvanically isolated 0/4...20mA output that can be used to connect external displays or to transmit measured values to a PLC.

This output is free adjustable too.

The NivuMaster can be connected to a PC or laptop via the RS232 interface. With the associated software, echo profiles and measurement values can be transferred from the NivuMaster.

The NivuMaster L2 is programmed via:

- the keypad (version with display)
- optionally available handheld programmer with keypad and display

The set parameters are retained even in the event of a power failure.

## Installation and Connection

### 21 General Mounting Instructions

During installation, observe the following instructions on "Electrostatic Discharge (ESD)" and "Installation Location".

- Follow applicable legal or operational guidelines.

Improper handling may lead to personal injuries and/or equipment damage!

#### 21.1 Avoiding electric discharge (ESD)

---



##### **ESD Risks**

*Maintenance procedures that do not require power to the unit must only be carried out after disconnection from the mains to minimise hazards and ESD risks.  
Disconnect the NivuMaster transmitter from the mains.*

---

The sensitive electronic components inside the unit can be damaged by static electricity. Observe the following steps to prevent damage to the device due to electrostatic discharge:

- Discharge any static electricity present on your body before you touch electronic components of the device.
- Avoid unnecessary movements to minimise the building-up of static charges.

#### 21.2 Selecting the Mounting Place

The following precautions must be taken at the mounting place for safe installation:

- Protect the transmitter from direct sunlight. If necessary install a sunshade.
- Observe the permissible ambient temperature (see Chap. "17 Specifications").
- Do not expose the transmitter and the connected sensors to strong vibrations or mechanical shocks.

**Necessarily avoid when selecting the mounting place:**

- Corrosive chemicals or gases
- Radioactive radiation
- Installation close to footpaths or travel ways

## 22 Electrical Installation

### 22.1 General Information on the Power Supply

**DANGER**



***Danger by electric voltage!***

*Disconnect the device from mains power.*

*When working on the electrical connections, there is a risk of electric shock. Observe the electrical data given on the nameplate.*

*Disregarding may lead to personal injury.*



**Note**

*Observe the national installation instructions.*

➡ Make sure that the following requirements are met:

1. Please note that installation may only be carried out by qualified personnel.
2. For the electrical installation, comply with the legal regulations of the respective country (such as VDE 0100 in Germany).
3. Follow further (country-specific) legal standards, regulations and technical codes.
4. For installation in wet environments or in areas where there is a risk of flooding, additional protection, e.g. by means of a residual current device (RCD), may be required.
5. Check whether the power supply of the units must be integrated into the emergency stop concept of the plant; also with regard to explosion protection.

➡ The Connection of Sensors can be found starting on page 23, the Supply Connections are described on page 22.

### 22.2 Supply Connections

**DANGER**



***Danger by electric voltage!***

*The power supply of the NivuMaster L2 must be separately protected with a 6 A slow-blow fuse and must be designed independently of other system parts or measurements (can be separately switched off, e.g. by means of circuit breakers with characteristic >B<).*

The NivuMaster L2 can be supplied with 115/230 V AC. There is also the option of a 10...28 V DC power supply.  
The maximum power consumption is 10 W.

## 23 Connection of Sensors



Connection diagrams for the sensors can be found in the respective technical description or operating instructions.

The connection to the transmitter is made in the sensor terminal block area. When connecting an ultrasonic sensor or a radar sensor, the following diagram results:

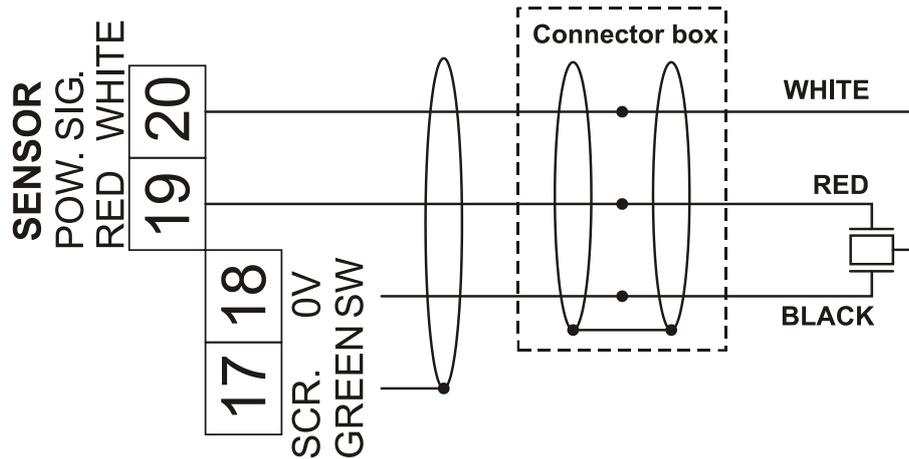


Fig. 23-1 Connecting a sensor (P-Series or R-Series)

### CAUTION



**Make connections correctly and use only specified cables**

Improper connections or the use of cables of a different type can lead to malfunctions or failure of the measurements.

### 23.1 Sensor Connection in Ex Areas

The NivuMaster L2 must be installed **outside** of Ex areas.

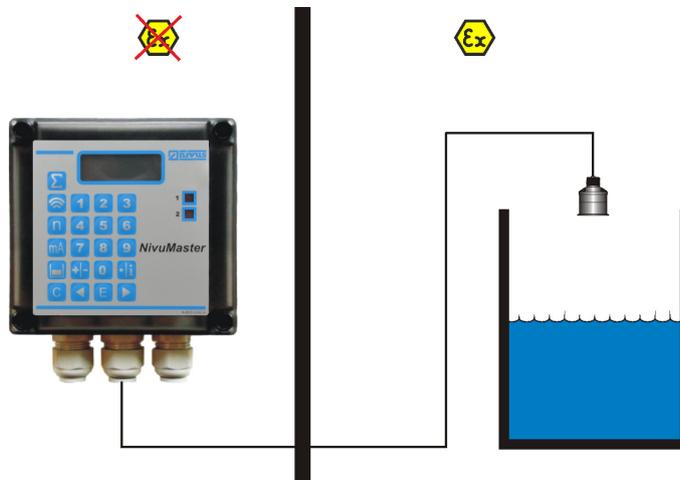


Fig. 23-2 Connection in Ex areas

For use in Ex areas Zone 1 or 2, an ATEX-approved sensor must be used, which is supplied via a fuse with 4000 A breaking capacity.

## 24 Overvoltage Protection Measures

For effective protection of the NivuMaster L2, it is necessary to protect the power supply as well as the mA outputs and mA inputs by means of overvoltage protection devices. NIVUS recommend the types EnerPro 220Tr or EnerPro 24Tr (with 24 V DC power supply) for the mains side. For the mA outputs and mA inputs NIVUS recommend the type DataPro 2x1 24/24Tr.

The sensor side can be protected against overvoltage with a SonicPro.

### WARNING



#### Observe the correct side connection

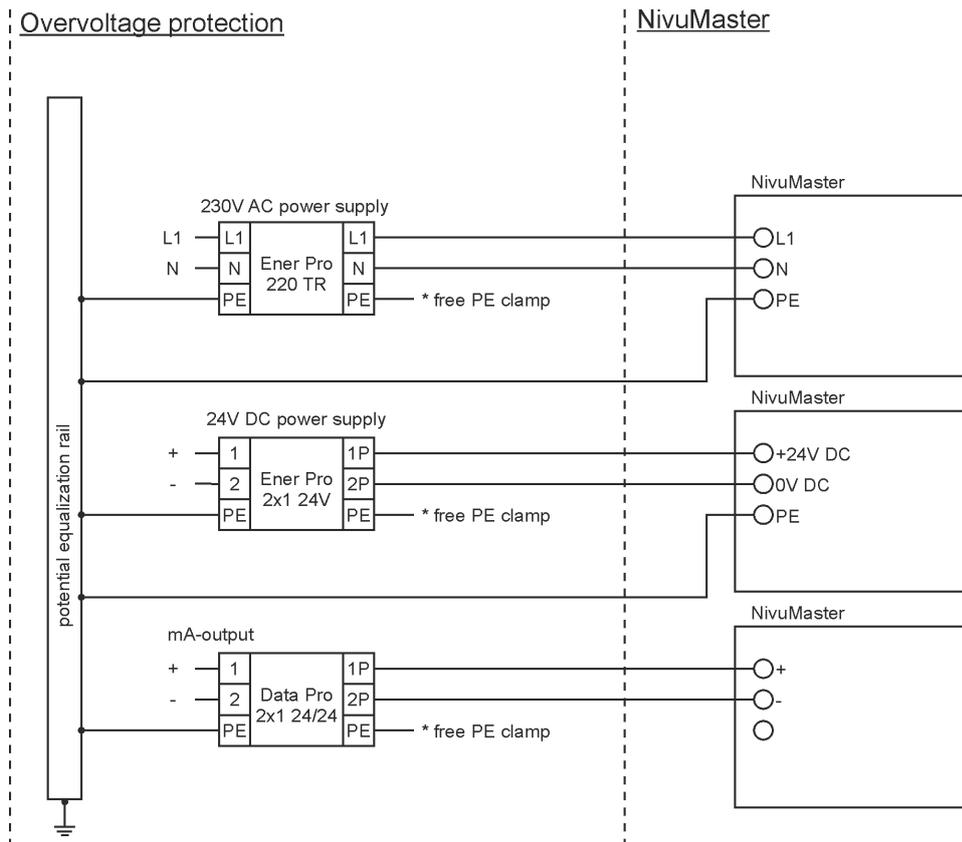
Ensure that the connection is correct (p-side towards the transmitter) and that the cable feed is correct and straight. The down conductor (earth) must be necessarily routed in the direction of the unprotected side.

Incorrect connections disable the function of the overvoltage protection.



#### Important Notice

In connection with the use of the sensors in Ex areas, the electrical connection values of the overvoltage protection elements must also be taken into account.



\* Connect these PE clamps among each other if **several** overvoltage protectors are in use. Then connect to the potential equalization rail only **once**.

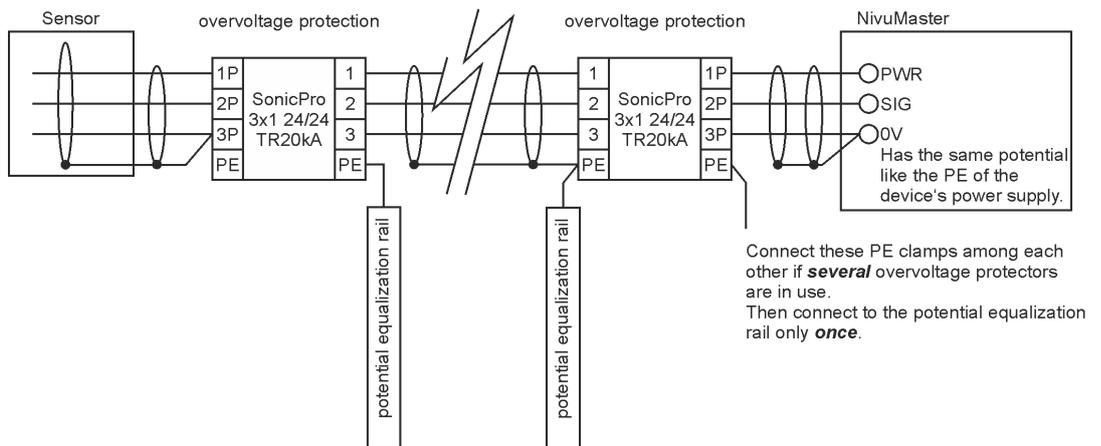
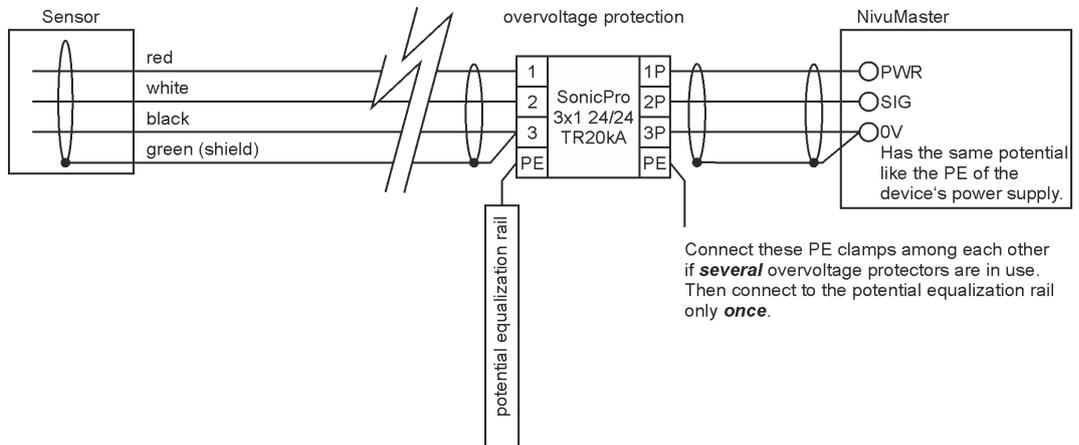
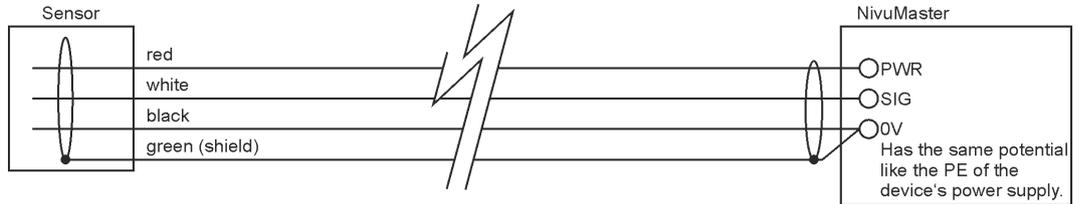
Fig. 24-1 Connecting overvoltage protection

**WARNING**



**Observe the correct side connection**

Ensure that the connection of the SonicPro is correct (p-side towards the transmitter) and that the cable feed is correct and straight. The down conductor (earth) must be necessarily routed in the direction of the unprotected side.



**Fig. 24-2 Connection overvoltage protection sensor input**

## 25 Connecting the Transmitter

### 25.1 Common

Note during installation work that electronic components can be destroyed by electrostatic discharges. Therefore, care must be taken during installation to avoid impermissibly high electrostatic charges by taking suitable grounding measures.



**Note**

Before initial connection, apply slight pressure to the screw of the clamp connection using the screwdriver so that it opens securely and a correct clamp connection is ensured.

- ➡ Close the terminal compartment of the wall mount enclosure with the cover supplied and the four screws so that no water or dirt can penetrate.



**Important Notice**

In case of incorrect or faulty closure, the specified protection class cannot be guaranteed.

### 25.2 Terminal Assignment Diagram

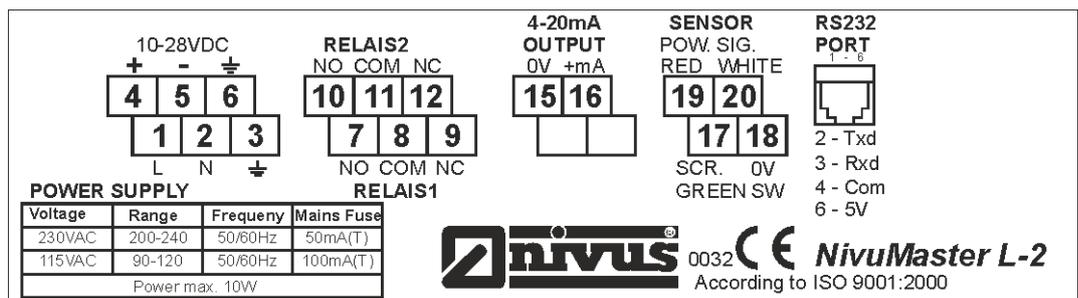


Fig. 25-1 Terminal wiring wall mount enclosure NivuMaster L2

### 25.3 RS232 Interface

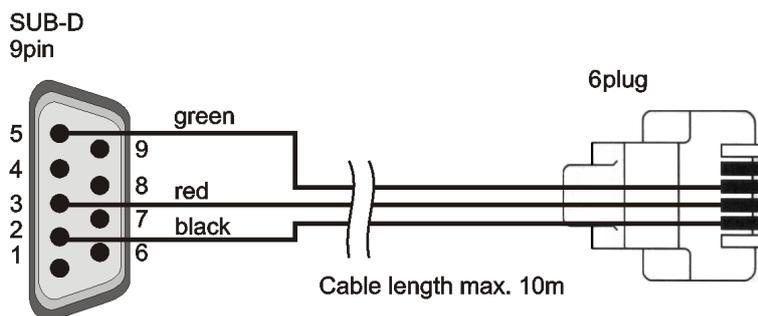


Fig. 25-2 Connection cable between NivuMaster L2 and PC

Various data and parameters can be read out directly via the RS232 interface. The "Black Box PC" software in the PC Software Suite can be used for this purpose. For connection to a USB interface, a suitable RS232 to USB adapter must be used.

25.4 Application Examples

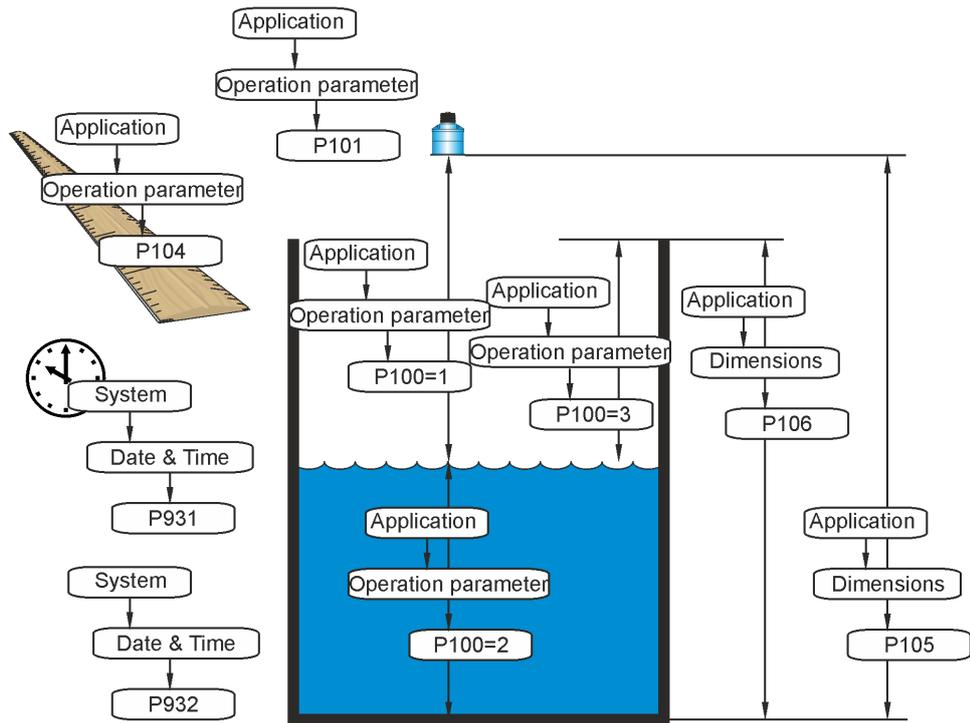


Fig. 25-3 Application example level measurement

Application		
	Operating Parameters	
		P100 = 2    Level
		P101 = 2    Sensor P06
	Dimensions	
		P104 = 2    Measurement unit cm
		P105 = 400    Distance sensor to zero point 400 cm
		P106 = 370    Max. level 370 cm
		P107 = 30    Near blanking 30 cm
		P108 = 20    Far blanking 20 %
Stability		
	Damping	
		P870 = 200    Max. change for filling 200 cm/Min.
		P871 = 300    Max. change for emptying 300 cm/Min.
mA output		
	Range	
		P830 = 2
	Assignment	
		P831 = 0    4-20 mA

mA refers to the setting in P100

**Fig. 25-4 Basic parameters (see examples Programming Relays page 38)**



**Note**

*The zero point is easiest to determine when the tank or basin is completely empty. The distance measurement is taken by the NivuMaster and the recorded value is entered in P105 as the zero point.*

---

## Commissioning

### 26 Notes to the User

Before connecting and operating the NivuMaster the instructions below shall be followed. This instruction manual contains all information required for parameterisation and use of the device. The instruction manual is intended for qualified expert personnel. Appropriate knowledge in the areas of measurement systems, automation technology, control engineering, information technology and wastewater hydraulics are preconditions for putting the NivuMaster into operation.

Read this instruction manual carefully to ensure proper functioning of the NivuMaster. Connect the NivuMaster according to Chapter "25 Connecting the Transmitter".

If you have any questions regarding installation, connection or parameter setting, please contact our hotline at:

- +49 7262 9191-955

#### General Principles

Commissioning of the measurement system shall not be carried out before installation has been finished and verified.

- ➡ Commissioning must be carried out in accordance with the instruction manual and the information contained therein, in order to exclude faulty or incorrect programming.
- ➡ Familiarise yourself with the operation of the NivuMaster L2 via PC with the help of the instruction manual before you start with the parameterisation.
- ➡ After connecting the transmitter and sensors (according to Chapters "25 Connecting the Transmitter" and "23 Connection of Sensors") the measurement place must be parameterised.

The user interface of the NivuMaster L2 is easy to understand. You can quickly make the **basic settings** yourself.

The parameterisation of the device should be carried out by NIVUS or by a specialist company authorised by NIVUS if one or more of the following conditions apply to you:

- Comprehensive programming tasks
- Difficult hydraulic conditions
- Service specifications require a settings and error log
- Qualified personnel not specially trained or with little metrological experience

## 27 Handheld programmer with display (optional)

The optional handheld programmer with display can be used to program any number of L2 units.

- ➡ Connect the handheld programmer to the RJ12 socket inside the NivuMaster via the RS232 interface using the cable supplied.
- ➡ A short status message may appear on the display while the unit is being connected.
- ➡ After a successful connection, the current measurement values are displayed, depending on the measurement mode and the selected device.

## 28 Description of the Display



1. Main Screen (6 digits)	
<b>Operation Mode</b>	Display: - Current Measurement Value - Measurement value activated via the info buttons
<b>Programming Mode</b>	Display: - Parameter - Parameter Content
<b>Simulation Mode</b>	Display: - Simulated Measurement Value
2. Auxiliary Display (12-digit alpha-numeric display with scroll function)	
<b>Operation Mode</b>	Display: - Units selected in P104 - Short-term relay status change - Messages and displays that can be called up via the info buttons
<b>Programming Mode</b>	Display: - Explanation of parameter functions - Input suggestions and their description

Fig. 28-1 Indication of the handheld programmer on the PC screen and display

## 29 Principles of Operation

The entire operation is menu-driven, supported by explanatory graphics. The following table describes the function of the individual function keys. A distinction is made between the functions of the **operation mode** and the **programming mode**.

Keys	Operation Mode	Programming Mode
	No Function	No Function
	Indication of echo quality, echo strength, interference noise, average, peak and temperature	No Function
	No Function	Resetting the current parameter to the default setting
	Display of the mA value at the output	No Function
	Display of empty space, fill level, distance and trend rate	Switching the relay switching points from % indication to absolute value indication
	No Function	- Jump back to higher menu level - Deleting faulty entries
	No Function	- Moving to the left on the menu levels - Scroll parameters backwards
	No Function	- Moving to the right on the menu levels - Scroll parameters forward
	Confirming the code word to switch to programming mode	- Confirm entries (menu items, parameter contents) - Confirm queries of the NivuMaster
	No Function	Specification of negative values
	Indication of device type and software revision	Entering decimal points
	1997 – Entering the code word	Entering numerical values

Tab. 4 Function Keys: Operation Mode vs. Programming Mode

## 30 Before Switching On

The following things must be checked **before** switching on.

- Is the NivuMaster L2 mounted correctly?
- Is the power supply connected properly?
- Has the sensor been installed according to the instructions?
- Are the relays connected correctly?
- Is the voltage selector switch set correctly?

**When** the NivuMaster L2 is switched on, the unit goes into operation mode. If the sensor is already connected, the distance from the sensor to the medium is output, provided the correct sensor has been set in P101 (factory setting: P-Series sensor P06).

## Programming

### 31 Programming

#### 31.1 Quick Start

A quick start function is available for standard applications.

During programming, the user is also asked for relay functions, but has no influence on the assignment of relay functions to a specific relay.

If the **relays have already been connected before commissioning**, the question for alarm and control function must be answered with **NO** (in the quick start function). The relays can be programmed separately later.

The advantage of the quick start is mainly that the NivuMaster guides the user to all important parameters. For the experienced programmer, however, the quick start offers few advantages.

#### 31.2 Principles of the Parameterisation

**1997** Enter this number as the access code for the NivuMaster L2 and then confirm this number with "E".



##### **Important Notice**

*Only give the access code to authorised persons.*

*Do not leave the code next to the device or write it on the device by hand.*

*The access code protects against unauthorised access.*



##### **Note**

*These operating instructions describe all programming options of the NivuMaster L2. One analogue output and two relay outputs are available.*

After termination of the parameterisation mode, the unit continues to operate with the previously set values. After approx. 20-30 seconds the NivuMaster L2 is ready for operation again.

- ➡ After mounting and installing the sensor and transmitter (see previous chapters), activate the power supply to the unit.

#### 31.3 Operating Conditions

The NivuMaster L2 has three different operating conditions (modes):

- Operation Mode
- Programming Mode
- Simulation and Test Mode

##### 31.3.1 Operation Mode

The L2 automatically switches to operation mode after being switched on, or after entering the parameters in programming mode, the NivuMaster L2 is switched to operation mode. To do this, the corresponding question: "Operation?" must be confirmed by pressing the ENTER key.

In operation mode, the transmitter records the measured value set in P100, e.g. distance, empty space or level.

All programmed relays switch **On** or **Off** according to their programming when the switching points are reached.  
 The value at the mA output corresponds to the measured value, unless programmed otherwise.  
 The function keys can be used to query further data during operation.

### 31.3.2 Programming Mode

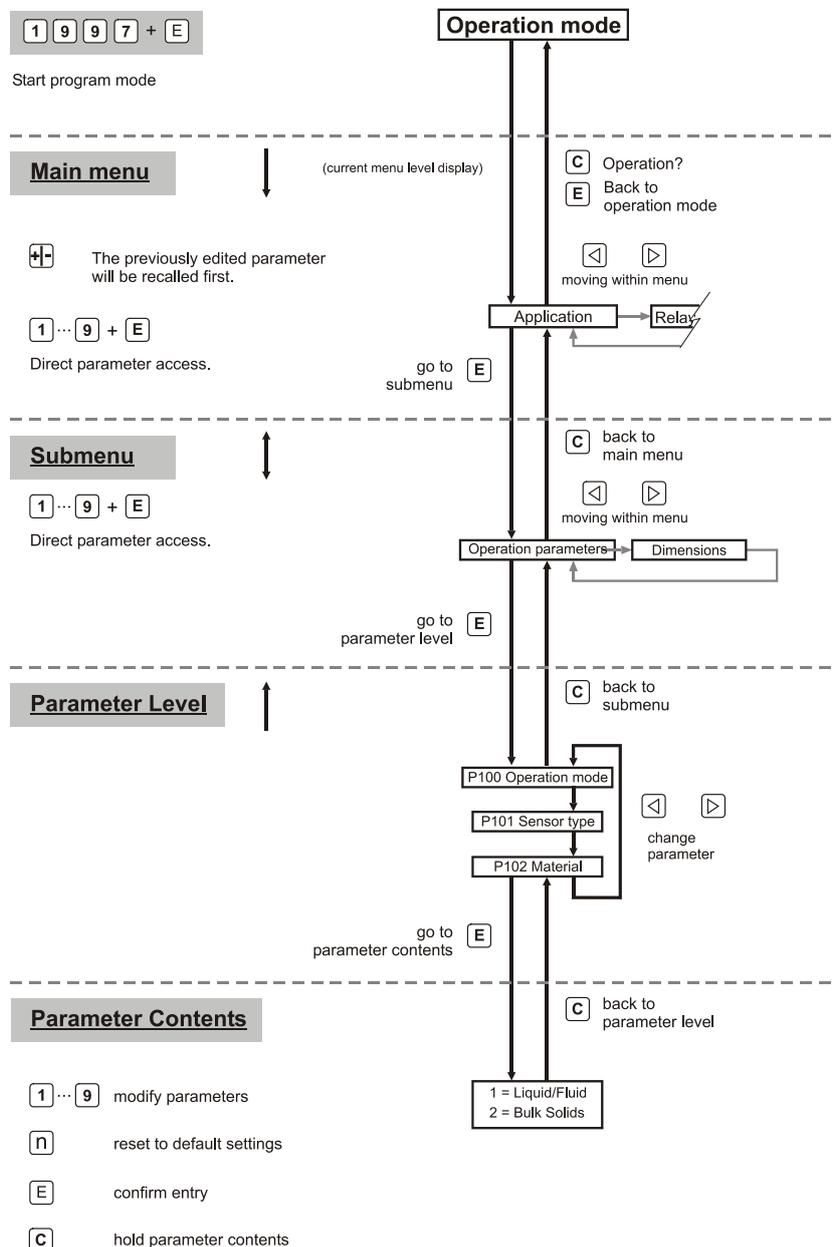
In programming mode, the settings and parameter entries of the NivuMaster L2 are made. From the operation mode, you can enter the programming mode by entering the code word. This is done as follows:

**1997** Press these keys and confirm with ENTER.



#### Note

*If no input is made in programming mode for a period of 15 minutes, the NivuMaster automatically goes back to operating mode.*



**Fig. 31-1 Device Operation**

### 31.3.3 Simulation and Test Mode

With the simulation mode, different operating conditions can be simulated, independent of the current fill level. In this way, connected circuits can be checked for their function. During the simulation, you can choose between a "Soft Test" and a "Hard Test". The relays do not respond during the "Soft Test". During the "Hard Test", the relays respond too.

Furthermore, a distinction can be made between "Manual" and "Auto" in the simulation. With the "Auto" setting, the level changes up and down automatically within the programmed measuring span. With "Manual", the fill level changes by pressing the arrow keys.

The rate of change and step size can be specified via parameters. Pressing the "C" key terminates the simulation mode. The device is now in programming mode again.

### 31.4 Starting the Programming Mode

➡ Procedure:

**1997** Press these keys.

The display shows the message > **Code Word?** < and after entering the number, a > - <. Pressing the ENTER key confirms the code word. The display shows the message > **Please Wait** <, followed by the first item of the main menu: > **Quick Start** <.

### 31.5 Resetting the Parameters

All parameters can be reset to factory settings via parameter P930. It is always recommended to reset the parameters to factory settings before each commissioning.

➡ Procedure:

1. When you are in the main menu, press the > **930** < keys to access the parameter. During input, the message > **Par. Selection** < appears in the display.
2. After pressing the button, > **0** < and the message > **Reset Param.** < appear in the display.
3. Enter > **1** < and then ENTER to activate the function.
4. By confirming the query > **Enter if Ok** <, the parameters are reset. During the reset, the message > **Please wait** < appears, and after completion > **P930 Reset Param.** <.
5. Use the "C" key to jump back to the main menu

### 31.6 Back to Operation Mode

No matter where you are in the menu, pressing the "C" key repeatedly will take you to the prompt > **Operation?** <.

Press the ENTER key to confirm that you want to change to the operation mode.

### 31.7 Programming Relays



**Important Notice**

All relay switching points are entered as level (referred to the zero point set in P105). These are independent of the operating mode set in P100.

Basic requirements for the following examples:

- The switching cycles of the relay are not taken into account during programming (P217/227).
- The Fail Safe behaviour has always been left at the factory setting.

### 31.8 Level Alarm

**Max. Alarm**

Programming Relays	
Relay No. 1	
P210 = 1	Alarm relay in closed-circuit mode
P211 = 1	Level Alarm
P212 = 2*	Max. Alarm
P213 = 2 (m)	Switching point 1
P214 = 1.8 (m)	Switching point 2

\* if a relay is programmed as a max. alarm, the higher value is used as the switch-on point and the lower value is used as the switch-off point, regardless of the entry of the switching points in P213 and P214.

Programming Relays	
Relay No. 1	
P210 = 1	Alarm relay in closed-circuit mode
P211 = 1	Level Alarm
P212 = 1*	General Alarm as Max. Alarm
P213 = 2.0 (m)	Switch-on point
P214 = 1.8 (m)	Switch-off point

\* if a relay is programmed as a general alarm, P213 is always the switch-on point and P214 the switch-off point.

**Min. Alarm**

Programming Relays	
Relay No. 1	
P210 = 1	Alarm relay in closed-circuit mode
P211 = 1	Level Alarm
P212 = 4*	Min. Alarm
P213 = 0.5 (m)	Switching point 1
P214 = 0.7 (m)	Switching point 2

\* if a relay is programmed as a min. alarm, the lower value is used as the switch-on point and the higher value is used as the switch-off point, regardless of the entry of the switching points in P213 and P214.

Programming Relays	
Relay No. 1	
P210 = 1	Alarm relay in closed-circuit mode
P211 = 1	Level Alarm
P212 = 1*	General Alarm as Min. Alarm

P213 = 0.5 (m)	Switch-on point
P214 = 0.7 (m)	Switch-off point

\* if a relay is programmed as a general alarm, P213 is always the switch-on point and P214 the switch-off point.

## 31.9 Error Message

Programming Relays	
Relay No. 1	
P210 = 1	Alarm relay in idle mode
P211 = 3	Alarm at echo loss
P809 = 2 (Min.)	Time period from detection of the error until the relay switches.

## 32 Parameter Directory

The factory setting of the parameters is marked with > **F** = < or in **bold letters**.

### Main Menu

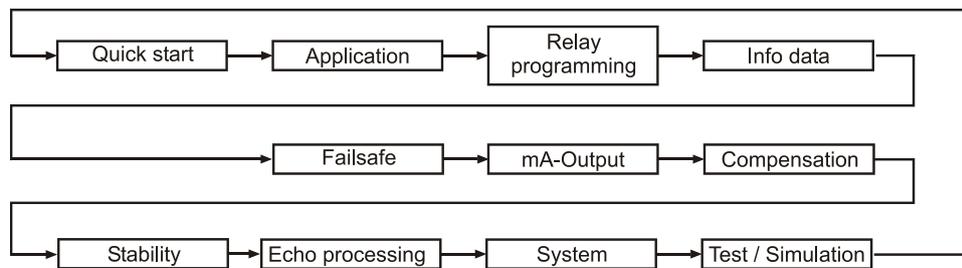


Fig. 32-1 Programming overview "Main Menu"

### 32.1 Applications

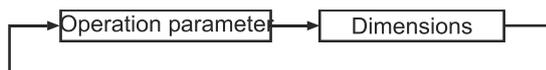


Fig. 32-2 Overview "Applications"

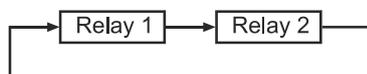
#### Operating Parameters

Parameters	Name / Version	Description
100	Operation Mode	Selection of the value that is shown in the display. 0=Off; <b>1=Distance</b> ; 2=Level; 3=Empty Space
101	Sensor Type	Entry of the connected sensor. 1=P03; <b>2=P06</b> ; 3=P10; 4=P15; 5=P25; 6=P40; 9=R16; 10=R08; PS6

**Dimensions**

Parameters	Name / Version	Description
104	Units	Entry of the measurement unit. <b>1=Meter</b> ; 2=cm; 3=mm; 4=feet; 5=inches
105	Empty Distance	Entry of the distance between sensor and the zero point of the measurement. F=6 m
106	Measurement span	Entry of the measurement span from the zero point to the maximum level value. F=5.7 m The measurement span is assigned to the mA output automatically. In principle, it is also possible to set the measuring span larger than the zero point. However, the measurement only works up to the beginning of the blanking.
107	Near Blanking	Entry of the distance from the emitting surface at which a measurement is not possible due to the sensor ringdown. The range can be increased if necessary, but never entered smaller than the factory setting <b>F=0.3 m</b> (with P-Series Sensor P-06).
108	Far Blanking	Entry of the range in percent by which the measuring range is increased. This way, echoes below the zero point can still be evaluated properly. F=20 %

**32.2 Programming Relays**



**Fig. 32-3 Overview "Programming Relays"**

The relay functions for relay 1 are described below.  
This applies for relay 2 accordingly

- Relay 1: Parameters P210 to 218
- Relay 2: Parameters P220 to 228

**Relay 1**

**Programming Alarm Functions**

Parameters	Name / Version	Description
210	R1 Type	Sets the mode of operation of the relay.
	0=no Function	When switched off, the relay is de-energised. This state corresponds to the relay position drawn in the wiring diagram.
	1=Alarm	Alarm functions all work according to the closed-circuit current principle, i.e. in the alarm state the relay is energised.
211	R1 Function	Indicates the measurement variable or value to which the alarm refers.
	0=Off	Relay has no function.
	1=Level	The switch-on and switch-off points to be programmed refer to the measured level.

	2=Temperature	The switch-on and switch-off points to be programmed refer to the temperature measured on the sensor.
	3=Echo Loss	No switch-on and switch-off points can be defined, as the echo loss is independent of the fill level. Relay reacts according to the time set in P809.
	4=Clock Error	In the event of an error in the internal system clock, an alarm is issued. No further parameters need to be entered.
212	R1 Alarm Type	The alarm type determines the function of the subsequent switch points P213, P214 when P211=1 or 2. If P211=3 or 4, no function.
	1=General	The relay switches ON at P213 and OFF at P214.
	2=Max. Alarm	The alarm is always ON at the higher level value and OFF at the lower level value, regardless of the entry in P213 and P214.
	3=Max. Max Alarm	The alarm is always ON at the higher level value and OFF at the lower level value, regardless of the entry in P213 and P214.
	4=Min. Alarm	The alarm is always ON at the lower level value and OFF at the higher level value, regardless of the entry in P213 and P214.
	5=Min. Min. Alarm	The alarm is always ON at the lower level value and OFF at the higher level value, regardless of the entry in P213 and P214.
	6=In Band Alarm	The alarm is ON within the limits of P213 and P214 and OFF outside.
	7=Out of Band Alarm	The alarm is ON outside the limits of P213 and P214 and OFF within.
213	R1 Switching point 1	Entry of the level (e.g. if P212=1 then switch-on point).
214	R1 Switching point 2	Entry of the level (e.g. if P212=1 then switch-off point).
217	R1 Switching cycles	Here the number of relay switching cycles is shown.
218	Error mode	Entry of how the relay should behave in the event of an error. <b>0=Factory setting (P808); 1=Hold; 2=De-energise; 3=Energise</b>

## Programming Control Functions

Parameters	Name / Version	Description
210	R1 Type	Sets the mode of operation of the relay.
	0=no Function	When switched off, the relay is de-energised. This state corresponds to the relay position drawn in the wiring diagram.
	2=Control (Control)	Control functions all work according to the open-circuit principle, i.e. in the control state the relay is energised.
211	R1 Function 1	Indicates the measurement variable or value to which the alarm refers.

	0=Off	Relay has no function.
	1=Gen. Alarm	The relay switches ON at P213 and OFF at P214.
212	R1 Alarm Type	Sets the advanced control functions.
	1=Fixed Setting	The relay switches ON at P213 and OFF at P214.
	2=Alternating	Pumps with cyclic swapping (alternating), when the switching points are reached, all pumps always work (relay).
213	R1 Switching point 1	Entry of the level (e.g. if P211=1 then switch-on point).
214	R1 Switching point 2	Entry of the level (e.g. if P211=1 then switch-off point).
217	R1 Switching cycles	Here the number of relay switching cycles is shown.
218	Error mode	Entry of how the relay should behave in the event of an error. <b>0=Factory setting (P808); 1=Hold; 2=De-energise; 3=Energise</b>

#### Relay 2

Relay 2: P220 to 228 analogous to Relay 1

### 32.3 Info Data

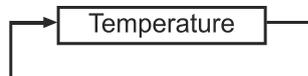


Fig. 32-4 Overview "Info Data"

#### Temperature

Parameters	Name / Version	Description
580	Min. Value Temperature	Display of the measured min. temperature.
581	Date P580	Display of the date when the min. temperature was measured.
582	Time P580	Display of the time when the min. temperature was measured.
583	Max. Value Temperature	Display of the measured max. temperature.
584	Date P583	Display of the date when the max. temperature was measured.
585	Time P583	Display of the time when the max. temperature was measured.
586	Current Temperature	Display of the currently measured temperature.

### 32.4 Error mode

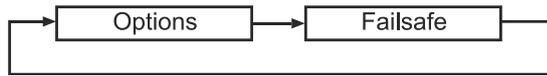


Fig. 32-5 Overview "Error Mode"

#### Options

Parameters	Name / Version	Description
801	Decimal Places	F=2

#### Error Mode (Fail Safe)

Parameters	Name / Version	Description
P808	Error Mode	Entry of how the display and the mA output should behave in the event of an error (e.g. echo loss) after the error time P809 has elapsed. <b>1=Hold</b> (last measured value is held), <b>2=Max</b> (display and mA output go to max. value), <b>3=Min</b> (display and mA output go to min. value)
809	Error Time	Enter the length of time after an error occurs before the error function is activated. <b>F=1</b> Minute

### 32.5 mA output

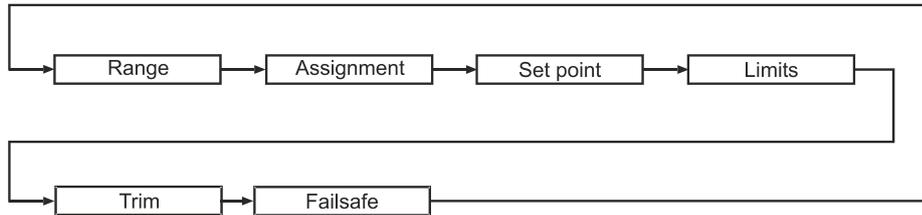


Fig. 32-6 Overview "mA Output"

#### Range

Parameters	Name / Version	Description
830	mA Range	0=Off Output blocked, 1=0-20 mA → 0 %=0 mA / 100 %=20 mA (related to P831), <b>2=4-20 mA</b> → 0 %=4 mA / 100 %=20 mA (related to P831), 3=20-0 mA → 0 %=20 mA / 100 %=0 mA (related to P831), 4=20-4 mA → 0 %=20 mA / 100 %=4 mA (related to P831)

#### Assignment

Parameters	Name / Version	Description
831	mA Assignment	<b>0=Operation Mode (P100),</b> 1=Distance, 2=Level, 3=Empty Space

### Limit Values

Parameters	Name / Version	Description
834	Min. Level	F=0 in measurement unit P104
835	Max. Level	F=Span P106 in measurement unit P104

### Limits

Specification of mA values that must not be exceeded or fallen short of during operation.

Parameters	Name / Version	Description
836	Min. Limit	F=0 mA (entry in mA)
837	Max. Limit	F=20 mA (entry in mA)

### Fine Trim

Parameters	Name / Version	Description
838	Low Value	F=0.00 -> Entry of deviation in $\pm$ mA
839	High Value	F=0.00 -> Entry of deviation in $\pm$ mA

### Error mode for mA output separate

Parameters	Name / Version	Description
840	Error mode	0=Value from P808 1=Hold 2=Min. 3=Max.

## 32.6 Compensation

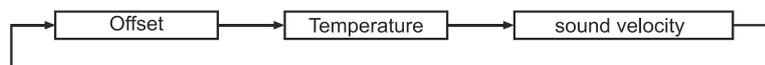


Fig. 32-7 Overview "Compensation"

### Offset

Parameters	Name / Version	Description
851	Offset Value	Entry of the Measurement Value Offset. This value will influence the mA output and the relay switching points. F=0

### Temperature

Parameters	Name / Version	Description
852	Temp. Source	1=Automatic 2= fixed setting (P854)
854	Fixed Temp.	F=20 °C
857*	Temperature Calibration	F=20 °C

\* Temperature calibration should always be carried out for cable lengths over 100 metres to avoid incorrect measurements due to a temperature error.  
Can be performed only using access code "552621".

**Sound Velocity**

Parameters	Name / Version	Description
860*	Ultrasound Transit Time	<b>F=342</b> , 720 m/s (at 20 °C)

\* Can be performed only using access code "552621".

**32.7 Stability**

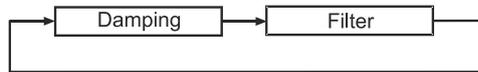


Fig. 32-8 Overview "Stability"

**Damping**

Parameters	Name / Version	Description
870	Damping Rising	Enter the damping of the rising level in units/min. <b>F=10 m/min.</b> lower values=greater damping higher values=lower damping
871	Damping Falling	Enter the damping of the falling level in units/min. <b>F=10 m/min.</b> lower values=greater damping higher values=lower damping

This damping will influence only the mA output. It has no effect on the evaluation speed of the NivuMaster L2.

If the measurement lags behind the level despite low damping, the reason is the speed of the echo evaluation. This can be changed by using service parameters.

**Filters**

Parameters	Name / Version	Description
881	Fixed Distance	Width of measurement Window. In each case before and after the reading. F=0.2m Total width = 0.4 m = 0.2 m + 0.2 m

**32.8 Echo Processing**



Fig. 32-9 Overview "Echo Processing"

**Sensor No 1**

Parameters	Name / Version	Description
900	Condition No. 1	Display of the current sensor condition. 0=ok; 1=Inactive; 2=Error; 3=No Sensor
901	Echo Quality 1	Display of the echo quality in %. Measure of certainty that the echo evaluated is the correct echo.
902	Amplitude 1	Display of the amplitude level of the evaluated echo.
903	Noise Average	Display of the average noise level.
904	Noise Peak	Display of the noise peak value.
905	Sensitivity 1	Setting the min. value of the DATEM baseline. <b>F=5.0 dB</b>

### 32.9 System

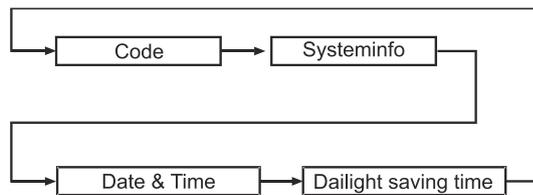


Fig. 32-10 Overview System

#### Password

Parameters	Name / Version	Description
921	Activation?	Switching the password function On or Off. <b>1=On</b> , 0=Off, the access Programming Mode via "E" key.
922	Input code	Change password for programming access. F=1997

#### System Info

Parameters	Name / Version	Description
926	Software Revision	Display of the current software revision.
927	Hardware Revision	Display of the hardware revision (boards).
928	Serial Number	Display of the internal serial number.
929	No. of measurement place	Allows customers to freely specify a measurement place F=1
930	Reset Parameter	Resetting the parameters to default settings. <b>0=no</b> , 1=yes

#### Date & Time

Parameters	Name / Version	Description
931	Date	Input of the current date.
932	Time	Input of the current time.
933	Data Format	Select the format of the date setting. <b>1=DD:MM:YY</b> , 2=MM:DD:YY, 3=YY:MM:DD (D=Day, M=Month, Y=Year)

#### Time Switchover

Parameters	Name / Version	Description
970	Daylight saving time?	Activate daylight saving time switchover? <b>0=No</b> , 1=Yes
971	Time Difference	Time shift for daylight saving time. F=+1 hour
972	Start Time	Time when the switchover is to take place. F=02:00 o'clock
973	Start Day	Input of the weekday. 2=Mo, 3=Tu, 4=We, ..... <b>8=Su</b>
974	Start Week	Input of the week. 1=We.1, 2=Wo.2, 3=Wo.3, 4=Wo.4, <b>5=last We.</b>

<b>975</b>	Start Month	Input of the month. 1=Jan, 2=Feb, <b>3=Mar</b> , .....12=Dec
<b>976</b>	End Time	Time when the switchover is to take place. F=02:00 o'clock
<b>977</b>	End Day	Input of the weekday. 2=Mo, 3=Tu, 4=We, ..... <b>8=Su</b>
<b>978</b>	End Week	Input of the week. 1=We.1, 2=Wo.2, 3=Wo.3, 4=Wo.4, <b>5=last We.</b>
<b>979</b>	End Month	Input of the month. 1=Jan, 2=Feb, ..... <b>10=Oct</b> ,... 12=Dec

## 32.10 Test / Simulation

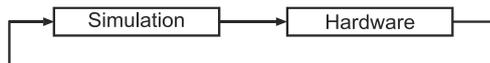


Fig. 32-11 Overview "Test / Simulation"

### Simulation

Parameters	Name / Version	Description
<b>980</b>	Simulate	<b>0=Off</b> , 1=Manual Soft, 2=Auto Soft, 3=Manual Hard, 4=Auto Hard
<b>981</b>	Step Width	Input of the step width for the simulation. F=0.25m
<b>982</b>	Trend Rate	Input of the rate of change. F=1 Min.

### Transmitter

Parameters	Name / Version	Description
<b>992</b>	mA output	Preset of the mA output value. F=0.00 mA
<b>993</b>	Relays Test	1=Relay 1 On/Off 2=Relay 2 On/Off
<b>994</b>	Sensor Test	Checking the sensor line. <b>0=Off</b> , any other key=100 transmit pulses

### 33 Service Parameters



**Note**

*The service parameters must be selected directly. They cannot be accessed via the menu navigation.*

**Sensor**

With > Set DATEM 1 < the course of the DATEM line (mask line) can be influenced. When activating the parameter, the setting of the previous mask line is deleted.

To be able to observe the operation of the function, the NivuMaster evaluation software PC Software Suite (BlackBox PC) is required.

Parameters	Name / Version	Description
20	Set DATEM 1	0=Cancel The process can be cancelled by entering 0. 1=Mask The DATEM line will be stretched over the raw echo within the entire measurement range. This may be necessary if e.g. in distance applications the target is situated out of the measurement range on the initial start-up. 2=Default Due to the sensor type the DATEM line will be reset to factory value. After that the unit begins to mute any false echoes prior to the effective echo.



**Note**

*When commissioning a new unit, the DATEM curve should always be reset to the factory setting (2) with parameter P20.*

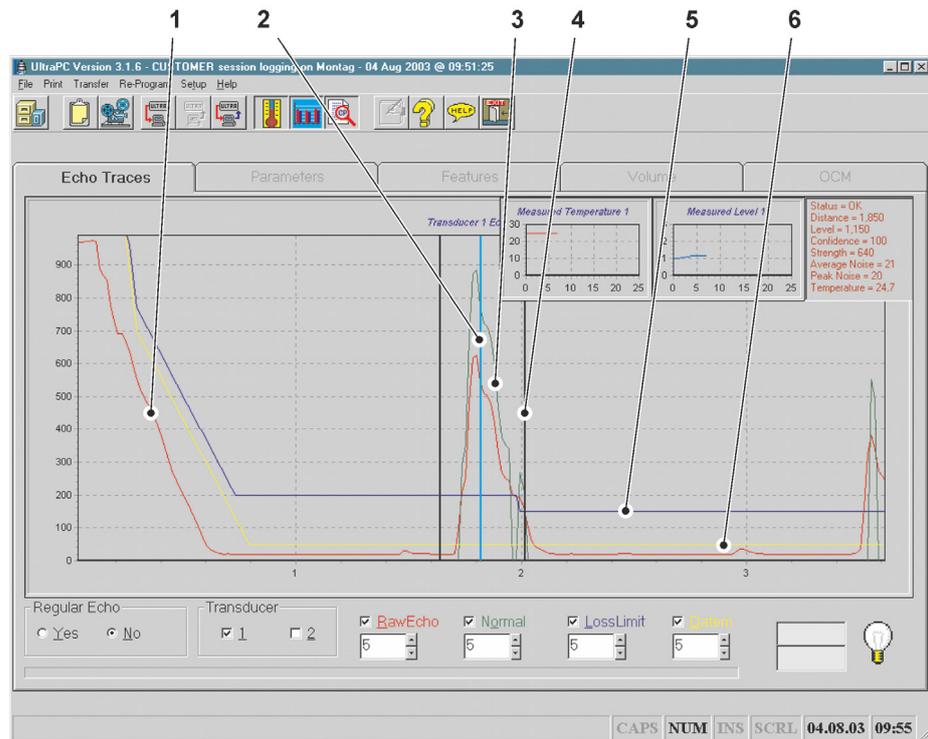
Parameters	Name / Version	Description
21	Select Echo	Entry: value in pre-set unit (P104). Distance of "correct" echo measured from sensor face in the selected unit.



**Note**

*Parameter P21 is required if e.g. a higher level than the current level is put out. You then can set the "correct" distance to the material on the NivuMaster. All interferences before will be masked out and muted.*

### 34 Echo Profile



- 1 Raw Echo (red trace)
- 2 Measurement
- 3 Normalisation (green trace)
- 4 Gate
- 5 Response Threshold (blue trace)
- 6 DATEM (yellow trace)

**Fig. 34-1 Echo profile, display with NivuMaster software BlackBox PC**

## Error Description

### 35 Troubleshooting

Symptom	Reason	What to do
No function on turn-on.	No power supply.	- Check power supply voltage. - Check mains fuse (on AC operation only, on DC operation a temperature fuse is used).
	If the power supply is in proper condition maybe the unit is defect.	Contact NIVUS GmbH.
The NivuMaster indicates a level reading above the actual filling level.	Large interference echo (e.g. caused by conductor, pipe or filling) above the current level disables the "correct" echo to be evaluated.	Entering the "correct" level as distance from the sensor in parameter 21 will mask the interference before the sensor. Basically it is recommended to place the sensor in a way that the effective echo can be evaluated without the help from NivuMaster service parameters. Further it must be taken into account to avoid the sound beam to cross feeder flows.
The NivuMaster indicates a level reading below the actual filling level.	The NivuMaster evaluates a double echo (multiple reflexion). This phenomenon mainly appears at measurements in closed stand-pipes or narrow vessels. The acoustic energy cannot escape from here causing a very high number of double echoes.	The evaluation mode of the NivuMaster L2 must be adjusted. To do this please contact NIVUS GmbH.
	The correct echo is too close to the sensor face. It disappears within the near blanking distance area (P107) and thus cannot be processed. This will cause a double echo to be displayed.	Check the blanking distance (P107) of the sensor and adjust if necessary. However, it must not be set lower than the minimum value. If adjustment is not possible re-install the sensor a little higher or physically reduce the maximum filling level.

## 36 Error Messages

Message	Reason	What to do
<b>No Sensor</b>	No sensor connected or cable break in sensor line.	<ul style="list-style-type: none"> <li>- Wiring correct? Check terminal clamps.</li> <li>- Is the sensor still firing? Does the sensor supply clock signals? Check the sensor supply voltage. It must be set to 24 V DC on the terminals. At least 18 V DC are required for the sensor to ensure correct operation. If the voltage difference is too high you eventually must use a cable with lower damping or higher diameter instead.</li> </ul>
<b>Errors</b>	The unit is in failsafe status. This means that an error has exceeded the duration of error time P809.	Check the sensor for proper function. Check error mode, increase error time (P809) if possible.
<b>Echo loss</b>	The NivuMaster does not find an echo that meets the programmed selection criteria.	Check programming. View echo profile with NivuMaster BlackBox PC software to find out the reason for echo loss.
	The sensor used does not have enough transmitting power.	Use a sensor type with higher power or, if possible, mount the sensor lower.

## 37 LED Status / Error Display (Image Variants)

Green	Red	Run Mode
OFF	OFF	No supply to the unit or in power save mode.
Constant ON	Constant ON	Internal Error
Flashing slowly	Flashing slowly	Sensor Error
OFF	Flashing slowly	Fail Safe / Echo Loss
Flashing slowly	OFF	Working status, unit running normally.

## Maintenance and Cleaning

---

### WARNING



#### **Disconnect the System from Mains Power**

*Disconnect the unit from the mains and secure the higher system against being switched on again before starting maintenance, cleaning and/or repair work (only by qualified personnel).*

*Disregarding may lead to electric shock.*

---

### WARNING



#### **Germ Contamination**

*Due to the frequent use of the sensors in the waste water sector, parts can be contaminated with dangerous germs. Therefore, appropriate precautions must be taken when coming into contact with cables and sensors.*

*Wear protective clothing.*

---

## 38 Maintenance

### 38.1 Maintenance Interval

The Type NivuMaster L2 transmitter is virtually free of maintenance and wear by design. Nevertheless, NIVUS recommend an **annual check** of the entire measuring system by the NIVUS customer service.

Depending on the area of application of the measuring system, the maintenance interval may vary. The scope of maintenance and its intervals depend on the following factors:

- Material wear
- General regulations for the operator of the measurement system
- Environmental conditions

In addition to the annual maintenance, NIVUS recommend a complete maintenance of the measuring system by the NIVUS customer service after **ten years at the latest**.

Generally the verification of instruments and sensors is a basic measure in order to improve operational reliability and to increase the lifetime.

### 38.2 Customer Service Information

For the recommended annual inspection of the entire measuring system or complete maintenance after ten years at the latest, contact our customer service:

#### **NIVUS GmbH - Customer Centre**

Phone +49 7262 9191-922

[customercenter@nivus.com](mailto:customercenter@nivus.com)

## 39 Cleaning

### 39.1 Transmitter

#### WARNING



#### ***Disconnect the System from Mains Power***

*Make sure that the device is disconnected from mains power.*

*Disregarding may lead to electric shock.*

If necessary, clean the transmitter enclosure with a dry lint-free cloth. In case of heavier dirt, you can wipe the enclosure with a damp cloth. **Do not** use aggressive cleaning agents or solvents.

Mild household cleaners or soap suds can be used.

### 39.2 Transducers

Be sure to follow the instructions for maintenance and cleaning of the sensors. These instructions can be found in the respective technical description or instruction manual.

The manual is part of the sensor delivery.

If a sensor has to be removed for cleaning, be sure to switch off the transmitter before removing it. This is the only way to ensure that the mask line is maintained and does not adapt to the "wrong" environment when removed. In addition, the installation position must be clearly marked for later re-installation.

When installing the sensor, make sure that the installation position is identical to the position when removing it. If this is not the case, it can lead to the display of incorrect readings under certain circumstances.

## 40 Dismantling/Disposal

Improper disposal may be harmful to the environment.

➡ Dispose of device components and packaging materials in accordance with the applicable local environmental regulations for electrical products:

1. Disconnect the device from mains power.
2. Remove connected cables from the device by using appropriate tools.
3. Remove the transmitter and dispose of it properly if necessary.
4. Remove the buffer battery from the transmitter and dispose of it separately and properly.



#### ***EU WEEE Directive***

This symbol indicates that the requirements of Directive 2012/19/EU on waste electrical and electronic equipment must be observed when disposing of the device. NIVUS GmbH support and promote the recycling or environmentally sound, separate collection/disposal of waste electrical and electronic equipment to protect the environments and human health. Observe the local laws and regulations on disposal.

NIVUS GmbH is registered with the EAR, therefore public collection and return points in Germany can be used for disposal.

***The device is equipped with a buffer battery (lithium button cell) that must be disposed of separately.***

## 41 Installation of Spare Parts and Wearing Parts

We expressly draw your attention to the fact that spare parts and accessories which have not been supplied by us have also not been tested and approved by us. The installation and/or use of such products may therefore negatively alter or invalidate the design properties of your measurement system.

NIVUS are not liable for damage caused by the use of non-original parts and non-original accessories.

## Parameter List

Parameters	NivuMaster L2: Variants	Entry
100	Operation Mode	
	<b>1=Distance</b> ; 2=Level; 3=Empty Space	
101	Sensor Type	
	1=P-03; <b>2=P-06</b> ; 3=P-10; 4=P-15; 5=P-25; 6=P40; 9=R16; 10=R08	
104	Units	
	<b>1=Meter</b> ; 2=cm; 3=mm; 4=feet; 5=inches	
105	Empty Distance	
	F=6.00m	
106	Measurement span	
	F=5.70m	
107	near blanking	
	F=0.30m	
108	Far Blanking	
	F=20 %	
210	Relay 1 Type	
	<b>0=Off</b> ; 1=Alarm	
211	Relay 1 Function	
	<b>0=Off</b> ; 1=Level; 2=Temperature; 3=Echo Loss; 4=Clock Error	
<b>if P211=1 or 2. If P211=3 or 4, P212 - P214 do not have any function</b>		
212	Relay 1 Alarm Type	
	<b>1=General Alarm</b> ; 2=Max; 3=Max-Max; 4=Min; 5=Min-Min; 6=In-Bounds; 7=Out-Of-Bounds	
213	Relay 1 Switching Point 1	
	Switch-On-Point or High Switching Point (In-/Out-Of-Bounds Alarm)	
214	Relay 1 Switching Point 2	
	Switch-Off-Point or Low Switching Point (In-/Out-Of-Bounds Alarm)	
217	Relay 1 Switching Cycles	
218	Relay 1 Error Mode	
	<b>0=Factory setting (P808)</b> ; 1=Hold; 2=De-energise; 3=Energise	
220	Relay 2 Type	
	<b>0=Off</b> ; 1=Alarm	
221	Relay 2 Function	
	<b>0=Off</b> ; 1=Level; 2=Temperature; 3=Echo Loss; 4=Clock Error	
<b>if P221=1 or 2. If P221=3 or 4, P222 - P224 do not have any function</b>		
222	Relay 2 Alarm Type	
	<b>1=General Alarm</b> ; 2=Max; 3=Max-Max; 4=Min; 5=Min-Min; 6=In-Bounds; 7=Out-Of-Bounds	
223	Relay 2 Switching Point 1	
	Switch-On-Point or High Switching Point (In-/Out-Of-Bounds Alarm)	
224	Relay 2 Switching Point 2	
	Switch-Off-Point or Low Switching Point (In-/Out-Of-Bounds Alarm)	
227	Relay 2 Switching Cycles	

Parameters	NivuMaster L2: Variants	Entry
228	Relay 2 Error Mode	
	<b>0=Factory setting (P808); 1=Hold; 2=De-energise; 3=Energise</b>	
580	Min. Value Temperature	
	Read Only	
581	Min. Temperature Date	
	Read Only	
582	Min. Temperature Time	
	Read Only	
583	Max. Value Temperature	
	Read Only	
584	Max. Temperature Date	
	Read Only	
585	Max. Temperature Time	
	Read Only	
586	Current temperature	
	Read Only	
801	Decimal Places	
	F=2	
808	Error mode	
	<b>1=Hold; 2=Max.; 3=Min.</b>	
809	Error Time	
	F=1 Minute	
830	mA Range	
	0=Off; 1=0-20mA; <b>2=4-20mA</b> ; 3=20-0mA; 4=20-4mA	
831	mA Assignment	
	<b>0=Operation Mode (P100); 1=Distance; 2=Level; 3=Empty Space</b>	
834	Min. Level	
	F=0.00m	
835	Max. Level	
	F=Measurement Span	
836	Min. Limit	
	F=0 mA	
837	Max. Limit	
	F=20 mA	
838	Low Value	
	F=0.00 mA	
839	High Value	
	F=0.00 mA	
840	Error mode	
	<b>0=Value from P808; 1=Hold; 2=Min.; 3=Max.</b>	
851	Offset Value	
	F=0m	
852	Temp. Source	
	<b>1=Automatic; 2= fixed setting</b>	
854	Fixed Temp.	
	F=20 °C	

Parameters	NivuMaster L2: Variants	Entry
857	Temperature Calib.	
	F=current measured temperature at the sensor	
860	Ultrasound Transit Time	
	F=342, 720 m/s	
870	Damping Rising	
	F=10 m/min	
871	Damping Falling	
	F=10 m/min	
881	Fixed Distance	
	F=0.2 m	
900	Condition No. 1 (Read only <b>0=Ok</b> ; 1=Inactive; 2=Error; 3=No Sensor)	
901	Echo Quality	
	Read Only	
902	Amplitude	
	Read Only	
903	Noise Average	
	Read Only	
904	Noise Peak	
	Read Only	
905	Sensitivity	
	F=5.0 dB	
921	Password Activation? 0=No; 1=Yes	
922	Input code	
	F=1997	
926	Software Revision	
	Read Only	
927	hardware revision	
	Read Only	
928	serial number	
	Read Only	
929	No. of measurement place	
	F=Serial Number	
930	Reset Parameter 0=No; 1=Yes	
931	Date	
	F=DD:MM:YY	
932	Time	
	F=HH:MM	
933	Data Format	
	<b>1=DD:MM:YY</b> ; 2=MM:DD:YY; 3=YY:MM:DD	
970	Daylight saving time? 0=No; 1=Yes	
971	Time Difference	
	F=01:00 Hr	

Parameters	NivuMaster L2: Variants	Entry
972	Start Time	
	F=02:00 o'clock	
973	Start Day	
	2=Monday; 3=Tuesday; 4=Wednesday; 5=Thursday; 6=Friday; 7=Saturday; <b>8=Sunday</b>	
974	Start Week	
	1=Week 1; 2=Week 2; 3=Week 3; 4=Week 4; <b>5=last Week</b>	
975	Start Month	
	1=Jan.; 2=Feb.; <b>3=March</b> ; 4=April; 5=May; 6=June; 7=July; 8=Aug.; 9=Sep.; 10=Oct.; 11=Nov.; 12=Dec.	
976	End Time	
	F=02:00 o'clock	
977	End Day	
	2=Monday; 3=Tuesday; 4=Wednesday; 5=Thursday; 6=Friday; 7=Saturday; <b>8=Sunday</b>	
978	End Week	
	1=Week 1; 2=Week 2; 3=Week 3; 4=Week 4; <b>5=last Week</b>	
979	End Month	
	1=Jan.; 2=Feb.; 3=March; 4=April; 5=May; 6=June; 7=July; 8=Aug.; 9=Sep.; <b>10=Oct.</b> ; 11=Nov.; 12=Dec.	
980	Simulate	
	<b>0=Off</b> ; 1=Manual Soft; 2=Auto Soft; 3=Manual Hard; 4=Auto Hard	
981	Step Width	
	F=0.25m	
982	Trend Rate	
	F=1 Min.	
992	Test mA Output	
	F=0.00 mA	
993	Relays Test	
	1=Relay1 On/Off; 2=Relay 2 On/Off	
994	Sensor Test	°
	0=Stop, any other key=transmit 100 impulses	

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## Approvals and Certificates

DE / EN / FR

### EU Konformitätserklärung

*EU Declaration of Conformity*

*Déclaration de conformité UE*

Für das folgend bezeichnete Erzeugnis:

*For the following product:*

*Le produit désigné ci-dessous:*



NIVUS GmbH  
Im Täle 2  
75031 Eppingen

Telefon: +49 07262 9191-0  
Telefax: +49 07262 9191-999  
E-Mail: info@nivus.com  
Internet: www.nivus.de

<b>Bezeichnung:</b>	<b>Multifunktionaler Messumformer NivuMaster</b>
<i>Description:</i>	<i>Multi-functional measurement transmitter</i>
<i>Désignation:</i>	<i>Convertisseur de mesure multifonctionnel</i>
<b>Typ / Type:</b>	<b>NMx-xxxx...</b>

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

*we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:*

*nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:*

- 2014/35/EU
- 2014/30/EU
- 2011/65/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug auf die nachfolgend genannten anderen technischen Spezifikationen:

*The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:*

*L'évaluation est effectuée à partir des normes harmonisées applicables ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:*

- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:

*This declaration is submitted on behalf of the manufacturer:*

*Le fabricant assume la responsabilité de cette déclaration:*

**NIVUS GmbH**  
**Im Täle 2**  
**75031 Eppingen**  
**Germany**

abgegeben durch / *represented by / faite par:*

**Ingrid Steppe** (Geschäftsführerin / *Managing Director / Directeur général*)

Eppingen, den 21.10.2022

Gez. *Ingrid Steppe*

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## UK Declaration of Conformity

NIVUS GmbH  
Im Täle 2  
75031 Eppingen  
Telefon: +49 07262 9191-0  
Telefax: +49 07262 9191-999  
E-Mail: info@nivus.com  
Internet: www.nivus.de

For the following product:

<b>Description:</b>	<b>Multi-functional measurement transmitter NivuMaster</b>
<b>Type:</b>	<b>NMx-xxxx...</b>

we declare under our sole responsibility that the equipment made available on the UK market as of the date of signature of this document meets the standards of the following applicable UK harmonisation legislation:

- SI 2016 / 1101 The Electrical Equipment (Safety) Regulations 2016
- SI 2016 / 1091 The Electromagnetic Compatibility Regulations 2016
- SI 2012 / 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

- BS EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- BS EN 61326-1:2013

This declaration is submitted on behalf of the manufacturer:

**NIVUS GmbH**  
**Im Taele 2**  
**75031 Eppingen**  
**Germany**

represented by:

**Ingrid Steppe** (Managing Director)

Eppingen, 21/10/2022

Signed by *Ingrid Steppe*

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