

Instruction Manual

Measurement Device Rain Gauge Type RM200 / RM202



Revised Instruction Manual

Document Revision 08 / 25.01.2023

Original Instruction Manual: German / Rev. 08 / 19.12.2022

measure analyse optimise

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If the device is sold to a country in the European Economic Area this instruction manual 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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Names

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Revision History

| Rev. | Modifications | Responsible Editor | Date |
|---------|--|--------------------|------------|
| 08 | Optional data logger NivuLink Micro II incorporated; technical data, accessories etc. updated; declarations of conformity updated; manual changed/amended in various places (NIVUS layout, document structure, change history, etc.) | MoG | 2023-01-25 |
| 06...07 | --- | --- | --- |
| 05 | Various changes | DMR | 2016-11-24 |
| 04 | Various changes | MM | 2015-03-04 |
| 03 | Various changes | DMR | 2012-11-19 |
| 02 | Various changes | IM | 2004-12-16 |
| 01 | Various changes | IM | 2004-12-16 |
| 00 | New creation on the basis of the German-language instruction manual | HeG/DBi | 2004-08-12 |

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General

1 About this Manual



Important

READ CAREFULLY BEFORE USE.

KEEP IN A SAFE PLACE FOR LATER REFERENCE.

This instruction manual is for the NIVUS Rain Gauge Type RM200 / RM202 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.




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 Data Logger NivuLink Micro II
- NIVUS WebPortal handbook

These manuals are provided with the devices 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

1.3 Abbreviations used

1.3.1 Colour code for wires and single conductors

The abbreviations of colours for wire and single conductor labelling follow the international colour code according IEC 60757.

| | | | | | |
|------|--------------|----|--------|----|-----------|
| BK | Black | BN | Brown | RD | Red |
| OG | Orange | YE | Yellow | GN | Green |
| BU | Blue | VT | Violet | GY | Grey |
| WH | White | PK | Pink | TQ | Turquoise |
| GNYE | Green/Yellow | GD | Gold | SR | Silver |

1.3.2 Abbreviations, common

The following device/subject-related abbreviations are used within the document:

WMO World Meteorological Organization (measurement principle)

NLG02 NivuLink Micro II

2 Connections and Control Elements

2.1 Power Supply

The power supply for the NIVUS rain gauge is either provided by the rechargeable/batteries of the connected data logger NivuLink Micro II or by the power supply unit *RMT0 ZNTH02*.

Alternatively, the rain gauge can be supplied via the customer's own voltage sources. The basic prerequisite for this is professional connection.

2.2 Control Elements of the Rain Gauge

The NIVUS rain gauge does not need its own control elements. Operation/control is carried out via the connected data logger NivuLink Micro II or via the connected customer's own PLC/data logger(s).



Observe the accompanying instruction manual.

Safety Instructions

3 Used Symbols and Signal Words

3.1 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

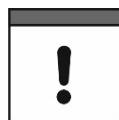
Indicates a possible danger with moderate risk which may result in minor or moderate personal injury or property damage if not avoided.

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 Note

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.

3.2 Warning Notices on the Device (optional)

3.2.1 Common



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.

4 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



Check danger due to explosive gases

Before starting assembly, installation and maintenance work, be sure to check that all regulations on safety at work have been observed and that there is no possible risk of explosive gases. Use a gas warner for the check.

When working in the sewer system, make sure that no electrostatic charge can occur:

- *Avoid unnecessary movements to reduce the building-up of static charges.*
- *Discharge any static electricity present on your body before you start installing the sensor.*

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

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 instrument from mains power (if connected) before you begin maintenance, cleaning and/or repair works (qualified personnel only). Disregarding may lead to electric shock.

**Commissioning only by qualified Personnel**

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

Special conditions for outdoor use

The products of the NIVUS GmbH for outdoor use have extensive protection against the ingress of dust and moisture. If these products are connected to the power supply or to the sensors / actuators by cables with plugs instead of permanently installed wiring, then there is a risk of dirt, dust and moisture penetrating the plug and socket. It is the operator's responsibility to protect the plug and socket from the ingress of dirt, dust and moisture and to comply with local safety regulations.

5 Warranty

The device was functionally tested prior to shipping. When used for the intended purpose (see Chap. "7 Intended Use") and in compliance with the instruction manual, the applicable documents (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 "6 Disclaimer".

**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.

6 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 devices/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 devices/sensors 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.



No liability for data loss

If the device should be damaged and the data is not saved correctly, the companies of the NIVUS group of companies are not liable for data loss of any kind. The risk is the sole responsibility of the operator.

7 Intended Use



Strictly observe and comply with guidelines and requirements

*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 rain gauge is designed to detect precipitation in liquid or solid form (snow or hail).

The rain gauge 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.

8 Duties of the Operator



Important Note

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.

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 data logger, 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 rain gauge comprises:

- Rain Gauge Type RM200 / RM202 (variant/version according to delivery documents)
- Instruction manual (with declaration of conformity) including all the necessary information for operating the rain gauge (printed or as a link to the NIVUS download centre)

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

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.



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.

Store the device in the original packaging.

13 Transport

Protect the rain gauge from strong impacts, blows, shocks or vibrations by using appropriate safety measures.

Transport the device in the original packaging.

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.



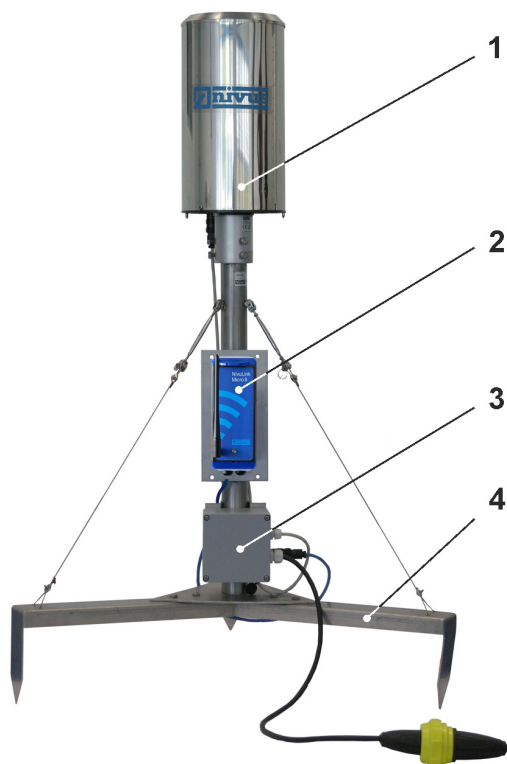
See Chap. "30.3 Customer Service Information".

Product Description

15 Product Construction and Overview

15.1 Construction

All parts of the rain gauge are corrosion-proof. The rain gauge head is made of stainless steel (V2A/AISI 304).



- 1 Rain Gauge Head Type RM200 (no heating) or Type RM202 (with heating for winter operation)
- 2 Data Logger NivuLink Micro II (optional)
- 3 Power adapter with connection cable and plug (optional) *RMT0 ZNTH02*
- 4 Stand *ZMS0 156* for field use; alternatively *ZMS0 155* with base plate

Fig. 15-1 Device structure Rain Gauge Type RM200 / RM202

15.2 Enclosure dimensions

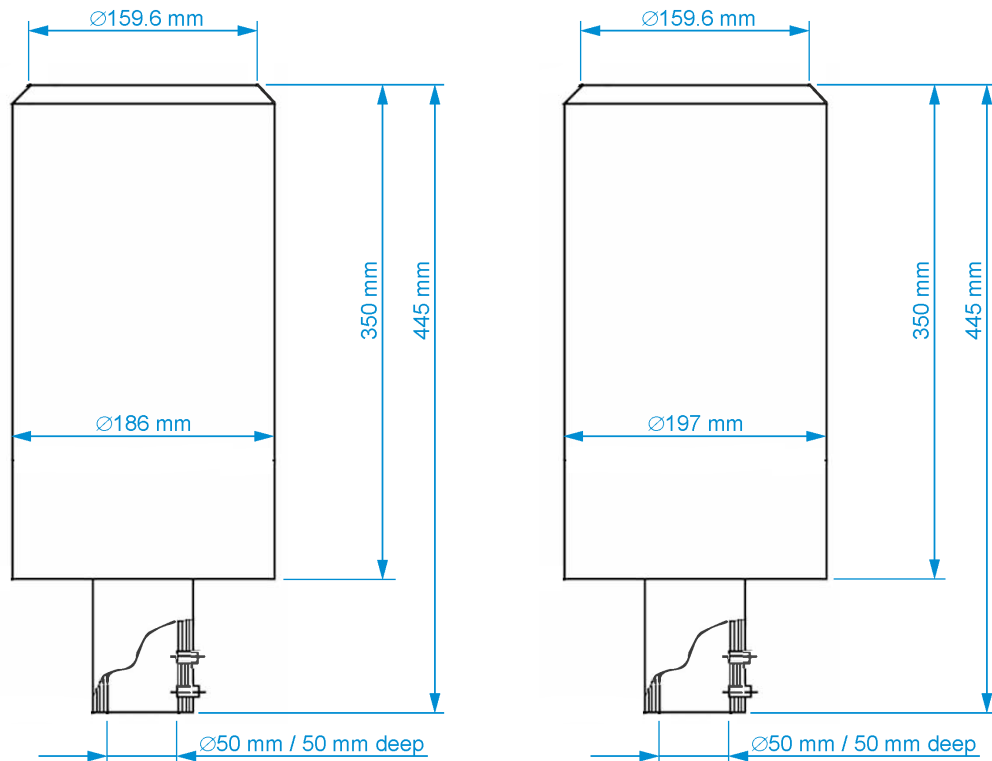


Fig. 15-2 Enclosure for Type RM200 / enclosure with heating for Type RM202

16 Device ID

16.1 Nameplates Rain Gauge

The information in this instruction manual only apply to the devices indicated on the title page. The nameplates are attached to the side of the enclosure and contain 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 (2248.....)

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.

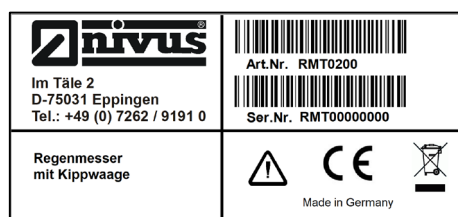


Fig. 16-1 Nameplate Rain Gauge (Type RM200)

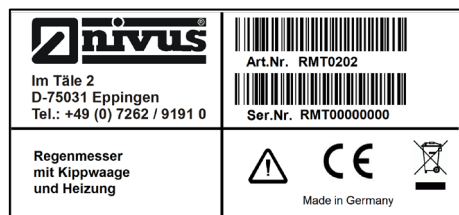


Fig. 16-2 Nameplate Rain Gauge with heating (Type RM202)



Check nameplates

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



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

17 Specifications

| Rain Gauge General | |
|--|---------------------------|
| Collecting surface | 200 cm ² |
| Volume of tipping scale | 2 cm ³ |
| Intensity | max. 11 mm/min |
| Resolution | 0.1 mm NS |
| Accuracy output 1 at 0...11 mm/min | ± 3 % * |
| Ambient temperature (no heating) | 0...60 °C |
| Ambient temperature (with heating) | -25...60 °C |
| Dimensions precipitation transmitter | Ø 160 x 350 mm |
| Mounting on tube stand | Ø 50 mm |
| Weight | 3.3 kg |
| Storage Temperature | -25...60 °C |
| Humidity | max. 80 %, non-condensing |
| Output signal 1 | |
| Impulse length | 125 ms |
| Impulse frequency | 0...2 Hz |
| Power Supply | 3...24 V DC |
| Closed circuit current (no precipitation) | 50 µA |
| Impulse current | 80 mA |
| R _a Max (R _a in interface (V _{cc} = 5 V)) | 10 kOhm |
| R _v (series resistor in precipitation transmitter) | 100 Ohm |
| Output signal 2 | |
| Impulse Length | 50 ms |
| Impulse frequency | 0...2 Hz |
| Switching capacity | max. 0.5 W |

| | |
|--|--|
| Switching voltage (V _{cc}) | max. 42 V DC |
| Heating (optional) - Type RM202 | |
| Power Supply | 24 V |
| Heating power | 48.5 W |
| Switch-on temperature of the heating | 5 °C |
| Hysteresis | 2 °C |
| Data Logger (optional) - NivuLink Micro II (see also accompanying / binding instruction manual) | |
| Power supply rechargeable battery | 3.75 V Rechargeable battery pack: 13.6 Ah 11.1 V nominal Capacity: 5000 mAh (55 Wh) Charging voltage: 12.6 V |
| Enclosure protection | IP68 |
| Data Transmission | 2G/3G/4G |
| Data Memory | internal; 182,398 measurement cycles |
| Power adapter for RM202 RMT0 ZNTH02 | |
| Primary | 85...265 V AC |
| Secondary | 24 V DC |
| Power Consumption | 48.5 W (heating); approx. 10 W (data logger) |
| Enclosure protection | IP65 |
| * Determination under laboratory conditions | |

Tab. 2 Specifications

18 Equipment/Device Versions

18.1 Product Structure

The Rain Gauge is manufactured in different versions. The table below provides an overview on the currently available different versions.

The version determines the article number. The article number can be found on the name-plate.

Conversely, the exact equipment/device version can be specified on the basis of the article number.

RMT0 200 Rain Gauge with tipping scale

RMT0 202 Rain Gauge with tipping scale and additional heating (for winter operation)

Tab. 3 Product Structure



Accessories see Chapter "34 Accessories".

Function Description

19 Function

The Rain Gauge is a measurement device for precipitation measurement. The installation/anchoring of the rain gauge on / in the ground is carried out with

- spikes for insertion into the soft subsoil (*ZMS0 156*) **when used in the field** and
- with the base plate for screwing on (*ZMS0 155*) when **used on concrete**.

The Rain Gauge head is made of stainless steel and is therefore suitable for use in a wide range of environmental conditions. The rain gauge is optionally equipped with data storage.

Each unit is factory calibrated in the intensity range of 0...11 mm/min with a water volume of 200 cm³.

20 Area of Application

The Rain Gauge records the following values:

- Precipitation Level
- Precipitation Volume
- Precipitation Intensity

The measurement principle is based on the description of the "Guide to Meteorological Instruments No 8" of the WMO (World Meteorological Organisation).

21 Measurement Principle

21.1 Information

A precipitation level of 1 mm corresponds to a water volume of 1 litre on 1 m² of ground surface.

The rain gauge records the precipitation falling on the ground in the forms:

- Rain
- Snow
- Hail

Precipitation is recorded using the principle of the tipping scale. After collecting a precipitation level of 2 cm³, the scale tilts and makes the other half of the tipping scale available for collecting precipitation.

With steady precipitation, the processes repeat.

2 cm² tipping scale volume = 1 tipping scale impulse = 0.1 mm precipitation

Through the 200 cm² collecting surface, the precipitation enters the tipping scale via an inlet filter. This inlet filter prevents the drip mechanism from being soiled by leaves or bird excrement.

A Reed switch detects the tilting process. The Reed switch generates an output impulse of 0.1 mm precipitation.

Output Signal as Impulse

The following output signals are available:

- Output 1:
Since the number of tipping processes is not linear to the precipitation intensity, an intensity-dependent linearisation is carried out in the downstream electronics.
The linearisation method is based on an intensity-dependent impulse count correction for the range of approx. 0.5...11 mm/min. This output is used in connection with the data logger NivuLink Micro II (NLG02).
- Output 2:
This output is available as a potential-free contact (Reed contact).
The output is not linearised.

Processing of recorded Data

The rain gauge outputs the tipping impulses to the (optional) data logger.

The data is stored in the data logger and optionally transmitted to the NIVUS WebPortal via 2G/3G/4G.

The following functions are available in the NIVUS WebPortal:

- Graphical and tabular evaluation of the measurement data
- Status check
- Data forwarding
- Alarming
- Creation and representation of statistics



Please refer to the instruction manual for the data logger NivuLink Micro II.

Rain Gauge for winter operation

The Rain Gauge type RM202 is suitable for winter operation. This rain gauge is equipped with an electronically controlled heating.

An external 24 V DC power supply with at least 60 W power is required to operate this Rain Gauge.

The heating is optionally operated via an external 230 V AC power supply unit.



Accessories (power adapter) see Chap. "34 Accessories".

Installation and Connection

22 General Installation Information

- Observe the following instructions regarding ESD and installation location when setting up / installing the device.
1. Ensure proper installation.
 2. Follow applicable legal or company guidelines.

CAUTION



Observe the previous notes

Improper handling may lead to equipment damage.

23 Installation Location

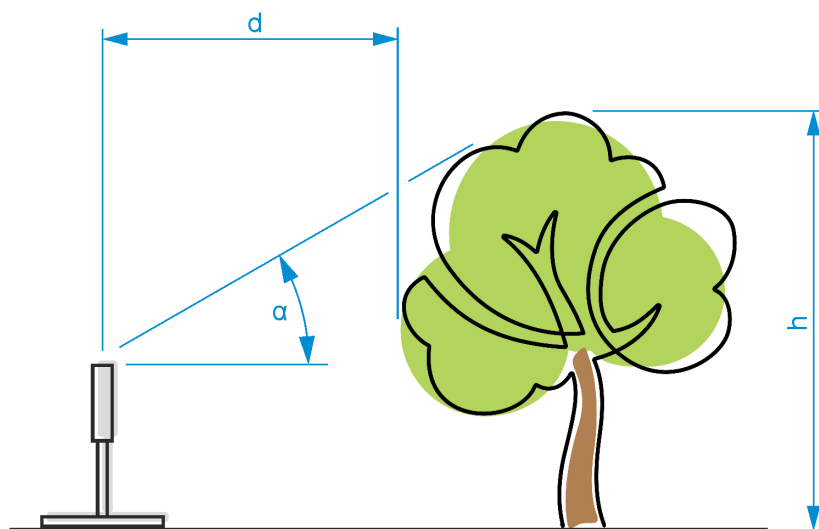
The accuracy of the precipitation measurement depends not only on a clean measuring device but also on the correct installation location.

Depending on the wind velocity, a certain portion of the precipitation particles is blown over the collecting surface. Therefore, installation in completely open terrain and in the immediate vicinity of an obstacle should be avoided. For example, gardens with wind protection by hedges or similar are suitable for installation.

The precipitation measurement is a spot measurement.

Select the installation location so that

- the measured values are representative for as large an area as possible,
- the rain gauge (at the installation location) is not exposed to strong vibrations or mechanical shocks and
- the following WMO recommendations are observed.



d = Distance between Rain Gauge and obstacle

h = Height of the next obstacle

α = Angle between top edge of Rain Gauge and top edge of obstacle

Fig. 23-1 WMO recommendations for the installation location

The WMO recommendations for the installation location are:

- The distance (d) should be at least 4x the height (h) ($d_{\min} = 4 \cdot h$).
- The angle (α) should be max. 45° ($\alpha < 45^\circ$).

24 Procedure for the Installation

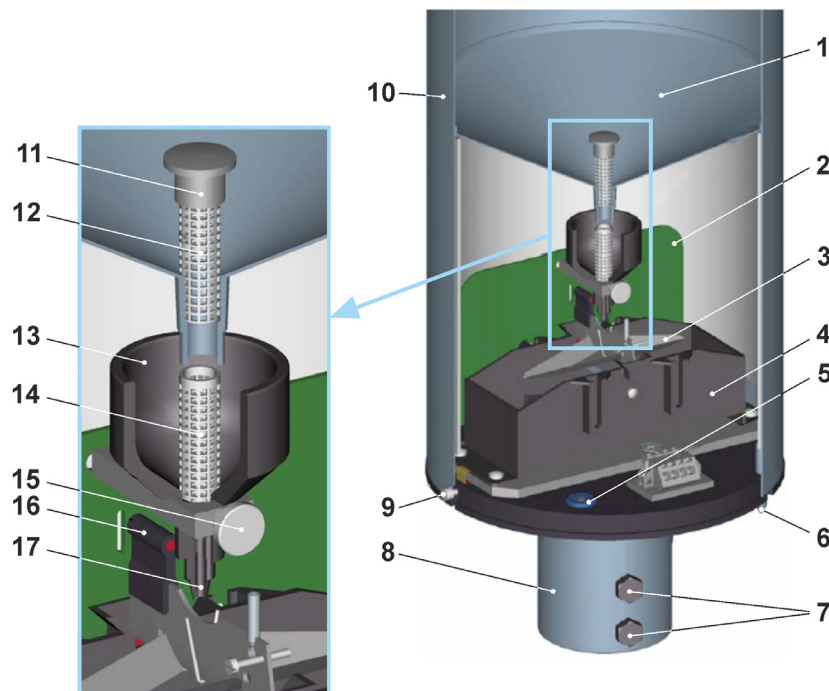
24.1.1 Installation of the device at the installation location

Basic Conditions

- Set up the rain gauge so that the collecting surface is horizontal. Check the horizontal position using the spirit level (Fig. 24-1 Pos. 5) in the bottom of the enclosure.
- Distance between the top edge of the rain gauge and the ground: 1 m. Increase this distance if snow is regularly expected at the installation site (if necessary, place the rain gauge in an elevated position).

24.2 Rain Gauge Head

24.2.1 Components of the Rain Gauge Head



- 1 Collector funnel
- 2 Circuit board
- 3 Tipping scale
- 4 Drain pan
- 5 Spirit level
- 6 2x Adjustment bolts (enclosure shell - enclosure bottom)
- 7 6x Hexagon head screw SW13 for fastening and aligning the rain gauge head on the rain gauge stand
- 8 Connecting piece (to rain gauge stand)
- 9 2x Cylinder head screw SW3 for fastening the enclosure (shell)
- 10 Enclosure (shell)

- 11 Plug
- 12 Filter
- 13 Collector
- 14 Filter
- 15 Knurled screw
- 16 Magnet
- 17 Nozzle

Fig. 24-1 Device structure Rain Gauge Type RM200 / RM202

24.2.2 Pre-Assembly of the Rain Gauge

Required Tools

The following tools are required for pre-assembly of the rain gauge:

- Spanner SW13
- Hexagon spanner SW3



Note

The required tools are **not** included in the delivery.

Procedure



Unpack and pre-assemble the rain gauge:

1. Take the rain gauge out of the box.
2. Remove the small box out of the collector funnel (Fig. 24-1 Pos. 1) of the enclosure (Fig. 24-1 Pos. 10).



Tipping Scale

When handling the tipping scale (Fig. 24-1 Pos. 3), make sure that the inner surfaces are not soiled and that the attached drain pins are not bent.

3. Unpack the tipping scale (Fig. 24-1 Pos. 3) and filter (Fig. 24-1 Pos. 14) and put them aside for later.



Tipping Scale Number

Tipping scale and rain gauge have the same tipping scale number and are thus assigned to each other per default.

The tipping scale number can be found on a small label on the following components:

- Collector funnel box
- Drain pan
- Connecting piece (to rain gauge stand)

4. Remove the bag with the pre-assembled combination of filter (Fig. 24-1 Pos. 12) and plug (Fig. 24-1 Pos. 11) from the collector funnel (Fig. 24-1 Pos. 1) and put it aside for later assembly.
5. Place rain gauge head/connecting piece on a suitable stand (optional; see Chap. "34 Accessories").

6. Loosely fasten the rain gauge head/connecting piece to the rain gauge stand (Fig. 24-1 Pos. 8) with the six hexagonal bolts SW13 (Fig. 24-1 Pos. 7).
- ➡ Remove the enclosure and align the rain gauge horizontally:
7. Loosen two cylinder head screws SW3 (Fig. 24-1 Pos. 9) on the enclosure (shell) (Fig. 24-1 Pos. 10).
 8. Push the enclosure (shell) upwards and put it aside.
 9. Use the spirit level (Fig. 24-1 Pos. 5) on the bottom of the enclosure to check whether the rain gauge is horizontal and, if necessary, correct the position by screwing in/screwing out the six hexagonal bolts SW13 (Fig. 24-1 Pos. 7) in the connecting piece (to the rain gauge stand) (Fig. 24-1 Pos. 8).
 10. Tighten six hexagonal bolts SW13.
 11. Loosen the knurled screw (Fig. 24-1 Pos. 15) and push the collector (Fig. 24-1 Pos. 13) upwards and fix it temporarily in the upper position.
 12. Carefully insert the tipping scale (Fig. 24-1 Pos. 3), which has been put aside, into the bearing socket of the pan (Fig. 24-1 Pos. 4) with the magnet (Fig. 24-1 Pos. 16) of the tipping scale pointing in the direction of the circuit board (Fig. 24-1 Pos. 2).
 13. Check the tipping function of the tipping scale by hand for smooth and trouble-free tipping.
- ➡ Assembling the Rain Gauge:
14. Put the filter (Fig. 24-1 Pos. 14) which has been put aside into the collector.
 15. Bring the collector (Fig. 24-1 Pos. 13) back into the lower position and fix it with the knurled screw (Fig. 24-1 Pos. 15).
 16. Carefully place the enclosure (shell) (Fig. 24-1 pos. 10) on the rain gauge, position it using the alignment bolts (Fig. 24-1 Pos. 6) and fasten it with the two cylinder head screws SW3 (Fig. 24-1 Pos. 9).



Winter Operation / Snowfall

Remove / do not mount the pre-assembled combination of filter (Fig. 24-1 Pos. 12) and plug (Fig. 24-1 Pos. 11) in the collector funnel (Fig. 24-1 Pos. 1) during winter operation in case of snowfall.

17. Insert the (pre-assembled) combination of filter (Fig. 24-1 Pos. 12) and plug (Fig. 24-1 Pos. 11) previously put aside into the duct of the collector funnel.

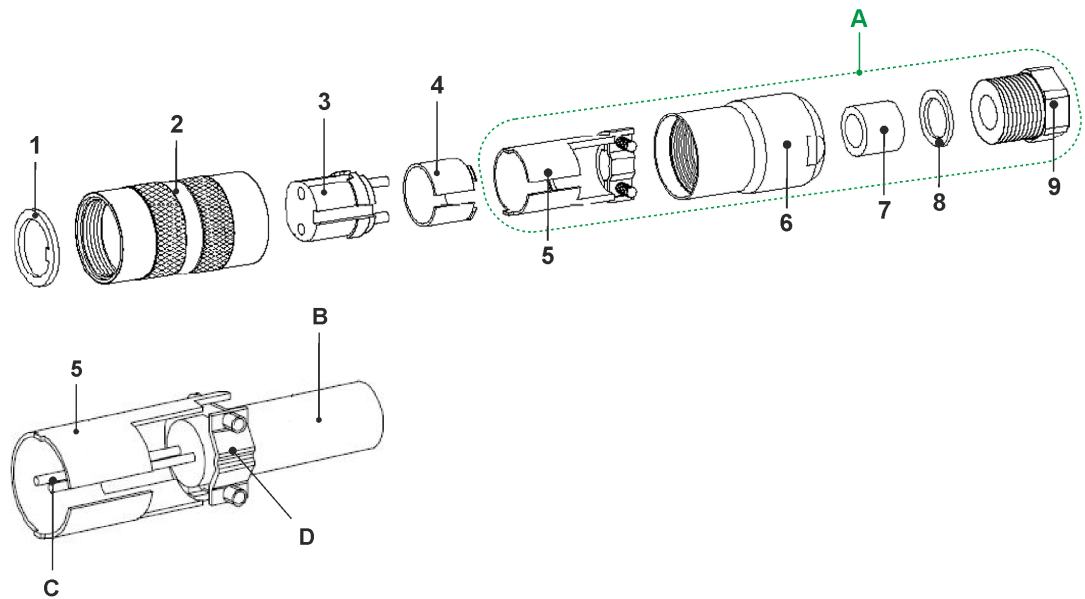
24.3 Plug

The plug or its pre-assembly is required if the rain gauge is to be connected to the **customer's own systems** (data logger, PLC, etc.).

When using the NIVUS data logger NivuLink Micro II, a ready-made cable is supplied with a plug on one side and an open cable end on the other side.

➡ See Chap. "34 Accessories".

24.3.1 Plug Components (Option)



- 1 Gasket ring
- 2 Threaded ring
- 3 Bushing insert
- 4 Short cable clamp (plastic)
- 5 Cable clamp (with screw connection)
- 6 Coupling sleeve
- 7 Gasket ring
- 8 Pressure ring
- 9 Pressure screw
- A Cable strain relief (consisting of Pos. 5, 6, 7, 8 and 9)
- B Cable sheath
- C Cable strands
- D Holding sheet on the cable clamp (with screw connection)

Fig. 24-2 Plug construction/installation

24.3.2 Plug pre-assembly (option)

Required Tools

The following tools are required for pre-assembly of the plug:

- Soldering iron
- Open-end spanner SW16
- Open-end spanner SW17



Note

The required tools are **not** included in the delivery.



Solder on additional cable

For rain gauges with the "Plug" option, a cable (e.g. LiYCY 0.5 mm²) must be soldered on according to the connection diagram (Fig. 25-1).

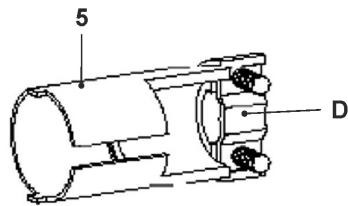
Procedure

🔄 Pre-Assemble Plug:

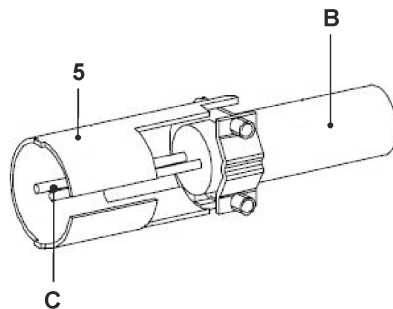
1. "Open" the holding sheet (D) on the cable clamp (with screw connection) (Pos. 5) until the cable fits through.

Info:

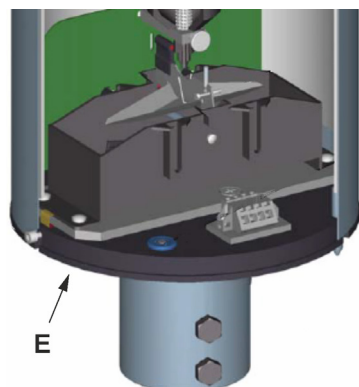
For the cable, see the previous note "Solder on additional cable".



2. Push the parts (Fig. 24-2 Pos. 9, 8, 7, 6, 5 and 4) of the plug onto the cable (B) as shown in Fig. 24-2.



3. Strip 20 mm of insulation from the end of the cable (sheath) (B).
4. Shorten the exposed cable shield by 20 mm (up to the cable sheath).
5. Strip 5 mm of the remaining cable strands (C).
6. Solder the cable strands to the socket insert (Fig. 24-2 Pos. 3) according to the connection diagram (Fig. 25-1 or Fig. 25-2).
7. Insert the short cable clamp (Fig. 24-2 Pos. 4) into the cable clamp (with screw connection) (Fig. 24-2 Pos. 11).
8. Place the cable clamp (with screw connection) on the socket insert (Fig. 24-2 Pos. 3) (note the recesses) and close the holding sheet (D) to secure it to the cable (sheath).
9. Push the threaded ring (Fig. 24-2 Pos. 2) over the socket insert from the front.
10. Assemble/screw together cable strain relief (Fig. 24-2 pos. A) (consisting of Pos. 5, 6, 7, 8 and 9) by hand.
11. Push the cable strain relief (Fig. 24-2 Pos. A) as far as possible into the threaded ring (Fig. 24-2 Pos. 2). In this position, tighten the pressure screw (Fig. 24-2 Pos. 9) and coupling sleeve (Fig. 24-2 Pos. 6) with the open-end spanners SW17/SW16.
12. Insert the gasket ring (Fig. 24-2 Pos. 1) correctly positioned (recess and nose congruent) into the front of the threaded ring (Fig. 24-2 Pos. 2).



13. Position the pre-assembled plug (with sealing ring) correctly on the screw connection (E) on the rain gauge (recess and nose congruent). Screw in by turning the (front) ring of the plug.
14. Connect the power supply for rain gauges type RM202 (with heating) via the power supply unit (see Chapter "34 Accessories").

24.4 Fastening the Data Logger NivuLink Micro II (Option)

➤ Procedure:

1. Screw the data logger to the rain gauge stand using the mounting plate ZMS0 176 (or customer's own mounting method).
When using the mounting plate ZMS0 176
 - screw the data logger NivuLink Micro II onto it using the screws supplied,
 - thread the two (pipe) clamps supplied through the rectangular openings and
 - fasten the combination mounting plate/data logger to the rain gauge stand by closing and screwing the (pipe) clamps.



Note

The mounting plate ZMS0 176 incl. fixing material and tools can be ordered from NIVUS at a charge.

2. Connect the data logger to the Rain Gauge as described in Chapter "25.3 Connecting the Data Logger NivuLink Micro II".

24.5 Fastening the Power Adapter RMT0 ZNTH02 (Option)

➤ Procedure:

1. Open the two (pipe) clamps on the power adapter (unscrew the nuts), place them around the rain gauge stand and close them again, thus clamping them to the rain gauge stand.



Note

*The (pipe) clamps and nuts for fastening are pre-mounted on the power adapter. The required tools are **not** included in the delivery.*

2. Connect data logger and power adapter to the Rain Gauge as described in Chapter "25.3 Connecting the Data Logger NivuLink Micro II".

25 Electrical Installation/Power Supply

25.1 General Information on the Power Supply

WARNING



Disconnect the System from Mains Power

Disconnect the instrument from mains power (if connected) before you begin maintenance, cleaning and/or repair works (qualified personnel only).

Disregarding may lead to electric shock.



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. Complete the installation of the connected devices before applying the operating voltage. Check whether the installation is correct.

25.2 Connection of the Rain Gauge Head (only when using customer's own systems)

The connection as described in this chapter is required if the rain gauge is to be connected to the **customer's own systems** (data logger, PLC, etc.).

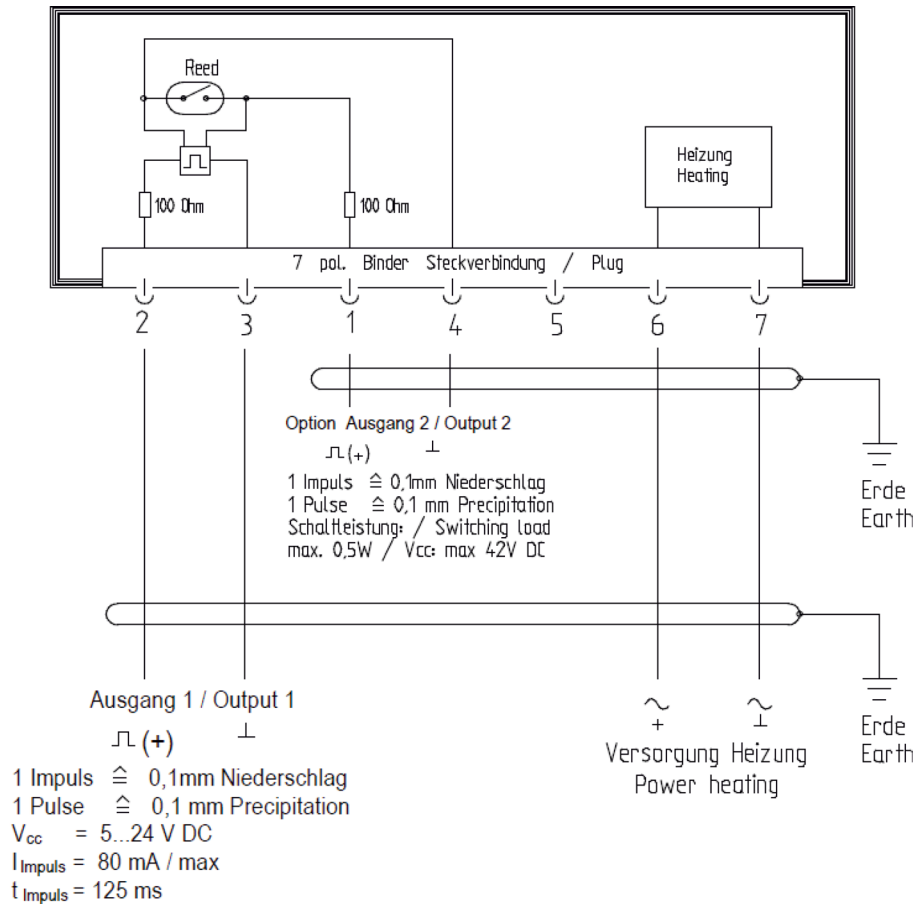
Devices with terminal strip

A cable (e.g. LiYCY 0.5 mm²) must be connected to the built-in terminal strip according to the connection diagram (Fig. 25-1).



Connections on Rain Gauge without heating

For the rain gauge without heating, connections 6 and 7 of the terminal strip are not used.



Nur Ausgang 1 oder Ausgang 2 beschalten
 only Output 1 or Output 2 connected

Fig. 25-1 Wiring diagram Rain Gauge

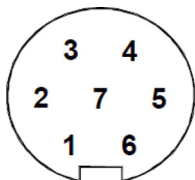


Fig. 25-2 Solder connection (mating) plug

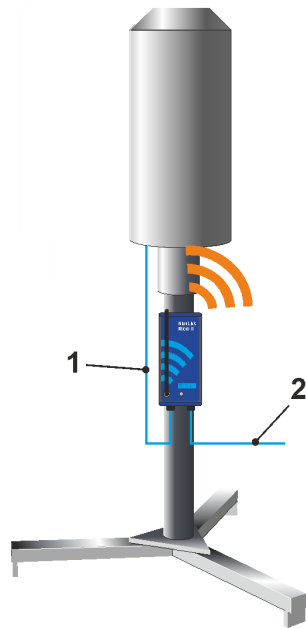
25.3 Connecting the Data Logger NivuLink Micro II to the Rain Gauge



It is essential to select data loggers according to functionality

The data logger NivuLink Micro II can operate the rain gauge with or without charging function, depending on the type.

- Type NLG02 xG0xxxx and NLG02 xGBxxxx with 5...15 V DC supply, but **without** charging function (standard batteries, not rechargeable)
- Type NLG02 xGRxxxx with 24 V DC supply, **with** charging function (rechargeable batteries)



- 1 Connection cable (ZUB0 KAB RM NLG) between data logger and rain gauge
- 2 Charging voltage battery / supply voltage heating

Fig. 25-3 Connection rain gauge - data logger (rechargeable battery operation)



The **wiring diagram** and the detailed **procedure** for connecting the NivuLink Micro II to the Rain Gauge are described in the instruction manual for the data logger NivuLink Micro II.

- For **power supply** via the **data logger**, see the Chapter "Connection of the Rain Gauge".
- When using the **power supply** via the **data logger** and simultaneously connecting the **rain gauge heating**, the yellow (ye) (+) and green (gn) (-) cables are connected to the 12 V voltage terminal for the external voltage supply; see Chapter "Connection of the rain gauge" and additionally Chapter "Connection of an external voltage supply" (only from Rev. 07 of the instruction mal of the NivuLink Micro II).

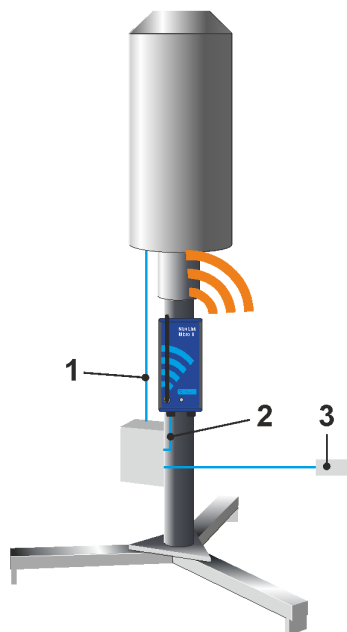


When connecting the heating, only use the data logger NLG02 xGRxxxx

If the rain gauge heating and the data logger NivuLink Micro II are powered simultaneously, only use the data logger NLG02 xGRxxxx.

This,

- *like the heater, can be supplied with 24 V DC and*
- *is equipped with a charging function for the internal battery.*



- 1 Connection cable (fixed to the *RMT0 ZNTH02* power adapter) between Rain Gauge and power adapter
- 2 Connection cable (*ZUB0 KAB RM NLG*) between data logger and power adapter
- 3 Mains connection 85...265 V AC

Fig. 25-4 Connection Rain Gauge - data logger (ext. supply via mains connection)



The **wiring diagram** and the detailed **procedure** for connecting the NivuLink Micro II to the Rain Gauge are described in the instruction manual for the data logger NivuLink Micro II.

- For **power supply** via a **power adapter**, see Chapter "Connection of the Rain Gauge" and additionally Chapter "Connection of an external power supply" (as of Rev. 07 of the operating instructions of the NivuLink Micro II).
- When using the **power supply** via a **power adapter** and simultaneously connecting the **rain gauge heating**, the yellow (ye) (+) and green (gn) (-) cables are connected to the 12 V voltage terminal together with the cables for the external voltage supply; see Chapter "Connection of the Rain Gauge" and additionally Chapter "Connection of an external voltage supply" (as of Rev. 07 of the instruction manual of the NivuLink Micro II).

25.4 Connecting output 1 /output 2 of the Rain Gauge (only when using customer's own systems)

The rain gauge is supplied with power via the signal line (2-wire circuit). This can be implemented by connecting to a customer's own interface or PLC.

The following procedures for connection in Chapters "25.4.1 Connection to an Interface" and "25.4.2 Connection to a PLC" are identical for output 1 and output 2. Which output must be used depends on the connected system.



Output 2 is not linearised

*Output 2 can only be used in conjunction with detection systems that can only process a **potential-free contact** (Reed contact).*

25.4.1 Connection to an Interface

With an interface voltage of $V_{CC} = 5\text{ V}$, the input resistance R_a must not exceed $10\text{ k}\Omega$.

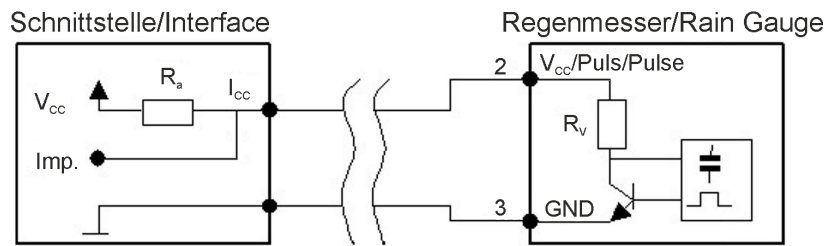


Fig. 25-5 Connection to an interface

25.4.2 Connection to a PLC

When connecting to a PLC, the maximum impulse current must not be exceeded.

➡ See Chap. "17 Specifications".

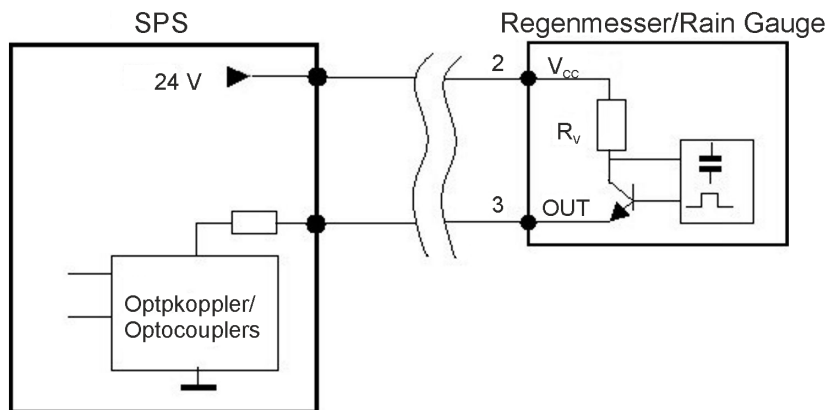


Fig. 25-6 Connection to a PLC

25.5 Power Supply of the NivuLink Micro II Data Logger

Depending on the type, the data logger NivuLink Micro II is powered by batteries, rechargeable batteries or via an external connection.



The **specifications** and further details and information on the NivuLink Micro II are described in the instruction manual for the data logger NivuLink Micro II.

Commissioning

26 Notes to the User

Observe the following instructions for use and the (operating) instructions of the connected devices before connecting the Rain Gauge and putting it into operation.

This instruction manual for the Rain Gauge contains all information required for the use of the Rain Gauge. 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 NIVUS Rain Gauge into operation.

Read this instruction manual carefully to ensure proper functioning of the Rain Gauge.

If you have any questions regarding installation, connection or parameter setting of NIVUS devices, please contact our hotline under:

- +49 7262 9191-955

General Principles

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

Observe the information in the according instruction manual to prevent incorrect or faulty or parameterisation.

27 Preparatory Work

➤ Procedure

1. Set up the Rain Gauge according to Chapter "Installation and Connection" from page 22.
2. Connect the power supply according to Chap. "25 Electrical Installation/Power Supply".
3. Parameterise/prepare the connected devices for data transmission.
When using the NIVUS data logger NivuLink Micro II, it records the captured rain gauge impulses and transmits them to the NIVUS WebPortal via 2G/3G/4G.

Setting Parameters

28 NIVUS Data Logger NivuLink Micro II

➤ Procedure

1. Set the NivuLink Micro II parameters in conjunction with the Rain Gauge.



The **parameterisation** of the data logger is described in detail in the NivuLink Micro II data logger instruction manual.

2. Prepare the NIVUS WebPortal accordingly.



The **operation** of the NIVUS WebPortal is described in the NIVUS WebPortal manual.

29 Customer Infrastructure

- Prepare / parameterise used devices of the connected infrastructure in compliance with the respective (operating) instructions.

Maintenance and Cleaning

WARNING



Disconnect the System from Mains Power

Disconnect the unit from the mains (if connected) 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.



Open the Rain Gauge only in dry environments

- *Only open the rain gauge in a dry environment for maintenance and cleaning. If necessary, fit suitable rain protection.*
- *Make sure that the exposed electronics are not damaged.*

30 Maintenance

30.1 Maintenance Interval Rain Gauge Head

The rain gauge must be serviced regularly for proper operation. The maintenance interval depends on the degree of pollution of the device. At locations with a lot of particles falling in (leaves, etc.), the rain gauge must be maintained and cleaned more frequently to ensure the quality of the measurement.

As a basic principle, NIVUS recommend an **annual check** of the entire measuring system by the NIVUS customer service.

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 devices, data loggers and sensors is a basic measure in order to improve operational reliability and to increase the lifetime.

Contact the NIVUS customer service to make an appointment (see Chap. "30.3 Kundendienst-Information").

30.2 Maintenance Interval Data Logger NivuLink Micro II



Maintenance interval and tasks described in the NivuLink Micro II data logger instruction manual.

30.1 Maintenance Tasks Rain Gauge

The rain gauge must be cleaned of dirt particles such as leaves etc. at regular intervals. The degree of pollution depends on the location and the time of year.

30.2 Maintenance Tasks Data Logger NivuLinkMicro II



Maintenance interval and tasks described in the NivuLink Micro II data logger instruction manual.

30.3 Customer Service Information

For maintenance measures to be carried out by NIVUS, 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 Service

Phone +49 7262 9191-922

customercenter@nivus.com



Observe Chap. "14 Return" prior to returning the rain gauge or data logger to NIVUS GmbH.

31 Cleaning

31.1 Cleaning Rain Gauge Head

WARNING



Disconnect the System from Mains Power

Make sure that the device is disconnected from mains power.

Disregarding may lead to electric shock.



Important instructions for cleaning the rain gauge head

- *Cleaning agents: Clean the inside of the rain gauge head with clear water only, do not use any cleaning agents (except: aqueous rinsing agent solution for the tipping scale), do not use petrol or alcohol*
 - *Tipping scale: Do not bend the drain pins, do not touch the inner surface of the tipping scale and do not treat it with sandpaper or similar.*
-

31.2 Cleaning Data Logger NivuLink Micro II



Information on cleaning and the **cleaning works** described in the instruction manual for the data logger NivuLink Micro II.

32 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 devices from mains power, if connected.
 2. Remove connected cables from the devices.
 3. Remove any batteries that may be present and, if they are defective, dispose of them properly.
 4. Dispose of the Rain Gauge or data logger or customer devices 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.

33 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.

34 Accessories

| Article No | Description |
|------------------|---|
| RMT0 ZNTH02 | Power adapter for RM202 with heating and NivuLink Micro II data logger (only in connection with NLG02 4GRS000) |
| ZUB0 KAB RM NLG | Connection cable between NLG data logger and rain gauge (one side with plug, other side with open cable ends) |
| ZMS0 155 | Rain Gauge stand, material: 1.4301 (V2A/AISI 304), H=650 mm, for permanent installation on a fixed base |
| ZMS0 156 | Mobile Rain Gauge stand, material 1.4301 (V2A/AISI 304), H=650 mm, for field use |
| ZMS0 176 | Mounting plate for fastening of the NivuLink Micro II on the Rain Gauge stand, material: 1.4301 (V2A/AISI 304), incl. fastening material |
| RMT0 Z VOGEL SCH | Bird protection ring, material: stainless steel |
| | NIVUS WebPortal: Data management system for storage and provision of measurement data. Multiple options for direct measurement data analysis, system verification, data forwarding and alarming, right up to complete log generation through processing in the cloud. For details, please contact your sales representative. |
| | NIVUS DataKiosk / Data Kiosk Client: NIVUS DataKiosk is a web-based connectivity platform for the secure provision of measurement and process data to upstream or downstream systems such as a process control system. Due to its open architecture, NIVUS DataKiosk connects IoT solutions with a wide variety of IT systems and makes necessary data format adaptations. DataKiosk fulfils the function of a gateway. It enables application programmes to read data from a wide variety of devices and pass on control signals to devices on the basis of standardised internet technologies. Through comprehensive networking and automation, processes can be improved overall and their utility can be increased. |

The NIVUS DataKiosk Client is a graphical interface that retrieves the data from the DataKiosk and automatically stores the result in a configurable location.

For details, please contact your sales representative.

Tab. 4 Spare Parts and Accessories



More accessories and spare parts can be found in the current NIVUS price list.

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Approvals and Certificates

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE



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E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

| | |
|---------------------|--------------------|
| Bezeichnung: | Regenmesser |
| <i>Description:</i> | <i>Rain Gauge</i> |
| <i>Désignation:</i> | <i>Pluviomètre</i> |
| Typ / Type: | RMT0... |

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 applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61000-6-2:2005
- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- EN 61000-6-3:2007-A1:2011

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 25.10.2022

Gez. *Ingrid Steppe*

Q:\Formulare\CE...



UK Declaration of Conformity

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

For the following product:

Description: Rain Gauge

Type: RMT0...

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 61000-6:2005 • BS EN 61000-6-3:2007-A1:2011
- BS EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019

This declaration is submitted on behalf of the manufacturer:

NIVUS GmbH
Im Täle 2
75031 Eppingen
Germany

represented by:

Ingrid Steppe (Managing Director)

Eppingen, 30/11/2022

Signed by *Ingrid Steppe*