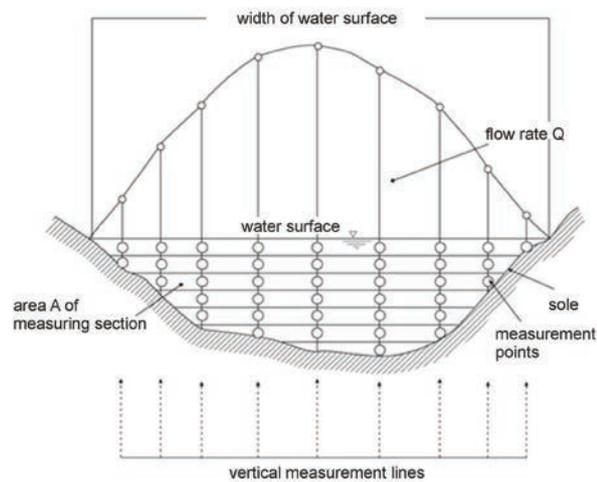


Instruction Manual

Mobile Measuring System NivuFlow Stick for Flow Measurement in Flowing Waters



Firmware Version: 5.1.x

Revised Instruction Manual

Document Revision 02 / 24.02.2022

Original Instruction Manual: German / Rev. 02 / 24.02.2022

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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Revision History

Rev.	Modifications	Responsible Editor	Date
02	Title page changes; addresses of subsidiaries updated; various display images updated (e.g. due to battery indicator and other new features); Chap. "1 About this Manual", "8 Duties of the Operator", "14 Return" and "15 Product Construction and Dimensions" updated; Chap. "16 Device ID": nameplate updated; Chap. "17 Specifications" and "18 Equipment" revised; Chap. "20.1 Flow Velocity Measurement Cross Correlation": Fig. 20-4 updated with flow profile; Chap. "21.2 Transparent Door" recreated; Chap. "22.3 Work Steps for carrying out a Flow Measurement": working step 3 and Fig. 22-1 adjusted; Chap. "24 First Steps" and "25 Lighting System of the Status LED on NivuFlow Stick" amended; Chap. "26 Connection Setup": various images updated; Chap. "27.1 Overview Display": battery indicator added; Chap. "27.3 Menus": five menus instead of the previous six; position of Chap. "Main Screen" changed (moved to before Chap. "Setting Parameters"); Chap. "28.6 Menu of the "Chart" Main Screen" added; Chap. "29.4 Loss of the Password" changed; Chap. "30.1 Main Menu", "30.2.2 Menu - Measurement Data", "30.2.3 Menu - System", "31.1 Menu Measurement Place" updated; Chap. "31.1.3 Channel profile (additional function licence)" and "31.1.5 v-Sensor" newly created; Chap. "31.1.6 Material" and "31.1.10 Bank left, k(Bank left), Bank right and k(Bank right)" updated; Chap. "31.1.13 Section Factor max." and "32.1.6 Start and Stop" newly created; Chap. "33.3 Menu Time/Date" updated; Chap. "33.5.4 Feature Unlock", "33.5.5 Upload", "33.5.6 Update NivuFlow", "33.5.7 Update Bootloader" and "33.5.8 Load Parameters" newly created; Chapter "Data Memory" completely removed; Chap. "44 Accessories" updated; minor changes in layout and text	MoG	24.02.2022
01	Revision was skipped	MoG	-
00	New Creation	MoG	27.01.2020

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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 mobile flow measurement system NivuFlow Stick and serves its intended use. This instruction manual is oriented exclusively to qualified expert personnel.

Read this instruction manual carefully and completely prior to using the flow measurement system since it contains relevant information on this product. Observe the notes and particularly follow the warning notes and safety instructions.

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.

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 operation of the NivuFlow Stick extra instruction manuals or technical descriptions may be required apart from this manual.

- Standards text of SN EN ISO 748 "Hydrometry – Measurement of liquid flow in open channels – Velocity area methods using point velocity measurements (ISO 748:2021)"; these instructions are based on knowledge of the contents of the standard
- VDI/VDE Guideline 2640: "Net Measurement in Flow Cross-Sections; general Guidelines and mathematical Principles" (available in German)
- Technical Description for Correlation Sensors and external Electronic Box

The manuals of the mentioned NIVUS products are provided with the respective (auxiliary) units or sensors 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.
>Text<	Parameter or menu	Indicates a parameter or a menu that is to be selected or is described.
	Refers to a documentation	Refers to an accompanying documentation.

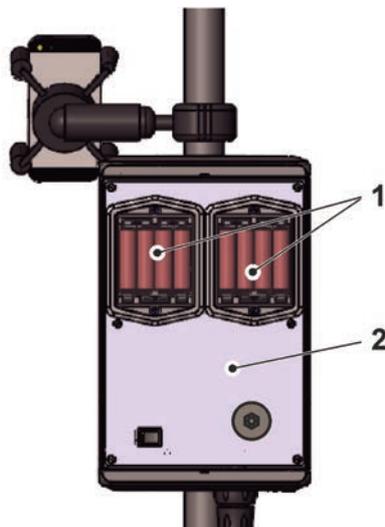
Tab. 1 Structural elements within the manual

2 Connections and Control Elements

2.1 Power Supply

2.1.1 Flow Measuring System

The power for the NivuFlow Stick is provided by rechargeable batteries type AA or standard batteries type AA (eight pieces) (see chapter "17 Specifications").



- 1 Battery compartment (for four batteries each)
- 2 Transmitter

Fig. 2-1 Power supply by rechargeable battery blocks

2.1.2 Rechargeable batteries

The rechargeable batteries are charged outside the flow meter system with a commercially available battery charger.

2.2 NivuFlow Stick Control Elements

On the NivuFlow Stick itself there are only the on/off switch and the reed contact (status LED), beyond that there are no operating elements. The entire operation and parameterisation is carried out via the respective smartphone, tablet, notebook or PC.



Also observe the instruction manuals for the smartphone, tablet, notebook or PC you are using.

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)



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.

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 work, be sure to check that all regulations on safety at work have been observed and (particularly in closed channel systems) that there is no possible risk of explosive gases. Use a gas warner for the check.

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

WARNING



Germ Contamination

Particularly due to the 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 working with the flow measurement system, compliance with all work safety regulations must always be ensured.

Disregarding may lead to personal injury.



Built-In Backup Battery

The backup battery integrated in the transmitter may only be replaced by NIVUS or personnel authorised by NIVUS. Non-compliance will result in a limitation of the warranty (see Chap. "5 Warranty").

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 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 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** and for any consequential damage resulting therefrom.

7 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 flow measurement system NivuFlow Stick incl. associated sensors is intended for mobile flow measurement within the scope of discharge measurements in flowing waters.

The NivuFlow Stick 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



Strictly observe and comply with guidelines and requirements

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)

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 NivuFlow Stick, this instruction manual must be handed over with it. The manual is part of the standard delivery.

9 Requirements for the Personnel

The flow measurement system may only be used by persons 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 NivuFlow Stick comprises:

- Flow measuring system Type NivuFlow Stick (according to delivery documents)
- Instruction manual (with declaration of conformity) including all the necessary information for operating the NivuFlow Stick (printed or as a link to the NIVUS download centre)
- Ring magnet

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 according to Chapter "17 Specifications".

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

- ➡ To store the device remove the batteries.

13 Transport

Protect the NivuFlow Stick from strong impacts, blows, shocks or vibrations by using appropriate safety measures such as straps or similar.

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.

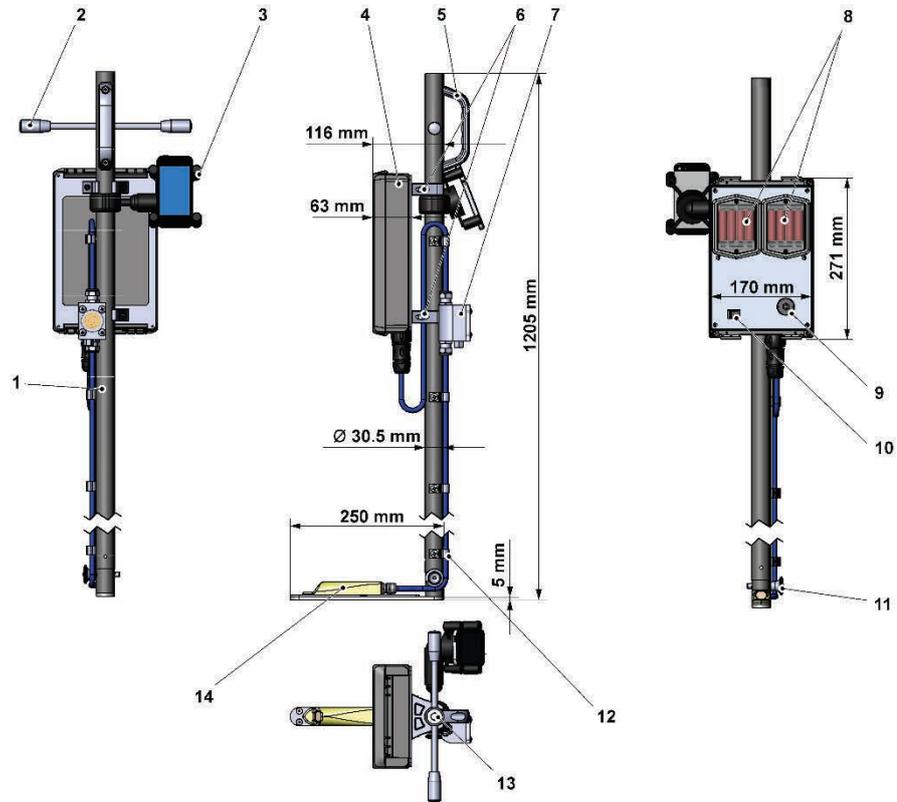
Items that have not been sufficiently franked will not be accepted!

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. "40.2 Customer Service Information".

Product Description

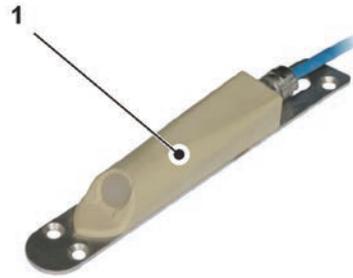
15 Product Construction and Dimensions



- 1 Guide rod with height scale
- 2 T-handles (optional)
- 3 Smartphone holder
- 4 Transmitter
- 5 Handhold
- 6 Fastening clip for the transmitter
- 7 Pressure compensation element for the sensor
- 8 Battery compartments (each for four pieces)
- 9 Status LED
- 10 On/Off switch (toggle switch)
- 11 Plug-in bolt for dismantling sensor - tube
- 12 Cable fastening clip
- 13 Level for alignment
- 14 CSM Flow velocity wedge sensor with pressure measurement

Fig. 15-1 Device structure NivuFlow Stick

15.1 Connectable Sensors



1 CSM Flow velocity wedge sensor with pressure measurement

Fig. 15-2 Connectable sensors

16 Device ID

The information in this instruction manual only applies to the device type indicated on the title page. The nameplate is attached 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 (2133.....)

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.

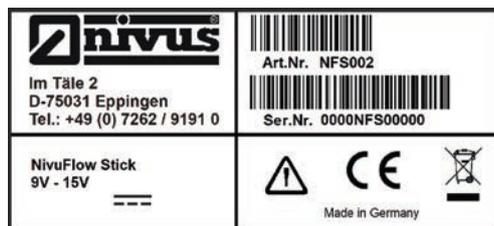


Fig. 16-1 Nameplate NivuFlow Stick



Check nameplates

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



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

17 Specifications

Measurement Principles	- Ultrasonic cross-correlation with real flow profile measurement (flow velocity) - Hydrostatic (depth measurement relative to atmospheric pressure)
Power Supply	- 8x rechargeable battery, commercially available, nominal voltage 1.2 V or - 8x standard battery type AA, commercially available, nominal voltage 1.5 V
Service Life	12 hrs. in continuous operation ((when operating with 2,650 mAh batteries and an ambient temperature of 15 °C)
Enclosure	Protection: IP67 (closed)
Total Weight	approx. 4.1 kg
Operation Temperature	-20...+70 °C (device without batteries) It is essential to observe the corresponding instructions/recommendations of the manufacturers of the batteries/rechargeable batteries used.
Storage Temperature	-30...+70 °C (device without batteries)
Operation	On/Off switch: via WLAN with display and operating module provided by customer (smartphone, tablet, notebook, etc.)
Velocity Measurement	Measurement Range: -1...+6 m/s Resolution: 0.001 m/s Number of scan layers: max. 16 Error limits (per scan layer): < 1 % of measurement value ($v > 1$ m/s) < 0.5 % of measurement value + 5 mm/s ($v < 1$ m/s)
Depth Measurement	Resolution: 1 mm Measurement range (pressure measurement cell): 0...5 m Measurement uncertainty: < 0.5 % of final value
Temperature Measurement	Resolution: 0.1 °C Measurement uncertainty: 0.1 °C
Acoustic Frequency	3 MHz
Medium Depth	at least 3 cm (above sensor) Max. measuring depth in the medium (immersion depth): NivuFlow Stick <i>NFS002</i> : 75 cm 3-piece rod <i>NFS0 STG 3TLG</i> : 100 cm
Data Memory	1,400 Discharge measurements
Data Transmission/ Communication	Via WLAN
Sensor	CSM Flow velocity wedge sensor with pressure measurement

Tab. 2 Specifications

Sensor

The structure and description of the associated sensor as well as its technical data can be found in the instructions "Technical Description for Correlation Sensors and external Electronics Box".

The Technical Description is available as download on www.nivus.com.

18 Equipment

18.1 Device Versions

The mobile flow measurement system is manufactured in the cross-correlation version with a CSM flow velocity wedge sensor with pressure measurement.

NFS002 NivuFlow Stick; mobile measurement system for discharge measurement in flowing waters

⇒ Accessories see Chapter "44 Accessories".

18.2 Add-On Function Licences

The transmitter can be equipped with supplementary functions at extra charge. The following function extension is currently available as a (software) licence:

⇒ The function(s) are/is activated according to Chap. "33.5.4 Feature Unlock".

⇒ Parameterisation of fixed geometries (channel profiles) (*NFS0 LIZENZ GEO*) see Chap. "31.1.3 Channel profile (additional function licence)".

Function Description

19 Areas of Use

NivuFlow Stick is a mobile flow measuring system. It is designed mainly for use in the measurement of slightly to heavily contaminated, aqueous liquids of the most varied compositions.

It is used in the context of discharge measurements in rivers, flumes and canals of the most varied geometries and dimensions.

An overview on connectable sensors/probes can be found in Chapter "15.1 Connectable Sensors".



Note on the Ultrasound Reflection Principle

The flow velocity measurement method is based on the ultrasound reflection principle. Therefore, it is indispensable for the function of the system that particles (dirt particles, gas bubbles or similar) are present in the water. These particles reflect the ultrasonic signal emitted by the sensor.

20 Functional Principles

20.1 Flow Velocity Measurement Cross Correlation

The piezo crystal, which is inclined in the direction of flow, works as a velocity sensor. For this purpose, a short ultrasonic signal beam is irradiated into the measurement medium at a defined angle. All particles present in the measurement path (air, dirt particles, suspended particles) reflect parts of the ultrasonic signal. Depending on the size and shape of the particle, this produces a special ultrasonic reflection signal.

The multitude of reflected signals results in a reflection pattern (see Fig. 20-1). This pattern is received back by the piezo crystal, converted into electrical signals and loaded into a digital signal processor (DSP) contained in the sensor.

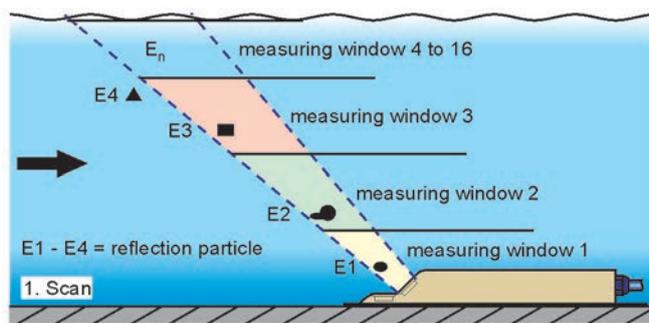


Fig. 20-1 Situation at first signal reception

After a defined time, a second ultrasonic pulse is irradiated into the medium. The newly received reflection signal is also loaded into the DSP.

Different flow velocities prevail at different flow heights (flow velocity profile).

The reflecting particles have thus moved on to different distances from the first measurement point, depending on their height. This creates a shifted image of the reflection pattern (see Fig. 20-2).

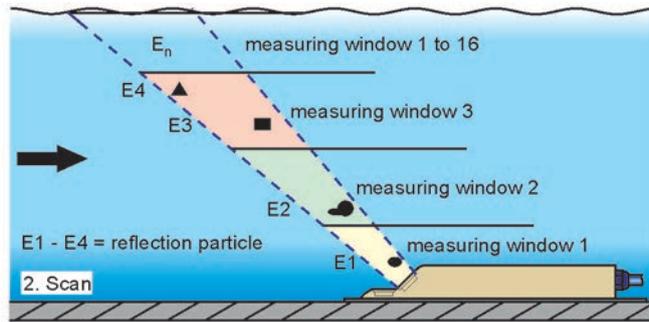


Fig. 20-2 Situation at second signal reception

The two reflection patterns are checked for their similarities in the DSP using cross-correlation methods. All signals that cannot be clearly identified (new particles, rotated particles) are discarded, leaving two shifted signal patterns that are similar to each other. Up to 16 measurement windows are overlaid on these two images, depending on the previously performed height measurement.

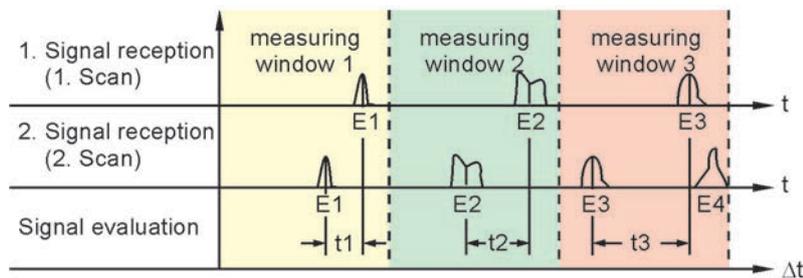


Fig. 20-3 Echo signal formation and evaluation

The flow velocity is determined in each measurement window on the basis of the transmission angle, the temporal distance between the two transmission signals and the difference in the signal pattern.

The mathematical stringing together of the individual calculated flow velocities results in the velocity profile of the acoustic path.

This measured velocity profile is shown directly in the display of the NivuFlow Stick (Fig. 20-4 picture 1). By clicking on the graphic, the display switches to the lateral profile (Fig. 20-4 picture 2).

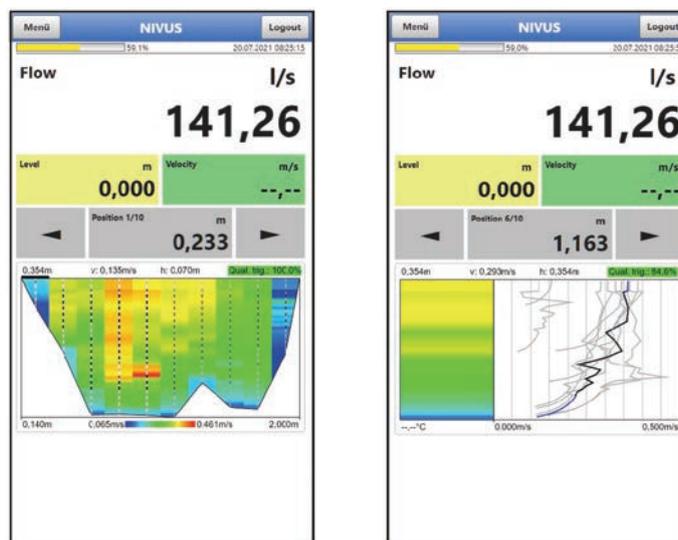


Fig. 20-4 Measured flow profile

20.2 Level Measurement Pressure

The CSM-V1D0 sensor works with a hydrostatic level measurement.

The piezoresistive pressure sensor works according to the relative pressure principle. The pressure of the stationary water column above the sensor is, depending on the density of the liquid, directly proportional to the filling level. Fluctuations in atmospheric air pressure are compensated for using a little air tube. This air tube is integrated in the sensor cable.

The pressure sensor is calibrated during commissioning by entering a manually determined reference value.

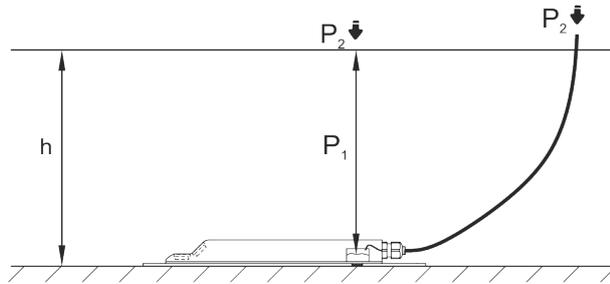


Fig. 20-5 Determined level

Handling the NivuFlow Stick Measuring System

21 General Information on the Use of the Device

21.1 Energy Saving Mode (Powerdown)

After a preset time (5...720 minutes) of inactivity, the NivuFlow Stick transmitter saves the pending data and goes into energy saving mode (powerdown).

To restart, press the on/off switch and continue the measurement.



The time until powerdown can be set under >System< / >Time/Date< / >Powerdown<.

21.2 Transparent Door

The transparent door of the transmitter is covered with a protective film to protect it from scratches during transport. This protective film must be removed before first use.



UV Radiation

If the transparent door with the protective film is exposed to UV radiation (as occurs outdoors) for a longer period of time, the film cannot be removed without leaving residues.

Should this occur, cleaning the transparent door with spirit or car polish may solve the problem.

If these measures are not successful, the transparent door can be replaced by NIVUS at extra charge.

21.3 Gaskets



Check the gaskets on the enclosure cover each time it is used.

Before closing the enclosure cover, make absolutely sure that the gasket is clean and undamaged. Therefore:

1. Remove foreign bodies and dirt.
2. Replace defective gaskets.
3. Treat the seals with silicone grease if necessary.



Gaskets

Damage to equipment caused by leaking or defective gaskets shall be excluded from the liability of the companies of NIVUS GmbH.

21.4 Protection

CAUTION



Protection IP67 only with closed enclosure cover

When open (enclosure cover for switching on/off or battery/battery compartment open), the flow transmitter does not have sufficient protection against water penetration and can be damaged by flooding.

Keep the enclosure cover closed during operation.

22 Performing Flow Measurements

22.1 Required measuring equipment and aids

In addition to the NivuFlow Stick flow measurement system and a display and operating unit (smartphone, tablet, notebook or PC), a sufficiently long measuring tape and aids for attaching it to the edge of the watercourse are required.

Depending on the type of water body additional safety measures for the executing person in order to avoid accidents due to streaming or falling may be necessary.



Observe problems with strong streams

A sensor on the (telescopic) rod is always in danger of being washed away in powerful flows at greater depths and is therefore always in motion. This makes it difficult to align and to hold the sensor against the flow direction for the period of an individual measurement.

22.2 Prerequisites for carrying out a Flow Measurement

- The measuring tape has been attached so that the performing person can easily locate the measurement points/verticals.
- The device has been parameterised according to the measuring point to be measured (for this e.g. the width of the water body must be available).



See Chap. "31 Parameter Menu Application".

- The device was connected to the display unit (smartphone, tablet, notebook, PC, etc.).



See Chap. "26 Connection Setup".

- Sufficient safety equipment is available to secure the person carrying out the work in order to prevent accidents.

22.3 Work Steps for carrying out a Flow Measurement



Procedure:

1. Open the transmitter enclosure cover and switch on the transmitter at the on/off switch. Close the enclosure cover again.
2. Read the first measuring point/vertical in the display (start button, Fig. 22-1 Pos. 1) and locate it in the water. If the parameters are set correctly, the transmitter suggests the respective measuring points for the grid measurement.



See also Chap. "32.1 Menü >Readings<: Information and Parameterisation Options".

3. Hold the transmitter vertically in the water so that the **sensor** measures **against the direction of flow**. The **handle** on the guide rod is then aligned in a straight line **with the direction of flow**.

The spirit level at the top of the guide rod indicates whether the sensor is parallel to the water surface.

The depth measurement can be cross-checked on the scale on the side of the guide rod.



Observe the possible measuring depth of the NivuFlow Stick

*The **depth measurement** of the sensor used only works when the pressure compensation box is above the water level.*

***Flow velocity measurement** with cross correlation requires a minimum water depth of 30 mm above the sensor to obtain usable measurement results.*

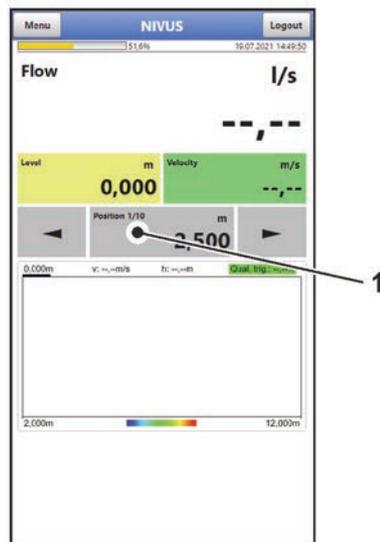


Fig. 22-1 Starting the measurement

4. Touch/click the start button (Fig. 22-1 Pos. 1) on the display and operating module and do not move the NivuFlow Stick for the duration of the measurement. The measuring data of the measuring spots are automatically transmitted to the display module and displayed.
The measurement values can be overwritten with another measurement if the first measurement was "unclear".

Info:

The duration of the measurement is defined in advance in the menu >Application< / >Measuring point<. If necessary, the measurement can also be ended early by pressing the start button while the measurement is running (the information that the measurement was shorter than the default setting is then saved together with the measured value).

5. Go to the next measuring spot and repeat the procedure.
When all measuring spots have been measured, the transmitter automatically suggests saving the measured data. To retain the measurement data, save it.
6. After the measurement has been completed (saved), switch off the transmitter at the on/off switch to save the batteries.

Commissioning

23 Notes to the User

Before putting the NivuFlow Stick into operation, the instructions below shall be followed. This instruction manual contains all information required for parameterisation and use of the flow measuring system. The instruction manual is intended for qualified expert personnel. Read this instruction manual carefully to ensure proper functioning of the NivuFlow Stick. If you have any questions regarding use or parameter setting, please contact our hotline at:

- +49 7262 9191-955

General Principles

Observe the information in this instruction manual to prevent incorrect or faulty or parameterisation. Familiarise yourself with the operation of the transmitter before you start with the parameterisation.

The user interface of the NivuFlow Stick is easy to understand. You can quickly make the basic settings yourself.

24 First Steps

24.1 When ordering the NivuFlow Stick *NFS002*

24.1.1 Assembly Works

If desired, screw in the two enclosed T-handles on the top side of the tube. See also Fig. 15-1 on page 17.

24.1.2 Final Works

For parameterisation and use of the NivuFlow Stick, all that remains to be done after unpacking is to open the housing cover and insert the batteries/rechargeable batteries into the transmitter, then the connection with the respective smartphone, tablet, notebook or PC can begin. Subsequently, the parameterisation takes place with the definition of the type of batteries/rechargeable batteries used according to Chap. "35 Parameter Menu Battery (12V)". Further parameterisation is carried out according to the respective measuring point.

➡ See Chap. "26 Connection Setup" and "Setting Parameters".

24.2 When ordering the 3-piece Rod

24.2.1 Required Parts

No.	Designation	NivuFlow Stick NOT available (Variant A)	NivuFlow Stick available (Variant B)
1	3-piece rod (incl. ground plate/sensor base, smartphone holder und fastening clips for cable (<i>NFS0 STG 3TLG</i>))	x	x
2	Transmitter (<i>NFS0 MU</i>)	x	-
3	CSM-D sensor with pressure measurement cell and plug (<i>CSM- V1D0 K3 xxxP</i>)	x	-

Tab. 3 Required parts for assembly

Variant A:

If no NivuFlow Stick is available, the transmitter and a CSM-D sensor are also required.

The sensor is attached to the ground plate / sensor base (Fig. 24-1 Pos. 9) at the factory and fastened to the rod at the bottom (Fig. 24-1 Pos. 8) with the knurled screw (Fig. 24-1 Pos. 7).

The sensor cable is inserted into the fastening clips at the bottom of the rod. The upper end of the sensor cable with plug and pressure cell is temporarily attached to the rod at the bottom and must be detached during installation.

Variant B:

If a NivuFlow Stick is already available, the transmitter and the sensor can be removed from the NivuFlow Stick and mounted on the 3-piece rod.



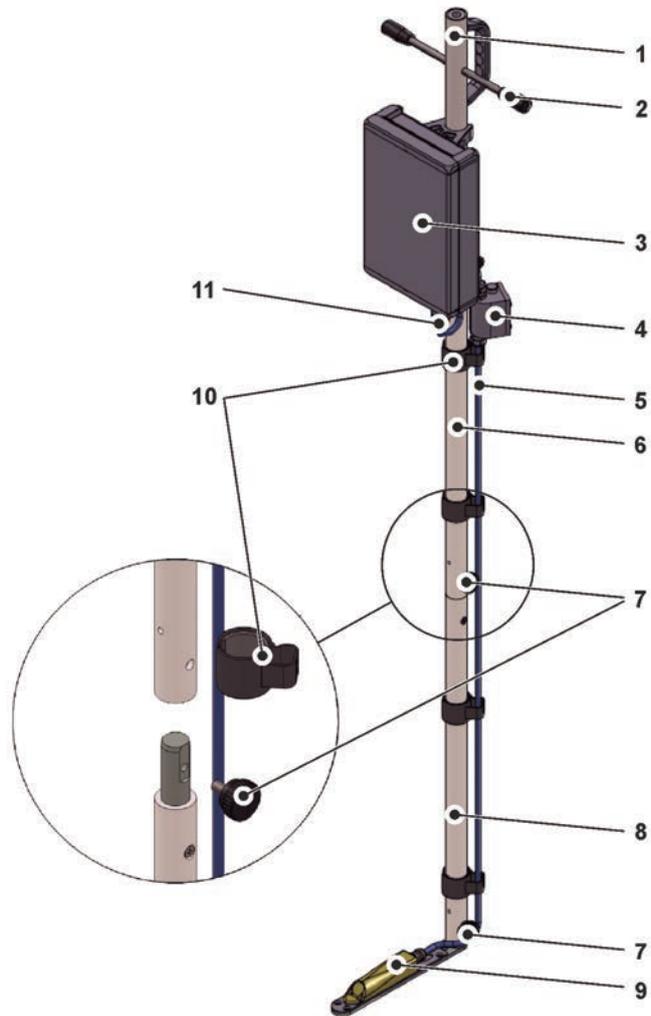
Note sensor cable assembly/length

The **depth measurement** of the sensor used only works when the pressure compensation box is above the water level.

- This is possible without any problems for all delivered sensors with a pressure measurement cell **from serial number 2201CSMxxxx onwards**.
 - For already delivered sensors with pressure measurement cell of the **serial numbers 1915CSMxxxx to 2152CSMxxxx**, the distance between the plug and the pressure measurement cell must be measured.
If this distance is **less than or equal to 20 cm**, the sensor can be used for a measurement depth of **1 m**.
At greater distance, only the measuring depth of 75 cm is possible.
-

Depending on the variant, the subsequent assembly work differs in Chap. "24.2.2 Assembly Works". These differences are indicated in the procedure.

24.2.2 Assembly Works



- 1 Top rod
- 2 T-handles (2x)
- 3 Transmitter
- 4 Pressure compensation element
- 5 Sensor cable
- 6 Middle rod
- 7 Knurled screw (3x)
- 8 Bottom rod
- 9 Sensor base with screwed-on sensor
- 10 Cable guide clips (4x)
- 11 Plug

Fig. 24-1 Assembly with the 3-piece rod

➡ Procedure for both variants (differences noted in the individual steps):

1. Only Variant B:

On the present NivuFlow Stick, disconnect the plug of the sensor cable from the transmitter.

On the present NivuFlow Stick, "unthread" the sensor cable (with plug and pressure compensation element) from the cable guides on the rod.

Remove the sensor from the sensor base of the present NivuFlow Stick: To do this, unscrew the four M5x8 countersunk screws and remove the sensor.

Put the sensor (with sensor cable, pressure cell and plug) and countersunk screws aside for further use.

On the present NivuFlow Stick, remove the transmitter and put it aside for further use.

2. Put the top rod (Fig. 24-1 Pos. 1) and the middle rod (Fig. 24-1 Pos. 6) together and screw them tight with the knurled screw (Fig. 24-1 Pos. 7).

3. Put the middle rod and the bottom rod (Fig. 24-1 Pos. 8) together and screw them tight with the knurled screw.

4. Fasten the transmitter (Fig. 24-1 Pos. 3) according to Fig. 24-1 on the 3-piece rod (clips).

5. Only Variant B:

Screw the sensor onto the sensor base supplied with the 3-piece rod using the four M5x8 countersunk screws.

If the sensor base was delivered loose: Insert the sensor base with sensor (Fig. 24-1 Pos. 9) into the bottom of the 3-piece rod and fasten it with the knurled screw (Fig. 24-1 Pos. 7).

6. Thread the sensor cable (Fig. 24-1 Pos. 5) (with plug (Fig. 24-1 Pos. 11) and pressure cell (Fig. 24-1 Pos. 4) into the cable guide clips according to Fig. 24-1.

7. Insert the plug (Fig. 24-1 Pos. 11) into the transmitter.

8. If desired, screw in the two enclosed T-handles (Fig. 24-1 Pos. 2) at the top of the sides of the rod.

24.2.3 Final Works

For parameterisation and use of the NivuFlow Stick, all that remains to be done after assembly is to open the enclosure cover and insert the batteries/rechargeable batteries into the transmitter, then the connection with the respective smartphone, tablet, notebook or PC can begin. Subsequently, the parameterisation takes place with the definition of the type of batteries/rechargeable batteries used according to Chap. "35 Parameter Menu Battery (12V)". Further parameterisation is carried out according to the respective measuring point.



See Chap. "26 Connection Setup" and "Setting Parameters".

25 Lighting System of the Status LED on NivuFlow Stick

The status LED (Fig. 25-1) on the front of the NivuFlow Stick lights up during operation according to a predefined system that allows conclusions to be drawn about the current status of the device.

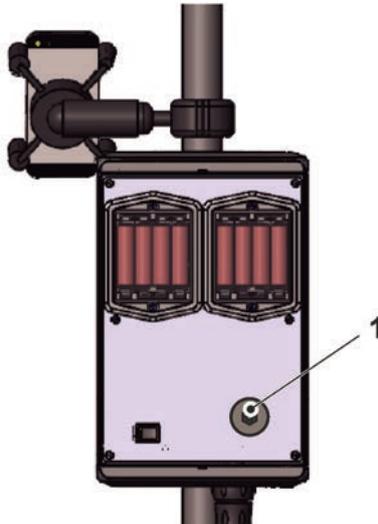


Fig. 25-1 LED on the front of the NivuFlow Stick

If the NivuFlow Stick works without restrictions, the LED lights up **green**: 1x long, pause, 5x short (Tab. 4 No. 1).

If at least one error message is present, the same rhythm applies, but the LED then lights up **red** for a long time (1.5 s), followed by an error code (Tab. 4 No. 6...8).

Blue light in the pause between the first long light and the five consecutive ones indicates the number of users logged in: 1x for each user (up to max. four logged-in users are possible) (Tab. 4 Nr. 0...5).

➡ See also Chap. "29 General Programming".

The LED lights up **white** (Tab. 4 No. 12 Special code: Switch-on sequence without update) when the device is switched on.

Background info:

The colour white is generated by simultaneously illuminating the colours red, green and blue. So white also shows that all colours of the LED are working correctly.

Depending on the status of the transmitter, the colours **yellow** and **cyan/turquoise** are also possible. Details see Tab. 4 No. 6 and 9.

Explanation of the following table of possible light combinations:

- LED oval means 1.5 s active (on or off)
- LED round means 0.5 s active (on or off)
- Each message consists of a start identifier (LED 1.5 s off / 1.5 s on) and a sequence of five short flashing codes (LED 0.5 s on / 0.5 s off) containing the actual information.
- The special codes (Tab. 4 No. 10, 11 and 12) consist of a start identifier (LED red 0.5 s / green 1.5 s) and a sequence of long phases (LED 1.5 s on or off).

Possible light combinations of the status LED

1 OK: Normal operation; no WLAN connections (0 users)



2	OK: 1 WLAN connection (1 user; blue)	
3	OK: 2 WLAN connection (2 user; blue)	
4	OK: 3 WLAN connection (3 user; blue)	
5	OK: 4 WLAN connection (4 user; blue)	
6	Error: Automatic sensor detection	
7	Error: Battery	
8	Error: Other, undefined error	
9	Warning: Firmware update (bootloader ext. FLASH) is running	
10	Special code: Start bootloader without update	
11	Special code: Firmware update (bootloader int. FLASH) is running	
12	Special code: Switch-on sequence without update	

Tab. 4 Lighting system of the status LED

26 Connection Setup

26.1 Common

The entire operation of the NivuFlow Stick is done via a commercially available smartphone/tablet or via a notebook/PC. The operation of the display and operating module used is carried out in accordance with the manufacturer's instructions for the respective unit.

The procedure for establishing a connection for the Android, iOS and Windows operating systems is described below.

26.2 Android Operating System

➡ Preparations on NivuFlow Stick:

1. Open the NivuFlow Stick enclosure cover and switch on at the on/off switch.

➡ Work steps on the display and operating module (smartphone, tablet, notebook, PC, etc.):

1. Start the display and operating module.
2. Open the corresponding menu using the Settings symbol (Fig. 26-1 Pos. 1).

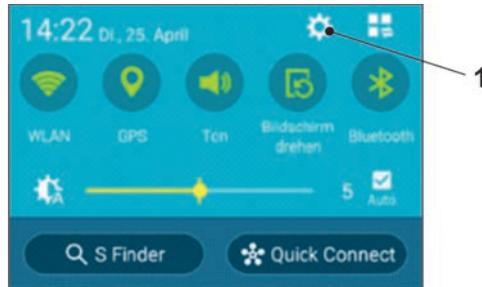


Fig. 26-1 Settings symbol

3. Select WLAN (Fig. 26-2 Pos. 1).

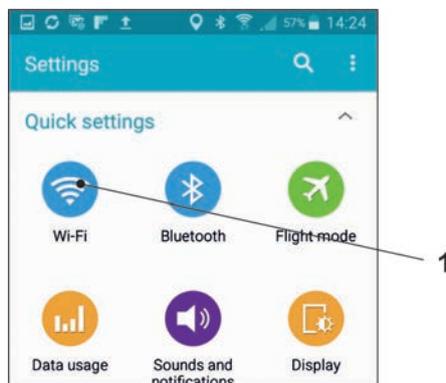


Fig. 26-2 WLAN symbol

4. In the WLAN list select the NivuFlow Stick (Fig. 26-3 Pos. 1) with the corresponding SSID (delivery status = serial number).

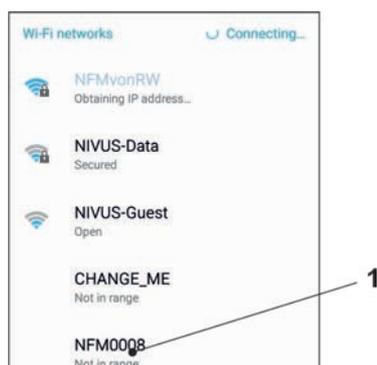


Fig. 26-3 WLAN list

5. Enter the password for server access (delivery status = PUK) (Fig. 26-4 Pos. 1) and connect (Fig. 26-4 Pos. 2).

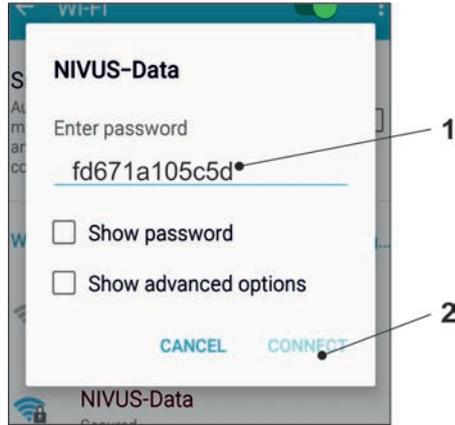


Fig. 26-4 Enter password (here fd671a105c5d as example) and connect

6. Start Internet browser.
7. Enter the IP address "192.168.1.1" in the address field and open.
After successful connection the display of the NivuFlow Stick (Fig. 26-5) is shown.

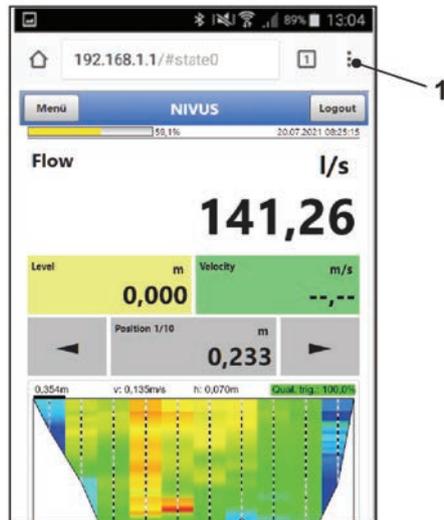


Fig. 26-5 Indication of NivuFlow Stick display in the browser

8. To set up a link on the "Home screen" (for direct access), tap the icon for more tabs (Fig. 26-5 Pos. 1) and settings and select "Add to start screen" (Fig. 26-6 Pos. 1).

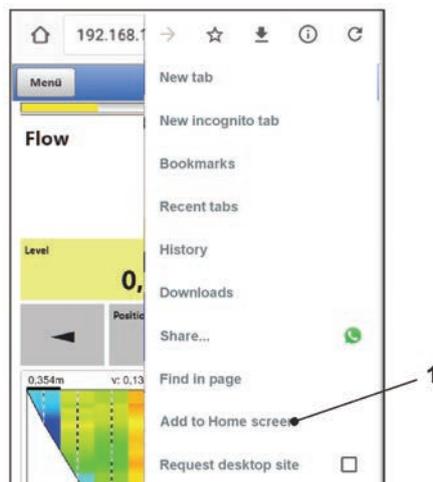


Fig. 26-6 Add to start screen

9. Confirm with "Add" (Fig. 26-7 Pos. 1).

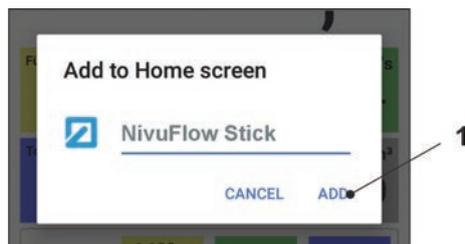


Fig. 26-7 Confirm adding

The shortcut (Fig. 26-8 Pos. 1) appears on the start screen and can be used for immediate entry without entering the IP address.

This link can also be used with any other NivuFlow Stick transmitter after the respective selection in the WLAN list.

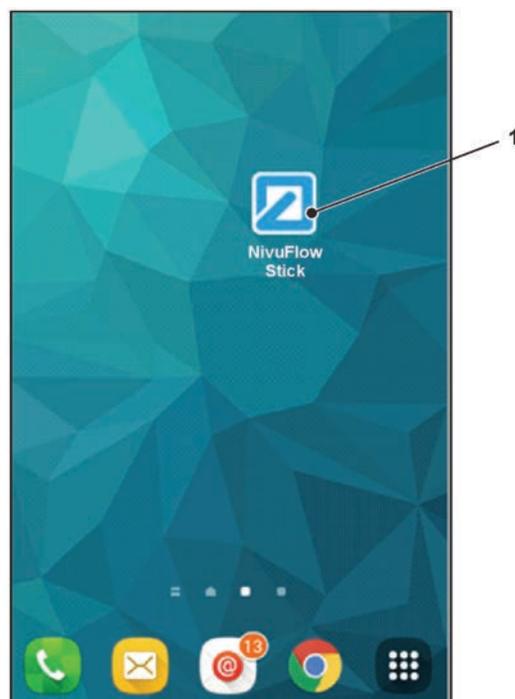


Fig. 26-8 Link on the start screen

26.3 iOS Operating System

- Preparations on NivuFlow Stick:
 1. Open the NivuFlow Stick enclosure cover and switch on at the on/off switch.
- Work steps on the display and operating module (smartphone, tablet, notebook, PC, etc.):
 1. Start the display and operating module.
 2. Open the corresponding menu using the Settings symbol (Fig. 26-9 Pos. 1).



Fig. 26-9 Settings symbol

3. Select WLAN (Fig. 26-10 Pos. 1).



Fig. 26-10 WLAN symbol

4. In the WLAN list select the NivuFlow Stick (Fig. 26-11 Pos. 1) with the corresponding SSID (delivery status = serial number).



Fig. 26-11 WLAN list

5. Enter the password for server access (delivery status = PUK) (Fig. 26-12 Pos. 2) and connect (Fig. 26-12 Pos. 1).



Fig. 26-12 Enter password and connect

6. Start Internet browser.
7. Enter the IP address "192.168.1.1" in the address field and open.
After successful connection the display of the NivuFlow Stick (Fig. 26-13) is shown.

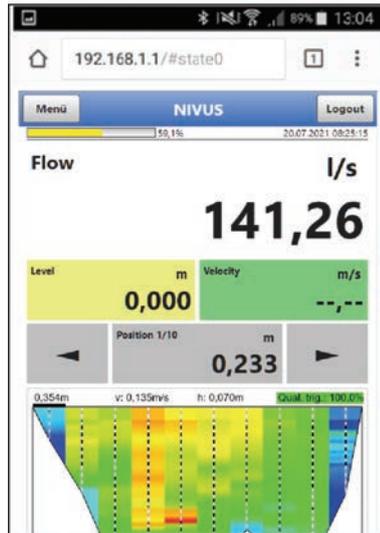


Fig. 26-13 Indication of NivuFlow Stick display in the browser

8. To set up a link on the Home screen (for direct access), tap the "Provide" icon (Fig. 26-14 Pos. 1).

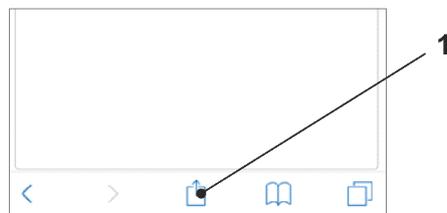


Fig. 26-14 Set up link

9. Select "To Home screen" (Fig. 26-15 Pos. 1).

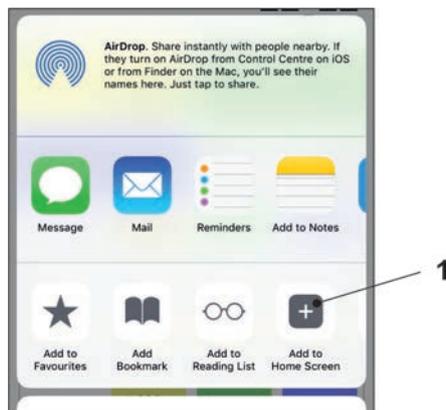


Fig. 26-15 To Home screen

10. Confirm with "Return" (Fig. 26-16 Pos. 1).

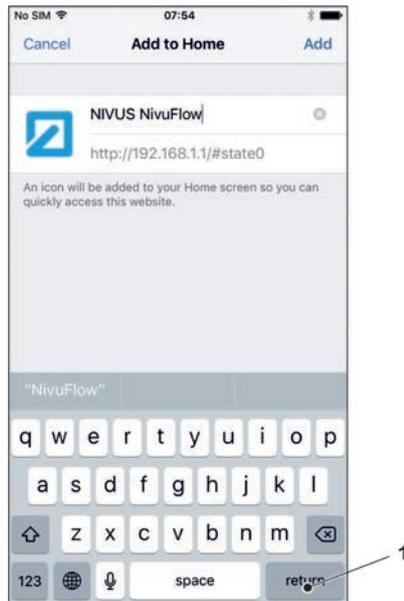


Fig. 26-16 Confirm adding

The shortcut (Fig. 26-17 Pos. 1) appears on the start screen and can be used for immediate entry without entering the IP address.

This link can also be used with any other NivuFlow Stick transmitter after the respective selection in the WLAN list.

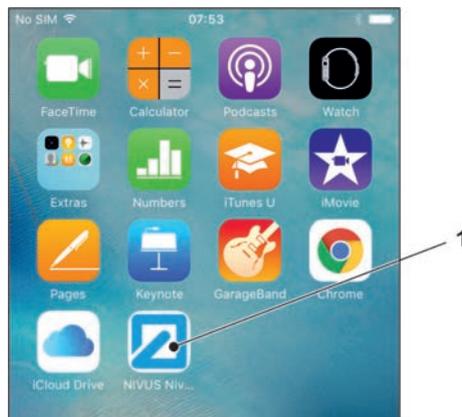


Fig. 26-17 Link on the start screen

26.4 Windows Operating System

➡ Preparations on NivuFlow Stick:

1. Open the NivuFlow Stick enclosure cover and switch on at the on/off switch.

➡ Work steps on the display and operating module (smartphone, tablet, notebook, PC, etc.):

1. Start the display and operating module.
2. Go to the overview of the available (WLAN) networks (Fig. 26-18 Pos. 2).
3. In the WLAN list select the NivuFlow Stick (Fig. 26-18 Pos. 1) with the corresponding SSID (delivery status = serial number).



Fig. 26-18 (WLAN) Network list

4. Enter security key (password) (delivery status = PUK; here fd671a105c5d as example) (Fig. 26-19 Pos. 1) and connect.

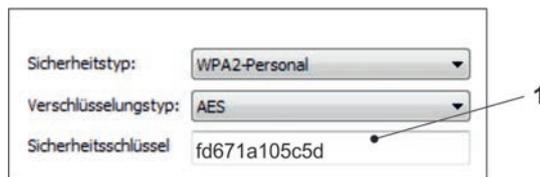


Fig. 26-19 Enter security key and connect

5. Start Internet browser.

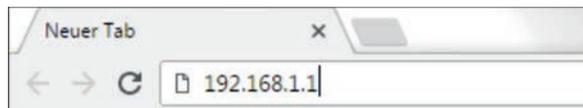


Fig. 26-20 Address field

6. Enter the IP address "192.168.1.1" in the address field (Fig. 26-20) and open. After successful connection the display of the NivuFlow Stick (Fig. 26-21) is shown.

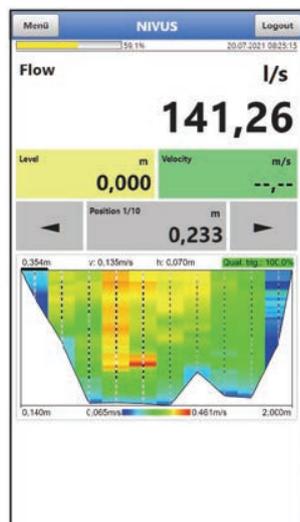


Fig. 26-21 Indication of NivuFlow Stick display in the browser

7. To set up a favourite in the browser (for direct access), tap the star for "Favourites" (Fig. 26-22 Pos. 1) (Google Chrome is used as an example) and confirm with "Done" (Fig. 26-22 Pos. 2).

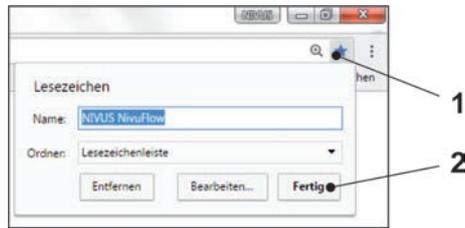


Fig. 26-22 Setting up favourite

The bookmark appears on the bookmark bar (Fig. 26-23 Pos. 1) and can be used for immediate access by simply selecting it without entering the IP address.

This link can also be used with any other NivuFlow Stick transmitter after the respective selection in the WLAN list.

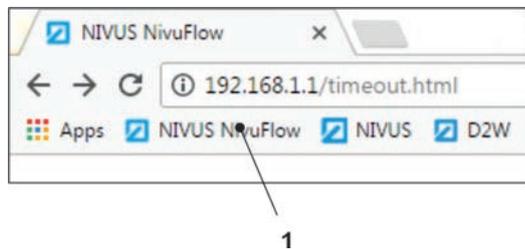
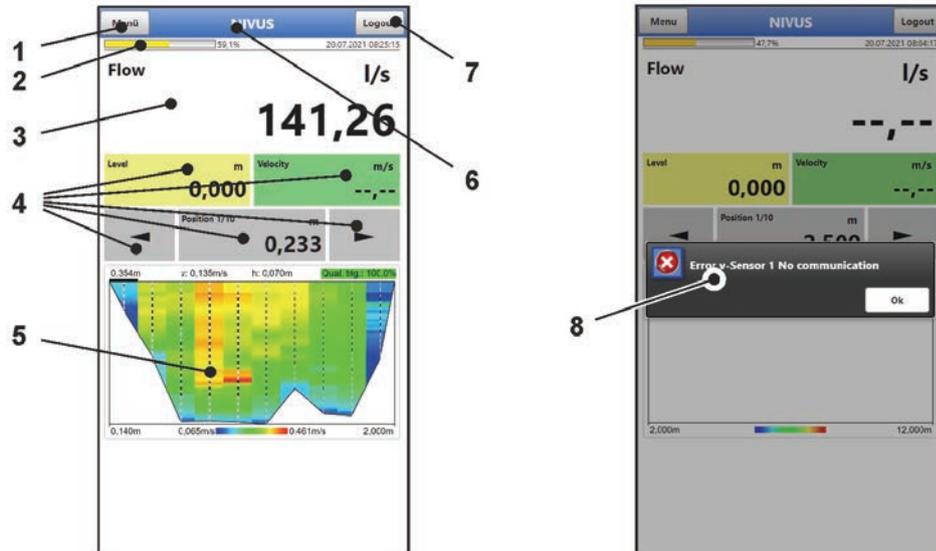


Fig. 26-23 Link in the bookmarks bar

27 Menu Control/Overview

27.1 Overview Display

Via the NIVUS display you can see at any time where you are in the menu and which entries you are currently editing.



- 1 Menu / Back (depending on the display view)
- 2 Battery indicator
- 3 Display Area 1 (output field for the flow measurement)
- 4 Display Area 2 (output fields for level, average velocity, selection and indication of the measurement place position)
- 5 Display Area 3 (output fields for the measured velocities of the individual measurement place positions)
- 6 Measurement place name or designation of the opened menu and service symbol, if applicable
- 7 Logout (disconnecting the operating and display module from the transmitter; the transmitter continues to run with the last saved settings)
- 8 Possibly existing error message or information

Fig. 27-1 Display view

27.2 Save Parameters

After changing parameters and scrolling back via the menu field, the changed parameters must be saved before the changes take effect. After saving, the status message "Successful" appears (Fig. 27-2).

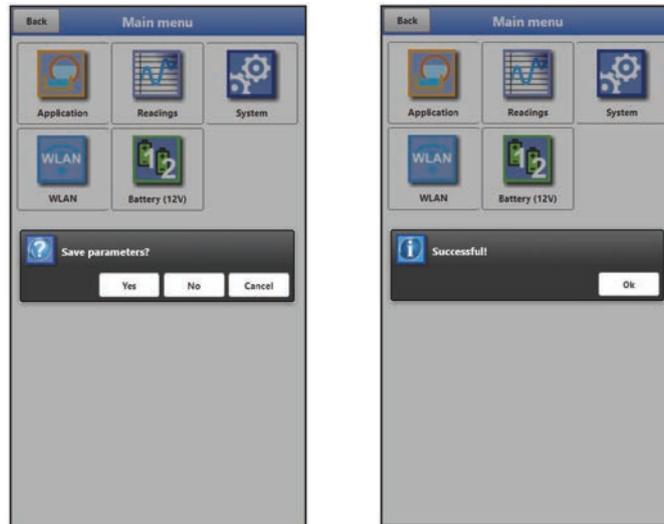


Fig. 27-2 Save parameters

➡ Procedure for saving see Chapter "29.1 Save Parameters".

27.3 Menus

All menus are described in a logical programming sequence in chapter "Setting Parameters" starting on page 51.

There are five basic menus available in the main menu. These become visible and selectable by selecting the "Menu" field (from the main display) or the "Back" field (from within the submenus).

In detail these are:

Application	Parameterisation of measurement places (default) and diagnostics
Measurement Data	<ul style="list-style-type: none"> - Parameterisation of measurement places (based on the default measurement place or individually) - Information on flow rate, level and (average) flow velocity - Saving and loading of measurement data - Deleting measurement data
System	<ul style="list-style-type: none"> - Retrieval of basic information (serial number, version, item number, etc.) on the transmitter (required for queries with NIVUS GmbH) - Setting the language and date format under >Country Settings< - Setting the system time and time zones under >Time/Date< - Error messages under >Error Messages< - Service Levels - Parameter/System Reset - Activating function licences - Information about the rechargeable batteries and the current capacity - Loading parameters
WLAN	Setting parameters for the communication interface of the NivuFlow Stick
Battery (12V)	Selection of rechargeable/batteries used

Tab. 5 Menu overview

Main Screen

28 Information on Main Screen

Quick Access

In addition to displaying the values themselves, the main screen also allows for direct access to the most important setting parameters.

The changed **setting parameters** only apply to the **current measurement**, do not change the original parameters for the measurement place. When the measurement place is reloaded, the original setting parameters apply again.

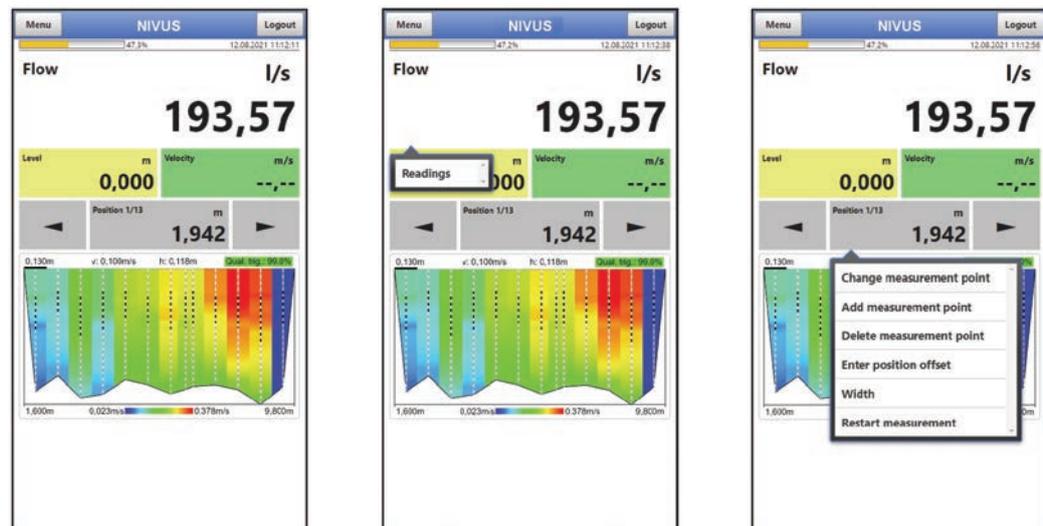


Fig. 28-1 Selection of the quick access menus / pop-up menus

If the **quality of the triggers** for the measurement is invalid or below the defined limit, the text "Quality Trig.:" on the right above the graphic and the following value in % are displayed in red. If the actual value is above the set minimum value, the text is highlighted in green.



See also Chap. "31.1.12 Quality Trigger min.".

28.1 Selecting/opening pop-up menus

For the display areas "Flow", "Level", "Velocity" and for the **arrow fields** for jumping between the positions, a short click with the left mouse button or a short tap with the touch screen is sufficient to open the pop-up menus of the quick access menus.

In the "**Position 1/x**" display area, the measurement is started and ended with a short click/tap. To open the pop-up menu, click or tap for a moment:

- Hold down left mouse button for a moment
- Maintain touch on the touch screen on the field for a moment

28.2 Menu of the "Flow" Main Screen

The flow rate pop-up menu allows access to the >Measurement data< parameterisation menu.

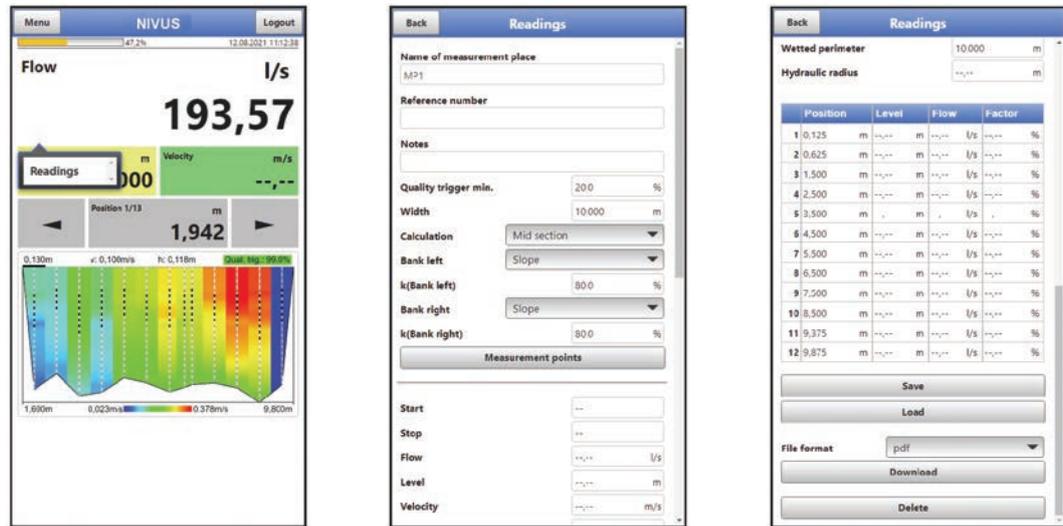


Fig. 28-2 Pop-up menu "Flow"

➡ The measurement data menu is described in detail in Chap. "32 Parameter Menu Readings".

28.3 Menu of the "Level" Main Screen

The pop-up menu at level allows directly the manual overwriting of the level at the selected position and the access to the parameterisation menu >Application< / >Diagnosis< / >h-Sensors<.

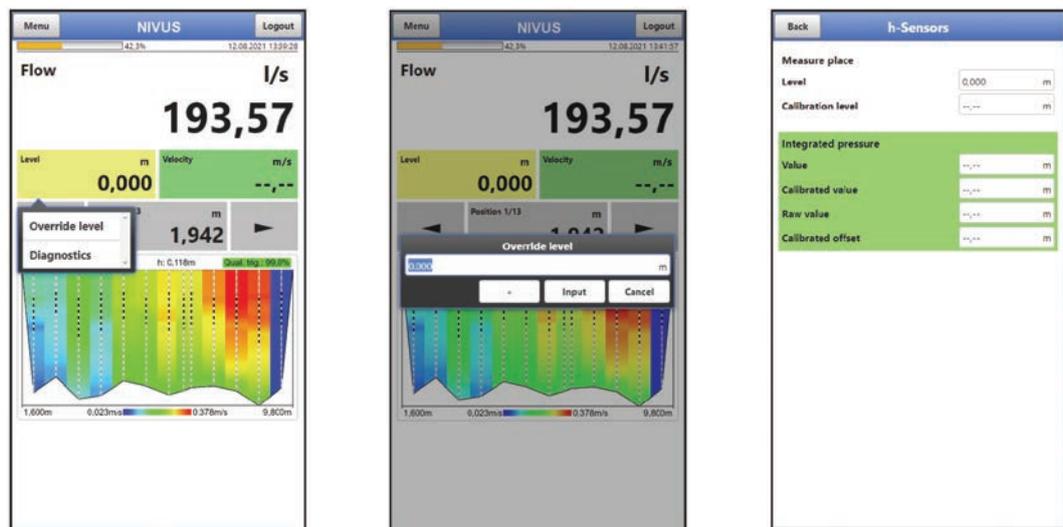


Fig. 28-3 Pop-up menu "Level"

➡ The diagnosis menu is described in detail in Chap. "37 Menu Diagnostics h-Sensors".

28.4 Menu of the "Velocity" Main Screen

The pop-up menu at velocity allows quick access to the parameterisation menus >Application< / >Diagnosis< / >v-Sensors< and >Application< / >Diagnosis< / >Signal Analysis<.



Fig. 28-4 Pop-up menu "Velocity"

⇒ The diagnosis and signal analysis menus are described in detail in Chap. "38 Menu Diagnostics v-Sensors" or "39 Menu Diagnostics Signal Analysis".

28.5 Menu of the "Position 1/x" Main Screen

The Position 1/x pop-up menu allows quick access to various functions.

⇒ Observe Chap. "28.1 Selecting/opening pop-up menus".

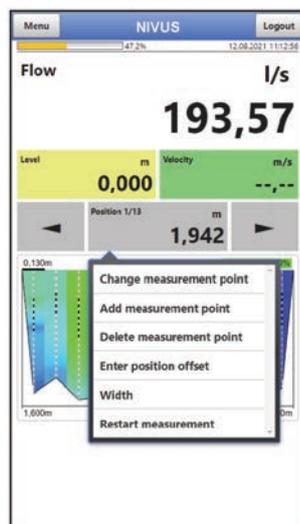


Fig. 28-5 Pop-up menu "Position 1/x"

>Change Measurement Point<

Changes the position of the measurement point(s)/vertical(s) within the channel.

In the representation on the display, this measurement point and the adjacent ones are visually adjusted in width, their values remain unchanged.

>Add Measurement Point<

Adds another measuring point/verticals to the existing ones.

In the display, this measurement point is added depending on the position entered (in metres). Adjacent measurement points are visually adjusted in width and their flow values are calculated individually.

>Delete Measurement Point<

Deletes the current measurement point(s)/vertical(s) within the channel.

In the representation on the display, the adjacent measurement points are visually adjusted in width, their values remain unchanged.

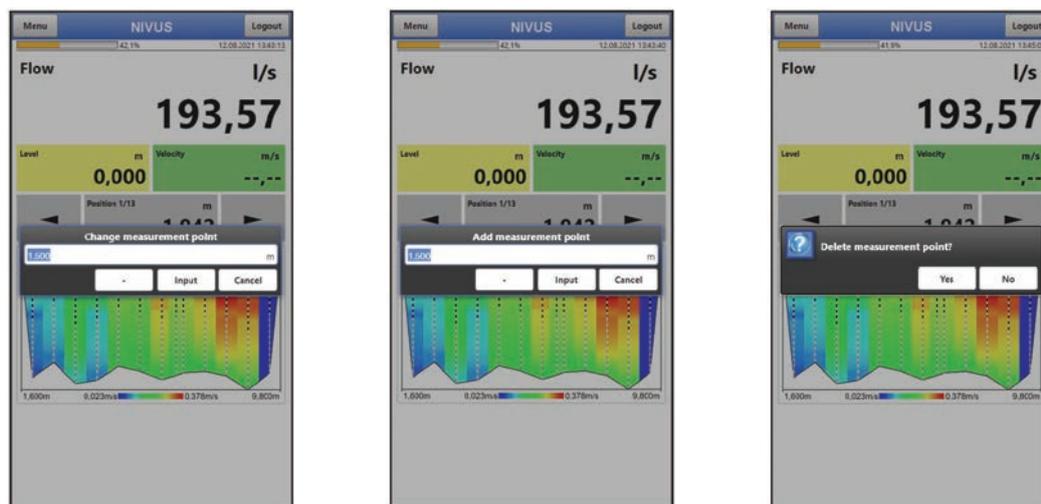


Fig. 28-6 Change/add/delete section

>Enter Position Offset<

Here a new value (a lateral deviation) can be entered for the measurement points/measurement verticals for the offset originally set. See also Chap. "31.1.8 Offset".

In the display, the measurement points remain the same, the offset is added to or subtracted from the original position values (value displayed in each case in the start button).

A position offset may be required if the width (of the watercourse) is changed or if the location of the fixing peg is changed.



Fig. 28-7 Position offset

>Width<

Changes the originally entered width of the channel. After entering the new width, the following prompt appears: "Measurement Place Parameters changed. Recalculate Measurement Points?".

- If "Yes" is selected, all measurement points/verticals are changed proportionally. In the representation on the display, all measurement positions are visually adjusted in width.
- If "No" is selected, the measurement points/verticals remain in the same place, the total width of the channel is adjusted.

Tip: If the width is changed, the position offset must also be checked and adjusted if necessary.

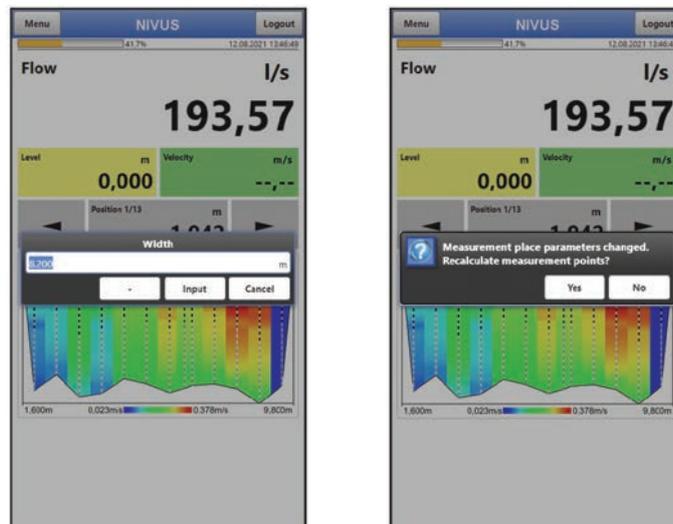


Fig. 28-8 Change Width – Recalculate Measurement Points?

>Restart Measurement<

Deletes the entered measurement results from the display of the current measurement and starts a new measurement.

The message/query "Attention: All unsaved measurement points will be deleted! Restart measurement anyway?" appears.

- If "Yes" is selected, the next query "Load measurement place settings?" is shown.
 - If "Yes" is pressed again, the parameters saved under >Application< / >Measurement Place< are loaded to the measurement place. All other changes made via the quick access (in the main screen) are deleted.
 - If "No" is selected, the last saved parameters are retained. These may differ from the parameters stored under >Application< / >Measurement Place<.
- If "No" is selected, operation continues with the current measuring point settings that have been changed via the quick access (in the main screen) but have not yet been saved. All settings, values and (display) indications remain unchanged.

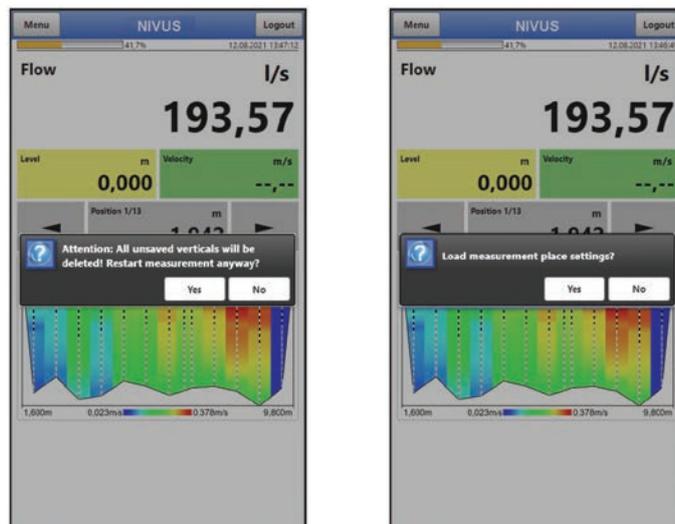


Fig. 28-9 Restart measurement

28.6 Menu of the "Chart" Main Screen

The measured velocity profile is shown in the main screen chart (Fig. 28-10 Image 1). By clicking on the graphic, the display switches to the lateral profile (Fig. 28-10 picture 2).

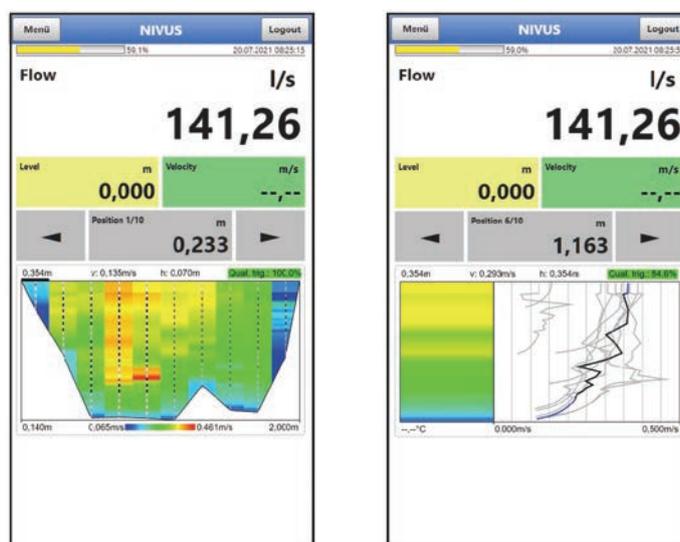


Fig. 28-10 Flow profile from the front and side

Information on Colours and Areas in the Main Chart

In the main chart, the measurement range limits are shown with vertical white dash lines, the measurement verticals with a vertical grey-black solid line.

Grey (partial) line: Virtual/calculated gates

Black (partial) line: Actually measured gates

The position of the vertical lines can be used to identify the measurement method (Mean Section or Mid Section) set during the measurement. In the Mean Section method, the measurement verticals are optically in the same position as the measurement range limits, resulting in white-grey-black dashed lines, whereas in the Mid Section method there are clearly separated lines (white dash lines or grey-black solid lines).

➡ See also Chap. "31.1.9 Calculation".

The lower flow profile curve is always the connecting line between the individual measurement verticals.

When a pdf of a measurement is generated via the transmitter, the firmware numbers the measurement verticals consecutively from 1 to x (depending on the number of individual measurements).

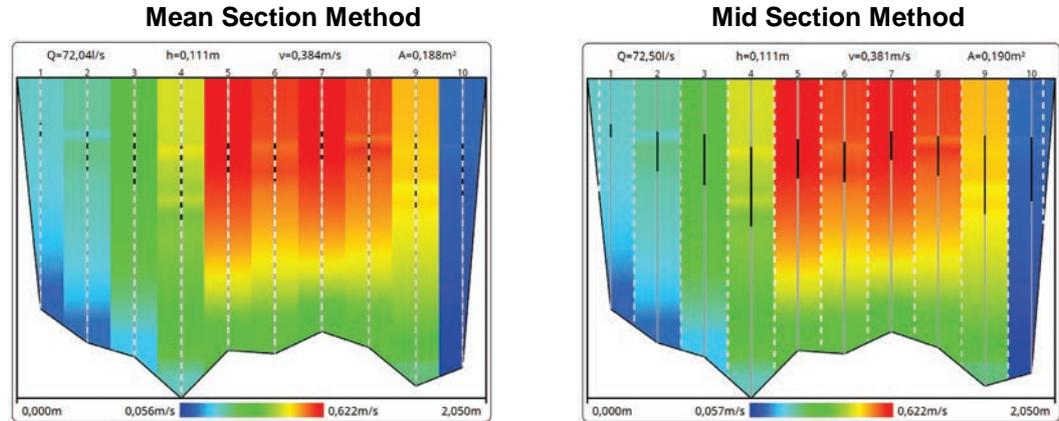


Fig. 28-11 Representation of the measurement depending on the measurement method (in pdf)

Information on Colours and Areas in the Side Profile

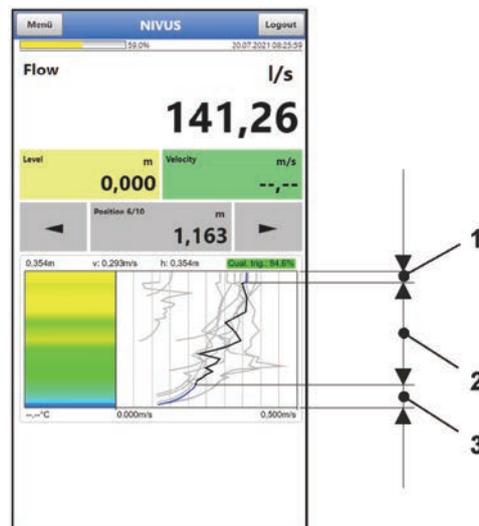
Black line (flow curve): representation of the actually measured gates

Blue line (flow curve): representation of the virtual (computed) gates

Tip: For read-in measurements made with an earlier firmware (up to V3.3.x), all parts of the flow curve are displayed in black.

The height of the black flow curve represents the height of the measured gates; i.e. the range between h-crit (bottom, min.) to the maximum possible measurement height, without the further distance to the water surface.

Tip: If there were also invalidly measured gates within the range of measured gates (black curve; area "2" of the following figure), these would be replaced by the virtual (computed) values and the affected sub-area of the curve would be shown in blue. This would result in a blue-black mixed curve in the representation in area "2" of the following figure.



- 1 Distance to water surface
- 2 Measured gates
- 3 h-crit

Fig. 28-12 Representation of the measurement in the lateral profile

➡ See also Chap. "38 Menu Diagnostics v-Sensors".

Setting Parameters

29 General Programming

In principle, changed parameters do not become effective before they have been saved. When exiting all menus via the "Back" field, the transmitter checks whether parameters have been changed. If any have been changed, you will be asked whether the parameters should be saved.

- >Yes<: the changed parameter setting is accepted and saved.
- >No<: the changes to the parameters are discarded and the device exits the menus.
- >Cancel<: You exit the query. The parameters remain changed, but are not yet effective and not saved.



Tip for repeated measurement of the same measurement places

If measuring points are not only measured once but repeatedly, it is recommended to save the parameterisation of the measuring point and, if necessary, also the measurement data. During the next measurement at the measuring point in question, these can then be quickly reloaded and there is no need for new parameterisation. See Chapter "32.1.10 Load" starting on page 71.

29.1 Save Parameters

After entering all necessary (measurement place) parameters, these must be saved to become effective.

➡ Procedure:

1. Select "Back" 3 times: a window opens with the message >Save Parameters?<. Confirm with >Yes<.*
The message "Successful!" indicates the completed saving of the parameters.

* >Yes< saves the new parameters; >No< cancels the saving process and the last saved parameters are active again; >Cancel< cancels the saving process, the last changed parameters remain active and the initialisation process can be continued.

29.2 Change WLAN Password

The WLAN password is set **per default** to an individually determined identifier for the device. This is attached as a sticker on the side of the transmitter.

This factory-assigned password can be changed as described below. The new password must have between 8 and 32 characters.

➡ Procedure:

1. Open the main menu via "Menu".
2. Open the >WLAN< menu.
3. Select the >Password< field.
4. Enter the new password and confirm.

Up to four users can access the transmitter and its parameterisation simultaneously via the WLAN access. Simultaneous access is not indicated or logged.

If changes in the parameterisation are necessary, make sure that this is done in consultation and that there is no simultaneous access. The last saved parameter is always valid.



Keep your password safe

Only give the password to authorised persons.

If you write down the password, keep it in a safe place.

29.3 Change the device SSID

The SSID is set **per default** to the **serial number** of the unit. This is written on the nameplate on the enclosure.

This factory-assigned SSID can be changed as described below. The new SSID must have between 8 and 32 characters.

➡ Procedure:

1. Open the main menu via "Menu".
2. Open the >WLAN< menu.
3. Select the >SSID< field.
4. Enter the new name and confirm.

29.4 Loss of the Password

Each NivuFlow Stick is delivered with a PUK ("Personal Unblocking Key" or also Super PIN). This allows the unit to be reactivated if the password is forgotten and a new password can be assigned.

This PUK is identical to the default WLAN password which is attached as a sticker on the side of the transmitter.

➡ Procedure:

1. Open the cover.
2. Hold the magnet against the Reed contact (status LED) and at the same time switch the NivuFlow Stick on using the On/Off switch.
The magnet must be held against the reed contact until the LED flashes green for the second time. The flashing sequence is green - white - green.
The NivuFlow Stick restarts.
3. The NFS appears in the WLAN list with the default SSID (identical to the serial number of the respective device according to the nameplate).
4. Enter the default PUK as password.
5. Enter new password and possibly also the SSID according to Chapters "29.2 Change WLAN Password" and "29.3 Change the device SSID".
6. To adopt the new password/the new SSID, reinitialise the unit by switching it off and on again.
7. Activate the NFS within five minutes, otherwise the password changes will not be accepted and the unit will continue to report under the default identifier and will only respond to the factory-assigned password.
8. Close the cover.

30 Parameter Functions

30.1 Main Menu

The NivuFlow Stick is parameterised via the total of five settings menus.

The individual menus are explained in greater detail starting with Chapter "31 Parameter Menu Application". In the main menu there are five icons with the functions described below:



Fig. 30-1 Overview Main Menu

30.2 Functions of the first Menu Level

30.2.1 Menu - Application



Fig. 30-2 Menu Application

The application menu includes two submenus.

Here the dimensions of the measurement place, the calculation method and the division into the measurement place positions are programmed as default values.

This menu provides diagnostic options for:

- Flow velocity/level sensors
- Signal analysis

Possible entries or changes to the default settings:

- Determination of the mounting type of the v-sensor and permitted histogram deviations
- Material/dimensions/shape of the measurement place
- Number of measurement points
- Max. section factor
- Duration of individual measurements
- Minimum value for trigger quality
- Damping of signal evaluation/output
- Stability of signal evaluation/output

30.2.2 Menu - Measurement Data

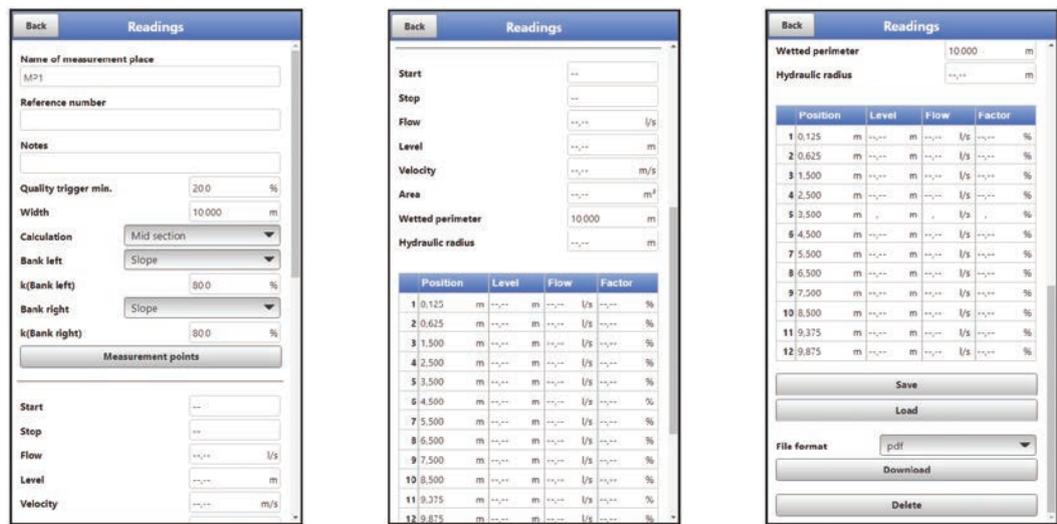


Fig. 30-3 Menu - Measurement Data

The measurement data menu includes all internally saved measurement values.

The following functions are available:

- Listing (and changing) of measurement place name and reference number
- Possibility of entering notes
- Listing (and temporary changing) of the data and dimensions of the measurement place and measurement points
- Setting of the calculation method
- Storage and deletion options for the measurement data

30.2.3 Menu - System



Fig. 30-4 Menu System

This menu contains information on the transmitter:

- Firmware version
- Article Number
- Serial Number
- Information on battery voltage and credits/licences

In addition, the following settings are possible:

- Language
- Units
- Correct date and time
- Read active error messages
- Delete error memory
- Execute parameter reset
- Carry out firmware updates
- Load Parameters

30.2.4 Menu - WLAN

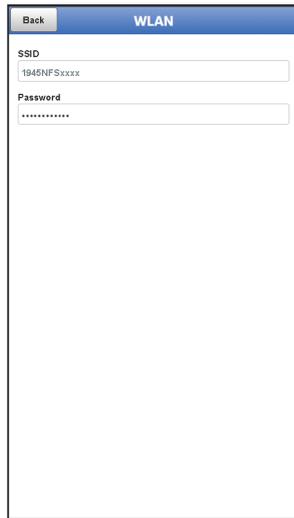


Fig. 30-5 Menu WLAN

This menu shows the SSID and the password and offers the possibility to change these two key data.

30.2.5 Menu - Battery (12V)



Fig. 30-6 Menu Battery

In the Battery menu, the battery types used are selected.



Correct display of the capacity indicator

The capacity display in the >System< / >Information< menu only works reliably if fully charged rechargeable/batteries are used and the battery type used is entered here.

31 Parameter Menu Application

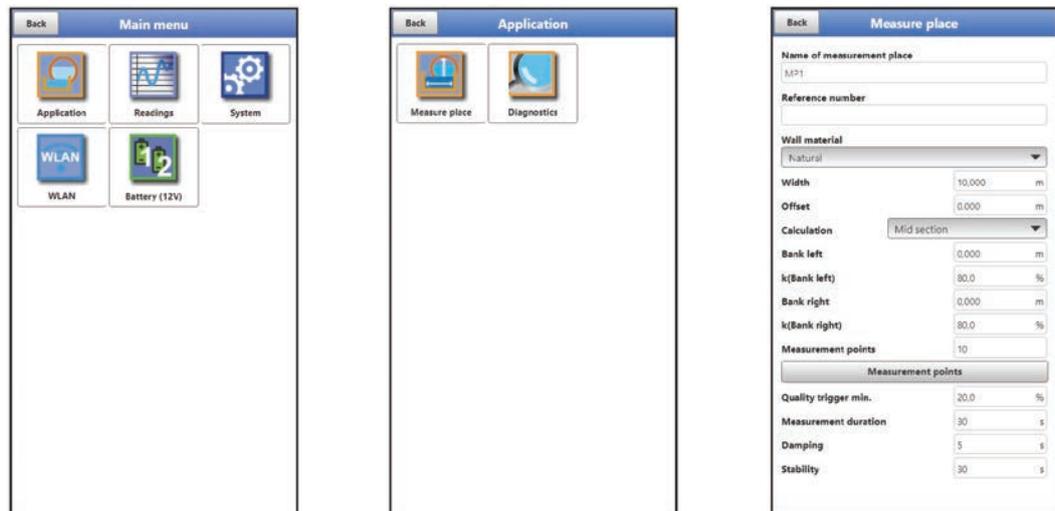


Fig. 31-1 Menu Application

The general parameterisation of the measurement place is described below.

31.1 Menu Measurement Place

In the sub-menu >Measurement Place< you can create your own "Default Measurement Place", independent of the factory setting, which can be saved (e.g. as "Default Measurement Place" or "Base Measurement Place" or similar) and loaded again and again. This default setting exists once in the transmitter, but can also be overwritten and saved again.

The parameter settings of the measurement place include the following basic settings:

- Measurement place name and reference number
- Channel profile (additional function licence; only available after purchase and activation).
- v-Sensor
- Material, width of the measurement place, offset, calculation method, construction type of the banks and the number of planned measurement points
- Quality Trigger min. and Section Factor max.
- Duration, damping and stability of the measurement

31.1.1 Name of the measurement place

The measurement place name can be changed here. After the change, when returning to the main display, the query "Load Measurement Place Parameters?" is displayed after saving the parameters.

- If "Yes" is selected, the transmitter jumps to the main display and the previous readings in the display are removed.
- If "No" is selected, the previous readings are still displayed.

When initialising the measurement place name, the default name is automatically deleted after the first letter or number is selected.

- Write the desired measurement place name in the text field and confirm with "Enter". The measurement place name is transferred to the main menu and displayed there.

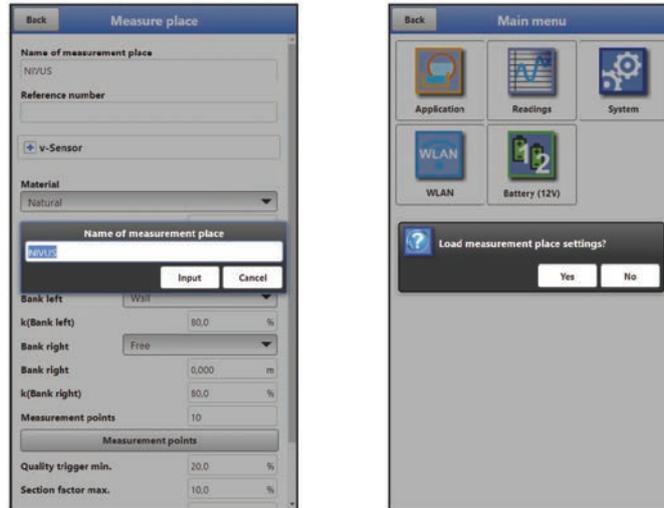


Fig. 31-2 Load new measurement place (parameters)

31.1.2 Reference Number

The reference number can be used as a supplement to the measurement place name to define the measurement more precisely. The input is manual and can be selected by the user as desired.

31.1.3 Channel profile (additional function licence)

The basic setting of the measuring system offers "Survey" as the channel profile. This channel profile is to be used for water bodies whose dimensions are not available in detail. In addition, the measuring system for measured profiles allows the selection of a variety of standardised channel profiles that are predominantly used in practice.

Since older sewer systems in particular often have special designs, the measuring system also offers the option of entering the dimensions of symmetrical and asymmetrical flumes in the form of a table.

The selected profile is displayed graphically when the 3D preview field is selected. The entered measurements are set in relation to each other in the graphical representation.

Through this visual check, you can immediately determine whether the profile has been created correctly in principle. Especially with free profiles, this direct control is helpful.

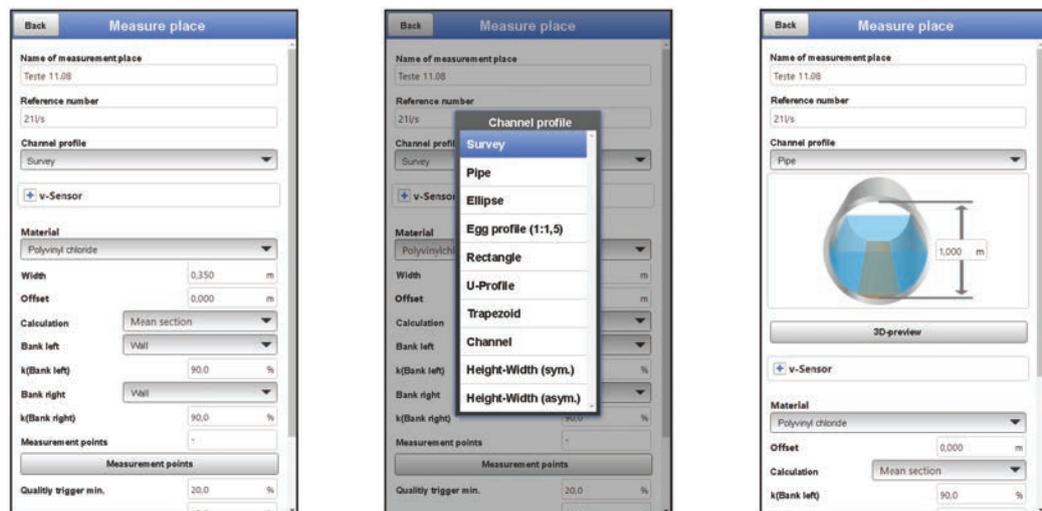


Fig. 31-3 Channel profile (additional function licence)

- Select from the available channel profiles:
- Survey

- Pipe
 - Ellipse
 - Egg Profile (1:1.5)
 - Rectangle
 - U-Profile
 - Trapezoid
 - Water Bed
 - Height-Width (sym.)
 - Height-Width (asym.)
-  Enter dimensions.
After selecting the profile the dimension values are entered. The unit of measurement used is factory set in metres [m], but can be changed in the menu >System< / >Country Settings< / >Units< / >Level<.

Survey

This setting is the correct selection for channel types that are not measured in detail. The width of the channel and the condition of the two banks are entered. The geometry of the channel is automatically determined and stored by the measurements at the measurement verticals.

Pipe

This selected shape is suitable for round pipes. This shape selection can also be used for half shells with a maximum filling level of 50 %.

Deformed pipes with asymmetrical height/width ratio can be parameterised using the Ellipse profile.

A separate profile selection is created for U-profiles.

Ellipse

The elliptical profile is mainly used for pipes subject to mechanical loads (lateral pressure or crest pressure). Special channel shapes are also known as elliptical profiles.



Ellipse Profile or Egg Profile

Do not confuse the horizontally and vertically symmetrical ellipse profile with the egg profile.

Egg profiles have different radii in bottom and crest and are therefore only vertically symmetrical.

-  Enter both dimensions of the elliptical profile.

Egg Profile (1:1.5)

This channel is a "standard egg" according to German DWA A 110 with a width/height ratio of 1:1.5. Pressed or compressed egg profiles must be parameterised using a free profile.

When setting the parameters for a "standard egg" egg profile, only the maximum channel width must be entered. The transmitter automatically calculates the height using the specified 1:1.5 ratio.

Rectangle

With this profile selection, channels with vertical walls and horizontal bottom are parameterised. By simply entering the channel width and height, the parameters are quickly set.

This menu also includes the option to set parameters for a channel with a central dry weather flume.

- Rectangle with Dry Weather Flume

➡ Procedure:

1. Select dry weather flume.
2. Check the >Active< box.
Two more input fields open up.
3. Enter height and diameter of the dry weather flume.
Check the input of the dimensions using the 3D display.

U-Profile

The U-profile consists of a semicircle at the bottom and vertical walls. The semicircle radius here is 0.5x the channel width. It is entered independently by the system in the calculation. Program profiles with radii > 0.5x the channel width as free profile.

Trapezoid

With this profile selection, it is possible to parameterise symmetrical channels with a horizontal bottom and sloping side walls. Symmetrical channels with a horizontal bottom, sloping side walls and attached vertical walls are also parameterised via this profile setting. Even with the trapezoid option, it is possible to parameterise a channel with a central dry weather flume.

- Trapeze with Dry Weather Flume

➡ Proceed as described in the Rectangle with Dry Weather Flume section on page 60.

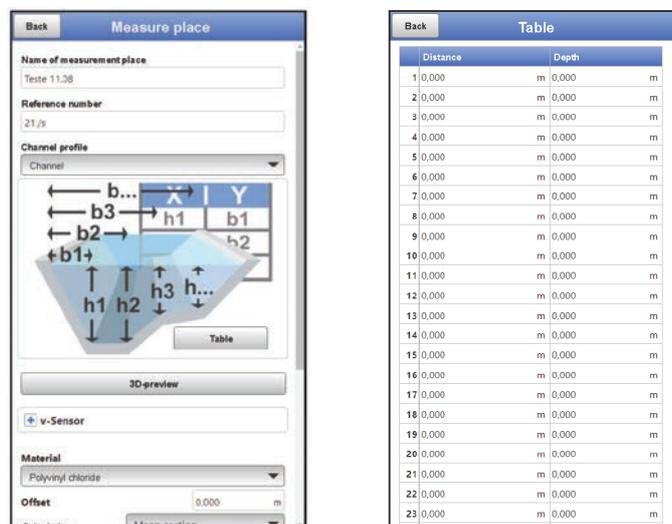


Fig. 31-4 Water bed

Water Bed



Extensive expertise required

Programming a water bed requires extensive knowledge and experience with the functions of the NivuFlow Stick as well as the hydrological boundary conditions.

We recommend that the programming be carried out by the NIVUS commissioning service or a specialist company authorised by NIVUS.

With this profile, you define the reference point/zero point yourself. Usually, the maximum filling level or the water surface on a bank or channel side is defined as the zero point. Here,

the watercourse profile for a specific watercourse section can be stored in the transmitter by means of local measurements.

- Enter the freely defined measurement sections one after the other into the table.

Symmetrical profile with Height-Width (Height-Width (sym.))

Any symmetrical profiles can be set in this menu.

After selecting >Table< a table of values appears. A maximum of 32 breakpoint pairs (channel height/channel width) can be entered in this table. These values are automatically calculated in the system and stored internally as a symmetrical profile.



Drawing required

A drawing to scale is required for the parameterisation of the channel.

- Procedure:

1. Draw a vertical guide line in the centre of the channel on the scaled drawing.
2. Draw horizontal guide lines at the prominent profile change points.
3. Measure the length of these guide lines and then convert them to scale.
4. Start at height "0" to define a channel start.
5. Enter all other breakpoints "free" in height and width.
Enter all other breakpoints "free" in height and width. The distance between the individual height points can be variable. For the profile definition, it is not necessary to specify all 32 breakpoints. The transmitter linearises between the individual breakpoints. In the case of large uneven changes in the channel dimensions, select a smaller breakpoint distance in this change range. After the channel parameterisation has been completed, the entered values are displayed graphically in proportion to each other.
6. Check the input of the dimensions using the 3D display. This visual control option makes any gross programming errors visible.

Free asymmetric Profile with Height-Width (Height-Width (asym.))

In practice, asymmetrical profiles occasionally appear in unusual shapes. The programming option for asymmetric profiles is used for this.



Important note on the viewing direction for free profiles

The viewing direction >Width left< or >Width right< is opposite to the flow direction in the channel.



Drawing required

A drawing to scale is required for the parameterisation of the channel.



Fig. 31-5 Asymmetric profile with Height-Width (Height-Width asym.)

➡ Procedure:

1. Draw a vertical guide from the lowest channel point upwards on the scaled drawing.
2. From this guide line, draw horizontal guides to the left and right at the prominent profile change points.
3. Measure the distances of these guide lines from the centre guide line to the right and left respectively.
4. Enter the breakpoints, converted to scale, in the 3-column value table as follows:
Height / Width to the left / Width to the right.
Here, **observe** the previously mentioned Important note on the viewing direction for free profiles on page 61.
Start at height "0" to define a channel start.
5. Enter all other breakpoints "freely". A maximum of 32 breakpoints is possible. The distance between the individual height points can be variable. For the profile definition, it is not necessary to specify all 32 breakpoints. The measuring system linearises between the individual breakpoints. In the case of large uneven changes in the channel dimensions, select a smaller breakpoint distance in this change range. After the channel parameterisation has been completed, the entered values are displayed graphically in proportion to each other.
6. Check the input of the dimensions using the 3D display. This visual control option makes any gross programming errors visible.

31.1.4 3D Preview (only in conjunction with the Channel Profile Option)

If the 3D preview is selected, the parameterised measurement place with the respective sensors can be displayed.

31.1.5 v-Sensor

- **Mounting** (three variants can be set here):
Factory setting: Standard rod
 - **Standard Rod**
 - The NivuFlow Stick measuring system is delivered pre-assembled with NIVUS standard rod, transmitter, sensor base and sensor (see Fig. 15-1). Then >Standard Rod< must be selected so that all dimensions are correctly stored in the transmitter for the internal calculations.
 - For the 3-piece rod (*NFS0 STG 3TLG*), which can be ordered as an accessory, >Standard Rod< must also be selected.

- **Telescopic rod**

The NivuFlow Stick can also be operated with the NIVUS telescopic rod (*ZUBO TELE SKOP*) for individual, special applications (e.g. if vertical positioning of the NivuFlow Stick is not possible in the duct) in consultation with the NIVUS GmbH. Details on the required parts, assembly and handling can be obtained from NIVUS. For such special applications, the >Telescopic Rod< must be selected in >Mounting< in order to obtain correct data for the internal calculations.

- **Free**

This variant is selected if a customer's own rod with corresponding sensor attachment (i.e. neither the NIVUS standard rod nor the NIVUS telescopic rod) is used. Then the corresponding distance from the bottom edge of the sensor base plate to the bottom edge of the respective mounting plate must be measured and entered under >Mounting Height<.

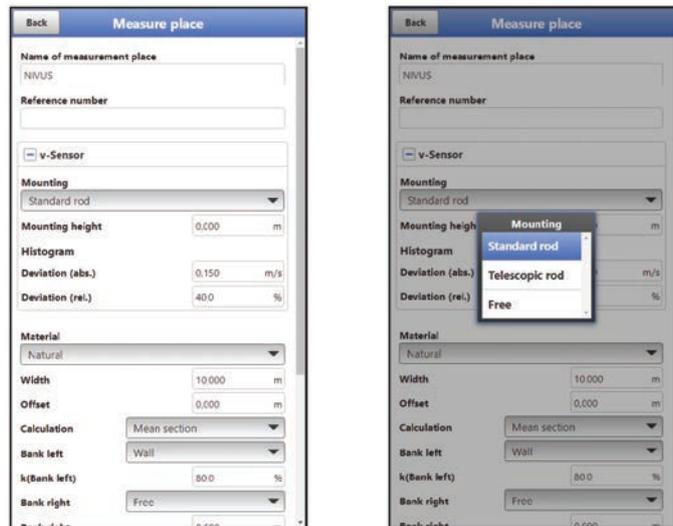


Fig. 31-6 v-Sensor – Mounting

- **Mounting Height**

If the NivuFlow Stick is additionally mounted with a block or plate (e.g. sludge plate), its material thickness must be specified as the mounting height. A value must also be specified when using a custom fastening (see previous paragraph on "Free").

- **Histogram**

With the permitted deviations (absolute/relative), values are set for deviating velocities. Measured velocities outside this defined deviation are ignored by the transmitter. If the absolute and relative deviations result in mathematically different deviations, the transmitter operates with the larger of the two specified deviations.

Default Setting:

Deviation (abs.): 0.15 m/s
 Deviation (rel.): 40 %

31.1.6 Material

The most common materials can be selected here: "Cast Iron", "Polyvinyl Chloride", "Cement" and "Natural" (for e.g. river bottom/bank).

In addition to the default selection, "User defined" can also be set. However, it is then necessary to enter the roughness of the corresponding material manually, as this value is included in the transmitter's calculations.

Default setting: Natural

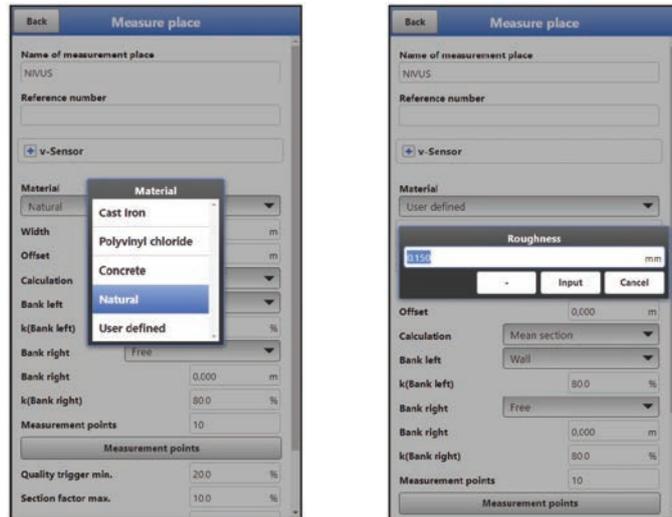


Fig. 31-7 Material

31.1.7 Width

The watercourse/channel width is included in the calculation of the transmitter to determine the distances of the measuring point positions.

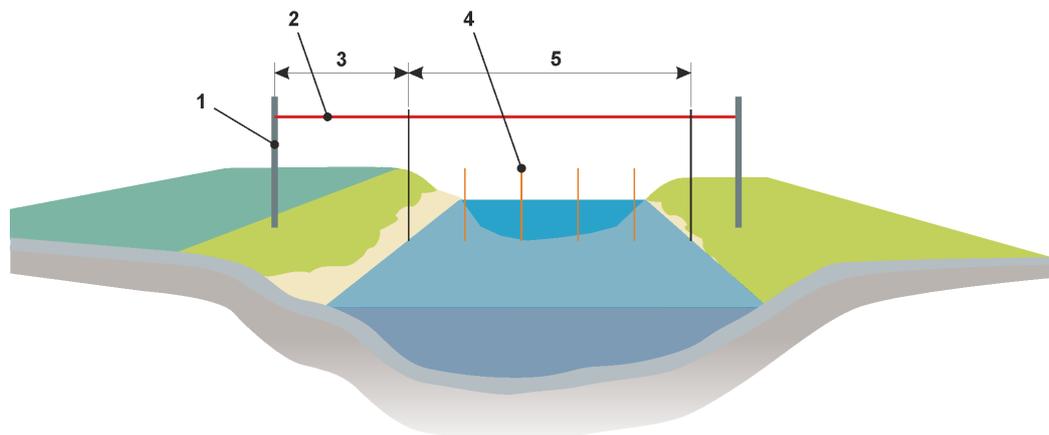
31.1.8 Offset

In practice, a tape measure is usually fixed over a water body outside the water body to simplify the approach to the preset measurement points. This tape measure starts with the scale then outside the water. If this distance is entered as an offset, the transmitter displays the measuring points including the offset.

The offset always relates to the left-hand bank.

A negative offset is also possible if the tape measure is fixed within the watercourse rim, e.g. on a bridge.

Default setting: 0.0 m



1 Fixing peg

- 2 Tape measure
- 3 Offset (positive here) (always related to bank left)
- 4 Individual measuring points (measurement verticals)
- 5 Width of water body

Fig. 31-8 Offset at the measurement place

31.1.9 Calculation

To calculate the flow rate within the individual measuring points/ranges, the transmitter requires the specification of which of the two calculation methods "Mid Section" or "Mean Section" is to be used.

- ⇒ More details on this see SN EN ISO 748 "Hydrometry – Measurement of liquid flow in open channels – Velocity area methods using point velocity measurements (ISO 748:2021)".



Fig. 31-9 Calculation

31.1.10 Bank left, k(Bank left), Bank right and k(Bank right)

With **>Bank left<** or **>Bank right<** with pop-up menu the bank forms "Free", "Slope" and "Wall" can be selected. For the defined bank forms "Slope" and "Wall", certain specifications are assumed in the transmitter for the calculations of the flow in the rim area; for "Free", values must still be entered manually in the input fields **>Bank left<** or **>Bank right<** for the medium depth at the respective outermost rim of the flowing water.

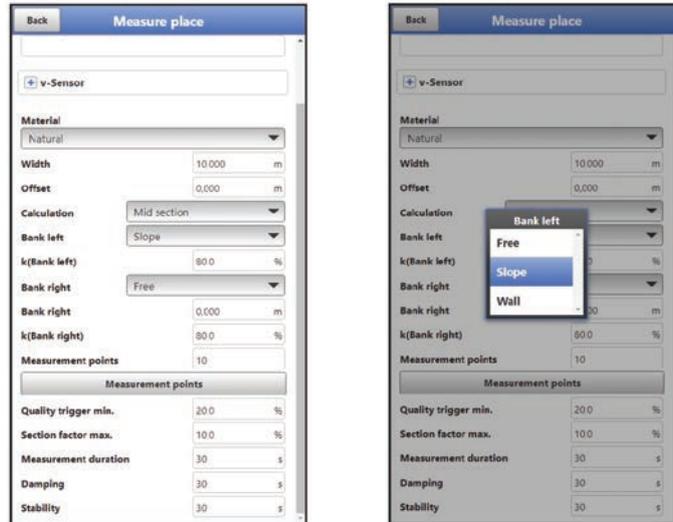


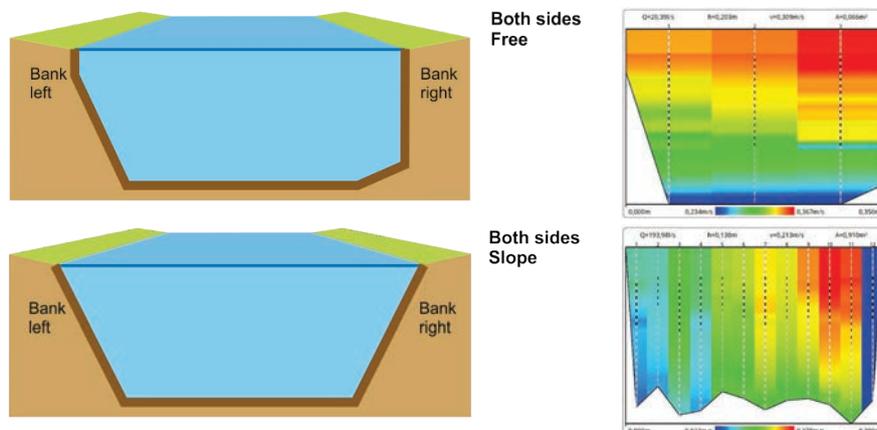
Fig. 31-10 Bank

>k(Bank left)< or **>k(Bank right)<** are correction factors in percent, which are included in the calculation to compensate for inaccuracies due to the roughness of the water's edge. This value is based on the user's experience; the **default setting** is "80 %" and can also be retained in most cases.

Depending on the **shape of the bank**, different measurement curves result in the two **outer** measurement ranges (if set correctly).

- In the case of the bank form "Free", the outer lines do not start at the very top, as the banks only slope down below the top of the water, while the upper area consists of vertical bank parts.
- In the case of the "Slope" bank form, the top edge of the water is the highest point and the bank begins immediately with sloping flanks.
- The bank shape "Wall" stands for vertical banks, which is also shown vertically in the measurement curve.
- Here both sides of the bank can also be different. Mixtures of the three shapes are realistic and can be easily parameterised.

The **lower line/curve of the measurement profile** is a rough representation of the actual water bottom. If the bottom is flat, this line/curve will be horizontal; if the bottom is uneven, it will be irregular with peaks and troughs.



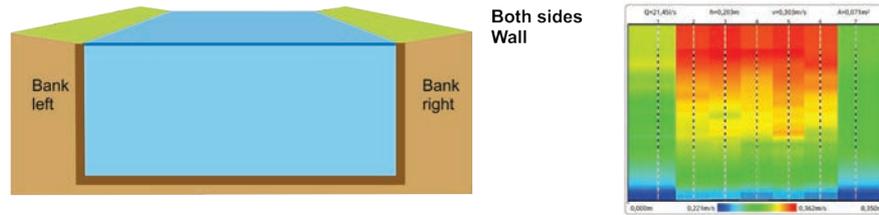


Fig. 31-11 Examples of bank shapes and measurement curves/charts

31.1.11 Measurement Points

Under "Measurement points" the number of measurement points can be entered individually.

Default setting: 10

The positions of the individual measurement points are listed in a table. If the positions suggested by the transmitter are not (or cannot be) adhered to, these distances can be manually overwritten in the measurement point table.

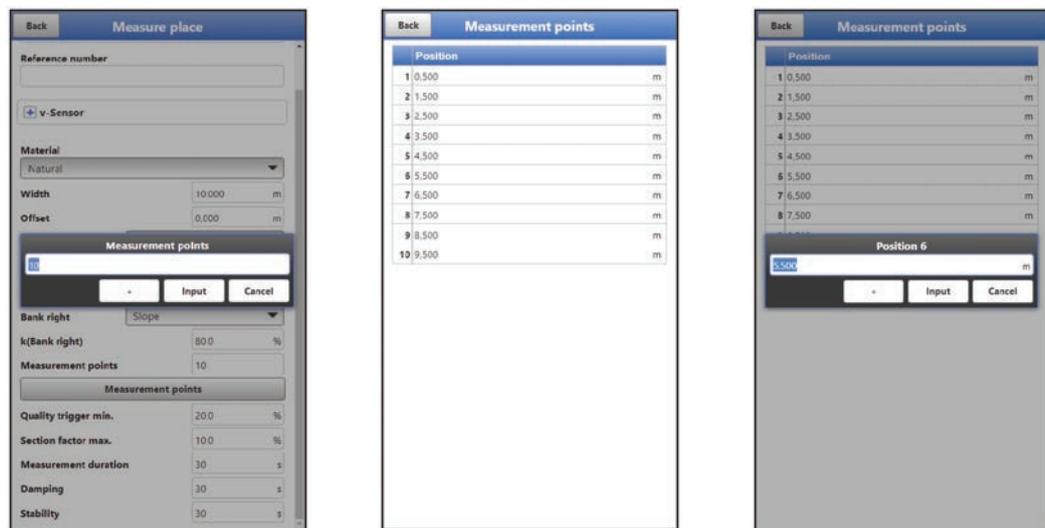


Fig. 31-12 Measurement point positions

31.1.12 Quality Trigger min.

The minimum value for the quality of the trigger is entered here as a percentage. All values above the one entered here are considered good. In general, the higher the proportion of particles and the lower the turbulence in the medium, the higher the quality of the trigger.

Default setting: 20 %

If the actual value during a measurement is below this set value or is invalid, the transmitter shows the text "Quality Trig.: x.x%" on the main screen (on the right above the chart) highlighted in red. If the actual value is above the set minimum value, the text is highlighted in green (see also Chap. "Main Screen" starting on page 44).

31.1.13 Section Factor max.

Maximum recommended proportion of the flow rate of a (measuring) section in relation to the total flow rate at the measuring point.

This recommendation of the max. flow rate is determined nationally/regionally by the respective authorities and can be entered here. If individual sections exceed this percentage, a message appears in the display (Fig. 31-13). If necessary, the user can divide the measurement point into more measurement points/sections.

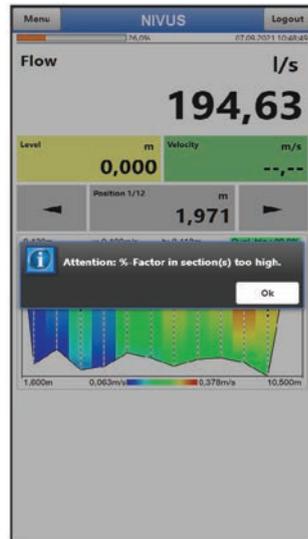


Fig. 31-13 Message on exceeded flow rate

31.1.14 Measurement Duration

Here the duration of the individual measurements (in seconds) is preset manually.

Default setting: 30 s

A measurement in progress can also be ended prematurely. The measurement is counted and the premature termination is recorded.



See Chap. "22.3 Work Steps for carrying out a Flow Measurement".

31.1.15 Damping

This menu point allows you to change the damping of the display in seconds.

The damping refers to all level and flow velocity values that are available as input values. Individual values cannot be selected and damped differently.

A moving average is calculated for each individual measurement value over the specified time range.

During data recording, the measurement duration is used as the time range for the damping.

Default setting: 30 s

The time range is entered in steps of 1 second.

31.1.16 Stability

The stability is the time in which the transmitter bridges the values without correct measurement, i.e. in case of invalid level and flow velocity values.

The transmitter operates during this period with the last valid measured value. If the specified time is exceeded without a correct value being recorded, the transmitter goes to the measured value "0", taking into account the set damping. The transmitter does not store a value.

The time range is entered in steps of 1 second.

Default setting: 30 s

31.2 Menu Diagnostics

The diagnostics menu is described separately in Chapter "Diagnostics" starting on page 84 of the instruction manual.

32 Parameter Menu Readings

32.1 Menü >Readings<: Information and Parameterisation Options

32.1.1 Using the >Readings< Menu

While the basic settings for a "default measurement place" are parameterised in the parameterisation menu >Measurement Place<, the parameterisation menu >Readings< is the actual work area on site. This is where the individual measurement places are parameterised and their measurement data is saved. All essential menu items can be set, which can also be set under >Measurement Place<. In addition, various measured or calculated measurement place values are displayed.

After switching on the NivuFlow Stick, three different procedures can be selected to parameterise a measurement place:

- On the one hand, the last measurement place setting can be used. This makes sense if the measurements are to be continued at exactly the same measurement place that was already measured the last time the NivuFlow Stick flow measurement system was used.
- For known measurement places that have already been measured and saved at some point, they can be reloaded via >Load< (see Chap. "32.1.10 Load"). Then save them with new measurement data after the measurement.
- And then the "default measuring point" originally parameterised under >Measurement Place< can also be loaded and adapted to the current measurement place. Then save them with the new measurement data after the measurement.

It is up to the user which procedure is chosen. When the transmitter is switched on, the last measurement place is always actively loaded and is also displayed.



Fig. 32-1 Menu - Readings

32.1.2 Name of the measurement place

Just like in the menu >Application< / >Measurement Place<, the measurement place name can be changed here. After the change, when returning to the main screen, the transmitter jumps directly to the main screen without saving and the previous readings are still displayed. However, the new measurement place name now appears at the top of the header and the measurement can be continued with the existing parameters. If the preset default parameters are to be changed, this must be done under >Application< / >Measurement Place<.

➡ See Chap. "31.1.1 Name of the measurement place".

32.1.10 Load

Load previously saved data and values. These were stored with the function >Save< and can be retrieved at any time. The selection is made via the displayed icons for folders and documents. The measurement place name and the date of the saved measurement, which is part of the file name, provide help in the selection.

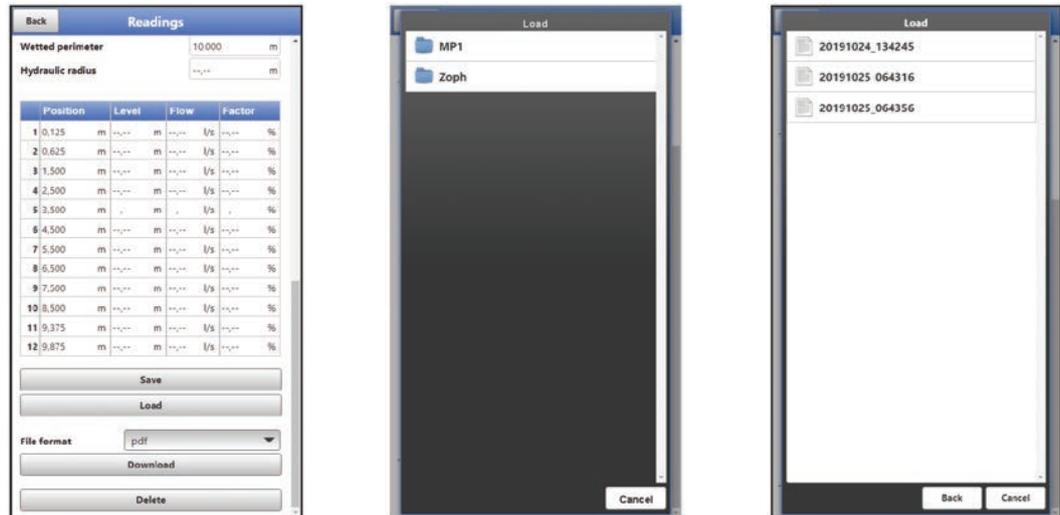


Fig. 32-3 Loading available measurement place data

32.1.11 File Format and Download

Here you can download stored measurement data for further use in other software applications. The file formats pdf, csv, xml and zip are available via the pop-up menu. With zip, the transmitter creates a folder containing the selected file in the four formats pdf, csv, xml and xmx.

The selection of the measurement data for download is done via the displayed symbols for folders or documents.

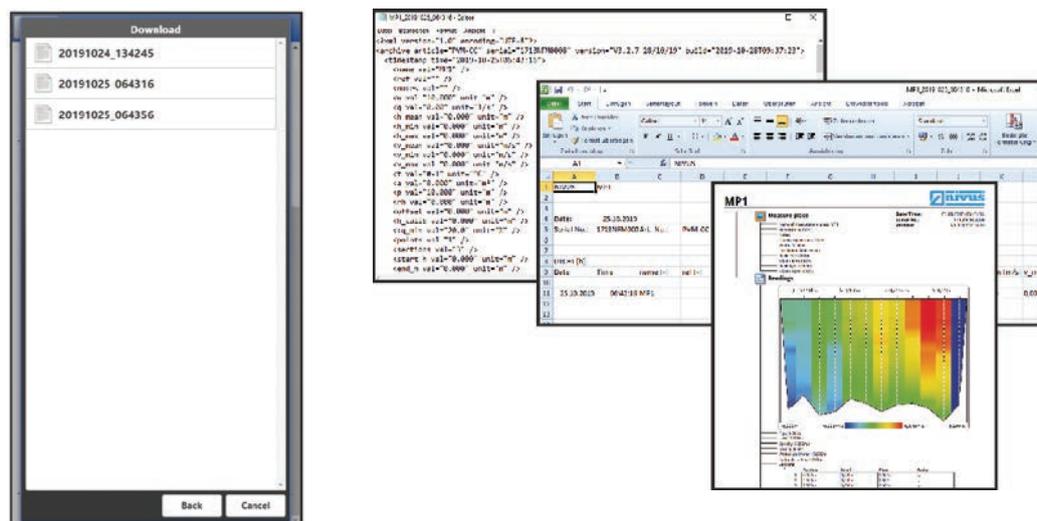


Fig. 32-4 Download as xml / csv / pdf in zip-Container

32.1.12 Delete

Delete previously saved data and values. These were stored with the function >Save< and can be deleted at any time. The selection is made via the displayed icons for folders and documents. There is a confirmation prompt asking whether the data should be deleted. The action can still be cancelled at this point. The deletion is confirmed with the message >Successful<.

33 Parameter Menu System

33.1 Menu Information



Fig. 33-1 Menu System: Information

The menu >Information< is a display menu. It contains the following information on the device:

- Serial number and article number
- MAC Address
- Transmitter firmware version
- Specifications on the bootloader and the WLAN version
- Date of the last software update (firmware) and the last parameter storage
- Current charging status of the rechargeable/batteries
- Information on Credits and Licenses (corresponding background information can be downloaded as pdf)

33.2 Menu Country Settings

In this menu you can make the following settings:

- (Operating) Language
- Date Format
- Units of the measurement values
Here it is possible to distinguish between displayed and stored measured values.



Fig. 33-2 Country Settings: Language and Date Format

33.2.1 (Operating) Language

All listed languages (Fig. 33-2) provide texts in the national language or the substitute language English.

33.2.2 Date Format

The following date formats can be set:

- DD.MM.YYYY (Day/Month/Year)
- MM/DD/YYYY (Month/Day/Year)

33.2.3 Units

At this point, various country-specific and unit system-dependent settings for the measurement values can be set.

>Decimal Separator<

- Comma or dot

The decimal separators entered here are only used for the display of the display and operating module.

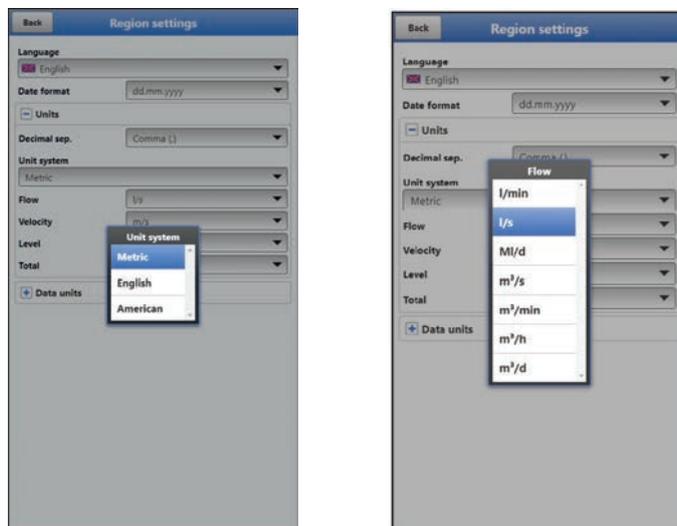


Fig. 33-3 Units system

>Units System<

The choices are:

- Metric
- English
- American

The **adjustable units** depend on the previous selection of the unit system:

- In the metric system: l, m³, cm/s, etc.
- In the English system: ft, in, gal/s, etc.
- In the American system: fps, mgd, etc.

Units for the representation in the display for

- Flow
- Flow Velocity
- Level
- Total
- Temperature (only in unit system "English")

33.2.4 Data Units

The settings >Data Units< are analogous to the settings of the >Units<.

In >Data Units< the recorded measurement values are **converted and stored** according to the selected unit.

>Decimal Separator<

- Comma (for the German-speaking area)
- Dot (for the English-speaking area)

The specification of the decimal separators is important for the correct reading of the data. Particularly when evaluating the measurement data with a software in a different language (e.g. English Excel) it is important that the decimal separators are correctly selected.

>CSV Separator<

- Comma (for the English-speaking area)
- Semicolon (for the German-speaking area)

The specification of the csv separators is important for the correct reading of the data (e.g. in Excel).

>Units System<

The choices are:

- Metric
- English
- American

The **adjustable units** depend on the previous selection of the unit system:

- In the metric system: l/s, m³/s, m³/d, cm/s, etc.
- In the English system: ft³/s, in, gal/min, Mgal/d, in/s, yd/s, etc.
- In the American system: gps, gpm, cfs, cfm, cfh, cfd, mgd, etc.

Units for the storage of measurement data for

- Flow
- Flow Velocity
- Level
- Total
- Temperature (only in unit system "English")

33.3 Menu Time/Date

Each time the NivuFlow Stick is switched on, its time is **automatically** synchronised with the time of the display and operating module used.

Furthermore, in this submenu the current date and the system time of the transmitter can be changed **manually**. The system time is based on the coordinated universal time UTC (en.: "Universal Time Coordinated"). The time zones are defined by "plus" or "minus" hours compared to UTC.

If, in addition to the time on the display and operating module, a change of the time zones or the summer/winter times is made via **>Time Zone (UTC)<**, it is essential to note that this set time difference is retained even after the renewed automatic synchronisation with the display and operating module. This means that the NivuFlow Stick always saves with different times to the display and operating module until a new change is made via **>Time zone (UTC)<**.

By clicking **>Sync Time/Date<** the date and system time are automatically (re-)synchronised with the display and operating module. A possibly set time difference via **>Time Zone (UTC)<** is also deleted.



Effects of a System Time Change

Changing the system time affects the storage of the data. If data storage is activated, duplicate data or data gaps may occur after system time changes.

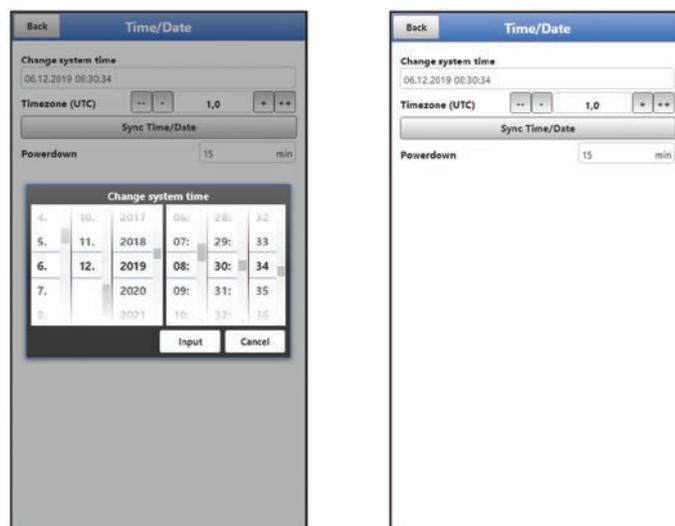


Fig. 33-4 Change system time: manually and automatically

The current system time is set via the selection menu (Fig. 33-4).

The time deviation (UTC or GMT) from the prime meridian is done via the "+" and "-" fields:

- = Decrease by 1 hour each
- = Decrease by ½ hour each
- + = Increase by ½ hour each
- ++ = Increase by 1 hour each



Fig. 33-5 Set Energy Saving Mode/Powerdown

To save energy, the transmitter goes into **>Powerdown<** mode after a defined period of inactivity. This mode can be set by the user between 5 minutes and 720 minutes (12 hours). The time is always given in minutes.

Default setting: 15 min.

Before the transmitter goes into energy saving mode, it automatically saves the last data.

- ➡ To reactivate the transmitter, switch it off and on again at the on/off switch. The transmitter restarts with the measurement place / measurement point at which it was last activated.

33.4 Menu Error Messages

In this menu, the current pending error messages can be called up and the error memory can be erased.

The contents of the error memory are deleted immediately by selecting **>Delete error memory<**, there is **no** confirmation prompt.

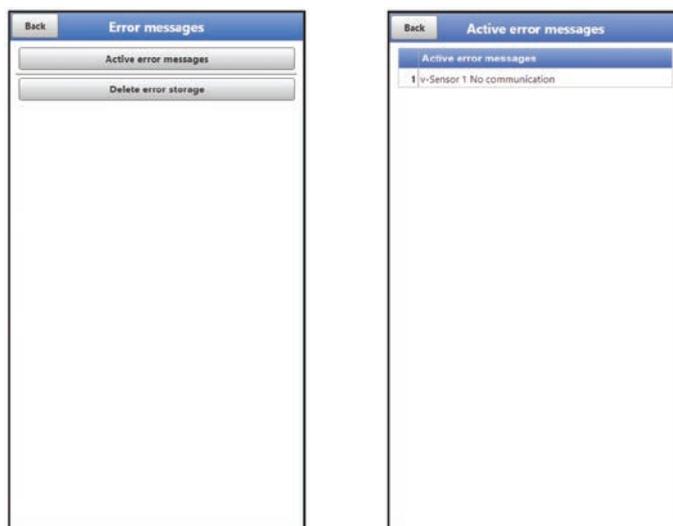


Fig. 33-6 Error messages

33.5 Menu Service

This submenu contains the following functions:

- Service levels (secured with passwords); the service levels are exclusively reserved for the NIVUS service
- Restart (of system)
- Parameter reset (back to default settings)
- Feature unlock
- Upload (of files)
- Update NivuFlow / Update Bootloader
- Load parameters



Fig. 33-7 Service

33.5.1 Service Level

The service levels are divided into different access levels and protected accordingly with passwords.

The settings possible there and the information stored require extensive specialist knowledge and are not required for the usual applications. Therefore, they are reserved exclusively for NIVUS service personnel.

33.5.2 Restart

A restart of the transmitter interrupts the current measurement process.

The system boots using the set (saved) parameters. After booting, the system behaves as when it is switched on (analogous to the PC).

This menu point replaces switching the system off and on again. All saved parameters and data are retained.

33.5.3 Parameter Reset

During parameter reset, all parameters are reset to the default settings. Changed passwords and stored measurement data are retained in the system.

The actual resetting of the parameters is only carried out after exiting the service menu (back to the main menu) and confirming the storage. The process can still be cancelled at this point.

33.5.4 Feature Unlock

Special (optionally available) functions can be enabled via the feature unlock, provided these have been ordered from NIVUS.

Activation of the Licence

➡ Procedure for **ordering a device with a licence**:

1. Place order for NivuFlow Stick device with the respective licence(s). Internally at NIVUS, processes are started which, on the one hand, concern the production of the NFS device and, on the other hand, initiate the licensing process.
2. After receiving the NFS device and the e-mail with the licence code(s), open the display and operating module (smartphone, tablet, notebook, PC, etc.) for the respective NFS and open the menu >System< / >Service< / >Function Activation< (Fig. 33-8) (see also the operating manual of the display and operating module used).
3. Click the >Feature Unlock< button.



Assignment of the licence to the device unchangeable after being carried out

*One licence is only valid for exactly one device and is permanently assigned to it through the serial number. This assignment **cannot be changed** or **cannot be undone**.*

Before assigning, check exactly which device must/should be linked to which licence so that the correct device also receives the licence and can use this feature.

4. Enter the corresponding (activation) licence code (for the device serial number; see e-mail received) and confirm with Enter. The linked licence is shown in the display.



Fig. 33-8 Activation of the licence in the NFS display tool

The NFS confirms the activation and requests a device restart (Fig. 33-9). In the menu >Application< / >Measurement Place< the possibility of selecting the geometries (channel profiles) is now available.

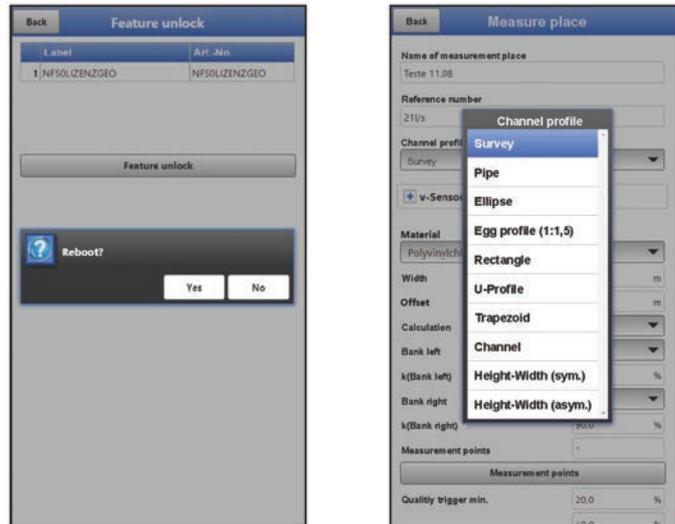


Fig. 33-9 System reboot after activation / available channel profiles

5. Select/enter and save parameters in the >Application< / >Measurement Place< menu.

🔄 Procedure for later ordering the licence:

1. Place order for the desired licence(s). Internally at NIVUS, processes are started which initiate the licensing process.
2. After receiving the e-mail with the licence code(s), click on the "Activate for Device" link contained therein. This takes you to the "NIVUS GmbH Management Platform".



Assignment of the licence to the device unchangeable after being carried out

One licence is only valid for exactly one device and is permanently assigned to it through the serial number. This assignment **cannot be changed** or **cannot be undone**.

Before assigning, check exactly which device must/should be linked to which licence so that the correct device also receives the licence and can use this feature.

3. Enter the unit serial number of the respective NivuFlow Stick there and confirm. The corresponding licence code for the ordered licence is activated.
4. Open the display and operating module (smartphone, tablet, notebook, PC, etc.) for the respective NFS and open the menu >System< / >Service< / >Feature Unlock< (Fig. 33-10) (see also the operating manual of the display and operating module used).



Fig. 33-10 Activation of the licence in the NFS display tool

5. Click the >Feature Unlock< button.
6. Enter the corresponding (activation) licence code (for the device serial number; see e-mail received) and confirm with Enter. The linked licence is shown in the display.

Observe the previously mentioned important **information on the Assignment of the licence to** the device!

The NFS confirms the activation and requests a device restart (Fig. 33-11). In the menu >Application< / >Measurement Place< the possibility of selecting the geometries (channel profiles) is now available.

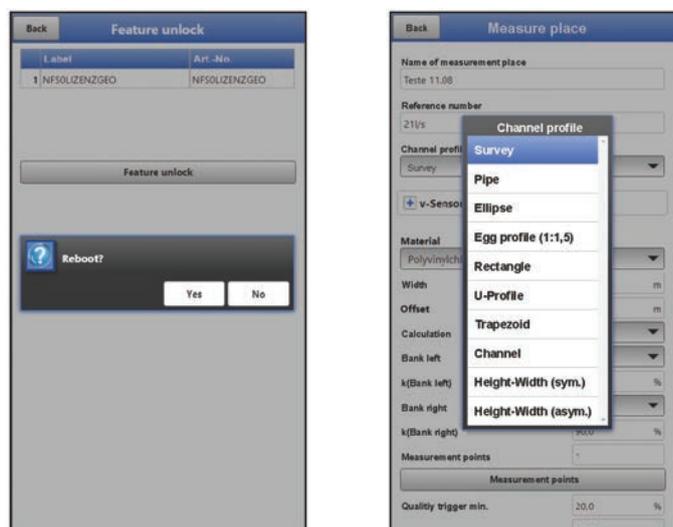


Fig. 33-11 System reboot after activation / available channel profiles

7. Select/enter and save parameters in the >Application< / >Measurement Place< menu.

33.5.5 Upload

Upload a file to the transmitter via the web browser.

33.5.6 Update NivuFlow

Upload of a saved NivuFlow Stick firmware.



Important Note

Update only in consultation with NIVUS GmbH or the responsible local (country) representation.

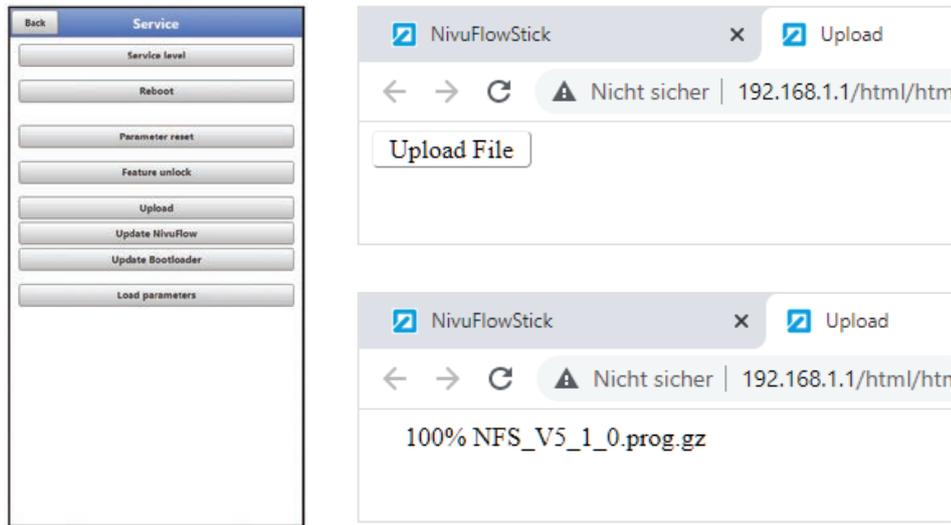


Fig. 33-12 Upload firmware for NivuFlow Stick update



Procedure (possible from firmware V3.6.0):

1. Open menu >System< / >Service<.
2. Click the "Upload" button to upload the firmware file.
The browser opens and the button "Upload File" appears (Fig. 33-12).
3. Search for the required file in the browser and select it. The upload starts.
4. As soon as the firmware file is completely uploaded, click on the button "Update NivuFlow".
5. Click on the newly uploaded firmware file in the display and operating module.
The update starts automatically (Fig. 33-13).

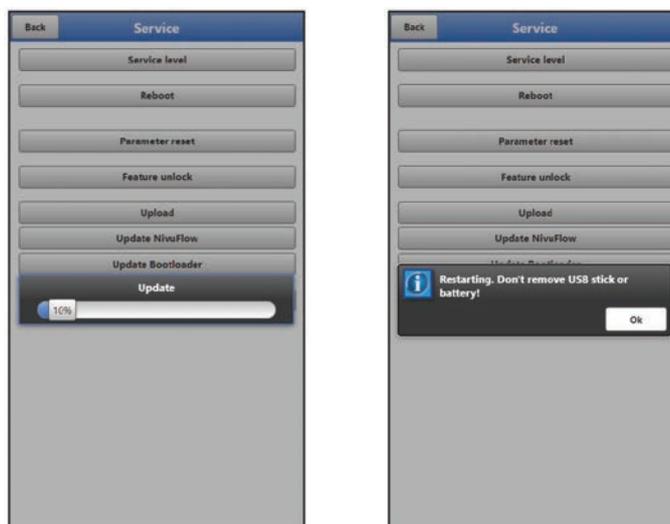


Fig. 33-13 Update running / restart occurs

6. The message "Restarting. Don't remove USB stick or battery!" announces the restart of the NivuFlow Stick.
The connection via the WLAN is stopped during the restart and must be reconnected

in the browser as soon as the identification of the NivuFlow Stick can be selected/is available again (via the link in the display or according to Chap. "26 Connection Setup" starting on page 32).

7. After the restart, the NivuFlow Stick works with the new firmware. Download the new corresponding operating instructions from the NIVUS homepage (Download Centre).

33.5.7 Update Bootloader

Upload of a saved bootloader software.

Information on the bootloader/data logger firmware version:

To update the bootloader to firmware version V2.00, at least firmware version V3.6.0 of the NivuFlow Stick must be available.

A firmware downgrade of the bootloader is not permitted.



Important Note

Update only in consultation with NIVUS GmbH or the responsible local (country) representation.

33.5.8 Load Parameters

With this function a previously saved parameter file can be loaded from the operating device to the transmitter.

34 Parameter Menu WLAN

In this menu, communication is established with the display and operating module (smartphone, tablet, notebook, etc.) or other devices.

Communication is carried out via WLAN.



Fig. 34-1 Menu - WLAN

Information on the SSID and the WLAN password is stored under **>WLAN<**. Both SSID and password can be changed here.



To change the WLAN password see Chapter "29.2 Change WLAN Password".

35 Parameter Menu Battery (12V)

In this menu, the type of rechargeable/battery used is selected.



Correct display of the capacity indicator

The capacity display in the >System< / >Information< menu only works reliably if fully charged rechargeable/batteries are used and the battery type used is entered here.

The choices are:

- **8x AA (Recharge)**
Eight commercially available (rechargeable) batteries, type AA, are built in. The exact data on the rechargeable battery are known and stored in the software.
- **8x AA**
Eight commercially available batteries, type AA, are built in. The exact data on the battery are known and stored in the software.
- **User defined**
The capacity [Ah] must be specified for the correct display of the rechargeable/battery power in the menu >System< / >Information<.

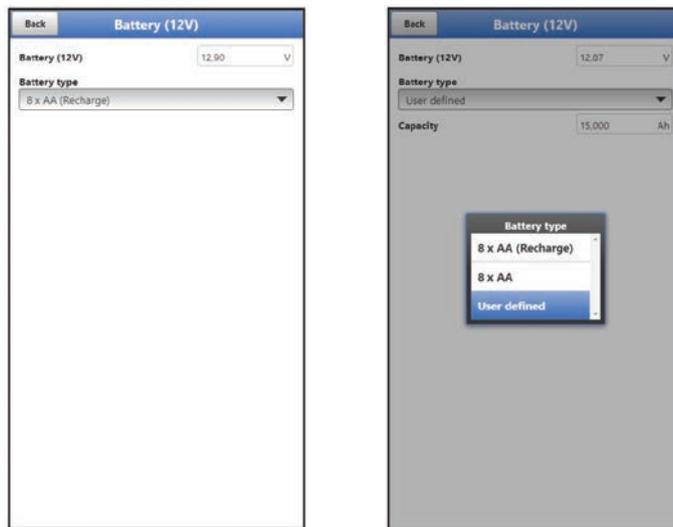


Fig. 35-1 Menu – Battery

Diagnostics

36 Basics of the Diagnostics Menu



Fig. 36-1 Menu Diagnostics

The menu >Diagnostics< can be found in the >Application< menu. Diagnostics is divided into three submenus.

The Diagnostics menu and all submenus are purely display and simulation menus.

In this section, settings for the following areas can be displayed or simulated:

- h-Sensors
- v-Sensors
- Signal analysis

37 Menu Diagnostics h-Sensors

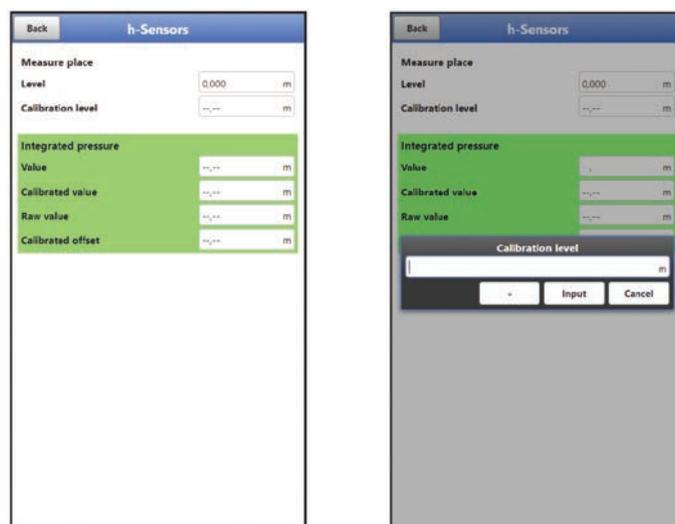


Fig. 37-1 Menu Diagnostics h-Sensors

The current fill level is displayed in the >Diagnostics< />h-Sensors< menu. The calibration level can be set/changed manually and is confirmed with OK after entry.

If the fill level in the application is determined by another calibrated level sensor or the level is defined by a fixed measuring scale, this value can be entered under "Calibration Level".

Displayed:

- Value: output value
- Calibrated Value: corrected, used value
- Raw value: value actually measured
- Calibrated offset: h-Offset (if saved in the sensor)

38 Menu Diagnostics v-Sensors



Fig. 38-1 Menu Diagnostics v-Sensors

This menu is only needed for analysis purposes.

In case of disturbances or uncertainties in the cross-correlation measurement, various factors can be used to determine the cause.

Displayed:

- **>Velocity<**
Display of the current flow velocity (calculated from the different gates).
- **>Gates<**
Display of the average flow velocity of the individual gates (for calculating the velocity). Here the gate positions can also be displayed relatively by setting the tick.
- **>VGATES<**
Display of the virtual and average individual flow velocities and their positions. A maximum of 32 positions can be displayed.
- **>Quality Measurement<**
Relevant for NIVUS commissioning and service personnel.
- **>Quality Trigger<**
Relevant for NIVUS commissioning and service personnel.
- **>Noise typical<**
Information about the installation of the sensor cable (interference); relevant for NIVUS commissioning and service personnel.
- **>Noise maximum<**
Information about the installation of the sensor cable (interference); relevant for NIVUS commissioning and service personnel.

39 Menu Diagnostics Signal Analysis

In this menu, the present sensor signal is searched for and evaluated. In addition, the functionality of the sensor can be tested.

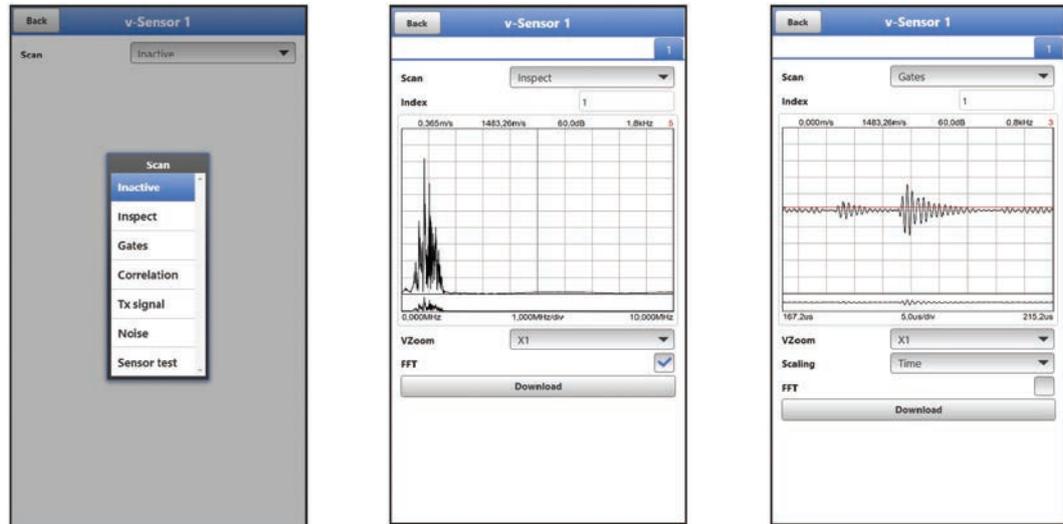


Fig. 39-1 Signal Analysis Selection Menu / Inspect / Gates

In detail, the following options are available:

- **>Inactive<**
No signal search/evaluation.
- **>Inspect<**
(Rough) search for the signal based on the client's settings and possibly a range extension. The red number at the top right of the graphic stands for the respective signal displayed for the sub-areas (these are displayed alternately on a continuous basis).
 - **>Index<**: sub-areas 1...8
 - **>VZoom<** of graphic: X1, X2, X5, X10, X20 and X50
 - **>Scaling<** of graphic: time or distance
 - **>FFT<** (Fast Fourier Transformation): this box can be checked. The selection changes the scaling from time/distance to frequency range. The signal is thereby divided into its frequency components and can be better examined for interfering signals.
 - **>Download<**: of the current data (as .csv file) for analysis by NIVUS.
- **>Gates<**
More detailed representation of the signals of the 16 gates from the somewhat rougher representation with >Inspect<. The red number at the top right of the graphic stands for the respective signal displayed for the gates (these are displayed alternately on a continuous basis).
 - **>Index<**: Gates 1...16
 - **>VZoom<** of graphic: X1, X2, X5, X10, X20 and X50
 - **>Scaling<** of graphic: time or distance
 - **>FFT<** (Fast Fourier Transformation): this box can be checked. The selection changes the scaling from time/distance to frequency range. The signal is thereby divided into its frequency components and can be better examined for interfering signals.
 - **>Download<**: of the current data (as .csv file) for analysis by NIVUS.



Fig. 39-2 Signal Analysis Correlation / Tx (Transmission) Signal / Noise

- **>Correlation<**
Optical comparison of the two signals, corresponding to the movement of the particles in the medium. The red number at the top right of the graphic stands for the respective signal displayed for the gates (these are displayed alternately on a continuous basis).
 - >Index<: Gates 1...16
 - >VZoom< of graphic: X1, X2, X5, X10, X20 and X50
 - >Download<: of the current data (as .csv file) for analysis by NIVUS.

- **>Tx (Transmission) Signal<**
Optical representation/shape of the signal. The shape of the curves depends on the sensor used and cannot be changed because they are stored in the firmware. The curves may appear different in the individual sub-areas (index), but this does not necessarily have to be the case. The red number at the top right of the graphic stands for the respective signal displayed for the sub-areas (these are displayed alternately on a continuous basis).
 - >Index<: sub-areas 1...8
 - >VZoom< of graphic: X1, X2, X5, X10, X20 and X50
 - >FFT< (Fast Fourier Transformation): this box can be checked. The selection changes the scaling from time/distance to frequency range. The signal is thereby divided into its frequency components and can be better examined for interfering signals.
 - >Download<: of the current data (as .csv file) for analysis by NIVUS.

- **>Noise<**
Display of all noises (including interference noises) during signal evaluation.
 - >VZoom< of graphic: X1, X2, X5, X10, X20 and X50
 - >FFT< (Fast Fourier Transformation): this box can be checked. The selection changes the scaling from time/distance to frequency range. The signal is thereby divided into its frequency components and can be better examined for interfering signals.
 - >Download<: of the current data (as .csv file) for analysis by NIVUS.

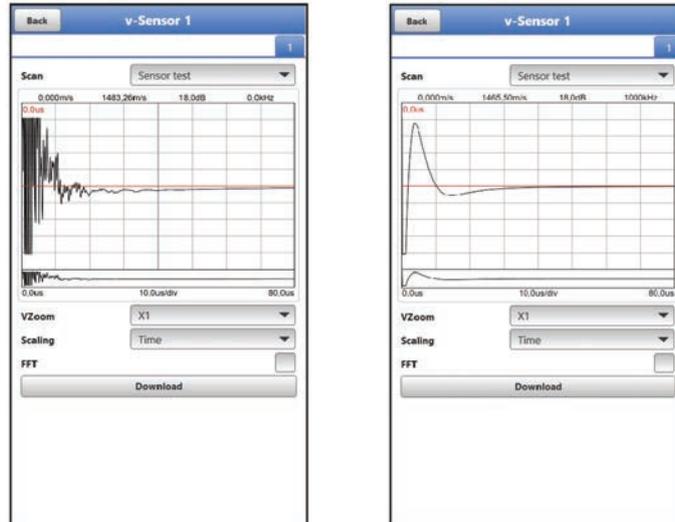


Fig. 39-3 Signal Analysis Sensor Test / No Sensor detected

- **>Sensor Test<**

Function test of a connected sensor; obstacles such as air and deposits are detected. If no sensor is detected (defective, cable break, etc.) the curve appears like in the right picture in Fig. 39-3.

The data collected is mainly used by the NIVUS customer service.

- >VZoom< of graphic: X1, X2, X5, X10, X20 and X50
- >Scaling< of graphic: time or distance
- >FFT< (Fast Fourier Transformation): this box can be checked. The selection changes the scaling from time/distance to frequency range. The signal is thereby divided into its frequency components and can be better examined for interfering signals.
- >Download<: of the current data (as .csv file) for analysis by NIVUS.

Maintenance and Cleaning

WARNING



Germ Contamination

Particularly due to the 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.

40 Maintenance

40.1 Maintenance Interval

The Type NivuFlow Stick flow measuring system is virtually free of calibration, 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:

- Measurement principle of the sensors
- Material wear
- Measurement medium and channel hydraulics
- 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 transmitters and sensors is a basic measure in order to improve operational reliability and to increase the lifetime.

40.2 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

41 Cleaning

41.1 Transmitter

The NivuFlow Stick enclosure complies with protection class IP67 when closed and is not very sensitive. Nevertheless, a high-pressure cleaner should **not** be used for cleaning.

Also, do **not** use harsh cleaning agents or solvents. Instead, it is better to use mild household cleaners or soap suds.

41.2 Sensor

Be sure to follow the instructions for maintenance and cleaning of the sensor. These instructions can be found in the "Technical Description for Correlation Sensors and external Electronic Box".

The Technical Description is available as download on www.nivus.com.

42 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. Remove connected cables and sensors from the device.
 2. Remove rechargeable/batteries and, if they are defective, dispose of them properly.
 3. 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. Die 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.

43 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.

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

- ➡ You will find a selection of the accessories of the NIVUS GmbH in chapter "44 Accessories". Further information on spare parts and accessories can be obtained from your responsible distributor/agency or directly from the NIVUS GmbH.

44 Accessories

Article Number	Description
<i>NFM0 ZAB 02</i>	Display and operating module for NFM and NFS: IP67-certified 4.7" outdoor smartphone, OS: Android, Device communication: WLAN
<i>NFM0 ZAB 01</i>	Display and operating module; IP67-certified 8" outdoor tablet, Resolution: 1280x800; OS: Android; Device communication: WLAN; other communication types: USB, Bluetooth, modem 2G, 3G and 4G (customer SIM card)
<i>NFS0 ZTABH</i>	Holder for attaching a tablet (7" to 8") to the NivuFlow Stick
<i>ZUB0 NFM MAGNET</i>	Ring magnet
<i>ZUB0 TELE SKOP3</i>	Telescopic rod with sensor holder for CSM-V1D0 sensors; length 4 m; for alternative use at measurement places that are difficult to access (e.g. when measuring from a bridge; due to high water levels or when vertical positioning for measurement is not possible with the NFS)
<i>NFS0 STG 3TLG</i>	3-piece rod with ground plate, smartphone holder and fastening clips for cable; total length 1.6 m
<i>NFS0 MU</i>	Transmitter NFS
<i>CSM-V1D0K3xxxP</i>	Sensor CSM (with pressure measurement cell) for connection to NFS transmitter
<i>NFS0 ZCASE</i>	Transport case with wheels and foam insert for storage/transport of the NivuFlow Stick; Outside dimensions (LxWxH): 1410x415x159 mm
<i>NFS0 ZCASE 3T</i>	Transport case with wheels and foam insert for storage/transport of the 3-piece rod and the accessories available/required for this; Outside dimensions (LxWxH): 989x415x157 mm
<i>NFS0 LIZENZ GEO</i>	Device licence for NFS to activate fixed geometries (channel profiles)

Tab. 6 Accessories for the NivuFlow Stick Flow Measuring System



Further information on spare parts and accessories can be obtained from your responsible distributor/agency or directly from the NIVUS GmbH.

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Credits and Licenses

45 List of Sources of the Licences and Codes used

The measurement system type NivuFlow Stick uses code from the following open source projects:

- Freetype (<http://www.freetype.org>)
- Libharu (<http://libharu.org>)
- Libjpeg (<http://www.ijg.org>)
- Libpng (<http://www.libpng.org>)
- Zlib (<http://www.zlib.net>)
- Mini-XML (<http://www.msweet.org>)
- qooxdoo (<http://www.qooxdoo.org>)
- TinyGL (<https://www.bellard.org/TinyGL>)
- LGPL



Licensing Issues

For questions on licensing contact opensource@nivus.com.

Approvals and Certificates

DE / EN / FR	<p>EU Konformitätserklärung</p> <p><i>EU Declaration of Conformity</i></p> <p><i>Déclaration de conformité UE</i></p> <p>Für das folgend bezeichnete Erzeugnis: <i>For the following product:</i> <i>Le produit désigné ci-dessous:</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Bezeichnung:</td> <td style="padding: 2px;">Portabler Durchflussmessumformer NivuFlow Stick</td> </tr> <tr> <td style="padding: 2px;">Description:</td> <td style="padding: 2px;"><i>Portable flow measurement transmitter NivuFlow Stick</i></td> </tr> <tr> <td style="padding: 2px;">Désignation:</td> <td style="padding: 2px;"><i>Débitmètre portable NivuFlow Stick</i></td> </tr> <tr> <td style="padding: 2px;">Typ / Type:</td> <td style="padding: 2px;">NFSxxx</td> </tr> </table> <p>erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen: <i>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:</i> <i>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:</i></p> <p style="text-align: center;">• 2014/53/EU • 2011/65/EU</p> <p>Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug auf die nachfolgend genannten anderen technischen Spezifikationen: <i>The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:</i> <i>L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:</i></p> <ul style="list-style-type: none"> • EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019 • EN 62311:2008 • Draft ETSI EN 301 489-1 V2.2.0 • EN 300 328 V2.2.2 (WLAN) • EN 300 440 V2.1.1 (WLAN) • EN 61326-1:2013 • Draft ETSI EN 301 489-17 V3.2.0 • EN 301 893 V2.1.1 (WLAN) <p>Diese Erklärung wird verantwortlich für den Hersteller: <i>This declaration is submitted on behalf of the manufacturer:</i> <i>Le fabricant assume la responsabilité de cette déclaration:</i></p> <p style="text-align: center;">NIVUS GmbH Im Taele 2 75031 Eppingen Allemagne</p> <p>abgegeben durch / <i>represented by / faite par:</i> Marcus Fischer (Geschäftsführer / <i>Managing Director / Directeur général</i>)</p> <p>Eppingen, den 27.10.2021</p> <p>Gez. <i>Marcus Fischer</i></p>	Bezeichnung:	Portabler Durchflussmessumformer NivuFlow Stick	Description:	<i>Portable flow measurement transmitter NivuFlow Stick</i>	Désignation:	<i>Débitmètre portable NivuFlow Stick</i>	Typ / Type:	NFSxxx	 <p>NIVUS GmbH Im Taele 2 75031 Eppingen</p> <p>Telefon: +49 07262 9191-0 Telefax: +49 07262 9191-999 E-Mail: info@nivus.com Internet: www.nivus.de</p>
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