



# TRANSLATION OF THE ORIGINAL OPERATING MANUAL



Valid for clamping force measuring device F-senso chuck  
ID. No.: 179800

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Thank you very much for choosing the clamping force measuring device F-senso chuck from RÖHM. Read the operating manual through carefully before you put the device into operation and always keep it handy at the location where used.

## 1 General

### 1.1 About this manual

This manual allows you to work safely and efficiently with the product. It is a component of the product and must always be kept available to personnel in the direct vicinity of the product. The personnel must have read through and understood this manual before beginning work. A basic requirement for safe work is the compliance with all specified safety information and handling instructions in this manual. Figures in this manual are for general understanding and might deviate from the actual product version.

### 1.2 Symbol explanation

#### Safety information

Safety information is marked with symbols in this manual. It is introduced with signal words which indicate the severity of the hazard. It is imperative that this information be followed in order to avoid accidents as well as personal injuries and material damage.



#### **Danger**

...indicates an immediately dangerous situation which will lead to death or serious injuries if it is not avoided.



#### **Warning**

...indicates a potentially dangerous situation which will lead to death or serious injuries if it is not avoided.



#### **Caution**

...indicates a potentially dangerous situation which could lead to minor or slight injuries if it is not avoided.



#### **Note**

...indicates a potentially dangerous situation which could lead to material damage if it is not avoided.

#### Tips and recommendations

...highlights useful tips and recommendations as well as information for smooth operation.

### **1.3 Limitation of liability**

All specifications and information in this manual were compiled taking the valid standards and regulations, state of the art and many years of knowledge and experience into account.

The manufacturer assumes no liability for damage due to:

- non-observance of the manual
- unintended use
- deployment of untrained personnel
- unauthorized conversion
- technical modifications
- use of unapproved spare parts

The actual scope of delivery might deviate from the explanations and illustrations described here in the case of special designs, the usage of additional ordering options or due to the newest technical changes.

The obligations agreed-upon in the contract for delivery, the general terms and conditions, as well as the delivery conditions of the manufacturer and the legal regulations valid at the time the contract was concluded apply.

### **1.4 Copyright protection**

This manual is copyright protected and is only meant for internal purposes. Making the manual available to third parties, duplications of any kind, even excerpt-wise, as well as exploitation and/or communication of the content are not permitted without the written permission of the manufacturer, except for internal purposes. Violations incur an obligatory payment of damages. The right for further claims remains reserved.

### **1.5 Scope of delivery**

The basic equipment of the F-senso chuck includes:

- 1 measuring head with test protocol
- Measuring bolts in sizes 5 mm, 15 mm, 25 mm, 30 mm
- Measuring bolt extension with length of 25 mm
- 1 Tablet PC with pre-installed measuring and evaluation program
- 1 USB data/charging cable
- 1 USB charging cable
- 1 USB mains adapter
- 1 insertion aid
- Storage case with foam insert

## 1.6 Warranty

The warranty is included in the general terms and conditions of the manufacturer.



### Note

The software is pre-installed on the Tablet included in the scope of delivery.

Each system modification and outside influence on the Tablet, such as

- the installation of other software
- the use of the Tablet for other purposes can influence or destroy the F-senso software and is therefore prohibited.

## 2 Safety

This section outlines all important safety aspects for safe and smooth operation and optimal protection of personnel.

### 2.1 Responsibility of the user

The product is used in the commercial area. The user of the product is therefore subject to the legal obligations regarding work safety. In addition to the safety information in this manual, the local safety, accident prevention and environmental regulations valid for the application area of the product must be complied with.

### 2.2 Personnel requirements

The clamping force measuring device F-senso chuck may only be used by instructed, skilled personnel.



### Warning

Improper handling of the product can lead to serious personal injuries and considerable material damage. Non-instructed personnel are not aware of the dangers and should leave the work area when the product is being used.

### 2.3 Hazards during use

The clamping force measuring device F-senso chuck is meant for use in a machine tool, together with a clamping device. To avoid dangerous situations, the following items must be observed:

- Comply with all specifications and information in this manual
- Comply with the technical data for the F-senso chuck
- Comply with the safety regulations valid at the workplace



**Danger**

If the F-senso chuck is clamped improperly and eccentrically in a rotating chuck, centrifugal forces will arise which might lead to the measuring head being hurled out at high speeds.



**Danger**

The speed may only be selected so high that the clamping force due to the centrifugal forces of the clamping jaws does not fall below 1/3 of the clamping force at a standstill. There is a danger that the measuring head will be hurled out. Here, observe the warning on the Tablet. See also section 5.7.



**Danger**

The measurement of rotating two-jaw clamping devices is prohibited. If the F-senso chuck is clamped improperly and eccentrically in a rotating chuck, centrifugal forces will arise which might lead to the measuring head being hurled out at high speeds.



**Warning**

The charging/data cable must not be plugged into the measuring head for any use. Otherwise, this can result in serious material damage and personal injuries.

## 2.4 Environmental protection



**Note**

**Environmental hazard due to incorrect handling**

If used incorrectly with substances which are harmful to the environment, particularly incorrect disposal, considerable damage can be done to the environment.

The information given below must always be observed. If substances harmful to the environment are released into the environment by mistake, appropriate measures must be taken immediately. If in doubt, the responsible local authorities are to be informed about the damage.

Both the rechargeable batteries as well as the electronic components contain toxic substances which are harmful to the environment. These must not be released into the environment under any circumstances. The F-senso chuck must be disposed of properly. There is the option of sending the product back to the company RÖHM GmbH for disposal.

The rechargeable battery used in the measuring head is a lithium iron phosphate battery. Due to the solid electrolyte and the cell chemistry, LiFePO<sub>4</sub> cells are considered to be intrinsically-safe, i.e. the risk of thermal runaway and membrane fusion, as with lithium ion batteries, can be ruled out.

## 3 Technical data

### 3.1 General information

<b>F-senso chuck</b>		<b>179800</b>
Measuring range / clamping force	kN	2-jaws: 0 - 200 3-jaws: 0 - 300
Measuring range / speed	min <sup>-1</sup>	0 – 8250 (not for 2-jaws)
Precision	(F/RPM)	Force <0.5% / speed ±10 rpm FSR
Clamping diameter	mm	75 - 175
Dimensions	mm	Ø75/80 x 130



#### Note

#### Risk of damage if there are more clamping jaws than support points

- The F-senso chuck may have max. 100 kN applied at the measuring bolt. Even 6-jaw chucks, for example, can be measured with the F-senso chuck. The F-senso chuck has max. 3 bolts on which the clamping force can be applied. For a 6-jaw chuck, the other 3 jaws would be without a load during the measurement. This means that the 3 "clamping" jaws bear double the load as compared with the normal case. ATTENTION: There is a danger the clamping device could be destroyed. It might be possible to minimize this risk by cutting the actuation force in half. During the evaluation, it must be made sure that the clamping force indicated is the product of the measured force on the measuring bolt and the number of jaws.
- RÖHM GmbH accepts no liability for material damage or personal injuries suffered from measurements of clamping devices with more than 3 clamping points.

### 3.2 Operating conditions

To avoid measurement imprecisions and damage on the F-senso chuck, the following conditions should be met:



#### Note

- **Temperature:** A temperature between 10-40°C must be maintained.
- **Liquids:** The F-senso chuck is protected from sprayed water, but must not be immersed under water or come into direct contact with a jet of liquid.
- **Measuring points:** The measuring points must be clean.

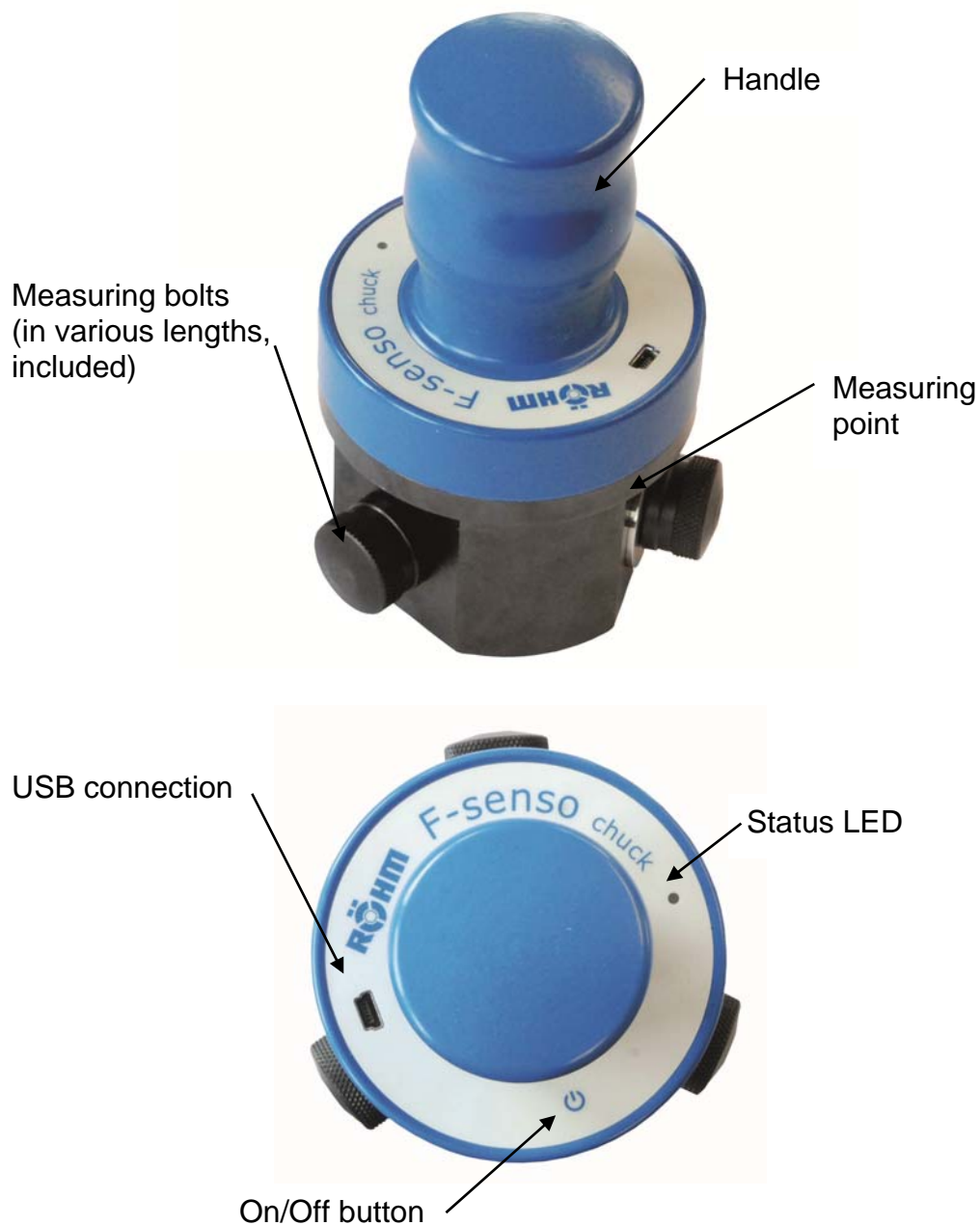
## 4 Setup

### 4.1 Components

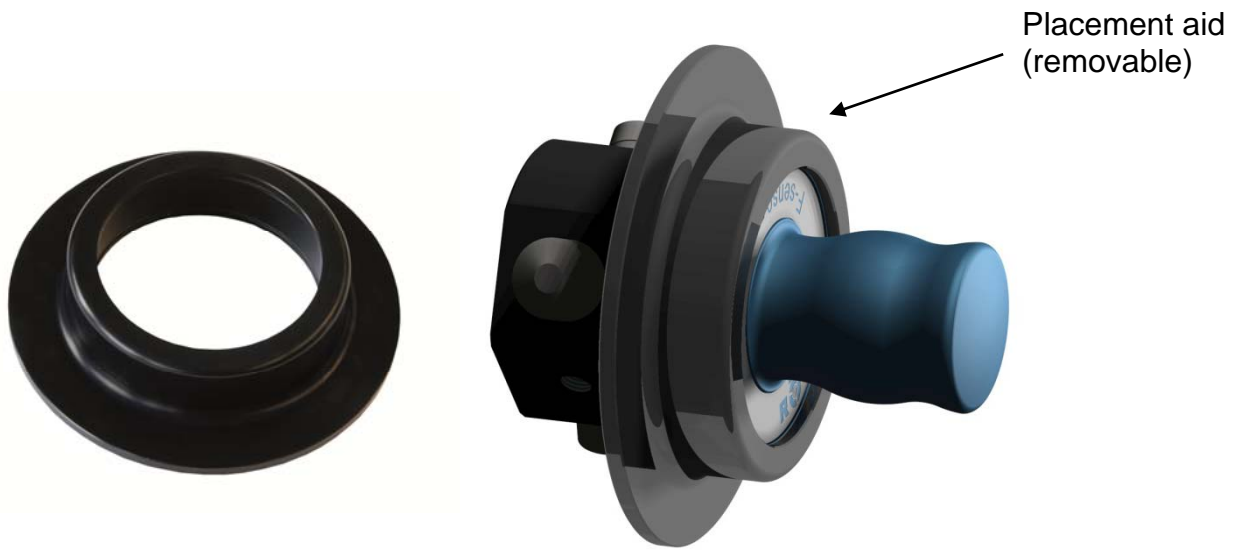
#### Tablet PC

The Tablet included in delivery has pre-installed software for operating the F-senso chuck. This is explained starting from chapter 5. Hardware-related information can be found in the enclosed original operating manual of the Tablet.

#### Measuring head







## 4.2 Function description

The clamping force measuring device F-senso chuck measures the clamping force of a chuck on a clamping jaw using a strain gauge. The product of the number of jaws and the measured clamping force is indicated on the Tablet PC and gives the sum of the clamping forces.

The highly sensitive, integrated gyro sensor measures the speed and also sends this to the Tablet PC via Bluetooth. The combination of the two values is shown in a diagram and yields a speed-dependent force curve. Thus, it is possible to exactly assess the centrifugal force behaviour of the clamping chuck and clamping jaws and to select the necessary clamping force. If desired, each clamping force diagram can be saved and shown in the automatically generated measurement report. The reports are saved as PDF files on the Tablet PC and can be easily downloaded via the USB connection.

An implemented archiving system allows the production departments and clamping devices to be archived in a structured way. Monitoring all clamping devices in the company is therefore possible without an unnecessary external archiving expense.

## 5 Measurement

In this chapter, the measurement procedure with the individual steps is explained and the software functions are shown.

### 5.1 Preconditions

In order to be able to carry out a measurement safely and error-free, the following items must be complied with:



#### Note

- The rechargeable battery of the measuring head and Tablet must be charged.
- The calibration of the measuring device must not be older than 1 year.
- The measuring points must be clean.
- The measuring bolts must be screwed in.
- The data/charging cable must be unplugged from the measuring head.
- The clamping force per jaw must not be exceeded (see chapter 3).

### 5.2 Establishing the connection

In order to establish the connection between the measuring head and the Tablet PC, follow the following steps:

1. Switch on the measuring head at the on/off button (status LED lighting up in green means: measuring head ready for connection).
2. Switch on the Tablet and connect it to the F-senso according to the following steps.  
PIN: 1234



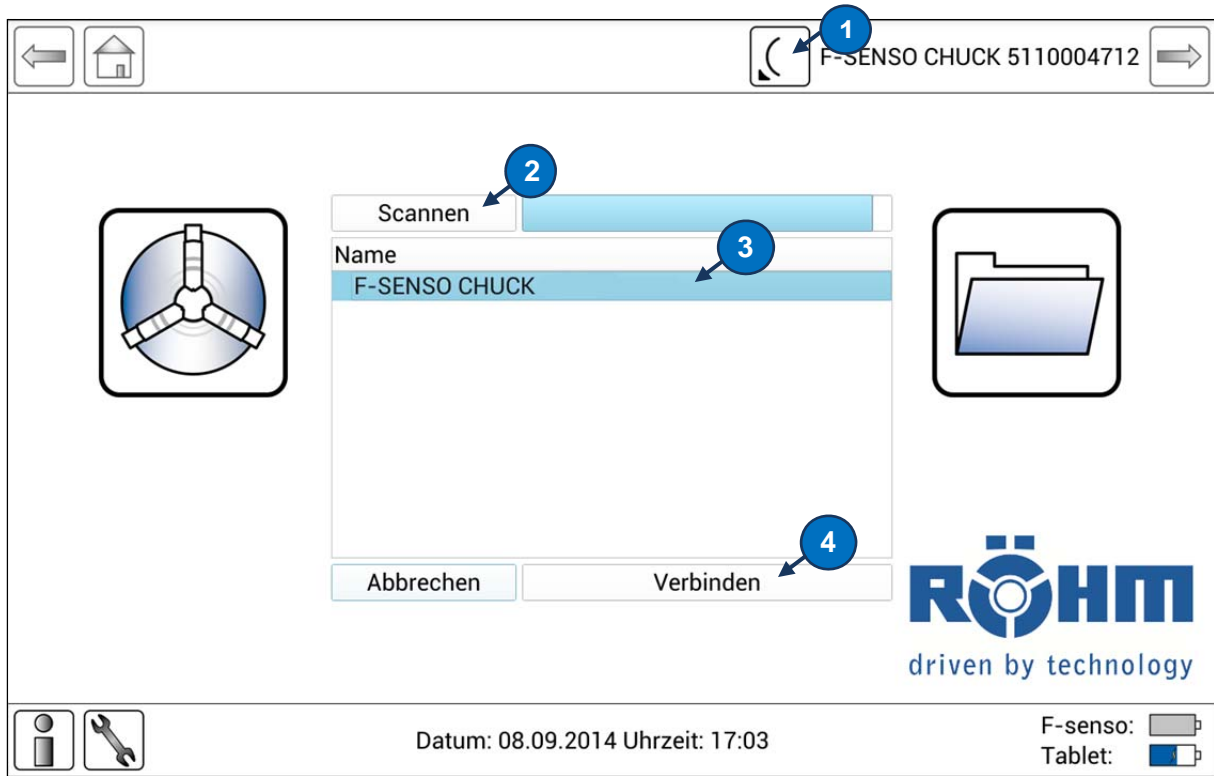
#### Note

Do not switch on the measuring head in the clamped-in state, since an automatic calibration takes place every time it is switched on.



#### Note

At the first connection with another F-senso chuck, PIN 1234 must be input.



- 1 Open the connection menu
- 2 Search for F-senso chuck
- 3 Select F-senso chuck from the list
- 4 Connect

The Tablet automatically connects to the last connected measuring head.



No connection available



Connection available

### 5.3 Mechanical preparation

The following steps must be followed during the measurement:

1. Open the clamping device.
2. Select the measuring bolt such that the clamping position lies in the middle clamping range.
3. Clamp the measuring head into the chuck. Here, the clamping bolts must lie in the middle of the clamping jaws. To avoid measuring errors, it is recommended to use the insertion aid. To do this, push the insertion aid over the clamping head and let this lie flat on the clamping jaws when inserting the measuring head.
4. **Remove the insertion aid.**



**Danger**

Remove the insertion aid before starting a measurement under rotation. The insertion aid might come loose from the measuring head at high speeds and flail around.

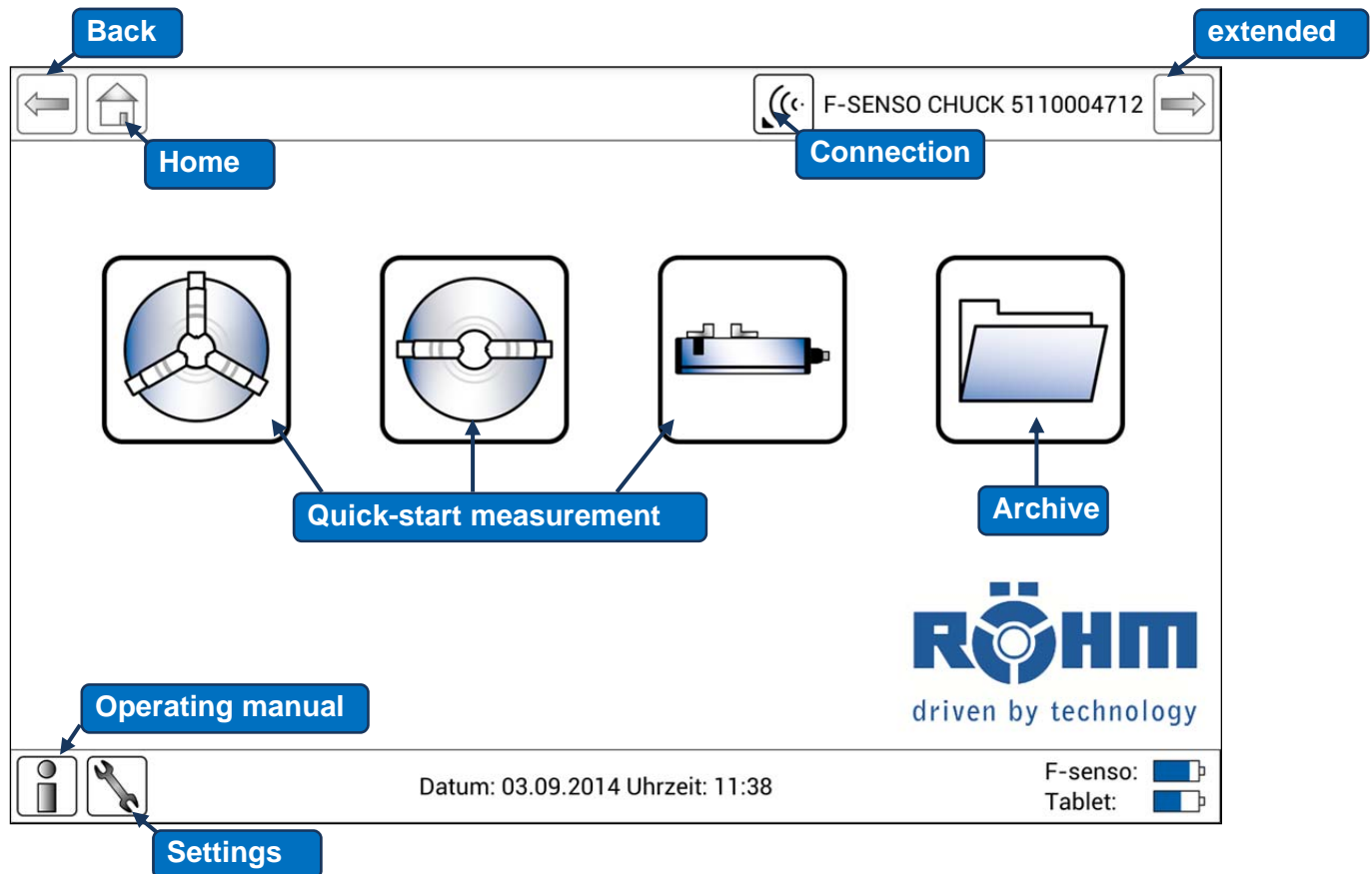


**Danger**

Danger of crushing when clamping in the measuring head.

## 5.4 Start screen

The following functions can be found on the start screen:



### Note

The operating manual can be called up under each menu item.

## 5.5 Quick-start measurement

It is possible to make a spontaneous control measurement with the buttons for the quick-start measurement.

To do this, first select a 3-jaw chuck, 2-jaw chuck or vice.



### Danger

The measurement of rotating 2-jaw clamping devices is prohibited. If the F-senso chuck is clamped improperly and eccentrically in a rotating chuck, centrifugal forces will arise which might lead to the measuring head being hurled out at high speeds.

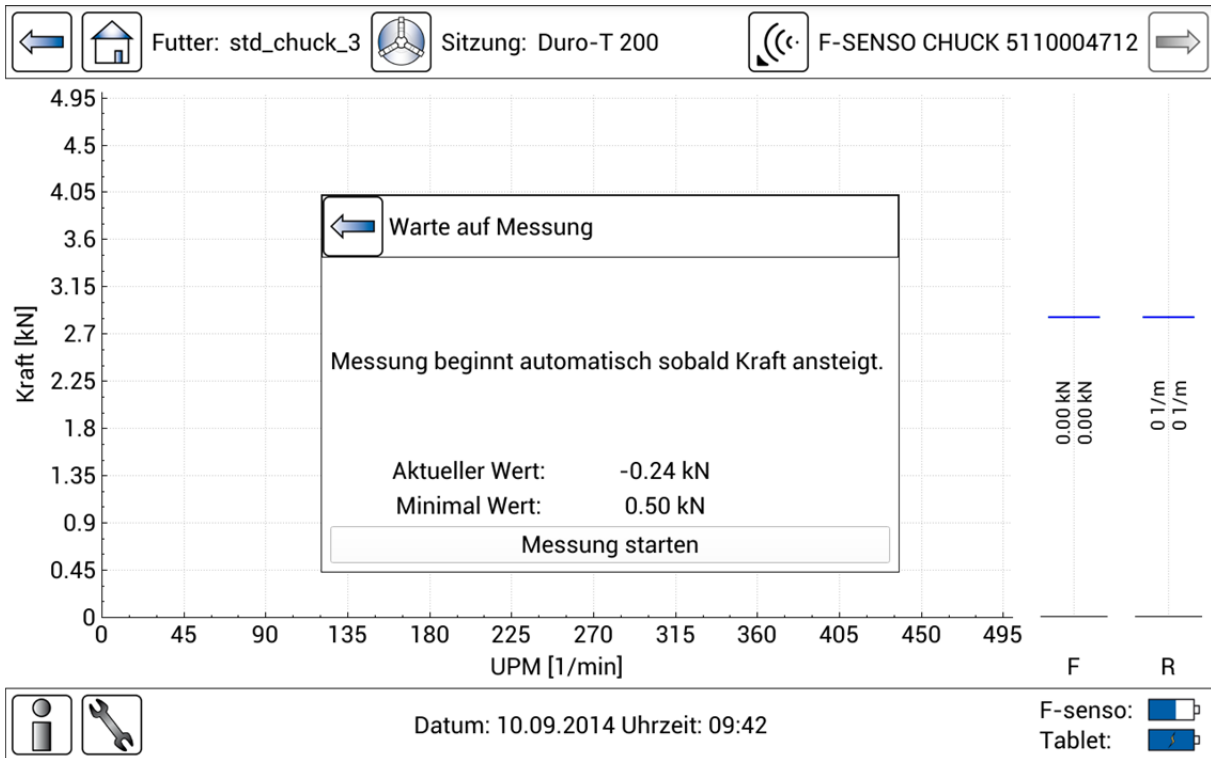
After selecting the clamping device, a view appears for verifying the measurement.

## 5.6 Verification of the measurement

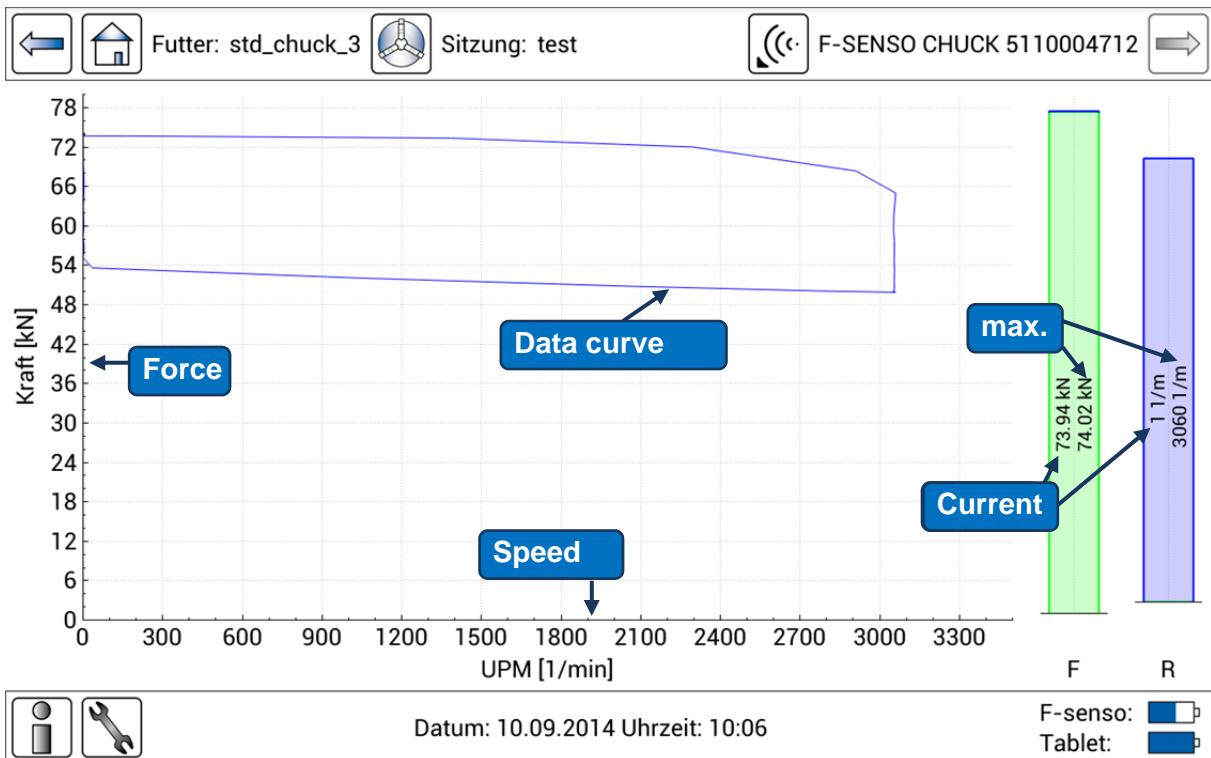
The screenshot displays a mobile application interface for measurement verification. At the top, there is a navigation bar with a home icon, the text 'Futter: std\_chuck\_3', a camera icon, and the text 'SENSO CHUCK 5110004712'. Below this is a form with several input fields: 'Name (benötigt)', 'Wechselteilsatz', and 'Prüfer'. To the right of these fields is a larger text area labeled 'Kommentare'. A blue callout box labeled 'Obligatory field' points to the 'Name (benötigt)' field. Below the 'Prüfer' field is a right-pointing arrow button, which is also pointed to by a blue callout box labeled 'Start measurement'. At the bottom of the screen, a virtual keyboard is visible, including keys for letters, a 'Done' button, and a keyboard toggle icon.

To start a measurement, at least the name of the measurement series must be input. All data given in this window is documented after the measurement series is completed in an automatically generated measurement record.

## 5.7 Display during measurement



When the measurement is started, all values are zeroed. The measurement begins by clamping in the F-senso chuck or by clicking on the "Start measurement" button.

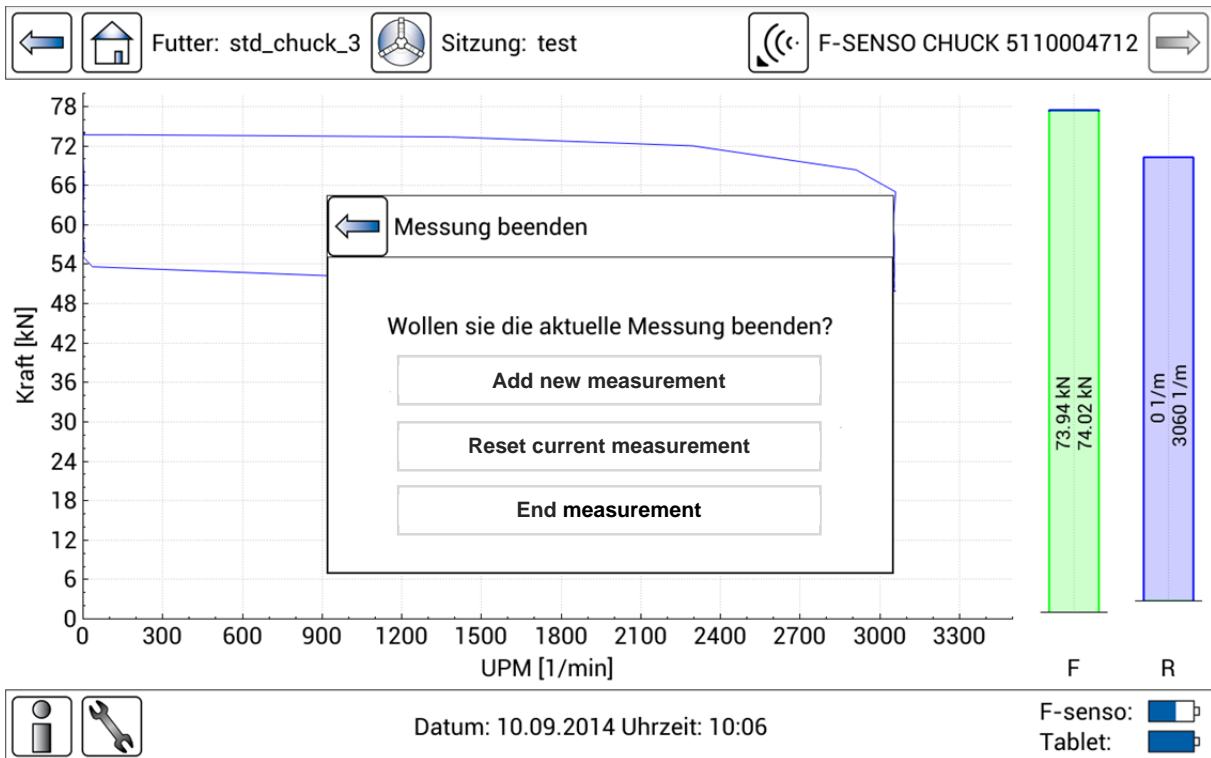




**Danger**

The measuring bar of the force turns red if only 1/3 of the clamping force, which is displayed at zero speed, is available. This safety function indicates that the F-senso chuck is no longer securely clamped.

The measurement is ended by unclamping the F-senso chuck again, whereby the clamping force will drop to zero. While doing so, the following dialog box appears with the options:



Add new measurement

The completed measurement will be saved. A new measurement will be started. All measurements are compiled in a record.

Reset current measurement

The completed measurement will be deleted. A new one will be started.

End measurement

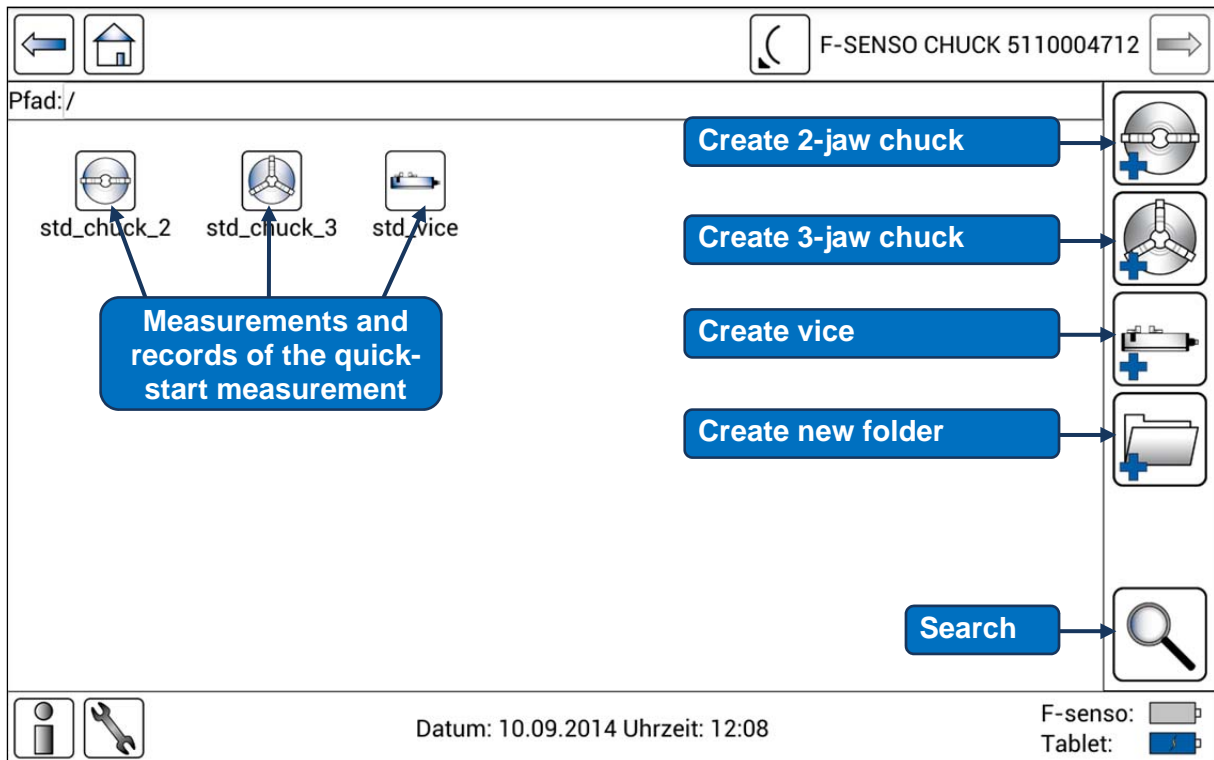
All measurements are saved in the measurement series and a measurement record will be generated.

By clicking on the "Back arrow" in the "End measurement" window, one gets to the current measurement and can show several data curves (measurements) in one view.



## 6 Archiving




In the archiving function (see section Start screen 5.4), it is possible to look at the records and individual measurements. Furthermore, it is possible to create folders and clamping devices. This way, complete companies with halls, departments and machines can be represented by folder structures.



### 6.1 Creating a folder

A new folder is created by clicking on . For the name, letters, numbers and the characters "= \_ + #" can be used.

### 6.2 Creating a clamping device

By clicking on , , or , a clamping device corresponding to the symbol will be created. For the name, letters, numbers and the characters "= \_ + #" can be used.

## 6.3 Renaming, moving and deleting folders and clamping devices

By pressing the folder or clamping device for a long time, a window will appear for renaming or copying the file. By pressing an empty folder for a long time, a window will appear for pasting the copied file.

## 6.4 Records of the quick-start measurements

The records of the quick-start measurements can be found in the clamping devices



std\_chuck\_2



std\_chuck\_3



std\_vice

. These clamping devices cannot be deleted or renamed, but can only be emptied.

## 6.5 Opening measurements and records

By pressing a clamping device, one gets to the following view:

The screenshot shows a software interface for managing measurements. At the top, there are navigation icons (back, home) and a title bar with 'Futter: Duro-T 200' and 'Measurement'. On the right, there are icons for refresh and navigation, and a device ID 'F-SENSO CHUCK 5110004712'. The main area is a table with columns 'Sitzung', 'Wechselteilsatz', and 'Datum'. Below the table, there are three callout boxes: 'Open record' pointing to a document icon, 'Create new measurement' pointing to a plus sign icon, and 'Delete' pointing to a trash can icon. A 'Measurements' callout box points to the list of individual measurement entries.


Sitzung	Wechselteilsatz	Datum
▾ Nach Wartung 34	B 54321	2014-09-10 14:10:04
2014-09-10 14:10:39		
2014-09-10 14:10:29		
2014-09-10 14:10:22		
2014-09-10 14:10:15		
▸ Kontrollmessung 1	B 12345	2014-09-10 14:08:04

Datum: 10.09.2014 Uhrzeit: 14:19

F-senso:  Tablet:

After pressing on a measurement series or "Session", there is the option of opening the record or deleting it.

The individual measurements can also be looked at again or deleted. The individual measurements have time stamps.

By pressing on , it is possible to add a new measurement series to the selected clamping device.



**Note**

The records are archived in the Tablet memory as a PDF file and can be downloaded to the PC using a USB cable.

The path is: *Computer\F-Senso Chuck\Internal storage\pdf\_export*


Here, the same folder structure is stored as was created in the archiving function on the Tablet.

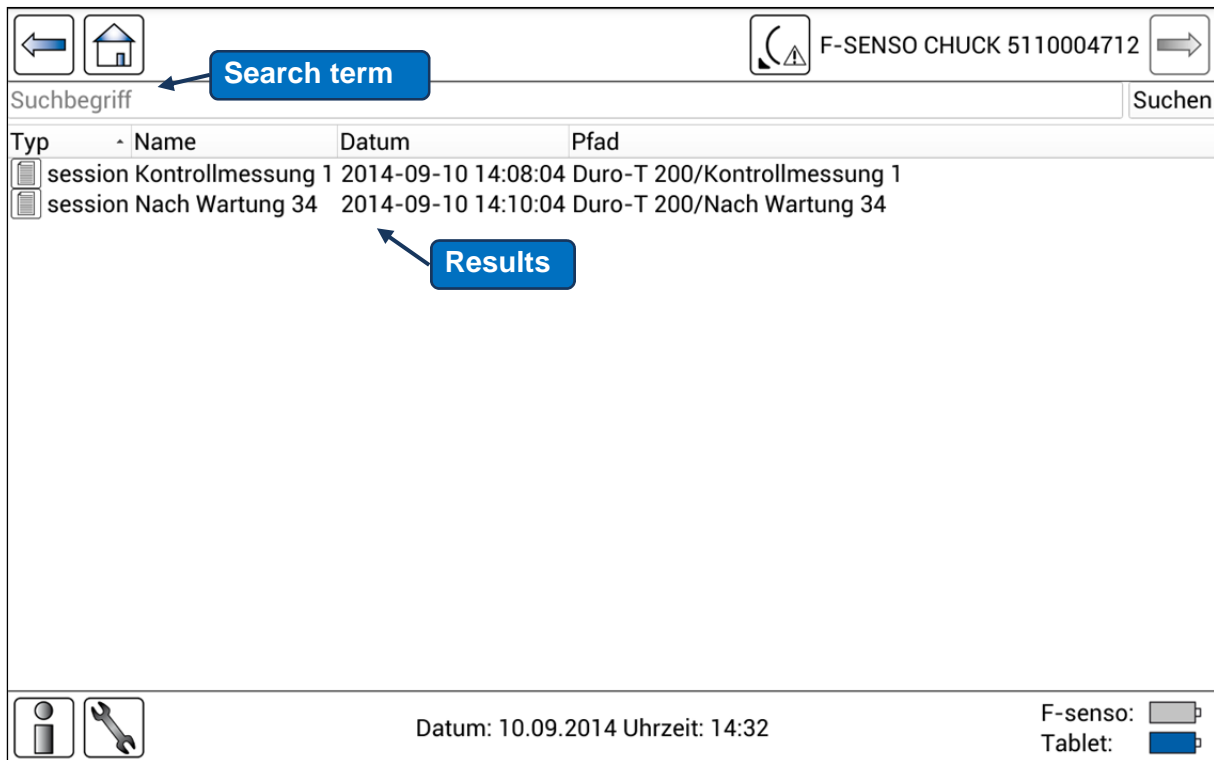


**Note**

In the record and the measurement, the maximum force, maximum speed and minimum force at maximum speed are noted.

## 6.6 Searching measurements and records

By pressing on  in the archive, all files can be searched in the full-text search.



Typ	Name	Datum	Pfad
session	Kontrollmessung 1	2014-09-10 14:08:04	Duro-T 200/Kontrollmessung 1
session	Nach Wartung 34	2014-09-10 14:10:04	Duro-T 200/Nach Wartung 34

Datum: 10.09.2014 Uhrzeit: 14:32

F-senso:  Tablet:




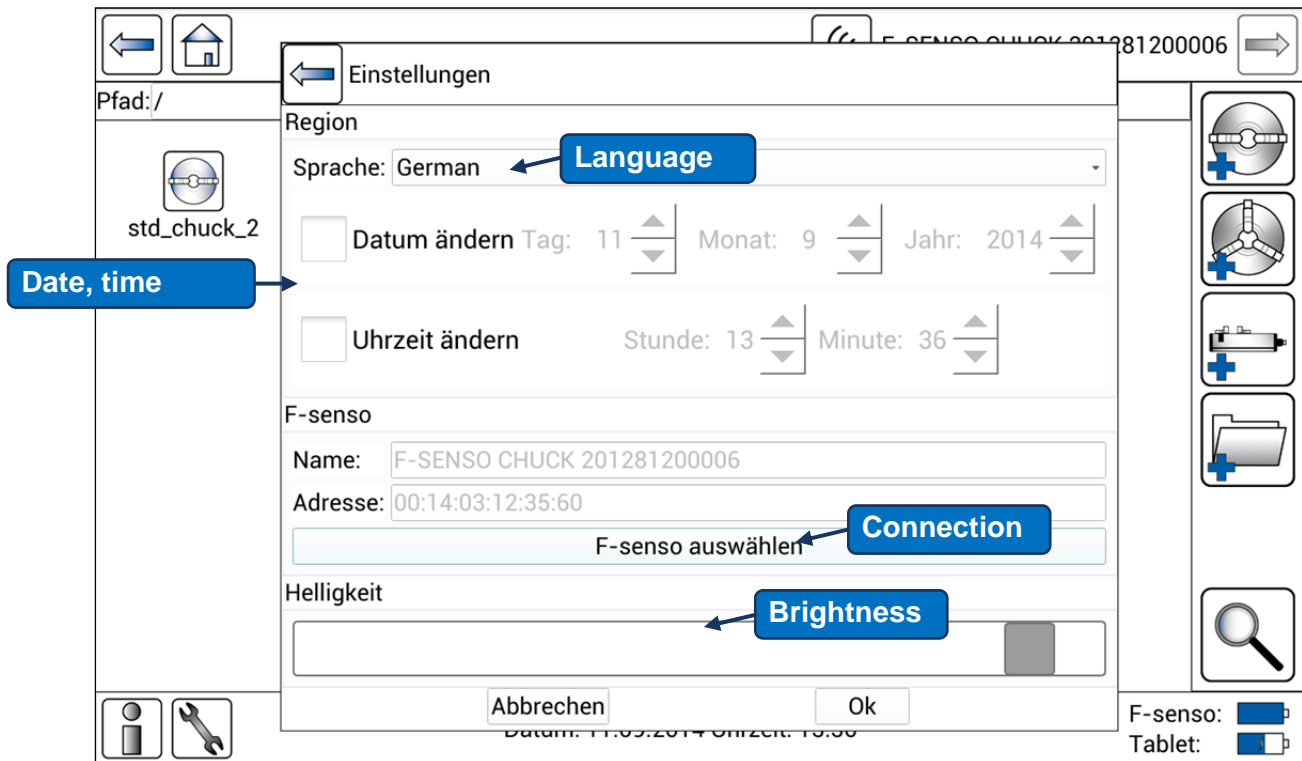
**Note**

This is a full-text search. The following can be searched for:

- Clamping device
- Folders
- Testers
- Words in comments
- ...

## 7 Settings

By pressing on , one gets to the settings under every menu item.



### 7.1 Change language

In the "Language" tab, the following languages can be selected:

- German
- English
- French
- Italian
- Russian
- Spanish
- Chinese

### 7.2 Changing the date/time

The date and time are set to the European time zone GMP+0 when it is delivered. To change the settings, the checkmarks must be set in front of the "Change date" and "Change time" dialogs.

### 7.3 Changing the brightness

To change the brightness, move the slider. Sliding to the left makes the screen darker, to the right, brighter.

## 8 Maintenance and storage

The F-senso chuck is a measuring device and should also be treated as such. It should always be clean and have no visible damage.



### Note

- The measuring device should be exchanged if damaged.

### 8.1 Bearings



### Note

Any storage information affixed to the packaging must be complied with.

The measuring device should be stored under the following conditions:

- Always store in its original storage case.
- Store in a dry, dust-free place.
- Do not store outside.
- Do not expose it to any aggressive media.
- Avoid mechanical vibrations.
- Storage temperature: 15°C to 35°C
- Relative humidity max. 60%

### 8.2 Calibration

It is recommended to calibrate the F-senso chuck every year. A certificate for the initial calibration is enclosed with the delivered product. The initial calibration is valid for one year starting from the first use.

For the yearly calibration, please send the F-senso chuck together with the enclosed quality pass to RÖHM GmbH.

### 8.3 Cleaning

The measuring head should always be stored oil- and grease-free. For this, please only use soft, lint-free cloths and non-aggressive cleaning agents.

### 8.4 Disposal

There is the option of sending the product back to the company RÖHM GmbH for disposal. If this is not taken advantage of, the individual components must be disposed of properly.



**Note**

**Environmental hazard due to incorrect disposal**

(Rechargeable) batteries are subject to special waste treatment and may only be disposed of by licensed specialized companies.

## 8.5 Charging batteries

To charge the measuring head, use the USB cable with mini USB included in delivery. The measuring head can be charged via a USB port of a PC or with the enclosed power supply.

## 9 Malfunction

Possible malfunctions and their solutions are listed in the following chapter.

### 9.1 Status LED (on the measuring head)

The status LED on the measuring head can have the following statuses:

#### Color/status in charging mode

- Orange flashing: Battery is being charged
- Green: Battery fully charged

#### Color in operating mode

- Green: Battery fully charged
- Orange: Low battery
- Red: Battery is dead (device switches itself off automatically after 5 s)  
Device error (see flash codes / error codes)

#### Flash codes:

- Statically on: Device is ready, auto-calibrated and is waiting for a connection to the Tablet.  
Device switches itself off automatically after 5 min.
- Flashing (1/4 s): There is a connection to the Tablet.  
Device will not switch off automatically.
- Flashing (error codes): LED flashes red n times, followed by a pause.  
Afterwards, the output is repeated.  
Device switches itself off automatically after 5 min.

## 9.2 Malfunction table

Malfunction	Possible cause	Solution	Solution executed by
Measuring head cannot be switched on	The battery is dead.	Charge the battery.	Skilled worker
	The measuring head is defective.	Send back to the manufacturer.	RÖHM GmbH
Tablet cannot be switched on.	The battery is dead.	Charge the battery.	Skilled worker
	The Tablet is defective.	Send back to the manufacturer.	RÖHM GmbH
Impossible or unrealistic measurement results	Incorrect operation	Please observe operating manual	Skilled worker
	Yearly calibration skipped	Send in for calibration	RÖHM GmbH
	Measuring bolts are not screwed in evenly or not completely	Please use measuring bolts of the same length and screw them in completely.	Skilled worker
	The measuring head is defective.	Send back to the manufacturer.	RÖHM GmbH
LED on the measuring head indicates an error code	The measuring head is defective.	Send back to the manufacturer.	RÖHM GmbH
Measuring head is damaged.	Measuring head has been handled improperly.	The measuring head must be checked by the manufacturer.	RÖHM GmbH
Measuring head wobbles when it rotates	Measuring head not inserted centrally or axially	Use insertion aid	Skilled worker
Connection to the measuring head cannot be established.	Measuring head not switched on	Switch on measuring head	Skilled worker
	Software error	Restart the Tablet	Skilled worker
	Incorrect measuring head selected from search results	Switch off all other measuring heads in the surrounding area.	Skilled worker