



Operating instructions

[incl. installation manual]

F-Senso 2



Translation of the original operating instructions

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1 General

1.1 Information about this manual

This manual enables you to work safely and efficiently with the product.

This manual is part of the product and must be kept in a location directly beside the product that is accessible to the personnel at all times. The personnel must have read this manual carefully and understood its contents before starting any work. The basic requirement for safe work is compliance with all stipulated safety notices and work-related instructions in this manual.

If the product is passed onto a third party, this manual must accompany it.

Illustrations in this manual are there to facilitate a basic understanding, and may differ from the actual design configuration of the product.

1.2 Key to symbols

Safety instructions in this manual are designated by symbols. The safety notices are invoked by signal words that express the level of hazard involved.

Always comply with safety notices and exercise caution to avoid accidents, injury to people and damage to materials.

Safety notices



DANGER

... indicates an immediate and hazardous situation that can lead to death or serious injury if not avoided.



WARNING

... indicates a potentially hazardous situation that can lead to death or serious injury if not avoided.



CAUTION

... indicates a potentially hazardous situation that can lead to moderate or slight injuries if not avoided.



NOTE

... indicates a potentially hazardous situation that can lead to damage to materials if not avoided.

Tips and recommendations



INFORMATION

... highlights useful tips and recommendations as well as information for efficient and problem-free operation.



... refers to other documents relating to personal and general safety.

Warning symbols may appear on the product or its components.

Always pay attention to warning symbols, and exercise caution to avoid accidents, injury to people and damage to materials.



... warns of stored energy [for example involving springs].



... warns of hand injuries.



... draws attention to the fact that the operating instructions of the product must be read.

1.3 Limitation of liability

All details and notices in this manual were compiled with due reference to applicable standards and specifications, state-of-the-art technology and our many years of expertise and experience.

The manufacturer accepts no liability for damage arising from any of the following:

- Non-compliance with this manual
- Unintended use
- Use of untrained personnel
- Autonomous conversion work
- Technical modifications
- Use of non-approved spare parts
- Use of non-approved accessories

Subject to any commitments agreed to in the supplier contract, the General Terms & Conditions of Business and the delivery terms of the manufacturer and all legislative stipulations valid at the time of conclusion of this contract.

1.4 Copyright

This manual is protected by copyright, and are only intended for internal use.

The dissemination of this manual to third parties, reproductions in any shape or form - even in part - as well as commercial use and/or communication of their contents are prohibited for anything other than internal use, except with the written consent of the manufacturer.

Infringements oblige the offending party to pay compensation. Without restriction on further claims.

1.5 Scope of delivery

Complete set

The scope of delivery of this product includes:

- Senso-Modul [basic unit]
- F-Senso Modul [measuring device]
- Display device [tablet] with the measurement and F-Senso 2 archiving software
- USB charger / power adapter
- USB charging cable for tablet
- USB charging cable for the Senso-Modul
- Magnet holder
- Torx wrench
- Storage case
- The operating instructions

Extension set

The scope of delivery of this product includes:

- F-Senso Modul [measuring device]
- Service pass and test protocol
- Torx wrench [only for F-Senso Modul for external clamping devices]
- Storage case

Additionally needed and included as optional items in the scope of delivery:

- Senso-Modul [basic unit]

1.6 Spare parts and accessories



WARNING

Serious injuries can be caused by incorrect or defective spare parts!

- Always use genuine spare parts made by the original manufacturer.



NOTE

Damage, malfunctions or total failure of the product or the machine tool caused by an incorrect or defective spare parts!

- Always use genuine spare parts made by the original manufacturer.

Spare parts and accessories can be sourced from contract dealers or directly from the manufacturer [see »Contact« chapter].

Without exception, wearing parts and components in contact with the workpiece are not covered by warranty.

1.7 Warranty terms

The warranty terms are included in the manufacturer's General Terms & Conditions of Business.



NOTE

Effect on or destruction of the preinstalled F-Senso 2 software by any system change and external influence on the display device!

- Effects such as
 - Installation of additional software
 - Software updates
 - Connection with external devices and / or a networkIs prohibited.

Röhm accepts no responsibility for loss of data on the display device.

The warranty for the F-Senso Modul is one year from delivery.



NOTE

Damage, malfunctions or total failure of the product or the machine tool from incorrect or defective accessories!

- Use only the accessories included in the scope of delivery:
 - Power adapter
 - USB cable

2 Safety

This section provides an overview of all the important safety aspects for optimum protection of personnel, and for safe and problem-free operation.

2.1 Responsibility of the operator

The product is used in the industrial sector. The operator of the product is therefore governed by the provisions of Health & Safety at Work legislation.

As well as the safety notices in this manual, the area of use of the product must also comply with locally applicable safety, accident prevention and environmental protection specifications as well as those in the manual for the machine tool.

No modifications must be made to the product. The operator is wholly and solely responsible for any resultant personal injury and/or damage to materials.



INFORMATION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.2 Personnel requirements



WARNING

Serious injuries caused by incorrect handling of the product by insufficiently skilled or trained personnel!

- All activities must be performed by skilled staff from the relevant specialist field.



WARNING

Serious injuries caused by unauthorized presence of unauthorized personnel in the working area!

- Keep unauthorized people away from the working area.
- If in doubt, speak to people and direct them to leave the working area.
- Interrupt work until unauthorized people have left the working area.



NOTE

Serious damage to materials caused by incorrect handling of the product by insufficiently skilled or trained personnel!

- All activities must be performed by skilled staff from the relevant specialist field.

This manual name the following skills sets required for various different areas of activity:

Skilled specialist

Skilled specialists, due to their professional training, knowledge and experience and awareness of applicable provisions, are capable of carrying out the work entrusted to them and independently to identify and avoid potential hazards.

Hydraulics specialist

Hydraulics specialists are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, hydraulics specialists can work on hydraulic systems and can independently identify and avoid potential hazards.

Pneumatics specialist

Pneumatics specialists are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, pneumatics specialists can work on pneumatic systems and can independently identify and avoid potential hazards.

Electricians

Electricians are trained in the specific task profile for which they are employed, and are familiar with the relevant standards and legislative provisions.

Due to their vocational training and experience, electricians can work on electrical systems and can independently identify and avoid potential hazards.

Trainees

Trainees can only work on the machine under the supervision and direction of staff skilled in the relevant specialist field.

The only people admitted as personnel are those who can reasonably be expected to carry out their work to a reliable standard. People whose response capabilities are impaired, for example by drugs, alcohol or medication, are prohibited.

For the selection of personnel, pay attention to the stipulations applicable at the place of work governing age and specific vocational requirements.

2.3 Intended use

The measuring device is intended for measuring the force of a product in a CE-compliant machine tool.

The product is only intended for the type of use described in this manual [see »Use« chapter]. Furthermore, an extended form of use can be agreed contractually between manufacturer and operator.

Only skilled staff from the appropriate specialist fields may operate and clean the product [see »Personnel requirements« chapter].

Never exceed the technical values stipulated for the product [see »General information« and »Operating conditions« chapters].

Furthermore, never exceed the limits for use of the product [see »Limits of use« chapter].

The product must be serviced regularly [see chapter »Annual factory calibration«].

When used for its intended purpose, the operational safety of the product is assured, subject to compliance with relevant safety stipulations, to the full extent foreseeable.

Intended use also includes compliance with all stipulations in this manual.

Any form of use beyond the scope of intended use, or other forms of use of the product, is considered as misuse, and can lead to dangerous situations.



WARNING

Serious injuries caused by misuse of the product!

- Only in a CE-compliant machine tool with a separating set of guards.
- Only use for the type of use indicated [see »Use« chapter].
- Only skilled staff from the appropriate specialist fields may use the product [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General information« and »Operating conditions« chapters].
- Never exceed the limits for use of the product [see »Limits of use« chapter].
- The product must be serviced regularly [see chapter »Annual factory calibration«].
- Only use with compatible products.



NOTE

Damage to materials caused by incorrect use of the product!

- Only in a CE-compliant machine tool with a separating set of guards.
- Only use for the type of use indicated [see »Use« chapter].
- Only skilled staff from the appropriate specialist fields may use the product [see »Personnel requirements« chapter].
- Never exceed the technical data indicated on the product [see »General information« and »Operating conditions« chapters].
- Never exceed the limits for use of the product [see »Limits of use« chapter].
- The product must be serviced regularly [see chapter »Annual factory calibration«].
- Only use with compatible products.

Claims of all kinds will be rejected that are due to unintended use.

Here are some examples of unintended use of the product

- if the product is used for unintended clamping devices.

2.4 Personal protective equipment

During work, it is essential to wear personal protective equipment to minimize the health hazards.

Always wear the required personal protective equipment when working on any given job.

Always pay attention to any notices about personal protective equipment displayed in the working area.

Always wear



Workplace clothing

Workplace clothing should be close-fitting, with low tear-resistance, narrow cuffs and no protruding parts. It serves primarily to protect the wearer from coming into contact with moving machine parts. Do not wear rings, chains or other jewelry.



Safety footwear

To protect the wearer from any heavy items that may fall, and from losing their footing on slippery ground.



Protective goggles

To protect the eyes from projectile parts and liquid splashes.



Hair net

To protect long hair from getting snagged in rotating parts on the machine tool.

Additional personal protective equipment

When carrying out certain work, additional personal protective equipment is required. Separate reference is made to this in the individual chapters of this manual. The following section explains these additional items of personal protective equipment:



Protective gloves

To protect the hands from friction, chafing, stabbing or deeper injuries and from contact with hot surfaces.



Hard hat

To protect against falling and projectile parts and materials.

2.5 Particular hazards

The following section names residual risks resulting from the installation of the product in a machine tool. In all cases, the residual risks detected during a risk assessment of the machine tool need to be named by the operator.

Pay attention to the safety instructions named here, as well as the warning notices in other chapters of these operating instructions to reduce the risk of health hazards and to prevent dangerous situations.

Sharp-edged parts



WARNING

Serious cut injuries caused by sharp-edged parts and burrs!

- All installation of individual parts must be performed by skilled staff from the relevant specialist field.
- Also wear the following items of personal protective equipment, in addition to the basic equipment:



2.6 Functionality



WARNING

Serious injuries caused by severe contamination of the product!

- Always comply with the cleaning instructions and intervals [see »Cleaning« chapter].



NOTE

Incorrect measurement results due to insufficient cleaning and service intervals.

- Always comply with the cleaning and intervals [see »Cleaning« chapter].

2.7 Environmental protection



NOTE

Substantial damage to the environment can result from non-compliant handling or incorrect disposal of environmentally hazardous substances!

- If environmentally hazardous substances enter the environment accidentally, take immediate remedial action.
- If in doubt, notify the relevant municipal authorities about the incident.

The following environmentally hazardous substances are used:

Rechargeable battery

Batteries and rechargeable batteries as well as other electronic parts and foreign materials contain toxic substances. These must not enter the environment.

Dispose of environmentally hazardous substances properly [see »Disposal« chapter].

3 Technical data

3.1 General information

F-Senso Modul for		external clamping devices [clamping force measurement]	
Size		Chuck 32	Chuck 65
Clamping \varnothing		32	65
Max. clamping force measuring range [kN]: 3 measuring points		0-140	0-225
Max. clamping force measuring range [kN]: 2 measuring points		0-90*	0-150
Max. speed [min^{-1}]		8000	6000
Dimensions \varnothing x length [mm]		\varnothing 134 x 28	\varnothing 134 x 36
Protection class		IP21	IP21

* To use size 32 with two measuring points, the flat measuring pins must be used, see chapter »Converting the F-Senso Modul«

Table 1: Technical data of F-Senso Modul for external clamping devices

F-Senso Modul for		hollow tapered shanks [draw-in force]			
Size		Spindle 40	Spindle 50	Spindle 63	Spindle 100
Measuring range [kN]		0-20	0-20	0-50	0-90
Dimensions \varnothing x length [mm]		\varnothing 76 x 91	\varnothing 76 x 98	\varnothing 76 x 98	\varnothing 100 x 138.5
Protection class		IP21	IP21	IP21	IP21

Table 2: Technical data of F-Senso Modul for hollow tapered shanks

F-Senso 2

Technical data

F-Senso module for	Clamping heads [draw-in force measurement]	
Size	125	140
Measuring range [kN]	0-50	0-50
Dimensions \varnothing x length [mm]	$\varnothing 78$ x 127.791	$\varnothing 98$ x 140
Protection class	IP21	IP21

Table 3: Technical data for F-Senso module for clamping heads

3.2 Performance values



NOTE

Material damage to the products use and/or to the machine tool caused by exceeding the maximum performance values!

- Do not exceed the maximum performance values [see »General information« chapter].
- On all products used, do not exceed the lowest of the maximum performance values.
- Only use product in machine tools with the same performance values.



INFORMATION

Details of maximum performance values can be found on each product.

3.3 Speed

The product for measuring the clamping force is approved for rotational operation.

The maximum speed is written on the product [maximum speed, see »General information« chapter].



DANGER

Serious injuries caused by parts being ejected centrifugally due to a non-compliant combination of several products!

- From all of the maximum speeds indicated for the combined products, always remain at the lowest of those maximum speeds.

3.4 Operating conditions

Indication	Value	Unit
Ambient temperature range	15 - 40	°C
Humidity	≤ 80	%

Table 4: Operating conditions

3.5 Type designation

The type designation is on the product and it includes the following indications:

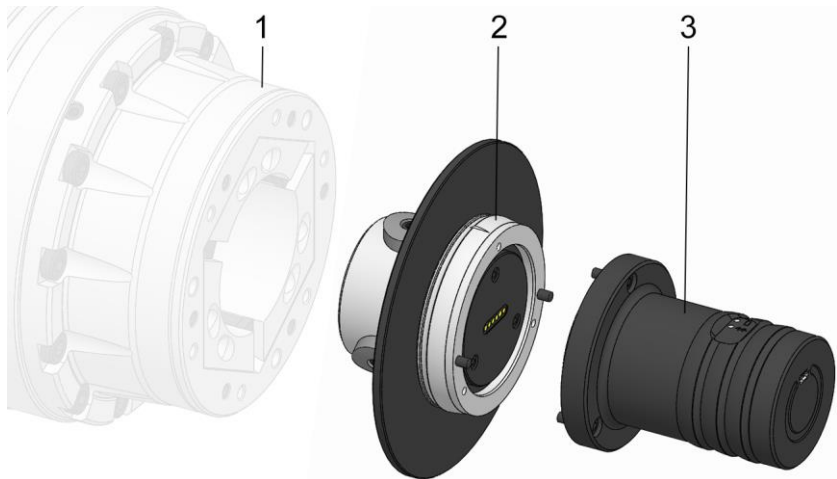
- Manufacturer
- Product designation
- ID number
- Serial number [marked with a # symbol]
- Build year
- Maximum speed n [min^{-1}]
- maximum clamping force F_{max} [kN] for the sum of all measuring points

4 Layout and function

4.1 Overview and brief description

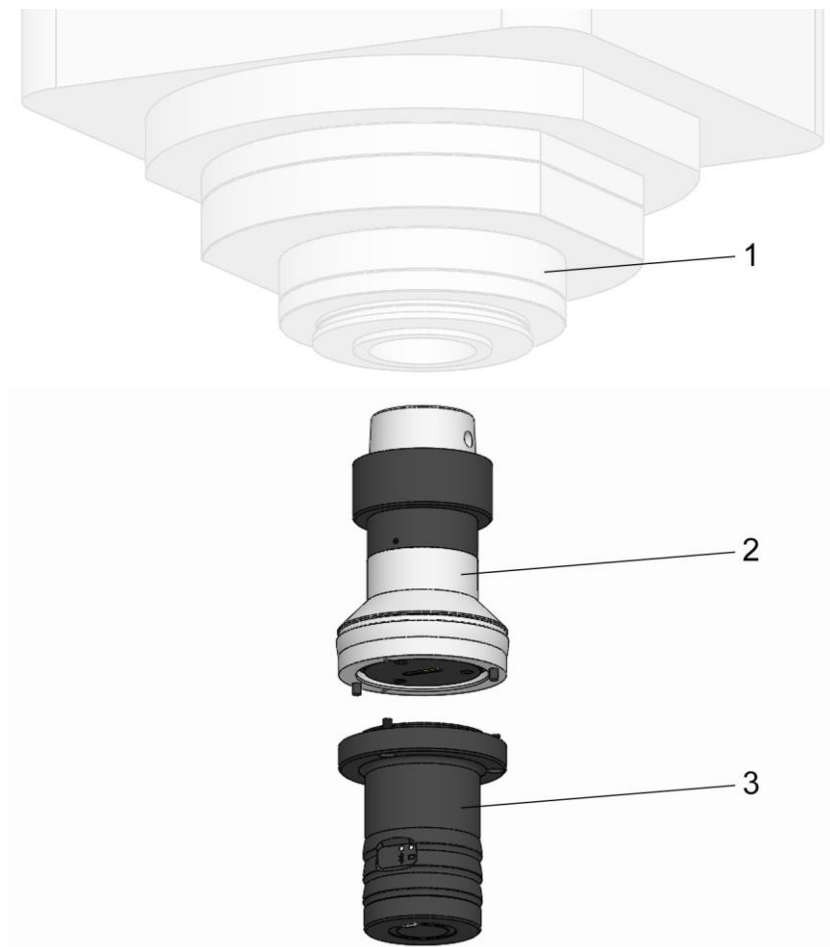
External clamping devices [clamping force measurement]

- 1 Clamping device
- 2 F-Senso Modul
- 3 Senso-Modul



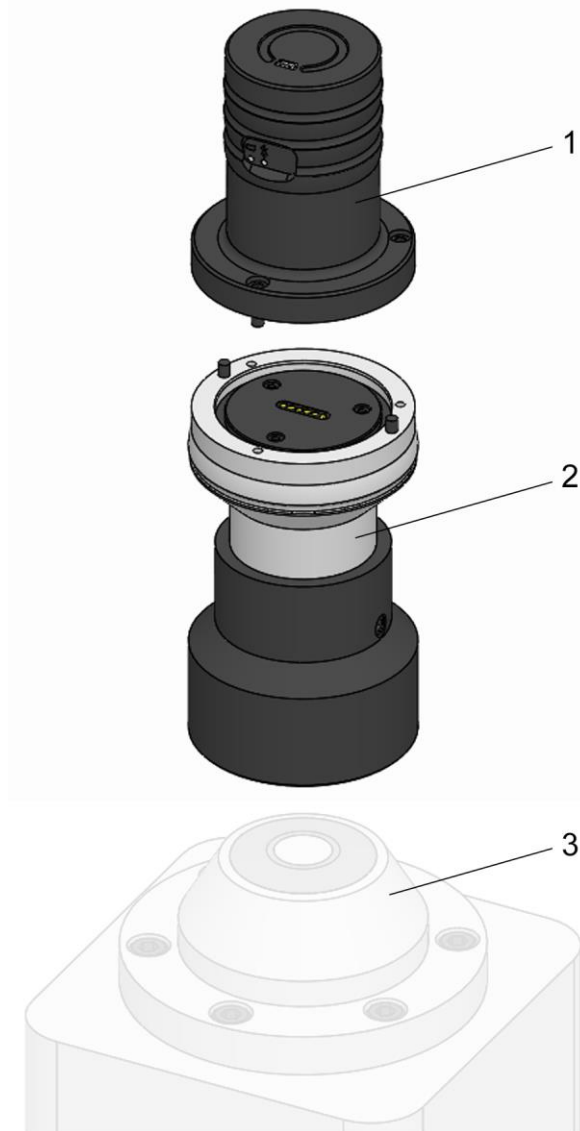
Hollow tapered shanks [draw-in force]

- 1 Tool holder
- 2 F-Senso Modul
- 3 Senso-Modul



F-Senso 2 Layout and function

Clamping head [draw-in force measurement]



- 1 Senso module
- 2 F-Senso module
- 3 Clamping head

Depending on the version, the measuring device is used to test the clamping force, the axial force or the draw-in force.

The measuring device consists of a basic unit, the Senso-Modul, and a measuring unit, the F-Senso Modul, which can be separated from each other.

The clamping device is equipped to hold the measuring device.

The measuring device is clamped by means of the clamping device.

The F-Senso Modul determines the force by means of sensors and transfers it to the Senso-Modul.

The measured values are transmitted via Bluetooth Low Energy [BLE] to the output device with the installed F-Senso 2 software.

F-Senso 2

Layout and function

4.2 Accessories required

4.2.1 Display unit

The F-Senso 2 software is already preinstalled on the display device.

The Bluetooth connection with the Senso-Modul is established via the internal Bluetooth interface of the display device.

4.2.2 F-Senso Modul

The F-Senso Modul is used to measure the clamping force on / in the mounted clamping device.

The F-Senso Modul is supplied in the size stated in the order. Together with the Senso-Modul, it forms a measuring device with which the actual measurement is made.

4.2.3 Senso-Modul

The Senso-Modul is used to transfer the measurement results to the F-Senso 2 software.

Together with the F-Senso Modul, it forms a measuring device with which the actual measurement is made.

4.2.4 USB charging cable

The USB charging cable is used to charge the Senso-Modul. While the Senso-Modul is not in use, it can be charged using the USB charging cable on the display unit or alternatively via the power adapter.

A static measurement is also possible during the charging process.

4.2.5 USB charger / power adapter

The power adapter is used to charge the Senso-Modul.

4.2.6 Storage case

The storage case is used to transport and store the F-Senso 2 components.

5 Use and limits of use

5.1 Use

The product is a measuring device that may only be used for force measurement.
Any other fields of application require the explicit approval of the manufacturer

With the help of suitable F-Senso Modules from the manufacturer, the measuring device can rapidly be converted to suit a different measurement.

5.2 Limits of use

The measuring device is intended solely for use with smooth clamping points.

6 Transport, packaging, storage

6.1 Safety, transport, packaging, storage



WARNING

High level of physical strain due to the weight of the product or of its components if not transported properly!

- From a weight of 10 kg, use appropriate transport equipment, lifting gear and lifting tackle.



WARNING

Serious crushing injuries and breakages caused by falling parts if transported incorrectly!

- Ensure that the product cannot roll away or fall.
- Place on a non-slip surface.
- When using lifting gear, use appropriate load-bearing equipment and lifting tackle.



WARNING

Serious injuries caused by transporting off-center equipment!

- Pay attention to marks on the packaging items.
- Attach the crane hook directly above the center of gravity.
- Raise carefully and correct the lifting points if necessary.



WARNING

Serious injuries caused by incorrect transport with lifting gear!

- Never raise loads above people.
- Never step under suspended loads.
- Pay attention to information about the intended lifting points. Ensure that the lifting gear is mounted on a secure base.
- Only use authorized and undamaged lifting gear, load-bearing equipment and lifting tackle.
- Never exceed the maximum load-bearing capacity of lifting gear, load-bearing equipment and lifting tackle.

F-Senso 2

Transport, packaging, storage



NOTE

Damage to materials caused by falling parts if transported incorrectly!

- Ensure that the product cannot roll away or fall.
- Place on a non-slip surface.
- When using lifting gear, use appropriate load-bearing equipment and lifting tackle.



NOTE

Damage to materials or total failure of the product due to improper transport!

- Transport product with extreme care.
- Never drop or otherwise subject the product to strong shocks.

6.2 Symbols on the packaging



Fragile

Designates packaging items with fragile or breakable contents.

Handle the packaging item with care. Do not drop it and protect it against collision impacts.



Keep it dry

Keep packaging items dry and protect them from the ingress of water.



Position designation

Points to the correct upright position of the packaging item.

F-Senso 2

Transport, packaging, storage

6.3 Transport inspection

Check the delivery on receipt immediately to ensure it is complete and has not been damaged in transit.

Proceed as follows if you find any externally visible signs of damage while in transit:

- Refuse to accept the delivery, or only subject to later approval
- Make a note of the extent of damage on the transportation documents or on the delivery note of the transportation company
- Initiate a complaint



INFORMATION

Raise a complaint for every defect as soon as it is discovered. Compensation claims can only be enforced during the applicable complaint periods.

6.4 Storage



INFORMATION

The packaged items may display information relating to storage and readmission to storage that extend beyond the scope of these requirements. Pay attention to these notices.

Store packaged items under the following conditions:

- Safe for storage.
- Do not store outdoors.
- Store in a dry, dust-free place.
- Avoid exposure to aggressive media.
- Protect against direct sunlight.
- Avoid mechanical vibration.
- Storage temperature: 15 to 35°C.
- Relative humidity: Maximum 60%.

6.5 Return to storage

Return product to storage under the following conditions:

1. Clean the product [see »Cleaning« chapter].
2. The product must be stored safely in the original case.
3. For storage conditions, see the »Storage« chapter.

7 Installing and setting up the F-Senso 2 software

7.1 Installing the F-Senso 2 software

The software is already installed on the display device when the device is delivered.



INFORMATION

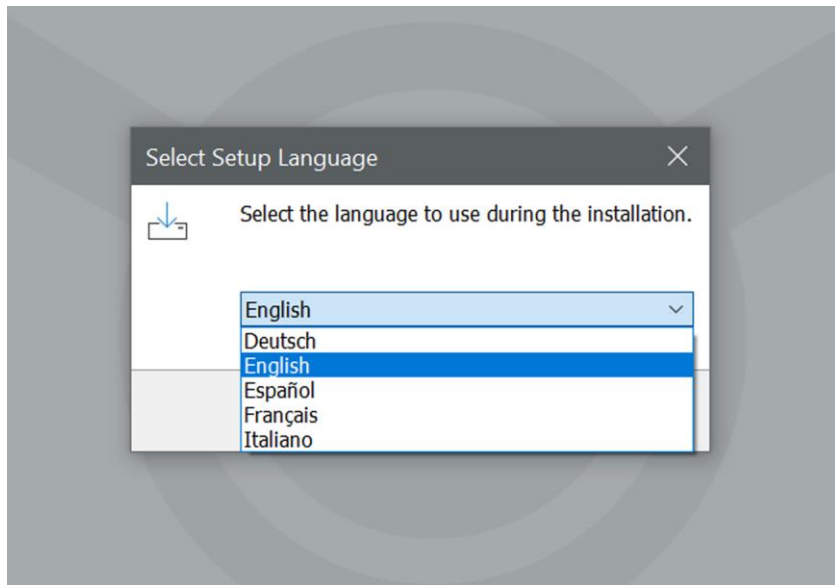
The selected display device must meet the hardware requirements of the F-Senso 2 software:

- Operating system WINDOWS 10 with version 1709 or newer [version code number must be 1709 or greater].
- Operating systems such as Android or IOS [Apple] are not compatible with F-Senso 2 software.

Installing the F-Senso 2 software

A Setup Wizard guides you through the installation process.

1. Start the »F-Senso 2_Setup« application.

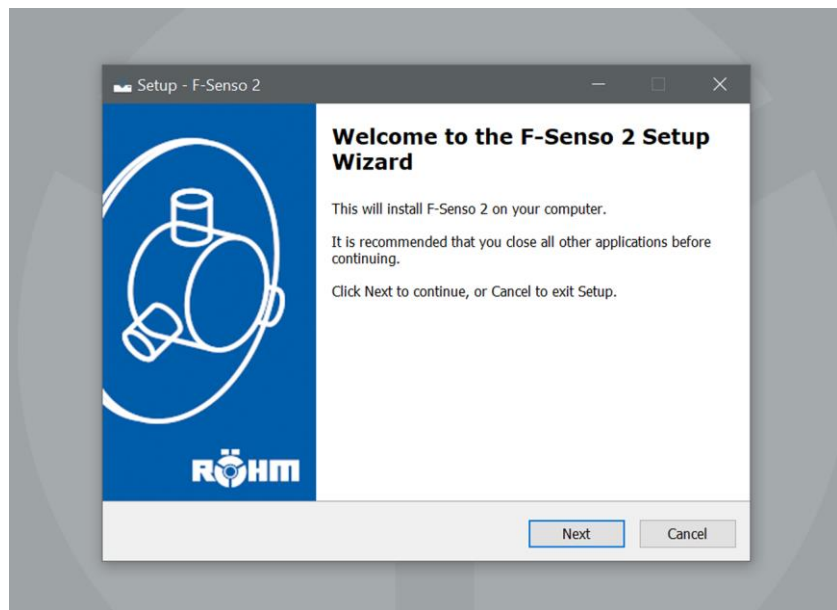


2. Select the language in which you want to run the Setup Wizard.
3. Confirm by pressing »OK«.

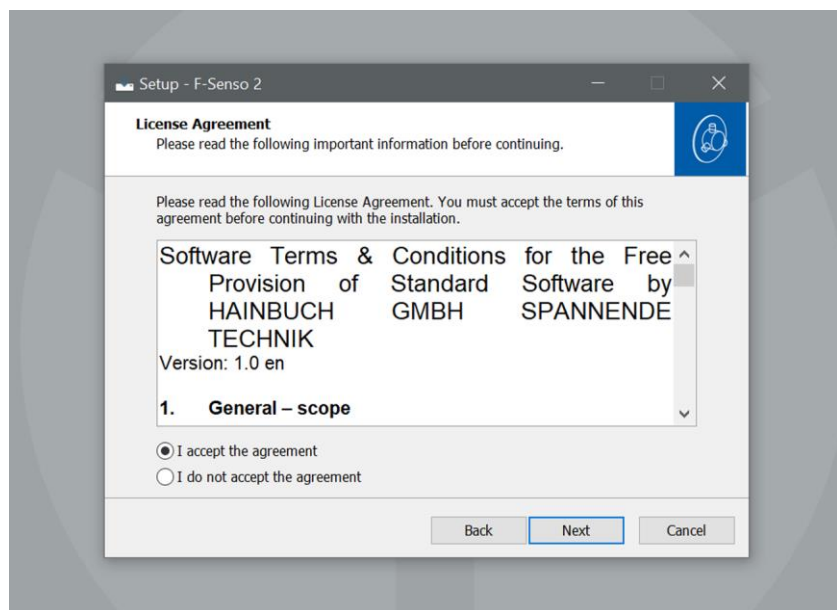
The welcome greeting appears on the screen.

F-Senso 2

Installing and setting up the F-Senso 2 software



4. Click »Next«.

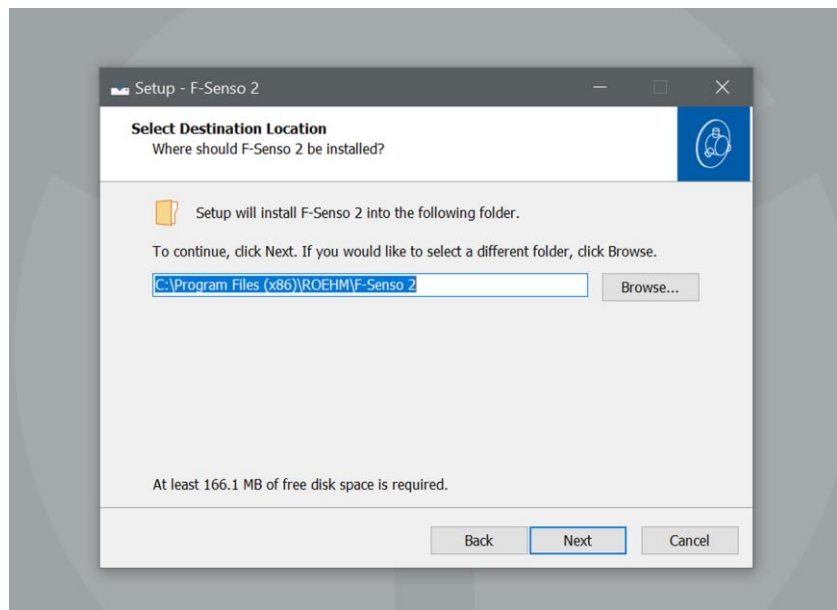


5. Accept the license agreement.

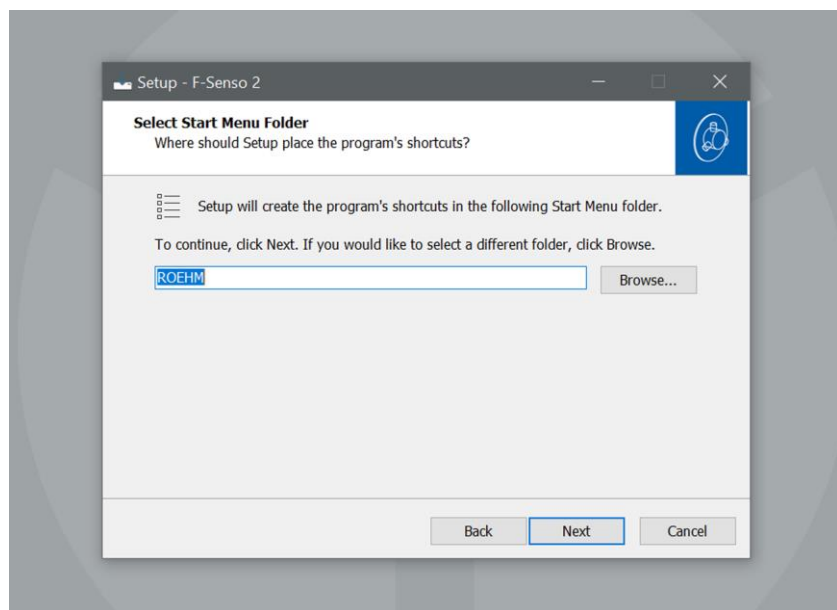
6. Click »Next«.

F-Senso 2

Installing and setting up the F-Senso 2 software



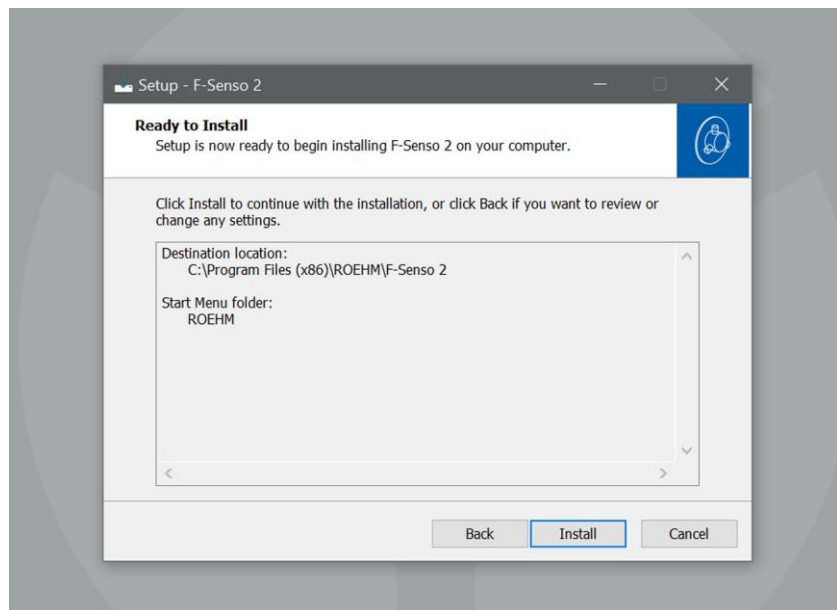
7. Select the destination folder for installation of the F-Senso 2 software.
8. Click »Next«.



9. Select the Start menu folder for the program shortcuts.
10. Click »Next«.

F-Senso 2

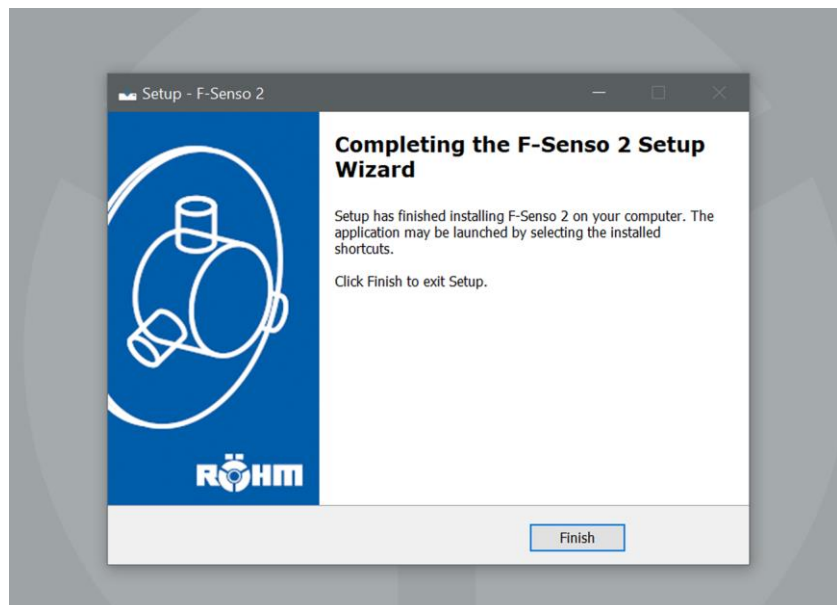
Installing and setting up the F-Senso 2 software



11. Click »Install«.

The F-Senso 2 software is being installed. Following installation, the F-Senso 2 software is started automatically.

12. Exit the F-Senso 2 software to complete the installation.



13. Click »Finish«.

The F-Senso 2 software is installed.

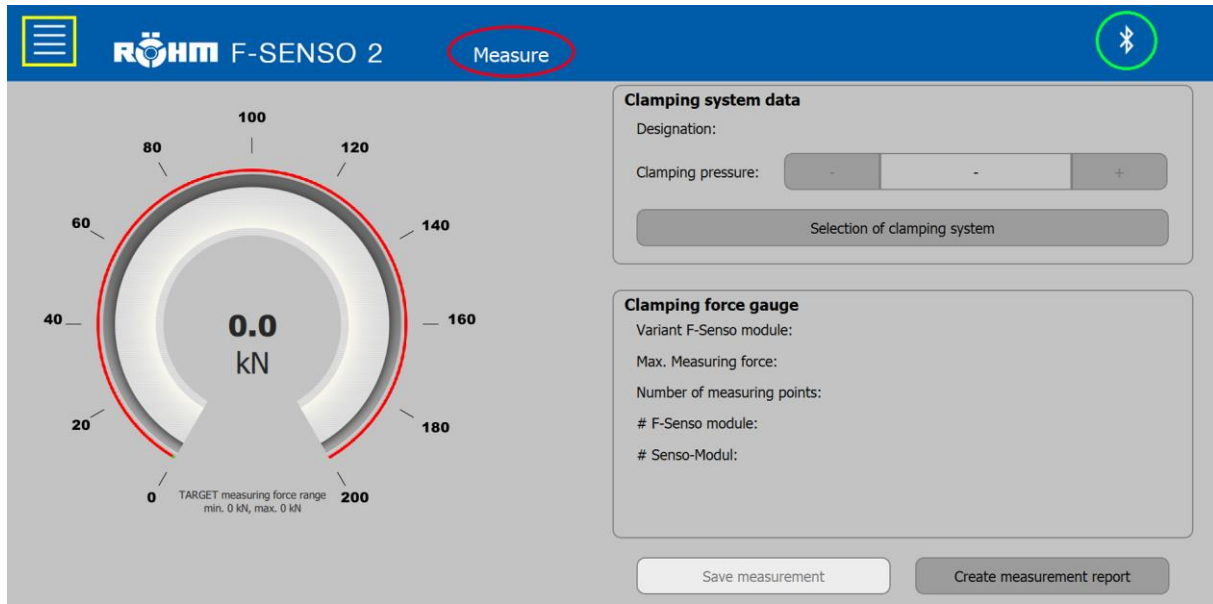
The F-Senso 2 software can be found in the selected Start menu folder.

F-Senso 2

Installing and setting up the F-Senso 2 software

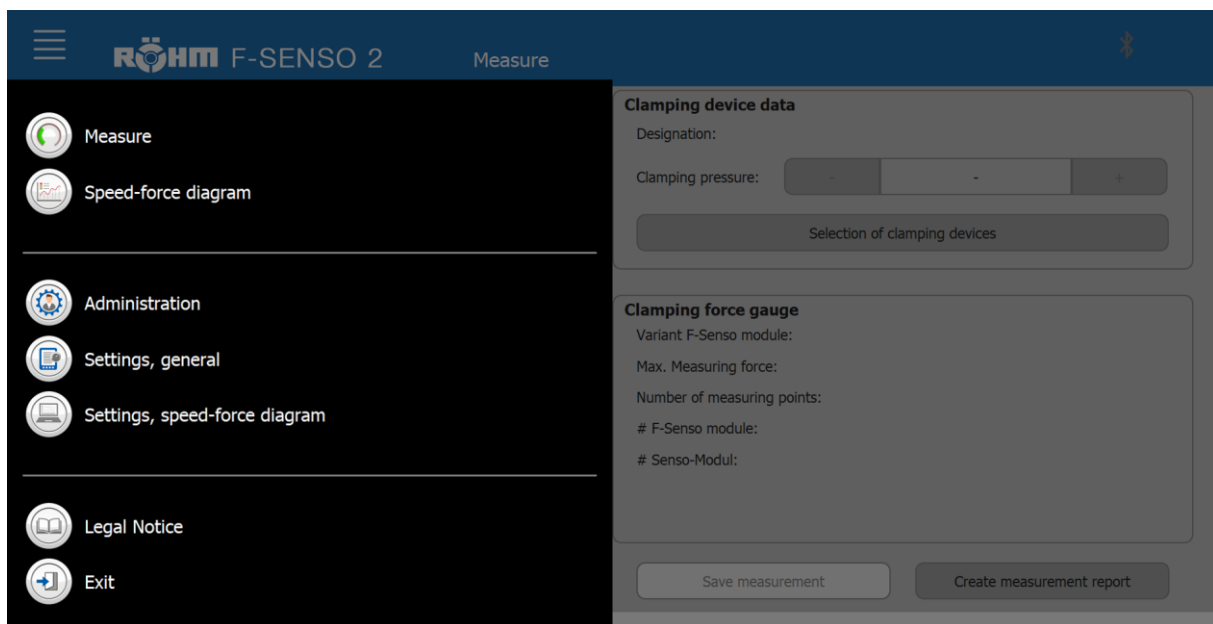
7.2 Start page of the F-Senso 2 software

After the F-Senso 2 software has been started, the »Measure« page is displayed.



- The area highlighted in yellow opens the menu.
- The area highlighted in red shows the page currently in use.
- The area highlighted in green indicates whether there is a Bluetooth connection.

7.2.1 Menu



The menu is visually divided into three areas.

- The upper area contains the pages relevant for performing a measurement.
- The middle area shows the administrative pages.

F-Senso 2

Installing and setting up the F-Senso 2 software

- The bottom area contains a page with help settings.

7.2.2 The Bluetooth® symbol



INFORMATION

If the customer's display device does not have an internal Bluetooth module, the Bluetooth stick included in the scope of delivery must be plugged into a USB port on the display device. The Bluetooth stick is a plug-and-play device.

The Bluetooth® symbol appears if an F-Senso 2 is within range for pairing.

The Bluetooth® symbol can be displayed in combination with a battery symbol.

White without battery symbol	There is no connection to a measuring device.
White with battery symbol	In combination with a battery symbol, it indicates an existing connection to a measuring device.

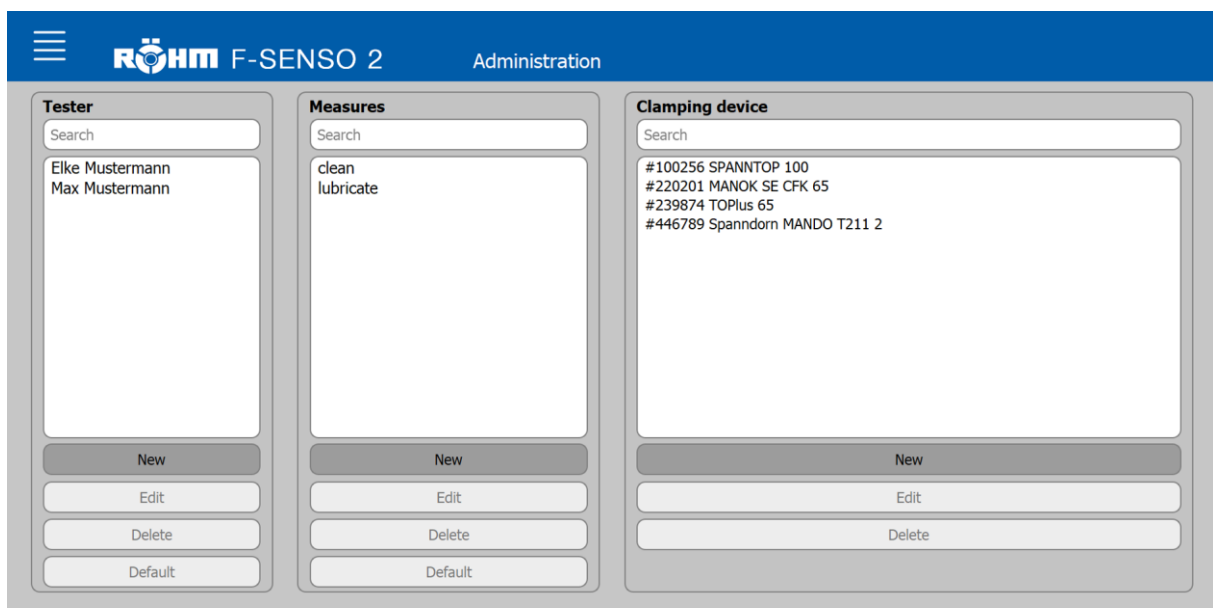
Table 5: Display of the Bluetooth® symbol

7.3 Administration

It is recommended that you make certain settings before using for the first time.

On the »Administration« it is possible to create

- Tester
- Actions
- Clamping device

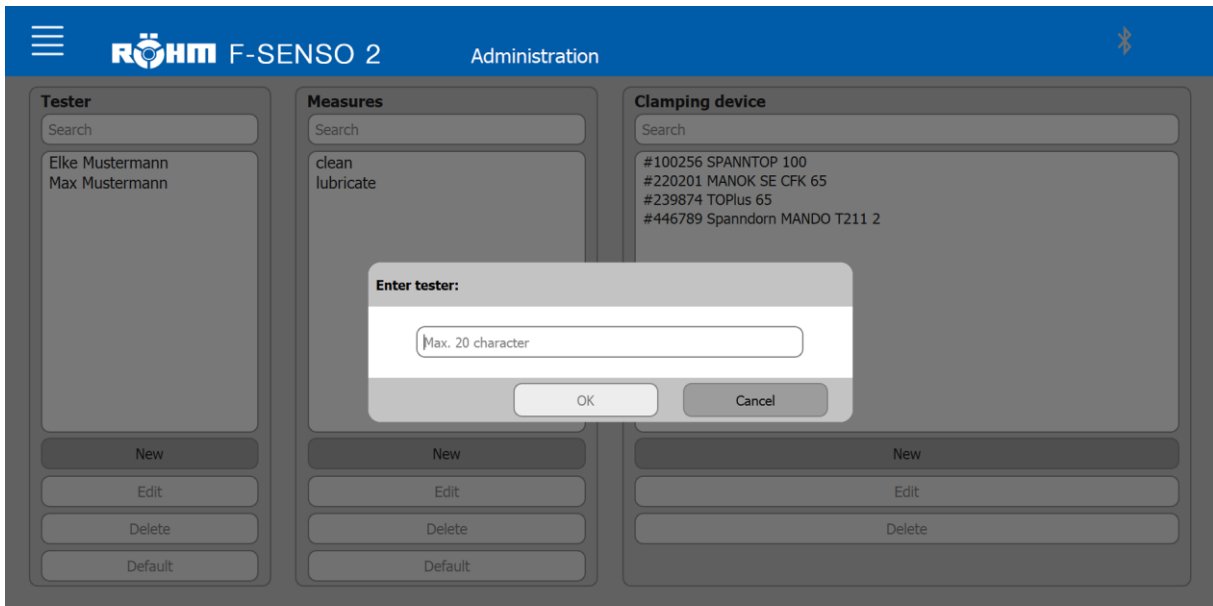


F-Senso 2

Installing and setting up the F-Senso 2 software

7.3.1 Tester

To create a new tester:



1. Click the »New« button.

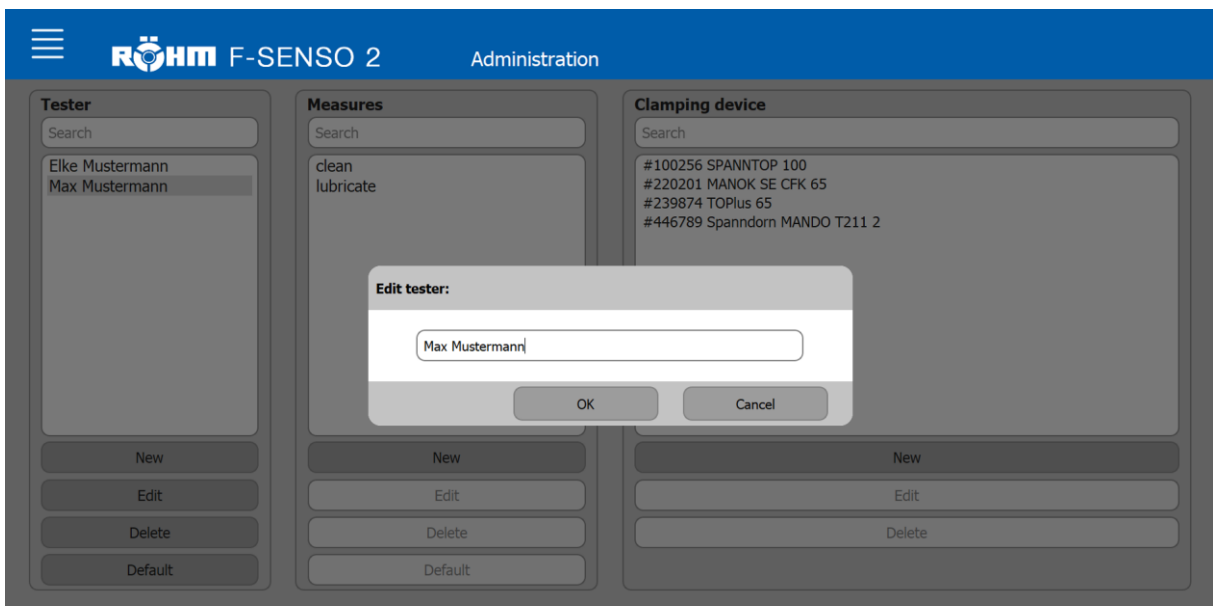


INFORMATION

The input field is limited to 20 characters.

2. Enter the name of the new tester.
3. Click »OK«.

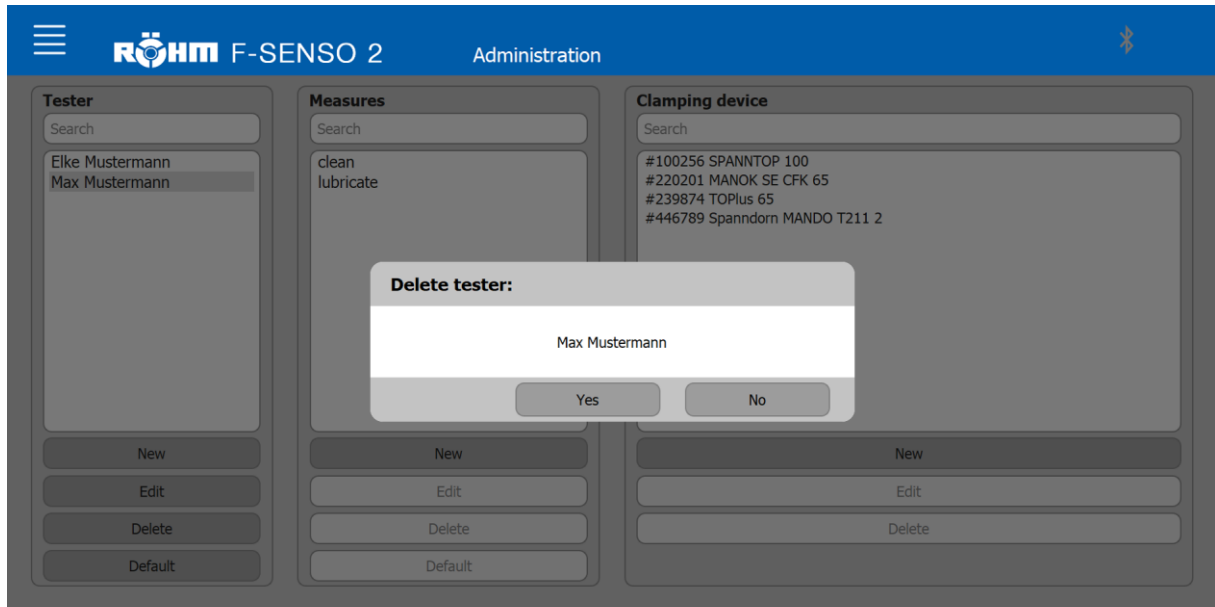
If an existing tester is selected from the list, this tester can be



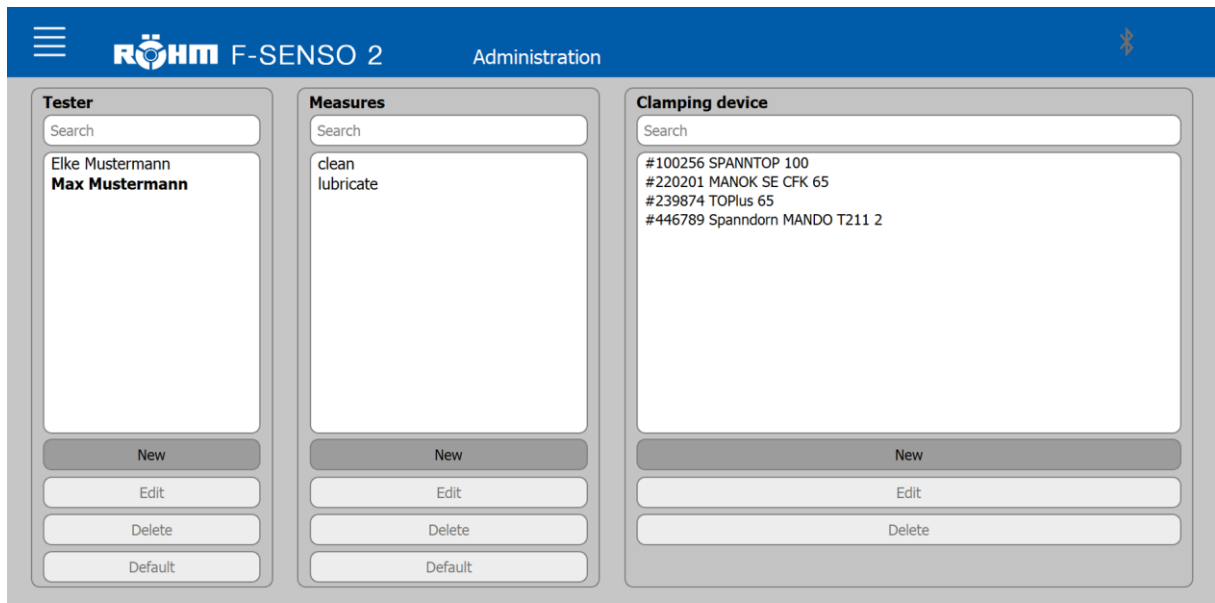
- edited

F-Senso 2

Installing and setting up the F-Senso 2 software



- deleted



- that can be set as the default
 - A tester who is set as the default is highlighted in bold in the listing.
 - When a measurement is saved, the tester set here as the default is preset.

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Installing and setting up the F-Senso 2 software

7.3.2 Actions

What applies to the tester also applies to the actions.

Actions can also be

- Created
- Edited
- Deleted
- Set as default

7.3.3 Clamping device

Various information and data are required to create a new clamping device.

- Name *
- ID number *
- Actuation type *
 - force-actuated [radial]
 - Maximum radial clamping force *
 - Maximum axial draw-in/pressing force *
 - Actuation pressure at maximum axial draw-in/pressing force [diagram]*
 - force-actuated [axial]
 - Maximum axial draw-in/pressing force *
 - Actuation pressure at maximum axial draw-in/pressing force [diagram]*
 - manually actuated [radial]
 - Maximum radial clamping force *
 - Maximum axial draw-in/pressing force *
 - Maximum torque *
 - manually actuated [axial]
 - Maximum axial draw-in/pressing force *
 - Maximum torque *
 - Draw-in force measurement [booster]
 - Minimum draw-in force *
 - Maximum actuating pressure *
 - Draw-in force measurement [spring force]
 - Minimum draw-in force *
 - Further selection options may be available
- Allowed tolerance [+/-] *
- Maintenance interval
- Machine/location

* Mandatory field

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Installing and setting up the F-Senso 2 software

To create a new clamping device:

The screenshot shows the 'Administration' screen of the RÖHM F-SENSO 2 software. A dialog box titled 'Enter clamping system:' is open, allowing the user to input details for a new clamping device. The dialog contains the following fields and options:

- Designation:** Text input field with a maximum length of 30 characters.
- ID number:** Text input field with a maximum length of 20 characters.
- Actuating type:** A dropdown menu currently set to 'power operated [radial]' with a checkmark icon.
- Max. radial clamping force:** A dropdown menu with options: 'manually operated [radial]', 'power operated [radial]', 'power operated [axial]', 'manually operated [axial]', and 'pull-in force [spring force]'. The unit is 'kN'.
- Max. axial draw force/compression force:** A dropdown menu with options: 'pull-in force [Booster]', 'power operated [e.g. hydr. Centering clamp]', and 'power operated radial [e.g. electric screwdriver]'. The unit is 'bar'.
- Actuating pressure at max. axial draw force / compression force [diagram]:** A dropdown menu with options: 'manually operated [radial]', 'power operated [radial]', 'power operated [axial]', 'manually operated [axial]', and 'pull-in force [spring force]'. The unit is 'kN'.
- Permissible tolerance [+/-]:** Text input field with a note: 'Only numeric input possible, e.g. 15'. The unit is '%'. The unit 'bar' is also visible on the right side of the dialog.
- Time period maintenance interval:** Text input field with a note: 'Only numeric input possible, e.g. 7'. The unit is 'Days'.
- Machine/site:** Text input field with a maximum length of 20 characters.

At the bottom of the dialog, there are 'OK' and 'Cancel' buttons.

1. Click the »New« button.



INFORMATION

The input field is limited to 30 characters.

2. Enter the required data for the new clamping device correctly.
3. Click »OK«.

F-Senso 2

Installing and setting up the F-Senso 2 software

If an existing clamping device is selected from the list, the following is possible

ROHM F-SENSO 2 Administration

Edit clamping device:

Designation:	TOPlus 65
ID number:	#239874
Actuating type:	power operated [radial] ✓
Max. radial clamping force:	120.0 kN
Max. axial draw force/compression force:	45.0 kN
Actuating pressure at max. axial draw force / compression force [diagram]:	40.0 bar
Permissible tolerance [+/-]:	15.0 %
Time period maintenance interval:	14 Days
Machine/site:	Showroom

OK Cancel



INFORMATION

The ID number of the clamping device cannot be changed after it has been created.

- edited

ROHM F-SENSO 2 Administration

Tester
Search
Elke Mustermann
Max Mustermann
New Edit Delete Default

Measures
Search
clean
lubricate
New Edit Delete Default

Clamping device
Search
#100256 SPANNTOP 100
#220201 MANOK SE CFK 65
#239874 TOPlus 65
#446789 Spanndorn MANDO T211 2
New Edit Delete

Delete clamping device:
#239874 TOPlus 65
Yes No

- deleted

F-Senso 2

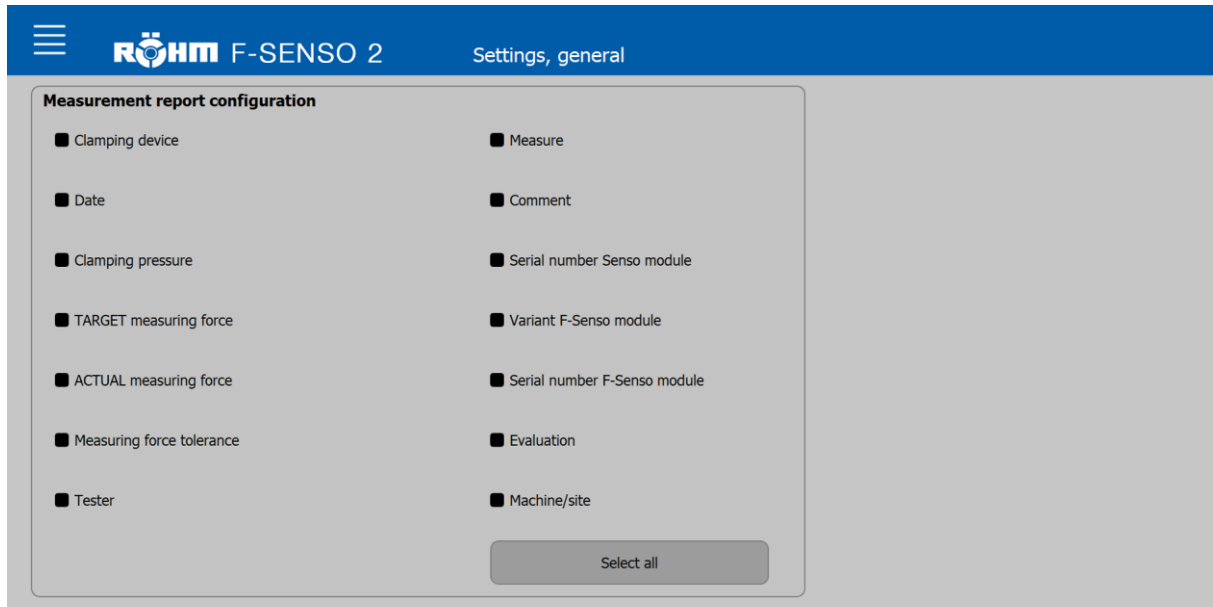
Installing and setting up the F-Senso 2 software

7.4 General settings

The following functions are available on the »General Settings« page:

- Settings for configuring the measurement protocol

7.4.1 Configuring the measurement protocol



The configuration page can be used to select all the information to be provided on the measurement report.

Selected information is indicated by a solid box.

Information that is not selected is indicated by an empty box.

Information that you do not want can be deselected.

7.5 Speed/force diagram settings

The appearance of the diagrams/curves to be generated can be customized.

The following adjustments are possible:

- Color of the curve and curve background
- Maximum values of the X and Y axes
- Name of the curve

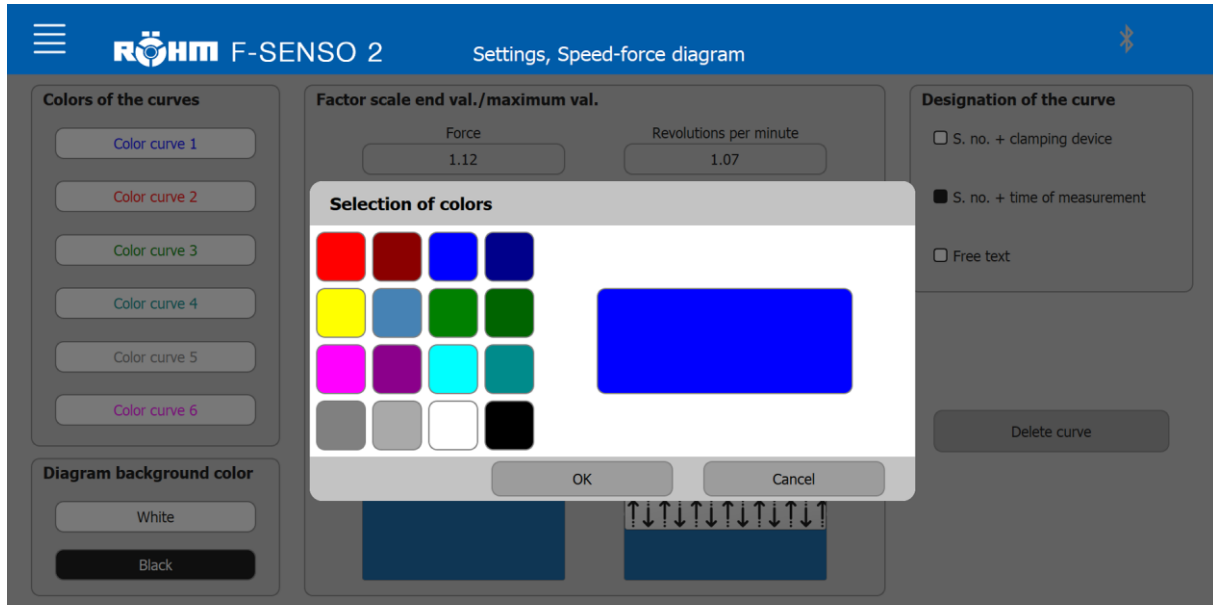
F-Senso 2

Installing and setting up the F-Senso 2 software

7.5.1 Customizing the colors of the curves

The colors of the curves and the curve background can be customized.

Clicking on the relevant field opens a window where the new color is selected.



7.5.2 Customizing the background color of the diagram

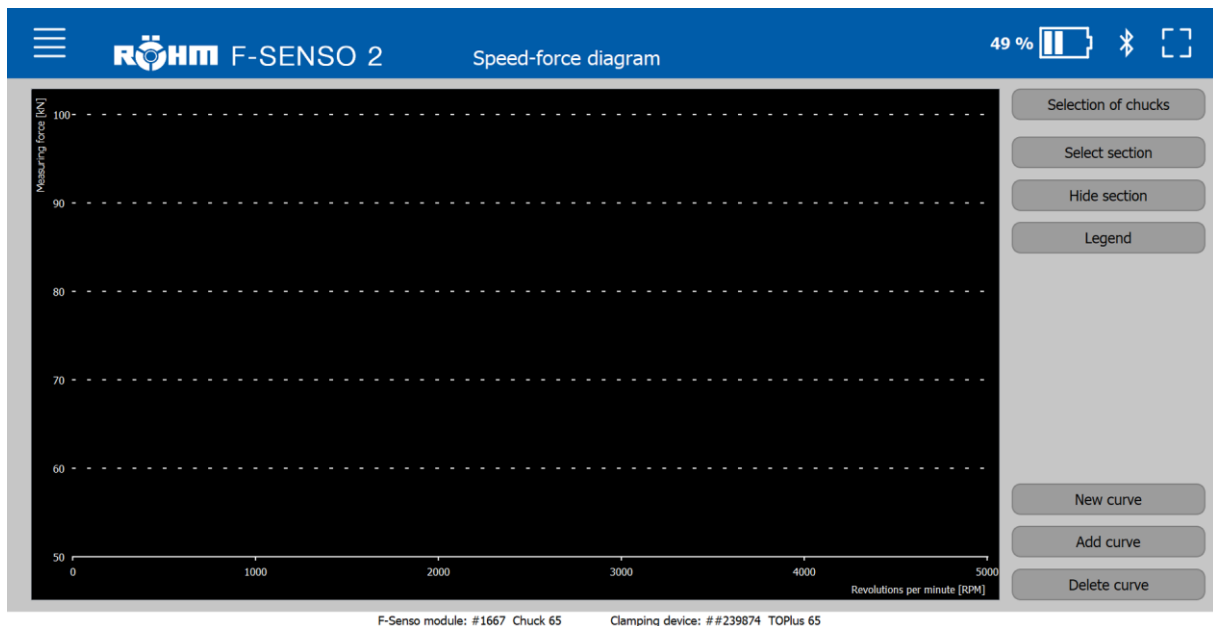
The color of the selected field can be adjusted by clicking on the respective colored button and confirming with »OK«.

The background of the diagram can be set to white or black. A white background with black font is the default setting. However, the background of the diagram can be changed to a black background with white font by clicking the »Black« button.

The background of the curves in the »Colors of curves« area changes, depending on the selected background color of the diagram. This is used to preview the selected curve colors on the respective background color selected.

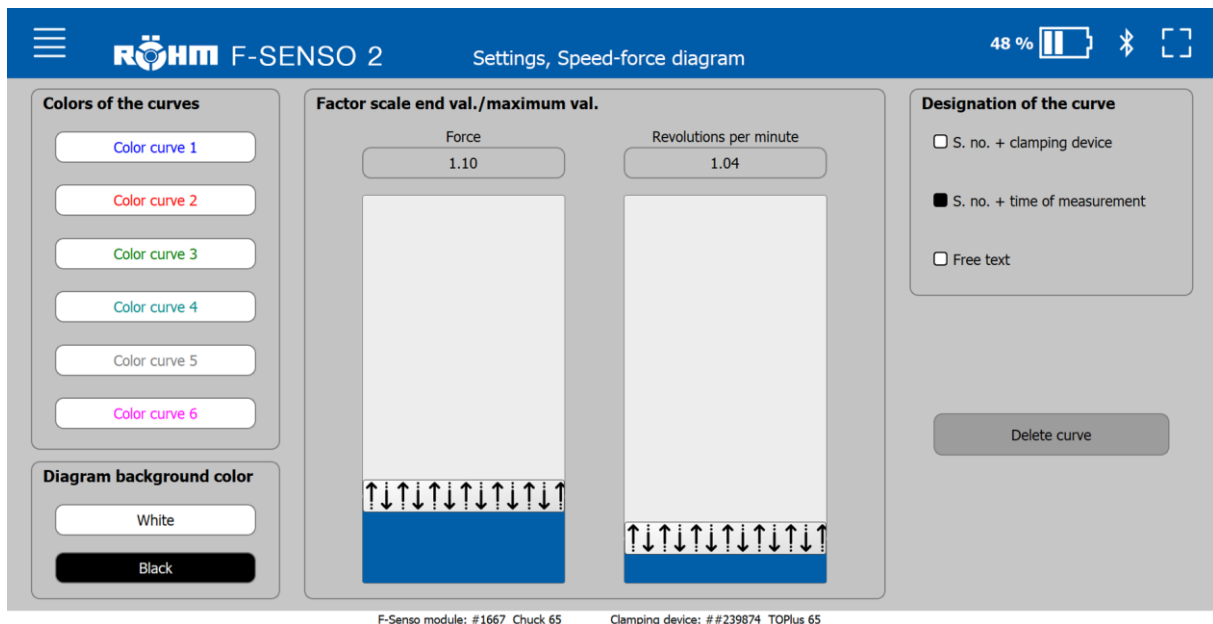
F-Senso 2

Installing and setting up the F-Senso 2 software



7.5.3 Customizing the scale values / maximum values factor

Two sliders are displayed in the area for the scale values / maximum values factor.



These controls can be used to change the maximum value for the force and speed to be displayed.

The controller shows the maximum values in percent/100.

The value 1 corresponds to 100%, the value 1.05 corresponds to 105%.

If a new centrifugal force curve is recorded under »Speed/force diagram« or an already saved centrifugal force curve is added to the diagram, the maximum values for the force and speed of the diagram are determined on the basis of set factor.

F-Senso 2

Installing and setting up the F-Senso 2 software

The maximum measuring force value in a centrifugal force curve is multiplied by the set factor and then serves as the maximum value for scaling the diagram.

If several curves are now added, the curve with the maximum measuring force value is always used to scale the diagram.

The same procedure is used for scaling the speed.

These settings are the basic settings.

Example

- Maximum measuring force value $F_{\text{max.Messkraft}} = 71\text{kN}$
- The set factor for force is $Faktor_{\text{Kraft}} = 1.05$

The maximum force value displayed by the speed / force diagram is calculated as follows:

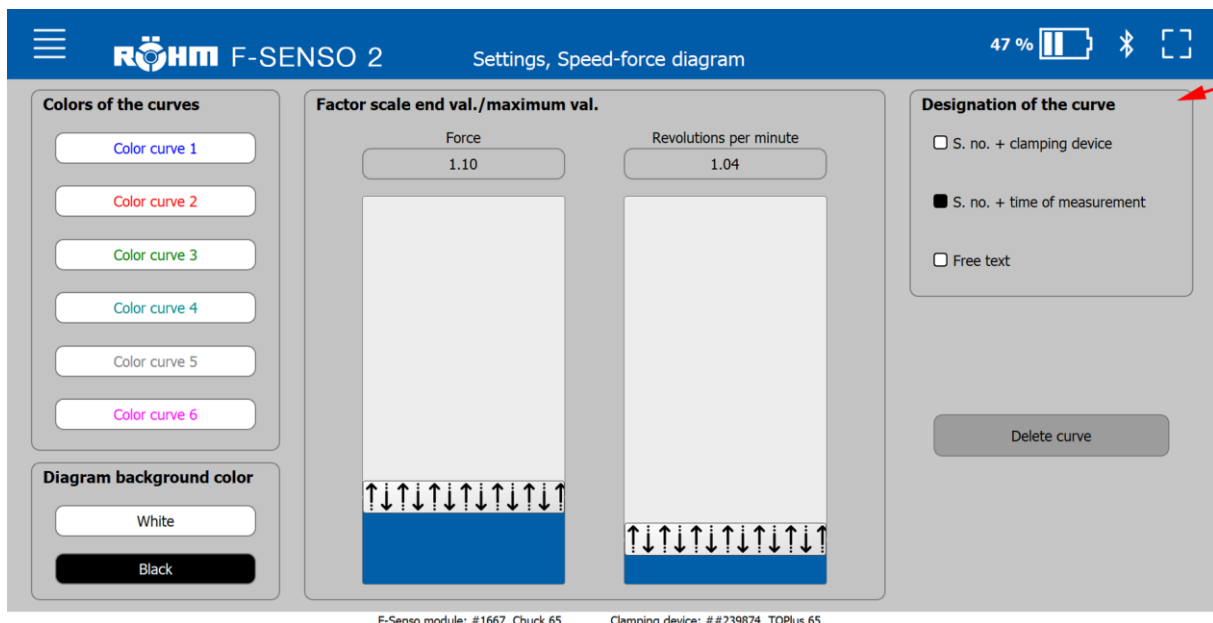
$$F_{\text{max.Diagramm}} = F_{\text{max.Messkraft}} * Faktor_{\text{Kraft}}$$

$$F_{\text{max.Diagramm}} = 71\text{kN} * 1.05 = 74.55\text{kN} \approx 75\text{kN}$$

Specifically, the factor indicates that the graph shows a 5% larger value.

7.5.4 Customizing the name of the curve

In the settings you select which form of the name is to be used for the curve. The selected name of the curve is indicated by a solid box.

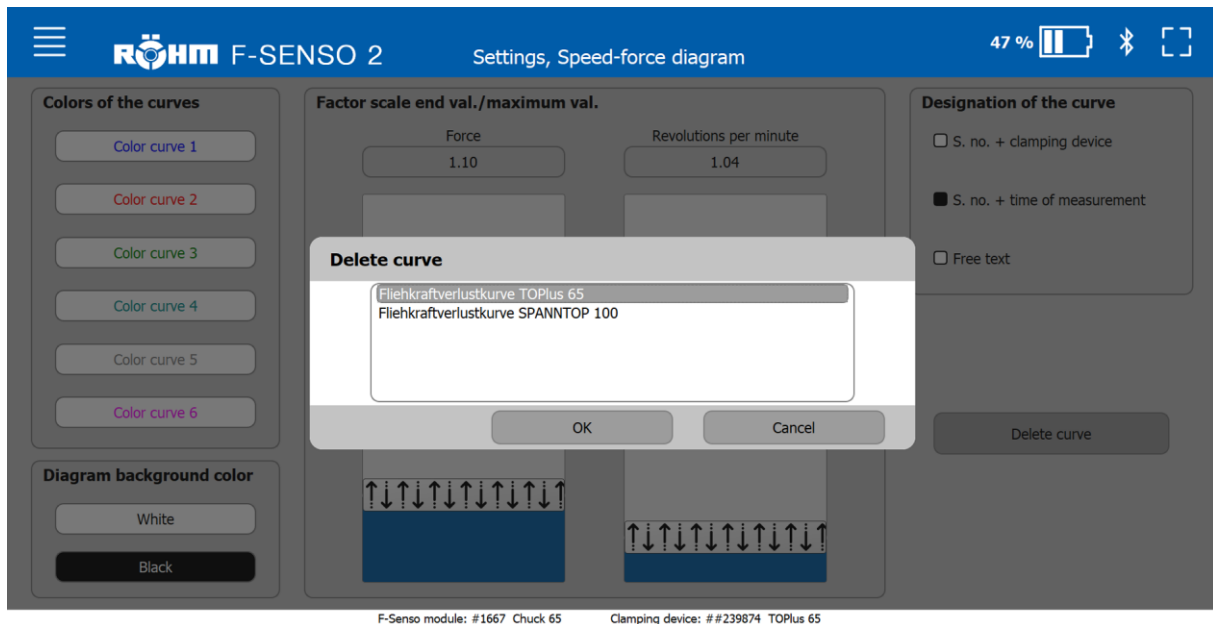


F-Senso 2

Installing and setting up the F-Senso 2 software

7.5.5 Delete curve button

Clicking on the »Delete curve« button opens a window where a saved curve can be deleted from the database.



Selecting the corresponding curve and clicking on »Delete« removes the curve from the database.

7.6 Language selection

The language setting for the F-Senso 2 software is set via the language of the Windows 10 operating system. This means that on an English operating system, the F-Senso 2 software will also be English.

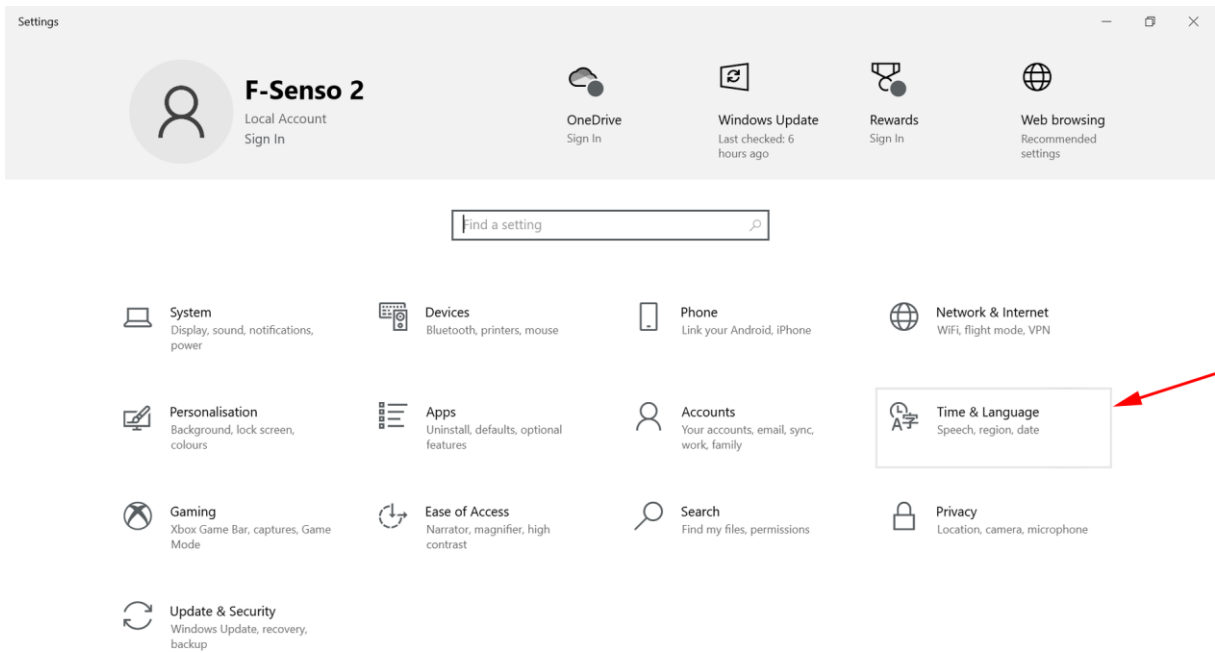
If the operating system is set to a language that is not present in the F-Senso 2 software, the F-Senso 2 software is displayed in English by default.

The language settings in Windows 10 are discussed in the following.

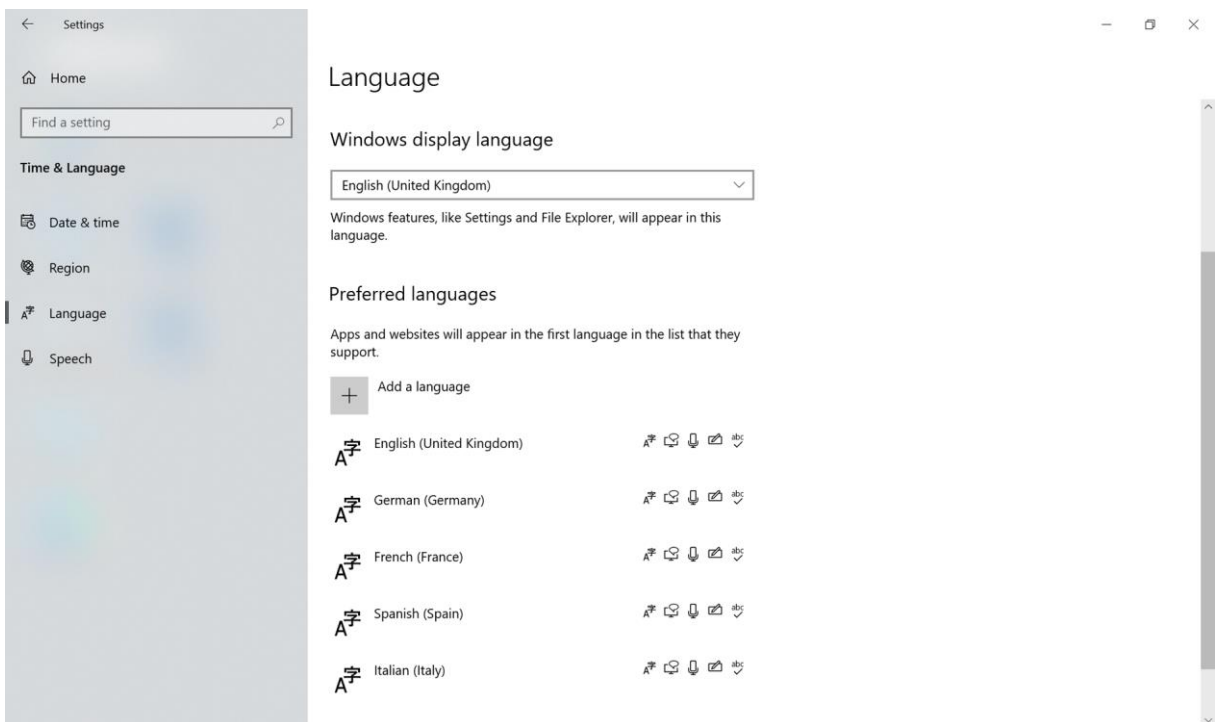
F-Senso 2

Installing and setting up the F-Senso 2 software

1. In the Start menu select »Settings«.



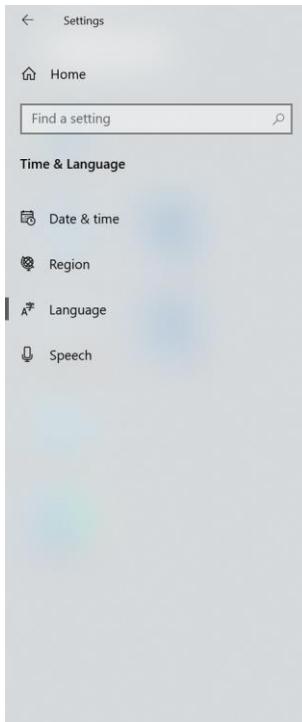
2. Select the tab »Time and Language«.



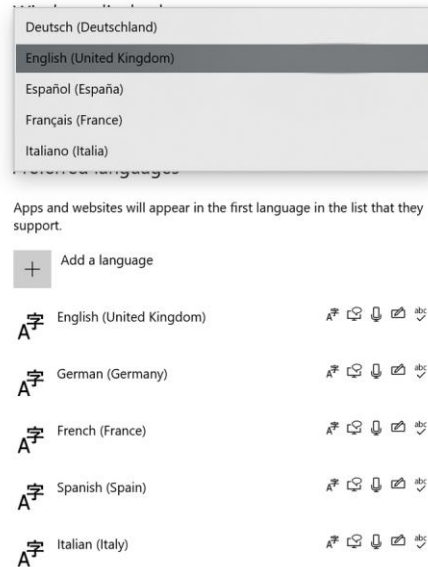
3. Select the »Language« tab.

F-Senso 2

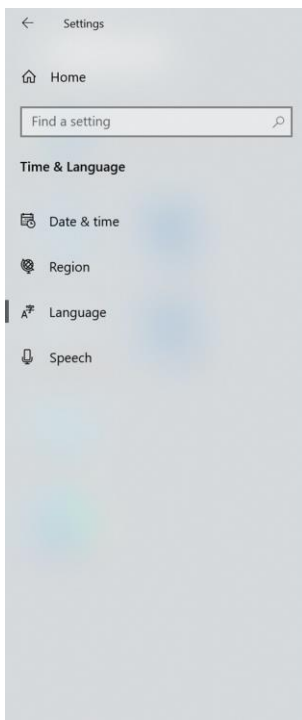
Installing and setting up the F-Senso 2 software



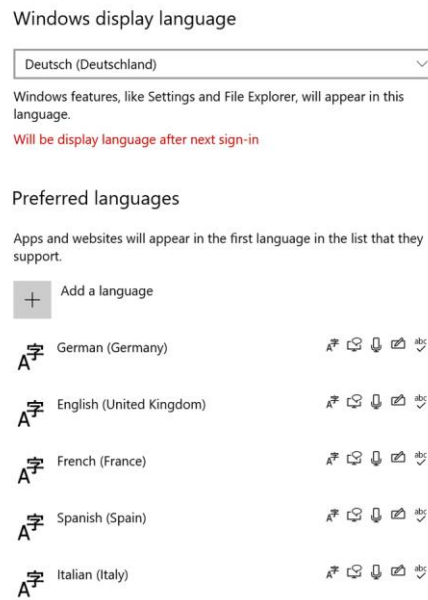
Language



4. In the example, German is the currently selected display language.



Language



5. Select the Windows display language. Already installed languages can be selected via a drop-down menu. As an example, English is now selected as the Windows display language.

F-Senso 2

Installing and setting up the F-Senso 2 software



INFORMATION

The change of the Windows display language becomes active only after the next login. This means:

1. The user must log out.
2. The use must log in again.

Now both Windows and the F-Senso 2 software are displayed in the previously selected language.

If a Windows display language that is not available in the F-Senso 2 software is selected, the F-Senso 2 software is displayed in English by default.

7.7 Legal notice

RÖHM F-SENSO 2

Version 1.0.1 (32bit)
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[View Privacy Policy](#)
[View User Manual](#)

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Tel. +49 7325 16-0
E-Mail info@roehm.biz

Röhm GmbH
Heinrich-Röhm-Str.50
89567 Sontheim
Germany
<https://www.roehm.biz>

The software terms, privacy policy and user manual are linked as PDFs on the »Legal notice« page.

In addition, support and contact data are listed.

8 Measuring device

8.1 Safety when using the measuring device



NOTE

Sensor distortion due to excessively high tightening torque!

- Do not exceed the specified tightening torque.

8.2 Displays

The Senso-Modul has two LEDs for display purposes:

- The orange LED, located below the rechargeable battery symbol, lights up during charging and goes out when the rechargeable battery is charged. A fully charged rechargeable battery holds its charge for up to 7 hours.



INFORMATION

At a residual charge of <1%, the Senso-Modul switches itself off. The Senso-Modul must then be recharged.

- The blue LED, located below the Bluetooth symbol, lights up if there is a connection to the F-Senso 2 software. It goes out again as soon as the connection is interrupted.

8.3 Connections

Measuring device connection:

- Mini-USB connection

8.4 Screw tightening torques

The tables show the specified values.

Knowledge of the applicable guidelines and design criteria is essential.



NOTE

Damage to materials caused by defective screw tightening torques!

- To secure the product to the machine, pay attention to the values specified by Röhm and by the machine manufacturer for screw tightening torques. If the machine manufacturer stipulates different values, you must consult Röhm.

Metric control threads

The following table contains the guide values in Nm for screw tightening torques for achieving the highest permitted pre-load for metric control threads.

- Total friction coefficient $\mu_{ges} = 0.12$

Thread designation	Tightening torque at screw quality [Nm]	
	10.9	12.9
M4	4	5
M5	7	9
M6	12	15
M8	25	38
M10	50	70
M12	100	130
M16	220	300
M20	400	550
M24	600	800

Table 6: Screw tightening torques, metric control threads

Aluminum components

The following table contains the reduced screw tightening torques for securing aluminum components.

Thread designation	Tightening torque [Nm]	Minimum screw depth [mm]
M6	10	12
M8	23	16
M10	46	20

Table 7: Screw tightening torques for aluminum components

8.5 Converting the F-Senso Modul

Conversion of the respective F-Senso Modul to two measuring points is described in the following.

If the F-Senso Modul needs to be converted to a different size or back to several measuring points again, all measuring pins must be removed and then reattached as described below. The tightening torque of 0.8 Nm for the measuring pin fastening screw must be observed.

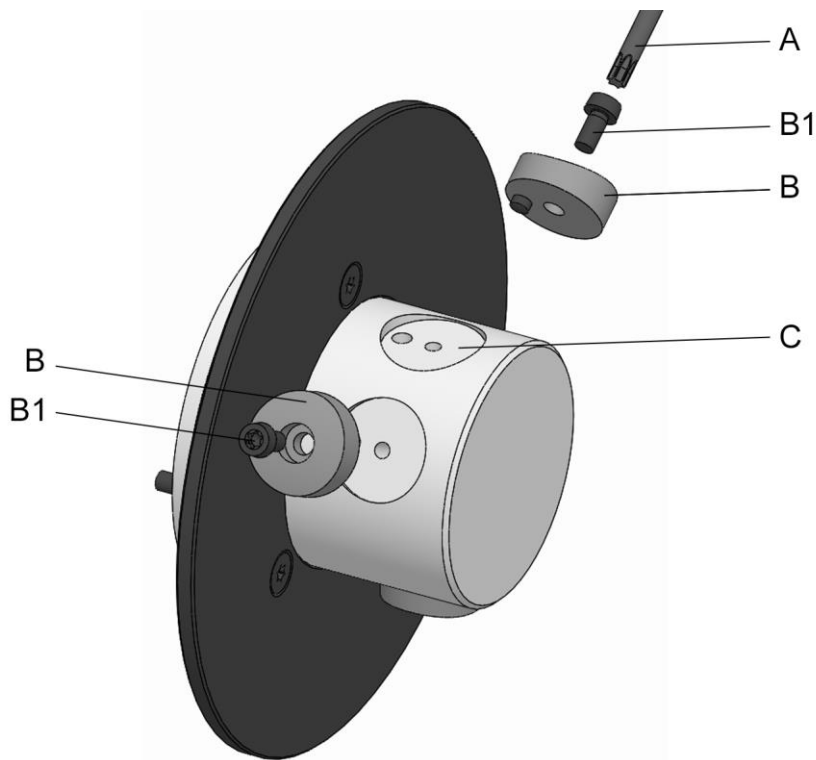
For size 32, make sure that the correct measuring pins [not the flat measuring pins] are used for three-point clamping.



INFORMATION

After the F-Senso Modul has been converted, the measuring pins that belong to each other must always be mounted at each required measuring point.

8.5.1 F-Senso Modul for external clamping device size 65



- A Torx wrench
- B Measuring pin
- B1 Measuring pin fastening screw
- C Attachment point of two clamping points

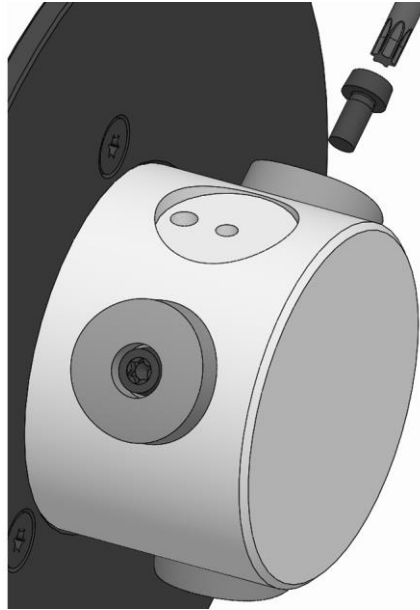
F-Senso 2 Measuring device

The F-Senso Modul is prepared for three clamping points. The following steps are necessary to convert the F-Senso Modul from three clamping points to two clamping points:

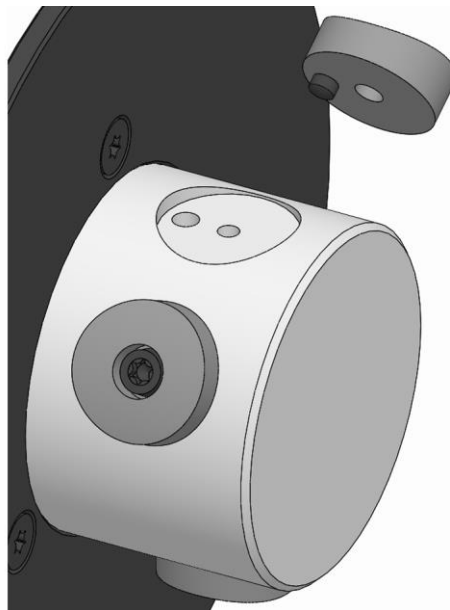


INFORMATION

For conversion, first remove the two measuring pins which are next to the free attachment point.

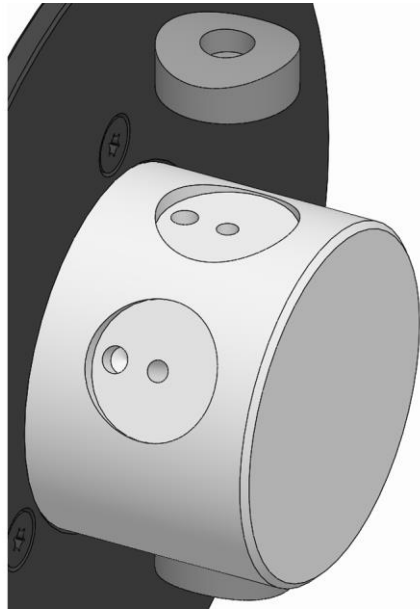


1. Loosen and remove the fastening screw for the measuring pin.

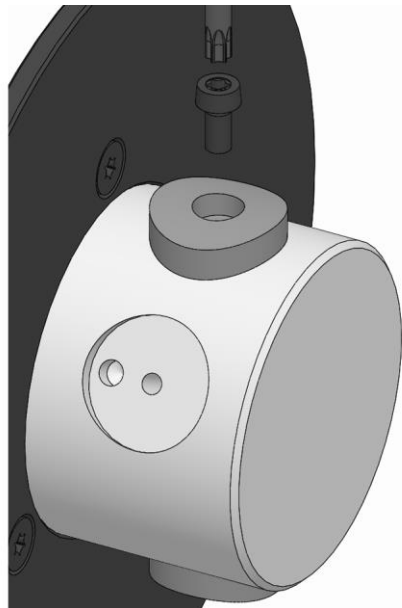


2. Remove the measuring pin from the product.
3. Also remove the second measuring pin as described.

F-Senso 2 Measuring device



4. Place the measuring pin on the attachment point for two clamping points on the product.



5. Screw in the fastening screw of the measuring pin and tighten it to a tightening torque of 0.8 Nm.

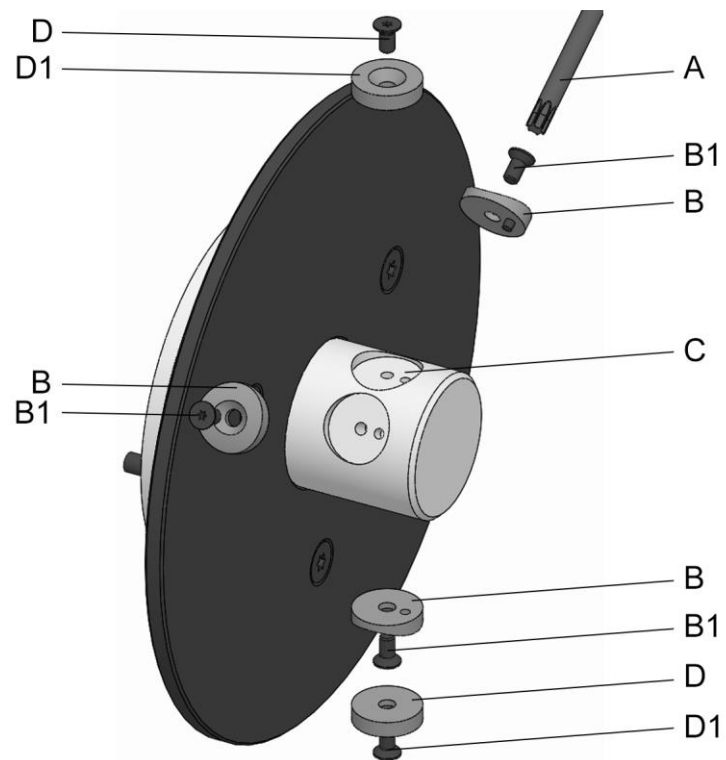


INFORMATION

After conversion, the number of clamping points must be set in the F-Senso 2 software.

F-Senso 2 Measuring device

8.5.2 F-Senso Modul for external clamping device size 32



- A Torx wrench
- B Measuring pin
- B1 Measuring pin fastening screw
- C Attachment point of two clamping points
- D Flat measuring pin
- D1 Flat measuring pin fastening screw

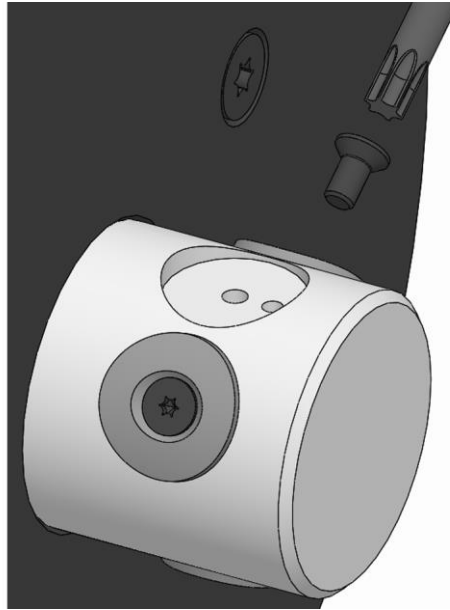
F-Senso 2 Measuring device

The F-Senso Modul is prepared for three clamping points. The following steps are necessary to convert the F-Senso Modul from three clamping points to two clamping points:

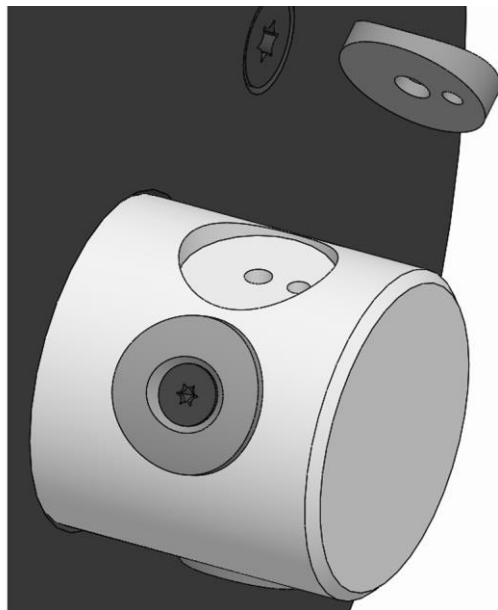


INFORMATION

For conversion, first remove the two measuring pins which are next to the free attachment point.

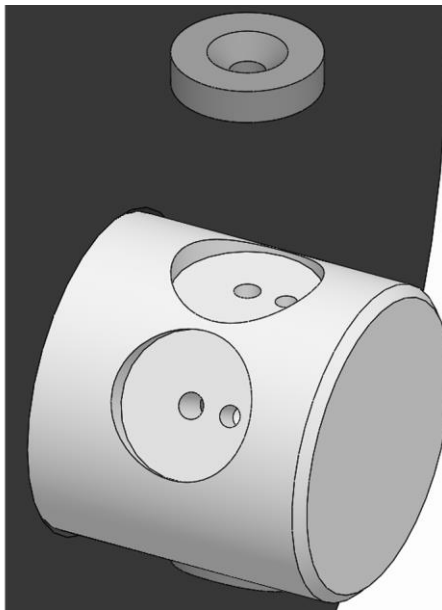


1. Loosen and remove the fastening screw for the measuring pin.



2. Remove the measuring pin from the product.
3. Also remove the second measuring pin as described.

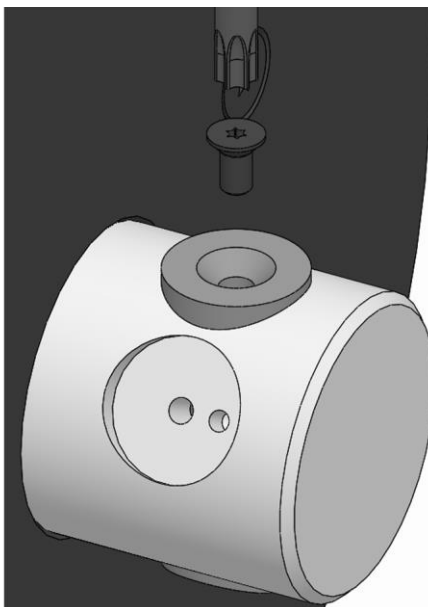
F-Senso 2 Measuring device



INFORMATION

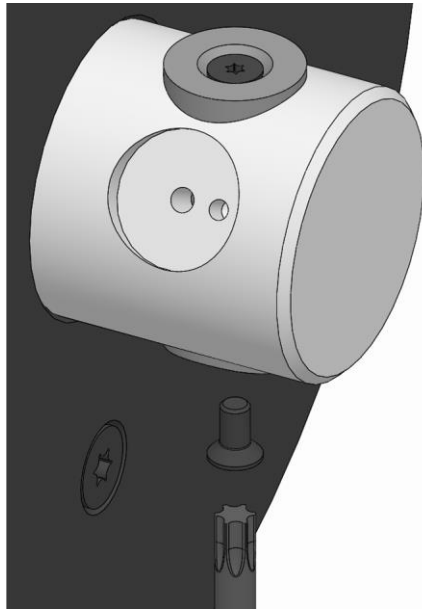
When measuring with two clamping points, for example in a vice, the flat measuring pins [not included in the scope of delivery] must be used.

4. Place the flat measuring pin on the attachment point for two clamping points on the product.

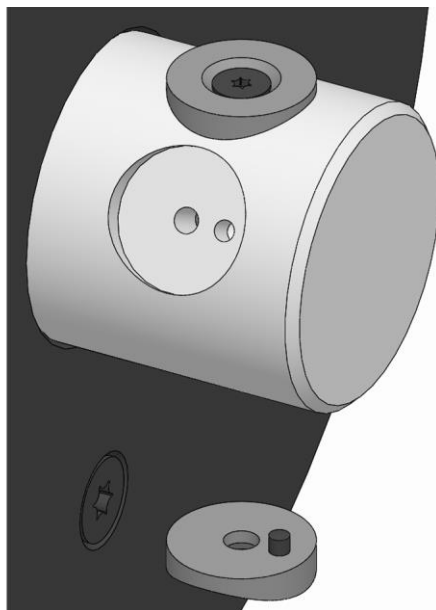


5. Screw in the fastening screw for the flat measuring pin and tighten it to a tightening torque of 0.8 Nm.

F-Senso 2 Measuring device

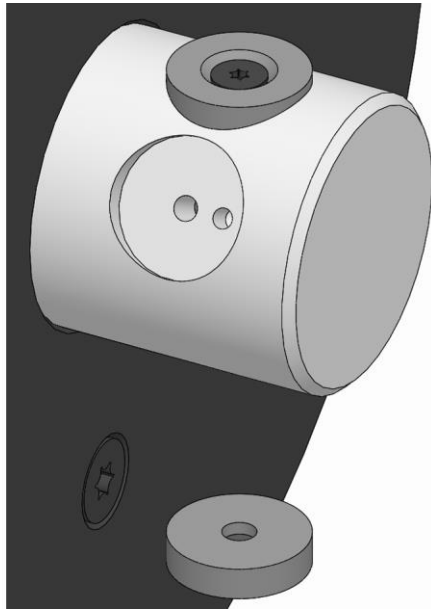


6. Loosen and remove the fastening screw for the measuring pin located opposite the attachment point of two clamping points.

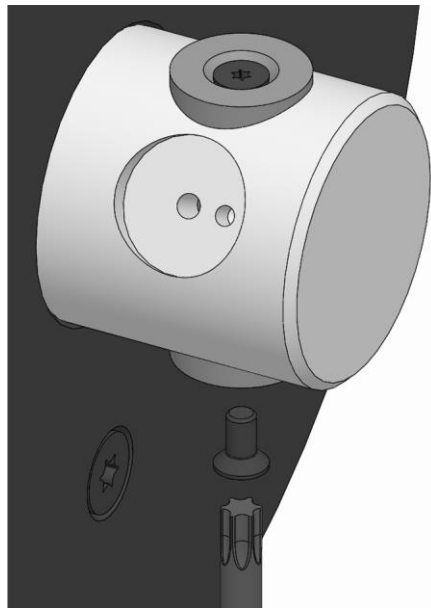


7. Remove the measuring pin from the product.

F-Senso 2 Measuring device



8. Place the flat measuring pin on the product opposite the attachment point of two clamping points.



9. Screw in the fastening screw for the flat measuring pin and tighten it to a tightening torque of 0.8 Nm.

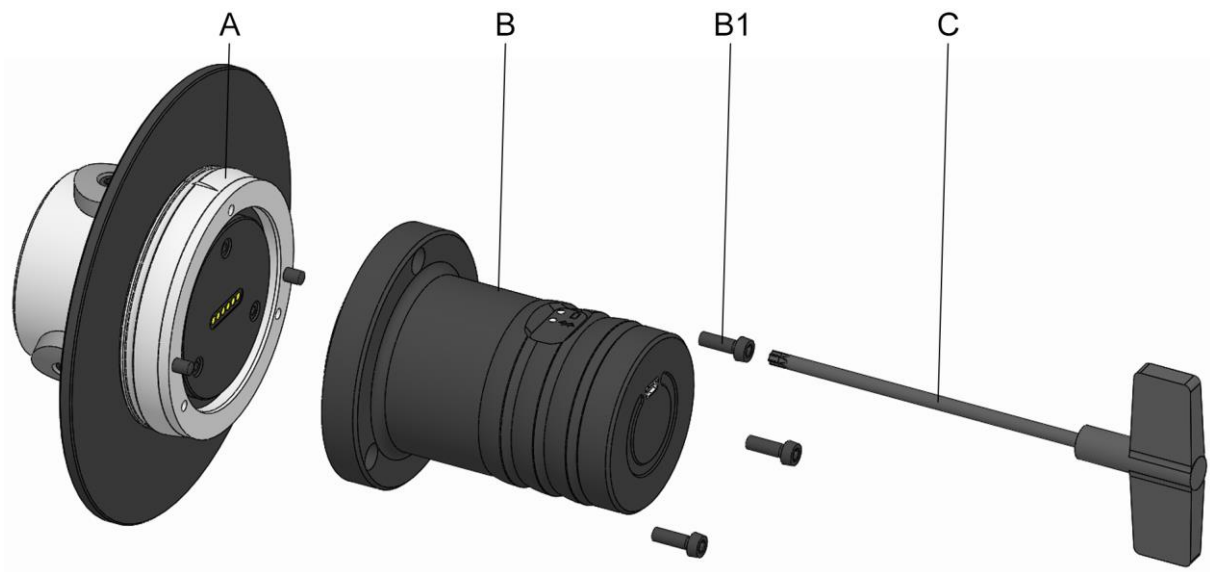


INFORMATION

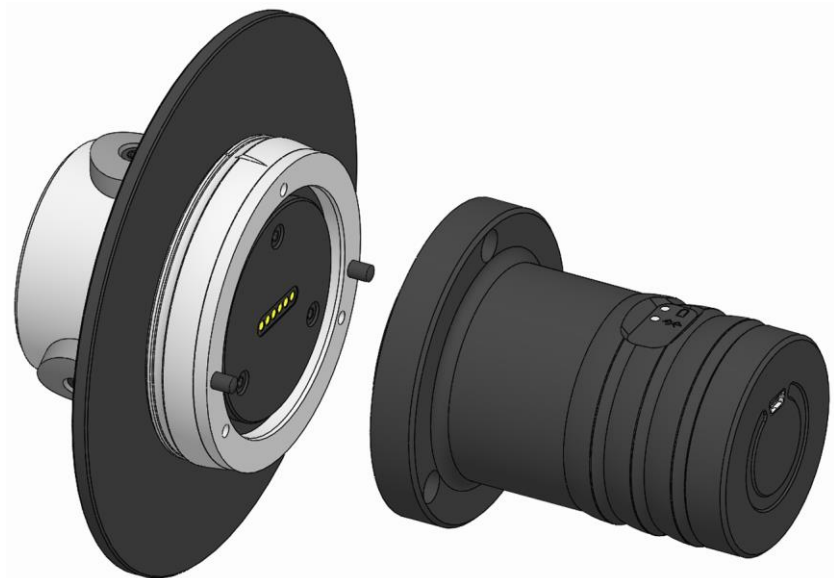
After conversion, the number of clamping points must be set in the F-Senso 2 software.

F-Senso 2 Measuring device

8.6 Assembling a F-Senso Modul with a Senso-Modul



- A F-Senso Modul
- B Senso-Modul
- B1 Senso-Modul fastening screws
- C Torx wrench

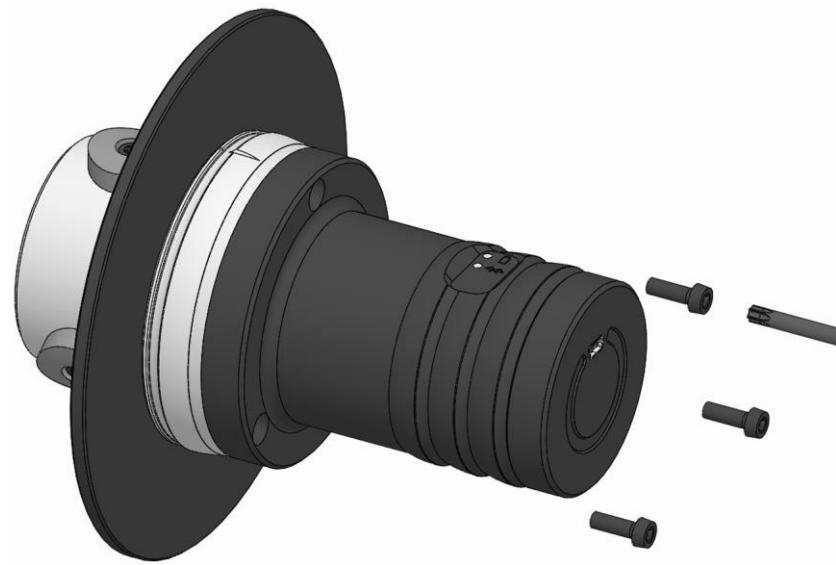


1. Put the F-Senso Modul and the Senso-Modul together, position them using the pins and the hole circles.

F-Senso 2 Measuring device



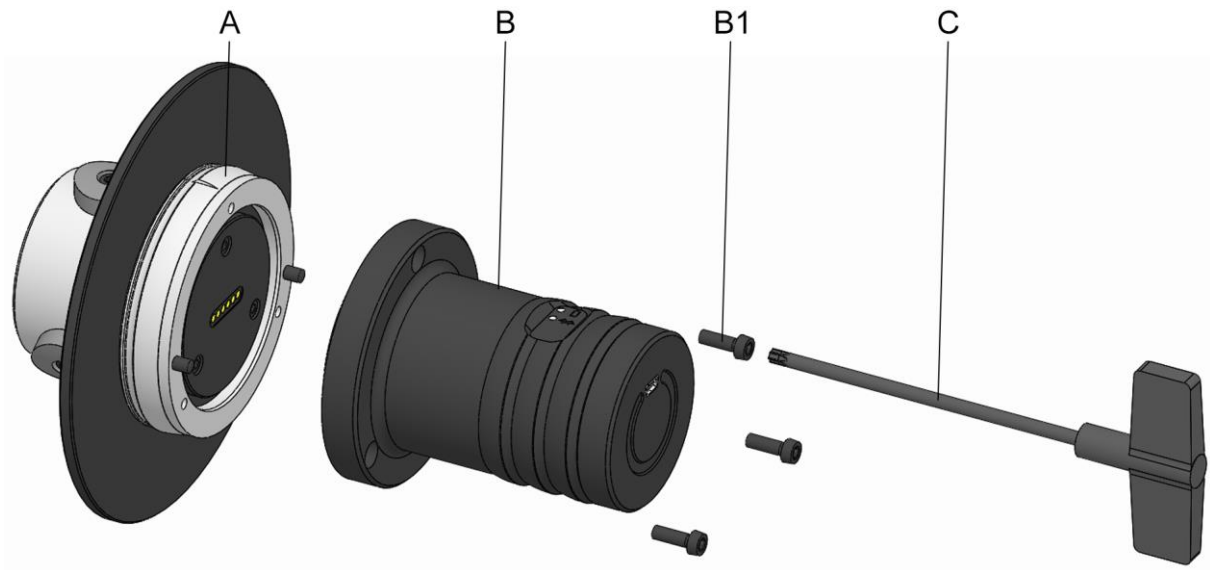
2. Press the F-Senso Modul and Senso-Modul firmly together.



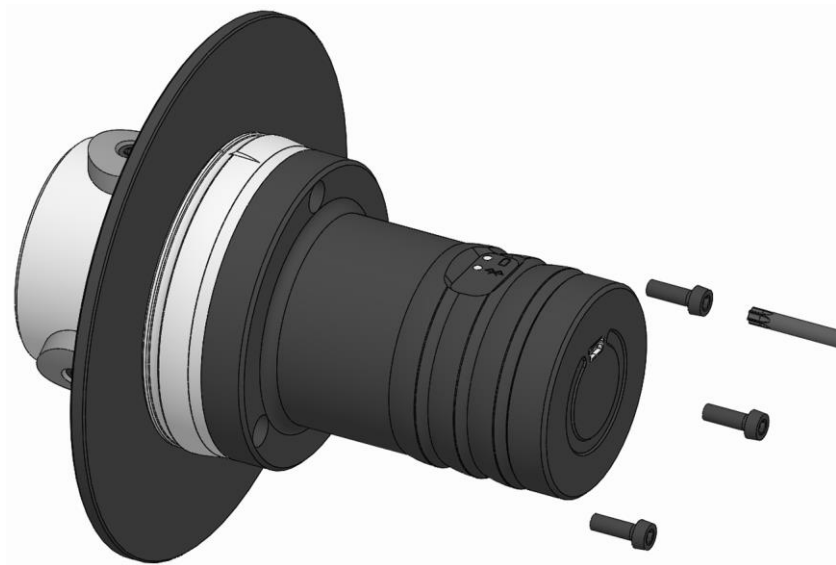
3. Screw in the Senso-Modul fastening screws and tighten them hand-tight.

F-Senso 2 Measuring device

8.7 Disconnecting a F-Senso Modul from a Senso-Modul

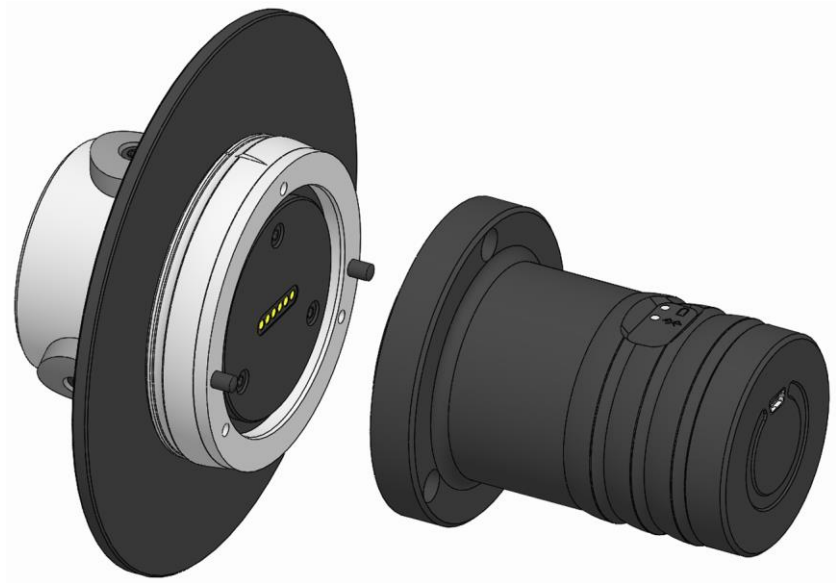


- A F-Senso Modul
- B Senso-Modul
- B1 Senso-Modul fastening screws
- C Torx wrench



1. Loosen and remove the Senso-Modul fastening screws.

F-Senso 2 Measuring device



2. Pull the F-Senso Modul and Senso-Modul apart, thereby separating them.

9 Measurement

9.1 Safety while measuring



WARNING

Serious injuries from unplanned process start in automatic mode!

- Before starting the measurement, set the machine to manual operation.



CAUTION

Destruction of the measuring device due to unwanted supply of cooling lubricant.

- Make sure that the cooling lubricant supply is switched off during the measurement.



NOTE

Damage to the measuring device from unplanned process start in automatic mode!

- Before starting the measurement, set the machine to manual operation.



INFORMATION

Before measuring:

- Switch off supply of cooling lubricant to the machine.
- Clean the clamping surfaces of the clamping elements with a soft, lint-free cloth.



INFORMATION

- The measuring device must not strike a workpiece stop or the face of the clamping device during clamping.
- Check the clamping diameter of the clamping element.



INFORMATION

For correct use of the measuring device, the clamping device must have sufficient reserve stroke.

- Read and follow the manual for the clamping device used.

9.2 Preparation

Both the F-Senso 2 software and the measuring device must be prepared for the measurement.

9.2.1 Preparing the software

1. Check the charge status of the display unit's rechargeable battery and charge if necessary.
2. If the clamping device to be measured has not yet been saved in the F-Senso 2 software, create the clamping device [see chapter »Administration«].



INFORMATION

The tester and actions should already be created [see chapter »Installing and setting up the F-Senso 2 software«].

9.2.2 Preparing the measuring device

1. When measuring the clamping force of an external clamping device, convert the F-Senso Modul to the required number of measuring points if necessary [see chapter »Converting the F-Senso Modul«].
2. Assemble the measuring device [see »Assembling a F-Senso Modul with a Senso-Modul« chapter].



INFORMATION

The rechargeable battery must be sufficiently charged to use the measuring device.

- If necessary, use the enclosed USB cable to connect the measuring device to the display device.
 - Maintain the connection until the measuring device's rechargeable battery is fully charged.
3. Check the charge status the measuring device's rechargeable battery and charge it if necessary.

9.3 Clamping the measuring device

9.3.1 External clamping devices

The following steps are required to check the radial clamping force:



In addition to these operating instructions, also read and follow the operating instructions for the relevant clamping device.

1. Attach the clamping device [see operating instructions for the clamping device].
2. Attach the clamping element to the clamping device [see operating instructions for the clamping device].



INFORMATION

When a clamping head is used, all measuring surfaces of the measuring device must be completely covered by the steel segments of the clamping head.



INFORMATION

The marking on the F-Senso Modul must always be positioned at the center of the steel segments of the clamping element.

3. Insert the measuring device into the clamping device so that the measuring device rests against the clamping element and NOT against the workpiece stop. All measuring surfaces of the measuring device must be completely covered by the clamping elements.
4. Clamp the measuring device.

9.3.2 Hollow tapered shanks

The following steps are required to check the draw-in force:

1. Remove the tool from the HSK holder.
2. Inspect the HSK holder and clean if necessary.
3. Place the measuring device in the HSK holder.
4. Draw in the measuring device.

9.3.3 Clamping head

The following steps are required to check the draw-in force:

1. Remove the holder [e.g. the pallet] from the clamping head.
2. Inspect the clamping head and clean if necessary.
3. Place the measuring device in the clamping head.
4. Draw in the measuring device.

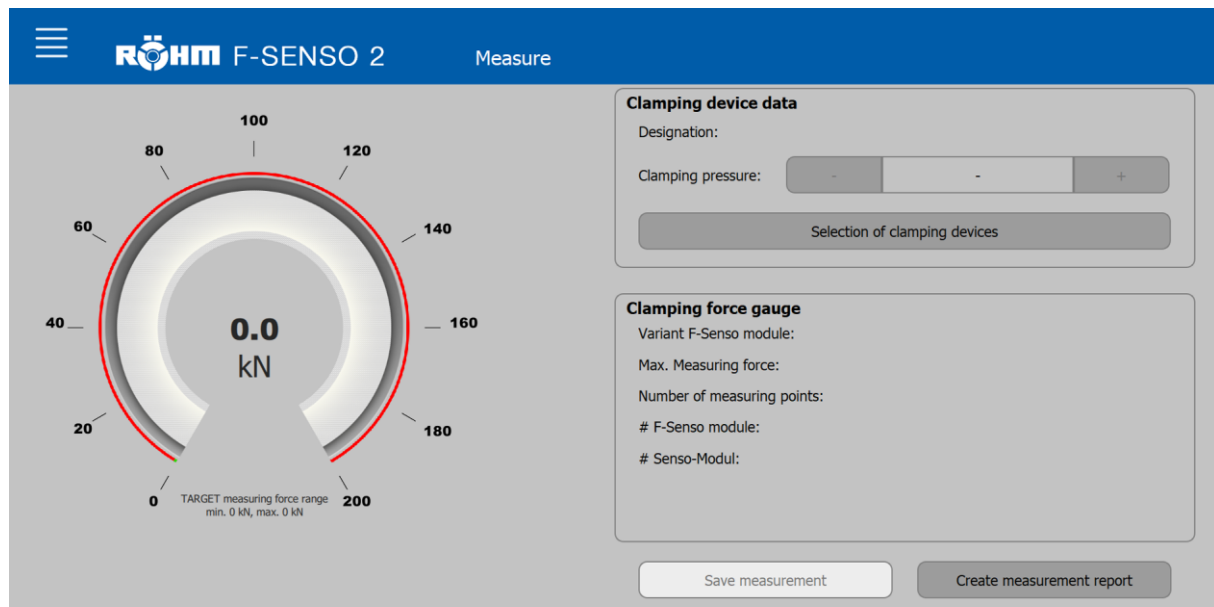
F-Senso 2 Measurement

9.4 Measuring

The measurement process is performed by the F-Senso 2 software.

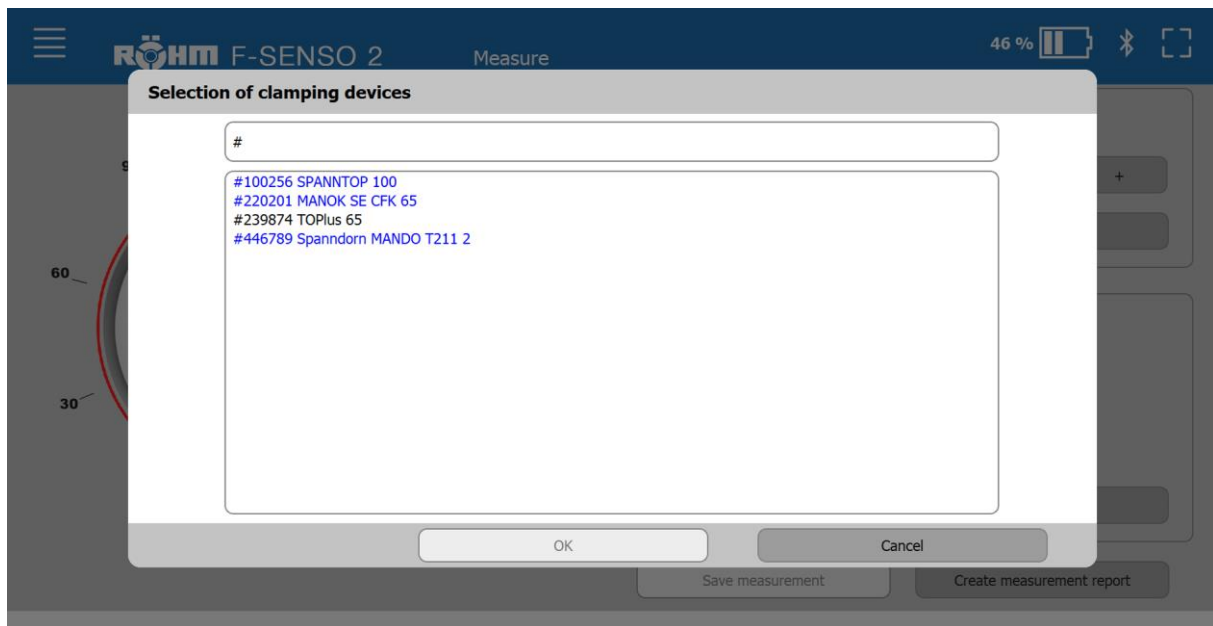
1. Select »Measure« in the menu.

9.4.1 Selecting a clamping device



1. Click the »Select clamping device« button.

F-Senso 2 Measurement



INFORMATION

In the selection window, two colors are used to list the clamping devices.

- Clamping devices written in blue indicate to the worker that the clamping device has a missing measurement. A clamping device is marked in blue if the time from the last measurement exceeds the time of the selected maintenance interval. The maintenance interval is defined when creating a clamping device, but can be changed at any time.
- Clamping devices written in black mean that the time of the maintenance interval has not yet elapsed. The time from the last measurement to the current date is less than the time of the selected maintenance interval.



INFORMATION

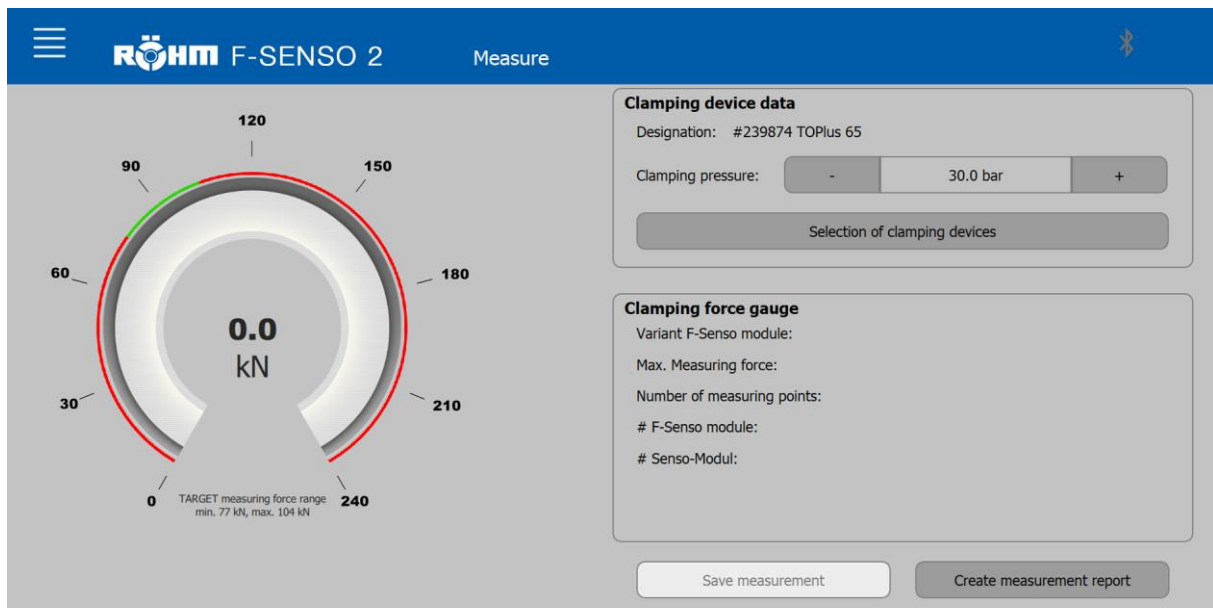
In the selection window you can search for a clamping device by means of the ID number.

2. Select the desired clamping device.
3. Click »OK«.

Once a clamping device has selected, the following items change, depending on the clamping device data saved

- the scaling of the tachometer
- the SET measuring range for force
- the clamping pressure / the torque

F-Senso 2 Measurement



INFORMATION

If a clamping device with manual operation is selected, the »Clamping pressure« field changes to »Torque«.



INFORMATION

If a clamping device for draw-in force measurement, i.e. spring force, is selected, the »Clamping force« field does not appear.

4. Set the clamping pressure or torque to the value set on the machine tool.

The clamping pressure or the torque, as well as the clamping device data [axial/radial ratio, selected tolerance] must be entered correctly in the F-Senso 2 software so that the SET measuring force range [green range] is determined correctly in the tachometer.

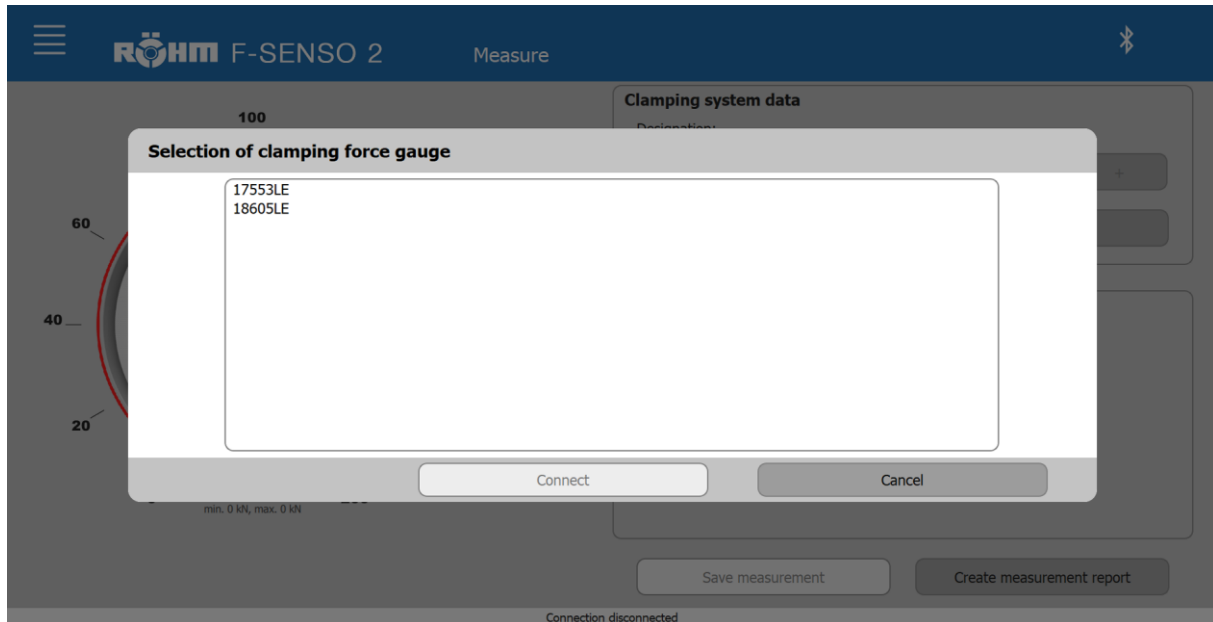
F-Senso 2 Measurement

9.4.2 Selecting a measuring device

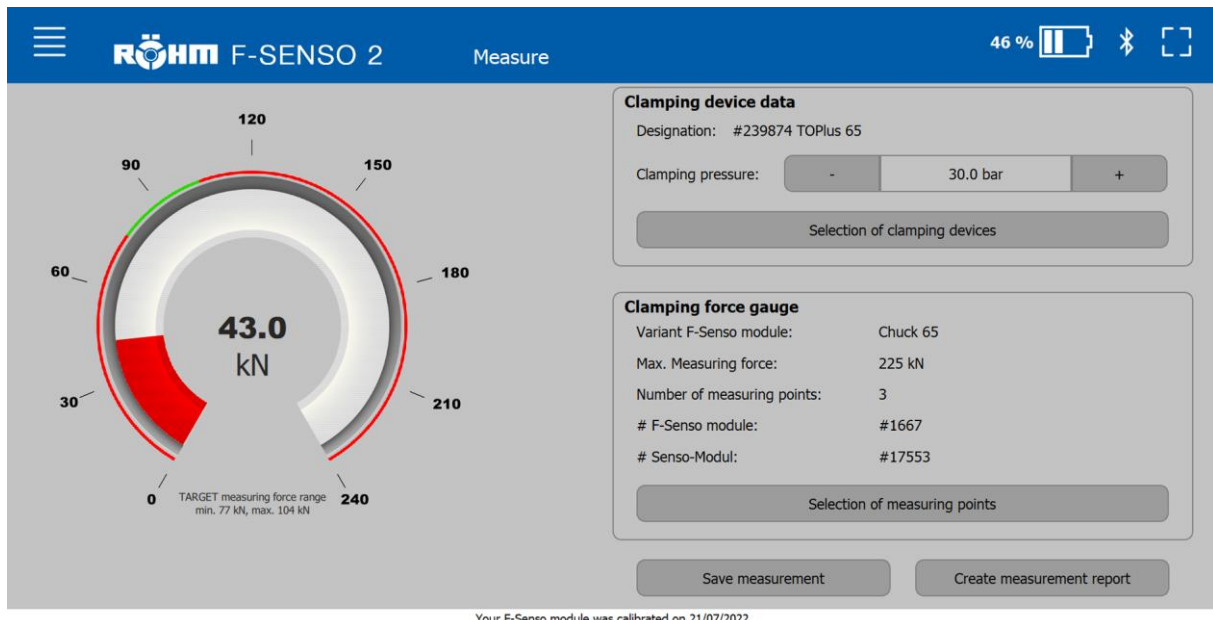
If the Bluetooth® symbol is visible without the battery symbol, F-Senso 2 modules are within range for pairing.

1. Click on the Bluetooth® symbol.

A selection window opens.



2. Select the desired measuring device.
3. Click »Connect«.



If there is a connection to a measuring device, a battery symbol with a capacity display in percent is shown next to the Bluetooth® symbol.

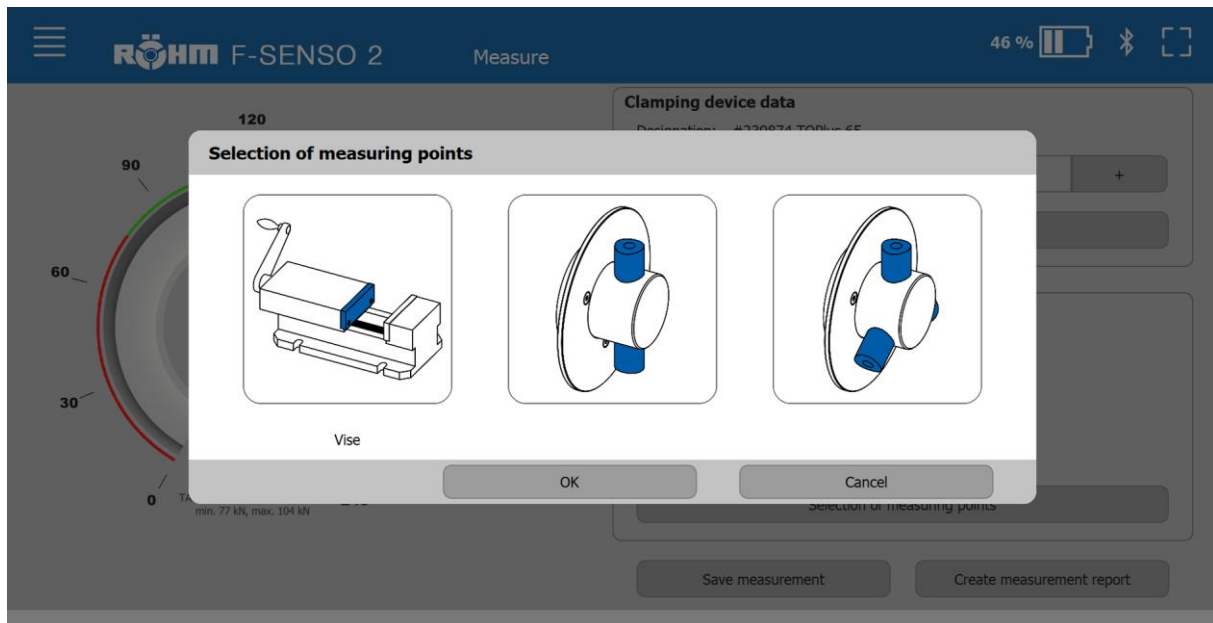
F-Senso 2 Measurement

All relevant data for the selected measuring device are displayed in the »Clamping force measuring device« area.

- Variant of the F-Senso Modul
- the maximum measuring force
- the number of clamping points if selection of the measuring points is provided
- the F-Senso Modul and Senso-Modul serial numbers

In the case of a measuring device for an external clamping device, the »Select measuring points« button is displayed.

4. Click the »Select measuring points« button.

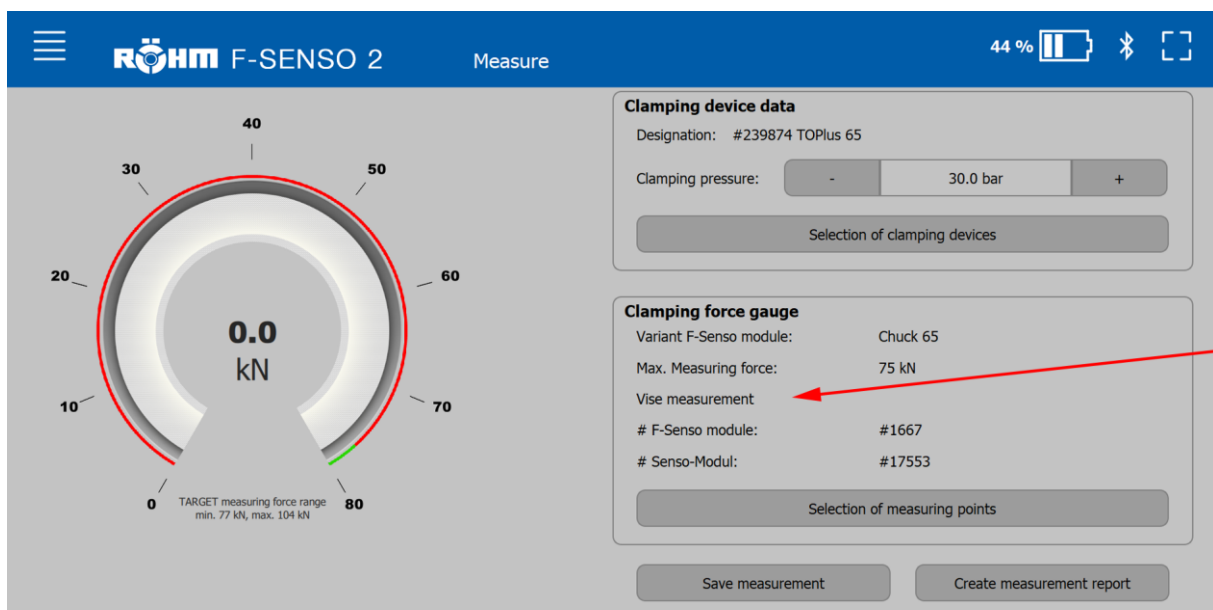
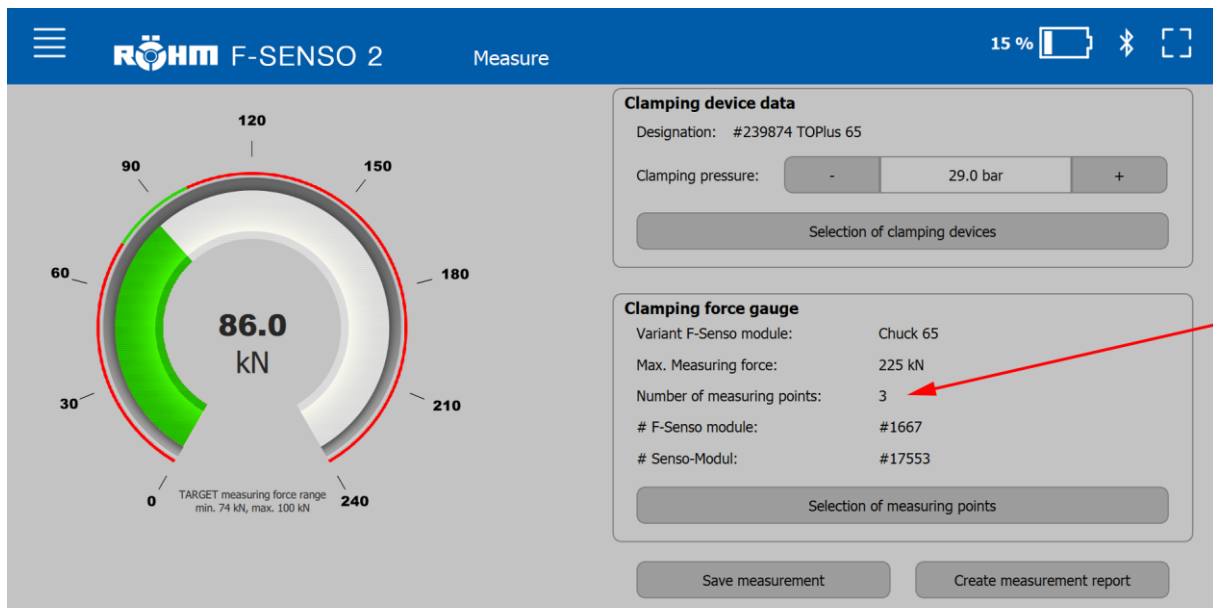


5. Select the number of measuring points with which the connected measuring device is equipped.

6. Click »OK«.

The scaling of the tachometer and the maximum measuring force are updated on the basis of the selected measuring point variant. The following two figures serve as an explanation through comparison.

F-Senso 2 Measurement

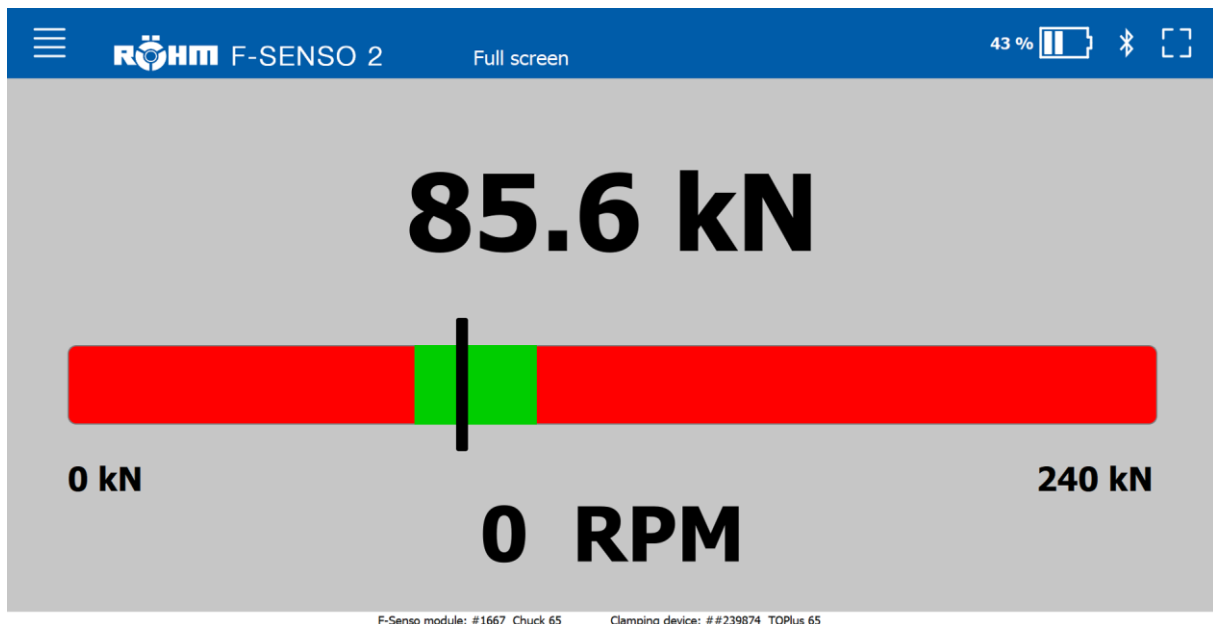


Full screen

If there is a connection to a measuring device, a square appears at the right in the header. This takes you to the full screen mode.

In full screen mode, the data for the selected clamping device and measuring device are hidden. The force display [tachometer] is enlarged and displayed as a bar. The red bar represents the measuring range of the tachometer in linear form. The SET measuring force range is represented by the green bar and the current measuring force by the black line. In the case of a centrifugal force measurement, the speed is also displayed.

F-Senso 2 Measurement



To exit full screen mode, click once again on the square at the right side in the header.

9.4.3 Performing a measurement

1. Prepare the F-Senso 2 software and the measuring device [see chapter »Preparation«].
2. Select the clamping device in the F-Senso 2 software.
3. Select the measuring device in the F-Senso 2 software.
4. Clamp the measuring device [see chapter »Clamping the measuring device«]. The measurement is started and visualized by the F-Senso 2 software.

9.4.4 Saving the measurement

A measurement can be saved. The status of the measurement is saved, and can be seen in the F-Senso 2 software. The saving process involves a total of four selection/input windows.

- Evaluate the measurement. The evaluation of a measurement is carried out at the discretion of the worker
- Select tester
- Select action [optional]
- Enter comments [optional]

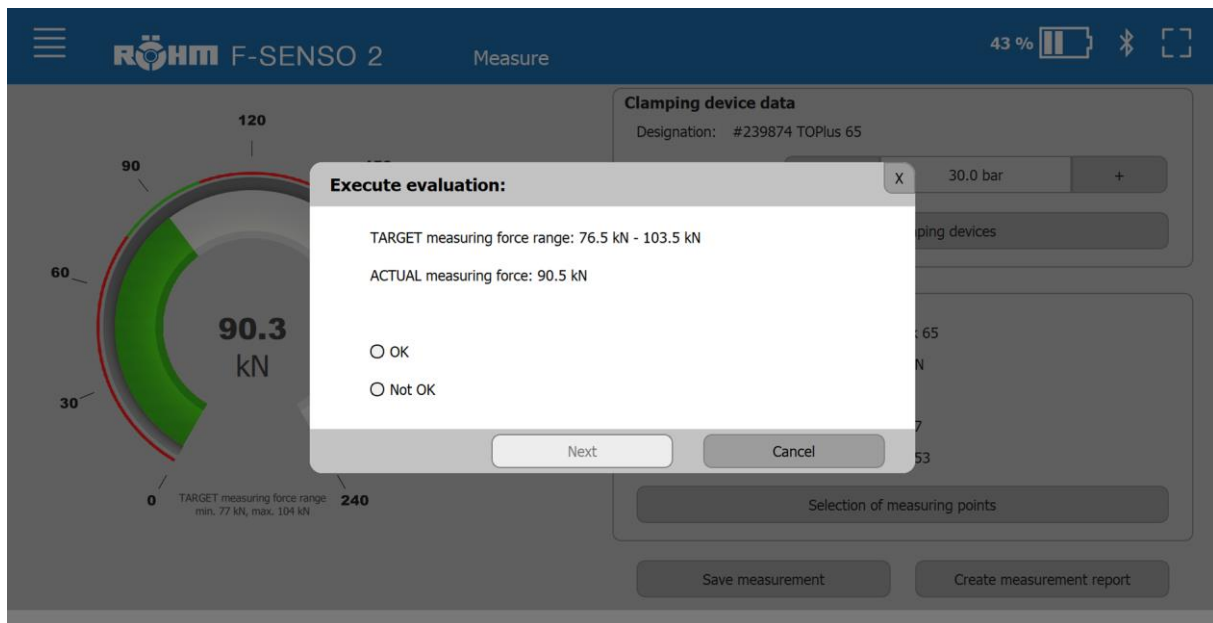


INFORMATION

The saving process can be canceled at any time via the »X« in the upper right corner.

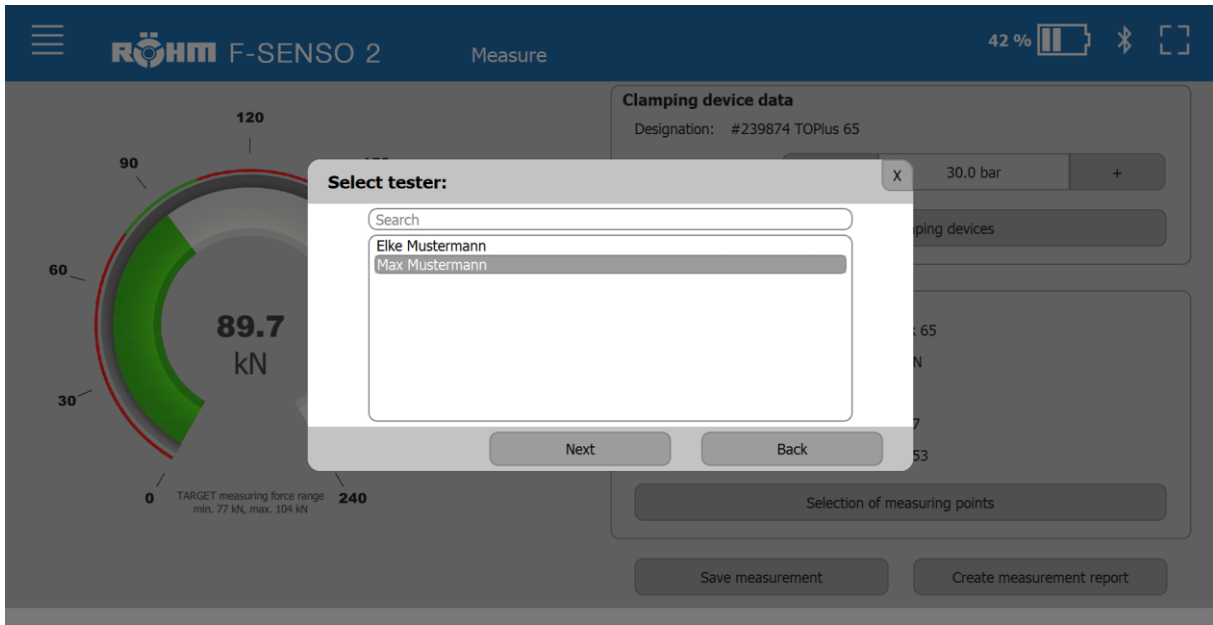
Use the »Back« button to navigate back to the previous window.

1. Click the »Save measurement« button.



2. Evaluate the measurement by selecting »OK« or »Not OK«. The evaluation of a measurement is carried out at the discretion of the tester.
3. Click »Next«.

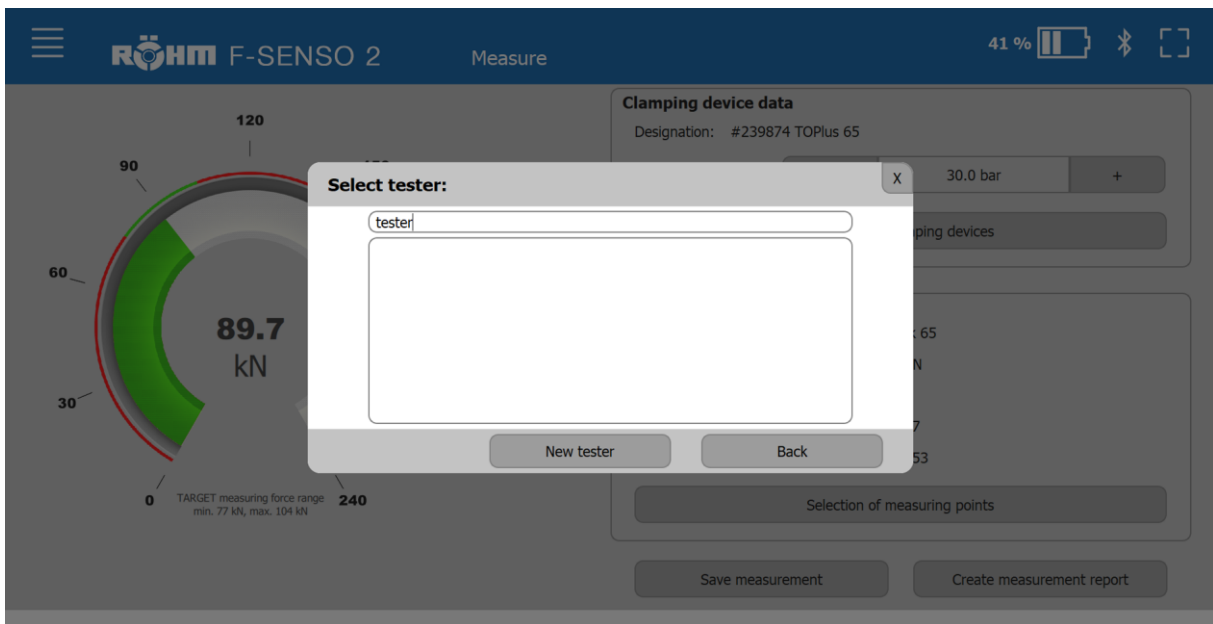
F-Senso 2 Measurement



4. Select the tester.

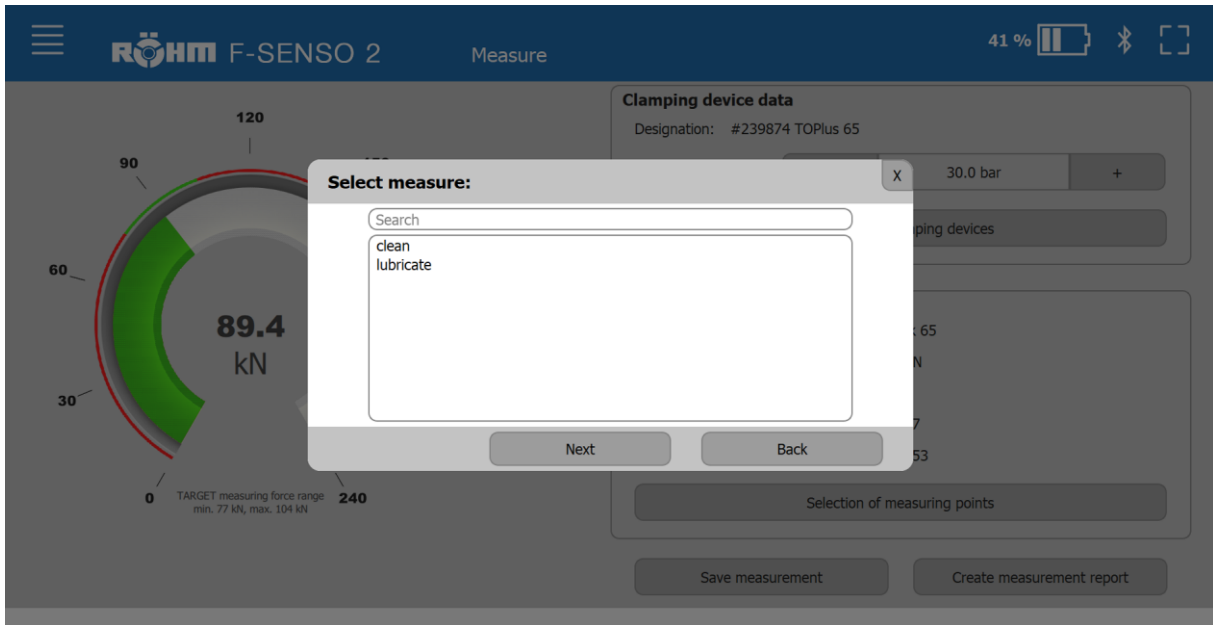
5. Click »Next«.

Alternatively, create a new tester:



- Enter the new tester in the search field.
- Click »New tester«. This creates the new tester and automatically saves it for this measurement.

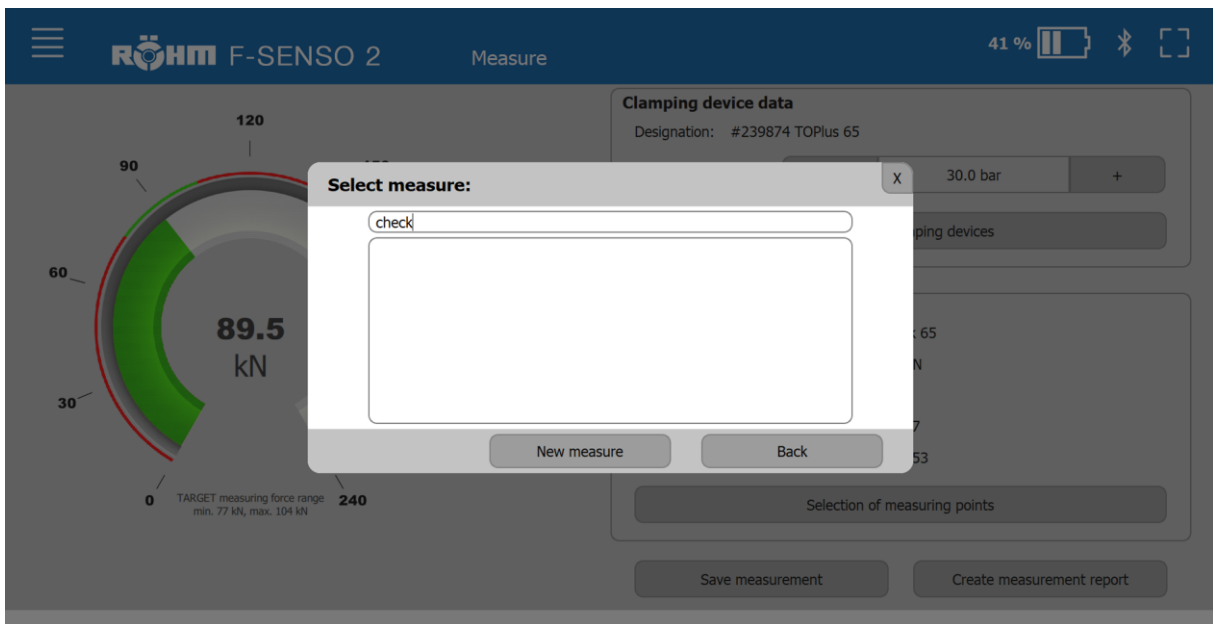
F-Senso 2 Measurement



6. Optionally, select an action.

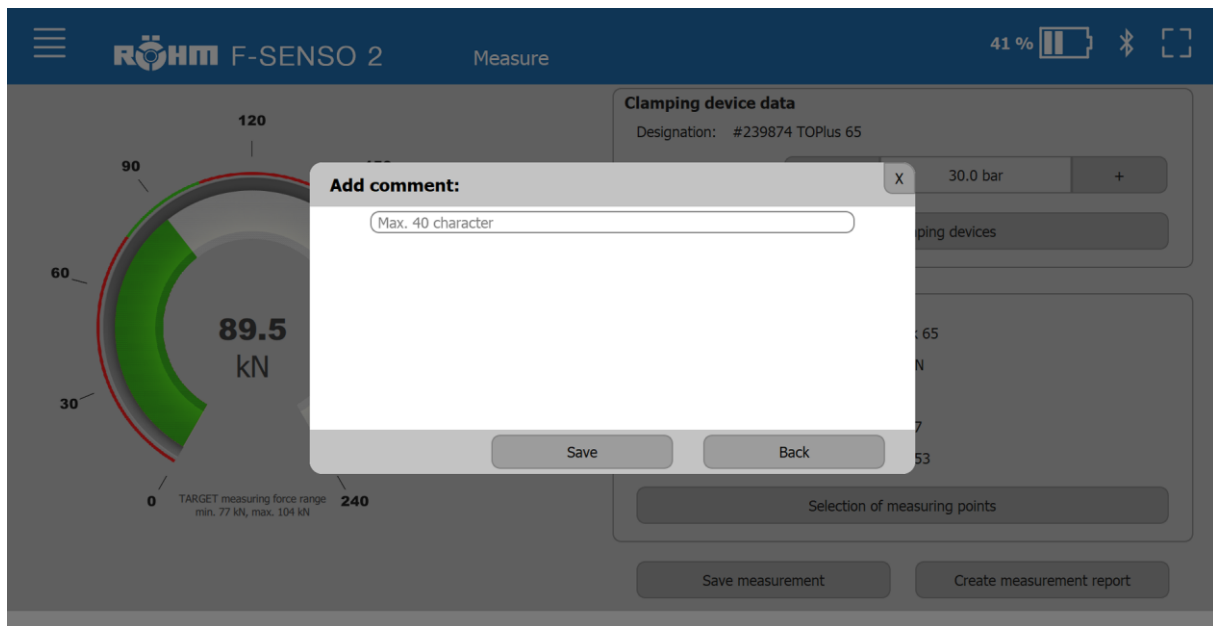
7. Click »Next«.

Alternatively, create a new action:



- Enter the new action in the search field.
- Click »New action«. This creates the new action and automatically save it for this measurement.

F-Senso 2 Measurement



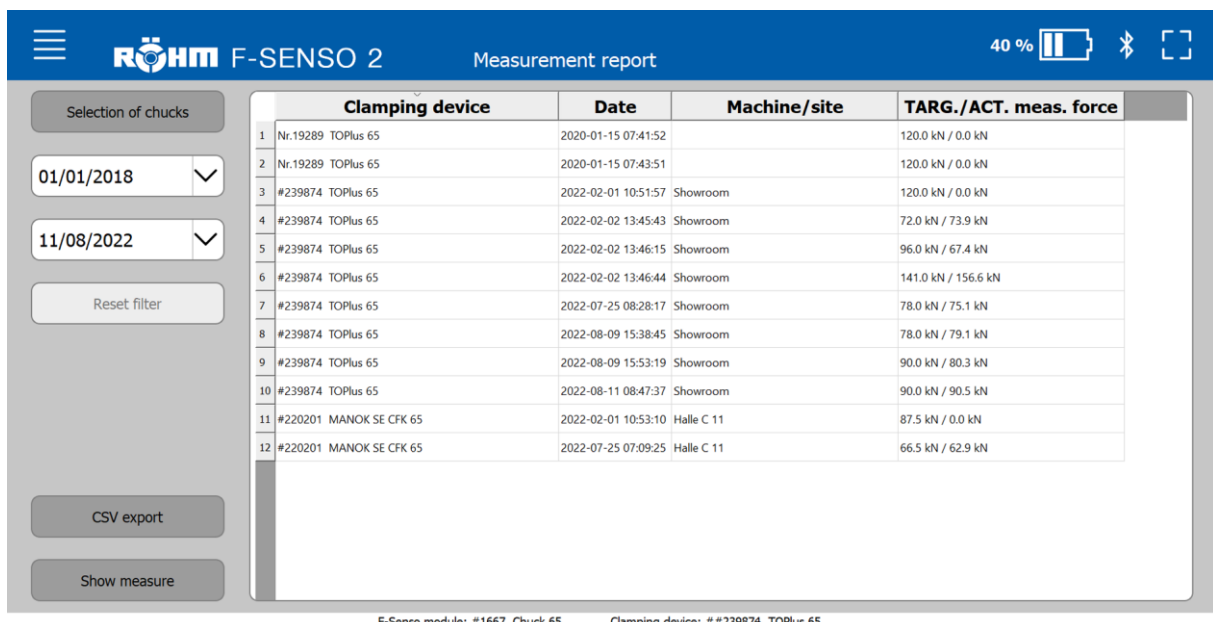
8. Optionally add a comment.
9. Click »Save«.

9.4.5 Creating a measurement protocol

A measurement protocol can be created from a saved measurement. This is possible regardless of whether a measuring device is connected or not.

The measurement report can be created as a CSV-formatted file or in PDF format.

1. Click the »Create measurement protocol« button.



INFORMATION

If no measurement is selected, the log of all displayed measurements is created.

2. Select one or more measurements.

PDF format

1. Click the »Display measurement« button.

The measurement report will be opened in PDF format.

2. Save the displayed document by using »Save As«. The location where the document is saved can be freely selected by the operator.

CSV-formatted file

1. Click the »CSV Export« button.
2. Save the displayed document by using »Save As«. The location where the document is saved can be freely selected by the operator.

Filtering and sorting

The list of saved measurements can be sorted and filtered.

The listed measurements can be sorted by different criteria:

- »Clamping device« [depending on ID number, ascending / descending]
- »Date« [ascending / descending based on how current]
- »Machine/location« [alphabetically, ascending / descending]

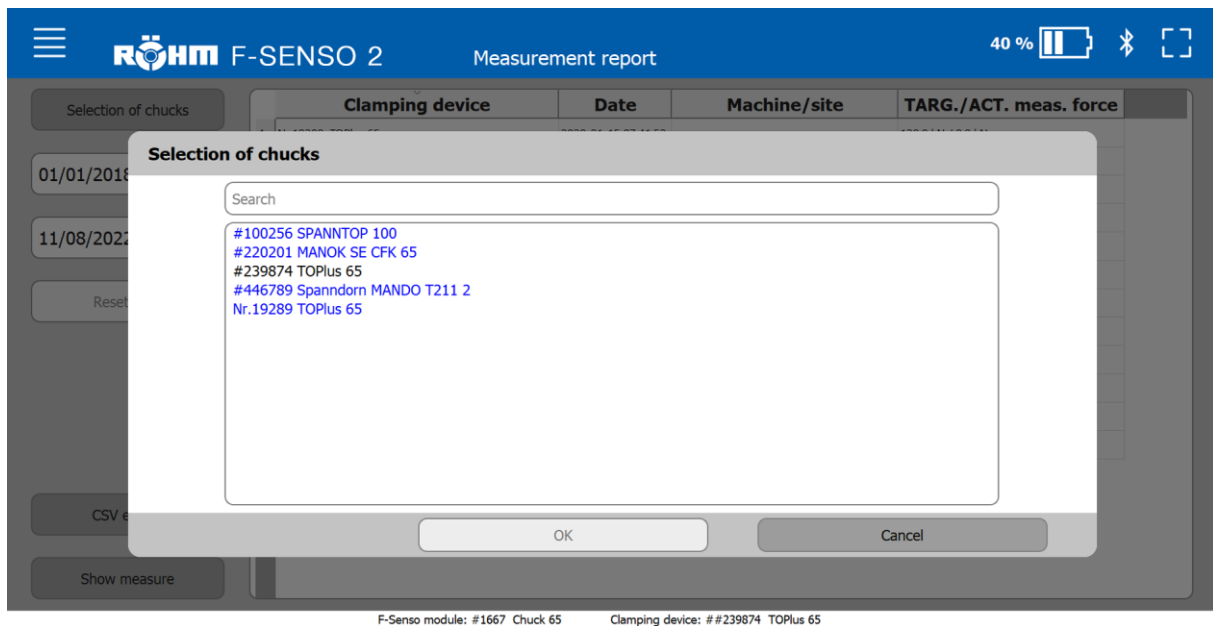
The listed measurements can be filtered by different criteria:

- »Clamping device«
- »Date«

F-Senso 2 Measurement

To filter by clamping device:

1. Click the »Select clamping device« button.



INFORMATION

In the selection window, two colors are used to list the clamping devices.

- Clamping devices written in blue indicate to the worker that the clamping device has a missing measurement. A clamping device is marked in blue if the time from the last measurement exceeds the time of the selected maintenance interval. The maintenance interval is defined when creating a clamping device, but can be changed at any time.
- Clamping devices written in black mean that the time of the maintenance interval has not yet elapsed. The time from the last measurement to the current date is less than the time of the selected maintenance interval.



INFORMATION

In the selection window you can search for a clamping device by means of the ID number.

2. Select the desired clamping device.
3. Click »OK«.

F-Senso 2 Measurement

To filter by date:

1. Enter the start date and the end date in the corresponding fields.

	Clamping device	Date	Machine/site	TARG./ACT. meas. force
1	Nr.19289 TOPlus 65	2020-01-15 07:41:52		120.0 kN / 0.0 kN
2	Nr.19289 TOPlus 65	2020-01-15 07:43:51		120.0 kN / 0.0 kN
3	#239874 TOPlus 65	2022-02-01 10:51:57	Showroom	120.0 kN / 0.0 kN
4	#239874 TOPlus 65	2022-02-02 13:45:43	Showroom	72.0 kN / 73.9 kN
5	#239874 TOPlus 65	2022-02-02 13:46:15	Showroom	96.0 kN / 67.4 kN
		2022-02-02 13:46:44	Showroom	141.0 kN / 156.6 kN
		2022-07-25 08:28:17	Showroom	78.0 kN / 75.1 kN
		2022-08-09 15:38:45	Showroom	78.0 kN / 79.1 kN
		2022-08-09 15:53:19	Showroom	90.0 kN / 80.3 kN
		2022-08-11 08:47:37	Showroom	90.0 kN / 90.5 kN
	FK 65	2022-02-01 10:53:10	Halle C 11	87.5 kN / 0.0 kN
	FK 65	2022-07-25 07:09:25	Halle C 11	66.5 kN / 62.9 kN

F-Senso module: #1667 Chuck 65 Clamping device: ##239874 TOPlus 65

9.4.6 Overload

Each variant of the F-Senso Modules is designed for a maximum measuring force.

Clamping device data
Designation: #239874 TOPlus 65
Clamping pressure: 30.0 bar

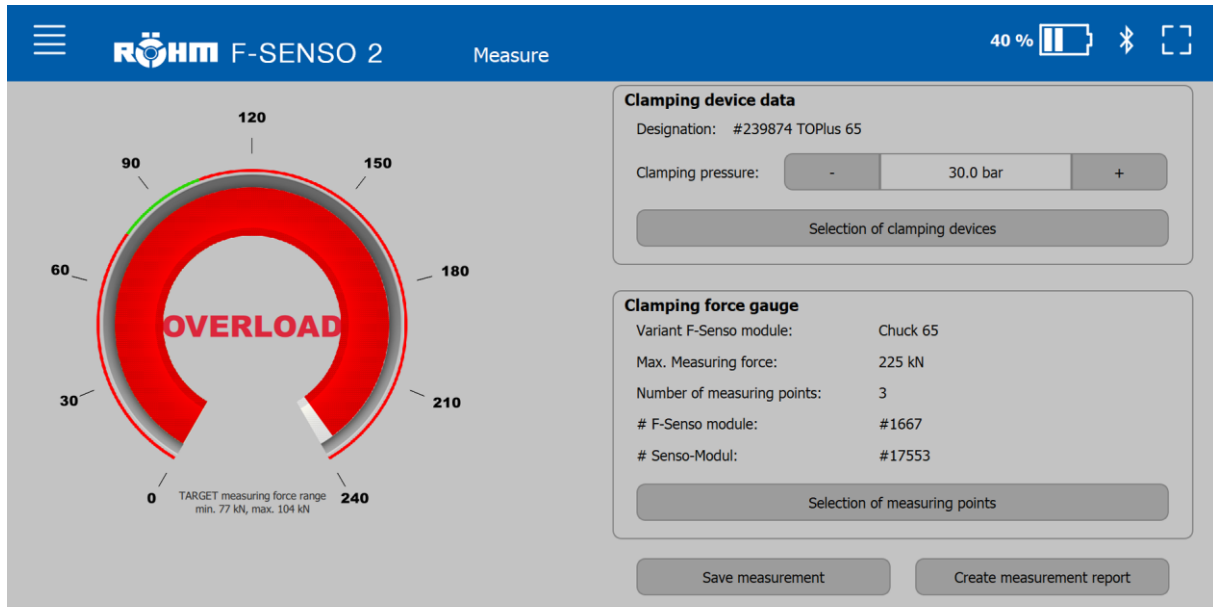
Clamping force gauge
Variant F-Senso module: Chuck 65
Max. Measuring force: 225 kN
Number of measuring points: 3
F-Senso module: #1667
Senso-Modul: #17553

Measured force: 230 kN

TARGET measuring force range: min. 77 kN, max. 104 kN

If the maximum measuring force is exceeded by up to 3%, the measured value is colored red in the tachometer.

F-Senso 2 Measurement



If the measuring force exceeds the maximum measuring force by $> 3\%$, the display changes. In this case, the measured value in the tachometer is overwritten with the text »OVERLOAD«.

As soon as the current measuring force is smaller than the maximum measuring force, the display changes again.

If an overload is indicated, it is recommended that you return the F-Senso Modul to Röhm for checking and factory calibration.

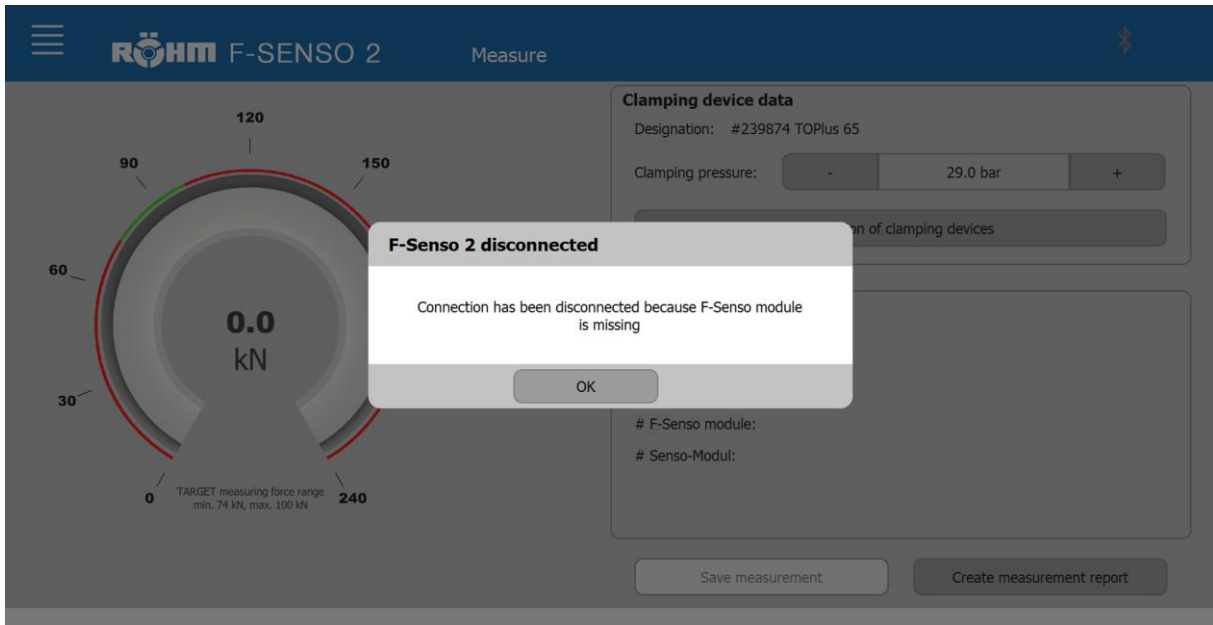
9.4.7 Checking the connection between F-Senso Modul and the Senso-Modul

An Senso-Modul cannot be connected to the F-Senso 2 software unless an F-Senso Modul is attached.

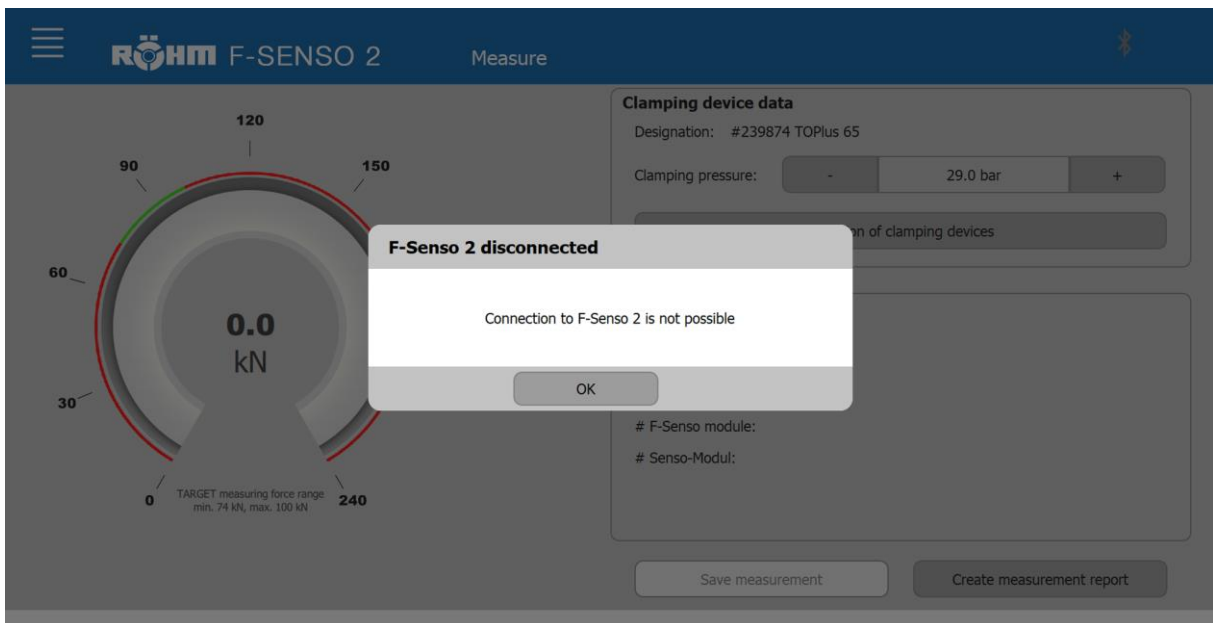
To ensure that an Senso-Modul is correctly connected to a F-Senso Modul, a query of the F-Senso Modul takes place. whether the F-Senso Modul is still connected to the Senso-Modul is determined while a connection exists between the F-Senso 2 software and the measuring device.

If a F-Senso Modul is disconnected from the Senso-Modul while the measuring device is connected to the software, the measuring device is disconnected from the F-Senso 2 software. In the F-Senso 2 software, the following message window draws attention to this.

F-Senso 2 Measurement



After a 30-second-long unsuccessful attempt to reconnect, the following message window appears.



9.5 Speed/force diagram

Under »Speed/force diagram«:

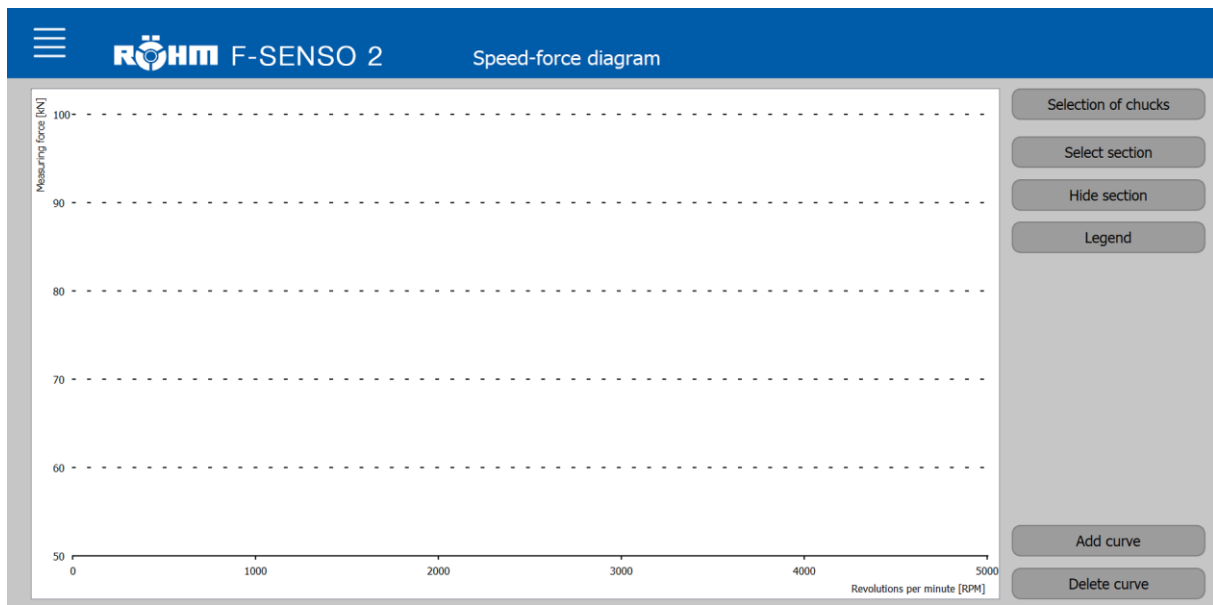
- A new centrifugal force curve can be created
- Several centrifugal force curves can be compared

In the centrifugal force curve, the measured force values [y-axis] are recorded versus the associated speed values [x-axis].

9.5.1 Selecting a clamping device

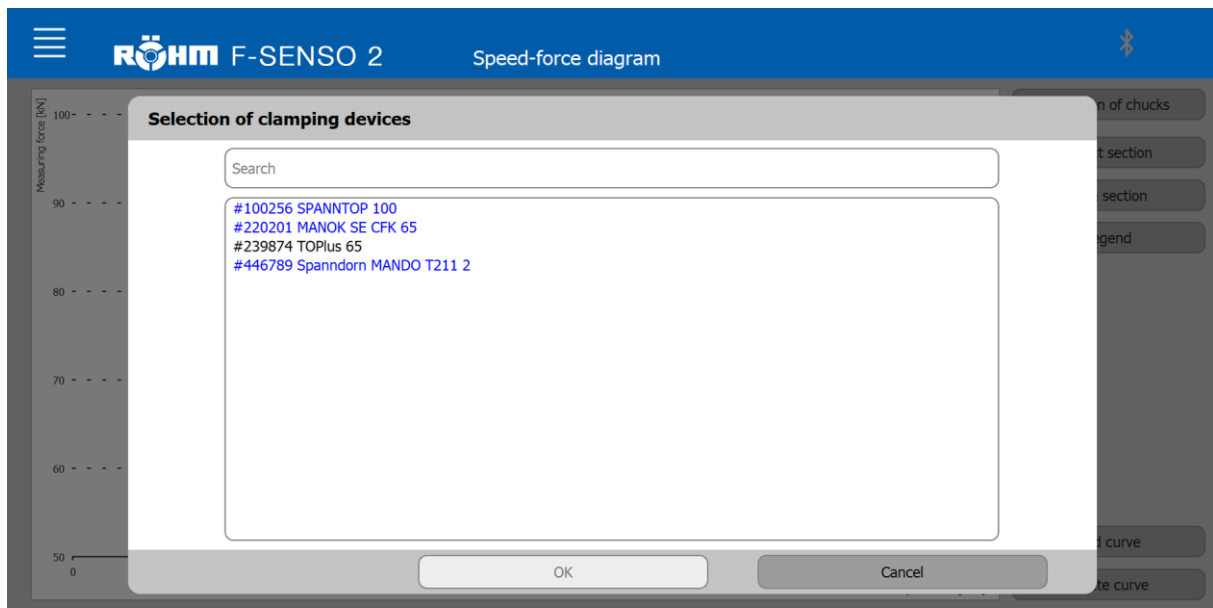
If a clamping device is already selected on the »Measure« page, it will be used for the measurement of a centrifugal force curve.

If no clamping device has been selected, or if you wish to select a different clamping device, the following steps are necessary.



1. Click the »Select clamping device« button.

F-Senso 2 Measurement



INFORMATION

In the selection window, two colors are used to list the clamping devices.

- Clamping devices written in blue indicate to the worker that the clamping device has a missing measurement. A clamping device is marked in blue if the time from the last measurement exceeds the time of the selected maintenance interval. The maintenance interval is defined when creating a clamping device, but can be changed at any time.
- Clamping devices written in black mean that the time of the maintenance interval has not yet elapsed. The time from the last measurement to the current date is less than the time of the selected maintenance interval.



INFORMATION

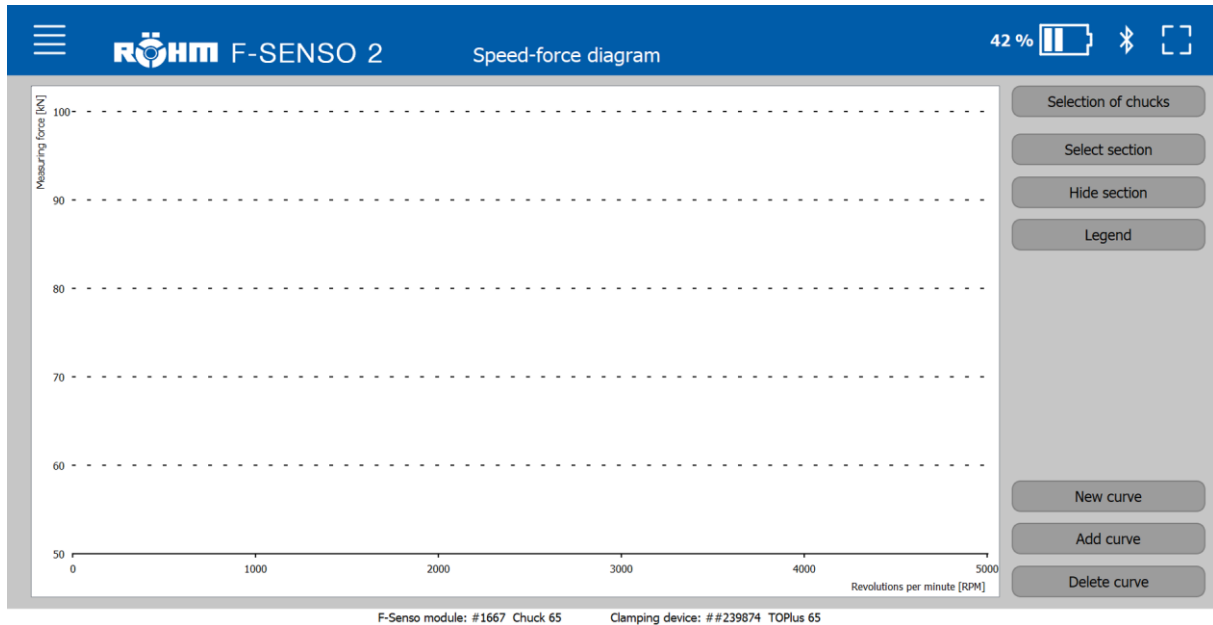
In the selection window you can search for a clamping device by means of the ID number.

2. Select the desired clamping device.
3. Click »OK«.

The selected clamping device appears on the »Measure« page.

Once a clamping device is selected, the »New curve« button is displayed.

F-Senso 2 Measurement



9.5.2 Selecting a measuring device

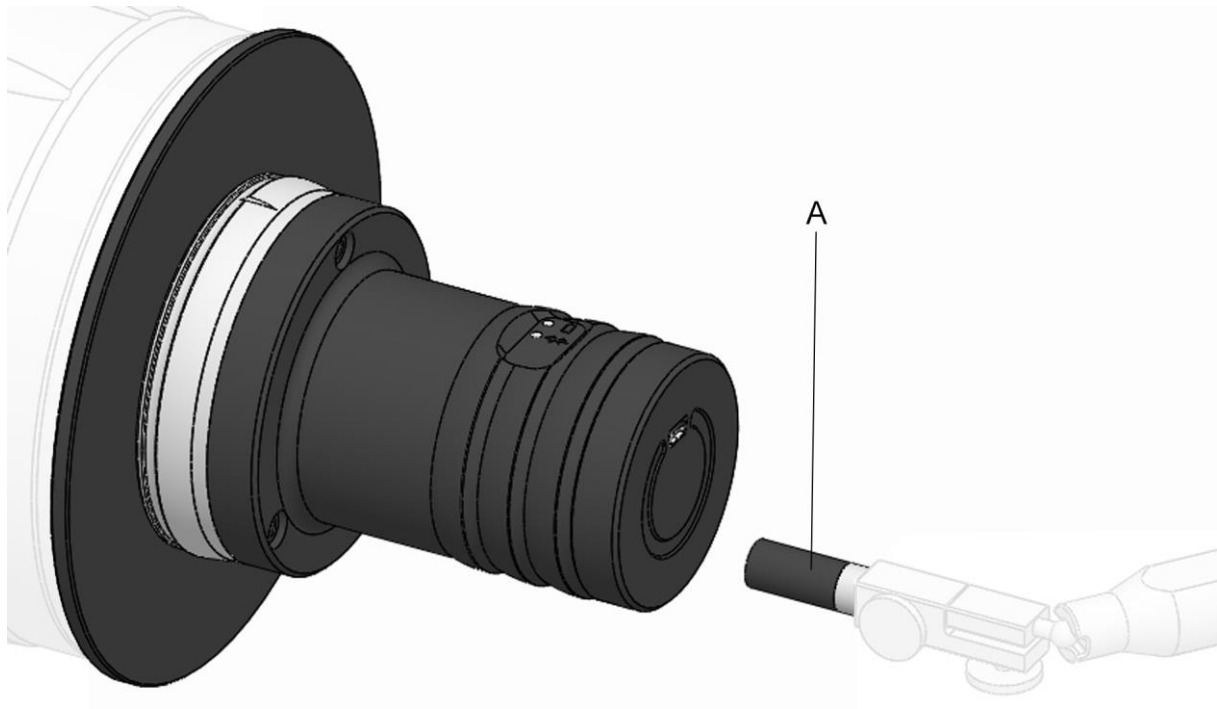
The measuring device is selected as described in the chapter »Measuring«.

The selected measuring device appears on the »Measure« page.

All relevant data for the selected measuring device are displayed on the »Measure« page in the »Clamping force measuring device« area.

In the case of a measuring device for an external clamping device, the number of measuring points must be set on the »Measure« page.

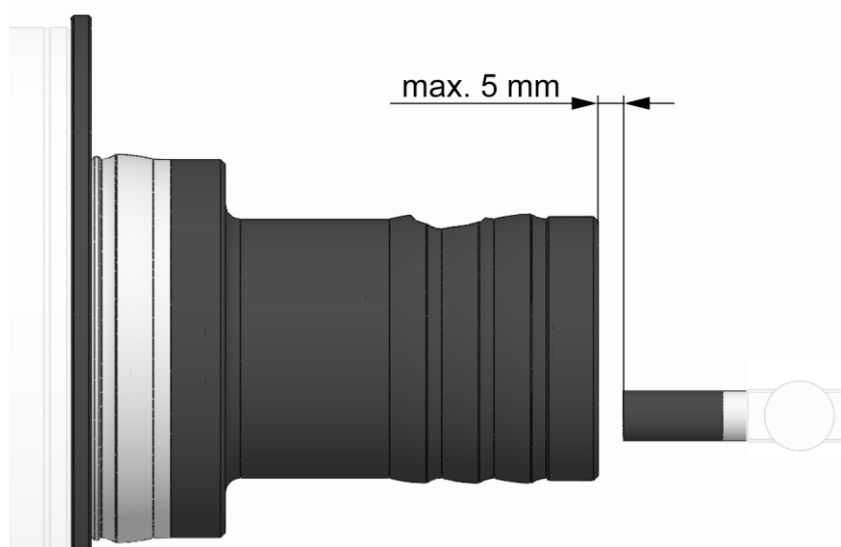
9.5.3 Creating a centrifugal force curve



A Magnet

1. Prepare the F-Senso 2 software and the measuring device [see chapter »Preparation«].
2. Select the clamping device in the F-Senso 2 software.
3. Select the measuring device in the F-Senso 2 software.
4. Clamp the measuring device [see chapter »Clamping the measuring device«]. The measurement is started and visualized by the F-Senso 2 software.

F-Senso 2 Measurement

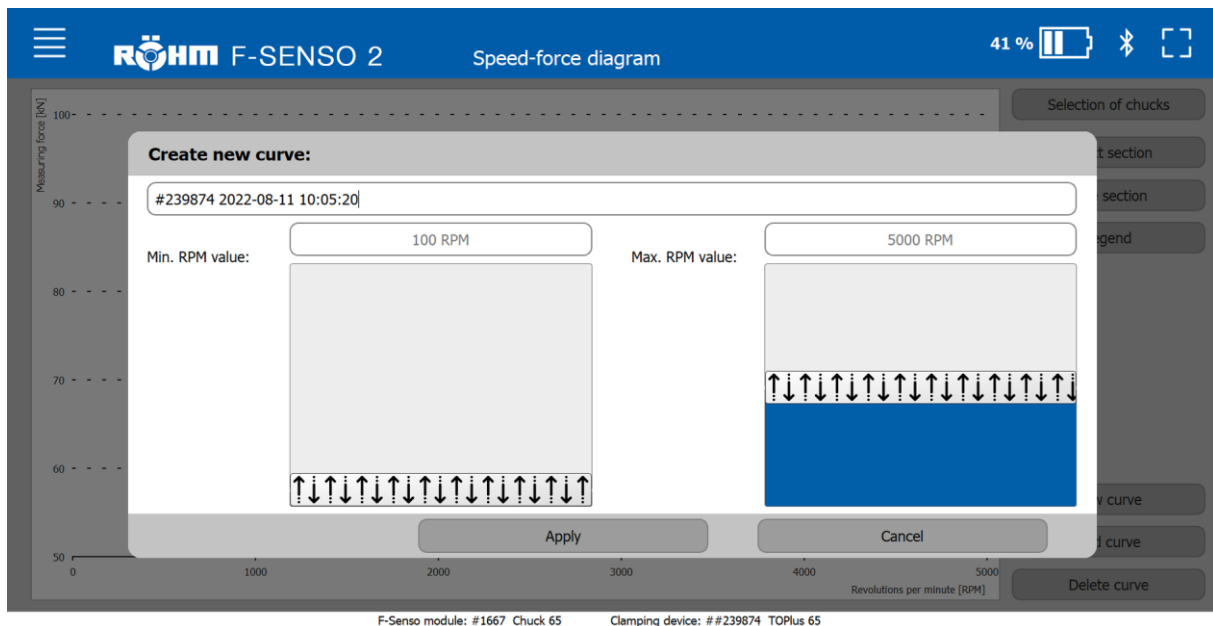


INFORMATION

The magnet must be positioned over the turned groove on the measuring device housing so that the distance between the magnet and the measuring device is a maximum of 5 mm.

5. Position the magnet over the measuring device, but so that it does not touch the measuring device.
6. Click the »New curve« button.

F-Senso 2 Measurement



INFORMATION

The name of the centrifugal force curve can be preset under »Speed/force diagram settings«. The default setting can be changed at any time.

7. Enter the name of the centrifugal force curve or modify it if necessary.



INFORMATION

The minimum speed value defines at which speed the recording of the centrifugal force curve is started.

8. Enter the minimum speed value.



INFORMATION

The maximum speed value defines the final value for determining the centrifugal force curve.

9. Enter the maximum speed value.
10. Click »Apply«. The F-Senso 2 software is ready for measurement.



INFORMATION

The maximum speed value must be reached within 10 seconds after the minimum speed value is exceeded, otherwise the F-Senso 2 software will automatically abort the measurement process. »Recording canceled« appears in the status bar.

11. Bring the clamping device up to the maximum speed saved in the F-Senso 2 software.

Recording of the measurement curve in the F-Senso 2 software starts and ends at the selected speed values.

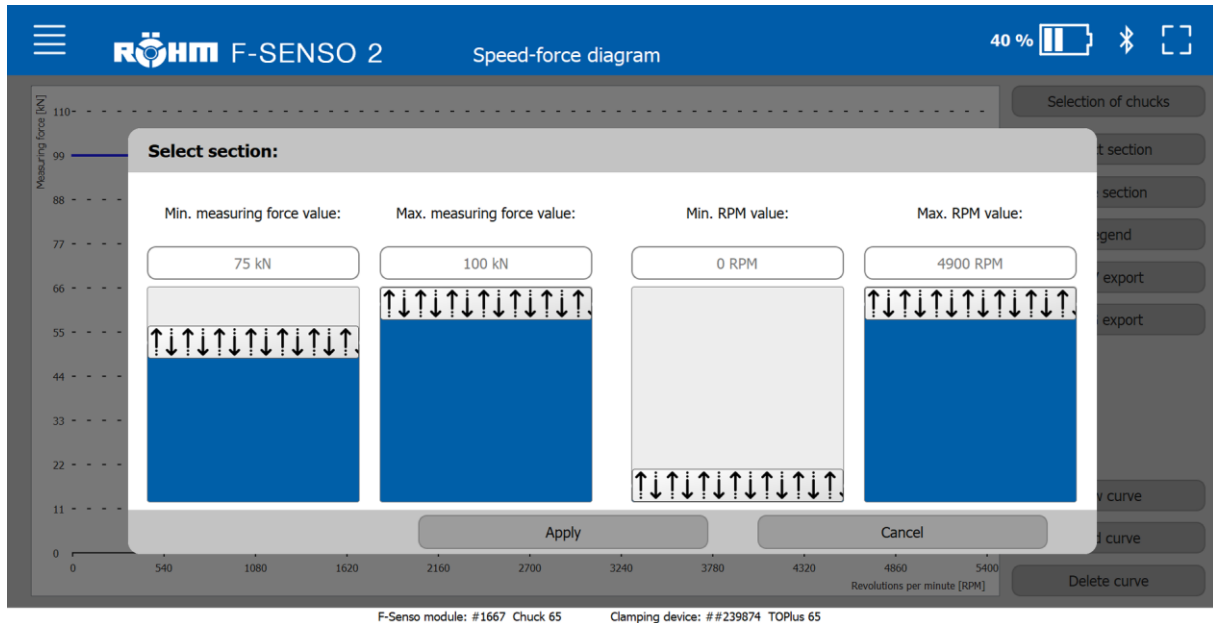
F-Senso 2 Measurement

The centrifugal force curve is plotted in the diagram only after recording has ended. The axes are scaled independently, depending on the maximum values of force and speed.

The centrifugal force curve is automatically stored in the F-Senso 2 software.

9.5.4 Selecting a segment

1. Click the »Select segment« button.



2. Enter the minimum and maximum measuring force, as well as the minimum and maximum speed value.

To undo the zoom:

1. Click the »Hide segment« button.

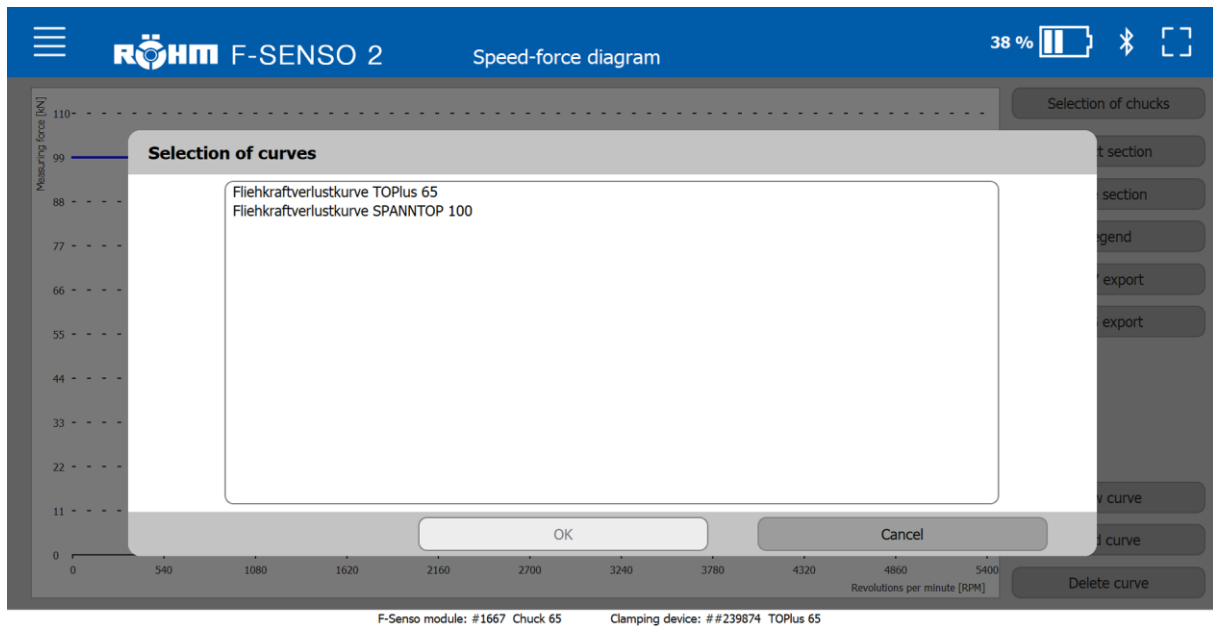
F-Senso 2 Measurement

9.5.5 Adding a curve

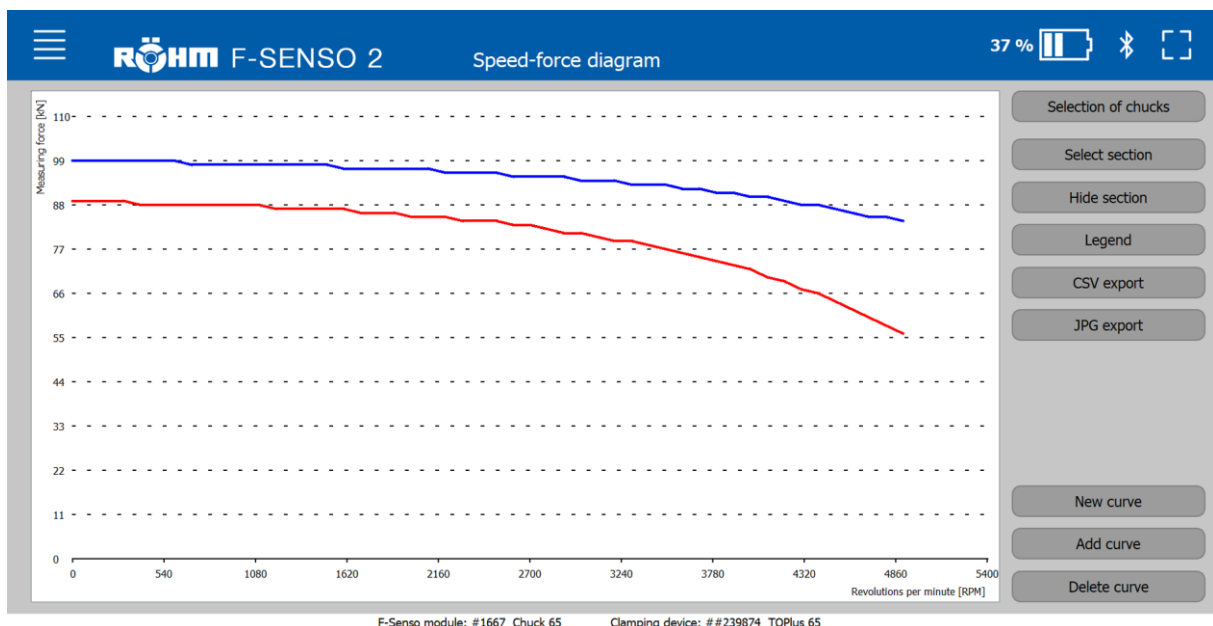
If several curves have already been recorded, it is possible to load curves into the diagram via »Add curve« and compare them. It is not necessary to select a clamping device to visualize stored curves.

Up to six curves can be loaded into the diagram at the same time and compared.

1. Click the »Add curve« button.



2. Select a curve.
3. Click »OK«.

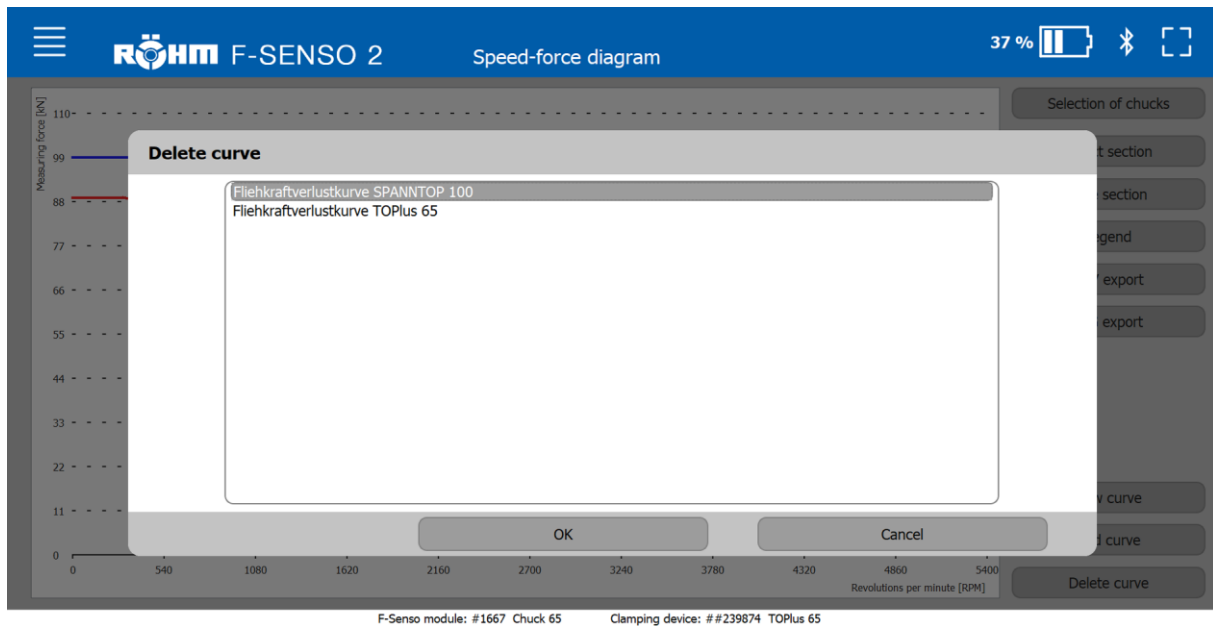


9.5.6 Deleting a curve

A curve can also be deleted from the displayed diagram. Only the visualization of the curve is removed from the diagram.

A saved curve can only be deleted from the database on the Speed/force diagram settings page [see chapter »Speed / force diagram settings«].

1. Click the »Delete curve« button.



2. Select a curve.
3. Click »OK«.

9.5.7 Curve overview

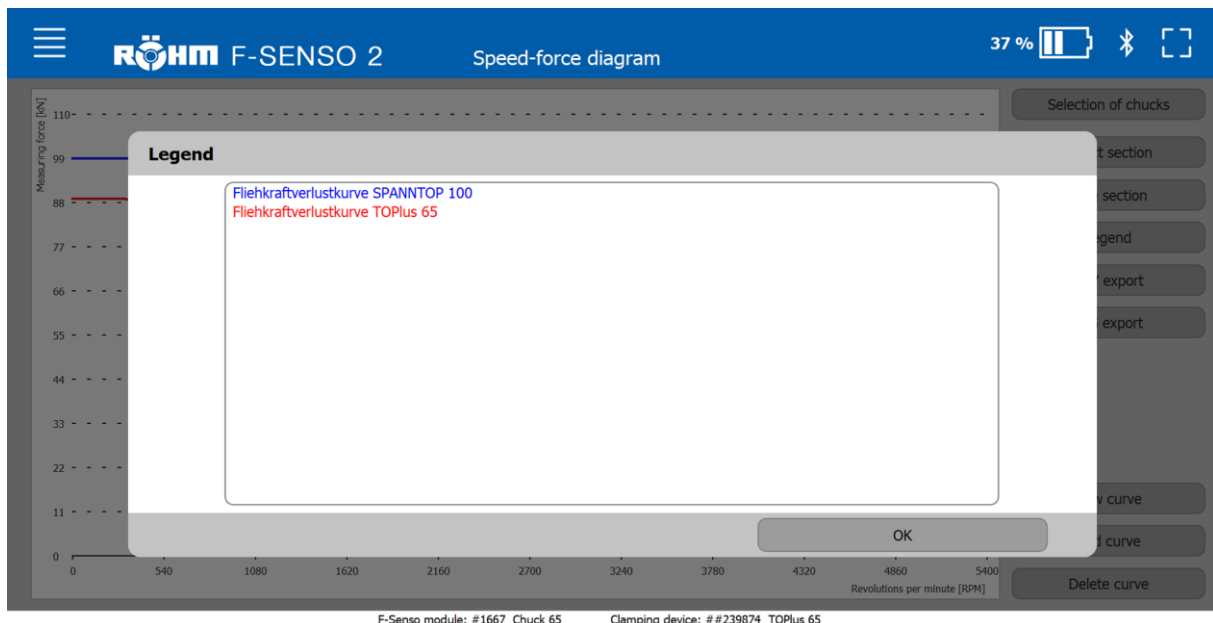
The caption of the diagram is stored under Curve Overview. You can see all the curves added to the diagram here. The name of the curve is displayed in the color in which the curve is shown in the diagram.



INFORMATION

The color of the curves can be changed [see chapter »Speed/force diagram settings«]. The color is assigned in the order in which the curves are added to the diagram. That means that the first added curve gets the color that is saved for »Curve 1«.

1. Click the »Curve overview« button.



9.5.8 Exporting a curve

The curve can be exported as a CSV-formatted file or as an image.

All curves displayed in the diagram are exported.

CSV-formatted file

1. Click the »CSV Export« button.

The measurement is opened as an Excel file. It shows the name of the curve and columns for the speed and force values.

Image

1. Click the »JPG Export« button.

The measurement is opened as a JPG file.

10 Maintenance

10.1 Maintenance safety

The measuring device must be handled with care.



INFORMATION

Special attention must be given to the surface of the F-Senso Modul. This can become worn as a result of the clamping forces that are applied with frequent use.

- Replace the measuring device if there are visible or measurable signs of wear.

10.2 Cleaning



WARNING

Eye injuries and cuts caused by failure to wear protective clothing during cleaning operation!

- Never use compressed air to clean the product.
- Also wear the following items of personal protective equipment, in addition to the basic equipment:



1. Use a cloth moistened with detergent to remove all oil and grease residues from the product.

10.3 Annual factory calibration

The F-Senso Modul is already calibrated at the factory when delivered. This can be read on the stamp in the associated service passport.

The F-Senso Modul must be recalibrated annually to ensure measurement accuracy.

Each time a measuring device is connected to the F-Senso 2 software, the date of the last calibration is displayed for 20 seconds in the status line.



NOTE

Damage to materials from service work on the product by the customer!

- Service work on the F-Senso Modul or the Senso-Modul by the customer is not permitted.
- Return the F-Senso Modul and/or the Senso-Modul to Röhm for service.

Return the F-Senso Modul together with its service passport to Röhm for the annual factory calibration.

F-Senso 2 Maintenance

Other service work performed by Röhm will also be noted in the service passport and this will be returned together with the newly calibrated F-Senso Modul.



F-SENSO 2 SPANNKRAFTMESSGERÄT / CLAMPING FORCE MEASUREMENT DEVICE

Servicepass / Service Pass

Seriennummer / Ausführung
Serial number / model



11 Disposal

When the measuring device has reached the end of its useful life, please return it to Röhm for disposal. Note »For disposal« on the delivery papers.

The specific guidelines of the carrier for transport of lithium ion rechargeable batteries installed in equipment must be observed.



DANGER

Serious injuries from possible fire and explosion when removing the battery!

- Never remove the rechargeable battery.
- The display device, the power adapter and the USB charging cable must be disposed of in accordance with the manufacturer's operating instructions.
- These parts can also be returned to Röhm for disposal.

12 Faults

The following chapter describes possible causes for faults, and the work involved in remedial action.

If multiple faults occur, shorten the maintenance intervals in accordance with actual load levels.

Contact the manufacturer if faults occur that cannot be remedied by following these instructions [see »Contact« chapter].

12.1 Procedure with faults

This applies in all cases:

1. With faults that constitute an immediate danger to people or capital equipment, press the Emergency Stop button on the machine tool immediately.
2. Establish the cause of the fault.
3. If troubleshooting requires work to be conducted in the danger area, switch the machine tool into set-up mode.
4. Notify the person on location of the fault immediately.
5. Depending on the type of fault, get it remedied by authorized and appropriately skilled specialists.



INFORMATION

The troubleshooting table in the following section provides information about who is authorized to remedy a given fault.

6. In the event of a fault not caused by the product, the fault may be caused by something close to the machine tool. For this, refer to the operating instructions of the machine tool.

F-Senso 2 Faults

12.2 Fault table

Fault	Possible cause	Remedial action	Remedied by
Senso module not found, the Bluetooth symbol is not displayed	Battery of the Senso module is discharged	Charge Senso module	Skilled specialist
	Bluetooth driver of the display device is not working correctly	Restart the display device and the F-Senso 2 software	Skilled specialist
	Bluetooth is deactivated on the display device	Activate Bluetooth in Windows settings	Skilled specialist
	Senso module not within range	Approach Senso module to F-Senso 2 software [display device]	Skilled specialist
Unable to connect to Senso module although it is detected and listed	Battery of Senso module is too weak	Charge Senso module	Skilled specialist
	Senso module not connected to F-Senso module	Assemble Senso module with F-Senso module	Skilled specialist
	Senso module is at range limit of the radio signal	Approach Senso module to F-Senso 2 software [display device]	Skilled specialist
	Senso module needs to be rebooted	Reboot the Senso module [see chapter »Resetting the Senso module«]	Skilled specialist
Bluetooth symbol is displayed, but Senso module is not shown in the selection window	Senso module was not visible for Bluetooth driver at the time the Bluetooth symbol was pressed	Close and reopen the »Select clamping force measuring device« window by pressing »Cancel«.	Skilled specialist
Display device does not start	Display device's rechargeable battery is discharged	Charge the rechargeable battery of the display device	Skilled specialist
	Display device has a defect	Return the display device to the manufacturer	Röhm
F-Senso 2 software displays a measuring force although no measurement is being performed	Measuring device was overloaded during a previous measurement	F-Senso module must be recalibrated	Röhm

F-Senso 2 Faults

Fault	Possible cause	Remedial action	Remedied by
Measuring device is damaged	Measuring device dropped / struck	Functional test at the factory; If necessary, components must be replaced	Röhm

Table 8: Fault table

12.3 Resetting the Senso-Modul

In rare cases, it is necessary to restart the Senso-Modul. This restart is performed by means of the reset button.



INFORMATION

The Reset button can be reached with a suitable tool through the 1.5 mm hole.

1. Press the Reset button.

If the LED lights up green, the restart of the Senso-Modul has been performed successfully.

If the LED does not light up, the charge level of the Senso-Modul's rechargeable battery may be too low. The Senso-Modul must then be recharged.

13 Annex

13.1 Contact

The following hotline is available to you for orders, schedule tracking and emergencies:

+49 7325 16 0

13.2 Conformity declaration

The conformity declaration is supplied with the product and with its manual.

F-Senso 2 Annex

F-Senso 2 Annex

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