SCHUNK IFT SST Clamping Force Tester

Assembly and Operating Manual

Superior Clamping and Gripping

SCHUNK®

Imprint

Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

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Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

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Fax +49-7572-7614-1039

customercentermengen@de.schunk.com

Please read the operating manual in full and keep it close to the product.

Table of Contents

1 General instructions

1.1 Information about this manual

This manual contains important information for the safe, correct use of the product.
The manual is an integral part of the product and must be kept accessible for personnel at all times.
Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is the precondition for safe working. The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.
Besides this manual, other documents which apply are those listed under (1.1.2)

1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.

⚠ DANGER

Danger for persons!

Non-observance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons!

Non-observance can lead to irreversible injury and even death.

⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *

The documents labeled with an asterisk (*) can be downloaded from **schunk.com**.

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the applicable documents, ▸ 1.1 [🗋 5]
- Observe the ambient conditions and operating conditions
- Observance of the specified calibration intervals.

Parts touching the workpiece and wearing parts are not part of the warranty.

1.3 Scope of delivery

1 Tablet incl. APP
1 Measuring head
2 Intermediate stops
1 Charging adapter for tablet and measuring head
2 USB charging cable
1 Torx wrench
3 Screws for intermediate stop

2 Basic safety notes

Risks to persons and property may arise from incorrect handling of this product if these instructions are disregarded.

Report any damage and defects immediately and repair without delay to keep the extent of the damage to a minimum and avoid compromising the safety of the product.

Only original SCHUNK spare parts may be used!

2.1 Intended use

The product is intended for measuring clamping force on clamping devices in a machine tool. Measurements are performed as a static measurement (clamping force without speed of rotation).

- The product may only be used within the scope of its technical data.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

The product is not being used as intended if, for example:

- the product is used with machines or clamping devices that are not designed to be used with it.
- the specified technical data for use of the product are exceeded.
- the product is used in working environments that are not permissible.
- system changes or external influence of the tablet by the operator.

2.3 Structural changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- Structural changes should only be made with the written approval of SCHUNK.

2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts and spares authorized by SCHUNK.

2.5 Ambient conditions and operating conditions

Requirements for ambient and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is only used within its defined application parameters.
- The measuring head must have reached room temperature before measurement.

2.6 Personnel qualification

Inadequate qualification of personnel

Work on and with the product by inadequately qualified personnel can lead to serious injuries and considerable material damage.

- Order all work to be performed only by appropriately qualified personnel.
- Personnel must have read and understood the complete operating manual before beginning any work on the product.
- Observe national accident prevention regulations and the general safety notes.

The following personnel qualifications are required for the various types of work on the product:

Specialist personnel:

Specialist personnel have the specialized training, knowledge, and experience to perform the tasks entrusted to them, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Instructed personnel:

Instructed persons have been instructed by the user regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.

Manufacturer service personnel:

The manufacturer's service personnel have the specialized training, knowledge, and experience to perform the work entrusted to them and to recognize and avoid potential dangers.

2.7 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff in the event of a danger that may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear close-fitting protective clothing and place a hairnet over long hair when dealing with moving components.

2.8 Instructions for safe operation

Working in an incorrect manner

An incorrect manner of working can make the product unsafe and risk the danger of serious injuries and considerable material damages.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media.
- Rectify malfunctions as soon as they occur.
- Observe the calibration intervals.
- Observe the current safety, accident prevention, and environmental protection regulations for the application field of the product.

2.8.1 Constructional changes, attachments, or modifications

Additional threads, bore holes or attachments which are not supplied as accessories by SCHUNK may affect safety. They may only be applied after obtaining the prior consent of SCHUNK.

2.9 Transport

The transport is performed exclusively in the original, specially adapted transport case.

2.10 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Have appropriately trained personnel rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.11 Disposal

Conduct during disposal

Incorrect handling during disposal can make the product unsafe and risks serious injuries and considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.
- Batteries and rechargeable batteries are subject to hazardous waste treatment and may only be disposed of by authorized specialist companies.

2.12 Fundamental dangers

General:

- Do not reach into the open mechanism or movement area of the product during operation.
- Never deactivate safety installations.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Technical data of the machine or the clamping device must not exceed the maximum permissible data of the measuring head.

2.12.1 Notes on particular risks

⚠ WARNING

Crushing!

- Do not reach between moving parts (measuring head and jaw).

3 Technical Data

3.1 Tablet technical data:

Description		Handset/tablet/APP
Display size		10"
Operating system		Android
Charger connection		USB type C
Operating temperature	[°C]	0...40
Transmitting/receiving frequency	[GHz]	2.4
Data exchange		MicroSD; USB type C

3.2 Measuring head technical data

Description		Measuring head
Voltage supply		Internal energy accumulator
Energy accumulator capacity		approx. 1.5 h @ 100% DC
Charging process		< 3 minutes
Charger connection		USB mini
Number of jaws*		2-jaw SCHUNK 2-jaw KONTEC / Gressel
Force measurement range	[kN]	0...120 kN (SCHUNK) 0...60 kN (KONTEC / Gressel)
Force measurement accuracy		< 3% fsr
Clamping range	[mm]	55
Measured value transmission rate		500 ms
Dimensions	[mm]	95 x 55 x 63
Weight	[g]	700
Operating temperature	[°C]	0...40
Protection class		IP67
Transmission frequency	[GHz]	2.4
Handset/measuring head distance		< 10 m (depending on ambient conditions)

* For a 2-jaw SCHUNK, this corresponds to the arithmetic total for the jaw clamping force (factor 2)
For a 2-jaw Gressel / KONTEC this corresponds to the clamping force per jaw (factor 1)

4 Functional description and operation

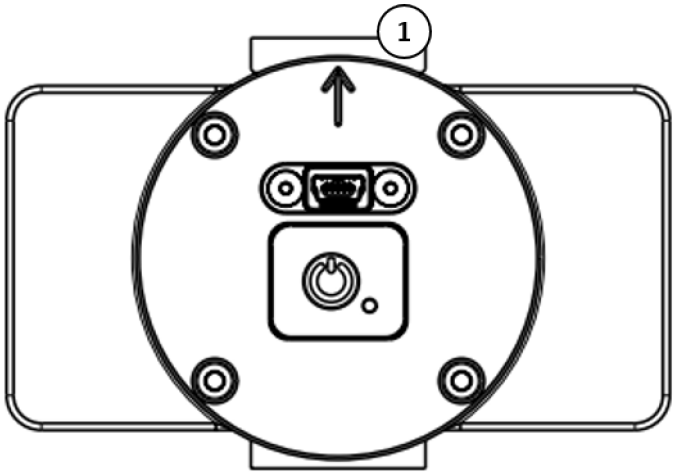
4.1 Overview

The operating principle of the measuring head is based on several internal strain gauges. The applied clamping force is converted into an electrical signal and evaluated by the electronics. A wireless data link transmits the data from the measuring head to the tablet and visualizes the measured values in the APP.

4.2 Measuring head

4.2.1 General

The measuring head consists of the base body with an integrated sensor system and electronic processor, as well as intermediate stops for clamping support. The arrow on the cover and also on the bottom of the measuring head symbolizes the measuring jaw, which must always rest on a jaw of the clamping device to be measured.



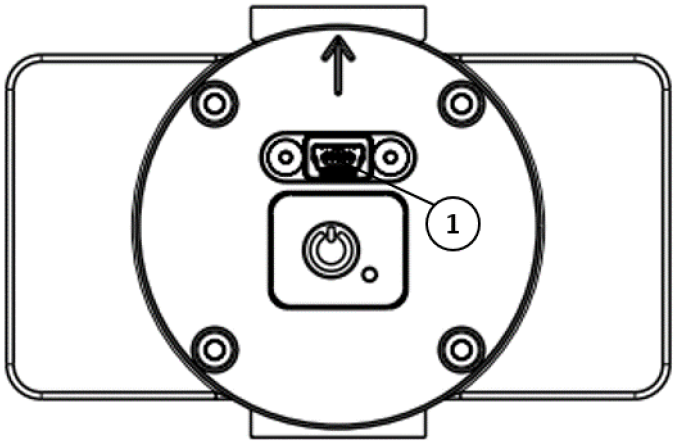
1 measuring jaw with indicator arrows

CAUTION

Measuring jaw always in force flow!
Otherwise the measured values are not meaningful.

4.2.2 Charging process / state of charge

A USB mini port is located in the cover of the measuring head. This is used in conjunction with the USB mini cable supplied and the charging adapter to charge the measuring head.



1 USB-mini measuring head charging socket

CAUTION

Danger of confusion!

Charging the tablet: USB type C
Charging the measuring head: USB mini

⚠ WARNING

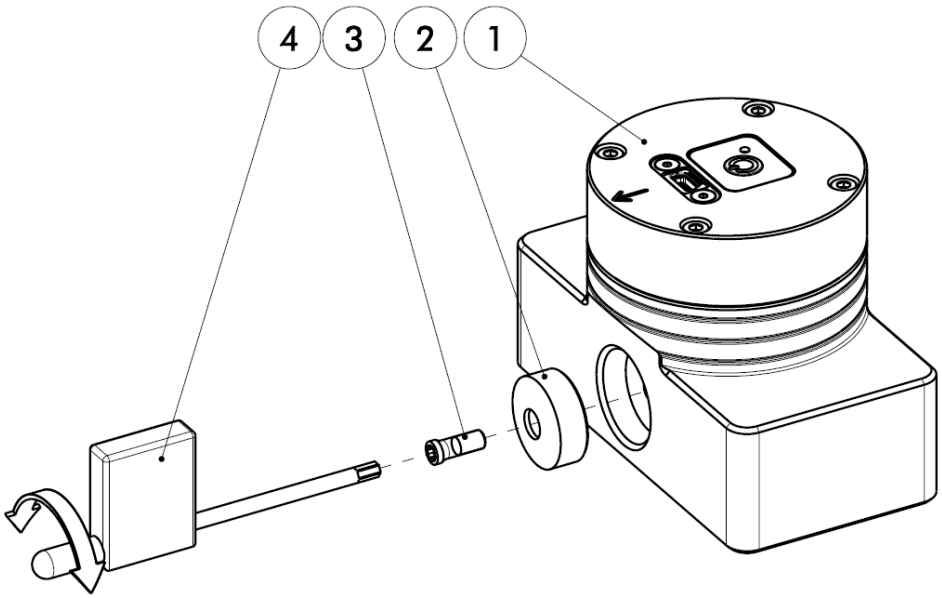
Damage by liquid!

The charging socket must be dry and free of dirt during the charging process.

The charging status is indicated by the LED integrated in the lid and within the APP. If the charge level is less than 15%, the LED on the measuring head flashes.

4.2.3 Changing the clamping inserts

The clamping inserts can be changed with the assembly key enclosed. The clamping width is 55 mm.



1	Measuring head
2	Clamping insert
3	Fastening screw
4	Torx assembly key

4.3 Tablet and APP

⚠ WARNING

Lithium-ion battery!

The product is equipped with a lithium-ion battery.

- Do not disassemble.
- Keep away from heat sources.
- Do not use in areas of increased radiation.

4.3.1 Functional description of the tablet

The supplied tablet is connected to the measuring head via the internal Bluetooth interface. The evaluation of the measured values is done with the pre-installed app.

The tablet is charged using the charging adapter and the USB type C cable supplied.

CAUTION

Danger of confusion!

Charging the tablet: USB type C.
Charging the measuring head: USB mini.

⚠ WARNING

Damage by liquid!

The charging socket must be dry and free of dirt during the charging process.

1	USB type C port (charging)
2	ON key

4.3.2 Operating the APP

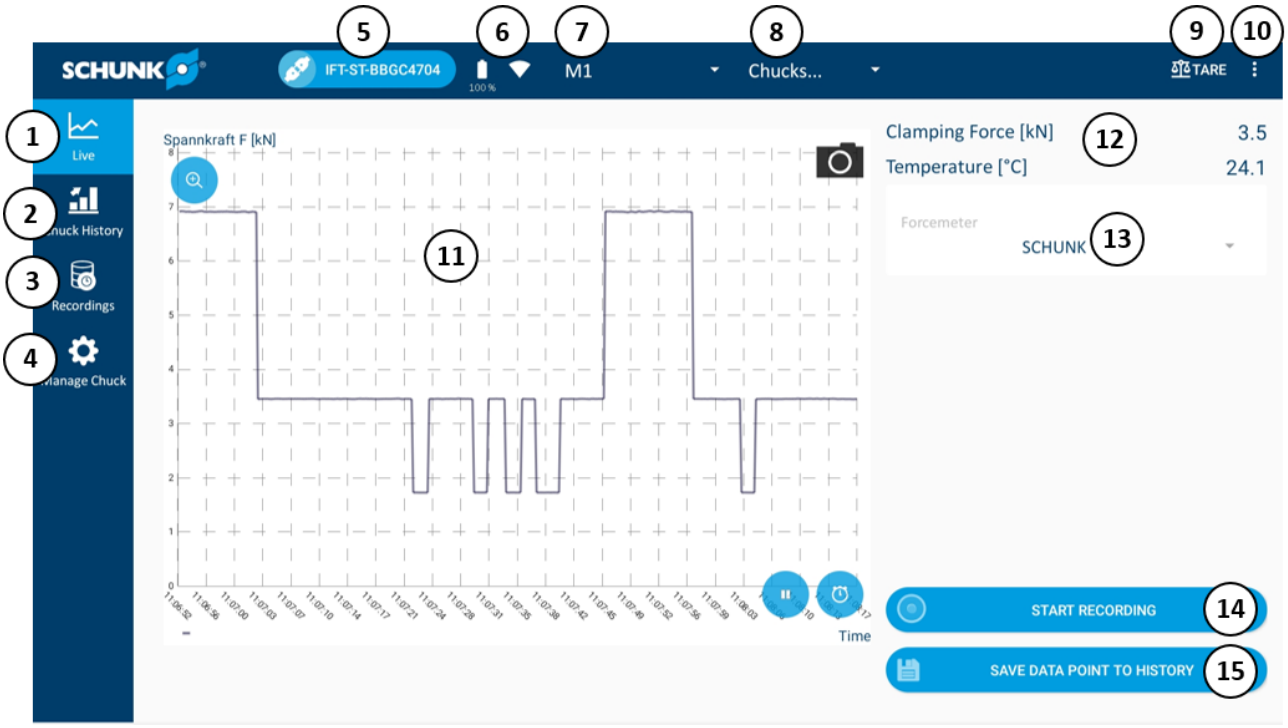
The pre-installed APP is used to visualize the values of the measuring head.

4.3.2.1 Starting the APP

The APP for the clamping force measuring device is started via the APP ICON on the start screen.

4.3.3 Live screen

All the relevant data can be visualized and processed on the live screen.



1	Set display for live view / start screen
2	Set display for clamping force history for clamping devices stored
3	Set display for the clamping force images stored
4	Set display for the machine and clamping device editor
5	Button for connection with a measuring head
6	Status of the connected measuring head (charging status / connection quality)
7	Button for selecting a machine
8	Button for selecting a machine-based clamping device
9	Button for taring the measuring head
10	Advanced menu (language settings / imprint)
11	Current measured data for clamping force displayed in a diagram
12	Current measured data display (clamping force / temperature)
13	Selection of clamping device type (responsible for the correct clamping force calculation)
14	Button to start / stop data acquisition
15	Button for saving the current value to clamping force history

4.3.3.1 Sequence for clamping force measurement

- Load the measuring head and switch it on. As soon as the power button is pressed, an LED lights up.
- Select measuring head and connect with APP **(5)**.
  - The measuring head designation in the radio network corresponds to the serial number. This is applied to the measuring head.
  - Measured values are now transferred and displayed automatically.
- Tare of the measuring head **(9)** with unloaded measuring head.
- Insert the measuring head into the clamping device and clamp it.
  - The measuring head must be inserted plane-parallel to the chuck jaws.
  - The contact point of the jaws must be centered on the clamping insert (jaw height > 15 mm).

Variant A: Direct measurement without machines and clamping device selection

- Select the calculation method for the clamping force suitable for the clamping device **(13).**

Variant B: Measurement with selection of machine and clamping device

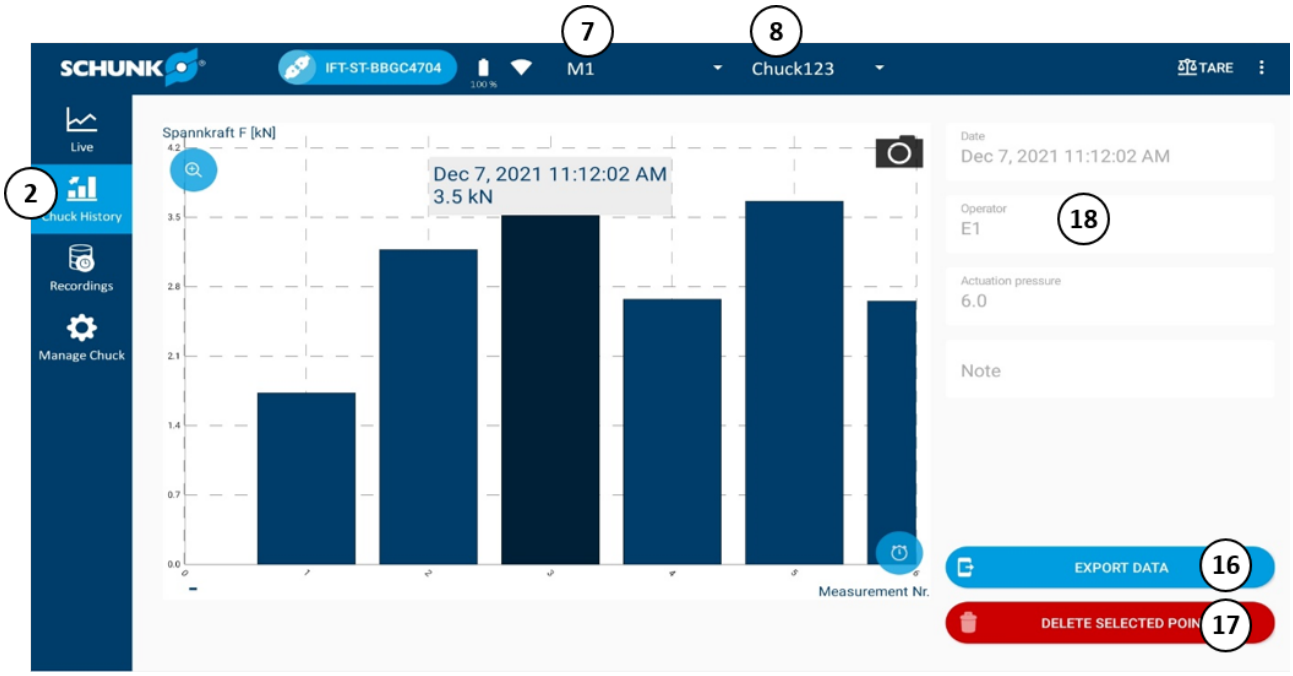
- Selection or creation of machine **(7)**.
- Selection or creation of clamping device **(8)**.
  - Calculation method for clamping force is predefined.
  - Maximum actuation and clamping force are displayed.
- Start / stop clamping force data acquisition **(14)**, image stored is displayed at **(3)**.
- Current clamping force value can be stored in history **(15)**, history is displayed at **(2)**.

4.3.3.2 Advanced menu

In the advanced menu **(10)**, the language can be changed by the user.

4.3.4 History

Values for machines and their clamping devices can be stored and archived in the history. The history of the measured values can be called up.



7	Button for selecting a machine
8	Button for selecting a machine-based clamping device
16	Export data series (to tablet)
17	Delete data item / data series
18	Data display for the selected data item (date, processor, actuation, note)

4.3.4.1 History display for a clamping device

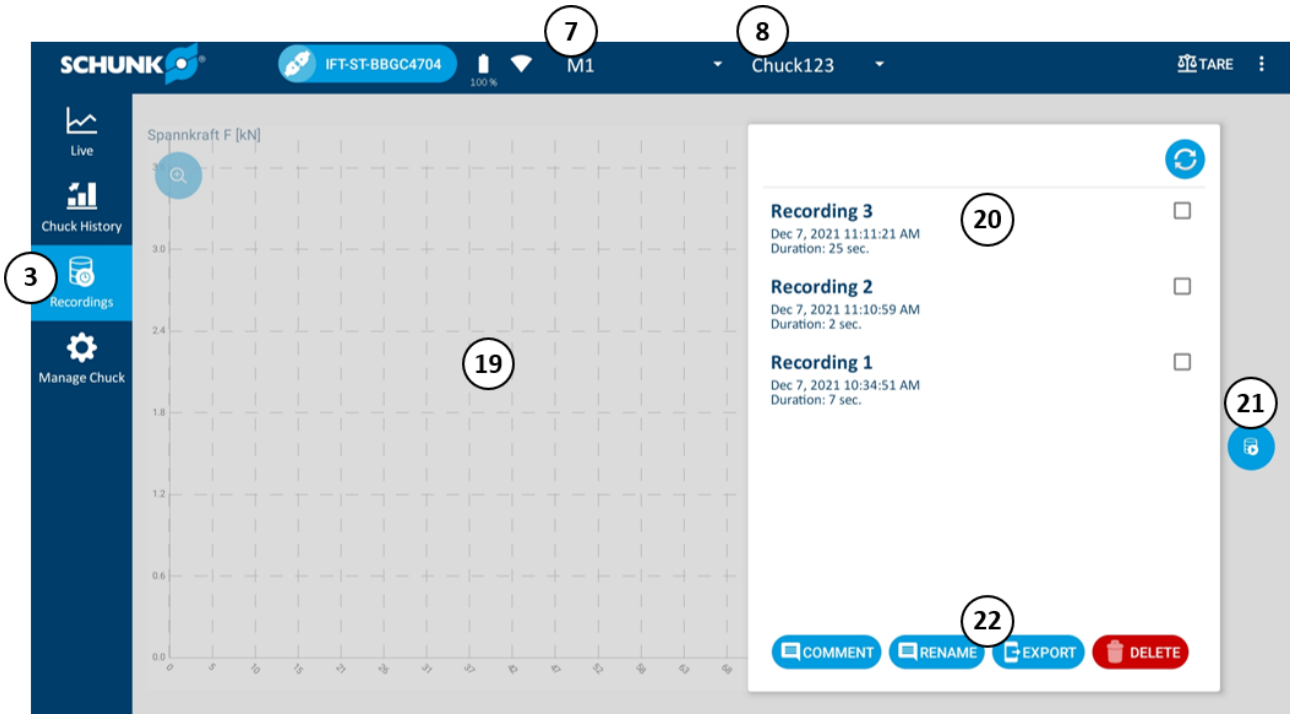
- History selection **(2)**.
- Selection of machine on which the clamping device is located **(7)**.
- Select the clamping device **(8)**.

Diagram with data items is displayed

- Selection of a desired measuring item on the diagram.
  - Bar changes color.
  - Data is displayed for the data item **(18)**.
- Export or delete data series **(16) (17)**.

4.3.5 Images

Images of clamping force/time diagrams can be saved in relation to the clamping device. These can then be viewed and edited.



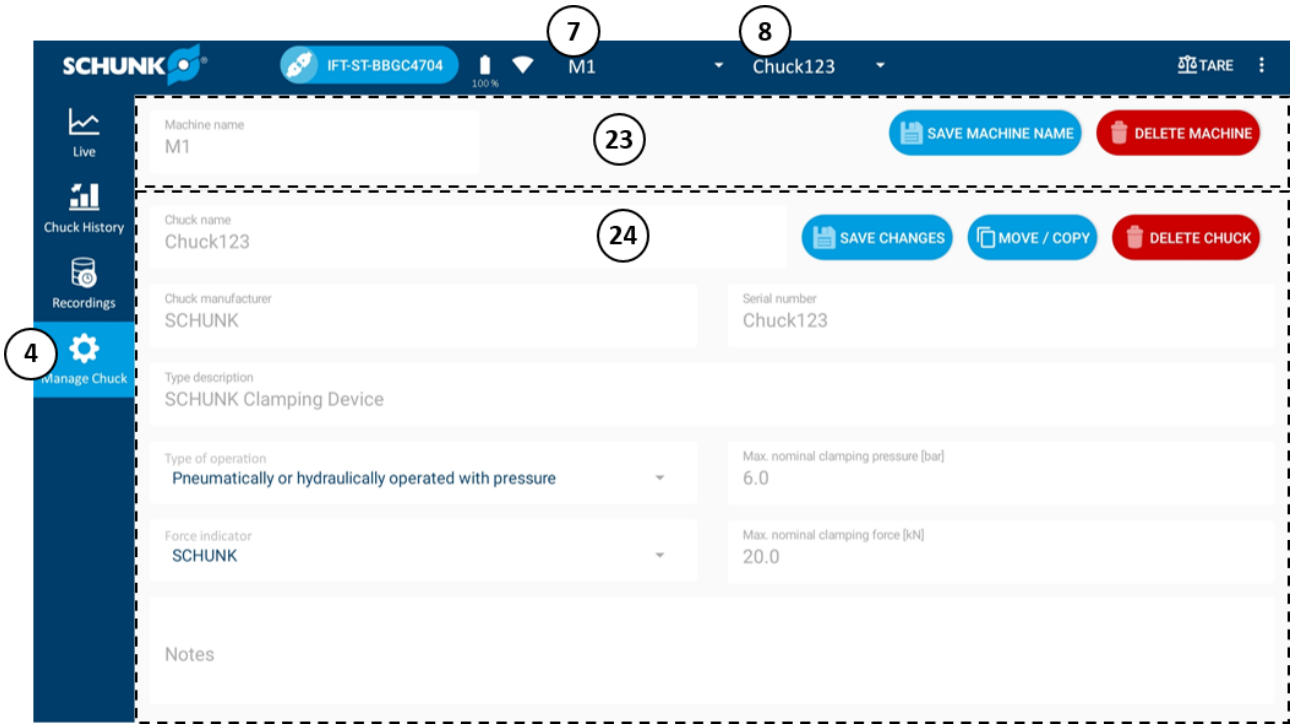
7	Button for selecting a machine
8	Button for selecting a machine-based clamping device
19	Diagram of data acquisition
20	Selection area for the available images
21	Hide / show selection area
22	Editing fields for the images saved

4.3.5.1 Saved images display

- Selecting images **(3)**
- Selecting the machine on which the clamping device is located **(7)**
- Selecting the clamping device **(8)**
  - Saved images are displayed **(20)**
- Selection of the desired image **(20)**
  - Diagram of measured values **(19)** is displayed
  - Editing the image **(22)** (comment, rename, export, delete)

4.3.6 Machines and clamping devices editor

In the machine and clamping devices editor, machines and associated clamping devices can be created, edited and viewed.



7	Button for selecting a machine
8	Button for selecting a machine-based clamping device
23	Machine parameters
24	Clamping device parameters

4.3.6.1 Entering and changing machines and clamping devices

- Open machine and clamping device editor **(4)**.
- Selecting or newly creating a machine **(7)**.
- Select or create the clamping device for the machine **(8)**.
  - All fields for the clamping device must be filled in.
  - The correct method of calculating the clamping force must be selected for the clamping device.

4.3.7 Calculation method of the clamping force

In clamping technology, the clamping force is determined using two different calculation methods. This can be selected in the APP for the respective clamping device. The selection is based on the clamping device manufacturer (SCHUNK, GRESSEL, KONTEC).

4.3.7.1 SCHUNK clamping device (e.g. TANDEM)

For SCHUNK clamping devices, the clamping force results from the arithmetic total of the jaw clamping force acting on each jaw. For clamping devices with two contact points (e.g. TANDEM), this results in a calculation factor of 2.0.

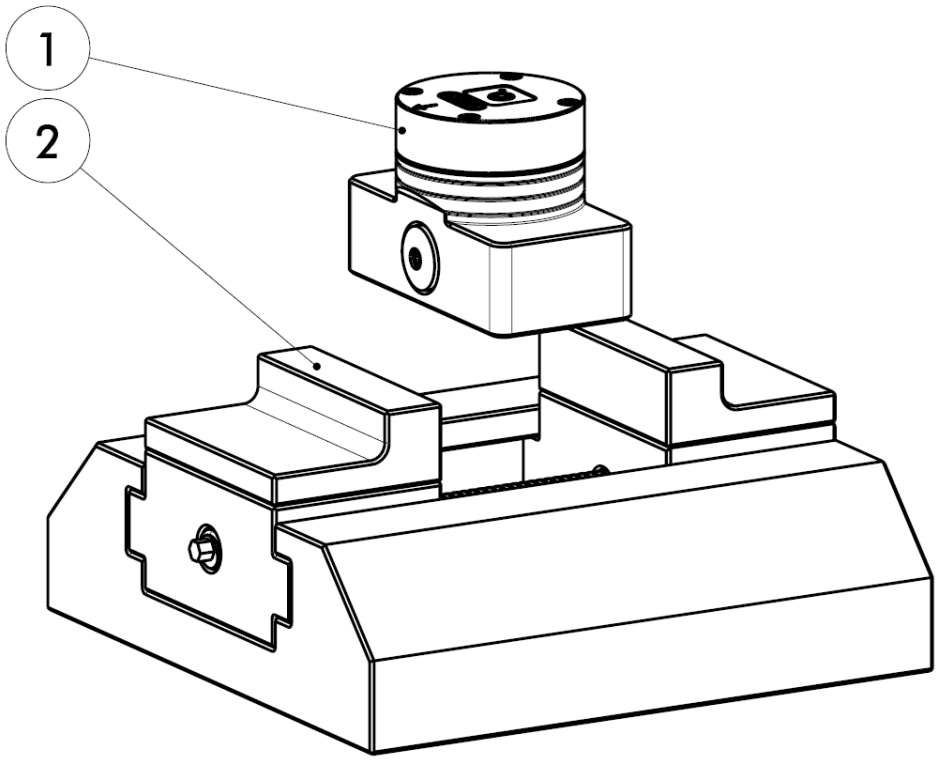
4.3.7.2 GRESSEL / KONTEC clamping devices

For clamping devices from GRESSEL or SCHUNK-KONTEC, the clamping force is equivalent to the jaw clamping force. This results in a calculation factor of 1.0.

4.3.8 Measuring procedure

4.3.8.1 Clamping force measurement

The clamping force can be used with the measuring head for clamping systems with two jaws. The sequence is explained using the example of a 2-jaw vise and can similarly be applied to other lathe chucks. The clamping force measuring device must be inserted plane-parallel to the clamping jaws. The contact point between clamping jaw and measuring head (clamping insert) must be centered for all planes. Particular attention must be paid to the clamping height.



1	Measuring head
2	Clamping devices

⚠ WARNING

Crushing!

- Do not reach between moving parts (measuring head and jaw).

5 Calibration and recalibration

Before delivery the measuring head is carefully checked and calibrated at the factory. A calibration certificate is enclosed with the measuring instrument.

To ensure the measuring accuracy, the measuring head must be recalibrated annually. For this, the measuring head must be sent to SCHUNK with the tablet and case.

In case of strong zero drift due to material fatigue or overload, recalibration is necessary.

CAUTION

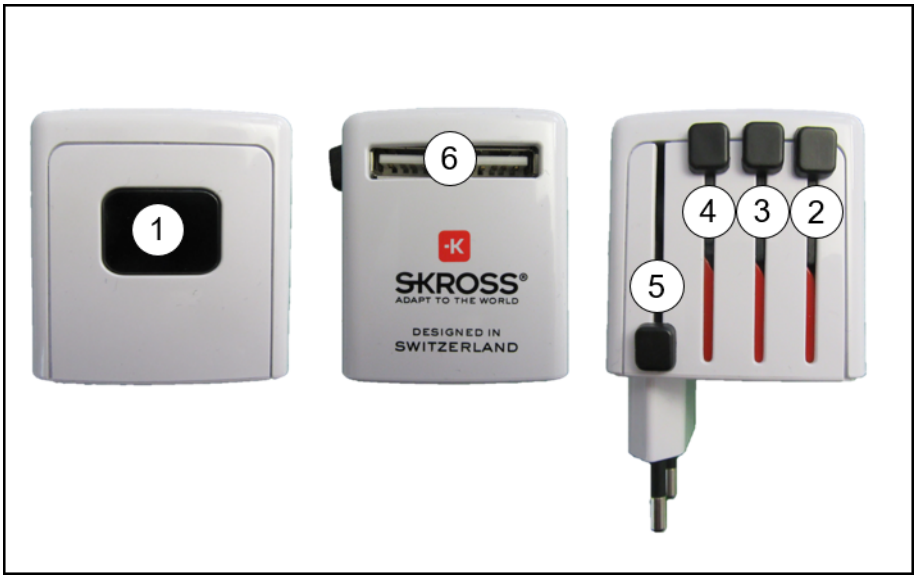
The SCHUNK IFT clamping force tester may not be serviced by the customer!

6 Charging adapter

With the "World USB Charger" charging adapter, the measuring head and the tablet can be charged in over 220 countries around the world.

Application:

- Before use, press the release button and push the desired slide (2-5) forward until it snaps in (click).
- Connect the USB device to the charger.
- Connect the charger to the mains.
- After use, press the release button and move the slide fully to its initial position.



1	Unlock button
2	Slide for country-specific plugs –USA, Japan
3	Slide for country-specific plugs – Australia, China
4	Slide for country-specific plugs – UK
5	Slide for country-specific plugs – Euro
6	Dual USB output

Technical data:

Input voltage	100 V - 250 V
Protection class II	
Output	5V / 2400 mA, 2x USB, shared

⚠ WARNING

Charger for temporary use!

Disconnect from the power supply after use.

⚠ WARNING

Do not expose the charger to liquids or humidity!

⚠ WARNING

Do not use with damaged housing!

7 EU Declaration of Conformity

in accordance with Directive 2014/30/EU (electromagnetic compatibility), Annex IV of the European Parliament and Council of 26 February 2014.
The manufacturer bears sole responsibility for issuing this EU declaration of conformity.

Manufacturer/ Distributor	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen

We hereby declare that the product described below is in conformity with the essential health and safety requirements of Directive 2014/30/EU in its design and construction and in the version placed on the market by us at the time of this declaration. The declaration is rendered invalid if modifications are made to the product.

Product designation	Clamping force tester SCHUNK IFT
ID number	1475766
	The subject of the declaration described above complies with the following harmonization legislation:
2011/65/EU	RoHS Directive

European harmonized standards applied:

EN 61000-6-2: 2016-05	Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments
EN 61000-3-3: 2011-09	Electromagnetic compatibility (EMC) - Generic standards- Interference emissions in residential, commercial, industrial and light industrial environments

Person authorized to compile the technical documentation:
Philipp Schräder, Address: see manufacturer's address

Signature: see original declaration

Mengen, December 2021 p.p. Philipp Schräder; Head of Engineering Design

H.-D. SCHUNK GmbH & Co. Spanntechnik KG

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