Operating Manual

Hardware/Software Version 1.8/1.5

Date: December 2012

H.-D. SCHUNK GMBH & CO. SPANNTECHNIK KG
Lothringer Straße 23, D-88512 Mengen
Tel. +49-(0)-7572-7614-0, Fax +49-(0)-7572-7614-99

Manufactured exclusively by
MESA Systemtechnik GmbH ♦ D-78467 Konstanz

Congratulations on your new ***Gripping Force Tester GFT®-X 270***! You have made an excellent choice in buying this innovative technology which offers a variety of advantages in its use. In order to avoid handling errors you should take a few minutes and read these operating manual carefully.

When you have read these manual you should keep them safely at a place where they can be easily accessed so you can refer to them again at any time. Keep your ***Gripping Force Tester GFT®-X 270*** in the transport case where it has optimum protection. When the device is dispatched for maintenance or repair, it must also be sent in the transport case so that the sensitive parts are protected in an optimum way during transportation.

The information and data contained in these operating manual may be modified without prior notice. No part of this documentation may be reproduced or transmitted for any purpose whatsoever, regardless of the mode or the means, electronically or mechanically, without the prior permission in writing of MESA Systemtechnik GmbH.

In order to protect the unit against fire, electric shock or potential destruction of the electronic components, it must never be exposed to rain or extreme humidity. Direct sun or heat are to be avoided as well.

Please do not try to open the hand-held unit or the measuring device. There are no parts inside which you could maintain.

All data in this publication have been compiled and checked with utmost diligence, nevertheless errors and mistakes cannot be totally excluded.

All modifications, in particular those relating to technological improvements, are reserved.

Table of Contents

1 Introduction

This manual contains important information about connection and safety operation of the ***Gripping Force Testers GFT®-X270***. Please read the safety instruction carefully.

2 Safety information

2.1 Introduction

The Gripping Force Tester GFT®-X 270 is constructed according to DIN EN 61010-1; VDE 0411-1:2009-06. At the upper front face the Handheld Unit contains an USB slave connector for data communication with a Windows® based computer and for power supply / recharging. The Power Supply Plug operates in the range of 100V~-240V~ alternating current and complies with EN60950-1 and UL60950-1.

2.2 Safety information pictograms

Helpfull Information / Hints
Pictogram advices helpfull informations and hints.

Danger!
Please read observantly, non-compliance may result in risk of severe damage to your health.

Warning!
Non-compliance may result in risk of damage at the GFT-X.

3 System requirements

Operating Systems

- Windows 2000
- Windows XP
- Windows Server 2003
- Windows Vista
- Windows 7

Recommended Hardware

- 233 MHz processor (*Recommended:* pentium 500 MHz or newer processor)
- 64 MB RAM (*Recommended:* 128 MB RAM or more)
- 20 MB of hard drive space

4 Introduction

The Gripping Force Tester GFT®-X 270 allows the measurement of tension when the chuck or collet is in either static or dynamic mode.
Using a complex array of strain gauges in the Measuring Head, the mechanical forces are converted into an electrical signal and amplified by the integrated electronics. The amplified signals are transmitted from the Measuring Head with an integrated UHF transmitter (433MHz) to the Handheld Unit to be displayed and processed.
On the display the current clamping force and, in dynamic mode, the accompanying number of revolutions of the chuck are indicated.

The Handheld Unit is equipped with a high resolution TFT display which shows all important menu items as icons. These icons, which are self-evidend, and a transparent command structure allows easy operation also for occasional users.
All items are designated for use in severe workshops, the Handheld Unit is in addition equipped with a silicon protector and offers therefore utmost protection against shocks and drop down.

4.1 Packing list

When you open the case, please make sure that all parts and components are included in the **Gripping Force Testers GFT®-X 270 M3 / M4** package:

- ☑ Handheld Unit GFT®-X 270 with Protector
- ☑ Power Supply Plug with USB master-connector
- ☑ Adapter for North America, United Kingdom, Australia and Europe
- ☑ GFT®-X *ChuckExplorer* for Windows-XP / Windows 7
  (CD contains operating software and operating manual)
- ☑ USB- connecting cable from Handheld Unit to PC/Laptop, approximately 1m length
- ☑ Measuring Head for jaw chucks with rotating electronics and 4 each of Extension Cylinder for jaw diameter ø72mm
- ☑ 3 each Extension Cylinders for jaw diameter ≥88 und ≥108mm
- ☑ Torx-key T15 inclusive spare screws
- ☑ Stand with magnetic mounting for rpm measurement
- ☑ Measuring Head - charging cable, 2 pin, approximately 1m length
- ☑ Loading Bracket for Measuring Head

The **GFT®-X Upgrade Kit** includes following parts:

- ☑ Handheld Unit GFT®-X with Protector
- ☑ Power Supply Plug with USB master-connector
- ☑ Adapter for North America, United Kingdom, Australia and Europe
- ☑ GFT®-X *ChuckExplorer* for Windows-XP / Windows 7
  (CD contains operating software and operating manual)
- ☑ USB-connection cable from Handheld Unit to PC/Laptop, approximately 1m length

GFT®-X Upgrade Kit can only be used for Measuring Heads showing a serial number of >= 0089-3.

For other Measuring Heads packing list can vary.

5 Overview

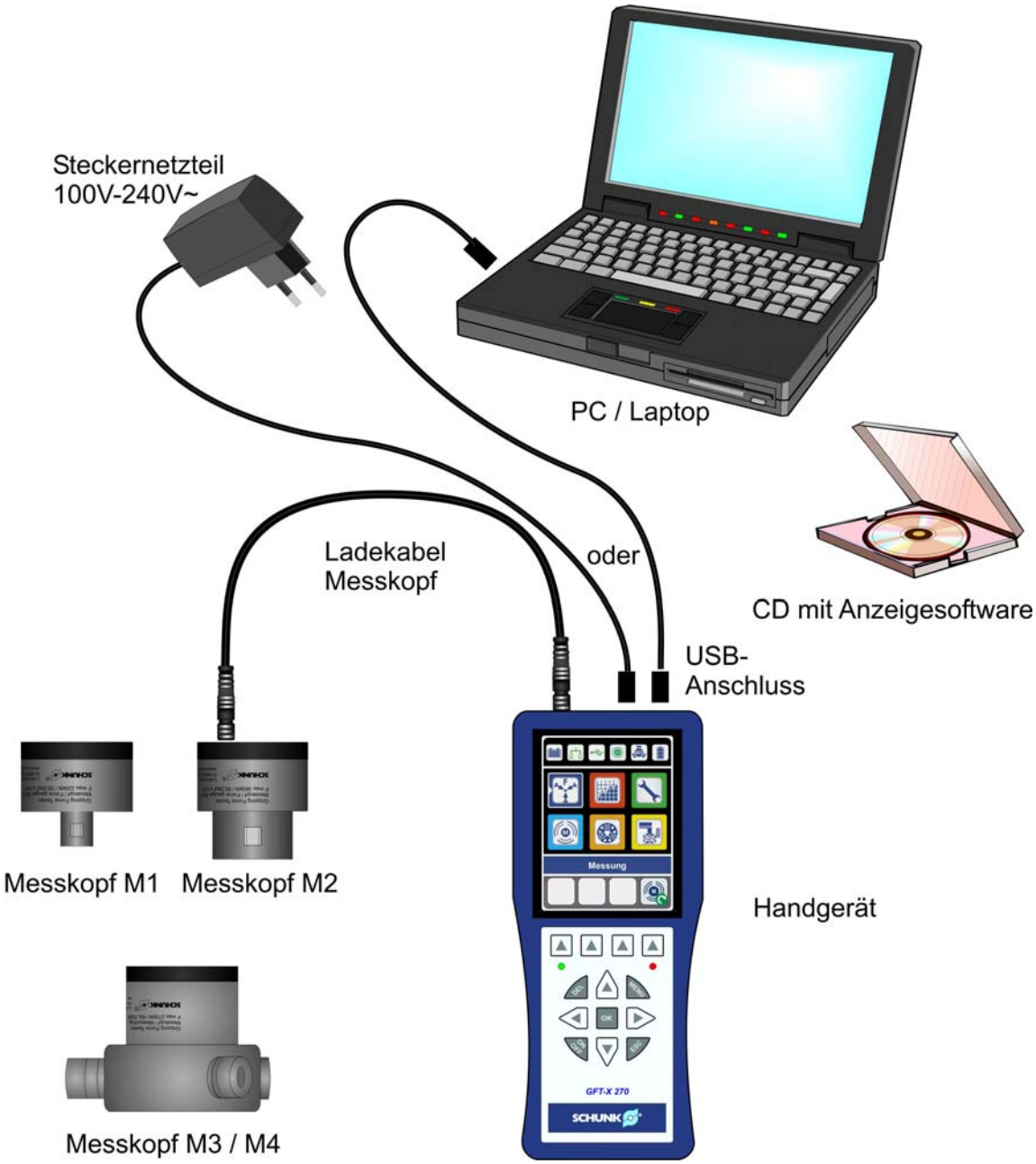


Figure: GFT®-X measuring set up

A fundamental distinction is made between stationary and dynamic mode:

Static operation
Measuring Head to be clamped, magnetic mounting for rpm measurement is not needed

Dynamic operation
Measuring Head to be clamped, the stand for rpm measuring is fastened to the support of the machine. Now the support must be positioned in such a way that the magnetic bar ends besides the black cover of the Measuring Head (see chapter 8.3.2)

6 Technical Data

6.1 GFT®-X Handheld Unit

Power supply	via USB, 5V DC
Measurement range / gripping force F	indication in kN or lbf, selectable by user bargraph in % full scale, wheras value of measurement range is indicated as follows: 0.....80% green, 80….95% yellow, 95...100% red.
Measurement range / speed (rpm)	indication in 1/min (can be switched off)
Dimensions	220x100x50mm
Weight	460g
Operating temperature	0...40°C
Protection class	IP54
Interface PC / Laptop	USB 2.0
Data cable/charging cable Handheld Unit	approx. 1,5m length
Charging cable for Measuring Heads	approx. 1m length including mating connector
Receiving frequency	433,92 MHz
Distance Handheld Unit / Measuring Head	see chapter 6.2 / 6.3

6.2 Measuring Heads for collets

	Measuring Head M1	**Measuring Head M2**
Power supply	internal energy storage	
Energy storage capacity	ca. 1,5h@50% duty cycle	
Measurement range/gripping force F	0...75kN	0...120kN
Measurement range/ speed of rotation (rpm)	>approx. 200*) to <10.000 rpm	>approx. 200*) to <8.000 rpm
Accuracy (F/rpm)	<5% / <1% fsr	
Clamping diameter	18mm	42mm
Number of jaws	3	3
Dimensions	ø18/57x56mm	ø42/57x63mm
Weight	400g	700g
Operating temperature	0...40°C	
Protection class	IP65	
Transmitting frequency	433,92MHz	
Charge time	<3 minutes	
Distance Handheld Unit/ Measuring Head	>1m and <4m straight line (value may vary depending on the ambient conditions)	

*) the lower value can start from 60 rpm by reducing the gap between magnet and Measuring Head from 3mm to about 2mm

6.3 Measuring Heads for jaw chucks

	Measuring Head M3	Measuring Head M4
Power supply	by internal energy storage	
Energy storage capacity	approx. 1,5h@50% d.c.	approx. 1,5h@50% d.c.
Measurement range/gripping force F	0…180kN (2 jaws) 0…270kN (3 jaws)	0…30kN (2 jaws) 0…45kN (3 jaws)
Measurement range/speed (rpm)	>ca. 200*) bis <6.000 rpm	
Accuracy (F/rpm)	<3% / <1% fsr	<1,5% / <1% fsr
Clamping diameter	72…108mm	
Number of jaws	2 or 3, user adjustable	
Dimensions	ø68/57x63mm	
Weight	700g without extentions	
Operating temperature	0…40°C	
Protection class	IP65	
Transmitting frequency	433,92MHz	
Charge time	<3 minutes	
Distance Handheld Unit/ Measuring Head	>1m and <4m straight line (value may vary depending on the ambient conditions)	

*) the lower value can start from 60 rpm by reducing the gap between magnet and Measuring Head from 3mm to about 2mm

6.4 Mains / Battery operation

The GFT®-X Handheld Unit is supplied by 5VDC (500mA) via a Power Supply Plug with an input voltage range from 100VAC to 240VAC. Different interchangeable blade assemblies for North America, United Kingdom, Australia and Europe are included.
Please see chapter 13 for a guidance to exchange the interchangeable blade assemblies.

Furthermore GFT-X is equipped with a powerful battery (Li-Ion). A one time charge allows an operation up to 5 hours. During this time frame, a Measuring Head can be loaded up to 4 times out of the Handheld Unit battery.

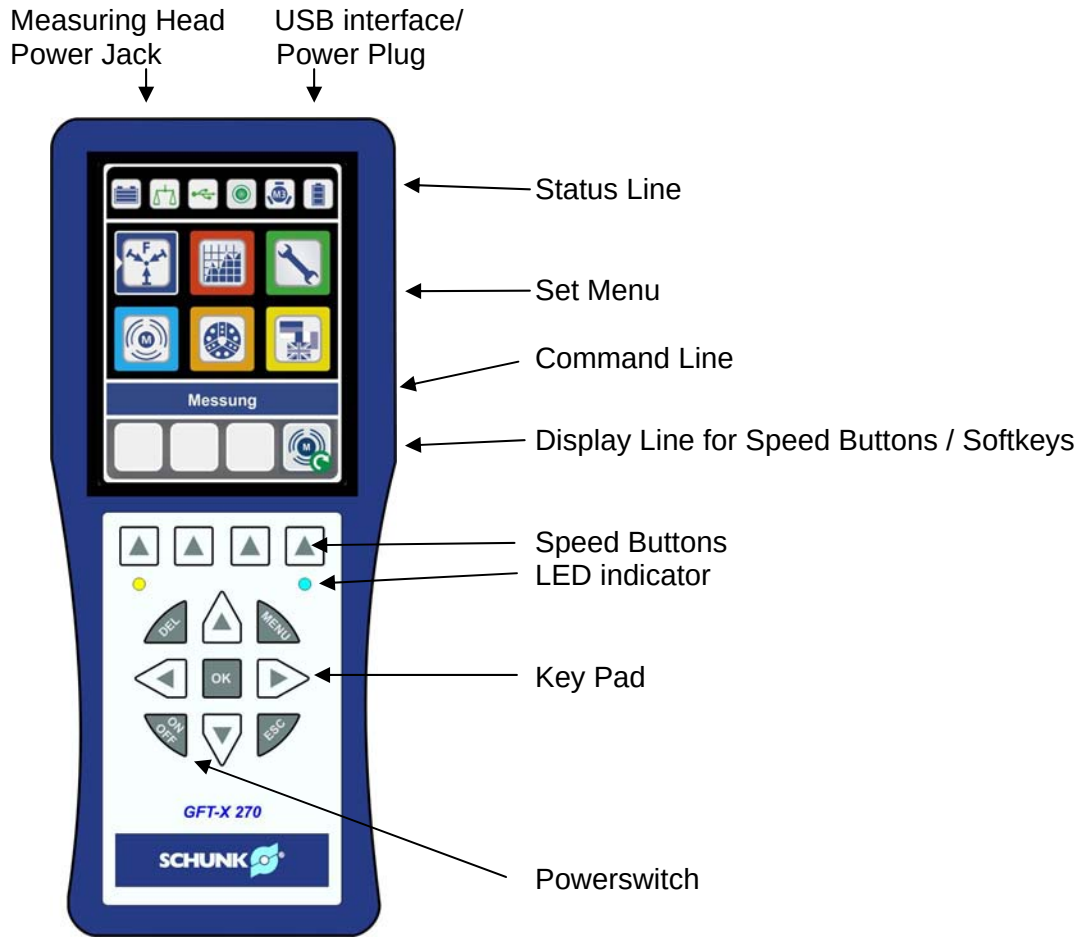
A correct indication of the charge condition is only possible until the battery is completely full charged and discharged first. It's recommended to charge the handheld unit first completely and then use it until the power is turned off automatically.

Charging condition of the battery is indicated on battery symbol in Status Line, left side (see chapter 7.3).

Battery could, if not in use and not charged for several months, discharge itself.
If operating time drops down to less than 2 hours it is recommended to replace the battery (see chapter 15)

7 Handheld GFT®-X

7.1 Overview



7.2 Keyboard GFT®-X Handheld Unit

To switch on and off the Handheld Unit press ON OFF for about 2 seconds. First it appears the Welcome Logo, at the same time blue LED twinkles. The Set Menu appears after 2 seconds automatically.

Speed Button – With this button the above indicated menu item will be chosen. These buttons are freely configurable (see chapter 7.4)

Moves icon or line above / Moves icon or line down

Moves icon or character / number to the right

Moves icon or character / number to the left

DEL Delete deletes last input (character / number)

MENU Menu Back to Main Menu

ESC ESC Back one level above

OK OK Confirm selection

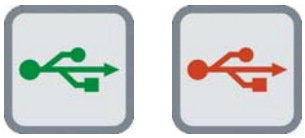
7.3 Status Line

Explanation of the symbols from left to right:

>80% >50% >10% <10% <10%, <10min (charging condition/remaining time)

Indicates the current charging condition of the integrated Lithium-Ion battery. At a remaining operating time of less than 10 minutes a pop-up window appears and remembers you to connect the Handheld Unit to a Power Supply or a PC.
If the charging symbol turns red it is not possible charging the Measuring Head or the charging process stops.

If an unloaded Measuring Head shows >0kN (offset), tare is possible by pressing  in the menu Measurement.
Deviations >3% (M1 – M3) and >5% (M4) of measurement range couldn´t be compensated. The Measuring Head should be returned for service.
Meaning of symbol colors:
Green symbol - Measuring Head works fine, no tare applied
Yellow symbol - Measuring Head still works fine, however tare has been applied
Red symbol - Measuring Head for service, offset to large, tare is impossible



Green symbol if PC or Power Supply is attached and connection is fine. Red symbol means no USB connection.

Blinking green symbol indicates proper radio communication to Measuring Head.
Red symbol indicates disturbed radio communication or no Measuring Head available /in range.

Indicates chosen Measuring Head M1 or M2. At M3 and M4 the number of jaws is also indicated.

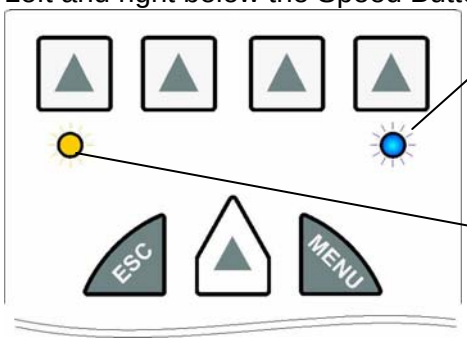
Charging condition of Measuring Head, quantitative indication only (shown if measuring head is switched on).

Tara function always to refers to the dedicated Handheld Unit. If Measuring Head is tared with different Handheld Units the Measuring Head could be damaged.

The charging condition detection of Handheld Unit is self-learning. It takes several charging cycles till the charge status is detected properly. First charge is already made at factory.

7.4 LED indicator

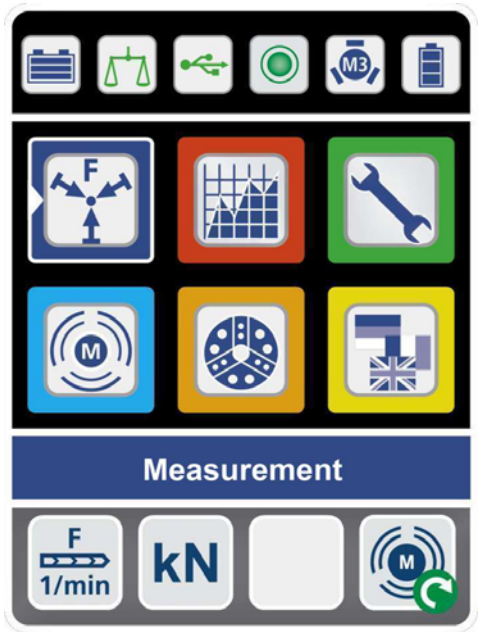
Left and right below the Speed Buttons two LED are located with following meaning:



- While pressing ON/OFF twinkles some times prior to Welcome Logo appears
- twinkles as soon display turns into Power Save Mode (display almost dark)

Charge indicator: LED is illuminated during charging is in progress

7.5 Speed Buttons



The lowermost line of the display is reserved for Softkeys which can be programmed by the user. The left three Icons are free to be programmed, whereas the Icon on the right side is predetermined to charge the Measuring Head.

Setting / programming Speed Buttons
-choose the relevant function
-activate the Icon (triangle on the left and a highlighted frame)
-press desired Speed Button for about 2 seconds
-the Icon appears in the display

As soon as desired symbol appears in the Speed Button Bar, the programming is finished successfuly.

The Softkeys could be programmed as often as desired.

Already programmed keys couldn´t be deleted. Only overwriting is possible.

In some Menus not each Softkey is available.

7.6 Menu GFT®-X Hand Held - outline

Use the arrow keys for easy navigation on Set menu. By pressing OK you will end up directly to the important sub menu.
The chosen or activated Icon will be discovered by a triangle on the left side and a highlighted frame. A clear explanation is also shown in the Command Line.

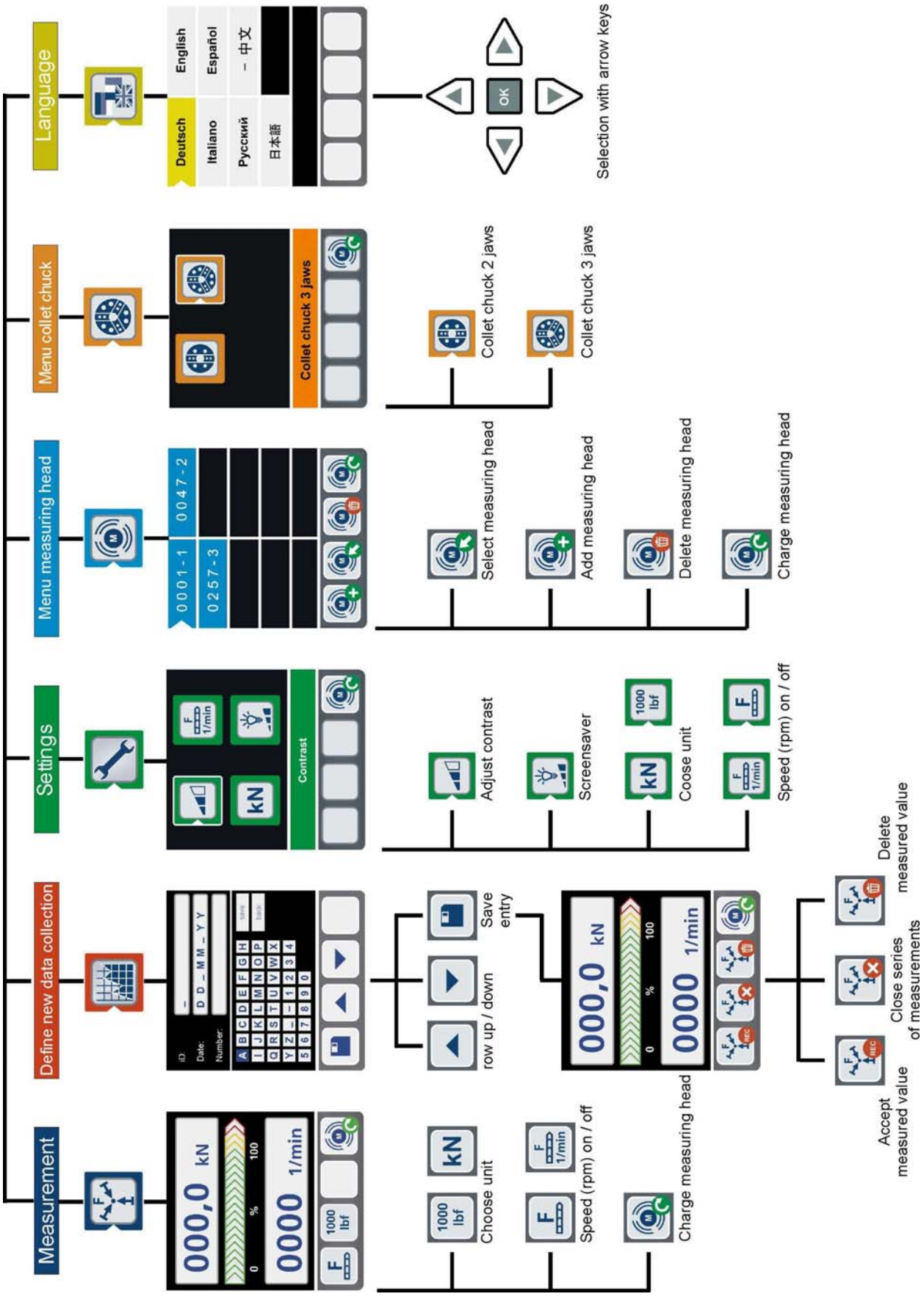
The main menu encloses represented icons:

Icon)*	*Description*	*Further notes*
	Measurement	see chapter 7.6.2
	Define new data collection	see chapter 7.6.3
	Settings	see chapter 7.6.4
	Menu Measuring Head	see chapter 7.6.5
	Menu collet chuck	see chapter 7.6.6
	Select language	see chapter 7.6.7

*) All Icons figured as „selected“, identifiable by the white triangle, at the left side of the border.

All functions and Icons are explained in a tree structure on next page, followed by a detailed description of the relevant commands.

7.6.1 Menu-Overview



7.6.2 Measuring

Individual measurement for an experimental setup could easily be performed and displayed with this function. The Measuring Head to be chosen should be desired and activated under Icon Menu Measuring Head.

If a pop up Windows appears with „No Measuring Head connected!“ make sure that Measuring Head is switched on (white LED on Measuring Heads front face is twinkling). Radio communication should also be checked.

7.6.2.1 Measuring Head Recalibration

If the Measuring Head is connected to GFT®-X Handheld Unit, following message will be shown:

Serial number: x x x x – x

Calibration expires:
When using a new Measuring Head it will give an advice (see date code) to a label sticked on the Measuring Head. The sticker shows the date when factory calibration date expires.
After the first factory recalibration the date of expire will be shown in a format MM_YYYY like shown in the sample left. Recalibration should be performed at least every 12 months to guarantee correct function of Measurement Head.

Version: y_y displays software version of Measuring Head

To be confirmed by pressing OK

The Handheld Unit now shows the current measurement values. If no load is applied to the Measurement Head and the indication shows a value >0kN, tare function can be applied by pressing ▷ (see chapter 7.3).

Depending on individual Setting (see chapter 7.6.4) the force only will be indicated or both force and speed. The unit for force can be adjusted to kN or lbf (1kN = 0,2248 x 1000lbf).

If needed the Measuring Head can be recharged directly form this menu by using the relevant Speed Button.

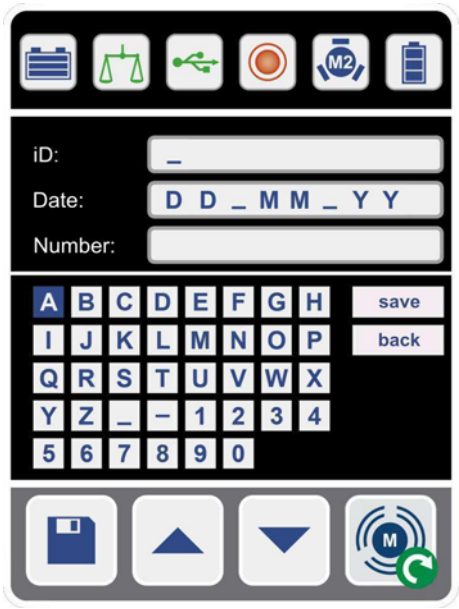
If no Measuring Head is chosen the message No Measuring Head connected! appears. This window must be confirmed by pressing OK. Managing all Measurement Heads must be performed under Menu Measuring Head, chapter 7.6.5.

7.6.2.2 Recharge Measuring Head

This Icon is available independent where you currently are. It allows easy and fast loading of a linked Measurement Head at any time. Just link the Handheld Unit to the Measurement Head (switched off) with the Connecting Cable and press the relevant Speed Button. The message "Measuring head battery charging…" appears. Is the loading process finished after a few minutes the message "Battery is fully charged" appears. Both popup windows should be confirmed by OK.

7.6.3 Define new data collection

This function allows the aquisition of up to 20 measurement values and store them under a user defined name. This data can be processed afterwards by the *ChuckExplorer.* This tool allows easy transfer of the data to a PC, showing it on xy diagram and archive it. The number of stored data to be transferred to a PC is not limited.



First put in your individual entry. Navigate by using arrow keys , confirm by OK corrections to be made by DEL or back.

iD:	up to 10 characters/numbers
Date:	use format **D**ay**D**ay_**M**onth**M**onth_**Y**ear**Y**ear (just use 2 last digits for year, e.g. 11 for 2011
Number:	maximum 3 digits, numbers only, range from 1 to 254

Activate save or press the Speed Button floppy disk to memorize your entries. Now you jump directly to measurement mode. Besides the measurement values the number of stored measurements are indicated.

Use the arrow keys to navigate to the next entry.
Pressing Disc symbol in the Speed Button all entries are stored and a jump to measurement mode follows. If window keep staying the same the cursor shows you an invalid or not complete entry. Please check this line and try again.

If cursor keeps staying on the input mask after save or disk symbol is activated, the Handheld Unit has recognized an entry error. Please check your entries regarding this chapter again and use just valid characters.

Speed Buttons layout for further actions:

	Accept / overtake measured value
	Finish series of measurements and exit to Set Menu
	Delete measured value
	Charge Measuring Head (see chapter 7.6.2.2)

Handheld Unit always stores the last Measurement Head in use. If you switch on the Handheld Unit after a while you do not have to activate the Measuring Head again. The serial number will be stored inside the device till a new entry follows.

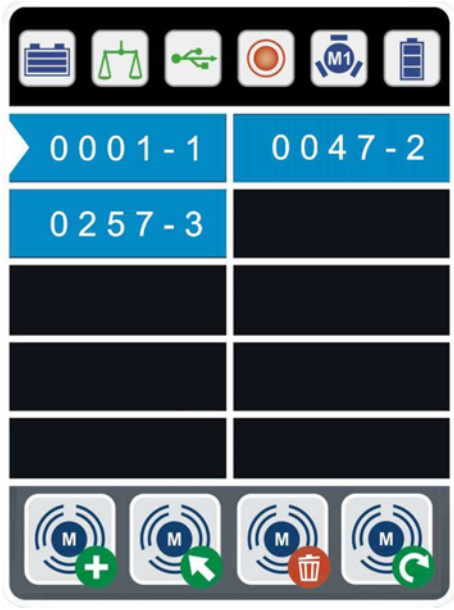
7.6.4 Settings

Following functions are available in this menu:

	Contrast	Allows quantitative changing of brightness by pressing arrow keys left or right, confirmation by OK
	Display	Indication of measurement values: force and number of revolutions or force only
	Units	Force unit to be changed from kN to lbf and v.v.
	Screen saver	Screen saver to be activated after x minutes when no entries happens. Time to be set from 1 bis 43 minutes, acceptance of indicated value by pressing OK. Reduces brightness to a minimum and helps to increase operating time. When in Save mode the first entry leads to normal indication again.

7.6.5 Menu Measuring Head

The Gripping Force Tester GFT®-X can operate with different Measuring Heads. Available are Measuring Heads for jaw chucks and collets. Furthermore, there is a choice of different clamping forces, dimensions and number of jaws available.



Basically only one Measuring Head can communicate with Handheld Unit at the same time. However this menu allows administration of up to eight Measuring Heads. The activated Measuring Head is marked with a triangle on the left side of label.
The image on the left shows a Measuring Head with serial no 0001-1 which is active.

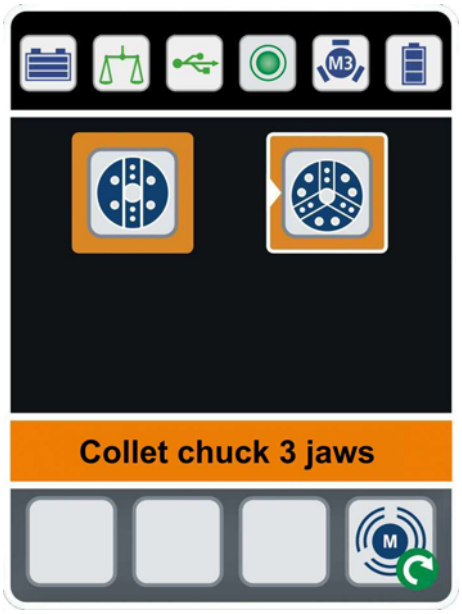
To navigate use the arrow keys, confirm with 

The following commands are available:

	Choose Measuring Head	Activates the relevant Measuring Head with the triangle from the index
	Add a (new) Measuring Head	A sub menu will open and requires the entry of a new Measuring Head serial number.
	Delete Measuring Head	Deletes the Measuring Head marked
	Recharge Measuring Head	see chapter 7.6.2.2

7.6.6 Menu collet chuck

This menu refers to chuck jaw Measuring Head only, which serial number ends with xxxx-3 or xxxx-4. The Measurement Head M3 and M4 offer the choice of 2 or 3 jaws.



The selection of the number of jaws is made with arrow keys of the keypad. The active choice is indicated with a white arrow.

For confirmation press OK .

7.6.7 Select Language

The GFT®-X Handheld Unit is prepared for several languages:

 German

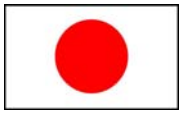
 English

 Italian

 Spanish

 Russian

 Chinese

and  Japanese.

The selection is made with the arrow keys and confirmed by OK .

8 Measuring Head

There are four different Measuring Heads available for the GFT®-X. Two for collets (M1 and M2) and two for chucks (M3 and M4)

The Measuring Head works according to the following principle:
Via a dedicated arrangement of strain gauges inside the Measuring Head, the mechanical forces are converted into an electrical signal which is amplified by the integrated electronics, transformed into a digital radio signal via a micro-controller and sent to the Handheld Unit. There the data signal is encoded and displayed.

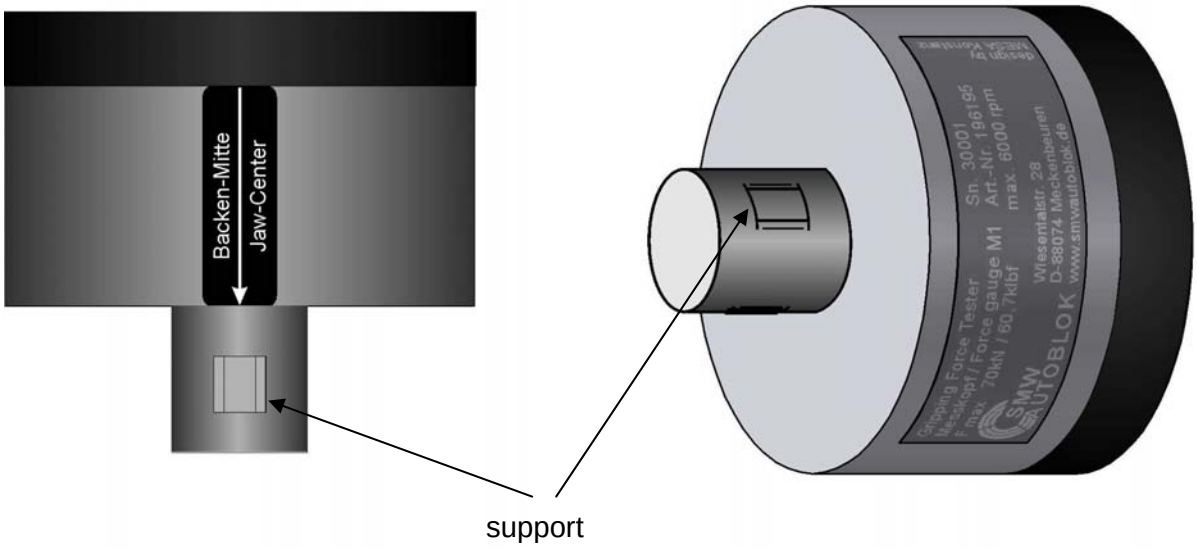
Factory provided the Measuring Heads are calibrated. After respectively 12 months a check-up and a recalibration should take place by the manufacturer. The date for the next calibration is shown under Menu Measurement or marked on the Measuring Head (see chapter 7.6.2.1).

The maximum load is mentioned on each Measuring Head. Please make sure that this value will not exceed because this can lead to non valid measurements or even to the destruction of the Measuring Head.

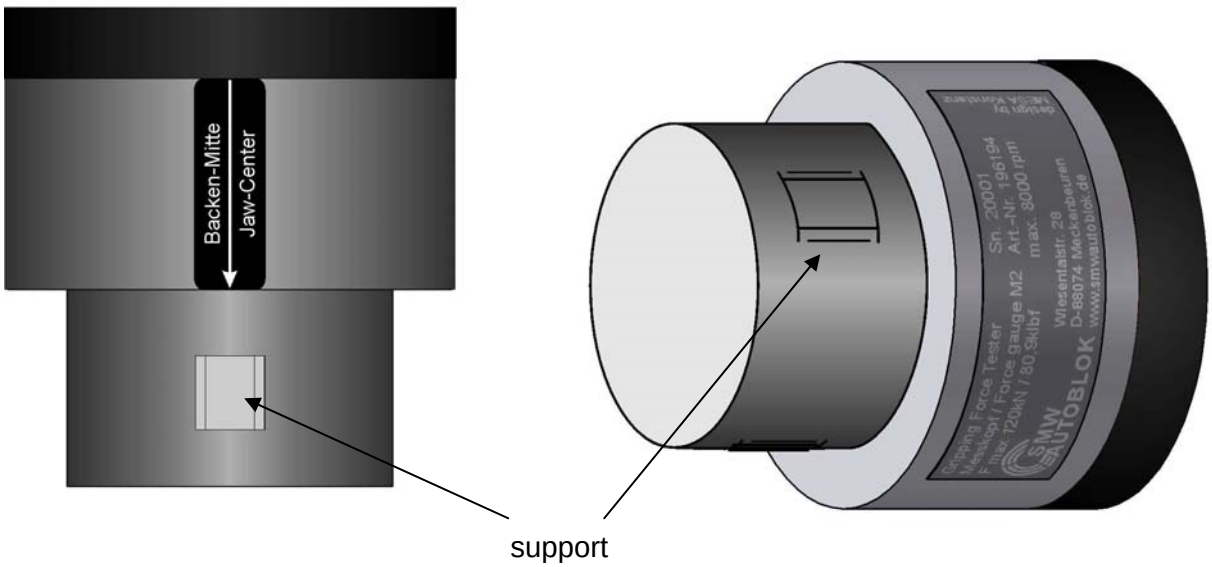
Please be assured, that prior to measuring procedure the Measuring Head is tight and plane-parallel clamped to the rotational axis.

8.1 Measuring Head M1 and M2 for collets

Via the 3 contact surfaces (support) on the Measuring Head the force is transmitted to the measuring elements inside the housing. It is recommended to use special collets with smooth finish in order to avoid damage to these contact surfaces. Furthermore, care must be taken to insert the measuring head in such a way that it does not get tilted. The "jaw centre" inscription must correspond to the centre of one of the three collet jaws. Please note, that compliance with the above instructions will be decisive for the quality of the measuring values.



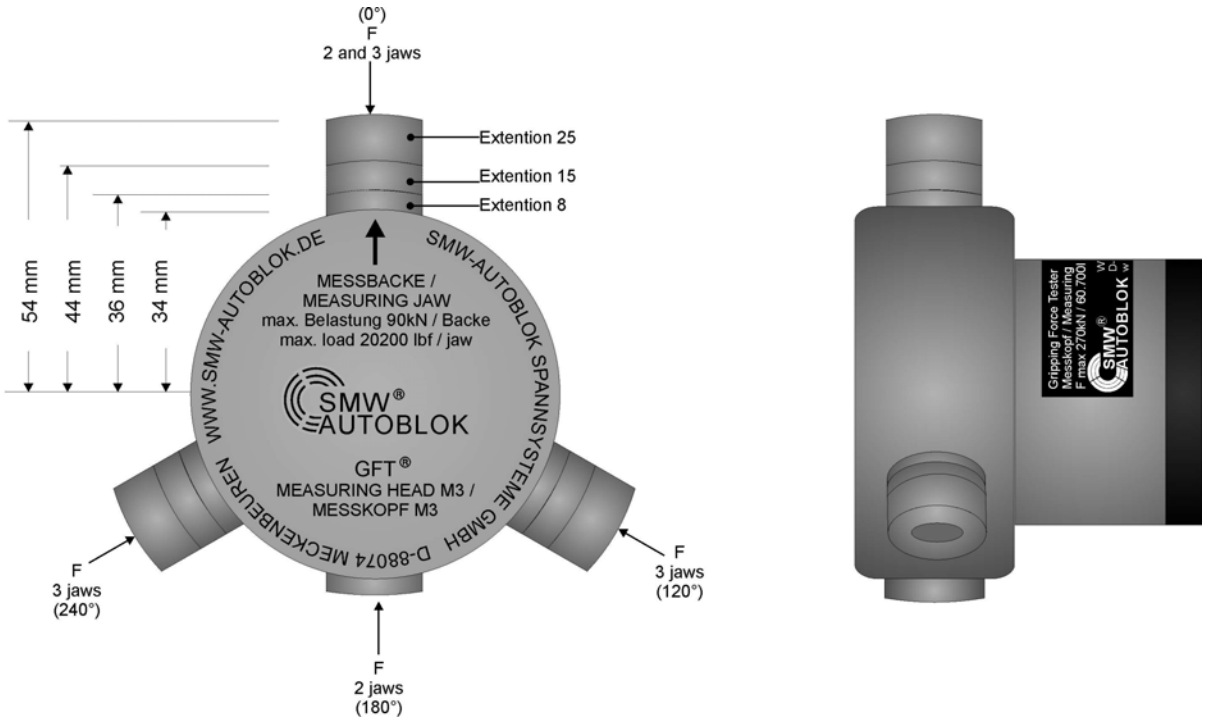
Measuring head M1 (max. 75kN)



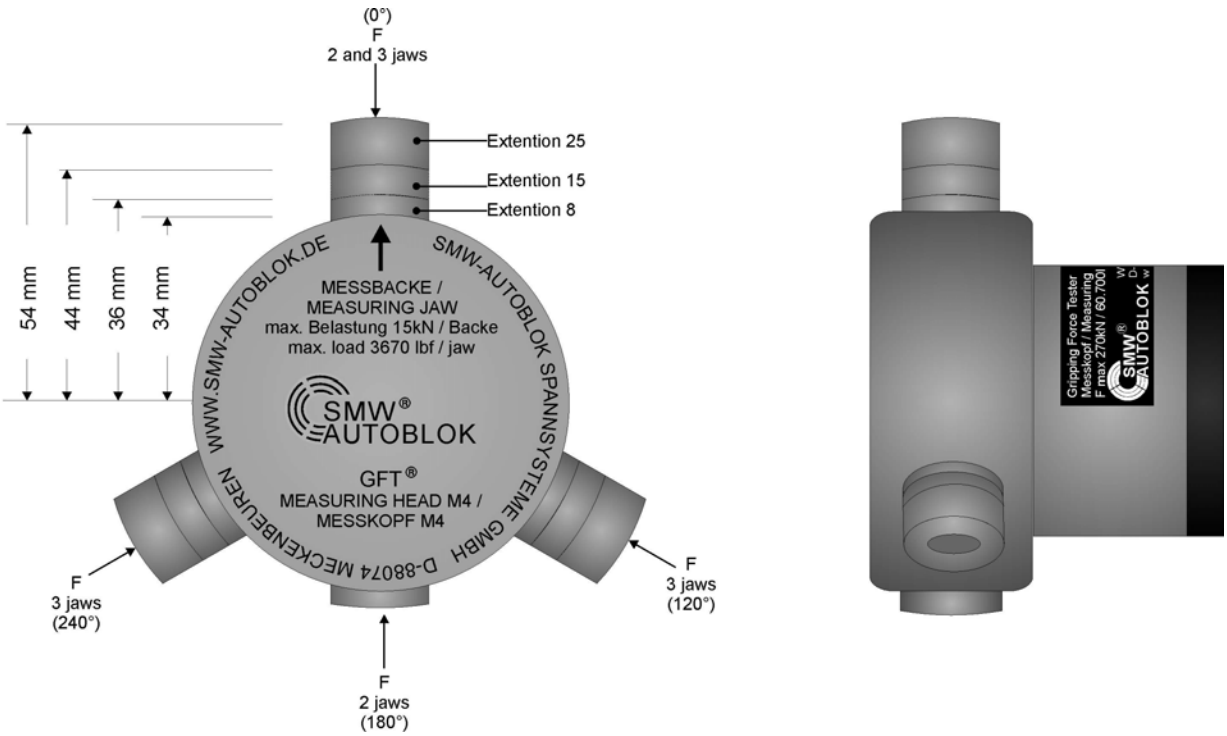
Measuring Head M2 (max. 120kN)

8.2 Measuring Head M3 and M4 for jaw chuck

The Measuring Head M3 and M4 are provided for the measurement of tension or force in jaw chucks. The Measuring Head M3 is designed for forces up to 90kN per jaw, the Measuring Head M4 offers higher resolution up to a maximum clamping force of 15kN per jaw. Different Extension Cylinders making the Measurement Head M3 and M4 applicable for nearly all kinds of jaws. Extension Cylinders for minimum jaw diameter of 72, 88 and 108 mm are available by default.



Measuring Head M3 (maximum load 90kN/jaw)



Measuring Head M4 (maximum load 15kN/jaw)

Figure:
Measuring head M4
with warning notice max. 45kN / 3 jaws)
(complies to 15kN / jaw)

By operating M3 or M4 following hints have to be considered:

Operation with 2-jaw chuck:
If operated with 15 or 25mm extension, the 8mm extension must always be mounted to the unused jaws (at 120° und 240°)
Always fit the extension symmetrically (0° and 180°)
Always mount the Extension Cylinder firmly (screw the Torx screw down tightly)

Operation with 3-jaw chuck:
If operated with 15 or 25mm extension, the 8mm extension must always be mounted to the unused jaws (180°)
Always fit the extension symmetrically (0°, 120° and 180°)
Always mount the Extension Cylinder firmly (screw the Torx screw down tightly)

Only with original accessories correct measured values are ensured.

8.2.1 Measuring Head Extension Cylinder for M3 und M4

The Measuring Head Extension Cylinder transmits the tension forces to a load cell located inside the Measuring Head. For different chuck diameters Extension Cylinders are supplied which can be easily exchanged to suit. A T15 Torx key is included for loosening and tightening the screws.

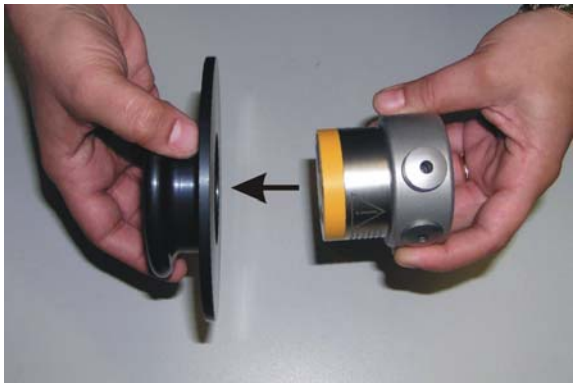
The extension cylinders are to be used as follows:

Jaw chuck (Diameter in mm)	72mm	88mm	108mm
Extension Cylinders in mm	8mm	15mm	25mm

Assembly instructions see chapter 8.2.2

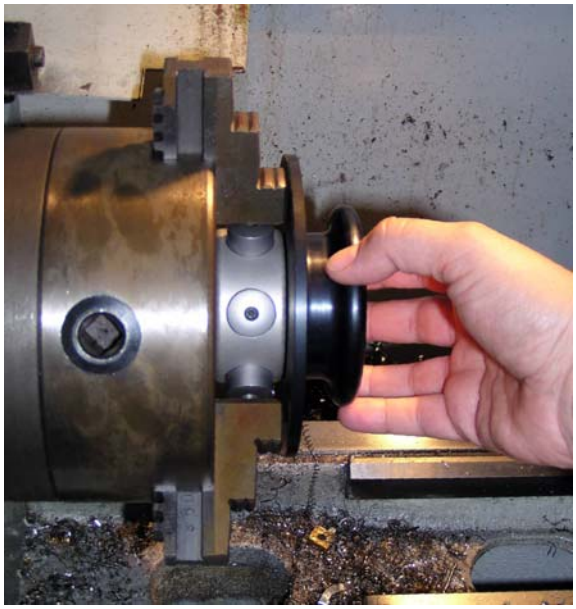
8.2.2 Mounting M3 und M4 Measuring Head

From the safety point of view and to prevent any injury, the Loading Bracket must be used to put the Measuring Head M3 or M4 into the chuck.



Take the Loading Bracket like shown in the picture and put the Measuring Head M3 or M4 into it. After this, the Measuring Head can be insert into the chuck until the Loading Bracket fit tightly in the chuck. Now the chuck must be tensioned.

Because of that it is guaranteed, that the Measuring Head is not tilt and it is in the optimum measuring position.



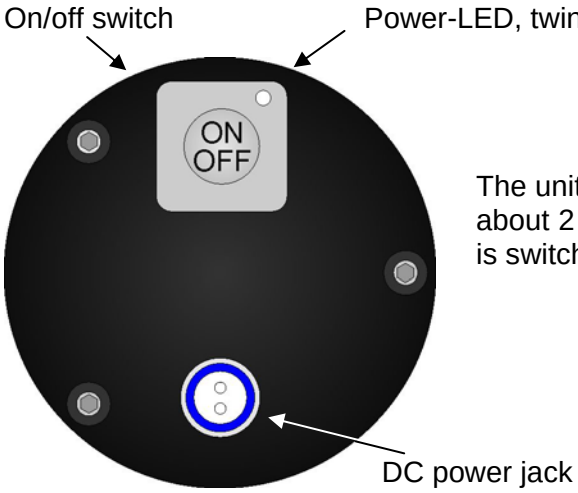
Put the Measuring Head like shown into the chuck.

Is the chuck tensioned, the Loading Bracket have to be removed.

Please be assured, that prior to measuring procedure the Measuring Head is tight and plane-parallel clamped to the rotational axis and the Loading Brackets are removed.

8.3 Measuring procedere

Starting with the first measurement make sure that the Measuring Head is fully charged. For this purpose the Measuring Head Power Jack is to be linked to the Charge receptacle of the Measuring Head (switched off).



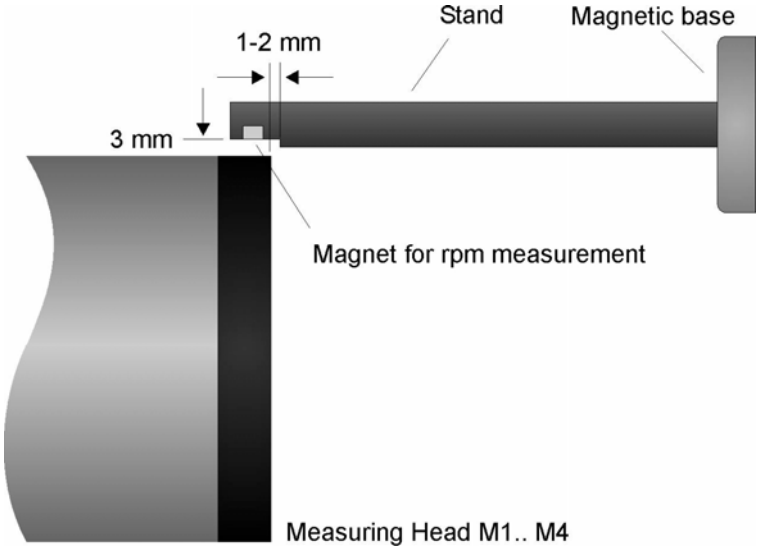
The unit will start operation by pressing the ON/OFF key for about 2 seconds if the LED is blinking, the Measuring Head is switched on.

Figure: Front cover Measuring Head

8.3.1 Static Measuring

For static measuring the Measuring Head is clamped and switched on. After the Handheld Unit has been switched on, the immediate tension is recorded and indicated on the display.

8.3.2 Dynamic Measuring



After the Measuring Head has been clamped in a parallel plane (see chapter 8.2.2) the stand with the magnetic base must be fastened to the support of the tool machine and positioned in such a way that the lateral distance between the flattened end of the stand and the Measuring Head is approximately 3 mm. The distance between the top of the cover and the edge of the flattened part of the stand should be 1-2 mm approximately. The stand should end with the yellow cover of the Measuring Head before the steel part begins.

When the Handheld Unit is switched on and rmp measuring is activated, the current gripping force is determined and shown on the display. When the chuck is rotating at the same time, the display shows besides the gripping force the corresponding actual number of revolutions

If no data is displayed although the Handheld Unit is switched on and the measurement menu is activated, proceed according chapter 13 Trouble shooting / FAQ´s.

9 Calibration, Recalibration

The GFT®-X is carefully tested and calibrated on a test bench at the factory. A calibration certificate is enclosed. This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

The zero point of the Measuring Head could change due to stress (material fatigue) and due to temperature variation. In a narrow range the measured value can be tared (set to zero) referring 7.6.2.1.
The GFT®-X is a calibrated measuring equipment, a recalibration should be performed by the manufacturer after 12 months of operation. For calibration purpose we will ask you to send the complete GFT®-X unit back to your supplier.

10 Maintenance, Service

The GFT®-X is a measuring device and should therefore be treated very carefully.

Special care must be taken with respect to the Measuring Head extension with its crowned surface. Due to the gripping forces, this surface might be subject to wear and tear in the course of time. A replacement is advisable at the latest when a ridge becomes visible on the disk (spare part numbers see chapter 16)

If problems occur which cannot be solved as described in chapter 13, the complete GFT®-X must be returned to the supplier. A detailed description of the problem will shorten the time to repair and save costs.

11 Measured data display / storage on PC

The GFT®-X is supplemented by the capable software module *ChuckExplorer*. This program permits transfer of the data displayed and stored on the Handheld Unit to a PC / laptop. A USB Connecting cable is included in the delivery package.

The gripping force and the corresponding number of revolutions can be graphically represented, printed and stored on the PC. It is also possible to convert the measuring data into an Excel spreadsheet and to store the graphical representation as bitmap. These data can then be used for further processing in any program. This module represents an invaluable tool for documentation, in particular with regard to a consistent quality management.

11.1 Installing ChuckExplorer

To operate the *ChuckExplorer* there is no need of detailed computer knowledge. The program could be installed and runs under standard hardware. The function implemented are tested under Windows XP and Windows 7.
To install the software please follow the instruction below:

- Switch on the computer and start Windows
- Insert *Chuck Explorer* disk in the CD-ROM drive

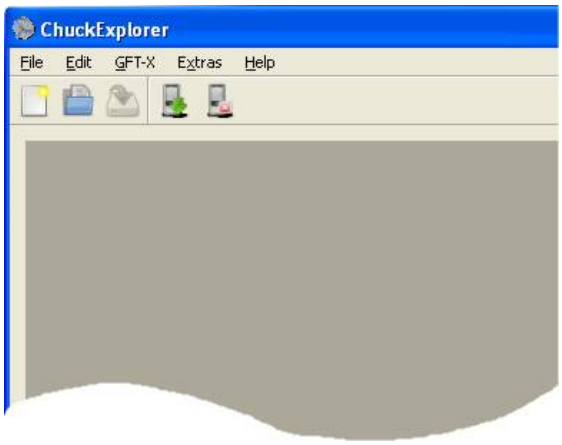
The setup program starts automatically. If it doesn't you can also start the setup manually:

- Open the file manager / explorer
- Start the "AutoRun.exe " program on the *ChuckExplorer* CD-ROM
- First install USB-driver, then *ChuckExplorer*.

ChuckExplorer is now ready to be installed, the installation path can be freely chosen.

At the end of this process, a message confirms the successful installation and the program can be started immediately.

Startscreen *ChuckExplorer (extract)*



The menu bar is self-explanatory, i.e. a small info window will open when the mouse pointer is positioned on the individual button.

Description of the individual push buttons:


Start a new measurement

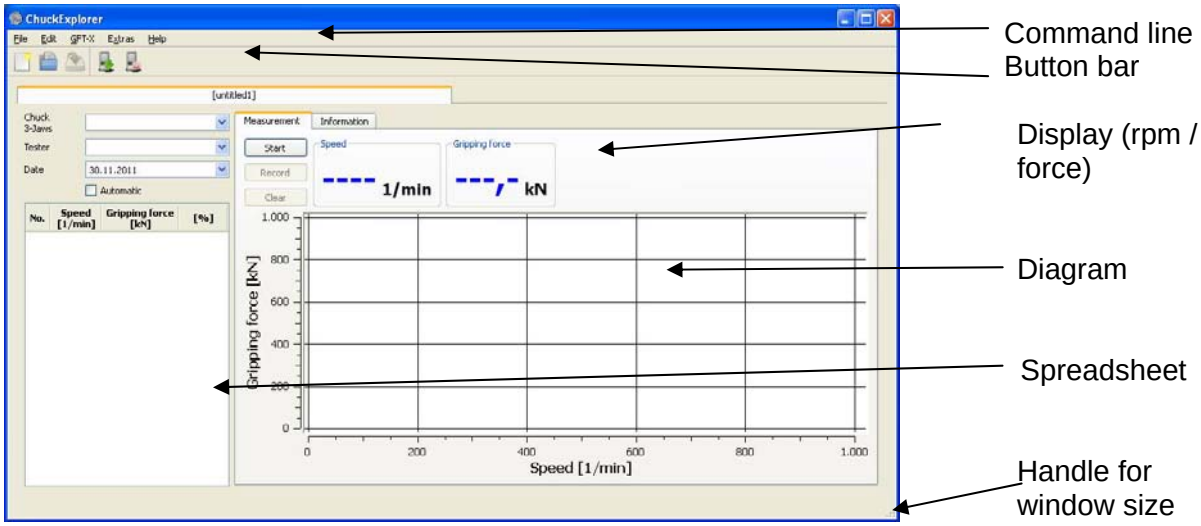

Open a saved measurement


Save measurement


Download data from Handheld Unit


Delete internal memory of GFT®-X Handheld Unit (all measurement data will be discarded)

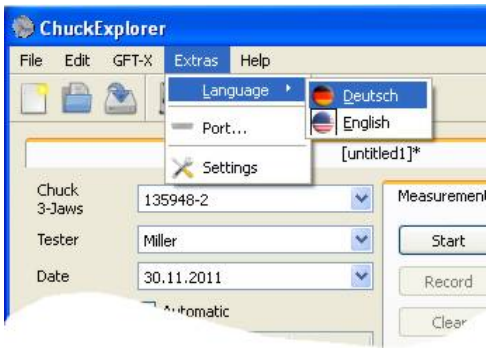
File ▸ New () open a new measurement series. The following screen will be shown:



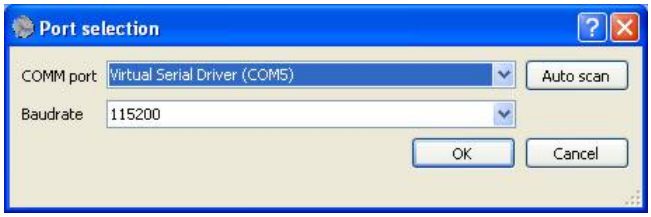
All program and menu windows can be changed in their size, by clicking on the right edge with the mouse cursor.

11.2 Using the software

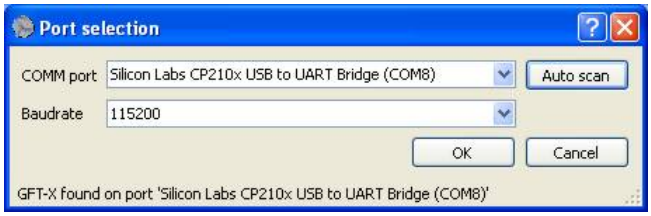
Start *ChuckExplorer* by double click  With the Command line all individual settings can be performed.



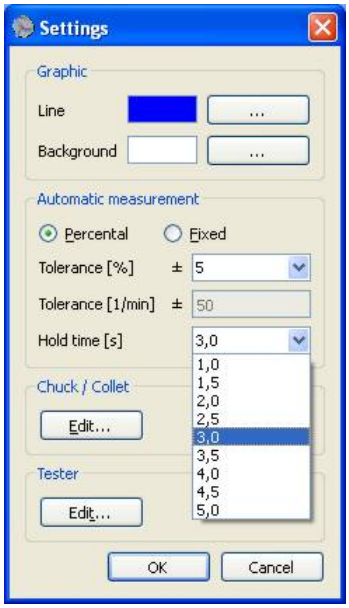
The desired language can also be selected by Command Extras ▸ Language. Actually, German and English versions are available.



Equally under Extras ▸ Port the USB port to communicate with GFT®-X Handheld Unit could be chosen.



Just activate the button Auto scan. As soon the Handheld Unit is found, the active port appears at the lower part of the window.

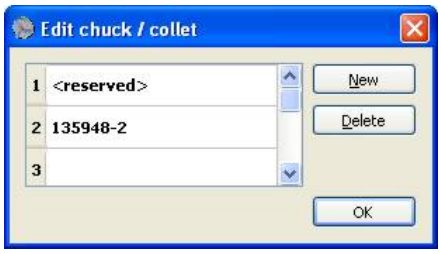


With File ▸ Setup following parameters can be adjusted:
Graphic: By pressing ... key a color bulletin appears. Choose the color you want for the diagram and its background.

Automatic measurement (Automatic mode):
The criteria to take over a measure automatically is the revolving speed.
Setting Percentaged:
The sample shown left means the speed should be within less than +/-5% of the maximal speed and should be there for at least 3 seconds.
Setting Fixed:
If the speed is x ±50 [1/min] during the hold time, the measured value is taken over.

Automatic measurement settings:

- Tolerance [%] ± 1-10%,
- Tolerance [1/min] – freely selectable
- Hold time [s] 1-5sec (0,5sec steps)

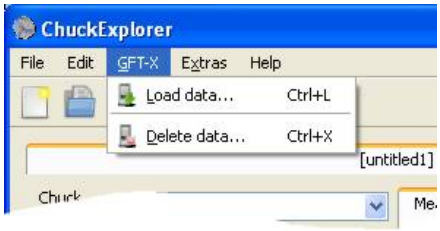


Equally different chuck / collets and Tester can be saved in the settings.

The first line is reserved by the system.
At the click of a mouse into the field the entries can be edited. New adds a new entry, Delete erases an entry which is required no more.

These entries are available in the main window now at Chuck or Tester and can be called up over the arrow button ( ).

Under Help, you will find information about the current software version as well as comprehensive explanations concerning the individual software functions (F1) and the terms used.



GFT-X ▸ Load data: Data to be downloaded from a series of Handheld Unit measures into *ChuckExplorer (see also chapter 7.6.3).*

GFT-X ▸ Delete data: Allows remote deleting of Handheld Unit memory, it is recommended to do so after every download to assure having sufficient memory space for next measurement available.

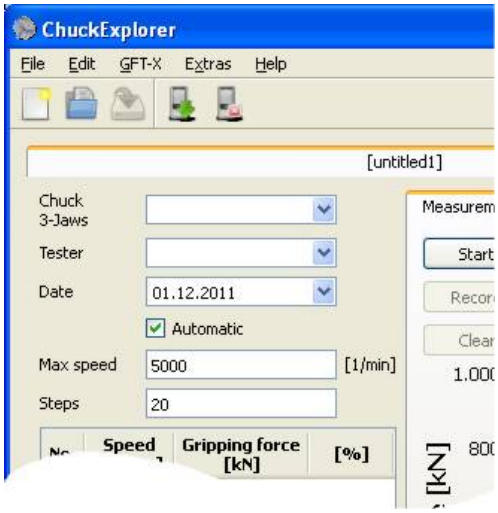
Edit ▸ Copy table: To copy the table into the clipboard. The spreadsheet can be dropped easily in Excel or a Word processing program for further processing.

Edit ▸ Copy chart: To copy the displayed diagram into clipboard and could imported or paste in Bitmap-Format into other programs.

11.2.1 Measurement

There is a general distinction between two different methods for storing the measured values with the GFT®-X Handheld Unit (see chapter 7.6.3 and 11.3) and directly with the *ChuckExplorer*.

If the measured value recording is made directly by the *ChuckExplorer*, then there is the possibility of a manual and automatic measured value recording.

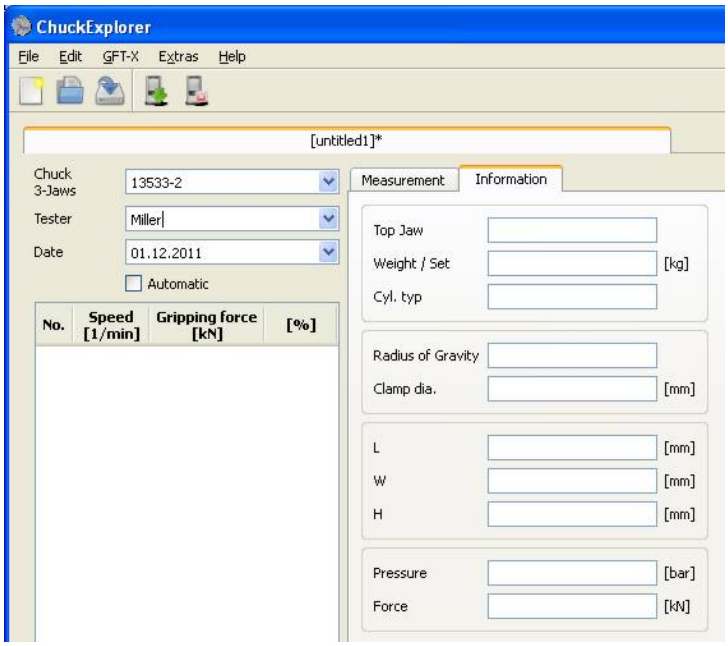


In case of manual storing of the measured values, the user can decide by himself at what rpm value or at what force he wants to store a value.
When automatic storing is activated, two new input lines are provided. Here the maximum number of revolutions (Max speed) and the number of steps are defined, the program divides the maximum number of revolutions by the number of the measured values to be stored and logs them as soon as the relevant numbers of revolutions are reached (see chapter 11.2.4).

11.2.2 Measurement preparations

Relevant data and parameters can be entered into the program and included into the measurement log so that a measurement can be documented.

Machine or chuck ID and the name of the Tester are entered on the left side in the upper part of the program window. Up to 10 names are stored by the program and are available for future measurements. They can be displayed and selected by clicking on the ▼ button beside the text field.



The Date field is feeded directly from the system, however it can be changed in the same way. This is necessary e.g. if measuring sequences stored on the Handheld Unit are read out only after several days (see chapter 11.3).

After clicking on the Information tab, you can enter further parameters (jaw type, hydraulic pressure, etc.) in the right-hand part of the display window. These parameters are recorded together with the measurement.

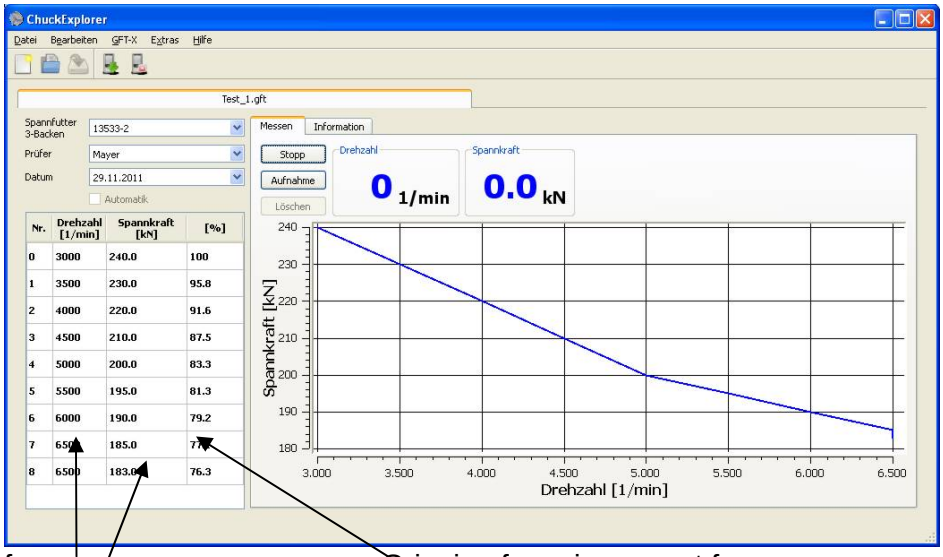
11.2.3 Manual measuring

For starting the measurement, the Measurement tab must be active and the Start button must be pressed.

The button Start changes to Stop, number of revolutions and gripping force will be indicated.

By each click on the Record button, a measured value is stored and displayed in the spreadsheet on the left and in the diagram. The scale of the chart is switched to the optimum range in order to get a better optical presentation.

If a measuring sequence is complete, it can be stored on hard disk Stop, File ▸ Save.



force and rotational speed

Gripping force in percent from reference value (measure number 0)

11.2.4 Automatic measuring

If check box Automatic ☑ is activated, two new input fields are displayed. Here you can enter the maximum number of revolutions (Max speed) and the number of measurement steps. The software will then determine automatically the equidistant numbers of revolutions (1/min) for which the measured value is to be stored.

The rpm tolerance and the minimum time during which the rpm value must be constant within the tolerance range can be set in menu item Setup (see chapter 11.2).
The measurement is started by the Start button. If the maximum number of revolutions is reached, the program will automatically terminate the measurement and display the corresponding table of values and the graphical evaluation.

11.3 Download data from GFT®-X Handheld Unit

Measurements recorded by a series of measurements (chapter 7.5.3) and saved in the internal memory of the GFT®-X Handheld Unit, can be downloaded directly from the Handheld Unit with GFT-X ▸ Download and afterwards indicated. If several IDs and / or series of measurements transferred, they are shown as different tabs.

A backup of data of the indicated series of measurements is necessary before. Choose therefore File ▸ Save... or Save as.

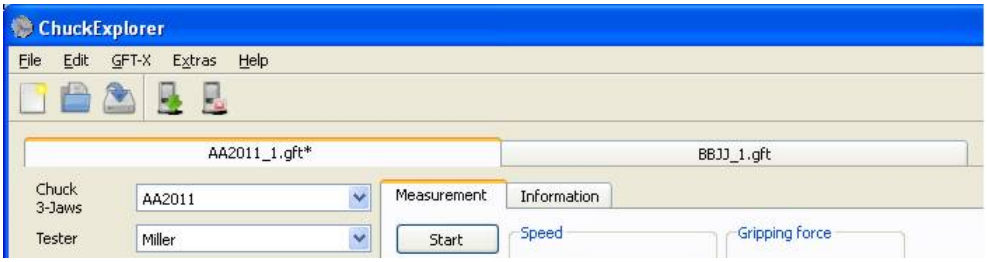
After download and the backup of data on the PC, data memory of GFT®-X Handheld Unit can be deleted completely with GFT-X ▸ Delete memory.

11.4 Loading and saving files

Choose File ▸ Save to save your recorded data. The directory is user-defined, files end with *.gft. Will be several series of measurements (Files) downloaded from GFT®-X Handheld Unit, the active tab will be saved.

Do not store the measuring data in the program directory of the *ChuckExplorer* or in a subdirectory of it. If *ChuckExplorer* will be uninstalled, these data files are erased, too.

Choose File ▸ Open to open an existing data file. The filename appears in the tab bar.



12 Software update

The software of the GFT®-X handheld unit is improved constantly and is subject to certain changes. The actual software version will be displayed in the Welcome Logo. Starting with version 1.2 online update is possible, older versions need to be updated at the manufacturer.

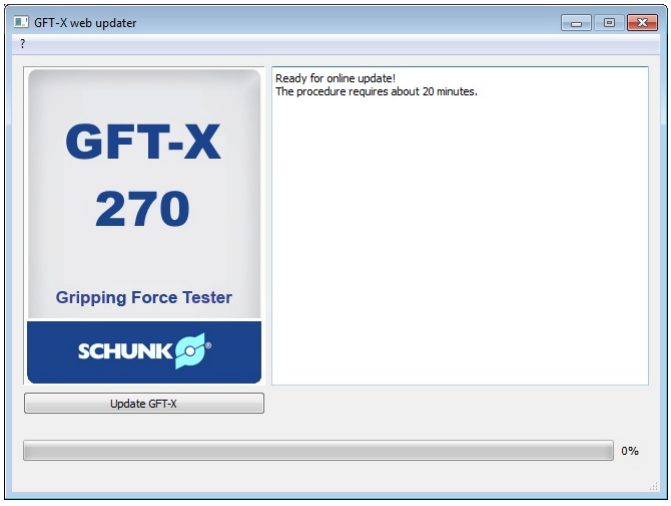
To start the update please follow the instruction below:

- Switch on the computer and start Windows
- Check if your computer is connected to the Internet
- Close the chuck Explorer Software
- Insert *Chuck Explorer* disk in the CD-ROM drive

The setup program starts automatically. If not you can also start the setup manually:

- Open the file manager / explorer
- Start the "AutoRun.exe " program on the *ChuckExplorer* CD-ROM

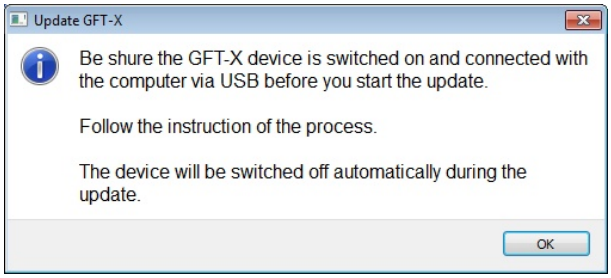
Choose Online Update GFT-X and perform the instructions step by step, otherwise the update could fail.



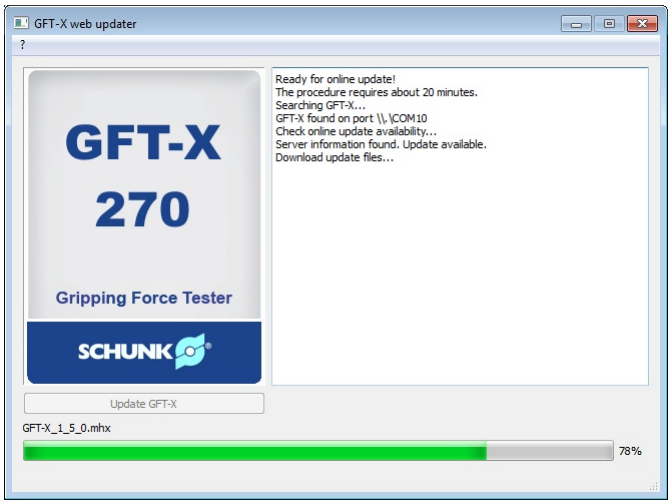
The online update starts in a separate window. At the right side, the state of the update is shown.
A bar chart that shows the progress of each step of the program is located at the bottom of the window.

It will take 20 minutes to update the Handheld Unit.
Please make sure, your GFT®-X Handheld Unit is connected via USB to your computer and switched on.

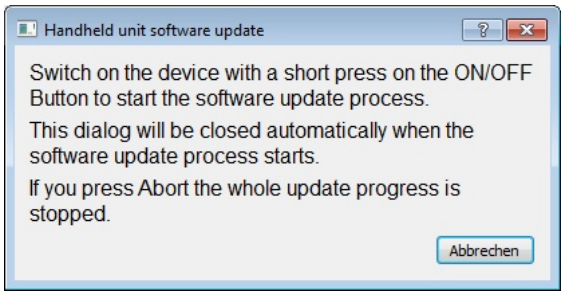
The update starts by pressing the Update GFT-X button.



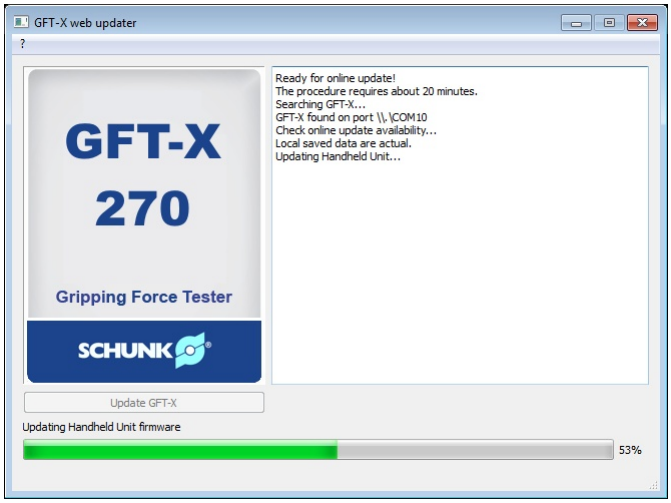
Do not disconnect the USB connection during the update, otherwise a factory service will be necessary.



Now the update program is connected with the Handheld Unit.
Available software updates are to be download from the Internet and saved temporarily.



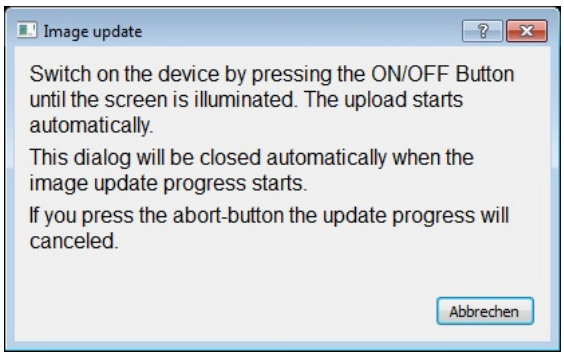
A short press on the ON / OFF Button starts the update procedere.



First the Handheld Unit firmware will be updated.

During this process do not interrupt the USB connection between Handheld Unit and Computer.

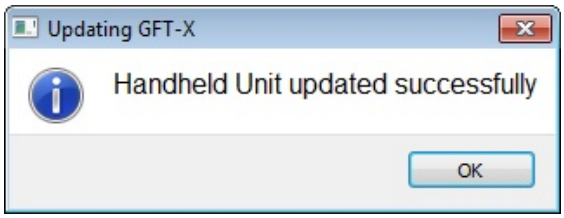
Should that happen, please send the device with a corresponding note to the service center.



Now, the graphic files will be transferred to the Handheld Unit.

Should the USB connection be interrupted during this process, start the update once again.

The update of the graphics files will take about 15 minutes.



This message appears after successful update.

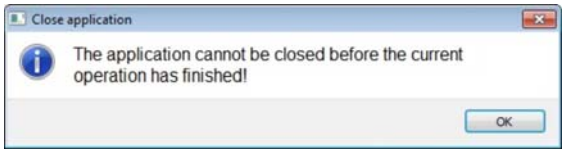
After pressing the OK button, the unit can be used for measurement again.

It is advisable to check periodically your suppliers website for updates.

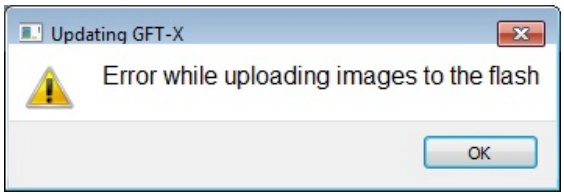
12.1 Problems with the Update of the GFT-X Handheld Unit cause / corrective

This error can be caused by different causes:

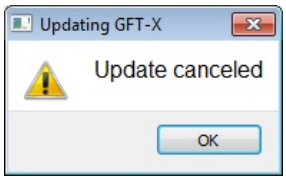
- Check, whether the Handheld Unit is switched on
- Check, whether the Handheld Unit is correctly connected to computer via USB
- Check whether another USB device with same chipset may blocks the connection
- check whether the USB driver has been installed correctly, if necessary, install it from the *ChuckExplorer* CD-ROM
- check that the Chuck Explorer program is closed.



Data is sent from the computer to the Handheld Unit, the programm cannot be closed. Please wait until the update is finished.



Please repeat the update process. If the update fails again so please send the device with a corresponding error description to the service center.



This message appears if the user correctly cancels the update operation. This is no fault notice.

13 Trouble shooting / FAQ´s

13.1 Problems at GFT®-X Handheld Unit cause / corrective

Display will not be illuminated / start after pressing the power button

- *Check power supply, recharge Handheld Unit battery*
- *Press power button again (not less than 2 sec.) until blue LED indicator begins to flash*
- *Connect Handheld Unit via USB-cable to mains adapter or PC, try again*

Keypad is not responding to keystrokes

- *Switch off Handheld Unit, wait approx. 5 seconds, then turn power on again*

Icon radio communications in Status Line is / keeps staying red

- *White LED indicator at Measuring Head front face must flash, if not try to recharge Measuring Head battery*
- *Radio interferences, e.g through shielding or (metal) absorption, relocate*
- *Wrong Measuring Head selected / activate appropriate serial number again*

Tare-icon in status bar is red

- *Offset of the Measuring Head is too high, tare is not possible any more. Measuring Head has to recalibrated by the vendor*

During the measurement dashes appear in the display of the Handheld Unit

- *Battery in Measuring Head empty / discharged*
- *Radio interferences*

Blue LED indicator at Handheld Unit is flashing

- *Screen saver is active, press any key to continue (except ON/OFF-key)*

How to allocate the Speed Buttons

- *Select desired function, then press Speed Button until icon appears in the Speed Button bar.*
- *Selected Speed Button function can not be deleted, only overwrite possible*

Right Speed Button can not allocated to other functions

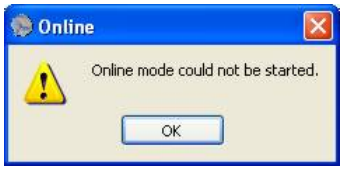
- *Right Speed Button reserved for function "Charge Battery" only.*

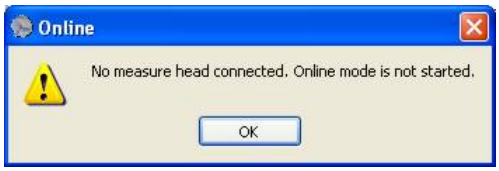
13.2 Problems with Chuck Explorer – cause / corrective

Data download not possible

- *No connection from GFT®-X Handheld Unit to PC, check USB-interface cable*
- *Check interface settings in ChuckExplorer: is COM Port selected?*
- *Check whether the Handheld Unit is switches on*

After pressing the start-button an error message appears





- *Check if proper Measuring Head is activated*
- *Check power of Measuring Head – white LED indicator must flash*
- *Check whether the Handheld Unit is switches on*
- *Check interface settings in ChuckExplorer: is COM Port selected?*

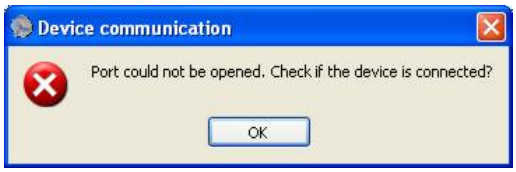
Port Selection - Auto Scan

- *Reboot ChuckExplorer, then choose Extras ▸ Port ▸ Auto Scan*
- *Check whether the Handheld Unit is switches on*
- *No connection from GFT®-X Handheld Unit to PC, check USB-interface cable*

Speed (rpm) will not displayed in online-mode

- *Due to the Refresh-Rate the Speed of rotation rpm it could happen during machine stillstand. However when late is turning again the indication should appear properly.*

Error when starting a new measurement



- *choose Extras ▸ Port ▸ Auto Scan*
- *No connection from GFT®-X Handheld Unit to PC, check USB-interface cable*

Error message: "During the first measurement gripping force must be above zero"

- *To afford a calculation of the percentage aberration, the first measured gripping force must be above zero.*

14 How to change the power plug at mains adapter

The GFT®-X Handheld Unit is powered with a Power Supply Plug at 5VDC (500mA), the input voltage range is 100~240V.
Different interchangeable blade assemblies of North America, United Kingdom, Australia and Europe are included. The blade assembly of Europe is already mounted.

Insert the blade assembly (as shown in following figures):

- Hold the power supply in one hand using thumb or finger, slide the spring loaded locking key downwards (it is marked with an arrow, Picture 1).
- Hold the locking pin down pull upward on the blade to remove (Picture 2).

Picture 1

Picture 2

- Insert now the required blade assembly:

Picture 3

Picture 4

Picture 5

Picture 6

- Insert the tip of the blade assembly into the power supply at a 30 – 60 degree angle (Picture 3). The top edge of the blade assembly is flat and the bottom edge is U-shaped. The power supply has the corresponding shapes.
- Push the blade assembly into the power supply in a downward motion (Picture 4)
- Push the blade assembly down until the blade assembly locks in place. A clicking sound will occur (Picture 5).
- Checking the blade assembly for correct insertion: Hold the power supply in one hand. Using another hand pull up on the blade (Picture 6).

Note: The blade assembly is "finger proof" which meets UL requirements against all shock hazards.

15 Changing the battery of the Handheld Unit

Furthermore GFT-X is equipped with a powerful Lithium-Ion battery. A one time charge allows an operation up to 5 hours. During this time frame, a Measuring Head can be loaded up to 4 times out of the Handheld Unit battery.

Technical Data:
Li-Ion rechargeable battery, 1950mAh, 3.7V

Safety Instructions:

- do not incinerate
- do not disassemble
- do not short terminals
- do not expose to high temperature

For replacement of the Li-Ion battery open the battery box on the back side of the GFT®-X handheld unit. For this purpose, please use a suitable screwdriver or a 20 cent coin

Remove the battery carefully and separate the plug connector. Therefore press the latch battery-sided downwards and separate plug and socket (see yellow pictograph).

Connect the new battery with the plug inside the GFT®-X Handheld Unit. Insert the battery as shown beside into the housing and close the battery cover carefully.

Recharge the battery before first use completely.

16 Accessories / spare parts list

Item	*Id.*	*Bezeichnung*
	203819	GFT®-X complete incl. case, Measuring Head M3 and Handheld Unit
1	-	GFT®-X case (case only)
2	204003	GFT®-X Handheld Unit
3	204004	GFT or GFT®-X Measuring Head M1 (optional)
4	204005	GFT or GFT®-X Measuring Head M2 (optional)
5	204006	GFT or GFT®-X Measuring Head M3 (standard)
	204007	GFT®-X Measuring Head M4
	204008	CD with *ChuckExplorer* and operating instructions
6	201764	Power Supply Plug USB incl. interchangeable blade assemblies
7	196839N	Loading Bracket for GFT or GFT®-X
8	198161	Recharging cable for GFT or GFT®-X, 1m, Push-Pull
9	201765	USB-cable for GFT®-X, 1.5m
10	036201	Extension Cylinders 8mm for GFT or GFT®-X
11	036203	Extension Cylinders 15mm for GFT or GFT®-X
12	036205	Extension Cylinders 25mm for GFT or GFT®-X
13	201766	Stand with magnetic mounting for GFT or GFT®-X
	085961	Torx-key for GFT or GFT®-X M3 and M4
	033010	Spare screws
	201922	Protector for GFT®-X Handheld Unit
	201923	Spare battery for GFT®-X Handheld Unit

Prices and delivery times on request! Please contact your local vendor.