Operating Instructions

TORKMASTER 4

Version 4.2.1

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Preface

Key to success
Congratulations on your purchase of a high-quality STAHLWILLE tool.

Firmly based on tradition while embracing new technologies - this has been our guiding philosophy ever since we started making high-grade tightening tools at our location in Germany 150 years ago. From the careful selection of steels, the forging process and heat-treatment through to the final product, all the crucial steps in the production chain of STAHLWILLE brand products are in our hands.

STAHLWILLE quality tools are developed consistently in conjunction with customers in all application fields and then jointly tested down to the last detail to ensure the required standards are met. This makes STAHLWILLE's practically orientated tools “Key to success” - underlining their already legendary reputation for precision, reliability and durability. STAHLWILLE tools are more durable and, as a result, more economical in use.

Our aim is to contribute to your business success through our high-grade tools. We can offer decades of experience, frankness and confidence in our dealings with others. Take us by our word and put us to the test. Take advantage of the benefits of STAHLWILLE quality tools and keep ahead of your competitors.

STAHLWILLE
Management

Contents

Safety instructions

Please observe the safety instructions contained in the operating manuals of the measuring equipment used.

We would also draw your attention to the section headed >Calibrating instructions< in this operating manual, where you will find descriptions of factors that may influence the results of the calibration process.

If torque wrenches are incorrectly adjusted or calibrated, this can lead to corresponding errors in tightening joints and further consequential damages. Note the manufacturer's instructions when adjusting and calibrating a torque tool. STAHLWILLE does not accept any liability for any damage or injury caused as a result of improper operation or use of this software and any torque wrenches incorrectly calibrated or adjusted or for any consequential damages.

Introduction

The TORKMASTER 4 software can be used for testing, adjusting and calibrating tools in conjunction with the perfectControl 7794-x calibrating units, loaders 7791 and 7792 and the workshop torque tester. The software is intended for recording measured values acquired from series 772x torque transducers and 7770-x transfer torque wrenches. The software enables calibrated tools and their data to be organised and managed.
The standard version allows manually operated Type I, Classes A-E and Type II, Classes A-G torque tools to be calibrated in accordance with DIN EN ISO 6789. In addition, there is a calibration method based on DIN EN ISO 6789 which enables individual calibration points to be repeated during the process. For testing and adjusting procedures, the software offers a specific testing and adjusting method which can also be activated as a quick-check method.
The functionality of the software can be expanded by the purchase of additional optional licences; these include customer-specific calibration processes and the adjustment of transducers using transfer torque wrenches and lever/mass systems.

Please observe the safety instructions and instructions for use contained in the operating manuals for the transducers, transfer torque wrenches and perfectControl 7794-x calibrating units and the 7707 W workshop torque tester.

If there are any sections of this operating manual you do not understand or if you have any questions about the product, please do not hesitate to contact our application engineers at EDUARD WILLE GmbH & Co. KG. You can contact them by phone on +49 202 4791-0 or by email: info@stahlwille.de.

System requirements

Operating systems supported:	Microsoft Windows XP, SP3; Windows Vista; Windows 7
Hardware requirements:	1 free USB interface for the STAHLWILLE USB Adapter 7757-1

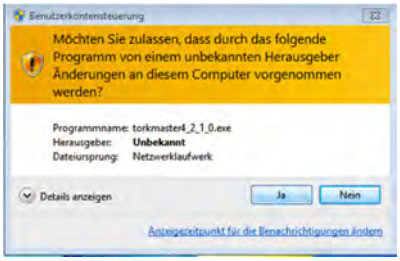
Preconditions relating to the operator

To ensure the calibration is performed correctly, it is essential that the operator has been instructed in the content of the applicable standards (e.g.: DIN EN ISO 6789:2003) and has fully understood them. Lack of knowledge or understanding of these standards and regulations can result in the results of calibrations being inaccurate.

Installation

Installation of the software is explained below. For the installation on a Windows PC you will require local administrator rights at the very least. If you do not have those rights, please contact your system administrator.

- Insert the CD-ROM and run the file named >TORKMASTER.exe<.

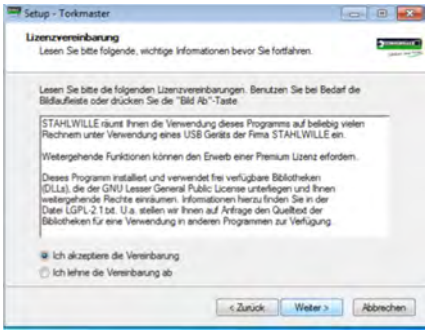


- Acknowledge the warning message by clicking >Yes<

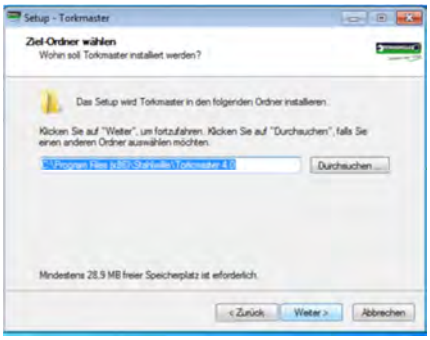
- Select your preferred language for the installation procedure.

Note: This is not the language used for the software interface itself. The TORKMASTER software will first run in the default language for your operating system but this setting can be changed later to one of the other available languages via the Basic settings in the TORKMASTER software.

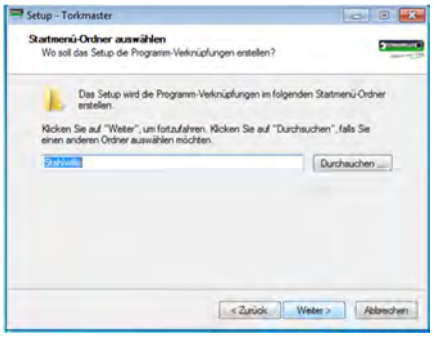
- Acknowledge the message by clicking >Next<



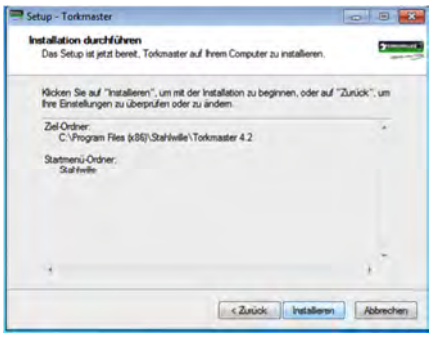
- Please read and accept the licence conditions to install the software. Then click >Next< to continue the installation.



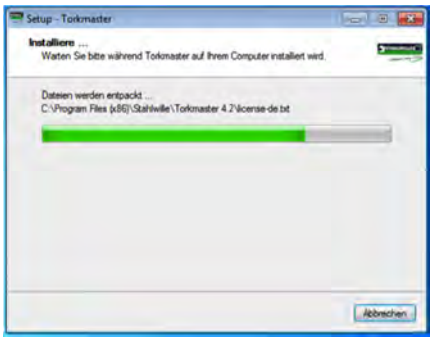
- Select the preferred installation folder.



- Select a name for the start menu entry in Windows.



- The window will display a summary of the selected options for the installation. Continue the installation by clicking >Install<.

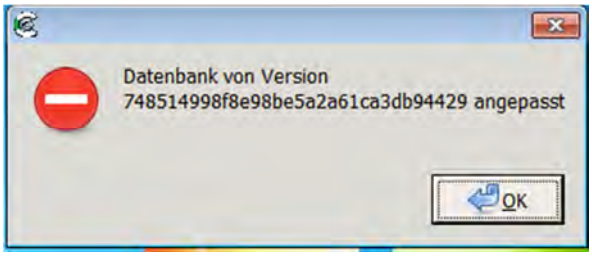


The TORKMASTER 4 software will now be installed on your PC.

- Click >Finish< to complete the installation.

Notes on the first start of the program after installation

If you had an older version of TORKMASTER 4 on your PC, you will see a message when you run the new version for the first time. Please confirm the message, which will enable the existing database to be converted to the required format for the new TORKMASTER software.

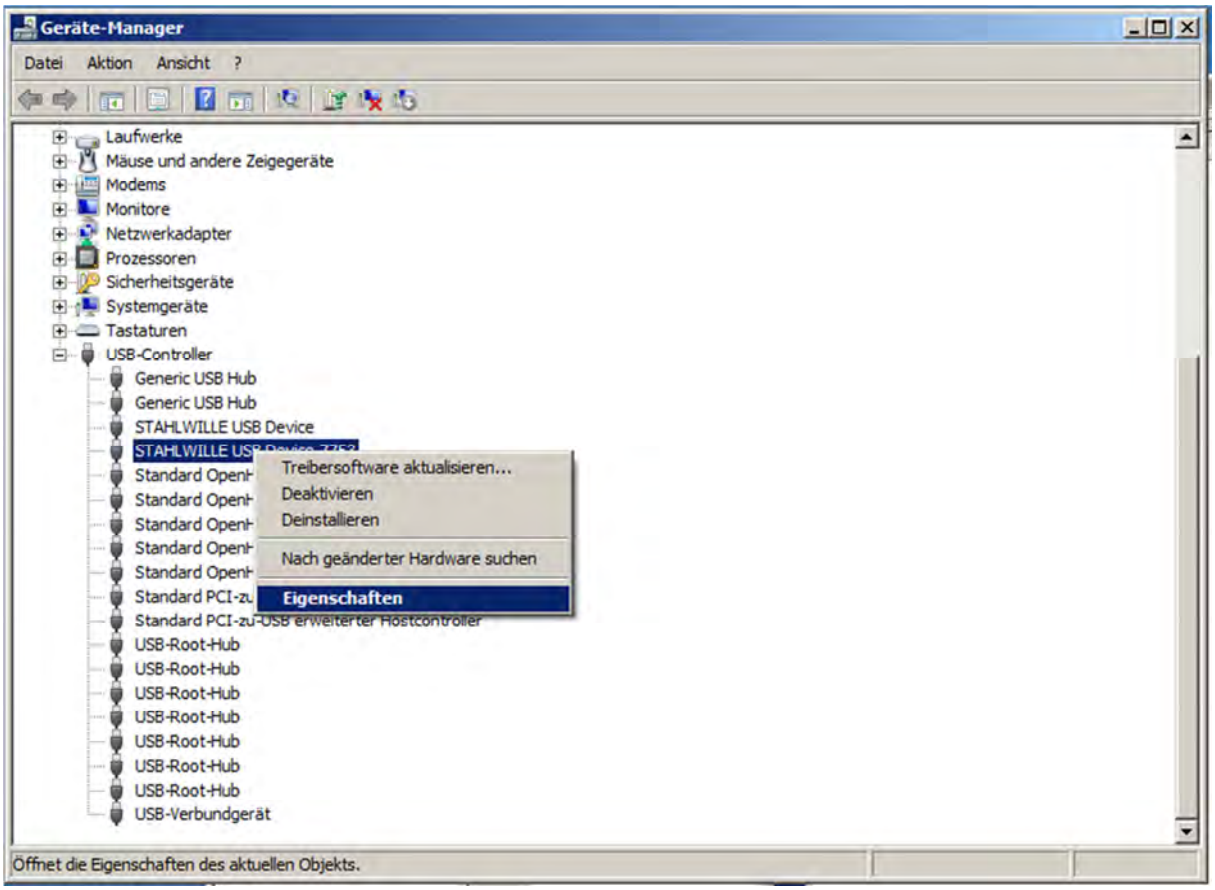


If, after running the program for the first time, the software does not detect the USB hub (there will be a corresponding message in the TORKMASTER 4 status bar), or if the transducer connected directly to the PC produces a steady warning sound, the driver for the USB hub has not been correctly installed. This problem can be solved by referring to the notes in the section headed >Drivers under Windows<.

Drivers under Microsoft Windows

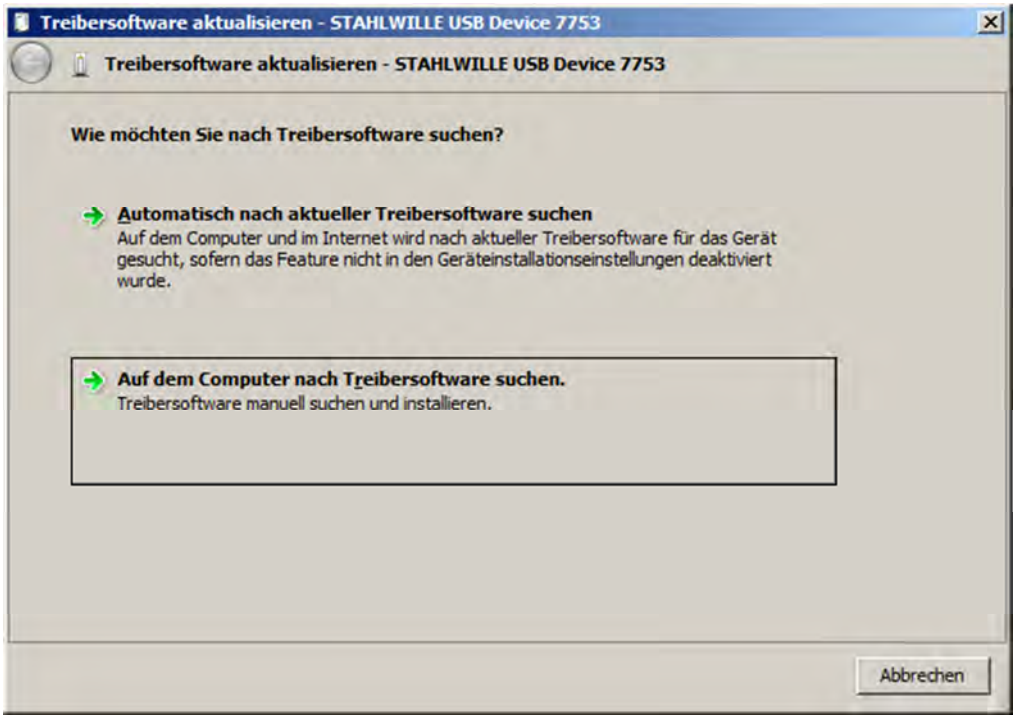
Occasionally, the driver is not correctly installed under Windows. If this happens, it is because Windows has installed its own native driver. This becomes noticeable if the TORKMASTER software does not detect the transducer and no serial number or readings are displayed. The status bar of the TORKMASTER 4 will state that the USB hub could not be found. To correct this, proceed as follows:

- Run the Windows Device Manager via the Control Panel (you will probably require Administrator rights) and select the properties of the USB device by right-clicking the name of the device:

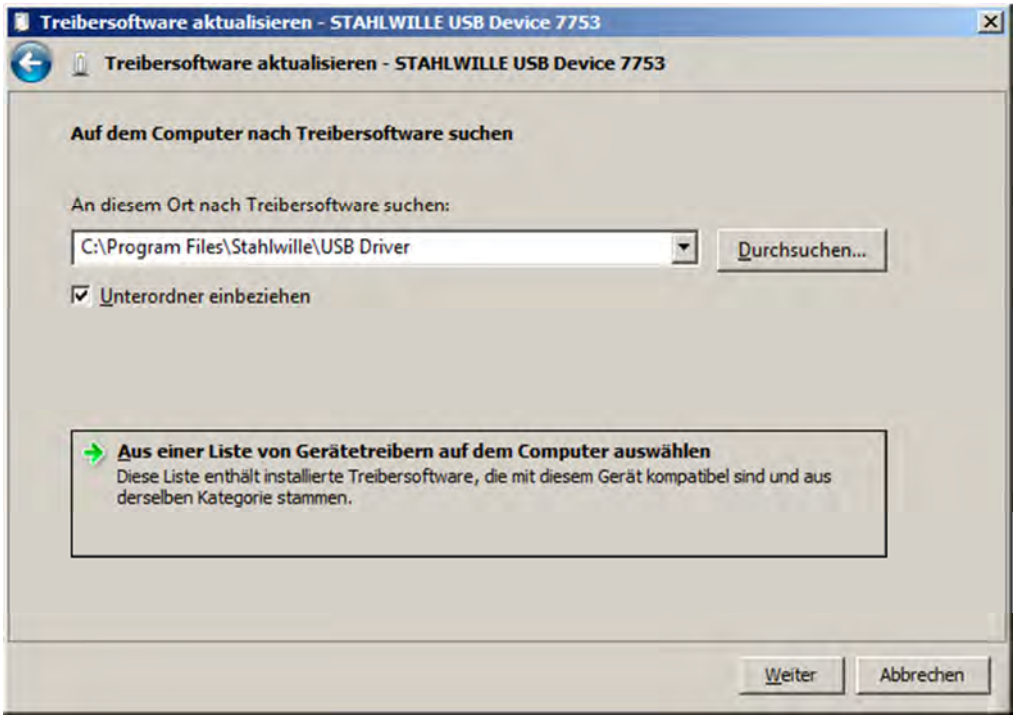


- Select >Update driver<:

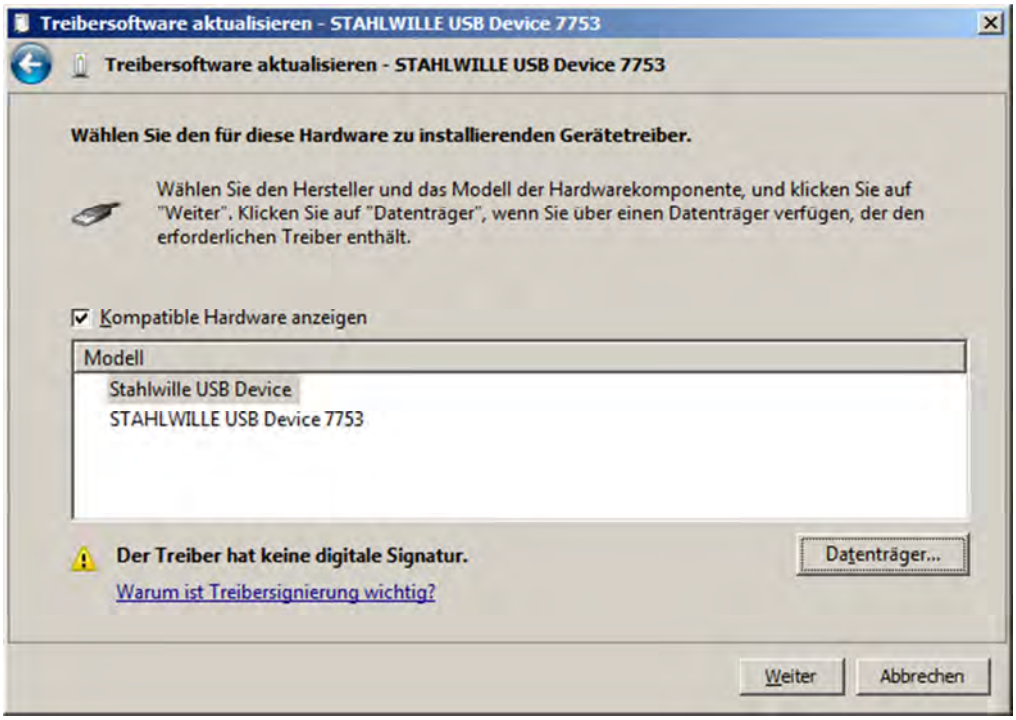
- Select >Search the computer for updated drivers**<**.



- Navigate to the STAHLWILLE installation folder via the >Browse...< button.



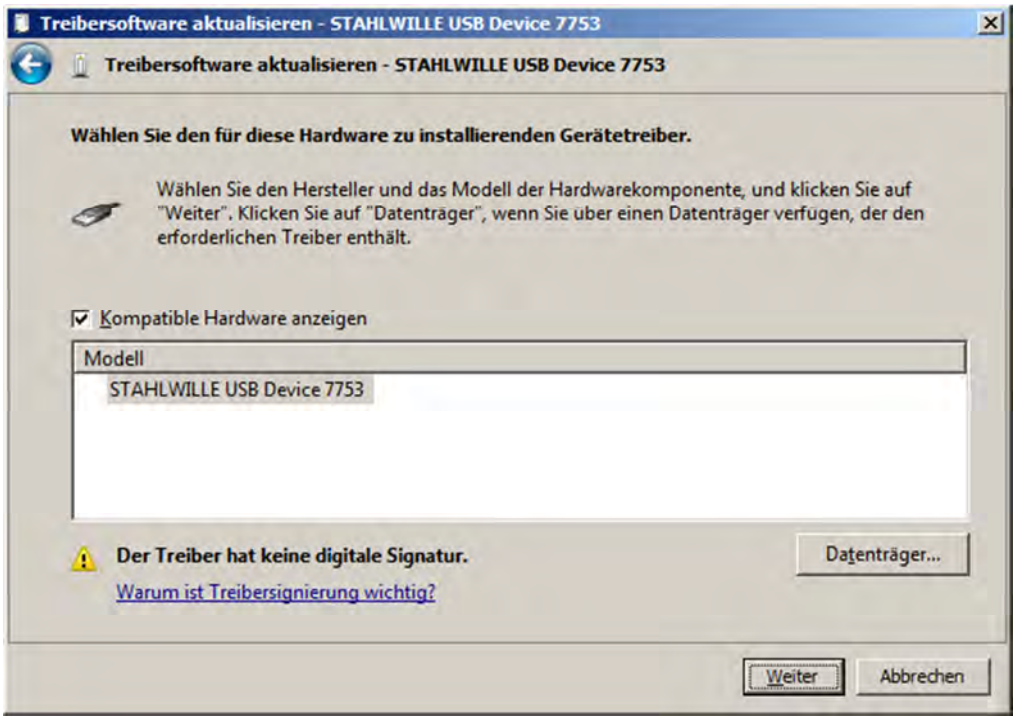
- Select the device named >Stahlwille USB Device<.



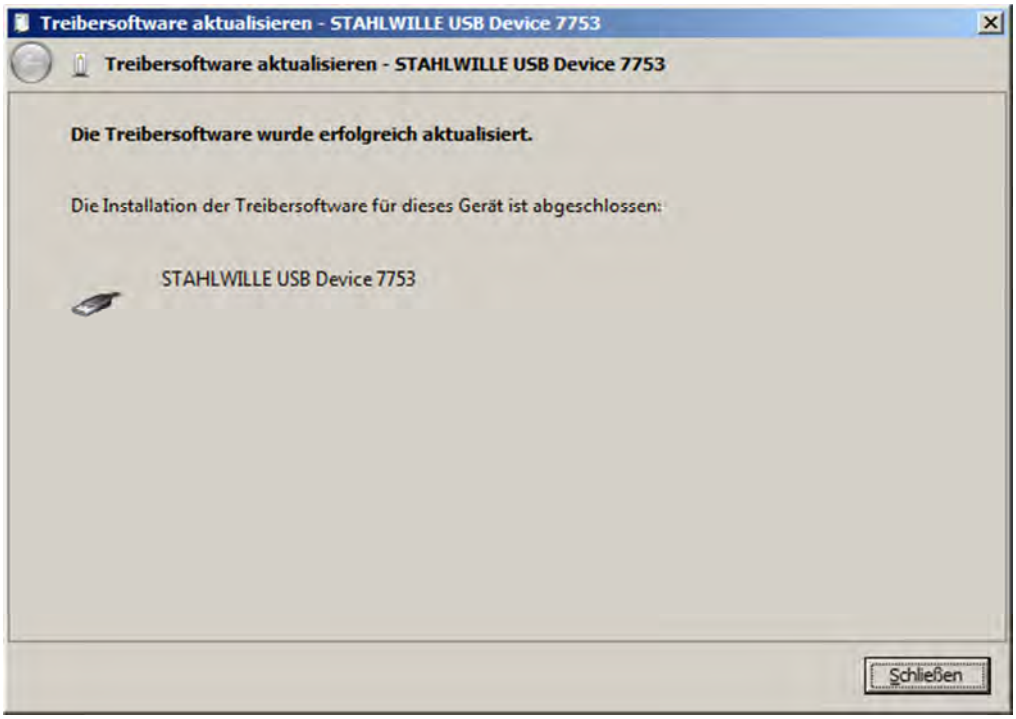
- Select the data medium and then select C:\Program Files\Stahlwille\USB Driver *

* The actual path will depend on where you originally installed the Torkmaster software.

- Click >Next< to install the driver.

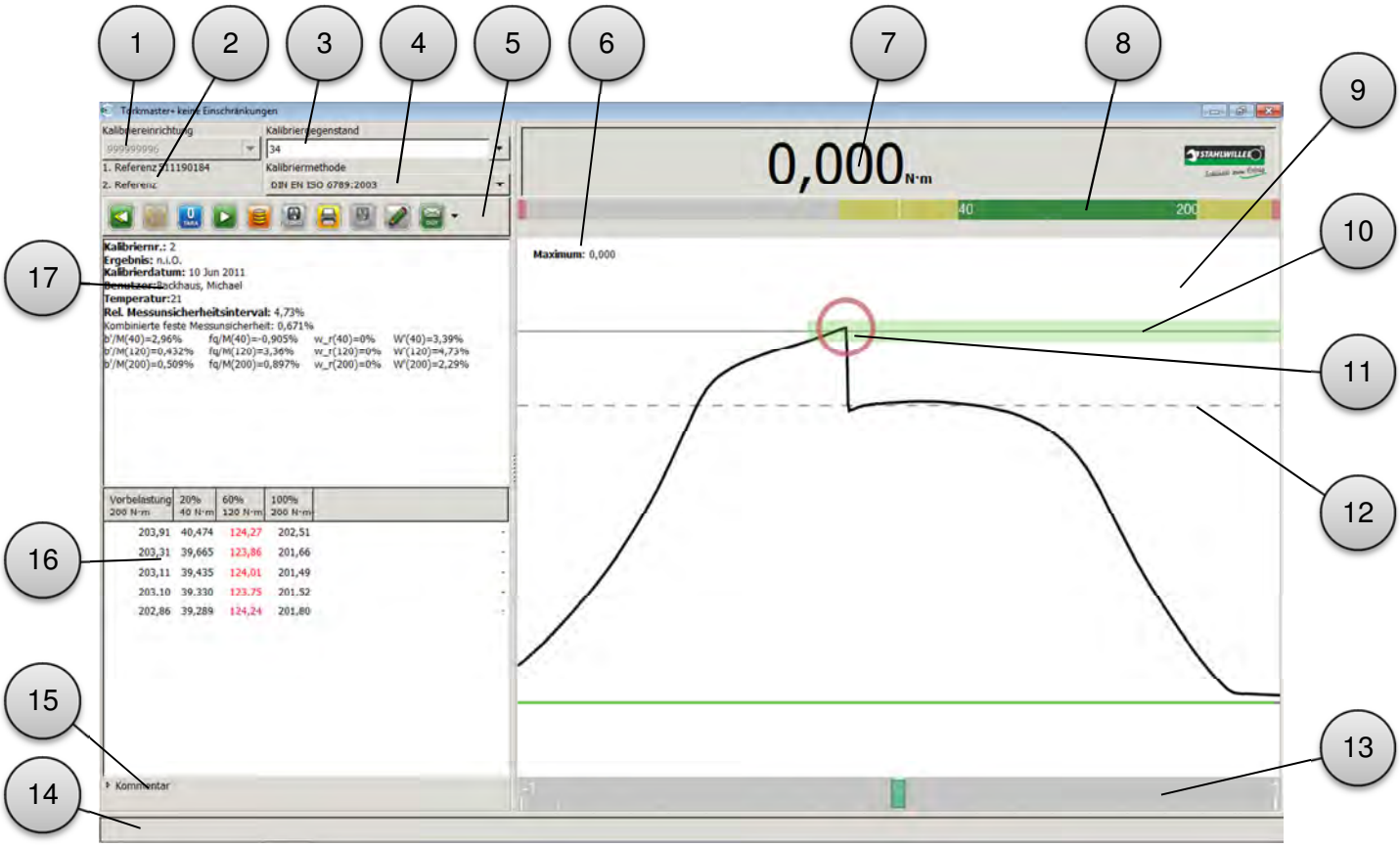


The driver will now be correctly installed.
Now close all the windows and restart the TORKMASTER software.



User interface

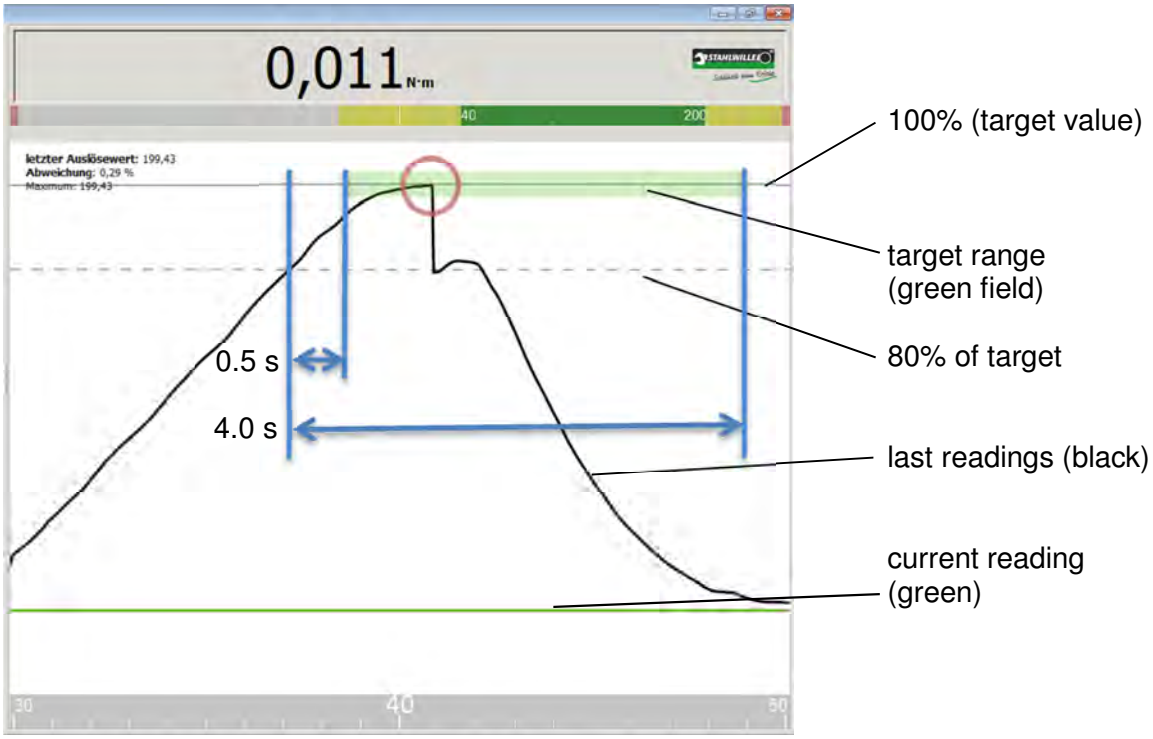
Main window



No.	Function / description
1	Select the calibrating unit. If it is an automatic calibrating unit, you will see the serial number of the connected loader. If it is a manual loader and tester, you will have to select the unit manually via the pull-down menus.
2	Serial number of the connected reference (transducer). If two references are required for a calibration, both serial numbers will be displayed. Reference 1 is the unit currently connected.
3	Field for entering the search string for the device to be calibrated. This can be either the serial number or the ident no. of the device. If the serial or ident no. is shown in red, this means it has not yet been stored in the database. For a calibration, the device to be calibrated must first be entered in the database. Refer to the section headed “Creating a new tool”.
4	Selecting the calibration method. This selection is via the pull-down menu. The entries may differ depending on the software licence. Standard methods: Test & adjustment, quick test, DIN EN ISO 6789:2003 and based on DIN EN ISO 6789:2003.
5	Function keys (description on the following page)
6	Display of the last reading made.
7	Display of the current reading.
8	Bar graph showing the full measuring range of the reference device.
9	Graphical display of torque development over time.
No.	**Function / description**

10	The green area describes the target field based on the relevant temporal parameters taken from DIN EN ISO 6789:2003 (X axis) and the display deviation value for the torque wrench as defined in the database (Y axis).
11	Display of the cut-out value (first peak) detected.
12	80% marking in accordance with DIN EN ISO 6789:2003.
13	Bar graph display for the restricted measuring range (±25% of target).
14	Status bar for application notes (yellow / black), action notes (grey / green) and fault messages (yellow / red).
15	Comment field. Optional comments can be entered here at any point until the calibration is saved. The comment is stored in the database together with the calibration data. Comments cannot be modified subsequently.
16	Display of calibration readings
17	Display of a summary of the calibration (after saving).

Description of the graphical user interface:

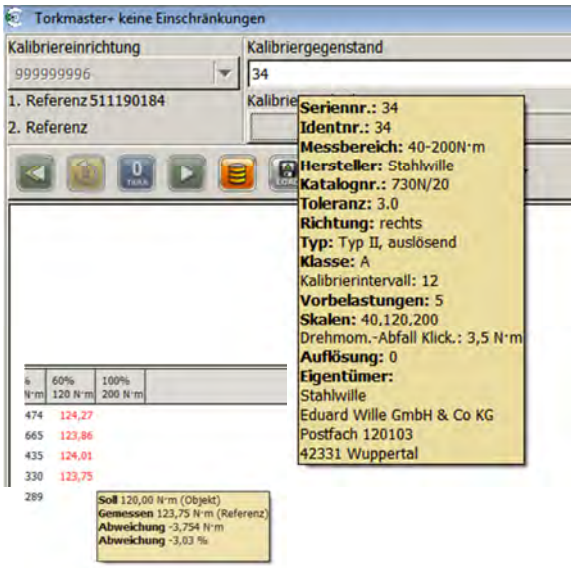


The max. vertical value of the target range is represented by the display deviation value for the torque wrench as stored in the database under tool group.

The width of the target range is provided by the requirements of the standard used for the calibration (in this case: DIN EN ISO 6789:2003).

If a function is not available, the corresponding keys will be greyed out.

No.	Function / description
1	Repeat calibration. This initiates a new calibration. If the previous calibration was not saved, it will be aborted.
2	Repeat last measurement.
3	Reset transducer.
4	Resend the last calibration step to the calibrating unit. This enables interrupted calibrations (e.g. after an error) to be continued.
5	Opens the TORKMASTER database and the basic settings.
6	Read saved test and calibration data.
7	Print calibration certificate. Depending on the basic settings, the calibration certificate can be displayed, printed or saved as a PDF file in a folder defined in the basic settings. Clicking this button saves the calibration in the database and performs the preset option.
8	Save calibration in the database.
9	Show comment field. Comments can only be entered up to the point where the calibration is saved.
10	Marking of the calibration as either “as found” or “as left” calibration.
11	Expansion of the menu with additional functions (output graph, export calibration (CSV format) and open operating manual).



Move the mouse pointer over the serial number of the tool being calibrated, the references or the individual readings and hover the pointer over one of these to display the context menu. The context menu contains important details about the value.

If the tool is a torque wrench, the details will be taken from the database, if it is a transducer, the data stored will be shown and with the measured values, you will see the target and actual values including the associated errors.

Any readings outside the tolerance range will be shown in red.

Connecting electronic tools to be calibrated

If electronic tools are to be calibrated with the perfectControl 7794-2 or 7794-3 and adjusted, they have to be connected to the calibration system via the port at the rear. Details can be seen in the operating manual for the calibration system.

To initiate communication between the calibration system and the tool to be calibrated, click the button above the edit box for the serial number (see illustration).

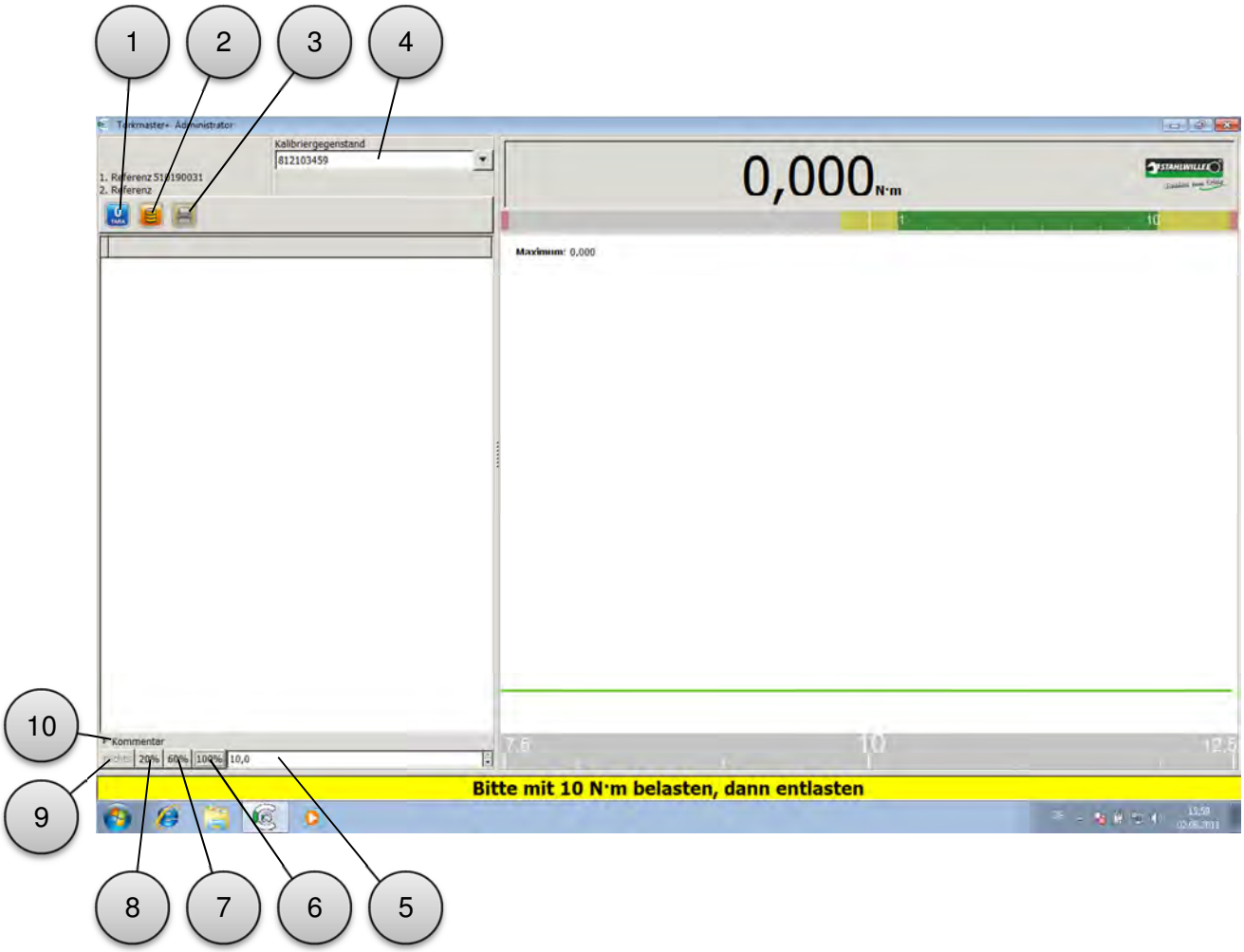
Once communication has been established, the serial number in the edit box is shown on a grey background.

If it is not possible to establish communication with the tool, the system will abort the attempt after 60 seconds. In some cases, it is not possible to set up an automatic connection with the tool to be calibrated due to its hardware configuration. In such cases, the tool can be calibrated manually.

If, at this point, the torque tool is not already stored in the database, it will be automatically added. The current tool settings will be used.

Quick test mode

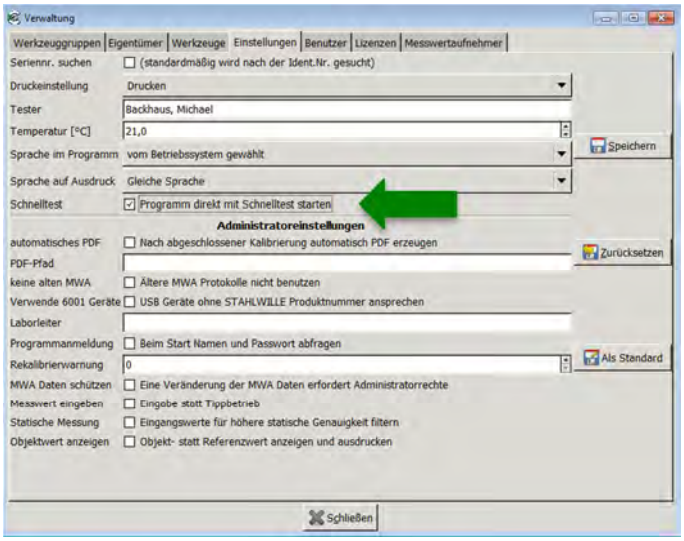
The TORKMASTER also has a quick test mode. This mode is particularly recommended when the STAHLWILLE 7707 W workshop torque tester is being used to document the test results.



No.	Function / description
1	Reset transducer.
2	Opens the TORKMASTER -78 database and the basic settings.
3	Print calibration certificate. Depending on the basic settings, the calibration certificate can be displayed, printed or saved as a PDF file in a folder defined in the basic settings. Clicking this button saves the calibration in the database and performs the preset option.
4	Field for entering the search string for the device to be calibrated. This can be either the serial number or the ident no. of the device. If the serial or ident no. is shown in red, this means it has not yet been stored in the database.
5	Free-text entry of the target value of the test. Enter the required value and confirm by pressing ENTER. The value becomes the target value.
6	Take maximum possible scale reading from the tool database.
7	Take 60% scale reading from the tool database.
8	Take 20% scale reading from the tool database.
9	Change direction of loading, provided the tool being calibrated has been entered in the database as being usable in both directions.
10	Show / hide comment fields

The quick test mode can be activated via the basic settings menu. Proceed as follows:

- Open menu >Administration< (>Verwaltung<)
- Activate the >Quick test< (>Schnelltest<) checkbox (green arrow)
- Click the >Save< key (>Speichern<)
- Close the menu
- Exit Torkmaster and restart

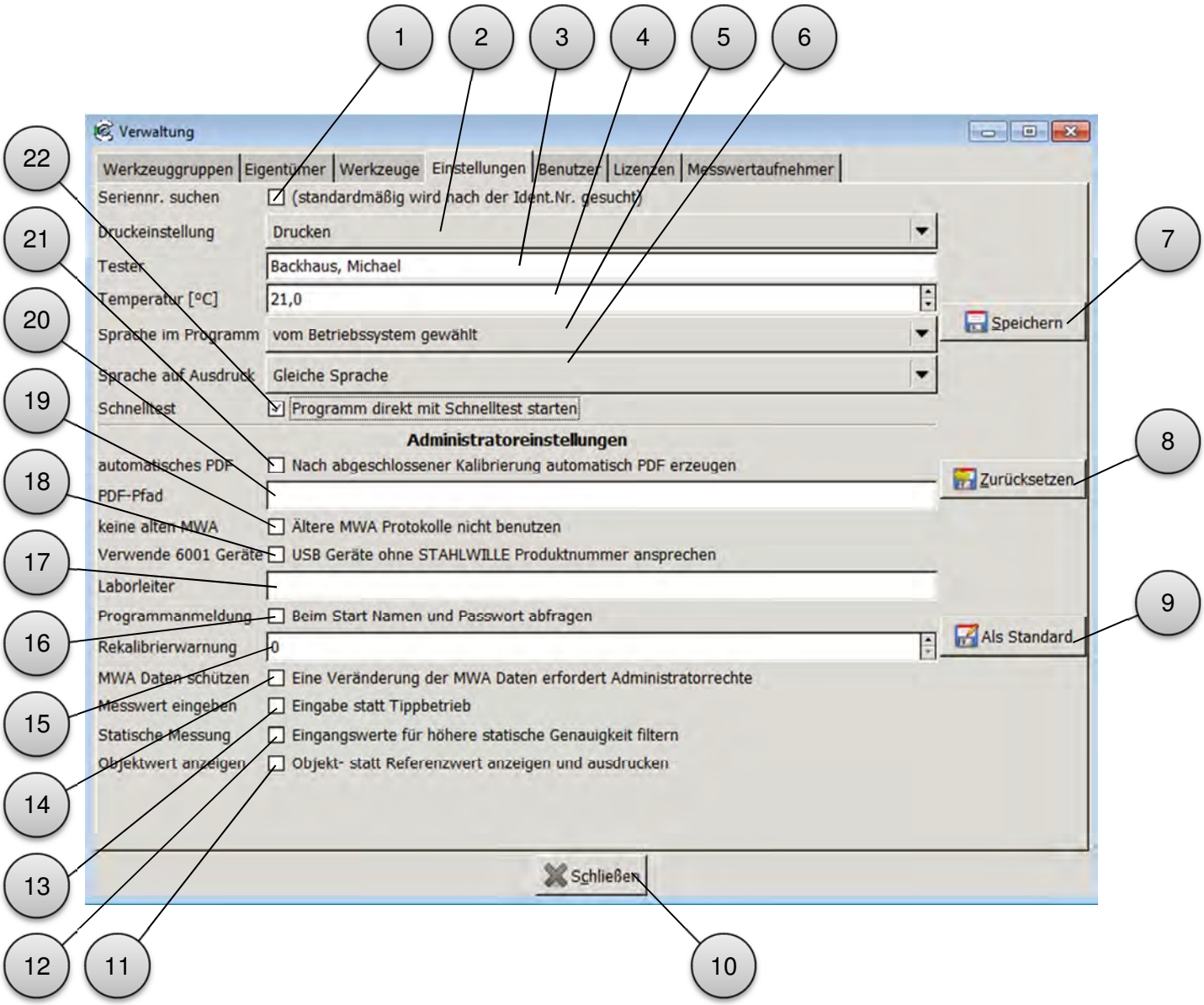


If the quick test mode checkbox has been activated, TORKMASTER will always run in this mode until the checkbox is deactivated again.

The quick test mode is used for testing torque tightening tools. The tools to be tested must first be entered in the database. Target values can be preset using the <20%>, <60%> and <100%> keys. The edit box can be used to enter any required intermediate values.

The results of the quick test are saved under the predefined serial number for that torque tightening tool.

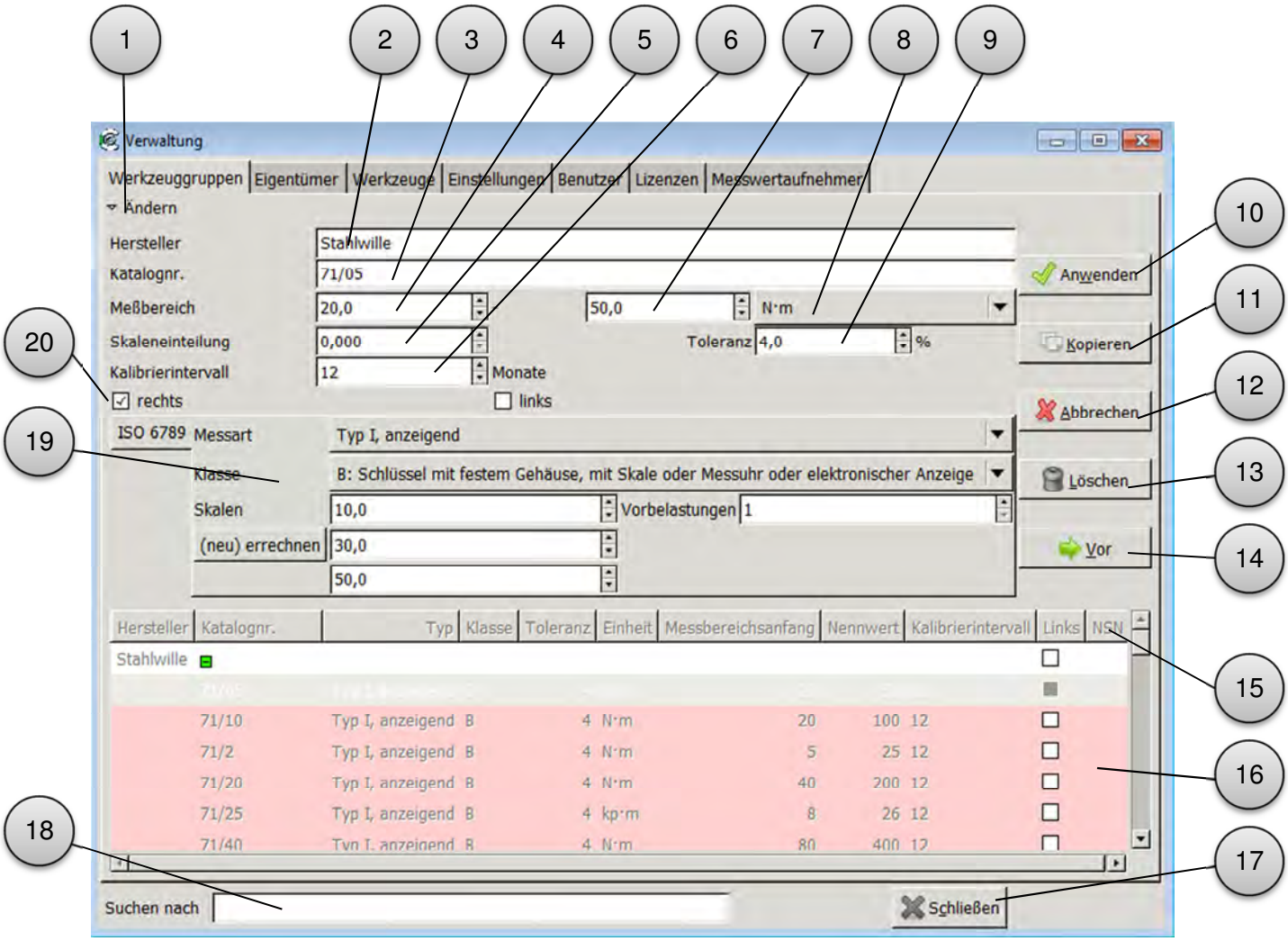
Administration



No.	Function / description
1	Standard search settings. It is always possible to search by serial number and ident number. The display shows either the ident number or the serial number.
2	Settings for the printer icon in the main window.
3	Name of the employee carrying out the calibration.
4	Temperature during calibration. This has to be manually recorded and entered. The default setting is 21 °C.
5	Language setting. The default is the language of the operating system. It is however possible to select a different language. If the language of the operating system is not supported, all text will be displayed in English.
6	Language settings for the calibration certificate. The default is the language of the operating system. It is however possible to select a different language. If the language of the operating system is not supported, all text will be displayed in English.
7	Saving the modified basic settings.
8	Restoring default settings.
No.	**Function / description**

9	Save current settings as new defaults.
10	Close the window.
11	Only applies to indicating calibration tools: Representation of tool results in the calibration certificate (instead of reference results). According to DIN EN ISO 6789:2003, the reference results should be given (checkbox deactivated). Activating this option does not influence the calculated, displayed deviation between the tool being calibrated and the reference.
12	Mathematical filter of torque signal. This can be used to increase the accuracy for static measurements. Only activate this function if you are doing static measurements!
13	This function only applies to indicating torque wrenches. If this option is selected, the perfectControl with automatically ramp up to the preset. The operator enters the reading displayed on the torque wrench manually.
14	The parameters for the transducer may only be modified by a system administrator.
15	Number of days for the advance warning of an impending recalibration. If this function has been activated, the TORKMASTER will give advance warning of impending recalibrations for all tools that are subject to compulsory recalibration at specific intervals. If a zero is entered, the function is disabled.
16	The program can use its own login and user administration system instead of the Windows logon.
17	Name of the laboratory manager whose name is to appear on calibration certificates.
18	STAHLWILLE USB hubs used to use different USB ident numbers in the past. If any ident number is to be accepted, this field must be activated as otherwise only the current adapters will be accepted.
19	Activating this field will enable transducers equipped with firmware 2.xx to be accepted. Warning: If this field is activated, there will not be such a high standard of protection for transducers!
20	Path for saving automatic PDF calibration certificates. Hover the mouse pointer over this field to see the options for a generic path
21	Save calibration certificates automatically as PDF files after the calibration has been saved.
22	Run TORKMASTER in quick test mode. Refer to the section headed >Quick test mode<.

Database of tool families



General tool-specific data of the tool to be calibrated are stored in the tool family. Before a tool can be calibrated, it must first be allocated to a tool family. In addition, every tool to be calibrated must have an owner and individual tool parameters entered with it (e.g. serial number).

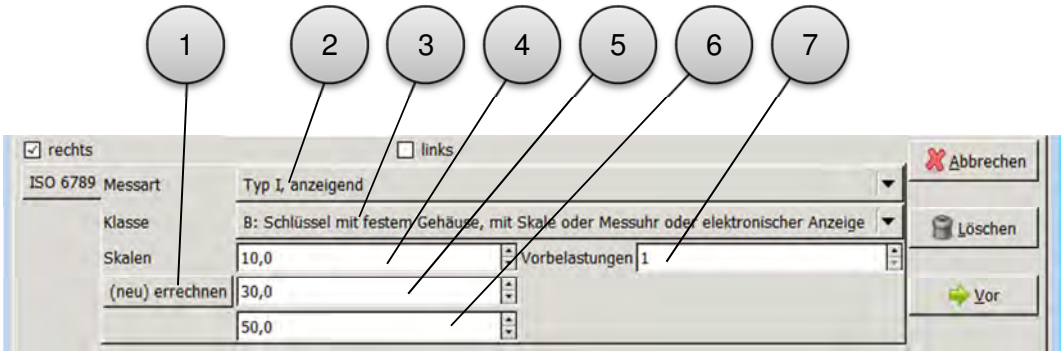
STAHLWILLE tools are already stored in the database. Third party tools can be added by the operator.

The settings must follow the manufacturer's instructions and corresponding relevant standards and regulations.

No.	Function / description
1	Function key for expanding the menus.
2	Manufacturer of the torque wrench.
3	Catalogue number / designation of the torque wrench.
4	Starting value for the measuring range of the torque wrench.
5	Scale of the torque wrench.
6	Recalibration interval of the torque wrench. If a specific recalibration interval is entered on the Tool tab, this will have priority.
7	Finishing value for the measuring range of the torque wrench.
No.	**Function / description**

8	Unit of measure of the torque wrench.
9	Display deviation value of the torque wrench.
10	Confirm entries and save the new or modified data record.
11	Copying a data record. Select the data record to be copied and then confirm by clicking the >Copy< button. Any required changes can then be made to the new data record (e.g. manufacturer, measuring range or unit of measure). Save the new data record by clicking >Apply< and close the dialogue box. Note: The data record must have a different name because it is not permitted to have multiple names with differing parameters in the database.
12	Cancel data entry or editing of a data record.
13	Delete a data record. It is only possible to delete a data record if no tools have been allocated to that tool family. An error message will occur otherwise.
14	Continue on the next tab.
15	Filter bar. Tools entered in the database can be sorted by a number of criteria.
16	List of all the tools entered in the database.
17	Close the window.
18	Edit box for the automatic filter function within the database. This filter is applied to the first column of the database shown. Double-clicking the corresponding column heading allows you to sort by that column as the first column.
19	Additional standards-specific details relating to that tool. Details below.
20	Marking of the tool for clockwise and anticlockwise tightening.

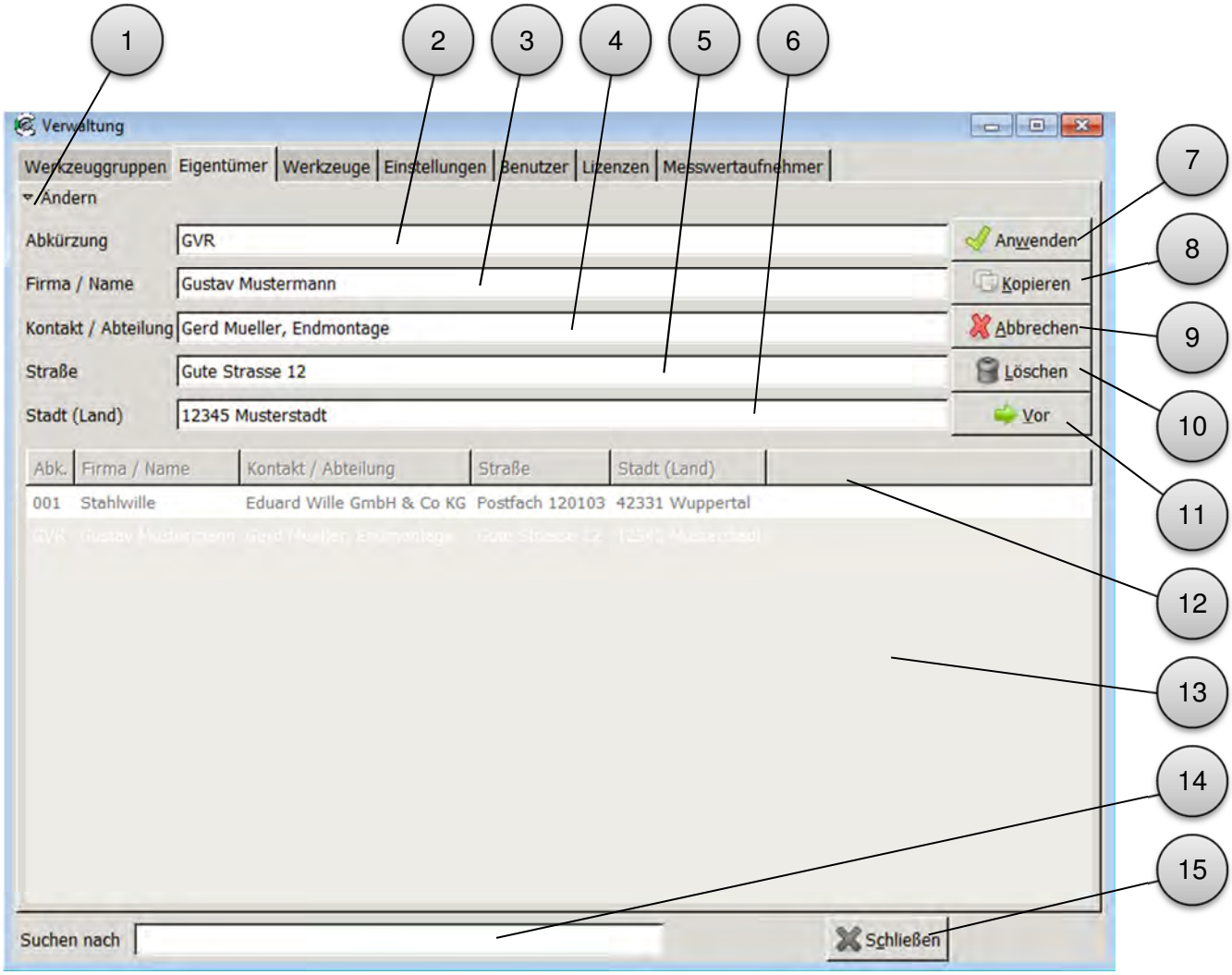
Additional settings for calibration in accordance with DIN EN ISO 6789:2003:



When entering parameters, note the manufacturer's instructions and the DIN EN ISO 6789:2003 requirements.

No.	**Function / description**
1	Calculate the values for the calibration points (20, 60 und 100%).
2	Type of torque wrench in accordance with DIN EN ISO 6789:2003.
3	Class of torque wrench in accordance with DIN EN ISO 6789:2003.
4	Starting value for the measuring range of the torque wrench.
5	20% calibration point. If the torque wrench is to be calibrated at calibration points other than the standard ones, individual changes can be entered manually.
6	60% calibration point. If the torque wrench is to be calibrated at calibration points other than the standard ones, individual changes can be entered manually.
7	100% calibration point. If the torque wrench is to be calibrated at calibration points other than the standard ones, individual changes can be entered manually.

Owner database

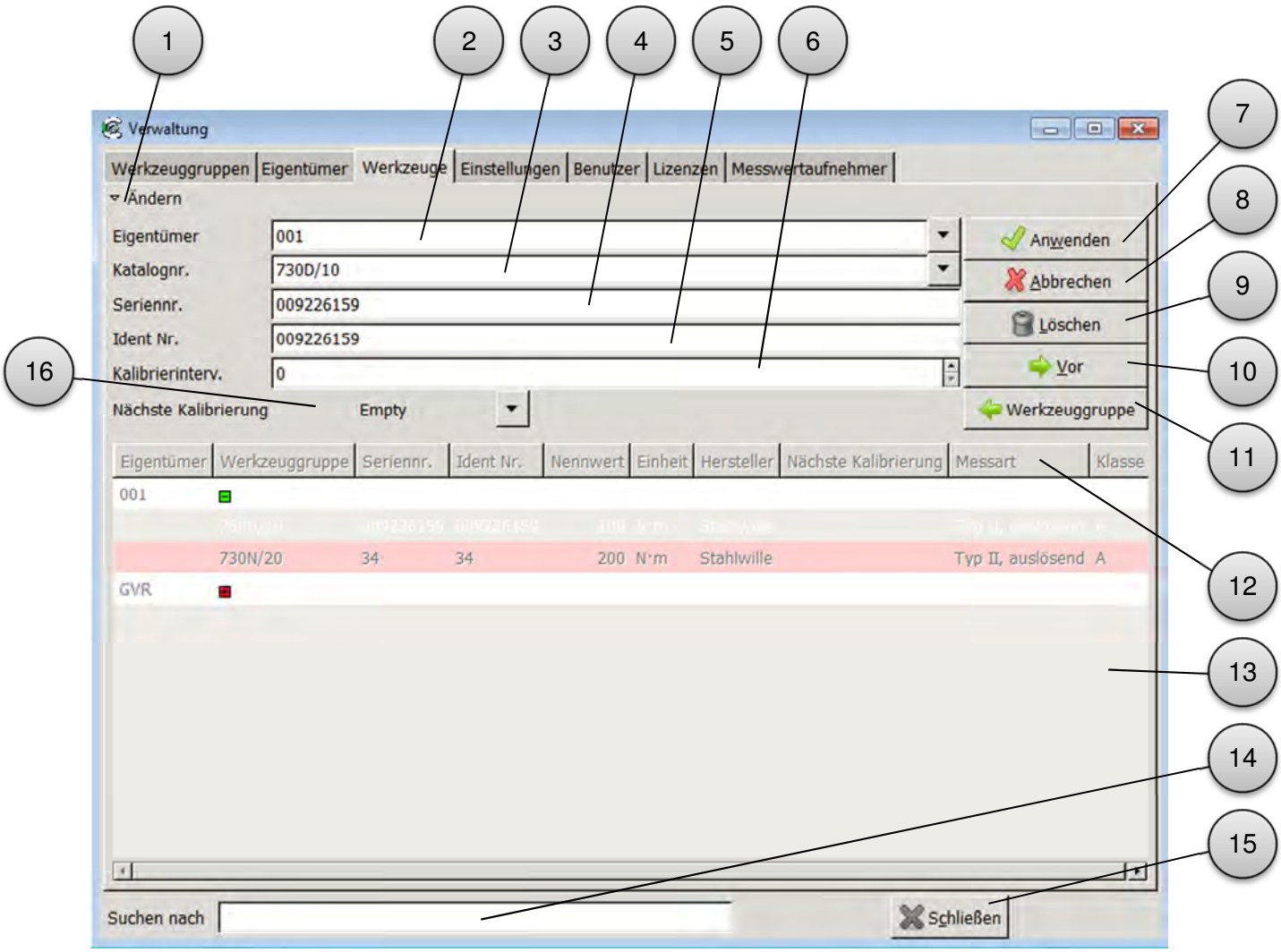


Every tool to be calibrated must be assigned to an owner. The “owner” might be the customer of a calibration laboratory or a production cell within the production facility.

No.	Function / description
1	Function key for expanding the menus.
2	Abbreviation of the owner (alphanumeric).
3	Name of the owner
4	Contact details of the owner
5, 6	Address of the owner
7	Function key for adding a new data record to the database
8	Function key for copying an existing owner.
9	Cancel entry of a new owner
10	Delete an owner from the database. It is only possible to delete an owner if no tools have been allocated to him / her
11	Function key for entering more details for a tool (individual parameters of a tool)
12	Filter bar. Owners entered in the database can be sorted by a number of criteria.
13	List of all the owners entered in the database.
No.	**Function / description**
14	Edit box for the automatic filter function within the database. This filter is applied to

	the first column of the database shown. Double-clicking the corresponding column heading allows you to sort by that column as the first column.
15	Close the window.

Tools database

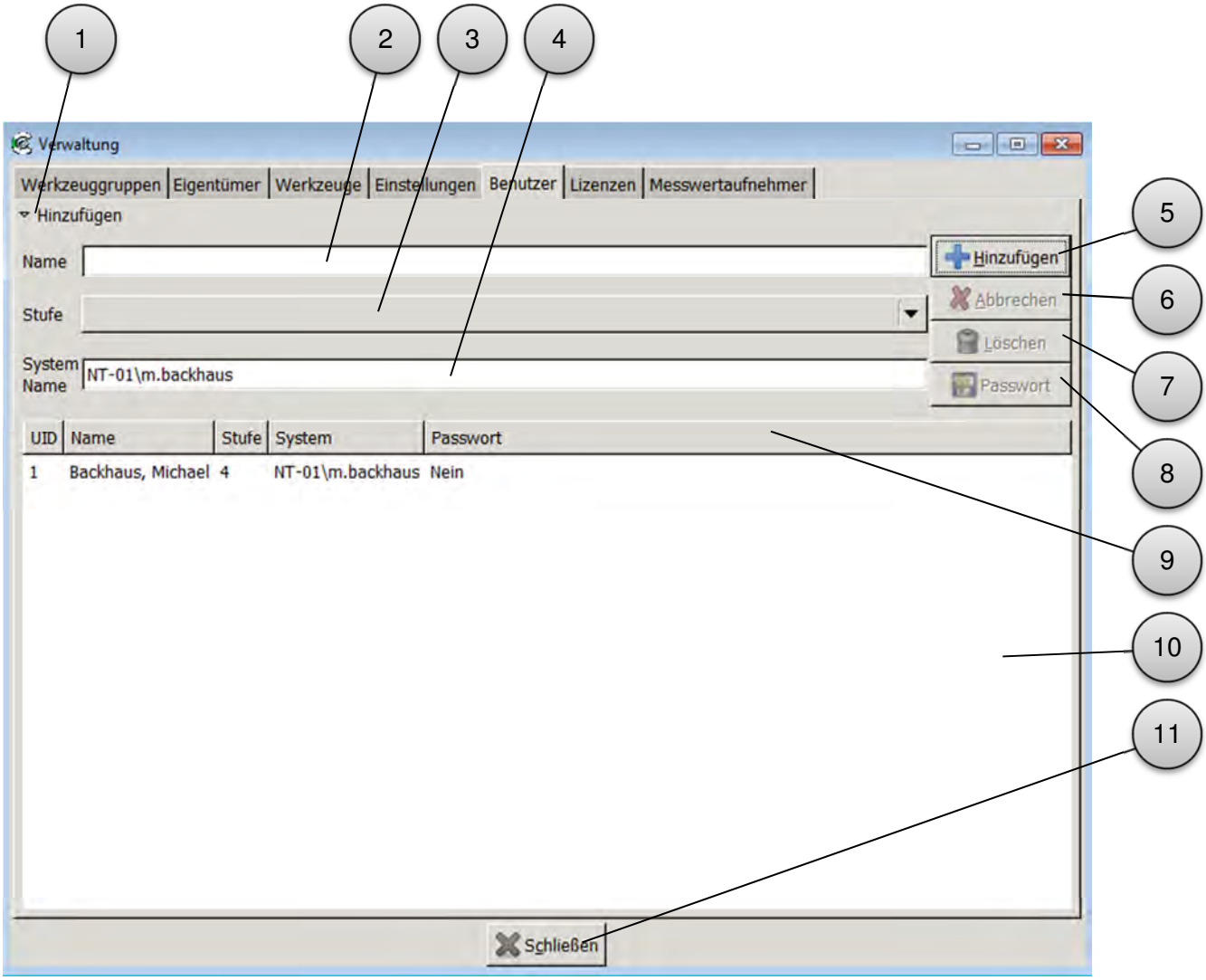


This is where the individual parameters for a tool are entered. It is a precondition that the corresponding tool family and the owner have already been entered.

No.	Function / description
1	Function key for expanding the menus.
2	Select the abbreviation for the owner. You can choose between the pull-down menu (arrow on the right) to display the complete list or simply start typing in the box. The autotext function will then automatically restrict the list to those applicable.
3	Choice of tool family. You can choose between the pull-down menu (arrow on the right) to display the complete list or simply start typing in the box. The autotext function will then automatically restrict the list to those applicable.
4	Serial number of the tool to be calibrated. Use this number to search for the tool in the database.
5	User specific ident number (e.g. test equipment number) of the tool. Use this number to search for the tool in the database.
6	Enter the calibration interval if this deviates from the one entered in the tool family.
7	Function key for adding a new data record to the database.
No.	**Function / description**
8	Cancel entry of a new tool.
9	Delete a tool from the database.
10	Returns to the main menu and loads the tool (torque wrench) for calibration.

11	Returns to the tool family to enable any necessary modifications.
12	Filter bar. Click a column header to sort the tools.
13	List of all the tools entered in the database.
14	Edit box for the automatic filter function within the database. This filter is applied to the first column of the database shown. Double-clicking the corresponding column heading allows you to sort by that column as the first column.
15	Close the window.
16	Date of next calibration of the torque wrench. This may be a specific date, or calendar week or year. This is essential data if you wish to use the automatic advance recalibration notification function.

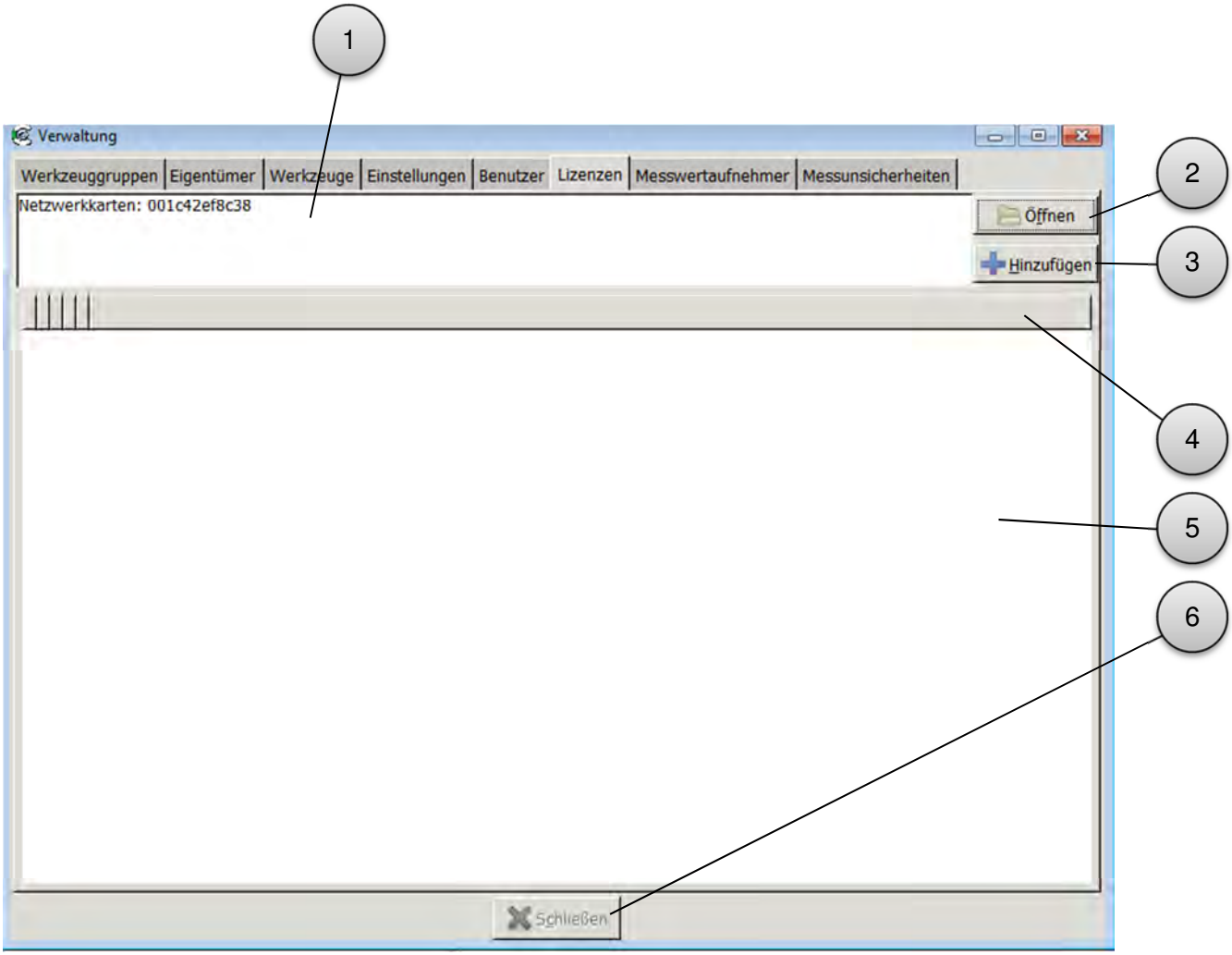
User management



User management can be used to restrict the functionality of the software.

No.	Function / description
1	Function key for expanding the menus.
2	Name of the user.
3	Permissions level.
4	Sign-in name at operating system level.
5	Function key for adding a new data record to the database.
6	Cancel entry of a new user.
7	Delete a user from the database.
8	Assign the user a password or change a password (Administrator rights required).
9	Filter bar. Click a column header to sort the users.
10	List of all the users entered in the database.
11	Close the window.

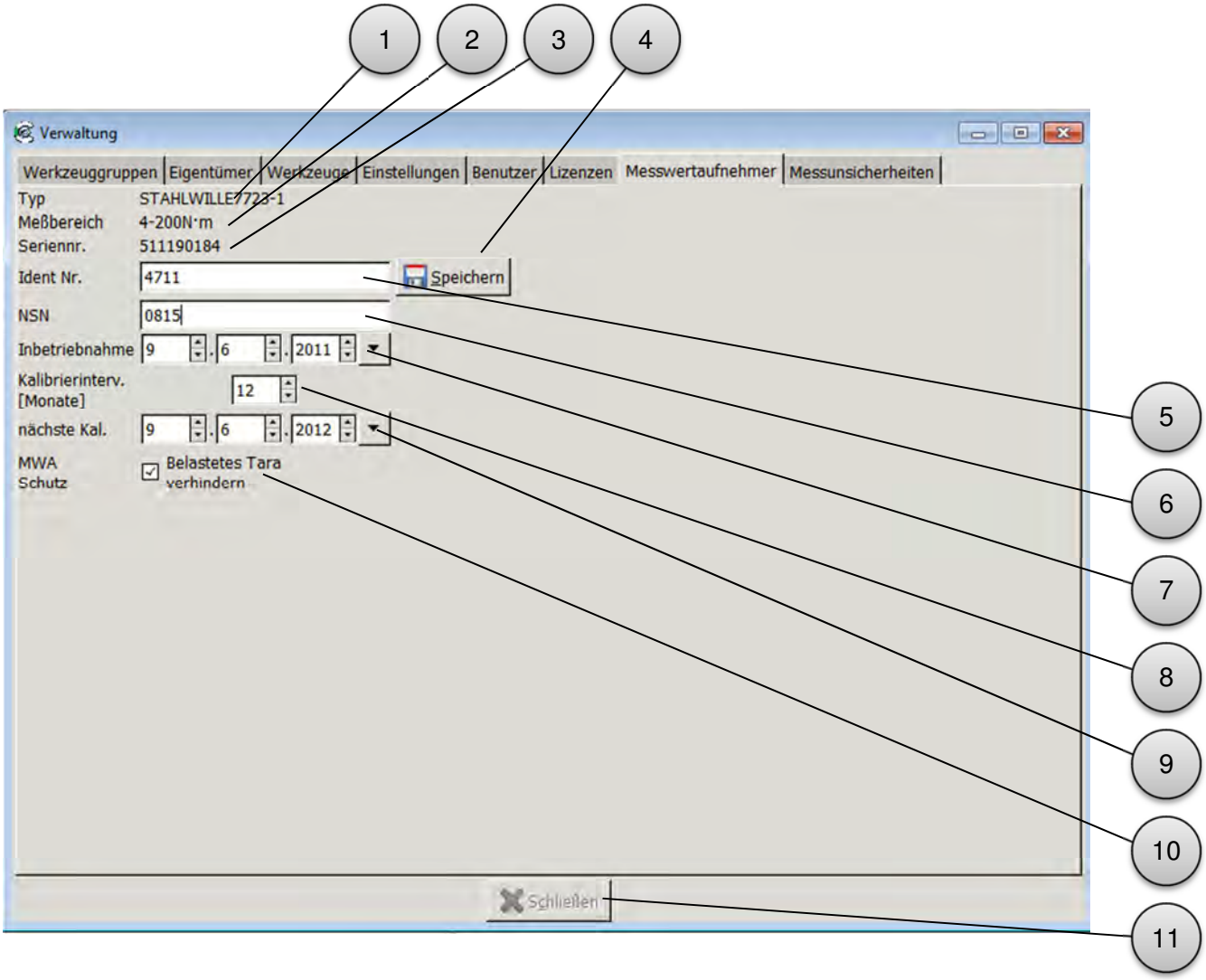
Program licences



The functionality of the TORKMASTER software can be expanded by purchasing additional licences (TORKMASTER Premium). Examples of expansion packs are special-purpose calibrating or adjustment workflows (DKD-R 3-8 or ASME B107.300).
To provide a licence, we would require the MAC ID of the network adapter of the PC to be used. As an alternative, you can provide us with the USB device ID of the STAHLWILLE USB hub. These details are displayed in the edit box and have to be communicated to STAHLWILLE to enable us to generate the licence file.

No.	Function / description
1	Edit box for the licence key
2	To open the licence file.
3	Function key for adding a new licence.
4	Filter bar. Click a column header to sort the licences.
5	List of all the licences entered in the database.
6	Close the window.

Parameters for the transducers



The variable parameters can be entered here for the reference modules (transducers). The transducers have to be connected to the PC via the USB hub for this function.

We recommend entering these data before you use each transducer for the first time.

No.	Function / description
1	Display of the transducer type. This data record is permanently stored in the transducer.
2	Measuring range of the transducer type. This data record is permanently stored in the transducer.
3	Serial number of the transducer. This data record is permanently stored in the transducer.
4	Function key for saving the parameters in the transducer that is connected to the PC.
5	User specific ident number (e.g. test equipment number) of the tool.
6	User specific number of the tool to be calibrated.
7	Commissioning date of the transducer (format: DD/MM/YYYY). A calendar view will open via the pull-down menu (arrow on right).
8	Recalibration interval of the transducer.
No.	**Function / description**

9	Date of next calibration of the transducer (format: DD/MM/YYYY). A calendar view will open via the pull-down menu (arrow on right). This date also appears in the calibration certificate generated with TORKMASTER.
10	This function prevents the transducer from being reset when it is under load. When using the transducer together with a perfectControl 7794-2 or 7794-3, this function must be selected. The function is intended to prevent damage to the transducer if the equipment is incorrectly used, but also prevents measuring errors resulting from incorrect operation of the tare button.
11	Close the window.

Instructions for use and examples

Notes on calibration (factors influencing the accuracy of readings)

The results of a calibration may be falsified by the following factors:

- Climatic conditions
  - Room temperature (absolute value and stability)
    18 - 28°C and ≤ 1K temperature change during calibration
  - Temperature of the tool being calibrated
    We recommend storing the tool to be calibrated in the laboratory for 24 hours before attempting to calibrate it.
  - Relative humidity
- Transducer
  - Display accuracy / measurement uncertainty
  - Scan rate
  - Influence of lateral forces
  - Point at which the unit is reset
  - The way the transducer is fixed
- Alignment of the tool to be calibrated
  - Horizontal or vertical alignment
  - Level position of the tool to be calibrated with reference to the base (e.g. ±3°)
  - Position of the point of application of force (variation in the lever arm)
  - Shift of the point of application of force during the measurement process
  - Support for the point of application of force
- Adaptation of the tool to be calibrated
  - Calibrating insert tool and alignment of the square drive
  - Reduction adapter for matching the insert tool to the transducer
  - Use of ratchets or male square drives with a ball end. Both insert tools will have a considerable influence on the results of the calibration due to their tolerances, which are a result of the production process. This is why we recommend using special calibration insert tools.
- Detecting the trip point
  - Scan rate of the transducer
  - Tightening speed of the torque wrench
  - Point at which the transducer is reset
  - Parameters for detecting the trip point
- Human error
  - Knowledge and experience of using the calibration technology being applied
  - Knowledge of the requirements in the standards and regulations applicable
  - Knowledge of the tools being calibrated
  - Non-observance of instructions contained in the various documents
    - Operating instructions
    - Standards and regulations

We recommend carrying out an FMEA (failure mode and effects analysis) on the calibration process to identify any possible process defects and their consequences and take corresponding corrective action to prevent these defects.

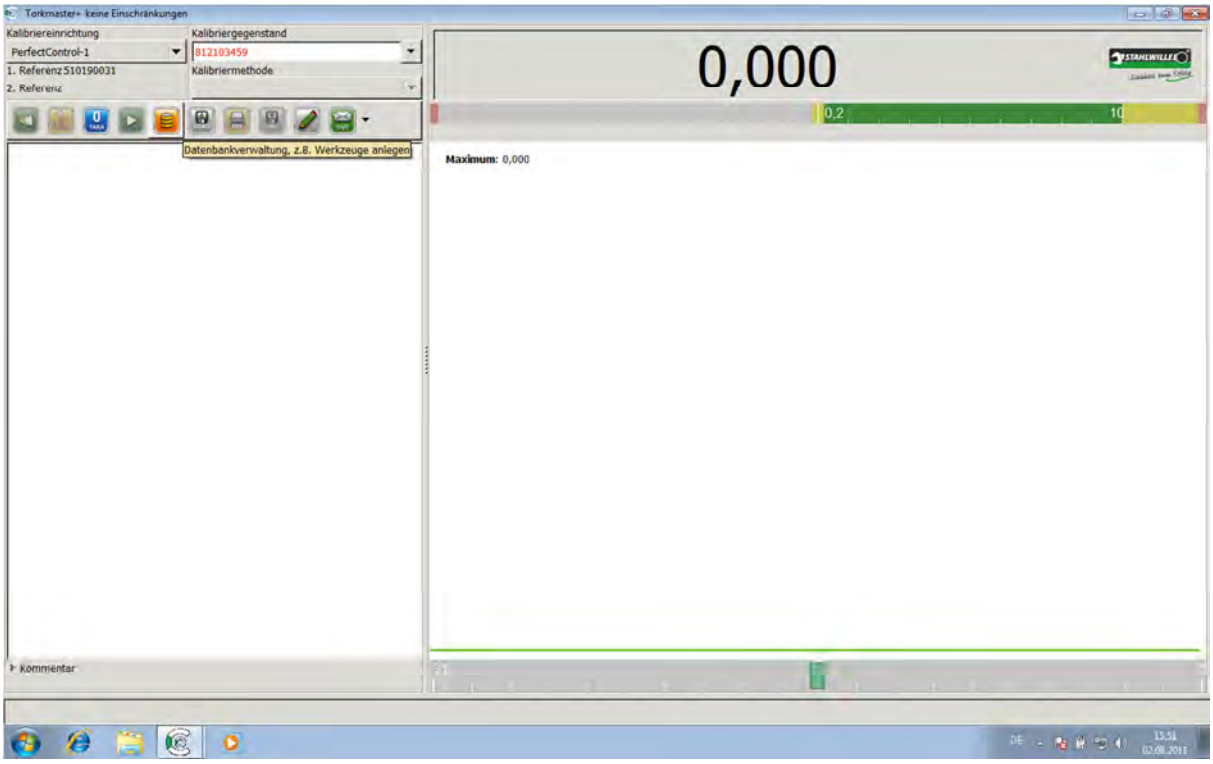
Apply Ishikawa logic: Manpower, Method, Machine, Matter and Means

Creating a new tool in the database

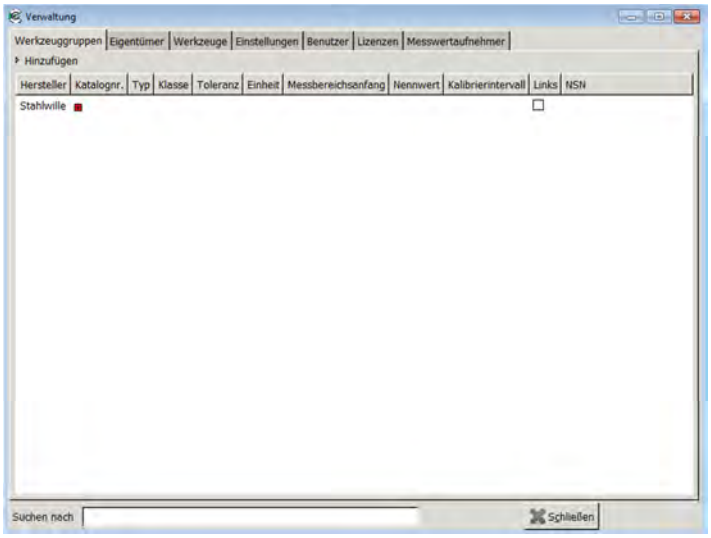
Below we show an example for creating a completely new clicking torque wrench (Type II / Class A) in accordance with DIN EN ISO 6789:2003 in the TORKMASTER database. This requires four steps:

1. Create a tool family
2. Create an owner
3. Create a tool
4. Start calibration

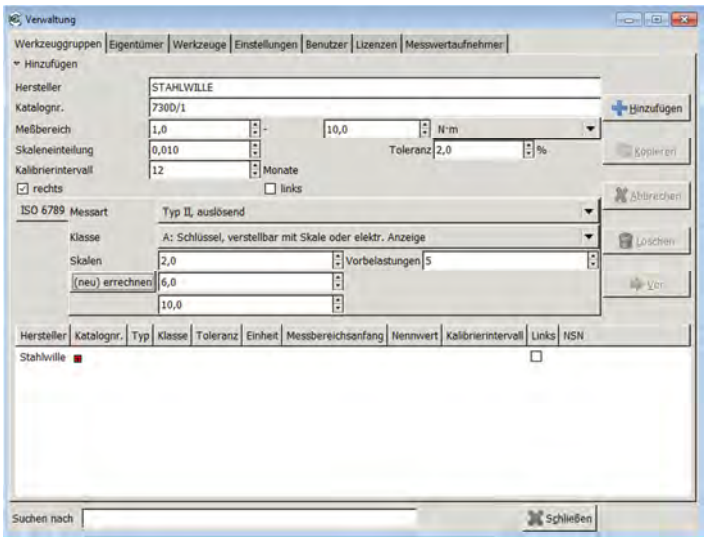
➢ Open the database.



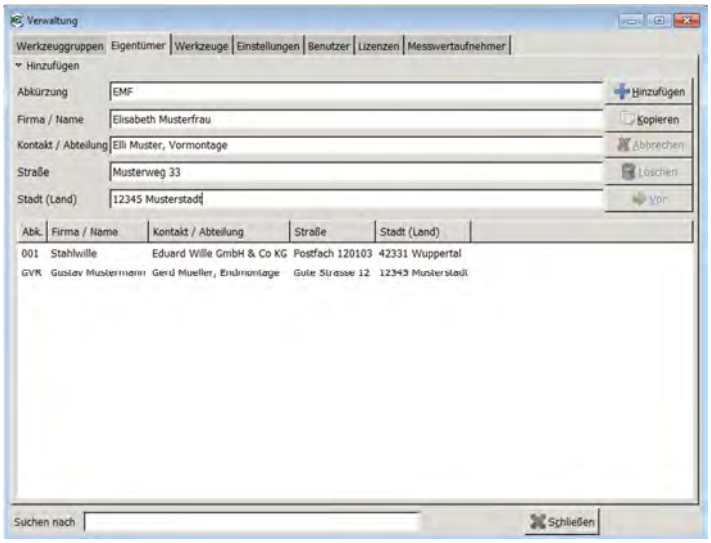
➢ Select the >Tool family< (>Werkzeuggruppen<) tab.



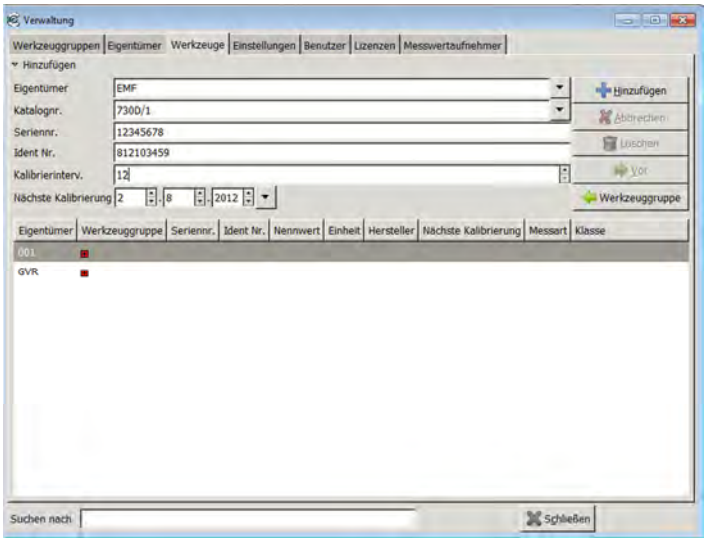
➢ Click >Add< (>Hinzufügen<).



- Enter the manufacturer of the tool (>Hersteller<).
- Enter a unique name for the tool. (>Katalognr.<) Note: The name is the identifier within the database. If you wish to create a number of tools of the same type but e.g. with different units of measure, the unique names have to show this difference. Example: 730D/10_Nm and 730D/10_inlb.
- Enter the starting point of the scale.
- Enter the end point of the scale (>Meßbereich< right-hand box).
- Select the unit of measure (pull-down menu).
- Enter the scale resolution (>Skaleneinteilung<).
- Enter the display deviation value (>Toleranz<).
- Enter the recalibration interval (>Kalibrierinterval<).
- Activate the appropriate checkboxes for the permitted directions of loading (here: only clockwise (>rechts<)).
- Select the type in accordance with DIN EN ISO 6789:2003 (>Messart<).
- Select the class in accordance with DIN EN ISO 6789:2003 (>Klasse<).
- Enter the three scales for calibration (>Skalen<). Press >Recalculate< (>(neu) errechnen<) to have the values automatically recalculated.
- If necessary, adjust the number of dummy measurements.
- Click the >Add< button (>Hinzufügen<) to create the new tool family.
- Click >Next< (>Vor<) to advance to the >Tools< tab (>Werkzeuge<). If the owner of the tool is not yet in the database, select >Owners< (>Eigentümer<) to add the name.

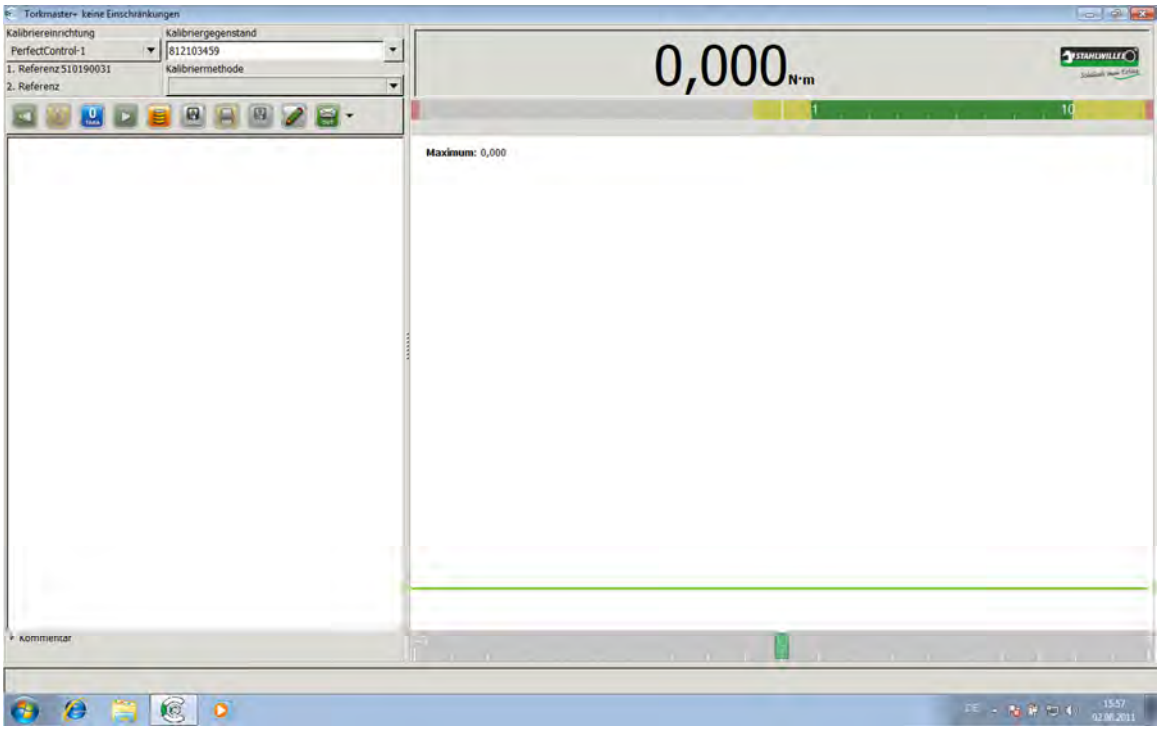


- Enter an abbreviated name (matchcode) (>Abkürzung<) for the user. Note: This matchcode is the identifier within the database.
- Enter the company and/or name (>Firma/Name<).
- Enter the contact details (>Kontakt/Abteilung<).
- Enter the street address (>Straße<).
- Enter the town (>Stadt (Land)<).
- Click the >Add< button to create the new owner (>Hinzufügen<).
- Click >Next< (>Vor<) to advance to the >Tools< tab (>Werkzeuge<).

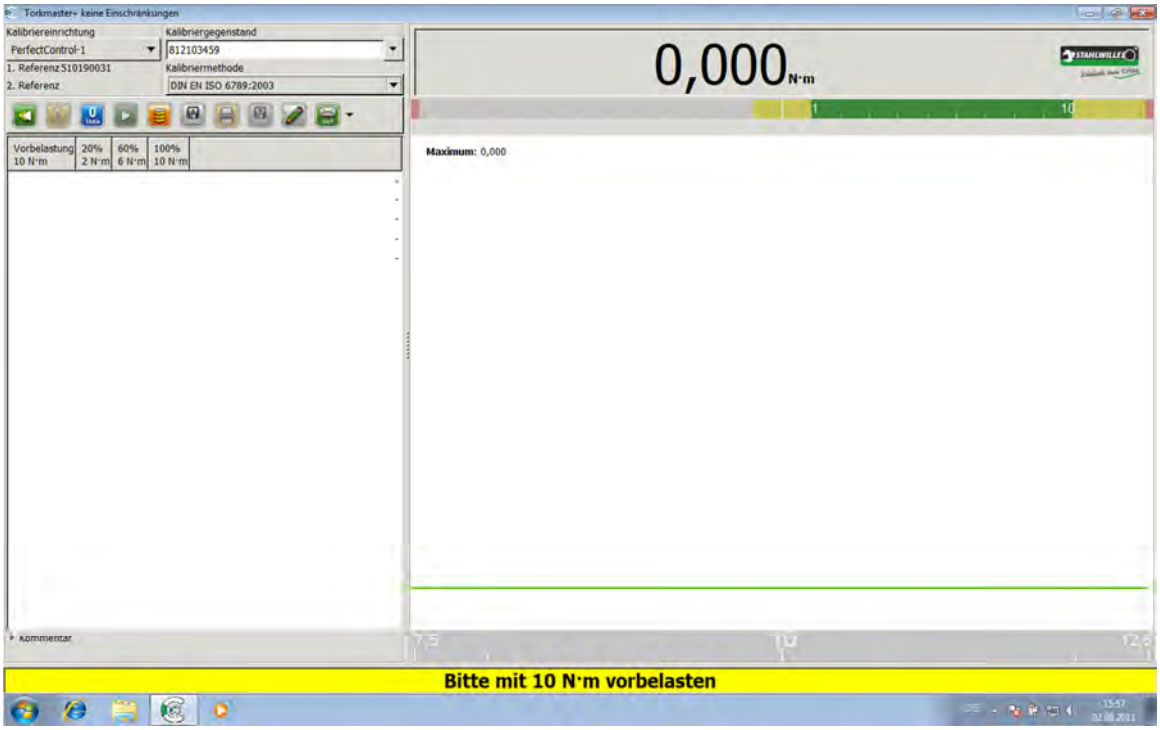


- Select the owner (>Eigentümer<). You can enter the beginning of the name if it is known. In the list that then appears, select the correct entry with the mouse or using the arrow keys and press enter to select.
- Select the torque tightening tool (>Katalognr.<). You can enter the beginning of the name if it is known. In the list that then appears, select the correct entry with the mouse or using the arrow keys and press enter to select.
- Enter the serial number (>Seriennr.<). Note: This unique number is the reference within the database.
- Enter the test equipment number or label (>Identnr.<).
- Enter the recalibration interval (>Kalibrierinterval<).
- Enter the date for the next calibration (>Nächste Kalibrierung<). This may be a specific date, or calendar week or year. This is essential data if you wish to use the automatic advance recalibration notification function.

- Click the >Add< button (>Hinzufügen<) to create the new tool.
- Click >Next< (>Vor<) to advance to the main menu.



- Select the calibration method



- Start the calibration process and follow the instructions in the status bar of the TORKMASTER software.

Example of calibration in accordance with DIN EN ISO 6789:2003 using the PerfectControl 7794-1, 7791 or 7792

Below we show an example for calibrating a clicking torque wrench (Type II / Class A) in accordance with DIN EN ISO 6789:2003 using the perfectControl 7794-1 and manual operation. The procedure applies also to loaders 7791 and 7792, and if the software is used together with the 7707 W workshop torque tester.

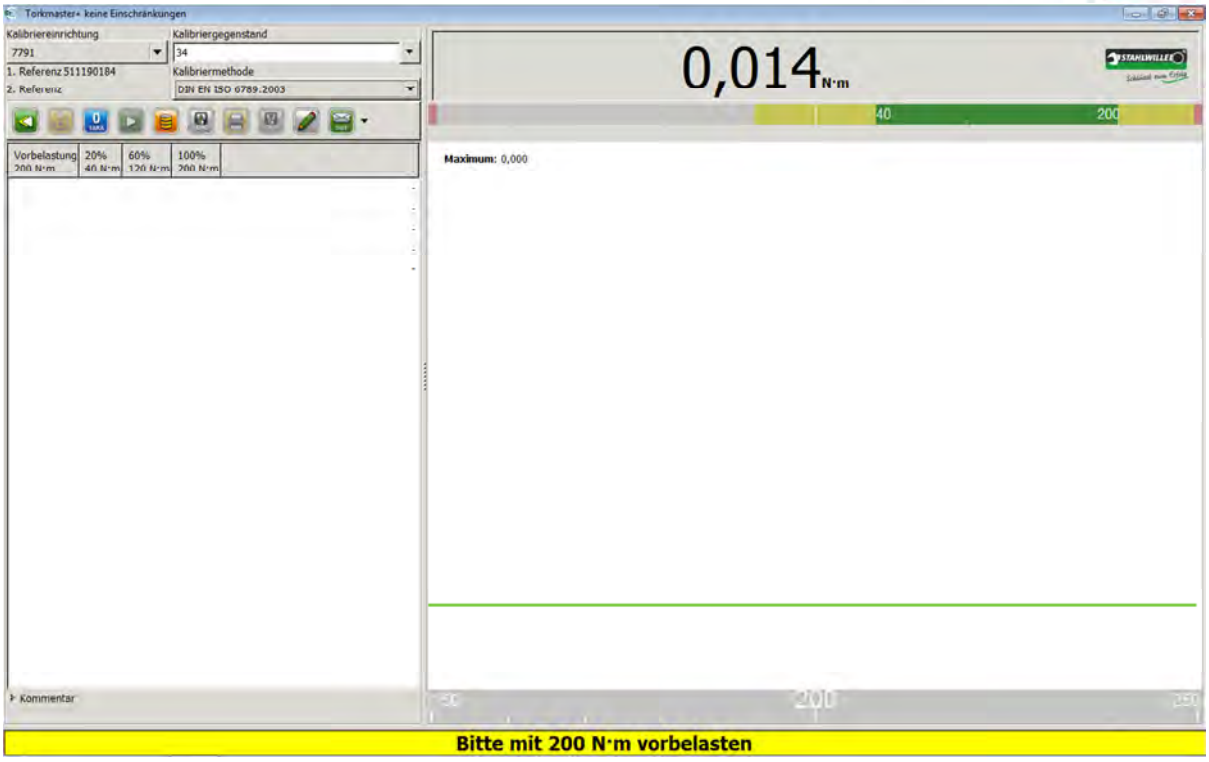
Preconditions:

- The TORKMASTER software must be installed and running.
- A transducer must be connected to the PC via the USB hub.
- The software will automatically detect the transducer and the serial number of the transducer will appear in the field >***1st reference< (>1. Referenz<)***.
- Torque is displayed.
- There are no faults in the equipment.

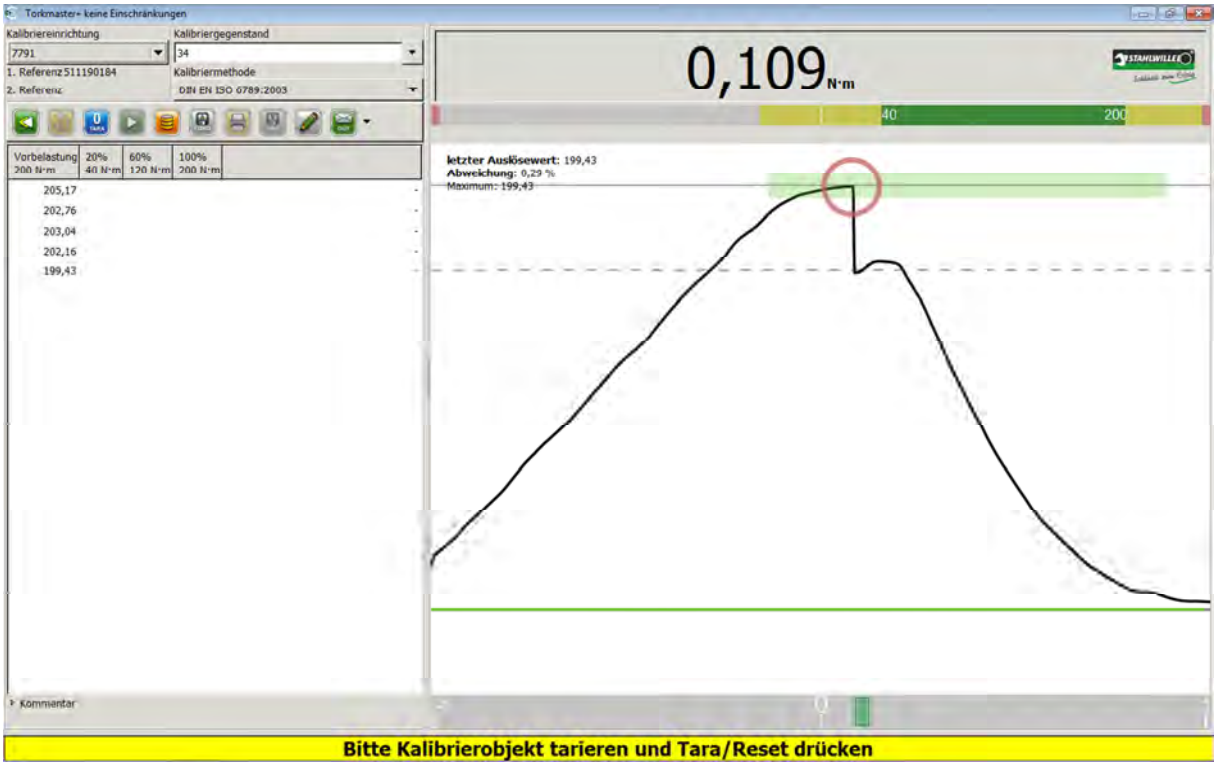
Calibration:

- Select a >***Calibrating unit< (>Kalibriereinrichtung<)***.
- First check the tool to be calibrated for any signs of damage or cracks and check that the scale is easily legible.
- To run the calibration, enter the serial number, as an alternative the ident number, under >***Tool to be calibrated< (>Kalibriergegenstand<)***. If the number is shown in red, the tool being calibrated has not yet been defined in the database. In this case, you will have to enter its details in the database first (see section on tool database).
- If the tool being calibrated is already in the database (serial number shows in black), you can now select the >***Calibration method< (>Kalibriermethode<)***. In this example, the tool is to be calibrated in accordance with DIN EN ISO 6789:2003.
- Select the corresponding adapter and a suitable calibrating insert tool. If necessary, use reducing adapters but never combine several reduction adapters! This will falsify the calibration results. Place the torque wrench in the calibrating unit and align it in accordance with the provisions in the regulations. Note the calibration instructions on the effects of external factors.
- On the torque wrench, set the highest value for the dummy measurements.

Note: Always adjust from a lower to a higher value.

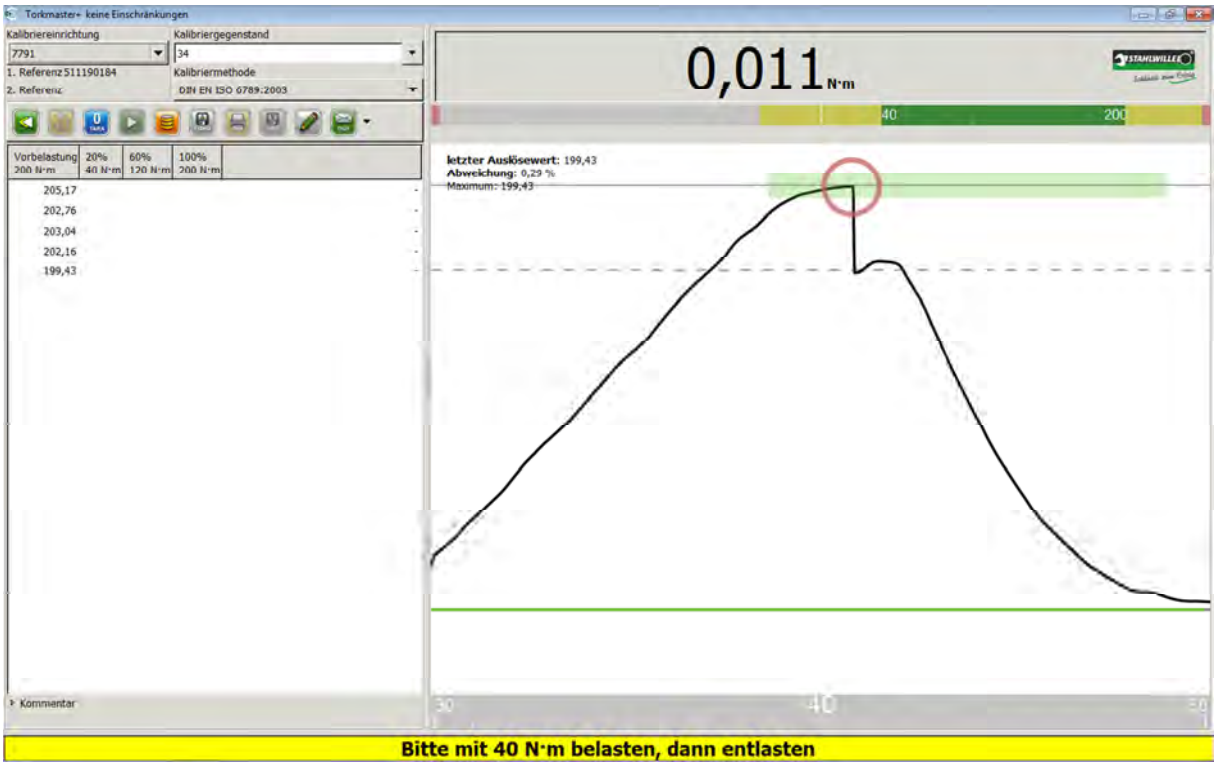


- Now follow the instructions shown in the status bar and do 5 dummy measurements by applying force via the handwheel. While applying force, ensure that the trip point is always within the target area, which is shown in green. If force is applied too fast, the trip point will be before the green area (t <0.5 s), and if it is applied too slowly, the trip point will be behind the green area (t >4 s).

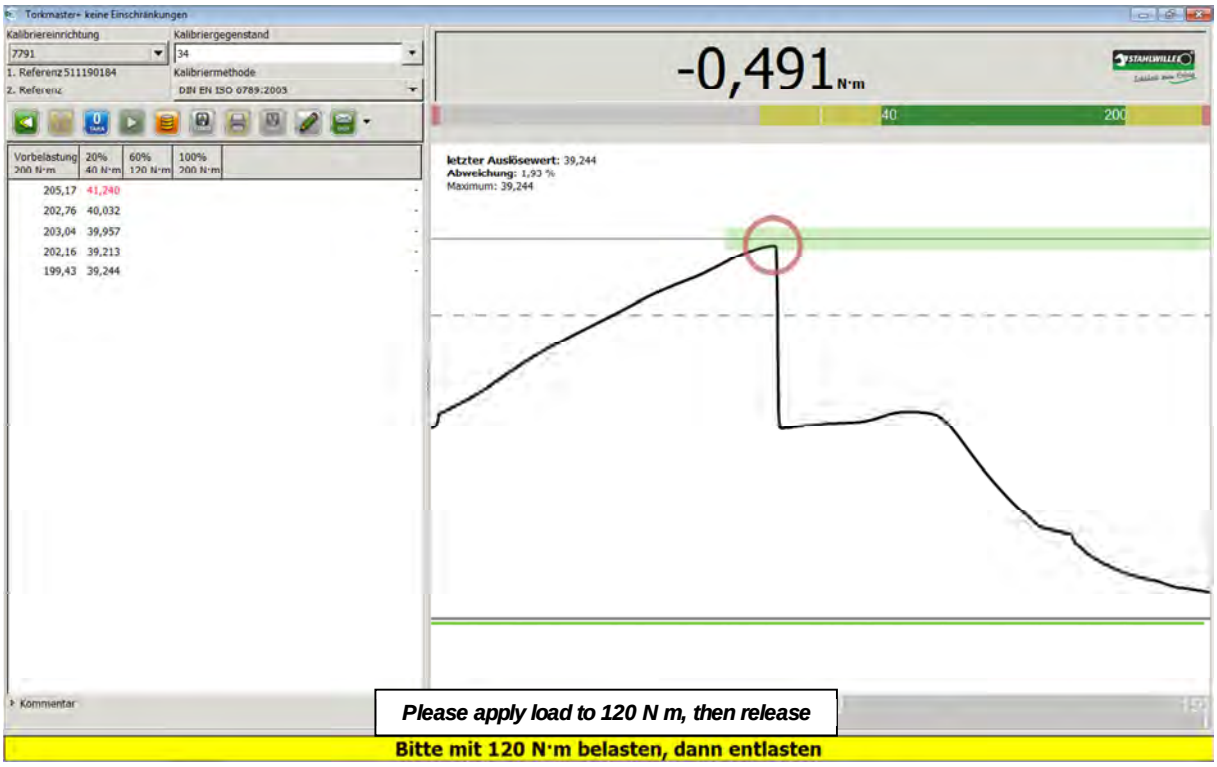


- Completely remove the torque wrench, reduction piece and the adapter.

- Press the tare / reset button (>Tara<). Ensure the torque displayed on the unit does not change at all before the tare button is pressed.

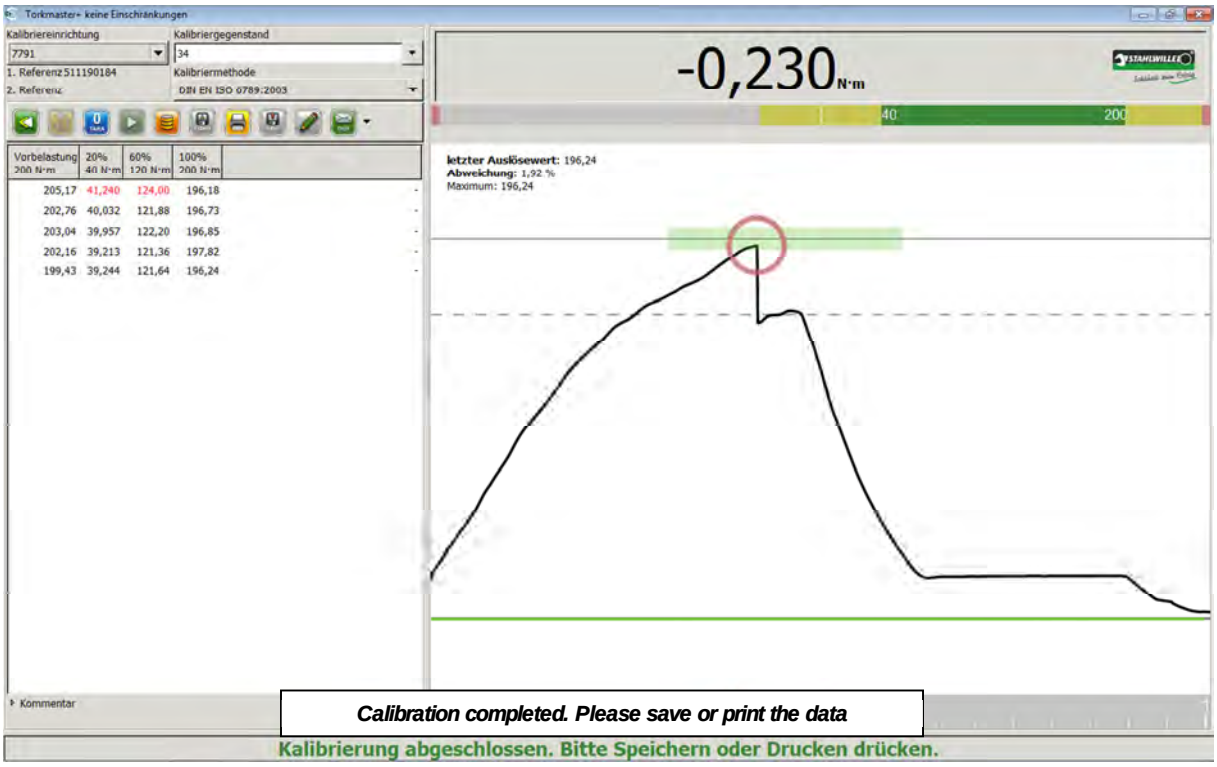


- Now set the value shown in the status bar on the torque wrench. It is possible to define different calibration points in the database (under tool family (>Werkzeuggruppe<)). As an example, this could be the starting point of the scale if this is less than 20%.
- Now load the wrench.



- Now set the value shown in the status bar on the torque wrench.
- Now load the wrench.

- Now set the value shown in the status bar on the torque wrench.
- Now load the wrench.



- After the fifth loading, the software recognises that the calibration has been completed. You can now label the calibration as either “As found” or “As left” and/or enter a comment in the comments field. You can then save or print the calibration.

- The software will now display the calibration summary. The software is now ready for the next calibration. Any values outside the tolerance range will be shown in red.

Example of calibration in accordance with DIN EN ISO 6789:2003 using the PerfectControl 7794-2

Below we show an example for automatically calibrating a clicking torque wrench (Type II / Class A) in accordance with DIN EN ISO 6789:2003 using the perfectControl 7794-2.

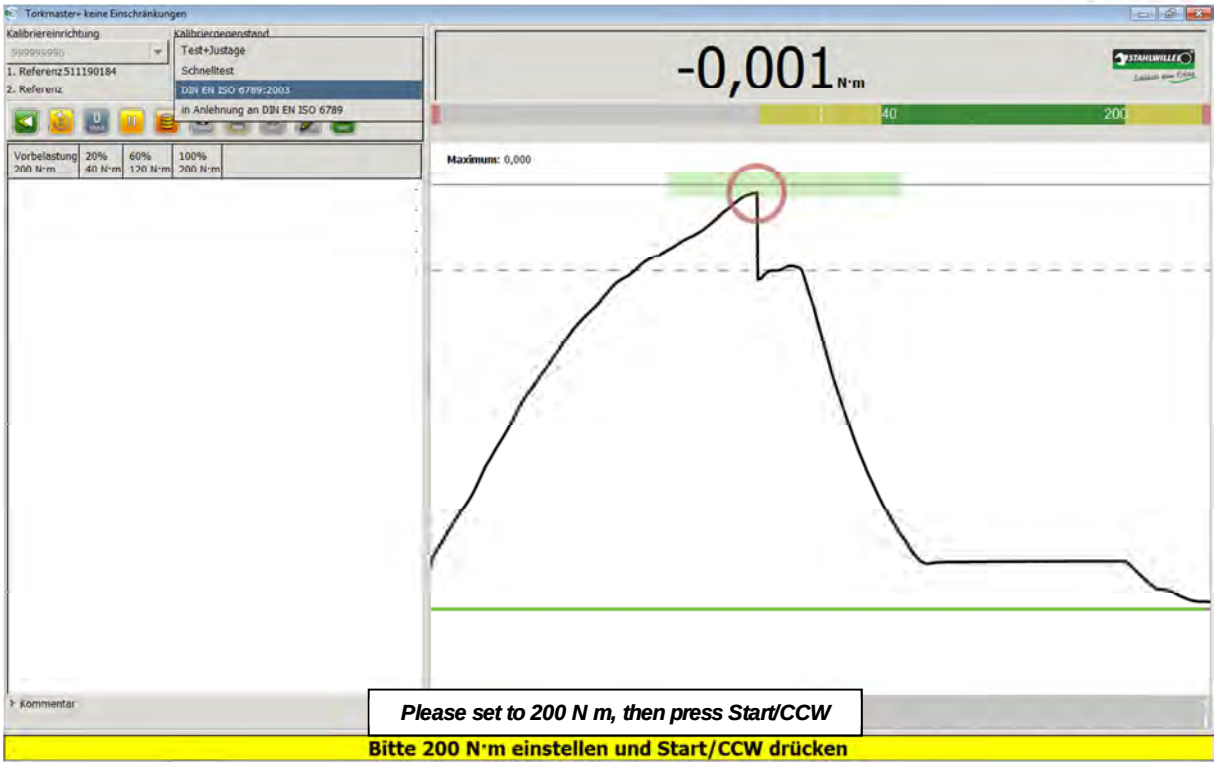
Preconditions:

- The perfectControl must be powered on, the TORKMASTER software installed and running.
- The software will automatically detect the calibrating unit.
- The serial number of the unit is displayed in the >***Calibrating unit***< (>***Kalibriereinrichtung***<) field and the serial number of the transducer in the >***1st reference***< (>***1. Referenz***<) field.
- Torque is displayed.
- There are no faults in the equipment.

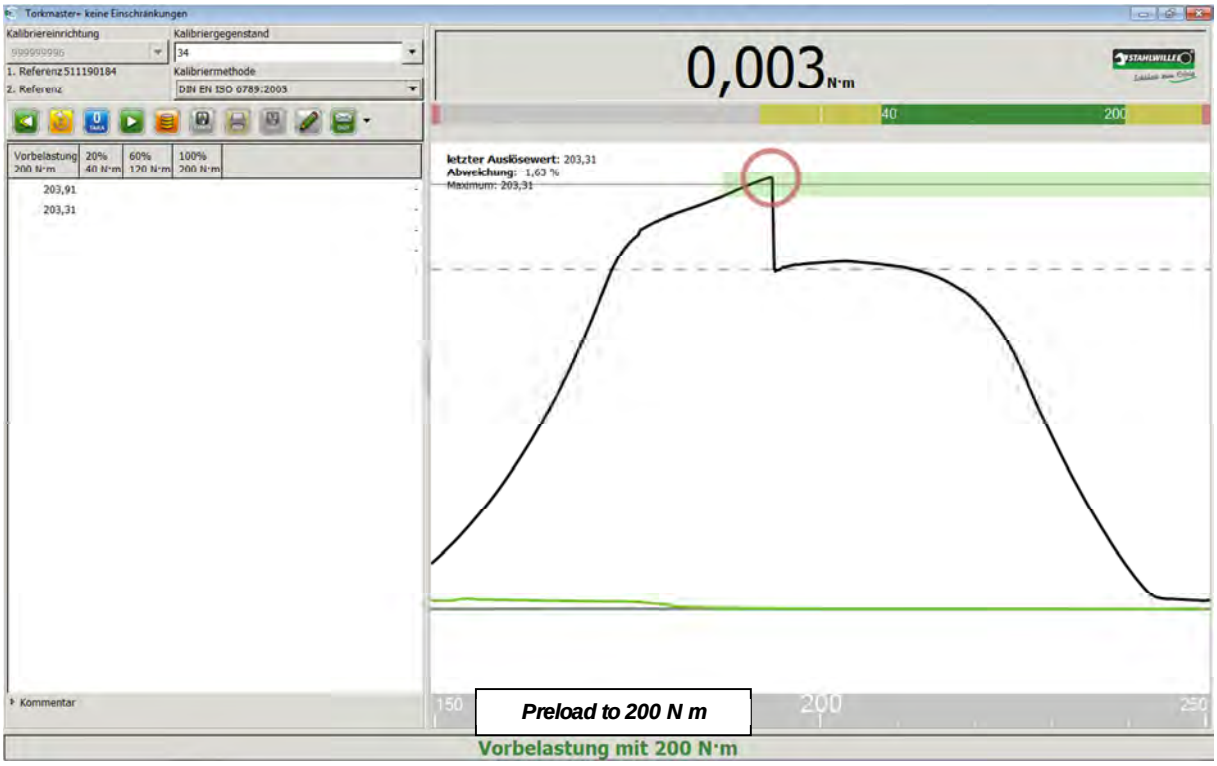
Calibration:

- Select a >***Calibrating unit*< *(>Kalibriereinrichtung<)***.
- First check the tool to be calibrated for any signs of damage or cracks and check that the scale is easily legible.
- To run the calibration, enter the serial number, as an alternative the ident number, under >***Tool to be calibrated*< *(>Kalibriergegenstand<)***. If the number is shown in red, the tool being calibrated has not yet been defined in the database. In this case, you will have to enter its details in the database first (see section on tool database).
- If the tool being calibrated is already in the database (serial number shows in black), you can now select the >***Calibration method*< *(>Kalibriermethode<)***. In this example, the tool is to be calibrated in accordance with DIN EN ISO 6789:2003.
- Select the corresponding adapter and a suitable calibrating insert tool. If necessary, use reducing adapters but never combine several reduction adapters! This will falsify the calibration results. Place the torque wrench in the calibrating unit and align it in accordance with the provisions in the regulations. Note the calibration instructions on the effects of external factors.
- On the torque wrench, set the highest value for the dummy measurements.

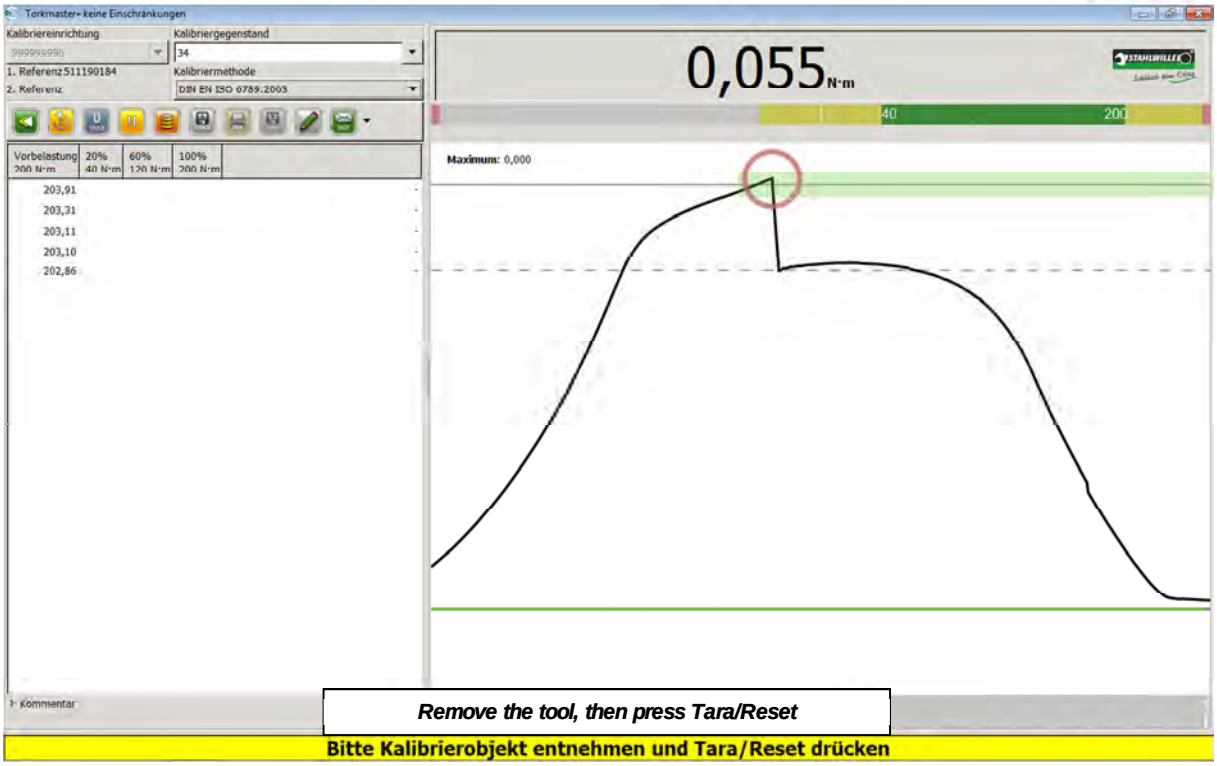
Note: Always adjust from a lower to a higher value.



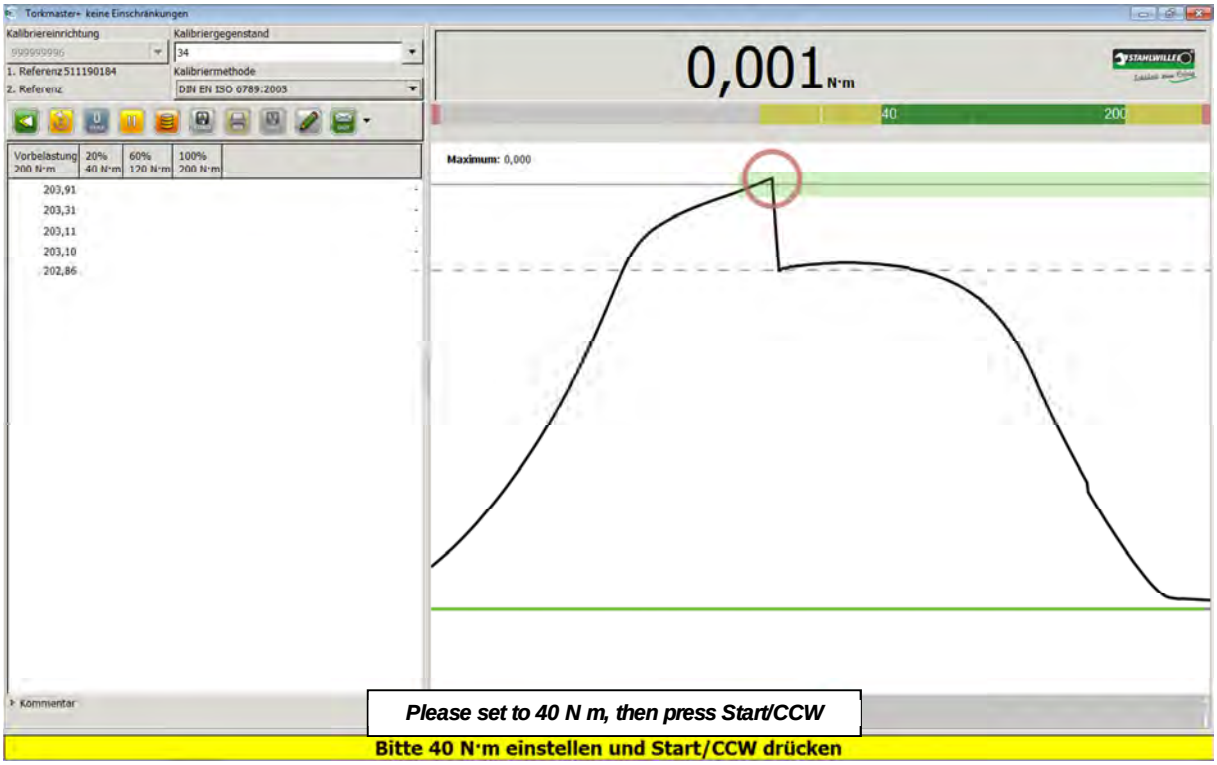
- Press the Start button.



- The perfectControl will now run the dummy measurements fully automatically.

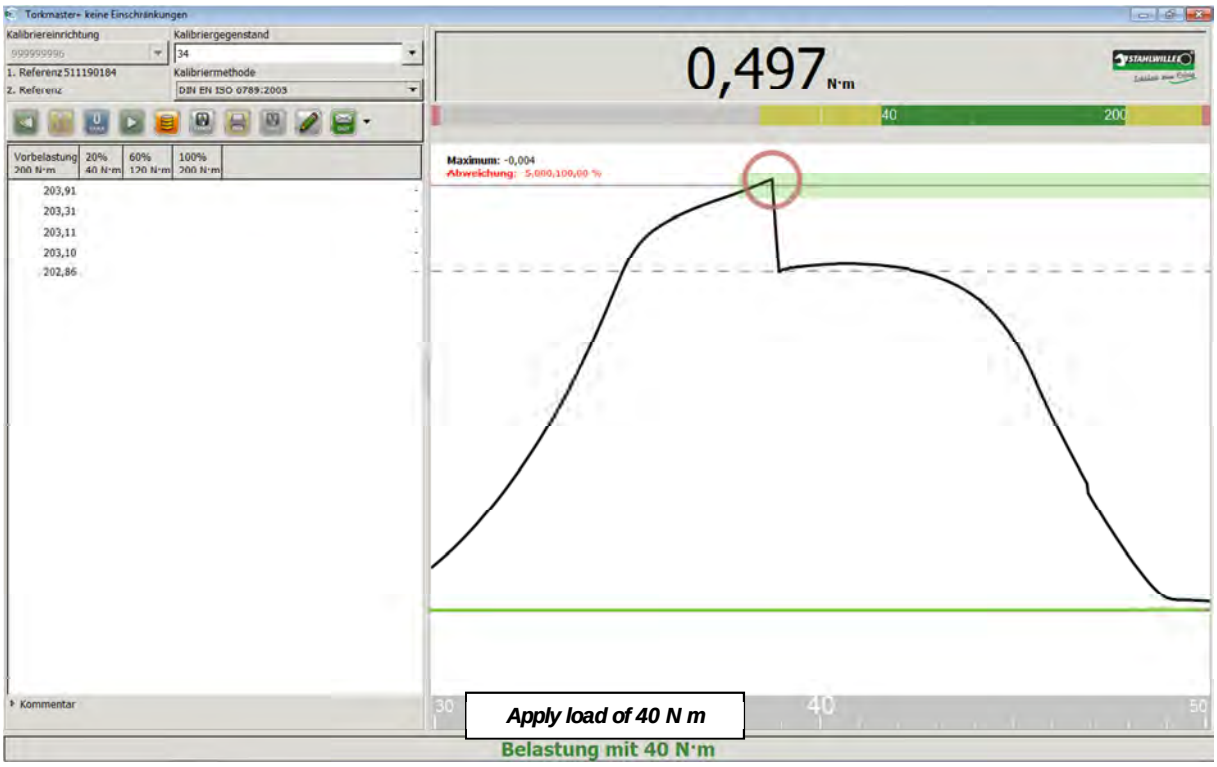


- Remove the torque wrench completely.
- Press the tare button on the unit. Ensure the torque displayed on the unit does not change at all before the tare button is pressed.

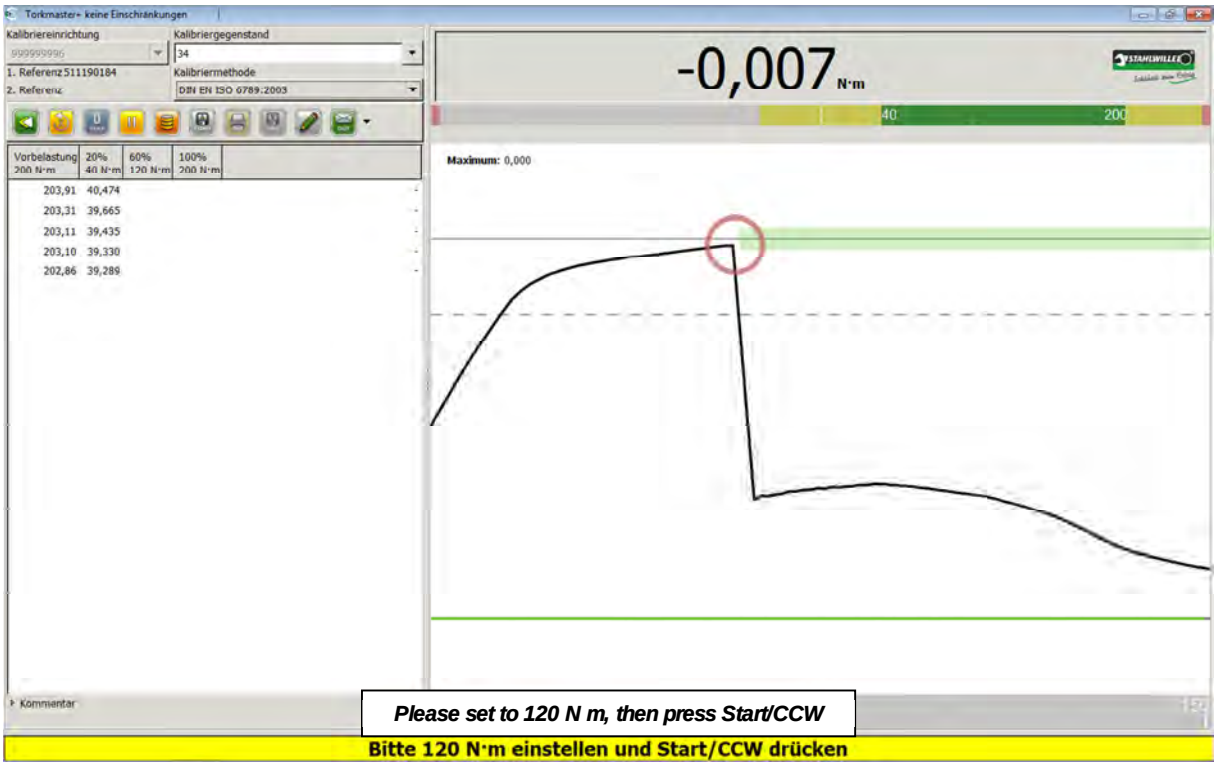


- Replace the torque wrench in the unit. Ensure it is perfectly horizontally aligned and that the anti-pinch mechanism is correctly set. If the software shows a torque reading after the wrench has been replaced in the unit, this is a sign that the torque wrench is not correctly positioned. The torque is generated by lateral forces being applied. If the torque wrench is incorrectly positioned, this can falsify the calibration.

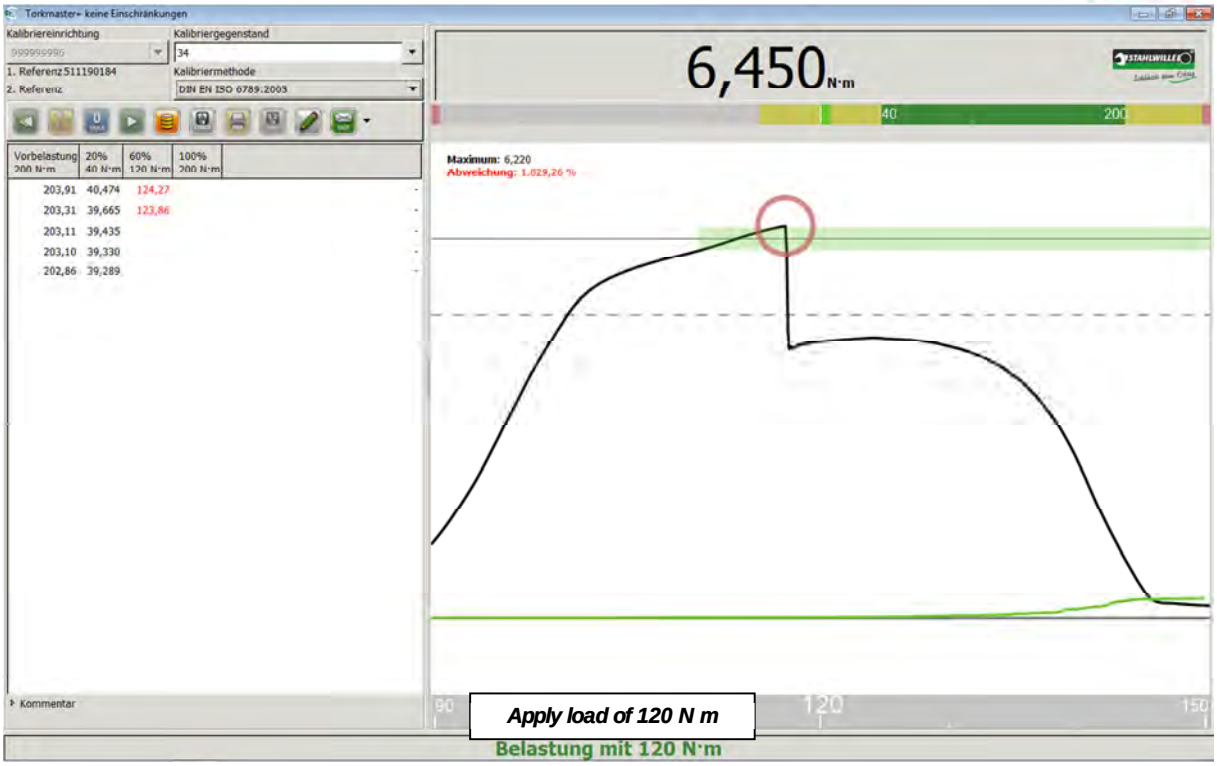
- Close the hood
- Now set the value shown in the status bar on the torque wrench.
- Press the Start button on the unit.



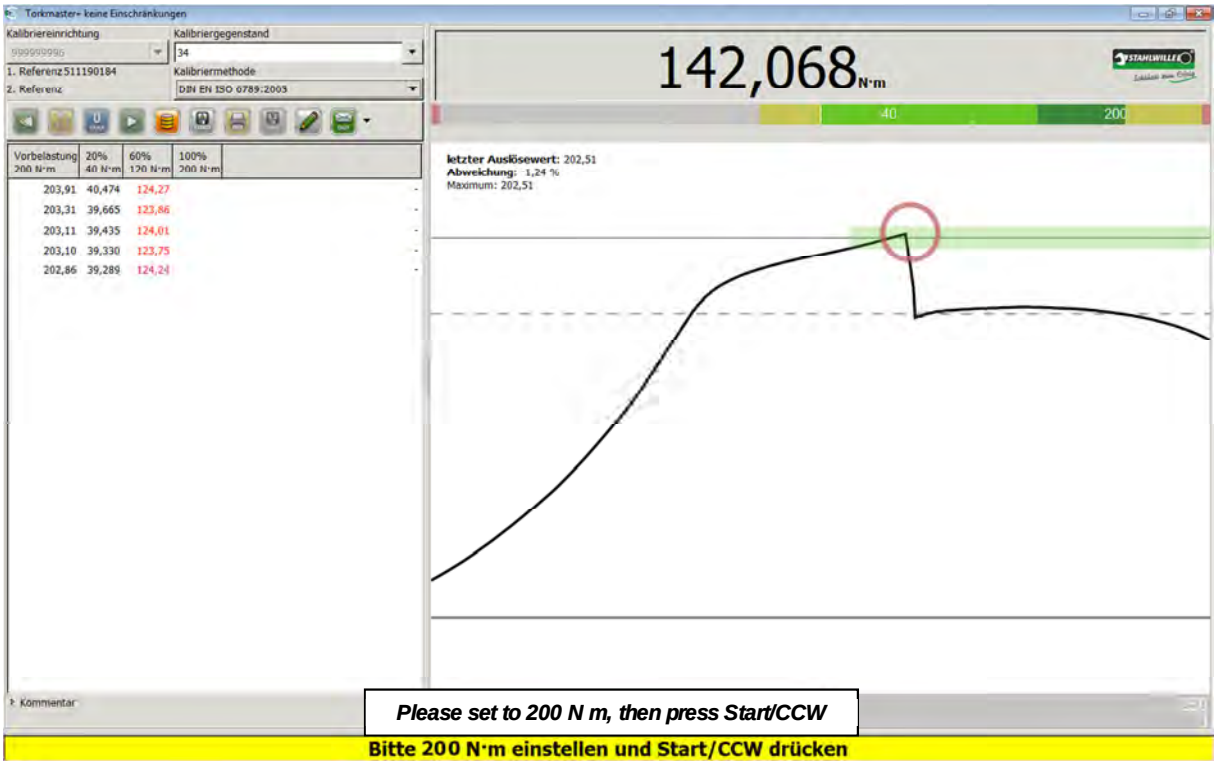
- The perfectControl will now run the loadings fully automatically.



- Now set the value shown in the status bar on the torque wrench.
- Press the Start button on the unit.

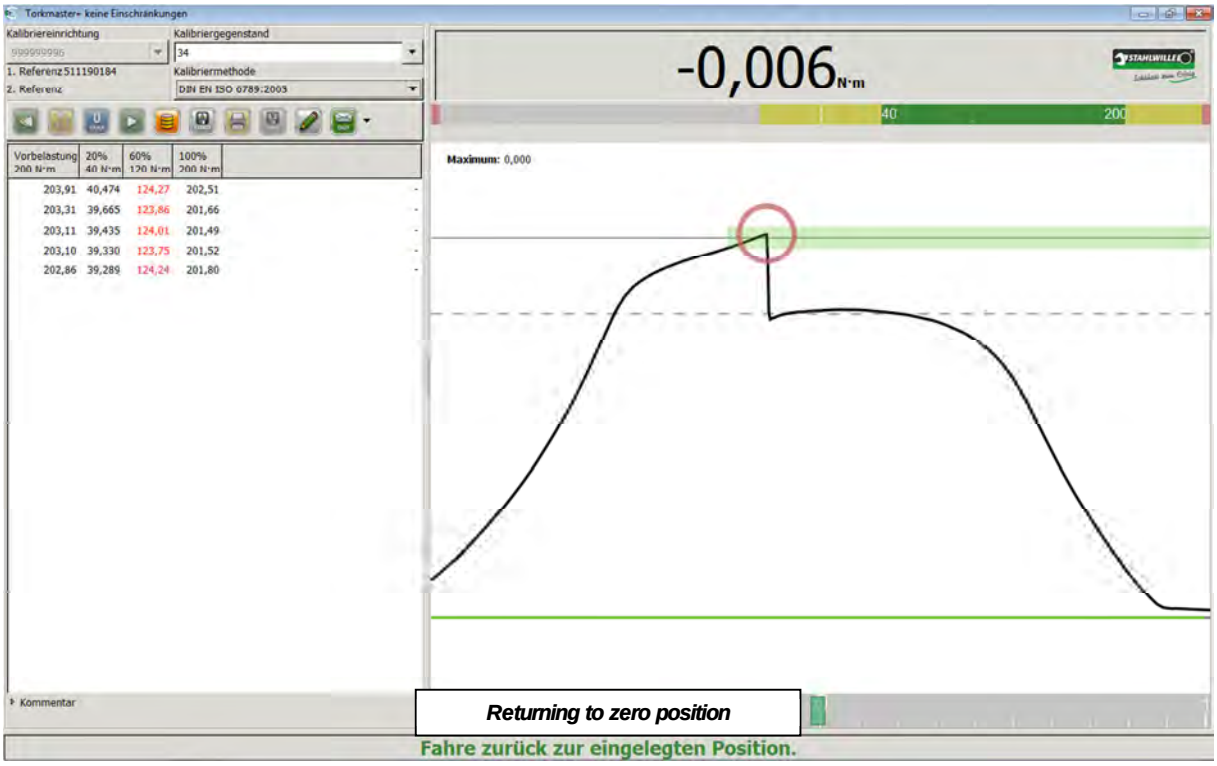


- The perfectControl will now run the loadings fully automatically.

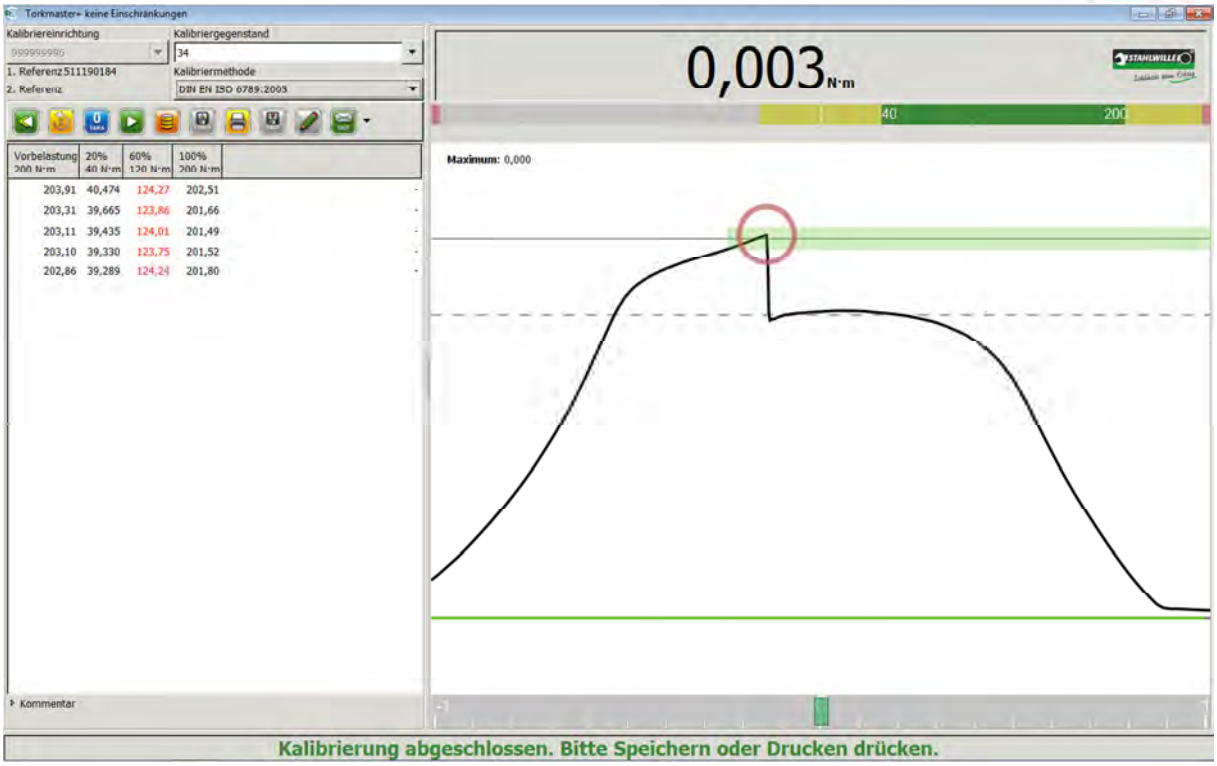


- Now set the value shown in the status bar on the torque wrench.
- Press the Start button on the unit.

- The perfectControl will now run the loadings fully automatically.



- The perfectControl will return the torque wrench to its home position after the calibration has been completed.



- After the fifth loading, the software recognises that the calibration has been completed. You can now label the calibration as either “As found” or “As left” and/or enter a comment in the comments field. You can then save or print the calibration.

- The software will now display the calibration summary. The software is now ready for the next calibration.

Example of test and adjustment mode

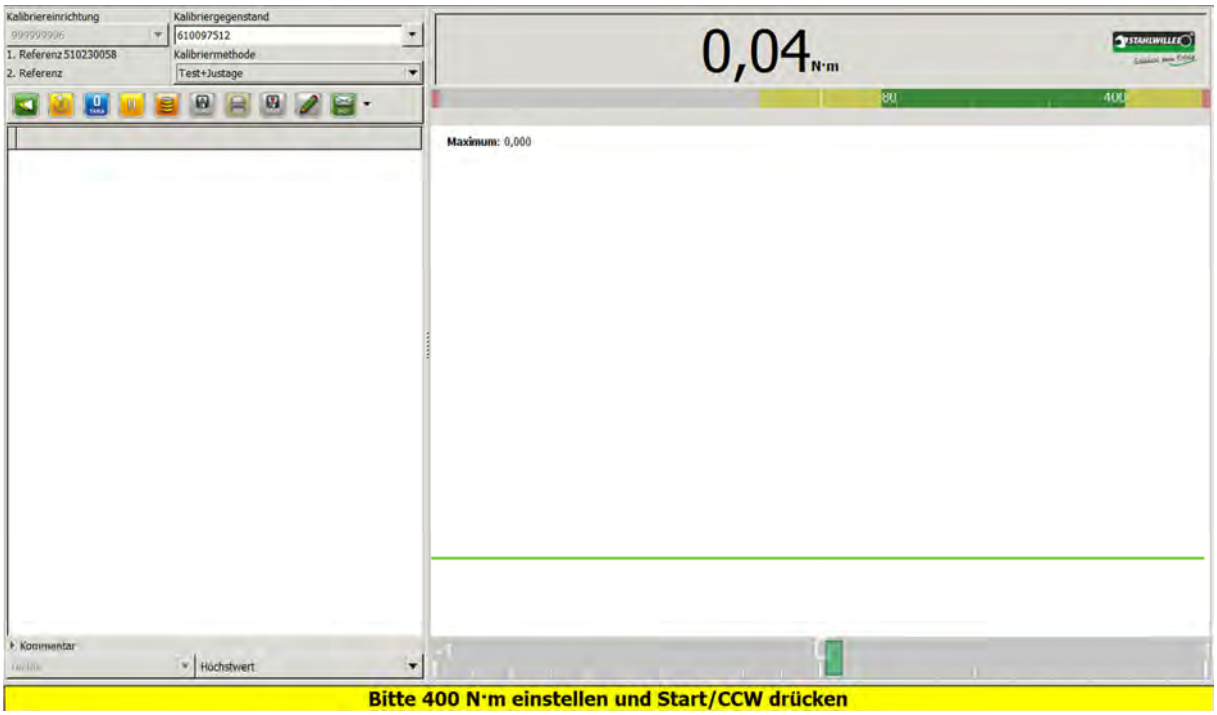
Below we will show how a clicking torque wrench (Type II / Class A) is tested and adjusted using the perfectControl 7794-2.

Preconditions:

- The perfectControl must be powered on, the TORKMASTER software installed and running.
- The software will automatically detect the calibrating unit and the serial number of the unit will appear in the field >***Calibrating unit< (>Kalibriereinrichtung<)***.
- The serial number of the transducer will appear in the >***1st reference<*** (>***1. Referenz***<) field.
- Torque is displayed.
- There are no faults in the equipment.

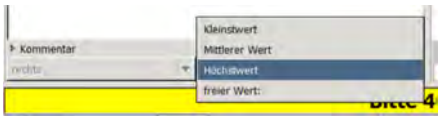
Test and adjustment:

- First check the tool to be calibrated for any signs of damage or cracks.
- To run the test and adjustment, enter the serial number, as an alternative the ident number, under >***Tool to be calibrated< (>Kalibriergegenstand<)***. If the number is shown in red, the tool being calibrated has not yet been defined in the database. In this case, you will have to enter its details in the database first (see section on tool database).
- If the tool to be calibrated is already defined in the database, you can select the >***Calibration method< (>Kalibriermethode<)***. In this example, we want to test and adjust the tool. Select >***Test and adjustment< (>Test und Justage<)***.
- Select the corresponding adapter and a suitable calibrating insert tool. If necessary, use reducing adapters but never combine several reduction adapters! Place the torque wrench in the calibrating unit and align it in accordance with the provisions in the regulations. Note the calibration instructions on the effects of external factors.
- On the torque wrench, set the rated value for the dummy measurements.

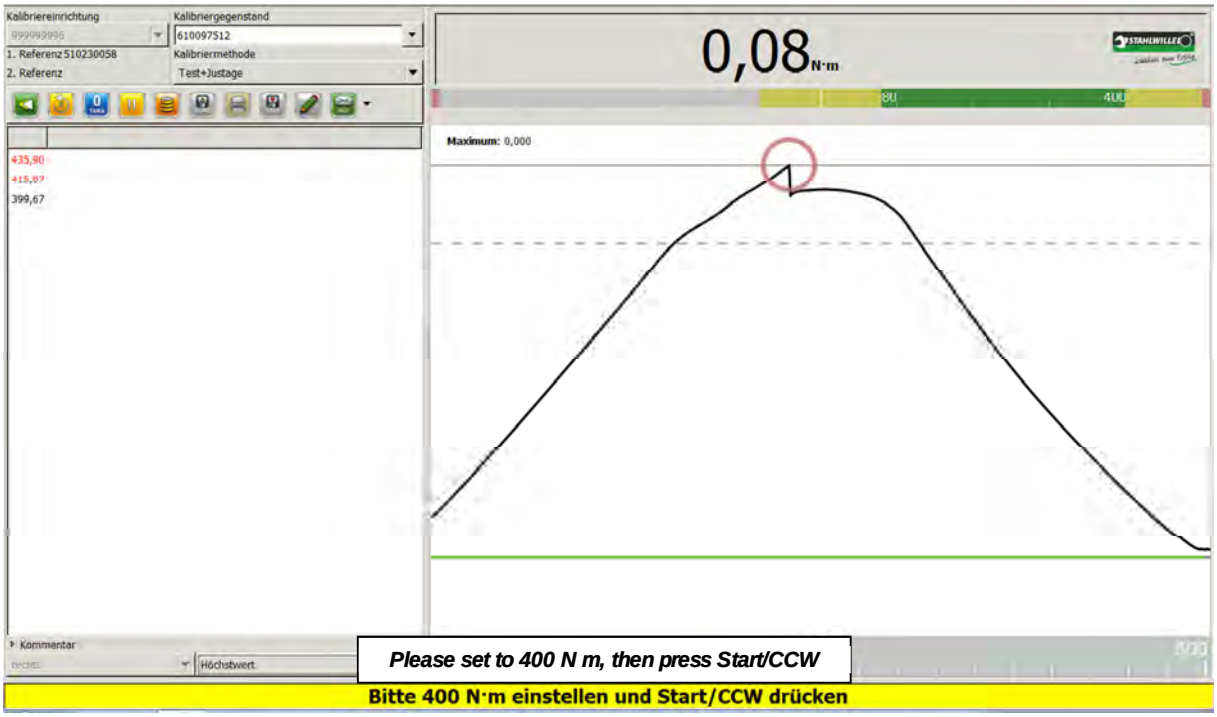


- Press the Start button.

From the list, select the value you wish to use to test & adjust the tool. As well as the calibration points defined in the database: low value (20%), medium value (60%) and high value (100%), it is also possible to enter a ***freely defined value*** (just enter in the field and press Enter.).



The status bar will show appropriate instructions. You can now perform this loading as often as required by simply pressing the Start button.



The test and adjustment data can also be stored in the database. The data can be printed or saved in a PDF file. Note that a maximum of 10 data points can be printed.

Note: After completing the adjustment, ensure you load the torque wrench several times to prevent mechanical settling tendencies from influencing the subsequent calibration process.