



Programming Manual
P2544PM
2021-02

CellTek™

S169263

CTBA & CTBP



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1 About this document

This document contains instructions and notes:

- for safe, appropriate and effective handling of the product.
- for installation, configuration and function.
- for programming the software.
Software version: S169263-211.

The original language of this document is German.

Other documents

No.	Type
P2543BA	Instruction Manual CTBP & CTAW
P2545KA	Quick Installation Guide – Data Transmission CellTek Installation
P1730PM	Programming Manual – Fastening Sequences
P2381TS	Troubleshooting – EMS error messages
P2280PM	Programming Manual – S168813 mPro400GC(D) & mPro200GC(-AP)
P2372JH	Installation Instructions – LiveWire Utilities

Symbols in the text

<i>italic</i>	Menu options (e.g., <i>Diagnostics</i>) input fields, check boxes, radio buttons or dropdown menus.
>	Indicates selection of a menu option from a menu, e.g., <i>File > Print</i>
<...>	Specifies switches, pushbuttons or the keys of an external keyboard, e.g., <F5>
<code>Courier</code>	Filenames and paths, e.g., setup.exe
•	List
-	List, level 2
a)	Options
b)	
→	Result
1. (...)	Action steps
2. (...)	
▶	Single action step

Warnings and notices

Warning notices are identified by a signal word and a pictogram:

- The signal word describes the severity and the probability of the impending danger.
- The pictogram describes the type of danger



Danger

A symbol combined with the word **Danger** indicates a hazard with a **high level of risk** which, if not avoided, will result in death or extremely serious injuries.



Warning

A symbol combined with the word **Warning** indicates a hazard with a **medium level of risk** which, if not avoided, could result in death or serious injury.



Caution

A symbol combined with the word **Caution** indicates a hazard with a **low level of risk** which, if not avoided, could result in minor or moderate injuries or environmental damage.



Note

A symbol combined with the word **Note** indicates a potentially **harmful situation** which, if not avoided, could result in damage to the tool or the environment.



General instructions include application tips and useful information, but no warnings against hazards.

Abbreviations

Abbreviation	Description
OK	Result is OK
TQ	Torque
NOK	Result is not in order
AN	Angle

Definition

Term	Description
FastApps mode	In the FastApps mode, the tool works independently without a controller. The Linking groups (FastApps) and settings are parameterized on the tool.
mPro mode	In the mPro mode, a connection between the tool and the controller is necessary. The linking group and settings are parameterized on the controller and sent to the tool.

2 Product Description

The tool is a cordless tool that can be used in two modes of operation:

- FastApps mode
- mPro mode

Fig. 2-1: LCD and tool controls

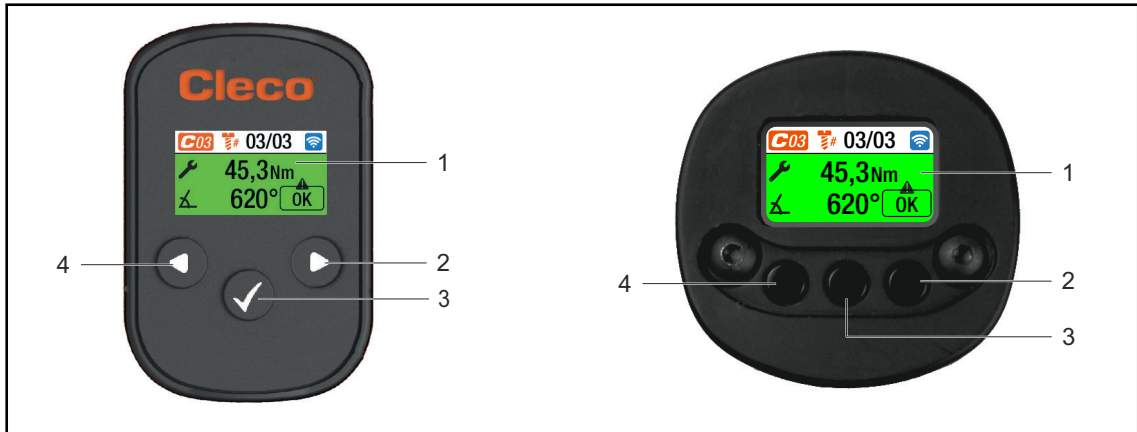


Fig. 2-2: LCD and tool controls from CTBP

Fig. 2-3: LCD and tool controls from CTAW

Item	Description
1	LCD (Liquid Crystal Display)
2	Navigation button right
3	Confirmation button
4	Navigation button left



The following description shows the operating elements of the CTBP tools.

2.1 LCD

See Chapter 3 Menus and Functions, page 9.

2.2 Confirmation button



The confirmation button  has the following functions:

- Open menu.
- Confirm settings: The changes are saved.
- Activate parameter to change the value.

2.3

Navigation buttons

Use the navigation buttons to navigate to menu items and settings. Some buttons also have additional functions.

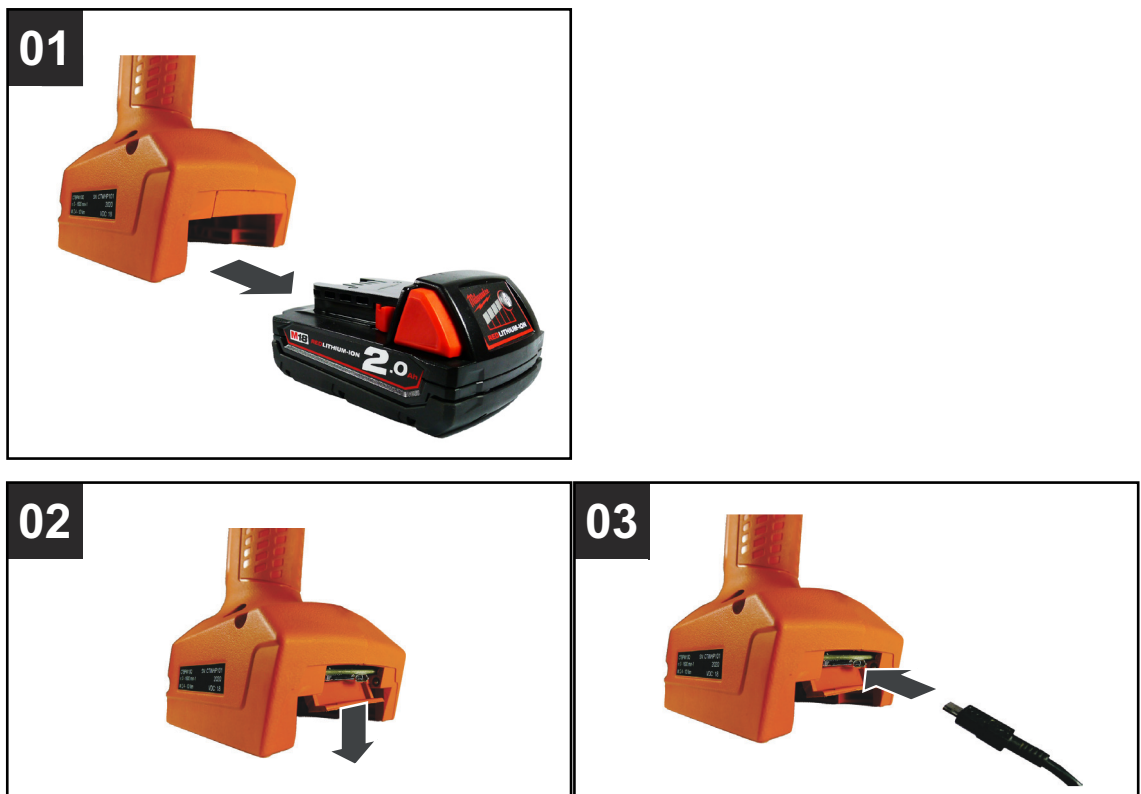
Button	Functions
	<ul style="list-style-type: none"> Press to move the selection box to the right. Press to increase a value.
	<ul style="list-style-type: none"> Press to move the selection box to the left. Press and hold to go to the run screen in the main menu. Press and hold to jump up one menu level. Press and hold to exit settings. Press to decrease a value.
Start switch	<ul style="list-style-type: none"> Press to go directly to the run screen from all menu levels. Press to start the rundown in the runscreen.

2.4

USB connection

Connection for a Micro B USB cable to connect the tool to an external device interface. This is used for parameterizing WLAN settings.

To connect the Micro B USB cable:



3 Menus and Functions

3.1 General functions



All paths are specified starting from the main menu.



Fig. 3-1: Main menu

- ▶ To go from the runscreen to the main menu, press the key.

3.1.1 Switching on

To switch on the tool, press the Start switch.

3.1.2 Switching off

There are several ways to switch off the tool.

Option 1:

Remove the battery.

- Tool switches off after 20 seconds.

Option 2:

1. Navigate to *Switching the tool off.* >
2. Press the button.

- The symbol is displayed on the LCD.
- After five seconds, the tool switches off.

Option 3:

The tool will switch off if it is not used for a certain time. See 3.7.4 Setting the shut-off properties, page 25.

3.1.3 Selecting a button

When talking about pressing a button in this manual, this means the following:

1. Use the arrow buttons to navigate to the desired button (outlined in blue).
2. Press the button.






3.1.4 Changing parameters

Enter the parameter by changing each character of the value individually. Each character can have a maximum value of nine.

1. Press the button.
 - The value is highlighted in red and an arrow is displayed below the first digit. This digit can be changed.
2. Change the selected digit using the arrow buttons.
3. Confirm with the button.
 - The next digit can be changed.
4. Repeat the procedure with each digit of the value.
5. After the last digit confirm the input with the button to save the input.

3.1.5

Change between FastApps/mPro mode

1. Select  > .
2. Press the  button to switch between modes:
 -  FastApps mode is activated.
 -  mPro mode is activated. A connection to the controller is necessary, see document P2545KA.

3.1.6

CID (CellTek ID Card)

To permit simple replacement of tools in production, a replaceable CID memory card is installed. When the tool is switched on, the network settings are read from the CID and used to establish the WLAN connection. When the tools are changed, the CID has to be installed in the new tool being used. Please refer to P2543BA.

The following data are stored on the CID:

- MAC address
- Network name (SSID)
- Encryption
- Network key
- Use of the DHCP server
- IP address
- Subnet mask
- Gateway
- Country-specific settings
- Roaming settings
- Channel selection
- Network certificates
- API license
- FastApp configuration and archive
- Tool settings

3.2

LCD setup

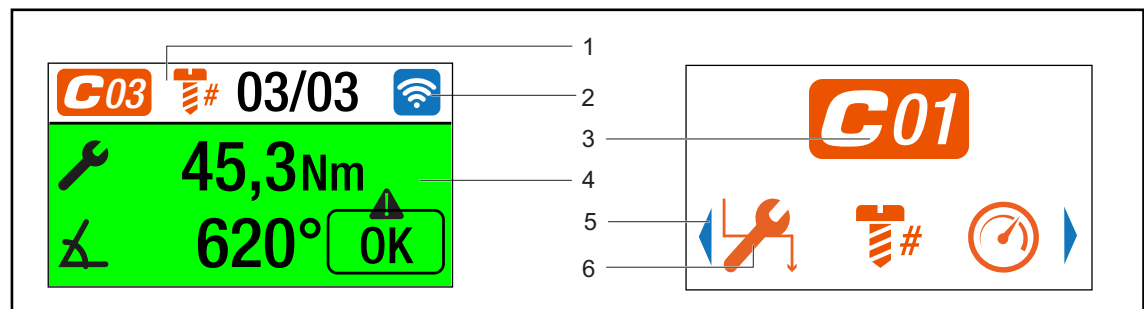







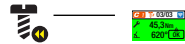
Fig. 3-2: Setup of the menus using the run screen and a submenu as an example

Item	Description
1	Application/Linking group/FastApp selection
2	Symbol of the current communication connection.
3	Symbol of the current menu
4	Rundown result
5	Arrow left and right indicates that there are other menu items available that are not yet displayed on the LCD. To reach them, press  or  .
6	Submenus Press  button to display the parameters.

3.2.1 General presentation of the buttons

Button	Description
	Button is in color: Function selectable.
	Button highlighted in gray: Function disabled.

3.3



3.4 Run screen

The run screen displays the rundown data for the tightening sequence. The structure of the run screen is equal in mPro and FastApps mode.

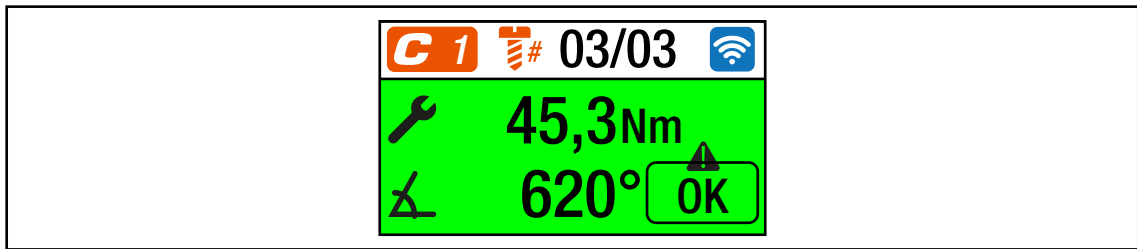



Fig. 3-3: Run screen with a rundown result of the FastApp 3



Symbol	Description
	Display of the currently selected FastApp. Up to ten FastApps can be programmed. The number on the button indicates which FastApp is selected.
	Display of the currently selected Application or Linking group (mPro). Up to 99 Applications/Linking groups can be programmed. The number on the icon indicates which Linking group is selected.
	Number of tightening positions for a application/batche. <ul style="list-style-type: none"> If there is only one FastApp, then each result is evaluated. If there is more than one FastApp, the overall result of all the tightening positions is considered. Example: 2/3 <ul style="list-style-type: none"> Current tightening position: 2 Total number of tightening positions: 3
	Number of repeats when a rework is performed due to NOK rundown. This function is only available in mPro mode.
	The symbol that appears shows the available WLAN or Bluetooth connection. If the symbols are grayed out, no WLAN/Bluetooth connection could be established yet.
	Display of the torque for the current tightening. If an arrow pointing up appears next to the symbol, the result is too high. If an arrow pointing down appears next to the symbol, the result is too low.
	Display of the angle for the current tightening. If an arrow pointing up appears next to the symbol, the result is too high. If an arrow pointing down appears next to the symbol, the result is too low.
	Display of the rundown status. Error messages for shut-off cause, page 47.

3.4.1

Selecting the FastApp

- To change between the FastApps, press  or .
- Only Linking groups that have already been parameterized can be selected.
- Press the  button to select the new FastApp.

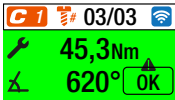

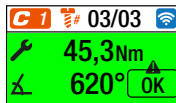

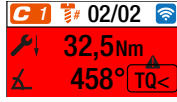
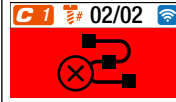
If the FastApp is blocked  (under:  > ), then the selection options are not available.

In this case, a PIN must be entered to switch to another Linking group. A requirement is that a PIN has been defined in the PIN menu ( > ).

3.4.2

Status display

The LEDs next to the LCD and the color of the run screen show the result of the last rundown:

LEDs/Color	Operating status	Result after fastening cycle	Display on the LCD
Continuous green light	Active	OK	
Continuous red light	Active	NOK	
Flashing light Green – low frequency	Energy saver mode		
If linking is selected on the controller:			
Green flashing light – high frequency	Active	Linking OK	 <-> 
Flashing red light	Active	Linking NOK	 <-> 

3.4.3

Counterclockwise rotation

In the *Counterclockwise Rotation* menu, the tool rotates in the opposite direction of rotation as programmed for the FastApp in the controller or in the FastApps menu. During tightening, the LCD flashes yellow-gray. The speed for the counterclockwise rotation starts at 20 rpm and increases to 300 rpm or the maximum tool speed, if this is lower than 300 rpm.













Fig. 3-4: LCD during counterclockwise rotation

- To activate the counterclockwise rotation press one of the reverse switches.
- Press the start button to loosen a rundown with counterclockwise rotation.
- To return to the runscreen, press one of the reverse switches again.

3.4.4 Tool locked

If a warning occurs, one of the following messages appears in the run screen:

Symbol	Description
	Warning that the battery has reached the undervoltage limit. The symbol is displayed until the rundown is completed. Then the tool is locked.
	If WLAN is used, the IP address is assigned twice. ► Change the IP address.
	If Bluetooth is used, the node number is assigned twice. ► Change the node number.
	The tool is locked because the time, which the tool is allowed to work in offline mode, has expired. ► Reconnect the control and the tool.
	The tool is locked until a new workpiece ID or barcode is scanned. ► Scan barcode.
	The tool is locked because there is no job for the next rundown. ► Select application/batch.
	The tool is locked because the battery has reached the undervoltage limit. ► Change the battery.
	The tool is locked because no tightening parameters are available. ► Parameterize parameters in the application/batch.
	The tool is locked because the maximum number of NIO results has been exceeded, see P2280PM (Reject Release). ► Use counterclockwise rotation or set Reject Release input.
	The tool is locked by the controller. ► Check the error message in the run screen on the controller.

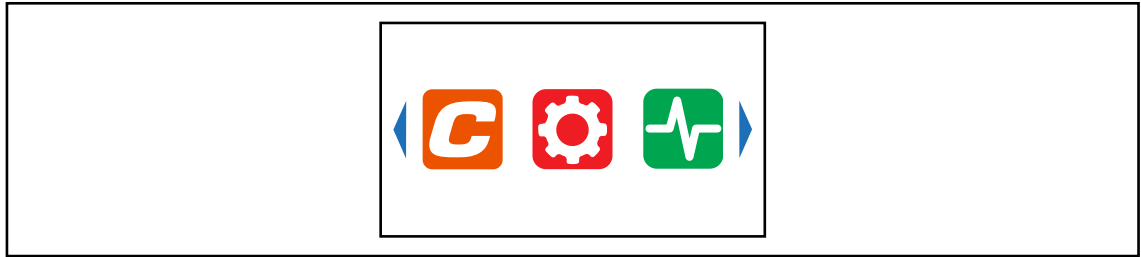








Fig. 3-5: Main menu

Button	Description
	FastApps menu The menu is used to parameterize FastApps.
	Settings
	Diagnostics
	Communications
	Bluetooth communication
	Utility

3.6 FastApps menu

The FastApps menu is used to parameterize FastApps.
In the mPro mode, the FastApps menu has no function.

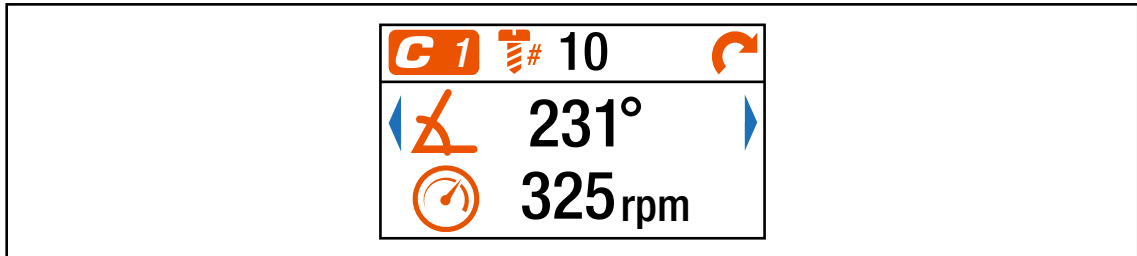


Fig. 3-6: Menu – FastApps menu

Button	Description
	FastApps mode is activated. → mPro mode is disabled.
	FastApps mode is disabled. → mPro mode is active.
	Display of the currently selected FastApp. Up to ten FastApps can be programmed. The number on the button indicates which FastApp is selected.
	FastApp mit Drehmoment-Abschaltung. Die Zahl rechts neben dem Symbol zeigt das Abschaltdrehmoment an. Die Einheit entspricht der Auswahl, siehe 3.7.5 Selecting the torque units, page 25..
	FastApp with angle shutoff. The number to the right of the symbol indicates the shut-off angle.
	Batch display
	Display of the selected direction of rotation. Depending on the selected direction of rotation, one of the two symbols is displayed.
	Start speed display.

3.6.1

Configuring FastApps

Up to ten FastApps can be programmed. The maximum tightening time is ten seconds.

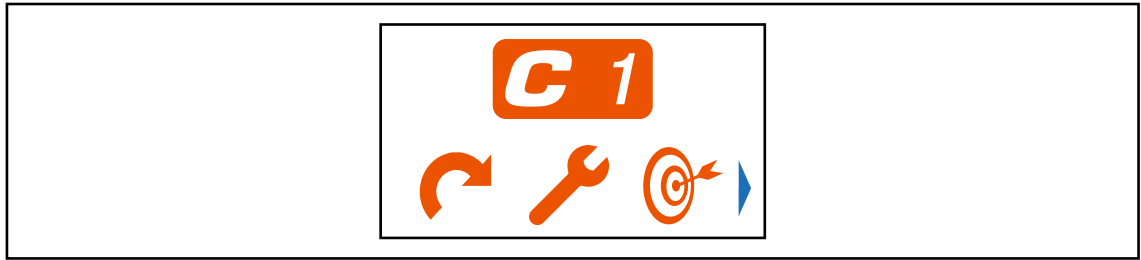









Fig. 3-7: Submenu – Configuring FastApps

Button	Description																								
	Display of the selected direction of rotation. Depending on the selected direction of rotation, one of the two symbols is displayed.																								
																									
	Display of the tightening strategy. Depending on the selected shutoff, one of the symbols will be displayed. One torque and one angle shutoff is possible. <ul style="list-style-type: none">• Display of the torque shutoff.																								
		<ul style="list-style-type: none">• Display of the angle shutoff.																							
	<ul style="list-style-type: none">► For a torque shutoff, enter the shut-off torque.► For an angle shutoff, enter the shut-off angle. Once the value has been reached, the tightening process is completed. This setting option is the same as in the menu 3.6.4 Advanced settings, page 20.																								
	Note If the shut-off value is entered here in the <i>Configuring FastApps</i> menu, then the following values are calculated automatically:																								
	<table><tr><th>Parameter</th><th>Torque shutoff</th><th>Angle shutoff</th></tr><tr><td>Low torque</td><td>-15% of the shut-off torque</td><td>Threshold torque</td></tr><tr><td>MaxTorque</td><td>+15% of the shut-off torque</td><td>Tool capacity</td></tr><tr><td>Minimum angle</td><td>0</td><td>-10 deg of the shut-off angle</td></tr><tr><td>Maximum angle</td><td>9999</td><td>+10 deg of the shut-off angle</td></tr><tr><td>Threshold torque</td><td>50% of the shut-off torque</td><td>Manual input</td></tr><tr><td>Final speed</td><td>50</td><td>50</td></tr><tr><td>Speed threshold</td><td>1/4 x shut-off torque</td><td>Threshold torque</td></tr></table>	Parameter	Torque shutoff	Angle shutoff	Low torque	-15% of the shut-off torque	Threshold torque	MaxTorque	+15% of the shut-off torque	Tool capacity	Minimum angle	0	-10 deg of the shut-off angle	Maximum angle	9999	+10 deg of the shut-off angle	Threshold torque	50% of the shut-off torque	Manual input	Final speed	50	50	Speed threshold	1/4 x shut-off torque	Threshold torque
	Parameter	Torque shutoff	Angle shutoff																						
	Low torque	-15% of the shut-off torque	Threshold torque																						
	MaxTorque	+15% of the shut-off torque	Tool capacity																						
	Minimum angle	0	-10 deg of the shut-off angle																						
	Maximum angle	9999	+10 deg of the shut-off angle																						
	Threshold torque	50% of the shut-off torque	Manual input																						
	Final speed	50	50																						
Speed threshold	1/4 x shut-off torque	Threshold torque																							
These values can be changed manually in the  menu, see 3.6.4 Advanced settings, page 20.																									
Entering the threshold torque.																									
	This button is only displayed during angle shutoff. This setting option is the same as in the menu 3.6.4 Advanced settings, page 20.																								

Button	Description
	Batch display ► Enter the number of tightening positions for a FastApp.
	Start speed display. ► Enter the start speed.
	Advanced settings.
	Block Angle Detection activated. If block angle detection is enabled, a block angle of 180° is added to torque/angle shutoff. This block angle is used at the start of rundown, to detect if screw is already tighten or thread/screw damaged or crooked screwed-in. The angle counting starts after the block angle. So if within that first 180° the torque exceeds the shutoff-torque (torque shutoff) or maximum torque (angle shutoff), the rundown is aborted and the "BLOC" error is show.
	Block Angle Detection disabled.
	Reset FastApps.

3.6.2 Selecting the direction of rotation

C > **C 1** >

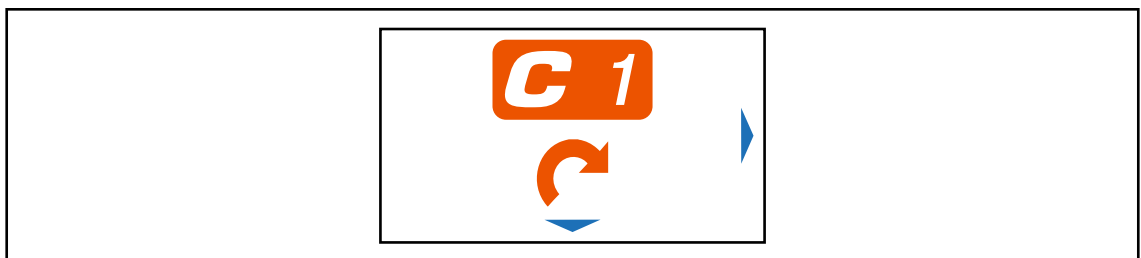


Fig. 3-8: Submenu – Selecting the direction of rotation

Button	Description
	Direction of rotation, right-hand thread.
	Direction of rotation, left-hand thread.

3.6.3

Selecting the tightening strategy

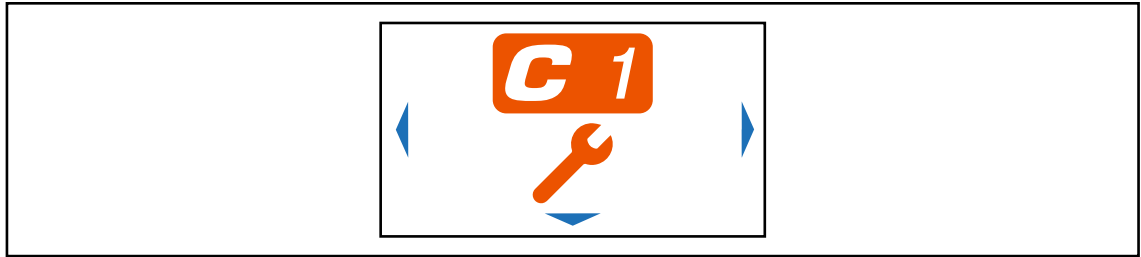


C > **C1** > 


Fig. 3-9: Submenu – Selecting the tightening strategy

Button	Description
	Torque shutoff Sequence 31: Shut-off torque controlled tightening sequence with torque and rotation angle check. See 4 Tightening sequence, page 45.
	Angle shutoff Sequence 51: Shut-off angle controlled tightening sequence with rotation angle and torque check. See 4 Tightening sequence, page 45.

3.6.4

Advanced settings

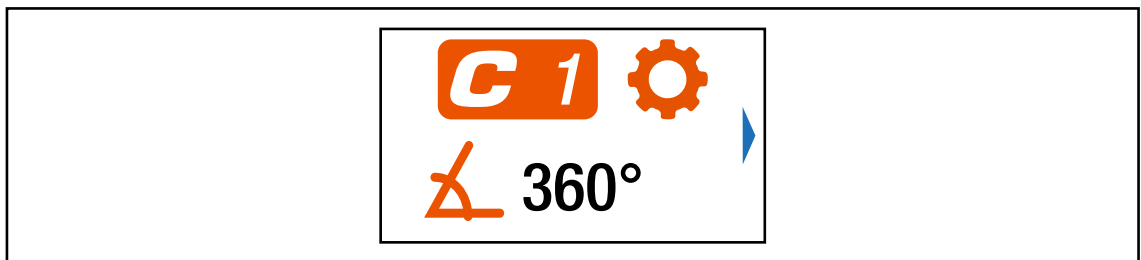









C > **C1** > 


Fig. 3-10: Submenu – Advanced Settings

Button	Description
	<ul style="list-style-type: none"> ► For a torque shutoff, enter the shut-off torque. ► For an angle shutoff, enter the shut-off angle. Once the value has been reached, the tightening process is ended. This setting option is the same as in the menu 3.6.1 Configuring FastApps, page 18.
	Note If the shut-off value is entered here in the <i>Advanced Settings</i> menu, the minimum and maximum torque, the minimum and maximum angle, as well as the threshold torque, are not calculated automatically.
	Display of the maximum torque.
	Display of the minimum torque. The minimum torque can not be greater than the shut-off torque and must be at least as great as the threshold torque.

Button	Description
	► Enter the threshold torque.
	► Enter the maximum angle.
	► Enter the minimum angle.
	► Enter the final speed.
	► Enter speed threshold. As soon as the speed threshold is reached, the speed immediately changes from the start speed to the final speed up to the maximum torque.

3.6.5

Resetting FastApp

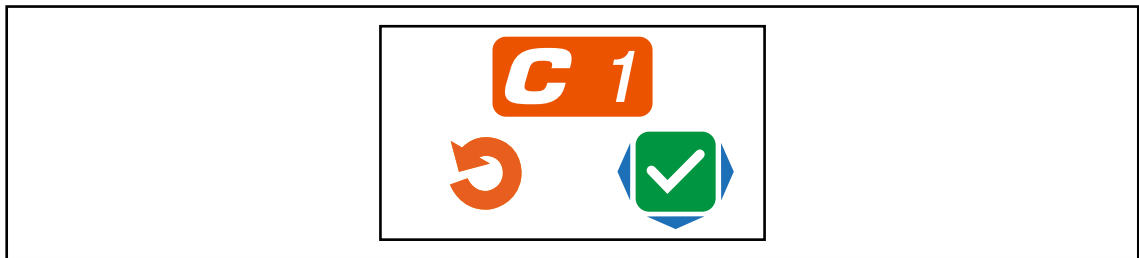






Fig. 3-11: Submenu – Resetting FastApps

Button	Description
	► Select this button to cancel the process. Leave the menu press and hold the  button.
	► Select this button and confirm with the  button to reset the settings of the FastApp. → All settings for the selected FastApp are deleted. → The FastApp is no longer parameterized and no parameter settings are displayed in the <i>Configuring FastApps</i> menu

Settings

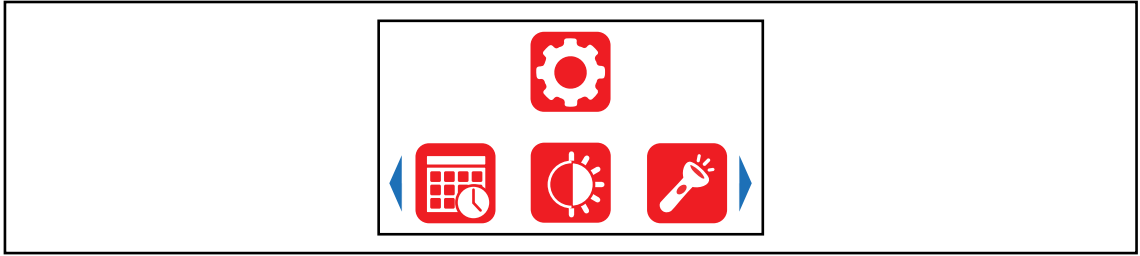







Fig. 3-12: Menu – Settings

Button	Description
	Display and set time and date.
	Adjust screen brightness.
	Adjust tool light.
	Set shut-off properties.
	Select torque units.
	PIN menu
	Lock menu.
	Allow Linking group selection.

3.7.1 Setting the date and time

The date and time can only be changed in the FastApps mode. In the mPro mode, this menu is only used as a display.

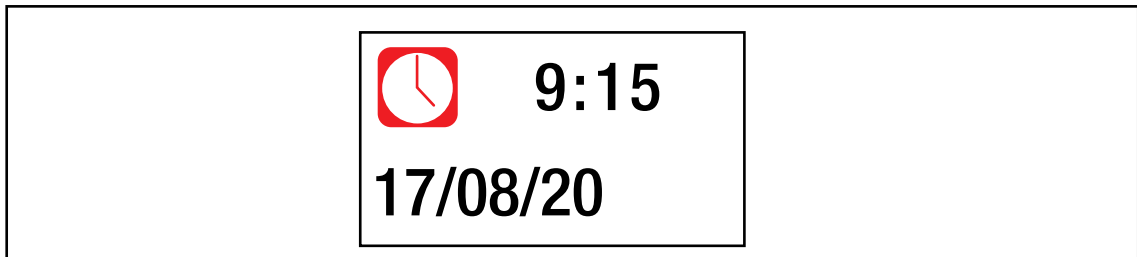









Fig. 3-13: Submenu – Setting the date and time

Button	Description
	Time display Presentation: Hour: Minute
	Display of the date Presentation: Day.Month.Year

To change the date or time:

1. Press the  button to activate the input fields. Each digit can be changed individually.
→ The value is highlighted in red and an arrow is displayed below the first digit. This digit can be changed.
2. Use the  and  buttons to increase/decrease the numbers.
3. Confirm with the  button and activate the next digit.
4. Repeat the procedure with each digit to change the time and date one by one.
5. Nach dem letzten Zeichen die Eingabe mit der -Taste speichern.
After the last digit confirm the input with the  button to save the input.

3.7.2 Adjusting the screen brightness

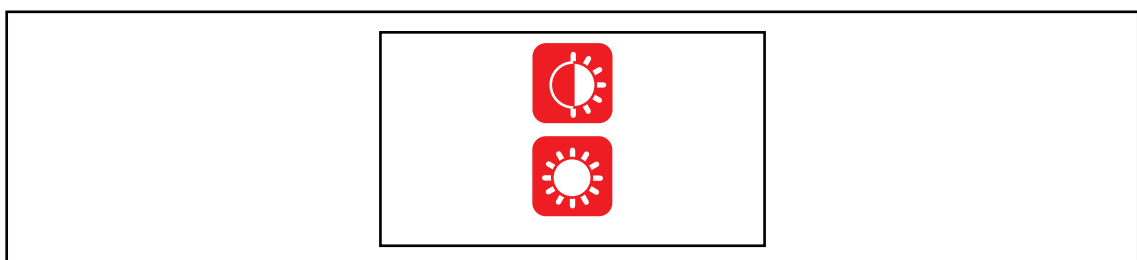





Fig. 3-14: Submenu – Screen brightness

- Press the  button to switch between the following options. The visible option is active.


Button	Description
	Brightness Level 1: The LCD is dark and dimly lit.
	Brightness Level 2: The LCD has medium illumination. This is the default setting that is used when none of the buttons are selected (outlined in green).
	Brightness Level 3: The LCD is brightly lit.





3.7.3 Adjusting the tool light

This menu is only available in the FastApps mode. The tool light illuminates the tightening position.



Fig. 3-15: Submenu - Adjusting the tool light

- Die -Taste drücken, um zwischen den nachfolgenden Optionen zu wechseln. Die sichtbare Option ist aktiv.

Button	Description
	Tool light disabled. Tool light never goes on.
	Tool light will only go on when the Start switch is pressed halfway. During tightening, it is switched off.
	Tool light is on as long as the Start switch is pressed halfway. If the Start switch is pressed all the way, the tool light will go on for three seconds before it switches off.
	Tool light is on as long as the Start switch is pressed. Tool light is on during the tightening process until the Start switch is released.

3.7.4 Setting the shut-off properties

This menu is only available in the FastApps mode. In the mPro mode, the values can only be changed via the controller.

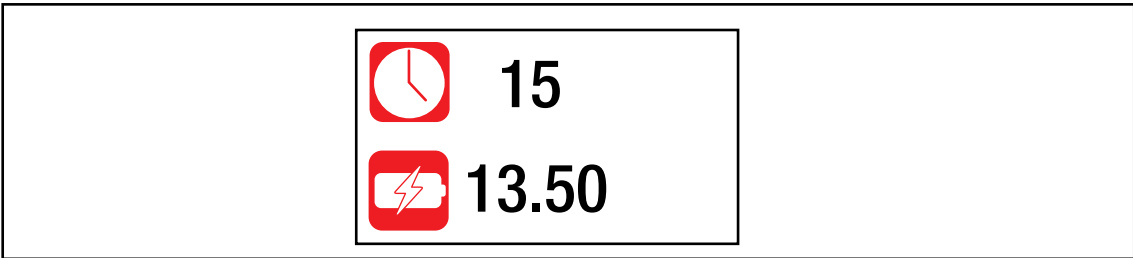




Fig. 3-16: Submenu – Setting the shut-off properties

Button	Description
	Shutoff after idle mode. Enter the time in minutes after which the tool switches off if no button or key has been pressed.
	Undervoltage limit Enter the voltage in volts for the undervoltage limit. The undervoltage limit indicates when a battery change is necessary. If the battery voltage falls below the defined value, a gray battery symbol flashes on the LCD.

3.7.5 Selecting the torque units

The torque values on the run screen are displayed in the selected units. The selection is also used for the data export.

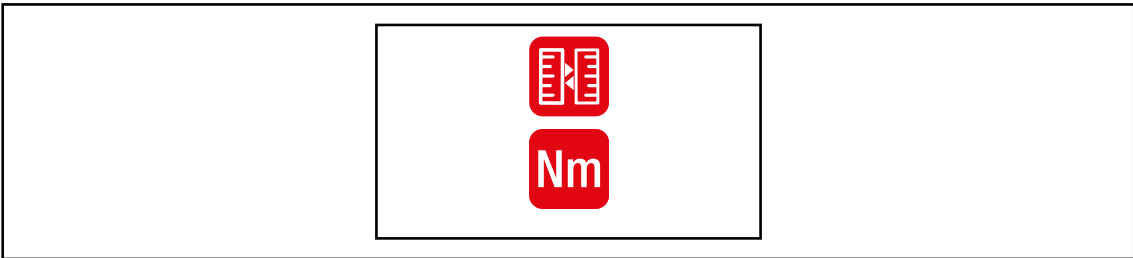





Fig. 3-17: Submenu – Selecting units

- Die -Taste drücken, um zwischen den nachfolgenden Optionen zu wechseln. Die sichtbare Option ist aktiv.

Button	Description
	Units <i>Newton-meters</i>
	Units <i>inch-pounds</i>
	Units <i>foot-pounds</i>

3.7.6

PIN menu

Up to three PINs for three access levels can be defined. With the access levels, different menus can be available. If a PIN is defined, then the menus can be opened. However, changes can only be made after entering the required PIN.

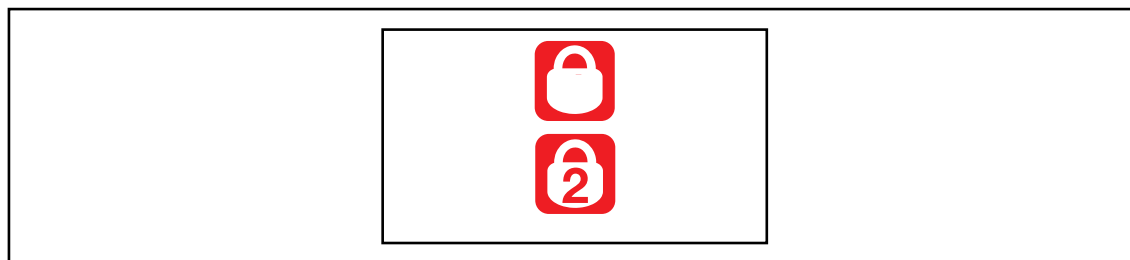


















Fig. 3-18: Submenu – PIN menu

Button	Description
	Access Level 1 Valid for the menu:  
	Access Level 2 Valid for the menus:     
	Access Level 3 Valid for the menus:      

If only one PIN is defined, then it applies to all the access levels. PINs for higher access levels also apply to the lower access levels.

	PIN 1	PIN 2	PIN 3
Access Level 1	X	X	X
Access Level 2		X	X
Access Level 3			X

Example

The following PINs are defined: PIN 1: 1111 PIN 2: 2222 PIN 3: 3333

If asked for PIN 2, both PIN 2 (2222) and PIN 3 (3333) can be entered to access a menu. However, PIN 1 (1111) is invalid.

Entering a PIN

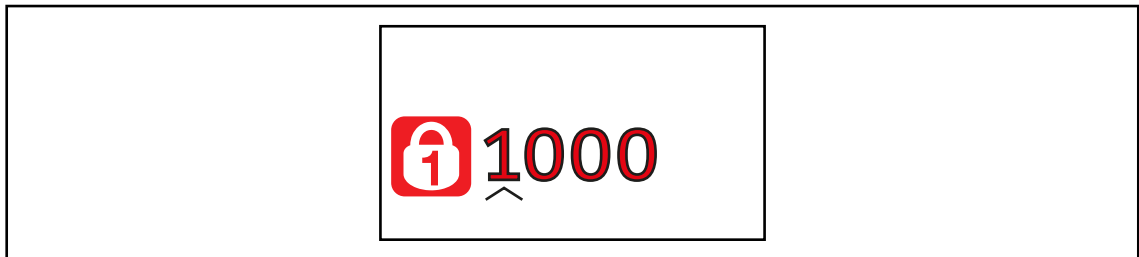


Fig. 3-19: Submenu – Entering a PIN

A PIN consists of four numbers. To enter a PIN:

1. Enter four numbers. The number on the lock indicates which PIN must be entered.
 - Use the ◀ and ▶ buttons to increase/decrease the numbers between 0 and 9.
 - Use the ✓ button to switch between four input fields.
2. Confirm the PIN with the ✓ button.
 - If the menu is opened, the pin is correct.
 - If the arrow jumps back to the first number, the pin is wrong.

After unlocking, the tool will lock again if no action is taken for two minutes or if a switch is made to the run screen.

Changing a PIN

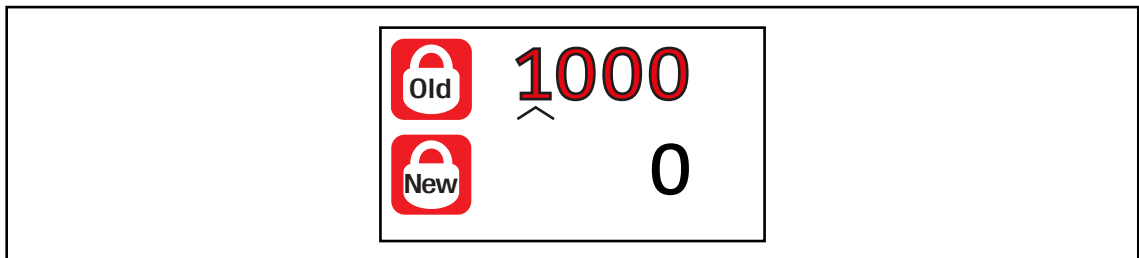












Fig. 3-20: Submenu – Changing a PIN

Button	Description
	Entering an old PIN.
	Entering a new PIN.

To change a PIN:

1. Navigate to *Changing a PIN*  >  and select one of the three access levels   .
2. Press the  button to activate the input box. The numbers are entered individually.
3. For , enter the old PIN. If no PIN was previously defined, enter 0000.
4. For , enter the new PIN. The PIN must not be 0000.
5. To save the PIN, press .
 → The new PIN is activated and the menu is exited.

Deactivating a PIN

- For , enter 0000 to deactivate a PIN.

3.7.7

Locking a menu

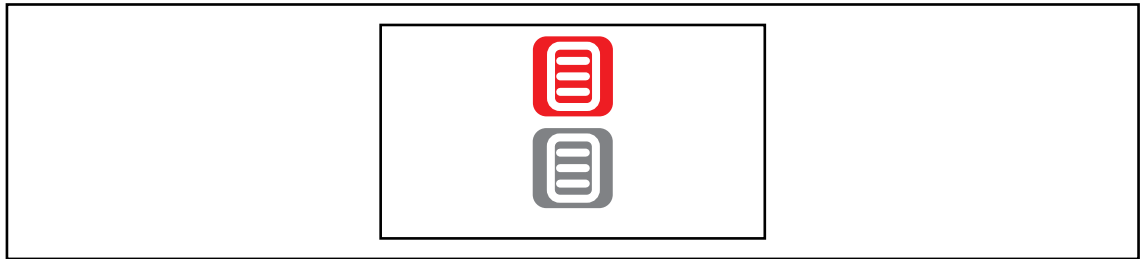




Fig. 3-21: Submenu – Locking a menu

Button	Description
	Lock activated. To open the main menu from the run screen, a PIN must be entered. Unlocking is possible with each access level. The requirement is that a PIN has already been defined.
	PIN lock disabled. All menus can be opened without entering a PIN.

3.7.8 **Allowing a Linking group/FastApp selection**

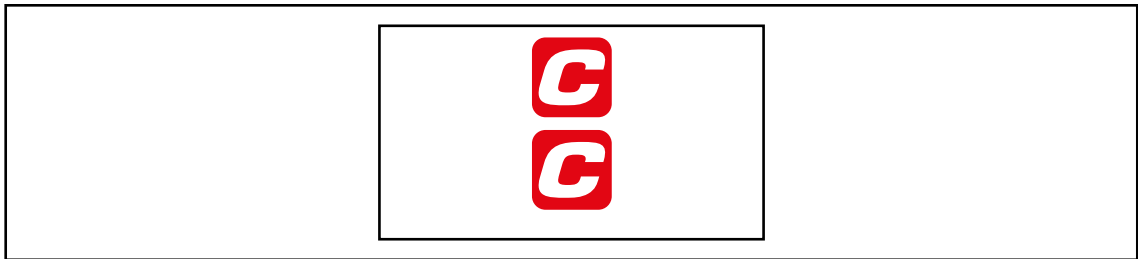


Fig. 3-22: Submenu – Allowing a Linking group/FastApp selection

Button	Description
	Lock activated. Requirement: A PIN must be activated. To switch to another Linking group/FastApp from the run screen, a PIN must be entered. The functionality of the Start switch is not restricted.
	Lock disabled. Switching between all the parameterized Linking groups/FastApps can be carried out in the run screen. There is no need to enter a PIN.

3.8 **Diagnostics**

Various test functions can be found in *Diagnostics*.



Warning

Movable parts!

- ▶ Never reach into the rotating parts of the tool.
- ▶ Make sure that the rotation of the tool does not pose any danger.
- ▶ Do not perform diagnostic tests on the workpiece - only with a freely rotating tool.

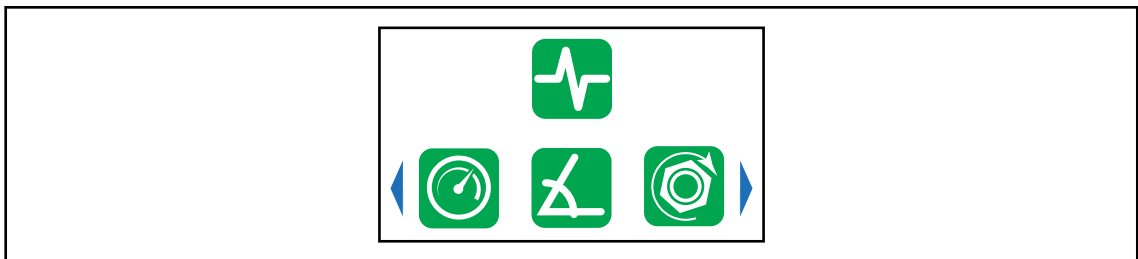





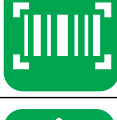




Fig. 3-23: Menu – Diagnostics

Button	Description
	1 Speed test
	Angle test

Button	Description
	Torque test
	Calibration value
	Voltage
	Counters status
	Tool constant
	If an accessory is used, one of the buttons is displayed depending on the type: <ul style="list-style-type: none"> • 2D Reader • Gyroscope • Accessory is not detected. <ul style="list-style-type: none"> ► Perform software update with a newer software version. The latest software version can be found at: https://software.apextoolgroup.com
	
	

3.8.1

Speed test

The speed measurement is based on the angle information from the motor. If the start button is released, the tool stops. As a safety function, the torque is monitored by the tool transducer. If it exceeds 15% of its calibrated value, the speed measurement is terminated.

- To start the tests, keep the Start switch pressed.

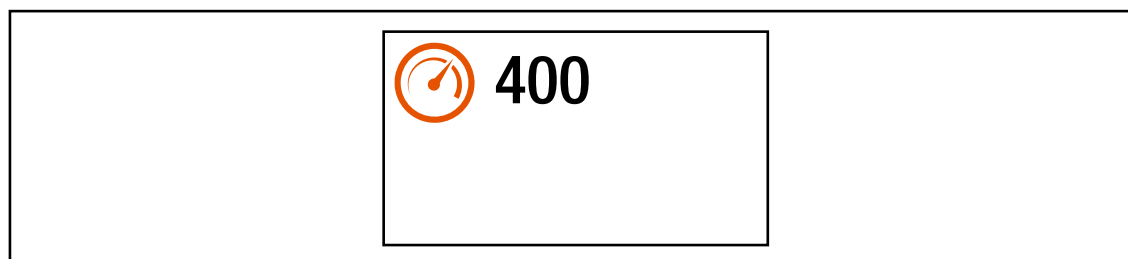



Fig. 3-24: Submenu – Speed test

Symbol	Description
	<ul style="list-style-type: none"> ► Keep the Start switch pressed. <ul style="list-style-type: none"> → The tool runs at maximum speed. → The current speed is displayed.

3.8.2 Angle test

This test function allows an evaluation of the angle measurement.

By using the Start button, the tool starts with 25% of the maximum speed. The speed is limited to a maximum of 60 rpm. After one revolution at the output (target angle 360°), the tool is stopped. During a fixed dwell time of 200 ms, any possible angular pulses are still detected. The total result is shown as the Actual Angle.

If the test run is not aborted by a monitoring criterion and the total result is greater than or equal to 360°, then it is evaluated as OK and displayed. Monitoring criteria are the torque and a monitoring time.

If the torque exceeds 15% of the calibration value (even during the dwell time), or if the monitoring time lasts four seconds, then the test run is aborted with an Tq> or TMAX evaluation. However, you must check for yourself whether the output has rotated by the displayed value (e.g., make a mark).

Make sure that the output shaft has actually rotated by the indicated number of revolutions (e.g., by marking its position). If the rotation made by the output shaft does not match the displayed value, either an incorrect angle factor has been set or the angle sensor is defective.

- To start the tests, keep the Start switch pressed.

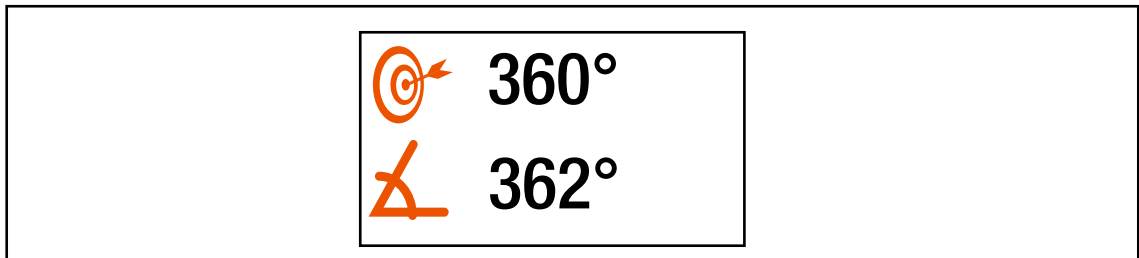


Fig. 3-25: Submenu – Angle test

Symbol	Description
	Display of the shut-off angle of 360°.
	Display of the angle. The displayed angle should be close to 360°.

3.8.3

Torque test

With the torque test, the functionality of the measuring sensor can be checked and the torque measurement can be evaluated. At the beginning of the test, the torque is 0 Nm. Throughout the entire test, the torque is measured and displayed.

- To start the tests, keep the Start switch pressed.

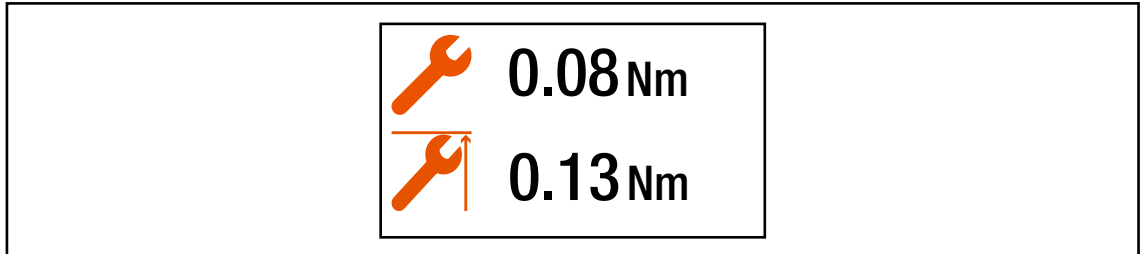




Fig. 3-26: Submenu – Torque test


Symbol	Description
	Display of the current torque.
	Display of the maximum torque.

3.8.4

Calibration value



Fig. 3-27: Submenu – Calibration value

Symbol	Description
	Display of the neutral position value for the measuring sensor. The displayed value should be at 0 V. The tolerance limits are ± 0.2 V.

3.8.5 Voltage



Fig. 3-28: Submenu – Voltage

Symbol	Description
	Display of the undervoltage limit. This limit can be set in the menu 3.7.4 Setting the shut-off properties, page 25.
	Display of the current battery voltage. For high operational capability, this voltage is continuously monitored during the tightening process. If the voltage drops below the undervoltage, a warning is issued on the tool. See 3.7.4 Setting the shut-off properties, page 25.
	Display of the logic voltage of 5 V. A voltage for components that are not needed for the core functions of the tool. The tolerance limits are $\pm 5\%$.

3.8.6 Counters status

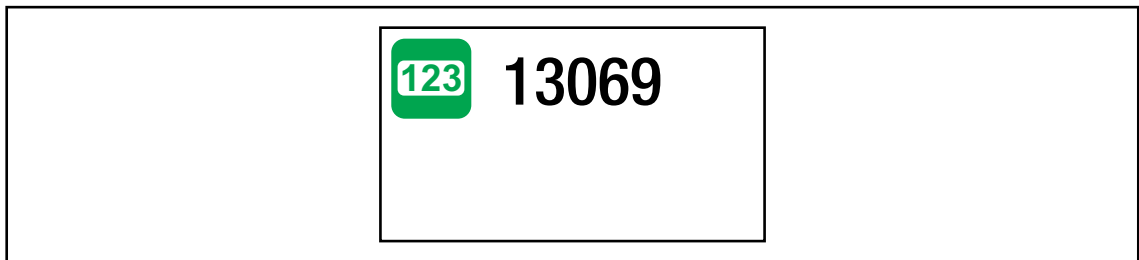


Fig. 3-29: Submenu – Number of tightenings

Symbol	Description
	Display of the number of all previous tightenings.

3.8.7

Torque calibration value

This menu is only available in the FastApps mode. In the mPro mode, the menu is hidden.

In *Torque calibration value*, the torque calibration value of the tool can be adjusted. This may be necessary if the torque of the tool changes due to wear.

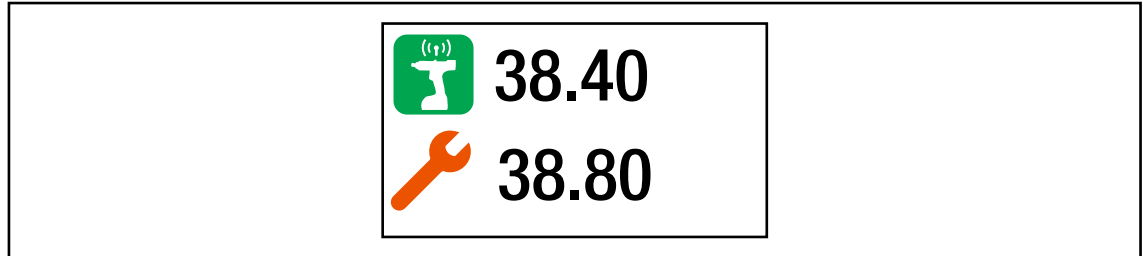








Fig. 3-30: Menu – Torque calibration value





Button	Description
	<p>Display of the torque calibration value.</p> <p>The tool constant can be changed by $\pm 20\%$.</p>
	<p>Display of the static torque constant [Nm/A].</p> <p>The value serves as a starting point for further current/torque conversion calculations.</p>

To change the torque calibration value:

1. Activate the input box with the  button.
2. Increase/decrease the torque calibration value with the  and  buttons. Enter each digit of the value individually. As soon as a digit is confirmed, it is stored.
3. To exit the menu, press and hold the  button.

3.8.8 Accessory

If an accessory is used, one of the buttons is displayed depending on the type:

- 2D Reader:  > 
- Gyroscope:  > 

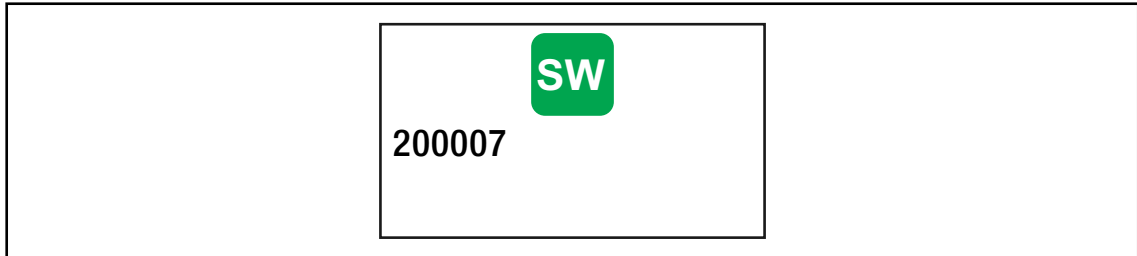









Fig. 3-31: Submenu – Accessory

Symbol	Description
	Display of the scanned barcode. The symbol is only displayed if a 2D reader is used. - No function -
	Display of the barcode type. The symbol is only displayed if a 2D reader is used. - No function -
	Display of the gyroscope angle. The symbol is only displayed if a gyroscope is used. - No functions -
	Display of the software version for the accessory.
	Display of the serial number for the accessory.
	Display of the hardware version for the accessory.
	Display of the bootloader version for the accessory.

3.9

WLAN-Communications

In this menu, information about the WLAN connection is to be found. To configure WLAN settings, use the *Cordless RF Configuration* software. See Document P2372JH.

If the tool is programmed so that WLAN settings are assigned via DHCP, this will appear to the right near the "-" symbol as long as no connection could be established.

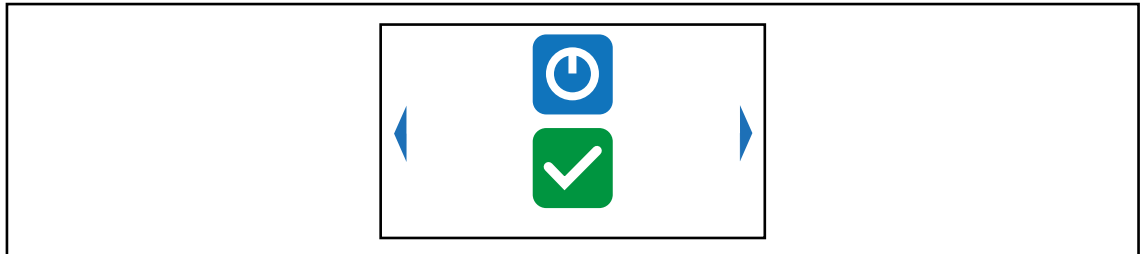











Fig. 3-32: Menu – Communications

Symbol	Description
	Activating/deactivating WLAN connection.
	SSID display.
	IP address display. If the IP address is assigned twice, the symbol  is displayed in the run screen. ► Then change the IP address.
	Network mask display.
	Gateway display.
	MAC address display.
	Signal strength in [dBm] display.
	Region display.

3.9.1 Activating/deactivating WLAN connection

This menu is displayed when the WLAN connection is to be activated or deactivated.

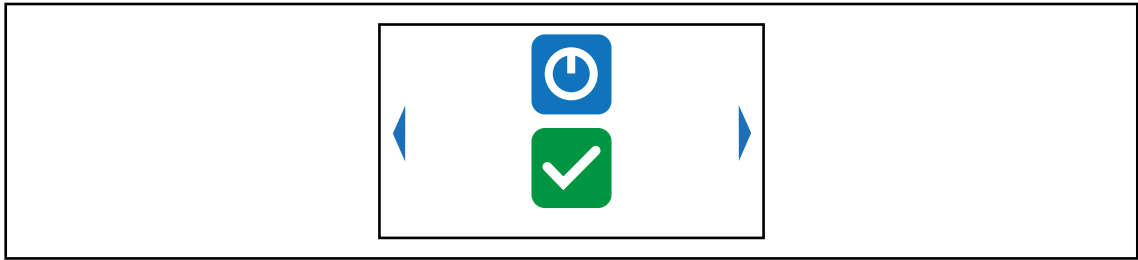


Fig. 3-33: Submenu – Activating/deactivating WLAN connection

- Press the button to switch between the following options. The visible option is active. A simultaneous WLAN and Bluetooth connection is not possible. As soon as the WLAN connection is activated, the tool disconnects the Bluetooth connection.

Button	Description
	► Select this button to cancel the process. Leave the menu press and hold the button.
	► Select this button and confirm with the button to activate/deactivate the WLAN connection.
	A simultaneous WLAN and Bluetooth connection is not possible. As soon as the WLAN connection is activated, the tool disconnects the Bluetooth connection.

3.10 Bluetooth communication

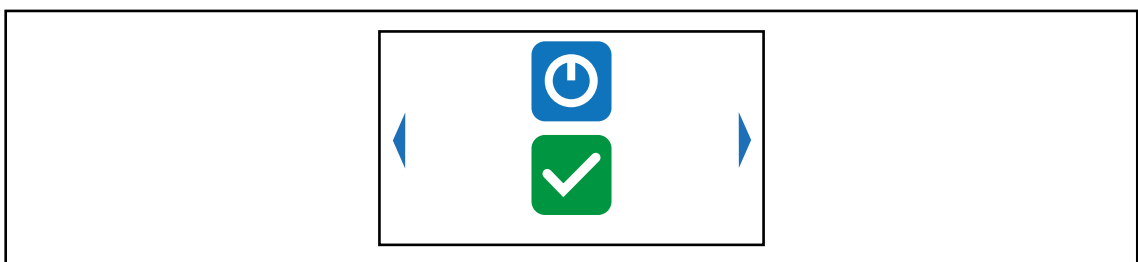








Fig. 3-34: Menu – Bluetooth communication

Button	Description
	Activating/deactivating Bluetooth.
	Scanning Bluetooth devices and establishing a Bluetooth connection.

Button	Description
	Display active Bluetooth connection and disconnect Bluetooth connection. → The MAC address or the name of the controller is displayed with which the tool is connected via Bluetooth.
	Select the node number. <ul style="list-style-type: none"> The IP address ranges from 192.168.245.101 to 192.168.245.107 and depends on the node number. Example: Tool 3 has the IP address 192.168.245.103. Ensure that each node number is assigned only once. Up to seven node numbers can be assigned: 1. Press the  button to activate the input field. 2. Use the arrow keys to increase/decrease the node number. 3. Confirm with the  button. → If the node number is assigned twice, the field is highlighted in yellow and the symbol  is displayed in the run screen. ► In this case, change the node number.
	MAC address display of the Bluetooth module.

3.10.1 Activating/deactivating Bluetooth

This menu is displayed when Bluetooth is to be activated or deactivated.

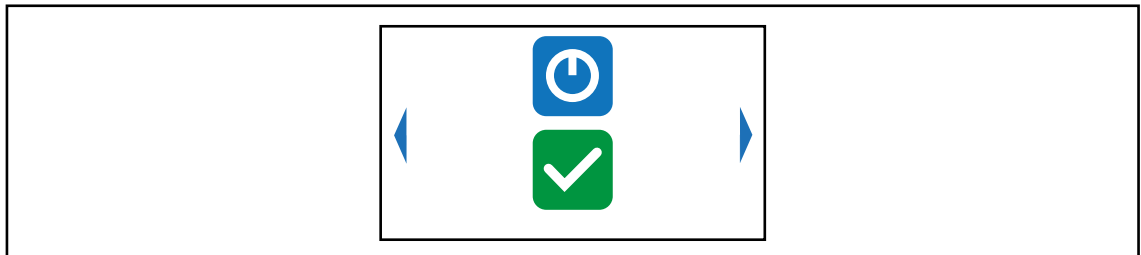







Fig. 3-35: Submenu – Activating/deactivating Bluetooth

- Press the  button to switch between the following options. The visible option is active. A simultaneous WLAN and Bluetooth connection is not possible. As soon as the Bluetooth connection is activated, the tool disconnects the WLAN connection.

Button	Description
	► Select this button to cancel the process. Leave the menu press and hold the  button.
	► Select this button to activate/deactivate the Bluetooth connection.
	A simultaneous WLAN and Bluetooth connection is not possible. As soon as the Bluetooth connection is activated, the tool disconnects the WLAN connection.

3.10.2 Scanning Bluetooth devices

The scan will continue as long as the menu is open.



Fig. 3-36: Submenu – Scanning Bluetooth devices

Icon	Description
	<p>List of all devices detected during scanning.</p> <ul style="list-style-type: none"> • All devices with which a Bluetooth connection is possible are displayed. The tool can only connect to a controller of the mPro200GC-AP series. • Each device is displayed with an icon and the MAC address or name of the device. • The controller to which the tool is already connected is highlighted in green in the list. <p>To establish a Bluetooth connection, select a controller and confirm with the button, see document P2545KA for details.</p> <ul style="list-style-type: none"> → Yellow background: Connection establishment is ongoing. → Green background: Bluetooth connection has been established. → Red background: Bluetooth connection failed.

3.10.3 Disconnect Bluetooth connection

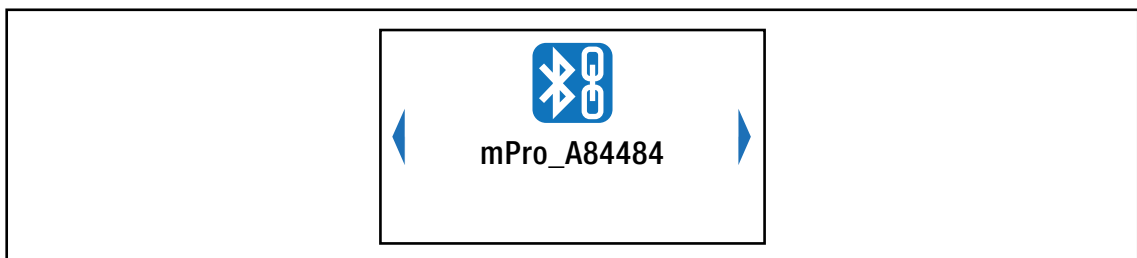


Fig. 3-37: Submenu – Disconnect Bluetooth connection

1. Press the button to open the submenu with the following options. The visible option is active.
2. Press the arrow keys to switch between the options.
3. Confirm the selection with the button.

Button	Description
	<p>► Press to cancel the process.</p> <ul style="list-style-type: none"> → The Bluetooth connection to the device is not interrupted. → The <i>Disconnect Bluetooth connection</i> menu is exited.
	<p>► Press to disconnect the Bluetooth connection.</p> <ul style="list-style-type: none"> → The Bluetooth connection to the device is interrupted. → The <i>Disconnect Bluetooth connection</i> menu is exited.

Utility

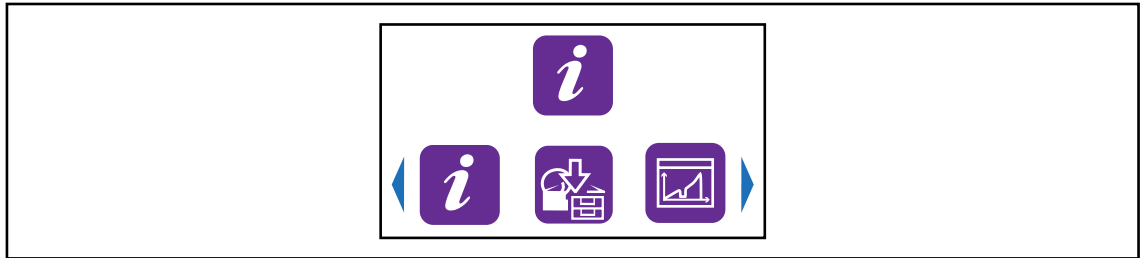


Fig. 3-38: Menu – Utility

Button	Description
	Display of the software versions.
	Save archive. - No function -
	Save torque graph. - No function -
	Load parameters. - No function -
	Save parameters. - No function -
	Software update.
	Delete archive.
	Reset to factory settings.
	Switch off tool. Tool switches off after five seconds.

3.11.1 Displaying the software version

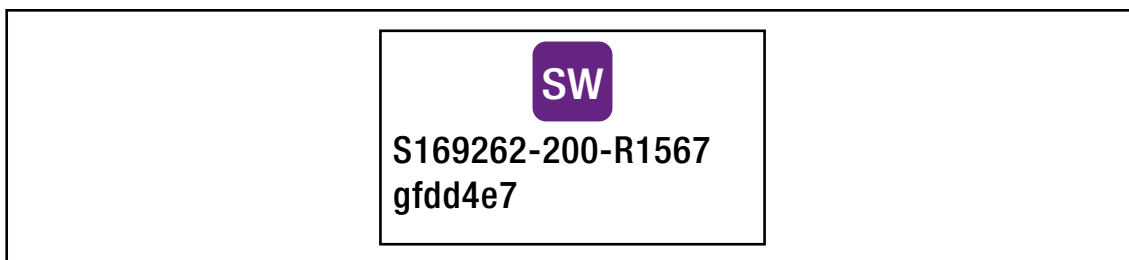








Fig. 3-39: Submenu – Displaying the software version

- Use the arrow keys to switch between the menu items.

Symbol	Description
	Display of the software version for the measuring board.
	Display of the software version for the operating system.
	Display of the software version for the servo.
	Display of the software version for the LCD.
	Display of the version for the LCD bootstrap.
	Display of the version for the LCD failsafe.

3.11.2

Software update

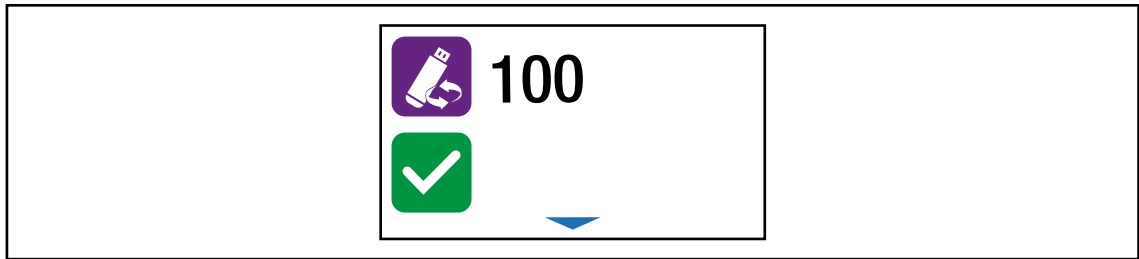


Fig. 3-40: Submenu – Software update

Carry out the software update via WLAN connection using the *Cordless RF Configuration* software.

1. Switch the tool on.
2. Install the *Cordless RF Configuration* software, see document *P2372JH*.
3. Make sure that the WLAN settings on the tool are configured so that the software update can be performed via a WLAN connection.
4. Activate the *TCP/IP direct* interface in the *Communication with tool* tab and enter the IP address of the tool.
5. Open the *Tool identification* tab.
6. To change the software on the tool, press <Software Update>.
7. Confirm the following messages with <ja>.
8. Select the appropriate .tma-file with the selection dialog.

**Note**

Do not switch off the system after software update is completed.

The update can take up to three and a half minutes.

► Wait until the software update is completely finished.

As soon as **SW update done!** is displayed, the software update starts in background.

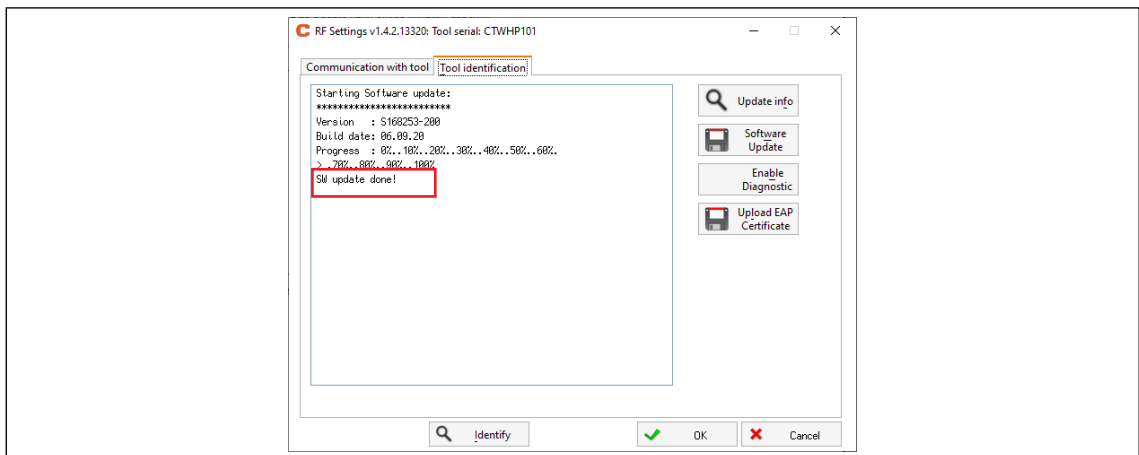


Fig. 3-41: Update process

- The progress is shown on the tool display.
- The software update is finished when the tool restarts.

3.11.3 Deleting an archive

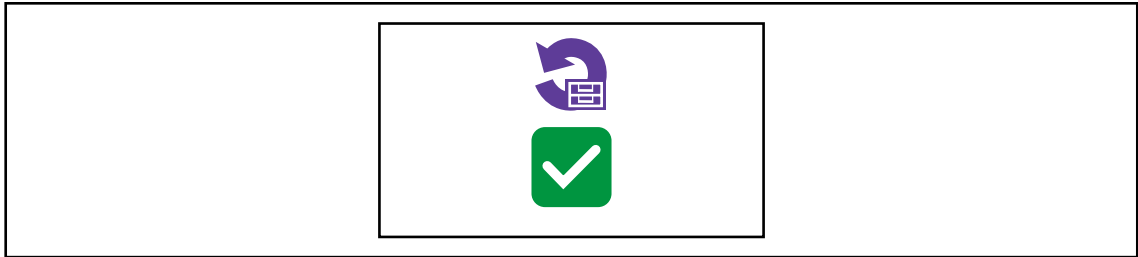


Fig. 3-42: Submenu – Deleting an archive

Button	Description
	<ul style="list-style-type: none"> ▶ Press and hold the button to cancel the process. → The tightening results and the torque graphs are not deleted.
	<ul style="list-style-type: none"> ▶ Press to delete the archive. → All tightening results and torque graphs are deleted. → The <i>Reset archive</i> menu is exited.

3.11.4 Resetting to factory settings

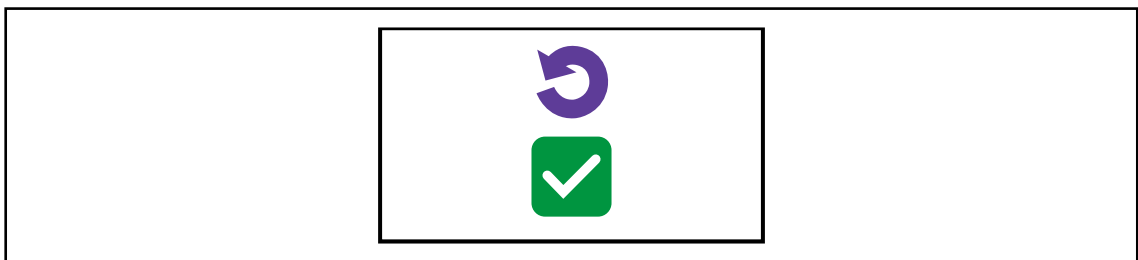




Fig. 3-43: Submenu – Resetting to factory settings

Button	Description
	<ul style="list-style-type: none"> ▶ Press and hold the button to cancel the process. → The tool is not reset to factory settings.
	<ul style="list-style-type: none"> ▶ Press to reset the tool to factory settings. → All the settings of the tool and the archive are deleted. → The <i>Resetting to factory settings</i> menu is exited.

3.11.5**Switch off tool**

- ▶ Select  > .
- The following screen is displayed. After five seconds, the tool switches off.

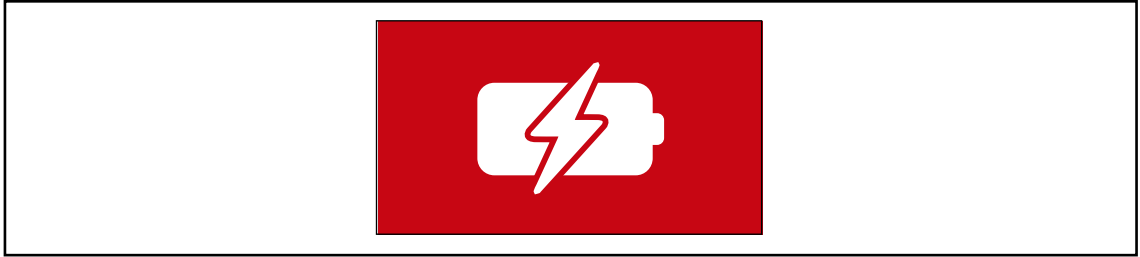


Fig. 3-44: Switch off the tool

4 Tightening sequence

In the FastApps mode, there is a choice between two tightening sequences:

- **Torque shutoff: Sequence 31 torque controlled, extended monitoring**
Shut-off torque-controlled tightening sequence with torque and angle check.

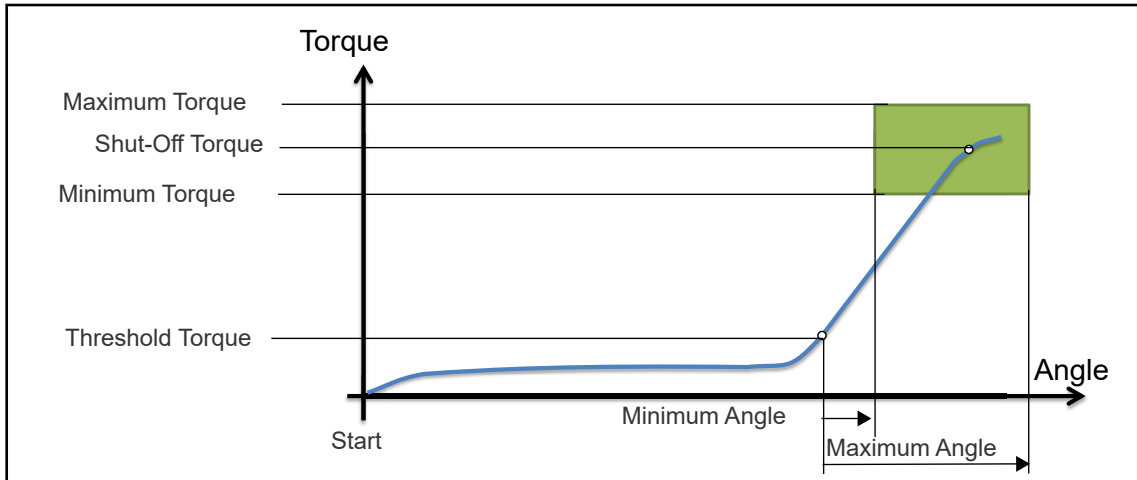


Abb. 4-1: Representation of torque shutoff

- **Angle shutoff: Sequence 51 angle-controlled, extended monitoring**
Shut-off angle-controlled tightening sequence with angle and torque check.

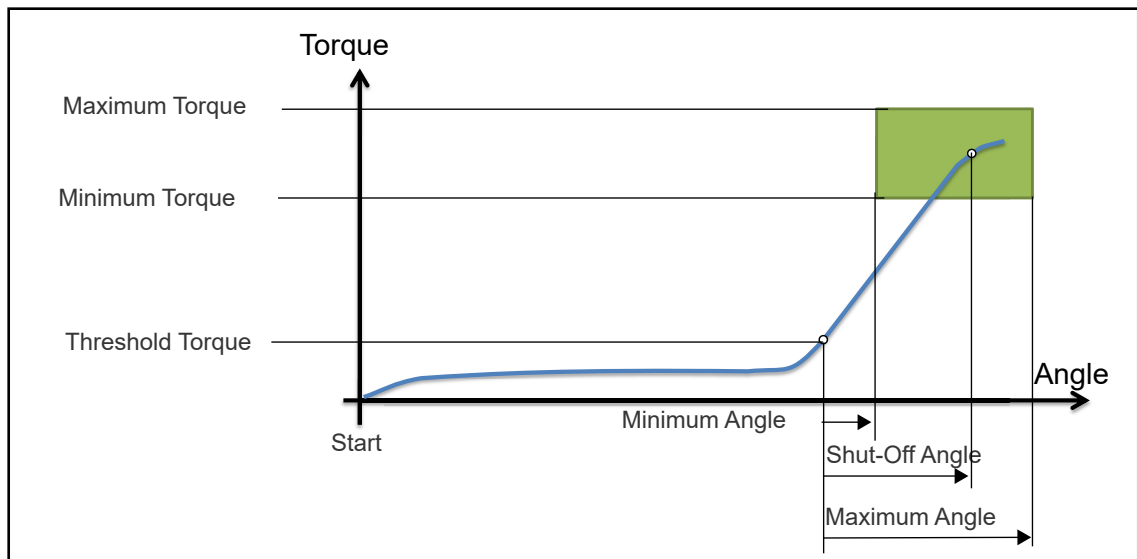


Abb. 4-2: Representation of angle shutoff

The following description applies to both tightening sequences.

For the speed, select a second speed parameter *Final Speed*. The behavior at the *Final Speed* is different in FastApps and mPro mode:

- FastApps mode: If this is parameterized, the speed immediately changes from the start speed to the final speed up to the maximum torque.
- mPro mode: If this is parameterized, the speed is reduced from the starting speed to the final speed starting from the threshold torque to the maximum torque.

The final speed must be lower than the standard speed.

The angle counting starts when the *Threshold Torque* is reached.

After switching off via the *Shut-Off Torque/Shut-Off Angle*, the torque that develops or the associated angle is compared with the *Minimum/Maximum Torque* and the *Minimum/Maximum Angle* and evaluated OK/NOK accordingly.

The following parameters can be programmed in the particular FastApp configuration. See 3.6.1 Configuring FastApps, page 18 and 3.6.4 Advanced settings, page 20.

Parameters	Explanation	Range of values	Abbrev.
Speed (rpm)	<p>Speed selection: In the range of the maximum speed specified in the tool constants, with validity at the beginning of the sequence up to the threshold torque.</p> <p>Begin: With tool start End:</p> <ul style="list-style-type: none"> • Threshold Torque • Speed threshold 	± Maximum speed	n
Speed Threshold (rpm) ^a	<p>Speed when the maximum torque is reached. Must be less than the starting speed (rpm).</p> <p>FastApps mode As soon as the speed threshold is reached, the speed is reduced from the starting speed to the final speed at the maximum torque. With increasing torque, the speed drops.</p> <p>Begin: From the <i>Speed Threshold Torque</i> End: <i>Shut-Off Torque</i></p> <p>mPro mode In mPro mode, the parameterization of the controller is valid.</p>	± Maximum speed	n2
Maximum Angle (deg)	Upper limit of attained angle.	0 ... 9 999	AngMax
Maximum Torque (Nm)	Upper limit of attained torque.	0 ... 1.2 x TQ capacity	TqMax
Minimum Angle (deg)	Lower limit of attained angle.	0 ... 9 999	AngMin
Minimum Torque (Nm)	Lower limit of attained torque.	0 ... TQ Shut-Off Torque	TqMin
Threshold Torque (Nm)	Beginning of angle counting.	0 ... TQ capacity	TqTh
Shut-Off Torque (Nm)	Valid monitoring torque during the tightening process. If the monitoring torque is exceeded, the drive stops immediately.	0 ... TQ capacity	TqP
Shut-Off Angle (deg)		0 ... 9999	AP






- a. The maximum torque is not normally reached. The torque shutoff value is less than the maximum torque. Therefore, it is not completely regulated to the final speed.

5 Troubleshooting

Error messages, software updates and data storage

Error message	Description	Measure
E1	Export script not available.	<ul style="list-style-type: none"> ▶ Try to export the script two to three times. ▶ If the error message continues to occur, perform a software update.
E2	Error during export.	<ul style="list-style-type: none"> ▶ Insert SD card. ▶ Check SD card for errors.
E3	Error while writing the archive.	<ul style="list-style-type: none"> ▶ Check SD card for errors.
E10	Software update script not available.	<ul style="list-style-type: none"> ▶ Try two to three times to perform the software update. ▶ If the error message continues to occur, contact the service department at Apex Tool Group.
E50	Crash during software update.	
E99	Timeout on startup expired.	<ul style="list-style-type: none"> ▶ Insert SD card.
E200	Several .tma files available.	<ul style="list-style-type: none"> ▶ Select only one .tma file.
E210	No compatible update packages found.	<ul style="list-style-type: none"> ▶ Make sure there is the right .tma file selected.

Error messages displayed on the screen:







Symbol	Cause	Beasure
	Communication between measuring card and LCD interrupted.	The tool automatically performs a restart. <ul style="list-style-type: none"> ▶ Wait until the tool has restarted.
	No CID available.	<ul style="list-style-type: none"> ▶ Insert Cleco CID.
	CID not inserted correctly.	<ul style="list-style-type: none"> ▶ Insert Cleco CID correctly.
	No signed CID. → CID is invalid.	<ul style="list-style-type: none"> ▶ Use Cleco CID.
	CID is damaged.	<ul style="list-style-type: none"> ▶ Replace CID.
	Software is not available or damaged.	<ul style="list-style-type: none"> ▶ Perform software update.






Error messages for shut-off cause

Error message	Description
A<	Angle too small
A>	Angle too large
AW<	Too few graphic values recorded for an evaluation
BLOC	Tightened on block
CAL	Torque encoder calibration error
ENC	Angle encoder error
Error	Error occurred
IIT	Requested motor output is too high
IP	Error output section, excessive current

Error message	Description
IREd	Current/TQ redundant
JMP	Error due to the socket slipping off
MBO>	Torque has exceeded top evaluation torque
MBU<	Torque has fallen below bottom evaluation torque
MDSI	Safety torque exceeded
NOK	Rundown is not ok
OFF	Torque encoder offset error
OK	Rundown is ok
RC	Rundown terminated by interruption of the start signal
SS>	Max. number of cycles for stick-slip exceeded
SST	Too many stick-slip edges
TMAX	Canceled by exceeding the max. time
TQ<	Torque too low
TQ>	Torque too high
TTT<	Time that may lapse after threshold torque maximum. If this time is exceeded, there is a shut-off with this error message.
TTT>	Time that must pass in the Shut-Off Value after threshold torque minimum is reached. If the time is less, this error message is output.





Troubleshooting

Problem	Possible cause	Measure
General tool		
Tool does not start.	Speed not parameterized.	<p>Check Linking group.</p> <p>► In the mPro mode, select <i>Navigator > Standard</i> or <i>Navigator > Basic</i>.</p> <p>Check FastApps.</p> <p>In the FastApps mode:</p> <p>►  >  must be selected.</p>
Tool does not start with counterclockwise rotation activated.	With counterclockwise rotation, parameter for speed is set to 0 rpm.	<p>Parameterizing the speed for counterclockwise rotation.</p> <p>► On the control screen <i>Standard > Standard Application Builder > Tool Groups</i></p>
Tool light disabled.	Disabled by parameter setting.	<p>Parameterizing the tool light:</p> <p>► On the control screen <i>Advanced > Tool Group > Extended Tool Settings</i></p> <p>► To activate the tool light:  > </p>
Control menu on tool not enabled or only partially enabled.	Disabled by parameter setting.	<p>► To enable the control menu:  > </p>
Idle speed not reached.	Battery voltage is too low.	<p>► Use fully charged battery.</p>

Problem	Possible cause	Measure
General tool		
Tool does not start.	Speed not parameterized.	Check Linking group. ► In the mPro mode, select <i>Navigator > Standard</i> or <i>Navigator > Basic</i> .
		Check FastApps. In the FastApps mode: ►  >  must be selected.
Expected number of run-downs is not achieved with one charge of the battery.	Battery is not fully charged.	► Use fully charged battery.
	The warning threshold for undervoltage is not set to the minimum value.	► On the control screen <i>Tool Setup > Tool Settings</i> , reduce the <i>Undervoltage (V)</i> .
		► To set the warning threshold:  > 
	High torque is needed during a fastening sequence, e.g., for coated fasteners.	If a high torque is needed for a longer period of time, e.g., for several turns, the number of run-downs that can be achieved with one battery charge will be significantly reduced.
Software does not boot.	Battery has too many charging cycles.	After 800 charging cycles, the capacity is reduced to approx. 60%.
	Error in the main software.	► Press the following keys: 
		► Use recovery stick. Contact the service department at Apex Tool Group.
Software does not boot.	Error in the main software.	► Use recovery SD card. Contact the service department at Apex Tool Group.

Problem	Possible cause	Measure
WLAN data communication between controller and access point		
No communication between the controller/ service PC and access point. Applies only to WLAN infrastructure customers.	IP address and subnet mask are not in the same range.	Without network administration, it is necessary for the IP address and subnet mask for the mPro200GC and the base station to be in the same range. 1. Use the same subnet mask for both. 2. For the IP address, use the same first three numbers, e.g., - IP address for the controller: 192.168.1.xxx - IP address for the base station: 192.168.1.xxx - Subnet mask: 255.255.255.0

Problem	Possible cause	Measure
WLAN data communication between tool and access point		
The tool can not connect with the access point. Indicator: Signal strength at tool is always "-". The tool does not appear in the list of connected clients.	Tool not yet parameterized with the correct WLAN settings.	► Parameterize WLAN settings in the controller and with the <i>Cordless RF Configuration</i> PC software. See Document P2545KA.
	WLAN settings are different for the tool and the access point.	► Use the <i>LiveWire RF Configuration</i> PC software to check whether the WLAN settings for the tool match the settings of the access point (SSID, encryption, network key).
	Encryption settings are not selected correctly. Password is entered incorrectly.	
	Incorrect WLAN channel	Select another channel. 1. Select the channel on the controller: <i>Utility > Cordless Tools</i> . 2. Select the channel with the <i>Cordless RF Configuration</i> PC software. The same channel must be set as on the controller.

Problem	Possible cause	Measure
WLAN data communication between controller and tool		
No WLAN data communication between the controller and tool.	The IP address of the tool is not correctly entered in the controller.	1. On the control screen <i>Tool Setup</i> , check whether the IP address of the tool has been entered in the <i>Type</i> box. 2. Otherwise, mark the line and <Edit>. IP address of tool – see Tool in <i>RF Settings</i> submenu.
	Tool is already assigned to another controller.	► Check the WLAN settings and make sure that the WLAN settings for the controllers are different. Applies only to WLAN infrastructure customers: ► Check whether another controller already has a connection to this tool. In other words, another controller is using the same IP address.
IP address cannot be pinged.	IP address already exists in the network. In this case, the tool will not establish a connection.	► Check the physical connection (RSSI values):  >  ► Check the assigned IP address.
Occasional interruptions in WLAN data communication.	Distance between the access point/mPro200GC-AP and the tool is too great.	1. Check signal strength at tool in the <i>Signal Strength</i> submenu:  >  2. If necessary, reduce the distance between the access point/mPro200GC-AP and the tool.
	Excessive data traffic on WLAN network.	Reduce data traffic on WLAN network. 1. On the <i>Basic</i> control screen, increase the <i>Trigger</i> . 2. On the <i>mPro > Main Menu > System Programming > Special Functions > MWF</i> control screen, disable the torque graph data transmission.

Bei Ems-Fehlern handelt es sich um Fehler, die von der Messkarte gesendet werden. Siehe Dokument

Problem	Possible cause	Measure
Bluetooth data communication between controller and tool		
The tool can not connect with the controller.	Controller is not visible.	▶ Make sure that the Bluetooth function is activated on the controller.
	The controller is not displayed in the <i>Scanning Bluetooth devices</i> menu.	▶ Make sure that the Bluetooth function is activated on the controller. ▶ Check that the controller is visible with another tool.
	Establishing a Bluetooth connection fails.	▶ Note that the tool can only connect to an mPro200GC series controller. ▶ Retry to establish a Bluetooth connection. ▶ Restart the tool and try to establish the Bluetooth connection again. ▶ Restart the controller and try to establish the Bluetooth connection again.
	The node number is assigned twice.	▶ Make sure that each node number is assigned only once. Note that only seven nodes are possible.
	The wrong IP address is used for the tool on the controller.	▶ Make sure that the tool has been installed on the controller with the correct IP address.

EMS errors are errors sent by the measuring board. See Document *P2381TS*.

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