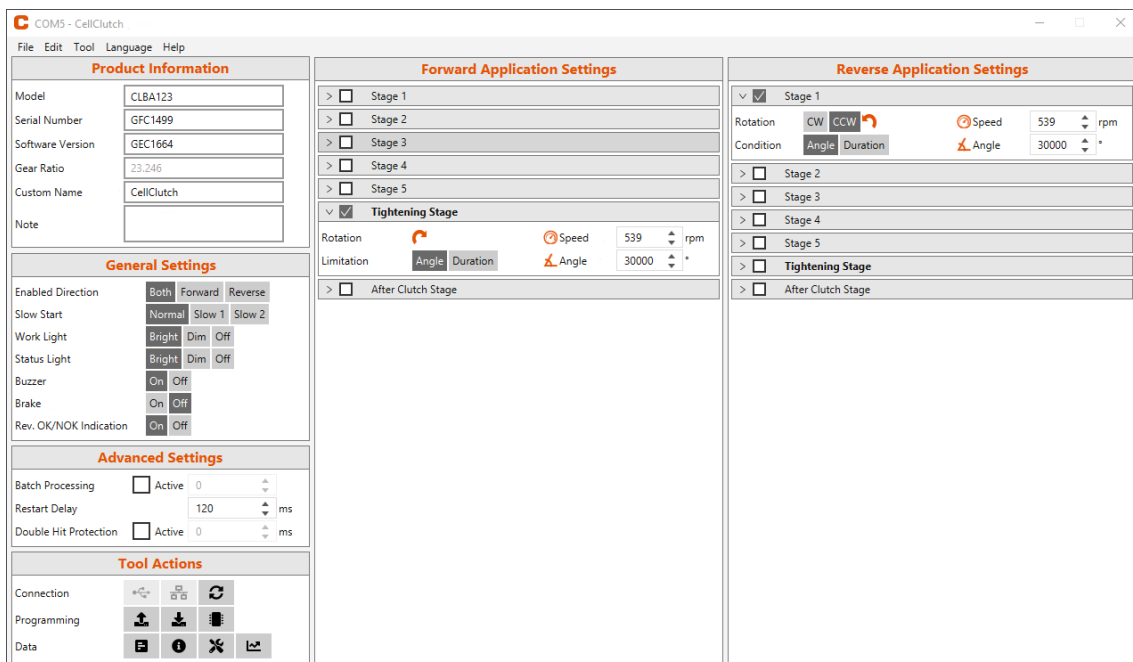




CellClutch™

S168715
CLBA & CLBP



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About this document

This document is intended for qualified employees responsible for installation and maintenance (administrators, maintenance technician, service, operator).

It contains information

- for safe and appropriate handling of the product.
- on function.
- for programming the software: 0.9.8

The original language of this document is German.

Other documents

Number	Document
P2547BA	Instruction Manual – CLBA & CLBP Cordless EC Tool

Symbols in the text

<i>italic</i>	Menu options (e.g., Diagnostics) 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>.
<i>Courier</i>	Indicates Filenames and paths, e.g., <i>setup.exe</i> .
•	Indicates lists, level 1.
–	Indicates lists, level 2.
a)	Indicates options.
b)	
➤	Indicates results.
1. (...)	Indicates action steps.
2. (...)	
▶	Indicates single action steps.

2 Initial operation

2.1 Requirements

- Operating system: Windows 10, 64 Bit
- Screen resolution: 1280 x 800 or higher

2.2 Installation

Installing the software

1. Download the *Installer X.Y.Z* software package from the following website:
<https://software.apextoolgroup.com/current-software-packages/cellclutch/>
2. Start the *CellClutch-X.Y.Z.exe* installation file and follow the installation instructions.



Windows does not recognize the manufacturer of the software, so a Windows virus message appears. To start the installation, press *More information* and *Run anyway*.

2.3 Connecting Tool

Connect the tool to the laptop/PC via USB

1. Connect the tool to the laptop/PC via a Micro-B USB cable.



Fig. 2-1: Remove battery



Fig. 2-2: Connect Micro-B USB cable

2. Determine the serial port (COM port) of the tool in the device manager of the laptop/PC.

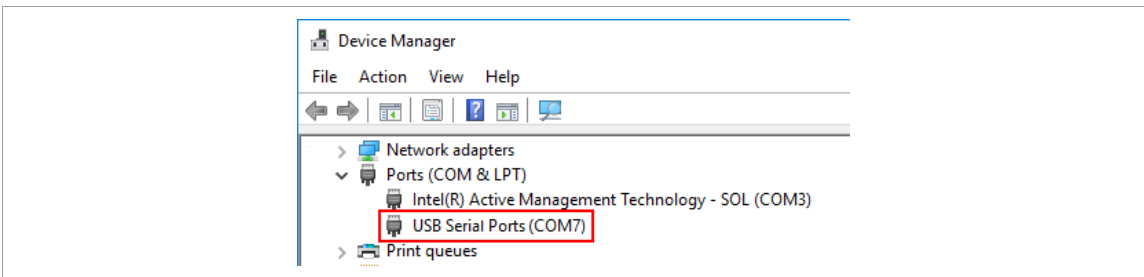


Fig. 2-3: Device Manager

3. Start the *CellClutch* PC software.

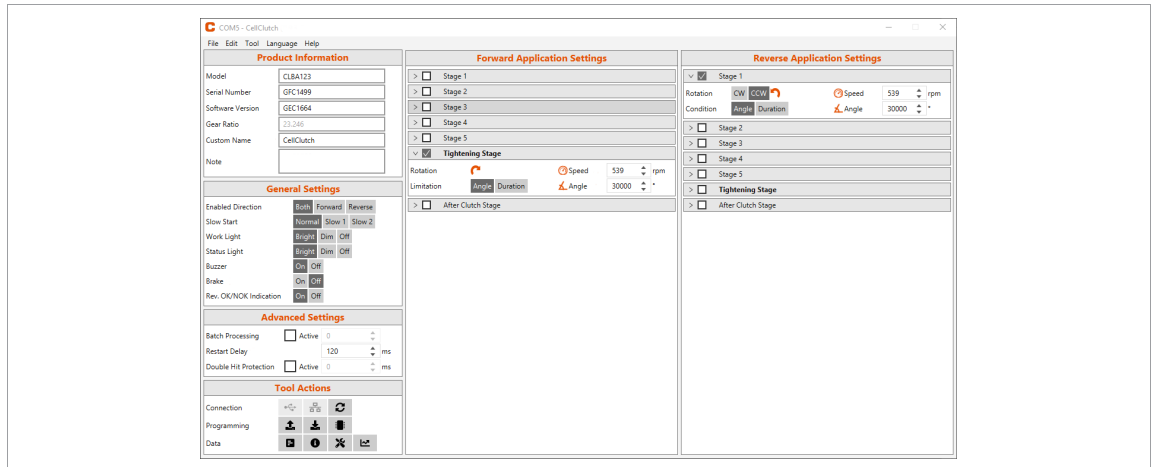



Fig. 2-4: PC software

4. Select under *Tool Actions*  the COM port in the drop-down menu. Details see *chapter 3.2.4 Tool Actions, page 11*.
5. Confirm the input with <OK>.

3 Operation

The *CellClutch* PC software is used to parameterize tools of the CellClutch series. Tool settings can be made, tightening sequences can be parameterized, results can be saved, and a firmware update can be performed.

3.1 General Functions

Switching On The Tool

- ▶ To switch on the tool, press the start trigger.

Switching Off Tool

If no action is performed on the tool for three minutes, it switches to the idle state.

3.2 Menus And Functions

The user interface of the PC software is divided into three columns. The left-hand column is used for general settings and actions. The other two columns are used for programming application settings.

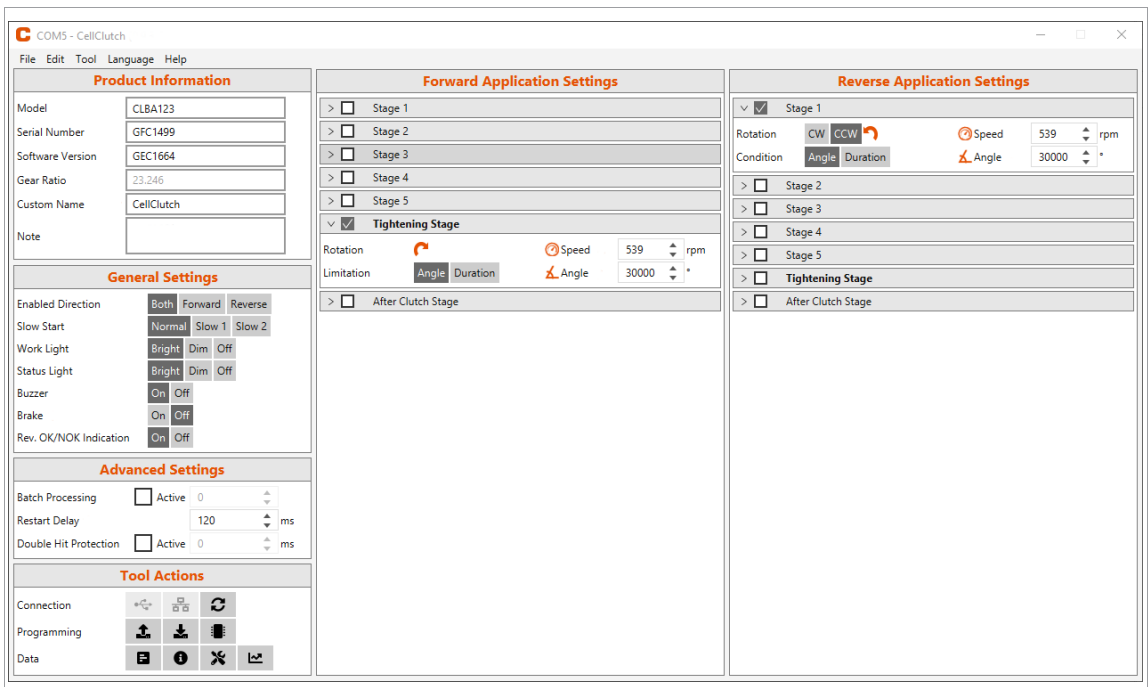
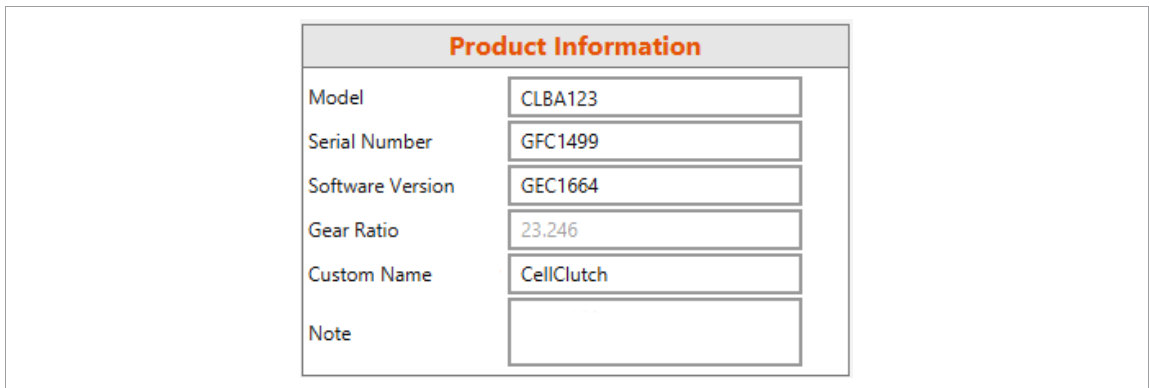


Fig. 3-1: User interface with exemplary settings

The individual areas of the user interface are described below.

3.2.1 Product Information

The *Product Information* area displays information about the tool.



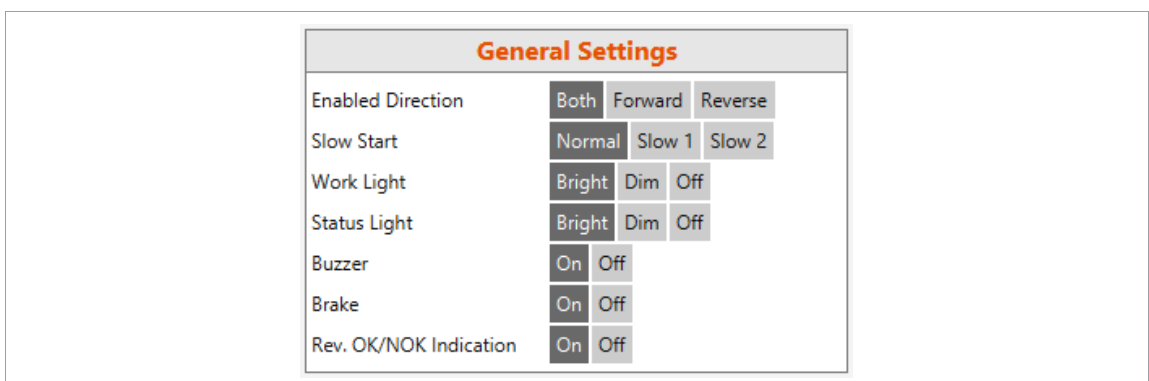
Product Information	
Model	CLBA123
Serial Number	GFC1499
Software Version	GEC1664
Gear Ratio	23.246
Custom Name	CellClutch
Note	

Fig. 3-2: Product Information

Parameter	Description
Model	Display of the tool type. If no tool is connected, <i>Not connected</i> is displayed.
Serial Number	Display of the serial number of the tool. If no tool is connected, <i>Not connected</i> is displayed.
Software Version	Display of the software version of the tool. If no tool is connected, <i>Not connected</i> is displayed.
Gear Ratio	Display of the gear ratio of the tool. The value is configured in the tool and cannot be changed. If no tool is connected, <i>Not connected</i> is displayed.
Custom Name	Input field for a custom name that is assigned to the tool. Up to 32 characters are possible.
Note	Additional notes can be entered in the input field, which will be saved on the tool. Up to 200 characters are possible.

3.2.2 General Settings

Settings for the behavior of the tool during a rundown can be made in the *General Settings* area.




















General Settings	
Enabled Direction	Both Forward Reverse
Slow Start	Normal Slow 1 Slow 2
Work Light	Bright Dim Off
Status Light	Bright Dim Off
Buzzer	On Off
Brake	On Off
Rev. OK/NOK Indication	On Off




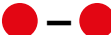








Fig. 3-3: General Settings – View of the default settings

Parameter	Description
Enabled Direction	Setting which program is used. <ul style="list-style-type: none"> Both: The <i>Forward</i> and <i>Reverse Application Settings</i> are activated. Forward: Only the <i>Forward Application Settings</i> are activated. The reverse switch on the tool has no effect. Reverse: Only the <i>Reverse Application Settings</i> are activated. The reverse switch on the tool has no effect.
Slow Start	Setting with which acceleration the motor reaches the parameterized speed. <ul style="list-style-type: none"> Normal: The maximum speed is reached after 200 ms. Slow 1: The maximum speed is reached after 2 s. Slow 2: The maximum speed is reached after 5 s.
Work Light	Setting for the brightness of the work light. <ul style="list-style-type: none"> Bright: The work light is bright. Dim: The work light is dim. Off: The work light is off.
Status Light	Setting for the brightness of the status light. <ul style="list-style-type: none"> Bright: The status light is bright. Dim: The status light is dim. Off: The status light is off.
Buzzer	The buzzer gives an acoustic signal to indicate the status. The buzzer can be switched on or off.
Brake	Setting of the motor behavior. <ul style="list-style-type: none"> On: As soon as the start trigger is released, the motor brakes immediately. Off: As soon as the start trigger is released, the motor brakes slowly until it comes to a standstill.
Rev. OK/NOK Indication	If the <i>Tightening Stage</i> in the <i>Reverse Application Settings</i> is active, its result will be monitored like the <i>Forward Application Settings</i> . If the <i>Tightening Stage</i> in the <i>Reverse Application Settings</i> is deactivated, its result is set by this setting. <ul style="list-style-type: none"> On: The result is shown with the status display. It is always NOK. Off: The result is not displayed. It is always IO.

Status Indication

The color and duration of the LED display indicate the status of the rundown and the tool.

Status light	Work light	Sound	Meaning
 15 s	 3 s	—	Result after fastening cycle OK
 15 s	 3 s		Result after fastening cycle NOK
 1 s	 1 s		Restart Delay
 1 s	 1 s		Double Hit Protection
—	 3 s After releasing the start trigger	—	Work light is activated by start trigger
  — 15 s	 3 s	 — 	Linking OK (overall tightening result)

Status light	Work light	Sound	Meaning
 15 s	 3 s		Linking NOK (overall tightening result)
 Until the end of the event	 Until the end of the event		Tool overheating
 Until the end of the event	—	—	Maintenance alarm
 Until the end of the event	 Until the end of the event	—	Battery low status
 Until the end of the event	 Until the end of the event		General error

Legend

Symbol	Meaning
	Green LED lights up
	Blue LED lights up
	Red LED lights up
	Buzzer sound is heard
—	Break

3.2.3

Advanced Settings

Settings for the behavior of the clutch can be made in the *Advanced Settings* area.

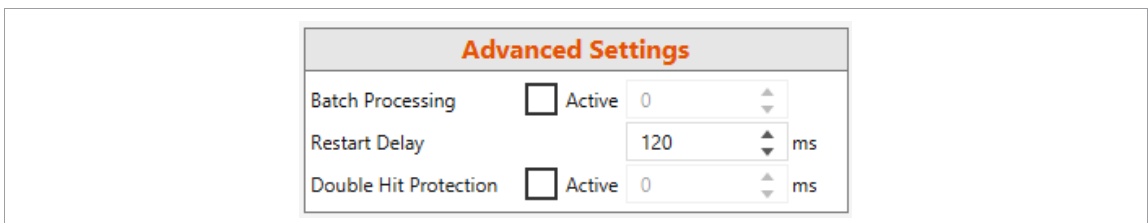


Fig. 3-4: Advanced Settings

Parameter	Description
Batch Processing	- Without function - If the check box is activated, multiple rundowns can be evaluated together. The number indicates how many rundowns belong to one batch.
Restart Delay	Time in milliseconds between the release of the clutch and the start of a new rundown. This prevents accidentally triggered rundowns.
Double Hit Protection	If the Double Hit Protection is activated, a time in milliseconds can be defined. If the clutch is triggered again within this time, a NOK error is generated. In this way, screws are detected that are already tightened.




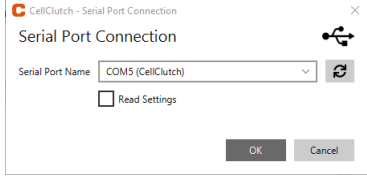





If no gear ratio is programmed, no data can be saved on the tool. In this case, a warning message is displayed after connection and the tool must be sent to a *Sales & Service Center*, see reverse.


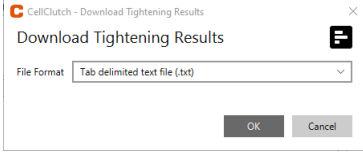

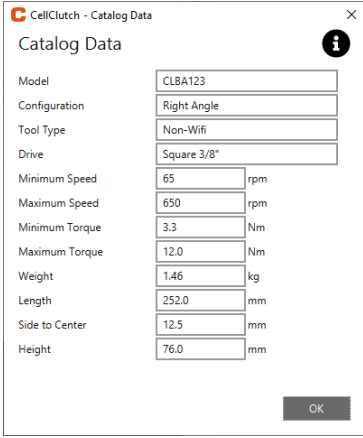

3.2.4 Tool Actions


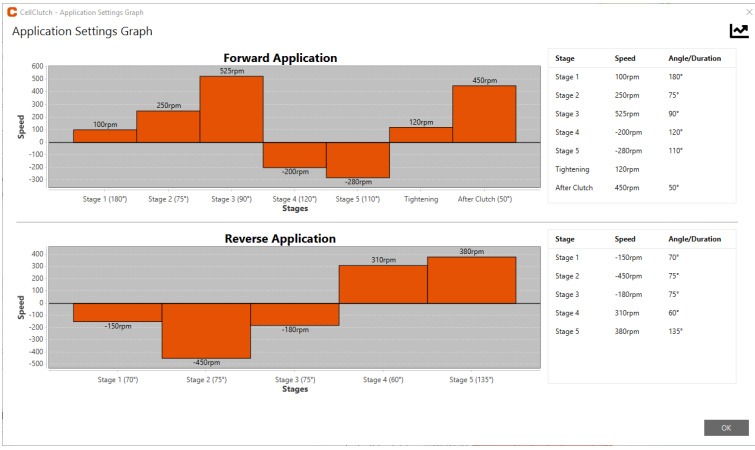
In the *Tool Actions* area, a connection can be established, and data exchanged between the PC software and the tool.



Fig. 3-5: Tool Actions

Parameter	Description
	<p>Establish a connection between the PC software and the tool via a serial interface.</p>  <p><i>Fig. 3-6: Serial Port Connection</i></p> <ul style="list-style-type: none"> • Port: All connected tools of the CellClutch series are displayed in the drop-down menu. Select the COM port of the tool. • Read Settings: If the check box is activated, the settings of the tool are automatically displayed in the user interface after a connection has been established. If the check box is deactivated, the current settings of the user interface is retained.
	Reestablish the connection. If there is no connection at the moment, the last existing connection will be re-established.
	Tool is disconnected.
	Reads the settings out from the connected tool and displayed in the PC software.
	Writes the settings of the user interface to the connected tool.
	Firmware update see <i>chapter 3.4 Performing A Firmware Update, page 15.</i>

Parameter	Description
	<p>Download tightening results from the tool. The tightening results are saved as a *.txt, *.csv or *.xlsx file. Once downloaded, results are deleted from the tool.</p> <p>Select a file format, press <OK> and select a location.</p> <div data-bbox="560 353 1437 533" style="border: 1px solid black; padding: 5px;">  </div> <p><i>Fig. 3-7: Download Tightening Results</i></p>
	<p>Display of the technical data of the tool.</p> <div data-bbox="560 674 1437 1133" style="border: 1px solid black; padding: 5px;">  </div> <p><i>Fig. 3-8: Catalog Data</i></p>
	<p>Display of the maintenance information of the tool.</p> <ul style="list-style-type: none"> • Service Date: Date of the last maintenance. • Total Number of Tightenings: The number increases as soon as the start trigger is pressed. • Total Number of Clutch Activations: The number increases as soon as the clutch is released. • Number of Tightenings at Last Service: Number of rundowns at the last maintenance. • Number of Services: Number of times the tool has been serviced. • Service Warning (Tightening Count): Number of rundowns after which the maintenance note for the next maintenance should be displayed. • Calibration Warning (Clutch Activations): Number of rundowns after which the warning message for the next calibration of the clutch should be displayed.

Parameter	Description
	<p>Graphic display of the tightening stages parameterized in the Forward and Reverse Application Settings. The bars represent the speed per step. The steps and condition are shown below the bars. All parameters are listed in the table next to the graphic.</p>  <p>Fig. 3-9: Application Settings Graph</p>

3.2.5 Application Settings

Up to seven stages can be programmed in the *Forward Application Settings* and *Reverse Application Settings* for a tightening sequence.

Stages 1 to 5 are used to pre-tighten the screw. They can be activated as required. The *Tightening Stage* triggers the clutch and is always set in the *Forward Application Settings*. In the case that the tool is jammed, the *After Clutch Stage* can be used to remove the tool from the screw without loosening it. In the *Reverse Application Settings*, at least one stage must be activated. Stage 1 is activated by default but can be deactivated as soon as at least one other stage is activated.




Fig. 3-10: Example Stage 1

The pre-tightening stages 1 to 5 and the After Clutch Stage

Parameter	Description
Stage	The check box offers the possibility to activate or deactivate the stages individually. If a stage is deactivated, the setting options are hidden.
Rotation	Set the tool rotation of the step.
Speed	Set the speed of the stage. The adjustable range depends on the tool configuration.
Condition	Depending on the setting, the angle or duration is monitored.
Angle/Duration	Depending on the selected <i>Condition</i> , a value for the angle or the time duration can be set. If the clutch is not released within this value, the rundown is aborted.

Tightening Stage

Parameter	Description
Tightening Stage	In the <i>Forward Application Settings</i> , the Tightening Stage is always activated.
Rotation	The Tightening Stage is always performed with a forward direction of rotation.
Speed	Set the speed of the stage. The adjustable range depends on the tool configuration.
Limitation	Possibility of setting the shut-off condition. Depending on the setting, the angle or the time duration is monitored.
Angle/Duration	Depending on the selected <i>Limitation</i> , a value for the angle or the time duration can be set. If the set value is reached, the clutch is released. If the clutch is not released within this value, the rundown is aborted.

3.2.6 Menu Bar


Additional information can be displayed, and settings can be made in the menu bar.

Menu	Description
File	<ul style="list-style-type: none"> • Open...: Opens a *.ccl file. The settings parameterized in this file are displayed in the user interface. • Save as...: Save the parameterized settings in a *.ccl file. • Preferences: <ul style="list-style-type: none"> – Automatically connect on startup: If the check box is activated, an attempt is made to establish a connection to the last connected tool when the software is started. – Read settings after automatic connect: If the check box is activated, an attempt is made to read out the data after the tool has connected automatically. – Unit System: Select the unit in which the torque is displayed. • Exit: Close the software.
Edit	The options <i>Undo</i> and <i>Redo</i> allow to restore previously deleted settings.
Tool	The menu contains the same functions as the <i>Tool Actions</i> area, see <i>chapter 3.2.4 Tool Actions, page 11</i> .
Language	<p>Language selection of the user interface. When the software is started, the language set in the operating system of the PC/laptop is displayed. If the language of the operating system is not supported by the software, English is displayed.</p> <p>The software supports the following languages:</p> <ul style="list-style-type: none"> • English • German
Help	<ul style="list-style-type: none"> • Open Log Directory...: Opens the directory where all log files are stored. If the software is open, log files are saved regularly. These contain log messages that are used to analyze possible errors. Up to ten log files are saved. The oldest file is always overwritten. The file <i>cell-clutch.latest.log</i> contains current messages. • Open Latest Log File...: Opens the last saved log file. • Open Source Licenses: Overview of all open source licenses used in the software. • About: Display of additional information about the software.

3.3 Changing Settings

Changing settings and writing to the tool

1. Connect the tool to the laptop/PC via a Micro-B USB cable.
 - The connected tool is displayed in the header and in the *Product Information* area.
2. Make settings in the PC software.

- Changed settings are marked with an orange asterisk.
 - The selected options are shown in dark gray color. The options that are not selected are shown in light gray color.
3. To write the settings to the tool, select  under *Tool Actions*.
- The transfer to the tool was successful as soon as the progress bar shows 100% and all process steps have a green check mark.

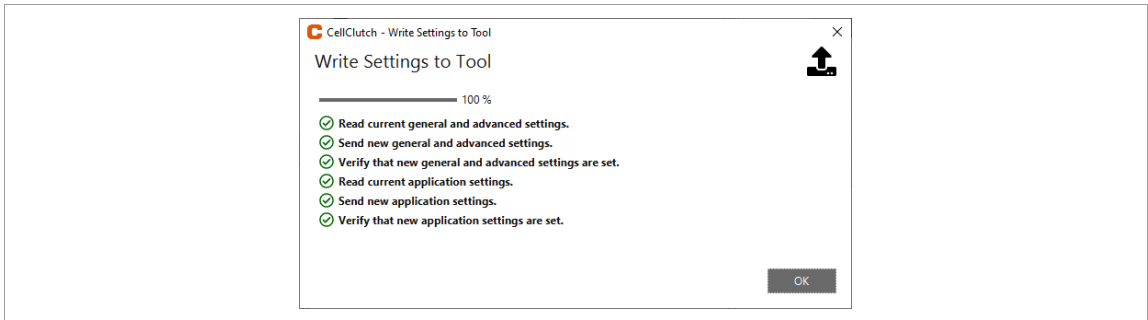



Fig. 3-11: Data transmission was successful

3.4 Performing A Firmware Update

The firmware is included in the installation package *Installer X.Y.Z* of the PC software.

Performing a firmware update on the tool

1. Press and hold the start trigger on the tool and connect it to the laptop/PC via a Micro-B USB cable.
 - The tool is then in update mode.
2. Start the *CellClutch* PC software and press .
 - The firmware update is finished when the progress bar has reached 100%.

4 Troubleshooting


4.1 Error codes

The code indicates the shut-off cause in the result file. The error messages are displayed in the PC software.

Code	Error message	Possible cause	Measure
100	Error during initialization of the hardware or the parameter.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
101	Checksum of the parameter in RAM or EEPROM is invalid.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
102	The stack has overflowed.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
103	The software has reached an unexpected condition.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
104	A general calculation error has occurred.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
105	The type coding of the hardware is unknown.	Internal error.	▶ Contact a <i>Sales & Service Center</i> .
150	An overrun in the receive buffer has occurred.	Communication is disrupted. When communicating with the tool, the data was sent too fast and cannot be processed.	▶ Check USB port.
200	Power stage temperature too high (>80°C).	Tool temperature is too high.	▶ Allow the tool to cool down. The current rundown can be terminated, but a new one cannot be started.
201	Power stage temperature too low (<-10°C).	Tool temperature is too low.	▶ Warm the tool up. The current rundown can be terminated, but a new one cannot be started.
202	Power stage temperature critically high (>60°C).	Tool temperature is too high.	▶ Allow the tool to cool down. The current rundown can be terminated, but a new one cannot be started.
210	Motor temperature too high (above parametrized level, default 80°C).	Tool temperature is too high.	▶ Allow the tool to cool down. The current rundown can be terminated, but a new one cannot be started.
211	Motor temperature too low (below parametrized level, default -10°C).	Tool temperature is too low.	▶ Warm the tool up. The current rundown can be terminated, but a new one cannot be started.
212	Motor temperature critically high (10°C below error level).	Tool temperature is too high.	▶ Allow the tool to cool down. The current rundown can be terminated, but a new one cannot be started.
250	I ² t of servo is at 100% (current is limited to nominal current).	The cycle rate of the rundown is too high.	▶ Make a longer break between rundowns.
252	I ² t of servo is at 80%.	The cycle rate of the rundown is too high.	▶ Make a longer break between rundowns.


Code	Error message	Possible cause	Measure
260	I ² t of motor is at 100% (current is limited to nominal current)	The cycle rate of the rundown is too high.	▶ Make a longer break between rundowns.
262	I ² t of motor is at 80%.	The cycle rate of the rundown is too high.	▶ Make a longer break between rundowns.
332	Undervoltage, Overtemperature, Logic Fault (Hall sensors).	Motor is defective.	▶ Send the tool to a <i>Sales & Service Center</i> for repair.
		Encoder is defective.	
350	Battery overvoltage (>22.25V).	Battery is defective.	▶ Change battery.
351	Battery undervoltage (below parametrized level).	Battery is not fully charged.	▶ Use a fully charged battery.
352	Warning battery undervoltage.	Battery is not fully charged.	▶ Use a fully charged battery.
360	Short circuit error.	Motor is defective.	▶ Send the tool to a <i>Sales & Service Center</i> for repair.
		Short circuit in the cable between two phases or between phase and shield.	
		Insulation of the motor phase connections.	
		Servo is defective.	
361	Current offset error.	Error in the calibration of the current measurement.	▶ Send the tool to a <i>Sales & Service Center</i> for repair.
410	The motor did not stop within the expected time.	Motor is defective.	▶ Send the tool to a <i>Sales & Service Center</i> for repair.
		Encoder is defective.	
490	The parameterized current overload was reached.	Tool is incorrectly dimensioned.	▶ Send the tool to a <i>Sales & Service Center</i> for repair.
491	Motor speed has dropped from 4000rpm to below 3500rpm.	Battery is not fully charged.	▶ Use a fully charged battery.
600	Another run started within a short time.	The start trigger was pressed again too quickly.	▶ Increase the interval between rundowns. ▶ At <i>Restart Delay</i> reduce the minimum time between rundowns.
610	Time too short until clutch activates.	An attempt was made to re-tighten a tightened screw.	▶ Check rundown.
		The torque for tightening a screw was exceeded too early.	▶ Check rundown.
		The programmed time for the double hit protection is too long.	▶ Bei <i>Double Hit Protection</i> reduce the minimum time for the new release of the clutch.

4.2 Tool

Problem	Possible causes	Measure
Tool does not start	No speed (RPM) programmed.	► Program speed for all active stages.
	Tool temperature is too high.	► Cool down the tool.
	Battery voltage is too low.	► Change battery.
Tool not recognized.	Software is incorrect.	► Check <i>CellClutch</i> laptop/PC software.
	Connection to laptop/PC is not available.	► Check USB cable. ► Check PC driver.
	Tool is defective.	► Change tool.
Tool starts in tightening direction, but not in counterclockwise rotation.	No speed programmed for counterclockwise rotation.	► Program the counterclockwise rotation: In the <i>CellClutch</i> PC software, set the <i>Rotation to Reverse</i> in the <i>Forward and Reverse Application Settings</i> and parameterize the <i>Speed</i> .
		 If <i>Forward</i> is selected for <i>Enabled Direction</i> , the counterclockwise rotation of the reverse switch has no function.
Tool does not start with counterclockwise rotation activated.	With counterclockwise rotation, parameter for Speed is 0 rpm.	► Program the speed for counterclockwise rotation: In the <i>CellClutch</i> PC software, set the <i>Speed and Rotation</i> in the <i>Forward and Reverse Application Settings</i> .
Tool shuts off prematurely.	Operator releases start trigger before the controller stops the tool.	► Make sure that the operator keeps the start trigger pressed throughout the entire sequence.
	The fastening time exceeds the standard time of 10 seconds.	► Increase the fastening time.
	Tool exceeds the angle setpoint.	► Check the fastening sequence to ensure that the torque shutoff value and/or angle setpoint are correct. Adjust as necessary. ► Check whether the fastening joint has changed significantly.
Tool does not change speed.	Speed is the same in all stages.	► Make sure that the speed in the stages is correct.
Status/work light is disabled.	Disabled by parameter settings.	► Parameterize the work light: In the <i>CellClutch</i> PC software, select <i>Bright</i> or <i>Dim</i> for <i>Work Light</i> . ► Parameterize the status light: In the <i>CellClutch</i> PC software, select <i>Bright</i> or <i>Dim</i> for <i>Status Light</i> .
No-load speed not reached.	Battery voltage is too low.	► Use a fully charged battery.
Expected number of test rundowns is not achieved with one charge of the battery.	Battery is not fully charged.	► Use a fully charged battery.
	High torque is needed during a fastening sequence, e.g. for coated fastenings.	If a high torque is needed for a longer period, e.g. for several turns, the number of rundowns that can be achieved with one battery charge will be significantly reduced.
	Battery is at end of life.	After 800 charging cycles, the capacity is reduced to approx. 60%. ► Use new battery.

Problem	Possible causes	Measure
Status light flashes, see <i>chapter Status Indication, page 9</i> .	Encoder is defective.	▶ Press start switch. If the status light continues to flash, send the tool to a <i>Sales & Service Center</i> for repair.
	Tool temperature is too high.	▶ Allow the tool to cool down. The current rundown can be terminated, but a new one cannot be started.
	Battery voltage is too low.	▶ Change battery.
	Warning that the next maintenance is due.	▶ Send the tool to a <i>Sales & Service Center</i> for maintenance.

4.3 Software

Problem	Possible cause	Measure
Firmware Update does not start. The message <i>0 Device(s) found. Plug your DFU Device!</i> is displayed.	Tool is not in Firmware Update mode.	▶ Disconnect tool from USB port and hold the start trigger while reconnecting it.
Although the tool is connected via USB, the PC software does not offer to connect to it.	USB drivers are not installed.	▶ Run the installation file again and select the USB driver installation.
	Tool is in the update mode.	▶ Disconnect tool from USB port and do not hold the start trigger while reconnecting it.
Connection to tool lost when connected via USB.	Invalid response from tool.	1. Disconnect the USB connection and reconnect the tool. 2. Press  .
	Data packets lost.	▶ Change the USB cable.
Tool settings cannot be written to tool.	At least one speed value of a stage is out of range.	▶ Check speed values.
	Gear ratio is not set on tool.	▶ Send the tool to a <i>Sales & Service Center</i> , see reverse.
Tool settings cannot be read from tool.	Gear ratio is not set on tool.	▶ Send the tool to a <i>Sales & Service Center</i> , see reverse.
In the <i>Product Information</i> area, <i>Not available</i> is displayed.	No model number is stored on the tool.	▶ Send the tool to a <i>Sales & Service Center</i> , see reverse.
	No serial number is stored on the tool.	

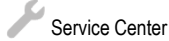
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