

**Instruction Manual**  
**AH2088UM/EN**  
2015-01

# Cleco®

**PRW-0015...PRW-1200**  
**I-Wrench**



For additional product information visit our website at <http://www.apextoolgroup.com>

# For this Instruction Manual

This Instruction Manual is the original one and is intended for all persons who operate and configure settings on a LiveWire I-Wrench, and configure communication settings on the mPro400GC controller.

The 'Original User Manual' is written in English. Every translation, i.e. every language other than English is a 'Translation of Original User Manual'.

The Instruction Manual

- provides important notes for safe and effective use.
- describes the function and operation of the cordless LiveWire I-Wrench.
- provides connection and operation information on the use of the mPro400GC controller when communicating to the LiveWire I-Wrench.
- serves as a reference work for technical data, service intervals and spare part orders.
- provides information on options.

For more detailed information on the operation of the LiveWire I-Wrench connected to a mPro400GC controller, refer to:

- User Manual PL12EN-1001\_mPro400GC\_User Manual.pdf
- User Guide AH2080UG mPro400GC Global Controller\_ EZ-Explorer.pdf

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Symbols in the text	
→	Identifies instructions to be followed.
•	Identifies lists.
<i>Italics</i>	Indicates menu items such as <i>Main Menu Screen</i>
>	A > between two names indicates the selection of an item from the menu, e. g. <i>file &gt; print</i>
<b>Courier</b>	Indicates input fields within the menu, such as checkboxes, radio buttons or drop-down menus
<...>	Identifies elements that have to be pushed, such as push buttons or functional keys, i.e. <F5>

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# 1 Safety

## 1.1 Warnings and notes

Warning notes 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.

**WARNING!** Indicates a potentially **hazardous** situation, which, if not avoided, could result in serious injury.



**CAUTION!** Indicates a potentially **hazardous** situation, which, if not avoided, may result in minor or moderate injury or property and environmental damage. If this warning is not observed, injuries, property or environmental damage may occur.



**Class 2 laser product**

Class 2 laser scanners use a laser diode that produces a low-power visible light beam that is comparable to a very bright source of light, such as the sun.

→ Do not look into the laser beam when the laser is on. Doing so can cause damage to the eyes



**General notes**

Includes application tips and useful information, but no hazard warnings.

## 1.2 Basic requirements for safe working practices

You should read all instructions. Non-observance of the instructions below may result in electrical shock, burns and serious injuries:

**CAUTION!**



**Work area**

- Ensure there is enough space in the work area.
- Keep the work area clean.

**Electrical safety**

- Protect the I-Wrench from rain and moisture. Use only in the inner zone (IP40).
- Follow the safety instructions printed on the battery pack and charger.
- Use I Wrench only with power supply (PS) by Cleco.
- Do not open the battery pack.

**Safety of persons**

- Ensure a secure standing position. Maintain balance.
- Make sure that the PS is securely installed before operating the I Wrench.
- Do not look into the laser beam of tools with built-in barcode scanners.
- Follow generally valid and local safety and accident prevention rules.

**Safe working with and around fastening tools**

- Inspect sockets and bits for visible damage and cracks. Replace damaged sockets and bits immediately.
- Only use sockets and bits for machine-controlled fastening tools.
- Only use sockets and bits from Cleco - Apex.
- Make sure that the sockets are properly seated on the head.

## 1.3 Operator training

- All operators must be trained and experienced before operating the I-Wrench.
- The I-Wrench may be repaired by authorized technicians only.

## 1.4 Personal protective equipment

When working with the tool

**CAUTION!** Danger of injury by spurting metal splinters:



- Wear the protective goggles to protect.

## 1.5 Designated use

The I-Wrench is designed exclusively for tightening and loosening threaded fasteners. The communication with the mPro400GC controller is supported only over the following interface ports:

Types	Communications
All	WLAN Standard IEEE 802.11a/b/g WEP, WPA(2), LEAP, PEAP (WiFi)
	WPAN Standard IEEE 802.15.4 (Bluetooth)

- Do not open it or modify it structurally.
- Only use with accessory parts which are approved by the manufacturer
- Do not use the I-Wrench as a hammer or as a leverage device

## 1.6 Codes and standards

It is mandatory that national, state and local codes and standards be followed.

### 1.6.1 FCC conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### 1.6.2 Canada conformity

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 1.7 CE- Declaration

Advanced Tightening Solutions for Quality Control &amp; Production

**EU/UE  
DECLARATION DE CONFORMITE  
DICHIARAZIONE DI CONFORMITA  
DECLARATION OF CONFORMITY  
KONFORMITÄTSERKLÄRUNG**

**■** Nous  
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Wir  
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declare under our sole responsibility that the product

**Clé dynamométrique électronique I-Wrench  
Chiave dinamométrica elettronica I-Wrench  
Elektronischer Drehmomentschlüssel I-Wrench  
Electronic Torque Wrench I-Wrench**

**Cleco** 

**I-Wrench WiFi**



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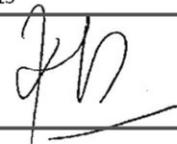
**EN 61326-1: 2006  
EN 301 489-1 V.1.9.2 - EN 301 489-17 V.2.1.1  
EN 62311:2008  
EN61010:2010  
EN 300 328 V1.7.1 - EN 301 893 V1.5.1**

Conformément aux disposition de(s) Directive(s),  
Secondo le disposizioni della(e) normativa(e) **2004/108/EC**  
Gemäss den Bestimmungen der Richtlinie(n),  
Following the provisions of Directive(s),

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**Montbéliard, le 30/04/2013**

**Samuel KNORST**



Siège social: Parc d'Activités des Courts Cantons, 6 Rue Gaston Pretot - 25200 - MONTBELIARD (France)

Tél: +33.03.81.95.41.88. Web: www.scsconcept.eu

SAS au Capital de 135.000 € Siret 483265062 00057 APE 2651B RCS BELFORT 483265062 TVA N° FR24483265062

Fig. 1: CE-Erklärung

## 2 Scope of supply, transport and storage

### 2.1 Items supplied

Check shipment for transit damage and ensure that all items have been supplied:

- I-Wrench
- Battery
- Tool handle end cap for battery
- USB cable
- USB stick; contains this user manual, SQnetFTA software, Calibration Certificate
- Calibration Certificate (paper print)
- 1 Tool and Display Rubber Protective Cover
- 1 Head / Socket Recognition (optional)



*Fig. 2: Items supplied*

### 2.2 Transport

Transport or store the I-Wrench in the original packaging. The packaging is recyclable. In addition to the original cardboard shipping container, there is an optional industrial Aluminum Storage case for the I-Wrench. (Refer to Section 18).

## 2.3 Storage

For short-term storage and for protection against damage:

→ Place the I-Wrench in the tool holder.

For storage longer than 100 hours:

→ Remove the battery from the I-Wrench.

The battery is discharged by the electronics integrated in the tool. For long term storage, the battery should have a partial charge between 30% and 50%.

Object	Temperature	Relative humidity
I-Wrench	-13 °F to +104 °F (-25 °C to +40 °C)	10 to 90 percent (Non-Condensing)
Battery	-4 °F to +77 °F (-20 °C to +25 °C) 59 °F (15 °C) is ideal	20 to 85 percent (Non-Condensing)

## 3 Product description

The I-Wrench is a true all-around production tool to meet flexible manufacturing requirements. It is the perfect tool for advanced threaded tightening's. It is suitable for production line applications, supporting both torque and angle fastening strategies.

The patented measuring system for angle of fastener rotation measurement, the color display with touch screen and the large memory of 1 GB make the Cleco LiveWire I-Wrench the most flexible and versatile wireless torque I-Wrench available on the market.

I-Wrench is an electronic hand-operated torque / angle Wrench designed for fastening control and high accuracy tightening applications on many types of assembly lines. The I-Wrench can analyze joints displaying torque / angle graphs. With I-Wrench, it is possible to observe a graph and data directly from the on-tool-display for each fastening rundown. In addition, statistical data can be viewed displaying major statistical values.

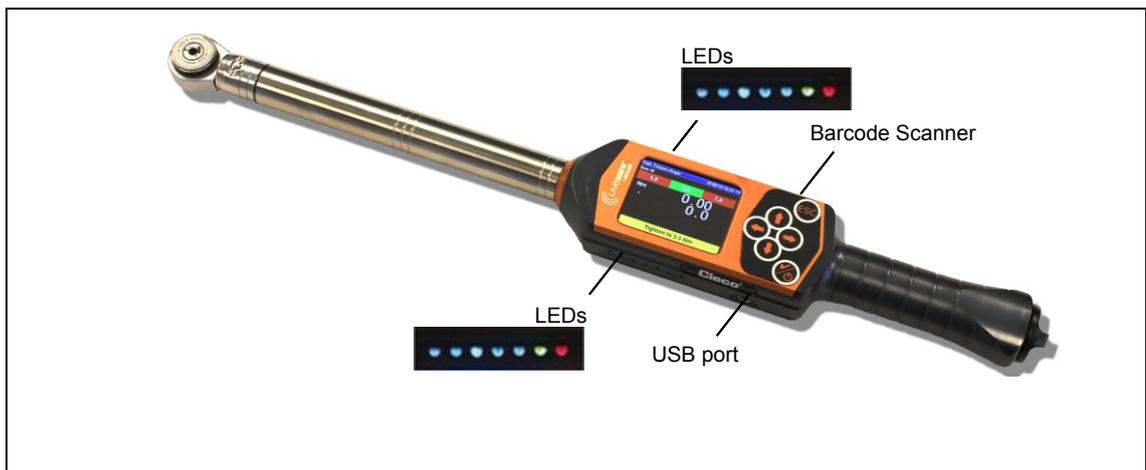


Fig. 3: I-Wrench

### 3.1 Operation and functional elements



Fig. 4: Activate Barcode scanner

#### Power up

- Place the I-Wrench on a solid surface.
- Hold  down for 2 seconds, then let go.



Do not move the I-Wrench while the power up cycles. The power up will take less than 40 seconds, and during that time the internal gyroscope will be self-calibrating. The LED's on both sides of the I-Wrench will flash. During the 40 seconds, avoid any physical movement of the tool.

- At the conclusion of the power up, press <ESC> once or twice.  
Once or twice depends on the present application programming of the tool and the state of battery charge level. The LCD display will then display the *Main Menu Screen*.

#### Power down

- Make sure the display is displaying the *Main Menu Screen*.

With Apex GC mode:

- De-select the application at the mPro400GC controller to allow the I-Wrench to return to the *Main Menu Screen*. A de-select of the application cannot occur at the I-Wrench.
- Press <ESC> several times to return the LCD display to the *Main Menu Screen*.
- Hold down  for 4 seconds. When the LCD display goes to black, let go.



For maintenance of the tool, it is acceptable to remove the battery for 4 seconds, and then replace it. This will not damage the tool, and will not have any effect on the I-Wrench programming. The battery temporary removal will force an immediate power down. This is not a recommended usual procedure for power down, but can be used under special circumstances.

### 3.1.1 Display

#### Main Menu Screen

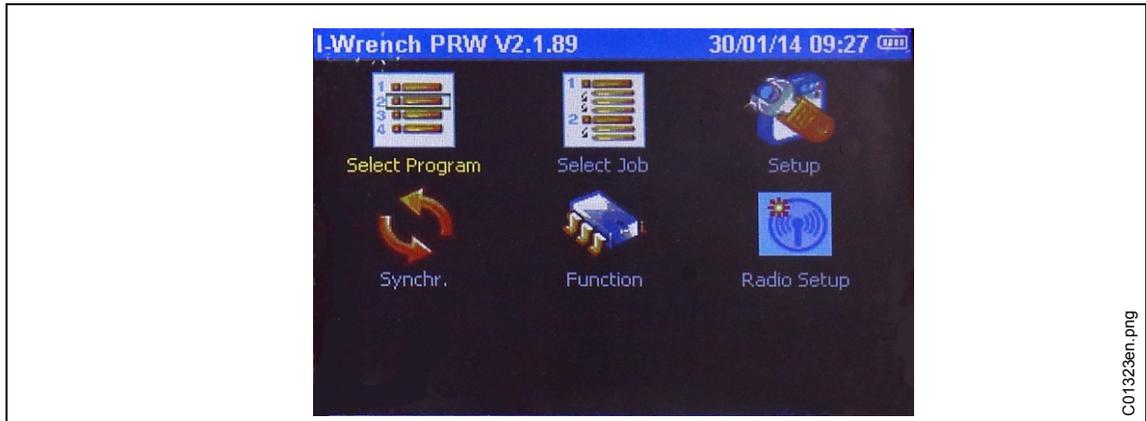


Fig. 5

Display	Description
I-Wrench PRW	I-Wrench running production firmware
V2.x.xx	I-Wrench firmware version number
*	An Asterisk which indicates a Wi-Fi connection to the Cleco controller exists
T1	Head /Socket recognition number
05/08/13	Day / Month / Year
10:00	Time of Day Hour : Minute
	Battery charge state

#### Fastening results

The following illustration shows the I-Wrench display results screen following a production rundown. The same information is available at the mPro400GC controller by viewing the *Run Screen*. The controller is responsible for rundown statistics and OK / NOK data.

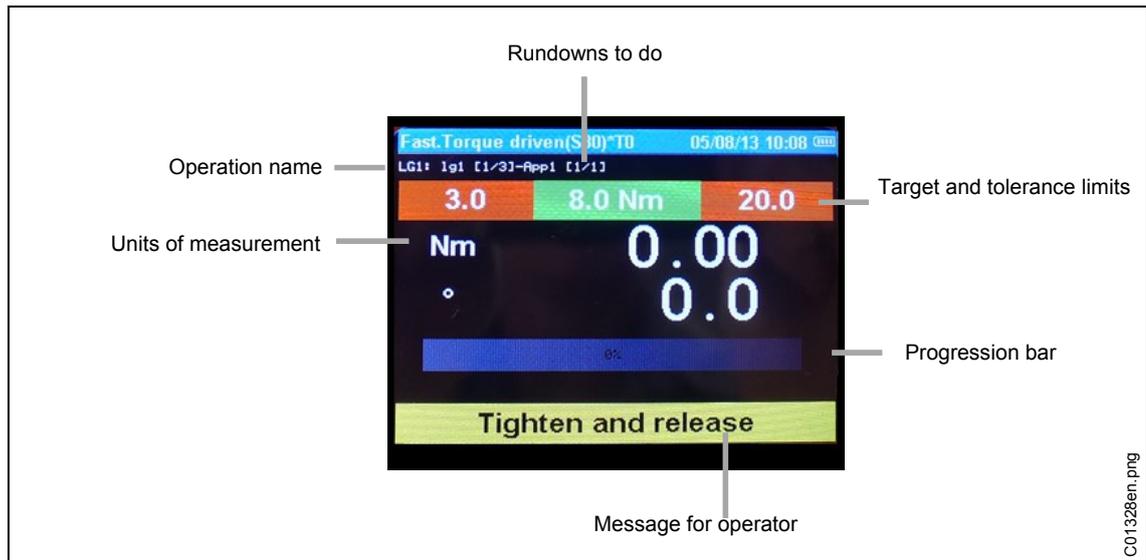


Fig. 6: Results screen

### 3.1.2 LED Display Lights

On each side of the I-Wrench are a group of 7 LED lights which provide Operator Guidance. In addition, there is an internal Buzzer and Vibration Alert for the operator. Within the group of 7 LED's are 5 Blue LED's which provide a progression of increasing illumination to alert the operator when approaching and reaching the target torque value. The two remaining LED's indicate Red for notification of NOK (fail) and Green for notification of OK (pass) results. Refer to the following illustration for LED locations.

The five blue LED lights provide a "chase light" effect. A chase light is a string of adjacent lights which cycle on and off frequently to provide an illusion of lights moving along the string. Each of the five LED's lights turns on when a specific percentage of target value (Torque or Angle) has been achieved.

The default settings for each LED turn-on percent of target achieved is:

- 30% for LED 1
- 50% for LED 2
- 70% for LED 3
- 90% for LED 4
- 98% for LED 5

These are percent of target achieved default values. For special applications, the percentage trip point can be custom modified by an external software connection. The application software is SQnet+ which is run on an external PC. SQnet+ is primarily used to provide external connectivity to the I-Wrench in Stand-alone mode when there is no connection to the mPro400GC controller. Each fastening program application can be programmed with a different target achieved percentage.

At 100% or greater of target achievement, the green LED will illuminate for OK, or the red LED will illuminate for NOK.

### 3.1.3 USB Connection

The mating cable requires a USB mini-B connector. The port is located on the left side of the I-Wrench. Refer to Fig. 3: I-Wrench.

The USB port is used for several requirements:

- Connection of the I-Wrench to a PC running SQnet+ for Stand-alone mode.
- Backup of the I-Wrench configuration settings
- Data backup

- Establishing an audit route in Stand-alone mode
- Installation of I-Wrench firmware updates.

### 3.1.4 **Barcode scanner**

The barcode scanner can be programmed to read a Part ID (part identification) alpha-numeric code, and append the Part ID to the fastening rundown data. This capability is an Error Proofing method which assures that the fastening data and accept/reject information is permanently associated with the correct part via the Part ID.

This capability of appending the Part ID code is available in both Stand-alone mode and APEX GC mode.

## 4 Before initial operation

### 4.1 Charging

---

**CAUTION!**

Risk of injury.

By unsafe handling with the battery.

- Use batteries only for their intended use.
  - Do not crush the battery.
  - Do not heat up or burn.
  - Do not short circuit.
  - Do not open.
  - Use only recommended Cleco charger.
- 

**WARNING!**

Risk of injury

Failure to observe the instructions below may result in electric shock, fire and serious injuries.

- Cradle/external battery charger is intended exclusively for charging the I-Wrench internal battery.
  - Do not open the cradle/external battery charger or modify it structurally.
  - Operate cradle/external battery charger in dry, enclosed rooms only and protect cradle from moisture and rain.
  - Never operate the cradle/external battery charger under unsuitable ambient conditions (e.g. where combustible gases, solvents, dust, vapors or moisture is present).
  - Do not operate the cradle/external battery charger if the housing or power plug are damaged.
  - Do not use cradle/external battery charger with damaged LiveWire I-Wrench.
- 

- Charge battery fully. It is only partly charged when delivered.

There are 3 different ways:

#### 4.1.1 Charging with the cradle

- Plug the cradle into a source of 110 to 240 VAC
- Place the I-Wrench in the cradle and assure the tool is pushed into the cradle connector.

The tool cradle provides battery recharging and a secure tool rest when the I-Wrench is not in use. The cradle contains an internal battery charger. Re-charging the tool battery will take approximately 4 hours depending on the discharged level of battery condition.

#### 4.1.2 Charging with an external battery charger

- Plug the battery into the charger.
- Plug the charger into a source of 110 to 240 VAC.

Re-charging the tool battery will take approximately 4 hours depending on the discharged level of battery condition.

#### 4.1.3 Charging with a Mini-B USB cable

- Connect the tool Mini-B USB cable directly into the tool.
- Plug the other end of the cable into a USB power source derived from a third party 110 VAC / USB power adapter as shown below.



Fig. 7: Mini-B USB-cable (figure shows an US power adapter)

**CAUTION!**



Risk of injury from electrical shock.

A defective tool cable parts may result in an electric shock and causes life-threatening injuries and burns  
 → Do not touch defective tool cables and arrange to have these replaced immediately by a trained and authorized technical specialist.

## 5 Application modes

There are two individual application modes associated with the I-Wrench: the APEX GC mode and the Stand-alone mode.

### 5.1 APEX GC mode

APEX GC mode operates in conjunction with the mPro400GC controller Master or Primary model. The communication connection between the mPro400GC controller and the I-Wrench is via Wi-Fi or Bluetooth.

**Advantages of communication to the mPro400GC controller**

- Links the I Wrench rundown data to a choice of communication protocols used by the assembly plant. In the case of a Chrysler Assembly Plant, this adds the additional functionality of communication to the PFCS (Plant Floor Communication System).
- Links the I Wrench rundown data to additional plant communication protocols in addition to Statistics and Storage available for fastening rundown data.

### 5.2 Stand-alone mode

The Stand-alone mode operates in conjunction with a laptop computer running a software application named **SQnet+**. The communication connection between the laptop computer running **SQnet+** and the I-Wrench is via USB.

The I-Wrench can be used for production assembly applications with no online connections of either cable or Wi-Fi. The I-Wrench is a completely portable, independent tool.

**Advantages of using the I-Wrench in Stand-alone mode:**

- The I-Wrench can be used in areas (or outdoor parking lot) where Wi-Fi or LAN connection is not yet available.
- Fastening curve graphics can be collected for each fastening rundown.
- The I-Wrench has internal memory for retaining up to 5,000 fastening rundown results.
- The I-Wrench can be preprogrammed with up to 1000 fastening applications.

# 6 APEX GC mode: Communication setup

This description refers to mPro400GC software S168813 ≥ V1.4.0

## 6.1 Overview

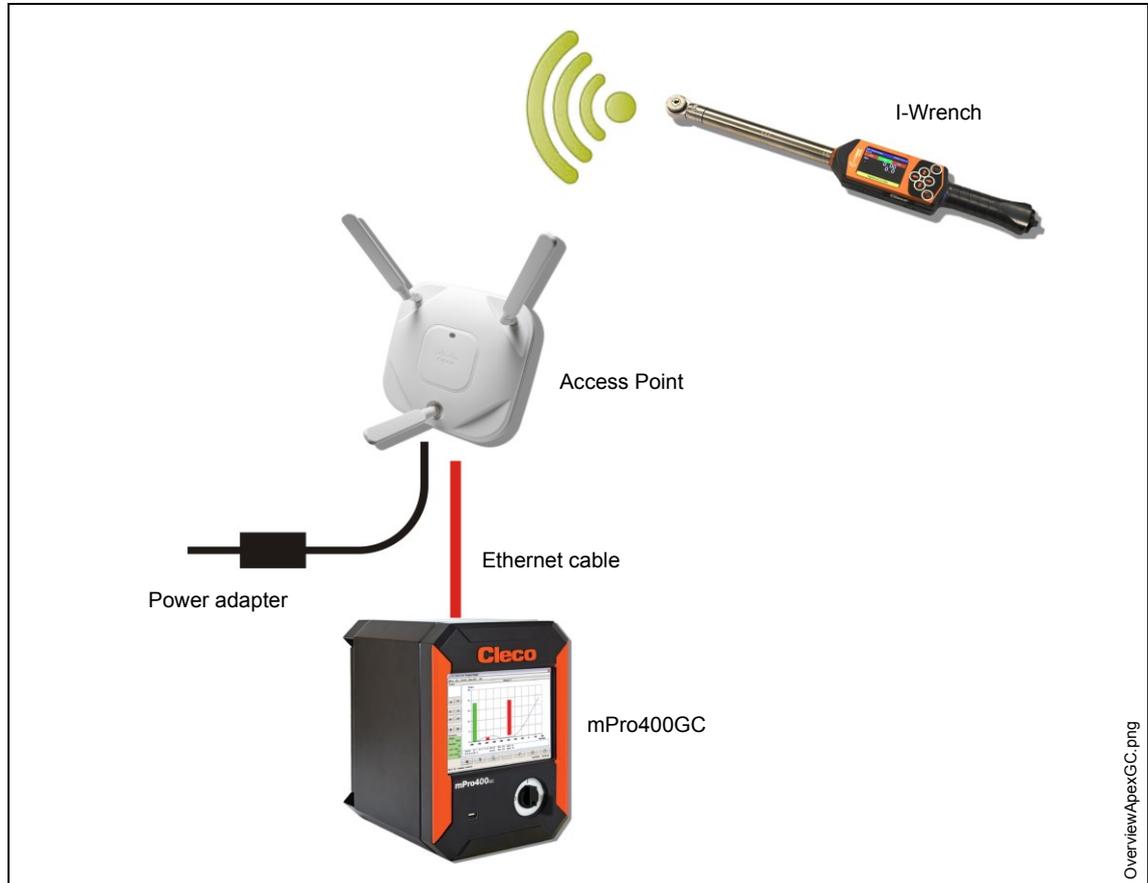


Fig. 8: Data communication between the I-Wrench and mPro400GC

This description refers to the simplest connection: using an access point (AP) connected to the mPro400GC controller over an Ethernet cable. The connection to the I-Wrench is Wi-Fi.

Set Access Point, internal antennas Order no. 961600PT	Set Access Point, external antennas Order no. 961601PT
<ul style="list-style-type: none"> <li>• Access Point configuration with ATG default parameters</li> <li>• Power Supply</li> <li>• Ethernet Patch Cable</li> </ul>	<ul style="list-style-type: none"> <li>• Access Point configuration with ATG default parameters</li> <li>• Power Supply</li> <li>• Ethernet Patch Cable</li> </ul>

## 6.2 Setup on I-Wrench

The following steps are detailed instructions for programming the I-Wrench to communicate via Wi-Fi. This is a required initial step to communicate a fastening rundown from the I-Wrench to the mPro400GC controller.

### 6.2.1 Configure Apex GC mode

- If using a Rubber Protective Cover, remove clear acrylic cover (protects the LCD display).
- Power up the I Wrench.
- Following boot-up, press <ESC>.
- Press on *Main Menu Screen* > *Setup* > *Setup*
- Enter Password: **1247** and press <OK>.
- Using the touch slide bar on the right, or the  on the keypad. Select **Wrench ID**.  
It should be unique to each tool configured per controller.
- Select the keyboard icon on the bottom right.
- Enter the last 4 digits of the tool Serial Number. This becomes the Wrench ID number. (Preceding zeros are not displayed).
- Press <OK>.
- **Set version: Apex GC**
- Verify if following parameters are enabled:
  - **Must work online**
  - **Has Radio**
  - **Radio Type: WiFi**
- Press <Confirm>.
- Restart I-Wrench.

### 6.2.2 Configure Wi-Fi settings

- Press on *Main Menu Screen* > *Radio Setup*.
- Enter Password: **7421**.
- When connecting a Wi-Fi I-Wrench directly to a plant Network and not directly to a mPro400GC controller, configure the wireless settings in accordance with the plant network settings. (In Bluetooth model tools, select the master to which the connection is being made.):

Feature	Setting
<b>Wrench ID</b>	→ Type the last 4 characters of the serial number. 0 will not be displayed.
<b>Oper. Mode</b>	→ Select <b>Managed</b> .
<b>MAC Address</b>	→ Hardware address of the I-Wrench (Read only)
<b>Build AdHoc</b>	→ Select if communication is without Access Point.
<b>WiFi SSID</b>	→ Type the SSID name presently used on the Access Point.
<b>Reg. Domain</b>	→ Assign <ul style="list-style-type: none"> <li>• 2.4 GHz or 5GHz</li> <li>• 2.4GHz + 5GHz</li> </ul>

Feature	Setting
<b>WiFi Channel</b>	→ Assign <ul style="list-style-type: none"> <li>• 0 for default roam</li> <li>• 1 to 12 for 2.4 GHz</li> <li>• 36 to 44 for 5 GHz</li> <li>• 150 to 160 for Uniband II</li> </ul>
<b>WiFi Authentication</b>	→ Select <ul style="list-style-type: none"> <li>• WPA/WPA2 PSK</li> <li>• LEAP</li> <li>• PEAP</li> </ul>
<b>WiFi Encryption</b>	→ Select <ul style="list-style-type: none"> <li>• WEP64</li> <li>• WEP128</li> <li>• TKIP</li> <li>• AES/CCMP</li> </ul>
<b>WiFi Key</b>	→ Enter the key name presently used on the Access Point.
<b>WEP Key num</b>	→ Enter the key number presently used on the Access Point.
<b>WiFi DHCP</b>	→ Leave the <b>WiFi DHCP</b> box unchecked.
<b>WiFi Ip</b>	→ The IP address of the I-Wrench must be in the same IP family (first 9 characters) as the controller. However the last 3 characters must be unique.
<b>WiFi Mask</b>	→ The usual WiFi mask IP is <b>255 . 255 . 255 . 0</b>
<b>WiFi Gateway</b>	→ Do not leave the gateway setting blank. At a minimum enter the first 9 characters of the I-Wrench IP family and 001 as the last entry characters. (It will register as a 1).
<b>User Name</b>	→ Type user name for login at WLAN WPA Enterprise.
<b>WiFi Host</b>	→ Enter the IP address of the mPro400GC controller presently used.
<b>DNS Suffix</b>	→ Enter DNS Suffix, if required.
<b>Wi-Fi Local Port</b>	→ Enter <b>23</b>
<b>Wi-Fi Remote Port</b>	→ Enter <b>3456</b>
<b>Wi-Fi Init Mode</b>	→ Enter <b>Always</b>
<b>Use UDP</b>	→ Select to avoid TCP overhead and to reduce WLAN traffic (not used).
<b>TCP Keepalive Period</b>	→ Select to detect connection loss automatically.
<b>Radio USB bridge</b>	→ Select to connect directly to the ConnectBlue WLAN module (Firmware update).

## 6.3 Setup on mPro400GC controller

### 6.3.1 Adjusting network

- Connect Access Point with the controller via Ethernet cable. Connect Ethernet cable on port X1 or X2.
- Switch-on Access Point.

Following entries are necessary (exemplary inputs):

#### Local network (Access-Point is connected to the controller)

Device	Static IP address	SSID	Subnet mask
Tool 1	192.168.0.1	Station 6	255.255.255.0
Tool 2	192.168.0.2	Station 6	
Controller	192.168.0.110		
Access-Point	192.168.0.50	Station 6	

#### Existing network, depending on the actual infrastructure

Device	IP address	SSID	Subnet mask	Std. Gateway
Tool 1	10.122.77.101	Hall 6		
Tool 2	10.122.77.102	Hall 6		
Controller	10.122.77.110		255.255.255.0	10.122.77.1

- Enter IP address on the controller (exemplary here on Ethernet port 2)

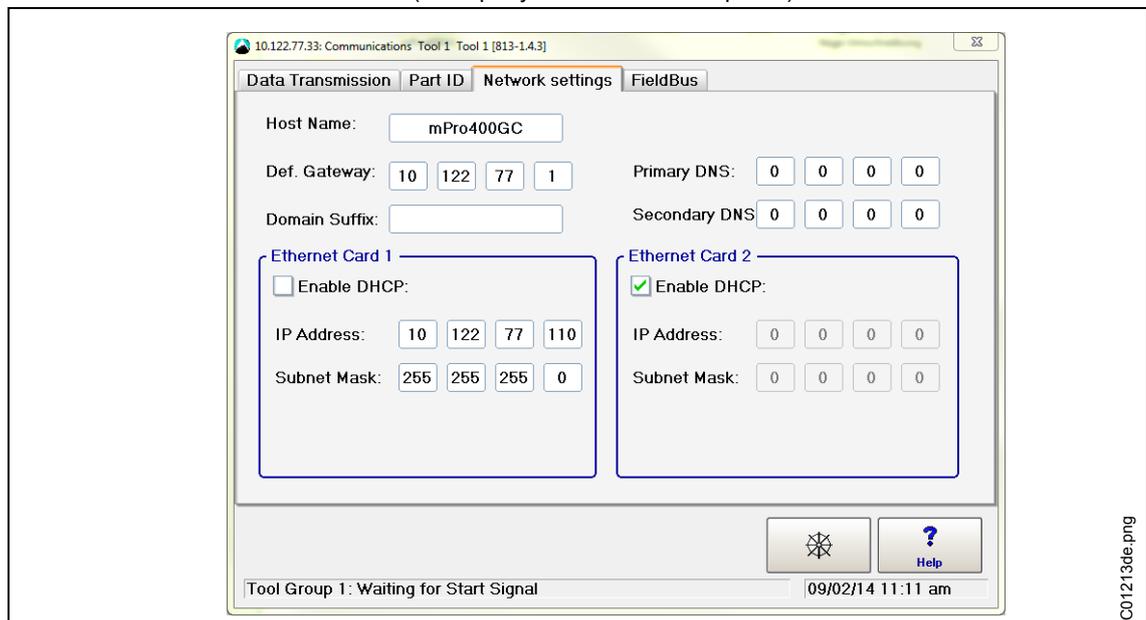


Fig. 9: Network settings (existing network)

- Select *Navigator > Communications > Network settings*.
- Remove the check from **Enable DHCP**.
- Enter **IP Address**, **Subnet Mask** for the controller.
- Enter **Std. Gateway**, if necessary.
- Press <Navigator> and save settings with <Accept>.  
*Navigator Menu* is displayed.

→ Restart controller.

### 6.3.2 Install I-Wrench

→ Select *Navigator > Tool Setup*.

→ Mark the next free line by touching it.

→ Press <+ Install> and select from the drop down list **Type: LiveWire I-Wrench**.

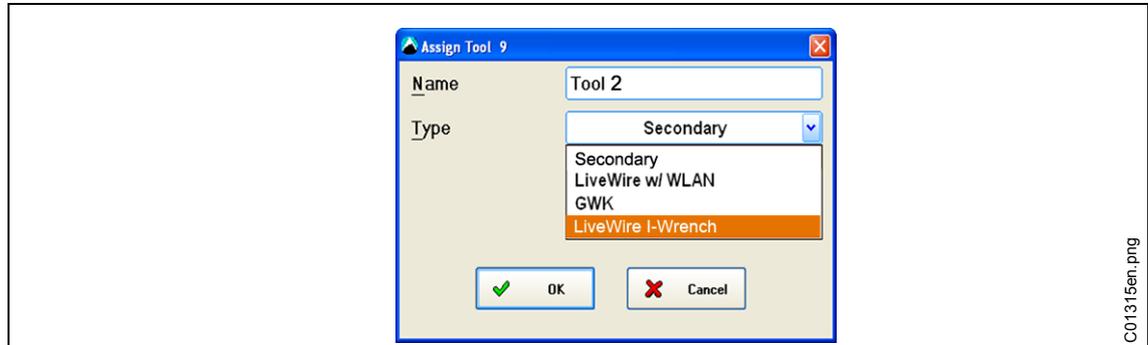


Fig. 10

→ Enter the **Wrench ID** and the **Connection Type** and click on <OK>.

Each mPro400GC controller only supports a single type of connection: WiFi or Bluetooth on COM1/COM2. This option is made non selectable after the first I Wrench has been installed. COM1 or COM2 is based on which serial line the Bluetooth Wireless adapter has been connected within the controller.

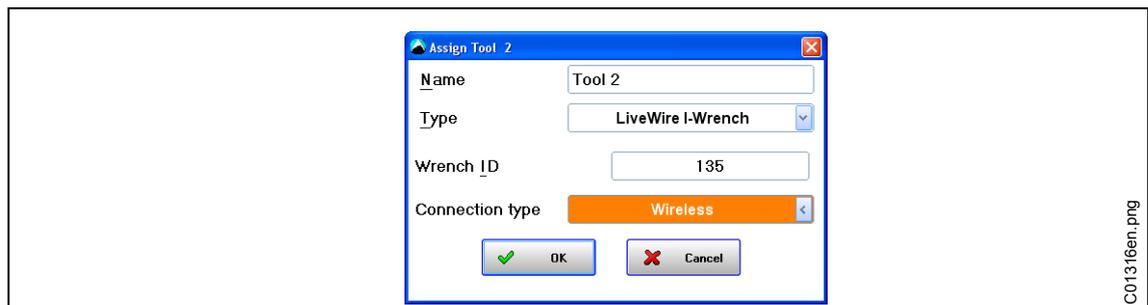


Fig. 11

→ View the I-Wrench *Main Menu Screen* on the upper title banner:

If there is a Wi-Fi connection to the controller, an asterisk “ \* ” is displayed.

→ Status of the tool is **Needs User Acceptance**. Press <Tool Settings>.

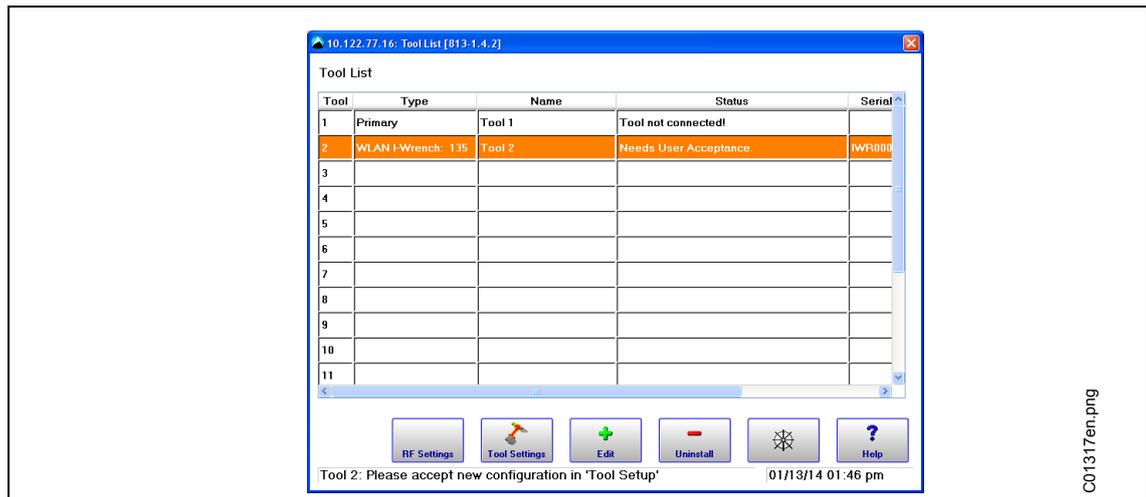


Fig. 12

→ Verify **Model Number**, **Serial number** and check that the displayed tool corresponds to the connected tool.

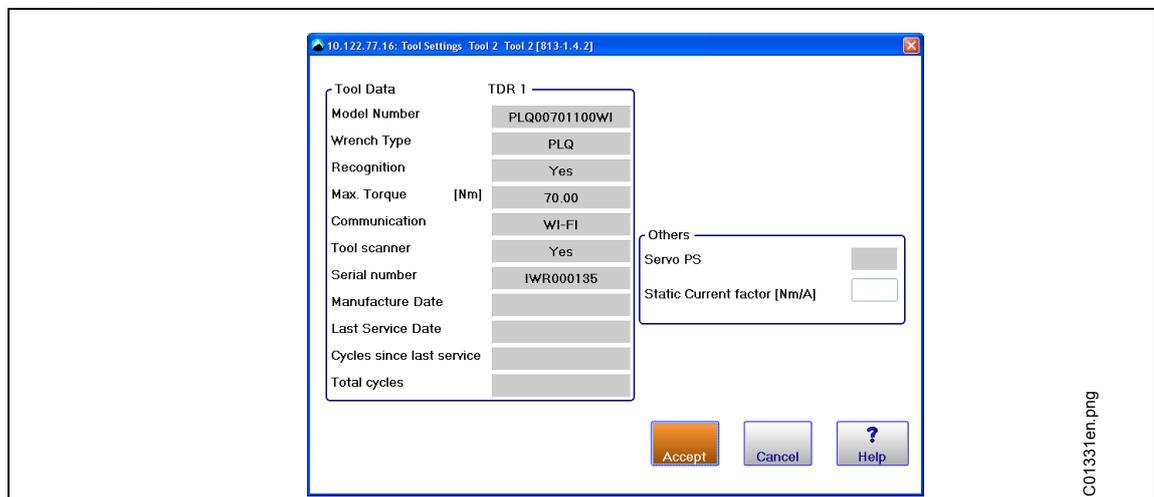


Fig. 13

→ If correct, click 2× <Accept> to store. The tool list is displayed. Status of the tool is now **Online**.  
 → Press <Navigator>.

### 6.3.3 Programming a simple fastening strategy

→ Select *Navigator > Standard*. The *Standard Application Builder* is displayed.  
 → Select *Tool Group > Tool Group 2*.  
 → Select *Settings > Fastening program*.  
 → Press <Deactivated> next to <Stage 1>. It will turn in <Activated>

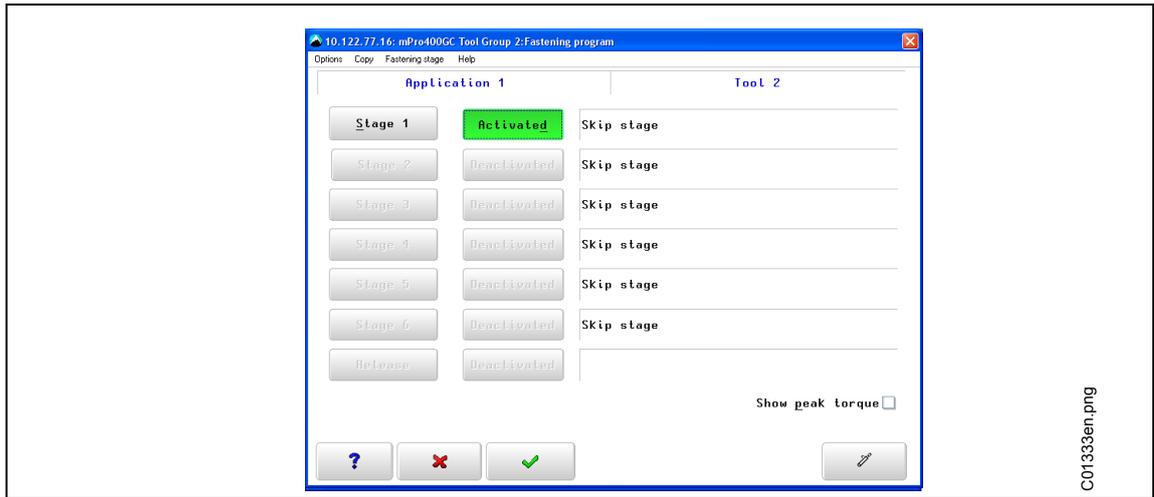


Fig. 14: Stage Activated

- Press <Stage 1>, than <Sequences>.
- Select the requested strategy **SEQ 30** or **SEQ 50**. The parameter can be adjusted manually.

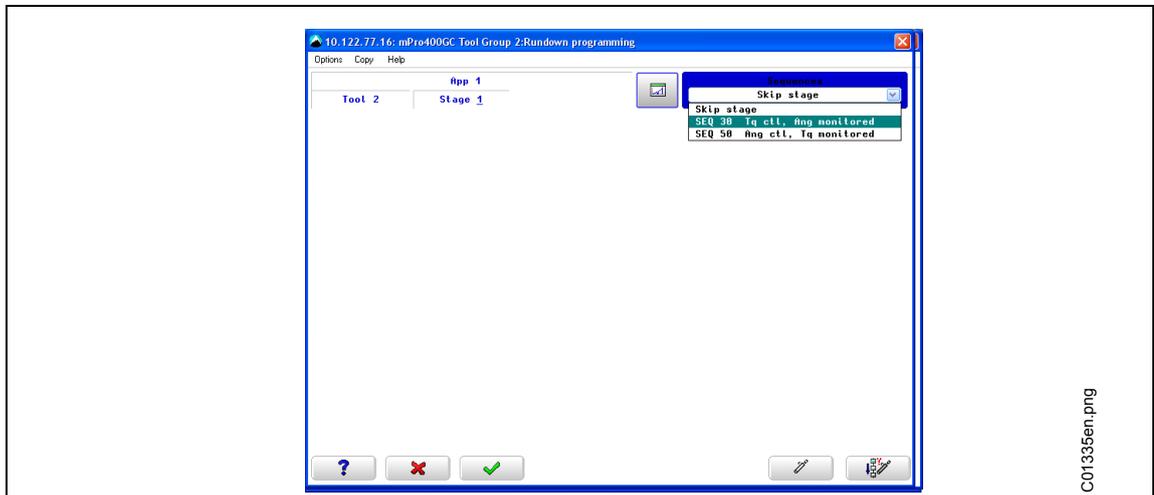


Fig. 15

## 6.4 Setup barcode-scanner on I-Wrench

- Switch on the I-Wrench
- Following boot-up, press <ESC>.
- Press on the *Main Menu Screen* > *Setup* > *Setup*.
- Type in **1247** when requested to enter a password.
- Press <Ok>.
- Scroll to *Input VIN* on the upper half of the screen. Touch the text or use **↑****↓** on the keypad.
- Select **No VIN** on the lower half of the screen.

Feature	Setting
<b>No VIN</b>	Used for APEX GC mode
<b>VIN after select</b>	Used for Stand-alone Mode. Do not select these option
<b>VIN before select</b>	Used for Stand-alone Mode. Do not select these option
<b>VIN after sel.offl.</b>	Used for Stand-alone Mode. Do not select these option

Feature	Setting
2VIN before select	Used for Stand-alone Mode. Do not select these option

→ Activate following parameter. The check mark must be set.

- **Barcode Use**

→ Check if the following parameter is necessary:

- **Confirm scanned string**

→ To save the selection, press  on the keypad.

## 6.5 Setup barcode scanner on mPro400GC controller

→ Select *Navigator Menu > Communications > Part ID*

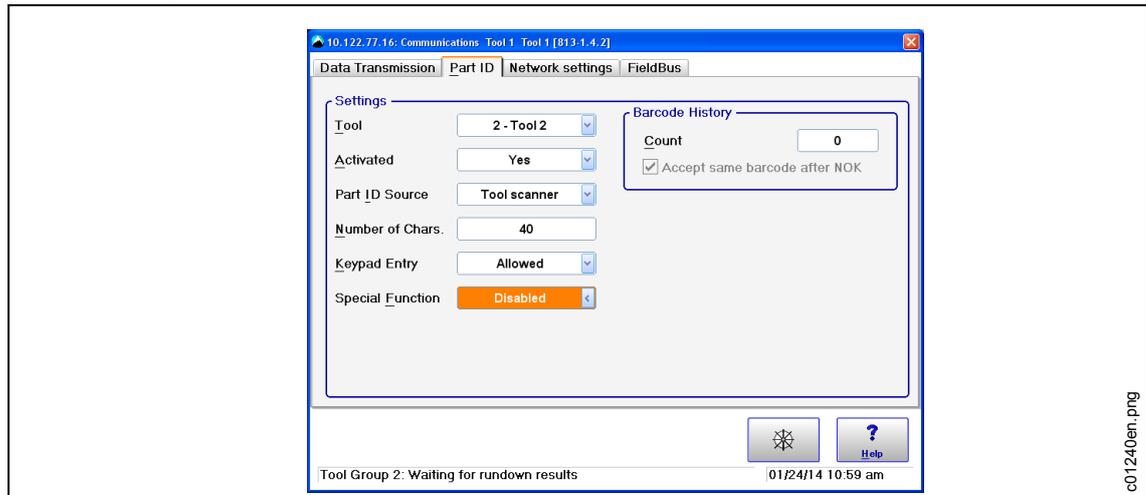


Fig. 16: Part ID

→ Choose the following settings

- **Tool:** requested tool
- **Activated:** Yes
- **Part ID Source:** Tool scanner
- **Number of Chars.:** 0 (or as appropriate)



“0” is a default character and means that the MPro400GC controller will accept all lengths up to 40 characters.

- **Keypad Entry:** Allowed (if manual entry is required)
- **Barcode History:** Number of different barcodes till you are allowed to scan the same barcode again.
- **Accept same barcode after NOK**
- **Special Function:** Disabled

→ Save settings with <Navigator>.

## 6.6 Setup to select fastening application/Linking group

→ Select *Navigator Menu > Advanced > Tool Settings*

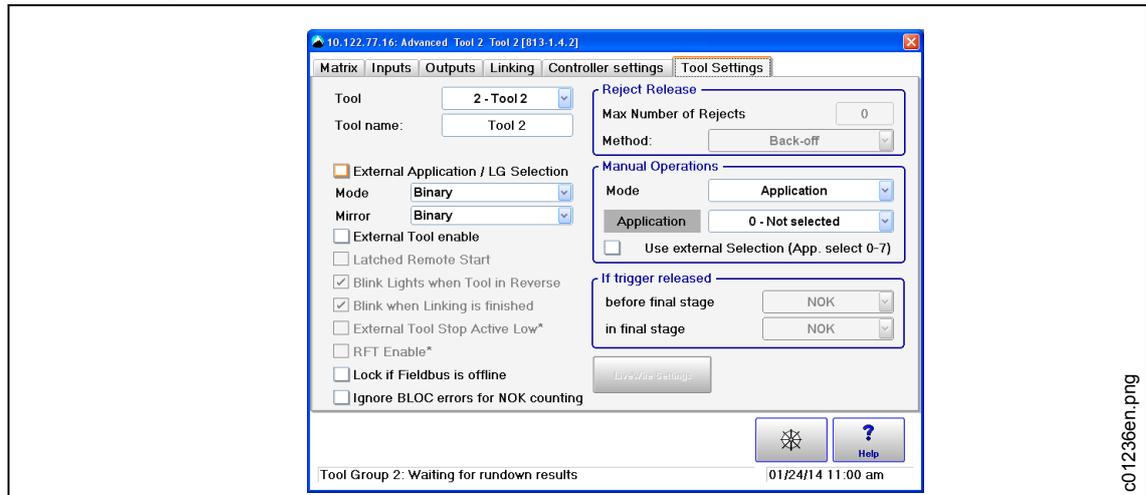


Fig. 17: Tool Settings

→ Remove the check from **External Application/LG Selection**

→ Save settings with <Navigator> and <Accept>.

→ Select *Navigator Menu > Communications > Part ID*

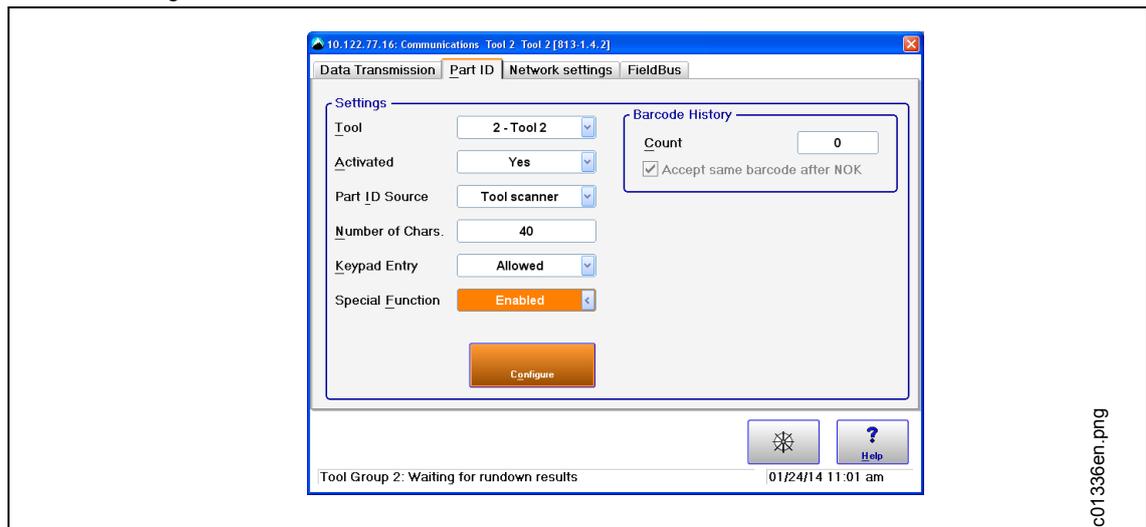


Fig. 18: Part ID

→ Choose the following settings

- **Tool:** requested tool
- **Activated:**
  - Yes, Interlocked:** Every tightening will require a barcode scan.
  - Yes:** Part ID will remain the same until the barcode has been scanned with a new Part ID.
- **Part ID Source:** Tool scanner
- **Number of Chars:** a specific number of characters (as appropriate to the Part ID code)
- **Keypad Entry:** Allowed
- **Special Function:** Enabled

→ Press the new displayed button <Configure>

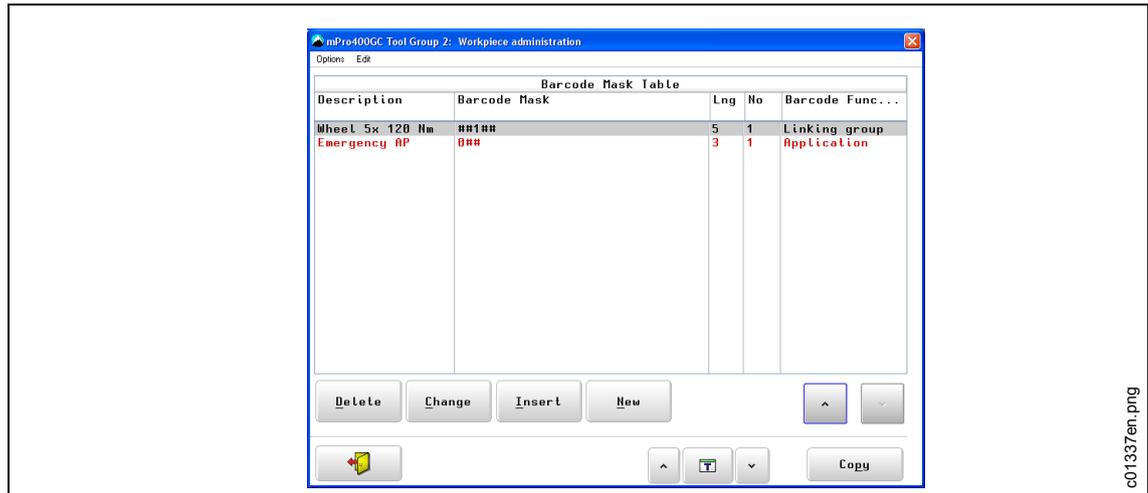


Fig. 19: Part ID

- Select with <^> a cell in the table. It is marked red.
- Use  or the arrows beside to select the fastening group. The data of the work piece administration are group oriented.
- Use <Copy> from the currently selected fastening group to the desired fastening group.
- Use <Delete>, <Change>, <Insert> and <New> to add or change items in the work piece table.

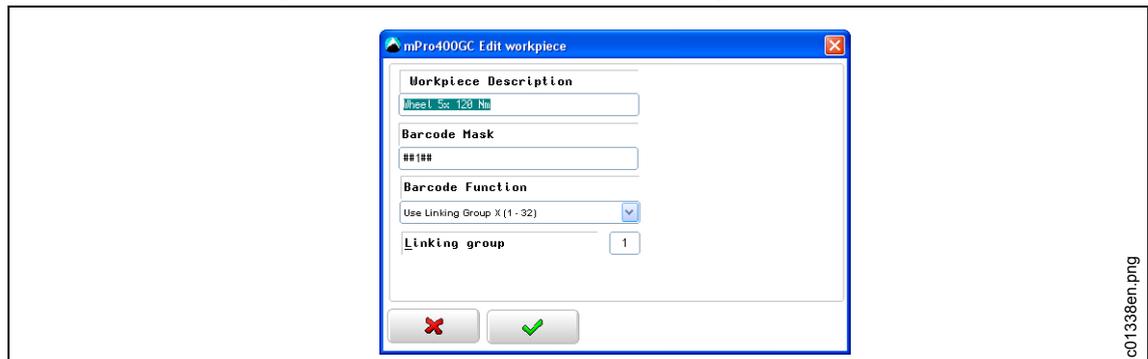


Fig. 20: Part ID

- Enter the following settings
  - **Workpiece Description:** This description is irrelevant for the joint and do not appear in the rundown results.
  - **Barcode Mask:** Determines the fastening program in relation to the barcode. Barcode masks consist of an alphanumeric string and wildcards # (# = ignore this character). The string will be compared with the incoming work piece number. If a number matches, the associated fastening program will be enabled.
  - **Barcode function:** a special function for the Barcode Mask.  
Choose between **Use LinkingGroup**, **Use Application**, **Enable** and **Disallowed** to enable or disallow Application /Linking group or tool.
- Save settings with <Navigator>.

## 7 Stand-alone mode: Communication setup

### 7.1 Overview

Use SQnet+ to program fastening applications off line and download them to the I-Wrench or read the fastening application rundown data out of the I-Wrench memory and upload them back to SQnet+.

When programming SQnet+, it is possible to reproduce part, or all assembly line stations into a “Tree Structure”. This will support the ability to link every location to a specific fastening application. Once the tree structure is built, the user can create a list of applications (tightening strategies) which can be downloaded to the I-Wrench.

SQnet+ can also be programmed to create a specific sequence which the I-Wrench operator must follow. A sequence consists of a group of applications; however this requires a definition of several important terms which are related specifically to Stand-alone mode.

Term	Description
<b>Application</b>	This refers to an “umbrella program” of fastening strategies (or fastening sequences, or fastening algorithms) from the beginning of the fastening cycle to the end of the fastening cycle. The “umbrella” is usually referred to as a fastening “process”
<b>Linking Group</b>	This term refers to running a single application multiple times.
<b>Batch Processing</b>	This term refers to running multiple applications of a single process
<b>Job</b>	Job is another term for Linking Group. Job is the name used by the I-Wrench and Linking Group is the name used by the mPr400GC controller.

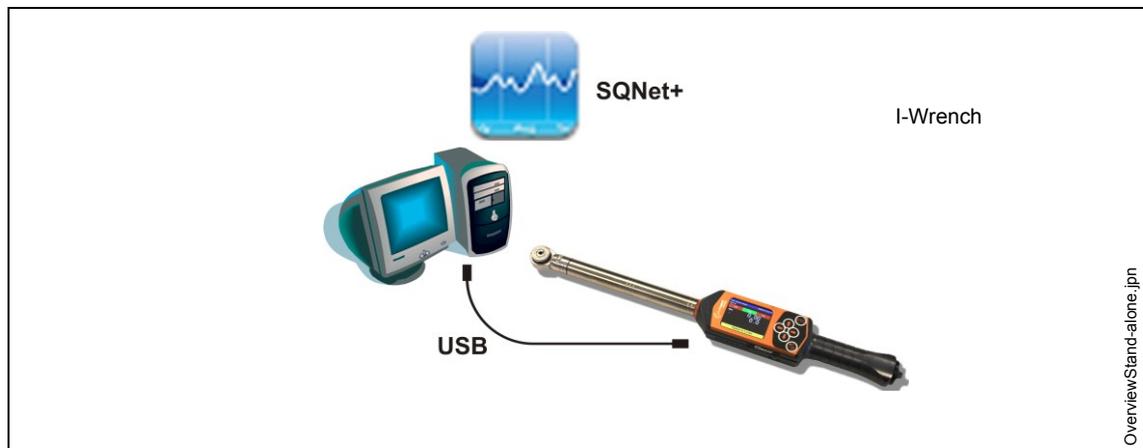


Fig. 21: Data communication between the I-Wrench and SQnet+

For the Stand-alone mode a separate software program named SQnet+ running on an external PC is required. The minimum requirement for the PC which runs the SQnet+ application is:

- CPU: Pentium 2 or later
- Available Hard Disk Space: 100 MB
- RAM: 128 MB
- Operating System: MS Windows XP or later

Connection for up-/download data between the I-Wrench and the PC is a USB cable connection.

For working with the I-Wrench in Stand-alone mode the following procedures have to be done:

1. Build a Tree Structure with necessary locations in SQnet+
2. Edit a Fastening Application to a Location
3. Send the Fastening Application from SQnet+ to the I-Wrench (Build a route)
4. Send Fastening Data Results from I-Wrench to SQnet+

## 7.2 Setup on I-Wrench

### 7.2.1 Configure Stand-alone mode

- If using a Rubber Protective Cover, remove clear acrylic cover (protects the LCD display).
- Power up the I Wrench.
- Following boot-up (40 seconds), press <ESC>.
- Press on *Main Menu Screen* > *Setup* > *Setup*
- Enter Password: **1247** and press <OK>.
- **Set version: Stand alone** and confirm.
- Verify if following parameters are disabled:
  - **Must work online**
  - **Has Radio**
  - **Radio Type: None**
- Press .
- Restart I-Wrench.

## 7.3 Setup barcode-scanner on I-Wrench

- Switch on the I-Wrench
- Following boot-up, press <ESC>.
- Press on *Main Menu Screen* > *Setup* > *Setup*.
- Type in **1247** when requested to enter a password.
- Press <OK>.
- Scroll to *Input VIN* on the upper half of the screen. Touch the text or use   on the keypad.
- Select one of these options on the lower half of the screen.

Feature	Setting
<b>No VIN</b>	Used for APEX GC mode. Do not select these option
<b>VIN after select</b>	Used for Stand-alone Mode.
<b>VIN before select</b>	Used for Stand-alone Mode.
<b>VIN after sel.offl.</b>	Used for Stand-alone Mode.
<b>2VIN before select</b>	Used for Stand-alone Mode.

- Activate following parameter. The check mark must be set.
  - **Barcode Use**
- Check if the following parameters are necessary:
  - **Confirm scanned string**
- To save the selection, press  on the keypad.

## 7.4 Build a Tree Structure

- Install the software *Setup SQnet+ ... Apex.exe* following the dialogs.
- Click on the *SQnet+* icon to run the program.
- Select *Settings* icon to choose your language.
- Select the *Test Definition* icon.

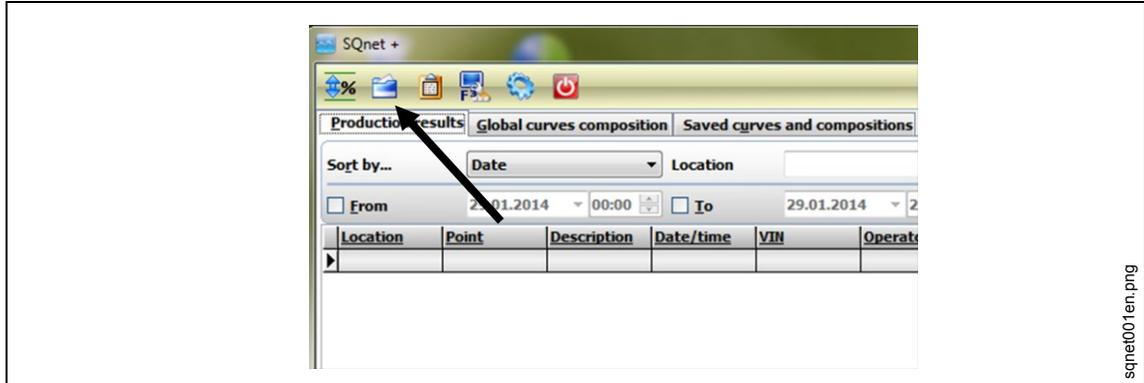


Fig. 22:

Here you can organize the work, set locations and tightening operations for every single joint. Create different levels of folder (group of locations).

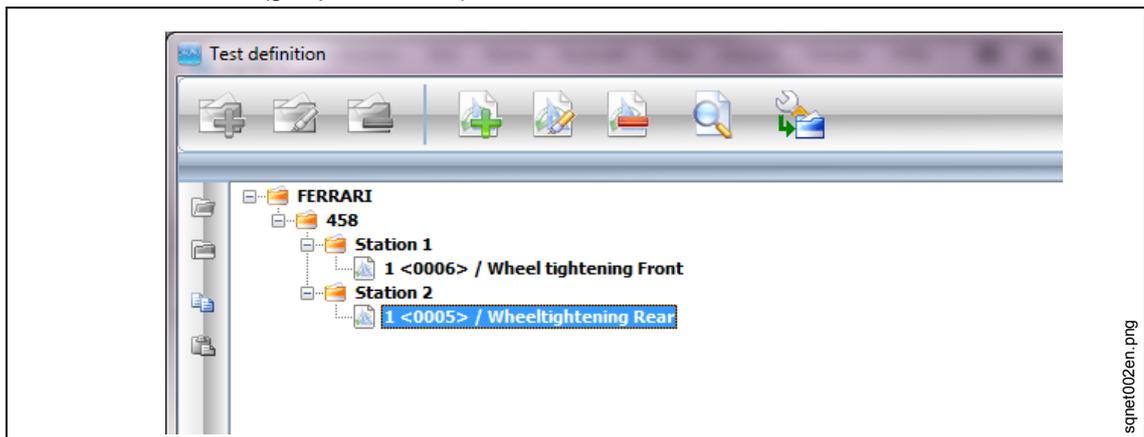


Fig. 23:

Example:

- Main folder = factory name
- Second level folder = name of the product
- Third level folders = all assembly stations where parts of the product are mounted.

This is just an example; user can organize the tree as user wants in order to optimize your work organization concerning your production line.



Location is the physical location on the assembly line where the part being fastened is located. Every location can be programmed with an **Identifier** and **Description** (**Description** will be displayed on the I-Wrench LCD screen).

Icon	Function	Icon	Funktion		
	Create new folder		Create new location		Collapse all levels
	Modify existing folder		Modifiy existing location		Expand all levels
	Delete existing folder		Delete existing location		Copy one location
			Search folder or location		Paste one location

- Create new folder as much as needed.
- Create new location.

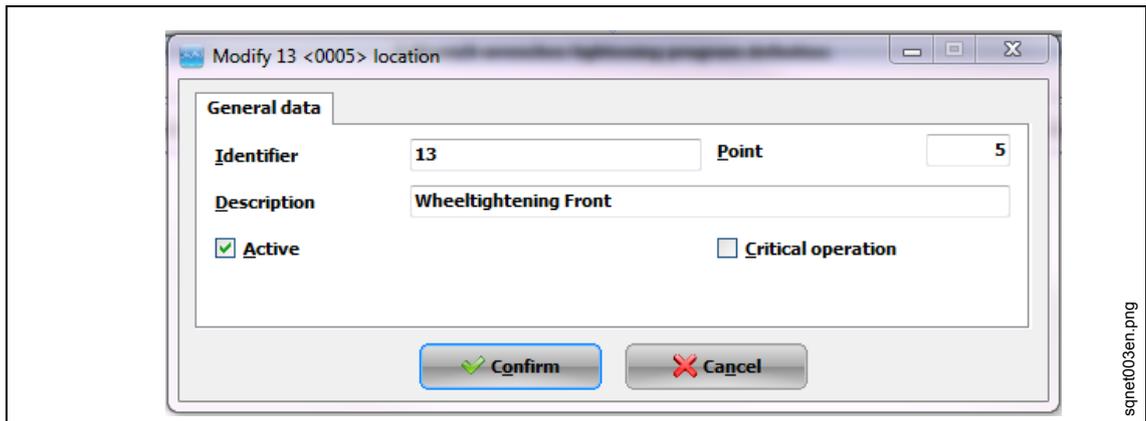


Fig. 24:

Feature	Function
<b>Identifier</b>	Location ID
<b>Point</b>	Info field for the joint location with additional rundowns of the same family. <b>Point</b> is displayed in the <i>Test definition</i> menu.
<b>Description</b>	This field is used to describe the location in order to easily identify it.
<b>Active</b>	Enable (check mark) or disable the location.
<b>Critical Operation</b>	This checkbox is for all joints where it is necessary to have a more restrictive control limits (all the safety joints in a transport vehicle, such as brake system joints)
<b>Curve download</b>	The User can choose fastening graphs for every fastening download, or only when the test result is NOK, or never. Feature of the full version. Please contact our Sales & Service Center.

## 7.5 Edit a fastening application to a location

SQnet+ can link one tightening strategy to all or multiple locations. This provides SQnet+ the ability to upload production fastening results and declaration of OK or NOK.

→ From the screen *Test Definition*, select the location (operation) which you want to link to a tightening strategy.

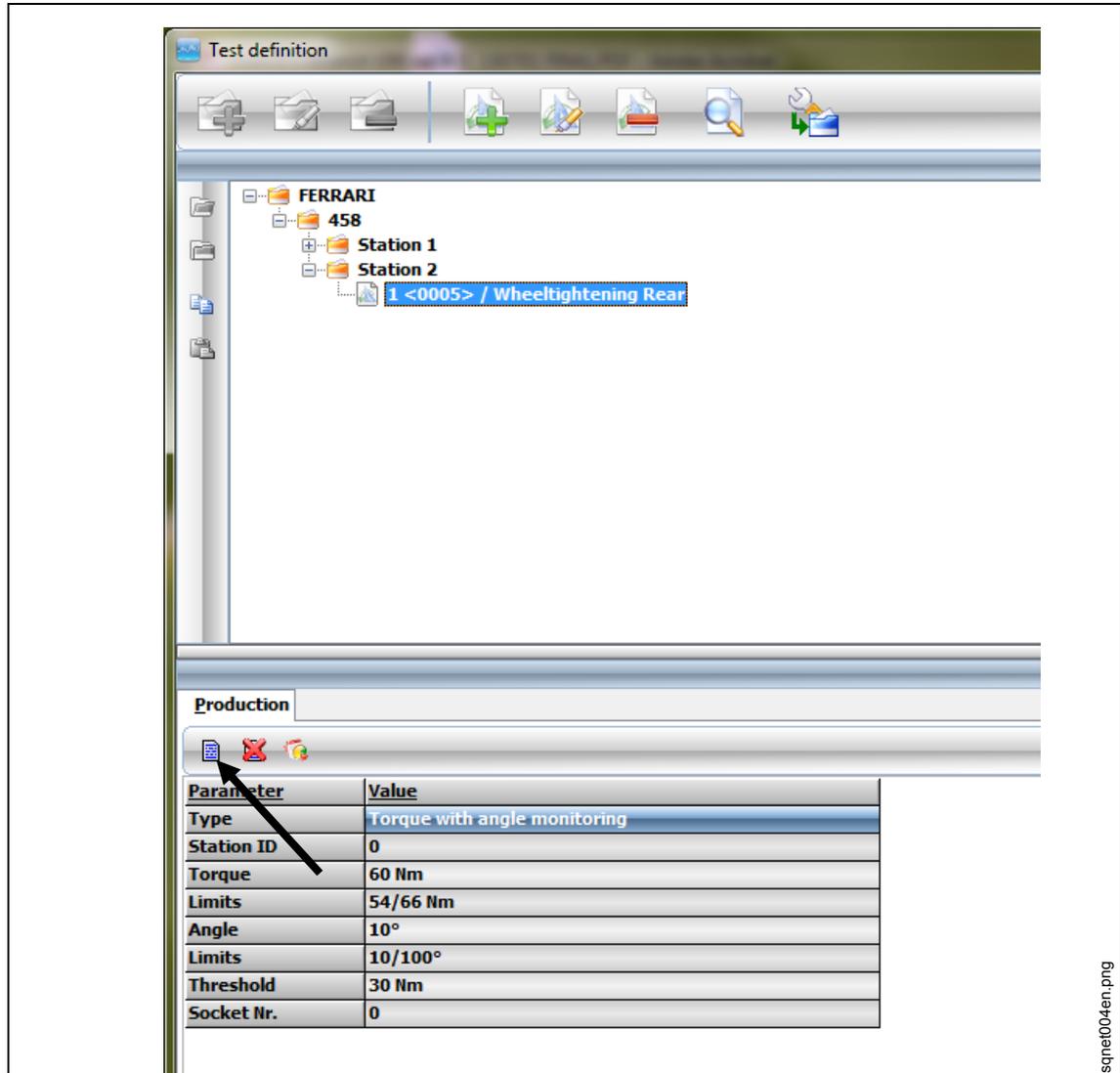


Fig. 25:

- Click on the tab *Production*
- Click on the icon *I-Wrench wrenches tightening program definition*.
- Edit the parameter and click on <Confirm>.

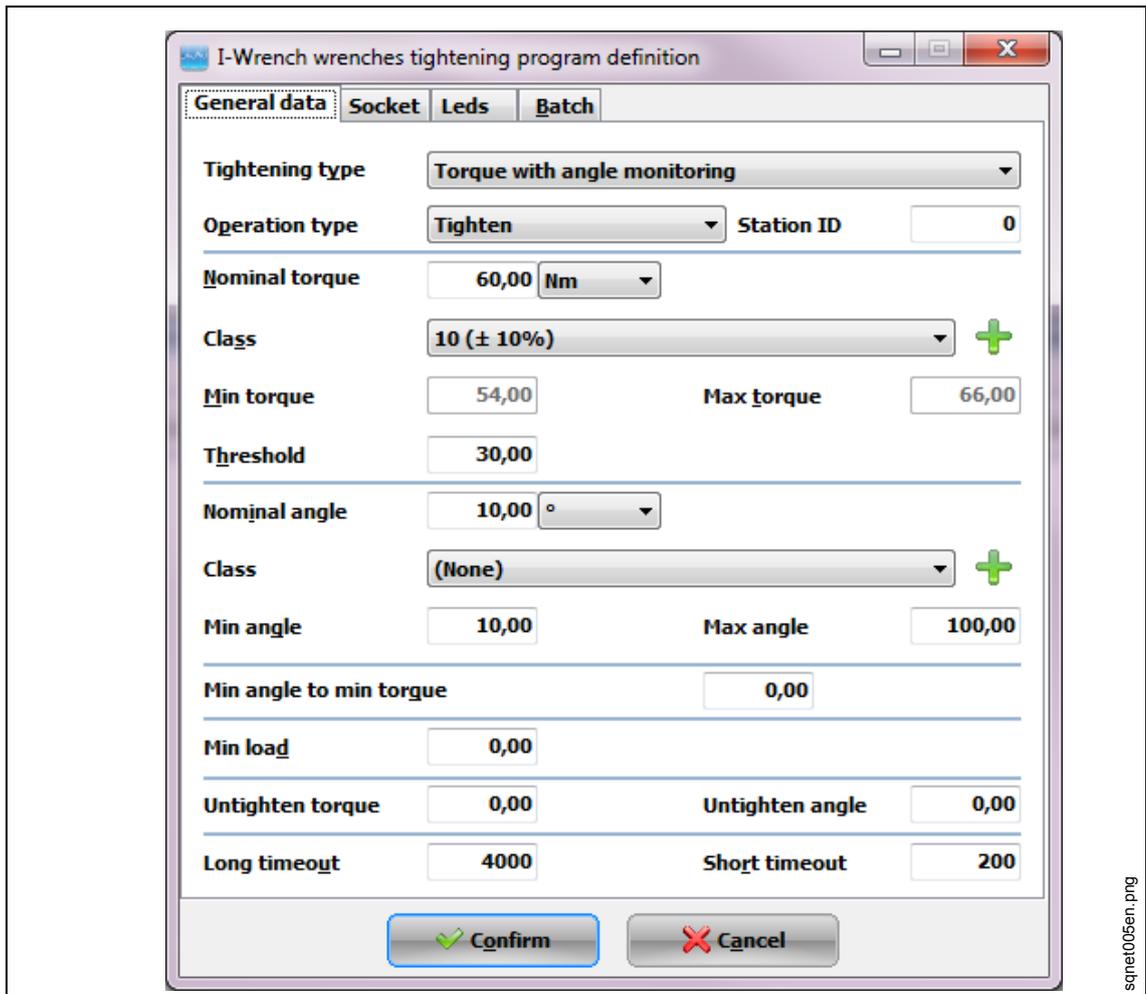


Fig. 26: General data

Feature	Description
<b>Tightening Type</b>	Fastening strategy to use during tightening: <ul style="list-style-type: none"> <li>• Torque + Angle</li> <li>• Torque with angle monitoring</li> <li>• Torque + Angle (CCW)</li> <li>• Torque with angle monitoring (CCW)</li> <li>• Yield</li> </ul>
<b>Operation Type</b>	Operation which has to be done during tightening: <ul style="list-style-type: none"> <li>• Tighten</li> <li>• Loosen</li> <li>• Tighten/Loosen</li> <li>• Bidirectional</li> </ul>
<b>Station ID</b>	Identification number of the station where the joint is located. This field is not mandatory.
<b>Nominal torque</b>	Torque target to reach during the tightening.
<b>Nm (Measure Unit)</b>	Change the engineering units to: Nm, cNm, kgfm, ozf.in, kNm, lbf.ft, lbf.in

Feature	Description
<b>Class (torque)</b>	Tolerance classes for the tightening strategy. If the user prefers to create a new one, click on <+> and a new window will appear. Fill all fields and click on <Confirm> to save.
<b>Min torque/ Max torque</b>	Alternate to insert lower (min) and upper (max) limits manually, if the user doesn't want to define tolerance limits by <b>Class</b> .
<b>Threshold</b>	Torque value where the I-Wrench starts to count the angle.
<b>Nominal angle</b>	Angle target value that the user has to reach during tightening.
<b>Class (angle)</b>	Tolerance classes for the tightening strategy. If the user prefers to create a new one, click on <+> and a new window will appear. Fill all fields and click on <Confirm> to save.
<b>Min angle/ Max angle</b>	Alternate to insert lower (min) and upper (max) limits manually, if the user doesn't want to define tolerance limits by <b>Class</b> .
<b>Min angle to min torque</b>	When tightening a screw previously tightened. Fill out the angle degrees value and the I-Wrench will check during the tightening. If a low tolerance is reached in this value, it means that the screw has previously been tightened.
<b>Min load (torque)</b>	This is a torque parameter. It defines when the test has to start. If the user does not fill in a value, the I-Wrench will default to a start value 5% of the I-Wrench transducer full scale. If the user writes a value higher than threshold torque, the I-Wrench will default as Min Load the start torque value for the test otherwise, the I-Wrench cannot start to measure the angle.
<b>Untighten torque</b>	This is a negative CCW (counter-clockwise) torque value. The I-Wrench can only determine the joint is loose if the operator, during the loosening direction, exceeds the loosen start-cycle, the torque will back down to a value lower (considering CCW) than the "un-tighten Torque" parameter.
<b>Untighten angle</b>	This is a negative angle parameter (counter-clockwise angle). The I-Wrench determines that a joint is un-tightened only if, during the loosening, exceeds the open start-cycle. The angle read at the end of Un-Tightening is greater than 1.5°. The angle written in this field indicates after how many degrees the <i>Short timeout</i> will be enabled.

Feature	Description
<p><b>Long Timeout</b></p>	<p>This parameter defines when the fastening cycle is ended and enables the user to conclude the fastening with a final result, even after several tightening steps. The value entered should be slightly higher than the maximum pause expected when the I-Wrench is reset or tightened further. The value is input in milliseconds.</p> <p><i>Long Timeout</i> is active as soon as the torque exceeds the lower torque limit (5% of I-Wrench capacity) for the first time and remains below 75% of the target torque. The I-Wrench starts measuring the time when the torque drops below the 5% level (I-Wrench capacity) between the tightening steps, when tightened further or when resetting.</p> <p>If the time pause is longer than the <i>Long Timeout</i> value, the I-Wrench will assume the highest torque below 75% of the target torque as the result of the fastening cycle.</p> <p>If the time pause is shorter than the <i>Long Timeout</i> value and the torque is <b>more</b> than 75% of the target torque, the <i>Long Timeout</i> will end and the <i>Short Timeout</i> will be activated.</p> <div data-bbox="520 707 1441 1072" data-label="Figure"> </div> <p>Fig. Long Timeout</p>
<p><b>Short Timeout</b></p>	<p>This parameter defines when the fastening cycle is ended and thus enables the fastening cycle to be quickly concluded after the last tightening step (see graphic: <b>Long Timeout</b>). The value entered should be small, typically 200 ms.</p> <p><i>Short Timeout</i> is active as soon as the torque exceeds 75% of the target torque. The I-Wrench starts measuring the time when the torque drops below the 5% level (I-Wrench capacity).</p> <p>If the time pause is longer than the <i>Short Timeout</i> value, the I-Wrench will assume the highest torque above 75% of the target torque as the result of the fastening cycle.</p>

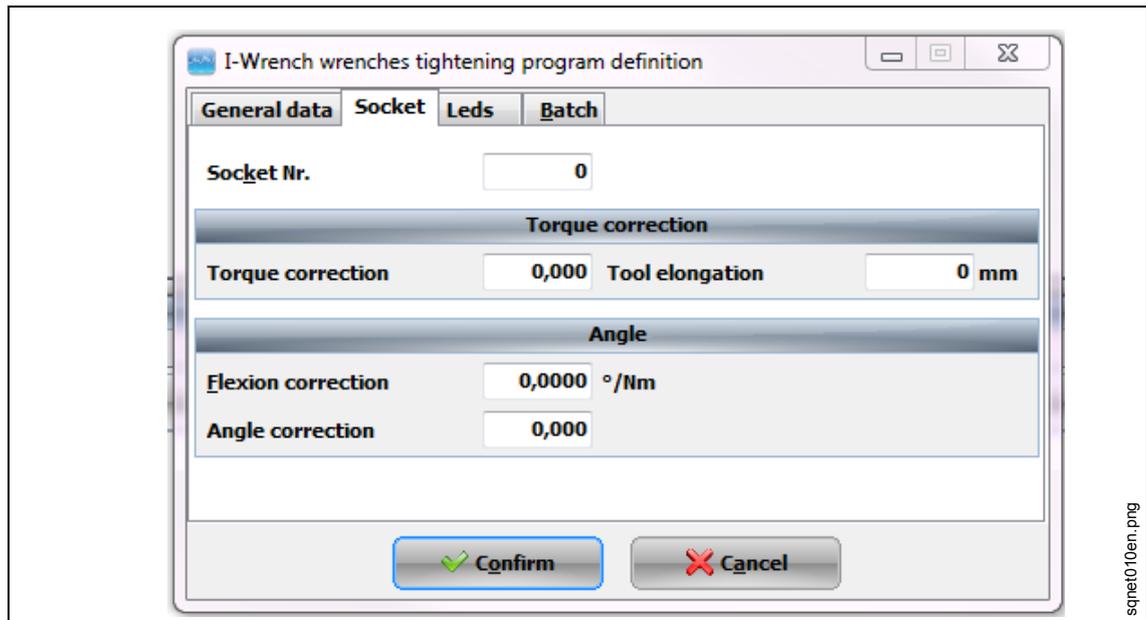


Fig. 27: Sockets

Feature	Function
<b>Socket Nr.</b>	Identification number of the socket (end fitting)
<b>Torque correction</b>	Torque factor, only to be entered if an extension is plugged on the I-Wrench, which modifies the original calibration length.
<b>Tool elongation</b>	Value in millimeter, only to be entered if an extension is plugged on the I-Wrench that modifies the original calibration length.
<b>Flexion correction</b>	Angular error due to the extension tool. → Measure by using a protractor or a rotary transducer mounted at the end of the extension (close to the joint). → See the difference between the angle reading of the I-Wrench and the angle reading of the protractor or the rotary transducer. Example if the difference is 3° at 100 Nm, enter 0.03 °/Nm in the proper field.
<b>Angle correction</b>	Angle factor, only to be entered if a torque multiplier is used with the I-Wrench. For example, if the I-Wrench is rotated of 360° and the output socket of torque multiplier rotates of 90°, user has to write in this field 0.25.



To define **Socket Nr**, **Torque correction**, **Angle correction** and **Flexion correction**, the I-Wrench must have auto-recognition function enabled; otherwise it's not possible to send those parameters to the I-Wrench.

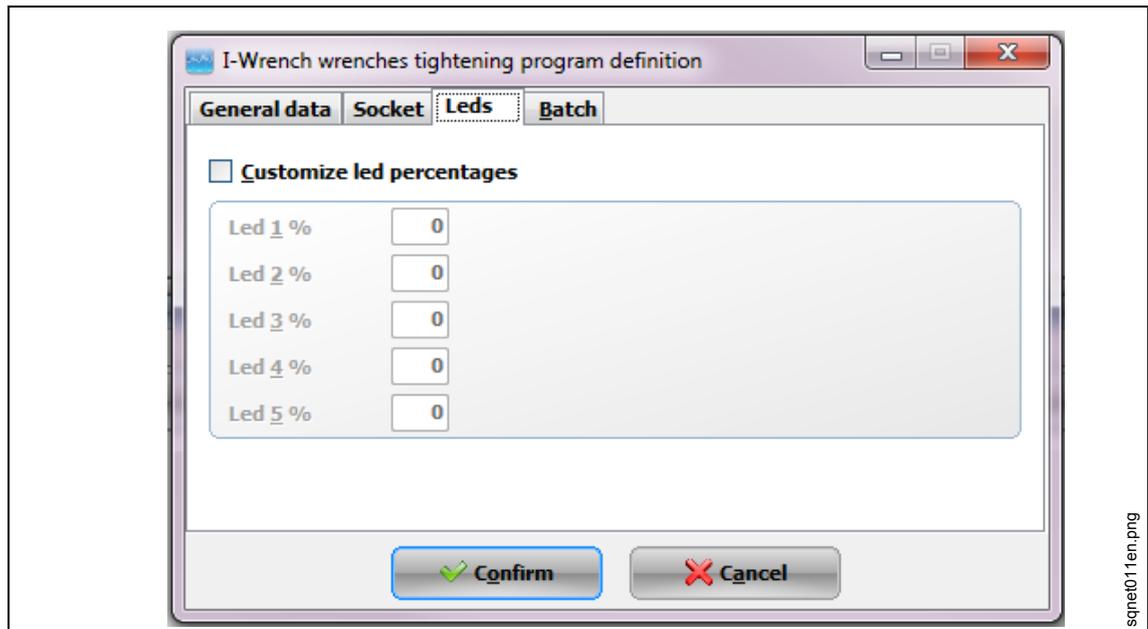


Fig. 28: Sockets



On the *Leds* tab it is possible to customize the percentage of every single led on the I-Wrench considering the target.

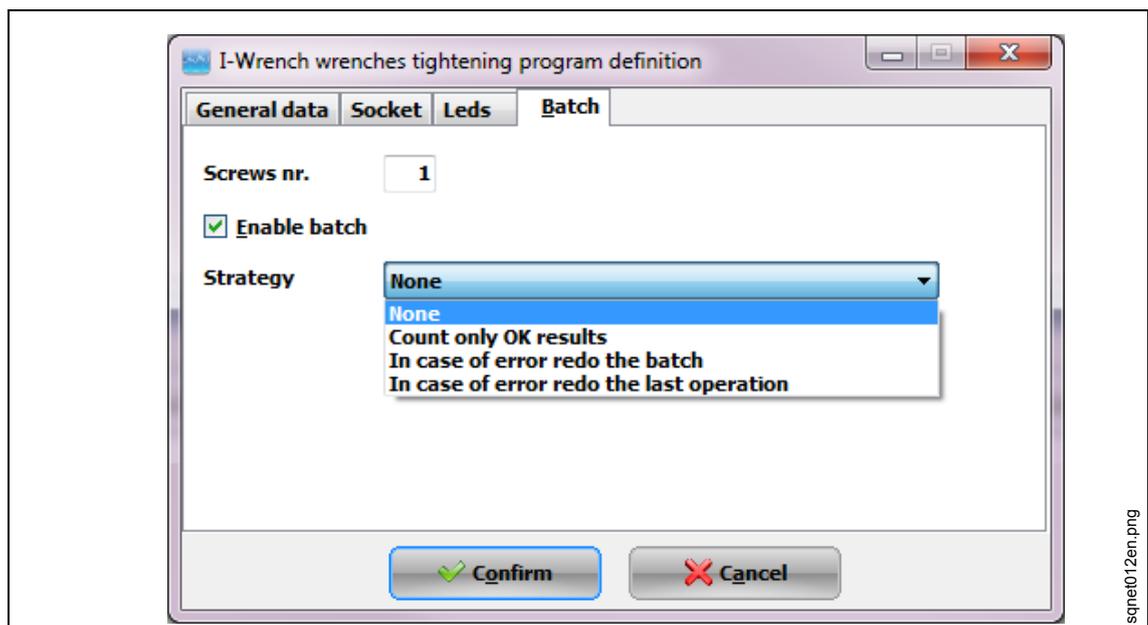


Fig. 29: Sockets



On the *Batch* tab it is possible to multiply the number of screws to tighten. For example, to mount a wheel on the car there are 4 screws with the same strategy needs to be tightened. In this tab it is possible to define how many screws the I-Wrench has to tighten.

Feature	Function
<b>Screw nr.</b>	Number of the screws to be fastened.
<b>Enable batch</b>	Allows to enable the batch function.
<b>Strategy</b>	<p>Strategy, considering the status of the screw:</p> <ul style="list-style-type: none"> <li>• <b>Count only OK results</b> I-Wrench checks the whole group only, if all rundowns are OK. All NOK results will not be considered for the group and not counted.</li> <li>• <b>In case of error redo the batch</b> If the group contains a NOK rundown, the whole group has to be redone (all other results will not be considered)</li> <li>• <b>In case of error redo the last operation</b> If the group contains a NOK rundown, only the last rundown has to be redone.</li> </ul>

## 7.6 Send the fastening application from SQnet+ to the I-Wrench

- Power down the I-Wrench
- Connect the USB cable from the I-Wrench to the PC.
- Power up the I-Wrench.
- Press <ESC> to come to the *Main Menu Screen*.
- Press <Synchr.>.
- Press <USB/Radio> and confirm synchronization with . During communication with SQnet+ this screen is displayed.



Fig. 30: Synchronization

### 7.6.1 Setup route

- Start SQnet+.
- Press <Route management>.

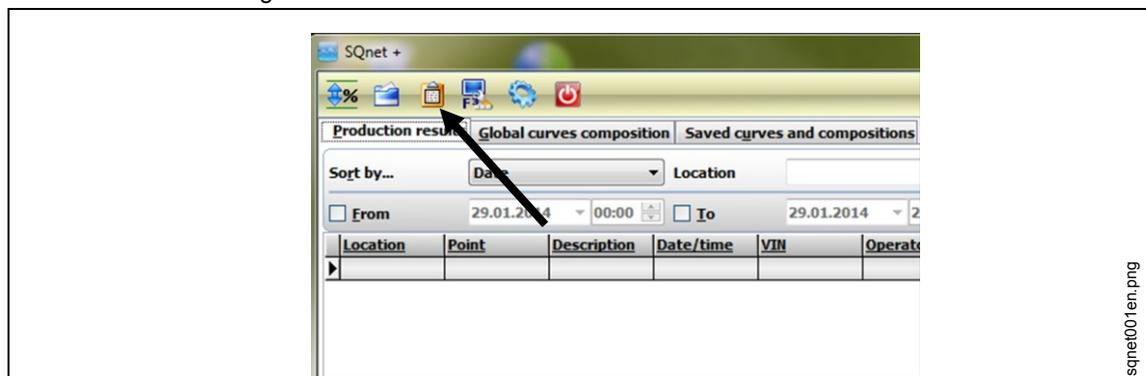


Fig. 31: Main menu

- Expand the tree and select requested location to send to the I-Wrench.

→ Press <New Route>.

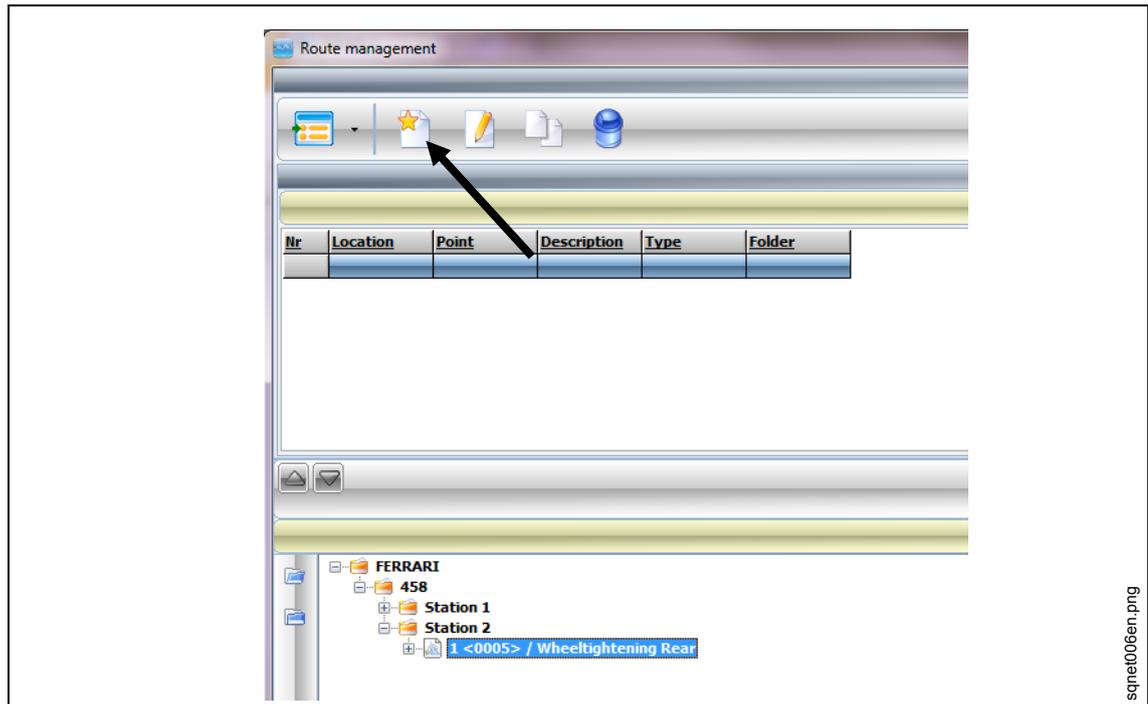


Fig. 32: Route management

→ Edit a **Route name**.

→ Choose **Route type** for tightening programs **I-Wrench wrenches programs**.

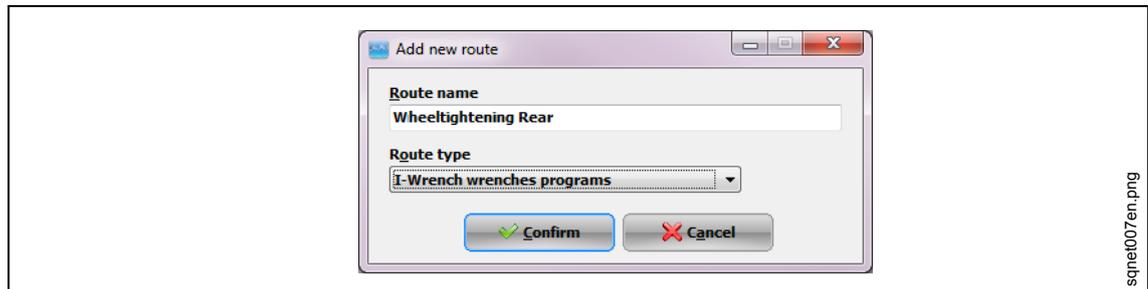


Fig. 33: Add new route

→ Press <Confirm>

→ Click on the  to add.

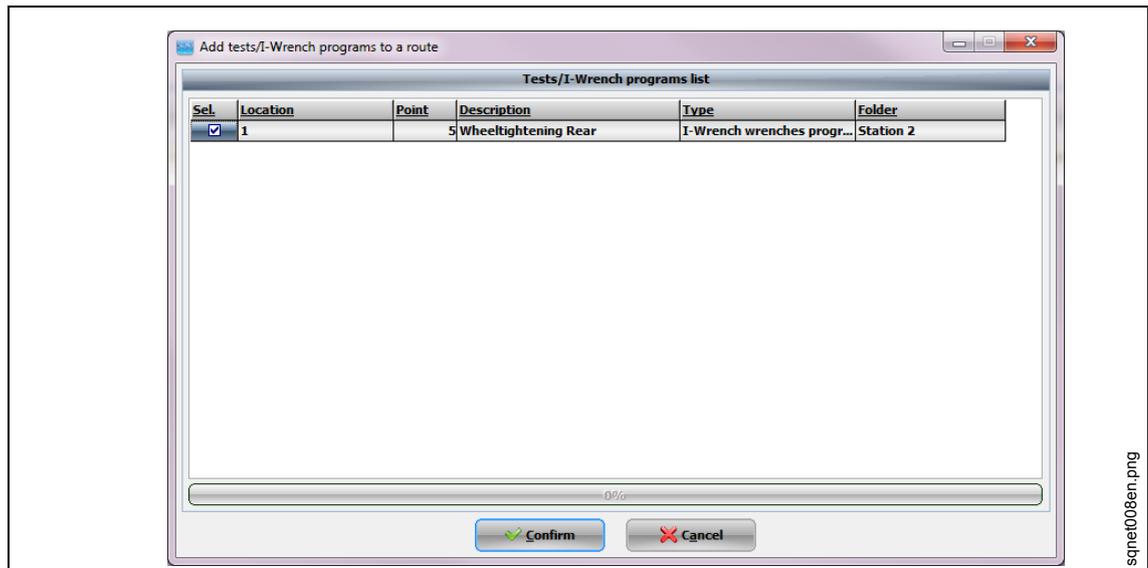


Fig. 34: Add tests/I-Wrench programs to a route

→ Press <Confirm> and close this window.

## 7.6.2 Send route

Return to the SQnet+ *Main Menu* and click on <I-Wrench interface (PROD)>.

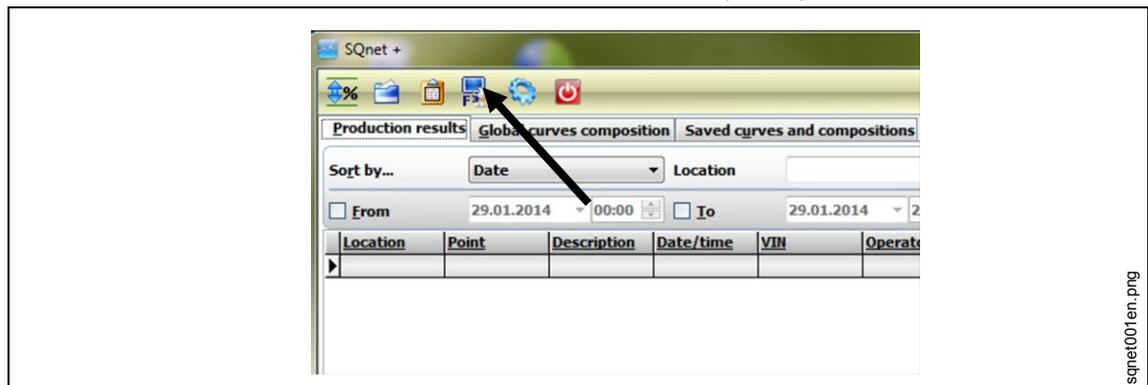


Fig. 35: I-Wrench interface (PROD)>

→ Select a **Route** to be sent to the I-Wrench.

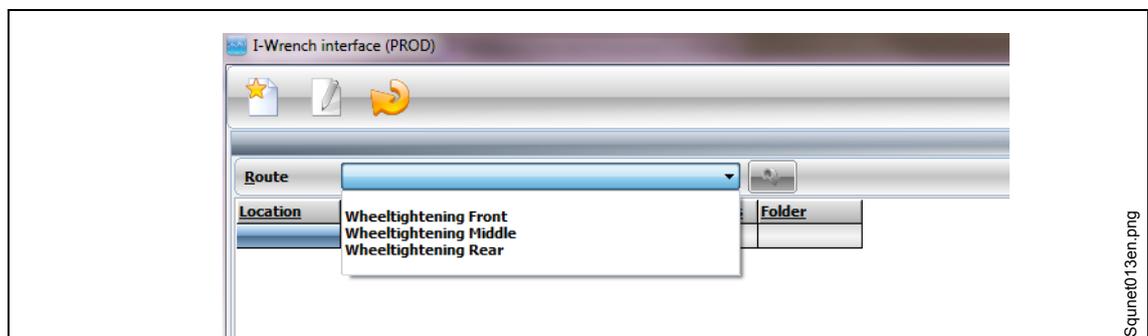


Fig. 36

Once the application has been selected, all of the operations which belong to this application will appear.

→ Click on the  to send the application to the I-Wrench.

On the right side of the screen below **Logs**, the status of data transfer is displayed.

After completing the application download, the last message is **Data sending completed**

→ Press <ESC> on the handle of the I-Wrench.

The I-Wrench will restart automatically in the synchronization menu.

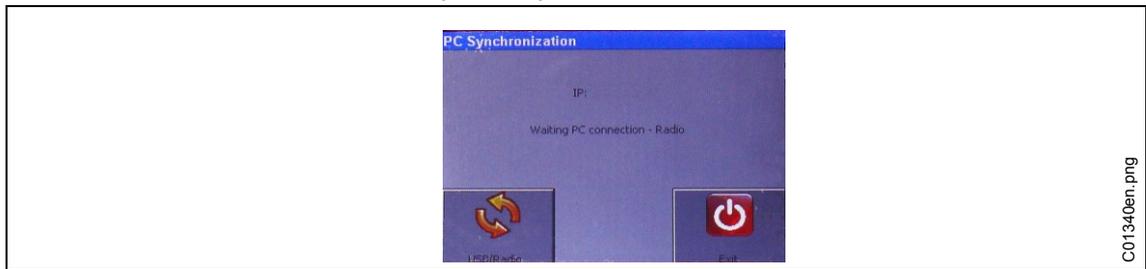


Fig. 37: PC Synchronization

→ Press <Exit>.

→ Remove USB cable.

→ Select requested program and press .

The I-Wrench is now ready to execute a tightening program.

## 7.7 Send fastening data results from I-Wrench to SQnet+

→ Power down the I-Wrench

→ Connect the USB cable from the I-Wrench to the PC.

→ Power up the I-Wrench.

→ Press <ESC> to come to the *Main Menu Screen*.

→ Press <Synchr.>.

→ Press <USB/Radio> and confirm synchronization with .

During communication with SQnet+ this screen is displayed.



Fig. 38: Synchronization

### Upload results

→ Start SQnet+.

→ Press <I-Wrench interface (PROD)>

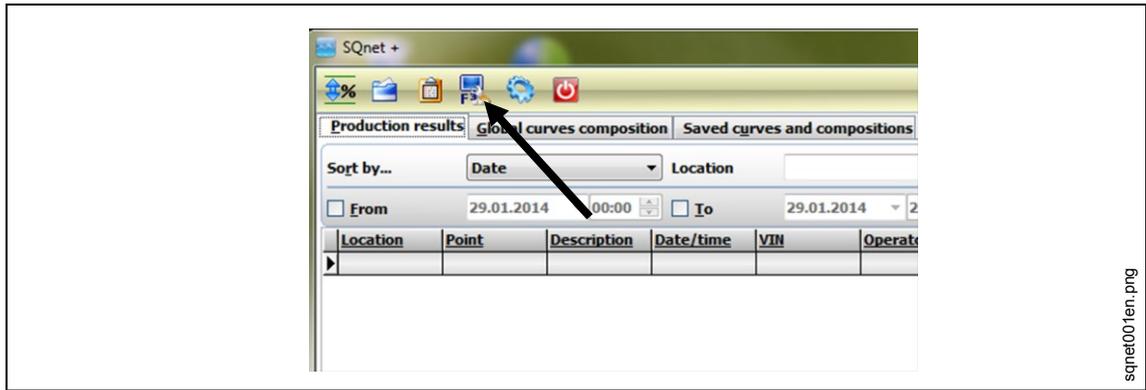


Fig. 39: I-Wrench interface (PROD)>

- Press on  to receive the results from the I-Wrench.  
On the right side of the screen below **Logs**, the status of data transfer is displayed.  
After completing the application download, the last message is **Data reception completed**.
- Press <ESC> on the handle of the I-Wrench.  
The I-Wrench will restart automatically in the synchronization menu.
- Remove USB cable.
- Return to the SQnet+ *Main Menu*
- Press on   
Production results are displayed.

## 8 Master list of setup menu

→ Press on *Main Menu Screen* > *Setup* > *Setup*

→ Enter Password: 1247 and press <OK>.

Setup Item	Apex GC mode	Stand-alone mode	Meaning
<b>Set version</b>	<b>Apex GC</b>	<b>Stand alone</b>	Allows to pre-set all parameters necessary to use the I-Wrench with SQnet+.
<b>Language</b>	x	x	Allows to choose one of the following languages: <ul style="list-style-type: none"> <li>• English</li> <li>• Italian</li> <li>• German</li> <li>• French</li> <li>• Portuguese</li> <li>• Spanish</li> </ul>
<b>Server/Client Mode</b>		<b>Server</b>	Allows to configure the I-Wrench as Client or Server in the pairing with Bluetooth or WiFi. This setting is already selected as <b>Server</b> if in the setting <b>Set Version</b> is selected <b>Stand Alone</b> .
<b>Must work on line</b>	x	Must be disabled	If enabled the I-Wrench works only if connected to a net (Bluetooth or WiFi). This setting is already disabled if in the setting <b>Set version</b> is selected <b>Stand Alone</b> . Note: if a route is already sent, it must be sent again to enable this setting.
<b>RS232 Baudrate</b>		–	Allows to select parameters for RS232 communication.
<b>Wrench ID</b>		–	Wrench Identification
<b>Has Radio</b>	x	–	Enable only if there is a radio module installed on board.
<b>Radio Type</b>	x	–	Allows to select which radio module is installed on the I-Wrench.
<b>Radio 232 Baud</b>		–	Allows to select the serial parameters to communicate with radio.
<b>Net ID</b>		–	“Group” identifier for Wi-Fi
<b>Node ID</b>		–	“Node” identifier for Wi-Fi
<b>Master ID</b>		–	Reserved
<b>Radio Channel</b>		–	Reserved
<b>Radio Power</b>		–	Reserved
<b>Online Period</b>		–	Reserved
<b>Has Tool Recognition</b>		x	Enable only if the <b>Tool/Socket recognition</b> is installed on the I-Wrench.

Setup Item	Apex GC mode	Stand-alone mode	Meaning
<b>Tool selects Prog.</b>		x	Enable only if the tool (socket) must select the tightening program (application).
<b>Passw for Firmware</b>		x	If enabled, user must type the password <b>7421</b> to change parameter.
<b>Has Positioning</b>		–	Enable only if on the I-Wrench is installed the positioning function.
<b>Send Long Res.</b>		–	This item allows to select the function standard o customized.
<b>Job restart strat.</b>		x	Allows to select the strategy at the end of an interrupted job: <ul style="list-style-type: none"> <li>• <b>Ask</b> the I-Wrench will ask to continue the job, interrupt it or restart a new one.</li> <li>• <b>Continue</b> the I-Wrench automatically continues the job interrupted (without asking)</li> <li>• <b>Restart</b> The I-Wrench restarts automatically the job from the beginning (without asking).</li> </ul>
<b>NOK as OK</b>		x	If enabled, I-Wrench will continue to execute next test after a NOK Result. Enable this setting only if the NOK result must not be repeated.
<b>Connect to 4000</b>		–	Connection with 4000
<b>4000 baud</b>		–	RS232 parameters for 4000
<b>Slave Mode</b>		<b>Slave Mode off</b>	This setting is automatically at <b>Slave mode off</b> , if in the setting <b>Set version</b> is selected <b>Stand alone</b> . <ul style="list-style-type: none"> <li>• <b>Slave mode off:</b> The I-Wrench is controlled from user: The programs are selected manually from operator.</li> <li>• <b>Slave at Start:</b> User is not enabled to select programs till the I-Wrench will receive an external signal to be enabled.</li> <li>• <b>Fully Slave:</b> The I-Wrench is totally controlled from an external system via radio. User cannot select any program, User can only decide to skip the program.</li> <li>• <b>Fully no skip:</b> The I-Wrench is totally controlled from an external system via radio. User cannot select any program.</li> </ul>
<b>Beep Volume</b>		x	Allows to set the percentage of acoustic signal (from 0 to 100).
<b>Light Intens.</b>		x	Allows to set the percentage of display light (from 0 to 100).
<b>Light timeout</b>		x	Time in minutes to switch to standby modality. (This time will restart everytime operator touches the display or the keys). In standby modality the display light is at lower value in order to save battery.

Setup Item	Apex GC mode	Stand-alone mode	Meaning
PowerOff sec. (0=never)		x	Time in seconds to switch off automatically the I-Wrench if it is not used . Select "0" to disable.
All Measures in Window		x	If enabled, I-Wrench will use <i>Short timeout</i> only if torque and angle are in the tolerance window.
Set Tool number		–	
Tool Tq Corr.		x	Must only be entered if an extension is mounted on the I-Wrench. This setting is used to modify the original length of the I-Wrench. This factor must be calculated. Note: If this setting is entered, you must not enter the setting at <b>Adapter Length</b> .
Tool Ang Corr. (°-Nm)		x	Must only be entered if an extension is mounted on the I-Wrench. This setting is used to compensate the angle reading error due to the flexion of the extension.
Adapter len (mm)		x	Must only be entered if an extension is mounted on the I-Wrench. This setting is used to modify the original length of the I-Wrench. Write the length of the extension in mm. Note: If this setting is entered, you must not fill the setting " <b>Tool Tq Corr</b> ."
Comm. fail strategy		–	If I-Wrench is connected to SQnet+ (or another software) by radio, in case line is dropped, is possible to define a specific strategy: <ul style="list-style-type: none"> <li>• <b>Warn &amp; disable:</b> I-Wrench displays the message <b>Host not connected</b> and disables itself.</li> <li>• <b>Allow declassified mode:</b> I-Wrench displays the message <b>Host not connected</b> then operators can press for 4 seconds  on keyboard to continue to work in off-line mode</li> <li>• <b>Complete curr. job/batch:</b> I-Wrench allows operator to finish the current job or batch then I-Wrench displays the message <b>Host not connected</b> and disable itself.</li> </ul>
Green Led at Nom		x	If enabled, the I-Wrench will light the green led when torque or angle targets are reached.
Vibration		x	Enable vibration when target is reached.

Setup Item	Apex GC mode	Stand-alone mode	Meaning
<b>Input VIN</b>		x	If enabled user must read the Vehicle Identification Number (VIN) <ul style="list-style-type: none"> <li>• <b>VIN after select</b>: After program selection</li> <li>• <b>VIN before select</b>: Before program selection</li> <li>• <b>VIN after sel.offl.</b>: After program selection only if the I-Wrench is off-line (not used)</li> <li>• 2 VIN before program selection.</li> <li>• when the radio communication is off (not used).</li> </ul>
<b>BarCode Use</b>		x	Enable only if on the I-Wrench is installed a barcode reader.
<b>Wait NOK Confirm</b>		x	If enabled, in case of NOK result the I-Wrench will activate the vibration till the user confirm with  on the I-Wrench.
<b>Confirm scanned string</b>		x	Possibility in case of error to re-scan the barcode before sending it to the controller. If enabled, after barcode reading, user must confirm with  .
<b>Quit Zero Err. with pwd</b>		x	When the I-Wrench is starting, it makes the zero values for torque and angle. If those values are different from those stored in the calibration, the I-Wrench will show an error message. If enabled, user must type the password <b>7421</b> to proceed.
<b>BarCode Setup</b>		x	Setup when the barcode reader is new, for the first installation or if the barcode reader has lost factory settings (only for service tech.)
<b>Alw. Save Curve</b>		-	Set "1" to save always the curves.
<b>End at last led</b>		x	If enabled, <i>Short timeout</i> will start considering the positioning of last led (it's possible to set by SQnet+ when I-Wrench lights the last led). If it is disabled <i>Short timeout</i> will start when target is reached.
<b>Operator Input</b>		x	This setting has three options: " <ul style="list-style-type: none"> <li>• <b>Not used</b></li> <li>• <b>At startup</b>: during I-Wrench start-up, user must insert Operator ID to continue</li> <li>• <b>Before Sel.</b>: Before starting a test I-Wrench will ask for operator ID.</li> </ul>
<b>ms wait enable</b>		Must be 0	Waiting time in seconds after barcode reading. If the I-Wrench doesn't receive any program, I-Wrench will ask to scan again the barcode. I-Wrench has to be connected to VPG (or another on-line software).
<b>BT Fast connect</b>		-	Fast Connection for Bluetooth radio, to reduce disturbs to other radio (for example WiFi).

Setup Item	Apex GC mode	Stand-alone mode	Meaning
Conn. to Schatz		–	Enable to connect I-Wrench with Schatz bench (bench for torque/angle calibration)
Schatz baud			Rs232 parameters for connection with Schatz bench.
Fix Cable Port		–	Only for SCS. Used for I-Wrench or EWW <sup>3</sup> to select the port.
Plug in Cable Port		–	Only for I-Wrench first generation.
Cradle Input		–	Only for I-Wrench with “RID” sensor, to recognize when I-Wrench is positioned on cradle battery charger.
Adapter Coeff. Mode		×	Defines which input has the priority to define <b>Adapter coefficient mode</b> , if enabled: <ul style="list-style-type: none"> <li>• <b>Adapter Prio</b>: If any else tightening program is used, the I-Wrench will consider the coefficient written in the adapter first.</li> <li>• <b>Only Adapter</b>: The I-Wrench will consider only the coefficient written in the adapter</li> <li>• <b>Program Prio</b>: If any else tightening program is used, the I-Wrench will consider what is written in the program first.</li> <li>• <b>Only Program</b>: If any else tightening program is used, I-Wrench will consider only the coefficient written in the program.</li> <li>• <b>Both</b> Tool and tightening program coefficients will be added each other.</li> </ul>
Speed Over Delay (ms)		–	This time indicates how long the gyroscope can stay over the maximum speed. Once over this time, the I-Wrench will display the error message <b>Speed over</b> ” (This happens when user tightens too fast).
Freq.RT reading (Hz)		–	Allows to choose the frequency for sending value to VPG in real time.
PF2000 Res send		–	
Ignore angle		–	
Auto Selected Prog at Start		Must be 0	Application which will be chosen automatically at the start of the I-Wrench.
Auto Selected Job at Start		Must be 0	Linkig group which will be chosen automatically at the start of the I-Wrench.
Radio USB bridge		–	Connects USB port directly to the RF module.

## 9 Set correction factor when changing sockets / using special heads

The use of adaption tools (sockets, ratchets, open end adapter...) may cause a difference of reading in torque (due to elongation) and angle (due to torsion or bending). If not compensated, the extension twisting during the tightening, can compromise the torque/angle reading value. The I-Wrench or torque/angle transducer used for the tightening will measure the joint twist (angle) and the extension joint twist that will be added to the final angle result.

This chapter describes how the I-Wrench manages adapter tools by entering torque and angle correction factors.

### 9.1 Torque correction

Torque correction is a proportional multiplying factor.

Torque correction has two correction parameters:

- Absolute multiplying factor
- Elongation in mm (I-Wrench will calculate factor depending on its length and the tool elongation).

#### 9.1.1 Absolute multiplying factor

This factor will multiply the reading of the I-Wrench to obtain the actual torque applied to the bolt. This parameter will be different for each size of the I-Wrench on which the adapter will be used.

This is more suitable when the shape of tool and work condition make the correction using elongation not reliable.

This factor can be stored into the following applications

- the adapter memory
- as a parameter of the tightening program on the mPro400GC controller
- as a parameter of the tightening program in SQnet+.

#### 9.1.2 Elongation

The I-Wrench is calibrated by applying an **F** force in the mid-handle that provides a torque **C** that is related to the I-Wrench length **L**. If an extension has been applied, the torque reading will be modified accordingly (to equal applied force, by varying the arm, the torque will be modified accordingly).

In this section we will explain how to calculate the torque correction coefficient, and how to compensate the torque reading error, in case of I-Wrench extension.

This way of correcting torque allows to define a single correction for a tool independently from the length of the I-Wrench on which it will be used. This parameter is always the same for all sizes of wrenches.

$$\text{Torque factor (C)} = \frac{\text{I-Wrench length (L)} + \text{Extension length (E)}}{\text{I-Wrench length (L)}}$$

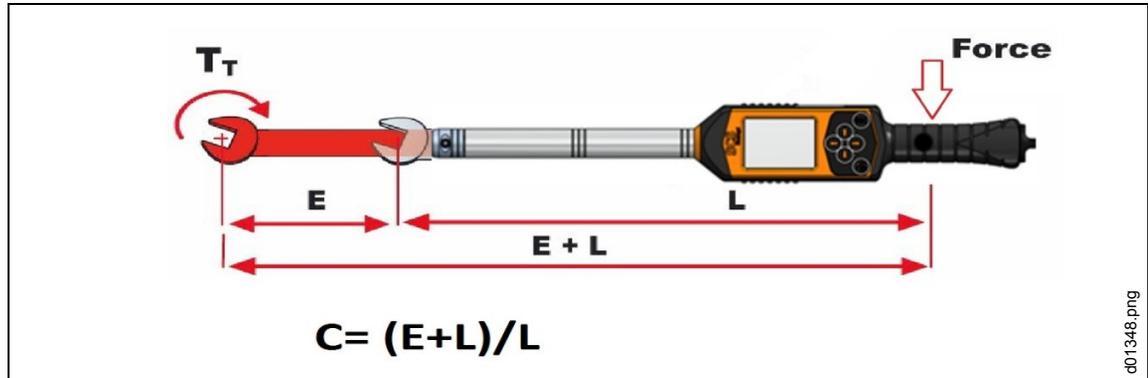


Fig. 40: Elongation

This factor can be stored into the following applications managing the I-Wrenches

- the adapter memory (if available)
- as a parameter of the tightening program on the mPro400GC controller
- as a parameter of the tightening program in SQnet+.Angle correction

## 9.2 Angle correction

Angle correction has 2 correction parameters

- Angle Absolute Multiplying Factor
- Torsion factor (°/Nm)

### 9.2.1 Angle Absolute Multiplying Factor

This factor is used when something like a gear box torque multiplier is interposed between I-Wrench and bolt, which cause a proportional reduction on rotation applied to the bolt. This is a multiplying factor which will be applied to the angle read by the I-Wrench.

This factor can be stored into the following applications managing the I-Wrenches

- as a parameter of the tightening program on the mPro400GC controller
- as a parameter of the tightening program in SQnet+.

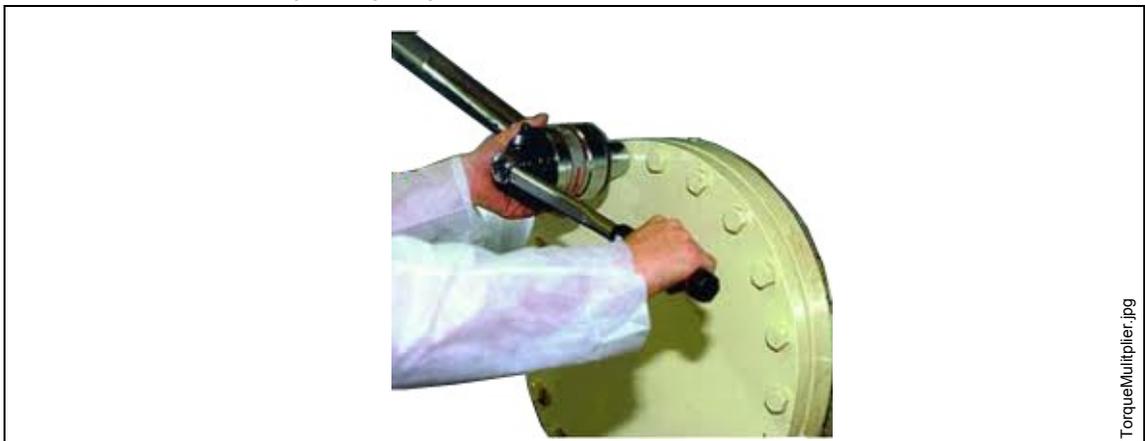


Fig. 41: Elongation

### 9.2.2 Torsion factor

This parameter is used to correct the angle measuring error due to torsion or bending of the adapter due to torque applied. Correction will be proportional to currently applied torque therefore it is expressed as °/Nm.

This factor can be stored into the following applications managing the I-Wrenches

- the adapter memory
- as a parameter of the tightening program on the mPro400GC controller
- as a parameter of the tightening program in SQnet+

#### Factor calculation

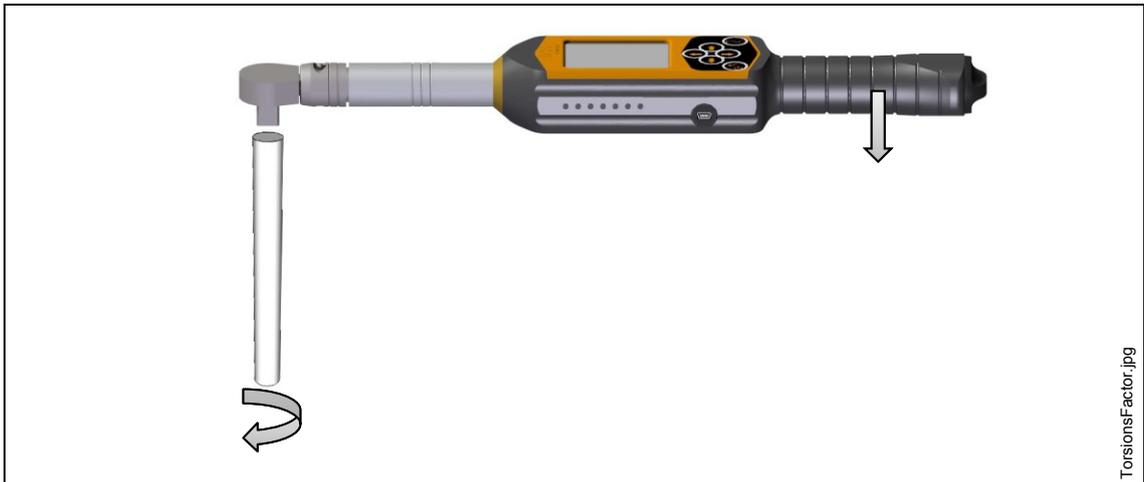


Fig. 42: Example of extension applied to the I-Wrench

Measure the extension twist degrees on maximum torque tightening:

- Block the end of the extension (screw side) to a static cell or to a clamp so that will be fixed while torque will be applied.  
On the I-Wrenches, it is possible to enter in peak measure modality. The torque/angle peak reached will be visualized.
- Apply torque until maximum torque reachable;  
for example with tightening on 100 Nm apply torque max. 110 Nm (maximum tolerance limit).
- Verify the angle value provided at the maximum torque reached limit; for example 5
- Repeat the test for at least 5 times to calculate the angle and torque average values.
- Divide the average value for the maximum torque value (calculate the average of the maximum reached torque values)

Example:

We will consider an average angle value of 5 and a maximum torque average value of 100 Nm

**FA** = angle correction factor

**Am** = average angle value

**Cm** = average torque value at maximum tolerance

$$FA = \frac{AM}{CM} = \frac{5}{110} = 0,04545^{\circ}/Nm$$

FA = 0,04545 angle correction factor to be entered in head with microchip (adapter memory) and software.

### 9.3 Configure correction factors

#### 9.3.1 Apex GC mode

mPro400GC controller

→ Select *Navigator > Standard > Settings > I-Wrench Socket configuration*.

**Using an APEX head with microchip:**

→ Select **Tool head with memory**.

→ Edit requested **Tool head number**.

You find the number (**T2** for example) on the *I-Wrench Main Menu Screen*.

→ Make sure you enabled **Has Tool Recognition** at the I-Wrench.

The tool head number is now paired with a fastening application and matches the correct fastening parameters to be applied whenever the head is recognized by the I-Wrench.

**Using an APEX head without microchip:**

→ Select **Tool head without memory**.

→ Edit the parameter and click on <Confirm>.

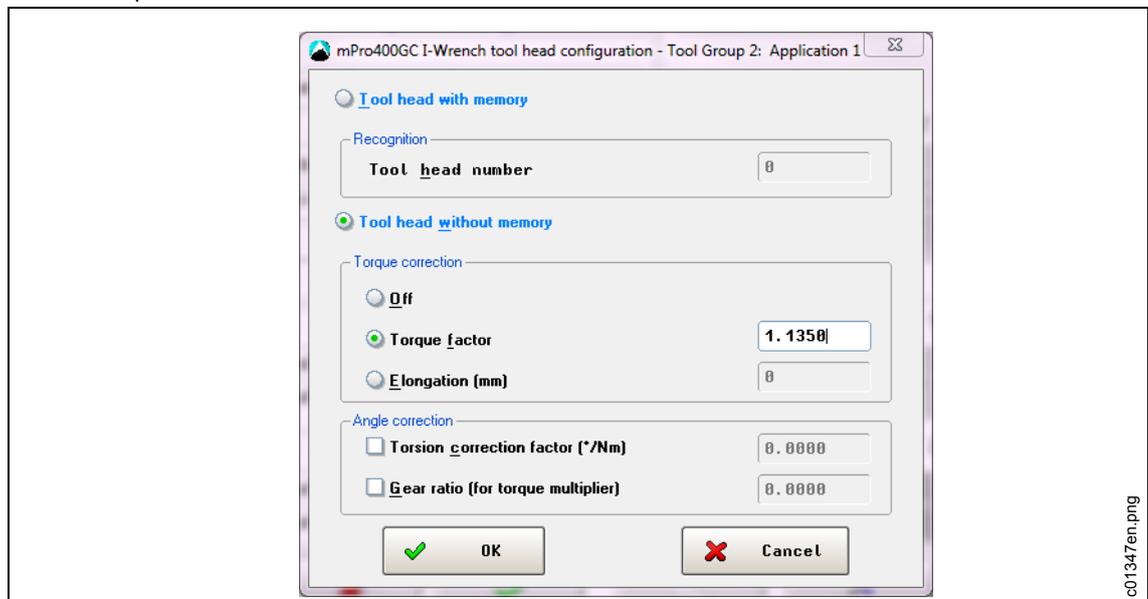


Fig. 43: I-Wrench tool head configuration

Feature	Function
<b>Torque factor</b>	Correction factor (multiplies I-Wrench reading)
<b>Elongation (mm)</b>	I-Wrench elongation due to inserted socket
<b>Torsion correction factor</b>	Angle correction proportional to torque applied (°/Nm)
<b>Gear ratio</b>	Angle multiplying factor due to eventual torque multiplier



**Torque factor** and **Elongation** are alternative one to the other! When Torque factor is used Elongation should be disabled and set to 0 and vice versa.

### 9.3.2 Stand-alone mode

#### SQnet+

- Click on the *SQnet+* icon to run the program.
- Select the *Test Definition* icon.
- From the screen *Test Definition*, select the location (operation) which you want to edit.
- Click on the tab *Production*
- Click on the icon *I-Wrench wrenches tightening program definition > Socket*.
- Edit the parameter and click on <Confirm>.

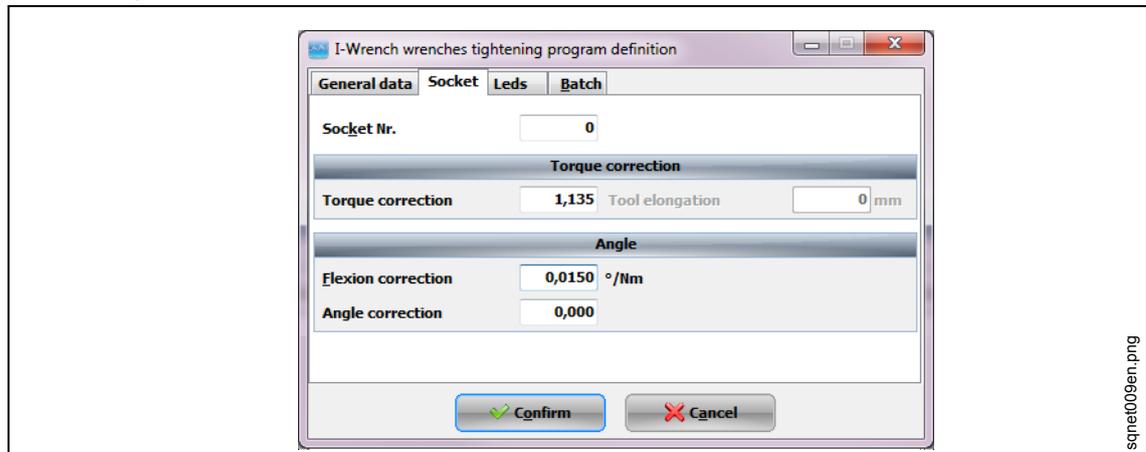


Fig. 44: Socket

Special forms are implemented in SQnet+ to define correction factor relative to each tightening program. These should normally be used when adapters without tool recognition chip are used.

### 9.3.3 Edit adapter memory via SCS ToolEditor

Following data on the socket can be programmed using the software SCS ToolEditor in combination with tool programming USB box (see Accessories):

- Tool head number - within the range of 1 thru 999.
- Torque correction factor
- Angle correction factor

This will allow the I-Wrench to obtain automatically information about correction factors without having to define them into tightening programs definitions.

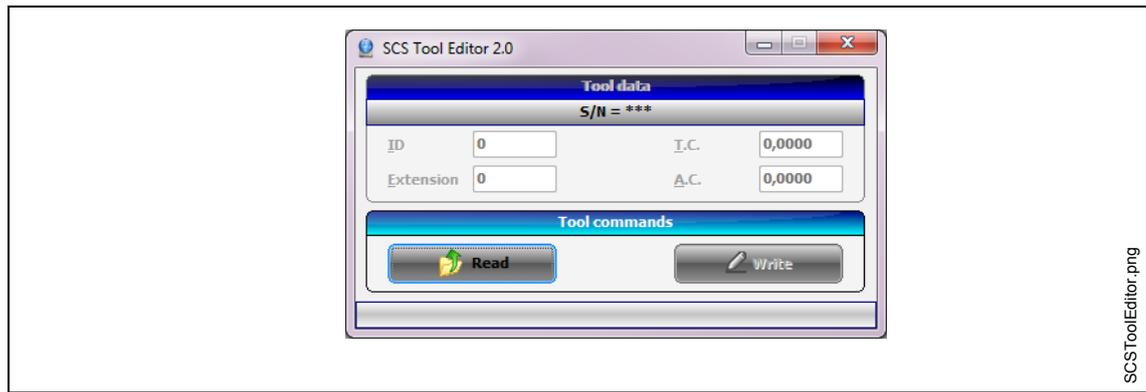


Fig. 45: SCS Tool Editor

Feature	Function
<b>ID (Tool head number)</b>	Socket number
<b>Extension (Elongation)</b>	I-Wrench elongation due to inserted socket
<b>T.C. (Torque factor)</b>	Correction factor (multiplies I-Wrench reading)
<b>A.C. (Angle factor)</b>	Angle correction proportional to torque applied (°/Nm) It will always have priority on <b>Extension</b> (Elongation), thus it will be used when both are programmed into tool memory.



If the tool head number is changed, the torque and angle factor will get lost.

### 9.3.4 Factors multiple definition management

May happen that the same correction factor are defined in more than one place (ex. SQnet+, mPro400GC and chip memory). The I-Wrench can be programmed to give priority to the desired source of the parameter.

- Press on *Main Menu Screen* > *Setup* > *Setup*
- Enter Password: 1247 and press <OK>.
- Select **Adapter Coeff. Mode**.
- Select one option (see 8 Master list of setup menu) and press <OK>.

# 10 Operation barcode scanner

The bar code scanner must be programmed setup prior to use or it will not operate. Refer to Section Setup barcode scanner.

When the I-Wrench is connected to the mPro400GC controller, the controller manages the application selection. Whether it is an I/O input or manually entered at the controller.

→ To activate the scan process press <↓>.



Fig. 46: Wi-Fi Setup on the LiveWire I-Wrench

The barcode is displayed on the mPro400 controller screen.

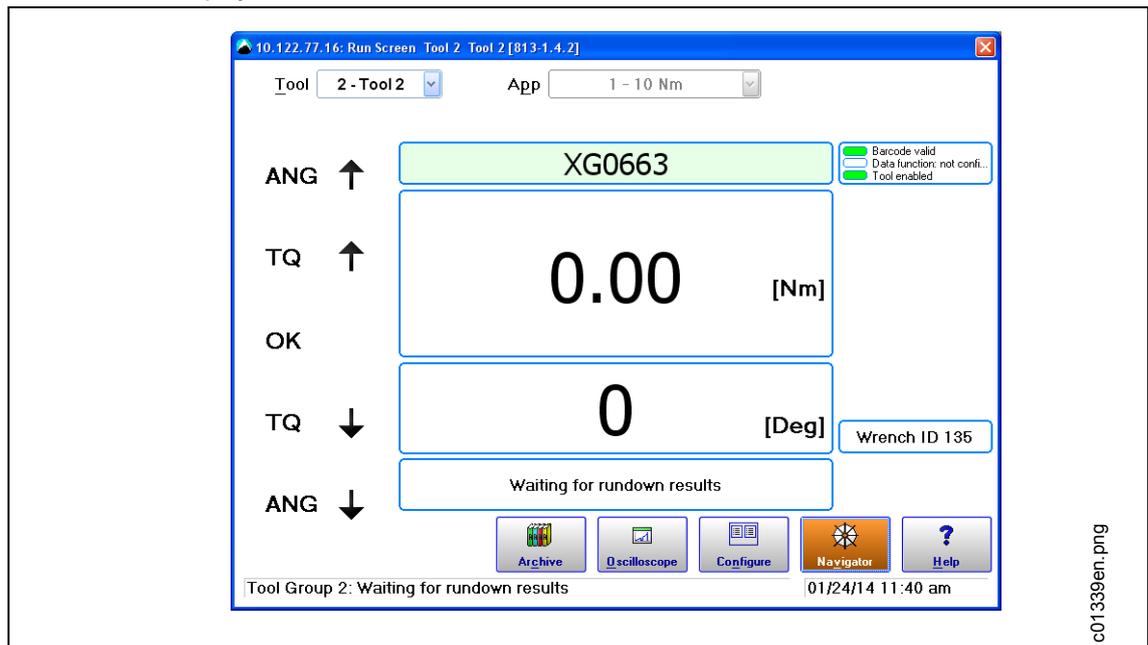


Fig. 47: Run Screen

## 11 Backup

This chapter describes how to connect to a PC to backup all files in memory of the I-Wrench.

There are four major categories of files which can be transferred by USB cable from the I-Wrench to a PC.

setup.dat	All wireless settings
progs.dat	All application settings
jobs.dat	Linking of jobs

All Stand-alone mode fastening data results are in binary files which can be uploaded to SQnet+ directly. Refer to 7.7 Send fastening data results from I-Wrench to SQnet+



Apex recommends:

→ Once a USB connection has been made, copy ALL folders and ALL files to your PC into a folder named with the I-Wrench serial number.

- Power down the I-Wrench.
  - Connect the USB cable from the I-Wrench to the PC.
  - Power up the I-Wrench.
  - Press <ESC> to come to the *Main Menu Screen*.
  - Press <Synchr.>.
  - Press <USB/Radio> and confirm synchronization with .
- During communication this screen is displayed.



Fig. 48

- Open Windows Explorer.  
The I-Wrench will appear as a removal flash drive.
- Copy the whole content to your PC into a folder named with the I-Wrench serial number.
- Confirm replacing the files.
- Press <ESC> when finished.

## 12 Installation of I-Wrench Firmware Updates

The firmware will be delivered as a ZIP file.

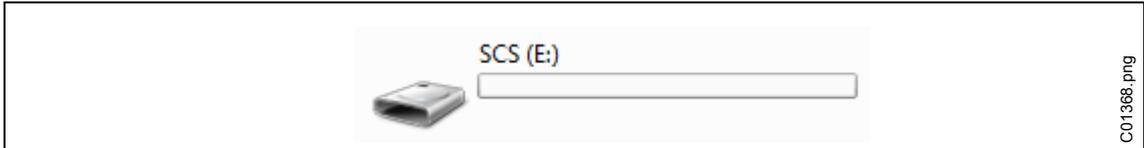
- Extract the ZIP file.
  - Disable all active rundowns on the I-Wrench to see the main menu.
  - Connect the USB cable from the I-Wrench to the PC.
  - Press <Synchr.>.
  - Press <USB/Radio> and confirm synchronization with .
- During communication this screen is displayed.



C01341.png

Fig. 49

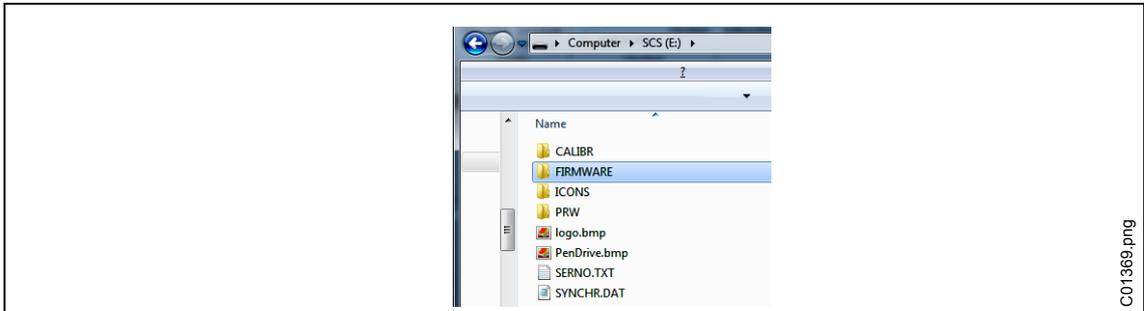
- Open Windows Explorer.  
The I-Wrench (SCS) will appear as a removal flash drive.



C01366.png

Fig. 50: Removal flash drive

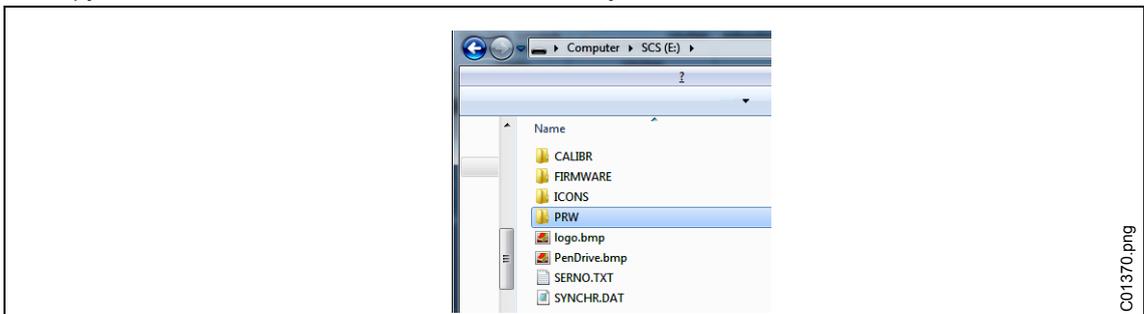
- Copy the file *FIRMWARE.HEX* from the ZIP into the directory *FIRMWARE*.



C01369.png

Fig. 51: FIRMWARE

- Copy the file *DICT.CSV* from the ZIP into the directory *PRW*.



C01370.png

Fig. 52: PRW

- Press <ESC> on the handle of the I-Wrench.  
*Upgrading firmware* is displayed. The I-Wrench will restart automatically.
- Press <ESC> to come to the *Main Menu Screen*
- Check new version of firmware displayed on the title bar.

## 13 Calibration

In Europe every instruments must be calibrated once per year. Calibration is a physical modification to a sensor or its electronic output. Calibration is required when a custom head, socket or adapter is fitted to the I-Wrench. Validation of the I-Wrench is performed on a regular basis to assure that the torque reading from the I-Wrench is within assembly plant limit requirements set by the plant fastening performance specification and is a comparison to a standard such as a high accuracy slip ring torque transducer or static torque transducer with a higher accuracy than the I-Wrench transducer.

### 13.1 Calibration of Torque and Angle Zero Offset

The calibration of zero offset for torque and angle are parameters which can be modified by the I-Wrench:

→ Press on *Main Menu Screen > Setup > Cont.Read*

→ Using , press and hold briefly. The message will read **Setting Zero**.  
This will set Torque to Zero Offset.

→ Using , press and hold briefly. The message will read: **Setting Zero Wait**  
This will set Angle to Zero Offset.



→ Do not move the I-Wrench during this procedure.

## 14 Maintenance

### 14.1 Cleaning instructions

#### All I-Wrench models

- Keep the LCD Touch screen surface free of dirt. Use a damp cloth with conventional window cleaner fluid. Do not use acetone for cleaning.
- Do not clean the display with power on. Turn the tool power off.
- Do not immerse the I-Wrench in any liquid or cleaning fluids.

#### I-Wrench models with a built-in scanner (Optional bar code reader)

The window must be free of dirt. Clean it regularly or immediately if becomes dirty.

- Use a damp cloth or cotton swab on a soft stick with conventional window cleaner fluid. Do not use acetone for cleaning. A dirty window may make it impossible to read barcodes.

#### I-Wrench models, with an (Optional) removable rubber protection boot

The boot contains a removable window.

- Keep this removable window free of dirt on both surfaces. Use a damp cloth with conventional window cleaner fluid. Do not use acetone for cleaning.

## 14.2 Service Schedule

Interval	Visual inspection
Once a shift	→ Inspect the I-Wrench for damage.
	→ Inspect that the I-Wrench scanner window is transparent.
Once a week (if in use)	→ Inspect the transparency of the I-Wrench LCD touch screen display and the Protection Boot window.
Once a year	→ Do a Calibration
Depends how often the I-Wrench is used.	→ From time to time it is necessary to do verification. We recommend to keep a quality manual of the control frequencies for every I-Wrench.

## 14.3 Disassembly

Except for changing heads or sockets or special adapters, the tool should not be disassembled. Disassembly and repairs may only be carried out by Apex Tool Group authorized personnel.

# 15 Troubleshooting

## 15.1 Wi-Fi issues

After configuring a Wi-Fi Connection between the I-Wrench and the mPro400GC controller, observe the I-Wrench LCD display during boot-up. On the bottom line of the display **init WLAN** prompt will be displayed. After a short delay, if the connection is successful, the prompt **WiFi Module OK!** will be displayed. If there is a problem, the error code **WiFi Module KO!** module will be displayed. The codes are described in the following table.

Error	Possible Cause	Action
Error code 1	Failed to access programming mode for the module	→ Verify module wire connection and baud rate
Error code 2	Failed to set <b>keep connection during programming</b> option	→ Configure option
Error code 3	Failed to set <b>SSID</b>	→ Configure SSID
Error code 4	Failed to set <b>WiFi channel</b>	→ Configure WiFi channel
Error code 5	Failed to set <b>Authentication mode</b>	→ Configure Authentication mode
Error code 6	Failed to set <b>Encryption mode</b>	→ Configure Encryption mode
Error code 8	Failed to set <b>Passkey</b>	→ Configure passkey
Error code 10	Failed to set <b>DHCP</b> parameter	→ Configure DHCP
Error code 11	Failed to set <b>WiFi IP</b>	→ Check for IP Format Ceck for WiFi IP → Check for WiFi Gateway → Check that above settings are valid

Error	Possible Cause	Action
Error code 12	Failed to set <b>Hostname</b>	→ Set Hostname
Error code 15	Failed to set TCP client peer	→ Check for WiFi Host IP → Check for WiFi Remote Port → Check that above settings are valid
Error code 16	Failed to set <b>Power mode</b>	→ Set power mode
Error code 20	Failed to set <b>Regulatory domain</b> parameter	→ Set Regulatory domain parameter
Error code 21	Failed to set <b>Username</b> parameter	→ Set Username parameter
Error code 22	Failed to set <b>Build Ad Hoc</b> parameter	→ Set Build Ad Hoc parameter
Error code 23	Failed to set <b>Operational mode</b> parameter	→ Set Operational mode parameter
<b>Warning Invalid channel Zero!</b> - Error Message following boot up and Livewire splash screen.	The I-Wrench boot up was performed with a torque load at the head of the I-Wrench. The torque transducer may be defective.	→ Perform a manual zero offset of the torque transducer and reboot the I-Wrench.
<b>Angle Test Failed!</b> - Error Message following boot up and Livewire splash screen:	During boot up the I-Wrench was being moved around. The angle transducer gyro may be defective.	→ Reboot the I-Wrench. Do not move the I-Wrench during boot up. If the problem appears again it could be a failure on the gyroscope.

## 15.2 WLAN communication between controller and I-Wrench

Error	Possible Cause	Action
<p>No WLAN communication between controller and tool.</p> <p>The asterisk * is not present on I-Wrench display.</p>	Wrench ID of tool is not entered correctly on the controller.	<p>→ Check in the <i>Tool Setup</i> screen of the controller that the Wrench ID of the tool is entered in the <b>Type</b> field.</p> <p>→ Otherwise mark line and push &lt;Edit&gt;.</p> <p>For Wrench ID see the last 4 characters of the serial number. 0 will not be displayed.</p>
	Tool is not configured with correct WLAN parameter values.	<p>→</p> <p>→ Setup on I-Wrench See chapter 6.2 Setup on I-Wrench</p>
	WLAN network settings of the controller and the access point differ.	→ See chapter 6.3.1 Adjusting network
	MAC address filter of the access point is active.	<p>→ Add the MAC address of the tool to the address list of the access point.</p> <p>For MAC address of the tool see submenu <i>Radio Setup</i>.</p>
	A firewall blocks port 3456.	<p>→ See chapter 6.2.2 Configure Wi-Fi settings.</p> <p>→ Reconfigure the firewall so that the specific IP/MAC address of the tool can use port 3456.</p>
	The RF channel at the access point is out of the tool-supported range.	<p>→ Change the channel setting of the access point relating to the country code.</p> <p>EU 1–13; World 1–11 (see Installation Instruction P1894E).</p>
	Tool is already assigned to a different controller.	→ Check whether any other controller has already established a connection to this tool. That means another controller use same IP address or Wrench ID.
	Ethernet connection	→ Check for connectivity from the mPro400GC to the Access Point.
IP address cannot be pinged	The IP address already exists in the network. In this case the tool does not connect.	<p>→ See chapter 6.2</p> <p>→ Setup on I-Wrench.</p> <p>→ Check the physical connection (RSSI values).</p> <p>→ Check the assigned IP address.</p>
WLAN communication partly interrupted.	Distance between access point and tool is too great.	→ Move the access point closer to the tool
	Tool is also assigned to a different controller.	<p>→ Check whether this tool (IP address) is assigned to any other controller.</p> <p>→ If so, delete the assignment on the other controller.</p> <p>A tool can only be assigned to one controller.</p>

### 15.3 Bluetooth communication between controller and I-Wrench

Error	Possible Cause	Action
No serial communication between controller and base station.  The asterisk * is not present on I-Wrench display	Wrong serial cable is used.	→ Use a null modem cable (crossed).
	Wrong port is selected for connection with the controller.	→ Check the port settings in the <i>Tool Setup</i> screen of the controller.
		→ Check that the serial cable is connected to the selected port.
	Selected port is used for serial data transmission. Don't use the same port simultaneously for serial communication and infrared communication.	Check the following settings in the <i>Communications &gt; Data Transmission</i> screen of the controller. → Is serial data communication serial data transmission is enabled? (The protocol is set to anything except NONE) → If the same port is being used, select a different port or disable serial data transmission.  Checking is required for all tools.
	Power outlet not active.	→ Check the voltage at the outlet socket where the base station is plugged in for power supply.
No bluetooth communication is possible between controller and tool.  The asterisk * is not present on I-Wrench display	Settings are not configured correctly.	→ Check that Bluetooth settings in submenu <i>Radio Setup</i> of the tool.
	Distance between base station and tool is too great.	Distance can be up to 98 ft. (30 m) → Move the tool close to the base station to check whether communication is successful. → If so, increase output power on base station and on the tool, or move the base station closer to the tool.
RF communication is partly interrupted..	Output power is too low.	→ Increase the output power of the base station and of the tool.
	Too many tools on the same channel.	→ Use different channels for different base stations.
Distance for bluetooth communication is shorter than expected	Output power is too low.	→ Increase the output power of the base station and of the tool.
	Location of the base station bad.	→ Move the base station to a location where there is an unobstructed line of view between the base station and the tool.

### 15.4 Barcode Scanner

Error	Possible Cause	Action
Barcode scanner does not activate when <↓> is pressed.	Parameter for Part-ID is not set to <b>Yes, interlocked</b> .	→ At the controller select in <i>Communications &gt; Part-ID &gt; Activated &gt; Yes, interlocked</i> . → At the I-Wrench check if on <i>Main Menu Screen &lt; Setup &gt; Setup &gt; Barcode Use</i> is enabled.
Barcode is not read.	Barcode scanner window is not clean.	→ Clean the window by using a damp cloth and a conventional window cleaner.
	Barcode type is not supported.	→ Use 1-D Barcode Type.

## 16 Spare parts

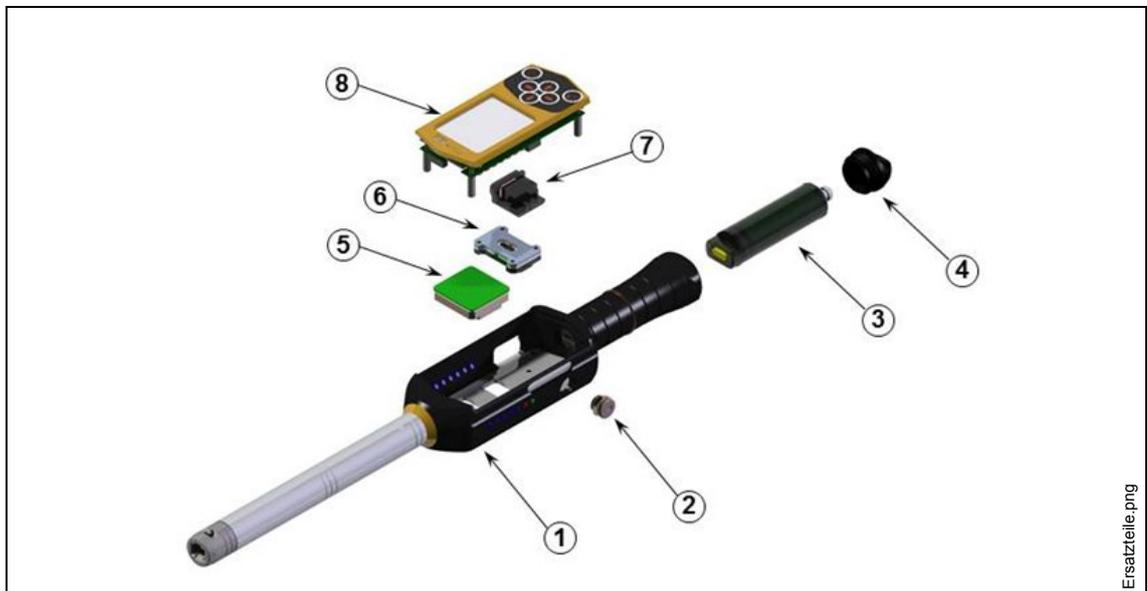


Fig. 53: Spare Parts

Key Number	Part Number	Description
1	313 11 0050	Group body + transducer 15 Nm
	313 11 0051	Group body + transducer 30 Nm
	313 11 0052	Group body + transducer 50 Nm
	313 11 0053	Group body + transducer 70 Nm
	313 11 0054	Group body + transducer 100 Nm
	313 11 0055	Group body + transducer 200 Nm
	313 11 0056	Group body + transducer 300 Nm
	313 11 0057	Group body + transducer 400 Nm
	313 11 0058	Group body + transducer 600 Nm

Key Number	Part Number	Description
	313 11 0059	Group body + transducer 800 Nm
	313 11 0060	Group body + transducer 1000 Nm
	313 11 0061	Group body + transducer 1200 Nm
2	313 21 0054	USB internal connector with cable
3	313 21 0042	Battery
4	323 41 0024	Battery cap
5	197 14 0002	Wi-Fi Module
6	197 14 0014	PC Module
7	197 14 0005	Bar Code Reader Module
8	313 21 0075	Electronic PC board assembly with LCD and cover

## 17 Technical Data

### 17.1.1 Dimensions, Weight and Torque Capacity

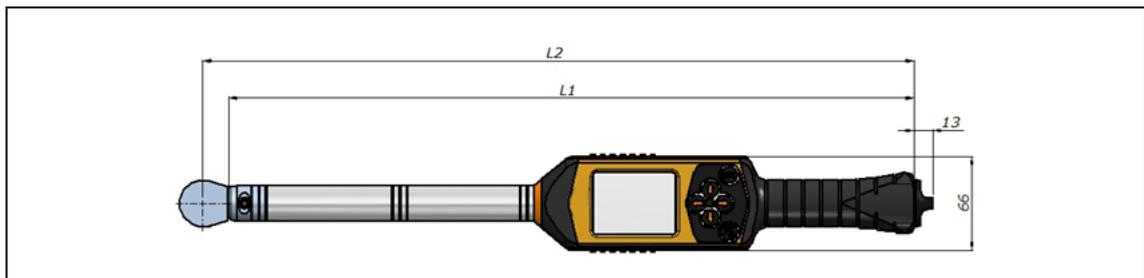


Fig. 54: Dimensions

Torque Capacity Nm	Connection (end- Fitting)	L1 mm	L2 Inch (mm)	Weight Lb (kg)
1,5–15	9x12	375	15.47 (393)	1.76 (0,80)
3–30	9x12	375	15.47 (393)	1.90 (0,86)
7–70	9x12	480	19.61 (498)	2.05 (0,93)
10–100	9x12	480	19.61 (498)	2.05 (0,93)
20–200	14x18	604	24.76 (629)	3.31 (1,50)
30–300	14x18	754	30.67 (779)	4.10 (1,86)
40–400	14x18	854	34.61 (879)	4.41 (2,00)
60–600	14x18	1032	41.61 (1057)	8.05 (3,65)
80–800	Ø 20	1250	52.36 (1330)	11.24 (5,10)
100–1000	Ø 20	1530	63.39 (1610)	13.78 (6,25)
120–1200	Ø 20	1635	67.52 (1715)	15.43 (7,00)

## 17.2 Measurement accuracy

Deviation	
± 0,5%	20%...100% of the torque capacity
± 1%	10%... 20% of the torque capacity
± 0,1°	Display deviation of the angle display

## 17.3 Performance

Feature	Data
Internal Memory	1 GB
Stores	20,000 results 20,000 curves 1,000 programs settable
Screen	2.8" High Resolution Touch-Screen
Color display	320 x 240 pixel, 65535 colors
Keyboard (for switching power on/off and navigation)	
Optional Barcode scanner (to add Part Identification)	

## 17.4 Power supply

Feature	Data
Rechargeable and replaceable Lithium	Ion Internal battery, rated
Battery capacity	3.7 VDC at 2,700 milli-amp
Battery life between re-charge	9 h
Re-charge time using a PC via USB cable connection	6 h
Re-charge time using external, optional battery charger	4 h

## 17.5 External Battery Charger

Feature	Data
Input Power	100 to 240 VAC at 50 / 60 Hz
Output Power	5,0 VDC at 0,7 amp

## 17.6 Ports, Inputs and Outputs

- Mini -B USB 2.0 for data and optional battery charger connection
- 4 Pin Connector for battery charging by optional cradle
- Keyboard and touch screen for programming and navigation.
- Optional Bar Code Laser Scanner
- 7 LED Indicator lights
- Wi-Fi support

## 17.7 Communication

Feature	Data
Standard	IEEE 802.11a/b/g/n
Safety	<ul style="list-style-type: none"> <li>• WEP 64/128-bit encryption</li> <li>• WPA-TKIP/WPA2-AES(CCMP)</li> <li>• 802.1x EAP authentication LEAP, PEAP<sup>1</sup>, EAP-TTLS</li> </ul>
Range	Typically up to 50 m (164' 0.5")
Channels	<ul style="list-style-type: none"> <li>• 1 - 13 (2.412 - 2.472 GHz)</li> <li>• 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140, 149, 153, 157, 161, 165 (5.180 – 5.825 GHz)</li> </ul>
Transmission power	20 dBm typ. @ 2.4 GHz 15 dBm typ. @ 5.0 GHz
Sensitivity	-94 dBm (typ. @ 1 Mbps, 2.4 GHz) -80 dBm (typ. @ 5 GHz)
Modulation	DSSS / OFDM
Standards	EN 300 328-1 V1.7.1 EN 301489-1, -17 EN 301893 V1.5.1 EN 60950 FCC Part 15 IC (Industry Canada)

## 17.8 Fastening Strategies

The term fastening strategy refers to the tightening process when fastening a threaded joint. The measurement of torque when used to control the end of the fastening cycle and (monitor) measurement of the rotated angle of the nut or bolt is a fastening strategy named *Torque Control, with Angle Monitor*. This means that Torque is used to end the fastening cycle. A high and low acceptable value for Torque and Angle creates a rectangular “window” defining an acceptable joint. Conversely, when Angle is used to end the fastening cycle with a (monitor) measurement of Torque, the strategy is named *Angle Control with Torque Monitoring*.

This fastening strategy discussion is based on the fastening cycle limits as preset by the User and results are measured by the mPro400GC controller when connected to the I-Wrench.

The mPro400GC Controller refers to **Torque controlled with Angle monitoring as Sequence 30** and **Angle controlled with Torque monitoring as Sequence 50**. Both of these strategies will be explained in detail separately:

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<sup>1</sup> PEAP (without client certificate)

**17.8.1 Sequence 30: Torque controlled with Angle monitoring**

Shut-off torque controlled fastening sequence with torque control and tightening angle monitoring. This fastening sequence assumes a fast pretightening stage.

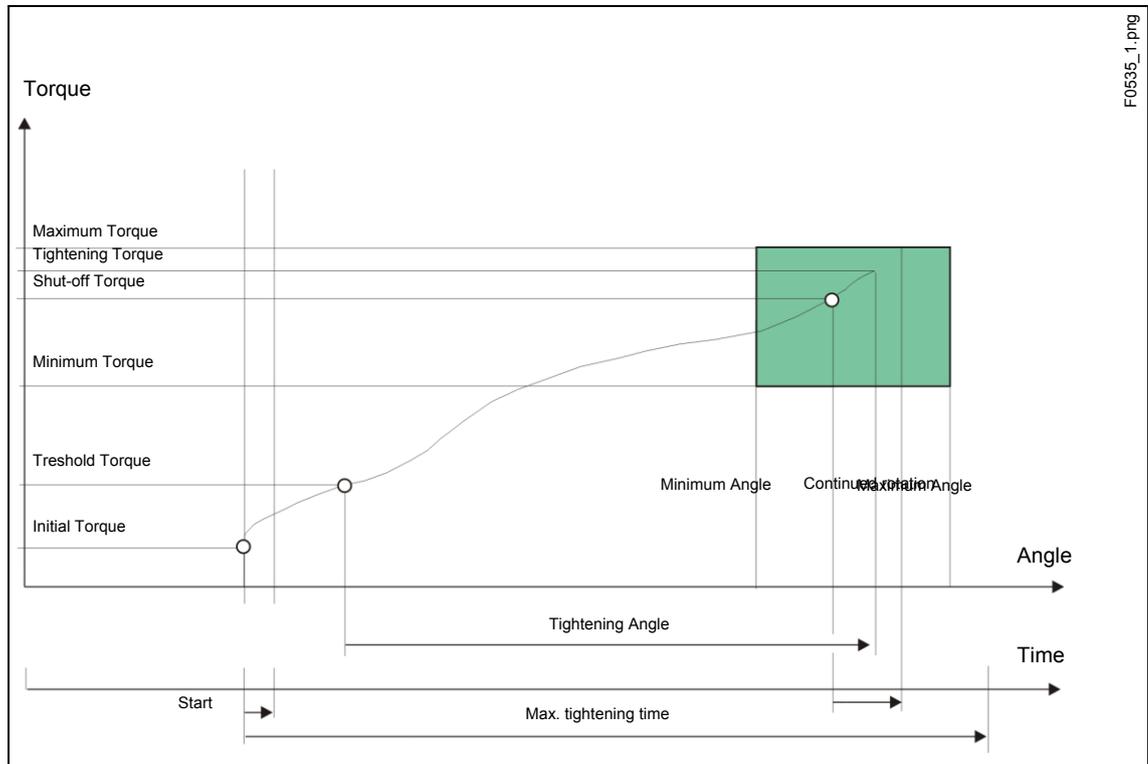


Fig. 55: Sequence 30

Via the installed transducer, the torque and the tightening angle occurring during the fastening sequence are measured and processed in the nutrunner controller. After the *threshold torque* is reached, the *tightening angle* is measured. When the shut-off torque is reached, the tool signals that to the worker. From this point on the angle and the maximum torque are measured and fed to the nutrunner controller as tightening torque along with the evaluation of the fastening sequence.

Peak torque and the tightening angle must be within the specified limits in order for the rundown to be evaluated as OK. If the maximum tightening angle is exceeded before the shut-off torque is achieved, the rundown is stopped and evaluated as NOK.

When the Trigger torque is reached, the torque trace is recorded and can be viewed via the trace function. This parameter isn't changeable.

The following parameters are entered into the nutrunner controller:

Parameters	Explanation	Range of values
Maximum Angle (deg)	High limit for angle reached and safety shut-off value	0 ... 9 999
MaximumTorque (Nm)	High limit of torque reached.	0.1 ... 1.2 x TQ capacity
Minimum Angle (deg)	Low limit of angle reached	0 ... 9 999
Minimum Torque (Nm)	Low limit of torque reached	0 ... 1 × Torque calibration value <sup>2</sup>

<sup>2</sup> Subsequent plausibility test related to the tool capacity (software-dependent)

Parameters	Explanation	Range of values
Shut-off Torque (Nm)	Shut-off Torque of the stage	0.1 ... 1 x TQ capacity
Torque Averaging Filter	Number of measured values used for filtering torque by averaging. Eliminates noise spikes that may lead to unnecessary rejects.	1
Treshold Torque	When this torque is exceeded, the angle counting begins.	0...1.2 x Torque cal. factor
Trigger Torque (Nm)	Beginning of measurement recording for the trace display	0

**17.8.2 Sequence 50: Angle controlled with Torque monitoring**

Shut-off angle controlled fastening sequence with tightening angle monitoring and torque control. This fastening sequence assumes a fast pretightening stage

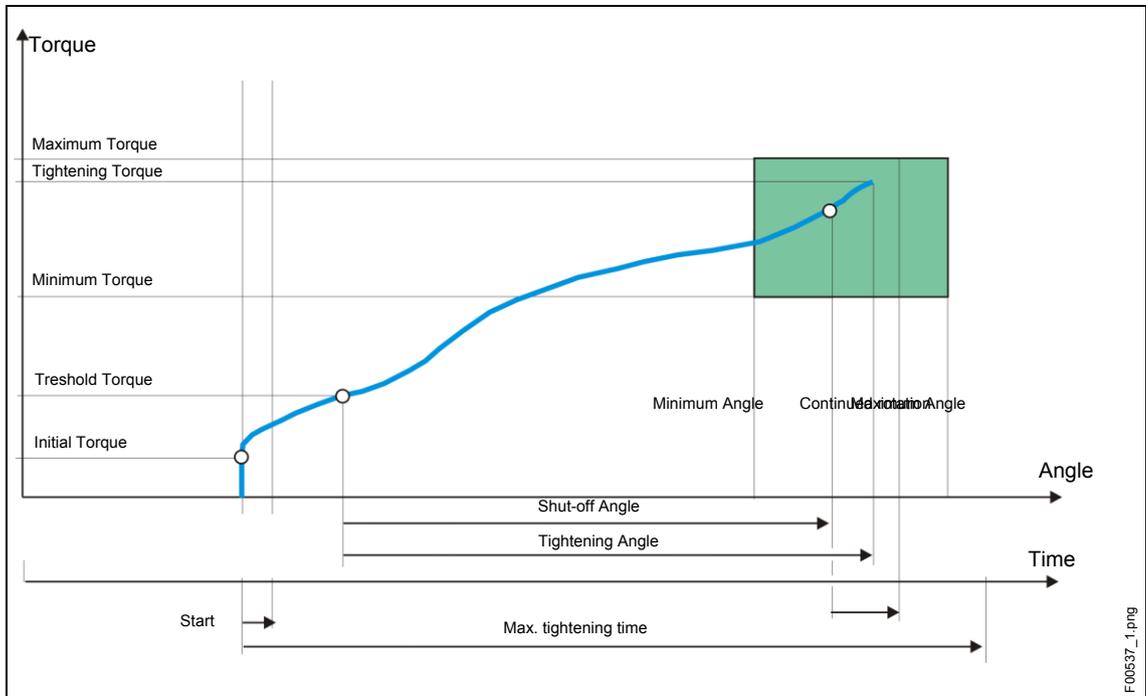


Fig. Diagramm 50

The torque occurring during the fastening sequence as well as the tightening angle is measured by the installed transducer and processed in the nutrunner controller. When the shut-off angle is reached, the tool signals this to the worker. From this point on the angle and the maximum torque are measured and fed to the nutrunner controller as tightening torque along with the evaluation of the fastening sequence.

If the maximum torque parameter is exceeded before the angle shut-off is achieved, the tightening is stopped and evaluated as a NOK.

When the Trigger torque is reached, the torque trace is recorded and can be viewed via the trace function. This parameter isn't changeable.

The following parameters are entered into the nutrunner controller:

Parameters	Explanation	Range of values
Maximum Angle (deg)	High limit for angle reached and safety shut-off value	0 ... 9 999
Maximum Torque (Nm)	High limit of torque reached.	0.1 ... 1.2 x TQ capacity
Minimum Angle (deg)	Low limit of angle reached	0 ... 9 999
Minimum Torque (Nm)	Low limit of torque reached	0 ... 1 × Torque calibration value <sup>3</sup>
Shut-off Angle (Nm)	Shut-off Angle of the stage	0 ... 9 999
Torque Averaging Filter	Number of measured values used for filtering torque by averaging. Eliminates noise spikes that may lead to unnecessary rejects.	1
Threshold Torque	When this torque is exceeded, the angle counting begins.	0...1.2 x Torque cal. factor
Trigger torque (Nm)	Beginning of measurement recording for the trace display	0

## 18 Accessories

For ordering Accessories please contact our Sales & Service Center.

### 18.1 Cradle

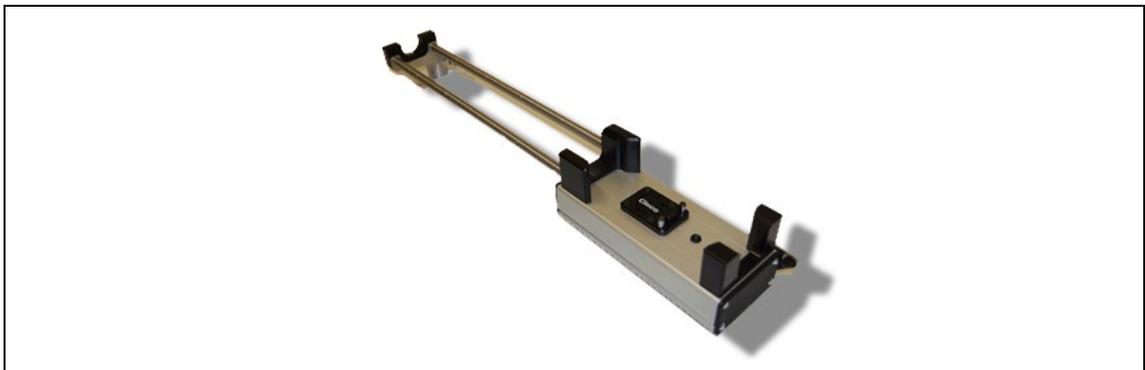


Fig. 56: Cradle

<sup>3</sup> Subsequent plausibility test related to the tool capacity (software-dependent)

## 18.2 Battery

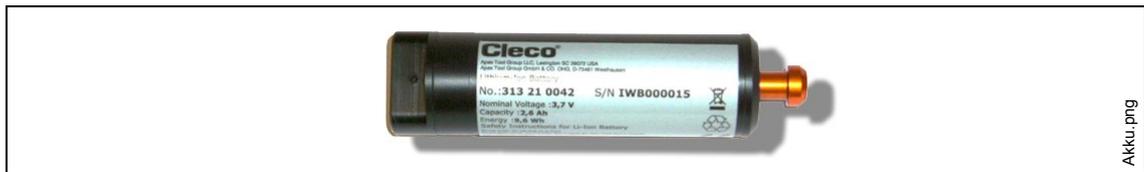


Fig. 57: Battery

Feature	Data
Type	Lithium Ion (Li-ion).
Order no.	313 21 042
Nominal voltage	3.7 VDC
Capacity	2,600 mAh
Weight	84 g

The I-Wrench battery is mounted internally within the tool handle. It is removable and requires no soldering for removing or replacing.

## 18.3 Tool and Display Rubber Protective Cover



Fig. 58: Rubber Protective Cover

The cover provides a secure non-slip protection surface surrounding the LCD Display. The cover slip over the LCD display section and contains a removable clear acrylic cover which protects the LCD display surface. When the acrylic cover is in place, the touch screen capability is disabled.

→ If touch screen capability is desired, remove the clear acrylic cover.

## 18.4 Ratches and Open End Heads with Recognition



Fig. 59: Automatic Head / Socket Recognition

The mPro400GC controller can synchronize a tool head number with pre-programmed applications, matching torque/angle parameters to head sockets. The recognition is a good method to prevent fastening rundowns with an incorrect set of torque or angle target parameters. Therefore a tool head with a built-in microchip is needed.

The microchip contains the following data:

- Tool head number.  
This number can be programmed from 1 to 999. The ID is usually selected as coincident with the fastening application number.
- Torque correction factor
- Angle correction factor

A User can program the head using the Optional Tool Recognition Programming Unit.

### Available models

- Fixed, no ratchet
- Ratchet
- Crow Foot
- Tubenut

## 18.5 Tool Recognition Programming Unit



Fig. 60: Tool Recognition Programming Unit

The mPro400GC controller can synchronize a tool head number with pre-programmed applications, matching torque/angle parameters to head sockets.

The tool recognition programming unit includes

- the unit shown above
- USB adapter cable
- Software ToolEditor

## 18.6 Aluminum Storage Case



Fig. 61: Aluminum Storage Case

The I-Wrench can be stored in an optional aluminum storage case. This is a rugged, industrial aluminum exterior case with internal foam cutout shock protection panels.

## 18.7 External battery charger



Fig. 62: External battery charger

### Available models

Model	Order no.	Description
EC-1	197140017	Charges one external battery at a time.
EC-2	197140018	Charges two batteries at the same time following the same procedure.

## 19 Service

### 19.1 Tool Repair



If repair of the I-Wrench is required, send the complete I-Wrench to an Apex Tool Group Sales and Service Center. Twelve centers are presently located in the United States; in addition to one each in Germany, Mexico, England, and Brazil.

A repair is only permitted by Apex Tool Group authorized personnel. If the User attempts to open or repair the tool, the tool warranty may be voided.

## 20 Disposal

### CAUTION!



Damage to persons and the environment

Due to improper disposal of operating materials. Components of the I-Wrench pose risks to health and environment.

- Dispose of individual components of the I-Wrench in a segregated and proper manner.
- Follow the instructions and specifications of the manufacturer.
- Follow the general prevailing disposal guidelines.
- Follow the locally applicable regulations



In the United States, battery disposal is presently controlled by local and state ordinances.

Although Lithium-Ion batteries are not presently classified as hazardous waste, batteries are not always permitted to be disposed in normal garbage pickup.

- Dispose batteries at a local certified recycling center, or at a consumer store which is registered as a recycling center for specific products.

In the United States, there are a large number of local recycling centers available all over the country. To locate a recycling center near you, telephone 1-800-8-BATTERY or 1-877-2-RECYCLE

### 20.1 Battery Disposal in other regions

The definition of hazardous waste applying to batteries is different from region to region. Following defective battery removal, disposal must be in accordance with local regulations.

### CAUTION!



Risk of fatal injury

- Do not crush the battery
- Do not heat up or burn
- Do not short circuit
- Do not open
- Use only recommended charger from Apex Tool Group.



## Sales & Service Centers

**Note:** All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

Brazil

**Apex Tool Group  
Sales & Service Center**  
Av. Liberdade, 4055  
18087-170 Sorocaba, SP  
Brazil  
Phone: +55-15-3238-3820  
Fax: +55-15-3238-3938

France

**Apex Tool Group S.N.C.**  
25 Rue Maurice Chevalier  
B.P. 28  
77831 Ozoir-la-Ferrière  
Cedex, France  
Phone: +33-1-6443-2200  
Fax: +33-1-6440-1717

Mexico

**Apex Tool Group México  
S. de R.L. de C.V.**  
Vialidad El Pueblito #103  
Parque Industrial  
76220 Querétaro  
Mexico  
Phone: +52 (442) 211-3800  
Fax: +52 (442) 103-0443

USA – Seattle, WA

**Apex Tool Group  
Sales & Service Center**  
2865 152nd Avenue N.E.  
Redmond, WA 98052  
USA  
Phone: +1 (425) 497-0476  
Fax: +1 (425) 497-0496

Canada

**Apex Tool Group  
Sales & Service Center**  
7631 Bath Road  
Mississauga, Ont. L4T 3T1  
Canada  
Phone: +1-866-691-6212  
Fax: +1-905-673-4400

Germany

**Apex Tool Group  
GmbH & Co. OHG**  
Industriestraße 1  
73463 Westhausen  
Germany  
Phone: +49-7363-81-0  
Fax: +49-7363-81-222

USA – Detroit, MI

**Apex Tool Group  
Sales & Service Center**  
2630 Superior Court  
Auburn Hills, MI 48326  
USA  
Phone: +1 (248) 393-5640  
Fax: +1 (248) 391-6295

USA – York, PA

**Apex Tool Group  
Sales & Service Center**  
3990 East Market Street  
York, PA 17402  
USA  
Phone: +1-717-755-2933  
Fax: +1-717-757-5063

China

**Apex Power Tools Trading  
(Shanghai) Co., Ltd**  
Building A8, No.38,  
Dongsheng Road Pudong,  
Shanghai  
China 201201  
Phone: +86-21-60880320  
Fax: +86-21-60880298

Hungary

**Apex Tool Group  
Hungaria Kft**  
Platánfa u. 2  
9027 Győr  
Hungary  
Phone: +36-9666-1383  
Fax: +36-9666-1135

USA – Lexington, SC

**Apex Tool Group**  
670 Industrial Drive  
Lexington, SC 29072  
USA  
Phone: +1 (800) 845-5629  
Phone: +1 (803) 951-7544  
Fax: +1 (803) 358-7681

England

**Apex Tool Group GmbH &  
Co. OHG**  
C/O Spline Gaugesl  
Piccadilly Tamworth  
Staffordshire B78 2ER  
United Kingdom  
Phone: +44-1827-872-771  
Fax: +44-1827-8741-28

India

**Apex Power Tools  
India Private Limited**  
Gala No. 1, Plot No. 5  
S. No. 234, 235 & 245  
Indialand Global Industrial Park  
Taluka-Mulsi, Phase I  
Hinjawadi, Pune 411057  
Maharashtra, India  
Phone: +91-20-66761111

USA – Los Angeles, CA

**Apex Tool Group  
Sales & Service Center**  
6881 Stanton Avenue, Unit B  
Buena Park, CA 90621  
USA  
Phone: +1 (714) 994-1491  
Fax: +1 (714) 994-9576

**Apex Tool Group GmbH & Co. OHG**  
Industriestraße 1  
73463 Westhausen  
Germany  
Phone: +49-7363-81-0  
Fax: +49-7363-81-222  
[www.apexpowertools.eu](http://www.apexpowertools.eu)

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