Cleco®
Production Tools

Instruction Manual
P2291BA
REV J | 2023-07

LiveWire™

47BA...

Cordless EC Tool

For additional product information visit our website at www.ClecoTools.com

Disclaimer

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Contents

1 For This Instruction Manual

The original language of this Instruction Manual is German. This Instruction Manual is intended for any persons working with this tool that do not carry out any programming

Softwareversion: S169252-(...)

The Instruction Manual has the following purposes:

- provides important notices for safe and effective operation.
- describes the function and operation of the cordless EC tool.
- serves as a reference for technical data, service intervals, and spare part orders.
- indicates options.

Further Documents

Number	Document type
P2260JH	Installation Manual WLAN data transmission, Cordless EC tool
P2372JH	Installation Manual LiveWire Utilities
P1730E	Procedure description Bolted joint diagrams
P2280SW	Programming Manual mPro400GC Standard Software
P(…)MA	Assembly instructions for Platform Accessories, see 6 Accessories, page 14
P3248C	EG EC Declaration of Conformity Cordless EC tool

Symbols In The Text

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

Symbols In Graphics

	Movement in one direction
	Function and force

Abbreviation

Abbreviation	Description
47BA(…)	Stands for all versions of the cordless EC tool/LiveWire 1 described here.
47BA(…)L	Stands for all versions of the cordless EC tool/LiveWire 2 described here.
EV	Stands for all versions of the power supply described here: Battery pack or Power module.
LMC	Stands for the LiveWire Memory Chip memory module.

2 Safety

2.1 Warnings and Notes

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

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

Danger

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

Warning

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

Caution

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

Note

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

General notes

Includes application tips and useful information but no hazard warnings.

Structure Of Warnings

Caution

Type and source of danger.

Possible consequences of non-observance.

▶ Measures to avoid danger.

Symbols On The Product

Be sure that you understand their meaning before operation.

Class 2 laser product

CE compliant

The product corresponds to the prescribed technical requirements in Europe.

Read all instructions.

Observe generally valid disposal guidelines such as, in Germany, the Electrical and Electronic Equipment Act (ElektroG) and the Battery Act (BattG).

CE compliant

The product corresponds to the prescribed technical requirements in Europe.

2.2 Operator training

All operators must be trained and experienced before operating the tool. The tool may only be repaired by authorized personnel.

2.3 Intended use

The tool is a part of the APEX tightening system and is exclusively intended for fastening and releasing threaded fasteners.

- Use only in connection with a nutrunner controller of the mPro400GC series and the accessories and cables approved by APEX.
- Only operate with a power supply from APEX.
- Do not use as a hammer or for re-bending.
- Do not open it or modify it structurally.
- Do not use it in areas where there is a risk of explosion.
- Only in EMC Limit Class A (electromagnetic immunity for industrial areas).

2.4 Standards

It is mandatory that national, state, and local codes and standards be followed. Other type-specific standards see *Technical Data*.

2.4.1 FCC and IC compliance

This product complies with Part 15 of the FCC Rules. Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this product. Operation is subject to the following two conditions:

- this product may not cause harmful interference, and
- this product must accept any interference received, including interference that may cause undesired operation.

FCC Responsible party

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This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.4.2 Canada conformity

Operation satisfies the following two prerequisites: (1) the device does not cause any impermissible failure, and (2) the device accepts failure, including failures which cause unwanted operation of the device.

2.4.3 EMC, noise, vibration

For the currently observed EMC standards, emission sound pressure levels and vibration values, see the EC Declaration of Conformity.

2.5 General Power Tool Safety Warnings

⚠ **WARNING! Read all safety warnings, instructions, illustrations and specifications provided with this power tool.** *Failure to follow all instructions listed below may result in electric shock, fire and/or serious injuries.*
Save all warnings and instructions for future reference.
The term "power tool" in the warnings refers to mains-operated (corded) power tool or battery-operated (cordless) power tool.

1 Work Area Safety

a) **Keep your work area clean and well lit.** *Cluttered or dark areas invite accidents.*
b) **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** *Power tools create sparks which may ignite the dust or fumes.*
c) **Keep children and bystanders away while operating a power tool.** Distractions can cause you to lose control.

2 Electrical Safety

a) **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.** *Unmodified plugs and matching outlets will reduce risk of electric shock.*
b) **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators.** *There is an increased risk of electric shock if your body is earthed or grounded.*
c) **Do not expose power tools to rain or wet conditions.** *Water entering a power tool will increase the risk of electric shock.*
d) **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electric shock.*

3 Personal Safety

a) **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** *A moment of inattention while operating power tools may result in serious personal injury.*
b) **Use personal protective equipment. Always wear eye protection.** *Protective equipment such as a dust mask, non-skid safety shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries.*
c) **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.** *Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.*
d) **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
e) **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.
f) **Dress properly. Do not wear loose clothing or jewellery. Keep your hair and clothing away from moving parts.** Loose clothes, jewellery or long hair can be caught in moving parts.
g) **Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles.** *A careless action can cause severe injury within a fraction of a second.*

4 Power Tool Use And Care

a) **Do not force the power tool. Use the correct power tool for your application.** *The correct power tool will do the job better and safer at the rate for which it was designed.*
b) **Do not use the power tool if the switch does not turn it on and off.** *Any power tool that cannot be con-*

trolled with the switch is dangerous and must be repaired.

c) **Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools.** *Such preventive safety measures reduce the risk of starting the power tool accidentally.*

d) **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.** *Power tools are dangerous in the hands of untrained users.*

e) **Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** *Many accidents are caused by poorly maintained power tools.*

f) **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** *Use of the power tool for operations different from those intended could result in a hazardous situation.*

g) **Keep handles and grasping surfaces dry, clean and free from oil and grease.** *Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.*

5 Service

a) **Have your power tool serviced by a qualified repair person using only identical replacement parts.** *This will ensure that the safety of the electric tool is maintained.*

2.6 Specific Safety Instructions For Power Tools

The term "power tool" in the warnings refers to mains-operated (corded) power tool or battery-operated (cordless) power tool

a) Do not exceed a total tool cable length of 45 m.
Exception:
- 30 m when used with an mPro400GCD-S(H)-STO.
- 30 m when used with 70 series tools.

b) Our insulation is not insulation in the sense of VDE standards: Hold the device at the insulated handle surfaces when you perform work where the screw can strike hidden power lines or your own power cable. Contact between the screw and a live power line could energize metal parts of the tool and cause an electric shock.

c) Hold the tool firmly. Be prepared for torque reaction.

d) Reaction bars are recommended in applications with limited space and when using:
- Inline tools used above 4 Nm.
- Pistol tools used above 10 Nm.
- Angle tools used above 60 Nm.

e) NEVER rest your hand on the reaction bar when working.

f) Check that the suspension bail is properly secured to the balancer.

Personal Protective Equipment

Risk of injury by being wound up in and caught by machinery

a) When working with rotating parts, it is not permitted to wear gloves. Recommendation: Freely rotating *u-GUARD* protected fastening tools from APEX.

b) Wear a hair net, if necessary.

Power Tool Use And Care

a) Only use bits or sockets designed for industrial use with machine-controlled tools.

b) Make sure that the bit or socket is securely inserted.

c) Do not attach the bit or socket to the screw head at an angle.

d) Inspect the bit or socket for visible damage and cracks. Replace damaged screw bits immediately.

e) Cordless EC tools: Do not open the battery pack.

2.7 System Relevant Safety Instructions

Follow national, state and local safety and connection standards during installation. The standards take precedence over the information in this section.

- ▶ Do not make any modifications to the controller, protective devices, or accessories without prior written authorization from Apex Tool Group.
- ▶ Do not attempt to open the controller or components of the controller for troubleshooting or other work on the device. In the event of a fault, any intervention can result in serious injury from electric shock.

  Operation with the device open may also cause the following:
  - An increased amount of emissions: may produce interference with other devices.
  - Reduced immunity from interference: may produce faulty results.
  - Loss of remaining warranty period.

Risk Of Injury Due To Electric Shock

The controller and tool can conduct current in the event of a fault. An electric shock can lead to cardiac arrest, cessation of breathing, burns, and serious or fatal injuries.

- ▶ Always turn off the controller before connecting power and tool cables, cleaning or removal from operation.
- ▶ Do not operate the tightening system if the housing, cable or tool are damaged.

Installation

- ▶ Ensure the controller is rigidly mounted and secured(see Quick Installation Guide).
- ▶ Organize cables and lines to avoid damage and tripping hazards.
- ▶ Observe the permitted cable bending radius.

In the event of a fault, high leakage currents may occur and cause injuries by electric shock.

- ▶ Use an approved power cable, with suitable ratings.

Prior To Initial Operation

- Only operate on a grounded power supply with a neutral conductor (TN system). Operation without a neutral conductoron (IT system) is not permitted.
- Ensure a standard-compliant PE connection is in place.
- A ground fault circuit interrupter (GFCI) type A is recommended to protect the supply line.
- Prior to initial operation, carry out the protective conductor measurement in accordance with the local regulations (in Germany, DGUV Regulation 3).
- Do not switch on the controller until all connections have been made correctly.

Operation

- Protect the controller from moisture.
- Immediately power off the controller in the event of unusual noise, heating or vibration from the tool.
- Disconnect the power cord and have the tightening system checked by qualified personnel and repaired if necessary.
- Never pull the power cord to remove from an outlet.
- Protect all cables from heat, oil, sharp edges and moving parts.
- Replace damaged cables immediately.
- Ensure tool and plug connections between the controller and tool are clean.
- Ensure the workstation and surrounding area are clean.
- Ensure the workstation provides adequate space for the operation being completed.
- When working with a nutrunner, remain alert at all times. Do not use a nutrunner if you are tired or under the influence of drugs, alcohol or medication. A moment of carelessness when working with a nutrunner may contribute to a life threatening situation.

Danger Due To Incorrect Torque Measurement

An undetected NOK tightening may contribute to a life-threatening situation.

- Recalibration (or capability analysis) is essential following incorrect use (crash, mechanical overload…).
- For Category A Tightenings (VDI 2862) which are critical for safety, activate a redundancy measurement (e.g., current redundancy).
- Introduce regular monitoring of measuring equipment for associated manufacturing equipment.
- Only conduct tightening operations with a properly functioning system. If in doubt, contact *Sales & Service Center*.

Danger Due To Unexpected Start Of The Motor Or An Expected But Missing Stop

Despite redundant controller parts and monitoring functions, an unexpected start of the machine can occur in very rare cases. Possible reasons may include, but are not limited to: Remote control of diagnostic functions, bit dump in the memory of the controller.

Mechanical hazards such as jars/jolts due to counter torques; risk of injury due to winding up and seizing can result from the tool.

- Use the tool at the designated grip points.
- Use the recommended reaction devices. For torques, reference appropriate tool instruction manual.
- After powering the controller on, wait until the boot cycle is completed, approximately 60 seconds, before powering it down again.

Maintenance

- The controller is generally maintenance-free.
- Consider local regulations for maintenance and servicing for all operating phases of the tightening system.

Cleaning

- Only clean the exterior of the tool using a dry or slightly damp cloth.
- Do not immerse the controller or tools in any liquids.
- Do not use a high pressure or abrasive cleaner.
- Disinfection of surfaces with alcohol-based disinfectant is permitted.

Repair

Repairs to the equipment are not permitted.

- Send the controller to a Authorized Cleco Production Tools *Sales & Service Center*.

Disposal

Components of the tightening system may present potential risks the environment. The tightening system contains components that can be recycled, as well as components that have specific disposal requirements.

- Follow local applicable regulations.
- First separate, then dispose of components.
- Collect auxiliary materials (oils, greases) and dispose properly.
- Separate the components of the packaging and dispose of them according to local regulations.
- Return defective equipment to an approved collection point or return it to the *Sales & Service Center*.

Observe local regulations for disposal of electronics and batteries. (In Germany, the Electrical and Electronic Equipment Act (ElektroG) and the Battery Act (BattG)):

- Used up batteries must be disposed of properly. Return depleted or defective batteries to an approved collection facility or to *Sales & Service Center* for recycling.

2.8

3 Items delivered

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

- Cordless EC tool
- This instruction manual
- Declaration of Conformity
- Tool Certificate
- Machine Capability Analysis (MCA)

4 Storage

For short-term storage and for protection against damage

▶ Place the tool in the tool holder.

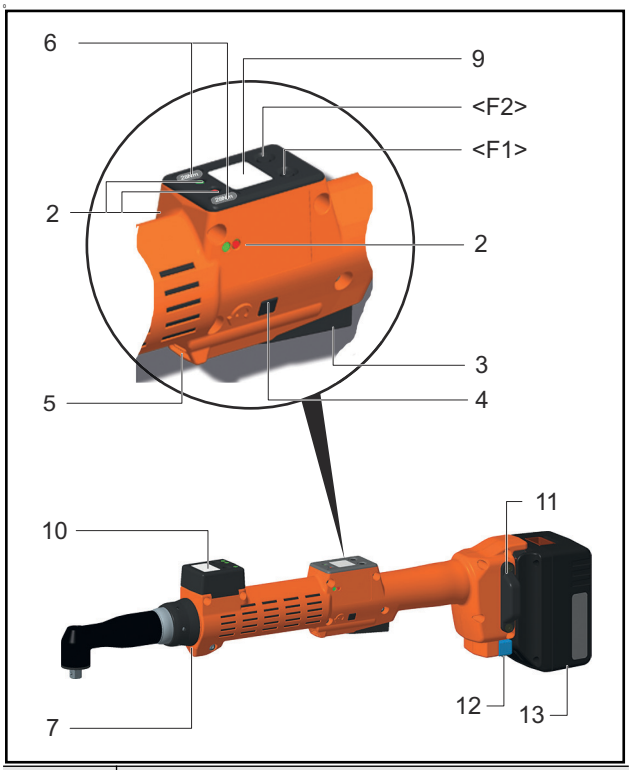
For storage longer than 100 hours

▶ Disconnect the battery pack from the tool.
The battery pack is discharged by the electronics integrated in the tool.

For the storage temperature, see *13.4 Ambient conditions, page 47.*

5 Product description

- Sturdy, brushless motor with resolver. Shutoff is torque/angle-controlled.
- LCD display with information on status, torque, and angle.
- Green OK and red NOK LED display provides information about current fastening result.
- LED lighting makes it possible to find the screw point quickly.
- Clockwise/counterclockwise rotation
- Fastening parameters are set with the controller or a PC.
- An exchangeable memory module (LiveWire Memory Chip) allows the quick exchange of identical tools, without changing the parameters.
- Depending on the type, data is transmitted between the control and the tool via
  - Infrared (IrDA)
  - WLAN
- Built-in acoustic signal.
- The *Stay alive* function of 15 seconds, prevents a restart during the battery change and thus saves time. The LEDs flash during this process (buffer mode).



Item	Designation
<F1>, <F2>	Function keys
2	LED display
3	Start button
4	Reverse switch
5	IrDA (infrared interface port)
6	Set torque – stick-on marking foil
7	LED lights for fast location of the fastening position

Item	Designation
9	LCD display with information on torque, angle, and status
10	Platform; 47BAYP(…) illustrated
11	Wireless module
12	LiveWire Memory Chip (LMC)
13	Power supply; battery pack 26 V illustrated

5.1 Operation elements

5.1.1 Function keys

Left function key <F1>

<F1>	Function
Press once.	• Confirm error message. • Programmable: Depending on how the key is programmed, actions can be carried out by pressing it briefly.
Press for two seconds	• Exit menu

Right function key <F2>

<F2>	Function
Press until the display shows the *Main menu* (refer to 9.3.4 Administration sub-menu, page 23).	• Activate menu.
Press for two seconds	• Select functions, if menu is activated. Alternatively, the start button can be pressed.

5.1.2 Start button

Depending on the setting, the start button has three functions:

- It activates the LED lighting.

▶ Press the start button halfway down and hold it.

- It starts the motor, the LED light goes out.

▶ Press the start button all the way down.

- It activates the barcode scanner.

▶ Press the start button all the way down.

5.1.3 Reverse switch

The reverse switch changes the rotation direction of the tool:

Clockwise rotation – for screwing in screws

▶ Press reverse switch as far as it will go.
→ When the start button is pressed *Active* appears on the LCD display.

Counterclockwise rotation – for loosening or screwing out screws

▶ Press reverse switch as far as it will go.
→ When the start button is pressed *Left* appears on the LCD display.

5.2 Functional elements

5.2.1 LED display

The LED display shows the respective operating status and the result of the last fastening sequence (see 8.2 Operating status, page 18):

LEDs	Operating status	Result after fastening cycle
Continuous green light	Active	OK
Continuous red light	Active	NOK
Flashing light Green – low frequency	Energy saver mode	
Off	Sleep	
If linking is selected on the controller:		
Green flashing light – high frequency	Active/Setting: Linking	Linking OK
Flashing red light	Active/Setting: Linking	Linking NOK

Software update

During the *software update*, the actual programming process is indicated by rapid flashing alternating at irregular intervals between red and green.

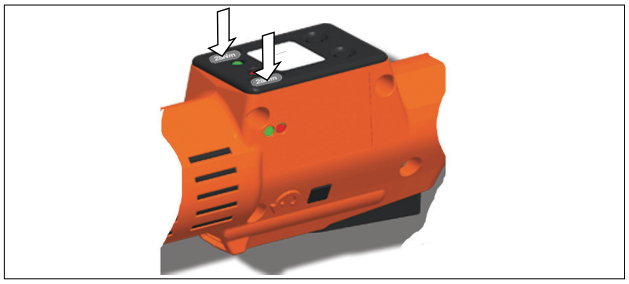
Do not interrupt programming by disconnecting the power supply during this phase.

5.2.2 IrDA interface port

The tool communicates with the controller over the tool holder via the IrDA interface port (infrared). For secure data transmission and for programming, place the tool in the tool holder with IrDA interface port

5.2.3 Identification – set torque (accessories, optional)

To identify the tool with the set torque, glue the corresponding marking foil to the right and the left of the LCD display.



5.2.4 LED lighting

LED lighting make it possible to quickly find the screw point.
3 different activation methods are possible. Which is used depends on the programming in the control:

- Activation by pressing the start button halfway down (5.1.2 Start button, page 11).
- Time-controlled beginning at start
- You also have the option of disabling it.

The range of the LED illumination is 120 mm.

5.2.5 Power supply

The power supply can take place via:

- 26 V / 44 V battery pack
- 48 V power module

The maximum tool speed depends on the power supply used. The higher the voltage of the power supply, the higher is the maximum speed of the tool. The maximum speed of the standard 26 V battery packs is specified on the tool.

Target speed parameter in screwing sequences must be adjusted to use the higher speeds with the 44 V/48 V power supply.

Note

If the tool is operated with a 44 V/48 V power supply for the first time, the maximum speed in the self-identification data of the tool is permanently increased.

In this is the case, note the following:

- ▶ Use at least the LiveWire software version S169251-123.
- ▶ Adjust the speed parameters in the reference values to be able to use the higher speeds.
- ▶ At higher speeds, higher reaction torques are to be expected. This can lead to surprise effects and risk of injury.
- ▶ Due to the higher kinetic energy at higher speed, the shut-off point can be passed over. Shut-off point adjustment need to be checked.
- ▶ Perform test tightening with the new parameters.
  - Tightening behavior may change and may require further adjustments.
  - Tightening time changes. Adjustment of process monitoring tmax is necessary..
  - With changing power supplies, the higher target speed with the battery pack 26 V can not necessarily be achieved (Δ tmax).
- ▶ To reset the maximum speed to the value of 26 V operation, contact the Apex Tool Group service department.

See instruction manual for battery pack/instruction manual for power module PM48.

5.2.6 LCD display

See 9 LCD display, page 19

5.2.7 Wireless interface

Communication	Required remote station
WLAN Standard IEEE 802.11ac/b/g/n	Access Point nach Standard IEEE ac/b/g/n

The tool uses this wireless interface port for continuous communication with the controller. This interface port is used to transmit both the parameters and the rundown results. Data transmission is possible in the *Active*, *Energy saver mode* and *Standby* operating modes, but not possible in *Sleep* (see 8.2 Operating status, page 18). Programming and setting up the wireless interface port are described in the programming manual of the controller.

After the tool is switched on, it can take up to 35 seconds until the communication is active.

5.2.8 LiveWire Memory Chip (LMC)

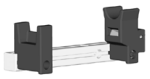
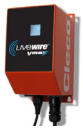
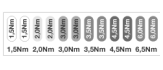
To permit simple replacement of tools in production, a replaceable LMC memory module is installed. When the tool is switched on, the network settings are read from the LMC chip and used to establish the WLAN connection. When the tools are changed, the LMC has to be installed in the new tool being used. Please refer to 7.4 Changing LMC, page 16.
The following data are stored on the LMC:

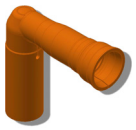
- MAC address
- Network name (SSID)
- Encryption
- Network key
- Use of the DHCP server
- IP address
- Subnet mask
- Gateway
- Country-specific settings
- Roaming settings
- Channel selection
- Network certifikates
- API license

The MAC address is defined by *Cleco* and cannot be changed. The other data can be changed via infrared connection of the tool to the controller.

6 Accessories

6.1 LiveWire 1, LiveWire 2

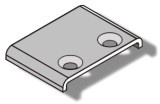
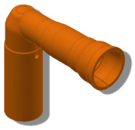
	Battery pack 26 V HC, li-ion, Order No. 961101PT
	Battery pack 44 V HC, li-ion, Order No. 961102PT
	Battery charger 26/44 V, li-ion Order No. 962085PT
	Adapter cable PM48 Order No. 961341-030 – 3 m Order No. 961341-060 – 6 m Order No. 961341-080 – 8 m Order No. 961341-100 – 10 m
	Extension cable: Adapter cable PM48 Order No. 961342-030 – 3 m Order No. 961342-060 – 6 m Order No. 961342-080 – 8 m Order No. 961342-100 – 10 m
	Tool holder with IrDA interface Order No. 935290 – up to 65 Nm Order No. 935999 – starting from 70 Nm …without IrDA interface, Order No. 935395 – up to 65 Nm Order No. 935998 – starting from 70 Nm
	RS232 extension cable (IrDA) Order No. 935154 – 3 m (9.84") Order No. 935155 – 6 m (19.7") Order No. 935157 – 10 m (32.8")
	Power Module PM48 Order No. 961350PT
	IrDA adapter Order No. 935170
	Laminate Order No. 935330: 1.5 – 28 Nm Order No. 935759: 30 – 49 Nm

	LMC Order No. 961461PT
	Protection, angle attachment P3 + P4 Order No. 937704PT – up to 28 Nm Order No. 937706PT – up to 35 Nm Order No. 937708PT – up to 48 Nm Order No. 942328PT – up to 65 Nm Secure with fabric tape, Order No. 935194PT: 2 windings on circumference, overlapping

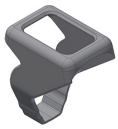
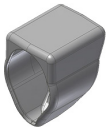
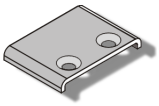
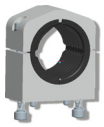
Platform

Order No.	Gyroscope	TAG SiMATIC RTLS	TAG Ubisense D4	TAG Ubisense 7000	TAG Nexonar	1D Reader	2D Reader	Tool light	For tool seires:	Angle	Pistol	Assembly Instruction
943691PT	×	×								x		P2242MA
943556PT		×					×			x	x	P2331MA
943566PT		×								x	x	P2331MA
962033PT		×					x			x	x	P2331MA
942039PT	×											P2242MA
943640PT	×				x						x	P2358MA
943642PT	×				x					x		P2358MA
943694PT	×		x				×			x		P2331MA
943695PT	×		x				×				x	P2331MA
943734PT	×						×			x		P2331MA
943735PT	×						×				x	P2331MA
937240PT						x						P2172MA
937377PT				x								P2171MA
937383PT				x								P2171MA
942169PT			x			x						P2262MA
942306PT				x		x						P2262MA
943045PT							×					P2314MA
943546PT			x									P2171MA
943641PT					x						x	P2358MA
943643PT					x					x		P2358MA
943696PT			x				×			x	x	P2331MA
961621PT						x						P2172MA
962034PT							×					P2314MA

6.2 Only for LiveWire 1

	Protection, display Order No. 937210PT
	Cover plate, alu Order No. 937255PT
	Platform: Protection scanner Up to 50 Nm Order No. 937648PT
	Platform: Protection scanner From 70 Nm Order No. 937649PT
	Protection, angle attachment P4 Order No. 937711 – angle attachment 70 Nm/90 Nm Secure with fabric tape, Order No. 935194PT: 2 windings on circumference, overlapping

6.3 Only for LiveWire 2

	Protection, display Order No. 937715PT
	Platform: Protection Order No. 937718PT
	Cover plate, plastic Best.-Nr. 943717PT
	Reaction bar Order No. 942040PT
	Suspension bail Order No. 942045PT
	Suspension bail,rotatable Order No. 942185PT
	Cover angle head 943440PT (65 Nm) Order No. 942328PT

7 Prior to initial operation

The tool was preset by Apex Tool Group. A setting for your specific fastening sequence must only be made with the controller or a PC by a qualified person. For more information, refer to the programming manual.

7.1 Use of reaction bar

Caution

Danger of hands being crushed.

- ▶ Always use a reaction bar for applications in restricted space and torques over 60 Nm.

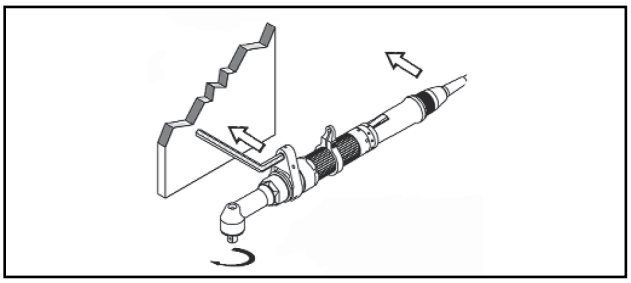


Fig. 7-1: Fixing the reaction bar

7.2 Setting up tool holder

1. Mount the tool holder on a stable base.
2. Place the tool in the tool holder with IrDA interface portData transmission is possible in the Active, Energy-saver mode and *Standby* operating modes, but not possible in *Sleep* mode (see 8.2 Operating status, page 18).

If the data transmission has been interrupted, the LCD display reports a synch error.

- ▶ Replace the tool in the tool holder.

The complete data transmission is acknowledged on the display with *Rest 512*.

3. Select the location in such a way that no outside light shines onto the tool holder.
   This can inhibit data transmission.
4. Lay the connection cable in such a way that there is no danger that persons can trip.
5. Programming see document P2372JH.

7.3 Charge battery pack

Battery pack is only partly charged upon delivery.

- ▶ It must be fully charged before initial use. See battery pack instruction manual.

7.4 Changing LMC

Note

Electrostatically sensitive component.

The electronic assemblies of the cordless EC tool can be destroyed or damaged by electrostatic discharge (ESD). This can lead to immediate failure, or to malfunctions at a later date.

- ▶ Note handling instructions.
- ▶ To avoid damage when changing the LMC, make sure that there is a potential equalization between the person and the tool.
- ▶ Possibly set up equipment in an ESD-protected environment. Recommendation for an ESD workplace: Electrically conductive work surfaces, anti-static straps, appropriate furniture, clothing and footwear, as well as grounding of all components.

LMC must only be changed with the battery is disconnected.

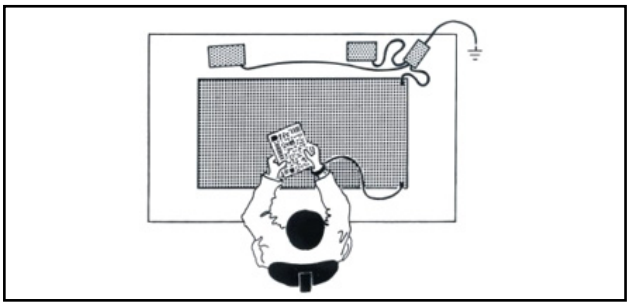
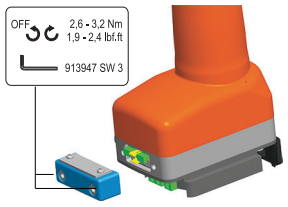
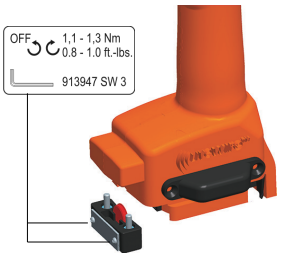


Fig. 7-2: ESD workplace

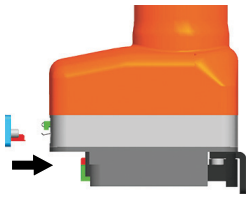
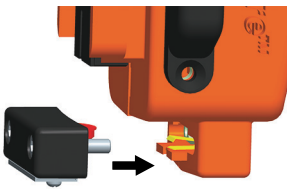
Removing LMC

1. Remove the battery.
2. Slacken the screws (M4, DIN 912).
3. Carefully pull the LMC out of the handle and replace it.

LiveWire 1	LiveWire 2
	

7.5 Inserting LMC

1. Carefully insert the LMC as shown in the illustration.
2. Tighten the screws (M4, DIN 912).
3. Insert the battery.

LiveWire 1	LiveWire 2
	

7.6 Activating platform accessories

See the corresponding installation instructions: Further Documents, page 5

1. Activate the LCD display with the start button.
2. *Select Administration* > *Platf*. To do this, select menu items with <F1>/<F2> and confirm with the start button

<Main Admini strati	**Platf None**

3. Enter *Pin 254*. To do this, count up with <F1> and confirm with the start button.

Pin 000

4. Select *Barcod* or *TAG* (firmware-dependent) and confirm with the start button.

Plattf 937› Barcod	**Plattf 937› TAG**	…

7.7 Performing a software update

▶ Perform update, see document P2372JH.
Do not remove the battery pack during the software update!

8 Initial operation

Warning

Risk of glove being pulled in due to rotating machine parts.

Risk of fingers being crushed or lost.

▶ Do not wear gloves when working with this tool.

8.1 Carrying out the rundown

Ensure secure position of the power supply before starting the tool. The tool is now ready for operation.

▶ Press and release the start button: Rundown is executed, the LCD display shows *Ready.*

Types with wireless transmission continuously communicate with the controller. The tool automatically receives the parameters and, when the rundown is complete, automatically sends the rundown results to the control system. Programming and setting up the wireless interface port are described in the programming manual of the controller.
Types without wireless transmission must be placed in the tool holder when the rundown is complete. The rundown results are transmitted and shown under the *Run screen* menu item.

8.2 Operating status

The following functions are available depending on the display:

The operating modes change in the following order.

Operating status	LED display	LCD display	Function
Active	Continuous light: Red – Fastening NOK Green – Fastening OK	On	screws Data transmission
[a] After 1 minute idle time automatic switch to:			
Energy saver mode	Green flashing light	Off	Data transmission
Automatic switch to the following after a further 10 minutes:			
Sleep	Off	Off	Data transmission not possible
Manual change from *Sleep* to *Active*: Press the start button fully down and hold it for about 1 second. For manual deactivation of the tool, disconnect the power supply.			

a.) Times are default values and can be programmed in the controller.

This operating mode maintains the logic supply for up to 15 seconds during the battery pack change:

Operating status	LED display	LCD display
Stay alive	Red-green flasing light alternately	Aus

9 LCD display

The LCD display on the tool is divided into the result display, status display, operating menu and system error messages.

9.1 Result display

The LCD display consists of a three lines, each with 6 characters, to display the status, torque and angle. The result display is updated after the rundown ends.

First line – result:

OK	Result is OK
NOK	Result is not OK
OFF	Torque encoder offset error
CAL	Torque encoder calibration error
ENC	Angle encoder error
IP	Current overload in output section
IIT	Requested motor output is too high
TMAX	Maximum fastening time exceeded
RC	Rundown terminated by disabled start signal
Tq<	Torque too low
Tq>	Torque too high
WI<	Angle too small
WI>	Angle too large
Error	Error occurred
AW<	Too few graphic values recorded for an evaluation (SEQ 31/51)
BLOC	Fastened to block / tightened screw fastened (SEQ 31/51)
IRED	Current redundancy error
JMP	Bit jump detected
MBO>	Torque has exceeded top evaluation torque (SEQ 31/51)
MBU<	Torque has fallen below bottom evaluation torque (SEQ 31/51)
MDSI	Safety torque exceeded (SEQ 31/51)
SS>	Time for stick-slip too large
SST	Too many stick-slip edges
TTT<	Time since TT too small
TTT>	Time since TT too large

The status is displayed in alternation with the Application being used.

Second line – Shut-off torque in Nm:

T	Shutoff torque

Third line – Shut-off angle in degrees:

A	Shutoff angle

The symbol at the top right shows an interrupted data connection to the control.

9.2 Status display

The status display is divided into the "Standard" and "Linking" modes. "Standard" is selected if "Linking" is not enabled at the control system.

▶ See *Navigator* > *Advanced* > *Linking*. The application is selected at the <Run Screen> or via the *Application Select* inputs.

No other status messages take priority. The tool is ready.

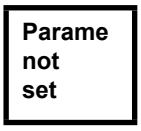
Number of remaining rundowns that can still be carried out until the rundown data memory is full and the rundown data have to be transmitted to the control.

All fastening sequences have been completed.

▶ Synchronize the tool with the control once again.

No fastening sequences have been initialized.

▶ Synchronize the tool with the control once again.



No fastening sequence parameters have been set.

▶ Check the Application and Tightening group selected on the control to determine whether the tool settings and process programming have been carried out.

Application locked.

▶ Synchronize the tool with the control once again.

Reject Releas Sync	Reject Release active. The Reject Release was programmed in the control. 1. See *Navigator > Advanced > Tool Group > Tightening > Reject Release.* 2. Depending on the programming, unlock the tool via the external input *NOK release* or Release on Backoff. For unlocking via the external input *NOK release*, set the external input and synchronize it with the control.
Sync Error	Error in last data synchronization with the control. ▶ Synchronize the tool with the control once again.
Tool not set	Tool has not yet been synchronized with a control. ▶ Synchronize the tool with the control for the first time.
Input Enable Missin	The *Tool Enable* input is missing. 1. Activate *External Tool enable* in *Process programming > Advanced >Tool Settings*. 2. Synchronize the tool with the control once again. This message can only appear if in *Navigator > Advanced > Tool Settings > External release* has been activated.
Need Part ID	No barcode was detected within the timeout or an invalid barcode was read. The display switches to *Expect barcod*. ▶ Scan the barcode in again.
Wait barcod enable	Tool waits for job from the control. If no job within 5 seconds: ▶ Scan the barcode in again.
Expect barcod	Tool waits for a barcode to be scanned.
Barcod accept	Barcode was read successfully and confirmed by the control.
WLAN init..	Initialization of WLAN chip and WLAN module.
Service in XXXXXX	Optional - XXXXXX rundowns remaining until next service.
Serv. Interv	Optional - Service interval—the tool is blocked. No rundowns possible. ▶ Return tool to *Sales & Service Centers* for service.

Additional messages in "Linking" mode

The regular sequence is carried out in automatic mode, which is configured by default. Only for the emergency mode is an emergency operation enabled or disabled via a scan.

P 1/16 0ZZ899 99	Linking display, if this is programmed in the job, here link position 1 of 16 for WK-ID 0ZZ89999.
N.Pos1 of 3 Rpl 0	First line: The next position to be fastened. Second line: Number of positions. Third line: Number of repetitions at this position in case of an NOK rundown.
Linkin No Result	Linking has been canceled without a batch result. Not all of the positions in the tightening group have been programmed. ▶ Check the Application and Tightening group selected on the control to determine whether the tool settings and process programming have been carried out.
Linking OK	Linking result OK.
Linking NOK	Linking result NOK.

Linkin locked Synch	Linking disabled. ▶ Synchronize the tool with the control once again.
Linkin No Job	Wait for end of transmission. ▶ Synchronize the tool with the control once again.

9.3 Operating menu

9.3.1 General

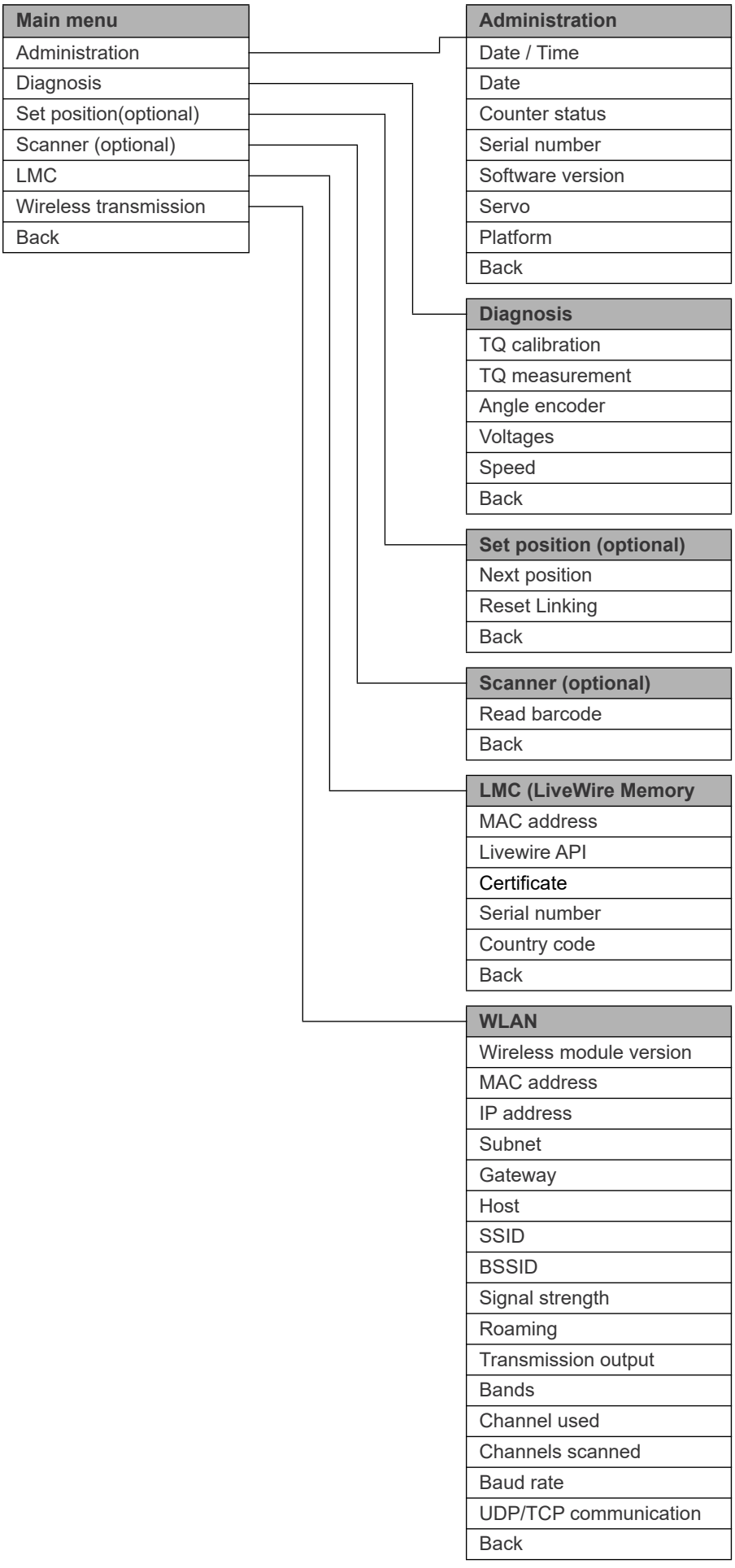
The operating menu on the tool is divided into a main menu and submenus. You can navigate through the menus using the two function keys below the LCD display. In the following description, <F1> is used for the left function key and <F2> is used for the right function key. The menu is activated by pressing the right function key, <F2>. The menus can be disabled by configuring appropriate parameter in the controller.

Basic functions:

- <F2>: Activate main menu.
- <F1>: Go to previous menu item.
- <F2>: Go to next menu item.
- Press <F1> longer than 2 seconds to go to the next higher menu level. If the main menu is activated, the system goes into production mode.
- Press the start button or <F2> longer than 2 seconds to activated the highlighted item or execute the highlighted action. Actions that start the tool can be carried out only by pressing the start button.
- If the menu is enabled, no rundowns are possible.
- At the end of each submenu there is an entry for *Back*.

Back	Enables the main menu.

9.3.2 Structure



9.3.3 Main menu

>Main Admini strati	Shows general items such as Date/ Time, Counter display, etc.
>Main Diag- nostic	Diagnostic functions for the tool.
>Main Posi- tion	Optional – *Position* – Selects the position to be used next.
>Main Scan- ner	Optional – Deletes a previously read barcode and activates a new read cycle.
>Main LMC	Shows Settings *LiveWire Memory Chip*.
>Main RF WLAN	Shows settings of wireless transmission.

9.3.4 Administration submenu

Time 07:47 30.09	**Date / Time** Displays the tool system time. The system time can be displayed in US or European format. Refer to "Setting the system time on the control" under *Administration* > *Date* > *Time*. ▶ Set the system time, refer to Control.
Date 06.07. 2023	**Date** Displays the date. The date can be displayed in US or European format. Refer to "Setting the system time on the control" under *Administration* > *Date* > *Time*. ▶ Set the system time, refer to Control.
Counte 99 XXXXXX	**Counter status** The tool counter display is incremented after each rundown throughout the service life of the tool. Refer to control under *Diagnostics* > *Tool* > *Tool Memory.*
Counte load XXXXXX	Optional - Active when service counter was activated by Apex Tool Group. Number of rundowns under load.
Counte serv XXXXXX	Optional - Active when service counter was activated by Apex Tool Group. Number of rundowns until next service.
S/N 000000 245	**Serial number** Serial no. display.
Vers. V1.00. 00	**Control software version** Displays the installed software version.
Servo V:T10C N00015	**Servo software version** Displays the installed software version.
Platf None	Activating add-on parts fitted on platform (scanner, TAG…).

9.3.5 Diagnostics submenu

Cal OK
K 1.11
O 0.00

TQ calibration

This test function cyclically recalibrates the system with the values used immediately before the start of a rundown. For this, the tool must not be tensioned!
First line: Calibration test and status.
Second line: TQ calibration voltage.
Third line: Offset voltage. If a value lies outside the tolerance range, the corresponding error is displayed.

Valid until transducer serial number 168696:

Value	Rated value	Tolerance
TQ calibration voltage	1,10 V	± 45 mV
Calibration offset	0 V	± 58 mV

Valid from transducer serial number 168696:

Value	Rated value	Tolerance
TQ calibration voltage	1,21 V	± 0,05 V
Calibration offset	0 V	± 0,05 V

Torque
T 5.57
T 8.23

TQ measurement

In this test function, after the start button is pressed, the same calibration is carried out as immediately before the start of a rundown. For this, the tool must not be tensioned!
Then, the tool starts with speed "0". The torque is continuously measured and displayed until the start button is released.
Second line: Current torque.
Third line: Peak value, highest value since the start button was pressed.

Angle
A 360
OK

Angle encoder

The start button starts the tool at 30 % of the maximum speed. After one revolution of the output shaft (nominal angle 360°), measured with the resolver, the tool is stopped. During a fixed dwell time of 200 ms, any further angle pulses occurring are traced. The total result is shown as Actual Angle. If the test run is not terminated by a monitoring criterion and the batch result is greater than or equal to 360 degrees, it is evaluated and displayed as OK. Monitoring criteria are the torque and a monitoring time.

If the torque exceeds 15 % of the calibration value (even during the dwell time), or if the monitoring time of 4 seconds expires, the test run is terminated with a *TQ>* or *TMAX* result. However, you specifically need to check whether the output shaft has actually turned by the value indicated (e. g. by placing a mark on the spindle). If the angle reached by the output shaft does not agree with the value displayed, either the angle factor has been entered incorrectly or the resolver is defective.

Voltage
V26.40
U19.00

Voltages

Second line: Current battery voltage. To ensure high utilization potential, this voltage is monitored continuously during fastening operation. If the voltage drops below limit, a warning output on the tool.
Third line: Programmed value.
This can be changed using the control (in menu *Tool*) .

Speed
RPM466
T 0.02

Speed

The start button starts the tool at the maximum speed.
Second line: Current output shaft speed.
Third line: Current torque.
Rotational speed measurement is based on the angle information of the resolver. If you release the start button, the tool stops. As a safety function the torque is monitored by the tool transducer. If it exceeds 15 % of its calibrated value, the speed measurement is terminated.

9.3.6 Set position submenu – only with Linking enabled

>Posit Change Positi	Selects the position to be used next.
Select Positi 2/6	You can skip the position. You can select the position to be used next using the function keys: • <F1>: Activate the previous position. • <F2>: Activate the next position. • Press the start button or <F2> longer than 2 seconds to accept the select and display the next menu item. • Press <F1> longer than 2 seconds to delete the selection and exit the menu.
>Posit Reset Positi	Reset linking to position 1. The machine operator can cancel Linking.

9.3.7 Scanner submenu

>Scann Activa Scanne	Deletes a previously read barcode and activates a new read cycle. Press the Start button or <F2> for longer than 2 seconds.

9.3.8 LMC submenu

MAC 00302e e162f8	MAC address display.
S: 5800 00008D 54C823	Display LMC serial number.
Certif OK 01. 01.04	Displays EAP-TLS certificate. The certificate is used for WLAN encryption. The display is only shown if a LiveWire tool is used with the L1 measuring card and EAP-TLS encryption is activated.
LW API Active No	Display whether LiveWire API (Application Programming Interface) is active.
Countr code World	Various WLAN frequency ranges are available: • World: worldwide approved • US/CA: approved in the USA • EU: approved in Europe • JP: approved in Japan • CN: approved in China
Daimler Wirele Active	Display whether Daimler function is active.

9.3.9 WLAN wireless transmission submenu

The WLAN wireless transmission submenu shows the settings being used.
If no actions are carried out, the menu is automatically exited after 60 seconds.
Programming the RF settings for WLAN data transmission is described in the programming manual of the control.

Versio #27173 Dec 1	Displays the installed software version of the wireless module.
MAC 00302e e162f8	MAC address display
IP 010 122.0 77.110	IP address display

Sub255 .255.2 40.0	Subnet display
Gat010 122.0 61.001	Gateway display
Host 122.0 61.001	Display of tool designation in a network.
SSID APEX	SSID display Only a maximum of the first 12 characters are displayed.
BSSID	BSSID display Access point with which the WLAN socket tray is connected.
WLAN Signal	Change to graphic view of current quality of wireless signal via function key <F1>.
WLAN 	When the start button is pressed, the current strength of the wireless signal is displayed as an RSSI value. The higher the RSSI value, the better the signal strength: • 5 bars: > -48 dBm • 4 bars: -55 dBm • 3 bars: -60 dBm • 2 bars: -66 dBm • 1 bar: -72 dBm
S: 60	S = Signal strength (dBm) For a reliable signal strength, the signal strength should be > -73 dBm.
Roamin 	Sensitivity display Tool reaction to Access Point change
TxLeis	Transmission output display
Wave-bands	Wavebands display
Active channel	Display of channel currently used
ScanCh 1,5,9,7,2	Display of channels scanned
Baud rate	Baud rate display
Comm. TCP	Selection of communication tool – control: TCP / UDP

9.4 System error messages

If an error is displayed, fastening is disabled until the error is acknowledged with the left-hand button on the tool. In the event of serious hardware errors, the tool is not enabled again even after the error is acknowledged, and must be returned to the manufacturer for repair.

Servo Error Init	Initialization error in tool servo. 1. Remove the battery and then re-insert it. If this does not help: 2. Return tool to *Sales & Service Centers* for repair.
Servo Error PWM	Speed specification from the measuring board to the servo is faulty. 1. Remove the battery and then re-insert it. If this does not help: 2. Return tool to *Sales & Service Centers* for repair.
Servo Error IIT	Too much power is being demanded from the tool. 1. Switch the tool off for a time so that it can cool down. 2. Increase the cycle time, reduce the fastening time or the torque.

Servo Error IOFF	The servo's current sensor is detecting a current offset error. ▶ Return tool to *Sales & Service Centers* for repair.
Servo Error Other	Collective servo error caused by hardware. ▶ Return tool to *Sales & Service Centers* for repair.
Servo Error IP	The current setpoint has been exceeded. There may be a short circuit. ▶ Return tool to *Sales & Service Centers* for repair.
Servo Error Temp >	The servo has overheated. 1. Switch the tool off for a time so that it can cool down. 2. Increase the cycle time, reduce the fastening time or the torque.
Servo Error TempM>	The tool motor has overheated. 1. Switch the tool off for a time so that the motor can cool down. 2. Increase the cycle time, reduce the fastening time or the torque.
Servo Error Voltag	Operating voltage is outside the admissible range. 1. Change the battery. If this does not help: 2. Return tool to *Sales & Service Centers* for repair.
Servo Error Curr>	Current at servo output stage is too high. There may be a short circuit. ▶ Return tool to *Sales & Service Centers* for repair.
Servo Error Angle	Tool angle encoder is sending incorrect signals to the servo amplifier. ▶ Return tool to *Sales & Service Centers* for repair.
Low voltag warnin	Warns that battery is running low. ▶ Recharge battery or replace it with one that is already charged.
Servo Error Othe80	Servo firmware is not compatible with measuring board software. ▶ Update servo firmware.
Tool Error Counte	The rundown counter could not be read or written to. ▶ Return tool to *Sales & Service Centers* for repair.
Tool Error Ident	Tool memory could not be read. ▶ Return tool to *Sales & Service Centers* for repair.
Tool Error Start	Two-stage start button defective. ▶ Return tool to *Sales & Service Centers* for repair.
Transd Ref.V. Error	Transducer reference voltage error ▶ Return tool to *Sales & Service Centers* for repair.
Trans CAL Error	Transducer calibration voltage error Tool was not discharged at time of calibration. 1. Allow tool to discharge and try again. If this does not help: 2. Return tool to *Sales & Service Centers* for repair.
Trans Off Error	Transducer offset voltage error Tool was not discharged at time of calibration. 1. Allow tool to discharge and try again. If this does not help: 2. Return tool to *Sales & Service Centers* for repair.
Unknow Error	General collective error Return tool to *Sales & Service Centers* for repair.
Batter empty -> off	The battery is empty. ▶ Replace the battery.
No result	The min. torque for evaluation was not reached. ▶ Repeat the current rundown.

Servic interv warnng

The service counter has reached the warning threshold for the service interval.

▶ Acknowledge message once. The message only appears again once the system is switched back on.

Servic Interv

The service counter has reached the maximum number of rundowns. Tool has locked.

▶ Return tool to manufacturer for repair.

LMC Error

Initialization error *LiveWire Memory Chip* .

1. Switch the tool on and off again.
2. Check the parameters in the software controller.
3. Insert the WLAN chip again. Replace if necessary.
4. Return tool to manufacturer for repair.

WLAN error

WLAN module programming initialization fault.

1. Switch the tool on and off again.
2. Check the parameters in the software controller.
3. Return tool to manufacturer for repair.

Tool Locked Offline

The authorized WLAN offline time for the connection was exceeded. Tool is locked until the connection is restored or the tool moves within the wireless transmission range.

▶ Move the tool within range of the WLAN access point.

Certif ErrPwd

The EAP-TLS certificate is encrypted with a password. The entered password does not match the certificate file.

▶ Enter correct certificate password.

Certif SrvNot YetVal

The EAP-TLS certificate on the server is not valid yet.

▶ Adjust the validity of the certificate or check the time and date.

Certif SrvExp

The EAP-TLS certificate on the server is expired.

▶ Renew the EAP-TLS certificate on the server or check the time and date.

Additional messages from »PLUS«

Depending on the software used, different messages relating to the process with the PLUS system can be programmed to appear on the display in addition to the standard tool displays.

1st line Text/ Color	2nd line Text/ Color	3rd line Text/ Color	Description
NEW	PARA	METE RS	New parameters have just been adopted. This does not mean that these parameters will have an immediate effect on the nutrunner/ fastening process. The message is deleted when a new job is initiated.
PLUS	None	TMU	Could not determine TMU. The message is deleted when a new job is initiated
PLUS	TmuErr	POFL Time Send	PLUS offline, timeout, send error The message is deleted when a new job is initiated
No	RS	found	No work step found!
Job	Pos.	>	The job has more than 32 steps.
Job 1	without	action	The job does not involve processing.
No	Job	found	No job found.
Job	TIME	OUT	The job timeout has expired.
Bit 1:	Wait	Remov	Message with exclusion character
PLUS	Send	results	PLUS result is sent. The message is deleted when a new job is initiated
PLUS	ErgErr	Send	Error sending the PLUS result.

10 Servicing

10.1 Cleaning instructions

For tools with a barcode scanner, the window must be free of dirt. The barcode is not read if the window is dirty.

- ▶ Clean it regularly—or immediately, if it becomes dirty—using a damp cloth and a conventional window cleaner. Do not use acetone for cleaning.
- ▶ Remove contamination on the plastic housing (47BA(…)L) with a commercially available cleaning agent. Do not use acidic cleaners or acetone. These could dissolve the plastic.
- ▶ Disinfection of surfaces with alcohol-based disinfectant is permitted.

10.2 Service schedule

A repair is only permitted by Apex Tool Group authorized personnel. Regular service reduces operating faults, repair costs, and downtime. In addition to the following service schedule, implement a safety-related service program that takes the local regulations for repair and service for all operating phases of the tool into account.

Caution

Risk of injury through unintentional activation.

- ▶ Prior to servicing 47BA disconnect power supply.

After … fastening cycles[ab])	Measures
100,000	▶ Check to ensure the battery adapter, scanner and wireless adapter are seated securely. ▶ Check the tool and power supply for damage. ▶ Check to ensure scanner window is transparent. ▶ Check to ensure the power supply is clean. ▶ Check to ensure battery charger is clean. ▶ Check the gearing and angle head for leaks. ▶
500,000	▶ Check power supply guide, locking mechanism and contacts for wear and replace if necessary. ▶ Clean the gearing parts with a grease-dissolving agent and re-lubricate. ▶ Check the gearing parts for wear, renew as necessary. ▶ 47BA(…)65(…): ▶ Replace angle attachment. ▶ 47BA(…)90(…): ▶ Send angle attachment to the general refurbishment unit at *Sales & Service Center*.
1 million	▶ 47BA(…)15(…), 47BA(…)21(...), 47BA(…)28(...), 47BA(…)35(...), 47BA(…)48(...), 47BA(…)70(...): ▶ Send angle attachment to the general refurbishment unit at *Sales & Service Center*. ▶ Recommendation: Recalibration of tool, see Recalibration, page 48.
2.5 million	▶ General refurbishment of tool. Send it to *Sales & Service Center*.

a.) For the number of fastening cycles, refer to the counter display in 9.3.4 Administration submenu, page 23

b.) Use of 80% of maximum torque

10.3 Lubricants

- ▶ For proper operation and a long service life, use the correct type of grease.

Grease lubricants according to DIN51502/ ISO3498

Order No.	Packing unit [kg]	DIN 51502	KLÜBER LUBRICATION
933027	1	KP1K	Microlube [a] GL 261

a.) Erstschmierung Apex Tool Group

10.4 Disassembling gear

If the tool is opened, the warranty is voided. Only specialized technicians should be allowed to open the gear for servicing.

1. Carefully clamp the 47BA in a vice (see illustration).
2. Unscrew the lock nut with a hook wrench **Z**.
3. Pull off 47BA.
4. Pull gear completely off angle attachment.

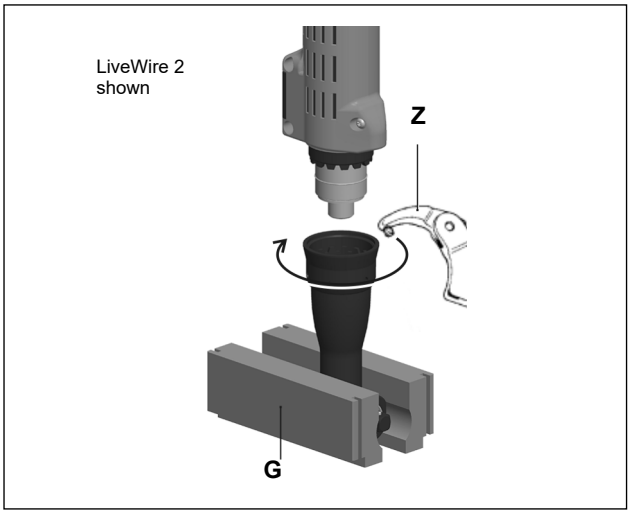


Fig. 10-1: Disassembling gear

Equipment order list

Index	Order No.	Designation
G	938637PT	Chuck jaws for 47BA(…)15P3(L) 47BA(…)21P3 47BA(…)28P3(L)
	938638PT	47BA(…)35P3(L)
	938639PT	47BA(…)48P3(L)
	938640PT	47BA(…)70P4 47BA(…)90P4
Z	933336	Hook wrench Angle attachment - gearing fastening

11 Troubleshooting

11.1 General tool

Problem	Possible cause	Measure for mPro400GC (SW S816813)	Measure for mPro400S… (example SW 816841)[a]
Tool doesn't start with counterclockwise rotation activated.	With counterclockwise rotation, parameter for speed is set to 0 1/min.	▶ Parameterize *Settings for speed left rotation.* On the control screen *Navigator > Standard > Tool Groups.*	On the control screen *Main Menu > Application Builder > Tool Groups*
Tool light disabled.	Disabled by parameter setting.	▶ Parameterize the *tool light* On the control screen *Navigator > Advanced > Tool Group > Extended Tool Settings.*	1. Press <> on the control. 2. Select the required tool under *TM Unit # > Tool Assignment*. 3. Press < >. 4. Make selection under *Nutrunner Lighting Function*.
Control menu on tool not enabled or only partially enabled.	Disabled by parameter setting.	▶ On the control screen *Navigator > Advanced > Tool Group > Extended Tool Settings*, mark the check box *Enable Tool Menu* or use the drop down list *F1 Button on Tool* to assign the left function key <F1>.	1. Press <> on the control. 2. Select the required tool under *TM Unit # > Tool Assignment*. 3. Press < >. 4. Select function under *Control Button Settings. Default = Control menu disabled*.
Idle speed not reached.	Battery voltage is too low.	▶ Use fully charged battery.	
Expected number of test rundowns is not achieved with one charge of the battery.	Battery is not fully charged.	▶ Use fully charged battery.	
	The warning threshold for undervoltage is not set to minimum value.	▶ On the control screen *Navigator > Tool Setup > Tool settings > Others*, reduce the *Undervoltage (V).*	1. Press <> on the control. 2. Select the required tool *TM Unit # > under Tool Assignment* 3. Press < >. 4. Under *Energy Management* reduce the *Undervoltage Threshold*.
	High torque is needed during a fastening sequence, e.g. for coated fasteners.	If a high torque is needed for a longer period of time, e.g. for several turns, the number of rundowns that can be achieved with one battery charge will be significantly reduced.	
	Battery has too many charging cycles.	After 800 charging cycles the capacity is reduced to approx. 60%.	

a.) Software-dependent measure. Discrepancy possible when using Custom Tool Software.

11.2 Infrared data communication between controller and tool

Problem	Possible cause	Measure for mPro400GC (SW S816813)	Measure for mPro400S… (example SW 816841)[a]
No infrared data communication between the controller and tool.	Incorrect interface selected for the connection to the controller.	▶ On the control screen *Navigator > Utilities > System Settings > Radio Frequency (RF) Configuration LiveWire/CellCore*, check the correct *IRDA Connection*.	▶ On the control screen *Main Menu > System Programming > Service > TMA Configuration > Communication with Tool*, check the correct *IRDA Connection*.
		▶ Check whether the tool holder is connected at the selected interface.	
	Selected interface is used for serial data transmission.	Do not use the same interface for serial data transmission and infrared data transmission.	
		Check on the control screen *Navigator > Utilities > System Settings > Radio Frequency (RF) Configuration LiveWire/CellCore.* 1. Is serial data transmission activated (selection *RF Mode* is not *None*)? 2. Is the same interface selected? 3. If so, select a different interface or deactivate serial data transmission. All tools must be checked.	Check on the control screen *Main menu > System Programming > Service > TMA Configuration > Communication with Tool* 1. Is serial data transmission activated (selection *RF Mode* is not *None*)? 2. Is the same interface selected? 3. If yes, select another interface under *Main Menu > System Programming < System Programming > Serial Ports* 4. Disable serial data transmission. All tools must be checked.

a.) Software-dependent measure. Discrepancy possible when using Custom Tool Software.

11.3 WLAN data communication between controller and tool

Problem	Possible cause	Measure for mPro400GC (SW S816813)	Measure for mPro400S… (example SW 816841)[a]
No WLAN data communication between the controller and tool.	The IP address of the tool is not correctly entered in the control.	1. On the control screen *Tool Setup*, check whether the IP address of the tool has been entered in the field *Type*. 2. Otherwise, mark the line and <Edit>. IP address of tool – see Tool in submenu *Wireless Settings*.	1. Press <> on the control. 2. Select the required tool under *TM Unit # > Tool Assignment*. 3. Press < >. 4. Enter the IP address under *Tool Address*. IP address of tool – see Tool in submenu *Wireless Settings*.
	Tool not yet parameterized with the correct WLAN settings.	▶ On the control screen *Navigator > Utilities > System Settings > Radio Frequency (RF) Configuration LiveWire/CellCore* parameterize the tool with the infrared interface with the correct WLAN settings.	1. On the control screen *Main Menu > System Programming > Service > TMA Configuration > Communication with Tool*, select > *RF Mode* WLAN. 2. Parameterize the tool with the correct settings via the infrared interface.

Problem	Possible cause	Measure for mPro400GC (SW S816813)	Measure for mPro400S… (example SW 816841)[a]
No WLAN data communication between the controller and tool.	WLAN settings are different for control and access point.	▶ On the control screen *Tool Navigator* > *Utilities* > *System Settings* > *Radio Frequency (RF) Configuration LiveWire/CellCore*, check whether the WLAN settings for the tool agree with the settings for the access points (network name, encryption, network key).	▶ On the control screen *Main Menu* > *System Programming* > *Service* > *TMA Configuration* > *Communication with Tool*, check whether the WLAN settings for the tool agree with the settings for the access point (network name, encryption, network key).
	A filter for MAC addresses is activated at the Access Point.	▶ Add the MAC address for the tool to the list of approved addresses at the Access Point. MAC adress of tool – see • Label above the battery • On the tool in the *Wireless Settings* submenu.	
	Port 4001 is disabled by a firewall.	▶ Configure the firewall such that the required IP/MAC addresses can use port 4001.	
	The wireless channel at the access point is outside the range supported by the tool.	▶ To change the wireless channel setting at the access point to the right wireless channel with respect to country code: EU 1–13; World 1–11 (see Installation Manual P1894E).	
	Tool is already assigned to another control.	▶ Check whether another control already has a connection to this tool. In other words, another tool is using the same IP address.	
IP address cannot be pinged.	IP Address already exists in network. In this case, the tool will not build up a connection.	▶ Check the physical connection (RSSI values). ▶ Check the assigned IP address.	
Occasional interruptions in WLAN data communication.	Distance between the access point and the tool is too great.	1. Check the signal strength at the tool in the *Wireless Setting* submenu. 2. If necessary, reduce the distance between the access point and the tool.	
	The tool is already assigned to another control.	1. Check whether the tool (IP address) is also assigned to another control. 2. If yes, delete the assignment in the other control. A tool can only be assigned to one control.	
	Excessive data traffic on WLAN Network.	Reduce data traffic on WLAN Network.	
		1. On the control screen *Basic*, increase the *Initial Torque*. 2. On the control screen *Navigator* > *Advanced* > *Controller* > *Trace Recording*, disable the torque graph data transmission.	1. On the control screen *Main Menu* > *Application Builder* > *Settings* > *Fastening Stages* > *Fastening Stage #* > *Fastening Sequence*, increase the *Initial Torque*. 2. On the control screen *Main Menu* > *System Programming* > *Special Functions* > *MWF*, disable the torque graph data transmission.

a.) Software-dependent measure. Discrepancy possible when using Custom Tool Software.

11.4 Barcode scanner on tool

Problem	Possible cause	Measure for mPro400GC (SW S168813)	Measure for mPro400S… (example SW 168841)[a]
The barcode scanner is not activated when the Start button is pressed.	Parameters for Part ID not set to *Activated Tool Disabled*.	▶ On the control screen *Navigator* > *Communication* > *Part ID*, check whether the parameter *Activated* is set to *Activated Tool Disabled*.	1. Press <> on the control. 2. Select the required tool under *TM Unit #* > *Tool Assignment*. 3. Press < >. 4. Select function under *Control Button Settings*.
		1. Press the left function key on the tool to start a new read cycle. 2. On the control screen *Navigator* > *Advanced* > *Tool Group* > *Extended Tool Settings* > *F1 Button on Tool* select *Read Barcode*.	1. Press <> on the control. 2. Select the required scanner under *Station #* > *Identification*. 3. Select the required tool under *TM Unit #* > *Tool Assignment.* 4. Press < >. 5. Select *Scanner Settings.*
	Barcode has already been read.	▶ Activate a new read cycle on the tool, in the submenu *Scanner*.	
Barcode not being read.	Window on barcode scanner is dirty.	▶ Clean window with a damp cloth and a standard commercially available glass cleaner.	
	Barcode type is deactivated through parameter setting.	No barcode types are disabled.	1. Press <> on the control. 2. Select the required tool under *TM Unit #* > *Tool Assignment.* 3. Press < >. 4. Under *Scanner Settings*, set the parameter *Barcode Type* to the relevant type.
Barcode scanner does not work on platform.	Power supply not active	▶ Press start switch on tool ▶ Check system	
	Scanner cable not connected properly in carrier board	▶ Check plug connection	
	Scanner defective Cable defective	▶ Replace scanner ▶ Replace cable	

a.) Software-dependent measure. Discrepancy possible when using Custom Tool Software.

11.5 Reset tool

This key combination activates the *Service* menu. Here, the tool can be shut off or reset to the delivery settings.

Note

The following will then be deleted:

- the internal memory (programming)
- the current fastening job
- rundown data not yet transmitted to the control

Once selected, there is no way back to the current fastening job.

1.	2.	3.	4.
			
1. Press <F1>+<F2> at the same time and hold. 2. Press start button 1× and release.	1. Release <F2>. 2. Keep <F1> pressed and continue with step 3.	1. Press <F2> 3× and release. 2. Keep <F1> pressed and continue with step 4.	1. Press start button 1x. 2. Release both buttons.

5. Switch off	5. Reset
>Servi Dis Able Select within 60 seconds or else the tool with switch off: ▶ Confirm with the start button and switch the tool off. or…	1. Change to the Service menu with <F1>, <F2>. **>Servi Reset** 2. Confirm with the start button and reset the tool to the delivery settings.

12 Spare parts

Always use only original *Cleco* spare parts. Failure to comply with this instruction can result in decreased performance and an increased need for servicing. Installing spare parts from other manufacturers will void all manufacturer's warranties. Information, but no warning of hazards.

12.1 Gearing 15 Nm – 65 Nm

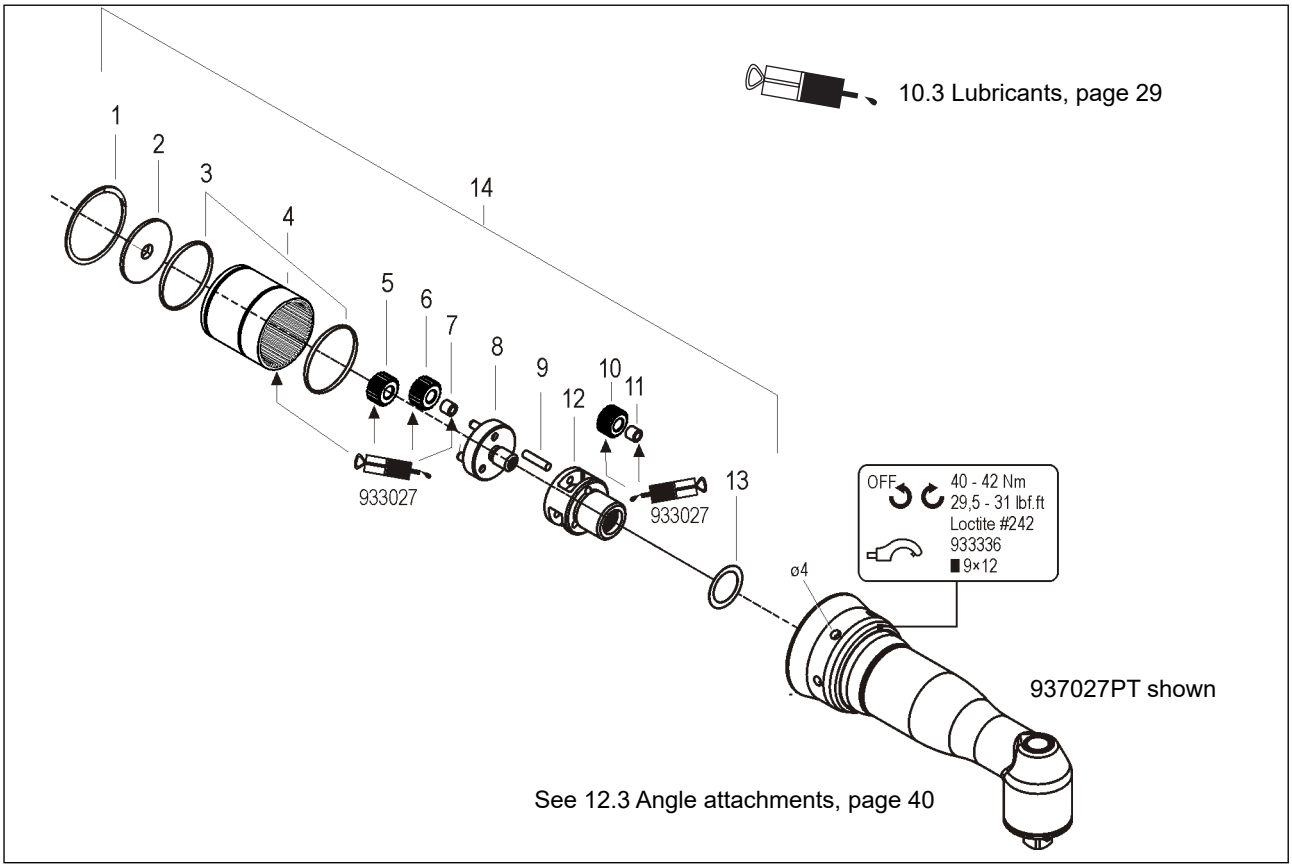


Table 12.1

Type	14	4	5	6	8	9	10	11	12
47BAYPB15P3(B)L	935263	942193PT	541899	541894	542233	541888	943530PT	923095	943531PT
47BAYPB21P3(B)L	935262	942193PT		541893	542231	541888	541894	923095	943532PT
47BAYPB28P3(B)L	935261	942193PT	–	541893	542232	541888	943530PT	923095	943531PT
47BAYPB35P3(B)L	935262	942193PT		541893	542231	541888	541894	923095	943532PT
47BAYPB48P3(B)L	935264	935748		541893	935754	924066	935944	930228	935945
47BAYPB65P4(B)L	935264	935748	–	541893	935754	924066	935944	930228	935945

Index	Order no	Quan-tity	[a]	Description	Dimension
1	800116	1		circlip	25,98 X 0,94 IR
2	541887	1		washer	
3	542724	2		o-ring	28,24 X 0,78
4	Table 12.1[b]	1		gear ring	
5	Table 12.1[b]	1	1	pinion gear	
6	Table 12.1[b]	3	6	idler gear	
7	923095	3	6	needle bearing	3 X 5 X 7
8	Table 12.1[b]	1		planet carrier	
9	Table 12.1[b]	3	6	needle roller	
10	Table 12.1[b]	3	6	idler gear	
11	Table 12.1[b]	3	6	needle bearing	
12	Table 12.1[b]	1		planet carrier	
13	502983	1		thrust washer	15,88 X 28,58 X 1,56
14	Table 12.1[b]	1		gear	

a.) Recommended spare part for every 5 tools

b.) See Table 12.1 , page 36[b]

12.2 Gearing 70 Nm – 90 Nm

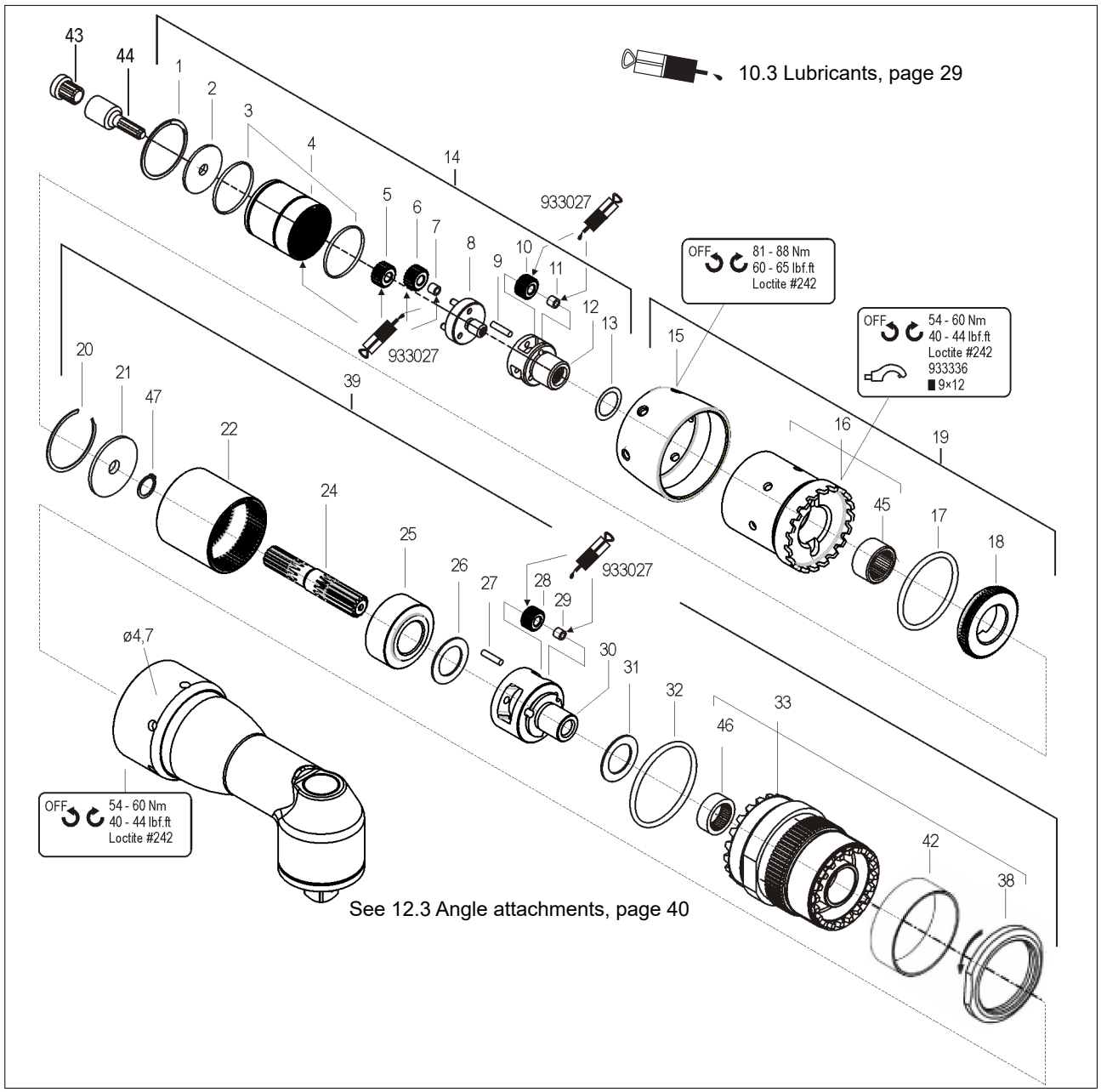


Table 12.2

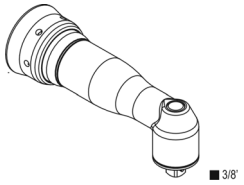
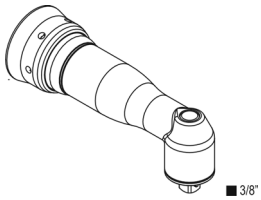
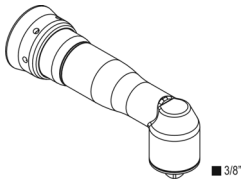
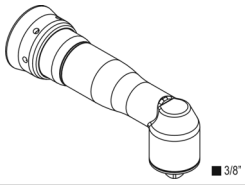
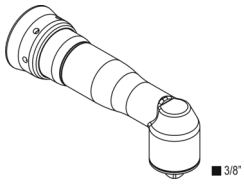
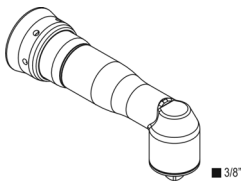
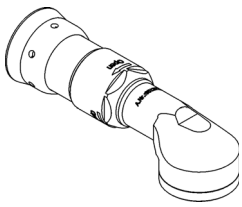
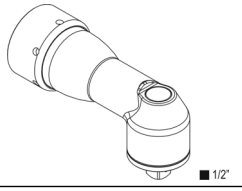
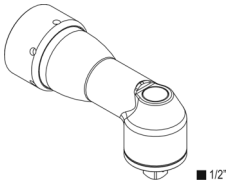
Type	39	30	28	24	47
47BAYB70P4	942005PT	541279	943451PT	543456	–
47BAYPB70P4					
47BAYB70P4B					
47BAYPB70P4B					
47BAYB90P4	942001PT	541278	943452PT	543459	800146
47BAYPB90P4					
47BAYB90P4B					
47BAYPB90P4B					

Index	Order no	Quan-tity	[a]	Description	Dimension
1	800116	1	2	circlip	25,98 X 0,94 IR
2	541887	1		washer	
3	542724	2	6	o-ring	28,24 X 0,78
4	942193PT	1		gear ring	
5	541899	1	2	pinion gear	
6	541894	3	6	idler gear	
7	923095	3	6	needle bearing	3 X 5 X 7
8	542230	1		planet carrier	
9	541888	3	6	needle roller	
10	541894	3	6	idler gear	
11	923095	3	6	needle bearing	3 X 5 X 7
12	943532PT	1		planet carrier	
13	502983	1		thrust washer	15,88 X 28,58 X 1,56
14	301765	1		gear	
15	207353	1		union nut	
16	207469	1		adapter	
17	14273	1	3	o-ring	
18	207473	1		adapter	
19	301874	1		adapter asm.	
20	541210	1	2	circlip	
21	207472	1		washer	
22	541167	1		gear ring	
24	Table 12.2[b]	1		pinion gear	
25	207471	1		spacer	
26	510675	1	2	thrust washer	17,45 X 27 X 1,27
27	541492	3	6	bolt	NR 4 X19.8
28	Table 12.2[b]	3	6	idler gear	
29	541489	3	6	needle bearing	4 X 7 X 10
30	Table 12.2[b]	1		planet carrier	
31	510675	1	2	thrust washer	
32	1010843	1	3	o-ring	
33	942002PT	1		gear case asm.	
38	942004PT	1		threaded ring	AWG18
39	Table 12.2[b]	1		gear	
41	Kapitel 12.4, Seite 41	1		reaction bar 1/2"	
42	541169	1		ring	
43	541044	1		pinion gear	
44	943450PT	1	1	adapter shaft	
45	500528	1	2	needle sleeve	16 X 22 X 12
46	800177	1	1	needle sleeve	15,88 X 20,62 X 12,7
47	Table 12.2[b]	1		circlip	8,99 X 0,64 AR

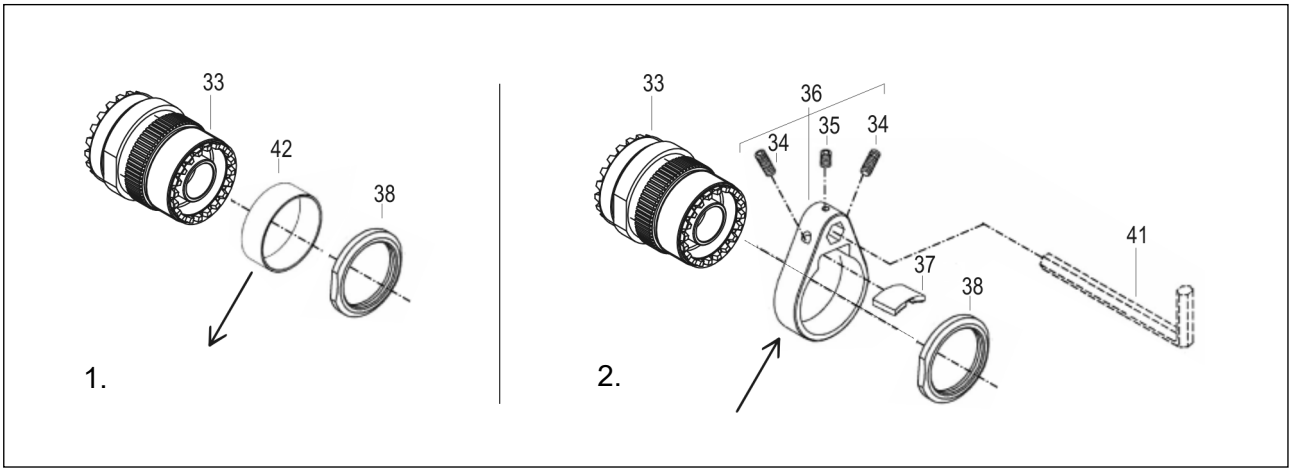
a.) Recommended spare part for every 5 tools

b.) See Table 12.2 , page 38

12.3 Angle attachments

For type	Order no.	Code	■	Vision	
47BA(…)15(…)P3L 47BA(…)21(…)P3L 47BA(…)28(…)P3L	937017PT	AB28P3	3/8"	with pin lock	
47BA(…)15(…)P3BL 47BA(…)21(…)P3BL 47BA(…)28(…)P3BL	944205	AB28P3B	3/8"	with ball lock	
47BA(…)35(…)P3L	937022PT	AB38P3	3/8"	with pin lock	
47BA(…)35(…)P3BL	944208	AB38P3B	3/8"	with ball lock	
47BA(…)48(…)P3L	937027PT	AB51P3	3/8"	with pin lock	
47BA(…)48(…)P3BL	944211	AB51P3B	3/8"	with ball lock	
47BA(...)65(...)P4BL	943440PT	AB65P4	1/2"	with pin lock	
47BA(…)70(…)P4 47BA(…)90(…)P4	937776PT	A85P4	1/2"	with pin lock	
47BA(…)70(…)P4B 47BA(…)90(…)P4B	937779PT	A85P4B	1/2"	with ball lock	

12.4 Use with reaction bar 1/2" hexagonal



Index	Order no.	Quantity	a	Description	Dimension
34	B132Z	2	4	Metering screw	
35	B129J	1	2	Metering Screw	
36	541206	1		Bucking bar collar	
37	541207	1		Key splined	
38	942004PT	1		Threaded ring	AWG18
41	b	1		Reaction bar 1/2“	
42	541169	1		Ring	

a.) Recommended spare part for every 5 tools

b.) Is provided and adjusted by user, see 7.1 Use of reaction bar, page 16

12.5 Tool holder

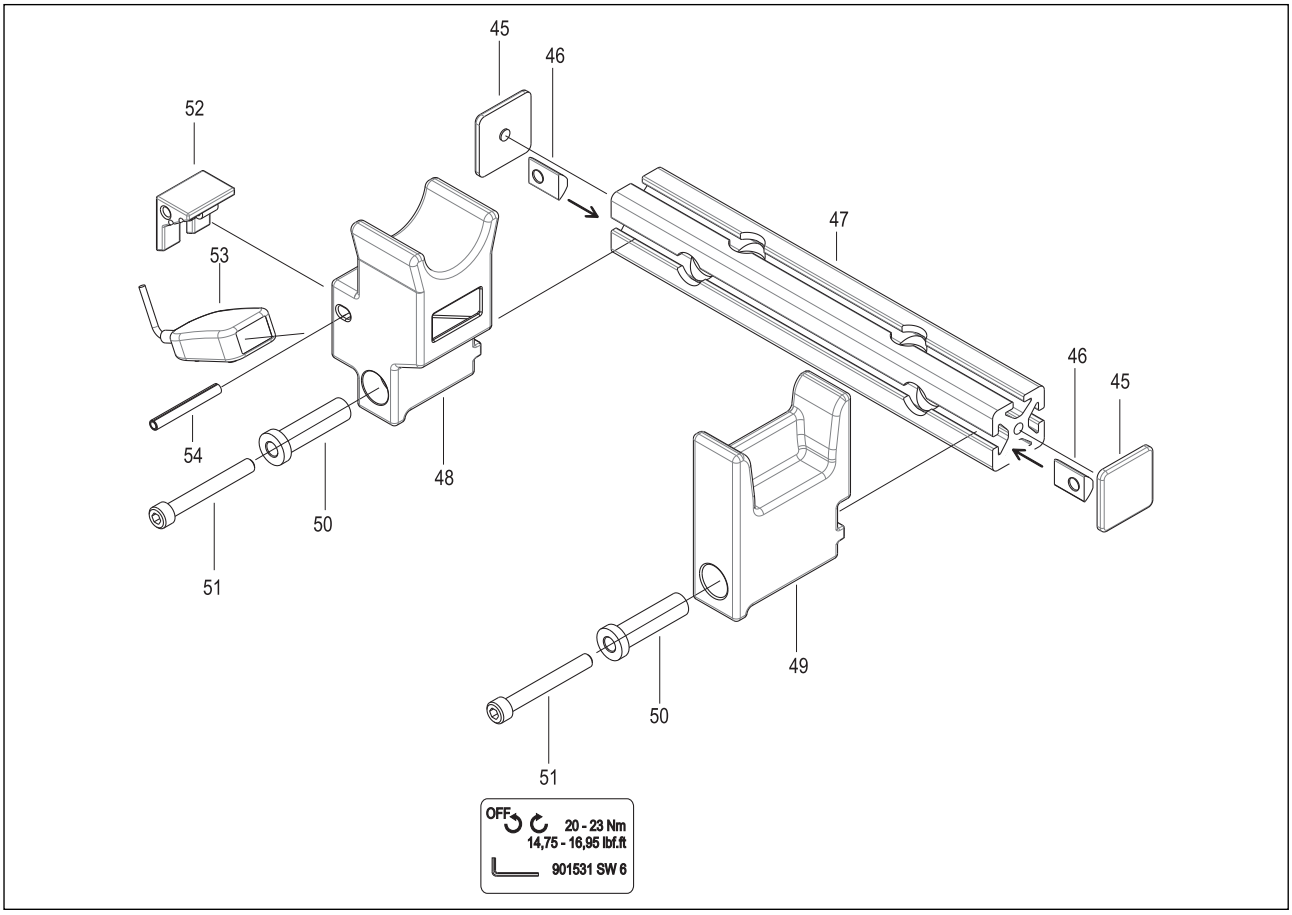


Table 12.3

Order no.	IrDA	For Tool (…)	47	52	53	54
935290	×	from 47BA(…)65(…)	935292	935303	935170	917735
935395	–			–	–	–
935999	×	ab 47BA(…)70(…)	935942	935303	935170	917735
935998	–			–	–	–

Index	Order no.	Quantity	Description	Dimension
45	S900983	2	Cap	40 X 40
46	S900418	2	Slot nut	M 8
47	Table 12.3[a]	1	Brace	
48	935293	1	Support	
49	935294	1	Support	
50	935291	2	Plug	
51	902490	2	Cap screw	M8 X 65
52	Table 12.3[a]	1	Locking cover	
53	Table 12.3[a]	1	IrDA-Serial Adapter	
54	Table 12.3[a]	1	Dowel pin	6 X 50

a.) See Table 12.3 , page 42

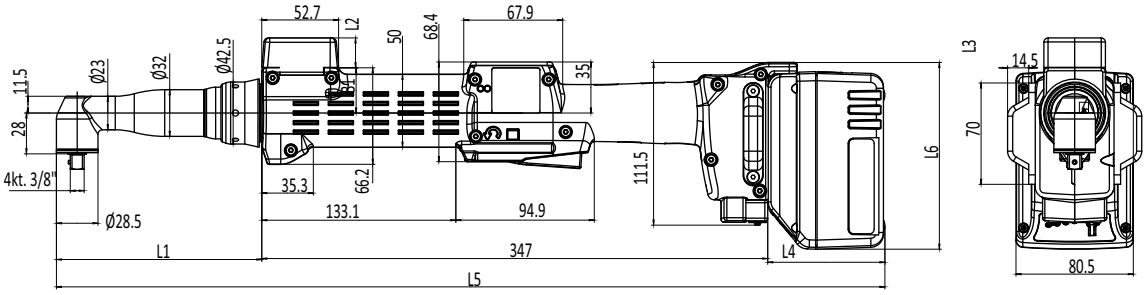
13 Technical Data

13.1 Dimensions

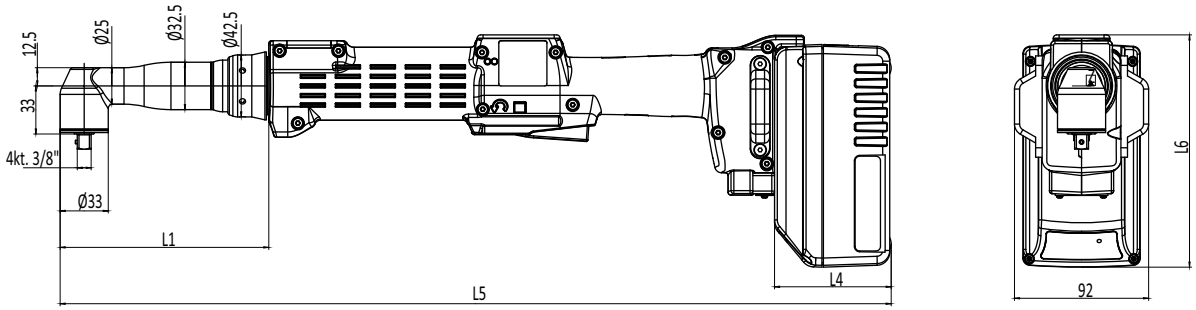
15 Nm–65 Nm • LiveWire 2 • Platform

Measure in mm

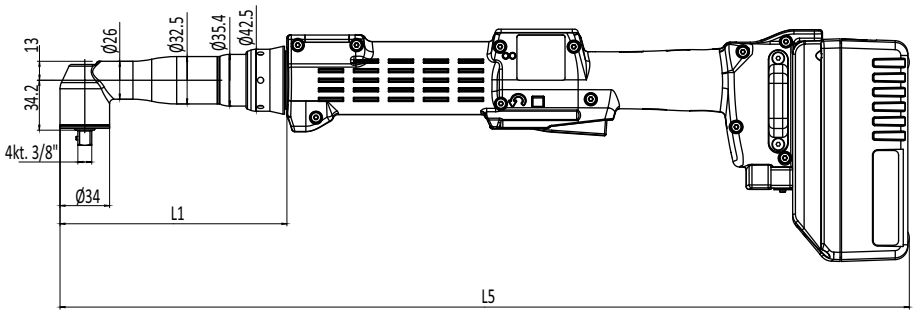
47BAYPB15P3L
47BAYPB21P3L
47BAYPB28P3L shown with 26 V battery and scanner



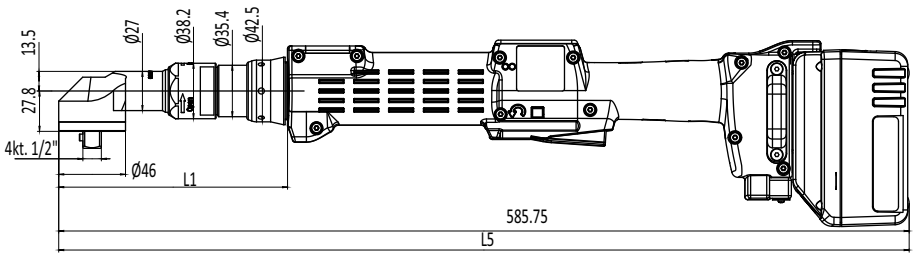
47BAYPB35P3L shown with 26 V battery



47BAYPB48P3L shown with 26 V battery



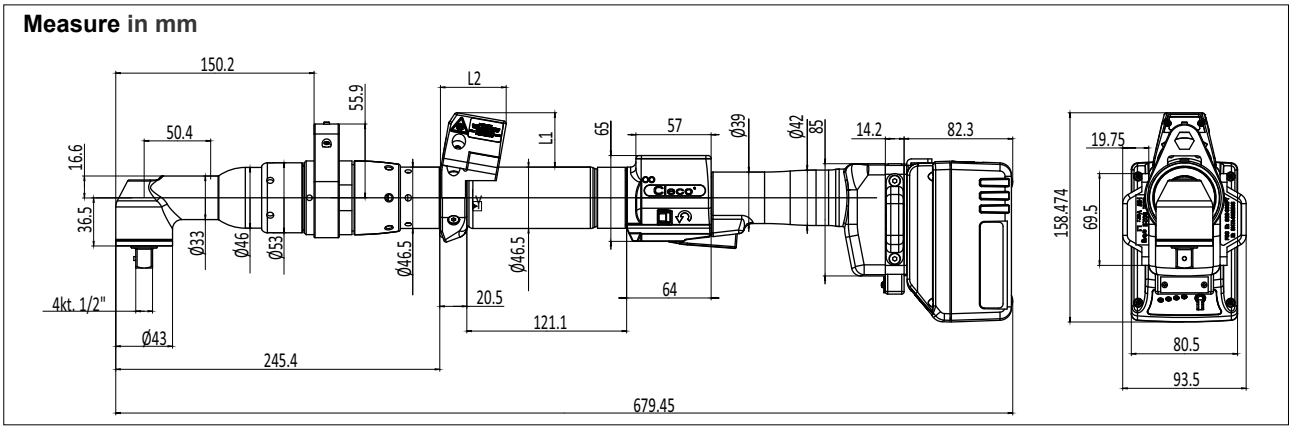
47BAYPB65P4(B)L shown with 26 V battery



Type	L1	L2	L3	L4		L5		L6	
		Height TAG/ Scan-ner	Additional height TAG/Scanner	26 V	44 V	26 V	44 V	26 V	44 V
47BAYPB15P3(B)L	140,8	21	16,9	80	80	569	569	128	159
47BAYPB21P3(B)L									
47BAYPB28P3(B)L									
47BAYPB35P3(B)L	143,1					571	571		
47BAYPB48P3(B)L	155,6					584	584		
47BAYPB65P4(B)L	157,6					587	587		

70 Nm–90 Nm • LiveWire 1 • Standard • Platform

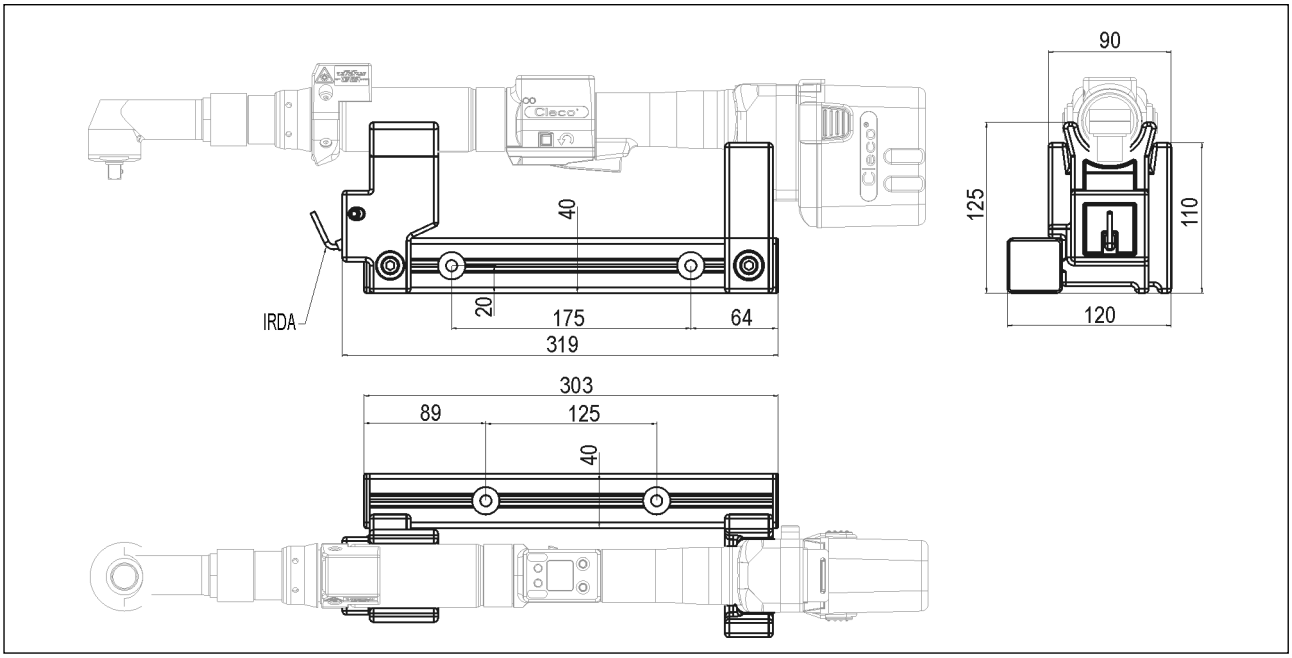
Measure in mm



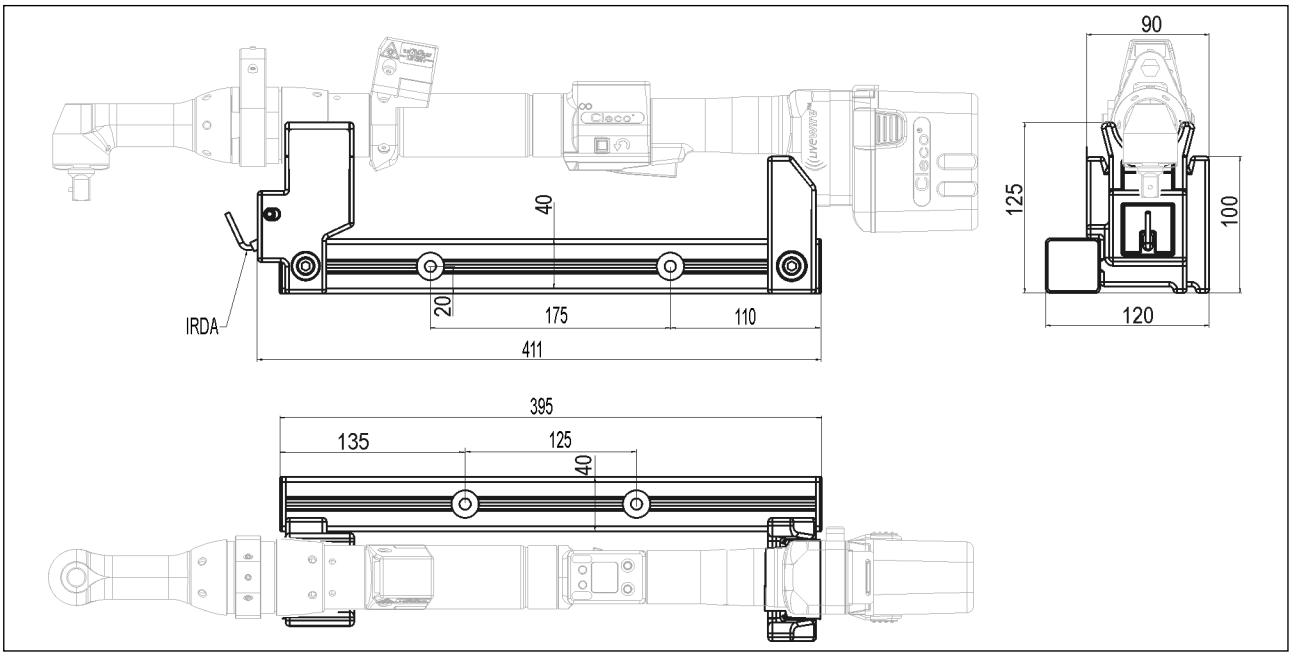
WLAN 5 Ghz			
	Type	L1	L2
Standard	47BAYB70P4(B) 47BAYB90P4(B)	–	–

WLAN 5 Ghz			
	Type	L1	L2
Platform	47BAYPB70P4(B) 47BAYPB90P4(B)	36,3	52,5

Dimension of tool holder 935290 / 935395 (optional)



Dimension of tool holder 935999 / 935998 (optional)



13.2 Performance data

15 Nm–65 Nm • LiveWire 2

Type	Recommended torque range		Idling speed Battery pack 26 V	Idling speed PM48/ Battery pack 44 V	Screw size 8.8	Weight with-out PS[a]	Calibration data	
							Torque (nominal)	Angle pulses (Resolver)
	Nm max.	Nm min.	rpm	rpm	mm	kg	Nm	1 degrees
47BAYPB15P3(B)L	15	5,5	487	891	M6	1.83	18.46	1.5967
47BAYPB21P3(B)L	15	8	370	680	M6	1.83	25.86	2.0910
47BAYPB28P3(B)L	28	10	264	482	M8	1.83	46.67	2.9504
47BAYPB35P3(B)L	35	12	255	446	M8	1.88	47.16	2.0910
47BAYPB48P3(B)L	48	18	181	316	M10	1.97	54.20	2.9504
47BAYPB65P4(B)L	65	15	135	236	M10	2.07	72.64	3.9545

a.) Weight of power supply: battery pack 26 V 961101PT 0.69 kg, battery pack 44 V 961102PT 1.10 kg

70 Nm–90 Nm • LiveWire 1

Type	Recommended torque range		Idling speed Battery pack 26 V	Idling speed PM48/ Battery pack 44 V	Screw size 8.8	Weight with-out PS[a]	Calibration data	
							Torque (nominal)	Angle pulses (Resolver)
	Nm max.	Nm min.	rpm	rpm	mm	kg	Nm	1 degrees
47BAYB70P4(B)	70	24	121	211	M10	4.12	98.79	4.4130
47BAYPB70P4(B)						4.18		
47BAYB90P4(B)	90	40	81	141	M12	4.12	147.98	6.6064
47BAYPB90P4(B)						4.18		

a.) eight of power supply: battery pack 26 V 961101PT 0.69 kg, battery pack 44 V 961102PT 1.10 kg

13.3 Electrical Data

13.3.1Output stage servo electronics

Features	Data
Nominal motor phase current	8 A peak value, sine
Rated output	150 VA
Maximum power	500 VA

13.3.2Control electronics

Features	Data
Rated voltage	26 V
Nominal current in *Active* operating mode	105 mA
Nominal current in *Standby* operating mode	95 mA
Nominal current in *Power-saving* operating mode	55 mA
Nominal current in *Sleep* operating mode	< 1 mA

13.3.3IrDA interface port

Features	Data
Supply voltage	5.0 V (4.8 to 5.5 V)
Power consumption	0.30 VA
Maximum current	11 mA
Transmission rate	57.6 kbit/s
Parity Bit	No
Data Bit	8 bit
Stop Bit	1 bit
Error check	CRC

13.3.4WLAN data transmission

Features	Data
Standard	IEEE 802.11ac/b/g/n IEEE 802.11d/e/i/h/r/w
Safety	• WPA, WPA2 • TKIP, AES/CCMP hardware accelerator • LEAP, PEAP[a], EAP-TTLS
Range	up to 50 m (typ. @ 2,4 GHz) up to 30 m (typ. @ 5 GHz)
Channels[b]	1 – 13 (2,412 – 2,472 GHz) 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153, 157, 161, 165 (5,180 – 5,825 GHz)
Transmission power:	18 dBm EIRP (radiated)
Sensitivity	-95 dBm (typ. @ EIRP 2,4 GHz) -89 dBm (typ. @ EIRP 5 GHz)
Standards	Europe (RED) US (FCC/CFR 47 part 15) Canada (IC RSS) Japan (MIC) Taiwan (NCC) China (SRRC) China (SRRC) South Korea (KCC) Australia (ACMA) New Zealand; Brazil (Anatel) South Africa (ICASA)

a.) PEAP (without client certificate)

b.) If permitted by IEEE 802.11d

13.3.5Torque transducer

Torque is measured by a reaction transducer with expandable measurement strips. The reaction transducer is positioned between the motor and the gears in the handle housing.

Features	Data
Nominal calibration	see 13.3 Electrical Data, page 47
Sensitivity	2 mV/V
Bridge ohms	1000 Ohm
Precision class	0.5% of final value
Linearity error	+0.25% of final value
Measurement range	-125% to +125% of final value

13.4 Ambient conditions

Features	Data
Ambient temperature	32 °F to +104 °F (0 °C to +40 °C)
Humidity	0 to 80 % (at +40 °C), not with dew
Working height	up to 3000 m above sea level
Storage temperature without power supply)	4 °F to 158° F (-20 °C to +70° C)
Degree of protection DIN EN 60529	IP40
Protection class DIN EN 61140 (VDE 0 140-1)	III

14 Service

If repair is required send the complete 47BA to *Sales & Service Center*. Repairs on the gears and angle attachment are only permitted by Apex Tool Group authorized personnel. If the tool is opened, the warranty is voided.

Recalibration

At delivery, model-specific calibration data is stored in the integrated fastening electronics system of your *Cleco* tool. If service is required to change the torque transducer, the screw electronic system or if a recalibration is required, please send the *Cleco* tool to *Sales & Service Center*. This will ensure that after the service work, any required calibration data update is carried out properly.

15 Disposal

Injuries and environmental damage from improper disposal.

- ▶ Components and auxiliary materials of the tool pose risks to the health and the environment.
- ▶ Catch auxiliary materials (oils, greases) when drained and dispose of them properly.
- ▶ Separate the components of the packing and segregate the different materials before disposing of them.
- ▶ Follow the locally applicable regulations.

Observe generally valid disposal guidelines such as, in Germany, the Electrical and Electronic Equipment Act (ElektroG) and the Battery Act (BattG).

- ▶ Wasted rechargeable batteries must be disposed of. Return the tool and defective / power supplies to your company collection facility or to *Sales & Service Center*.

POWER TOOLS SALES & SERVICE CENTERS

Please note that all locations may not service all products.
Contact the nearest Cleco® Sales & Service Center for the appropriate facility to handle your service requirements.

Sales Center
Service Center

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