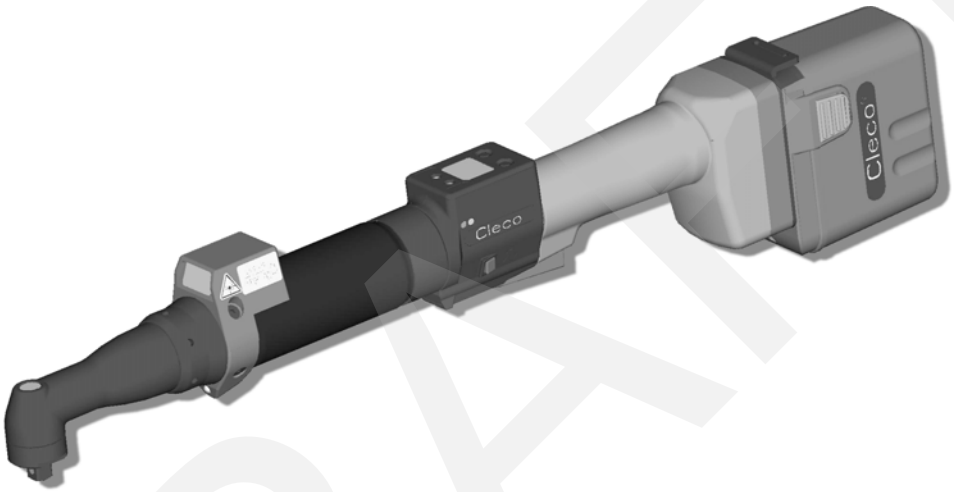
Cleco®

47BA…B…

EN Cordless EC angle nutrunner



47	B	A	…	S	B	…	AM3

Series
47

Power
B – Battery

Tool Style
A – Angle

Feature 1 (Data Transmission)
– IrDA
W – WLAN
R – RF868 MHz
F – RF915MHz

Attachment
AM3 - Square 3/8"

Max. Torque
15 - 15 Nm
28 - 28 Nm
35 - 35 Nm
50 - 50 Nm

Battery
B - 26 V

Feature 2 (Scanner)
S - Barcode Scanner

Retain for future reference!

For additional product information visit our website at http://www.cooperpowertools.com

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For this Instruction Manual

This Instruction Manual is intended for all persons who work with this tool but do not do any programming work.

The Instruction Manual

- provides important notes for safe and effective use.
- describes the function and operation of the cordless EC angle nutrunner (referred to below as 47BA).
- serves as a reference work for technical data, service intervals and spare part orders.
- provides information on options.

For more information on the operation of the 47BA with the TMEB-200 control electronics see

- programming manual controller TMEB-200, no. P1895E
- programming manual TMEB-COM, no. P1898E for PC application

In the text:

47BA represents all models of the *cordless EC angle nutrunner* as described here.

➔ refers to required actions.

• refers to lists.

Identification text:

47BA	represents all models of the cordless EC angle nutrunner as described here.
➔	refers to required actions.
•	refers to lists.
kursiv	refers menu items, i. e.: *Diagnostics*
<…>	refers elements, that have to be selected or deselected, such as buttons or control boxes, i.e.: <F5>
`Courier`	refers names of paths and files are written in Courier font i.e.: `setup.exe`
\	refers selection of an item from the menu i.e.: *file* \ *print*

Identification graphic:

⟵	refers a movement in one direction.
⇩	refers function and force.

Copyright protection

Contents

1 Safety

1.1 Presentation of 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!

Possibly dangerous situation situation for the health of persons.
If this warning is not observed, very serious injury may result.

CAUTION!

Possibly harmful situation for the health of persons or property and environmental damage.
If this warning is not observed, injuries, property or environmental damage may occur.

NOTE

General notes,
Contain application tips and particularly useful information, but no warnings on hazards.

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 47BA from rain and moisture.
- ➔ Follow the safety instructions printed on the battery and charger.

Safety of persons

- ➔ Ensure a secure standing position. Maintain balance.
- ➔ Make sure that the battery is securely installed before operating the 47BA.
- ➔ Hold the 47BA tightly in the hand –
  be prepared for high short-term reaction torques.
- ➔ Do not carry the 47BA with the finger on the start button –
  prevent accidental operation.
- ➔ Do not open the battery. Contact with acid will cause injury.
- ➔ Follow generally valid and local safety and accident prevention rules.

Safe working with and around fastening tools

- ➔ Inspect sockets for visible damage and cracks.
  Replace damaged sockets immediately.
- ➔ Disconnect the 47BA from the battery before replacing the sockets.
- ➔ Only use screw inserts for *machine-controlled fastening tools*.
- ➔ Make sure that the sockets are securely inserted.

1.3 Personnel training

All operators must be trained and experienced before operating the 47BA.
The 47BA must be repaired by authorized technicians from Cooper Power Tools only.

1.4 Personal protective equipment

When working

- Wear the protective goggles to protect against spurting metal splinters.

Danger of injury by being wrapped up in and caught by machinery

- Wear a hairnet.
- Wear close-fitting clothing.
- Do not wear jewelry.

1.5 Proper use

The 47BA is designed exclusively for fastening and releasing threaded fasteners.

The 47BA must communicate with the TMEB-100 control unit or a PC via the IrDA port of the tool holder (order no. 935290) only.

The 47BA

- Do not use it in areas with an explosion hazard.
- Do not open it or modify it structurally.
- Only use with accessory parts which are approved by the manufacturer (see 3.3 System overview – optional accessories, Seite 14).
- Do not use as a hammer or for re-bending.

1.6 Standards

1.6.1 FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

In accordance with FCC15.21, 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 Canadian Compliance

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

1.6.3 EMC

Industrial environment EMC limit class A.

The following EMC standards are complied with.

Interference emission

DIN EN 61000-6-4

Interference resistance

DIN EN 61000-6-2

1.7 Noise and vibration

Noise level < 60 dB(A) at free speed (without load) according to ISO 3744.

Vibration values < 2.5 $^{m}/s^{2}$ according to ISO 5349.

2 Scope of supply, transport and storage

2.1 Scope of supply

Check shipment for transport damage and ensure that contents match scope of supply:

1 47BA
1 18 VDC replaceable battery nickel metal hydride (NiMH)
1 Marking foil
1 This instruction manual
1 Declaration of Conformity
1 Factory test certificate for transducers

2.2 Transport

Transport and store the 47BA in the original packaging. The packaging is recyclable.

2.3 Storage

For short-term storage and for protection against damage.

➔ Place the 47BA in the tool holder.

For storage longer than 100 hours

➔ Disconnect battery from the 47BA.
The battery is discharged by the electronics integrated in the 47BA.

WARNING!

Danger of explosion from short circuit

- ➔ Protect the 47BA and the battery from moisture.
- ➔ Do not bring any electrically conducting objects such as paper clips, coins, keys, nails or screws in contact with the battery contacts.
- ➔ When storing the battery outside the 47BA or the battery charger cover the battery contacts.

Object	Time period	Storage temperature	Supplemental information
47BA without battery	No guideline	–25 °C to +40 °C	
Rechargeable Battery	Short-term	–20 °C to +45 °C	
	Long-term, from 1 year	–20 °C to +35 °C recommended: +10 °C to +30 °C	30 % – 50 % store charged; recharge after 1 year to avoid total discharge

3 Product description

3.1 General description

- Sturdy, brushless motor with resolver.
  Shut-off is torque/angle-controlled.
- LCD display with information on status, torque and angle.
- Green OK and red NOK LED display provides information on the current fastening result.
- LED lighting makes it possible to find the screw point quickly.
- Clockwise/counterclockwise rotation
- Low vibration level
- Servo and fastening electronics are integrated in the 47BA.
- Fastening parameters are set with the TMEB-100 controller or a PC.
  Data is transmitted from the controller to the tool holder via RS232.
- Rundown data is sent to the TMEB-100 controller or a PC by placing the 47BA into the tool holder. Data is transmitted from the tool holder to the 47BA via the IrDA interface port (infra-red).
- Types with WLAN data communication use the WLAN to transmit set points and results.

3.2 Operation and functional elements

This chapter describes the operating and functional elements and their functions:

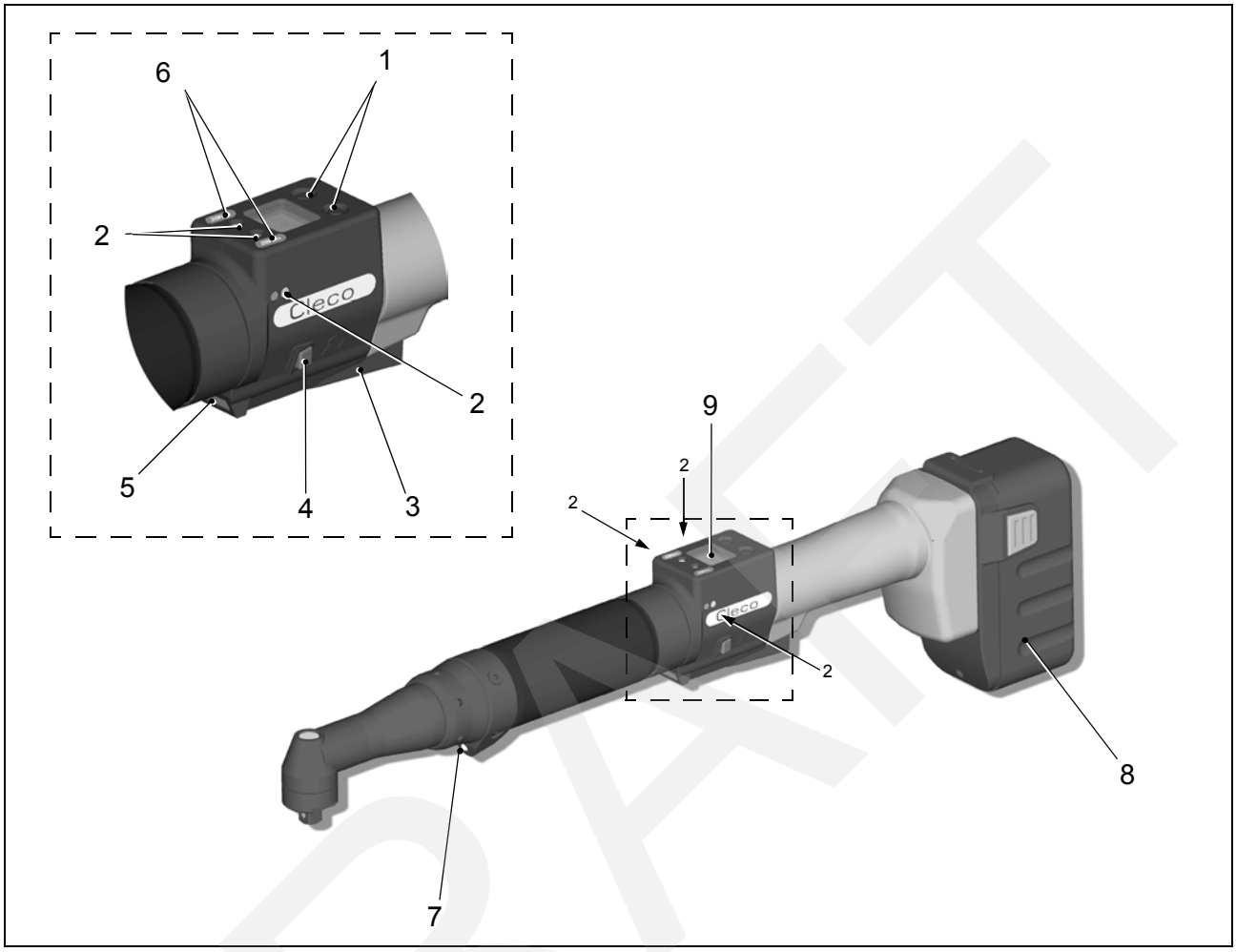


Fig. 3-1:

1 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
8 Rechargeable Battery
9 LCD display with information on torque, angle and status

3.2.1 Function keys

Left function key

- Confirm error message
  → Press once.

- Activate *Diagnosis* menu
  e.g. query number of rundowns to complete the service schedule.
  → Press for three seconds: *Test Menu.*
  → Press once. *Count.*
  → To exit the menu, press this key for three seconds: *Exit Menu.*

Right function key

- Cancel menu selection
  → Press once.

For more information see 6.3 Set position (only allowed with Linking) , page 21 and 6.5 Diagnostics , page 24.

3.2.2 LED display

The LED display shows each operating mode and the result of the last screwing cycle (see 5.2 Operating status , page 17):

LEDs	Operating status	Result after screwing cycle
Steady light Green	Active	OK
Steady light Red	Active	NOK
Flashing light Green – low frequency	Energy saving mode	
Flashing light Green	Standby	
None	Sleep	

If *Linking* is selected on TMEB-100:

Flashing light Green – high frequency	Advanced / Linking	Linking OK
Flashing light Red	Advanced / Linking	Linking NOK

Software update

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

NOTE

Do not interrupt programming by removing the battery during this phase.

3.2.3 Start button

The start button has 2 functions (Standard for TMEB-100):

- It activates the LED lighting.
  → Press down the button halfway and hold it.
- It starts the motor, the LED lighting goes out.
  → Hold down the button completely.

3.2.4 Reverse switch

The reverse switch changes the rotation direction of the 47BA:

Clockwise rotation – for screwing in screws
Press reverse switch to detent.
When the start button is pressed *Active* appears on the LCD display.

Counterclockwise rotation – for loosening or screwing out screws
Press reverse switch to detent.
When the start button is pressed *Left* appears on the LCD display.

3.2.5 IrDA interface port

The 47BA communicates with the TMEB-100 controller or a PC via the IrDA interface port. For data transmission and programming of the 47BA place the 47BA in the tool holder. Data transmission is possible in the *Active*, *Energy saving mode* and *Standby* operating modes but not possible in *Sleep* (see 5.2 Operating status, Seite 17).

NOTE

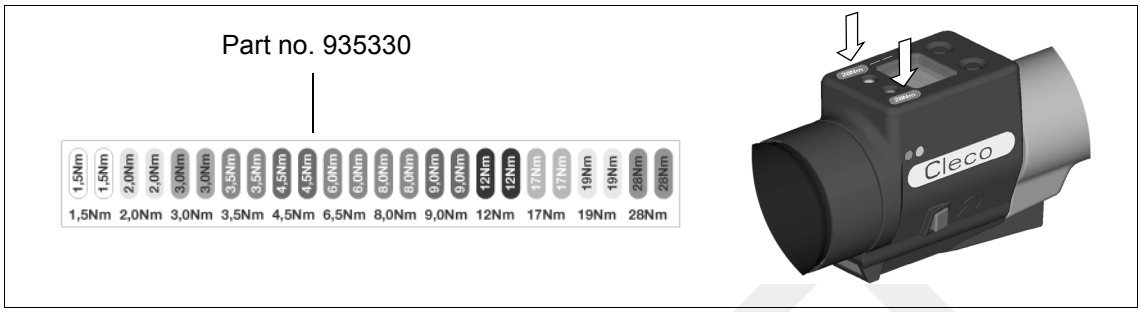
If the data transmission was interrupted, the 47BA reports *Synch error* on the reversed LCD display. Place the 47BA in the tool holder again. The complete data transmission is acknowledged on the display with *Rest 512*.

3.2.6 WLAN interface port

The WLAN data transmission is used for data communication between the controller and the Tool. Before start of a fastening cycle the WLAN data transmission is used in order to define the parameter, like turn off torque, on the Tool. If all values are defined the worker could start the fastening cycle. After a fastening cycle is complete the WLAN data transmission is used in order transmit the reached final values, like peak torque and turned angle, back to the controller. These values usually used on the controller for documentation of the production process.

3.2.7 Identification – set torque

To identify the set torque on the 47BA, glue the corresponding marking foil to the right and the left of the LCD display.



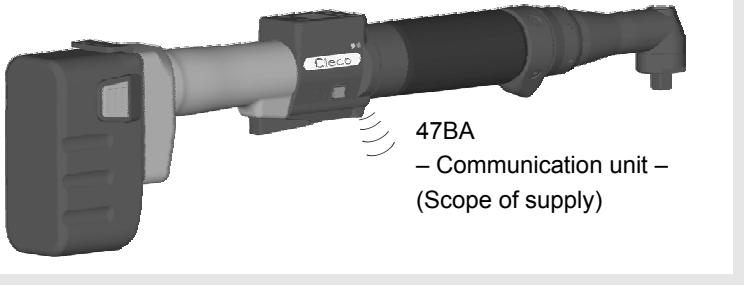
3.2.8 LED lighting

LED lighting make it possible to quickly find the screw point. To start it, press the start button half way (see 3.2.3 Start button, Seite 12).

3.2.9 Rechargeable Battery

For information on the battery see
4.3 Load battery, Seite 15
4.4 Replacing the battery, Seite 16
10.3.1 Battery power supply , page 50.

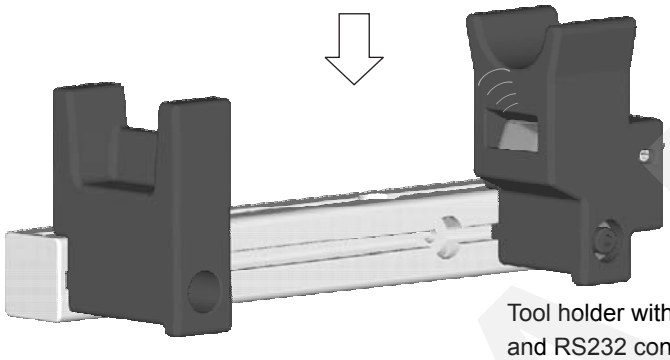
3.3 System overview – optional accessories



47BA
– Communication unit –
(Scope of supply)

Controller for
electric nutrunner
TMEB-100

Alternative:
Controller with
PC software
TMEB-COM



RS232

Tool holder with IrDA interface port
and RS232 connection cable
Part no. 935290

Replacement battery
Part no. 935129

1-battery charger
Part no. 935150 (230 VAC)
Part no. 935151 (115 VAC)

4-battery charger
Part no. 935143 (230 VAC)
Part no. 935152 (115 VAC)

RS232 extension cable (IrDA)
Part no. 935154 / 3m
Part no. 935155 / 6m
Part no. 935157 / 10m

Fig. 3-2: System overview – optional accessories

4 Before initial operation

The 47BA has been configured by Cooper Power Tools. A setting for your specific screw joint needs must only be made with the TMEB-100 controller or a PC by a qualified person. See the following:

- Programming manual TMEB-100
- Programming manual TMEB-COM

4.1 Setting up tool holder

➔ Mount the tool holder on a stable base.

➔ Select the location in such a way that no outside light shines onto the tool holder. This can inhibit data transmission.

➔ Lay the connection cable in such a way that there is no danger that persons can trip.

4.2 Environmental conditions

Ambient temperature	0 °C to maximum +40 °C
Humidity	0 to 80 %, not with dew
Working height	Up to 1000 m over msl

4.3 Load battery

WARNING!

Electrical shock, overheating or leakage of corrosive liquid from the battery can occur when using incorrect chargers or batteries.

➔ Use only original Cleco batteries and chargers. They are designed for use together.

NOTE

With proper use, the battery can be charged at least 500 times.
Here the following is important:

Battery charge temperature	5 °C to +40 °C recommended: +10 °C to +30 °C

➔ Follow the safety instructions printed on the battery and charger.

➔ Fully charge new batteries or those not used for a long time. The full charge is reached after 4 – 5 cycles (Charge / discharge).

➔ Fully charge the battery without interruption.

➔ After approx. 10 charges, do a controlled discharge of the battery The battery capacity remains.

➔ Do not totally discharge the battery (< 0.8 V).

- ➔ Protect the battery from impact.
- ➔ Keep the charger and battery contacts clean and dry.
- ➔ Protect the battery from moisture.
- ➔ The battery can remain in the charger when not in use.
  Power is supplied to it via a float charge.
- ➔ Replace used batteries and recycle them (see 10 Environment, page 28.)

4.4 Replacing the battery

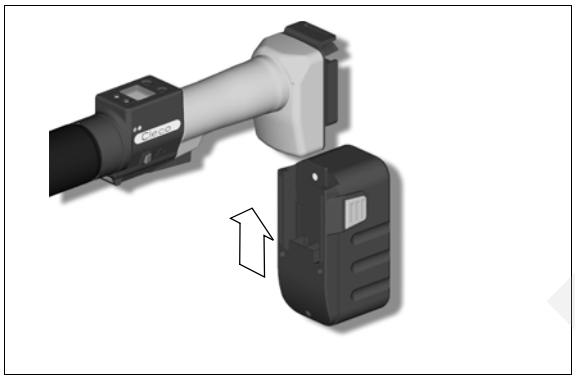


Fig. 4-1:

Inserting the battery

- ➔ Insert the battery into the tool guide until the catches securely engage.

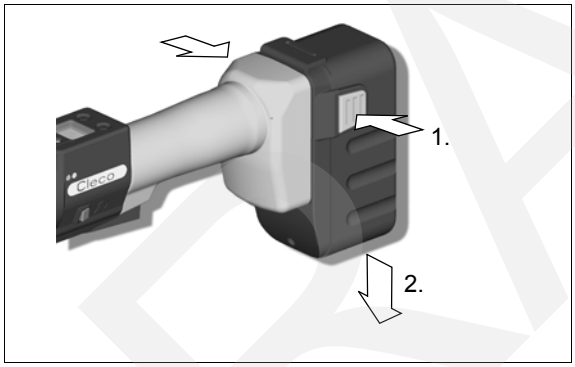


Fig. 4-2:

Removing the battery

- ➔ Press the catches together and pull the battery forward from the grip.

5 First Operation

5.1 Perform the rundown

Make sure that the battery is securely installed before operating the 47BA. The 47BA is now ready for use. After you press and release the start lever, the LCD display shows the message *Ready*.

When the rundown has been done, place the tool into the tool holder. The results of the rundown are shown under the *Run screen* menu item.

5.2 Operating status

The operating modes change in the following order.
The following functions are available depending on the display:

Operating status	**LED display**	**LCD display**	**Function**
Active	Steady light: Red – Rundown Not O.K Green – Rundown O.K.	On	Screws Data transmission
Automatic switch to the following after 1 minute idle time:			
Energy saving mode	Flashing light Green	Off	Data transmission
Automatic switch to the following after 11 minute idle time:			
Sleep	Off	Off	Data transmission is not possible
Manual switch from *Sleep* to *Active*: Press down start button and hold down for approx. 1 second.			

6 LCD display

6.1 Results display

Die LCD display consists of a three-line display with 6 characters each to indicate status, torque and angle.

First line – Status:

OK	Result is OK
NOK	Result is not OK
OFF	Torque transducer offset fault
CAL	Torque transducer calibration fault
ENC	Angle encoder fault
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
TS	Depth sensor signal was active at Start or deactivated during the fastening process (Series 17BP only)
Tq<	Torque too low
Tq>	Torque too high
A<<	Angle too low
A>	Angle too high
Error	Error occurred

Second line – Shut-off torque in Nm:

T	Shut-off torque

Third line – Shut-off angle in degrees:

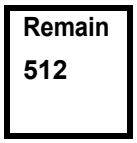
A	Shut-off angle

6.2 Status

RUN Screen

Ready is displayed when no other status message takes precedence and the tool is ready for operation.

Standard operating mode



Standard mode is selected when *Linking* is not activated. The application is selected at the *Run Screen* or via the App. selection inputs.

The display shows how many more rundowns can be executed before the fastening results memory unit is full and the rundown data has to be transmitted to the TMEB-100.

Linking operating mode

Linking mode is selected if *linking* is activated (see *Advanced application builder\Linking*).

The top line displays the first position to be fastened. The number of positions in displayed in the second line. The third line displays how frequently this position was repeated in the event of a NOK rundown.

Emergency function active

If Emergency is active during fastening, this is indicated by the status display *Emergency active*. (2.6.12 Activate Emergency)

6.3 Set position (only allowed with *Linking*)

Activate Set position

Hold
3 sec.

To activate the *Set position* menu, you must hold down the right-hand button for three seconds.

NOTE

Set position can only be enabled if TMEB-100 is activated in the *Advanced application builder\System settings\Set tool enable position* menu.

Settin
locked

If diagnosis is not enabled, the message S*ettings disabled* is displayed.

Linkin
menu

After three seconds, the message *Linking Menu* is displayed and you can release the right-hand button. Then the status for *Linking* is displayed.

NOTE

When *Linking* is active fastening is not possible.

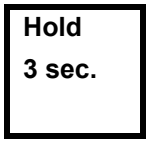
N.Pos1
of 3
Rpl 0

Use the right-hand button to increase the position and the left-hand button to reduce it. This allows you to skip or repeat positions. After the last position, the message *Linking End* in displayed. This means that the worker wishes to terminate *Linking*.

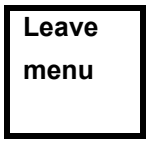
NOTE

If the position is changed, the overall result for linking will be evaluated as NOK in this case.

Deactivate Set position



To deactivate the *Set position* menu, you must hold down the right-hand button for three seconds.



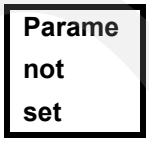
After three seconds, the message *Leave Menu* is displayed and you can release the right-hand button. The message *Run Screen* is then displayed again.

After you release the right-hand button you can proceed to the next fastening cycle using the programmed fastening parameters.

6.4 Communications

The tool must be synchronized with the TMEB-100 since all fastening sequences have been processed.

The tool must be synchronized with the TMEB-100 since no fastening sequences have been initialized.



No fastening sequence parameters have been set.

Check the selected application or tightening group at the TMEB-100 to see if tool settings and process programming have been performed.

Linkin
No
Result

No *Linking* result; *Linking* was terminated without an overall result.

Not all of the positions in the tightening group have been programmed. Check the selected application or tightening group at the TMEB-100 to see if tool settings and process programming have been performed.

Linkin
OK

Linking result OK

Linkin
NOK

Linking result NOK

Linkin
locked
Sync

Linking is disabled; the tool must be synchronized with the TMEB-100.

Under TMEB-100*Advanced application builder**System settings* at the TMEB-100, the function *NOK interlock* is activated; this function locks the tool when the interlock criterion is met.

App
locked
Sync

Application is disabled; the tool must be synchronized with the TMEB-100.

Under A*dvanced application builder**System settings* at the TMEB-100, the function *NOK interlock* is activated; this function locks the tool when the interlock criterion is met.

Reject
Releas
Sync

NOK interlock is active; the tool has been programmed under *Advanced application builder*\ *NOK interlock*. Depending on the parameter setting, the tool can be unlocked by the external input *NOK release* or by Release on Backoff. For unlocking via the external input *NOK release*, set the external input and synchronize it with the TMEB-100.

Sync Error

Error during last synchronization of data with the TMEB-100; the tool must be synchronized with the TMEB-100 again.

Tool not Init

Tool has not yet been synchronized with a TMEB-100; the tool must be synchronized with the TMEB-100 for the first time.

Input Enable Missin

The *Tool enable* input is missing. The input *Tool Enable* must be set and the tool must be synchronized with the TMEB-100. This message can appear only if *External Tool Enable* has been activated in *Advanced application builder\System settings*.

Need Part ID

Tool disabled since no valid barcode data has been set. The barcode must be sent to the TMEB-100 and the tool must be synchronized once again.

6.5 Diagnostics

Activate diagnosis function

Hold 3 sec.

To activate the Diagnosis menu via the function keys, you must hold down the left-hand button for three seconds.

NOTE

The Diagnosis function can be activated only if *Diagnosis* has been enabled with the help of the TMEB-100 in the menu *Advanced application builder\System settings*.

Diag
locked

If diagnosis is not enabled, the message Diagnosis Disabled is displayed.

Test
menu

After three seconds, the message *Test Menu* is displayed and you can release the left-hand button. The first Test Function (display tool system time) is then shown.

NOTE

While test functions are active, fastening cannot take place, or only the test function parameters can be used.

Deactivate diagnosis functions

Hold
3 sec.

To deactivate the Diagnosis menu via the function keys, you must hold down the left-hand button for three seconds. This can be done from any test function.

Leave
menu

After three seconds, the message *Test Menu* is displayed and you can release the left-hand button. The message *Run Screen* is then displayed again.

After you release the left-hand button, you can again proceed to use the programmed fastening parameters.

Display Tool System Time

Time
07:47
30.09

Displays the tool system time. The system time can be displayed in US or European format. The system time is set with the aid of the TMEB-100 in the *Administration\Date/Time* menu.

Display Counter Display

Counte
99
999999

The tool counter display is incremented after each rundown throughout the service life of the tool. You can also view the counter display on the TMEB-100 under *Diagnosis\Tool\Tool Memory*.

Display calibration test

Cal OK
K 1.11
O 0.00

This test function cyclically recalibrates the system with the values used immediately before the start of a rundown. For this, the tool must be in a relaxed state! The first line displays *Cal* for calibration test and *OK* for the status: all values are within the tolerance.
The values *Offset Voltage in volts,* line O and *Full Scale Voltage in volts*, line K for the torque transducer are displayed. If a value lies outside the tolerance range, the calibration fault display appears.

Rated values and tolerances:

Value	Rated value	Tolerance
Calibration offset	0 V	±45 mV
Calibration voltage:	1.122 V	±32 mV

Display TQ Measurement

Torque
M 5.57
M 8.23

When you actuate the start button after calling this test function, the same calibration is performed as directly before the start of a rundown. For this reason, the tool must be in a relaxed state when this function is called. Then the tool starts at speed "0". The torque is continuously measured and displayed until the start button is released again. The current torque is displayed in the second line, and, in the third, the peak value, the highest value since the start button was pressed.

Angle Encoder Display

Angle
W 360
OK

When the Start button is pressed the tool is started at 30 % of the maximum speed. After one revolution of the output shaft (setpoint angle 360 deg), measured with the resolver, the tool is stopped. During a permanently adjusted 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, the total result equals or is higher than 360 degrees and is evaluated as okay (*OK*).

Monitoring criteria are the torque and a monitoring time.

If the torque exceeds 15 % of its 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. The user must check, if the output shaft has actually turned by the value indicated (e. g. put mark on the spindle). If the angle reached by the output shaft does not agree with the value displayed, either the angle factor or the resolver is defective.

Display Voltages

Voltag
V19.40
U13.00

Current battery voltage is displayed in the second line. To ensure high utilization potential, this voltage is monitored continuously during fastening operation. If the voltage drops below limit, a warning is issued at the tool. The programmed value is displayed in the third line; it can be altered in the Tool menu with the TMEB-100.

Display Speed

Speed
Rpm466
M 0.02

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

Display Serial Number

S/N
000000
245

The tool serial number is displayed in this menu. The serial number is also displayed via the TMEB-100 in the Tool menu or *Diagnosis\Tool\Tool Memory*.

Display Software Version

Vers.
V1.00.
00

Displays the installed software version

Activate Emergency

NOTE

The emergency function can only be activated if it is activated in the TMEB-100 in the *Advanced application builder\System settings\Enable emergency function* menu.

Emerge
Strate
locked

Emergency function is disabled.

Emerge
Strate
OFF

If activated in the TMEB-100 in the *Advanced application builder\System settings\Enable emergency function* menu, the emergency function can be enabled and disabled in the *Diagnosis\Emergency function* menu with the tool start button. The Emergency function is disabled automatically when the tool links to the TMEB-100. The last fastening parameters used are always applied as parameters.

Emerge
Strate
On

In *Linking* mode this is the last position and in *Standard* mode the last parameters used. The data from 512 rundowns are stored in memory. If more rundowns than this are executed while the Emergency function is active, the oldest results are always discarded once 512 rundowns have been recorded.

Emerge
Active

NOTE

If Emergency is active during fastening, this is indicated by the status display *Emergency active*.

6.6 System fault messages

NOTE

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

Servo
Error
Init

Initialization error in tool Servo.

Remedy: remove and replace battery. If this does not help, return to tool to the manufacturer for repair.

Servo
Error
PWM

Speed specification from the measuring board on the Servo is faulty.

Remedy: remove and replace battery. If this does not help, return to tool to the manufacturer for repair.

Servo
Error
IIT

Too much power is being demanded from the tool.

Remedy: Switch the tool off for a time so that it can cool down.

Increase the cycle time, reduce the fastening time or the torque.

Servo
Error
IOFF

The Servo current sensor is detecting a current offset fault.

Remedy: Return tool to manufacturer for repair.

Servo
Error
Other

Collective Servo fault caused by hardware.

Remedy: Return tool to manufacturer for repair.

Servo
Error
IP

The current setpoint has been exceeded.
Remedy: there may be a short-circuit. Return tool to manufacturer for repair.

Servo
Error
Temp >

The Servo has overheated.
Remedy: Switch the tool off for a time so that it can cool down.
Increase the cycle time, reduce the fastening time or the torque.

Servo
Error
TempM>

The tool motor has overheated.
Remedy: Switch the tool off for a time so the motor can cool down.
Increase the cycle time, reduce the fastening time or the torque.

Servo
Error
Voltage

Operating voltage is outside the admissible range.
Remedy: Replace the battery. If this does not help, return the tool to manufacturer for repair.

Servo
Error
Curr>

Current at Servo output stage is too high.
Remedy: there may be a short-circuit. Return tool to manufacturer for repair.

Servo Error Angle

Tool angle encoder is sending incorrect signals to the Servo amplifier.
Remedy: Return tool to manufacturer for repair.

Low voltag warnin

Warns that battery is running low.
Remedy: Recharge battery or replace it with one that is already charged.

Tool Error Counte

The counter display could not be read or written.
Remedy: Return tool to manufacturer for repair.

Tool Error Ident

Tool memory could not be read.
Remedy: Return tool to manufacturer for repair.

Tool Error Start

Two-stage Start button faulty
Remedy: Return tool to manufacturer for repair.

Transd Ref.V. Error

Transducer reference voltage fault.
Remedy: Return tool to manufacturer for repair.

Transd
CAL
Error

Transducer calibration voltage fault.

Remedy: Tool was not relaxed at time of calibration. Allow tool to relax and try again. If this does not help, return to tool to the manufacturer for repair.

Transd
OFF
Error

Transducer offset voltage fault.

Remedy: Tool was not relaxed at time of calibration. Allow tool to relax and try again. If this does not help, return to tool to the manufacturer for repair.

Unknow
Error

General collective fault.

Remedy: Return tool to manufacturer for repair.

7 Maintenance

7.1 Service schedule

Regular maintenance reduces operating faults, repair costs and downtime.

CAUTION!

Danger of injury due to unintentional activation
– before service - disconnect the 47BA from the battery.

After... fastening cycles[1])	Actions
100,000	→ Check housing components for damage → Check to ensure battery contacts are clean → Check to ensure battery charger is clean
250,000 or once a year	→ Check that screw joints are tight → Check tool holder for wear → Check wear parts on angle attachment and lubricate 8.2 Angle attachment, page 42
250,000 or 500 loading cycles	→ Check the capacity of the battery if necessary
1 million or once a year	→ Clean gear components → Check the gear components for wear and replace if necessary → Relubricate the gear components, see 8.1 Gear + angle attachment, page 40 → Re-Calibration 47BA
Implement a safety-related maintenance program that takes the local regulations for repair and maintenance for all operating phases of the 47BA into account.	

1) Number of all fastening cycles, see 3.2.1 Function keys, page 11

7.2 Lubrication Products

For smooth function and a long service life, use of the correct grease types according to the table is essential.

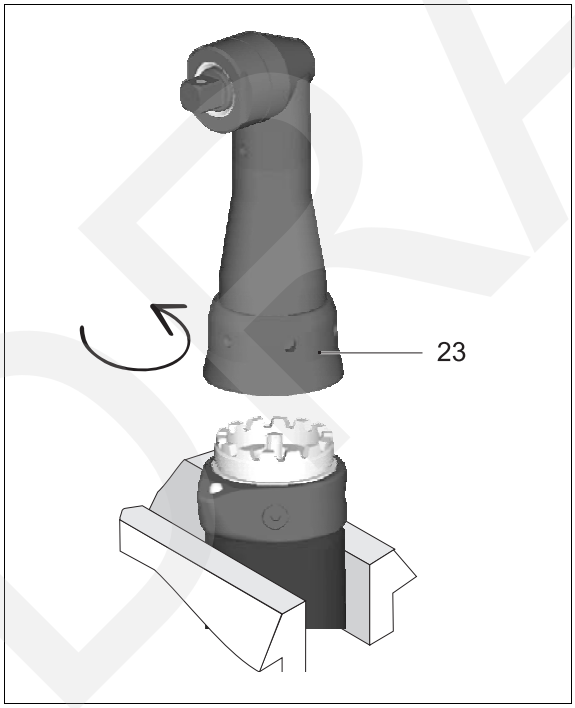
Grease lubricants according to DIN51502 /ISO3498

Part no.	Pack. unit [kg]	Standard designation DIN / ISO	ARAL	BP	elf	Mobil	KLÜBER LUBRICATION	SHELL
912554	15	G-POH	Aralub FD00	Energrease HTO	GA 0 EP Expa 0	Mobilplex 44		Special Gear H
933027	1	KP1K					Microlube GL 261	

7.3 Disassembling gear

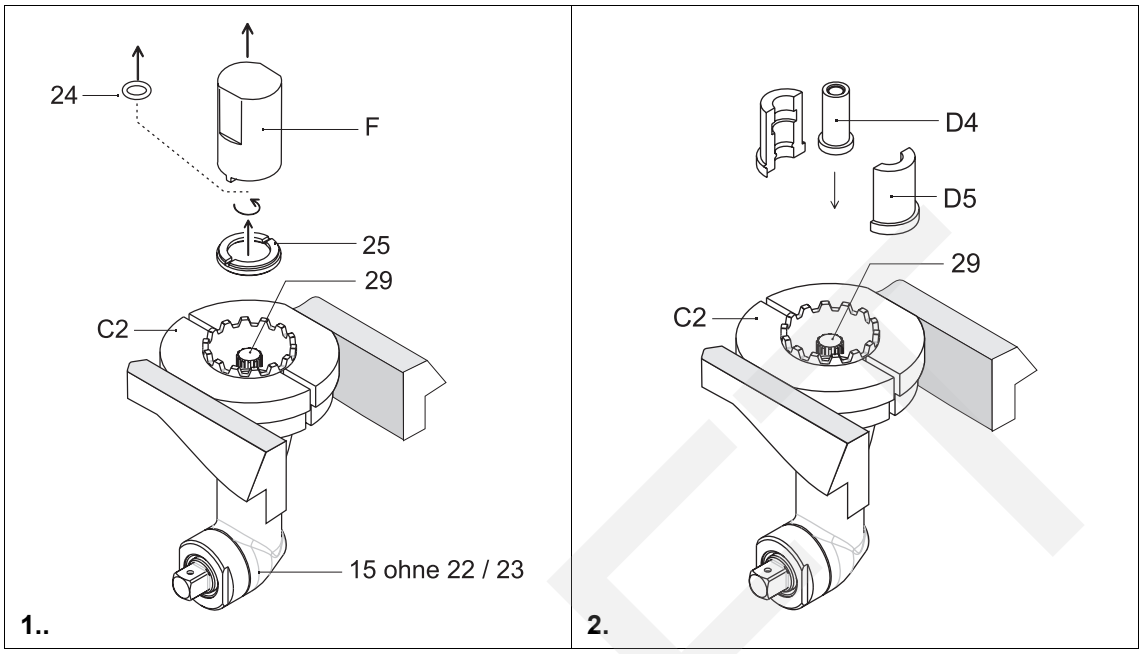
NOTE

If the 47BA is opened, the warranty is voided. Only specialized technicians should be allowed to open the gear for maintenance reasons.

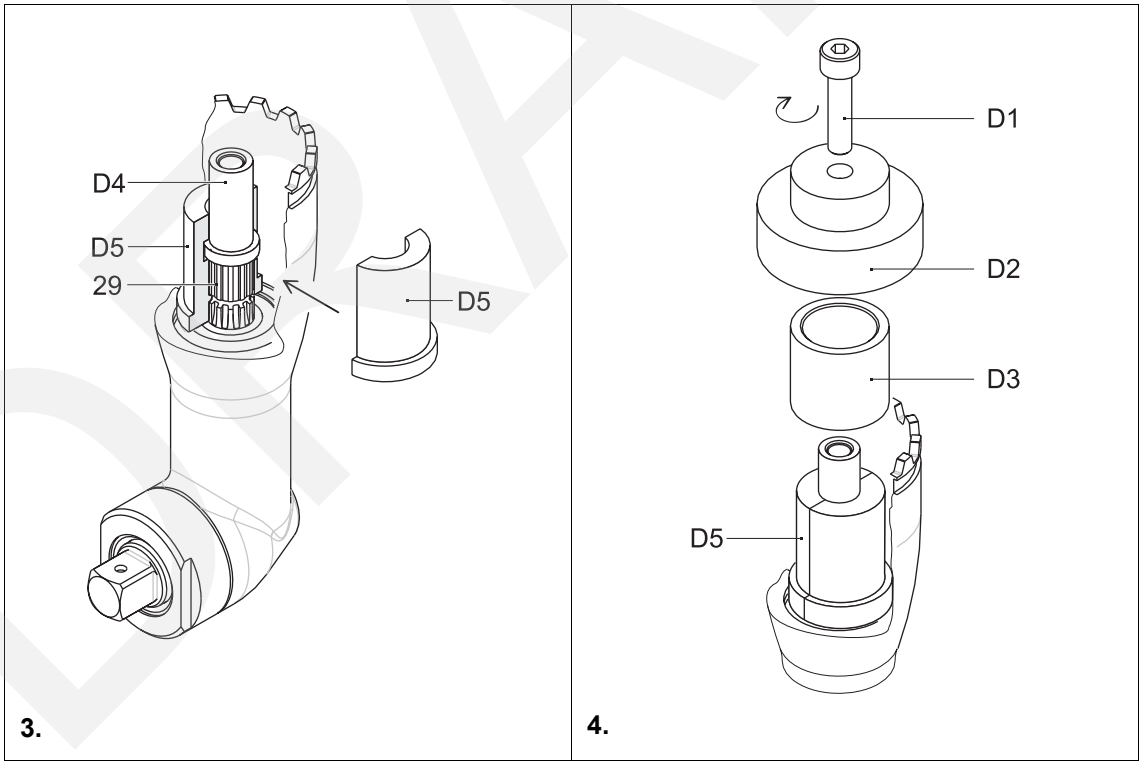


- ➔ Carefully tension the 47BA at the contact faces in a vise with plastic jaws (max. 15 mm high).
- ➔ Loosen **23** in a counterclockwise motion ø42.5; Hole diameter 4.1 Order no. 933257 + 933340
- ➔ Completely remove angle attachment.
- ➔ Pull gear completely off angle attachment.

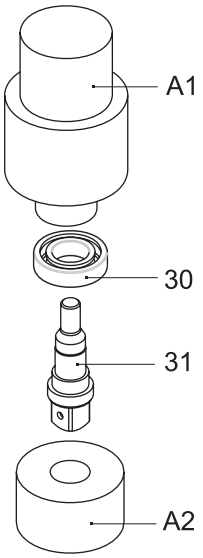
7.4 Disassembling angle attachment



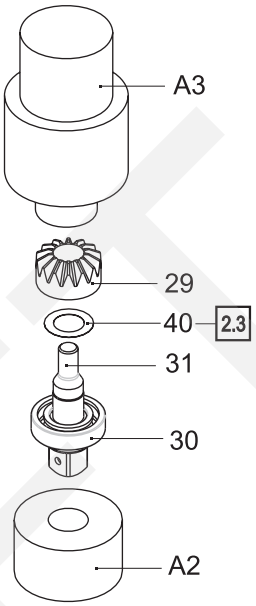
Index, see 8 Spare parts, page 39 / 8.4 Fixture order list, page 46



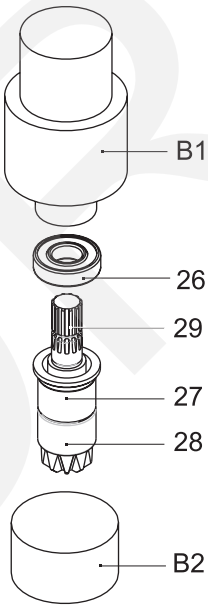
7.5 Assembling angle attachment



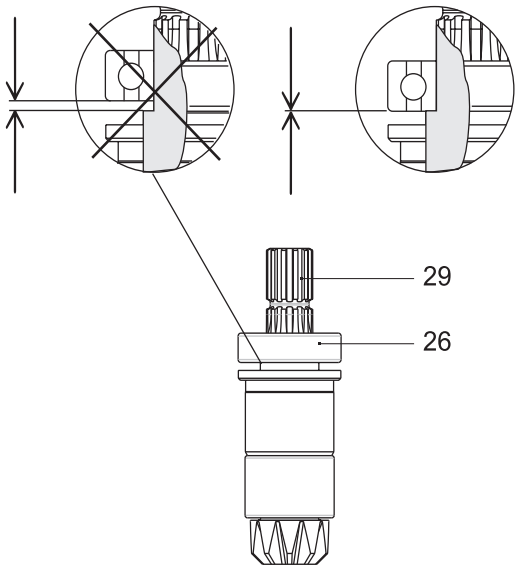
1.



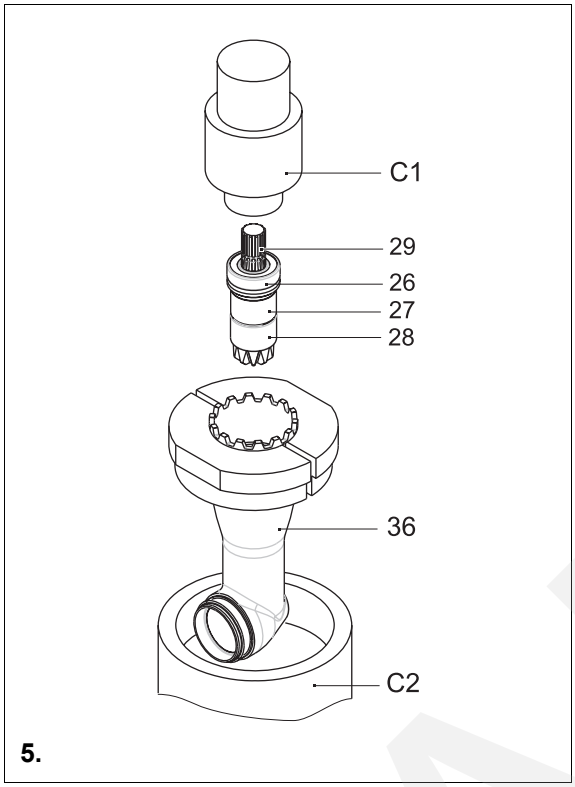
2.



3.



4.



5.

8 Spare parts

Note

Use only original CLECO spare parts. Failure to comply can result in reduced power and increased service requirements. If spare parts not manufactured by us are installed, the tool manufacturer is entitled to deny any warranty claims.

We would be pleased to prepare a special offer for spare parts and wear parts. Please send the following data to us:

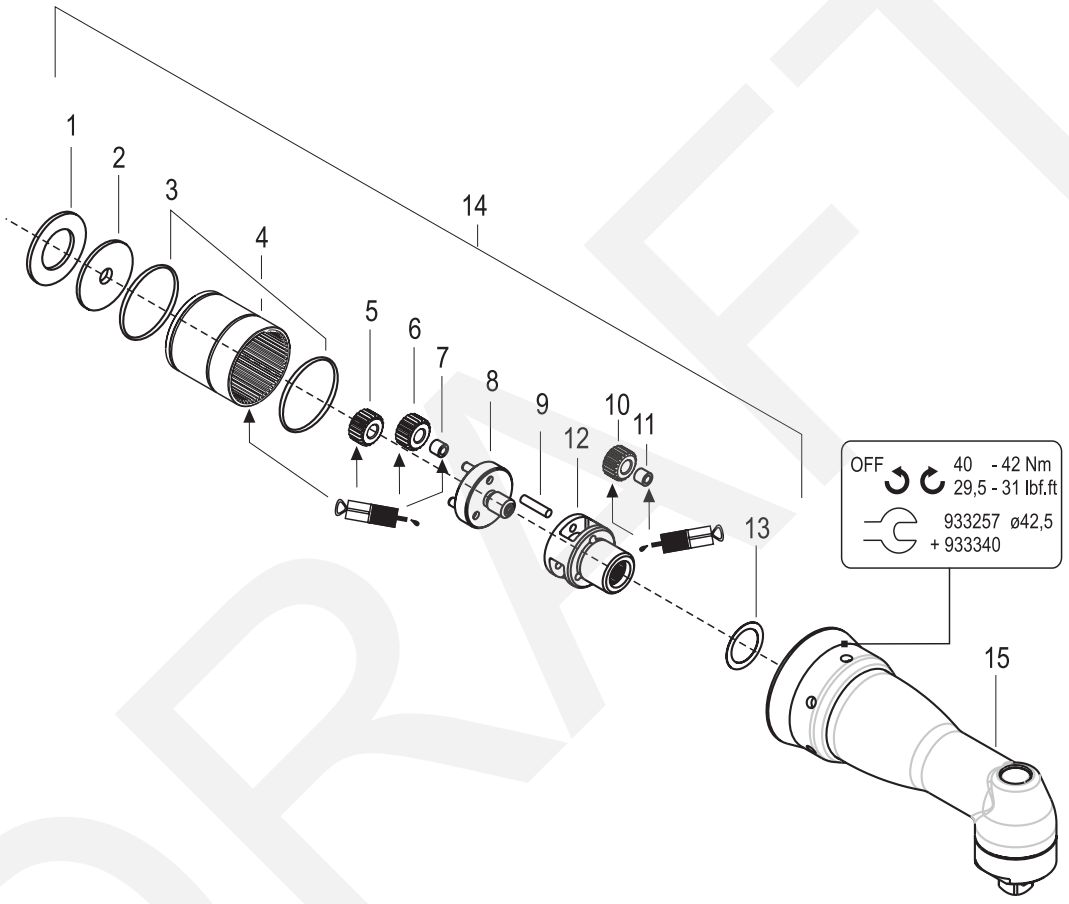
- Tool model
- Number of tools
- Number of rundowns/ day
- Set torque

Contact person
Customer Service Department
Tel.: +49(0) 7363 81 125
Fax: +49(0) 7363 81 383

8.1 Gear + angle attachment

*

Type	14	5	6 (3×)	8	10 (3×)	12
47BA15AM3	935263	541899	541894	542233	541897	542099
47BA21AM3	935262	–	541893	542231	541894	542079
47BA28AM3	935261	–	541893	542232	541897	542099



7.2 Lubrication Products , page 34

Index	1)	2)	Benennung	Description	3)
1	800116	1	Sicherungsring	circlip	25,98X0,94 IR
2	541887	1	Scheibe	washer	
3	542724	2	O-Ring	o-ring	28,24X 0,78
4	542722	1	Zahnkranz	toothed ring	
5	*	1	Steckritzel	pinion gear	
6	*	3	Planetenrad	idler gear	
7	923095	3	Nadelkranz	needle rim	3,X5,X 7,
8	*	1	Planetenradträger	gear cage	
9	541888	3	Zylinderstift	cylinder pin	
10	*	3	Planetenrad	idler gear	
11	923095	3	Nadelkranz	needle rim	
12	*	1	Planetenradträger	gear cage	
13	502983	1	Axialscheibe	thrust washer	15,88X 28,58X 1,56
14	*	1	Getriebe	gear	
15	935342	1	Winkelkopf	angle attachment	

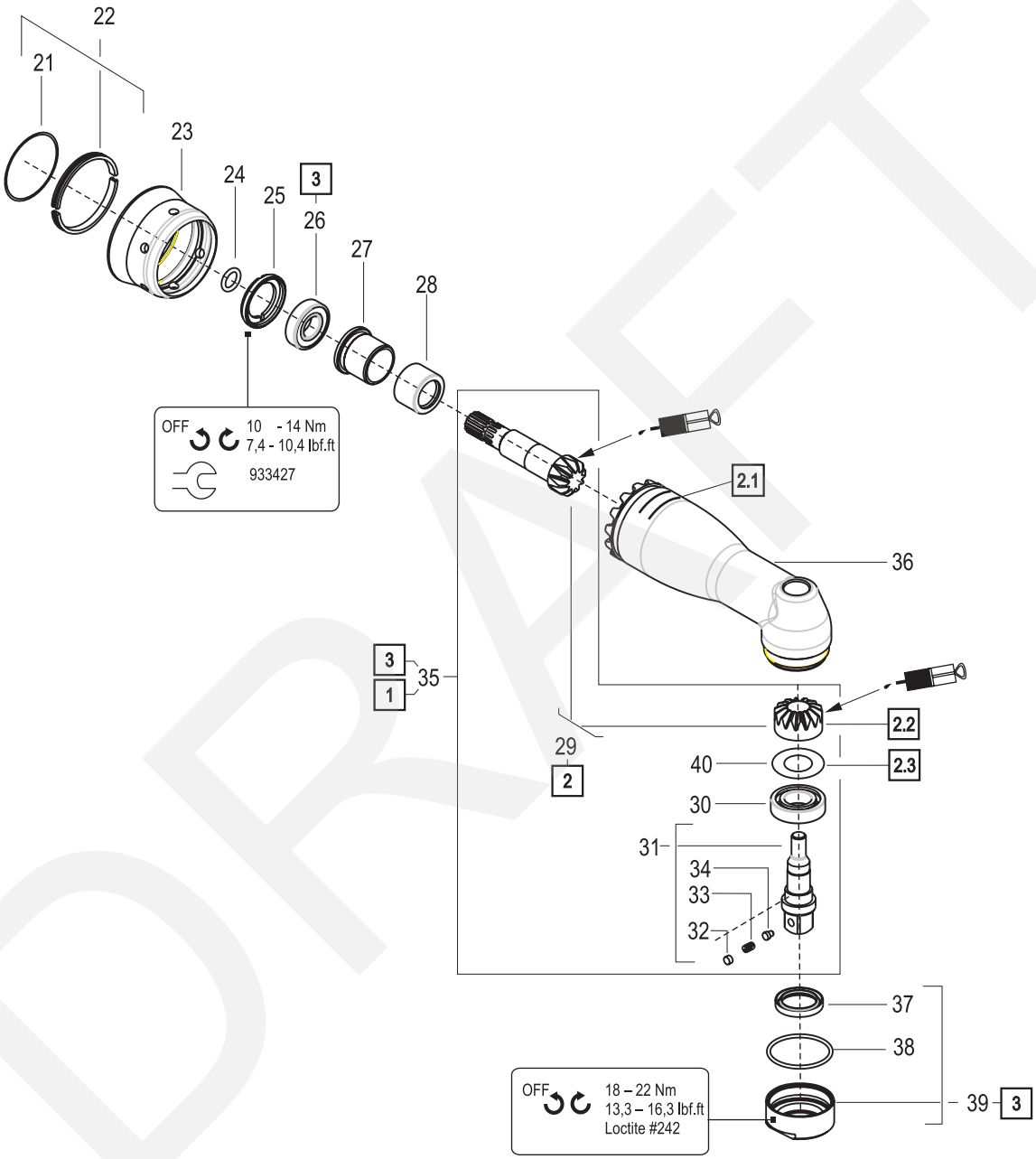
1) Order no.
2) Quantity
3) Dimensions
* See table, Page 40

8.2 Angle attachment

1 Always replace <29> and <31> as a set

2 Calculation of the correct thickness of the shim ring (40) for adjustment of the bevel gear , page 45

3 8.4 Fixture order list , page 46

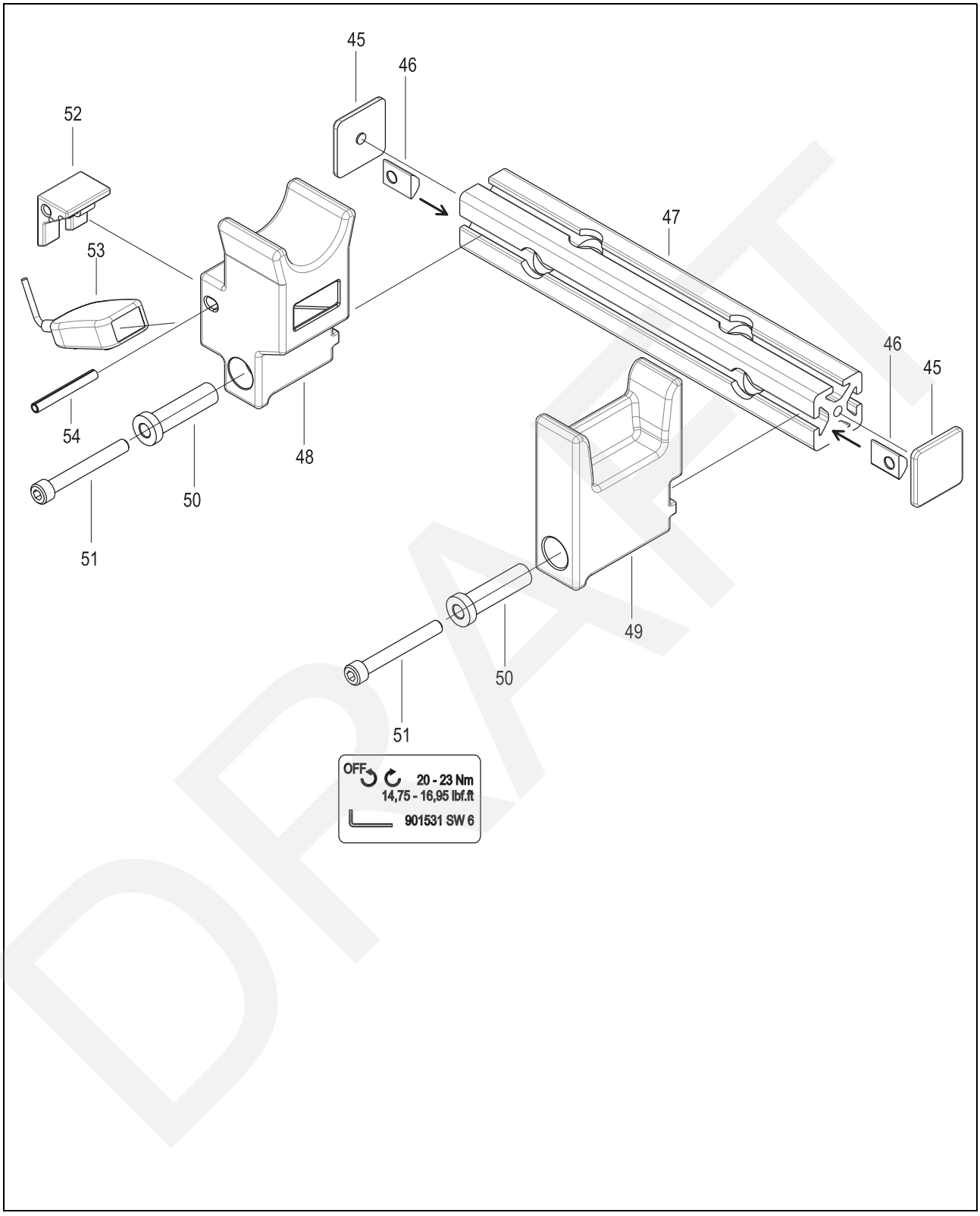


7.2 Lubrication Products , page 34

Index	1)	2)	Benennung	Description	3)
21	1011732	1	O-Ring	o-ring	
22	207309	1	Halbschalensatz	split-ring set	
23	935338	1	Überwurfmutter	union nut	
24	504970	1	O-Ring	o-ring	7,65X1,78
25	934023	1	Gewindering	threaded ring	
26	934035	1	Rillenkugellager	ball bearing	10,X 22,X 6,
27	934021	1	Hülse	sleeve	
28	934027	1	Nadellager	needle bearing	12,7 X 19,05X12,7
29	933792	1	Kegelradsatz	bevel gear set	
30	915064	1	Rillenkugellager	ball bearing	12,X 24,X 6,
31	935348	1	Abtriebsspindel kpl.	drive spindle asm.	
32	26989	1	Stopfen	plug	
33	9D6481	1	Druckfeder	compression spring	0,3 X 3,2 X9,2
34	914517	1	Stift	pin	
35	935350	1	Kegelradsatz kpl.	bevel gear set asm.	
36	935341	1	Winkelkopfgehäuse	angle attachment	
37	918163	1	Dichtring,Wellen-	seal shaft	15,X 21,X 3,
38	905084	1	O-Ring	o-ring	26,X1,5
39	929177	1	Überwurfmutter kpl.	union nut asm.	
40	935344	1	Passscheiben Kit	shim ring kit	

1) Order no.
2) Quantity
3) Dimensions
* See table, Page 40

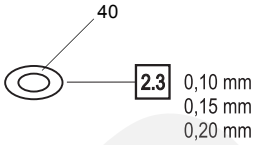
8.3 Tool holder with IrDA interface port

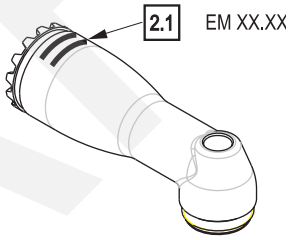


Index	1)	2)	Benennung	Description	3)
45	S900983	2	Abdeckkappe	cap	40,X40,
46	S900418	2	Nutenstein	slot nut	M 8
47	935292	1	Strebe	brace	
48	935293	1	Schrauberauflage	support	
49	935294	1	Auflage	support	
50	935291	2	Bundbuchse	plug	
51	902490	2	Zylinderschraube	cap screw	M 8X 65
52	935303	1	Verschluss	locking cover	
53	935170	1	IrDA-Serial Adapter	IrDA-Serial Adapter	
54	917735	1	Spannstift	dowel pin	6,X 50,

1) Order no.
2) Quantity
3) Dimensions
* See table, Page 40

2 **Calculation of the correct thickness of the shim ring (40) for adjustment of the bevel gear**





EM	16.60	16.61	16.62	16.63	16.64	16.65
16.48						
16.49					0.20 mm	
16.50		0.15 mm				
16.51						
16.52	0.10 mm					

NOTE

After calculation of the correct shim ring press the bevel gear onto the drive spindle.
Frequent disassembly of the ball bearings will reduce the compression and will cause incorrect function.

8.4 Fixture order list

Index		Part no.	Name
A		933450	Reassembly equipment
	A1	933451	Punch
	A2	933453	Base
	A3	933452	Punch
B		933454	Reassembly equipment
	B1	933455	Punch
	B2	933456	Base
C		933449	Reassembly equipment
	C1	933457	Punch
	C2	933458	Base
D		933448	Equipment Disassembly
	D1	900009	Cap screw
	D2	933459	Thrust pad
	D3	933460	Sleeve
	D4	933461	Extraction pin
	D5	933462	Semi-monocoque pair
E		933428	Socket wrench insert WAF 24
F		933427	Socket wrench insert D 16
		933340	Torque wrench

9 Service

Note

If repair is required send the complete 47BA to Cooper Power Tools. A repair is only permitted by Cooper Power Tools authorized personnel. If the tool is opened, the warranty is voided.

Contact person for all customer service and repair services:
Mr. Anton Schmid
TS Department
Tel.: +49(0) 7363 81 171
Fax: +49(0) 7363 81 252

Mr. Reinhold Eichberger
TSK Department
Tel.: +49(0) 7363 81 254
Fax: +49(0) 7363 81 263

9.1 Re-Calibration

The type-specific calibration data is saved on the integrated screw electronic system in the delivery state of the 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 Cooper Power Tools. This ensures that any updating of the calibration data, if necessary, is done correctly.

10 Technical Data

10.1 Dimensions 47BA

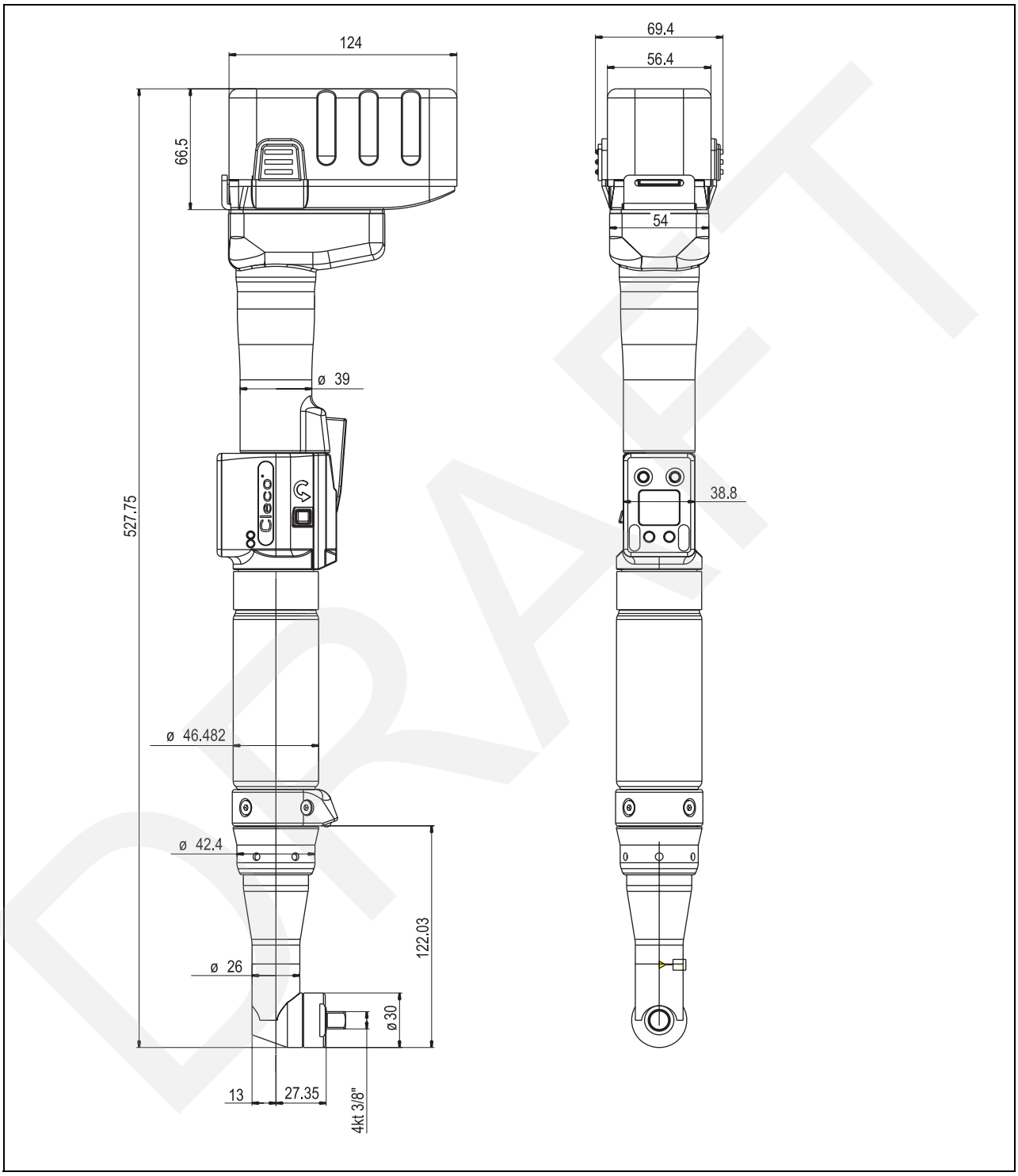


Fig. 10-1: Dimensions of 47BA (mm)

10.1.1 Dimensions of tool holder (Optional)

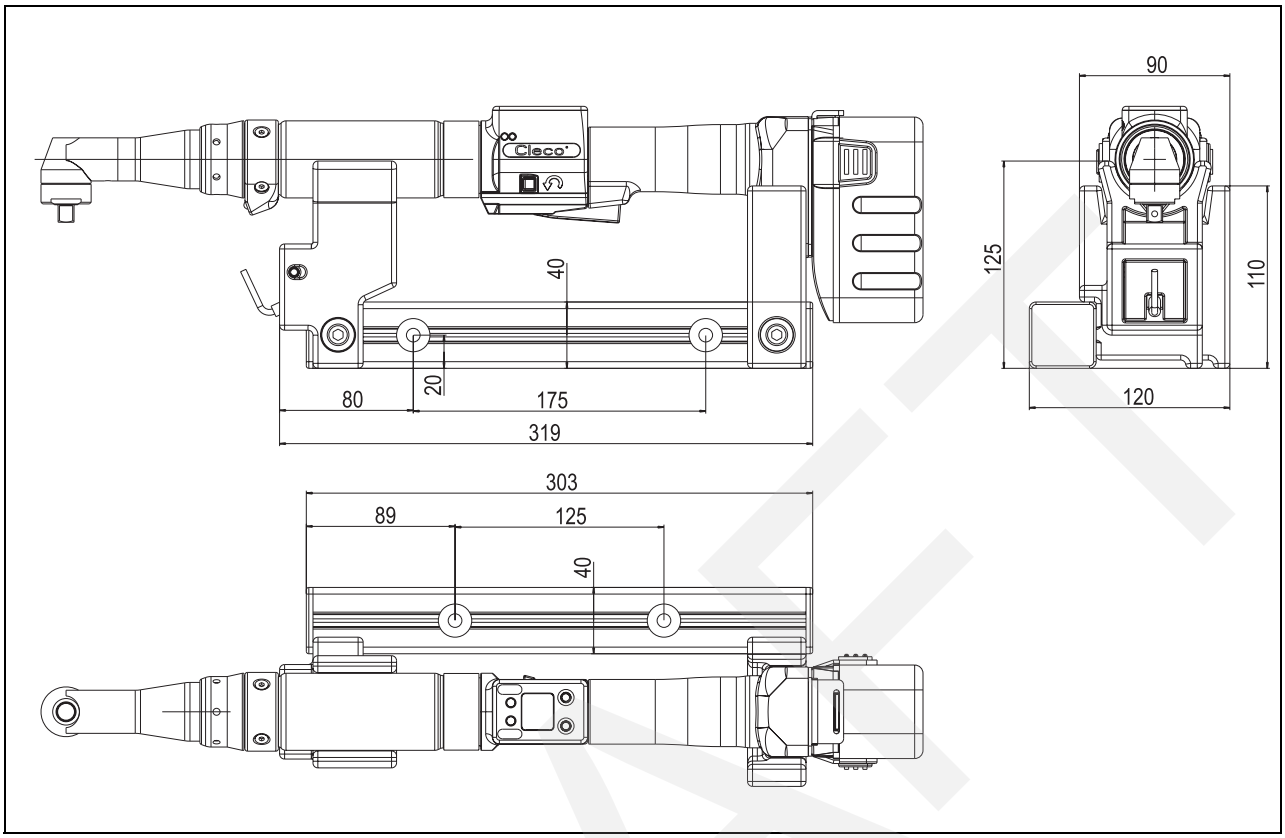


Fig. 10-2: Dimensions of tool holder (mm)

10.2 Performance Data

Type	Recommended torque range		Free speed	Screw size	Weight		Calibration data	
					without Recharge-able Battery	with Recharge-able Battery	Torque (nominal)	Angle pulses (Resolver)
	Nm max.	Nm min.	¹/min	mm	kg		Nm	¹ degrees
47BA15AM3	15	5.5	400	M6	1.95	2.60	16.35	1.4464
47BA21AM3	21	8	305	M7			22.91	1.8941
47BA28AM3	28	10	215	M8			41.35	2.6727

10.3 Electrical data

Tool

Protection class III as per DIN EN 61140 (VDE 0140-1)
Degree of protection IP40 as per DIN EN 60529 (IEC 60529)

Tool holder

Protection class III as per DIN EN 61140 (VDE 0140-1)
Degree of protection IP40 as per DIN EN 60529 (IEC 60529)

10.3.1 Battery power supply

Battery type	Nickel metal hydride (NiMH)
Nominal capacity	1700 mAh
Rated voltage	18 V
Battery automatic discharge	approx. 0.3 mA

10.3.2 Output stage servo electronic

Nominal current motor phase	8 A peak value sinus
Rated output	120 VA
Maximum power	400 VA

10.3.3 Control electronics

Rated voltage	18 V
Nominal current in *Active* operating mode	100 mA
Nominal current in *Power-saving* operating mode	70 mA
Nominal current in *Standby* operating mode	30 mA
Nominal current in *Sleep* operating mode	< 1 mA

10.3.4 IrDA interface port

Supply voltage	5.0 V (4.8 to 5.5 V)
Power consumption	0.30 VA
Maximum current	11 mA
Transmission speed:	57.6 kbit/s
Parity Bit	none
Data Bit	8 bit
Stop Bit	1 bit
Error check	CRC

10.3.5 WLAN interface port

Description	Data
Standard	IEEE 802.11b
Security	WEP64, WEP128, WPA
Distance	Typisch bis zu 50 m
Channels	1 – 11 (2.412 – 2.462 GHz)
Output power	15 dBm typ.
Sensitivity	-93 dBm (typ. @ 1 Mbps) -84 dBm (typ. @ 11 Mbps)
Modulation	DSSS/CCK
International standards	EN 300328 EN 60950/2000 EN 301489-1/-17 FCC part 15

10.3.6 Torque 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.

Nominal calibration	see 10.2 Performance Data , page 49
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

11 Disposal

Recovery of raw materials instead of waste disposal

In accordance with the Electrical and electrical device law (ElektroG) and the national Battery ordinance (BattV) the tool and the nickel metal hydride battery must be recycled in an environmentally friendly manner.

Return the tool and defective/used batteries to your company collection facility or to Cooper Power Tools. Do not throw the battery in household refuse or in water. Do not open the battery.

12 Glossary

Angle	Angle that is to be reached at the end of the fastening sequence (also final angle, rated angle, or nominal angle).
Angle High Limit [AHL]	Maximum admissible angle of rotation for a fastening stage.
Application	Programmed setting of the tool for a specific fastening sequence of up to 6 stages.
End delay time [ms]	Delay from the time the tool is switched off until measurement stops.
Fastening parameters	Parameters that determine the fastening sequence for a run-down.
Linking	Linking allows the user to automatically change from application to application (max. 255) for a predefined number of steps (rundowns). The automatic changes are available for eight tightening groups. The corresponding tightening groups can be selected with the Run Screen or by external selection.
Max. fastening time [mS]	Max time for the tool to run during the stage
Maximum tool speed	Maximum admissible speed of tool.
NOK	Active if Torque/Angle/Yield Point are outside the programmed limits or some other fault has occurred.
NOK interlock	Tool stop following a preset number of faulty rundowns.
OK	Active if Torque/Angle/Yield Point are within the programmed limits.
Position (linking)	A number between 1 and 96 which describes rundown position during linking.
Pulses per degree	Number of encoder pulses generated by the tool when rotating the head exactly 1 degree or 1/360 of a revolution
Resolver (angle encoder)	Sensor for measure rotation angle.
Speed	Nominal speed of nutrunner during a stage.
Start spike time [ms]	Time delay for the control system to start measuring torque after the stage starts
Tightening Group (Linking)	Group (1-8), which specified how many rundowns are required during the Linking with which parameters (application). The corresponding tightening groups can be selected with the Run Screen or by external selection.
Tool Enable	Input to enable or disable the tool.
Tool reverse	When active prior to tool start, the tool will run counter-clockwise using the backoff strategy
Torque High Limit [THL]	Maximum torque that may be reached during a cycle.
Torque Low Limit [TLL]	Minimum torque that must be reached during a cycle.
Torque monitoring	Fastening strategy by which a tool is monitored based on predetermined torque limits

Torque transducer	Sensor for measuring torque.
Turn off angle	Angle at which a tool is shutoff
Turn off torque	Torque at which a tool is shutoff

COOPER Power Tools

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Fax: 803-808-6735
www.cooperpowertools.com

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