Operating instructions

Battery nutrunner
DA2 and DA2*docu*

PLARAD®
Torque & Tension Systems

Read the manual carefully before use!
Keep for future use!

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Translation of the original operating instructions
Mach-55253-DE, 2, en_GB

Information about this manual

This manual enables the safe and efficient handling of the battery nutrunners DA2 and DA2*docu* (referred to in the following as “nutrunner”).

The manual is a component of the nutrunner and must be kept in its immediate vicinity so that the user can access it at any time.

The user must have read and understood this manual prior to commencing any tasks. A basic prerequisite for ensuring that work is performed safely is compliance with all safety instructions and guidelines in this manual. In addition, the local accident prevention regulations and general safety provisions for the nutrunner’s area of application apply.

Illustrations in this manual serve to provide a basic understanding and may differ from the actual design.

Versions

This manual is valid for the following battery nutrunners and software:

- DA2
- DA2*docu*
- Data Transfer Software DTS
- Diagnostic Setting Software DSS

DA2	DA2*docu*
DA2-05	DA2*docu* 05
DA2-10	DA2*docu* 10
DA2-20	DA2*docu* 20
DA2-30	DA2*docu* 30
DA2-36	DA2*docu* 36
DA2-48	DA2*docu* 48
DA2-80	DA2*docu* 80

Other applicable documents

The following documents must be observed in addition to this manual:

- Rating plate
- EU declaration of conformity
- Torque chart
  Individual assignment of bolting processes and torques to the torque levels of the supplied nutrunner
- Certificates (option)
- Technical data sheet

Copyright

Further development of the manual

This manual was compiled with great care. If you notice any errors, have any questions or identify any inconsistencies, please notify us in writing. Your suggestions for improvement will help us design a user-friendly manual.

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1 Unpacking

Delivery

Fig. 1: Transport case

The nutrunner is delivered in a plastic transport case together with the other items in the scope of delivery.

The transport case is packed in a cardboard box upon delivery.

The transport case is fitted with a foam inlay. The recesses in the inlay enable precision storage of the scope of delivery.

Checking the delivery

Check the delivery for transport damage and ensure it is complete immediately upon receipt. If it is incomplete or if there are defects, note the extent of the damage on the transport documents and lodge a complaint immediately.

Scope of delivery

DA2

The scope of delivery includes:

- Transport case
- Trolley
- Nutrunner
- Reaction arm
- Circlip pliers
- Circlip
- O-ring
- Document folder
  - Operating instructions
  - Torque chart
  - EU declaration of conformity
  - Technical data sheet
- Batteries
- Battery charger

Options:

- Impact wrench socket
- Test certificate for torque chart
- Reaction arm versions
- Any accessory ordered
- Diagnostic Setting Software DSS
- Programming adapter, USB cable

Scope of delivery for DA2*docu*

In addition to the scope of delivery for the DA2, the scope of delivery for the DA2*docu* includes:

- Data Transfer Software DTS
- Option: DA2*docu* receiver
- USB stick with software for data transfer
- USB stick with operating instructions and translations

Handling packaging material

The individual packages are packed according to the expected transport conditions. Only environmentally friendly materials are used for the packaging.

The packaging should provide protection against transport damage, corrosion and other damage. For this reason, do not destroy the packaging and do not remove it until shortly before use.

Dispose of packaging material in accordance with the applicable statutory provisions and local regulations.

ENVIRONMENT!

Danger to the environment due to incorrect disposal!

Packaging materials are valuable raw materials and, in many cases, can be further utilised or appropriately reconditioned and recycled. Incorrect disposal of packaging materials can be hazardous to the environment.

– Reuse pallets.
– Dispose of packaging materials in an environmentally sound manner.
– Observe the locally applicable disposal regulations. If necessary, engage the services of a specialist company with regard to disposal.

Transport and storage

Always store and transport the nutrunner in the transport case.

Set the direction of rotation to the middle position (transport position) ↳ *"Direction of rotation setting" on page 14*.

Do not take the nutrunner out of the transport case until shortly before use.

Transporting batteries

Batteries contain hazardous substances are classified globally as dangerous goods. These products are therefore only approved for commercial transport under certain conditions.

With regard to road transport in Europe, the regulations of the ADR must be complied with; the regulations of IATA DGR must be complied with for air transport. These contain specifications for packaging and accompanying documentation, for example.

Before transporting hazardous substances, always familiarise yourself with current regulations pertaining to the transport of dangerous goods.

2 Getting to know the nutrunner

2.1 Illustration of the nutrunner

DA2 and DA2*docu*

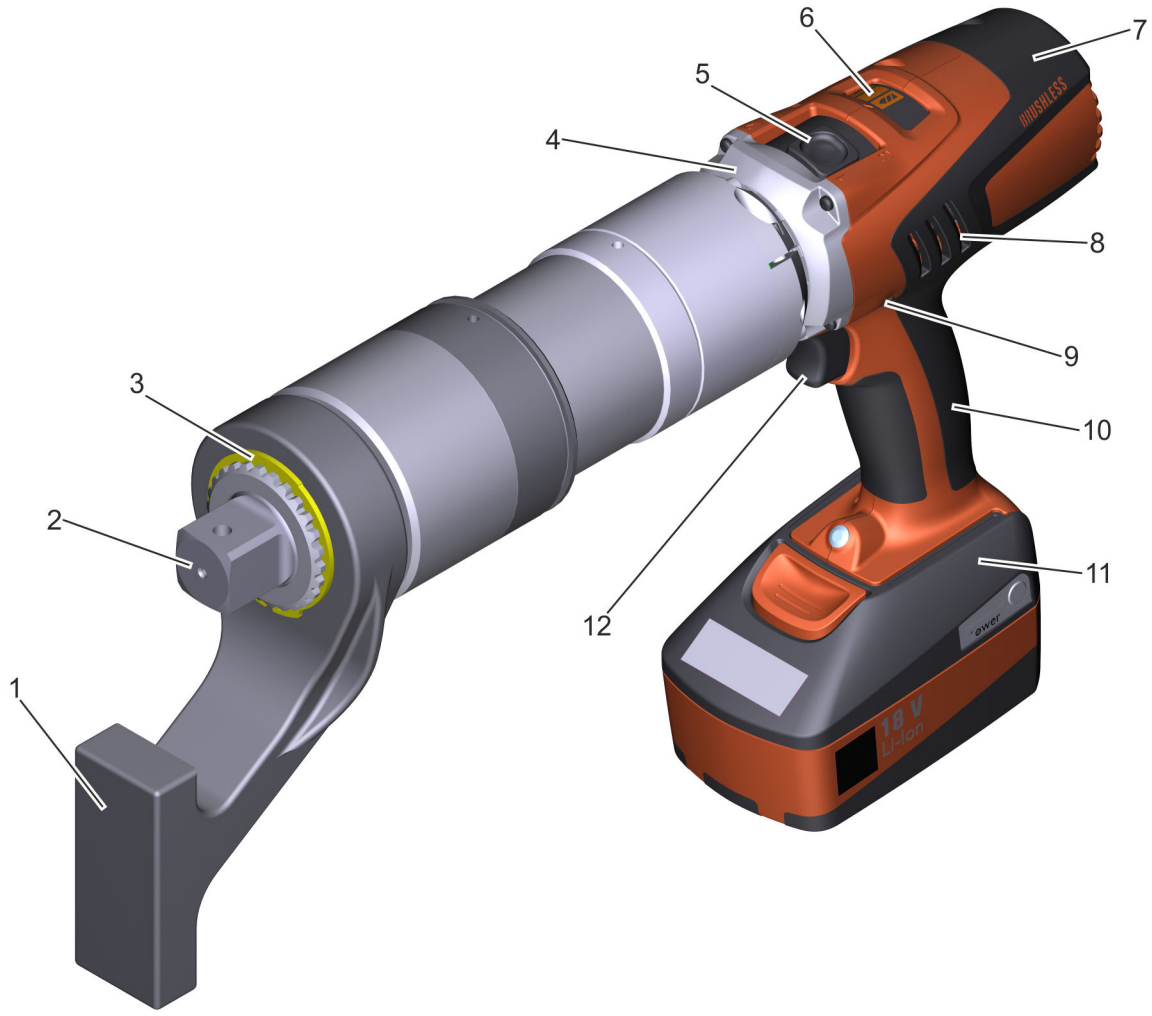


Fig. 2: Illustration of the DA2 and DA2docu battery nutrunners

1	Reaction arm	7	Drive motor
2	Square drive (tool holder)	8	Ventilation slot
3	Reaction arm circlip	9	Direction of rotation setting
4	Safety swivel joint	10	Handle
5	Gear setting	11	Battery
6	Setting levels	12	Trigger

Battery

1 Battery release button
2 Electrical contacts and guide rail
3 Battery charge status indicator button
4 4 LEDs for battery charge status indicator

Fig. 3: Illustration of battery

Battery charger

1 LED display
2 Battery connection
3 Power cable (not shown)

Fig. 4: Illustration of battery charger

2.2 Brief description

The nutrunner is a hand-held tool for tightening and loosening bolted connections in a dry environment.

The nutrunner is powered electrically with the aid of a battery.

An individually adjustable reaction arm is used to brace the tool against the torque.

The desired torque can be selected by switching the gearbox stages and by actuating the setting potentiometer.

With the DA2*docu* nutrunner version, information and events can be documented in the nutrunner and subsequently transferred to a terminal device.

2.3 Rating plate

Nutrunner

The following data is inscribed on the rating plate:

- Name of the manufacturer including their full address
- Machine designation
- Type designation
- Article/serial number
- Maximum torque
- Year of construction
- Weight
- CE mark

2.4 Performance variables

Overview of available performance variables for the nutrunner versions:

DA2	DA2 *docu*
DA2-05	DA2*docu* 05
DA2-10	DA2*docu* 10
DA2-20	DA2*docu* 20
DA2-30	DA2*docu* 30
DA2-36	DA2*docu* 36
DA2-48	DA2*docu* 48
DA2-80	DA2*docu* 80

2.5 Nutrunner controls

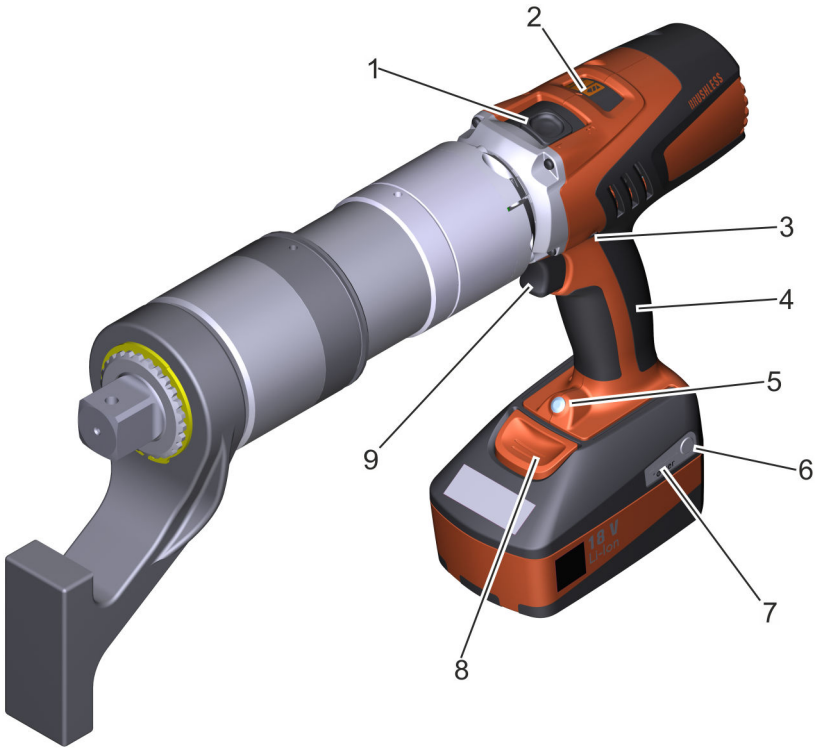


Fig. 5: Controls

1 Gear setting
2 Setting levels
3 Direction of rotation setting
4 Handle
5 Battery charge status indicator
6 Battery charge status indicator button
7 4 LEDs for battery charge status indicator
8 Battery release button
9 Trigger

The nutrunner features the following controls:

Gear setting and setting levels

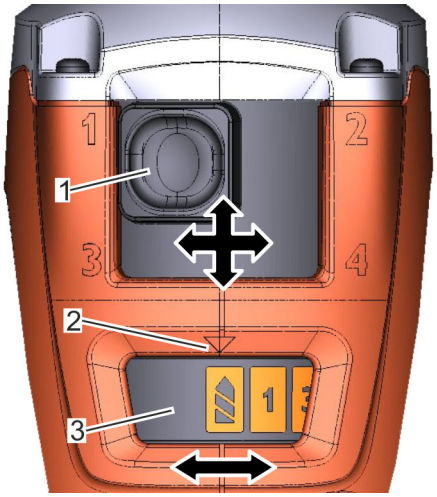


Fig. 6: Gear setting and setting levels

1 Gear setting
2 Marking for setting level
3 Setting levels

The torque is selected using a combination of gear and setting level.

Note the enclosed torque chart.

Gear: Gear 1 to 4

The gearbox gears are adjusted manually.

The highest torque is obtained in gear 1.

Setting level: Level 1 to 15

The potentiometer is adjusted electronically.

The highest torque is obtained in level 15.

Breakaway torque level:

The breakaway torque level is located at the start and end of the setting level scale .

The breakaway torque level must not be used to tighten the bolted connections.

Direction of rotation setting

Fig. 7: Direction of rotation setting (1)

The direction of rotation can be changed with the aid of the direction of rotation setting (Fig. 7/1).

Standard direction of rotation: Right-hand thread

	Direction of rotation setting	Direction of rotation
	Right-hand side is pressed.	Clockwise (CW) Tightening in clockwise direction
	Middle position	No rotation possible. Transport position

	Direction of rotation setting	Direction of rotation
	Left-hand side is pressed.	Counterclockwise (CCW) Loosening in counterclockwise direction

Handle

The nutrunner can be gripped securely and carried by the handle (Fig. 5/4). Ergonomic use of the trigger is possible.

Battery charge status indicator

Fig. 8: Battery charge status indicator

1 Battery charge status indicator
2 Button and 4 LEDs for charge status indicator
3 Battery release button

A proactive battery charge status indicator is fitted below the handle of the nutrunner. The white LED (Fig. 8/1) warns the user of insufficient battery capacity, thereby preventing a sudden loss of torque and faulty bolted connections.

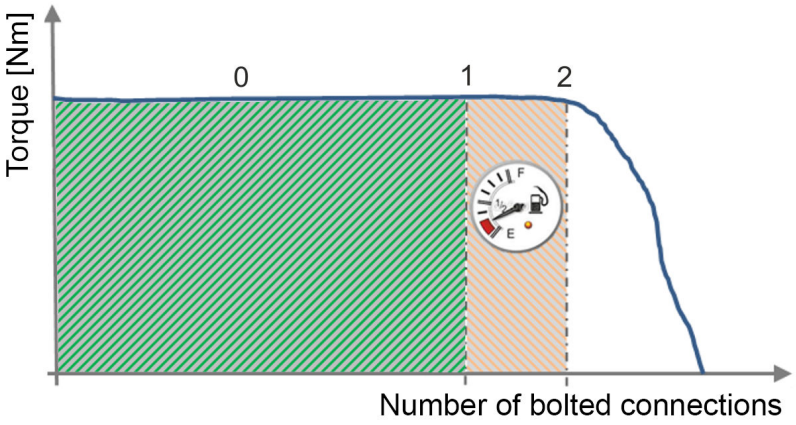


Fig. 9: Charge status

Level	LED	Meaning
0	LED is not illuminated	Battery charged.
1	LED flashing slowly	There is still approx. 30% of the usable battery capacity available. It is still possible to tighten the bolted connections with the set torque.
2	LED flashing rapidly	Battery capacity is no longer sufficient to achieve the set torque. The nutrunner switches off automatically. It is no longer possible to continue working. The results of further bolted connections are NOK.

Button and LEDs for charge status indicator

Fig. 10: LED display and charge status indicator button

The battery charge status can only be displayed correctly when the drive motor is switched off.

The battery charge status is displayed (as a percentage) by pressing the button.

LED	Meaning
1 to 4 LEDs light up green	The charge status is displayed as a percentage: 25% – 50% – 75% – 100%
LED lights up red continuously	The battery is empty. Charge the battery.
LED flashes red	The battery is not operational. Bring the battery to within the operating temperature range and then charge it.

Battery release button

The battery is released from the nutrunner using the release button (Fig. 8/3) and can be removed.

Trigger

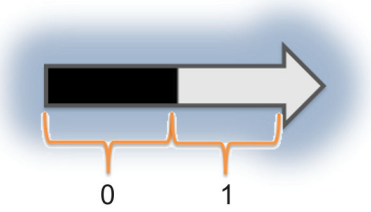
The set bolting process is initiated with the trigger (Fig. 5/9) and is executed for as long as the trigger is pressed.

DA2 and DA2*docu*

Do not pulse!

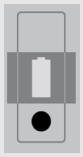
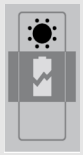
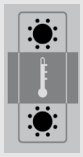
(Press and release the trigger in quick succession)

Always execute the bolting process in full. To this end, press and hold the trigger for the entire duration of the bolting process.



The trigger operates digitally. The drive is off when the trigger is pressed to a point (0). 100% of the torque is available beyond this (1). The trigger does not need to be operated sensitively. This facilitates use in the event of prolonged utilisation and if gloves are worn.

LED display for battery charger

LED display		Meaning
	Continuous yellow light	The battery charger is operational. Mains voltage is available.
	Flashing green light	Quick charging is active.
	Continuous green light	Quick charging has concluded.
	Flashing red light	Charging is not possible. Potential causes: ■ The contacts are dirty. Measure: Clean the contacts by inserting and removing the battery multiple times. ■ The battery is faulty. Measure: Replace the battery.
	Flashing green light and flashing red light	The battery temperature is located outside the charging temperature range of +5 to +45°C. If the battery reaches the permissible charging temperature range, quick charging is initiated.

2.6 Overview of functions

The DA2 nutrunner versions offer the following functions:

DA2

- Tightening and loosening
- Torque can be set via 4 gears and 15 setting levels
- Trigger with On/Off switch function
- Diagnostic Setting Software DSS (option)
  - Read out data from the nutrunner. (Bolted connection documentation)
  - Block individual torque levels.
  - Update the firmware.
  - Save the status report as a PDF file.
- Automatic safety swivel joint
- Automatic release function

DA2*docu*

- Tightening and loosening
- Torque can be set via 4 gears and 15 setting levels
- Trigger with On/Off switch function
- Data Transfer Software DTS
  - Read out operating data and events
- Diagnostic Setting Software DSS (option)
  - Read out data from the nutrunner. (Bolted connection documentation)
  - Block individual torque levels.
  - Update the firmware.
  - Save the status report as a PDF file.
- Automatic safety swivel joint
- Automatic release function

Automatic safety swivel joint

The safety swivel joint between the drive motor and gearbox makes it possible to rotate the handle into any position you wish. As soon as the torque on the handle exceeds 2 Nm, the safety swivel joint is automatically locked such that no reaction force is applied to the user's hand.

If the nutrunner is switched off, the safety swivel joint is unlocked again and can be rotated freely.

Automatic release function

Load on the gearbox is relieved after the bolting process. The reaction arm retracts slightly. This makes it easier to remove the nutrunner from the bolt and facilitates further work.

Software – DTS

Data Transfer Software DTS

Information about the bolted connections that have been established can be read out from the nutrunner DA2*docu*.

Software – DSS (option)

Diagnostic Setting Software DSS (option)

Information about the nutrunner can be read out from the nutrunner and the nutrunner can be configured.

2.7 Accessories

The following accessories can be ordered in addition to the nutrunner and can be enclosed with the delivery:

- Impact wrench socket with circlip (spring clip)
- Reaction arm with circlip
  Special reaction arm
  Nose extension
- “Torque Control TC1” mobile measuring unit
- Impact wrench sockets in various designs
- Certificate
  Technical, more detailed supplement to the torque chart
- Offset heads for long studs

Special accessories

Contact PLARAD® service.

3 Before you begin

This section provides an overview of all safety aspects that are essential to the best possible protection of the personnel and the safe and trouble-free operation of the machine. Additional safety instructions for specific work tasks are contained in the sections regarding the individual life stages of the machine.

3.1 Symbols in this manual

Safety instructions

Safety instructions are indicated by symbols in this manual. The safety instructions are initiated by signal words that indicate the degree of the danger.

DANGER!
This combination of symbol and signal word indicates an imminently dangerous situation which, if not avoided, will result in death or serious injury.

WARNING!
This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in death or serious injury.

CAUTION!
This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in slight or minor injuries.

NOTICE!
This combination of symbol and signal word indicates a potentially dangerous situation which, if not avoided, could result in damage to property.

ENVIRONMENT!
This combination of symbol and signal word indicates potential dangers to the environment.

Safety instructions in specific instructions

Safety instructions may refer to specific, individual instructions. Such safety instructions are integrated into the instruction so that they do not interrupt the flow of reading when carrying out the task. The signal words described above are used.

Example:

1. Loosen the screw.
2. 

CAUTION!
Risk of pinching by cover!

Close the cover carefully.

3. Tighten the screw.

Tips and recommendations

This symbol highlights useful tips and recommendations as well as information designed to ensure efficient and smooth operation.

Other markings

The following markings are used in this manual in order to highlight instructions, outcomes, lists, references and other elements:

Marking	Explanation
→	Step by step instructions
⇨	Outcomes of steps
⇝	References to sections of this manual and to other applicable documents
■	Lists without a fixed order
[Button]	Controls (e.g. buttons, switches), indicators (e.g. signal lamps)
“Display”	Display elements (e.g. on-screen buttons, assignment of function keys)

3.2 Symbols on the nutrunner

Illustration

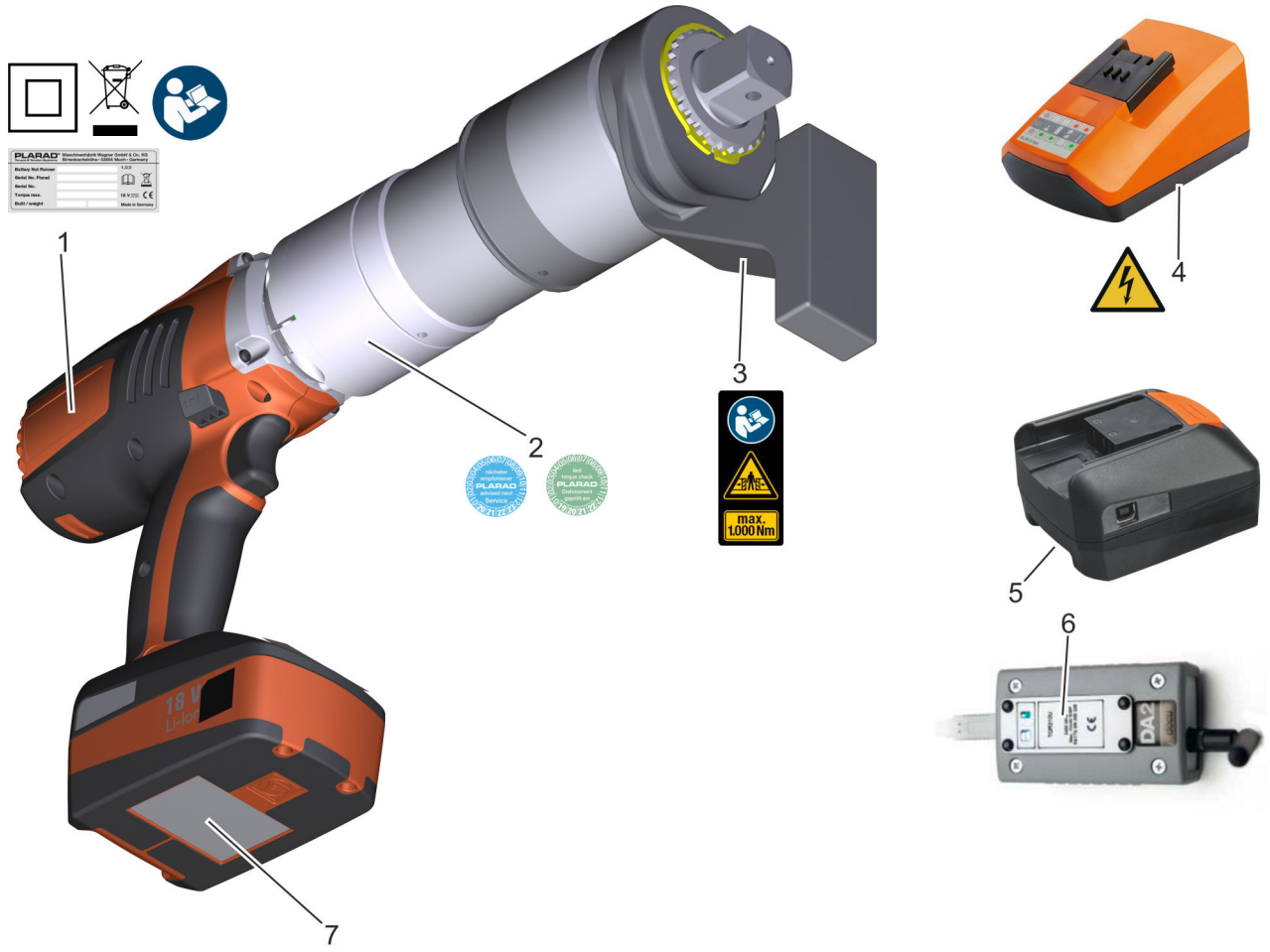


Fig. 11: Symbols

1 Nutrunner rating plate
2 Test badges
3 DA2 reaction arm
4 Battery charger rating plate
5 Programming adapter rating plate
6 DTS receiver rating plate
7 Battery rating plate

Illegible signage

WARNING!

Danger in the event of illegible signage!

Over time, signs and stickers can become dirty or be rendered unrecognisable by other means, such that hazards cannot be recognised and necessary operating instructions cannot be followed. This creates a danger of injury.

– Keep all safety notices, warnings and operating instructions in a clearly legible state at all times.
– Replace damaged signs and stickers immediately.

The following symbols and information notices are located on the nutrunner:

Voltage

The equipment marked in this way is supplied with electrical energy.

Do not open the nutrunner.

Danger of crushing

Keep your hands away from areas bearing this warning.

There is a danger of body parts being crushed, pulled in or otherwise injured.

It is necessary to pay greater attention when performing work at the marked locations.

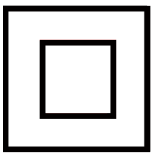
Hot surface

Hot surfaces, such as the housing of the drive motor, cannot always be identified as such. Do not touch surfaces marked in this way without protective gloves.

Follow the manual

Read the operating instructions prior to using the nutrunner.

Protection class II



This symbol indicates protection class II. Equipment of protection class II has reinforced insulation between active and touchable parts.

Separate collection

Do not dispose of waste electronic and electrical equipment marked with this symbol in household waste.

Test badges

The test badges state the dates of the respective tests.

Date of the next PLARAD® service.

For nutrunners with certificate:

Date of the last torque test.

Reaction arm

The stated value indicates the maximum permissible torque for the reaction arm.

3.3 Intended use

The battery nutrunner DA2 is a hand-held tool and may only be used for tightening and loosening bolted connections within the defined specifications (↬ *Chapter 16 “Technical data” on page 88*).

The nutrunner may only be used in a commercial setting and must not be used in a potentially explosive atmosphere.

The nutrunner may only be used in a dry environment.

Intended use includes compliance with all of the stipulations in this manual.

WARNING!

Danger of injury due to unadjusted torque levels!

The assignment of torque level (power level) and torque was determined on a test joint according to ISO 5393 (medium joint). If these values do not correspond to the actual bolting process, this could result in injuries and property damage.

– Determine the specific bolting process and adjust the torque levels.
  ↬ *Chapter 4 “Determining the bolting process” on page 42*

3.4 Misuse

Any use beyond the intended use as well as any other use is considered misuse.

WARNING!

Danger in the event of misuse!

Misuse of the nutrunner can lead to dangerous situations.

- Never operate without the reaction arm.
- Do not operate the nutrunner as a driving motor.
- Do not operate the nutrunner in continuous operation.
- Never subject the nutrunner, bolts and accessories to loads in excess of the permissible torque.
- Never use to tighten pre-tightened bolts.
- Never operate unless properly braced.
- Never disregard protection classes.
- Never operate outside the permissible environmental conditions.
- Never carry out bolting processes that have not been considered in the torque chart.
- Do not “pulse” (briefly start up the nutrunner multiple times).
- Never operate with batteries other than the original batteries supplied by the manufacturer.
- Do not switch on the nutrunner in a damp environment.
- Never change the gear setting or setting levels during operation.

3.5 General safety instructions for electric tools

EN 62841-1

Safety instructions as per EN 62841-1 VDE 0740-1:2016-07

Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety Part 1: General requirements

Read all safety information, instructions, illustrations and technical data provided with this electric tool. Failure to comply with the following instructions could cause electric shock, fire and/or serious injuries.

Keep all safety information and instructions for future reference.

The term “electric tool” used in the safety instructions refers to mains-operated electric tools (with mains lead) or to battery-operated electric tools (without mains lead).

3.5.1 Workplace safety

- Keep your work area clean and well lit.
  Untidiness and unlit work areas can cause accidents.
- Do not work with the electric tool in potentially explosive environments in which there are flammable liquids, gases or dusts.
  Electric tools generate sparks that could ignite the dust or fumes.
- Keep children and other persons away from the electric tool while it is in use.
  You could lose control of the electric tool if you are distracted.

3.5.2 Electrical safety

- The plug of the electric tool must fit into the socket. The plug must not be modified in any way. Do not use any adapter plugs together with any electric tools connected to protective earth.
  Unmodified plugs and suitable sockets reduce the risk of electric shock.
- Avoid bodily contact with earthed surfaces such as pipes, heaters, stoves and refrigerators.
  There is an increased risk of electric shock if your body is earthed.
- Keep electric tools away from rain and moisture.
  If water penetrates an electric tool, the risk of electric shock increases.
- Do not misuse the power cable by using it to carry or hang up the electric tool, or to pull the plug out of the socket. Keep the power cable away from heat, oil, sharp edges and moving parts.
  Damaged or entangled power cables increase the risk of electric shock.
- If you are working outdoors with an electric tool, only use extension cables that are suitable for use outdoors.
  The use of an extension cable suitable for use outdoors reduces the risk of electric shock.
- If operation of the electric tool in a damp environment is unavoidable, use a residual current-operated circuit breaker.
  The use of a residual current-operated circuit breaker reduces the risk of electric shock.

3.5.3 Personal safety

- Be attentive, pay attention to what you are doing, and take the utmost care when working with an electric tool. Do not use any electric tools if you are tired or are under the influence of drugs, alcohol or medicines.
  A moment of inattention when using the electric tool could result in serious injuries.
- Wear personal protective equipment and always wear safety goggles.
  The wearing of personal protective equipment, such as a dust mask, non-slip safety shoes, hard hat or hearing protection, reduces the risk of injury depending on the type and use of the electric tool.
- Avoid unintentional commissioning. Ensure that the electric tool is switched off before you connect it to the power supply and/or the battery, pick it up or carry it.
  If you have your finger on the switch when carrying the electric tool or if you connect the electric tool to the power supply when it is switched on, this can result in accidents.
- Remove the adjustment tools or spanner before you switch on the electric tool.
  A tool or spanner that is in a rotating part of the electric tool can cause injuries.
- Avoid adopting an unnatural posture. Ensure you have a secure footing and maintain your balance at all times.
  This gives you better control of the electric tool in unexpected situations.
- Wear suitable clothing. Do not wear any loose clothing or jewellery. Keep your hair and clothes away from moving parts.
  Loose clothing, jewellery and long hair can get caught in moving parts.
- Do not be lulled into a false sense of security and do not disregard the safety rules for electric tools, even if you are familiar with the electric tool from having used it many times.
  Careless conduct can cause serious injuries in a split second.

3.5.4 Using and handling the electric tool

- Do not overload the electric tool. Use the designated electric tool for your work.
  You can work better and more safely within the specified power range with the right electric tool.
- Do not use any electric tools with a faulty switch.
  An electric tool which can no longer be switched on or off is dangerous and must be repaired.
- Unplug the plug from the socket and/or remove a removable battery before you make any device settings, exchange any plug-in tool parts or put away the electric tool.
  This precautionary measure prevents the electric tool from starting up unintentionally.

- Store unused electric tools out of reach from children. Do not allow any person to use the electric tool if the person in question is not familiar with the electric tool or if they have not read the instructions.

  Electric tools are dangerous if they are used by inexperienced persons.
- Take good care of electric tools and plug-in tools. Check that moving parts are functioning flawlessly and do not jam; check whether parts are broken or damaged in such a way that the function of the electric tool is impaired. Have damaged parts repaired prior to using the electric tool.

  Many accidents are caused by poorly maintained electric tools.
- Use electric tools, plug-in tools etc. in accordance with these instructions. In this regard, give due consideration to the working conditions and to the work to be performed.

  Use of electric tools for purposes other than the intended uses can lead to dangerous situations.
- Keep handles and gripping surfaces dry, clean and free of oil and grease.

  Slippery handles and gripping surfaces mean that safe operation and control of the electric tool is not possible in unforeseen situations.

3.5.5 Service

- Have your electric tool repaired by qualified specialist personnel without exception and using only original spare parts.

  This ensures that the safety of the electric tool is maintained.

3.6 Residual risks

The following section outlines the residual risks potentially posed by the nutrunner even when it is used as intended.

To reduce the risks of personal injury and property damage and to avoid dangerous situations, observe the safety instructions listed here and the safety instructions in the other sections of this manual.

3.6.1 Electrical dangers

Electrical current

DANGER!

Danger of death due to electric shock!

If contact is made with live parts, there is an immediate danger of death due to electric shock. Damage to the insulation or individual components can be life-threatening.

- Do not open the nutrunner.
- If the housing is damaged, disconnect the battery from the nutrunner immediately and arrange for repair.
- Never operate the nutrunner if the trigger is faulty.
- Keep moisture away from live parts. Moisture can cause short circuits.
- Never operate the battery charger with a mains voltage and mains frequency other than those specified on the rating plate.
- Only operate the nutrunner with original batteries supplied by the manufacturer.
- Ensure that the power supply complies with local regulations.
- Never make modifications to the nutrunner, battery or battery charger.
- Never modify the power plug or power cable for the battery charger.
- Only operate the battery charger at suitable power sockets.
- Never operate after the test period has passed. See the test seal regarding the date for the next test.
- Never operate in a potentially explosive atmosphere.
- Keep away from moisture, liquids, steam, dust and coarse contamination.

  Do not switch on in a damp environment or in the rain.
- If possible, operate the battery charger with a residual current-operated circuit breaker installed.
- When charging the battery charger with mobile power generators, ensure continuous and constant compliance with the specified values for voltage, frequency, sufficient power and earthing.

Batteries

WARNING!

Danger of death due to fire, explosion, smoke and toxic gases if batteries are handled incorrectly!

Incorrect handling of rechargeable batteries can result in fire, explosions and electric shock. Escaping gases or smoke can lead to poisoning and suffocation.

- Never charge batteries.
- Only use and charge batteries supplied by the manufacturer.
- Only use the charger included in the delivery to charge the battery.
- Only insert a battery with the correct polarity (+/-) in the charger. If the battery cannot be inserted properly, never use force to insert it.
- Never short-circuit the contacts (positive and negative terminal) of the battery.
- Never modify, drill, open, disassemble or subject the battery to mechanical loads.
- Never charge batteries that are clearly damaged. Do not put inflated, dropped or damaged batteries into service. Dispose of them in the proper manner.
- Never expose the battery to moisture or humidity (rain, saltwater, liquids). A humid or moist battery must not be used or charged under any circumstances.
- Avoid permanent damage due to deep discharge of the lithium-ion battery.
- Never use, charge or store the battery in places where there is a potentially explosive atmosphere or where high temperatures could occur.
- Charge lithium-ion batteries in a dry state, at room temperature and in a fireproof location.
- Do not expose to extreme heat. Do not store in the sun or in an overheated car.
- Do not throw the battery into a fire.
- Only use approved chargers.
- Only operate in the designated nutrunners.
- Do not inhale escaping gases or smoke.
- Dispose of in an environmentally sound manner.
- Transport lithium-ion batteries in accordance with the currently applicable legal regulations pertaining to dangerous goods.

EMC

WARNING!

Danger of injury due to very strong electromagnetic radiation!

Very strong electromagnetic radiation can cause the nutrunner to malfunction, resulting in serious injuries and major property damage.

– Do not operate in the immediate vicinity of strong transmitting antennas.
– Suspend use immediately and remove the battery as soon as there are signs of malfunctions.

3.6.2 Mechanical dangers

Moving components and rotational movements

WARNING!

Danger of injury due to moving components!

Moving components can cause serious injuries. There is a danger of being pulled in during rotational movements.

Dirt can be ejected from the lower ventilation slots and cause eye injuries.

– During operation, do not reach into moving components or handle moving components.
  Do not touch the reaction arm, drive shaft, impact wrench socket, nut and other moving attachment parts.
– Do not switch on the nutrunner while carrying it. Set the direction of rotation to the middle position. Transport the nutrunner in the transport case.
– Never open the nutrunner.
– Wear tight fitting work clothing that resists tearing to some degree.
– Wear safety goggles.
– Protect long hair from being pulled in by rotating parts using a protective cap (hair net).

Incorrect bracing and overloading

WARNING!

Danger of injury due to incorrect bracing, overloading, breakage!

Incorrect bracing or overloading of the nutrunner or individual components can result in serious injuries.

- Do not use the nutrunner if the bolting process is not entirely clear.
- Note the torque chart.
- Check the reaction arm for visible damage prior to use. Do not use the reaction arm if it is damaged.
- Brace the reaction arm correctly ↬ *Chapter 8 “Bracing the reaction arm” on page 50*.
- Do not operate the nutrunner in continuous operation and do not use it as a drive unit.
- Use only PLARAD® original parts.

Reaction arm

The reaction arms are designed for a maximum permissible load.

Observe the stickers on the reaction arm and data sheet.

Crushing

WARNING!

Danger of crushing when bracing and due to high weight!

During operation, very strong forces act on the nutrunner, reaction arm, bracing surface and bolts. There is a danger of crushing between the reaction arm and bracing surface during tightening and loosening. The high weight of the nutrunner can cause crushing if it falls down.

- Handle the nutrunner with care and as intended.
- Give due consideration to the weight during transport and during all work.
- Have work performed only by persons who are physically capable of using the nutrunner safely despite its high weight.
- Do not reach between the reaction arm and bracing surface.
- Secure the nutrunner against falling when working at height.
- Wear safety shoes.
- Also wear an industrial safety helmet for overhead work.

Dirt and scattered objects

CAUTION!

Danger of injury from falling over dirt and scattered objects!

People may slip on or stumble over dirt and scattered objects. Falling may cause injuries.

- Always keep the work area clean.
- If objects are no longer needed, remove them from the work area and especially if such objects are at ground level.
- Mark unavoidable stumbling points with hazard tape.
- Keep handles and gripping surfaces of the nutrunner dry, clean and free of lubricants. Clean them immediately if they are dirty.

Impact wrench sockets

NOTICE!

Property damage due to incorrect use of impact wrench sockets!

- Use impact wrench sockets suitable for the bolting process without exception.
- Ensure a flawless, positive connection between the nutrunner, impact wrench socket and bolt.

  Ensure that there is a positive connection between the tool holder (square drive of the nutrunner) and square drive of the impact socket wrench.

Gear setting and setting levels

NOTICE!

Property damage due to gear and setting level adjustment!

Changing the setting during operation causes property damage including destruction of the nutrunner. Changing the gear causes mechanical damage to the gearbox. Changing the setting levels results in undefined behaviour.

- Only make changes to the gear or setting level settings when the nutrunner is at a standstill.

Conserving materials

In order to prevent premature damage to tools and accessories, only use the nutrunner up to 80% of the maximum torque of the nutrunner during continuous use, if possible to do so.

Especially during loosening, loads could occur that have adversely effect durability.

Torques in excess of 80% (based on the maximum torque of the nutrunner) should only be used in exceptional cases.

3.6.3 Noise and ergonomics

Noise

WARNING!

Danger of injury due to noise!

The noise level of 72 dB(A) (3 dB(A) measurement uncertainty) occurring in the work area can cause hearing damage.

– Make hearing protection available.
– Recommendation: Wear hearing protection.

Hot surfaces

WARNING!

Danger of injury due to hot surfaces!

The surfaces of components, such as the drive motor or gearbox, could heat up significantly during operation. Surface temperatures of up to 80°C could develop. Contact between the skin and hot surfaces will result in severe burns to the skin.

– Always wear protective work clothing and safety gloves when working in the vicinity of hot surfaces.

Inadequate ergonomics

CAUTION!

Damage to the musculoskeletal system due to the high weight of the nutrunner!

Lifting and carrying heavy loads can cause permanent damage to the musculoskeletal system.

- Ensure stable footing and sufficient room for movement.
- Keep your back as straight as possible. Do not lift with your upper body hunched over, bent forward, or with your back arched.
- Lift the nutrunner as close to your body as possible.
- Avoid one-sided loading. Avoid twisting your spine. Do not carry one-handed.
- Never move the nutrunner abruptly.
- Use the safety swivel joint to rotate the trigger in such a way that it is possible to work without any discomfort.
- Use suitable auxiliary devices (e.g. lifting eyes).

Inattention

WARNING!

Danger of injury due to distraction, inattention or irresponsible use!

Distraction, inattention or irresponsible use can result in losing control of the nutrunner and thus cause serious injuries.

- Always keep the work area well-lit.
- Keep children and unauthorised persons away.
- Work purposefully and in a responsible manner. Do not allow yourself to be distracted.
- Do not work if you are tired or under the influence of drugs, alcohol or medicine.
- Do not be lulled into a false sense of security. Do not disregard the safety information and instructions in this manual, even if the nutrunner seems familiar to you after frequent use.
- When the nutrunner is not in use, always store it in the transport case out of reach from children and other unauthorised persons.
- Wear the prescribed personal protective equipment.

Faulty safety devices

WARNING!

Danger of death due to inoperative safety devices!

If safety devices or safety functions are inoperative or disabled, there is a danger of serious injuries.

– Prior to commencing work, check that all safety devices are operative and correctly installed.
– Never disable or bypass safety devices or safety functions.

The nutrunner is equipped with the following safety devices and safety functions:

- Automatic safety swivel joint
  The safety swivel joint prevents reaction forces acting on the wrist.
- Automatic release function
  Load on the gearbox is relieved after the bolting process. The nutrunner can be removed more easily.
- Insulation of the power cable for the charger
- Protection class 2
- Insulated handle
- Overheating protection for drive motor
  The drive motor switches off at the maximum temperature
- Undervoltage detection
  The nutrunner switches off if there is undervoltage (loss of power).
- Automatic start-up protection
  The nutrunner is protected against automatic start-up when the power supply is switched on.
- Start-up protection/transport position
  The nutrunner is protected against unintentional start-up in the middle position of the direction of rotation setting.
- Reaction arm circlip
  The reaction arm is protected against outward ejection by means of a circlip.
- Spring clip for impact wrench socket
  The impact wrench socket is secured against outward ejection by means of a spring clip on the square drive of the nutrunner.
- Acoustic signal
  Indicates that a bolting process has been completed correctly or indicates a faulty bolting process.
- Password protection
  DTS: The nutrunner configuration is access-protected by different password levels ↳ *Chapter 11 “Using the Data Transfer Software DTS” on page 57*.

3.7 Operator's obligations

The nutrunner is used in the commercial sector. The operator of the nutrunner is therefore subject to the statutory obligations pertaining to occupational safety.

In addition to the safety instructions in this manual, the applicable safety, occupational safety and environmental protection regulations for the nutrunner's area of application must be adhered to.

The following specifically applies in this regard:

- The operator must familiarise themself with the applicable occupational safety regulations and, as part of a risk assessment, determine additional dangers that arise as a result of the specific operating conditions at the operating site of the nutrunner. This risk assessment must be implemented in the form of safety instructions for operation of the nutrunner.
- During the entire time the nutrunner is in use, the operator must check whether the safety instructions they have compiled reflect current regulations and, if necessary, the operator must change the instructions accordingly.
- The operator must clearly define and regulate responsibilities for all work on and with the nutrunner. The authority and responsibilities of personnel regarding operation, set-up, maintenance and repair must be clearly defined.
- The operator must reliably check the use of the nutrunner and ensure that only commissioned and instructed personnel work with the nutrunner. Only allow personnel to be trained or instructed and those undertaking vocational training to work on the nutrunner under the supervision of an experienced person.
- The operator must ensure that the nutrunner is not opened and that the no work is performed on the electrical equipment by unauthorised persons.

  Work on electrical equipment may only be performed by an electrician or by trained persons under the guidance and supervision of an electrician. Adhere to electrotechnical regulations for safety reasons.

The operator is also responsible for ensuring that the nutrunner is in technically flawless condition at all times. The following applies for this reason:

- The operator must ensure adherence to the maintenance intervals described in this manual.
- The operator must have the functionality and integrity of all safety devices checked on a regular basis.

3.8 Who is permitted to use the nutrunner?

WARNING!

Danger of injury if personnel are insufficiently qualified!

If unqualified personnel perform work on or with the nutrunner or if such persons loiter in the danger zone while work is being performed, dangers arise that could cause serious injuries and considerable property damage.

– Have all tasks performed by suitable qualified personnel without exception.
– Keep unqualified personnel away from the danger zones and working areas.

User

The user of the nutrunner has the requisite knowledge and the requisite training for handling electrical tools. Furthermore, as part of training provided by the operator, the user was trained in relation to the tasks assigned to them and the potential dangers associated with improper conduct.

The user is trained in how to use the personal protective equipment, is familiar with the most important specifications, situations and information relating to the specific application and is physically capable of using the nutrunner safely despite its weight. This includes overhead work, working at heights, etc.

The user must be older than the legally permissible minimum age.

Tasks that go beyond operation during normal operation may only be carried out by the user if this is specified in this manual and the operator has expressly entrusted them with the performance of such tasks.

The user knows who their supervisor is, can contact their supervisor if they have questions or in an emergency, and is able to communicate with their supervisor.

The user is familiar with all residual risks and is trained in the practical handling of the nutrunner.

Qualified nutrunner personnel

Qualified nutrunner personnel are trained for the specific task area in which they work and are familiar with the relevant standards and regulations.

Due to their professional training and experience, qualified nutrunner personnel are able to perform work with the nutrunner, recognise and avoid potential dangers independently and convey this to users.

Specific capabilities of qualified nutrunner personnel include:

- Identify bolting processes.
- Prepare the nutrunner. Select the appropriate impact wrench socket.
- Use all functions of the nutrunner.

- Create passwords for users.
- Uphold safety, occupational safety and health protection when using the nutrunner and convey this to users.
- Identify damage on the nutrunner and arrange for repairs or get in touch with the manufacturer.
- Instruct users in the proper manner.

Operator

The operator is the person who operates the nutrunner for commercial or economic purposes themself, or makes it available for a third party to use, and who bears legal responsibility for the product vis-à-vis protection of personnel and third parties during operation.

Chapter 3.7 “Operator's obligations” on page 37

PLARAD® service

Certain work may only be performed by PLARAD® service or by personnel authorised by Maschinenfabrik Wagner GmbH & Co. KG. Other personnel are not authorised to perform this work. Contact PLARAD® service or authorised PLARAD® partners regarding performance of the work that is due.

Contact: *www.plarad.de*

Chapter 13.3 “Having service tasks performed by the manufacturer” on page 81

Unauthorised persons

WARNING!

Danger of death for unauthorised persons due to dangers in the danger zone and work area!

Unauthorised persons, who do not meet the requirements described in this manual, are not aware of the dangers in the danger zone. There is therefore a danger of serious injuries or even death for unauthorised persons.

– Keep unauthorised persons away from the danger zone and work area.
– If in doubt, address the respective persons and instruct them to leave the danger zone and work area.
– Suspend work while there are unauthorised persons loitering in the work and danger zone.

3.9 Personal protective equipment

Safety gloves

Safety gloves are used to protect the hands from friction, abrasions, punctures or deeper injuries and from contact with hot surfaces.

Safety shoes

Safety shoes protect the feet from crushing, falling parts and from slipping on slippery ground.

Hearing protection

Hearing protection is used to protect against hearing damage cause by noise.

Safety goggles

Safety goggles are used to protect the eyes from airborne parts and liquid jets.

Protective work clothing

Protective work clothing is tight fitting work clothing that resists tearing to some degree, with tight sleeves and without any protruding parts.

Protective cap

The protective cap (hairnet) is used to protect the hair from being pulled in by rotating and moving parts, such as bolts.

The wearing of a protective cap is mandatory if your hair is longer than the circumference of the moving shaft.

Industrial safety helmet

Industrial safety helmets are used to protect the head from falling objects, suspended and swinging objects and from bumping into stationary objects.

An industrial safety helmet must be worn for overhead work involving the nutrunner.

3.10 Environmental protection

ENVIRONMENT!

Danger for the environment due to incorrect handling of environmentally hazardous substances!

If environmentally hazardous substances are handled incorrectly, especially if such substances are disposed of incorrectly, this could cause significant damage to the environment.

- Always adhere to the instructions given below in relation to the handling of environmentally hazardous substances and the disposal thereof.
- If environmentally hazardous substances accidentally enter the environment, adopt suitable measures immediately. If in doubt, notify the competent local authority of the damage and inquire about suitable measures to be taken.

The following environmentally hazardous substances are used:

Batteries and rechargeable batteries

Batteries and rechargeable batteries contain toxic heavy metals. They are subject to special waste treatment and must be deposited at municipal collection points or be disposed of by a specialist company.

Lubricants

Lubricants, such as greases and oils, contain toxic substances. Such substances must not enter the environment.

The nutrunner must not be lubricated by the operator. If lubricants do however escape, arrange for them to be disposed by a specialist disposal company.

Electrical and electronic components

Electrical and electronic components contain toxic materials. These components must be collected separately and deposited at municipal collection points or be disposed of by a specialist company.

4 Determining the bolting process

Information about bolted connections

The nutrunner reacts differently to “soft” and “hard” bolted connections. Even “soft” and “hard” bolted connections react individually to each other, as the thread and lubrication state can vary from bolted connection to bolted connection.

The torque setting of the nutrunner must be made for each bolting process individually and checked directly during the bolting process.

Use a rotating, electrical measuring transducer or a calibrated torque spanner for checking purposes.

Fig. 12: Mobile measuring unit TC1

Personnel: ■ Operator

The nutrunner can only be used safely and properly if the bolting process is known.

1. Determine the bolting process. To do so:

   Determine a suitable bracing surface and select a suitable reaction arm for proper bracing.

   Determine the appropriate impact wrench socket.

2. Determine the requisite torques and angles for the bolting process.

   To this end, measure the applied torque of a bolting process, e.g. using the mobile measuring unit TC1 (not included in the scope of delivery; see available accessories).

3. Make further accessories (bracing aids, suspension etc.) available according to the situation.

5 Preparing the nutrunner

Unsecured or overloaded components

WARNING!

Danger of injury due to unsecured or overloaded components!

Unsecured components or components subjected to loads exceeding the intended use could result in uncontrolled nutrunner behaviour, outward ejection of components or breakage and thereby cause serious injuries.

- Carefully determine all parameters for a bolting process.
- Ensure that all components are used within the scope of their intended use.
  Never exceed load limits (e.g. maximum torques).
- Only use impact wrench sockets.
- Never put the nutrunner into operation if the reaction arm or impact wrench socket are unsecured.

Personnel: ■ Qualified nutrunner personnel

Protective equipment: ■ Protective work clothing
■ Safety shoes

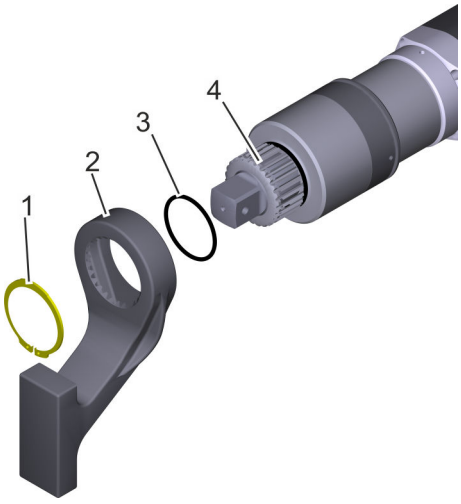


Fig. 13: Securing the reaction arm

1 Circlip
2 Reaction arm
3 O-ring
4 Serration

Prior to being used for tightening or loosening, the bolting process must be known and the nutrunner must be prepared.

1. Ensure that the bolting process has been determined ↬ *Chapter 4 “Determining the bolting process” on page 42* and that all parameters are available.

2. **NOTICE!**

   Property damage to the O-ring!

   Carefully slide the O-ring (Fig. 13/3) onto the serration (Fig. 13/4) on the nutrunner.

3. Push the reaction arm (Fig. 13/2) onto the serration.

Fig. 14: Circlip pliers

4. Slide on the circlip (Fig. 13/1) with the aid of the circlip pliers (Fig. 14) and clamp it.

   ⇨ The reaction arm is secured.

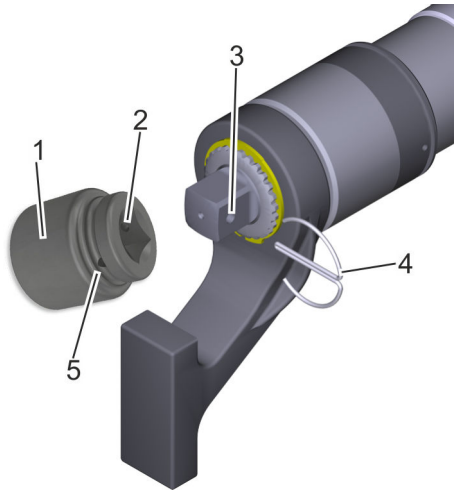


Fig. 15: Securing the impact wrench socket

1 Impact wrench socket
2 Bore
3 Square drive with bore
4 Spring clip for impact wrench socket
5 Bore

5. Attach the impact wrench socket (nut) to the square drive on the nutrunner and secure it.

   To do so, push the impact wrench socket (Fig. 15/1) fully onto the square drive (Fig. 15/3). The bores (Fig. 15/2, 3 and 5) for securing must be on top of each other.

   Fully insert the spring clip (Fig. 15/4) in all bores (Fig. 15/2, 3 and 5) until the ring is fully seated.

   ⇨ The impact wrench socket is secured.

6. Attach further accessories if such accessories have been determined for the bolting process.

6 Supplying with energy

6.1 Battery care

Battery care instructions

In order to obtain the full performance, lithium-ion batteries (Li-Ion) require care.

Battery care rules

- The first charging process is crucial. Charge the battery fully prior to first use.
- Each battery has a limited number of charge cycles. For this reason, do not recharge the battery at every opportunity. Instead, wait until a charge status of between 10% and 20% capacity before recharging.
- If the battery is discharged below its nominal voltage, the battery could be damaged or destroyed. The batteries included in the delivery therefore have electronics that warn of deep discharge and switch off the nutrunner.
- Frequent overcharging can cause permanent damage to the battery. The charger automatically concludes the charging process if the battery is fully charged. Do not connect the battery again.
- The battery can only be charged at temperatures between 5°C and 45°C. To avoid damaging the battery cells, do not charge the battery when it is cold. Let it warm up to room temperature beforehand. Charge the battery at room temperature (18°C to 21°C).
- High temperatures damage the battery. Never leave the battery or the transport case in the car or in the sunshine on hot days. The lithium-ion battery loses capacity and performance capability at temperatures above +60°C.
- Do not store lithium-ion batteries empty or fully charged for a prolonger period of time. Optimum storage at a capacity of 40% to 50% and at temperatures of 5°C to 10°C.
- Store unused batteries in a cool but not cold location. Batteries also lose energy in an unused state. The energy loss for lithium-ion batteries is approx. 3% to 5% per month.
- If a lithium-ion battery is not used for a prolonger period of time, recharge the battery after 12 months at the latest.
- Always dispose of old and used batteries in an environmentally sound manner.

Storing the battery

Optimum storage temperature: 5°C to 10°C.

Lithium-ion batteries (Li-Ion) should not be stored empty or fully charged for a prolonged period of time. Optimum storage, which was determined in an extensive series of tests, is at 40% to 50% of capacity and at low temperatures, but not below 0°C. Due to self-discharge, recharging is required every 12 months at the latest.

Battery not in use for a prolonged period of time

Disconnect the battery from the nutrunner if the nutrunner will not be used for a prolonged period of time.

Even when the device is switched off, a small current can flow that leads to a deep discharge after a prolonged period of time. Deep discharge damages the battery and, in extreme cases, will destroy it.

Self-discharge

A charge loss of 3% to 5% per month is possible for lithium-ion batteries. The self-discharge is temperature-dependent and greater at high temperatures.

Deep discharge

The capacity of the battery is fully exhausted in the event of deep discharge. In such cases, the voltage drops to as low as 0 volt.

In the battery, chemical reactions take place on the electrodes. Such reactions can render them unusable. The battery loses considerable capacity and can potentially no longer be charged. For this reason, the battery must not be discharged below a type-dependent end-of-discharge voltage and must be recharged as quickly as possible.

Do not fully discharge lithium-ion batteries and lithium-ion polymer batteries.

Good lithium-ion batteries usually have extensive protection or monitoring circuits in the battery pack that prevent deep discharging/overcharging and explosion.

Temperature range for battery operation

Temperature range for use: -10°C to +55°C

Temperature range for charging: +5°C to +45°C

The ideal temperature range for batteries is at room temperature.

A sensor in the battery ensures that no quick charging takes place outside this range.

Service life of batteries

Lithium-ion batteries can be charged up to 1,000 times (capacity-dependent). This value is only achieved under optimum conditions.

The number of cycles could decrease depending on battery treatment and care. The capacity decreases over the course of the service life.

Batteries should generally be replaced below 70% nominal capacity.

Memory effect, lazy battery effect

Lithium-ion batteries and lithium-ion polymer batteries can and may be recharged at any time. These batteries do not have any memory effect. It is only necessary to avoid frequent brief charging. Even full charging in several stages, with or without partial discharge in between stages, does no harm.

Lithium-ion batteries and lithium-ion polymer batteries must not be fully discharged.

6.2 Charging the battery

The first time

Charge the battery fully prior to first-time use.

Electrical current

DANGER!

Danger of death due to electric shock!

If contact is made with live parts, there is an immediate danger of death due to electric shock. Damage to the insulation or individual components can be life-threatening.

- If the housing is damaged, disconnect it from the power supply immediately and arrange for repair.
- Keep moisture away from live parts. Moisture can cause short circuits.
- Never operate with a mains voltage and mains frequency other than those specified on the rating plate.
- Ensure that the power supply complies with local regulations.
- Never modify the power plug or power cable.
- Only operate at suitable power sockets.
- Never operate after the test period has passed. See the test seal regarding the date for the next test.
- Keep away from moisture, liquids, steam, dust and coarse contamination.

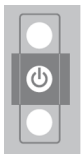
  Do not switch on outdoors, in a damp environment or in the rain.
- During operation with mobile power generators, ensure continuous and constant compliance with the specified values for voltage, frequency, sufficient power and earthing.

Battery charger

The batteries (Fig. 16/2) can be charged using the battery charger (Fig. 16/1) included in the scope of delivery.

Fig. 16: Charging the battery

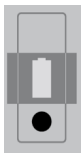
Setting up the charger



1. Set up the battery charger in a cool, dry place and connect it to a power socket.

⇨ If the yellow continuous light is illuminated, mains voltage is present and the battery charger is operational.

Inserting the battery



2. Carefully slide the battery into the battery charger until the locking mechanism clicks into place.

⇨ The charging process begins.

If the green continuous light is illuminated, the battery is fully charged.

Using the battery

4. Press the release button on the battery (Fig. 17/1) and remove the battery from the battery charger.

Fig. 17: Unlocking the battery

6.3 Connecting the nutrunner to the battery

A charged battery needs to be inserted prior to using the nutrunner.

Charge status

1. Ensure that the battery is charged. Press the battery charge indicator button in order to check the charge status.

Inserting the battery

2. Carefully slide the battery into the nutrunner until the locking mechanism clicks into place.

⇨ The nutrunner is operational.

Replacing the battery

3. In order to remove the battery, press the battery release button and remove the battery.

Insert a charged battery.

7 Setting the torque levels

Gear setting and setting levels

NOTICE!

Property damage due to gear and setting level adjustment!

Changing the setting during operation causes property damage including destruction of the nutrunner. Changing the gear causes mechanical damage to the gearbox. Changing the setting levels results in undefined behaviour.

– Only make changes to the gear or setting level settings when the nutrunner is at a standstill.

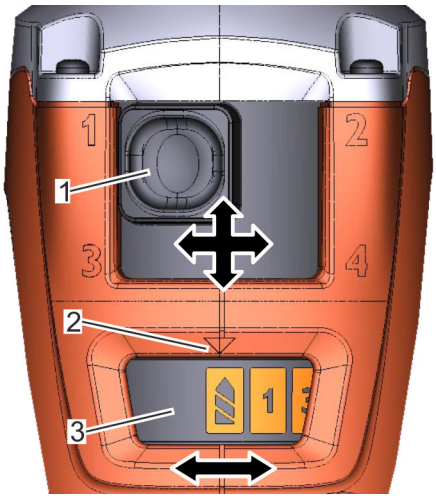


Fig. 18: Gear setting and setting levels

1 Gear setting
2 Marking for setting level
3 Setting levels

For each bolting process, the correct torque level must be determined and the gear and setting level must be set accordingly on the nutrunner.

1. Determine the torque *Chapter 4 "Determining the bolting process" on page 42*.
2. Find a suitable combination of gear and setting level using the torque chart (performance table) provided.
3. Set gear (Fig. 18/1) 4 to 1 (manual gearbox setting).
4. Set setting level (Fig. 18/3) 1 to 15 (electronic setting).

   In order to select the breakaway torque level, turn the setting level scale to at the start or end. The torque of the breakaway torque level is roughly 15% greater than the torque of setting level 15.

   ⇨ The desired torque level is now set.

DA2 nutrunner in performance levels 05 and 10:

The 4th gear (high-speed gear) is not suitable for controlled tightening.

8 Bracing the reaction arm

Reaction arm

Torques can only be generated if the reaction forces are absorbed. The reaction arm fulfils this function on the nutrunner:

The scope of delivery for the nutrunner contains a standard reaction arm. The nutrunner may only be used with the reaction arm included in the delivery.

For bolting processes for which the standard reaction arm is unsuitable, contact PLARAD® service.

Incorrect bracing and overloading

WARNING!

Danger of injury due to incorrect bracing, overloading, breakage!

If the nutrunner is not sufficiently braced, it can slip out of place and be ejected. Any point contact between the reaction arm and the corners of a bracing element can cause considerable forces to act on the nutrunner. Incorrect bracing or overloading of the reaction arm, bolts or other components can result in serious injuries and damage to the nutrunner.

- Do not use the nutrunner if the bolting process is not entirely clear.
- Note the torque chart.
- Check the reaction arm for visible damage prior to use. Do not use the reaction arm if it is damaged.
- Brace the reaction arm correctly. Note the following instructions regarding bracing.
- Always ensure that the reaction arm is in full contact with the surface.
- Use only PLARAD® original reaction arms.

Bracing

Fig. 19: Bracing the reaction arm correctly

1 Reaction arm
2 Starting rotation angle
3 Bracing surface

1. Find the ideal bracing surface for the bolting process. Ensure that the reaction arm (Fig. 19/1) is in full contact with the bracing surface (Fig. 19/3) and cannot slip out of place. Note the starting angle of rotation (Fig. 19/2).

If the standard reaction arm is not suitable for this, use a suitable reaction arm. If you have questions, contact PLARAD® service.

Fig. 20: Reaction arm braced incorrectly

→ Correct bracing point
→ Incorrect bracing point

2. Ensure that only the points (Fig. 20) marked with → absorb the torque and are in full contact.

9 Tightening

Danger of crushing

WARNING!

Danger of crushing between the reaction arm and bracing surface!

Body parts could get between the reaction arm and bracing surface. This could result in serious injuries.

– Never put body parts between the reaction arm and bracing surface.
– Carefully attach the impact wrench socket.

Overloading and breakage

WARNING!

Danger of injury due to overloading and breakage!

Overloading of the nutrunner or individual components can result in serious injuries.

– Do not use the nutrunner if the bolting process is not entirely clear.
– Note the torque chart.
– Check the reaction arm for visible damage prior to use. Do not use the reaction arm if it is damaged.
– Brace the reaction arm correctly ↳ *Chapter 8 “Bracing the reaction arm” on page 50*.

Starting the bolting process

Contact PLARAD® service prior to operation at temperatures below 0°C.

1. Ensure that the nutrunner has been properly prepared (↳ *Chapter 5 “Preparing the nutrunner” on page 43*) and that the bolting process is known ↳ *Chapter 4 “Determining the bolting process” on page 42*.
2. Ensure that the battery is charged and correctly connected to the nutrunner ↳ *Chapter 6 “Supplying with energy” on page 45*.
3. Ensure that the torque level setting has been made ↳ *Chapter 7 “Setting the torque levels” on page 49*.
4. Attach the nutrunner to the bolted connection in such a way that the full height of the bolt head or nut is gripped by the impact wrench socket.

   If this is not possible, use an impact wrench socket and accessories that match the bolting process.

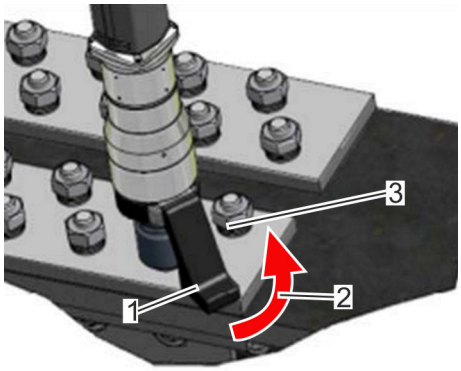


Fig. 21: Starting rotation angle

1 Reaction arm
2 Starting rotation angle
3 Bracing

5. Ensure that the reaction arm (Fig. 21/1) is braced against a bracing surface (Fig. 21/3) on its side facing the nutrunner's desired direction of rotation of rotation. Ensure that there is full contact.

6. Do not retighten. Do not repeat correctly completed bolting processes.

Direction of rotation

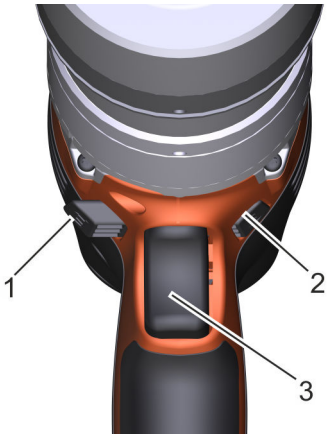


Fig. 22: Direction of rotation

1 Tightening in clockwise direction
2 Loosening in counterclockwise direction
3 Trigger

7.

Standard direction of rotation: Right-hand thread

	Direction of rotation setting	Direction of rotation
	Right-hand side is pressed.	Clockwise (CW) Tightening in clockwise direction
	Middle position	No rotation possible. Transport position
	Left-hand side is pressed.	Counterclockwise (CCW) Loosening in counterclockwise direction

To tighten in clockwise direction (CW), push the direction of rotation setting (Fig. 22/1) to the right.

To loosen in counterclockwise direction (CCW), push the direction of rotation setting (Fig. 22/2) to the left.

⇨ An acoustic signal sounds if torque levels are blocked.

Trigger

8. **NOTICE!**
Property damage due to pulsing!

Press and hold the trigger (Fig. 22/3) until the bolting process has concluded and an acoustic signal sounds. Do not pulse (press and release the trigger in quick succession).

⇨ If the bolting process was successful, a longer one-off acoustic signal sounds and the next bolting process can be started.

If the bolting process was not successful, two brief acoustic signals sound. The set torque was not reached.

If no acoustic signal sounds, the bolted connection was not correct.

9. If the bolting process does not start, ensure that the selected torque level is not blocked ↳ *Chapter 12 “Using the Diagnostic Setting Software DSS” on page 68*.

Checking the result

10. Check the torque with a suitable torque gauge to verify that the bolting process was successful.

During the bolting process

During the bolting process, the handle of the nutrunner can be turned so ensure that ergonomic use is possible. The automatic safety swivel joint between the drive motor and gearbox locks at a torque in excess of 2 Nm. Reaction forces acting on the user’s hand are prevented.

If the nutrunner is switched off, the handle can be turned freely once more.

The automatic release mode makes it easier to continue working after finishing a bolted connection. The torque resulting from the bracing within the nutrunner is used to move the reaction arm away from the bracing surface. The nutrunner can be easily removed from the bolted connection.

10 Loosening

Danger of crushing

WARNING!

Danger of crushing between the reaction arm and bracing surface!

Body parts could get between the reaction arm and bracing surface and result in serious injuries.

– Never put body parts between the reaction arm and bracing surface.
– Carefully attach the impact wrench socket.

Overloading

NOTICE!

Property damage due to overloading!

Significant torques are exerted on the components during loosening. This can cause breakages.

– Do not overload components.

Starting the loosening process

Contact PLARAD® service prior to operation at temperatures below 0°C.

1. Ensure that the nutrunner has been properly prepared (↬ *Chapter 5 “Preparing the nutrunner” on page 43*) and that the bolting process is known ↬ *Chapter 4 “Determining the bolting process” on page 42*.
2. Ensure that the battery is charged and correctly connected to the nutrunner ↬ *Chapter 6 “Supplying with energy” on page 45*.
3. Ensure that the torque level setting has been made ↬ *Chapter 7 “Setting the torque levels” on page 49*.
4. Attach the nutrunner to the bolted connection in such a way that the full height of the bolt head or nut is gripped by the impact wrench socket.

   If this is not possible, use an impact wrench socket and accessories that match the bolting process.
5. Ensure that the reaction arm is braced against a bracing surface on its side facing the nutrunner’s desired direction of rotation. Ensure that there is full contact.

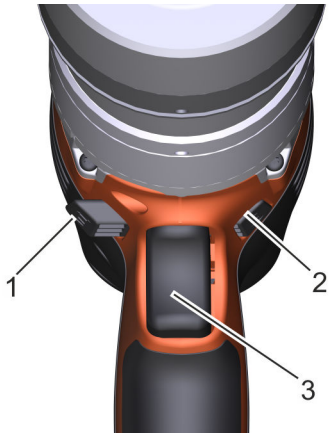


Fig. 23: Direction of rotation

1 Tightening in clockwise direction
2 Loosening in counterclockwise direction
3 Trigger

6.

Standard direction of rotation: Right-hand thread

To tighten in counterclockwise direction (CCW), push the direction of rotation lever (Fig. 23/2) to the left.

⇨ An acoustic signal sounds if torque levels are blocked.

7.

NOTICE!
Property damage due to overloading!

In order to loosen bolted connections, it is often the case that greater torques are needed than those required for bolting. To set the maximum torque, set the setting level to the breakaway torque level  ↳ *Chapter 7 “Setting the torque levels” on page 49*. Ensure that all components are designed for this load.

Do not use the breakaway torque level for bolting.

In delivery state, the breakaway torque level is blocked when tightening in clockwise direction (CW).

Trigger

8.

NOTICE!
Property damage due to pulsing!

Press and hold the trigger (Fig. 23/3) until the loosing process has been completed. Do not pulse (press and release the trigger in quick succession).

⇨ If loosening was successful, the next bolting process can be started.

9. If the bolting process does not start, ensure that the selected torque level is not blocked ↳ *Chapter 12 “Using the Diagnostic Setting Software DSS” on page 68*.

11 Using the Data Transfer Software DTS

Scope of delivery

Fig. 24: DA2docu receiver

Operating data and events can be read out of the DA*docu* nutrunner and transferred to a Windows®-compatible terminal device using the Data Transfer Software DTS.

The Data Transfer Software DTS is included in the scope of delivery for the DA*docu* nutrunner and is stored on the enclosed USB stick.

The scope of delivery for the DA2*docu* may also include a DA2*docu* receiver Fig. 24.

The data transfer between the receiver and DA2*docu* uses an ISM band (2.4 GHz). The receiver is connected to the terminal device using a USB cable.

GPS

A GPS module is installed in the DA2*docu* nutrunner. This module generates data for the individual bolted connections.

The GPS module does not store the location of the nutrunner. No movement profile is created.

Sleep mode

An activated GPS module requires energy. If GPS is set permanently, the battery discharges quickly.

In order to save energy, the GPS connection is disconnected automatically after 4 minutes of inactivity and the nutrunner switches to sleep mode. The sleep mode is also activated after attaching and changing the battery.

In order to switch from sleep mode to normal work mode, press and hold the trigger for 5 seconds.

After roughly 4 to 5 minutes of inactivity, the nutrunner switches back to sleep mode automatically.

11.1 Connecting to the DTS

For data exchange to be possible, the Data Transfer Software DTS must be installed on the terminal device.

Personnel: ■ Qualified nutrunner personnel

Prerequisites:

- Terminal device with Windows® operating system.
- Read, modify and write permissions for the folder in the file system.

1. Connect the USB stick to the terminal device.
2. Copy the 11 elements (Fig. 25) associated with the DTS to a folder of the computer file system.
3. Ensure that an FTDI driver is installed on the computer. See the *"READ ME"* file in this regard.
4. Connect the DA2*docu* receiver supplied to the computer using the USB cable. In doing so, ensure you use the correct USB-COM port. The COM port can be identified via the Windows® Device Manager.
5. Start the application (.exe file).

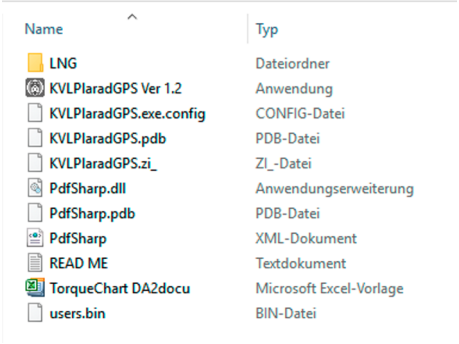


Fig. 25: DTS files

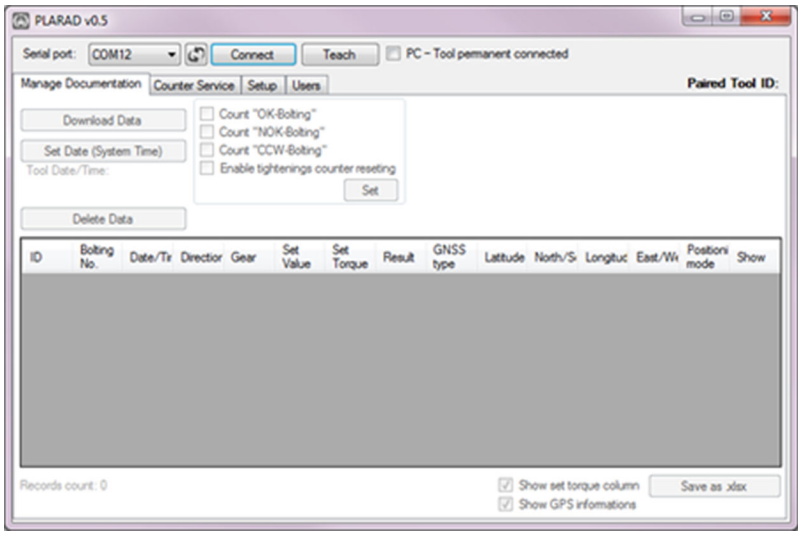


Fig. 26: DTS

6. To connect DTS to the DA2*docu* receiver, press  .

Fig. 27: Removing the battery

7. Remove the battery from the nutrunner.

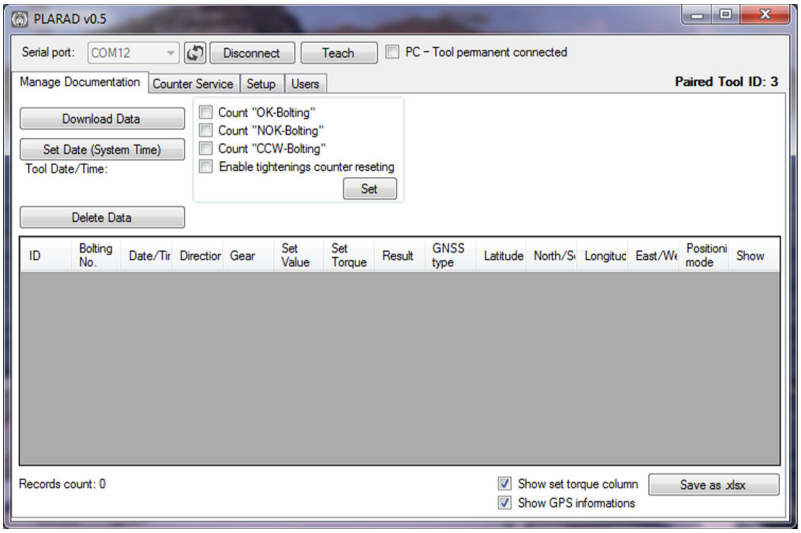


Fig. 28: Coupling the DTS

8. To couple the nutrunner with the DTS, press Teach.

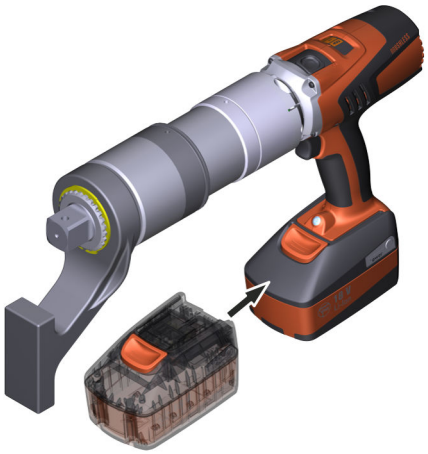


Fig. 29: Attaching the battery

9. Attach the battery and press and hold the trigger until a serial number appears in *“Paired Tool ID: ”* (top right).

⇨ The nutrunner is connected to the DTS.

The serial number S/N is first displayed in “Paired Tool ID: ” if there is a data exchange between the terminal device and the nutrunner (“Download Data”).

10. In order to conserve the battery of the nutrunner, the connection to the receiver remains in place for approx. 4 minutes after the last software operation. Do **not** select *“PC - Tool permanent connected”* here.

A new coupling is then required.

This is the recommended setting.

11. To establish permanent coupling, select *“PC - Tool permanent connected”*.

⇨ The coupling remains in place until Disconnect is pressed.

12. To undo an existing coupling, press Disconnect.

11.2 Managing documentation

Personnel: ■ Qualified nutrunner personnel

Prerequisite:

Nutrunner is connected to DTS *Chapter 11.1 “Connecting to the DTS” on page 57*.

1. Select *“Manage Documentation”*.

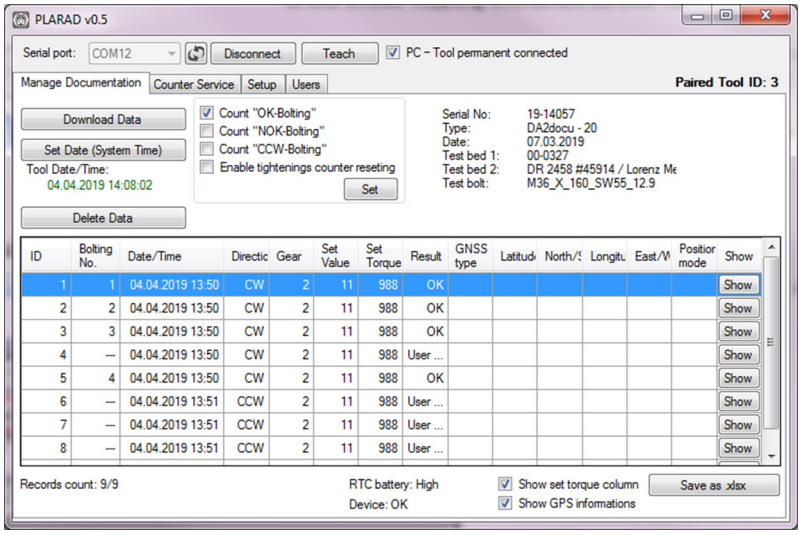
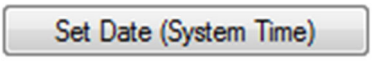


Fig. 30: Managing documentation

2. To load the data from the nutrunner onto the terminal device, press Download Data.



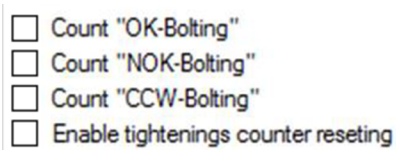
3. To transfer the system time from the terminal device to the nutrunner, press Set Date (System Time).

Existing data and times are not modified.

4. *A password can be used to protect data from deletion. See Chapter 11.5.2 “Using passwords” on page 67.*

To delete data in the nutrunner, press Delete Data.

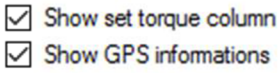
⇨ *The data is permanently deleted from the nutrunner. This data cannot be restored.*



5. ☑ Select which bolting processes are to be logged in the nutrunner.

The following data can be stored:

- OK-Bolting
  The bolting process was carried out correctly.
- NOK-Bolting
  The bolting process was not completed correctly.
- CCW-Bolting
  Bolting process with counterclockwise rotation, loosening process
- Tightenings counter resetting
  The counters are reset to “0”.



6. ☑ Select whether the associated torque and GPS data are to be stored in addition to the torque levels.

GPS data requires that GPS reception was possible during the bolting process.

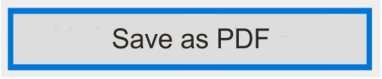
7. To transfer the ☑ data selection, press Set.

⇨ The selected data is stored in the nutrunner for future bolting processes and can be viewed on the terminal device after download.

	A	B	C	D	E	F	G	H
1	Serial No:	19-14057						
2	Type:	DA2docu - 20						
3	FW tool:							
4	HW No. docu:	1,5						
5	FW No. docu:	1,1						
6	Date:	07.03.2019						
7	ID	Bolting No.	Date/Time	Direction	Gear	Set Value	Set Torque	Result
8	1	1	17.04.2019 16:11	CW	1	13	1821	User switched off
9	2	2	17.04.2019 16:11	CW	1	13	1821	User switched off
10	3	1	17.04.2019 16:11	CCW	1	13	1821	User switched off
11	4	2	17.04.2019 16:11	CCW	1	13	1821	User switched off
12	5	3	17.04.2019 16:11	CCW	1	13	1821	User switched off
13	6	---	17.04.2019 16:14	CCW	1	13	1821	User switched off
14	7	---	17.04.2019 16:14	CCW	1	13	1821	User switched off
15								

Fig. 31: Excel file example

8. To export the data displayed in the DTS to an Excel file, press Save as .xlsx and select a storage location in the terminal device.



9. To export the data displayed in the DTS to a PDF file, press Save as PDF and select a storage location in the terminal device.

The storage methods (.xlsx and .pdf) can be blocked and enabled via Password Management.

11.3 Managing the Counter Service

Personnel: ■ Qualified nutrunner personnel

Prerequisite:

Nutrunner is connected to DTS ↳ *Chapter 11.1 "Connecting to the DTS" on page 57*.

The number of boltings per gear/setting are counted and displayed in this menu area. The number of boltings are managed independently of the (bolted connection) documentation. This information can be used to specify maintenance or document the last service date, for example.

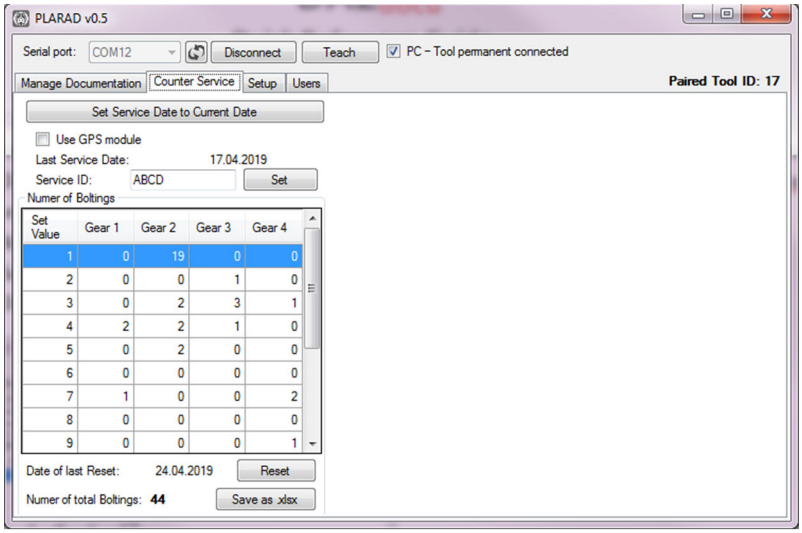


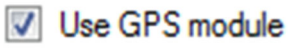
Fig. 32: Counter Service

1. Select *"Counter Service"*.

2. To export the data displayed in the DTS to an Excel file, press Save as .xlsx and select a storage location in the terminal device.

3. To set the service date to the current date, press Set Service Date to Current Date.

   ⇨ The date is documented during the download.



4. To use GPS data, select ☑ Use GPS module.

5. *A password can be used to protect settings from being changed. See ↳ Chapter 11.5.2 "Using passwords" on page 67.*

To accept changes to the settings for the service date or GPS data, press Set.

Download Data ⇨

The changes are not transferred to the nutrunner until Download Data *is pressed in "Manage Documentation".*

Two-way data exchange takes place.

11.4 Setup

Personnel: ■ Qualified nutrunner personnel

NOTICE!

Incorrect documentation results!

Errors in the configuration can result in incorrect data.

- Never modify the configuration data without training from PLARAD® service.
- If you have questions, contact PLARAD® service.
- Set up password protection and do not give the password to unauthorised persons.

Nutrunner-specific data can be changed in the *"Setup"* menu area. The configuration data directly effects the documented data.

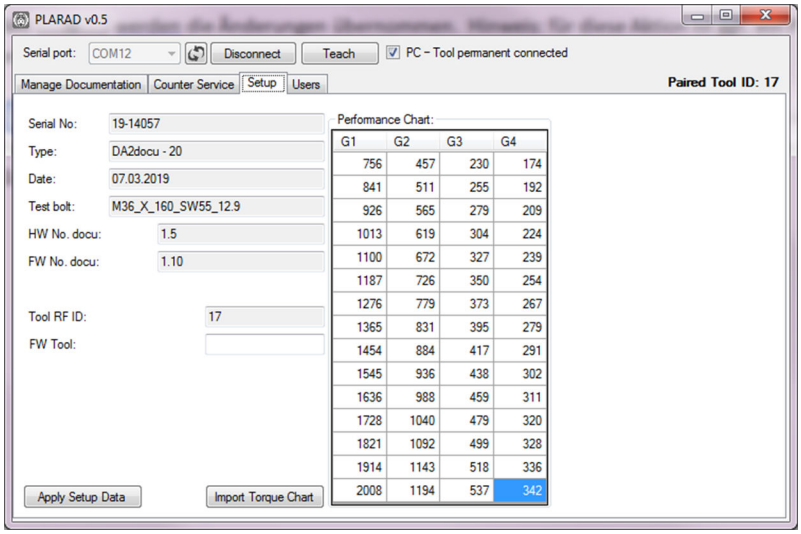


Fig. 33: Setup

→ Select *"Setup"*.

Importing torque values

Prerequisite:

Nutrunner and DTS are connected ↬ *Chapter 11.1 “Connecting to the DTS” on page 57*.

The nutrunner is supplied together with a torque chart. This torque chart shows the individual assignment of bolting processes and torques to the torque levels of the supplied nutrunner.

If this torque chart created at the factory with a test bolt differs from the actual bolting process on site (“hard and soft bolting process”), new torque values can be imported.

1. Have calibration carried out on site by PLARAD® service if possible.
2. Save current torques. The torque values cannot be restored after overwriting.
3. **NOTICE!**
   Incorrect import file!

   Enter the measured torque values as a base table in the Excel *“TorqueChart DA2docu”* template from the copied DTS folder.

   The layout of the table must not be changed.

   Only the fields with a green background may be changed.

   ⇨ All fields in the base table with a green background are overwritten.

4. *A password can be used to protect configuration data from being changed. See ↬ Chapter 11.5.2 “Using passwords” on page 67.*

   To import torque values, press Import Torque Chart.

   ⇨ *The changes are not transferred to the nutrunner until Download Data is pressed in “Manage Documentation”.*

   Two-way data exchange takes place.

   The overwritten data is no longer available after the transfer to the nutrunner.
5. In order to ensure a secure process, restart the programme after the transfer and check the newly implemented data once more.

11.5 Managing users

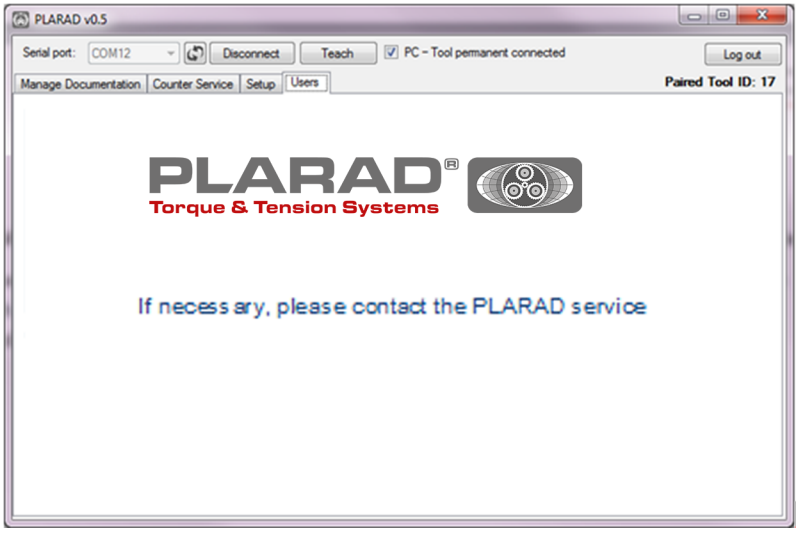


Fig. 34: Users

Permissions and passwords can be assigned and changed in the *"Users"* menu area. This area is reserved exclusively for PLARAD® service. After delivery, changes can still be made by PLARAD® service via TeamViewer, for example.

→ Contact PLARAD® service in relation to requests for changes to user management.

11.5.1 Password settings on delivery

The following passwords and password levels are assigned in delivery state:

Menus and functions	Username	Password	Level
"Manage Documentation"			
Download data (via DTS)	None		0
Export data (.xlsx/PDF)	Customer		1
Set data (system time)	None		0
Show column for the set torque	None		0
Show GPS information	None		0
PC – Tool permanent connected	None		0
Deleting data	Customer		1
Counter settings	Customer		1
Tightenings counter resetting	Customer		1
"Counter Service"			

Menus and functions	Username	Password	Level
Set Service Date to Current Date	*****		2
Use GPS module	*****		2
Reset	*****		2
Save counter as (.xlsx)	None		0
“Setup”			
	*****		2
“Users”			
	*****	*****	3

With regard to software updates or newer versions, the passwords and usernames listed above can be changed without notifying PLARAD® in advance. If you have questions, contact PLARAD® service.

11.5.2 Using passwords

Individual menus and functions can only be called up and executed with a password. Access is denied to users without the appropriate permission.

An input field appears if a protected function is called up:

- Username
- Password

1. **NOTICE!**
   Damage due to access by unauthorised persons!

   Never give passwords to unauthorised persons.

2. Enter and confirm the username and password.

   ⇨ If the username or password are incorrect or are not appropriate for the required password level, access will be denied.

   The function is executed if the username, password and password level match.

12 Using the Diagnostic Setting Software DSS

Functions

The “Diagnostic Setting Software” (DSS) can be used as an option. Functions:

- Read out data from the nutrunner.
- Block individual torque levels.
- Update the firmware.
- Save the status report as a PDF file.

Different functional scope

The functional scope is dependent on the nutrunner.

- Nutrunner without direction of rotation recognition
  Step blocking effects all gears in CW and CCW.
- Nutrunner with direction of rotation recognition
  Step blocking effects all gears. Step blocking in CW and CWW may vary.
- Nutrunner with direction of rotation and gear recognition
  Step blocking can be specified individually for each gear and each direction of rotation.

The different levels are displayed under *“Information”* in the *“Customizing”* menu (↳ *Chapter 12.3 “Customizing” on page 72*).

Scope of delivery

Fig. 35: Programming adapter

The scope of delivery for the Diagnostic Setting Software DSS includes:

- Programming adapter
- USB connection cable
- USB stick with Diagnostic Setting Software DSS and FTDI drivers

System requirements

In order to use the Diagnostic Setting Software DSS, the following system requirements must be met:

- Terminal device with Windows® operating system.
  Windows® XP, Windows® 7, Windows® 8, Windows® 10
- Installed FTDI® VCP driver (Virtual COM port)
  ↳ www.ftdichip.com/Drivers/VCP.htm
- Installed Microsoft .NET Framework 4 Version (or newer)
  ↳ Microsoft Download Center
- USB interface (USB 2.0 or newer)
- Administrator rights (for installation only)

12.1 Connecting to the DSS

Installing the DSS

The *"Diagnostic Setting Software"* programme must be installed on a Windows®-compatible terminal device.

1. Ensure that the system requirements are met *"System requirements" on page 68*.

2. Start the *"Diagnostic Setting Software Installer.exe"* programme.

3. Select the optional components to install and confirm with Next >.
   - Diagnostic Setting Software
   - Desktop Shortcut
   - Start Menu Shortcuts
   - FTDI Driver for USB connection

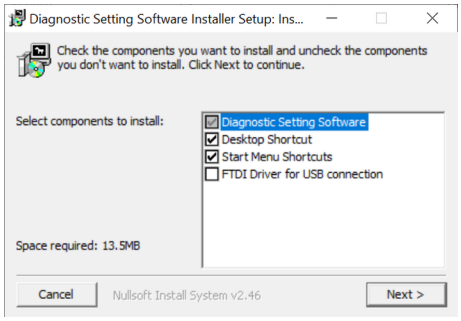


Fig. 36: DSS installation

4. Select destination folder for installation.

5. Press Install.

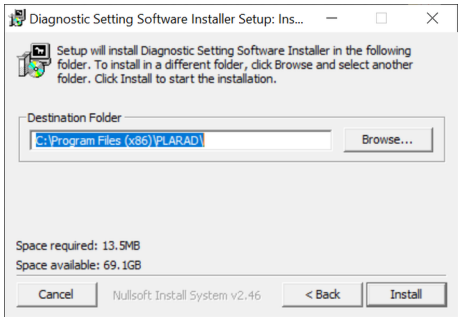


Fig. 37: DSS installation

6. Wait until installation has concluded. Press Close.

   ⇨ The programme and the additionally selected components are installed. The programme is ready for operation thereafter.

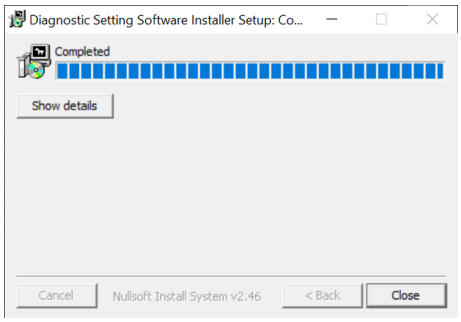


Fig. 38: DSS installation

Connecting the programming adapter

The FTDI® VCP driver must be installed in order to connect the USB programming adapter *“Installing the DSS” on page 69*.

1. Connect the programming adapter to the terminal device using a USB cable.

   ⇨ An LED on the charge status indicator lights up green.

Starting the DSS

2. Start *“Diagnostic Setting Software.exe”*.

Connecting the nutrunner

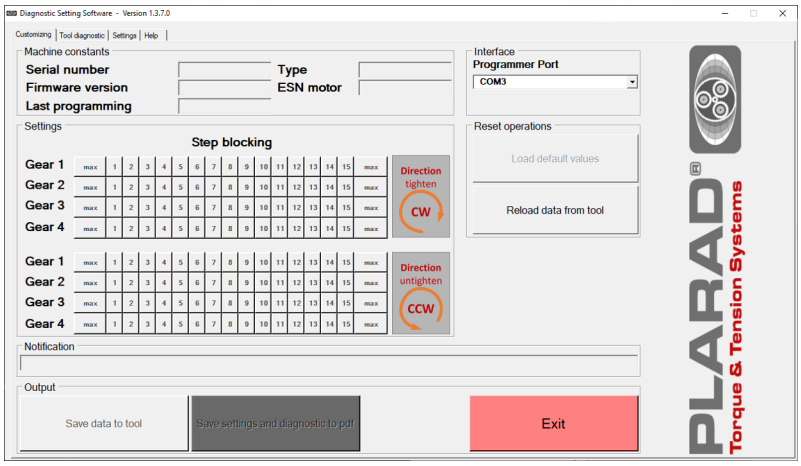
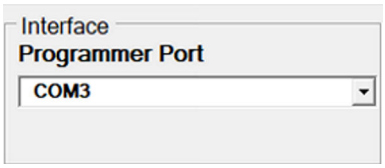


Fig. 39: Start display

3. Connect the nutrunner to the programming adapter. To this end, slide the programming adapter onto the nutrunner instead of the battery.

   ⇨ The “Interface” list and all controls required for communication with the battery nutrunner are activated.

   All controls that require a machine connection are deactivated (grey).



4. Select the interface to which the USB programming adapter is connected.

> *If the automatic COM selection is not working, select the correct COM Port manually.*

5. Press Reload data from tool.
6. Press and hold the trigger until the *“Now Connected”* message is displayed.

   ⇨ The nutrunner is connected to the terminal device via the programming adapter.

Transferring nutrunner data

7. Press Reload data from tool.

   Press and hold the trigger until the *"Info: Communication successful. Settings could be changed"* message is displayed.

   ⇨ All available nutrunner data is loaded and displayed.

12.2 Getting to know the DSS

Start display

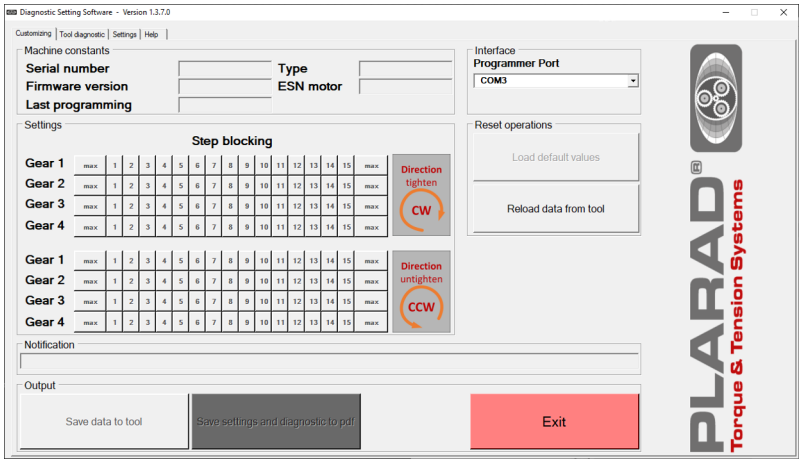


Fig. 40: Start display

DSS starts up in the *"Customizing"* menu.

Inactive features and data that has not yet loaded are greyed out.

The following is displayed:

- *"Machine constants"*
  Parameters for the nutrunner
- *"Settings"*
  Step blocking
- *"Interface"*
- *"Reset operations"*
- *"Notification"*
- *"Output"*

DSS menus

- *"Customizing"*
- *"Tool diagnostic"*
- *"Settings"*
- *"Help"*

Error messages

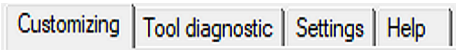
Error messages can be displayed in the *"Notification"* line.

Chapter 14.2 "DSS – Error messages" on page 84

Exiting the DSS

→ To exit the DSS, press Exit.

12.3 Customizing



→ Call up the *"Customizing"* menu.

Retrieving nutrunner data

Prerequisite:

Nutrunner is connected to DSS ↳ *Chapter 12.1 "Connecting to the DSS" on page 69*.

→ Press Reload data from tool.

Press and hold the trigger until the *"Info: Communication successful. Settings could be changed."* message is displayed.

⇨ All available machine data for the nutrunner is loaded and displayed:

- Serial number
- Type
- Firmware version
- ESN motor
- Last programming
- Step blocking

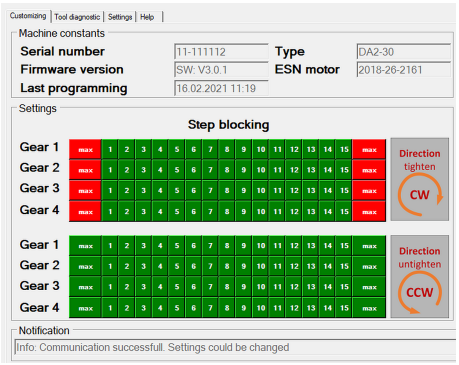


Fig. 41: Information

Blocking torque levels

Individual setting levels for the nutrunner can be blocked. This means it is no longer possible to use the blocked torque levels.

The breakaway torque level is blocked in "Direction tighten" (CW) as standard.

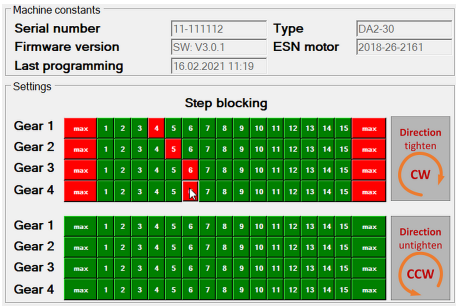


Fig. 42: Blocking torque levels

The display and setting options for step blocking is dependent on the (firmware) version of the nutrunner:

No direction of rotation recognition is possible in version 1. The blocked setting levels are blocked for both directions of rotation CW and CWW.

No gear recognition is possible in version 2. The blocked setting levels are blocked in all gears.

In version 3 (Fig. 41), each individual setting level can be blocked or enabled independently of the direction of rotation and independently of the gear setting.

1. Ensure that the nutrunner is connected to the DSS and that the nutrunner data has been retrieved.
2. Select or deselect setting levels individually. Press the corresponding number to do so.

   ⇨ Torque levels shown in red are blocked.

   Torque levels shown in green are enabled for use.

   Save data to tool is displayed for each change.

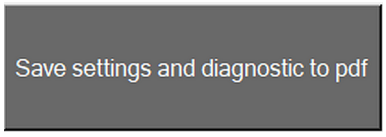
   A message appears: *"Info: The change will not be transferred to the machine until programming."*

3. To reset individual changes to the default values, press Load default values.
4. Press Save data to tool.
5. Press and hold the trigger until the *"Info: Programming successful."* is displayed.

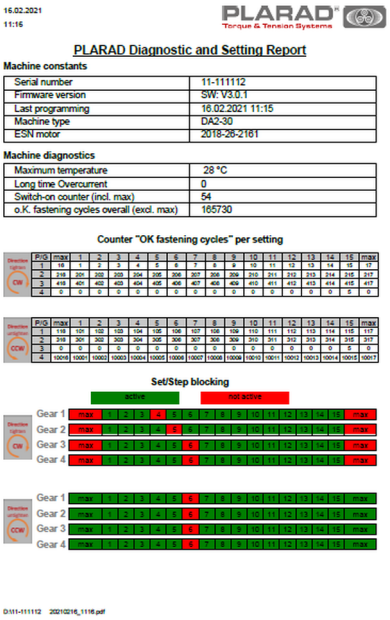
   ⇨ The changes to the step blocking have been transferred to the nutrunner.

Saving settings and diagnostic data as a PDF

The currently displayed settings and diagnostic data can be saved as a PDF for documentation purposes and for subsequent evaluation.



1. To generate a PDF file, press Save settings and diagnostic to pdf.


16.02.2021
11:16

PLARAD Diagnostic and Setting Report

Machine constants

Serial number	11-111112
Firmware version	SW: V3.0.1
Last programming	16.02.2021 11:15
Machine type	DA2-30
ESN motor	2018-26-2161

Machine diagnostics

Maximum temperature	28 °C
Long time Overcurrent	0
Switch-on counter (incl. max)	54
o.K. fastening cycles overall (excl. max)	165730

Counter "OK fastening cycles" per setting

Set/Step blocking

active not active

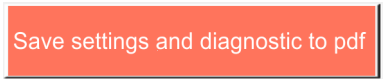
Gear 1 Gear 2 Gear 3 Gear 4

Fig. 43: Example, PDF file

2. Specify a storage location and confirm with *"Save"*.

⇨ If saved successfully, the *"Info: Values archived successfully."* message appears.

If not saved successfully, the *"Error 0x01: Error during archiving."* message appears.



12.4 Tool diagnostic

Call up the *"Tool diagnostic"* menu.

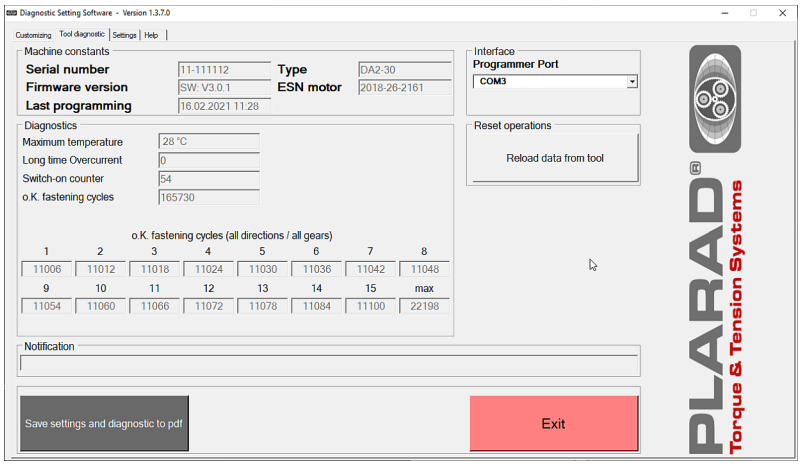


Fig. 44: Tool diagnostic

Retrieving nutrunner data

Prerequisite:

Nutrunner is connected to DSS ↳ *Chapter 12.1 "Connecting to the DSS" on page 69*.

→ Press Reload data from tool.

Press and hold the trigger until the *"Info: Communication successful. Settings could be changed."* message is displayed.

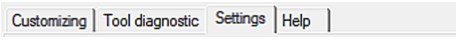
Diagnostic data	Meaning
Maximum temperature	Maximum temperature measured at the drive motor in °C. At maximum 100°C, the integrated overheating protection switches off the drive motor.
Long time overcurrent	Number of nutrunner stops due to overheating.
Switch-on counter	Number of nutrunner starts, independently of direction of rotation, runtime and result.
OK fastening cycles overall	Total number of correctly completed bolting processes with the set torques.
OK fastening cycles per setting	Number of correctly completed bolting processes with the set torques. Each individual setting level is logged separately; gears and directions are not individually separated. Save the PDF file for a detailed listing.

Saving settings and diagnostic data as a PDF

The currently displayed settings and diagnostic data can be saved as a PDF for documentation purposes and for subsequent evaluation.

→ ↳ *"Saving settings and diagnostic data as a PDF" on page 73*.

12.5 Settings



→ Call up the *"Settings"* menu.

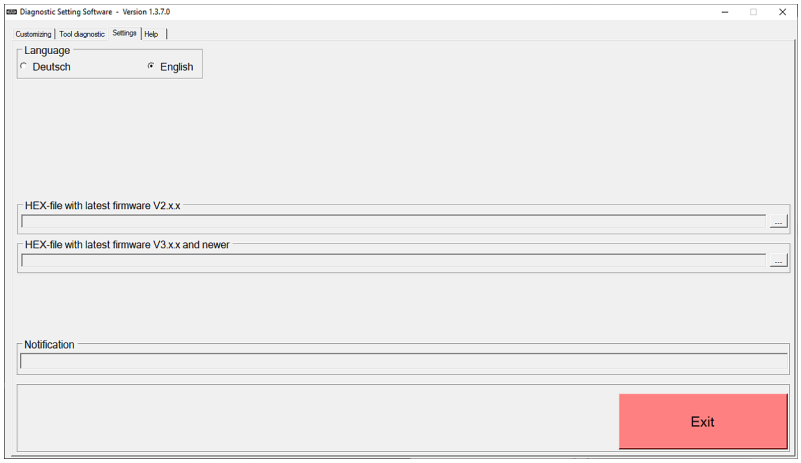


Fig. 45: Settings

Changing the language setting

The programme interface can be displayed in German and English.

→ Select the desired language.

⇨ The programme starts with the selected language interface.

The nutrunner data needs to be reloaded.

Updating the firmware

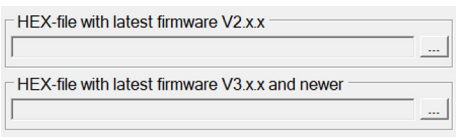
The firmware of the nutrunner can be updated using an original PLARAD® configuration file.

NOTICE!

Property damage due to incorrect configuration file!

The loading of an incorrect configuration file can cause unpredictable behaviour including the destruction of the nutrunner.

– Always contact PLARAD® service first.
– Use only the original PLARAD® configuration file provided by PLARAD® directly.



1. → Ensure that an up-to-date original PLARAD® configuration file is available.

2. To select the configuration file, press ... . Make sure it is the correct version.
3. In the subsequent selection dialogue, change to the storage location and select the correct Hex file.
4. Change to the *"Customizing"* or *"Tool diagnostic"* menu.

5. Press Reload data from tool.

   Press and hold the trigger until the firmware dialogue is displayed.

   ⇨ Information about the current version and any available newer version are displayed.

6. *The old firmware cannot be restored after an update.*

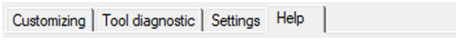
   To update the firmware, press *"Update"*.

   To abort the process, press *"Cancel"*.

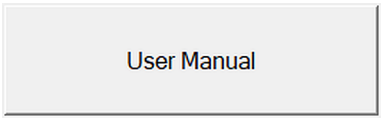
   ⇨ *"Update"*: Message indicates the charge status. The information about the nutrunner is displayed once the firmware has been fully updated. All values are retained.

   "Cancel": No updates are performed.

12.6 Help



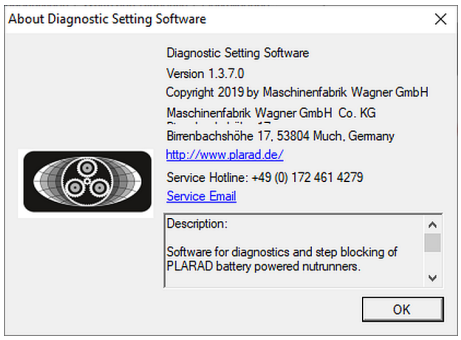
1. Call up the *"Help"* menu.



2. To view the user manual for the nutrunner, press User Manual.

   ⇨ The PDF file of the user manual opens in a PDF display programme.

3. To view information about the Diagnostic Setting Software DSS, press About PLARAD Diagnostic Setting Software.



⇨ Information about the software is displayed in a dialogue window.

13 Performing maintenance

13.1 Maintenance schedule

Improperly performed maintenance tasks

WARNING!

Danger of injury from improperly performed maintenance tasks!

Improper maintenance can cause serious injuries and significant property damage.

- Ensure sufficient assembly space prior to commencing the tasks.
- Ensure that the assembly site is clean and tidy. Loosely stacked or randomly scattered components and tools may cause accidents.
- With regard to maintenance tasks, only allow “Clean nutrunner” and “Have it checked for damage” to be performed by the user.
- Have all repairs performed by the manufacturer.
- Never open the nutrunner.
- Use only PLARAD® original parts.

Faultless operation

The following sections describe the maintenance tasks that are required in order to ensure optimum and faultless operation of the nutrunner.

Insofar as routine checks reveal increased wear, shorten the requisite maintenance intervals according to the actual signs of wear. If you have questions about maintenance tasks and intervals, contact PLARAD® service.

Interval	Maintenance task	Personnel
Before and after every use	■ Clean. ■ Check surfaces, warning symbols and pictograms for damage. ■ Check the power cable, power plug and fasteners of the battery charger for damage. ■ Check the impact wrench socket and spring clip for damage and correct operation. ■ Check the reaction arm and circlip for damage and correct operation. ■ Check for leaks.	User
Every 3 months ■ In the event of extreme operating conditions (e.g. dust, dirt) ■ In the event of high frequency of use, multi-shift operation ■ In the event of constant work in the upper torque range ■ In the event of soft bolting processes Every 6 months ■ In the event of standard operating conditions ■ In the event of average frequency of use ■ In the event of work in the medium torque range Every 12 months ■ In the event of low frequency of use ■ In the event of work in the low torque range	■ Drive motor Perform service as stipulated by the motor manufacturer. ■ Perform the software update. ■ Planetary gearbox Perform service as stipulated by the manufacturer. Lubricate. ■ Nutrunner Exchange damaged markings. Recalibrate. Determine characteristics. Create torque chart/factory certificate. ■ Accessories Check for damage; exchange. ■ Exchange damaged markings. ↳ *Chapter 13.3 “Having service tasks performed by the manufacturer” on page 81*	PLARAD® service

Accessories, spare parts and wear parts

Spare parts must meet the technical requirements specified by PLARAD®. This is always ensured by original spare parts. A warranty can only be provided for original spare parts supplied by PLARAD®.

The installation or use of other spare parts can, under certain circumstances, adversely alter the specified design properties and, consequently, impair active or passive safety.

Any liability and warranty for damage resulting from the use of parts other than the original spare parts and accessory parts is excluded.

Have at least the following information about the nutrunner to hand to enable quick and easy processing:

- Client
- Serial number of the nutrunner
- Desired spare part
- Desired quantity
- Desired mode of shipping

“PLARAD® service” on page 4

13.2 Having the nutrunner maintained by the user

Personnel: ■ User

Perform the following maintenance steps before and after every use:

Cleaning

1. **NOTICE!**
   Property damage due to improper cleaning!

   Clean the nutrunner with a soft cloth. Never use strong cleaning agents, water, brushes, sharp-edged tools or high-pressure cleaners.

Surfaces and markings

2. Check surfaces and markings for damage. Arrange for repairs if there is damage or illegible markings.

Battery charger

3. Check the power cable and power plug for damage and insufficient fastening. Arrange for exchange if there is damage.

Impact wrench socket

4. Check the impact wrench socket and spring clip for damage, deformation and correct operation. Arrange for exchange if there is damage.

Reaction arm

5. Check the reaction arm for damage and deformation. Check the circlip for correct operation. Arrange for exchange if there is damage.

6. **WARNING!**
   Danger of injury due to faulty nutrunner!

   Do not use a faulty nutrunner. This also applies if there are leaks. Have it repaired immediately or have the faulty parts exchanged. Contact PLARAD® service.

Transport case

7. Store the cleaned and damage-free nutrunner in the transport case until its next use.

13.3 Having service tasks performed by the manufacturer

Service intervals

The service intervals are dependent on the conditions of use and the operating site.

Service interval	Conditions
Every 3 months	■ In the event of extreme operating conditions (e.g. dust, dirt) ■ In the event of high frequency of use, multi-shift operation ■ In the event of constant work in the upper torque range ■ In the event of soft bolting processes
Every 6 months	■ In the event of standard operating conditions ■ In the event of average frequency of use ■ In the event of work in the medium torque range
Every 12 months	■ In the event of low frequency of use ■ In the event of work in the low torque range

Contacting service

WARNING!

Danger of injury and property damage due to improperly performed service tasks!

Improperly performed service tasks can cause incorrect bolted connections, destruction of the nutrunner and to injuries.

– Do not perform service tasks yourself.

→ Contact PLARAD® service in good time regarding the following service tasks.

Service tasks

Personnel: ■ PLARAD® service

Component	Service task
Drive motor	Perform service in accordance with the manufacturer's specifications.
	Perform the software update.
Planetary gearbox	Perform service as stipulated by the manufacturer.
	Lubricate.
Accessories	Check for damage; exchange.
	Exchange damaged markings.
Nutrunner	Exchange damaged markings.
	Recalibrate. Determine characteristics.
	Create torque chart/factory certificate.

Torque chart

The torques need to be checked after repairs and, in the event of deviations, a new torque chart or a new torque selection diagram needs to be created.

Newly determined values need to be stored in the nutrunner.

14 Troubleshooting

14.1 Identifying faults

Malfunctions and faults can become noticeable in different ways:

- Nutrunner is not working for no apparent reason:
  First note the list of typical errors and issues ↳ *"FAQs" on page 83*.
- Nutrunner, battery or accessory is faulty or shows signs of damage.
  Contact ↳ *"PLARAD® service" on page 4*.

FAQs

Below is a summary of typical malfunctions, issues and answers. This is intended to provide rapid assistance. For problems that cannot be solved in this way, contact ↳ *"PLARAD® service" on page 4*.

Fault symptom	Measure
The nutrunner will not start.	Check the battery charge status and charge or replace the battery in the event of insufficient charge. Is the torque level blocked? ↳ *Chapter 12 "Using the Diagnostic Setting Software DSS" on page 68*
The device gets hot too quickly.	Are the openings for the air supply dirty or clogged? Clean with a soft cloth.
Battery charge status indicator is flashing red.	The battery is not operational. Bring the battery to within the operating temperature range and then charge it.
Battery charge status indicator lights up red continuously.	The battery is empty. Charge the battery.
An acoustic signal sounds.	Is the torque level blocked? ↳ *Chapter 12 "Using the Diagnostic Setting Software DSS" on page 68*
Two brief acoustic signals during use.	The bolting process was not successful. The set torque was not reached. Determine the bolting process. Repeat tightening.

14.2 DSS – Error messages

Error messages in the *“Notification”* line:

Error number	Message	Meaning
01	No connection to the device. Press the accelerator switch.	Nutrunner cannot be connected. It is potentially not connected. Check the COM-Port connection.
	The device does not transmit any data or does not transmit any correct data.	The update was not completed or was not fully completed. The firmware could be damaged. Repeat the update.
	Error due to timeout on error memory	Nutrunner did not transmit the correct data. Restart the DSS.
	Error due to timeout after error memory request	Nutrunner did not transmit any data. Restart the DSS.
	Syntax within the hex file – Firmware not changed	Internal error. The firmware has not yet changed. Repeat the update.
	Checksum transmission – Firmware not changed	Transmission error. The firmware has not yet changed. Repeat the update.
	Transmission error due to timeout – Firmware not changed	Internal error. The firmware has not yet changed. Repeat the update.
	Syntax within the hex file – Firmware damaged	Internal error. The original software is potentially damaged. Repeat the update.
	Checksum transmission – Firmware damaged	Transmission error. The original software is potentially damaged. Repeat the update.
	FRAM checksums – Firmware damaged	FLASH error. The original software is potentially damaged. Repeat the update.
	Error due to timeout – Firmware damaged	Transmission error. The original software is potentially damaged. Repeat the update.
21, 22, 23	Serial port error due to timeout	No connection to the programming adapter. The FTDI driver is potentially not installed correctly.
31	No response from the tool	No confirmation from the device. The original software is potentially damaged. Repeat the update.

Error number	Message	Meaning
32, 33	Several possible messages (operating system) available	No confirmation from the device. The original software is potentially damaged. Repeat the update.
39	No valid message.	No valid confirmation from the electronic device. The original software is potentially damaged. Repeat the update.
41	Serial port error due to timeout	No connection to the programming adapter. The FTDI driver is potentially not installed correctly.
42	Serial port IO exception error	No connection to the programming adapter. The FTDI driver is potentially not installed correctly.
43	Serial port already open	No connection to the programming adapter. The FTDI driver is potentially not installed correctly.
44	Serial port not open	No connection to the programming adapter. The FTDI driver is potentially not installed correctly.
51, 53	Several possible notifications (from the operating system)	The terminal device detects an error during reception of the serial data.

14.3 Performing troubleshooting

Improperly performed troubleshooting

WARNING!

Danger of injury due to improperly performed troubleshooting!

Improper troubleshooting can cause serious injuries and significant property damage.

- The user may only clean the nutrunner and check it for damage.
- Have all repairs performed by the manufacturer.
- Never open the nutrunner.
- Use only PLARAD® original parts.

Device damage

→ Contact *“PLARAD® service” on page 4* if there is any damage to the nutrunner.

Battery

→ Replace a faulty or uncharged battery. Do not put faulty batteries into service.

Reorder battery:

Contact PLARAD® service.

Returning to service after repair

WARNING!

Danger of injury due to faulty nutrunner!

If a nutrunner is not properly repaired, this can cause serious injuries.

– Never put a defective nutrunner back into service.

→ Check for correct operation prior to first-time use.

15 Disposing of the nutrunner

The nutrunner must be disposed of in an environmentally sound manner at the end of its service life.

Disassembly

WARNING!

Danger of injury due to short circuit and stored residual energy!

If components are damaged, there is a danger of injury due to short circuit or the continued presence of stored residual energy.

1. Disconnect the battery from the nutrunner.
2. Remove the impact wrench socket, reaction arm and all other optional attachment parts.
   ⇨ Reuse these components if necessary.
3. Do not dismantle the nutrunner any further.

Disposal

Insofar as no take-back or disposal agreement has been put in place, dispose of the nutrunner as electronic waste in accordance with local regulations. Use authorised collection points for the reprocessing of old electrical and electronic devices.

ENVIRONMENT!

Danger to the environment due to incorrect disposal!

Incorrect disposal can be hazardous to the environment.

Do not allow electronic components to enter bodies of water, the sewage system, the soil or household waste collection.

Have electronic waste, electronic components, lubricants and other auxiliary materials disposed of by approved specialist companies.

Do not dispose of battery cells and button cells in household waste.

Dispose of the plastic transport case and foam inlay separately from the nutrunner.

If in doubt, obtain information about environmentally sound disposal from the local municipal authority or from specialist disposal companies.

16 Technical data

Dimensions and weight

Dimensions and weight are dependent on the DA2 version. See the technical data sheet in the document folder regarding specific values for the nutrunner.

Data	Value	Unit
Weight*	5.4 – 13.5	kg
Length	365 – 522	mm
Width	68 – 101	mm
Height	245	mm

* Specific details on the rating plate. Specifications without reaction arm but with battery.

Performance values

Data	Value	Unit
Performance range	See torque chart	
Repeatability*	≤ 4%	
Speed	0.7 – 71.6	min^{-1}

* Depending on the bolting process. Independently of the torque, the repeatability depends on the individual bolting process and must therefore be determined in the specific bolting situation.

Electrical connected loads

Data	Value	Unit
Battery charger nominal input voltage, 50 to 60 Hz	220 to 240	V
Battery charger nominal input voltage, 50 to 60 Hz	100 to 120	V
Battery charger power consumption, maximum	100	W
Battery charger charging current, maximum	5,000	mA
Nominal battery voltage	18	V
Battery capacity	5.2 – 6	Ah
Battery	Lithium-ion	
Protective insulation	Protection class IP20	

Battery capacity

The number of possible bolted connections are values determined in trials. These values essentially depend on the bolting process (hard/soft) and on the condition of the battery. Such values may therefore vary significantly. Values based on a fully charged 6.0 Ah battery.

Type	Number of possible bolted connections	Bolting process	Torque [Nm]
DA2-05	748	M 24x95	420
DA2-10	385	M 27x95	670
DA2-20	220	M 27x95	1,400
DA2-30	110	M 36x95	2,100
DA2-36	104	M 36x95	2,300
DA2-48	88	M 52x95	3,600
DA2-80	29	M 72x300	7,900

Environment

Data	Value	Unit
Temperature range	0 to 50	°C
Temperature range for charger, battery	5 to 45	°C

Emissions

Emission levels as per EN 60745

Data	Value	Unit
Emission sound power level L_{WA}	82	dB(A)
Emission sound pressure level L_{pA}	72	dB(A)
Measurement uncertainty of emission sound pressure level	3	dB(A)
Vibration total value	< 2.5	m/s²
Measurement uncertainty for vibration total value	1.5	m/s²

17 Index

Appendix

The following documents are supplied with the nutrunner in a document folder in addition to this manual.

- EU declaration of conformity
- USB stick
- Torque chart
- Certificates (option)
- Technical data sheet