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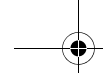
## GDR | GDX Professional

180-Li

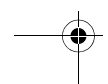
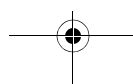
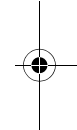
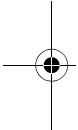


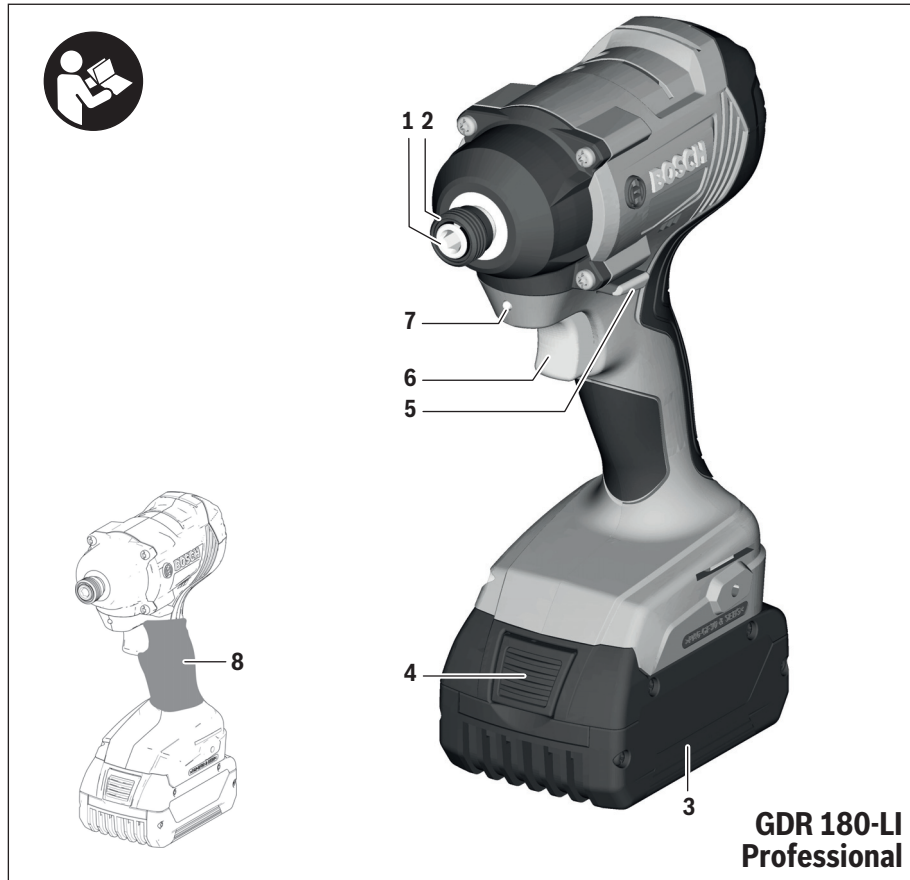
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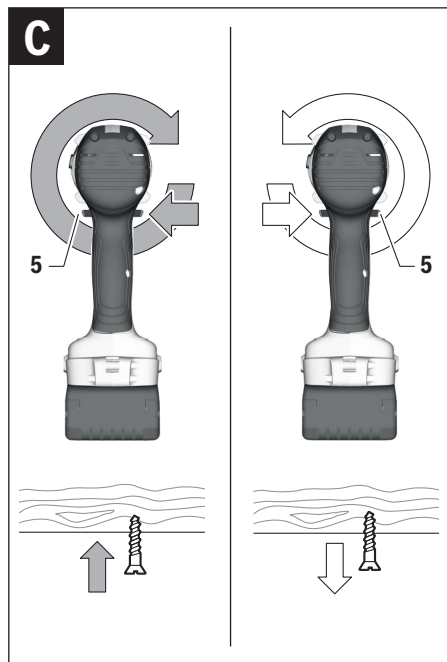
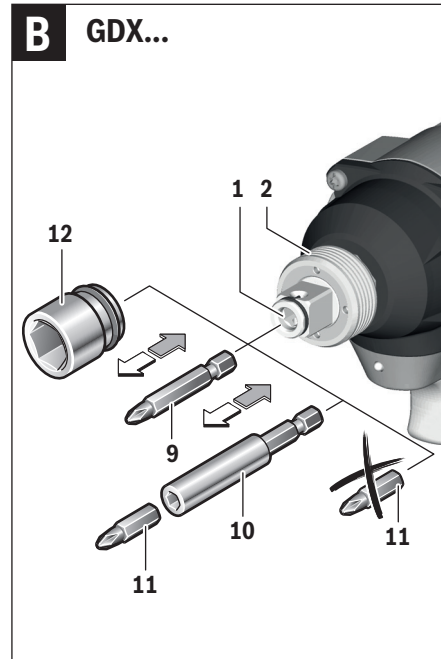
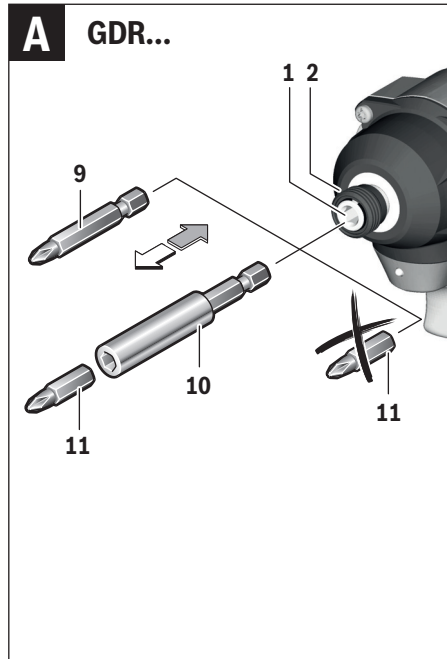


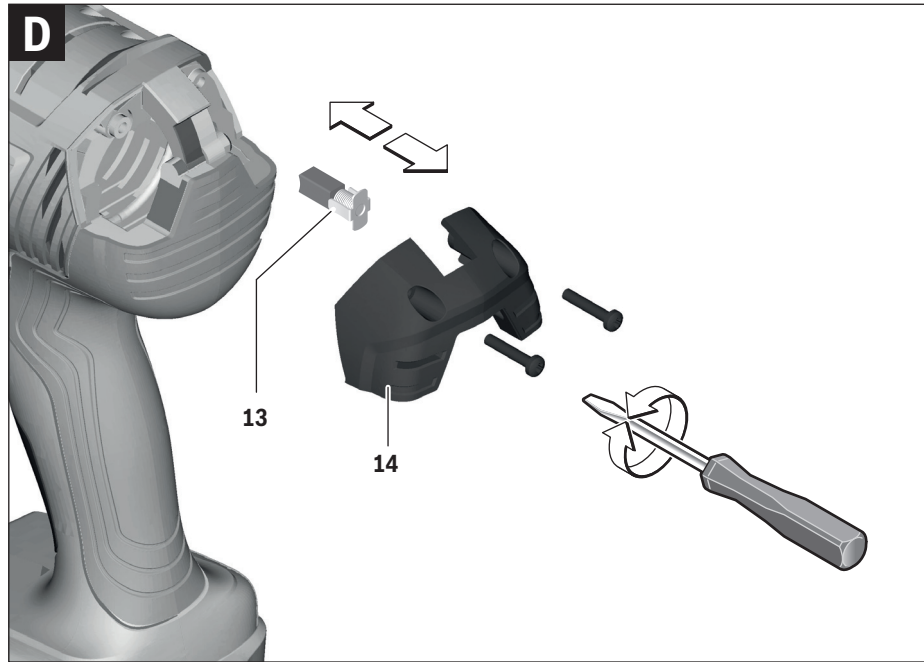


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## English

### Safety Notes

#### General Power Tool Safety Warnings

**⚠ WARNING** Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

**Save all warnings and instructions for future reference.** The term "power tool" in the warnings refers to your mains-operated (corded) power tool or battery-operated (cordless) power tool.

#### Work area safety

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

#### Electrical safety

- ▶ **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.** Unmodified plugs and matching outlets will reduce risk of electric shock.
- ▶ **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is earthed or grounded.
- ▶ **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
- ▶ **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges and moving parts.** Damaged or entangled cords increase the risk of electric shock.
- ▶ **When operating a power tool outdoors, use an extension cord suitable for outdoor use.** Use of a cord suitable for outdoor use reduces the risk of electric shock.
- ▶ **If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply.** Use of an RCD reduces the risk of electric shock.

#### Personal safety

- ▶ **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- ▶ **Use personal protective equipment. Always wear eye protection.** Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection

used for appropriate conditions will reduce personal injuries.

- ▶ **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.** Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.
- ▶ **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
- ▶ **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.
- ▶ **Dress properly. Do not wear loose clothing or jewellery. Keep your hair, clothing and gloves away from moving parts.** Loose clothes, jewellery or long hair can be caught in moving parts.
- ▶ **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** Use of dust collection can reduce dust-related hazards.

#### Power tool use and care

- ▶ **Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the rate for which it was designed.
- ▶ **Do not use the power tool if the switch does not turn it on and off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
- ▶ **Disconnect the plug from the power source and/or the battery pack from the power tool before making any adjustments, changing accessories, or storing power tools.** Such preventive safety measures reduce the risk of starting the power tool accidentally.
- ▶ **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.** Power tools are dangerous in the hands of untrained users.
- ▶ **Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** Many accidents are caused by poorly maintained power tools.
- ▶ **Keep cutting tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.
- ▶ **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** Use of the power tool for operations different from those intended could result in a hazardous situation.

**Battery tool use and care**

- ▶ **Recharge only with the charger specified by the manufacturer.** A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.
- ▶ **Use power tools only with specifically designated battery packs.** Use of any other battery packs may create a risk of injury and fire.
- ▶ **When battery pack is not in use, keep it away from other metal objects, like paper clips, coins, keys, nails, screws or other small metal objects, that can make a connection from one terminal to another.** Shorting the battery terminals together may cause burns or a fire.
- ▶ **Under abusive conditions, liquid may be ejected from the battery; avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help.** Liquid ejected from the battery may cause irritation or burns.
- ▶ **Do not use a battery pack or tool that is damaged or modified.** Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury.
- ▶ **Do not expose a battery pack or tool to fire or excessive temperature.** Exposure to fire or temperature above 130°C may cause explosion.
- ▶ **Follow all charging instructions and do not charge the battery pack or tool outside the temperature range specified in the instructions.** Charging improperly or at temperatures outside the specified range may damage the battery and increase the risk of fire.

**Service**

- ▶ **Have your power tool serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the power tool is maintained.
- ▶ **Never service damaged battery packs.** Service of battery packs should only be performed by the manufacturer or authorised service providers.

**Safety Warnings for Impact Wrenches**

- ▶ **Hold power tool by insulated gripping surfaces, when performing an operation where the fastener may contact hidden wiring.** Fasteners contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.
- ▶ **Secure the workpiece.** A workpiece clamped with clamping devices or in a vice is held more secure than by hand.
- ▶ **Hold the machine with a firm grip.** High reaction torque can briefly occur while driving in and loosening screws.
- ▶ **Always wait until the machine has come to a complete stop before placing it down.** The tool insert can jam and lead to loss of control over the power tool.
- ▶ **Do not open the battery.** Danger of short-circuiting.



**Protect the battery against heat, e. g., against continuous intense sunlight, fire, water, and moisture.** Danger of explosion.

- ▶ **In case of damage and improper use of the battery, vapours may be emitted. Ventilate the area and seek medical help in case of complaints.** The vapours can irritate the respiratory system.
- ▶ **Use the battery only in conjunction with your Bosch power tool.** This measure alone protects the battery against dangerous overload.
- ▶ **The battery can be damaged by pointed objects such as nails or screwdrivers or by force applied externally.** An internal short circuit can occur and the battery can burn, smoke, explode or overheat.

## Product Description and Specifications



**Read all safety warnings and all instructions.** Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

**Intended Use**

The machine is intended for driving in and loosening screws and bolts as well as for tightening and loosening nuts within the respective range of dimension.

The light of this power tool is intended to illuminate the power tool's direct area of working operation and is not suitable for household room illumination.

**Product Features**

The numbering of the product features refers to the illustration of the machine on the graphics page.

- 1 Tool holder
- 2 Locking sleeve\*
- 3 Battery pack\*
- 4 Battery unlocking button\*
- 5 Rotational direction switch
- 6 On/Off switch
- 7 "PowerLight"
- 8 Handle (insulated gripping surface)
- 9 Screwdriver bit with ball catch\*
- 10 Universal bit holder\*
- 11 Screwdriver bit\*
- 12 Application tool (e. g. an impact socket)\*
- 13 Carbon brushes
- 14 Cover lid

\*Accessories shown or described are not part of the standard delivery scope of the product. A complete overview of accessories can be found in our accessories program.

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## Technical Data

Cordless Impact Screwdriver		GDR 180-LI	GDX 180-LI
Article number		3 601 JG5 1..	3 601 JG5 2..
Rated voltage	V=	18	18
No-load speed	min <sup>-1</sup>	0 – 2800	0 – 2800
Impact rate	min <sup>-1</sup>	0 – 3600	0 – 3600
Maximum torque, hard screwdriving application according to ISO 5393			
– ¼" hexagon socket	Nm	160*	160*
– ½"	Nm	–	180
Bolt size	mm	M6 – M14	M6 – M16
Tool holder		¼" hexagon socket	½"
Weight according to EPTA-Procedure 01:2014	kg	1.7*	1.8*
Permitted ambient temperature			
– during charging	°C	0...+45	0...+45
– during operation ** and during storage	°C	-20...+50	-20...+50
Recommended batteries		GBA 18V..	GBA 18V..
Recommended chargers		GAL 18.. GAX 18..	GAL 18.. GAX 18..

\*depending on the battery pack being used

\*\*limited performance at temperatures &lt; 0 °C

## Noise/Vibration Information

Sound emission values determined according to EN 60745-2-2.

Typically the A-weighted noise levels of the product are:  
Sound pressure level 96 dB(A); Sound power level 107 dB(A). Uncertainty K = 3 dB.

**Wear hearing protection!**

Vibration total values  $a_h$  (triax vector sum) and uncertainty K determined according to EN 60745-2-2:

Impact tightening of fasteners of the maximum capacity of the tool:  $a_h = 9.5 \text{ m/s}^2$ ,  $K = 1.5 \text{ m/s}^2$ .

The vibration level given in this information sheet has been measured in accordance with a standardised test given in EN 60745 and may be used to compare one tool with another. It may be used for a preliminary assessment of exposure. The declared vibration emission level represents the main applications of the tool. However if the tool is used for different applications, with different accessories or insertion tools or is poorly maintained, the vibration emission may differ. This may significantly increase the exposure level over the total working period.

An estimation of the level of exposure to vibration should also take into account the times when the tool is switched off or when it is running but not actually doing the job. This may significantly reduce the exposure level over the total working period.

Identify additional safety measures to protect the operator from the effects of vibration such as: maintain the tool and the accessories, keep the hands warm, organisation of work patterns.

## Assembly

## Battery Charging

► **Use only the battery chargers listed on the accessories page.** Only these battery chargers are matched to the lithium-ion battery of your power tool.

**Note:** The battery supplied is partially charged. To ensure full capacity of the battery, completely charge the battery in the battery charger before using your power tool for the first time.

The lithium-ion battery can be charged at any time without reducing its service life. Interrupting the charging procedure does not damage the battery.

The lithium-ion battery is protected against deep discharging by the "Electronic Cell Protection (ECP)". When the battery is empty, the machine is switched off by means of a protective circuit: The inserted tool no longer rotates.

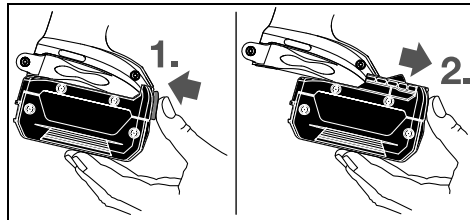
► **Do not continue to press the On/Off switch after the machine has been automatically switched off.** The battery can be damaged.

Observe the notes for disposal.

## Removing the battery

The battery **3** is equipped with two locking levels that should prevent the battery from falling out when pushing the battery unlocking button **4** unintentionally. As long as the battery is inserted in the power tool, it is held in position by means of a spring.





To remove the battery **3**, press the unlocking button **4** and pull out the battery toward the front. **Do not exert any force.**

### Changing the Tool (see figures A and B)

- ▶ **Before any work on the machine itself (e. g. maintenance, tool change, etc.) as well as during transport and storage, remove the battery from the power tool.** There is danger of injury when unintentionally actuating the On/Off switch.
- ▶ **Regularly clean the power tool's air vents.** The motor's fan will draw the dust inside the housing and excessive accumulation of powdered metal may cause electrical hazards.
- ▶ **When working with an application tool, pay attention that the application tool is connected securely on the tool holder.** When the application tool is not securely connected with the tool holder, it can come off during application.

#### Inserting GDR 180-Li:

Pull the locking sleeve **2** forward, push the insert tool to the stop into the tool holder **1** and release the locking sleeve **2** to lock the insert tool.

Use only screwdriver bits with ball catch **9** (DIN 3126-E6.3). Other screwdriver bits **11** can be used with a universal bit holder with ball catch **10**.

#### GDX 180-Li:

Slide the application tool **12** onto the square drive of the tool holder **1**.

With this system, there will be a slight amount of play around the application tool **12** after connecting securely to the tool holder **1**; this has no influence on the function/safety.

#### Removing

Pull the locking sleeve **2** forward and remove the insert tool.

## Operation

### Method of Operation

The tool holder **1** with the tool is driven by an electric motor via a gear and impact mechanism.

The working procedure is divided into two phases:

**Screwing in** and **tightening** (impact mechanism in action).

The impact mechanism is activated as soon as the screwed connection runs tight and thus load is put on the motor. In this instance, the impact mechanism converts the power of the

motor to steady rotary impacts. When loosening screws or nuts, the process is reversed.

### Starting Operation

#### Inserting the battery

Set the rotational direction switch **5** to the centre position to protect the power tool against accidental starting.

Insert the charged battery **3** from the front into the base of the power tool until the battery is securely locked.

#### Reversing the rotational direction (see figure C)

The rotational direction switch **5** is used to reverse the rotational direction of the machine. However, this is not possible with the On/Off switch **6** actuated.

**Right rotation:** For driving in screws and tightening nuts, press the rotational direction switch **5** through to the left stop.

**Left Rotation:** For loosening and unscrewing screws and nuts, press the rotational direction switch **5** through to the right stop.

#### Switching On and Off

To **start** the machine, press the On/Off switch **6** and keep it pressed.

The power light **7** lights up when the On/Off switch **6** is slightly or completely pressed, and allows the work area to be illuminated when lighting conditions are insufficient.

To **switch off** the machine, release the On/Off switch **6**.

To save energy, only switch the power tool on when using it.

#### Adjusting the Speed

The speed of the switched-on power tool can be variably adjusted, depending on how far the On/Off switch **6** is pressed.

Light pressure on the On/Off switch **6** results in a low rotational speed. Further pressure on the switch results in an increase in speed.

### Working Advice

- ▶ **Apply the power tool to the screw/nut only when it is switched off.** Rotating tool inserts can slip off.

The torque depends on the impact duration. The maximum achieved torque results from the sum of all individual torques achieved through impact. The maximum torque is achieved after an impact duration of 6 – 10 seconds. After this duration, the tightening torque is increased only minimally.

The impact duration is to be determined for each required tightening torque. The actually achieved tightening torque is always to be checked with a torque wrench.

#### Screw Applications with Hard, Spring-loaded or Soft Seat

A test in which the achieved torques in an impact series are measured and transferred to a diagram will produce the curve of a torque characteristic. The height of the curve corresponds with the maximum reachable torque, and the steepness indicates the duration in which this is achieved.

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A torque gradient depends on the following factors:

- Strength properties of the screws/nuts
- Type of backing (washer, disc spring, seal)
- Strength properties of the material being screwed/bolted together
- Lubrication conditions at the screw/bolt connection

The following application cases result accordingly:

- A **hard seat** is given for metal-to-metal screw applications with the use of washers. After a relatively short impact duration, the maximum torque is reached (steep characteris-

tic curve). Unnecessary long impact duration only causes damage to the machine.

- A **spring-loaded seat** is given for metal-to-metal screw applications, however with the use of spring washers, disc springs, studs or screws/nuts with conical seat as well as when using extensions.
- A **soft seat** is given for screw applications, e. g., metal on wood or when using lead washers or fibre washers as backing.

For a spring-loaded seat as well as for a soft seat, the maximum tightening torque is lower than for a hard seat. Also, a clearly longer impact duration is required.

**Reference Values for Maximum Screw/Bolt Tightening Torques**

Calculated from the tensional cross-section; utilization of the yield point 90 % (with friction coefficient  $\mu_{\text{total}} = 0.12$ ). As a control measure, always check the tightening torque with a torque wrench.

Property Classes according to DIN 267	Standard Screws/Bolts							High-strength Bolts			
	3.6	4.6	5.6	4.8	6.6	5.8	6.8	6.9	8.8	10.9	12.9
M 6	2.71	3.61	4.52	4.8	5.42	6.02	7.22	8.13	9.7	13.6	16.2
M 8	6.57	8.7	11	11.6	13.1	14.6	17.5	19.7	23	33	39
M 10	13	17.5	22	23	26	29	35	39	47	65	78
M 12	22.6	30	37.6	40	45	50	60	67	80	113	135
M 14	36	48	60	65	72	79	95	107	130	180	215
M 16	55	73	92	98	110	122	147	165	196	275	330

**Tips**

Before screwing larger, longer screws into hard materials, it is advisable to predrill a pilot hole with the core diameter of the thread to approx.  $\frac{2}{3}$  of the screw length.

**Note:** Pay attention that no metal particles enter the power tool.

**Belt Clip**

With the belt clip, the machine can be hung onto a belt. The user has both hands free and the machine is always at hand.

**Recommendations for Optimal Handling of the Battery**

Protect the battery against moisture and water.

Store the battery only within a temperature range between  $-20\text{ }^{\circ}\text{C}$  and  $50\text{ }^{\circ}\text{C}$ . As an example, do not leave the battery in the car in summer.

Occasionally clean the venting slots of the battery using a soft, clean and dry brush.

A significantly reduced working period after charging indicates that the battery is used and must be replaced.

Observe the notes for disposal.

**Maintenance and Service****Maintenance and Cleaning**

- **Before any work on the machine itself (e. g. maintenance, tool change, etc.) as well as during transport and storage, remove the battery from the power tool.**

There is danger of injury when unintentionally actuating the On/Off switch.

- **For safe and proper working, always keep the machine and ventilation slots clean.**

**Replacing the Carbon Brushes (see figure D)**

Check the length of the carbon brushes approx. every 2 – 3 months and replace the carbon brushes if required.

Never replace only a single carbon brush!

**Note:** Use only carbon brushes supplied by Bosch and intended specifically for your product.

- Unscrew the cover lid **14** using a suitable slotted screwdriver.
- Replace the spring-loaded carbon brushes **13** and screw the cover lid back on again.

**After-sales Service and Application Service**

Our after-sales service responds to your questions concerning maintenance and repair of your product as well as spare parts. Exploded views and information on spare parts can also be found under:

**www.bosch-pt.com**

Bosch's application service team will gladly answer questions concerning our products and their accessories.

In all correspondence and spare parts order, please always include the 10-digit article number given on the type plate of the machine.

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Tehini Hana & Co. S.A.R.L.  
 P.O. Box 90-449  
 Jdeideh  
 Dora-Beirut  
 Phone: +9611255211  
 Email: service-pt@tehini-hana.com

**Libya**

El Naser for Workshop Tools  
 Swanee Road, Alfalah Area  
 Tripoli  
 Phone: +218 21 4811184

**Oman**

Malatan Trading & Contracting LLC  
 P.O. Box 131  
 Ruwi, 112 Sultanate of Oman  
 Phone: +968 99886794  
 Email: malatanpowertools@malatan.net

**Qatar**

International Construction Solutions W L L  
 P. O. Box 51, Doha  
 Phone: +974 40065458  
 Fax: +974 4453 8585  
 Email: csd@icsdoha.com

**Saudi Arabia**

Juffali Technical Equipment Co. (JTECO)  
 Kilo 14, Madinah Road, Al Bawadi District  
 Jeddah 21431  
 Phone: +966 2 6672222 Ext. 1528  
 Fax: +966 2 6676308  
 Email: roland@eajb.com.sa

**Syria**

Dallal Establishment for Power Tools  
 P.O. Box 1030  
 Aleppo  
 Phone: +963212116083  
 Email: rita.dallal@hotmail.com

**United Arab Emirates**

Central Motors & Equipment LLC, P.O. Box 1984  
 Al-Wahda Street – Old Sana Building  
 Sharjah  
 Phone: +971 6 593 2777  
 Fax: +971 6 533 2269  
 Email: powertools@centralmotors.ae

**Yemen**

Abualrejal Trading Corporation  
Sana'a Zubiery St. Front to new Parliament Building  
Phone: +967-1-202010  
Fax: +967-1-279029  
Email: tech-tools@abualrejal.com

**Ethiopia**

Forever plc  
Kebele 2,754, BP 4806,  
Addis Ababa  
Phone: +251 111 560 600  
Email: foreverplc@ethionet.et

**Ghana**

C.WOERMANN LTD.  
Nsawam Road/Avenor Junction, P.O. Box 1779  
Accra  
Phone: +233 302 225 141

**Kenya**

Robert Bosch East Africa Ltd  
Mpaka Road P.O. Box 856  
00606 Nairobi

**Nigeria**

Robert Bosch Nigeria Ltd.  
52 – 54 Isaac John Street P.O. Box  
GRA Ikeja – Lagos

**Republic of South Africa**

**Customer service**  
Hotline: (011) 6519600

**Gauteng – BSC Service Centre**

35 Roper Street, New Centre  
Johannesburg  
Tel.: (011) 4939375  
Fax: (011) 4930126  
E-Mail: bsctools@icon.co.za

**KZN – BSC Service Centre**

Unit E, Almar Centre  
143 Crompton Street  
Pinetown  
Tel.: (031) 7012120  
Fax: (031) 7012446  
E-Mail: bsc.dur@za.bosch.com

**Western Cape – BSC Service Centre**

Democracy Way, Prosperity Park  
Milnerton  
Tel.: (021) 5512577  
Fax: (021) 5513223  
E-Mail: bsc@zsd.co.za

**Bosch Headquarters**

Midrand, Gauteng  
Tel.: (011) 6519600  
Fax: (011) 6519880  
E-Mail: rbsa-hq.pts@za.bosch.com

**Tanzania**

Diesel & Autoelectric Service Ltd.  
117 Nyerere Rd., P.O. Box 70839  
Vingunguti 12109, Dar Es Salaam  
Phone: +255 222 861 793/794

**Australia, New Zealand and Pacific Islands**

Robert Bosch Australia Pty. Ltd.  
Power Tools  
Locked Bag 66  
Clayton South VIC 3169  
Customer Contact Center  
Inside Australia:  
Phone: (01300) 307044  
Fax: (01300) 307045

Inside New Zealand:  
Phone: (0800) 543353  
Fax: (0800) 428570

Outside AU and NZ:  
Phone: +61 3 95415555  
www.bosch-pt.com.au  
www.bosch-pt.co.nz

**Transport**

The contained lithium-ion batteries are subject to the Dangerous Goods Legislation requirements. The user can transport the batteries by road without further requirements.

When being transported by third parties (e.g.: air transport or forwarding agency), special requirements on packaging and labelling must be observed. For preparation of the item being shipped, consulting an expert for hazardous material is required.

Dispatch batteries only when the housing is undamaged. Tape or mask off open contacts and pack up the battery in such a manner that it cannot move around in the packaging. Please also observe possibly more detailed national regulations.

**Disposal**

The machine, rechargeable batteries, accessories and packaging should be sorted for environmentally friendly recycling.



Do not dispose of power tools and batteries/rechargeable batteries into household waste!

**Only for EC countries:**

According to the European Guideline 2012/19/EU, power tools that are no longer usable, and according to the European Guideline 2006/66/EC, defective or used battery packs/batteries, must be collected separately and disposed of in an environmentally correct manner.

Batteries no longer suitable for use can be directly returned at:

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**Great Britain**

Robert Bosch Ltd. (B.S.C.)  
P.O. Box 98  
Broadwater Park  
North Orbital Road  
Denham  
Uxbridge  
UB 9 5HJ

At [www.bosch-pt.co.uk](http://www.bosch-pt.co.uk) you can order spare parts or arrange the collection of a product in need of servicing or repair.

Tel. Service: (0344) 7360109

E-Mail: [boschservicecentre@bosch.com](mailto:boschservicecentre@bosch.com)

**Battery packs/batteries:****Li-ion:**

Please observe the instructions in section "Transport", page 13.

**中文****安全规章****电动工具通用安全警告**

**警告！** 阅读所有警告和所有说明！不遵照以下警告和说明会导致电击、着火和/或严重伤害。

保存所有警告和说明书以备查阅。

在所有下列的警告中术语“电动工具”指市电驱动（有线）电动工具或电池驱动（无线）电动工具。

**工作场地的安全**

- ▶ **保持工作场地清洁和明亮。** 混乱和黑暗的场地会引发事故。
- ▶ **不要在易爆环境，如有易燃液体、气体或粉尘的环境下操作电动工具。** 电动工具产生的火花会点燃粉尘或气体。
- ▶ **让儿童和旁观者离开后操作电动工具。** 注意力不集中会使操作者失去对工具的控制。

**电气安全**

- ▶ **电动工具插头必须与插座相配。** 绝不能以任何方式改装插头。需接地的电动工具不能使用任何转换插头。未经改装的插头和相配的插座将减少电击危险。
- ▶ **避免人体接触接地表面，如管道、散热片和冰箱。** 如果你身体接地会增加电击危险。
- ▶ **不得将电动工具暴露在雨中或潮湿环境中。** 水进入电动工具将增加电击危险。
- ▶ **不得滥用电线。** 绝不能用电线搬运、拉动电动工具或拔出其插头。使电线远离热源、油、锐边或运动部件。受损或缠绕的软线会增加电击危险。

▶ **当在户外使用电动工具时，使用适合户外使用的外接软线。** 适合户外使用的软线将减少电击危险。

▶ **如果在潮湿环境下操作电动工具是不可避免的，应使用剩余电流动作保护器（RCD）。** 使用 RCD 可减小电击危险。

**人身安全**

- ▶ **保持警觉，当操作电动工具时关注所从事的操作并保持清醒。** 当你感到疲倦，或在有药物、酒精或治疗反应时，不要操作电动工具。在操作电动工具时瞬间的疏忽会导致严重人身伤害。
- ▶ **使用个人防护装置。始终佩戴护目镜。** 安全装置，诸如适当条件下使用防尘面具、防滑安全鞋、安全帽、听力防护等装置能减少人身伤害。
- ▶ **防止意外起动。** 确保开关在连接电源和 / 或电池盒、拿起或搬运工具时处于关断位置。手指放在已接通电源的开关上或开关处于接通时插入插头可能会导致危险。
- ▶ **在电动工具接通之前，拿掉所有调节钥匙或扳手。** 遗留在电动工具旋转零件上的扳手或钥匙会导致人身伤害。
- ▶ **手不要伸展得太长。时刻注意立足点和身体平衡。** 这样在意外情况下能很好地控制电动工具。
- ▶ **着装适当。不要穿宽松衣服或佩戴饰品。让衣服、手套和头发远离运动部件。** 宽松衣服、配饰或长发可能会卷入运动部件中。
- ▶ **如果提供了与排屑、集尘设备连接用的装置，要确保他们连接完好且使用得当。** 使用这些装置可减少尘屑引起的危险。

**电动工具使用和注意事项**

- ▶ **不要滥用电动工具，根据用途使用适当的电动工具。** 选用适当设计的电动工具会使你工作更有效、更安全。
- ▶ **如果开关不能接通或关断工具电源，则不能使用该电动工具。** 不能用开关来控制的电动工具是危险的且必须进行修理。
- ▶ **在进行任何调节、更换附件或贮存电动工具之前，必须从电源上拔掉插头和 / 或使电池盒与工具脱离。** 这种防护性措施将减少工具意外起动的危险。
- ▶ **将闲置不用的电动工具贮存在儿童所及范围之外，并且不要让不熟悉电动工具或对这些说明不了解的人操作电动工具。** 电动工具在未经培训的用户手中是危险的。
- ▶ **保养电动工具。检查运动件是否调整到位或卡住，检查零件破损情况和影响电动工具运行的其他状况。如有损坏，电动工具应在使用前修理好。** 许多事故由维护不良的电动工具引发。
- ▶ **保持切削刀具锋利和清洁。** 保养良好的有锋利切削刃的刀具不易卡住而且容易控制。

- ▶ **按照使用说明书，考虑作业条件和进行的作业来使用电动工具、附件和工具的刀头等。** 将电动工具用于那些与其用途不符的操作可能会导致危险。

#### 电池式工具使用和注意事项

- ▶ **只用制造商规定的充电器充电。** 将适用于某种电池盒的充电器用到其他电池盒时会发生着火危险。
- ▶ **只有在配有专用电池盒的情况下才使用电动工具。** 使用其他电池盒会发生损坏和着火危险。
- ▶ **当电池盒不用时，将它远离其他金属物体，例如回形针、硬币、钥匙、钉子、螺钉或其他小金属物体，以防一端与另一端连接。** 电池端子短路会引起燃烧或火灾。
- ▶ **在滥用条件下，液体会从电池中溅出；避免接触。** 如果意外碰到了，用水冲洗。如果液体碰到了眼睛，还要寻求医疗帮助。从电池中溅出的液体会发生腐蚀或燃烧。
- ▶ **请勿使用损坏或改变了的充电电池。** 损坏或改变了的充电电池性能不可预测，可能会导致火灾、爆炸或受伤危险。
- ▶ **充电电池请勿靠近火源或高温环境。** 火源或高于 130 °C 的温度可能会引发爆炸。
- ▶ **请遵守所有充电说明，切勿在操作说明规定的温度范围外为充电电池或无绳工具充电。** 充电方式错误或未在许可的温度范围内充电可能会导致充电电池损坏，加大火灾风险。

#### 维修

- ▶ **将你的电动工具送交专业维修人员，使用同样的备件进行修理。** 这样将确保所维修的电动工具的安全性。
- ▶ **切勿对损坏的充电电池进行维护。** 仅允许由制造商或授权的客户服务中心对充电电池进行全面维护。

#### 针对冲击扳手的安全规章

- ▶ **在紧固件可能触及暗线进行操作时，要通过绝缘握持面来握持工具。** 紧固件碰到带电导线会使工具外露的金属零件带电从而使操作者受到电击。
- ▶ **固定好工件。** 使用固定装置或老虎钳固定工件，会比用手握工件更牢固。
- ▶ **务必握紧电动工具。** 在拧紧和放松螺丝时，可能出现短暂的强大反击。
- ▶ **等待电动工具完全静止后才能够放下机器。** 机器上的工具可能在工作中被夹住，而令您无法控制电动工具。
- ▶ **切勿打开蓄电池。** 可能造成短路。



**保护蓄电池免受高温（例如长期日照），火焰，水和湿气的侵害。** 有爆炸的危险。

- ▶ **如果蓄电池损坏了，或者未按照规定使用蓄电池，蓄电池中会散发出有毒蒸汽。** 工作场所必

**须保持空气流通，如果身体有任何不适必须马上就医。** 蓄电池散发的蒸汽会刺激呼吸道。

- ▶ **本蓄电池只能配合博世的电动工具一起使用。** 这样才能确保蓄电池不会过载。
- ▶ **通过尖的物件如钉子或螺丝刀通过外力作用时，可能损坏蓄电池。** 有可能出现内部短路、蓄电池燃烧、发出烟雾、爆炸或过热。

## 产品和功率描述



**阅读所有的警告提示和指示。** 如未确实遵循警告提示和指示，可能导致电击，火灾并且 / 或其他的严重伤害。

### 按照规定使用机器

本电动工具适用于拧入和拧出螺丝，并且可以拧紧和放松规定尺寸内的螺母。

本电动工具的照明灯用于电动工具工作范围周围的照明，不适用于家庭房间照明。

### 插图上的机件

机件的编号和电动工具详解图上的编号一致。

- 1 工具接头
- 2 锁定套筒\*
- 3 蓄电池\*
- 4 蓄电池的解锁按键\*
- 5 正逆转开关
- 6 起停开关
- 7 灯 "PowerLight"
- 8 手柄（绝缘握柄）
- 9 配备滚珠制动功能的螺丝批咀\*
- 10 通用批嘴连杆\*
- 11 螺丝批嘴\*
- 12 安装件（例如螺母起子头）\*
- 13 碳刷
- 14 盖子

\*图表或说明上提到的附件，并不包含在基本的供货范围中。本公司的附件清单中有完整的附件供应项目。

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## 技术数据

充电式冲击钻 / 起子机		GDR 180-LI	GDX 180-LI
物品代码		3 601 JG5 1..	3 601 JG5 2..
额定电压	伏特 =	18	18
无负载转速	次 / 分	0 - 2800	0 - 2800
冲击次数	次 / 分	0 - 3600	0 - 3600
根据 ISO 5393, 硬垫拧转的最大扭力			
- 1/4" 内六角	牛頓米	160*	160*
- ■ 1/2"	牛頓米	-	180
螺丝直径	毫米	M6 - M14	M6 - M16
工具夹头		1/4" 内六角	■ 1/2" 1/4" 内六角
重量符合 EPTA-Procedure 01:2014	公斤	1.7*	1.8*
允许的环境温度			
- 充电时	° C	0...+45	0...+45
- 运行 ** 和储藏时	° C	-20...+50	-20...+50
建议使用的充电电池		GBA 18V..	GBA 18V..
推荐的充电器		GAL 18.. GAX 18..	GAL 18.. GAX 18..

\* 视所使用的蓄电池而定

\*\* 温度 &lt; 0 ° C 时功率受限

## 噪音 / 震动值

根据 EN 60745- 2- 2 测定噪声辐射值。

本机器的 A 类加权噪音水平一般为：声压水平 96 dB(A)，声功率水平 107 dB(A)，不确定系数 K=3 dB。

## 请佩戴护耳罩！

振荡总值  $a_n$  (三向量总和) 以及不确定系数 K 符合 EN 60745- 2- 2:

拧紧许可上限的螺丝和螺母时： $a_n=9.5$  米 / 平方分秒，K=1.5 米 / 平方分秒。

本使用说明书中提供的震动水平，是根据 EN 60745 中规定的测量方式所测得的，因此可以用来在电动工具之间进行比较。也可以临时用来评估震动负荷。此震动值是电动工具用于正式用途时的震动水平。如果未按照规定使用电动工具，在电动工具上安装了其他的附件或不合适的工具，或者未切实做好保养的工作，都可能改变机器的震动水平。这样长期工作下来会明显地提高震动负荷。

为了准确地评估震动负荷，还必须考虑到关机的时间，以及开机后尚未正式工作之前的待命时间。这些因素都会明显降低整个工作过程的震动负荷。

重要的是，采取额外的安全防范措施，保护操作者免受震动伤害，例如：做好电动工具以及安装工具的保养工作，工作时手部保持温暖，正确地安排工作的流程等。

## 安装

## 为蓄电池充电

▶ **只能选用附件页上提供的充电器。** 此充电器是电动工具上的锂离子蓄电池的专用充电器。

**指示：** 蓄电池在交货时只完成部分充电。首度使用电动工具之前，必须先充足蓄电池的电以确保蓄电池的功率。

可以随时为锂离子蓄电池充电，不会缩短电池的使用寿命。如果充电过程突然中断，也不会损坏电池。

本锂离子蓄电池配备了 "Electronic Cell Protection (ECP) (电子充电室保护装置)"，可以防止蓄电池过度放电。电池的电量如果用尽了，保护开关会自动关闭电动工具：安装在机器上的工具会停止转动。

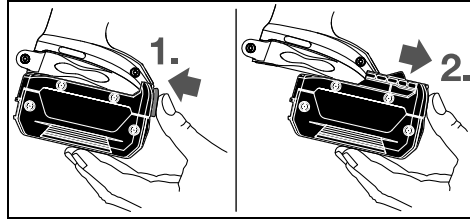
▶ **电动工具被关闭之后，切勿继续按住起停开关。** 可能损坏电池。

请注意有关作废处理的规定。

## 取出蓄电池

本蓄电池 3 具备了双重锁定。即使不小心触动了 蓄电池的解锁按键 4，蓄电池也不会从机器中掉落出来。固定弹簧会把蓄电池夹紧在机器中。





拆卸蓄电池 3 时先按下解锁按键 4 接著再向前从电动工具中拉出蓄电池。不可以强行拉出蓄电池。

#### 更换工具 (参考插图 A 和 B)

- ▶ 在电动工具上进行任何维护的工作 (例如维修, 更换工具等等), 以及搬运、保存电动工具之前都必须从机器中取出蓄电池。不小心开动了起停开关可能造成伤害。
- ▶ 经常清理电动工具的通风口。电动机风扇会将灰尘吸进机壳, 过多的金属粉末沉积会导致电气危险。
- ▶ 装入安装件时务必要确认它是否牢牢地固定在工具接头上。如果安装件未牢固地插在工具接头中, 可能在拧转螺丝时松脱。

#### 安装工具

##### GDR 180-LI:

先向前抽拉锁定套筒 2, 将工具插入工具接头 1 中并把工具推到接头的末端, 接著再放开锁定套筒 2 以锁定工具。

只能使用有滚珠制动功能的螺丝批咀 9 (DIN 3126-E6.3)。可以借用有滚珠制动功能的通用批咀架 10 来安装其他的螺丝批咀 11。

##### GDX 180-LI:

把工作头 12 套在工具接头 1 上。

由于系统设计的关系, 安装件 12 和工具接头 1 之间会存在些微的游隙; 这并不会影响机器的功能 / 安全性能。

#### 拆卸工具

先向前抽拉锁定套筒 2, 并取出工具。

## 操作

#### 运作原理

工具接头 1 和安装在接头上的工具, 是靠著电子马达带动传动装置和敲击体来驱动的。

整个运作过程可以划分为两个阶段:

**旋转和拧紧** (冲击体投入运作)。

一旦螺丝咬入工件中而且发动机开始受荷, 冲击体便投入运作。冲击体把发动机的传动力转换为均匀的旋转式敲击动作。放松螺丝或螺母时, 整个运作过程会反向进行。

## 操作机器

#### 安装蓄电池

把正逆转开关 5 设定在中央的位置, 以避免不小心开启动电动工具。

把充满电的蓄电池 3 从前端推入电动工具的底座中, 必须让蓄电池确实卡牢。

#### 改变转向 (参考插图 C)

使用正逆转开关 5 可以改变机器的转向。如果按住了起停开关 6, 则无法改变转向。

**正转:** 适用于转入螺丝和拧紧螺母时, 把正逆转开关 5 向左推到底。

**逆转:** 适用于放松 / 转出螺丝和螺母, 把正逆转开关 5 向右推到底。

#### 开动 / 关闭

操作电动工具时先按下电动工具的起停开关 6, 并持续按着。

轻按或是把起停开关 6 按到底时灯 7 会亮起。在照明状况不佳的环境中可以借此照亮操作位置。

放开起停开关 6 便可以关闭电动工具。

为了节约能源, 只在当您使用机器时, 才开启动电动工具。

#### 调整转速

你可以无级式调整转速, 把起停开关 6 按得越紧, 转速就越快。

轻按起停开关 6 机器以低转速运转。逐渐在开关上加压, 转速也会跟着提高。

#### 有关操作方式的指点

- ▶ 先关闭电动工具, 然后再把工具放置在螺母 / 螺丝上。安装在接头上的工具如果仍继续转动, 容易从螺丝头上滑开。

扭力大小和冲击时间长短有关。最大扭力是所有经由冲击所产生的单一扭力的总和。在冲击约 6-10 秒之后扭力可以达到最大。超过这段时间, 拉紧扭力只轻微增加。

必须测量每个拉紧扭力的持续冲击时间。随时以扭力测量仪, 检查测得的拉紧扭力。

#### 硬垫拧转, 弹簧垫拧转或软垫拧转

如果把单一冲击过程中测得的各个扭力记载在线图上, 可以得到扭力变化的曲线。曲线的最高点是最大扭力。上升的线段则代表到达最大扭力所需的时间。

扭力曲线的演变会受以下因素影响:

- 螺丝 / 螺母的强度
- 垫片的种类 (螺片, 冠状弹簧, 密封片)
- 即将被拧入螺丝的物料的程度
- 螺丝是否涂抹了润滑油

综合以上因素, 大概可以归类出下列的工作状况:

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- **硬垫拧转**，是指在使用垫片的前提下把金属螺丝拧入金属物料中。经过短暂的冲击之后便可以达到最大扭矩（比较陡的上升曲线）。不必要的延长冲击时间只会损坏机器。
- **弹簧垫拧转**，是指在使用了弹簧圈、冠状弹簧、螺柱、带圆锥座的螺丝 / 螺母以及延长零件等的情况下把金属螺丝拧入金属物料中。
- **软垫拧转**，以下几个例子都属于软垫拧转：把金属螺丝拧入木材中，或者拧紧螺丝时使用了铅垫片、纤维垫片。

弹簧垫拧转和软垫拧转的最大扭力小于硬垫拧转的最大扭力。而且前者需要的冲击时间却明显超越后者。

**最大螺丝拉紧扭力的参考值**

所提供的数据的单位是牛顿米，数据是由切削截面积运算所得；屈服点的利用为百分之 90 %（在摩擦系数  $\mu_{\text{时}} = 0.12$ ）。随时以扭力测量仪检查拉紧扭力。

强度等级根据 DIN 267	标准螺丝				高强度螺丝							
	3.6	4.6	5.6	4.8	6.6	5.8	6.8	6.9	8.8	10.9	12.9	
M 6	2.71	3.61	4.52	4.8	5.42	6.02	7.22	8.13	9.7	13.6	16.2	
M 8	6.57	8.7	11	11.6	13.1	14.6	17.5	19.7	23	33	39	
M 10	13	17.5	22	23	26	29	35	39	47	65	78	
M 12	22.6	30	37.6	40	45	50	60	67	80	113	135	
M 14	36	48	60	65	72	79	95	107	130	180	215	
M 16	55	73	92	98	110	122	147	165	196	275	330	

**建议**

把大的、长的螺丝拧入坚硬的物料中之前，必须根据螺纹的中心直径打预钻孔，预钻孔的深度大概为螺丝长度的  $\frac{2}{3}$ 。

**指示：** 请注意，勿让小的金属物品掉入电动工具中。

**腰带夹**

使用腰带夹 可以把电动工具挂在腰带上。不但能够空出双手而且电动工具也随手可取。

**如何正确地使用蓄电池**

保护蓄电池，避免湿气和水分渗入。

蓄电池必须储存在摄氏 -20 到 50 度的环境中。夏天不可以把蓄电池搁置在汽车中。

不时地地使用柔软，清洁而且干燥的毛刷清洁蓄电池的通气孔。

充电后如果蓄电池的使用时间明显缩短，代表蓄电池已经损坏，必须更换新的蓄电池。

请注意有关作废处理的规定。

**维修和服务****维修和清洁**

- ▶ 在电动工具上进行任何维护的工作（例如维修，更换工具等等），以及搬运、保存电动工具之前都必须从机器中取出蓄电池。不小心开动了起停开关可能造成伤害。
- ▶ 电动工具和通风间隙都必须保持清洁，这样才能够提高工作品质和安全性。

**更换碳刷（参考插图 D）**

每 2 到 3 个月就得检查碳刷的长度。必要时得更换两个碳刷。

切勿只更换一个碳刷！

**指示：** 只能向博世购买针对该电动工具的碳刷。

- 使用合适的螺丝起子拧松盖子 14。
- 更换通过弹簧固定的碳刷 13 并再度拧紧盖子。

**顾客服务处和顾客咨询中心**

本公司顾客服务处负责回答有关本公司产品的修理、维护和备件的问题。以下的网页中有爆炸图和备件的资料：

[www.bosch-pt.com](http://www.bosch-pt.com)

博世顾客咨询团队非常乐意为您解答有关本公司产品及附件的问题。

询问和订购备件时，务必提供机器铭牌上标示的 10 位数物品代码。

有关保证，维修或更换零件事宜，请向合格的经销商查询。

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**搬运**

随着机器一起供货的锂离子蓄电池必须受危险物品法规范。使用者无须另外使用保护包装便可以运送该蓄电池。

但是如果将它交由第三者运送（例如：寄空运或委托运输公司）则要使用特殊的包装和标示。此时必须向危险物品专家请教有关寄送危险物品的相关事宜。

确定蓄电池的外壳未受损后，才可以寄送蓄电池。粘好未加盖的触点并包装好蓄电池，不可以让蓄电池在包装中晃动。

必要时也得注意各国有关的法规。

**处理废弃物**

必须以符合环保的方式，回收再利用损坏的电动工具、蓄电池、附件和废弃的包装材料。



不可以把电动工具和蓄电池 / 电池丢入一般的家庭垃圾中！

**只针对欧盟国家:**

无法再使用的电动工具根据欧盟第 2012/19/EU 号指令，损坏的或旧充电电池 / 蓄电池根据欧盟第 2006/66/EG 号指令必须单独收集并根据环保要求进行回收利用。

**充电电池 / 电池:****锂离子:**

请注意“搬运”段落中的指示，页 19。

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