

## INSTRUCTION MANUAL

CORDLESS POWER TOOLS FOR PROFESSIONAL

### Cordless Drill Driver

OCD-143KL 15(14.4V) / OCD-143KL 26(14.4V)

OCD-183KL 15(18V) / OCD-183KL 26(18V) / OCD-183KL 30(18V)



Li-ion Battery

This manual contains important information about product safety  
Please read and understand this manual before operating the tool

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# 1. Safety

## 1.1 Important Safety Instructions

Read this Instruction Manual before operating with power tool. For personal and optimum product performance, thoroughly understand the contents before using this power tool. Most accidents that result from power tool operation and maintenance are caused by the failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing a potentially hazardous situation before it occurs, and by observing appropriate safety procedures. Basic safety precautions are outlined in the "SAFETY" section of this Instruction Manual and in the sections which contain the operation and maintenance instructions. Hazards that must be avoided to prevent bodily injury or machine damage are identified by WARNINGS on the power tool and in this Instruction Manual.

## 1.2 Means of Warning

Before you start, familiarise yourself with the icons used in this manual.



### **WARNING**

**INDICATES A POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF IGNORED, COULD RESULT IN DEATH OR SERIOUS INJURY.**



### **CAUTION**

**INDICATES A POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY, OR MAY CAUSE DAMAGE TO YOUR TOOL OR OTHER EQUIPMENT**

### **NOTE**

**NOTES, USAGE TIPS, OR ADDITIONAL INFORMATION**

## 1.3 General power Tool Safety Warnings

**WARNING: READ ALL SAFETY WARNINGS AND 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.**

### 1) Work area safety

**a) Keep work area clean and well lit.**

Cluttered or dark areas invite accidents.

**b) Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.**

Power tools create sparks which may ignite the dust or fumes.

**c) Keep children and bystanders away while operating a power tool.**

Distractions can cause you to lose control.

### 2) Electrical safety

**a) Power tool plugs must match the outlet. Never modify the plug in any way.**

**Do not use any adapter plugs with earthed (grounded) power tools.**

Unmodified plugs and matching outlets will reduce risk of electric shock.

**b) Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators.**

There is an increased risk of electric shock if your body is earthed or grounded.

**c) Do not expose power tools to rain or wet conditions.**

Water entering a power tool will increase the risk of electric shock.

**d) Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the Power tool. Keep cord away from heat, oil, sharp edges or moving parts.**

Damaged or entangled cords increase the risk of electric shock.

### 3) Personal safety

**a) Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.**

A moment of inattention while operating power tools may result in serious personal injury.

**b) Use personal protective equipment. Always wear eye protection.**

Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.

- c) **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.**

Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.

- d) **Remove any adjusting key or wrench before turning the power tool on.**

A wrench or a key left attached to a rotating part of the power tool may result in personal injury.

- e) **Do not overreach. Keep proper footing balance at all times.**

This enables better control of the power tool in unexpected situations.

- f) **Dress properly. Do not wear loose clothing or jewellery. Keep your hair, clothing and gloves away from moving parts.**

Loose clothes, jewellery or long hair can be caught in moving parts.

- g) **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.

#### 4) Power tool use and care

- a) **Do not force the power tool. Use the correct power tool for your application.**

The correct power tool will do the job better and safer at the rate for which it was designed.

- b) **Do not use the power tool if the switch does not turn it on and off.**

Any power tool that cannot be controlled with the switch is dangerous and must be repaired.

- c) **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.

- d) **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.**

Power tools are dangerous in the hands of untrained users.

- e) **Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.**

Many accidents are caused by poorly maintained power tools.

- f) **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.**

Use of the power tool for operations different from those intended could result in a hazardous situation.

#### 4) Battery tool use and care

a) **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.

b) **Use power tools only with specifically designated battery packs.**

Use of any other battery packs may create a risk of injury and fire.

c) **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.

d) **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.

#### 5) Service

a) **Have your power tool serviced by a qualified repair person using only identical replacement parts.**

This will ensure that the safety of the power tool is maintained.

### 1.4 Important Safety Instructions for Use of the Cordless Tool

 **WARNING:**

**DEATH OR SERIOUS BODILY INJURY COULD RESULT FROM IMPROPER OR UNSAFE USE OF THE CORDLESS IMPACT DRIVER. TO AVOID THESE RISKS, FOLLOW THESE BASIC SAFETY INSTRUCTIONS**

1. Never use this driver/wrench handle for any application other than those in this manual.
2. Never place hands or other body parts near the drill bit or chuck during operation. Hold the impact driver by its handle only.
3. When working in high places, always make sure that there is no one below before starting to work.
4. Always wear eye and ear protection when you work.
5. Always install the driver bit securely. A loose bit is dangerous because it can come loose while you are working.
6. Always use the driver bit that matches the screw size.
7. Always have the screw you are screwing in and this impact driver in a straight line. Working with this impact driver at an angle to the screw can damage the screw head and will not give the prescribed tightening torque.

## 1.5 Important Safety Instructions for Use of the Battery and Battery Charger

### 1) Battery Charger



#### **WARNING:**

**DEATH OR SERIOUS BODILY INJURY COULD RESULT FROM IMPROPER OR UNSAFE USE OF BATTERY CHARGERS.  
TO AVOID THESE RISKS, FOLLOW THESE BASIC SAFETY INSTRUCTIONS**

1. This manual contains important safety and operating instructions for battery charger Model OMC-1836C and OMC-1816D
2. Before using battery charger, read all instructions and cautionary markings on
  - (1) battery charger,
  - (2) battery, and
  - (3) product using battery.
3. To reduce risk of injury, charge OSUNG rechargeable battery type Li-ion series. Other type of batteries may burst causing personal injury and damage.
4. Do not expose battery charger to rain or snow.
5. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
6. To reduce risk of damage to electric plug and cord, pull by plug when disconnecting battery charger.
7. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
8. An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used make sure:
  - a. That blades of extension cord are the same number, size, and shape as those of plug on battery charger:
  - b. That extension cord is properly wired and in good electrical condition.
  - c. That wire size is large enough for AC ampere rating of battery charger.
  - d. If the input rating of a battery charger is given in watts rather than in amperes, the corresponding ampere rating is to be determined by dividing the wattage rating by the voltage rating
9. Do not operate battery charger with damaged cord or plug-replace them immediately.

10. Do not operate battery charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
11. Do not disassemble battery charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
12. To reduce risk of electric shock, unplug charger from receptacle before attempting any maintenance or cleaning. Removing the battery will not reduce this risk.

## 2) Battery & Battery Charger



### **CAUTION:**

**CHARGE THE BATTERY WITH ONLY THE OSUNG BATTERY CHARGER.  
THE BATTERY CHARGER SHOULD NOT BE USED WITH OTHER PRODUCTS.**



### **WARNING:**

**INAPPROPRIATE USE OF THE BATTERY OR BATTERY CHARGER  
CAN LEAD TO SERIOUS INJURY.**

Understand and follow the guidelines and precautions below before using the battery and battery charger.

1. Do not open and disassemble the battery. There are no user-serviceable components or safety elements inside. Opening or modifying them will void the warranty and could cause personal harm.
2. Protect the battery and battery charger from moisture, and respect operating and storage temperature limits.
3. Do not short-circuit the battery, there is a risk of fire.
4. Do not insert any objects into the battery charger's air vents. Electric shock or damage to the battery charger may result.
5. Do not cover the battery or battery charger, subject it to prolonged periods of direct sunlight, or place it upon or next to heat-sensitive materials.
6. Do not charge when the temperature is below 0°C or above 40°C.  
Charging the battery at temperatures outside the range of 0°C – 40°C may prevent proper charging and reduce battery life.
7. Do not use a booster transformer when charging.
8. Do not use an engine generator or DC power to charge.
9. Operate charger on standard household electrical power (220 volts).  
Using the charger on any other voltage may damage the charger.
10. Wait at least 15 minutes between charges to avoid overheating the charger.
11. Disconnect the power cord from its receptacle when the charger is not in use.



### 3) Caution on Li-ion Battery

To extend the lifetime, the lithium-ion battery equips with the protection function to stop the output. When using this product, even if you are pulling the switch, the motor may stop. This is not the trouble but the result of protection function.

1. When the battery power remaining runs out, the motor stops.

In such case, charge it up immediately.

2. If the tool is overloaded, the motor may stop. In this case, release the switch of tool and eliminate causes of overloading. After that, you can use it again.

3. If the battery is overheated under work, the battery power may stop. In this case, stop using the battery and let the battery cool, After that you can use it again



#### **WARNING:**

**IN ORDER TO PREVENT ANY BATTERY LEAKAGE, HEAT GENERATION, SMOKE EMISSION, EXPLOSION AND IGNITION BEFOREHAND, PLEASE BE SURE TO HEED THE FOLLOWING PRECAUTIONS.**

1. Make sure that swarf and dust do not collect on the battery.
  - During work make sure that swarf and dust do not fall on the battery.
  - Make sure that any swarf and dust falling on the power tool during work do not collect on the battery.
  - Do not store an unused battery in a location exposed to swarf and dust.
  - Before storing a battery, remove any swarf and dust that may adhere to it and do not store it together with metal parts (screws, nails, etc.).
2. Do not pierce battery with a sharp object such as a nail, strike with a hammer, step on, throw or subject the battery to severe physical shock.
3. Do not use an apparently damaged or deformed battery.
4. Do not use the battery in reverse polarity.
5. Do not connect directly to an electrical outlets car cigarette lighter sockets.
6. Do not use the battery for a purpose other than those specified.
7. If the battery charging fails to complete even when a specified recharging time has elapsed, immediately stop further recharging.
8. Do not put or subject the battery to high temperatures or high pressure such as into a microwave oven, dryer, or high pressure container.
9. Keep away from fire immediately when leakage or foul odor are detected.
10. Do not use in a location where strong static electricity generates.
11. If there is battery leakage, foul odor, heat generated, discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the equipment or battery charger, and stop use.

**⚠ CAUTION:**

1. IF LIQUID LEAKING FROM THE BATTERY GETS INTO YOUR EYES, DO NOT RUB YOUR EYES AND WASH THEM WELL WITH FRESH CLEAN WATER SUCH AS TAP WATER AND CONTACT A DOCTOR IMMEDIATELY. IF LEFT UNTREATED, THE LIQUID MAY CAUSE EYEPROBLEMS.
2. IF LIQUID LEAKS ONTO YOUR SKIN OR CLOTHES, WASH WELL WITH CLEAN WATER SUCH AS TAP WATER IMMEDIATELY. THERE IS A POSSIBILITY THAT THIS CAN CAUSE SKIN IRRITATION.
3. IF YOU FIND RUST, FOUL ODOR, OVERHEATING, DISCOLOR, DEFORMATION, AND/OR OTHER IRREGULARITIES WHEN USING THE BATTERY FOR THE FIRST TIME, DO NOT USE AND RETURN IT TO YOUR SUPPLIER OR VENDOR.

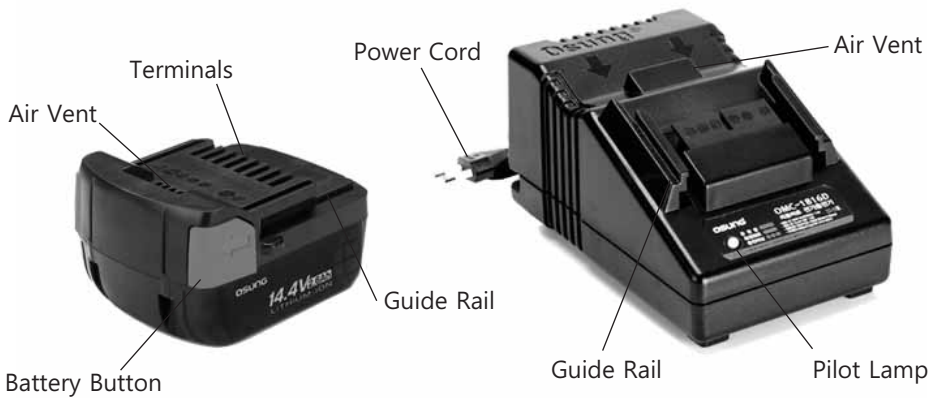
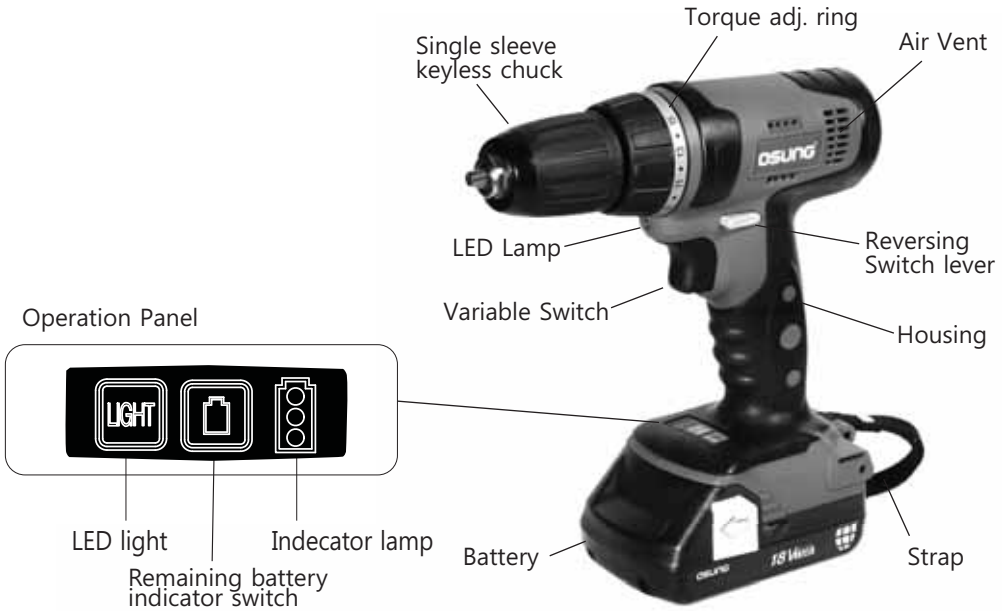
**⚠ WARNING:**

If an electrically conductive foreign object enters the terminals of the lithium ion battery, a short-circuit may occur resulting in the risk of fire. Please observe the following matters when storing the battery.

1. DO NOT PLACE ELECTRICALLY CONDUCTIVE CUTTINGS, NAILS, STEEL WIRE, COPPER WIRE OR OTHER WIRE IN THE STORAGE CASE.
2. EITHER INSTALL THE BATTERY IN THE POWER TOOL OR STORE BY SECURELY PRESSING INTO THE BATTERY COVER UNTIL THE VENTILATION HOLES ARE CONCEALED TO PREVENT SHORT-CIRCUITS.

## 2. Functional Description

### 2.1 Name of Parts



## 2.2 Specifications

### 1) Specifications of Tools

Spec. \ Type	Cordless Drill Driver(14.4V)		Cordless Drill Driver(18V)		
Model	OCD-143KL15	OCD-143KL26	OCD-183KL15	OCD-183KL26	OCD-183KL30
Rated Voltage	DC 14.4V	DC 14.4V	DC 18V	DC 18V	DC 18V
Battery Type/Ah	Li-ion 1.5Ah	Li-ion 2.6Ah	Li-ion 1.5Ah	Li-ion 2.6Ah	Li-ion 3.0Ah
No Load speed	0 ~ 950 RPM	0 ~ 950 RPM	0 ~ 1,000 RPM	0 ~ 1,000 RPM	0 ~ 1,000 RPM
Adjustable clutch	1 - 15 Stage	1 - 15 Stage	1 - 15 Stage	1 - 15 Stage	1 - 15 Stage
Max. Tightening Torque	38 N.m	38 N.m	43 N.m	43 N.m	43 N.m
Switch	Variable S/W	Variable S/W	Variable S/W	Variable S/W	Variable S/W
Chuck Capacity	0.8 - 10mm	0.8 - 10mm	0.8 - 10mm	0.8 - 10mm	0.8 - 10mm
Weight(Include Battery)	1.4 kg	1.5 kg	1.6 kg	1.6 kg	1.7 kg
LED Light	White LED	White LED	White LED	White LED	White LED
Battery remain lamp	Red LED	Red LED	Red LED	Red LED	Red LED

### 2) Specifications of Charger

Model	OMC-1816D
Input Voltage	AC 100V~240V, 50/60Hz
Available battery	14.4V / 18.0V
Charing Current	1.6 A
Charging Time	Approx. 55min. (Battery 1.5A)
Weight	0.5 kg
Using Temp.	0°C ~ 40°C
Significant	Volt-free

### 3) Specifications of Batteries

Model	Battery type	Rated Voltage	Ampere	Weight
ORB-1415LU	Lithium-ion	DC 14.4V	1.5Ah (1500mAh)	0.3kg
ORB-1420LU	Lithium-ion	DC 14.4V	2.0Ah (2000mAh)	0.3kg
ORB-1426LU	Lithium-ion	DC 14.4V	2.6Ah (2600mAh)	0.5kg
ORB-1815LU	Lithium-ion	DC 18.0V	1.5Ah (1500mAh)	0.4kg
ORB-1820LU	Lithium-ion	DC 18.0V	2.0Ah (2000mAh)	0.4kg
ORB-1826LU	Lithium-ion	DC 18.0V	2.6Ah (2600mAh)	0.6kg
ORB-1830LU	Lithium-ion	DC 18.0V	3.0Ah (3000mAh)	0.6kg
ORB-1840LU	Lithium-ion	DC 18.0V	4.0Ah (4000mAh)	0.6kg

### 3. Operating Instructions

#### 3.1 How to charge the battery

- 1) Insert the power cord of the charger in the socket(220V outlet), and charger's pilot lamp will be flickered in red, green, and yellow in turn within one second. And then, the battery charger will be in the standby position.
- 2) Firmly insert the battery in the battery charger considering the polarity, and the charging will be started immediately.
- 3) When the battery is connected to the battery charger, charging will commence and the pilot lamp will light in red.
- 4) If the pilot lamp flickers in yellow(at 0.5sec. intervals), pull out the plug from the receptacle and check if the battery is properly mounted.
- 5) When the battery is fully charged, the pilot lamp will light in green.
- 6) When the battery working time is remarkably short despite full charging, the life of the battery maybe over. Replace the battery immediately.



#### WARNING

**DO NOT CHARGE AT VOLTAGE HIGHER THAN INDICATED ON THE NAMEPLATE.**

**IF CHARGED AT VOLTAGE HIGHER THAN INDICATED ON THE NAMEPLATE, THE CHARGER WILL BURN UP.**



#### WARNING

**DO NOT USE THE ELECTRICAL CORD IF DAMAGED. HAVE IT REPAIRED IMMEDIATELY.**

Indicate pilot lamp.

Charger status	Lamp indicator	
The initial self-diagnosis	Red- Green- Yellow- Turns off	
Before charging	Lamp turns off	
While charging	Red light	
Charging completed	Green light	
Overheat standby	Yellow light	
Charging impossible	Yellow blinks(10 times)	

## 3.2 Reverse the direction of rotation

### NOTE

**TO SWITCH THE REVERSING SWITCH LEVER, STOP THE DRILL DRIVER, AND THEN SET THE REVERSING SWITCH LEVER.**

The bit rotates clockwise (viewed from the rear side) by pushing the R-side of the reversing switch lever. The L-side of the reversing switch lever is pushed to turn the bit counterclockwise. When the reversing switch lever is in the neutral position, the switch trigger cannot be pulled.



## 3.3 Installing and removing the Battery

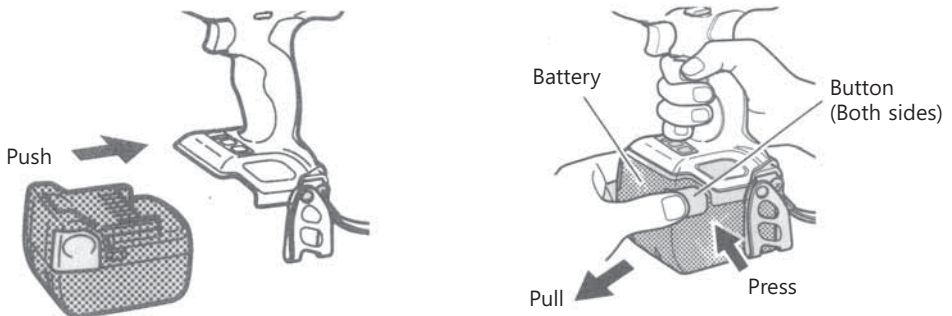
### 1) Installing

Set the reversing switch to the neutral position. (lock status)

Insert the changed battery into the slot below the handle until the battery securely latched with a click.

### 2) Removing

Button is pressed the sides of the battery, and then pull outward.



### 3.4 Switch operation and adjusting the speed

#### NOTE

**A BUZZING NOISE IS PRODUCED WHEN THE MOTOR IS ABOUT TO ROTATE; THIS IS ONLY A NOISE, NOT A MACHINE FAILURE.**

When the trigger switch is depressed, the tool rotates. When the trigger is released, the tool stops.

The rotational speed is increased by increasing pressure on the switch trigger. Speed is low when the trigger switch is pulled slightly and increases as the trigger switch is pulled more.

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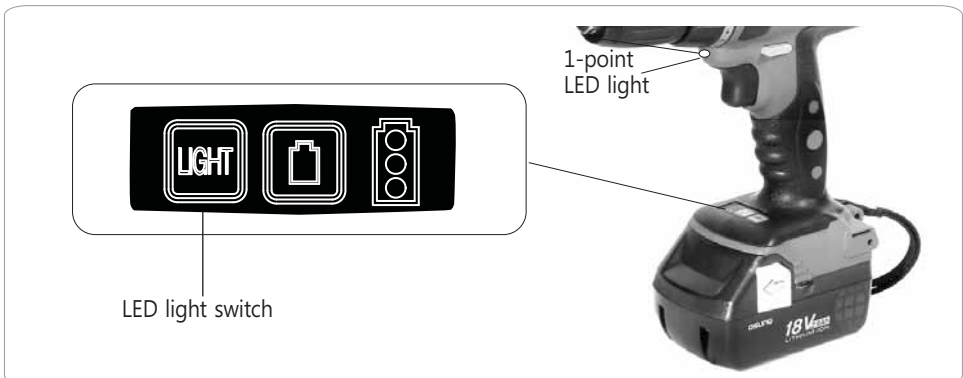
**THE MOTOR RUNS CONTINUOUSLY IN THE LOW STATUS SWITCH (LOW SPEED SWITCH TRIGGER) WILL CAUSE THE FAILURE OF THE RISE IN THE TEMPERATURE OF THE TERMINAL CIRCUIT COMPONENTS.**

### 3.5 How to use the LED light

Every time you press the light switch on the switch panel, the LED light lights or goes off. To prevent the battery power consumption, turn off the LED light frequently.

#### NOTE

**TO PREVENT THE BATTERY POWER CONSUMPTION CAUSED BY FORGETTING TO TURN OFF THE LED LIGHT, THE LIGHT GOES OFF AUTOMATICALLY IN ABOUT 5 MINUTES.**



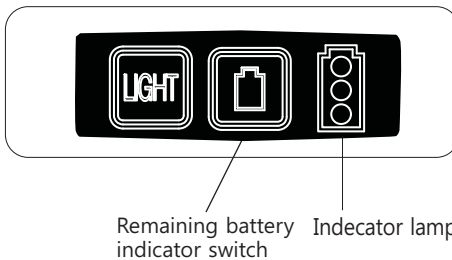
### 3.6 How to use the remaining battery indicator

When pressing the remaining battery indicator switch, the remaining battery indicator lamp lights and the battery remaining power can be checked.

When releasing your finger from the remaining battery indicator switch, the remaining battery indicator lamp goes off. Below the table shows the state of remaining battery indicator lamp and the battery remaining power.

#### NOTE

**TO SAVE THE BATTERY POWER CONSUMPTION, THE REMAINING BATTERY INDICATOR LAMP LIGHTS WHILE PRESSING THE REMAINING BATTERY INDICATOR SWITCH.**



State of lamp	Battery Remaining Power
	The battery remaining power is enough.
	The battery remaining power is a 70%.
	The battery remaining power is a 40%.
	The battery remaining power is nearly empty.
	The flashing of the bottom of the lamp is low voltage, so please recharge quickly.

As the remaining battery indicator shows somewhat differently depending on ambient temperature and battery characteristics, read it as a reference.

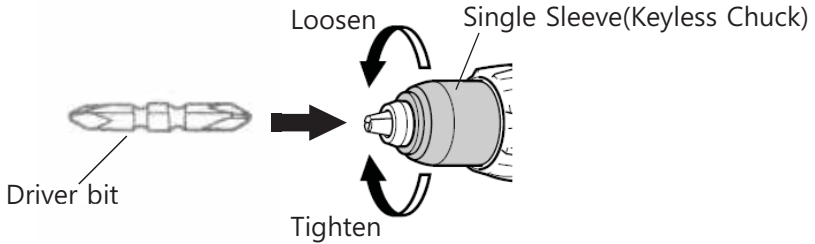


## 4. Assembly and Maintenance

### 4.1 Mounting and dismounting of the bit

#### 1) Mounting the bit.

Always follow the following procedure to install driver bit, etc.,



- (1) Loosen the sleeve by turning it toward the left (in the counterclockwise direction as viewed from the front) to open the clip on the keyless chuck.
- (2) Inserting a driver bit, etc., into the keyless drill chuck, and tighten the sleeve by turning it toward the right (in the clockwise direction as viewed from the front).

#### NOTE

**THE GEARBOX LOCKING SLEEVE, THE SLEEVE AXIS IS FIXED EASILY WITH ONE HAND BIT REPLACEMENT IS EASY.**

#### 2) Dismounting the bit

- (1) Loosen the sleeve by turning it toward the left (in the counterclockwise direction as viewed from the front), and then take out the bit etc.

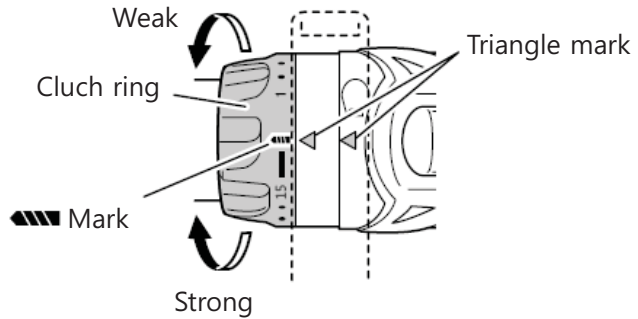
#### NOTE

**IF THE SLEEVE IS TIGHTENED IN A STATE WHERE THE CLIP OF THE KEYLESS CHUCK IS OPENED TO A MAXIMUM LIMIT, A CLICK NOISE MAY OCCUR. THIS IS THE NOISE THAT OCCURS WHEN THE LOOSENING OF THE KEYLESS CHUCK IS PREVENTED AND IS NOT A MALFUNCTION.**

## 4.2 Torque adjustment ring

### 1) Using a screwdriver

When using this unit as a screwdriver, line up the one of the numbers "1, 3, 5 ... 15" on the clutch ring, or the black dot, with the triangle mark on the outer body.



### 2) Using a drill

When using this unit as a drill, line up the clutch ring drill mark "▲" with the triangle mark on the outer body.

### 3) Tightening torque adjustment.

Tightening torque should correspond in its intensity to the screw diameter. When too strong power is used, the screw head may be broken or be injured. Be sure to adjust the clutch ring position according to the screw diameter. The tightening torque differs depending on the type of screw and the material being tightened. The unit indicates the tightening torque with the numbers "1, 3, 5 ... 15" on the clutch ring, and a dot. The tightening torque at position "1" is the weakest and the torque is strongest at the highest number.

## **⚠ CAUTION**

**THE MOTOR ROTATION MAY BE LOCKED TO CEASE WHILE THE UNIT IS USED AS DRILL. WHILE OPERATING THE DRIVER DRILL, TAKE CARE NOT TO LOCK THE MOTOR.**

**IF THE MOTOR IS LOCKED, IMMEDIATELY TURN THE POWER OFF. IF THE MOTOR IS LOCKED FOR A WHILE, THE MOTOR OR BATTERY MAY BE BURNT.**

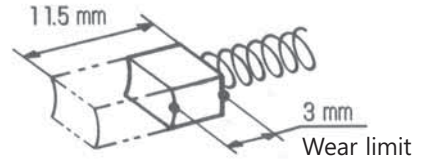
**TOO LONG HAMMERING MAY CAUSE THE SCREW BROKEN DUE TO EXCESSIVE TIGHTENING.**

**A BUZZING NOISE IS PRODUCED WHEN THE MOTOR IS ABOUT TO ROTATE; THIS IS ONLY A NOISE, NOT A MACHINE FAILURE.**

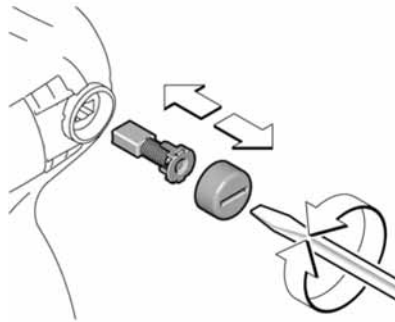
## 4.3 Inspecting and replacing the Carbon Brushes

### 1) Inspecting the carbon brushes

The motor employs carbon brushes. Since an excessively worn carbon brush can result in motor trouble, replace the carbon brush with new ones when it becomes worn to or near the "wear limit". In addition, always keep carbon brushes clean and ensure that they slide freely within the brush holders.



### 2) Replacing carbon brushes



1. Take out the carbon brush by first removing the brush cap and then hooking the protrusion of the carbon brush R with a slotted head screw driver, etc.
2. When installing the carbon brush, choose the direction so that the nail of the carbon brush agrees with the contact portion outside the brush tube.
3. Push it in with a finger and then install the brush cap.

#### **⚠ CAUTION:**

**BE ABSOLUTELY SURE TO INSERT THE NAIL OF THE CARBON BRUSH INTO THE CONTACT PORTION OUTSIDE THE BRUSH TUBE. (YOU CAN INSERT WHICHEVER ONE OF THE TWO NAILS PROVIDED.) CAUTION MUST BE EXERCISED SINCE ANY ERROR IN THIS OPERATION CAN RESULT IN THE DEFORMED NAIL OF THE CARBON BRUSH AND MAY CAUSE MOTOR TROUBLE AT AN EARLY STAGE.**