

# Dnsys X1 Hip Exoskeleton Instruction Manual

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## Disclaimer

- Dnsys reserves the right of final interpretation of this manual.
- The components of this product include: Dnsys X1 host, battery, charging dock, charging adapter, auxiliary strap.
- Dnsys is only responsible for the safety, reliability, and performance of the product if it is used in accordance with the requirements of this manual.
- Please read this manual carefully before using the product. Motion Thinking Innovation is not liable for any form of loss or injury caused by not operating the product according to this manual.

## FCC Caution:

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
- If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- -- Reorient or relocate the receiving antenna.
- -- Increase the separation between the equipment and receiver.
- -- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- -- Consult the dealer or an experienced radio/TV technician for help.
- The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

## Repair Service

- The standard warranty period for this product is 2 years.
- Consumables: mainly include straps and batteries; these are disposable materials that need to be replaced after each use or regularly replaced due to wear and tear. Consumables are not covered under warranty.

The warranty period starts from the shipping date indicated on the invoice. During the warranty period, the product is eligible for free after-sales service. However, please note that even within the warranty period, if the product requires repair for any of the following reasons, Motion Thinking Innovation will provide paid repair services, and you will need to pay for repair and parts fees:

1. Human-induced damage;
2. Improper use;
3. Grid voltage exceeding the specified range of the product;
4. Force majeure natural disasters;
5. Unauthorized disassembly or repair of the product without permission from Motion Thinking Innovation;
6. Replacement or use of parts, accessories, or consumables not approved by Motion Thinking Innovation or repairs conducted by personnel not authorized by Motion Thinking Innovation;
7. Other faults not caused by the product itself.

- After the warranty period has expired, Motion Thinking Innovation may continue to provide paid repair services. If you do not pay or delay payment for the paid repair service, Motion Thinking Innovation will temporarily suspend the repair service until payment is made.

## Product Lifespan and Disposal:

- The product's designed lifespan is 2 years. After this period, please dispose of the product according to the electronic waste disposal regulations of your region/country.

- The product's battery pack is a consumable item. If you notice a significant decrease in usage time after a full charge, you should replace the battery. Please dispose of the old battery according to the electronic waste disposal regulations of your region/country.

## Preface

Thank you for purchasing the Dnsys X1 exoskeleton.

Before using the product, please carefully read the contents of this user manual to ensure proper use of the product.

After reading, please keep this manual in a safe place for future reference when needed.

**Warning:** This product is not to be used by individuals who meet the contraindications described herein.

**Warning:** Users must read this manual and follow the instructions before using the product.

This manual may be updated due to changes in software, product design, or technical specifications without prior notice. Please refer to the latest product features, configurations, and actual products.

This user manual is for the rehabilitation training device. It mainly aims to help users understand the product's principles, structure, operation, daily maintenance, and troubleshooting. Please follow the instructions in this manual for operation. If you need an electronic version of the manual, please contact after-sales support!

## Audience

The intended audience of this user manual includes users of the Dnsys X1 exoskeleton, as well as:

1. Individuals performing daily operations of the product;
2. Individuals performing product maintenance and troubleshooting;
3. Individuals learning to operate the product.

## Chapter 1: Safety

### 1.1 Symbol Definitions

In this manual, the terms "Danger," "Warning," "Caution," and "Notice" are used to indicate precautions, prohibitions, and other warnings related to the use of the product. Their specific meanings are as follows. Before reading this manual, please carefully understand and remember these terms.

Symbol/Term	Meaning
Danger	Indicates an immediate danger that, if not avoided, may result in death or serious injury.
Warning	Indicates a potential or indirect danger that, if not avoided, may result in death or serious injury.

Caution	Indicates a danger that, if not avoided, may result in minor or moderate injury and may cause property damage.
Notice	Provides tips on how to correctly use the machine.

## 1.2 Safety Symbols

The product uses the following safety symbols. Their meanings are as follows:

Symbol	Description	Symbol	Description
	Power On	○	Power Off
	Production Date		Manufacturer
---	Direct Current	~	Alternating Current
	Environmental Use Period		Waste from electrical and electronic equipment should not be disposed of as unsorted municipal waste but should be collected separately for proper treatment
	Serial Number		Upward
	Fragile		Keep Dry
	Stacking Limit		Do Not Roll
	Temperature Limit		<b>Humidity Limit</b>
	Atmospheric Pressure Limit		Recyclable Material
	Follow Operation Manual		General Prohibition Symbol
	General Warning Symbol		Ordinary Command Symbol

## 1.3 安全注意事项

为保证使用者和操作人员的安全，在使用本系统时请严格遵守下列安全注意事项。

### 1.3 Safety Precautions

To ensure the safety of users and operators, please strictly adhere to the following safety precautions when using this system.

Type	Safety Precautions
Danger	<ol style="list-style-type: none"><li>1. Do not use the product in an environment where flammable gases (such as anesthetics) or flammable liquids are present, as there is a risk of explosion.</li><li>2. Do not use the product in an oxygen-enriched environment, as there is a risk of fire or explosion.</li></ol>
Warning	<ol style="list-style-type: none"><li>1. When using the product for the first time, carefully read the manual and complete the beginner tutorial under the guidance of the app.</li><li>2. Do not clean or maintain the product during use. Always disconnect the battery before cleaning.</li><li>3. Do not open the product's casing or panels. Any repairs or upgrades must be performed by service personnel trained and authorized by Motion Thinking Innovation.</li><li>4. Do not attempt to disassemble or replace any parts if you are a user or non-professional; maintenance should be performed by professional technicians.</li><li>5. Do not use parts or accessories not approved by Motion Thinking Innovation; do not modify the product.</li><li>6. Do not attempt to change the system software or update the product with software not provided by the company.</li><li>7. Do not unfasten the thigh or waist straps while the product is operating.</li><li>8. Do not connect any devices other than those included with the product (consider the charger in this context).</li><li>9. Disconnect the battery if the product will not be used for an extended period.</li><li>10. Use only the original battery provided with the product.</li><li>11. The charger plug should not be inserted into a difficult-to-reach location.</li><li>12. If the motor fails to provide assistance when needed or makes unusual noises, immediately turn off the product, disconnect the battery, and contact the company's sales office, user service department, or authorized agent.</li></ol>
Caution	<ol style="list-style-type: none"><li>1. During installation, operation, and maintenance, professionals must use testing equipment.</li><li>2. Improper power loss during operation may cause system failure.</li><li>3. Pay attention to the product's requirements for power</li></ol>

Type	Safety Precautions
	frequency, voltage, allowable current values, and interface standards.

## 1.4 Usage Precautions

- To ensure the long-term use of the product, please observe the following usage precautions:
  1. Carefully read the manual before using the product for the first time.
  2. Before using the product, note the following:
    1. Before starting the product, ensure it is worn correctly, and the waist and leg straps are securely fastened. Do not start the product if the straps are not properly fastened.
    2. Check for any looseness at the product's connection points, including all rotating joints and hinge connections. If any issues are found, promptly contact a professional for repairs.
    3. Do not use the product in locations where chemicals are stored or in places with flammable or explosive gases or harmful gases.
  3. During product use, observe the following:
    1. Monitor the product for unusual noises from the motor or battery swelling. If any anomalies occur, disconnect the product from the battery and contact a professional for repair.
    2. Heat generation during use is normal, and excessive temperature can trigger the product's internal protection mechanism, causing it to stop operating. If you experience unacceptable high temperatures, stop the product immediately. If components continue to overheat after shutdown, contact a professional for maintenance.
    3. Do not unfasten the straps during operation. Before unfastening the straps, stop the product using the button or app, or turn off the product.
  4. After using the product, observe the following:
    1. First, turn off the product and disconnect the power, then unfasten the straps.
    2. When unfastening the straps, start with the leg straps and then unfasten the waist straps to avoid damaging the product.

3. Store the product in a place protected from atmospheric pressure, temperature, humidity, ventilation conditions, sunlight, dust, and harmful air containing salts or sulfur.
4. Do not store the product in areas with chemicals or in places with flammable or explosive gases or harmful gases.
5. Use a soft, damp cloth to clean the product's surface. You can use regular cleaning agents (excluding organic solvents) but avoid abrasive or corrosive cleaners and disinfectants.
6. Do not attempt unauthorized repairs; follow the instructions for proper handling, and have repairs conducted by the company's approved professionals.
7. Maintenance:
  1. Regularly inspect the product and its components.
  2. Before reusing a product that has been out of service, inspect it to ensure that moving joints and mechanical parts are functioning properly and that there are no visible cracks or breaks.
  8. Follow the instructions in this manual and the app for correct product operation.

## Chapter 2: Product Overview

### 2.1 Product Description

- Product Name: Dnsys X1 Exoskeleton
- Model: Dnsys X1
- Components: Main unit, battery, auxiliary strap connection cables, battery charger
- Operating Principle: The product provides walking assistance to the wearer through hip joint motors.

### 2.2 Basic Product Performance:

The product cannot provide hip joint assistance that conflicts with the commands issued through the user interface.

### 2.3 Usage Contraindications

- Do not use the product for individuals who cannot stand independently.

- Do not use the product for individuals who cannot control their balance independently.
- Do not use the product for individuals who cannot walk independently.
- Individuals with skeletal injuries (e.g., unstable fractures, severe osteoporosis, spinal instability, lower limb amputations).
- Individuals with severe cognitive or visual impairments.
- Individuals with severe heart conditions or high blood pressure.
- Individuals who are uncooperative or exhibit aggressive behavior.
- Individuals with mental health conditions or psychological disorders.
- Patients requiring long-term infusion or prescribed bed rest by a doctor.
- Pregnant women, children, or individuals in a weakened physical state.
- Any other patients deemed unsuitable for standing or walking by a doctor or medical institution.

## 2.4 Product Specifications

### 2.4.1 Overall Specifications

- Power Supply: Lithium battery DC 14.4V, 2.5Ah
- Charging: USB Type-C QC/PD
- Dust and Water Resistance: IP54

### 2.4.2 Environmental Specifications

Operating Environment:

- Temperature: 5°C ~ 40°C
- Relative Humidity: ≤70%
- Atmospheric Pressure: 80kPa ~ 106kPa

Storage/Transportation Environment:

- Temperature: -40°C ~ 55°C
- Relative Humidity: ≤93%
- Atmospheric Pressure: 80kPa ~ 106kPa

### 2.4.3 Charging Power Requirements

- The product's battery should be charged using the supplied charger.

- The charger is powered through an external USB Type-C interface, supports USB Type-C charging protocol negotiation, and supports PD/QC and other charging protocols. It is recommended to use a USB Type-C power adapter that supports PD/QC charging protocols with a power output of at least 15W.

#### *2.4.4 Product Configuration List*

- Dnsys X1 Main Unit: 1 unit
- Battery: 1–2 pieces (number of batteries depends on the purchase)
- Battery Charger: 1 unit
- Auxiliary Straps: Several
- Battery Cable: 1 piece
- Product Manual: 1 copy

## 第三章 产品操作说明

### Chapter 3: Product Operation Instructions

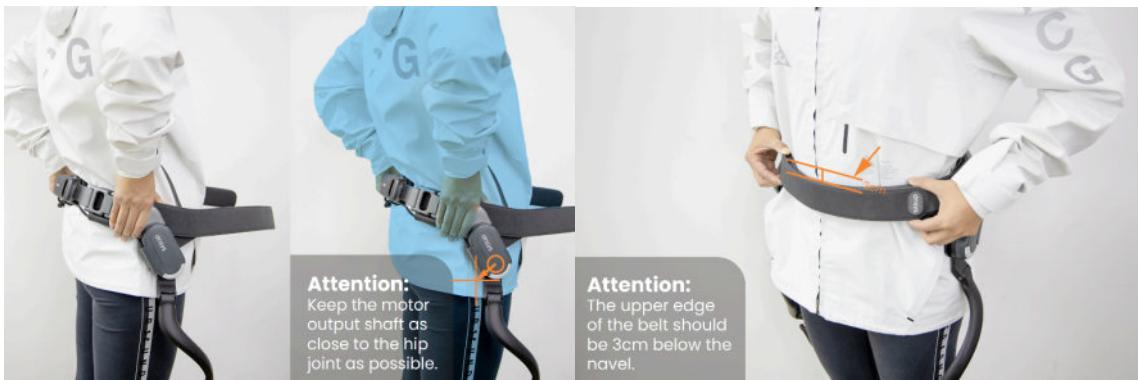
#### 3.1 Basic Operations

##### 3.1.1 Wearing the Product

1- Pick up the product. 2- Adjust the telescoping carbon plates.



3- Wrap the waist belt around your waist. 4- Tighten the waist strap and secure it with the Velcro.



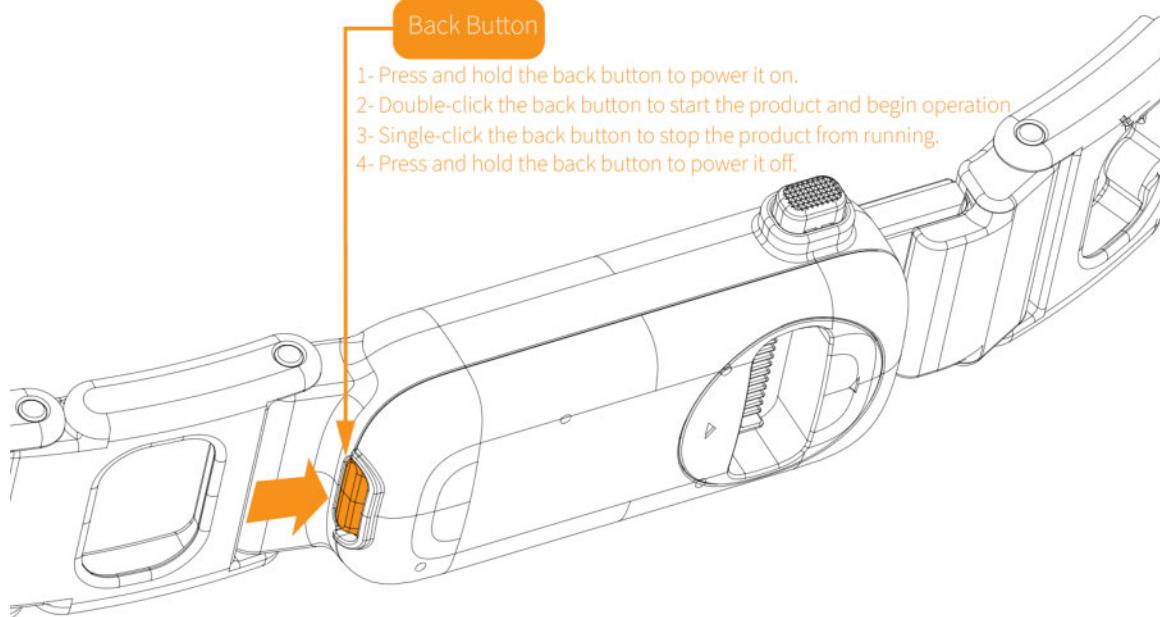
5- Adjust the Velcro to modify the length of the leg straps. 6- Hook the rope loop.



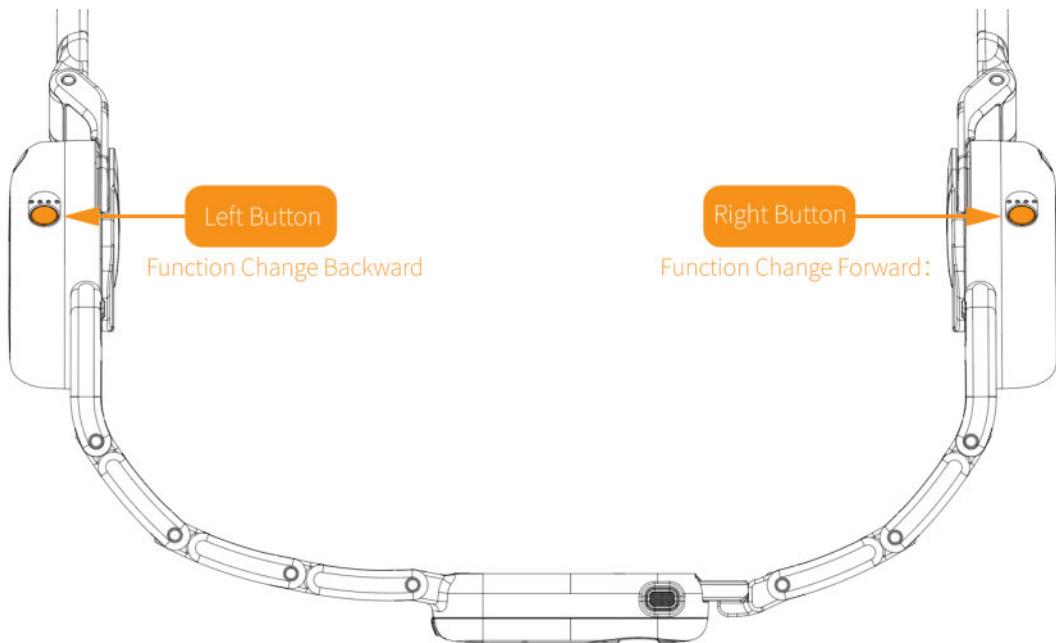
7- Tighten the thigh strap. 8- Connecting the Battery.

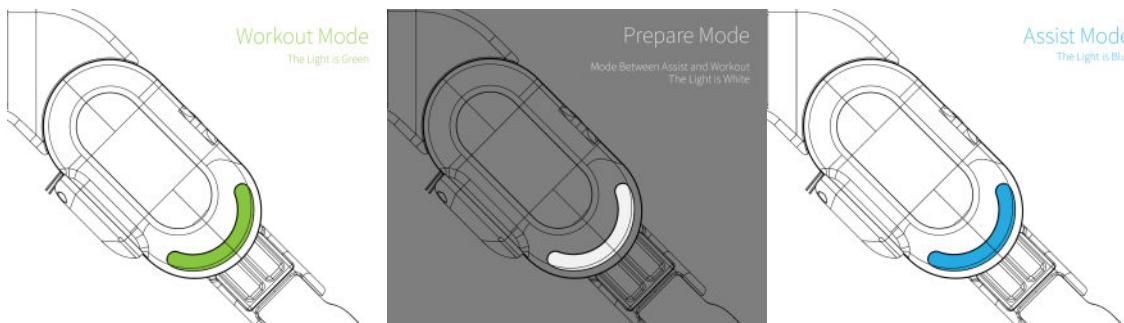


### 3.1.3 Powering On/Off, Starting, and Stopping



### 3.1.4 Parameter Adjustment and Interaction Indicators





### 3.1.5 Removing the Product

- To avoid dropping the product, first unfasten the thigh straps, then unfasten the waist strap.

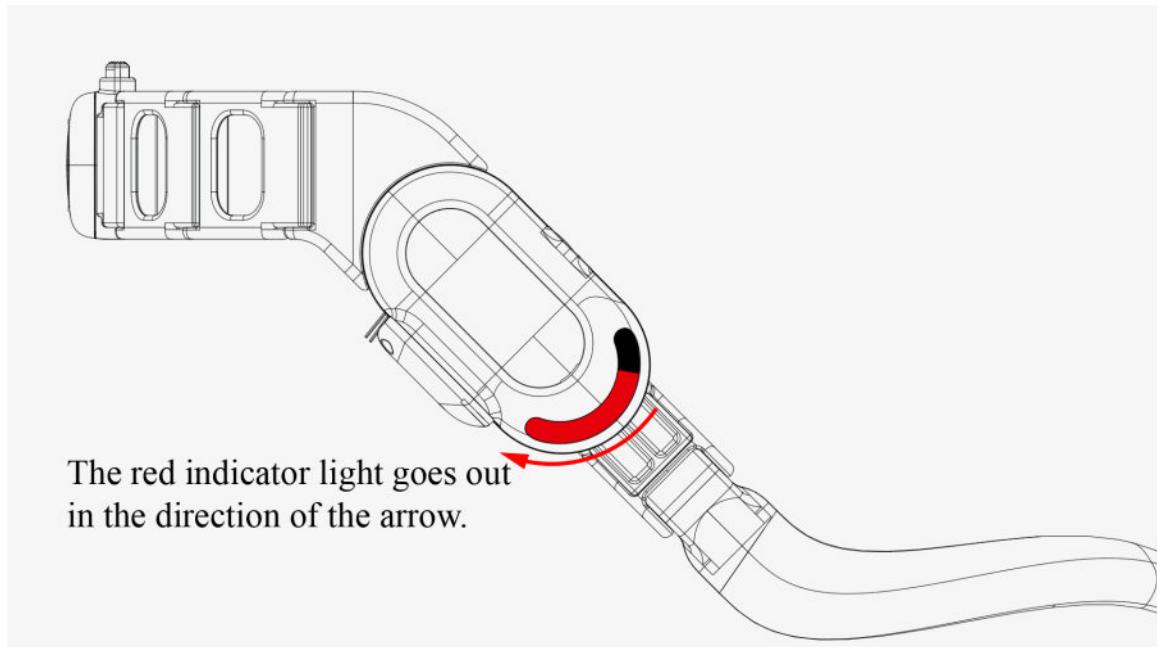
### 3.1.6 Handling and Transferring

- After removing the product, you can carry it yourself. It is recommended to disconnect the battery when not wearing the product.

### 3.1.7 Battery Use

#### 3.1.7.1 Battery Charging

- The battery level is indicated by the product's LED lights and the app. If the battery is too low, the product will automatically shut down after displaying a warning light effect. At this point, insert the battery into the charger and use a power adapter that supports the USB Type-C charging protocol to charge the battery.



- During charging, the indicator lights on the charger will show the current battery level and whether it is fully charged.

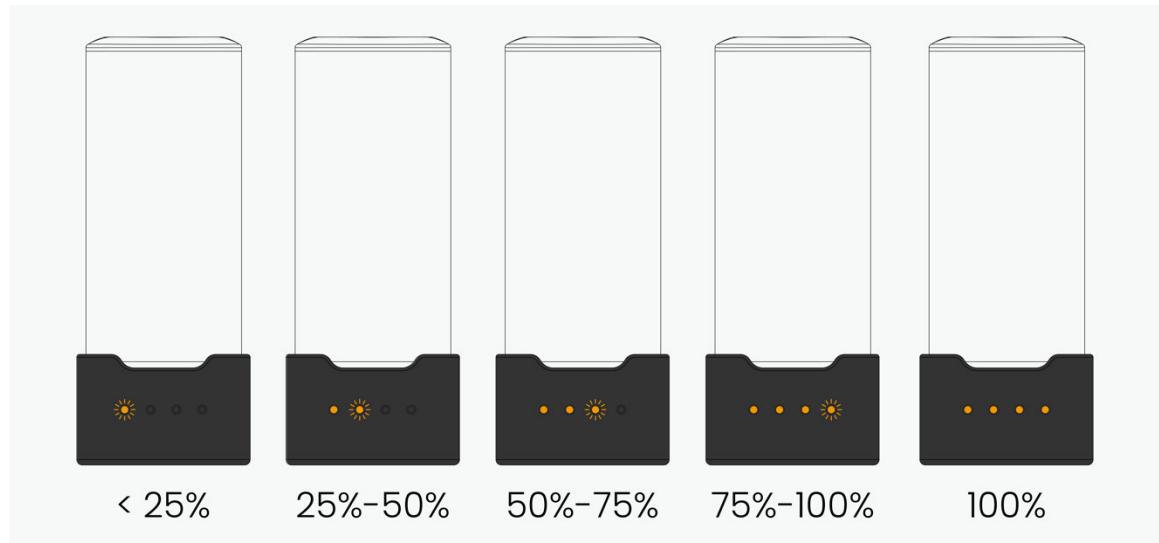
- Once the battery is fully charged, remove it from the charger and store it according to maintenance guidelines.

### 3.1.7.2 Battery Discharge

- The battery powers the product via the supplied battery cable.
- When not connected to the product and placed on the charger, the battery can supply power through the Type-C port of the charger to external devices like phones or tablets. The charger supports Type-C charging protocols (PD, QC, etc.) and negotiates with the external device.

### 3.1.7.3 Battery Level Indication

- The battery's charge/discharge status is shown through the indicator lights on the charger. The meanings of the indicator lights are as follows:



Normal Charging				
电量	D1	D2	D3	D4
100%	On	On	On	On
75%~100%	On	On	On	Flashing @0.5Hz
50%~75%	On	On	Flashing @0.5Hz	Off
25%~50%	On	Flashing @0.5Hz	Off	Off
0%~25%	Flashing @0.5Hz	Off	Off	Off
Normal Discharging				
75%~100%	On	On	On	On
50%~75%	On	On	On	Off
25%~50%	On	On	Off	Off
0%~25%	On	Off	Off	Off
0%	Flashing 4 Times	Off	Off	Off
Abnormal Operating Status				
/	Flashing	Flashing	Flashing	Flashing

## Chapter 4: Maintenance and Transportation

To ensure the continued safe use of the product, users should perform regular maintenance.

**Caution:** Failure to conduct regular inspections and maintenance may lead to undetected deterioration in working conditions, which could result in product malfunction, severe personal injury, or product damage. There are two levels of maintenance: user-performed and professional maintenance.

### 4.1 User Daily Product Maintenance

- Store the product in a place out of reach of children.
- Do not throw, stomp on, or apply heavy pressure to the product.
- Avoid storing or keeping the product in direct sunlight, high temperatures, high humidity, salt mist, dusty environments, or areas with corrosive gases.
- During daily use, clean the product surface with a soft cloth or towel dampened with clean water or a 70%-80% (by volume) ethanol solution. After cleaning, allow the product to air dry or wipe it with a dry cloth. Disconnect the battery while cleaning.
- Before using the product daily, visually inspect it for any fractures, surface cracks, or loose parts, and check if rotating mechanisms like hinges and joints are functioning properly.

**Warning:** Disconnect the battery while cleaning the product.

**Warning:** Do not soak or wipe the battery terminals with a wet cloth.

**Warning:** Do not disassemble or modify any parts of the product during routine cleaning and maintenance, as this may cause serious personal injury and/or damage to the product.

### 4.2 Professional Maintenance

Only maintenance personnel trained and authorized by the manufacturer are allowed to repair the product.

During repairs, if a fuse is found to be blown, it can be removed and replaced with a new one using a soldering iron. If the fuse blows again after replacement or if the malfunction is caused by other issues, replacing internal components is not permitted.

The company can provide circuit diagrams, component lists, annotations, calibration procedures, or other materials to assist maintenance personnel in repairing manufacturer-approved parts.

### 4.3 Safe Use of Rechargeable Batteries

- Do not short-circuit the battery terminals with any conductive material, as this may permanently damage the battery.
- Do not open the battery casing yourself, as this may cause fire or explosion.
- Use only the manufacturer-provided charging equipment for charging the battery.

- Do not exceed the specified current limits for charging/discharging.
- Do not burn the battery or dispose of it in fire or water.
- Avoid exposing the battery to adverse environmental conditions such as extreme temperatures, deep charge/discharge cycles, and over-discharge, as these can reduce battery life.
- Store the battery in a cool, dry place.
- If the battery is not used for an extended period (over 6 months), perform a full discharge before recharging.
- If the battery swells or overheats when not connected to external devices, stop using it immediately. Place the battery away from flammable materials and contact after-sales service for proper disposal.

#### **4.4 Storage Conditions**

Store the packaged product in an indoor environment with temperatures between -40°C and 55°C, relative humidity not exceeding 93%, atmospheric pressure between 80 kPa and 106 kPa, free from corrosive gases, and well-ventilated. Avoid direct sunlight.

#### **4.5 Transportation Requirements**

After packaging, the product can be transported using common means (cars, trains, ships, airplanes, etc.) as specified in the contract. Avoid simultaneous shipment with corrosive substances, handle with care to prevent damage, and protect from rain and mechanical impact. Transportation conditions should be temperatures between -40°C and 55°C, relative humidity not exceeding 93%, and atmospheric pressure between 80 kPa and 106 kPa.