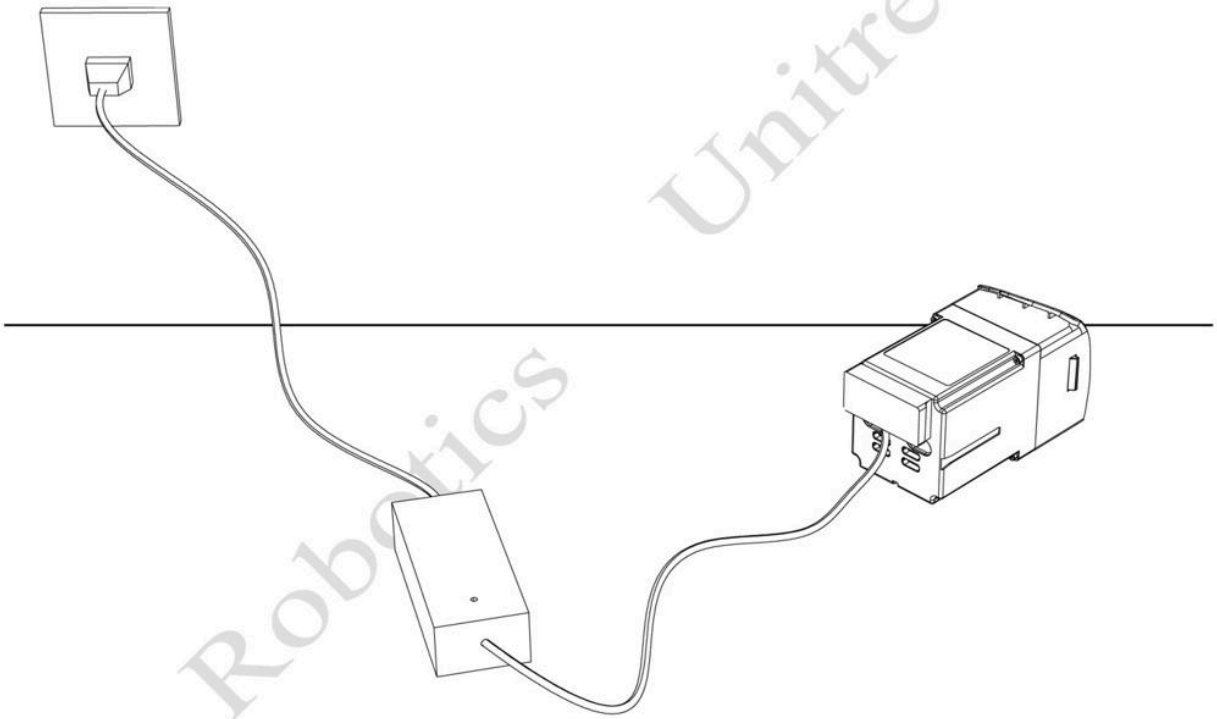
R1 Battery and Charger

User Manual V1.1



Unitree

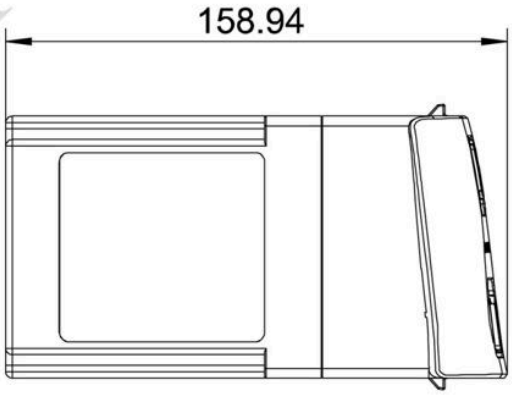
This product is a civilian robot. We kindly request that all users refrain from making any dangerous modifications or using the robot in a hazardous manner.

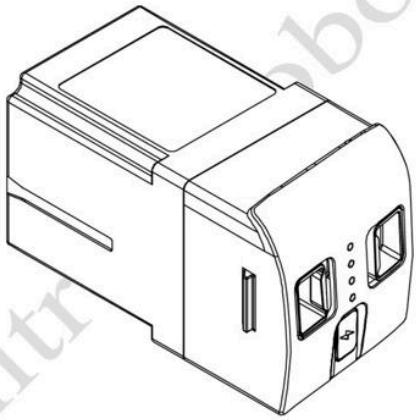
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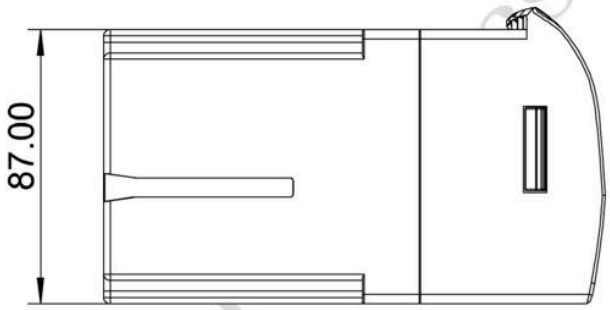
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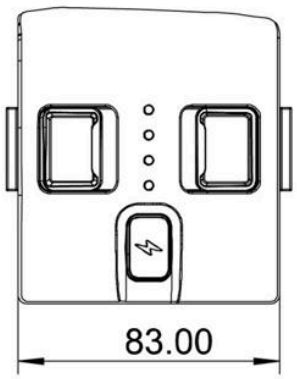
1.Introduction

The BT2-72 battery is a specially designed battery for the R1 robot, with a capacity of 6000mAh, a nominal voltage of 35.1V, and integrated charge and discharge management functions. This battery utilizes high-performance cells and employs the advanced Battery Management System (BMS) independently developed by Unitree Technology to deliver robust power for the R1 humanoid robot. The battery must be charged using the dedicated charger officially provided by Unitree.







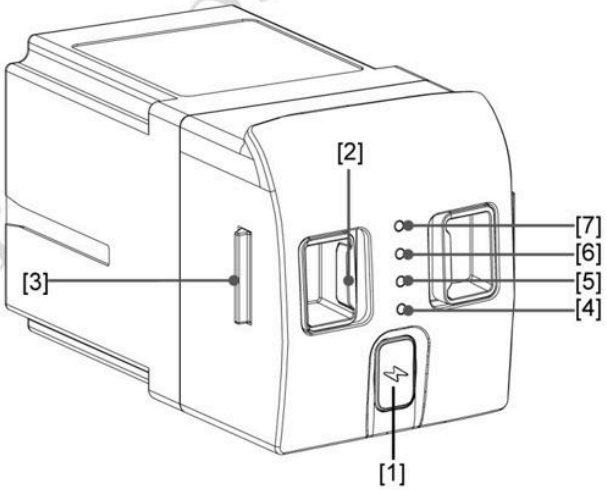


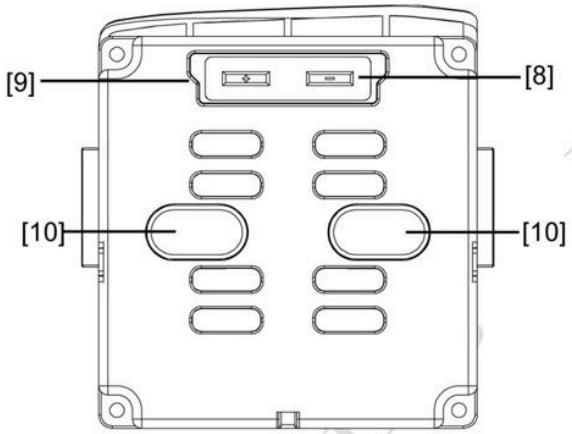
The battery charger is a charging device specifically configured for the R1 battery. It is compact, lightweight, and portable, providing a stable power supply for the battery.

⚠ Before using the battery for the first time, make sure that the battery are fully charged before using at the first time!

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2. Parts Name





1) Power On/Off Button
2) Buckle
3) Latch
4) LED 1
5) LED 2
6) LED 3
7) LED 4
8) Charging and Discharging Port
9) Fool-Proof Notch/Key
10) Ejection Port

3.Technical Specification

Battery		
Parameters	**Specifications**	**Remarks**
Size	158.94mm*83mm*87mm	
Rated Voltage	DC 35.1V	
Limited Charge Voltage	DC 37.8V	
Charge Current	3.0A	
Rated Capacity	6000mAh，194.4Wh	
Execution Standard	IS 16046(Part 2)/IEC 62133-2	

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● The rated capacity of the battery pack is calibrated based on the nominal capacity of the battery cells. To ensure the optimal performance release of the entire machine while meeting the management requirements for long-term storage and extended service life of the battery pack, the Battery Management System (BMS) will reserve a portion of the energy. Furthermore, considering factors such as ambient temperature and actual discharge conditions, a deviation of 5% to 10% between the actual usable capacity and the rated capacity is considered normal.

Charger		
Parameters	**Specifications**	**Remarks**
Size	150mm*58mm*36mm	
Input	100-240V~50/60Hz 1.5A 150VA	
Output	38V，3A，114.0W	
Charging duration	About 1.5h	

4.Battery Function

1) **Power Display:** The battery is equipped with a power indicator light, which can display the current battery level.

2) **Balanced Charging Protection:** Automatically balances the voltage of individual cells inside the battery to protect it.

3) **Over-charge Protection:** Over-charging can severely damage the battery. Charging will automatically stop once the battery is fully charged.

4) **Charging Temperature Protection:** Charging at temperatures below 0°C or above 50°C can damage the battery. The battery will trigger a charging abnormality at these temperatures.

5) **Charge Current Protection:** High-current charging can severely damage the battery. If the charging current exceeds 12A, the battery will trigger an over-current charging abnormality.

6) **Over-discharge Protection:** Over-discharging can severely damage the battery. When the battery discharges to 25.2V, it will cut off the output.

7) **Short Circuit Protection:** If a short circuit is detected, the battery will cut off the output to protect itself.

8) **Battery Load Detection Protection:** The battery cannot be turned on unless it is inserted into the robot. If an activated battery is unplugged from the robot, it will automatically power off.

9) **Abnormality Display:** The battery's LED lights can display information related to its self-protection triggered by abnormalities.

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5.Battery Indicator

When the battery is off, briefly press the battery switch (Key) once to view the current power level.

Be used to display the battery power during the charging and discharging process of the battery. The indicator is defined as follows.

White Breathing | White/Red Alternating Breathing

Green Breathing | Green Solid On | Green Blinking | Red /Green Alternating Breathing

Red Breathing | Red Solid On | Red Blinking | Green/Red Blinking | LED light is off

When powered off and not inserted into the robot, check the power level / LED status.

LED1	LED2	LED3	LED4	Current Battery
○	○	○	○	75%~100%
○	○	○	◌	50%~74%
○	○	◌	◌	25%~49%
○	◌	◌	◌	6%~24%
○○	◌	◌	◌	0%~5%

When powered off and inserted into the robot, check the power level / LED status.

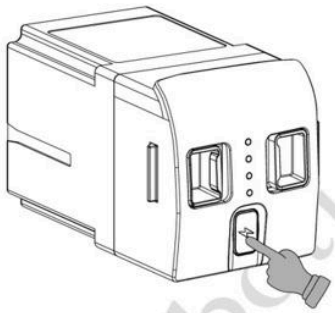
LED1	LED2	LED3	LED4	Current Battery
○	○	○	○	75%~100%
○	○	○	◌	50%~74%
○	○	◌	◌	25%~29%
○	◌	◌	◌	6%~24%
○○	◌	◌	◌	0%~5%

When powered on and discharging, the LED light status.

LED1	LED2	LED3	LED4	Current Battery
●	●	●	●	88%~100%
●	●	●	✺	75%~87%
●	●	●	◌	62%~74%
●	●	✺	◌	50%~61%
●	●	◌	◌	38%~49%
●	✺	◌	◌	25%~37%
●	◌	◌	◌	13%~24%
✺	◌	◌	◌	5%~12%
✺	◌	◌	◌	0%~4%

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6.Battery Turn on/ Turnoff



Turn On The Battery: When the battery is off, first briefly press the battery switch (button) once, then press and hold the battery switch for more than 3 seconds to turn on the battery. When the battery is on, the indicator light glows green to display the current battery level.

Turn Off The Battery: When the battery is on, first briefly press the battery switch (button) once, then press and hold the battery switch for more than 3 seconds to turn off the battery. After the battery is turned off, all indicator lights will go out.

7.Battery Charging

1) Connect the charger to an AC power source (100-240V, 50/60Hz). It must be ensured that the external power supply voltage matches the rated input voltage of the charger before connecting. Otherwise, the charger will be damaged (the rated input voltage of the charger is marked on the nameplate of the charger).

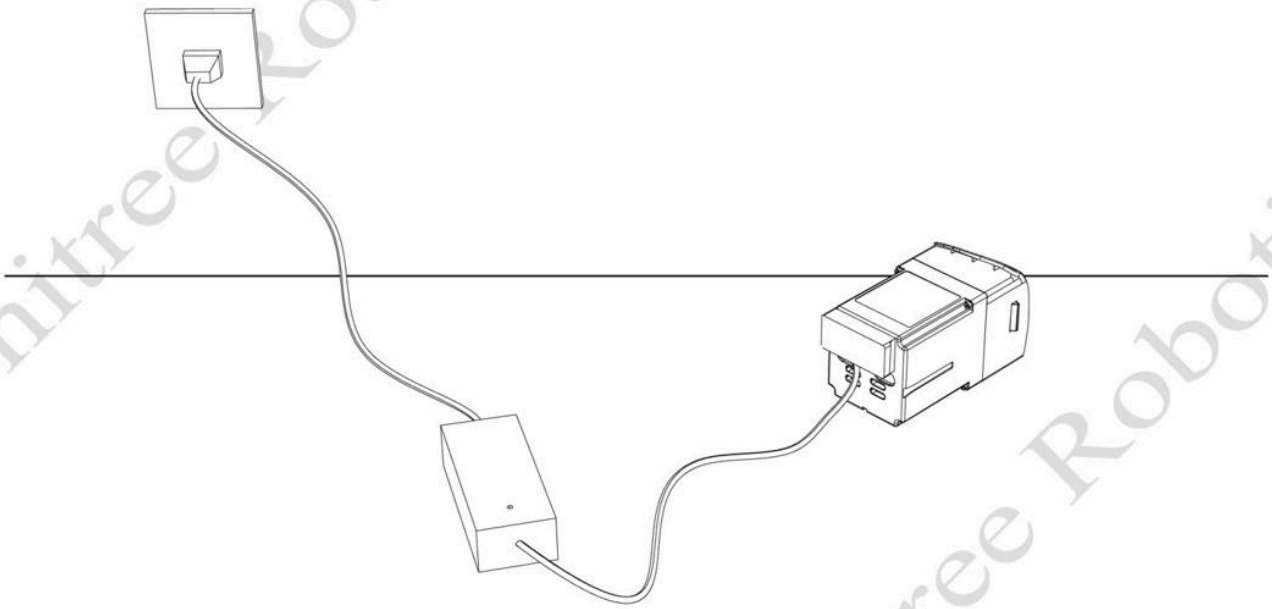
2) Before charging the battery, ensure that the battery is switched off. Otherwise, the battery and charger may be damaged.

3) The users need to remove the battery from the robot itself when charging the battery.

4) When all the indicator lights are off, it indicates that the battery is fully charged. Please remove the battery and charger to complete charging. You can also check the current charging status through the charger indicator.

5) The temperature of the battery may be high after running, and the battery must be charged after the temperature of the battery has dropped to room temperature.

6) Charging connection diagram:

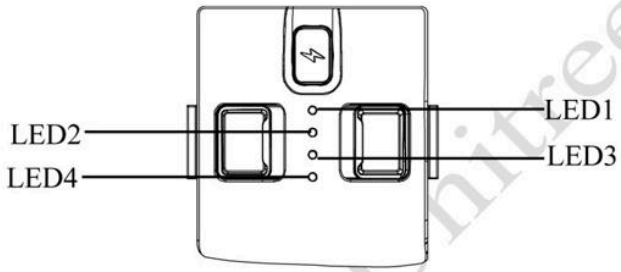


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Charging battery indicator: The battery LED light shows the current battery while charging.

Charging Indicator Light				
LED1	**LED2**	**LED3**	**LED4**	**Current Battery**
☼	○	○	○	0%~24%
●	☼	○	○	25%~49%
●	●	☼	○	50%~74%
●	●	●	☼	75%~99%
○	○	○	○	Full-Charged

Charging protection indication: The battery LED light can display battery protection information triggered by abnormal charging.



Protection Iindicator Light					
LED1	**LED2**	**LED3**	**LED4**	**Display**	**Protection Items**
☼	○	○	○	Blinking	Battery Damaged
●	○	○	○	Solid On	Battery Damaged
○	☼	○	○	Blinking	Low Temperature Alarm
○	●	○	○	Solid On	High Temperature Alarm
○	○	☼	○	Blinking	Over-voltage Alarm
○	○	●	○	Solid On	Under-voltage Alarm
○	○	○	☼	Blinking	Discharge Over-current
○	○	○	●	Solid On	Charge Over-current
☼	☼	☼	☼	Breathing	Battery Short Circuit
☼	☼	☼	☼	Blinking	Battery Short Circuit
☼	●	●	☼	1,4 Blinking 2,3 Solid On	Communication Cable Damaged, Battery and Machine Need to be Returned to Factory for Repair

If LED 3 indicates an error during charging, it means the charger is faulty. Please replace the charger and try again. For discharge faults, please refer to the table above. If a malfunction occurs (such as over-current,

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short circuit, over-voltage or under-voltage, excessively high or low temperature), first confirm the specific cause of the abnormality. The battery can only be used again after the issue is resolved.

- After the battery firmware update is complete, the battery power will be displayed, and the battery will automatically turn off.
- For safety reasons, the battery must be kept at a low power level during transportation. Therefore, it is necessary to discharge the battery by inserting it into the robot and operating it until the power level is low (such as around 65%).

8..Battery Safe Operation Guide

Improper use, charging or storage of batterys may result in fire or property and personal injury. Be sure to use the battery in accordance with the safety instructions below.

Recommended use

1) Make sure the battery has enough battery before each use.

2) When using, moving or charging, please be careful with the battery and charging plug to avoid being damaged by external force.

3) When the power of the battery is lower than 40%, stop using the robot as soon as possible, replace the battery with a new one or charge the battery.

4) It is normal for a battery that has just been used or charged to generate heat.

5) It is forbidden to contact the battery with any liquid. Do not immerse the battery in the liquid or wet it. Short circuit and decomposition reactions may occur when the inside of the battery meets water, which may lead to spontaneous combustion of the battery or even explosion.

6) It is forbidden to use batterys not officially provided by Unitree Robotics. If the users need to replace it, please go to the official website of Unitree Robotics for relevant purchase information. Unitree Robotics is not responsible for battery accidents, operation failures and machine damage caused using batterys not officially provided by Unitree Robotics.

7) It is forbidden to use batterys with damaged packages and shells.

8) Before installing or unplugging the battery from the robot, please keep the power of the battery off. Do not plug and unplug the battery when the power supply of the battery is turned on, otherwise the power supply or the robot may be damaged.

9) The battery should be used within an ambient temperature range of -20°C to 70°C. If the temperature is too high (above 75°C), it may cause the battery to catch fire or even explode. If the temperature is too low (below -20°C), the battery lifespan will be severely compromised.

10) It is forbidden to use the battery in strong magnetic field or electrostatic environment. Otherwise, the batterys protection board will fail, resulting in the failure of the batterys and the robot.

11) It is forbidden to disassemble or puncture the battery in any way.

12) If the battery is seriously impacted by external forces, it cannot be used again until it is delivered to Unitree Technology for official inspection.

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13) If the battery is on fire, use solid fire extinguishers. It is recommended to use fire extinguishers in the following order: sand, fire blanket, dry powder, and carbon dioxide extinguishers.

14) Do not place the battery in the pressure cooker or microwave oven.

15) Do not place the battery on the conductor plane.

16) Do not use any conductive material (such as wire or other metal objects) to short the positive and negative terminals of the battery.

17) Do not hit the battery. Do not place heavy objects on the battery or charger.

18) If there is dirt on the battery interface, please use a clean and dry brush, toothpick, or dry cloth to clean it. Otherwise, poor contact may be caused, resulting in energy loss or failure to charge.

Carge

1) The battery will automatically stop charging when fully charged. It is recommended to disconnect the charger after the battery is fully charged.

2) Please make sure that the battery is turned off before plugging in the charger.

3) When charging the battery, please ensure that the battery is charged within sight to prevent unpredictable accidents.

4) When charging, please pay attention to ensure that the environment around the battery has good heat dissipation, and there are no flammable and explosive items such as sundries.

5) Please keep the intelligent battery closed when charging.

6) The intelligent battery must be charged with a special charger officially provided by Unitree Robotics. Unitree Robotics will not be responsible for all the consequences caused by using a charger not officially provided by Unitree Robotics.

7) When charging, please place the battery and charger on the cement floor and other surrounding areas without flammable and combustible materials. Please pay attention to the charging process to prevent accidents.

8) It is forbidden to charge the battery immediately after the robot runs. At this time, the battery is in a high temperature state, and forced charging will seriously damage the life of the battery. It is recommended to wait for the battery to cool to room temperature before charging. The ideal charging ambient temperature (5°C -40°C) can greatly prolong the service life span of the battery.

9) After charging, please disconnect the charger from the battery. Regularly check and maintain the charger, and regularly check the appearance of the battery and other components. Never use alcohol or other combustible agents to clean the charger. Do not use a damaged charger.

Storage and transportation

1) When the battery is not in use, please remove the battery from the robot and store it out of the reach of children.

2) It is forbidden to place the battery near a heat source, such as a car in direct sunlight or hot weather, a fire source, or a heating furnace. The ideal storage temperature of the battery is 22°C -28°C.

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3) During storage, please pay attention to ensure that the surrounding environment of the battery has good heat dissipation and is free of sundries and other inflammables and explosives.

4) The environment where the battery is stored shall be kept dry. Do not place the battery in water or where water may leak.

5) It is forbidden to mechanically impact, crush or pierce the battery. It is forbidden to drop or artificially short circuit the battery.

6) It is forbidden to store or transport the battery together with glasses, watches, metal necklaces, hairpins, or other metal objects.

7) Do not transport damaged batterys. Once the battery needs to be transported, be sure to discharge the battery to about 65% charge.

8) Do not store the battery for a long time after it is completely discharged to avoid the battery entering the state of over-discharge, which may cause damage to the battery cell and cannot be restored to use.

Battery Maintenance

1) Do not use the charger to charge the battery in an environment where the temperature is too high or the temperature is too low.

2) Do not store the battery in environments where the ambient temperature exceeds 0°C to 40°C.

3) Do not overcharge the battery, otherwise it will cause damage to the battery core.

4) If you do not use the battery for a long time, please check the remaining battery power regularly. If the battery is lower than 30%, please charge the battery to 70% before saving. In order to avoid battery over-discharge and damage the battery.

Abandonment

Damaged batteries such as bulging, falling, water ingress and breakage shall be scrapped and shall not be used again to avoid safety risks. Be sure to completely discharge the battery before placing it in the specified battery recycling box. Batterys are hazardous chemicals, which are forbidden to be discarded in ordinary garbage cans. For details, please follow local laws and regulations on battery recycling and disposal.

9.Revision History

Edition	Date	Modify Content
1.1	May 27, 2026	Add battery rated capacity description.
1.0	March 23, 2026	Initial Version

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