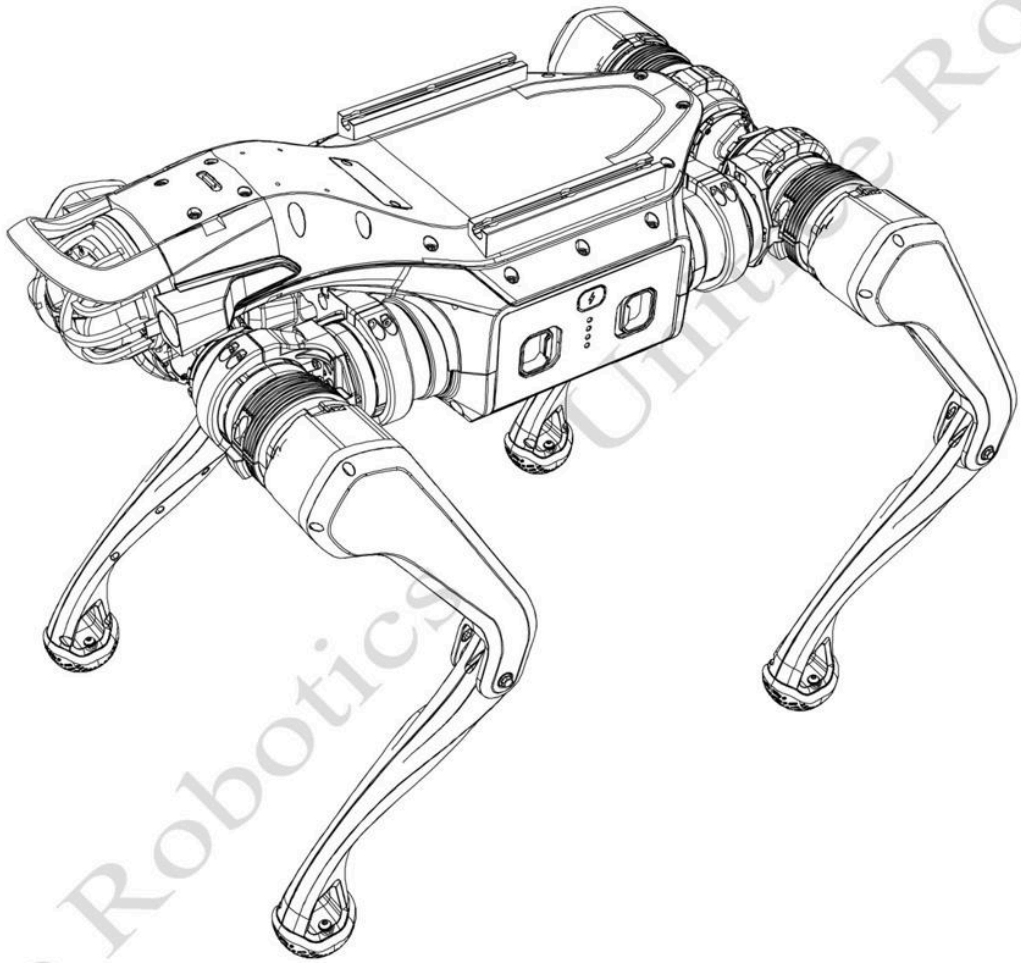
# As2

User Manual V1.3



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.

Please visit Unitree Robotics Website for more related terms and policies, and comply with local laws and regulations.

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# Catalogue


Disclaimer....2
Safety Instructions....3
Product Overview....4
- Introduction....4
- Parts Name....4
- Function Highlights....5
- Specification Comparison....6
- Interface Description....9

How to charge....10
- Charge the battery....10
- Remote Control Charging....11

Instructions for use....12
- Operation Environment Requirement....12
- Unpacking....12
- Check before Power on....12
- Preparation before Power on....13
- Start up As2....14
- Status indicator....14
- Connect to the Unitree Go App....15
- Operate your As2....20
- Switching off As2....25
- Packing....26

Frequently Asked Questions (FAQ)....26
Precautions....31
Daily Maintenance....32
Interface_Sensors Description....34
Industry Canada....35
FCC Statement....36
Radio Frequency Specifications....37
ANATEL Res. 680 RF warning sentence....38
Revision History....38


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# Disclaimer

To avoid illegal behavior, potential harm, and loss, it is essential to adhere to the following regulations:

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# Safety Instructions

The As2 is a quadruped robot designed for consumer-grade applications, featuring a compact body with industrial-level performance, powerful drive and exceptional load capacity, extended battery life and all-weather adaptability, agile biomimetic and dynamic motion capabilities, as well as intelligent perception and open expandability.

1) This product is not a toy and is not suitable for individuals under 18 years of age. Keep out of reach of children, and exercise extreme caution when operating near children.

2) You are responsible for being aware of and complying with the laws and regulations applicable in your region.

3) This manual serves as an introductory chapter for new users to quickly learn how to control the robot using the remote controller, enabling outstanding movement performance. It is also a reference chapter for experienced users to review key operational techniques, draw inferences, and understand which actions are not recommended.

4) When running self-developed programs in developer mode: during high-level (application layer) development, remote controller commands remain effective. If both high-level API commands and remote controller commands are sent to the robot simultaneously, the robot will execute both types of commands, which may cause instability. Please assess the robot's operating status before deciding whether to use the remote controller. During low-level development, remote controller commands are disabled.

5) Always keep the robot within your line of sight during operation and maintain a safe distance from the quadruped robot. Do not touch the robot with your hands after it is powered on!

6) The As2 automatically stands up after power-on. Please maintain a safe distance from the quadruped robot!

7) When using complex remote control commands, ensure there are no obstacles (especially people) within a semicircle with a diameter of 2 meters in front of the robot dog. Unitree Robotics assumes no responsibility for any injuries, fatalities, or property damage caused by improper operation!

8) Safety note on standing recovery: The robot requires space to roll over when recovering to a standing position. Ensure no people or objects are within a circle with a diameter of 2 meters around the robot dog to avoid unnecessary casualties and property loss. Otherwise, Unitree Robotics shall not be liable for any resulting losses or consequences.

9) Do not touch the joint parts of the robot when transporting it or while it is moving, as this may cause pinching injuries.

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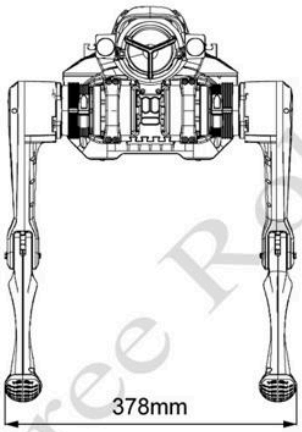
10) When the battery level is low, stop and shut down the robot promptly. Remove the battery for charging to prevent damage caused by the robot falling due to power loss!

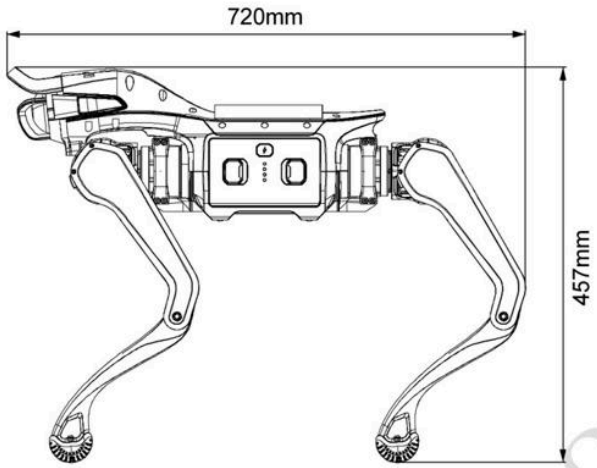
11) This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

# Product Overview

## Introduction

The Unitree As2 is an ultra-lightweight, highly dynamic, and openly customizable consumer-grade quadruped robot. Its body features a high-rigidity design, with a self-weight of only about 20 kg including the battery. The EUD version, however, delivers joint torque of up to 95 N·m, providing powerful motion performance. It is equipped with a large-capacity 648Wh battery for extended endurance and boasts IP54 protection, making it adaptable to various environments. Powered by an advanced bionic embodied AI model, the As2 can smoothly run, jump, and climb, offering exceptional agility and playability. Standard features include an 8-core high-performance CPU and an upgraded ISS 3.0 intelligent following system, enabling high-precision positioning and stable tracking. More importantly, it provides user-friendly secondary development interfaces and an open platform that supports integration with AI models, making it an ideal platform for embodied intelligence research and development, as well as exploring cutting-edge human-robot interaction.

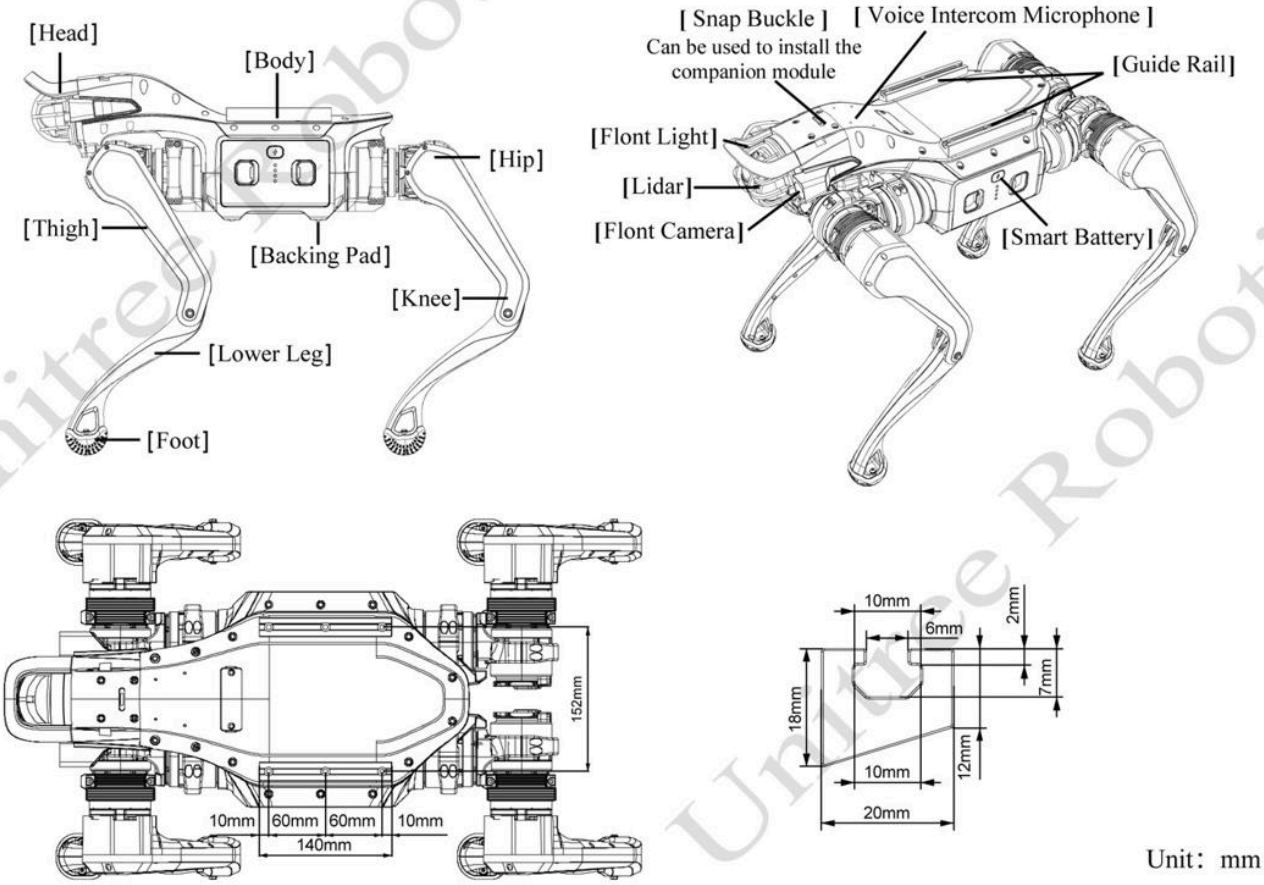



## Parts Name

The main body of the As2 quadruped robot is as shown in the following diagram. Please refer to the actual product for accuracy.

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**Note:** The radar used here is based on lidar technology, which uses infrared emission, not radio wave emission.

- The snap-fit bracket on the head can be used to install the accompanying module.
- The As2 AIR version comes standard with the Unitree L2 LiDAR, while the As2 PRO version and above come standard with an industrial-grade 64–128-line LiDAR.

## Function Highlights

**1) Extremely Lightweight, Powerful Drive**

The As2 features a high-rigidity, lightweight design. Weighing only approximately 20 kg with the battery installed, it delivers a maximum joint torque of up to ~95 N·m, achieving a torque-to-weight ratio of approximately 5 N·m/kg - roughly twice the power performance of the Go2. This provides a strong and precise force control foundation for scientific research experiments and dynamic interaction.

**2) Long-Lasting Battery Life, Expanded Boundaries**

The As2 PRO version and above are equipped with a large-capacity 648Wh (15000mAh) battery. It can walk continuously for over 4 hours (>20 km) without a load, and still operate for more than 2.5 hours (>13 km) with a 15 kg payload, offering sustained energy support for extended outdoor testing, scenario exploration, and creative development.

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**3) All-Weather Adaptability, Reliable Operation**

The As2 PRO and above versions have an IP54 dust and water resistance rating, while the As2 X and above versions operate within a temperature range of -20°C to 55°C, ensuring stable performance in complex weather and environments such as rain, dust, and extreme temperatures.

**4) Agile Biomimetics, Exceptional Dynamics**

Based on an advanced biomimetic embodied foundation model, the As2 can perform a variety of agile dynamic movements including running, climbing, and jumping. Its maximum unloaded speed reaches 5 m/s (limit state), and it can scale vertical platforms up to 50 cm high and slopes of up to 40°, demonstrating outstanding locomotion and obstacle-crossing capabilities.

**5) Precise Perception, Intelligent Companion**

All series come standard with an 8-core high-performance CPU. The As2 PRO version and above are equipped with the ISS 3.0 intelligent accompanying system by default, achieving centimeter-level high-precision positioning and stable following/accompanying functionality. This provides a solid foundation for perception and control in research and applications such as autonomous navigation and human-robot interaction.

**6) Open Platform, Empowering Creation**

The As2 EDU version offers a user-friendly secondary development interface and supports integration with AI foundation models, enabling embodied intelligent interaction and autonomous decision-making. It is equipped with external interfaces such as Gigabit Ethernet and SBUS, along with an open software platform, making it an ideal platform for robotic algorithm research, intelligent agent development, and innovation incubation.

## Specification Comparison

| | As2 AIR | As2 PRO | As2 X | As2 EDU |
|---|---|---|---|---|
| Size (Standing) | 720mmx378mmx457mm | 720mmx378mmx457mm | 720mmx378mmx457mm | 720mmx378mmx457mm |
| Size (Lying Prone) | 776mmx378mmx233mm | 776mmx378mmx233mm | 776mmx378mmx233mm | 776mmx378mmx233mm |
| Weight (with battery) | Approx. 20kg | Approx. 20kg | Approx. 20kg | Approx. 20kg |
| Material | Aluminum Alloy + High-Strength Engineering Plastic | Aluminum Alloy + High-Strength Engineering Plastic | Aluminum Alloy + High-Strength Engineering Plastic | Aluminum Alloy + High-Strength Engineering Plastic |
| Degrees of Freedom (Joint Motors) | 12 | 12 | 12 | 12 |

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| | | | | |
|---|---|---|---|---|
| Joint Bearings | Industrial-grade crossed roller bearings (high precision, high load capacity) | Industrial-grade crossed roller bearings (high precision, high load capacity) | Industrial-grade crossed roller bearings (high precision, high load capacity) | Industrial-grade crossed roller bearings (high precision, high load capacity) |
| Joint Motors | Low-inertia, high-speed inner rotor PMSM (enhanced response & heat dissipation) | Low-inertia, high-speed inner rotor PMSM (enhanced response & heat dissipation) | Low-inertia, high-speed inner rotor PMSM (enhanced response & heat dissipation) | Low-inertia, high-speed inner rotor PMSM (enhanced response & heat dissipation) |
| Max Joint Torque | Approx. 65 N.m | Approx. 75 N.m | Approx. 95 N.m | Approx. 95 N.m |
| Range of Motion | Body:-45 ~ 45°<br>Thigh:-115° ~ 200°<br>Shank:-159° ~ -47° | Body:-45 ~ 45°<br>Thigh:-115° ~ 200°<br>Shank:-159° ~ -47° | Body:-45 ~ 45°<br>Thigh:-115° ~ 200°<br>Shank:-159° ~ -47° | Body:-45 ~ 45°<br>Thigh:-115° ~ 200°<br>Shank:-159° ~ -47° |
| Supply Voltage | 36V ~ 50.4V | 36V ~ 50.4V | 36V ~ 50.4V | 36V ~ 50.4V |
| Joint Encoder | Dual encoders | Dual encoders | Dual encoders | Dual encoders |
| Cooling System | Local air Cooling | Local air Cooling | Local air Cooling | Local air Cooling |
| Power Supply | Lithium battery | Lithium battery | Lithium battery | Lithium battery |
| Wi-Fi 6, Bluetooth 5.2 | YES | YES | YES | YES |
| Speaker | YES | YES | YES | YES |
| Microphone | YES | YES | YES | YES |
| Front Light | YES | YES | YES | YES |
| ISS 3.0 Intelligent side-follow system | / | YES | YES | YES |
| GPS (Mainland China version only) | / | Yes (disabled by default; enabled with user authorization) | Yes (disabled by default; enabled with user authorization) | Yes (disabled by default; enabled with user authorization) |
| 4G (Mainland China version only) | / | Yes (disabled by default; enabled with user authorization) | Yes (disabled by default; enabled with user authorization) | Yes (disabled by default; enabled with user authorization) |
| HD Camera | YES | YES | YES | YES |

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| | | | | |
|---|---|---|---|---|
| Ultra-Wide-Angle LiDAR | Unitree L2 | Industrial-grade 64~128-line LiDAR | Industrial-grade 64~128-line LiDAR | Industrial-grade 64~128-line LiDAR |
| Computing Power | 8-Core high-performance CPU | 8-Core high-performance CPU | 8-Core high-performance CPU | 8-Core high-performance CPU |
| External Interfaces | Gigabit Ethernet x 1<br>SBUS x 1<br>Power Output:BAT | Gigabit Ethernet x 1<br>SBUS x 1<br>Power Output:BAT | Gigabit Ethernet x 1<br>SBUS x 1<br>Power Output:BAT | Gigabit Ethernet x 1<br>SBUS x 1<br>Power Output:BAT |
| Operating Temperature | -20℃~50℃ | -20℃~50℃ | -20℃~55℃ | -20℃~55℃ |
| Battery Life (Unloaded) | ~2 hours continuous walking, approx. 10km | ~4 hours continuous walking, approx. 20km | ~4 hours continuous walking, approx. 20km | ~4 hours continuous walking, approx. 20km |
| Battery Life (Loaded) | With 10kg loaded, >1.5 hours continuous walking, approx. 7km | With 13kg loaded, >2.5 hours continuous walking, approx. 13km | With 15kg loaded, >2.5 hours continuous walking, approx. 13km | With 15kg loaded, >2.5 hours continuous walking, approx. 13km |
| Max Standing Load | Approx. 45kg | Approx. 55kg | Approx. 65kg | Approx. 65kg |
| Continuous Walking Load | Approx. 10kg | Approx. 13kg | Approx. 15kg | Approx. 15kg |
| Slope Walking Capability | Approx. 30° | Approx. 40° | Approx. 40° | Approx. 40° |
| Stair Climbing Capability | 20cm | 25cm | 25cm | 25cm |
| Speed | 0~3.0m/s | 0~3.7m/s | 0–3.7 m/s (Up to ~5 m/s) | 0–3.7 m/s (Up to ~5 m/s) |
| Protection Rating | / | IP54 | IP54 | IP54 |
| Remote Control | Optional | YES | YES | YES |
| Battery Capacity | Standard (8000mAh) x1 | Long Range (15000mAh) x1 | Long Range (15000mAh) x1 | Long Range (15000mAh) x1 |
| Charger | Standard (50.4V 4A) | Fast Charging(50.4V 7.4A) | Fast Charging(50.4V 7.4A) | Fast Charging(50.4V 7.4A) |
| Charging Dock | / | / | YES | YES |
| High Computing Power | No | No | No | Multiple brands and models available such as Orin NX, etc. |

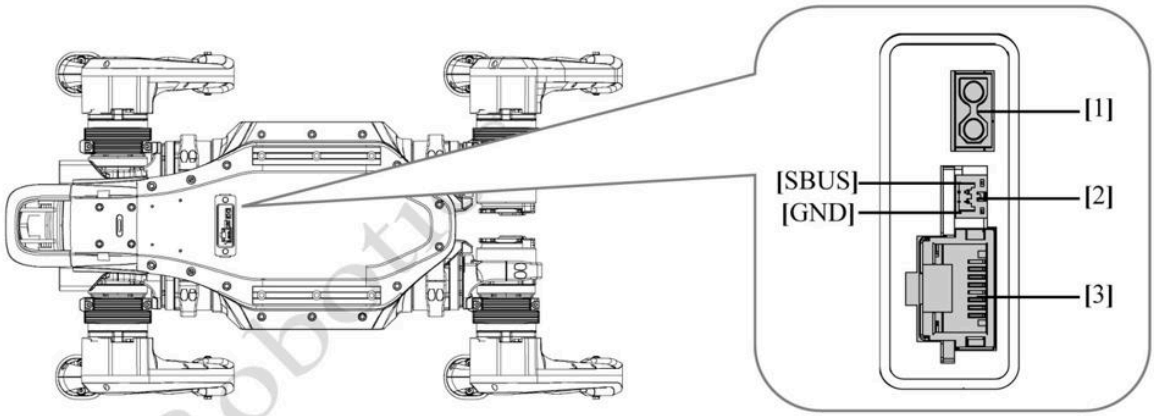
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| | | | | |
|---|---|---|---|---|
| Expansion Dock | | | | |
| Secondary Development | Not Supported | Not Supported | Supported | Supported |
| UniStore Platform | Supported | Supported | Supported | Supported |
| Smart OTA Upgrade | Continuous Upgrades | Continuous Upgrades | Continuous Upgrades | Continuous Upgrades |
| Warranty | 6 Months | 12 Months | 12 Months | 12 Months |

● Please visit the Unitree documentation center to obtain the As2 secondary development guide.

## Interface Description

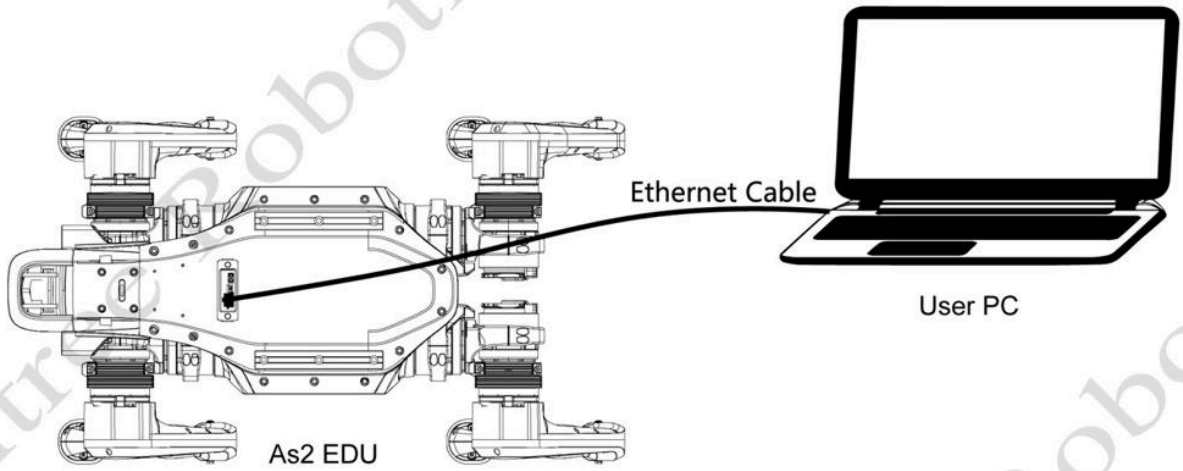
The back of the As2 EDU version body is equipped with an SDK expansion port, allowing developers to carry out further extended function development, as shown in the figure below. When using the expansion interface, please remove the rear cover panel first.




| No. | Interface Type | Interface Name | Interface Specifications |
|---|---|---|---|
| [1] | XT30PW-F | BAT | Battery power output port: 36–50.4V / 5A |
| [2] | GH1.25-2P | SBUS Interface | Used for communication connection on the universal remote controller. This interface does not provide power output. Interface definition (from top to bottom): SBUS / GND |
| [3] | RJ45 | 1000 BASE-T | Gigabit Ethernet |

You can connect your own PC (Ubuntu system) via Ethernet to the Ethernet port of the As2 to establish communication between the User PC and the As2.

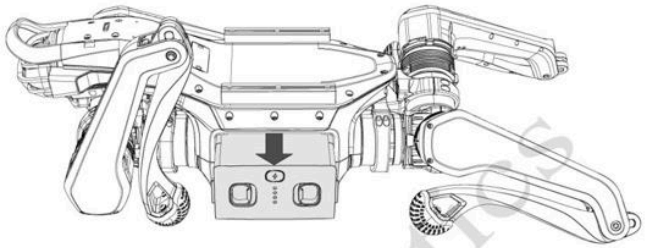
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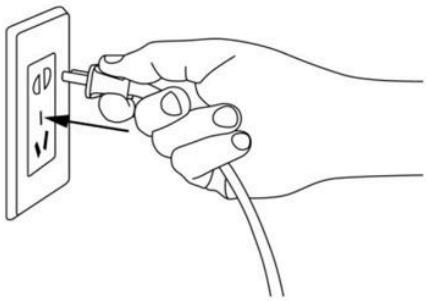

# How to charge

Due to factors such as battery self-discharge during transportation and storage, it is normal for the battery to have low or no power when first used. You can charge it as follows.

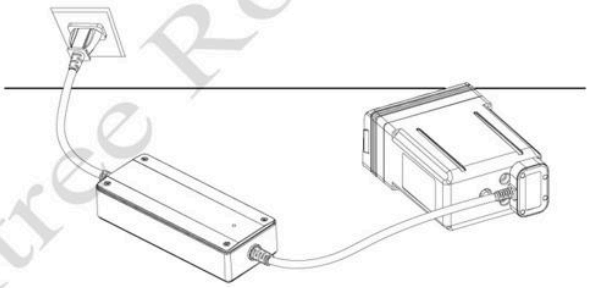
## Charge the battery



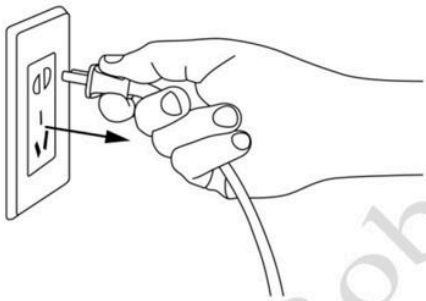
1) Remove the battery from the As2 body (Press the battery latch)



2) Charger input AC power (100-240V, 50/60Hz)



3) Connect the As2 battery



4) Manually disconnect the power when fully charged

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).

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2) Plug in the input AC power first before charging the battery, then connect the charger to the battery.

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

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

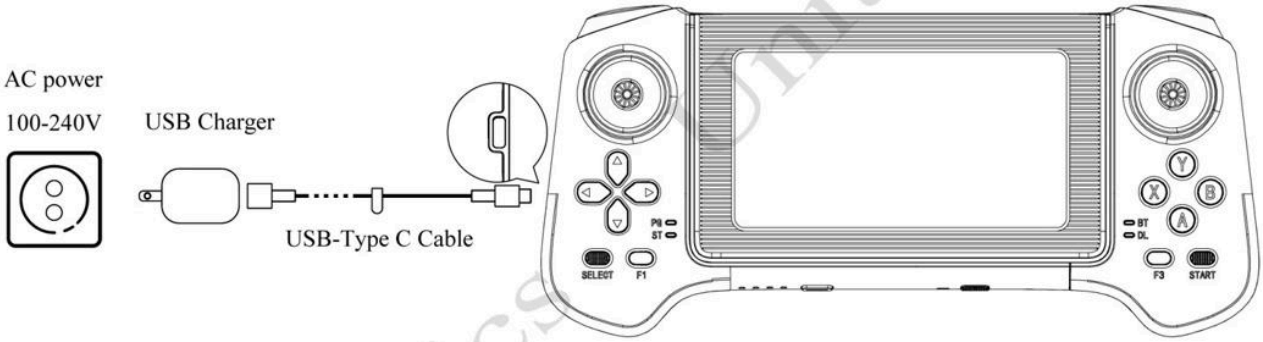
5) In the charging state, the battery indicator of battery pack will flash at a frequency of 1Hz (1 second/time) and indicate the current battery.

6) If the battery indicator is off, the battery pack is fully charged. Please remove the battery pack and charger to finish charging.

7) After the robot has finished operating, the battery pack temperature may be high. The battery pack must be allowed to cool down to room temperature before charging.

## Remote Control Charging

When the battery indicator light of the companion remote control shows that the battery is low, you should connect the companion remote control to the charger as shown in the figure below:




1) We recommend you to use a 5V/2A USB charger which meets FCC/CE standard.

2) Ensure that handheld remote control is switched off before charging it.

3) The power indicator light will flash at 1Hz (1 second/time) in charging status and indicate the current power level.

4) When the power indicator light is all on it means the battery pack is full, please remove the charger to finish charging.

| Charging Indicator Light | | | | |
|---|---|---|---|---|
| **LED1** | **LED2** | **LED3** | **LED4** | **Current Battery** |
| ☼ | ○ | ○ | ○ | 0%-25% |
| ☼ | ☼ | ○ | ○ | 25%-50% |
| ☼ | ☼ | ☼ | ○ | 50%-75% |
| ☼ | ☼ | ☼ | ☼ | 75%-100% |
| ☼ | ☼ | ☼ | ☼ | Full Charged |

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# Instructions for use

## Operation Environment Requirement

1) Operate the robot in good weather conditions within a temperature range of -20°C to 50°C. Do not operate it in severe weather, such as thunderstorms or tornadoes. When operating in water, strictly follow the requirements described in the IP54 protection rating instructions.

2) During use, keep the robot within your line of sight and maintain a safe distance of at least 2 meters from obstacles, uneven terrain, crowds, bodies of water, and other objects at all times.

3) Do not operate the robot in environments with electromagnetic interference. Sources of electromagnetic interference include, but are not limited to: high-voltage power lines, high-voltage substations, mobile phone base stations, and television broadcast towers.

4) Do not operate the robot in environments with Wi-Fi signal interference. Wi-Fi signal interference is usually caused by co-channel interference. If interference occurs, be sure to turn off some or all other wireless device Wi-Fi signal sources before using the remote controller to operate the robot.

5) Due to varying levels of operator skill, for safety and reliability, please use the robot in an open, unobstructed, flat ground environment. When operating the robot, pay attention to avoiding steps higher than 20 cm, slopes greater than 30°, and obstacles that may cause the robot to fall. When the robot is walking on complex terrain or surfaces with some undulations and slopes, the operator should reduce the robot's walking speed and operate carefully to prevent the robot from tripping over obstacles.

6) Legged robots have certain requirements for the walking surface. Do not use the robot on surfaces with very low friction, such as ice. Do not use the robot on soft surfaces, such as thick sponge floors. If using the robot on relatively smooth surfaces, such as glass or tile floors, please operate the robot carefully and smoothly, avoid vigorous movements, and reduce the robot's walking speed to prevent its feet from slipping and causing a fall.

## Unpacking

Place the case on a flat surface according to the placement instructions (with the front side facing up). Then open the upper case, remove the quadruped robot, remote controller, charger, and other items from the case separately, and place them on a flat surface. Proceed with the startup preparations.

## Check before Power on

1) Only Use Unitree Robotics authentic parts and ensure that all parts are in good working condition.

2) Ensure that the firmware has been updated to the latest version.

3) The users ensures that he or she is not operating the robot while intoxicated, under the influence of

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drugs, and unable to concentrate.

4) Be familiar with the characteristics of each gait mode. Be familiar with the emergency braking method of the robot in case of instability / loss of control.

5) Ensure that there are no foreign matters (such as water, oil, sand, soil, etc.) inside the robot and its components.

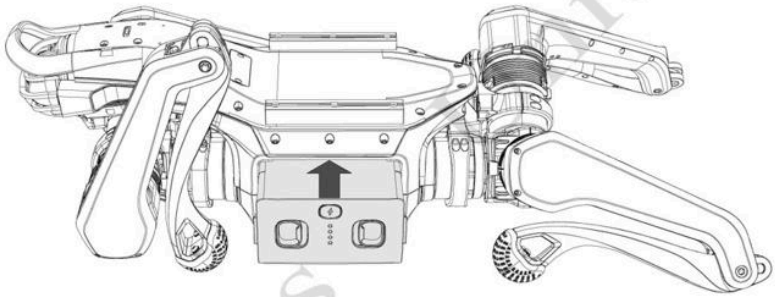
6) Ensure that the remote control module and battery pack are fully charged.

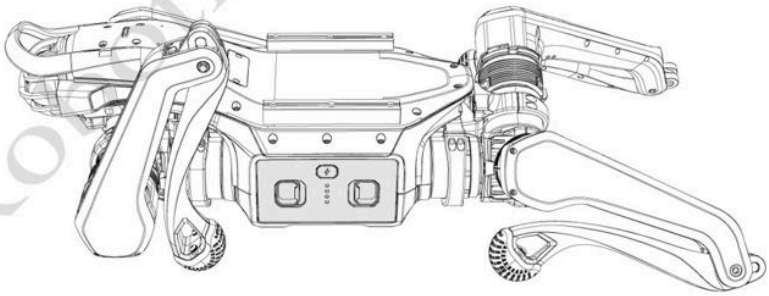
7) If the expansion interface is used, check whether the cable connection is correct.

## Preparation before Power on

**1) Installing Battery Packs**

Place the As2 on a flat surface. Insert the battery pack into the battery slot from the side of the robot, paying attention to the installation direction as shown in the figure. If the battery pack cannot be fully inserted, adjust its orientation. Do not force it, to avoid damaging the battery interface and latch. When a "click" sound is heard, the battery pack installation is complete. Ensure the latch is securely engaged!

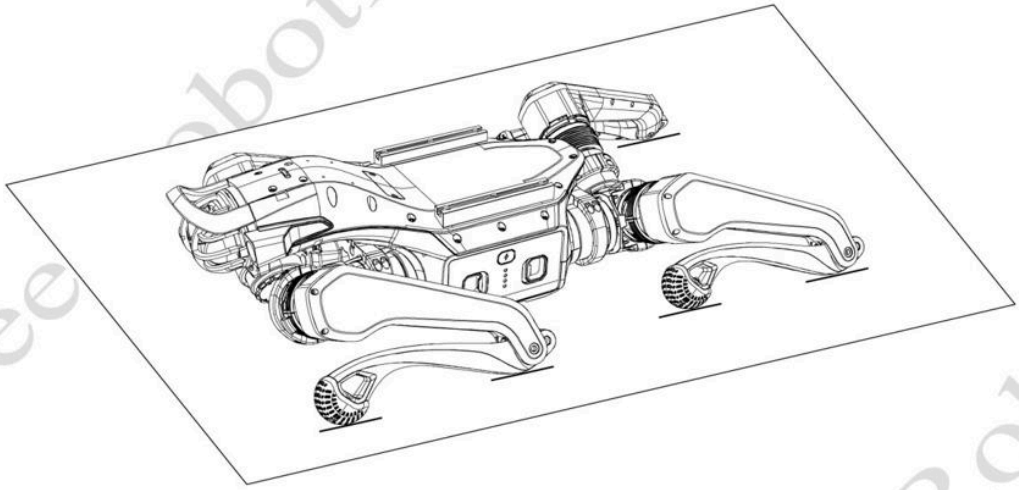




**2) Body Placement (Important Steps !!!)**

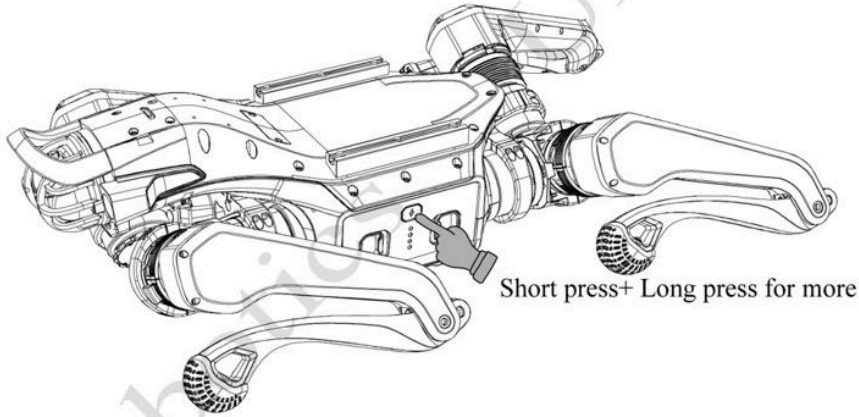
Horizontal type startup: please make sure that the robot dog is placed on a flat ground before startup and operation. The belly support pad of the robot dog should be flat against the ground. The machine body should lie on the ground horizontally without tilting. The legs of the robot dog should be fully retracted (as shown in the figure below). The four knee joints and foot ends should be flat on the ground to ensure that neither the thighs nor the legs of the robot dog are pressed by the machine body.

Unitree Robotics



## Start up As2

After the robot completes the pre-startup check and is positioned according to the pre-startup preparation requirements, follow the steps below to power it on: First, briefly press the power switch once, then press and hold the power switch for more than 3 seconds to turn on the battery. After the battery starts, wait for 2 minutes. The robot will automatically stand up, with its body parallel to the ground, indicating a successful startup.



Short press+ Long press for more than 3 seconds

⚠
- If startup fails, carefully check the placement of the robot body.
- Startup failure of the As2 may occur if the thighs are extended outward or the shins are pressed inward.
- Be careful not to pinch your hands at the joints during exercise, please be careful and cautious!
- Once the As2 starts up successfully, it will stand up automatically. Please maintain a safe distance!

## Status indicator

The front indicator light on the As2's head emits different lights to indicate the robotic dog's current working status and the status of the currently running system. Please refer to the table below to understand the operating states represented by the different flashing patterns and colors:

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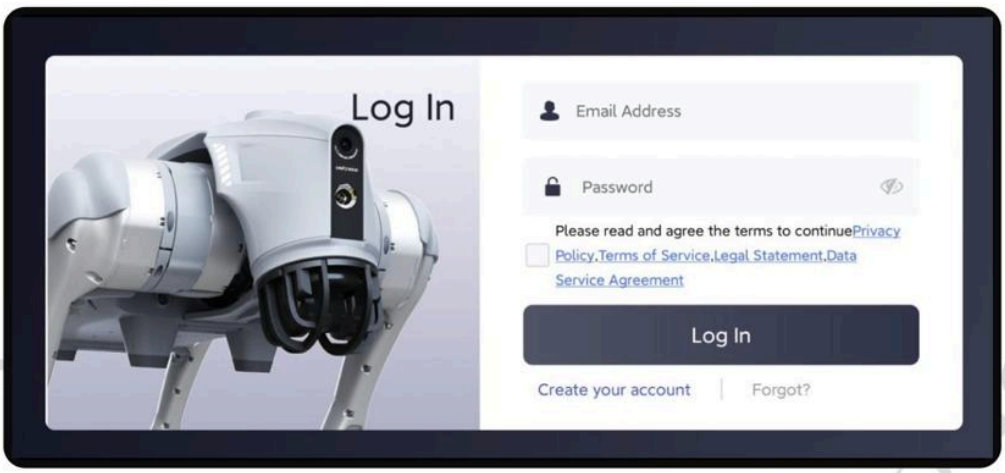
| Color | Status | Meaning |
|---|---|---|
| Blue Light | Breathing | Starting up |
| Cyan Light | Steady on | Startup complete, obstacle avoidance enabled by default |
| Green Light | Steady on | Voice wake-up |
| Purple Light | Steady on | Companion mode activated |
| Yellow Light | Slow flash | Low battery |
| Red Light | Steady on | System anomaly, contact after-sales service |

## Connect to the Unitree Go App

For first-time use, activation is required. Please install the Unitree Go App first, then follow the app prompts to activate the As2 and complete the built-in tutorial. During the activation process, please turn on your phone's Bluetooth and keep your phone close to the As2 to ensure real-time Bluetooth communication. Once binding is successful, you can start controlling the robot.

**1. Scan the QR code to download and install the Unitree Go App**, register an account, and log in.

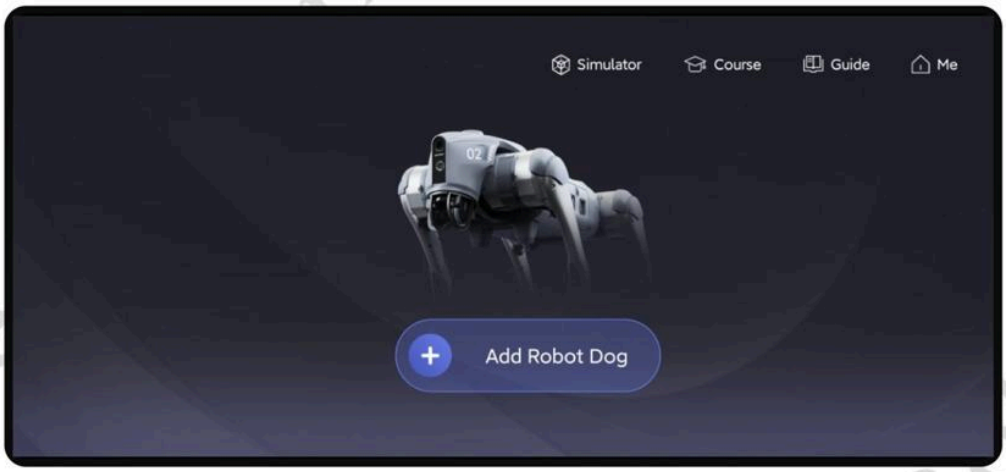
Unitree Go App
Download Link




● The Unitree Go App is specially designed for the Go2 and As2 series robots, providing an excellent control experience and feature support!

**2. After the As2 is powered on, tap "Add Robot."**

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**3. Tap the device you want to add.**




⚠ ● Please keep your phone's Bluetooth turned on during the connection process!

● Bluetooth connection error: The Unitree Go App requires Bluetooth permission. Please enable Bluetooth permission for Unitree Go in your phone's app settings.

● If you forget your bound account or lose your account, please contact the relevant Unitree personnel!

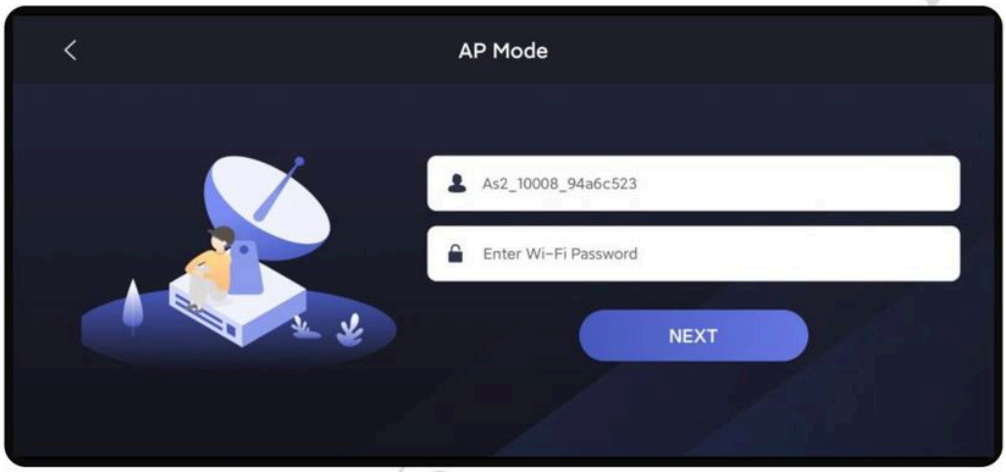
● Bluetooth connection error: The Unitree Go App requires Bluetooth permission. Please enable Bluetooth permission for Unitree Go in your phone's app settings.

**4. AP Direct Connection Mode**

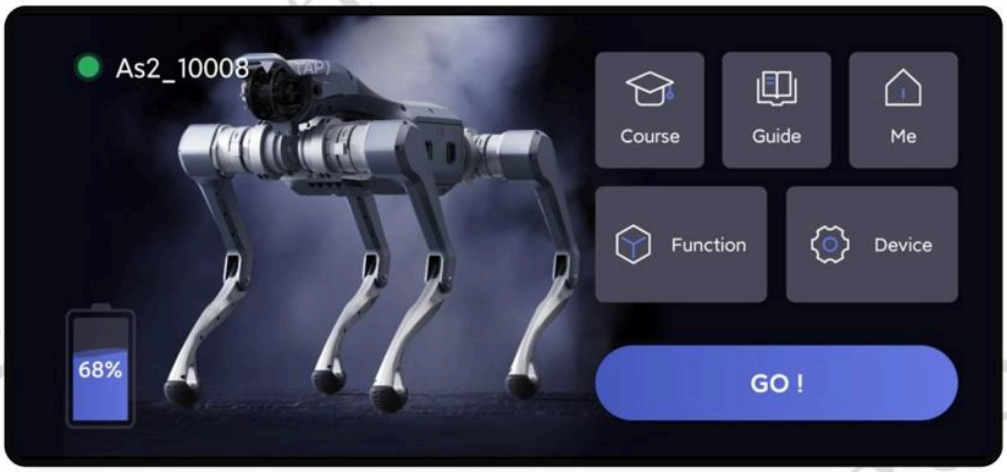
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Step 1: Tap "AP Direct Connection"




Step 2: Read the robot account



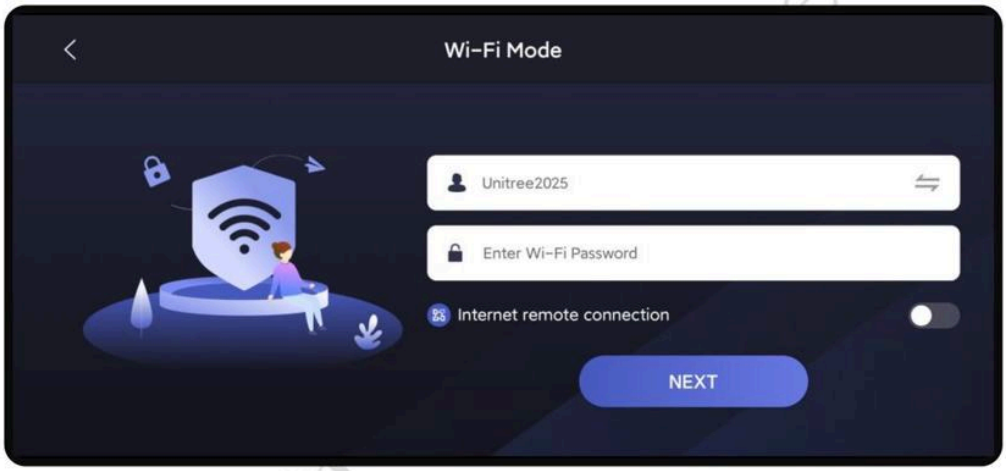

Step 3: Connection Successful

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**5.Wi-Fi Connection Mode**



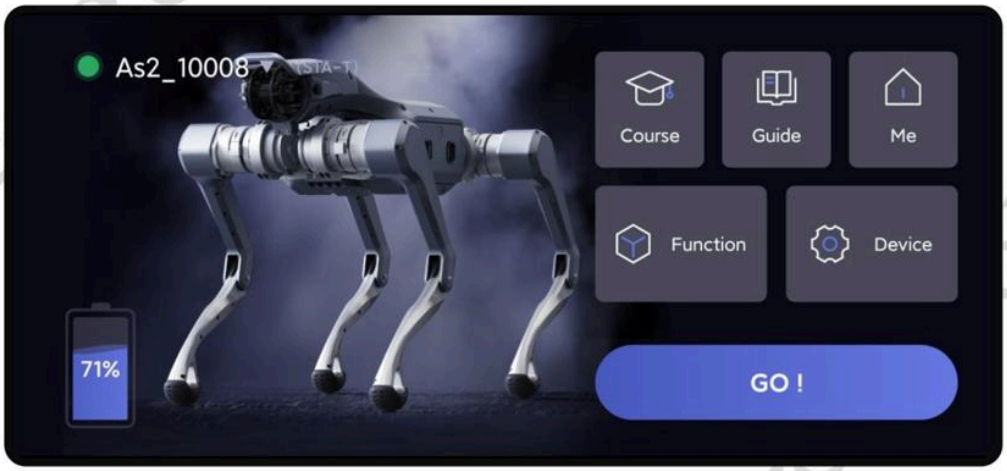

Step 1: Tap "Wi-Fi Connection Mode"




Step 2: Select a Wi-Fi network and enter the password, then tap "Next"

(Your phone must first connect to the target Wi-Fi network; the App can detect it automatically)

(When remote public network connection is enabled, you can connect to a public network, which can be used to upgrade the robot's software)

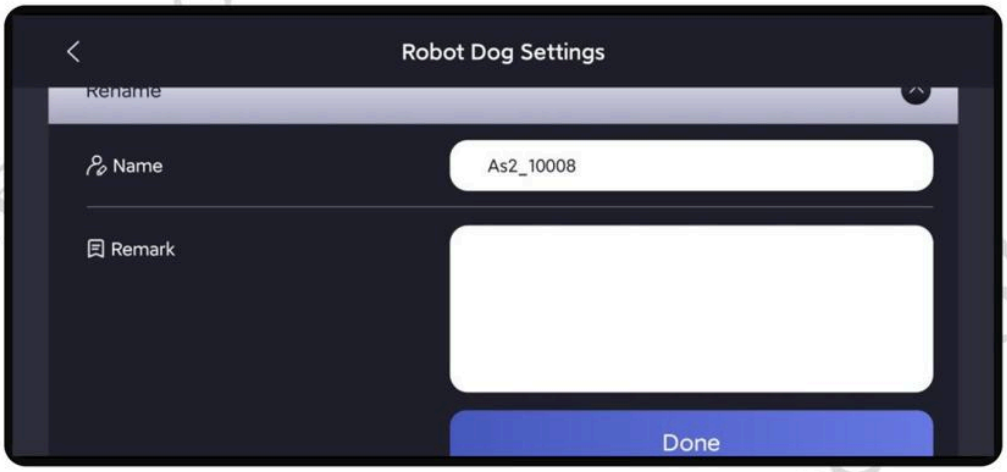


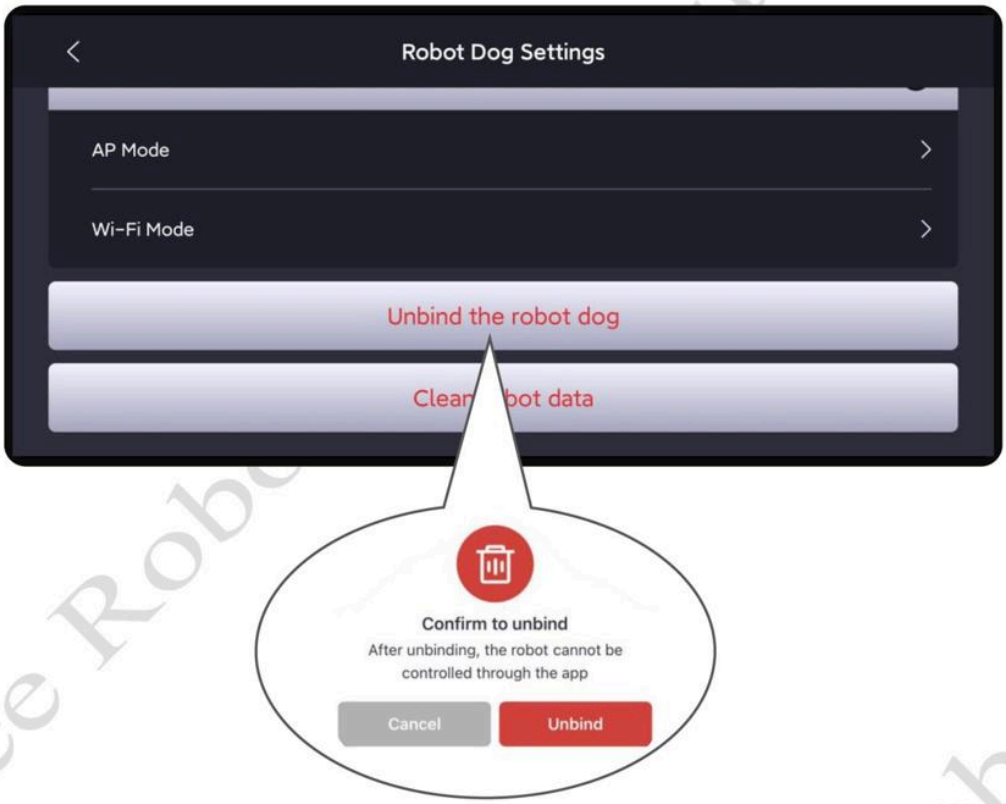

Step 3: Connection Successful

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### 6. How to Change Account Binding

On the home page, tap [Settings] -> [Robot Settings] -> Unbind to unbind the currently bound robot. Once unbound, the robot can be bound to another account.

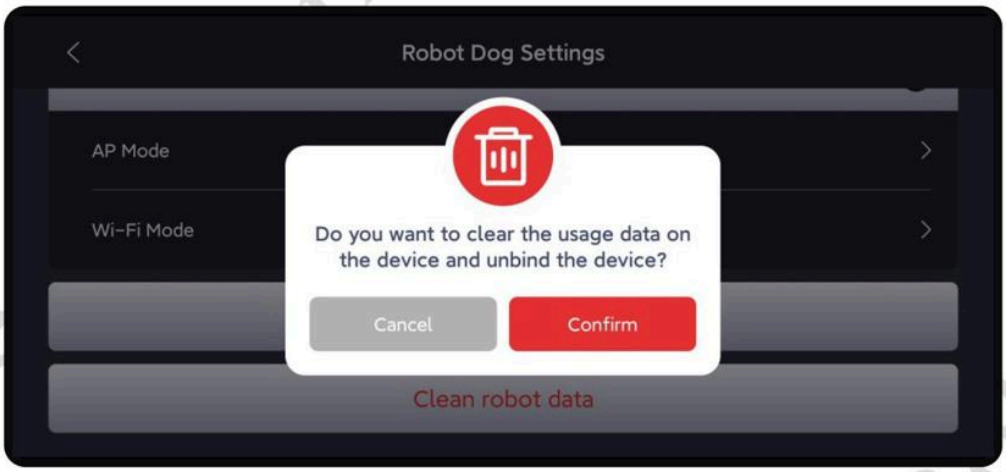



### 7. How to Restore Factory Settings

On the home page, tap [Settings] -> [Robot Settings] -> Clear Device Data. This operation will restore the robotic dog to factory settings and erase all data.

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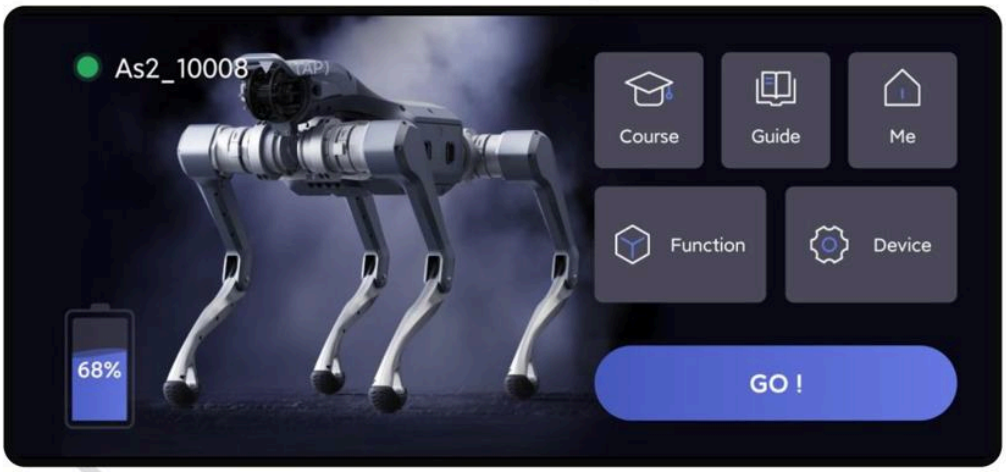



⚠ ● Warning: Once restored to factory settings, this operation cannot be undone!!! Please proceed with caution!!!

## Operate your As2

**1) Using the Unitree Go App for Control**

After completing the built-in tutorial in the Unitree Go App guide, tap **[GO]** to enter the first-person view operation interface.




Step 1: Tap [GO]

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Step 2: Enter the operation interface

**2) Using Voice Control to Operate the Robot**

The As2 has a built-in voice module. You can use voice commands to control the As2 to perform corresponding actions as follows.

| Type | Entry | Voice Response | Corresponding Action |
|---|---|---|---|
| Awakening Words | Hi, robot | I'm here | |
| Command | show me a dance | OK, let's dance! | Do dance moves |
| Command | Wiggle Butt | No problem | Execute hip wiggling |
| Command | move forward | As you wish | Unlock and activate sport mode to advance 2s |
| Command | stretch yourself | What a sunny day | Stretch |
| Command | shake hand | Yes sir | Stop movement and lift front leg to shake hands (2s) |
| Command | lie down | I'm tired/I'm sleepy | Stop moving. First switch to low stance mode, then enter damping mode |
| Command | stand up | Let's go! | Return to standing and lock out |
| Command | push up | I'm so strong! | Squat and stand up three times in a row |
| Command | music | As you wish | Play several fixed offline music tracks. |
| Command | Sit down / Squat down | No problem | Execute the sit-down action. |
| Command | bow with hands | Wish you good luck! | Stand up and bow |
| Command | Heart gesture | No problem | Execute the heart gesture action. |
| ..... | | | |

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● As2 motion control voice responses randomly trigger personalized replies such as " Yes sir" "No problem," etc.

**3) Using the Companion Remote Controller to Operate the Robot (Not supported by the As2 AIR version)**

Power on the As2 robotic dog. Once powered on successfully, the robotic dog will automatically stand up. You can then use the companion remote controller to operate it. The specific steps are as follows:

**Step 1: Start the Companion Remote Controller (Default: Joystick Mode)**

a) Briefly press the power button on the companion remote controller. When the indicator light stays steady, startup is complete. The robotic dog will issue a corresponding voice prompt. At this point, the companion remote controller has been successfully connected to the robotic dog, defaulting to joystick mode.



Figure 1

b) Use the joystick to control the movement of the robotic dog.

**Step 2: Wear and Activate Companion Mode (Important step!)**

a) Attach the companion remote controller to the right side of your waist belt. Stand directly to the left of the robotic dog, ensuring that your body's orientation aligns with the robotic dog's facing direction. Refer to Figure 1 for the relative position diagram.

b) When wearing it, ensure the side with the joystick faces to the right, pointing toward the robotic dog. Keep the antenna vertically upright while wearing it on the right side of your waist. Alternatively, you can hold it in your right hand, also ensuring the joystick side faces right and the antenna remains vertical. Do not grip the antenna directly.

c) Confirm that the robotic dog is positioned to the right of the companion remote controller and that the distance between the remote controller and the top of the robotic dog's head is less than 2.4 meters. Briefly press the M function button; the robotic dog will enter Companion Mode and emit a voice prompt.

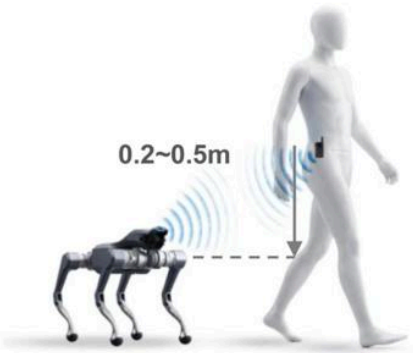



Figure 2

d) If the robotic dog emits a voice prompt indicating the distance is too far, it means the distance between the remote controller and the robotic dog exceeds 2.4 meters, exceeding the companion range. Move closer and repeat Step 3.

**Step 3: Exit Companion Mode**

a) Press the P button on the companion remote controller or move the joystick. The robotic dog will exit Companion Mode, enter Joystick Mode, and emit a voice prompt.

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b) Place the companion remote controller horizontally, or tilt it at an angle greater than 40° compared to its activated state. The robotic dog will exit Companion Mode, enter Joystick Mode, and emit a voice prompt.

c) Press any button on a two-handed remote controller or move the joystick. The robotic dog will exit Companion Mode, enter Joystick Mode, and emit a voice prompt.

d) Press and hold the power button on the companion remote controller for 2 seconds to turn it off, exiting Companion Mode. Restarting the remote controller will automatically re-enter Companion Mode.

**Additional Operating Instructions**

a) Joystick Control: After the companion remote controller enters Joystick Mode, you can control the robotic dog's movements via the joystick. While in joystick control mode, you may remove the remote controller from the waist belt for operation. To resume Companion Mode, reattach the remote controller to the waist belt before activating companion mode again.

b) In Companion Mode, the device achieves following functionality based on the relative position between the remote controller and the robotic dog. Therefore, ensure the companion remote controller moves along with the wearer's torso. Do not hold it and wave it around arbitrarily.

**Companion Mode Precautions:**

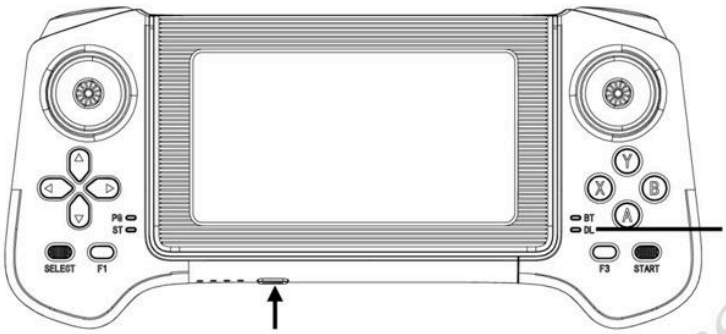
- Do not use in narrow indoor spaces or areas with dense metal reflective surfaces.
- Ensure that before entering or exiting Companion Mode, the button side faces to the right and the antenna points vertically upward.
- The maximum operating distance in Joystick Mode for the companion remote controller is approximately 15 meters.
- When Companion Mode is active, ensure the distance between the robotic dog and the remote controller does not exceed 2.4 meters. Excessive distance may cause signal interruption, loss of control, or other malfunctions.
- When Companion Mode is active, do not run quickly. Maintain a steady walking speed of no more than 2 m/s. Rapid movement can easily result in loss of remote control signals and loss of control over the robotic dog, leading to potential safety hazards.
- The optimal height difference between the companion remote controller and the robotic dog's head should be maintained between 0.2m and 0.5m, as shown in Figure 2.
- In Companion Mode, the optimal straight-line distance between the remote controller and the robotic dog's head is approximately 0.8 meters.
- In Companion Mode, the following function is achieved through the relative position of the remote controller and the robotic dog. Therefore, ensure the companion remote controller moves along with the wearer's torso. Do not hold it and wave it around arbitrarily.
- When walking, try to proceed on flat, open ground without obstacles to prevent the robotic dog from colliding with environmental obstacles during companion mode.

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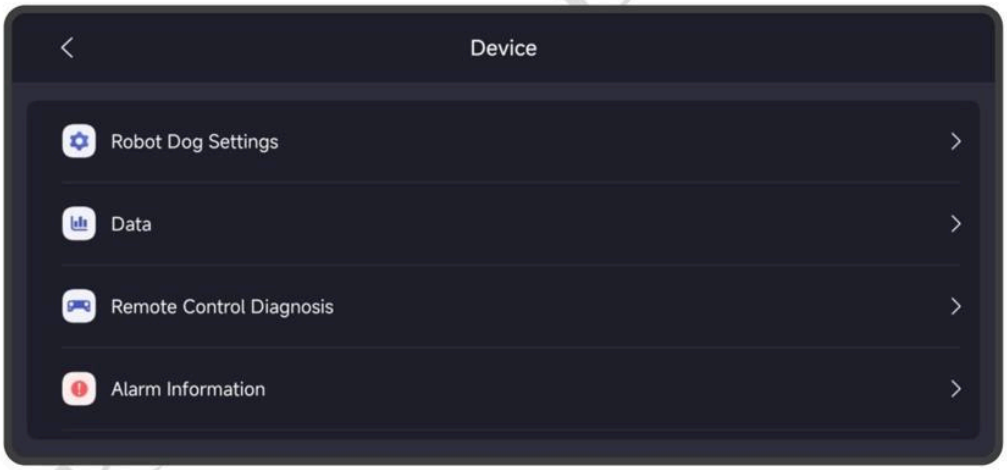
● Do not use the Companion function on special terrains such as stairs or steep slopes. Such environments are prone to rollovers, falls, and other issues that could damage the robotic dog.

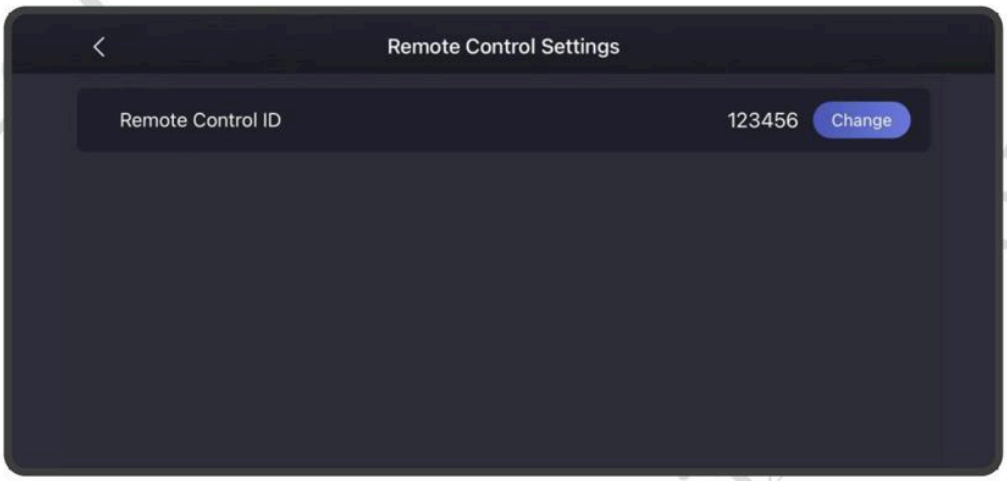
**4) Use remote control to control (Optional)**

First, briefly press the power button on the remote controller once, then press and hold the power button for more than 2 seconds. When you hear a "Beep~" sound, the remote controller is powered on.




For first-time use, the remote controller must be paired via the Unitree Go App. Go to [Settings] -> [Remote Controller Settings], enter the corresponding remote controller code to bind it with the robot's data-link module. Tap [Modify] to switch to a different remote controller for control.




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● Please control the remote controller according to the control instructions printed on its face sticker, or visit the Unitree Go App to obtain the remote controller user documentation.

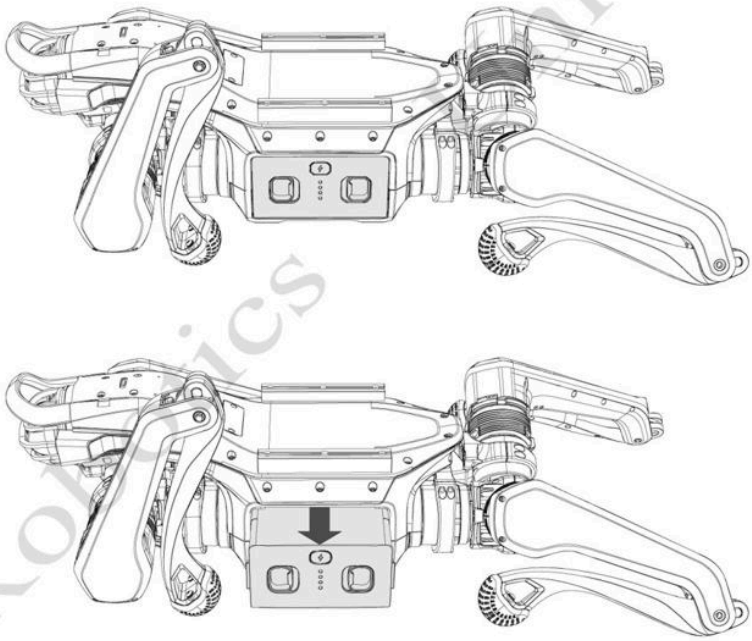
## Switching off As2

Before shutting down, ensure the robot is standing on flat ground and is in a static standing state (the robot's body position is at the initial state after powering on and standing up, with the body level, no joystick input, and in a static standing posture).

1) Press the L2+A buttons twice. The robot will complete joint locking and lying down actions in sequence.

2) After the robot has lain down, briefly press the power button followed by pressing and holding it for 3 seconds or longer to shut down.

After shutdown, position the robot's thighs, calves, and hip joints according to the body placement requirements to prepare for the next startup. If the As2 will not be used for an extended period, remove the battery pack promptly.



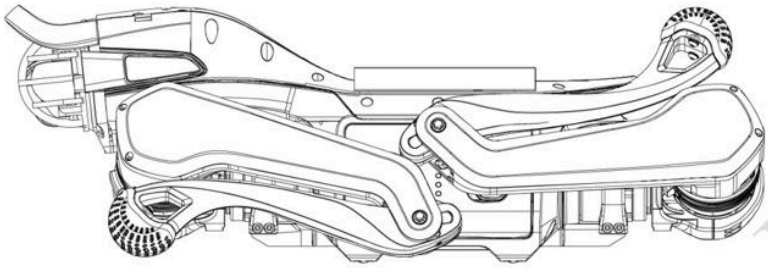
● Please make sure that the robot turned off in a damping state, otherwise the robot will fall heavily on the ground after it is turn down and powered off, which may cause damage to the robot body and certain potential hidden dangers!

● Be careful to avoid pinching your hands at the moving joints. Please proceed with caution!

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## Packing

Preparation for packing: Rotate the legs of the quadruped robot to the position shown in the picture (rear leg retracted step: rotate the rear leg hip motors so that the rear thighs are placed in the position as the picture shows, and at the same time retract the rear lower legs to the position shown in the picture.



After completing the pre-packing preparations, first place the quadruped robot into the lower part of the transportation case. After the quadruped robot is placed in the lower part of the case, put the accompanying remote control, charger, etc. into their respective positions inside the transportation case to ensure that none of the above items will fall out when the upper part of the case is closed.

# Frequently Asked Questions (FAQ)

When using the As2 quadruped robot, the robot may be abnormal. Most abnormal situations are controllable (there are solutions). The users should not panic when encountering these problems. Read the following contents in detail and solve the problems step by step.

If you have any questions, please contact Unitree Robotics official technical support: https://global-serviceconsole.unitree.com/#/work-order

**1) Power-on Self-check Failure**

If the robot fails to stand up within 2 minutes after being powered on in a lying-down position, it indicates that the power-on self-check has failed and the robot cannot stand up. In this case, recheck the robot body by following the "Pre-power-on Inspection" and "Pre-power-on Preparation" steps, then try again.

**2) Robot Fall Self-protection**

When using the official motion control program provided by Unitree (controlling the robot with a remote controller), if the robot loses stability and falls due to external environmental factors (e.g., insufficient ground friction) or improper user operation, the robot will automatically switch to self-protection mode. The motors will automatically engage braking mode to protect all components.

**3) App Connection Anomaly**

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If using AP connection mode, check whether your phone is connected to the AP hotspot emitted by the As2.

If using Wi-Fi connection mode, check whether the connected Wi-Fi network is functioning properly and can access the external network.

If using 4G connection mode(Mainland China version only), go to [Settings] -> [Mobile Network] in the App to view the current data usage and ensure the 4G IoT SIM card can connect to the external network normally.

**4) Unable to Control As2 via App?**

The As2 companion remote controller and the App cannot control the As2 simultaneously. To use the App to control the As2, first exit Companion Mode. Press and hold the power button on the companion remote controller for 2 seconds to turn it off. Then you can use the App to control the As2.

**5) Abnormal Standing Posture After Power-on**

If the As2 exhibits abnormal walking posture after power-on, such as being prone to falling, and restarting the robot does not resolve the issue, recalibrate the robot's joints by following the relevant steps in the Unitree Go App.

Note: The As2 comes pre-calibrated from the factory. Do not perform joint calibration under normal use! If the As2 experiences abnormalities, first consult Unitree official technical support to determine whether joint recalibration is necessary.

The joint calibration entry in the App is: [Settings] -> [Data] -> [Robotic Dog] -> [IMU Information] -> [Calibration].

**6) Radar Stops Rotating After External Force**

Under normal circumstances, the radar will automatically resume rotation once the external force is released. If it does not resume, try giving the radar a slight spin manually. If the issue persists, try restarting the As2. If restarting does not solve the problem, check the fault details in the App and consult Unitree official technical support.

**7) How to Shut Down the Robot When the Remote Module Fails**

If the remote module becomes unavailable (e.g., due to a drained phone or remote controller battery), making it impossible to command the robot to lie down and standby, the only option is to force shutdown by pressing the battery power button.

Force Shutdown: Ensure a safe distance of at least 2 meters between the robot and obstacles, complex terrain, crowds, water surfaces, etc. Lift the robot by its head and tail, briefly press the power button once, then press and hold the power button for more than 3 seconds to cut off power. After the robot powers down, slowly lower it to the ground.

**8) How to Put the Robot into Long-term Standby**

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If long-term standby is needed, put the robot into a lying-down posture (press L2 + B to enter Damping Mode) to prevent the robot from shutting down automatically due to low battery and falling, which could cause damage.

**9) As2 Standard Power-On Procedure**

a) Confirm that the battery is fully installed and securely locked;

b) Before powering on, place the robot flat on a level, hard surface, with all four lower legs fully retracted and flush against the body;

c) Briefly press the power button, then long-press for 2 seconds to complete startup. A steadily lit battery indicator signifies successful power-on;

d) Wait approximately 1 minute for the robot to complete motor self-check. The robot will stand up automatically, marking the completion of the startup process.

**10) What to do if the robot shows no response after powering on?**

a) Observe the indicator light on the robot's head. Continuous red flashing indicates a hardware alarm—further fault diagnosis is required;

b) Download the Unitree Go App on your phone, bind the device, and check the detailed abnormal alarm prompts on the interface;

c) If no alarm messages appear, connect the supplied remote controller and press the key combination L2+A to attempt triggering the robot to stand;

d) Power off the entire unit and restart to verify whether the fault is cleared. If the issue persists, please submit an after-sales repair ticket.

**11) As2 Standard Power-Off Procedure**

a) After use, use the remote controller key combination L2+A to switch the robot to a prone (lying-down) posture;

b) Briefly press the power button, then long-press for 2 seconds to shut down. Complete extinction of both the battery indicator and body status lights confirms normal power-off;

c) If the robot will be idle for an extended period, it is recommended to remove the battery and store it separately in a dry environment to eliminate safety risks;

d) Forcibly shutting down or removing the battery while the robot is standing or moving is strictly prohibited, as it may easily cause motor or joint damage.

**12) The robot drifts during movement, consistently veering in one direction**

a) If drifting occurs during straight joystick control, it is most likely due to IMU attitude data deviation. Recalibrating the IMU via the Unitree Go App will correct this;

b) Minor drifting falls within the normal tolerance range. The extent of drift may be influenced by gait parameters and floor material, and straight-line walking performance can be optimized through refined calibration.

**13) Abnormal noise from legs during walking, unilateral limping, uneven leg height**

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a) Power down and inspect the wear on the anti-slip foot pads at the bottom. Check joint gaps for entangled hair, mud, sand, or debris, and thoroughly clean any foreign matter;

b) Open the Unitree Go App and perform a full recalibration of the entire unit's motors and IMU attitude;

c) If the fault persists after calibration, log in to the after-sales platform and submit a repair ticket for hardware inspection.

**14) What causes unstable walking or frequent slipping?**

a) Operation on low-friction surfaces such as ice or soft surfaces like sponge is prohibited;

b) When operating on smooth surfaces such as glass or polished tiles, always reduce movement speed and strictly avoid high-speed pivoting in place;

c) Suitable scenarios: Cement floors, short-grass dirt roads, and lightly graveled surfaces are all appropriate for normal use. Single obstacle-crossing height must not exceed 20 cm.

**15) Is it normal for motors to become hot after prolonged operation?**

a) Mild warmth under heavy load or prolonged high-speed travel is normal. If the body becomes noticeably hot to the touch and a high-temperature protection pop-up appears in the App, immediately stop operation to ventilate and dissipate heat, while reducing load and lowering walking speed;

b) After high-temperature protection is triggered, the robot may be unable to stand autonomously. In this case, power off and let it sit idle until the motors have fully cooled before restarting;

c) Motor temperature and high-temperature alarm details can be viewed in the Unitree Go App;

d) After fully cooling, restart the robot and confirm that gait and standing functions have returned to normal before resuming use.

**16) As2 Battery Installation Method & Low Battery Warning Threshold**

a) Pinch the latches on both sides of the battery with both hands, smoothly push the battery into the body, and listen for the simultaneous "click" locking sound from both side latches—this confirms proper installation. It is normal for a new unit to arrive partially charged or empty;

b) When battery level drops to 25% (only the last indicator light remains lit), it is recommended to return promptly for charging to prevent over-discharge damage to the cells caused by complete battery depletion;

c) Real-time precise remaining battery level can be viewed on the Unitree Go App home screen.

**17) Will carrying heavy loads affect the robot's movement performance? How does it impact battery life?**

a) Under standard no-load conditions, battery life can exceed 4 hours, with a range of approximately 20 km (AIR version: 2 hours, 10 km);

b) Under walking conditions with a full 15 kg load, battery life shortens to 2.5 hours, with a range of approximately 13 km (AIR version: 1.5 hours, 7 km);

c) Prolonged operation beyond weight limits will increase motor heating, accelerate joint bearing wear, and cause irreversible hardware damage to the body.

**18) What is the maximum payload capacity of the robot?**

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a) Static standing limit load: 65 kg (AIR version: 45 kg, PRO version: 55 kg);

b) Dynamic walking limit load: 15 kg (AIR version: 10 kg, PRO version: 13 kg);

c) Long-term overload operation is prohibited, as it can cause permanent damage to motors and bearings.

**19) Can the robot be used in rainy or humid environments?**

a) The As2 has an overall ingress protection rating of IP54, protecting against water splashes from all directions and brief, light rain;

b) IP54 does not support immersion, prolonged rainfall exposure, or continuous water flow washing. Extended operation in heavy rain or on flooded surfaces is not recommended;

c) If the body becomes heavily wet, immediately power off, remove the battery, wipe moisture from gaps, and allow thorough ventilation and drying before restarting.

**20) Does the robot support stair climbing and slope ascent? What are the limitations?**

a) Step traversal: Maximum step height of 25 cm (AIR version limit: 20 cm);

b) Slope climbing: Maximum incline of 40° (AIR version limit: 30°);

c) When operating under load or on uneven terrain, operators must reduce walking speed and avoid sharp or tall obstacles to prevent tripping or tipping.

**21) What to do if the Unitree Go App cannot detect the As2 robot?**

a) Enable phone Bluetooth and grant the App Bluetooth access permission in system settings;

b) Keep the phone close to the robot body and disconnect other idle Bluetooth devices on the phone to avoid signal contention;

c) Wait until the robot completes full startup and stands up automatically before entering the App to search for and pair with the device.

**22) Troubleshooting steps for delayed response or unresponsive buttons on the remote controller**

a) Check the battery levels of both the remote controller and the robot to ensure sufficient power;

b) Move away from areas with high electromagnetic interference such as routers, industrial wireless equipment, and high-voltage cables to reduce signal obstruction;

c) Restart both the remote controller and the robot separately, then open the Unitree Go App to re-pair and reconnect.

**23) What to do if there is no feedback when waking the robot via voice command?**

a) Press the remote controller key combination L1+L2 to check the microphone switch status and confirm that the voice interaction function is enabled;

b) Connect to the Unitree Go App, check the system volume setting, and try setting the volume to 100% for testing;

c) Have the operator move closer to the robot, clearly speak the wake word in full, and wait for the device's response before issuing action commands.

**24) How to fix interrupted OTA firmware upgrade or upgrade failure?**

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a) Before upgrading, ensure device battery ≥30% and connect to a stable Wi-Fi network;

b) Do not forcibly power off during an interrupted upgrade—reconnect to Wi-Fi and initiate the upgrade again;

c) If repeated upgrade attempts fail, contact official after-sales support for technical assistance.

**25) How to adjust ISS3.0 Smart Follow Mode when the following distance fluctuates or the target is frequently lost?**

a) Open the follow function switch in the Unitree Go App and check the companion module status. If readings remain at zero, this indicates a hardware abnormality in the module;

b) Adjust follow sensitivity and ranging thresholds within the App. During operation, avoid areas with strong light reflections or dense obstructions. For outdoor inspections, it is recommended to enable radar-assisted obstacle avoidance simultaneously to improve follow stability.

**26) What are the standards for robot cleaning and maintenance intervals?**

a) After each operation, clean the anti-slip foot pads and radar lenses, and inspect joint motors for entangled hair or cables;

b) Perform a full joint calibration once per week;

c) Once per month, tighten all fixing screws on the body and robotic arm, and complete a full functional self-test of the unit.

⚠ ● Note! When lifting the robot, do not place your hands near the joints, such as the hip joints. Be careful to avoid pinching your hands!

# Precautions

1) Please ensure the robot is in a lying-down position before shutting it down. Otherwise, the robot will fall heavily to the ground when powered off, which may cause damage to the body and pose certain safety risks!

2) When standing, if the ground lacks sufficient friction or the robot's feet do not have reliable support, do not aggressively manipulate the robot for posture adjustments (including pitch, roll, yaw, body height adjustment, etc.), as this may cause the robot to lose stability and fall.

3) Walk steadily on flat terrain during operation. When walking on surfaces with low friction, do not aggressively manipulate the robot, as this may cause the feet to slip, leading to instability and falling.

4) Regarding battery life: The robot's comprehensive operational battery life is approximately 2–4 hours, varying by version. The actual runtime depends on the robot's operating conditions. For example, prolonged fast walking, intense posture adjustments while standing, standing with bent legs, carrying loads, walking at a low body height, or traversing uneven or sloping terrain will all shorten battery life. (When the body height is

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low and the knee joint bend is large, the motor load increases, significantly raising power consumption and causing motor heating.)

5) Regarding steps and uneven terrain: Since users' skill levels vary, for reliability and safety, it is not recommended to step over obstacles taller than 25 cm (20 cm for the AIR version). Otherwise, improper operation may cause tripping. When encountering uneven ground, operators should proceed with caution and reduce the robot's movement speed.

6) Regarding slope climbing: The rated forward climbing angle is ≤40° (30° for the AIR version). When climbing at steeper angles (approximately 40° or more), the robot's body may drift sideways. Turning directly on a steep slope may cause the robot to lose stability. When climbing slopes, reduce walking speed and exercise proper control.

7) **Regarding speed:** Under stable control on flat terrain, the speed ranges from approximately 0 to 3.7 m/s (0 to 3 m/s for the AIR version), with the EDU version reaching a limit of approximately 5 m/s.

8) **Regarding foot-end components:** The robot's foot-end components are consumables. Spare foot-end components are included with the shipment. Wear is especially severe when operating on rough terrain. If noticeable wear or damage to the foot pads is observed, or if the impact noise against the ground increases significantly during walking, replace the foot-end components promptly to prevent abnormal movement or fall-related damage caused by worn components.

9) **Regarding IP54 protection rating:** Before operation, ensure the battery connector, battery compartment connector, battery surface, and battery compartment surface are dry and free of moisture before inserting the battery into the robot body. (Not supported by the AIR version.)

10) Do not touch the robot while it is in motion! Be careful of pinch points at the joints, such as the knee joints.

⚠ ● The maximum running speed of the EDU version is 5 m/s, achieved under special configurations. In practice, the speed will be limited for safety reasons.

# Daily Maintenance

## Whole Machine Clean

**1) Cleaning**

The As2 AIR version is neither dustproof nor waterproof. If there are stains on the surface after use, clean the body promptly. Before wiping the body, turn off the power. Use a dry, clean soft cloth to wipe the body, paying special attention to whether the camera and radar are clean.

The As2 PRO version and above (including the battery pack) have an IP54 waterproof rating. Do not remove the battery pack during cleaning. Slightly dampen a soft cloth with clean water, wring it out, and gently

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wipe the body. After cleaning, thoroughly dry the device surface with a dry soft cloth. Do not rinse directly with water!!

**2) Storage**

The As2 should be stored in a dry, cool indoor environment, avoiding direct sunlight and rain to prevent corrosion of parts and shortened service life. Remove the battery pack for long-term storage.

## Inspection and Maintenance

Carrying out routine inspection before and after operation can greatly improve the reliable performance of products, reduce potential safety hazards and extend the service life span.

**Uncharged checklist**

| Type | Main points |
|---|---|
| Appearance of the whole robot | 1) Check whether the body's appearance is clean, and free of damage or deformation marks.<br>2) Whether the lens on the camera surface has foreign matters.<br>3) Check if there are any obstructions around the head-mounted LiDAR. |
| Structure | 1) Visually and touch to check whether the body, joints, connections, and foot end parts are in good condition. If there are cracks or damages, replace them in time and contact Unitree Robotics after-sales service.<br>2) Ensure that the screws of all connecting parts are locked, especially the screws of joint connectors and battery locking knobs.<br>3) Check for any obstructions in the intake and exhaust of the cooling fan. |
| Foot end parts | Check whether there is obvious foot pad damage. If there is damage, please replace it in time. |
| Battery packs | 1) Check the battery pack interface of the body for foreign matters and deformation.<br>2) Whether the battery pack is installed reliably to ensure that it will not loosen during operation.<br>3) Check whether the battery pack shell is obviously damaged. The battery pack with obvious damage is forbidden to be used. |
| Remote Control | 1) Whether the remote control rocker is in the middle position and whether the rocker enters sand and other foreign matters.<br>2) Check whether each key of the remote control is lagged. |

**Uncharged checklist**

| Type | Main points |
|---|---|

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| | |
|---|---|
| Remote Controller / Companion Remote Controller | 1) Confirm whether the basic operation function of the rocker is normal.<br>2) Confirm whether the current power is sufficient |
| Battery | Confirm whether the current power is sufficient. |
| Cooling fan | Listen carefully with ears to confirm that the cooling fan works normally and there is no sound such as scratching. |

**Battery pack maintenance**

1) Never charge the battery pack in an environment where the temperature is too high or too low

2) Never store the battery pack at room temperatures above 40°C.

3) Do not overcharge the battery pack as this will cause damage to the cells.

4) If you do not use the battery for a longer period of time, please check the remaining battery power regularly, if the power is less than 30%, please charge the battery to 70% before continuing to store. So as not to over-discharge the battery and damage the battery.

- It is recommended to do the above inspection before each use!
- If any parts are damaged and need to be replaced, please contact Unitree Robotics after-sales service in time!

## Interface_Sensors Description

**Network Interfaces & Services:**

| Network Interface | Network Service | Description |
|---|---|---|
| WLAN Interface | HTTP web service on port 9991. | Serves as signal server for webrtc connection |
| BLE Interface | BLE one to one link between a mobile and our robot. | Enable mobile app connection for wlan network configuration |
| LoRaWAN Interface | One to one LoRaWan between our remote controller and our robot | Enable remote controller connection for controlling the robot. |
| UWB | UWBcapability for robot-side positioning of users equipped with UWB receivers. | The UWB system is configured with the base station on the robot and the tag on the handheld device, facilitating mutual data exchange. |

**Environment Sensors:**

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| Sensor Name | Remark | Function description | Sensing capabilities |
|---|---|---|---|
| camera | 1 | Mounted in the front of the robot to transfer video signal to mobile apps. | 1080p resolution. |
| LiDAR | Unitree (L2-As2-AIR) Version JT128 and AIRY are optional (As2-PRO, As2-EDU) | High-perfommance 3D LiDAR for SLAM. obstacle avoidance, and environment perception. | JT128: 360° 3D environmental perception;128 beam; Long-range sensing capability from 0.1m up to 40m@10% ;<br>AIRY: 360° 3D environmental perception;96 beam; Long-range sensing capability from 0.1m up to 30m@10% ;<br>L2 ;360° 3D environmental perception; sensing capability from 0.1m up to 15m@10% ; |
| Microphone | 1 | The function of microphone is to record the voice commandofusers torealize the functionality of voice control. | 5 meters in circle. |

**Company Information:**

YuShuTechnologyCo.,Ltd.

306 Room, Building 1, 88 Dongliu Rd, Xixing Street, Binjiang District, Hangzhou, 310000 Zhejiang P.R. China.

## Industry Canada

**This device complies with Industry Canada licence-exempt RSS standard(s):**

Operation is subject to the following Two conditions:(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

**Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux**

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appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi,même si le brouillage est susceptible d'en compromettre le fonctionnement.

**This Class B digital apparatus complies with Canadian ICES-003.**

**Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.**

**RESTRICTIONS IN THE 5 GHZ BAND**

Within the 5.15 to 5.25 GHz band, UNII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel Mobile Satellite System (MSS) operations.

**RESTRICTIONS DANS LA BANDE DE 5 GHZ**

Dans la bande de 5,15 à 5,25 GHz, les appareils UNII seront restreints aux opérations intérieures pour réduire toute possibilité d'interférence pouvant nuire aux opérations du Système satellite mobile dans le même canal(MSS).

**RF Exposure**

RF Radiation Exposure Statement Caution: This Transmitter must beinstalled to provide a separation distance of at least 20 cm from all persons.

Déclaration d'exposition Attention: Cet émetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne.

## FCC Statement

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 Federal Communications Commission (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.

Changes or modifications to this equipment not expressly approved by the Party responsible for compliance could void the user's authority to operate the equipment.

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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. Privacy of communications may not be ensured when using this device.

**General Information**

RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

## Radio Frequency Specifications

**Specifications**

2.4GHz Wi-Fi (2412-2472MHz): 20dBm (EIRP)

Bluetooth(2402-2480MHz): 20dBm (EIRP)

2.4GHz SRD (2400.8-2480MHz) : 14dBm (EIRP)

Sub 1GHz Bands (865-868, 868-868.6, 869.4-869.65, 869.7- 870MHz): 14dBm (ERP)

**5GHz Wi-Fi:** 5150-5250MHz: 23dBm (EIRP)  5250-5350MHz, 5470-5725MHz: 20dBm (EIRP) 5725-5850MHz: 14dBm (EIRP)

Wi-Fi 5150-5350MHz frequency range is limited to indoor use in all EU/EFTA member states and Turkey.

**RF exposure:**

The equipment complies with radiation exposure limits set for an uncontrolled environment. To avoid the possibility of exceeding radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm during normal operation. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.



| | | | | | |
|---|---|---|---|---|---|
| BE | BG | CZ | DK | DE | EE |
| IE | EL | ES | FR | HR | IT |
| CY | LV | LT | LU | HU | MT |
| NL | AT | PL | PT | RO | SI |
| SK | FI | SE | UK (NI) | TR | NO |
| CH | IS | LI | | | |

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

The appliance is only to be used with the power supply unit provided with the appliance.

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## ANATEL Res. 680 RF warning sentence

The equipment complies with radiation exposure limits set for an uncontrolled environment. To avoid the possibility of exceeding radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm during normal operation. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

ANATEL website:

Para maiores informações, consulte o site da ANATEL http://www.gov.br/anatel/pt-br.

## Revision History

| Edition | Date | Modify Content |
|---|---|---|
| 1.3 | August 7, 2026 | Specification Sheet Updated |
| 1.2 | July 16, 2026 | 4G, GPS supported only in the mainland China version |
| 1.1 | July 7, 2026 | Adding FAQ Section |
| 1.0 | May 29, 2026 | Initial Version |



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