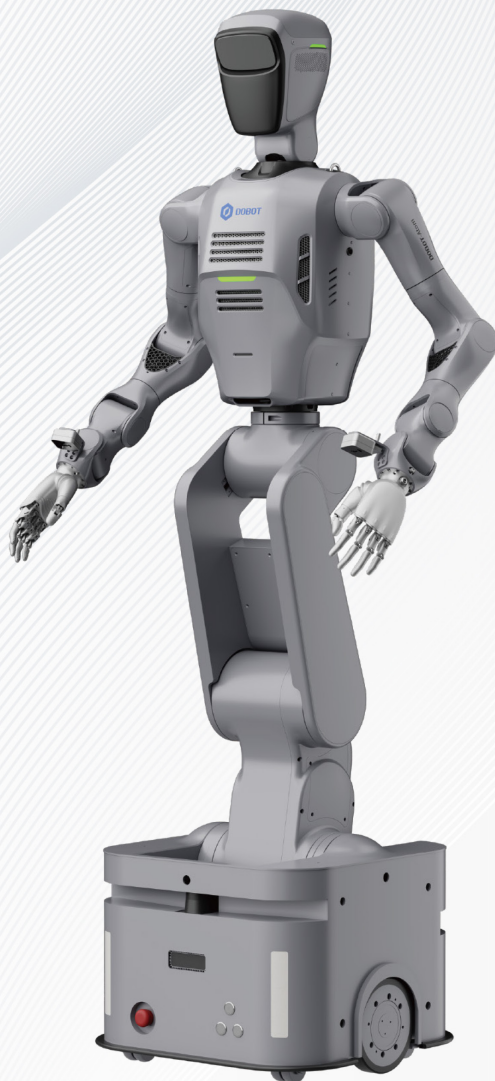




DOBOT ATOM-W

Wheeled Humanoid Robot

Quick Start



Original Instructions

Issue: V1.0

Date: 2026-01-29

SHENZHEN DOBOT CORP LTD | China

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Before using our product, please thoroughly read and understand the contents of this document and related technical documents that are published online, to ensure that the robot is used on the premise of fully understanding the robot and related knowledge. Please use this document with technical guidance from professionals. Even if follow this document or any other related instructions, damages or losses may happen in the using process DOBOT shall not be considered as a guarantee regarding all security information contained in this document.

The user has the responsibility to make sure following the relevant practical laws and regulations of the country, in order that there is no significant danger in the use of the robot.

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Website: www.dobot-robots.com

Preface

This document introduces the functions, technical specifications, installation guidelines, and other aspects of the DOBOT ATOM-W Wheeled Humanoid Robot, aiming to help users understand and operate the robot.

Scope of application

ATOM-W Wheeled Humanoid Robot.

Intended audience

This document is intended for:

- Customer
- Sales Engineer
- Installation and Commissioning Engineer
- Technical Support Engineer

Revision history

Date	Version	Revised content
2026-01-29	V1.0	The first release

Symbol conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, could result in death or serious injury.
 WARNING	Indicates a hazard with a medium level or low level of risk which, if not avoided, could result in minor or moderate injury, robot damage.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in robot damage, data loss, or unanticipated result.
 NOTE	Provides additional information to emphasize or supplement important points in the main text.

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1. Safety Precautions

1.1 Disclaimer

The ATOM-W Wheeled Humanoid Robot is a product developed by SHENZHEN DOBOT CORP LTD (hereinafter referred to as "DOBOT"). It is a humanoid robot based on embodied AI operation models and edge AI computing power, designed to perform tasks such as "collection, training, and inference" in specific application scenarios. However, as robotics technology has not yet reached full maturity, special attention must be paid to the safety-related instructions described in this document during actual operation.

All safety information contained in this document shall not be construed as a warranty by DOBOT. Even if all safety instructions are followed, the robot may still cause injury or damage.

- DOBOT is not responsible for any damage incurred during the transportation and handling of the robot.
- Natural wear and tear of components and battery aging are considered normal risks. DOBOT assumes no liability for such risks.
- It is strictly prohibited to disassemble, modify, or perform unauthorized repairs on the robot. DOBOT shall not be liable for any robot malfunctions or damages resulting from such actions.
- The ATOM-W Wheeled Humanoid Robot is only intended for use by individuals aged 18 and above who possess the corresponding cognitive and behavioral capabilities. Individuals who do not meet these requirements must use the robot under the guidance and supervision of a guardian and must read this document carefully before use. DOBOT assumes no responsibility for any robot damage or personal injury resulting from failure to follow the product instructions or from other improper operations.
- It is strictly prohibited to operate the robot under unrecommended environmental conditions. DOBOT shall not be liable for any robot damage caused by inappropriate [operating environments](#).
- DOBOT reserves the final right of interpretation regarding the ATOM-W robot and the right to update its terms and conditions.

1.2 Operating environment

Recommended environment

- -5°C to 40°C, standard atmospheric pressure, no condensation.
- Indoor use.
- Hard, flat, and obstacle-free ground surface.

Unsuitable environments



Do not operate the robot in the following environments!

- Humid, dusty, or chemically corrosive environments.
- Environments with electromagnetic interference or Wi-Fi signal interference.
- Complex, slippery, or cluttered environments, or areas with sharp objects.
- Icy surfaces or soft ground (e.g., thick sponge).

1.3 Transport and installation

- During transport, secure the packaging to ensure the robot is not tilted or shaken.
- When lifting or moving the robot, use appropriate and reliable lifting equipment. Operations must be performed by personnel holding valid operation certificates as per relevant national regulations, or by personnel authorized by the company.
- Do not move or transport the robot while it is powered on.
- Ensure the packing/unpacking area is clear of obstructions to allow personnel to evacuate promptly in case of an emergency.
- During installation, support the robot to avoid impacts that could cause surface scratches or functional damage.
- It is strictly prohibited to alter or remove any nameplates, instructions, icons, or markings on the robot.
- It is strictly prohibited to obstruct the robot's sensor areas (head, wrists, waist), as this may reduce perception accuracy and pose a risk of system malfunction.
- Personnel responsible for installing, operating, maintaining, or servicing the robot must undergo rigorous training, understand all safety precautions, and master the correct operating and maintenance procedures.

1.4 Usage instructions

Before Use

- The operator must ensure they are in good physical and mental condition.
- The operator must be familiar with the robot's various operating modes and emergency stop procedures.
- Only original parts of the robot should be used, and all parts must be in proper appearance and functional condition.
- Check that the robot's battery and the handheld remote controller have sufficient charge.
- Check that the robot's exterior is intact and that its upper and lower limbs can move flexibly.
- Check that there are no foreign objects (e.g., water, oil, sand) inside the robot.
- Check that surfaces such as the robot's LiDAR and cameras are unobstructed.
- Regular daily inspections and periodic maintenance must be performed. Replace faulty components promptly.

During Use

- Keep the robot within your line of sight at all times.
- Do not touch the robot while it is powered on.
- A qualified professional must monitor the robot throughout its operation. This ensures the operator can regain control immediately in case of an unexpected event.
- When operating the robot, avoid wearing loose clothing or jewelry. Keep fingers, hair, and clothing away from the robot's joints, gaps, and moving parts to prevent pinching or entanglement.
- Stop the robot and power it off promptly when the battery is low. This prevents damage from falls caused by an automatic shutdown due to insufficient power.
- The robot generates heat during operation. Do not touch the motor surfaces while it is running to prevent burns.
- During debugging, ensure no personnel or other equipment (including the computer used for debugging) remains within the robot's hazard zone.
- When the robot is in motion, ensure the surrounding area is clear. Use protective barriers whenever possible to prevent falls that could damage the robot or injure personnel.
- Do not continue using the robot if it is damaged.
- Avoid making drastic adjustments to the robot's posture on

surfaces with insufficient friction.

- In case of a malfunction, contact DOBOT's technical support engineer in time.

After Use

- Power off the robot immediately after use.

1.5 Emergencies

In the event of abnormal robot operation or any other emergency, all robot motion can be stopped by using the emergency stop button on the chassis, the emergency stop button on the robot's back, or the handheld remote controller.

For specific instructions on executing an emergency stop of the robot, please refer to [Abnormal Stop](#).

According to IEC 60204-1 and ISO 13850, emergency stop devices are not safeguards. They serve as supplementary protective measures and are not intended to prevent injuries.

NOTICE

An emergency stop command sent via the App may be delayed or fail due to factors such as poor network connectivity. Therefore, if the robot is deployed in a high-risk scenario, it is recommended to use the physical emergency stop button located on the robot.

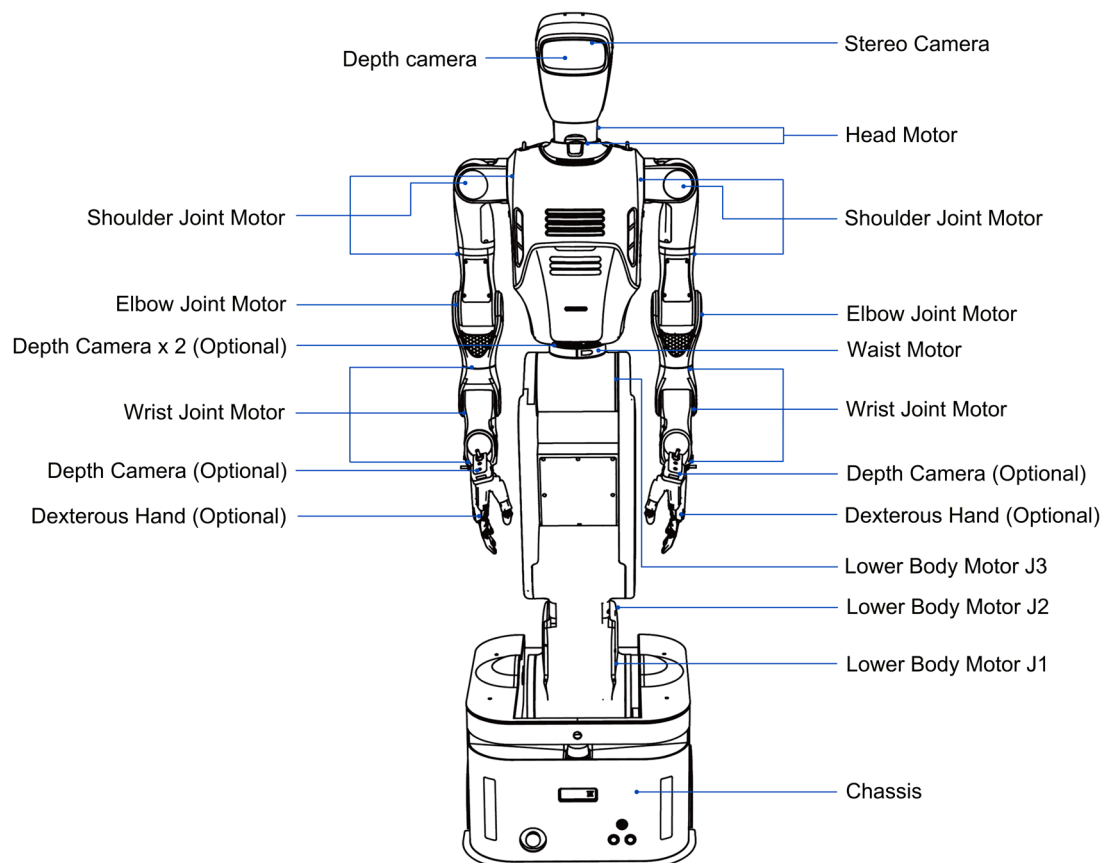
2. Product Introduction

2.1 Product overview

ATOM-W is an embodied wheeled humanoid robot developed by DOBOT. It features a 7-degree-of-freedom (DOF) industrial-grade bionic arm ($\pm 0.05\text{mm}$ precision), a human-like articulated head, and an optional five-fingered dexterous hand. Its mobile chassis achieves a repetitive positioning accuracy of $\pm 10\text{mm}$, capable of autonomous stable movement and high-dynamic motion in complex scenarios. Leveraging embodied AI operation models and edge AI computing power, it enables "collection, training, and inference" in specific application scenarios.

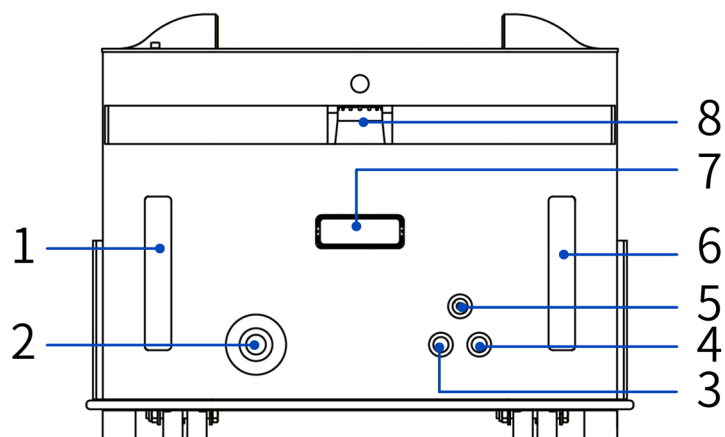
2.2 Appearance

2.2.1 Robot



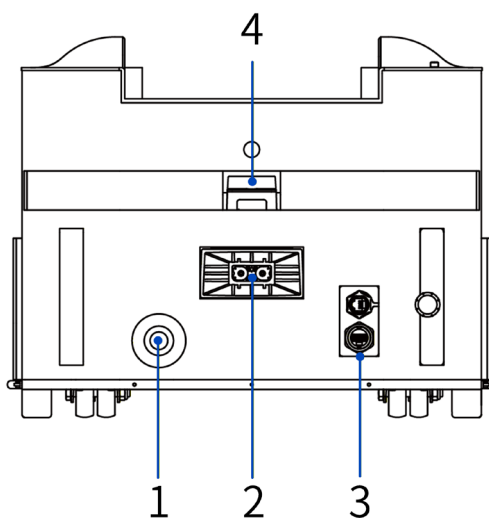
2.2.2 Chassis

Front panel



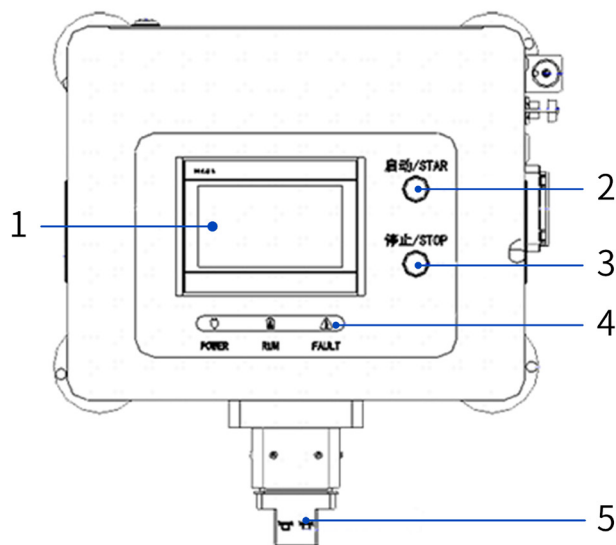
No.	Name	Description
1 & 6	Indicator	- Yellow: Standby. - Green: Task in progress, or charging. - Red (1-second blink): Obstacle encountered or fault detected. - Red (3-second blink): Low battery.
2	Emergency stop button	- Press: Immediately stops all mechanical operations of the device. - Rotate and release: Restores mechanical operation and initiates an automatic system self-check.
3	Maintenance button	Used to switch between Maintenance and Automatic modes. - Press: Maintenance mode. Motors are disabled, allowing manual pushing of the robot. - Release: Light off. Task mode. Motors are enabled, robot cannot be pushed.
4	Confirm button	Activates the robot's motion status.
5	Power button	Device power switch.
7	3D camera	Acquires 3D environmental data for autonomous navigation and obstacle avoidance.
8	LiDAR	Enables positioning and navigation via laser scanning.

Rear panel



No.	Name	Description
1	Emergency stop button	- Press: Immediately stops all mechanical operations of the device. - Rotate and release: Restores mechanical operation and initiates an automatic system self-check.
2	Charging port	For autonomous charging docking (the device can auto-align and connect).
3	Debug port	For connecting debugging cables (user-restricted).
4	LiDAR	Enables positioning and navigation via laser scanning.

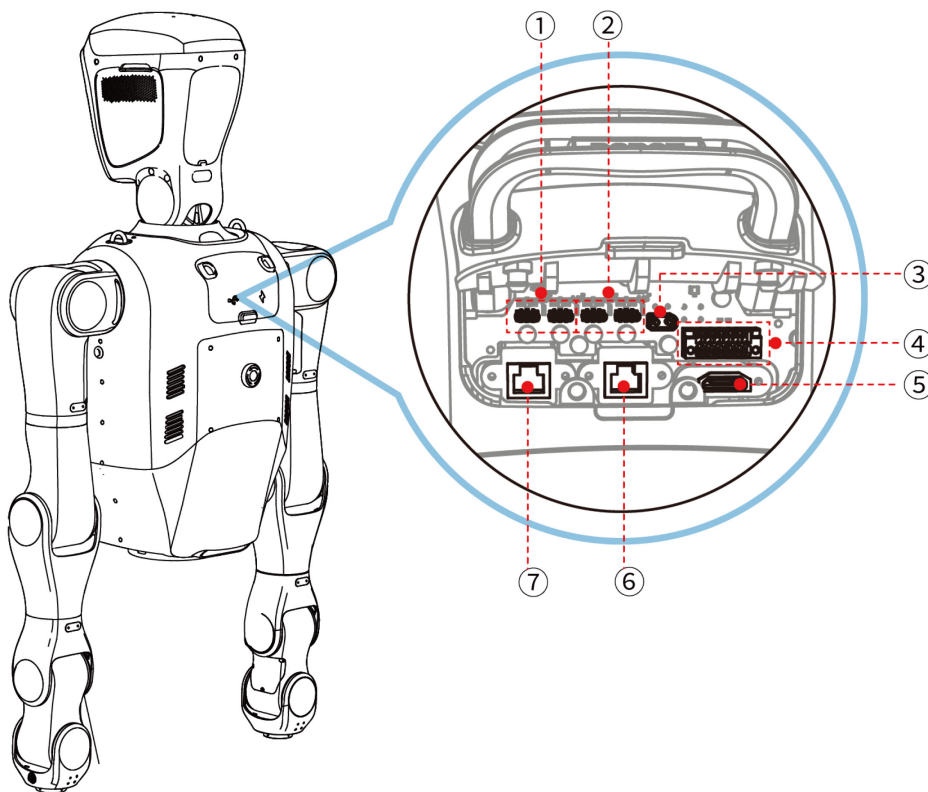
2.2.3 Charging dock



No.	Name	Description
1	Display	Shows current charging status, network configuration, and fault information/logs.
2	Start button	Initiates manual device charging.
3	Stop button	Stops manual device charging.
4	Status indicators	Indicates the charging dock status. - POWER light on: Dock is powered on. - RUN light on: Dock is charging. - FAULT light on: Dock has a fault.
5	Charging port	Used for docking and charging the device.

2.3 External interface

The wheeled robot's external interfaces are located beneath the silicone casing on its back and are intended for secondary development and debugging purposes.



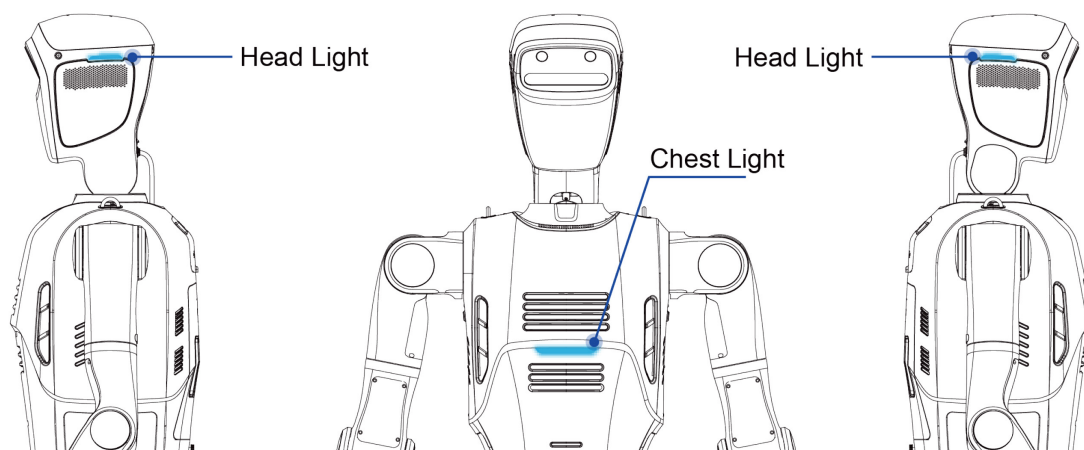
No.	Interface type	Qty.	Silkscreen	Description
①	Type-C (Reinforced)	2	TypeC1 TypeC2	Supports USB 3.0 host with 5V/1.0A power output (connected to PC1, expanded to 2 ports via a hub chip). Can connect to a docking station to add peripherals (e.g., keyboard, mouse).
②	Type-C (Reinforced)	2	TypeC3 TypeC4	Supports USB 3.0 host with 5V/1.0A power output (connected to PC2, expanded to 2 ports via a hub chip). Can connect to a docking station to add peripherals (e.g., keyboard, mouse).
③	XT30	1	VBAT	Reserved for internal use.
④	GPIO*	1	/	Provides 3 DI (Digital Input) channels, 3 DO (Digital Output) channels, and offers 5V/12V/24V power output interfaces.

No.	Interface type	Qty.	Silkscreen	Description
⑤	HDMI	1	HDMI	Connected to PC2, for connecting an external monitor.
⑥	RJ45 (1000 BASE-T)	1	LAN2	Gigabit Ethernet (connected to PC2). Use this port when stable, high-speed wired internet access is required for secondary development via PC2★.
⑦	RJ45 (1000 BASE-T)	1	LAN1	Gigabit Ethernet (connected to the switch). Use this port when secondary development requires accessing API interface data from PC1★.

- ★ PC1: Dedicated to ATOM-W motion control programs, not open to external access.
- ★ PC2: Developers are only permitted to use PC2 for secondary development. The IP address for PC2 is 192.168.8.13, port 3390. For the initial username and password, please contact technical support.
- ★ The functions corresponding to each pin number on the GPIO module are as follows:

Pin No.	Function	Pin No.	Function
1	DI1	7	DO1
2	+5VDC_OUT	8	GND
3	DI2	9	DO2
4	+12VDC_OUT	10	GND
5	DI3	11	DO3
6	+24VDC_OUT	12	GND

2.4 Indicator

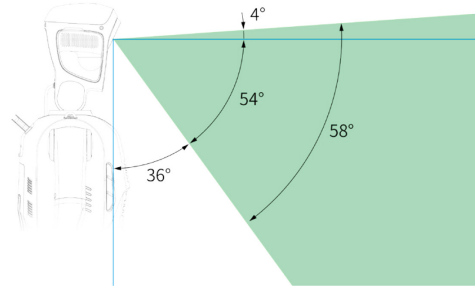


Light status	Device status
OFF	Device is not powered on, or the power distribution board is faulty.
Blue (Slow flash)	Device is booting up.
Blue (Steady on)	Device is disabled with no active alarms.
Red (Quick flash)	CAN board or servo communication lost. Contact technical support for troubleshooting.
Red (Slow flash)	Other alarms excluding CAN/servo communication loss (e.g., servo or feedback over-limit alarm, BMS error, enable failure). Contact technical support for troubleshooting.
Green (Steady on)	Device is enabled and all systems are normal.
Yellow (Steady on)	Warning condition (e.g., low battery or JSON file error detected).

2.5 Camera and LiDAR

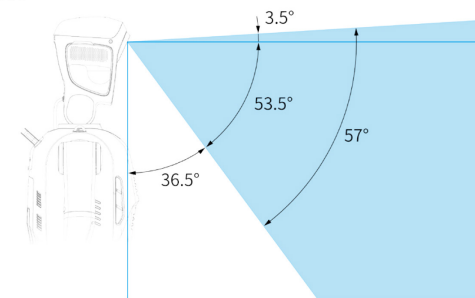
- Head-Mounted Depth Camera Field of View**

The ATOM-W is equipped with a head-mounted depth camera, enabling the robot to perceive and understand its surroundings with greater accuracy. Refer to the right-side diagram for the head-mounted depth camera's field-of-view angles.



- Head-Mounted Stereo Camera Field of View**

The ATOM-W is equipped with a head-mounted stereo camera, working in conjunction with the depth camera to enhance the robot's spatial perception and obstacle detection capabilities. Refer to the right-side diagram for the head-mounted stereo camera's field-of-view angles.



2.6 Technical specifications

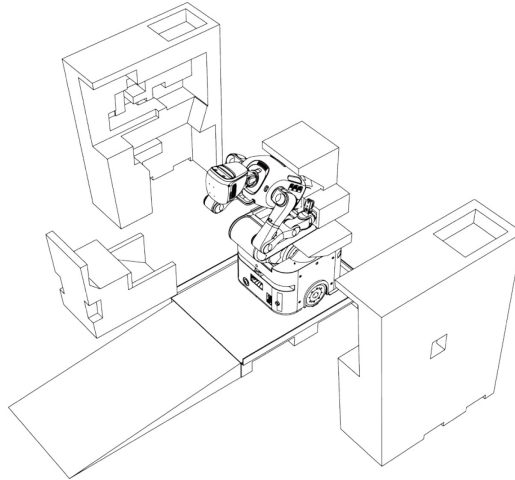
Product dimensions	Approx. 1785mm (H) × 500mm (W) × 500mm (D)
Weight (excluding dexterous hand/gripper)	Approx. 136 kg
Total Degrees of Freedom (DoF) (excluding dexterous hand)	22
Head DoF	2
Arm DoF	7×2
Waist DoF	4
Arm rated payload (each, excluding dexterous hand/gripper)	3.5 kg
Arm max payload (each, excluding dexterous hand/gripper)	5 kg
Arm reach (excluding dexterous hand/gripper)	600 mm

Dexterous hand (optional)	6 DOF
Head vision	Depth camera x 1, Stereo camera x 1
Hand vision (optional)	Depth Camera x 2
Waist vision (optional)	Depth Camera x 2
Hand force sensing (optional)	6-axis force sensor at end-effector
Audio equipment	360° omnidirectional microphone x 1, Neodymium speaker x 2
Battery	55Ah
Chassis speed	1.5 m/s
Navigation method	LiDAR-based navigation
Repeatability	±10 mm (center-to-point)
Battery life	Approx. 10 h
Charging time	≤ 2.5 h (Charging dock input: AC 220V, charging from 20% to 100%)
High-performance computing module	Intel i9 (24-core, 32-thread) + Dedicated GPU with large video memory (FP32 GPU computing power: 41.15 TFLOPS)

3. Quick Start

3.1 Unpacking

1. Upon receiving the robot, please check the outer packaging to ensure it is in good condition. If any damage is found, promptly contact the logistics company and your local supplier.
2. After opening the outer packaging, please verify the items against the unpacking checklist included with the product shipment. If any items are missing, promptly contact after-sales support for a replacement.



3.2 Charging

NOTICE

- Use only the official DOBOT charging dock provided. Third-party chargers are prohibited.
- Before connecting to AC power, ensure the AC voltage matches the charger's rated input voltage to prevent damage to the charging dock.
- Ensure the charging voltage and current are compatible with the robot, and that the charging port is properly connected.
- If smoke, unusual odor, overheating, or deformation occurs during charging, immediately disconnect the charger.
- After pressing the **Start** button, charging should begin within 30 seconds. If not, contact technical support for troubleshooting.

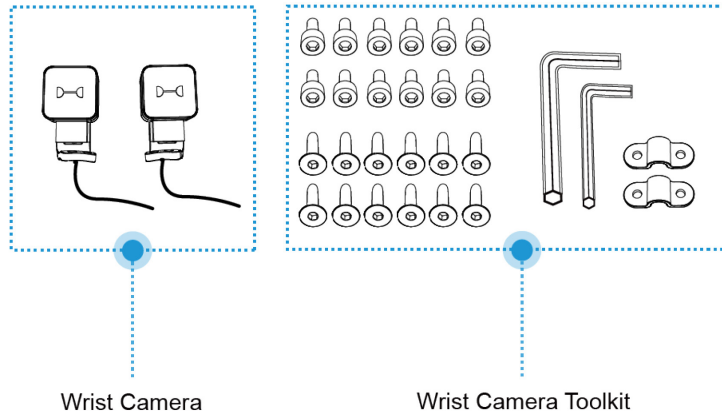
Charging is required for first-time use or whenever prompted by the robot.

1. Before charging, press the **LB+A** buttons on the handheld remote controller to engage damping mode, or press the **LB+B** buttons to engage zero-torque mode.
2. Push the robot in front of the charging dock, align the robot chassis's charging port with the dock's charging port, then press the dock's **Start** button to begin manual charging.
3. Charging will stop automatically once fully charged, or you can press the **Stop** button to halt charging.

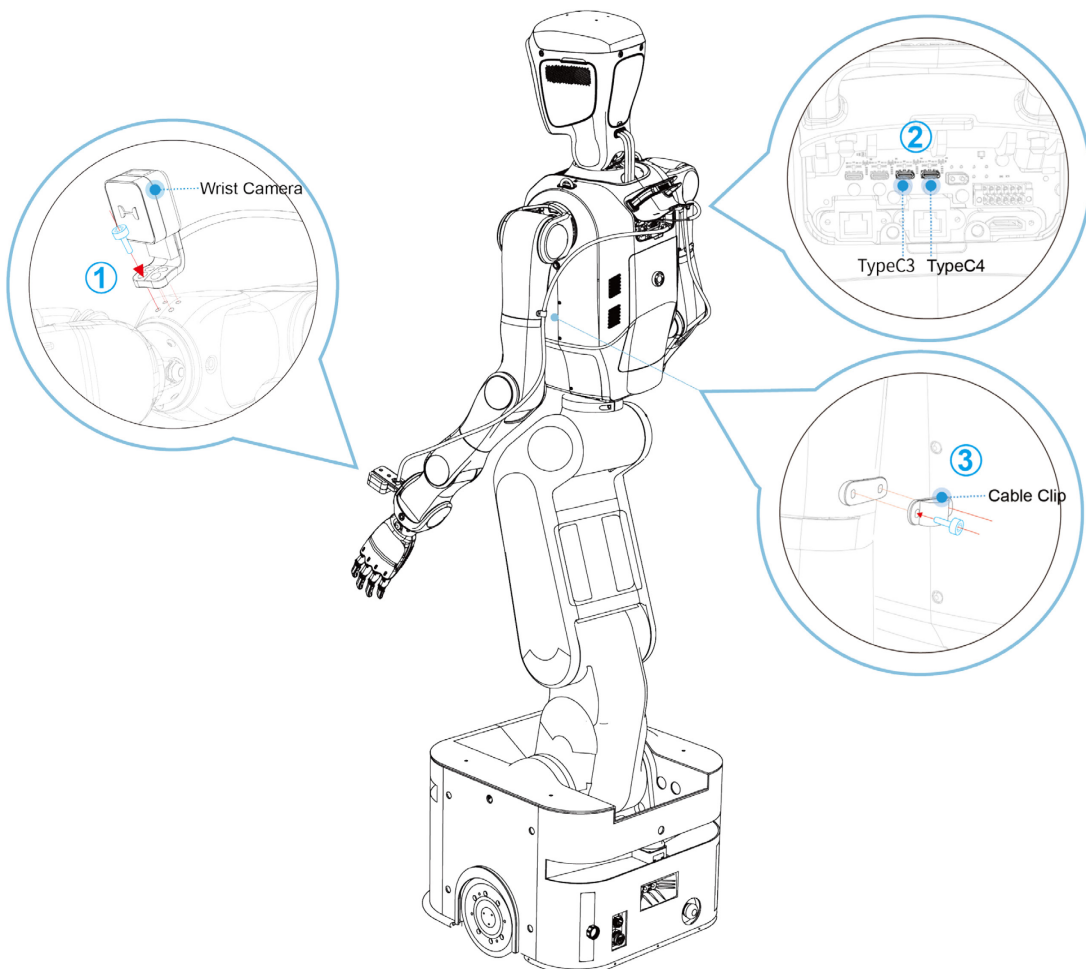
3.3 Installation

Installing the wrist camera

The wrist camera is an optional accessory. If ordered, it and its accompanying parts will be shipped with the main product. Please verify the items against the packing list and contact your supplier if anything is missing.



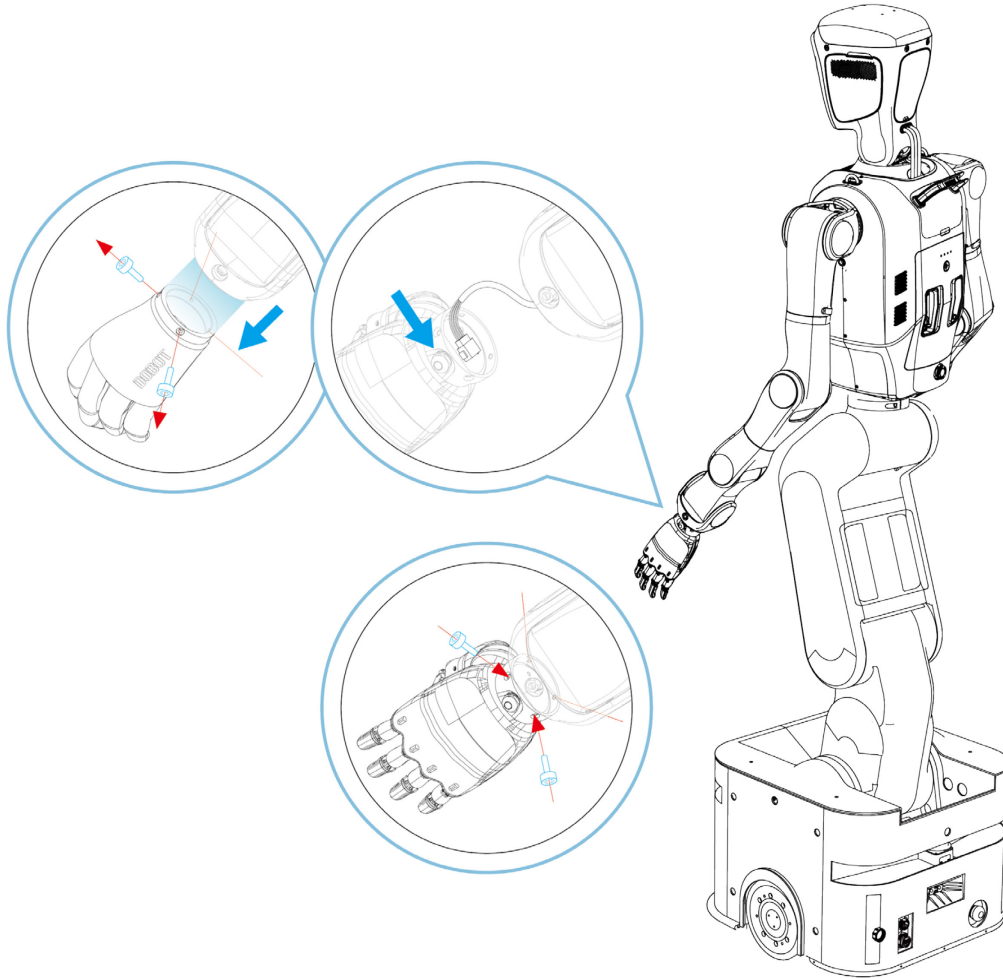
Refer to the following instructions for installation:



1. Secure the wrist camera to the pre-drilled screw holes on the robot's wrist using the provided hex socket head cap screws.
2. Connect the communication cable included with the wrist camera to the TypeC3 or TypeC4 port on the robot's back.
3. Route and organize the wrist camera's communication cable, then secure it to the designated fixation points on the robot's elbow using the included cable clips.

Replacing the dexterous hand

The 6-DoF dexterous hand is an optional accessory. If ordered, it is pre-installed on the robot before shipment. To replace the dexterous hand, follow these steps:



1. Remove the 4 mounting screws securing the standard rubber hand (default gripper) to the robot.
2. Prepare the 6-DoF dexterous hand (optional accessory, sold separately), then connect the robot's communication cable to the dexterous hand's communication port.
3. Reattach the dexterous hand to the robot using the mounting screws.

3.4 Powering on

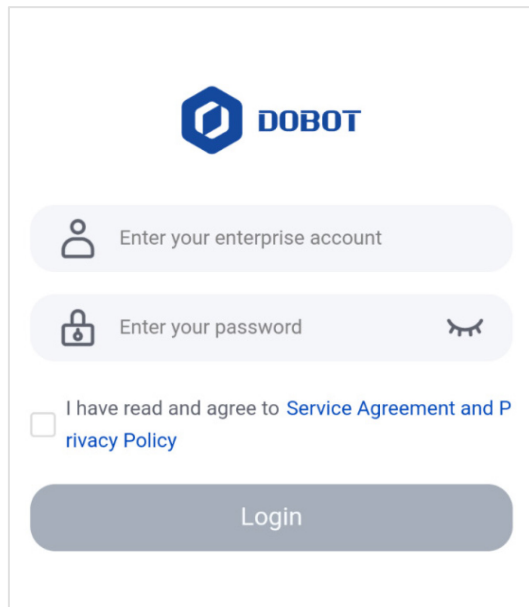
Before powering on, ensure the emergency stop buttons on both the chassis and the robot's upper body are released.

1. Press the chassis's power button, the indicator on the power button will turn off. The indicator on the robot's chest will display a blue, slow flash, indicating the robot is performing a self-check.
2. After a successful self-check, [connect to the App](#) to check for any error messages. If no errors appear, perform the "Enable" operation in the App to activate zero-torque mode.
3. After [connecting to the handheld remote controller](#), you can use it to switch the robot's operating mode.

3.5 Connection

3.5.1 Connecting to DOBOT Ex App

1. Power on ATOM-W by following the procedure outlined in the [Powering On](#) section.
2. Contact DOBOT technical support to obtain the **DOBOT Ex App** installation package, then download and install it.
3. Double-click to open the **DOBOT Ex App** and log in using the corporate account and password provided by the sales team.

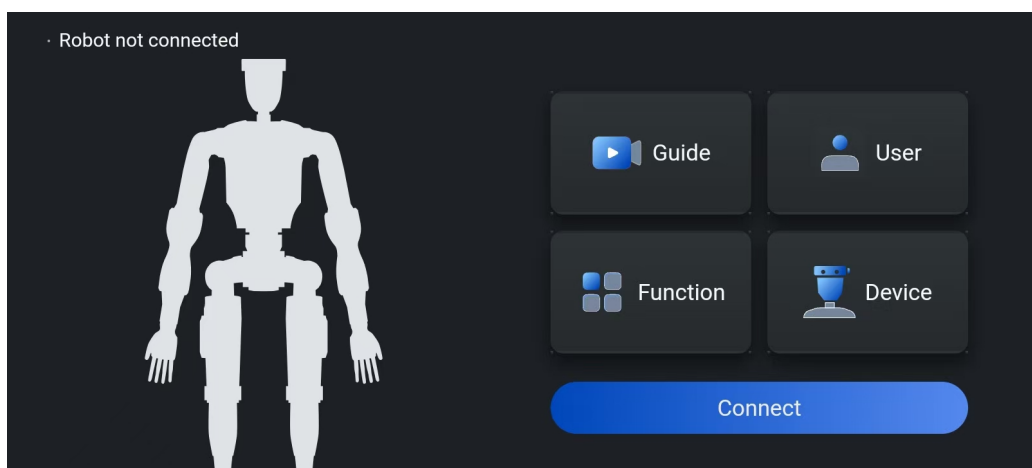
The image shows the login screen of the DOBOT Ex App. At the top is the DOBOT logo. Below it are two input fields: the first is labeled 'Enter your enterprise account' with a person icon, and the second is labeled 'Enter your password' with a lock icon and a toggle for visibility. Below these fields is a checkbox labeled 'I have read and agree to [Service Agreement and Privacy Policy](#)'. At the bottom is a large 'Login' button.

NOTE

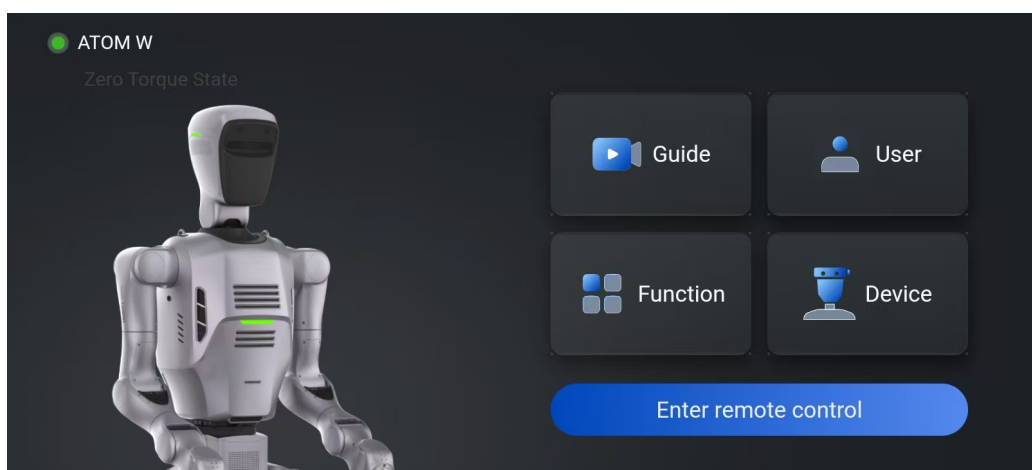
If you do not have a corporate account, please contact DOBOT sales service personnel to obtain one.

4. Turn on your mobile device's WiFi switch and connect to the WiFi named "ATOM+SN code" (default password: 12345678).
5. Click the "Connect" button on the initial interface of the DOBOT Ex App. Connection

is successful when the interface displays an image of the ATOM-W.



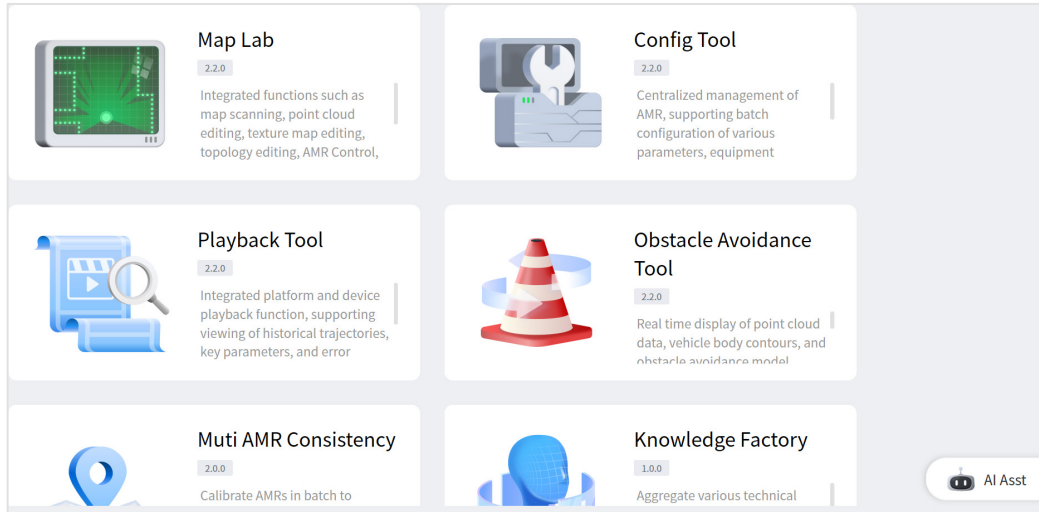
Robot not connected



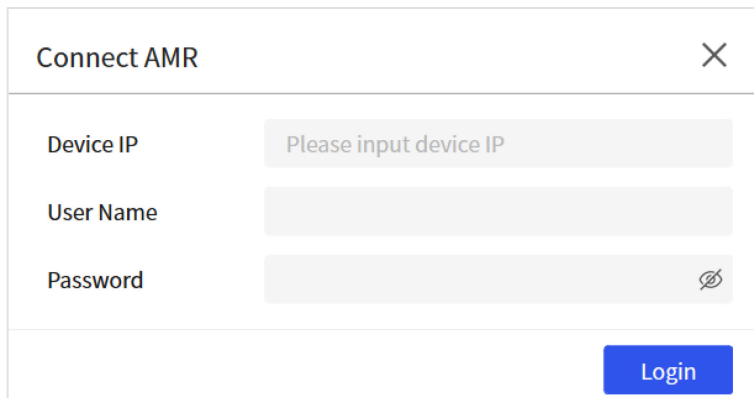
Robot connected

3.5.2 Connecting to mapping software

1. Contact DOBOT technical support to obtain the installation package for the mapping software **Walle**, then download and install it.
2. Double-click to open the **Walle** software to enter the main interface.



3. Click to open "Map Lab". Within the Map Lab interface, click "Connect AMR" in the top-right corner. In the dialog box that appears, enter the robot's IP address, username, and password.



The screenshot shows a dialog box titled "Connect AMR" with a close button (X) in the top right corner. The dialog contains three input fields:

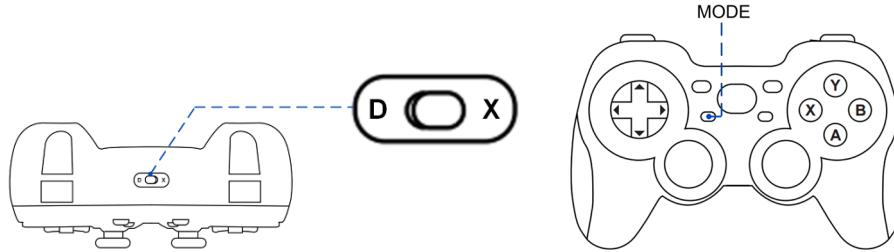
- Device IP**: A text field with the placeholder text "Please input device IP".
- User Name**: A text field.
- Password**: A text field with a password icon (a circle with a diagonal line) on the right side.

At the bottom right of the dialog, there is a blue button labeled "Login".

Before the chassis can operate autonomously, operations such as map creation, path editing, and task configuration are required. For detailed steps, please refer to the *DOBOT ATOM-W Wheeled Humanoid Robot Mapping Manual*.

3.5.3 Connecting to handheld remote controller

Before using the remote controller, set the switch on the top to the "X" position and press the MODE button to turn off its indicator light. The ATOM-W robot will automatically connect to the remote controller after powering on. Use the joysticks and buttons on the remote controller to control the robot's [motion direction](#) and [operating status](#).



NOTICE

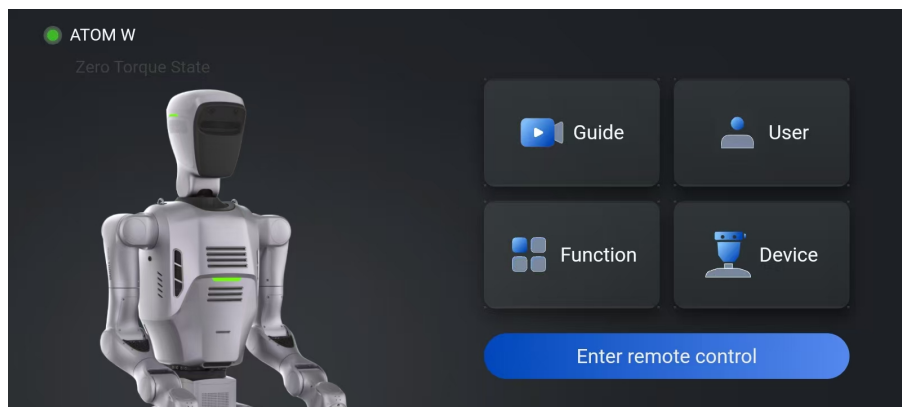
- The remote controller must be strictly set to "X" mode. After switching modes, the robot must be power-cycled (turned off and on again).
- During the use of the remote controller, the MODE indicator light must remain off.

3.6 Basic operations

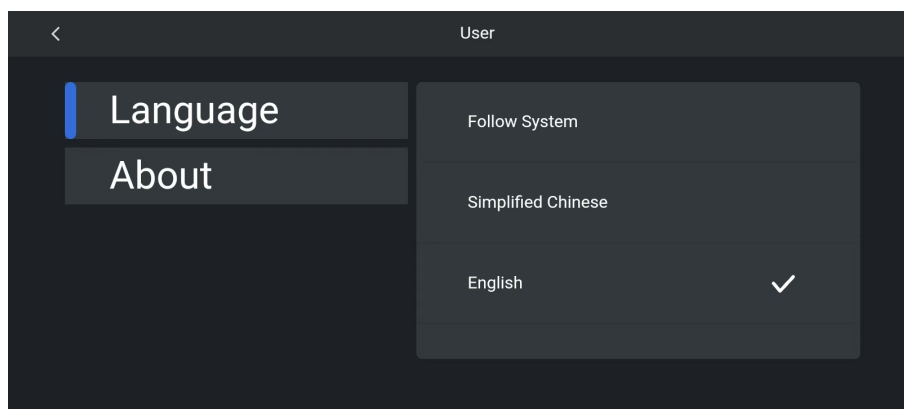
3.6.1 Viewing ATOM-W information

After connecting to the robot via the App, you can view and configure robot information.

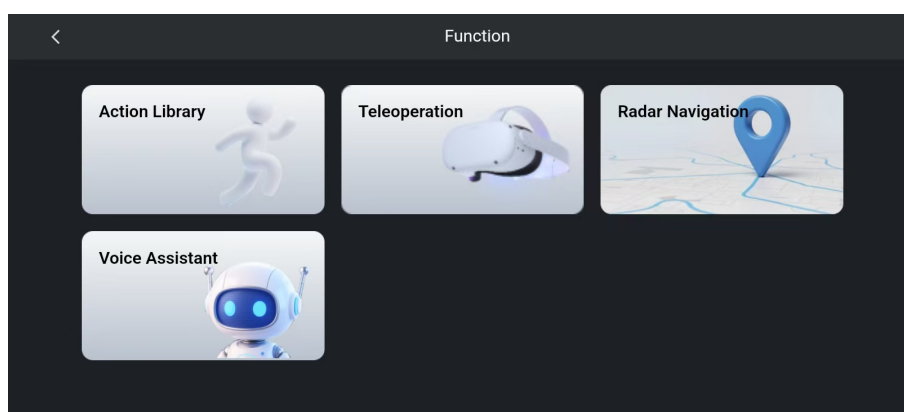
- "Guide" page: View instructional content for the robot.
- "User" page: Configure the App language and view App information.
- "Function" page: View/configure the action library, teleoperation, LiDAR navigation, and voice assistant.
- "Device" page: View robot information such as robot mode, version information, joint information, alarm information, etc., and configure related settings.



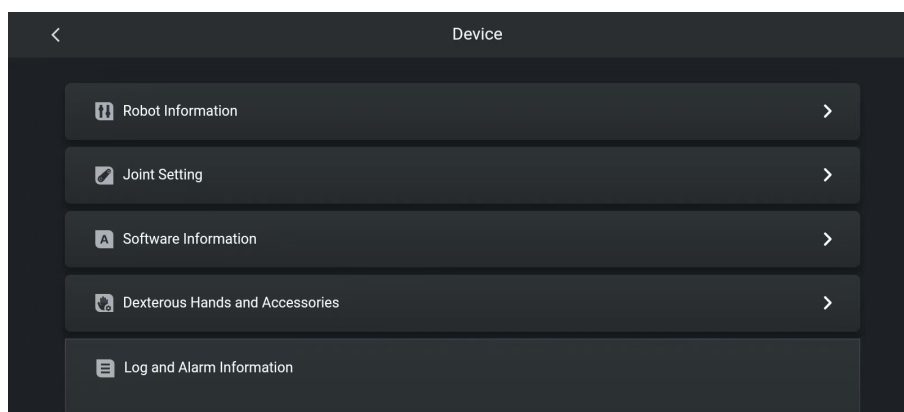
"Main" interface



"User" page



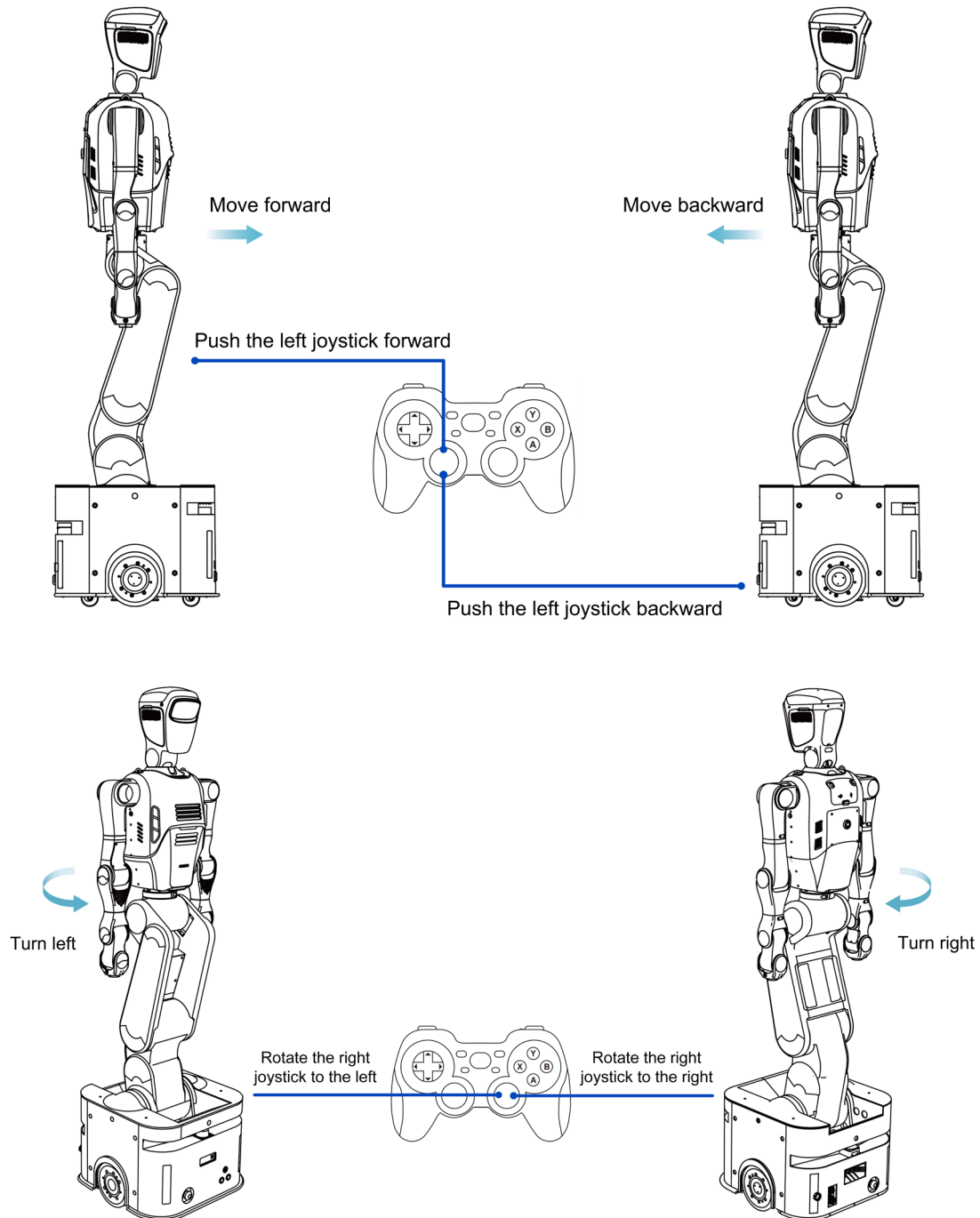
"Function" page



"Device" page

3.6.2 Controlling movement and steering

First, ensure the MODE button indicator light on the remote controller remains off. Then, use the left joystick to control robot's forward/backward movement and the right joystick to control left/right turning. As shown in the figure:

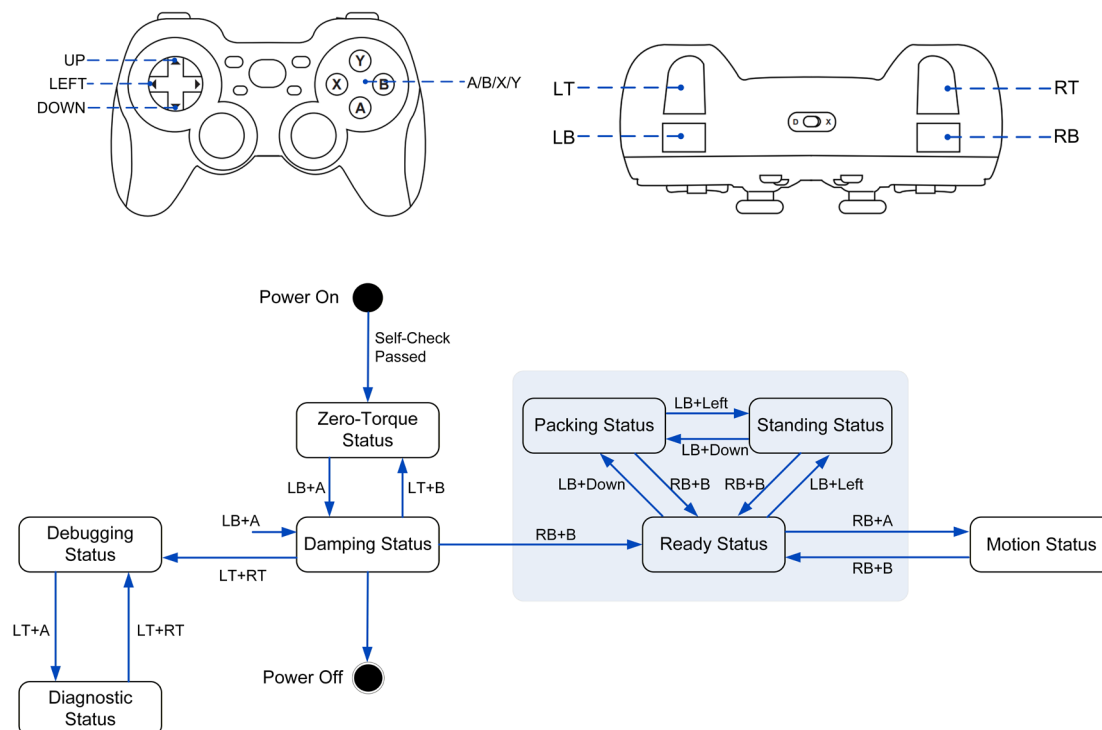


NOTICE

Before controlling the robot via the handheld remote controller, you must first enable it in the **DOBOT Ex App**.

3.6.3 Switching robot status

The robot's status can be switched using the following button combinations on the remote controller.



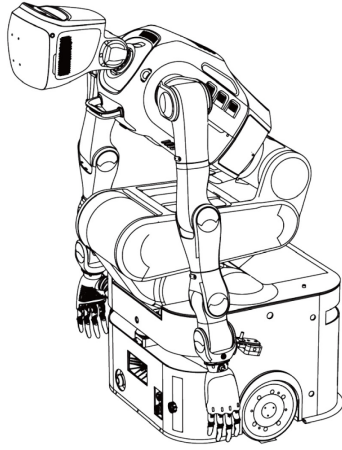
Remote controller buttons	Robot status	Description
LB+B	Zero-torque status	The robot's motors stop active movements, and its joints swing freely without any damping resistance.
LB+A	Damping status	- Upper body: All motors stop active movements, with noticeable damping resistance while swinging. - Lower body: Motors are disabled and brakes are engaged upon entering damping status. - Chassis: Exits remote control mode and stops moving.
LT+RT	Debugging status	Development and debugging are conducted based on the underlying control SDK. Real-time operational data (e.g., battery level, motor status, and IMU data) can be retrieved, and motors can be directly controlled.
LT+A	Diagnostic status	Performs joint position control to switch the robot to a specified diagnostic pose within 10 seconds. After diagnosis, press the START button on the remote

Remote controller buttons	Robot status	Description
		controller to return all joints to the zero position.
RB+B	Ready status	- Upper body: Gradually move into a prepared pose for motion within 10 seconds. - Lower body: Enabled status. J1 and J2 remain unchanged. J3 adjusts to maintain the upper body vertical.
RB+A	Motion status	- Upper body: Freely movable after entering this status. - Lower body: Use RB + directional buttons to control lifting, lowering, and forward/backward movement. - Chassis: Enables remote control mode. Exiting this status disables remote control.
LB+DOWN	Packing status	The robot gradually move into a packing pose within 10 seconds.
LB+LEFT	Standing status	The robot gradually move into a standing pose within 10 seconds.

3.6.4 Pose descriptions

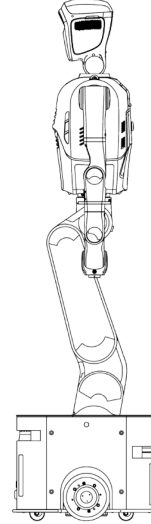
Packing pose

J1: -52°; J2: +73°; J3: -50°



Zero pose

J1: 0°; J2: 0°; J3: 0°



3.7 Debugging instructions

1. Press the **LB+A** buttons on the remote controller to put the robot into damping status.
2. Press the **LT+RT** buttons on the remote controller, ATOM-W enters the debugging mode. Under debugging mode, the robot defaults to a damping status. Development and debugging can be performed using the underlying control SDK to directly drive the motors. It supports customized teleoperation, reinforcement learning model deployment, and real-time monitoring of battery level, motor status, IMU data, etc.

The interface for debugging is located beneath the fixing ring on the robot's back. You can remove the silicone cover to access it. For details, refer to the [External Interface](#) section.

3. Press the **LT+A** buttons, ATOM-W enters diagnostic status and assumes a specific diagnostic posture. Press the **LT+RT** buttons again, ATOM-W returns to the debugging mode.

NOTE

This process is used to confirm whether ATOM-W has successfully entered debugging mode or for troubleshooting hardware issues.

3.8 Abnormal stop

In case of unexpected events during robot operation, users can quickly halt the robot using the following methods. Please ensure the robot is protected before performing an emergency stop to avoid accidental damage.

- **Stop via handheld remote controller**

In the event of an emergency, press the **LB+A** buttons on the remote controller. The upper body enters damping status, the lower body locks with brakes, and the chassis gradually comes to a stop. To resume normal operation, press **RB+B** on the remote controller to enter ready status, then press **RB+A**. Finally, press the confirm button on the chassis to switch back to motion control.

- **Chassis E-Stop**

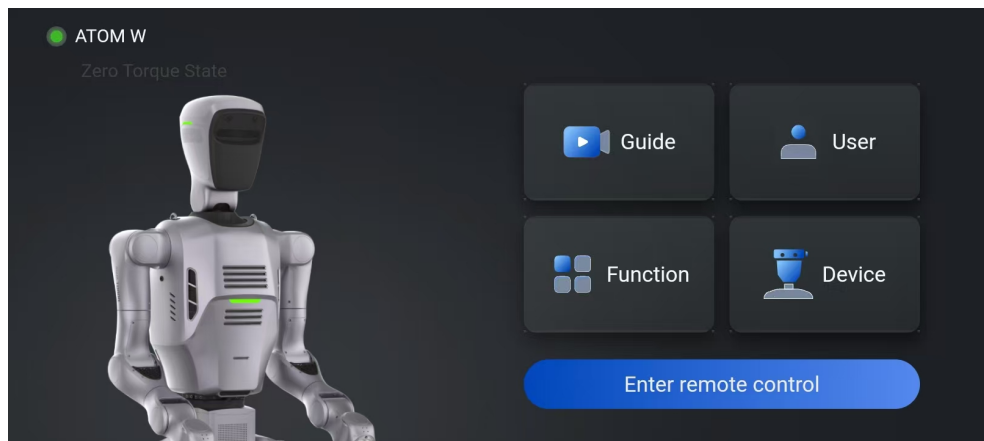
Press the emergency stop button on the chassis. The upper body enters damping status, the lower body locks with brakes, and the chassis immediately brakes to a halt. Release the emergency stop button to switch back to motion control.

- **Robot E-Stop**

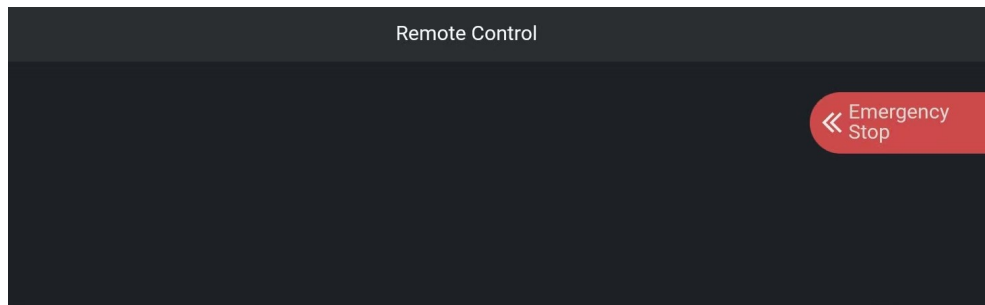
Press the emergency stop button on the robot. The upper body enters damping status, the lower body locks with brakes, and the chassis immediately brakes to a halt. Release the emergency stop button to switch back to motion control.

- **App E-Stop**

- ① After connecting to the robot, click "Enter Remote Control".



- ② Click the "Emergency Stop" button to trigger a robot emergency stop. After the emergency is resolved, tap the "Resume" button to restore operation.



3.9 Shutdown

Before shutting down, ensure the robot is in its initial startup position, with no arm operations and standing still.

1. Press the **LB+A** buttons on the remote controller to put the robot into damping status.
2. Press the power button on the chassis, the button will pop out, and its indicator light will turn from on to off.



NOTICE

- During shutdown, the robot's lower body may slightly sag, and the arms will immediately lose damping resistance. Before initiating the shutdown process, ensure the arms are not performing any operations or holding any objects to avoid unintended drops.
- Be careful of the robot joints pinching your hand.