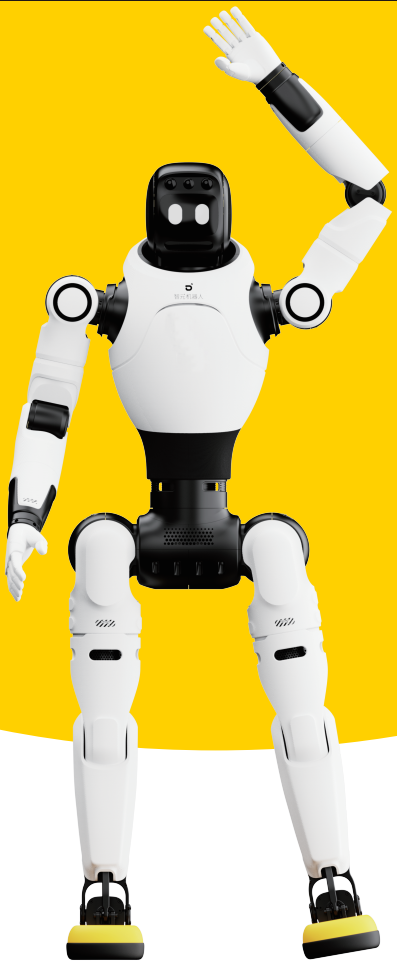
AGIBOT

LINGXI X2

Fully Intelligent Agile Robot

AgiBot X2 User Guide



CREATE UNLIMITED PRODUCTIVITY VIA INTELLIGENT MACHINES

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1. Preliminary Notice

1.1 Safety Instructions

1. **Product Knowledge:** Before using the robot, please carefully read the user manual to understand the robot's functions, operation methods, and safety precautions.

2. **Usage Requirements:** Ensure that the robot is operated in a flat environment. Avoid extremely high or low temperatures, humid environments, steep slopes, surfaces with large drops, fragile surfaces, and vibrating areas.

3. **Operating Space:** Ensure that the robot has sufficient operating space. Avoid operating in cramped or crowded environments to reduce the risk of collision and crushing.

4. **Emergency Stop Function:** During operation, users must be familiar with the location and operation of the emergency stop button on the robot remote control so that they can stop the robot in an emergency. When an emergency stop is activated, the robot will lose force from all joints and collapse to the ground. In this case, please pay attention to the robot's safety and use the protective cage at all times. Do not use the emergency stop function except in emergency situations.

5. **Power Safety:** Before operation, ensure that all cables, plugs, and sockets are intact. Immediately disconnect the power supply if an abnormality (such as a short circuit or overheating) occurs.

6. **Regular Inspection:** Perform regular maintenance and inspections to ensure the proper functioning of robot components, such as joints, sensors, and power supplies, to prevent hazards caused by aging or damage.

7. **Prevent Misuse:** Ensure the robot is not used in any inappropriate, dangerous, or legally prohibited manner.

1.2 Safety Guidelines

1. **Pre-Startup Confirmation:**

   a. Before starting the robot, ensure that its working area is clear of people

or other obstacles, especially near its moving parts.

b. Before starting the robot, the operator must confirm that the system is in normal condition and has completed self-tests.

2. **Safety Distance:** Maintain a safe distance (≥ 50 cm) from the robot's working area to avoid accidental collisions. Especially when the robot is performing high-speed movements, avoid standing near the movement path.

3. **Load and Operation:**

a. Strictly adhere to the load limits specified for the robot and avoid overloading.

b. When using the robot's actuators, grippers, or other components, ensure that they are properly aligned with the object being operated to avoid unnecessary pressure and stress.

4. **Emergency Stop:** In the event of an accident or loss of control, use the stop function on the remote control.

5. **Manual Intervention:** Direct intervention in the robot's movements is prohibited during operation. Any adjustments or manual intervention must be performed when the robot is completely stopped and powered off.

6. **Preventing Misoperation:** Ensure all operators receive training on proper robot operation and emergency response to prevent accidents caused by misoperation.

7. **Remote Operation Security:**

a. If developing remote operation capabilities for robots, ensure a secure network environment is used to prevent control failures due to network failures or external intrusions.

b. When remotely controlling, operators must have real-time monitoring equipment to ensure a full understanding of the robot and its surroundings.

1.3 Maintenance and Management Guidelines

1. **Regular Maintenance:** Maintenance and upkeep should be carried out regularly according to the recommendations of Agibot. This ensures that all parts of the robot remain in optimal working condition and helps extend the overall service life of the equipment.

2. Fault Handling：

a. If a malfunction occurs during robot operation, immediately stop the operation and promptly notify professional technicians for inspection and repair. Continued operation under fault conditions is strictly prohibited.

b. Do not disassemble, adjust, or repair the equipment while it is powered on or in operation, to avoid further damage or safety hazards.

3. Battery and Power Management:

a. If the robot uses batteries, ensure that the batteries are charged in a safe and dry environment.

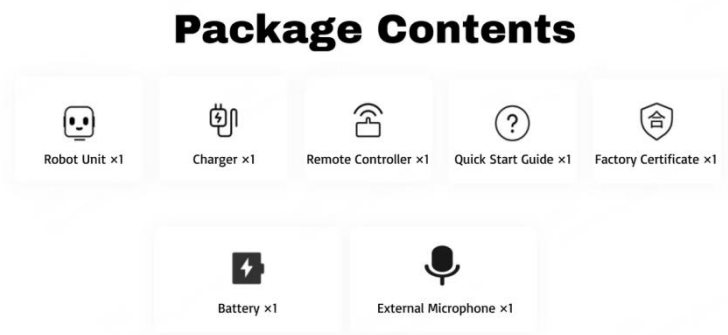
b. Avoid leaving the robot connected to a power source for extended periods to prevent overcharging or overheating of the battery.

c. In the event of a robot fall, immediately check the condition of the battery. If any damage or deformation is observed, discontinue use and contact the official after-sales service for assistance.

4. **Software Updates:** Regularly check for and update the robot's operating system and control software to ensure optimal functionality and enhanced system security, preventing potential vulnerabilities and safety risks.

2. About X2

2.1 Packing List



2.2 Product Overview

The AgiBot X2 series includes two models: AgiBot X2 and AgiBot X2 Ultra.

Each model differs slightly in configuration and functional capability, with a total of **25–30 degrees of freedom (DOF)** across the series, enabling precise motion and posture control.

- AgiBot X2

  ○ AgiBot X2 is equipped with a total of **25 degrees of freedom (DOF)**. Each arm has **5 DOF** (including shoulder, upper arm, and elbow joints), each leg has **6 DOF** (including hip, thigh, knee, and ankle joints), and the waist has **3 DOF** (yaw, pitch, and roll).

  ○ The head is equipped with RGB cameras and interactive hardware, including a microphone, speaker, interactive display, and touch sensors. The computing unit includes a main control board **RK3588** and an interactive computing board **RK3588s**.

  ○ This version does not support full secondary development, but it is compatible with the LinkCraft Platform.

- AgiBot X2 Ultra

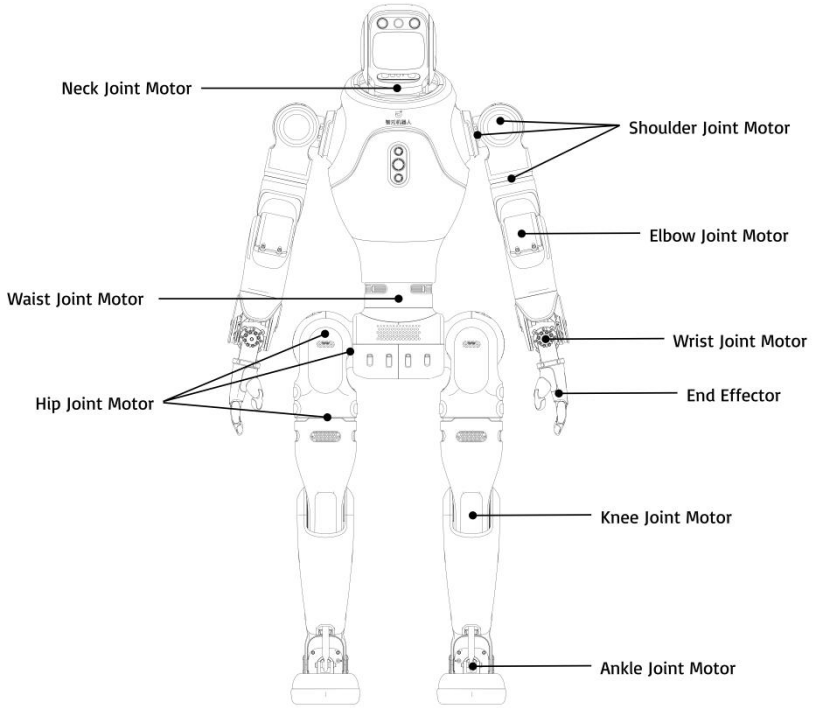
  ○ AgiBot X2 Ultra is equipped with a total of **30 degrees of freedom (DOF)**. The head has **1 DOF**, each arm has **7 DOF** (including shoulder, upper arm, elbow, wrist, and finger joints), each leg has **6 DOF** (including hip, thigh, knee, and ankle joints), and the waist has **3 DOF** (yaw, pitch, and roll).

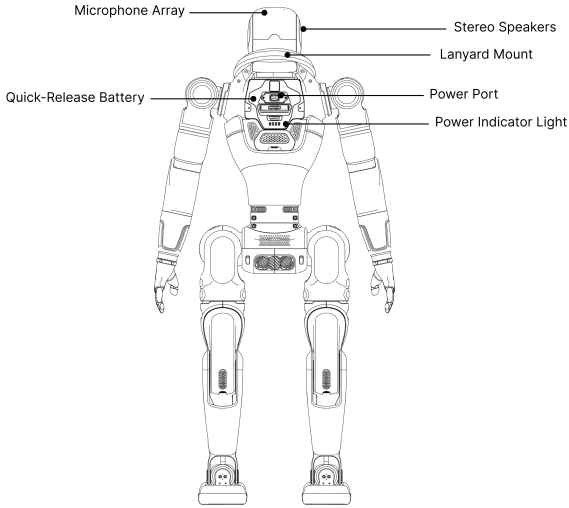
  ○ Building upon X2, the X2 Ultra adds a LiDAR sensor, front-facing stereo RGB cameras, an RGB-D camera, and a rear RGB camera. It is equipped with a high-performance Nvidia Orin NX computing unit and comes standard with 4G/5G communication modules. The X2 Ultra also supports optional accessories such as the OmniPicker and OminiHand, as well as optional teleoperation and charging station modules.

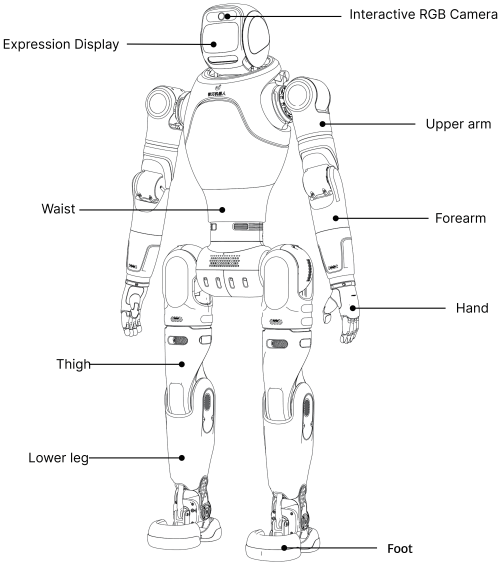
  ○ This model supports full secondary development and is also compatible with the the LinkCraft Platform.

2.2.1 Product Structure Diagram

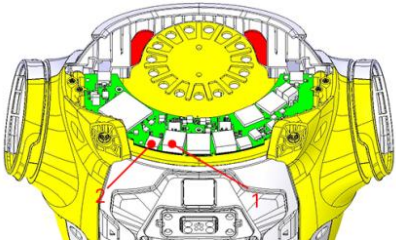
The following diagram illustrates the main components of the AgiBot X2.




Microphone Array
Stereo Speakers
Lanyard Mount
Quick-Release Battery
Power Port
Power Indicator Light


Interactive RGB Camera
Expression Display
Upper arm
Waist
Forearm
Hand
Thigh
Lower leg
Foot

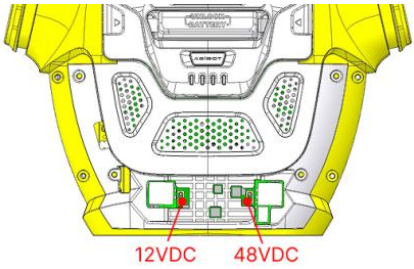
2.2.2 User Debugging Interface



User Debugging Interface Diagram

No.	Interface Type	Interface Name	Interface Description
1	RK3588 USB	USB Type-A	Supports USB 3.0 host, 5V/1.5A power output; RK3588 USB Type-A and Type-C ports share 5 Gbps bandwidth.
2	RK3588 USB	USB Type-C	Supports USB 3.0 host, 5V/1.5A power output; RK3588 USB Type-A and Type-C ports share 5 Gbps bandwidth.

2.2.3 Software Development Kit Interface



Software Development Kit Interface Diagram

No.	Interface Type	Interface Name	Interface Description
1	XT30UPB-F	12V Power Port	12V/3A Power Output
2	XT30UPB-F	48V Power Port	48V/5A Power Output

2.3 Computational Unit

Type	Standard Onboard Computing Unit
AgiBot X2	One Motion Control Computing Unit (PC1) and one Interaction Computing Unit (PC3).
AgiBot X2 Ultra	One Motion Control Computing Unit (PC1), one Interaction Computing Unit (PC3) and one development computing unit (PC2).

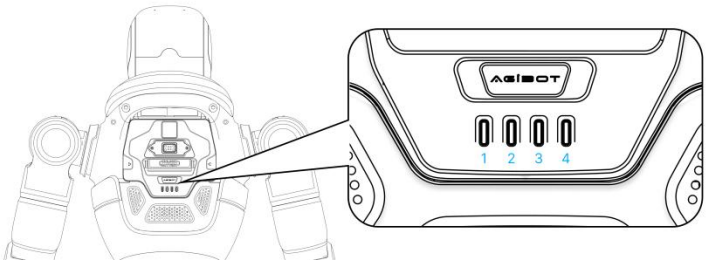
Parameter	Development Computing Unit (PC2)
Processor	Jetson Orin NX
AI Performance	157Tops
GPU	1,024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores
CPU	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU

Cache	2MB L2 + 4MB L3
VRAM (Graphics Memory)	16GB
System Memory (RAM)	16GB
Storage	512GB

2.4 Battery Indicator Lights

Note: When the robot is powered by the battery, please monitor the battery level carefully. If the battery power is low or nearly depleted, the robot may lose power suddenly and collapse. When only one indicator light remains on, charge or replace the battery promptly to ensure stable operation and prevent potential injury or damage caused by the robot falling due to power loss.

2.4.1 Battery Indicator Location



2.4.2 Battery Indicator Description

2.4.2.1 Battery Indicator Status (During Discharge)

Battery Indicator Status (Discharging)	Battery Level Description	Status Description
LEDs 1–4 steady on	75%≤SOC＜100%	Fully charged
LEDs 1–3 steady on, remaining off	50%≤SOC＜75%	Battery level sufficient, no action required
LEDs 1–2 steady on, remaining off	25%≤SOC＜50%	Normal battery level, no action required
LED 1 steady on, remaining off	15%≤SOC＜25%	Low battery, recharge soon
LED 1 flashing, remaining off	SOC＜15%	Critically low power, charge immediately

2.4.2.2 Battery Indicator Status (During Charging)

Battery Indicator Status (Charging)	Battery Level Description	Status Description
LED1 breathing, LEDs 2–4 off	SOC＜25%	Initial charging stage, low battery
LED1 steady on, LED2 breathing, LEDs 3–4 off	25%≤SOC＜50%	Low battery, not recommended to disconnect power during use
LEDs 1–2 steady on, LED3 breathing, LED4 off	50%≤SOC＜75%	Medium battery level, can be used normally, recommended to continue charging until full

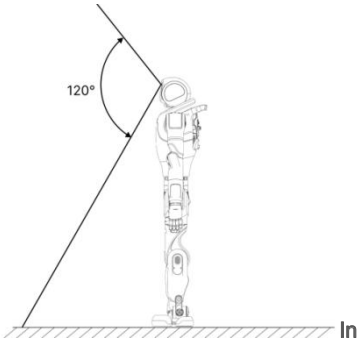
LEDs 1–3 steady on, LED4 breathing	75%≤SOC < 100%	Battery nearly full, can be used normally, recommended to continue charging until full
LEDs 1–4 steady on	SOC=100%	Fully charged, power can be disconnected

2.4.2.3 Battery Indicator Status (Other Conditions)

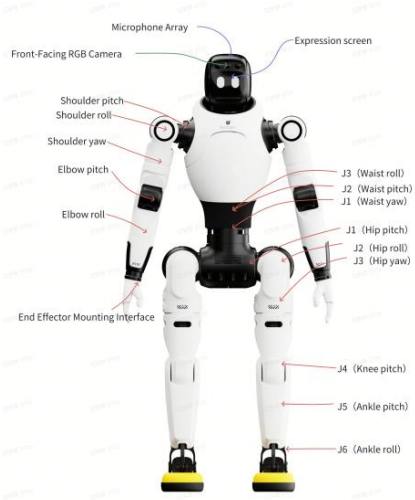
No.	Color	LED1	LED2	LED3	LED4	Status Description
1	Green	Displays according to SOC status				Normal
2		Flashes once per second	Flashes once per second	Flashes once per second	Flashes once per second	Protection mode (overtemperature, overcurrent, or overvoltage)
3	Red	Flashes once per second	/	/	/	Fault (requires return for repair)
4	-	All LEDs off				Power-off (deep sleep) or very low SOC (< 39V)

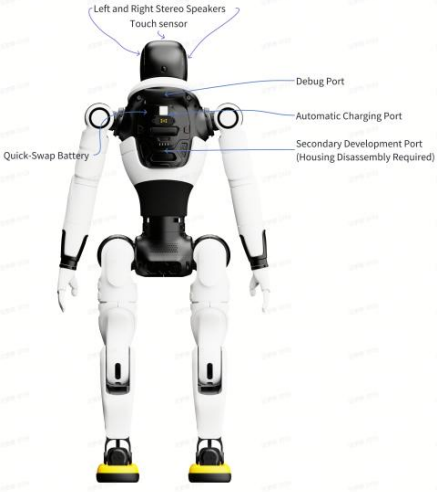
2.5 Sensor Field of View

Item	Perception Configuration	Perception Ability
X2	Interactive RGB Camera	Precision environmental data in real time
X2 Ultra	- LiDAR - RGB-D Depth Camera - Front Stereo RGB Cameras - Front Interactive RGB Camera - Rear RGB Camera	**LiDAR:** ● Captures high-precision environmental data in real time; ● Rapidly detects and measures surrounding objects; ● Outputs high-resolution point-cloud data as the core foundation for environmental perception. **Additional Camera Suite:** ● RGB-D Depth Camera: Provides accurate 3-D spatial information of surroundings; ● Stereo RGB Cameras: Enhances 3-D perception and distance-estimation precision; ● Rear RGB Camera: Covers rear field, eliminating blind spots; ● Interactive Cameras: Enable visual recognition and response during human-robot interaction scenarios.



2.6 Joint Name and Joint Limit





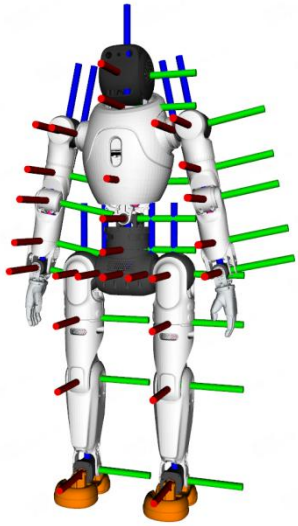
Joint Name	Joint Limit	
	AgiBot X2	AgiBot X2 Ultra
Arm	J1(Shoulder pitch):	J1(Shoulder pitch):

Workspace	-116.5~+176.5°	-116.5~+176.5°
	J2(Shoulder roll): -3.5~+174.5°	J2(Shoulder roll): -3.5~+174.5°
	J3(Shoulder yaw): ±146.5°	J3(Shoulder yaw): ±146.5°
	J4(Elbow): -135~0°	J4(Elbow): -135~0°
	J5(Wrist yaw): ±146.5°	J5(Wrist yaw): ±146.5°
	/	J6(Wrist pitch): ±33°
	/	J7(Wrist roll): -86.5~+41.5°
Leg Workspace	J2(Hip roll): -13.5°~+166.5°	J2(Hip roll): -13.5°~+166.5°
	J3(Hip yaw): -196.5°~+96.5°	J3(Hip yaw): -196.5°~+96.5°
	J4(Knee): 0~+138°	J4(Knee): 0~+138°
	J5(Ankle pitch): -26~+46°	J5(Ankle pitch): -26~+46°
	J6(Ankle roll): ±15°	J6(Ankle roll): ±15°
	J2(Hip roll): -13.5°~+166.5°	J2(Hip roll): -13.5°~+166.5°
Head Workspace	J1(Head pitch): 0°	J1(Head pitch): 0°
	J2(Head yaw): 0°	J2(Head yaw): ±20°
Leg Workspace	J1(Waist Yaw)： -196.5~+126.5°	J1(Waist Yaw)： -196.5~+126.5°
	J2(Waist pitch)：±18°	J2(Waist pitch)：±18°

	J3(Waist roll)：±28°	J3(Waist roll)：±28°

2.7 Coordinate Systems

The coordinate systems for each joint are illustrated in the diagram below, shown when all joints are at their zero-degree position. (Red indicates the X-axis, green the Y-axis, and blue the Z-axis.)



2.8 Specifications

Item		AgiBot X2	AgiBot X2 Ultra
Overall	Dimensions	1310（H）*460（W）*210（L）mm	1310（H）*460（W）*210（L）mm
	Height	Approx. 1.31 m	Approx. 1.31 m

	Weight	Approx. 35 kg	Approx. 39 kg
	Total actuated DOF	25	30
	Neck DOF	0	1
	Single-arm DOF	5	7
	Waist DOF	3	3
	Single-leg DOF	6	6
	Single-arm reach (without end-effector)	437mm	558mm
	Operating temperature	-10℃~40℃	-10℃~40℃
Perception System	RGB camera	RGB camera	Interactive RGB camera; front stereo RGB cameras; rear RGB camera
	Head touch sensor	Equipped	Equipped

	RGB-D camera	/	Equipped
	3D LiDAR	/	Equipped
Communication	Interface	Wi-Fi, Bluetooth	Wi-Fi, Bluetooth, 4G/5G module
Interaction Module	Voice	Microphone array, mini wireless microphone, speaker	Microphone array, mini wireless microphone, speaker
	Display	Interactive screen; lighting effects	Interactive screen; lighting effects
Performance Parameters	Peak joint torque	120N·m	120N·m
	Speed	Max 1.5 m/s; recommended ≤ 0.8 m/s for daily use	Max 1.5 m/s; recommended ≤ 0.8 m/s for daily use
	Payload	Payload (specific posture): Max 3 kg (excluding end-effector) Payload (full workspace): ≤ 1 kg (excluding end-effector)	Payload (specific posture): Max 3 kg (excluding end-effector) Payload (full workspace): ≤ 1 kg (excluding end-effector)

	Obstacle clearance capability	≤50mm	≤50mm
	Climbing capability	≤10°	≤10°
Power System	Battery capacity	Approx. 421 Wh	Approx. 421 Wh
	Endurance	~2 h continuous walking at 0.5 m/s	~2 h continuous walking at 0.5 m/s
	Energy replenishment	Supports direct charging and battery swap	Supports direct charging and battery swap; optional automatic charging dock
	Charging time	≤1.5h	≤1.5h
	Charger input voltage	100~220V	100~220V
	Charger output	54.6V 10A	54.6V 10A
Control & Compute	Base compute board	RK3588*2	RK3588*2
	High-performance compute /	/	Orin NX 16GB 157 TOPS

	secondary dev. board		
Hardware Interfaces	USB Host	USB Type-A*1 USB Type-C*1	USB Type-A*2 USB Type-C*2
	Ethernet	RJ45*2	RJ45*2
	Audio/Video output	/	miniDP*1
	Power input ports	12V/3A*1 48V/5A*1	12V/3A*1 48V/5A*1
Others	Smart OTA upgrade	Equipped	Equipped
	Handheld remote controller	Equipped	Equipped
	Mobile app	Equipped	Equipped
	Secondary development (SDK)	/	Equipped

3. Operation Guide

3.1 Safety Precautions

Note：

1. **Transportation and Lifting Safety:** When transporting or lifting the robot, avoid compression or collision to prevent structural damage or potential safety hazards.

2. **Ground Environment Requirements:** Place the robot on a hard, flat, and non-slippery surface. The ground material should meet a static friction coefficient greater than 0.4 to prevent the robot from unintended movement or tipping.

3. **Operating Space Reservation:** It is recommended to reserve a safety area with a radius of not less than 1 meter around the robot. Personnel are not allowed to stand within this area to ensure operational safety and provide sufficient space for robot movement.

4. **Robot Battery Management:** When powered by the battery, pay close attention to the battery status. Once the battery power is cut off, the robot may lose power and fall. When only one indicator light remains, charge or replace the battery in time to prevent potential injury caused by tipping.

5. **Remote Controller Power Management:** Ensure that the remote controller has sufficient power. Low power may prevent normal mode switching and cause unexpected tipping. If low power is detected, charge the controller in time.

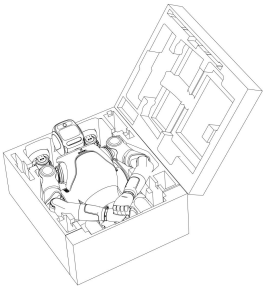
6. **Mode Usage Restriction:** Under non-emergency conditions, do not activate the emergency stop mode (zero-torque mode) or damping mode, as these modes will disable joint torque and may cause the robot to fall.

3.2 Start-Up Guide

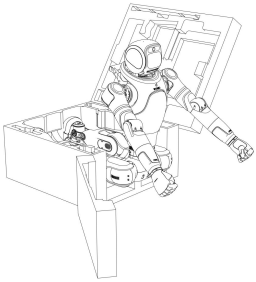
3.2.1 Start-Up with Hoisting (Gantry Device Required)

Step 1：Hoist the Robot Body

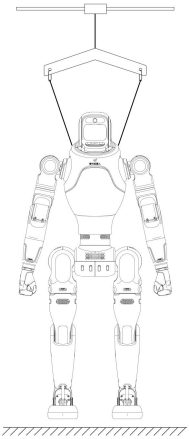
Open the package as shown in the illustration, and slowly lift the robot out. Use the gantry to suspend the robot naturally, ensuring that the feet do not touch the ground.



Step1-1: Unbox



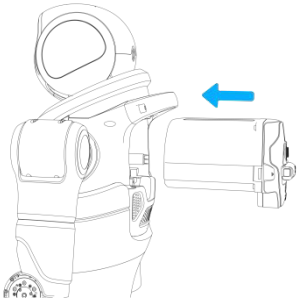
Step1-2: Carefully Lift Out the Robot



Step1-3: Hang the robot with its feet off the ground.

Step 2: Install the Battery

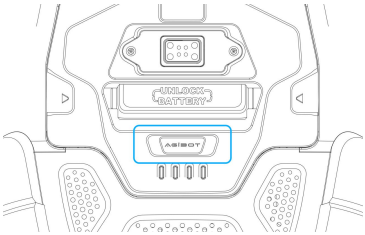
- If the battery is not installed, insert it into the rear battery slot from the outside toward the inside.
- Push it down until you hear a “click”, indicating it is properly seated.
- After installation, press down lightly again to confirm the battery is fully inserted and locked.



Step2: Install Battery

Step 3: Power On

- Before powering on, make sure the battery level is at least two indicator lights (≥50%).
- Short press the power button on the back of the battery to wake the system, then long press for 5 seconds to power on.
- After powering on, LEDs 1–4 on the battery will light up sequentially within about 2 seconds, indicating successful startup.



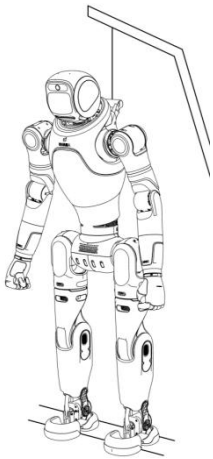
Step3: Press the power button to start the robot.

Step 4: Switch to Standing Preparation Mode (Position-Controlled Standing)

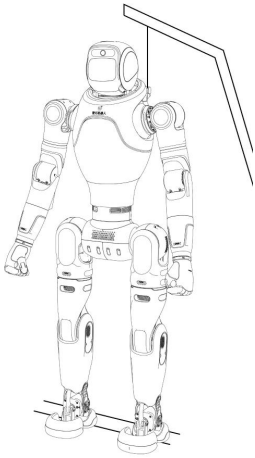
- **Initialization:** After powering on, wait for about 1 minute. Do not perform any operations during this period. When all joints enter the zero-torque state, the initialization is complete.
- **Adjust Suspension:** After initialization, lower the suspension ropes until both feet of the X2 robot are fully in contact with the ground. The robot will then enter the standing preparation mode (position-controlled

standing).

- **Enter Standing Preparation Mode:** On the remote controller, press the **[L2 + X]** buttons simultaneously to confirm and activate the standing preparation mode (position-controlled standing).



Step4-1: In zero-torque mode, ensure that the soles of the feet are in contact with the ground.



Step4-2: Use the remote controller to switch the robot to the standing preparation mode, ensuring both feet are fully in contact with the ground.

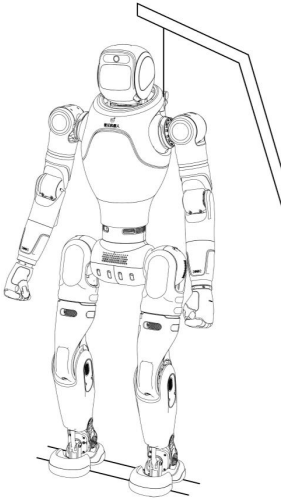
Step 5: Lower the Robot

- Use the gantry to slowly lower the robot until both feet are fully in contact with the ground.
- Ensure the suspension ropes are completely relaxed with some slack remaining.
- During the process, make sure the robot remains upright and does not tilt.

Step 6: Enter Stable Standing Mode (Force-Controlled Standing)

Note: Before switching to the stable standing mode (force-controlled standing), make sure the robot has been fully lowered to the ground and both feet are completely in contact with the surface.

- **Enter Stable Standing Mode (Force-Controlled Standing):** Press **[R2 + X]** on the remote controller simultaneously to activate the stable standing mode (force-controlled standing). Refer to the corresponding diagram for reference.
- **Release the Suspension Hooks:** After the X2 robot has reached a stable standing state, the suspension hooks can be fully released.
- In stable standing mode (force-controlled standing), the robot can maintain balance during slight movement and supports full-body motion control.



Step6: Use the remote controller to switch the robot to Stable Standing Mode.

Step 7: Enter Locomotion Mode

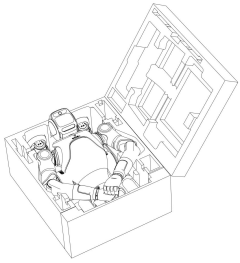
After entering stable standing mode, use the remote controller for “stick-to-move” operation:

- Left stick forward/backward: move forward/backward.
- Left stick left/right: strafe left/right.
- Right stick left/right: rotate in place (turn left/right).

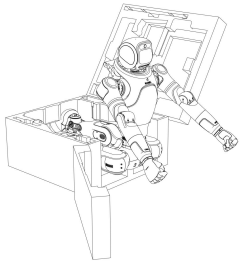
3.2.2 Start-Up from Supine Position (Gantry Device Not Required)

Step 1: Unbox and Position the Robot Correctly

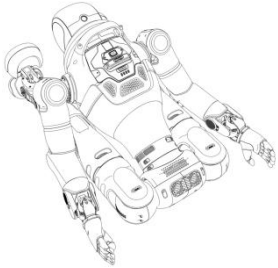
- Open the robot’s packaging box and carefully lift out the robot body **(see Step 1-1 and 1-2**). During handling, avoid any impact or compression to prevent equipment damage.
- **Place the robot in its folded posture** on a flat and secure surface (see Step 1-3). This position is used for checking the rear battery power status or installing the battery.



Step1-1: Unbox



Step1-2: Carefully Lift Out the Robot

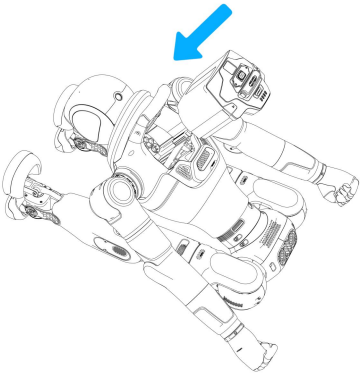


Step1-3: Place in Folded Posture

Step 2: Install the Battery

- If the battery is not installed, insert it into the rear battery slot from the outside toward the inside.
- Push it down until you hear a “click”, indicating it is properly seated.

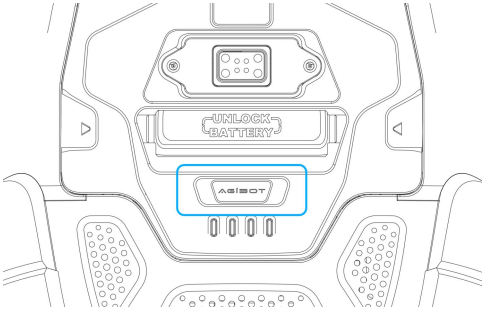
- After installation, press down lightly again to confirm the battery is fully inserted and locked.



Step2: Install Battery

Step 3: Power On

- Before powering on, make sure the battery level is at least two indicate lights (≥50%).
- Short press the power button on the back of the battery to wake the system, then long press for 5 seconds to power on.
- After powering on, LEDs 1–4 on the battery will light up sequentially within about 2 seconds, indicating successful startup.



Step3: Press the power button to start the robot.

Step 4: Place the Robot Supine

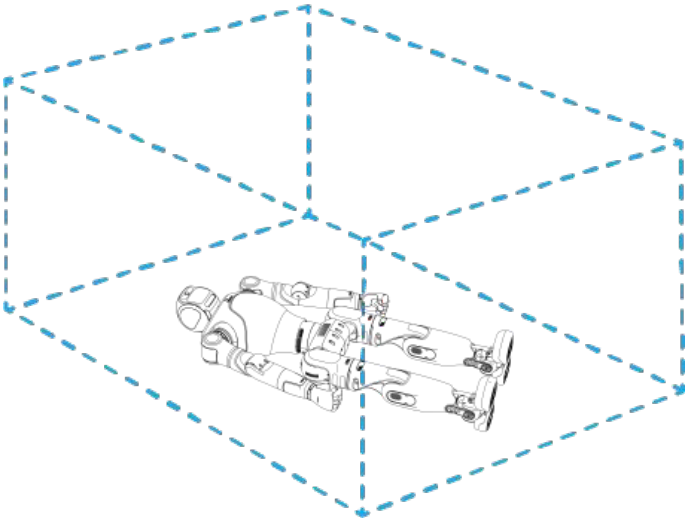
- Adjust the robot to a supine position with both arms and legs extended naturally and the face facing upward. At this point, the robot is in zero-torque mode.

Note: Refer to the illustration to ensure the head, legs, arms, chest, waist, and hips are in the correct initial positions. Make sure the legs and hips are aligned with the robot's forward direction.

- Before performing the "supine-to-stand" motion, ensure a safety radius of at least 0.5 meters around the robot is clear of any obstacles or objects.

Front arm silkscreen effect

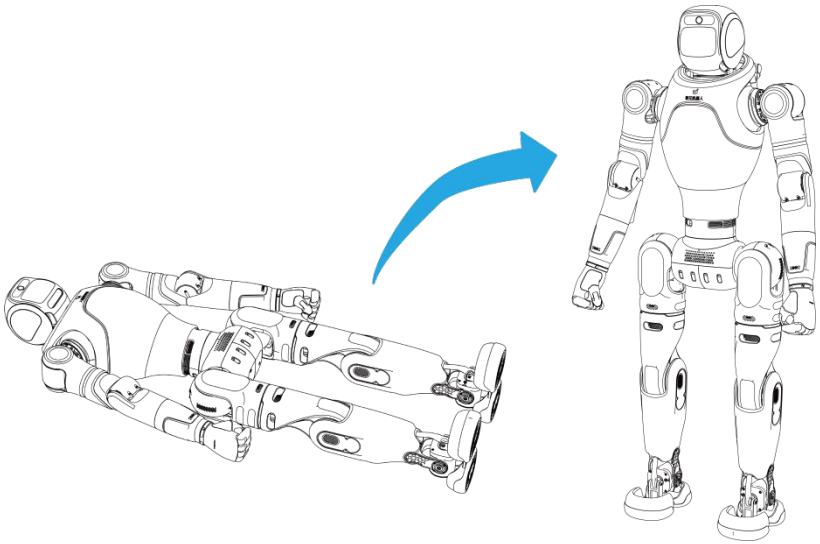
Thigh front silkscreen & fan effects



Step4：Supine position ready for stand-up and keep area clear

Step 5: Execute Supine-to-Stand Power-On

- Using the remote controller, simultaneously short press **[↑ + △]** to trigger the supine-to-stand motion.
- Once the motion is complete, the robot enters stable standing mode (force-controlled standing) and can proceed with further operations.



Step5: Supine-to-stand motion illustration

Supine-to-Stand Power-On Notes:

- **Usage Limitation:** When the end-effector is the “naturally open artificial hand”, the robot does not support the supine-to-stand motion to avoid damaging the hand. The motion is supported when the end-effector is the “fist-type artificial hand”.
- **Posture Requirement:** Before performing the motion, ensure the robot is face-up and all key parts (head, legs, arms, chest, waist, hips) are in the correct starting position to prevent mechanical stress.
- **Surface Requirement:** The robot must be placed on a flat, hard, and level surface to ensure stability and safety during the motion.

Step 6: Enter Locomotion Mode

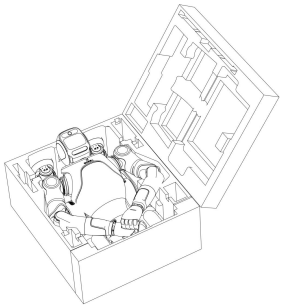
After entering stable standing mode, use the remote controller for “stick-to-move” operation:

- Left stick forward/backward: move forward/backward.
- Left stick left/right: strafe left/right.
- Right stick left/right: rotate in place (turn left/right).

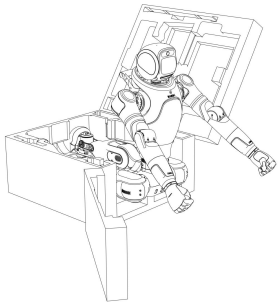
3.2.3 Start-up from Prone Position (Gantry Device Not Required)

Step 1: Unbox and Position the Robot Correctly

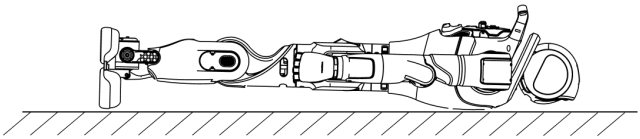
- Follow the diagram to open the packaging box and carefully lift the robot out to avoid collision during handling.
- Place the robot flat and stably on a level surface as shown in the diagram, ensuring proper posture. This allows you to check the battery status on the back of the robot or install the battery if necessary.



Step1-1: Unbox



Step1-2: Carefully Lift Out the Robot



Step1-3: Place the robot flat on a level surface to facilitate battery status inspection.

Notes:

During the flat placement process, extend the robot's legs and arms first, then adjust them so the front side faces downward.

Ensure that the head, legs, arms, chest, waist, and thighs are positioned as shown in the diagram, with the front side facing downward.

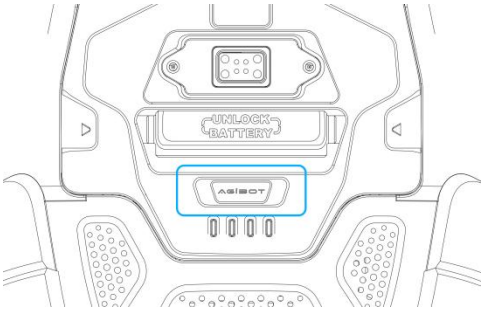
Step 2: Install the Battery

- If the battery is not installed, insert it into the rear battery slot from the outside toward the inside.
- Push it down until you hear a "click", indicating it is properly seated.
- After installation, press down lightly again to confirm the battery is fully inserted and locked.

Step2: Install Battery

Step 3: Power On

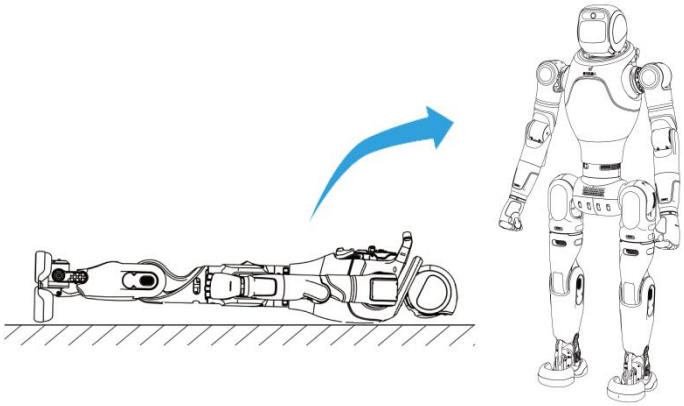
- Before powering on, make sure the battery level is at least two indicator lights (≥50%).
- Short press the power button on the back of the battery to wake the system, then long press for 5 seconds to power on.
- After powering on, LEDs 1–4 on the battery will light up sequentially within about 2 seconds, indicating successful startup.



Step3: Press the power button to start the robot.

Step 4: Start-up from Prone Position

Press **[↑ + △]** simultaneously on the remote controller to make the robot rise from the Prone Position to a standing position.



Step4: The robot transitions from flat to standing posture.

Step 5: Enter Locomotion Mode

After entering stable standing mode, use the remote controller for “stick-to-move” operation:

- Left stick forward/backward: move forward/backward.
- Left stick left/right: strafe left/right.
- Right stick left/right: rotate in place (turn left/right).

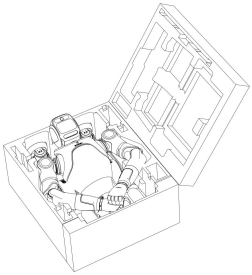
Notes：

- **Prohibited Scenarios:** When the end-effector is the “naturally open artificial hand”, the robot does not support the prone-to-stand motion to avoid damaging the hand. The motion is supported when the end-effector is the “fist-type artificial hand”.
- **Posture Requirements Before Start-Up:** Before performing the prone-position start-up, ensure the robot is adjusted to a face-down posture. Make sure that the head, legs, arms, chest, waist, and thighs are correctly positioned to prevent equipment damage due to improper posture.
- **Ground Condition Requirements:** Place the robot on a flat and solid surface with no slope before initiating the flat-position start-up. This ensures stability during the process.

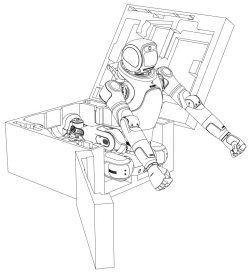
3.2.4 Start-up from Sitting Position (Gantry Device Not Required)

Step 1: Unbox and Position the Robot Correctly

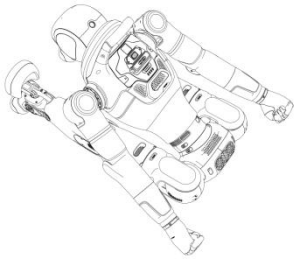
- Open the robot’s packaging box and carefully lift out the robot body (see Step 1-1 and 1-2). During handling, avoid any impact or compression to prevent equipment damage.
- Place the robot in its folded posture on a flat and secure surface (see Step 1-3). This position is used for checking the rear battery power status or installing the battery.



Step1-1: Unbox



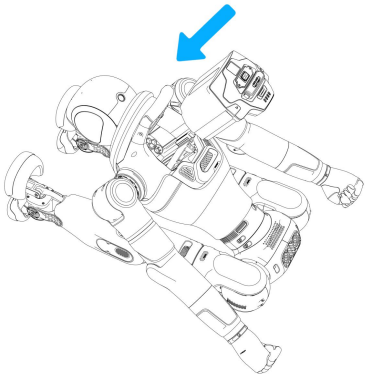
Step1-2: Carefully Lift Out the Robot



Step1-3: Place in Folded Posture

Step 2: Install the Battery

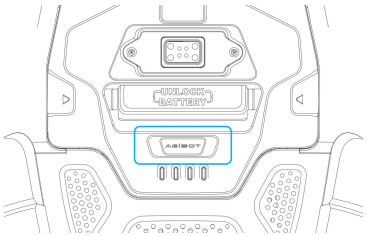
- If the battery is not installed, insert it into the rear battery slot from the outside toward the inside.
- Push it down until you hear a “click”, indicating it is properly seated.
- After installation, press down lightly again to confirm the battery is fully inserted and locked.



Step2: Install Battery

Step 3: Power On

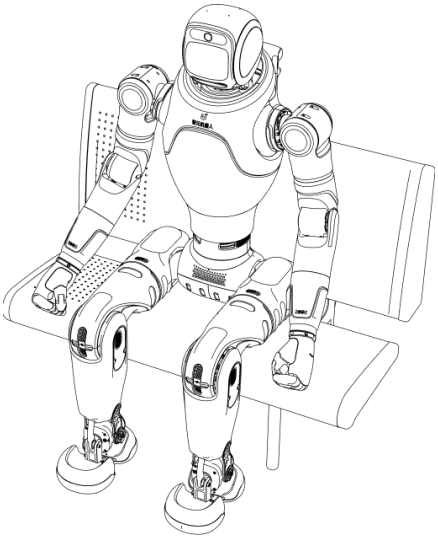
- Before powering on, make sure the battery level is at least two indicator lights (≥50%).
- Short press the power button on the back of the battery to wake the system, then long press for 5 seconds to power on.
- After powering on, LEDs 1–4 on the battery will light up sequentially within about 2 seconds, indicating successful startup.



Step3: Press the power button to start the robot.

Step 4: Place the Robot in Sitting Posture

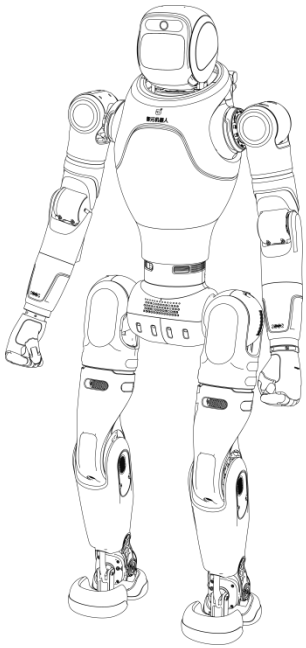
- **Posture Adjustment:** Adjust the robot to the sitting position as shown.
- **Key Requirements:**
  - Ensure the head, legs, arms, chest, waist, and hips are in the correct initial positions. The legs and hips must align with the robot's forward direction.
  - Place the robot on a stable platform or bench about 35-40 cm high, ensuring firm support.
  - The robot is in zero-torque mode; hold the rear handle to maintain balance and prevent falls.
- **Mode Activation:** Use the remote controller and short press **[↑ + X]** simultaneously to enter the sitting preparation (position-controlled sitting) mode.
- **Safety Tip:** During operation, support the robot's back from behind to maintain stability.



Step4: Adjust robot to sitting position and switch to sitting preparation mode

Step 5: Stand-Up Power-On

- **Operation:** Use the remote controller and short press **[↑ + □]** simultaneously to make the robot perform the sit-to-stand motion.
- **Mode:** After the motion is completed, the robot will automatically enter stable standing mode (force-controlled standing).
- **Safety Tip:** During operation, support the robot from behind by holding the back handle to help maintain balance and prevent it from falling.



Step5: Robot in Standing Position

Step 6: Enter Locomotion Mode

After entering stable standing mode, use the remote controller for “stick-to-move” operation:

- Left stick forward/backward: move forward/backward.
- Left stick left/right: strafe left/right.
- Right stick left/right: rotate in place (turn left/right).

Sitting-to-Stand Power-On Notes：

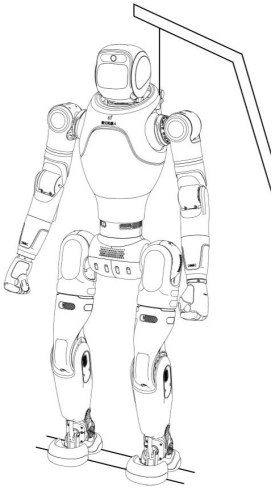
- Before performing the stand-up motion, ensure the robot is placed securely on a platform or bench **35 – 40 cm** high, and stable support is confirmed.
- **Foot Contact:** Confirm both feet are fully in contact with the ground before executing the sitting-to-stand motion to prevent abnormal movement.
- **Posture:** Verify all key parts (head, legs, arms, chest, waist, hips) are aligned forward and in the correct initial position to avoid damage.

3.3 Shutdown Guide

3.3.1 Hoisted Shutdown (Gantry Device Required)

Step 1: Install the Hoisting Ring and Perform Initial Hoisting

- Install the hoisting ring on the back of the robot and ensure it is securely attached.
- Use the electric gantry hoist to lift the robot to an initial hoisting position, preparing for the subsequent mode switching operation.



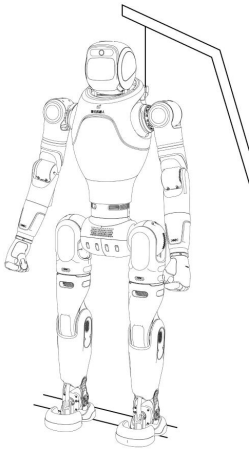
Step1: Install the lifting rings

Step 2: Switch to Standing Preparation (Position-Controlled Standing) Mode

Safety Reminder: Before switching modes, do not lift both feet of the robot completely off the ground to prevent potential equipment damage or personal injury.

Operating Steps:

- Keep the robot in the hoisted position and slightly raise the lifting rope to prevent sudden forward tilting.
- Use the remote controller and press **[L2 + X]** simultaneously to switch to Standing Preparation Mode (Position-Controlled Standing).



Step2: Switch the robot to the standing preparation mode

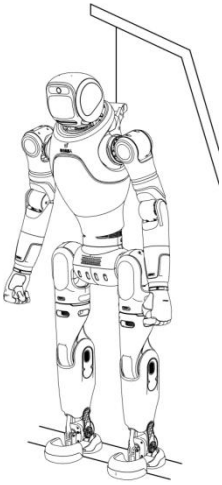
Step 3: Enter Zero-Torque Mode

Recommended Safe Procedure:

- First switch to **Damping Mode**: short press **[L2 + R2 + Create]**.
- Then switch to **Zero-Torque Mode**: short press **[L1 + R1 + Create]**.

Emergency Stop:

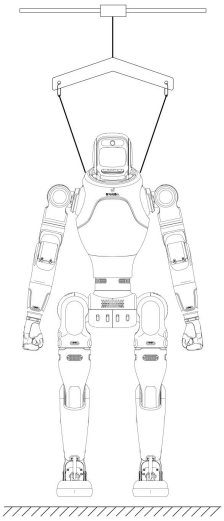
If an immediate stop is required, you can directly enter **Zero-Torque Mode** via the remote controller.



Step3: Use the remote controller to switch the robot to the zero-torque mode

Step 4: Hoist the Robot

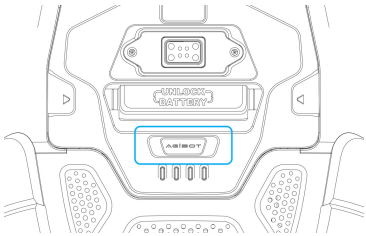
After confirming that the robot has entered **Zero-Torque Mode**, use the electric gantry hoist to slowly lift the robot until both feet are completely off the ground.



Step4: Robot fully hoisted, both feet off the ground

Step 5: Power Off

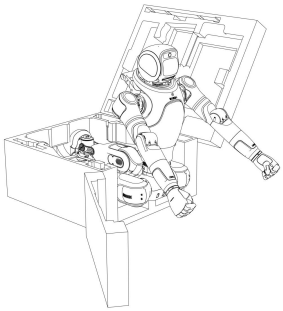
- Short press the power button on the back of the battery to wake the device, then long press for about 5 seconds to power off.
- During shutdown, LEDs 1–4 on the battery will turn off sequentially, indicating successful power-off.



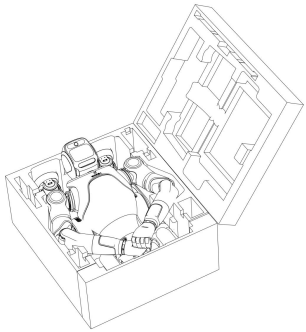
Step5: Press the power button to turn off the robot

Step 6: Repack the Robot

- Open the side door of the packaging box and ensure enough space for placement.
- Following the illustration, first place the legs into the bottom positioning slots, then fold the upper body into the box.
- Confirm the robot is securely positioned before closing and locking the packaging box.



Step6-1: Place the legs into the positioning slots as shown



Step6-2: Fold the upper body into the box to complete packing.

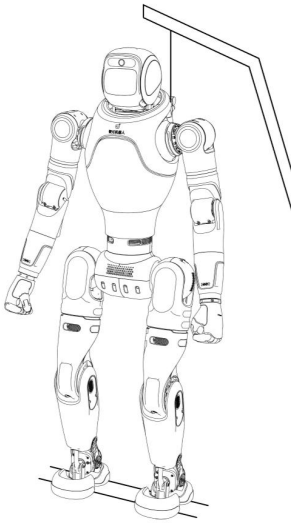
3.3.2 Assisted Lying-Down Shutdown (No Gantry Device Required)

Note:

After switching the robot to standing-preparation (position-controlled standing) mode and before it fully lies down, one or two operators should assist throughout the process to ensure the robot lands smoothly and remains balanced.

Step 1: Enter Preparation (Position-Controlled Standing) Mode

- Use the remote controller and short press **[L2 + X]** simultaneously to switch the robot to standing-preparation (position-controlled standing) mode.
- During operation, manually support the robot from behind using the back handle to prevent tipping caused by imbalance.

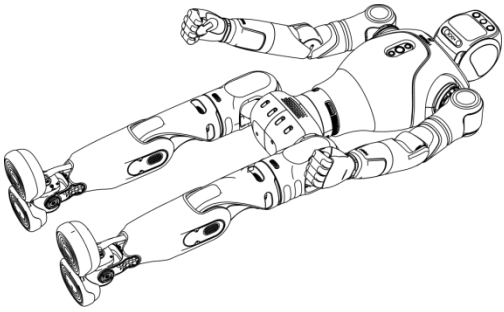


Step1: Switch to Standing-Preparation (Position-Controlled Standing) Mode

Step 2: Lay the Robot Down

- Gently lower the robot from the standing-preparation posture to a Prone Position on the ground, ensuring smooth and controlled movement.

- It is recommended that one or two operators assist to prevent tipping or abnormal postures during placement.



Step2: Gently Lay the Robot Flat

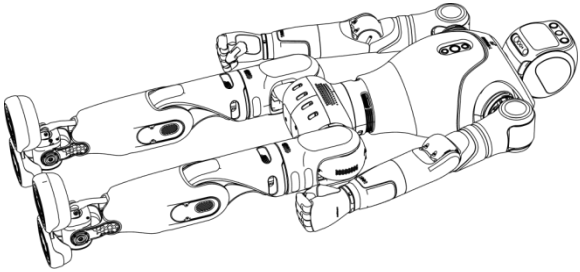
Step 3: Enter Zero-Torque Mode

Recommended Safe Procedure:

- First switch to **Damping Mode**: short press **[L2 + R2 + Create]**.
- Then switch to **Zero-Torque Mode**: short press **[L1 + R1 + Create]**.

Emergency Stop:

If an immediate stop is required, you can directly enter **Zero-Torque Mode** via the remote controller.

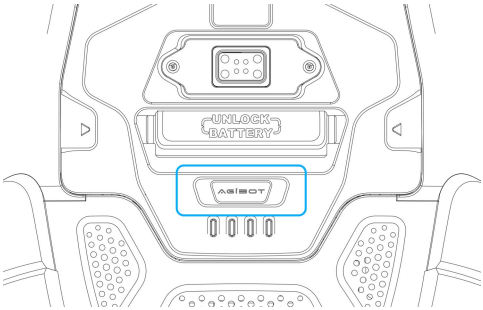


Step3: Switch to Zero-Torque Mode After the Robot is Fully Flat

Step 4: Power Off

- Short press the power button on the back of the battery to wake the device, then long press for about 5 seconds to power off.

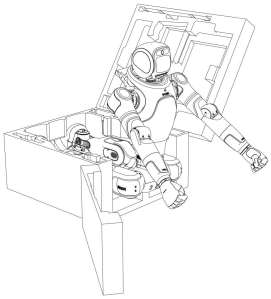
- During shutdown, LEDs 1–4 on the battery will turn off sequentially, indicating successful power-off.



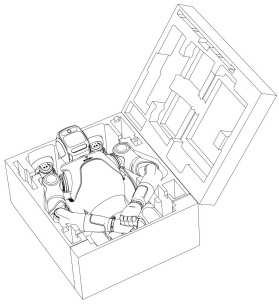
Step4：Press the power button to turn off the robot

Step 5: Repack the Robot

- Open the side door of the packaging box and ensure enough space for placement.
- Following the illustration, first place the legs into the bottom positioning slots, then fold the upper body into the box.
- Confirm the robot is securely positioned before closing and locking the packaging box.



Step5-1: Place the legs into the positioning slots as shown.

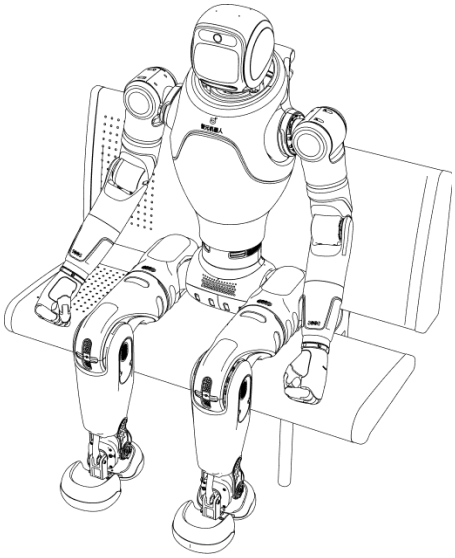


Step5-2: Fold the upper body into the box to complete packing.

3.3.3 Sitting-Position Shutdown (No Gantry Device Required)

Step 1: Command the Robot to Sit Down

- Use the remote controller and short press **[L2 + ←]** simultaneously to make the robot perform the sitting motion.
- Place the robot on a stable platform or bench approximately 35–40 cm high, ensuring firm support.



Step1: Make the robot perform the sitting motion.

Step 2: Enter Zero-Torque Mode

Recommended Safe Procedure:

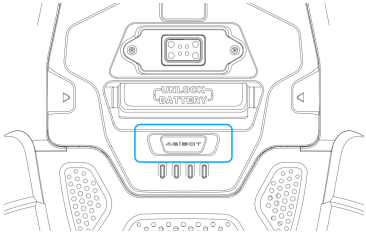
- First switch to **Damping Mode**: short press **[L2 + R2 + Create]**.
- Then switch to **Zero-Torque Mode**: short press **[L1 + R1 + Create]**.

Emergency Stop:

If an immediate stop is required, you can directly enter **Zero-Torque Mode** via the remote controller.

Step 3: Power Off

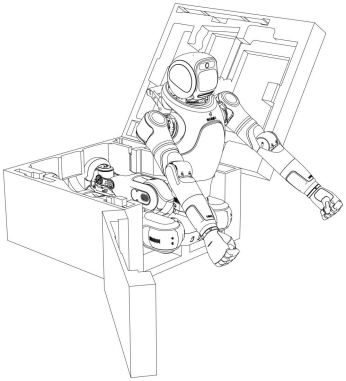
- Short press the power button on the back of the battery to wake the device, then long press for about 5 seconds to power off.
- During shutdown, LEDs 1–4 on the battery will turn off sequentially, indicating successful power-off.



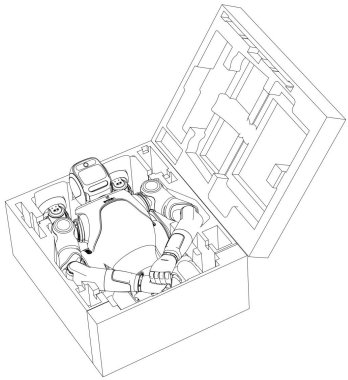
Step3: Press the power button to turn off the robot

Step 4: Repack the Robot

- Open the side door of the packaging box and ensure enough space for placement.
- Following the illustration, first place the legs into the bottom positioning slots, then fold the upper body into the box.
- Confirm the robot is securely positioned before closing and locking the packaging box.



Step4-1: Place the legs into the positioning slots as shown.



Step4-2: Fold the upper body into the box to complete packing.

Sitting-Position Shutdown Notes:

- During the sitting motion, ensure the robot is placed stably on a **35–40 cm** high bench or platform with a backrest for support.
- When switching from sitting posture to **zero-torque mode**, manually support the back handle or keep the robot leaning against the backrest to maintain balance and prevent tipping.

3.4 Charging Procedure

3.4.1 Charging

- **Charging Method Selection**

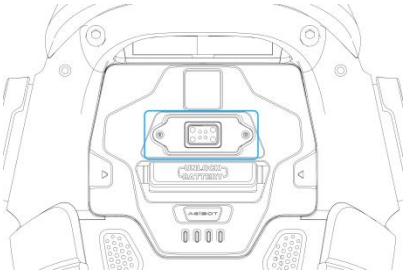
  ○ **Method 1:** After powering off the robot, directly connect the charger plug to the device’s charging port to charge.

  ○ **Method 2:** After powering off the robot, remove the battery first, then insert the charger plug into the battery’s charging port to charge.

- **Magnetic Charging Port Operation Notes**

  ○ The charging port adopts a magnetic design. Simply bring the charger plug close to the charging port, and it will automatically align and start charging.

  ○ During charging, make sure the magnetic charging port is fully aligned to avoid poor contact that could affect charging efficiency or damage the port.



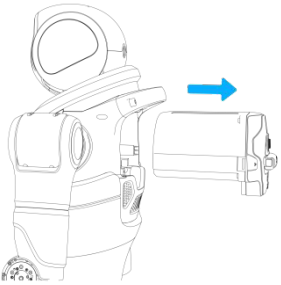
Magnetic Charging Port Location

Note:

Do not charge the robot while it is powered on. During charging, do not use the remote controller or operate the robot by any other means.

3.4.2 Battery Replacement

- **Power Off:** Refer to the shutdown procedure described earlier.
- **Remove the Battery:** Use two fingers to pull out the battery handle fixed on the front of the battery pack. Then insert your fingers into the handle loop and pull the handle strap outward to easily remove the battery.
- **Install the Battery:** Follow the installation procedure described in the startup section.



Pull the battery handle and extract the battery backward.

3.5 Remote Control User Guide

3.5.1 Mode Description

Concept	Description
Zero-Torque Mode	The default state after the robot is powered on. All motors stop active motion, and there is no damping sensation when the body is swung. Note: In zero-torque mode the robot will fall over and there is a risk of tipping. Switch to this mode with caution.

Damping Mode	The robot is powered on and the main controller is operating normally. All joints enter a damping state, with a clear damping feel when the body is swung. Changing joint positions is resisted; joints cannot actively change position or hold a position. Note: In damping mode, the robot will slowly collapse and there is a risk of falling. Switch with caution.
Standing Preparation (Position-Controlled Standing) Mode	The robot is powered on and the main controller is operating normally. The robot stands in a position-controlled posture and maintains it; the joints are locked at their current positions. In this mode, body motion cannot be commanded. It is commonly used for hoisting/lowering and is a safe posture. (The robot does not self-balance in this mode.)
Sitting Preparation (Position-Controlled Sitting) Mode	The robot is powered on and the main controller is operating normally. The robot enters a sitting posture and maintains it; the joints are locked at their current positions. In this mode, the robot's body motion cannot be commanded. It is typically used for starting up from a sitting or Supine Position, and represents a safe posture. (The robot does not self-balance in this mode.)
Stable Standing (Force-Controlled Standing) Mode	The robot is powered on and the main controller is operating normally. The robot stands and maintains posture. If joint positions are disturbed, there will be strong resistance and the robot will actively recover to the standing posture. The robot has a certain balancing capability. In this mode, body motions can be commanded; while standing the robot can perform upper-limb actions such as waving or handshaking.

	It is recommended to perform stable standing on flat, hard surfaces. Avoid standing on soft or uneven surfaces such as carpets or grass.
Locomotion Mode	The robot is powered on and the main controller is operating normally. The robot enters the walking mode and can move forward/backward/left/right and rotate clockwise or counter-clockwise as commanded. At this time, the robot has stronger disturbance rejection and will actively maintain balance when subjected to moderate external forces. Speed and gait can be adjusted via the joystick; start with a slow gait and then gradually increase the speed. To maintain balance, preset upper-limb actions are not supported in Locomotion mode. It is recommended to perform road tests on flat, hard surfaces and to avoid stairs, rough/uneven ground, and high-curvature ramps.
Emergency-Stop Mode	In this mode, the robot stops safely and may fall softly to the ground. Please pay close attention to the robot's safety during this state. It is recommended to use a protective frame to safeguard the robot when operating in this mode.
Off-Road Mode (Beta)	In this mode, the robot enters a fast-running control state with enhanced adaptability to rough terrain. To maintain balance, the robot's upper-limb preset motions are temporarily disabled during Off-Road Mode.

Remote Control Mode Precautions：

- It is recommended to operate the robot on flat, hard surfaces. Avoid stairs, steep or uneven roads, and steep or highly curved slopes to prevent the robot from tipping or falling.
- Avoid continuous running for more than **10 minutes**. Prolonged operation may cause the robot to overheat and pose safety risks.
- **Off-Road Mode (Beta):**

  ○ **Operation Limitation:** When pushing the remote-control joysticks, avoid pushing them to the maximum extent. It is recommended to gradually adjust the joystick amplitude in sequence.

  ○ **Environmental Requirement:** Operate only in open and unobstructed environments. Avoid stairs higher than 5 cm, slopes steeper than 10°, or rough terrain with elevation changes greater than ±5 cm.

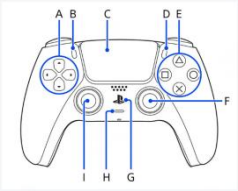
  ○ **Safety Reminder:** Continuously monitor the robot's balance during movement and adjust operation in time if needed.
- **Mode Trigger Limitation:**

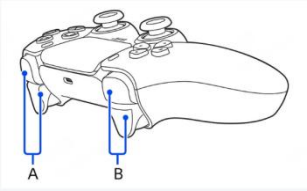
  Unless necessary, **do not** trigger **Emergency-Stop Mode (Zero-Torque Mode) or Damping Mode**, as these modes may cause joint unloading and could result in the robot falling.
- **Control Priority:**

  The control source priority order is: **Remote Controller > App > Voice Interaction.** When operating, pay attention to priority differences to avoid command conflicts.

3.5.2 Remote Control Instructions

3.5.2.1 Remote Control Button Positions





Button position	X2 remote control button names and meanings
B: Left Button/Trigger	L1, L2 Buttons (PS5 side view)
A: Right Button/Trigger	R1, R2 buttons (PS5 side view)
A: Arrow Button	The left cross key, ↑, ↓, ←, → four direction button
B: Create Button	Create Button
C: Touchpad	Touchpad
D: Options Button	Options Button
E: Four Action Buttons	△、□、○ and × Four Action Buttons
I&F: Sticks	I: Left Stick (controls forward/backward and left/right).

	F: Right Stick (controls rotation).
“PS”Button	G

3.5.2.2 Remote Controller LED Indicator Guide

Status Description	LED Color/Behavior
Controller power-on / connected	Solid blue
Controller waiting to pair	Fast-blinking blue
Pairing successful	Solid white
Normal startup	Breathing white
Battery level ≤10 %	Solid amber
Charging: 0–20 %：Fast blink 20–100 %：Slow blink	Breathing amber
Charging complete	Amber off

3.5.2.3 Remote Controller Charging Instructions

- **Charging Method:** Use a **5V charger plug + Type-C** cable for direct charging. Charging via a computer USB port is slower.
- **Charging Time:** Typical battery life is about 5 hours of continuous use, and it takes approximately 3–4 hours to fully charge. The actual duration for PS5 controllers may vary depending on usage conditions.

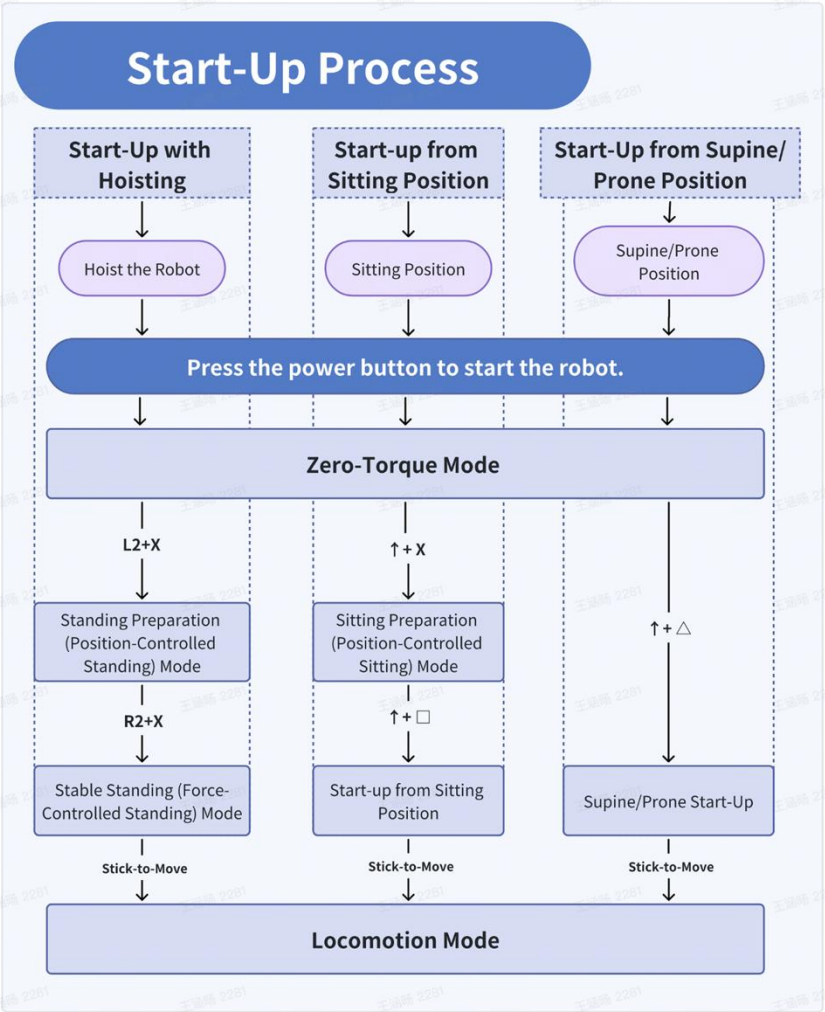
- **Notes:** Avoid using fast-charging cables or adapters. It is recommended to use a 5V1A or 5V2A charger. The controller may become slightly warm during charging — avoid overcharging to prevent overheating damage.

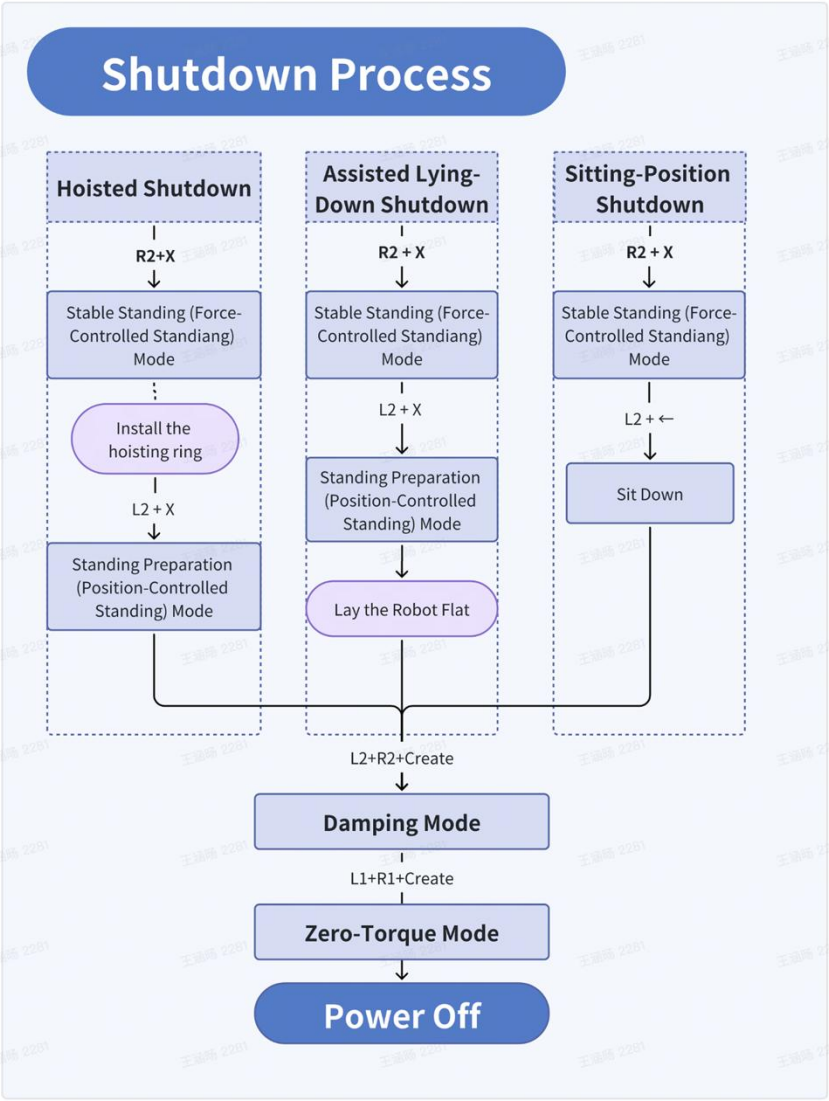
Remote Controller Usage Precautions

- When using the remote controller to operate the robot, **pay attention to the controller's battery level**. Insufficient power may prevent mode switching, which could cause the robot to lose balance or fall unexpectedly.
- Always use **certified safe chargers** when charging the remote controller. Using third-party fast chargers that only support **9V/12V (no 5V mode)** may result in **damage to the controller**.

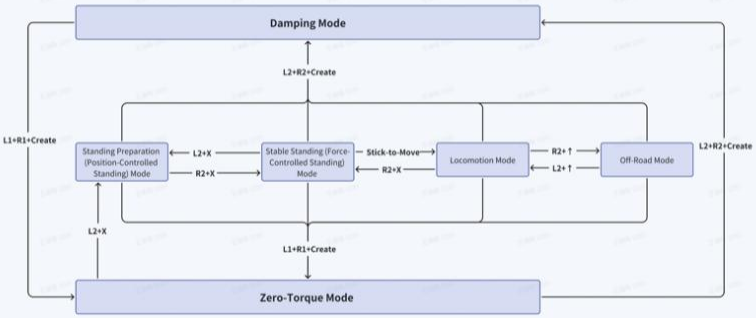
3.5.3 Mode Switching and Remote Control

3.5.3.1 Description of Mode Switching Logic

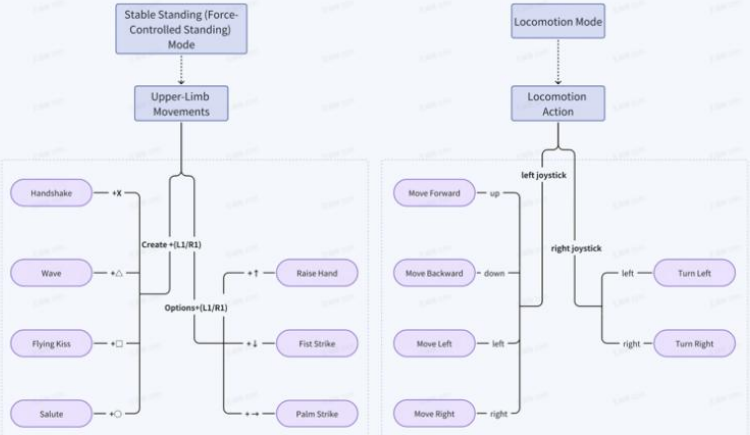



Shutdown Process
Hoisted Shutdown
R2+X
Stable Standing (Force-Controlled Standiang) Mode
Install the hoisting ring
L2 + X
Standing Preparation (Position-Controlled Standing) Mode
Assisted Lying-Down Shutdown
R2 + X
Stable Standing (Force-Controlled Standiang) Mode
L2 + X
Standing Preparation (Position-Controlled Standing) Mode
Lay the Robot Flat
Sitting-Position Shutdown
R2 + X
Stable Standing (Force-Controlled Standiang) Mode
L2 + ←
Sit Down
L2+R2+Create
Damping Mode
L1+R1+Create
Zero-Torque Mode
Power Off

Mode Switching



Body Motion



Notes：

- The robot includes multiple operation modes. Different modes support different state transitions, and switching must follow the logic described above.
- Upper-limb motion control is only available in **Stable Standing (Force-Controlled Standing) Mode** and can be triggered by sending upper-limb commands via the controller or app.

3.5.3.2 Emergency-Stop Mode Switching Instructions

- When the robot is walking, press **[L1 + R1 + Create]** simultaneously (short press) to trigger an emergency stop. After activation, all robot joints will release torque and the robot will slowly collapse. Use the protective frame throughout the process to ensure safety.
- To cancel the emergency stop, press **[L2 + X]** simultaneously to switch the robot back to **Sitting Preparation (Position-Controlled Sitting) Mode**.
- Avoid triggering the **Emergency-Stop Mode (Zero-Torque Mode)** unless absolutely necessary.

3.5.3.3 Full-Body Mode Switching Button Description

Name	Details
Hoisted Start-Up	**Process Description:** Power on (hoisted position) → Position-Controlled Standing → Force-Controlled Standing → Remove hoisting ring → Enter Locomotion Mode → Demonstration process. **Standing Preparation (Position-Controlled Standing) Mode: L2 + X** , short press simultaneously. **Stable Standing (Force-Controlled Standing) Mode: R2**

	+ X, short press simultaneously. **"Stick-to-Move":** The robot automatically enters Locomotion Mode when the joystick is pushed forward.
Start-up from Supine Position	**Process Description:** Power on (ensure the robot's hips are level with the ground and the torso is facing upward) → Start-up from supine position → Enter Locomotion Mode → Demonstration process. **Supine Start-Up:** Press ↑ **+** △ simultaneously (short press). **"Stick-to-Move"** : The robot automatically enters Locomotion Mode when the joystick is pushed forward.
Start-up from Prone Position	**Process Description:** Power on (ensure the robot's hips are level with the ground and the torso is facing downward) → Start-up from prone position → Enter Locomotion Mode → Demonstration process. **Prone Start-Up:** Press ↑ **+** △ simultaneously (short press). **"Stick-to-Move"** : The robot automatically enters Locomotion Mode when the joystick is pushed forward.
Start-up from Sitting Position	**Process Description:** Power on (sitting standby) → Enter sitting posture → Sit-to-stand → Enter Locomotion Mode → Demonstration process. Before starting, ensure that the robot's limbs are placed in the standard sitting posture. **Sitting Preparation (Position-Controlled Sitting) Mode:** Press ↑ + X simultaneously (short press). The robot's back must be supported by a stable chair or assisted by personnel.

	Siting Start-Up: Press ↑ **+** □ simultaneously (short press). **"Stick-to-Move"** : The robot automatically enters Locomotion Mode when the joystick is pushed forward.
Standing Preparation (Position-Controlled Standing) Mode	Press **L2 + X** simultaneously (short press) to switch to **Standing Preparation (Position-Controlled Standing) Mode.** This mode can also be switched from Zero-Torque Mode.
Sitting Preparation (Position-Controlled Sitting) Mode.	Press ↑ **+ X** simultaneously (short press) to switch to **Position-Controlled Sitting Mode.** This mode can also be switched from Zero-Torque Mode.
Stable Standing (Force-Controlled Standing) Mode	Press **R2 + X** simultaneously (short press) to switch to **Stable Standing (Force-Controlled Standing) Mode.**
Zero-Torque Mode	Press **L1 + R1 + Create** simultaneously (short press) to switch to Zero-Torque Mode. The robot can enter this mode from any other mode using the same button combination.
Damping Mode	Press **L2 + R2 + Create** simultaneously (short press) to switch to Damping Mode. The robot can enter this mode

	from any other mode using the same button combination.
Locomotion Mode	In **Stable Standing (Force-Controlled Standing) Mode**, the robot moves when the joystick is pushed. **Forward:** Push the left joystick upward. **Backward:** Push the left joystick downward. **Turn Left:** Push the right joystick to the left. **Turn Right:** Push the right joystick to the right. **Strafe Left:** Push the left joystick to the left. **Strafe Right:** Push the left joystick to the right.
Off-Road Mode (Beta)	When in Locomotion Mode, the robot can switch to **Off-Road Mode**. Press **R2 +** ↑ simultaneously (short press) to switch to Off-Road Mode.
Sit Down / Stand Up from Sitting	When in **Stable Standing (Force-Controlled Standing) Mode**, the robot can switch to Sitting Motion. **Sit Down:** Press **L2 +** ← simultaneously (short press). **Stand Up from Sitting:** Press ↑ + □ simultaneously (short press).
Crouch Down / Stand Up from Crouching	When the robot is in Stable Standing (Force-Controlled Standing) Mode, it can enter the Crouch/Stand Transition Motion. Press **▲ + Left Joystick** simultaneously to control the robot's crouching depth and standing height via the joystick. Push the **left joystick upward** to stand up from crouching.

	Push the **left joystick downward** to crouch down from standing. During the crouching process, please monitor the robot's balance closely. Assistance may be required to help maintain stability.
Emergency -Stop Mode	**Emergency-Stop Mode is equivalent to the Zero-Torque Mode, and the key combinations are the same.** Press **L1 + R1 + Create** simultaneously (short press) to switch to Emergency-Stop Mode. At this time, the robot will slowly collapse and fall to the ground. Please ensure the surrounding area is safe during this process. To exit Emergency-Stop Mode, press **L2 + X** simultaneously to switch the robot to the Standing Preparation (Position-Controlled Standing) Mode.
Hoisted Shutdown	**Process Description:** Demonstration Mode → Complete demonstration → Switch to Standing Preparation (Position-Controlled Standing) Mode → Switch to Damping Mode → Switch to Zero-Torque Mode → The robot's legs gradually lift off the ground → Power off. **Standing Preparation (Position-Controlled Standing) Mode:** Press **L2 + X** simultaneously to switch to this mode. **Damping Mode:** Press **L2 + R2 + Create** simultaneously (short press) to switch to Damping Mode. The robot will soften its joints and collapse slowly. Please ensure safety during this process. **Zero-Torque Mode:** Press **L1 + R1 + Create** simultaneously (short press) to switch to Zero-Torque

	Mode. When the robot is fully suspended with both feet off the ground, turn off the power to complete the shutdown.
Assisted Lying-Down Shutdown	**Process Description:** Demonstration Mode → Standing Preparation (Position-Controlled Standing) Mode → Manually assist the robot to lie down → Robot lies flat → Damping Mode → Zero-Torque Mode → Power off. During the transition from Standing Preparation (Position-Controlled Standing) Mode to the robot lying flat, an operator must assist in supporting the robot. **Standing Preparation (Position-Controlled Standing) Mode:** Press **L2 + X** simultaneously (short press). **Damping Mode:** Press **L2 + R2 + Create** simultaneously (short press) to switch to Damping Mode. At this time, the robot will switch to the Damping Mode and slowly collapse. Please ensure safety during this process. **Zero-Torque Mode:** Press **L1 + R1 + Create** simultaneously (short press).
Sitting-Position Shutdown	**Process Description:** Demonstration Mode → Sit-Down Action → Damping Mode → Zero-Torque Mode → Power off. **Sit-Down Action:** Press **L2 +** ← simultaneously (short press). **Damping Mode:** Press **L2 + R2 + Create** simultaneously (short press) to switch to Damping Mode. At this time, the robot will switch to Damping Mode and slowly collapse. Please ensure safety during this process. **Zero-Torque Mode:** Press **L1 + R1 + Create**

	simultaneously (short press) to switch to Zero-Torque Mode from sitting position. The robot's back should be supported by a chair or assisted manually for balance.

3.5.4 Interaction Action Library Control

The following robot actions can be performed through the controller, including certain head, upper-limb, and waist movements.

Action Type	Action Name	Button Instruction
Head Movements	Clockwise Rotation	L1 + push the left joystick to the right: The head rotates clockwise. When the joystick is released, the head will automatically return to its neutral position. To fix the head at a specific angle, hold the joystick; to unlock, press the joystick again.
	Counterclockwise Rotation	L1 + push the left joystick to the left: The head rotates counterclockwise. When the joystick is released, the head will return to neutral. Hold to fix at a specific angle; press again to unlock.
Upper-Limb Movements	Wave	Wave (Left Arm): Simultaneously press PS5 Create (Left) + L1 + tap △ Wave (Right Arm): Simultaneously press PS5 Create (Left) + R1 + tap △
	Handshake	Handshake (Left Hand): Simultaneously press PS5 Create (Left) + L1 + tap ×

		Handshake (Right Hand): Simultaneously press PS5 Create (Left) + R1 + tap ×
	Flying Kiss	Flying Kiss (Left Hand): Simultaneously press PS5 Create (Left) + L1 + tap ○ Flying Kiss (Right Hand): Simultaneously press PS5 Create (Left) + R1 + tap ○
	Salute	Salute (Left Arm): Simultaneously press PS5 Create (Left) + L1 + tap □ Salute (Right Arm): Simultaneously press PS5 Create (Left) + R1 + tap □
	Fist Strike	Fist Strike (Left Arm): Simultaneously press PS5 Options (Right) + L1 + tap↓ Fist Strike (Right Arm): Simultaneously press PS5 Options (Right) + R1 + tap↓
	Palm Strike	Palm Strike (Left Arm): Simultaneously press PS5 Options (Right) + L1 + tap → Palm Strike (Right Arm): Simultaneously press PS5 Options (Right) + R1 + tap →
	Raise Hand	Raise Hand (Left Arm): Simultaneously press PS5 Options (Right) + L1 + tap ↑ Raise Hand (Right Arm): Simultaneously press PS5 Options (Right) + R1 + tap ↑

Waist Movements	Clockwise Rotation	L1 + push the right joystick to the right: The waist rotates clockwise. When the joystick is released, the waist will automatically return to its neutral position. To fix the waist at a specific angle, hold the joystick; press again to unlock.
	Counterclockwise Rotation	L1 + push the right joystick to the left: The waist rotates counterclockwise. When the joystick is released, the waist will automatically return to its neutral position. To fix the waist at a specific angle, hold the joystick; press again to unlock.
	Bend Forward	L1 + push the right joystick downward: The waist bends forward. When the joystick is released, the waist will automatically return to its neutral position. To fix the waist at a specific angle, hold the joystick; press again to unlock.
	Straighten Waist	L1 + push the right joystick upward: The waist straightens up. When the joystick is released, the waist will automatically return to its neutral position. To fix the waist at a specific angle, hold the joystick; press again to unlock.

3.6 Robot Interaction Procedure Guide

3.6.1 Robot Interaction Precautions

1. During voice-controlled walking or upper-limb motion commands, it is recommended to maintain a clear space with at least a 1-meter radius around the robot. This ensures a safe operating area and allows the robot to

move freely within its active range.

2. During voice-controlled walking or motion execution, please pay close attention to the robot's safety to avoid any risk of falling.

3. It is recommended to perform motion commands on hard flooring. Avoid using voice control on soft surfaces such as grass or carpets, as this may affect stability.

4. For v0.8.1 customized speech corpus configuration, please contact AgiBot technical support. In later versions, this feature will be available for self-configuration via the LinkSoul Platform.

3.6.2 Robot Interaction Process

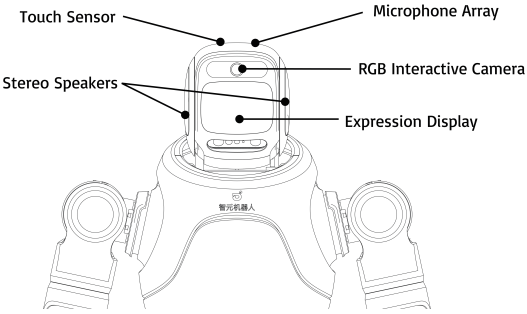
1. Current Version (External Microphone)

- **Interaction Support:** Only external microphone interaction is supported. You must use the external microphone provided in the package for connection.
- **Operation Steps:** Connect and pair the microphone properly. After ensuring that the robot is connected to the network, turn on the microphone to activate the voice interaction function.
- **Interaction Method:** No wake-up word is required — you can communicate with the robot directly through the external microphone.

2. Upcoming Version (Built-in Microphone, OTA Update)

- The built-in microphone interaction feature will be introduced through a **future OTA update**. Please pay attention to version upgrade notifications in the Agibot Go app for detailed update instructions.

- **Function Switching:** After the update, users can manually switch between the built-in and external microphones within the Agibot Go app.
- **Built-in Microphone Interaction:** When using the built-in microphone, the robot must be activated with a wake word before interaction.



3.6.2.1 Voice Chat

1. Chat Content Scope

- Everyday Topics: Users can engage in casual voice conversations with the robot on general subjects such as current news, weather conditions, or information about the surrounding environment.
- AgiBot Topics: Users can ask questions related to Agibot X2, including its personality, preferences, or its details.
- Knowledge Base Topics: Users can inquire about content related to the custom knowledge base, depending on the system configuration.

2. Language Interaction Support

- The system currently supports bilingual interaction in Chinese and English. Users can speak directly to the robot in either language, and the robot will automatically detect the language and respond accordingly in Chinese or English.
- In future updates, additional languages (including Chinese, English, and other minor languages) can be customized and switched via the LinkSoul Platform, enabling flexible adaptation to various use scenarios.

3. Voice Skill Commands

- Poem Recitation Skill:
  - ○ The recitable poems are selected from Three Hundred Tang Poems;
  - ○ Example commands: Recite a poem by XXX / Recite XXX's poem.
- Singing Skill:
  - ○ Supported songs include: Bingo, Happy Birthday, Little Star, London Bridge, Row Row Row Your Boat, The Wheels on the Bus, as well as Chinese songs such as The East Is Red, The Wheels on the Bus, The Most Glorious Labor, Little Star, Little White Boat, Kangding Love Song, Happy Birthday, Plant the Sun, Jasmine Flower, Blue Elf, and Jingle Bells.
  - ○ Example commands: "Sing me a song." / "Can you sing?"
- Rap Singing Skill:
  - ○ Example commands: "Sing me a rap." / "Can you do a rap?"

3.6.2.2 Multimodal Interaction

1. Environment and Object Q&A

- Users can initiate multimodal question–answering with the robot — for example, asking about the surrounding environment or inquiring about the number, color, or type of objects on a table.

2. Interactive Object Attribute Query

- The robot can answer questions about specific targets in the scene, such as detecting the number of people, or recognizing their clothing, facial expressions, or gender.

3. Customized Guest Greeting

- Supports face enrollment via the OMP platform. Once a face is registered, the robot can recognize the guest and greet them accordingly.
- Both single-person and multi-person recognition scenarios are supported.

- In version v0.8.1, face data must be imported by contacting AgiBot Robotics technical support. Future updates will allow self-service customization via the LinkSoul Platform, following platform update releases.
- A new Face Recognition Switch has been added — users can enable or disable the feature directly in the Agibot-Go app.

3.6.2.3 Voice Command Actions and Expressions

You can converse with the robot using voice commands to trigger physical actions or facial expressions：

Category	Supported Range
Upper Limb + Prosthetic Hand Actions	Left/Right wave, Left/Right chest-front wave, Cross arms, Left/Right raise hand, Left/Right salute, Left/Right handshake, Double-hand heart, Left/Right single-hand heart, Dynamic energy beam, Hug, High five, Cheering, Double-hand lift, Left/Right single-hand lift, Left/Right fist bump, Left/Right thumbs up, Left/Right “V” gesture **Example Voice Command:** “Perform a XXX action.”
Walking Actions	Move forward, backward, left, or right **Example Voice Command:** “Walk two steps forward/backward/left/right.”
Waist Movements	Turn waist left and return, Turn waist right and return **Example Voice Command:** “Turn your waist left/right.”
Expressive	Head scratching, Butt scratching

Actions	**Example Voice Command:** “Do a head-scratch/butt-scratch action.”
Facial Screen Expressions	Blinking, Laughing, Sad/Crying, Bored, Thinking, Sleepy, Confused/Surprised, Angry, Adoring, Coquettish, Sympathetic expressions **Example Voice Command:** “Show a XXX expression.”

3.6.2.4 Robot Interaction Customization

You may contact the sales representative to submit your knowledge base customization request. **The knowledge base customization template** generally includes the following items.

In future updates, you will be able to configure and customize your interactive knowledge base, character profile, wake words, and voice tone selection directly through the **LinkSoul Platform.**

Type	Required Content	Description
Character Customization	- Character profile (optional), default: AgiBot X2. - Desired company-related knowledge (optional). - Desired business-related knowledge (optional). - Limit: within 300 characters. - Currently supported via sales representative submission; future support through the LinkSoul Platform.	Customize a corporate-specific persona, enabling the robot to understand core company knowledge.

Q&A Customization	- Question: User utterances, up to 20 characters each, with 2–5 high-frequency variations (no special symbols). - Answer: Robot response, up to 50 characters (recommended 50). (Currently supported via sales representative submission; future support through the LinkSoul Platform.)	Designed for high-frequency Q&A scenarios — allows the robot to accurately answer company-specific questions and provide effective responses to user inquiries.
Facial Registration	Supports facial data entry and customization of greeting dialogues for specific individuals. Future customization will be available on the LinkSoul Platform.	Enables personalized greetings and welcome messages for registered faces.
Voice Tone Selection	Future customization available through the LinkSoul Platform.	Allows customization or replication of the robot’s voice tone.
Wake Word Customization	Future customization available through the LinkSoul Platform.	Enables defining personalized wake words for robot activation.

3.6.3 External Audio Device Connections

3.6.3.1 External Microphones Connection

1. Open the package and remove the transmitter (TX) and receiver (RX) of the lavalier microphone;

2. Locate the external microphone cable on the robot body and connect it to the microphone receiver. One end of this cable connects to the RX (DJI microphone receiver), while the other end connects to the robot body;

3. Turn on the microphone receiver and simultaneously press the power button to activate the transmitter. A steady green light indicates successful pairing;

3.6.3.2 External Speaker Connection

The AgiBot X2 supports external speaker devices. The specific operation is as follows:

1. Locate the external speaker connection cable on the robot body and connect it to the external speaker. One end of this cable connects to the external speaker, while the other end connects to the robot body;

2. After inserting the external speaker cable, if the external speaker is already powered on, the robot will automatically play sound through the external speaker. When the external speaker cable is unplugged, the robot will automatically switch to the built-in speaker for sound playback.

Note:

1. Before shutting down the speaker, the speaker and its included connecting cable must be unplugged, after which the robot can play sound through the built-in speaker;

2. When using the external speaker, ensure it is securely fastened to prevent damage to the speaker body or audio cable due to shaking during dancing or running;

Diagram of Microphone Transmitter Indicator Lights	Audio Cable Connection Instructions	External Speaker Connection Instructions
 ② System Indicator LED Flashing Pattern / Description Connection Status with DJI Mic 2 Receiver Solid Green — Connected to the receiver Slow Blinking Green — Not connected to the receiver Rapid Blinking Green — Pairing in progress Bluetooth Device Connection Status Solid Blue — Connected to a Bluetooth device Slow Blinking Blue — Not connected to a Bluetooth device Rapid Blinking Blue — Bluetooth connection in progress Noise Cancellation Solid Yellow — Noise cancellation enabled and the transmitter is connected to the DJI Mic 2 receiver or another Bluetooth device Blinking Yellow — Noise cancellation enabled but the transmitter is not connected to the DJI Mic 2 receiver or another Bluetooth device Battery Indicator Solid Red — 0–10% Charging Progress Battery Level Indicator Single Blinking Green — 0–25% Double Blinking Green — 26–50% Triple Blinking Green — 51–75% Quadruple Blinking Green — 76–100% LED Off — Charging complete Firmware Upgrade Indicator Alternating Red and Green Blinking — Firmware upgrading		

3.7 Agibot Go APP Manual

Agibot Go APP is the official companion control application for the **AgiBot X2** robot. Through **Agibot Go**, users can perform full lifecycle management of the robot, including but not limited to the following features:

- Network configuration and connection
- Motion control and posture management
- OTA firmware updates and version upgrades
- Exhibition and showroom navigation modes

Agibot Go provides users with an all-in-one intelligent management and control experience, making robot operation more intuitive, efficient, and convenient.

3.7.1 APP Download

The latest version of the APP corresponds to the latest firmware version of the robot. Please make sure to download and use the correct version.

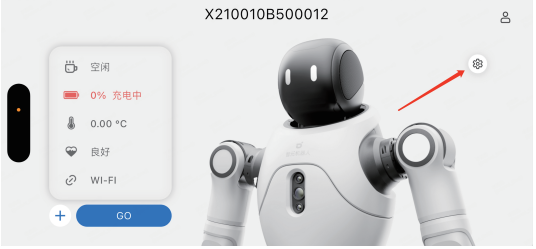
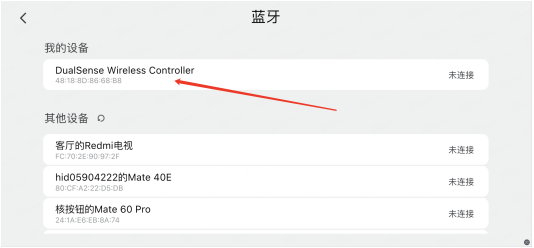
System	Address	QR Code
IOS	- Search Agibot Go APP in the App Store. - Scan the QR code on the right to download Agibot Go APP.	
Android	- Search Agibot Go APP in the Android app marketplace. - Scan the QR code on the right to download Agibot Go APP.	

3.7.2 Robot Connection

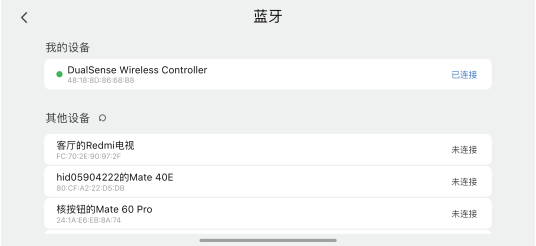
Operating Steps	User Interface
Add Robot	1. Open Add Robot Interface  2. Add Robot 
Connect Robot via Wi-Fi	1. Click Wi-Fi Connection Mode  2. Enter Wi-Fi Password 
Connect the Robot through AP Mode	1. Click AP Connection Mode  2. Select Connection 
Connection Result Notification	1. Connection Successful  2. Interaction Available 

3.7.3 Remote Controller Connection

1. Remote Controller Connection

Operating Steps	User Interface
1. Open the App and go to the Bluetooth Connection page. 2. Select the connected robot, then tap Settings → Bluetooth. 3. From the list of Bluetooth devices, select the controller (e.g., DataSense Wireless Controller), tap Connect, and complete the pairing process.	1. Go to the Bluetooth Connection page  **2.** Select the connected robot, then tap **Settings Bluetooth.**  3. Select the controller and tap Connect 

3. **Other operations:** such as checking the controller status, re-pairing the controller, and deleting historical pairing records.

Operating Steps	User Interface
Check Controller Status: In My Devices, you can choose to manually disconnect or ignore the remote controller.	 Check Controller Connection Status  Disconnect or Ignore the Controller

Re-pair the Controller (Note: The remote controller is pre-configured and paired at the factory. No manual re-pairing is required — simply press the center button to activate the controller when needed.)	The remote controller is pre-configured and paired by default at the factory, so no re-pairing is required — simply press the button inside the red box to activate it.  Default Pairing If you need to re-pair or connect another controller, follow these steps: 1. Enter pairing mode: Press and hold both buttons inside the red box at the bottom of the controller until the blue indicator light starts flashing, indicating that the controller has entered pairing mode. 2. Connect via APP: Wait for the Agibot Go APP to detect the controller, then tap “Connect.” When the blue light stays solid, the pairing has been successfully completed.  Repairing

Delete Pairing History	After the connection is disconnected, the controller will automatically power off. If the historical connection record has not been deleted, simply press the button shown in the red box the next time you power on to automatically reconnect. If the history has been deleted, you will need to go through the pairing process again.	 Automatic Pairing

Controller Connection Notes:

1. Basic Connection Operation

- The X2 remote controller comes pre-configured and paired at the factory — no re-pairing is required.
- To use, simply press the center button on the controller to quickly establish a connection.

2. How to Distinguish Multiple Controllers

- Each controller has a unique MAC address. If multiple controllers share the same name, follow these steps:
  - Try connecting several times to identify and remember your controller's MAC address.
  - In the APP Bluetooth scan interface, the MAC address is displayed

beneath the device name — use it to select and connect to the correct controller.

3. Troubleshooting Connection Issues

- If the historical connection record has not been deleted, but the controller fails to reconnect automatically after startup: wait a few moments. If the issue persists, enter pairing mode and reconnect.
- If the historical connection record has been deleted, you must manually enter pairing mode again to reconnect the controller to the device.

3.7.4 Action Control Commands

3.7.4.1 Safety Notes

1. When the robot switches to full-body motion control mode, please pay close attention to its movements. It is strongly recommended to provide manual support or other protective measures in advance to prevent falls that may cause mechanical damage.

2. Avoid triggering passive (zero-torque) mode, emergency stop mode, or damping mode unless necessary, as these modes may cause the robot to lose balance and fall, resulting in potential equipment damage.

3.7.4.2 App Action Command Operation

Operating Procedure	App UI and Interaction Logic
Start-up Procedure	1. Select Lift-up, Lying, Sitting, or Prone Start-up mode based on the robot's current posture. **Note:** Make sure to correctly select the robot's actual posture on the page below. Selecting an incorrect state may cause the robot to misjudge its condition, resulting in abnormal movements or potential damage.

<table>
<tr>
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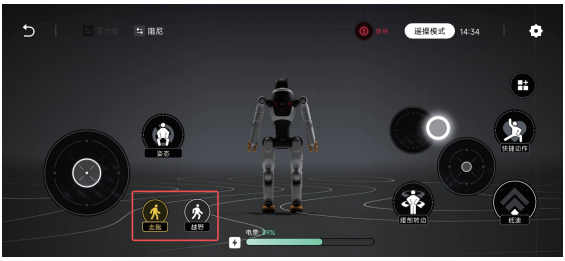
2. A secondary confirmation is required before performing actions such as lying down and standing up, lifting, sitting down and standing up, or prone-to-stand transitions.


</td>
</tr>
<tr>
<td>Action Control Mode Switching</td>
<td>1. Off-road Mode
2. Locomotion Mode
3. Use the button shown below to switch between</td>
</tr>
</table>

	Locomotion Mode and Off-road Mode 
Full-Body Action	1. Sit down action 2. Lie down action (to be supported in future versions) 3. Crawl/Prone action (to be supported in future versions) 
Upper Limb Action	1. Upper limb movements are only supported in Stable Standing Mode. 2. The available upper limb movements include: (1) Single-hand wave (left/right) (2) Single-hand handshake (left/right) (3) Turn-and-wave (left/right) (4) Hug (5) High five

(6) Chest-front wave

(7) Chest-front cross

(8) Single-hand blow kiss (left/right)

(9) Energy blast (Dynamic Light Wave)

(10) Single-hand raise (left/right)

(11) Raise both hands

(12) Salute

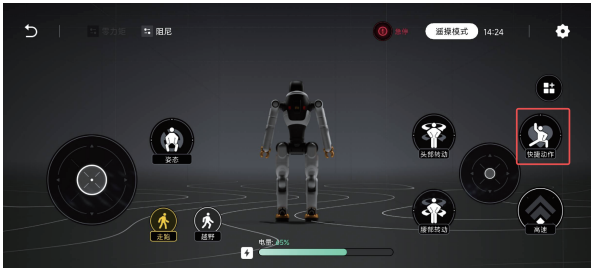
(13) Hand raise (left/right)

(14) Single-hand heart gesture (left/right)

(15) Double-hand heart gesture

3. Long press the shortcut action button to open the upper limb action menu. You can trigger actions via the rotary dial from this menu.

Note: Please note that when performing upper-body actions (such as Light Beam, Chest Cross, Hip Scratch, etc.), ensure that the current action is fully completed before triggering the next one. Rapid switching between actions may cause collisions or scraping damage to the robot.



<table>
<tr>
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<tr>
<td>Waist Action</td>
<td>
1. Rotate the waist clockwise
2. Rotate the waist counterclockwise
3. Bend forward
4. Straighten up

Note: Please note that during waist-related movements such as torso rotation or bowing, do not trigger full-body actions (e.g., squatting) or other upper-body actions (e.g., Hip Scratch, Bow) at the same time.
</td>
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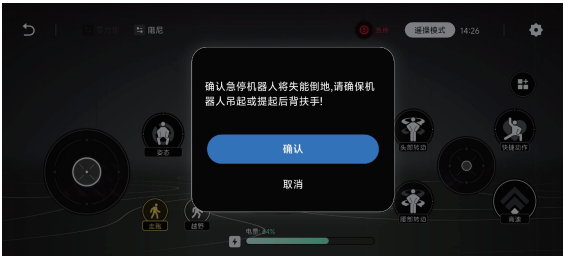
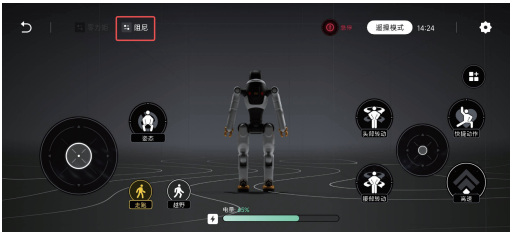
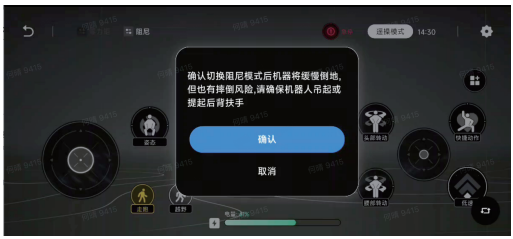
</table>

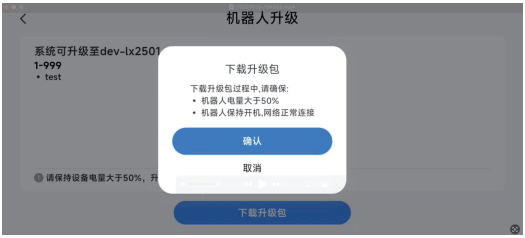
	
Tap to Trigger Expressions	The following expressions can be triggered by tapping: Happy, Super Happy, Cute, Bored, Sleepy, Drowsy, Calm, Gaming, Sad, Empathy, Confused, Shocked, Adorable, Serious, Thinking, Annoyed, Angry, Worship, Super Worship, Winking, Blinking, Warning, Charging Expression. 
Switch to Emergency Stop Mode (Zero Torque Mode)	1. Click the upper-left button to enter Emergency Stop Mode (Zero-Torque Mode). 2. A secondary confirmation is required before activating Emergency Stop Mode.

	 
Switch to Damping Mode	1. Click the upper-left button to enter Damping Mode. 2. A secondary confirmation is required before entering Damping Mode. 

3.7.5 APP OTA

Operating Procedure	App UI and Interaction Logic
OTA	Select OTA Option： 
Confirming Update Package Download	Download Update Package: During the download process, please ensure that the robot's battery level is above 50%, the robot remains powered on, and the network connection stays stable and uninterrupted.

	
OTA Package Download	1. OTA Package Download 2. **Stop Download:** Immediately terminates the ongoing OTA package download process. 3. **Pause Download:** Temporarily halts the OTA package download; you can resume it later from where it stopped. 
Installation Prompt After Download Completion	1. After Download Completed 2. **Install Update Package:** Proceed to the installation and upgrade process. 3. **Cancel Installation:** Abort the installation process and skip the system upgrade.

<table>
<tr><td></td><td> 
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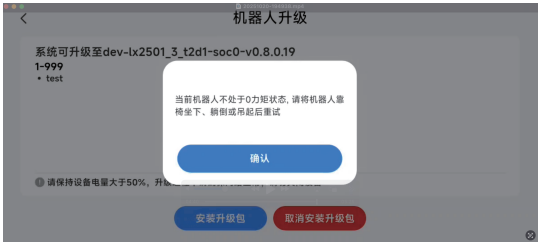
<tr><td>OTA Succeed</td><td>1. Ensure the robot is in Zero-Torque Mode (lying down, lifted, or seated against support). Otherwise, the app will prompt you to switch the robot to Zero-Torque Mode before retrying.
2. Do not send motion control commands via the remote controller or app during the upgrade process.
3. After a successful update, a confirmation message will automatically appear in the app.
 

 
</td></tr>
</table>

OTA Update Precautions

1. During the download and installation of the update package, ensure that the robot's battery level is above 50%, the robot remains powered on, and the network connection is stable throughout the process.

2. Before updating, make sure the robot is in zero-torque mode (lying down, lifted, or sitting against a surface). Otherwise, the app will prompt you to switch the robot to zero-torque mode and retry.

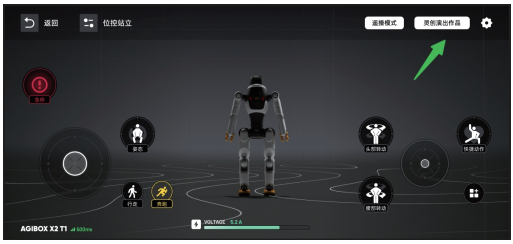
3. During the upgrade process, do not issue motion control commands via the remote controller or the app.

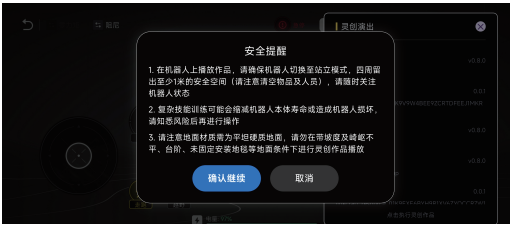
3.7.6 Playing Linkcaft Works via the App

1. Download the created work from the Linkcraft Platform to the robot.

2. Tap **“Performance Works”** in the app to view the list of works stored on the robot.

3. After selecting a work, tap again to confirm. The work will then be played on the robot through the app.

Tap to play a LinkCraft work	
Works available for playback will be listed here	
No works available — playback not supported	

Secondary confirmation prompt	

Notes

1. When playing LinkCaft works on the robot, ensure that the robot is switched to Standing Mode, and keep at least 1 meter of safety space around it (make sure the area is free of objects and personnel). Always monitor the robot's status during playback.

2. Complex skill training may shorten the robot's service life or cause hardware damage. Please proceed only after acknowledging and accepting the associated risks.

3. Ensure that the robot is placed on a flat and solid surface. Do not play LinkCraft works on sloped, uneven, stepped, or unsecured surfaces.

3.7.7 App Support for Fall Recovery (Beta)

1. When the robot has fallen, you may trigger the Fall Recovery skill through the Agibot Go app.

2. After triggering the skill, the system will display a secondary confirmation prompt: "Before confirming, ensure that the robot's limbs are not overlapping or interfering with each other, the waist is not twisted, and there is sufficient surrounding space. The robot will switch to Zero-Torque Mode before attempting to stand up. This process may involve a risk of secondary falls." Only proceed if all conditions are met.

3. Once the secondary confirmation is completed, swipe to activate Fall

Recovery mode.

Tap to trigger the self-righting function	
Second confirmation prompt	
Swipe to confirm and activate self-righting	

Fall Recovery – Safety Notes

1. Beta feature: Fall Recovery is a beta function.

If the robot is placed in an improper posture before activation, attempting Fall Recovery may result in uncontrolled movements or secondary falls.

Please fully understand the safety risks and operate with caution.

2. Prohibited conditions:

Fall Recovery is currently supported only when the robot is equipped with the prosthetic hands. Do not perform Fall Recovery using dexterous hands or grippers, as this may cause damage to those components.

3. Pre-recovery posture requirements:

Before initiating Fall Recovery, adjust the robot so that it lies face down or face up.

Ensure that the head, legs, arms, chest, waist, and hips are positioned correctly, without twisting, folding, or interference.

Incorrect posture may cause the waist to twist or lead to equipment damage during forced recovery.

4. Ground requirements:

Place the robot on a flat, hard surface with no slope before starting Fall Recovery to ensure stable movement.

Avoid using the function on high steps (>5 cm), sloped surfaces (>10°), or uneven terrain (surface variation > ±5 cm).

3.8 LinkCraft Platform Manual

The AgiBot X2 supports the use of the LinkCraft Platform, developed by AgiBot Robotics. LinkCraft is a content creation and performance platform designed for general creators, enabling users to easily produce and publish robotic performances without requiring professional backgrounds in programming, control, or motion design. The platform aims to lower the barrier to robot content creation, empowering anyone to bring creative ideas to life through intuitive tools and interfaces.

LinkCraft Platform Official Website：https://linkcraft.agibot.com/

3.9 Others

1. This manual is based on the X2-T2 version, software version V0.7.

2. For any other matters not mentioned in this user manual, please visit the AgiBot official website or contact AgiBot customer service for more information.

4. Contact Information

1. WeChat Official Account: 智元机器人-在线咨询-售后咨询

2. Hotline: 4001860818

3. Email: AfterSalesService@agibot.com

4. Corporate WeChat QR Code:

AGIBOT

Scan the QR code to download the app.

Contact Us

400-186-0818

https://zhiyuan-robot.com/