

# PUDU T300 Operation Guide

Version: V1.0.2

Model: WTID01、WTIDL1

Shenzhen Pudu Technology Co., Ltd.



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## Introduction

### Purpose

This manual describes the functions, technical specifications, and detailed operations of PUDU T300 to help users better understand and work with the robot.





### Audiences

This manual is intended for:

- Customers
- Sales engineers
- Installation and commissioning engineers
- Technical engineers

### Signs

The signs listed below may appear in this manual with the following meanings.

Sign	Description
 Danger	Indicates high potential hazards, which could cause death or serious personal injury if not avoided.
 Warning	Indicates moderate or low potential hazards, which could cause minor personal injury or robot damage if not avoided.
 Caution	Indicates potential risks, which could cause robot damage, data loss, or unpredictable consequences if neglected.
 Note	Provides additional information as the emphasis and supplement to the main text.

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# 1. Safety Instructions

## 1.1 Electrical requirements

- It is strictly prohibited to use chargers other than the original charger to charge the robot. If the charger is found to be faulty, please replace it as soon as possible.
- Please fully charge the battery to 100% before first use.
- Be sure to charge the robot as soon as it has less than 20% power remaining. Working at low battery levels for long periods will shorten the battery's service life.
- Make sure that the power supply voltage complies with the voltage range on the charger, otherwise the charger may be damaged.
- Please do not drop the charger or hit it with foreign objects to avoid damage.
- Please dispose of the battery according to local regulations and do not dispose of it as household waste. Improper handling may cause the battery to explode.

## 1.2 Use requirements

- Do not block the robot sensor. Otherwise, the robot may fail to move properly or get lost.
- Cleaning or maintenance work is prohibited while the robot is powered on.
- Do not place cookers with naked flames or flammable or explosive items on the robot.
- Do not pick up or place any items while the robot is moving, to avoid property losses or personal injury caused by accidental collisions.
- Do not push or carry the robot while it is moving, to prevent it from running abnormally.
- The robot must not be disassembled or repaired by anyone other than trained professionals. In case of any fault with the robot, please contact a technical support engineer immediately.
- When moving the robot, please observe the requirements on the maximum allowed weight for a single person stipulated by local laws or regulations. While the robot is being moved, please be sure to always keep it in an upright position.
- When the robot is in motion, no playing is allowed in front of the robot to avoid unnecessary harm.
- Although the robot features automatic obstacle avoidance, never block the robot moving at a high speed to avoid any accidents.
- Please prevent the robot from violent impact or shock to avoid any damage.
- Do not clean the robot with caustic chemicals, cleansers, or detergents. Always clean the robot by wiping it with a clean and dry cloth.

## 1.3 Environmental requirements

- Do not use or charge the robot in dangerous environments with high temperature, high pressure, or risks of flames or explosions, so as to avoid personal injury or damage to the product.

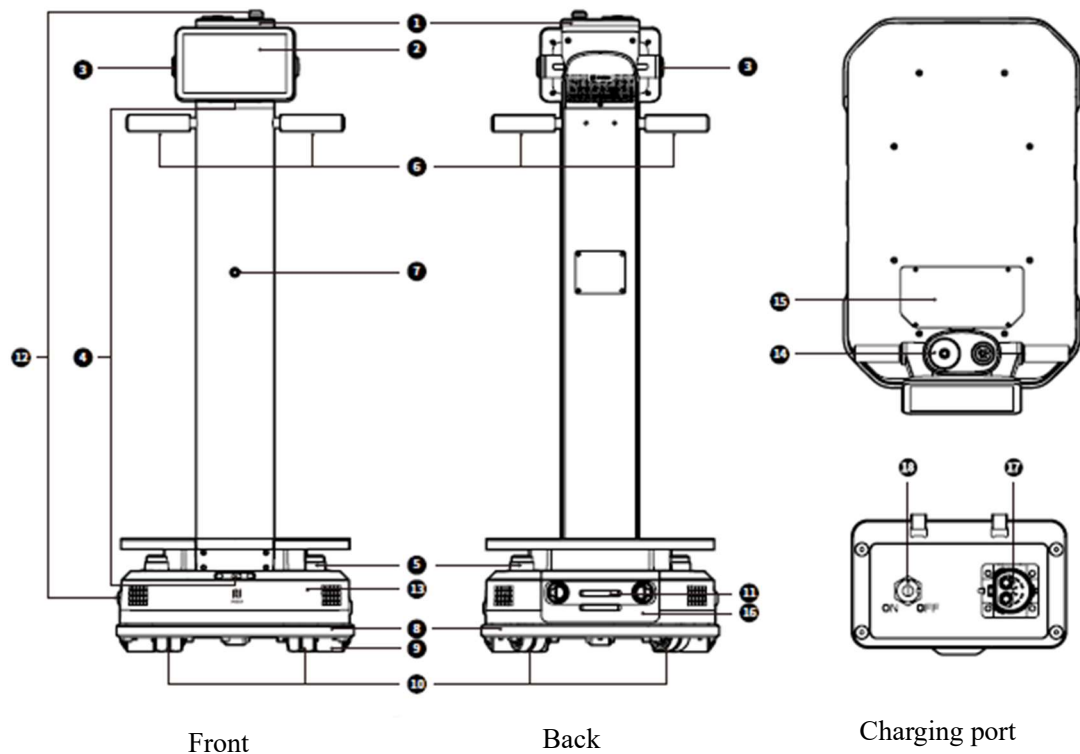
- Do not use the robot in a humid environment or in the presence of liquid or viscous substances on the ground, so as to avoid damage to the robot.
- Do not use the robot in locations where wireless devices are explicitly prohibited, as this may interfere with other electronic devices or cause other hazards.
- Do not use the robot in a humid environment or on surfaces covered with fluid or gooey stuff to avoid damage to the robot.
- The robot is suitable for use on flat ground. Do not use it in an environment with steps, or steep slope.
- It is necessary to use the robot under the product operating environment declared in this manual. Otherwise, there may be abnormal operation of the equipment or other hazards.
- Do not dispose of the robot and its accessories as ordinary domestic waste. Please comply with local regulations on the disposal of the robot and its accessories and support recycling.
- Please use the robot on a flat and smooth surface. If the robot gets stuck in a pit, please push the robot's chassis to help it get out. Please do not forcefully pull or push the handle.

## 2. Product Components

### 2.1 Overview

PUDU T300 is a delivery robot applied to material transfer in industrial scenarios and large load handling in commercial scenarios. It is equipped with a load carrier chassis as the core and an operation screen for user-friendly use. The maximum load of the robot can reach 300kg, and the carrying space is open and flexible, which can be matched with different accessories to meet different carrying needs. Meanwhile, it has rich interfaces, which is convenient for hardware expansion and IOT interconnection.

### 2.2 Appearance & Components





No.	Description
1	Indicator light
2	LCD screen
3	Shortcut button
4	RGBD
5	Lidar
6	Handles
7	Front view camera
8	Collision sensor
9	Drive wheels
10	Auxiliary wheels
11	Charging electrode plate
12	Emergency stop switch
13	Power switch
14	Top view camera
15	Interface window
16	Battery box
17	Charging port
18	Brake switch

### 2.3 Technical specifications

Product Feature	Description	
Operating voltage	DC 20.8 V~29.2 V	
Battery capacity	30 Ah	
Max. load	300 kg	661.39 pounds
Charging time	About 2 h (from 0 % to 90 %)	
Battery life	12 h (None load); 6 h (Max. load)	
Overall weight	65 kg (WTID01); 81 kg (WTIDL1)	143.30 pounds (WTID01); 178.57 pounds (WTIDL1)
Screen specifications	10.1" LCD screen	

Product Feature	Description	
Overall dimensions	835 × 500 × 1350 mm	32.87 × 19.69 × 53.15 inches
Chassis dimensions	780 × 500 × 240 mm	30.71 × 19.69 × 9.45 inches
Cruise speed	0.2–1.2 m/s (adjustable)	0.66-3.94 ft/s (adjustable)
Navigation method	Visual-SLAM, Laser-SLAM	
Min. Path Clearance	60 cm	23.62 inches
Max. surmountable height	20 mm	0.79 inch
Max surmountable gap	35 mm	1.38 inches
Operating system	Android	
Speaker power	10 W × 2 stereo speaker	
Working environment	Temperature: 0 °C to 40 °C; humidity: ≤ 85% RH	
Storage environment	Temperature: -20 °C to 60 °C; humidity: ≤ 85% RH	
Operating altitude	< 2000 m	6561.68 ft
Road surface requirements	Indoor environment with flat, smooth surfaces	
Charger power input	AC 100 V~240 V, 50/60 Hz	
Charger power output	29.2 V, 15 A	

### 3. Battery and charging

The PUDU T300 is powered by a replaceable lithium battery, which can be recharged with a wired charger or charging post that comes with the robot.

#### 3.1 To charge the robot

##### Caution

Before using the robot for the first time, it is necessary to fully charge the robot's battery to 100%.

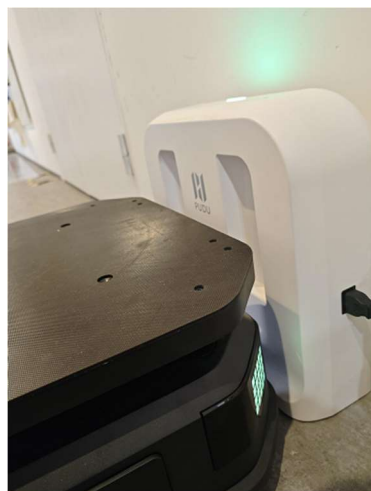
If the robot has not been used for more than a month, it is also necessary to fully charge the battery to 100% before using it again.

The robot supports charging using both a charger and a charging pile.

a) Charging with charger: Simply insert the provided charger into the robot's charging port to start the charging process.



b) Charging with a charging pile: After deploying the charging pile according to the instructions, power on the robot. On the robot's home page interface, click the "Charge Now" button to initiate automatic charging.



#### 3.2 Battery Replacement

In addition to recharging the robot's battery, it is also possible to directly replace the battery. The specific steps are as follows:

Step 1 With the robot powered off, use both hands to pull the battery compartment cover

tab and remove the battery compartment cover.



Step 2 Disconnect the power connector attached to the battery and remove the battery from the robot. Replace it with a new battery.



Step 3 After replacing the battery, connect the power connector and cover the battery compartment. The robot can now be powered on and used.

### 3.3 Battery Storage

When the battery is removed for independent charging, it is exposed to the environment. Therefore, during the charging and storage of the battery, the environmental conditions should meet the requirements for battery usage. If the charging or battery storage environment does not meet the usage requirements, it may shorten the battery's lifespan. The specific regulations are as follows:

(1) Charging:

- Temperature: 0° C ~ 45 °C
- Humidity: 25% RH ~75% RH

(2) Storage

- Temperature: -20°C ~ 60 °C (Whitin 1 month), -20 °C ~ 45 °C (Whitin 3 months), 20 °C ± 5 °C (Whitin 6 months).
- Humidity: 25% RH ~50% RH

#### ⚠Caution

The battery should not be exposed to or immersed in any liquids, as this may damage the battery.

It is recommended to charge the battery to a level of 30% to 50% before storing it to maintain the battery's

lifespan.

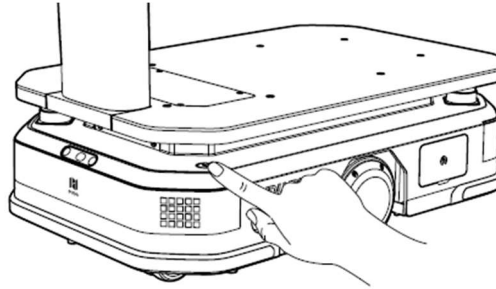
If the robot is not used for a long period (more than 15 days), it is recommended to remove the battery to avoid excessive discharge of the battery.

## 4. How to use

### 4.1 Basic operations

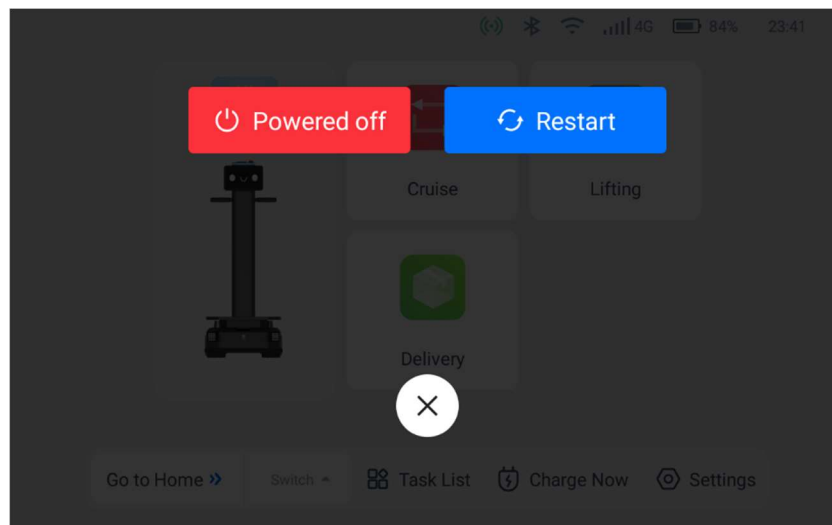
#### 4.1.1 Power On and Power Off

The power on and power off of the robot can be achieved by operating the power switch button. The power switch button is located on the base of the robot.



**Powering on:** Move the robot to the startup location. Press and hold the power switch for 3 second, and the Indicator light of the robot will turn blue, indicating that the robot has been successfully powered on.

**Powered off:** Press and hold the power switch for 3 seconds, and a shutdown prompt will pop up. Click "Power off" and the light strip on the top of the robot and the screen will turn off, indicating that the robot has been successfully powered off.



#### 4.1.2 Emergency Stop Switch

There are emergency stop switches located on the top and on both sides of the base of the robot. In case of an emergency during operation, the emergency stop switch can be pressed to halt the robot's movement. To restore the robot's operation, rotate the emergency stop switch clockwise as indicated on the interface.



## 4.2 Operating Configuration Instructions

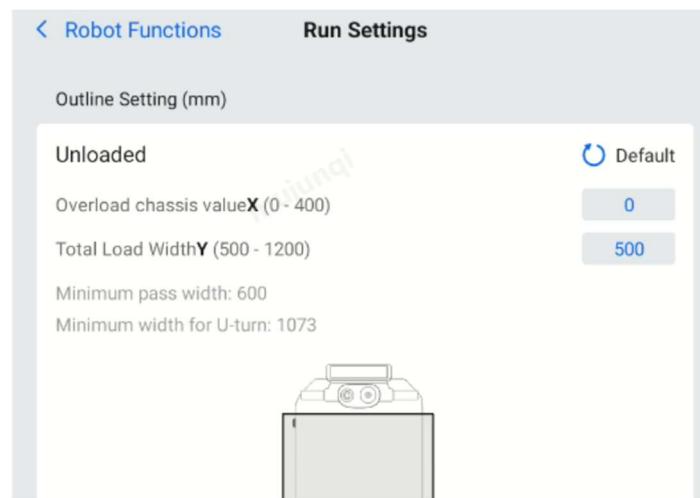
T300 is a product that allows users to flexibly connect external structures and hardware. Before using the robot, it is necessary to configure the robot's operating parameters correctly by clicking on "Settings" - "Robot Functions" - "Run Setting" on the robot's homepage.

### 4.2.1 Robot Unloaded Parameters

Users can fix brackets or other structures on the T300 load surface according to their actual application needs. We define the state of the robot with the bracket fixed but without any load attached as the "Unloaded" of the robot.

#### (1) Default Values

In the "Run Settings" section, the default values have been set for the robot's state without any brackets installed.



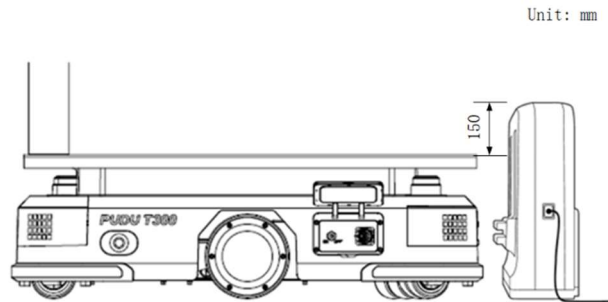
#### (2) External Structure Size Requirements

To ensure safe use, the following considerations should be taken into account when designing the installation of external fixed structures:

- After the installation of the external structure, the fixed bracket should not exceed 250mm on either side of the robot's chassis outline
- After the installation of the external structure, it should not extend beyond 400mm at the rear of the robot

- After the installation of the external structure, it should not extend beyond the front pillar of the robot.

To ensure that the robot can use the charging station for charging, the position of the charging station needs to be considered when designing the external structure to avoid obstacles during automatic return charging.



### (3) Configuration process after fixing the external structure

After fixing the external structure, it is necessary to enter the "Settings" - "Robot Settings" - "Run Settings" to modify the dimensions of the unloaded state after fixing the bracket. The parameters need to be input based on the actual size of the fixed bracket.

The parameters to be input are:

- The dimension value of the fixed bracket protruding from the rear of the robot chassis after installation. Input range: 0~400, default: 0, unit: mm.
- The total width of T300 + the fixed bracket after installation. Input range: 500~1200, default: 500, unit: mm.

After inputting the corresponding parameters, T300 will take into account the dimensions of the outline after fixing the bracket to avoid collisions with surrounding obstacles.

During the parameter input process, the current robot's minimum pass width and minimum width for U-turn will be displayed in real-time.

## 4.2.2 Parameters related to the lifting function

### ⚠Caution

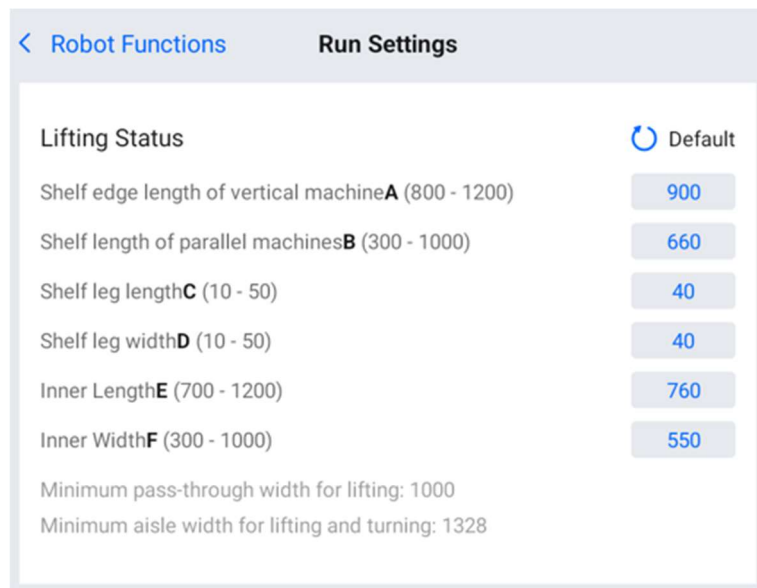
The lifting feature is only available on the WTIDL1 model.

When performing lifting tasks, the robot can carry a rack that provides a larger carrying space than its own chassis. The T300 chassis is designed to fit under the shelf and lift it up.

#### (1) Default parameters

In the "Running Settings" section, the "Lifting Status" parameter has been set to default values based on the dimensions provided by PUDU.



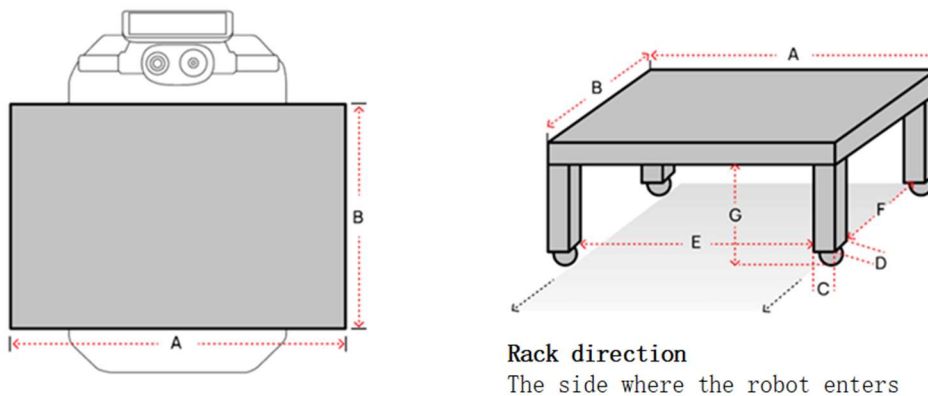


The shelf dimensions provided by PUDU are as follows:

- Overall dimensions (length \* width \* height): 90cm\*66cm\*30.8cm
- Load surface dimensions (length \* width): 82cm\*61cm
- Rack post dimensions (length \* width): 3cm\*3cm
- Height from the ground to the bottom of the rack load surface: 27.5cm

(2) Customized lifting rack size requirements

If you have specific requirements for the size of the shelf, please follow the guidelines below to create the shelf and configure the parameters accordingly.



- Rack length (dimension A): 80cm~120cm (need to ensure clearance of more than 600mm)
- Rack width (dimension B): 40cm~100cm
- Rack bottom height (dimension G): 27cm~28cm
- Rack posts width (dimension C, dimension D): 1cm~5cm

- Width between rack posts on the side where the robot enters (dimension E)  $\geq 60\text{cm}$

### (3) Customized Rack Parameter Configuration Process

If you use customized rack. You need enter “Setting”-“Robot Function”- “Running Setting”, to modify the parameters of rack.

After inputting the corresponding parameters, the T300 will memorize the profile dimensions of the lifted rack. This allows the robot to avoid collisions between the rack and surrounding obstacles during its movement.

During the parameter input process, real-time displays will also show the minimum pass width and minimum width for U-turn of the T300 in lifting status.

## 4.3 Mode Introduction

The robot comes with various modes to cater to different scenarios, including Delivery mode, Cruise mode, and Lifting mode.

Mode	Description
Delivery mode	Users can place materials for multiple destinations on the robot and use the screen to send tasks for materials delivery. The robot can plan the best path by itself and deliver the items to all destinations. After the delivery is completed, it will automatically return to the standby point.
Cruise mode	The user can set the path, and the robot will run along the pre-set path in a cycle. In addition, the robot can stop at a stop point on the cruise path, to make it easier for the user to pick up and place materials while the robot is running.
Lifting mode *	Users can set lifting points and lifting down points. The robot will automatically go to the lifting point to identify and lift the materials, and then automatically unload the materials after transporting them to the destination.

\* The lifting mode is only supported by the WTIDL1 model.

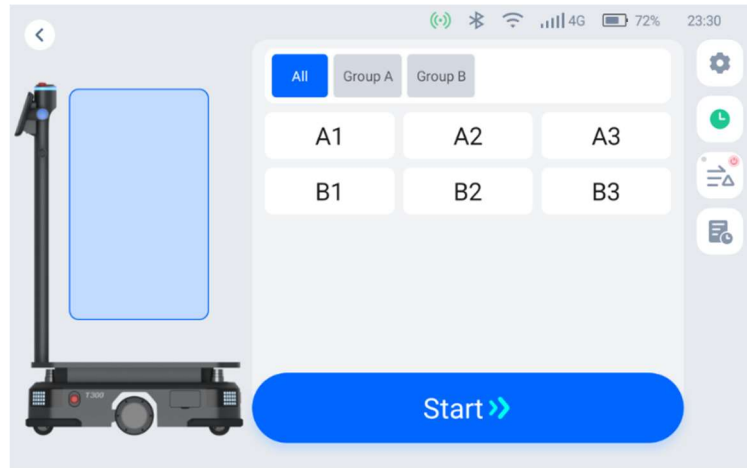
### 4.3.1 Delivery mode

In Delivery Mode, an item is delivered to a specified destination, with automatic return to the docking location after completing delivery to the final destination.

#### 4.3.1.1 The main processes of delivery mode

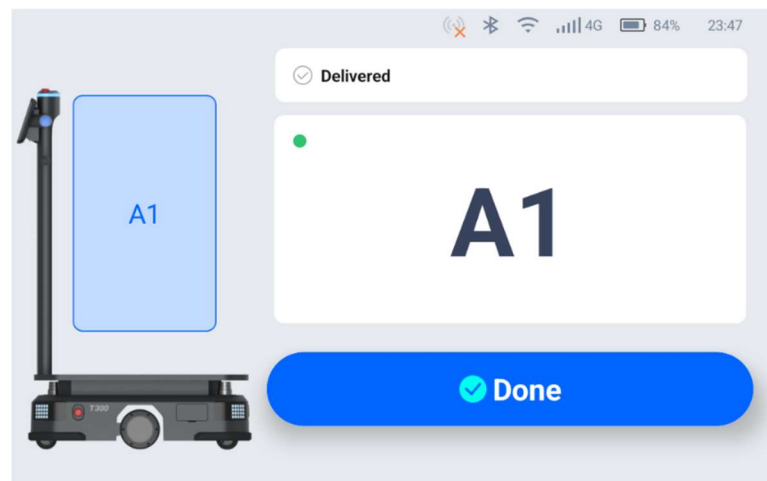
Step 1 On the robot's home page, select “Delivery” to access the main interface for delivery mode. And place the items on the corresponding load area.

Step 2 On the left side of the interface, click on the load area where the item is placed and select the destination on the right side.



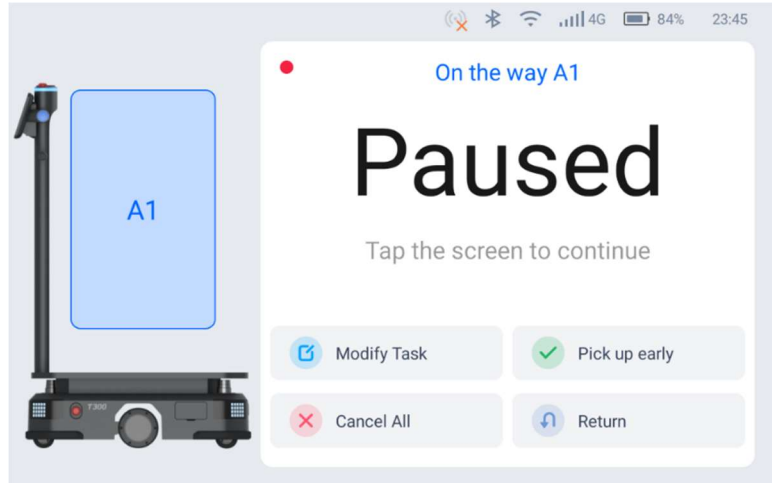
Step 3 Once you have finished entering the destination, tap “Start”. The robot will proceed to the corresponding destination.

Step 4 Once it reaches its destination, the robot will give a voice prompt. The operator will remove the item in accordance with the on-screen and voice prompts.



Step 5 Once the operator removes the item, tap “Done”, and the robot will then begin executing its next task. If the robot has completed all tasks, it will return to the docking location.

During the delivery process, if it is necessary to edit a task, remove a meal in advance, cancel all tasks, or return, you can tap on the robot’s screen to pause the robot before proceeding with the operation. If there are no operations during the countdown period, the robot will continue running



Button	Description
Modify Task	Tap to modify the destination.
Pick up early	Tap to Complete in advance and move on to the next task.
Cancel all	Tap to cancel all delivery tasks and not return to the docking location.
Return	Tap to return to the docking location.


#### 4.3.1.2 Description of Delivery Mode Homepage

The delivery mode homepage features the following buttons:

Illustration	Settings	Descriptions
	Previous Task	You can view the previous task.
	Steady Mode	When enabled, the robot can travel at a low speed and move smoothly.
	History of Tasks	You can view the previous task executed in the current mode.
	Delivery Mode Settings	You can make configurations for the delivery mode.




Detail explanation:

##### (1) Previous Task


Click the " " button on the delivery mode homepage to view the robot's last delivery task.

##### (2) Steady Mode


You can choose whether the robot uses the smooth mode during the delivery process. In steady mode, the robot will travel at a lower speed. It will start and brake in a relatively gentle manner. It is suitable for delivering items that require the robot to run smoothly. Usage is as follows:

- Click the " " icon on the right side of the delivery interface, and the icon changes to " ", which turns on the smooth mode, which is valid for one time. Click again to turn off the smooth mode;
- Press and hold the delivery icon for 2s, and the icon changes to " ", which turns on the smooth mode continuously. Click again to turn off the smooth mode.

### (3) History of Tasks

Click the " " button on the delivery mode homepage to view the robot's recent historical delivery tasks.

### (4) Delivery Mode settings

There is a " " button on the right side of the delivery mode interface. Click it to set the delivery mode. The settings are as follows:

Settings	Description
Destination Priority	You can set the way the robot goes to the target point in the case of multiple tasks: <ul style="list-style-type: none"> <li>• Distance Priority: The robot intelligently finds the shortest route and arrives at all the selected target points in sequence according to the distance;</li> <li>• Sequence Priority: The robot arrives in sequence according to the order of the input destinations.</li> </ul>
Auto-complete time after arrival	The robot will count down automatically after arriving at the destination. If no one is operating the robot, the robot will leave automatically after the countdown ends.
Delivery Complete, Returning	You can set the location where the robot returns after the delivery is completed.
Custom Function Button	Set the robot's action after the shortcut button is pressed: <ul style="list-style-type: none"> <li>• No action: No action after pressing the shortcut button;</li> <li>• Complete the current task: When the robot is on the delivery arrival page, press the shortcut button and the robot will automatically complete the current task.</li> </ul>
Play during tasks	When enable, you can select the synthesized voice or music file to play during the delivery task.
Play upon arrival	When enable, you can select the synthesized voice or music file to play when the delivery task arrives at the destination
Single Layer Multi-point	After turning on this function, a single load area can correspond to multiple locations for delivery.

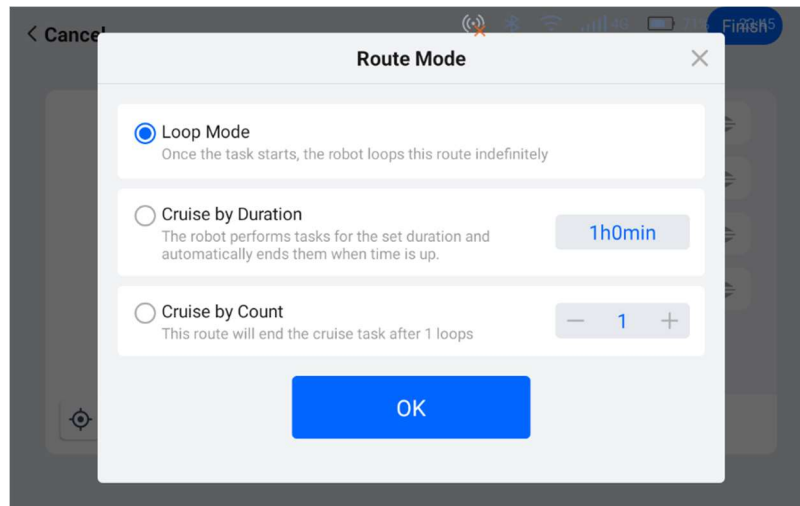
Settings	Description
Delivery Speed	The robot's scheduled driving speed to the destination can be configured, with a setting range of 0.2m/s~1.2m/s.

### 4.3.2 Cruise mode

Cruise mode means cruising in a specific environment and running in a loop. Some voice and music can be played during the cruise.

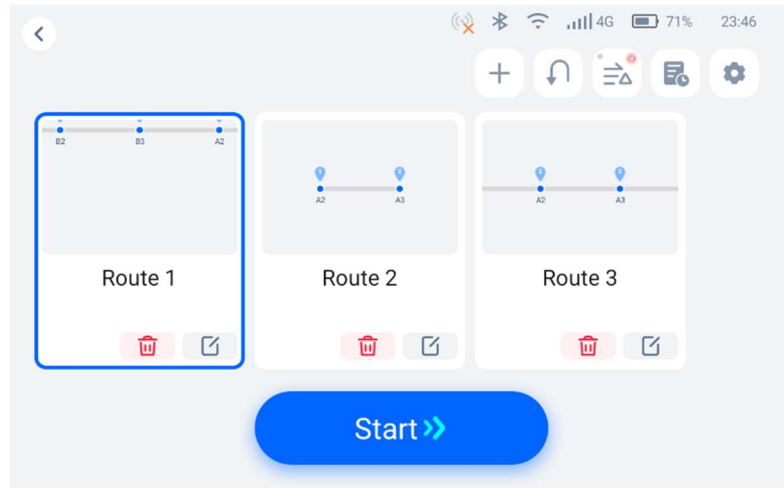
#### 4.3.2.1 The main processes of delivery mode

Step 1 Select "Cruise" on the homepage. Enter the cruise mode interface and click "+" to add a cruise path according to the instructions. There are three types of cruise paths that can be added:



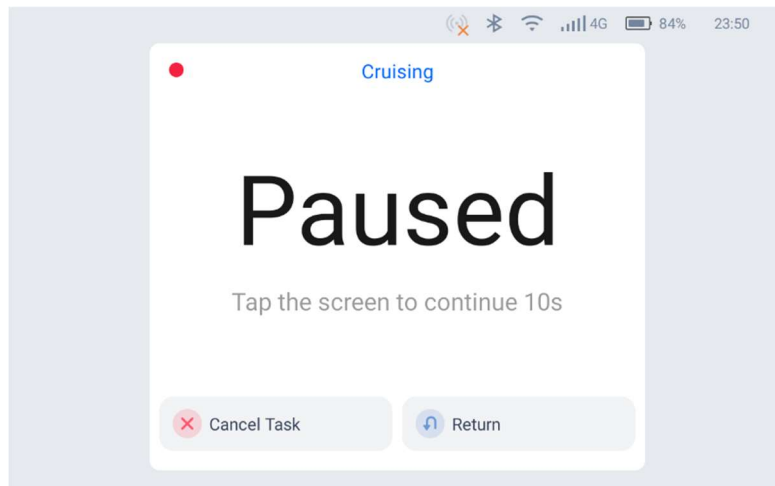
- Loop Mode: After the cruise task starts, it will continue to cruise along the set cruise path;
- Cruise by Duration: Cruise according to the set time, and automatically end the task after the cruise ends;
- Cruise by Count: After the robot cruises a specified number of laps, it will automatically end the cruise task.

Step 2 After setting the cruise route, select the cruise route you want to use and click "Start". The robot starts to run in a cycle along the cruise route.

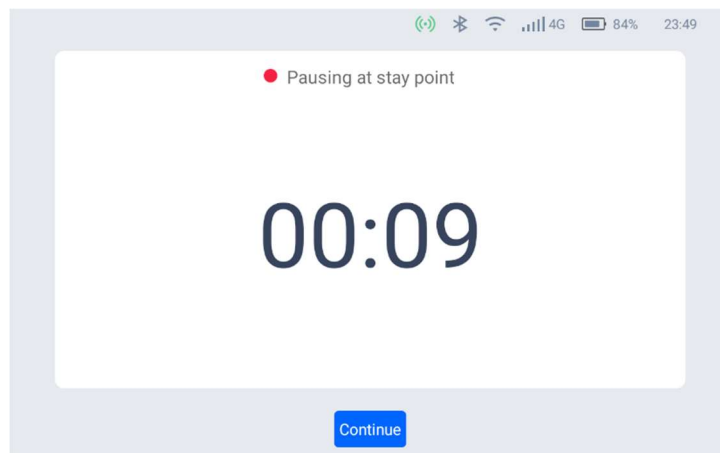


Step 3 During the robot's cruising, the user can click on the robot screen to pause. After the pause countdown ends, the robot will continue to perform the cruising task.

- If you click "Cancel Task" during the pause process, you can end the cruising task.








- If a stop point is set on the cruising path, the robot will drive to the stay point and stop. During the stop process, you can click "Continue" and the machine will go directly to the next point.。



### 4.3.2.2 Description of Cruise Mode Homepage

The cruise mode homepage features the following buttons:


Illustration	Settings	Descriptions
	Add Cruise Path	Clicking on this option allows you to add a new cruise path for the robot.
	Return	Clicking on this option will initiate the robot's automatic return to the docking location.
	Steady Mode	When enabled, the robot can travel at a low speed and move smoothly.
	History of Tasks	You can view the previous task executed in the current mode.
	Cruise Mode Settings	You can make configurations for the cruise mode.

Detail explanation:

#### (1) Add Cruise Path




Just follow the steps in the previous section.

#### (2) Return


After clicking "", the robot will automatically return to the standby point.

#### (3) Steady Mode


You can choose whether the robot uses the smooth mode during the delivery process. In steady mode, the robot will travel at a lower speed. It will start and brake in a relatively gentle manner. It is suitable for delivering items that require the robot to run smoothly. Usage is as follows:

- Click the "" icon on the right side of the delivery interface, and the icon changes to "", which turns on the smooth mode, which is valid for one time. Click again to turn off the smooth mode;
- Press and hold the delivery icon for 2s, and the icon changes to "", which turns on the smooth mode continuously. Click again to turn off the smooth mode.

#### (4) History of Tasks

Click the "" button on the cruise mode homepage to view the robot's recent historical cruise tasks.

#### (5) Cruise Mode settings

There is a "" button on the right side of the cruise mode interface. Click it to set the cruise

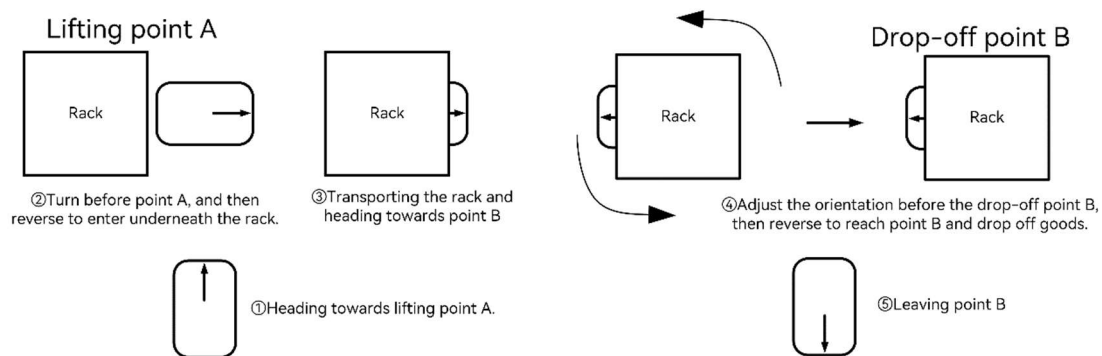


mode. The settings are as follows:

Settings	Description
On arriving at stop point	Set the action when the robot reaches the stop point. You can choose: <ul style="list-style-type: none"> <li>• Stay put: The robot stays at the stop point until the user clicks;</li> <li>• Keep moving: The robot does not stop at the stop point;</li> <li>• Stay Time: When the robot arrives at the stop point, it stays for a specified time and then continues to cruise.</li> </ul>
Cruise complete, returning to position	You can set the location where the robot returns after completing the cruise task.
Custom Function Button	Set the robot's action after the shortcut button is pressed: <ul style="list-style-type: none"> <li>• No action: No action after pressing the shortcut button;</li> <li>• Complete the current task: When the robot is on the stop point arrival page, press the shortcut button and the robot will automatically continue cruising.</li> </ul>
Play during tasks	When enable, you can select the synthesized voice or music file to play during the cruise task.
Play on arrival	When enable, you can select the synthesized voice or music file to play when the cruise task arrives at the stop point.
Cruise Speed	The robot's scheduled driving speed in cruising can be configured, with a setting range of 0.2m/s~1.2m/s.

### 4.3.3 Lifting Mode

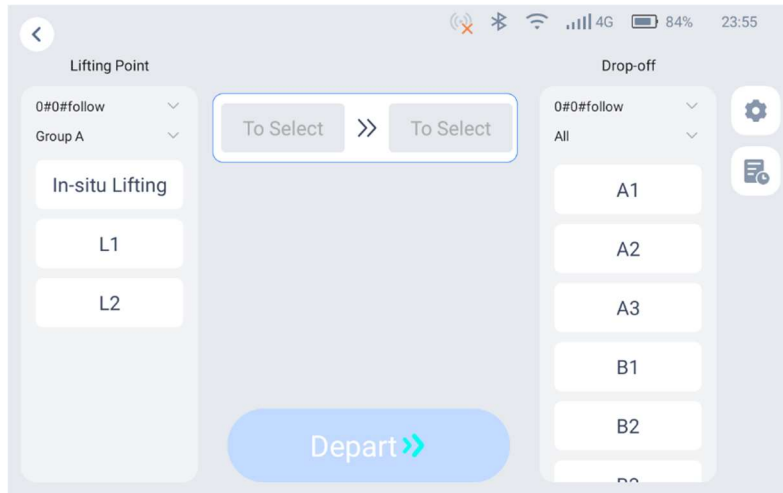
Users can set the lifting point and drop-off point. The robot will automatically go to the lifting point to identify and lift the goods, and then automatically unload the goods after transporting them to the destination. After completing all the set tasks, the robot will return to the docking location.



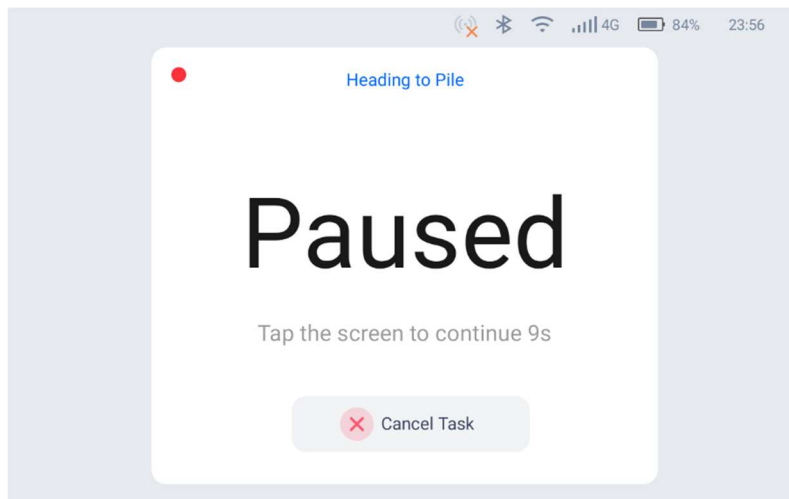
#### 4.3.3.1 The main processes of lifting mode

Step 1 Select "Lifting" on the homepage. Enter the lifting mode interface. Choose the desired lifting point from the list on the left and the drop-off point from the list on the right. After selecting the points, click "Depart" to initiate the task.

\*However, if the robot has already been pushed to the shelf to be transported and you want the robot to lift the shelf in place, please select "In-situ Lifting" in the lifting point list.

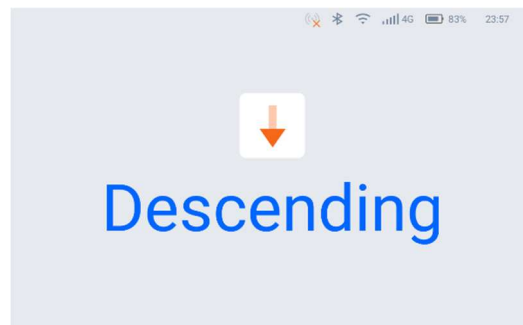
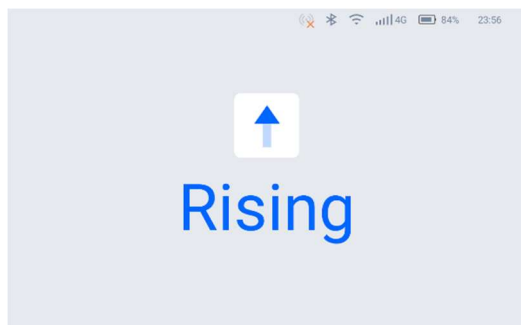


Step 2 During the lifting task, the user can click on the robot screen to pause. After the pause countdown ends, the robot will continue to perform the lifting task. If you click "Cancel Task" during the pause process, you can end the lifting task.





**Caution**

To ensure the precise operation of the lifting mechanism, the robot cannot be paused when lifting up or drop-off goods. If you need to stop the lifting mechanism, please press the emergency stop button.




### 4.3.3.2 Description of Lifting Mode Homepage

The lifting mode homepage features the following buttons:


Illustration	Settings	Descriptions
	History of Tasks	You can view the previous task executed in the current mode.
	Lifting Mode Settings	You can make configurations for the lifting mode.

Detail explanation:

#### (1) History of Tasks

Click the " " button on the cruise mode homepage to view the robot's recent historical cruise tasks.

#### (2) Cruise Mode settings

There is a " " button on the right side of the cruise mode interface. Click it to set the cruise mode. The settings are as follows:

Settings	Description
Play during tasks	When enable, you can select the synthesized voice or music file to play during the lifting task.
Play upon arrival	When enable, you can select the synthesized voice or music file to play when the lifting task arrives at the destination
Speed	The robot's scheduled driving speed in cruising can be configured, with a setting range of 0.2m/s~1.2m/s.

## 4.4 Setting

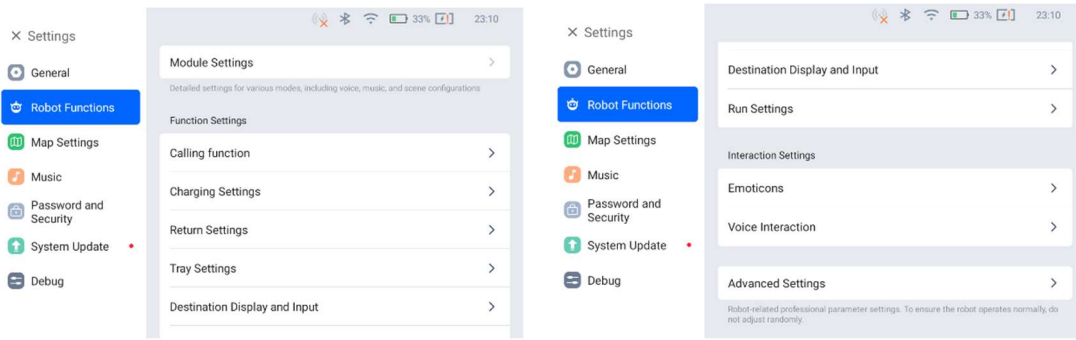
There is a "Settings" button on the robot's homepage. Clicking it will take you to the robot's general settings interface, where you can set the robot's operating configuration.

### 4.4.1 General

In the general settings, you can set basic settings such as language, WLAN, theme, brightness, volume, etc.

### 4.4.2 Robot Functions

The robot function includes most of the robot's operating settings.



The details are as follows:

#### 4.4.2.1 Module Settings

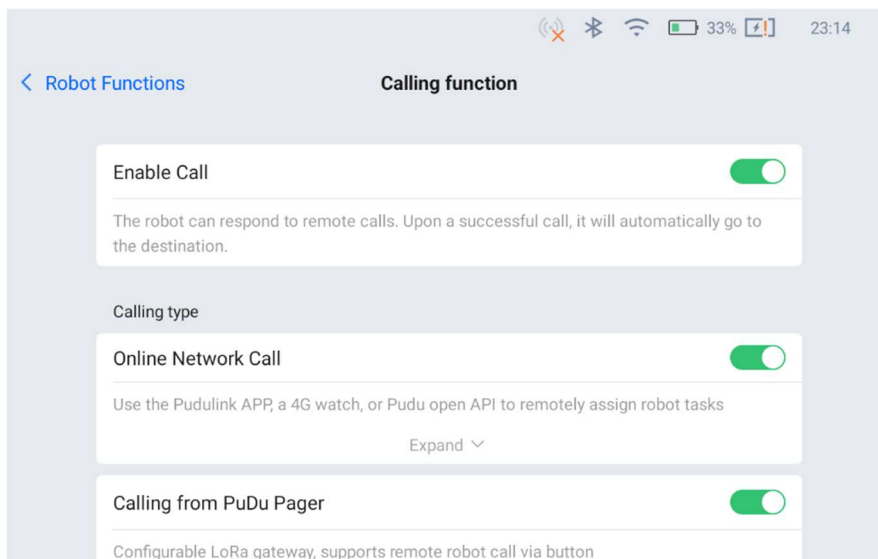
Functions of each business module (same as described in Sections 4.1 to 4.3)

#### 4.4.2.2 Calling function

Remote call related content can be set. Including network call, PUDU pager, microservice, etc.

##### (1) Enable Call

When enable, the robot can respond to remote calls. If you need to use the call function, you can turn on this switch.



##### (2) Online Network Call

When the switch is turned on, the robot can call the robot through pudulink APP, 4G watch, open interface and other methods that rely on network links.

##### (3) Calling from PuDu Pager

You can configure the PUDU Pager here. For specific deployment methods, please contact technical support.

##### (4) Local Microservice

After turning it on, you can use microservice in LAN to call the robot. For specific deployment

methods, please contact technical support.

(5) Other call setting items

Call settings also include the following setting items:

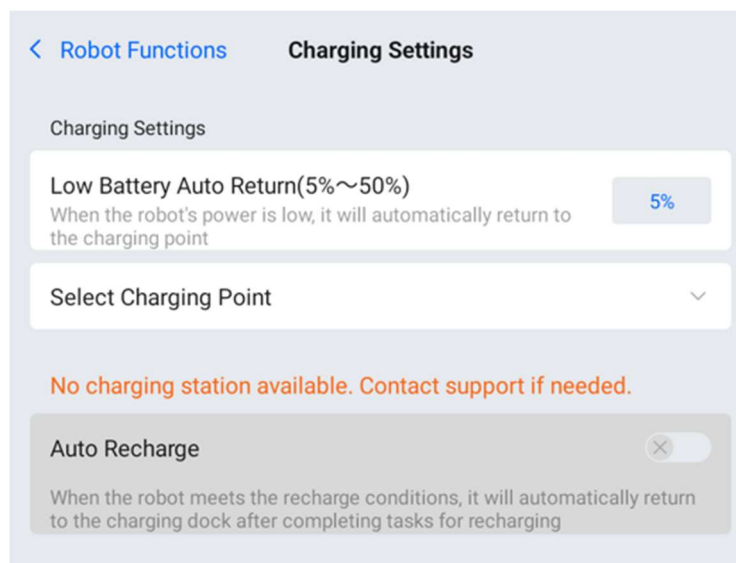
Setting items	Description
Wait when calling	When enable, when the robot receives a call task, it will count down according to the set time. And the call task will be executed after the countdown ends.
Call arrival wait	When enable, the robot will count down according to the set time after arriving at the point. After the countdown ends, the robot returns to the page before the original call. If this configuration is turned on, it will still stay on the call arrival page after the countdown ends.
Call Arrival Jump Mode	After the robot reaches the target point of the call task, the robot will jump to the corresponding mode;
Task complete, returning	After the call task is completed, the robot will return to the set location;
Callable Status	The state of the robot that can respond to the call task can be set
Play during tasks	When enable, you can select the synthesized voice or music file to be played during the call task.
Play on Arrival	When enable, you can select the synthesized voice or music file to be played when the call task arrives at the destination.

#### 4.4.2.3 Charging Setting

The robot's automatic recharging configuration can be adjusted according to actual usage needs.

(1) When there is no charging point in the map

When the robot's map does not contain a charging point, the page displays as follows:

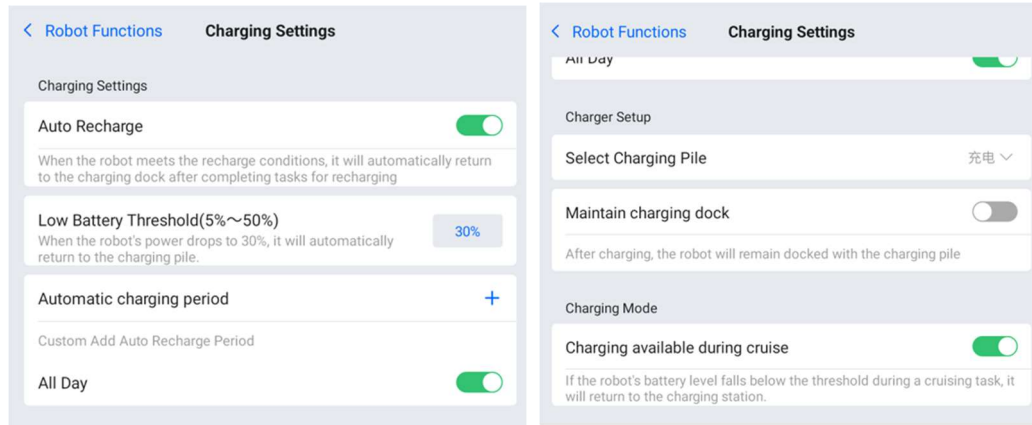


When the robot's battery power is lower than the "low battery Auto Return" threshold, it will

automatically return to the charging point. (The charging point is the point where the robot is charged daily, not the location of the charging pile)

(2) When there is a charging pile in the map

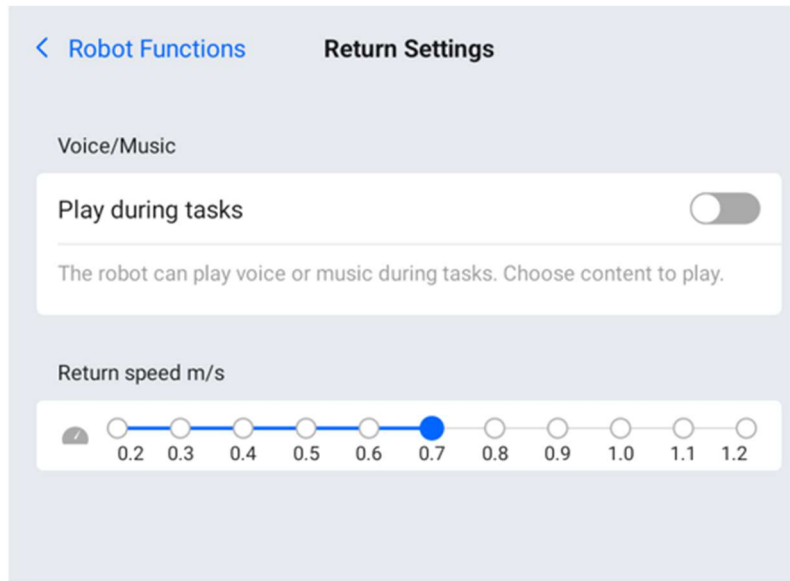
When there is a charging pile in the map, the robot will display the following configuration:



Setting items	Description
Auto Recharge	If a charging station is set in the robot map, this switch will be turned on by default.
Low Battery Threshold	After the switch is turned on, the robot will automatically perform recharging according to the configuration parameters. You can set a power threshold. When the robot power is lower than the threshold (setting range 5%~50%) and the robot is continuously idle. After 1 minute, the robot will automatically perform automatic recharging.
Automatic charging period	You can customize the robot's automatic recharge time period. The robot will only perform recharge tasks during the set time period. There is a default "all day" time period in the robot. You can also add time periods by clicking the "+" symbol, and you can turn each time period on/off by using the switch.  When multiple time periods are turned on at the same time, the robot will automatically recharge if the current time belongs to any of the time periods turned on.
Select Charging Pile	If multiple charging point are set in the map, you can select the charging station for the robot to automatically recharge here.
Maintain charging dock	When this switch is turned off, the robot will automatically return to the standby point after it is fully charged.  When this switch is turned on, the robot will stay on the charging pile after it is fully charged.
Charging Mode	You can configure whether the robot can automatically recharge in some working states according to actual usage needs.

#### 4.4.2.4 Return Settings

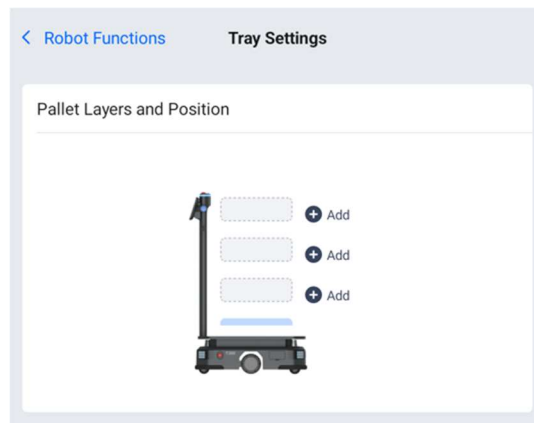
Similar to the mode settings, the return settings include the following settings:



Setting items	Description
Play during tasks	When enable, you can select the synthesized voice or music file to play during returning.
Return speed	The robot's scheduled driving speed in cruising can be configured, with a setting range of 0.2m/s~1.2m/s.

#### 4.4.2.5 Tray Settings

You can set the robot's load area. This is suitable for use when a pallet or bracket is installed on the robot. After adjustment, the delivery mode page can issue tasks for multiple robot load areas.



#### 4.4.2.6 Destination display and input

The destination display and input include the following settings:

Setting items	Description
Destination column	You can change the number of columns by selecting different column options for the

Setting items	Description
number	point list in the delivery mode.
Destination grouping filter	You can also hide certain destination groups in the robot map.
Default input method	You can choose: <ul style="list-style-type: none"> <li>• Directly select location: You can directly select a destination from the point list.</li> <li>• Intelligent search location: You can quickly search for robot destinations by entering keywords.</li> </ul>

#### 4.4.2.7 Running Settings

In the running settings, it includes parameter configuration for the general running status of the robot.

Setting items	Description
Automatic resume time paused.	You can set the countdown duration for the robot's pause state..
Outline Setting	Same as described in section 4.2.

#### 4.4.2.8 Emoticons

Choose whether to display emoticons on the robot during running.

#### 4.4.2.9 Voice Interaction

In the voice interaction module, you can perform the following operations:

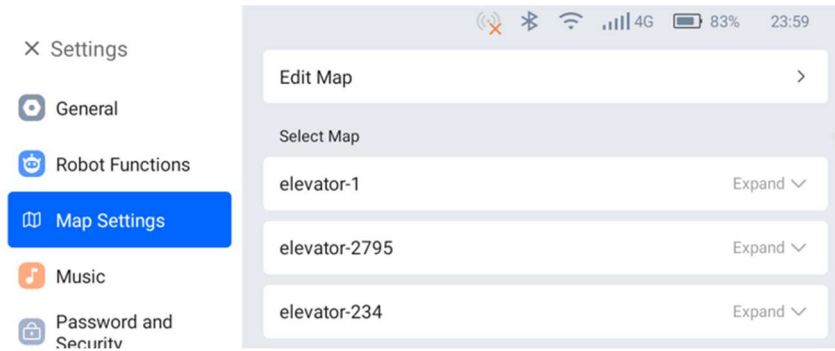
- Choose the voice speaker for the robot.
- Download voice packages configured on the cloud platform.
- Select locally stored voice packages.

#### 4.4.3 Map Settings

The robot can support the configuration of multiple maps, for use when the usage scenario changes or when the scenario route changes. When you switch maps, the Happy Delivery robot will automatically synchronize the destination information, docking location, and other configured information in the maps. Users can select a map and select a robot docking location based on the actual scenario.

Tap on the “Edit Map” screen to access the robot Mapping tool software interface and create maps, edit maps, and more.





#### 4.4.4 Music

In the Music Library module, users can import music for the robot by connecting the robot to the same Wi-Fi as their phone and scanning the QR code in the “Import Music” module. Imported music files will be displayed in the “List of All Music.” The robot can store up to 20 music files.

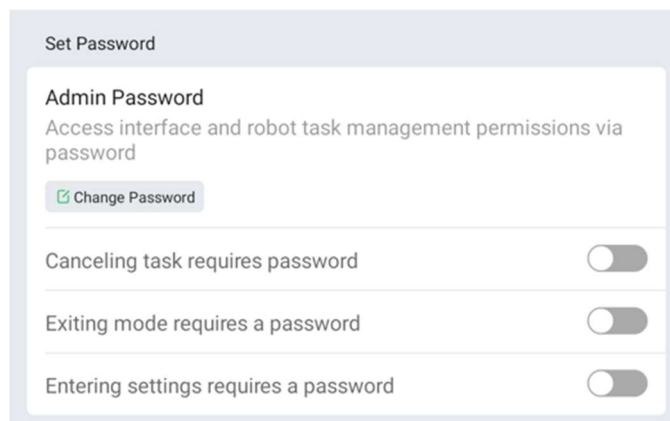
- Supported music file formats: MP3, WAV, FLAC, AAC, PCM, WMA, APE.
- You can test music by tapping the “▶” button to the right of the music file;
- By long pressing a song, the “Delete” button will pop up. Tap the button to delete music.

#### 4.4.5 Password and security

##### (1) Set Password

In the "Admin Password" section, users can set a 4-digit password. They can also set passwords for different entrances as needed:

- Canceling task requires password: When canceling tasks in various modes, a password is required.
- Exiting mode requires a password: When exiting any business mode, a password is required.
- Entering settings requires a password: When accessing settings and mode settings, a password is required.



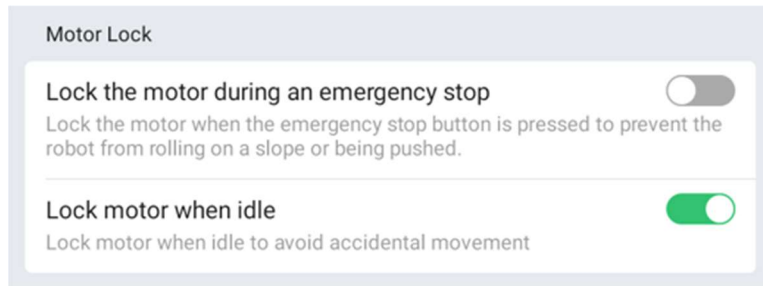
##### (2) Motor lock

You can set the time point for locking the robot motors in non-task states.

- Lock the motor during an emergency stop: After pressing the emergency stop button, the

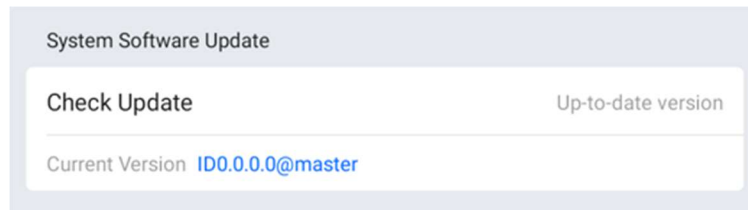
robot locks the motors to prevent accidental movement.

- Lock motor when idle: The robot locks the motors when it is in an idle state without any tasks to prevent it from being inadvertently pushed away.



#### 4.4.6 System Update

When the robot is connected to the network, it can check whether there are version updates. If a new version of the robot software is available, there will be a red dot prompt next to “System Update” as a reminder to perform the update.



After tapping Update, the robot will download the installation package and a prompt for the download percentage prompt will appear. Once the download is complete for the installation package, the robot will automatically restart.

#### ⚠ Caution

When performing version updates, please ensure that the robot has at least 20% battery remaining.

Please do not manually turn off the robot while performing a version update.

#### 4.4.7 Debug

The Debugging interface is provided for use by technical support to debug the device. Please do not use the Debugging interface yourself.

## 5. Robot Operation

### 5.1 Description of Robot Operation Logic

The robot uses sensors to determine its position within the map. When a task is given to the robot, it will autonomously plan the best path to reach the target location based on the topological path drawn on the map.

As the robot travels along the planned path, it will guide itself to avoid obstacles that are detected but not recorded on the map, in order to prevent collisions between the robot and the obstacles.:

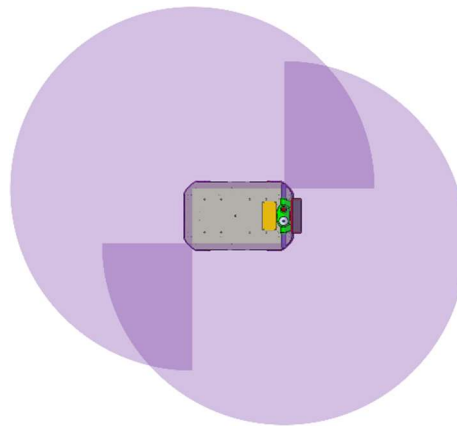
### 5.2 Obstacle Detection

The robot continuously detects obstacles while it is moving to ensure safe operation. The sensors involved in obstacle detection include:

- Lidar
- RGBD
- Collision switches

#### (1) Lidar

The robot scans the surrounding environment using lidars installed at the diagonals of the chassis, achieving a 360° detection around the robot. The specific range is as follows:



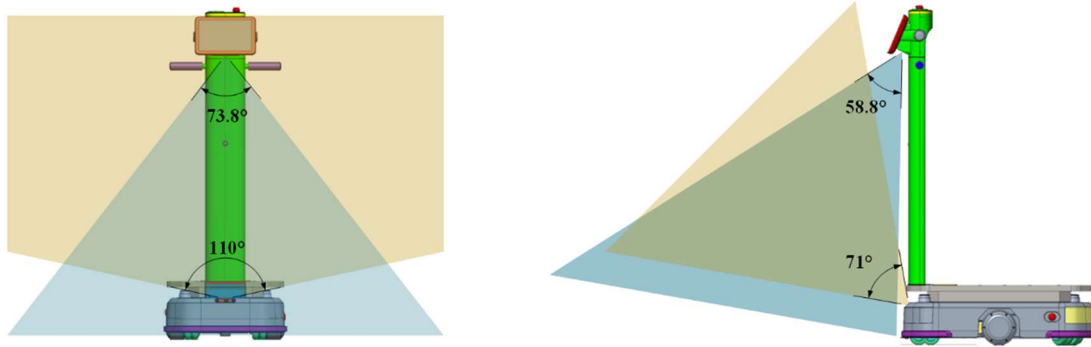
#### ⚠Caution:

The LiDAR can only scan the ground plane at a height of 19cm.

If there are transparent objects (such as glass) or reflective obstacles (such as mirrors) in the environment, the data from the LiDAR may have deviations. It is recommended to place frosted stickers or other markers at a height of 19cm or set up virtual walls on the map.

#### (2) RGBD

The robot is equipped with two RGBD cameras on the front side, which can perform stereoscopic detection of obstacles in front of the robot. The specific range of detection for the robot is as follows:



### ⚠ Caution

In environments with direct sunlight, the RGBD cameras may have abnormal detection. It is recommended to avoid running the robot in environments with direct sunlight.

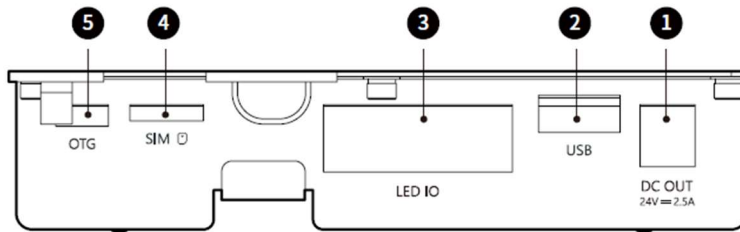
If there are transparent objects (such as glass) or reflective obstacles (such as mirrors) in the environment, the RGBD cameras may not accurately detect them. It is recommended to avoid running the robot in such environments or set up virtual walls on the map.

### (3) Collision switches

The collision switches are located at the front and rear edges of the robot's chassis. If the collision sensors are hit during robot operation, the robot will stop moving and pause the task. Follow the instructions on the interface to resume the task.

## 6. Interface Description

Under the interface window, there are external interfaces that can be used for hardware expansion and device debugging. The specific interface specifications are as follows:



No.	Name	Description
1	Power supply interface	24V (battery voltage), maximum output current of 2.5A. DC plug pin diameter: Ø2.5mm
2	USB	USB 2.0, for data communication with external devices
3	IO	Used for signal communication of external optional accessories
4	SIM card slot	Supports Nano SIM card
5	OTG	Used for device debugging

## 7. Troubleshooting

### 7.1 Troubles during Operation

#### Troubles

The following errors may be reported during the robot operation:

- Motor parameters error
- Sensor parameters error
- Sensor connection error
- Motor rotation anomaly

#### Solution

Step 1 Following the prompts on the screen, tap **OK** or **Continue operation** to see if the robot can continue operation.

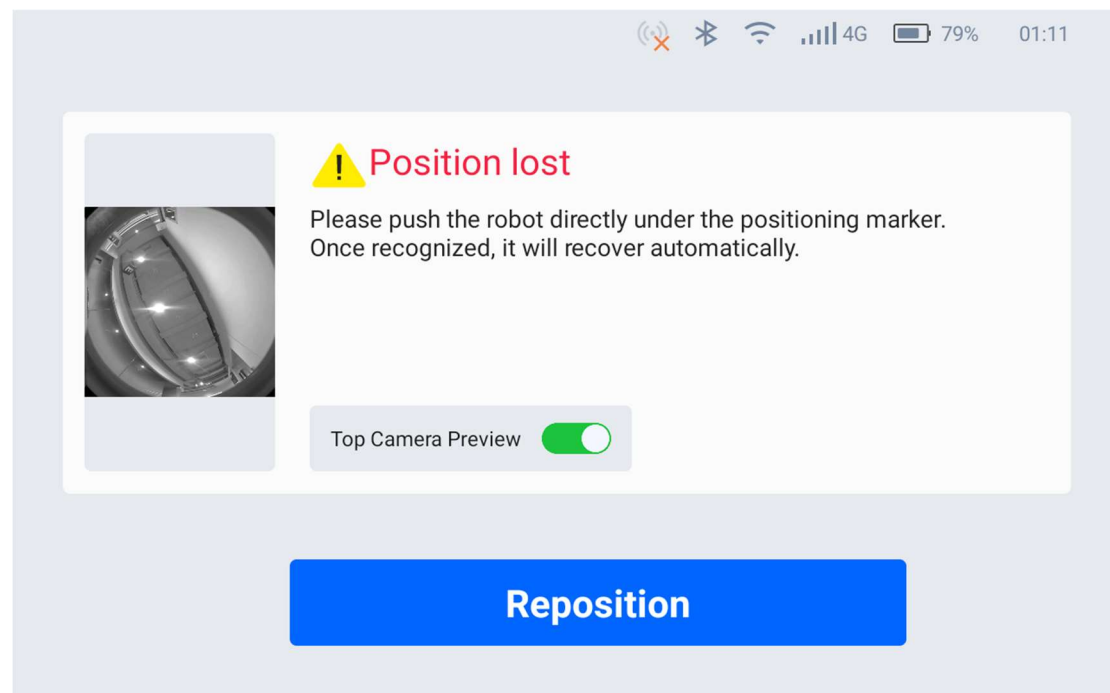
Step 2 If not, reboot the robot and re-enter the task.

Step 3 If the problem persists after the reboot, please contact our technical engineers.

### 7.2 Positioning Failure

#### Troubles

The robot screen prompts **Position lost**.



#### Possible Causes

- The robot fails to recognize the positioning feature.
- The map selected on the robot does not match the actual site.

#### Solution

Step 1 If the current map of the robot does not match the actual site, tap **Map selection** to select the correct map of the current site.

Step 2 Check if the robot is directly below the boot point. If the robot deviates too far from the boot point, move the robot right below the boot point. If the problem persists, please adjust the orientation of the robot..

Step 3 Check if the vision sensor is blocked by obstacles such as oil stains. If so, clean it with a lens cleaning kit.

## 7.3 Charging Failure

### Troubles

Charging failure

### Solution

- Check if the power switch is turned to “—”.
- Check if the charger indicator is on. If not, the charging failure may be caused by a damaged charger. Please contact our technical engineers in time.

## 7.4 Power-on Failure

### Troubles

Power-on failure

### Solution

- If the battery is low, please charge the robot in time.
- If the battery level is normal, please check if the power switch is turned to “—”.
- If the problem persists, please contact our technical engineers.

## 7.5 Robot Does Not Move Smoothly

### Troubles

The robot does not move smoothly or stops moving.

### Solution

- Check if there are obstacles in front of the robot.
- Check if there are stains like oil or soup on the depth vision sensors.
- Check if the passageway is wider than the minimum travel width.
- Check if there are mirrored and reflective metal surfaces on either side of the passageway that may affect the robot's operation. If so, attach matte stickers 5cm~6cm above the ground.

## 8. Maintenance and Care

### 8.1 Component Maintenance

Components	Robot Status	Inspection Interval	Method
Drive wheels and auxiliary wheels	Powered off	One week	Please wipe the surface with a clean cloth. Check the wheel surface for wear and replace if necessary.
Visual sensor, and LiDAR	Powered off	One week	Please wipe the surface with a clean cloth.  If there is sudden dirt or damage, please handle it in time to avoid blocking the sensor and causing abnormal operation of the robot.
Robot body	Powered off	One month	Please wipe the surface with a clean cloth. And check the installation. Make sure the housing is flat and securely fixed.
Indicator lights and sound	Powered on	One month	Check that all indicator lights and audible warnings are working properly.
Emergency stop switch	Powered on	One month	Check that the emergency stop button is working properly.
Battery	Charging	Three months / Six months	To avoid over-discharged state, battery shall be charged periodically to maintain 20~50% of capacity. Built-in battery shall be charged with terminal every 3 months while removable battery shall be charged every 6 months are recommended.
Brake switch	Powered on	Six months	Put the brake switch to the "OFF" position and gently push the robot forward to check that the brake switch is working properly.  Note: Turn the brake to the "ON" again after checking.
Safety stickers and	Powered off	Six months	Check that the safety stickers,



nameplates			labels and nameplates on the robot are intact and clearly visible
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## 8.2 Cleaning Method



Warning

Do not use water or any other liquid to clean the robot. Always make sure that the robot is kept dry.

**Step 1** Press and hold the power switch for 3 seconds to ensure that the robot is powered off.

**Step 2** Wipe the robot surface with a clean cloth.

**Step 3** Wipe the chassis, drive wheels, and auxiliary wheels with a clean cloth.

 Note

- If the drive wheels or auxiliary wheels are entangled or stuck with debris, please place the robot down on its side for cleaning. Keep the ground clean and tidy (a mat can be used) to avoid scratches on the robot surface when placing the robot down on its side.
- If there are oil stains on the tray pad, take it out and wash it separately. Put back the tray pad after it dries off completely.

**Step 4** Clean the vision sensor, depth vision sensors, and Lidar with a clean cloth or specialized lens cleanser.

 Note

- In case of unexpected contamination, address it immediately to avoid blocking the sensor and preventing the robot from working improperly.

## 9. Compliance Information

### 9.1 Federal Communications Commission Compliance Statement

The following information applies to Pudu robotic.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

### 9.2 Industry Canada Compliance Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

### 9.3 Disposal and Collecting Information



The Waste Electrical and Electronic Equipment (WEEE) Directive aims to minimize the impact of electrical and electronic goods on the environment, by increasing re-use and Collecting and by reducing the amount of WEEE going to landfill. The symbol on this product or its packaging signifies that this product must be disposed separately from ordinary household wastes at its end of life. Be aware that this is your responsibility to dispose of electronic equipment at Collecting centers

in order to conserve natural resources. Each country should have its collection centers for electrical and electronic equipment Collecting. For information about your Collecting drop off area, please contact your related electrical and electronic equipment waste management authority, your local city office, or your house hold waste disposal service.



Before placing electrical and electronic equipment (EEE) in the waste collection stream or in waste collection facilities, the end user of equipment containing batteries and/or accumulators must remove those batteries and accumulators for separate collection.