

# BellaBot Pro Operation Guide

Version: V1.0

Model: BLFD13

Shenzhen Pudu Technology Co., Ltd.

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## Introduction

### Purpose

This manual describes the functions, technical specifications, and detailed operations of BellaBot 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

### Revision History

Time	Revision History
2024/06/24	Initial release

### 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.

## Table of Contents

1. Safety Instructions .....	错误!未定义书签。
1.1 Power Usage.....	错误!未定义书签。
1.2 Robot Usage .....	错误!未定义书签。
1.3 Working Environment .....	6
2. Product Components.....	错误!未定义书签。
2.1 Overview .....	8
2.2 Appearance & Components .....	错误!未定义书签。
2.3 Specifications.....	9
3. How to Use .....	12
3.1 Quick Start Guide.....	12
3.1.1 Power On.....	错误!未定义书签。
3.1.2 Power Off.....	错误!未定义书签。
3.1.3 Pause.....	错误!未定义书签。
3.1.4 Emergency.....	错误!未定义书签。
3.2 Task Scenarios.....	13
3.2.1 Product Features .....	错误!未定义书签。
3.2.2 Delivery Mode.....	错误!未定义书签。
3.2.3 Cruise Mode .....	21
3.2.4 Guide Mode.....	27
3.2.5 Recycle Mode .....	30
3.2.6 Birthday Mode .....	35
3.3 Settings.....	39
3.3.1 General .....	40
3.3.2 Robot Functions .....	42
3.3.3 Map Settings.....	60
3.3.4 Music.....	61
3.3.5 Password and Security .....	61
3.3.6 System Update.....	62
3.3.7 About this device .....	63

3.3.8 Debug .....	64
3.4 Ad configuration .....	64
3.5 Docking Instructions .....	64
4. Troubleshooting.....	65
4.1 Troubles during Operation .....	65
4.2 Positioning Failure .....	65
4.3 Charging Failure .....	66
4.4 Power-on Failure .....	67
4.5 Tray Detection Anomaly .....	67
4.6 Robot Does Not Move Smoothly .....	68
5. Maintenance and Care .....	69
5.1 Component Maintenance .....	69
5.2 Cleaning Method .....	69
5.3 Battery Replacemen .....	69
6. After-sales Service Policies.....	71
7. Compliance Information .....	73
7.1 Federal Communications Commission Compliance Statement .....	73
7.2 Industry Canada Compliance Statement .....	73
7.3 Disposal and Recycling Information .....	73

# 1. Safety Instructions

## 1.1 Power Usage

- Always use the original rechargeable batteries and chargers. Do not charge your robot using non-original chargers. If the charger is damaged, replace it immediately.
- When the battery drops to 20%, the robot should be charged timely. Running at a low battery for a long time may impair battery life.
- Make sure that the power voltage matches the voltage indicated on the charger, or it may cause damages to the charger.
- Unplug the charger timely after the charging cycle is complete. Do not leave the charger plugged in for a long time if the robot is fully charged.
- If the robot is not used for a long time, please turn the key switch in the battery box to OFF.
- Do not expose the battery to high temperatures or heating equipment, including sunshine, heaters, microwave ovens, and water heaters. The battery may explode when overheated.
- 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.
- Please do not drop the battery and charger or hit them with foreign objects to avoid damage.
- Do not use the battery if it is damaged.
- Designate a person to charge the robot. Do not charge the robot or battery in an unattended manner.
- When using the charger, ensure that the fastener of the charging interface is fully engaged to avoid overheating during charging, which may cause burns or damage to the equipment.

## • 1.2 Robot Usage

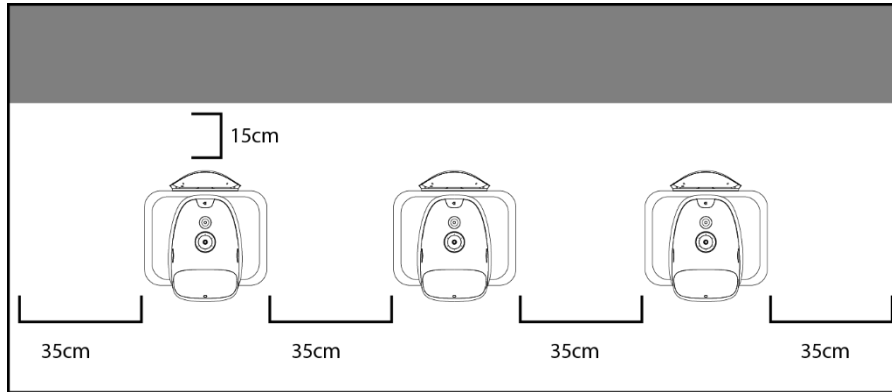
- Do not cover the robot's top camera while it is working to prevent it from moving abnormally. If the camera is covered, pause the current task and move the robot to the correct route before continuing the task.
- Do not clean or maintain the robot when it is powered on and working.
- Do not put open-flame stoves or any flammable and explosive articles on the robot.
- Do not pick or place dishes while the robot is moving to avoid any food loss or personal injury caused by accidental collision.
- To avoid damage to the robot, please ensure that no scattered power cords and sharp objects such as decoration wastes, glass, and nails are on the ground.
- If the collision sensor is hit while the robot is moving, the robot will stop moving and pause the task. At this time, you can resume the task according to the interface guidel

ines.

- When the robot is in motion, no playing is allowed in front of the robot to avoid unnecessary harm.
- Do not move or transport the robot while it is working to prevent it from moving abnormally.
- In case of emergency, stop the robot by pressing the emergency stop button on the top.
- The robot must not be disassembled or repaired by untrained personnel. In case of malfunction, contact Shenzhen Pudu Technology Co., Ltd. for technical support in time.
- Observe the maximum weight a person is allowed to lift as required by local laws and regulations when transporting the robot. Keep the robot upright during transportation. Never attempt to transport it by lifting the tray or the box.
- Do not spill any liquid into the robot to avoid any damage.
- 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 Working Environment**

- Do not use or charge the robot in a high temperature/pressure environment, areas with fire or explosion hazard, or other dangerous scenarios to avoid personal injury or robot damage.
- The robot can only be used in an indoor environment on a flat and smooth surface with a slope less than 5° and protrusions not more than 1cm(0.39in) high.
- Do not use the robot in a humid environment or on surfaces covered with fluid or goeey stuff to avoid damage to the robot.
- Do not use the robot in places where the use of wireless devices is explicitly prohibited, otherwise it may cause interference to other electronic devices or lead to other dangers.
- The minimum travel width for a single robot is 0.65m(2.13ft). The travel width is recommended to be greater than 1.6m(5.25ft). when two robots pass head-on. Otherwise, they should pass through in turn. The width of the standard kitchen entrance should be greater than 1.2m(3.94ft). Otherwise, it may cause congestion.
- There is a 35cm(13.78in) space between the two robots placed side by side at the standby point, and a clearance of 15cm(5.91in) from the rear wall and 35cm(13.78in) from the side wall.



- Things that are black (e.g., skirting line), polished, or transparent (e.g., French window) at the height of 16cm to 22cm(6.30-8.66in) may interfere with the radar reflection and cause abnormal movement of the robot. Such sites should be modified (e.g., posting stickers). Please contact Shenzhen Pudu Technology Co., Ltd. for technical support
- The maximum climbing angle of the robot is 5°. Do not pause the robot on the slope to avoid any sliding of the robot that may cause loss of dishes.
- If visual navigation is used, make sure there's no lighting fixture or other intense light source within the distance of 30cm(11.81in) from the Marker code.
- Do not dispose of the robot or its accessories as household waste. Always dispose of the robot and its accessories according to local laws and regulations, and recycle wherever possible.

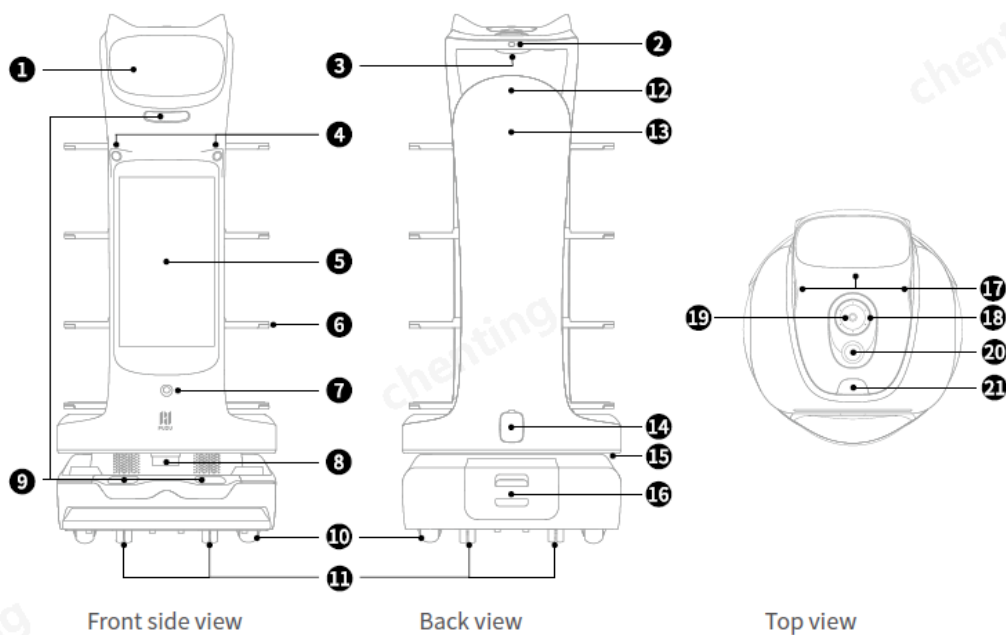


## 2. Product Components

### 2.1 Overview

BellaBot Pro is an indoor delivery robot with laser Slam + Vslam, a large advertising screen, and tray visual detection. It also provides excellent human-robot interactions, AI voice, lovely looking, and multimodal interactions. To adapt to different business scenarios, the BellaBot Pro provides a variety of modes, such as Delivery Mode, Cruise Mode, Recycle Mode, Birthday Mode, Guide Mode, and more.

### 2.2 Appearance & Components



No.	Description
1	LCD screen
2	Power switch
3	Tray detection sensor
4	Front view RGB camera
5	Advertising screen
6	Trays
7	Floor projector light
8	Lidar

9	Depth vision sensors
10	Drive wheels
11	Auxiliary wheels
12	Touch-finished sensor
13	Dot matrix screen
14	Charging port
15	Light strip
16	Battery box
17	Touch sensor
18	6-mic circular array kit
19	Upward facing sensor
20	Emergency stop switch
21	Lightning button

#### Buttons:

Button	Description
Power switch	Press and hold the power switch for 1 second to power on. Press and hold the power switch for 3 seconds to power off.
Emergency stop switch	In case of emergency, press the emergency stop switch to stop the robot. Rotate the emergency stop switch clockwise, tap on the screen or press the lightning button to resume operation.
Lightning button	Pause and resume the robot's operation.
Touch sensor	When the robot is stationary, touch its ears or head to realize Human-Robot Touch Interaction.
Collision Sensor	In order to avoid accidental injury, if the collision sensor is hit while the robot is moving, the robot will stop moving and pause the task. In this case, you can resume the task according to the interface operating guidelines.

## 2.3 Specifications

Feature	Description
Model	BLFD13
Operating voltage	DC 23 V~29.4 V

Power input	AC 100 V~240 V, 50/60 Hz	
Power output	29.4 V, 8 A	
Battery capacity	25.6 Ah	
Charging time	4.5 h	
Battery life	11 h (unloaded)	
Cruise speed	0.2 - 1.2 m/s (adjustable)	0.66-3.94 ft/s (adjustable)
Navigation	Visual positioning	
Min. travel width	65 cm	25.59 inches
Max.surmountable height	10 mm	0.39 inch
Max.climbing angle	5°	
Tray dimensions	410 mm x 500 mm	16.14 x 19.69 inches
No. of trays	Four	
Height between trays	From top to bottom: 230 /200 /200 /180 mm (adjustable)	From top to bottom: 9.06 /7.87 /7.87 /7.09 inches(adjustable)
Tray load	10 kg/layer	22.05 pounds/layer
Machine material	ABS/aviation grade aluminum alloy	
Robot weight	55 kg	121.25 pounds
Robot dimensions	570 mm x 550 mm x 1290 mm	22.44 x 21.65 x 50.79 inches
Screen size	10.1-inch LCD screen and 18.5-inch LCD screen (advertising screen)	
Operation system	Android	
Microphone	6-mic circular array kit	
Speaker power	2×10 W stereo speakers	
Working environment	Temperature: 0 to 40 °C (32 to 104 °F ); RH: ≤ 85%	
Storage environment	Temperature: -20 to 65 °C (-4 to 149 °F ); RH: ≤ 85%	
Working altitude	< 2000 m	6561.68 ft
Surface requirement	Indoor environment, flat and smooth ground	

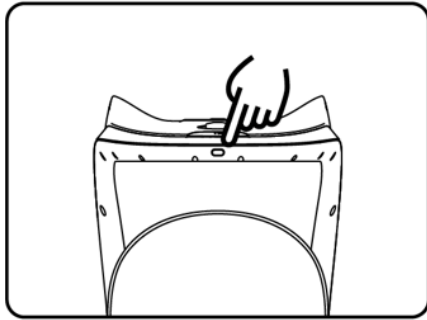
IP rating	IP20	
Frequency band range	Wi-Fi	2.4G Wi-Fi: 2412 – 2472 MHz, 2422 – 2462 MHz 5.2G Wi-Fi: 5180 – 5240 MHz, 5190 – 5230 MHz, 5210 MHz 5.3G Wi-Fi: 5260 – 5320MHz, 5270 – 5310 MHz, 5290 MHz 5.6G Wi-Fi: 5500 – 5700 MHz, 5510 – 5670 MHz, 5530 – 5610 MHz 5.8G Wi-Fi: 5745 – 5825 MHz, 5755 – 5795 MHz, 5775 MHz
	Bluetooth	2402 – 2480 MHz
	3G	B1/B8
	4G LTE-FDD	B1/B3/B7/B8/B20/B28
	4G LTE-TDD	B34/B38/B40
Max. transmit power	Wi-Fi	2.4G Wi-Fi: 16.96 dBm; 5.2G Wi-Fi: 13.07 dBm; 5.3G Wi-Fi: 12.66 dBm; 5.6G Wi-Fi: 12.73 dBm; 5.8G Wi-Fi: 12.93 dBm
	Bluetooth	BLE: 6.69 dBm; BR/EDR: 9.83 dBm
	3G	B1: 23.64 dBm; B8: 21.71 dBm
	4G LTE-FDD	B1: 23.77 dBm; B3: 23.51 dBm; B7: 23.7 dBm; B8: 23.22 dBm; B20: 22.97 dBm; B28: 23.05 dBm
	4G LTE-TDD	B34: 23.73 dBm; B38: 23.97 dBm; B40: 23.45 dBm

## 3. How to Use

### 3.1 Quick Start Guide

#### 3.1.1 Power On

Step1 Move the robot to the startup location, and press and hold the power switch for 1 second. The bottom light strip will go on, indicating that the robot is powered on.



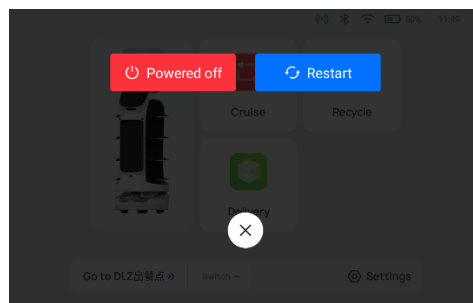
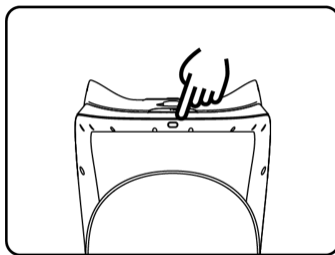
#### Note

The system will automatically start Pudu APP by default after powering on. If not, tap the “Desktop” icon on the system desktop to start it.

Step 2 The robot is powered on, let's try it out!

#### 3.1.2 Power Off

Press and hold the power switch for 3 seconds, and a shutdown prompt will pop up. Click "Powered 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.



#### 3.1.3 Pause

While the robot is moving, the current task can be paused by tapping the screen. Tapping the screen again will resume the current task.

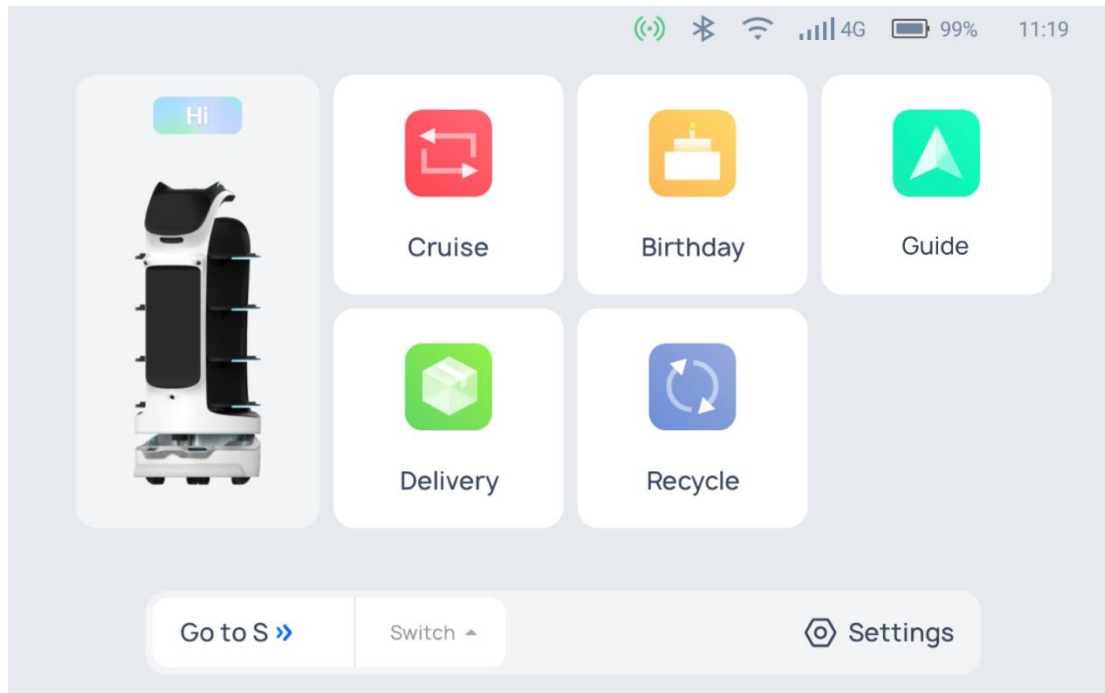
#### 3.1.4 Emergency stop

In case of an emergency while the robot is moving, press the emergency stop switch to stop the robot. Turn the emergency stop switch clockwise and follow the on-screen prompts to resume the robot's operation.

## 3.2 Task Scenarios

### 3.2.1 Product Features

The robot comes with various modes, including Delivery mode, Cruise mode, Recycle mode, Birthday mode, and Guide mode, to cater to the needs of different scenarios. After powering on the robot, you can select the mode as needed in the screen.



Mode	Description	Explanation
Delivery Mode	Robots can deliver items to multiple destination points in a single trip. By placing items for different destination points on different trays and inputting the corresponding destinations, the robot can autonomously plan its route, deliver the items to the specified locations, and automatically return to its docking point after completing the delivery.	Automating the delivery of items reduces unnecessary repetitive labor for staff, allowing them to focus more on completing complex tasks such as tableside service and introducing dishes.
Guide Mode	The robot says hello to customers coming into the store and leads them to their tables. Then, it automatically returns to the greeting location.	Recruiting and leading customers to their destination, robots attract customers' attention with their cute voice and appearance, leading them into the store and increasing foot traffic and in-store conversion rates.
Recycle Mode	After selecting the recycling mode, the robot can carry out the recycling task. Upon completing the recycling, it can choose to return to a designated location.	Transporting recyclable items to the recycling point, the robot collaborates with staff during peak hours to complete the recycling of items, allowing service personnel to focus more on

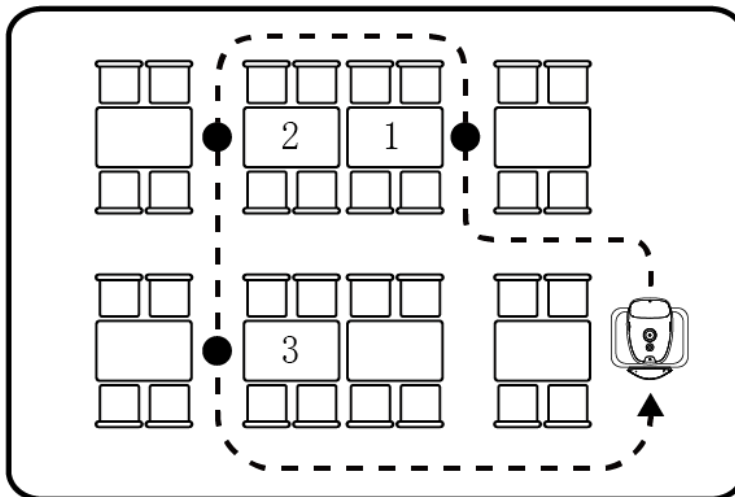
Mode	Description	Explanation
		serving customers and increasing table turnover rate.
Birthday Mode	The robot delivers birthday cakes or gifts to customers, accompanied by customized background music.	When delivering birthday cakes and gifts, the robot will play cheerful music and activate colorful lights to celebrate the customer's birthday, providing them with a surprise and enhancing customer satisfaction.
Cruise Mode	The robot circulates along a predetermined path with self-service drinks, desserts or napkins, and recommends them to customers by voice.	Carrying items on a designated route patrol, the robot can be accessed by customers in need, alleviating staff shortages and enhancing the dining experience for customers.

Note

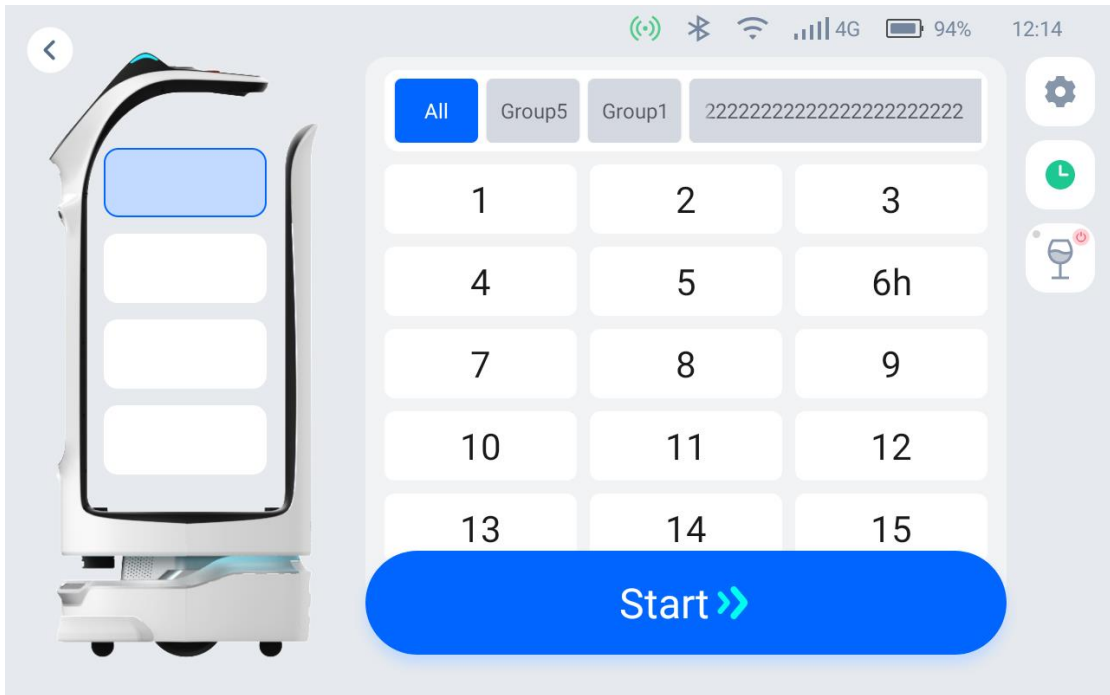
To ensure a stable and safe operation of the robot, it is recommended that the delivery speed be lower than 0.9m/s (2.95 ft/s), and the cruise speed at 0.2m/s (0.66 ft/s) to 0.6m/s (1.97 ft/s).

### 3.2.2 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.



Step1: On the robot's home page, select “Delivery” to access the main interface for delivery mode.

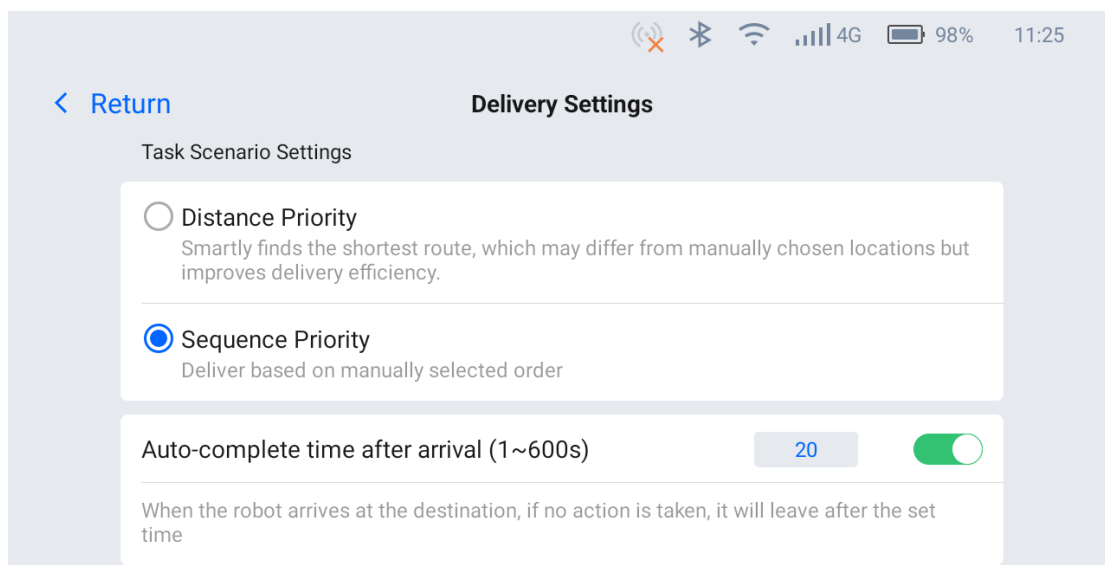


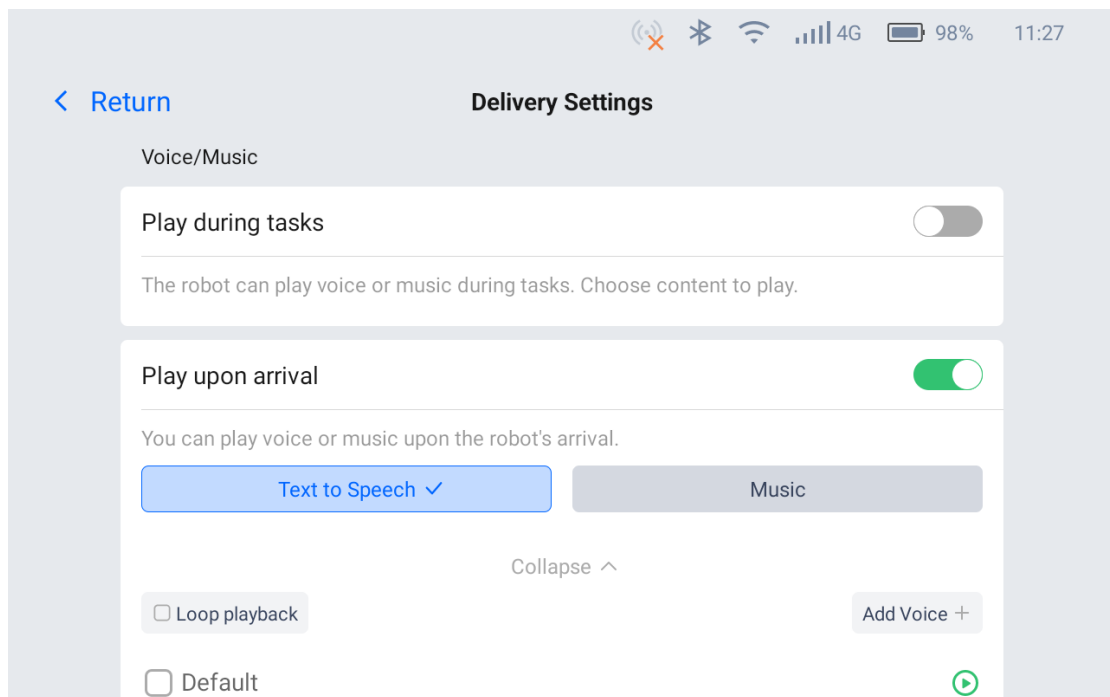
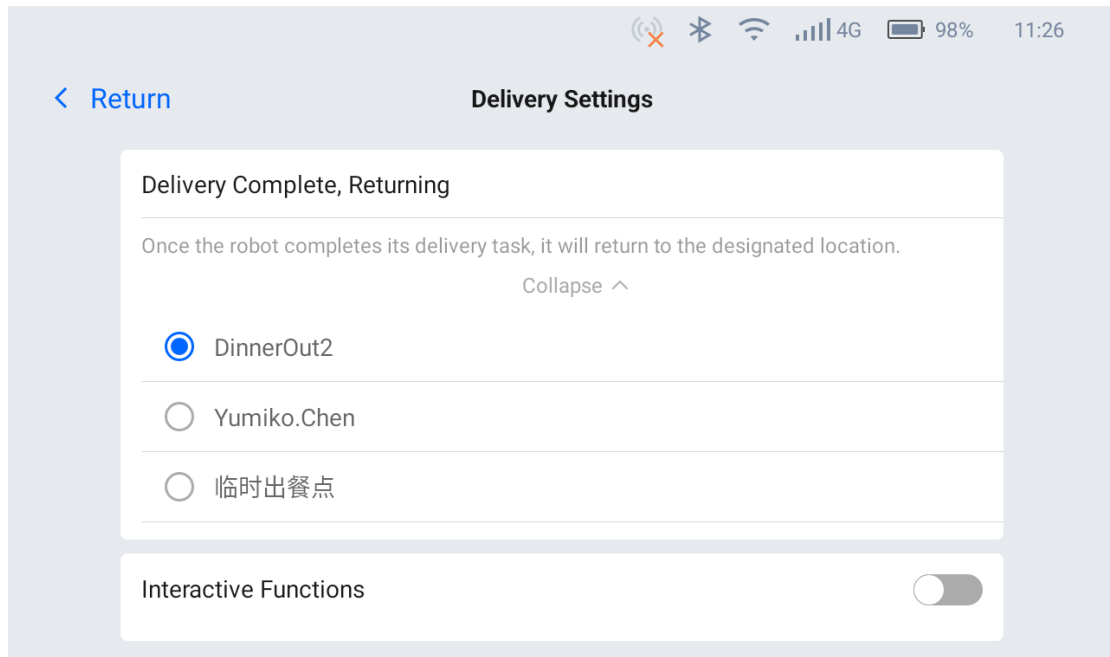
The shortcut keys for the delivery mode interface are as follows.

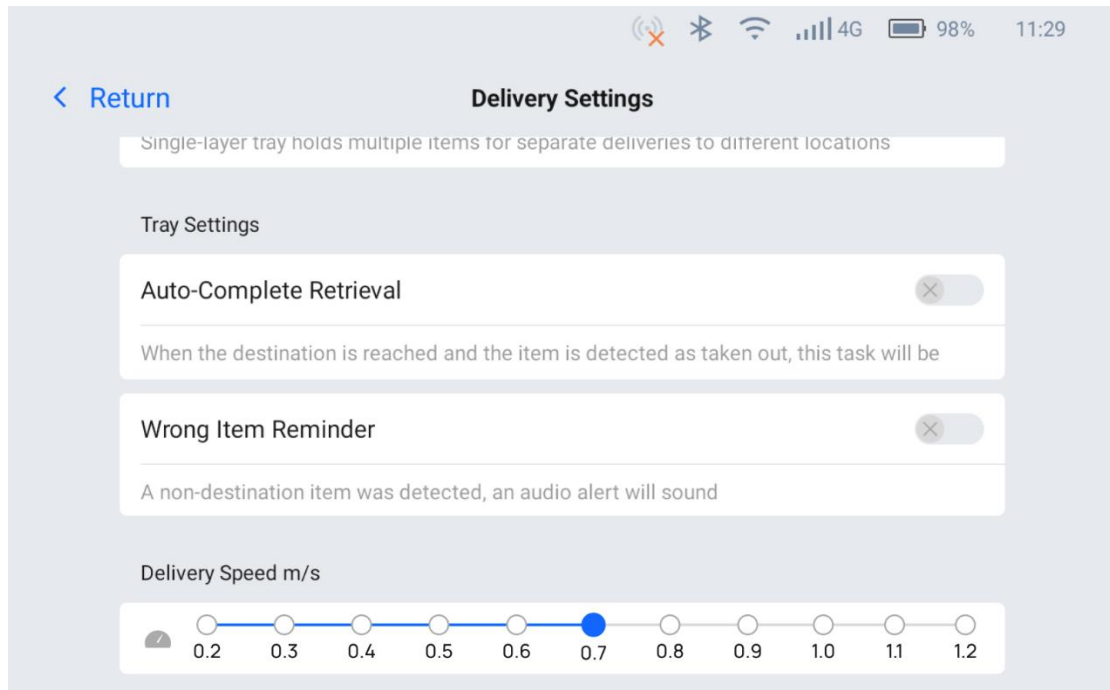
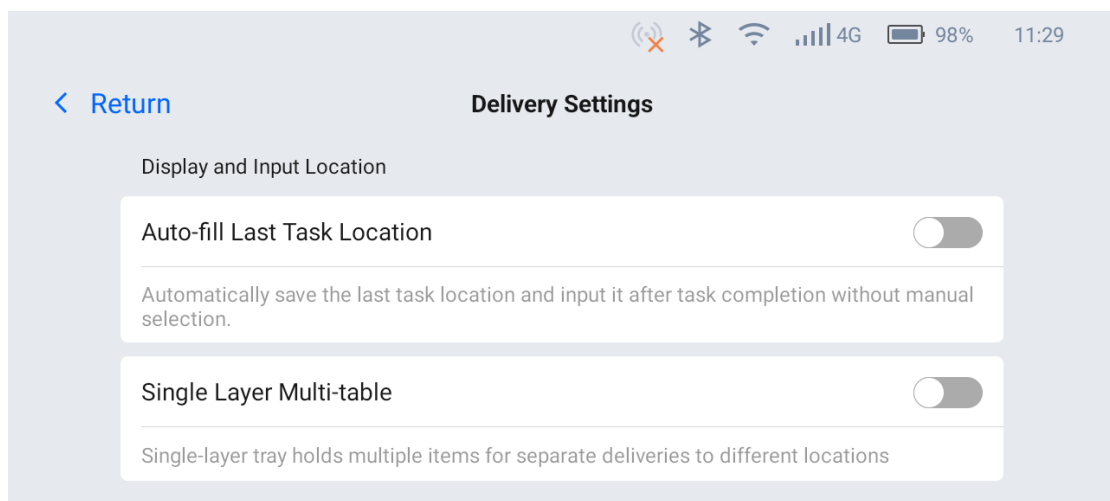
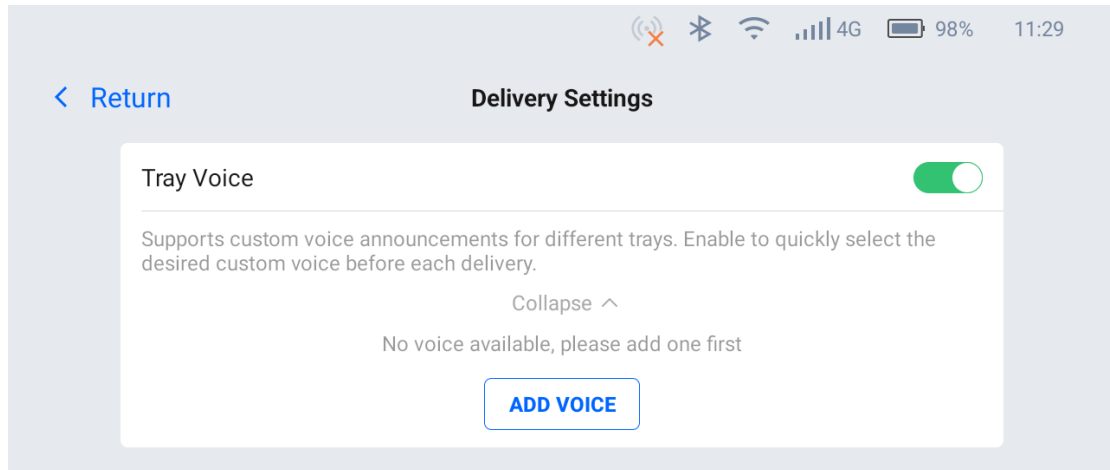


Button	Description
	Configure task scenarios, voice/music, tray, speed, etc. For detailed explanations, please refer to the table below.
	View the previous task.
	<p>Set the Smooth Mode.</p> <p>The Smooth Mode is mainly used for scenarios where there is a small amount of soup during delivery.</p> <p>Smooth Mode has three states:</p> <ul style="list-style-type: none"> <li>  : Not enabled. Click this icon to enable Smooth Mode, which is only valid for a single delivery and will be turned off by default after the task is completed; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates a single delivery. Click this icon to disable Smooth Mode; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates long-term validity. Click this icon to disable Smooth Mode.                 </li> </ul> <p>After enabling the Smooth Mode, the robot will deliver items at a speed of 0.5 m/s.</p>

The delivery settings interface is shown in the following figure, with detailed explanations provided in the table below.





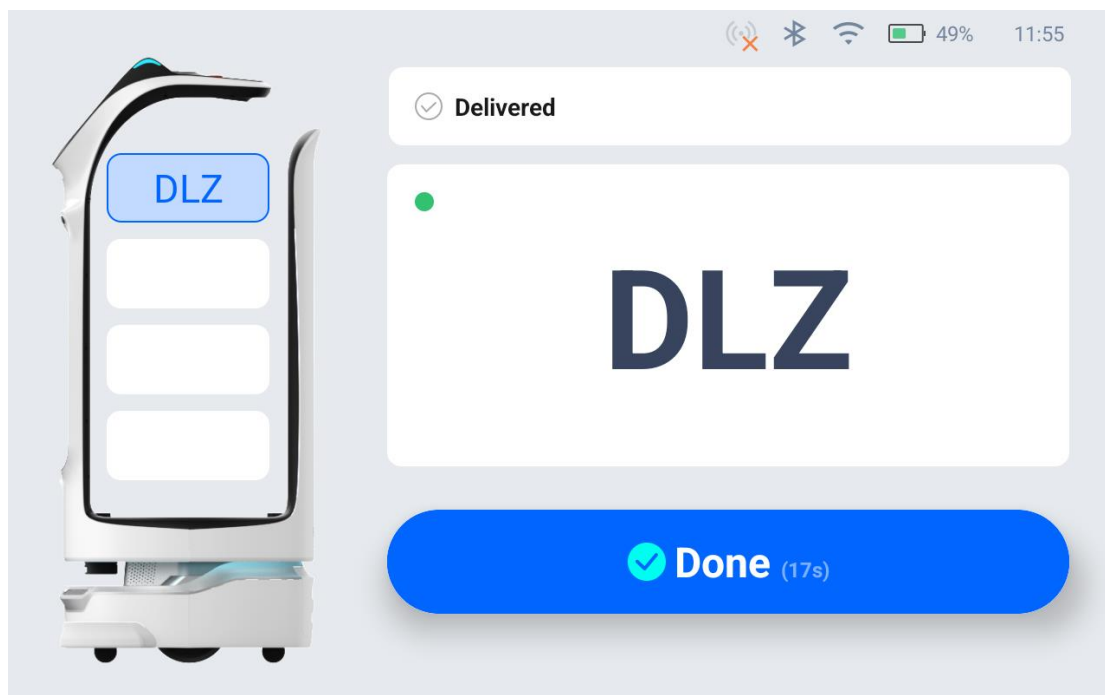


Delivery Settings	Description
Task Scenario Settings	Setting the delivery sequence for tasks: <ul style="list-style-type: none"> <li>Distance priority: the robot automatically plans the shortest route for delivery</li> <li>Sequence priority: deliveries are made in the order manually selected by humans</li> </ul>
Auto-complete time after arrival	After the robot reaches its destination, if there is no interaction with the robot, it will leave after a set period of time and proceed to the next task.
Delivery Complete, Returning	After completing the delivery task, the robot will return to the designated location.
Interactive Functions	Enable the interactive feature If the store is holding a lottery event, the store can activate the interactive feature and set the probability of winning, with the sum of all probabilities equaling . After the delivery is completed, customers can participate in the lottery. If they win, they will be prompted to take a photo and contact the store staff to claim the prize. Click "Please take a photo and click this button" and the robot will begin the next task. If they do not win, the robot will proceed to the next task.
Voice/Music	<ul style="list-style-type: none"> <li>Play during tasks                              If enabled, during the delivery process, the selected voice/music will be played. If there is no music, you can scan a QR code in the "Settings &gt; Music" interface to import music.</li> <li>Play upon arrival                              If enabled, the selected voice/music will be played upon the robot's arrival for delivery. If there is no music, you can scan a QR code in the "Settings &gt; Music" interface to import music.</li> <li>Tray Voice                              If enabled, before each delivery, you can quickly select the desired custom voice for different trays.</li> </ul>
Display and Input Location	<ul style="list-style-type: none"> <li>Auto-fill Last Task Location                              If enabled, the last task location will be recorded. After completing the task, it will be automatically entered without the need for manual selection.</li> <li>Single Layer Multi-table                              If enabled, a single tray can hold multiple items and be delivered</li> </ul>

Delivery Settings	Description
	to different locations.
Tray Settings	<ul style="list-style-type: none"> <li>• Auto-Complete Retrieval If enabled, upon reaching the destination, if the items are detected to have been taken out, the task can be automatically completed.</li> <li>• Wrong Item Reminder If enabled, upon reaching the destination, if items meant for a different destination are detected to have been taken out, a voice prompt will be played to remind of the error.</li> </ul>
Delivery Speed	Set the robot's running speed in delivery mode, supporting speed settings from 0.2 to 1.2m/s, with a default speed of 0.7m/s.

Step 2: Place the items on the corresponding tray. Select the destination on the right side. The destination name will be displayed on the corresponding tray. Click "Start". The robot will go to the corresponding destination.

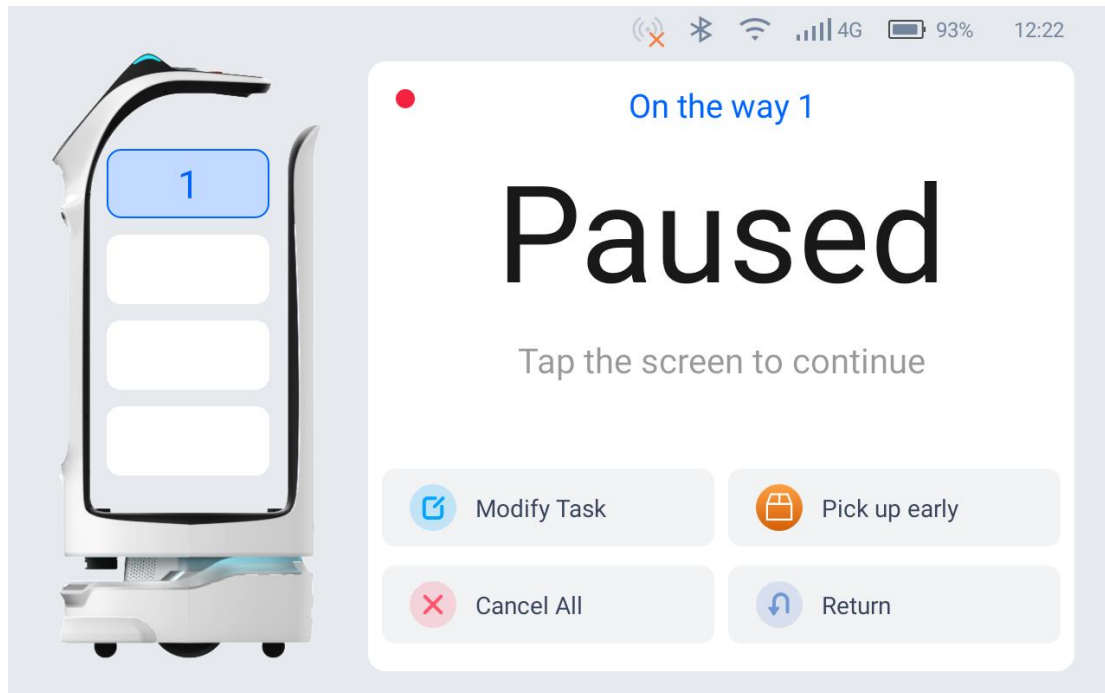
Step 3: Upon reaching the destination, the robot will provide a voice prompt, and the light strip on the corresponding tray will flash, and the top tray ambient light will illuminate. The server can retrieve the meal following the screen and voice prompts.



Step 4: After the operator retrieves the items, the tray detection can automatically complete the current task; or manually click "Complete", and the robot will start the next task. If the robot has completed all tasks, it will return to the docking point.

- If there is a need to edit tasks, complete them early, cancel all tasks, or return during the delivery process, you can click on the robot's screen to pause the robot for further operations.

- If there is no action taken within the countdown time, the robot will continue running.
- If the "Automatic Completion Time After Arrival" is enabled in the settings, and the items are not taken within the specified time after reaching the destination, the task cannot be automatically detected as completed, or if "Complete" is not clicked, the robot will automatically complete the task and move on to the next one.
  - If "Tray Detection" is enabled in the "Settings" page, after retrieving the meal, the robot will automatically end the current task and proceed to the next one. This function is only valid when a single tray corresponds to a single dish.



Button	Description
Modity task	Tap to modify the destination.
Pick up early	Tap to Pick up early 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.

### 3.2.3 Cruise Mode

Cruise mode means walking in a specific environment, covering a large area.

Step 1: On the robot homepage, select "Cruise" to enter the main interface of cruise mode.

The cruise mode interface is shown below. If a cruise route was created during mapping, the cruise mode interface will display the cruise route. As shown in the figure below, the blue path in the map is the cruise route.

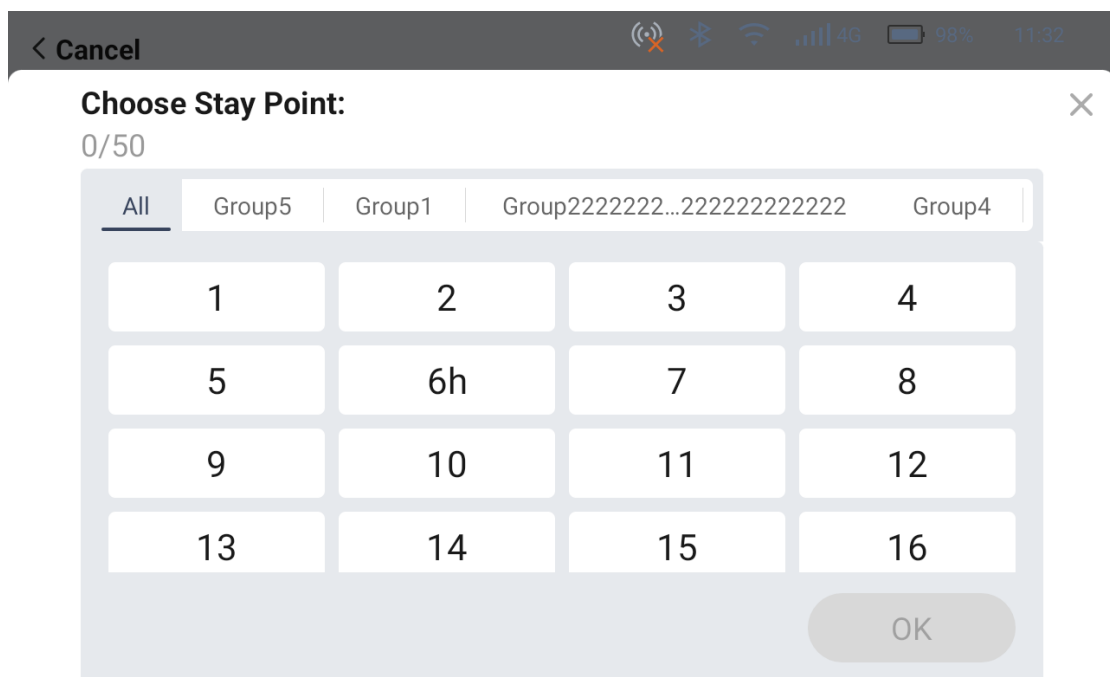
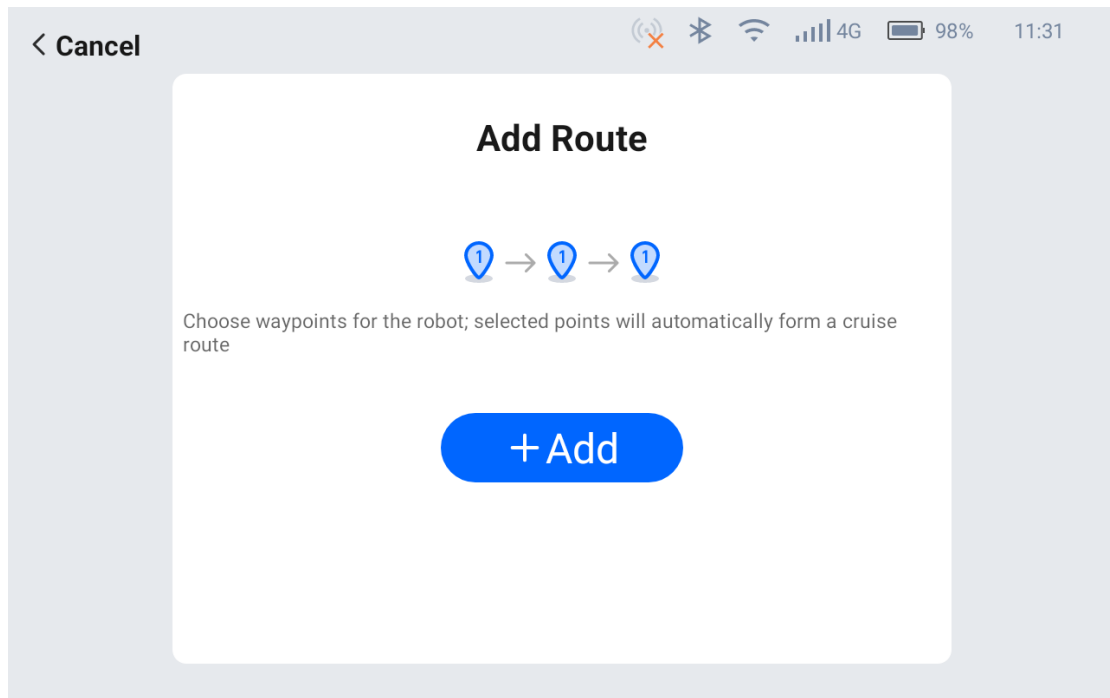


The shortcut key instructions for the cruise mode interface are as follows.

Button	Explanation
+	Add a custom cruise route to achieve fixed-point cruising.
	Shortcut for return, the machine returns to the selected docking point.
	<p>Set the Smooth Mode.</p> <p>Smooth Mode has three states:</p> <ul style="list-style-type: none"> <li>  : Not enabled. Click this icon to enable Smooth Mode, which is only valid for a single delivery and will be turned off by default after the task is completed; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates a single delivery. Click this icon to disable Smooth Mode; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates long-term validity. Click this icon to disable Smooth Mode.                 </li> </ul> <p>After enabling the Smooth Mode, the robot will Cruise at a speed of 0.5 m/s.</p>
	Please refer to the table below for detailed instructions on setting task scenarios, voice/music, speed, etc.

The operation for customizing a cruise route is as follows:

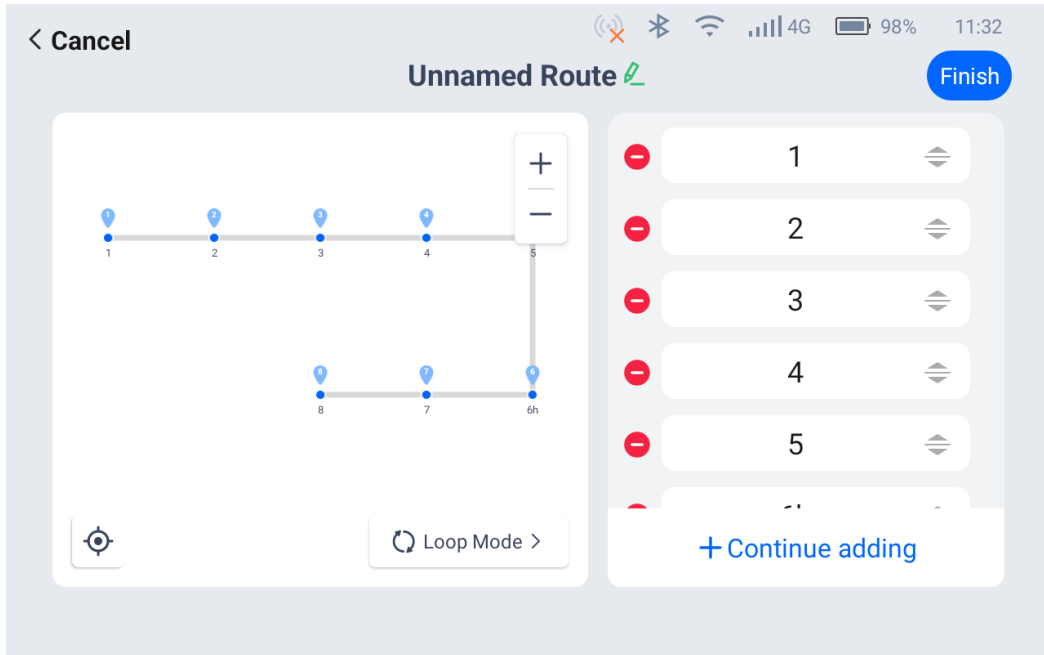
Click **+** to enter the select cruise point interface.



Please select at least two cruise points. Up to 50 cruise points are supported, and multiple selections of the same cruise point are allowed, but consecutive selection of the same cruise point is not allowed.

Step 2: Select the points to be cruised in the select cruise point interface, click "Finish" to enter the custom cruise route interface.





In this interface, you can rename the route, continue adding cruise points, and select the route mode.

There are three types of route modes: Loop mode, Cruise by duration, and Cruise by count.

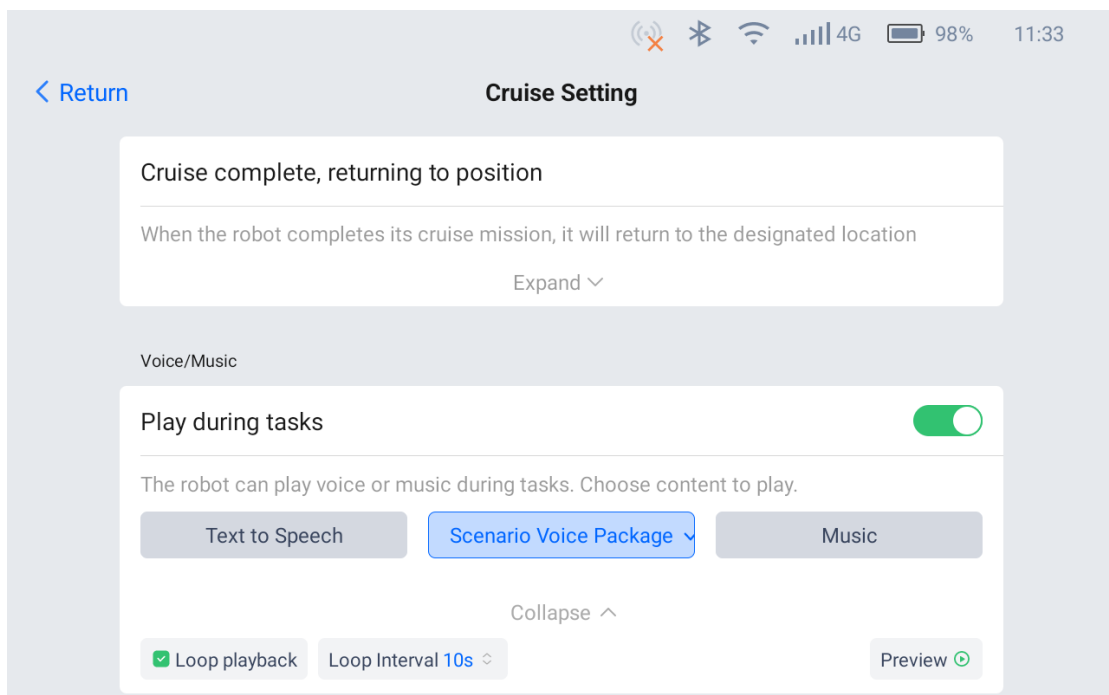
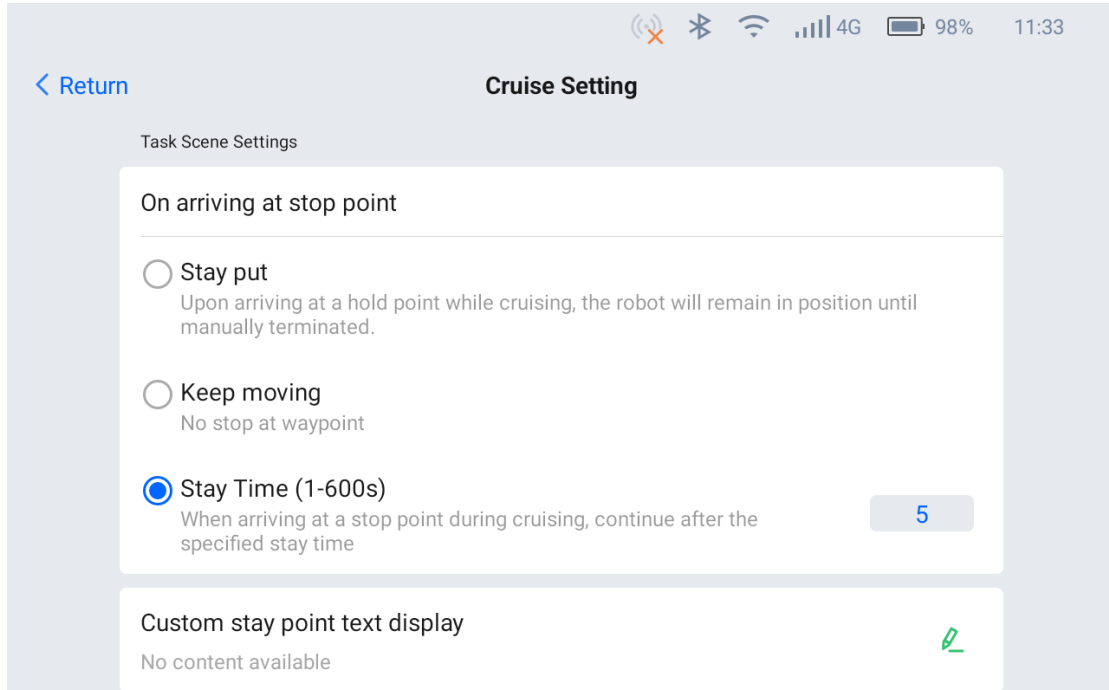
- **Loop mode:** The robot will loop this route indefinitely.
- **Cruise by duration:** The robot will continue the task for the set duration and automatically end when the time is up.
- **Cruise by Count:** The cruise task route will end after completing the specified number of loops.

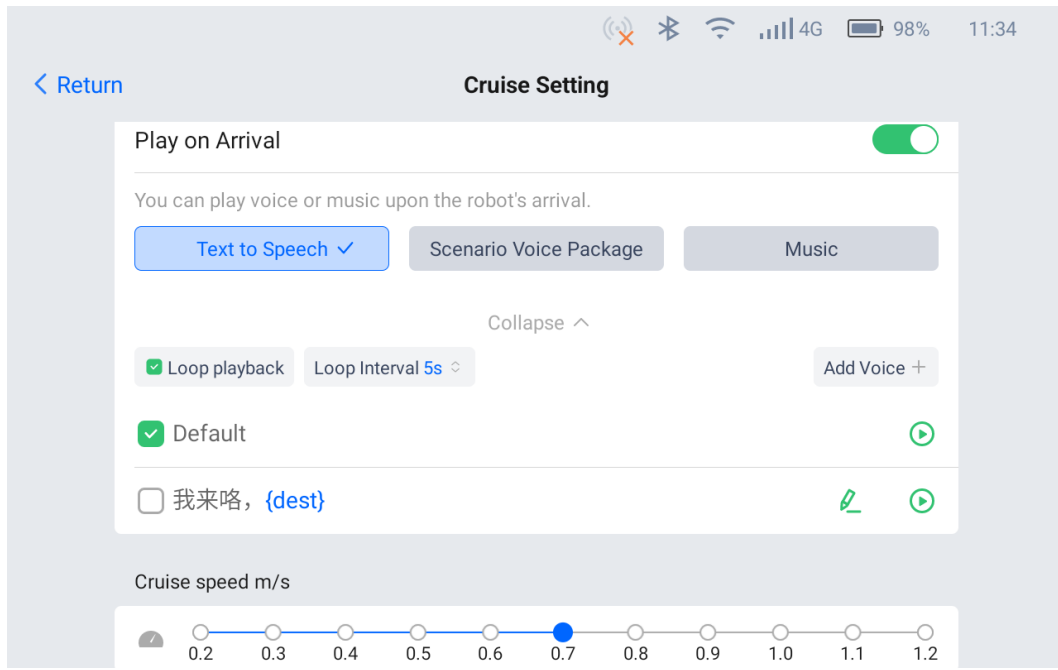


Step 3: Rename the cruise route in the custom cruise route interface and click "Save". This will generate a custom cruise route.

Users can view the list of cruise points, adjust the order of cruise points, or delete the current cruise route in the custom cruise route interface.

The cruise settings interface is shown in the following figure, detailed explanations are provided in the table below.





Cruise Settings	Explanation
Task Scene Settings	On arriving at stop point <ul style="list-style-type: none"> <li>Stay put: The robot will remain stationary at the stop point until manually ended by a person.</li> <li>Keep moving: The robot will not pause at the stop point.</li> <li>Stay Time: The robot will pause at the stop point for a specified time before resuming the cruise.</li> </ul>
Custom stay point text display	Set the text displayed on the screen during the cruise pause, which can scroll for playback.
Cruise complete, returning	After completing the cruise task, the robot will return to the set location.
Voice/Music	<ul style="list-style-type: none"> <li>Play during tasks</li> </ul> If enabled, the selected voice/music will be played during the cruise process. If there is no music, you can import music by scanning the code in the "Settings > Music " interface. <ul style="list-style-type: none"> <li>Play on arrival</li> </ul> If enabled, the selected voice/music will be played upon arriving at the stop point during the cruise. If there is no music, you can import music by scanning the code in the "Settings > Music" interface.
Cruise Speed	Set the running speed of the robot in cruise mode, supporting speed settings from 0.2 to 1.2 m/s, with a default speed of 0.7 m/s.

Step 4: Place desserts, snacks, or items on the tray. Select the cruise route to be used and click "Start".

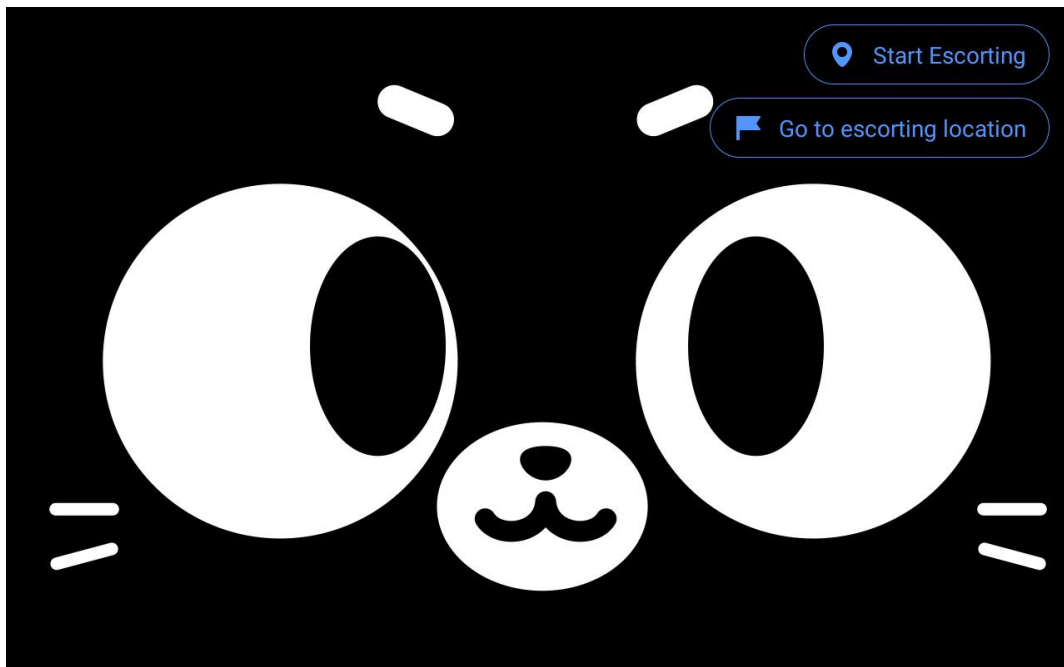
The robot will start running in a loop according to the cruise route.

- If you need to retrieve items, click on the robot screen or the lightning button to pause the robot for item retrieval. If there is no action within the pause time (automatic resumption of cruise pause time), the robot will continue running.
- If you need to stop the cruise, click on the screen or the lightning button, then click "Cancel Cruise" to exit the cruise mode.

### 3.2.4 Guide Mode

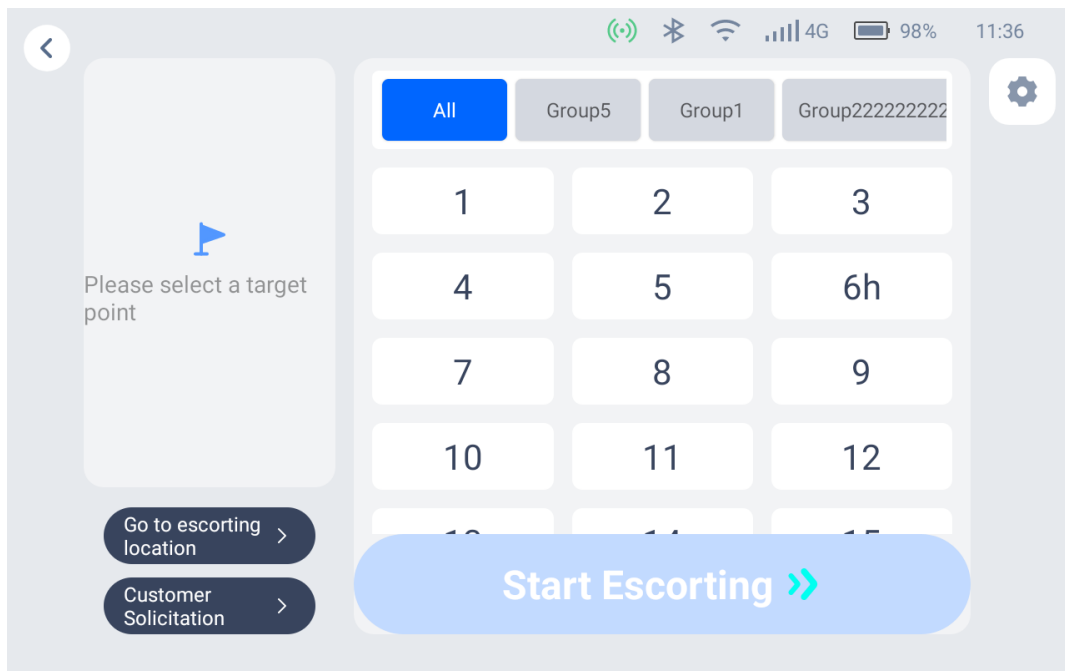
In guide mode, the robot acts as a receptionist, welcoming guests at the restaurant entrance and guiding them to the designated location.

Step 1: Click on "Guide Mode" at the entrance welcoming point.



Step 2: Select the target table number and click "Start Guiding".

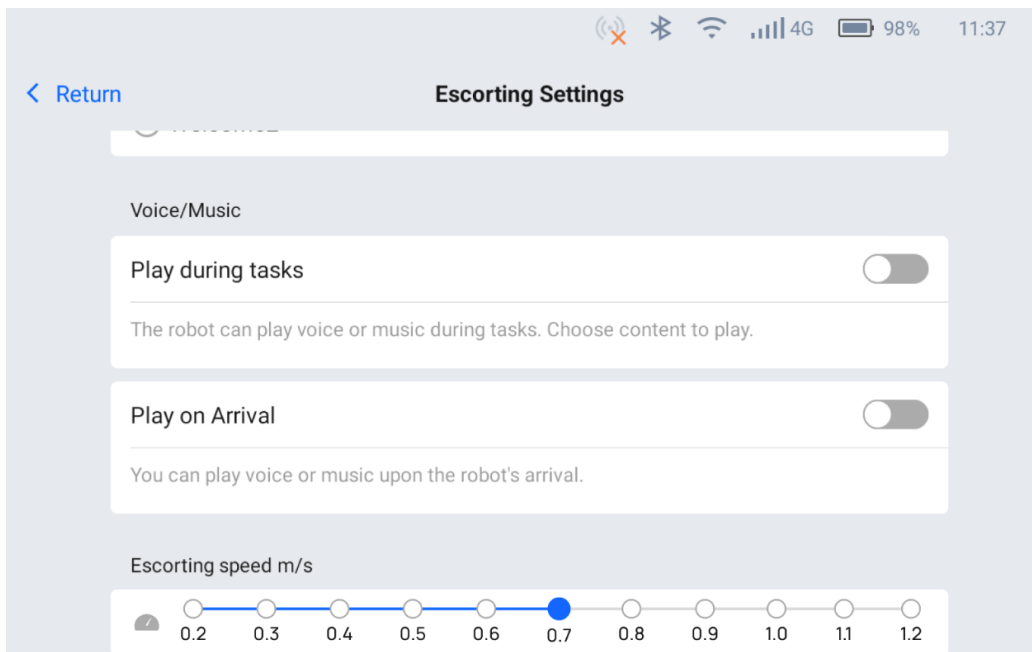
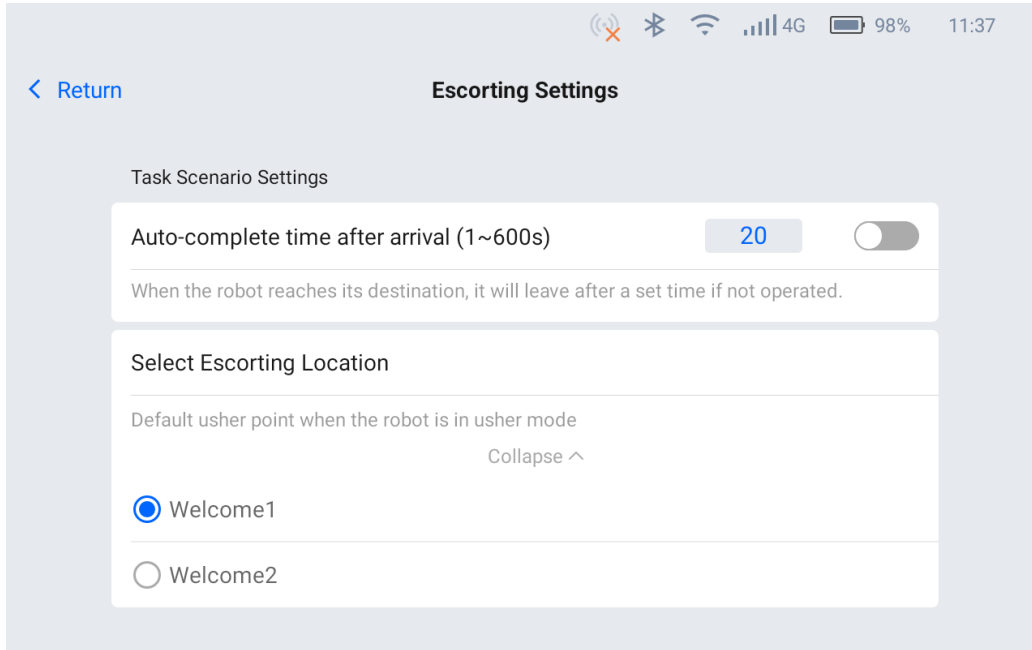
The robot will then guide the guests to the target table number.



The shortcut key instructions for the guide mode interface are as follows.

Button	Explanation
Go to guide location	Click on the button to go directly to the door greeting point.
Customer Solicitation	<ul style="list-style-type: none"> <li>Click on the button to enter the door greeting interface, where you can interact with the robot.</li> <li>Touch the robot's head or ears, and the robot will display cute expressions and provide voice feedback.</li> </ul>
	Set up the voice guidance for the arrival at the reception area, as well as the music played during the reception process. Please refer to the table below for detailed instructions.

The guide setting interface is as shown in the following image, with detailed explanations provided in the table below.



Guide Setting	Explanation
Auto-complete time after arrival	After the robot reaches the destination, if there is no operation on the robot, it will leave after the set time and proceed to the next task.
Select guide Location	The robot will return to the designated location after completing the assigned task.
Voice/Music	<ul style="list-style-type: none"> <li>Play during tasks</li> </ul> If enabled, selected voice/music will be played during the guiding process. If there is no music, you can scan the code on

Guide Setting	Explanation
	the "Settings > Music" interface to import music. <ul style="list-style-type: none"> <li>• Play on Arrival</li> </ul> If enabled, selected voice/music will be played upon arrival at the destination during the guiding process. If there is no music, you can scan the code on the "Settings > Music " interface to import music.
Guide Speed	Set the running speed of the robot in guide mode, supporting speed settings from 0.2 to 1.2 m/s, with a default speed of 0.7 m/s.

Step 2: After reaching the target table number, click on the "Complete" or lightning button. The robot will return to the door greeting point.

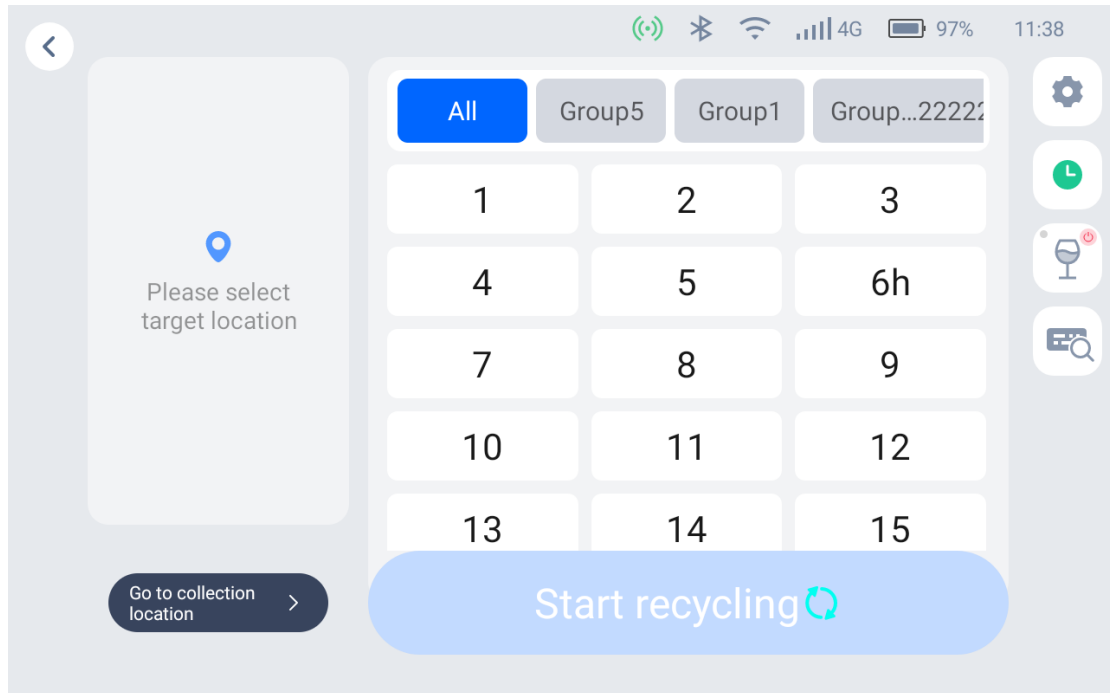
If the "Auto complete time after arrival" is reached at the target point and the "Complete" button is not clicked, the robot will automatically complete the task and return to the door greeting point.

If it is necessary to cancel the task or return to the door greeting point during the guiding process, you can click on the robot's screen or the lightning button on its head to pause and proceed. If there is no action within 10 seconds, the robot will continue to operate.

### 3.2.5 Recycle Mode

The recycle mode is used for recycling tasks, such as trays and parts. The robot can transport the recycled items from the designated location to the dishwashing area or recycling point.

Step 1: On the robot's homepage, select "Recycle" to enter the main interface of the recycling mode.

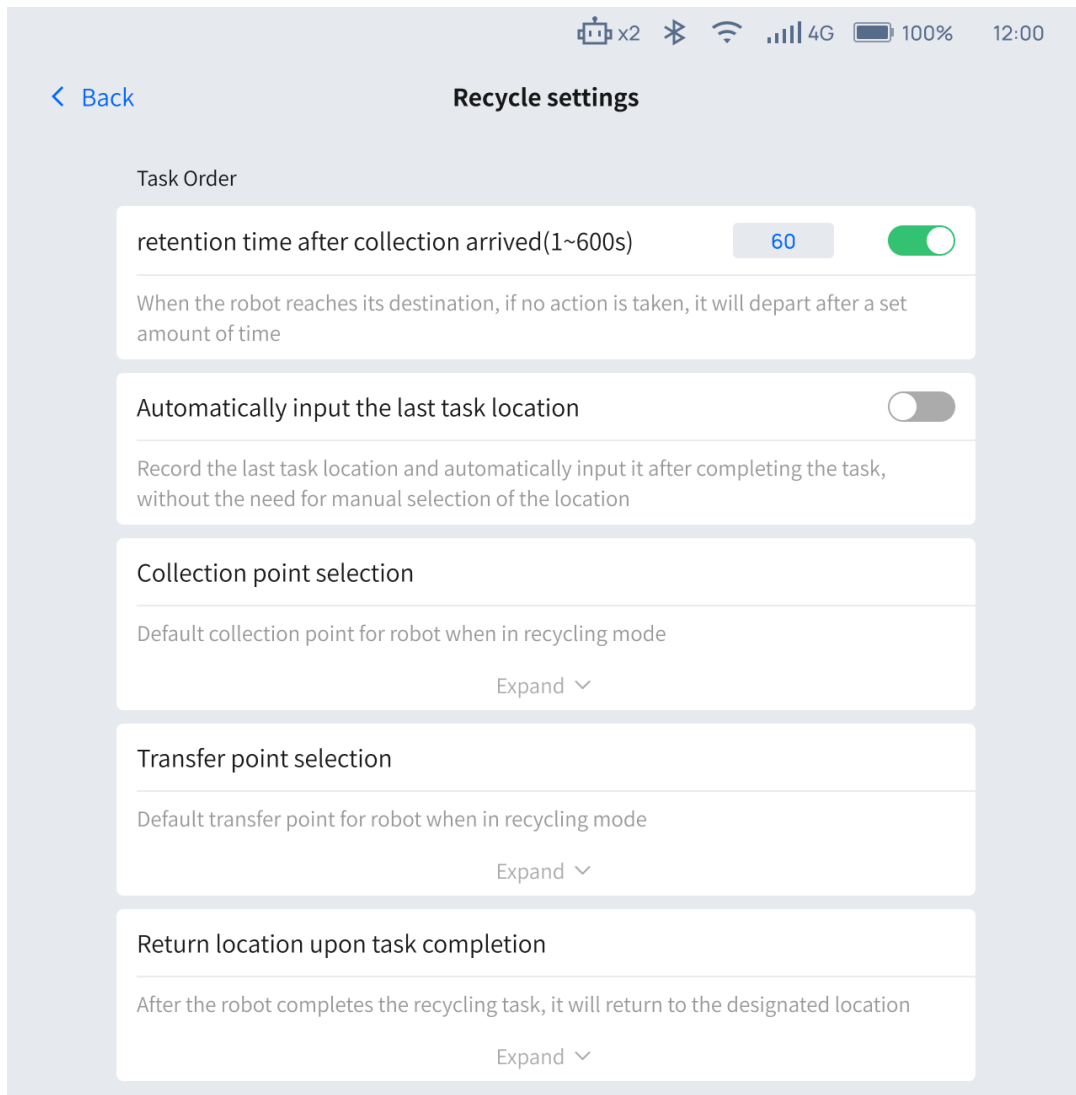


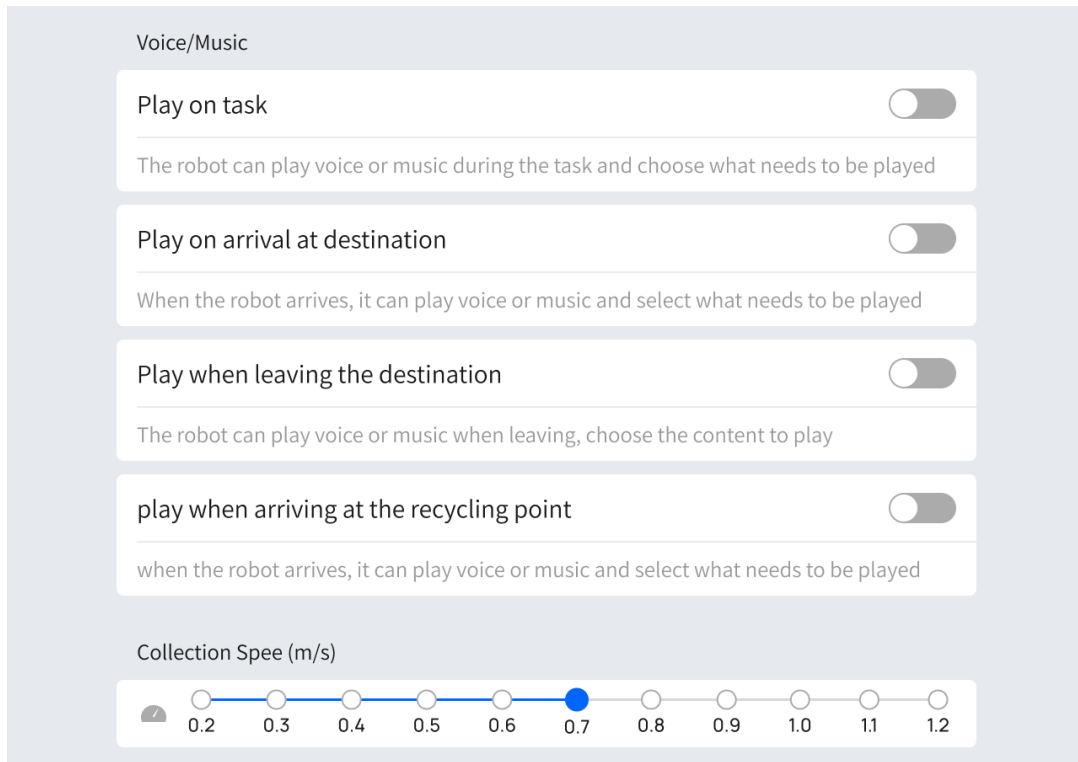
The shortcut key instructions for the recycle mode interface are as follows.

Button	Description
	Set up voice/music, speed, etc. For detailed instructions, please refer to the table below.
	View the previous task.
	<p>Set the Smooth Mode.</p> <p>Smooth Mode has three states:</p> <ul style="list-style-type: none"> <li>  : Not enabled. Click this icon to enable Smooth Mode, which is only valid for a single delivery and will be turned off by default after the task is completed; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates a single delivery. Click this icon to disable Smooth Mode; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates long-term validity. Click this icon to disable Smooth Mode.                 </li> </ul> <p>After enabling the Smooth Mode, the robot will recycle items at a speed of 0.5 m/s.</p>



Explanation of the shortcut keys on the recycle mode interface is as follows.



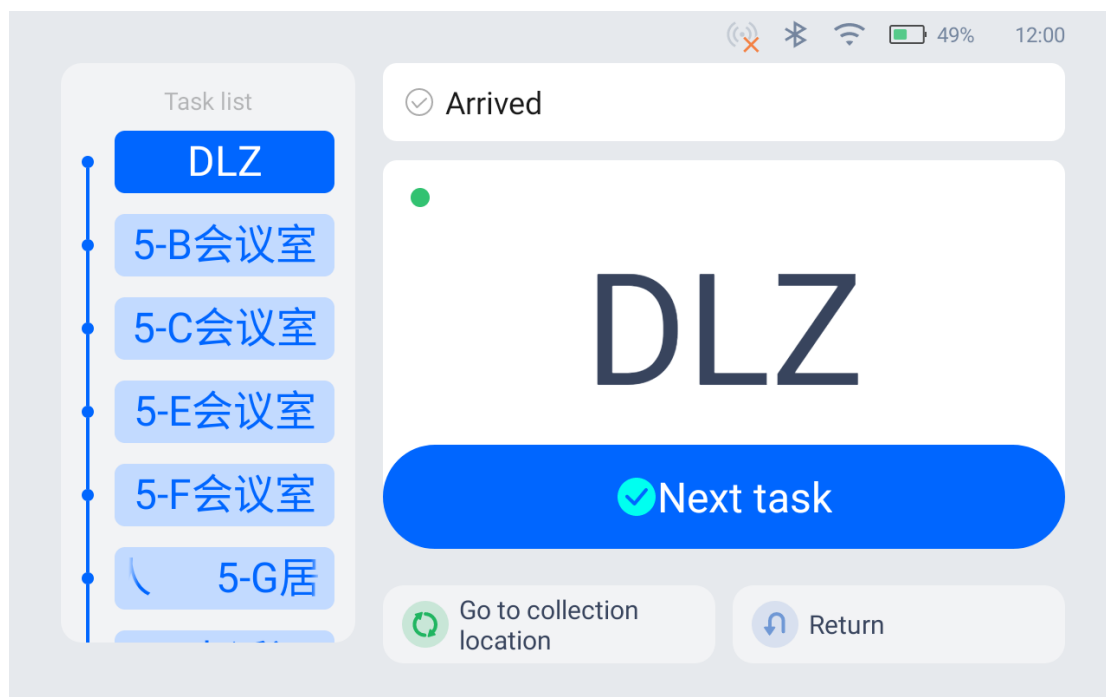


Recycle Setting	Description
Retention time after collection arrived (1-600s)	After the robot reaches its destination, if there is no interaction with the robot, it will leave after a set period of time and proceed to the next task.
Automatically input the last task location	If enabled, the last task location will be recorded. After completing the task, it will be automatically entered without the need for manual selection.
Collection point selection	The default recycling point for the robot when using the recycling mode.
Transfer point selection	The default transfer point for the robot when using the recycling mode.
Return location upon task completion	After completing the recycle task, the robot will return to the designated location.
Voice/Music	<ul style="list-style-type: none"> <li>• Play on task If enabled, the selected voice/music will play during the recycling process. If there is no music, you can scan and import music in the "Settings &gt; Music " interface.</li> <li>• Play on arrival at destination If enabled, the selected voice/music will play after the machine arrives at the destination. If there is no music, you can scan and import music in the "Settings &gt; Music " interface.</li> </ul>

Recycle Setting	Description
	<ul style="list-style-type: none"> <li>● Play when leaving the destination If enabled, the selected voice/music will play after the machine leaves the destination. If there is no music, you can scan and import music in the "Settings &gt; Music" interface.</li> <li>● Play when arriving at recycling point If enabled, the selected voice/music will play after the machine arrives at the recycling point. If there is no music, you can scan and import music in the "Settings &gt; Music" interface.</li> </ul>
Recycle Speed	Set the robot's running speed in recycle mode, supporting speed settings from 0.2 to 1.2m/s, with a default speed of 0.7m/s.

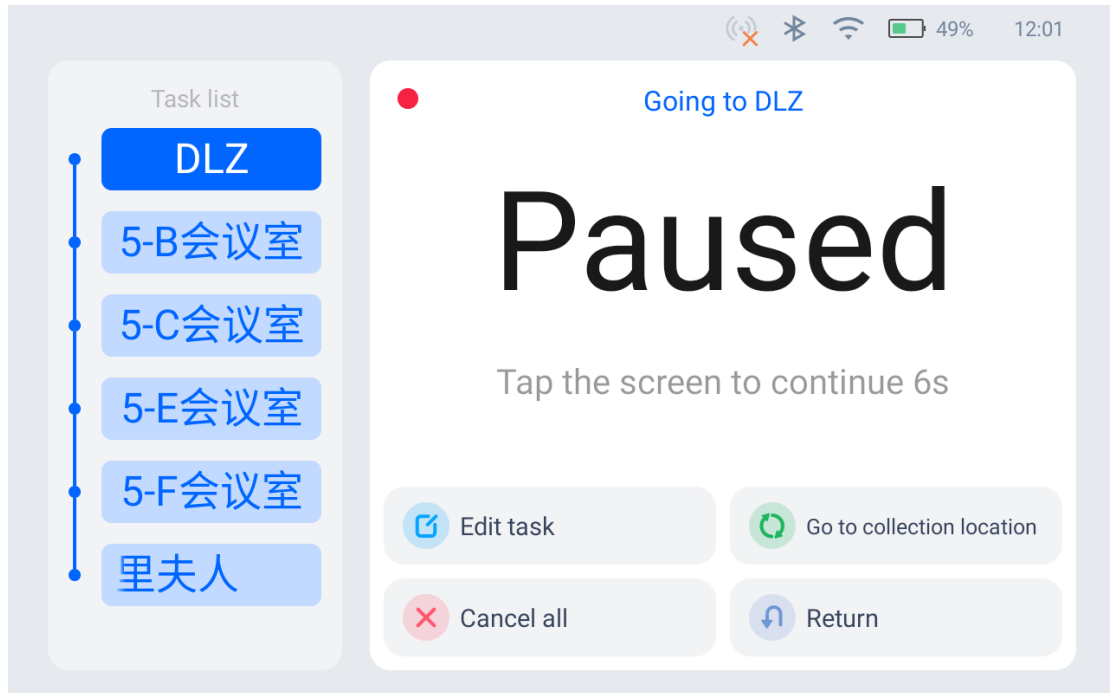
Step 2: On the right side, select the target point where the items to be recycled are located. After selecting, click "Start", and the robot will proceed to the destination one by one.

Step 3: Upon reaching the destination, the operator can start placing the items to be recycled on the robot. After placing the items, click "Next Task", and the robot will move towards the next destination.



Note: If there are no transfer points set on the map, the "Go to Transfer Point" button in the recycling mode will automatically be replaced with "Return". Clicking on it will make the robot directly return to the docking point. (Same for other pages)

If you need to edit tasks, go to the collection point, cancel all tasks, or return during the recycling process, you can click on the robot's screen to pause it and then proceed with the operation. If there is no operation within the countdown time, the robot will continue running.

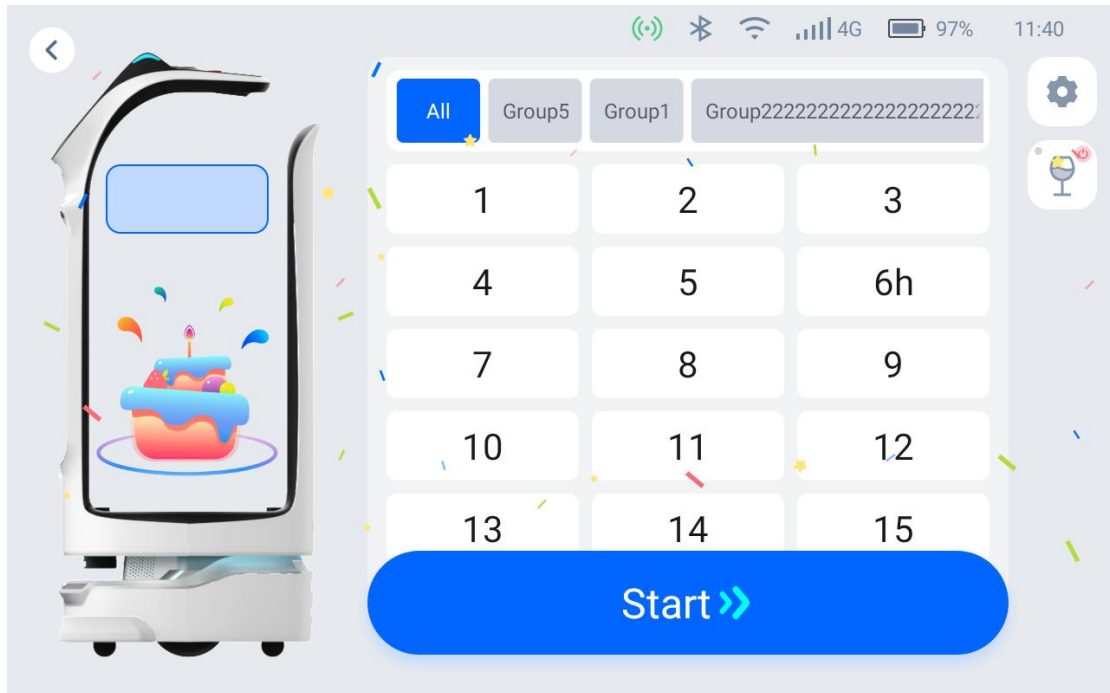


Button	Description
Edit task	Tap to modify the destination.
Go to collection location	The robot can directly go to the collection point.
Cancel all	Tap to cancel all recycling tasks and stay in place.
Return	Tap to return to the docking location.

### 3.2.6 Birthday Mode

The birthday mode is mainly used for delivering gifts and playing birthday songs during birthday celebrations.

Step 1: Select "Birthday" on the homepage to enter the main page of the birthday mode.



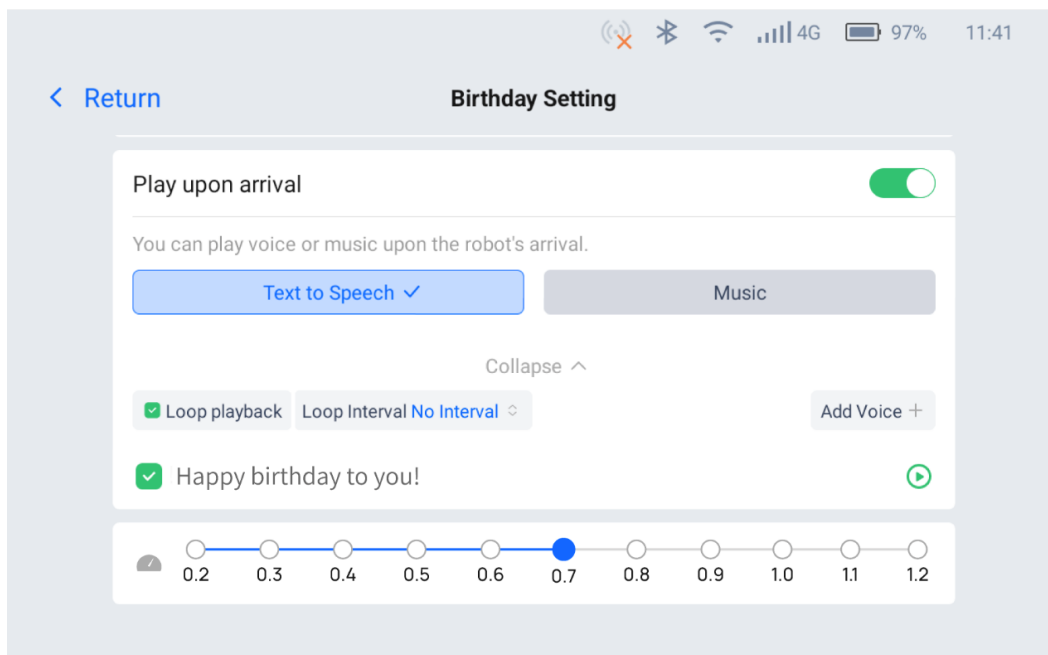
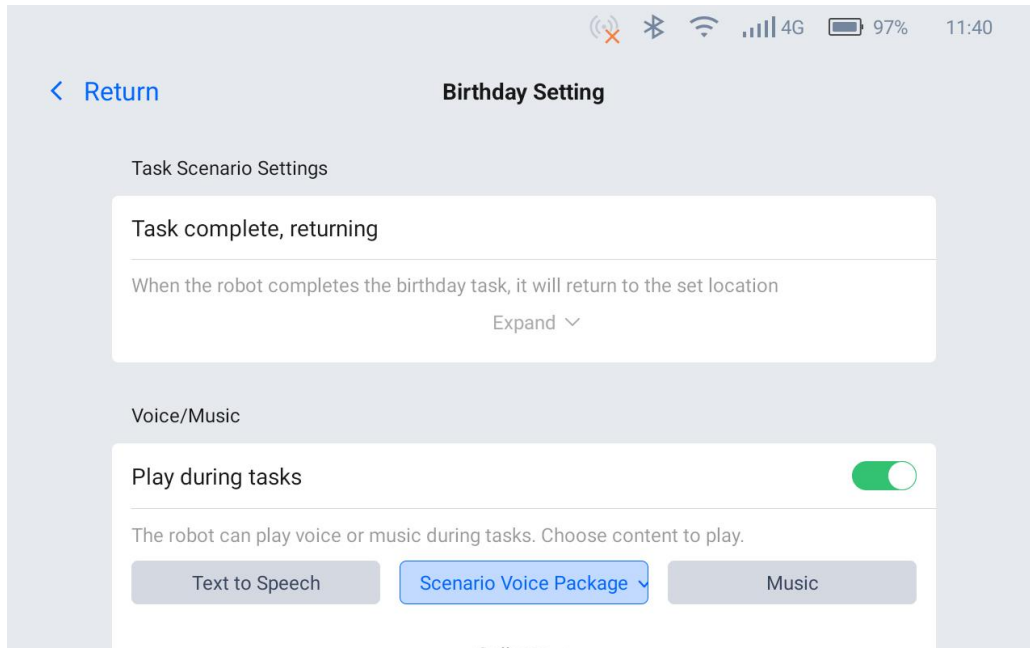
Explanation of the shortcut keys on the birthday mode interface is as follows.

Button	Description
	Set up voice/music, speed, etc. For detailed instructions, please refer to the table below.
	<p>Set the Smooth Mode.</p> <p>Smooth Mode has three states:</p> <ul style="list-style-type: none"> <li>  : Not enabled. Click this icon to enable Smooth Mode, which is only valid for a single delivery and will be turned off by default after the task is completed; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates a single delivery. Click this icon to disable Smooth Mode; long-press this icon for 1 second to enable Smooth Mode for a longer period.                 </li> <li>  : Indicates long-term validity. Click this icon to disable Smooth Mode.                 </li> </ul> <p>After enabling the Smooth Mode, the robot will delivery items at a speed of 0.5 m/s.</p>

Note

Only one table number can be selected in the birthday mode.

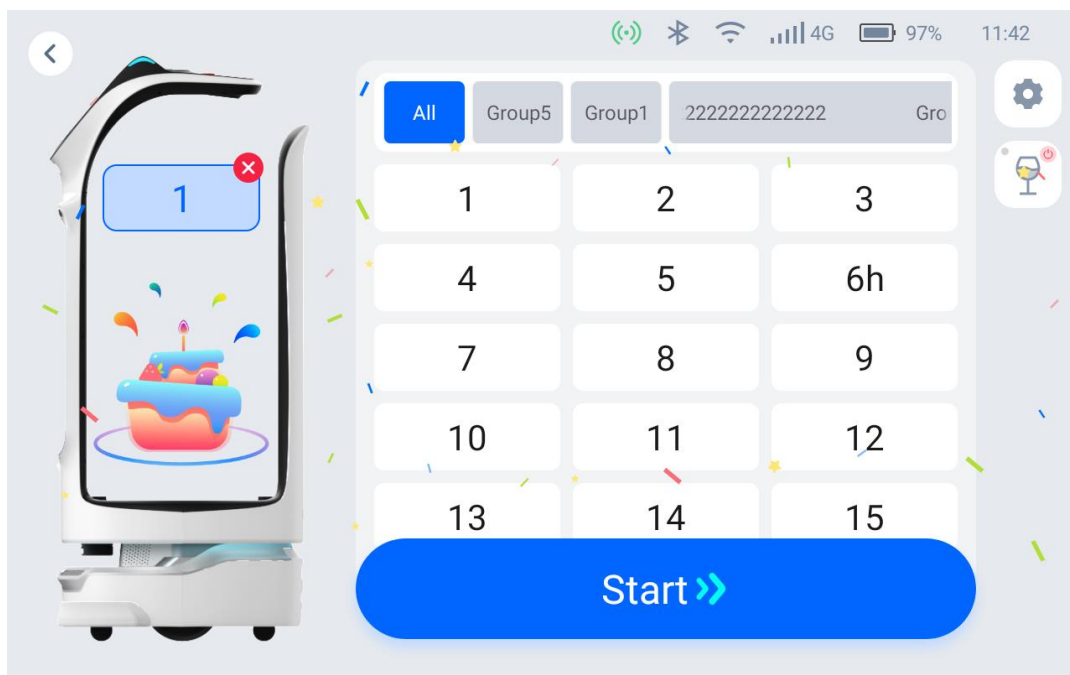
The birthday settings interface is shown in the image below, with detailed explanations provided in the table below.



Birthday Settings	Description
Delivery Complete, Returning	After completing the birthday delivery task, the robot will return to the designated location.
Voice/Music	<ul style="list-style-type: none"> <li>Play during tasks</li> </ul> <p>If enabled, during the delivery process, the selected voice/music will be played. If there is no music, you can scan a QR code in the "Settings &gt; Music" interface to import music.</p>

Birthday Settings	Description
	<ul style="list-style-type: none"> <li>Play upon arrival</li> </ul> If enabled, the selected voice/music will be played upon the robot's arrival for delivery. If there is no music, you can scan a QR code in the "Settings > Music" interface to import music.
Delivery Speed	Set the robot's running speed in birthday mode, supporting speed settings from 0.2 to 1.2m/s, with a default speed of 0.7m/s.

Step 2: In the birthday mode, click on the table number button on the right to select the target table number. Once clicked, the selected table number will be displayed on the robot's tray.



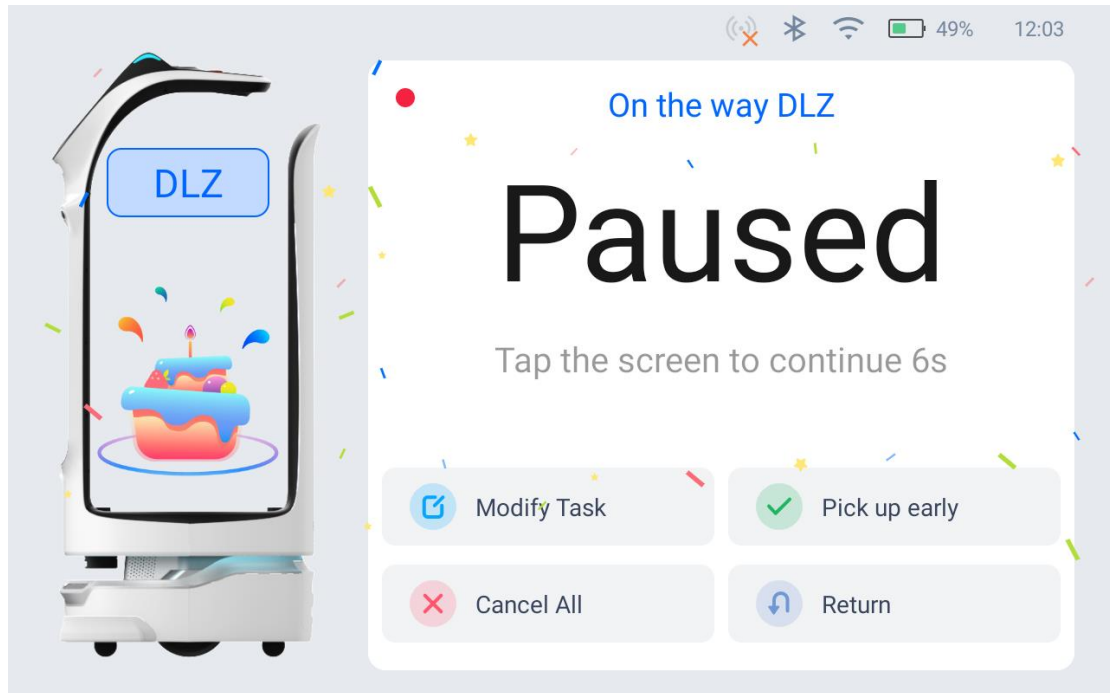
#### Note

Only one table number can be selected in the birthday mode.

Step 3: Click on "Start" and the robot will follow the established trajectory to reach the destination, playing relevant voice and music in the birthday mode.

Step 4: After completing the task, click on "Finish" and the robot will return to the docking point.

If any editing of tasks, early completion, cancellation of all tasks, or return is needed during the birthday gift delivery process, click on the robot screen to pause the robot for further actions. If there is no action within 10 seconds, the robot will continue running.



Button	Description
Modity task	Tap to modify the destination.
Pick up early	Tap to Pick up early 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.

### 3.3 Settings

At the bottom right of the robot's homepage, there is a "Settings" entry. Clicking on it will take you to the general settings interface of the robot, where you can configure the operation settings for the machine.

Settings	Description
General	Set the machine language, time zone, Wi-Fi, 4G network, Bluetooth, theme, screen brightness, music volume, voice volume, button volume, and advertising screen volume.
Robot Functionsz	Perform robot module settings, function settings, interaction settings, etc.
Map Settings	The robot's map management module allows for switching and editing the robot's operational map. (Entering map editing requires a password, please contact a technical support engineer if needed.)



Settings	Description
Music	Import music and manage the music stored on the robot. Up to 20 songs can be imported.
Password and Security	Set password management and motor lock. Control robot access to the interface through passwords.  Adjust robot business permissions, supporting custom password modifications. (Contact a technical support engineer for the administrator password.)
System Update	View the current version and check if it is the latest version.  If not the latest version, download the latest version for an upgrade.  Ensure the robot's battery is above 20% before upgrading to avoid upgrade failure.
About this device	Display manufacturer service information, such as official website information, robot operation guide, as well as robot SN, Mac, and other related information.
Debug	Adjust robot parameters, for use by technical support engineers only.  If accidents occur due to unauthorized operations, the company does not take any responsibility.

### 3.3.1 General

- (1) Select machine language and time zone.
- (2) Set up Wi-Fi and Bluetooth for the machine.
- (3) Activate the SIM card and configure mobile network for the machine.

Machines without network connection cannot perform version updates. If both mobile network and Wi-Fi are enabled, Wi-Fi will be prioritized. If the robot detects a weak Wi-Fi signal, it will automatically switch to the mobile network.

- (4) Switch machine themes, supporting light and dark modes.
- (5) Set the machine sleep time.
- (6) Adjust the brightness of the operation screen and advertising screen. Adjust the music volume, voice volume, button volume, and advertising screen volume. Brightness and volume can be adjusted from 0-100%.

× Settings

General

Robot Functions

Map Settings

Music

Password and Security

System Update

About this device

Debug

Language English >

Time Zone Hong Kong Standard Time >

WLAN pd-iot >

Bluetooth Open >

Cellular Network

Activate SIM card [Activate](#)

Theme

× Settings

General

Robot Functions

Map Settings

Music

Password and Security

System Update

About this device

Debug

Light Mode  Dark Mode

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

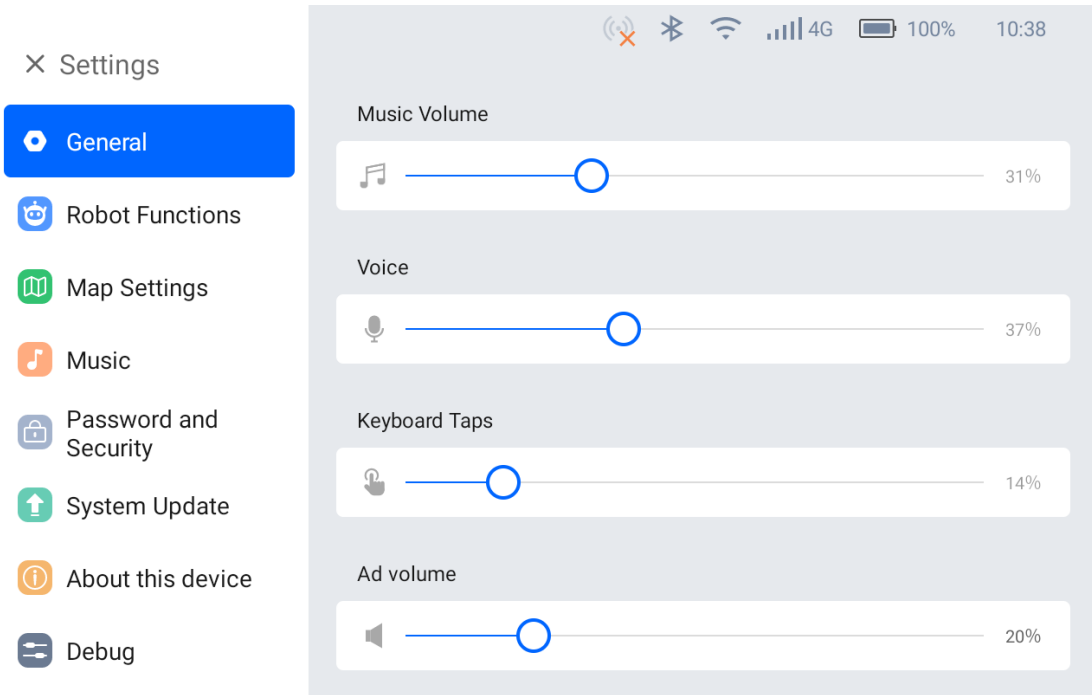
Standby/hibernation settings

standby 10min

After a period of inactivity, the robot enters standby mode.

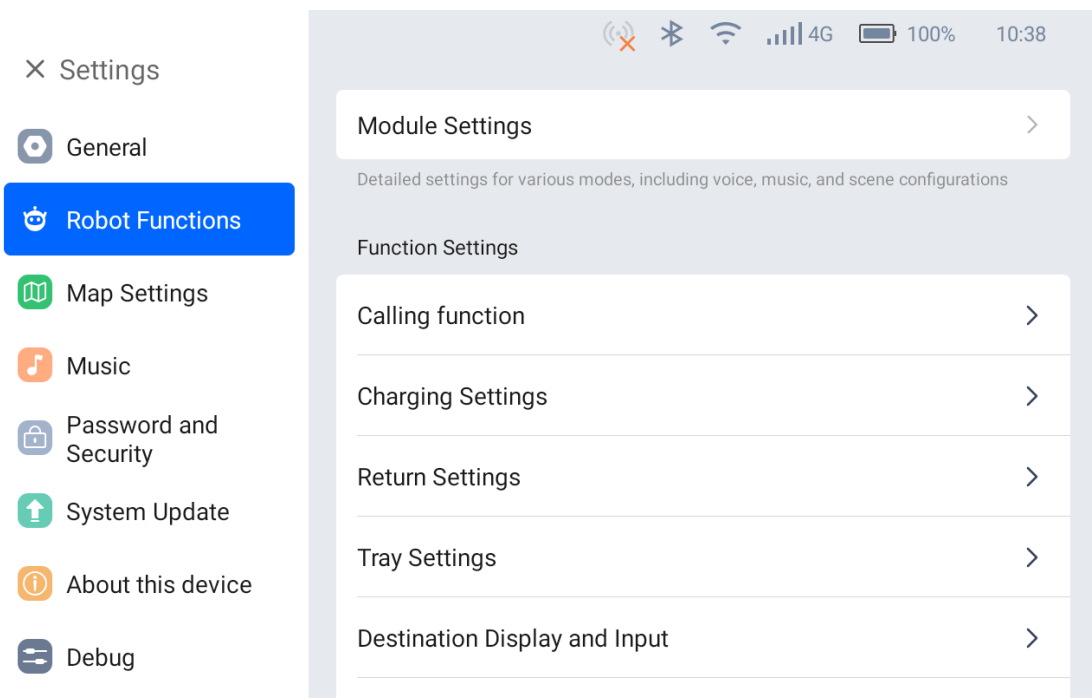
hibernate 60min

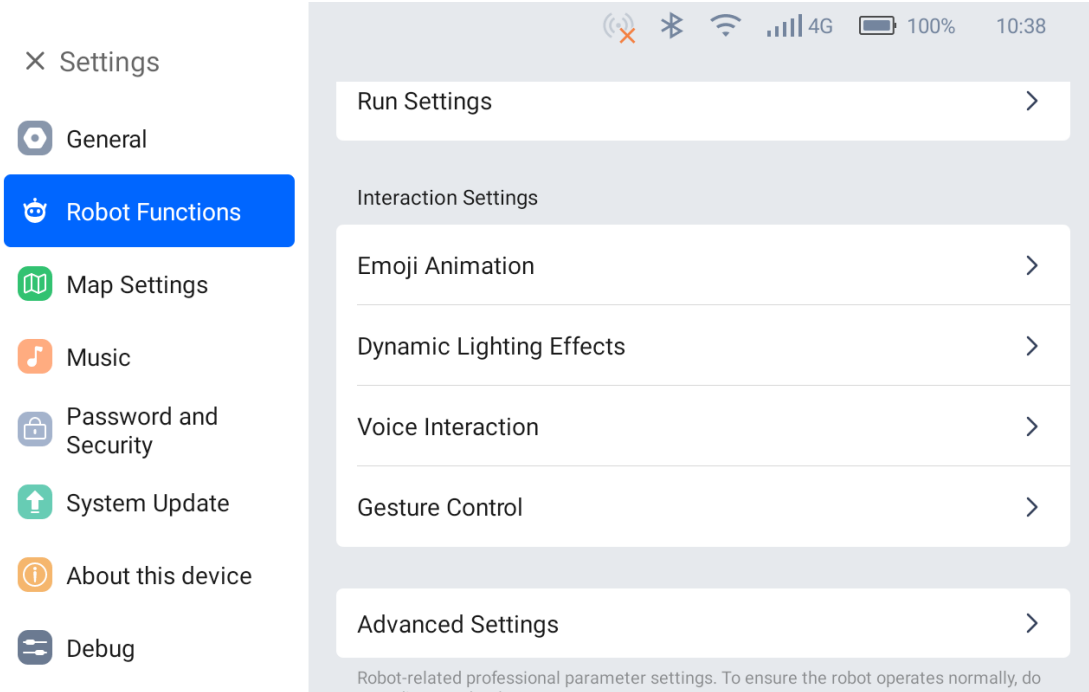
It can improve the battery life. After entering the sleep state, you need to wait for a while to wake up the robot again.



### 3.3.2 Robot Functions

Performing robot module settings, function settings, interaction settings, and advanced settings.

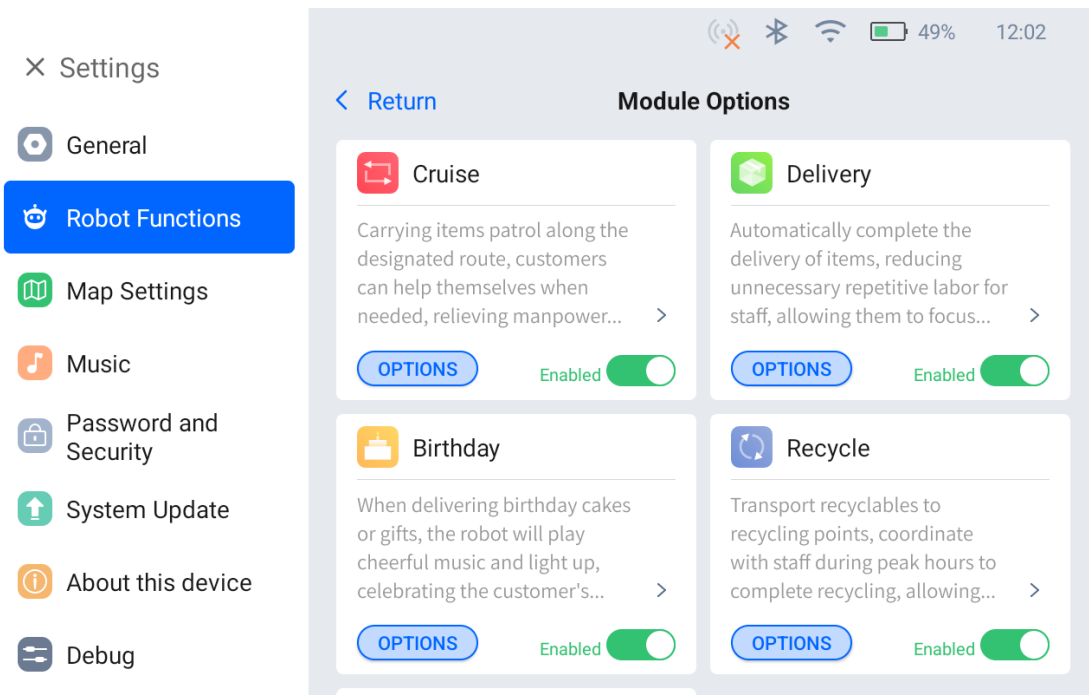


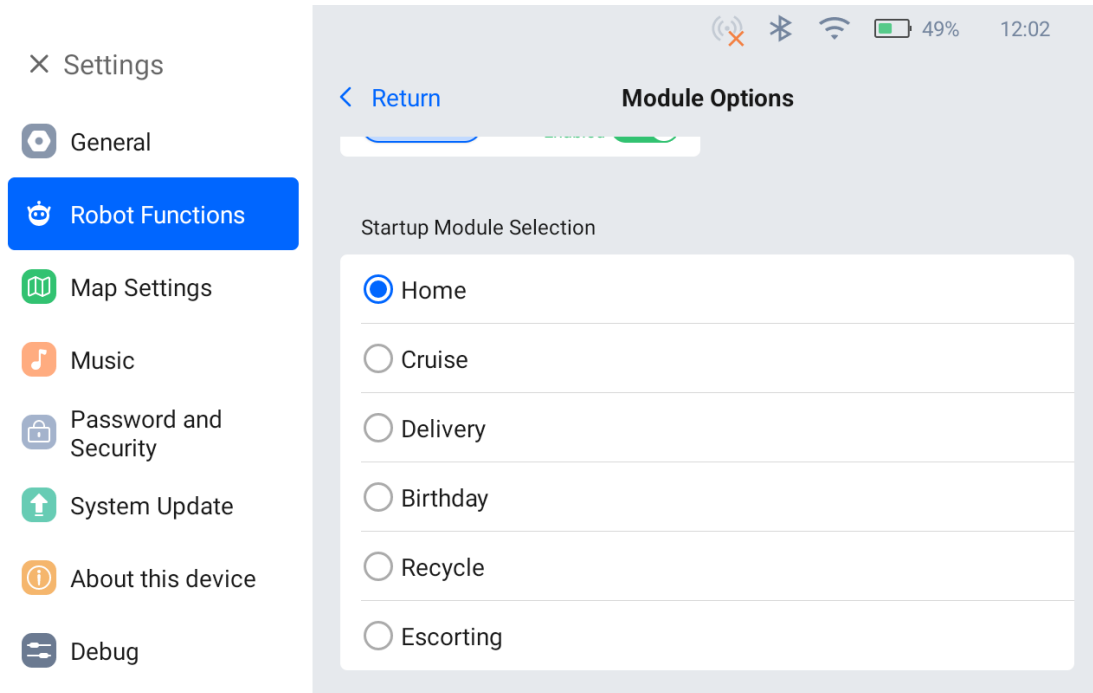


### 3.3.2.1 Module Settings

Detailed settings for each mode, including voice, music, scene configuration, etc. Upon entering, there are detailed descriptions of each mode and their enablement status. (Modes that are not enabled will not be displayed on the main page).

Additionally, it supports selecting the module for auto-start at boot, with the default being the homepage. Other enabled modules can be set as the auto-start module.





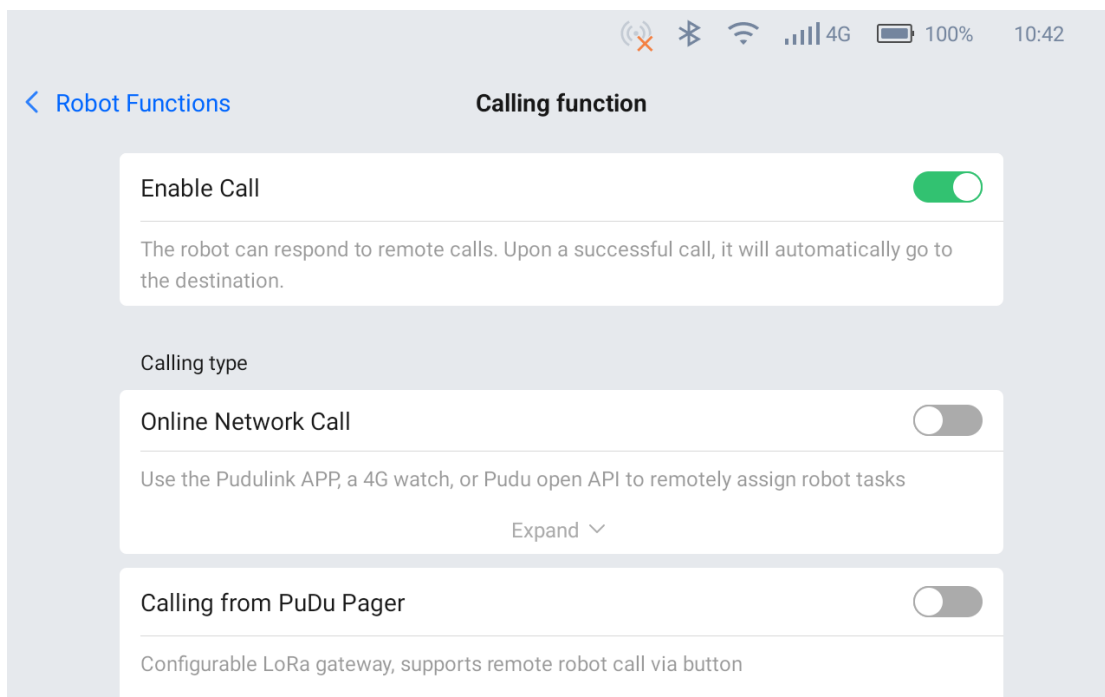
### 3.3.2.2 Function Settings

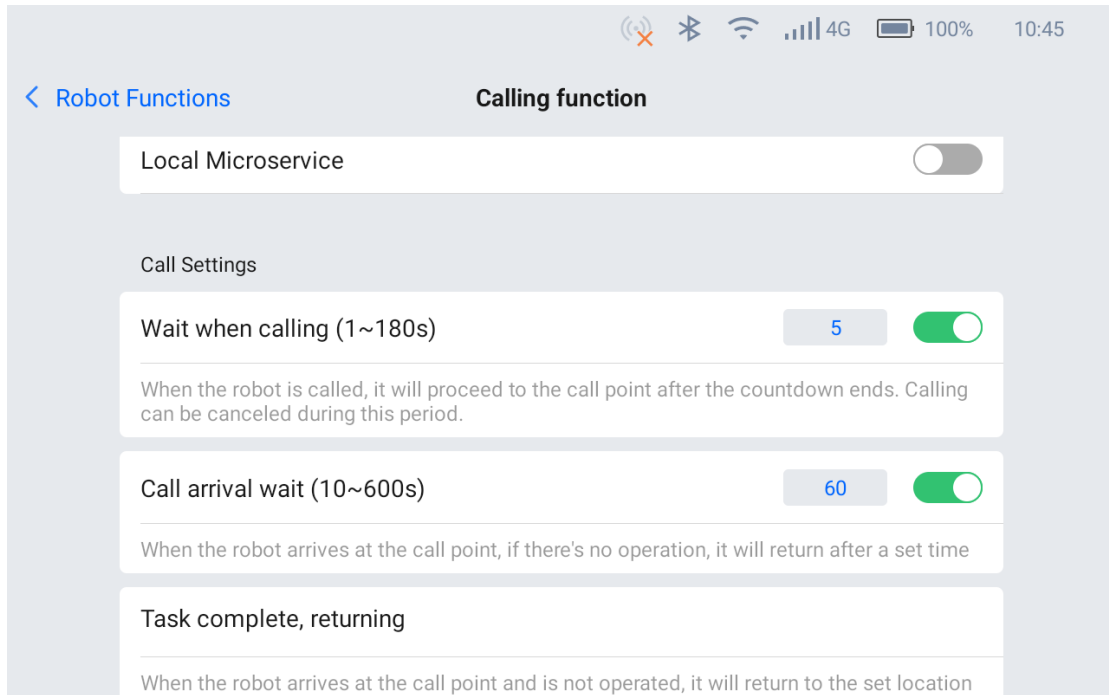
#### 3.3.2.2.1 Call Function

Enabling the call function allows the robot to respond to calls from remote devices. Upon successful call, the robot will automatically go to the destination.

##### (1) Call Types

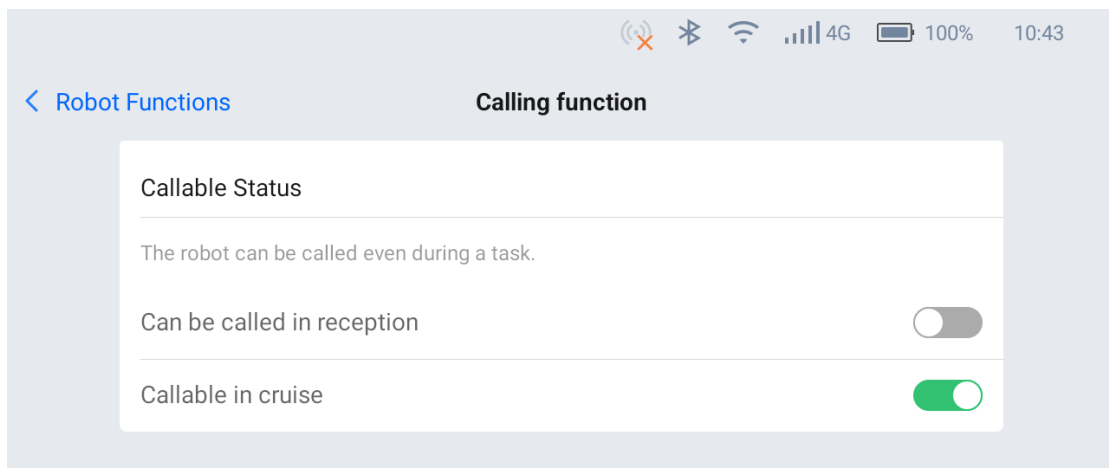
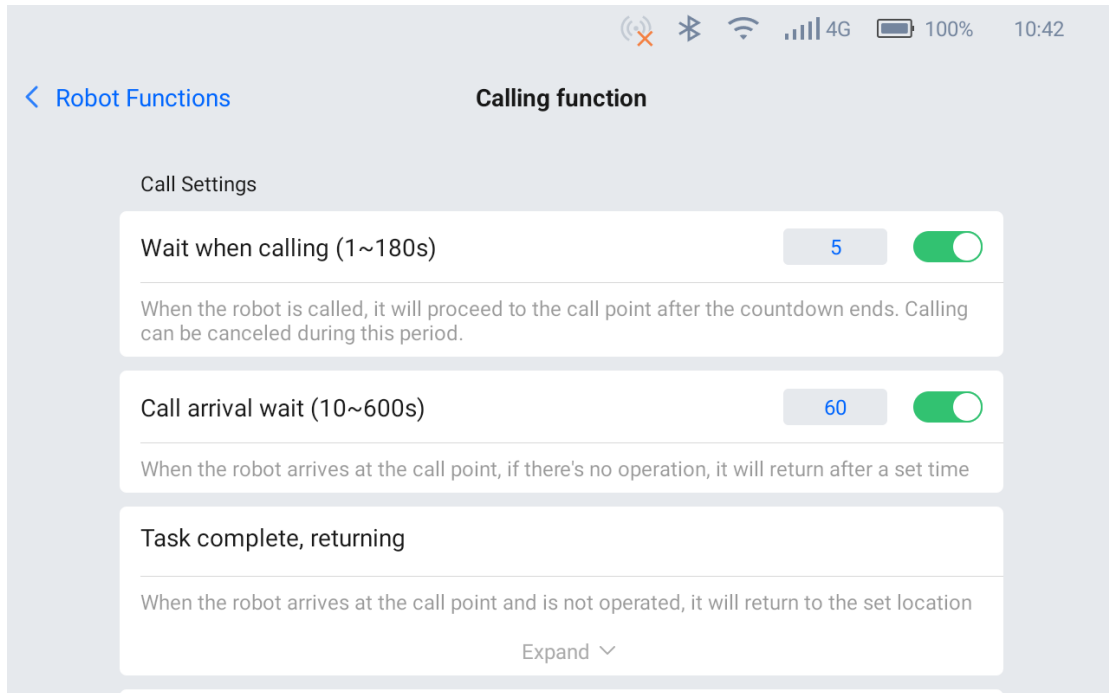
Supports Pudulink call, 4G watch call, button call, local microservice, and various call methods from open platforms. For specific deployment methods, please contact a technical support engineer.





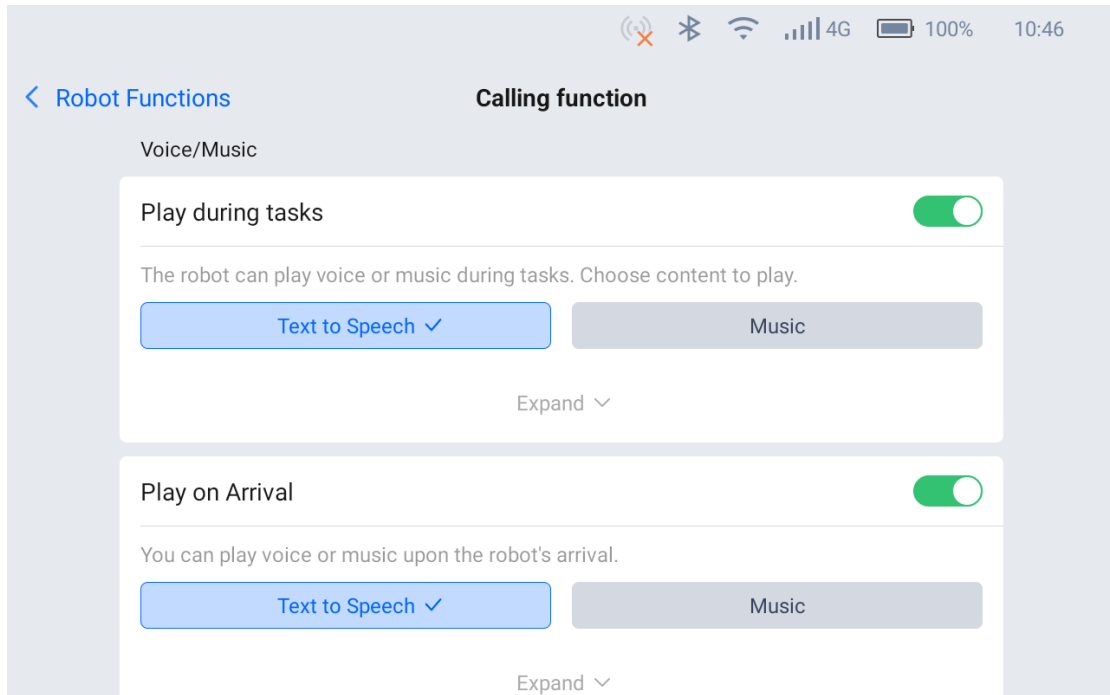
## (2) Call Settings

Setting Content	Explanation
Wait when calling (1~180s)	When the robot is called, it will go to the call point after the countdown ends. During this period, the call can be cancelled. The default wait time is 10 seconds, with support for setting between 1-180 seconds.
Call arrival wait (10-600s)	After the robot arrives at the call point, if there is no interaction with the robot, it will return after the set time. The default wait time is 10 seconds, with support for setting between 10-600 seconds.
Task complete, returning	When the robot arrives at the call point and there is no interaction, the robot will return to the set location. The default is to stop in place, but manual selection is supported for returning to the meal pick-up point, guiding point, or recycling point.
Callable status	Supports call at the guiding point and call during cruising. The robot can be called even during the aforementioned tasks.



### (3) Voice/Music

- ① **Play During Task:** If enabled, selected voice/music will be played during the call process. If there is no music, you can import music by scanning the code on the "Settings > Music" interface.
- ② **Play Upon Arrival:** If enabled, selected voice/music will be played after the call arrives. If there is no music, you can import music by scanning the code on the "Settings > Music" interface.



### 3.3.2.2.2 Charging Settings

#### (1) Low Battery Auto Return (5%~50%)

When the robot's battery level falls below the set percentage, it will automatically return to the charging point. The default setting is 5%, and it supports settings between 5% to 50%.

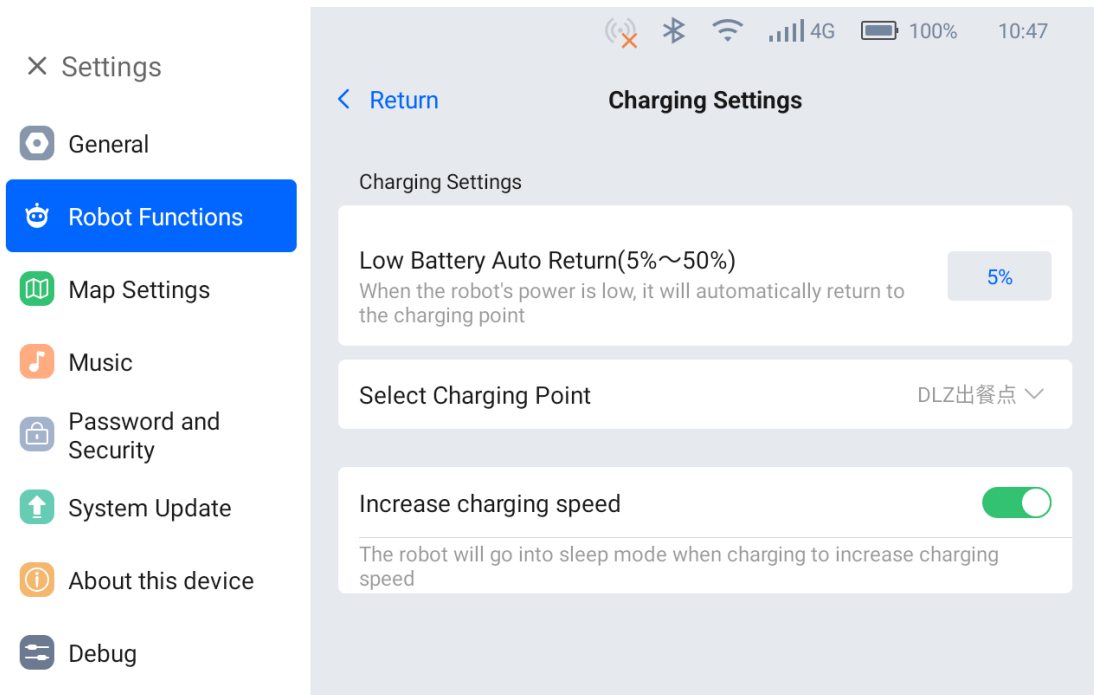
#### (2) Select Charging Point

Supports selecting the charging point, which serves as the docking point for the robot during the automatic return due to low battery.

#### (3) Increase Charging Speed

When enabled, the robot will enter sleep mode during charging to increase the charging speed.





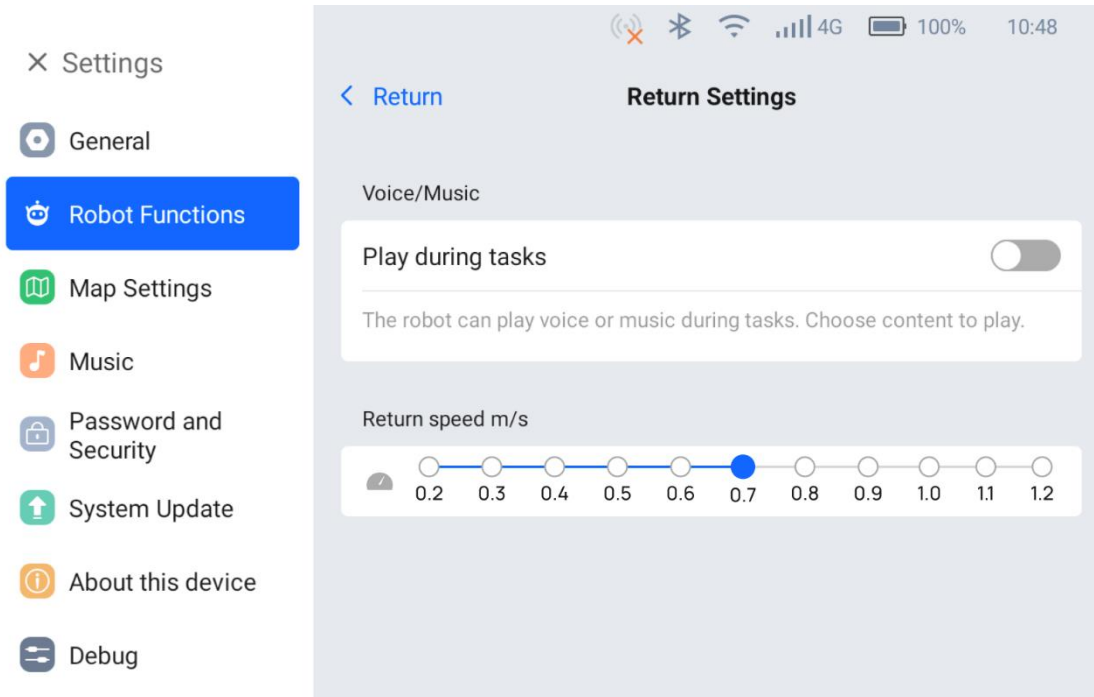
### 3.3.2.2.3 Return Settings

#### (1) Play Voice/Music During Tasks

If enabled, selected voice/music will be played during the return journey. If there is no music, you can import music by scanning the code on the "Settings > Music Library" interface.

#### (2) Return Speed m/s

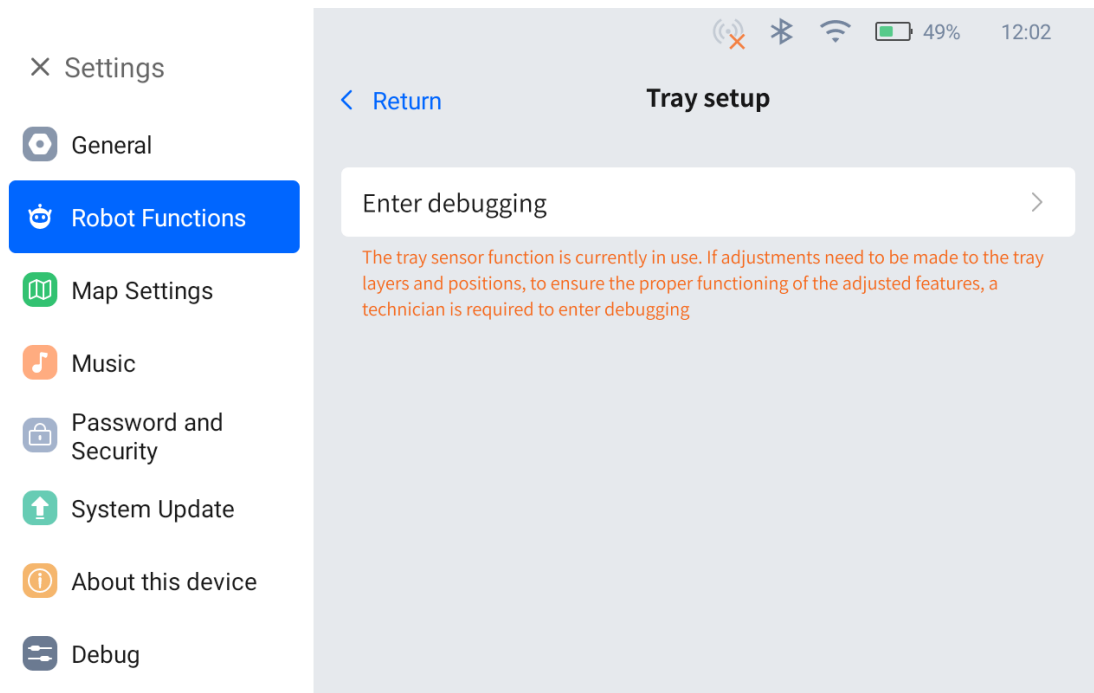
Set the running speed of the robot during the return journey, with speed settings supported between 0.2-1.2m/s. The default speed is set at 0.7m/s.

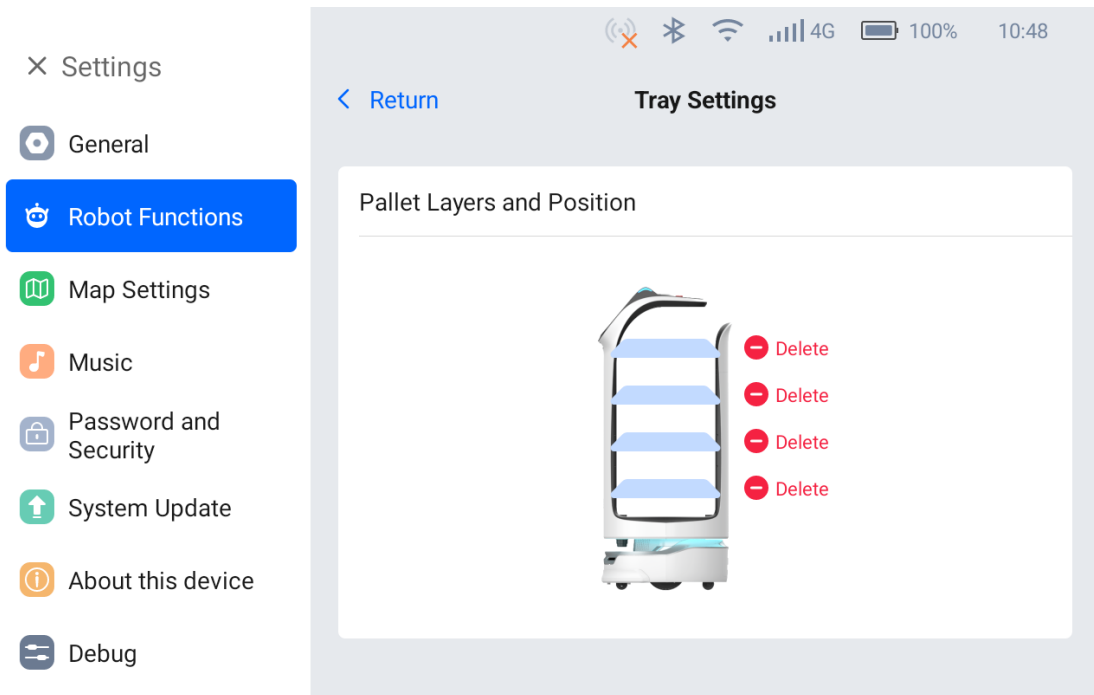


### 3.3.2.2.4 Tray Settings

(1) When the tray sensor function is enabled, the robot function tray settings will display "Enter Debug." If you need to adjust the number of tray layers and positions to ensure normal operation after adjustment, you need to contact a technician to enter debug mode.

(2) When all tray sensor functions are turned off, the robot function tray settings will display the tray layer adjustment function.





### 3.3.2.2.5 Destination Display and Input

#### (1) Destination Columns

The number of destination columns supports selection between 2 columns, 3 columns, 4 columns, and 5 columns, with the default set at 3 columns.

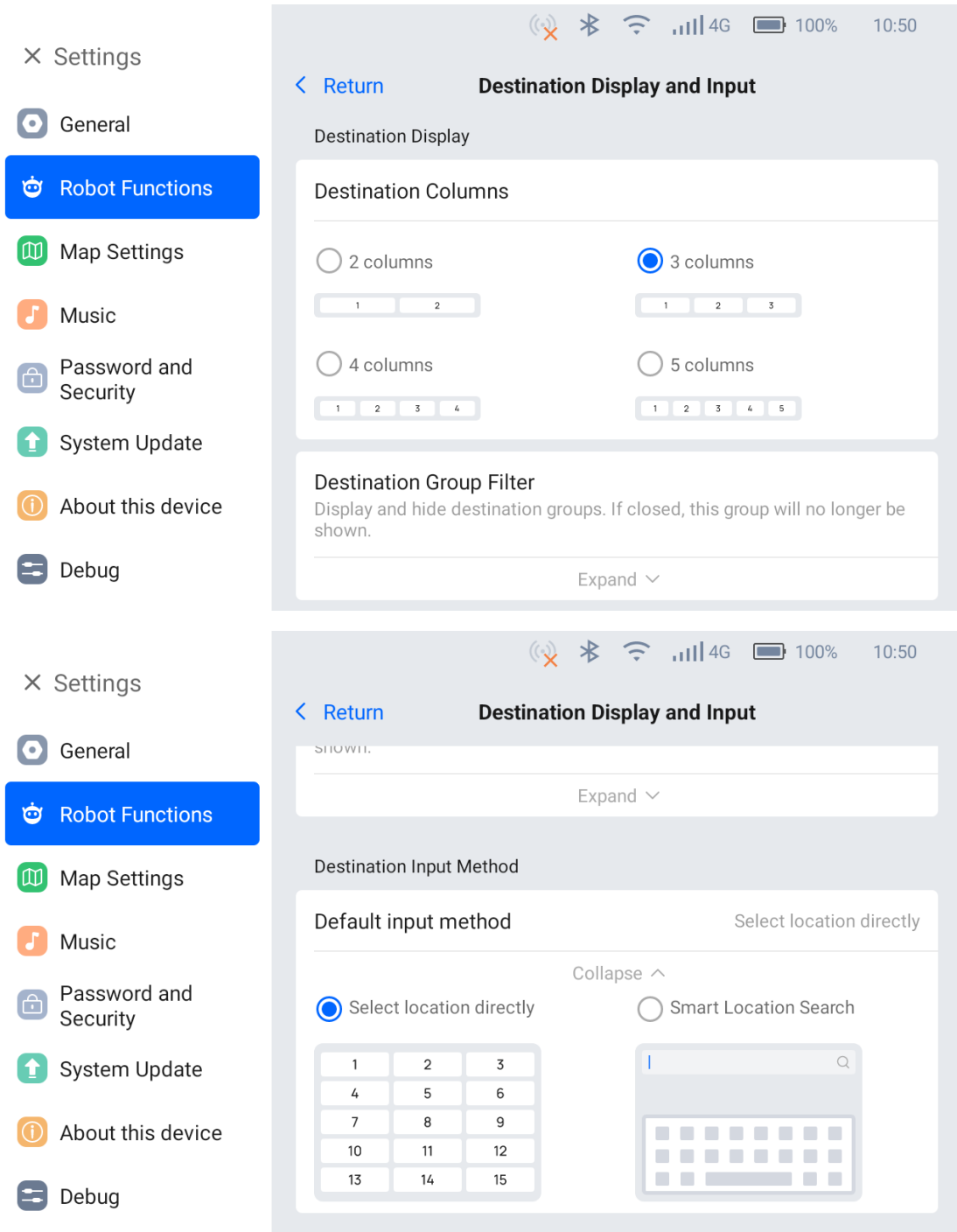
#### (2) Destination Group Filter

Supports displaying and hiding destination groups. When turned off, the corresponding group will no longer be displayed.

#### (3) Destination Input Method

Choose the destination input method, with the default set to table number selection.

When there are many tables, you can switch to intelligent search to quickly search for table numbers, supporting fuzzy keyword search.



### 3.3.2.2.6 Run Settings

#### (1) Run settings

##### ① Pause auto-resume time (5-600s)

After the robot is paused and there is no interaction, it will resume the task after the set time. The time setting can be between 5-600s, with a default of 10s.

##### ② Motion Protection

When enabled, during robot movement, touching the screen will not pause the robot. To pause

the robot, the emergency stop button needs to be pressed.

### ③ Replan path when blocked

Setting Content	Explanation
Replan route time (10-600s)	After the robot encounters an obstacle, it will pause for N seconds before starting to plan a new running path. N can be set between 10-600 seconds, with a default of 30 seconds.
Path block lock time (30-600s)	After the robot encounters an obstacle, it will lock this path for N seconds, meaning that during this period, it will not replan to use this route. N can be set between 30-600 seconds, with a default of 180 seconds.

### (2) Passability Settings

The BellaBot Pro has a passability of 65cm. When placing items that exceed the length of the tray, you can set an appropriate pass distance based on actual usage needs. The passability can be set to 75-85cm to accommodate items wider than the robot's body.

### (3) Braking Level

The braking level is divided into levels 1, 2, and 3. Level 1 is for emergency stop and start mode; level 2 is suitable for light to medium load mode with smooth braking; level 3 is suitable for heavy load mode with smooth braking.

### (4) Dispatch Mode

- ① Waiting Mode: When a robot is near the meal pick-up point, other robots will not move to the pick-up point to replace it. They will wait until the robot leaves the temporary replacement distance before moving to replace it.
- ② Fast Mode: In a multi-robot scenario, robots will autonomously dispatch to the pick-up point for meal delivery.

× Settings

General

**Robot Functions**

Map Settings

Music

Password and Security

System Update

About this device

Debug

**Run Settings**

Run Settings

- Pause auto-resume time (5~600s) 

After the robot pauses, if there is no operation, it will resume the task after the set time
- Replan path when blocked 

If blocked, the robot will automatically re-plan its path
- Replan route time (10~600s)
- Path block lock time (30~600s)

× Settings

General

**Robot Functions**

Map Settings

Music

**Run Settings**

Pass Settings

65cm  75cm 85cm

When using tray barriers, hanging cup holders, etc., set a suitable passing distance based on actual needs

× Settings

General

**Robot Functions**

Map Settings

Music

Password and Security

System Update

About this device

Debug

**Run Settings**

Braking level

1  3

Level 1: Emergency stop and start mode. Level 2: Suitable for light and medium load with smooth braking. Level 3: Suitable for heavy load with smooth braking

Dispatch Mode

- Idle Mode
 

When a robot is near the serving point, other robots will not go there
- Fast Mode
 

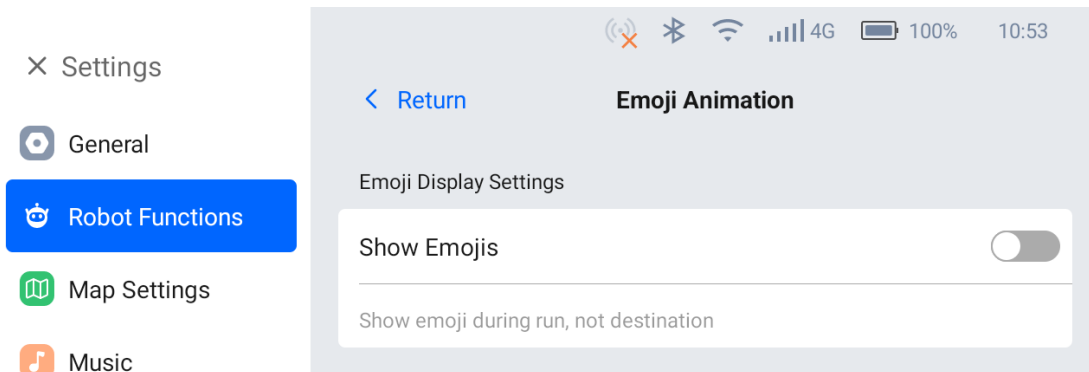
When multiple robots are present, they will autonomously coordinate and move to the delivery point.

### 3.3.2.3 Interaction Settings

#### 3.3.2.3.1 Emoji Animation

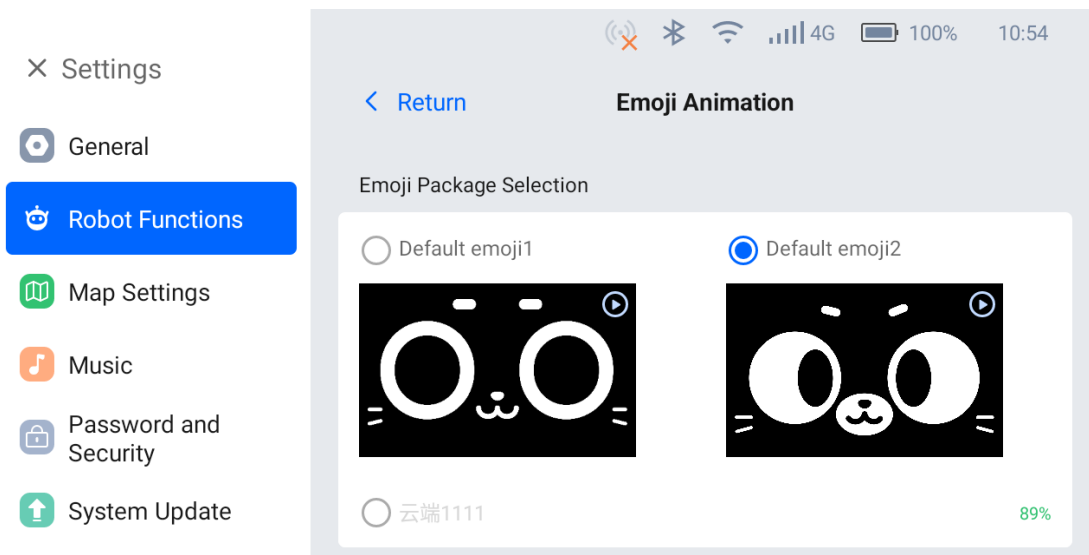
##### (1) Emoji Display Settings

By default, expressions are displayed during operation. When this function is turned off, the destination will be displayed during operation.



##### (2) Emoji Package Selection

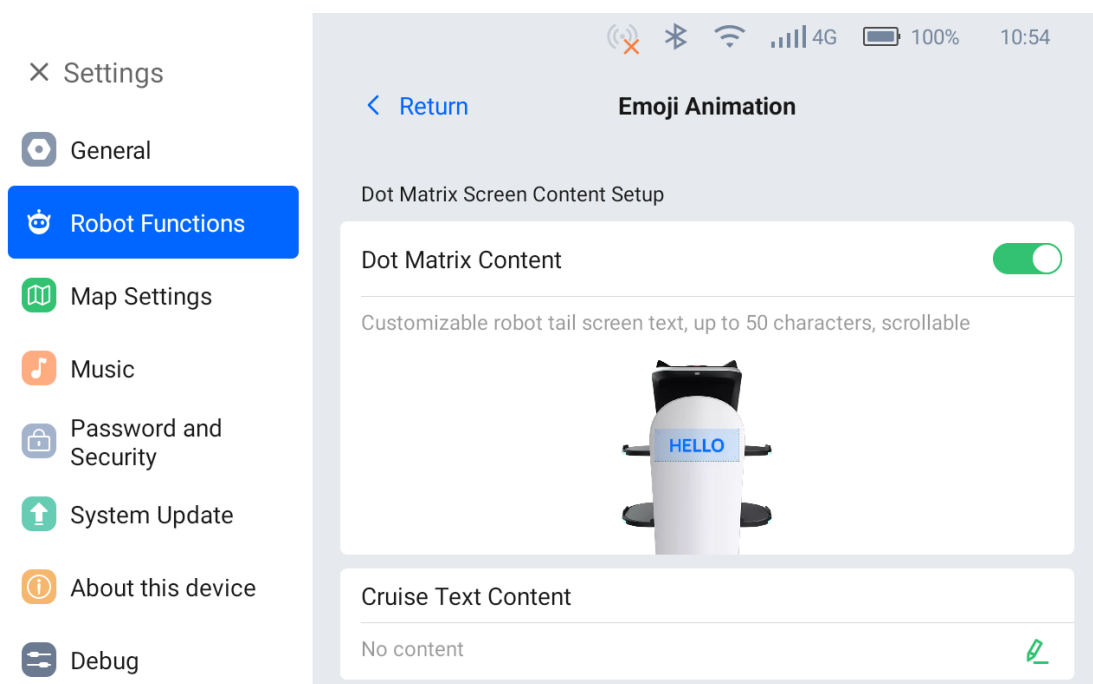
The BellaBot Pro defaults to supporting two sets of selectable expression packs. It also supports customizing expression packs on the cloud platform. For specific operations, please contact a technical support engineer. After configuring a new expression pack on the cloud, the robot will display the download option. Once downloaded successfully, it can be used. If there are updates to the corresponding expression pack on the cloud, the robot will also display an update button accordingly.



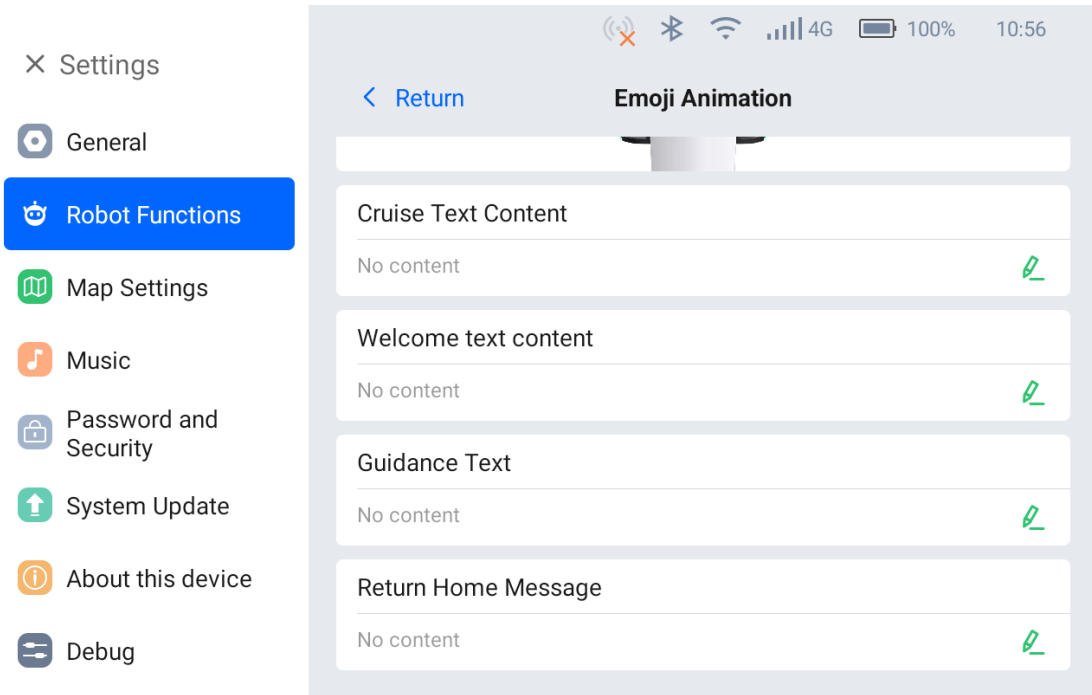
##### (3) Dot Matrix Screen Content Setup

In actual application scenarios, users can set the content displayed on the robot's matrix screen according to their specific needs. Currently, this feature is only supported during cruising, returning, door greeting, and seating guidance. A maximum of 50 characters can be input, and the content can be displayed in a scrolling manner.

Setting Content	Explanation
Cruise Text Content	Set the text content to be displayed during the cruising process.
Welcome Text Content	Set the text content to be displayed during the door greeting process.
Guide Text Content	Set the text content to be displayed during the seating guidance process, with the table number displayed upon completion.
Return Text Content	Set the text content to be displayed during the returning process, which will no longer be displayed once the return is completed.





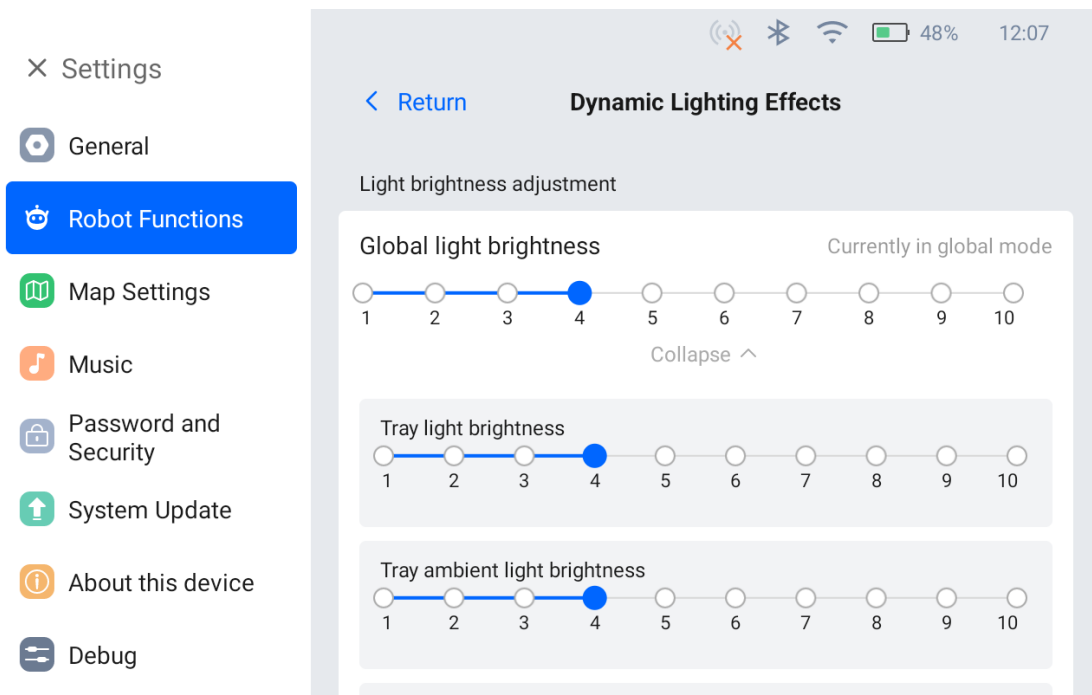


### 3.3.2.3.2 Dynamic Lighting Effects

#### (1) Light Brightness Adjustment

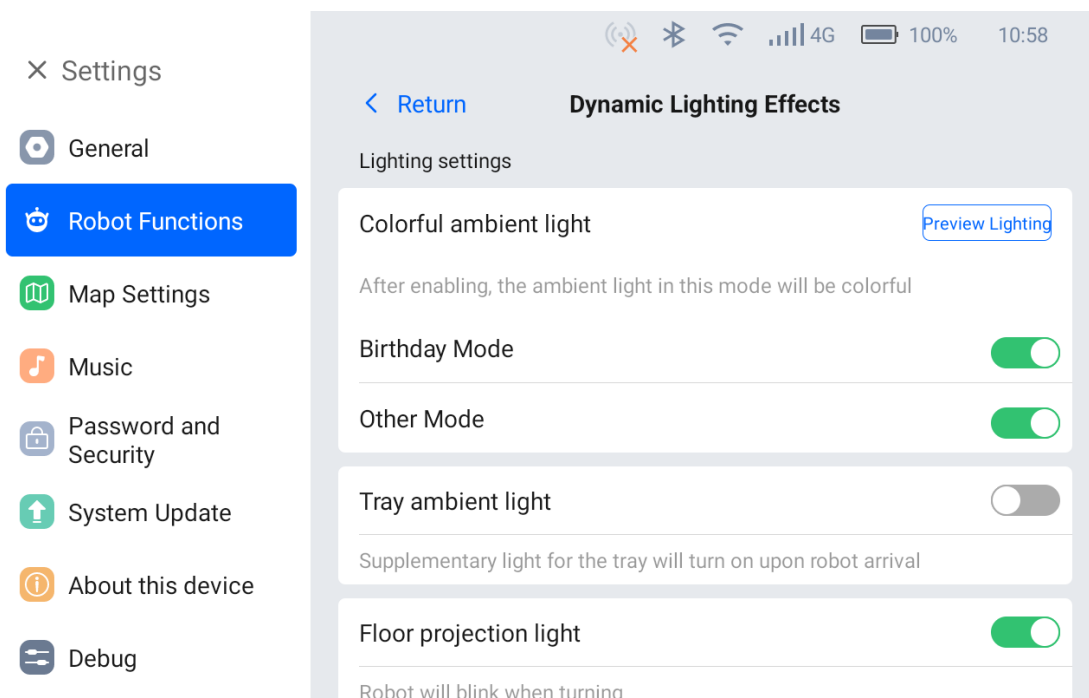
Supports adjusting the brightness of global lights from levels 1 to 10, with the default set at level 5; the higher the value, the brighter the light. Global lights include tray light strip brightness and tray ambient light brightness.

Global lights refer to unified settings, but can also be expanded to individually customize the brightness of a specific sub-item.



#### (2) Lighting settings

Setting Content	Explanation
Colorful Ambient Light	In birthday mode, the default chassis light strip is colored. When other modes are activated, the corresponding chassis light strip also displays colors, and supports previewing the light effects
Tray Ambient Light	When the robot arrives for delivery, the corresponding tray ambient light turns on to provide clear meal pick-up reminders to customers.
Floor Projection Light	When the robot turns or moves forward, it projects a flashing pattern on the ground as a double flash reminder, alerting pedestrians that the robot is about to pass through the intersection.



### 3.3.2.3.3 Voice Interaction

#### (1) TTS Voice

Support for selecting voice tones, with multiple English speakers available for selection.

#### (2) Scene Voice Pack Selection

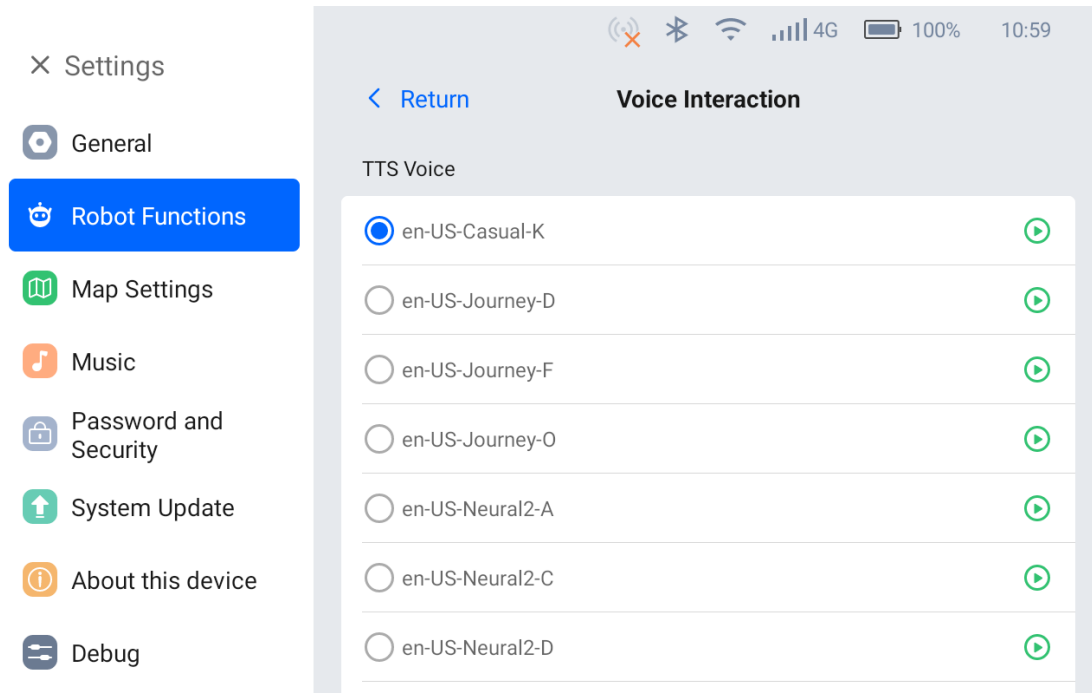
Currently, only Chinese and English are supported as default scene voices. If the default voice pack in the system does not meet user requirements or if other languages require setting up scene voice packs, users can customize them on the cloud platform. For specific operations, please contact a technical support engineer. When users need to replace the customized voice pack, they can follow the steps below:

Step 1: View the supported voice packs and download the corresponding voice pack.

Step 2: Select the downloaded voice pack for replacement.

For the corresponding downloaded voice pack, if there are updates on the cloud platform, the corresponding voice playback can be updated.

If you need to delete a voice pack, simply long-press on the corresponding voice pack to delete it.



### 3.3.2.3.3 Gesture Control

#### (1) Head Touch Interaction



When the robot is not in motion, you can touch its head or ears to interact with the robot.

- When touching the robot for the first time, it will display a friendly and pleasant expression and play a voice message.
- Continued touching will trigger further pleasant expressions and voice messages.
- Multiple consecutive touches may trigger the robot to display an angry expression and tone.
- Continued touching in the angry state will trigger a very angry expression and voice message.

No response to touch after being turned off.

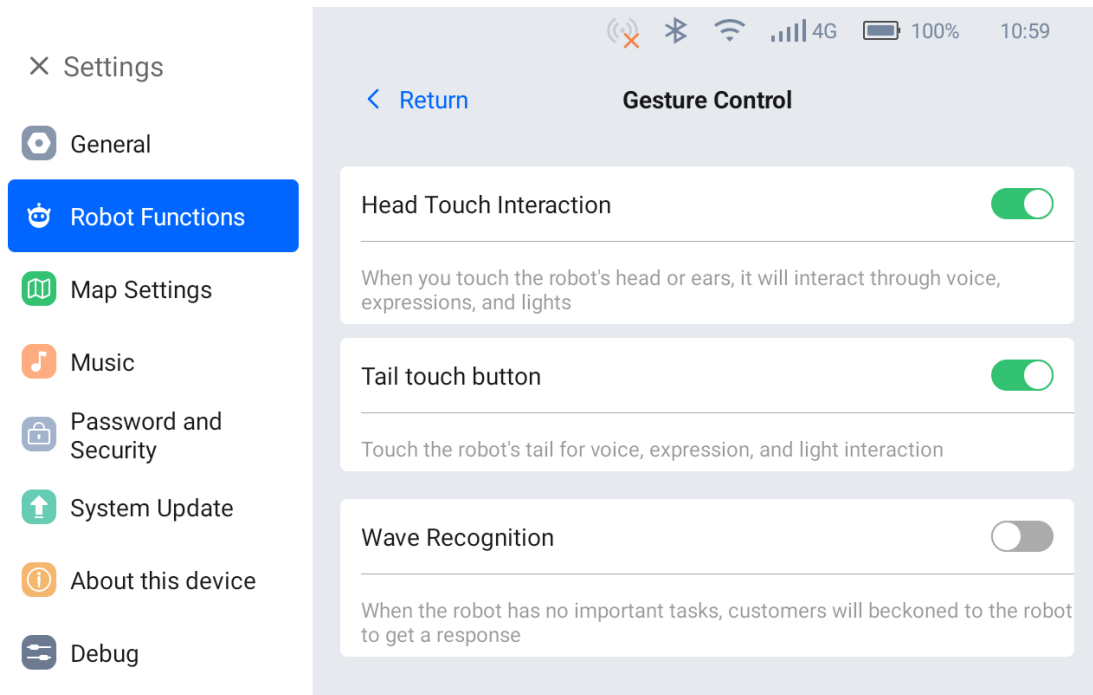
#### (2) Tail Touch Button

When the robot arrives for delivery, touching the robot's tail will automatically complete the task. It will also guide with the back matrix screen. When the robot arrives, the matrix screen will

display a prompt  to touch the top. After touching, the matrix screen will display  completion, indicating the task is done. The robot will then play a voice message and proceed to the next task. No longer responds to touch after completion.

#### (3) Wave Recognition

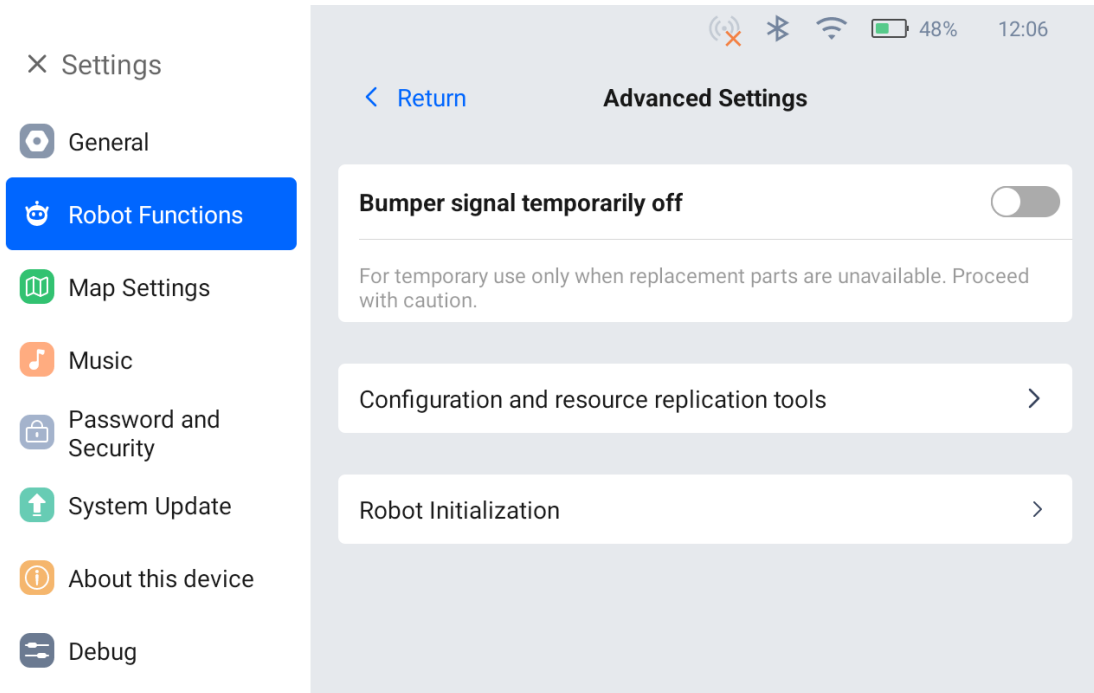
When the robot has no working tasks, waving to the robot will receive a response. No longer responds to waving after being turned off.



### 3.3.2.3.5 Advanced settings

Advanced settings are used to adjust the advanced configuration of the robot. A password is required to enter. If needed, please contact a technical support engineer.

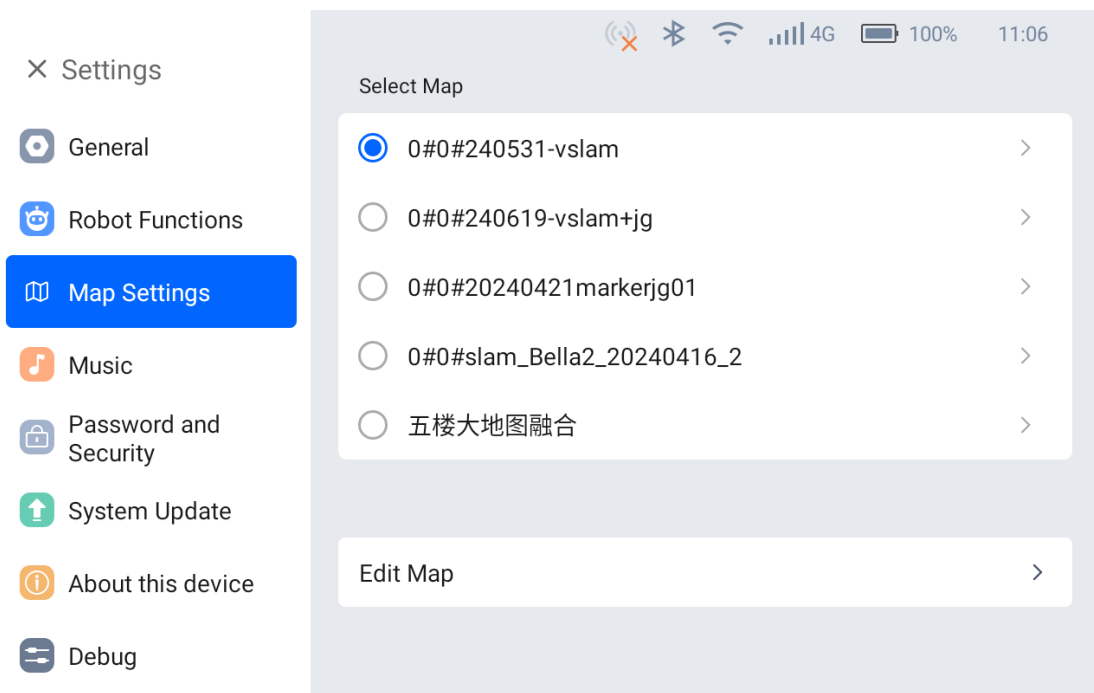
Setting Content	Explanation
Bumper signal temporarily off	When the collision bar is triggered abnormally, turning on the switch can shield the abnormal collision bar information, allowing the machine to continue running, but at the same time, the collision bar will no longer be effective.  This is only for temporary use in situations where spare parts cannot be replaced.
Robot initialization	This operation will erase all the default settings, records, and data of this device.
Configuration and resource copying tool	It supports copying the configuration and resources of this machine to other robots, as well as transferring configurations and resources from other robots.



### 3.3.3 Map Settings

The robot can support multiple maps to be used when there are changes in the usage scenario or scene routes. By switching maps, the robot will automatically synchronize the arrival points, docking points, and other configurations and elements in the map. Users can choose the map according to the actual scenario.

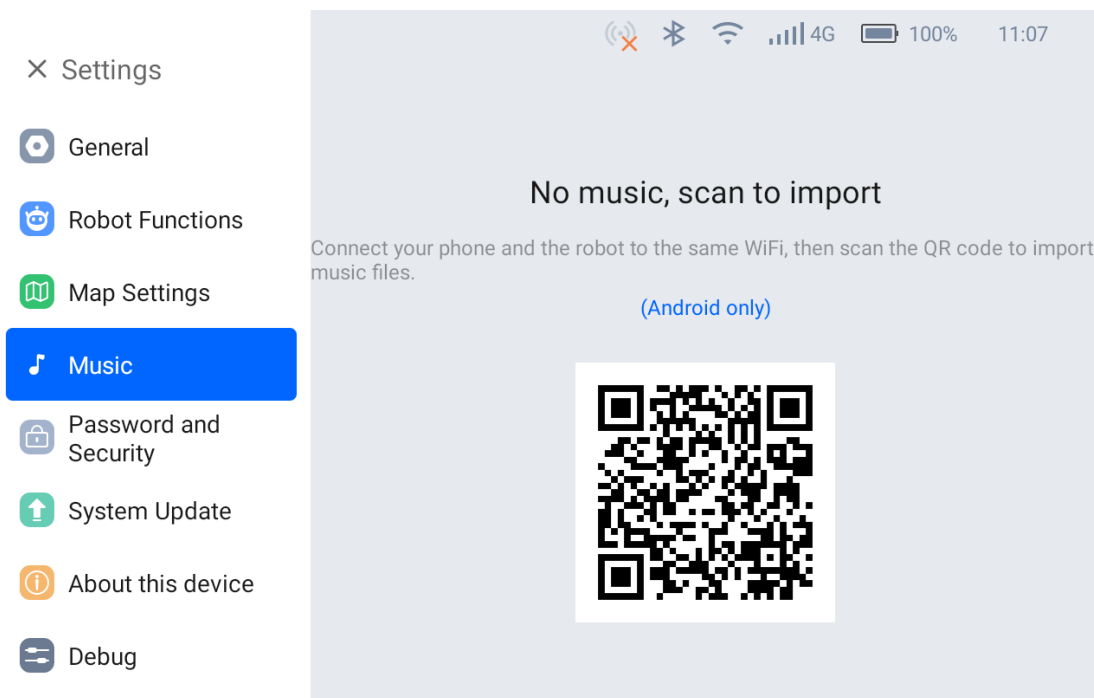
Clicking on "Edit Map" will take you to the robot's map management software interface, where you can perform mapping and map editing operations.



### 3.3.4 Music

In the music module, users can connect the robot and the phone to the same Wi-Fi network. After that, they can import music to the robot by scanning the QR code in the "Music Import" module. The imported music will be displayed in the "All Music List", with the robot able to store up to 20 songs.

- Supported music file formats: mp3, wav, flac, aac, pcm, wma, ape.
- Users can preview a music track by clicking on the "▶" button next to the music item.
- Long-pressing a song will bring up a "Delete" button, which can be clicked to remove the music.



### 3.3.5 Password and Security

#### 3.3.5.1 Password Management

You can control access to the robot interface and adjust permissions for robot operations using a password.

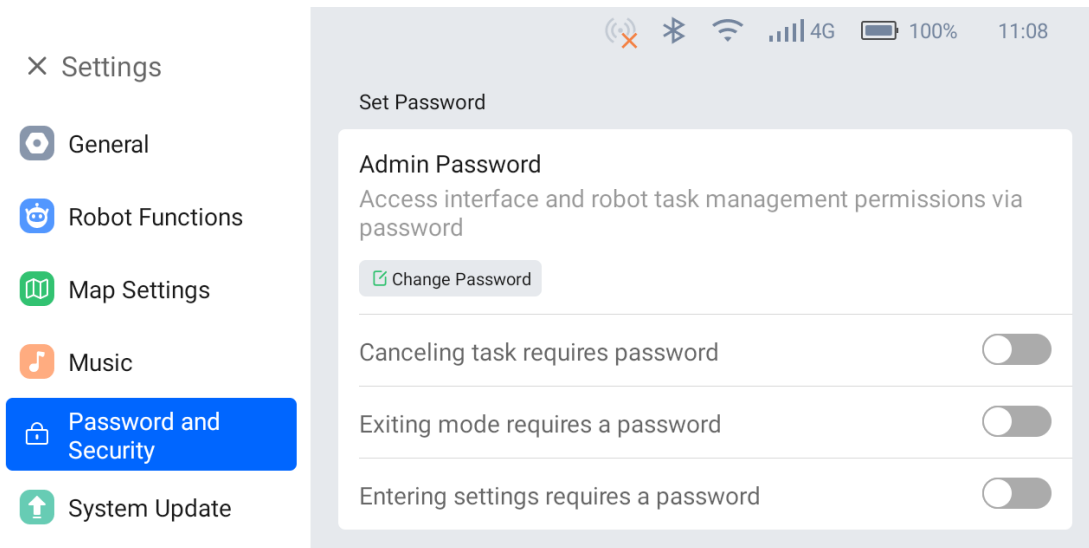
##### (1) Setting the password for the first time

You need to enter the password twice in a row. If the two inputs are consistent, you will be prompted with "Management password set".

The set password can be used for canceling tasks, exiting modes, and entering settings.

##### (2) Changing the password

To change the password, you need to enter the original password first. If you forget the original password, you will need to enter the administrator password. Please contact a technical support engineer for the administrator password.



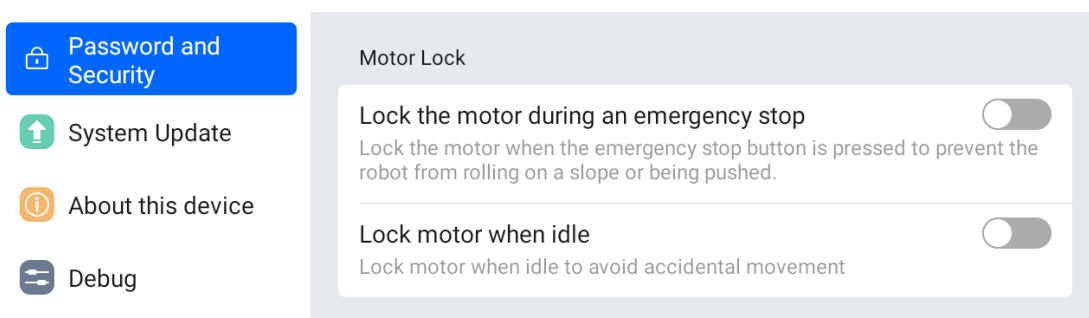
### 3.3.5.2 Motor Lock

Setting Content	Explanation
Lock the motor during an emergency stop	Lock the motor when the emergency stop button is pressed to prevent the robot from sliding down slopes or being pushed by people.
Lock motor when idle	Lock the motor when the robot is idle to prevent it from being accidentally pushed away.

#### Note

Trigger the motor lock in the corresponding state, and the interface will display a motor lock popup window .

Motor unlocking method: If a password is set and the password function is enabled, clicking on motor unlock will require entering the password. If no password is set, clicking on unlock will directly unlock the motor.



### 3.3.6 System Update

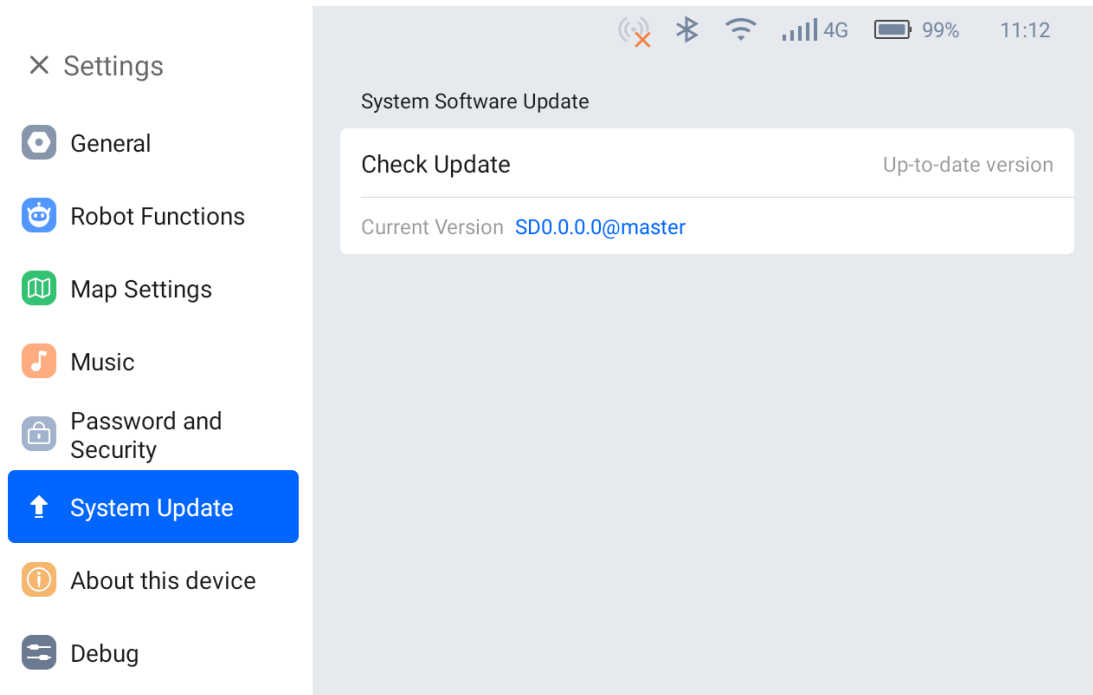
When the robot is connected to the internet, it can check for software updates. If there is a new version of the robot software, the new version content will be displayed, prompting an update.

After clicking "Upgrade Now", the robot will download the installation package. At this time, there will be a download percentage prompt. Wait for the download to complete, and the robot will

automatically restart.

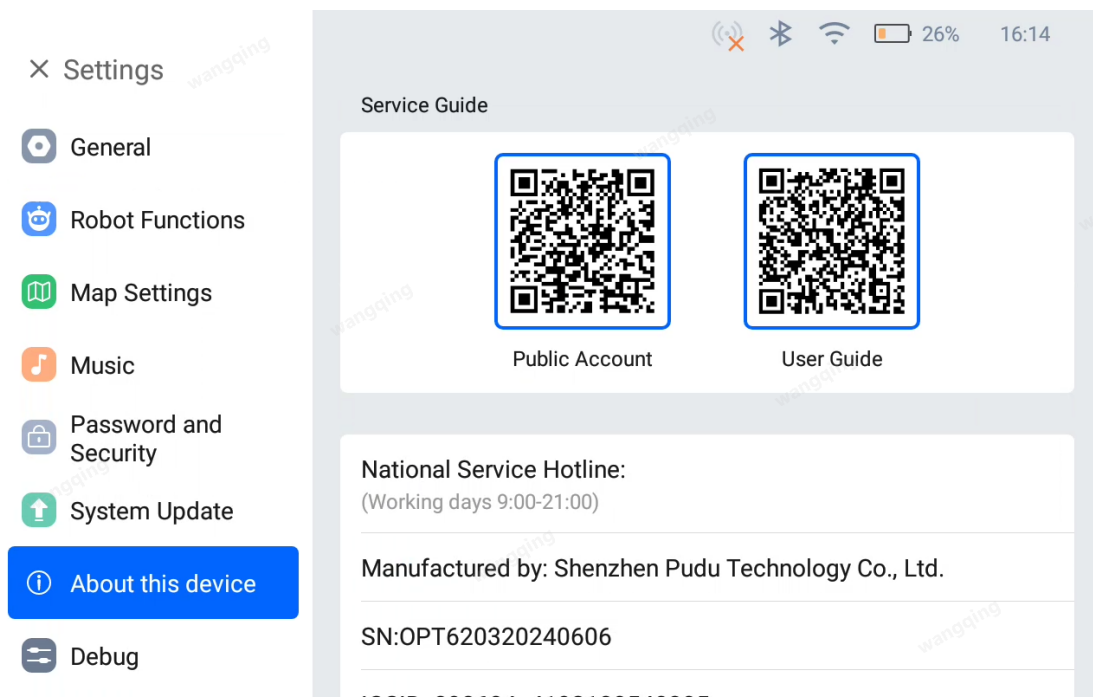
Note

- Ensure that the robot's battery level is above 20% before performing the software upgrade.
- Do not manually turn off the robot while performing the software upgrade.



### 3.3.7 About this device

About the interface display related service guide, manufacturer service hotline, name, as well as machine SN, Mac and other information.





### 3.3.8 Debug

The debugging interface is for technical support engineers to debug the machine. Please do not operate the debugging interface privately.

### 3.4 Ad configuration

Business users can upload advertising materials on the business management platform and Pudulink APP to push to robots in stores for playback, enhancing the marketing and promotional capabilities of the robots.

- Supports configuring large screen regular ads, large screen scene ads, and small screen ads; and can quickly copy the current configuration of ads to associated stores.
- Robots will automatically download and play new ads when they are connected to the internet.
- For detailed operations on ad configuration, please contact technical support engineers.

### 3.5 Docking Instructions

BellaBot Pro supports three docking modes. In actual scenarios where multiple robots cooperate, users can select any docking mode during mapping. This section only covers the description of the three docking modes. For details about mapping, please contact our technical engineers.

Three docking modes: ◦

- One-to-one Docking mode: Each robot has its fixed pickup location (docking location).
- Free Docking mode: Set multiple pickup locations (docking locations) for the robot to dock by priority, i.e., the robot chooses the nearest pickup location for docking.
- Waiting mode: Set temporary docking location. When the robot has no task and there's no vacancy at the pickup locations (docking locations), the robot docks at the temporary docking location. Once a vacancy appears at a pickup location (docking location), the robot automatically goes there for docking.

## 4 Troubleshooting

### 4.1 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.

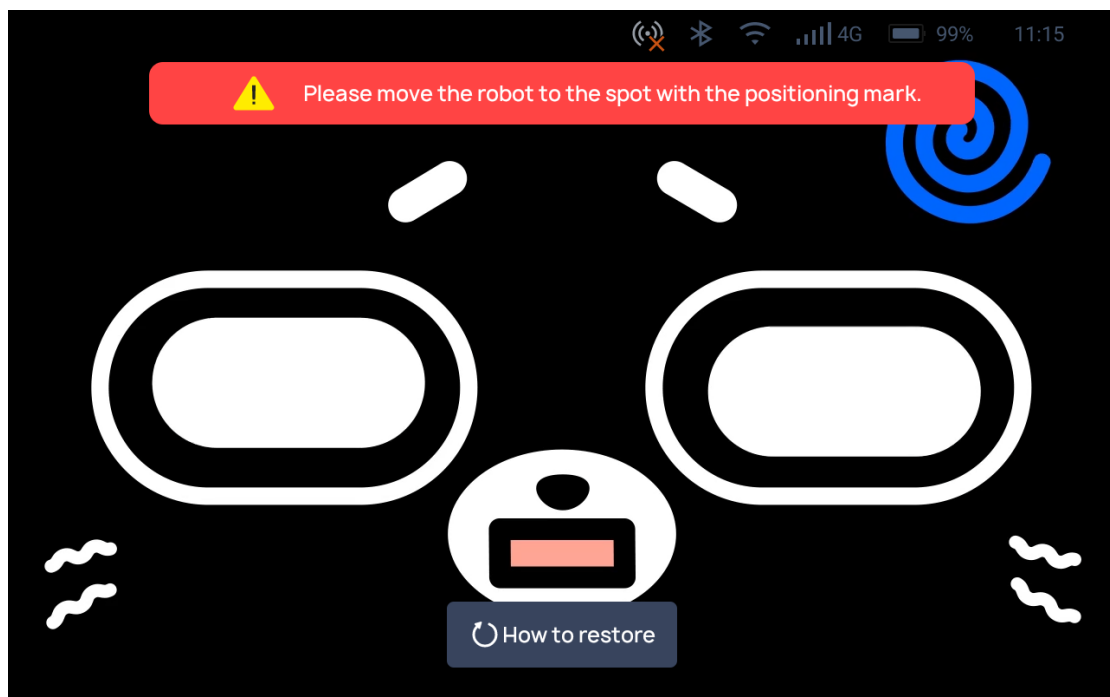
Step 2 If not, reboot the robot and re-enter the task.

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

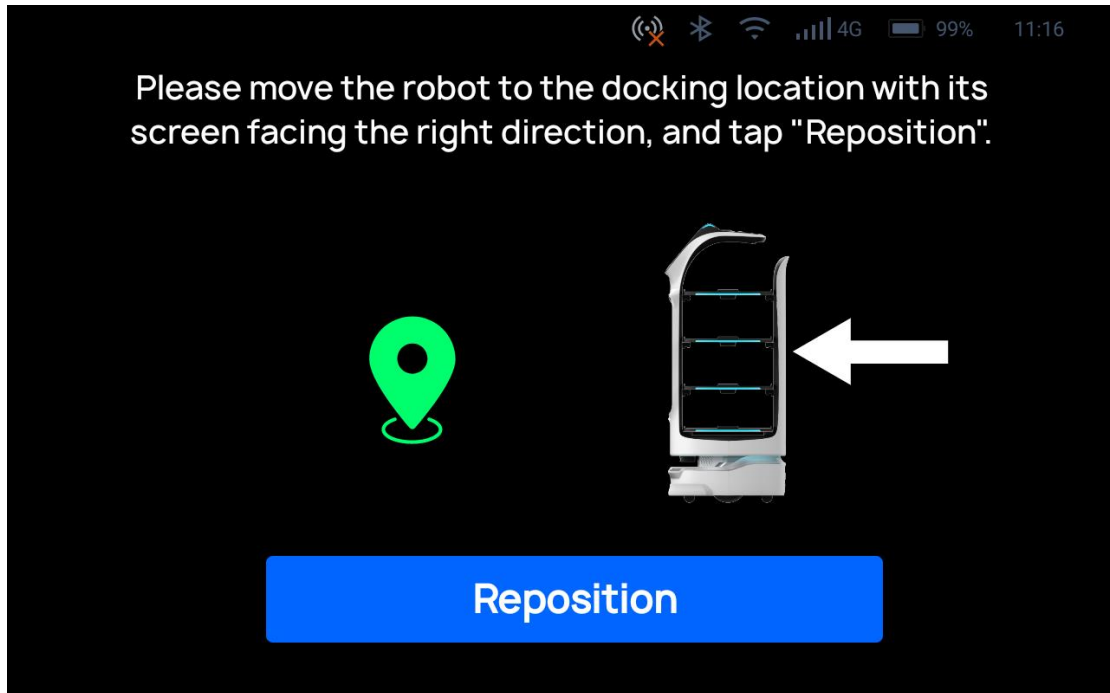
### 4.2 Positioning Failure

#### Troubles

The robot screen prompts **I'm lost. Please push me to the starting location**



Please click the screen, and the robot screen prompts **Please make sure the robot is parking the booting area and facing the right direction before you click the reposition button.**



#### 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.

Step 4 Check if the fill light of the vision sensor is red. If not, please contact technical engineers in time.

## 4.3 Charging Failure

### Troubles

Charging failure

#### Solution

- Open the rear cover of the battery box and check if the battery is installed properly.
- Check if the rear cover of the battery box is installed properly.
- 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.

## 4.4 Power-on Failure

### Troubles

Power-on failure

### Solution

- If the battery is low, please charge the robot. To check the battery level, proceed as follows:
  1. Open the rear cover of the battery box.
  2. Press the button on the battery to check the battery level.

Battery level	Color of battery indicator
0%~10%	● ○ ○ ○
10%~25%	● ○ ○ ○
25%~50%	● ● ○ ○
50%~75%	● ● ● ○
75%~90%	● ● ● ●
90%~100%	● ● ● ●

3. Close the rear cover of the battery box. If the battery is low, please charge the robot in time.
- If the battery level is normal, proceed as follows:
    1. Open the rear cover of the battery box and check if the battery is installed properly.
    2. Check if the rear cover of the battery box is installed properly.
  - If the problem persists, please contact our technical engineers.

## 4.5 Tray Detection Anomaly

### Troubles

When the tray detection switch is turned on, if the robot does not automatically complete the task after the items are removed during the delivery process, or if the robot completes the task automatically without the items being removed.

### Solution

- Check if the trays are installed correctly.
- Clean the tray sensor with a clean cloth or lens cleanser.

## 4.6 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 16-20 cm (6.30-7.87 in) above the ground.

## 5 Maintenance and Care

### 5.1 Component Maintenance

Components	Robot Status	Inspection Interval	Maintenance Method
Driving wheels, and auxiliary wheels	Power-off	Weekly	Clean the tangled hair and other stuck stuff
Trays	Power-off	Weekly	Wipe the surface with a clean cloth.
Vision sensor, depth vision sensors, and Lidar	Power-off	Weekly	Use a clean cloth or lens cleanser for the cleaning. In case of unexpected contamination, address it immediately to avoid blocking the sensor and prevent the robot from working improperly.
Robot body	Power-off	Monthly	Wipe the surface with a clean cloth.

### 5.2 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, click on the "Power off" button on the interface to ensure that the robot is turned off.

Step 2 Wipe the robot surface with a clean cloth.

Step 3 Wipe the trays, 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.

### 5.3 Battery Replacement

Step 1 Open the battery compartment cover, the machine enters the battery replacement

mode, and the operation screen displays a 2-minute countdown.

Step 2 Lift the battery handle to the horizontal position.

Step 3 Extract the battery pack using both hands.

Step 4 Insert the new battery pack using both hands.

Step 5 Press the battery handle back to the vertical position.

Step 6 Close the rear cover of the battery box. The robot is thereby ready to use.

 Note

The battery replacement mode only lasts for 2 minutes. If the battery replacement takes longer than 2 minutes, the machine will automatically shut down.

## 6 After-sales Service Policies

Shenzhen Pudu Technology Co., Ltd. promises to meet the following conditions, within the effective warranty period of the product (the warranty period of different parts of the product may be different). We will provide the spares parts for free, Customers do not need to pay it again, Circumstances beyond the warranty period or not covered by the free product warranty service. We will charge a normal price.

### **In Warranty**

Distributors are responsible for the maintenance for end-users, Pudu Robotics provides free maintenance spare parts and technical support;

- Pudu Robotics provides warranty within following conditions:
  - a. The products are within the specified warranty period;
  - b. The products are normally used, without man-made quality problems;
  - c. No unauthorized disassembly, maintenance, no water, foreign matters, no collision, fall situation happened etc.;
  - d. Product serial number, factory label and other marks are not torn or altered.
  - e. Valid proof of purchase, receipt and tracking number should be provided.
  - f. Damaged spare parts replaced in the warranty shall be owned by Pudu Robotics.

### **Out of Warranty**

The distributors shall pay for the maintenance spare parts and are responsible for the maintenance of end-user, PUDU provides free technical support;

- Pudu Robotics will not provide warranty in any of the following conditions:
  - a. The product has exceeded the warranty period;
  - b. Product serial number, factory label and other marks are torn or altered and cannot be identified;
  - c. Collision, burning and quality problems caused by foreign matter (water, oil, sand, etc.) and not the quality problems of the product itself;
  - d. Damage caused by unauthorized modification, dismantling, shell opening and maintenance under unofficial guidance;
  - e. Damage caused by improper installation, use, charging or storage without following the instructions;
  - f. Delivery robot: Damage caused by use in excess of safe weight;
  - g. Faults of accessories or parts other than major warranty parts
  - h. Faults and damages caused by force majeure (such as earthquake, fire, war, etc.).

### **Contact information**



- Please contact the local regional technical support first to solve your after-sales problems, or contact Pudu Robotics headquarters.
- PUDU Service Email: [techservice@pudutech.com](mailto:techservice@pudutech.com).
- PUDU Hotline: +86 755-86952935.

## 7 Compliance Information

### 7.1 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.

### 7.2 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.

### 7.3 Disposal and Recycling 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 recycling 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 recycling

centers in order to conserve natural resources. Each country should have its collection centers for electrical and electronic equipment recycling. For information about your recycling 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.