



Amanda Delivery Robot

USER OPERATING MANUAL

VERSION: V4.2.2

Suzhou Pangolin Robot Corp., Ltd.

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Chapter 1 Overview

Thanks for purchasing the 9th Generation Dish Delivery Robot -Amanda of Suzhou Pangolin Robot Corp., Ltd.!

This manual briefly introduces various functions which will guide you well about the machine. At the same time, a series of high-quality and premium solutions will be provided to bring you a comprehensive service experience!

Please carefully review this manual before using the machine.

Chapter 2 Copyright Statement

Suzhou Pangolin Robot Corp., Ltd. (hereinafter referred to as “Pangolin Robot”) will reserve all rights to modify this manual and we insure the information offered is correct and reliable.

Please kindly be noted that:

1. This manual is compiled to fulfill company series of products and it is permissible that your purchased machine may not be equipped with all specified functions.
2. When it comes to patent, copyright, trademarks and some other intellectual properties, you shall not be allowed to use our products or related documents until or only if you get the approval or authorization from Pangolin Robot, however, which don't belong to Pangolin Robot's responsibility.
3. Pangolin Robot will reserve all rights to this manual and users shouldn't disseminate, copy or modify any contents of this manual.

Chapter 3 Product Function

1 Animated emoticons Display Screen

Robot can show diverse face expressions by distinct working condition to enhance the interface interaction effect.

HMI (Human Machine Interface)

Set the functionality like dish delivery and other basic operations by touching on the screen interface.

2 Playing Advertisement

The robot can support to play music and video during her work process.

3 Trackless Navigation and Obstacle Navigation:

Robot will achieve auto navigation by laser sensor, which is designated by point to point. When there is any obstacles detected

ahead, robot will stop until the obstacle is cleared.

4 Voice reminding during dish delivery

During the dish delivery process, there will be corresponding voice reminding at each stage, for example: 1. at the beginning of delivery, the robot will remind “ I am going to delivery dish” 2. if some obstacles on they way of delivery ,the robot will say “ excuse me, you are on my way” . 3. When the robot takes the dish arriving at the set table, the robot will remind “ dear customer, your order is here”. After waiting for a while, The robot will remind “If there is nothing else, please touch my hand and let me get back”. 4. When returning to the waiting point, the robot will remind “I am back”. All the voice content can be set according to the actual situation by users.

5 Auto-charging system

The robot equipped with an automatic charging pile can realize the automatic charging. When the power is lower than a certain value, the robot will automatically find the charging pile and complete the charging.

Chapter 4 Precautions for Use

- 1 The robot is internally installed with Industrial Personal Computer (hereinafter referred to as IPC), with which the screen is adopted with touch screen technology. Please DO NOT frequently cut the power voltage during the system starts up in case of any machine breakdown.
- 2 Only if or unless urgent situation, please DO NOT press the “Emergency Stop Switch” in protection of the machine life expectancy.
- 3 DO NOT assembly and disassembly the robot or any spare part of the robot by yourself due to its high precision.
- 4 When the robot is in the process of working, DO NOT open her outer shell lest any careless touching on the electronic moving parts will do unnecessary damage on human body.
- 5 Avoid any strong collision impact or man force on the robot.
- 6 When the robot is in the process of working, DO NOT force to change her moving way in case of any unnecessary damage on human body.
- 7 Please use the AC 100~240V, the original charger and make sure it’s under the guardianship of somebody. Remember to unplug the charger once the robot finished charging. DO NOT shaking the battery during the whole process above mentioned.
- 8 It is a must that you should use the originally equipped charger and put the battery into the originally installed battery pack, all of which must also be under custody of somebody. DO NOT forget to unplug the charger after it finishes charging.
- 9 Any chemical cleaning is forbidden and you can use a dry clean cloth to wipe the surface dust out.
- 10 Please kindly deal with waste products and accessories in accordance with the relevant local environmental protection regulations.

- 11 In case of any data loss, it is recommended that the user backup the important documents, especially when software and firmware is about to upgrade. Our company shall not be responsible for any data loss caused herein.
- 12 During the process of repairing defective products, the company will root all of the data and back to manufacturer default Settings.
- 13 There won't be prior notice on any product changes. We apologize for any inconvenience caused.
- 14 Any problems please directly contact with our customer service.

Chapter 5 Safety Precautions

Before installing, using, carrying, maintenance and repairing, please make sure read carefully and master the content of this manual and relevant appendix. Make sure operate after you are fully familiar with all equipment, safety precaution and matters need attention. The following precaution is involved with five main categories: "Danger", "Attention", "Force", "Prohibited", "Important".



Compulsory: Rules must abide by.



Danger: Wrong operation might hurt or cause causality.



Attention: Wrong operation may cause irreversible or serious damage to the robot.



Prohibited: Matters excluded from use



Important



Compulsory

(1) This user manual belongs to technical materials concerned with robot body content. In order to ensure the normal application of this system and the proper maintenance and repair, including product profile, precautions for use, safety precautions, product instructions, installation and so on, please make sure read carefully and fully understand this manual before using.

(2) In addition, details regarding safety precautions are stated in chapter of "Safety", please read it carefully before using.



Danger

(1) The product is supplied with 24V battery but it is unguaranteed that individual spare parts are within 36V that is affordable safety voltage for human. In the process of working, any touching to electron moving parts is strictly prohibited in case of unnecessary damage to robot or human body.

The product is charged with 220V AC. Watch out the electricity shock when plug in. Please be carefully noted that lithium battery is vulnerable and explosive. For the sake of your health and property, it is suggested that charging is under the guardianship of somebody to avoid any potentiality of explosion and fire. Remember to unplug the charger once the robot finished charging. DONOT shake the battery during the whole process above mentioned.

Any individual part isn't so safe up to food grade that please DO NOT devour it and keep spare parts away from food material.

Please keep the minors and the elderly out of reach the product unless being under the custody.

(2) The product is charged with 220V AC. Watch out the electricity shock when plug in. Please be carefully noted that lithium battery is vulnerable and explosive. For the sake of your health and property, it is suggested that charging is under the guardianship of somebody to avoid any potentiality of explosion and fire. Remember to unplug the charger once the robot finished charging. DONOT shake the battery during the whole process above mentioned.

(3) Any individual part isn't so safe up to food grade that please DO NOT devour it and keep spare parts away from food material.

(4) Please keep the minors and the elderly out of reach the product unless being under the custody.



Attention

(1) Some of the illustrations in this manual are drafted upon uncovering the robot shell to more specify the robot, therefore when you are working with this kind of parts, ensure to recover the shell and operate it adhere to the specification.

(2) Graph and pics in this manual is only for your reference and there might be slightly different from the real purchased product on hand.

(3) Sometimes due to product improvement, spec change and utilizing, there should be times of modification which edition will be followed by hereafter.

(4) Perhaps due to loss or damage, please directly contact with the sales person if you need to book the manual and follow the material no to purchase.

(5) We won't be responsible for any alternation without authorization which as well shall not fall within the range of warranty.



Prohibited

(1)The product shell is made from ABS plastic. Please keep it from metal components or sharp object.

(2)When the robot is in the process of working, DO NOT strongly force her to change the moving way.

(3)The product is equipped with server and IPC so those non-professional people is prohibited from opening the back cover or plug and unplug the electric wire.

(4)Please keep customers away from touching ON/OFF switch and Emergency Stop switch.

(5)Please leave it in a dry, cool dark place. DO NOT put it lean or upside down.



Important

In spite of inconformity with content of "Attention "or" Danger" but these are indeed important matters marked exclusively to abide by.

Besides, even though it is recorded in "Important", occasions changing will also result in serious consequences; accordingly

any precautions should be paid extreme attention on and strictly obeyed herein.

Encountering emergent circumstances, quickly press the emergency stop button so that electricity is cut out from the movable parts and robot stops. Only after the emergency can you free emergency stop button (shown as Pic 1) :



Pic1. Emergency Stop

Chapter 6 On/Off button and Map building

6.1 On/off Button

6.1.1 Firstly confirm if it has freed the emergency stop, if not, Press down the red button to relieve the emergency stop state

6.1.2 Press the “On/Off Button” to turn on the robot.

The positions of emergency stop switch and on/off button shown as

The start switch is located in the upper and lower radar slits on the back(The screen orientation is front), and the emergency stop button is located directly above.



6.2 Emergency Stop

6.2.1 When it occurs to an emergency, please press the Emergency Stop asap. To cut out partly electricity and shut down any movement.

6.2.2 Press down the emergency stop button to relieve the emergency stop.

6.3 Map building

6.3.1 Preparations

- 1) Make sure it a vacant area or with limited people within the area;
- 2) Clear up all the frequently movable objects in the area;

3) Regarding to those objects may reflect, transmit and absorb lights, under some conditions permissible, stick several ordinary materials on the plane domain area where laser radar may reflect;

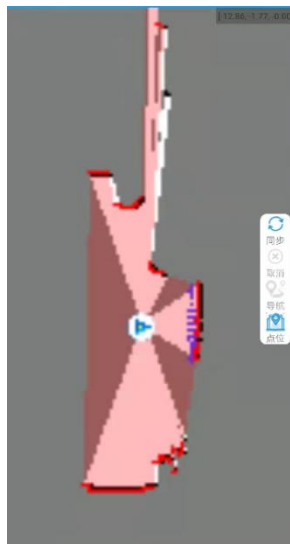
6.3.2 Frequently Disturbed Objects

Before starting mapping, you should figure out what kind of objects that may have an influence on the laser radar that requires us to do several precautions as the case may be. Generally speaking, 70% of light reflective rate will be up to the limit that radar data manual instructs. Attention should be focused that all the environment we are talking is inside the room /indoor environment. Below are several interfered objects:

- 3) Low reflective objects, e.g. light absorbing wall in black, furniture, etc.;
- 4) Glasses;
- 5) Mirror, stainless steel that reflects the objects;
- 6) Other reflective objects.

2 Mapping Steps:

(1) Push robots to the **Starting Point** where you turn on the robot. In order to generate a high-quality map, make sure the direction to which robot is facing towards a vertical straight wall (not a curve wall or closed loop area) among the area, no obstacles surround the robot within 1m in case of not interrupt robot to get more valid points, shown as below Pic



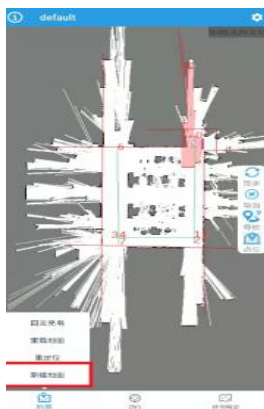
(2) Connect your Android Phone to the WIFI released by the robot router

(3) Open the software CsJRobotStudio.apk in your Android Phone, Click "Connect Robot", enter the IP address 192.168.99.2, then make it connected to enter the mapping page;, shown as below Pic:

(When you scanned the map and map is tilted, please turn off the robot and push it to the charging pile to restart it. If you not restart it and continue to scan the map, the quality of the map is very poor and it is easy to lose the positioning.)



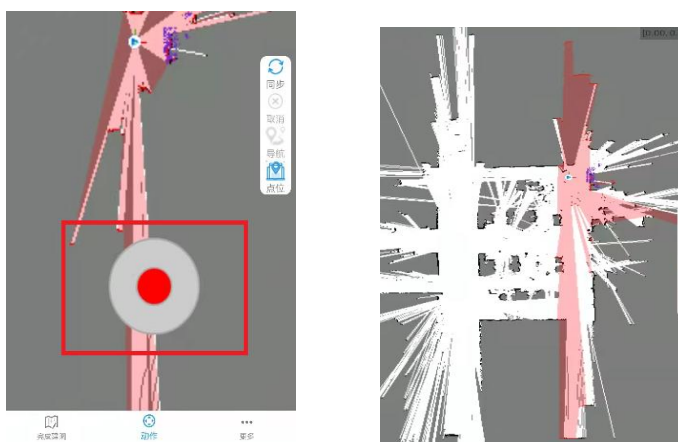
After clicking the new map button, you can start to create a new map, as shown in the figure below:



(4) Built new map

After entering the [Map Scan] page, you can use the joystick to control the robot, slide the joystick to control the robot to walk, as shown in the figure below:

When encountering a turn, you need to wait for a while, after refreshing the map on RobotStudio then Control walking again. Try to ensure the integrity of the map. On the possible walking path of the machine, all the surrounding 360-degree areas need to be detected by radar. The purpose is to increase the integrity of the map and make more reference points for laser matching.



(5) Save map

After the map has been scanned, run the robot nearby the charging pile, and then press the emergency stop button to slowly push the robot to the charging pile.

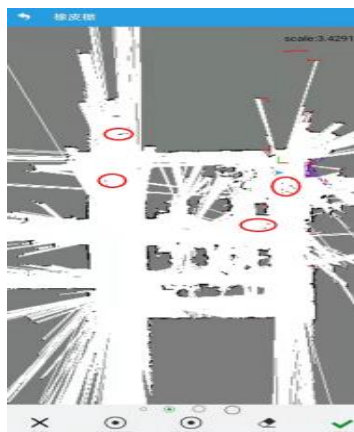
Click the [Save Map] button in the upper right corner, you can fill in the required map name in the input box. The default is default, If prompted [The map already exists, please check to overwrite], You need to check the [overlay map] button.



(6) Edit map: eraser operation

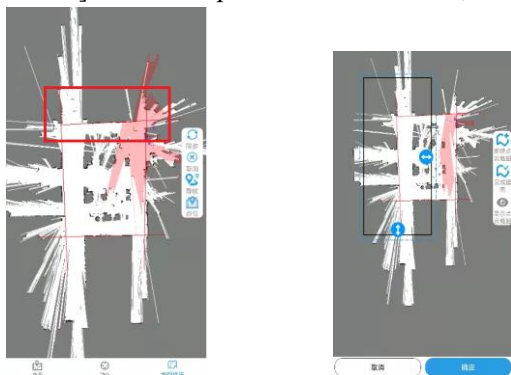
On the homepage (navigation mode), click the [Map Edit] button, click [Eraser], white eraser in order to erase moving objects (such as people, moving objects), as shown in picture

(Drag and drop on the screen to set certain grid areas as black, white or gray areas. At the same time, you can also choose the size and color of the eraser sassafras)



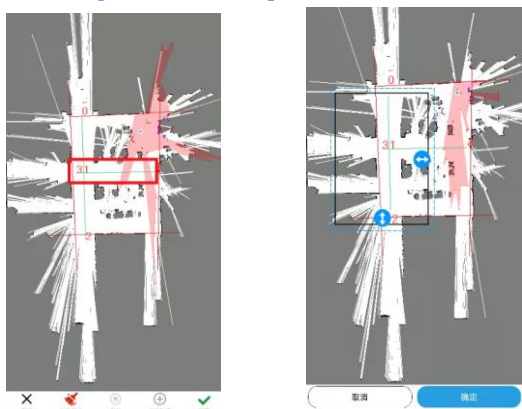
(7) Edit map: virtual wall operation

Click the [Virtual Wall] button to operate the virtual wall, add or delete the virtual wall, as shown in the picture:



(8) Edit map: virtual track

Click the [virtual track] button to operate the virtual track, add or delete a linear virtual track, as shown in the picture:



(9) After completing the above, please return to the navigation page and start navigation

Click the [Return] button in the upper left corner, or the system's [Return] to switch the mode to [Navigation Mode].



Chapter 7 System setting

7.1 Enter Setting Interface

Click the Settings button to enter the password verification interface. The manufacturer default password of the robot is “csjbot”, which can be modified by the user in the setting interface. See the below pic.for details.

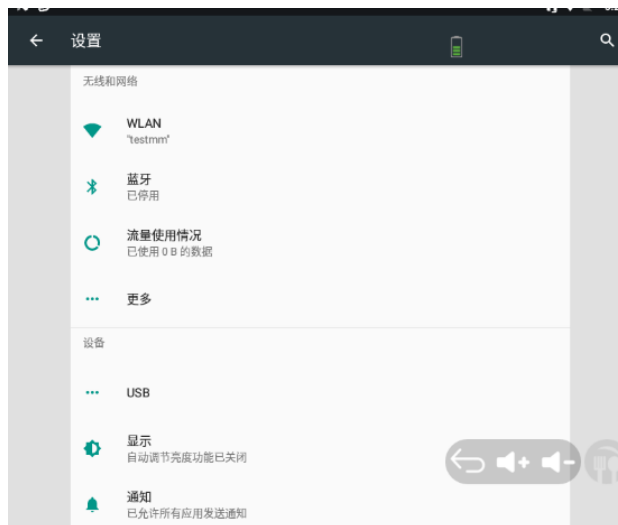


In the setting interface, we can realize many functions: set network, set walk speed, set language, restore the map, and manage the power and so on. See the below pic.for details

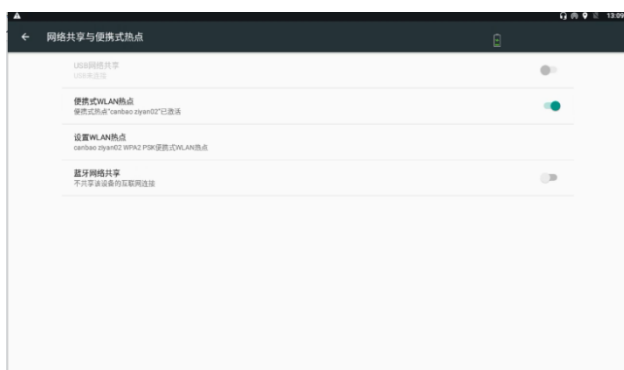


7.2 Network Setting

Click the Network Settings icon to go to the page shown as below .



- tap to get more/Network sharing with portable hot button , The hotspot page is displayed, and the portable hotspot is enabled , You can change the hotspot name and password as required , The default factory Settings have been set, do not change the hotspot name and password at will , The Ethernet IP address factory Settings have been set. Do not change the IP address Settings at will ,as shown below :



7.3 Speed Setting

Click the speed setting button to enter the speed setting interface. At present, the speed range is 0.4~0.7m/s, and the default speed is 0.5m/s. If the safety speed is exceeded, there will be a risk warning. Please set it carefully.



7.4 Charging management

Click the button of Charging Management to enter the charging management interface.

Charging immediately: Click the button of charging immediately, regardless of whether the battery reaches the threshold, the robot will go for charging immediately. If there is a charging pile, the robot will go to charging pile to charge immediately. If no charging pile, the robot will return to the starting point for charging immediately.



7.5 Language Setting

Click the button of language setting to enter the language setting interface.

Language options: Simplified Chinese, Traditional Chinese, English, Japanese.

Note: The robot's interface and the broadcast contents of each scene will be displayed in selected language



7.6 Save Map

Click the Save Map button to enter the save map page.

7.7 Restore the map

After the machine is turned on, it can be turned on near the starting point, try to choose a place with obvious reference, otherwise map restore may not be successful. Click the Restore map option in the Settings screen, You can also restore the map operation.



7.8 Password Management

Enter the page of password setting to set the login password and the gesture password.



Click Reset verification password to enter the interface of reset verification password. The default password of the robot is csjbot. The administrator can verify the password according to the actual situation. The password length is between 8~16 digits. When the password are consistent in 2 times: the robot will remind that the password change is successful.



Click Reset Graphic Password to enter the interface of the reset graphic password. The default graphic password of the robot is L. The administrator can modify it according to the actual situation. For resetting the graphic password, you need to draw the same graphic twice.



7.9 Situation Statement Setting

Click the situation settings option to enter the situation statement settings interface. The interface is mainly for setting up the content to be broadcast under the actual circumstances.

1. The table number and the dish name is the speaking content for robot arrival at the customer's table.

(1) The table number open with the dish name closed and use the default context statement, report table number before the default statement (such as, Hello, Table 11 has arrived. Please enjoy your meal.)

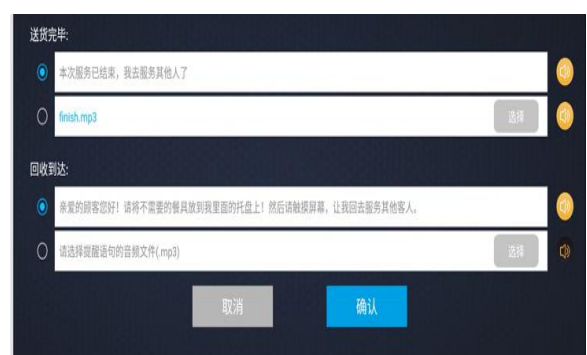
(2) The table number closed with the dish name open and use the default context statement, use the actual food instead the food in the default statement (such as, Hello, here is your kung pao chicken. Please enjoy it.)

(3) The table number and the dish name both open, and use the default context statement, report table number before the default statement, use the actual food instead the food in the default statement (such as, Hello, table 11 has kung pao chicken here. Please enjoy yourself.)

(4) The table number and the dish name both closed, use the default context statement.

2. If it is not custom context statement, The robot will use the default context statement content; if set new context statement content with enable "Use Default", then use new set context statement content as context statement.

3. Click the yellow speaker icon on the right, we can preview the complete statement the robot will speak out.



7.10 About BOT

Click on the About BOT to enter the About BOT interface, where you can see basic information about the robot. Robot Model, Android Versions, SN, Navigation Algorithm Versions.



7.11 Status Information

Click the status information button to enter the status information page, you can view the firmware version information: main control board information and power management board information.

名称	规格	序列号	运行状态	固件版本
主控板	STM32H743	010101017F80B580	OK	9_Main_Board_Amanda V3.0.2
电源管理板	STM32F103	0101010139468724	OK	9_Power_Board V2.0.0

7.12 Function Switch

Click the function switch option to enter the function switch interface. The functions can be turned on or off, the screen doesn't work.

When the food delivery lock screen is on, Lock screen operation will be carried out in the delivery process, The wait lock screen cannot be opened separately, So there are only three cases.



7.13 Waiting Point Setting

Click the Waiting Point Settings option to enter the Settings Waiting Point page, and set the starting point of dish delivery

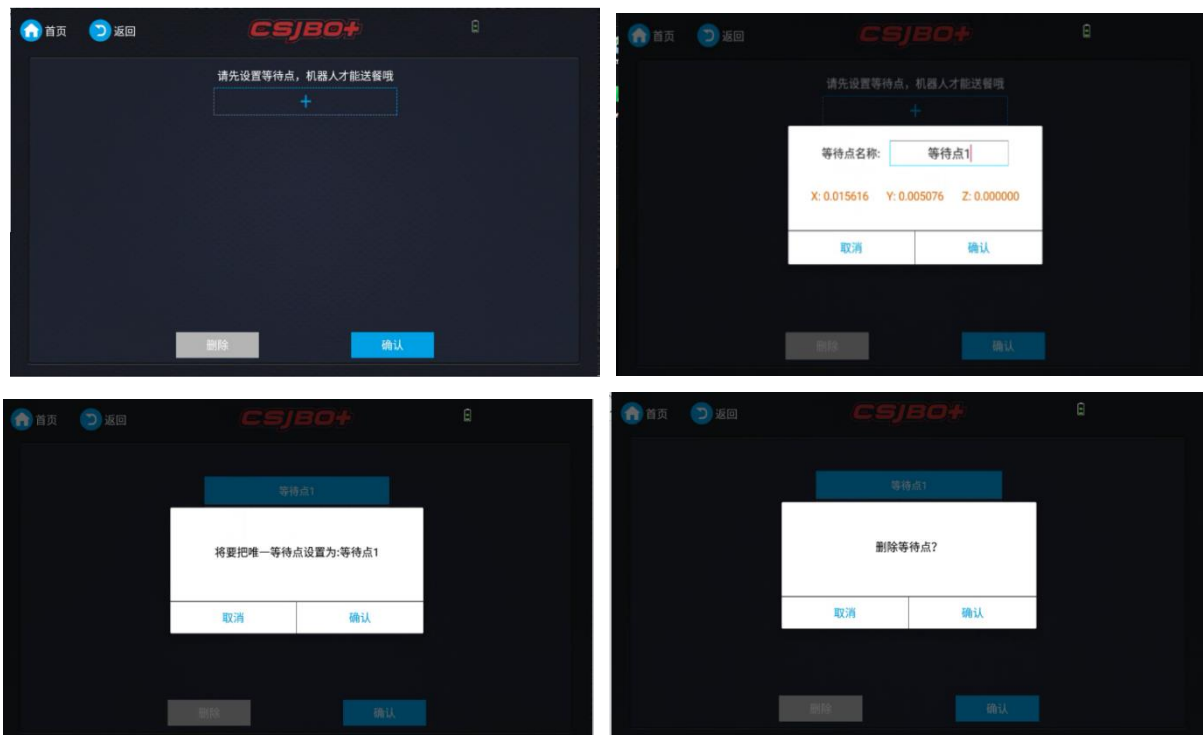
task.

When using the robot for the first time, the system will prompt you to set the waiting point; you can use the delivery function only after the wait point was set.

The user can set up three waiting points at most, and only one waiting point can be used in one time.

The user can add new waiting point to the system or change the current waiting point to a different waiting point.

The waiting points in the system can be deleted.



7. 14Waiting Time Setting

Click the wait time setting option to enter the waiting time setting interface. The administrator can set up the waiting time or checking the waiting time.

1. When the customer touches the screen during the waiting time, the robot will return to the waiting point or delivers the meal to the next table number (multi-point delivery model).
2. After broadcasting, the user doesn't touch the screen within the waiting time, the robot will return to the waiting point or delivery to the next table number (multi-point delivery model).



7.15 Menu set

Click menu set to enter menu setting interface. The administrator can add menu on this page, modify, and delete the menu, etc.



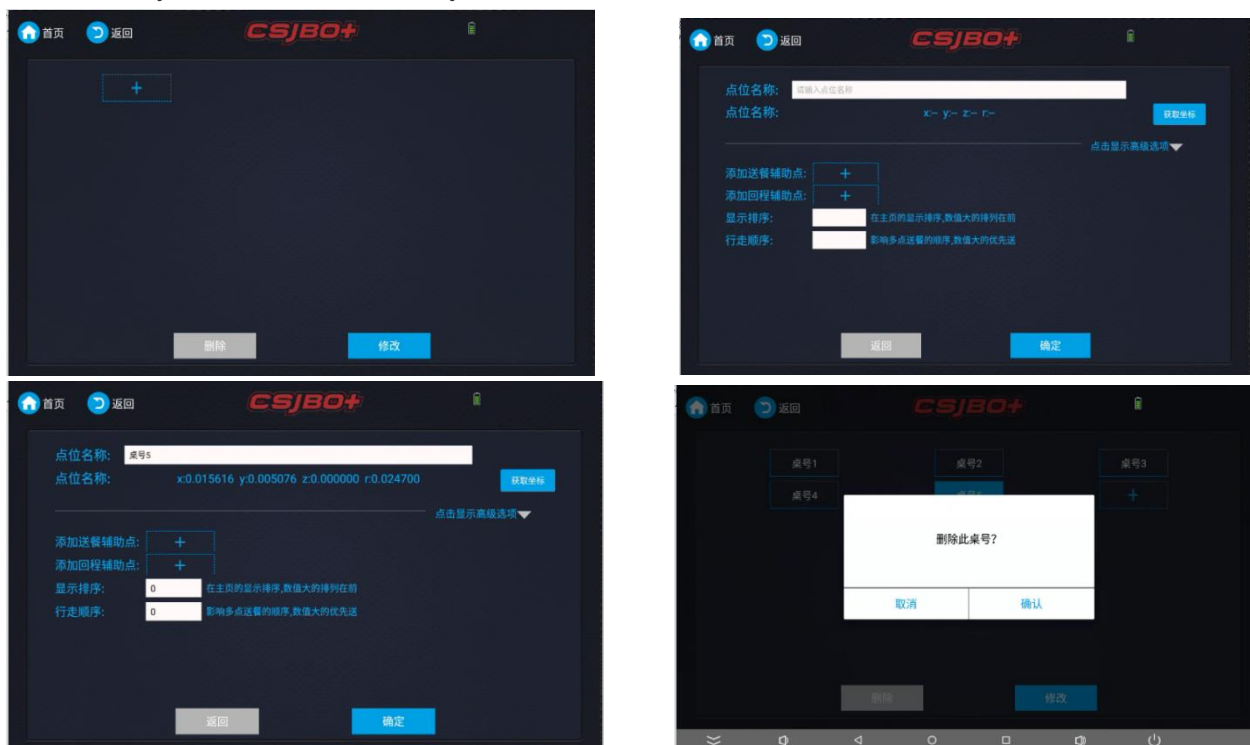
7.16 Table Number Setting

Click the table number setting option to enter the table number settings interface. The administrator can add table number, modify and delete table number in this interface. See below Pic.

Two points need to be noted:

1. the table number corresponds to the map. After the new map is set up, the table number information needs to be reset.
2. you need to set up the table number information in the first time you use the dish delivery service.

You can select any table number to modify it.



7.17 Table Number Saving

Click the Save Table Number option to save the table number information under the current map. The robot will have prompts

whether the saving is successful.

7.18 Table Number Restoring

Click the button of restore table number option to restore the saved table number information.

7.19 Background Music Setting

Click the background sound settings option to enter the background sound settings interface. The administrator can choose the multimedia files for the robot.

The background audio and video are played during the meal delivery. When the robot's hand is touched or stopped by obstacle, the playing will stop. The robot will continue to play audio and video when the robot restart to delivery the meal. If the task of dish delivery is cancelled, the background audio and video will no longer be played.



7.20 Door opening and closing settings

Click the door switch button to enter the door switch page. When the emergency stop is released, you can set the door to open or close.



7.21 Health status

Click the Health status button to enter the health status query page, you can view radars, depth cameras、odom、imu、infrared health.



TYPE	LEVEL	VALUE
lidar_health	1	0.8319218158721924
depth_health	-1	0.0
odom_health	1	1.0
imu_health	1	1.0
ir_health	1	0.0

Chapter 8 Dish Delivery

The mode of delivery includes single mode, multiple mode and circle mode, for normal delivery, please confirm whether the map is restored, whether the table number and waiting point is set, whether the data needs to be synchronized. Whether the background music settings, scene statements, lock screen switch settings are correct. During the delivery, if the power is low, the current delivery task will be cancelled and charged according to the charging management method.

8.1 Multiple Mode

Home page is a multi-point delivery interface, in which you can create a delivery task, delete the delivery task, start delivery, cancel delivery, return to the waiting point.

Choose the table number and the menu, the task content in the tasks window. The table number is selected, and the dishes are optional.

Click the Delete button to delete the meal assignment.

Click the delivery button to start serving meals.

Once "Delivery Lock Screen" opens, the screen locks after click confirm delivery, the interface display pictures.

Once "Delivery Lock Screen" closes, the screen stay on the home page, the interface display delivery task or rotated pictures.

Once the "dining lock screen" is opened, and users need to unlock the gesture when they want to operate.

During the delivery, users can click Cancel Task button to cancel the delivery task.

Click back to wait point, the robot can immediately return to the waiting point.



8.2 Circle Mode

Click the “Set Up” button to add the table number to circular table list .

In the circular table number list, select the table number to delete. Click Delete to delete the circular table number.

Click the table number in the circular table list to add circular tasks.

Click the Delete button to delete the circular task.

When the cycle task is more than or equal to 3 tasks, the cycle meal can be served.

Display default smiley face animation during food delivery.

During the delivery, a rotating picture or video is displayed.

For other operations, you need the unlock gesture .

Click Cancel button to cancel the cycle delivery .

Chapter 9 Best Practices

9.1 The robot starts on the charging pile

The charging pile is placed against the wall. The robot is placed on the charging pile to start the machine, The charging pile is recommended to be fixed and not moved, In order to avoid affecting the recharge or navigation or drawing functions, Start from the android APP , setup about the BOT option, Verify robot information is correct, reference to 7.9

9.2 Set new map

Open scan software on mobile phone ,set new map,save the map, edit map.Detailed process Reference to 6.3

9.3 Delivery task

1、 Set the table delivery number and circular table number in android APP ,set the menu, Other Settings can be set as required. refer to Chapter 7

2、 On the home page of android APP, select the table number and menu (table number require, Multiple table numbers are available, Up to 10 tables at a time, menu optional.), Click the food delivery button to start the food delivery task, When the task is complete, the system automatically returns to the waiting point. During delivery, click the cancel task button to cancel the delivery task at any time. During delivery, if you click back to the waiting point, it will return to the waiting point immediately.

3、 On circular food delivery page , Click on the new setting button, set a new circular table delivery number, You need to select at least three circular table numbers for circular delivery. Click the cycle delivery button to start the cycle delivery task, During the cycle delivery, click the cancel task button to cancel the cycle delivery task at any time. In the process of cycle delivery, click back to the waiting point, it will immediately return to the waiting point.

Chapter 10 Maintenance

10.1 Charge

The original charger or matching charging pile must be used to charge the robot, If the robot is not used for a long time, please charge the robot once a month.

When using the charger to charge the robot directly, please first plug the charger into the network power supply, wait 2-3 seconds for the charger to stabilize, and then plug the charger outlet into the charging hole below the back of the robot to start charging.

When charging the robot directly with charging pile, please place the charging pile against the wall first, plug the charger into the network power supply, wait 2-3 seconds for the charger to stabilize, and then plug the charger outlet into the charging hole on the side of the charging pile, when the robot detects a low battery, it automatically returns to the charging pile to charge.

10.2 Motor Clean

In the robot's normal walking process, it is inevitable to stick debris on robot's wheels which shall kill the service life of motor. Please clear it in time

Chapter 11 Packaging and Handling

11.1 Short Distance Handling (including the City Chartered Vehicle)

1. In the level of the cement floor or floor on the ground, can manually push the robot to walk, walking speed of not more than 15 m / min.

Note: It is strictly forbidden to manually drive the machine while the robot is powered or working.

2. In the loading and unloading truck, up and down the stairs or more (more than 2mm), slope (more than 10 °), when the outdoor asphalt road, are to use the company's special packaging, pay attention to the following operating practices and procedures will be fixed in the robot Tools, and then the corresponding handling and loading and unloading work

(1) Two adult men (height 1.6 meters above) from the sides of the robot, one hand at the bottom of the box, the other hand holding the middle of the box at the same time raised 15 ~ 25cm high, moved to the top of the special handling tools, In the middle of the tool plane.

(2) Two adult men (height 1.6 meters above) from the robot on both sides, one hand at the bottom of the box, the other hand holding the middle of the box at the same time lift, get off, steps.

(3) When loading, the internal height of the vehicle must be greater than 1800mm, and the robot and the truck interior box through the rope fixed, the machine and the car wall, between the machine and the machine need to use 2cm thick foam cotton filled to prevent bruises.

11.2 Long-Distance Transport (including Logistics Transport, Chartered Vehicle)

Transport needs to use the dedicated packaging and external packing box (company provided) filling method

