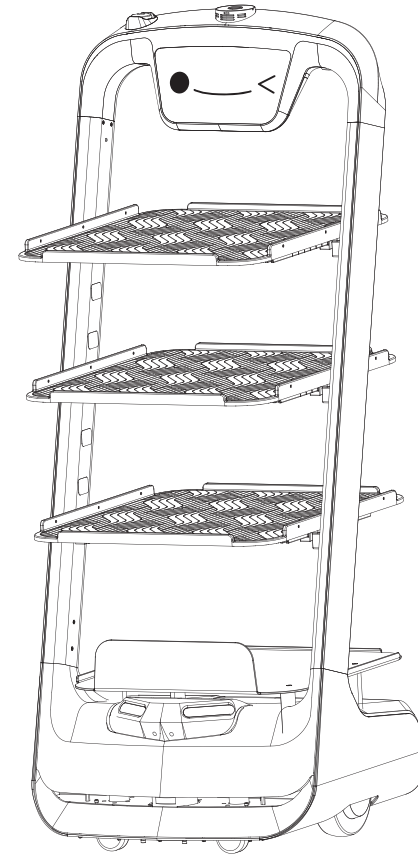




普渡科技



[www.pudutech.com](http://www.pudutech.com)



# ***PuduBot***

User manual V1.2

Copyright © 2019 Pudu Technology Inc. All Rights Reserved.

## Declaration:

Copyright © 2019 Pudu Technology Inc. All Rights Reserved.

Without the express written permission of Pudu Technology Inc., no unit or individual may imitate, reproduce, copy or translate the contents of this manual in part or in whole, the dissemination by any means (electronic, photocopying, recording, etc.) shall not be carried out for the purpose of making profits. Product specifications and information mentioned in this manual are for reference only and are subject to change without notice. Unless otherwise specified, this manual is for guidance only and does not constitute a warranty of any kind.

## CATALOG

### Safety Instructions

- Instructions for use
- Environmental notes
- Power and power requirements
- Safety instructions

### Product Composition

- Exterior parts introduction
- Performance parameters
- Tray size and height

### Product Use

- Charging instructions
- Charging interface
- Power ON, Power OFF, Pause, Start
- Mode selection
- Delivery mode
- Cruise mode
- B-day mode
- Direct delivery mode
- Used plate collection mode
- Special mode
- Alarm display

## Service functions

- Map settings
- Voice settings
- Speed settings
- Tray settings
- Version upgrade
- Advanced settings
- Music function
- Music playlist
- Music import
- Parking instructions

## Product Maintenance

- Trays, drive wheel and auxiliary wheel
- Sensors
- Robot body maintenance
- Handling of robot
- Sign maintenance

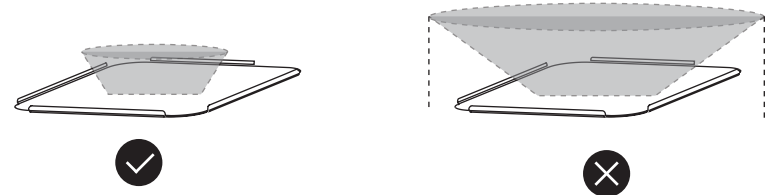
## Troubleshooting

## After-sales Service

# Safety Instruction

## Instructions for use

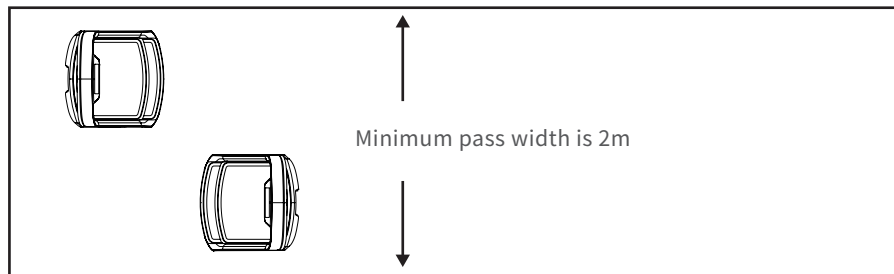
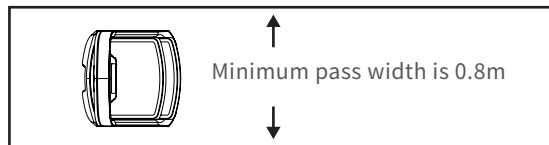
1. DO NOT place any item with weight over the load of the tray: plastic tray 10kg/layer, metal tray 13kg/layer.
2. Click Finish to deliver the next task immediately, please take the food before clicking Finish.
3. Do NOT pick up and drop the food when the robot is moving, if necessary, please click the screen to pause the robot, and then pick and drop the food. The pause time of cruise mode is 20s, and the pause time of other modes is 10s, after the pause, the robot will resume walking automatically.
4. DO NOT press hard on the screen or tap the screen.
5. DO NOT pull the robot during operation.
6. DO NOT push the robot backwards while the robot is powered on.
7. The food shall NOT exceed the size of the tray, otherwise the sensor may be blocked, and the robot may not move properly.



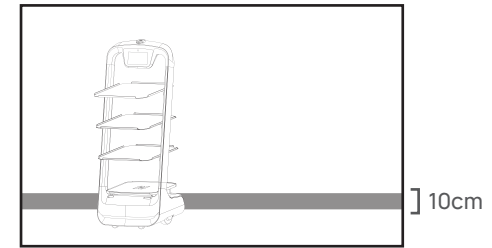
8. If the robot enters the wrong position due to factors such as blockage, please pause the task and push it to the correct route to continue the task.
9. In the event of a collision, please cancel the current task or pause, re-enter the task, DO NOT artificially block the robot.
10. In the absence of special custom-made trays, it is not recommended in principle to deliver soup with PuduBot. When using, be sure to prevent the soup from being splashed and being scalded by the hot water.
11. Pay attention to the change of state of the robot during its travel, please avoid the robot when it is carrying hot tableware or soup pot to prevent collision with the robot and high temperature burns.
12. The top camera is used for precise positioning of the robot, DO NOT block it with a cover during starting and running.
13. DO NOT tap or make other actions to the robot, otherwise it may easily cause equipment damage.

## Environmental notes

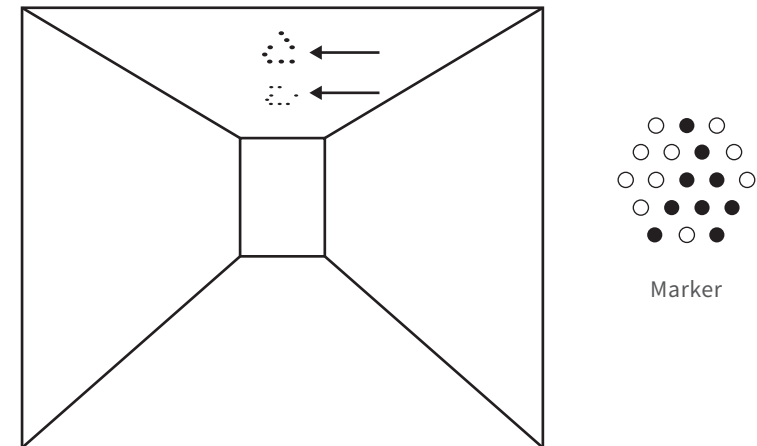
1. The robot is suitable for use in flat environments such as floors, tiles, and thin carpets, it is not suitable for use in environments where there are steps, the slope is too large, or the environment is too tight.
2. It is not recommended to use the robot on wet or obviously watery ground.
3. Any kind of debris such as the power cord that has been scattered on the ground may catch or wrap the robot, be sure to remove it before use.
4. The use of this product in the case of obvious protrusions such as sills may cause the food to sprinkle, please make sure that the height of the protrusions is within 1cm.
5. The minimum travel width of the robot should be greater than 80cm, the width of the long pass should be greater than 1m; if the width is greater than 2m, two robots can be set to travel side by side in opposite direction (the specific width is evaluated by the technical staff based on the actual scenario), otherwise it will move by making the way; the standard entrance of the kitchen should be greater than 1.2m, and less than 1.2m may cause certain human-machine congestion.



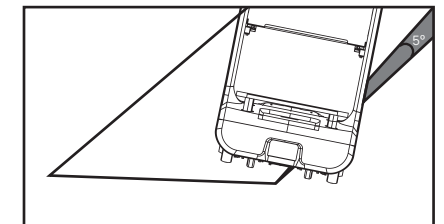
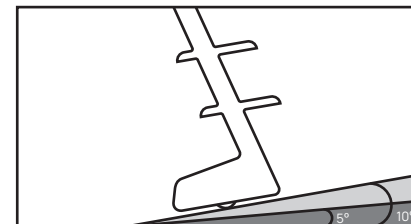
6. The pure black (such as skirting), mirror surface (such as wall), or full transparency (such as floor-to-ceiling glass) items within 10cm from the ground, it may interfere with the robot radar reflection, causing the robot to move abnormally, and it may be necessary to make some modifications to the site so that the radar can reflect (such as applying stickers).



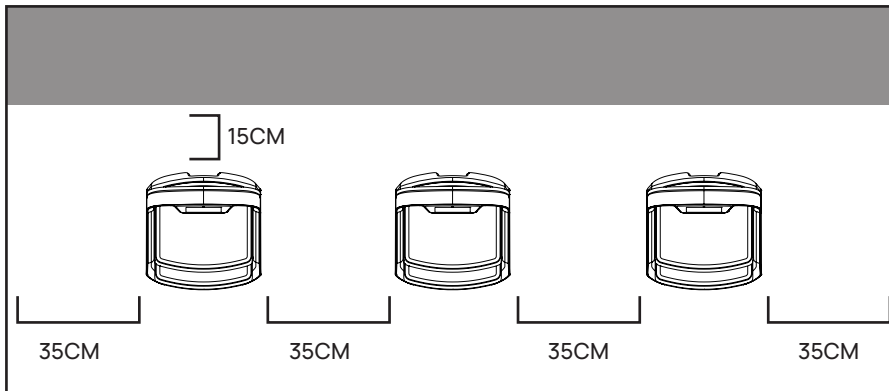
7. The ceiling height is within the range of 2-8 meters (higher or lower may require technical evaluation); taking the height of 3 meters as an example, it is necessary to apply a graphic mark every 2 meters or so, there is no lighting fixture or other strong light source in the 30cm area around the graphic mark. (Data for specific interval needs to be provided by Technology Dept.)



8. The designed maximum climbing angle of the robot is 10°, but in order to prevent the dishes from being poured, it is recommended that the slope of the dishes is within 5°; to prevent the robot from falling accidentally on the slope, the width of the slope should not be less than the minimum passing width of 0.80cm, and the rollover angle should not exceed 5°.



9. There is a 35cm space between the two robots placed side by side at the standby point, and a clearance of 15cm from the rear wall and 35cm from the side wall.



10. It is necessary to add fences or other blocking protection at the locations, such as the edge of the stairs and entrance of the downhill, where there is a risk of the robot falling.

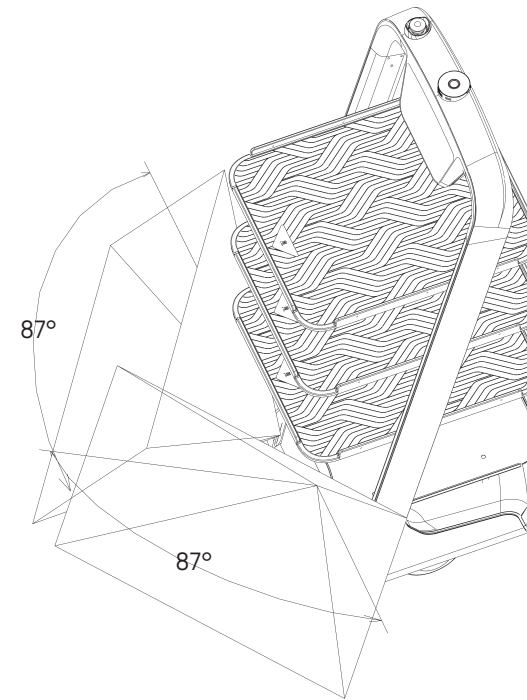
## Power and power requirements

1. When the remaining power of the robot is less than 10%, please charge it in time, as low battery operation for a long time may shorten battery life.
2. After charging, please disconnect the power supply in time, be sure not to charge for a long time when the robot is fully charged.
3. If the robot is not used for a long time, please power off the product in time to protect the battery.
4. ALWAYS use the original rechargeable battery and charging device, NEVER use a non genuine charger to charge the robot.
5. Charge the main unit according to the power supply voltage indicated on the nameplate of charger.
6. Make sure that the power supply voltage meets the voltage indicated on the charger, otherwise the charger may be damaged.
7. Carefully protect the power cord from pulling and twisting.
8. Please designate a full-time staff to charge the robot, be sure not to charge it unattended.
9. Be sure not to charge the robot near flammable or explosive objects.
10. Please keep the robot's storage and charging position dry and at normal temperature, it is strictly prohibited to place the robot and charger in high temperature area ( $>40^{\circ}\text{C}$ ), and it is forbidden to allow water entering the robot and charger.
11. It is strictly forbidden that the charger collides with foreign objects, causing damage to the charger.
12. If the charger is found damaged or the charging current is abnormal, please replace the charger in time.
13. When receiving a robot alarm, disconnect the charging device immediately.

## Safety instructions

1. DO NOT place any open flame on the tray, and DO NOT place any flammable solids, gases or liquids.
2. It is forbidden to do cleaning and maintenance work when the machine is powered on.
3. To ensure safety, it is recommended to adjust the robot speed to medium or below, and it is forbidden to play in front of the robot to avoid unnecessary injury.
4. Temporary tray loading adjustment is prohibited during the robot's travel, all operations should be performed after clicking the screen to make the robot pause.
5. When the robot delivers food to the designated table number area, DO NOT perform the operation such as picking up the food before the machine body is stopped, so as to avoid the loss of food or personal injury caused by accidental collision.
6. If the robot is going away and the screen operation is invalid, or other emergency situations occur, please use the toe to kick the emergency switch at the charging port.
7. This product is a wheeled robot, which is limited to indoor flat environment (smooth ground, slope less than 5 degrees, protrusions not higher than 1cm), DO NOT use it in outdoor environments (such as open balconies) or on rugged floors (such as stairs).
8. DO NOT use it in an environment where the ambient temperature is above 50°C or below 0°C, or if there is any liquid or viscous material on the floor.
9. Please put away all kinds of wires on the ground in the environment before use to avoid dragging when the main unit is running. Remove sharp objects on the ground (such as decoration waste, glass, nails, etc.) before use to avoid damage to the machine chassis.
10. To push or move the robot while it is moving, first tap the screen to pause it.
11. DO NOT spill any liquid into the product.
12. DO NOT place any non-transportable objects (including children, pets) on a stationary or moving robot.
13. The robot has automatic obstacle avoidance function, but it is strictly forbidden to block the robot suddenly during the high-speed operation, otherwise it may cause a safety accident.

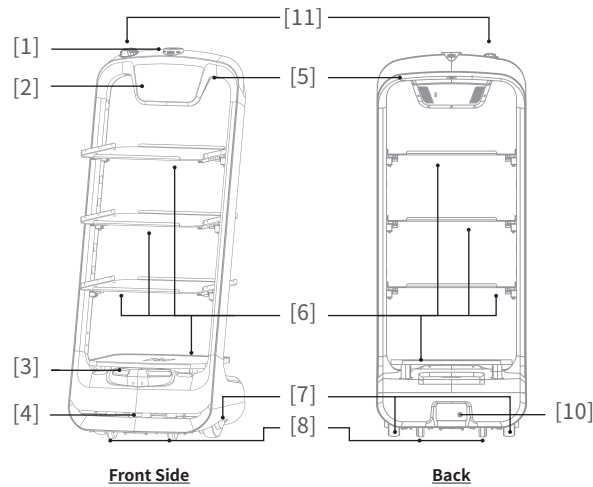
14. The blind-spot recognition area of the robot is shown below.



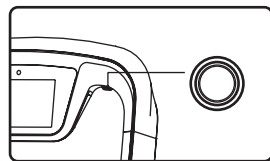
\* Our company does not assume any responsibility for all accidents caused by improper operation.

# Product Composition

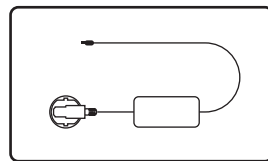
## Component description



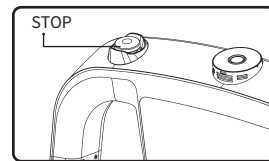
- [1] Vision positioning sensor
- [2] Screen
- [3] Depth vision sensor
- [4] Lidar
- [5] Power Switch
- [6] Tray
- [7] Drive Wheel
- [8] Auxiliary Wheel
- [9] E-stop Switch
- [10] Charging Jack
- [11] E-stop Switch



**Power Switch**



**Charging Cable**

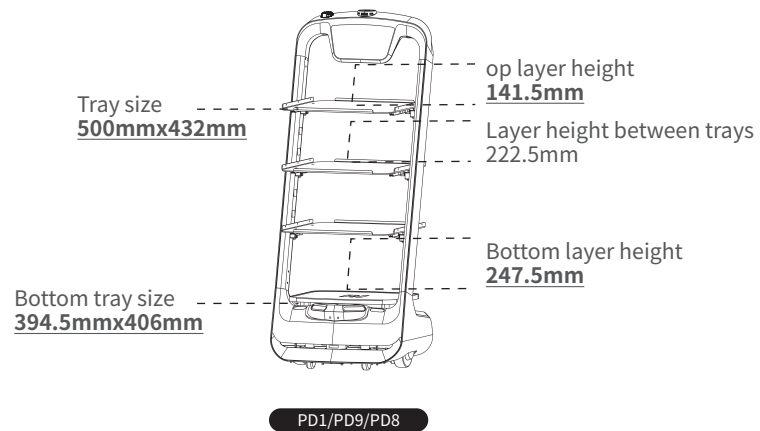
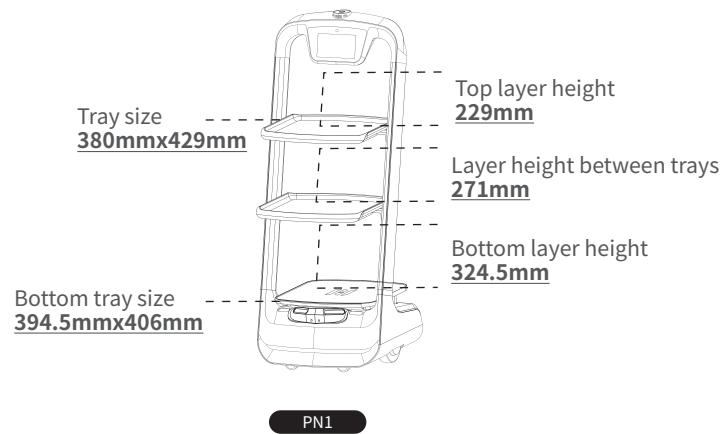


**E-stop Switch**

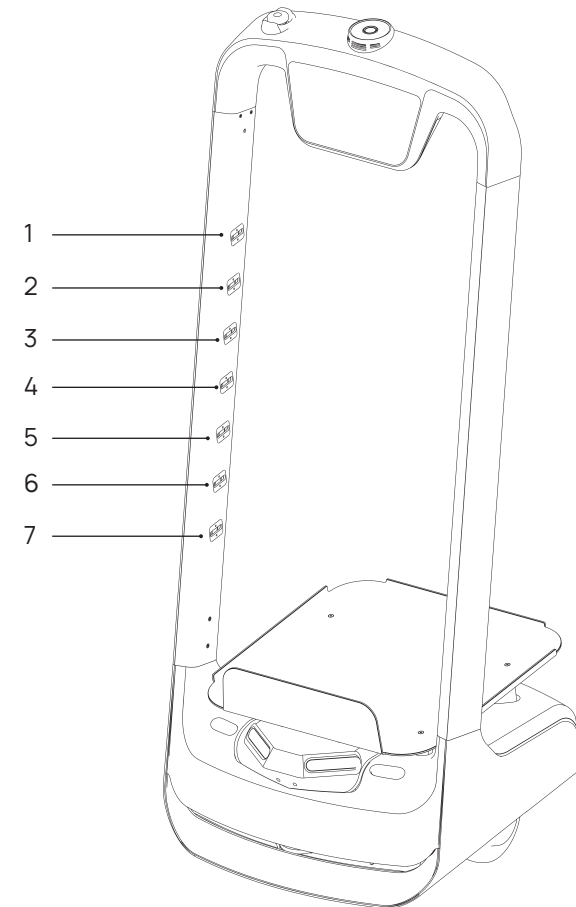
## Performance parameters

|                         |   |                         |
|-------------------------|---|-------------------------|
| Model                   | PN1/PD1/PD9/PD8   |                         |
| Operating voltage       | 24vDC 23-29V  |                         |
| Power input             | AC 100-240V, 50/60Hz  |                         |
| Power output            | 29V-4A  |                         |
| Charging time           | 4h  |                         |
| Battery lifetime        | 13~24h  |                         |
| Cruise speed            | 0.5~1.2m/s adjustable   |                         |
| Number of trays         | PN1: 3 layers   | PD1/PD9/PD8: 4 layers   |
| Tray load               | PN1: 10Kg/layer   | PD1/PD9/PD8: 13Kg/layer |
| Climbing slope          | 15° at maximum and 5-10° for safe delivery of dishes (depending on whether the dishes delivered are easy to be spilt) |                         |
| Machine material        | ABS/aviation-grade aluminum alloy   |                         |
| Battery capacity        | 15600mAh  |                         |
| Machine weight          | PN1: 30Kg   | PD1/PD9/PD8: 35Kg       |
| Machine size            | 516*500*1288(mm)  |                         |
| Screen specifications   | 7-inch HD color touch screen  |                         |
| Audio power             | 20W*2 Stereo  |                         |
| Design life             | 10 years  |                         |
| Working temperature     | 0~40°C  |                         |
| Storage temperature     | -40~65°   |                         |
| Charging method         | Manual plugging and charging  |                         |
| Operating humidity      | 85%RH   |                         |
| Environmental pollution | Grade 3   |                         |
| Operating altitude      | below 2000m   |                         |
| Working environment     | Indoor environment, flat and smooth ground  |                         |
| Enclosure               | IP20  |                         |

## Tray size and height



## Supporting 7 DOFs, with tray height adjustable

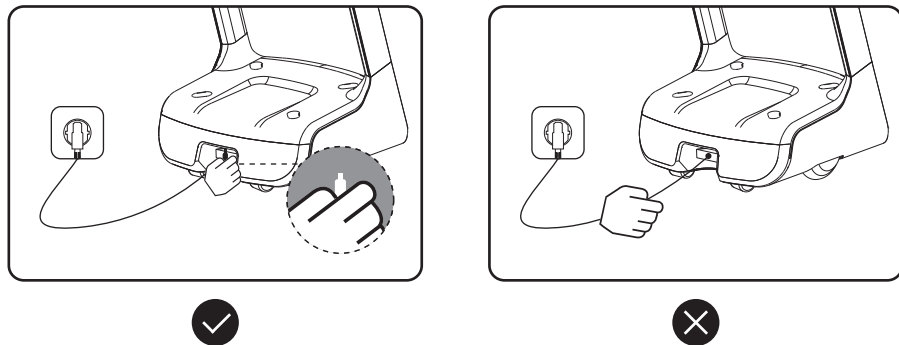




## Product Use

### Charging instructions

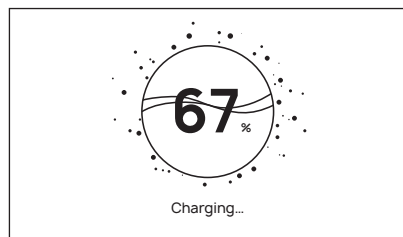
Charging mode: Connect the charging interface of the robot to the charging cable to ensure that the charging port of the robot is connected to the charging cable, if the connection is successful, the robot will prompt it is charging.



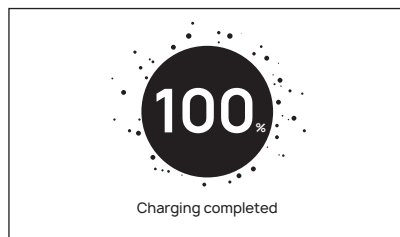
Power requirements:

1. In order to ensure the efficiency of the robot and battery life, please keep the robot power at 10% or more at any time;
2. When the power is lower than 10%, the robot is in a low battery state and needs to be charged as soon as possible;
3. When the power is lower than 2%, the battery is protected, the robot will not be able to perform the task, and it needs to be charged before use.

### Charging interface

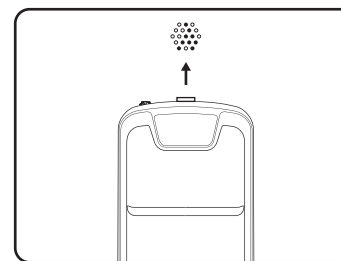


The screen displays an indication that charging is in progress, indicating that the machine is charging.



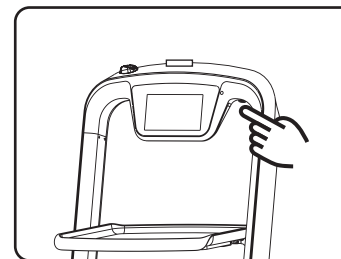
After charging is complete, the screen displays a reminder that the charging container is saturated.

### Power ON, Power OFF, Pause, Start



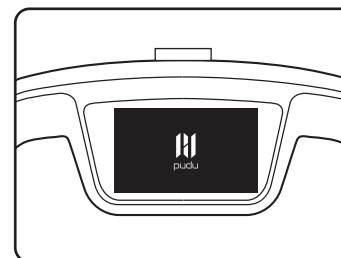
#### Before each power-on

Move the robot directly below the visual mark before each power-on.



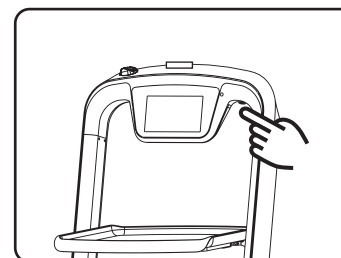
#### Power-on

Press and hold the power button for 3 seconds, and the bottom light strip will display blue.



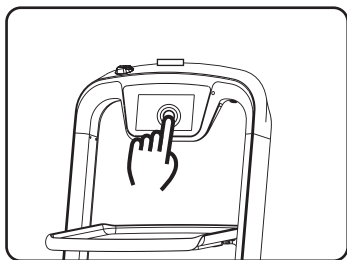
#### starting up

The screen enters the working mode, indicating that the boot is successful.



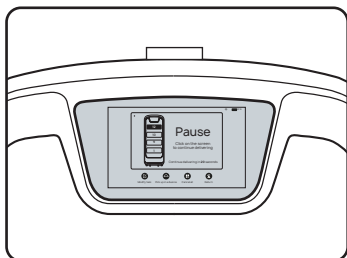
#### Power-off

Press and hold the power off button for 3 seconds, the bottom light strip is off, and the screen is black, indicating that the shutdown is successful.



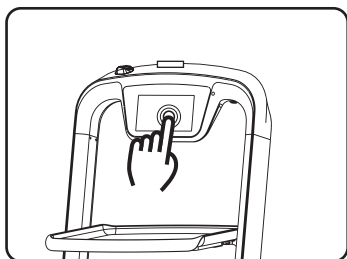
### Pause

While the robot is running, touch the screen to make the robot pause.



### Pausing

The screen enters the pause interface.

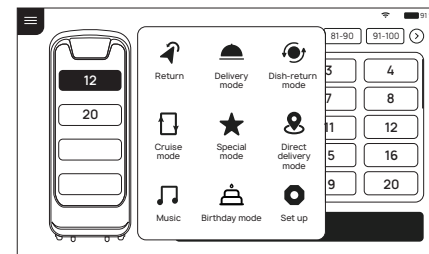


### Running

If it is necessary to continue running, you need to click the screen again. In cruise mode, if there is no other action in the pause interface, the robot will automatically resume walking after 20s, and after

## Mode selection

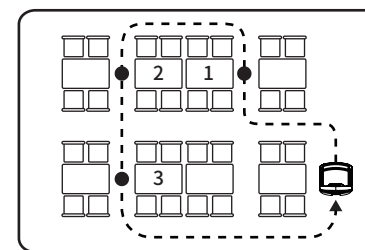
In order to be applicable in different business scenarios, the modes can be selected as required. The robot provides six mode selections, which are food delivery mode, cruise mode, direct delivery mode, B-day mode, special mode, and used plate collection mode. After the robot is turned on, the mode can be selected through the menu bar.



The direct delivery mode, B-day mode, and special mode require a purchase of license to be available, if you need it, please contact technical support personnel.

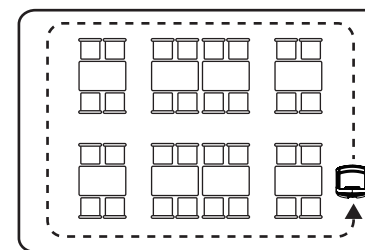
### Food delivery mode

In delivery mode, the robot can be used for food delivery to multiple tables at the same time. Place the food ordered by different customers on several trays, then enter the corresponding table number, it can plan the best path and deliver the food. After the food is delivered, the robot will automatically return to the pick-up position.



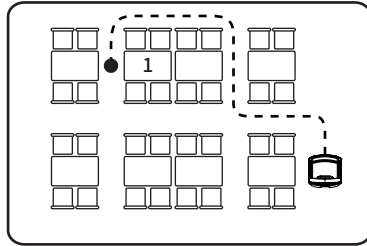
### Cruise mode

In cruise mode, it can carry self-service drinks, dessert, snacks, or paper towels, moving along the customized circulation path by the waiter, and inviting customers to enjoy or taste through voice.



### Direct delivery mode

In this mode, the robot can perform a one-way transport operation, you can set a table number, a dishwashing room or other places as the destination, after the delivery, the robot will automatically exit the task and will not return to the pick-up position, then you can enter the new destination again.



### B-day mode

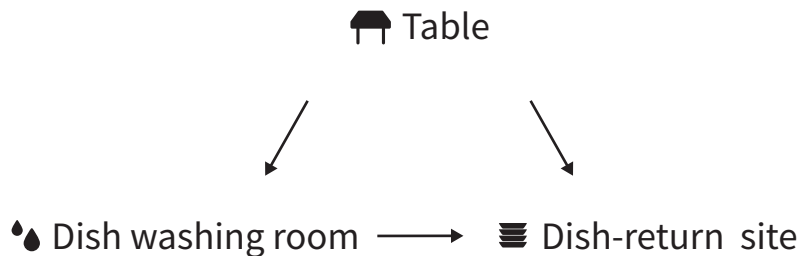
In B-day mode, the robot can provide the service of delivering birthday cakes or gifts, and automatically play the set music during the transport.

### Special mode

after selecting this mode, the interface will prompt to select background music. This mode is suitable for some special scenarios, such as marriage proposal and blessing, the robot can quickly select background music in a single time.

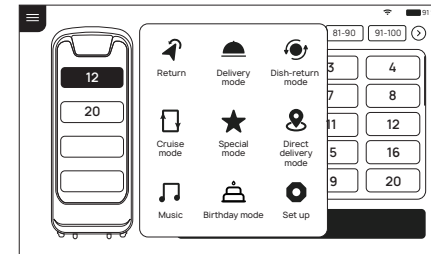
### Used plate collection mode

After selecting this mode, the robot can perform the task of collecting plates, after the collection, you can choose to let the robot return to the dish-return site or the dishwashing room. Until exiting the used plate collection mode, the tasks of collecting the used plates from the table and return to the dishwashing room are performed in a loop.

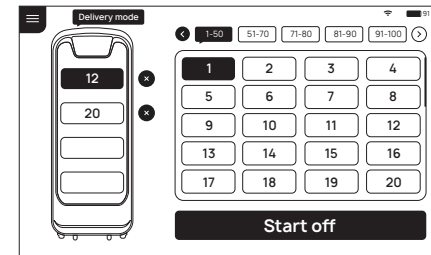


### Food delivery mode

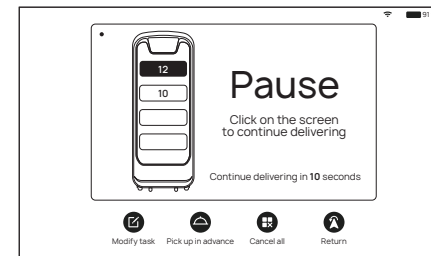
The food livery mode is a common mode, and the task delivery method is used for food delivery to a designated location, the specific steps are as follows:







1. At the food delivery location, select the Delivery Mode.
2. Place the food on the tray.

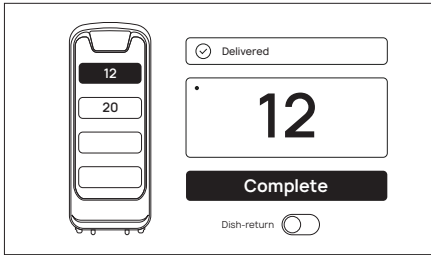


3. Click on the tray where the food is located and select the destination table number. The higher trays are automatically selected by default, and you can select the corresponding table number.
4. After the table number is entered, click to start the delivery, and the robot will start executing the task.



5. The robot quickly arrives at the designated location according to the established trajectory. During the delivery process, you can touch the robot screen to stop the command, and the robot will stop for waiting immediately, if a touch command is not received after 10 seconds, the robot will continue to perform the task.
6. After the robot is paused, the screen enters this interface, you can perform operations such as modifying the task, bringing food in advance, canceling all tasks, and returning.

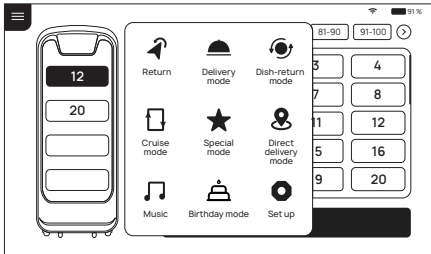
-  Click to modify the delivery table number
-  Click to cancel the current delivery task
-  Click to cancel all delivery tasks
-  Click to return to the dish ready point



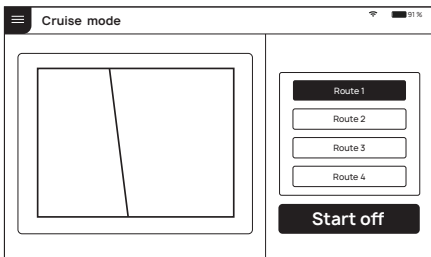
7. At the task destination, the robot will have a voice prompt to the guests that the food has arrived, and the guest can tap the screen to get the food.
8. The robot will automatically return to the food pick-up position and wait for the next task.

## Cruise mode

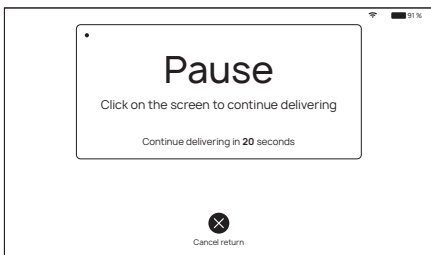
Cruise mode is a commonly used mode, the robot patrols in a specific environment, covering a large area, and the specific steps are as follows:



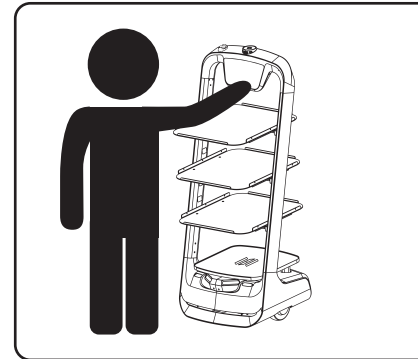
1. At the start of food delivery, select cruise mode.



2. Select the automatic cruise route.
3. Select Start and the robot will start the cruise task.



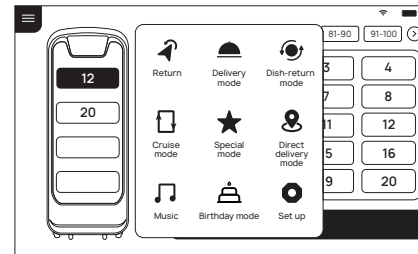
4. During the cruise process, you can touch the robot screen to stop the command, and the robot will stop for waiting immediately, if a touch command is not received after 20 seconds, the robot will continue to perform the task.



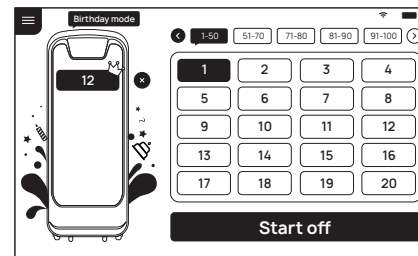
5. When picking up the food, please stand in front of the robot or touch the robot display screen, the robot stops running, and the screen enters the pause page, indicating that the robot stops running, and the diners can pick up food at will.
6. After the food is completely picked up, the diners only need to click again on the robot display or pause to wait for over 20 seconds, the robot returns to the operation mode again from the original stop.

## B-day mode

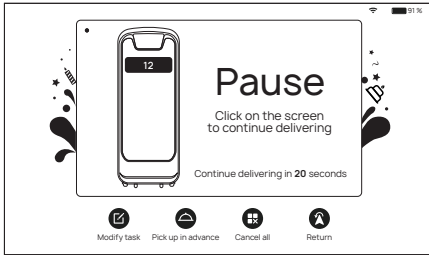
The B-day mode is used to deliver gifts and play birthday songs for birthday scenario, the specific steps are as follows:



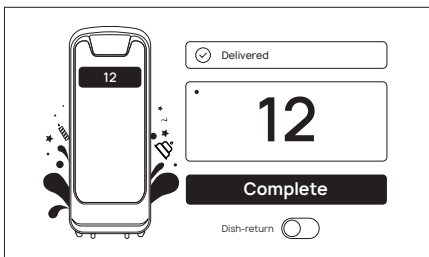
1. At the food delivery location, select the B-day Mode.



2. Place the gift on the tray, supporting only one destination at a time.
3. Select the table number of target destination.
4. After the table number is entered, click to start the delivery, and the robot will start executing the task. The robot starts playing the playlist set in B-day mode.



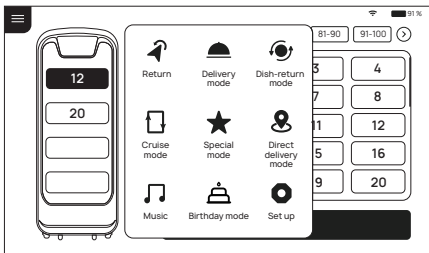
5. The robot quickly arrives at the designated location according to the established trajectory. During the delivery process, you can touch the robot screen to stop the command, and the robot will stop for waiting immediately, if a touch command is not received after 5 seconds, the robot will continue to perform the task. After the pause, the screen enters this interface, you can perform operations such as modifying the task, bringing food in advance, canceling all tasks, and returning.



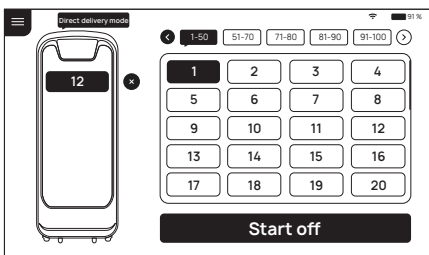
6. After reaching the task destination, click "Finish" to return to the food pick-up position.

## Direct delivery mode

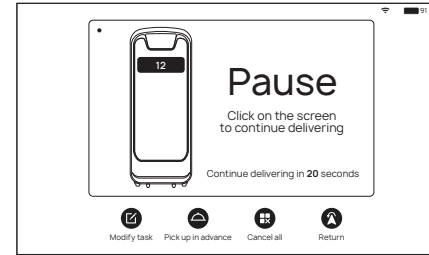
In the direct delivery mode, the robot can set any table, transfer position or food delivery position, the specific steps are as follows:



1. Select the Direct Delivery Mode.



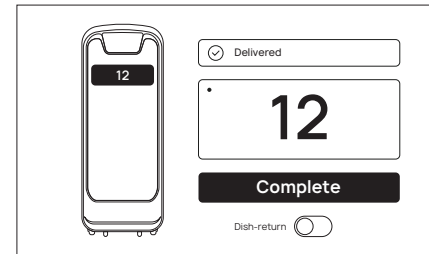
2. Select a destination, the direct delivery mode only allows you to select one destination.  
3. Confirm the destination, the robot starts execution.



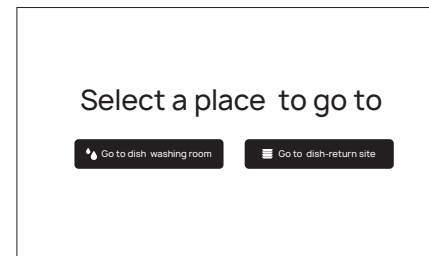
4. During the motion process, you can click the robot screen, and the robot will stop for waiting immediately, if a touch command is not received after 20 seconds, the robot will continue to perform the task.  
5. After reaching the destination, return to the main interface of the direct delivery mode, select a destination, and the robot can proceed with the next task.

## Used plate collection mode

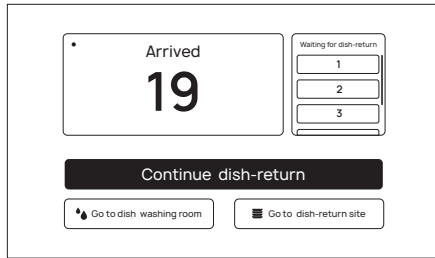
Used plate collection mode is used for the task of collecting plates, the robot can execute the command of returning to the collection position or the dishwashing room from the table. The specific steps are as follows:



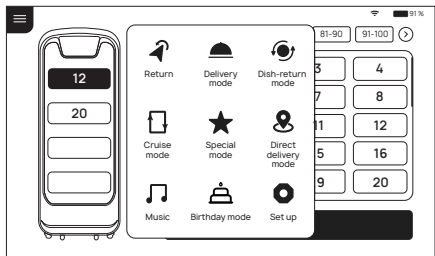
1. While delivering food, if there are plates to be collected, you can place the plates in the robot's recycling box, when the food is delivered, you can check the "Used plate collection" switch.



2. After the robot has delivered food to the last table, it will choose to go to the collection position or the dishwashing room to return the plates.  
3. If you select the collection position, the robot will go to the nearest collection position through the optimal path, if you select the dishwashing room, the robot will go to the dishwashing room through the optimal path.  
4. After reaching the collection position or the dishwashing room, the waiter can enter the table number for used plate collection to proceed with the process, or select "Return" to execute the food delivery task.



5. During the following process of used plate collection, the waiter can select the next table for collection or returning to the collection position or dishwashing room according to the recycling capacity of the robot.  
6. During the used plate collection process, you can touch the robot screen to stop the command, and the robot will stop for waiting immediately, if a touch command is not received after 10 seconds, the robot will continue to perform the task.

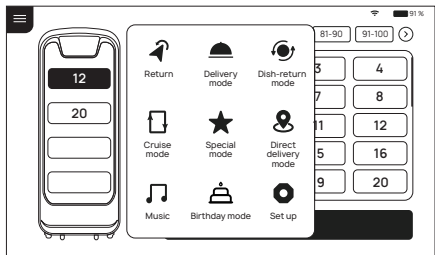


7. When the robot has no command for task, the waiter can directly choose a table for used plate collection by selecting the used plate collection mode, or go directly to the collection position or the dishwashing room.

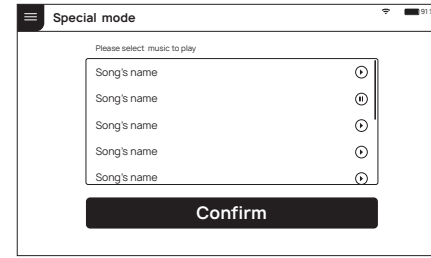


## Special mode

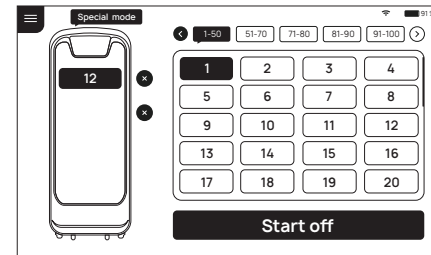
The special mode is used for food delivery services with robot in special scenario, you can quickly set the music played during food delivery, and the specific steps are as follows:



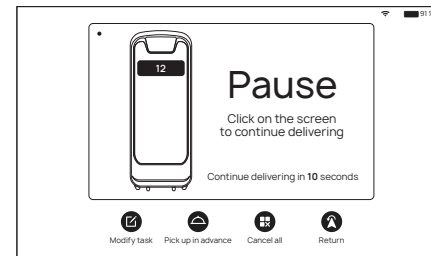
1. At the food delivery location, select the Special Mode.



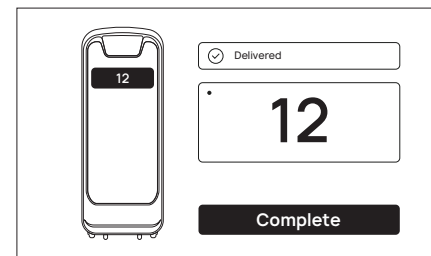
2. Place dishes or gifts on the tray, supporting only one destination at a time.



3. Select the background music used for the service, and choose the table number for the food delivery.  
4. After the table number is entered, click to start the delivery, the robot will start executing the task and start playing the playlist set for the Special Mode.



5. The robot quickly arrives at the designated location according to the established trajectory. During the delivery process, you can touch the robot screen to stop the command, and the robot will stop for waiting immediately, if a touch command is not received after 10 seconds, the robot will continue to perform the task.

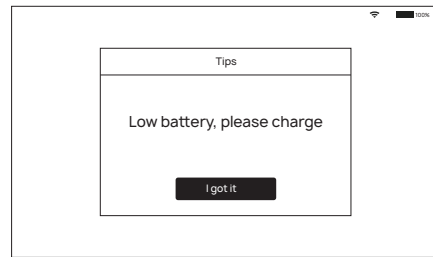


6. After reaching the task destination, click "Finish" to return to the food pick-up position.

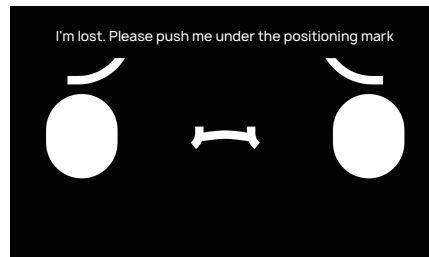
## Alarm display

In the following cases, the robot will stop working and give an alarm tone, the tablet interface will prompt the corresponding instructions, and the machine will need your assistance.

| Alarm display  | Solutions  |
|--|--|
| Battery is too low   | Please push the robot back for charging(Figure 1)        |
| Loss of positioning  | Push the robot directly below the visual mark (Figure 2) |
| The drive wheel, the auxiliary wheel is stuck or entangled | Please clean the drive wheel, auxiliary wheel            |
| Suspended  | Please put the robot on the flat ground                  |



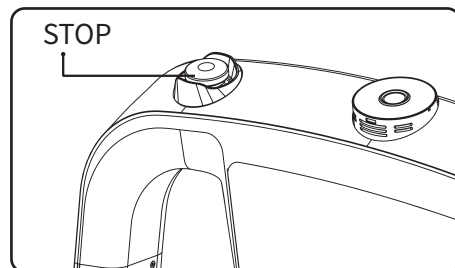
(Figure 1)



(Figure 2)

## Emergency handling

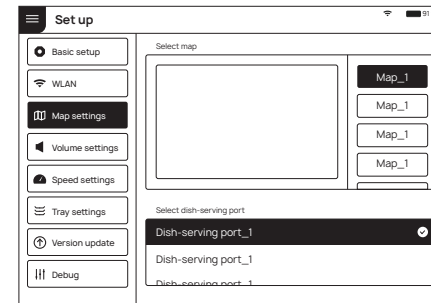
An abnormal state of the robot or an unexpected situation may cause damages to the surrounding environment, the user can press the emergency stop switch on the top of the robot to stop the robot.



## Service functions

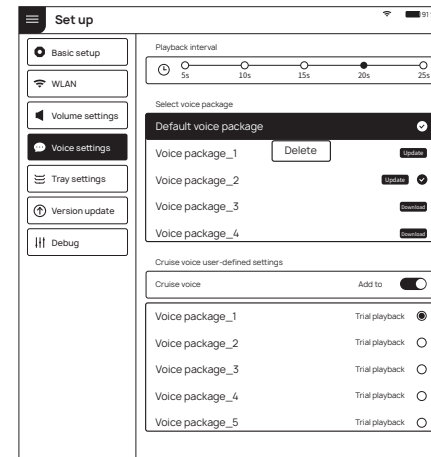
### Map settings

In the “Map settings” function, you can select from multiple maps. In the robot one-to-one parking mode, select the current map to configure the parking position for the robot.



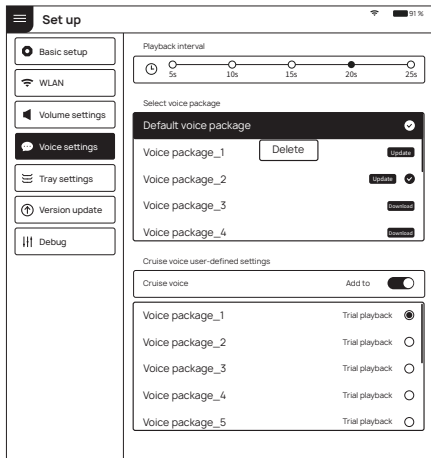
### Voice settings

The “Voice settings” function provides voice packet replacement and custom settings of cruise voice.



1. Check the available voice packets for update support and choose to download the voice packets.
2. After downloading, select the corresponding voice packet for replacement.
3. Select “Default” to restore the default voice packet
4. Press and hold the voice packet to delete it.

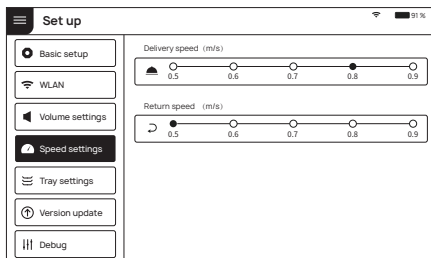
The operating steps for custom settings of cruise voice are as follows:



1. Select “Add voice” to pop up the voice text editing box, enter the text to be played, and click OK to generate a custom voice.
2. It supports adding multiple voices, if multiple voices are selected, these will be played at random.
3. Turn off the cruise voice switch to restore the default voice packet
4. Click for voice preview, press and hold a voice packet to delete it.

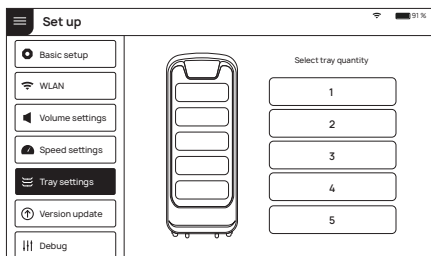
## Speed settings

With the “Speed settings” function, you can set the food delivery speed and cruise speed respectively, supporting the speed settings of 0.5m/s, 0.6m/s, 0.7m/s, 0.8m/s and 0.9m/s.



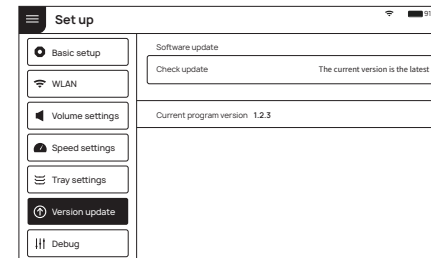
## Tray settings

With the “Tray settings” function, you can choose the number of trays for food delivery, supporting 5 layers of trays.



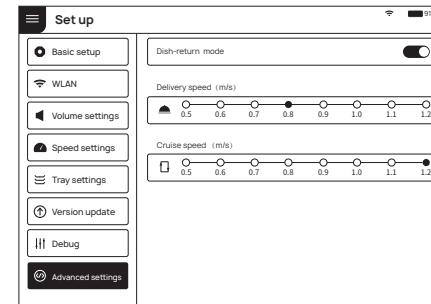
## Version upgrade

With the “Version upgrade” function, you can check the current version and whether it is up-to-date. If it is not up-to-date, you can choose to check for updates, download and update the latest version.



## Advanced settings

Select “Advanced settings” to choose the mode of used plate collection. You can also set the speed for food delivery mode and cruise mode, which supports 1.0m/s, 1.1m/s and 1.2m/s.

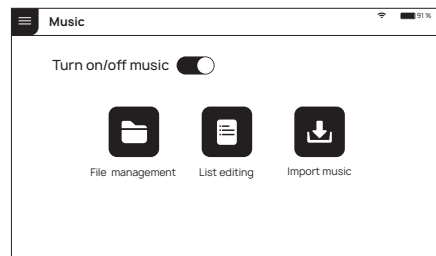


Note: The commissioning setting is advanced robot operation, which requires consulting technical support personnel before proceeding with the operation, the Company does not assume any responsibility for all accidents caused by unauthorized operation.



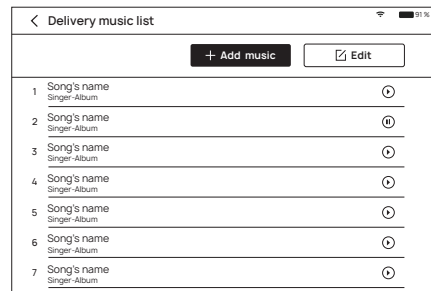
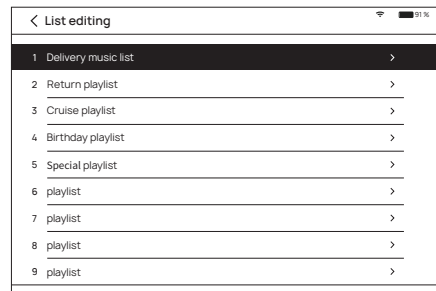
## Music function

Select the “Music” switch to control the playback and start of the music.



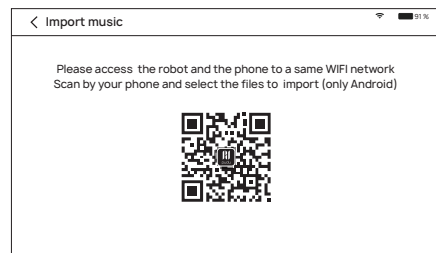
## Music playlist

Select “List editing” to view the music settings of each music mode. Click the corresponding list to view the music playlist. With the “Edit menu” function, you can modify the configuration list, and you can click “Add music” to configure other music.



## Music import

The user can use a mobile phone to connect to the same Wifi with the robot, and can scan directly to upload music. When uploading music files, you need to make sure that the uploaded files are in music format.



## Parking instructions

Depending on the size of the restaurant, there are three robot parking options available.

1. One-to-one parking: fixed parking locations can be set for each robot.
2. Free mode: multiple parking locations can be set the robots, and the robots can be parked according to priority.
3. Parking replenishment mode: In addition to the settings of parking locations in 1) and 2), you can also set temporary parking locations in other areas, and when there is location available, the robot can automatically go to the parking location for replenishment. When a robot is parking at non-parking location with no task designated, you can choose the “Return” command to let the robot return to the parking location automatically, or push the robot to the parking location.

Note: The robot at the temporary location will display "Temporary parking" in the normal state, when there is location available at food pick-up position, the robot will automatically to the pick-up position for parking.



## Product Maintenance

### Trays, drive wheel and auxiliary wheel

Keep the tray clean and clean with a clean cotton cloth, Please check for cleaning at least once a week. When the bottom wheel is entangled or stuck by debris, the robot needs to be lifted for cleaning.

### Sensor maintenance

Inspect and clean the positioning sensor on the top and the 3D obstacle avoidance sensor at least once a week. In case of unexpected contamination, be sure to clean it immediately so as not to block the sensors and cause abnormal operation of the product. Use soft tissue or other lens cleaner for cleaning.

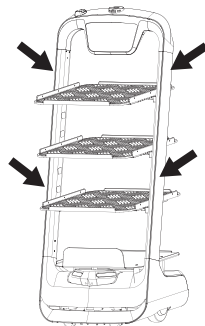
### Robot body maintenance

Keep the robot body clean with clean cotton cloth. Do not lift, climb, bump, push, or break the robot or stack things on its body. If it operates abnormally, do not uninstall any screw or open any cover without permission or instruction of our technical support engineers.

### Handling of robot

During the transportation of the robot, it is necessary to meet GB/T 4857.23-2012 requirements for road transport of steel spring vibration-damped trucks, please use forklifts and other handling tools for transportation.

The robot is a valuable equipment, when you need to manually move the robot, please strictly follow the instructions below. As shown in the figure, the left and right profiles of the robot (indicated by the arrows) are the parts that can be stressed, and you can lift the robot through this part. Please ask two colleagues to lift the profile from both sides, pay attention to balance, and keep the robot's upright posture during the handling. It is strictly forbidden to carry out the handling by lifting the tray.



### Sign maintenance

No other objects (such as balloons, barbed wire, slogans, etc.) can be hung directly under the sign, and no billboards or safety exit signs can be hung near the sign; pay attention not to damage the sign during routine ceiling cleaning and maintenance, and the sign cannot be moved or rotated.

## Troubleshooting

### POST fails

If the robot has sufficient battery power, restart the robot under the positioning mark, if the self-test still fails, please contact the after-sales service personnel in time.

### Robot stops during operation

1. Click the interface to show the pause page, the robot pauses, click again to run normally.
2. Voice prompt "Excuse me": Click the screen to pause the robot, then the robot will be on the right track, then click Continue.

### "Signal Loss" prompt

The robot interface prompts "I am lost, please push me directly below the positioning mark". At this time, the robot will issue a voice prompt for help, please push the robot directly below the positioning mark.

### Robot can't boot normally

1. Check if the emergency switch is pressed or damaged, if it is damaged, please contact customer service.
2. The battery is insufficient, please connect the robot through the adapter for charging.
3. For other reasons, please contact customer service staff for processing.

## After Sales

### Free Warranty Services

Shenzhen Pudu Technology Co., Ltd undertakes that, under the following circumstances, from the date of product sale, a free product warranty service will be provided during the warranty period (the warranty period for different parts of the product may vary, see the list in appendix for details), and the customer does not need to pay for the inspection, labor, replacement parts, test fees and courier charges for the repairs. When the warranty period expires, a certain fee will be charged according to the normal price. Please contact the After-sales Service Hotline on official website for product maintenance.

### The following conditions must be met for the free warranty services

1. The purchased product is under normal use within the specified warranty period, and a non-human failure of performance occurs.
2. There is no unauthorized disassembly, no modification or addition against non-official instructions, and other non-human failures of performance.
3. The product serial number, factory label and other indications are not torn or altered.
4. Valid proof of purchase, documents and order number are available.
5. Damaged spare parts replaced during the free warranty period are owned by Pudu Technology and should be returned as requested by the Company, otherwise the Company reserves the right not to grant free warranty service.

### The free warranty service does not cover the following circumstances

1. Deliberate collision or burning accident caused by quality problems resulted from human operations, but not related to product.
2. Damage caused by unauthorized modification, dismantling, shell opening, etc., against unofficial instructions.
3. Damage caused by improper installation, use and operation that are not instructed by the instructions.
4. In the absence of official instructions, the damage caused by the customer's unauthorized repair to the assembly.
5. Damage caused by circuit modifications, improper use of battery packs and chargers against non-official instructions.
6. Damage caused by use over the safe load weight.
7. Damage caused by insufficient discharge when the battery is low or when using a battery with quality problems.
8. Failure or damage caused by force majeure factors (such as earthquakes, fires, etc.).
9. Other circumstances that do not meet the free warranty conditions.

### Under one of the following circumstances, a request for return can be made

1. Within 7 natural days after the customer receives the goods, the product has no manufacturing defects, the product packaging, accessories, gifts, and instructions are complete, and there is no human damage, and no impact on resale.
2. Within 7 natural days after the customer receives the goods, the customer finds obvious manufacturing defects before the goods are used.

### Under the following circumstances, we have the right to reject the customer's request for return

1. The goods were damaged, but the delivery person was not required for return on the spot upon customer's receipt of the goods.
2. The request for return is made after the valid period of 7 natural days for return of goods expires (calculated from the date of receipt).
3. The returned product is incomplete, the outer packaging, accessories, gifts, and instructions are incomplete, or the appearance has human damage.
4. Legal proof of purchase or receipt cannot be provided when returning, or to forge or alter the documents.
5. The occurrence of collisions, burns, and artificial modifications, the introduction of foreign objects (water, oil, sand, etc.), improper installation, failure to use and operate according to the instructions.
6. Tearing, altering of labels, machine serial number, waterproof mark, anti-counterfeit mark, etc.
7. Product damaged by force majeure such as fire, flood, lightning, traffic accidents, etc.
8. After contacting PuduTech to confirm the return service, if the corresponding item is not sent within 7 days from the date of contacting PuduTech, PuduTech has the right to reject such request.

### Under one of the following circumstances, a request for replacement can be made

1. Within 7 natural days after the customer receives the goods, the product has no manufacturing defects, the product packaging, accessories, gifts, and instructions are complete, and there is no human damage, and no impact on resale.
2. Within 15 natural days after the customer receives the goods, the customer finds obvious manufacturing defects before the goods are used.
3. Within 15 natural days after the customer receives the goods, the product cannot be started properly according to the instructions or under the guidance of the technicians after unpacking, or a non-human quality defects of the product is found.
4. The customer unpacks and inspects the goods in front of the delivery person upon receipt of the goods, and finds that the product is damaged due to transportation.
5. There is a clear discrepancy between the goods actually received and the description.

### Under the following circumstances, we have the right to reject the customer's request for replacement

1. When making the request for replacement, the customer fails to provide legal proof of purchase or documents, or the customer forges or alters the documents.
2. The goods were damaged, but the delivery person was not required for return or replacement on the spot upon customer's receipt of the goods.
3. The request for replacement is made after the valid period of 15 natural days for replacement of goods expires (calculated from the date of receipt).
4. The returned product is incomplete, the outer packaging, accessories, gifts, and instructions are incomplete, or the appearance is with human damage.
5. The goods are tested by the technical support department of PuduTech, and no quality problem is found with the product itself.
6. The occurrence of collisions, burns, and artificial modifications, the introduction of foreign objects (water, oil, sand, etc.), improper installation, failure to use and operate according to the instructions.
7. Tearing, altering of labels, machine serial number, waterproof mark, anti-counterfeit mark, etc.
8. Product damaged by force majeure such as fire, flood, lightning, traffic accidents, etc.
9. After contacting PuduTech to confirm the return service, if the corresponding item is not sent within 7 days from the date of contacting PuduTech, we have the right to reject such request.

### Process of after-sales service

1. Please contact PuduTech's technical support personnel at hotline: 400-0826-660 in time.
2. PuduTech's technical support personnel will record your product information in relevant forms.
3. PuduTech's technical support personnel will verify and carry out follow-up processing as soon as possible within 7 working days.

### Notice for goods replacing & returning & free-maintenance

1. Free door-to-door service  
The after-sales technical personnel will evaluate the application report you submitted and negotiate with you at the first time for the best solution such as remote technical support or door-to-door maintenance, and will handle it in time to give you the most satisfactory reply.
2. Processing time of returning goods  
After your application for return is approved, PuduTech will handle it within 7 days after the date we recorded when we received your problem goods in our official website.

### 3. Processing time of replacing goods

After your application for replacement is approved, PuduTech will handle it within 15 days after the date we recorded when we received your problem goods in our official website.

### 4. Processing time of maintenance

After your maintenance application is approved, PuduTech will repair the problem goods within 30 days after the date we recorded when we received your problem goods in our official website. The repair time will be delayed if there is national holiday or after-sales service center of some brand manufacturers is delayed. Please understand the inconvenience.

### 5. Processing time of refund

The refund will be paid to your bank account within 10 working days after PuduTech receive your refunding goods. Please check with your issuing bank for details.

## After-sales Service Beyond the Scope of the Warranty

For after-sales services that are not covered by the free warranty (exceeding the warranty period or not meeting the free warranty terms during the warranty period), PuduTech provides after-sales services with a certain fee.

## Remote technical guidance service

Pudu Technology officially provides online and remote technical support channels (please refer to the product manual for details) to provide customers with technical guidance for remotely answering usage problems and preliminary problem diagnosis.

## On-site service

If Pudu Technology engineers diagnosed that they must go to the site to solve the problem, the Company may assign professional and technical personnel to provide on-site services.

## Standards for after-sales service fees

For after-sales services that are not covered by the free warranty, you need to fill in the Pudu Technology After-sales Service Record Form, as shown in Annex IX; the after-sales service costs of the Company include: spare parts costs and maintenance costs;

a. For the after-sales issues with remote technical guidance services provided by Pudu Technology technicians and assistance by customers, Pudu Technology only charges the cost of spare parts;

b. For the after-sales issues with on-site services provided by Pudu Technology technicians, the after-sales service costs include spare parts costs and maintenance costs, and the maintenance costs will be charged at: 500 Yuan/day in Guangdong Province and 1,000 Yuan/day outside Guangdong Province;

## After-sales Service Contact

If you have any question, please call our service hotline: 400-0826-660

## Main Parts Warranty

| Main components                     | Warranty period |
|-------------------------------------|-----------------|
| Upper computer master control board | 12 months       |
| Upper computer expansion board      | 12 months       |
| Upper computer cooling fan          | 12 months       |
| Lower computer master control board | 12 months       |
| Audio amplifier board               | 12 months       |
| Lidar                               | 12 months       |
| RGBD vision sensors                 | 12 months       |
| Audio device                        | 12 months       |
| Camera module                       | 12 months       |
| Trays                               | No              |
| Chassis lower front shell           | 12 months       |
| Chassis left shell                  | 12 months       |
| Chassis right shell                 | 12 months       |
| Display assembly                    | 12 months       |
| Waterproof light strip              | 12 months       |
| Universal wheel                     | 12 months       |
| DC hub motor                        | 12 months       |
| Battery                             | 12 months       |
| E-stop switch                       | 12 months       |
| In-line charger                     | 12 months       |