# Multi-Scenario Intelligent Delivery Robot

# S2

# User Manual

**【Safety and Reference】**

Thank you for purchasing our product.

Please read this manual carefully before use to facilitate the full performance of the product and prevent accidents.

Please retain this manual for future reference.

The model and serial number of the product are located on the back of the product. Please quote them in case you ever need service.

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# Content of the Manual

# Important Notice Before Use

## User Notice

- Please read the User Manual carefully to ensure a comprehensive understanding of the product before use.
- Do not start using this product without the assistance of professional personnel. Only personnels who have received training or whose knowledge and practical experience are sufficient to ensure the products' normal operation can operate and use the equipment. Only technicians who have read and understood this manual, and have been equipped with relevant theoretical knowledge and practice are qualified to deploy this equipment.
- Only our company's technicians or specially authorized technicians can debug and repair this equipment. Any unauthorized repairing and maintaining this equipment will result in the termination of the warranty.
- Any improvements made to this product based on new technologies will not be declared separately.

## User Safety Instructions

- This robot must be installed and deployed by professional personnels, otherwise it may cause damage to the equipment.
- If the equipment requires maintenance or replacement of accessories, please contact your dedicated after-sales technician. Users are not allowed to replace any part of the equipment without permission.
- Do not force to open the cabinet door or press the "POWER" button during the operation of the robot, in order to prevent clamping or adverse effects on the robot, such as reducing the service life of the robot.
- Do not place the equipment in a place where it is susceptible to water, moisture or dust, as which may damage the circuit boards in the robot chassis.

## Robot Use Restrictions

- This product cannot be tilted or inverted. Do not tilt or invert the robot without authorization to avoid damaging the robot or causing accidental personal injury.

- Do not use the robot in an overhanging environment (such as stairs) or in an environment without a guardrail.
- Do not use the robot in an environment in which temperature is higher than 55℃ or lower than -15℃, or in an environment where there are liquids and viscous substances on the ground.
- Please pack up all existing wires on the ground before use, to avoid the robot from dragging and pulling them while operation.
- Please remove any sharp object on the ground (such as decoration wastes, glass, nails, etc.) before use, so as to avoid causing damage to the robot chassis.
- Please do not place any non-transportable object (including children and pets) on a static or running robot.
- Do not push or transfer a running robot.
- Please clean and maintain the robot and the charging pile when it is turned off or powered off. Please use a dry or wet cloth to gently clean the dust or stains on the surface, and do not drip water into the interior of the robot.
- Do not hit the robot with hardor sharp objects.
- Do not spray any liquid to the internal of the robot.
- Since robots are electronic products, please keep them away from fire.
- In case of transportation, please ensure the robot is in shut-down state. It is highly recommended to use the original packaging box for packaging.
- Please use the robot strictly in accordance with the User Manual to avoid any loss or injury caused by improper use.

## Environmental Necessities

| Environment Requirement | Description |
|---|---|
| Operation Temperature | -15℃-55℃ |
| Operation Relative Humidity | ≤80% |
| Pavement Requirement | Flat without steps<br>(Carpet floor's thickness less than 15mm) |
| Operation Conditions | • No dust<br>• No corrosive gas |
| Location Requirement | • Storage temperature is -20℃ to 60℃.<br>• Keep away from direct sunlight as well as humid environments.<br>• Keep away from dust, corrosive and combustible objects.<br>• The load-bearing capacity of the floor placing the robot shall be more than 100KG. |

# Product Information

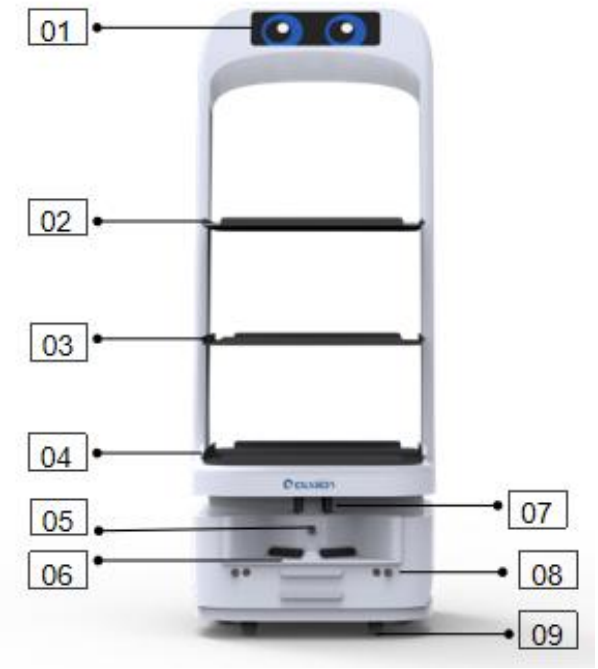
## Brief Introduction of the Product

Multi-Scenario Intelligent Delivery Service Robot (S2) is an intelligent electronic product that can be applied to various indoor environments such as restaurants, KTVs, hotels, buildings, shopping malls, business offices, factories, etc..Equipped with an one-stop intelligent mobile chassis and self-developed Q-SLAM algorithm, including environmental perception system, intelligent obstacle avoidance system, and active suspension system, S2 can achieve such functions as initiative delivery, intelligent cruise, autonomous navigation, dynamic 3D obstacle avoidance, wireless communication, automatic charging, voice broadcasting and acoustic and visual reminders. The storage space S2 possesses can be designed and adjusted based on the actual objects, which is able to ensure the flexibility, safety and convenience in the process of delivery. The robot can autonomously operate according to instructions, and achieve not only efficient delivery but also safe human-machine cooperation through low-speed autonomous driving.

## Product Appearance

### Robot Appearance

## Robot Schematic View




01——Expression Panel

02——First Tray

03——Second Tray

04——Third Tray

05——Camera for Recharging

06——3D Structure Camera

07——Laser Radar

08——Ultrasonic Sensor

09——Auxiliary Wheel


10——Android Operation Panel

11——Emergency Stop Button

12——Power Switch

13——Android USBInterface

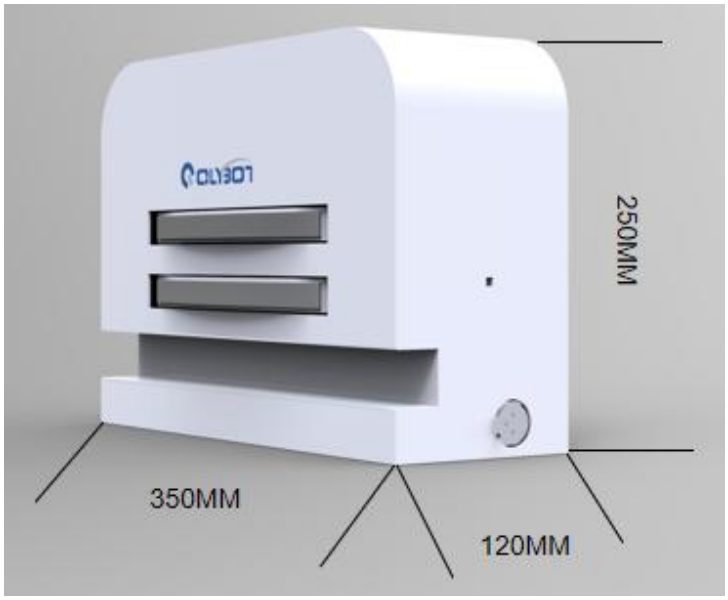
14——Air Switch

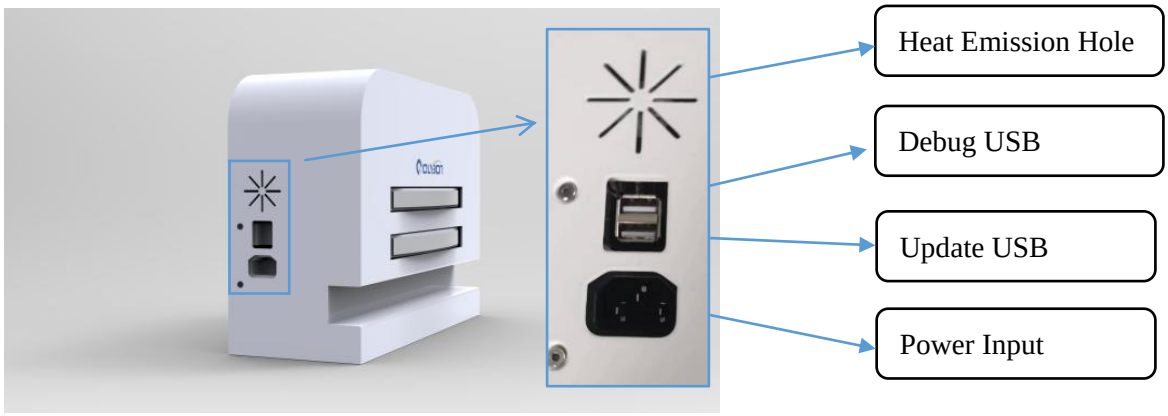
(Inside the debugging cover board)

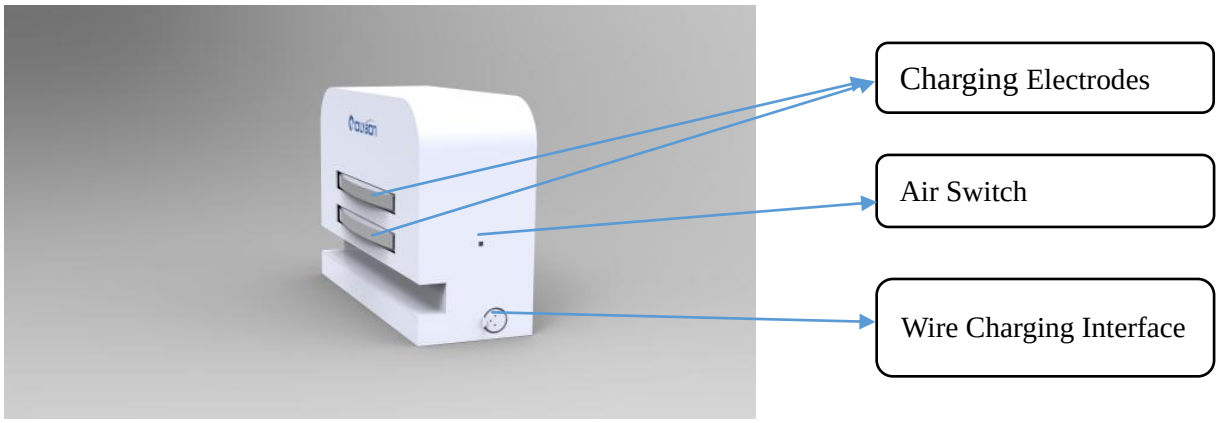
15——On-off of Debugging Cover Board

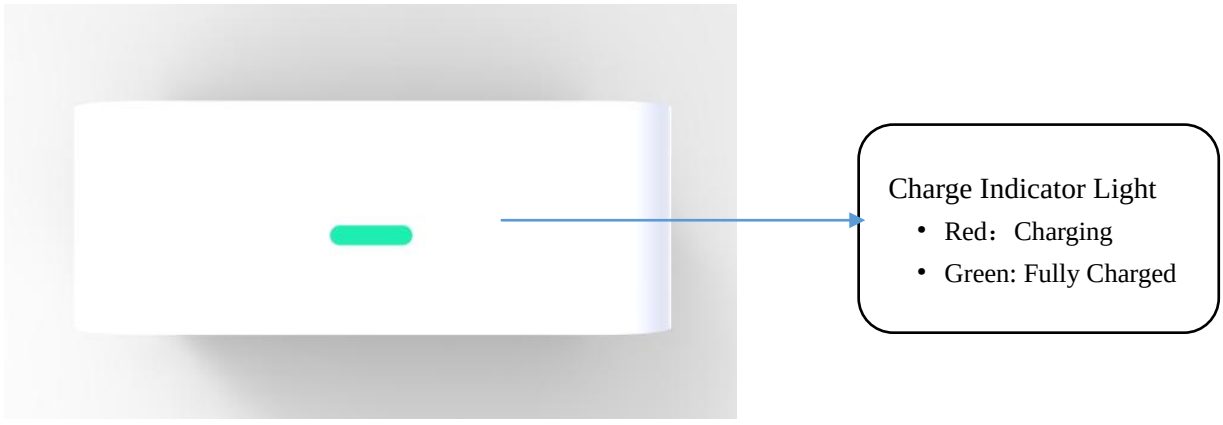
16——Wire Charging Interface


## Charging Pile Schematic





## Specifications

In order to continuously improve product functionality,product specifications may be changed without prior notice.

The relevant data (such as charging time, battery duration, etc.) in the following table are obtained from the normal use of the robot, and the actual data may vary depending on the use environment, use frequency, and user habits.

| Robot Specification | | |
|---|---|---|
| Robot Dimensions | Model | S2 |
| | Size | 492mm*585mm*1314mm |
| | Weight(Without Cover) | 45KG |
| | Weight(With Cover) | 58KG |
| | Maximum Single TrayLoad | 20KG |
| | Maximum Robot Load | 100KG |
| | Tray Quantity | Three layers (Tray space can be adjusted as needed) |
| | Tray Size | 440MM*490MM,Height250/280MM |
| | Wheel | Two Driving Wheels Plus Four Universal Wheel （Suitable for various types of floor） |
| | Screen Size | 10.1Inch Capacitive Touch Screen |
| | Screen Resolution | 1280（RGB）*800(FHD) |
| | Pixel Density | 149PPI |
| | Rated Power | 50W |
| Navigation and Position Performance | Laser Radar | One with detection range of 0.1M to 20M |
| | Ultrasonic Sensor | Two in the Front of Chassis |
| | Camera | Two cameras：<br>• Resolution:640X480<br>• Field angle: 70 °~90 °<br>• Focal length: 4mm<br>• Dynamic Range≥1:1000<br>• Minimum illumination≥0.02Lux |
| | Navigation Mode | Laser SLAM（oriented）andMulti-sensor Fusion |
| | Position Accuracy | Automatically recognize their own environment and position based on the surroundings, achieving a position accuracy of 10cm (environment without potholes, slipor stairs) |
| | Static Obstacle Avoidance(Objects) | Automatically avoid staticobstacles, excluding obstacles with non-fully absorbent materials |

| | | |
|---|---|---|
| | Dynamic Obstacle Avoidance (Persons) | Autonomouslyavoid persons in motion |
| | Low Object Avoidance | Avoid low objects（not less than 10cm*15cm）close to the ground |
| | PassingWidth | 800MM |
| | Maximum Obstacle Height | 7mm |
| | Maximum Gradeability | 7 ° |
| | Speed | 0.8m/s-1.2m/s |
| Battery Information | Charging Mode | Automatic Recharge(Charging Plie) or Manual Recharge |
| | Battery Capacity | 24V/20AH |
| | Charging Time | 3h-4h |
| | Battery Duration | 10h-20h |
| Communications | WIFI | For debugging robots and uploading operational data |
| | 4G Module(Optional） | For communication between robot and cloud server (SIM Card) |
| | Near-field Module(Optional) | For robots' near-field communications with elevators, gates and auto-doors |
| Voice | Voice Interaction | Equipped with full frequency dual speakers (power of 10w each) and Support customized audio playback |
| Lighting | Light Interaction | With working light |
| System | Version Upgrade | Online firmware upgrade and APP version update |
| | Operation System | Android 7.0 |
| **Charing Pile Specification** | | |
| Size | | 350*120*250mm |
| Weight | | 7.6KG |
| Voltage | | 100-220V/50HZ |
| Charging Indicator | | Red and Green |

# Product Use Instructions

This product is delivered as a complete machine with a pre-installed system, and can be normally used after debugging by authorized technician. No more assembly or installation require.

## Power Supply Requirement

| | |
|---|---|
| Power Supply | Voltage: 100V-240V/50HZ<br>Power Input: 210W |

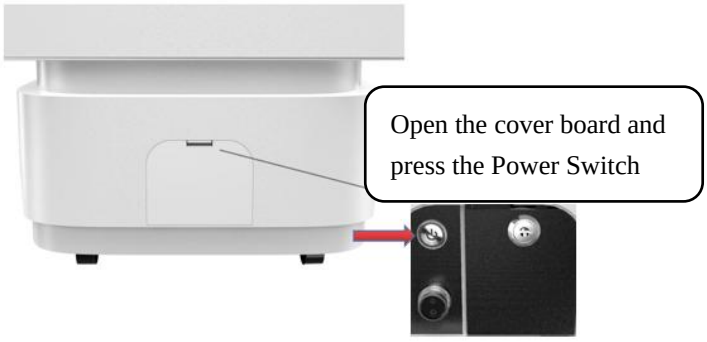
(Depending on country)

The power socket or switch used to power the robot should comply with national electrical standards, and the socket or switch should be securely and reliably grounded. In addition, the power socket should be located in a place where is convenient for workers to check the power supply daily, so that in case of equipment failure, the power can be cut off in time.

## Power On and Off

As shown in the following figure, press the “Power Switch” to start up the robot, observe the screen to enter the APP Operation Interface, which shows the robot is ready to be used.

In the same way, press the “Power Switch” to power off the robot.



## Operation Instructions（Put a robot into service）

### Pre-Mapping Before Use

Before use, technician shall pre-create maps and pre-record delivery pointsfor the robotBefore moving autonomously, the robot needs to familiarize itself with the surroundings, store and recognize its operating environment in the form of map, which is called mapping.

⚠

This step will be only completed by professional technicians.

Users are not allowed to operate by themselves.

### Delivery Operation

Depending on the map pre-built by the technician in accordance with the scheduled delivery environment, the robot can start to perform the normal delivery tasks.

For the robot's daily use and function adjustment, users can reset it step by step by referring to the following **[User Interface Operation Instructions]** in this Manual. It is highly recommended that the after-sales technician shall provide the users with corresponding user interface operation training.

⚠

Please strictly follow the User Interface Operation Instructions to fully utilize the system functions.

### Charging Pile Fixing

To facilitate the robot's automatic recharge function, the matched charging pile needs to be placed inside the robot's operating location for convenient charging. The installation of the charging pile shall be completed by professional technicians.

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Once fixed, please do not move the charging pile without authorization!

### Intelligent Automatic Recharge

According to the setting, in case of battery life below 8%, the robot will automatically return to reach the charging pile for recharge.

⚠

Please keep in mind to ensure charging pile stably fixed and power well supplied.

## Manual Recharge

Users can control the robot to automatically recharge through the User Interface. The operation steps are as follows:

① Tap the [Recharge] button on the screen, and the robot will automatically navigate to the set recharge point.

② Upon arrival to the recharge point, the robot will identify the position of the charging pile and automatically enter the recharge process.

③ After connecting to the electrodes on the charging pile, the robot screen shows a correct charging status, and the indicator light on charging pile turns into RED from GREEN.

## Emergency Recharge

In case that the robot runs out of power or cannot be turned on, users shall follow one of the below methods to recharge the robot:

① On the premise of power of the charging pile well supplied, push the robot to connect electrodes and ensure the electrodes both well connected.The indicator light on charging pile changes from green to red, or the battery icon on the robot screen changes to green after startup, both of which indicate that recharge is in progress.

② Use the attached charging cable to connect the wire charging interfaces of the charging pile and the robot. The indicator light on charging pile changes from green to red, or the battery icon on the robot screen changes to green after startup, both of which indicate that recharge is in progress.

Once the battery icon shows the robot's 100% full charged, please release the charging cable.

## Charging Cautions

- Do not use any third-party power adapter or charging pile.
- Do not disassemble, repair, or modify the power adapter or charging pile without permission.
- Do not place the charging station near a heat source (such as a radiator).
- Do not use a wet cloth or hand to wipe or clean the charging pile electrode.
- In case that the robot will be not used for a relatively long time, please fully charge it, turn off the main engine and place it in a cool dry place.

- Please keep the robot charge at temperature above 0℃. Temperatures between 0℃ and 10℃ may limit the charging current, which may result in longer charging time.
- The long-term suitable storage temperature for the robot is from -20 ℃ to 25 ℃. Robot with battery level over 60% can be stored for up to three months. The more battery level the robot has, the longer it can be stored.In case of battery level down to 0, the robot needs to be fully charged at least once a month, otherwise the battery may be damaged.

## Emergency Response

In case the robot encounters abnormal situations or reveals an abnormal operation state, which may result in some emergency situations, e.g., causing harm to the surrounding environment, users can immediately stop the robot by pressing the Emergency Stop Button on the robot.

⚠

Rotate the Emergency Stop Button clockwise to release the emergency stop status.

Location of Emergency Stop Button as shown in the below figure:


⚠

If pressing the Emergency Stop Button causes the robot to deviate from its current position, please gently push the robot back to its starting point and restart it, otherwise the robot may not be used normally. If the robot is still in its current position, just release the Emergency Stop Button, and the robot will continue to work normally.

# Troubleshooting

Please follow the corresponding methods to troubleshoot the problems in case of the following faults occurring.

| | |
|---|---|
| Cannot be powered on normally. | ① Check if the Air Switch protection trips. Return it to normal state.<br>② Check if the battery level is too low.Use the charging cable to connect the charging pile and the robot before starting up.<br>③ Contact your after-sales technician for help if the robot still cannot be charged properly. |
| Automatic recharge is abnormal. | ① Check if the charging electrode is stuck, causing it not to pop up or down.<br>② Open the Android panel debugging interface to check whether the charging and recharging process is normal or not.<br>③ Check if there are stains on the charging electrode causing poor contact.<br>④ Check if there are objects covering the robot recharge camera.<br>⑤ Check if the charging pile deviates from the set point. |
| Cannot operate or perform delivery tasks. | ① Check if the Emergency Stop Button is pressed. Squeeze the bumper strip to see if the robot retreats.<br>② Remove obstacles around the robot to ensure the robot can move normally.<br>③ Check if the robot's startup point is normal. Power off and push the robot to the startup point before restarting up.<br>④ Check if there are debris or stains on the laser radar.<br>⑤ Contact your after-sales technician for help in case of other circumstances. |
| The indicator light on charging pile not on. | ① Check if the power interface is loose.<br>② Check if the fuse has tripped. If the fuse button pops up, press to restore. |
| Move at random or arrive at points with large deviation of the target points. | ① Check if the robot's startup point is normal.<br>② Power off and push the robot to the startup point before restarting up. |

| | |
|---|---|
| Abnormal noise from wheels in movement. | Check if the wheels are stuck or entangled by debris or sundries. |
| Touch screen shows abnormal. | Check if there are water droplets on the screen or if the screen connecting cable interface is loose. |
| Battery level shows abnormal. | ① Power off the robot and restart.<br>② Contact your after-sales technician to check the Android debugging information. |

## Frequently Asked Questions

1. Can robots adapt to different floors?

- Robots can adapt to different indoor flat floors without steps, such as wooden floor, tile floor and carpet floor. It should be noted that in case of carpet floor, the carpet thickness shall be less than 15mm.

2. How to use the robot for delivery?

- Users can place orders through the user operation interface, and the robot will automatically go to pick up and deliver to the designated location.

3. What's the running speed of the robot?

- The running speed of the robot is from 0.8m/s-1.2m/s, which can be adjusted depending on the complexity of the workplace, delivery distance, etc.

4. Is the robot safe while working with people?

- The robot is equipped with various sensors and safety measures, which can effectively avoid collisions and other potential dangers. There will be basically no safety hazards as long as the robot is set and operated strictly in accordance with the manual and safety instructions.

5. How long does it usually take for a robot to complete a delivery service?

- The time for a robot to complete a delivery service varies depending on the order quantity, workplace size and other factors. Taking a 1000 square meter hall as an example, the robot usually will complete the delivery task within 2-5 minutes after an order is placed.

6. Will the robot be unable to recognize the target object or its own location?

- As long as the following matters are ensured, the robot will well recognize the surroundings

through its own way:

① Make sure the camera or sensor is not obstructed or contaminated. If so, please clean up or adjust the position.

② Make sure the target object or position meets the recognition range and requirements of the robot. If there is any discrepancy, please makeadjustment.

7. Will there be errors or interruptions during the delivery process?

- There might be errors or interruptions during the delivery process due to software communication interruptions or other reasons. If the aforementioned situations occur, users can restart the robot to restore communication. Meanwhile users are advised to check if the robot's navigation system operates normally. In case of any abnormality, please contact your after-sales technician for further help.

8. How long can the robot work when fully charged?

- With 100% battery level, the robot can work for 10 to 20 hours, which varies depending on user usage habits, work continuity, use environment, carrying capacity, etc.. Users are advised to control the robot to automatically recharge when the robot is unoccupied or low in battery, in order to increase its battery life.

9. How long does it take for a robot to be fully charged when in low battery？

- It normally takes 3-4 hours for the robot to be fully charged.

10. How toclean the robot?

- Before cleaning the robot, ensure that it is turned off or powered off. Gently wipe away the dust or stains on the appearance of the robot and in the storage tray with a dry or wet cloth. Do not drip water into the interior of the robot. Do not use a wet cloth or hands to wipe or clean the charging pile electrodes.

## Product Maintenance

Please contact your after-sales technician for the robot’s regular maintenance.

1. Check if the appearance of the robot covered by dust.
2. Check if the robot chassis is properly fixed and if there is dust accumulating inside.
3. Check if the interfaces of modules inside the chassis are loose.
4. Check if the internal wires and cables of the robot are abnormal (such as broken wires, dust, and interface connecting status).

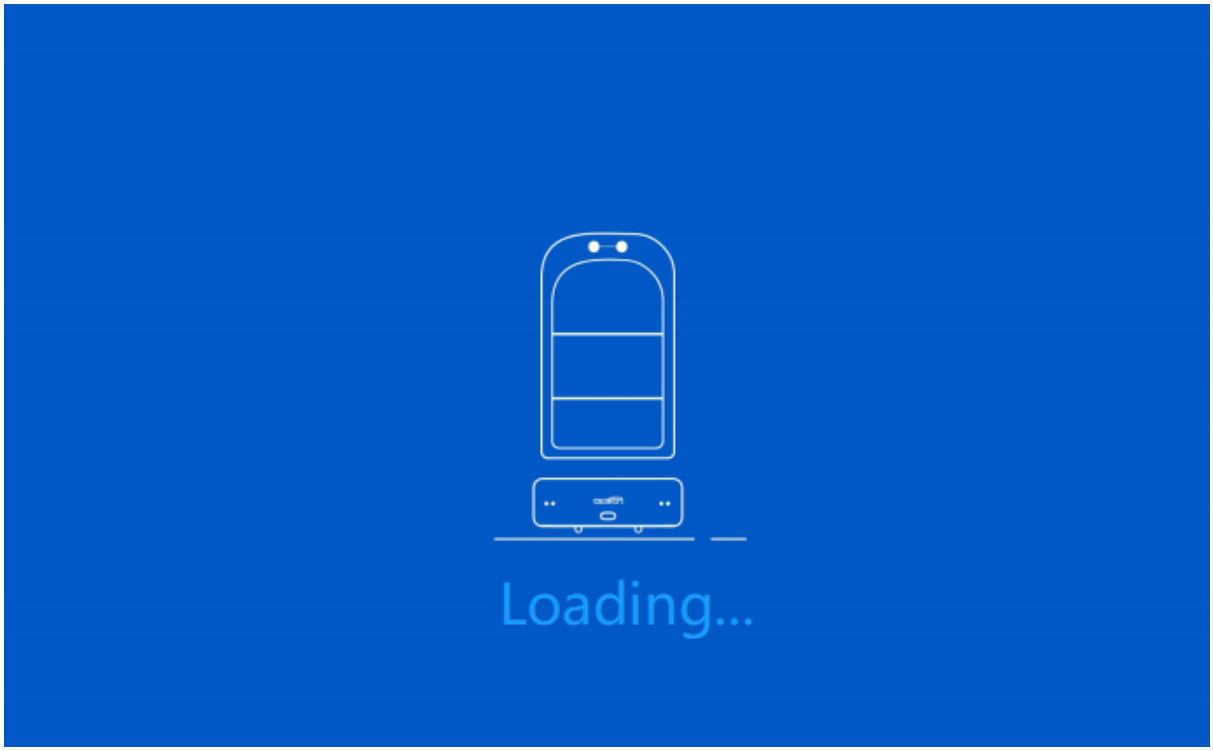
5. Check if the insulation components are damaged or moistened, and if the ground protection connection is reliable.
6. Check if the robot is in normal working condition and if the indicator signals are accurate.
7. Check if the wheels are abrased or entangled.
8. Check if there are stains on the surfaces of laser radar, camera, charging electrode, etc., and clean them in time.
9. Ensure that the robot software system is updated to the latest version.

## User Interface Operation Instructions

Users can operate and set up the robot according to the following guidelines after receiving training from after-sales technician.

### APP Loading

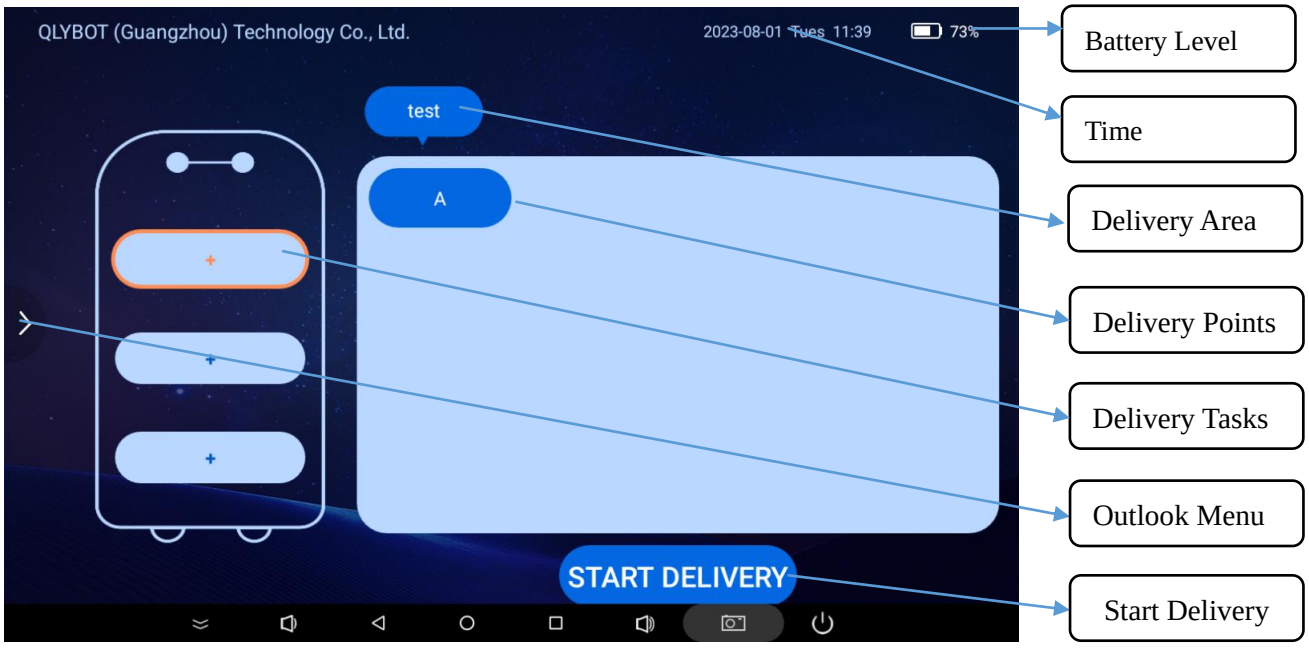
It might take some time for the robot to start up. Please be patient.



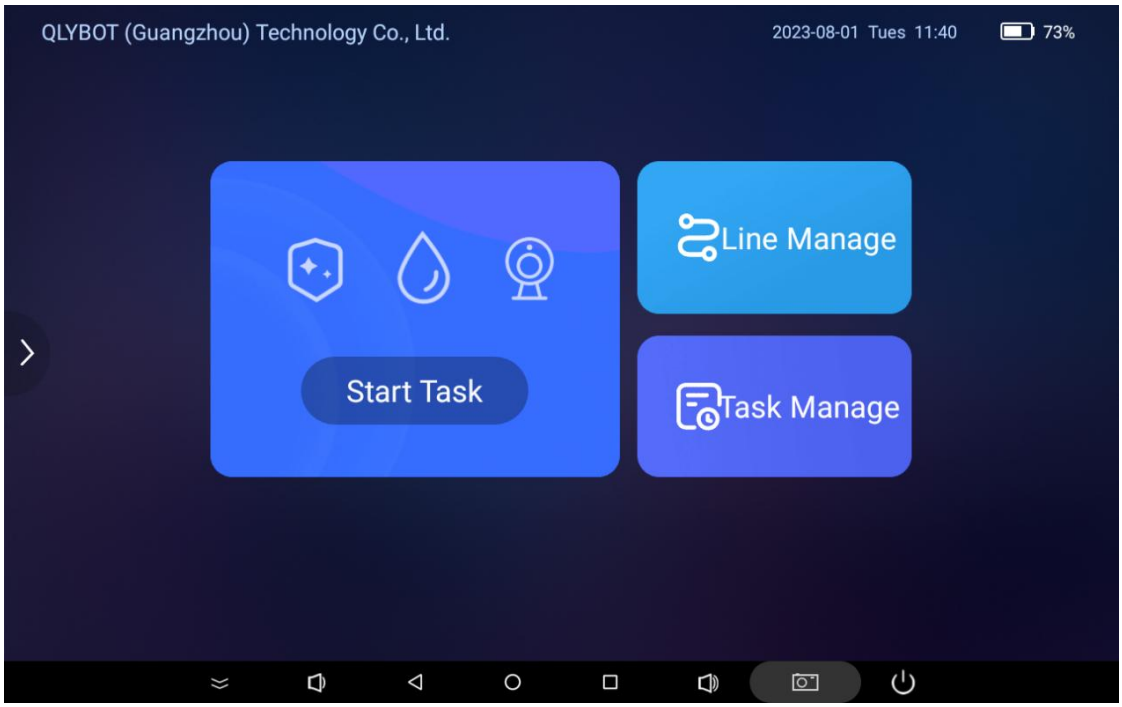
Password（Please consult your after-sales technician.


## Main Interface Operation Instructions

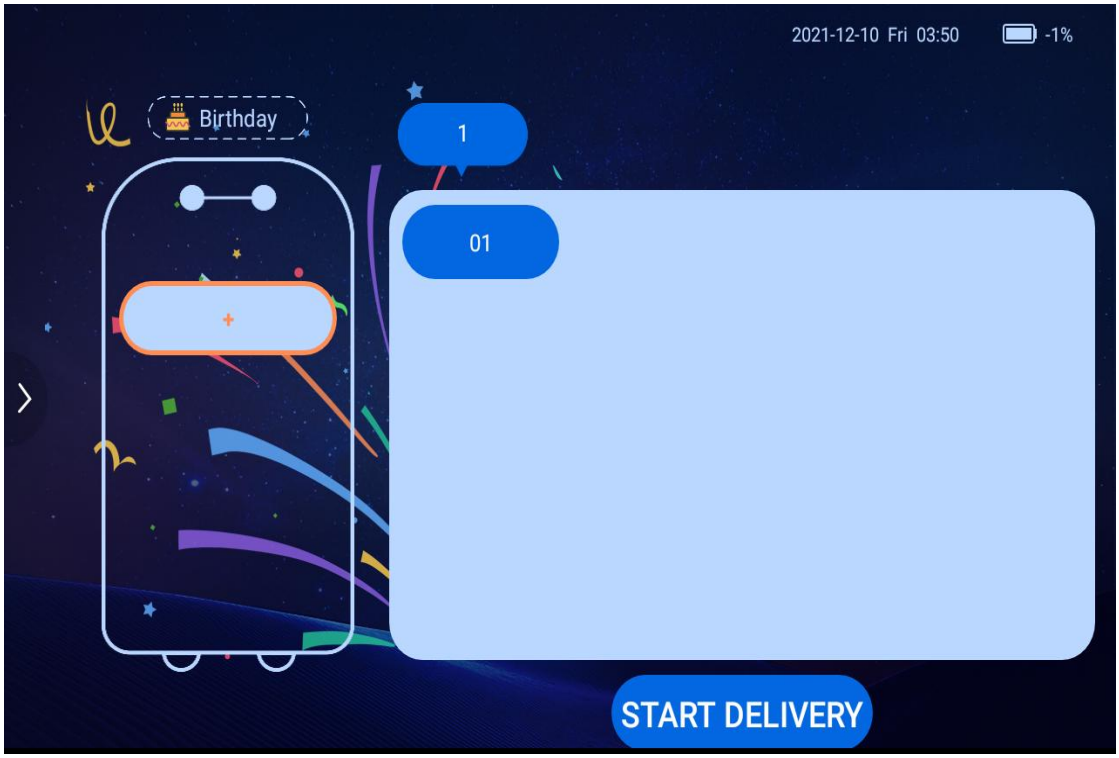
### Delivery Model



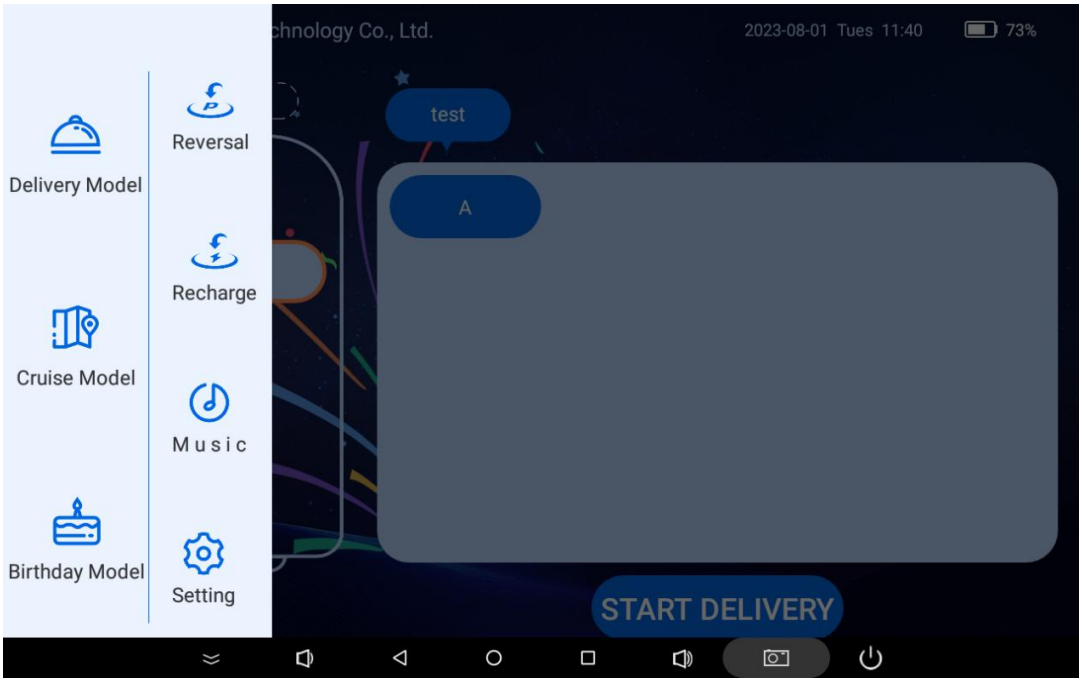
## Cruise Model




## Birthday Model

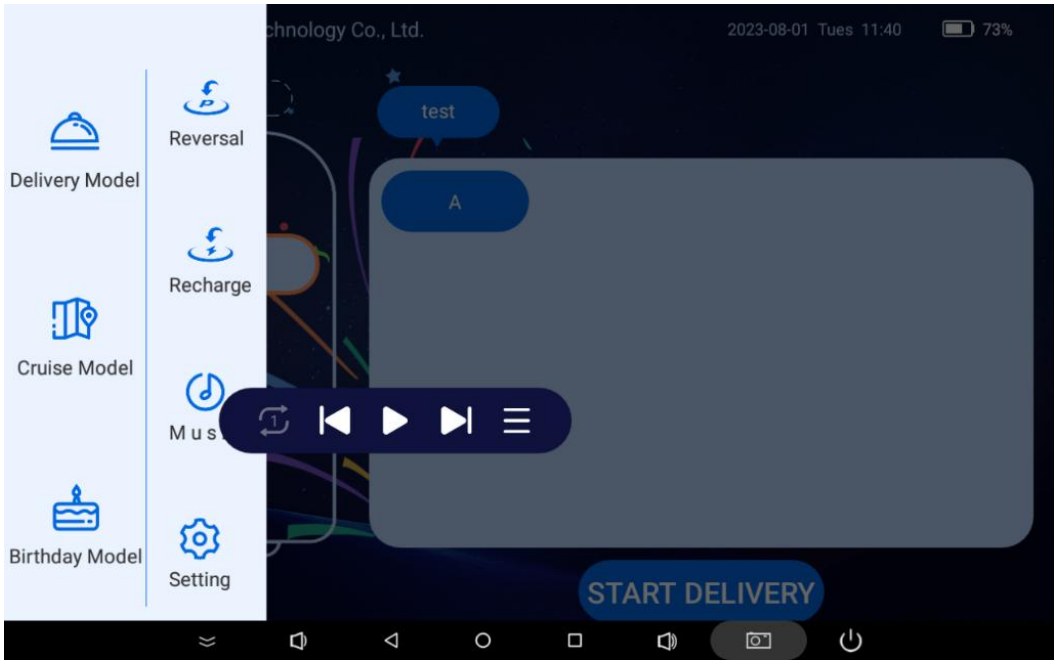


## Outlook Menu



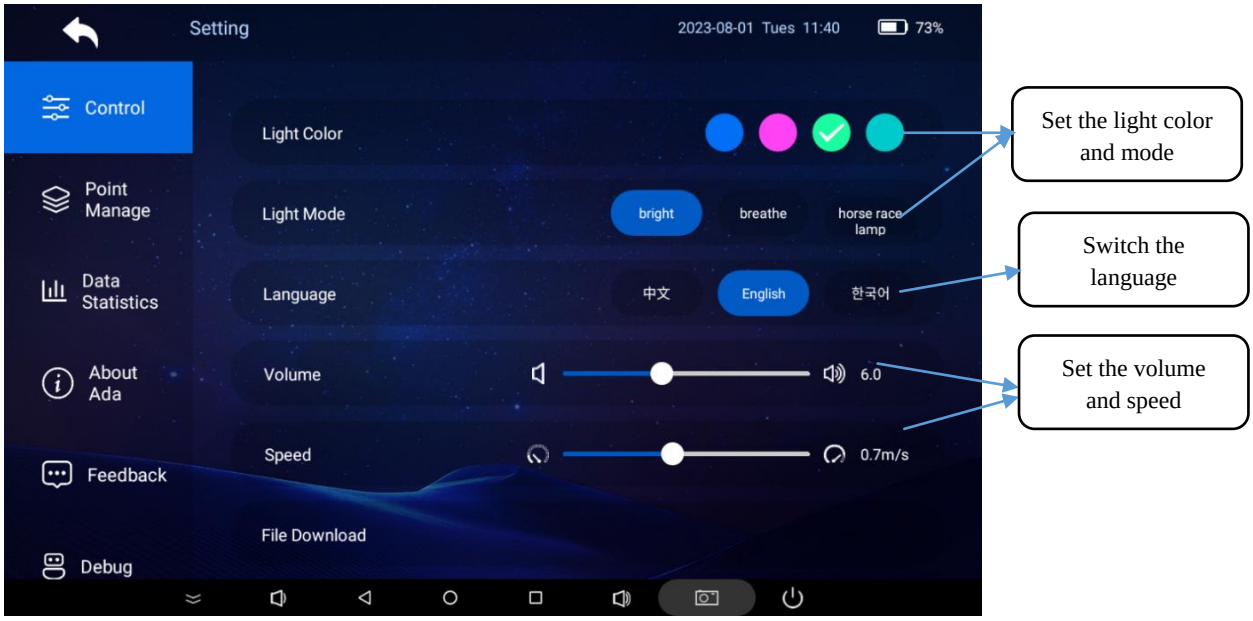

## Music's Play

Prepare a USB Drive——Create a new folder and name it Music——Copy the intended music files into the Music folder——Insert the USB Drive to the Android USB Interface of the robot and wait for the files to automatically copy——Play the music



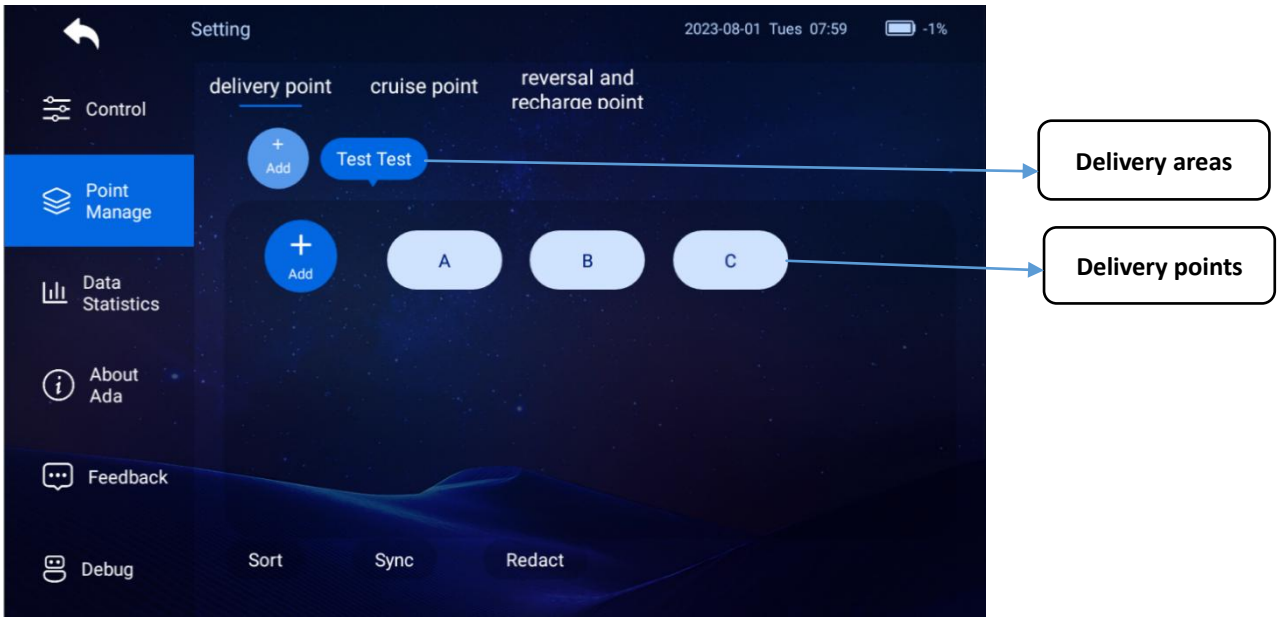
## Settings

### Control




### Point Management

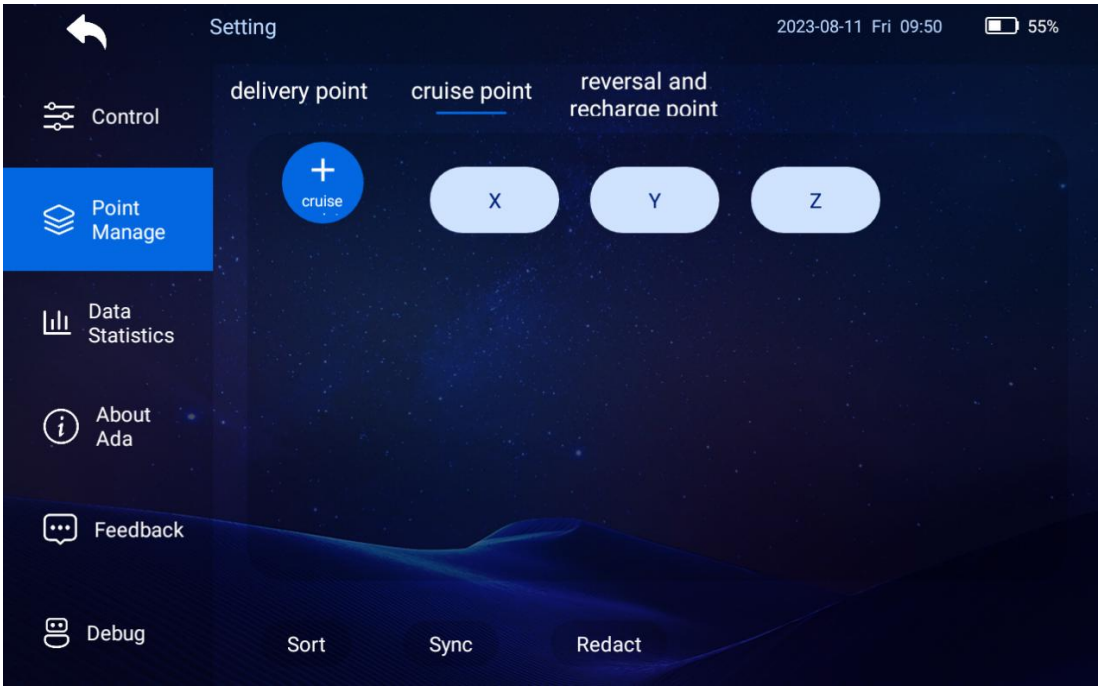
#### （1） Add Delivery Points



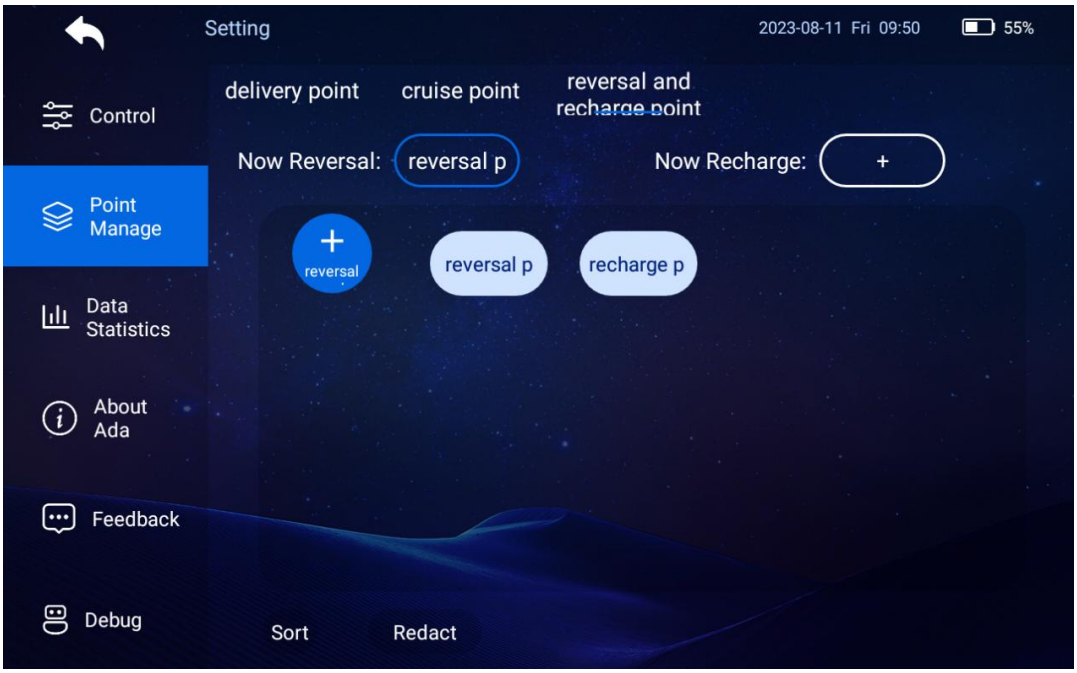

Notices:①Select the delivery area before adding the delivery points.

②Double tap the delivery point to modify.

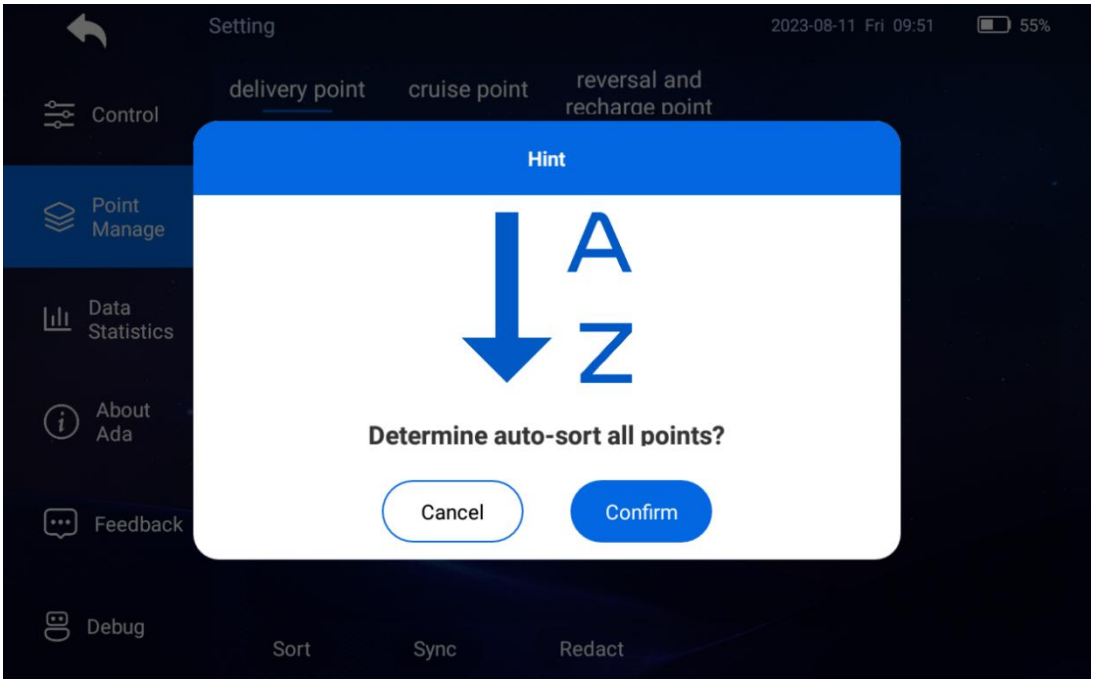
## （2） Add Cruise Points



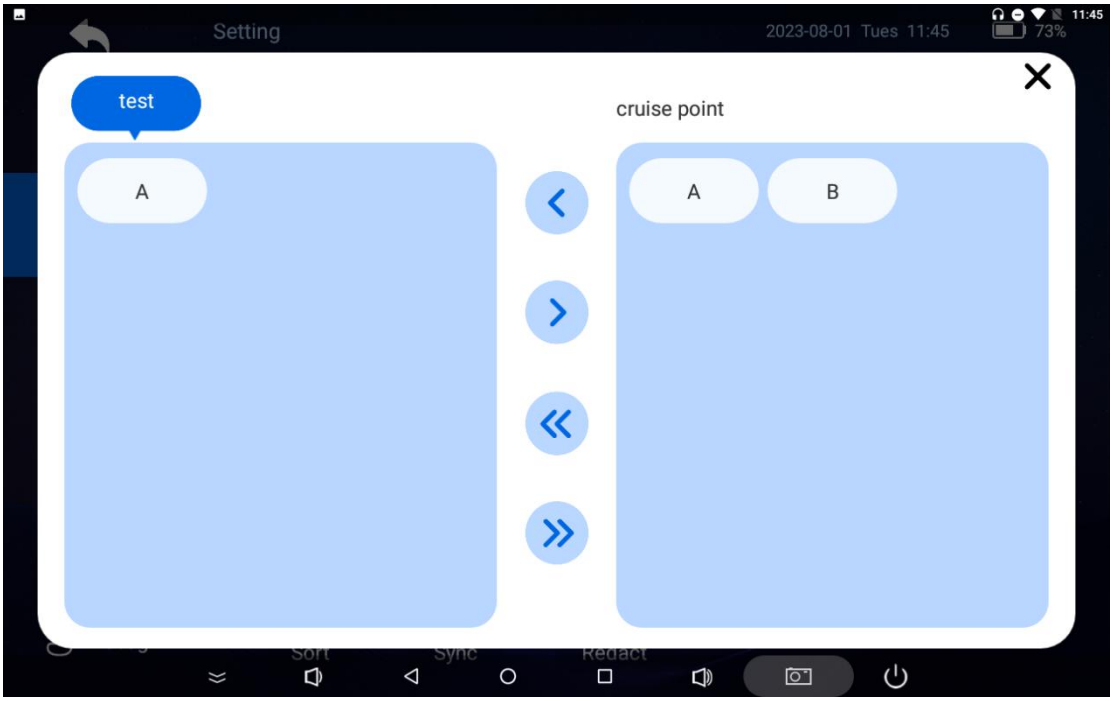

## （3）Add Reversal and Recharge Points



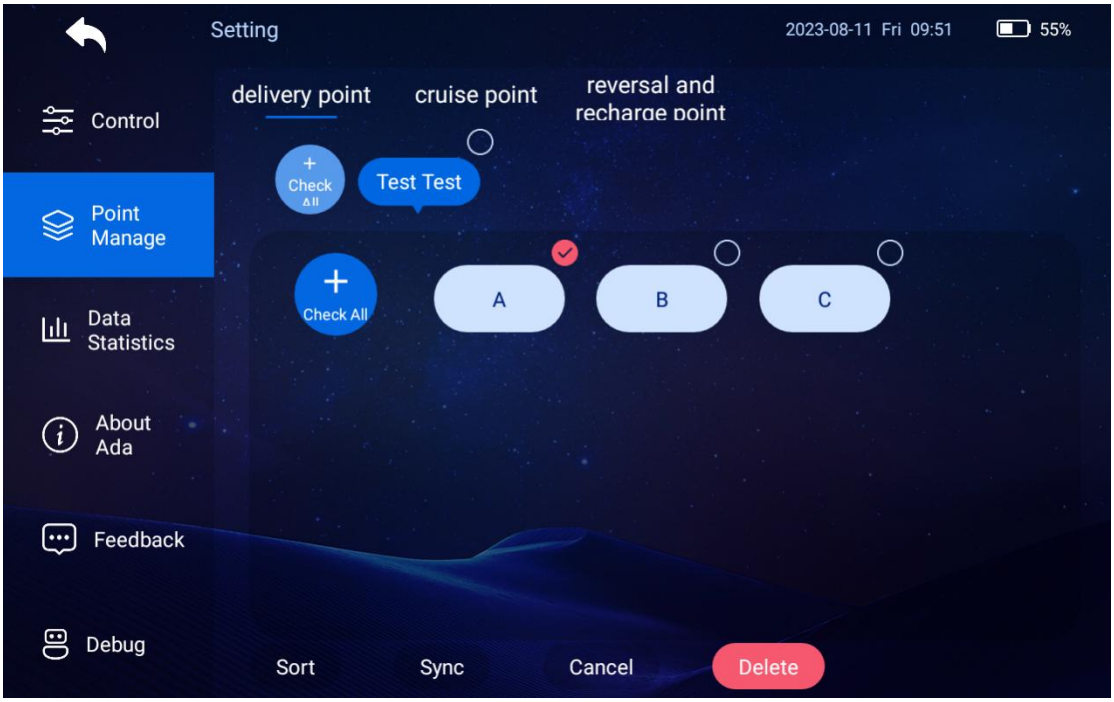
（4）**Sort: Tap to sort all the points**



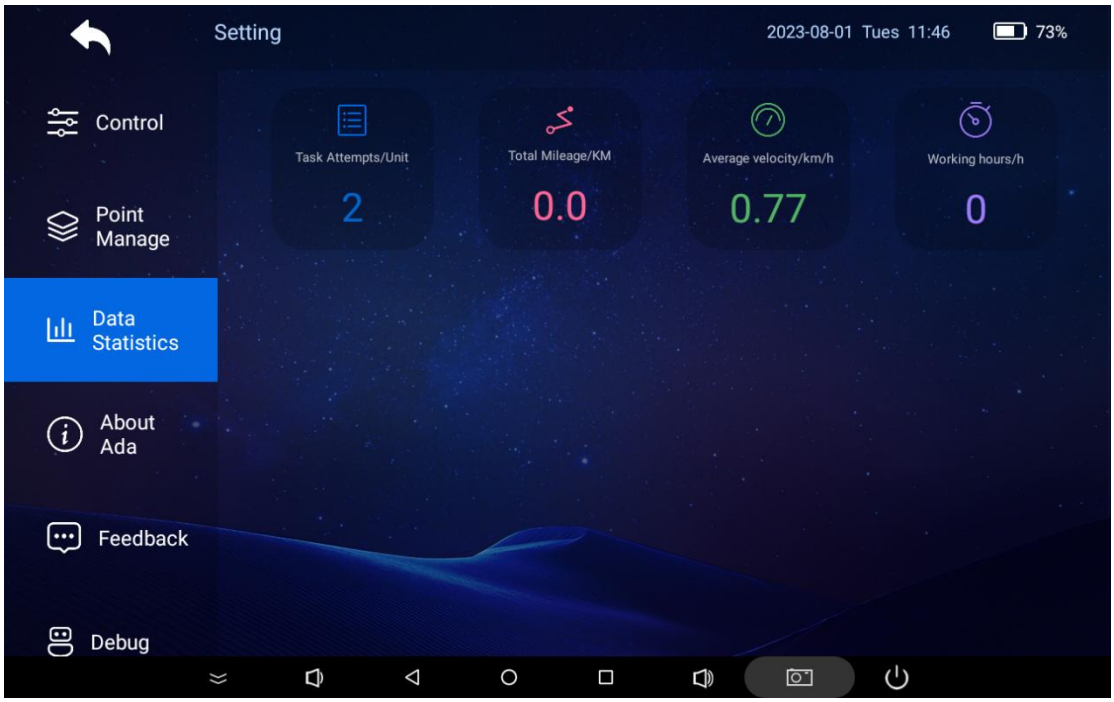

（5）**Synchronize：Synchronize points in delivery model and cruise model.**



（6）**Redact**：Tap the Redact button to delete any point in different models

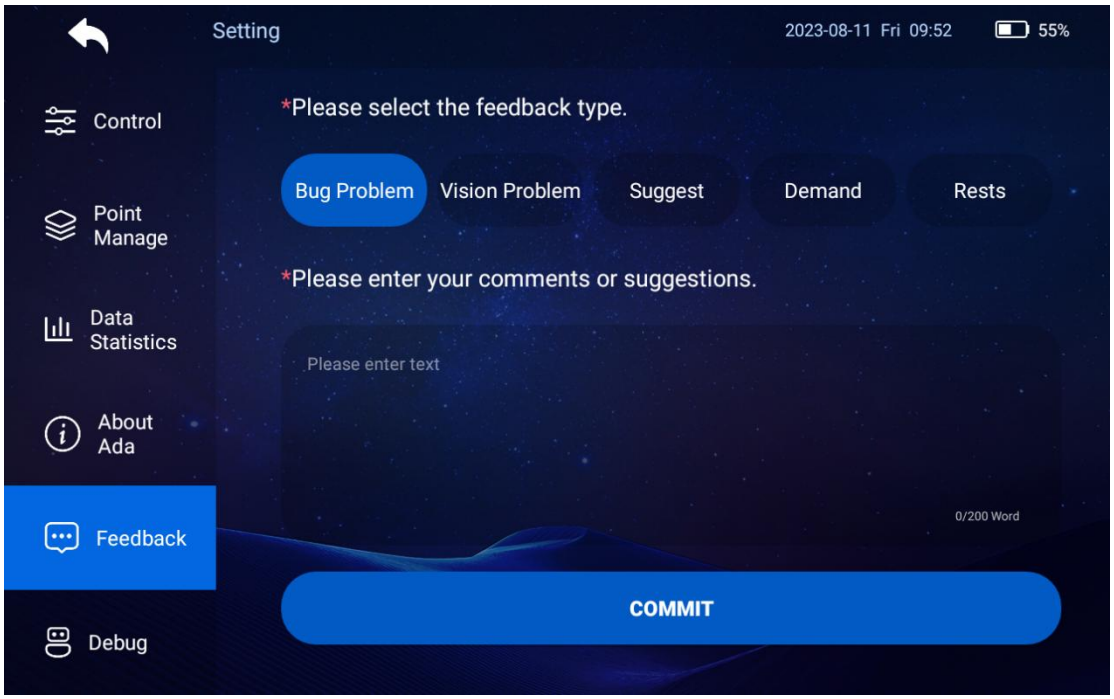



## Data Statistics

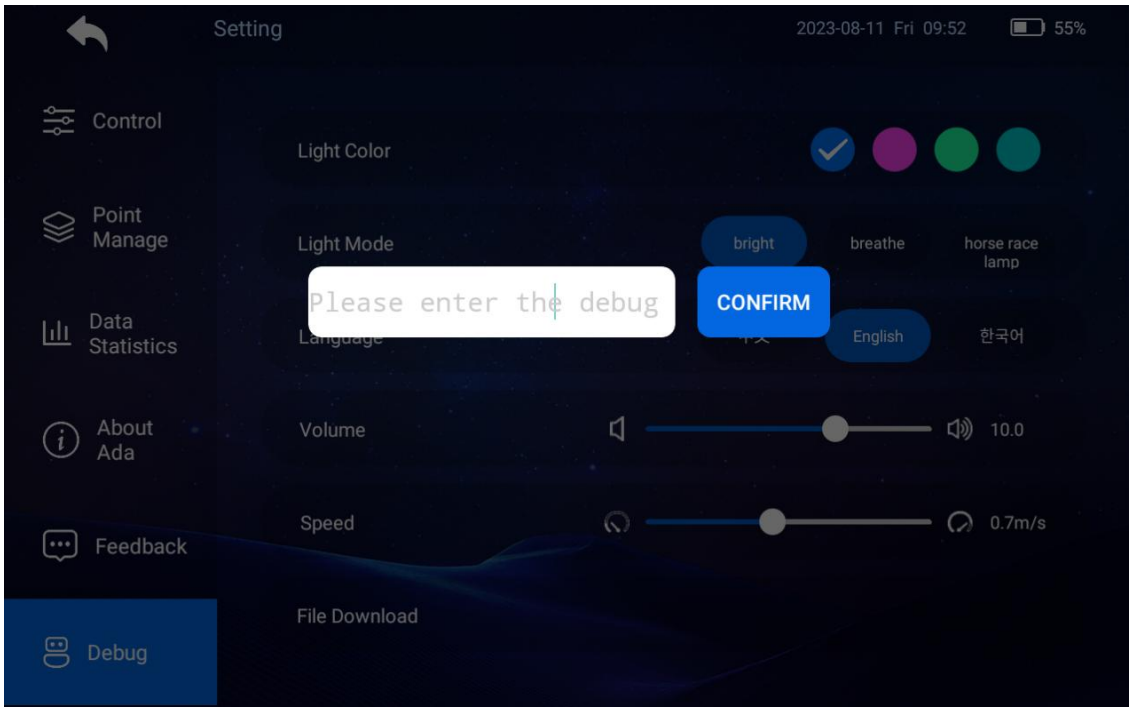


## About the Robot


## Feedback



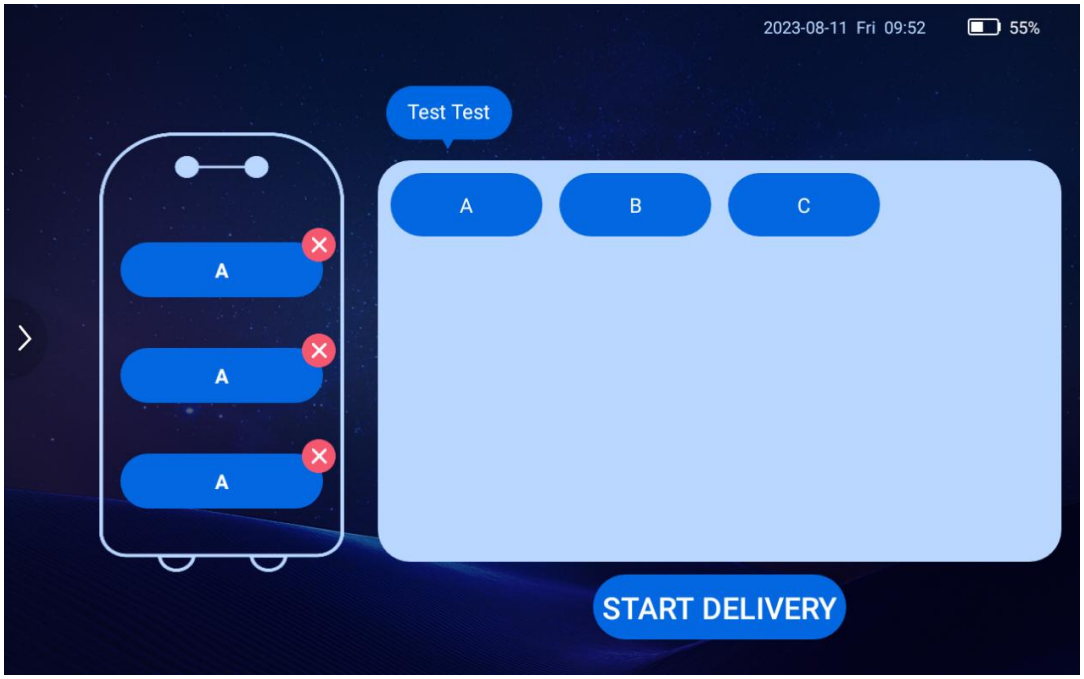
## Debugging（Only for Technician）



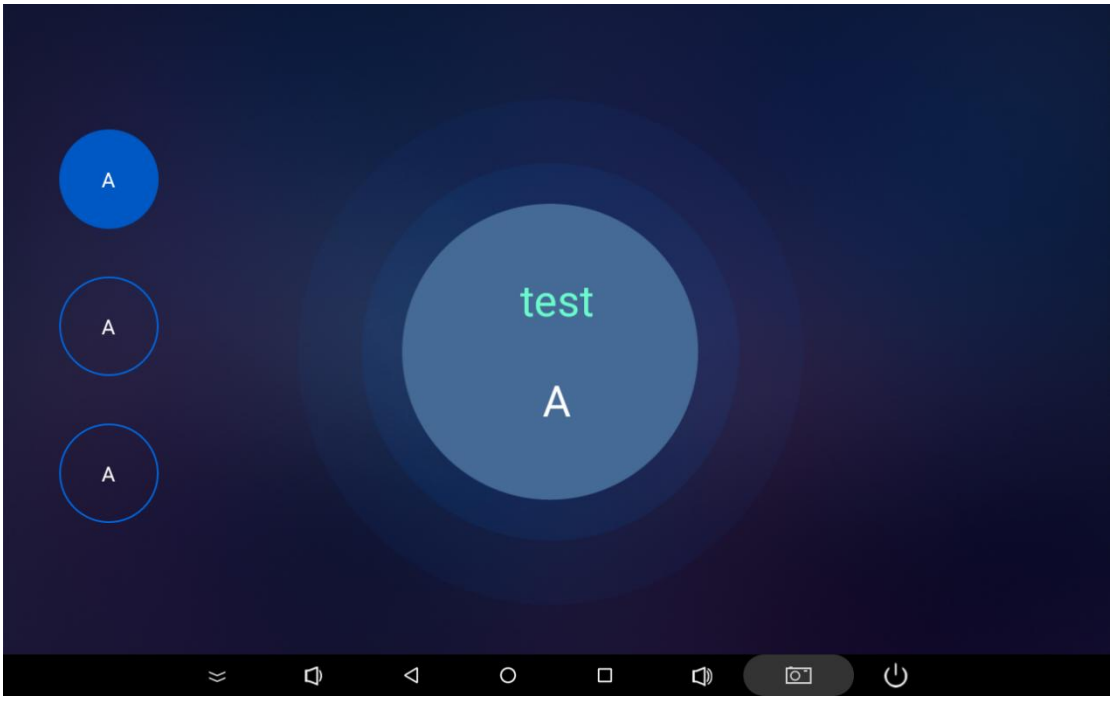

# Procedures of Performing Tasks

## Delivery Model

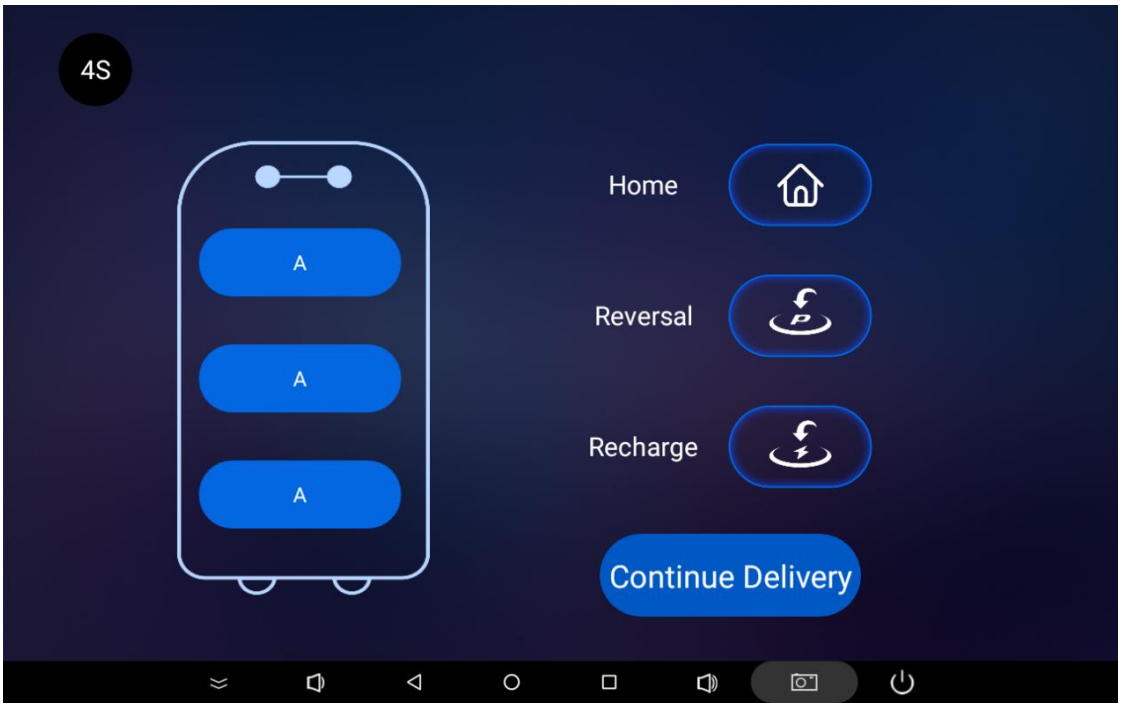
（1） Add delivery task and tap “START DELIVERY”.



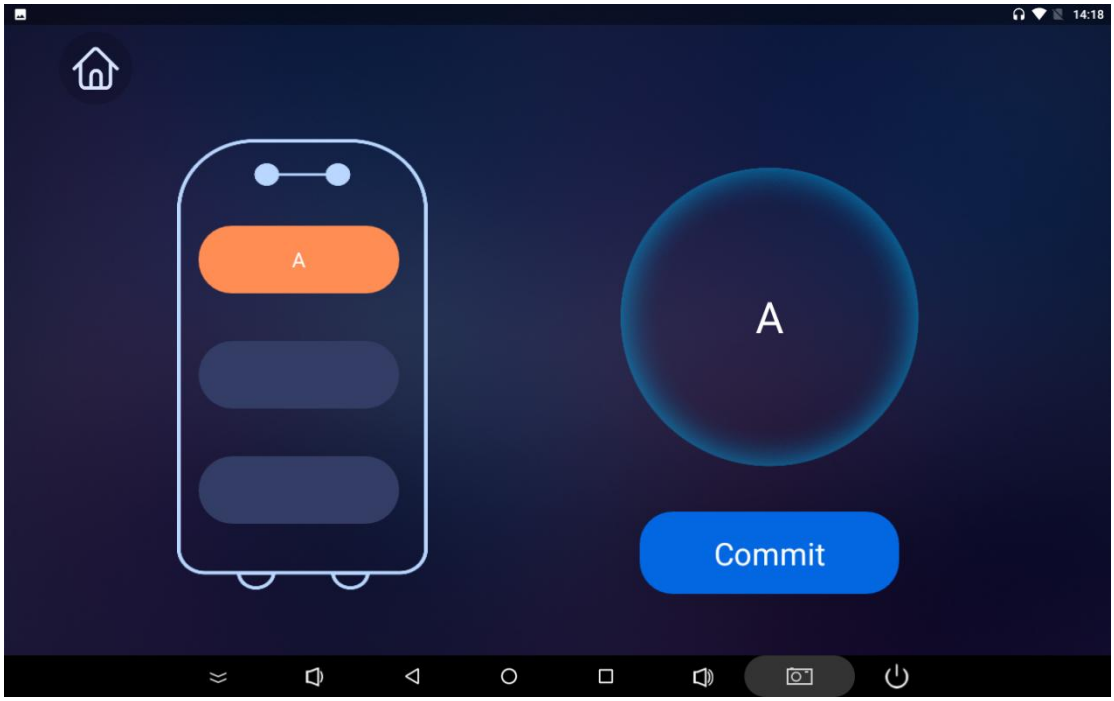
（2） Performing delivery tasks(Tap the screen to pause delivery)




（3） Pause a delivery task（Tasks will be continued with no operation within ten seconds）

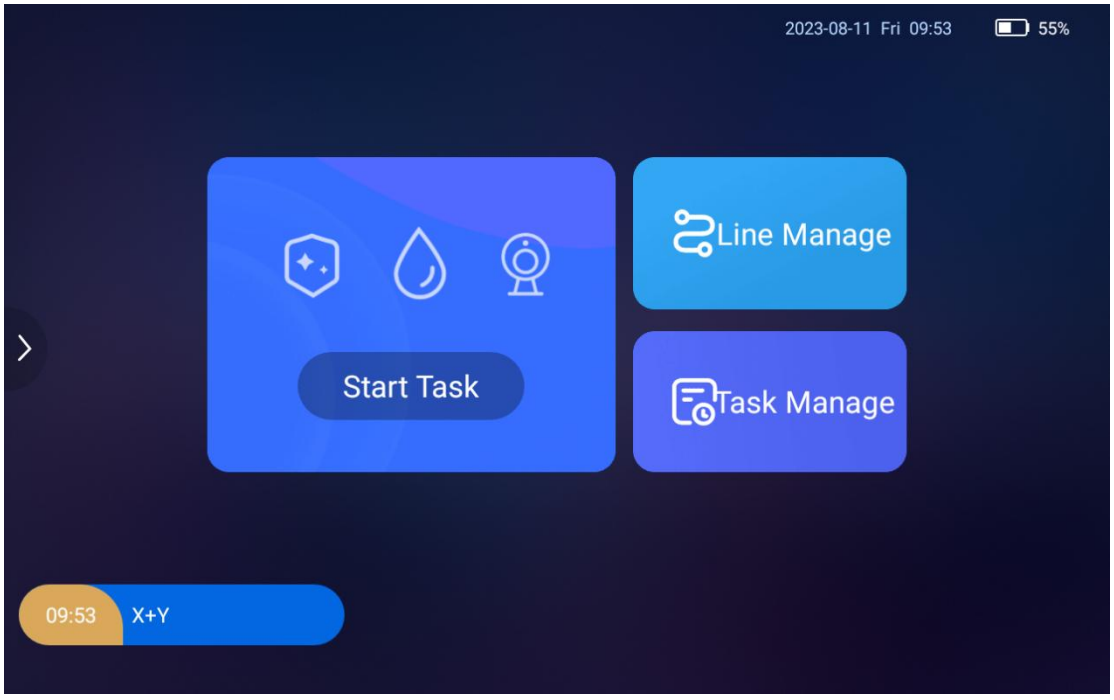


（4） Arrive at the target delivery point (Tap “Commit” for next delivery point. In the case of no next task, the robot will autonomously reverse.



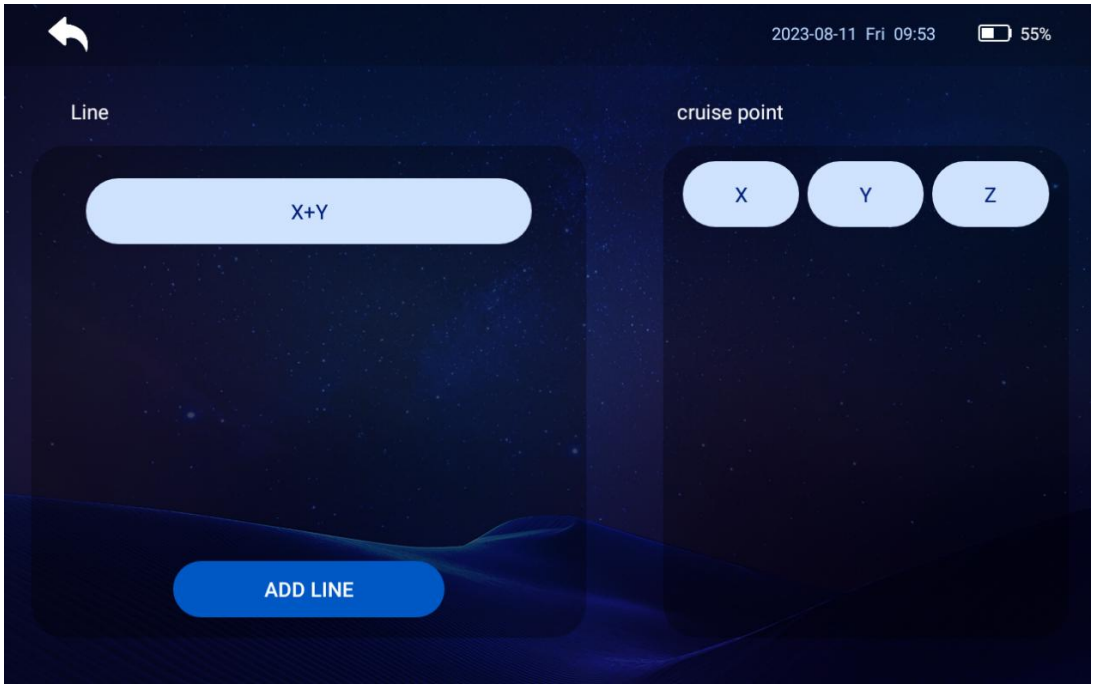

## Cruise Model

（1）Select task to be performed and tap “Start Task” to continue.

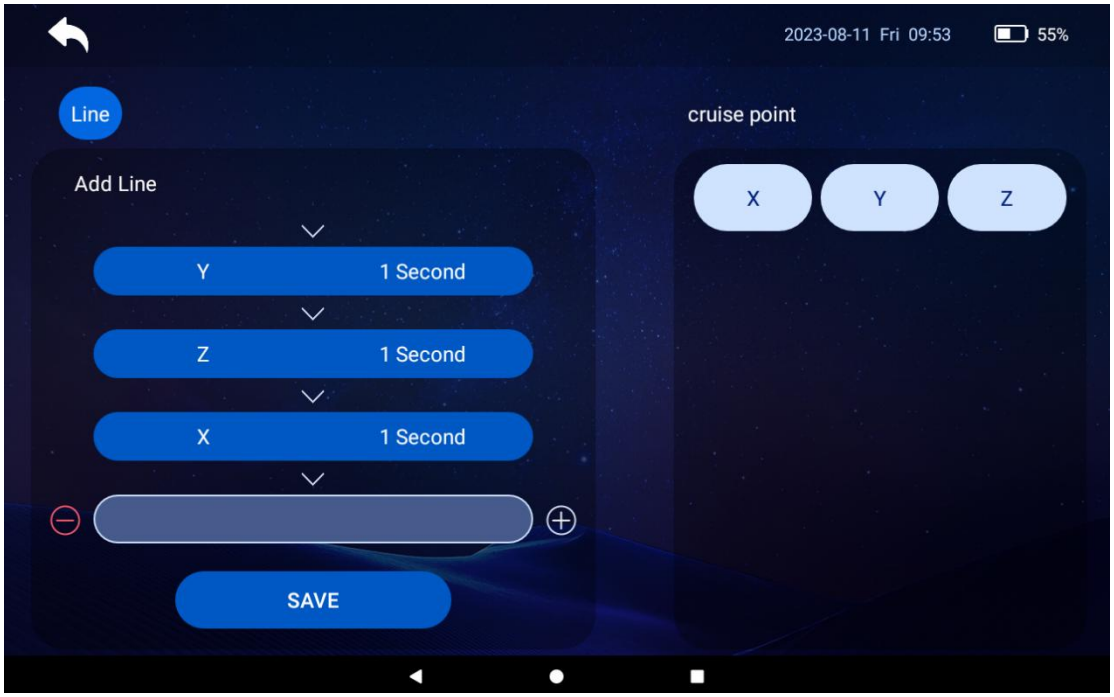


（2）Line Management

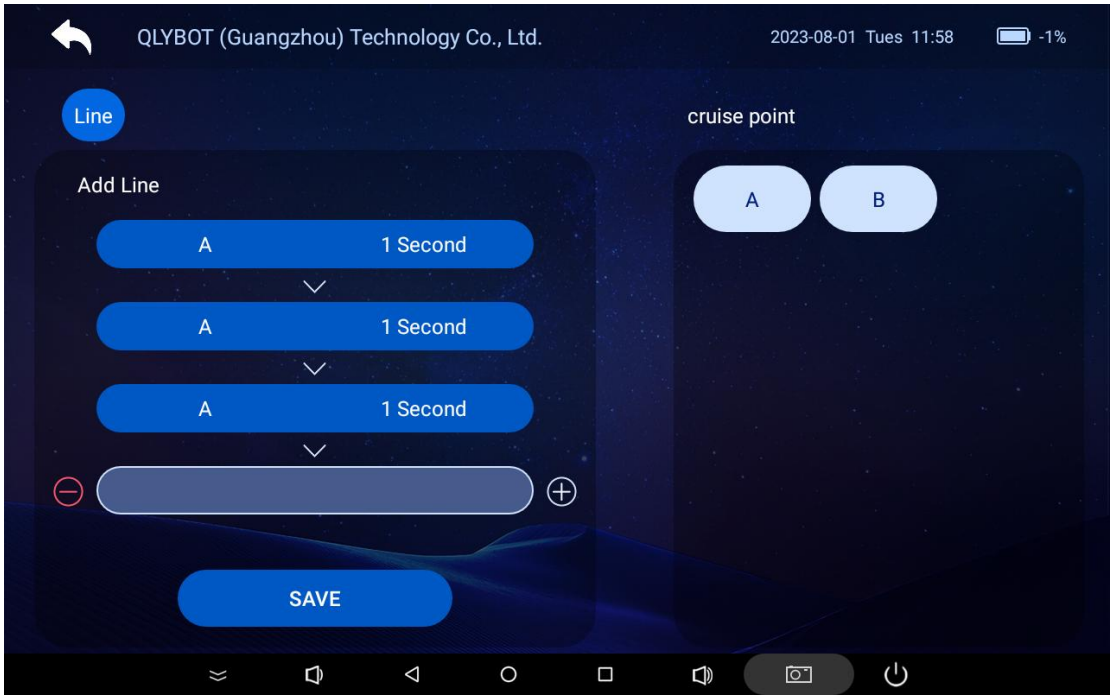
① Manage Line：Sideslip to delete the line



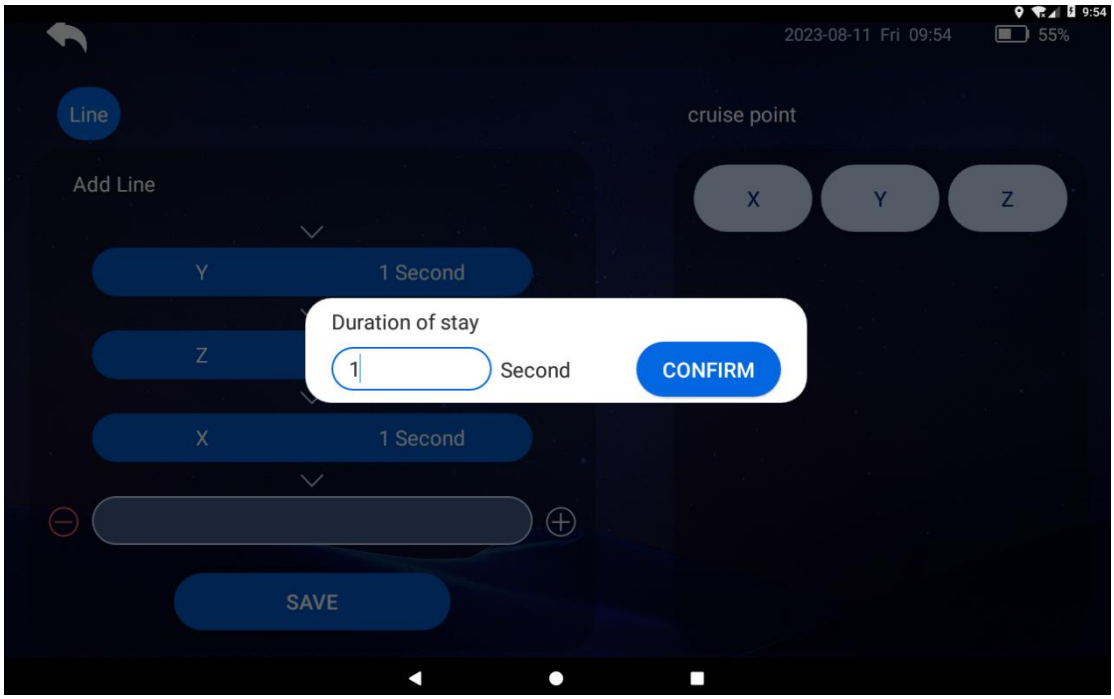

② Modify Line：Tap the existing line to modify



③ Add Line：Tap the Minus button to delete cruise point, and the plus button to add cruise point.

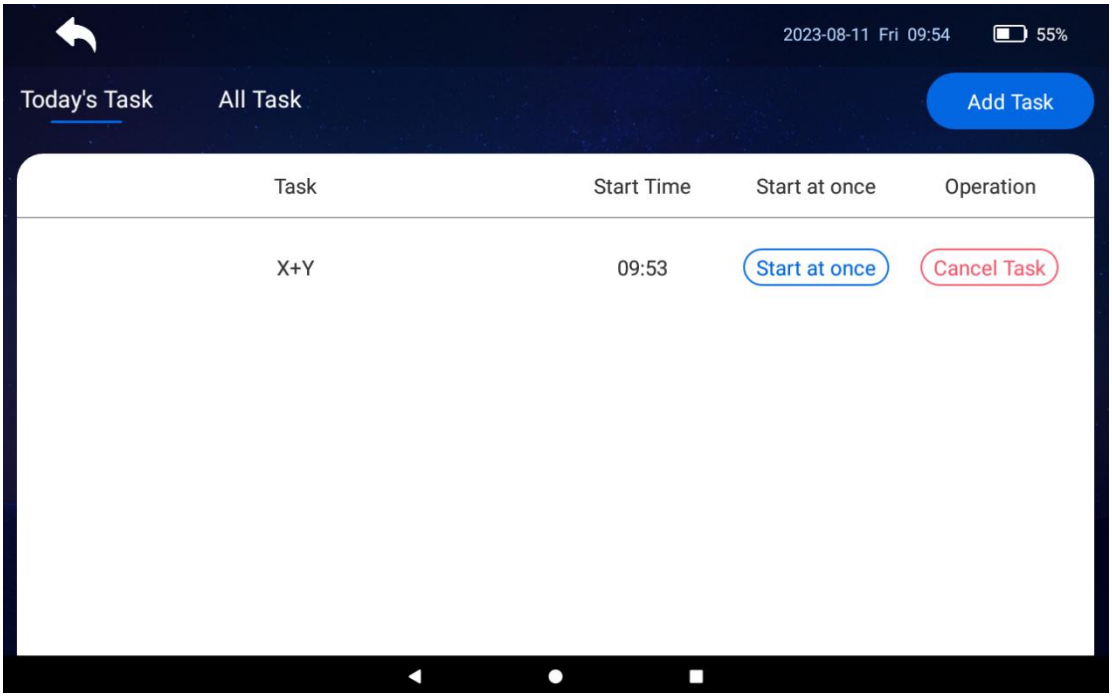



④ Add Line:Set the duration of stay and confirm (Tap the save button to complete).

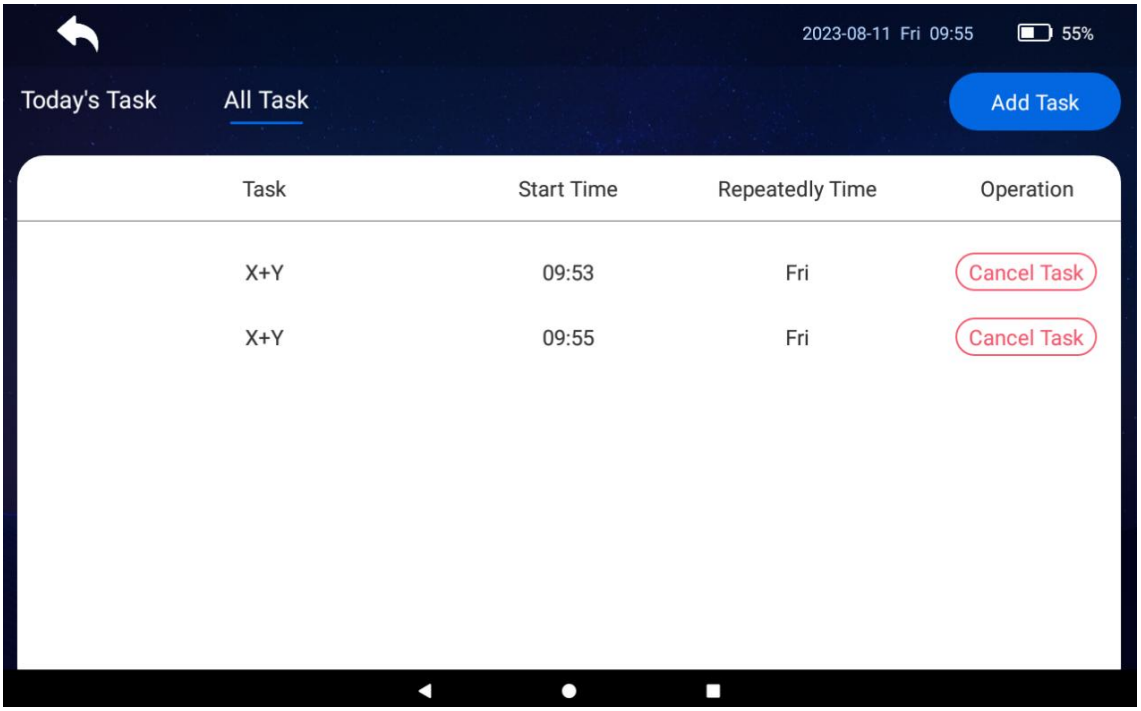


（3） Task Management

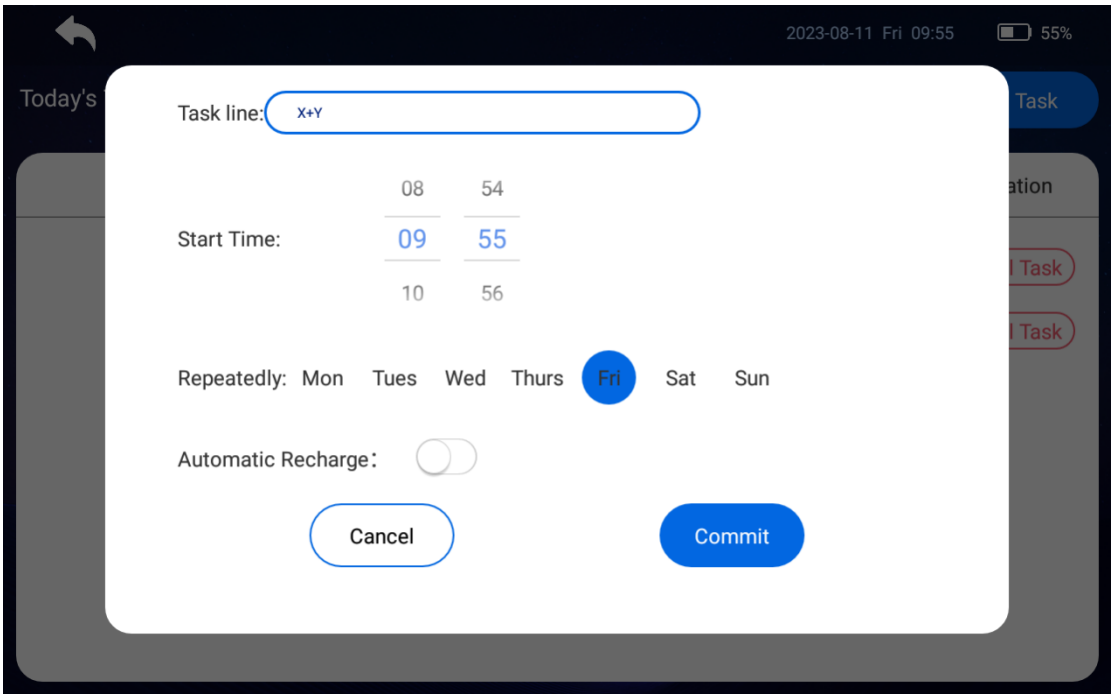
① Today’s Task




② All Tasks(Tap “Cancel Task” to delete the task)

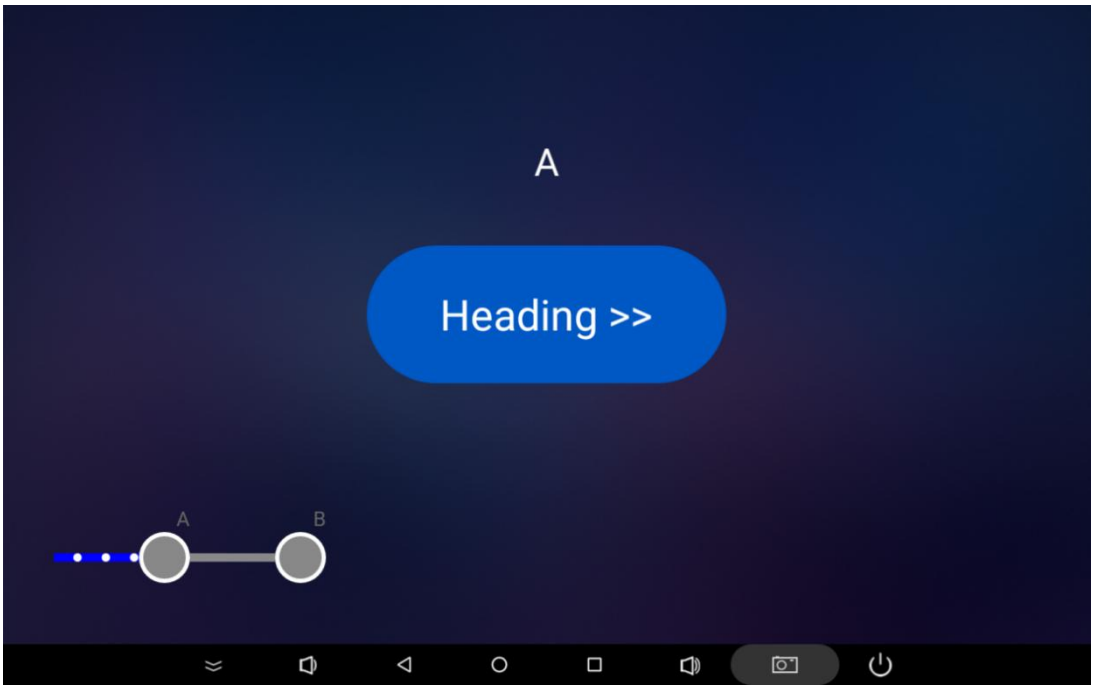


③ Add Tasks（Select task line→Set start time→Set repeat time→Commit）

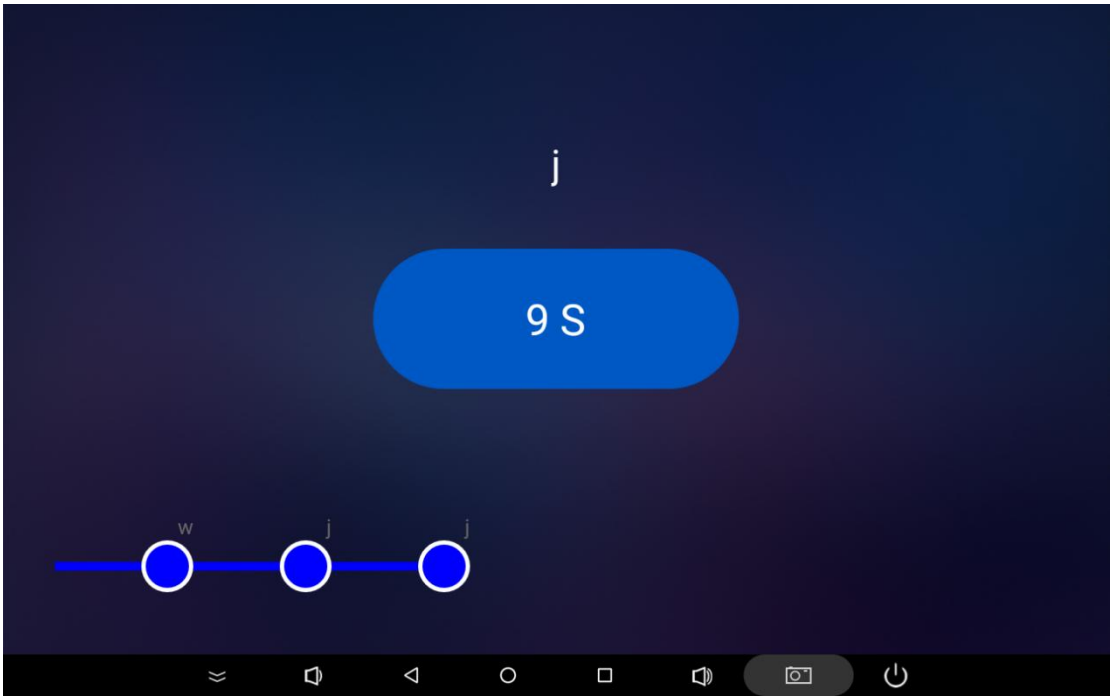



（4） Start Task

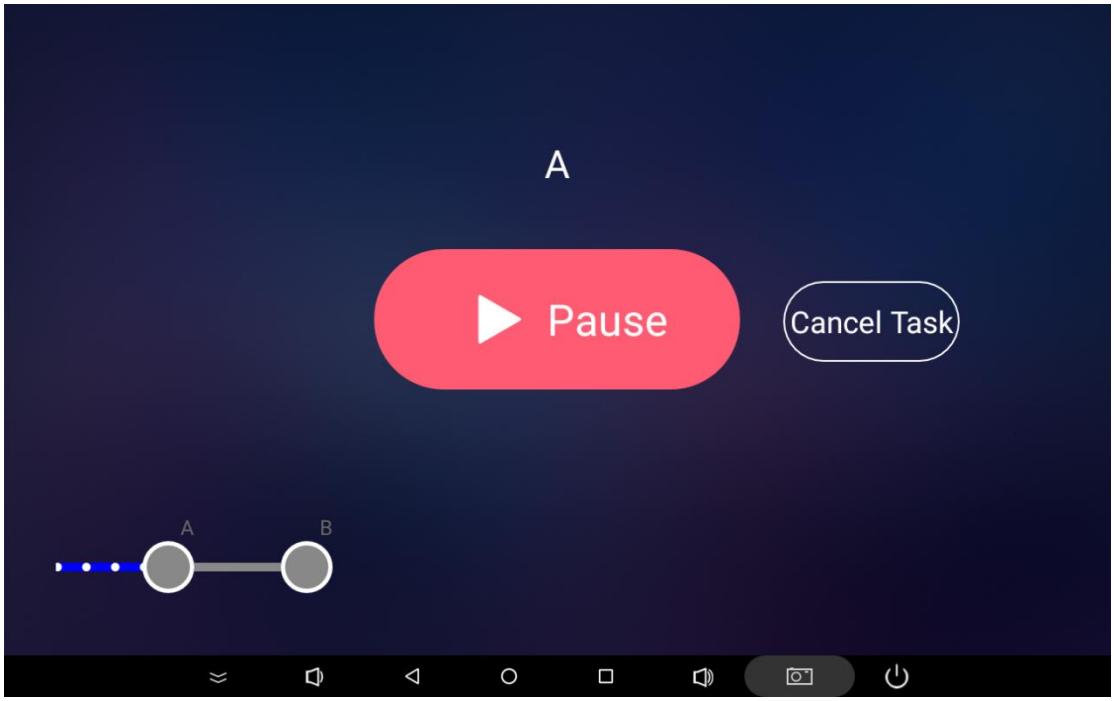
① Task Performing（Tap “Heading” to pause the process）



② Arrive and Stay(Head to the next task while countdown over)

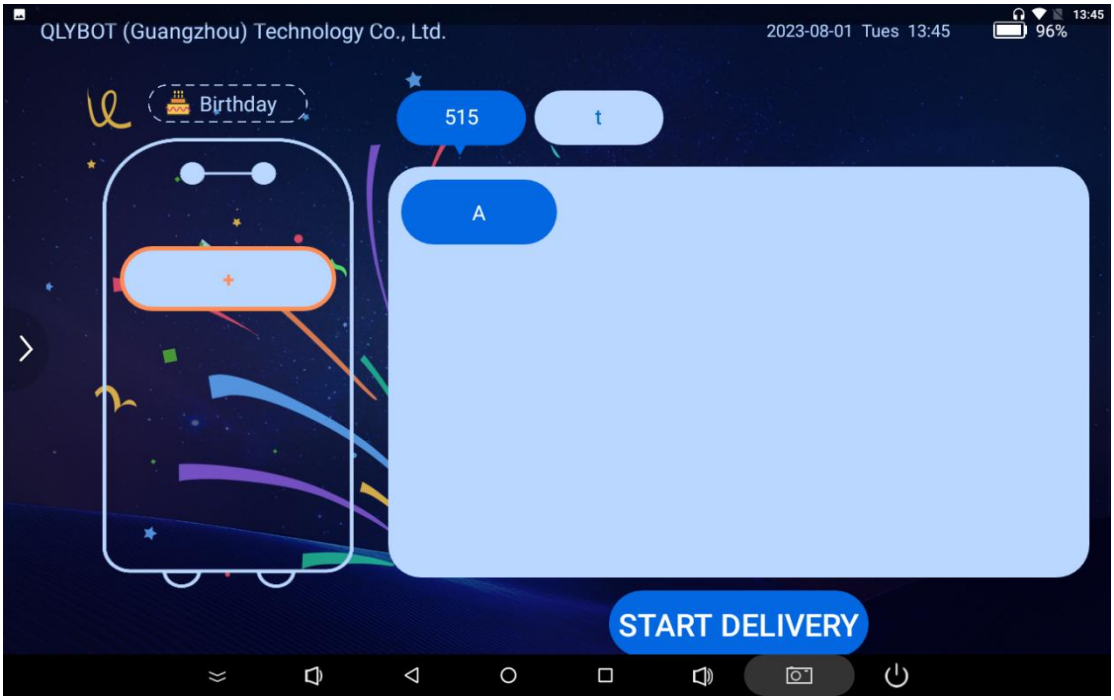



③ Pause Task(Tap “Pause” to continue task， Tap “Cancel Task” to end task)

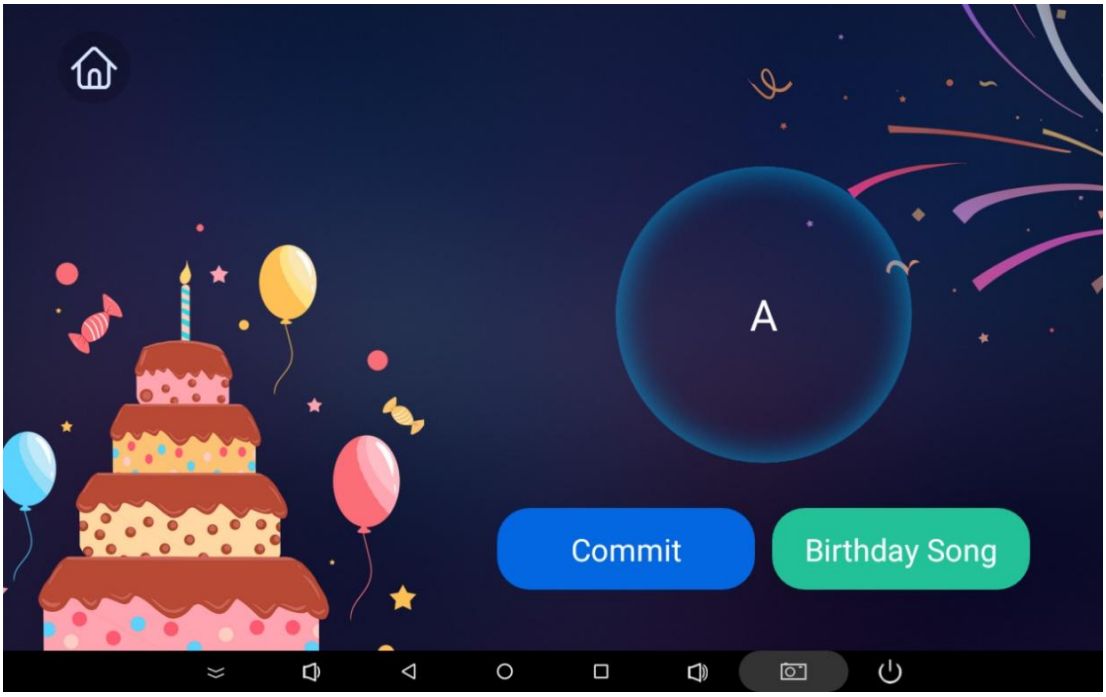


## Birthday Model

（1） Interface of Birthday Model

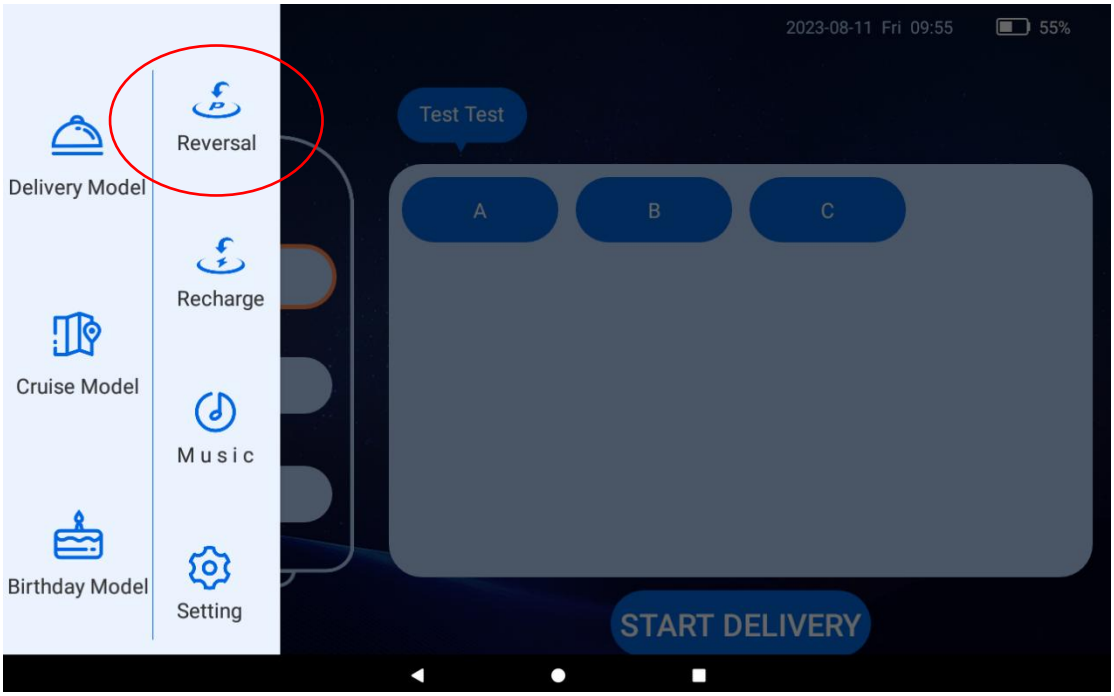



（2） Arrive at the set destination（Tap the “Birthday Song” to play music）



## Reversal

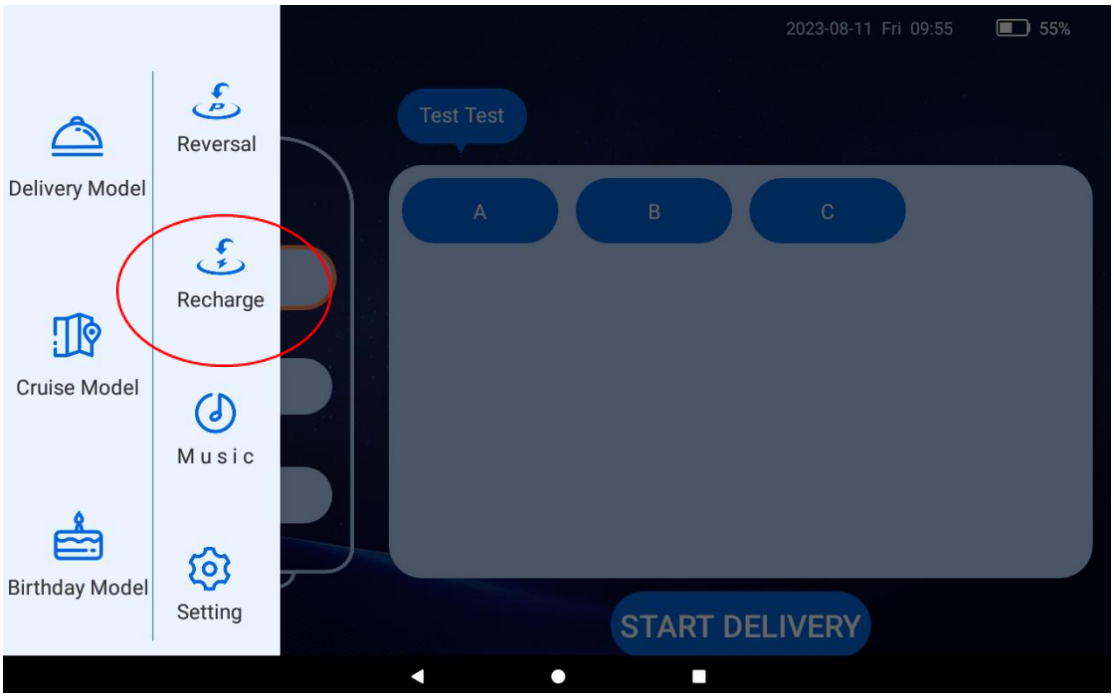
（1） Slide to the side Outlook Menu and tap “Reversal”



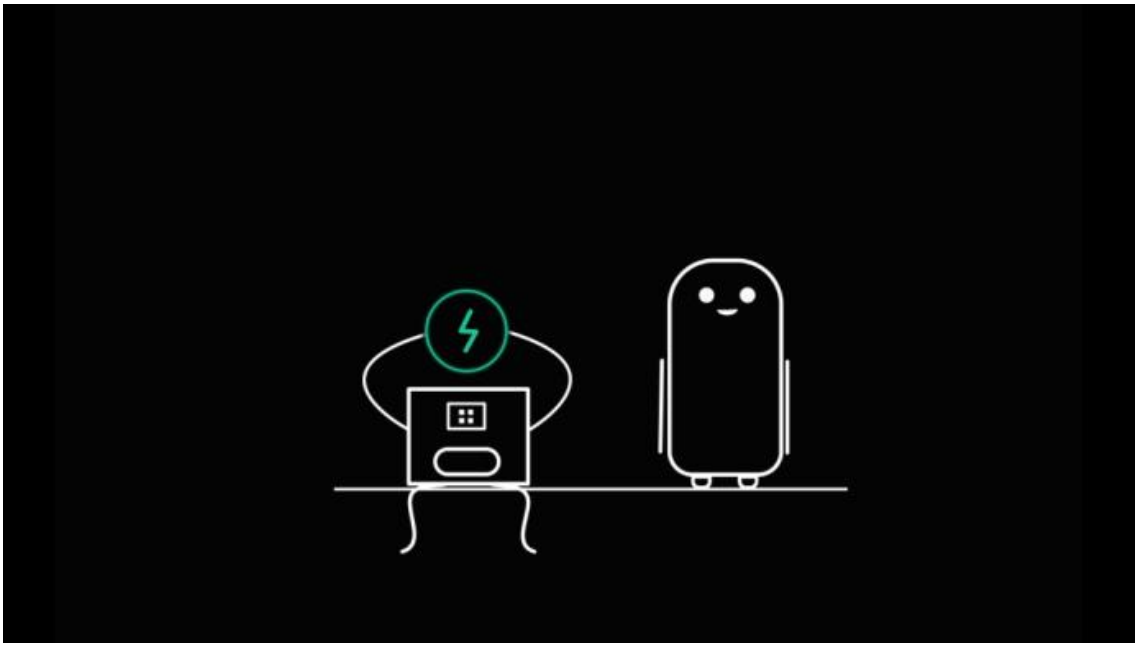

（2） Go reversal (The robot screen will be automatically back to the main interface while arriving at the reversal points.)

## Recharge

（1） Slide to the side Outlook Menu and tap “Recharge”




（2） Recharging(The robot screen will be automatically back to the main interface while arriving at the recharge point.)



# Warranty

Dear user:

Thank you for purchasing our multi-scenario intelligent delivery robot. We hope you can experience great joy and convenience brought by technology while using this product. In order to better serve you, please carefully read, fill in, and properly retain this warranty card after purchasing the product.

## Warranty Card

| | | | |
|---|---|---|---|
| Product Name | | Product Medel | |
| Serial No. | | Purchase Date | |
| User Name | | Tel. | |
| User Address | | | |
| Maintenance Record | | | |

Manufacturer:QLYBOT（Guangzhou）Technology Co., Ltd.
Address：Floor.5, Nanxiang Branch Road, Huangpu District, Guangzhou City, China
Website：www.qlybot.com
Tel.：020-62164236

## Warranty Clause

1. Please retain the Warranty Card for future maintenance.
2. Warranty Explanation

| **Warranty Period** | **What Is Cover** | |
|---|---|---|
| One (1) year after the date of product receipt | The while robot (excluding consumables) | • Software and hardware program upgrades<br>• System maintenance<br>• Free repair or replacement of the robot or components in case of quality issues<br>• User training and guidance |

3. During the warranty period, the following circumstances are all not covered by free Warranty service. If occur, usersare supposed to pay for maintenance.
   ① Product malfunction or damage caused by users' failures to comply with the Manual during use, including but not limited to failure to comply with Robot Use Restrictions or User Safety Instruction, and improper manualcleaning, use, maintenance and storage (such as operational errors, liquid inflow, incorrect plugging in and out, scratches, random moving, collisions, improper voltage input, falling into white ash, sand, dust, special adsorbed chemicals, metals and other microparticle substances).
   ② Artificial abnormal external force damage.
   ③ Damage caused by repairs or refits provided by maintenance units unauthorized by the manufacturer or other third parties.
   ④ Malfunctions or damages caused by natural disasters or other force majeure events.
   ⑤ Other man-made intentional damage or destructions。
4. The manufacturer reserves the right to modify and interpret the above warranty policy.

FCC:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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.

To maintain compliance with FCC’s RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.