

WATER II-S

Water 2 Smart Moving Robot Platform

User Guidance Version1.0



Basic use

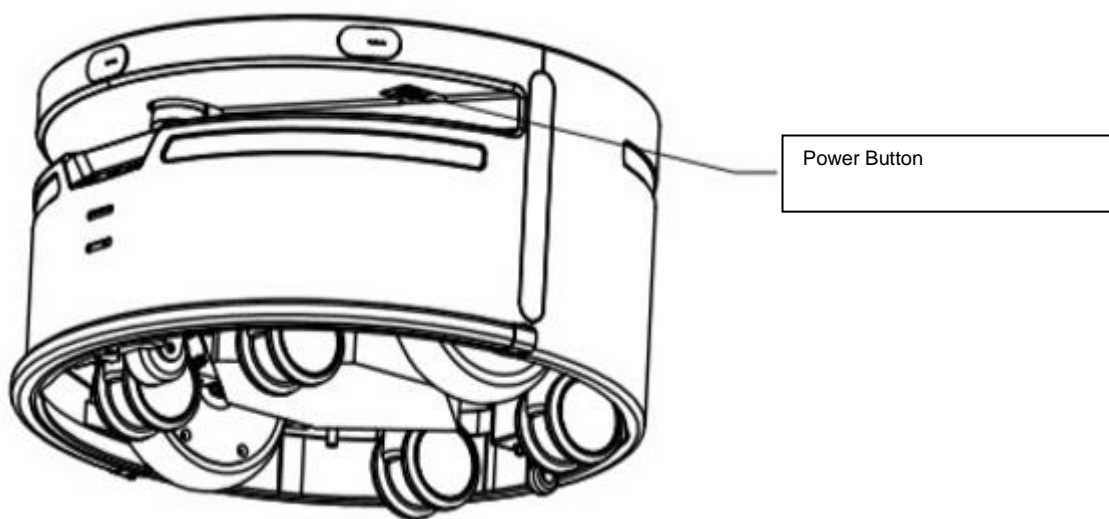
1. Switch machine operation

1.1 Main power switch

There is a main power switch at the bottom of the machine, which is located next to the universal wheel on the right side of the machine, and is used to disconnect the battery power. It is closed by default at the factory, and you need to manually turn the switch to the open state when you use it for the first time.

1.2 Boot

- Long press the power button, the buzzer will beep twice, and when the third beep becomes a long beep, release it and wait for the machine to turn on.



1.3 Shutdown

- Long press the power button, the buzzer will beep for seven short beeps, release when the eighth beep becomes a long beep, and wait for the machine to shut down.
- Shut down through the shutdown button at the bottom of the monitoring page.
- Shut down by calling the chassis shutdown interface.

2. Machine charging

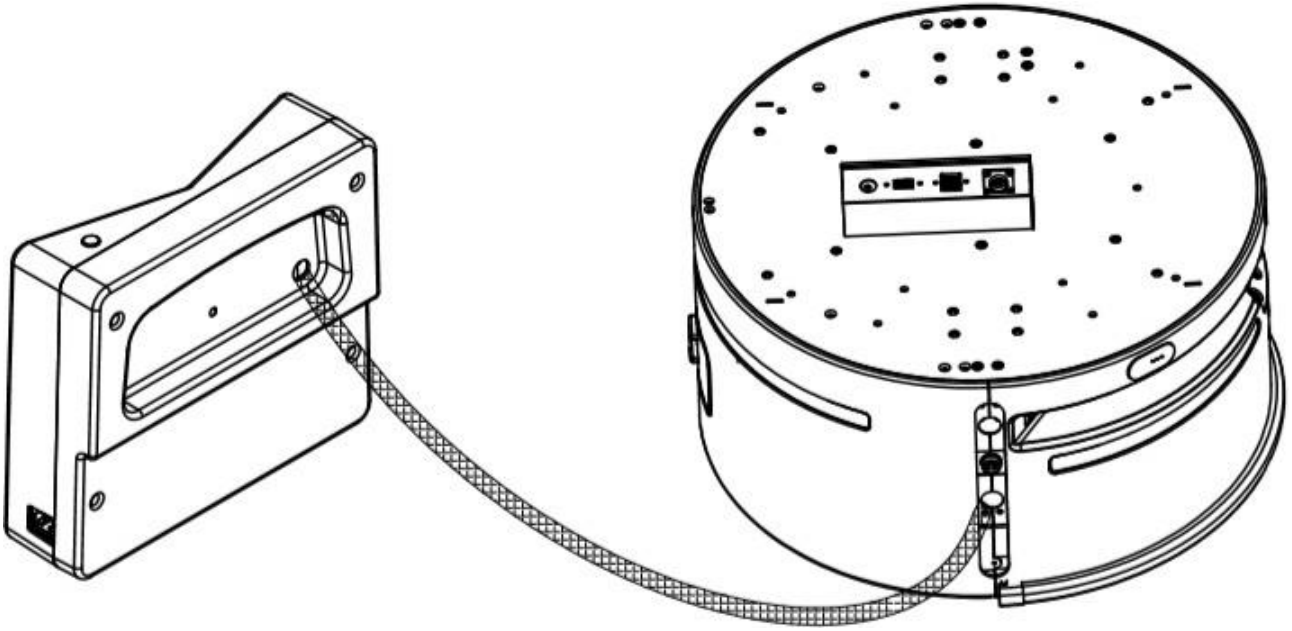
2.1 Placement of charging piles

- The charging pile needs to be placed on the wall, and there should be no other objects on the two sides of the center of the charging pile.
- The charging pile needs to be placed on a flat ground, not on a slope or carpet.
- The height of the charging piece of the charging pile needs to be kept at the same height as the charging contacts on the machine. If there is an error, it is necessary to adjust the bottom of the charging pile and increase or decrease the filling appropriately.
- The position of the charging pile needs to be fixed relative to the scene to avoid movement due to personnel movement or other reasons in the later period. The logo can be pasted on the ground or fixed by double-sided tape.
- When multiple machines are used at the same time in the same scene, the distance between the charging piles should not be less than 1.5m.

After making sure that the charging pile is properly placed, connect the charging pile to the power supply through the power cord. At this time, a green indicator light will light up on the charging pile.

2.2 Manual charging

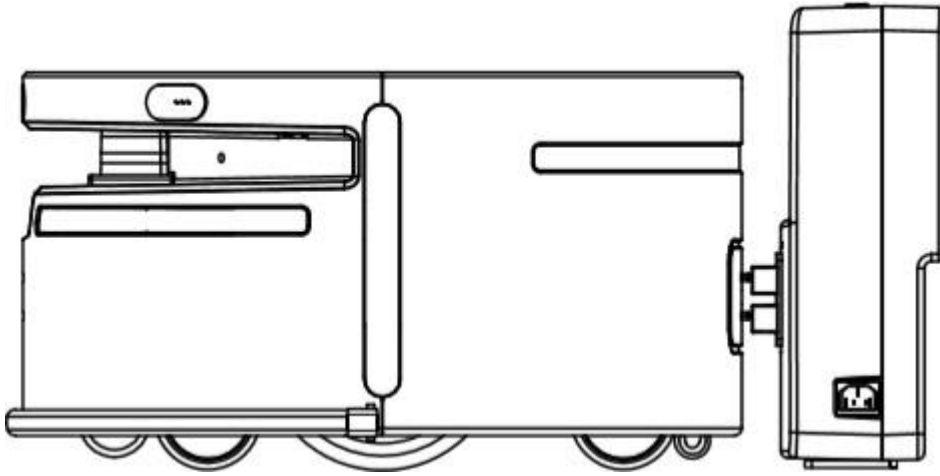
- There is a one-meter-long hand charging cable behind the charging pile, and a vertical cover is attached to the right side of the machine. The cover is fixed by magnetic suction. You can suck it out with the supplied suction cup. After removing the cover, you can see the hand charging port. Manually insert the plug at one end of the cable into the hand charging port on the machine end. After the normal connection, the indicator light of the charging pile will be changed to red.



When using the charging cable to manually charge, the chassis does not perform movement tasks. After the task is issued, the task will directly fail. Pay attention to remove the hand charging cable and put back the side cover of the machine before sending the task.

2.3 Contact charging

- After the position of the charging pile is fixed, manually push the machine to the charging pile, and make the charging contacts under the machine contact with the charging sheet on the charging pile, then the charging can be normal.
- When the map is normal and the charging pile point has been calibrated, the machine can automatically return to the charging pile position by sending it to the charging pile point task, and automatically recognize and recharge.



Note: The charging pile indicator has only two states:

green

- The charging pile is energized and does not touch the device for charging
- The charging pile is charging and the power of the machine is above 90%

red

- The charging pile is energized and contacts the equipment to be energized, and the power of the machine is less than 90%

When the machine is charging, the light strip will change to breathing state. This phenomenon also exists when charging when the machine is turned off. If the light strip on the charging pile does not change to the breathing state, please check whether the charging pile is normally energized and whether the machine is in normal contact with the charging pile. Light strip status refer to: [Light strip status](#)

3. Light strip status

The machine light belt will have different status prompts at different stages

- Green flashing: The power is on and the industrial computer is starting;
- Steady white: the boot is completed and working normally;

- White breath: charging;
- White flashing: press emergency stop;

Tool use

1. Establish communication

1.1 Wireless communication-WiFi

The machine has a built-in wireless router. By viewing the WiFi list, select the name **yunji_WT_XXXXX** (the last five digits represent the last five digits of the machine number), and the default password is **yunjiwater**. Make sure that the current device's wireless network card is not configured with a fixed IP. Connect to WiFi to indicate connection success. The same machine can be connected by multiple devices at the same time.

1.2 Wired communication-network cable

Use an Ethernet network cable to connect the reserved network port of the machine to the control device (personal PC or upper body PAD) to ensure that the current device's wired network card is not configured with a fixed IP. Wait for the computer to recognize it and it means the connection is successful.

Note: For the above two connection schemes, just choose one to connect.

2. Monitoring/Mapping Tools

After establishing communication with the chassis through the above method, you can use the browser to access: 192.168.10.10:9001. Chrome browser is recommended. The content displayed after the visit is as shown in the figure below

This page cannot be accessed normally when the software is restarted or shut down. You can access it normally after the software is started or turned on.



2.1 Monitoring page

2.1.1 Status bar

The upper left corner of the monitoring page is the status bar, from left to right are



- Map name/floor: The map name and floor information used by the current machine. If the map is shared by the cloud, green brackets will be displayed behind, and the unique ID code corresponding to the cloud map will be displayed inside. ;
- Current Mode: The currently selected operation modes on the monitoring page are: correction, punctuation, forbidden line, area, control;
- Power: current machine power information and charging status will be displayed at the same time;
- Emergency and hard stop status: Emergency stop is divided into physical button hard emergency stop and software control soft emergency stop. The two are controlled separately and cannot be canceled each other;
- Mobile status: current machine task status, the [specific status is as follows](#)
- Operation bar software version: the current machine uses the software version, and the software version will be released regularly, and it supports online upgrade. For the upgrade method, please refer to the [software upgrade](#) ;
- Chassis number: the unique identifier of the current equipment;

Mobile state

Field value	Explanation
idle	Indicates that the robot service has not received any movement instructions since it started.
running	Indicates that the robot is going to move_target and will refuse to accept new move instructions at this time.
succeeded	Indicates that the mobile task has been successfully completed.
failed	Indicates that the move task has failed.
canceled	Indicates that the move task has been cancelled.
leave_charging_pile	Leaving the charging pile.
dock_to_charging_pile	It is automatically docking to the charging pile.
goto_lift	Going to the elevator.
wait_lift_unlock	Wait for the elevator to unlock.
wait_lift_outside	Waiting for the elevator outside the elevator.
enter_lift	Entering the elevator.
avoid_lift	After failing to enter the elevator, he is avoiding the elevator.
take_lift	Taking the elevator.
exit_lift	Getting out of the elevator.
back_to_lift	Failure to exit the elevator is returning to the elevator.

2.1.2 Operation bar

The upper right corner of the monitoring page is the operation bar, from left to right are

- Floor: current floor information used by the machine, if there are multiple floors, you can directly click to switch between floors;
- Tracking: Set the focus of the page to the position of the machine, after selecting it, the machine will always remain at the center of the page;

- **Laser**: After selected, the real-time data of the current machine laser will be displayed on the page, and the status of the laser data as a red dot or line is displayed on the page;
- **Correction** : After selecting, you can manually operate on the page to correct the position of the machine to a suitable position;
- **Punctuation** : After selecting, you can add a point at any position in the page for subsequent sending tasks to move the machine to the target point;
- **Add forbidden line** : After selected, you can [add a forbidden line](#) at any position in the page to avoid entering the dangerous area or the area where the machine is forbidden when the machine moves in the later period;
- **Add area** : After selecting, you can [add an area](#) anywhere in the page. The area is divided into multiple types, and different types have different effects;
- **Control** : After selecting, you can [ijk1](#) control the machine to move forward and backward and rotate left and right through the keyboard , and at the same time, you can click on the map with the mouse to move the machine directly to the clicked position;
- **Distance measurement** : After selecting, you can click two points in the page and display the distance between the two points;
- **Global path** : After selecting, in the task state, the planned movement path between the current machine position and the target point will be displayed in the interface;
- **Soft emergency stop** : After selecting, the machine enters the emergency stop state, the motor is disabled, and the machine can be moved manually;

When the above operation needs to be used, click on the corresponding button to make the button background green to operate normally, and click again to change the background to black to cancel the operation.

2.1.2.1 Correction

Three ways to correct the position:

- When the machine is charging on the charging pile and there is an ID point corresponding to the charging pile on the current map, the machine will correct its position to the charging pile point.
- If there are situations such as switching maps, pushing the machine after shutting down, turning on the machine without charging, etc., the position of the machine on the map may be deviated. At this time, the machine position needs to be corrected to the position of the machine on the map relative to the actual scene through the correction function.
- Provides a correction map interface, which can be corrected by coordinate points or points. For specific operations, please refer to the [interface document: Correct the current position of the robot](#)

Monitoring page correction steps:

1. When correcting, first find the actual position of the current machine on the map corresponding to the position on the map;
2. Select the correction button in the operation bar;
3. Place the mouse at the real location of the machine on the map, keep the mouse or touchpad pressed, and don't release it;
4. At this time, a copy of the laser data of the current machine will be displayed on the page, which is dark purple. You can adjust the angle by sliding the mouse or touchpad;
5. When the position and orientation are roughly the same, release the mouse, and the page will pop up a fine-tuning window. You can control the laser copy to move forward, backward, left and right, and turn left and right through the buttons or the button icons displayed on the page;
6. After superimposing the current laser copy with the black line on the map through the fine-tuning button, click the OK button to complete the correction;
7. If the operation deviation in the fifth step is too large, you can confirm the actual position of the machine before correcting it further;

Note: If the machine is charging and there is a charging pile point on the map, the machine will be directly corrected to the charging pile point position. At this time, if the correction operation is performed, the machine will flash at the correction position and return to the original position. At this time, it is necessary to correct the charging pile point and calibrate the charging pile point to the correct position.

The correction function allows for a certain error, just make sure that the current laser of the machine is basically consistent with the environmental terrain. Even if there is a mismatch or angle deviation in some places, the machine will automatically fine-tune and correct it through the software when it moves. But it is necessary to ensure that the deviation position is within 20cm and the angle is within 5 degrees.

2.1.2.2 Punctuation

When the machine is moving, it is necessary to clearly indicate the current machine position and the coordinates of the target location to go through the coordinate system generated by the currently used map. The function of the point is to record the coordinate points of some special locations on the map and provide the mapped name for later use when sending tasks.

Calibration point method:

- Place the mouse on the page punctuation and select current position calibration or designated position calibration.
- Use the interface to calibrate the point at the specified location on the map or the current position of the machine. For specific operations, please refer to the [interface document: Calibrating the marker at the current position of the robot](#)

Method of deleting/editing points:

- Double-click the green triangle representing the point on the map, an edit box will pop up, click Delete to remove the point, or fill in the information that needs to be modified, and click the OK button.
- Use the interface to calibrate the point at the specified location on the map or the current position of the machine. For specific operations, please refer to the [interface document: Delete the marker point](#)

The point calibration method is similar to the correction operation. Click on the page to select the position. After clicking, continue to move the mouse to select the orientation. After releasing it, the point attribute edit box will pop up.

Name: The name used for the current calibration point. This name can be used to make the machine directly reach the corresponding coordinates through tasks.

Type: The chassis distinguishes some special points according to different types, so as to realize some special operations. The specific distinctions are as follows:

Common name	Types of	Description	Attributes	Property description
Normal point	0	For the task of moving to a common point, the machine will only move to make its position and orientation coincide with	no	no

		the point, and will not perform other redundant operations.		
Outside the elevator	3	The point outside the elevator, if the elevator IOT is installed in the machine use environment, the point with attribute 3 needs to be calibrated outside the elevator entrance, and the machine will call at the point with attribute 3 when performing cross-floor tasks and wait for the elevator to arrive .	Numbering	The elevator point needs to enter the number of the corresponding elevator module. The elevator module number will be explained by the staff during installation. The internal and external numbers of the elevator need to be one to one.
In the elevator	4	The point outside the elevator corresponds to the point of attribute 3. When the elevator arrives, the machine will move from	Numbering	The elevator point needs to enter the number of the corresponding elevator module. The elevator module number will be explained by the staff during installation. The

		<p>point 3 to point 4 in the elevator. The position of attribute 4 between different floors should be as consistent as possible with respect to the position of the elevator!</p>		<p>internal and external numbers of the elevator need to be one to one.</p>
Gate point	7	<p>When the gate & electronic gate communication module is installed in the machine use environment, you need to calibrate the position of the gate & electronic gate with the attribute of 7 on the map. It is necessary to ensure that the point arrow and the channel are at an angle of 90° during the point calibration of the gate.</p>	ID	<p>Gates & electronic gates need to be marked with the corresponding id of the control module in the point. If the id is abnormal, it will cause uncontrollable or wrong control of other equipment.</p>
			distance	<p>In the control gate & electronic gate parameters, you can configure how far away from the point to start the control module, and how far away from the point to release the module.</p>
			One-way	<p>If a single gate &</p>

			control	electronic door is equipped with two control panels, and the entrance and exit are controlled in different directions, the one-way control function needs to be turned on.
Elevator waiting point	8	Elevator waiting point. If there is only one elevator on site, this point can be omitted. If there are multiple elevators on site and multiple machines need to take elevators, then attribute point 8 needs to be calibrated.	Numbering	The elevator point needs to enter the number of the corresponding elevator module. The elevator module number will be explained by the staff during installation. The internal and external numbers of the elevator need to be one to one.
Charging point	11	Need to calibrate the placement position of the charging pile corresponding to the actual scene on the map. At the	Numbering	The charging pile number corresponding to the current charging pile point is attached with a corresponding label to indicate the number. If not,

		<p>same time, the corresponding number of the charging pile point needs to be input (if the charging pile supports it). The charging pile number will be marked on the charging pile. If the number is filled in incorrectly, the machine will not be able to automatically correct to the correct position during charging.</p>		<p>the charging pile does not support it. Just fill in this parameter.</p>
Confined area waiting point	20	<p>The point with attribute 20 needs to be calibrated outside the narrow area (if there is a narrow area). The passage can be entered according to the narrow area. A waiting point is calibrated for each passage. When there are</p>	no	no

		<p>other machines in the narrow area, the current machine will be in the narrow area. Wait for the point to wait. Reference for the use of narrow areas: narrow areas</p>		
Deceleration point	76	In the deceleration zone, the point with an attribute of 76 is the deceleration point. If there is a ramp or road sill on site, the deceleration zone can be calibrated at the corresponding position. The deceleration zone point calibration method is similar to the gate & electronic gate calibration. It is necessary to ensure that the point arrow and the channel are	proportion	When the machine enters the vicinity of the deceleration point, the speed will be reduced to the percentage of the current full speed.
			distance	When the machine approaches/leaves the point, it starts to decelerate.
			One-way deceleration	Only slow down when approaching the point, and immediately accelerate to full speed after passing the point.

at an angle of 90°. As shown below. The default deceleration width of the deceleration point is 50cm before and after the point, such as the position of the blue arrow. The deceleration distance can be configured in the point properties.

Each point needs to be set with a different name, even if the floor is different, if it is the same, the previous point will be covered. It is recommended to use floor plus room name or floor plus other style signs.

2.1.2.2.1 Special point calibration rules

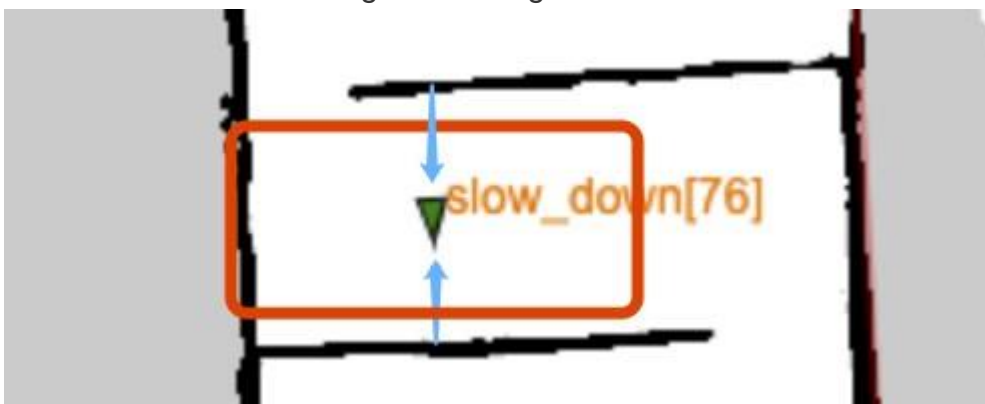
- ♦ Elevator point:
 - The points in the elevator need to ensure that the calibration timing of each floor is consistent with the relative position of the elevator, otherwise the map will shift after the elevator reaches the target floor.
 - When there is only one machine and one-step elevator, the elevator waiting point can be omitted.
- ♦ Gate point:
 - When calibrating the gate position, the bottom side and the top angle of the point triangle should be calibrated horizontally in the middle of the gate or gate. The point and the channel are at an angle of 90 degrees. As shown



- ♦ Elevator waiting point:
 - When there are multiple devices on site and there is only one elevator, you need to calibrate the No. 8 attribute waiting point on different equipment at different locations outside the elevator. When there is one device in the elevator, other devices wait in the No. 8 waiting point. The elevator is free. In other cases, there is no need to calibrate the 8th point.
- ♦ Charging pile point:
 - The point calibration time of the charging pile needs to be consistent with the actual placement position of the charging pile on the map, and the direction of the point arrow needs to be consistent with the opening position of the V-shaped groove of the charging pile. If multiple charging piles need to be placed in the same scene, it is necessary to ensure that the distance between the two charging piles is at least 80cm. At the same time, other obstacles cannot be placed within 50cm on the left and right sides of the charging pile to prevent the device from recharging.



- ♦ Deceleration point:
 - When the deceleration point is calibrated, the bottom and top corners of the point triangle should be calibrated horizontally in the middle of the gate or gate. The point and the channel are at an angle of 90 degrees. As shown



2.1.2.3 Forbidden line

Calibration method:

- After selecting the forbidden line function, use the mouse to click in the interface to select the starting point, and continue to click elsewhere. The two points will be connected to form a line, which can be clicked repeatedly to form a continuous line.
- Click the wrong position or click the right mouse button after the pull is complete to bring up the operation menu.

Deletion method:

- When the mouse is placed on the forbidden line, the forbidden line will turn blue and the name of the forbidden line will be displayed at the same time. At this time, double-click the mouse to pop up the forbidden line edit box, and click the delete button to delete it.

The prohibition line function is mainly to prevent the machine from entering the area that the machine is not allowed to enter during use. At the same time, it is necessary to use the prohibition line in the outer circle of the machine use site in combination with the black line on the map to circle the chassis in the operating area .

Each forbidden line needs to be set with a different name, if the same, the previous forbidden line will be overwritten.

2.1.2.4 Area

The area function can handle some special situations when the machine is running, and the specific use depends on the actual situation.

Area type	Area to be identified	Dedicated attributes	Property description
Fall risk zone	1. The area where the vertical height difference is $\geq 15\text{mm}$; (if the height difference in the same drop zone is inconsistent, take the maximum value) 2. If the above height difference requirements are met, (1) The area within the map range; (2) Not in the map range , But in the area directly reachable in the actual scene, such as: the buffet, coffee shop and other areas on the level of some hotel lobby; (3) It is not in the map range, but in the actual scene, it can be reached through	Height difference	Unit meter (m), accuracy to millimeter
		Operational visibility	Only three types: visible when running, not visible when running, outside the map
		Environment type	This includes: stairs, level stairs, small

	automatic doors and normally open doors. , Such as: the safe passage of some hotels is used as the daily passage for employees, and the drop behind the door should still be marked;		steps, escalators, and others (the type should be stated in the remarks)
Deceleration zone	If there is a ramp or road sill on site, or other terrain that requires the machine to slow down, you can mark the deceleration zone at the corresponding position.	Speed ratio	When the machine reaches the area, it will decelerate to the proportional value
Slope area	Within the range of the map, areas with obvious slopes ($\geq 5^\circ$) can be seen; you can use a mobile phone level to measure the slope angles of the front, middle, and back sections of the slope, and take the maximum value;	Slope angle	Unit degree ($^\circ$), accurate to degree
Elevator area	Used to mark elevator range	Elevator number	The elevator number is based on the elevator module when the elevator is installed
Camera noise area	Areas with abnormal camera data due to various reasons are generally not marked during on-site deployment	Causes of noise	Including: strong sunlight, strong light, reflective materials, ground spotlights, grid manhole covers, small gaps, patios, and others (the reason should be stated in the remarks)
Laser	1. Upon confirmation by the customer, the	Listed as a	Including: fall risk

restricted area	door should not be opened except under special circumstances; 2. There is a drop risk area behind the door; 3. The door should be closed when scanning the picture, this area is the gray area in the picture	restricted area reason	area behind the door, others (the reason should be stated in the remarks)
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2.1.2.5 Control

In the control mode, the machine can be directly controlled to move, which is divided into manual control and automatic movement:

- When the control button is selected, you can `ijkl` control the machine on the keyboard to move forward and backward, and rotate left and right. In this state, the machine only uses lasers to avoid obstacles. If there are other obstacles that need to be avoided, human observation and control of the machine are needed to avoid them.
- After selecting the control button, you can directly click and drag on the movable area on the map, and the machine will start to move to the target point.

In manual control mode, the machine only performs laser obstacle avoidance, and cannot detect three-dimensional obstacles and falling environments! The controller needs to observe the environment around the machine autonomously to ensure that the machine is not subject to safety risks.

2.1.2.6 Ranging

The distance measurement function can calculate the distance between two points in the actual scene through the map, which is only for reference.

Click on the map area and drag the mouse. The distance from the first point to the current mouse position will be displayed next to the mouse in real time. You can click and move the mouse again. At this time, the first point will be displayed on the position under the second point. The total length from a point to the current point.

- Sliding the mouse will display the distance from the previous point to the current mouse position.
- After clicking on the map, the total length from the position of the first point to the current clicked position will be displayed.

2.1.2.7 Global Path

In the task state, after selecting the global path button, the planned path from the current machine position to the target point will be displayed on the page in real time. If it is not displayed, it may be obstructed by obstacles between the machine reaching the target point, making it impossible to plan a driving path.

The global path will only be generated in the task state, and the path will not be displayed even if it is selected in the non-task state.

2.1.2.8 Soft emergency stop

After selection, the machine enters the soft emergency stop state. In the emergency stop state, the motor loses power and can be driven at will. Soft emergency stop and hard emergency stop are controlled separately, and they cannot be offset by each other.

In the emergency stop state, the machine motor will enter a disabled state. Do not use it on a ramp or at an inclined position.

2.1.3 Toolbar

The lower left corner of the monitoring page is the operation bar, from left to right are

网络设置 重启软件 断电重启 关机 更新&自诊断 地图管理 配置管理 传感器状态 测试工具

2.1.3.1 Network settings

2.1.3.1.1 Wireless network (obsolete)

Used to bridge WiFi, the latest chassis is bridged through a router, please refer to [router settings](#) .

2.1.3.1.2 Wired network

The basic information shows the current chassis network information, and the specific explanation is:

Field	Explanation
broadcast	Broadcast address of current network port
IP	IP address of current network port
netmask	Current network port network mask
DNS	Current network port DNS
gateway	Current network port gateway

The DHCP function is used for the chassis to share the network to other network ports to connect to the device. There is no need to set this in the WT chassis!

The current device network port gateway and DNS can be set in the settings. It is not recommended to change it privately if it is not necessary or not familiar with the configuration rules!

After making changes, click Save to restart the whole machine to take effect.

2.1.3.2 Restart the software

After clicking and confirming, the chassis software system will be restarted. When restarting, all tasks that the machine is executing will be cancelled, and it will take 30-50 seconds to restart. During this period, the monitoring page will refresh to reconnect to the chassis.

Do not restart the software during the software upgrade process, it may cause the software to fail to start normally!

2.1.3.3 Power off and restart

After clicking and confirming, power off the whole machine and then power on again, which is the same as manually pressing the power off button, powering off and then powering on again. During shutdown, the upper body power supply will also be interrupted. It takes 1~2 minutes to restart the whole machine.

Do not interrupt the power and restart during the software upgrade process, it may cause the software to fail to start normally!

2.1.3.4 Shutdown

After clicking and confirming, the machine will be powered off and shut down. If you do not use the machine for a long time, you need to manually turn the main power switch to the off state. You need to turn it on manually next time you use it.

Do not shut down the power during the software upgrade process, it may cause the software to fail to start normally!

2.1.3.5 Update & self-diagnosis

2.1.3.5.1 Software update

In this page, you can check whether there is a new version of the software, and upgrade the software version to the latest. The chassis will release new versions every once in a while to fix known problems or add new features. When upgrading the software, you need to ensure that the machine is connected to the Internet and has sufficient power. The machine will not be upgraded when it is in the task state. It is necessary to ensure that the machine will not be restarted or shut down during the upgrade process.

If the hardware needs to be updated after the software update, it will be updated automatically. If the power board program update is involved, the whole machine will be automatically restarted after the update. If a task is received during the firmware update, the machine will not move, and the task will be automatically cancelled when the whole machine restarts.

Do not perform software restart, power-off restart, power-off shutdown and other operations during the software or hardware upgrade process. It may cause the software or the whole machine to fail to start normally!

2.1.3.5.2 Hardware diagnosis

The hardware diagnosis will display the status and results of multiple detections since the software was started. The specific items and explanations are as follows:

Diagnostic item	Features
the Internet	Used to determine whether the current device is connected to the network.
laser	The main mobile sensor is used to scan surrounding obstacles.
Front upper depth camera	You need to install the upper body looking down camera to have this option. It is used for low obstacles on the ground or falling environment.
Front and bottom depth camera	Used for three-dimensional obstacle avoidance, detecting obstacles higher than the chassis.
IMU	Acceleration sensor, used to judge the direction and acceleration.
Odometer	According to the photoelectric encoders installed on the two driving wheel motors on the left and right, the radian of the wheels turning in a certain period of time is detected, and then the change of the relative pose of the robot is calculated.
CAN module	Controller Area Network (CAN or CAN bus)
Power Board	The chassis power control system is used to control the power supply of each component of the chassis.

Diagnostic item	Features
Motor board	The chassis motor control module is used to drive the motor to move.
Peripheral board	An integrated module that contains other communications or functions.
Routing board	Chassis 4G and WiFi module.

The success rate displayed in the diagnosis item is calculated from the number of successful diagnosis/total number of diagnosis after the software is started, and does not affect the current machine status. The current hardware status can be determined based on multiple clicks to start the diagnosis and confirm whether it is successful every time.

2.1.3.6 Map management

You can create, modify, switch, upload and download the map in the map management page.

For specific operations, see the [mapping tool](#)

2.1.3.7 Configuration Management

In the configuration management page, you can configure the parameters of the machine. The configurable parameters and descriptions are as follows:

parameter name	Description
Location sharing	When there are more than two machines in the same venue, the location sharing function must be turned on, and multiple machines will synchronize their positions to each other. The location sharing function requires the use of the same cloud sharing map between different machines, that is, the ID after the map name in the monitoring page is consistent. Default: off
Human body recognition	Calculate the human body around the current machine through algorithms, and make evasive actions while moving. It can effectively prevent pressing people's feet, but it will affect the passing performance in a small environment. This function has a certain probability of misrecognition. It is not recommended to say hello as a recognizer or rely too much on this function to avoid obstacles with low obstacles. Default: off
Tolerance to point position	When the target position is occupied or other reasons cause it to reach the vicinity of the target point but cannot accurately stop, the task is considered successful if the robot moves within this distance of the target. Setting this parameter to a small hour can improve the accuracy of the arrival point position, but correspondingly will reduce the efficiency of the arrival point. Default: 0.3m

parameter name	Description
Point-to-point angle tolerance	When the target position is occupied or other reasons cause it to reach the vicinity of the target point but cannot accurately adjust its orientation, the task is considered successful if the robot moves to within this angle range of the corresponding point. Setting this parameter to a small value can improve the accuracy of the arrival point, but correspondingly will reduce the efficiency of the arrival point. Default: 0.2rad
Straight speed	The straight speed when the current machine is moving. Although the efficiency can be improved after the increase, it will also lose part of the safety. The speed is proportional to the deceleration time. The faster the speed, the longer the deceleration takes. Default: 1m/s
spinning speed	The rotation speed of the current machine when it is turning. Default: 3.5rad/s
Safe stopping distance	Concession stop distance parameter. This function is complementary to the above point-to-point position tolerance. When the point can be reached, the point-to-point tolerance parameter is used for accurate stop. When there is an obstacle on the target point that cannot be reached normally, the edge stop will be carried out based on this parameter, and the task time will not be occupied. When the target point is occupied, set this parameter and the robot will directly stop near the point to complete the task, instead of trying to move to the point. The distance is calculated from the edge of the occupant to the center of the robot. This function does not take effect when set to 0.
Elevator IoT	Chassis elevator logic-used when installing the elevator module of the chassis manufacturer. If the elevator IOT function is realized independently, this option can be disabled.
Elevator lock	It is used when using chassis elevator logic. When there are multiple machines in the same scene that need to take the elevator, it can prevent different machines from preempting the elevator. You need to open location sharing at the same time, and ensure that the machine network is smooth.
Run sharing elevator lock	It is used when taking the elevator with Run at the same time in the same scene. It needs to be opened and 电梯锁 used at the same time .

parameter name	Description
Take the elevator number	After the elevator is deployed normally, this item will be displayed after the elevator point is calibrated on the map. The machine can take the elevator normally only after selecting the elevator that the machine will take in the later stage.
Emergency stop deceleration	When an emergency stop is triggered, the time from the moving state to the stopping state of the machine is calculated based on the negative acceleration. The larger the value, the shorter the braking distance and the faster the stop. This function has an exception and has been abandoned!

After the above parameters are modified, you need to click the save button below, and then restart the software to take effect.

2.1.3.8 Sensor status

2.1.3.8.1 Power status

- Charging voltage: it will be received only in the charging state, which is the voltage of the charging pile.
- Battery voltage: The current battery voltage, the non-charging state will gradually decrease.
- Battery current: The current consumption of the device. It is a positive number when charging and a negative number when discharging.
- Host current: Current consumption of the current device host.
- Motor board current: the current consumption current of the device motor.
- Host computer current: the current consumption current of the upper body interface of the device.
- Other current: other current consumption on the chassis besides the above-mentioned devices.
- Power: The current remaining power of the device.
- Charging status: display the current contact charging or line charging.
- Charging pile contact status: reserved field, temporarily useless.

2.1.3.8.2 Motor status

电源状态

电机状态

电机异常状态

项目	左电机	右电机
angle_offset_error	false	false
SPI_WR_error	false	false
encoder_pulse_fault	false	false
hall_study_error	false	false
angle_value_error	false	false
locked_rotor_protection	false	false
over_voltage	false	false
over_current	false	false
current_offset_fault	false	false
current_offset_error	false	false
under_voltage	false	false

The motor status displays the current operating status of the equipment motor. Under normal conditions, all fields are the same false . When an abnormality occurs, it will change to true and the background color will turn red.

The soft and hard emergency stop will also trigger the page status change -> soft_estop, hard_estop, and also motor_free_error will trigger the change. At this time, just release the emergency stop to recover, it is not an abnormal state.

2.1.3.9 Test tool

The test tool function is only used to assist in the test. Please be careful not to conflict with the task when sending the mobile task . Please make sure that the mobile test is over when you exit the page, or you can click to end all mobile tasks.

There are buttons in the characters under the yellow background above , which can cancel all moving tasks.

The current task status, target point, current floor, number of retries, soft and hard emergency stop status information are displayed in the intermediate movement status.

In the movement test below, click the selection box behind the set point to select the point to be moved. You can click multiple times to select multiple points to move, and the order of the points is executed in the order of selection. After selecting a point, enter the number of cycles below, and then click Start to execute it will move sequentially according to the point list until it reaches the specified number of laps and stops. During this period, you can 取消移动 cancel the task by pressing the button above .

The task log only records the tasks sent in this page and the movement records performed by the machine.

2.2 Mapping tools

2.2.1 Switch map

The switch map is the created map. After the map is created, the machine needs to switch the current map to the new map through the switch map function. Select the map name to be switched, and click the 设置地图 button after the current machine is located to switch. The software restart operation will be performed when the map is switched, and you need to wait 30~50 seconds for the restart to complete.

If the map that needs to be switched is the same as the current map, but the floor is different, you can switch directly by using the floor option in the toolbar of the monitoring page to avoid the restart link.

2.2.2 Retouching

After selecting the map and floor to be modified, click the 开始修图 button to enter the editing page.



At the top of the page is the toolbar, from left to right:

Operating tools:

- Mode: current operating mode, optional: scanning tool, retouching tool, punctuation
- Map name: The name of the currently modified map
- Floor: the currently modified map floor
- Download: The current map image can be downloaded to the local in png format

Retouching tools:

- Straight line: Straight lines can be drawn on the map. It is only used when there are walls or fixed obstacles that have not been swept while building the map. It is forbidden to add them when there are no walls or fixed obstacles in the map.
- Curves: Curves can be drawn in the map. It is only used when there are walls or fixed obstacles that have not been scanned during the map creation. It is forbidden to add them at will when there are no walls or fixed obstacles in the map.
- Eraser: Used to erase some moving obstacles when creating a map, such as human bodies, carts, cartons, sliding seats and other objects that are not fixedly placed in the venue
- Adjustment tool: used to adjust the size of the eraser
- Undo: You can undo the modifications made on the map, only during the current editing period. After saving the editing and refreshing the page, it cannot be undone again.
- Undo: undo the undo operation of the previous step
- Bold: used to bold the black lines on the map when automatically retouching
- Automatic retouching: Automatically erase unnecessary obstacles on the map, which has certain risks. It is recommended to retouch manually
- Reset: Restore the map modification to its previous appearance, only during the current retouching period. After saving the retouching and refreshing the page, it cannot be reset.
- Save: save changes

The left side of the page is a list of maps, you can quickly switch to other floors or modes.

In the middle of the page is the map of the current operation.

When retouching, you only need to use an eraser to remove temporary obstacles on the page, and thicken some walls as needed. Do not add walls where there are no obstacles, or erase real obstacles.

2.2.3 Create a map

2.2.3.1 Create a new map

After entering the newly created map name and floor, click the 开始创建 button to start creating a new map.

If the site involves taking an elevator, you need to scan three-dimensional floors, just fill in the same map name and create different floors.

When creating a new map or rescanning the map, you need to choose according to the size of the site environment: three resolutions: large, medium, and small, respectively corresponding to the area: within 3600m², 3600m²~10000m², and above 10000m².

When starting to scan the picture, it is recommended to place the machine in an area with obvious environmental characteristics, that is, the surrounding walls and other flat objects and corners are obvious, try to avoid the environment is messy or the similarity is extremely consistent with other locations and the open area within a radius of 5m.


After starting to scan the 先控制机器在原地旋转一圈 map, after collecting the current location features, continue to move to other locations, 当遇到拐角时进行原地旋转 and then continue to move forward. If the scene is in a circle, finally walk to the starting point and rotate, waiting for the map to close, if you can't close, you can try more Rotate a few times.

When all the locations that the later machines need to reach are created in the map, click the upper right corner to end the map creation.

There is a ring environment, and when the map cannot be closed normally after the machine has gone through a circle, you only need to rotate the machine several times in the area that has obvious features and has been swept before to correct it normally.

2.2.3.1.1 Node Scanning

When the map is created, the status bar on the left is the node list.

When the map is too large or the scene is too complicated, it can be created in different areas. After each area is created and the map is intact, click  on the left to save the current map node. After the node is saved, click OK to continue scanning the map. If you need to change the location to continue scanning, move the machine to the location where the map has been created before clicking OK. If the location of the machine has been changed, the page will prompt for correction. Correct the machine to the correct map location to continue creating.

During the period, there is a map disorder in a certain area, or other irreparable phenomena, you can restore the normal scanning by saving the node first, then deleting the previous node and recreating it.

The  icon in the middle of the list on the left can hide the data of a certain node.

2.2.3.2 Resume the map

When there is a slight change in the environment of the existing map, or when a mobile room is added, and the map needs to be re-scanned, enter the map name and floor to be re-scanned, click the 开始创建 button , and click OK when it is prompted that the map already exists.

The data record file will be generated when the map is created, and the data file will not be shared to other machines through the cloud. Therefore, only the map created by the current machine and the mapping data file can be scanned continuously. If the map is downloaded from the cloud, the map cannot be scanned continuously!

If the current map supports continuous scanning, there will be a continuous scanning button in the upper right corner. If there is only a rescan button, it means that the current map is not created by this machine and cannot be continued. You need to find the machine that created the map to continue scanning.

When the continuous scan starts, you need to correct it first. At this time, you need to ensure that the machine is in the previously created map, and you can correct the current machine position in the map. After that, the operation is the same as that of scanning the image. After the creation is completed, click the button to end the image creation in the upper right corner.

The node function can also be used in the continuous map scan, but it is not allowed to delete previously created nodes.

2.2.3.3 Map re-creation

Keep the map name and floor re-creation consistent with the re-scanning operation, and finally click the 重新扫图 button to clear the previous map and re-create it.

The rest of the scan details are consistent with the creation of a new map.

2.2.3 Upload and download (will be obsolete)

The upload and download function can upload the local map of the machine to the cloud. If there are multiple machines on site, it can be downloaded directly to avoid repeated scanning of the map.

When uploading and downloading, it will synchronize the location, prohibited line, area and other information. When a scene is deployed, it can be directly uploaded to the cloud for backup, so as to avoid other personnel's misoperation in the later period and the map is deleted or cannot be used normally.

This function will be 服务地点 replaced by a function later .

2.2.3.1 Upload

The upper window of the page is the upload function, which is used to upload the map of the robot body to the cloud.

The map option below is a list of maps that already exist in the current machine. Select the name of the map that needs to be uploaded to the cloud. This is a single choice. Only one map can be uploaded at a time.

The floor options below are the floor lists of the current map. By default, upload all is not selected. You can also upload a floor individually.

The location option is a logo stored in the cloud. If there is a corresponding location, just select it and upload it. If there is no corresponding location, click the 创建地点 button on the right below to create a new location and enter the name of the new location.

The newly created location name needs to have a certain meaning. It is recommended to use location + building name, or a more detailed name, such as: Beijing Haidian Zhongguancun International Innovation Building_Beijing Yunji Technology. Avoid some meaningless generic names such as 111, test site, etc. If a name is already used for other locations or products, it cannot be created repeatedly.

The corresponding map name in the location is unique. If the map name and floor are the same but the map scene is different, the previous map will be overwritten. Therefore, it is recommended to upload maps of different scenes with different location names, and do not upload maps of different scenes under the same location!

2.2.3.2 Download

The window at the bottom of the page is the download function, which is used to download the cloud map into the robot.

Select other machines or the name of the location when uploading the map before, select the name of the map to be downloaded below, and click Download to download the cloud map to the local.

When downloading a cloud map to the local, if a local map with the same name already exists, all data (maps, points, forbidden lines, areas, etc.) in the original map will be covered and will not coexist. Please be careful when downloading.

2.2.4 Service location

The service location function can upload the local map of the machine to the cloud. If there are multiple machines on site, it can be downloaded directly to avoid repeated scanning of the map.

When the map is uploaded and downloaded, it will synchronize the location, prohibited line, area and other information. When a scene is deployed, it can be directly uploaded to the cloud for backup, so as to avoid other personnel's misoperation in the later period and the map is deleted or cannot be used normally.

2.2.4.1 Service location information

At the top of the page is the detailed information of the current machine binding location, and the content can be edited in the cloud platform service location.

2.2.4.2 Upload to service location

The middle window of the page is the upload function, which is used to upload the robot map to the service location.

The map option below is a list of maps that already exist in the current machine. Select the name of the map that needs to be uploaded to the cloud. This is a single choice. Only one map can be uploaded at a time.

The floor options below are the floor lists of the current map. By default, upload all is not selected. You can also upload a floor individually.

After selecting the map and floor, click the start upload button, and the map will be uploaded to the cloud server. After a while, the upload result prompt will be displayed below the button. If the prompt

is successful, the upload is complete. If there are other prompts, you can click again to start uploading and try again.

The corresponding map name in the location is unique. If the map name and floor are the same but the map scene is different, the previous map will be overwritten. Therefore, it is recommended to upload maps of different scenes in different locations, and do not upload maps of different scenes under the same location!

2.2.4.3 Download to the machine

The window at the bottom of the page is the download function, which is used to download the map of the service location into the robot.

Select the name of the map to be downloaded below, and click Download to download the map of the service location to the local.

When downloading a cloud map to the local, if a local map with the same name already exists, all data (maps, points, forbidden lines, areas, etc.) in the original map will be covered and will not coexist. Please be careful when downloading.

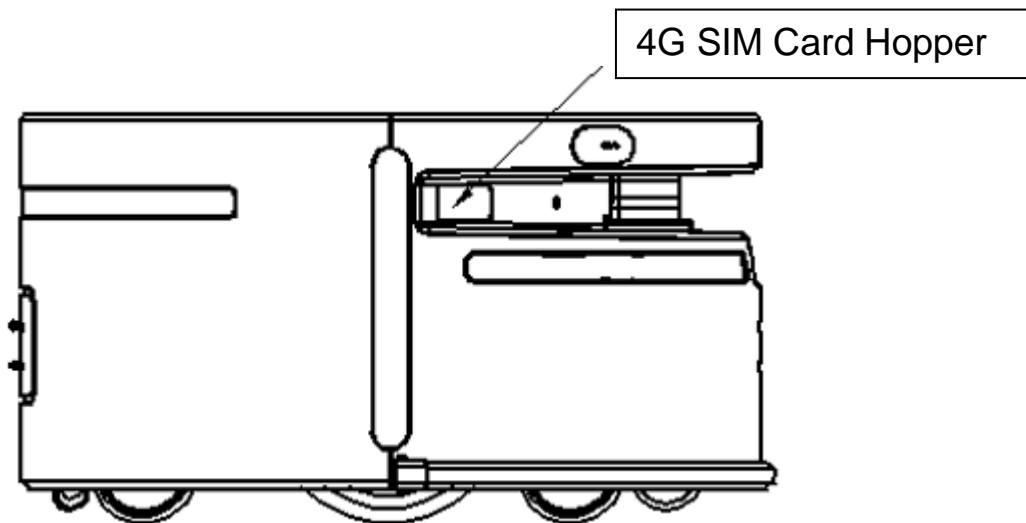
3. Router

The water drop 2 product comes with a router, which can be configured for networking through the following methods.

3.1 Connect to the network

The built-in router supports access to the network through the 4G card, and at the same time supports the router bridge environment WiFi access to the network.

3.1.1 4G card access to the network



On the right side of the machine, the position of the laser slot (as shown above) is the 4G card slot of the router. The card slot is covered by a metal cover, fixed with a magnet, and can be easily removed by a suction cup.

SIM card only supports Micro-SIM type, size: 15mm in length, 12mm in width, and 0.76mm in thickness.

When installing the SIM card, you need to make sure that the chip position is facing upwards, the notch position is facing inward, and the card slot is aligned and pushed inward. After pushing it to the bottom, the installation is successful after hearing a light click.

When the SIM is networked, it is necessary to ensure that the 4G signal in the current machine operating environment is good.

The SIM card needs to ensure sufficient traffic before it can access the network normally.

If the operator stipulates that the SIM card needs to be bound to the device, you need to determine whether the SIM card has been bound by other devices before use.

3.1.2 Bridge environment WiFi

After [establishing](#) a connection with the chassis by [establishing communication](#) , you can access 192.168.10.1 or 192.168.10.9 open the router management page through a browser , as shown in the figure below.

In addition to being used for network communication, the router also has other sensor functions in the machine. In addition to the following functions, please do not operate or change other functions privately!

YunjiRun

Authorization Required

Please enter your username and password.

Username

Password

Login

Reset

Powered by LuCI openwrt-18.06 branch (git-20.201.64093-23f30cf) / OpenWrt 18.06.4 r7808-ef686b7292

The default password of the router management page is: robot@yunji

After entering the password, click the Login button in the lower right corner to log in.

YunjiRun Status System Network Logout AUTO REFRESH ON

radio0: Mesh Point "yunji_exuwb" 00629 radio1: Client "YJGS"

Wireless Overview

Interface	Mode	SSID	BSSID	Channel	Bitrate	Encryption	Buttons
radio0	Generic MAC80211 802.11bgnac	yunji_WT_00629	0E:EF:AF:D5:89:57	11 (2.462 GHz)	866.7 Mbit/s	WPA/WPA2 PSK (CCMP)	Restart Scan Add
radio1	Generic MAC80211 802.11bgnac	YJGS	28:B2:BD:75:C1:B4	153 (5.765 GHz)	866.7 Mbit/s	WPA2 PSK (TKIP, CCMP)	Restart Scan Add

After entering the router page, place the mouse on the upper network menu and click the pop-up wireless button to enter the wireless network setting page.

The router comes with two wireless network cards, one of which (radio0 at the top of the page) is used to transmit WiFi hotspots, and the other (radio1 at the bottom of the page) is used to bridge WiFi. Click the scan button behind the circled part (radio1) in the figure to scan for connectable hotspots around.

In this step, make sure to use the Scan in radio1 below, otherwise it will affect the normal routing connection!

Join Network: Wireless Scan

Signal	SSID	Channel	Mode	BSSID	Encryption	
100%	yunji_WT_00629	11	Master	0E:EF:AF:D5:89:57	<u>mixed WPA/WPA2 - PSK</u>	Join Network
100%	yunji_exuwb	11	Mesh Point	0E:EF:AF:D4:7E:08	<u>open</u>	Join Network
100%	YJGS	153	Master	60:DA:83:92:F0:40	<u>mixed WPA/WPA2 - PSK</u>	Join Network
100%	YJGS-5G	153	Master	60:DA:83:92:F0:41	<u>mixed WPA/WPA2 - PSK</u>	Join Network
98%	robot_water_00813	6	Master	D4:EE:07:6B:40:26	<u>mixed WPA/WPA2 - PSK</u>	Join Network
95%	YJGS	1	Master	60:DA:83:93:23:F0	<u>mixed WPA/WPA2 - PSK</u>	Join Network
92%	YJGS	6	Master	60:DA:83:92:F0:50	<u>mixed WPA/WPA2 - PSK</u>	Join Network
92%	yunji_WT_00028	11	Master	0A:EF:AF:D4:7E:08	<u>WPA2 - PSK</u>	Join Network
92%	YJGS	48	Master	60:DA:83:93:23:E0	<u>mixed WPA/WPA2 - PSK</u>	Join Network

Select the SSID you want to connect to in the WiFi list page that jumps out, and click the corresponding join network button at the back.

Joining Network: "YJGS"

Replace wireless configuration

The hardware is not multi-SSID capable and the existing configuration will be replaced if you proceed.

WPA passphrase

Specify the secret encryption key here.

Name of the new network

The allowed characters are: A-Z, a-z, 0-9 and _

Create / Assign firewall-zone

Choose the firewall zone you want to assign to this interface. Select *unspecified* to remove the interface from the associated zone or fill out the *create* field to define a new zone and attach the interface to it.

[Back to scan results](#)

[Submit](#)

Fill in the WiFi password in the newly redirected page and click the submit button in the lower right corner .

Interface Configuration

General Setup
Wireless Security
Advanced Settings

Mode
Client

ESSID
YJGS

BSSID
60:DA:83:92:F0:50

Network
wwan:

Choose the network(s) you want to attach to this wireless interface or fill out the create field to define a new network.

Back to Overview
Save & Apply
Save
Reset

Drag to the bottom of the newly jumped page. If there are multiple APs in the live WiFi and the roaming function between multiple APs is involved, you need to delete all the content in the BSSID box on the page, and then click the save & Apply button in the lower right corner. The routing will enter the countdown and start to configure the bridge WiFi. When the bridge is completed, it will be displayed configuration has been applied and jump to the Network -> Wireless page.

Multi-AP roaming refers to the existence of multiple SSIDs with the same name and the same password in a unified scene. In subsequent use, the machine needs to be designed to automatically switch to other WiFi with the same name and the same password according to the signal strength of the current connected network.

At this point, the router has been successfully bridged to the ambient WiFi, and other devices can be connected to the chassis router for networking.

If the on-site environment WiFi has authenticated Internet access, you need to configure the current device router as a whitelist in the environment WiFi background before you can access the network normally.

3.1.3 Route port mapping

If you need to use the chassis device to connect to the environmental WiFi, the personal PC or device that is also connected to the environmental WiFi needs to directly establish communication with the chassis. The port mapping function can be used to forward all environmental routing requests to the chassis router to the chassis.

Principle of port mapping:

The chassis has a built-in wireless router (hereinafter referred to as slave). When the router in the chassis is bridged to the ambient WiFi (hereinafter referred to as the parent machine) through a wireless network card, the internal wireless router in the chassis is a slave relative to the ambient WiFi. The network card on the slave machine connected to the ambient WiFi will be assigned an IP in the same network segment as the ambient WiFi, but the device connected to the slave machine

needs to use a different IP network segment from the ambient WiFi. At this time, the device connected to the master machine can only use the local area network. Access to the chassis router (slave), there is no way to access the devices under the slave. At this time, it is necessary to set the port mapping function on the slave machine, so that the devices under the master machine can directly access the devices under the slave machine through the IP on the slave machine.

Port configuration method:

After logging in to the router background, select: Network->Firewall, and set the Input, Output, and Forward items behind the item zones in the Name field below . Used to allow the firewall to pass the port forwarding function. wan accept

YunjiiRun

Status

System

Network

Logout

UNSAVED CHANGES: 13

Drop invalid packets

☐

Input

accept

Output

accept

Forward

accept

Routing/NAT Offloading

Experimental feature. Not fully compatible with QoS/SQM.

Software flow offloading

☐

Software based offloading for routing/NAT

Interfaces

Wireless

Switch

DHCP and DNS

Hostnames

Static Routes

Firewall

Diagnostics

Zones

Name	Zone ⇒ Forwardings	Input	Output	Forward	Masquerading	MSS clamping	
lan	lan ⇒ wan mesh	accept	accept	accept	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<div>Edit</div> <div>Delete</div>
wan	wan ⇒ ACCEPT	reject	accept	reject	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<div>Edit</div> <div>Delete</div>
mesh	mesh ⇒ ACCEPT	accept	accept	accept	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<div>Edit</div> <div>Delete</div>

Add

Save & Apply

Save

Reset

Select the port Forwards button at the top of the Firewall page , and configure the mapping rules at the bottom.

Rule information is added in New port forward, the specific configuration is as follows:

- Name: The name of the rule, you can customize it
- Protocol: Forwarding protocol, use the default TCP+UDP
- External zone: request entry, select wan
- External port: request port, enter the port to be accessed after forwarding
- Internal IP address: mapping IP, select 192.168.10.10

- Internal port: mapping port, enter the port to be mapped. Such as: 9001, 31001

After configuration, click the rear add button to complete the configuration, and then click the Save&Apply button below to save the configuration and take effect.

After forwarding, the access port and the mapped port should be as consistent as possible.

[General Settings](#) **Port Forwards** [Traffic Rules](#) [Custom Rules](#)

Firewall - Port Forwards

Port forwarding allows remote computers on the Internet to connect to a specific computer or service within the private LAN.

Port Forwards

Name	Match	Forward to	Enable
This section contains no values yet			

New port forward

Name	Protocol	External zone	External port	Internal zone	Internal IP address	Internal port
New port forward	TCP+L ▾	wan ▾		lan ▾	192.168.10.10 (00:90:27:E5:82 ▾)	

[Add](#)

[Save & Apply](#) [Save](#) [Reset](#)

After the configuration is complete, you can create a connection with the chassis by accessing the IP of the slave machine through the device under the master machine. The method to obtain the IP of the slave is as follows

After logging in to the router background, select: Network->Interfaces, the IPv4 position behind the WWAN list below shows the WiFi obtained after the current device is connected to the environment WiFi.

Refer to the [bridge environment WiFi](#) for the method of connecting to the [environment WiFi](#)

YunjiRun Status System Network Logout AUTO REFRESH ON

YUNJI_MESH
Mesh Point "yunji_exuwb"

CELLULAR
qmi-cellular

WAN
eth0.2

WAN6
eth0.2

WWAN
Client "YJGS"

Network Menu:
Interfaces
Wireless
Switch
DHCP and DNS
Hostnames
Static Routes
Firewall
Diagnostics

WWAN Details:
Protocol: DHCP client
Uptime: 4d 23h 29m 50s
MAC: CC:F9:E4:37:C3:AA
RX: 11.53 GB (15181415 Pkts.)
TX: 1.80 GB (9099635 Pkts.)
IPv4: 192.168.100.120/22

Maintenance

The following maintenance schedule outlines the regular cleaning and parts replacement process.

Maintenance common sense

In order to extend the life of the product, we warmly remind you:

- Keep the device away from humid and high temperature places.
- Avoid squeezing the device or hitting the device shell with sharp objects.
- Avoid long-term exposure to sunlight. Long-term sunlight will cause the plastic shell to age quickly.
- Keep the outer surface of the equipment clean. When cleaning the equipment, please unplug all cables, close the chassis, and gently wipe the machine with a soft, slightly damp, lint-free cloth. Do not use corrosive cleaners or chemicals to wipe the machine, especially the optical lens.

Clean the shell

- Only use a soft, lint-free cloth. Avoid using rough cloths, towels, paper towels or similar items.
- Avoid excessive wiping, as this may cause damage.
- Disconnect all external power supplies, equipment, and cables when cleaning.

- Unless otherwise specified for a specific product, keep the product away from liquids.
- Do not use sprays, bleach or abrasives.
- Do not spray cleaner directly onto the product.

Regular inspection items

- Whether the equipment shell is loose and dirty.
- Check whether there is any foreign matter entangled in the wheels of the chassis and whether there is excessive wear.
- Whether the camera is clean and free of dirt.
- Whether the lidar cover is clean and free of dirt.
- Whether the ultrasonic radome is dirty and blocked.

Warnings

Safety Precautions

This manual describes how to use this product safely and correctly. This paper introduces in detail the instructions for the safety of human body and robot itself, so as to avoid personal harm and property loss. Do not operate other than those described in this manual.

Notes:

The contents described below should be taken seriously. Please read, understand and strictly abide by them. Beijing Yunji Technology Co., Ltd. will not be liable for all personal, financial, material and other losses caused by users' violation of the safety instructions.

Sign Description Warning If the following warnings are ignored, disoperation may result in casualties and property losses. **Note** If the following precautions are ignored, disoperation may result in personal injury and property loss. This icon shows warnings (including precautions), with represent specific warning contents. (**Example: Danger! Electricity!**)



This icon shows warnings (including precautions), with represent specific warning contents!

1. Before power on, the ground wire must be connected. If there is no grounding wire, it may cause electric shock.
2. Avoid using robots in unsafe environment, such as places where flammable gas, steam, liquid, dust or fiber may cause fire or explosion.
3. Do not rely on robots to prevent accidental falls or other injuries.
4. Do not shake, kick and other strong impact or push the robot to prevent accidental falls or other injuries.
5. Do not make the wheels of the robot suspended in the air artificially when the robot is working.
6. It is prohibited for children and adolescents under the age of 14 and older persons over the age of 65

- to use them alone; for pregnant women, alcoholics, mental illness, heart disease, persons with limited capacity, such as persons with disabilities with apparent mobility restrictions, to use them.
7. Don't let others use your robot unless he has read this manual carefully.
 8. Please do not use the power supply voltage beyond the specification, otherwise it is easy to cause the robot unable to start or fire and electric shock accidents.
 9. Do not disassemble or refit the product without authorization, otherwise it is easy to cause fire and electric shock.
 10. Do not manually move the three-layer thermal insulation flip during the operation of the robot, the robot will automatically open and close, otherwise the robot will be damaged.
 11. Please stop the operation immediately when the following phenomena are found.
 - (1) Smoking or burning smell.
 - (2) abnormal sound.
 - (3) problems not mentioned in the manual.
 12. When cleaning the robot, make sure the robot is off and has pulled out the charging cable or away from the charging pile! Otherwise, electric shock or serious failure may occur.
 13. It is strictly forbidden to wash the robot and charging pile directly with water, and to soak the whole machine with water, otherwise, the electronic components in the body accumulate water vapor or water resulting in irreparable faults.
 14. Do not use alcohol, gasoline, kerosene, acetone or other corrosive, volatile chemical solvents to clean the robot, or cause damage to the appearance or internal structure of the product.
 15. When an emergency occurs, press the robot stop button immediately.
 16. It is prohibited to violate other provisions of this specification, especially the "warning" and "attention" clearly indicating the prohibited contents.
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Notes

1. Ensure the priority of robot, do not compete with robot.
2. Do not put your feet near the robot at any time to prevent the robot from crushing the feet when walking.
3. Keep a distance from the robot and do not approach the robot in case of accidental falls or other injuries.
4. When pushing the robot, press the stop button.
5. Please check the basic condition of the robot regularly. All leakage parts are not loose, falling or damaged, no noise when walking.
6. This product requires professional installation and maintenance.
7. Avoid use in places that are at risk or do not meet the requirements of this product, such as deep pits, walking stairs, walking elevators, high dynamic environments, passageways less than 600 mm, etc.
8. Before handling the robot, please make sure that the power is off to avoid injury caused by idling of driving wheel, and use appropriate loading and handling tools. It is recommended that two people cooperate to carry the robot.
9. Please maintain your robot regularly.

Notes

1. Due to the upgrade of product functions, it is possible to modify the contents of this manual without notice.
2. It is forbidden to reprint or copy all or part of this manual without authorization.
3. This product has the self checking function of pre checking the wrong setting, wrong operation and internal fault, and preventing the wrong judgment. If you have any questions when using this product, please contact us via www.yunjichina.com.cn

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference

Any 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.