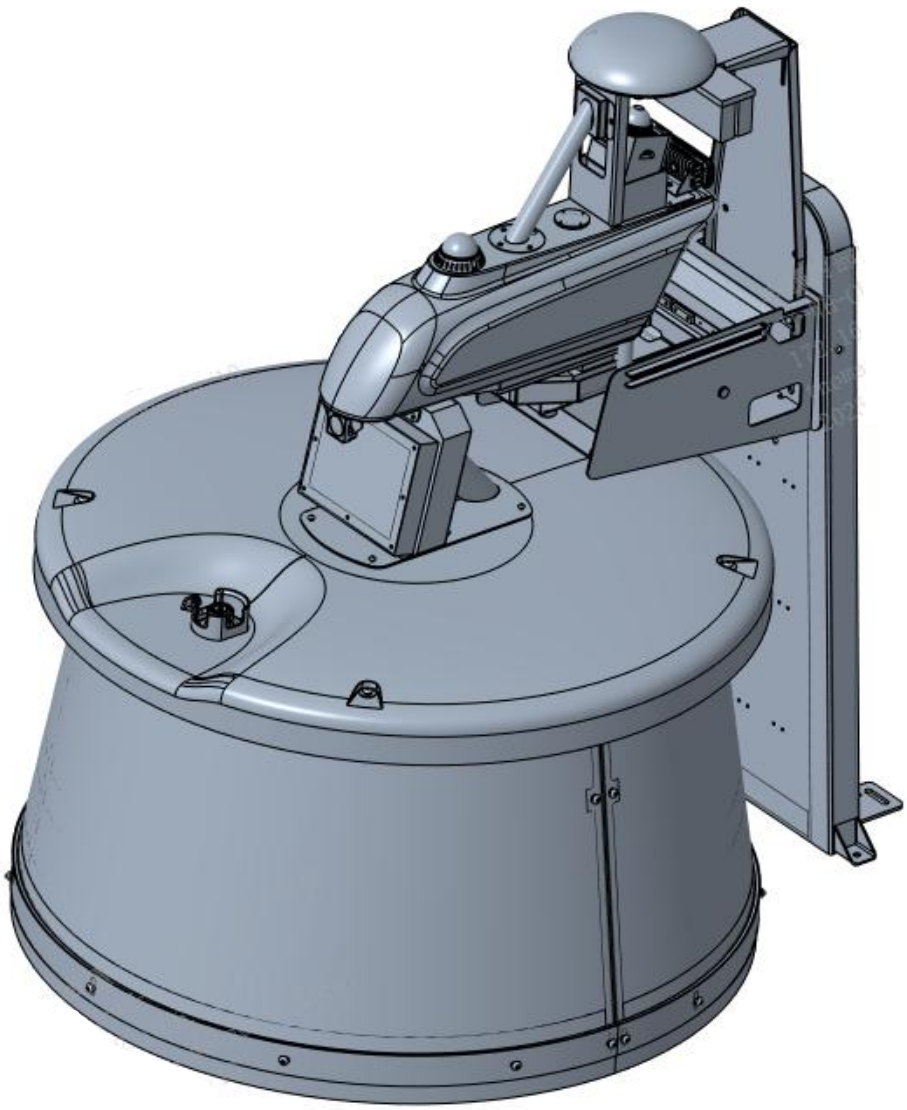
Sveaverken



LF02

RoboPusher Nimbo Plus

Instructions for use

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This manual will be updated without further notice.

Revision record:

Version	Date	Revised content
1.0	2024.08.01	Instruction manual first edition

Read before use:

	Please operate strictly according to this user manual! If you have any questions during use, please contact the service personnel in a timely manner.

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About the instruction manual

This manual introduces the operation, installation, debugging, maintenance and other aspects of the intelligent automatic pusher. All personnel involved in this type of product and related operations must carefully read and understand the contents of the manual and comply with the safety regulations in the manual.

1 Product introduction

1.1 Intended use

This product is an intelligent automatic pusher used for automated pusher in pastures, suitable for all modern pastures.

1.2 Product description

This product can achieve unmanned feeding, save labor costs, increase the feed intake of cattle, thereby increasing the milk production of dairy cows or the meat production of beef cows, in order to maximize the benefits of the pasture.

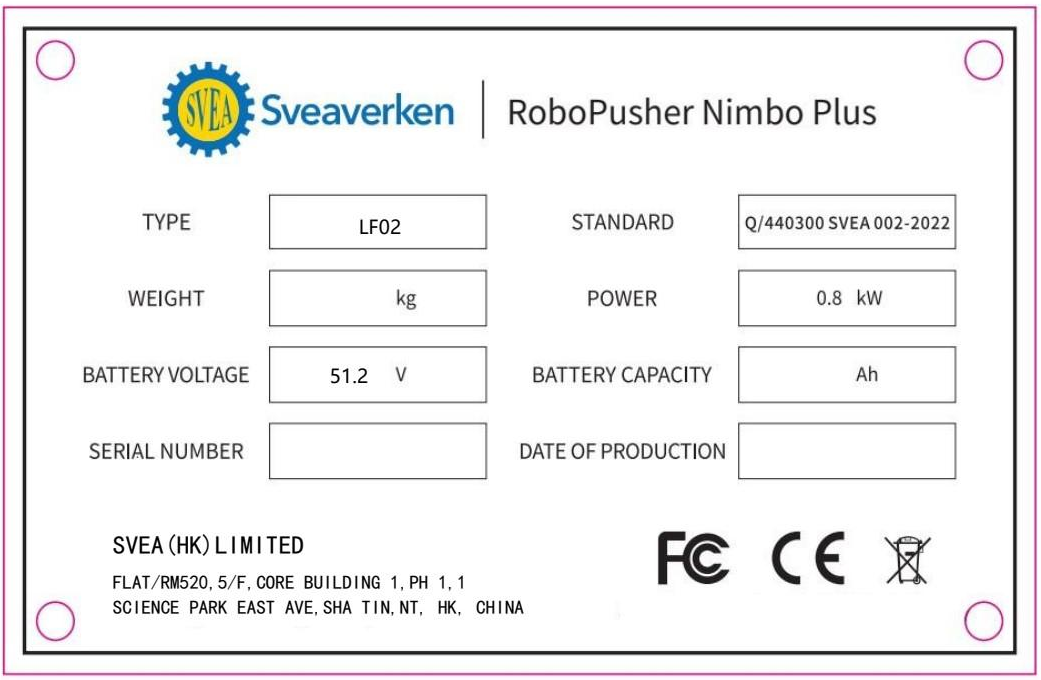
The automatic pusher pushes the feed back into the feeding path by rotating the drum, and relies on Computer Vision technology to control the direction and range of the pusher during the process. This technology allows the pusher to move more freely, as long as the road surface is suitable and there are no fixed obstacles, it can achieve any path planning and any running time control. After completing the pusher task, the pusher returns to the charging pile position automatically along the pre-deployed patrol path.

This product is remotely controlled through a web page, allowing users to manage pushing materials anytime and anywhere.

This product has a drum lifting function and can adapt to multi-terrain pastures

This product has radar navigation function

1.3 Product nameplate



!	**Note:**The installation position of the product nameplate can be found in section 6.2, "Top" diagram, marked 6.

1.4 Product standards

Product model: LF02 | **Product execution standard number:**Q/440300 SVEA 002-2022

2 Safety precautions

2.1 Electrical safety

- Only authorized electrical engineers can install power for the charging pile of the pusher.
- Ensure that the electrical equipment of the electrical system is grounded and all components of the charging pile of the pusher comply with local regulations.
- Charging piles cannot be exposed to rain.
- Immediately replace all damaged power lines, switches, and components.
- Before starting the maintenance operation of the pusher, turn off the power supply of the whole machine. (The location of the power supply of the whole machine refers to the annotation 2 in the "Top" schematic diagram of Chapter 6.2).
- The pusher is equipped with lithium batteries, which cannot be short-circuited, impacted, or disassembled at will.
- Before starting maintenance of the charging pile, unplug the plug from the socket.

2.2 Operational safety

- Before connecting the pusher to the power supply for operation, maintenance or adjustment, read and understand this manual and all safety signs.
- Only trained personnel can operate the pusher.
- It is recommended to operate the pusher in a site that eliminates safety threats such as no vehicles or cattle.
- Unauthorized personnel are not allowed to enter the operating area and work area; if unauthorized personnel are in the operating area and work area, the pusher operation must be stopped.
- When using remote desktop software on a smartphone or tablet for remote operation, it is necessary to ensure that there are no obstacles or human-machine safety threats on the path of the pusher.
- When you manually drive the pusher, make sure you have a clear view of the pusher.
- Keep your limbs, hair, and clothing away from all moving parts, and wear appropriate clothing or personal protective equipment (PPE).
- Regularly review safety-related content for all operators and related personnel.

2.3 Safety overhaul

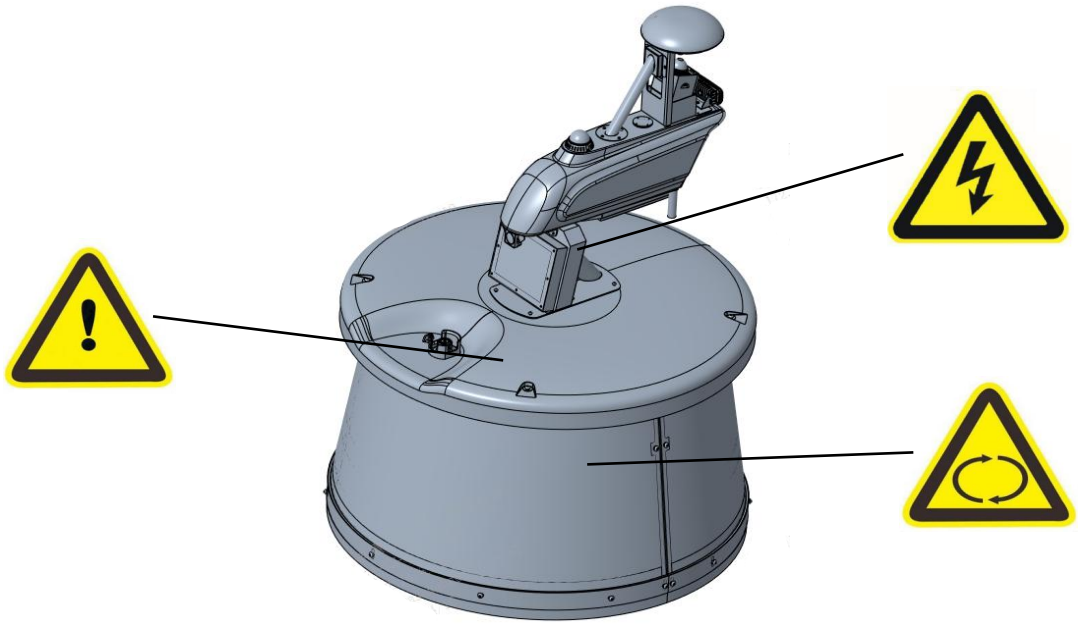
- Before connecting the pusher to the power supply for operation, maintenance, or adjustment, read and understand the corresponding instructions and all safety signs.
- Only trained personnel can troubleshoot the pusher.
- Place tools and metal parts away from the battery.
- Do not spray water on the body. Use a damp brush to clean the pusher.

- After completing the maintenance work, ensure that the equipment is installed completely.
- Do not change the equipment in any way.
- Only use approved spare parts and ensure installation is performed only by authorized technicians.

Identification description

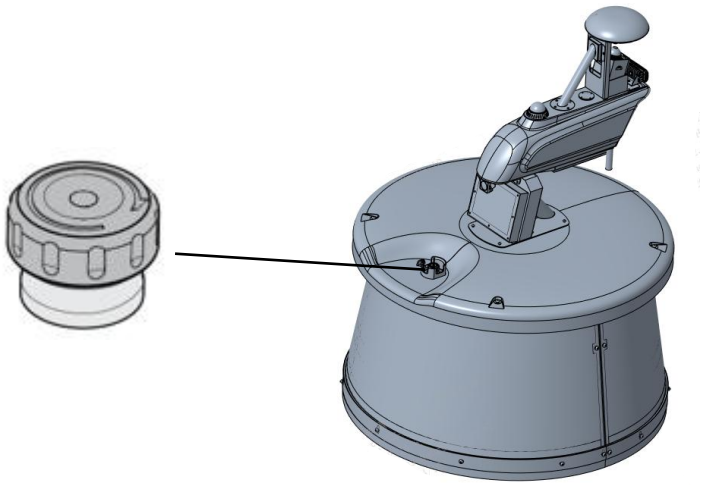
Warning: Beware of electric shock	Warning: No weight-bearing allowed	Warning: Beware of rotational injuries

Identify paste location



Emergency stop button

The emergency stop button is installed on the top of the pusher. When this button is pressed, the pusher will immediately stop operation. To reset the emergency stop button, rotate and pull the button up.



Software-controlled charging system

The operating software of the pusher controls the charging system, so that the pusher is always connected to the charging pile before moving, keeping the battery fully charged before the next operation, and preventing the battery from overcharging.

3 Technical parameters

Diameter		1080 mm
Highly		1335 mm (for use); 665 mm (for transportation)
Quality		525kg
Operating speed		18 m/min
Slope of climbing		16°
Working temperature		-20℃~50℃
Number of tires		3
Drive wheel specification		2×φ250 mm×100mm
Drum lifting		Yes
Speaker		Yes
Radar		Yes
Drive motor	Number	2
	Power	400 W
Battery	Battery type	Lithium battery
	Rated voltage	51.2 V
	Capacity	40 Ah
Charger	Input voltage	220 V/110 V
	Input frequency	45~65 Hz
	Output voltage	58.8 V
	Output current	10 A
Camera	Field of view (FOV)	Horizontal (H) 87.51 °; Vertical (V) 47.58 °
	Sensor	2 million pixels; 1/2.8; 1080p@30fps

!	**Note:** Due to laws and regulations in different regions, there are certain differences in

	battery configuration standards. Please confirm the specific technical parameter details with the technical personnel of Sveaverken.

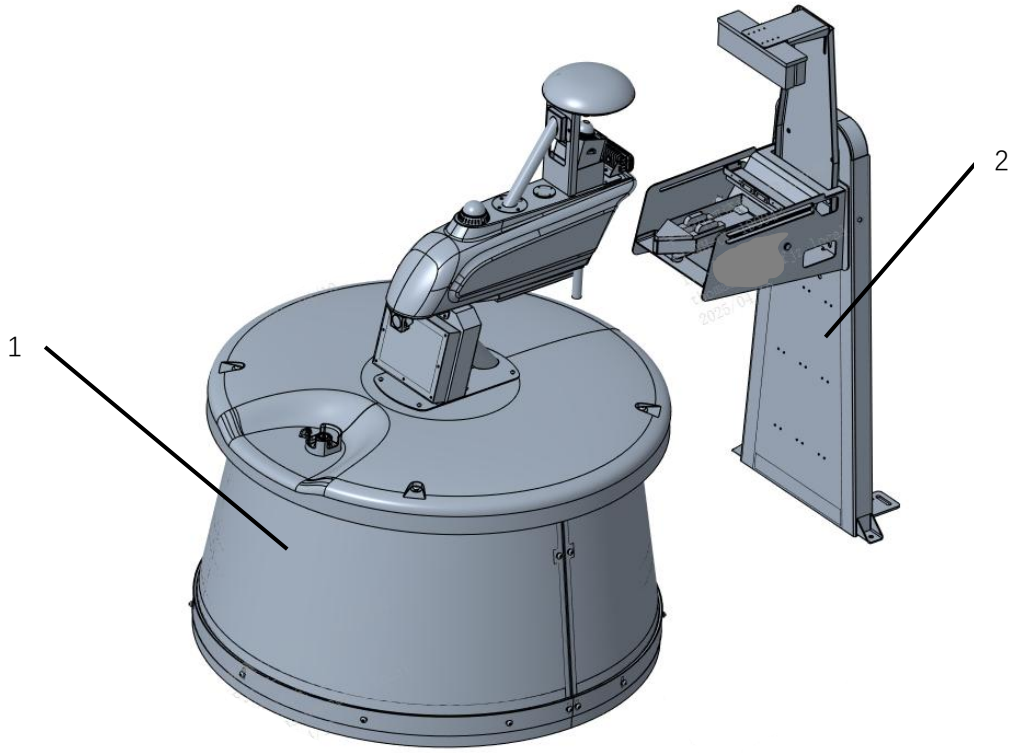
4 Product specification sheet

Serial number	Project	Design value
1	Model name	LF02 RoboPusher Nimbo Plus
2	Pushing mode	Drum rotary type
3	External dimensions	Φ1080×1335 mm
4	Navigation method	Visual navigation, magnetic navigation, laser radar navigation
5	Charging method	Automatic charging
6	Total motor power	0.8 kW
7	Battery capacity	40 Ah
8	Battery voltage	51.2 V

5 Product Overview

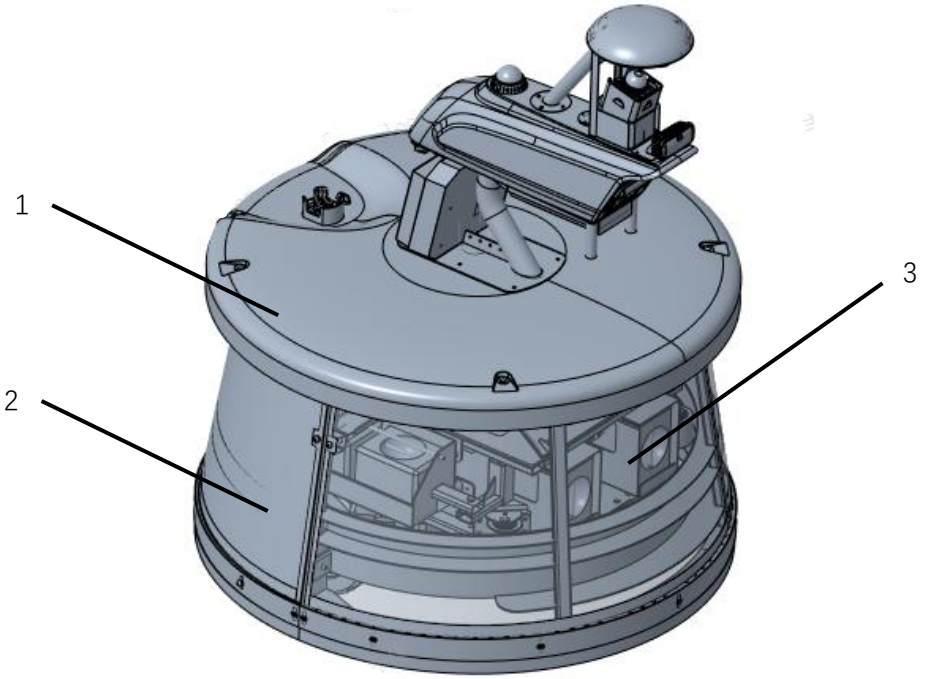
!	**Note:**This section is a schematic diagram of the product structure. Please do not open the top cover, drum and other structures by yourself. If you have any relevant needs, please consult the dealer or Sveaverken technical personnel.

5.1 Assembly



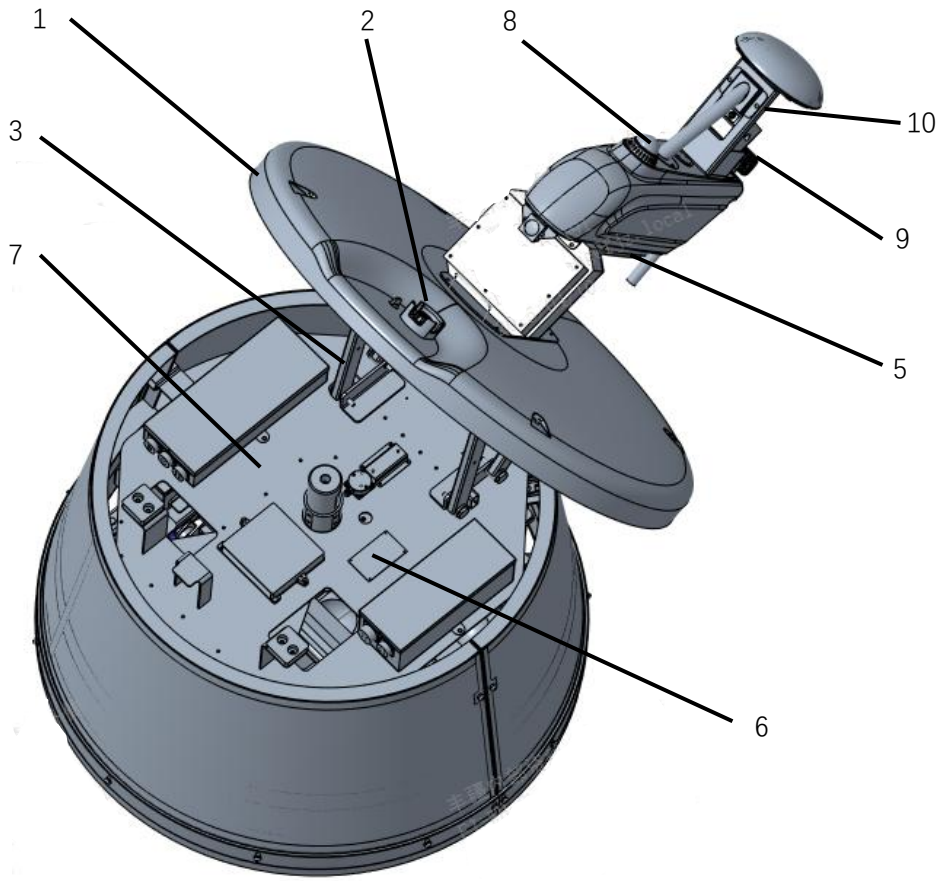
1	Automatic pusher	2	Charging pile

5.2 Automatic pusher



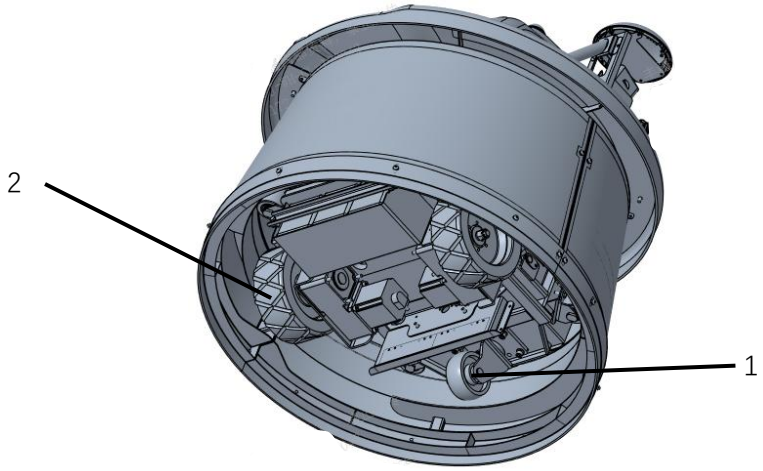
1	Top	2	Roller	3	Frame

Top



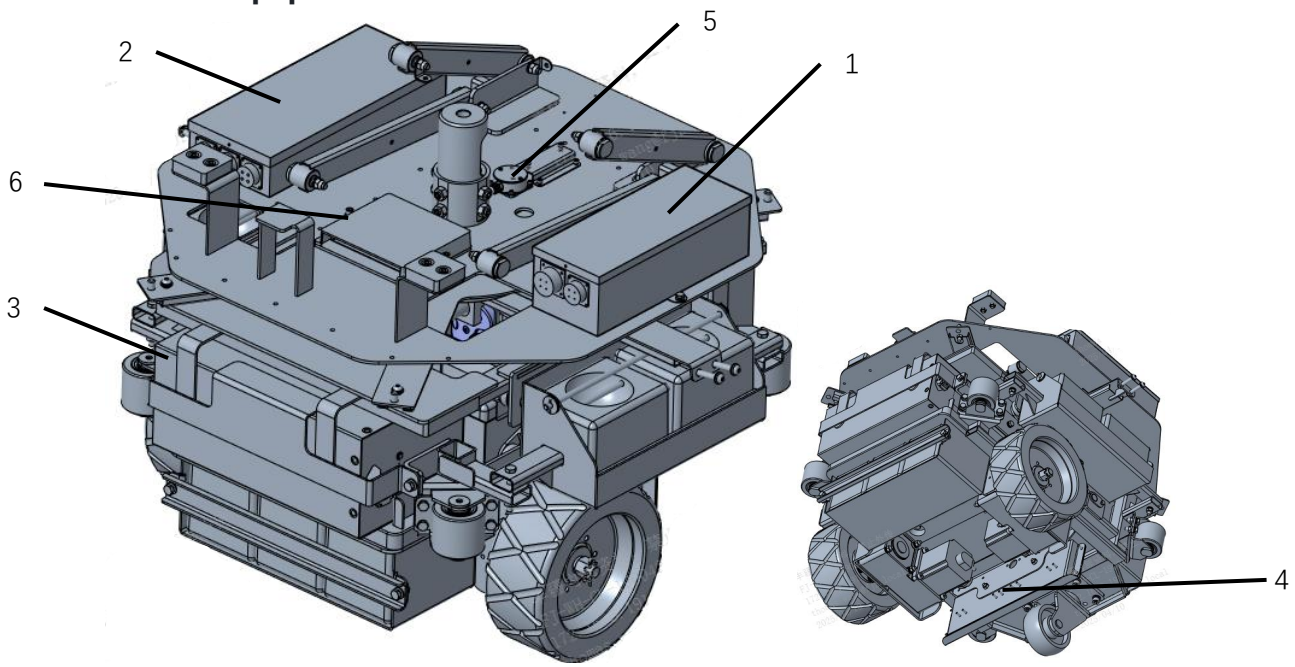
1	Top cover	2	Emergency stop button	3	Opening and closing mechanism
4	Intelligent vision module	5	Body charging plate	6	Nameplate
7	Rack number engraving position	8	Status indicator light (Flashing yellow during runtime)	9	Fill the light
10	Laser Radar				

Frame



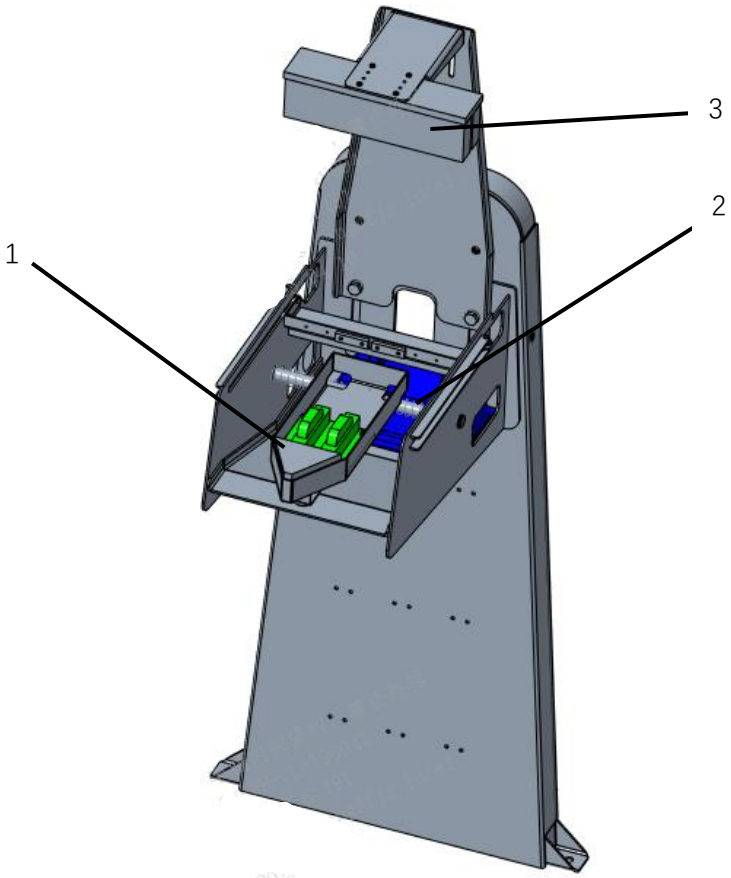
1	Front wheel (universal wheel)	2	Rear wheel (drive wheel)

Internal electrical equipment



1	Distribution box	2	Walking motor driver
3	Battery	4	Magnetic sensor
5	Gyroscope	6	Vehicle control box

5.3 Charging pile



1	Charging plate	2	Charger	3	Cleaning device

6 Software operation

6.1 Connect the backstage of the pusher

Support multiple mainstream browsers, such as Google Chrome, Microsoft Edge, Firefox, etc.

The operation interface is compatible with PC and mobile end points.

1. Directly connected

- PC or mobile end point search pusher Wi-Fi: fj-robot-SN; Wi-Fi password: 123456789.
  - Connect the pusher to Wi-Fi using a PC.

Figure 1

- Connect the pusher to Wi-Fi using the mobile end point.

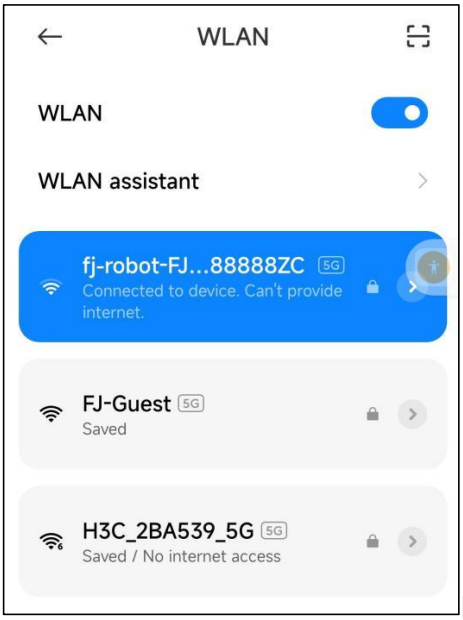
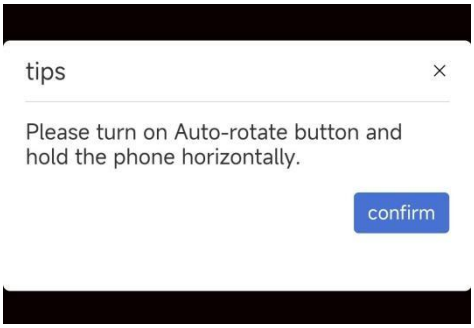


Figure2

- Open the browser and log in to the website 10.33.68.254.

!	**Note:**If using mobile end point login, you need to set rotation and horizontal mobile end point (such as mobile phone).


tips
Please turn on Auto-rotate button and hold the phone horizontally.
confirm
Figure 3

2. Indirect connection

- Connect your PC or mobile end point to the pusher's Wi-Fi.
- On the "Internet" configuration page, connect the pusher to the router, such as "Wi-Fi123".
- Log in to the router backend and search for the IP Address of the pusher "fj-robot-SN" connected to the router.
- Open the browser and enter the IP Address of the pusher to control the pusher.
- Browser configuration is recommended to prioritize Google Chrome.

6.2 Log in

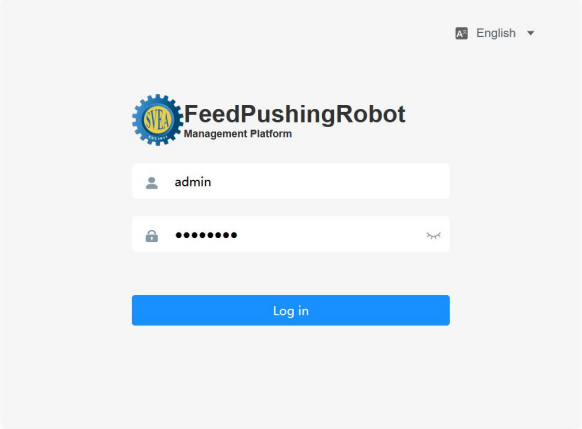


Figure4

- Enter default username: admin, password: svea1911.
- Click "Login" to enter the web side.
- Click the language switch drop-down option to switch languages.

6.3 Function Module Introduction

The Web has four functional modules, namely: Home - Robot Status Interface, Work - Work Management Interface, Configuration - Configuration Management Interface, and System - System Settings Interface.

6.3.1 Home Module

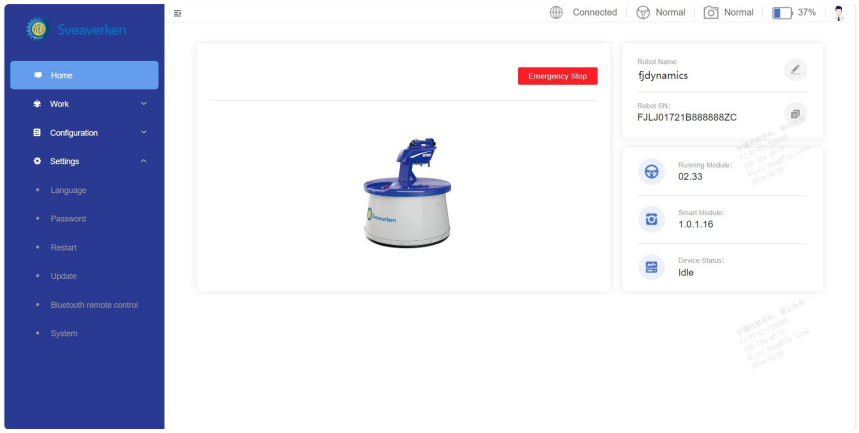


Figure 5

The status bar at the top of the homepage displays network connection status, driving module

status, intelligent module status, and real-time battery level.

Operational situation	Display the current job details of the robot.
Emergency cessation	Click the "Emergency Stop" button and confirm to stop the equipment.
Robot name	Click the Edit button to modify the robot name.
Robot SN	Display the serial number of the robot, click the Copy button to copy the serial number.
Driving module	Display the version number of the driving module.
Intelligent module	Display the intelligent module version number.
Device status	Display the current status of the device: active/charging/idle/paused.

6.3.2 Work module

The work module has three functional areas: job tasks, remote control, and camera.

1. Homework tasks

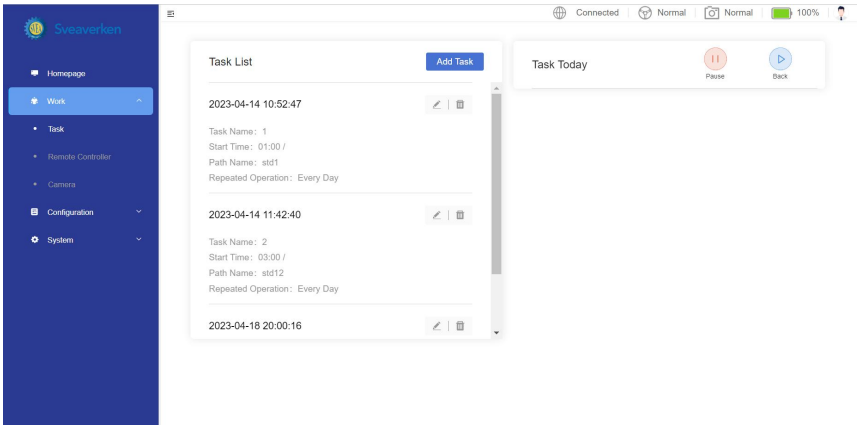


Figure 6

Homework tasks are mainly used to add and manage tasks.

Add tasks:

- Click "Add Task";
- Enter parameters according to the setting requirements.
- Click "Save Settings" to add tasks.

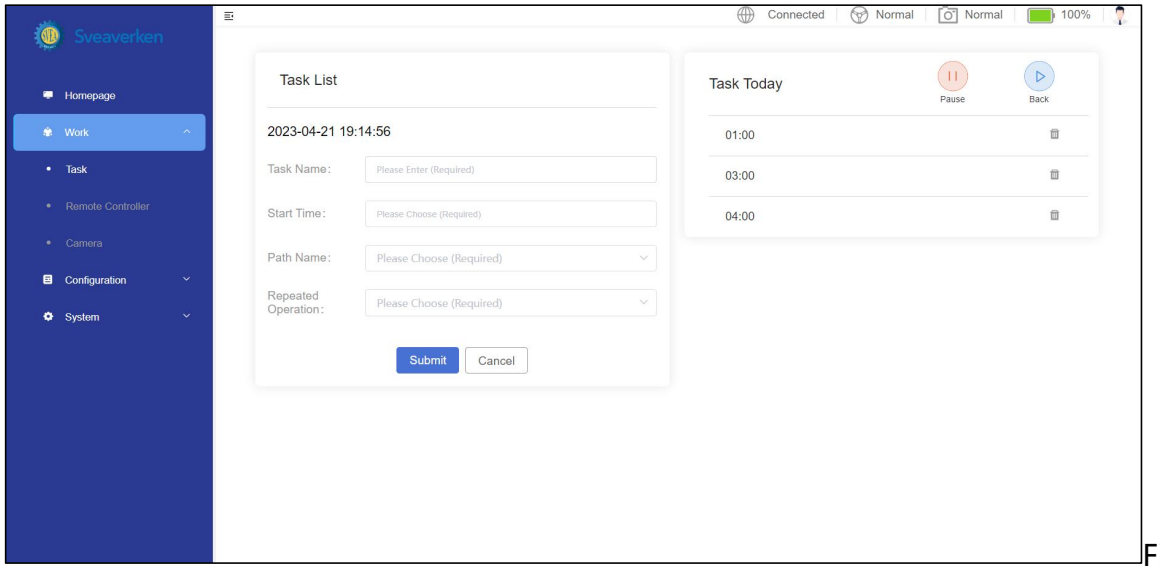


Figure7

After adding, the added tasks for today will be displayed in the "Today's Tasks" section, along with the start time, status, and related operations of today's tasks.

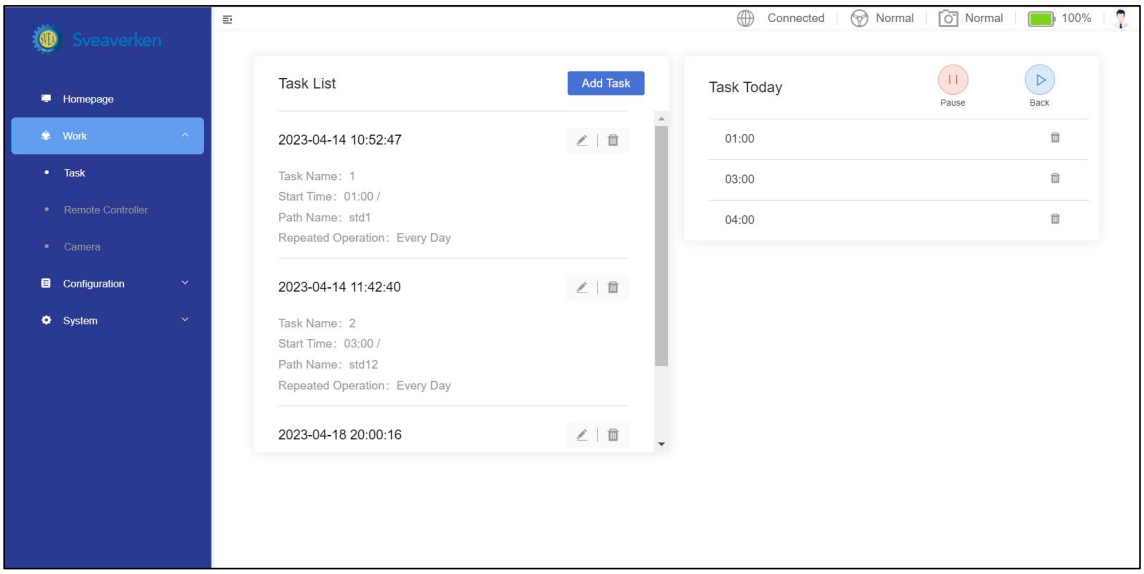


Figure8

Management tasks:

- Click Edit to enter the task editing interface.
- Modify settings;
- Save settings and create a new task.
- To delete a task, click the Delete button and confirm.

Other function descriptions:

Today's task	The task status is in progress. Click the camera icon on the right to view the real-time screen of the current task job (see "camera" function); you can also delete added task information (task status is completed/not started/cancelled/skipped).

2. Remote control

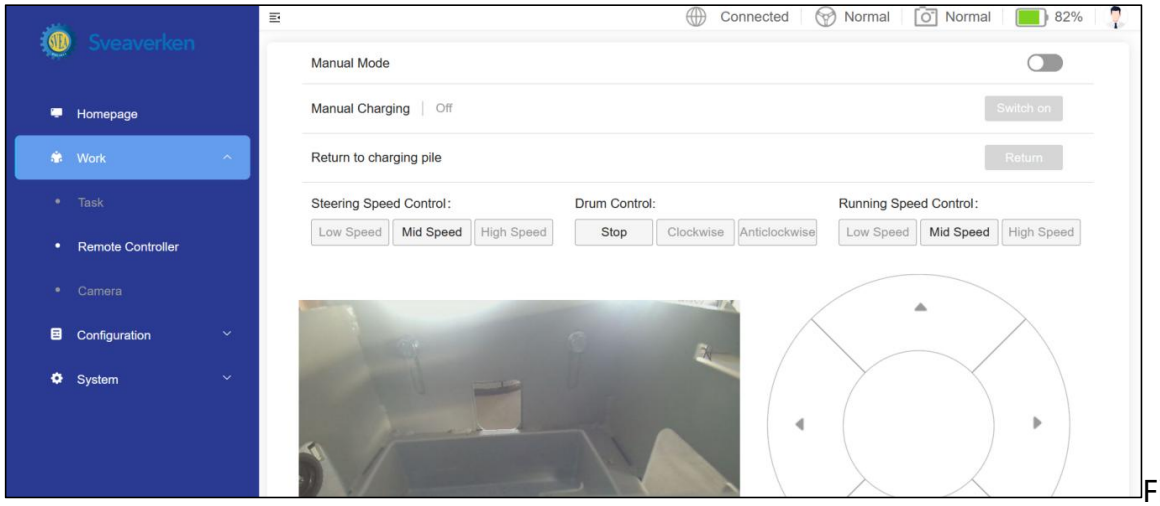


Figure9

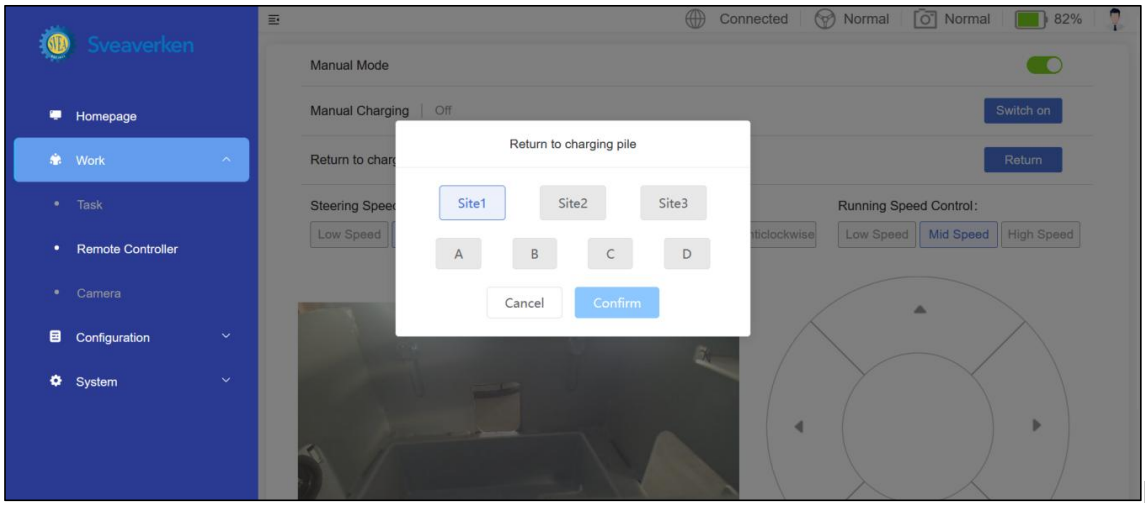


Figure10

Manual mode	Click the button on the right side of "Manual Mode", and the button switches to green to turn on the manual mode. At this time, the pusher can be controlled by the web remote control; click the button, and the button switches to gray to switch back to the automatic mode.
Direction control	Click the forward button to control the pusher to move forward at the currently set speed, and the same goes for moving backward; click the left turn button to control the pusher to turn, and the same goes for turning right.
Speed control	The speed is divided into three gears: slow, medium, and fast. Set the remote control pusher one gear lower than the current speed to slow down the pusher. The same applies to acceleration.
Real-time battery level	When the battery level is ≥ 80%, it displays green; when 80% > battery level is ≥ 35%, it displays blue; when 35% > battery level is ≥ 15%, it displays orange;

	when the battery level is < 15%, it displays red.
Manual charging	Click the "Start Now" button. If the text on the right side of manual charging shows "Enabled", extend the charging head to charge. If it shows "Not Enabled", retract the charging head.
Return to charge	Click the "Return Now" button, select the site and ABCD point, and confirm to automatically return to the charging pile. (For example, select Scene 2 and Point C to return, that is, select the abn2c path in the path configuration.)

3. Camera

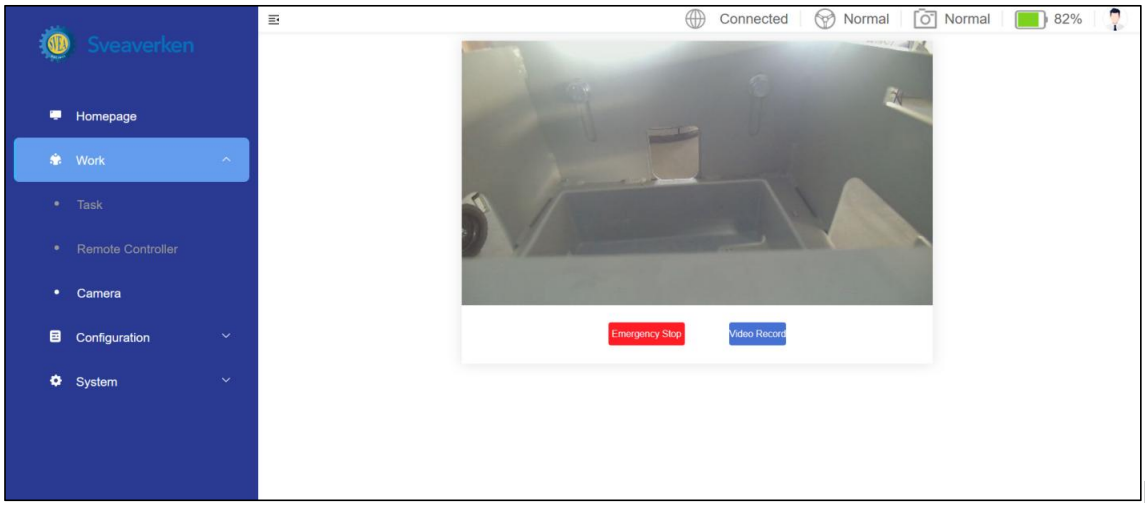


Figure11

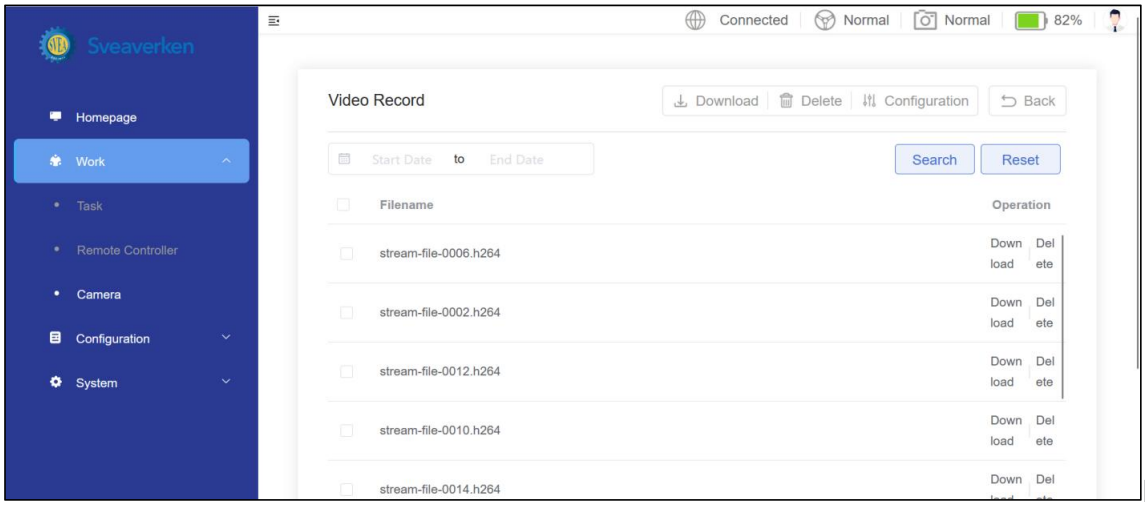


Figure12

The camera interface displays a video postback screen, and a black screen is displayed when there is no signal on the screen.

Emergency cessation	Click the "Emergency Stop" button and confirm the operation to stop the equipment.

6.3.3 Configuration module

The configuration module has four functional areas: Internet, Local Network, Charging Configuration, and Path Configuration.

1. Internet

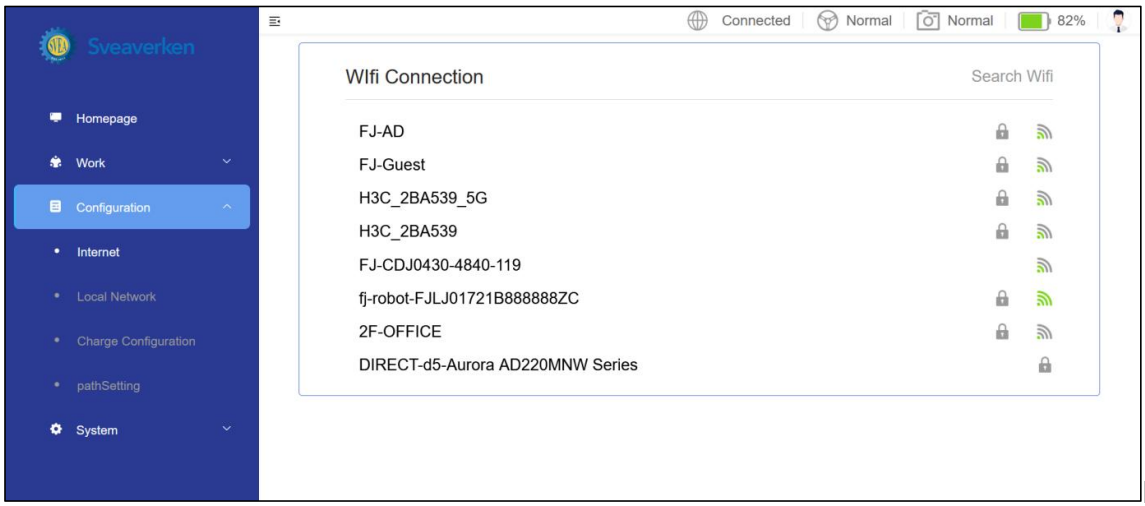


Figure13

- The network connection method is Wi-Fi connection.
- When connecting to Wi-Fi, you need to enter the correct password before connecting; After the Wi-Fi connection is successful, the background will record the Wi-Fi account and password that have been connected, so that it can be automatically searched for the next time you choose Wi-Fi connection.

2. Local network

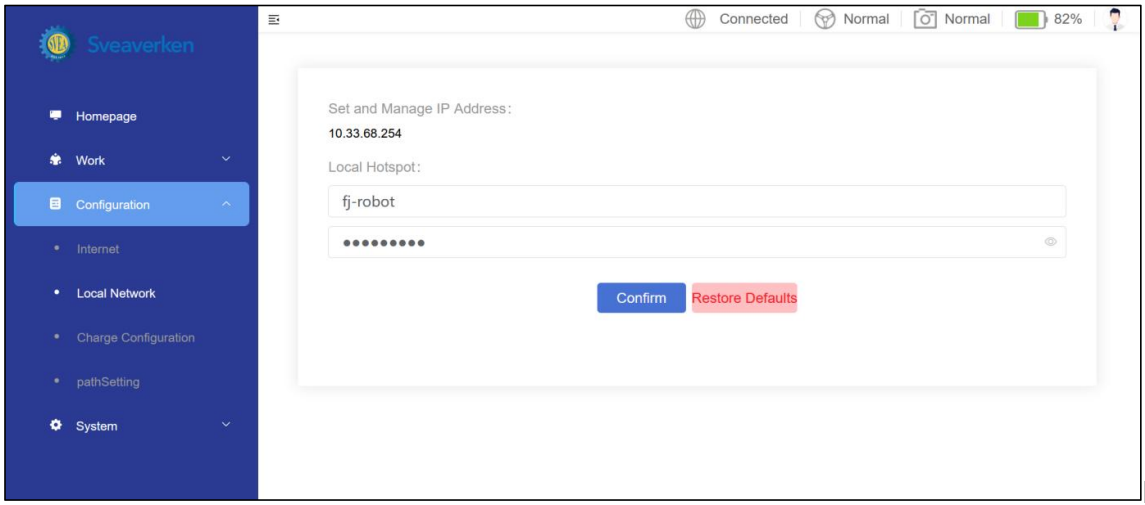


Figure14

- The default hotspot name and password of the pusher can be modified through the local network.
- After modification, click "Confirm" to take effect. If not clicked, the current interface will be reopened and the previous settings will be restored.
- Click "Restore Defaults" and confirm again to restore to factory settings.

3. Charging configuration

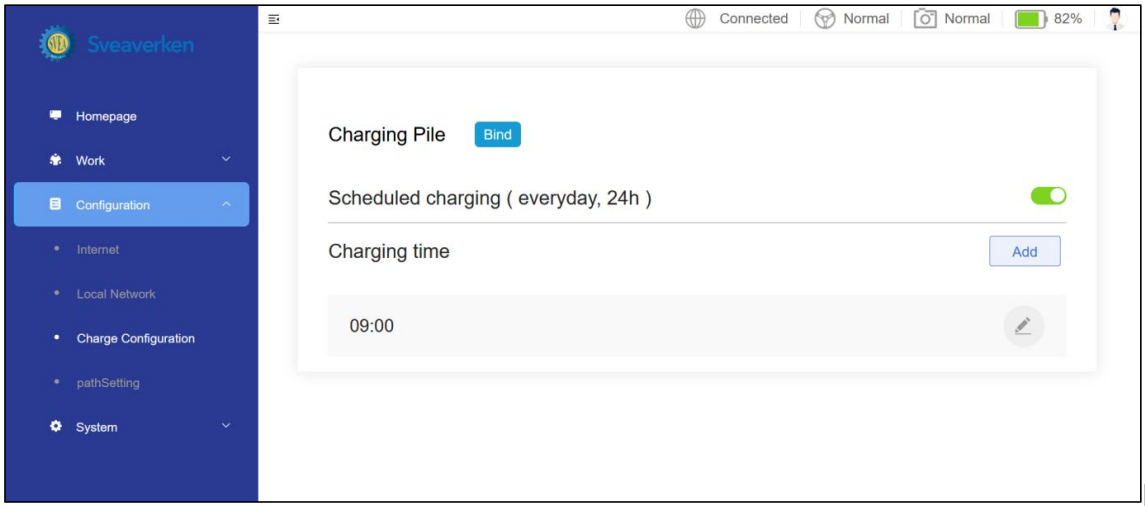


Figure15

- This interface allows you to set the charging time of the pusher (24-hour system). At that time, the pusher will end the task and return to the charging pile for charging operation, which lasts for 2 hours. The scheduled charging function is not enabled by default when the pusher is initialized.
- Click the switch button to turn on or off the timed charging function.
- Click "Add" to set multiple charging times.

4. Path configuration

- This interface allows you to edit the path configuration, and each path name is adapted to a different track.
- Enter a path name and click "Search" to find paths with matching names.
- Click "Reset" to display all path names.
- "Operation time" indicates the time when the path was last edited.

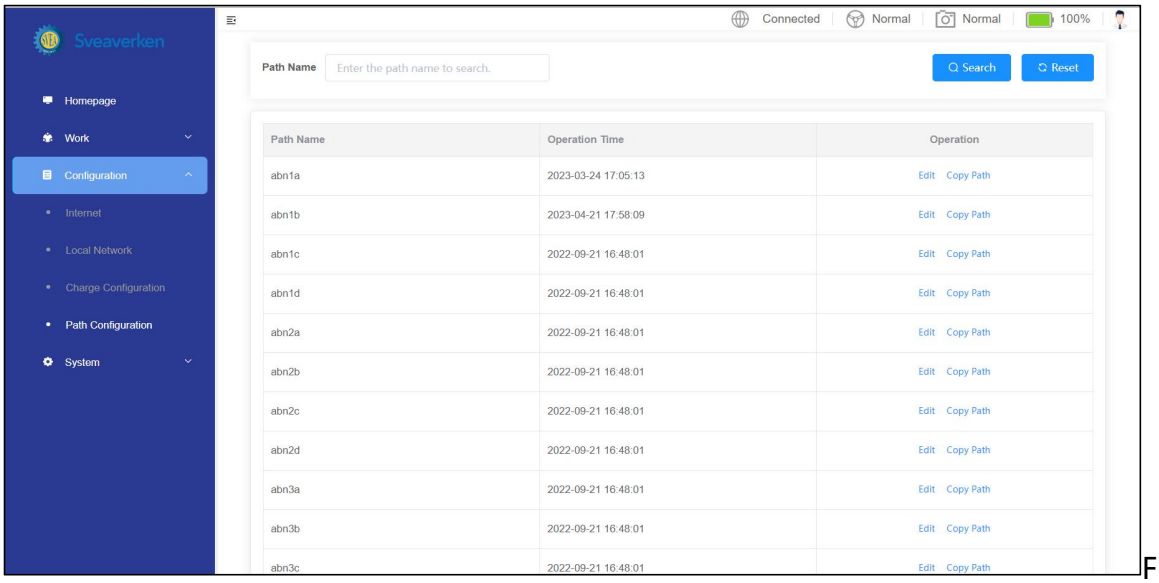
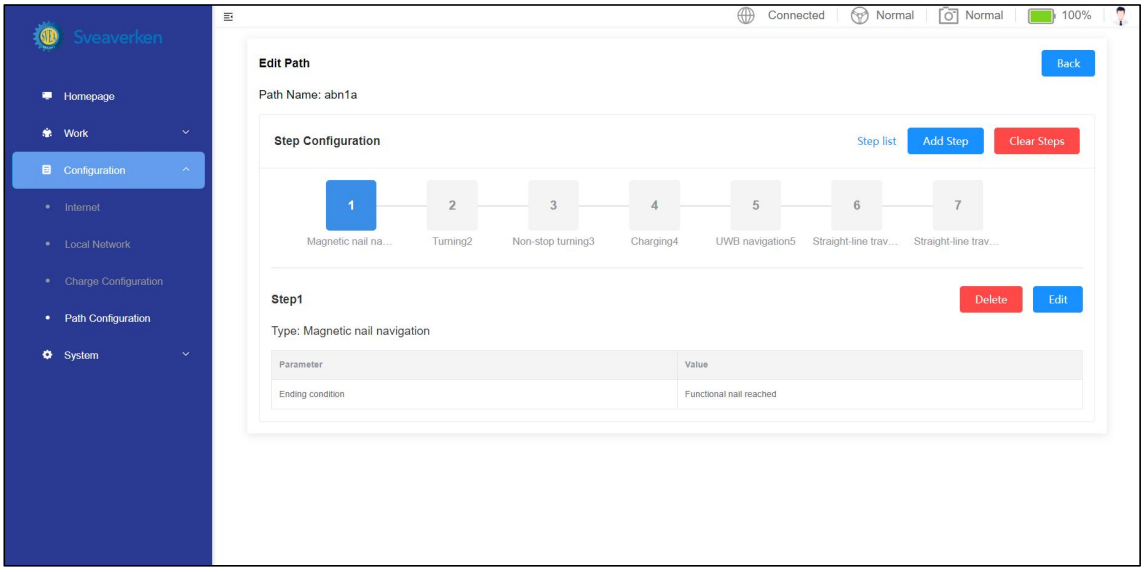


Figure 16

5. Path editing

- Click "Edit Path" to edit all steps under the path.



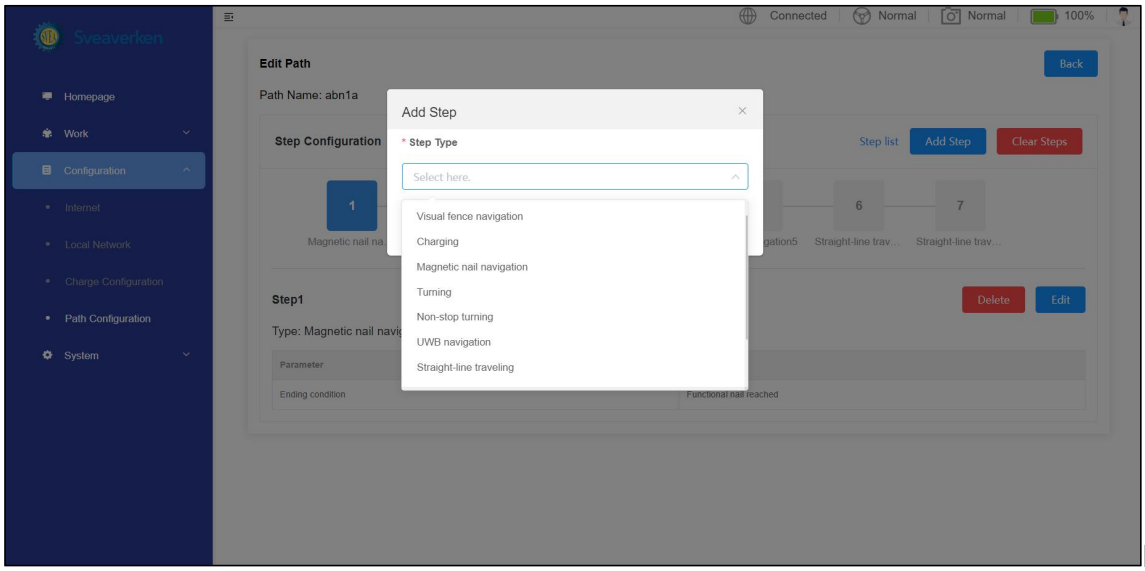


Figure18

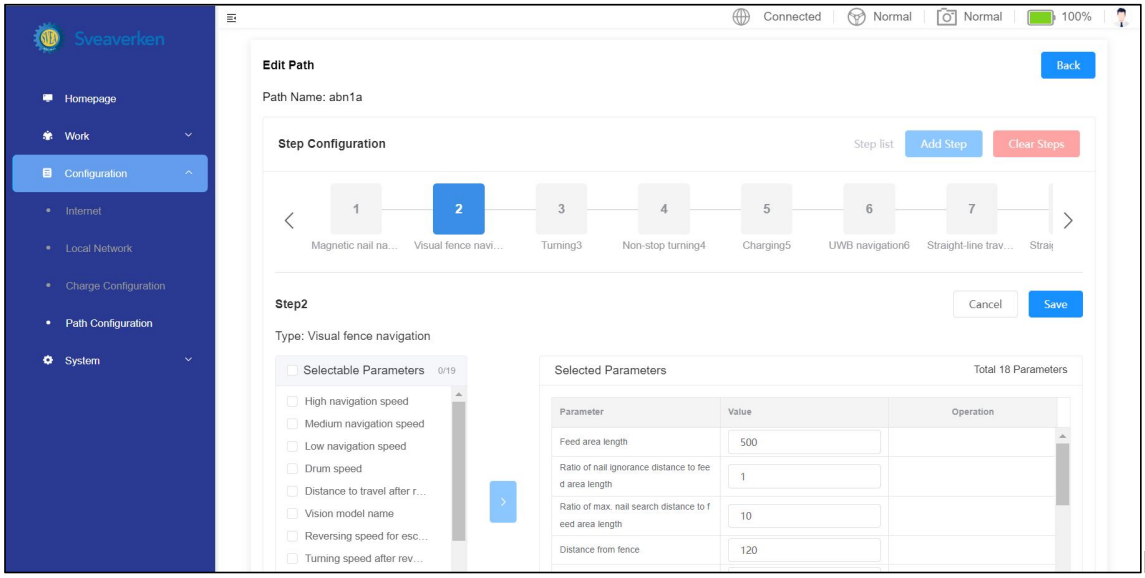


Figure19

- "Step path configuration" displays all the steps under this path.

- Click "Add Steps" to add new steps, including visual fence cruising, charging, magnetic nail navigation, steering, non-stop steering, straight walking, wall cruising, large-distance magnetic nail walking, drum lifting, radar cruising, radar pushing, radar cooling, radar pile removal.
- After configuring the selected parameters, click "Save". This step will be saved to the path (optional parameters can be added according to on-site requirements).
- Click "Clear Steps" to clear all steps.
- Select a step to display its configuration information for management.
- Click "Delete" to delete this step.
- Click "Edit" to edit this step. After editing the step, click "Save" to take effect.

6.3.4 System modules

The system module has five functional areas: language switching, password modification, system restart, version update, and system information.

1. Language switch

Figure20

The language switching interface displays switchable language options. Click the button on the right side of the language you want to switch to switch.

!	**Note:**The supported languages of the system will be continuously updated.

2. Change password

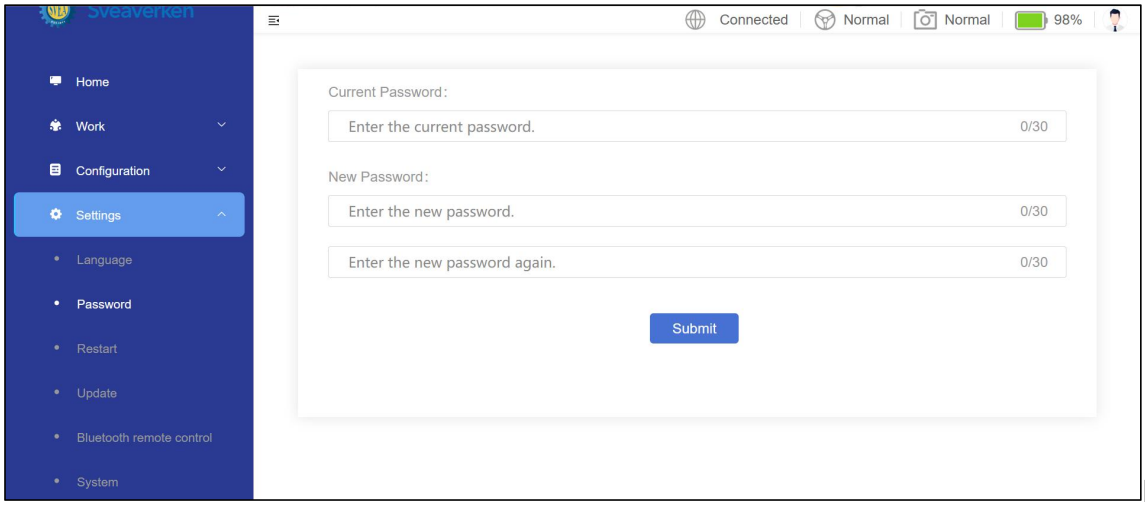


Figure21

This interface allows you to change the password.

- Enter the correct original password.
- Enter two correct and consistent new passwords.
- Click "Submit".

!	**Note:**The new password should be at least 6 characters and up to 30 characters, and only numbers and letters are supported.

3. System restart

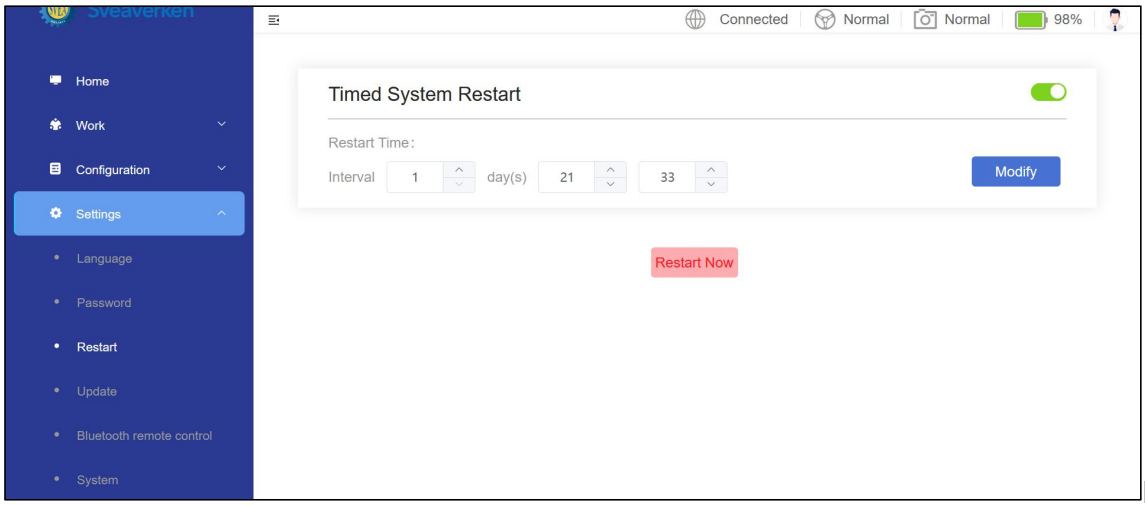


Figure22

System scheduled restart "is defaulted to the off state. When the system scheduled restart is turned on, the time setting bar will be displayed, and when it is turned off, the time setting bar will be hidden. When you need to set the system scheduled restart:

- Select the value for "Set system restart time".

!	**Note:**The default system scheduled restart time is 5am every day, which can be modified; this parameter supports a maximum of 3 days.

- Click "Modify" and confirm to take effect; if not, leave the current page and restore the previous settings.

If you need to restart the pusher immediately, click "Restart Now" and confirm twice before it takes effect.

4. Version update (user does not operate)

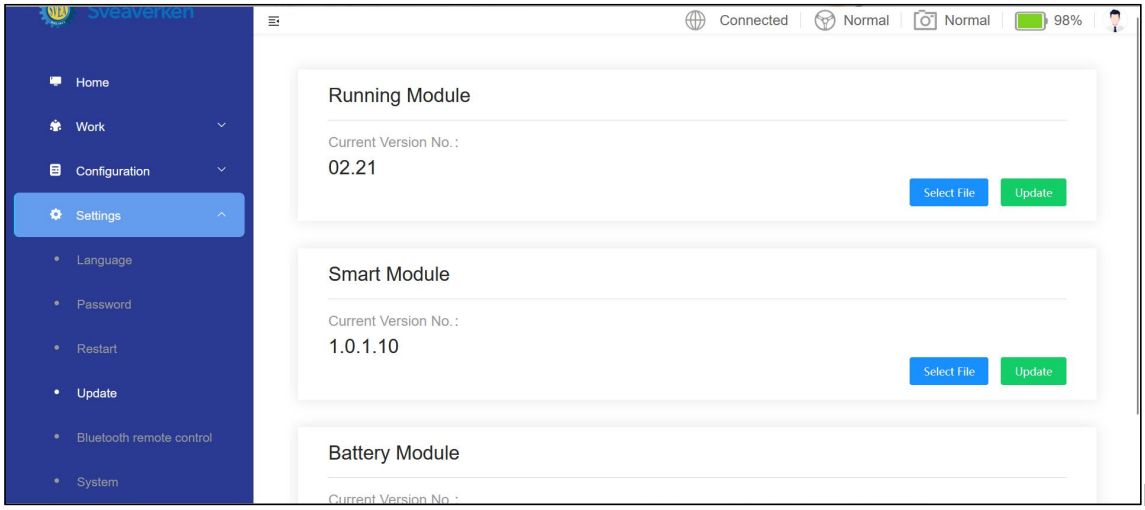


Figure23

When updating the version, you need to upload the update package.

- Click "Select File" and select Update Package to upload.
- Click "Update Upgrade", and the interface will prompt after the update is completed.

!	**Note:**The size of the uploaded update package file cannot exceed 10 MB. Update package upload error can be deleted.

5. System information

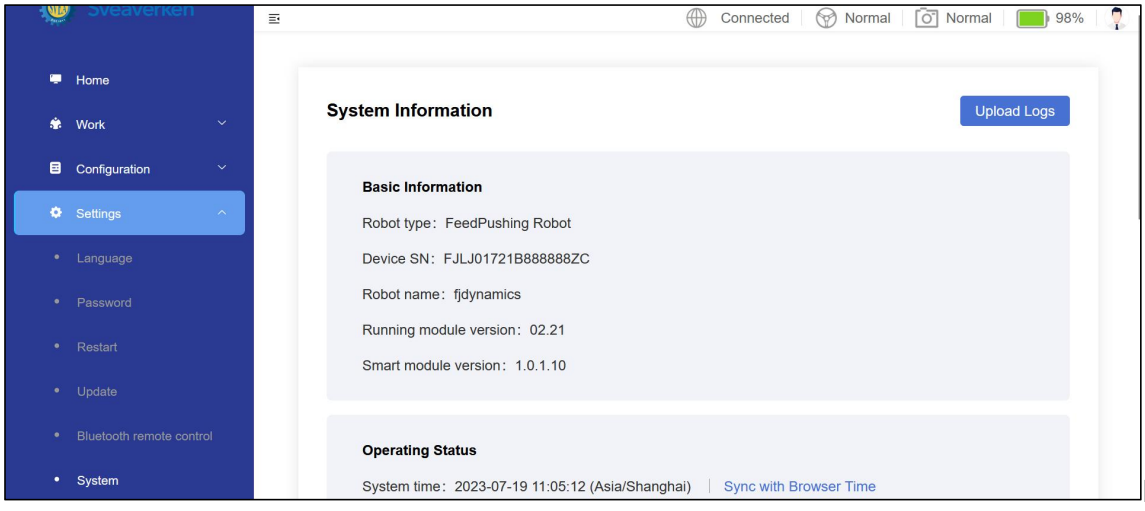


Figure24

Display four status information including basic information, operating status, local network, and extranet connection of the display device.

6.3.5 Remote monitoring module

The configuration module has six functional areas: camera, remote control, task management, facility management, parameter settings, and video settings.

Sveaverken
Statistics
Recording
Equipment
Device O&M management
Device access management
Dingding push management
Management
System
Please enter device SN for qu
Please enter device name for
Please enter FAE s name for
Please enter notes keyword fi
All models
All activation status
Search
Export
Device SN & Name
Activation status
Online status
Device status
Model
Camera status
Firmware Ver.
FAE
Update time
Note
Operation
FJSCP30023400022FY Belgium 1 Nimbo
Actived
Online
Charging
推料机器人A3_mini
Normal
Running Module: 02.16 Smart Module: 1.0.1.9 Battery Module: 1.1.1.4
13011110002,kristof
2023-07-04 17:09:23
比利时1号机--Kristof
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove
FJLJ017226000281ZC Brazil 1
Actived
Online
Charging
推料机器人A1_2nd
Normal
Running Module: 00.118 Smart Module: 1.0.0.11
13011110002,engenharia
2023-07-04 17:09:21
巴西1号机--Rodrigo
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove
FJLJ017224000130ZC Uruguay 2
Actived
Online
Working
推料机器人A1
Normal
Running Module: 00.117 Smart Module: 1.0.0.39
17558868609,femur,schonichesky
2023-07-04 17:09:16
乌拉圭2号机--Mauro
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove
FJLJ017225000148ZC Estonia 1
Actived
Online
Task completed
推料机器人A1_2nd
Normal
Running Module: 00.118 Smart Module: 1.0.0.7
17558868609,heitti.inal,mikhail.morgunov
2023-07-04 17:09:16
爱沙尼亚1号机--Heitti
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove
FJLJ017225000150ZC Czech Republic (new)
Actived
Online
Working
推料机器人A1_2nd
Normal
Running Module: 03.02 Smart Module: 1.0.0.7
17558868609
2023-07-04 17:09:17
捷克机器--Patrik
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove
FJLJ017225000155ZC Estonia 2
Actived
Online
Task completed
推料机器人A1_2nd
Normal
Running Module: 00.118 Smart Module: 1.0.0.7
17558868609,13011110001,heitti.inal,mikhail.morgunov
2023-07-04 17:09:18
爱沙尼亚2号机--Heitti
Camera RemoteControl TaskManagement DeviceManage
Parameter settings Video Settings Remove

Figure25

1. Camera

The camera interface displays a video postback screen, and a black screen is displayed when there is no signal on the screen.

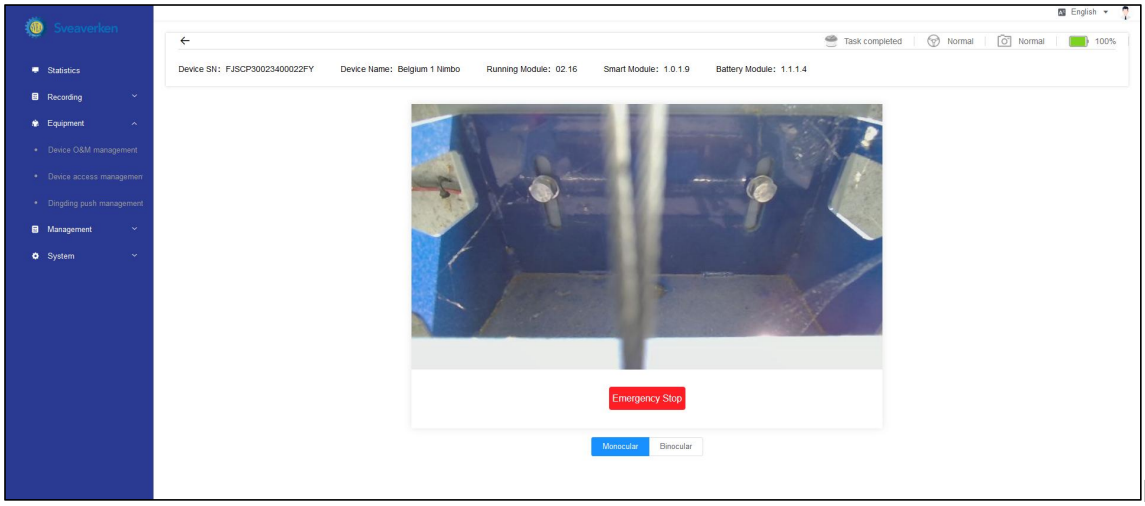


Figure26

Emergency cessation	Click the "Emergency Stop" button and confirm the operation to stop the equipment.
Monocular mode	Select the perspective of the monocular camera (at the front of the car) to view.
Binocular mode	Select the binocular camera (on the roof) perspective to view.

2. Remote control

Remote control can remotely control the device; view various parameters and maps of the device, as well as switch to manual automatic mode, manually charge, return to charge, turn on and off the escape mode, control vehicle speed, and operate the device while walking.

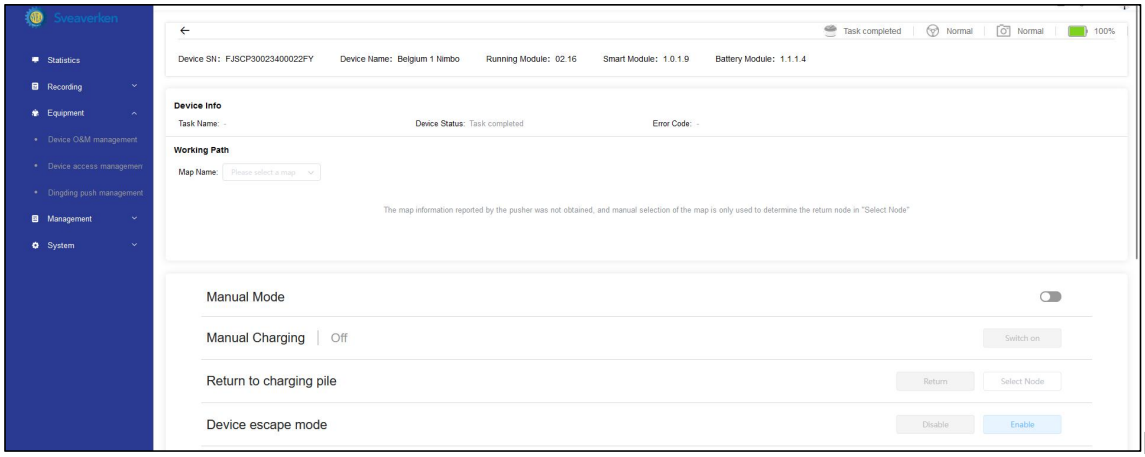


Figure27

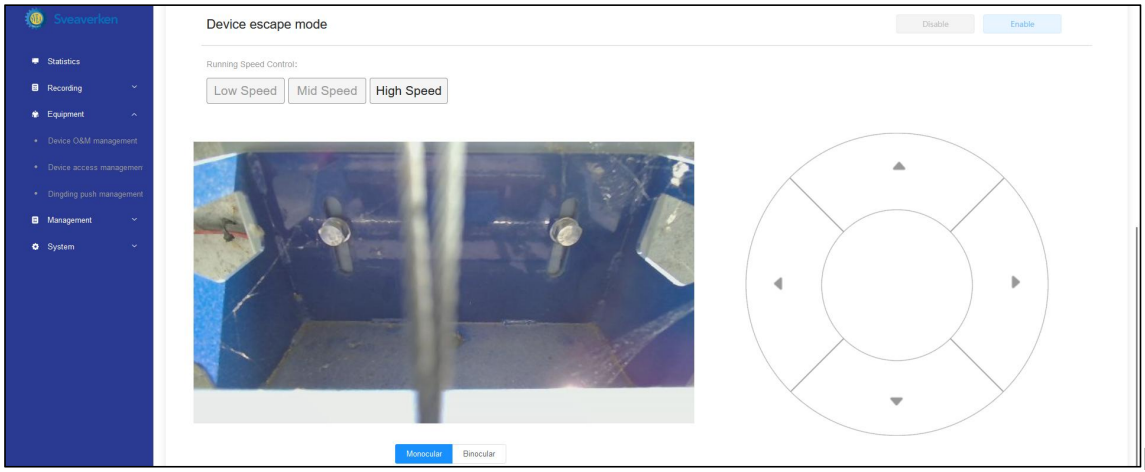


Figure28

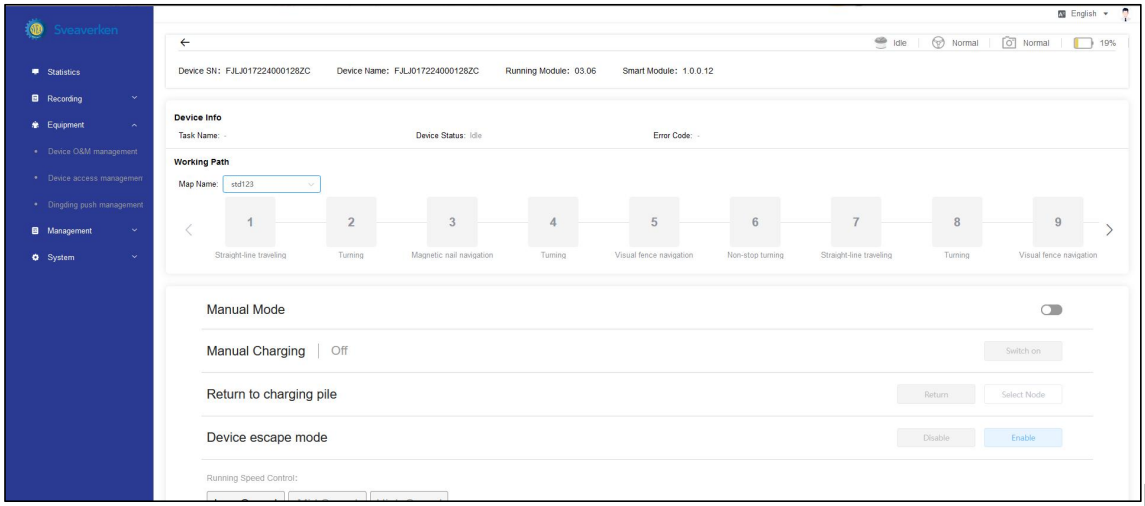


Figure29

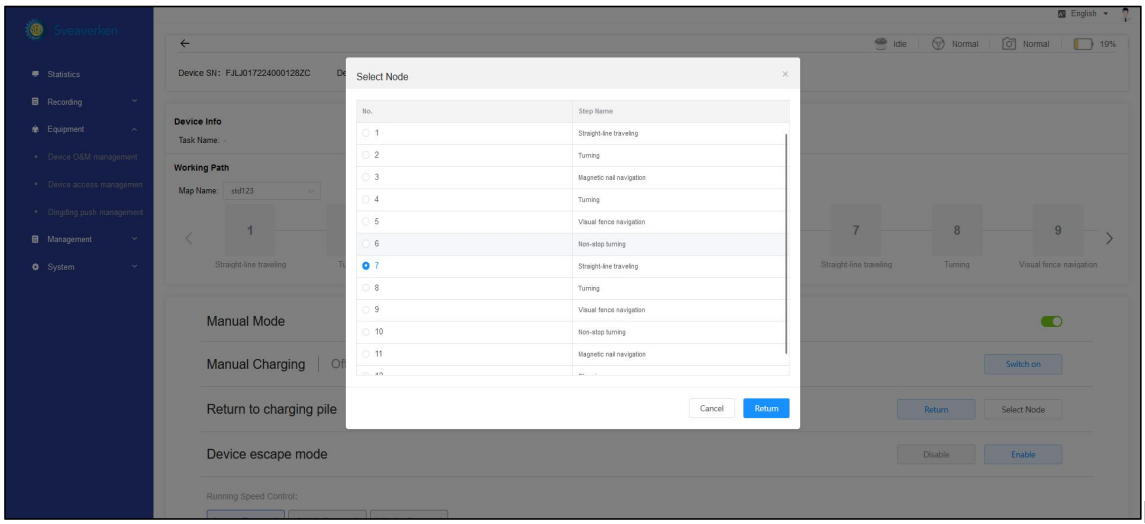


Figure30

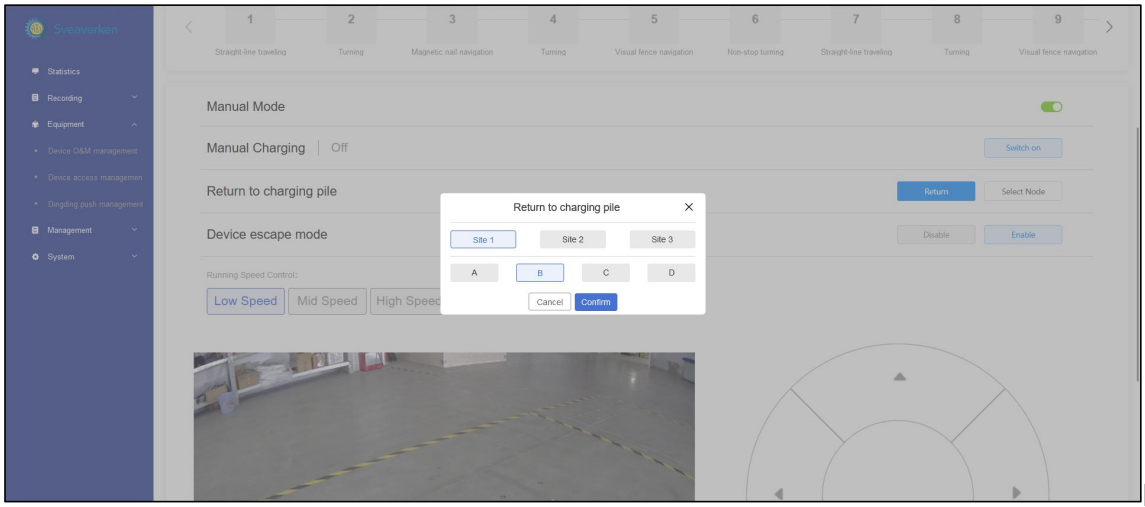


Figure31

Manual mode	Click the button on the right side of "Manual Mode", and the button switches to green to turn on the manual mode. At this time, the pusher can be controlled by the web remote control; click the button, and the button switches to gray to switch back to the automatic mode.
Direction control	Click the forward button to control the pusher to move forward at the currently set speed, and the same goes for moving backward; click the left turn button to control the pusher to make a differential turn at a percentage of the current speed, and the same goes for turning right.
Speed control	The speed is divided into three gears: slow, medium, and fast. Set the remote control pusher one gear lower than the current speed to slow down the pusher. The same applies to acceleration.
Real-time battery level	When the battery level is ≥ 80%, it displays green; when 80% > battery level is ≥ 35%, it displays blue; when 35% > battery level is ≥ 15%, it displays orange; when the battery level is < 15%, it displays red.
Manual charging	Click the "Start Now" button. If the text on the right side of manual charging shows "Enabled", charge the pusher.
Select node	Select the map in the map name above to select the node in the map for return, and the device will execute the remaining map (including the selected node) in order after the selected node.
Return to charge	Click the "Return Now" button, select the site and ABCD point, and confirm to automatically return to the charging pile. (For example, select the scene and C point to return, that is, select the abnc path in the path configuration.)22
Device out mode	You can choose to turn on or off the escape function. Clicking the button will switch to blue, and the other button will switch to gray.

3. Task management

Task management is mainly used for modifying and managing daily tasks.

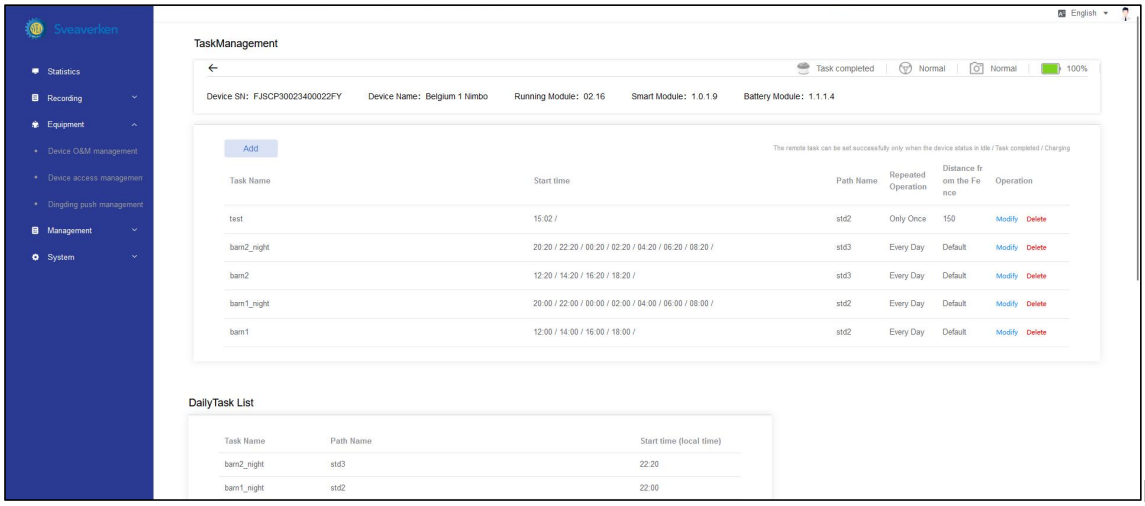


Figure32

Add tasks:

- Click Add button to enter the task addition interface.
- Fill in the task name, start time, path name, whether to repeat the task, and distance from the column.
- Save the settings and create a new task.

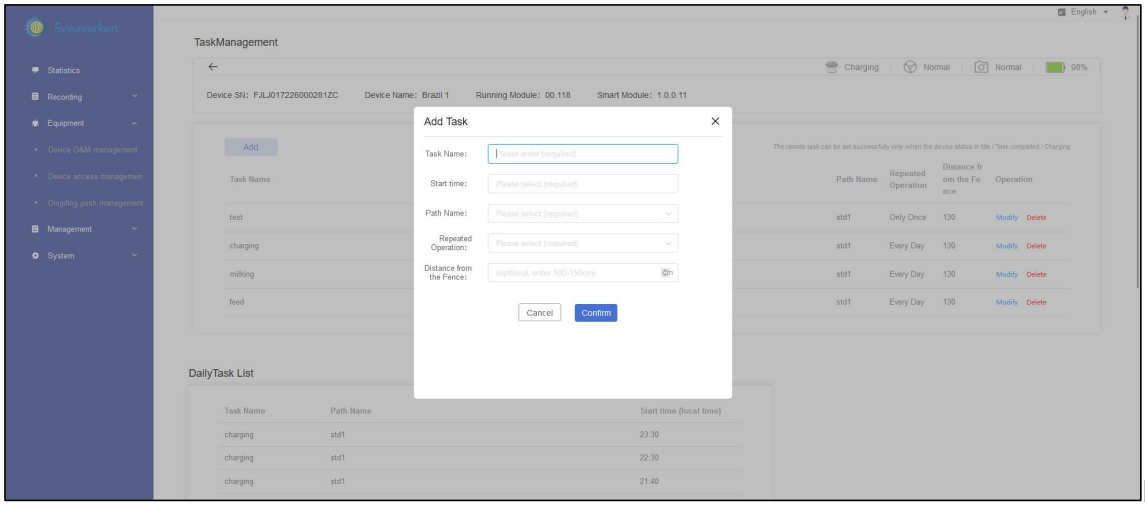


Figure33

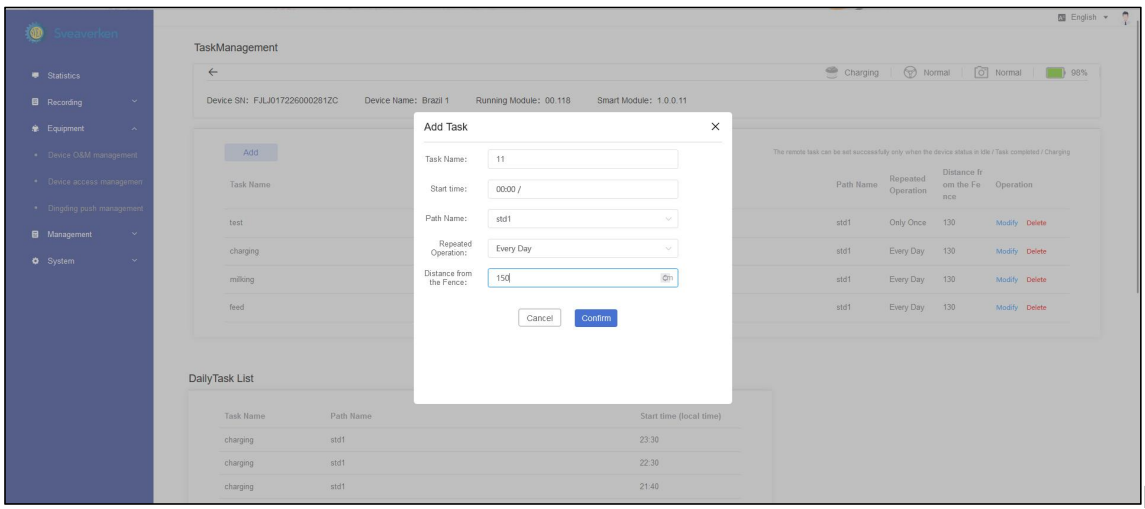


Figure34

!	**Note:**Please do not modify the current task and map while the task is in progress! The system allows only five tasks to exist.

Modify tasks:

- Click the Modify button next to the task to enter the task modification interface.
- Modify the items that need to be modified in the task name, start time, path name, whether to repeat the job, and distance from the column.
- Click Confirm to save your changes.

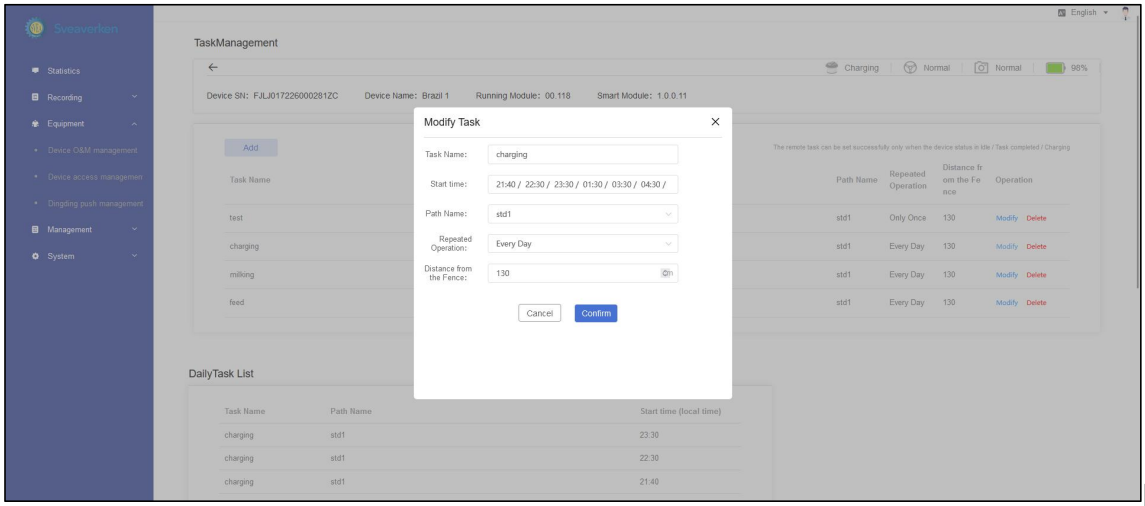


Figure35

Delete tasks:

- Click Delete button next to the task to confirm whether to delete.
- If you are sure to delete the task, please click "OK"; otherwise, please click "Cancel", and the system will cancel the task deletion.

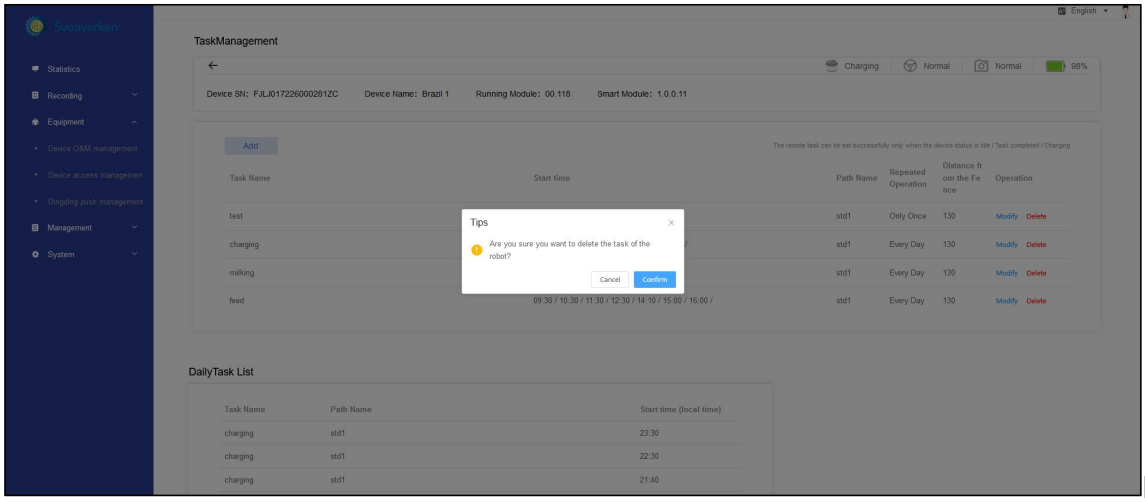


Figure36

Task list:

- Swipe down the page and a daily task list will appear. The list will display the task name, the path name where the task will run, and the start time of the task.

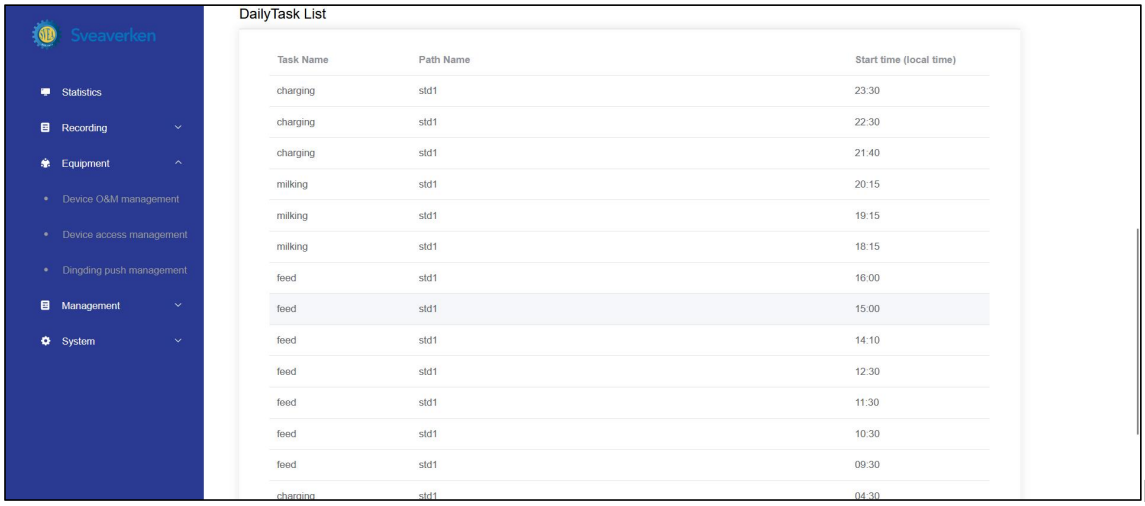


Figure37

4. Facility Management

Facility Management has two major functions: upgrade and restart. It can restart the car system, set a scheduled restart, and upgrade the car system.

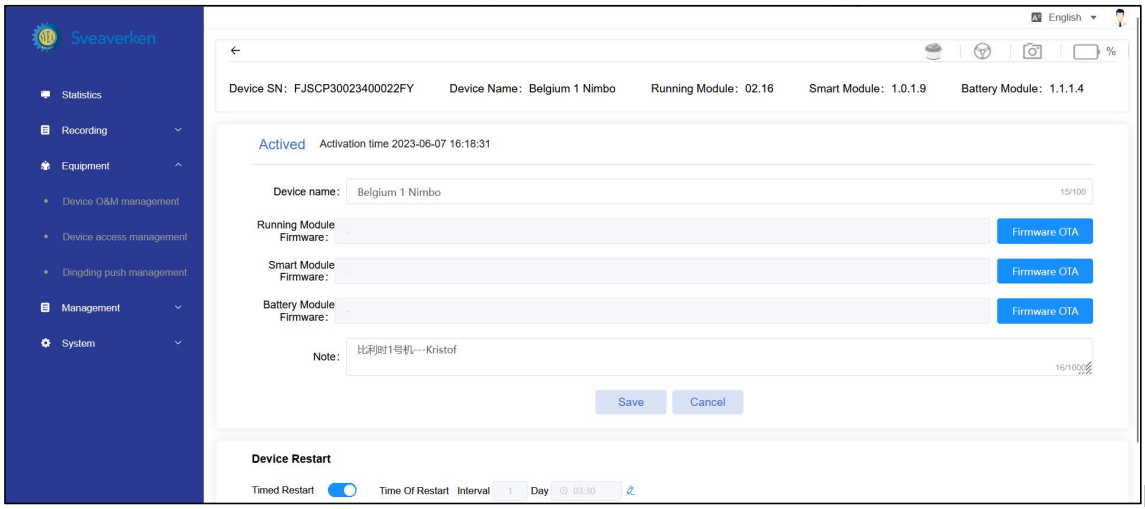


Figure38

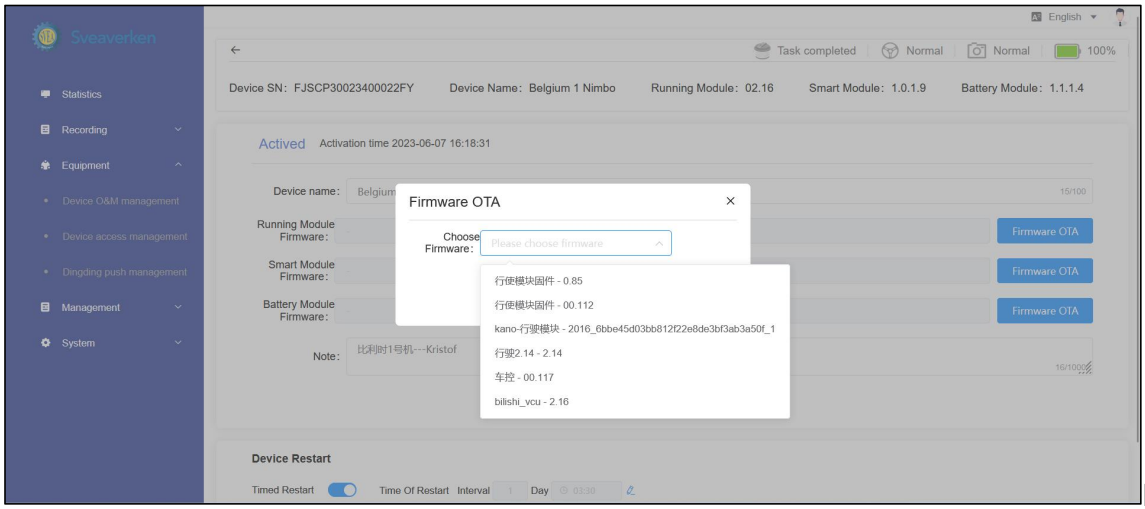


Figure39

Modify:

- Click the OTA button, select the firmware package and confirm.
- Fill in the equipment name, remarks, etc. that need to be modified.

- Click "Save Modifications" to upgrade and modify the note name.

!	**Note:**Please use this function under the guidance of a technician.

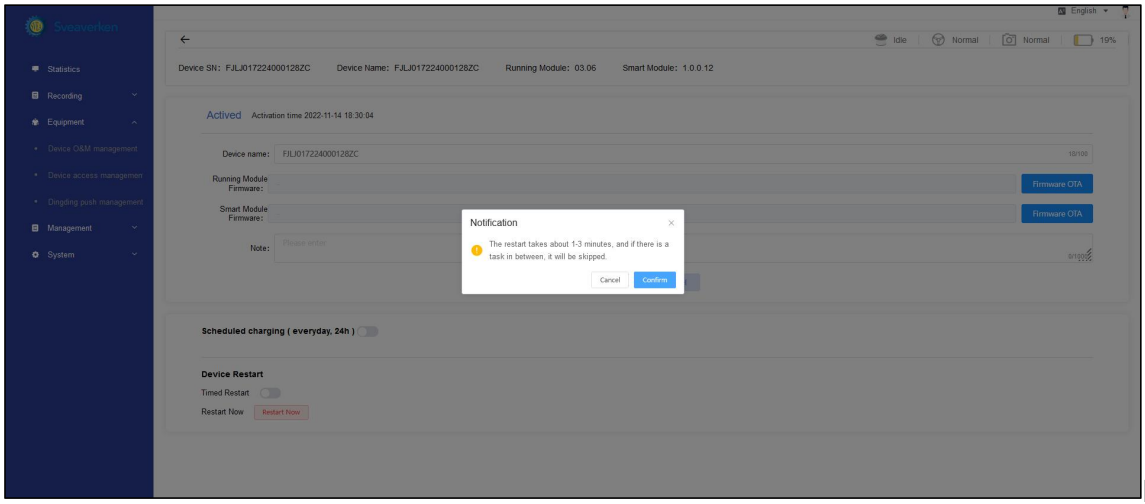


Figure40

Figure41

Device restart:

- Timed restart, click the button blue to turn it on, gray to turn it off (turning it off will result in no restart time on the right).
- When scheduled restart is enabled, click the edit button to edit the scheduled restart time.
- Restart Now: Click the red "Restart Now" button to confirm whether to restart. After confirming the restart, wait for 1-3 minutes for the car system to restart.

5. Parameter settings

Parameter settings can modify system parameters, which can better adapt to different terrains by adjusting the parameters.

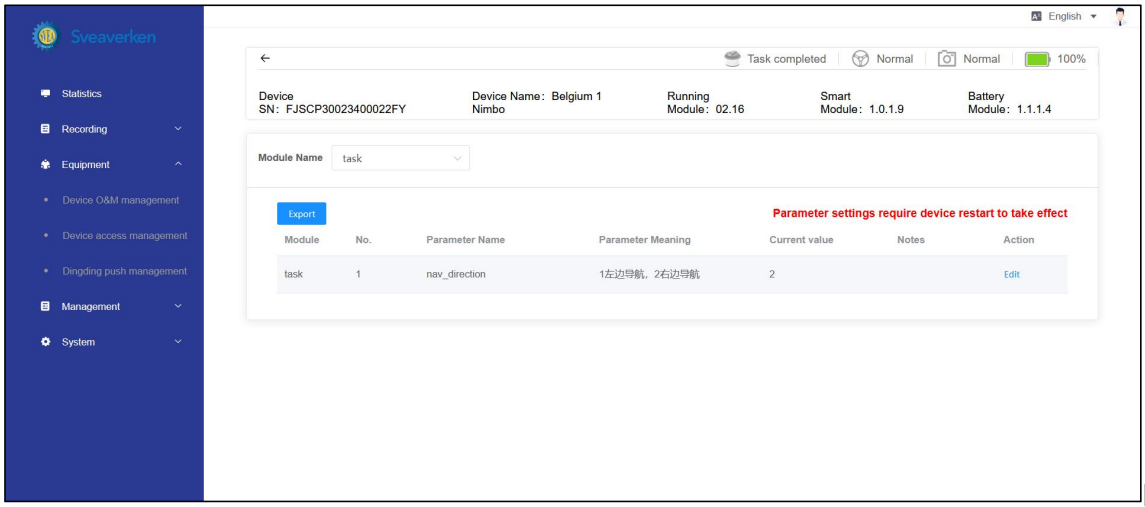
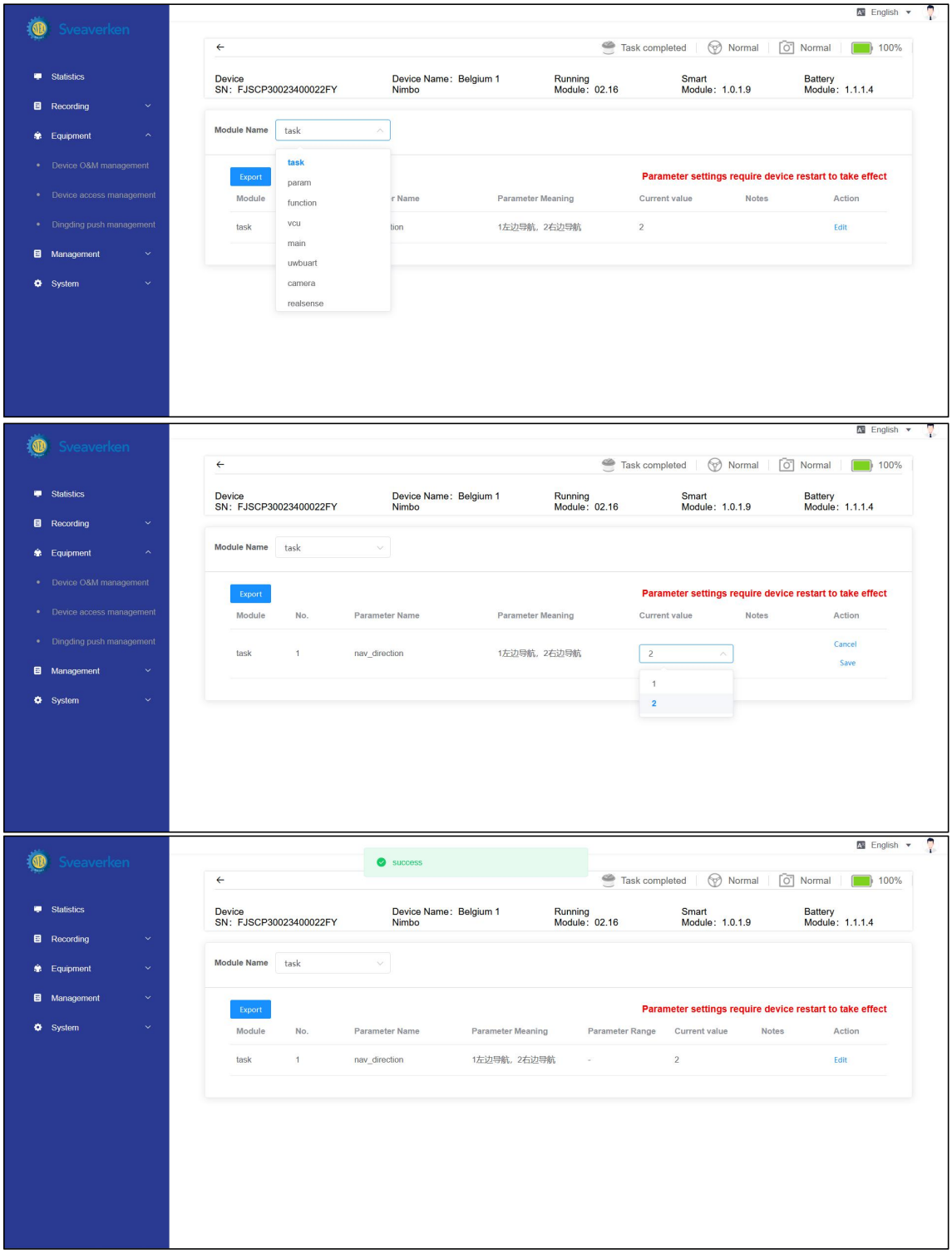


Figure42



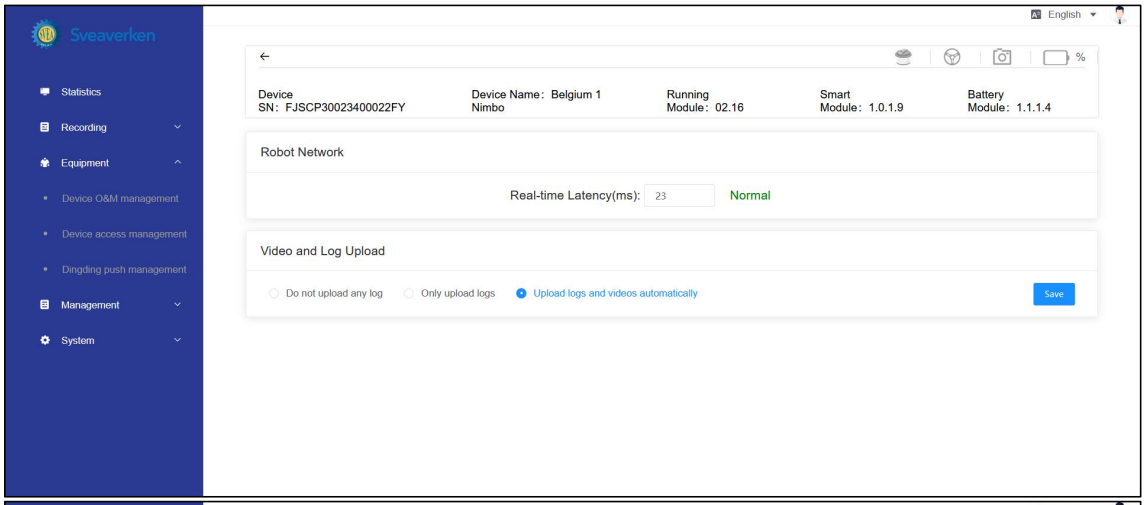
Parameter settings:

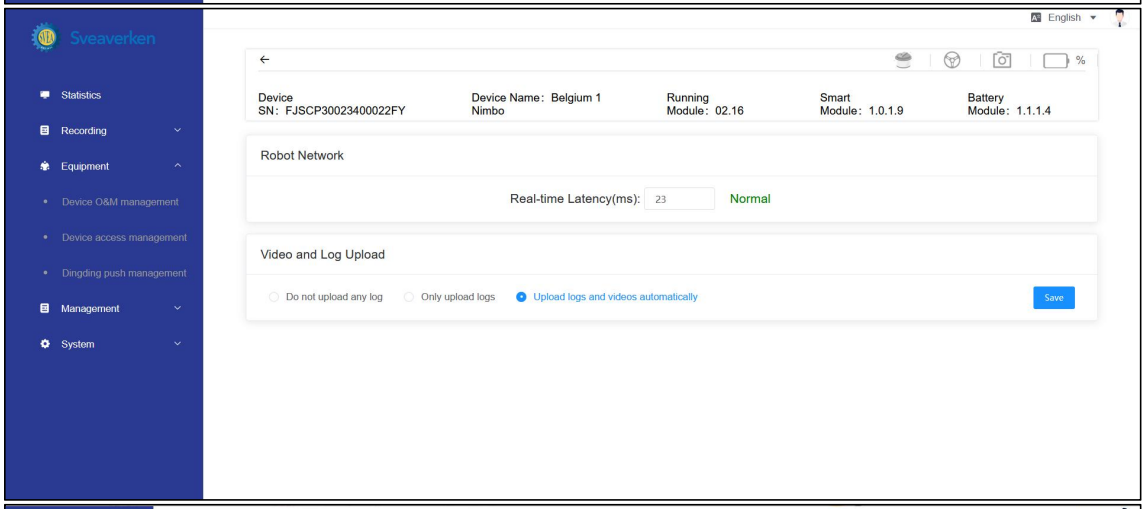
- Select the corresponding name in the module name, then select Modify in the operation bar behind the parameter you want to modify, and modify the corresponding value.
- After the modification is completed, click Save. If a green success appears, it means the save is successful. It will take effect only after restarting after saving.

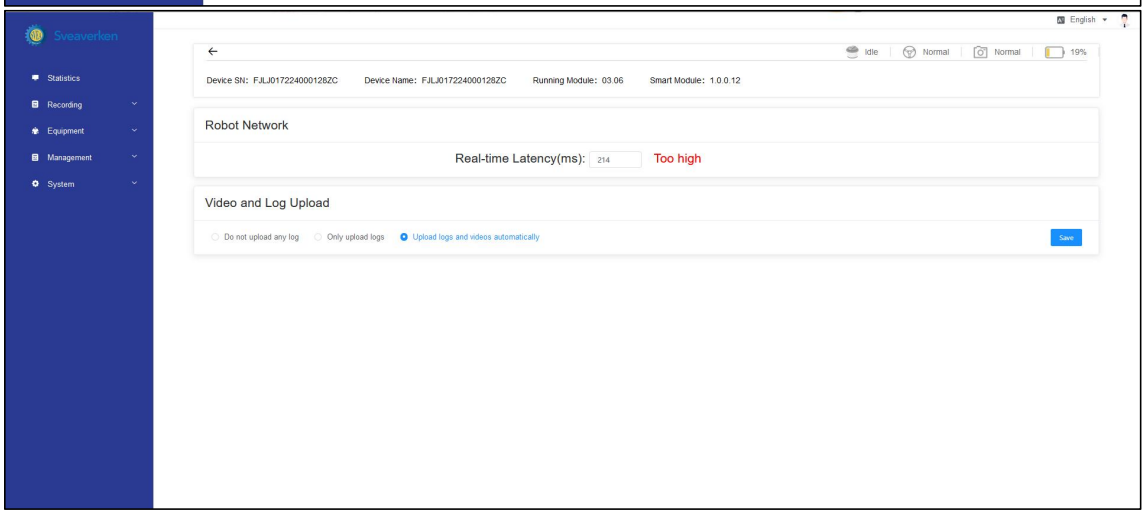
!	**Note:**Please use this function under the guidance of a technician.

6. Video settings

Video settings can be set to upload video logs, which can be modified to three settings: no logs uploaded, only logs uploaded, automatic logs uploaded, and videos. It can also detect the network speed of the car computer and prompt whether the delay is normal.







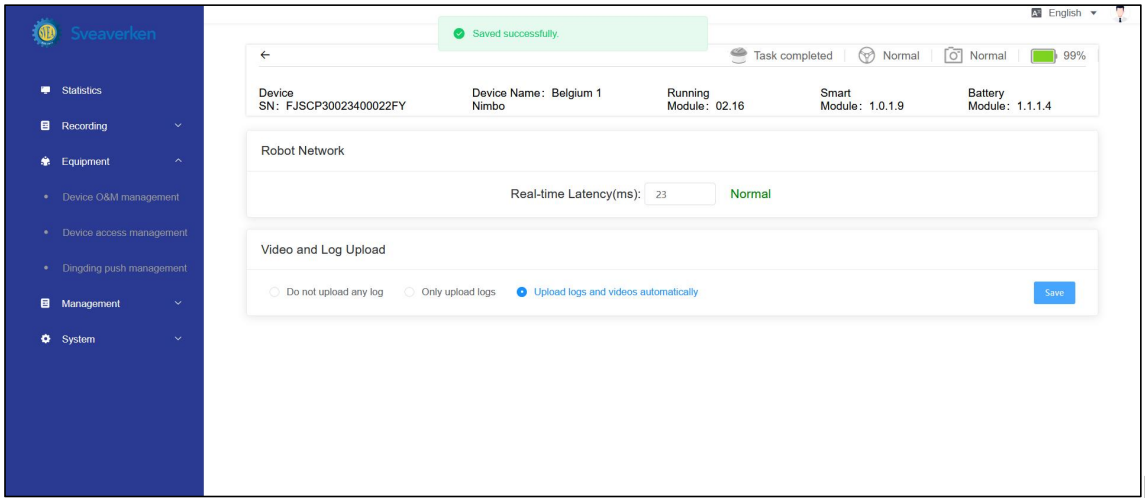


Figure46

Vehicle network speed settings:

- If the internet speed is good, the prompt on the back is in green font "Latency is within normal range".
- If the network condition is poor and the delay is too high, the rear prompt will change to red font "Delay is too high".

Video log upload settings:

- Click the small dot in front of the options Do not upload any logs, Upload logs only, Automatically upload logs, and Video to select the option. The video log will be automatically uploaded to Cloud Drive according to the selection.
- After the modification is completed, click Save and a green Save Successful will appear.

6.3.6 Drum lifting module

1. Drum lifting combination key (Bluetooth remote control)

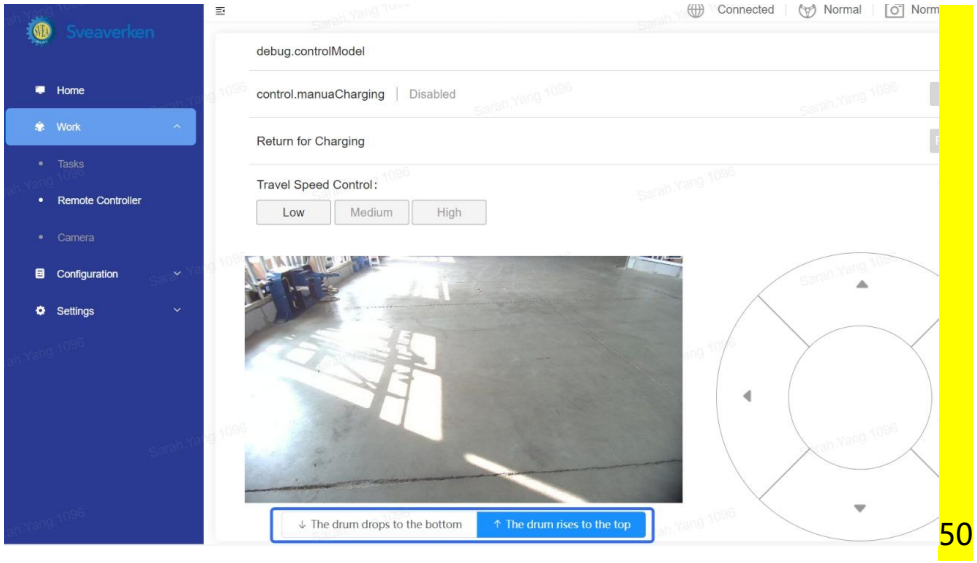
- Lift: Click A and the blue button in turn, release and wait for 5 seconds, then lift the drum
- Descend: Click B and the blue button in turn, release and wait for 5 seconds for the drum to descend
- The drum lifting reaction needs to wait for 5 seconds, and ensure that the drum is at the bottom when the pusher is working

2. Web control

Proximal web page

- Connect the machine WiFi, enter 10.33.68.254 in the browser;
- Work - Remote Control - Select the drum lift button, the blue icon represents the current drum position status.
- Ensure that the drum is at the bottom when the pusher is working

Figure



50

Operation platform

- Remote control - select the drum lifting button, the blue icon represents the current drum position status (ensure that the drum is at the bottom when the pusher is working)

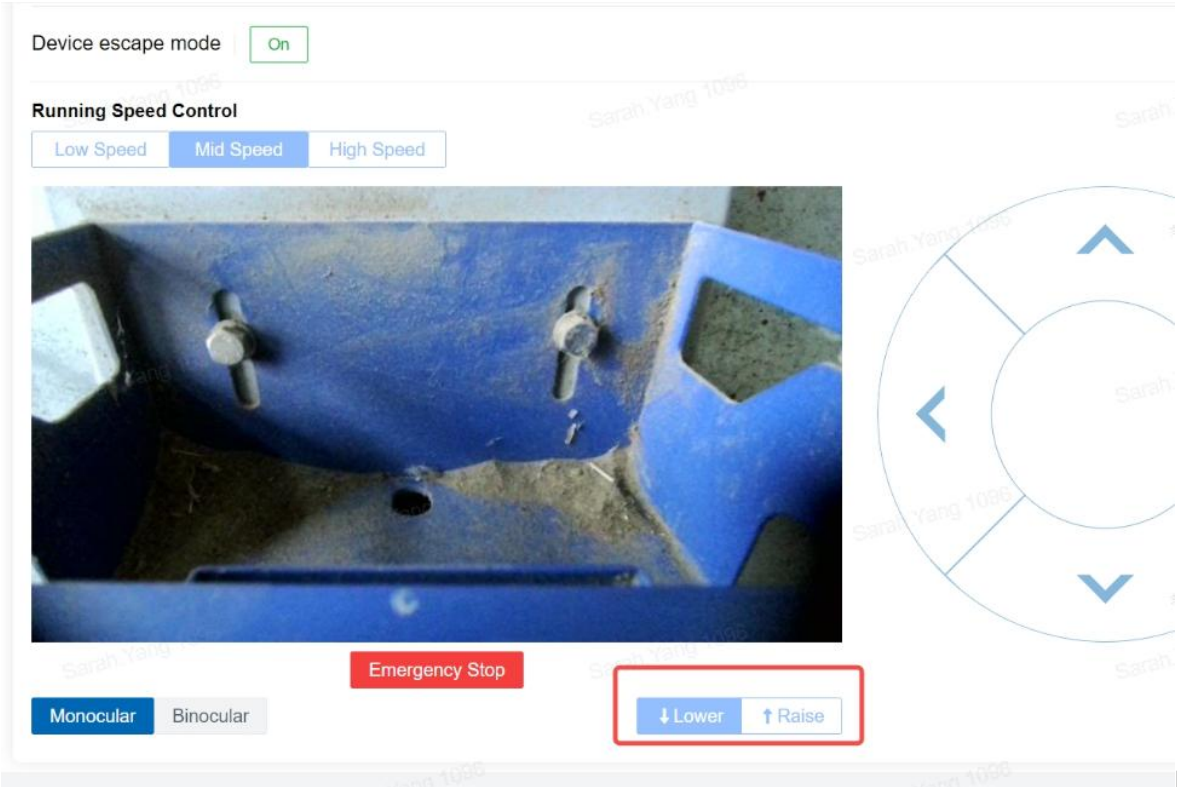


Figure 51

3. Roller lifting map configuration

Proximal map configuration

- Connect the machine WiFi, enter 10.33.68.254 in the browser;
- Configuration - Path Configuration - New Steps - Select Roller Lift;
- Select the drum operation (lifting/lowering/not operating) of the current node as needed.

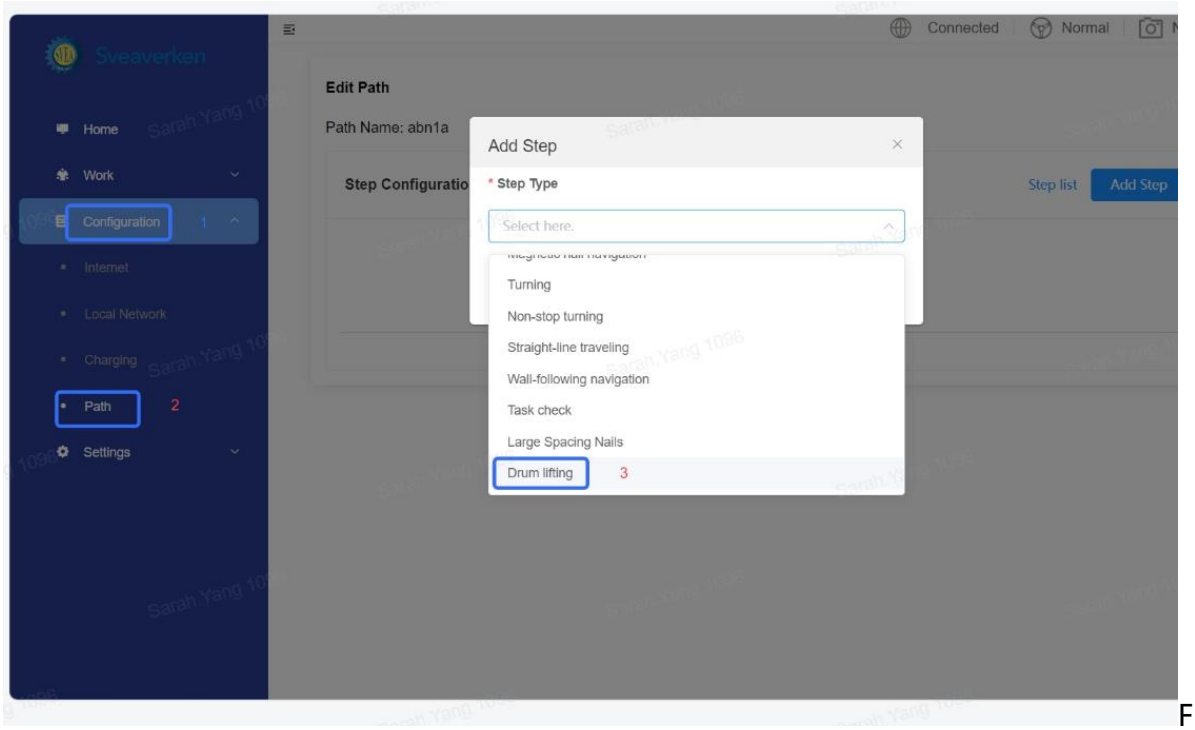


Figure52

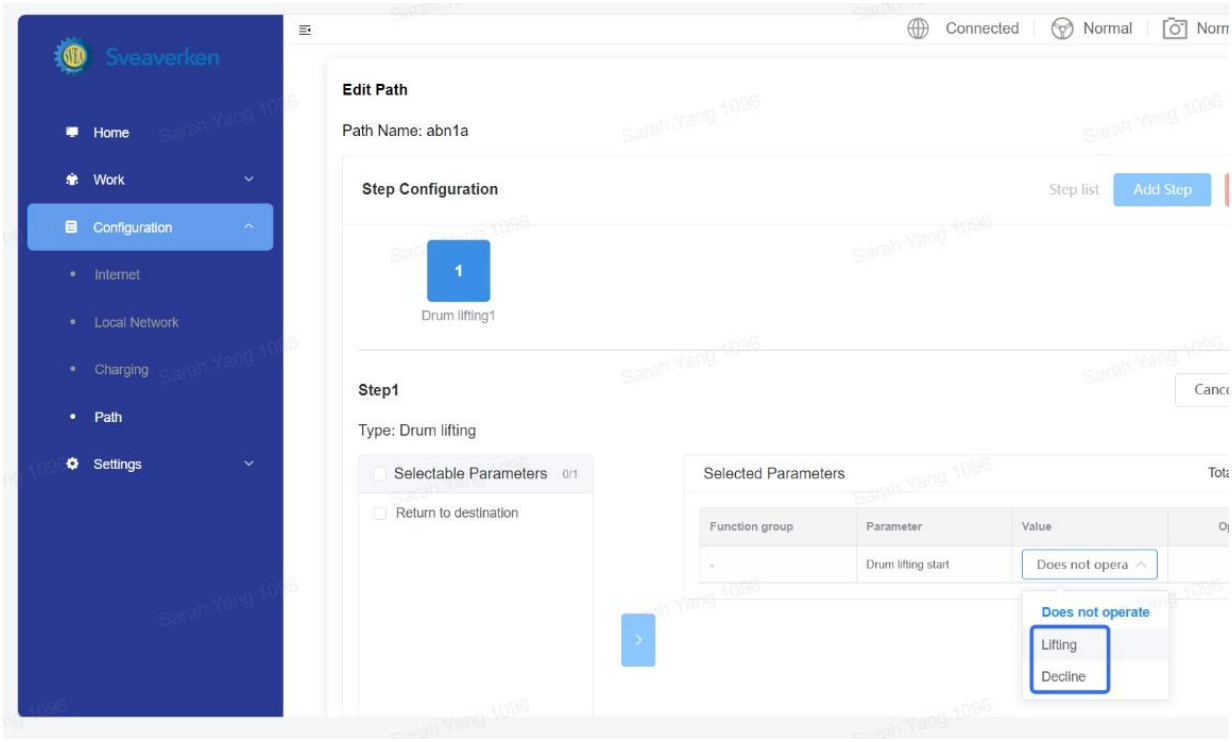


Figure5

3

Operation Platform Map Configuration

- Path Management - Add Step - Select Roller Lift;
- Select the drum operation (lifting/lowering/not operating) of the current node as needed.

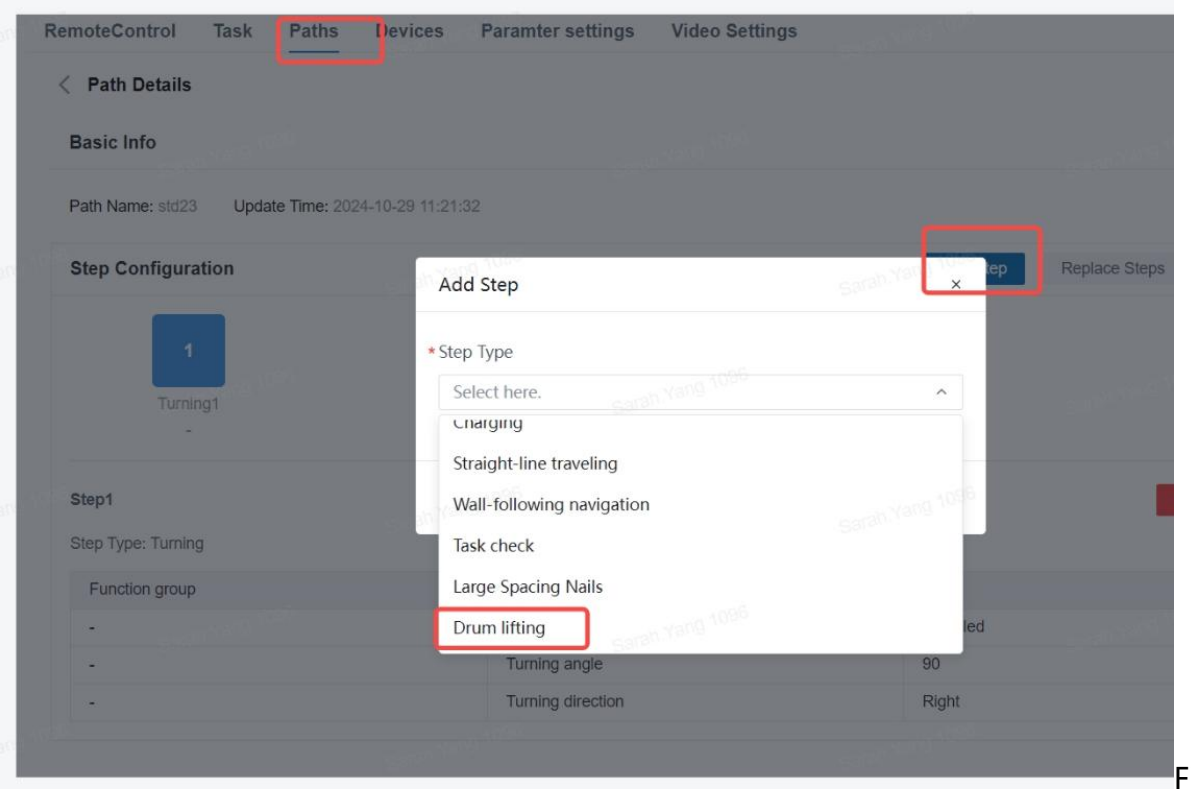


Figure54

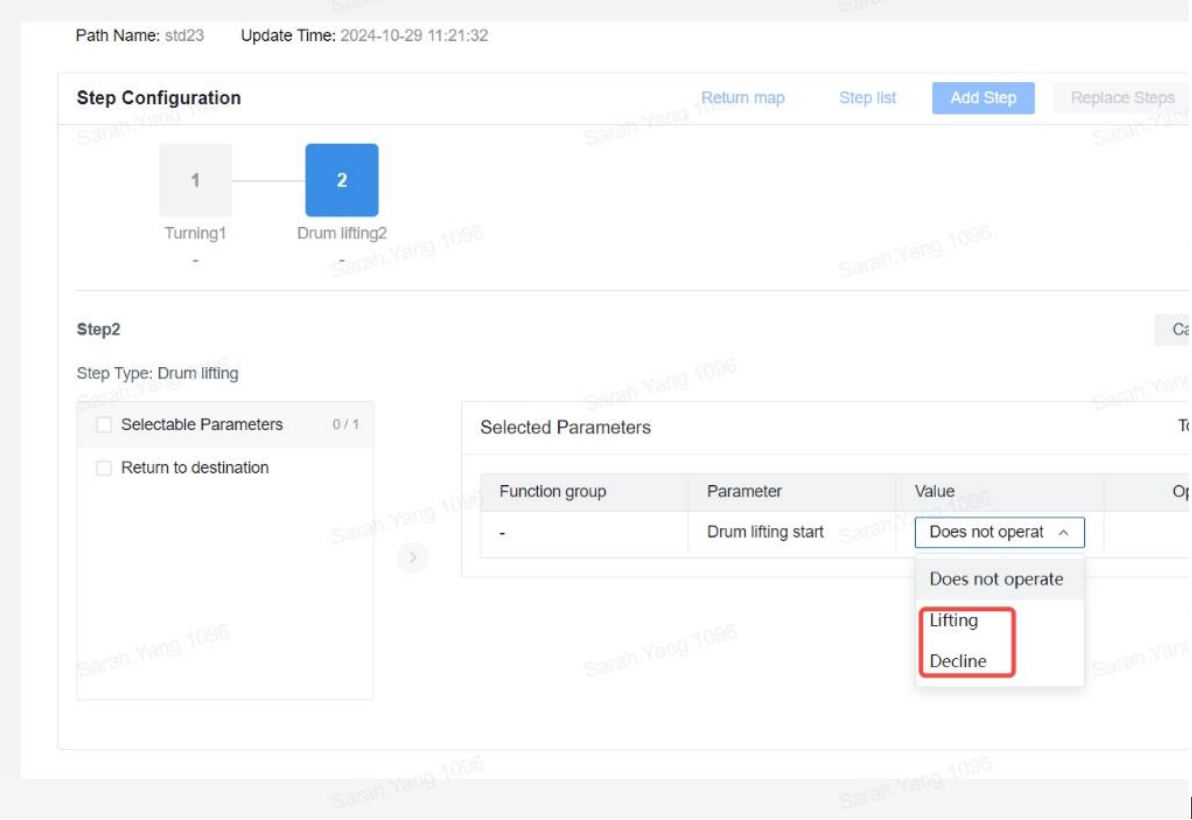
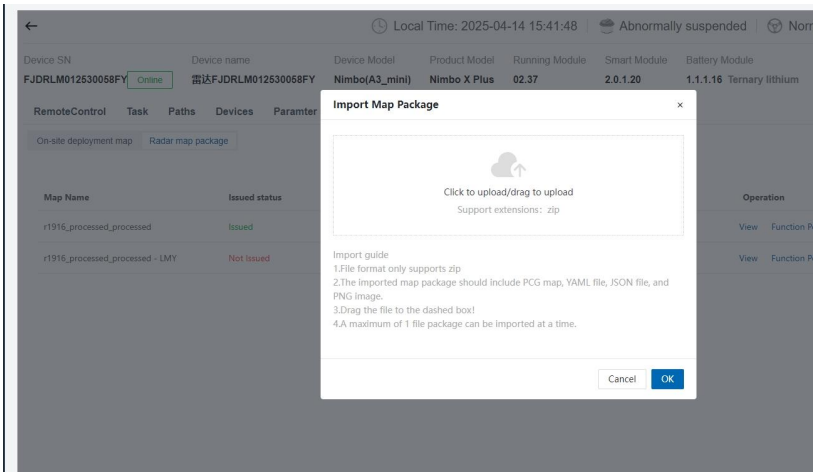


Figure55

6.3.7 Radar module

1. Import radar map package



Operation platform map package import

- Map Management - Import Map Package - Import Map Package - Click Upload - Confirm;

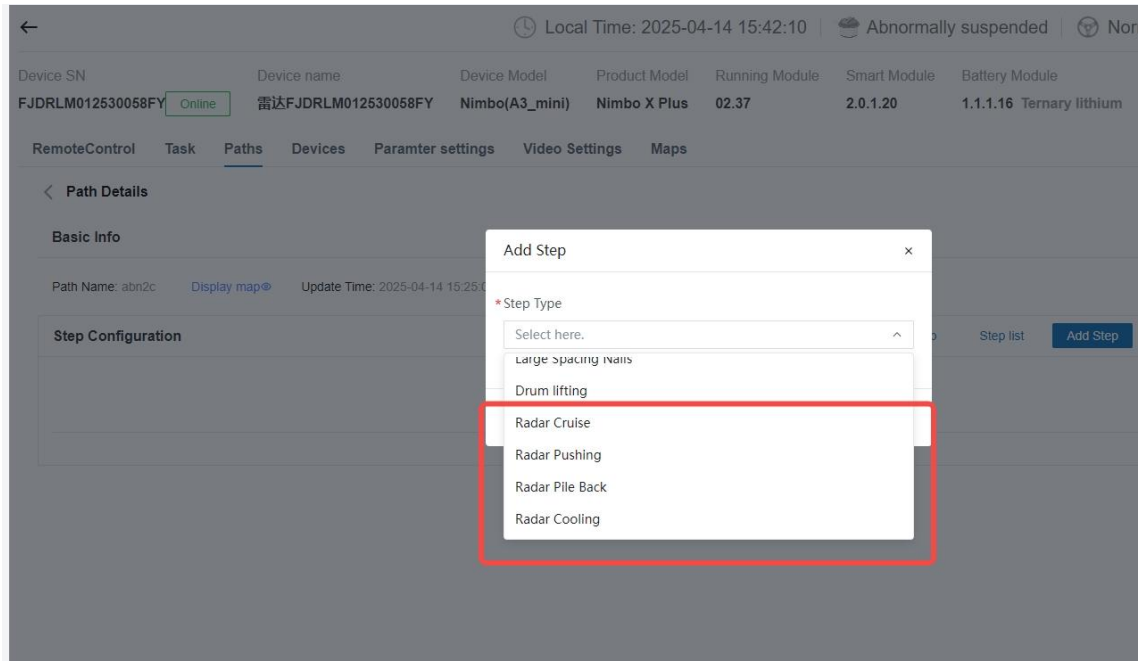
2. Configure Map Steps

Proximal map configuration

- Connect the machine WiFi, enter 10.33.68.254 in the browser;
- Configuration - Path Configuration - New Steps - Radar-specific steps can be added (radar cruising, radar pushing, radar pile removal, radar cooling) - Confirm.

Operation Platform Map Configuration

- Path Management - View - Add Steps - Radar-specific steps can be added (radar cruising, radar pushing, radar pile removal, radar cooling) - Confirm.



Radar cruise

Select the tracking method of the current node as needed, radar map, route Functional Button list, turning/walking speed

Radar thrust

Select the current node's stop function start and stop, tracking method, radar map, route Functional Button list, pushing baseline offset, entry navigation direction, radar escape start, radar escape angle, radar escape bar auto-

increase, anti-run opposite offset angle, turning/walking speed as needed.

Radar pile removal
Select the current node's retreat distance, radar map, and blower switch as needed.

Radar cooling
Select the cooling duration of the current node as needed.

7 Troubleshooting

Fault description	Possible reasons	Solution
Web page not connected to/disconnected from pusher	End point not connected to public Wi-Fi	• Enable end point Wi-Fi connection ▪ View end point Wi-Fi settings
	End point unconnected pusher	• Connect pusher using end point
	Pusher is turned off	• Start pusher
Pusher not moved	Pusher is turned off	• Start pusher ▪ Let the pusher enter the running state
	Route is blocked	• Remove obstacles
	Magnetic nails are demagnetized or destroyed	• Check and replace magnetic pins
	Low battery	• Manually operate the machine to the charging pile • Manually operate the machine to start charging
	The emergency stop switch has	• Reset emergency stop switch

Fault description	Possible reasons	Solution
	been pressed	
The pusher swings or turns incorrectly	Gyroscope drift	• Replace the gyroscope
	The camera is not working properly	• Clean the camera • Test the whole machine
Pusher not running	No tasks issued	• Send tasks up and down the web
The pusher cannot be charged	The charger is not plugged in	• Turn on the charger power

If you cannot troubleshoot the problem according to the solutions in the table, or encounter other problems, please contact the dealer.

8 Installation and debugging

8.1 Patrol installation

- Patrol line deployment can be carried out by contacting local dealer technicians. After providing the design drawing of the pasture pushing channel, the engineer will carry out relevant patrol line design for you, including visual patrol line and magnetic nail patrol line. Deployment will be carried out by authorized technicians from Sveaverken.
- The location of the charging pile for the pusher: The charging pile is generally placed on one side of the entrance of the cattle farm, which will not interfere with other work of the cattle farm.
- Use the charging pile as the starting point of the pusher's working path; keep the deployed patrol line clean, especially the right-angled and T-shaped parts; keep the magnetic nails intact, embedded in the ground, to prevent damage and loss.

8.2 Charging pile installation

- Place the charger and charging pile in a ventilated, rain-proof, and dry place.
- The circular plug and square gray Anderson connector at the rear of the charger are respectively connected to the circular socket on the charging pile and the gray square structure.
- The bottom of the charging pile bracket can be fixed to the ground with expansion bolts.

!	**Note:**Due to laws and regulations in different regions, there are certain differences in the input voltage of the charger. Please confirm the specific technical parameters with the technical personnel of Sveaverken.

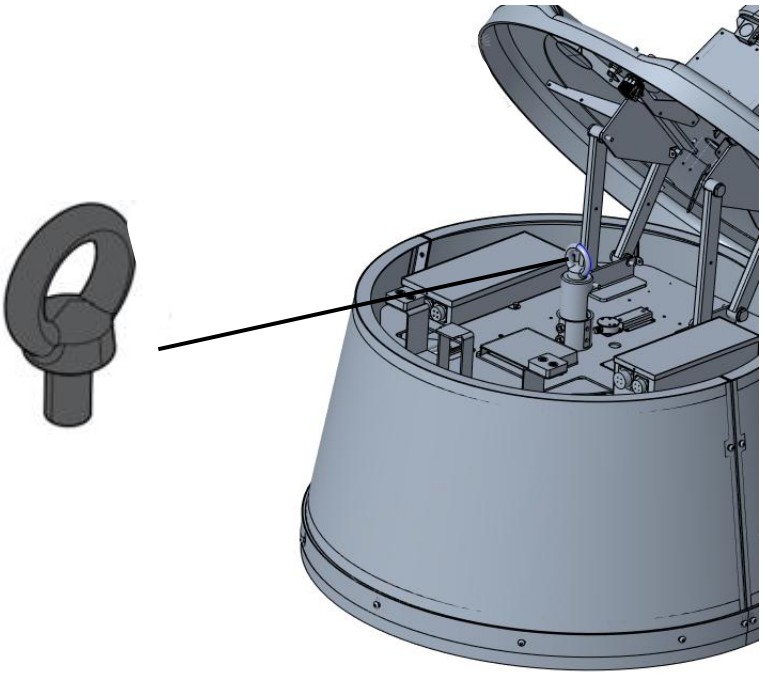
8.3 Debugging

Plan the route and return to charge the pusher according to the web page.

!	**Note:**It must be installed and debugged by authorized technicians from Sveaverken!

8.4 Pusher loading and unloading

During the handling of the pusher, the lifting ring should be used for loading and unloading. After the handling is completed, the lifting ring should be removed and the top cover should be locked.



9 Maintenance

Preventive maintenance cycle table.

Maintenance tasks	Frequency			
	7 days	20 days	30 days	3 months
Check whether the body charging plate and charging pile charging plate are oxidized		▲		
Check if the machine is connected properly			▲	
Check if the magnetic nail is clean or damaged				▲
Check and keep the camera clean	▲			
Check if the operation warning light is working properly				▲
Check if the lighting can be turned on and off normally				▲
Test emergency stop switch for malfunction				▲
Check whether the pushing rubber is worn or damaged				▲
Check drive wheel				▲
Check universal wheel				▲

!	**Note:**Customers must adjust the maintenance inspection cycle according to the actual environment of the ranch and the actual operation of the pusher. If you cannot maintain it yourself, please contact the local dealer.

10 Spare parts list

Component name	Single unit usage (Unit: pieces)
Universal wheel assembly	1
Driving wheel	2
Drive shaft	2
Visual box	1
Sensor class	1
Fill the light	1
Contactor	3
Fuse	1
Fuse	1
Fill light bracket	1
Warning light	1
Walking drive motor	2
Magnetic navigation sensor	2
Gyroscope	1
Note: If you need spare parts, please contact your local dealer.	

11 Transport and storage

- Before transportation or storage, the power supply of the pusher should be disconnected.
- Ensure to handle with care during transportation to avoid damage to the pusher.
- During transportation, avoid collisions and squeezing.
- The pusher should be stored in a dry and ventilated environment with a temperature of 25 ± 3 ℃ and a humidity of 65 ± 20%, avoiding direct sunlight.
- The pusher should be kept away from flammable and explosive materials and should not be mixed with metal objects.
- During the handling process of the pusher, lifting rings should be used for loading and unloading.
- If the device is stored for a long time, ensure that the battery level is around 50% before storage, and then charge it every two months to prevent the battery from being overdischarged and unable to be used normally.

12 Noise description

According to on-site tests, the noise generated by the machine during normal operation is 66.1dB, and the noise does not exceed 78dB.

13 Troubleshooting

Fault description	Possible reasons	Solution
Web page not connected to/disconnected from pusher	End point not connected to public Wi-Fi	• Enable end point Wi-Fi connection ▪ View end point Wi-Fi settings
	End point unconnected pusher	• Connect pusher using end point
	Pusher is turned off	• Start pusher
Pusher not moved	Pusher is turned off	• Start pusher ▪ Let the pusher enter the running state
	Route is blocked	• Remove obstacles
	Magnetic nails are demagnetized or destroyed	• Check and replace magnetic pins

Fault description	Possible reasons	Solution
	Low battery	• Manually operate the machine to the charging pile • Manually operate the machine to start charging
	The emergency stop switch has been pressed	• Reset emergency stop switch
The pusher swings or turns incorrectly	Gyroscope drift	• Replace the gyroscope
	The camera is not working properly	• Clean the camera • Test the whole machine
Pusher not running	No tasks issued	• Send tasks up and down the web
The pusher cannot be charged	The charger is not plugged in	• Turn on the charger power

If you cannot troubleshoot the problem according to the solutions in the table, or encounter other problems, please contact the dealer.

14 Waste disposal

This product contains metal materials and electronic components. Waste materials (including packaging materials, metal parts, and electronic components, etc.) should be sent to recycling centers or appropriate destruction sites. Waste disposal should be based on environmental protection principles and comply with local laws and regulations.

15 After-sales principle

- Any consequences caused by violating safety precautions shall be borne by the user.
- Use beyond the scope of machine operation conditions is considered incorrect use, and any consequences caused shall be borne by the user.
- Any consequences caused by human damage to the machine shall be borne by the user.

16 Manufacturer information

Manufacturer: SVEA(HK)LIMITED

Address: FLAT/RM520,5/F,CORE BUILDING 1,PH 1,1 SCIENCE PARK EAST AVE,SHA TIN,NT, HK, CHINA

Telephone: 70767979-000-05-22-9

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

FCC Warning

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

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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