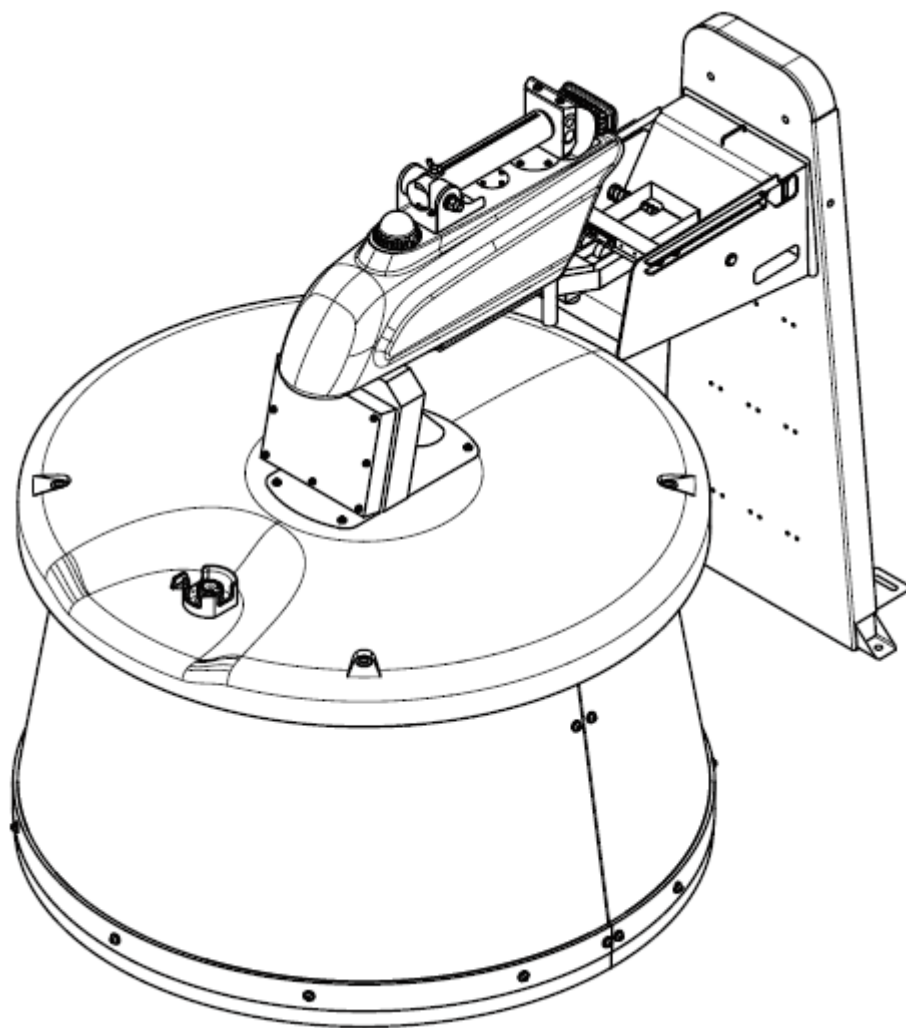




LF01

RoboPusher Nimbo Plus

User Manual

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This manual is subject to change without notice.

Revisions:

Version	Date	Description
1.0	2024.08.01	First release

Read Before Use:

	Operate in strict accordance with this manual. If you have any questions during use, contact the service personnel.
--	--

Disclaimer:

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- The content of this manual is subject to change due to product upgrades and other reasons. Sveaverken reserves the right to modify the content of this manual without notice.
- This manual only provides guidance for use of this product. Every effort has been made in the preparation of this manual to ensure accuracy of the content, but no information in this manual constitutes a warranty of any kind, express or implied.

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1 About the Manual

This manual provides instructions regarding the operation, installation, commissioning, and maintenance of RoboPusher Nimbo Plus. All people involved must read and understand the content of this manual and follow the safety instructions.

The English version is the original manual.

2 Product Introduction

2.1 Application

RoboPusher Nimbo Plus provides automatic feed pushing and is applicable to all modern farms.

2.2 Overview

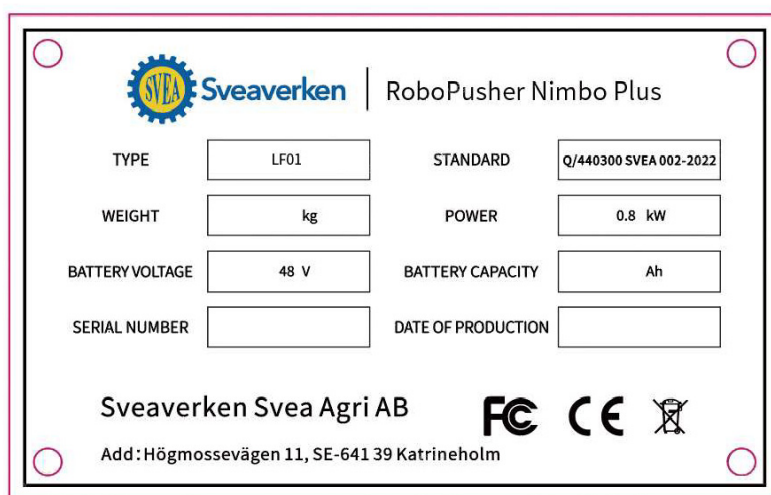
By providing automatic feed pushing, this product can reduce the labor costs and increase the feed intake, which improves the milk or meat production and maximizes the benefits for farms.

The robot pushes the feed towards the feed fence by rotating the drum. The computer vision technology enables the robot to control its moving direction and feed pushing scope and operate more flexibly. As long as the road conditions are ideal without any obstacle, the robot will automatically execute feed pushing tasks at set times and adjust its heading flexibly. After finishing the tasks, it automatically returns to the charging pile along the preset path.

You can remotely control the robot and manage feed pushing tasks at any time on the website.

This product has a roller lifting function, which can be adapted to multi-terrain pastures

2.3 Nameplate



Note: Refer to Item 6 in the figure of the robot top in section 6.2 for the nameplate installation position.

2.4 Standard Compliance

Model: LF01 | **Applied Standard:** Q/440300 SVEA 002-2022

3 Safety Instructions

3.1 Electrical Safety

- Only authorized electrical engineers are allowed to install the power supply for the charging pile.
- Ensure that the grounding of the electrical system and all parts of the charging pile meet the local rules and regulations.
- Ensure that the charging pile is not exposed to rain.
- If any electrical wires, switches, or components are damaged, replace them immediately.
- Turn off the power button before maintaining the robot. Refer to Item 2 in the figure of the robot top in section 6.2 for the location of the power button.
- Do not short-circuit or strike the lithium battery, or remove it without authorization.
- Unplug the power supply before working on the charging pile.

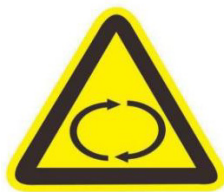
3.2 Operation Safety

- Read and understand this manual and all the safety signs before powering on the robot for operations, maintenance, or adjustments.
- Only trained people are allowed to operate the robot.
- Operate the robot in places without moving vehicles and herds.
- Unauthorized people are not allowed to enter the traveling area and the working area of the robot. If unauthorized people are found in such areas, stop the robot.
- When you remotely control the robot with your smart phone or tablet, ensure that there are no obstacles and safety hazards on its path.
- Ensure that the robot is in your sight when you operate it manually.
- Keep hands, feet, hair, and clothing away from moving parts, and wear suitable clothing and personal protective equipment.
- All operators and related personnel should review safety instructions regularly.

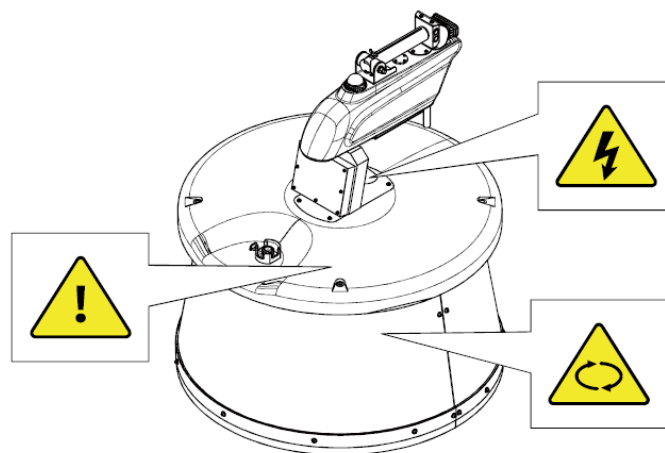
3.3 Maintenance Safety

- Read and understand this manual and all the safety signs before powering on the robot for operations, maintenance, or adjustments.
- Only trained people are allowed to maintain the robot.
- Keep tools and metal parts away from the battery.
- Do not spray water on the robot. Use a wet brush to clean the robot.
- Ensure that all parts are installed in place after maintenance.
- Do not alter the robot in any way.
- Only use approved spare parts, and ensure that they are installed by authorized technicians.

Safety signs

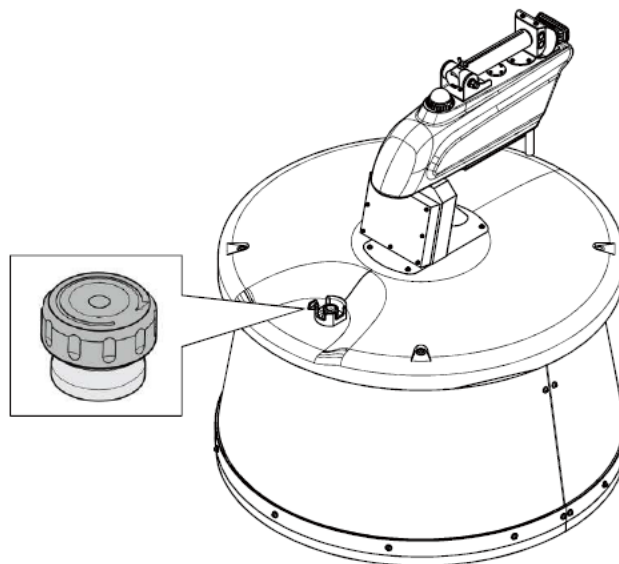
Warning: Electric shock hazard	Warning: No heavy load	Warning: Entanglement hazard
		

Position of safety signs



Emergency stop button

The emergency stop button is located on the top of the robot. Once this button is pressed, the robot stops immediately. To reset the emergency stop button, pull up the button..



Charging system controlled by software

The robot software controls the charging system and keeps the robot connected to the charging pile before it moves. The software ensures that the battery is fully charged until the next operation and also prevents battery overcharging.

4 Specifications

Diameter		1,080 mm
Height		1,120 mm (in use); 665 mm (during transport)
Weight		505 kg
Travel speed		18 m/min
Gradeability		16°
Operating temperature		-20°C to 50°C
Tires		3
Drive wheels		2; $\varnothing$ 250 mm×80 mm
Roller lifting function		Yes
Wheel motor	Number	2
	Power	400 W
Battery	Type	Lithium battery
	Rated voltage	48 V
	Capacity	40 Ah
Charger	Input voltage	110-245VAC
	Input frequency	45 Hz/65 Hz
	Output voltage(Max)	58.8 VDC
	Output current	10 A
Camera	FOV	Horizontal: 87.51°; vertical: 47.58°
	Sensor	2 megapixels; 1/2.8; 1,080p@30fps

	Note: The actual battery configuration may vary according to the requirements of local laws and regulations. Contact the technical personnel of Sveaverken for detailed specifications.
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5 Robot Information

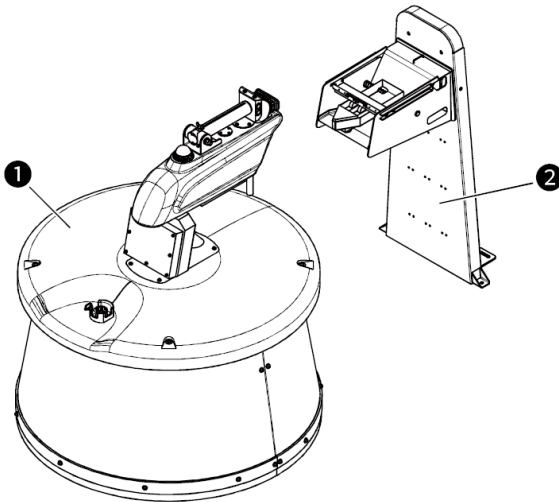
No.	Item	Designed Value
1	Product Name	RoboPusher Nimbo Plus
2	Model	LF01
3	Feed pushing method	By rotating the drum
4	Dimensions	Φ1,080×1,120 mm
5	Navigation method	Visual navigation / Magnetic nail navigation / Ultrasonic navigation
6	Charging method	Automatic charging
7	Total motor power	0.8 kW
8	Battery capacity	40 Ah
9	Battery voltage	48 V

6 Composition



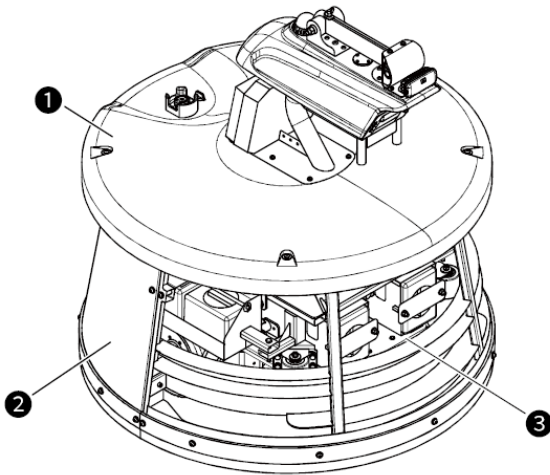
Note: Figures in this chapter are only for reference. Do not open the top cover or the drum without authorization. Contact your dealer or the technical personnel of Sveaverken if such operations are required.

6.1 Assembly



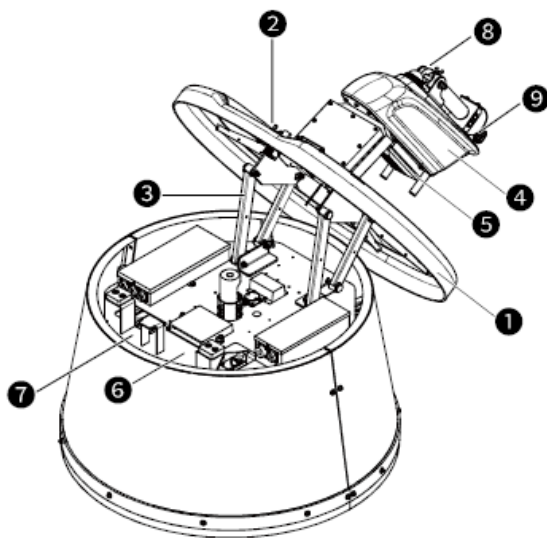
1	Feed pushing robot	2	Charging pile
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6.2 Feed Pushing Robot



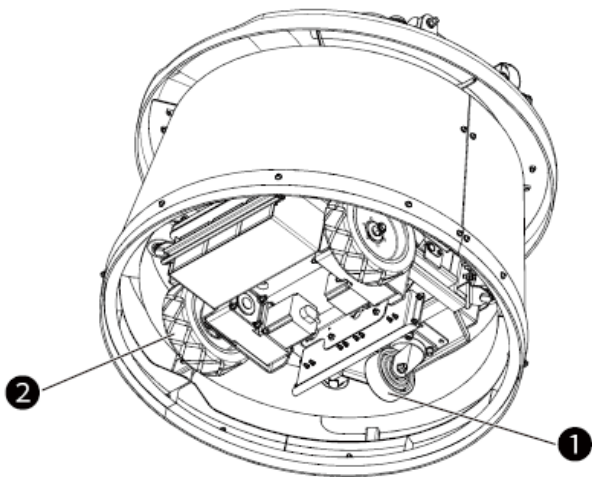
1	Top	2	Drum	3	Frame
---	-----	---	------	---	-------

Top



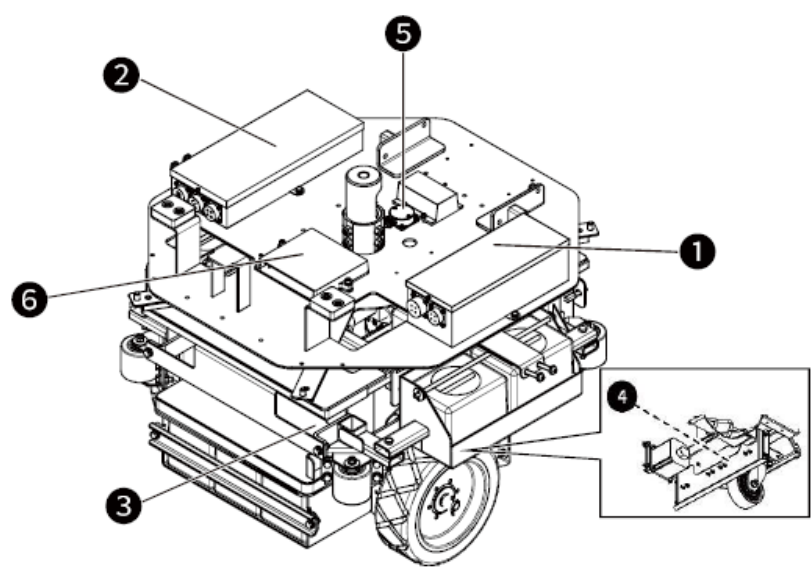
1	Top cover	2	Emergency stop button	3	Top cover opening mechanism
4	Vision box	5	Charging port	6	Nameplate
7	SN	8	Status indicator (blinks yellow when the robot is running)	9	Light

Frame



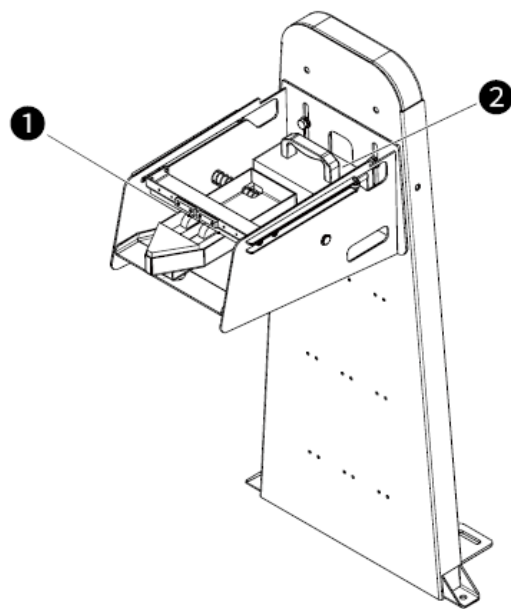
1	Front universal wheel	2	Rear drive wheel
---	-----------------------	---	------------------

Inner electrical parts



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

6.3 Charging Pile



1	Charging contact plate	2	Charger
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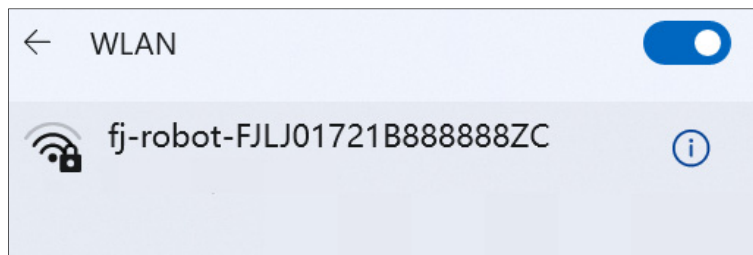
7 Software Operation

7.1 Connecting to the Robot

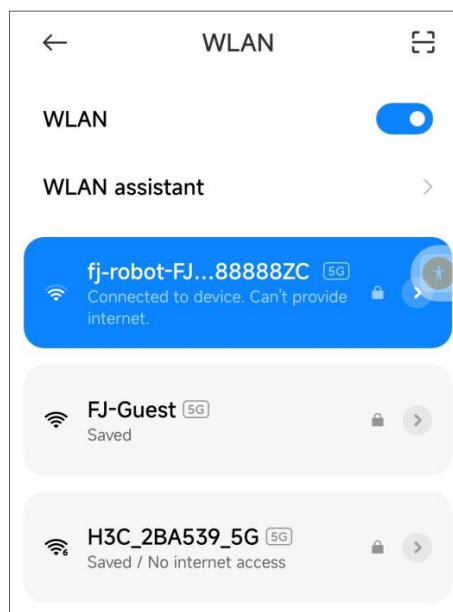
It supports major browsers such as Google Chrome, Microsoft Edge, and Firefox and is compatible with both personal computers and mobile devices.

1. Direct connection

- Find the robot Wi-Fi "fj-robot-SN" on your computer or mobile device, and enter the password 123456789 to connect to it.
 - Connecting your computer to the robot Wi-Fi:



- Connecting your mobile device to the robot Wi-Fi:



- Open a browser and enter 10.33.68.254 in the address bar to access the login screen.



Note: When logging in on a mobile device such as a mobile phone, enable the auto-rotate feature and hold the device horizontally.

tips



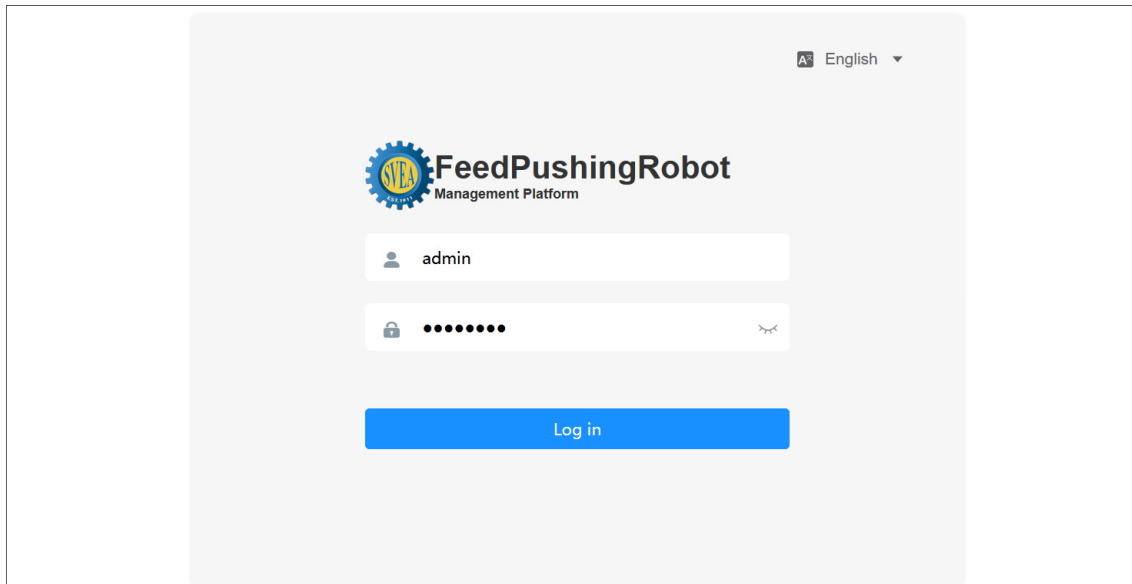
Please turn on Auto-rotate button and hold the phone horizontally.

confirm

2. Indirect connection

- Connect your computer or mobile device to the robot Wi-Fi.
- Go to **Configuration > Internet**, and connect the robot to the router via Wi-Fi connection.
- Access the backend page of the router and find the IP address of the robot "fj-robot-SN".
- Open a browser and enter the IP address in the address bar to control the robot.
- The recommended browser is Google Chrome.

7.2 Login

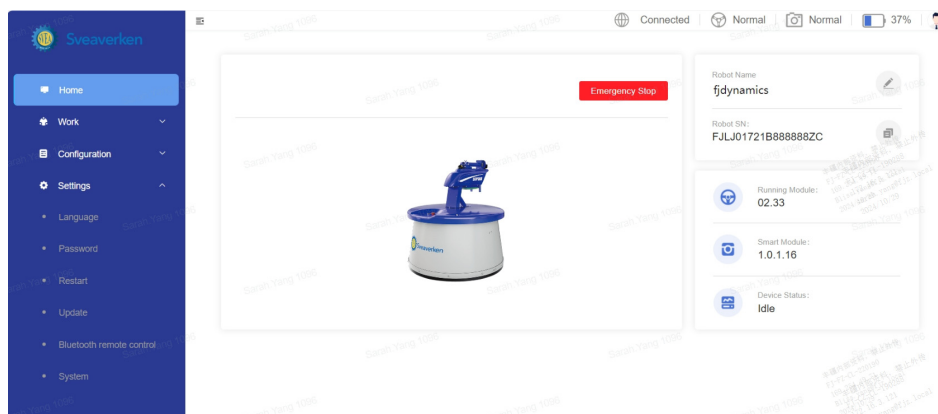


- Enter the default username "admin" and the password "svea1911".
- Click **Log In**.
- Click the language dropdown icon to change the language.

7.3 Modules

Four modules are available: **Home**, **Work**, **Configuration**, and **Settings**. Click **Home** to access the robot status screen. Click **Work** to access the task management screen. Click **Configuration** to access the configuration screen. Click **Settings** to access the system settings screen

7.3.1 Home



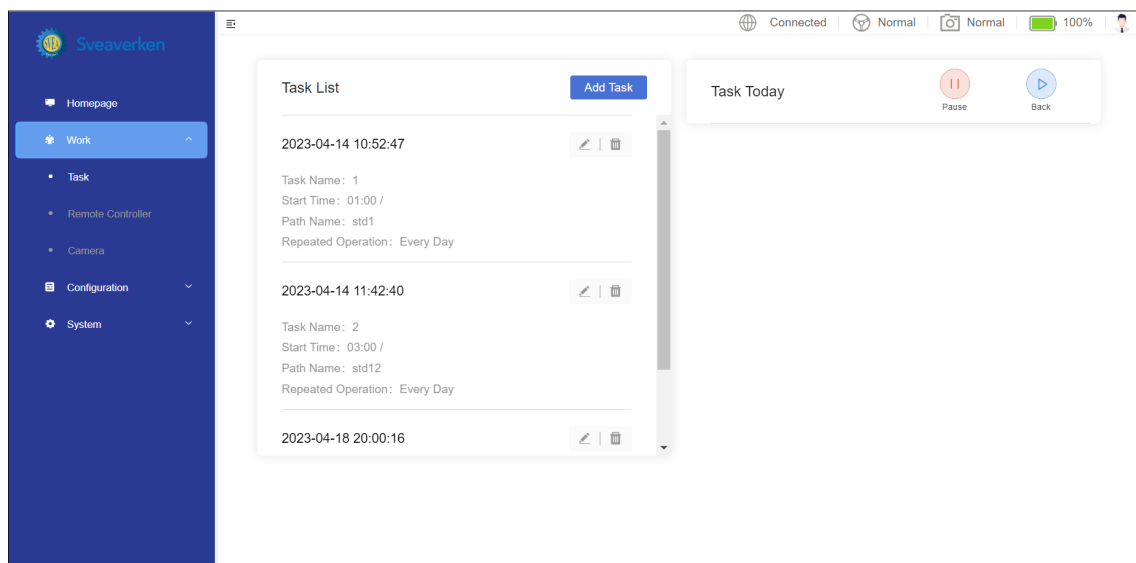
The status bar at the top shows the network status, running module status, smart module status, and battery level in real time.

Operation Status	Shows the operation details of the robot in real time.
Emergency Stop	Click Emergency Stop and then click OK on the pop-up to apply an emergency stop.
Robot Name	Click  to modify the robot name.
Robot SN	Click  to copy the robot SN.
Running Module	Shows the version No. of the running module.
Smart Module	Shows the version No. of the smart module.
Robot Status	Shows the robot status in real time, including Working , Charging , Idle , and Task Paused .

7.3.2 Work

The **Work** module consists of three parts: **Tasks**, **Remote Controller**, and **Camera**.

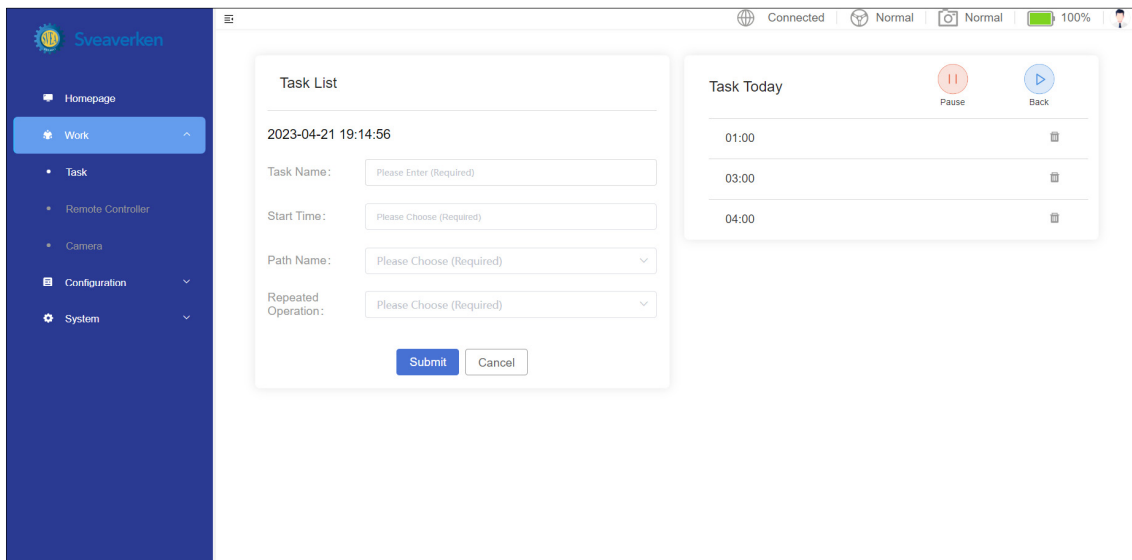
1. Tasks



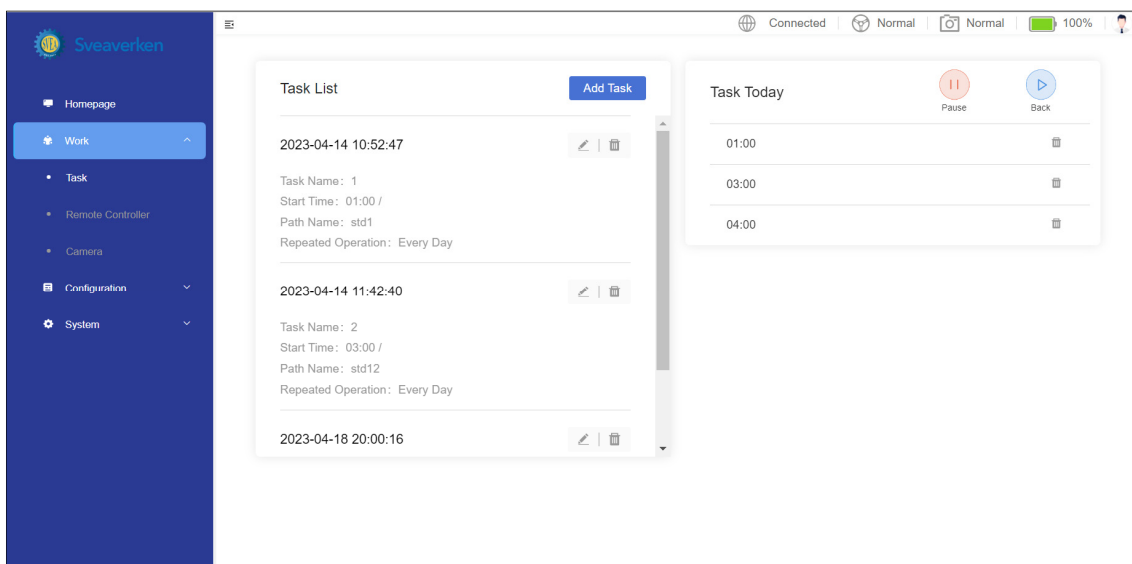
Click **Tasks** to add and manage tasks.

Adding tasks:

- Click **Add Task**.
- Set the parameters as required.
- Click **Save**.



Tasks of the current day, including its start time, status, and operation details, are displayed in **Tasks Today**.



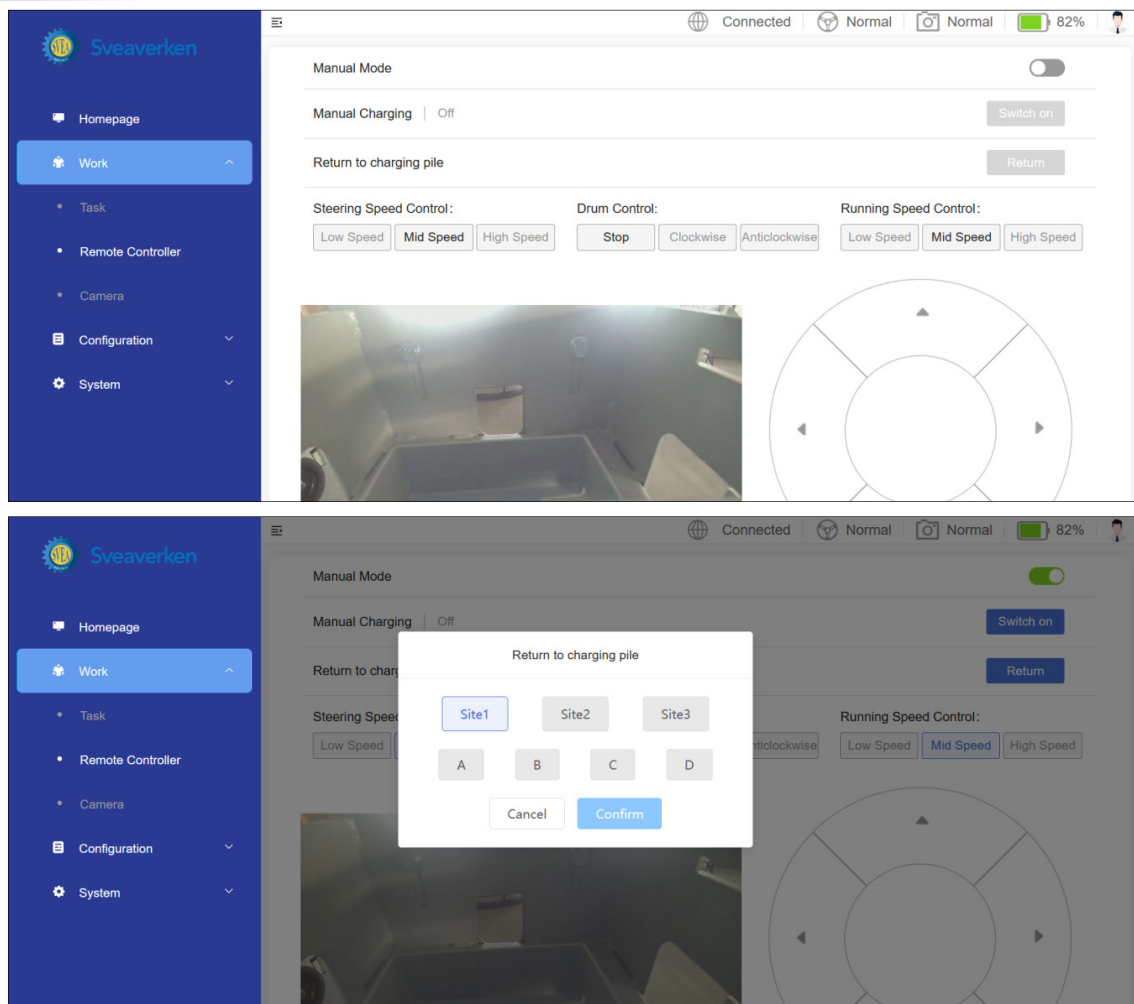
Managing tasks:

- Click  to access the edit screen.
- Modify the settings.
- Click **Save**.
- To delete a task, click  and then click **OK** on the pop-up.

Other features:

Tasks Today	If a task is in progress, you can click the camera icon on the right to view the real-time images (refer to the "Camera" section). If a task is completed, not started, canceled, or skipped, you can click the deletion icon to delete it.
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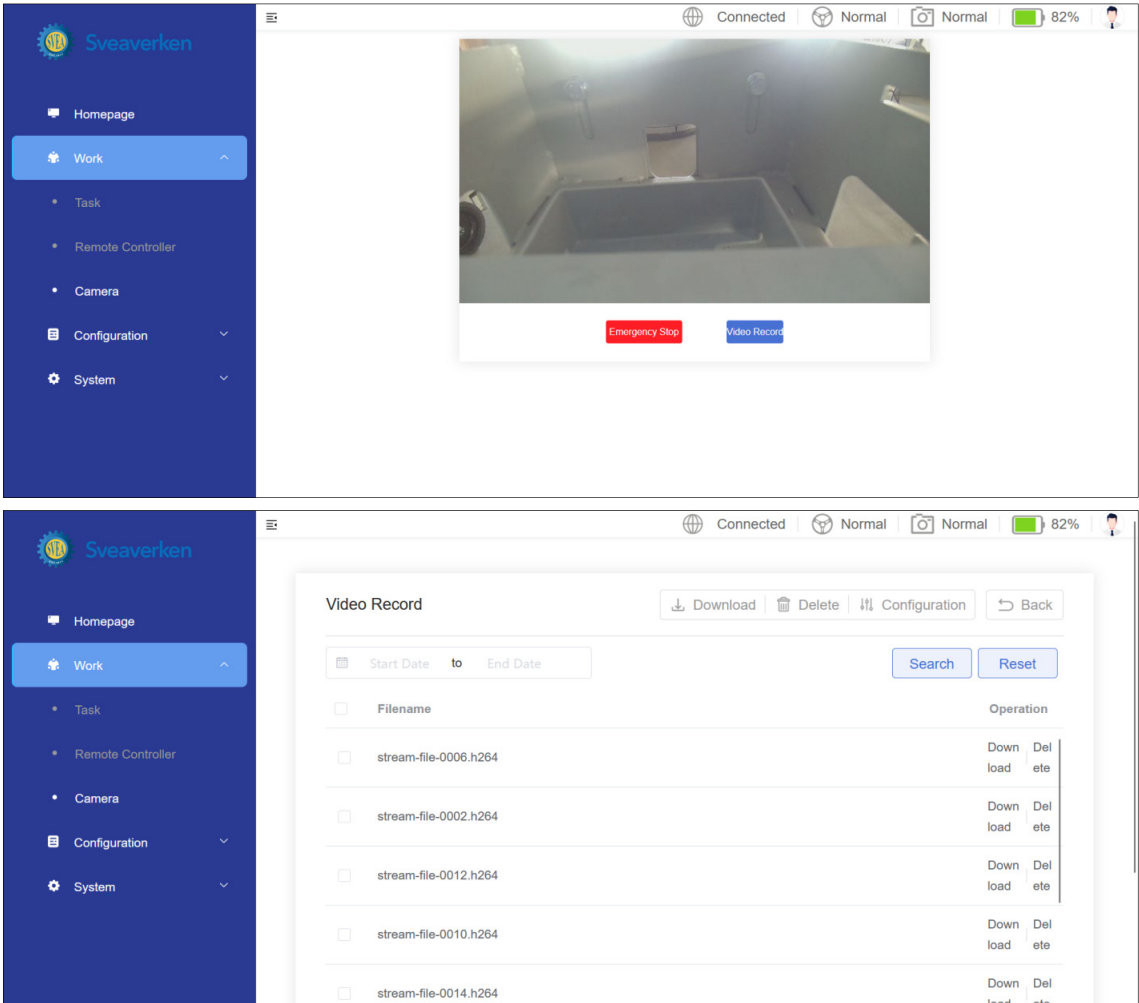
2. Remote Controller



Manual Mode	Turn on the toggle on the right to remotely control the robot. Turn off the toggle to enter the auto mode.
Direction control	Click the forward or backward button, and the robot moves forward or backward at the set speed. Click the left turn or right turn button, and the robot turns accordingly.
Speed control	Set the speed to Low , Medium , or High , and the robot slows down or speeds up accordingly.
Battery level icon	In green when the battery level is $\geq 80\%$, in blue when $80\% > \text{battery level} \geq 35\%$, in orange when $35\% > \text{battery level} \geq 15\%$, and in red when the battery level is $< 15\%$.
Manual Charging	Click Enable . When it shows Enabled on the right of Manual Charging , the electrodes extend out for charging. When it shows Disabled , the electrodes retract.
Return for	Click Return Now , select a site and a point on the pop-up, click OK , and then

Charging	the robot automatically returns to the charging pile for charging. For example, if you select Site 2 and point C , the robot returns to the charging pile along the abn2c path preset in Configuration > Path .
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3. Camera



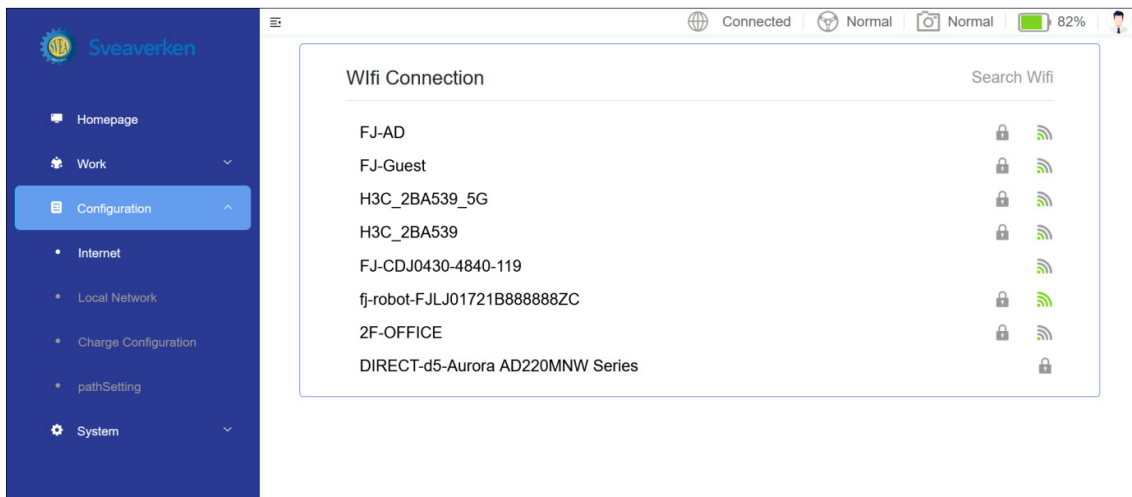
The camera screen displays real-time images. When there is no signal, a black screen is displayed.

Emergency Stop	Click Emergency Stop and then click OK on the pop-up to stop the robot.
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7.3.3 Configuration

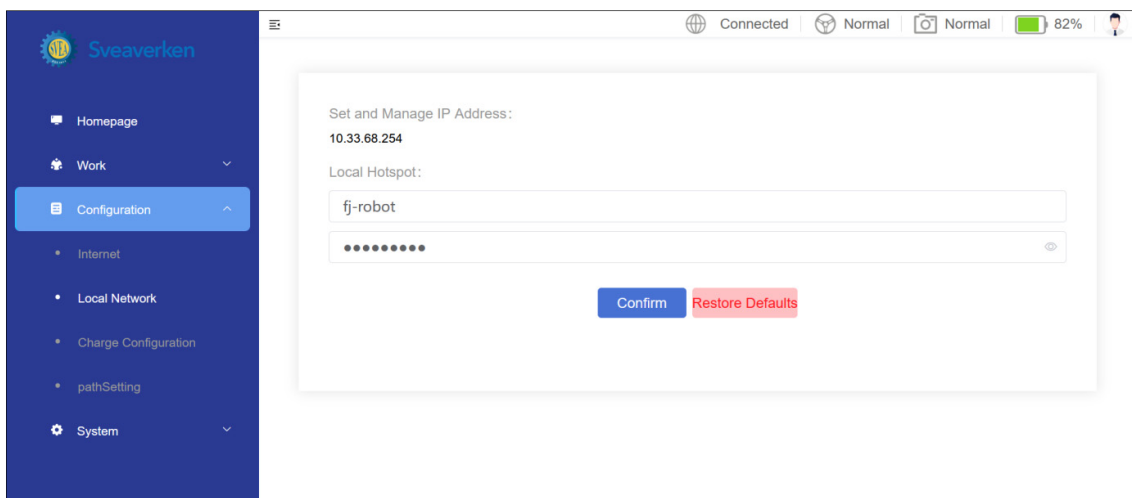
The **Configuration** module consists of four parts, **Internet**, **Local Network**, **Charging**, and **Path**.

1. Internet



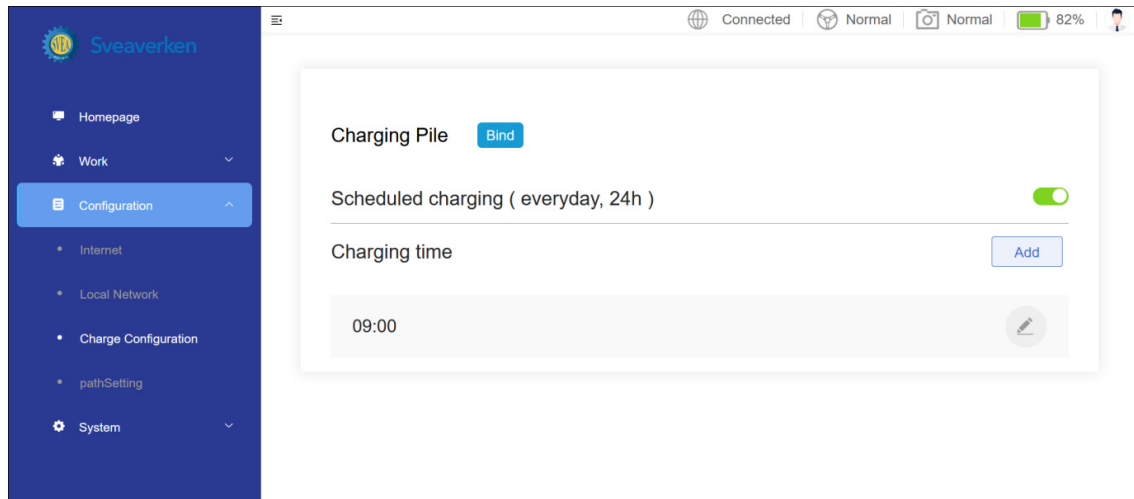
- The robot accesses the Internet through Wi-Fi.
- Enter the correct password to connect to the Wi-Fi network. The Wi-Fi networks that you have connected to and their passwords are saved so they can be connected automatically next time.

2. Local Network



- On the **Local Network** screen, you can change the hotspot name and password of the robot.
- Click **OK** to make the change take effect. Otherwise, the previous name and password are restored after you leave this screen.
- Click **Restore Defaults** and then click **OK** on the pop-up to restore the factory settings.

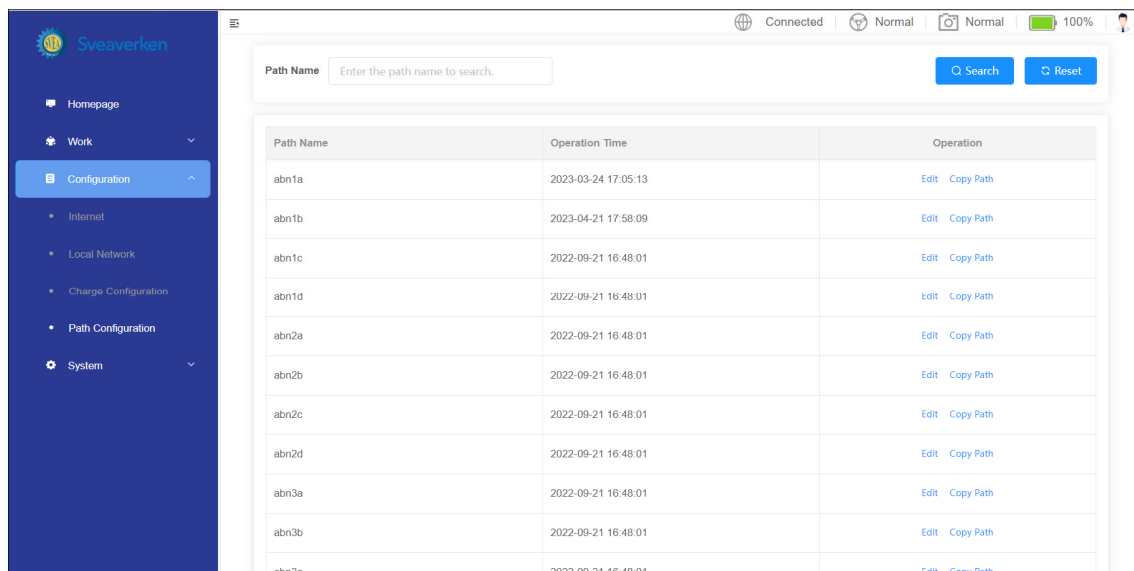
3. Charging



- On the **Charging** screen, you can set the robot charging time (24-hour clock). When the charging time arrives, the robot stops the operation and returns to the charging pile to charge the battery for two hours. The timed charging feature is disabled by default.
- Use the toggle switch to enable or disable the timed charging feature.
- Click **Add** to add charging timepoints.

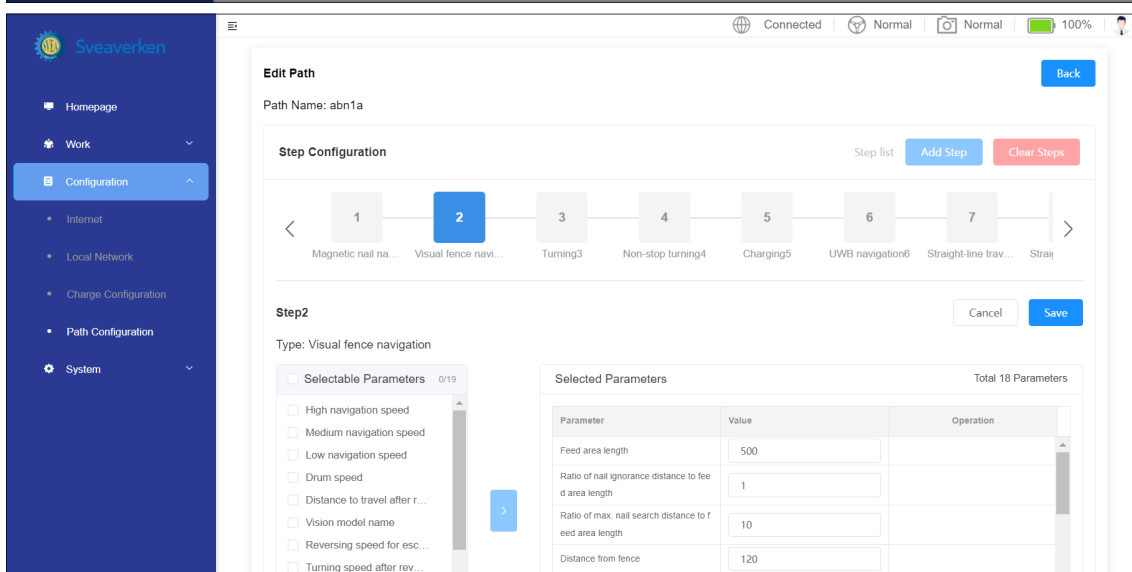
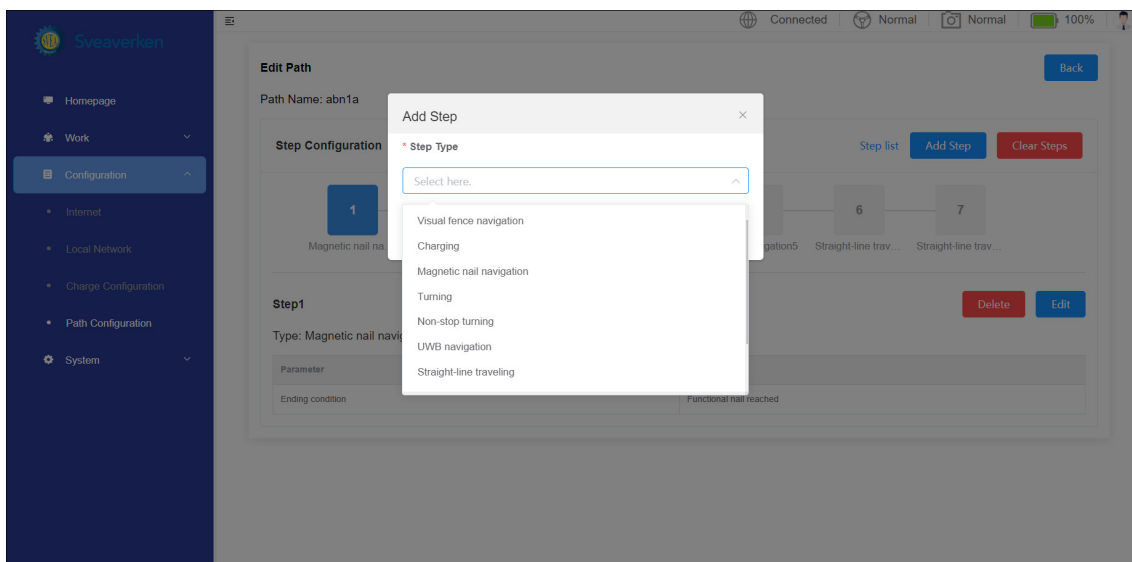
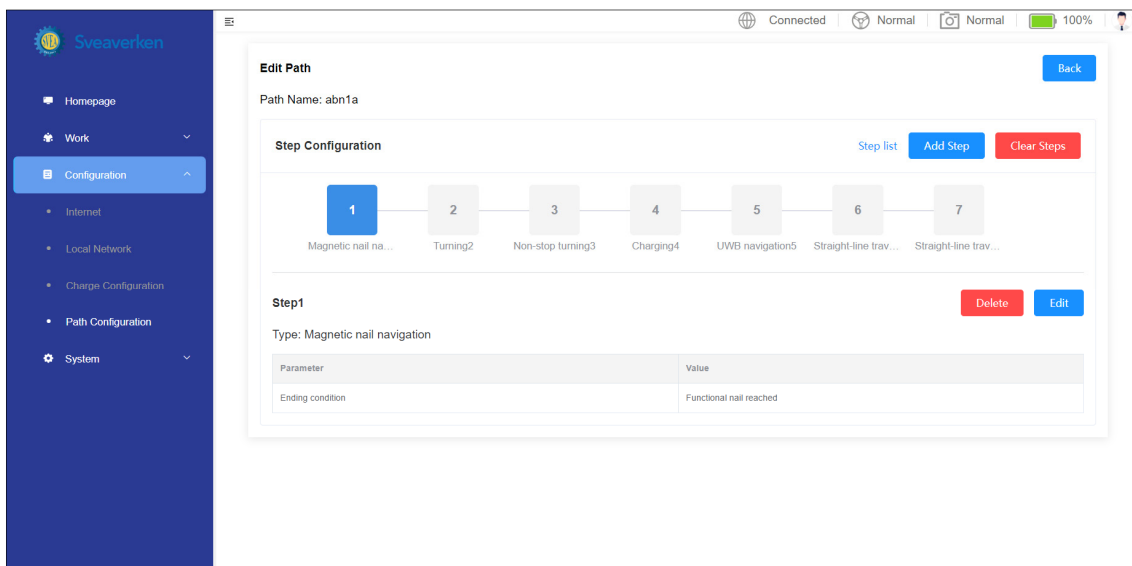
4. Path

- On the **Path** screen, you can edit the paths. The names correspond to different feeding paths.
- Enter a path name in the search box and click **Search** to search for matching paths.
- Click **Reset** to clear the search criterion and show all paths.
- The **Operation Time** indicates when a path is last edited.



5. Edit Path

- Click **Edit** to edit a path by steps.



- All steps on a path are displayed in the **Step Configuration** area.
- Click **Add Step** and select a step type, which can be **Visual fence navigation**, **Charging**, **Magnetic nail navigation**, **Turning**, **Non-stop turning**, **Straight-line traveling**, **QR code**

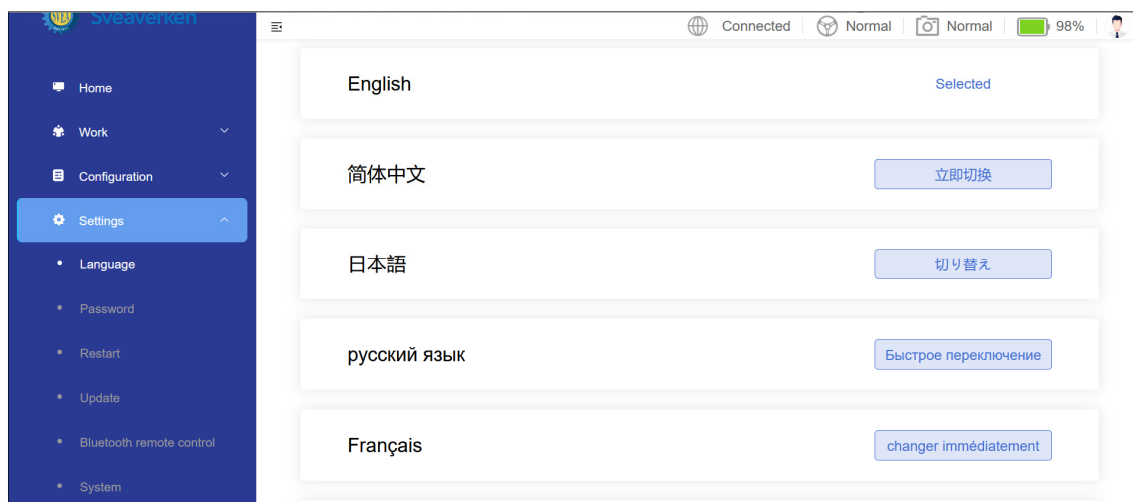
navigation, or **Wall-following navigation**.

- Configure the selected parameters and click **Save** to add the step into the path. You can add other parameters from the **Selectable Parameters** column based on the site requirements.
- Click **Clear Steps** to remove all the steps.
- Select a step to view the configuration and edit or delete it.
- Click **Delete** to delete the selected step.
- Click **Edit** to edit the selected step and click **Save** to make the modification take effect.

7.3.4 Settings

The **Settings** module consists of five parts, **Language**, **Password**, **Restart**, **Update**, and **System**.

1. Language

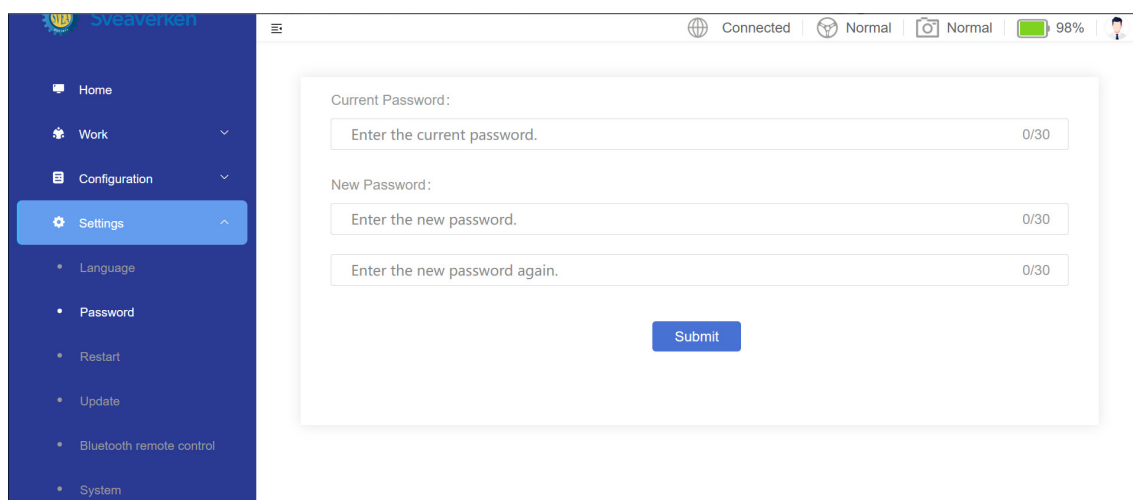


All supported languages are listed on this screen. To change the language, click **Select** next to the target language.



Note: Supported languages are constantly updated.

2. Password



The procedure for changing the password is as follows:

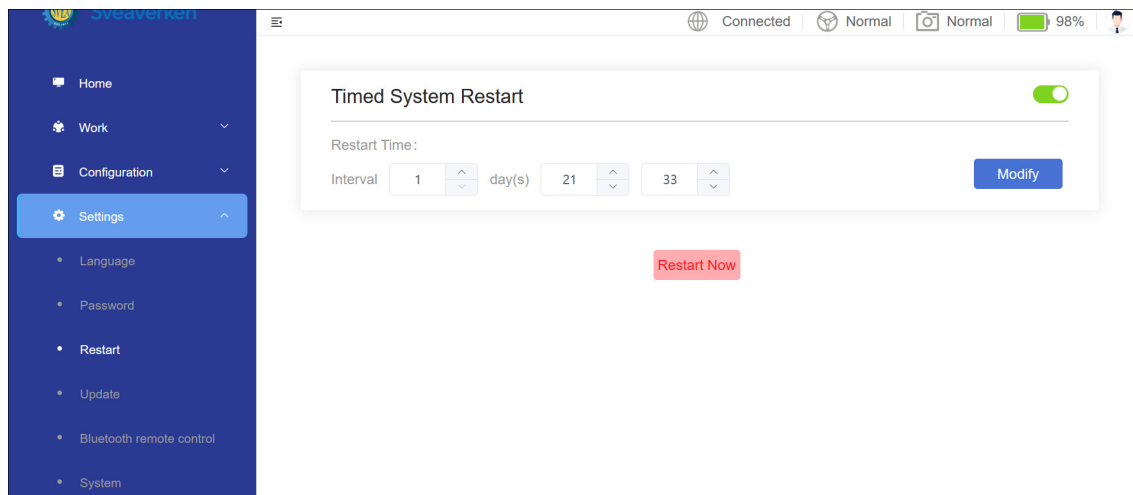
- Enter the current password.

- Enter the new password twice.
- Click **Submit**.



Note: The new password must contain 6 to 30 numbers or letters.

3. Restart



Timed system restart is disabled by default. The area for setting the restart time is hidden when the feature is disabled and shown when the feature is enabled. After enabling timed system restart, perform the following operations:

- Select the interval and time of system restart.

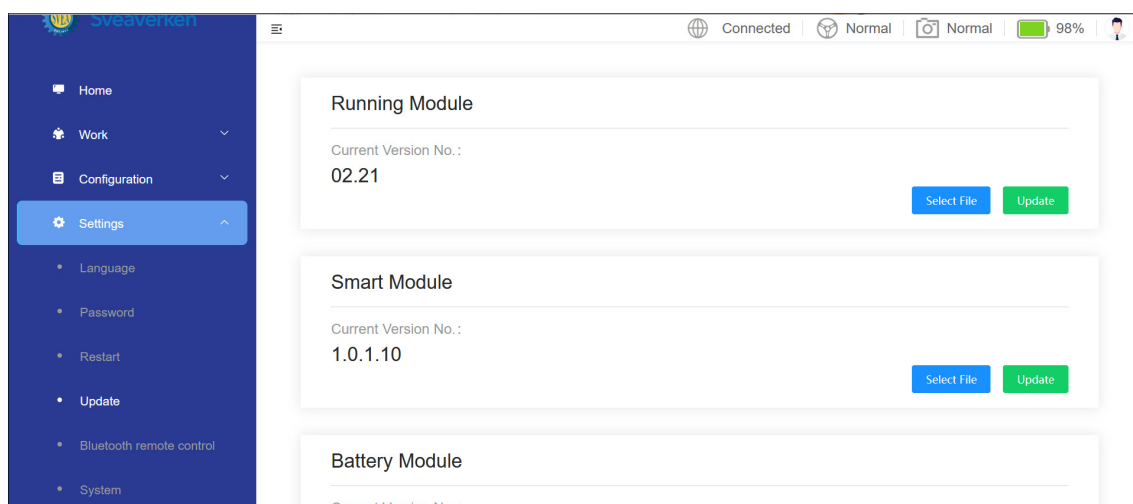


Note: The default restart time is 5:00 AM every day. You can modify the interval and time of system restart, and the maximum interval is three days.

- Click **Modify** to make the settings take effect. Otherwise, the previous settings are restored after you leave this screen.

To restart the system immediately, click **Restart Now** and then click **OK** on the pop-up.

4. Update (no user action required)



Before an update, an update package needs to be uploaded.

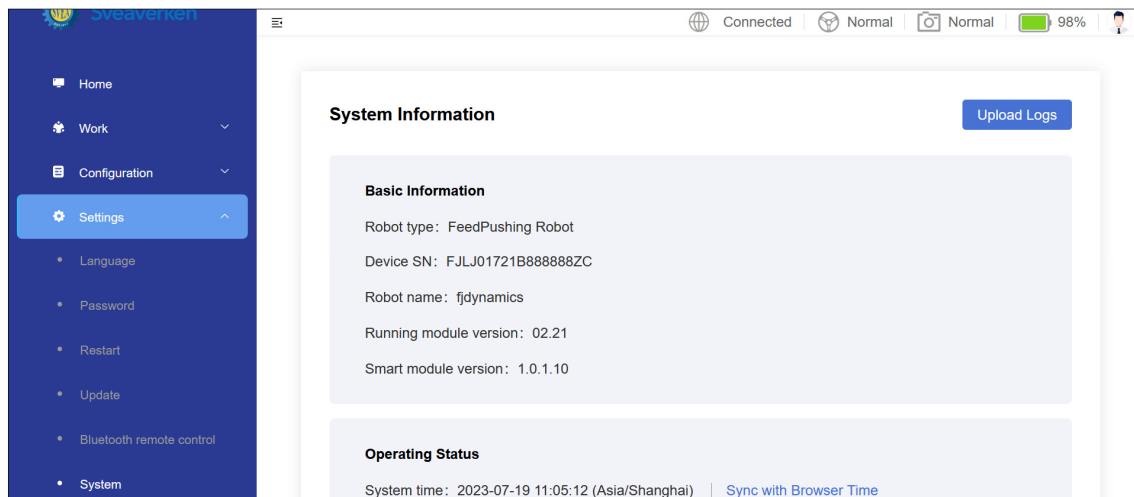
- Click **Select File** and select the update package.

- Click **Update**, and a message appears after successful update.



Note: The file size cannot exceed 10 MB.
An incorrect package uploaded can be deleted.

5. System



The basic information, operating status, local network, and external network of the robot are displayed on this screen.

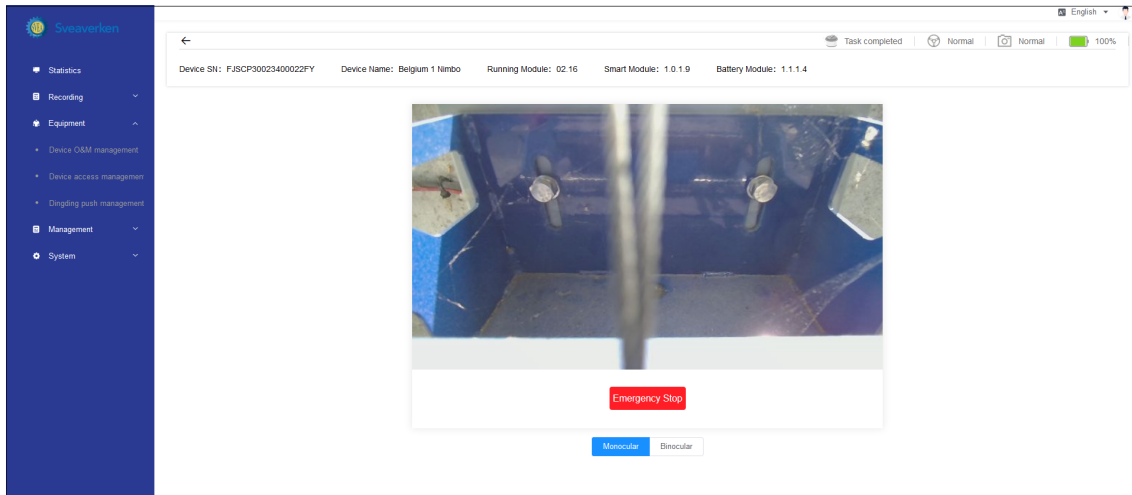
7.3.5 Remote Monitoring Module

Choose **Equipment** > **Device O&M Management**, and you can perform actions on each robot.

The available features include **Camera**, **Remote Control**, **Task Management**, **Device Management**, **Parameter Settings**, and **Video Settings**.

Device SN & Name	Activation status	Online status	Device status	Model	Camera status	Firmware Ver.	FAE	Update time	Note	Operation
FJSCP3002340022FY Belgium 1 Nimbo	Activated	Online	Charging	物料机器人A3_mini	Normal	Running Module: 0.2.16 Smart Module: 1.0.1.9 Battery Module: 1.1.4	13011110002.kristof	2023-07-04 17:09:23	比利時1号机—Kristof	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove
FJLJ01722600002812C Brazil 1	Activated	Online	Charging	物料机器人A1_2nd	Normal	Running Module: 0.0.118 Smart Module: 1.0.0.11	13011110002.engenharia	2023-07-04 17:09:21	巴西1号机—Rodrigo	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove
FJLJ0172240001302C Uruguay 2	Activated	Online	Working	物料机器人A1	Normal	Running Module: 0.0.117 Smart Module: 1.0.0.39	17558886609.femur.schoneschiesky	2023-07-04 17:09:16	乌拉圭2号机—Alejandra	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove
FJLJ0172250001482C Estonia 1	Activated	Online	Task completed	物料机器人A1_2nd	Normal	Running Module: 0.0.118 Smart Module: 1.0.0.7	17558886609.heiti.inal.mikhail.morgunov	2023-07-04 17:09:16	爱沙尼亚1号机—Heiti	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove
FJLJ0172250001502C Czech Republic (new)	Activated	Online	Working	物料机器人A1_2nd	Normal	Running Module: 0.3.02 Smart Module: 1.0.0.7	17558886609	2023-07-04 17:09:17	捷克新设备—Patrik	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove
FJLJ0172250001552C Estonia 2	Activated	Online	Task completed	物料机器人A1_2nd	Normal	Running Module: 0.0.118 Smart Module: 1.0.0.7	17558886609.1301110001.heiti.inal.mikhail.morgunov	2023-07-04 17:09:18	爱沙尼亚2号机—Heiti	Camera RemoteControl TaskManagement DeviceManagement Parameter settings Video Settings Remove

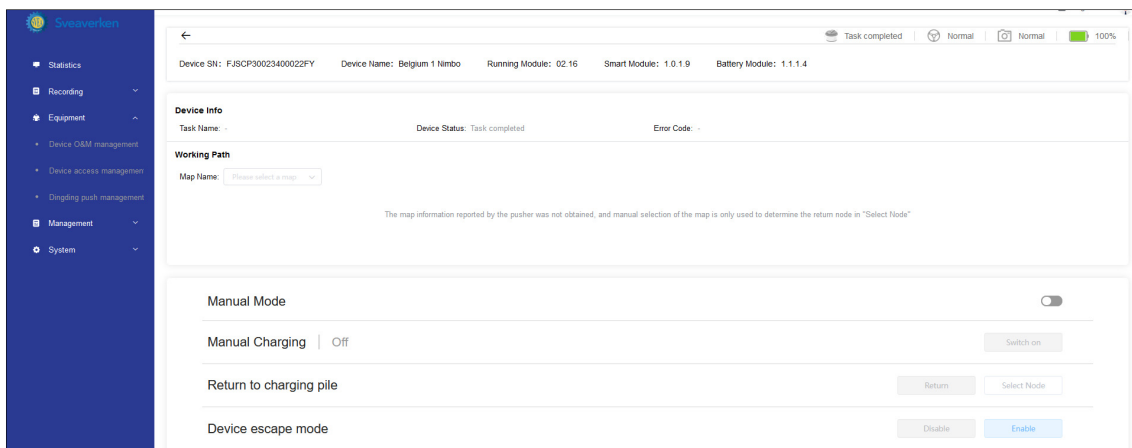
1. Camera

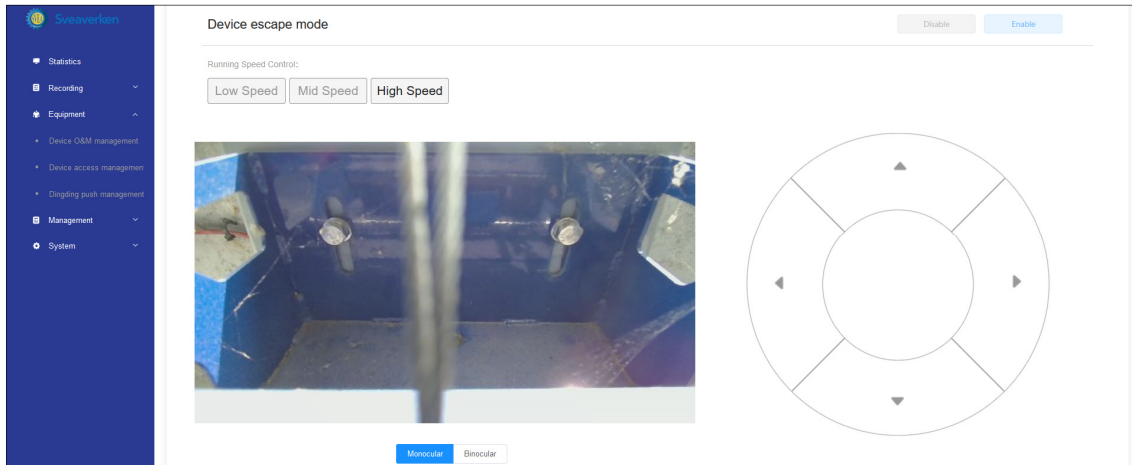


Find the target robot and click **Camera**, and the system displays the live camera image of that robot. When the camera signal is lost, the system shows a black screen.

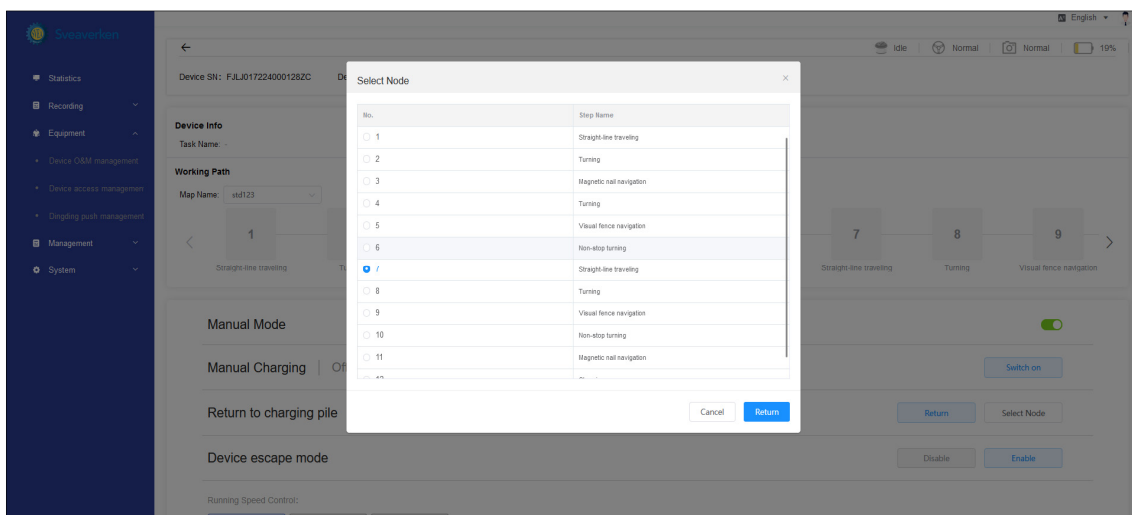
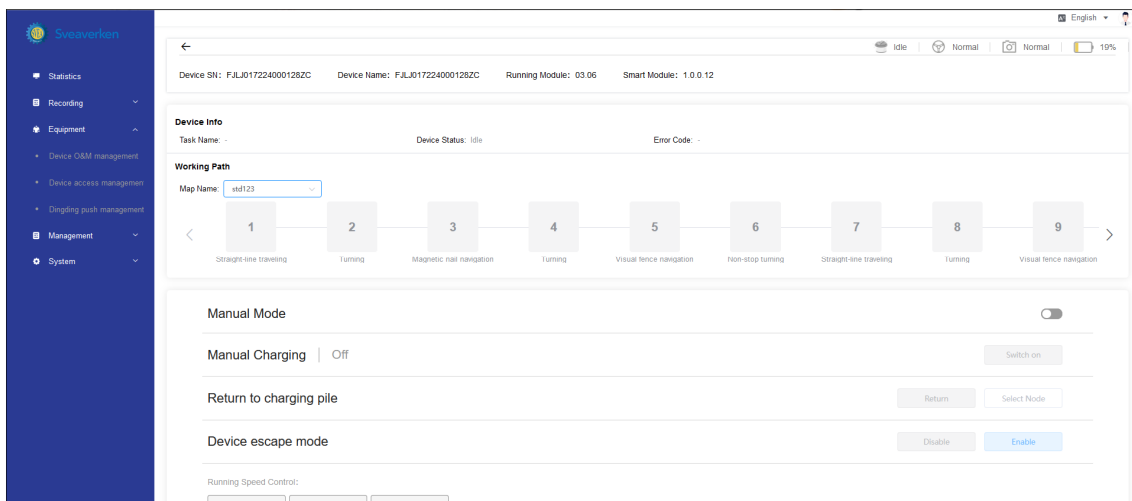
Emergency Stop	In case of an emergency, click Emergency Stop and confirm the operation in the popup to stop the robot.
Monocular mode	Select Monocular to show the image of the monocular camera in the front of the robot.
Binocular mode	Select Binocular to show the image of the binocular camera on top of the robot.

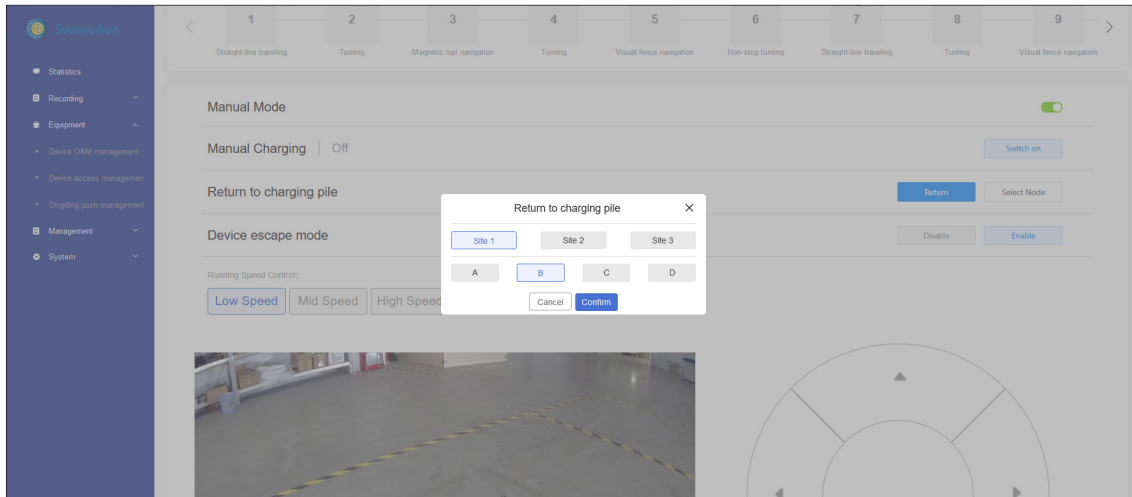
2. Remote Control





Find the target robot, and click **Remote Control** to control the robot remotely, check the robot parameters and maps, switch to the manual mode or auto mode, charge the robot manually, return the robot for charging, enable or disable the escape mode, and change the robot speed.





Manual Mode	Turn on the Manual Mode toggle to enable the manual mode. The toggle turns green, and you can control the robot remotely. Turn off the toggle to switch back to the auto mode, and the toggle turns grey.
Direction control	Click the up or down button, and the robot moves forward or backward at the set speed. Click the left or right button to turn the robot left or right.
Speed control	Set the speed to Low , Medium , or High , and the robot slows down or speeds up accordingly.
Battery level icon	Green: battery level $\geq 80\%$; blue: $80\% > \text{battery level} \geq 35\%$; orange: $35\% > \text{battery level} \geq 15\%$; red: battery level $< 15\%$.
Manual Charging	Click Switch on , and the charging starts when Switch on appears on the right.
Select Node	Select a map from the drop-down list, choose Select Node for Return for Charging , and select a point. Then, the robot navigates through the remaining path after the selected point (including the selected point).
Return for Charging	Click Return Now , select a site and a point on the popup, click Confirm , and then the robot automatically returns to the charging pile for charging. For example, if you select Site 2 and point C , the robot returns to the charging pile along the abn2c path.
Escape Mode	Click Enable or Disable to enable or disable the escape mode. The clicked button turns blue, and the other button turns grey.

3. Task Management

The screenshot shows the TaskManagement interface. At the top, there's a header with a back arrow, status icons (Task completed, Normal, Normal, 100%), and device information: Device SN: FJSCP30023400022FY, Device Name: Belgium 1 Nimbo, Running Module: 02.16, Smart Module: 1.0.1.9, Battery Module: 1.1.1.4. Below this is a table of tasks with columns: Task Name, Start time, Path Name, Repeated Operation, Distance from the Fence, and Operation. The tasks listed are: test (15:02 /, std2, Only Once, 150, Modify, Delete), bam2_night (20:20 / 22:20 / 00:20 / 02:20 / 04:20 / 06:20 / 08:20 /, std3, Every Day, Default, Modify, Delete), bam2 (12:20 / 14:20 / 16:20 / 18:20 /, std3, Every Day, Default, Modify, Delete), bam1_night (20:00 / 22:00 / 00:00 / 02:00 / 04:00 / 06:00 / 08:00 /, std2, Every Day, Default, Modify, Delete), and bam1 (12:00 / 14:00 / 16:00 / 18:00 /, std2, Every Day, Default, Modify, Delete). Below the table is a 'DailyTask List' section with a table showing Task Name, Path Name, and Start time (local time): bam2_night (std3, 22:20) and bam1_night (std2, 22:00).

Find the target robot, and click **Task Management** to modify and manage the tasks of the robot.

Add a task:

- Click **Add**, and a popup appears.
- Set the task name, start time, path name, repetition, and distance from the fence.
- Click **Confirm** to save the settings and create the task.

This screenshot shows the TaskManagement interface with the 'Add Task' popup open. The popup has fields for Task Name (Please enter (required)), Start time (Please select (required)), Path Name (Please select (required)), Repeated Operation (Please select (required)), and Distance from the Fence (optional, enter 100-150cm). There are 'Cancel' and 'Confirm' buttons at the bottom. The background shows the same task list as the previous screenshot, but with different values: test (15:02 /, std1, Only Once, 130, Modify, Delete), charging (22:30 /, std1, Every Day, 130, Modify, Delete), milking (22:30 /, std1, Every Day, 130, Modify, Delete), and feed (21:40 /, std1, Every Day, 130, Modify, Delete).

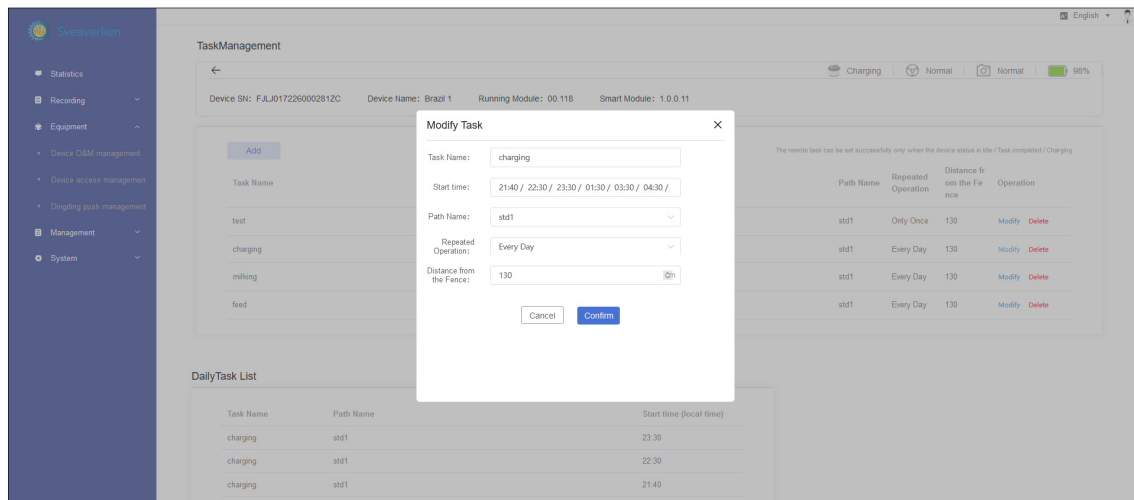
This screenshot shows the TaskManagement interface with the 'Add Task' popup open. The popup has fields for Task Name (11), Start time (00:00 /), Path Name (std1), Repeated Operation (Every Day), and Distance from the Fence (150). There are 'Cancel' and 'Confirm' buttons at the bottom. The background shows the same task list as the previous screenshot, but with different values: test (15:02 /, std1, Only Once, 130, Modify, Delete), charging (22:30 /, std1, Every Day, 130, Modify, Delete), milking (22:30 /, std1, Every Day, 130, Modify, Delete), and feed (21:40 /, std1, Every Day, 130, Modify, Delete).



Note: Do not modify the task or map when the task is being executed.
A maximum of five tasks are allowed in the system.

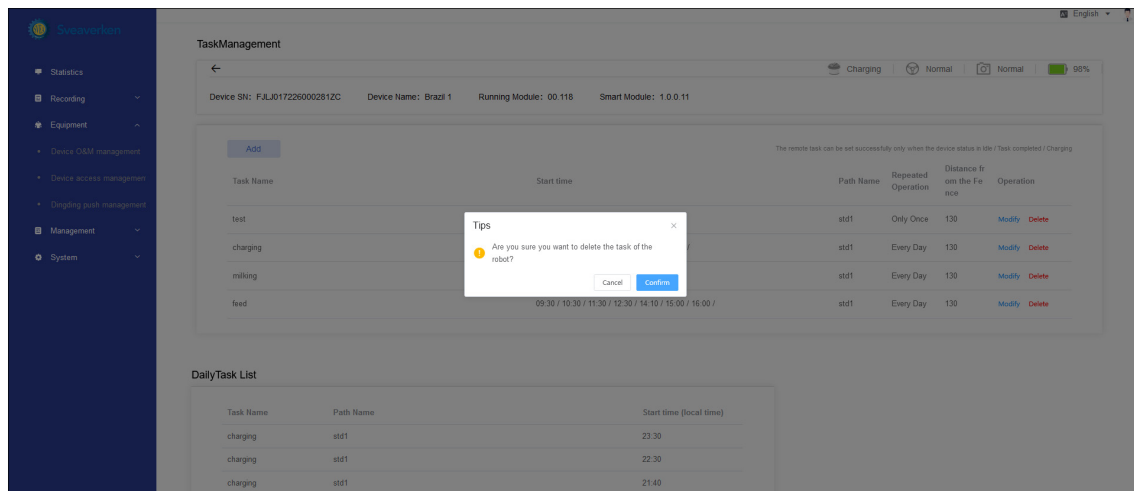
Modify a task:

- Find the target task and click **Modify**, and a popup appears.
- Modify the task name, the start time, the path name, repetition, and distance from the fence.
- Click **Confirm** to save the settings.



Delete a task:

- Find the task and click **Delete**, and a popup appears for confirmation.
- To confirm the operation and delete the task, click **Confirm**. Otherwise, click **Cancel** to cancel the operation.



Daily Tasks:

- Scroll down to show the task list. The list shows the task name, the path, and the start time of each task.

DailyTask List		
Task Name	Path Name	Start time (local time)
charging	std1	23:30
charging	std1	22:30
charging	std1	21:40
milking	std1	20:15
milking	std1	19:15
milking	std1	18:15
feed	std1	16:00
feed	std1	15:00
feed	std1	14:10
feed	std1	12:30
feed	std1	11:30
feed	std1	10:30
feed	std1	09:30
charging	std1	04:30

4. Device Management

Find the target robot and click **Device Management** to update or restart the robot at set time or immediately.

Modify:

- Click **Firmware OTA**, select an update package, and click **Confirm**.
- Modify the device name and the remarks as required.
- Click **Save** to save the changes and start the update.