

**LF01** 

# **RoboPusher Nimbo Plus**

**User Manual** 

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#### **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.

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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.

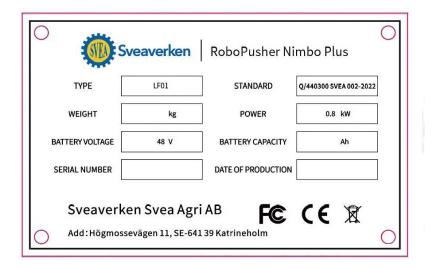
# 2.2 Overview

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.

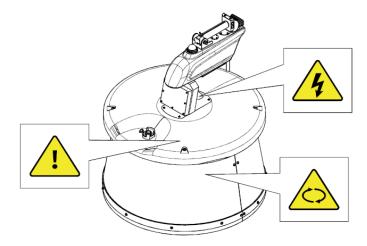
# 3.3 Maintenance Safety

- 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

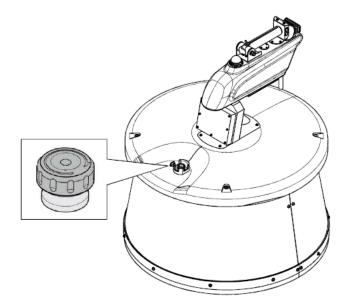


Position of safety signs



## **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; φ250 mm×80 mm		
Roller lifting function		Yes		
Wheel motor	Number	2		
wheel motor	Power	400 W		
	Туре	Lithium battery		
Battery	Rated voltage	48 V		
	Capacity	40 Ah		
	Input voltage	110-245VAC		
Chargor	Input frequency	45 Hz/65 Hz		
Charger	Output voltage(Max)	58.8 VDC		
	Output current	10 A		
Camera	FOV	Horizontal: 87.51°; vertical: 47.58°		
Calliela	Sensor	2 megapixels; 1/2.8; 1,080p@30fps		

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**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.

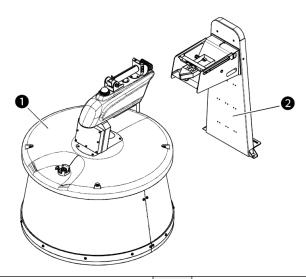
# **5 Robot Information**

No.	Item	Designed Value
1	Product Name	RoboPusher Nimbo Plus
2	Model	LF01
3	Feed pushing method	By rotating the drum
4	Dimensions	Ф1,080×1,120 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**

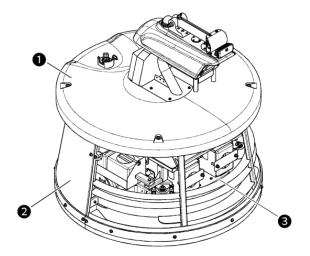
**Note:** Figures in this chapter are only for reference. Do not open the top cover or the drum without authorization. Contact your dealer or the technical personnel of Sveaverken if such operations are required.

# 6.1 Assembly

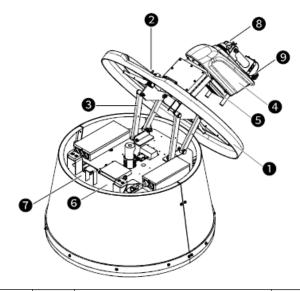


1	Feed pushing robot	2	Charging pile
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# **6.2 Feed Pushing Robot**

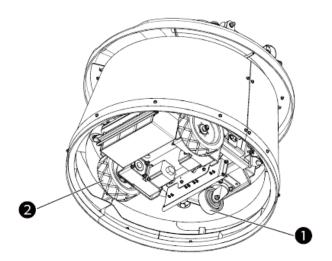


# Тор



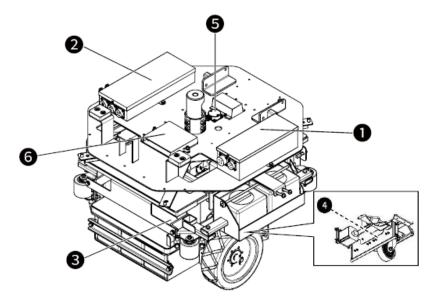
1	Top cover	2	Emergency stop button	3	Top cover opening mechanism
4	Vision box	5	Charging port	6	Nameplate
7	SN	8	Status indicator (blinks yellow when the robot is running)	9	Light

# Frame



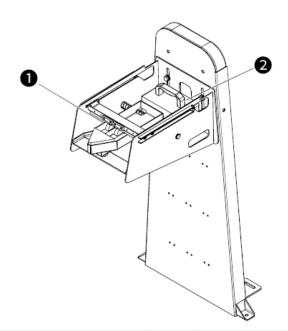
1	Front universal wheel	2	Rear drive wheel

# 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

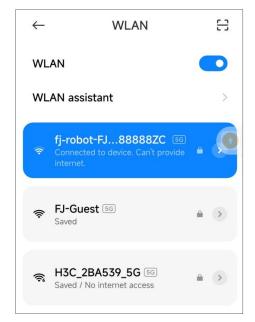
It supports major browsers such as Google Chrome, Microsoft Edge, and Firefox and is compatible with both personal computers and mobile devices.

#### 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:

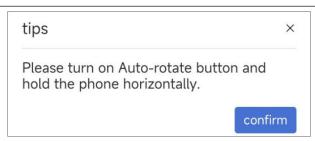


· Connecting your mobile device to the robot Wi-Fi:



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

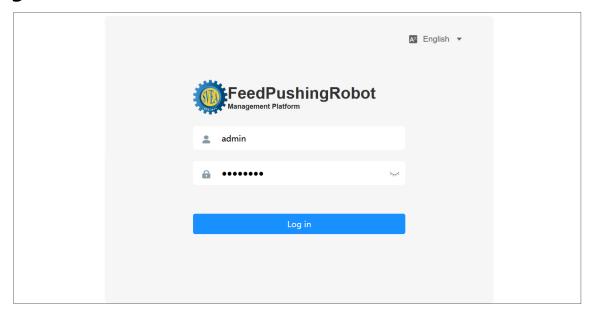
Note: When logging in on a mobile device such as a mobile phone, enable the autorotate feature and hold the device horizontally.



### 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

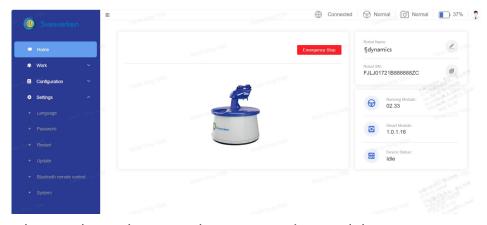


- Enter the default username "admin" and the password "svea1911".
- · Click Log In.
- Click the language dropdown icon to change the language.

# 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



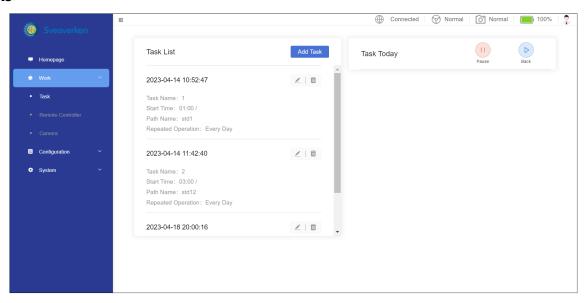
The status bar at the top shows the network status, running module status, smart module status, and battery level in real time.

Operation Status	Shows the operation details of the robot in real time.		
Emergency	Click <b>Emergency Stop</b> and then click <b>OK</b> on the pop-up to apply an emergency		
Stop	stop.		
<b>Robot Name</b>	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 <b>Working</b> , <b>Charging</b> , <b>Idle</b> , and <b>Task Paused</b> .		

# 7.3.2 Work

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

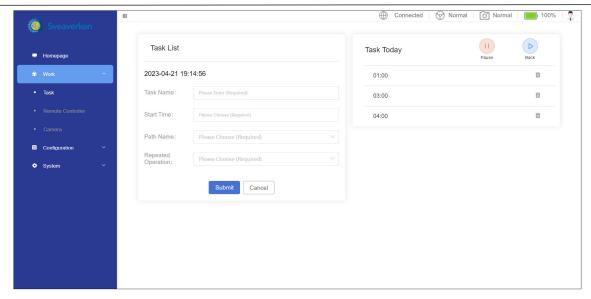
## 1. Tasks



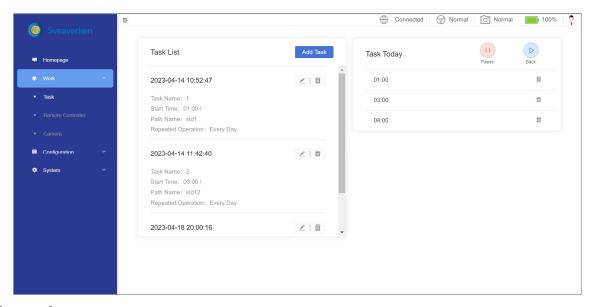
Click Tasks to add and manage tasks.

# **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:

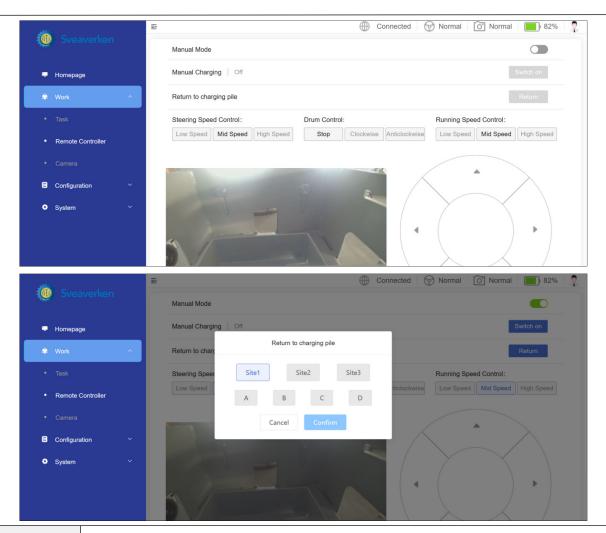
- Click to access the edit screen.
- Modify the settings.
- · Click Save.
- To delete a task, click and then click **OK** on the pop-up.

### 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.

## 2. Remote Controller

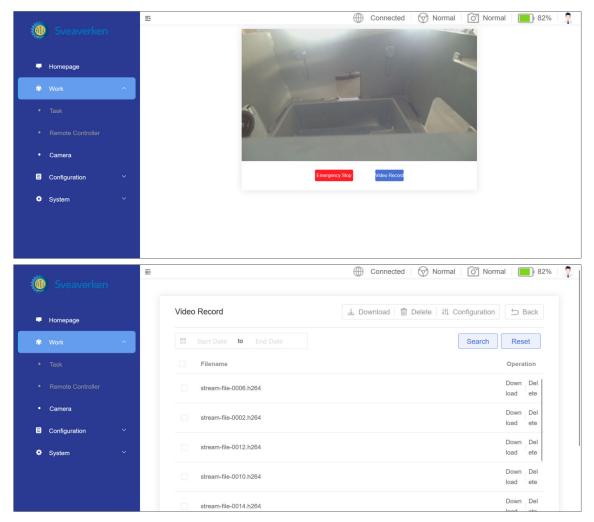


Manual Mode	Turn on the toggle on the right to remotely control the robot. Turn off the toggle to enter the auto mode.
Direction control	Click the forward or backward button, and the robot moves forward or backward at the set speed. Click the left turn or right turn button, and the robot turns accordingly.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

#### 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.

# 7.3.3 Configuration

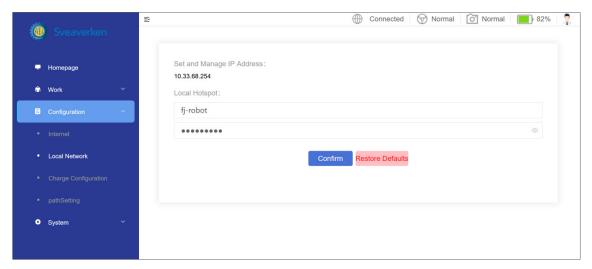
The Configuration module consists of four parts, Internet, Local Network, Charging, and Path.

### 1. Internet



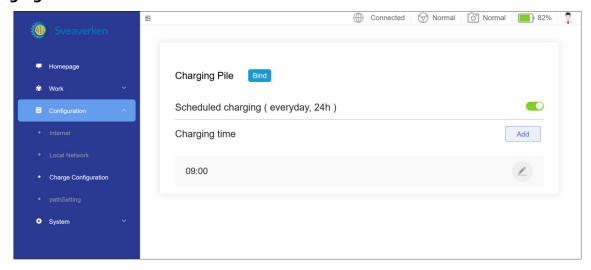
- The robot accesses the Internet through Wi-Fi.
- Enter the correct password to connect to the Wi-Fi network. The Wi-Fi networks that you have connected to and their passwords are saved so they can be connected automatically next time.

#### 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.

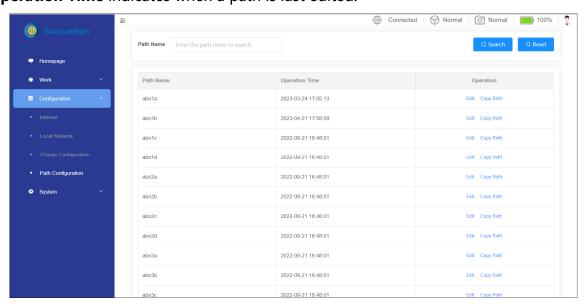
## 3. Charging



- 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.

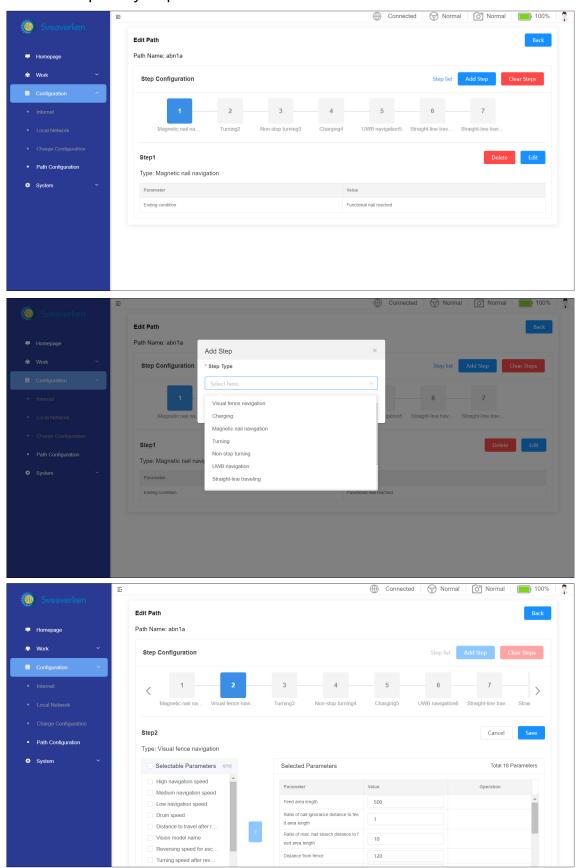
#### 4. Path

- 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.

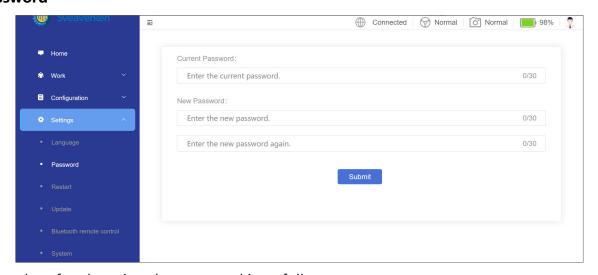
# 1. Language



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

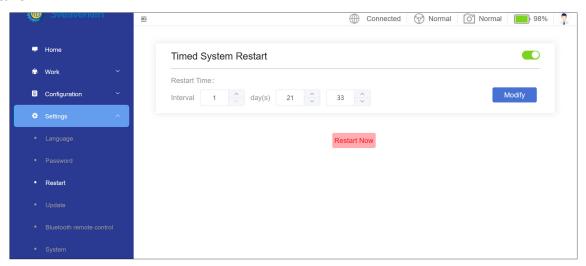


The procedure for changing the password is as follows:

• 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

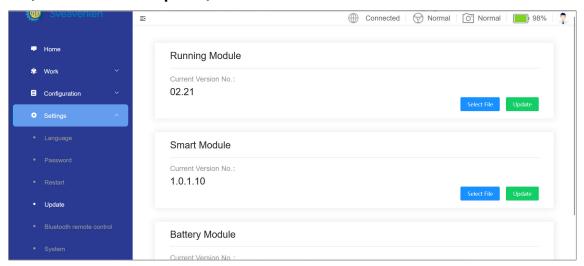


Timed system restart is disabled by default. The area for setting the restart time is hidden when the feature is disabled and shown when the feature is enabled. After enabling timed system restart, perform the following operations:

- 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.

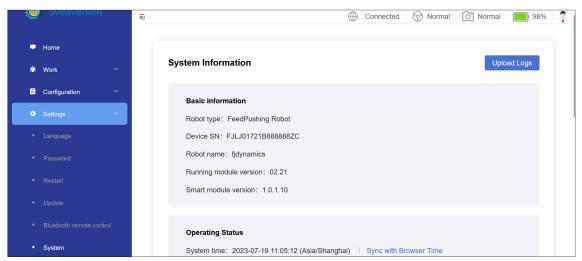
• Click **Update**, and a message appears after successful update.

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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.

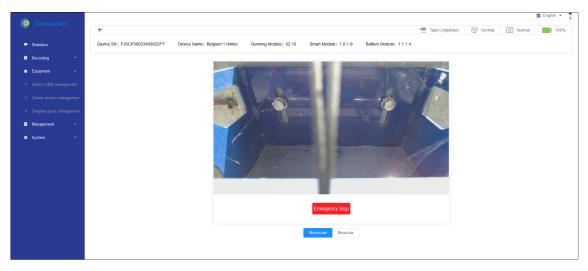
# 7.3.5 Remote Monitoring Module

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.



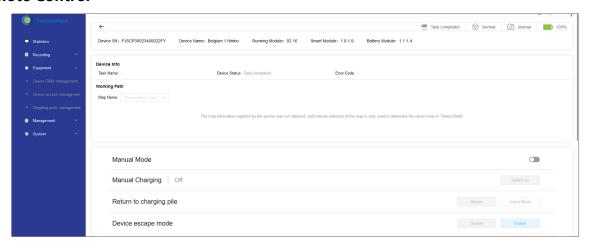
## 1. Camera

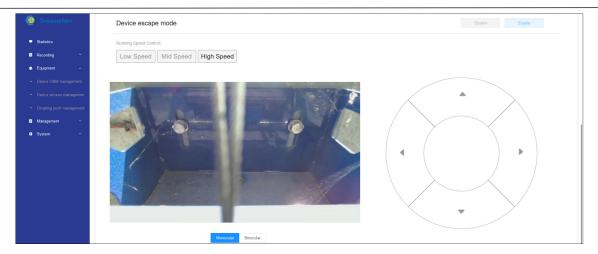


Find the target robot and click **Camera**, and the system displays the live camera image of that robot. When the camera signal is lost, the system shows a black screen.

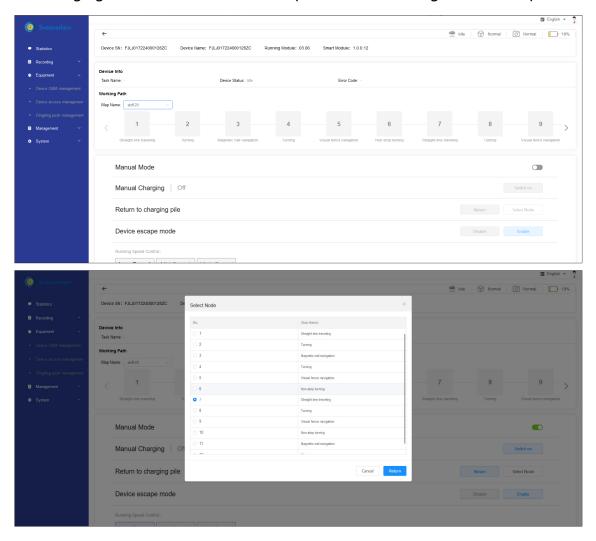
<b>Emergency Stop</b>	In case of an emergency, click <b>Emergency Stop</b> and confirm the operation
	in the popup to stop the robot.
Monocular mode	Select <b>Monocular</b> to show the image of the monocular camera in the front
	of the robot.
Binocular mode	Select <b>Binocular</b> to show the image of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

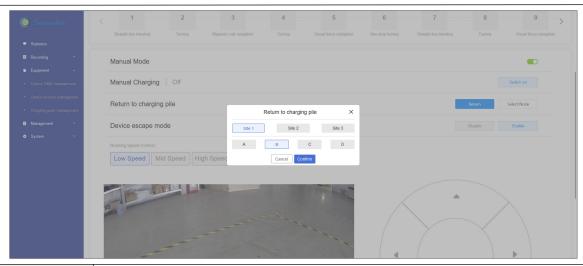
## 2. Remote Control





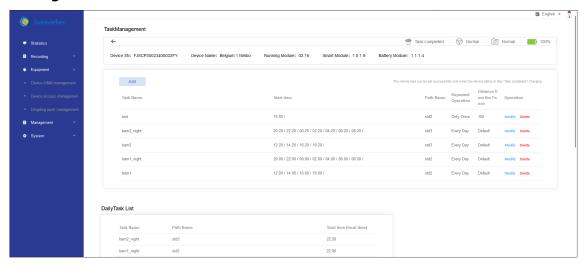
Find the target robot, and click **Remote Control** to control the robot remotely, check the robot parameters and maps, switch to the manual mode or auto mode, charge the robot manually, return the robot for charging, enable or disable the escape mode, and change the robot speed.





Manual Mode	Turn on the <b>Manual Mode</b> 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 ≥ 80%; blue: 80% > battery level ≥ 35%; orange: 35% >
	battery level ≥ 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 <b>Select Node</b> for <b>Return for</b>
	<b>Charging</b> , and select a point. Then, the robot navigates through the
	remaining path after the selected point (including the selected point).
	Click <b>Return Now</b> , select a site and a point on the popup, click <b>Confirm</b> , and
Return for	then the robot automatically returns to the charging pile for charging. For
Charging	example, if you select <b>Site 2</b> and point <b>C</b> , the robot returns to the charging
	pile along the <b>abn2c</b> path.
Escape Mode	Click <b>Enable</b> or <b>Disable</b> to enable or disable the escape mode. The clicked
	button turns blue, and the other button turns grey.

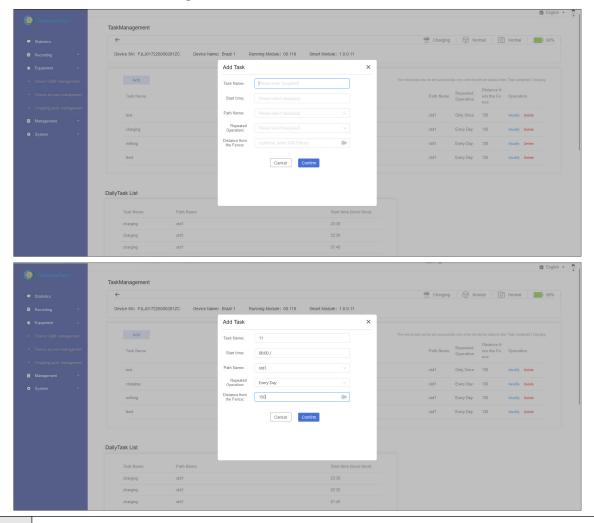
## 3. Task Management



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

#### Add a task:

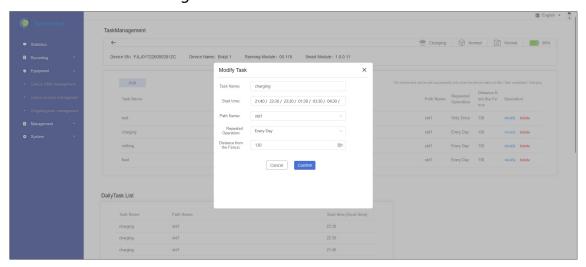
- Click Add, and a popup appears.
- Set the task name, start time, path name, repetition, and distance from the fence.
- Click **Confirm** to save the settings and create the task.



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

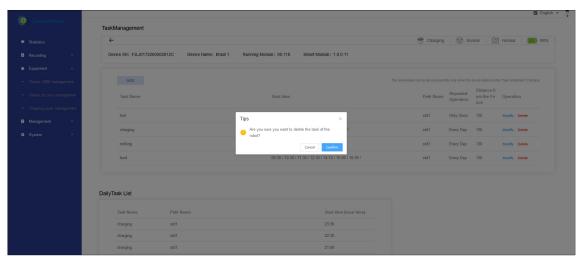
## Modify a task:

- 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.



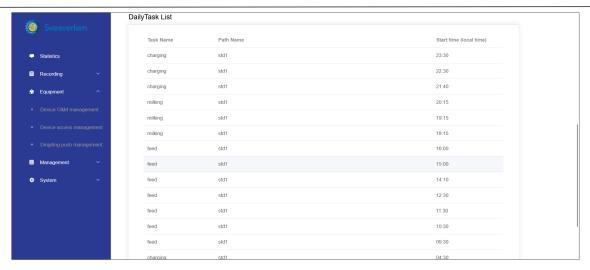
### Delete a task:

- 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.

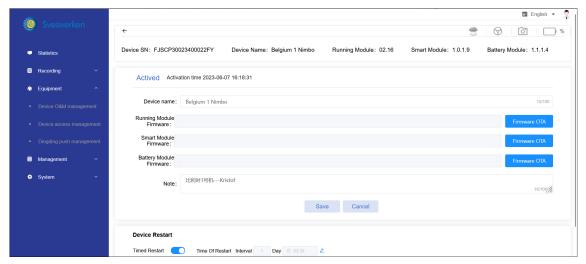


## **Daily Tasks:**

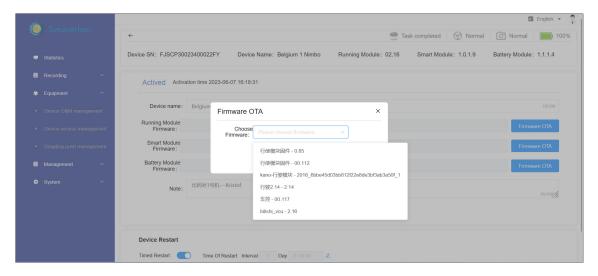
• Scroll down to show the task list. The list shows the task name, the path, and the start time of each task.



# 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.