HIKROBOT

RCS-Lite V1.5 Latent Tractor System

User Manual

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Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
Note	Provides additional information to emphasize or supplement important points of the main text.
Caution	Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
Danger	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

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Chapter 1 Overview

RCS-Lite V1.5 latent tractor system is applicable to latent tractors.

1.1 Software Architecture

RCS-Lite is a streamlined version of RCS-2000. It is presented as client, offering an excellent user interaction experience. It is mainly used in small-sized projects and demonstration projects. It features ultra-light deployment and one-click startup, integrating multiple services such as RCS, WCS, and AMS.

1.2 Function Module

RCS-Lite is composed of RCSLite-Server and RCSLite-Client.

RCSLite-Server provides API calling services, database storage, task scheduling and other functions. It supports data docking between each server and client.

RCSLite-Client provides the operation interface of data management and configuration for RCSLite-Server. When RCS-Lite starts, it will load all services including RCSLite-Server, WCS, RCS, and AMS.

For special functions of latent tractors (such as diverging and point filtering), you need to contact the developer for handling.

Chapter 2 Map Management

2.1 Home Page

2.1.1 Login Interface

Run the client. During the first running, you should choose task system type. According to different tasks, the system is divided into 5 types: carrying system (including LMR and forklift LMR), FMR system, CMR system (including latent tractor and single-layer roller CMR), single-cargo CTU system, and mixed system.

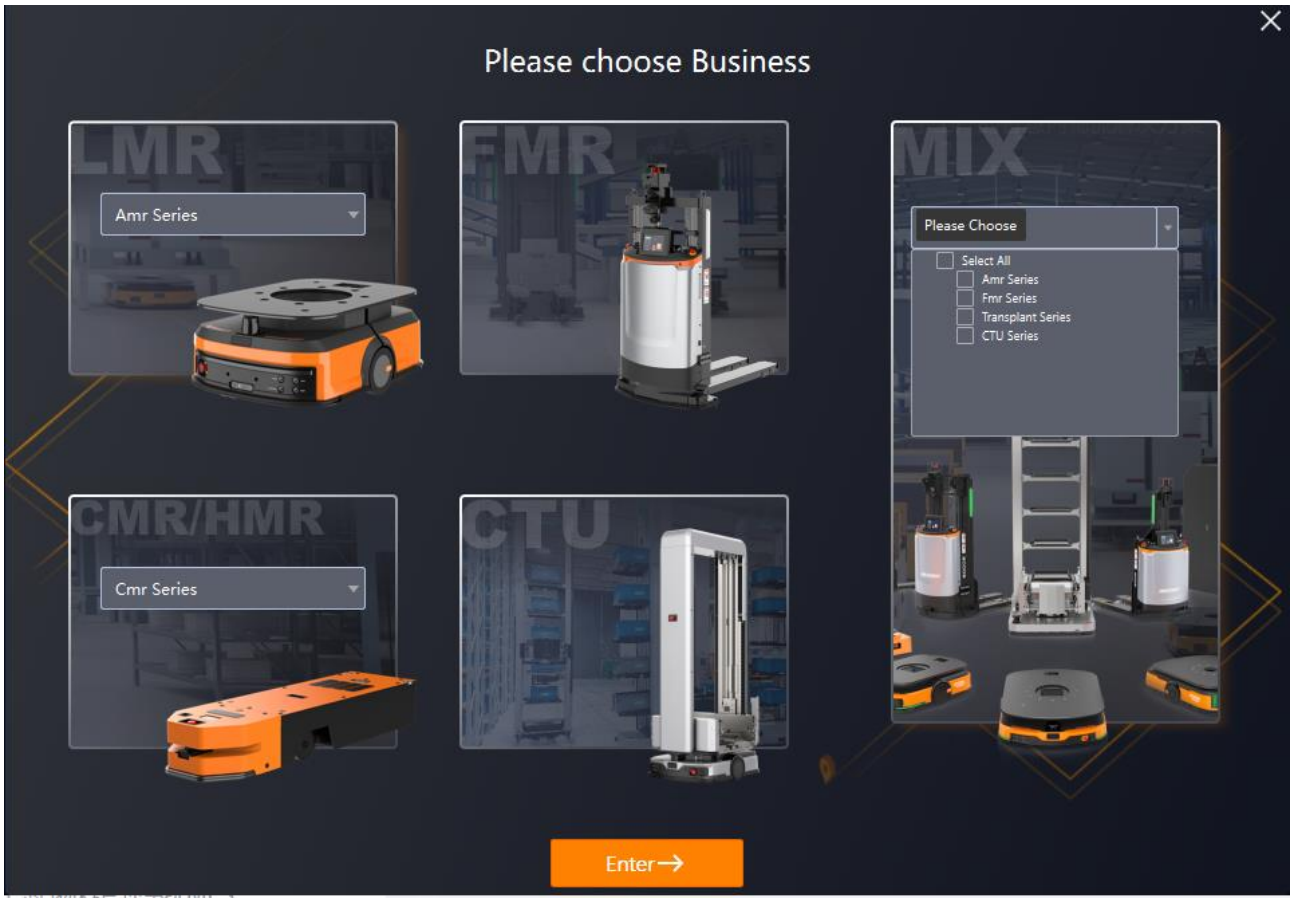


Figure 2-1 Select System Type

Go to the login interface, and enter user name and password. Local IP address is local service IP address by default. RCS-Lite supports primary and secondary server login. When the login IP is the local IP address, the current computer acts as the primary server. Otherwise, the current computer acts as the secondary server, connecting to RCS-Lite in the primary server. The port does no need to be changed by default. Subsequent login to MonitorClient requires the same IP address and port.

For the first login, activation code is required. Click **Activation**, then click **Export** in the pop-up window, and export the activation request file (ActiveRequest.bin).

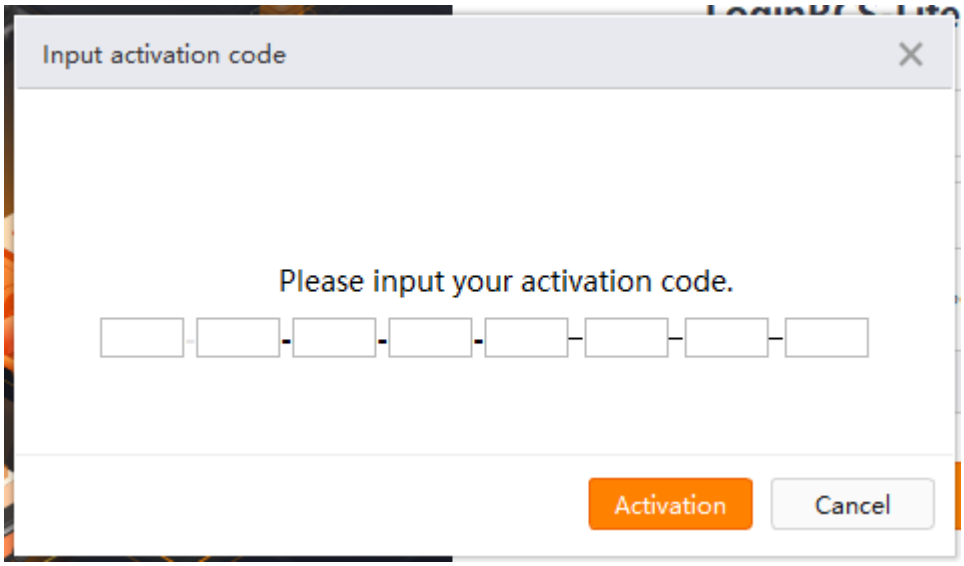


Figure 2-2 Enter Activation Code

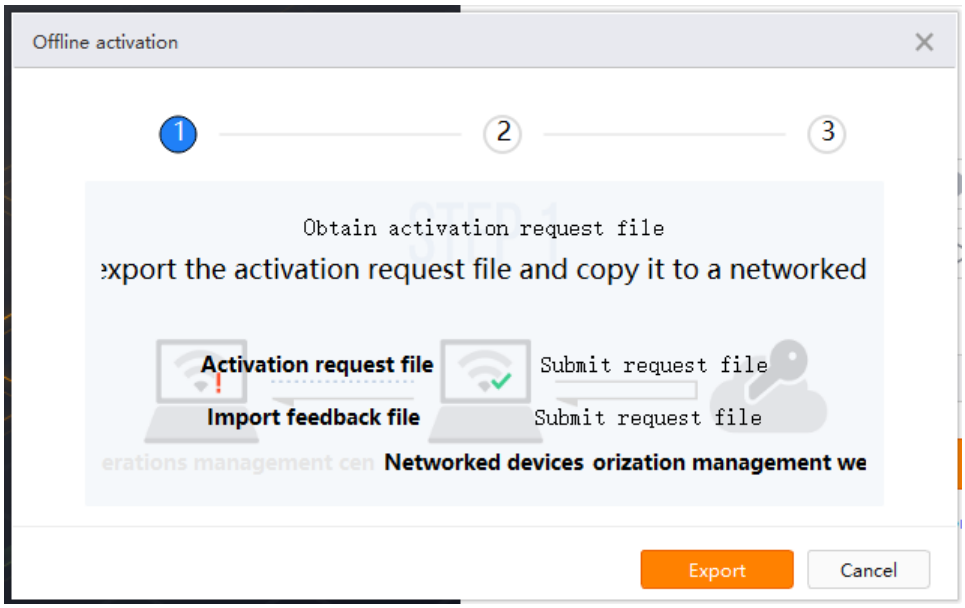


Figure 2-3 Export Activation Request File

After getting the activation response file, click **Activation**, and export the file. Then, RCS-Lite is activated.

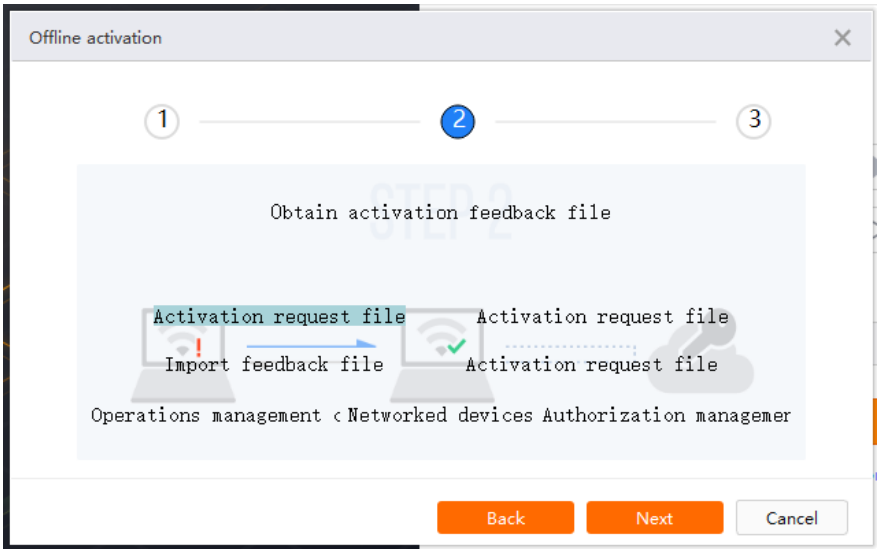


Figure 2-4 Get Activation Response File

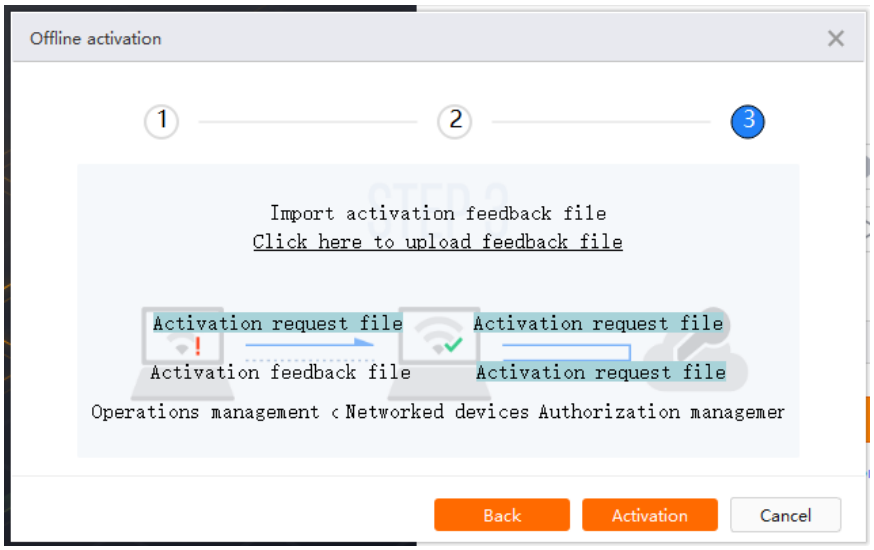


Figure 2-5 Upload Activation Response File

Note

Once activated, RCS-Lite will automatically enter baseline system or simulation system based on the activation code.

Before you log in to RCS-Lite, if the database service is abnormal, the system will automatically prompt you to switch to another database. For example, for pg service exception, it is recommended to switch to sqlite database.

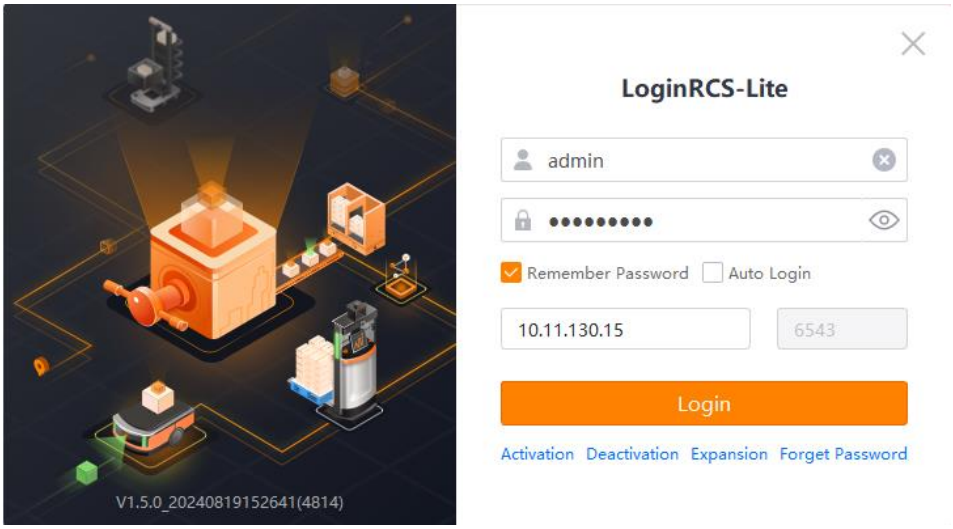


Figure 2-6 Login Interface

2.1.2 Switch Language

When entering the client home page, if you want to switch the language, go to **admin** > **Switch Language**.

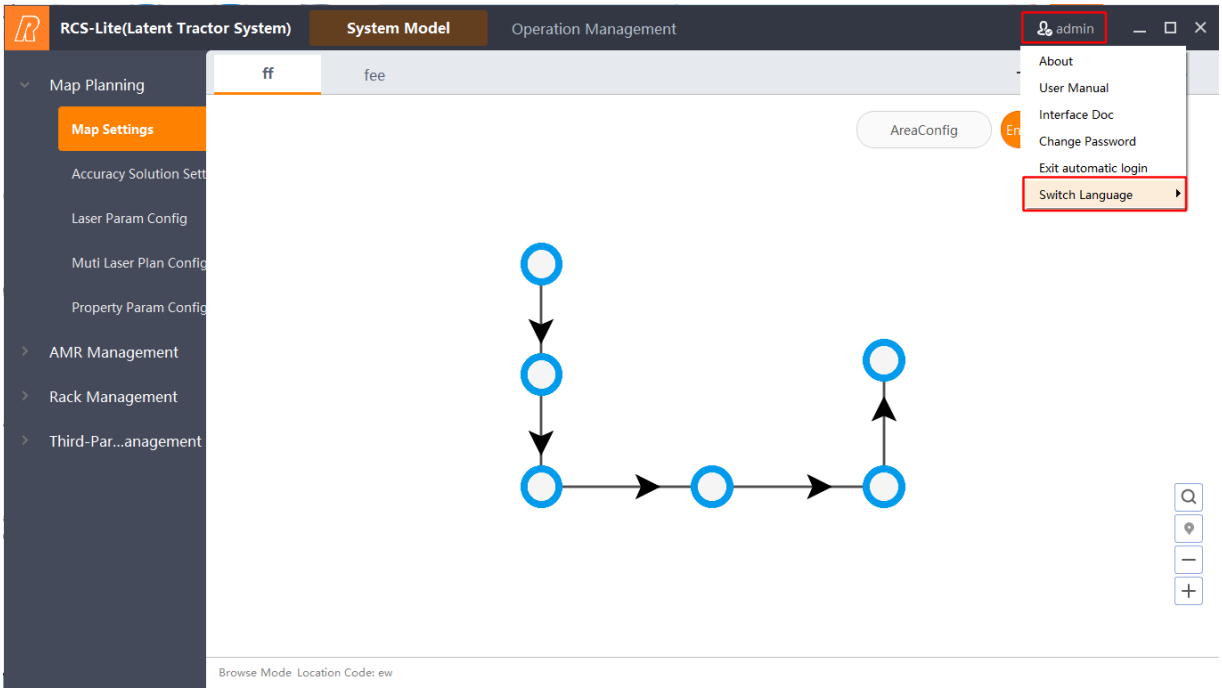


Figure 2-7 Switch Language

2.1.3 Create Map

For the first login, you should create a topological map, click **Create Topological Map**, and enter map name, location code type, and code spacing X and Y. Then click **OK** to go to the map editing interface.

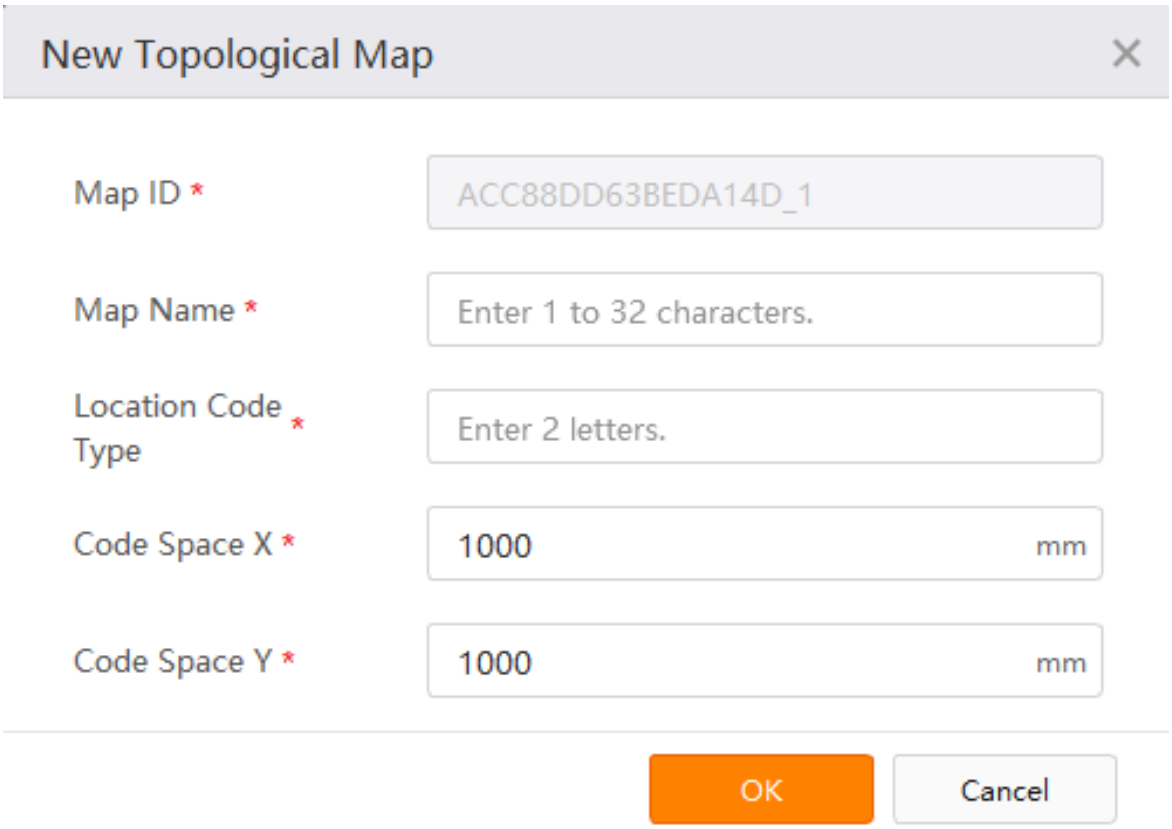


Figure 2-8 Map Creation Settings

2.1.4 Map Settings

In the interface, the title bar is the first-level menu, including System Model and Operation Management, and the second-level menu is on the left side. The Map Settings interface is entered by default. Map Settings is where you can view the existing topological maps. Currently, you can create 5 topological maps.

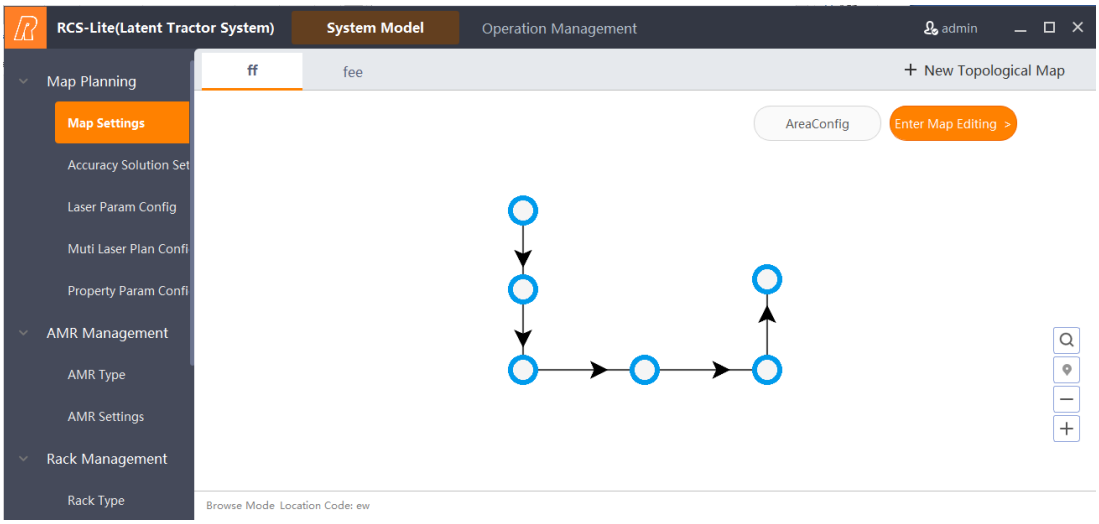


Figure 2-9 Map Settings

2.1.5 Area Configuration

It is mainly used for the latent tractor system, and its operation and usage are roughly the same as those of warehouse area settings. Select the topological map that needs to be configured, and click **AreaConfig** in the upper-right corner. The toolbar is the same as that of warehouse area settings. You can click corresponding buttons to exit editing, enter the panning mode or erasing mode, and save the work results.

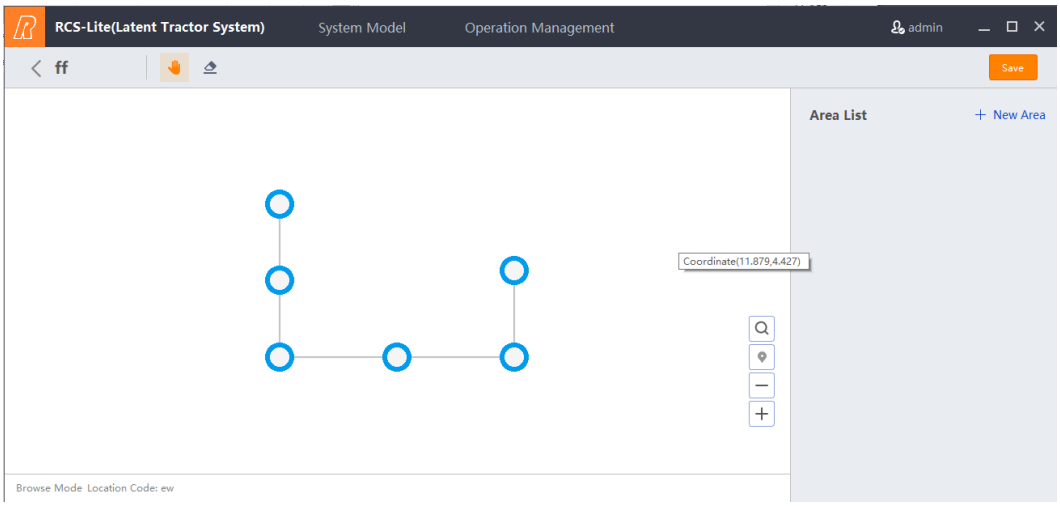


Figure 2-10 Area Configuration

When you first enter the interface, click **New Area** in the upper-right corner. Then enter No. and name, select the type, and click **OK**. Currently, only the ordinary area is supported. After the area is created, click  in the bar, and drag to select the area. Once the area is selected, a background frame will be displayed.

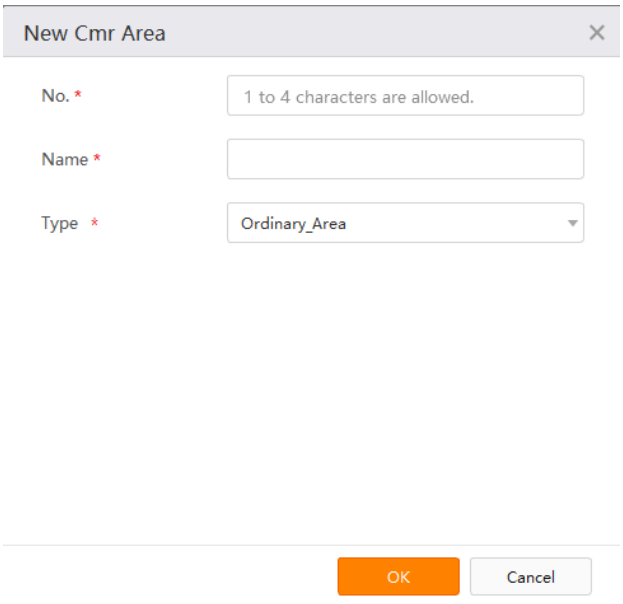


Figure 2-11 Create Area

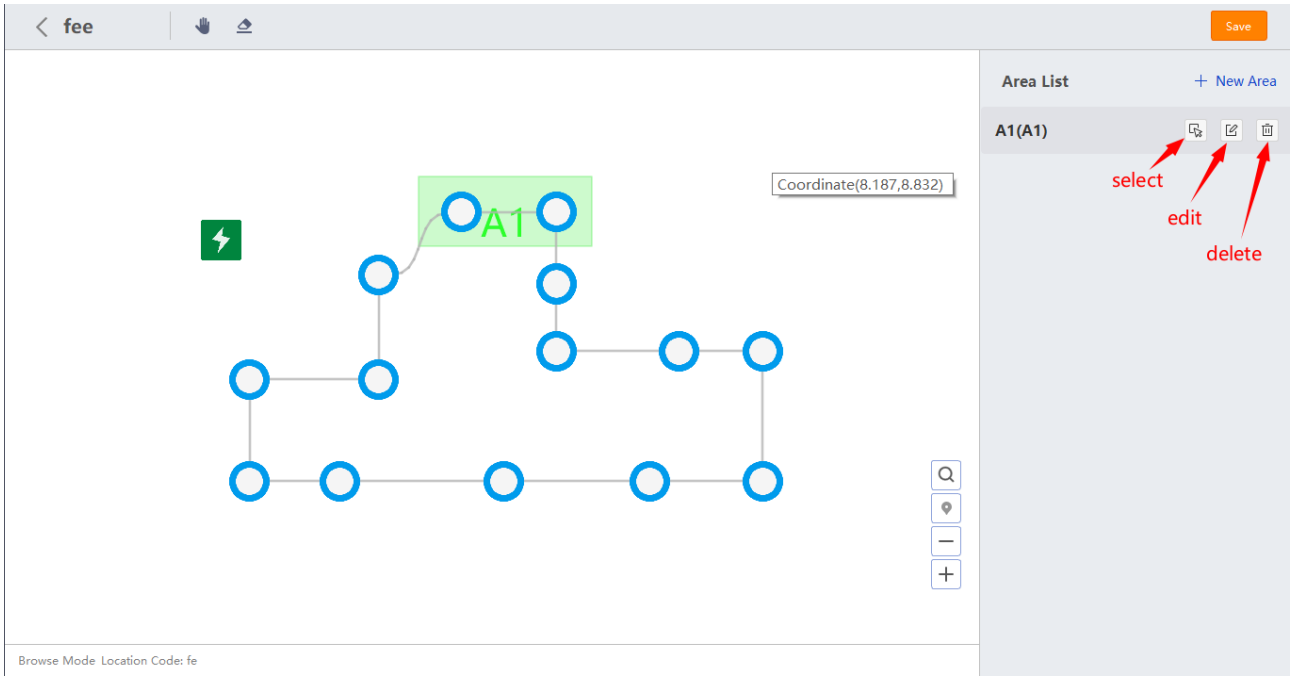


Figure 2-12 Edit Area

2.1.6 Laser Parameter

Note

You can configure the laser detection distance in the front, rear, left, and right direction for latent tractors on the specified map.

- Add laser parameter.

Step 1 Go to **Laser Param Config**, and click **Add**.

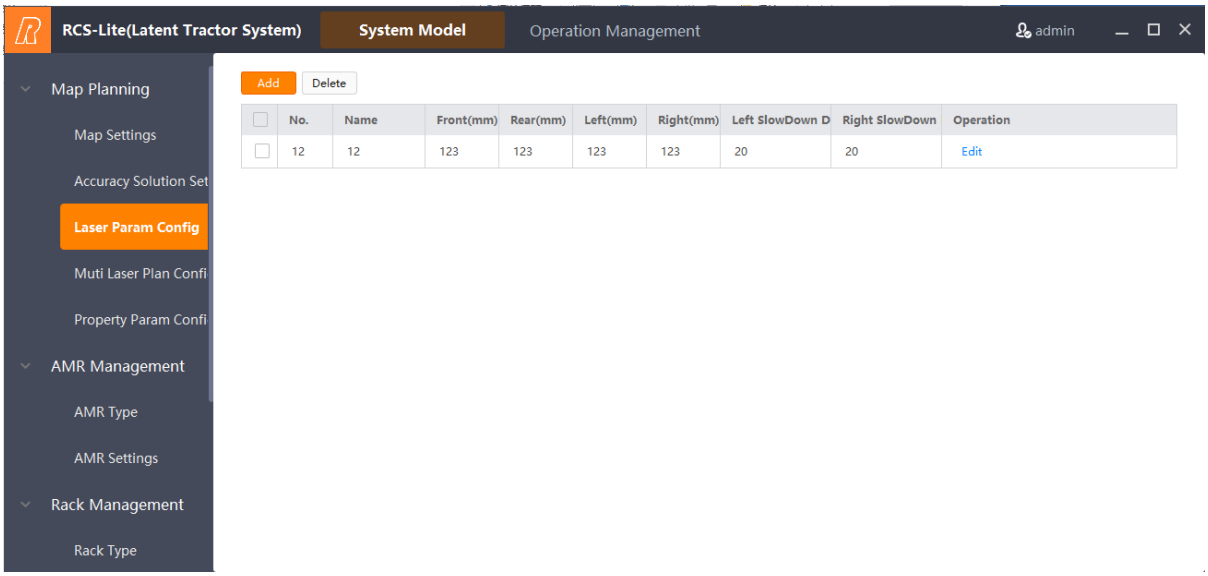


Figure 2-13 Add Laser Parameter

Step 2 Enter the content as required, and click **OK**.

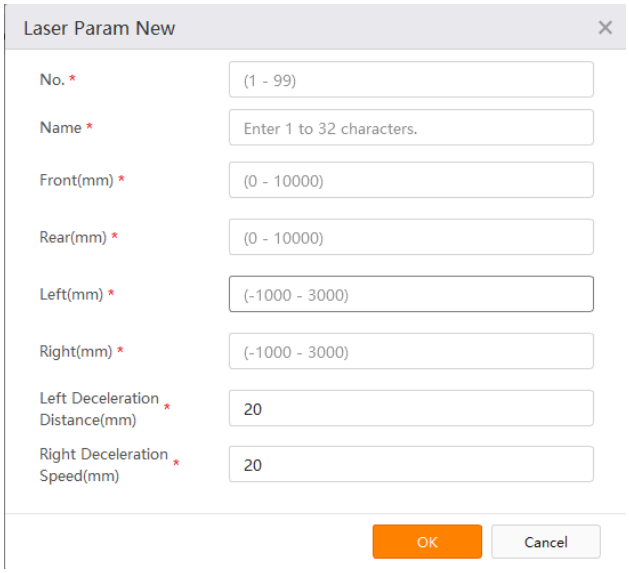


Figure 2-14 Create Laser Parameter

Table 2-1 Laser Parameter Fields

Field	Attribute	Description
No.	Required.	Unique No. of the laser parameter. Once added, it cannot be changed.
Name	Required.	Unique name of the laser parameter.
Front	Required.	The front detection distance in the moving coordinate system, unit: mm.
Rear	Required.	The rear detection distance in the moving coordinate system, unit: mm.
Left	Required.	The left detection distance in the moving coordinate system, unit: mm.
Right	Required.	The right detection distance in the moving coordinate system, unit: mm.
Left Deceleration Distance	Required.	The threshold for obstacle avoidance in the left direction, unit: mm.
Right Deceleration Distance	Required.	The threshold for obstacle avoidance in the right direction, unit: mm.

- Delete laser parameter.

Step 3 Go to **Line Property Information** > **Amr**, cancel the selection of the laser plan that uses this laser parameter, and click **Save**.

Step 4 Go to **Multi Laser Plan Config**, delete the laser plan that uses this laser parameter, or cancel the selection of this laser parameter in remote/mide/near laser code.

Step 5 Go to **Laser Param Config**, select the laser parameter to be deleted, click **Delete**, and click **OK** in the dialog.

2.1.7 Multi-Laser Plan

- Add laser plan.

Step 1 Go to **Multi Laser Plan Config**, and click **Add**.

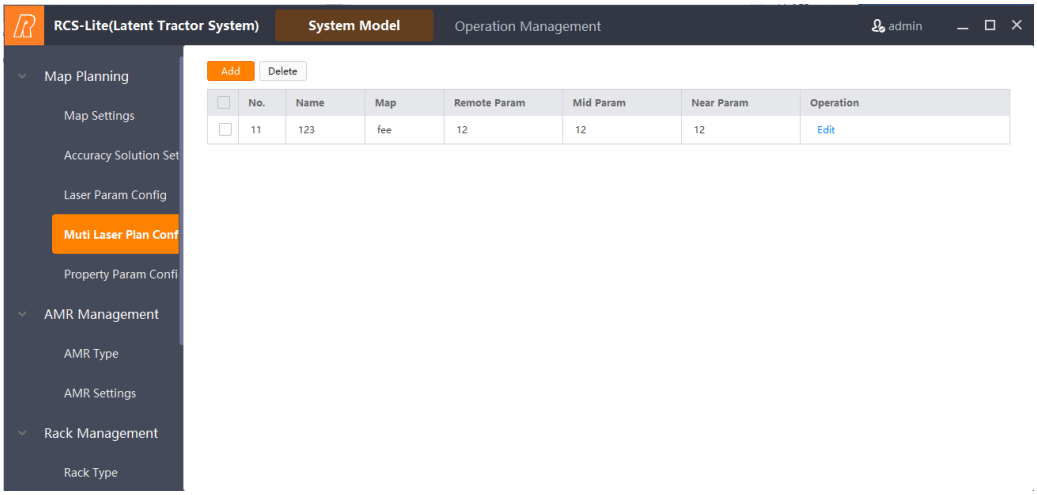


Figure 2-15 Add Laser Plan

Step 2 Enter the content as required, and click **OK**.

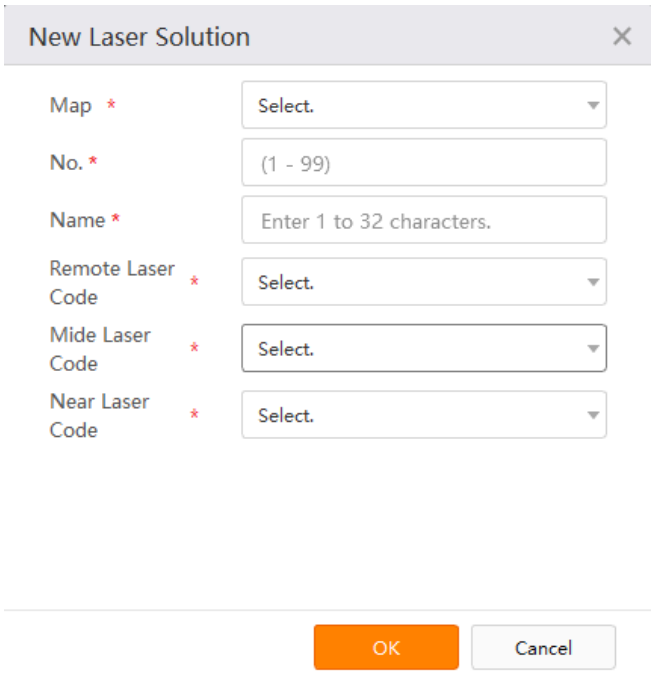


Figure 2-16 Create Laser Plan Configuration

Note

RCS-Lite V1.5 has a three-level obstacle avoidance function, that is, its laser plan is divided into three levels—remote, medium, and near areas. The latent tractor will perform different laser plans based on the area an obstacle is in. When an obstacle is detected in the remote area, the latent tractor will decelerate. When an obstacle is detected in the medium area, the latent tractor will stop with the light on. When an obstacle is detected in the near area, the latent tractor will stop with an alarm.

Table 2-2 Laser Plan Fields

Field	Attribute	Description
Map	Attribute	The map applying the laser plan.
No.	Required.	Unique No. of the laser plan. Once added, it cannot be changed.
Name	Required.	Unique name of the laser plan.
Remote Laser Code	Required.	The laser parameter of the laser plan configured for the remote area.
Mide Laser Code	Required.	The laser parameter of the laser plan configured for the medium area.
Near Laser Code	Required.	The laser parameter of the laser plan configured for the near area.

- Delete laser plan.

Step 1 Go to **Line Property Information** > **Amr**, cancel the selection of the laser plan, and click **Save**.

Step 2 Go to **Multi Laser Plan Config**, select the laser plan to be deleted, click **Delete**, and click **OK** in the dialog.

2.1.8 Accuracy Plan

- Add accuracy plan.

Step 1 Go to Accuracy Solution Settings, and click **Add**.

Step 2 Enter the content as required, and click **OK**.

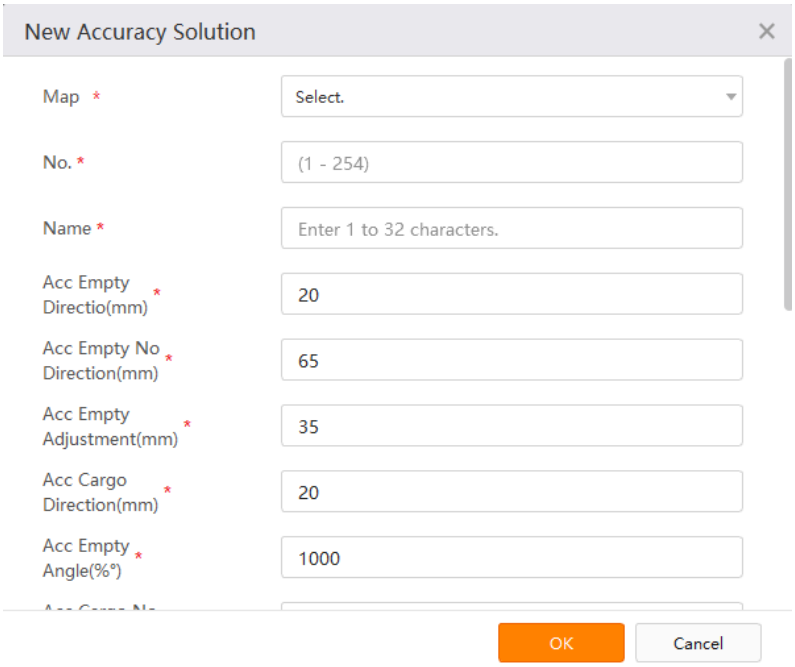


Figure 2-17 Add Accuracy Plan

Table 2-3 Accuracy Plan Fields

Field	Attribute	Description
Map	Required.	The map applying the accuracy plan.
No.	Required.	Unique No. of the accuracy plan. Once added, it cannot be changed.
Name	Required.	Unique name of the accuracy plan.
Type	Required.	It is divided into target plan and process plan. The former is used for accuracy plan of point attribute, while the latter is used for accuracy plan of line attribute.
X	Required.	The allowed deviation of positioning angle accuracy in X direction.
Y	Required.	The allowed deviation of positioning angle accuracy in Y direction.
Angle	Required.	The allowed deviation of positioning angle accuracy.

- Delete accuracy plan.

First, go to **Point/Line Property Information** > **Amr**, cancel the selection of the accuracy plan, and click **Save**. Then, go to **Accuracy Solution Settings**, select the accuracy plan to be deleted, click **Delete**, and click **OK** in the dialog.

2.1.9 Attribute Parameter

Note

It is an extension of point and line attributes. In the attribute parameter interface, you can extend the basic attributes, AMR attributes, and task attributes of point and line attributes. Attribute parameter includes attribute extension and data dictionary functions.

Attribute Extension Function

To add an extended attribute, go to **Property Param Config** > **Point Pro** > **Point Base Pro**, and click **Add**.

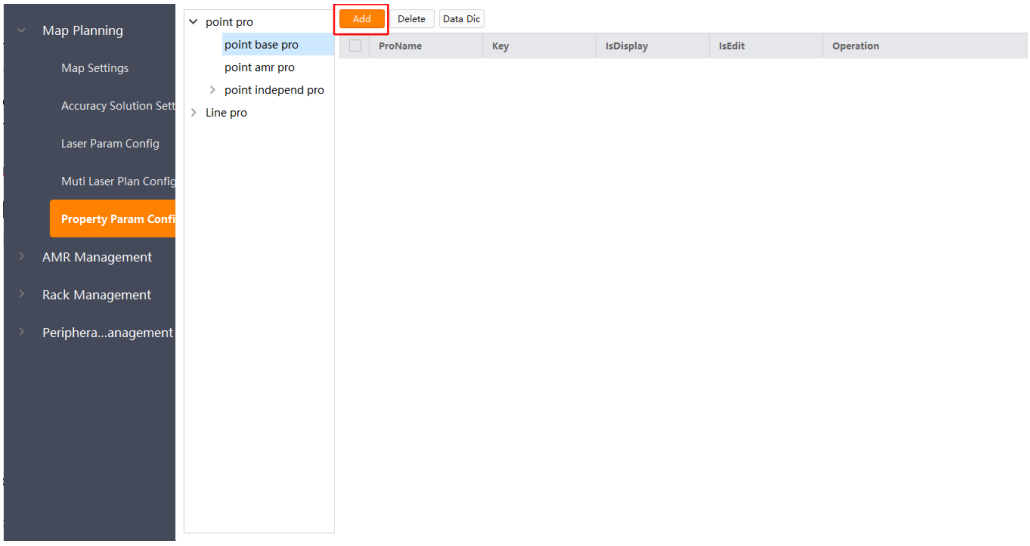


Figure 2-18 Attribute Parameter Configuration

In the pop-up window, enter key, attribute name, and control type, and enable or disable *Show* and *Editable*. Options for control type include text, switch, and drop-down list.

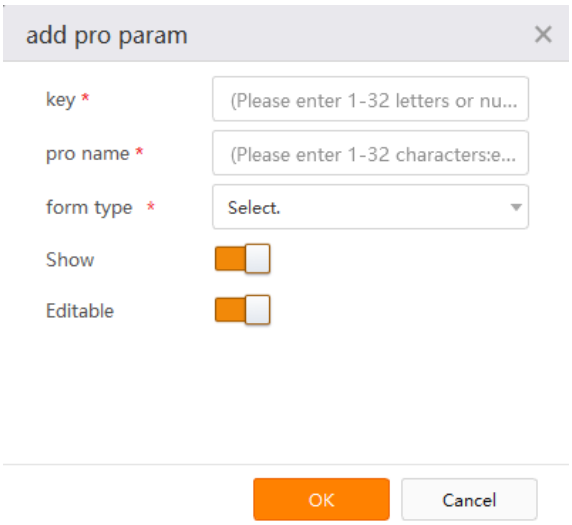


Figure 2-19 Add Attribute Parameter

In map editing mode, double-click a topological point to view the attribute interface where you can see the newly added attribute control.

Data Dictionary

It has two functions: to add new action lists, and to provide options when the newly added control is a drop-down list.

a) Add action list.

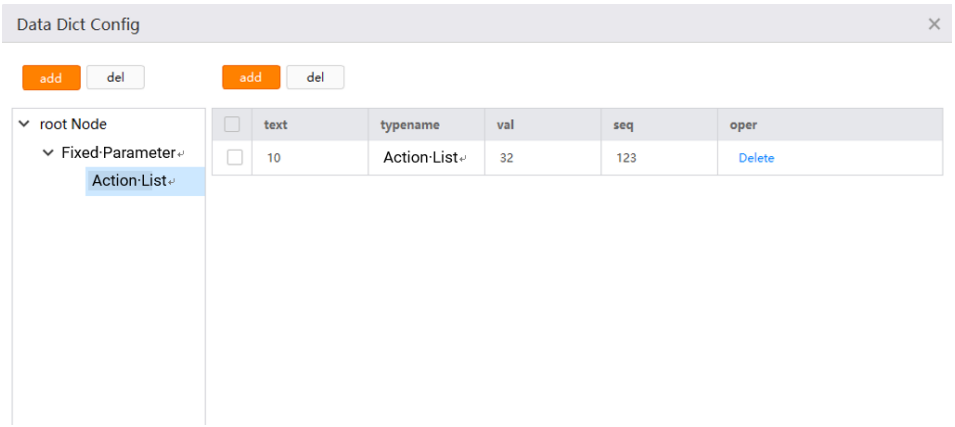


Figure 2-20 Add Action List

b) Add an option for drop-down list.

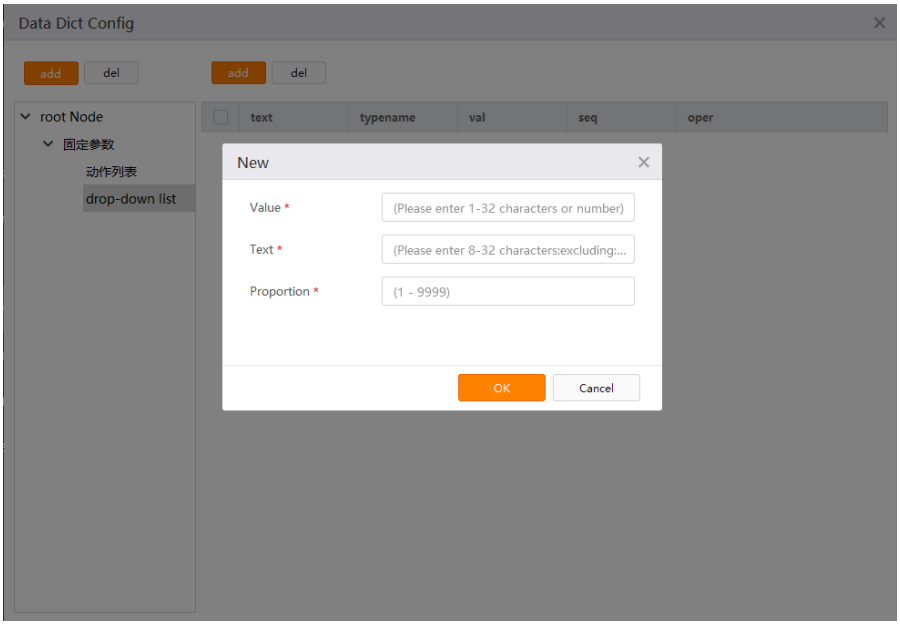


Figure 2-21 Add Option for Drop-Down List

2.2 Map Editing

Go to **Map Settings**, and click **Enter Map Editing**. The list of map elements is displayed on the left side. The toolbar is on the top, and the display control bar is in the lower-right corner.

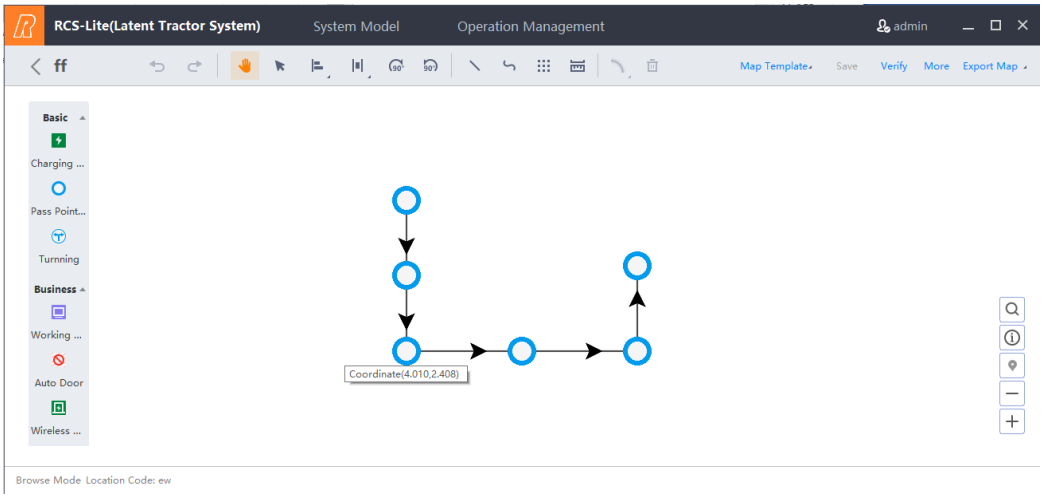


Figure 2-22 Topological Map Editing

2.2.1 Toolbar

Buttons on the toolbar are detailed below. If you want to draw points, you can choose from the list of point elements on the left side.

- Undo: Click to undo the last action.
- Redo: Click to redo a previously undone action.
- Pan: Click , and then you can drag the map in panning mode.
- Select: Click , and then you can drag to select points and lines. Right-click to pop up the right-click menu. Double-click a point or a line element to view the corresponding attributes, and editing is supported.

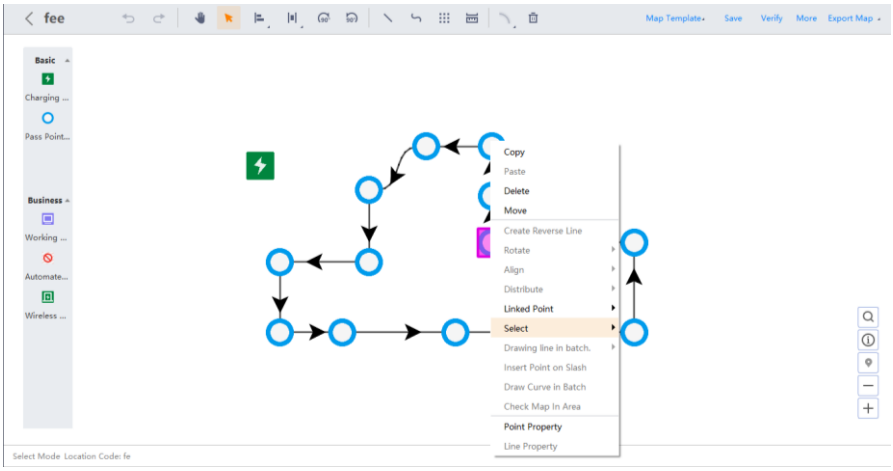


Figure 2-23 View Point and Line Attributes

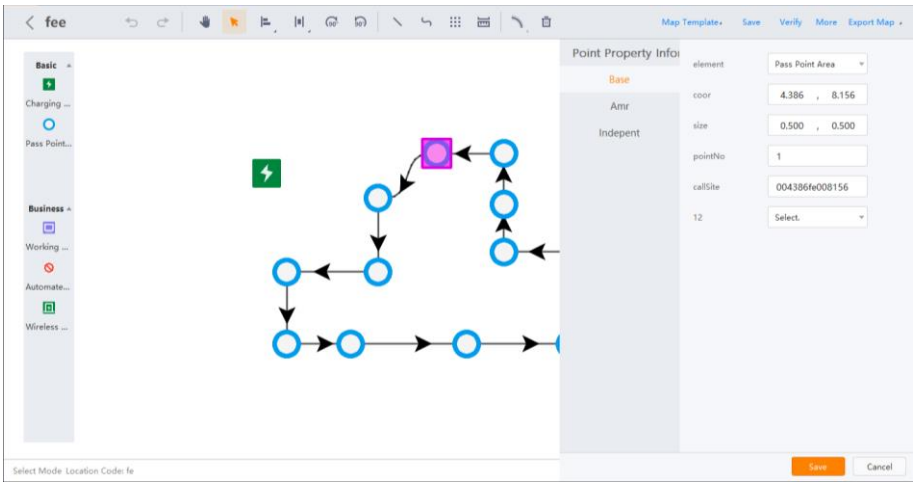


Figure 2-24 Point Attributes

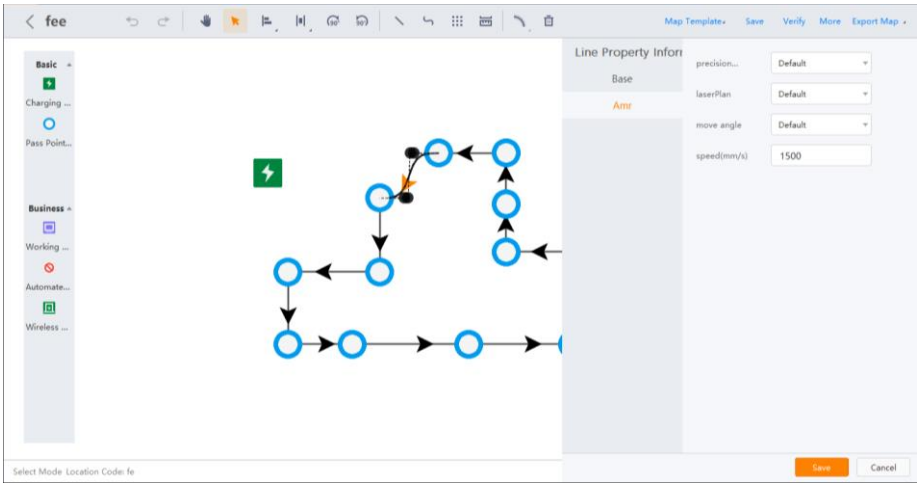


Figure 2-25 Line Attributes

- Align: Click , and select vertical or horizontal alignment to align the selected points and lines.
- Distribute: Click , and select vertical or horizontal layout to distribute the selected points and lines.
- Rotate: Click or to rotate 90° clockwise or counterclockwise the selected points and lines.
- Draw Line: Click , select a point, and drag to another point to draw a line between the two points.
- Draw Curve: Click , select a point, and drag to another point to draw a curve between the two points. In the curve editing box, you can select the curve type (general curve or 180° arc), and the starting or ending point direction (horizontal, vertical, consecutive, or custom), and set whether the curve is bidirectional.

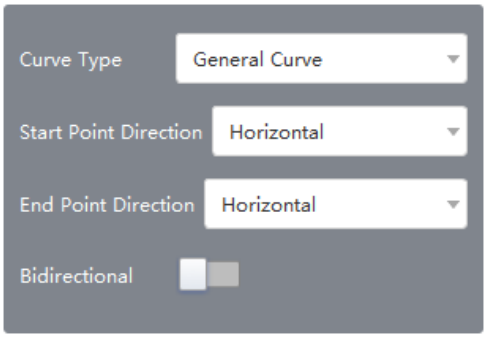


Figure 2-26 Curve Editing Box

- Draw Point Array: Click , and select a desired point on the map, and the point coordinates will be displayed in the reference point coordinates editing box. Click **OK**, and set parameters for the array in the pop-up window.

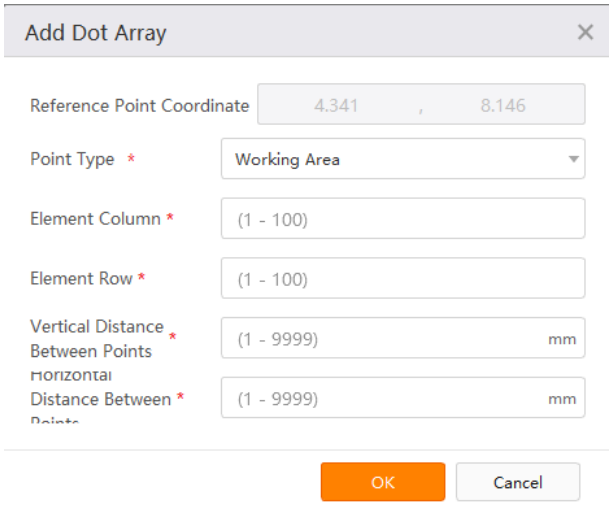


Figure 2-27 Edit Point Array

- Draw Measurement Line: Click , and draw a measurement line on the map to view the distance between the two points.

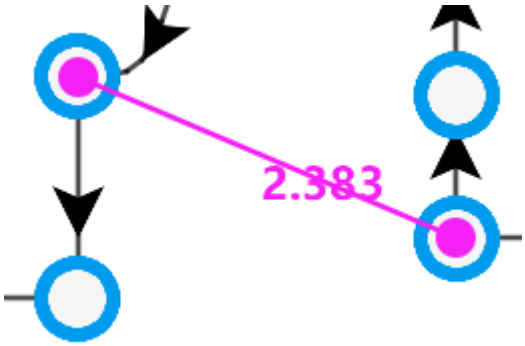


Figure 2-28 Measurement Line

- Delete: Click to select points and lines, and click to delete them.

- Envelope: Click  to select a point or a line, click  to view the drop-down menu, including Hide Envelope and Display Envelope. Click **Display Envelope**, and the envelope parameter editing box will pop up. You can set the allowed AMR type, AMR head direction, laser plan, rack type, rack direction, and AMR head length.

Note

AMR head length refers to the distance from FMR head to mast, and it is only required for FMR.

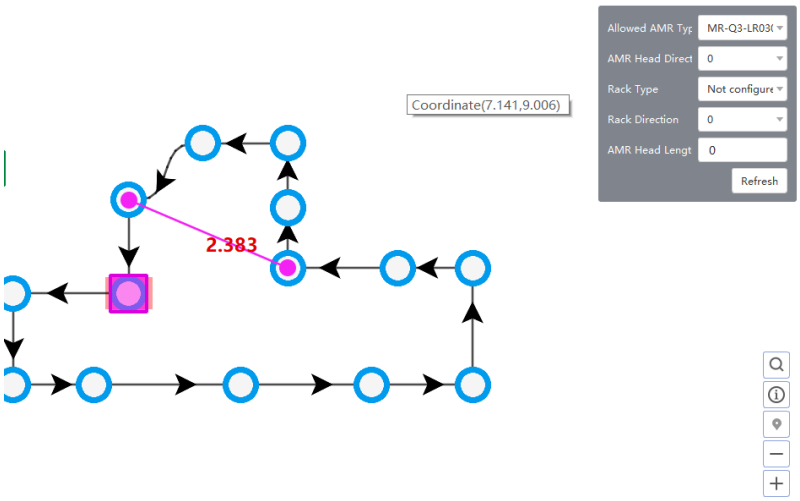


Figure 2-29 Edit Envelope Parameter

- **Verify**: Click **Verify** to check the entire topological map on point and line attributes configuration and route connectivity. Alarms will be shown in the alarm list. Double-click the alarm item in the list to locate the alarm to the specific point on the map. Alarm levels are indicated by a yellow exclamation mark or a red exclamation mark. The alarm with a red exclamation mark should be handled. Otherwise, it will severely affect operation.

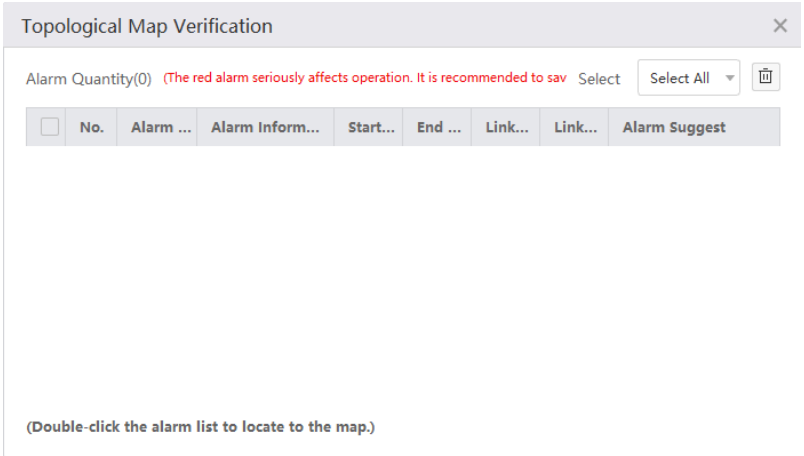


Figure 2-30 Verification Alarm List

- **Map Template**: Click **Download Template** to download the topological point template. After editing the template, you can click **Import Template** to import it to the client. Its format is consistent with that of the platform and can be imported from the platform.
- **Export Map**: Click **Export Map** to export edited map to local.
- **More**: Click **More** to import map, edit map information, or delete map.

Note

The importing function is only available when a topological map is created, and importing external maps is not available for existing maps.

2.2.2 Display Control Bar

Buttons on the display control bar are detailed below.

- Map Details: Click to view and edit map attributes, including selecting priority of point, line, and control point when they are overlapped, and selecting point and line status to display on the map.

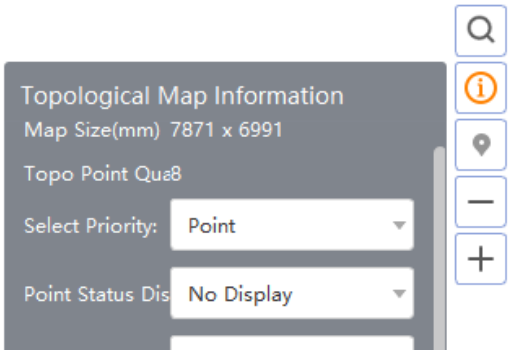


Figure 2-31 Map Attribute Information

- Search Coordinates: Click , and enter the coordinates to search the point on the map.
- Reset View: Click to restore the display scale to 100%.
- Zoom in and zoom out: Click or to zoom in or zoom out on the map.
- Click , drag to select points and lines, and right-click to show the right-click menu. Then you can copy, paste, delete, move, create reverse lines, rotate, align and distribute selected points and lines, configure linked points, further select lines or points in the selected area, etc.

2.2.3 Right-Click Toolbar

- **Create Reverse Line**: Click it to automatically create reverse lines to the selected unidirectional topological lines.

- **Select**: It is used to filter specific points, lines, curves, and measurement lines. It is applicable when you want to filter specified points or lines for batch configuration, such as setting workstation attributes and setting curve attributes.
- **Insert Point on Slash**: Select an oblique line on the map, right-click, and click **Insert Point on Slash**. Enter distributing distance and point quantity in the pop-up window, and click **OK**.
- **Draw Line in Batch**: Drag to select the point array, right-click, click **Draw Line in Batch**, and select the line direction to draw lines in batch between points.

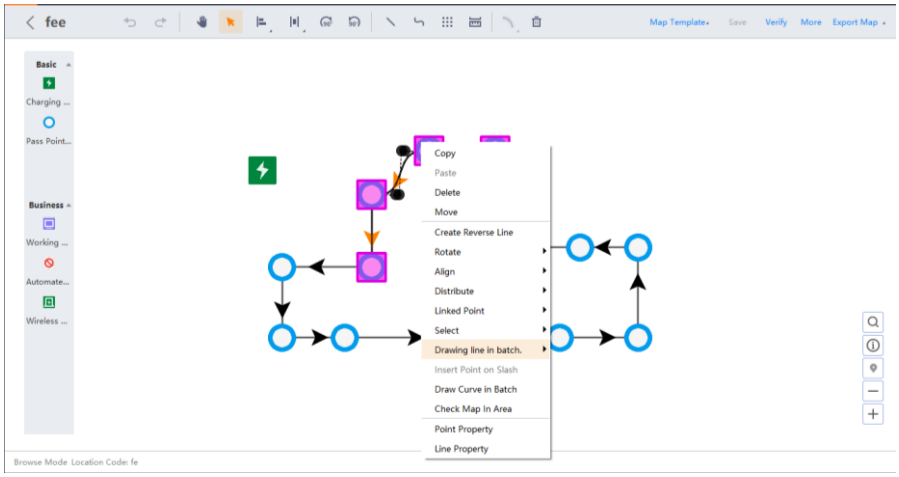


Figure 2-32 Draw Line in Batch

- **Draw Curve in Batch**: It is mainly used for warehousing projects with fixed and symmetrical storage locations. Select a row or a column of FMR waiting points or other points, right-click, and click **Draw Curve in Batch**. Enter start point direction, end point direction, and relative distance from X-axis and Y-axis, and click **OK** to create corresponding high-speed areas and curves.
- **Linked Point**: It is used to link FMR waiting points to other points. Right-click one FMR waiting point, click **Set Linking Point**, then select one point to be linked, and click **OK**. Viewing and deleting linked points are also supported by selecting a waiting point and right-clicking it.

2.2.4 Point and Line Attributes

Double-click the point or line, or drag to select the point or line, right-click, and click **Point Property** or **Line Property**, and the attribute configuration box will be displayed. Point attributes include basic attributes, AMR attributes, and task attributes.

Basic attributes include element type, coordinates, size, No., and point.

AMR attributes include accuracy plan, laser plan, rotating area quadrant, AMR head direction, and obstacle avoidance sensor switch.

Task attributes include parking, charging, charging time, charging station IP address, charging station direction, and structure action list. Click + to add an action to the action list. When an action is selected, the and buttons will be highlighted. Click to delete an action, and click or to change the sequence of the action in the list.

There are 7 types of actions available, each with its own attributes that can be configured.

- **Lifting / Pin Lifting**: Height, Lifting While Moving, and Rack Type.
- **Lowering / Pin Lowering**: Lowering While Moving and Rack Type.
- **Waiting in Idle Status**: Waiting Time.
- **Request Applying/Releasing**: Request Type, Applying Type, URL, content, Linked Area, and Linked Point.
- **Side Pin Extending**: Extending While Moving.
- **Side Pin Retracting**: Retracting While Moving.
- **Voice Prompt**: Duration.

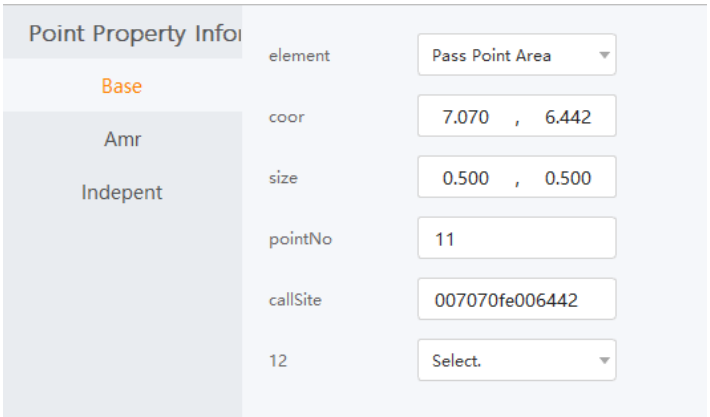


Figure 2-33 Edit Point Attribute

2.2.5 Task Attributes

Task attributes control the latent tractor to perform corresponding actions at points or along lines.

Parking and Charging

Enable **Stop** to control AMR to stop at this point, and enable **Charge** to control AMR to charge at this point. Enter the charging duration and wireless charging station IP address. The charging station direction is not used in the current version.

Structure Action Attributes

The structure action list controls the AMR to perform corresponding actions at points. Lifting / Pin Lifting controls the AMR to perform lifting actions, and the lifting stroke can be

configured. If **Lifting While Moving** is disabled, **Stop** should be enabled; if it is enabled, AMR can lift traction pin while moving. Lowering / Pin Lowering controls the AMR to lower the traction pin, and lowering while moving can be performed. Waiting in Idle Status controls the waiting time of AMR at the point. Voice Prompt enables AMR to play audio at the point.

Request Applying/Releasing

It is mainly used for interactions with third-party systems, requiring the input of path and content of third-party system. The request types include normal requesting, requesting in advance, and notifying by message.

- **Normal Requesting**: AMR stops and initiates a request, i.e., it calls a third-party API. If the request is approved, AMR will continue the next action.
- **Requesting in Advance**: For this type, linked point should be entered. AMR operates while initiating a request. If the request is rejected, AMR will stop at the linked point; if the request is approved, AMR will not stop.
- **Notifying by Message**: AMR operates while initiating a request. Regardless of whether the request is approved, AMR will continue the next action.

Applying types include applying for area, applying to the third-party platform, applying for third-party device, and waiting to be triggered.

- **Apply for Area**: The request is initiated when AMR passes through the area. If the area is occupied, the request will be rejected, and AMR needs to wait outside the area. AMR will only enter the area when the area is released and the request is approved. This attribute serves as traffic control.
- **Apply to Third-Party Platform**: AMR initiates a request to a third-party system at the point. The request methods are divided into synchronous ones and asynchronous ones. The former means that once the third-party system responds to the request normally, the action is considered completed, and AMR will continue the next action. The latter means that the third-party system first responds to the request normally, and then a continuing command should be sent by the system for the action to be considered completed, after which AMR continues the next action. To distinguish between these two methods, a specific field *isCallBack=0* should be entered in content, with a value of 0 indicating synchronous request and a value of 1 indicating asynchronous request. Note that the keyword *areaCode* should not be entered in content.
- **Apply for Third-Party Device**: AMR initiates a request to onsite devices, so third-party devices should first be added in Third-Party Device of RCS-Lite client. In RCS-Lite system, you can add elevator, automatic door, and roller/conveyor, with corresponding index values of 0, 1, and 2. However, for the latent tractor system, only the automatic door is available. Therefore, a special field *deviceType=door* should be entered in content to indicate that the applied device is automatic door, and *deviceIndex=XX* is required to indicate the applied automatic door No. Additionally, *action=applyLock* or *action=releaseDevice* should be entered to indicate whether you apply to open or close the door. When multiple fields are entered in content, they should be separated by dollar sign ($).

- **Wait to be Triggered**: AMR waits for an external triggering signal at the point. It can be triggered when you click the continue button in RCS-Lite client, or it can be triggered by a caller or a third-party system. Upon receiving this signal, AMR continues the next action.

Notes

- For normal requesting, **Stop** should be enabled. For requesting in advance, **Stop** can be disabled while linked point should be entered. For notifying by message, **Stop** can be disabled.
- For lifting and lowering actions, when **Lifting/Lowering While Moving** is enabled, **Stop** can be disabled; otherwise, **Stop** should be enabled.
- When applying for an area, linked area should be entered.

Chapter 3 AMR Management

3.1 AMR Type

AMR Management includes AMR type and AMR settings. The AMR Type interface for latent tractor system mainly includes No., name, AMR length, and AMR width. In the AMR Type main interface, attributes of each type are displayed in a tabular form.

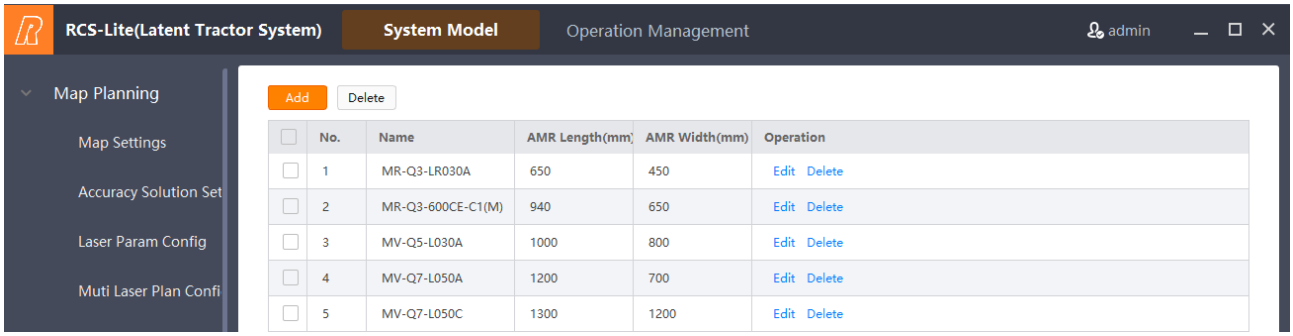


Figure 3-1 AMR Type Main Interface

Click **Add** in the upper-left corner of the main interface to create a latent tractor type of AMR.

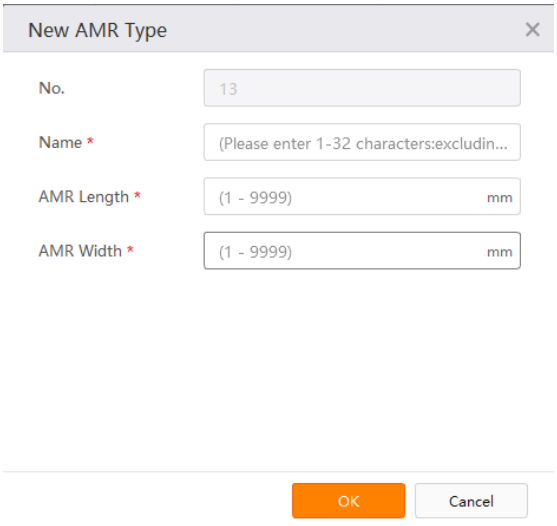


Figure 3-2 Create AMR Type

The No. in the pop-up window is automatically generated according to the current number of AMR types. Name, AMR length, and AMR width are required. Then click **OK**.

In the table of AMR type, you can click **Edit** in the operation column of each row to edit the attributes of the selected AMR type, and you can click **Delete** in the operation column of each row to delete the selected AMR type. You can also select the row and click **Delete** in the upper-left corner of the table to perform the deletion operation. When you click **Delete**, a prompt box will pop up for secondary confirmation.

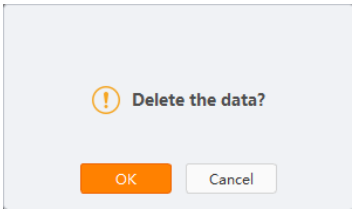


Figure 3-3 Prompt Box for Confirmation

If **Cancel** is clicked, the prompt box will be closed, the deletion operation will be stopped, and the page will go back to the main interface. If **OK** is clicked, three scenarios may occur:

If the current AMR type has been in use, a prompt box will pop up indicating that the current type has been linked to AMR. If you delete the current type, all linked AMRs will be deleted.

If the current type has not been linked to any AMRs, it will be deleted directly, and the page will go back to the main interface.

If the current AMR type is the default one, it is not allowed to be deleted.

3.2 AMR Settings

In this interface, you can configure the basic attributes of AMR, including No., name, AMR type, affiliated map, navigation type, and AMR status. In the AMR Settings main interface, all AMR parameters are displayed in a tabular form.

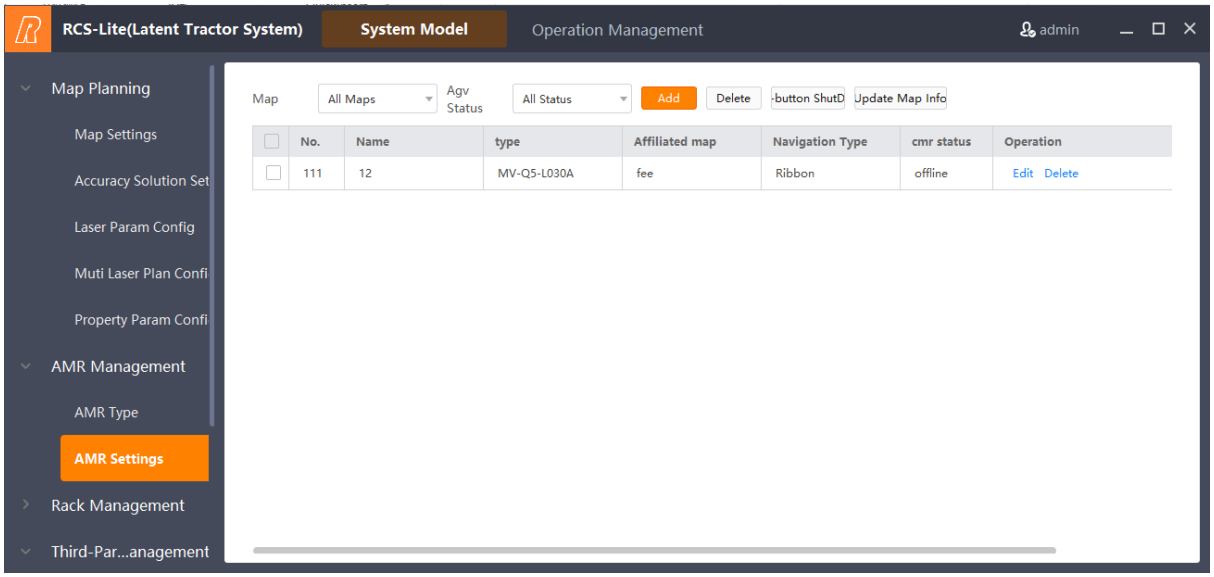


Figure 3-4 AMR Settings Main Interface

- Add AMR settings.

Click **Add** in the upper-left corner of the interface, enter the configuration information as required in the pop-up window, and click **OK**.

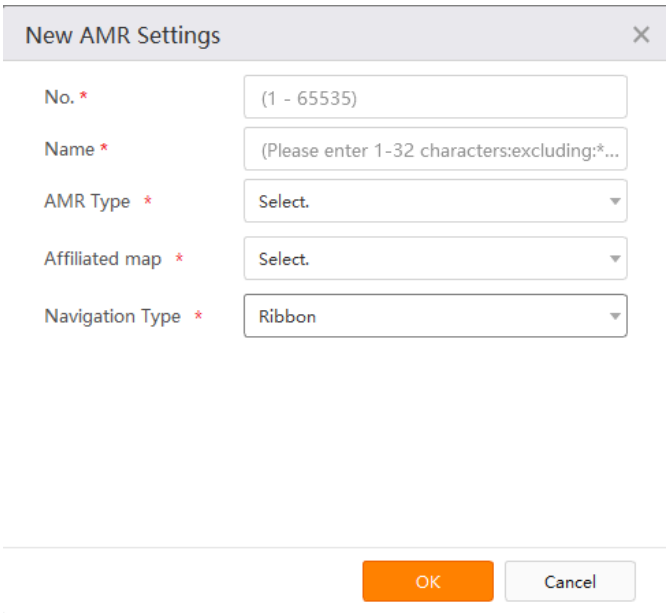


Figure 3-5 Create AMR Settings

Table 3-1 AMR Fields

Field	Attribute	Description
No.	Required.	Unique No. of the AMR. Once added, it cannot be changed.
Name	Required.	Unique name of the AMR.
AMR Type	Required.	AMR model.
Affiliated Map	Required.	The map where the AMR belongs.
Navigation Type	Required.	Navigation mode applied in AMR during operation.

- Delete AMR settings.

Click **Delete** in the top bar or click **Delete** in the operation column of each row, and click **OK** in the pop-up window to delete AMR configuration.

- One-button shutdown.

When One-Button Shutdown is clicked, the status of the selected AMR will first be detected. If the AMR is online, a configuration interface will pop up. In this interface, you can shut down the selected AMR with one click, and you can also specify the startup time of the AMR. When Set Startup Time is enabled, you can specify the startup time of the AMR, with a default duration within 7 days.

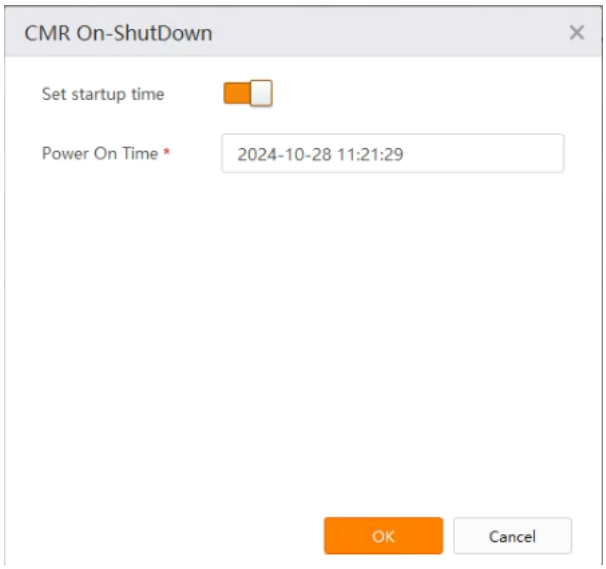


Figure 3-6 One-Button Shutdown

- Update map.

Select the AMR whose map needs to be updated, click **Update Map Info**, and AMR will be notified to perform map updating operation.

Chapter 4 Rack Management

4.1 Rack Type

In this interface, you can configure the basic attributes of a set of racks, including No., name, rack type, rack length, rack width, rack leg length, rack leg width, rack leg height, inner length, and inner width.

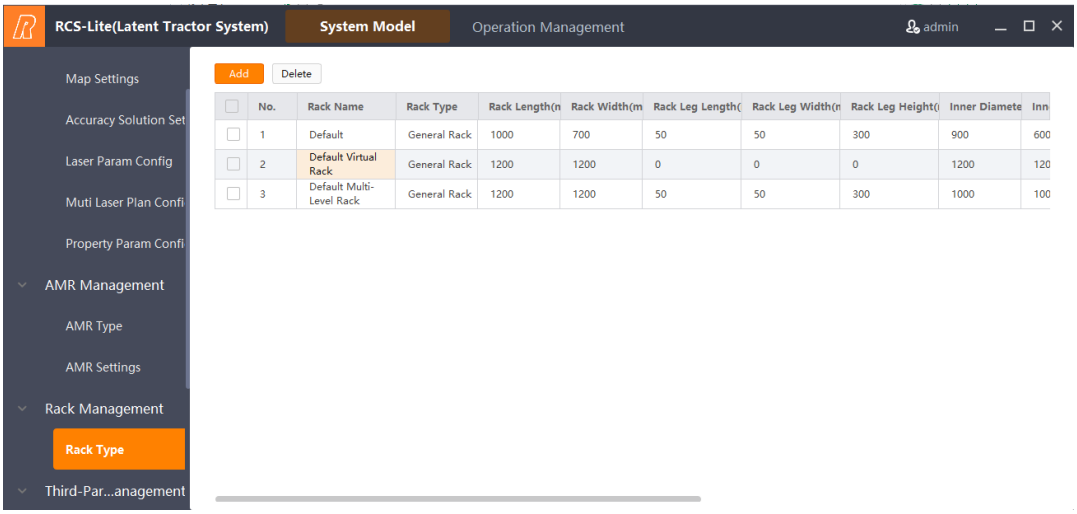


Figure 4-1 Rack Type List

Click **Add** in the upper-left corner of the table to add rack type. The basic attributes of the rack type are detailed below:

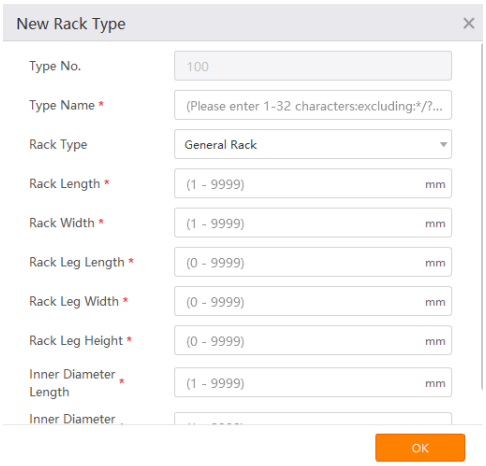


Figure 4-2 Create Rack Type

Click **Delete** on the top of the table to delete the selected rack type data.

Click **Delete** in the operation column of each row to delete the data of the current row.

Chapter 5 Third-Party Device

5.1 Caller

Go to **Third-Party Device** > **Caller**, click **Add**, enter No., name, and IP address in the pop-up window, and click **OK** to save the caller.

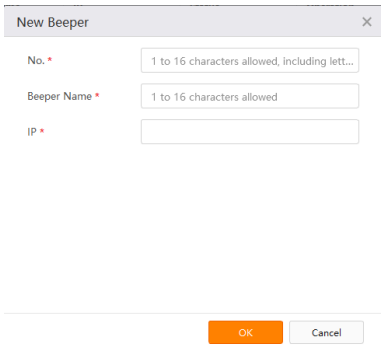


Figure 5-1 Create Caller

After saving succeeded, you can view the caller in the caller list.

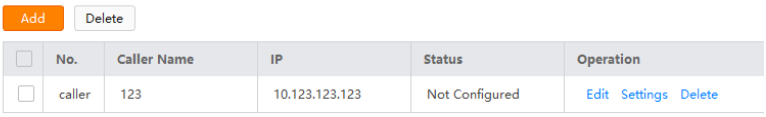
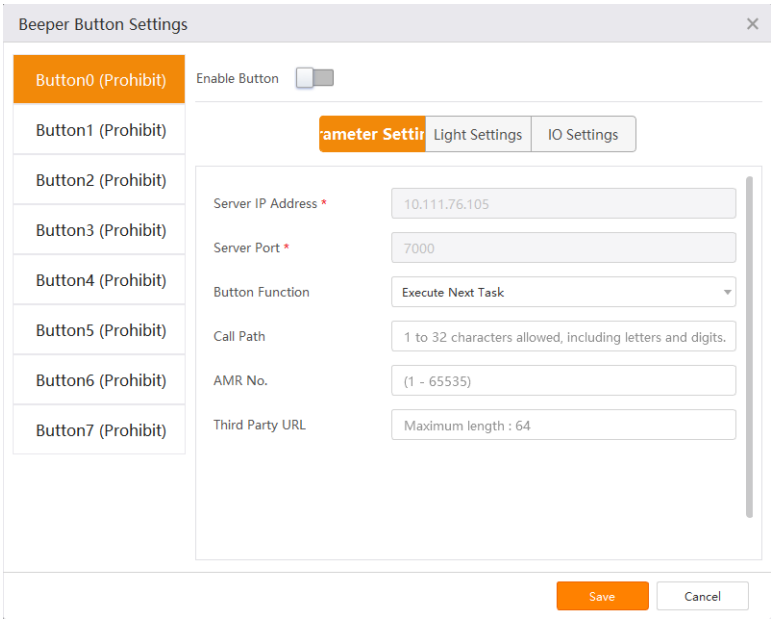


Figure 5-2 Caller List

Click **Settings** in the operation column. If the capability set of the caller can be obtained, the configuration interface for caller buttons will pop up.



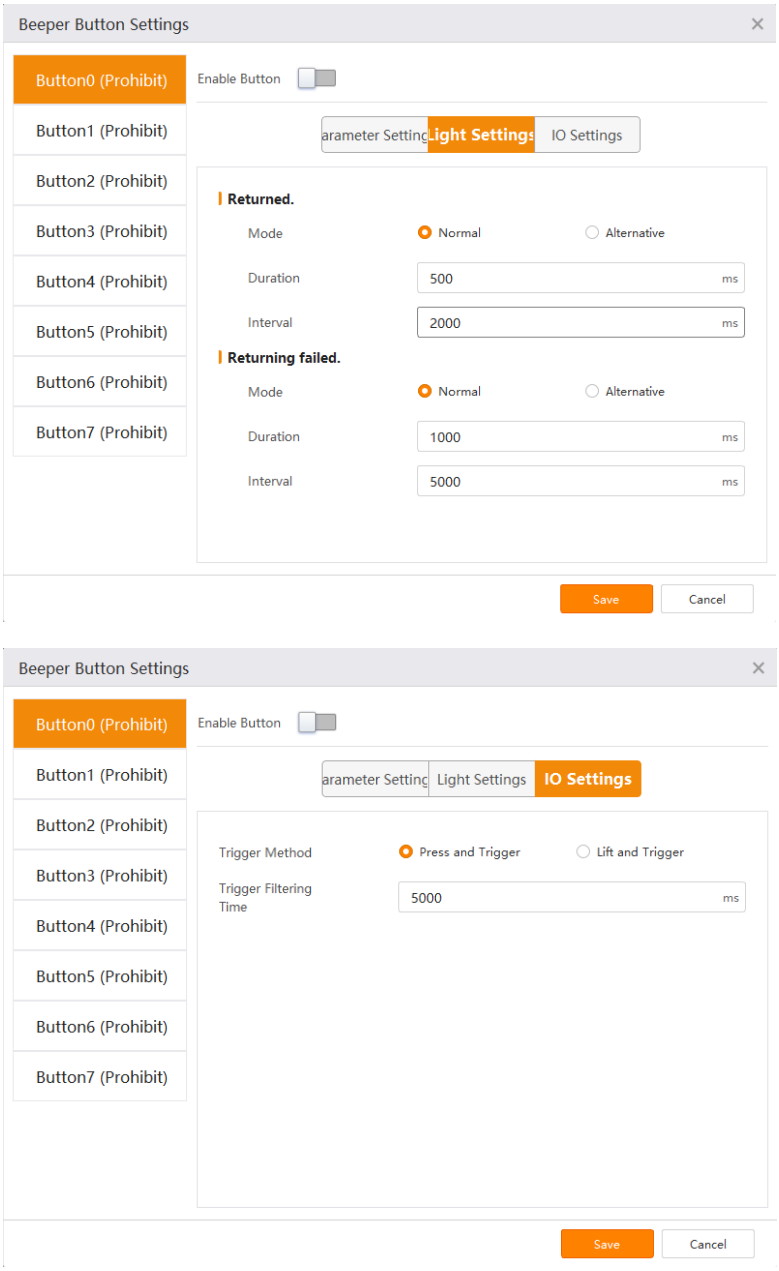


Figure 5-3 Caller Settings

All buttons can be configured in terms of parameter, light, and I/O.

Parameter configuration includes method name (execute next task, generate task order, and customize), main task type, point, point set, container type, AMR No., and third-party URL.

Light configuration includes the displaying mode (solid and blinking), duration, interval, and pin No. when a success or failure message is returned.

I/O configuration includes the triggering method (press to trigger and release to trigger), level (low level and high level), filtering interval, and pin No.

Click **OK**, and the status will be changed to configured.

5.2 Automatic Door

Go to **Third-Party Device** > **Automated Door**, click **Add** to enter the configuration information in the pop-up window, and click **OK** to save the automatic door. The No. should be unique.

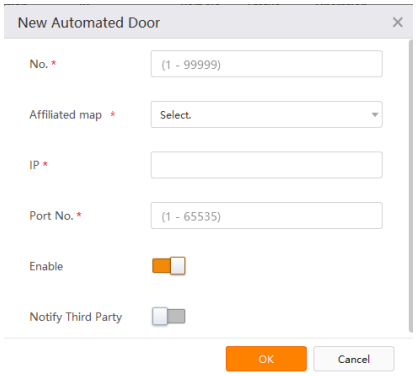


Figure 5-4 Create Automatic Door

Click **OK**, and the new record will be added to the automatic door list.

In addition, in the operation column, you can click **Edit** to edit the information, and click **Delete** to delete the information. After the automatic door is configured, you should restart RCS manually.

5.3 Other Third-Party Devices

Other third-party devices include goods detector, roller, camera, and stacker crane. Go to **Third-Party Device** > **Other Devices**, click **Add** to enter No., IP address, and port No. and select map and third-party device type in the pop-up window, and click **OK** to save the device.

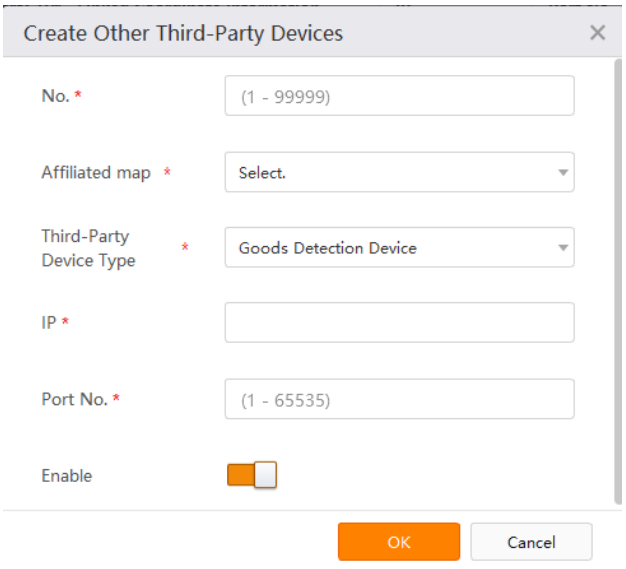


Figure 5-5 Create Other Third-Party Devices

The new record will be added to the list of other third-party devices. The coordinates of the devices should be linked to the topological map. Click **Select** and drag to select the area to determine coordinates.

Note

Make sure the selected area includes working area elements.

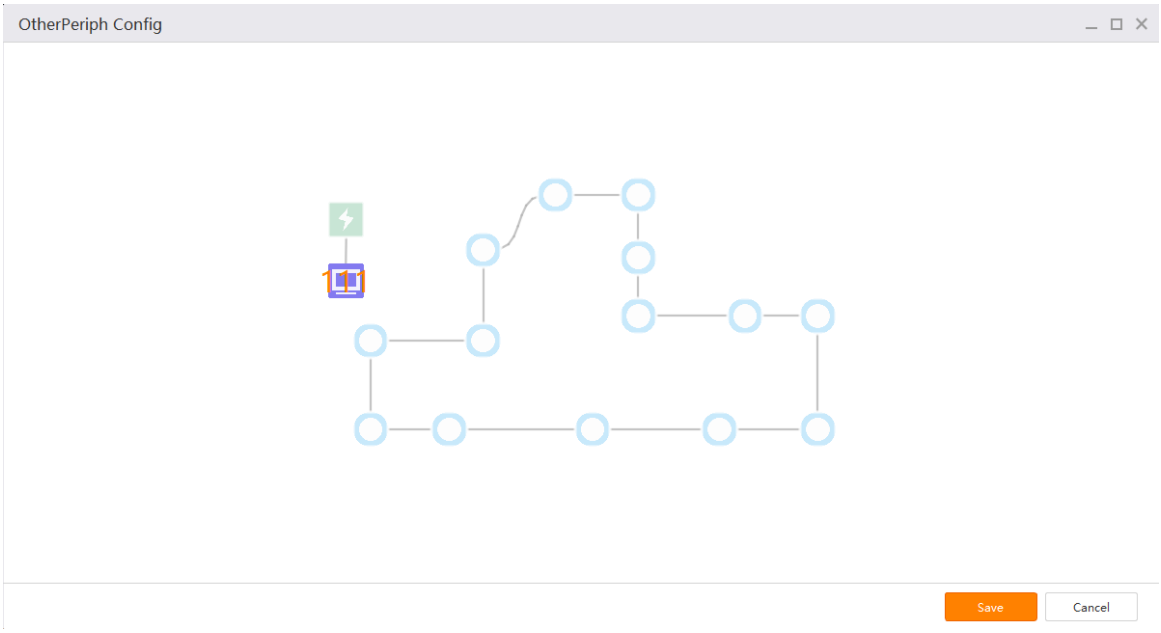


Figure 5-6 Link Coordinates of Other Third-Party Devices

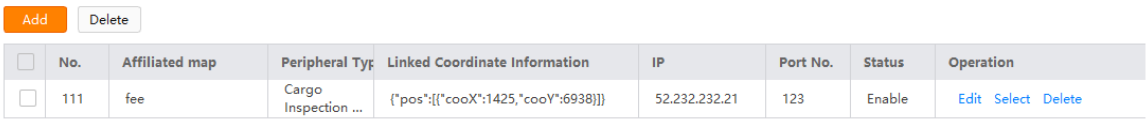


Figure 5-7 Configured Other Third-Party Devices List

Chapter 6 Control Scheduling

6.1 Send Commands to AMR

The commands sent to AMR include continue, pause, resume, and shutdown. You can enter either AMR No. or location No. If both are entered, AMR No. will be used.

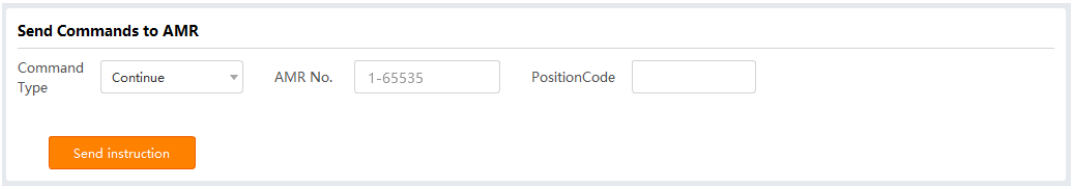


Figure 6-1 Send Commands to AMR

Click **Send Instruction**, if a success message is returned, the command will be sent to the specified AMR or the AMR at the specified position, and the execution status of the command can be viewed in Monitor Manage. Otherwise, you will be prompted with corresponding message.

6.2 Abnormal AMR Replacement

During task execution, when AMR is in an abnormal status due to uncontrollable factors, it should be replaced with a new AMR. Because the abnormal AMR stores task data, the data should be migrated to the new AMR, and in this case, the function of abnormal AMR replacement is needed.

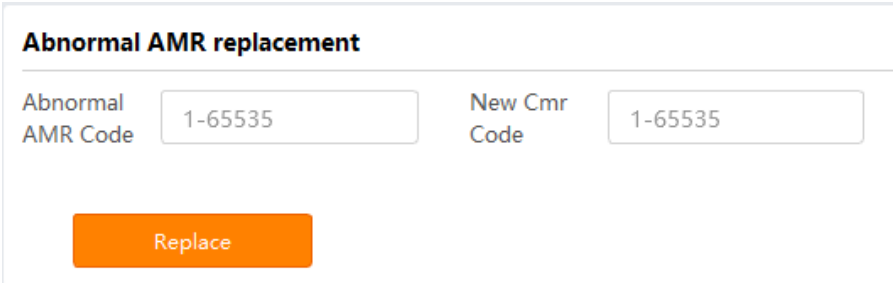


Figure 6-2 Abnormal AMR Replacement

After entering abnormal AMR No. and new AMR No., click **Replace**, and the data will be migrated.

6.3 WCS Exception Handling

When tasks of WCS are blocked or when exception occurred, this API can be used for quick handling. In this case, device type is automatic door, device No. is the automatic door No., and application ID is the application No. of the automatic door for task execution.

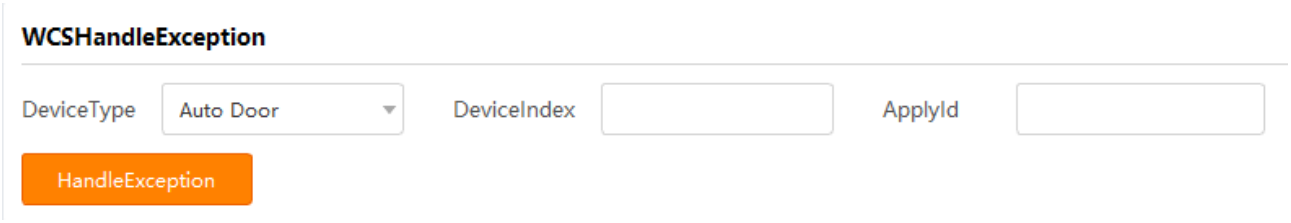


Figure 6-3 WCS Exception Handling

After entering device No. and application ID, click **Handle Exception**. If the information is correct, a success message will be returned; if the information is incorrect, specific error information will be returned.

6.4 Third-Party System Interaction

During using, if you need to test whether the API is functioning normally or to simulate the response of the API, you can use this API. The API includes URL, sending content, and receiving content. The URL needs to be filled with a full path, and both the URL and the sending content are required. The receiving content is the return value of the API and does not need to be entered.

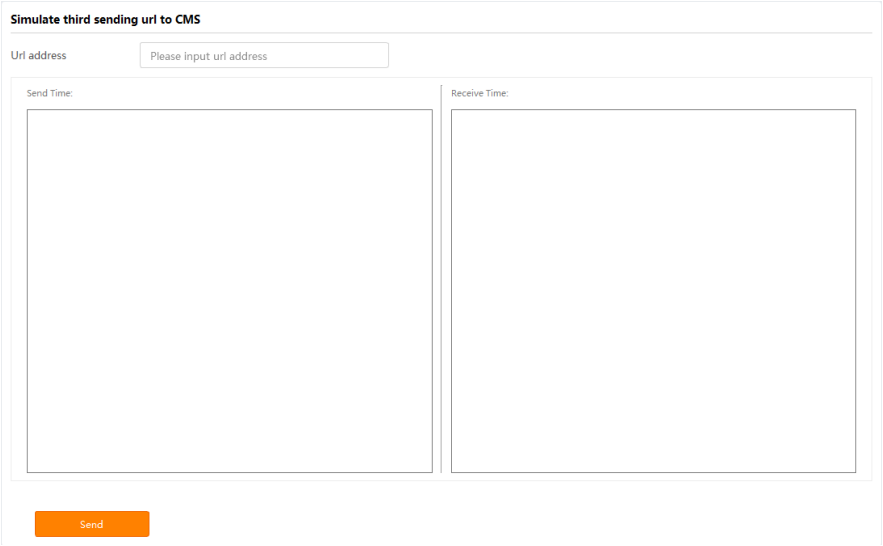


Figure 6-4 Third-Party System Interaction

After entering the URL and the sending content, click **Send**, and the response to this request will be displayed in the Receive Time box. You can also judge whether the request is normal based on the result returned by the API.

Chapter 7 Monitoring

7.1 Monitoring Interface

This module supports displaying up to four maps simultaneously, and you can view the operation of AMRs on the map in real time. You can choose to zoom in on one map for a closer look, or to zoom out and view all four maps.

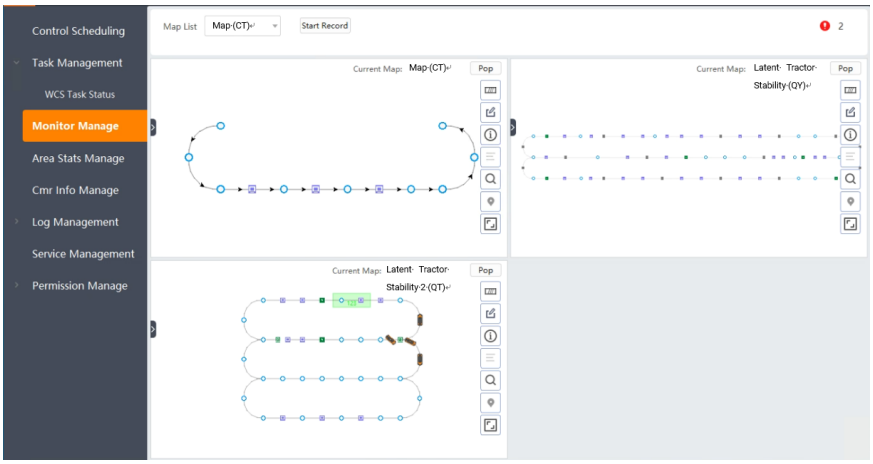


Figure 7-1 Monitoring

7.2 Device Monitoring

The interface can display the status (online, offline, or abnormal) of AMRs. When double-clicking an AMR, you can view the detailed real-time information in the pop-up window, including AMR IP address, position, and status indicator. You can also control AMRs in this interface. When commands are sent, AMRs will respond accordingly. In the lower-right corner of the interface, there are features including map attribute filtering, AMR No. generating, coordinates searching, map relocating, and map displaying in full screen.

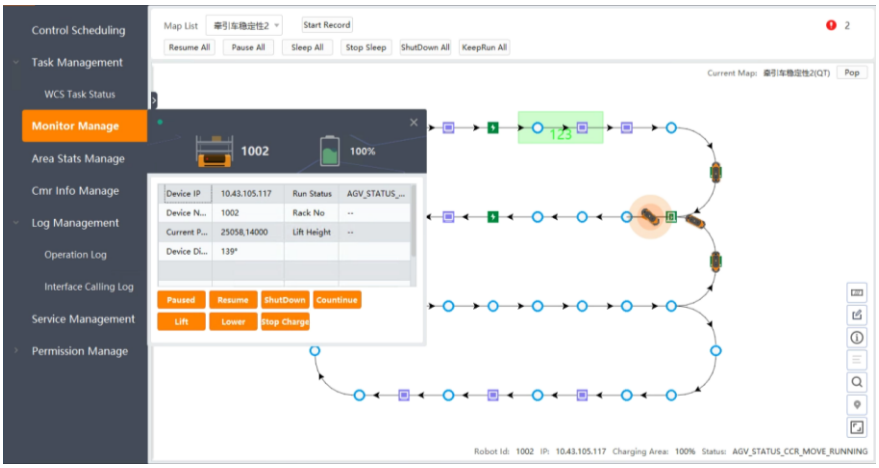


Figure 7-2 Device Management

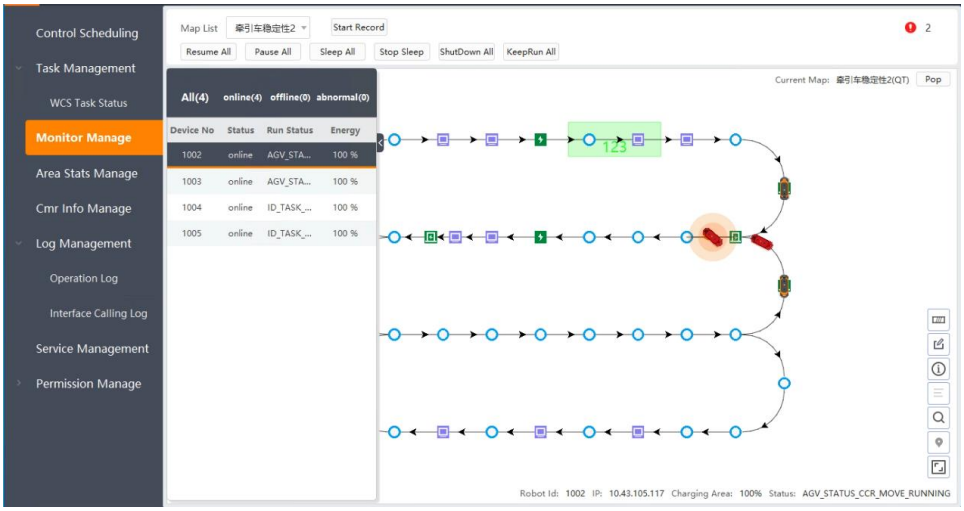


Figure 7-3 Device List

Note

When AMR is applying for loops, it cannot be controlled by commands sent in Monitor Manage. At this time, it can only be given a continue command sent in Control Scheduling.

7.3 Monitoring Playback

Click **Start Record** on the top to record the real-time operation status of devices on the current map. Once the recording has finished, you can click **Stop Record** to end it.

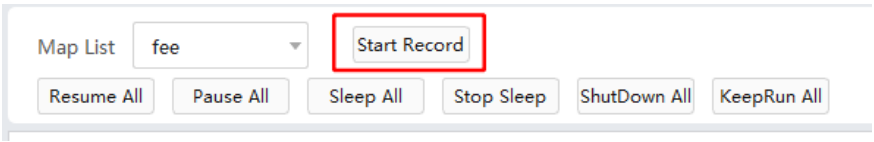


Figure 7-4 Start Recording

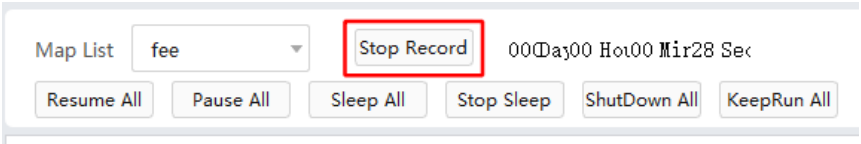


Figure 7-5 Stop Recording

Note

Saving path of recording files by default: RcsLite\Video\MapName.

Go to RcsLite\MonitorPlayer directory, and double-click MonitorPlayer.exe to run the client. Click **Open File**, select the recording file, and click **Open**.

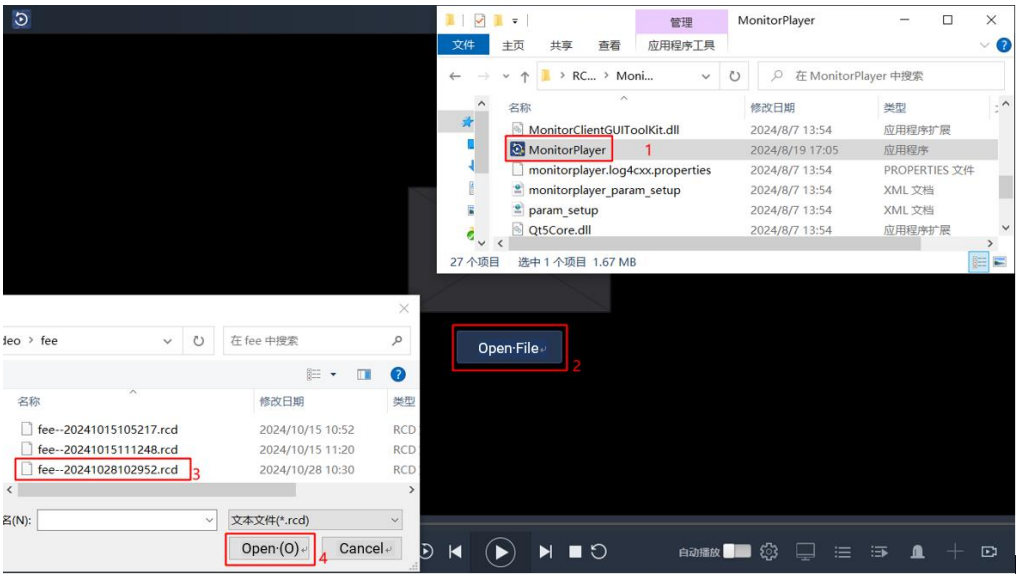


Figure 7-6 Open Recording File

Click  to play the file.

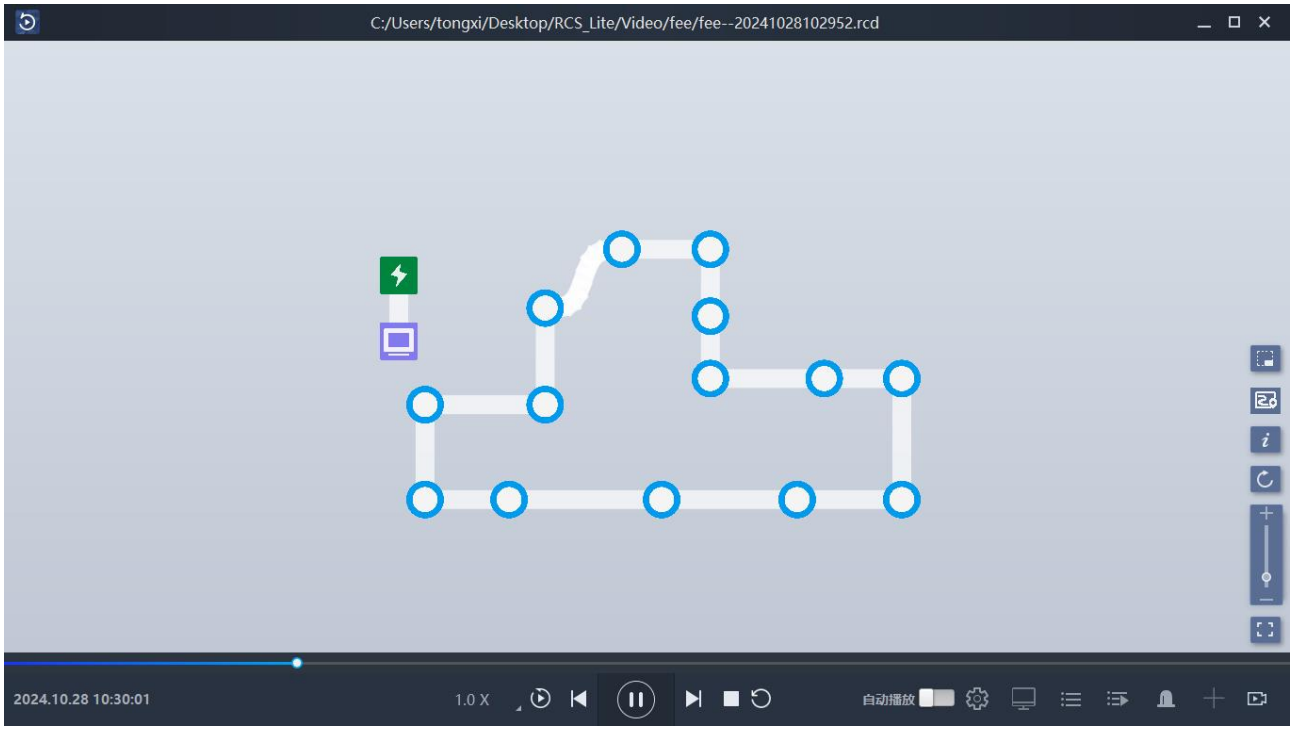


Figure 7-7 Play Recording File

The client supports showing tasks, blocked areas, routes, pre-scheduling tasks, device list, device details, file details, and alarms.

Chapter 8 Area Management

This interface will display all the area information configured on the map, including area No., area name, area type, map, area range, status, and AMR No.

On the top of the interface, you can search for corresponding area based on map, area type, and status.

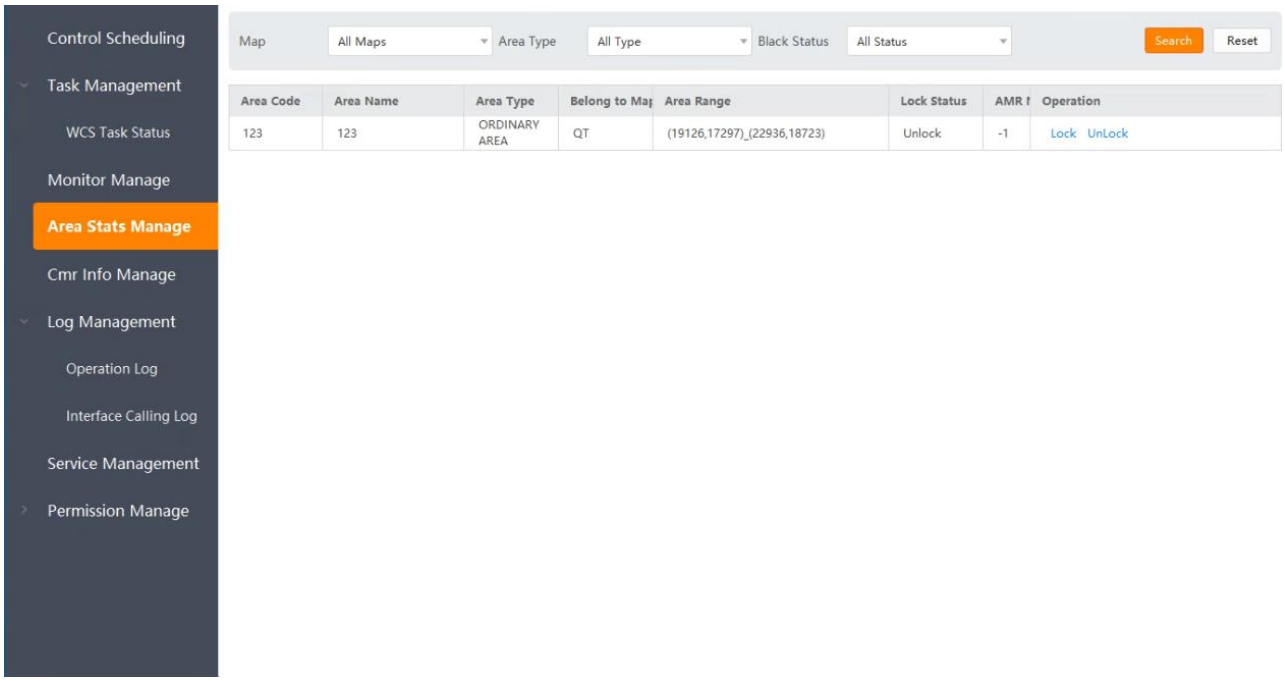


Figure 8-1 Area Management

In the operation column of each row, there are lock and unlock buttons.

Click **Lock** to lock the area. AMR cannot directly enter locked areas and should apply for access to enter. After it passes through the applied area, the area will automatically get relocked. When there is an AMR in the locked area, AMRs outside the area cannot apply to enter and should wait until the inside AMR leaves the area.

Click **Unlock** to unlock the area.

Chapter 9 Application Status Management

The interface displays the application status of AMRs during operation, including application No., task order No., AMR No., status, application type, applied action, object, creation time, status changing time, and content.

On the top of the interface, you can search based on AMR No., time, application type, application No., status, object, and task order No.

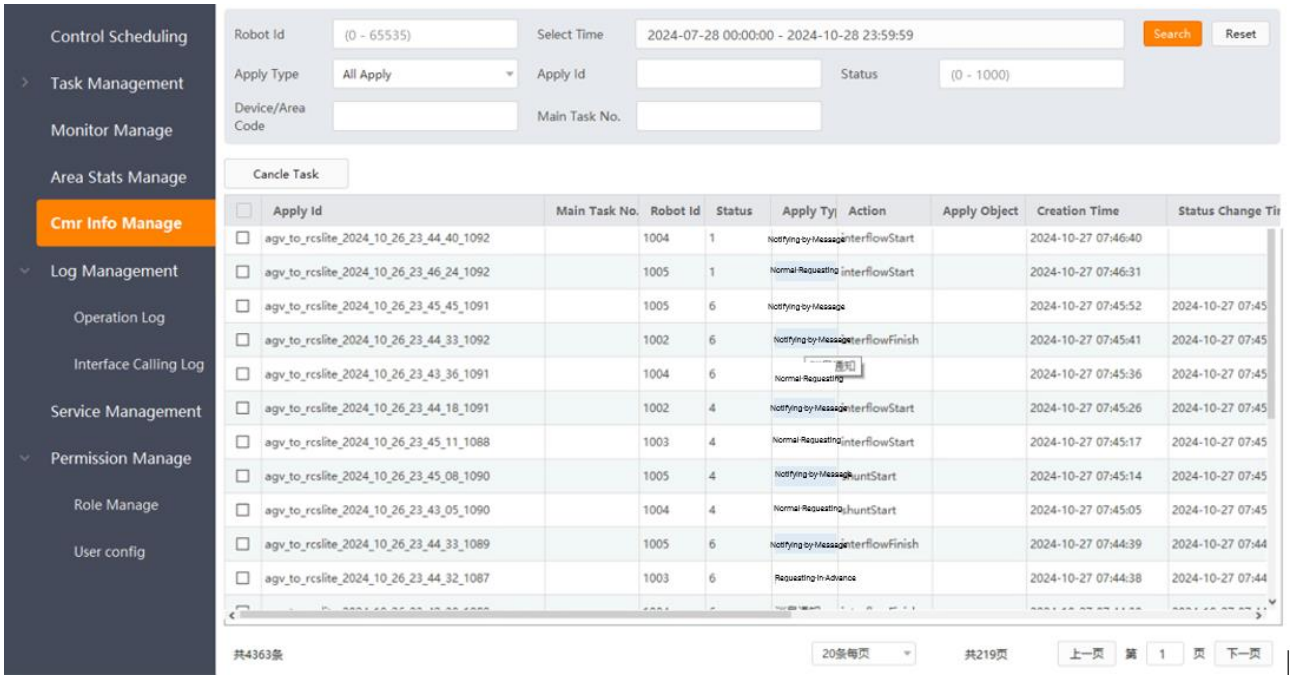


Figure 9-1 Application Status Management

Select the application task to be cancelled, and click **Cancel Task** in the upper-left corner to cancel the task.

Chapter 10 Log Management

10.1 Operation Log

Log Management is divided into Operation Log and Interface Calling Log. Operation Log displays all the operations you performed in a tabular form, mainly showing user name, user IP address, log content, and operation time.

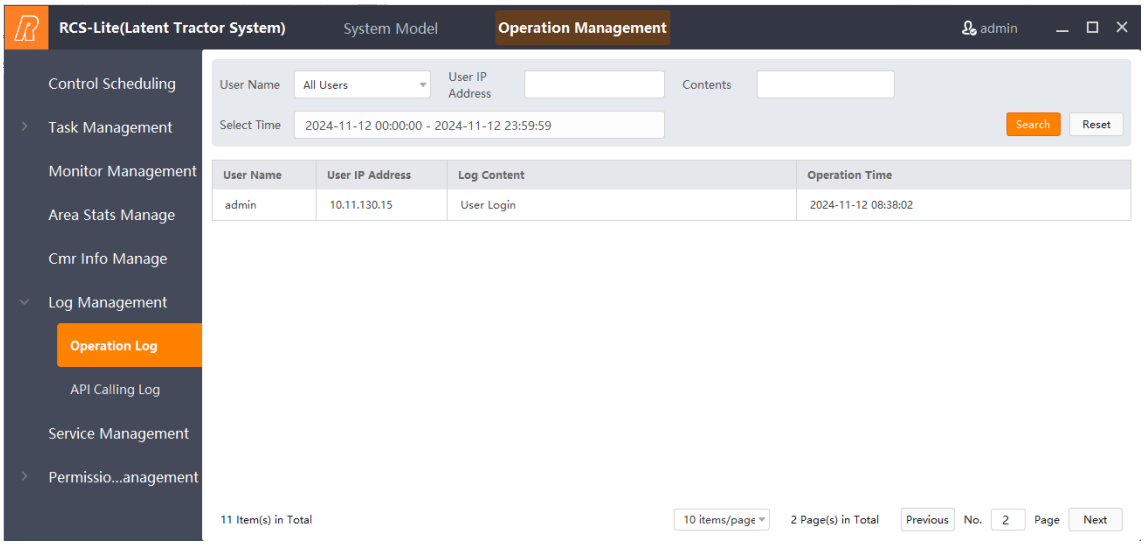


Figure 10-1 Operation Log Management

You can search the log by selecting the specified user in the user drop-down list, entering IP address in the user IP address box, entering content in the contents input box, and clicking time selector to select the date.

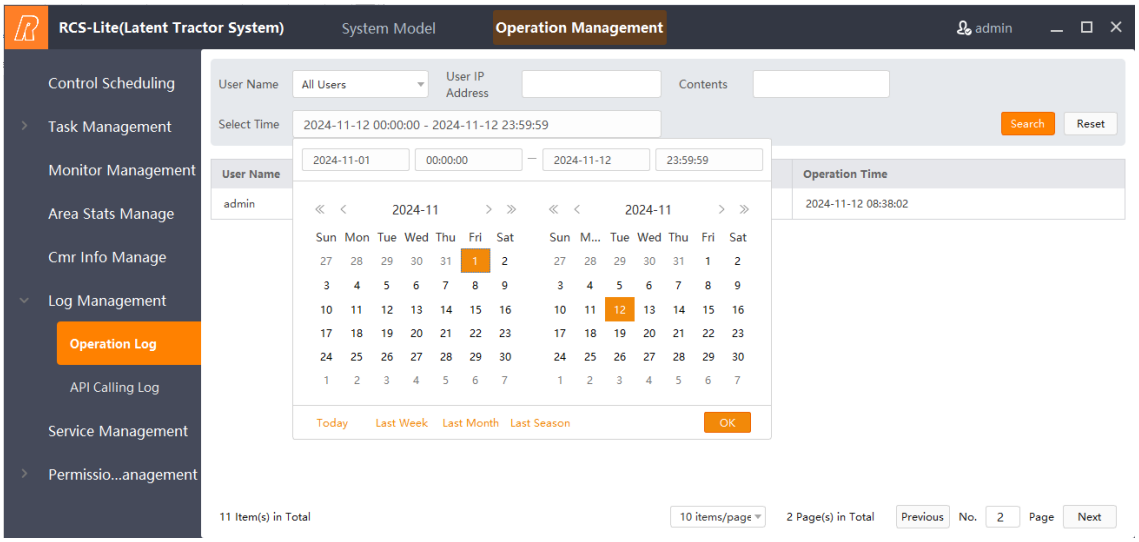


Figure 10-2 Data Selection

You can directly select two dates and click **OK**, or you can click **Today**, **Last Week**, **Last Month**, or **Last Season** for searching. Click **Reset** to clear all search conditions. Click **Previous** or **Next** of the pagination bar at the bottom to go to the previous or next page. You can set the number of items displayed per page. You can also enter the page No. to go to the specified page.

As for RCS-Lite V1.5, you can download historical maps in Operation Log by clicking the item marked in blue in the log content column. Saving path of historical maps by default: RcsLite\cms\mapBak.

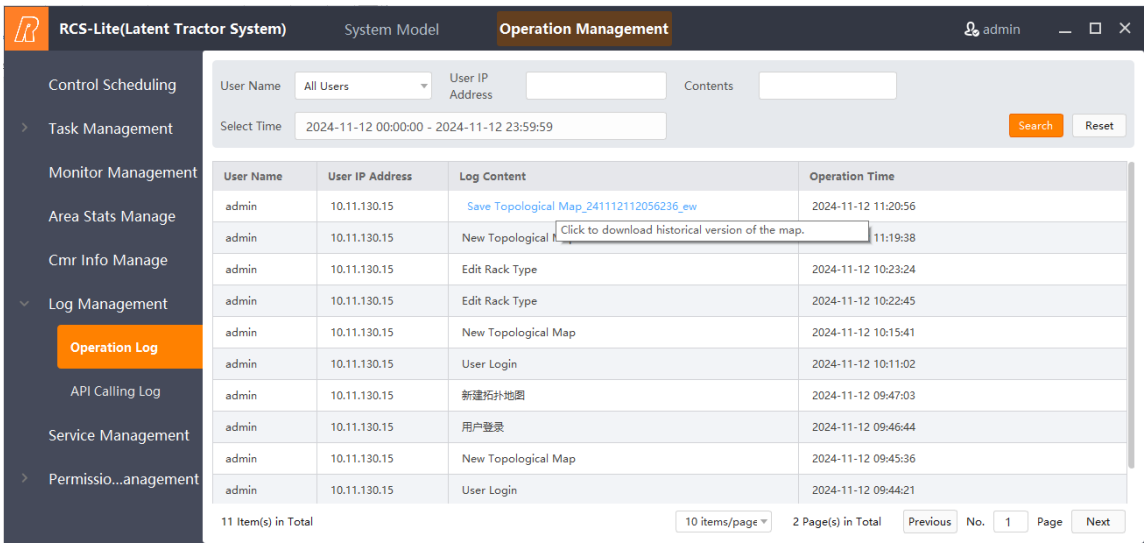


Figure 10-3 Download Historical Maps

10.2 API Calling Log

API Calling Log displays the calling status of all service APIs, including terminal type, API method name, API input parameters, calling status, and returned results.

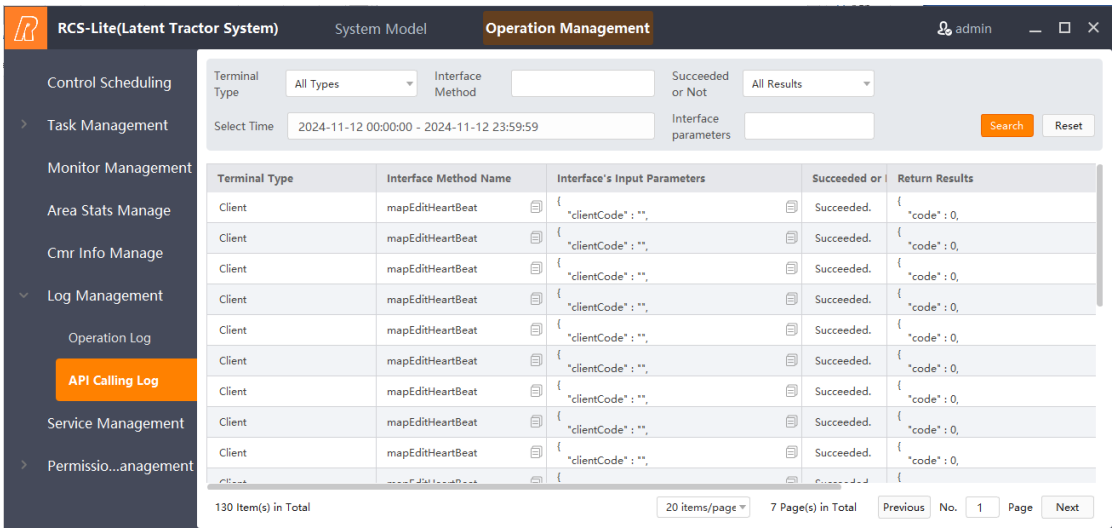


Figure 10-4 API Calling Log

Similar to Operation Log, API Calling Log allows searching based on terminal type, API method name, calling status, and time. The bottom bar allows setting the number of items displayed per page, going to the previous or next page, and entering the page No. to go to the specified page. Click **Reset** to clear all search conditions, and all data will be displayed.

Click  next to each data to copy the corresponding data information.

Chapter 11 Service Management

11.1 Service Management

You can restart, start, and close AMS, WCS, and RCS services.

Select the corresponding service and click **Restart** to restart the selected service.

Click **Start** to start the selected service.

Click **Close** to close the selected service.

The status indicator in the table shows the status of the server. If the server is started, the indicator turns green; otherwise, the indicator turns red.

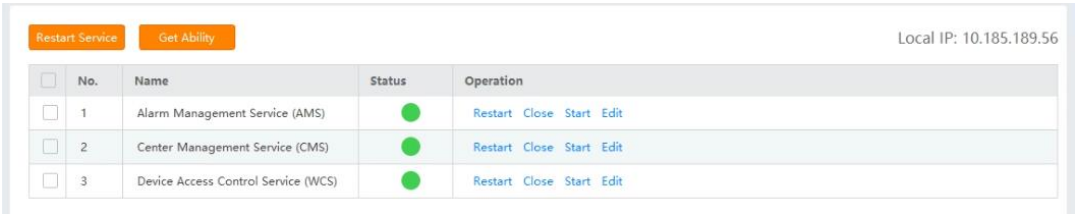


Figure 11-1 Service Management

The Get Ability button is on the top of the interface.

You can directly get the capability set of a service, check whether its parameter configuration is reasonable, and edit the capability set configuration.

11.2 License Management

You can view the remaining days before the license expires. If the remaining days are less than 7 days, you will be prompted when logging in.

Figure 11-2 License Prompt

After the license expired, you should enter a new activation code in the login page. Otherwise, you will be prompted that the license is expired and that you cannot use the system.

Chapter 12 Permission Management

RCS-Lite V1.5 adds permission management function, which is composed of role management and user management. With this function, you can control the pages that can be operated by roles with different permissions.

12.1 Role Management

In this interface, the information of each role is displayed in a tabular form, including role name and role status.

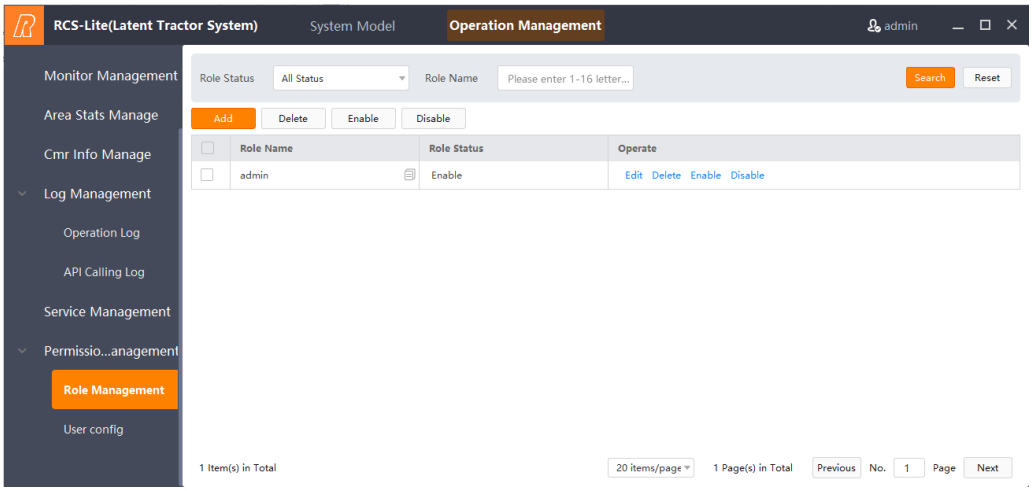


Figure 12-1 Role Management

- Add Role: Click **Add** to add a new role and configure the permission for the role to access various pages.

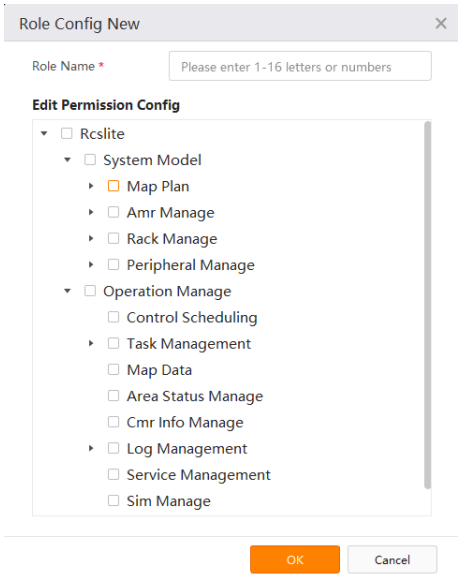


Figure 12-2 Create Role

- Edit Role: Click **Edit** in the operation column to edit the permission for the role to access various pages. The role name cannot be edited in the editing interface.
- Delete Role: Click **Delete** in the operation column to delete a single role. You can also select multiple roles and click **Delete** on the top of the table to batch delete them.
- Enable or Disable Role: Click **Enable** or **Disable** in the operation column to enable or disable a single role. You can also select multiple roles and click **Enable** or **Disable** on the top of the table to batch enable or disable them.

Note

Super administrator (admin) cannot be edited, deleted, or disabled.

- Search for Role: You can search for the role by selecting role status or entering role name on the top of the interface.

12.2 User Management

In this interface, the information of each user is displayed in a tabular form, including user No., user name, user status, and linked role.

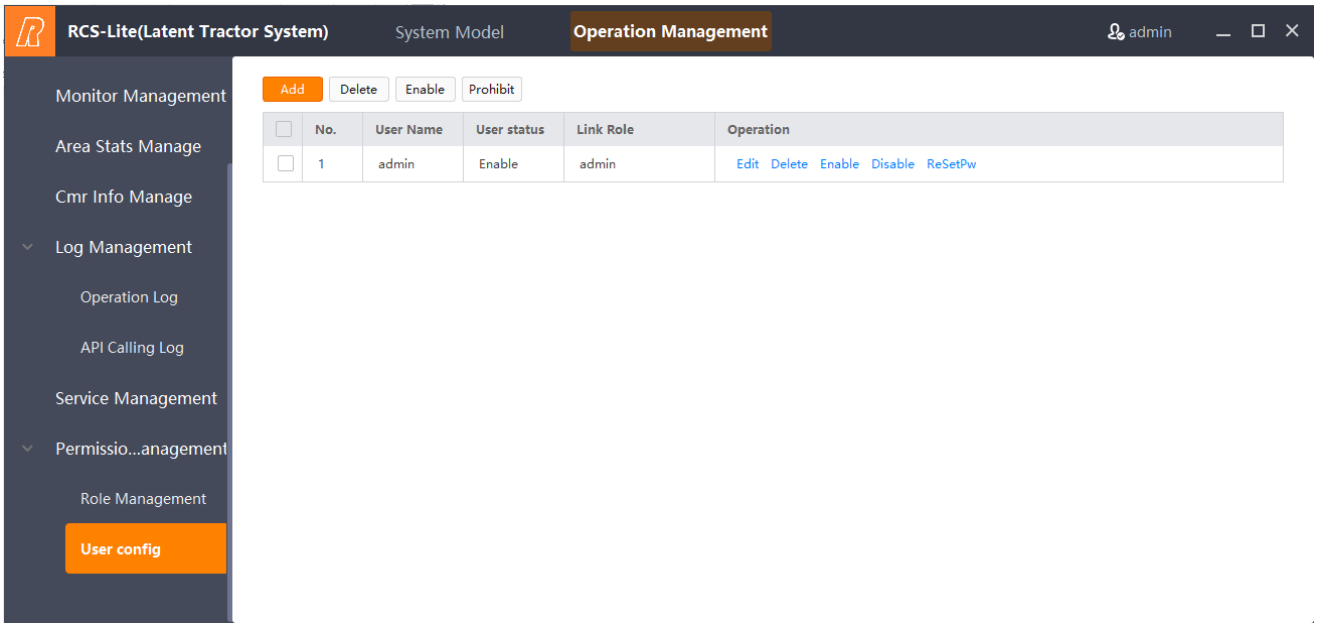


Figure 12-3 User Management

- Add User: Click **Add** on the top of the page to add a new user and configure user name, password, and its role.

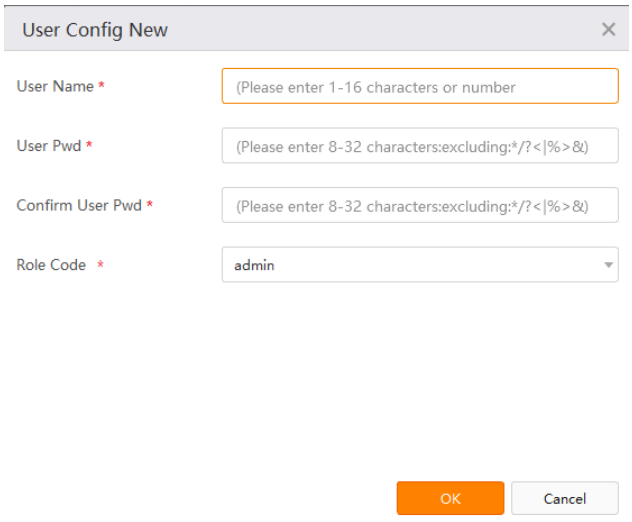


Figure 12-4 Create User

- Edit User: Click **Edit** in the operation column to edit the role of the user. User name cannot be edited in the editing page.
- Delete User: Click **Delete** in the operation column to delete a single user. You can also select multiple users and click **Delete** on the top of the table to batch delete them.
- Enable or Disable User: Click **Enable** or **Disable** in the operation column to enable or disable a single user. You can also select multiple users and click **Enable** or **Disable** on the top of the table to batch enable or disable them.
- Reset Password: Click **ReSetPw** in the operation column to reset the password of the user.

Note

Super administrator (admin) cannot be edited, deleted, or disabled, and its password cannot be reset.

Appendix A Terminology

Term/Abbreviation	Description
AMR	Automated Mobile Robot
RCS	Robot Control System
AMS	Alarm Management System
WCS	Warehouse Control System.
CMS	Central Management System