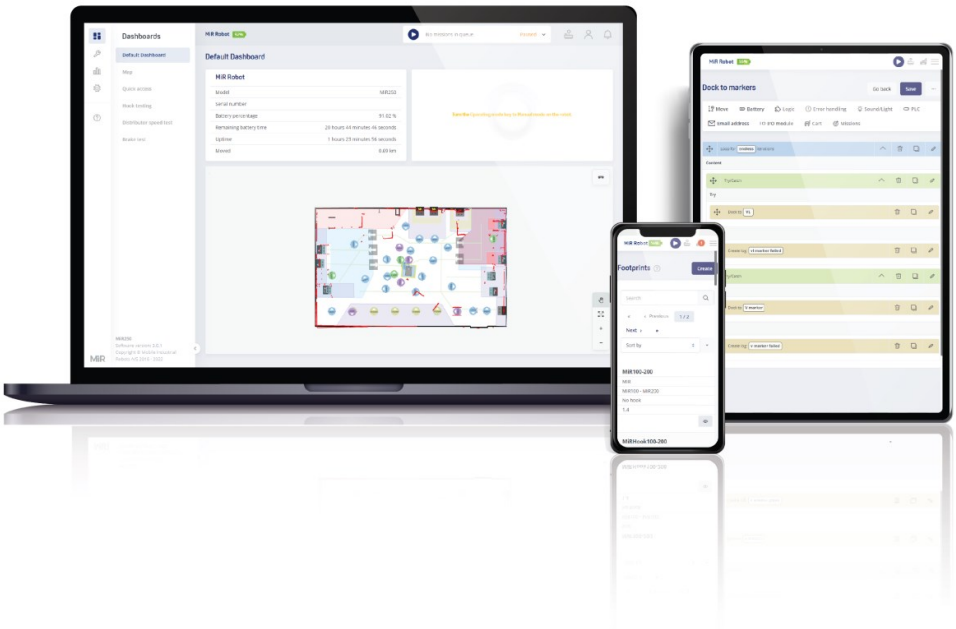
MiR Robot Interface Guide

Date: 12/2023
Version: 3.0 (en)
Software version: 3.x



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Original instructions (English)

Contact the manufacturer:

Mobile Industrial Robots A/S
Emil Neckelmanns Vej 15F
DK-5220 Odense SØ

www.mobile-industrial-robots.com
Phone: +45 20 377 577
Email: support@mir-robots.com

CVR: 35251235

1. About this document

This document describes the user interface and is intended for administrators of the MiR product and users responsible for updating the system regularly.

1.1 Where to find more information

For online courses to strengthen your understanding of MiR products, go to MiR Academy.

If you are looking for more documentation about all MiR products, go to MiR Support Portal where we have the following resources:

Documentation

- **Integrator Manuals** provide all the information you need to operate and maintain MiR robots. Integrator Manuals are available in multiple languages. These guides are intended for PCM (partly completed machinery) robots.
- **Quick starts** describe how you start operating MiR robots quickly. It comes in print in the box with the robots. Quick starts are available in multiple languages.
- **User guides** provide all the information you need to operate and maintain MiR products and how to set up and use top modules and accessories, such as charging stations, hooks, shelf lifts, and pallet lifts. User guides are available in multiple languages.
- **Risk assessment guide** describes how to conduct a risk assessment and provides some risk assessed use cases.
- **Commissioning guide** provides examples and guidelines to commission your robot successfully.
- **Interface guides** contain descriptions of all the elements of the robot interface and MiR Fleet interface. Interface guides are available in multiple languages.
- **Best practice guides** provide helpful information you can use when commissioning or operating your robot.
- **REST API references** for MiR robots, MiR Hooks, and MiR Fleet. HTTP requests can be used to control robots, hooks, and MiR Fleet.
- **MiR Network and Wi-Fi guide** specifies the performance requirements of your network and how you must configure it for MiR robots and MiR Fleet to operate successfully.

- **Migration guides** describe how to upgrade your MiR system from one major software version to the next.
- **Cybersecurity guide** provides important information and instructions to increase the cybersecurity of your MiR product.
- **How-to guides** are short guides providing instruction for maintenance, replacement, commissioning, and other tasks related to MiR products.
- **Troubleshooting guides** can help you determine the cause of an issue you are experiencing with your MiR product and how to resolve it.
- **Release notes** of new products and hardware updates that describe what has been changed and why.
- **Service notes** notify of issues identified in MiR products and changes that are applied.
- **Spare parts and additional products** list all spare parts and accessories you can order for robots.
- **Warranty** describes the MiR standard warranty agreement.
- **Certificates and declarations** for MiR products that prove compliance with standards.
- **Technical guides** provide in-depth information about how MiR products work.

Models and drawings

- **Wiring diagrams** are graphic representations of how the components in MiR robots are wired.
- **CAD files** of the robots that are made to scale can be used to help determine the dimensions of the robot or for illustrative purposes.

Resources

- **MiR Log Analytics** and **MiR Insights** are tools you can use to analyze how well your robots or fleet are performing. MiR Log Analytics is a free tool that lets you analyze recorded performance from error logs, and MiR Insights requires a paid license, but runs continuously alongside MiR Fleet to give real-time data on several metrics.
- **AprilTag** collection can be used instead of generating your own AprilTags.
- **Space calculator** determines the approximate amount of space your MiR robot will need to operate depending on the size of its footprint.
- **Community** is a forum of MiR users with a collection of questions, recommendations,

webinars and other community driven material.

- **Marketing and brand portal** is a collection of our graphical elements where you can download color schemes, rendered images of the robots, and icons.

1.2 Version history

This table shows current and previous versions of this document.

Revision	Description
3.0	**Date:** 2023-12-05 **SW version:** 3.3.2 • Updated for 3.x software with new user interface and new functions. Affects all sections.
2.5	**Date:** 2022-11-21 **SW version:** 2.13.4 • Changed title of document from *MiR Robot Reference Guide* to *MiR Robot Interface Guide*. • Added information about Action rate limiter. Affects section: Start mission.
2.4	**Date:** 2022-04-26 **SW version:** 2.13.1 • Improved descriptions for Mute Protective fields action and roll back. Affects section: Safety system (Mission actions) and Backups • Can enable static gateway in Advanced Wi-Fi settings Affects section: Settings
2.3	**Date:** 2021-09-16

Revision	Description
	SW version: 2.13.0 • Added MiR600, MiR1350, and MiR250 Hook Affects sections: Signing in and Footprints • Can set joystick speeds on the dashboard Affects section: Dashboards • New Wi-Fi settings Affects section: Settings • Added Modbus registers overview Effects section: Modbus registers
2.2	**Date:** 2021-02-09 **SW version:** 2.10.3.1 • Added Proximity sensors settings Affects sections: Settings and Robot setup
2.1	**Date:** 2020-09-11 **SW version:** 2.10.0 • Changes in cart calibrations for MiR hooks Affects section: Carts • Removed default users Affects sections: Signing in
2.0	**Date:** 2020-03-30 **SW version:** 2.8.0 • Added marker types, used for robots driving with shelves New section: Marker types

Revision	Description
	• Added a graphic Footprint editor Affects section: Footprints
1.9	**Date:** 2019-03-06 **SW version:** 2.6.0 • Map zones have been reconstructed and new zone settings are available Affects section: Maps
1.8	**Date:** 2018-10-01 **SW version:** 2.3.0 • Added speed control action Affects section: Missions
1.7	**Date:** 2018-07-20 **SW version:** 2.2.0 • I/O module feature replaces Bluetooth feature. Affects sections: I/O modules, Dashboards, Missions, and Maps. • Updated sound feature. Affects sections: Missions and Maps
1.6	**Date:** 2018-06-18 **SW version:** 2.1.0 • Added Directional zones which define which direction the robot can travel in certain areas. Affects section: Maps

Revision	Description
1.5	**Date:** 2018-05-24 **SW version:** 2.0.18 • Added a Mission log to log information about executed missions Affects section: Mission log • Added a Wi-Fi watchdog parameter. Affects section: Advanced settings
1.4	**Date:** 2018-04-19 **SW version:** 2.0.17 • Added a new Hook widget. Affects sections: Dashboards • Added Modbus support. Affects sections: Triggers and Modbus registry
1.3	**Date:** 2018-01-26 **SW version:** 2.0.15 • Redesigned Dashboard with flexible widgets and new options Affects section: Dashboards • Added Path guides for precise control of robots´ paths between two positions Affects section: Path guides • Positions & Mapping section removed and fully integrated in Mapping section Affects section: Maps
1.2	**Date:** 2017-12-06 **SW version:** 2.0.14

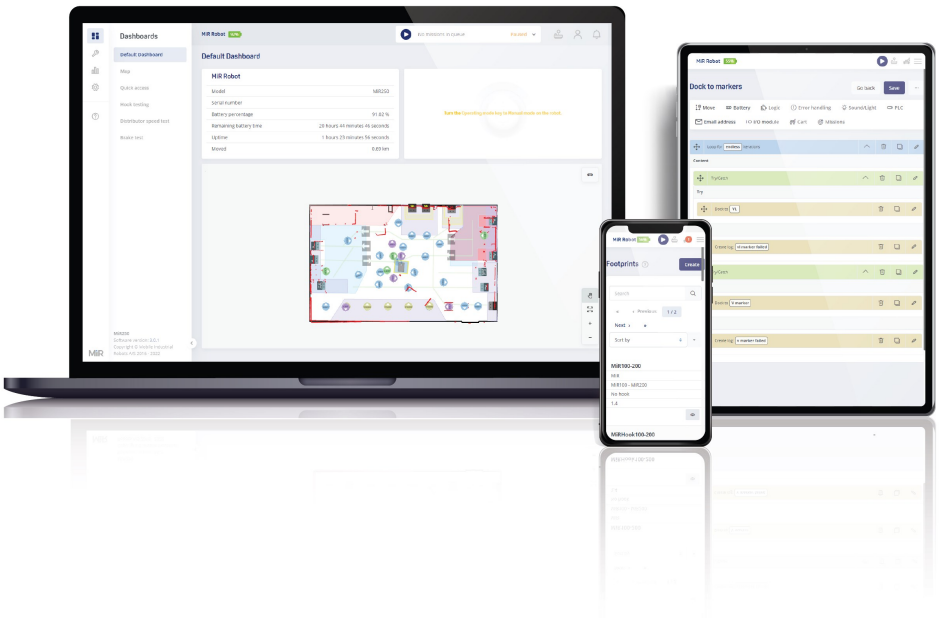
Revision	Description
	• Added new widgets and improved mapping editor. Affects sections: Dashboards and Maps • Jumping from 2.0.2 to 2.0.14 to align with old interface versions 1.8.14/1.9.14.
1.1	**Date:** 2017-10-30 **SW version:** 2.0.2 • Added Continue/Pause button added to top bar. • Added Pause action to Missions Affects section: Mission actions
1.0	**Date:** 2017-03-02 **SW version:** 2.0 First edition

2. The robot interface

The MiR Robot interface requires certain specifications of the device it is running on:

- The device must have at least 2 GB RAM, preferably 4 GB or more.
- The device must be running one of the latest two versions of the following browsers:
  - Chrome
  - Firefox
  - Edge
  - Safari
- Hardware acceleration must be enabled on the browser you are using. Hardware acceleration is always enabled if you are using a mobile phone or tablet, but not on PCs. See your chosen browser's documentation for information on how to enable hardware acceleration.

The interface is responsive and automatically adapts to your use of smartphone, tablet, or PC.



2.1 Signing in

The interface comes with three default access levels:

- Distributor - the MiR distributor
- Administrator - the end-customer's production engineer with technical responsibility for the robot
- User - the daily operator(s) of the robot

There are two ways in which you can sign in to the robot interface:

- Username and password
- PIN code

System permissions are handled per user group whereas sign-in credentials are handled per individual user. Read more in the sections "Users" on page 133 and "User groups" on page 128.

For more information about how to protect your system, see *MiR Cybersecurity Guide*. You can find this guide on MiR Support Portal.

Accessing the interface

To access the user interface, connect to the same network the robot is connected to, open your preferred web browser, and enter the IP address of the robot.

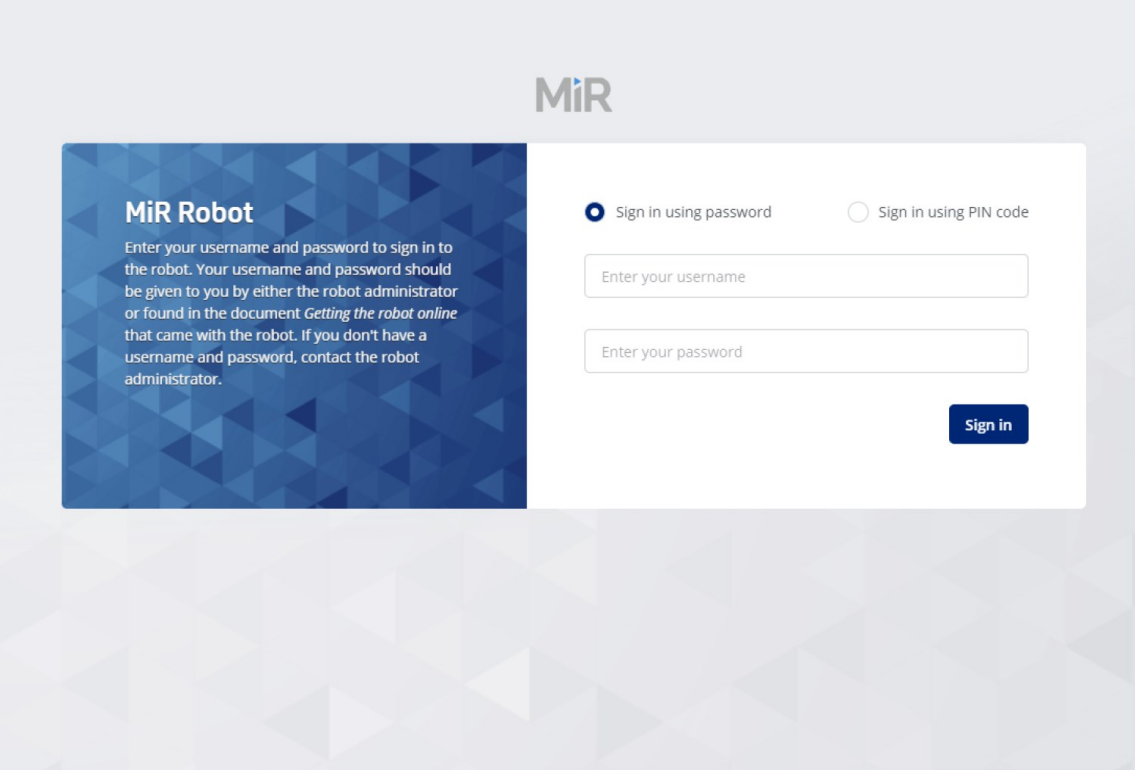
Username and password

Enter your username and password to sign in to the robot interface.

NOTICE

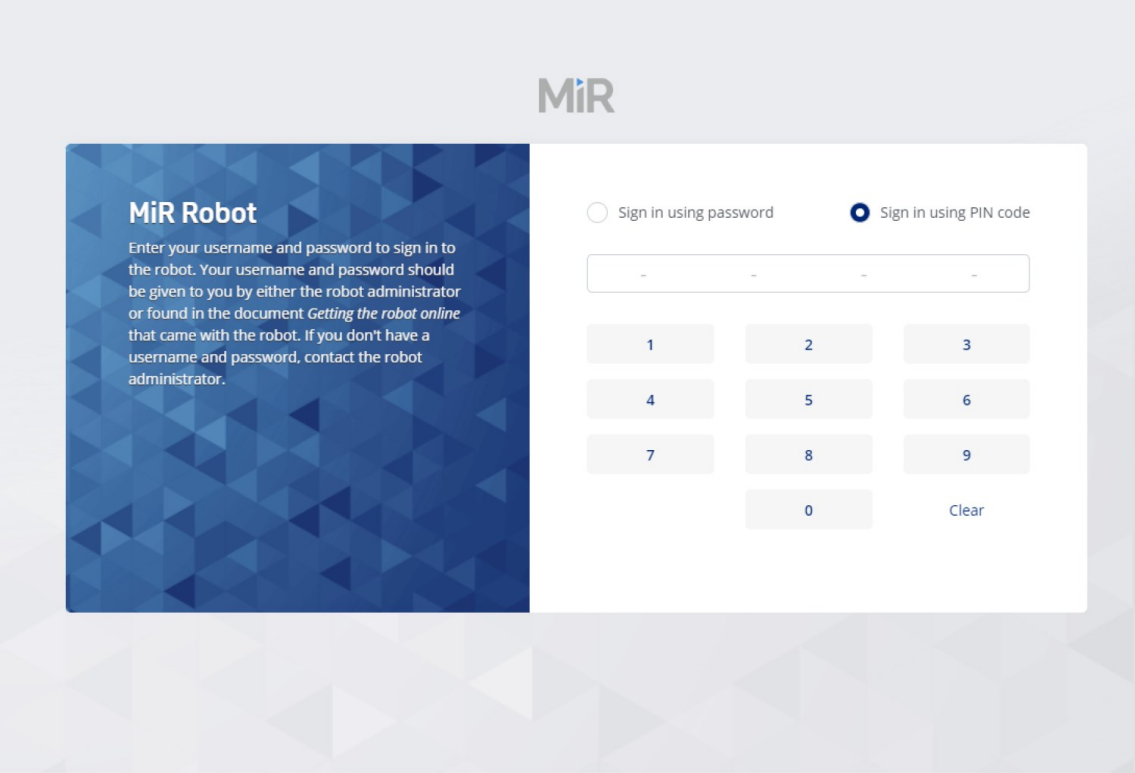
The original username and password for the robot's web interface are in the document *Getting the robot online*.
The unique password for the Wi-Fi access point is in the *Passwords* document. Both documents are in the box with the product.

After signing in the first time, we recommend to change the passwords of the default users: Distributor, Administrator, and User. See "Users" on page 133 to change the passwords.


MiR Robot
Enter your username and password to sign in to the robot. Your username and password should be given to you by either the robot administrator or found in the document Getting the robot online that came with the robot. If you don't have a username and password, contact the robot administrator.
Sign in using password
Sign in using PIN code
Enter your username
Enter your password
Sign in

PIN code

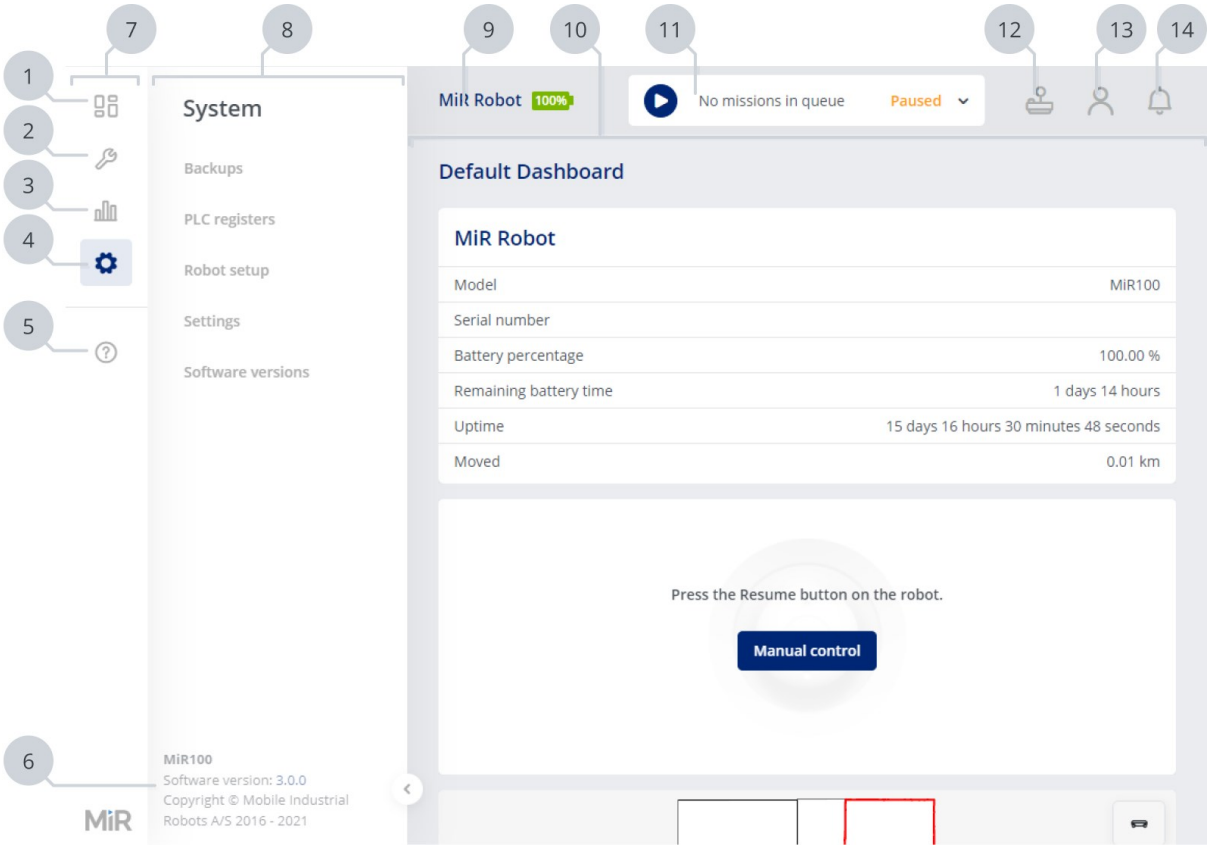
Selected users can also sign in using a PIN code. To enable this, see "Users" on page 133.



2.2 Navigating the MiR Robot interface

To access a section in the MiR Robot interface, first select an item on the main menu to the left, then select the relevant sub-menu. The section will then appear in the main window.

The top bar shows information on the current state of MiR Robot.



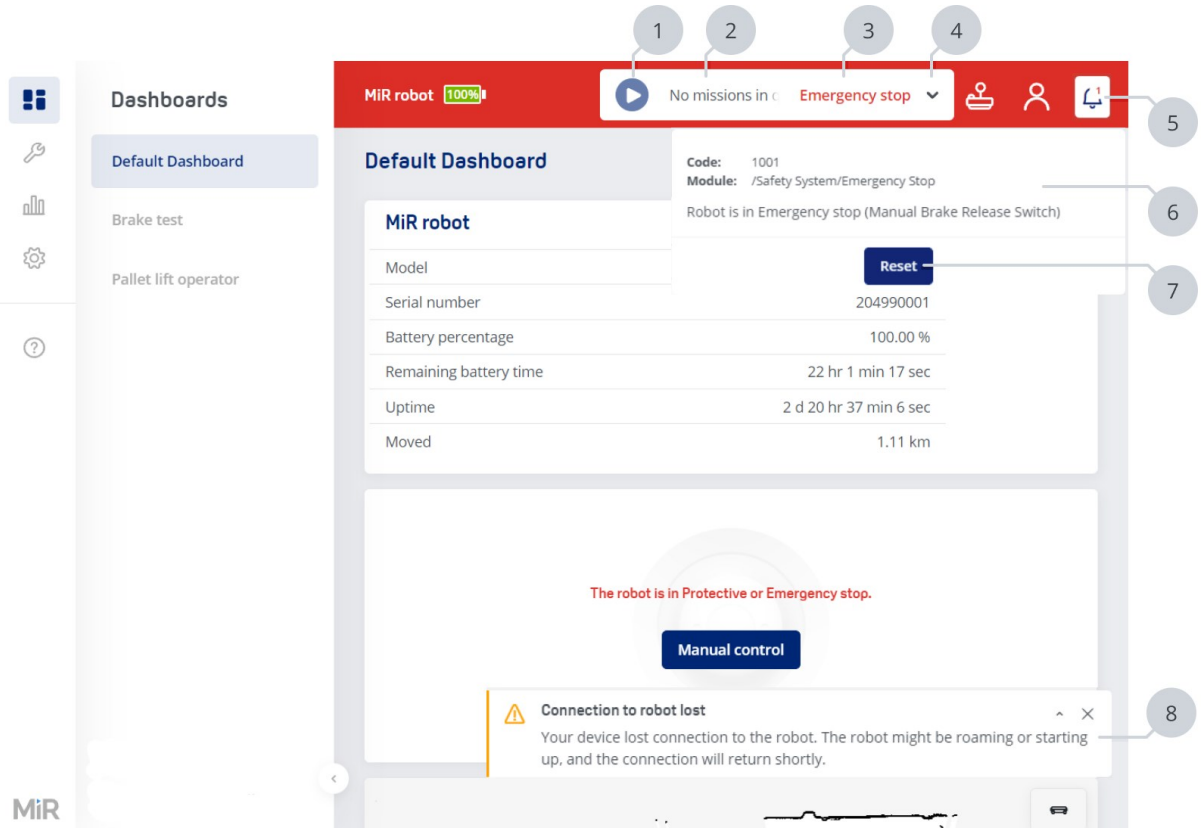
	Description		Description
1	**Dashboards** Contains all of the dashboards you create. Dashboards let you collect the main functions and features you need onto one page. To create and edit dashboards, see "Dashboards" on page 24.	2	**Setup** Contains the sub-menus needed to create and edit all of the site components—see "Setup" on page 24.
3	**Monitoring** Contains the sub-menus that let you see reported errors and system messages from MiR Robot—see "Monitoring" on page 138.	4	**System** Contains the sub-menus where you can modify MiR Robot system—see "System" on page 149.

	Description		Description
5	**Help** Contains the sub-menus that provide helpful information about MiR Robot—see "Help" on page 189.	6	**Software version** Identifies which software version MiR Robot is currently running. To update the software, see "Software versions" on page 182.
7	**Main menu** The main menu organizes the main pages into five categories. You must select an option in the main menu to then select a page in the interface.	8	**Main pages** All of the main pages are shown in the main menu categories. When you select a page from the menu, the main window shows the selected page.
9	**Robot name and battery percentage** The name of the robot and its current state of charge are shown here.	10	**Main window** Each section of the interface where you can edit or view information about MiR Robot is shown in the main window.
11	**Mission control** Provides status information about the current mission and lets you pause or continue the mission on the robot—see "Notifications and errors" on the next page.	12	**Manual control** Opens the manual control dialog box—see "Manual control" on page 20.
13	**User settings** Under the user settings, you can: • See which user you are logged in as and shortcut to the user editor page—see "Create user" on page 135.	14	**Reported errors** All errors from the robot are reported here—see "Notifications and errors" on the next page.

	Description		Description
	• Change which language the interface shows. • Sign out of the interface.		

2.3 Notifications and errors

The robot interface reports various errors and notifications to keep you up to date on the status of the robot and any missions it is executing.



	Description		Description
1	**Pause/Continue**	2	**Mission**

	Description		Description
	Toggles between pausing and continuing the current mission the robot is executing.		The mission that the robot is currently executing is shown here.
3	**State** The current state of the robot is shown here.	4	**Mission queue** Opens the mission queue list to see the upcoming missions that the robot will execute.
5	**Errors** If an issue on the robot is detected, an error is reported in the top bar. Select **Reported errors** to view all of the errors and see more details regarding the errors.	6	**Error message** The error message provides more information about the issue detected on the robot. It identifies which component is affected and what issue is detected. Use the guide *Error codes and solutions* to help resolve any issues. You can find this guide on MiR Support Portal.
7	**Reset** When you have taken action to resolve a reported error, select **Reset** to clear the reported error. If the robot still detects the issue, it will report the error again.	8	**Notification** Notifications appear at the bottom of the screen for more general information about MiR Robot, such as update or calibration progress and connection status.

2.4 Manual control

You can control the robot manually using the joystick in the interface.

CAUTION

When driving the robot in manual mode, it is possible to drive the robot into Forbidden zones and Unpreferred zones on the map. This can result in injury to personnel or damage to equipment if the robot is not driven carefully.

- Drive carefully to avoid collisions with any personnel or objects when driving the robot in Manual mode.
- Avoid driving the robot manually without a clear visual of the robot.

Drag the joystick in the direction you want the robot to move. The direction is relative to the robot, meaning that if you drag the joystick forward, the robot will drive straight in the direction it is currently facing.

For MiR100 and MiR200 you can enable **Reduced speed** to slow the robot down to 0.3 m/s. This keeps the size of the Protective fields small enough to enable the robot to drive close to obstacles.

For MiR250, MiR500, MiR600, MiR1000, and MiR1350 you can enable **Mute protective fields** to mute the Protective fields around the robot to enable the robot to drive close to obstacles. For safety reasons, this will also reduce the robot's speed to maximum 0.3 m/s.

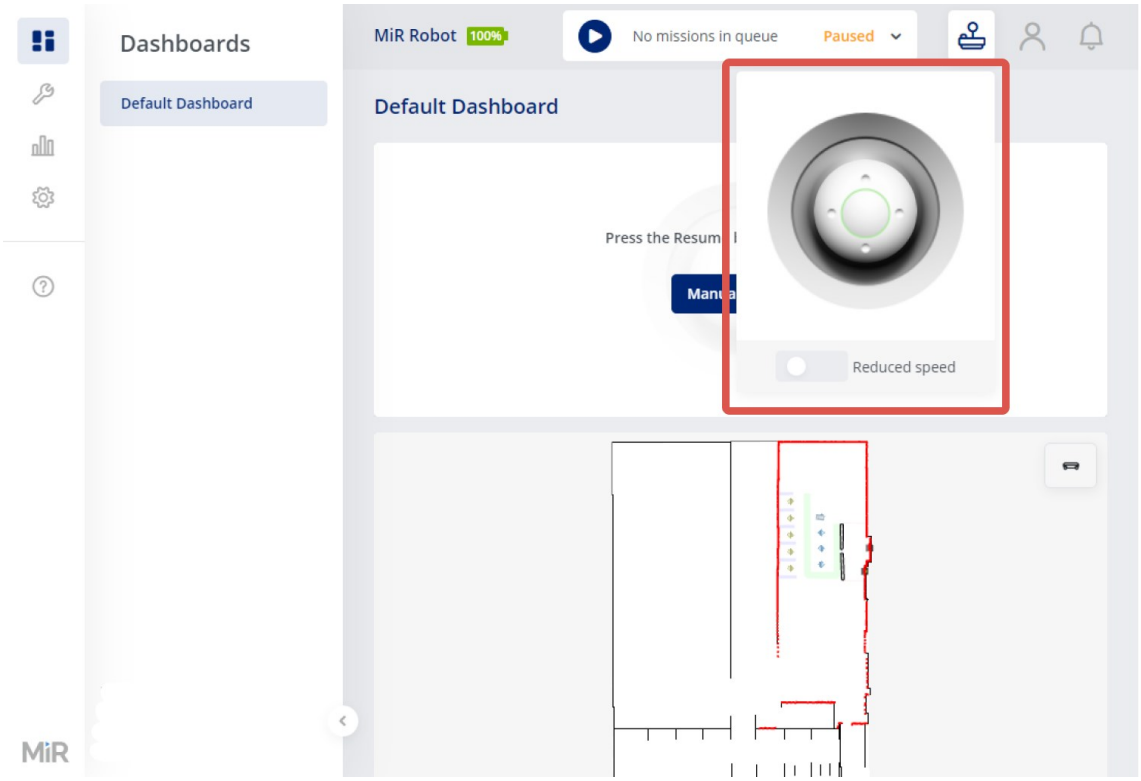


Table 2.1
States before you can activate Manual mode control

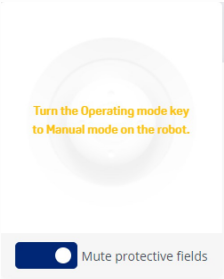
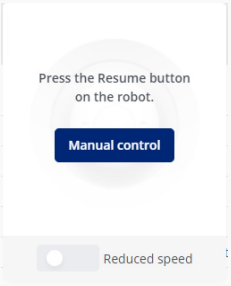
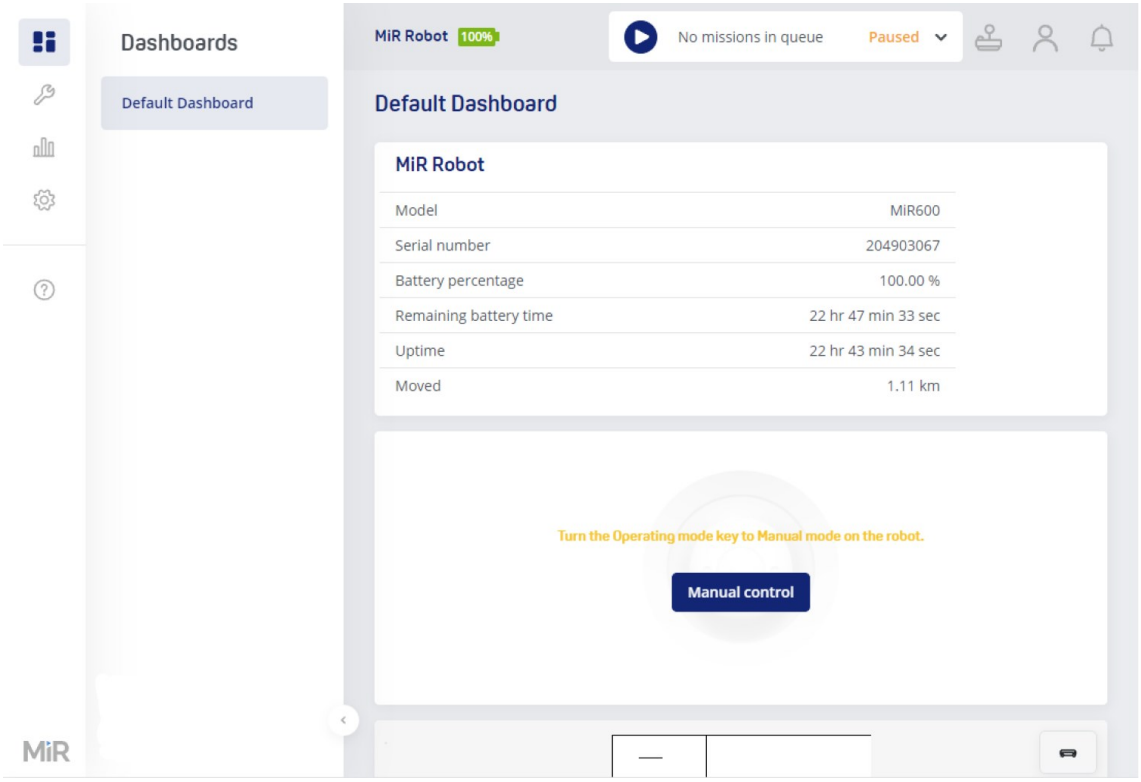
Image	Description
	For MiR250, MiR500, MiR600, MiR1000, and MiR1350, you cannot activate Manual mode until you have turned the Operating mode key to Manual mode. The key is located on the control panel of your robot—see the user guide for your robot application.

Image	Description
	Before you can control the robot manually, you must select **Manual control**. On MiR250, MiR500, MiR600, MiR1000, and MiR1350 you must also press the Resume button on the robot's control panel before manual mode can be activated. Once activated, the robot's status lights will change color to indicate that it is being controlled manually.

3. Dashboards

The Dashboards menu contains all of the dashboards you create. Dashboards let you collect the main functions and features you need onto one page. To create and edit dashboards, see "Dashboards" on page 24.



4. Setup

The Setup menu contains the following pages that let you create, modify, and remove components in the site:

4.1 Dashboards 24

4.2 Footprints 31

4.3 I/O modules 38

4.4 Maps 42

4.5 Marker types 74

4.6 Missions 78

4.7 Path guides 113

4.8 Paths 118

4.9 Sounds 121

4.10 Transitions 124

4.11 User groups 128

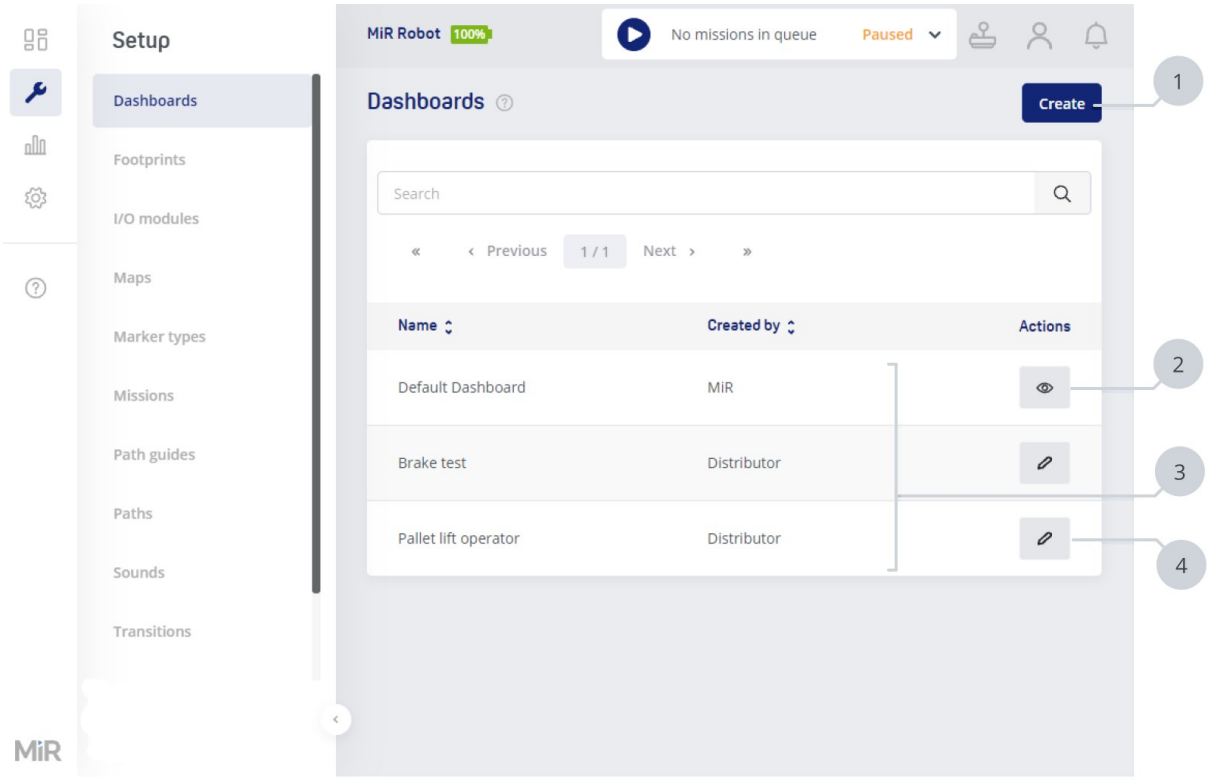
4.12 Users 133

4.1 Dashboards

A dashboard is a visual display of the robot's data and enables certain functions that can be adjusted to fit certain users.

You design custom dashboards using of a number of widgets each representing a feature in the system, such as a particular mission, the map the robot is running in, or the current mission queue.

A dashboard is used to collect the key functions a user needs on a single page.



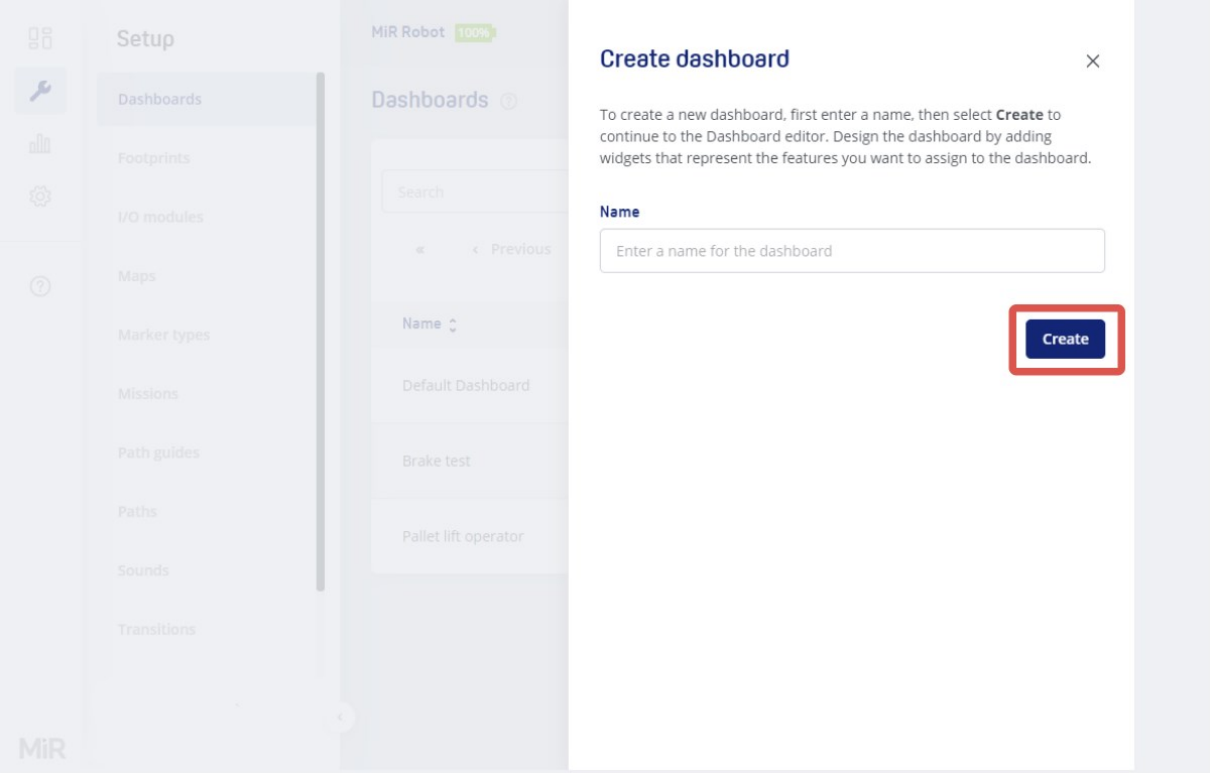
	Description		Description
1	**Create** Opens the dialog box to create a new dashboard—see "Create dashboard" on the next page.	2	**View** Opens a preview of the selected dashboard. Your user group does not have permission to edit the dashboard.
3	**Dashboards** Lists all dashboards used by MiR Robot. You can sort the dashboards based on the name or which user created them.	4	**Edit** Opens the dashboard editor for the selected dashboard. In the editor, you can modify, add, and remove dashboard widgets—see "Edit dashboard" on the next page.

Create dashboard

Setup > Dashboards > Create

To create a new dashboard, first enter a name, then select **Create** to continue to the Dashboard editor. Design the dashboard by adding widgets that represent the features you want to assign to the dashboard.

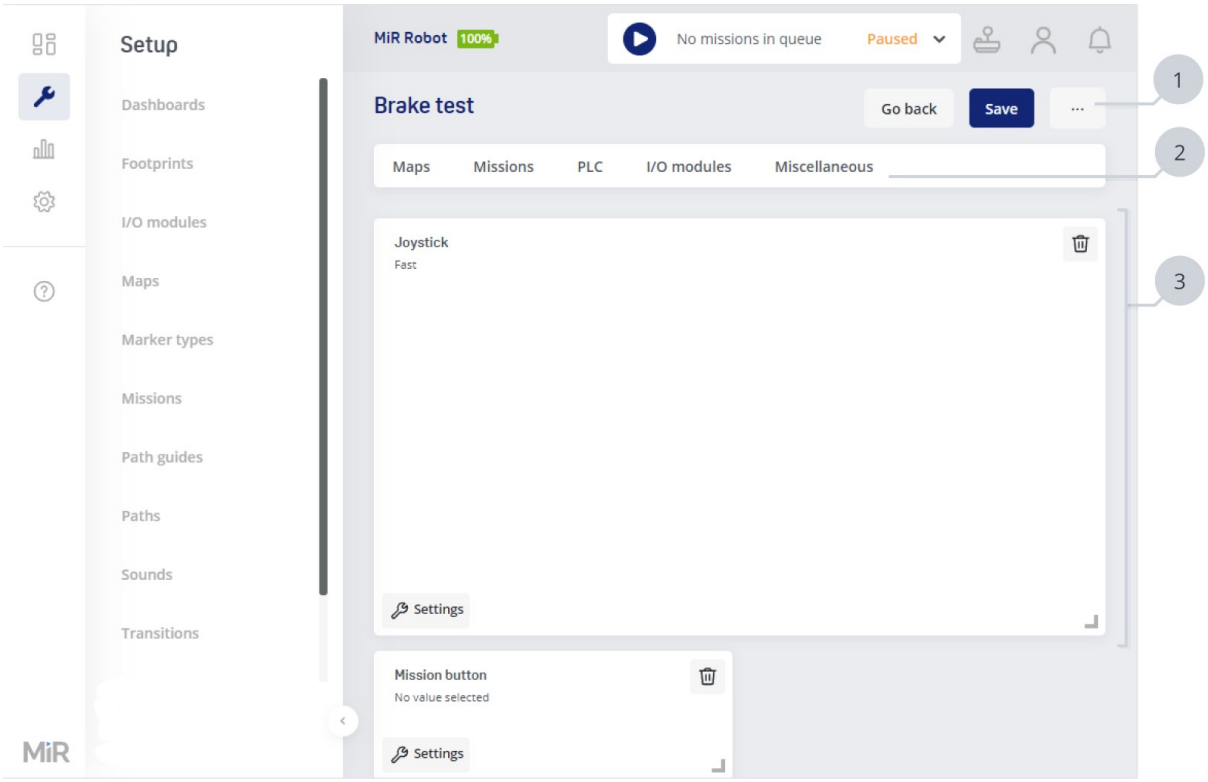
Give each dashboard a unique name. We recommend naming dashboards based on their function or which user group the board is designed for.



Edit dashboard

Setup > Dashboards > Edit

Design the dashboard by selecting widgets from the menus in the top bar. Resize the widgets by pulling in the lower-right corner and rearrange their order by selecting and dragging them. Some widgets require further settings where you can select which site components are used.



	Description		Description
1	**Dashboard settings** Allows you to: • **View dashboard**: View the dashboard outside of edit mode. • **Edit**: Change the name of the dashboard. • **Delete**: Delete the dashboard.	2	**Widget bar** All widgets you can add to your dashboard can be selected in the widget bar at the top of the editor—see "Widgets" on the next page.
3	**Widget** When you add a widget, you can edit it in the following ways:		

Description	Description
• To change the size of the widget, pull the lower-right corner of the widget. • To change the position of the widget, select and drag the widgets to rearrange them. • To edit the widget specific settings, select **Settings**. For more information about the settings in each widget, see "Widgets" below.	

Widgets

Setup > Dashboards > Edit

This section describes the dashboard widgets.

Maps

- **Map**
  A **Map** widget makes the active map visible on the dashboard.
- **Locked map**
  A **Locked map widget** makes the active map visible on the dashboard. The map automatically pans so the robot is always shown in the middle of the map.

Missions

- **Mission button**
  A **Mission button** widget lets you select a mission that can be queued by pressing the button on the dashboard.
- **Mission action log**
  A **Mission action log** widget displays the individual actions being performed during the execution of a mission.

- **Mission group**
  A **Mission group** widget lets you select a mission group and have all missions from that group displayed on the dashboard.
- **Mission queue**
  A **Mission queue** widget displays the list of missions in the mission queue.
- **Pause/Continue button**
  A **Pause/Continue button** widget functions the same way as ⏸ / ▷ **Pause/Continue** in the top bar of the robot interface.

PLC

- **PLC button/display**
  A **PLC button/display** widget lets you access PLC functions from the dashboard. The widget can be designed as a button to toggle between states or a display button for monitoring read-out values.

I/O modules

- **I/O module**
  An **I/O module** widget lets you connect and disconnect I/O modules from the dashboard.
- **I/O configuration**
  An **I/O configuration** widget lets you program one or more actions that you want the I/O module to perform when the outputs are in a certain state and when you select the button. Add states to the widget and configure the conditions that trigger the state and the outputs that the robot sets on the I/O module when you select the widget. Use the **Reset** section to configure a default output configuration.
- **I/O status**
  An **I/O status** widget shows the current status of the selected I/O module.

Hook

You must enable Hook under System > Settings > Features to see this

- **Hook information**
  A **Hook information** widget displays the following information about the hook:
  - Hook brake state
  - Hook gripper state
  - Hook height
  - Hook angle
- **Hook height**
  A **Hook height** widget lets you set the height of the hook manually. Use the arrows to change the value.
- **Hook gripper control**

  A **Hook gripper control** widget lets you open and close the hook gripper. This widget shows the current action (closing or opening) and lets you undo it during execution.
- **Cart actions**
  A **Cart actions** widget lets you queue the following missions: **Pick up cart**, **Place cart**.

  Use the check boxes to define which missions are available in the widget. You must select at least one option (either **Pick up cart** or **Place cart**).

  When you select the widget, the robot adds the mission shown in the widget to the mission queue. In the **Place cart** mission, the robot releases the gripper, lowers the hook, and leaves the cart in the current position. In the **Pick up cart** mission, the robot tries to find a cart within the hook camera's sight and pick it up. For the **Pick up cart** mission to work, it is necessary that the hook camera detects the QR code or AprilTag at the robot's current position.
- **Hook brake**
  A **Hook brake** widget lets you activate and deactivate the hook brake manually. The text in the widget shows the action that it executes when you select it and changes depending on the state of the hook brake. For example, if the brake is active (the arm is locked), the widget reads **Deactivate hook brake**, and selecting the widget deactivates the brake.

  After you select the widget, it shows the current action and you have an option to undo the action until it is over. For example, if the brake is active and you select the widget, it shows **Deactivating ... Click to undo**.

Miscellaneous

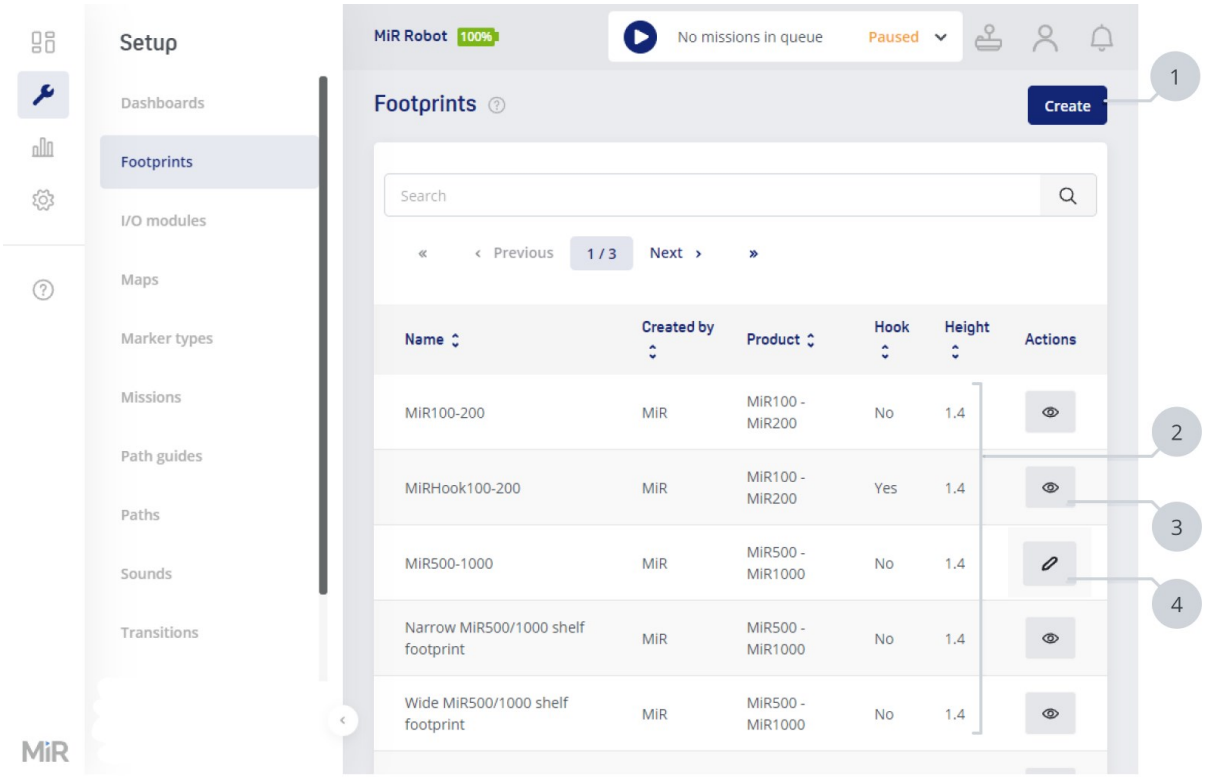
- **Distributor**
  A **Distributor** widget shows information about the distributor if any distributor data has been entered in the Distributor data section under **System > Settings**.

- **Error log button**
  An **Error log button** widget lets you generate an error log via the dashboard. The error log is saved under **Monitoring > Error log**—see "Error logs" on page 140.
- **Joystick**
  A **Joystick** widget lets you create one or more joysticks directly on the dashboard. Different speeds can be selected for the joysticks; slow (0.5 m/s), medium (1.0 m/s), or fast (1.5 m/s for MiR100, 1.1 m/s for all other robots). The standard joystick in the top bar is fast, except when the robot is mapping where it runs medium speed.
- **Sign out button**
  A **Sign out button** widget lets you sign out of the interface via the dashboard.
- **Pause/Continue button**
  A **Pause/Continue button** widget functions the same way as ⏸ / ▷ **Pause/Continue** in the top bar of the robot interface.
- **Robot summary**
  A **Robot summary** widget makes it possible to have information about the robot on the dashboard: name, serial number, battery percentage, remaining battery time, uptime, and moved distance.
- **Battery percentage**
  A **Battery percentage** widget shows how much battery is on the robot directly on the dashboard.
- **Robot status**
  A **Robot status** widget shows information about the current state of the robot.

4.2 Footprints

A footprint defines the amount of space the robot needs around it to operate in the work environment. It consists of a horizontal shape around the robot, often slightly bigger than the robot itself, and a maximum height that includes the robot's top module and payload.

The footprint is used to ensure that the robot plans its route to avoid collisions. The robot plans its route so the footprint does not collide with any mapped or detected obstacles. The larger the footprint, the more space the robot ensures is kept between it and all obstacles when planning its path. If the footprint is too small, the robot may plan its path too close to obstacles and affect its driving behavior.

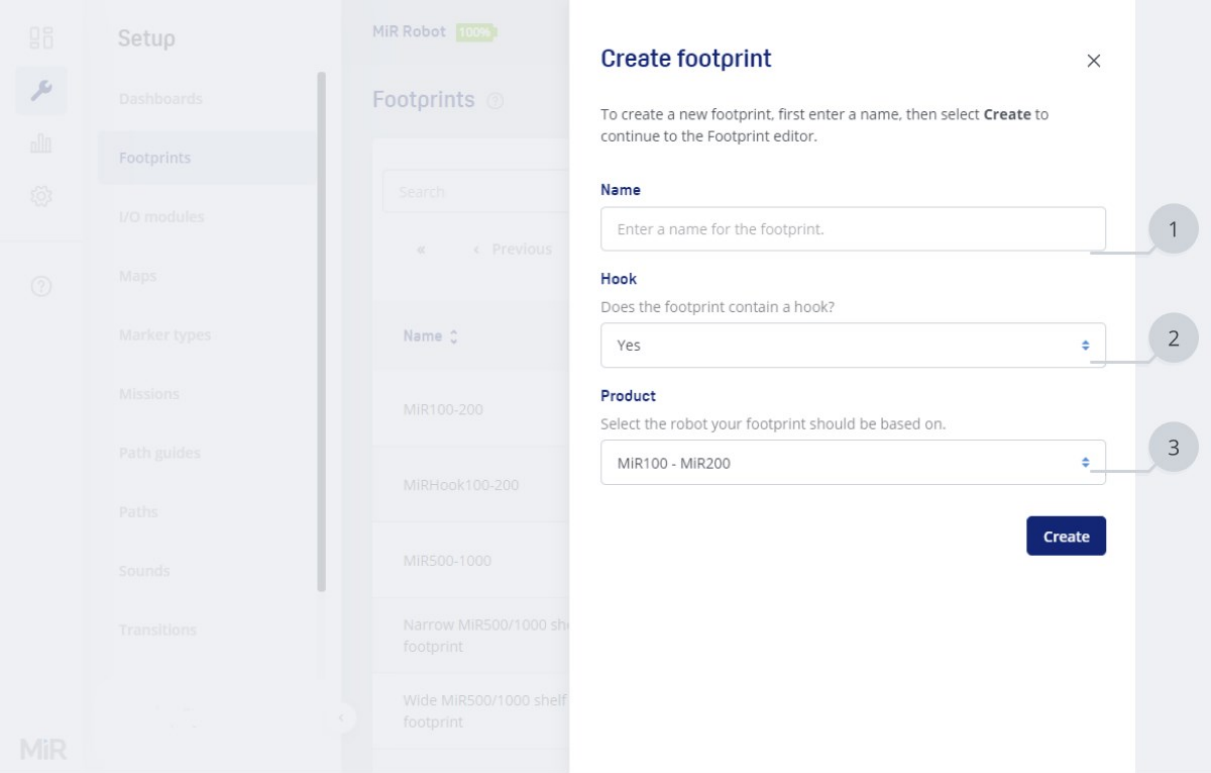


	Description		Description
1	**Create** Opens the dialog box to create a new footprint—see "Create footprint" on the next page.	2	**Footprints** Lists all footprints that can be used by robots connected to MiR Fleet.
3	**View** Opens a preview of the selected footprint. Your user group does not have permission to edit the footprint.	4	**Edit** Opens the footprint editor for the selected footprint. In the editor, you can modify, add, and remove points in the footprint—see "Edit footprint" on page 34.

Create footprint

Setup > Footprint > Create

To create a new footprint, first enter a name, then select **Create** to continue to the Footprint editor.



	Description		Description
1	**Name** Enter a name for the footprint.	2	**Hook** Select whether the robot that will use this footprint has a MiR Hook top module mounted to it. This will change the default footprint to include the hook.
3	**Product**		

Description	Description
Select the robot your footprint should be based on.	

Edit footprint

Setup > Footprint > Edit

You can edit a footprint in simple or in advanced mode:

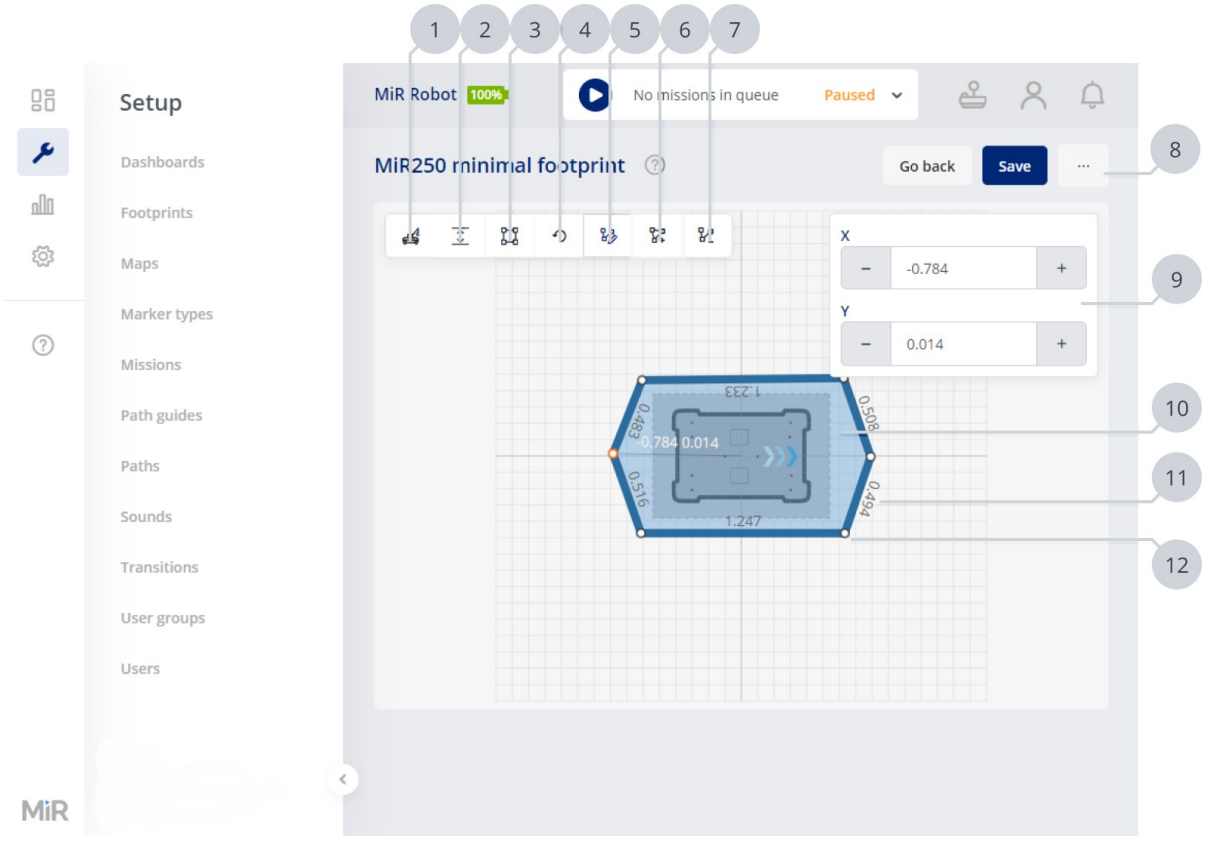
Simple mode lets you change the footprint length **X** and width **Y**

Advanced mode lets you add and remove points and reshape the footprint as long as it forms a convex shape.

You can use the following tools to edit the footprint:

- **Toggle mode** lets you switch between simple and advanced edit modes.
- **Add point** lets you add extra points to the shape.
- **Remove point** lets you remove points from the shape.
- **Edit height** lets you open the footprint height editor.

Drag the points to change the size and shape of the footprint, or select a point and enter the X and Y values at the bottom-left corner of the editor.

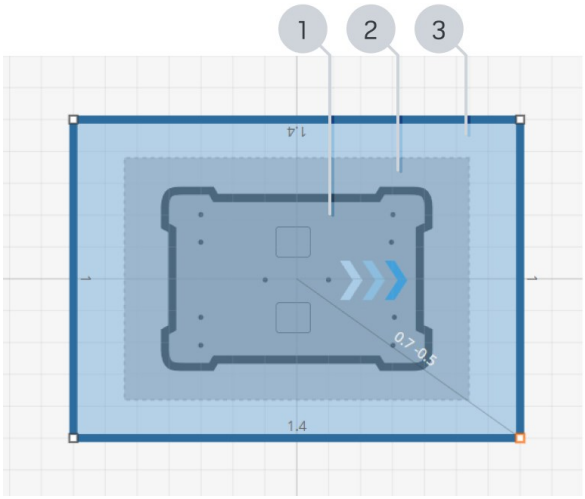


	Description		Description
1	**Toggle hook** Changes the footprint to the default footprint when a hook is attached to this robot model.	2	**Edit height** Opens the height editor for the footprint—see "Edit height" on page 37.
3	**Toggle mode** Switches between Advanced mode and Simple mode. Simple mode restricts the footprint to a rectangle. Advanced mode allows you to create any convex shape.	4	**Reset** Resets the footprint to the last time you saved the footprint.
5	**Select**	6	**Add point**

	Description		Description
	(Advanced mode only) Repositions points you select on the footprint's edge. You can either drag the point to where you want it to be or edit the coordinates—see position 9.		*(Advanced mode only)* Adds more points to the footprint.
7	**Remove point** *(Advanced mode only)* Removes points you select from the footprint.	8	**Footprint settings** Allows you to: • **Edit**: Change the name of the footprint. • **Delete**: Delete the footprint.
9	**Point coordinates** When you select a point, the X and Y coordinates of the point are displayed here, you can modify these coordinates directly.	10	**Footprint window** The window shows a graphical presentation of the footprint you are editing. For reference, the robot and the robot's default Protective fields at standstill are also shown in the editor—see "Footprint layers" on the next page.
11	**Edge length** An edge is automatically created between every two consecutive points. The distance between two points is displayed along the edge.	12	**Footprint point** The footprint consists of a number of points (four in Simple mode, and four or more in Advanced mode). You define the shape of the footprint by specifying each point.

Footprint layers

Within the editor, there are three main layers.

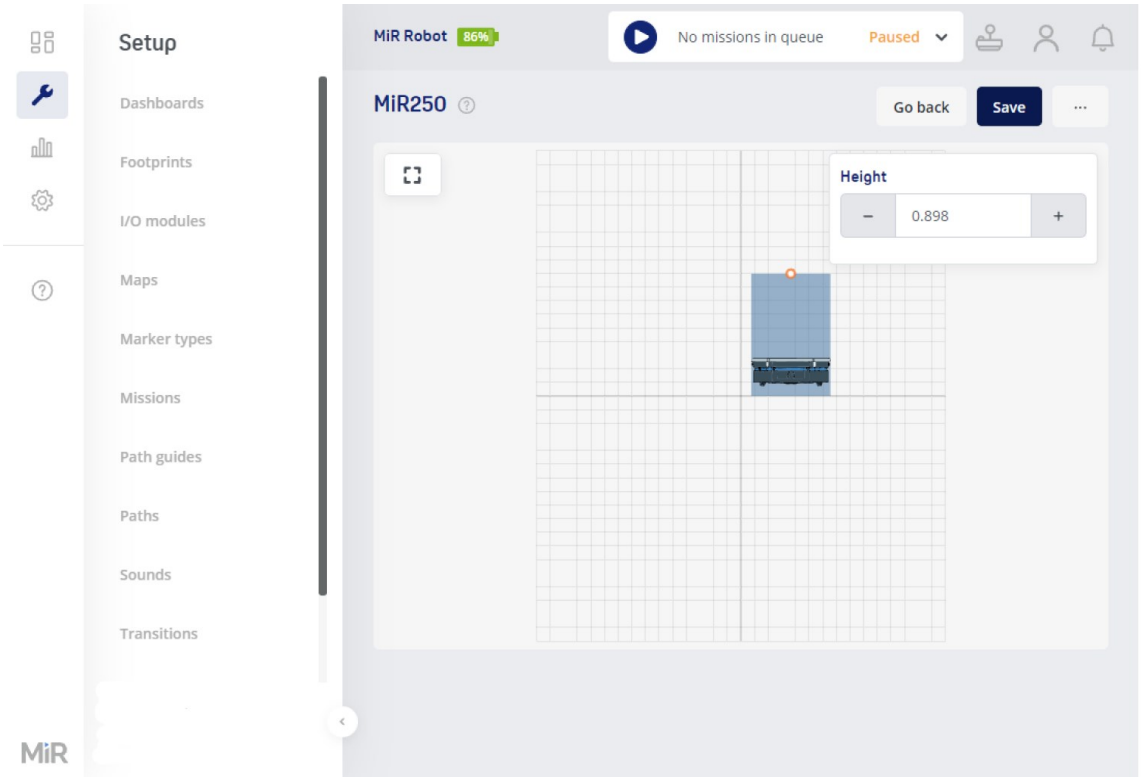


	Description		Description
1	**Robot** The robot image in the center corresponds to the physical dimensions of the robot and indicates the smallest permitted footprint.	2	**Safety** The gray area around the robot signifies the default Protective field while the robot is stationary. We recommend making your footprint larger than this.
3	**Footprint** The blue area signifies the footprint used for path planning. This is the shape you can edit to create a custom footprint.		

Edit height

You must also assign the height of the robot for each footprint. The height must include any top module or loads on the robot to ensure the robot does not drive under low hanging structures.

To edit the height, either enter the height in the upper-right corner of the editor window or drag the point above the robot to the desired height.



Edit migrated footprint

A migrated footprint comes from a site file with a software version that is older than the version in which the footprint editor was introduced.

To edit the migrated footprint, first edit the necessary information, then select **Save** to continue.

You edit the footprint using the same tools as described in "Edit footprint" on page 34.

4.3 I/O modules

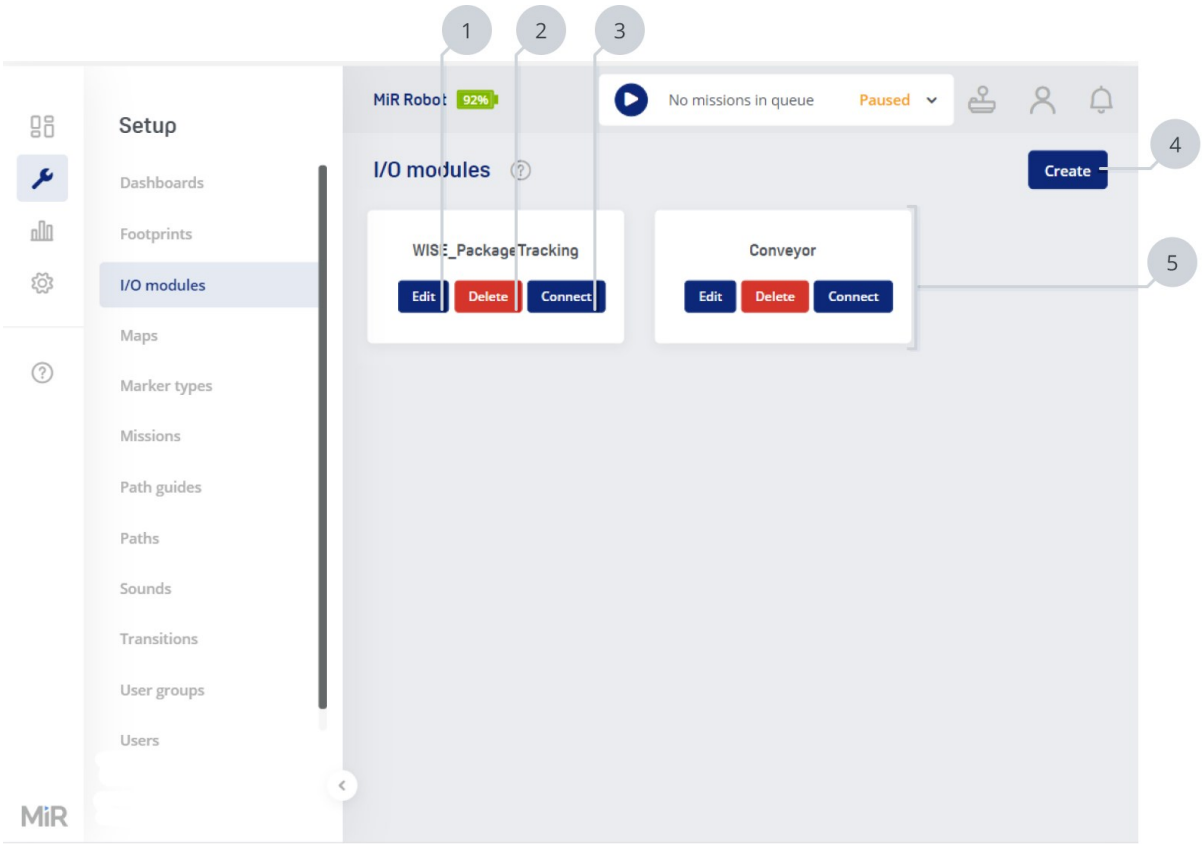
*You must enable I/O modules under **System** > **Settings** > **Features** to see this page.*

An I/O module defines and controls the robot's connection to an I/O device that the robot can communicate with. The device must be connected to the same network as the robot and is identified using its IP address.

I/O modules are used for receiving inputs and sending outputs with external devices, enabling the robot and the connecting device to send signals that can be linked to certain actions or missions.

You can control or read I/O registers using I/O actions in missions, I/O module zones on maps, or the I/O module widget on a dashboard.

For more information about setting up WISE modules, see the guide *How to use WISE modules*. WISE modules work in the range of 0-3.



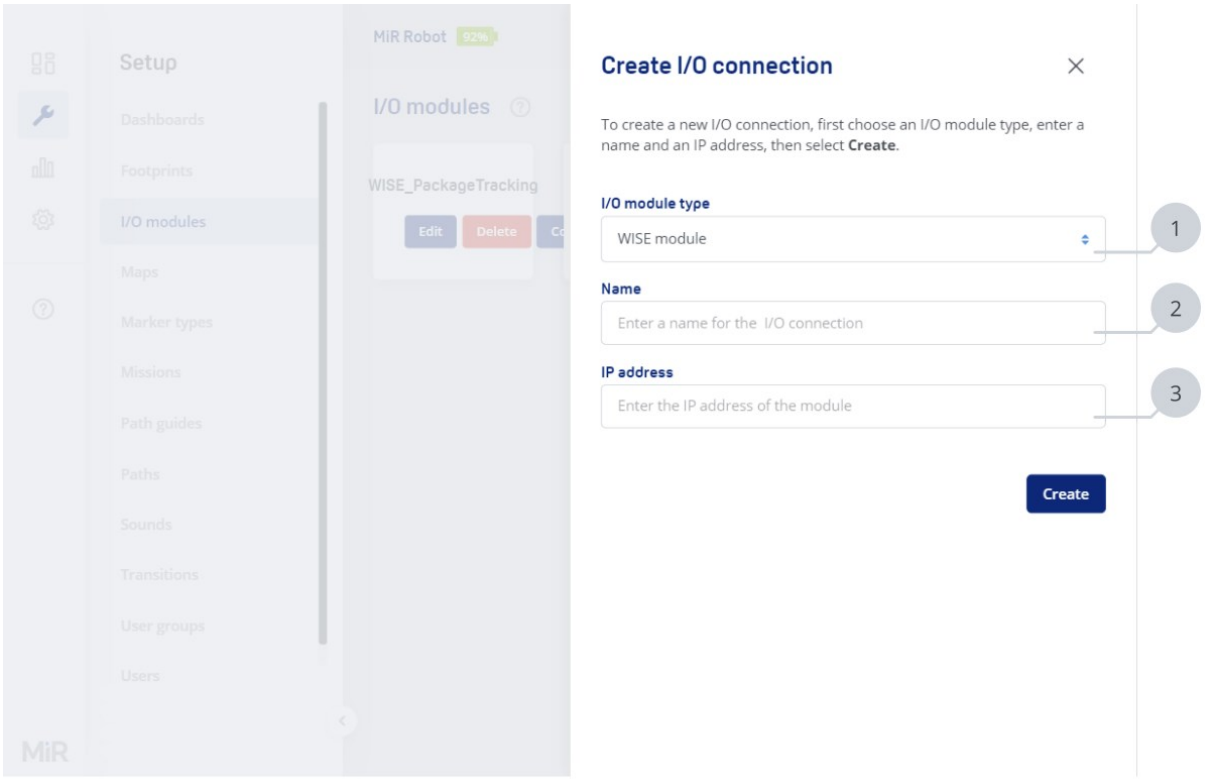
	Description		Description
1	**Edit** Opens the dialog box to edit the selected I/O module.	2	**Delete** Removes the selected I/O module.
3	**Connect**	4	**Create**

	Description	Description
	Tries to connect the robot to the I/O device. Once connected, you can see the inputs received from the device and control which outputs from the robot are active or inactive. You can use this to test any connected I/O device.	Opens the dialog box to create a new I/O module—see "Create I/O connection" below.
5	**I/O modules** All of the I/O modules you create to define a connection to an I/O device are displayed here.	

Create I/O connection

Setup > I/O modules > Create

To create a new I/O connection, first choose an I/O module type, enter a name and an IP address, then select **Create**.



	Description		Description
1	**I/O module type** Select the type of I/O device you want to connect to the robot.	2	**Name** Enter a name for the I/O module.
3	**IP address** Enter the IP address of the I/O device you want to connect to the robot.		

Edit I/O connection

Setup > I/O modules > Edit

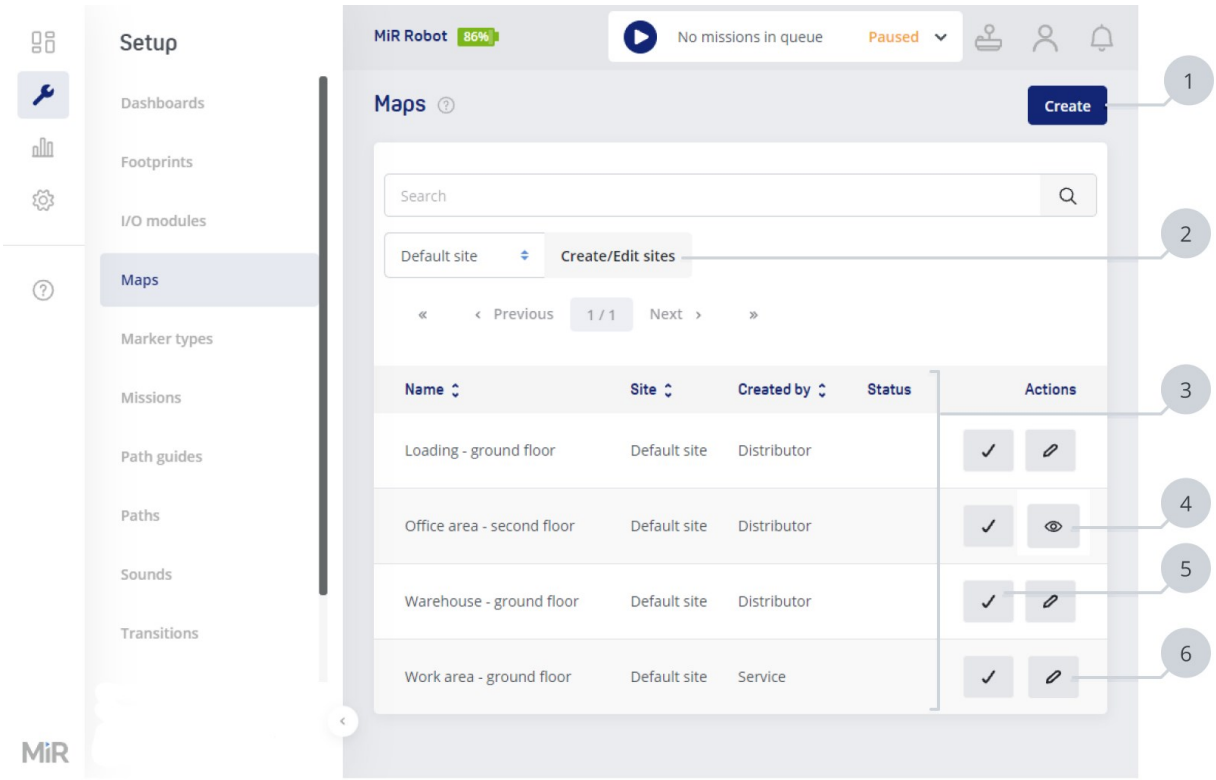
To edit an I/O connection, first choose an I/O module type, edit the name and the IP address, then select **Save**.

4.4 Maps

A map is a representation of the operating area of the robot. A basic map contains walls and floor that indicate where the robot can drive. You can add various map elements to determine how you want the robot to drive.

A map is used by the robot to navigate. The robot uses the map to determine its current location, where its goal destination is, and how it should get from its current location to the goal.

All maps belong to a site, which is the overall container for one or more maps used in the same facility.



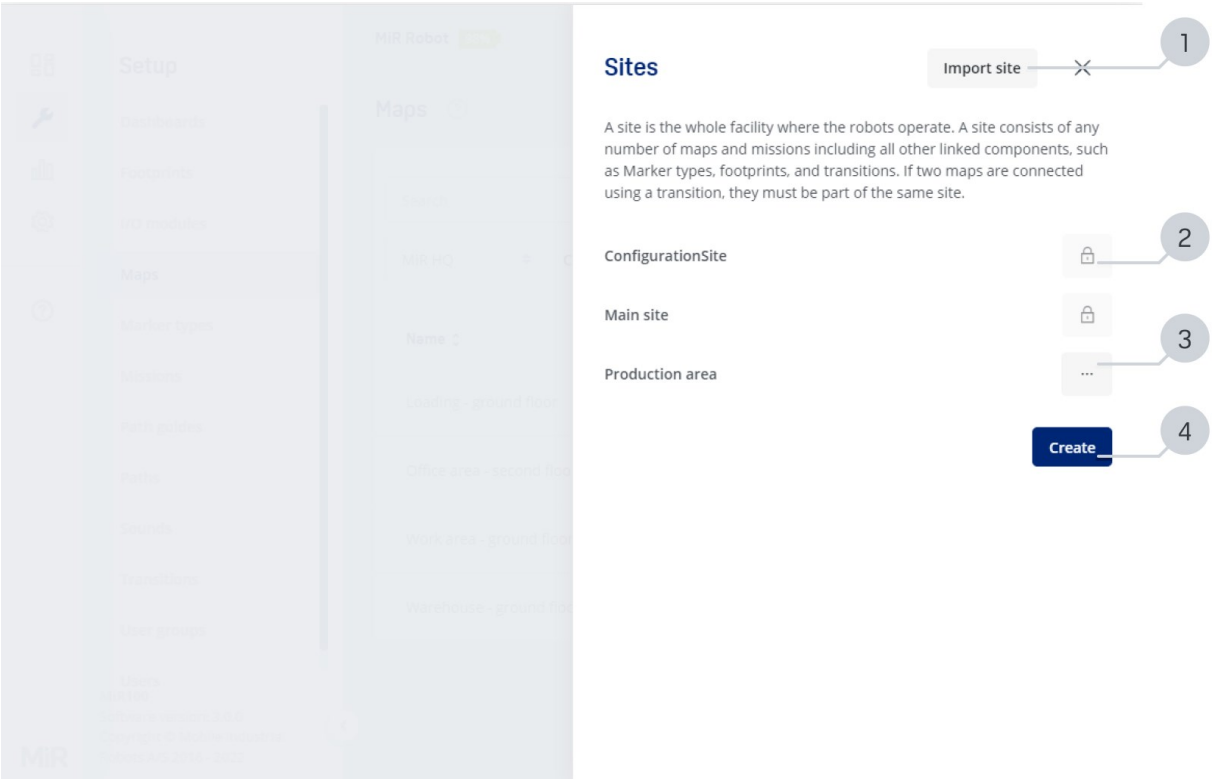
	Description		Description
1	**Create** Opens the dialog box to create a new map—see "Create map" on page 45.	2	**Create/Edit sites** Opens the dialog box where you can edit the name of existing sites or create

	Description		Description
			new sites—see "Sites" below.
3	**Maps** Lists all maps used by MiR Robot. You can sort the maps based on the name, which site they are a part of, or which user created them.	4	**View** Opens a preview of the selected map. Your user group does not have permission to edit the map.
5	**Activate** Activates the selected map. The active map should always be the map of the area the robot is operating in currently.	6	**Edit** Opens the map editor for the selected map. In the editor, you can modify the floor plan and add, remove, or adjust the map components—see "Map editor" on page 46.

Sites

Setup > Maps > Sites > Create/Edit

A site is the whole facility where the robots operate. A site consists of any number of maps and missions including all other linked components, such as Marker types, footprints, and transitions. If two maps are connected using a transition, they must be part of the same site.

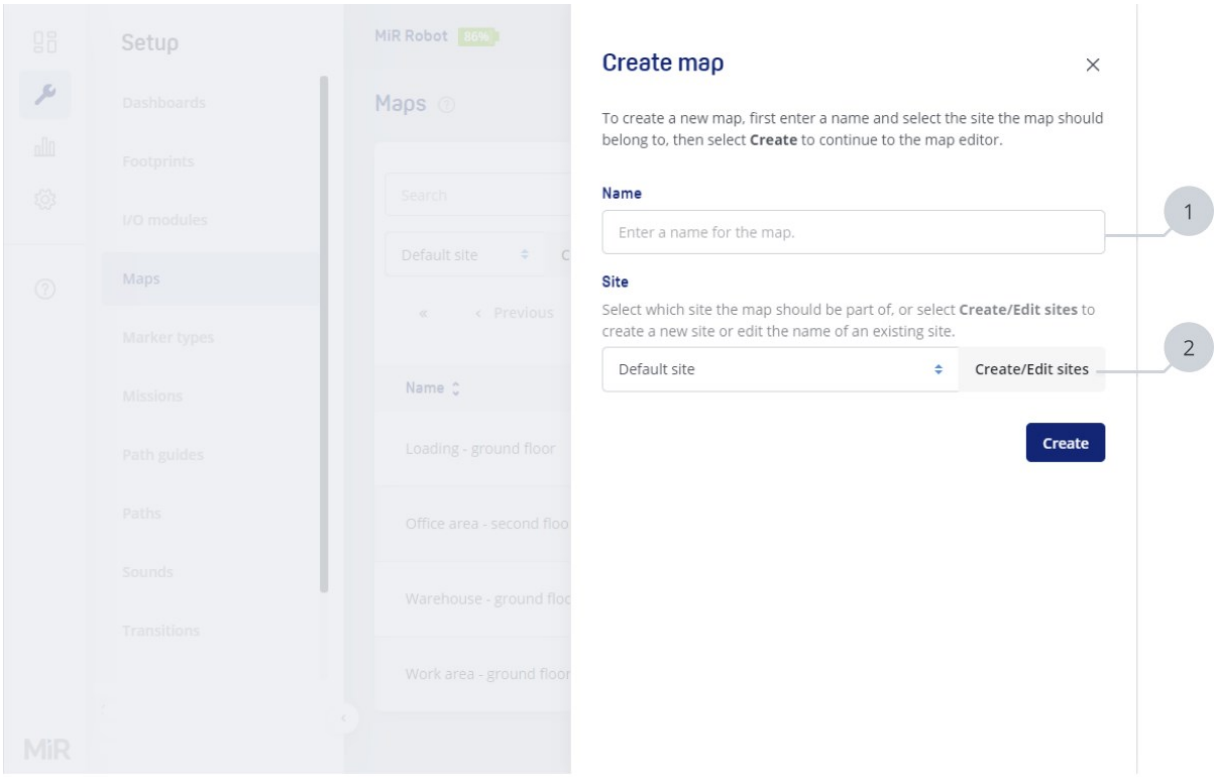


	Description		Description
1	**Import site** Select a site saved on your device that you want to upload to MiR Fleet. The site must have been exported from a MiR product running the exact same software version.	2	**Locked** You cannot perform this action. You cannot edit sites that were created by a user from a user group with a higher permission level than you.
3	**Site settings** Allows you to: • **Export**: Download a .site file of the site to your device. • **Edit**: Change the name of the site. • **Delete**: Delete the site.	4	**Create** Create a new site on MiR Robot. You must enter a name for the site to create it. Thereafter, you can add site components to the new site from the other pages in the interface.

Create map

Setup > Maps > Create

To create a new map, first enter a name and select the site the map should belong to, then select **Create** to continue to the map editor.



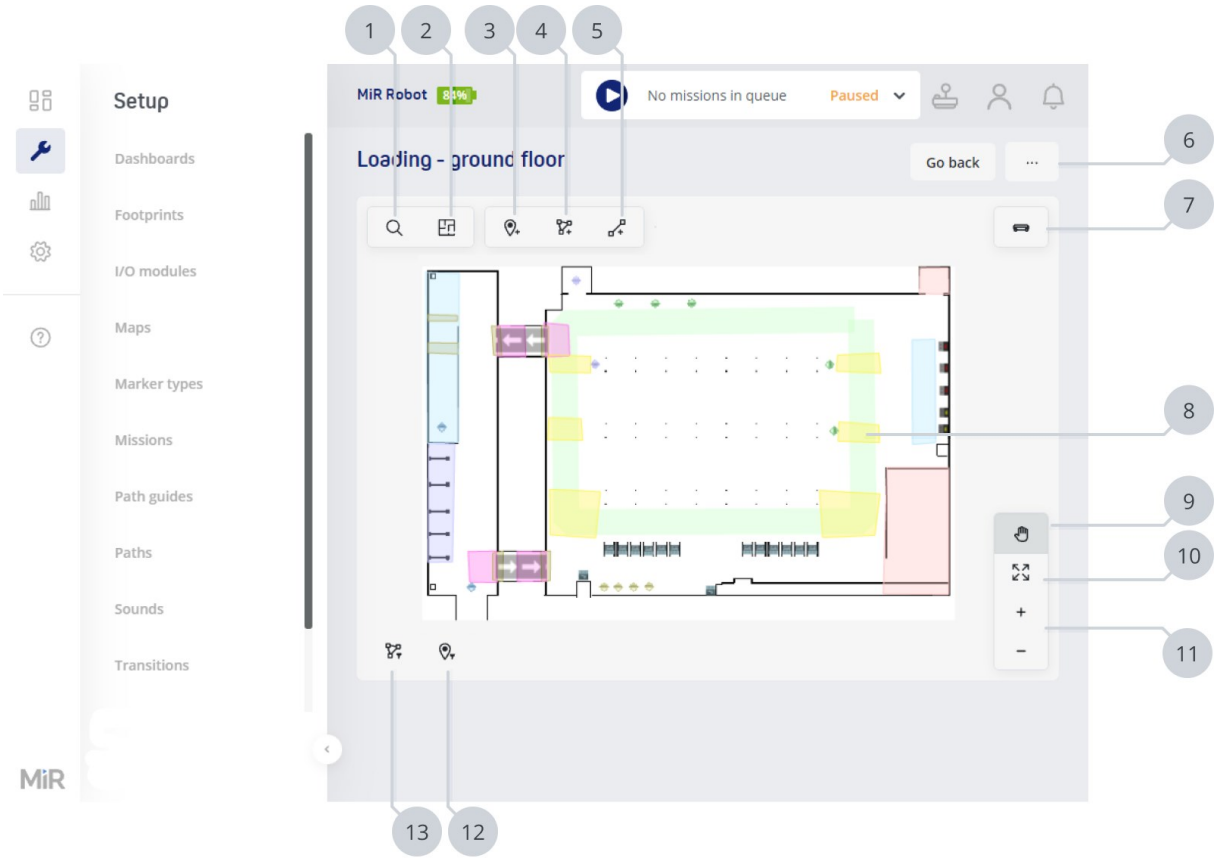
	Description		Description
1	**Name** Enter a name for the map.	2	**Site** Select which site the map should be part of, or select **Create/Edit sites** to create a new site or edit the name of an existing site. For more information about sites, see "Sites" on page 43.

Map editor

Setup > Maps > Edit

In the map editor you can modify the map using tools to:

- Edit, upload, append, or download a floor plan—see Floor plan.
- Add, remove, or edit map components—see "Map components" on page 57.



	Description		Description
1	**Find positions** Enter the name of the position or marker you want to find.	2	**Floor plan** Edit, download, upload, or append to the floor plan. The floor plan is the base layer of the map including the

	Description		Description
	You can also see the list of all markers and positions on the map.		walls and floor to mark permanent structures in the robot's work environment—see "Floor plan" on the next page.
3	**Add position** Select a marker or position from the list that you want to add to the map—see "Map components" on page 57.	4	**Draw a new shape** Select a zone type you want to add to the map, and draw a polygon shape to cover the area you want the zone to cover—see "Map components" on page 57.
5	**Draw a line** Select a zone type you want to add to the map, and draw a path with that zone. You can modify the width of the zone path while creating it—see "Map components" on page 57.	6	**Map settings** Allows you to: • **Edit**: Change the name of the map. • **Delete**: Delete the map.
7	**Robot tools** If you are editing the active map, you can use the robot tools to control the robot on the map—see "Robot tools" on page 72.	8	**Map viewer** In the map viewer you can see the map you are editing. All the changes you apply to the map are shown in the viewer. If you are editing the active map, the map includes an icon of the robot and red lines and blue clouds to indicate the obstacle data the robot collects from its laser scanner and 3D cameras.
9	**Move map**	10	**Show entire map**

	Description		Description
	Select this tool to pan around the map.		Centers the map viewer to show the entire map.
11	**Zoom in and Zoom out** Select these tools to either zoom in or zoom out on the map.	12	**Filter positions** Select or deselect a position to see the position on the map. Select all filters all positions on or off the map.
13	**Filter zones, walls, and floors** Select or deselect a zone, wall, or floor to see them on the map. Select all filters all positions on or off the map.		

Floor plan

Setup > Maps > Edit > Floor plan

The floor plan is the bottom layer of the map and consists only of walls, floor, and unknown space. This is the data that represents the operating area of the robot without any MiR map components, such as zones and positions. To create a floor plan, you can either use the robot to record the floor plan manually, or you can upload an image file of the floor plan.

- **Download floor plan** downloads a .png file of the current floor plan.
- **Walls and floors** lets you draw and edit walls and floors freely on the current floor plan. This is intended for correcting and cleaning up a recorded floor plan.
- **Adjust floor plan placement** lets you modify the current placement of the floor plan.
- **Record, upload, and append floor plan** lets you record or upload a floor plan that you can decide to append to the current floor plan or overwrite the current floor plan with.

The conversion from pixels on the map to meters in the real work environment is 20:1, meaning that every twenty pixels on the map represents one meter of the work environment.

Download floor plan

Setup > Maps > Edit > Floor plan > Download floor plan

When you download the floor plan to your device, it is saved as a black and white .png file that only includes the floors and the walls of the map. The downloaded floor plan does not include any map components created with the following tools:

- Add position
- Draw a new shape
- Draw a line

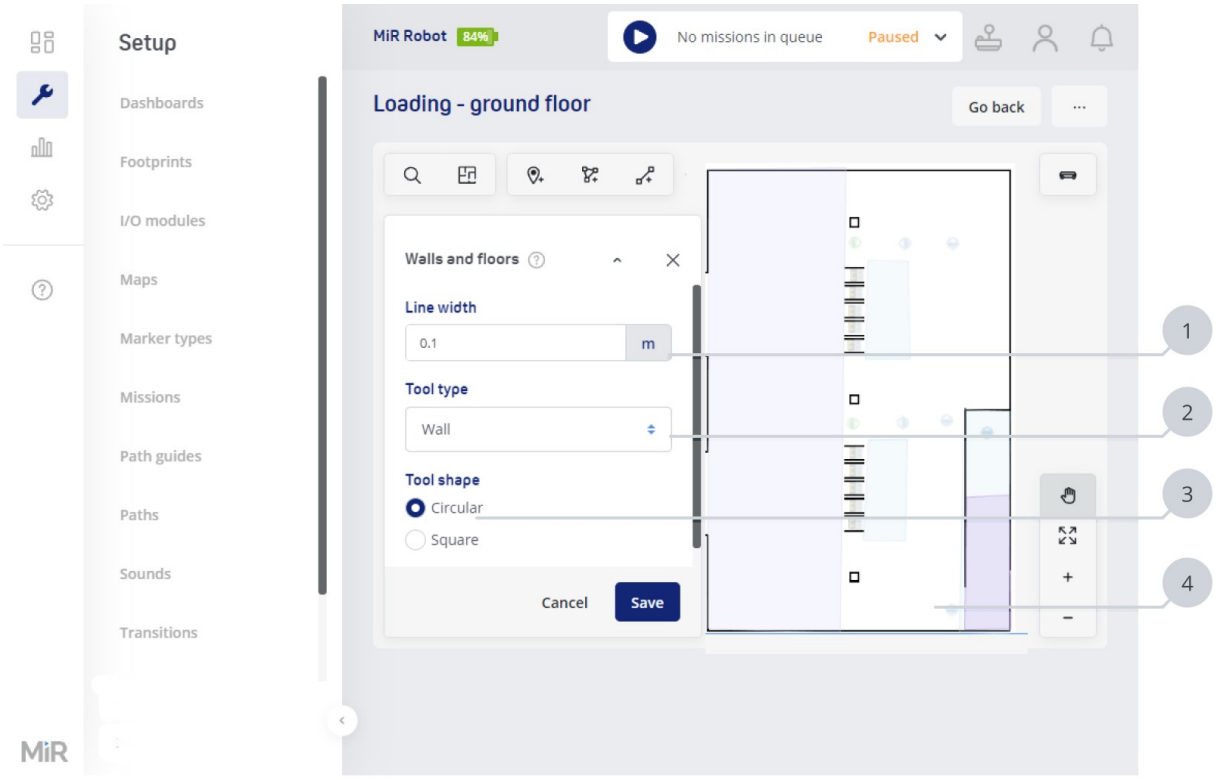
This means that walls, floors, zones, positions, or markers created using these tools are not saved. Only modification made using the editor tools under **Floor plan** are saved in the .png file.

Walls and floors

Setup > Maps > Edit > Floor plan > Walls and floors

Walls and floors is a tool that lets you draw walls and floors freehand and remove unwanted noise and objects from the recorded or uploaded floor plan to create a more legible map.

- **Tool type** lets you draw a wall, a floor, or erase uploaded or recorded data.
- **Tool shape** lets you draw with either a brush or a line.
- **Line width** is the thickness of the walls and floors you want to draw.



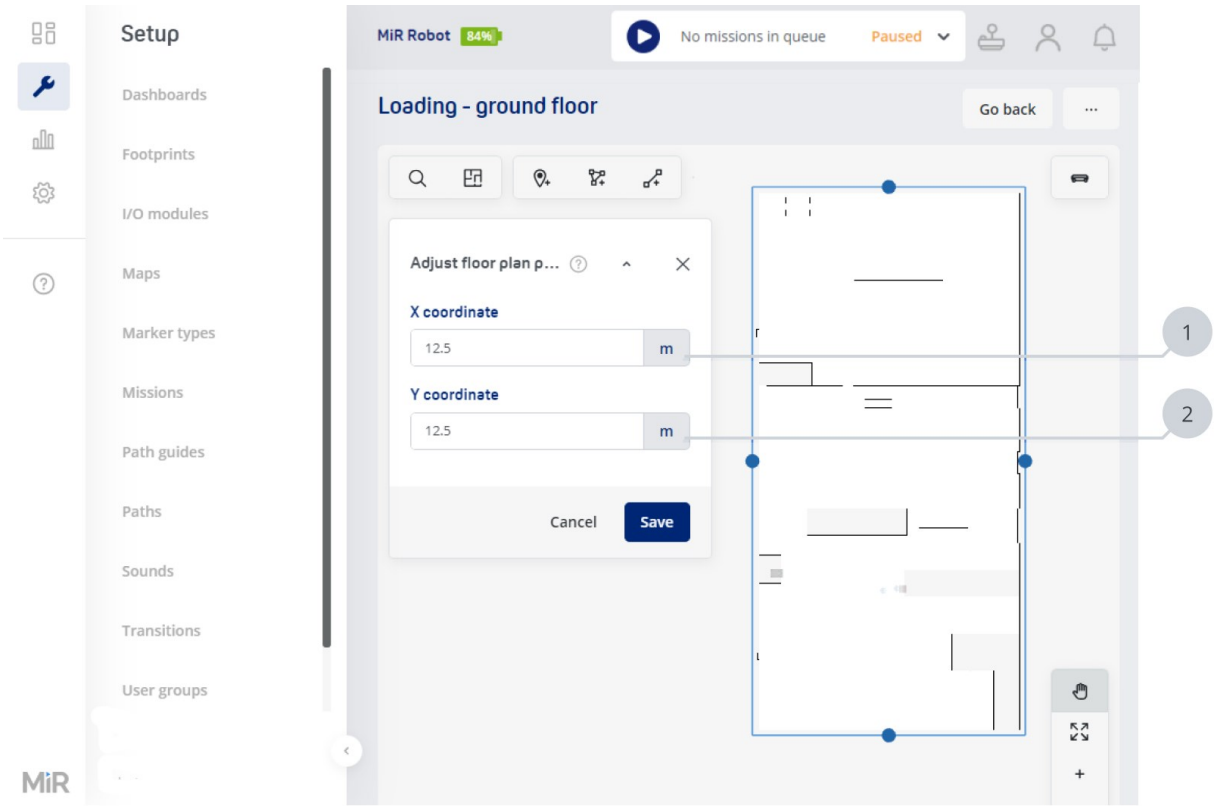
	Description		Description
1	**Line width** Enter the approximate width of the walls you want to draw in meters. The editor converts this to the equivalent pixel width.	2	**Tool type** Select whether you want to draw: • Wall • Floor • Erase uploaded or recorded data
3	**Tool shape** Select whether you want the tool shape to be circular or square.	4	**Map viewer** Once you have selected your desired settings, you can make modifications directly to the map in the viewer.

Adjust floor plan placement

Setup > Maps > Edit > Floor plan > Adjust floor plan placement

Adjust the placement of the new floor plan.

- **X coordinate** lets you adjust the plan horizontally.
- **Y coordinate** lets you adjust the plan vertically.

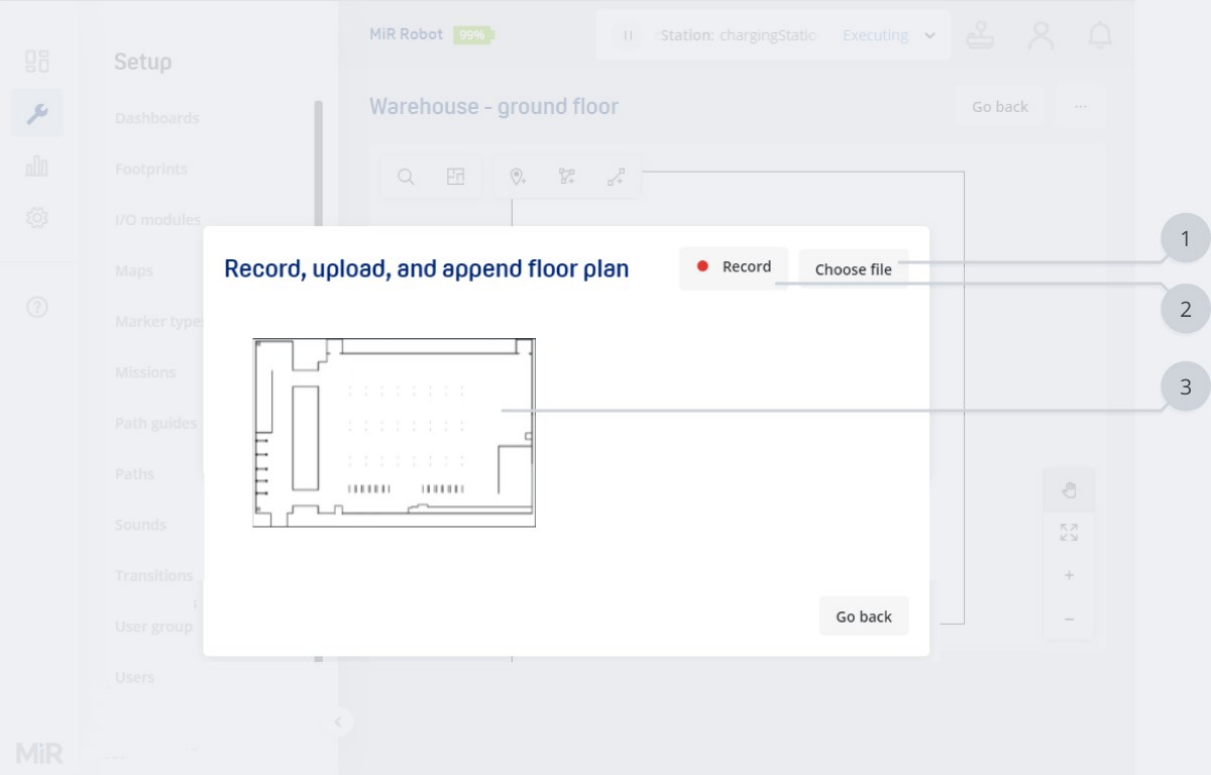


	Description		Description
1	**X-coordinate** X-coordinate lets you adjust the plan horizontally.	2	**Y-coordinate** Y-coordinate lets you adjust the plan vertically.

Record, upload, and append floor plan

Setup > Maps > Edit > Floor plan > Record, upload, and append floor plan

All floor plans you have recorded or uploaded to the robot are saved here. You can then choose to either overwrite or append a saved floor plan to the current floor plan.



	Description		Description
1	**Choose file** Opens a file explorer to let you select a .png file from your computer that you can upload to as a floor plan. The conversion from map to the real work environment is 1 pixel to 5 cm.	2	**Record** Starts map recording on the robot—see "Recording a floor plan" on the next page.
3	**Uploaded and recorded floor plans**		

Description	Description
All floor plans you have previously uploaded or recorded on the robot can be selected from the list. When you select a floor plan, you can choose to either overwrite the current floor plan with the selected one or append the new floor plan to the current plan—see "Overwriting or appending a floor plan" on page 55.	

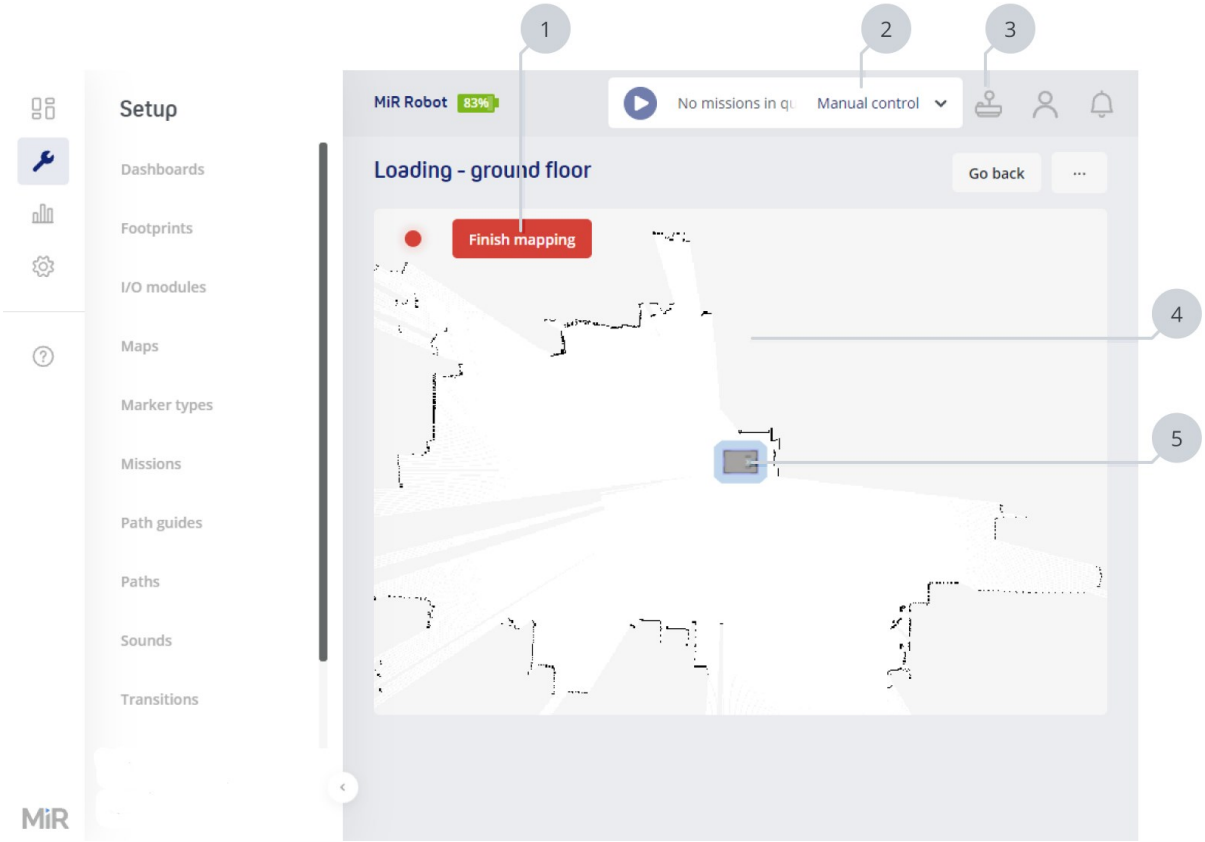
Recording a floor plan

Setup > Maps > Edit > Floor plan > Upload and append floor plan > Record

When you start a floor plan recording, the mapping engine starts. The mapping engine uses input from the safety laser scanners and motor encoders to create a 2D representation of the robot's operating environment. All physical obstacles that the scanners detect are recorded on the floor plan as walls. Remove any obstacles you do not want present on the floor plan after you have finished mapping.

To map the entire area, use the joystick to move the robot around its operating environment. Make sure to cover all of the areas that you want included in the floor plan. The robot will drive at medium speed while mapping to ensure better coverage.

Practice mapping in the lesson *Record your map*. You can find this lesson on MiR Academy.



	Description		Description
1	**Finish mapping** Closes the mapping engine and saves the floor plan on the robot. You cannot continue mapping on the same floor plan afterward. You must finish the complete mapping session or start over with a new floor plan. You can edit the floor plan after finishing the mapping session—see "Walls and floors" on page 49.	2	**Status** When the robot begins mapping, it automatically enters Manual mode.
3	**Manual control**	4	**Undetected data**

	Description	Description
	Opens the manual control dialog box that you can use to move the robot around—see "Manual control" on page 20.	If there are any areas where the walls or floor look incomplete, it means the robot has not detected all of the obstacles around that area yet. Drive your robot closer to any areas where the data appears unfinished or inaccurate.
5	**Robot** The current position of the robot is indicated on the floor plan. When you drive the robot around, the position of the robot icon will also update.	

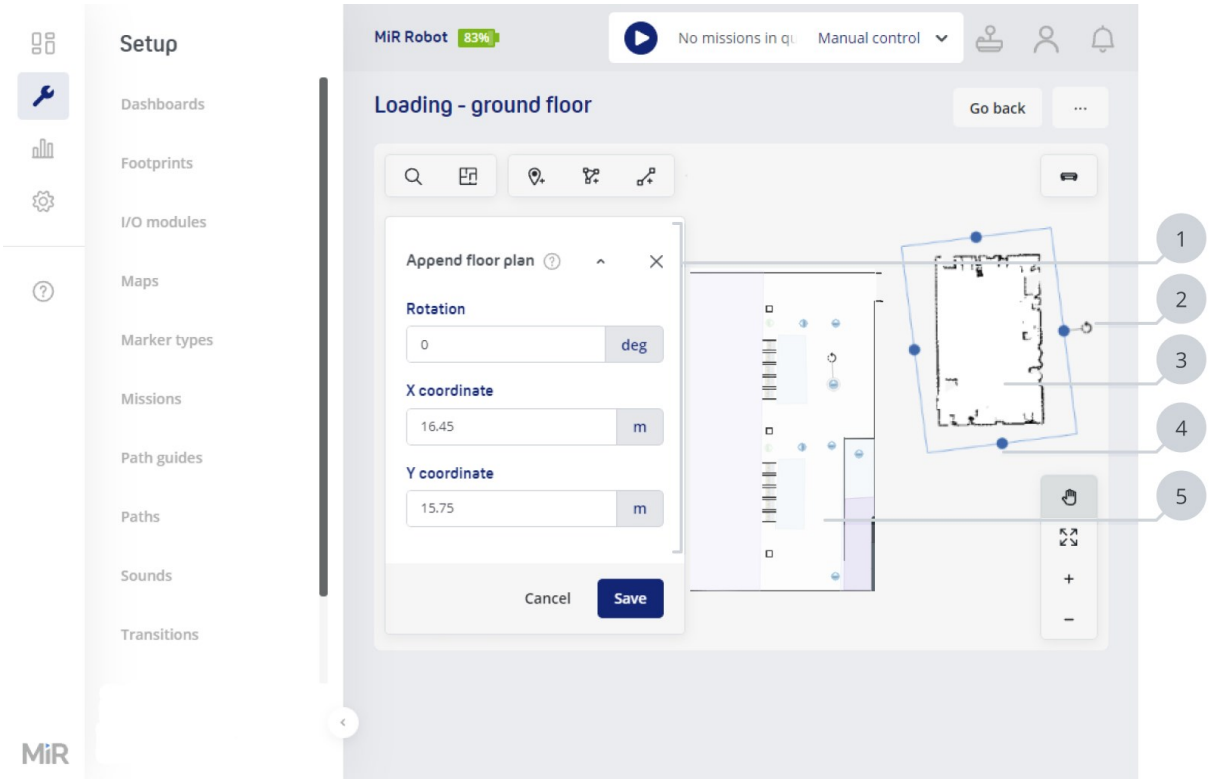
Overwriting or appending a floor plan

Setup > Maps > Edit > Floor plan > Upload and append floor plan > Overwrite current map / Append to current map

When you select a floor plan under **Record, upload, and append floor plan**, you have the following options:

- **Overwrite current map**: Removes the current floor plan in the map and overwrite it with the selected floor plan.
- **Append to current map**: Keeps the current floor plan on the map and lets you append the selected floor plan to it. Once you have appended a floor plan, you cannot separate them again, though each floor plan is still saved individually in your collection of floor plans.

Overwriting and appending has no affect on any map components already added to the map. It only affects the floor plan.



	Description		Description
1	**Floor plan placement settings** Adjust the placement of the new floor plan. • **X coordinate** lets you adjust the plan horizontally. • **Y coordinate** lets you adjust the plan vertically. You can also use the tools displayed around the floor plan to reposition it.	2	**Rotate floor plan** Pull on the rotate handle to change the orientation of the new floor plan.
3	**New floor plan** The new floor plan is displayed with a	4	**Scale floor plan** Pull on any of the four edges to scale the

	Description	Description
	blue box around it. You can drag the new floor plan around to place it where you want on the map.	new floor plan.
5	**Current floor plan** If you chose to append the floor plan, the current floor plan is displayed in the editor window so you can correctly place the floor plan appendage relative to the current floor plan.	

Map components

Setup > Maps > Edit

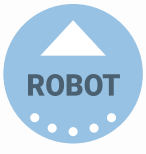
There are three categories of components you can add to the map: Positions and markers, Zones, and Floor plan components.

Positions and markers

Positions and markers mark points of interest on the map where you may want to send the robot to. They are defined by an X- and Y-coordinate indicating their position on the map and various attributes that affect how the robot may use them.

Positions

A position component marks a location where a robot can be sent to. Different positions have certain attributes to them, which enable them to be used for certain functions.

Graphic	Description
	**Robot position** A Robot position marks a location where the robot can be sent to. It has no special features.

Graphic	Description
	**Cart position** A Cart position marks where a robot with a hook can pick up and place carts. When a robot picks up a cart on a Cart position, you must select a Cart type that describes the dimensions of the cart the robot is docking to. When a robot places a cart on a Cart position, you must select how the robot should park the cart.
	**Shelf position** A Shelf position marks where a robot with a shelf carrier can pick up and place shelves. A robot can place shelves on other positions also, but then it cannot pick up the shelf again autonomously. Shelf positions act both as markers and positions. When there is a shelf on the position, the robot uses the shelf as a marker to dock to. When there are no shelves on the position, the robot treats the position like a Robot position since there is nothing physical to dock to. When a robot docks to a shelf on a Shelf position, you must select a marker type that describes the dimensions of the shelf the robot is docking to.
	**Elevator position** An Elevator position marks the robot's position in the elevator. This position is only used in MiR Fleet.
	**Elevator entry position** An Elevator entry position marks the robot's position outside the elevator. This is the position the robot goes to while waiting for the

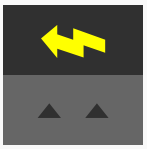
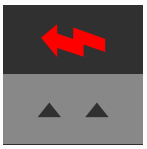
Graphic	Description
	elevator to arrive and the doors to open. This position is only used in MiR Fleet.
	**Evacuation position** An Evacuation position marks where a robot must go when commanded to evacuate all Evacuation zones from MiR Fleet. This position is only used in MiR Fleet.
	**Staging position** A Staging position marks where a robot can wait if it is idle. This position is only used in MiR Fleet.

Markers

A marker component marks a location where a physical marker is located. Once the robot is close enough to a physical marker to detect it, the robot can dock to the marker. This means the robot will position itself accurately to a specific point relative to the marker. Different markers have certain attributes to them, which enable them to be used for certain functions.

Graphic	Description
	**L-marker** An L-marker component on the map represents where the robot can find a physical entity of an L-marker. To create an L-marker component correctly, position the robot approximately one meter from the physical marker entity in the direction and position you want the robot to dock to the marker, and select **Detect**. When the robot docks to the marker, it will stop so its center is approximately 0.5 m from the closest edge of the marker.

Graphic	Description
	**VL-marker** A VL-marker component on the map represents where the robot can find a physical entity of a VL-marker. To correctly create a VL-marker component, position the robot where you want it to dock relative to the physical marker entity, and select **Detect**. When the robot docks to the marker, it will stop at the same position where it detected the marker.
	**V-marker** A V-marker component on the map represents where the robot can find a physical entity of a V-marker. To correctly create a V-marker component, position the robot where you want it to dock relative to the physical marker entity, and select **Detect**. When the robot docks to the marker, it will stop at the same position where it detected the marker.
	**Bar-marker** A Bar-marker component on the map represents where the robot can find a physical entity of a Bar-marker. To create a Bar-marker component correctly, first position the robot a meter in front of the physical marker entity, then select **Detect**. When the robot docks to the marker, it stops in the center between the two bars. Bar-markers are often used for custom pallet racks. There are some differences between functions used with Bar-markers and Pallet rack

Graphic	Description
	markers—see "Custom pallet racks" on the next page.
	**Pallet rack** A Pallet rack component on the map represents where the robot can find a physical entity of a MiR pallet rack. To create a Pallet rack component correctly, first position the robot a meter in front of the physical pallet rack, then select **Detect**. When the robot docks to the pallet rack, it stops in the center between the two racks.
	**MiR Charge 24V** A MiR Charge 24V component on the map represents where the robot can find a physical entity of MiR Charge 24V. To correctly create a MiR Charge 24V marker component, position the robot approximately one meter from the physical marker entity, and select **Detect**. When the robot docks, it positions itself in the correct position for charging.
	**MiR Charge 48V** A MiR Charge 48V component on the map represents where the robot can find a physical entity of MiR Charge 48V. To correctly create a MiR Charge 48V marker component, position the robot approximately one meter from the physical marker entity, and select **Detect**. When the robot docks, it positions itself in the correct position for charging.

Graphic	Description
	**Precision marker** A Precision marker component on the map represents where the robot can find a physical entity of a precision docking station. To create a Precision marker component correctly, first position the robot a meter in front of the physical precision docking station, then select **Detect**. When the robot docks to the station, it drives to the two precision pins and locks to them ensuring a precision of ±1 mm left and right, and ±1 mm in depth. If the docking fails, it may be necessary to adjust the marker offsets.

Custom pallet racks

If you do not use one of MiR's pallet rack products with the robot and choose to create custom pallet racks, you can either use a Bar-marker or a Pallet rack marker to mark it on the map.

Pallet rack marker

Use a Pallet rack marker if the dimensions of your pallet racks are the same as the MiR pallet racks—see MiR's website for the pallet rack specifications.

This enables the robot to use the Check position status action to check if there is pallet on top of a pallet rack before docking to it. This feature is not available for Bar-markers.

Bar-marker

Use a Bar-marker if the dimensions of your custom pallet racks differ from the MiR pallet racks.

Make sure the height of your pallet rack is suitable for the height specifications and tolerances for your top application.

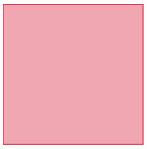
For more information about creating custom pallet racks, see *How to create custom pallet racks*. You can find this guide on MiR Support Portal.

Zones

Zones mark an entire area that should either affect the robot's driving behavior while it is in the zone or how the robot plans around or through the zone.

Action zones

Action zones are zones that have an affect on robots' behavior when their center is inside the zone.

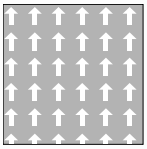
Graphic	Description
	**Speed zone** A robot in a Speed zone drives with another selected speed limit. A slow speed limit may be used if the robot is driving in a zone with many people, and a high speed limit may be used to traverse a zone free of people and obstacles quickly. This is an action zone and only affects the robot when the robot is inside the zone.
	Sound and light zone A robot in a Sound and light zone can play a sound and blink its status lights when driving in this zone. This zone can be used to warn people about the presence of the robot. This is an action zone and only affects the robot when it is inside the zone.
	**Planner zone** A robot in a Planner zone can ignore data from its laser scanners and localize with encoders, decrease its field of view to run smoothly in populated areas, optimize the waiting time and deviation of paths, and ignore obstacles. This is an action zone and only affects the robot when it is inside the

Graphic	Description
	zone.
	**I/O module zone** A robot in an I/O module zone can: • Activate an I/O module when it enters the zone. When the robot exits the zone, the module is deactivated. • Change a PLC register when it enters the zone. When the robot exits the zone, you can set the same or another PLC register to a chosen value. This is an action zone and only affects the robot when it is inside the zone.
	Limit-robots zone When a robot plans a path through a Limit-robots zone, it may only enter the zone if the number of robots inside the zone is less than the set limit. This zone only applies to robots controlled by MiR Fleet. If a robot cannot enter a zone because the limit has been reached, the robot waits outside the edge of the zone until another robot exits the zone. This is an action zone and only affects the robot when it is inside the zone.
	Evacuation zone A robot in an Evacuation zone will go to an Evacuation position if an evacuation is initiated. If there are not enough Evacuation positions for all robots, all remaining robots stop in the position they were in when the evacuation was initiated. This is an action zone and only affects the robot when it is inside the zone.

Path planning zones

Path planning zones affect how the area inside the zone should be used when the robot is planning its path. Once the robot begins driving after having planned its path, these zones no longer affect it until it plans a new path. You can add Path planning zones to the map using either "Draw a new shape" on page 69 or "Draw a line" on page 71.

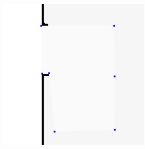
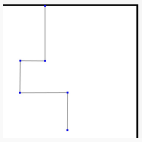
Forbidden zones are an exception to this. Even after creating the global path and even when avoiding obstacles, the robot will continue to make sure that it does not enter a Forbidden zone.

Graphic	Description
	**Directional zone** When a robot plans a global path through a Directional zone, the path is always in the direction specified in the zone. When you create a Directional zone, you specify its direction, and the map shows the direction with arrows drawn on the zone. In a Directional zone, the global path can be perpendicular to the direction of the arrow or at any angle less than 90° to the arrow. When you create a Directional zone shape, the same direction is applied across the whole shape. When you create a Directional zone line, the direction follows the direction of the line. If you add a position or marker inside or close to the border of the zone, make sure to orient it so it is pointing in a direction that the robot can plan in according to the zone. This is a path planning zone and only affects how the robot plans its global path.
	Preferred zone When a robot plans a global path, it tries to plan its path to go through Preferred zones. It will drive out of the zone to avoid obstacles. This is a path planning zone, and only affects how the robot plans its

Graphic	Description
	global path.
	Unpreferred zone When a robot plans its global path, it tries to plan its path to avoid Unpreferred zones. This may be useful in a work area with lots of activity and dynamic obstacles to guide the robot away from busy areas. The robot only drives into Unpreffered zones if all other paths are blocked. This is a path planning zone, and only affects how the robot plans its global path.
	Forbidden zone When a robot plans a path, the robot ensures that its footprint never enters a Forbidden zone. Even after creating the global path and even when avoiding obstacles, the robot will continue to make sure that it does not enter a Forbidden zone. This is a path planning zone and only affects how the robot plans its global and local path.
	**Access zone** When the robot plans a global path, the robot ignores sensor obstacles that are in Access zones. This allows the robot to plan paths through areas that it otherwise would not. This is useful for marking ramps and doors where the robot should drive through. When the robot detects an obstacle inside an Access zone, it will drive as close as it can to the obstacle and wait for it be cleared before continuing along its path. This is a path planning zone and only affects how the robot plans its global and local path.

Floor plan components

Besides editing the floor plan using the tools in "Floor plan" on page 48, you can also add floors and walls as map components. This allows you to edit the vertices that define the shape of the floor or wall more easily. If you export the floor plan from the interface, any walls and floors defined using the "Map component tools" below are not included.

Graphic	Description
	**Floor** When mapping, the floor is created automatically. The floor on the map marks the areas where the robot is able to drive. You can use the Floor tool to touch up the existing floor if there are areas where the floor is missing.
	**Wall** Walls mark areas on the map where there are permanent physical obstacles the robot cannot drive through. You can add straight lines to create a more legible map and decide how thick the walls should be by editing the stroke width.

Map component tools

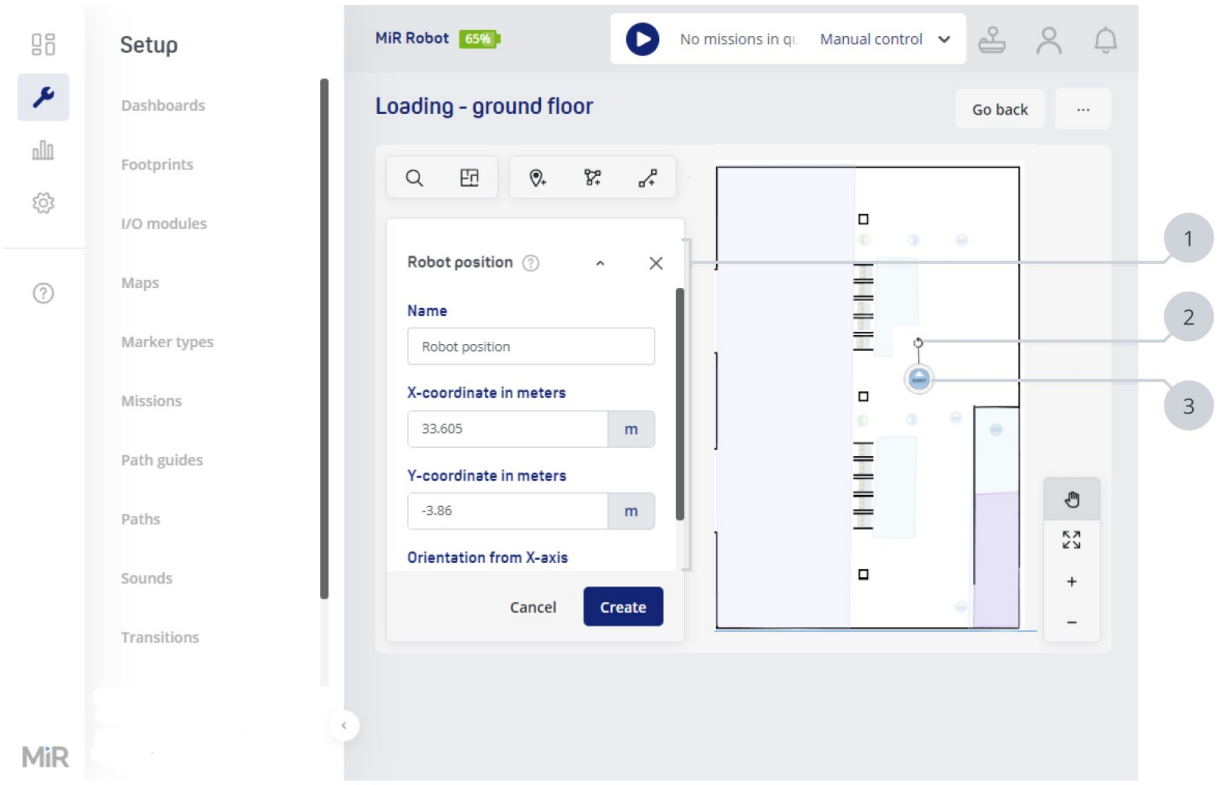
Setup > Maps > Edit

There are three tools you can use to add map components:

- **Add position** is used to add either a marker or a position to the map—see "Add position" on the next page.
- **Draw a new shape** is used to add a zone that covers a large area to the map—see "Draw a new shape" on page 69. With this tool, you define the vertices of the shape where the zone is applied.
- **Draw a line** is used to add a zone in the form of a path—see "Draw a line" on page 71. With this tool, you define consecutive points and the width of the line between the points where the zone is applied.

Add position

To add a new position, you must first select which position or marker type you want to create. The chosen marker or position is then added to the map viewer and you can reposition it where you want it on the map. You can select between the positions and markers described in "Positions and markers" on page 57.



	Description		Description
1	**Position settings** In the position settings you can adjust where the position is on the map and its orientation. If you are creating a marker, you can	2	**Rotate position** Pull the rotate tool around to change the orientation of the position. If you change the orientation numerically in the position settings, the

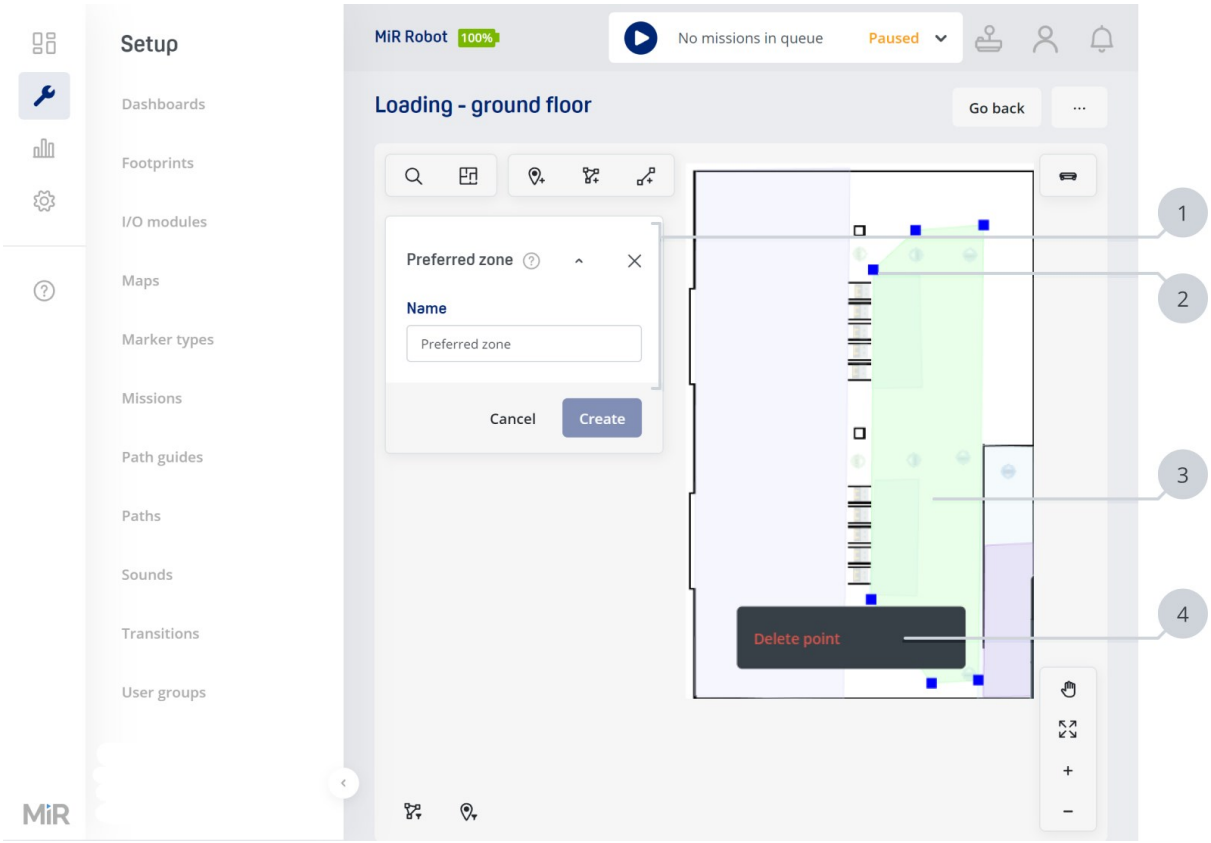
	Description	Description
	also adjust the offsets to modify where the robot positions itself relative to the marker. If you have opened the active map and your robot is close to the marker, you can select **Detect** to make the robot automatically fill out the values so that when it docks to the marker, it ends up in the position it is currently in, unless it is a charging station or pallet rack marker.	orientation of the position in the map viewer will update.
3	**New position** The new position is shown on the map. Pull the position around on the map to reposition it. If you change the position coordinates numerically in the position settings, the location of the position in the map viewer will update.	

Draw a new shape

To add a new shape, you must first select which type of zone you want to create. You can select between the zones and component described in "Zones" on page 63 and "Floor plan components" on page 67.

To draw a shape on the map, select a start point for the shape and continue adding points to create the shape you want. The interface will automatically generate a shape with an edge that passes through each point you make. While creating the shape, you can:

- Drag, add, and delete points to modify the line.
- Adjust the zone settings specific to your zone.
- Rearrange which pairs of points an edge is generated between.



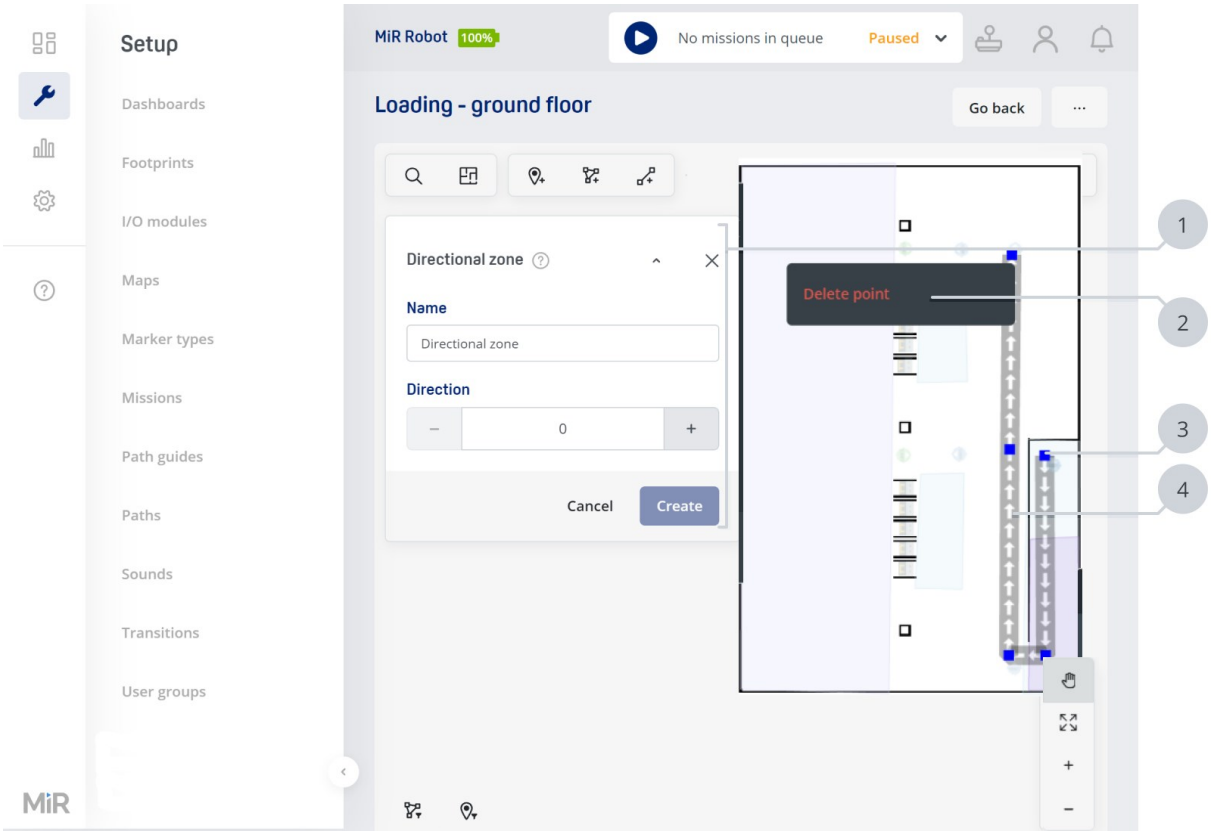
	Description		Description
1	**Zone settings** In the zone settings, you can: • Enter the name of the zone. • Modify any zone specific settings—see "Zones" on page 63.	2	**Point** You can drag points around to modify the shape. If you select between points, a new point is generated.
3	**Shape area** The area inside all of the created points is shaded with the selected zone color to indicate the area the zone will cover.	4	**Delete point** When you select a point, the option to delete the point appears.

Draw a line

To add a new line, you must first select which type of zone or floor plan component you want to create. You can select between the zones and components described in "Path planning zones" on page 65 and "Floor plan components" on page 67. You cannot create Actions zones—see "Action zones" on page 63— using the **Draw a line** tool.

To draw the line on the map, select a start point for the line and continue adding points to create the line you want. The interface will automatically draw a line to the next point you create. While creating the line, you can:

- Drag, add, and delete points to modify the line.
- Adjust the line width.
- Adjust the zone settings specific to your zone.
- Rearrange between which pairs of points an edge is generated.

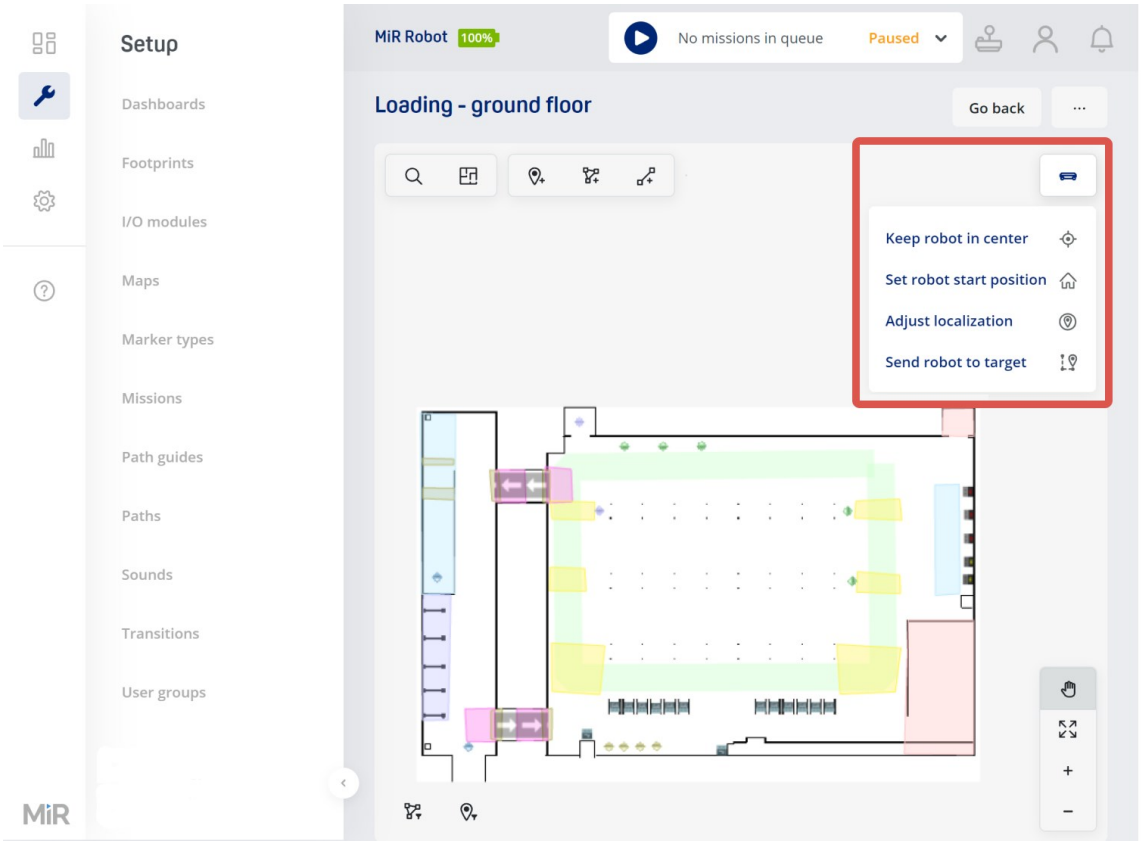


	Description		Description
1	**Zone settings** In the zone settings, you can: • Enter the name of the zone. • Adjust the line width. • Modify any zone specific settings—see "Zones" on page 63.	2	**Line** A line is automatically generated between every pair of consecutively created points.
3	**Point** You can drag points around to modify the shape. To create a new point, select an empty area without any existing points.	4	**Delete point** When you select a point, the option to delete the point appears.

Robot tools

Setup > Maps > Active map or Dashboards > Dashboard with active map

If you are viewing or editing the active map, the map will include a representation of the robot and its collected obstacle data. The **Robot tools** , which you can use to control the robot on the map, are available in the upper-right corner.



- **Keep robot in center**

  Makes the map automatically follow the robot to keep the robot in the center of the map.

- **Set robot start position**

  If the robot is not localized on the map, use this tool to mark where the robot currently is on the map to help it localize itself.

- **Adjust localization**

  If the robot is not correctly localized on the map (in other words, the scanner data does not align correctly with the map walls), use this tool to make the robot reposition itself on the map according to the scanner data. If the robot continues to fail to correctly localize itself, try moving the robot to another position with more landmarks it can use to identify where it is on the map.

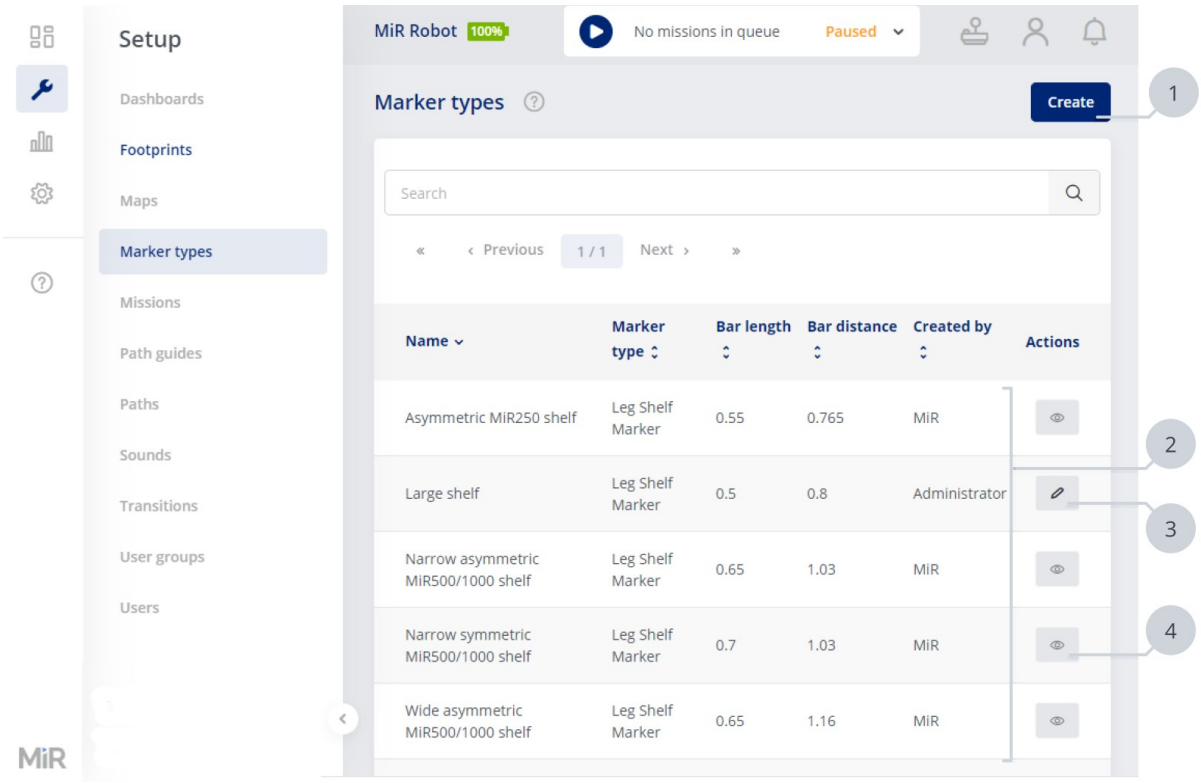
- **Send robot to target**

  Send the robot to any point on the map.

4.5 Marker types

A marker type is a description of a shelf that MiR robots can dock to. You must have a marker type for each type and size of shelf you want your robot to be able to transport.

A marker type is used to provide the information MiR robots need to dock to a shelf correctly. When you send the robot to a Shelf position to pick up a shelf, you must also select the marker type corresponding to the shelf.



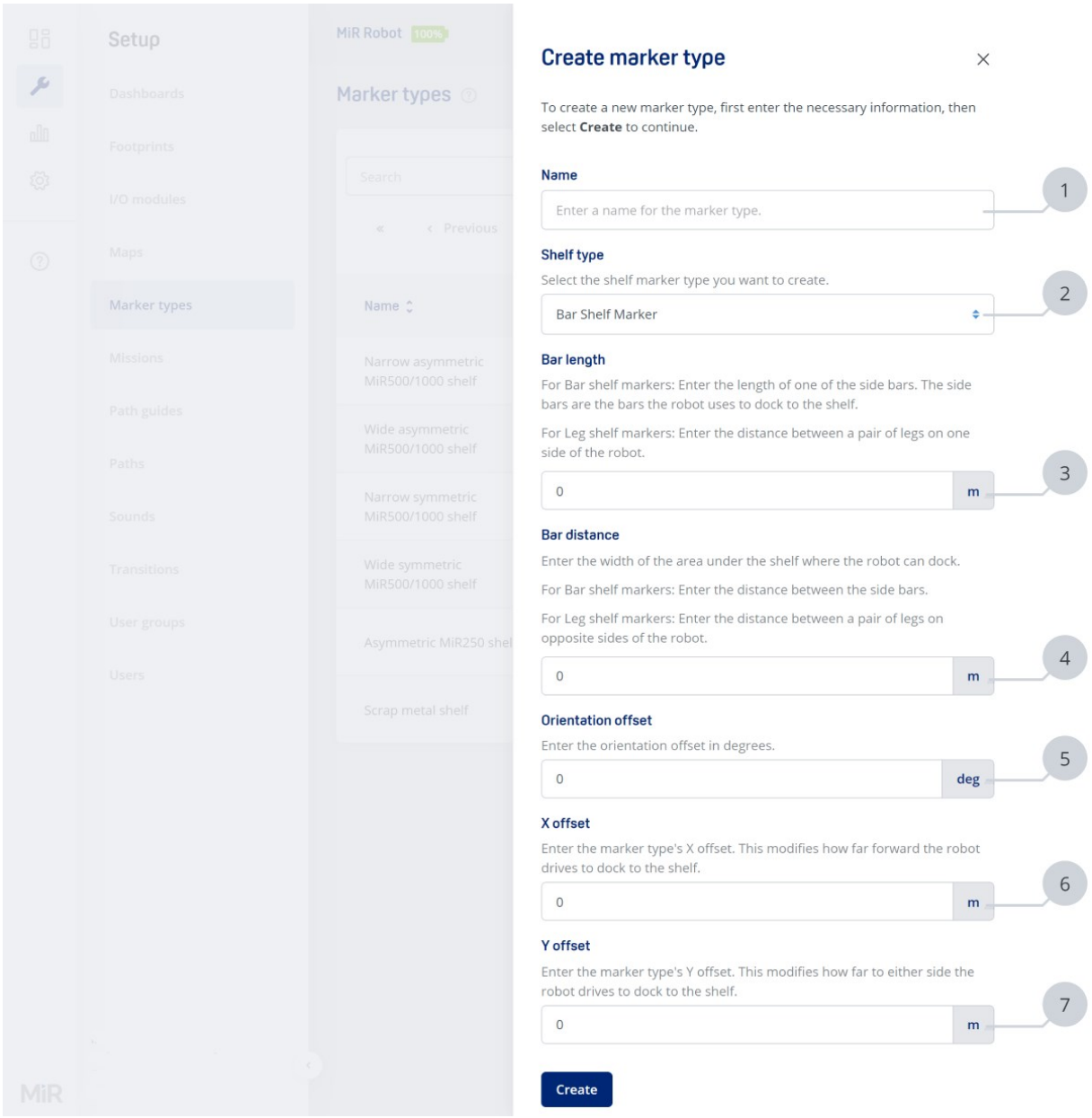
	Description		Description
1	**Create** Opens the dialog box to create a new marker type—see "Create marker type" on the next page.	2	**Marker types** Lists all marker types used by MiR Robot. You can sort the marker types based on the name, type, bar length, bar distance, or which user created them.

	Description		Description
3	**Edit** Opens the dialog box to edit the selected marker type—see "Edit marker type" on page 78.	4	**View** Opens the dialog box to view information about the selected marker type. Your user group does not have permission to edit the marker type.

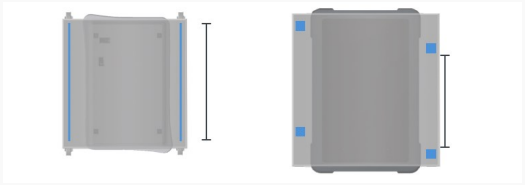
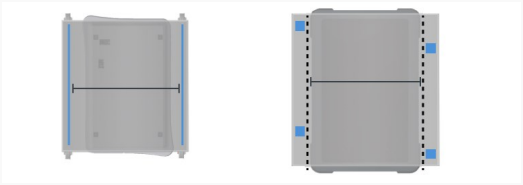
Create marker type

Setup > Marker types > Create

To create a new marker type, first enter the necessary information, then select **Create** to continue.



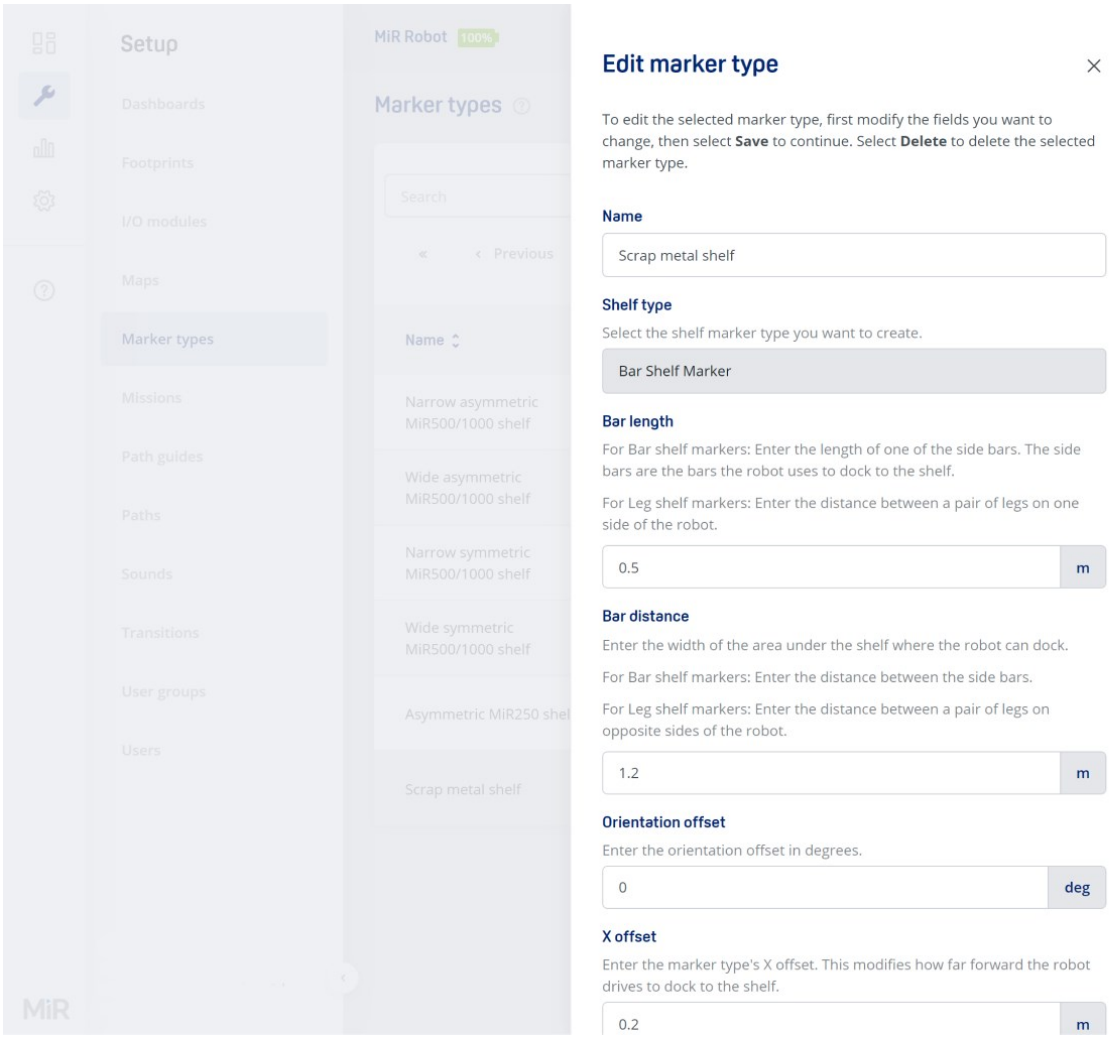
	Description		Description
1	**Name** Enter a name for the marker type.	2	**Shelf type** Select the shelf marker type you want to create.

	Description		Description
			Bar-markers are for MiR100 and MiR200. Leg-markers are for MiR250, MiR500, MiR600, MiR1000, and MiR1350.
3	**Bar length** For Bar shelf markers: Enter the length of one of the side bars. The side bars are to the left and right sides of the robot. For Leg shelf markers: Enter the distance between a pair of legs on one side of the robot. 	4	**Bar distance** Enter the width of the area under the shelf where the robot can dock. For Bar shelf markers: Enter the distance between the side bars. The side bars are to the left and right sides of the robot. For Leg shelf markers: Enter the distance between a pair of legs on opposite sides of the robot. 
5	**Orientation offset** Enter the orientation offset in degrees.	6	**X-offset** Enter the marker type's X-offset. This modifies how far forward the robot drives to dock to the shelf.
7	**Y-offset** Enter the marker type's Y-offset. This modifies how far to either side the robot drives to dock to the shelf.		

Edit marker type

Setup > Marker types > Edit

To edit the selected marker type, first modify the fields you want to change, then select **Save** to continue. Select **Delete** to delete the selected marker type.



You can change any of the fields described in "Create marker type" on page 75.

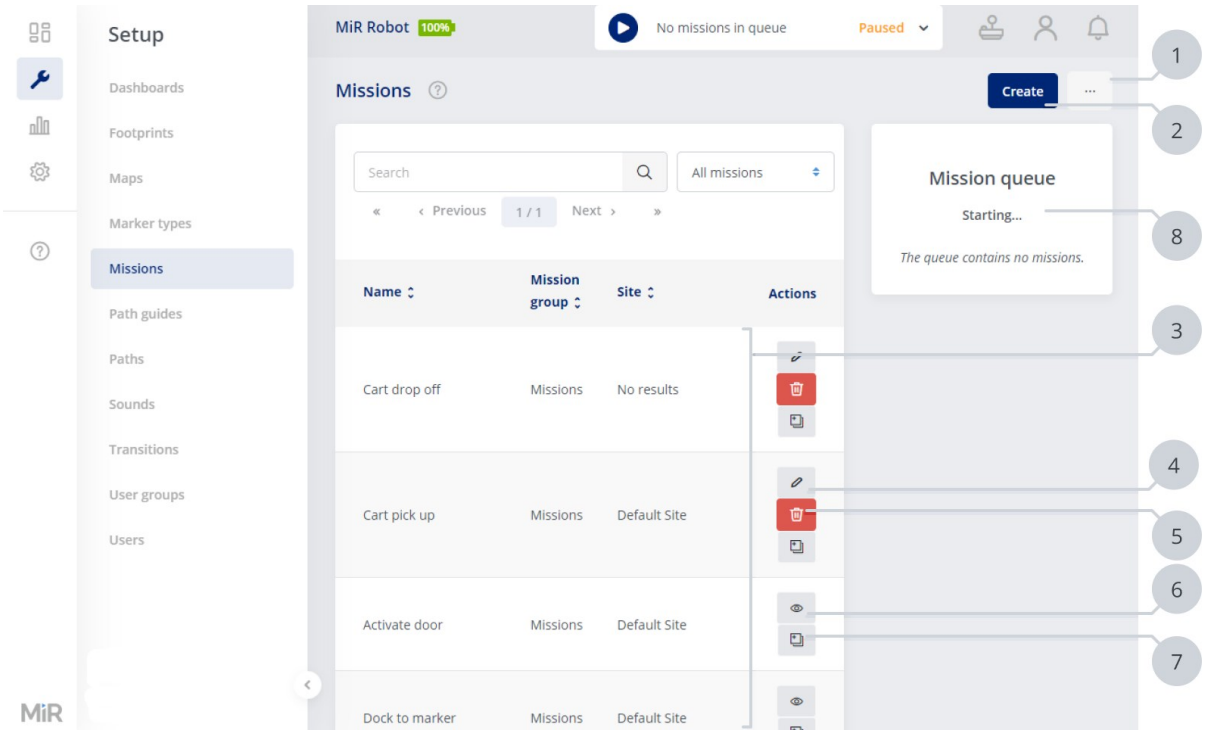
4.6 Missions

A mission is a user-defined series of actions the robot can be set to perform on demand.

Missions are used to program the tasks you want your MiR robot to perform. When you create and save a mission, you can make the robot perform the mission as many times as needed.

You start a mission by adding the mission to the mission queue. Missions will be run in the order they are added, or you can rearrange them as needed.

In MiR Fleet, missions are controlled in **Mission scheduler**.



	Description		Description
1	**Mission settings** Allows you to **Create/Edit mission groups**—see "Mission groups" on the next page.	2	**Create** Opens the dialog box to create a new mission—see "Create mission" on page 82.
3	**Missions** The list includes all missions used by	4	**Edit** Opens the mission editor for the

	Description		Description
	MiR Robot. You can sort the mission based on the name or which mission group or site they are part of.		selected mission—see "Edit mission" on page 83.
5	**Delete** Deletes the selected mission.	6	**View** Opens a preview of the selected mission. Your user group does not have permission to edit the mission.
7	**Queue mission** Adds the selected mission to the mission queue.	8	**Mission queue** The mission queue is the list of mission that the robot has been ordered to execute.

Mission action limiter

If you experience that a mission is executed slower than expected, the action limiter may have been activated.

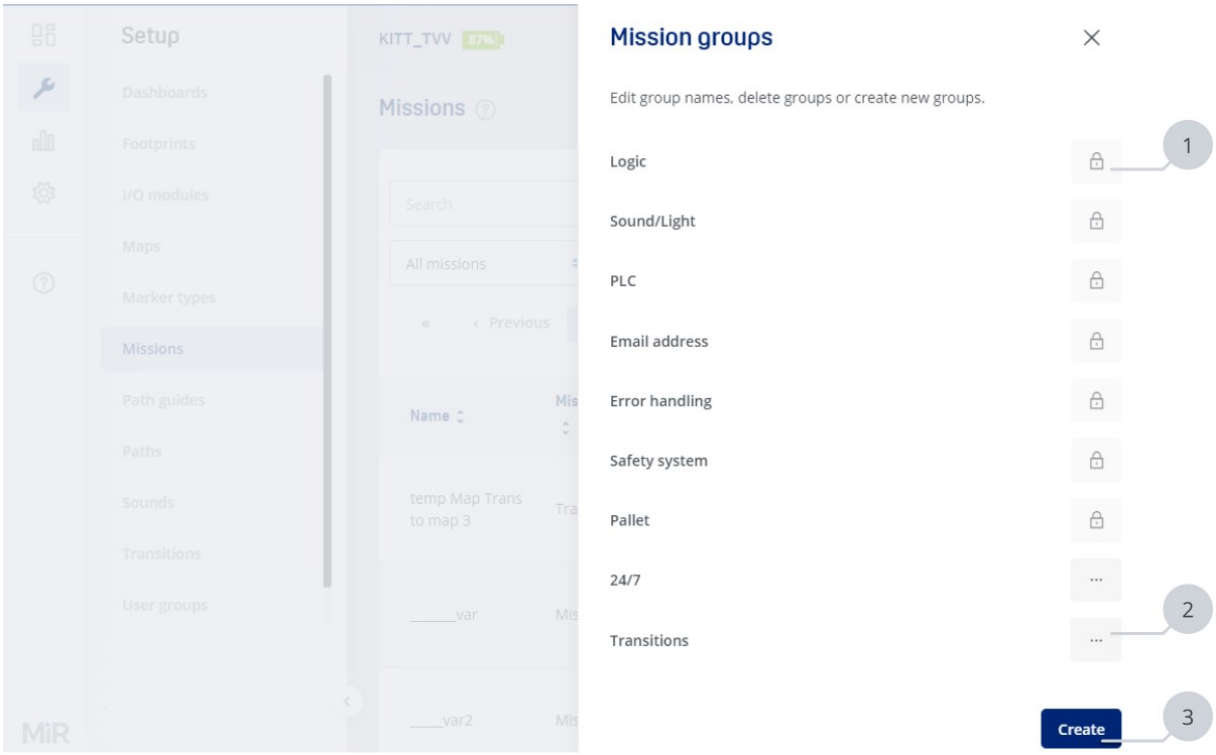
If the robot executes many actions within a short time frame, it can use a significant amount of the robot's processing power. This can have a negative effect on the robot's other automatic systems. To avoid this, the robot introduces an action limit if necessary.

If more than 30 actions have been performed in the last 10 seconds, the robot begins limiting the number of actions to two actions per second. It will keep this limit until less than four actions are executed in the last 10 seconds. Starting a new mission does not reset the action limit count or remove the two actions per second limit.

Mission groups

Setup > Missions > Mission settings > Create/Edit mission groups

Edit group names, delete groups, or create new groups.

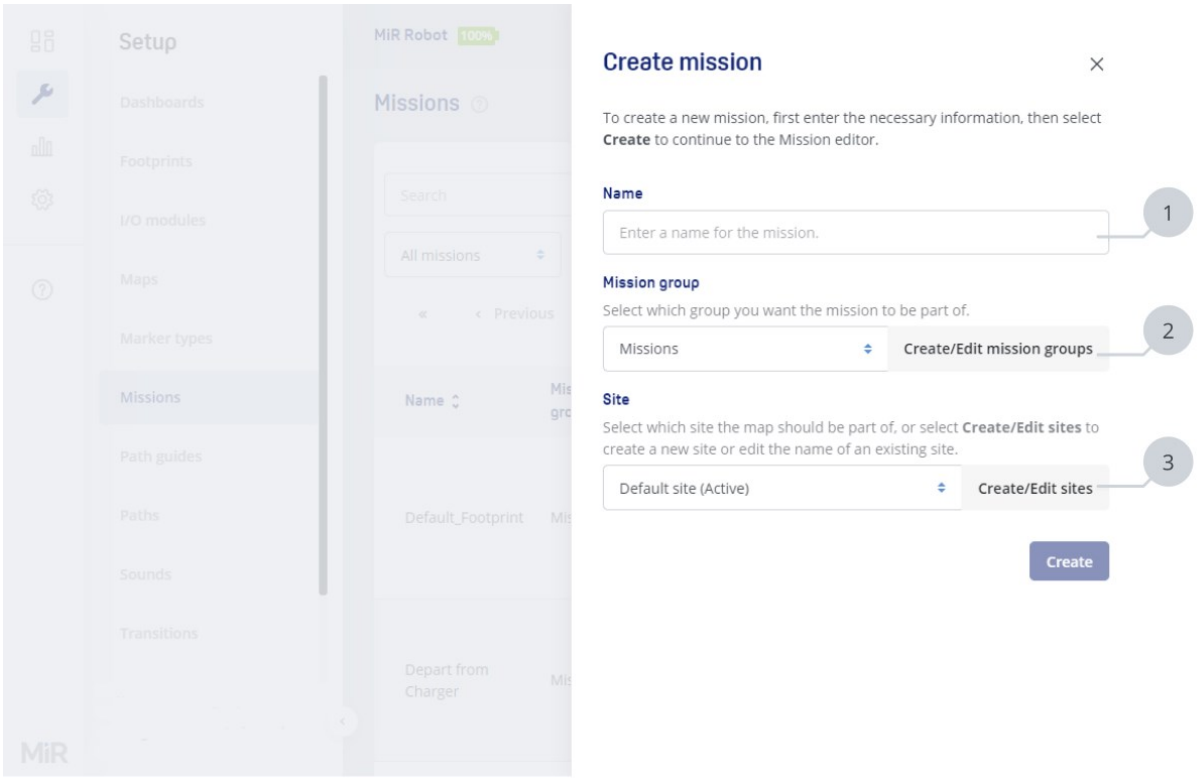


1	**Locked** You cannot perform this action. You cannot edit mission groups that were created by a user from a user group with a higher permission level than you.	2	**Mission group settings** Allows you to: • **Edit**: Change the name of the mission group. • **Delete**: Delete the mission group. All missions in the mission group are deleted too.
3	**Create** Opens the dialog box to create a new path guide—see "Create path guide" on page 115.		

Create mission

Setup > Missions > Create

To create a new mission, first enter the necessary information, then select **Create** to continue to the Mission editor.



	Description		Description
1	**Name** Enter a name for the mission.	2	**Mission group** Select which group you want the mission to be part of.
3	**Site** Select which site the map should be part of, or select **Create/Edit sites** to		

Description	Description
create a new site or edit the name of an existing site. For more information about sites, see "Sites" on page 43.	

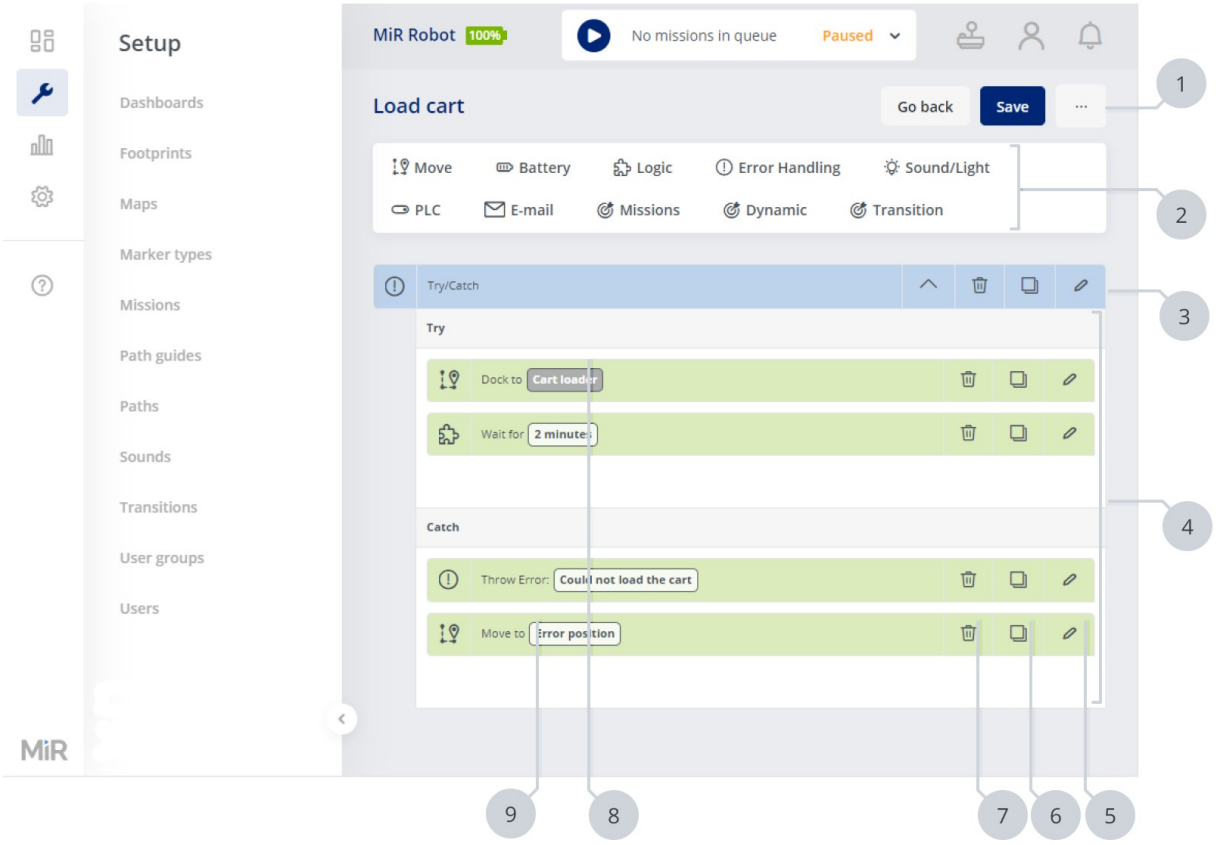
Edit mission

Setup > Missions > Edit

A mission is built from actions that you pick from the mission group menus in the top bar. You can also pick already created missions and nest them in new missions.

When you have picked the actions or missions you want in your mission, do the following:

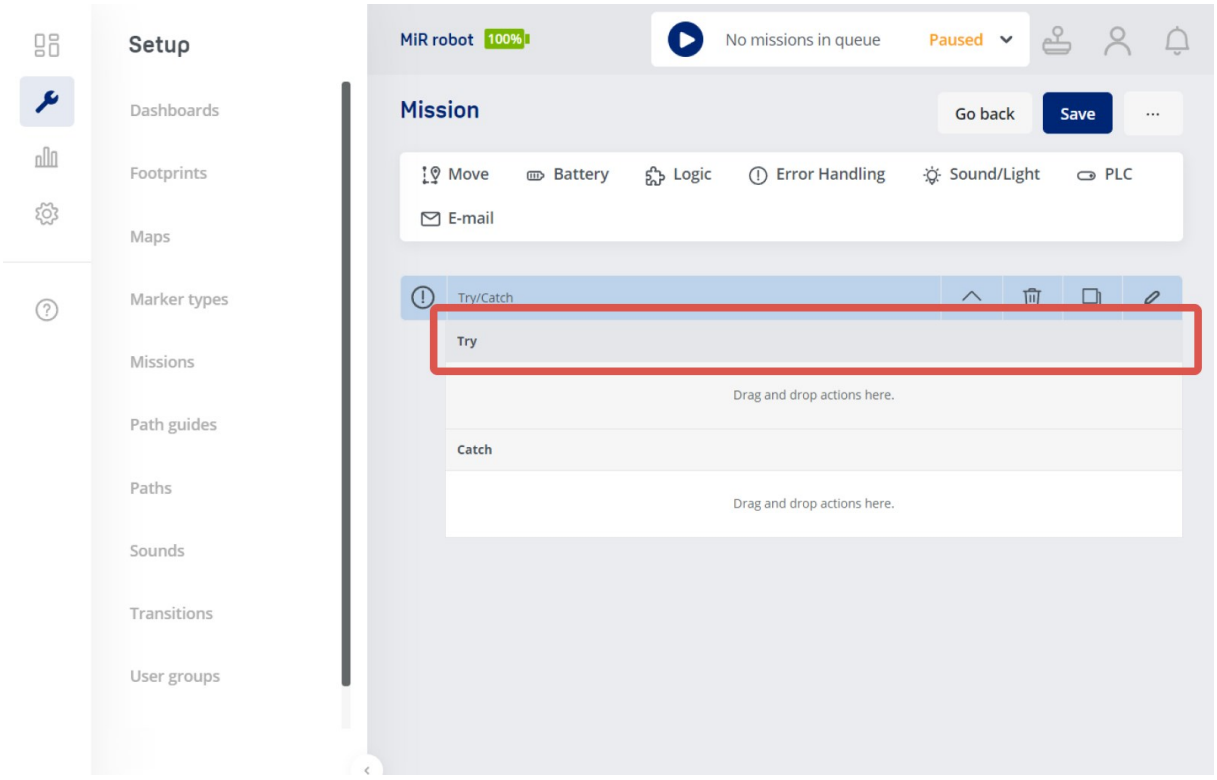
- Drag the actions to sort them in the desired order. The actions are executed in a top-to-bottom order.
- Set the parameters for the selected action by selecting **Edit** at the far right of the action line.



	Description		Description
1	**Mission settings** Allows you to: • Edit the name of the mission and which mission group and site the mission is part of. • Save a copy of the mission. • Delete the mission.	2	**Action menus** All of the actions and missions you can add to your mission are divided into the action menus at the top of the editor. These action menus correspond to the mission groups you have created for the site.
3	**Added action or mission** When you add an action or mission from the top menus, it is displayed in	4	**Sub-actions and missions** Some actions allow you to nest actions into them. This is used to indicate which

	Description		Description
	the editor below. Here, you can reorder and edit each mission or action. The mission is always executed from top to bottom, meaning that when the mission is run, it starts with the action at the top, and once the robot has completed that action, it continues to the next action below.		actions should be executed under certain circumstances. This can, for example, be for logical operators or for actions that should be executed with muted Protective fields.
5	**Edit** Opens the action or mission editor dialog box—see "Edit actions and nested missions" on the next page.	6	**Copy** Copies the action or mission below the existing instance.
7	**Delete** Deletes the action or mission from the current mission.	8	**Variable** If you have either nested a mission that uses a variable or you have chosen to use a variable in an action parameter, the variable is shown in gray.
9	**Entered parameter** The most important custom parameters are shown in the overview in white. When you change the parameter value, the value in the overview will also update.		

Instead of dragging and dropping actions into, for example, a Try/Catch action, you can include several actions from the different menus. Select the action you want to work with in the Mission editor, and select the actions you want to include underneath from the different menus.

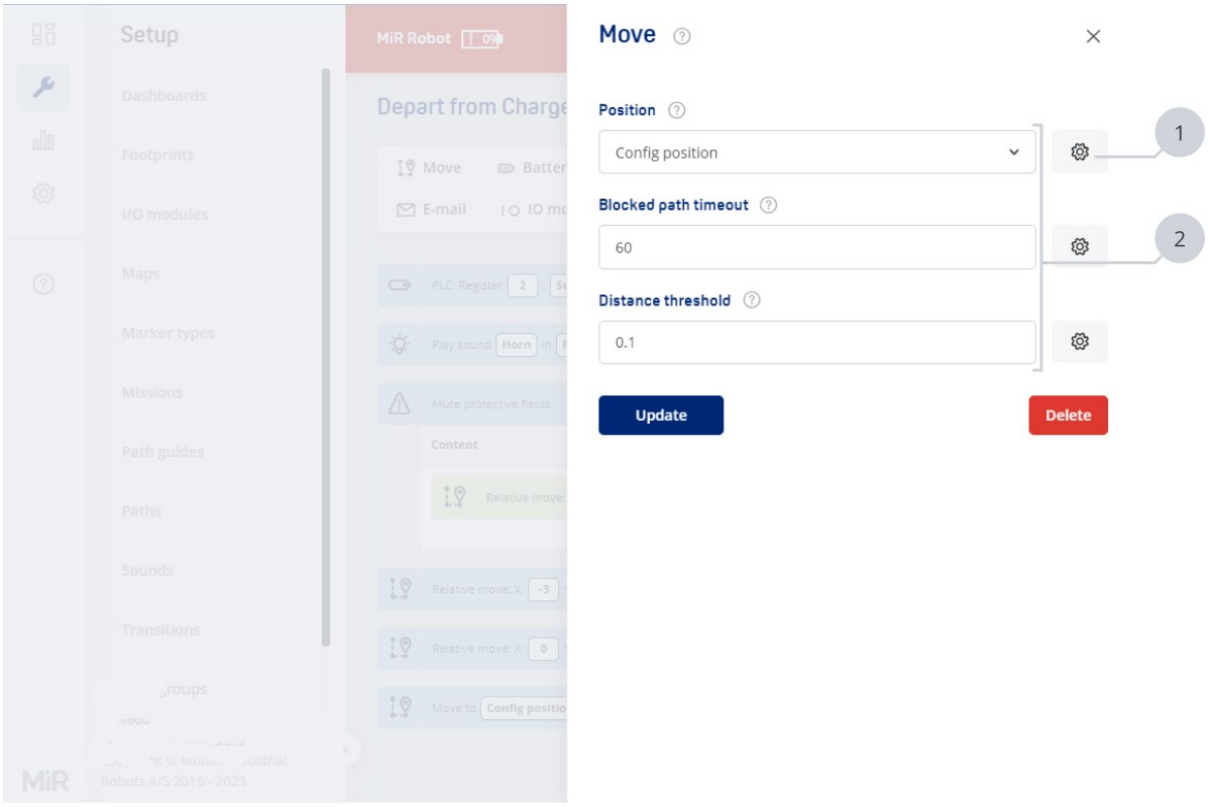


Edit actions and nested missions

Setup > Missions > Edit > Edit action

All actions have different parameters that you must enter values for. These define how the robot will execute the action. If you have a nested mission, any variable in the mission is displayed in the same way.

For more information about the types of parameters there are in each action type or template mission, see "Mission actions and template missions" on page 90.

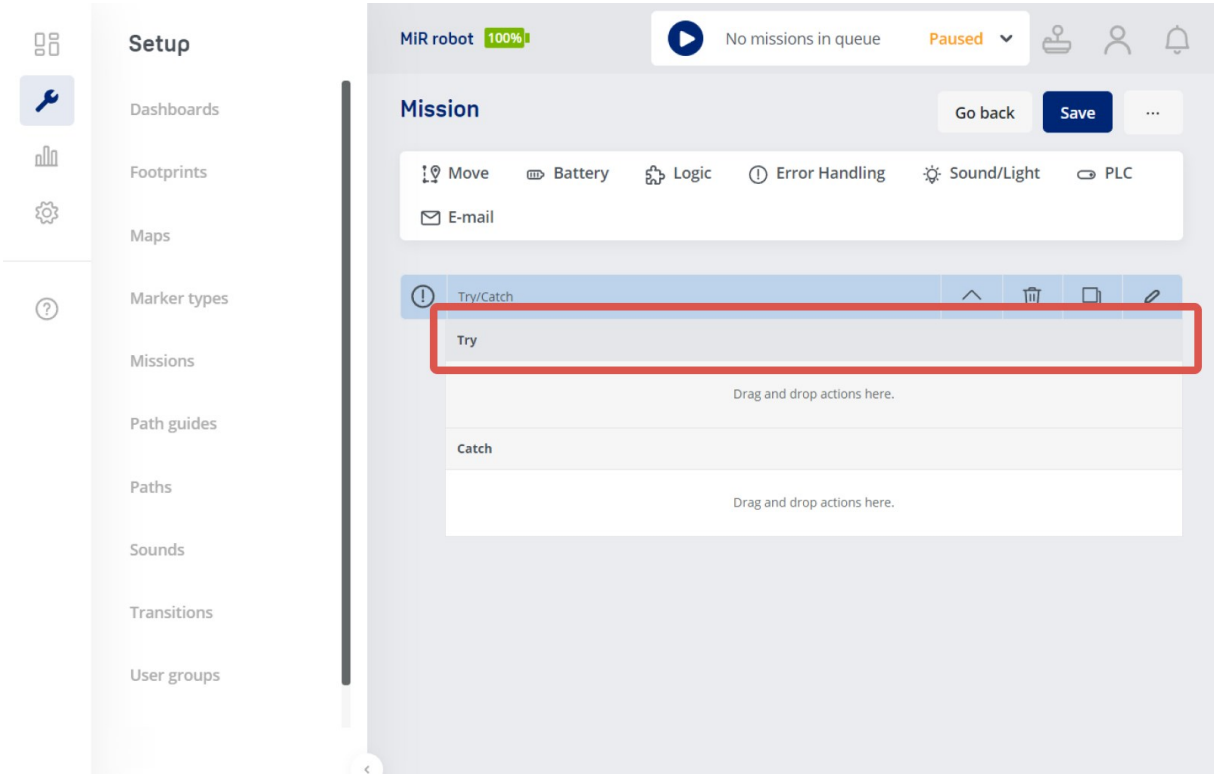


	Description		Description
1	**Variables** Opens the dialog box used to edit and apply a variable to this parameter—see "Variables" on the next page.	2	**Actions parameters or mission variables** All parameters or variables that you can customize in the action or mission are shown in the dialog box. Depending on the type of parameter or variable, you can either select a value from a list of available choices or enter a custom value.

If it seems like an option is missing from the menu, check that the component you want to use and the mission you are editing are part of the same site.

You can nest actions into other actions by:

- Dragging and dropping actions into the nestable sections.
- Selecting the nestable section and then selecting the action from the action menus to add the action directly in the section. If you have selected a section it turns a darker gray. You can unselect the section by selecting it.

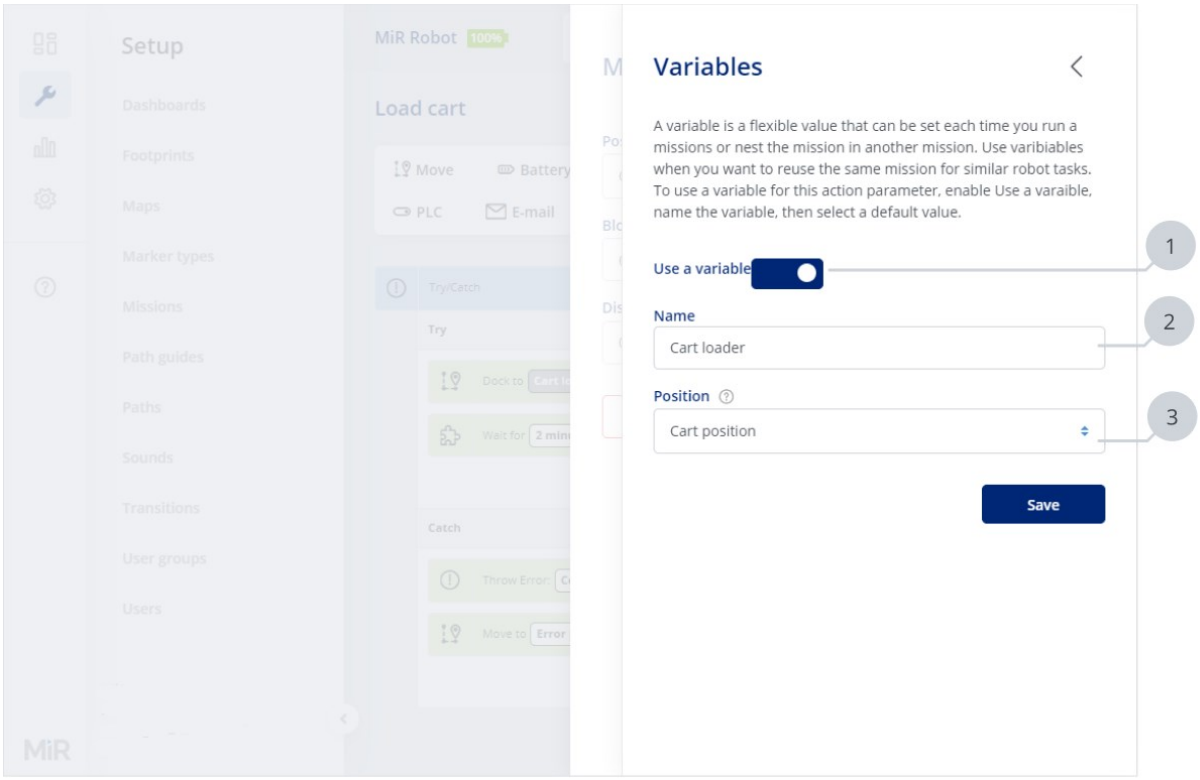


Variables

Setup > Missions > Edit > Edit action > Variables

A variable is a flexible value that can be set each time you run a mission or nest the mission in another mission. Use variables when you want to reuse the same mission for similar robot tasks.

To use a variable for this action parameter, enable **Use a variable**, name the variable, then select a default value.



	Description		Description
1	**Use a variable** Select whether or not you want to apply a variable to this parameter.	2	**Name** Enter a name for the variable. If you use the same variable name for a parameter that uses the same type of component, the same variable will be applied both places. Variable names are not case-sensitive.
3	**Default value** Enter a default value for the variable. When you run the mission or nest it in another mission, this is the value the variable is set to by default, but you can still change it to any other value.		

An example of how you can use variables with the same name could be if you have a mission where you use two Move actions and the robot must go the same position in both actions. If you use a variable with the same name in both actions, when you run the mission, you will only be prompted to select a single position that is then applied in both actions.

Mission actions and template missions

A mission is built from actions that you pick from the menus in the top bar. You can also pick already created missions and nest them in new missions.

Actions and missions are grouped together in the top bar menus. When you create a new mission, you can add it to one of the groups by assigning it to that mission group.

By default, the robot has a number of template missions that are also available to use in missions. The following sections describe all of the default template missions and actions you can use in your missions.

Move

The **Move** menu includes actions to control the robot's driving behavior.

Move

A Move action defines a map position the robot should move to.

This action has the following parameters:

- **Position**

  Select a position from the drop-down list.

- **Blocked path timeout**

  Set the amount of time (in seconds) the robot is allowed to be blocked before the movement will fail. This blocked time is summed up when the path is blocked multiple times.

- **Distance threshold**

  Depending on how accurately the robot is required to position itself on the goal position, the threshold can be increased or decreased.

Adjust localization

An Adjust localization action adjusts the robot to the correct position on the map. This is useful if it has to move through an area with many dynamic obstacles where the localization is likely to drift.

Switch map

A Switch map action is required if the robot needs to switch automatically from one map to another within a mission. The maps must have overlapping areas where the robot can locate itself in the physical environment. Switch map actions are the basis for Transitions (**Setup** > **Transitions**), which handle map switches automatically once they are set up.

This action has the following parameters:

- **Entry position**

  In the map you are switching to, select the position the robot should start from after the map transition.

  The Switch map action must be preceded by a Move action to the position in the current map that physically overlaps the goal position you select here. The overlap of the entry and goal positions in the physical area is important for the robot to localize itself in the new map.

Docking

A Docking action sends the robot to dock to a marker.

This action has the following parameters:

- **Marker position**

  Select a marker from the drop-down list.

- **Blocked path timeout**

  Set the amount of time (seconds) the robot is allowed to be blocked before the movement will fail. This blocked time is summed up when the path is blocked multiple times.

- **Maximum linear speed**

  Enter a value in meters per second for the maximum forward or backward speed during the movement.

Relative move

A Relative move action defines an X- and a Y-distance you want the robot to move and an orientation you want it to turn relative to its current position. A Relative move can be used, for example, to undock a robot from a marker.

Relative move actions are also automatically used for docking and undocking to markers or shelves.

This action has the following parameters:

- **X**

  Enter a value in meters for how much the robot should move forwards or backwards from its current position. For example, 1 for 1 meter forwards or -1 for 1 meter backwards.

- **Y**

  Enter a value in meters for how much the robot should move to the left or right. For example, 1 for 1 meter to the left or -1 for 1 meter to the right.

- **Orientation**

  Enter a value in degrees for how much the robot should turn when finalizing the relative move. For example, 5 for 5 degrees counterclockwise or -5 for 5 degrees clockwise.

- **Maximum linear speed**

  Enter a value in meters per second for the maximum forward or backward speed during the movement.

- **Maximum angular speed**

  Enter a value in meters per second for the maximum turn speed during the movement.

Planner settings

A Planner settings action allows you to set the desired speed of the robot, to change the settings for how much the robot is allowed to deviate from its planned path, and how it should filter out obstacles when driving.

Path deviation and obstacle clearing can be used, for example, if you want your robot to follow its path without it attempting to maneuver around any obstacles, the so-called Line-following mode.

This action has the following parameters:

- **Planner settings**

  Desired speed sets the desired speed of the robot while it runs this mission.

  Path deviation sets the maximum distance the robot is allowed to deviate from its path before it generates a new path. Setting the value to 0 means no deviation is allowed.

  Path timeout sets the amount of time the robot will wait for the path to clear before generating a new one. If you set the value to -1 the robot will wait indefinitely for obstacles to move out of its way instead of generating a new path.

  Obstacle history clearing sets how the robot will clear its obstacle history during driving. The

available options are, **No clearing**, **Clear all**, **Clear in front of robot**.

- **Value**

  Enter the value you would like to apply for the chosen planner setting.

Check position status

The Check position status action makes the robot use its laser scanners and 3D cameras to either:

- Scan a given position for an object.
- Project the footprint of the robot itself onto a given position to determine if it can physically fit there.

If the robot detects an object, or if the footprint of the robot is not able to fit, the position is considered 'occupied'. If there is no object detected, or if the footprint of the robot is able to fit, the position is considered 'free'. You can select to make the robot check:

- A relative position (defined in meters, relative to the robot's current position).
- A marker on the map (this can be either a basic positional marker, or an interaction-based marker, such as a pallet rack).

Use this action for the following purposes:

- Check whether a load is on a pallet rack before docking to the rack.
  This feature only works for pallet racks with the same dimensions as the pallet racks designed by MiR.
- Check whether a cart is in position before picking it up with the hook.
- Check whether the robot is physically able to fit in a given position.

This action has the following parameters:

- **Position**

  Select a position from the drop-down list.

- **Option**

  Select if the robot should check if a position is empty or occupied.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Move to coordinate

A Move to coordinate action defines an X- and Y-position on the map the robot should move to. The map's origin (the 0.0 position with 0 orientation) is located at the point where the robot began mapping.

If you do not know the map's origin, you can create a fixed position with those values as a reference point.

This action has the following parameters:

- **X**

  Enter the X (horizontal) map position the robot should move to.

- **Y**

  Enter the Y (vertical) map position the robot should move to.

- **Orientation**

  Enter the orientation in degrees, that is the way the robot should turn relatively to the 0-orientation when arriving on the position. A positive value rotates the robot counterclockwise, and a negative value rotates it clockwise.

- **Blocked path timeout**

  Set the amount of time in seconds that the robot is allowed to be blocked before the movement will fail. This blocked time is summed up when the path is blocked multiple times.

- **Distance threshold**

  Depending on how accurately the robot is required to position itself on the goal position, the threshold can be increased or decreased.

Set footprint

A Set footprint action changes the robot's footprint. This is often used to change between the default footprint and a larger footprint when the robot picks up or places a load that is larger than its physical dimensions. The footprint is shown as a shadow around the robot on the map.

This action has the following parameters:

- **Footprint**

  Select a predefined footprint.

Battery

The **Battery** menu includes actions used to charge the robot.

Charging

A Charging action makes the robot enable its charging station interface. The action is defined by setting a minimum charging time and a minimum charging percentage. When the first of those are reached, the action is completed. For example, if you set the minimum time to 30 minutes and the minimum percentage to 80%, the robot will charge for minimum 30 minutes or until it reaches a battery level of 80%. You may also choose to ignore either time or percentage.

A Charging action must be preceded by a Docking action where the robot docks to a compatible charging station.

This action has the following parameters:

- **Minimum time**

  Set a minimum amount of time the robot should charge before it continues to the next action. The system will compare the set minimum time with the minimum percentage, and when the first of those two requirements is fulfilled, the mission continues.

  You may skip defining a minimum time by selecting the Ignore value check box. The robot will then charge until the minimum battery percentage level is reached.

- **Minimum Percentage**

  Enter the minimum battery percentage the robot should charge to before it continues to the next action. The system will compare the set minimum percentage with the minimum time, and when the first of those two requirements is fulfilled, the mission continues. You may skip defining a minimum percentage by selecting the **Ignore value** check box. The robot will then charge until the minimum charge time is reached.

- **Charge until new mission in queue**

  Select this check box if you want the robot to continue charging until it receives a new mission. If selected, the robot stays in the charging station until it receives a new mission, but not until at least one of the criteria for minimum time or minimum percentage is reached.

  If deselected, the robot leaves the charging station when either of the two charging criteria are reached regardless of queued missions.

Logic

The **Logic** menu includes actions to apply logic in your mission.

Break

A Break action is used to interrupt a Loop action. The robot will continue to the next action or mission that comes after the Loop action the Break action is inside.

Continue

A Continue action is used to abort the rest of a Loop action and continue from the start of the loop.

If

An If action makes it possible to check battery level, number of pending missions, PLC registers, or input from I/O modules and then define which actions or missions should be performed if the conditions return either true or false. You may use one or more actions or missions to define both true and false conditions.

Battery Percentage: An If action on battery percentage checks if the battery percentage is below, above, or equal to a set limit and, depending on the result, either sends the robot to a charging station or continues the mission. The True action could be a previously defined charging mission. The False action could be any alternative actions or missions, but may also be left blank. In that case, the robot will continue to the next step in the mission.

Pending missions: An If action on pending missions checks if the number of pending (queued) missions is below, above, or equal to a set number. You then set actions that define what the robot should do if the set condition returns true or false. An example could be to send the robot to a charging station if the number of queued missions exceeds a certain amount.

PLC Register: An If action on a PLC register checks if the register is set to a certain value.

I/O input: An If action on an I/O input checks if the register is set to a certain value.

This action has the following parameters:

- **Compare**

  Select either **Battery Percentage**, **PLC Register**, **Pending Missions**, or **I/O input**.

- **Operator**

  Select the arithmetic operator you want to use.

  Operators are arithmetic operators used to specify the compare mission, for example, use the < operator to specify “If Battery percentage is below 50 percent”.

  The available operators are:

  - == 'equal to'
  - != 'not equal to'
  - > 'greater than'
  - >= 'greater than or equal to'
  - < 'lesser than'
  - <= 'lesser than or equal to'.

- **Value**

  Enter the value for the selected register.

Loop

A Loop action makes it possible to have the robot repeat a mission either a specified number of times or indefinitely (until stopped by an operator). Drag actions or predefined missions into the loop action to define the sequence of actions the robot will repeat. A loop can be interrupted with a Break action.

This action has the following parameters:

- **Iterations**

  Set the number of times the robot should run the loop.

Pause

A Pause action pauses the mission execution until you select **Continue**. This is often used when the robot must wait for an operator to finish a task before it can continue.

Prompt user

A Prompt user action displays a prompt on the user interface that must be answered with yes or no, and the robot then executes different actions based on the answer. All actions or missions

nested under the **Yes** section are executed when **Yes** is selected in the prompt, and vice-versa with the **No** section. If you do not respond to the prompt within the specified time-out, the robot executes the actions or missions nested under the **Time-out** section.

This action has the following parameters:

- **Question**

  Write a question which can be answered with a yes or a no. You will be prompted with this question where the answer determines whether the robot executes the actions under the **Yes** section or the **No** section.

- **User group**

  Select which User group the mission is intended for.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Return

A Return action is used to abort a mission. It can be used, for example, as catch action in a Try/Catch action.

Wait

A Wait action pauses the mission in a given period of time.

This action has the following parameters:

- **Time**

  Set an amount of time the robot should wait before moving to next action in the mission.

While

A While action makes it possible to check battery level, number of pending missions, PLC registers, or input from I/O modules and then define which actions or missions should be performed while these conditions return true. You may use one or more actions or missions to define the while conditions.

Battery Percentage: A While action on battery percentage checks if the battery percentage is below or above a set limit and, depending on the result, either sends the robot to a charging station or continues the mission.

PLC Register: A While action on a PLC register checks if the register is set to a certain value.

Pending missions: A While action on pending missions checks if the number of pending (queued) missions is below, above or equal to the set number. You then set an action that defines what the robot should do if the set condition returns true.

I/O input: A While action on an I/O input checks if the register is set to a certain value.

This action has the following parameters:

- **Compare**

  Select either **Battery Percentage**, **PLC Register**, **Pending Missions**, or **I/O input**.

- **Operator**

  Select the arithmetic operator you want to use.

  Operators are arithmetic operators used to specify the compare mission, for example, use the < operator to specify “If Battery percentage is below 50 percent”.

  The available operators are:

  - == 'equal to'
  - != 'not equal to'
  - > 'greater than'
  - >= 'greater than or equal to'
  - < 'lesser than'
  - <= 'lesser than or equal to'.

- **Value**

  Enter the value for the selected register.

Error handling

The ⓘ **Error handling** menu includes actions used to detect and report errors in the mission.

Create log

A Create log action is used to generate an error log. The generated error log is listed with the other error logs under **Monitoring > Error logs**. Use the description field to make it clear from which mission the error log is generated and for what reason. You can use this with a Try/Catch action to make the robot report an error if it fails to execute its main mission.

This action has the following parameters:

- **Description**

  Enter a description for the error log. This description can be used to distinguish the error log from other logs under **Monitoring > Error logs**.

Throw error

A Throw error action is used to enter an error message that will be shown in the user interface when the mission is run. You can use this with a Try/Catch action to make the robot report an error if it fails to execute its main mission.

This action has the following parameters:

- **Message**

  Enter the message you want displayed on the user interface when the action is executed.

Try/Catch

A Try/Catch action is a way to reinforce missions by defining an alternative action if the first choice action fails. This will in many cases prevent a mission from discontinuing due to an unexpected event. A Try/Catch action consists of a Try action, which the robot should attempt to complete, and a Catch action that is used in case the Try action fails.

Sound/Light

The ☼ **Sound/Light** menu includes actions that activate the status lights or speaker on the robot.

Stop sound

Stops playing the current sound.

Play sound

A Play sound action sets a sound, for example, a beep, a horn, or a voice message that the robot will play at a given stage in the mission or for the whole duration of the mission. There is a selection of standard sound bites to choose from, or you can upload your own sounds to the robot in the section **Setup > Sounds**.

This action has the following parameters:

- **Sound**
  Select a sound from the list. If you want to hear the sounds before selecting one, go to **Setup** > **Sounds**. You can hear the sounds on your computer by selecting **Listen**.

- **Volume**

  Set the volume of the sound. 100% is approximately 80 dB.

- **Mode**

  Select how the sound should be used in the mission:

  Full length plays the sound from start to finish, starting at the point in the mission where it is inserted and ending when the sound file finishes.

  Loop keeps repeating the sound file until the mission is completed.

  Custom length plays the sound for the duration of time you set under **Duration**. If the set duration exceeds the duration of the sound file itself, the sound file will loop for the duration of the set time.

  You can insert a Stop sound action anywhere in the mission. This will stop the playing of the current sound no matter which mode you have selected.

Show light

A Show light action sets a combination of light effect, speed, color, and intensity of the robot's status lights at a given point in the mission.

This action has the following parameters:

- **Effect**

  Select a light effect from the drop-down list.

- **Speed zones**

  Select a fast or slow speed from the drop-down list.

- **Color 1/Color 2**

  Select a color from the drop-down list. If you select two different colors for Color 1 and Color 2, the robot will alternate between the two.

- **Intensity**

  Set the intensity of the light. The intensity is defined as a percentage where 100 is full intensity.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

PLC

*You must enable **PLC registers** under **System > Settings > Features** to see this menu.*

The **PLC** menu includes actions that let you read or set inputs and outputs to PLC modules connected to the robot.

Wait for PLC register

A Wait for PLC register action is used to wait for a value and continue to the next action when the value is found in the set register.

This action has the following parameters:

- **Register**

  Select a PLC register. Registers 1 to 100 are reserved for integers and registers from 101-199 for floating point numbers.

- **Value**

  Enter a value for the selected register. If the selected register is between 1 and 100, the value must be an integer. If the selected value is between 101 and 200, the value must be a floating point number.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Set and reset PLC register

A Set and reset PLC register action is useful in missions where the robot is requested to set a value in a PLC register and reset the register to the original value when the action is finished.

This action has the following parameters:

- **Register**

  Select a PLC register. Registers 1 to 100 are reserved for integers and registers from 101-199 for floating point numbers.

- **Value**

  Enter a value for the selected register. If the selected register is between 1 and 100, the value must be an integer. If the selected value is between 101 and 200, the value must be a floating point number.

- **Reset value**

  Enter a value for the selected register. If the selected register is between 1 and 100, the value must be an integer. If the selected value is between 101 and 200, the value must be a floating point number.

Set PLC register

A Set PLC register action is used to set a value in a register. The register can be set in three ways:

- **Set**: sets a value every time the mission is executed.
- **Add**: adds a value every time the mission is executed.
- **Subtract**: subtracts a value every time the mission is executed.

This action has the following parameters:

- **Register**

  Select a PLC register. Registers 1 to 100 are reserved for integers and registers from 101-199 for floating point numbers.

- **Action**

  Select an action from the drop-down list. The options are **Set**, **Add**, and **Subtract**.

- **Value**

  Enter a value for the selected register. If the selected register is between 1 and 100, the value must be an integer. If the selected value is between 101 and 200, the value must be a floating point number.

Email

*You must enable **Email** under **System > Settings > Features** to see this menu.*

The ✉ **Email** menu includes actions to send emails to a chosen address.

Send email

A Send email action is used to send email messages to selected recipients as part of a mission, for example, to let an operator know that the robot has arrived at a specific location. Recipients must be set up in the Users section (**Setup** > **Users**) with an email address. Furthermore, an email account must be set up in the robot under **System** > **Settings** > **Email configuration**.

This action has the following parameters:

- **Recipient**

  Select a recipient from the drop-down list. The recipients on the list come from the Users section.

- **Subject**

  Type a subject of the email.

- **Message**

  Write the message that the robot should send to the selected email address when the action is executed.

I/O module

*You must enable **I/O modules** under **System > Settings > Features** to see this menu.*

The **I/O module** menu includes actions that let you read or set inputs and outputs to modules connected to the robot.

Wait for input

A Wait for input action is used when the robot needs to wait for an I/O module to respond.

This action has the following parameters:

- **Module**

  Select an I/O module from the drop-down list. I/O modules are set up in the section **Setup > I/O modules**.

- **I/O port**

  Enter which output port relay should be activated (1-4).

- **Operation**

  Set operation to **On** or **Off**.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Set and reset I/O

A Set and reset I/O action is useful in missions where the robot is requested to set an output on an I/O module and make sure the output is reset to the original value in case the robot is paused, goes into emergency stop or the mission is aborted, for example, in raise and lower shelf missions.

This action has the following parameters:

- **Module**

  Select an I/O module from the drop-down list. I/O modules are set up in the section **Setup > I/O modules**.

- **Input**

  Enter the input port number.

- **Operation**

  Set operation to **On** or **Off**.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Set output

A Set output action is used when the robot needs to send a command to an I/O module.

This action has the following parameters:

- **Module**

  Select an I/O module from the drop-down list. I/O modules are set up in the section **Setup > I/O modules**.

- **I/O port**

  Enter which output port relay should be activated (1-4).

- **Operation**

  Set operation to **On** or **Off**.

- **Timeout**

  Enter the maximum time during which the robot checks the position status. If the position status does not match the option selected for this position and the time expires, the robot reports an error.

Cart

*You must enable **Hook** under **System** > **Settings** > **Features** to see this menu.*

The 🛒 **Cart** menu includes actions to pick up and place carts at Cart positions.

Pick up cart

A Pick up cart action defines a position where the robot must pick up a cart. You must define which cart the robot must pick up from the position. If the robot does not detect the expected cart, it will report an error.

This action has the following parameters:

- **Position**

  Select a position from the drop-down list.

- **Cart**

  Select either a specific cart or **Any valid cart** from the drop-down list. If a specific cart is chosen and another cart is at the position, the robot will report an error.

Place cart

Place the cart currently attached to the robot at a specific position.

This action has the following parameters:

- **Position**

  Select a position from the drop-down list.

- **Release cart**

  Choose whether or not to release the cart after arriving at the position.

- **Reverse into place**

  You can choose to allow the robot to reverse into place. **Yes, with collision check** means that the robot will scan the area and check for obstacles before moving the cart to the drop-off position. **Yes, without collision check** means that the robot will move the cart into place without scanning for obstacles. This can be necessary when the robot docks into alignment fixtures.

- **Reverse method**

  Select how the robot should reverse to the cart position. There are three options:

  - Fast: This is the fastest option, but the robot uses the most space.
  - Standard: This is the default way the robot places carts.
  - Compact: This is the slowest option, but the robot uses the least space.

Shelf

*You must enable **Shelf** under **System > Settings > Features** to see this menu.*

The **Shelf** menu includes template missions used to pick up and place shelves on Shelf positions.

Pickup shelf PLC

This mission can only be used with a MiR robot that has a shelf lift application mounted to it where activating register 14 on the PLC triggers the lift mechanism to pick up the shelf. Register 8 must be active to indicate that the lift is fully raised—for more information about how the shelf application must work, see *MiR shelf lift application Operating Guide*.

The mission sends the robot to dock to a shelf at a selected Shelf position. Once docked, the robot raises the lift to carry the shelf and applies a selected footprint appropriate for the shelf. The mission will only run if the robot starts with a lowered lift. If the robot registers that the lift is raised, it is assumed the robot is already carrying a shelf and will report an error.

This action has the following parameters:

- **MarkerPosition**

  Select which Shelf position you want the robot to pick up a shelf from.

- **MarkerType**

  Select the marker type that describes how the robot should dock to the shelf at the slected Shelf position.

- **ShelfFootprint**

  Select the footprint that matches with the selected shelf.

Place shelf PLC

This mission can only be used with a MiR robot that has a shelf lift application mounted to it where activating register 13 on the PLC triggers the lift mechanism to pick up the shelf. Register 7 must be active to indicate that the lift is fully raised—for more information about how the shelf

application must work, see *MiR shelf lift application Operating Guide*. You can find this guide on MiR Support Portal.

The mission makes the robot lower the shelf application to place the shelf at its current position and then applies the robot's default footprint. The mission will only run if the robot starts with a raised lift application. If the robot registers that the lift is lowered, it is assumed the robot is not transporting a shelf and will report an error.

Pickup shelf I/O

This mission can only be used with a MiR robot that has a shelf lift application mounted to it where port 3 on a connected I/O module triggers the lift mechanism to pick up the shelf.

The mission sends the robot to dock to a shelf at a selected Shelf position. Once docked, the robot raises the lift to carry the shelf and applies a selected footprint appropriate for the shelf. The mission will only run if the robot starts with a lowered lift. If the robot registers that the lift is raised, it is assumed the robot is already carrying a shelf and will report an error.

This action has the following parameters:

- **Module**

  Select which I/O module controls the shelf lift application on your robot.

- **MarkerPosition**

  Select which Shelf position you want the robot to pick up a shelf from.

- **MarkerType**

  Select the marker type that describes how the robot should dock to the shelf at the slected Shelf position.

- **ShelfFootprint**

  Select the footprint that matches with the selected shelf.

Place shelf I/O

This mission can only be used with a MiR robot that has a shelf lift application mounted to it where port 2 on a connected I/O module triggers the lift mechanism to place the shelf.

The mission makes the robot lower the shelf application to place the shelf at its current position and then applies the robot's default footprint. The mission will only run if the robot starts with a raised lift application. If the robot registers that the lift is lowered, it is assumed the robot is not transporting a shelf and will report an error.

This action has the following parameters:

- **Module**

  Select which I/O module controls the shelf lift application on your robot.

MiR250 Pins Down

This mission can only be used with MiR250 Shelf Carrier. The mission deactivates port 3 and activates port 2 in the GPIO connection to the shelf carrier. This will make the top module pins lower.

MiR250 Pins Up

This mission can only be used with MiR250 Shelf Carrier. The mission deactivates port 2 and activates port 3 in the GPIO connection to the shelf carrier. This will make the top module pins rise.

Pick up MiR250 Shelf

This mission can only be used with MiR250 Shelf Carrier. The mission sends the robot to dock to a shelf at a selected Shelf position. Once docked, the robot raises the shelf carrier pins to lock to the shelf and applies a selected footprint appropriate for the shelf. The robot then drives backward by the selected undocking distance. The mission will only run if the robot starts with lowered pins. If the robot registers that the pins are raised, it is assumed the robot is already carrying a shelf and will report an error.

This action has the following parameters:

- **Marker position**

  Select which Shelf position you want the robot to pick up a shelf from.

- **Marker type**

  Select the marker type that describes how the robot should dock to the shelf at the selected Shelf position.

- **Shelf footprint**

  Select the footprint that matches with the selected shelf.

- **Mute all**

  Select whether or not the Protective fields must be muted when undocking with the shelf.

- **Undocking distance**

  Enter how far back you want the robot to undock after picking up the shelf.

Place MiR250 Shelf

This mission can only be used with MiR250 Shelf Carrier. The mission sends the robot to a selected Shelf position. Once at the position, the robot lowers the shelf carrier pins to place the shelf and applies the robot's default footprint. The robot then drives backward with the selected undocking distance. The mission will only run if the robot starts with raised pins. If the robot registers that the pins are lowered, it is assumed the robot is not transporting a shelf and will report an error.

This action has the following parameters:

- **Undocking distance**

  Enter how far back you want the robot to undock after placing the shelf.

Pick up MiR500/1000 Shelf

This mission can only be used with a MiR robot with MiR Shelf Lift mounted to it. The mission sends the robot to dock to a shelf at a selected Shelf position. Once docked, the robot raises the lift to carry the shelf and applies a selected footprint appropriate for the shelf. The robot then drives backward with the selected undocking distance. The mission will only run if the robot starts with a lowered lift. If the robot registers that the lift is raised, it is assumed the robot is already carrying a shelf and will report an error.

This action has the following parameters:

- **Marker position**

  Select which Shelf position you want the robot to pick up a shelf from.

- **Marker type**

  Select the marker type that describes how the robot should dock to the shelf at the selected Shelf position.

- **Shelf footprint**

  Select the footprint that matches with the selected shelf.

- **Mute all**

  Select whether or not the Protective fields must be muted when undocking with the shelf.

- **Undocking distance**

  Enter how far back you want the robot to undock after picking up the shelf.

Place MiR500/1000 Shelf

This mission can only be used with a MiR robot with MiR Shelf Lift mounted to it. The mission sends the robot to a selected Shelf position. Once at the position, the robot lowers the lift to place the shelf and applies the robot's default footprint. The robot then drives backward with the selected undocking distance. The mission will only run if the robot starts with a raised lift. If the robot registers that the lift is lowered, it is assumed the robot is not carrying a shelf and will report an error.

This action has the following parameters:

- **Undocking distance**

  Enter how far back you want the robot to undock after placing the shelf.

UR

*You must enable **Universal Robots Interface** under **System > Settings > Features** to see this menu.*

The **UR** menu includes actions to initiate a program on a connected Universal Robots arm.

Run UR program

A Run UR action is used to communicate with a Universal Robots application. The action starts a .urp file saved on the Universal robot. The program name is [program name].urp. Leave out .urp when you type the name. The MiR robot will continue until the given UR program has been executed.

This action has the following parameters:

- **Program name**

  Enter the name of the UR program (without the .urp extension).

Pallet

*You must enable **Pallet Lift** under **System > Settings > Features** to see this menu.*

The Pallet menu includes template missions to pick up and place pallets from pallet racks.

Lift down

This template mission deactivates port 3 and activates port 2 in the GPIO connection to the lift. This will make the lift top module lower itself.

Lift up

This template mission deactivates port 2 and activates port 3 in the GPIO connection to the lift. This will make the lift top module raise itself.

Pick pallet from rack

This template mission lets you select a pallet rack to move the robot to where the robot then checks that there is a pallet on the rack, picks up the pallet, and undocks from the pallet rack.

This template mission has the following parameters:

- **PalletRackMarker**

  Select which pallet rack you want the robot to pick up a pallet from.

Place pallet on rack

This template mission lets you select a pallet rack to move the robot to where the robot then checks that there is nothing on the rack, places the pallet the robot is currently carrying onto the pallet rack, and undocks from the pallet rack.

This template mission has the following parameters:

- **PalletRackMarker**

  Select which pallet rack you want the robot to place the pallet it is currently carrying.

Safety system

*You must enable **Mute Protective fields** under **System > Settings > Features** to see this menu.*

The ⚠ **Safety system** menu includes actions used to adjust the safety system.

Mute protective fields

A Mute Protective fields action makes the robot mute selected Protective fields while it is executing a number of actions. Drag the actions you want the robot to perform into the Mute Protective fields action.

After the action, the Protective fields are only fully activated again once the robot performs an action that requires it to plan a new path. For example, If you add a Relative move action after the Mute Protective fields action, the fields will still be muted.

This action has the following parameters:

- **Sound**

  Select a sound from the list. If you want to hear the sounds before selecting one, go to **Setup** > **Sounds**. You can hear the sounds on your computer by selecting **Listen**.

- **Volume**

  Set the volume of the sound. 100% is approximately 80 dB.

- **Front**

  Select whether or not to mute the front part of the Protective fields.

- **Rear**

  Select whether or not to mute the rear part of the Protective fields.

- **Sides**

  Select whether or not to mute the side parts of the Protective fields.

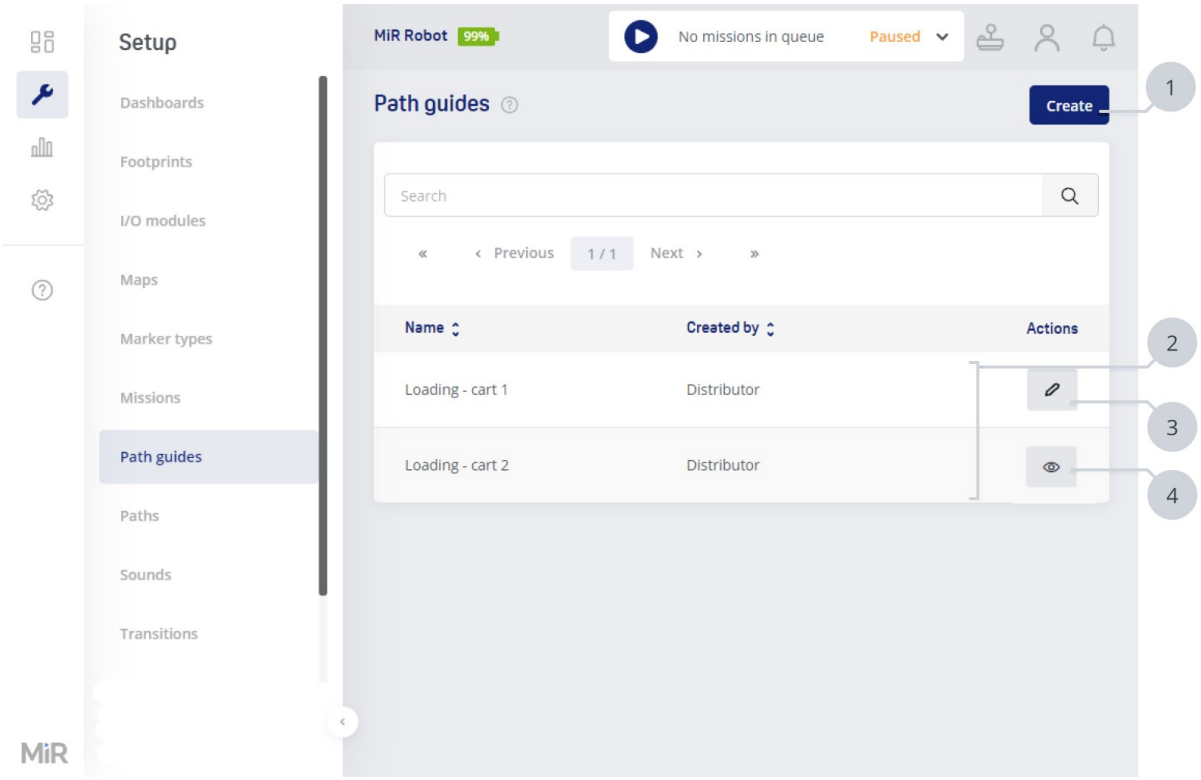
Only MiR500 and MiR1000 support partial muting, meaning you can choose to mute only parts of the Protective fields. On MiR250, MiR600, and MiR1350, you must select the same value for the parameters **Front**, **Rear**, and **Sides**.

4.7 Path guides

A Path guide is a defined route between two positions.

It consists of a start and goal position and any number of ordered waypoints between these two positions. The waypoints define the route the robot should take when driving between the start and goal positions.

A Path guide is used to make the robot drive along the defined path instead of taking the direct route whenever the robot is sent on a mission where the robot must travel from the start position to the goal position.

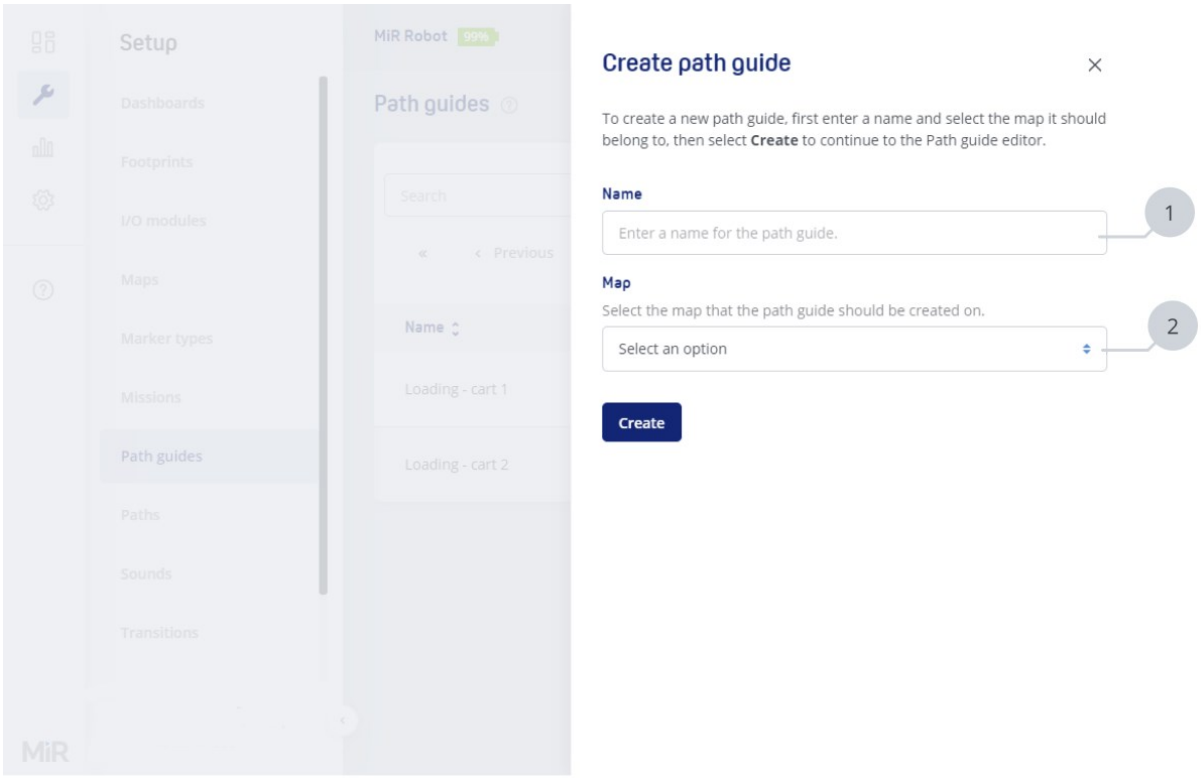


	Description		Description
1	**Create** Opens the dialog box to create a new path guide—see "Create path guide" on the next page.	2	**Path guides** Lists all path guides used by MiR Robot. You can sort the path guides based on the name or which user created them.
3	**Edit** Opens the dialog box to edit the selected path guide—see "Edit path guide" on the next page.	4	**View** Opens the dialog box to view information about the selected path guide. Your user group does not have permission to edit the path guide.

Create path guide

Setup > Path guides > Create

To create a new path guide, first enter a name and select the map it should belong to, then select **Create** to continue to the Path guide editor.



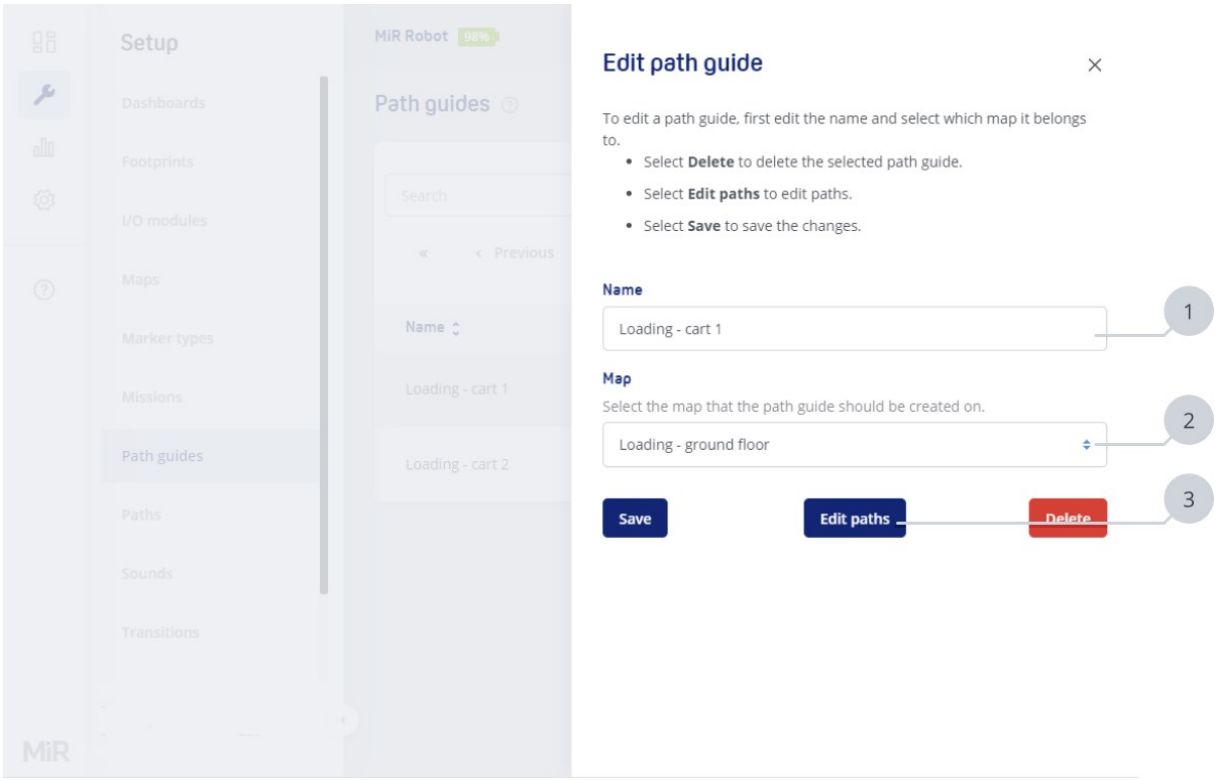
	Description		Description
1	**Name** Enter a name for the path guide.	2	**Map** Select the map that the path guide should be created on.

Edit path guide

Setup > Path guides > Edit

To edit a path guide, first edit the name and select which map it belongs to.

- Select **Delete** to delete the selected path guide.
- Select **Edit paths** to edit paths.
- Select **Save** to save the changes.



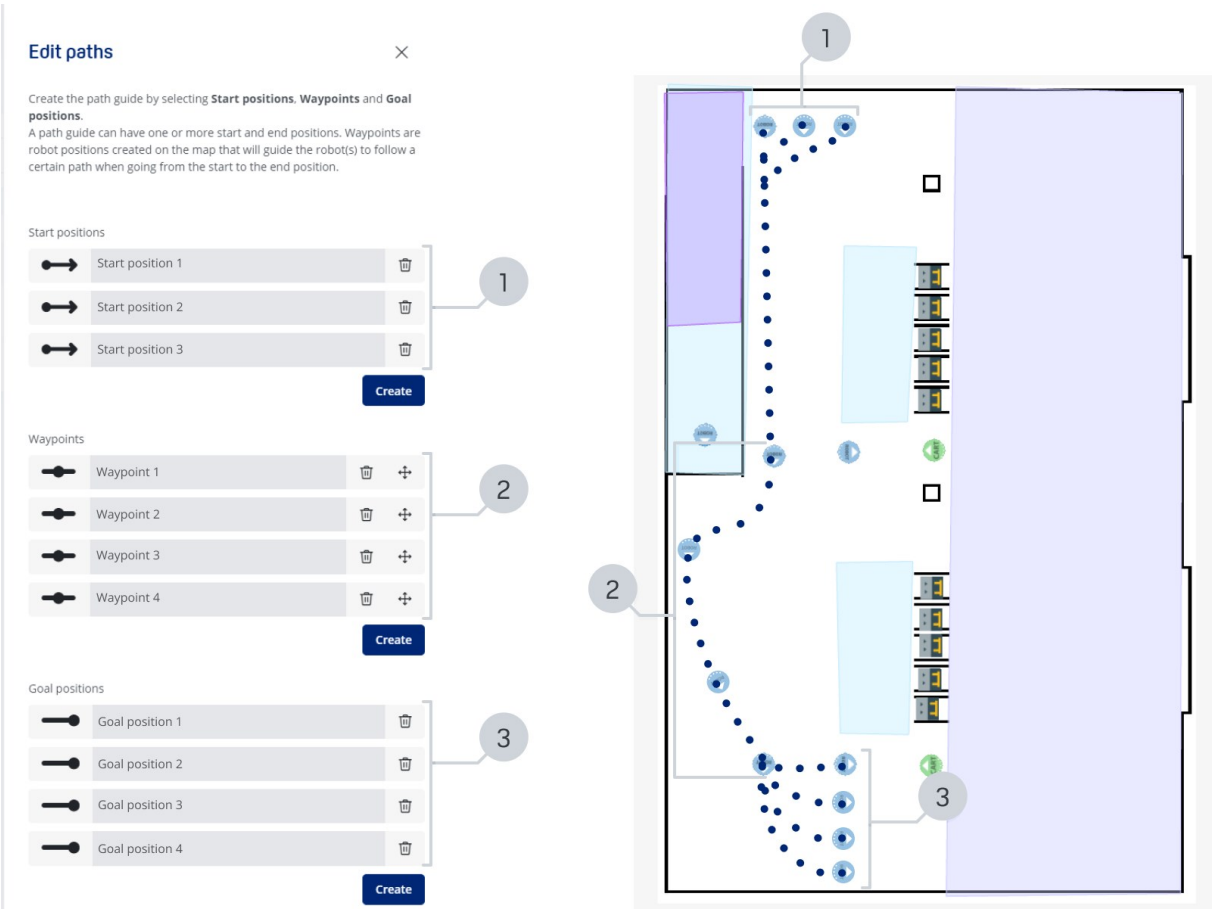
	Description		Description
1	**Name** Enter a name for the path guide.	2	**Map** Select the map that the path guide should be created on.
3	**Edit paths** Opens the path edit dialog box—see "Edit paths" on the next page.		

Edit paths

Setup > Path guides > Edit > Edit paths

Create the path guide by selecting **Start positions**, **Waypoints**, and **Goal positions**.

Path guides are applied automatically in missions when the robot is currently at one of the start positions and the next action makes it move to one of the goal positions. The robot drives to all the waypoints in their defined order until the robot reaches the goal position. A path guide can have one or more start and goal positions.



	Description		Description
1	**Start position**	2	**Waypoints**

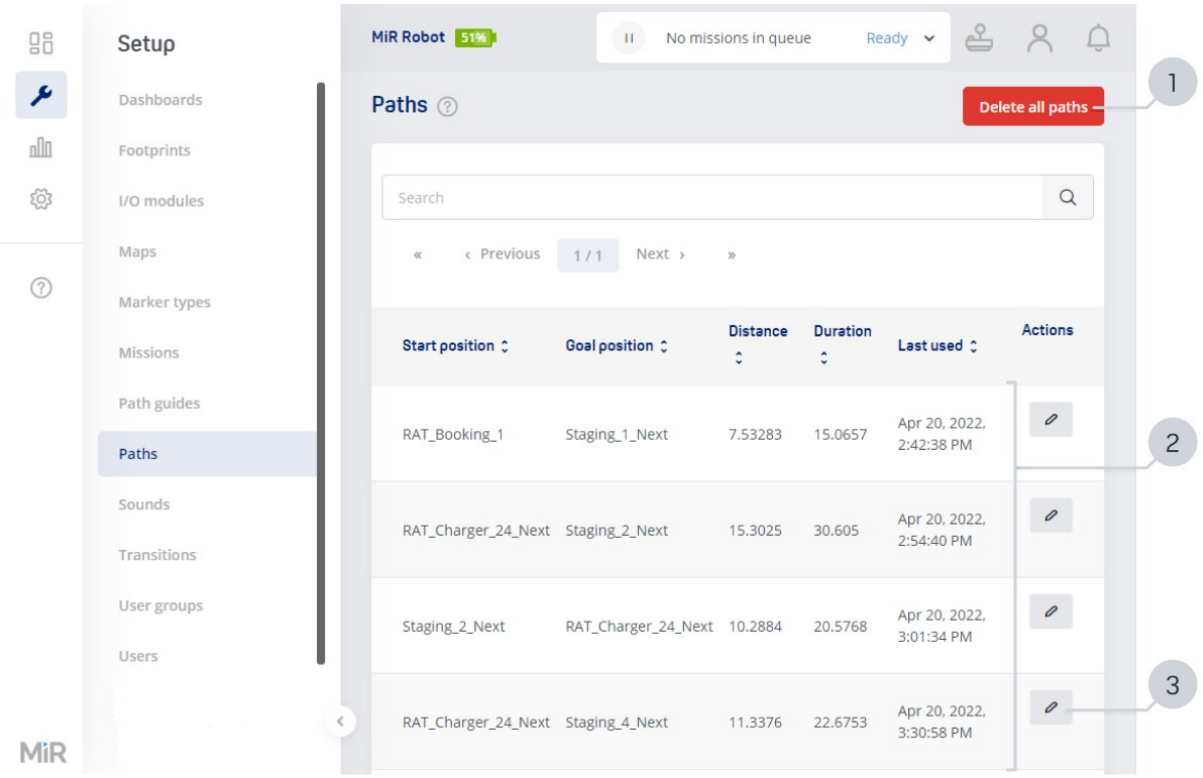
	Description	Description
	Add any number of Start positions you want to be able to trigger the path guide.	Add the positions you want to use to guide the robot from a Start position to a Goal position. While editing, you can rearrange the order of the waypoints, add more waypoints, or remove waypoints.
3	**Goal position** Add any number of Goal positions you want to be at the end of the path guide	

4.8 Paths

Paths are saved routes between two positions. The first time the robot runs the route between two positions, the calculated path is saved and used every time the robot runs the same route, thereby saving time for route calculation.

A path is automatically recalculated only in the event that one of its positions is modified. If you find that an automatically calculated path is unnecessarily long, for example, if the robot had to go around a dynamic obstacle at the time it was created, you may delete it, and the robot will then calculate a new path the next time it runs between those two positions.

Paths can also be created manually by drawing Preferred zones in the Maps section. To do this, you must first delete any automatically created paths between the affected positions before the preferred zone will take effect.

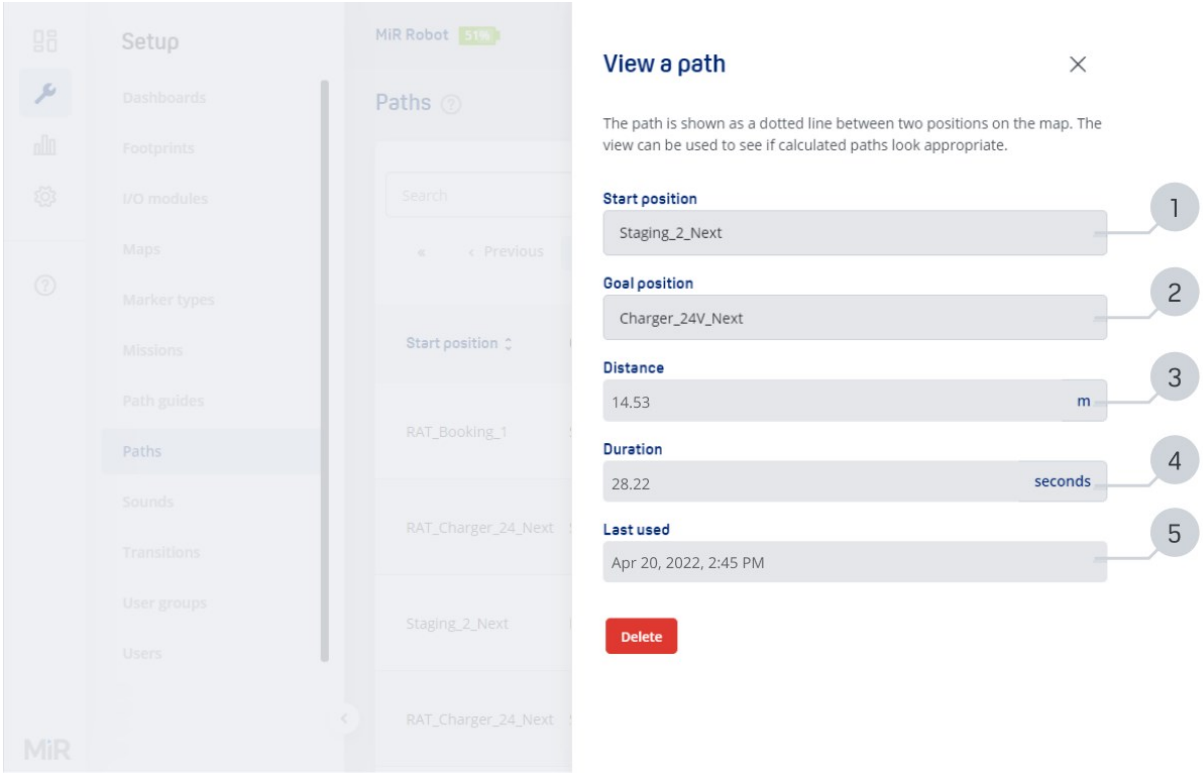


	Description		Description
1	**Delete all paths** Deletes all paths saved on the robot. The robot will save new paths each time it plans a new path between two points.	2	**Paths** Lists all paths that have been automatically generated on the robot. You can sort the paths based on the start or goal position, the path distance or duration, or the last time the path was used.
3	**Edit** Opens the dialog box to view information about the path or delete it—see "View a path" on the next page.		

View a path

Setup > Paths > View

See information about the saved path or select **Delete** to delete the path.



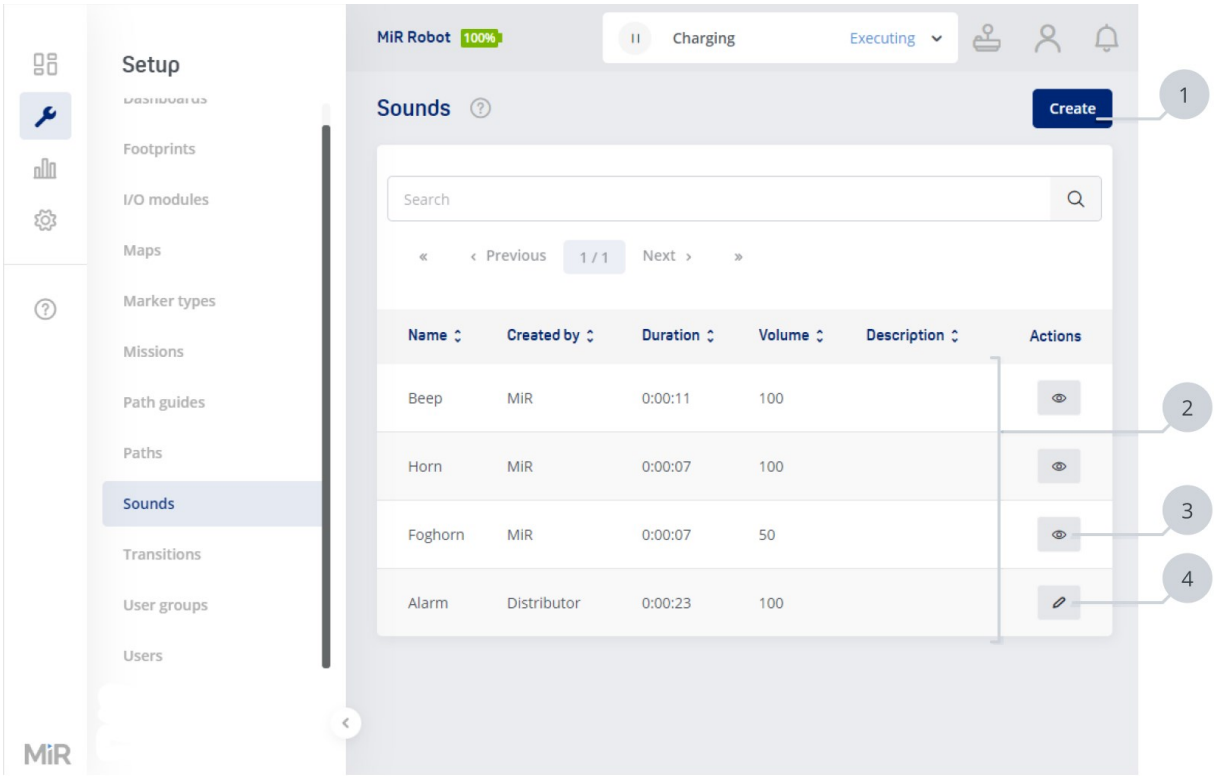
	Description		Description
1	**Start position** The position the robot begins at for this path.	2	**Goal position** The position the robot finishes at for this path.
3	**Distance** The total distance the robot traveled between the start position and the goal position.	4	**Duration** The length of time it took the robot to drive from the start position to the goal position the first time it drove along the path.

	Description	Description
5	**Last used** The time and date where the path was last used by the robot.	

4.9 Sounds

A sound is an .mp3 file you can upload to the robot that it can play from its speaker. You can modify how long the sound is played and at what volume.

Sounds can be used to indicate certain situations where it is important to notify nearby personnel of the robot and its current actions.



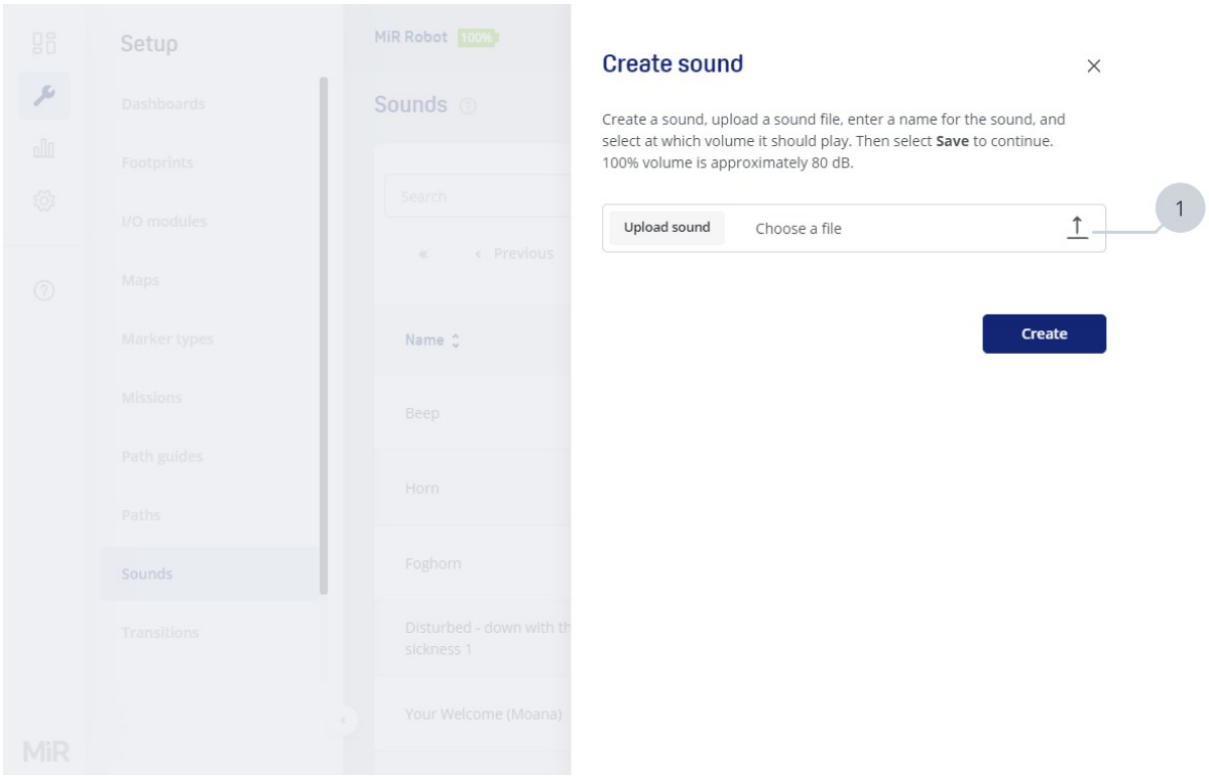
	Description		Description
1	**Create** Opens the dialog box to create a new sound—see "Create sound" below.	2	**Sounds** Lists all sounds used by MiR Robot. You can sort the sounds based on the name, the duration, the volume, or which user created them.
3	**View** Opens the dialog box to view information about the selected sound. Your user group does not have permission to edit the sound.	4	**Edit** Opens the dialog box to edit the selected sound—see "Edit sound" on the next page.

Create sound

Setup > Sounds > Create

Create a sound, upload a sound file, enter a name for the sound, and select at which volume it should play. Then select **Save** to continue.

100% volume is approximately 80 dB.



	Description	Description
1	**Upload sound** Upload a sound file.	

Edit sound

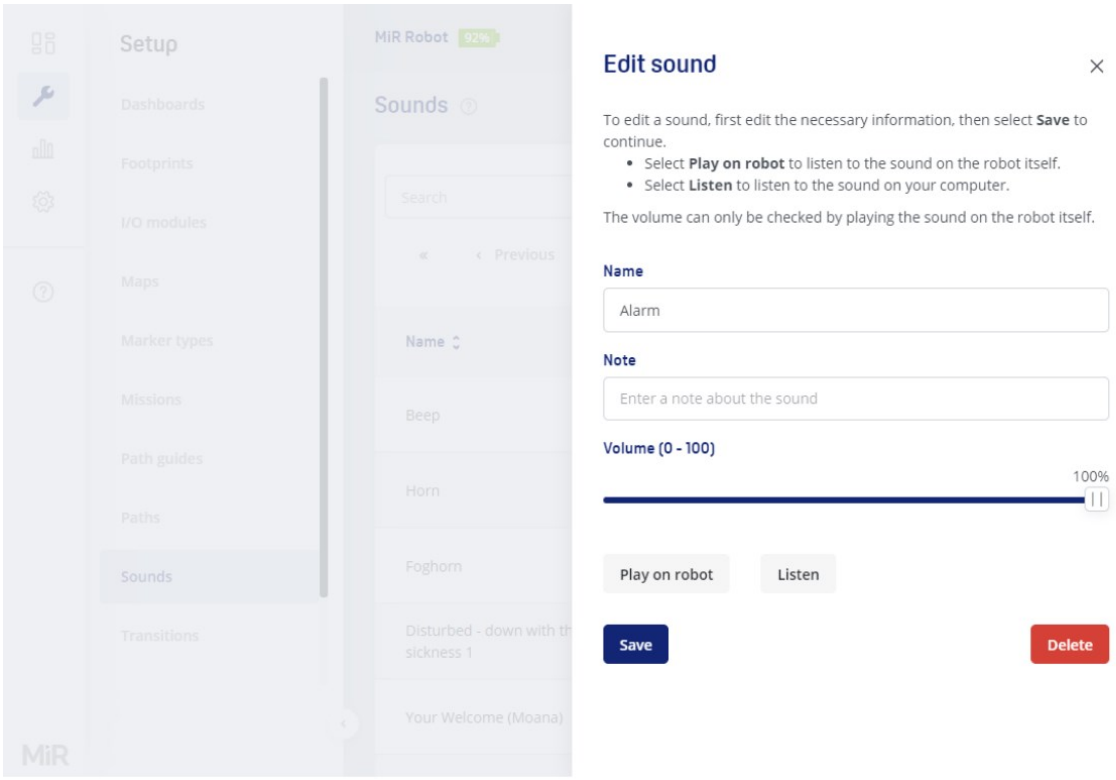
Setup > Sounds > Edit

To edit a sound, first edit the necessary information, then select **Save** to continue.

- Select **Play on robot** to listen to the sound on the robot itself.
- Select **Listen** to listen to the sound on your computer.

The volume can only be checked by playing the sound on the robot itself.

You can change any of the fields described in "Create sound" on the previous page.



	Description		Description
1	**Name** Enter a name for the sound.	2	**Note** Enter a descriptive text about the sound (optional).
3	**Volume (0 - 100)** Select at which volume you want the sounds to play from the robot.		

4.10 Transitions

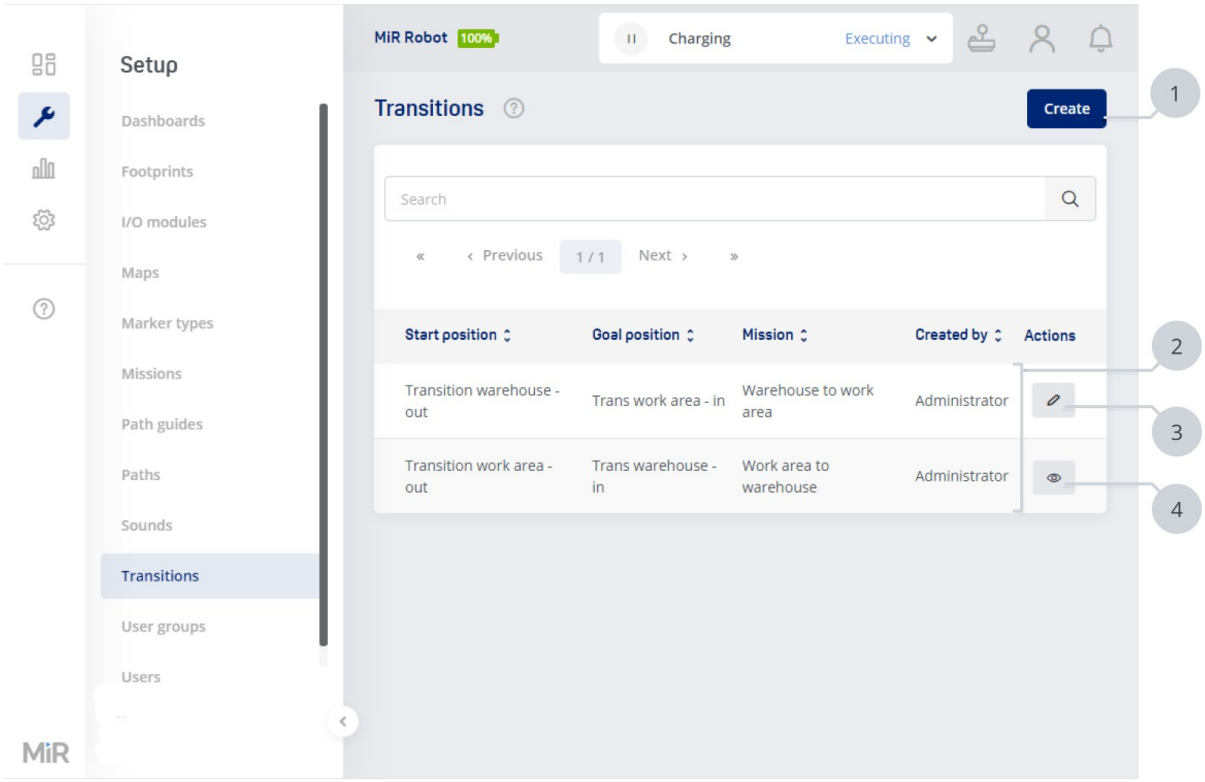
A transition is a connection between two maps in the site. It defines how the robot should change from one map to another. Each transition consists of:

- A position in the map the robot is on
- A position in the same physical location as the first position, but on the map the robot should transition to
- A transition mission that contains a Switch map action

If you define transitions between all maps in the site, the robot will automatically transition between maps when it is running missions that sends it to locations on other maps.

You must define a new transition for each transition direction. Going from map A to map B and from map B to map A requires two different transitions and transition missions.

When the robot transitions between maps, it will stop at the transition position shortly before continuing its mission.



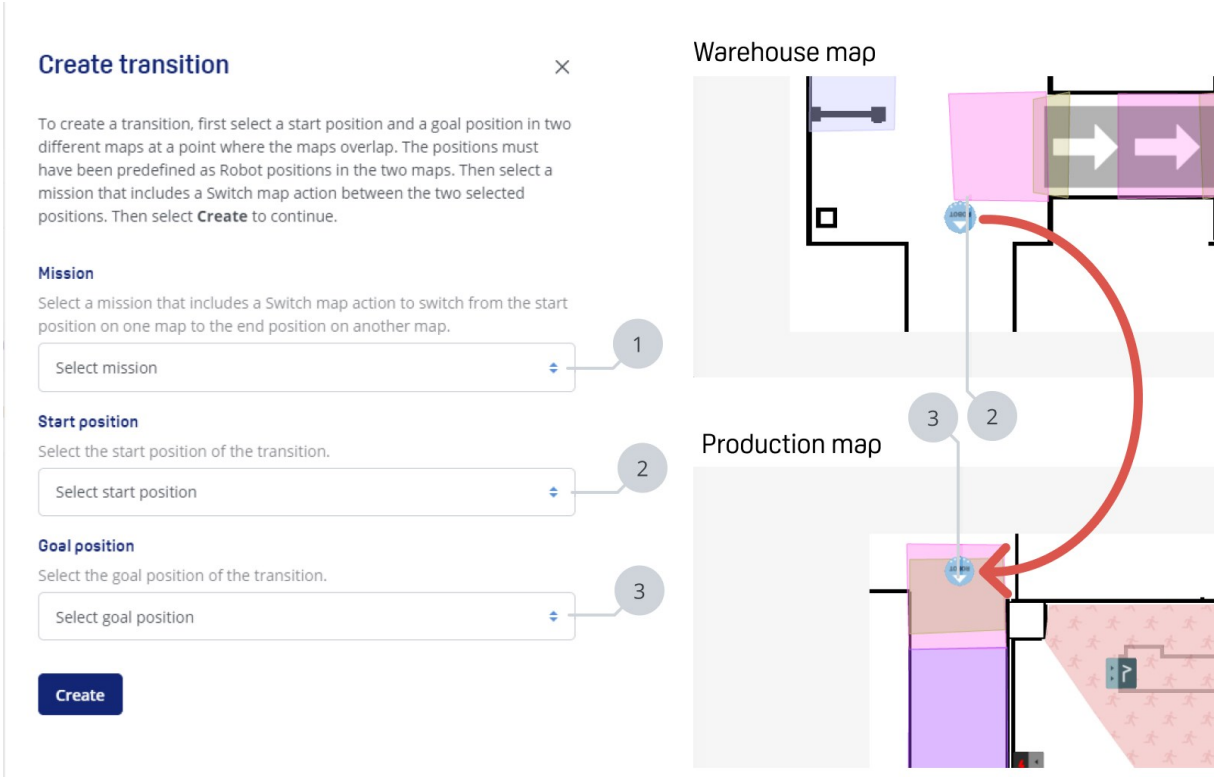
	Description		Description
1	**Create**	2	**Edit**

	Description		Description
	Opens the dialog box to create a new transition—see "Create transition" below.		Opens the dialog box to edit the selected transition—see "Edit transition" on page 128.
3	**Transitions** Lists all transitions used by MiR Robot. You can sort the transitions based on the start or goal positions, which mission it uses, or which user created them.	4	**View** Opens the dialog box to view information about the selected transition. Your user group does not have permission to edit the transition.

Create transition

Setup > Transitions > Create

To create a transition, first select a start position and a goal position in two different maps at a point where the maps overlap. The positions must have been predefined as Robot positions in the two maps. Then select a mission that includes a Switch map action between the two selected positions. Then select **Create** to continue.

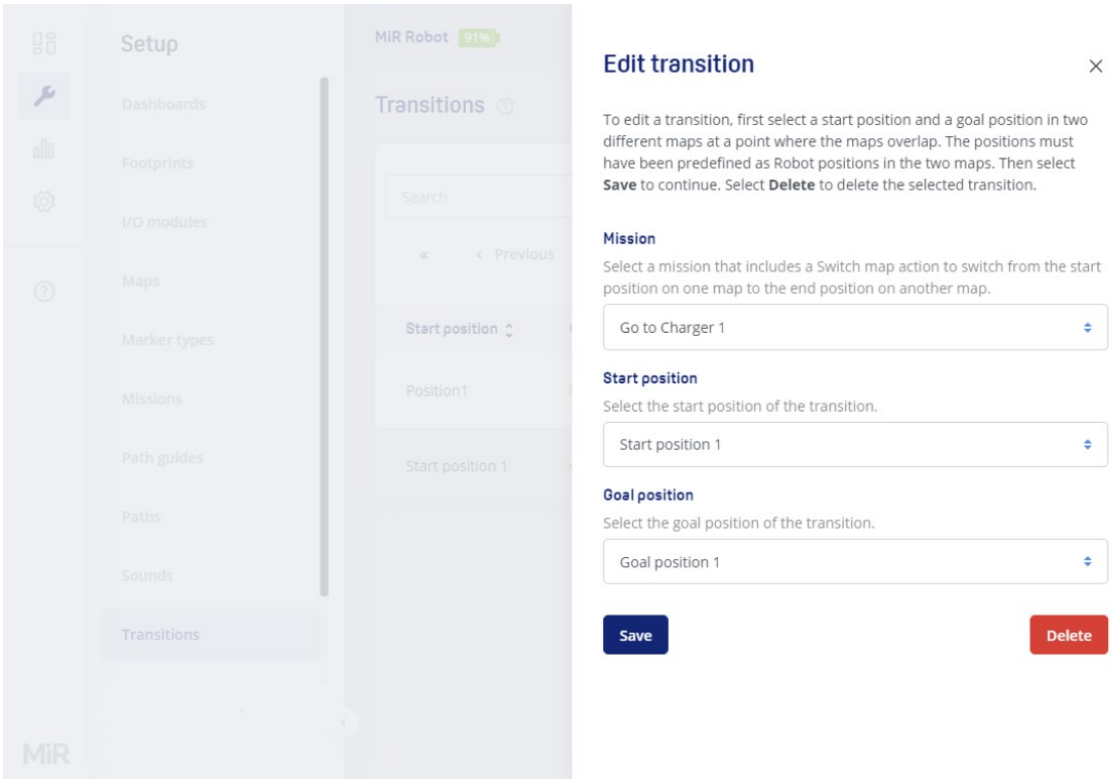


	Description		Description
1	**Mission** Select a mission that includes a Switch map action to switch from the start position on one map to the end position on another map.	2	**Start position** Select the start position of the transition.
3	**Goal position** Select the goal position of the transition.		

Edit transition

Setup > Transitions > Edit

To edit a transition, first select a start position and a goal position in two different maps at a point where the maps overlap. The positions must have been predefined as Robot positions in the two maps. Then select **Save** to continue. Select **Delete** to delete the selected transition.



You can change any of the fields described in "Create transition" on page 126.

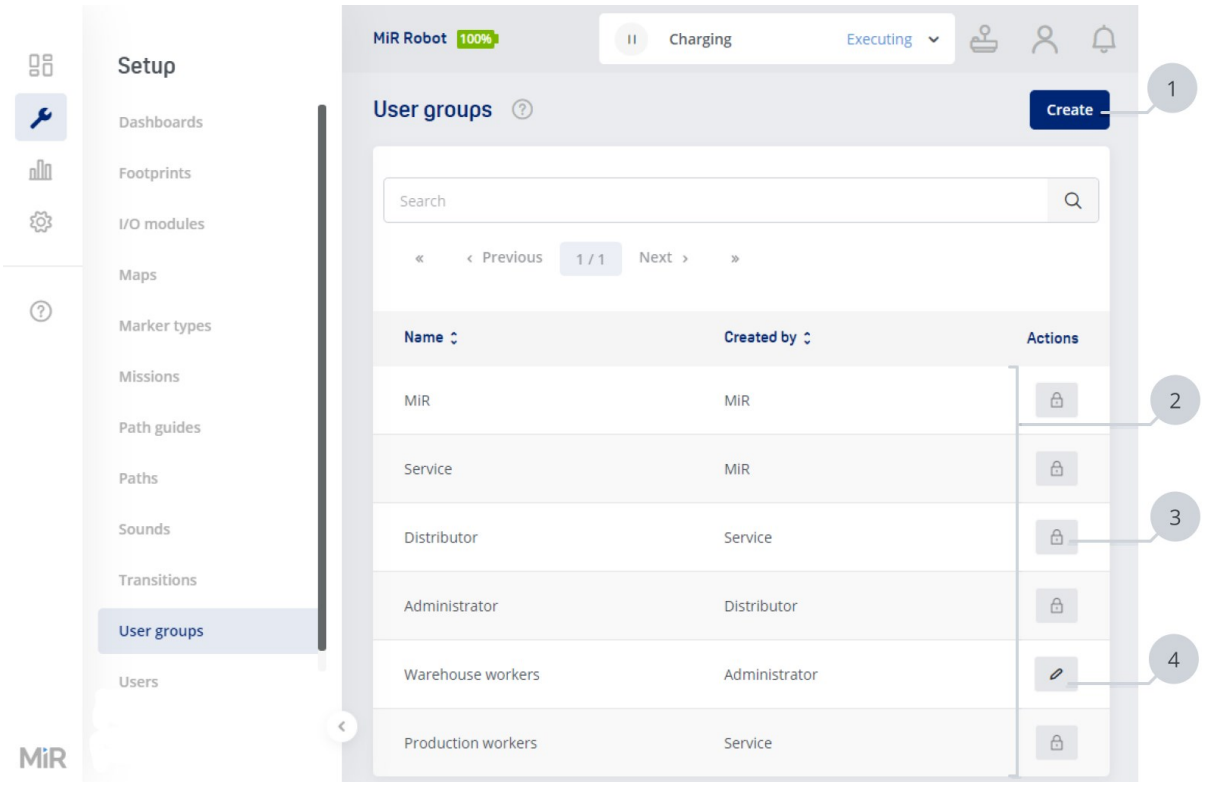
4.11 User groups

A user group is a permission set that can be assigned to any number of users.

User groups are used to manage the level of access for the robot users. Each user must be assigned to a user group.

The interface starts with a number of default user groups:

- Distributors have full access to the user interface and can administer the permissions of the Administrators and User groups.
- Administrators have full access to the user interface and can administer the permissions of the User group.
- Users have access to view the whole user interface and permission to create and edit dashboards.



	Description		Description
1	**Create** Opens the dialog box to create a new user group—see "Create user group" on the next page.	2	**User groups** Lists all user groups for MiR Robot. You can sort the user groups based on the name or which user created them.
3	**Locked** Opens the dialog box to view	4	**Edit** Opens the dialog box to edit the

Description	Description
information about the selected user group. Your user group does not have permission to edit the user group.	selected user group—see "Edit user group" on the next page.

Create user group

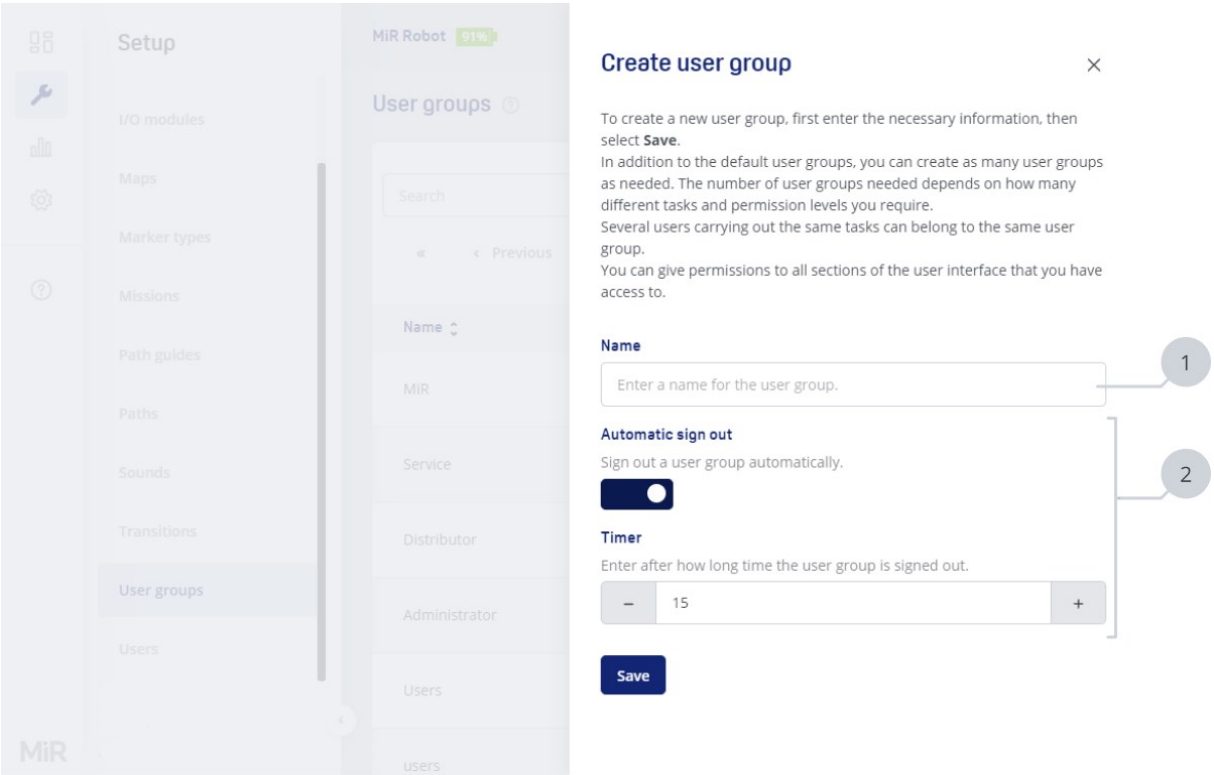
Setup > User groups > Create

To create a new user group, first enter the necessary information, then select **Save**.

In addition to the default user groups, you can create as many user groups as needed. The number of user groups needed depends on how many different tasks and permission levels you require.

Several users carrying out the same tasks can belong to the same user group.

You can give permissions to all sections of the user interface that you have access to.

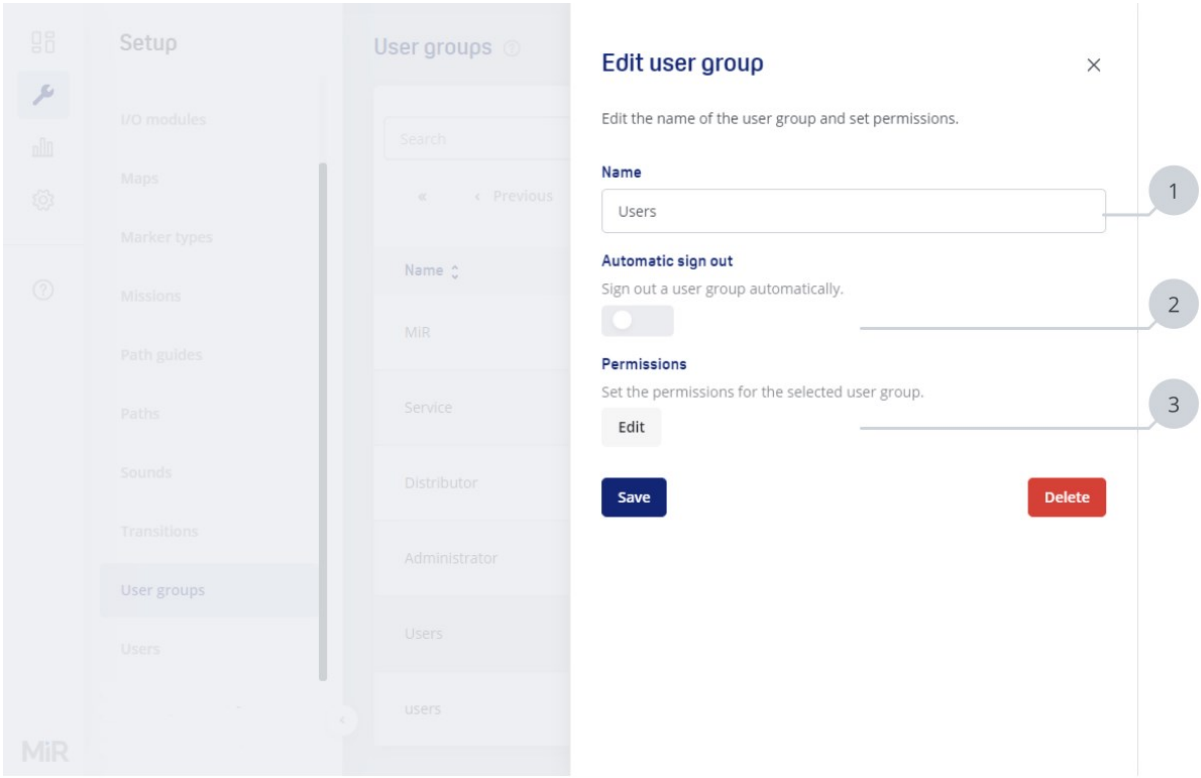


	Description		Description
1	**Name** Enter a name for the user group.	2	**Automatic sign out** Sign out a user group automatically. If you enable this setting, the field **Timer** becomes available. Enter after how long time the user group is signed out.

Edit user group

Setup > User groups > Edit

Edit the name of the user group and set permissions.



	Description		Description
1	**Name** Enter a name for the user group.	2	**Automatic sign out** Sign out a user group automatically. If you enable this setting, the field **Timer** becomes available. Enter after how long time the user group is signed out.
3	**Permissions** Select **Edit** to set the permissions for the selected user group—see "Permissions" below.		

Permissions

Setup > User groups > Edit > Permissions

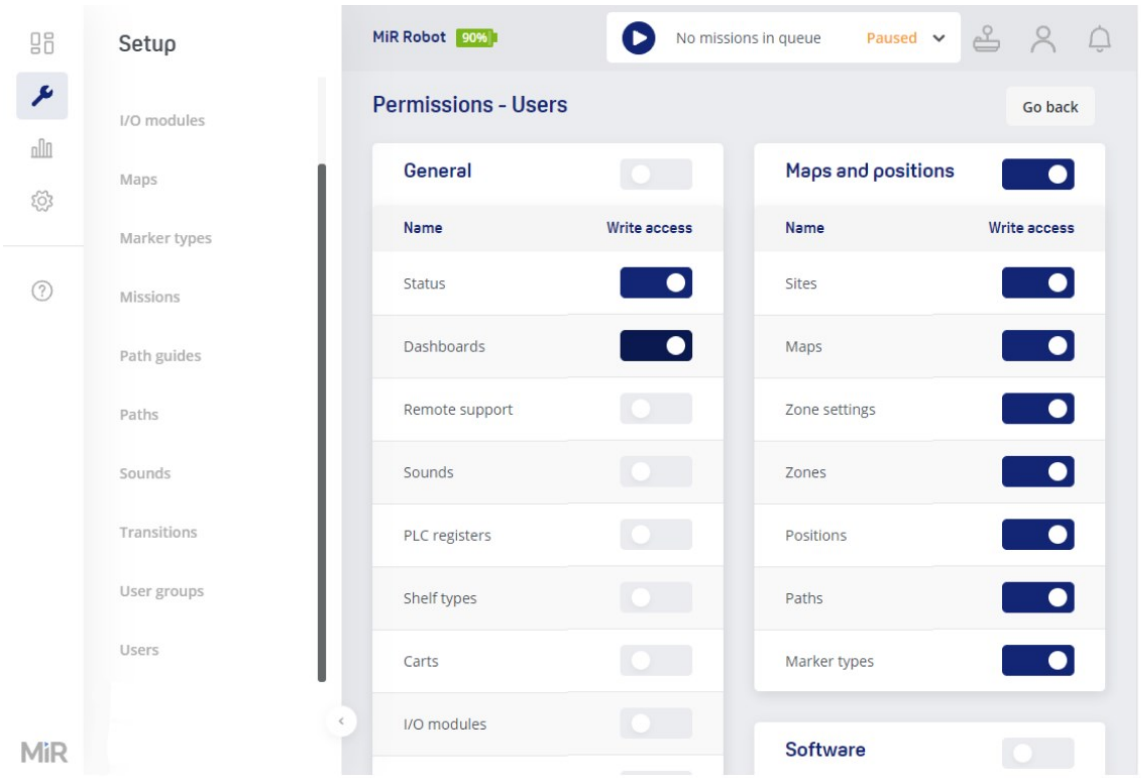
Set the permissions for the selected user group.

Except for Single-dashboard users—see "Create user" on page 135—all users can view all pages in the user interface. You can control which user groups are permitted to edit certain features. Permissions are divided into basic groups where you can choose to enable write access for the entire group, or you can select individual menus within each group.

Write access enables that user group to create and edit components within the selected category. The following are exceptions with special write properties:

- **Status** gives you permission to control the robot with the virtual joystick in Manual mode.
- **Remote support** gives you access to connect to remote support.
- **Modbus** give access to create and edit triggers. **Modbus** must be enabled under **System > Settings > Features** for this menu to be available.
- **Software update** and **Software update (MiR Fleet)** give access to update either MiR robots or MiR Fleet respectively.

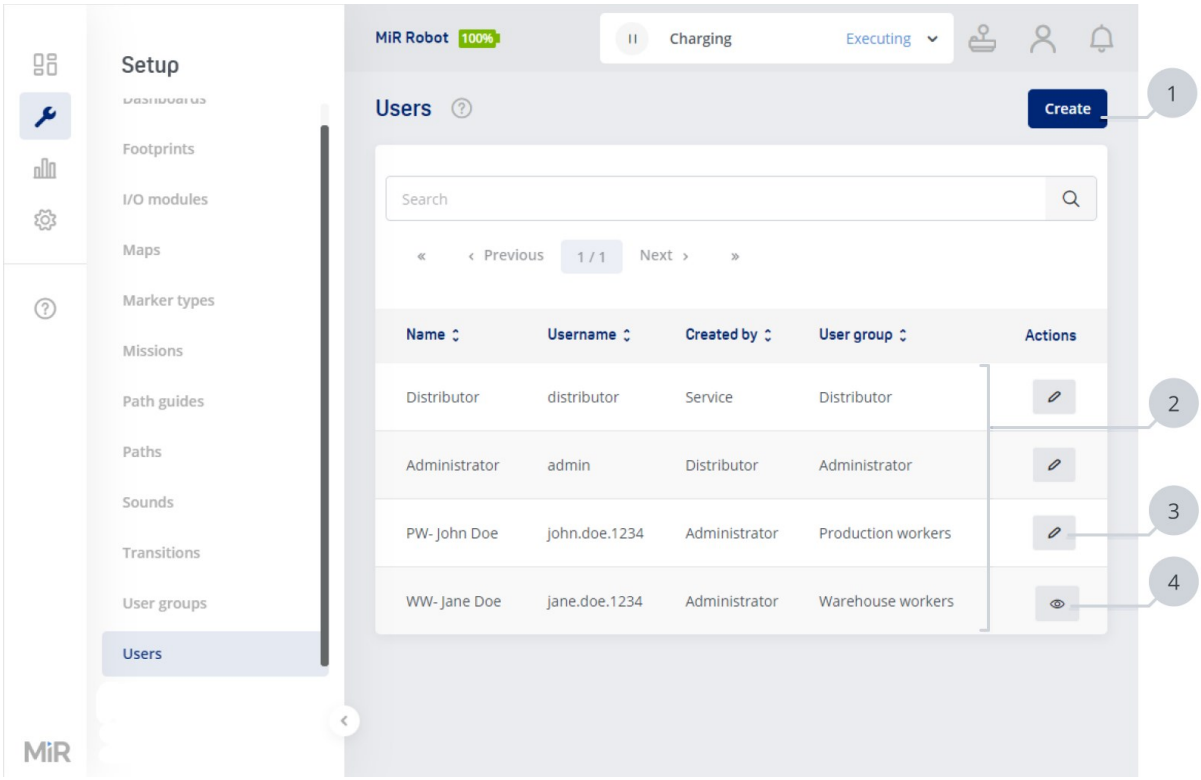
- **Mission queue** and **Mission scheduler** each give access to either queue or schedule missions depending on if you are using a MiR robot or MiR Fleet respectively.
- **System information** give access to change the robot name and serial number.
- **System settings** gives access to all system setting, except the Wi-Fi system settings.
- **Wi-Fi** gives access to create and edit connections under the Wi-Fi system settings. You do not need to have System settings permission to create Wi-Fi networks.



4.12 Users

A user is an account on the robot personnel can use to sign in with. Each user has a set of unique credentials to sign in with and is assigned to a user group to manage their access level.

Users are used to control who can access the robot. Each person who uses the robot should have their own user.



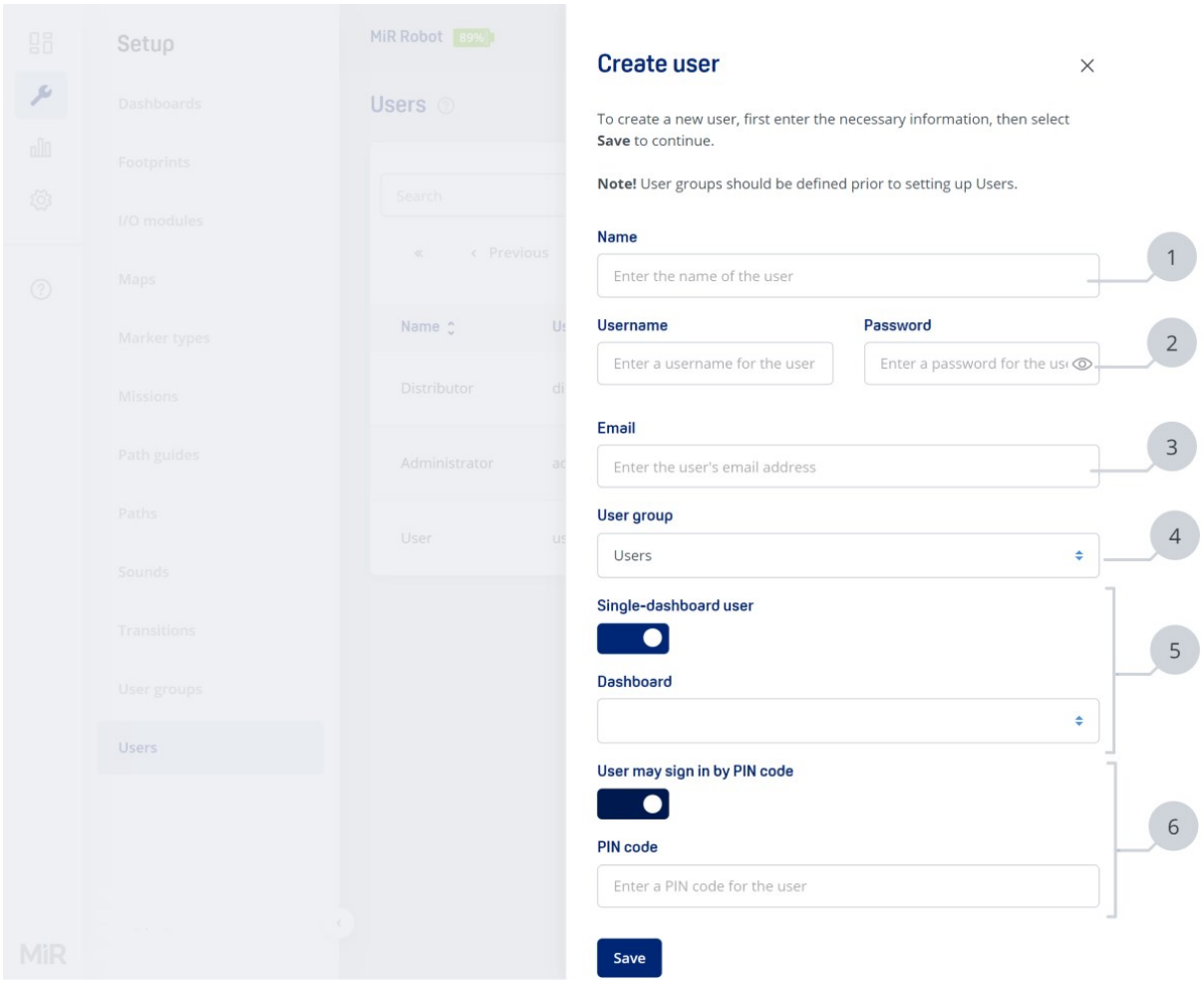
	Description		Description
1	**Create** Opens the dialog box to create a new user—see "Create user" on the next page.	2	**Users** Lists all users for MiR Robot. You can sort the users based on the name, username, which user created them, or which user group they are part of.
3	**Edit** Opens the dialog box to edit the selected user—see "Edit user" on page 136.	4	**View** Opens the dialog box to view information about the selected user. Your user group does not have permission to edit the user.

Create user

Setup > Users > Create

To create a new user, first enter the necessary information, then select **Save** to continue.

User groups should be defined prior to setting up Users.



	Description		Description
1	**Name** Enter the name of the user.	2	**Username and Password** Enter a username and password the

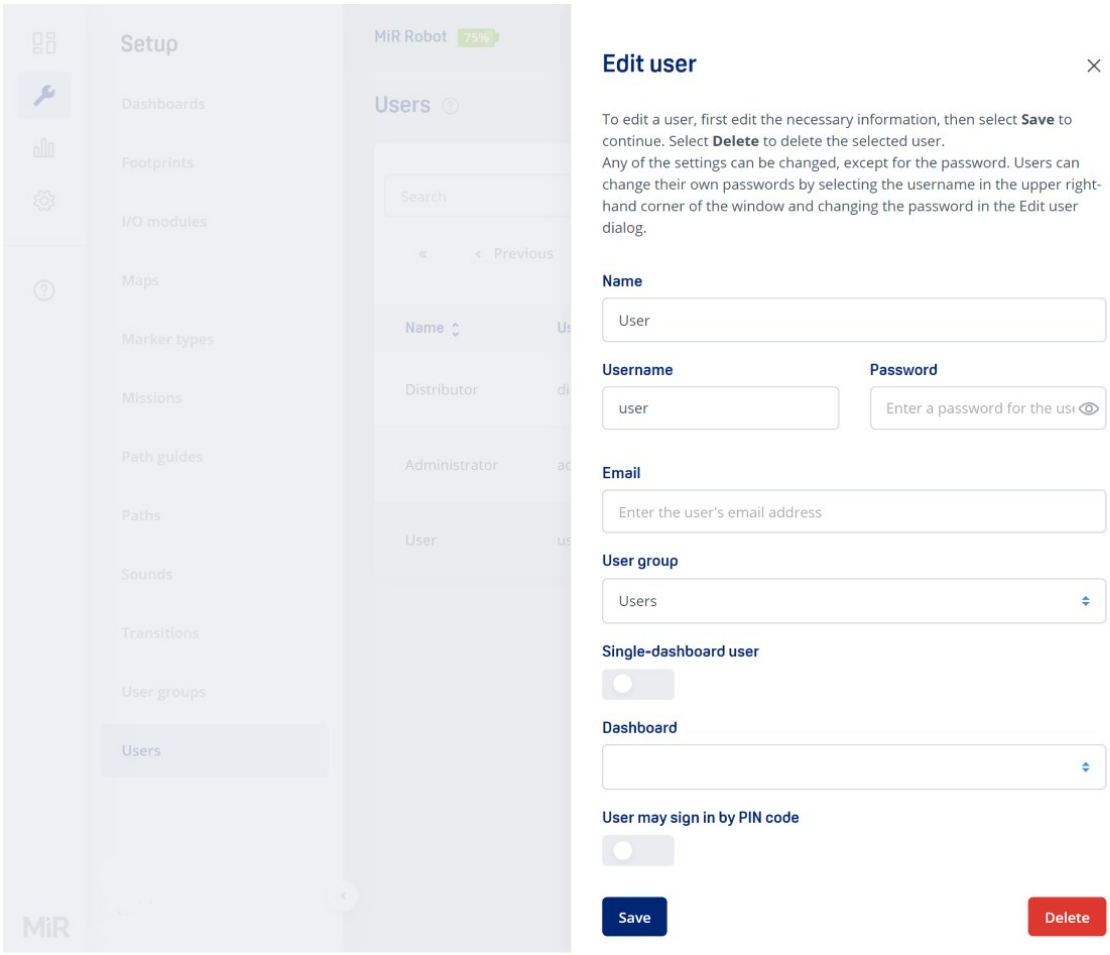
	Description		Description
			user can use to sign in to the interface.
3	**Email** Enter the email address of the user.	4	**User group** Select which user group the user is part of—see "User groups" on page 128.
5	**Single-dashboard user** Limit the user to a single dashboard. The user cannot access any other pages in the user interface and can only use the functions included in the selected dashboard. When you enable this setting, the field **Dashboard** becomes available. Select which dashboard you want the user to have access to.	6	**User may sign in by PIN code** Allow the user to sign in using a PIN code. We recommend only enabling this for users with limited access. When you enable this setting, the field **PIN code** becomes available. Enter the PIN code the user can use to sign in.

Edit user

Setup > Users > Edit

To edit a user, first edit the necessary information, then select **Save** to continue. Select **Delete** to delete the selected user.

Any of the settings can be changed, except for the password. Users can change their own passwords by selecting the username in the upper right-hand corner of the window and changing the password in the Edit user dialog.



You can change any of the fields described in "Create user" on page 135.

5. Monitoring

The Monitoring menu contains the following pages that let you view data collected by MiR Robot:

5.1 Analytics 138

5.2 Error logs 140

5.3 Hardware health 142

5.4 Mission log 143

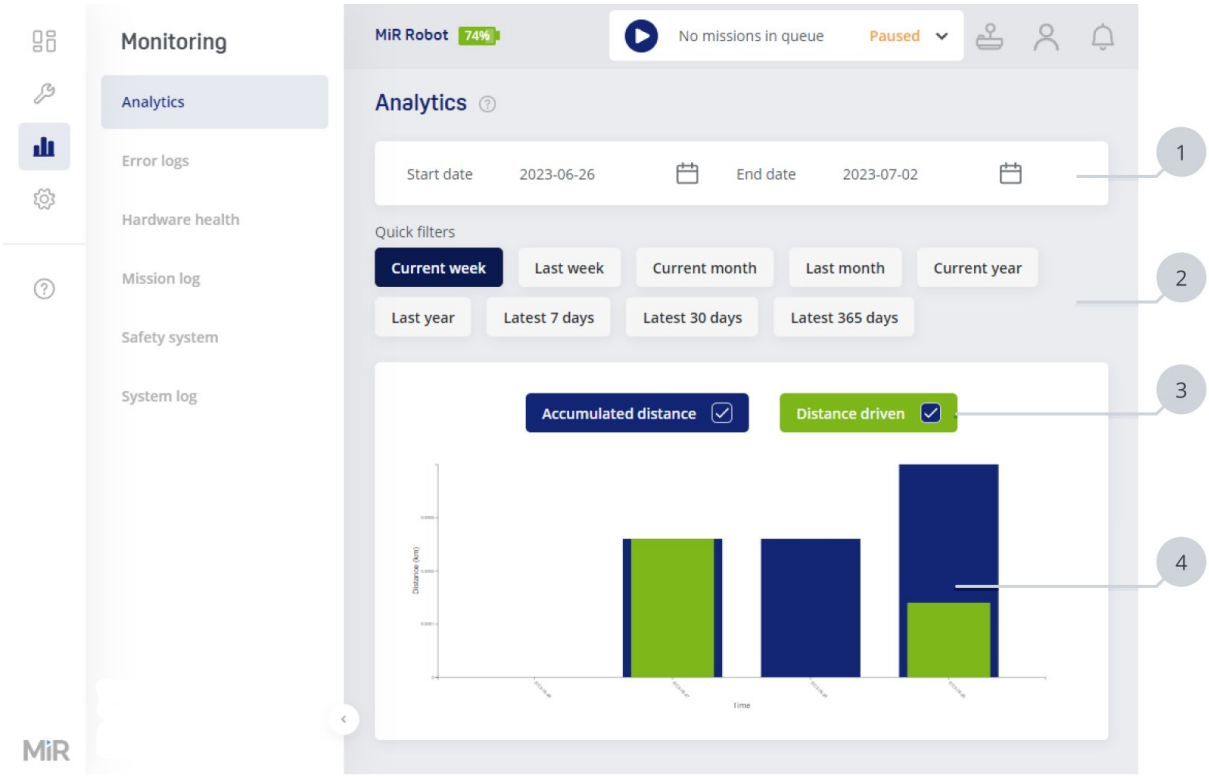
5.5 Safety system 145

5.6 System log 147

5.1 Analytics

Analytics gives a graphic overview of the robot's driven distance over a specified period of time.

You can select a period either by specifying a fixed start and end date or by clicking on one of the buttons spanning from current week to the last 365 days. In addition, you can choose whether to see a chart per day or per month, and you can see a graph showing the accumulated distance for the selected time period in addition to the default bar graph view.



	Description		Description
1	**Start date and End date** You can limit the data to a specific time span by selecting a start and end date.	2	**Quick filters** You can select one of the quick filters to limit the shown data to the selected time span.
3	**Legend** You can select whether the graph should show both or only one of the following data sets: • **Accumulated distance**: Is the sum of all the distances traveled on the previous days included in the time span.	4	**Graph** The graph displays a combination of the distance the robot has driven each day or the accumulated distance it has driven from the first data point. You can use the legend to filter the data.

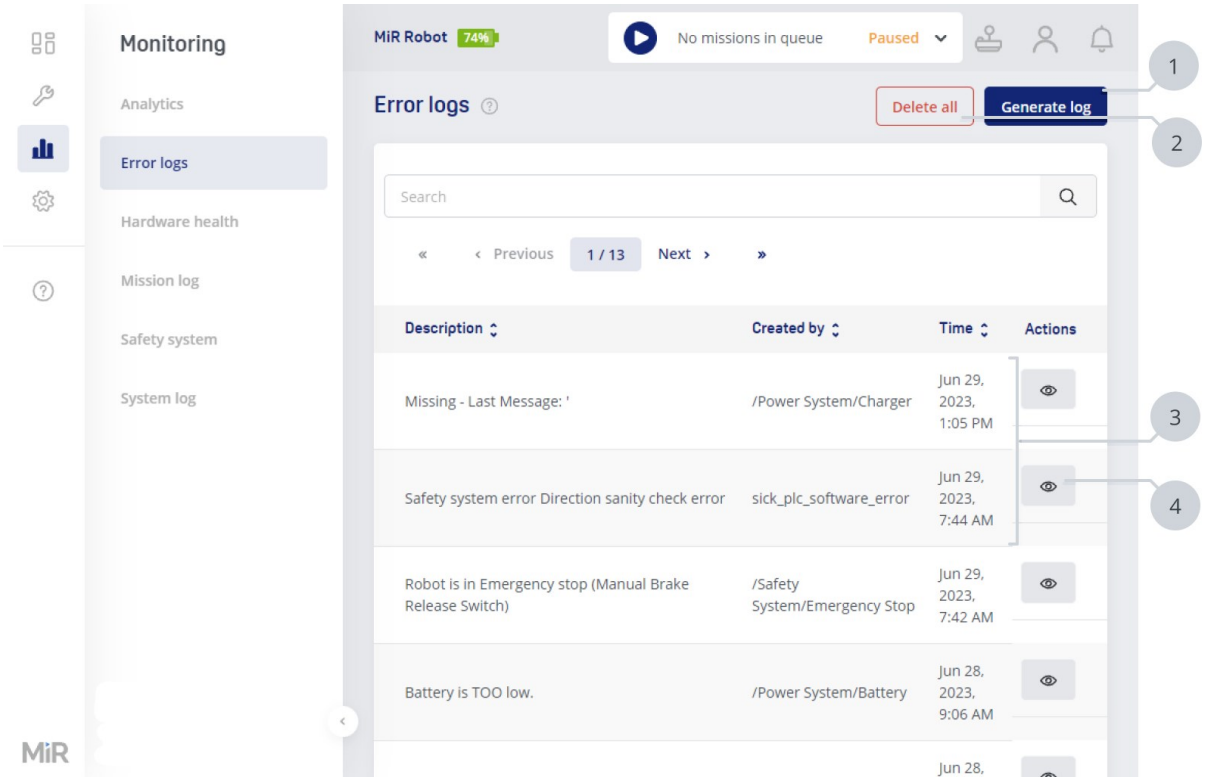
Description	Description
• **Distance driven**: Is the distance the robot has driven that day only.	

5.2 Error logs

An error log is a file that records everything that has happened in the robot's system in the last 30 seconds before the file is generated.

Error logs are used by MiR Technical Support to diagnose the cause of any issues occurring with your robot. Error logs are generated automatically if the robot detects an error and enters Error state. If an error is not recognized by the robot, you can generate an error log manually within 30 seconds of the error occurring.

To send an error log to MiR Technical Support, determine which error log captures the error you are experiencing based on the date and description, and download the encrypted file. You can then send this file with your support request.

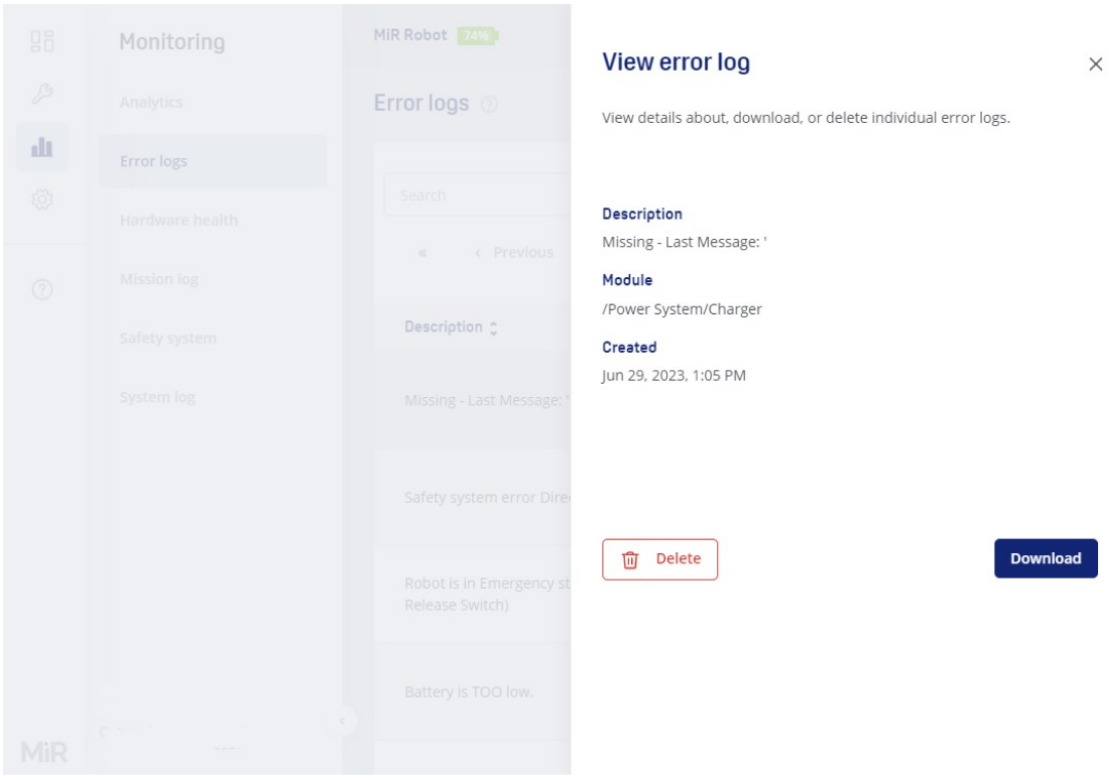


	Description		Description
1	**Generate log** Generates a new error log that contains all of the system data on the robot from the last 30 seconds. For more information about error logs, see the guide *How to generate an error log*. You can find this guide on MiR Support Portal.	2	**Delete all** Deletes all existing error logs.
3	**Error logs** Lists all error logs generated by MiR Robot. You can sort the error logs based on the description, which user created them, or when they were generated.	4	**View error log** View details about an error log or download it—see "View error log" below.

View error log

Monitoring > Error logs > View

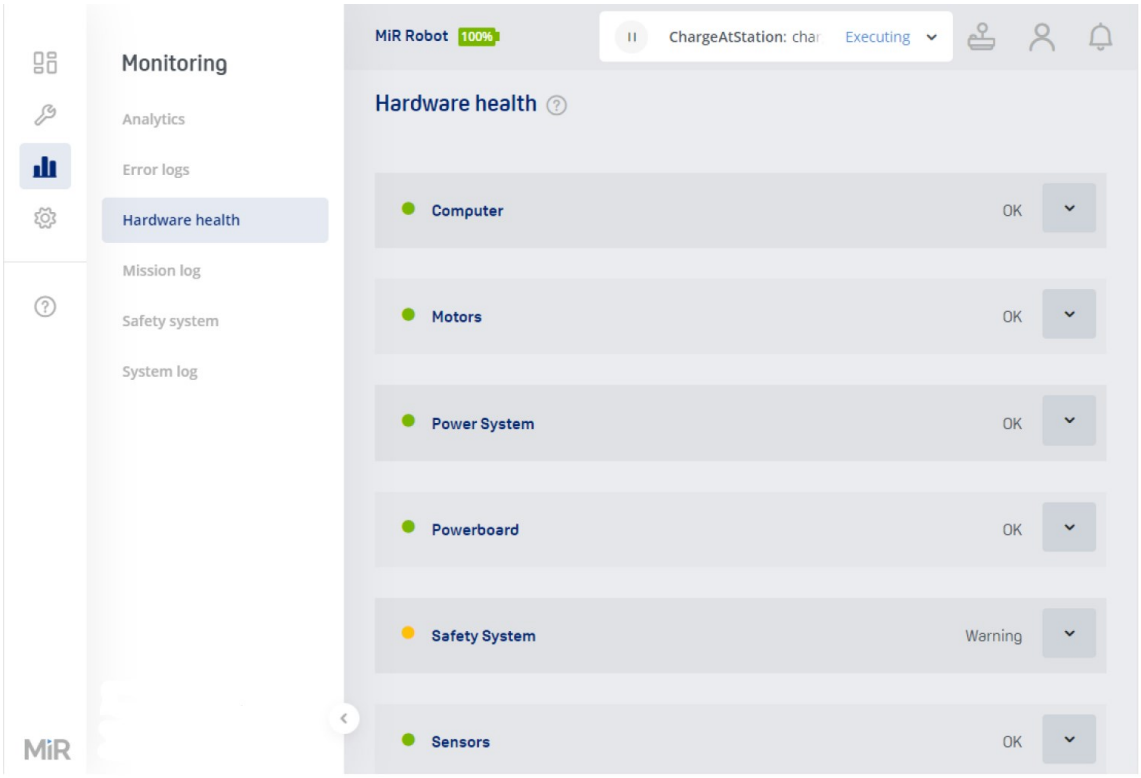
View details about, download, or delete individual error logs.



5.3 Hardware health

Hardware health allows you to see information on the robot's hardware components and check their condition.

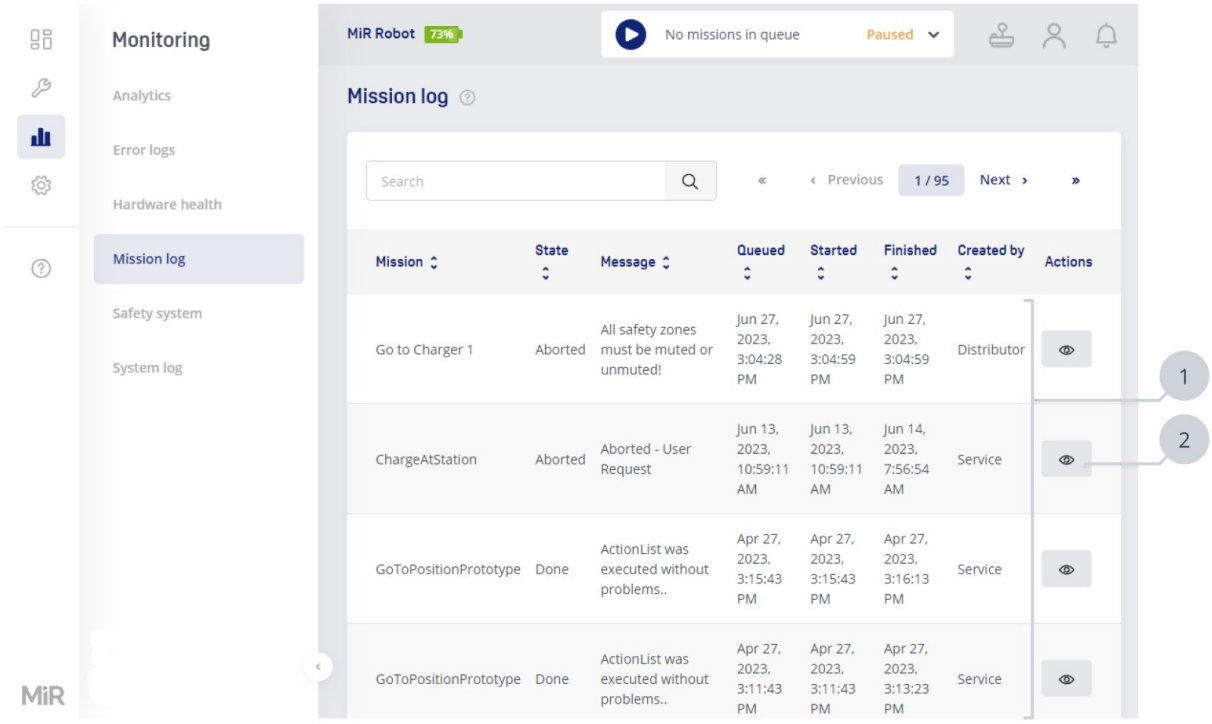
If all sub-components are functioning as expected, the group will be marked with a green dot and OK, whereas if one or more components in a group are not in the expected condition, the group will be marked with a yellow or red dot and read Warning or Error. To find out more about the condition, you can expand the group by selecting the arrow next to the group name and see which components are not functioning correctly and why. Each sub-component can be further expanded into one or more sub-parts for further information on the condition.



5.4 Mission log

The Mission log contains a list of all missions the robot has executed and the mission currently running, if any.

Select **View** to see the list of actions executed in a particular mission.



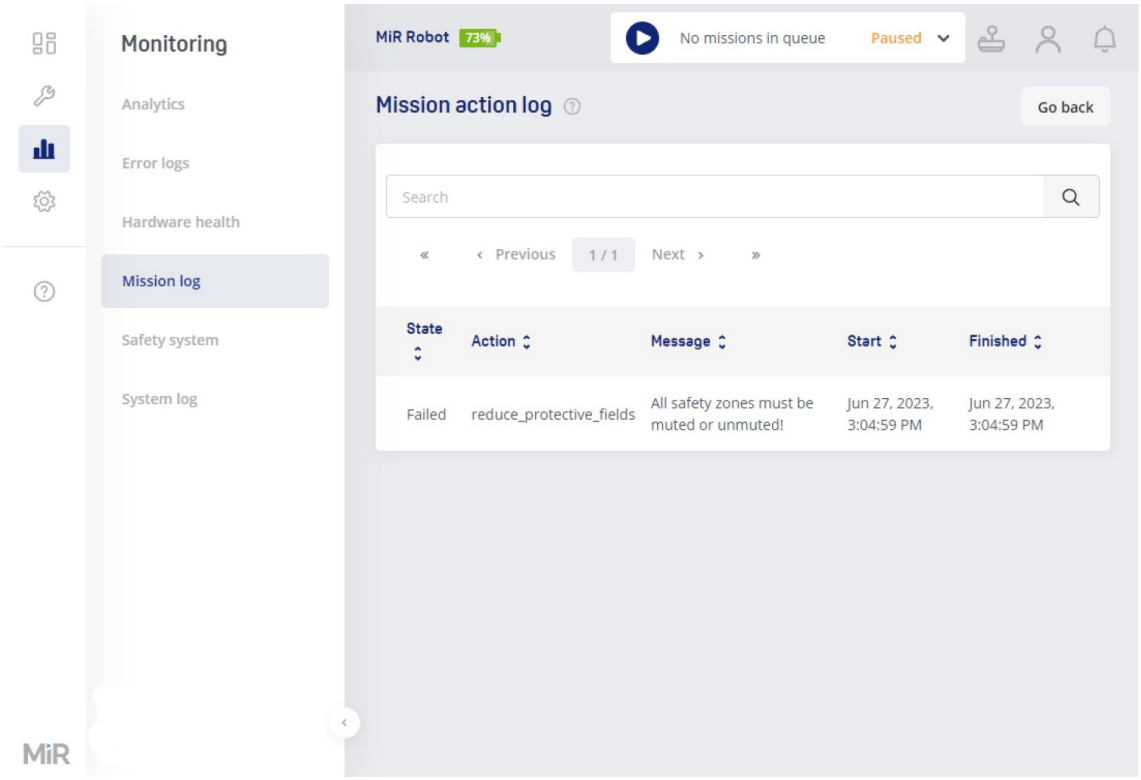
	Description		Description
1	**Missions** The list contains all missions executed by the robot and the current mission it is executing (if any).	2	**View** Opens the Mission action log containing a list of all actions included in that mission—see "Mission action log" below.

Mission action log

Monitoring > Mission log > Mission action log

The mission action log contains the list of actions that the robot has executed within the selected mission and the action that the robot is executing now.

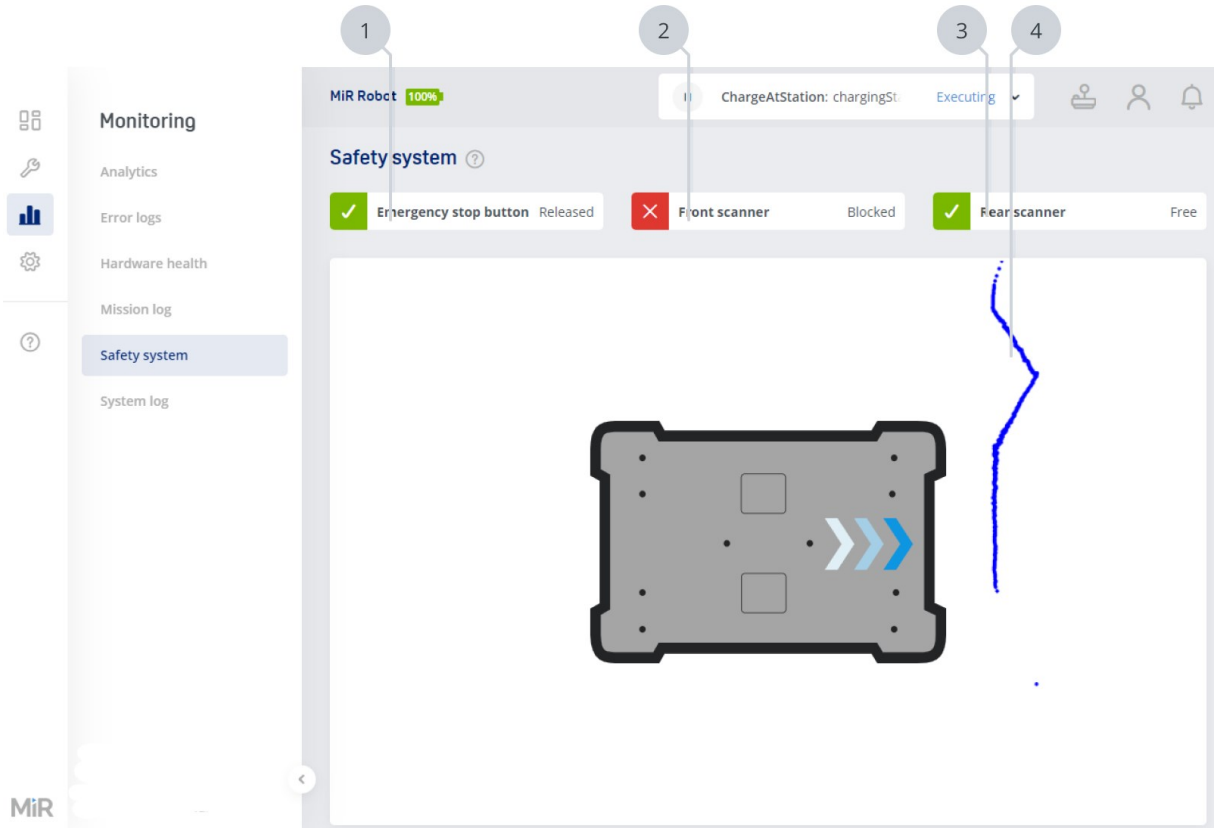
For each action, you can see state and the last message the robot reported regarding this action. This can be used to indicate if there are any actions that failed or behaved differently than expected.



5.5 Safety system

Safety system provides a live view of the input from the laser scanners and the state of the emergency stop button.

The purpose of the feature is mainly to be able to check if the robot has stopped unexpectedly due to a physical obstacle, or if someone has manually engaged the emergency stop button.

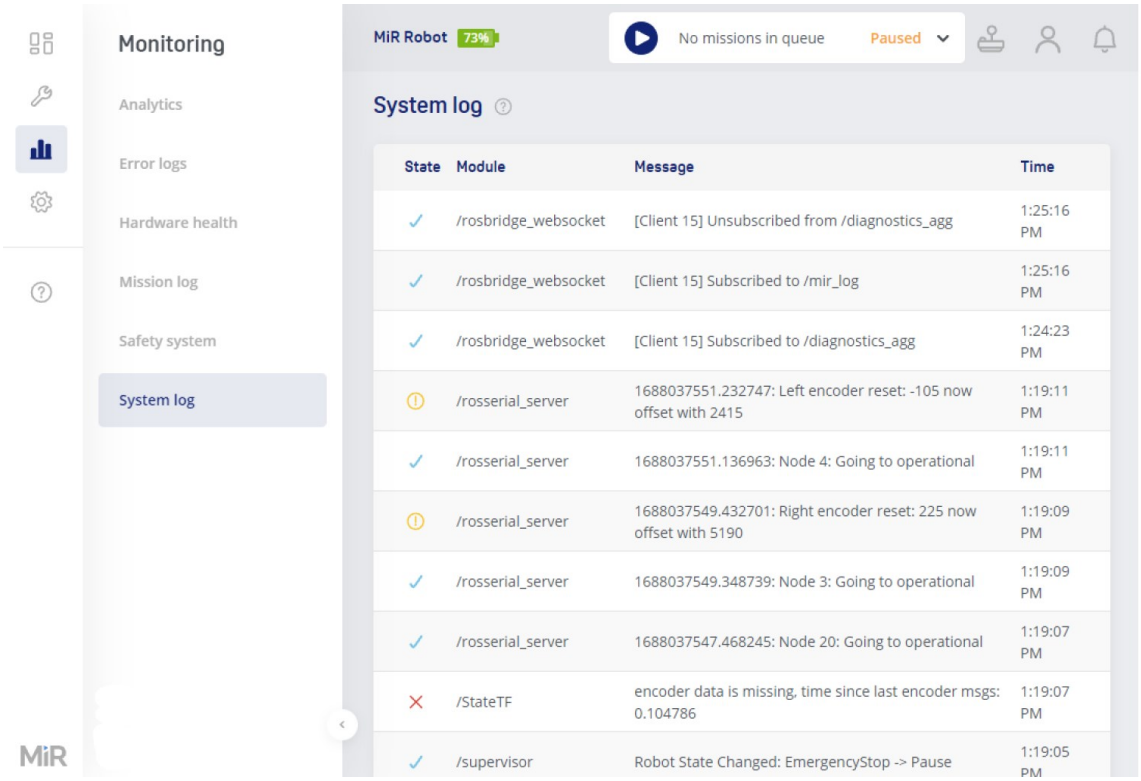


	Description		Description
1	**Emergency stop button** If any Emergency stop button on the robot is pressed, it is indicated here.	2	**Front scanner** If the front safety laser scanner detects an object within the active Protective field, it is indicated here.
3	**Rear scanner** If the rear safety laser scanner detects an object within the active Protective field, it is indicated here.	4	**Scanner data** A live stream of the scanner data collected by the safety laser scanners is shown here. Each blue dot represents a point where the scanner has detected an obstacle.

Description	Description
	Single points that are far away from clusters of other points are often disregarded as noise. If there are many outliers in the scanner data, consider cleaning the scanners—see the maintenance section in the user guide for your robot application.

5.6 System log

The system log contains events that are logged by the operating system components. The system log contains information about the system state at a given time, the affected module, a short explanation, and a time stamp. The system log is mainly used by system supporters for troubleshooting.


Monitoring
Analytics
Error logs
Hardware health
Mission log
Safety system
System log
MiR Robot 73%
No missions in queue
Paused
System log
State Module Message Time
/rosbridge_websocket [Client 15] Unsubscribed from /diagnostics_agg 1:25:16 PM
/rosbridge_websocket [Client 15] Subscribed to /mir_log 1:25:16 PM
/rosbridge_websocket [Client 15] Subscribed to /diagnostics_agg 1:24:23 PM
/rosserial_server 1688037551.232747: Left encoder reset: -105 now offset with 2415 1:19:11 PM
/rosserial_server 1688037551.136963: Node 4: Going to operational 1:19:11 PM
/rosserial_server 1688037549.432701: Right encoder reset: 225 now offset with 5190 1:19:09 PM
/rosserial_server 1688037549.348739: Node 3: Going to operational 1:19:09 PM
/rosserial_server 1688037547.468245: Node 20: Going to operational 1:19:07 PM
/StateTF encoder data is missing, time since last encoder msgs: 0.104786 1:19:07 PM
/supervisor Robot State Changed: EmergencyStop -> Pause 1:19:05 PM

6. System

The System menu contains the following pages that let you modify and view settings specifically for MiR Robot:

6.1 Backups 149

6.2 PLC registers 151

6.3 Robot setup 155

6.4 Settings 162

6.5 Software versions 182

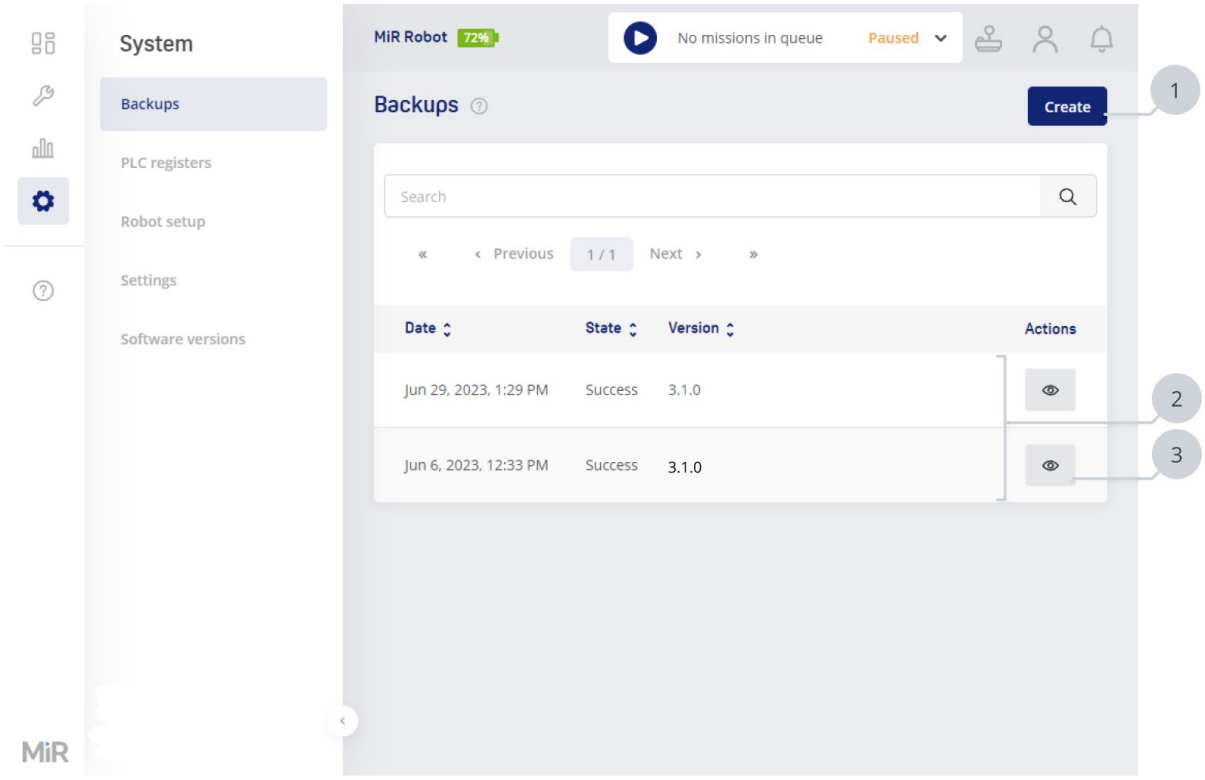
6.6 Triggers 185

6.1 Backups

A backup is a copy of the configuration and system state data of your robot.

A backup is used to revert your robot to a previous state. It contains the site data and system settings at the time the backup was generated. This is most often used if the system fails and you need to recover lost data, or if you want your robot to run an older software version than the one you last updated it to.

Backups are automatically created before you update the software version or roll back to a previous backup. You can also generate them manually on this page.



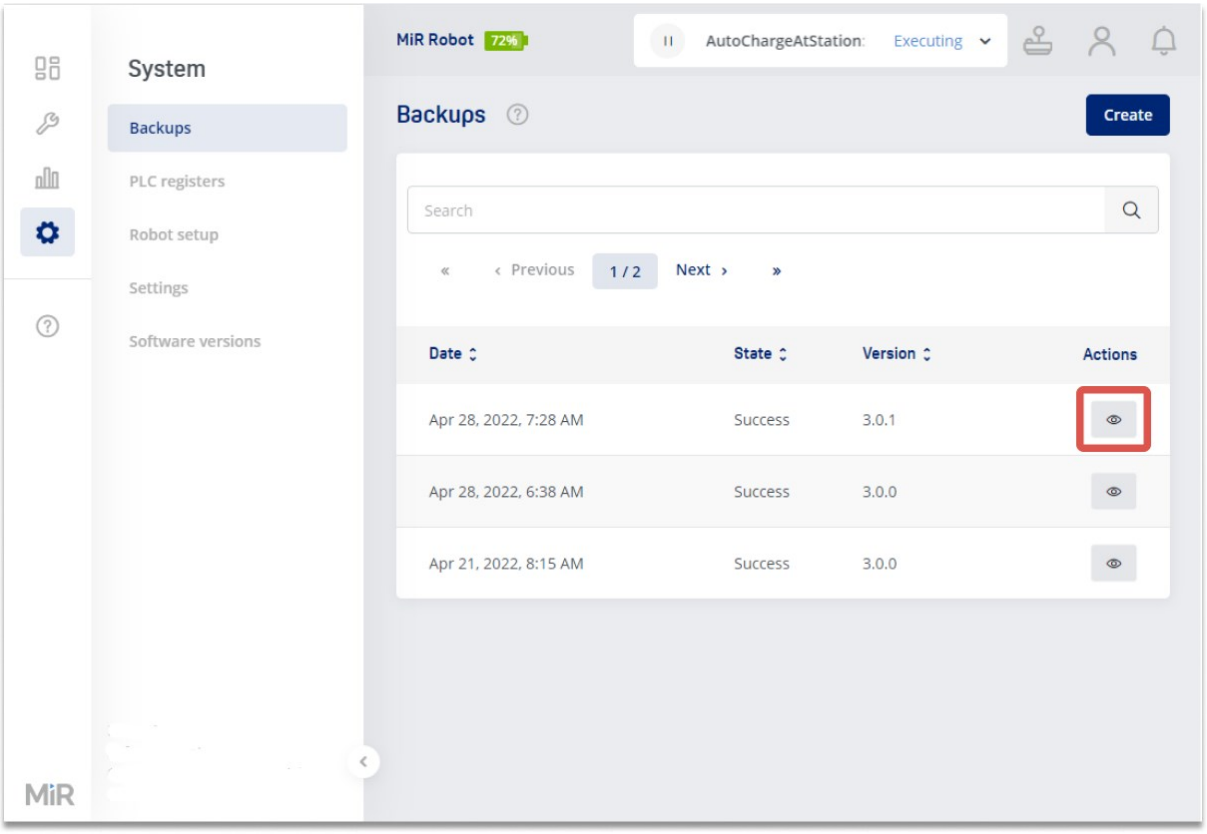
	Description		Description
1	**Create** Creates a new backup of your robot's current site, settings, and software version. It may take the robot a few seconds to create the backup.	2	**Backups** Lists all backups created for the robot. You can sort the backups based on the date they were created, the state, or the software version.
3	**View** See more information about the selected backup, and choose to either remove or restore the backup—see "View backup" on the next page.		

View backup

System > Backups > View

See information about the selected backup, or choose to roll back to this version of the robot or remove the backup.

Removing backups you are not going to use frees up more hard drive space on the robot.



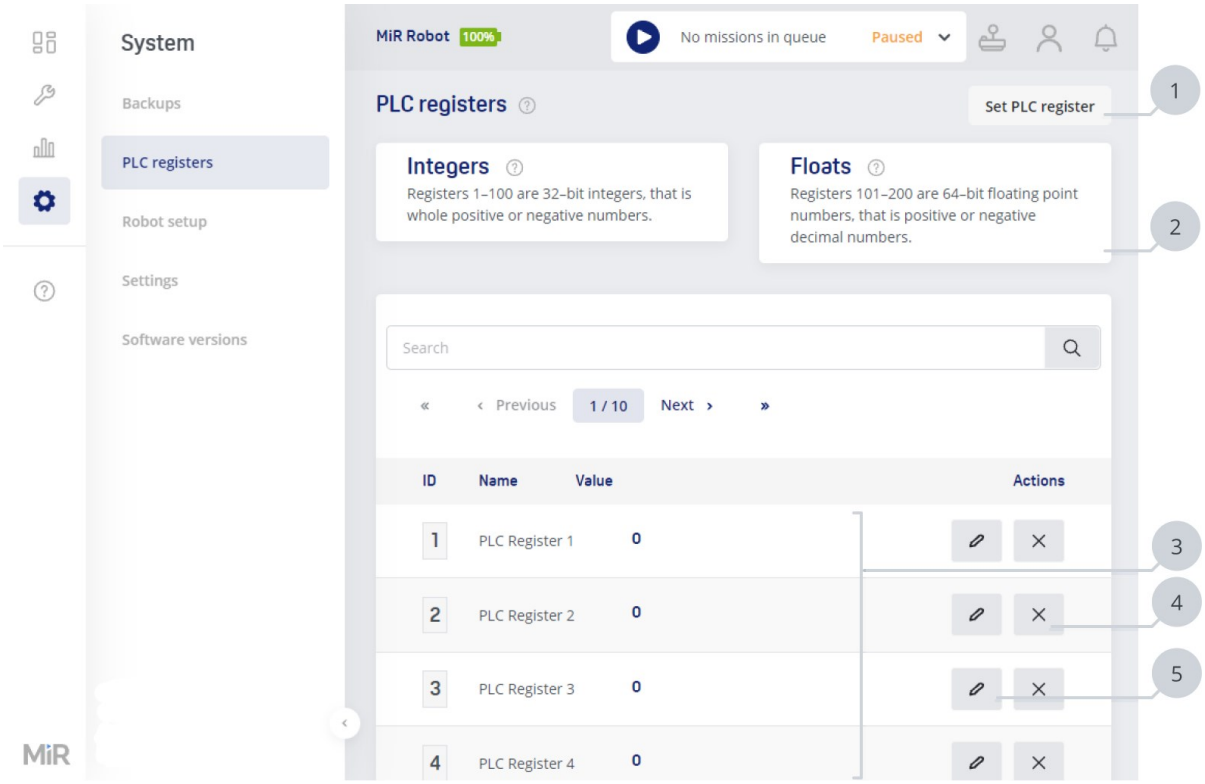
6.2 PLC registers

*You must enable PLC registers under **System** > **Settings** > **Features** to see this page.*

PLC registers store numbers that you can use or manipulate in missions or maps to control top modules or other connected devices or to trigger an action in a mission.

PLC registers can be accessed through a serial interface using the robot's USB port (via RS232 adapter) or through a REST interface using the robot's Ethernet connection.

You can control or read PLC registers using PLC actions in missions, I/O module zones on maps, or the PLC register widget on a dashboard.



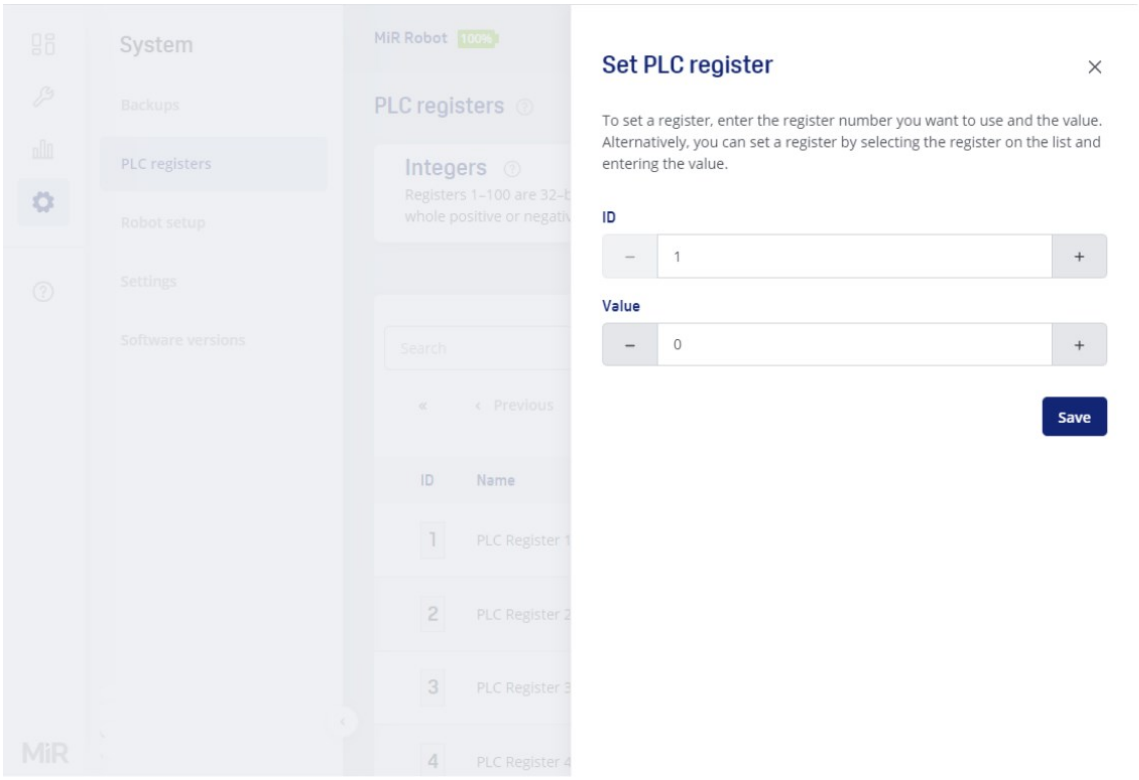
	Description		Description
1	**Set PLC register** Opens the dialog box to set a PLC register—see "Set PLC register" on the next page.	2	**Integer and Float information** The PLC registers are divided between floats and integers. **Integers**: Registers 1–100 are 32–bit integers, that is whole positive or negative numbers. **Floats**: Registers 101–200 are 64–bit floating point numbers, that is positive

	Description		Description
			or negative decimal numbers.
3	**PLC registers** Lists all PLC registers available on the robot. You can sort the registers based on the ID, name, or values they are set to.	4	**Reset** Reset the PLC register to its default settings.
5	**Edit** Opens the dialog box to edit the selected PLC register—see "Edit PLC register" on the next page.		

Set PLC register

System >PLC registers > Set PLC register

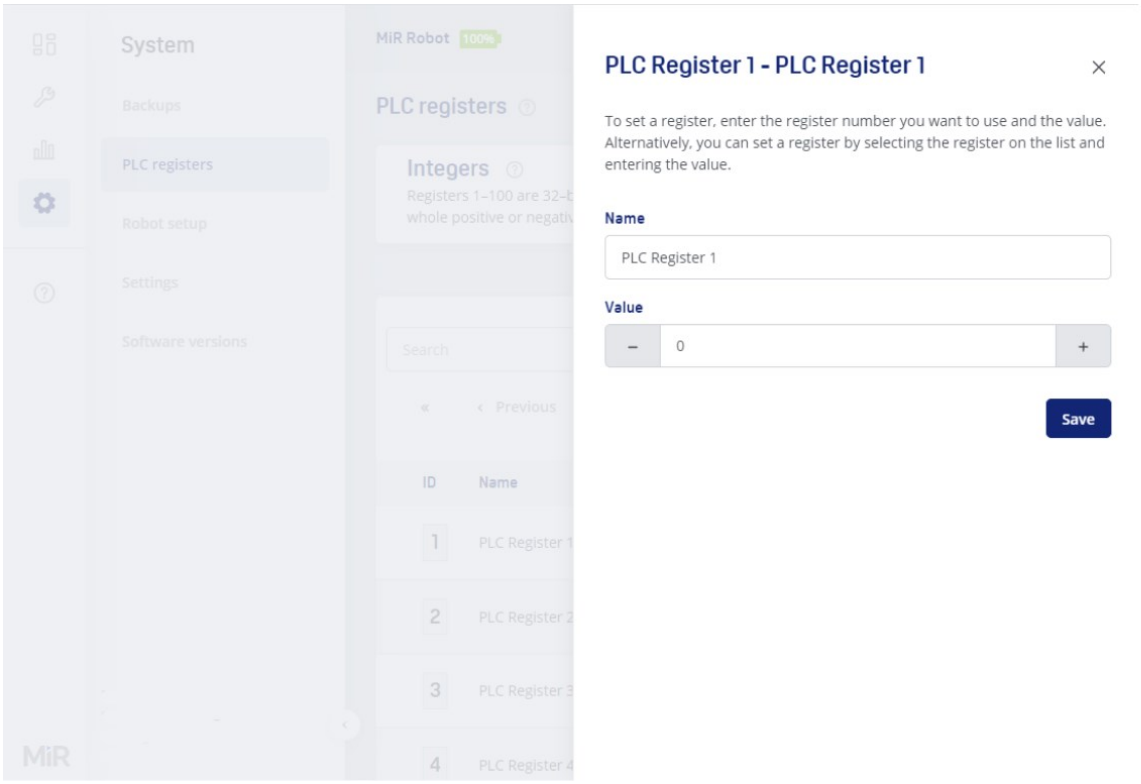
To set any of the PLC registers on the robot, first enter the ID for the register you want to set, then enter the value you want to change the register to. Select **Save** to set the register to the new value.



Edit PLC register

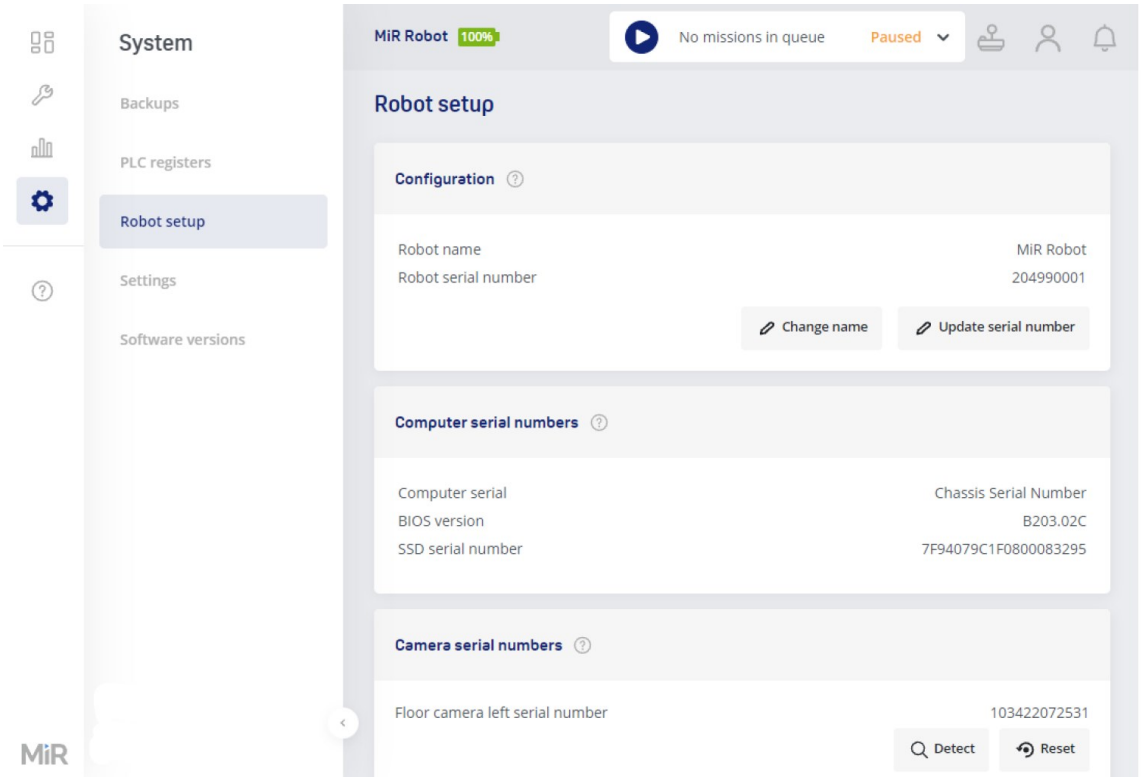
System >PLC registers > Edit

To edit a PLC register, first change the name or value of the PLC register, then select **Save**.



6.3 Robot setup

In the Robot setup section, you can view and update the serial numbers of the robot and its components, you can run calibrations of IMU and encoders, you can enable the charging relay, and you can download SICK configuration files.



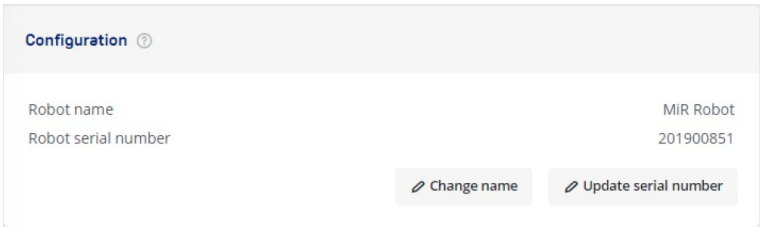
Updating and detecting serial numbers

System > Robot setup

The following setup settings are used to view, update, or detect the serial numbers of the robot or its components.

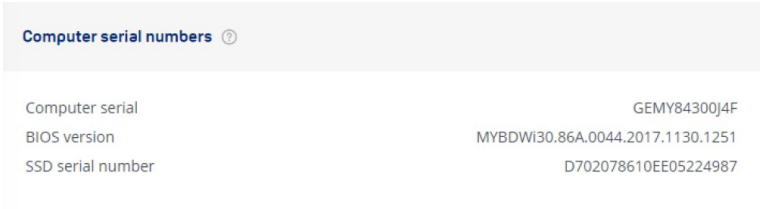
Configuration

The **Robot name** section gives you the option of changing the name of the robot and reading or updating the serial number.



Computer serial numbers

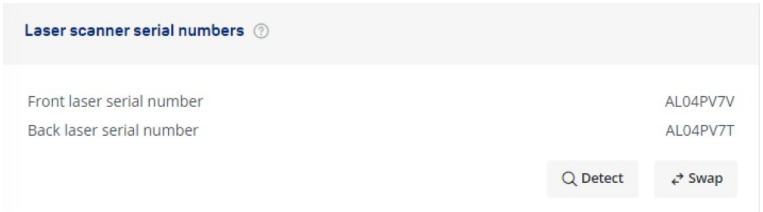
The **Computer serial numbers** section lists the serial numbers of the robot's hardware components.



Laser scanner serial numbers

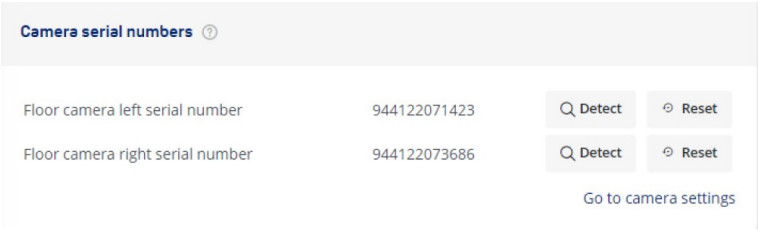
MiR100 and MiR200 only

The **Laser scanner serial numbers** section contains the serial numbers of the front and rear laser scanners and the functions for detecting and swapping the two scanners. **Detect** identifies the serial numbers of the two scanners connected to the robot. Only use this if a scanner has been disconnected or replaced. **Swap** swaps the front and rear laser scanners. Use this only if you can see that the data from the laser scanners have been inverted so obstacles in front of the robot are shown to be detected behind the robot.



Camera serial numbers

The **Camera serial numbers** section contains the serial numbers of the cameras and the functions for detecting the serial numbers automatically. **Detect** identifies the serial numbers of the connected camera. If there are more than one camera listed, you must disconnect any other cameras from the robot computer before you can detect the serial number correctly. **Reset** resets the serial number to the default value.



Calibrating sensors

System > Robot setup

The following setup settings are used to calibrate the sensors in the robot.

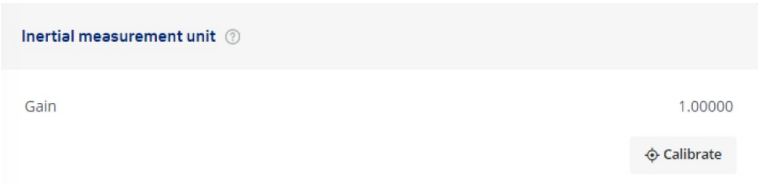
Inertial measurement unit

Inertial measurement unit (IMU) section lets you calibrate the IMU's 360 degree rotation. You must calibrate the IMU if you have replaced the robot's drive wheels, a motor, an encoder, the MiR board (MiR100 and MiR200 only), the motor controller carrier board or motor controller, the robot computer, or the wiring harness connected to the motor encoders.

To calibrate the IMU, select **Calibrate** and make sure the robot has enough space to rotate around itself. The robot will start spinning on the spot while the progression of the calibration is shown in percentage. After a couple of minutes, the calibration is finished and you get to decide if you want to keep the new calculated value. If the value deviates significantly from the original one, it will show in red color and you can choose to discard the calibration and restore to the default value.

For detailed instructions on how to calibrate the IMU, see the guide *How to calibrate the IMU*.

To perform the calibration, the robot must have an active map.



Laser scanner calibration

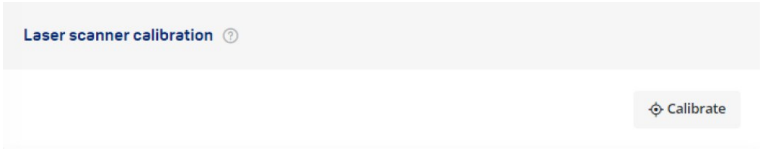
MiR100 and MiR200 only

The **Laser scanner calibration** section lets you calibrate the laser scanners. You must calibrate the laser scanners if you feel like the scanner data is inaccurate, or you have replaced a laser scanner, the robot computer, or the safety PLC.

To calibrate a laser scanner, place the robot approximately two meters in front of a wall, and select **Calibrate**. The robot now moves to a start position. Measure the distance from the front of the laser scanner to the wall and enter the distance in the dialog box in the interface. Follow the instructions in the interface, until the calibration is completed.

For detailed instructions on how to calibrate the scanners, see the guide *How to calibrate the safety laser scanners*.

After a calibration, the robot must be restarted.

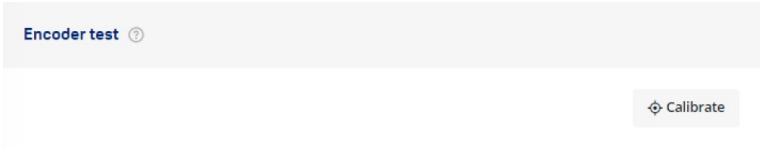


Encoder test

The **Encoder test** runs the robot through a sequence where it moves forward at both a slow and a faster speed and then moves back again. If you feel like your robot does not localize or dock well, it is a good idea to run this test to see if the robot's encoders are poorly calibrated.

Select **Test** to start the test. While the robot is moving, stand behind it and observe whether the robot is drifting slightly to the left or right. You are prompted to enter your observations in the test dialog box.

When the test is finished, the results from the test are displayed in a table. The results include notes on what you observed and the number of recorded encoder ticks for each drive wheel. If the robot has a tendency to drift to either side, but the number of encoder ticks recorded for each drive wheel is almost the same, it indicates that there is an issue with the encoders. If the encoder ticks represent the robot's driving behavior accurately, there may be another issue with the robot. Contact you distributor for further assistance.

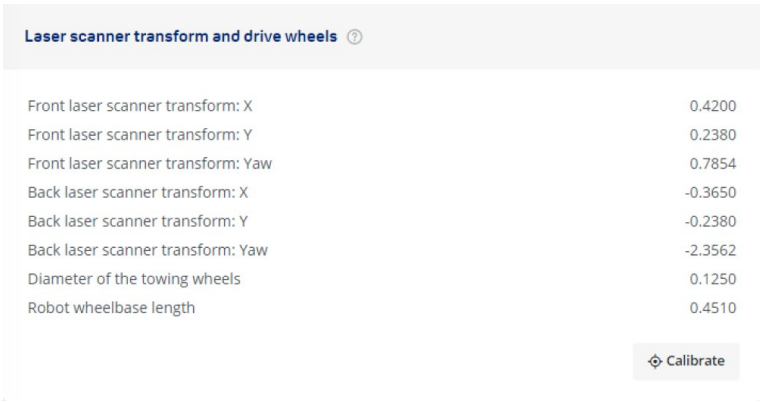


Laser scanner transform and drive wheels

The **Laser scanner transform and drive wheels** section displays the current calibration of the robot's scanners and wheels. If the scanners or wheels have been replaced, you must calibrate the transforms.

Before starting the calibration, you will need to make a small mission with three positions where the robot loops in a figure eight pattern. Start the mission, and then select **Calibrate** and wait until the calibration is completed (10-15 minutes).

When finished, decide if you want to keep the new calculated values. If any values deviate significantly from the original ones, they will show in red color and you can choose to discard the calibration and restore to the default values.



Proximity sensors

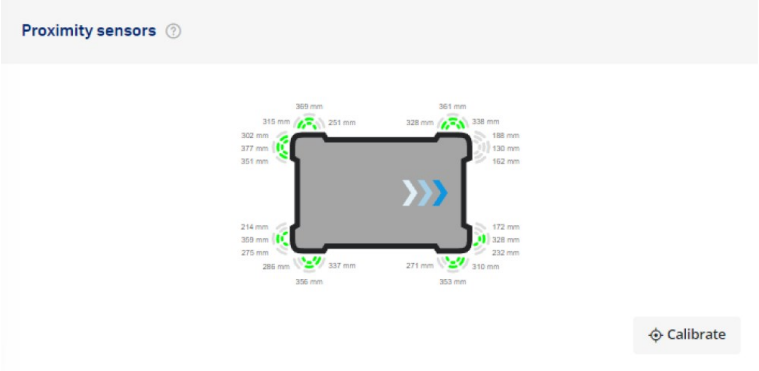
MiR250, MiR500, MiR600, MiR1000, and MiR1350 only

The **Proximity sensors** section lets you calibrate the proximity sensors. To calibrate, place the robot on a level floor and clear all obstacles in the area around the robot.

In the depiction of the robot, the current values shown next to each proximity sensor are the distances in millimeters between the proximity sensors and the nearest detected objects. If the sensors are well-calibrated, the values should be close to 365 mm when the robot is driving on a flat surface with no nearby obstacles. Select **Calibrate** and wait for the robot to determine the calibration offset values.

The offset values are displayed next to the values for the distance between the floor and the sensors. The offset values should result in the distances being around 365 mm. Evaluate whether the calibration corrections seem valid, and select **Apply** or **Cancel** depending on the calibration.

For detailed instructions on how to calibrate the proximity sensors, see the guide *How to calibrate the proximity sensors*.



Other functions

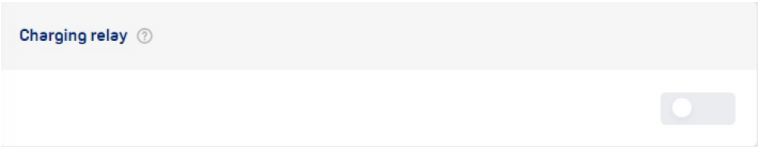
System > Robot setup

Depending on your robot model, there are also other functions available under Robot setup.

Charging relay

MiR100 and MiR200 only

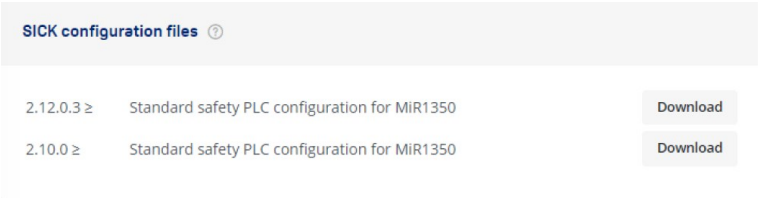
The **Charging relay** section contains the option of turning the robot's internal charging relay on or off. The charging relay is used when automatic charging is carried out by connecting the robot to a charging station.



SICK configuration files

MiR250, MiR500, MiR600, MiR1000, and MiR1350 only

The **SICK configuration files** section lets you download MiR's supported SICK configurations for various robot applications.



6.4 Settings

The Settings page contains all parameters you can modify to change the behavior of MiR Robot. The settings are divided into the following categories:

3D cameras 163
Advanced 164
Battery 165
Calibration 166
Date and time 168
Distributor data 169
Docking 169
Email configuration 170
Error handling 171
Features 172
Localization 173
Modified defaults 175
Motor controller 175
Planner 176
Proximity sensors 177

Serial interface 178

UR interface 179

Wi-Fi 180

WISE configuration 181

Many of the settings also have advanced parameters you can modify as well. Select **Advanced** in the upper-right corner to access the advanced settings.

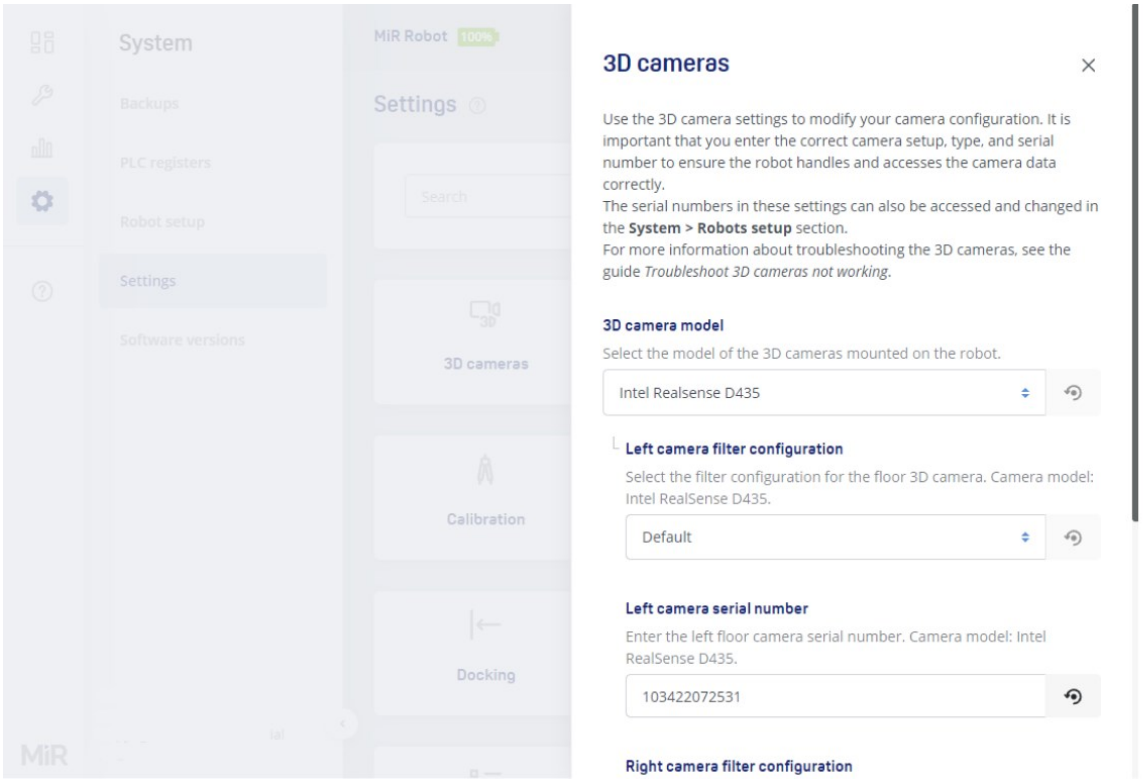
3D cameras

Use the 3D camera settings to modify your camera configuration. It is important that you enter the correct camera setup, type, and serial number to ensure the robot handles and accesses the camera data correctly. The serial numbers in these settings can also be accessed and changed in the **System > Robots setup** section. For more information about troubleshooting the 3D cameras, see the guide Troubleshoot 3D cameras not working.

Depending on the configuration and camera type, the available settings for the cameras change.

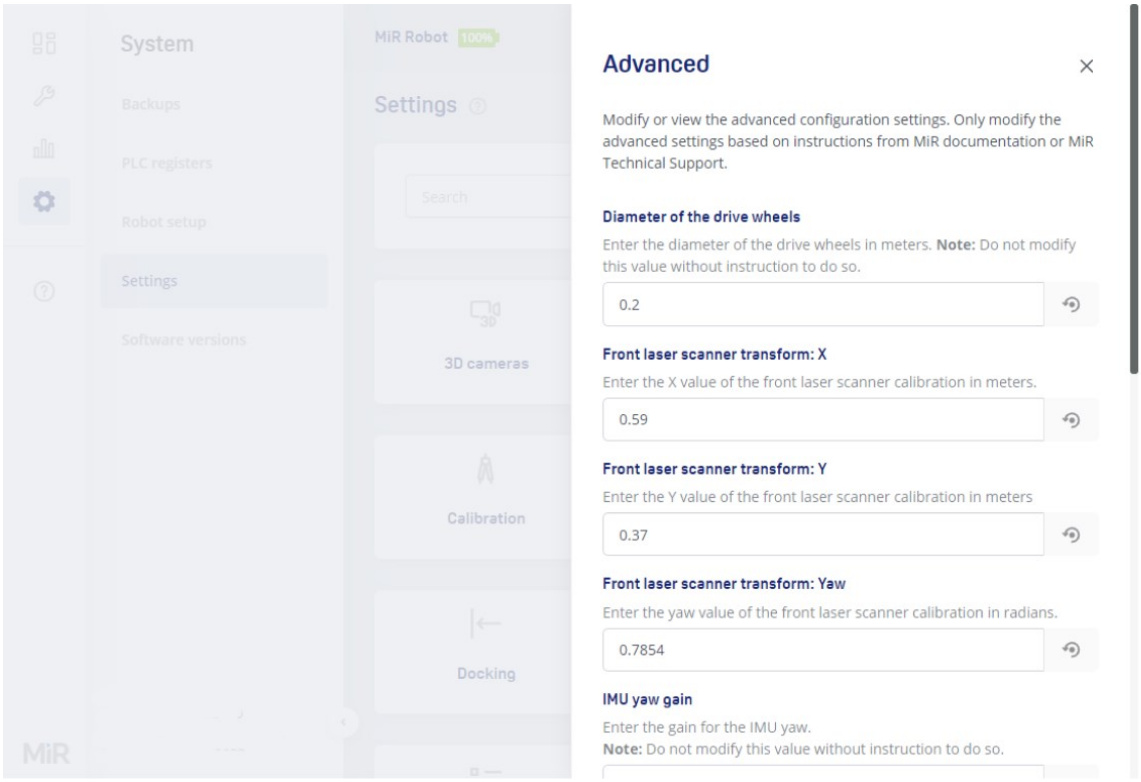
All robots except for MiR100 and MiR200 hardware versions 4.0 and lower use the **Left and right** configuration with D435 cameras.

If you have a MiR100 or MiR200 robot with hardware version 4.0 or lower, the robot uses the **Top and bottom** configuration. It is dependent on the top module whether a top camera is installed.



Advanced

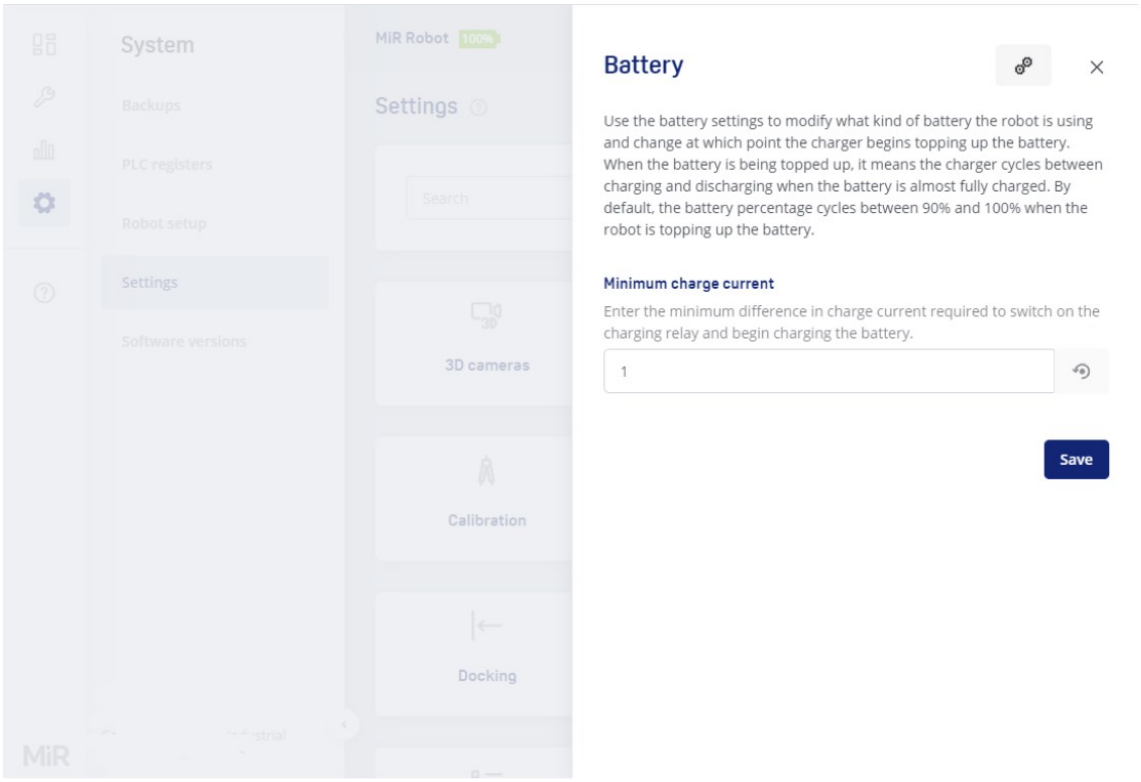
Modify or view the advanced configuration settings. Only modify the advanced settings based on instructions from MiR documentation or MiR Technical Support.



Battery

Use the battery settings to modify what kind of battery the robot is using and change at which point the charger begins topping up the battery.

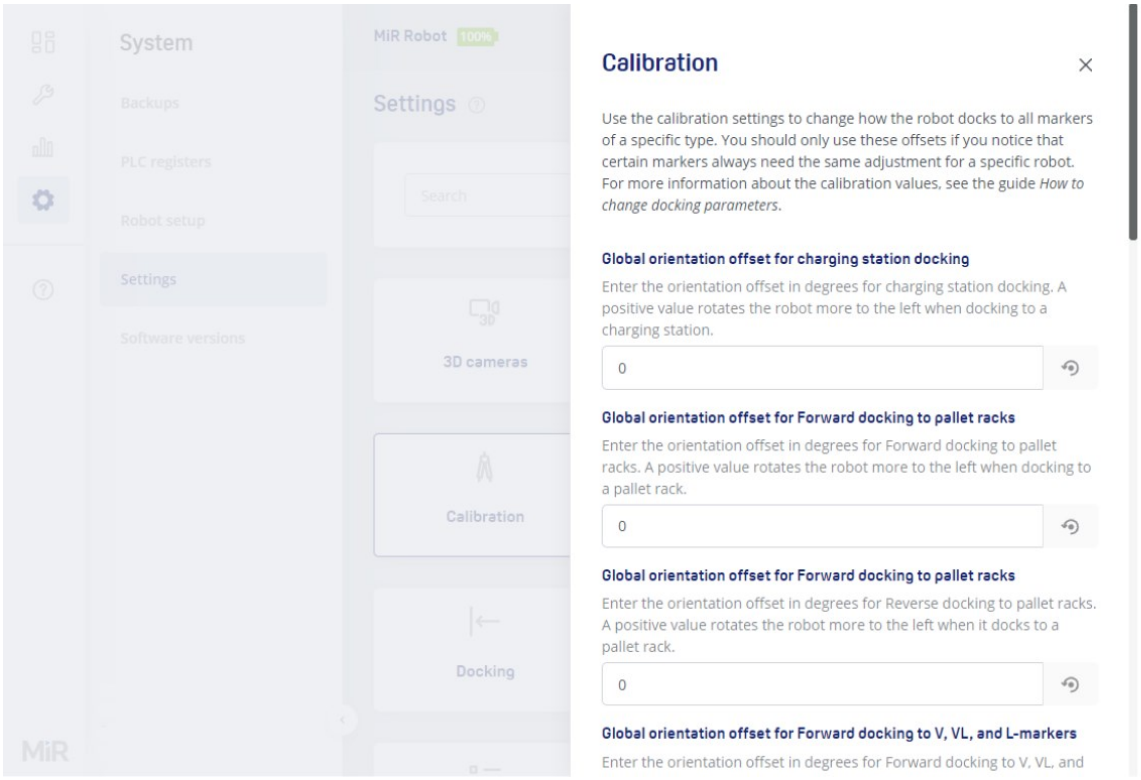
When the battery is being topped up, it means the charger cycles between charging and discharging when the battery is almost fully charged. By default, the battery percentage cycles between 90% and 100% when the robot is topping up the battery.



Calibration

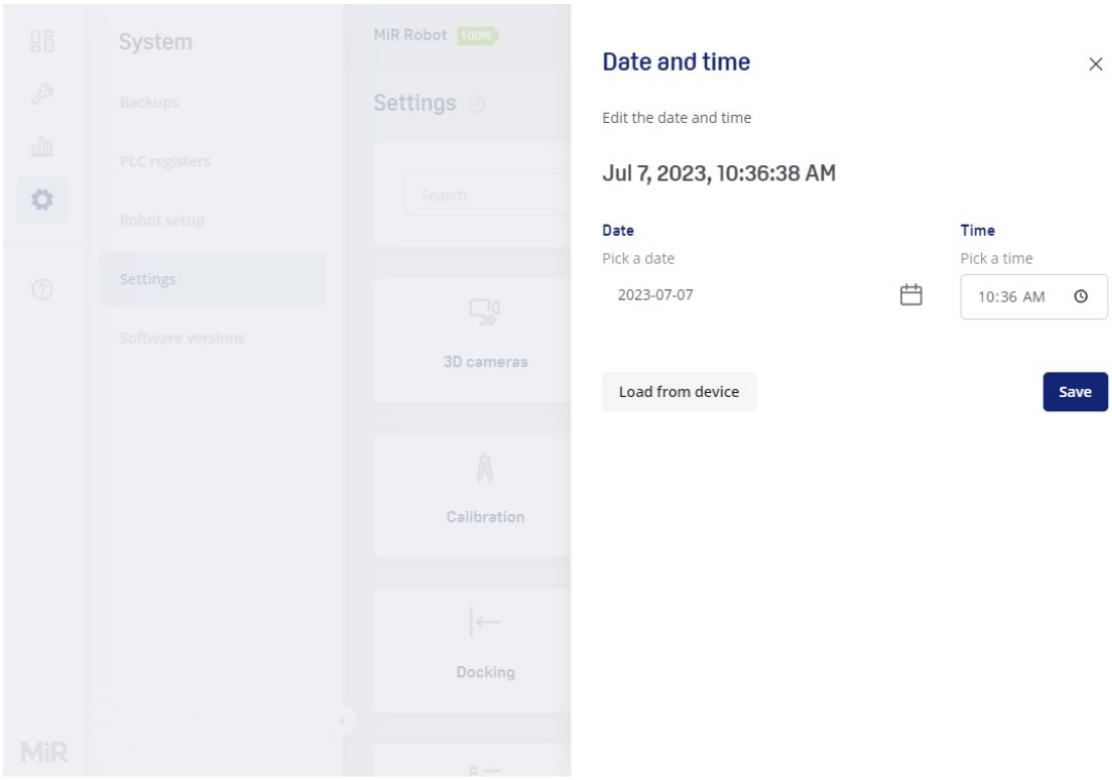
Use the calibration settings to change how the robot docks to all markers of a specific type. You should only use these offsets if you notice that certain markers always need the same adjustment for a specific robot.

For more information about the calibration values, see the guide *How to change docking parameters*.


System
Backups
PLC registers
Robot setup
Settings
Software versions
MiR Robot
Settings
Search
3D cameras
Calibration
Docking
Calibration
Use the calibration settings to change how the robot docks to all markers of a specific type. You should only use these offsets if you notice that certain markers always need the same adjustment for a specific robot. For more information about the calibration values, see the guide How to change docking parameters.
Global orientation offset for charging station docking
Enter the orientation offset in degrees for charging station docking. A positive value rotates the robot more to the left when docking to a charging station.
0
Global orientation offset for Forward docking to pallet racks
Enter the orientation offset in degrees for Forward docking to pallet racks. A positive value rotates the robot more to the left when docking to a pallet rack.
0
Global orientation offset for Forward docking to pallet racks
Enter the orientation offset in degrees for Reverse docking to pallet racks. A positive value rotates the robot more to the left when it docks to a pallet rack.
0
Global orientation offset for Forward docking to V, VL, and L-markers
Enter the orientation offset in degrees for Forward docking to V, VL, and

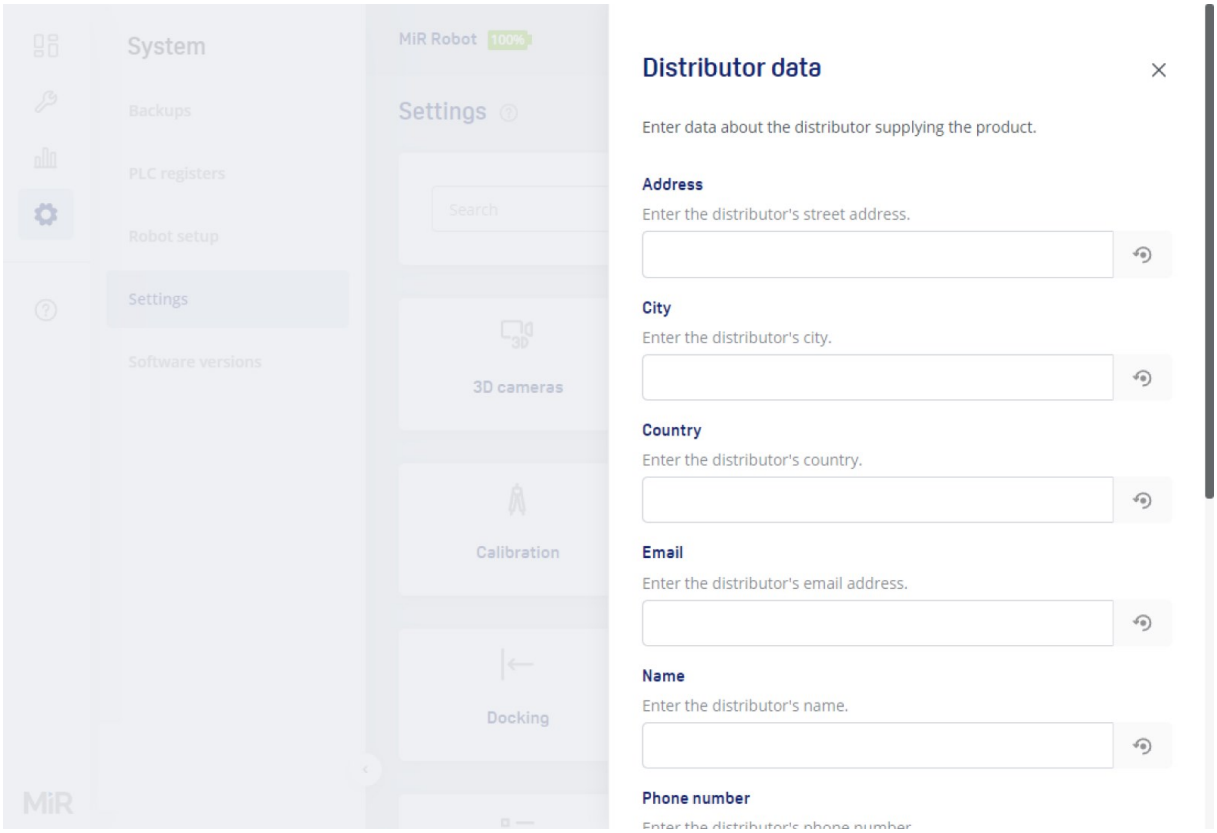
Date and time

Edit the date and time.



Distributor data

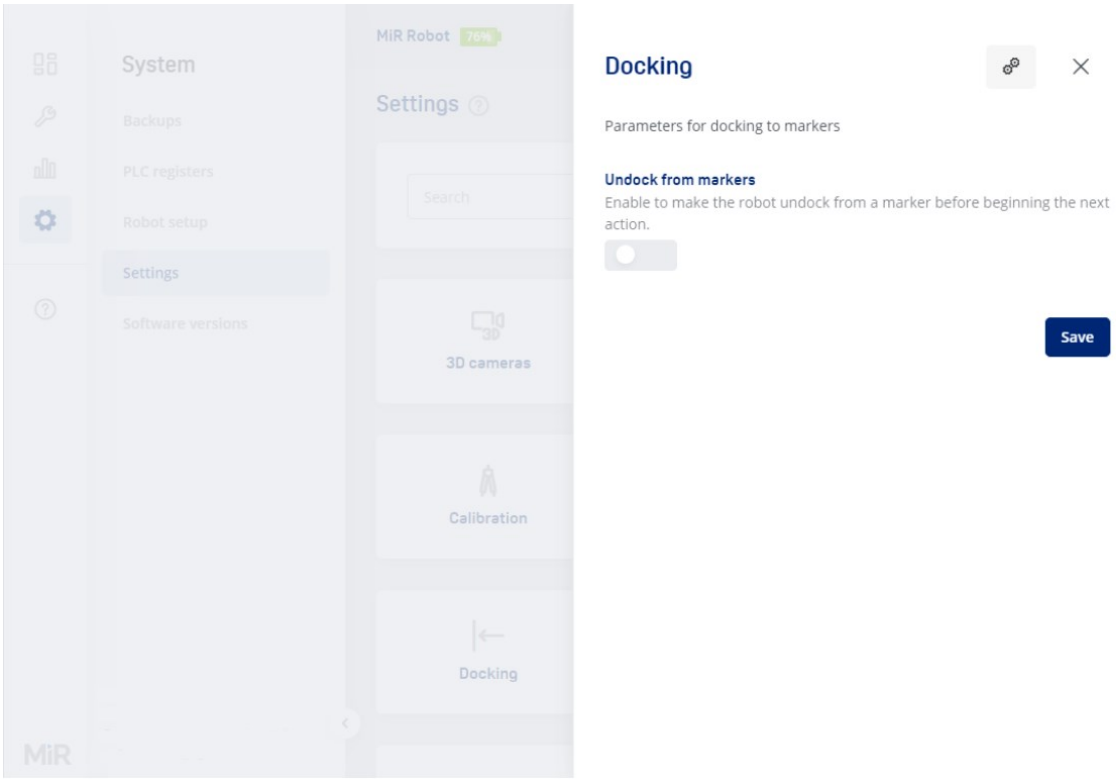
Enter data about the distributor supplying the product.



Docking

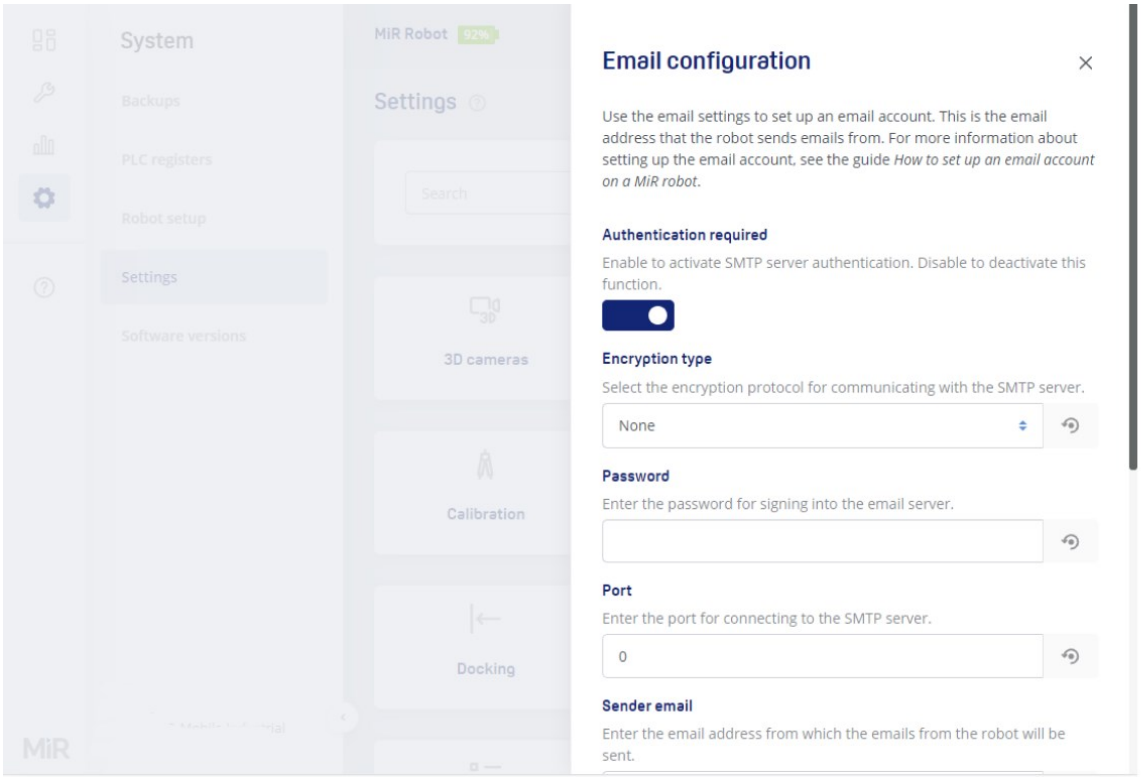
Use the docking settings to modify how the robot docks to and undocks from markers.

For more information about how the robot docks and undocks, see the user guide for your robot.



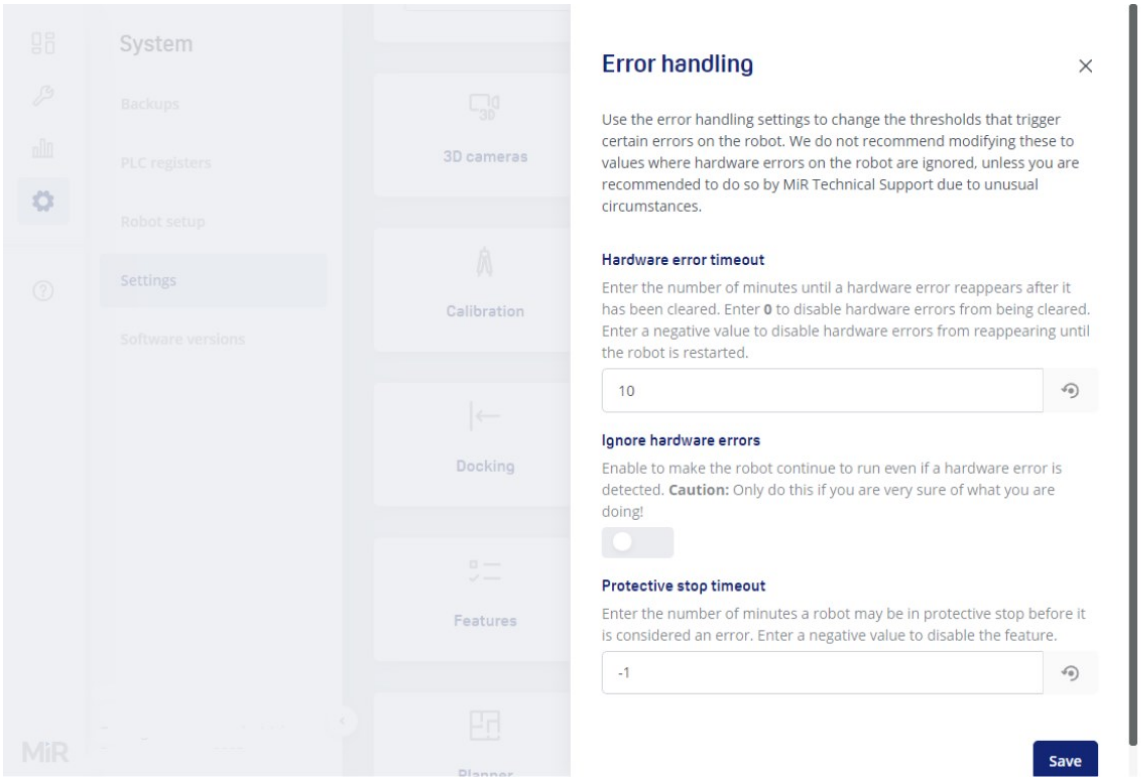
Email configuration

Use the email settings to set up an email account. This is the email address that the robot sends emails from. For more information about setting up the email account, see the guide *How to set up an email account on a MiR robot*. You can find this guide on MiR Support Portal.



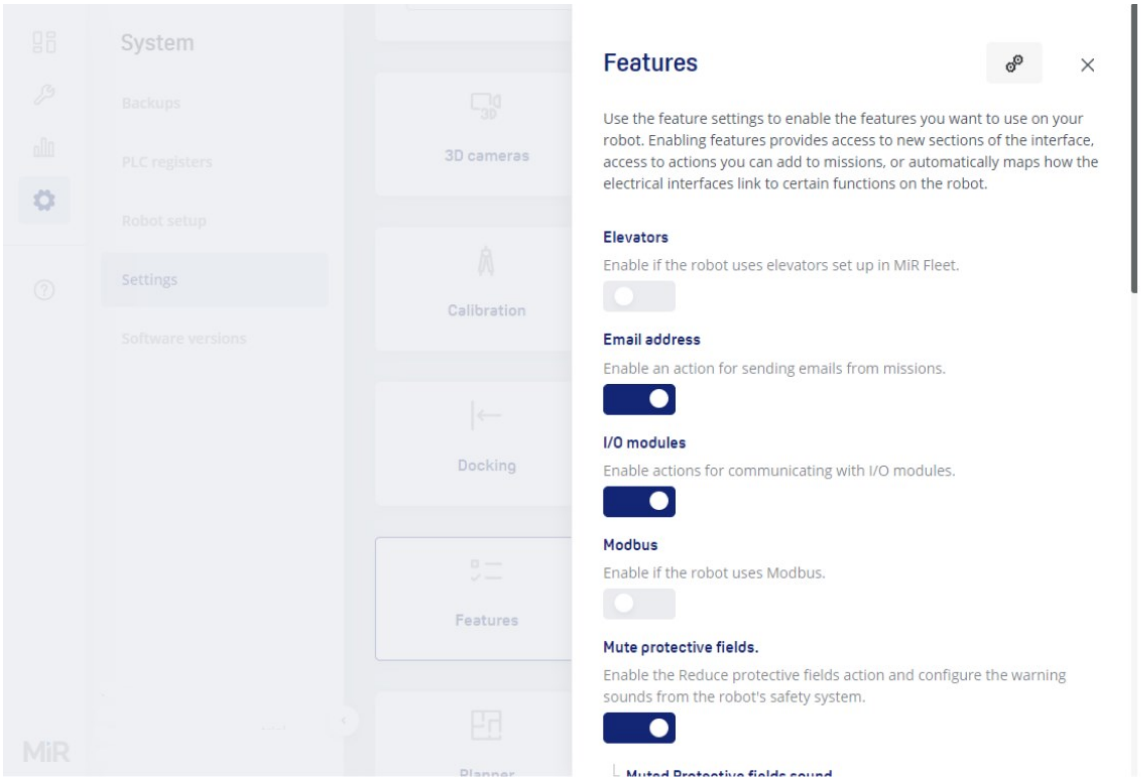
Error handling

Use the error handling settings to change the thresholds that trigger certain errors on the robot. We do not recommend modifying these to values where hardware errors on the robot are ignored, unless you are recommended to do so by MiR Technical Support due to unusual circumstances.



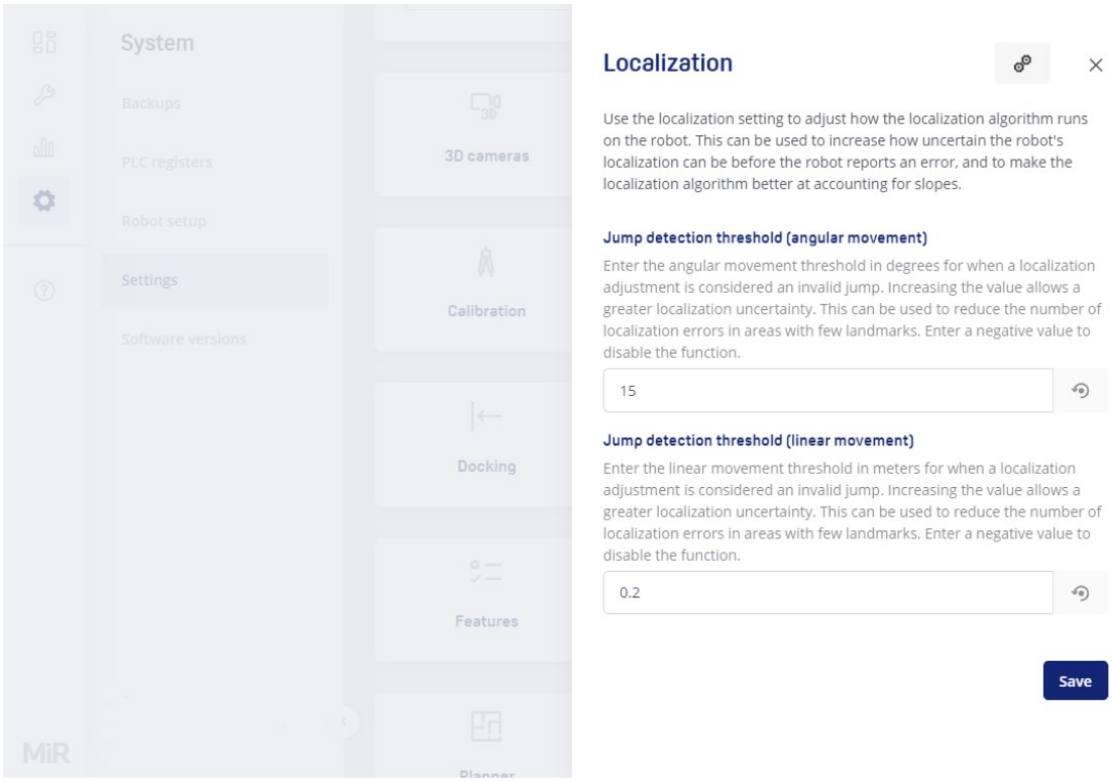
Features

Use the feature settings to enable the features you want to use on your robot. Enabling features provides access to new sections of the interface, access to actions you can add to missions, or automatically maps how the electrical interfaces link to certain functions on the robot.



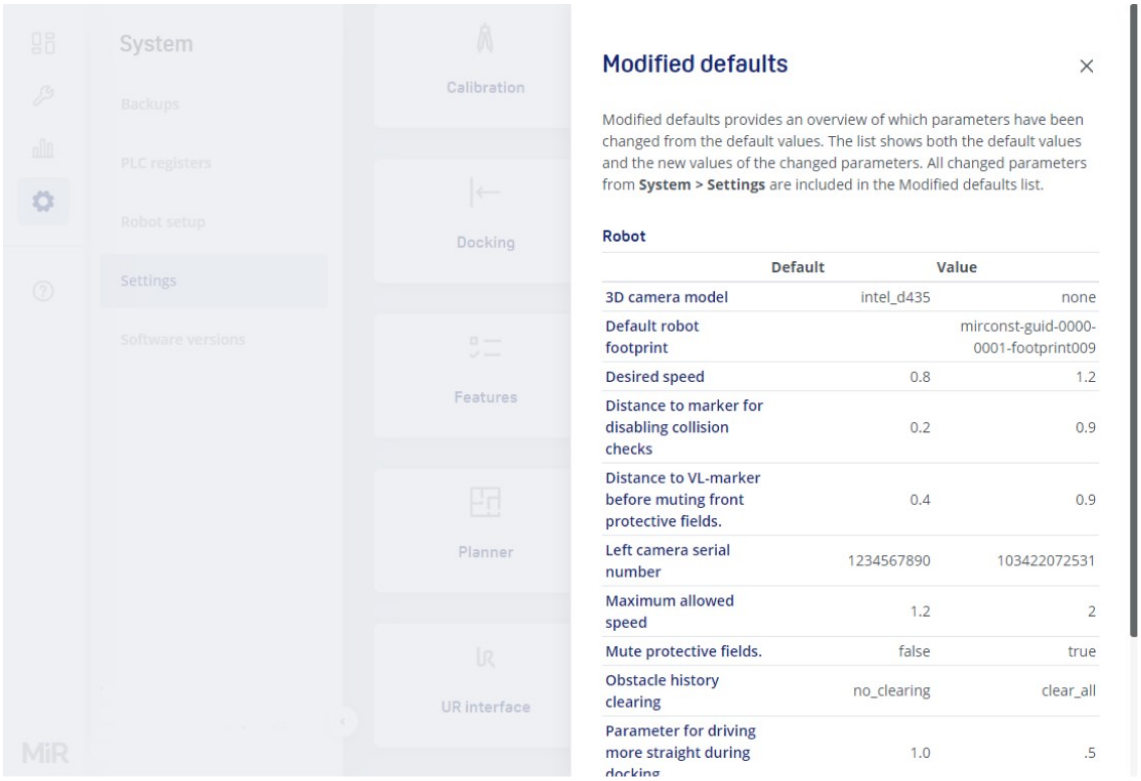
Localization

Use the localization setting to adjust how the localization algorithm runs on the robot. This can be used to increase how uncertain the robot's localization can be before the robot reports an error, and to make the localization algorithm better at accounting for slopes.


System
Backups
PLC registers
Robot setup
Settings
Software versions
3D cameras
Calibration
Docking
Features
Localization
Use the localization setting to adjust how the localization algorithm runs on the robot. This can be used to increase how uncertain the robot's localization can be before the robot reports an error, and to make the localization algorithm better at accounting for slopes.
Jump detection threshold (angular movement)
Enter the angular movement threshold in degrees for when a localization adjustment is considered an invalid jump. Increasing the value allows a greater localization uncertainty. This can be used to reduce the number of localization errors in areas with few landmarks. Enter a negative value to disable the function.
15
Jump detection threshold (linear movement)
Enter the linear movement threshold in meters for when a localization adjustment is considered an invalid jump. Increasing the value allows a greater localization uncertainty. This can be used to reduce the number of localization errors in areas with few landmarks. Enter a negative value to disable the function.
0.2
Save

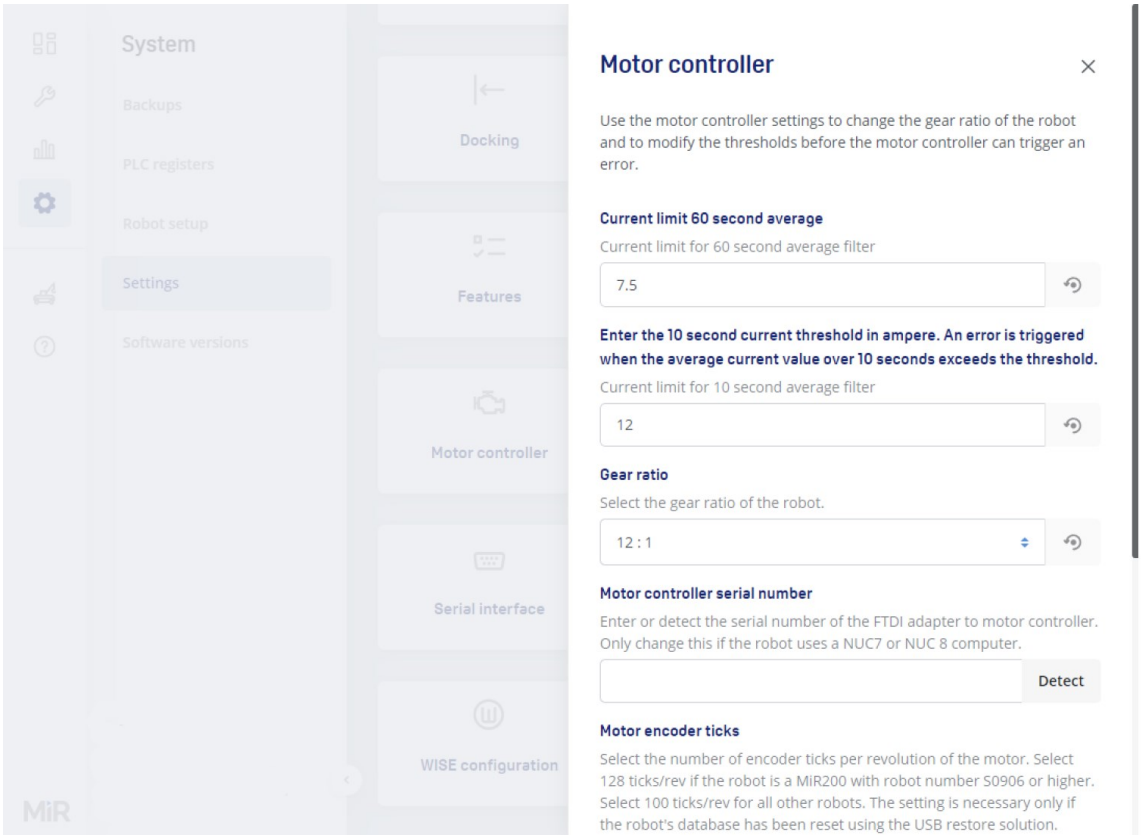
Modified defaults

Modified defaults provides an overview of which parameters have been changed from the default values. The list shows both the default values and the new values of the changed parameters. All changed parameters from **System > Settings** are included in the Modified defaults list.



Motor controller

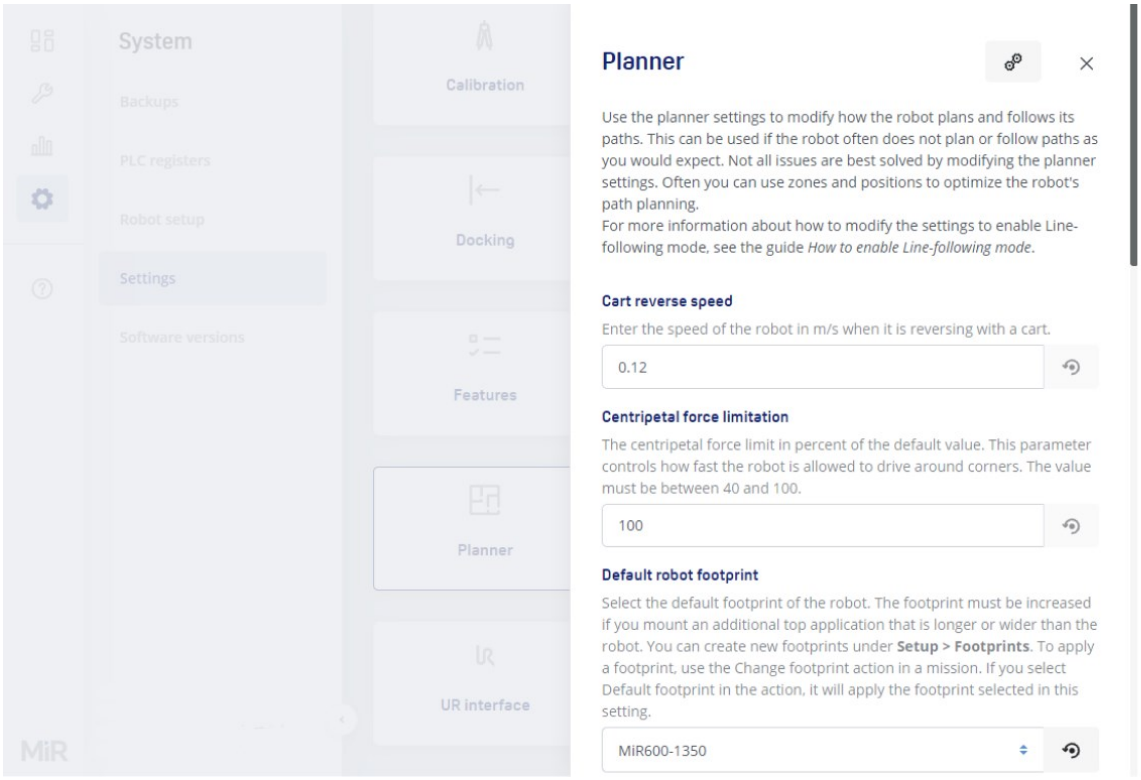
Use the motor controller settings to change the gear ratio of the robot and to modify the thresholds before the motor controller can trigger an error.



Planner

Use the planner settings to modify how the robot plans and follows its paths. This can be used if the robot often does not plan or follow paths as you would expect. Not all issues are best solved by modifying the planner settings. Often you can use zones and positions to optimize the robot's path planning.

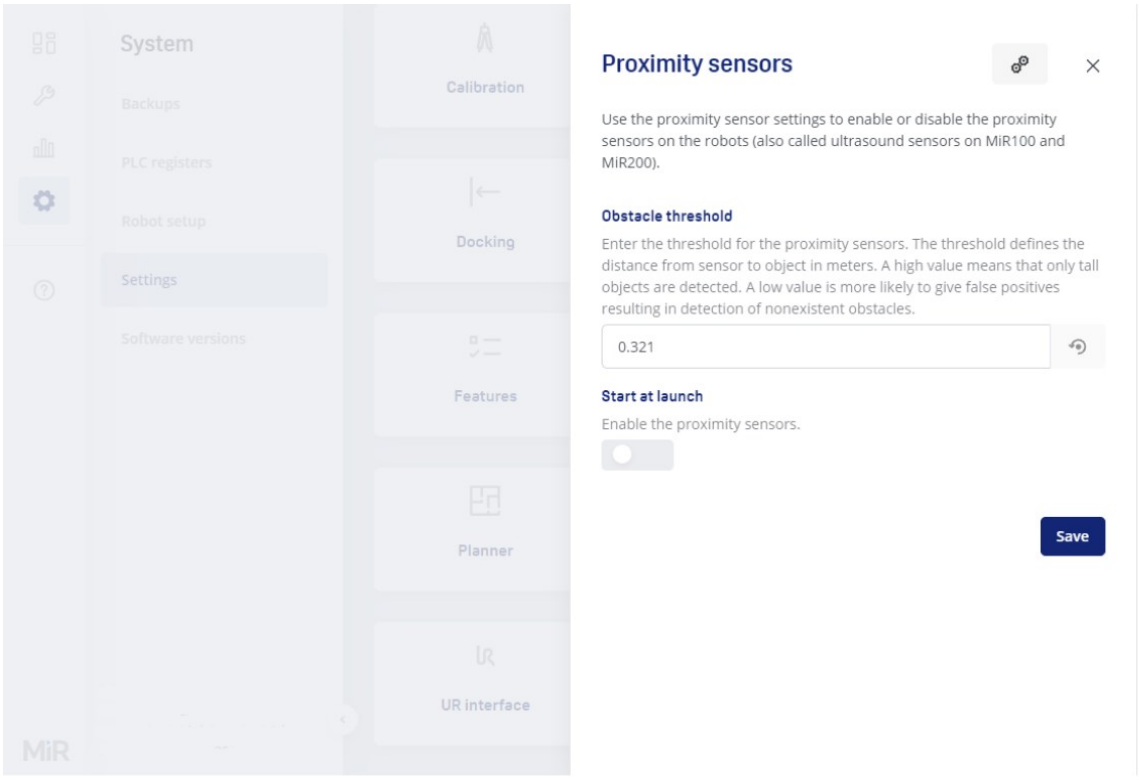
For more information about how to modify the settings to enable Line-following mode, see the guide *How to enable Line-following mode*. You can find this guide on MiR Support Portal.



Proximity sensors

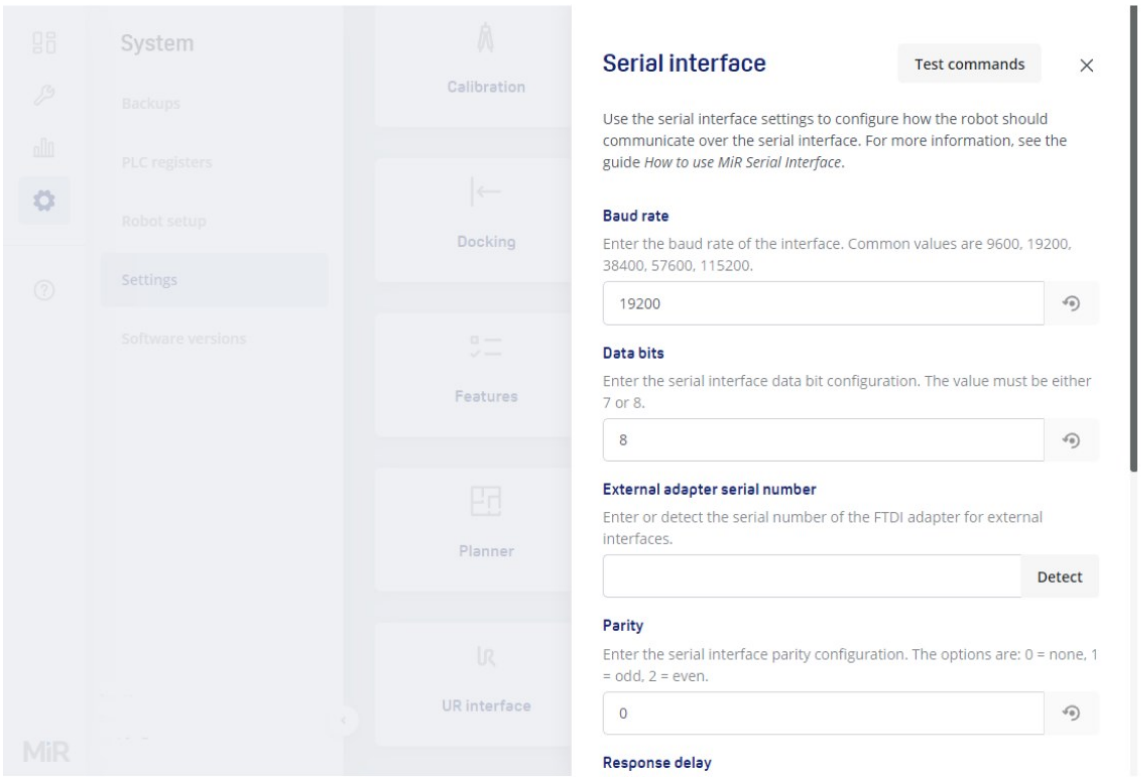
Use the proximity sensor settings to enable or disable the proximity sensors on the robots (also called ultrasound sensors on MiR100 and MiR200).

For more information about the proximity or ultrasound sensors, see the user guide for your robot.



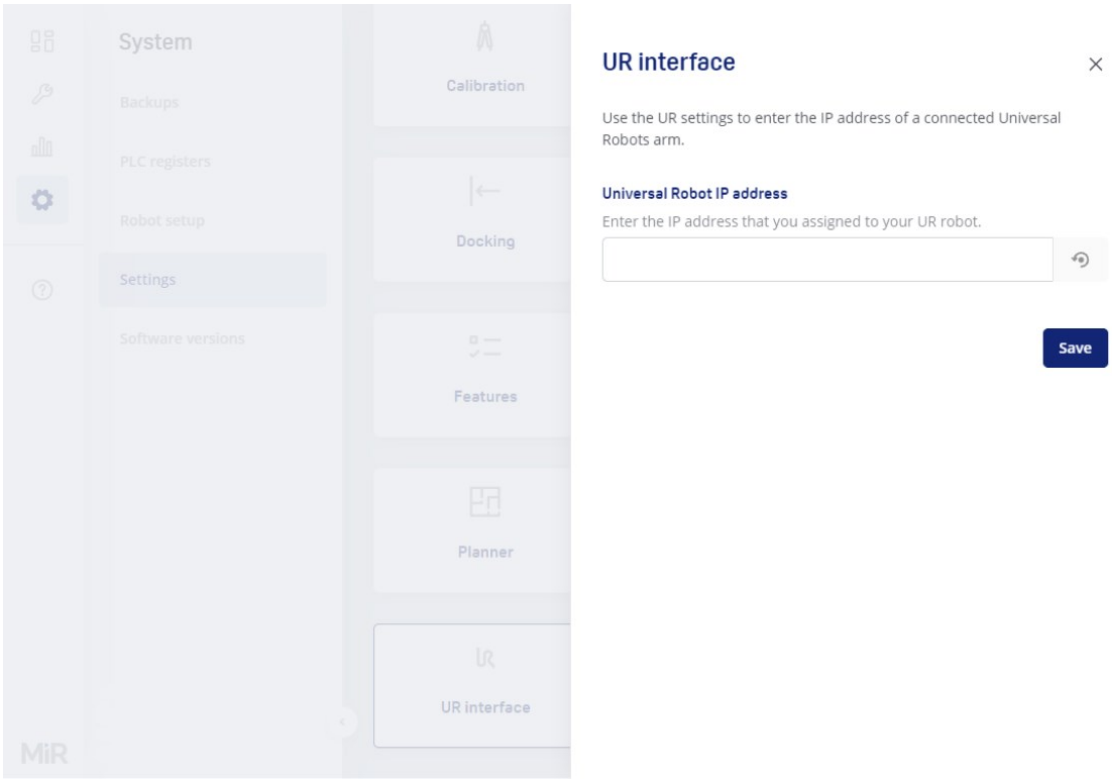
Serial interface

Use the serial interface settings to configure how the robot should communicate over the serial interface. For more information, see the guide *How to use MiR Serial Interface*. You can find this guide on MiR Support Portal.



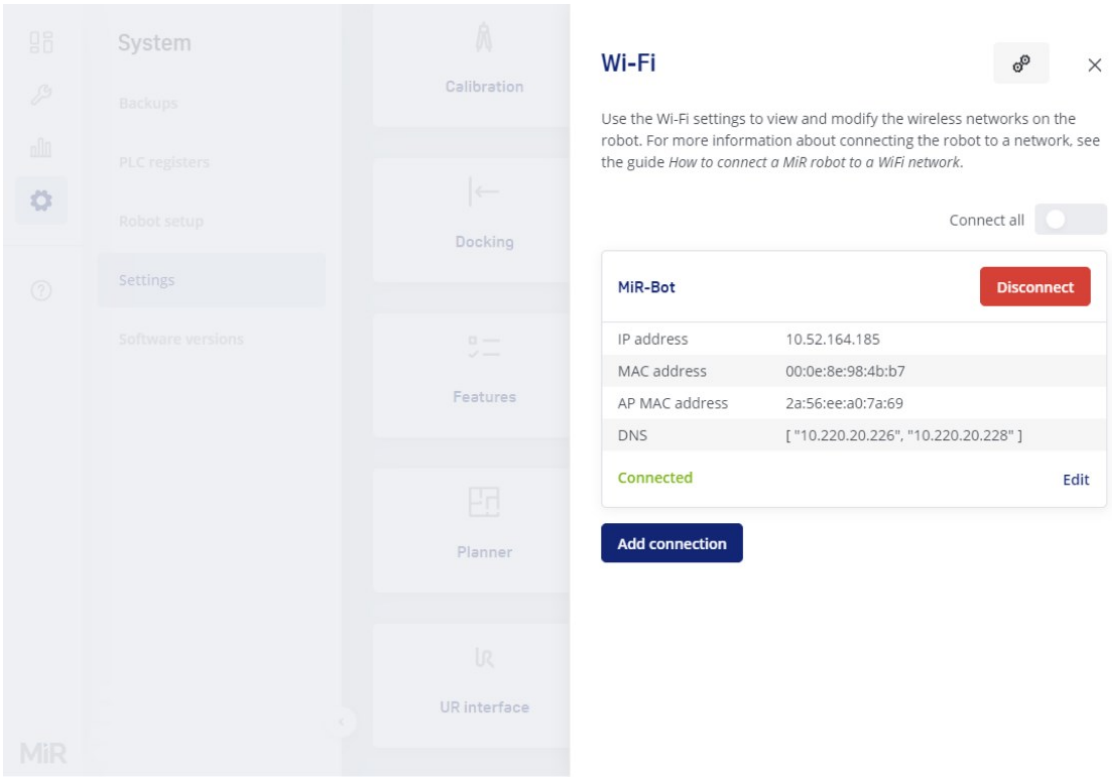
UR interface

Use the UR settings to enter the IP address of a connected Universal Robots arm.



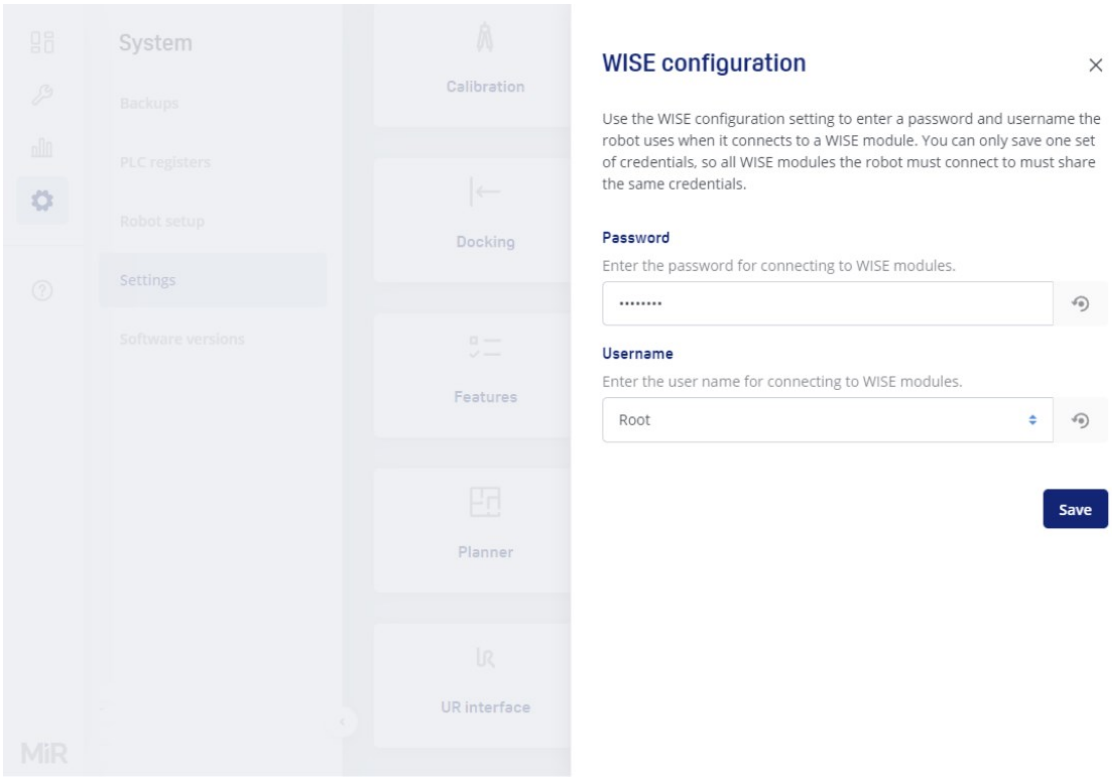
Wi-Fi

Use the Wi-Fi settings to view and modify the wireless networks on the robot. For more information about connecting the robot to a network, see the guide *How to connect a MiR robot to a Wi-Fi network*.



WISE configuration

Use the WISE configuration setting to enter a password and username the robot uses when it connects to a WISE module. You can only save one set of credentials, so all WISE modules the robot must connect to must share the same credentials.



6.5 Software versions

A software update file for a MiR robot is a .mir file that contains the software for MiR robots. There are two types of robot software: Application software and Platform software. The Platform software is the operating system software that the Application software runs on. The Application and Platform software control different aspects of how the robot operates.

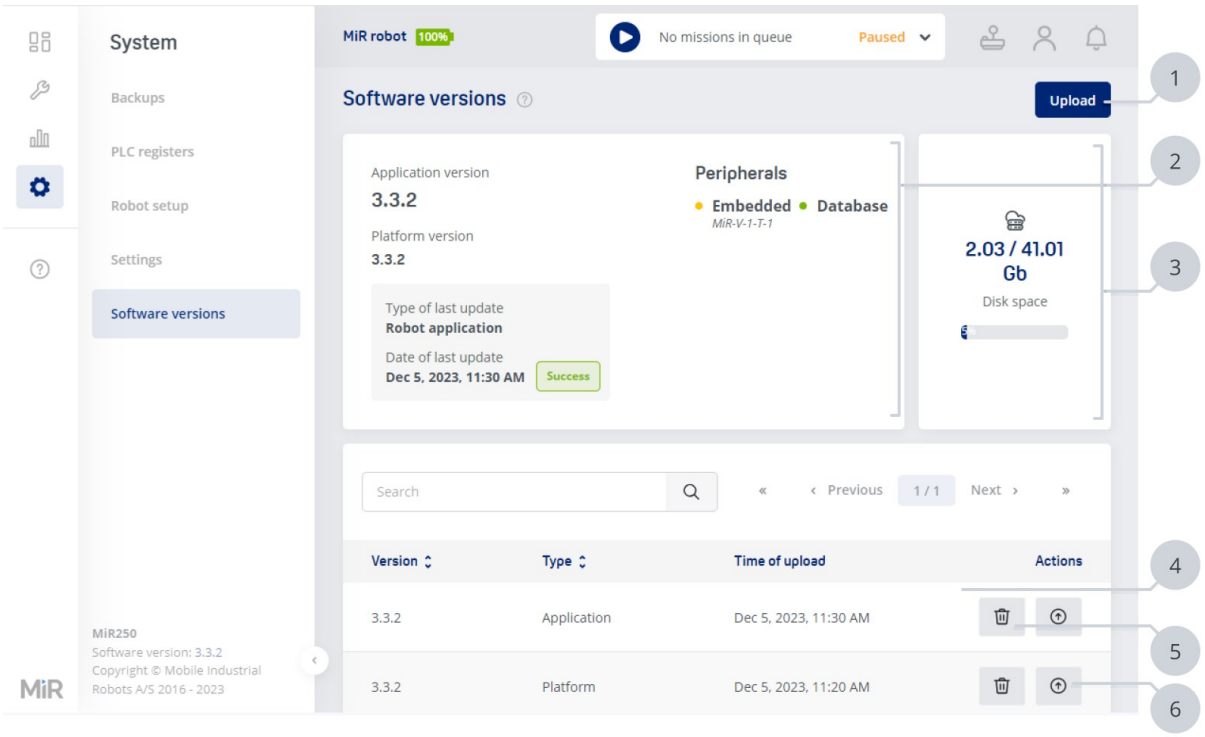
The software versions page lets you update the robot to different versions of the MiR software. All software versions you have uploaded to the robot are shown in the list and you can choose to update to the newest software on the list.

To add a new software version, select **Upload**, and select the software file on your computer.

When you want to switch to another software version, select **Update** next to the file. When the robot finishes updating, restart the robot, and sign in to the interface again. The robot is now ready to operate with the new software version.

If you have any issues during the update process, see the guide *How to update a MiR robot's software*.

If a hook is mounted on the robot, the hook must be running the same software version. Go to **Hook > Software versions** and update the hook.



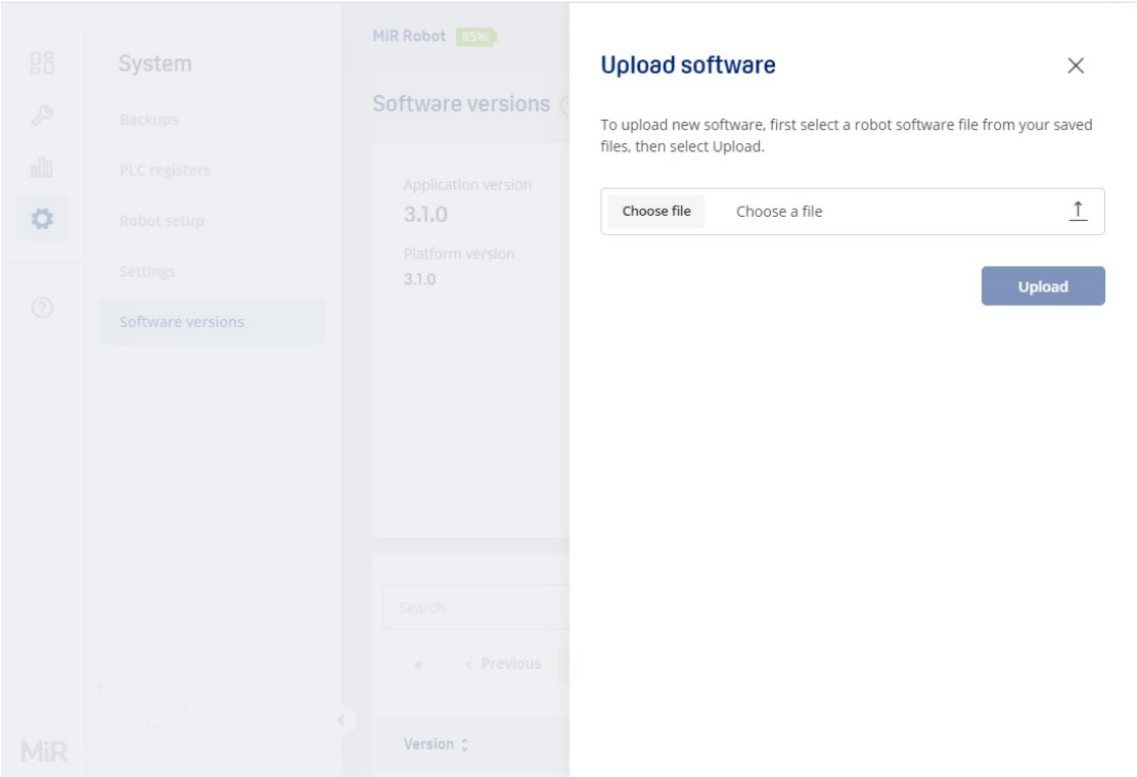
	Description		Description
1	**Upload** Opens the dialog box to upload a new software version—see "Upload new software" on the next page.	2	**Current version information** Shows information about the current software version on the robot and the peripherals, and the last time the robot was updated.
3	**Disk space** Shows how much disk space is left on the robot. If you are running out of disk space, consider removing old software versions or unnecessary backups from	4	**Software versions** Lists all software versions that have been applied to MiR Robot. You can sort the software versions based on the version, type, or when they were

	Description		Description
	the robot.		uploaded.
5	**Delete software version** Deletes the software version from the robot. If you still have the software file on another device, you can always upload it to the robot again.	6	**Update software** Updates the robot to the selected software version.

Upload new software

System > Software versions > Upload

To upload new software, first select a robot software file from your saved files, then select Upload.

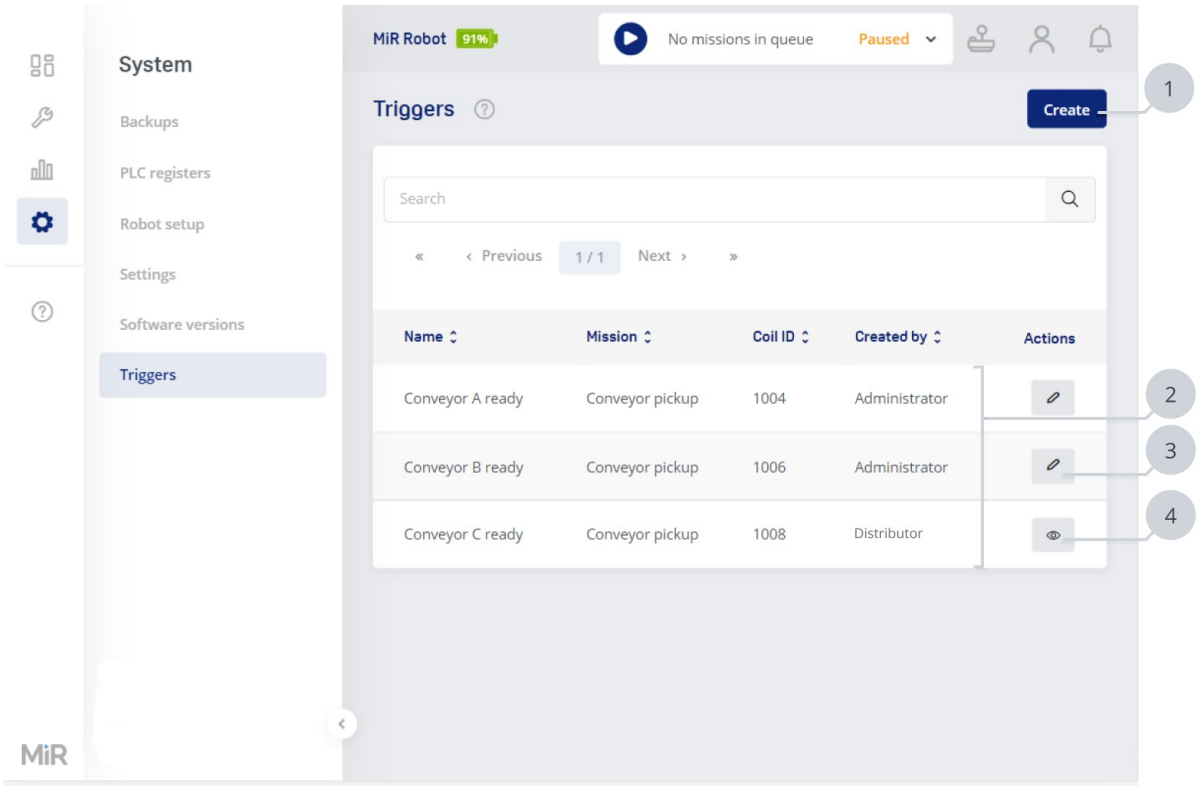


6.6 Triggers

*You must enable Modbus under **System > Settings > Features** to see this page.*

A trigger is a link that lets you define what mission should be added to the robot queue when a specific Modbus coil is active. Triggers enable remote devices to add missions to the robot's mission queue.

To setup Modbus communications between the robot and other devices, see the guide *How to use Modbus with MiR robots*.



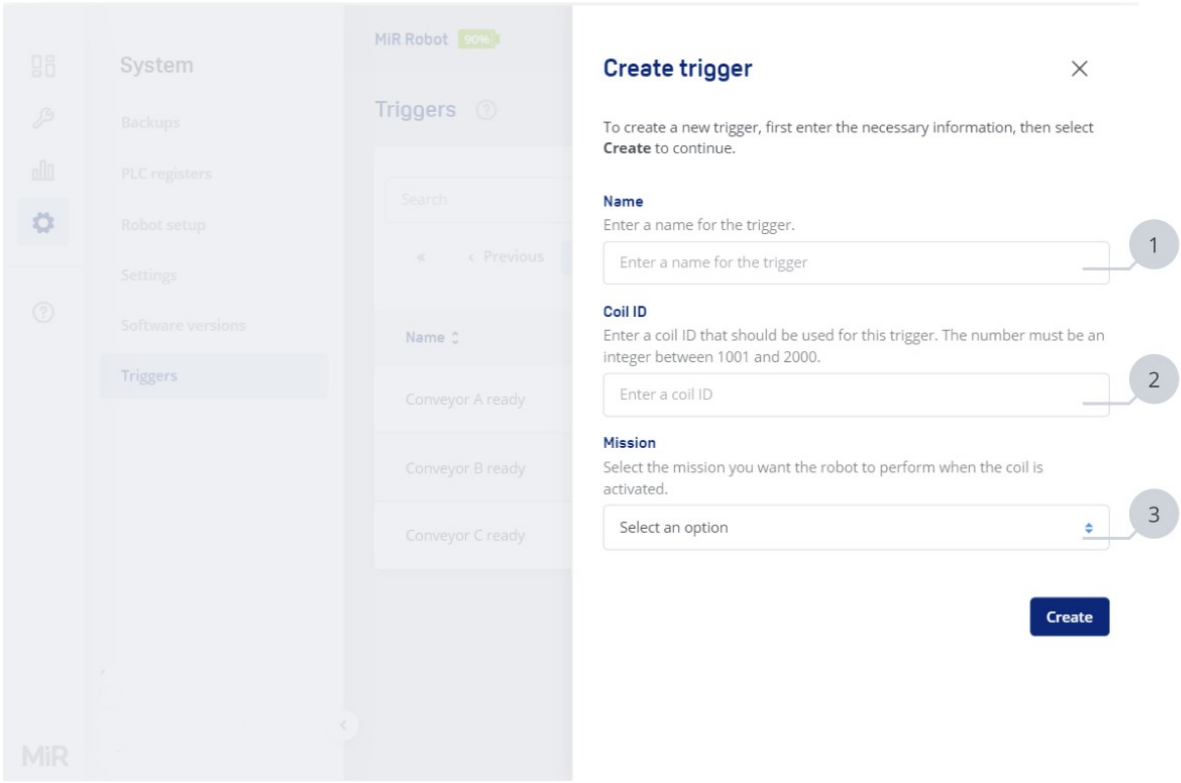
	Description		Description
1	**Create** Opens the dialog box to create a new trigger—see "Create trigger" on the next page.	2	**Triggers** Lists all triggers used by MiR Robot. You can sort the triggers based on the name, the mission it triggers, the coil ID

	Description		Description
			it is linked to, or which user created them.
3	**Edit** Opens the dialog box to edit the selected trigger—see "Edit trigger" on the next page.	4	**View** Opens the dialog box to view information about the selected trigger. Your user group does not have permission to edit the trigger.

Create trigger

System > Triggers > Create

To create a new trigger, first enter the necessary information, then select **Create** to continue.

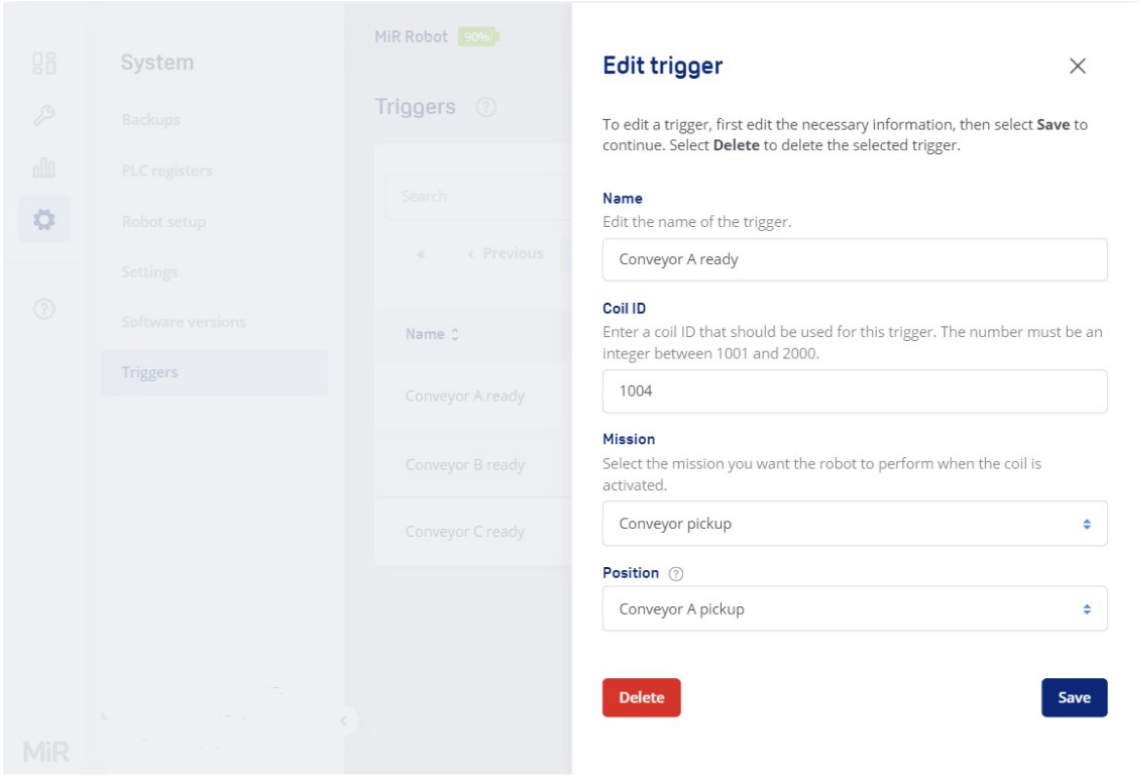


	Description		Description
1	**Name** Enter a name for the trigger.	2	**Coil ID** Enter a coil ID that should be used for this trigger. The number must be an integer between 1001 and 2000.
3	**Mission** Select the mission you want the robot to perform when the coil is activated.		

Edit trigger

System > Triggers > Edit

To edit a trigger, first edit the necessary information, then select **Save** to continue. Select **Delete** to delete the selected trigger.



You can change any of the fields described in "Create trigger" on page 186.

7. Help

The Help menu contains the following pages that let you view information about MiR Robot and its REST API:

7.1 API documentation 189

7.2 Remote access 190

7.3 Robot information 192

7.4 Service book 192

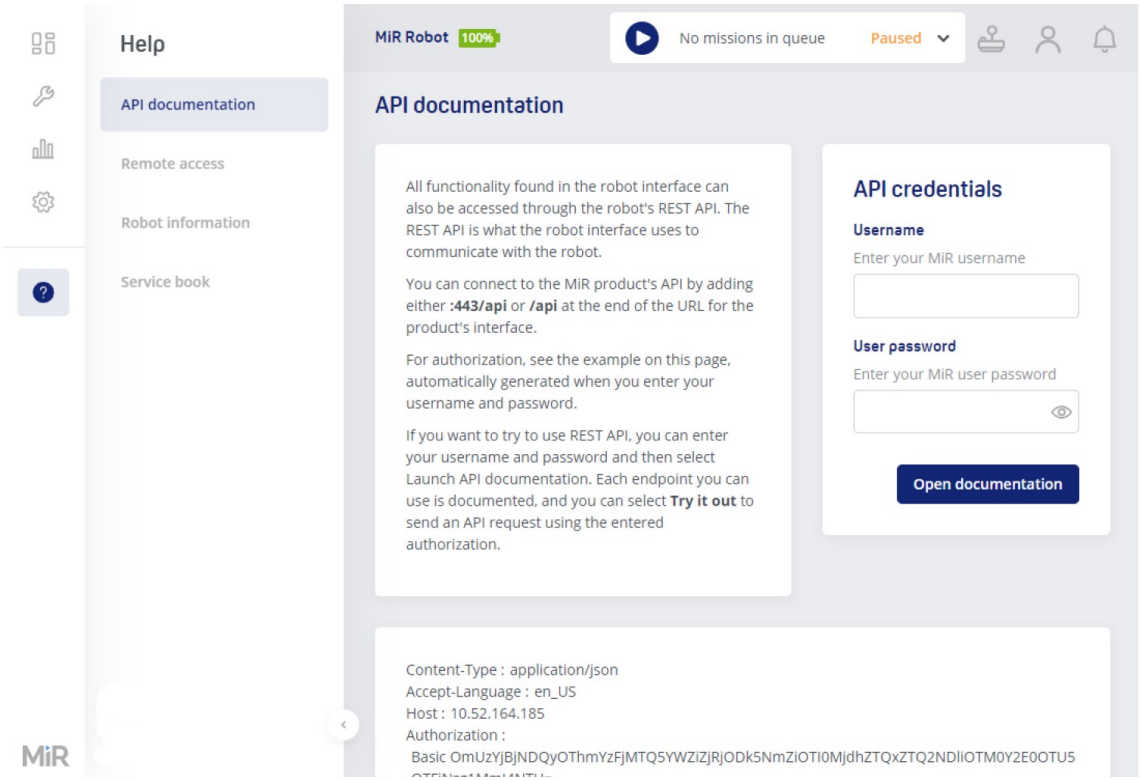
7.1 API documentation

All functionality found in the interface can also be accessed through the REST API. The REST API is what the interface uses to communicate with the product.

You can connect to the MiR product's API by adding either **:443/api** or **/api** at the end of the URL for the product's interface.

For authorization, see the example on this page, automatically generated when you enter your username and password.

If you want to try to use REST API, you can enter your username and password and then select Launch API documentation. Each endpoint you can use is documented, and you can select **Try it out** to send an API request using the entered authorization.



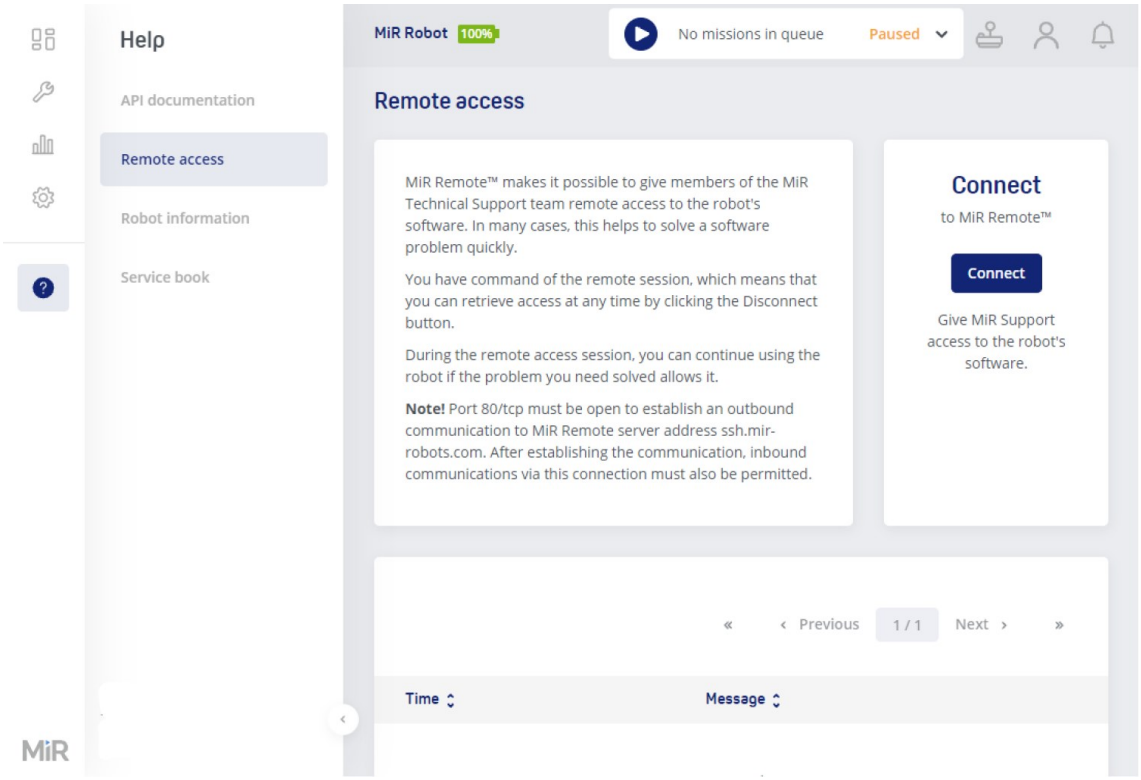
7.2 Remote access

MiR Remote™ makes it possible to give members of the MiR Technical Support team remote access to the robot's software. In many cases, this helps to solve a software problem quickly.

You have command of the remote session, which means that you can retrieve access at any time by clicking the Disconnect button.

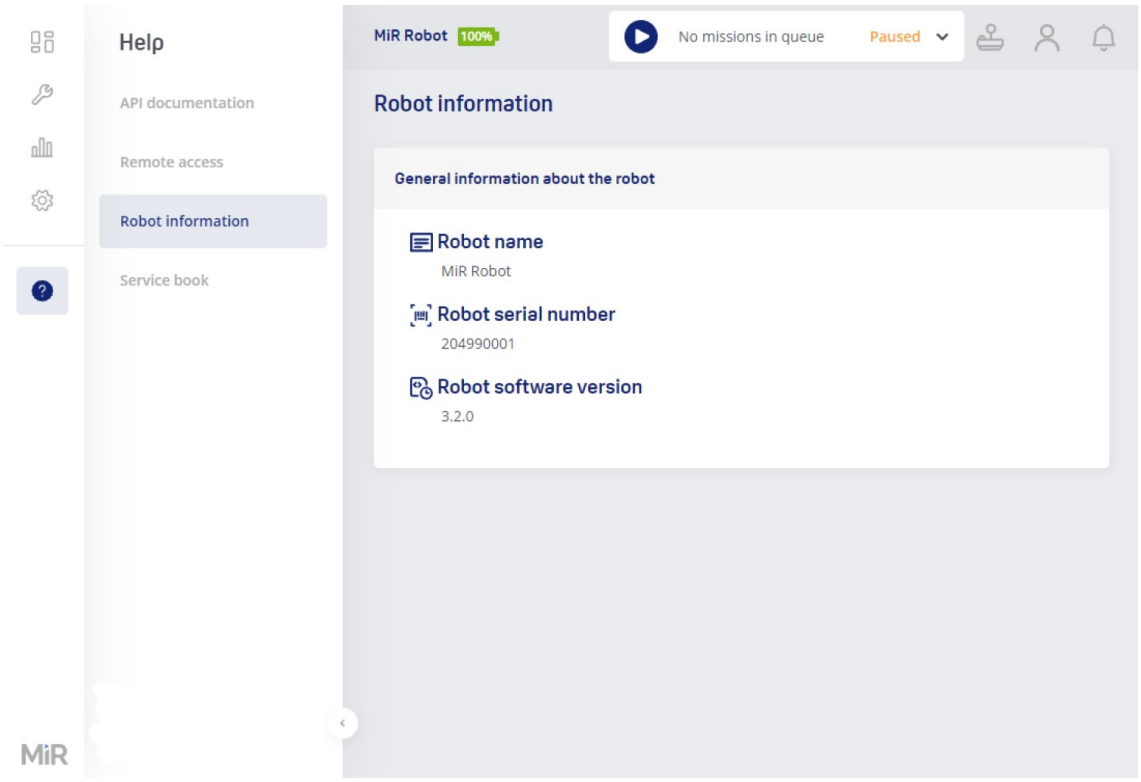
During the remote access session, you can continue using the robot if the problem you need solved allows it.

Port 80/tcp must be open to establish an outbound communication to MiR Remote server address ssh.mir-robots.com. After establishing the communication, inbound communications via this connection must also be permitted.


Help
API documentation
Remote access
Robot information
Service book
MiR Robot 100%
No missions in queue
Paused
Remote access
MiR Remote™ makes it possible to give members of the MiR Technical Support team remote access to the robot's software. In many cases, this helps to solve a software problem quickly.
You have command of the remote session, which means that you can retrieve access at any time by clicking the Disconnect button.
During the remote access session, you can continue using the robot if the problem you need solved allows it.
Note! Port 80/tcp must be open to establish an outbound communication to MiR Remote server address ssh.mir-robots.com. After establishing the communication, inbound communications via this connection must also be permitted.
Connect
to MiR Remote™
Connect
Give MiR Support access to the robot's software.
« ‹ Previous 1 / 1 Next › »
Time
Message

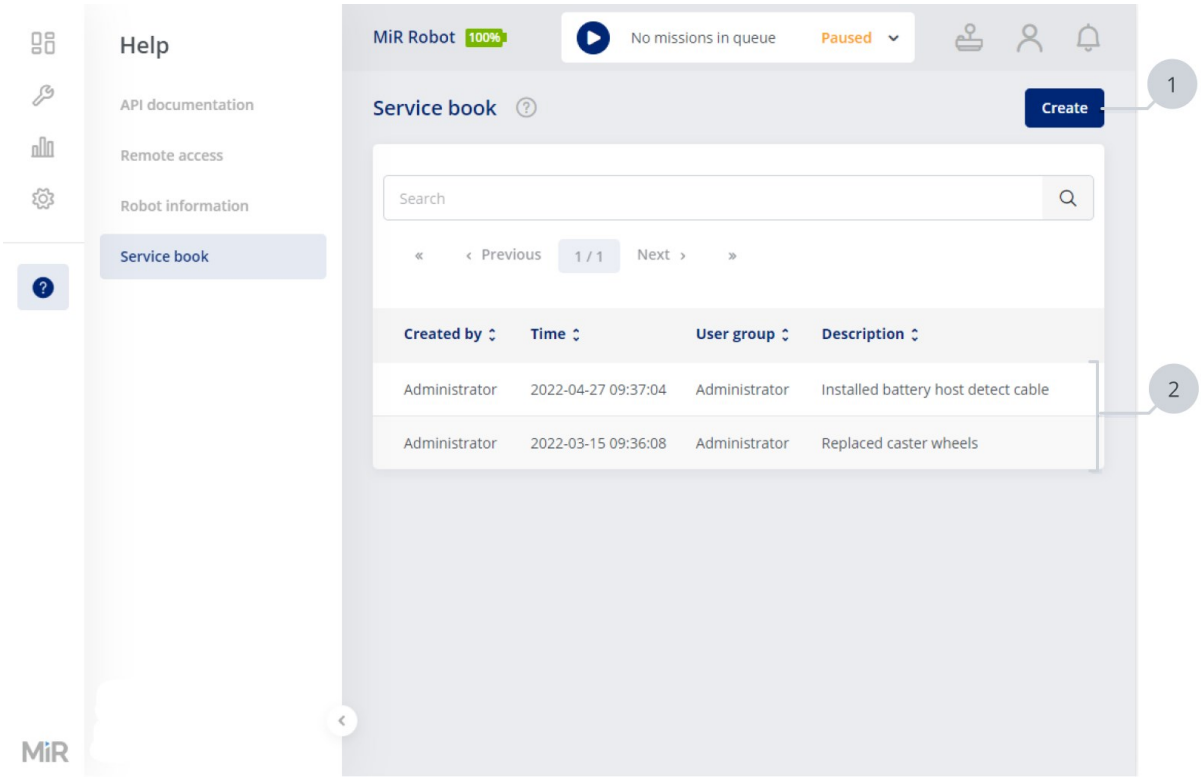
7.3 Robot information

See the name, serial number, and software version of your robot.



7.4 Service book

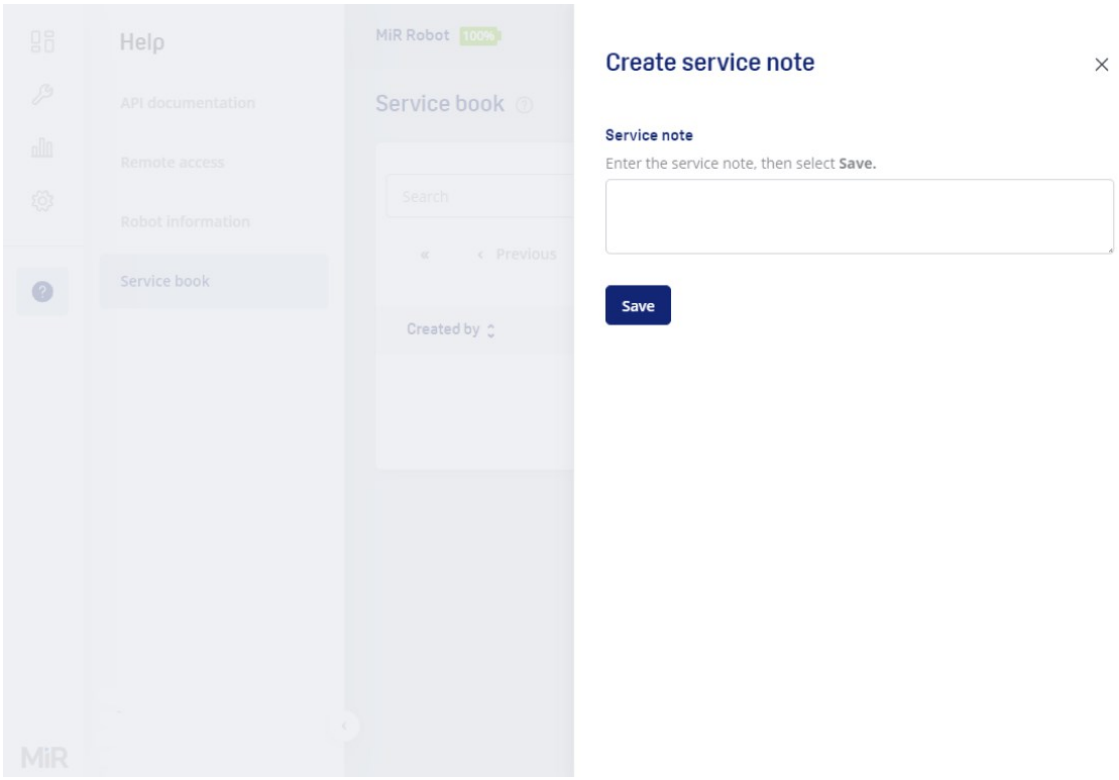
In the Service book you can enter notes about the robot, for example, about changes made in the robot. The notes can be read by all user groups and cannot be deleted.



	Description		Description
1	**Create** Opens the dialog box to create a new service note entry—see "Create service note" below.	2	**Service notes** Lists all service notes made for MiR Robot. You can sort the service notes based on which user created them, the time they were created, or the content.

Create service note

Enter the service note, then select **Save.**


Help
API documentation
Remote access
Robot information
Service book
MiR Robot
Service book
Search
Previous
Created by
Create service note
Service note
Enter the service note, then select Save.
Save

8. Hook

*You must enable **Hook** under **System** > **Settings** > **Features** to see this menu.*

The Hook menu contains the following pages that let you create, modify, and remove components for hook specific mission or lets you modify and view settings specifically for MiR Hook.

8.1 Backups 195

8.2 Carts 197

8.3 Manual control 208

8.4 Settings 214

8.5 Setup 218

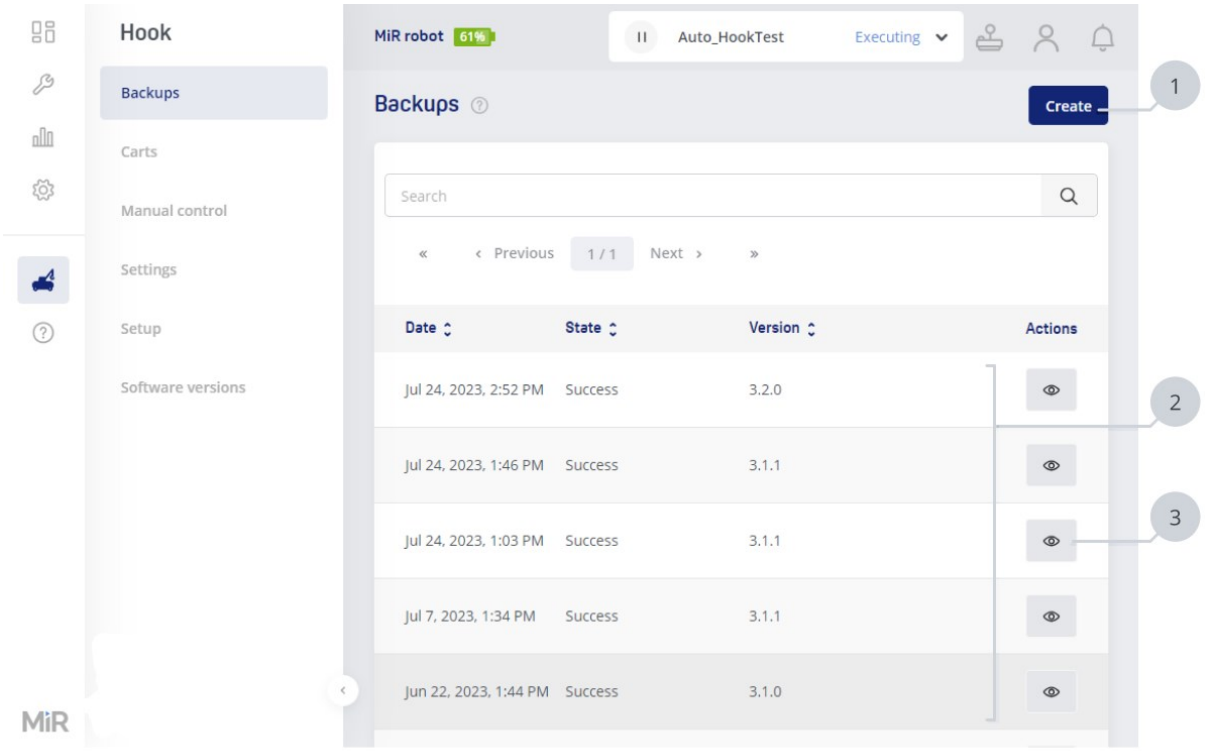
8.6 Software versions 219

8.1 Backups

A backup is a copy of the configuration and system state data of your robot.

A backup is used to revert your robot to a previous state. It contains the site data and system settings at the time the backup was generated. This is most often used if the system fails and you need to recover lost data, or if you want your robot to run an older software version than the one you last updated it to.

Backups are automatically created before you update the software version or roll back to a previous backup. You can also generate them manually on this page.



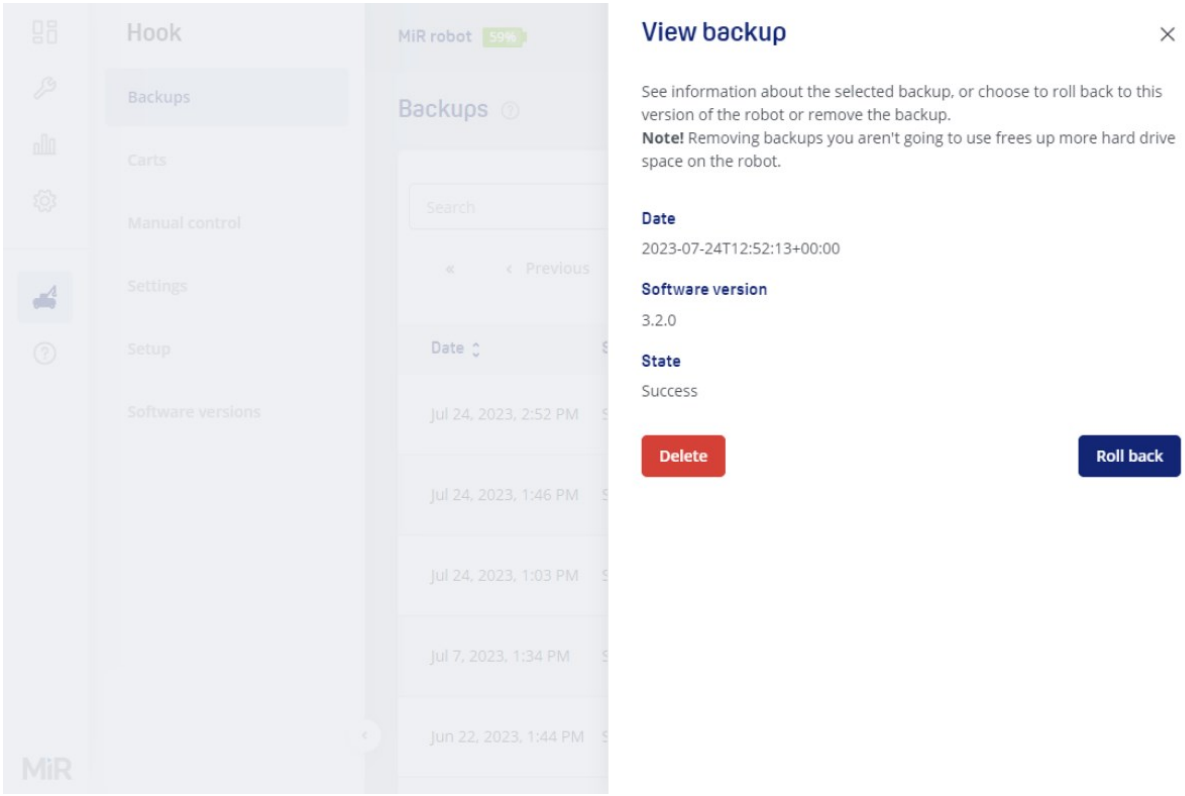
	Description		Description
1	**Create** Creates a new backup of your robot's current site, settings, and software version. It may take the robot a few seconds to create the backup.	2	**Backups** Lists all backups created for the robot. You can sort the backups based on the date they were created, the state, or the software version.
3	**View** See more information about the selected backup, and choose to either remove or restore the backup—see "View backup" on the next page.		

View backup

Hook > Backups > View

See information about the selected backup, or choose to roll back to this version of the robot or remove the backup.

Removing backups you are not going to use frees up more hard drive space on the robot.



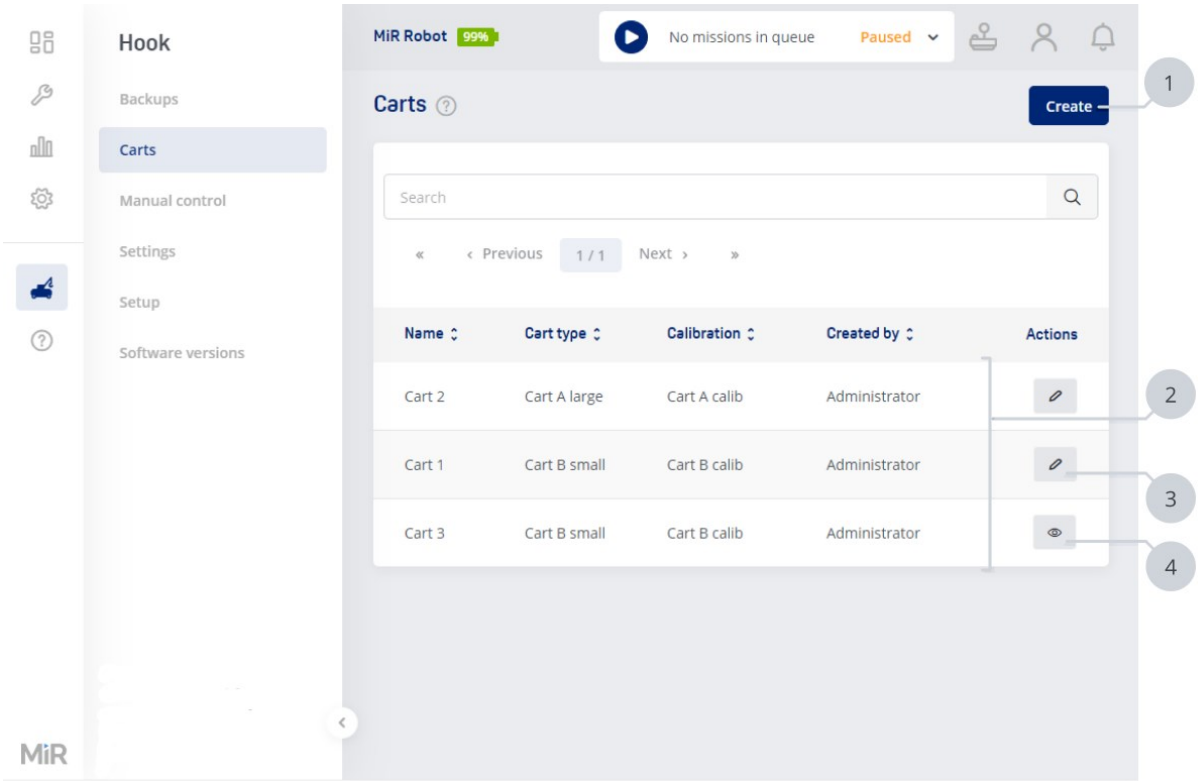
8.2 Carts

A cart in the user interface is a description of a physical cart that MiR robots can pick up and place. You must define every individual cart that you want the robot to be able to transport.

A cart in the interface is used to provide the information MiR robots need to pick up, drive, and place the cart correctly. When you send the robot to a Cart position to pick up a cart, the robot scans the ID tag on the cart to link the corresponding cart description in the interface that describes the dimensions, calibrations, and docking offsets of the cart.

Each cart defined in the interface contains the following information:

- **Cart type**: Defines the dimensions of the cart. You can reuse cart types across carts sharing the same length, width, and height.
- **Calibrations**: Defines the entry, lock, and drive heights of the hook when it picks up a particular cart. You can reuse calibrations across carts sharing the same gripping bar height.
- **Carts**: Are individual carts based on a cart type and calibration. Each cart has a unique ID tag attached to the cart. The robot uses this to apply the correct settings when picking up and towing the cart.



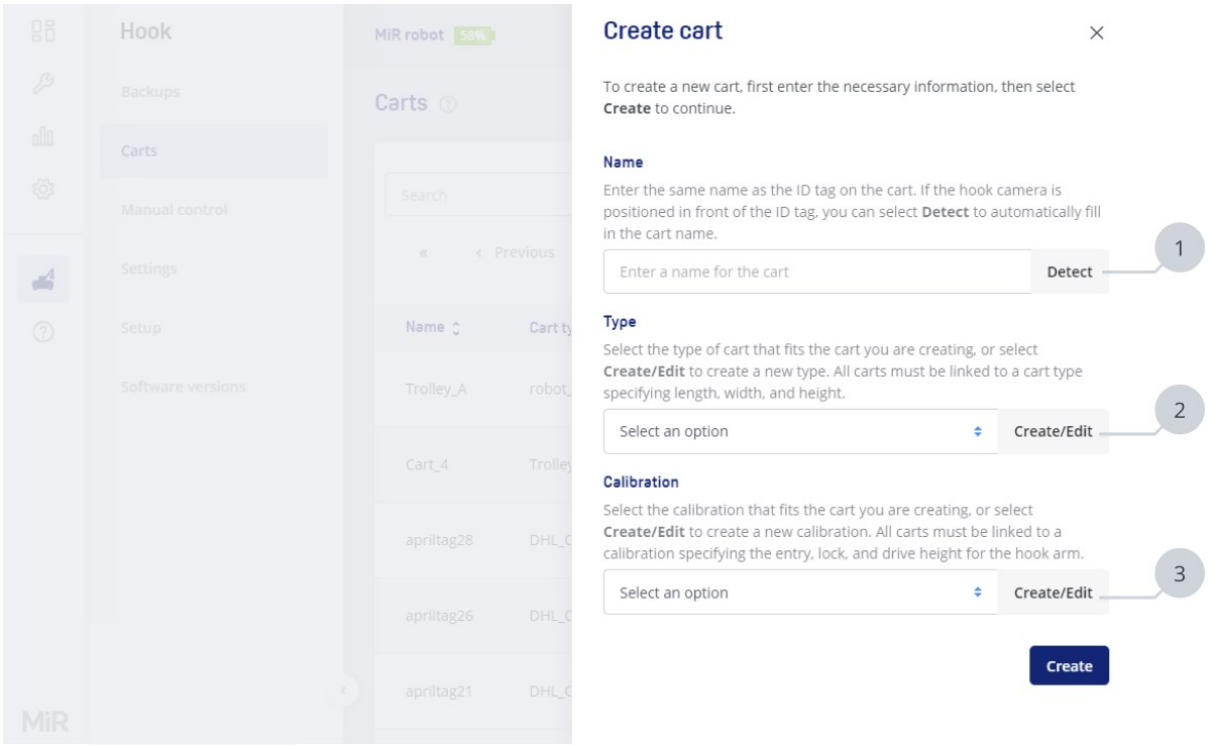
	Description		Description
1	**Create**	2	**Carts**

	Description		Description
	Opens the dialog box to create a cart—see "Create cart" below.		Lists all carts created for the robot. You can sort the carts based on the name, cart type, calibration, or the user who created them.
3	**Edit** Opens the dialog box to edit the selected cart—see "Edit cart" on page 207.	4	**View** Opens the dialog box to view information about the selected cart. Your user group does not have permission to edit the cart.

Create cart

Hook > Carts > Create

To create a new cart, first enter the necessary information, then select **Create** to continue.



	Description		Description
1	**Name** Enter the same name as the ID tag on the cart. If the hook camera is positioned in front of the ID tag, you can select **Detect** to automatically fill in the cart name.	2	**Type** Select the type of cart that fits the cart you are creating, or select **Create/Edit** to create a new type. All carts must be linked to a cart type specifying length, width, and height. For more information about cart types, see "Cart types" on the next page.
3	**Calibration** Select the calibration that fits the cart you are creating, or select **Create/Edit** to create a new calibration. All carts must be linked to a calibration		

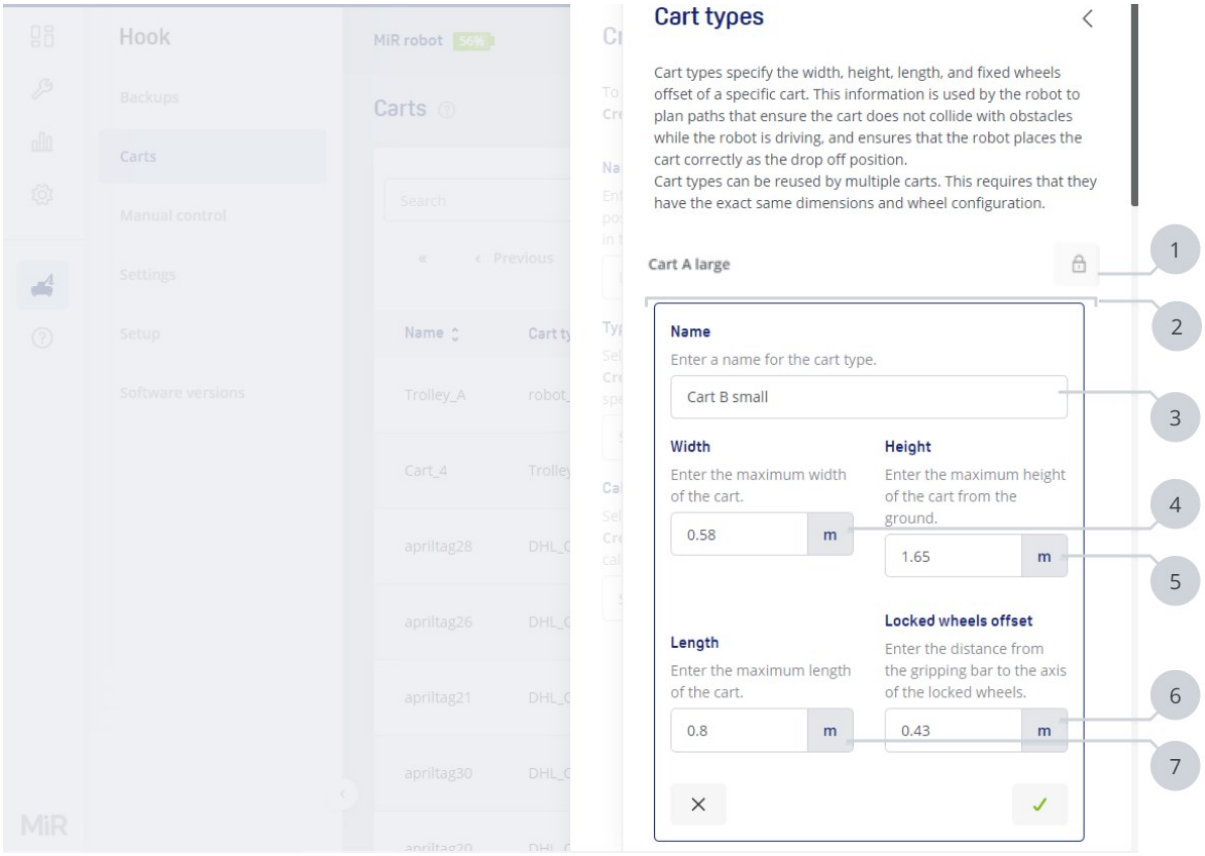
Description	Description
specifying the entry, lock, and drive height for the hook arm. For more information about cart types, see "Calibrations" on page 204.	

Cart types

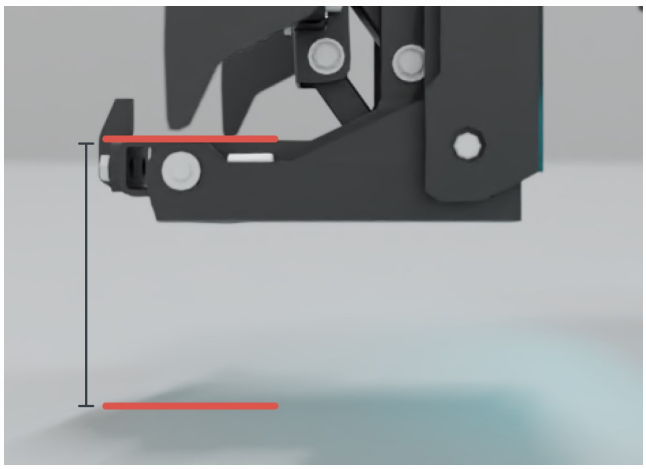
Hook > Carts > Create > Cart types > Create/Edit

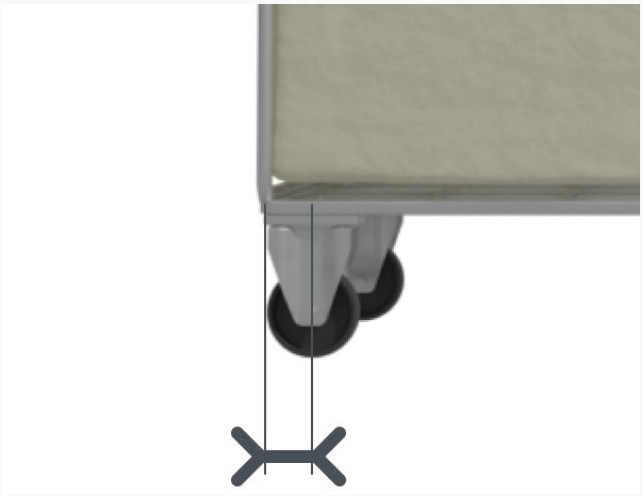
Cart types specify the width, height, length, and fixed wheels offset of a specific cart. This information is used by the robot to plan paths that ensure the cart does not collide with obstacles while the robot is driving, and ensures that the robot places the cart correctly as the drop off position.

Cart types can be reused by multiple carts. This requires that they have the exact same dimensions and wheel configuration.



	Description		Description
1	**Cart type settings** Allows you to: • **Edit**: Open the cart type editor. • **Delete**: Delete the cart type.	2	**Cart type editor** Contains all of the parameters you must define in the cart type.

	Description		Description
3	**Name** Enter a name for the cart type.	4	**Width** Enter the maximum width of the cart. 
5	**Height** Enter the maximum height of the cart from the ground. 	6	**Length** Enter the maximum length of the cart. 

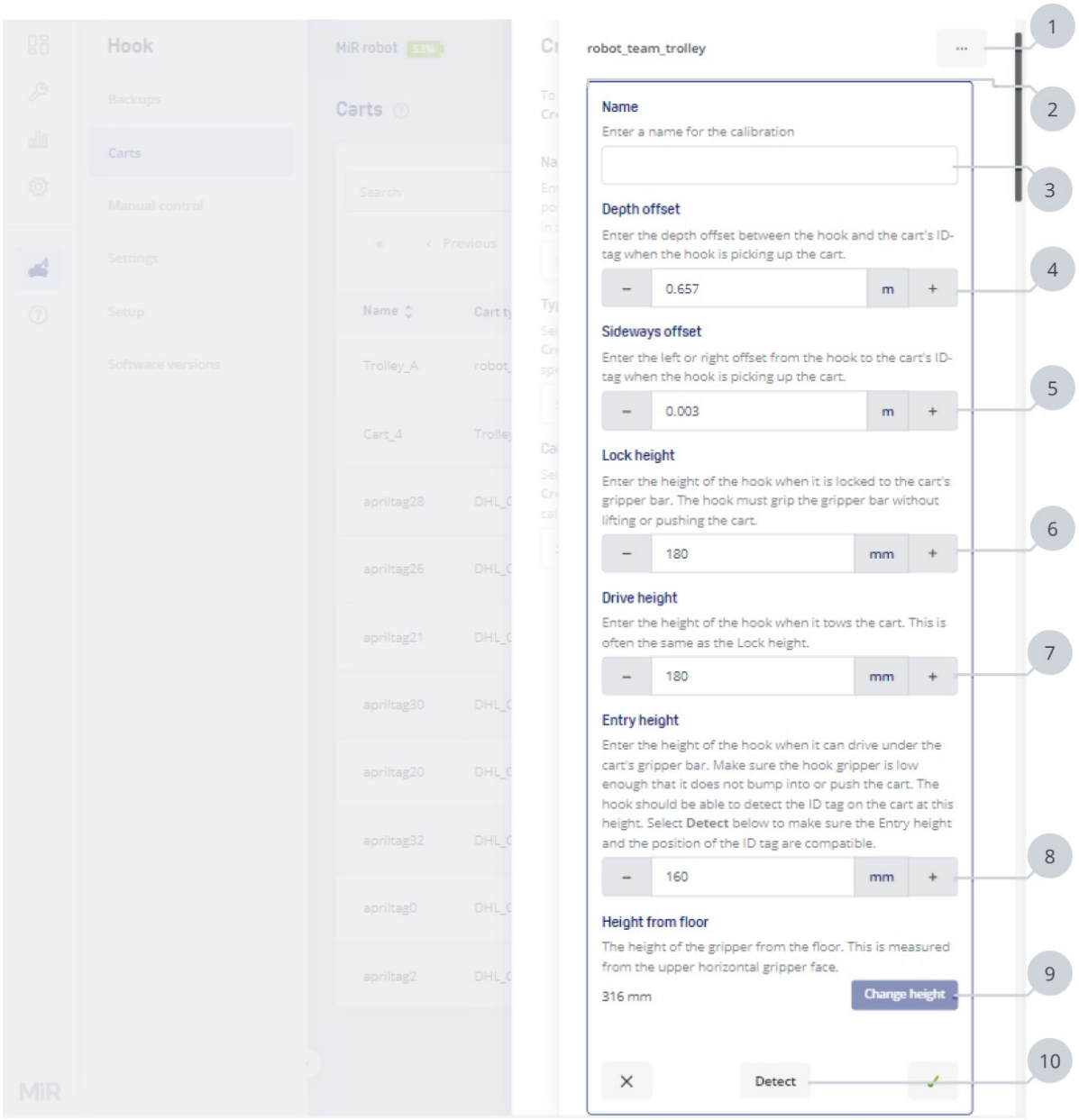
	Description	Description
7	**Locked wheels offset** Enter the distance from the gripping bar to the axis of the locked wheels. 	

Calibrations

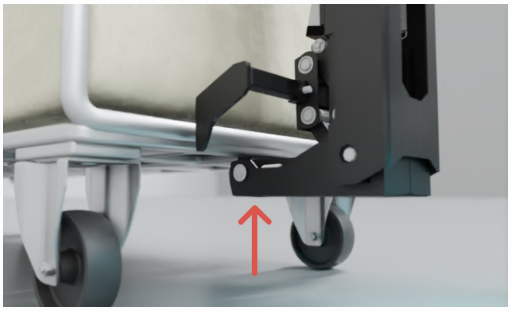
Hook > Carts > Create > Calibration > Create/Edit

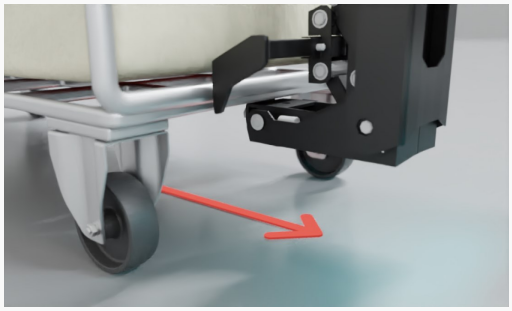
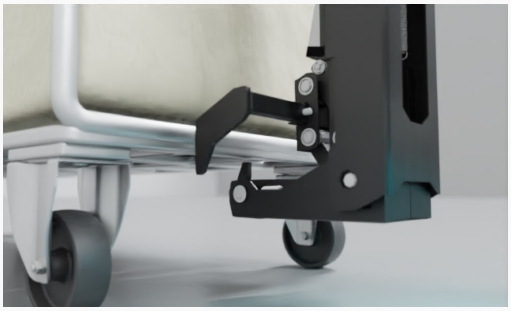
Cart calibrations specify the Entry, Lock, and Drive heights hooks must use to pick up and tow a specific cart. As part of the calibration, the hook camera detects the ID tag's position on the cart. This information is used by the hook to position itself precisely every time it picks up a cart. Once calibrated, the ID tag should not be moved on the cart, and if it happens, the calibration must be redone.

Calibrations can be reused by multiple carts. This requires that the ID tags are placed in the exact same positions on the carts sharing the calibration and that the carts are of the same type.



	Description		Description
1	**Calibration settings** Allows you to: • **Edit**: Open the calibration editor.	2	**Calibration editor** Contains all of the parameters you must define in the calibration, and includes

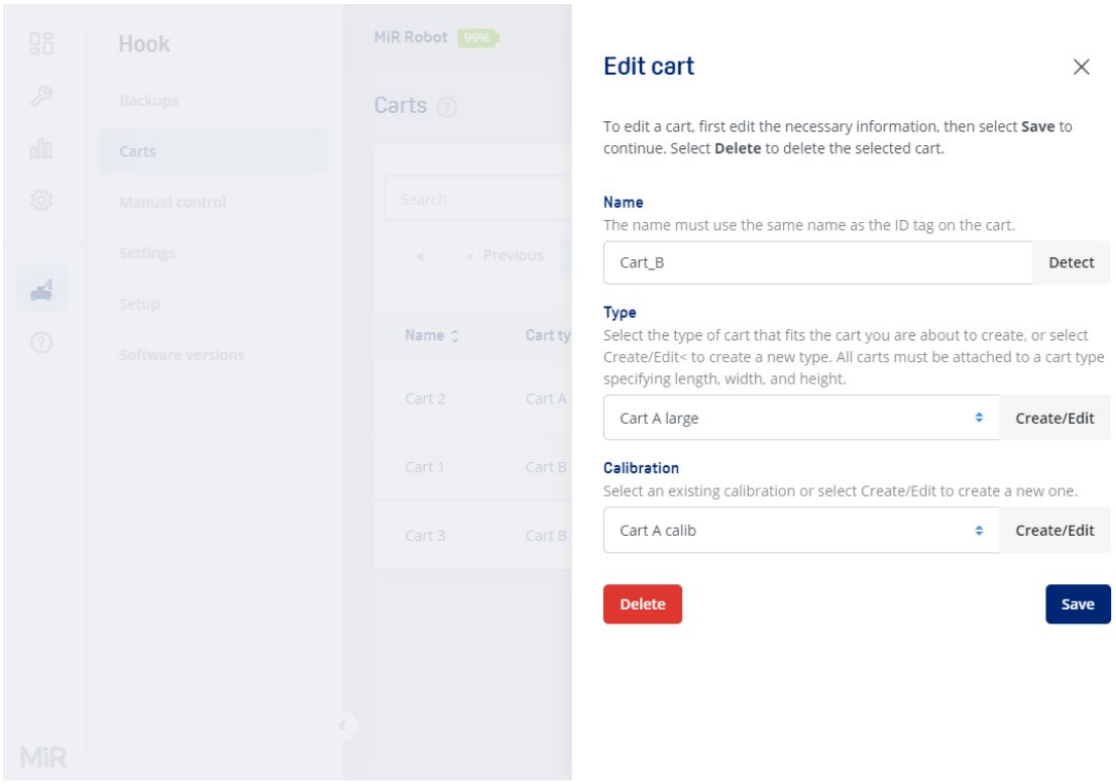
	Description		Description
	• **Delete**: Delete the cart calibration.		useful functions to make the values easier to determine.
3	**Name** Enter a name for the calibration	4	**Depth offset** Enter the depth offset between the hook and the cart's ID-tag when the hook is picking up the cart.
5	**Sideways offset** Enter the left or right offset from the hook to the cart's ID-tag when the hook is picking up the cart.	6	**Lock height** Enter the height of the hook when it is locked to the cart's gripper bar. The hook must grip the gripper bar without lifting or pushing the cart. 
7	**Drive height** Enter the height of the hook when it tows the cart. This is often the same as the Lock height.	8	**Entry height** Enter the height of the hook when it can drive under the cart's gripper bar. Make sure the hook gripper is low enough that it does not bump into or push the cart. The hook should be able to detect the ID tag on the cart at this height. Select **Detect** below to make sure the Entry height and the position of the ID tag are compatible.

	Description		Description
			
9	**Change height** Allows you to change the height of the hook's gripper. Use this to determine suitable Entry, Lock, and Drive heights.	10	**Detect** Makes the hook camera scan for an ID tag. Use this when the hook arm is at the Entry height and is facing the cart in the position just before it picks up the cart. If the camera can detect the ID tag, it will automatically enter its current height in the **Entry height** field.

Edit cart

Hook > Carts > Edit

To edit a cart, first edit the necessary information, then select **Save** to continue. Select **Delete** to delete the selected cart.



You can change any of the fields described in "Create cart" on page 199.

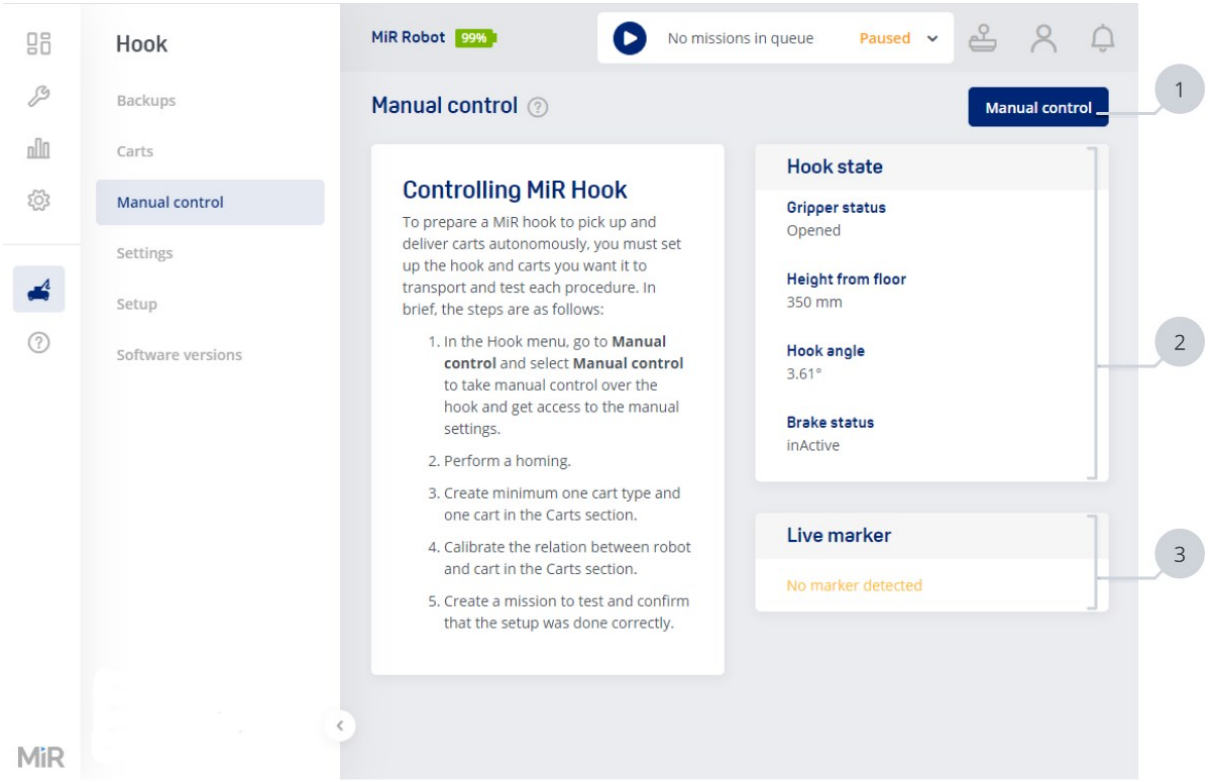
8.3 Manual control

To prepare a MiR hook to pick up and deliver carts autonomously, you must set up the hook and carts you want it to transport and test each procedure. In brief, the steps are as follows:

1. In the Hook menu, go to **Manual control** and select **Manual control** to take manual control over the hook and get access to the manual settings.
2. Perform a homing.
3. Create minimum one cart type and one cart in the Carts section.
4.

Calibrate the relation between robot and cart in the Carts section.

5 Create a mission to test and confirm that the setup was done correctly.



	Description		Description
1	**Manual control** Opens the dialog box to control the hook manually—see "Manual control" on page 211.	2	**Hook state** Displays the current state of the hook—see "Hook state" on the next page.
3	**Live marker** If the hook detects an ID tag, it will display the information about the tag here.		

Hook state

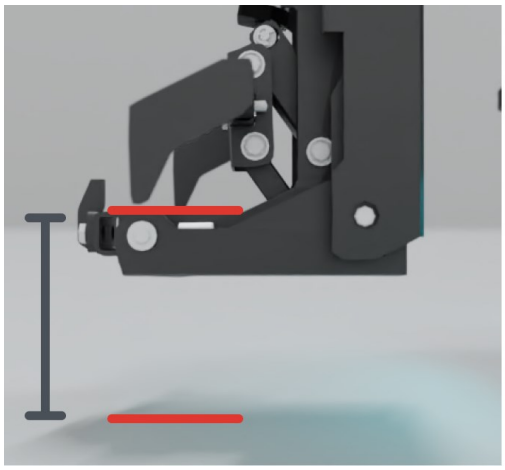
Under Manual control, you can see the following states of the hook:

- **Gripper status**

  Indicates whether the gripper is opened or closed.

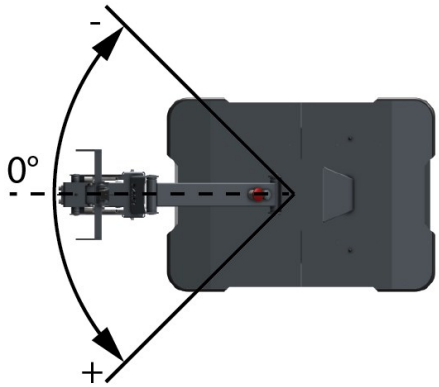
- **Height from floor**

  The height of the hook from the floor is measured from the upper plane of the gripper.



- **Hook angle**

  The angle in which the hook arm is currently positioned. When the arm is centered along the middle of the robot, the angle is 0. When the hook is oriented towards the left side of the robot, the angle is negative, and on the right side the angle is positive.



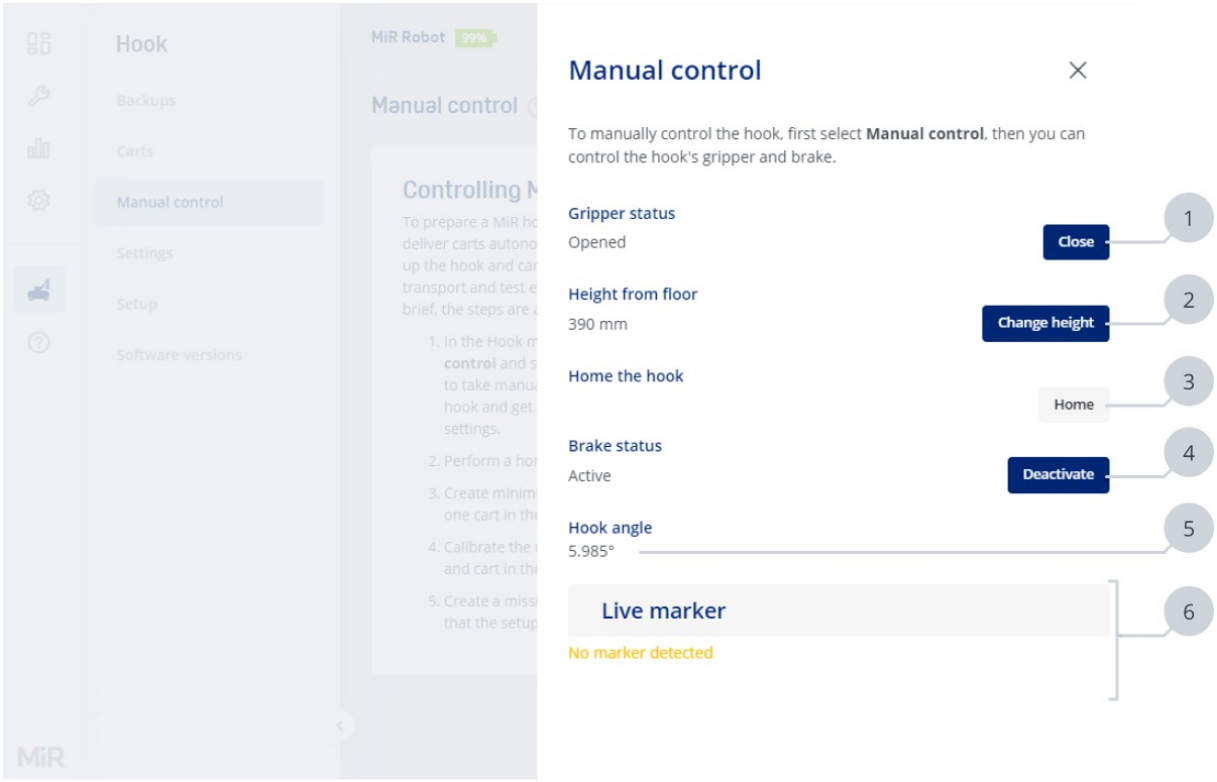
- **Brake status**

  When the hook's brake is active, you cannot rotate the hook arm. When deactivated, the hook arm can swing freely.

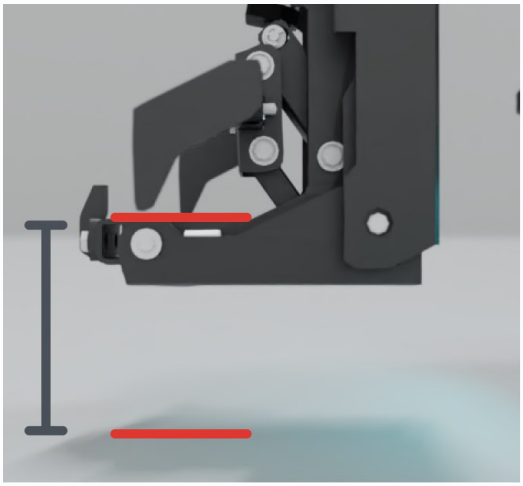
Manual control

Hook > Manual control > Manual control

To manually control the hook, first select **Manual control**, then you can control the hook's gripper and brake.



	Description		Description
1	**Gripper status**	2	**Height from floor** Change the height of the hook. The distance is measured from the upper plane of the gripper.

	Descri-ption		Description
	Closes and opens the hook grip-per.		
3	**Home the hook** Set the 0 point for the hook angle.	4	**Brake status** Deactivates the brake to let the hook swing freely, or activates the brake to stop the hook from moving to the sides.
5	**Hook angle** The angle that the hook is cur-rently	6	**Live marker** If the hook detects an ID tag, it will display the information about the tag here.

	Descri-ption	Description
	positioned at. When the arm is centered along the middle of the robot, the angle is 0. When the hook is oriented towards the left side of the robot, the angle is negative, and on the right side	

Descri-ption	Description

8.4 Settings

The Settings page contains all parameters you can modify to change the behavior of the hook top module. The settings are divided into the following categories:

Advanced settings 214

Distributor data 215

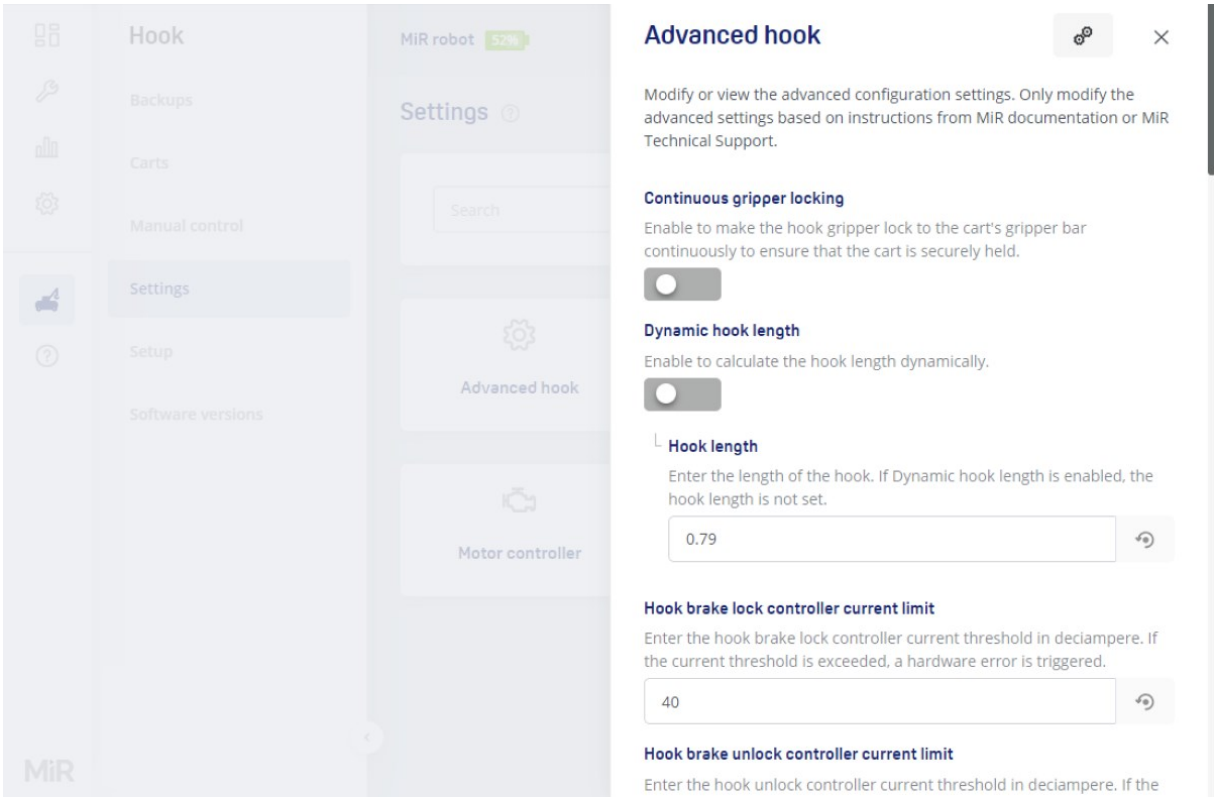
Modified defaults 216

Motor controller 217

Advanced settings

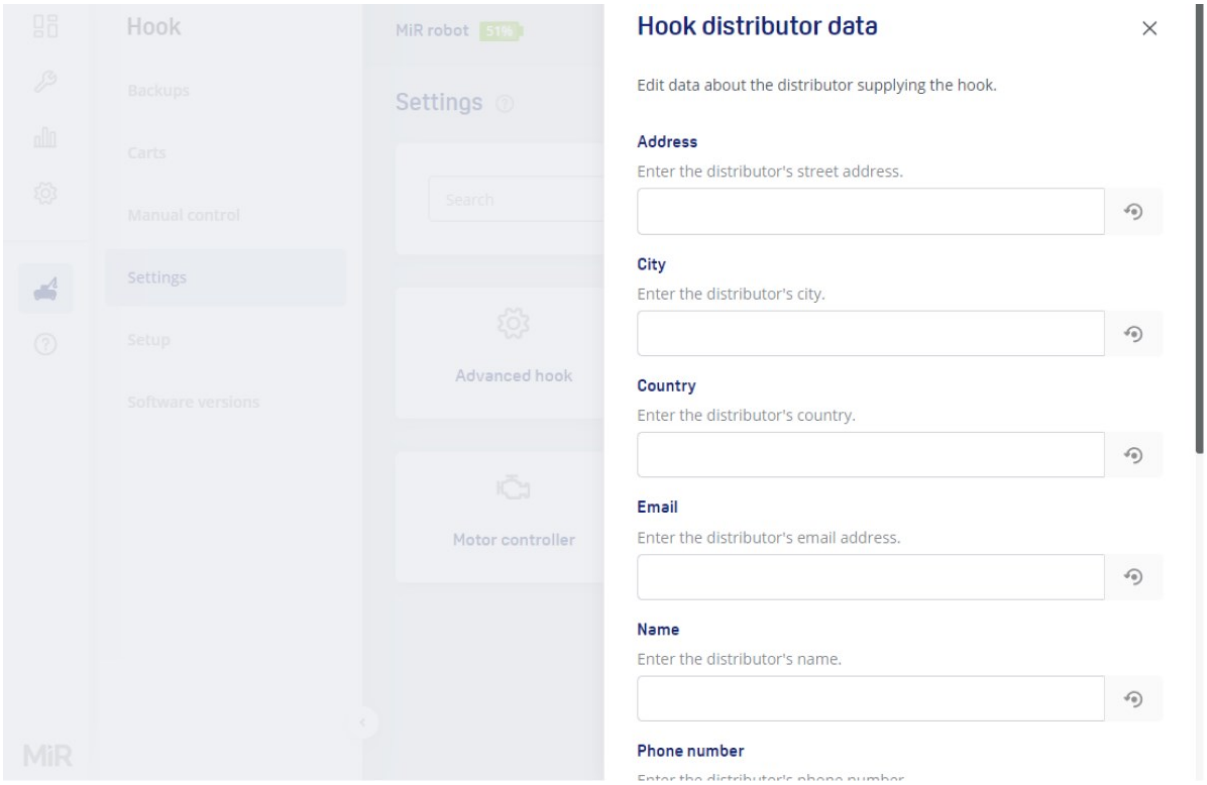
Modify or view the advanced configuration settings. Only modify the advanced settings based on instructions from MiR documentation or MiR Technical Support.

Use these settings to enable features that can improve your hook's performance. Only enable these features if recommended to do so by MiR Technical Support. The current limit can also be set in the Motor controller settings—see "Motor controller" on page 217.



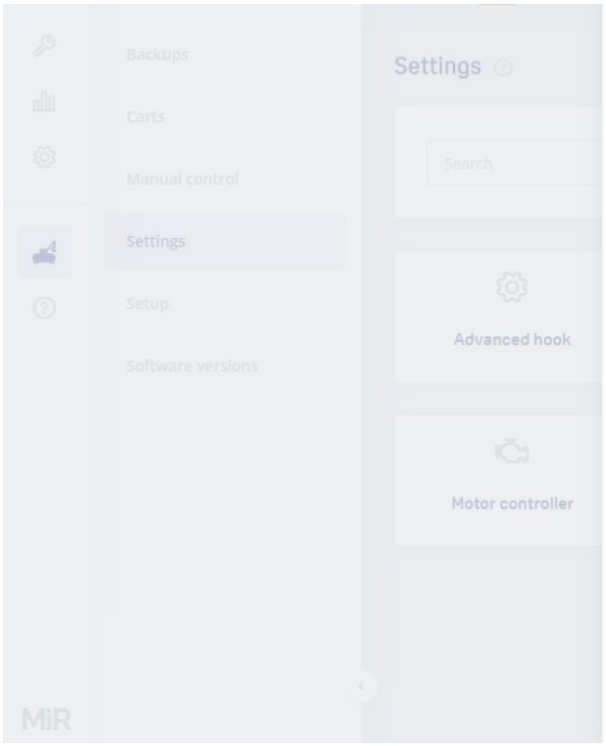
Distributor data

Edit data about the distributor supplying the hook.



Modified defaults

Modified defaults provides an overview of which parameters have been changed from the default values. The list shows both the default values and the new values of the changed parameters. All changed parameters from **System > Settings** are included in the Modified defaults list.



Modified defaults provides an overview of which parameters have been changed from the default values. The list shows both the default values and the new values of the changed parameters. All changed parameters from **System > Settings** are included in the Modified defaults list.

Hook

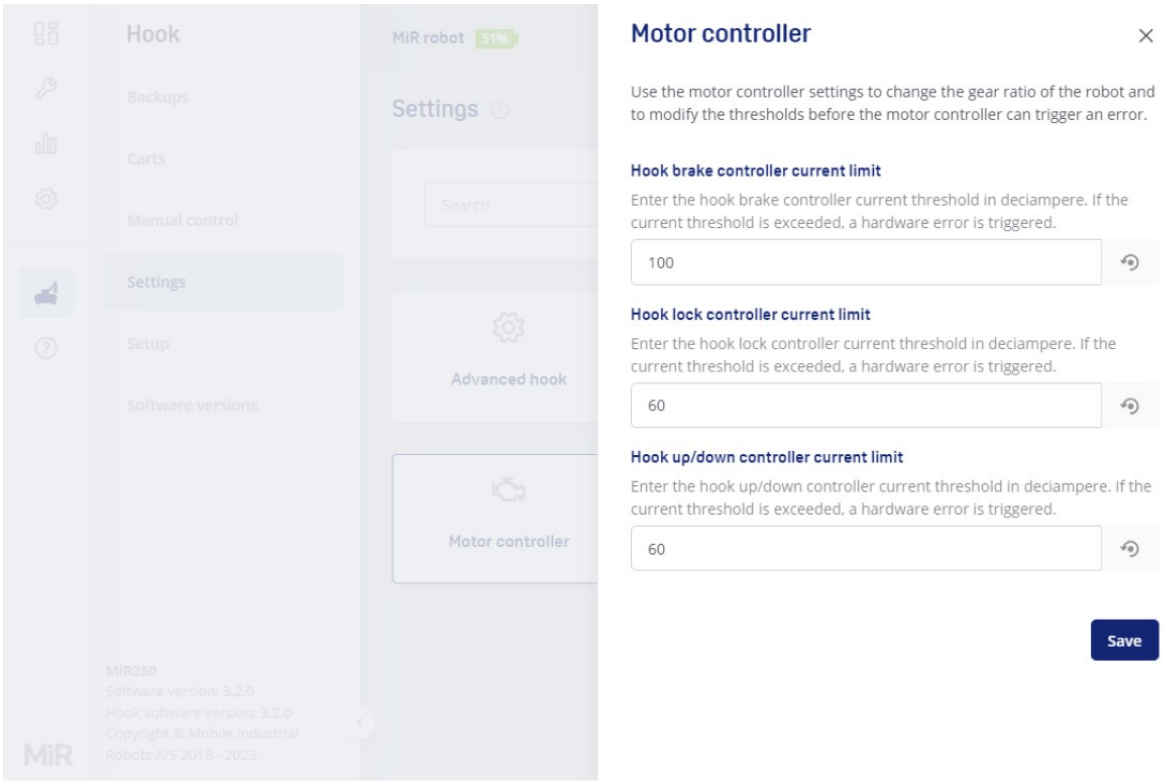
	Default	Value
Hook encoder angle calibration offset	0	-0
Hook actuator serial number		AU050WLO
Hook brake serial number		AU051CLR

Motor controller

Use the motor controller settings to change the gear ratio of the robot and to modify the thresholds before the motor controller can trigger an error.

MiR Hooks have three motors where you can modify the current limit. For more information about how to determine when to modify these values, see the guide *Troubleshoot MiR Hook 100 or MiR Hook 200 issues* or *Troubleshoot MiR250 Hook issues*. You can find these guides on MiR Support Portal.

- The Hook brake motor controls the brake motor that locks the hook arm so it does not swing freely from side to side. It pushes the brake pads together to prevent the hook arm from turning.
- The Hook lock motor controls the gripper that locks and releases the hook gripper bar. It moves the gripper to lock to the bar until the current limit is reached.
- The Hook up/down controller controls the height of the hook. It moves the whole hook arm up and down to the chosen height.



8.5 Setup

In the **Setup** section you can change the name of the hook, and find the serial number and its integrated components. Finally, the hook encoder can be zero calibrated, for example, if the encoder has been replaced.

Configuration

In the Configuration group you may change the name of the hook and the serial number.

The serial number is a 9- or 15-digit number identifying the hook. The serial number is also found in the Help section under Robot information and on the product label on the hook.

Motor controller serial numbers

The motor controller serial number group lists the serial numbers of the motor controllers for the actuators and brake.

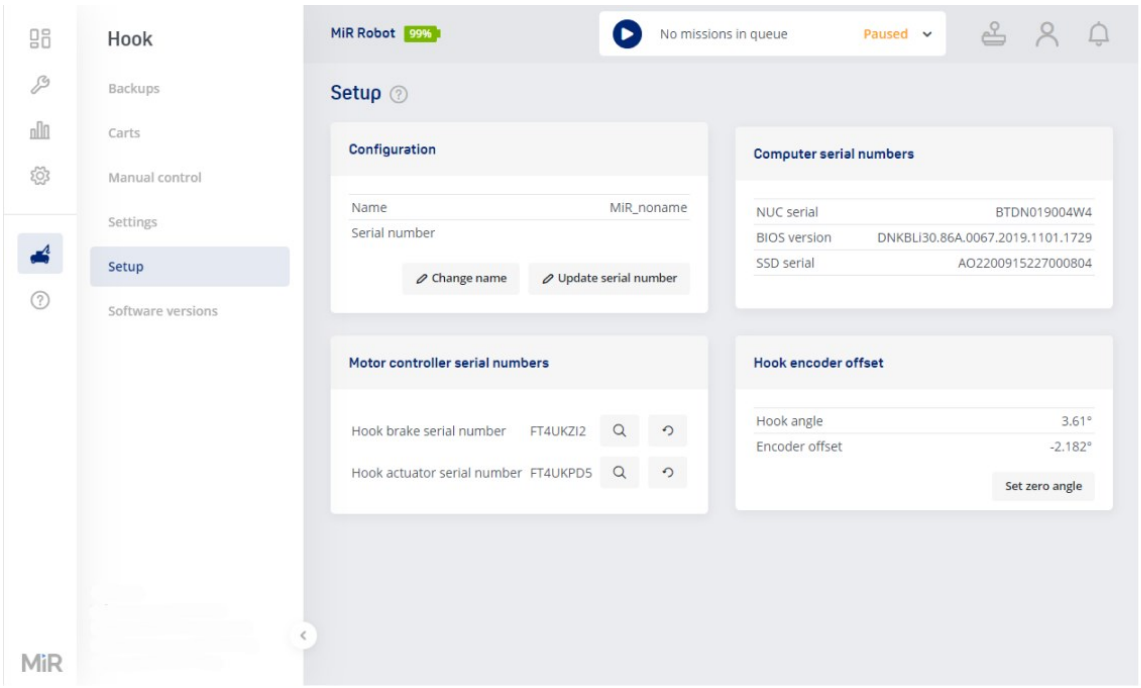
Select **Detect** to automatically find the serial number of a motor controller.

Computer serial numbers

The computer serial numbers group lists the information about the hook computer.

Hook encoder offset

The hook encoder offset group shows the horizontal angle of the hook arm and makes it possible to make a new zero calibration of the hook by selecting **Set zero angle**. The hook encoder has already been zero calibrated from the factory, and it should only be performed again if the encoder has been replaced.

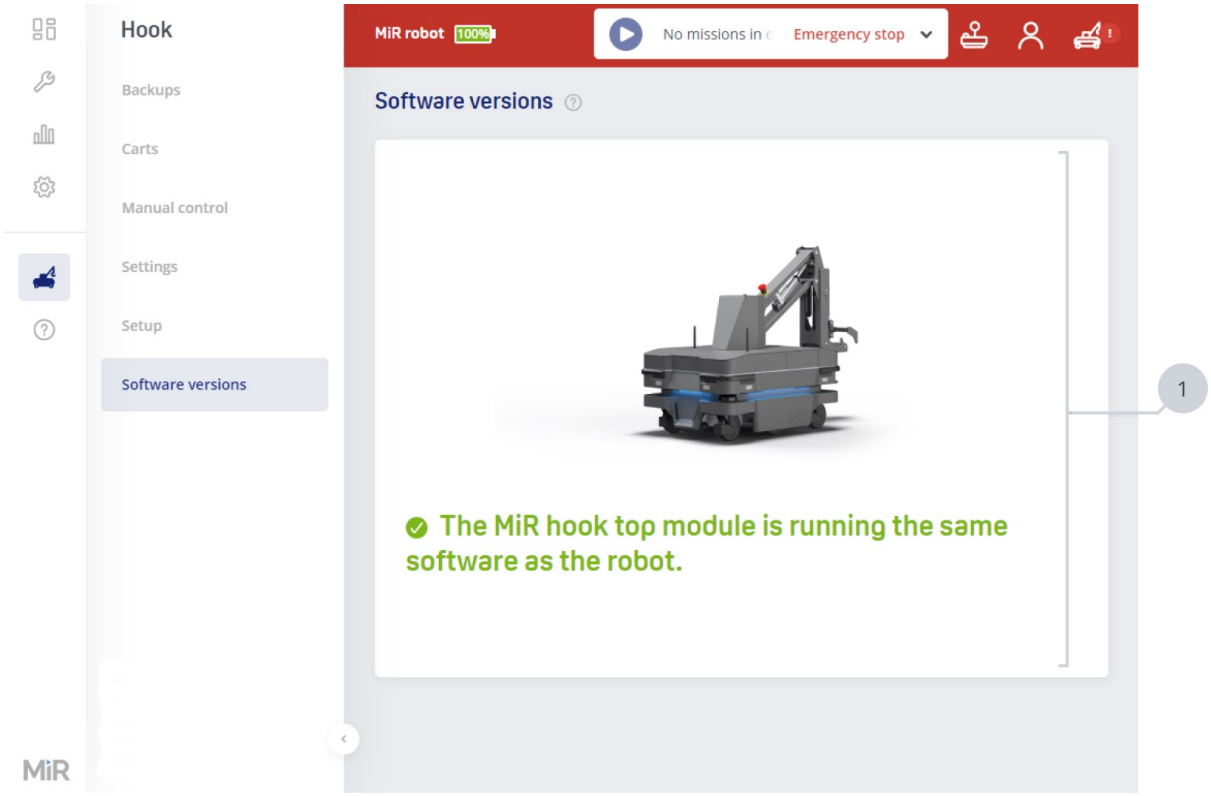


8.6 Software versions

A software update file is a .mir file that contains MiR robot software. MiR Hook uses the same file that you use to update a MiR robot.

The MiR robot and the mounted hook must be running the same software versions. When you update your robot's software and restart the robot, the hook will search for and transfer the same software. To apply the software to the hook, select Update.

Use this page to see the status of the hook software. When you upload the latest software from MiR, you ensure you are running with the latest updates and features.



	Description	Description
1	**Software versions** Follow the status of the hook software and update when the robot's software is updated.	