Reference guide (en)

Date: 03/2020

Revision: v.1.2

MiR Fleet interface

Copyright and disclaimer

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

Table of contents

1. About this document **5**

1.1 Where to find more information 5

1.2 Version history 6

2. MiR Fleet interface **8**

2.1 Signing in 8

2.2 Navigating the MiR Fleet interface 10

2.3 Getting started 11

3. Dashboards **13**

3.1 Dashboards 14

3.2 Widgets 16

4. Setup **19**

4.1 Scheduler 20

4.2 Robots 22

4.3 Elevators 27

4.4 Missions 30

4.5 Maps 65

4.6 Sounds 83

4.7 Transitions 84

4.8 Users 88

4.9 User groups 91

4.10 Paths 94

4.11 Path guides 96

4.12 Marker types 99

4.13 Footprints 102

5. Monitoring **106**

5.1 System log 106

5.2 Error logs 107

6. System **109**

6.1 Settings 110

6.2 Software versions 114

6.3 Backups 114

6.4 Fleet setup 115

6.5 Evacuation zones 116

7. Help **117**

7.1 MiR Fleet information 118

7.2 API documentation 118

7.3 Remote access 119

7.4 Manual 119

1. About this document

This document describes the MiR Fleet interface. The manual is intended for administrators of the system and users responsible for updating the system regularly, for example defining new missions or setting up new users in the system.

1.1 Where to find more information

At www.mobile-industrial-robots.com, several additional resources are available. To access more information, sign in to the Distributor site with your distributor account at http://www.mobile-industrial-robots.com/en/account/. The following resources are available:

- **Distributor site > Manuals**
  http://www.mobile-industrial-robots.com/en/account/manuals/
  This page contains the following resources:
  - **Quick starts** describe how you start operating MiR robots quickly. This document is 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 robots. User guides are available in multiple languages.
  - **Risk Analysis Guides** include guidelines on how to create a risk assessment of your robot solution.
  - **Commissioning guides** describe how to commission your robot safely and prepare it to operate in the workplace.
  - **Operating guides** describe how to set up and use top modules and accessories, such as charging stations, hooks, shelf lifts, and pallet lifts.
  - **Getting started guides** describe how to set up products that are mainly software-based, such as MiR Fleet and MiR AI Camera.
  - **Reference guides** contain descriptions of all the elements of the robot interface and MiR Fleet interface. Reference guides are available in multiple languages.
  - **REST API references** for MiR robots, MiR hooks, and MiR Fleet.
  - **MiR network requirements** specify the performance requirements of your network for MiR robots and MiR Fleet to operate successfully.

- **Distributor site > Download**
  http://www.mobile-industrial-robots.com/en/account/download/
  This page contains the following resources:
  - **Software** and **Product Release Notes** for your MiR product are displayed by selecting your product in the drop-down menu.
  - **CAD files** of MiR products are displayed by selecting **Show CAD files**.
  - **Certificates** for MiR products are displayed by selecting **Show Certificates**.
- **Distributor site > FAQ**
  https://www.mobile-industrial-robots.com/en/account/faq/
  This page contains frequently asked questions regarding MiR products.
- **Distributor site > How to**
  http://www.mobile-industrial-robots.com/en/account/how-to/
  This page contains how-to guides that describe how to perform specific tasks with MiR products.
- **Distributor site > Troubleshooting**
  https://www.mobile-industrial-robots.com/en/account/troubleshooting/
  This page contains troubleshooting guides to solve common issues with MiR products.

1.2 Version history

This table shows current and previous versions of this document and their interrelations with hardware releases.

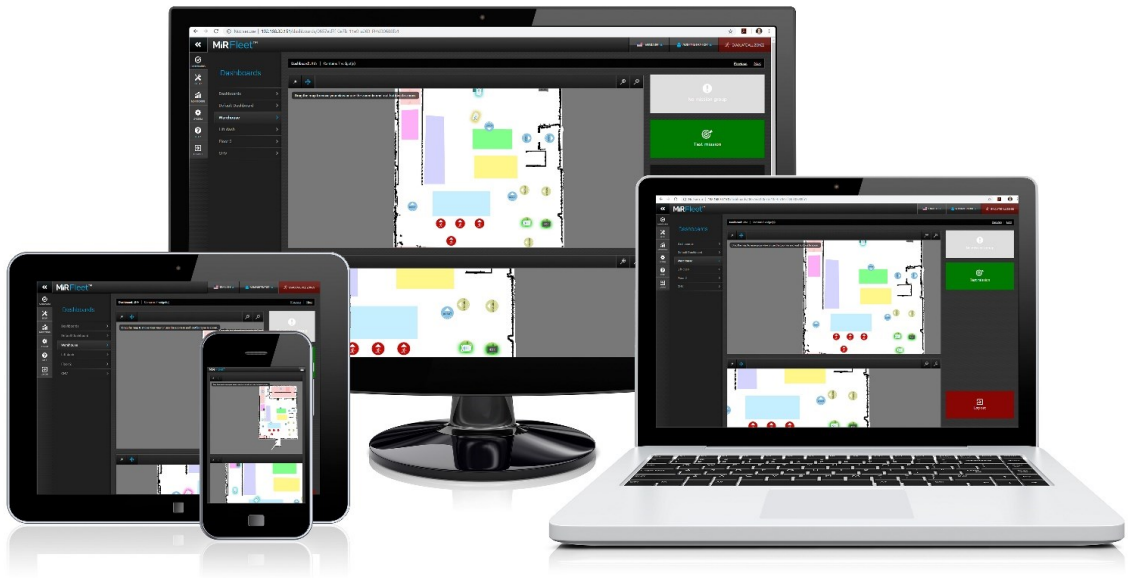
Revision	Release date	Description	SW version
1.0	2019-01-17	First edition.	2.5.0
1.1	2019-03-06	Update to SW version 2.6.0. New features in the fleet interface: • Map zones have been reconstructed and new zone settings are available. • Minor corrections and improvements throughout the manual.	2.6.0
1.2	2020-03-30	Update to SW version 2.8.0. New features in the fleet interface:	2.8.0

Revision	Release date	Description	SW version
		• Marker types, used for robots driving with shelves, has been added to the Setup section. • A graphic Footprint editor has been added to the Setup section making it easy to change and create footprints.	

2. MiR Fleet interface

This section gives a quick overview of the MiR Fleet interface.

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 MiR Fleet interface:

- Username and password
- PIN code

System permissions are handled per user group whereas login credentials are handled per individual user. Read more in the sections Users on page 88 and User groups on page 91.

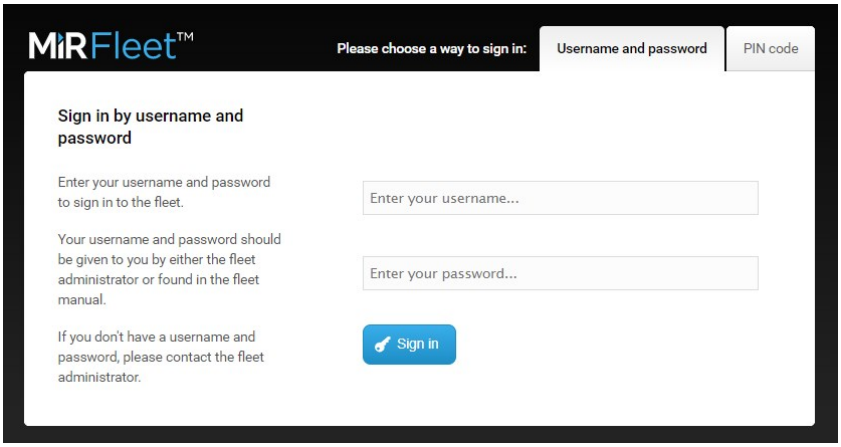
Accessing the interface

The user interface is accessed by connecting to the MiR Fleet WiFi and opening your preferred web browser. Enter the IP address of the MiR Fleet or enter mir.com in the browser's address bar.

The fleet interface can be accessed via Chrome, Safari, Firefox, and Edge.

Username and password

Enter your username and password to sign in to the MiR Fleet interface.



Default login credentials

The default usernames and passwords are:

Distributor

- Username: Distributor
- Password: contact MiR Support

Administrator

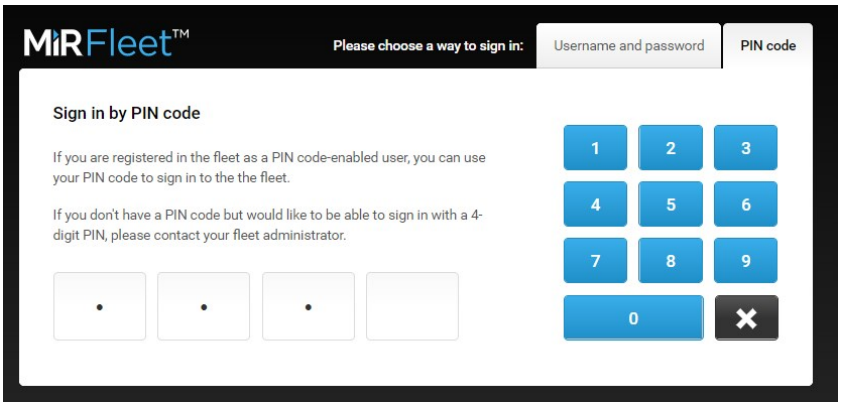
- Username: Admin
- Password: admin

User

- Username: User
- Password: user

PIN code

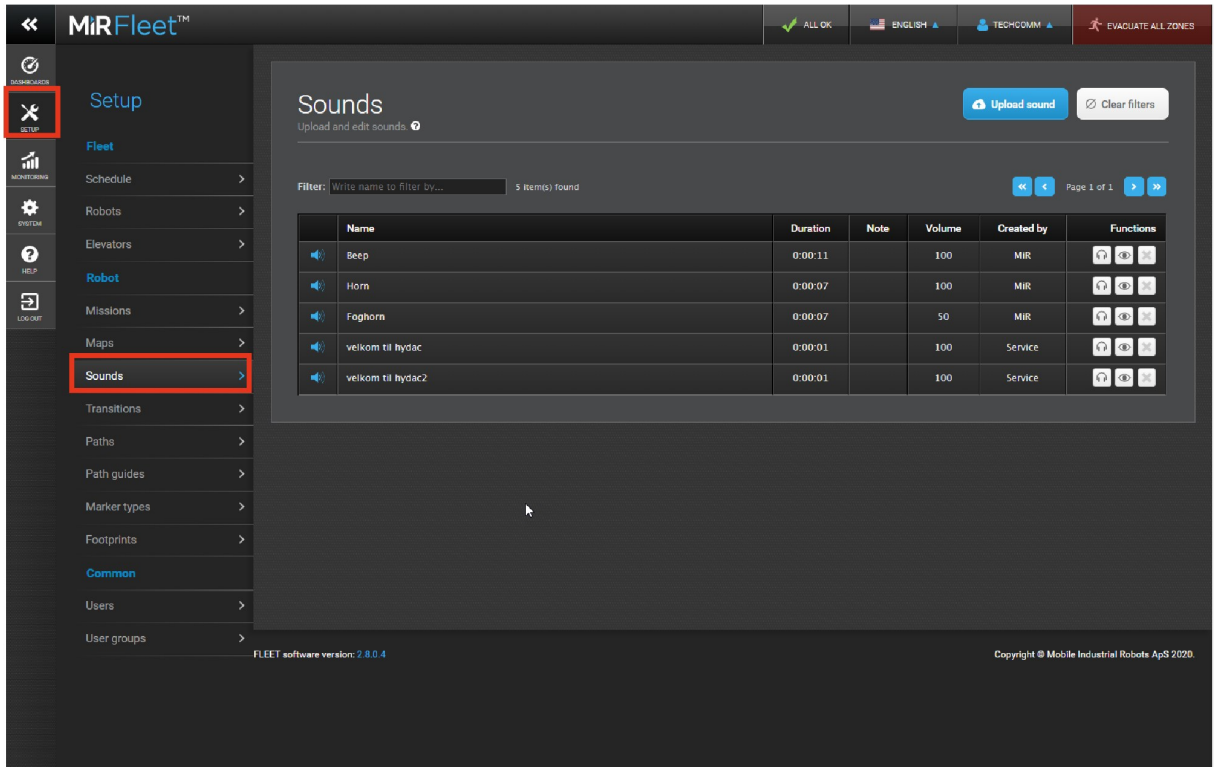
Select the PIN code tab and enter a four-digit PIN code. There is no preconfigured PIN code.



2.2 Navigating the MiR Fleet interface

To access a section in the MiR Fleet interface, first select an item on the main menu, then the relevant sub-menu. The section appears in the main window.

For example, to go to the **Sounds** section,select **Setup** on the main menu, then select **Sounds** on the submenu bar.



2.3 Getting started

The interface supports multi-level user access, and tailored dashboards. To get started, you first need to set up how different users may operate the robot. You can set the access level for each user and create individual dashboards that include the main functions they need to operate MiR Fleet. Before the robot can operate, you must also set up the system by creating maps and missions for the robot to use.

User setup

You must set up the various levels of users that will be operating MiR Fleet, and tailor each group to the extent of access they require. You do this in the following steps:

1. Set up users, see Users on page 88.
2. Define user groups, see User groups on page 91.
3. Create dashboards tailored to different users' tasks, see Dashboards on page 14.

System setup

For a smooth running fleet, you must define one or more maps where the robots can operate, including features, such as positions, and preferred or forbidden drive zones that contribute to an organized workflow. To define the tasks the robots should execute within a map, you must create new missions for each task. You do this in the following steps:"

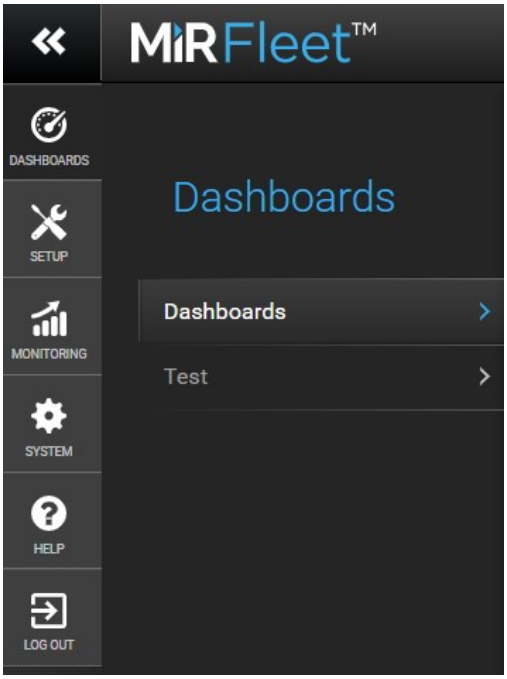
- Create a map, see Maps on page 65.
- Edit the map: add positions, drive zones etc., see Mapping tools on page 68.
- Create missions, see Missions on page 30.

3. Dashboards

This section describes the items in the Dashboards menu.

The **Dashboards** menu displays all dashboards currently available on the robot.

In the subsection **Dashboards** , you can create new dashboards and edit existing ones. Select **Dashboards** to open the list of dashboards, and select the **Create dashboard** button to open the dashboard designer.



The Dashboards menu contains the following items:

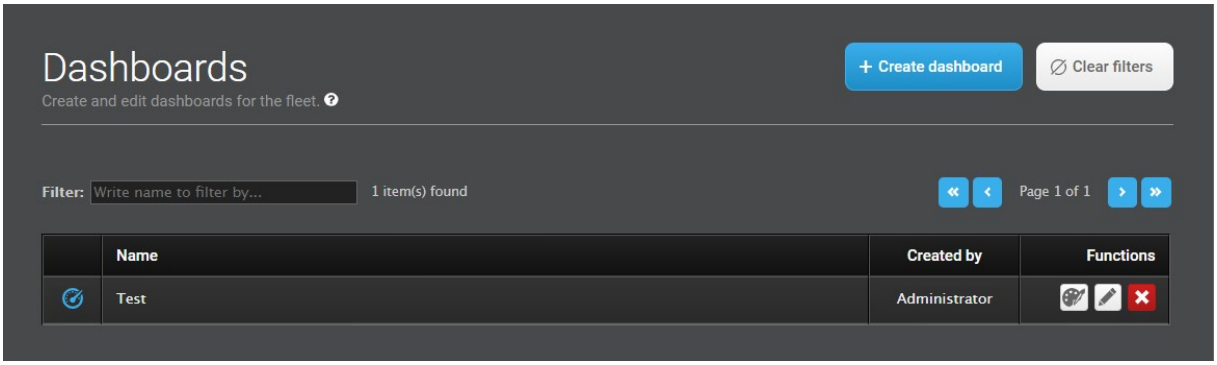
3.1 Dashboards **14**

3.2 Widgets **16**

3.1 Dashboards

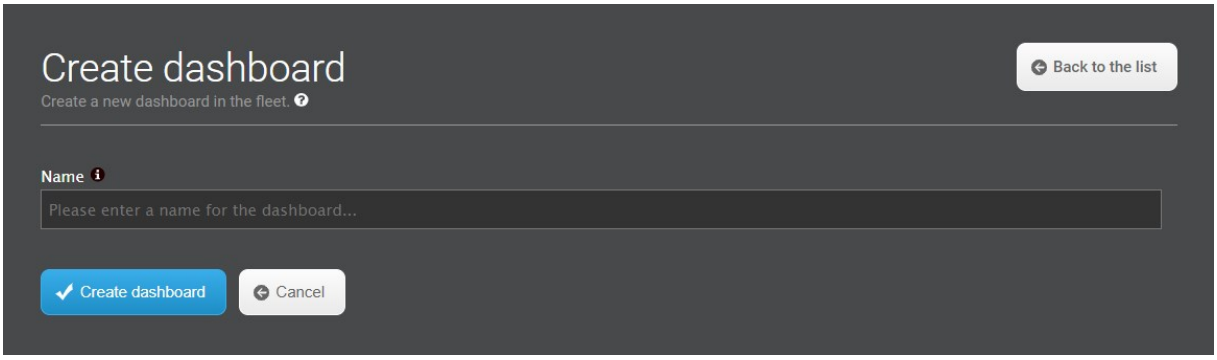
Dashboards are an easy way for different user groups to control the fleet giving direct access to their individual key functions. A dashboard is made up of a number of widgets each representing a feature in the system, such as a particular mission, the map the robots are running in, or the current mission queue.

The system comes with a default dashboard and, in addition, you may create an unlimited number of customized dashboards.



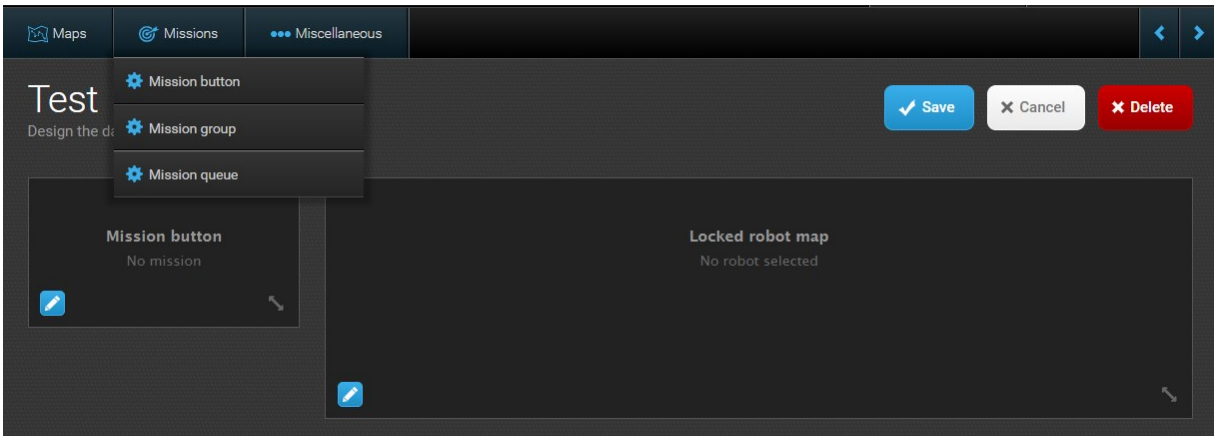
Create dashboard

Enter a name in the **Name** field to create a new dashboard. Select **Create dashboard** to continue to the design section. Design the dashboard by adding widgets that represent the features you want to assign to the dashboard.



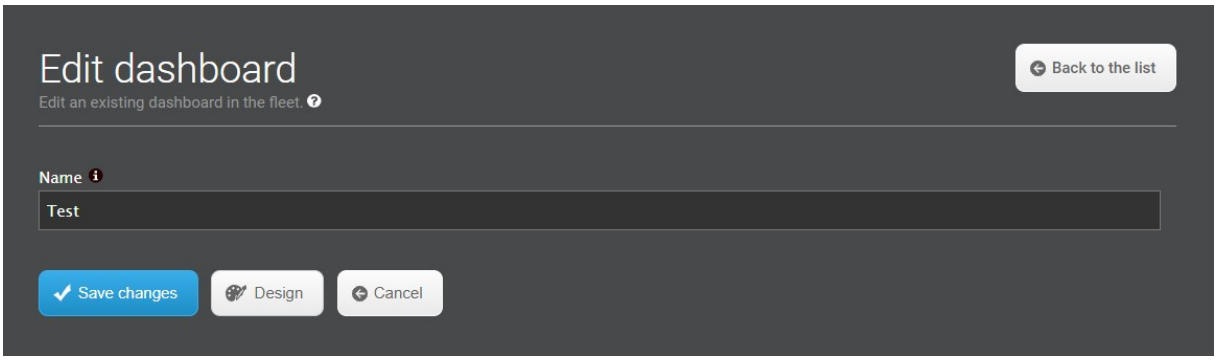
Dashboard designer

Design the dashboard by selecting widgets from the menus in the top bar. Resize the widgets by pulling the arrow in the lower right-hand corner and rearrange their order by click-dragging. Some widgets require further settings. For example, you must select a particular mission for mission buttons. To do this, select the pen icon in the lower left corner and select the wanted action.



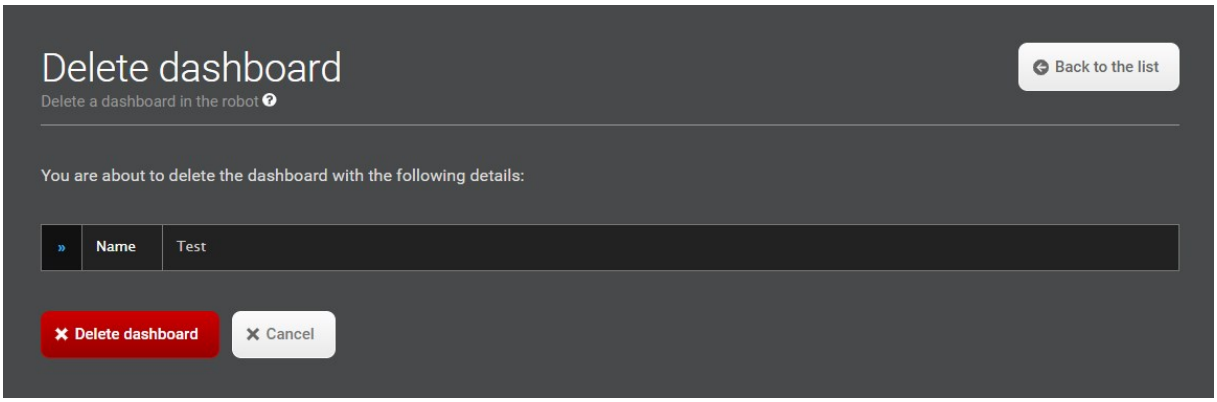
Edit dashboard

The dashboard design can be edited and widgets added or removed.



Delete dashboard

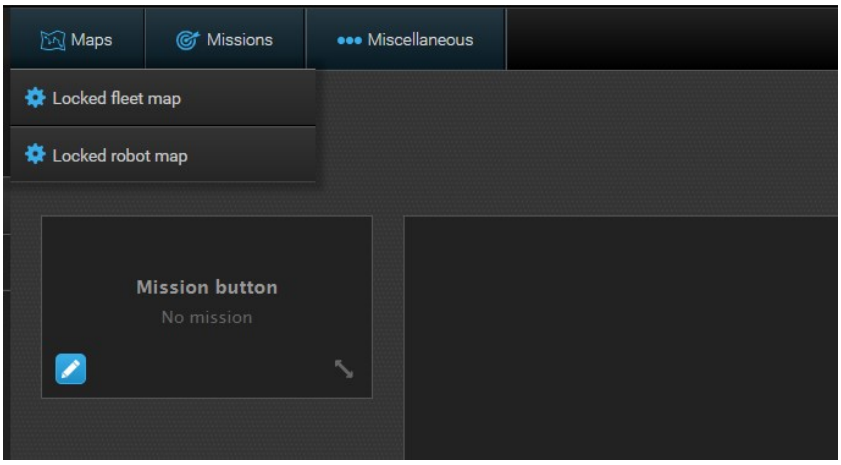
You can delete all dashboards that are created by you or another member of the user group you belong to.



3.2 Widgets

This section describes the dashboard widgets.

Maps



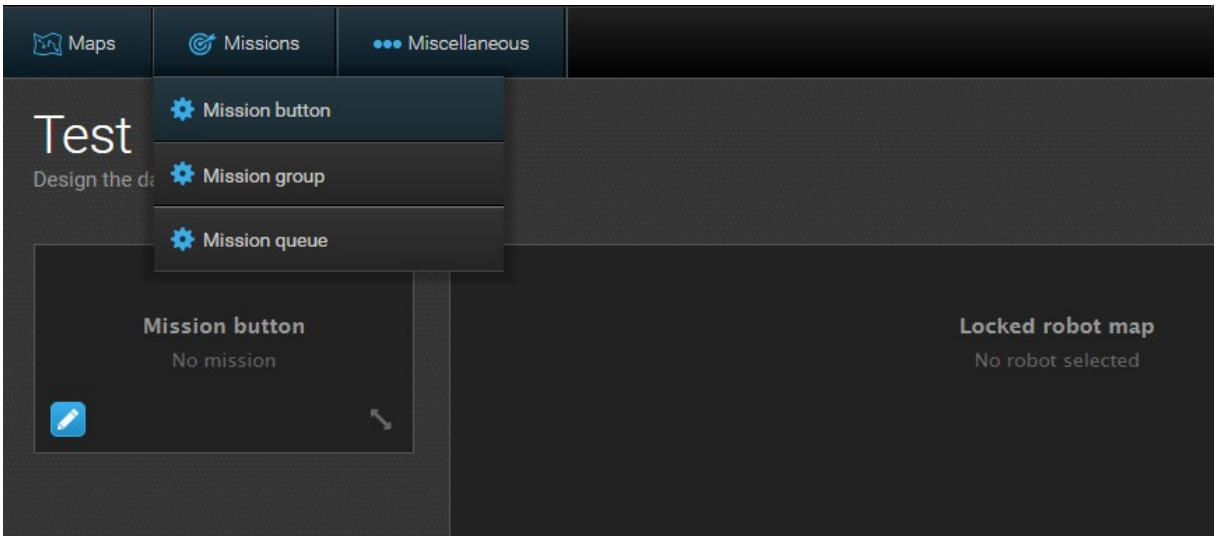
Locked fleet map

A **Locked fleet map** widget makes the selected map visible on the dashboard. Select the map that should be used for the locked fleet map.

Locked robot map

A **Locked robot map** widget makes the active map of the selected robot visible on the dashboard. The robot is always shown in the middle of a locked map. Select the robot you want shown on the dashboard.

Missions



Mission button

You can start a mission from the dashboard by adding a **Mission button** widget and selecting a predefined mission.

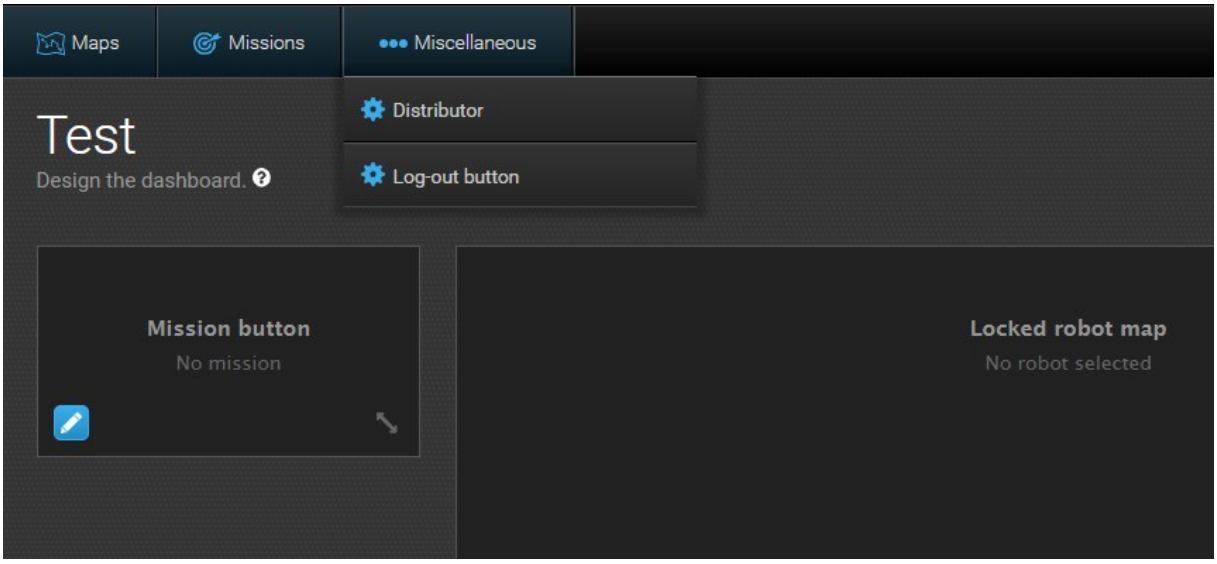
Mission queue

You can have the mission queue displayed on the dashboard by selecting a **Mission queue** widget.

Mission group

You can select a mission group and have all missions from that group displayed on the dashboard by adding a **Mission group** widget.

Miscellaneous



Distributor

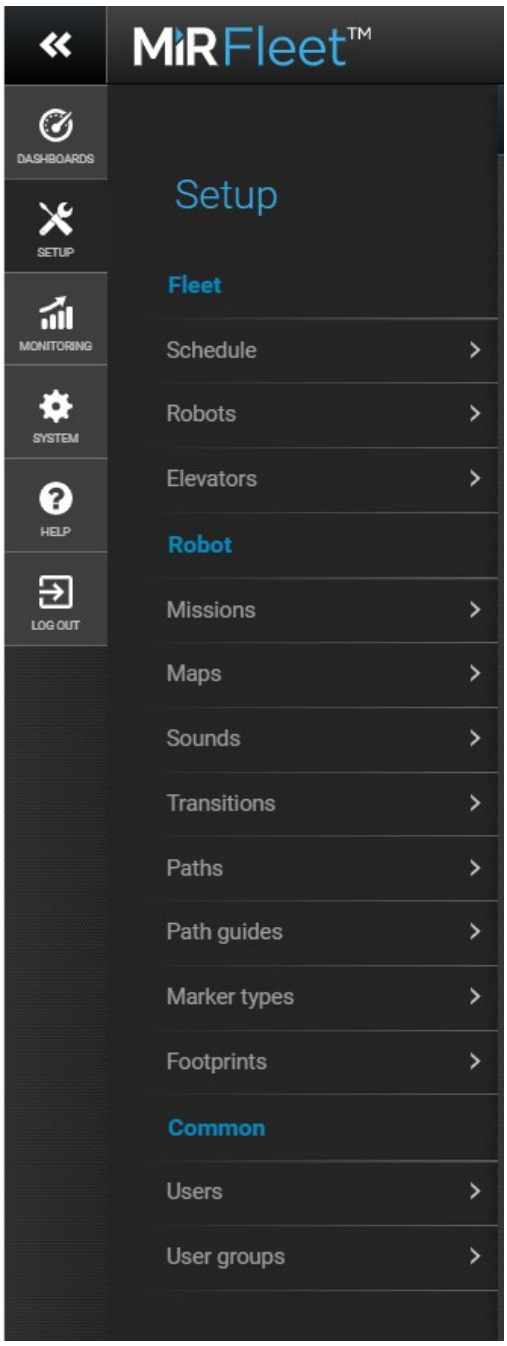
This widget shows information about the distributor if any distributor data has been entered in the Distributor data section under **System** > **Settings**.

Log-out button

The **Log-out button** allows you to log off via the dashboard. This is useful on small devices where there is no other log-out button.

4. Setup

This section describes the items in the Setup menu.



The Setup menu contains the following items:

4.1 Scheduler **20**

4.2 Robots **22**

4.3 Elevators **27**

4.4 Missions **30**

4.5 Maps **65**

4.6 Sounds **83**

4.7 Transitions **84**

4.8 Users **88**

4.9 User groups **91**

4.10 Paths **94**

4.11 Path guides **96**

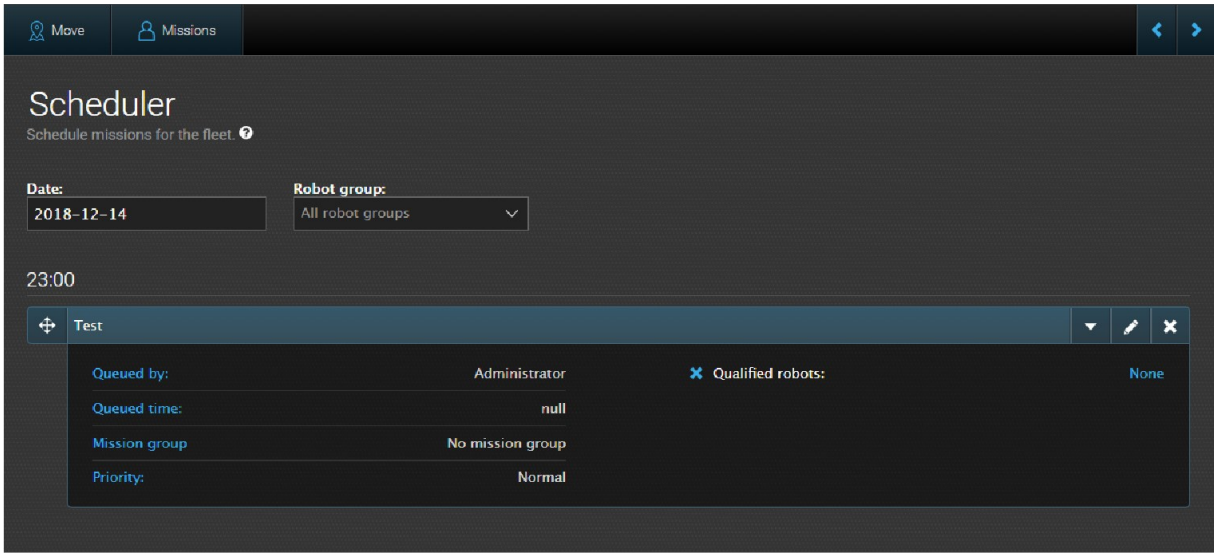
4.12 Marker types **99**

4.13 Footprints **102**

4.1 Scheduler

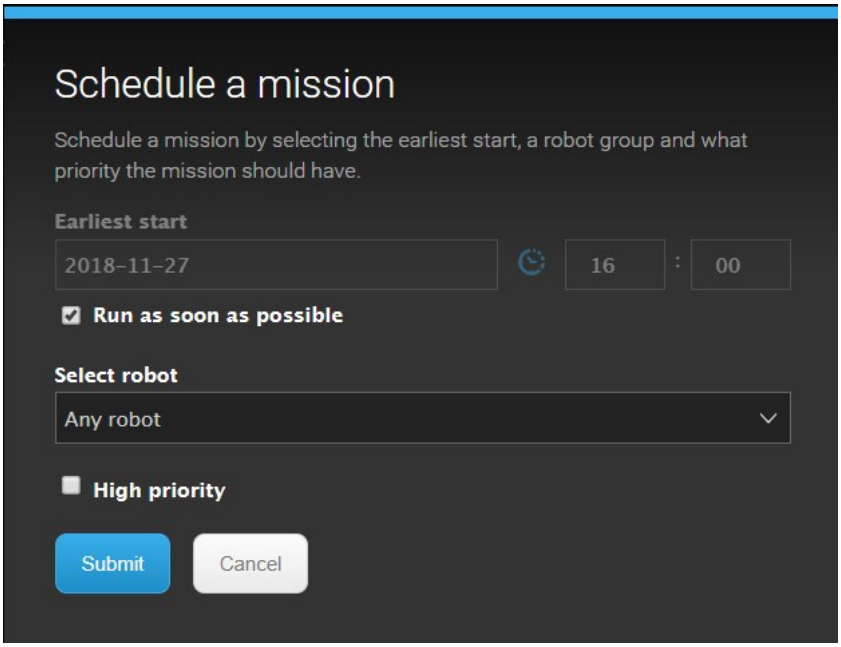
Missions to be carried out by MiR Fleet robots are handled in **Scheduler**. You can schedule which robot group should execute a mission, at what date and time, and set the priority of the mission. Missions and robot groups must be created before proper scheduling can be done. Go to **Robot** > **Missions** to create new missions, and go to **Fleet** > **Robots** to create robot groups.

See also Robots on page 22.



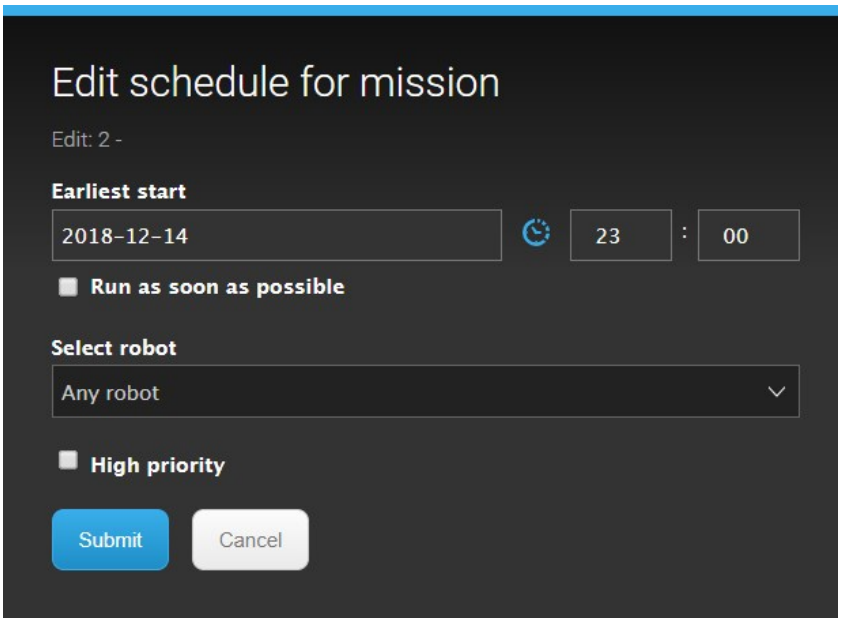
Schedule a mission

Schedule a mission by selecting the earliest start, a robot, and what priority the mission should have. Selecting **Run as soon as possible** schedules the mission to the queue of missions. Selecting **High priority** schedules the mission to run as the first mission before all other scheduled missions.



Edit schedule for mission

Edit a mission if you want to change the parameters you selected when creating the mission.



4.2 Robots

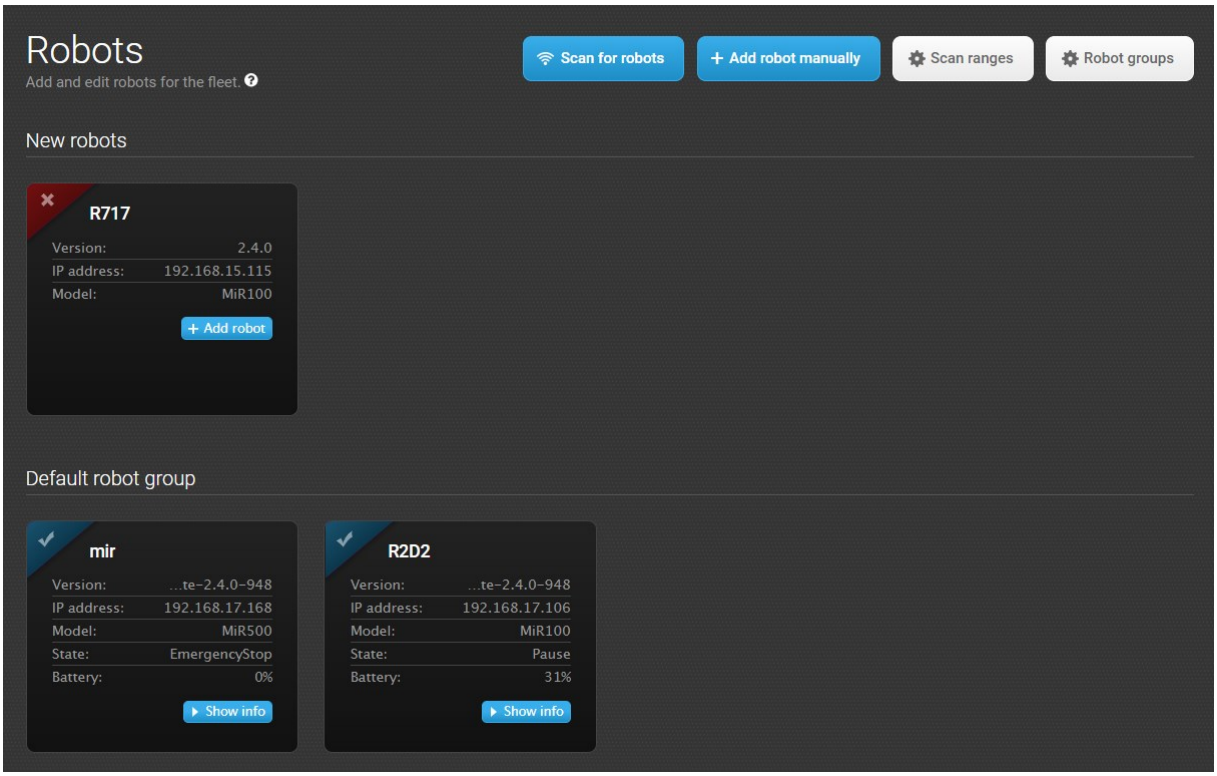
You can add new robots to MiR Fleet by scanning the network for robots or adding them manually.

Use the **Scan for robots** button to find available robots on the network and the **Add robot manual** button if you want to add robots by entering their IP addresses.

In the overview of robots on the fleet, each robot has an icon in the top left corner indicating its status.

- A blue checkmark indicates that the robot is active.
- A red cross indicates that the robot is not yet active or has been deactivated.
- A yellow exclamation mark indicates that the robot has a wrong software version. All robots and MiR Fleet must have the same software version.

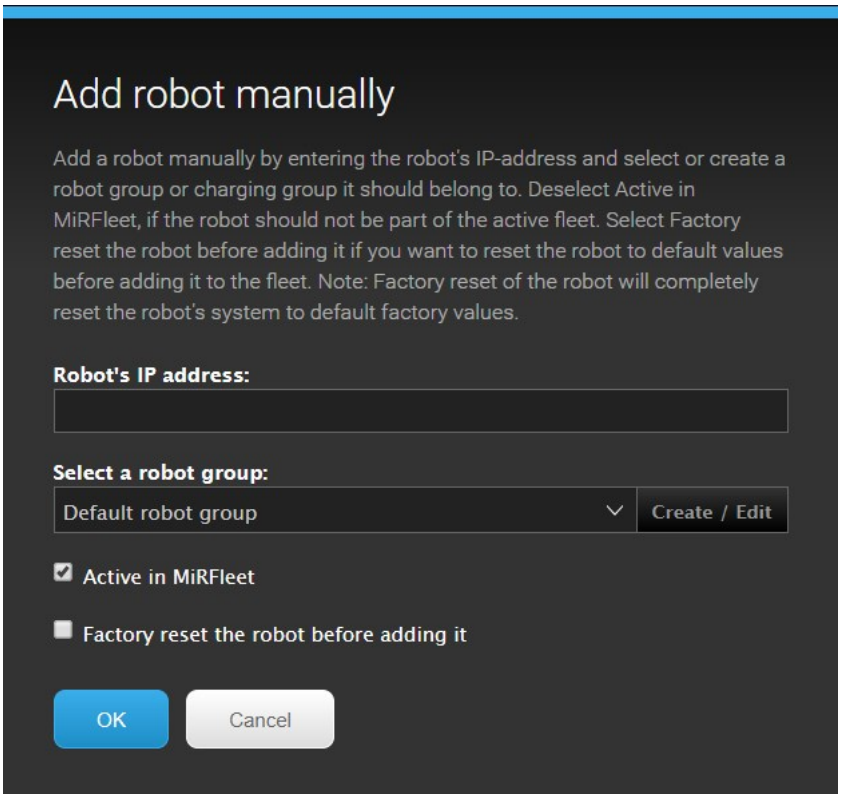
Select **Show info** to see all details on the robot's status, IP address etc. You can also open the robot's own interface by selecting **Show info** and then the **Go to robot interface** button.



Add robot manually

Add a robot manually by entering the robot's IP address, and select or create a robot group or charging group it should belong to. Deselect **Active in MiR Fleet** if the robot should not be part of the active fleet. Select **Factory reset the robot before adding it** if you want to reset the robot to default values before adding it to the fleet.

Note: Factory resetting the robot completely resets the robot's system to default factory values.



Scan for robots

Scanning for robots is a fast way to add robots on the same network to the fleet. It searches for the nearest robot WiFi addresses and lists the found robots on the screen. Subsequently you can add the robots to the fleet.

Groups

Robots controlled by MiR Fleet can be organized in groups each of which are dedicated to specific missions. Each robot can be assigned to one robot group and one charging group.

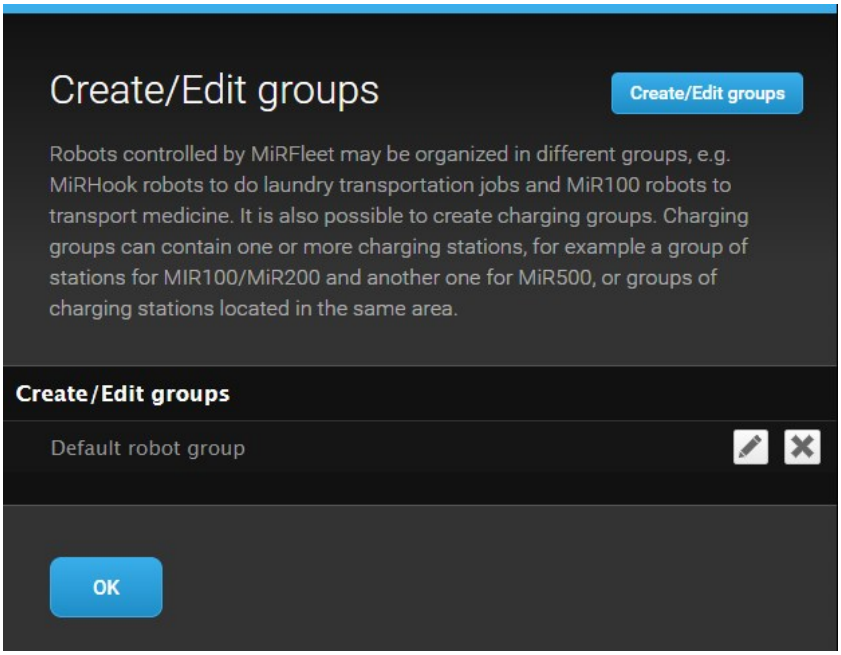
A robot group is a collection of mission groups that all robots in the group are allowed to execute. For example, you can use robot and mission groups to restrict a group of MiR Hook robots to only perform missions for transporting carts.

A charging group is used to organize charging stations into group based on, for example, their location. This is useful if you have enabled auto charging, and you have a set of chargers and robots in two isolated areas. Using charging groups ensures that robots from one area do not try to dock to charging stations in the second area.

You can read more about mission groups in the section Creating a mission on page 32.

Create robot or charging group

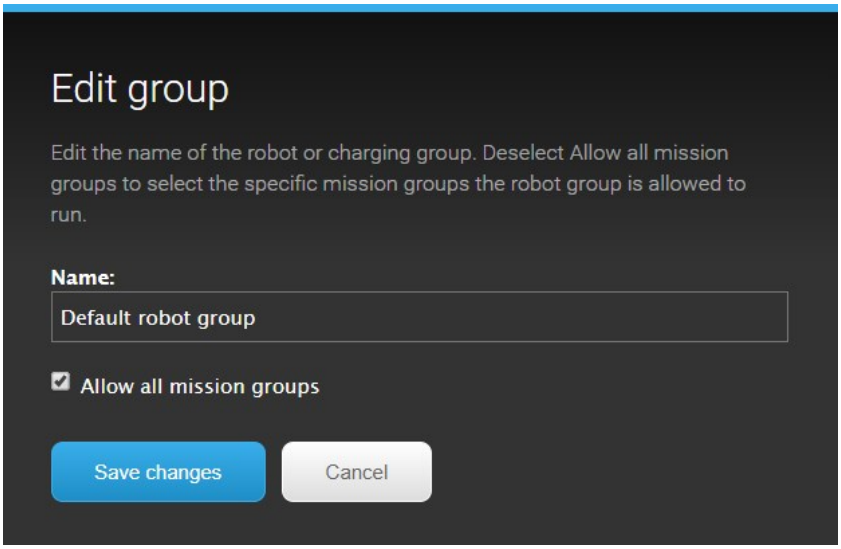
Create a group by selecting a name, and choose if it should be a robot group or a charging group. If you create a robot group, deselect **Allow all mission groups** to select the specific mission groups the robot group is allowed to run.



Edit group

Edit the name of the robot or charging group.

For robot groups, you can deselect **Allow all mission groups** to select from all available missions groups.

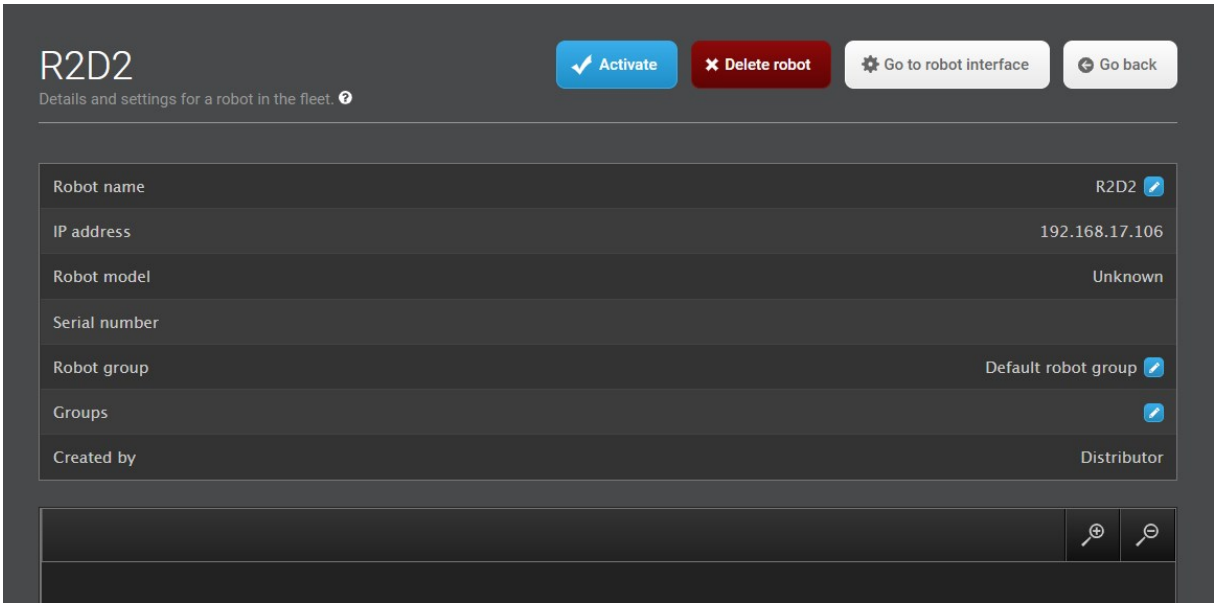


Show info

You can open a detailed view of the individual robots connected to MiR Fleet.

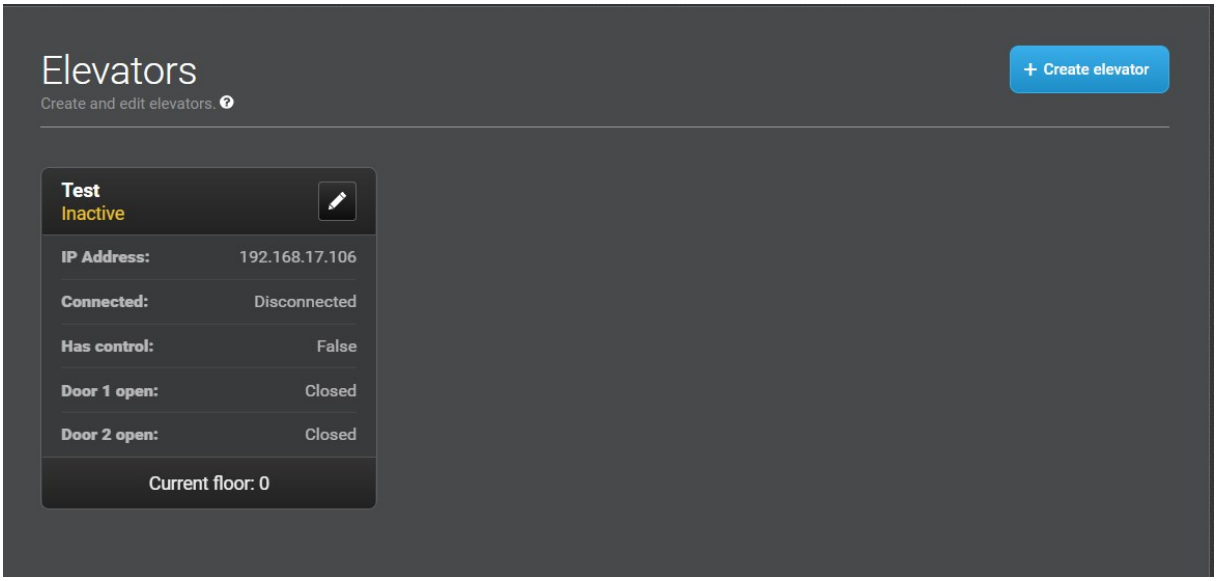
Select **Show info** to see and edit the details of the robot, such as its name and robot group. You can also view statistics of the particular robot's performance in percentage, such as errors, idle time, charging time, and missions, and view the robot's map.

Select **Go to robot interface** to open the robot's interface in a new tab.



4.3 Elevators

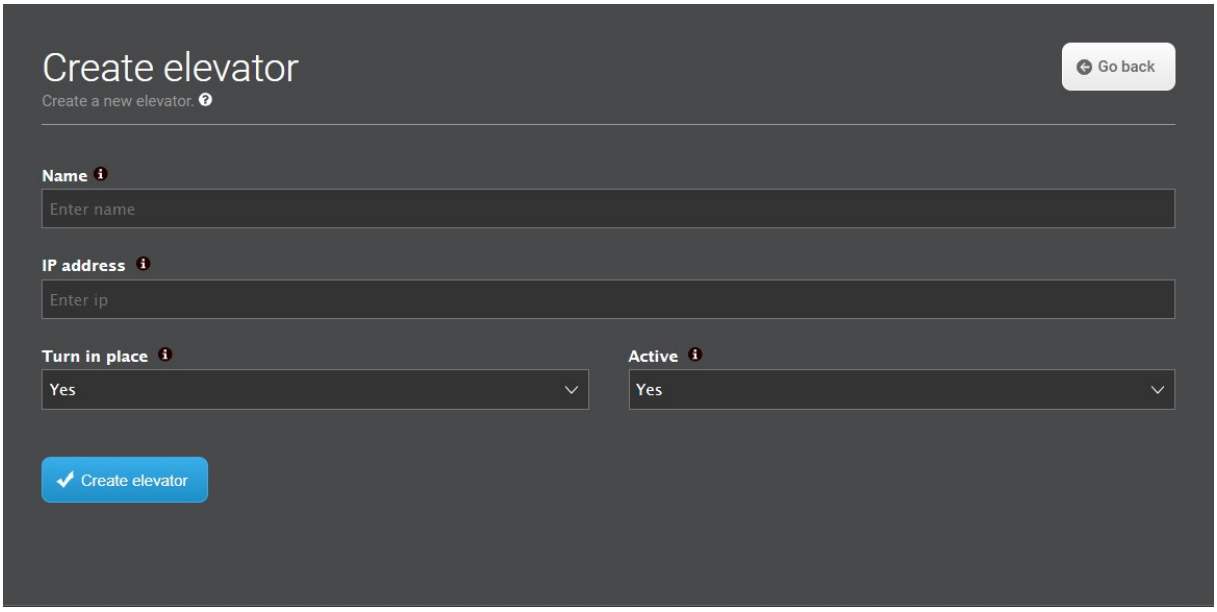
In installations with an elevator, transitions from one map (floor) to another are handled automatically by MiR Fleet. When an order is given to move to a position in a map representing a different floor, the fleet control takes over and brings the robot into the elevator and out again on the correct floor. MiR Fleetthen handles the map switch internally.



Create elevator

The steps for setting up an elevator are:

1. Set up name and IP address or the elevator, and set the elevator active or inactive in **Create elevator**.
2. Add floors with information about maps, positions, entry, and exit missions in **Edit elevator**.

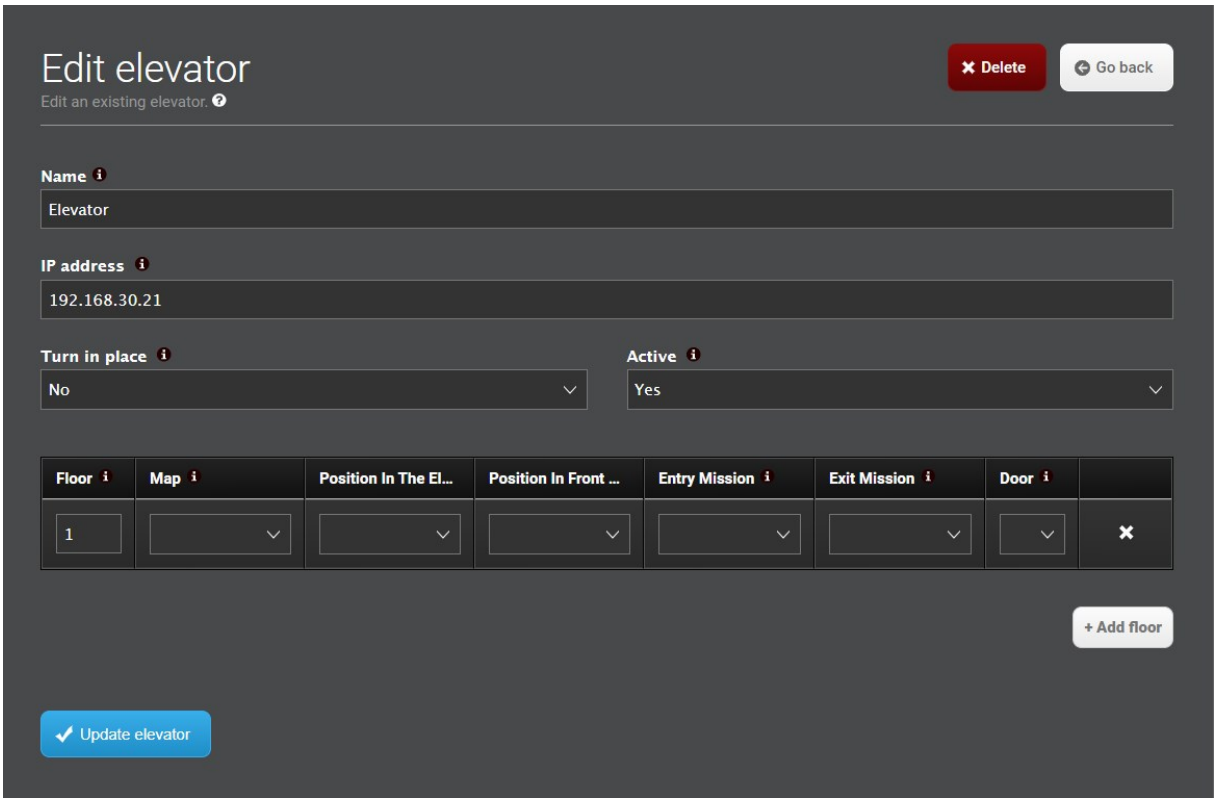


The **Create elevator** dialog has the following fields:

- **Name**
  Enter a name for the elevator
- **IP address**
  Enter a valid IP address for the elevator. The IP address is provided by the elevator system integrator.
- **Turn in place**
  Select whether or not the robot is allowed to turn in the elevator. Turning in the elevator might be relevant if the robot enters and exits the same elevator door and it must face front in both instances.
- **Active**
  Select whether or not the elevator should be actively used in the fleet.

Edit elevator

In **Edit elevator** you can add floors to elevators, and change the settings of an elevator. Select **+Add floor** to add a new floor.



When you add a new floor, you must enter the following details:

- **Floor**
  Enter the specific floor number. Floor designations must be numbers, for example, Ground floor could be represented by 0, and Basement by -1.
- **Map**
  Select the map that represents the floor. The map must include two robot positions that will enable the switching from one map to another.
- **Position in the elevator**
  Select the robot position representing the robot inside the elevator.
- **Position in front of the elevator**
  Select the robot position representing the robot outside the elevator. This is the position the robot goes to while waiting for the elevator to arrive and the doors to open.

- **Entry mission**
  An entry mission is not mandatory. An example of an entry mission could be a sound the robot plays as it enters the elevator. An entry mission must include a **Move** action with a variable position.
- **Exit mission**
  An exit mission is not mandatory. An example of an entry mission could be a sound the robot plays as it exits the elevator.
- **Door**

  Select 1 or 2 depending on the number of exits and entries in the elevator, and if the robot should use the same door to enter and exit the elevator or exit through the one opposite the entry.

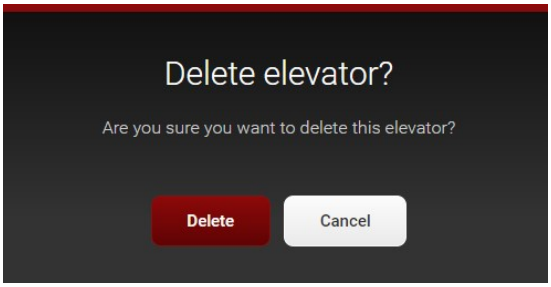
  1: The robot makes a 180° turn inside the elevator and exits through the same door it entered.

  2: The robot does not turn and exits through the door opposite the entry door.

Select **Update elevator** to save the settings.

Delete elevator

Delete an elevator by selecting **Delete** in the Edit elevator section.



4.4 Missions

A mission is a predefined series of actions that a robot within the fleet can be set to perform. A mission can be a simple transportation task between defined positions or a more complex task that includes both moving between positions and performing actions, such as opening an automatic door via Bluetooth signal, sounding a horn, or sending an email on arrival at a position.

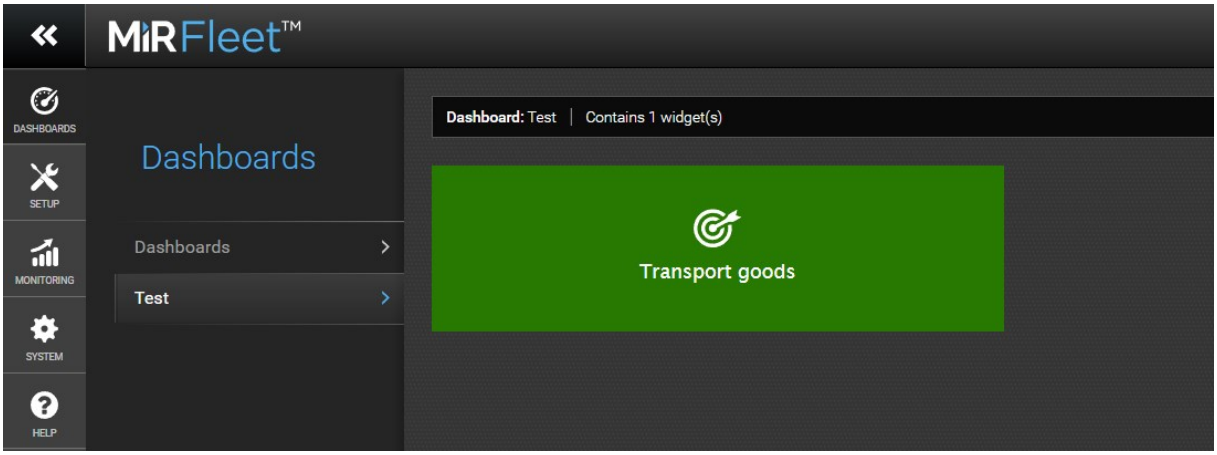
Missions are started by adding them to the schedule. It is possible to add them to the immediate mission queue by selecting **Run as soon as possible** when scheduling it.

Start mission

You can enqueue a mission in one of the following ways:

From a dashboard

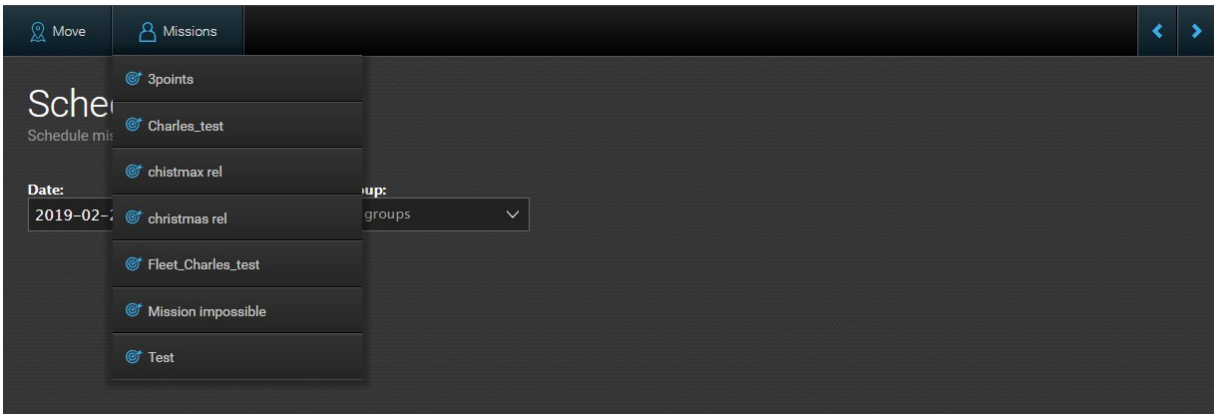
You can configure a Mission button widget on a dashboard.



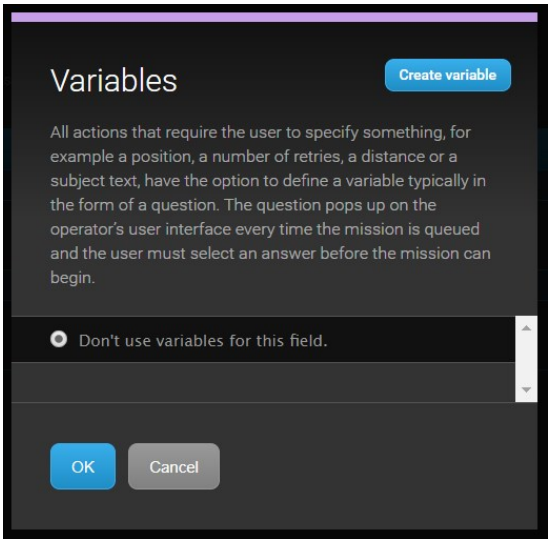
From the Scheduler menu

To enqueue a mission:

- Select **Missions** to schedule and run a mission.



If there are variable parameters in a mission, for example a variable position, you will be asked to select the position when adding the mission to the queue.



The selected parameters are shown in blue text.

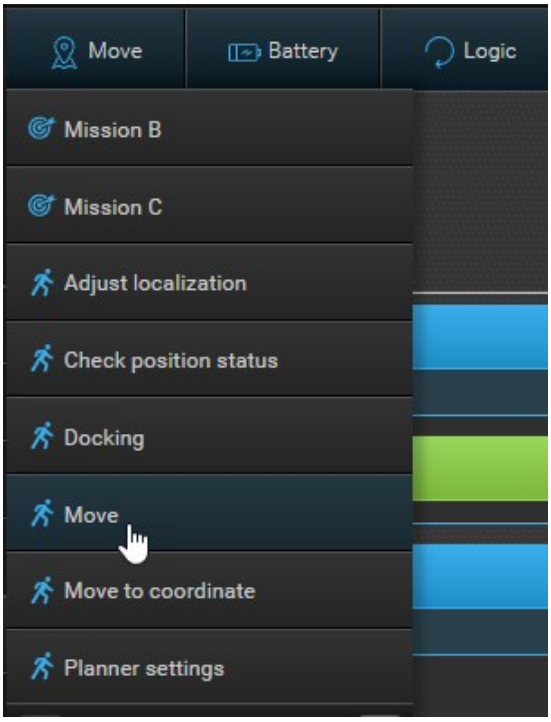
Creating a mission

This section describes what a mission is and how to make one.

MiR robots function through missions that the user creates. A mission is made up of actions, such as: move actions, logic actions, cart pick-up/delivery and sounds, which can be put together as building blocks to form a mission with as many actions as needed. Missions themselves can also be embedded into other missions.

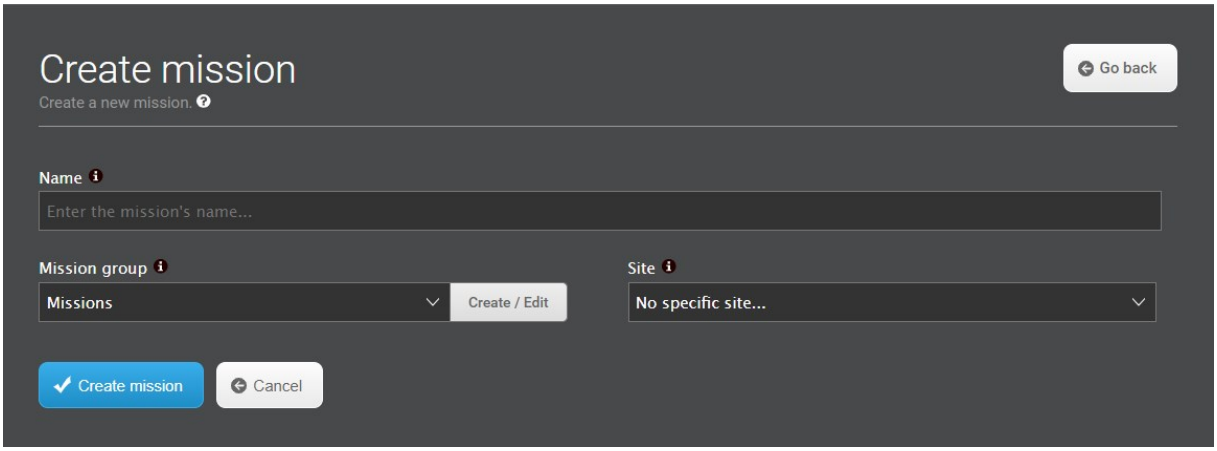
Most actions have adjustable parameters, for example which position to go to. Most actions also have adjustable variables where the user is asked a question regarding the variable every time the mission is added to the queue. This can be practical in cases where the robot performs the same series of actions in different areas of the facility that requires different variables in the mission action.

When you create a mission, you can save it in the default **Missions group**, or can choose to save it in any of the available actions groups. The actions groups are found in the top bar of the mission editor window, and you can distinguish missions from actions by the small icons shown next to their names: missions have a target icon, and actions have a running-man icon.



You can find more information about mission groups in the following section, **Mission groups** and about actions in Mission actions on page 38.

The **Mission** section also comes with a set of default missions that you can use and/or modify.



Fill in the following information to create a misison:

- **Name**
  The name must be unique and is used to identify the mission. For example, *Go to charging*

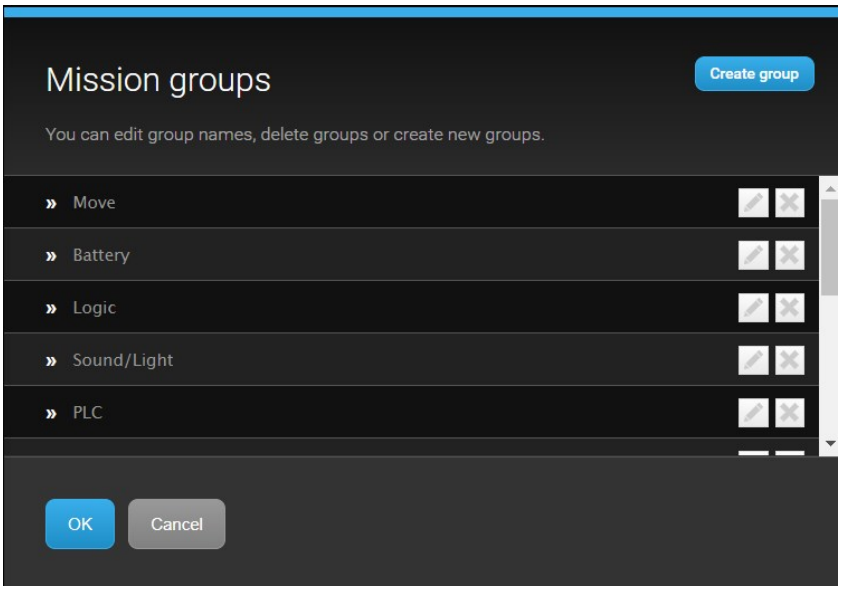
station, *Deliver spare parts* or *Warehouse to production line 1*.

- **Mission group**
  Select which group you want the mission to be part of.
- **Site**
  If you are using more than one site, select which site you want the mission to belong to.

Select **Create mission** to save the settings.

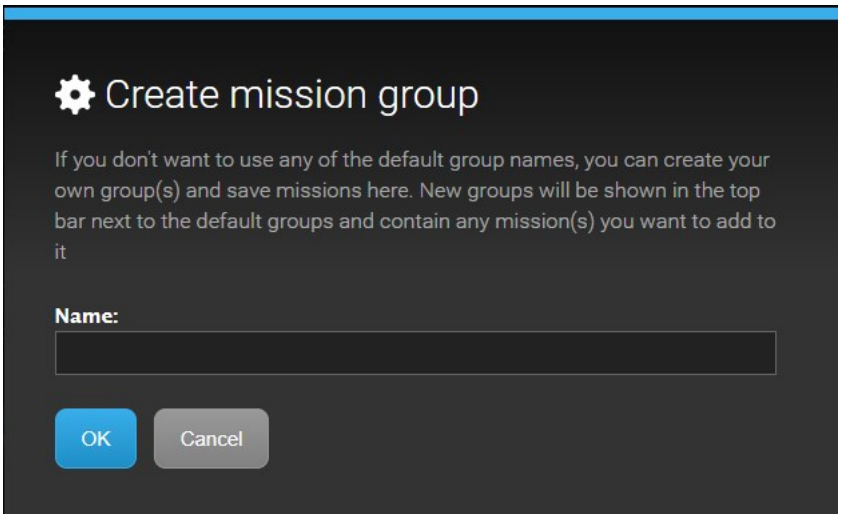
Mission groups

Each mission group has a number of predefined actions that can be selected when you build the mission. One mission can contain actions from several groups. When you save the new mission, it will be placed in the selected group and can be used as a separate mission or as an embedded mission in other missions.



Create mission group

If you don't want to use any of the default group names, you can create your own group(s) and save missions here. New groups will be shown in the top bar next to the default groups and contain any mission(s) you want to add to it



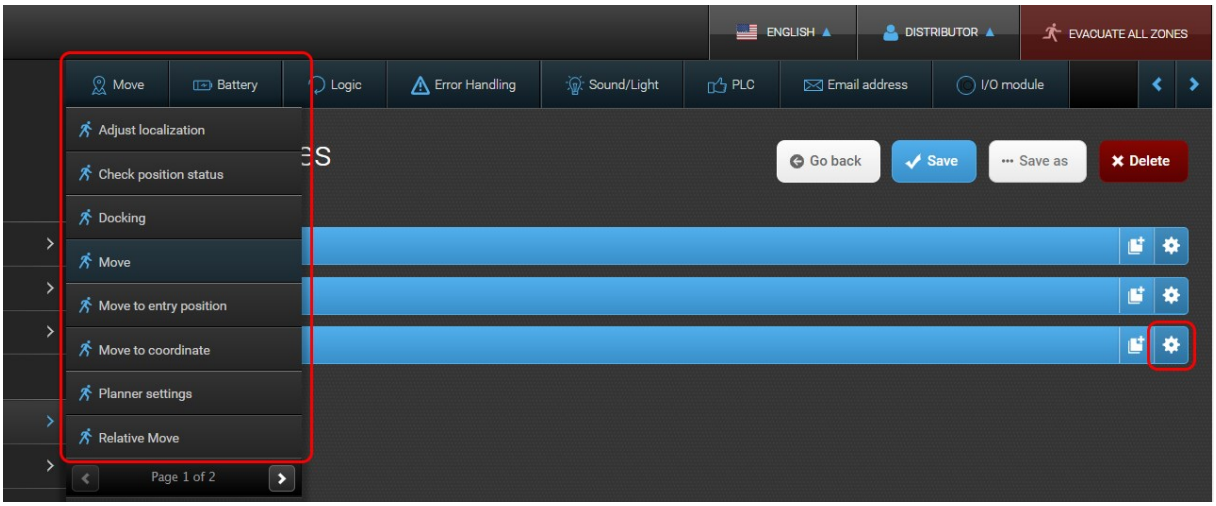
Mission editor

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

Actions and missions are grouped together in the top bar menus. All predefined actions are identified by a running-man icon. User created missions are placed together with actions in the group to which you append them and can be distinguished from actions by a target icon next to their names.

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

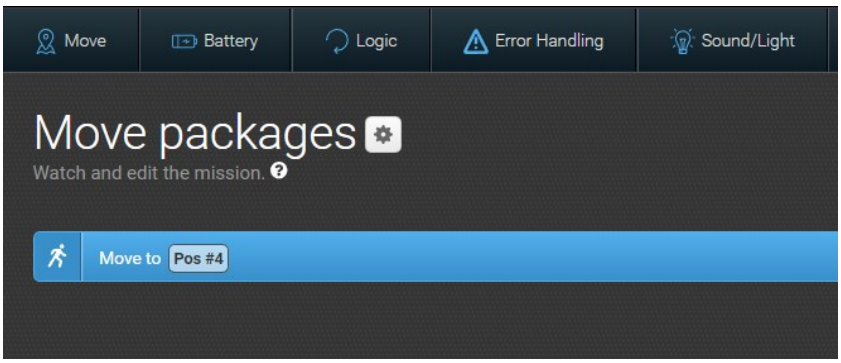
1. Drag the actions up or down with the four-headed arrow at the far left of the action line to sort them in the desired order. The actions are executed in a top-to-bottom order.
2. Set the parameters for the selected action by selecting the gear icon at the far right of the action line.



Change mission settings

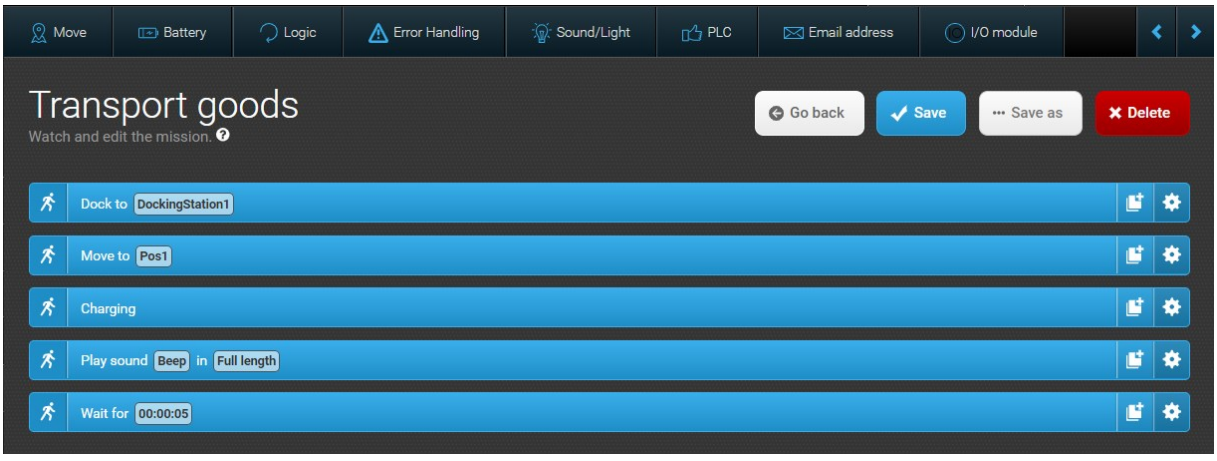
To change the name and mission group of a mission, in the mission editor window, select the gearwheel next to the name of the mission.

In the Mission editor window, move the mouse over the name of the mission, and select the gearwheel.



Save mission

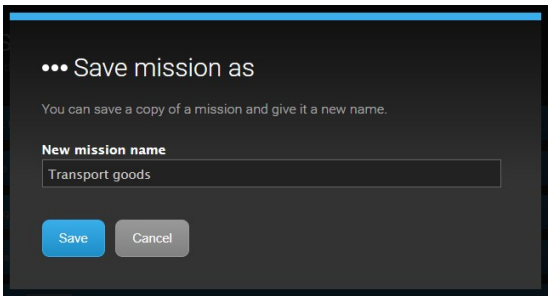
When you have completed the mission by adding all actions and sorted them in the desired order, select **Save** to save the mission.



Save mission as

You can save a copy of a mission and give it a new name. That way it is easy to create a new mission based on an existing one.

In the Mission editor window, select **Save as**.

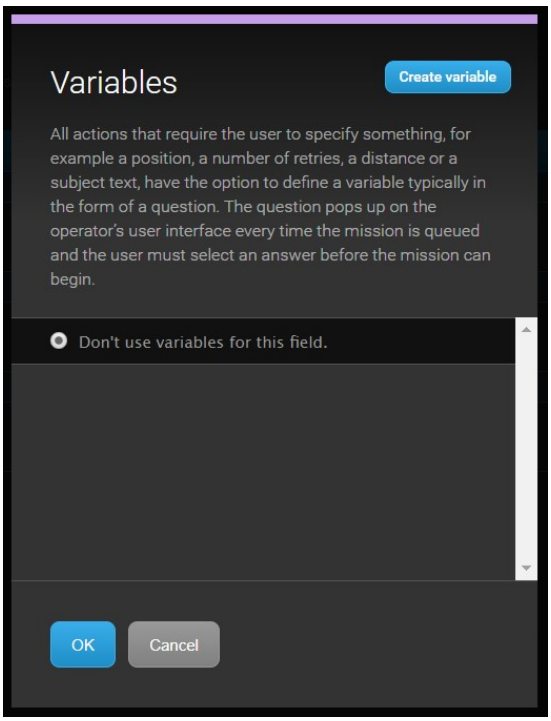


Mission actions

Actions used in missions are in the Groups tool bar at the top of the window.

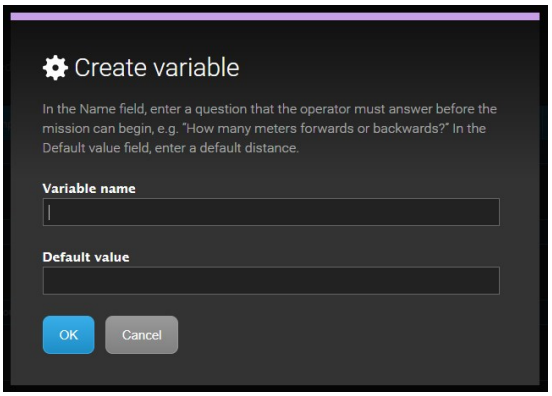
Variables

All actions that require the user to specify something, for example, a position, a number of retries, a distance, or a subject text, have the option to define a variable. We recommend naming variables in the form of a question that describes what the value you are inserting should be used for. The question pops up on the operator's user interface every time the mission is queued and the user must select an answer before the mission can begin.



Create variables

In the **Name** field, enter a question that describes what the variable is used for, for example, “How far should the robot move?” In the **Default value** field, enter a default distance.



Move

This mission group contains the following actions.

Action description	Parameter descriptions
### Adjust localization An **Adjust localization** action adjusts the robot to the correct position in the map. This is useful if it has to move through an area with many dynamic obstacles where the localization is likely to drift.	No adjustable parameters.
### Check position status Positions of the following types can have the states **free** or **occupied**: • Robot position • Cart position • Shelf position • Pallet rack position • Staging position	Position Select a position from the drop-down list, or select the **XYZ** icon to define a variable. Option Select if the robot should check if a position is empty or occupied, or select the **XYZ** icon to define a variable

Action description	Parameter descriptions
This action checks the state of the position for a given amount of time. If the condition in the action is satisfied, the robot continues executing the mission. Otherwise, the robot raises an error. Example: Use this action for the following purposes: • Check whether the load is on the pallet rack before docking to the rack. • Check whether the cart is in position before picking it up with the hook. • Check whether the target position is free.	Timeout (seconds) 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 (free, occupied, etc.) and the time expires, the robot shows an error.
Docking A Docking action sets a position the robot should dock to, for example, a charging station or a V, VL, or L-marker.	Marker Select a marker from the drop-down list or select the **XYZ** icon to define a variable.
Move A **Move** action defines a map position the robot should move to.	Position Select a position from the drop-down list, or select the **XYZ** icon to define a variable. Retries (Blocked Path) Set the number of times the robot should try to reach the position if the path is blocked, or select the **XYZ** icon to define a variable. If, after the number of retries, the path is still blocked, the robot stops and produces an error message. Distance threshold

Action description	Parameter descriptions
	Depending on how accurately the robot is required to position itself on the goal position, the threshold can be increased or decreased. The default is 0.1 m.
## Move to coordinate A **Move to coordinate** action defines an X, Y position on the map the robot should move to. The map's origin, i.e. the 0,0 position with 0 orientation, is located at the point where the robot began mapping. If in doubt of the map's origin, you may create a fixed position with those values as a reference point for the **Move to coordinate** position you wish to create.	X Enter the X (horizontal) map position the robot should move to, or select the **XYZ** icon to define a variable. Y Enter the Y (vertical) map position the robot should move to, or select the XYZ icon to define a variable. Orientation Enter the orientation in degrees, that is the way the robot should turn relatively to the 0-orientation when arriving on the position, or select the **XYZ** icon to define a variable. A positive value rotates the robot counterclockwise, and a negative value rotates it clockwise. Retries (Blocked Path) Set the number of times the robot should try to reach the position if the path is blocked, or select the **XYZ** icon to define a variable. If, after the number of retries, the path is still blocked, the robot stops and produces an error message. Distance threshold Depending on how accurately the robot is required to position itself on the goal

Action description	Parameter descriptions
	position, the threshold can be increased or decreased. The default is 0.1 m.
## 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 dynamic obstacles, the so-called Line-following mode.	Planner settings **Default speed**: sets the default 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**.
## 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 move the robot away from docking positions in narrow passages.	X Enter a value in meters for how much the robot should move forwards or backwards from its current position. A positive value moves the robot forwards and a negative value moves it backwards. Select the **XYZ** icon if you want to define a variable. Y

Action description	Parameter descriptions
When using a **Relative move**, be aware that the robot can move into Forbidden zones and through walls on the map. The robot will still drive with Collision detection and will not hit anything, but if there is a black line on the map, and the wall does not exist physically, it will drive through it.	Enter a value in meters for how much the robot should move left or right from its current position. A positive value moves the robot to the right and a negative value moves it to the left. Select the **XYZ** icon if you want to define a variable. Orientation Enter a value in degrees for how much the robot should turn (yaw) when finalizing the **Relative move**. A positve value moves it counterclockwise and a negative value moves it clockwise. Select the **XYZ** icon if you want to define a variable. Maximum linear speed Enter a value in meters per second for the max. forward or backward speed during the **Relative move**, or select the **XYZ** icon to define a variable. Maximum angular speed Enter a value in meters per second for the max. turn speed during the **Relative move**, or select the **XYZ** icon to define a variable. Collision detection Select the check box to turn on automatic Collision detection. Collision detection may be turned off if the robot needs to turn around its own center in tight spaces, for example, in an elevator. If collision detection is on, the robot will try to turn, but will go into emergency stop

Action description	Parameter descriptions
	as soon as it detects the surrounding walls.
## Set footprint A **Set footprint** action makes it possible to change the robot's default footprint. This can be necessary, for example, if the robot carries a top module with larger proportions than the robot's own or you want to extend the footprint when the robot tows a cart. The footprint is shown as a shadow around the robot on the map.	Footprint Select a created footprint, or select the **XYZ** icon to define a variable. Footprints must be created in the footprint editor found under **Setup > Footprints**.
## Switch map A **Switch map** action is required if the robot needs to switch automatically from one map to another within a mission, for example, if the robot is operating in a large site that includes more than one map. 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. The robot automatically chooses the start position when sent to a position in another map.	Entry Position In the map you are switching to, select the position the robot should start from after the map transition, or select the **XYZ** icon to define a variable. 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.

Battery

This mission group contains the following actions.

Action descriptions	Parameter descriptions
Charging A **Charging** action is used to make the robot go to a charging station for automatic battery recharge. 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 moves to a previously defined charging position near the charging station.	Minimum Time Set a minimum amount of time the robot should charge before it moves on, or select the **XYZ** icon to define a variable. 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 moves on, or select the **XYZ** icon to define a variable. 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

Action descriptions	Parameter descriptions
	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

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### Break A **Break** action is used to interrupt a loop action.	No adjustable parameters.
### Continue A Continue action is used to abort the rest of a loop action and continue from the start.	No adjustable parameters.
### If **If** actions make 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	Compare Select either **Battery Percentage**, **PLC Register**, **Pending Missions**, or **I/O input**, or select the **XYZ** icon to define a variable. Module For I/O inputs: select an I/O module from

Action descriptions	Parameter descriptions
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, for example, register 6=1 indicating that a lift is lowered when the robot arrives at a shelf. The **True** action (the lift is lowered) could then be a **Wait for PLC Register** action, for example, wait for register 6 to reset to 0. **I/O input**: An **If** action on an I/O input checks if the register is set to a certain value, for example, register 6=1 indicating	the drop-down list, or select the **XYZ** icon to define a variable. Index For PLC registers: enter the required index number (Integer registers 1-100, Floating point registers 101-200), or select the **XYZ** icon to define a variable. Operator Select the arithmetic operator you want to use, or select the **XYZ** icon to define a variable. **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, or select the **XYZ** icon to define a variable.

Action descriptions	Parameter descriptions
that a lift is lowered when the robot arrives at a shelf. The **True** action (the lift is lowered) could then be a **Wait for PLC register** action, for example, wait for register 6 to reset to 0.	
## Loop A Loop action makes it possible to have the robot repeat a mission either a specified number of times or endlessly (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.	Iterations Set the number of times the robot should run the loop, or select the **XYZ** icon to define a variable. Content Insert the actions that should be performed in each loop iteration.
## Pause A Pause action pauses the mission execution until an operator selects **Continue**. This can be used in missions where the robot should wait for an operator to do something, for example, placing items on the robot and manually sending the robot on to another position by selecting **Continue**.	No adjustable parameters.
## Prompt user A **Prompt user** action can be used when it is required to stop and ask the operator what the next step in the mission should be. The action consists of a Yes action, a No action and a Time-out action. The	Question Write a question which can be answered with a yes or a no, or select the **XYZ** icon to define a variable. The operator will be asked to answer yes or no to the question, and if the answer is no, the robot will carry on with the No action.

Action descriptions	Parameter descriptions
operator will be asked, for example, “Do you want to go to position X?”. If the operator answers Yes, the robot will go to position X. If the operator answers No, the robot will carry on to the defined No action, for example, move to an alternative position. If the operator does not answer yes or no within a given time, the Time-out action will be executed, for example, sending an email.	User group Select which User group the mission is intended for or select the **XYZ** icon to define a variable. Timeout (seconds) Set a timeout for when the robot should continue if the user does not answer the question. If the timeout is reached, the robot will execute the actions in the Timeout scope.
## Return A Return action is used to abort a mission. It can be used, for example, as catch action in a **Try/Catch** action.	No adjustable parameters.
## Wait A Wait action pauses the mission in a given period of time.	Time Set an amount of time the robot should wait before moving to next action in the mission.
## While While actions make 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 the while conditions. **Battery Percentage**: A **While** action on battery percentage checks if the battery	Compare Select either **Battery Percentage**, **PLC Register**, **Pending Missions**, or **I/O input**, or select the **XYZ** icon to define a variable. Module For I/O inputs: select an I/O module from the drop-down list, or select the **XYZ** icon to define a variable. Index

Action descriptions	Parameter descriptions
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, for example, register 6=1 indicating that a lift is lowered when the robot arrives at a shelf. **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. An example could be to send the robot to a charging station if the number queued missions exceeds a certain amount. **I/O input**: A **While** action on an I/O input checks if the register is set to a certain value, for example, register 6=1 indicating that a lift is lowered when the robot arrives at a shelf. The **True** action (the lift is lowered) could then be a **Wait for PLC register** action, for example wait for register 6 to reset to 0.	For PLC registers: enter the required index number (Integer registers 1-100, Floating point registers 101-200), or select the **XYZ** icon to define a variable. Operator Select the arithmetic operator you want to use, or select the **XYZ** icon to define a variable. **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, or select the **XYZ** icon to define a variable. Content Insert the actions that should be performed in each loop iteration.

Error handling

This mission group contains the following actions.

Action descriptions	Parameter descriptions
Create log A **Create log** action is used to create user generated error logs. A **Create log** action can be generated as an error log (**Monitoring** > **Error logs**) under the module name User, showing the description entered here. This is useful in, for example, a try/catch action where a log is created when catching an unsuccessful try.	Description Enter a description for the log type you want to create, or select the **XYZ** icon to define a variable. An example of a description could be “Mission x fail log”
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.	Message Enter the message you want displayed on the user interface when the mission is run, or select the **XYZ** icon to define a variable.
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 in case, for example, a position is blocked. A **Try/Catch** action consists of one action **Try** which the robot should attempt to complete, and a second action **Catch** which is used in case the **Try** action fails.	Try Select the action(s) that should be attempted. Catch Select the action that should be performed if the action(s) within **Try** fails.

Sound/Light

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### Show light A **Show light** action sets a light that the robot will show at a given point in the mission. The action is a combination of light effect, speed, color, and intensity.	Effect Select a light effect from the drop-down list, for example, 'Blink', or select the **XYZ** icon to define a variable. Speed zones Select a fast or slow speed from the drop-down list, or select the **XYZ** icon to define a variable. Color 1 Select a color from the drop-down list, or select the **XYZ** icon to define a variable. If you select two different colors for Color 1 and 2, the robot will alternate between the two. Color 2 Select a color from the drop-down list, or select the **XYZ** icon to define a variable. If you select two different colors for Color 1 and 2, the robot will alternate between the two. Intensity Set the intensity of the light, or select the **XYZ** icon to define a variable. The intensity is defined as a percentage where 100 is full intensity. Timeout (seconds)

Action descriptions	Parameter descriptions
	Set an amount of time the light should show, or select the **XYZ** icon to define a variable.
## 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**.	Sound Select a sound from the list, or select the **XYZ** icon to define a variable. If you want to hear the sounds before selecting one, go to **Setup** > **Sounds**. You can hear the sounds on your computer by selecting the headset symbol. Volume Set the volume of the sound (0-100), or select the **XYZ** icon to define a variable. 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 in the Duration window. 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

Action descriptions	Parameter descriptions
	anywhere in the mission. This will stop the playing of the current sound no matter which mode you have selected. Duration Set an amount of time the sound should play, or select the **XYZ** icon to define a variable.
### Stop sound Stop playing the current sound.	No adjustable parameters.

PLC

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### 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.	Register Select a specific PLC register, or select the **XYZ** icon to define a variable. Registers 1 to 100 are reserved for integers and registers from 101-199 for floating point numbers. Action Select an action from the dropdown list, or select the **XYZ** icon to define a variable. The options are **Set**, **Add**, and **Subtract**. Value Enter a value for the selected register, or select the **XYZ** icon to define a variable. If the selected register is between 1 and

Action descriptions	Parameter descriptions
	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 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.	Register Select a specific PLC register, or select the **XYZ** icon to define a variable. 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, or select the **XYZ** icon to define a variable. 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, or select the **XYZ** icon to define a variable. 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.
## 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 Select a specific PLC register, or select the **XYZ** icon to define a variable. Registers 1 to 100 are reserved for integers and

Action descriptions	Parameter descriptions
register.	registers from 101-199 for floating point numbers. Value Enter a value for the selected register, or select the **XYZ** icon to define a variable. 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 (seconds) Define how long the robot should wait for the value in the set register before giving an error.

Email address

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### 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 it 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**.	Recipient Select a recipient from the drop-down list, or select the **XYZ** icon to define a variable. The recipients on the list come from the Users section. Subject Type a subject of the email, or select the **XYZ** icon to define a variable. Message Write the message that the robot should

Action descriptions	Parameter descriptions
	send to the selected email address when the mission is executed, or select the **XYZ** icon to define a variable.

I/O module

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### Connect Bluetooth A **Connect Bluetooth** action is used when the robot must connect and stay connected to a Bluetooth module.	Module Select a Bluetooth module from the drop-down list, or select the **XYZ** icon to define a variable. Bluetooth modules are set up in the Bluetooth relays section (**Setup** > **Bluetooth relays**).
### Disconnect Bluetooth A **Disconnect Bluetooth** action is used when the robot must close the connection to a Bluetooth module.	No adjustable parameters.
### Set output An **I/O** action is used when the robot needs to send a command to an I/O module.	Module Select an I/O module from the drop-down list, or select the **XYZ** icon to define a variable. I/O modules are set up in the section **Setup** > **I/O modules**. SMTP port Enter which output port relay should be activated (1-4) , or select the **XYZ** icon to define a variable. Operation

Action descriptions	Parameter descriptions
	Set operation to **On** or **Off**, or select the **XYZ** icon to define a variable. For example, select **On** if the I/O module is used to open a door. Timeout (seconds) Set an amount of time the relay should stay on, or select the **XYZ** icon to define a variable.
## 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.	Module Select an I/O module from the drop-down list, or select the **XYZ** icon to define a variable. I/O modules are set up in the section **Setup** > **I/O modules**. Output Enter which output port relay should be activated (1-4) , or select the **XYZ** icon to define a variable. Operation Set operation to **On** or **Off**, or select the **XYZ** icon to define a variable. For example, select **On** if the I/O module is used to open a door. Timeout (seconds) Set an amount of time the relay should stay on, or select the **XYZ** icon to define a variable.
## Wait for input	Module

Action descriptions	Parameter descriptions
A **Wait for input** action is used when the robot needs to wait for an I/O module to respond.	Select an I/O module from the drop-down list, or select the **XYZ** icon to define a variable. I/O modules are set up in the section **Setup** > **I/O modules**. Input Enter the input port number or select the **XYZ** icon to define a variable. Value Set operation to **On** or **Off**, or select the **XYZ** icon to define a variable. For example, select **Off** if the **Wait for input** action is used to stop a conveyor belt. Timeout (seconds) Define how long the robot should wait for the input to match the state set in Value before giving an error.

Cart

This mission group contains the following actions.

Action descriptions	Parameter descriptions
### Pick up cart Go to a position and pick up a cart.	Position Select a position from the drop-down list, or select the **XYZ** icon to define a variable. 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 action will produce an error.

Action descriptions	Parameter descriptions
Place cart Place the cart currently attached to the robot at a specific position.	Position Select a position from the drop-down list, or select the **XYZ** icon to define a variable. 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.

Shelf

This mission group contains the following actions.

The actions in this mission menu are the template missions included in the software. The actions are visible only if **Shelf** is enabled in **System** > **Settings** > **Features**.

Action descriptions	Parameter descriptions
Pick up MiR500/MiR1000 shelf This template mission sends a MiR500/MiR1000 robot to a shelf position	Marker position Select a marker from the drop-down list or select the **XYZ** icon to define a

Action descriptions	Parameter descriptions
to pick up a shelf, change its footprint, and move away from the shelf position again.	variable. Marker type Select a marker type from the drop-down list or select the **XYZ** icon to define a variable. Shelf footprint Select a footprint, or select the **XYZ** icon to define a variable. Mute front Select **Muted** to mute the Personnel detection means in the front of the robot. Mute rear Select **Muted** to mute the Personnel detection means in the rear of the robot. Mute sides Select **Muted** to mute the Personnel detection means to thee sides of the robot. Undocking distance Enter a value in meters for how much the robot should move forwards or backwards from its current position. A positive value moves the robot forwards and a negative value moves it backwards. Select the **XYZ** icon if you want to define a variable.
Pick up Shelf I/O This template mission sends a robot with a shelf lifting application controlled with	Module For I/O inputs: select an I/O module from the drop-down list, or select the **XYZ** icon

Action descriptions	Parameter descriptions
I/O modules to a shelf position to pick up a shelf and change its footprint.	to define a variable. Marker position Select a marker from the drop-down list or select the **XYZ** icon to define a variable. Marker type Select a marker type from the drop-down list or select the **XYZ** icon to define a variable. Shelf footprint Select a footprint, or select the **XYZ** icon to define a variable.
## Pick up Shelf PLC This template mission sends a robot with a shelf lifting application controlled with PLC registers to a shelf position to pick up a shelf and change its footprint. See the *MiR shelf lift application Operating guide* for information regarding how the PLC registers control a shelf application.	Marker position Select a marker from the drop-down list or select the **XYZ** icon to define a variable. Marker type Select a marker type from the drop-down list or select the **XYZ** icon to define a variable. Shelf footprint Select a footprint, or select the **XYZ** icon to define a variable.
## Place MiR500/MiR1000 shelf This template mission makes the robot place a shelf at the current position,	Mute front Select **Muted** to mute the Personnel detection means in the front of the robot.

Action descriptions	Parameter descriptions
change back to the default footprint, and move away from the position again.	Mute rear Select **Muted** to mute the Personnel detection means in the rear of the robot. Undocking distance Enter a value in meters for how much the robot should move forwards or backwards from its current position. A positive value moves the robot forwards and a negative value moves it backwards. Select the **XYZ** icon if you want to define a variable.
Place Shelf I/O This template mission makes a robot with a shelf lifting application controlled with I/O modules place a shelf at the current position and change back to the default footprint.	Module For I/O inputs: select an I/O module from the drop-down list, or select the **XYZ** icon to define a variable.
Place Shelf PLC This template mission makes a robot with a shelf lifting application controlled with PLC registers place a shelf at the current position and change back to the default footprint.	No adjustable parameters.

UR

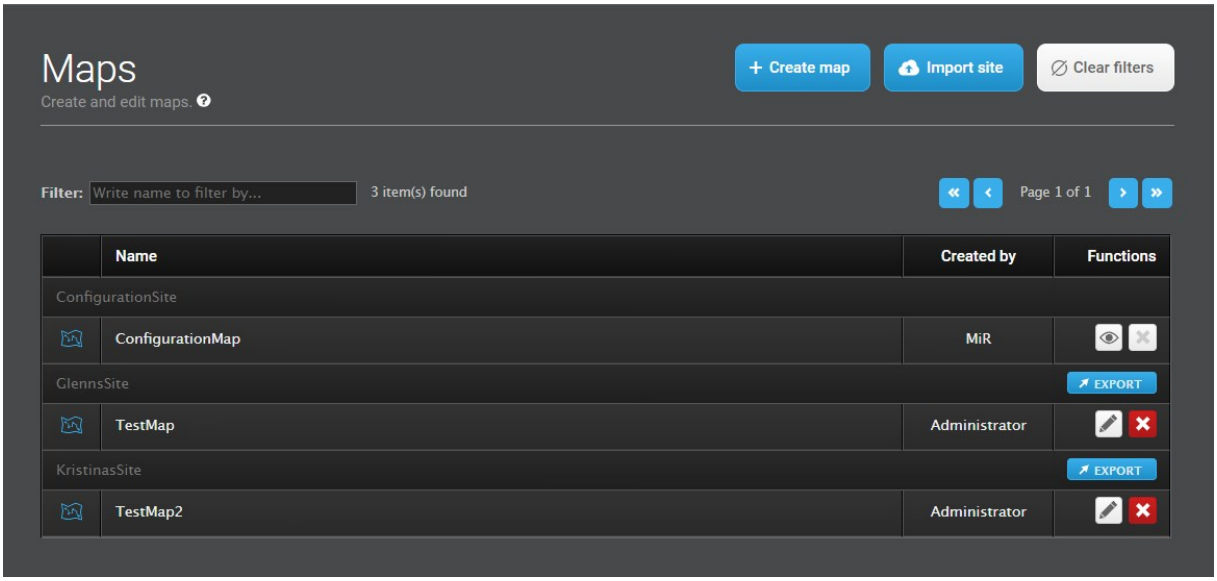
This mission group contains the following actions.

Action descriptions	Parameter descriptions
Run UR program	Program name

Action descriptions	Parameter descriptions
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.	Enter the name of the UR program (without the urp extension), or select the **XYZ** icon to define a variable.

4.5 Maps

In the **Maps** section, you create or edit the maps the robots use to navigate by. All maps must belong to a site, which is the overall container for one or more maps used in the same facility. A site may, for example, have one map per floor or one per section of a large production hall. The important thing is that the maps are contained in the same site for the robot to be able to move from one map to another.



Import and export sites

A site can be exported and imported into other robots.

A site contains the following information:

- Zones
- Cart calibrations
- Cart types
- Carts
- Dashboards
- Data used in missions (I/O modules, sounds, cart types, cart calibrations, carts, shelf types, mission groups)
- Docking offsets (for the positions - not the global ones for the robot)
- I/O modules
- Maps
- Mission actions
- Mission groups
- Missions
- Path guides
- Path guides positions
- Paths
- Position transition list
- Positions/Markers
- Robot name
- Sessions (the site file itself)
- Shelf types
- Sounds
- User group permissions
- User groups
- Users
- Widgets

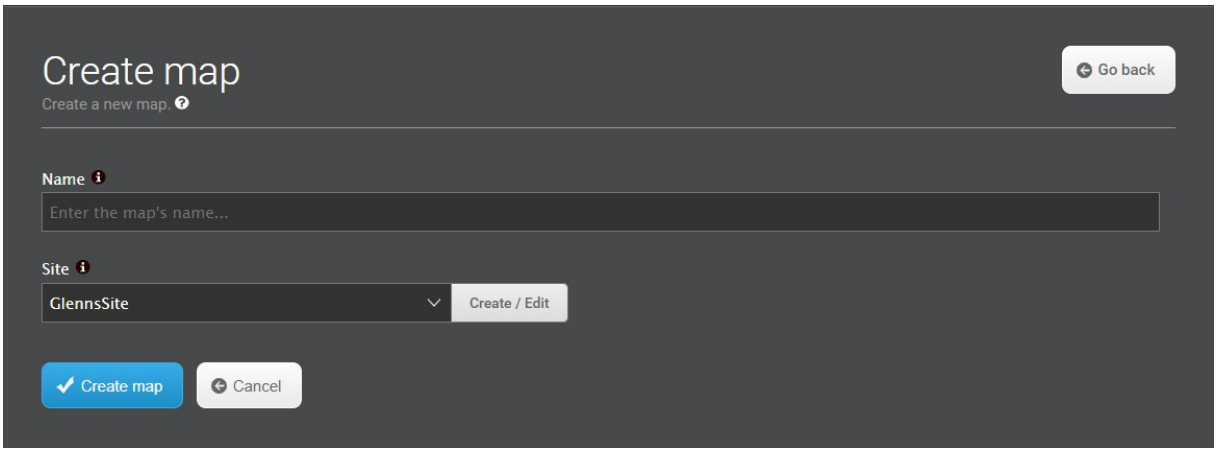
To export a site, simply click on the **Export** button next to the site you want to export. The exported file is named [Site name]_[Robot name]_[SW version]_[Date].site

To import a site, click the **Import site** button and select the site file.

Site files must be imported to a robot with the same software version as the robot the site file was exported from. If you want to import a site file from another software version, you must upgrade or downgrade your robot to that version first, import the file, and then upgrade or downgrade back to the desired software version.

Create map

To create a map, first enter a name for the map and select the site, the map should belong to. When you select **Create map**, you are directed to the map editor where you find the tools to draw the map and add various features.



Name

Enter a name that describes the map.

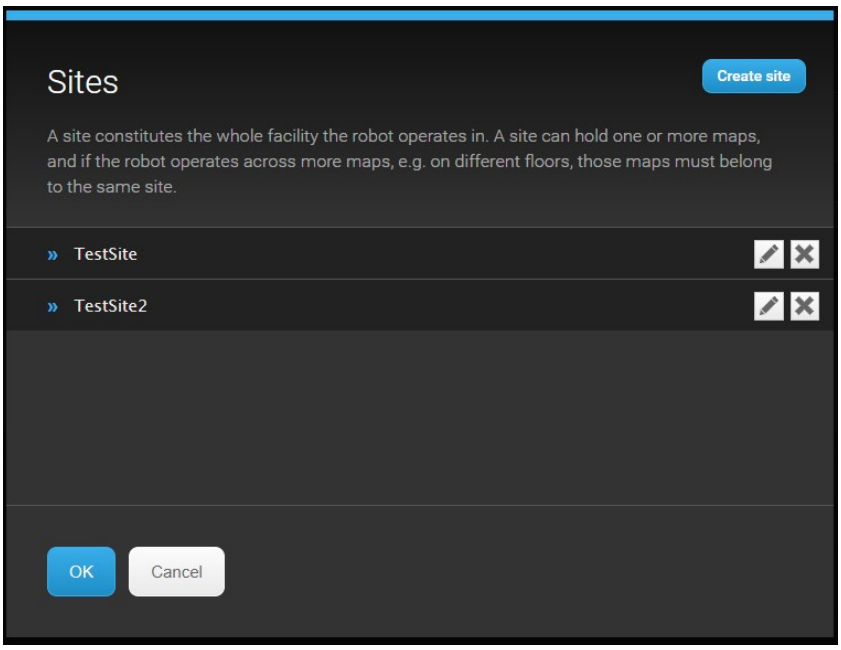
The name is used to identify a certain area of the site.

One way of naming maps is to select names that relate to the area of the map, for example, Ground floor or Hall A.

Site

Select which site the map should be part of or click **Create/Edit** to create a new site or edit the name of an existing site.

A site is the whole facility where MiRFleet operates. A site can hold one or more maps, and if the robots operate across more maps, for example, on different floors, those maps must belong to the same site.



Click **Create site** to create a new site. Name the site and click **OK**.

Click **Create map** to save the map.

Mapping tools

The map recording and editing tools are all found on the icon tool bar, and the drop-down list contains all the features you can add to your map. Different tools are displayed on the icon toolbar depending on which feature you have selected from the drop-down list.

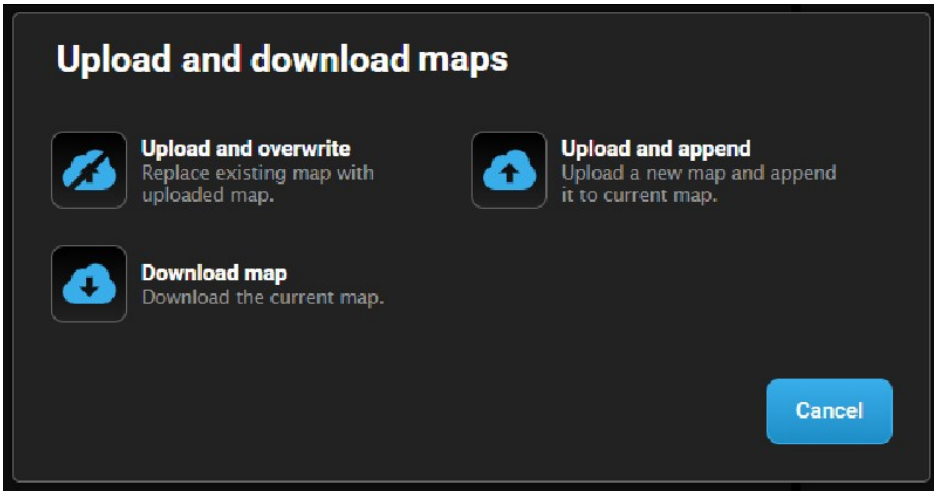
Mapping tools

Press the 3-dots icon to open the **Upload and download map** dialog box. This toolbar has options for uploading and downloading existing maps. It is not possible in MiR Fleet to record a new map using a fleet robot. This must be done on the individual robot interface. The maps saved on each robot are accessible by the fleet and can be used by other robots on the fleet.

You may upload a map from your computer in .png format. For example, if CAD drawings of the facility are available, it is possible to use those after converting them to .png instead of mapping the area with the robot, but you can also upload maps previously created with the robot and downloaded to your PC.

When you download a map, only the recorded map data is saved, that is any added features such as positions and zones are not saved with the map file. If you want to save a map including all details, you should export the whole site that the map belongs to.

The Download and upload map dialog has the following options.



- **Upload and overwrite**
  The Upload and overwrite option erases the existing map and replaces it with the map you upload.
- **Upload and append**
  The Upload and append option adds the uploaded map to the existing one.
- **Download map**
  The Download map option saves the map to your PC as a PNG file.

Editing a map

Once you have uploaded your map, modify the map by removing unwanted “noise”, adding virtual walls, preferred or unpreferred drive zones, positions, and other features to get a reliable map that allows the robots to maneuver smoothly and efficiently in the area.

Left-hand side tool bar

The left-hand side tool bar has the basic tools for saving, undoing and navigating in the map you are working on. Furthermore, different tools appear on the tool bar depending on which map layer you select from the Object types drop-down list. These are presented on the following pages.

The toolbar contains the following elements:

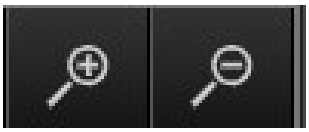
- **Find position**
  Select the magnifying glass to search for a position on the map.
- **Download and upload map**
  Click to upload and download maps.
- **Undo icon**
  Press one or more times to undo your last operation(s). While you are drawing a shape or line in the map, the Undo tool is not available. But as soon as you finish by clicking the check mark, you can undo the whole shape or line.
- **Save icon**
  Click to save the changes to the map. For the changes to take effect, you'll need to reload the map.
- **Navigate icon**
  Click to view the map with all added details, and drag to move the view.

Select object list

The Select object-list contains all features that you can add to the map, such as markers, postions, zones, walls, and floors. See detailed descriptions in Object types on page 72.

Right-hand side tool bar

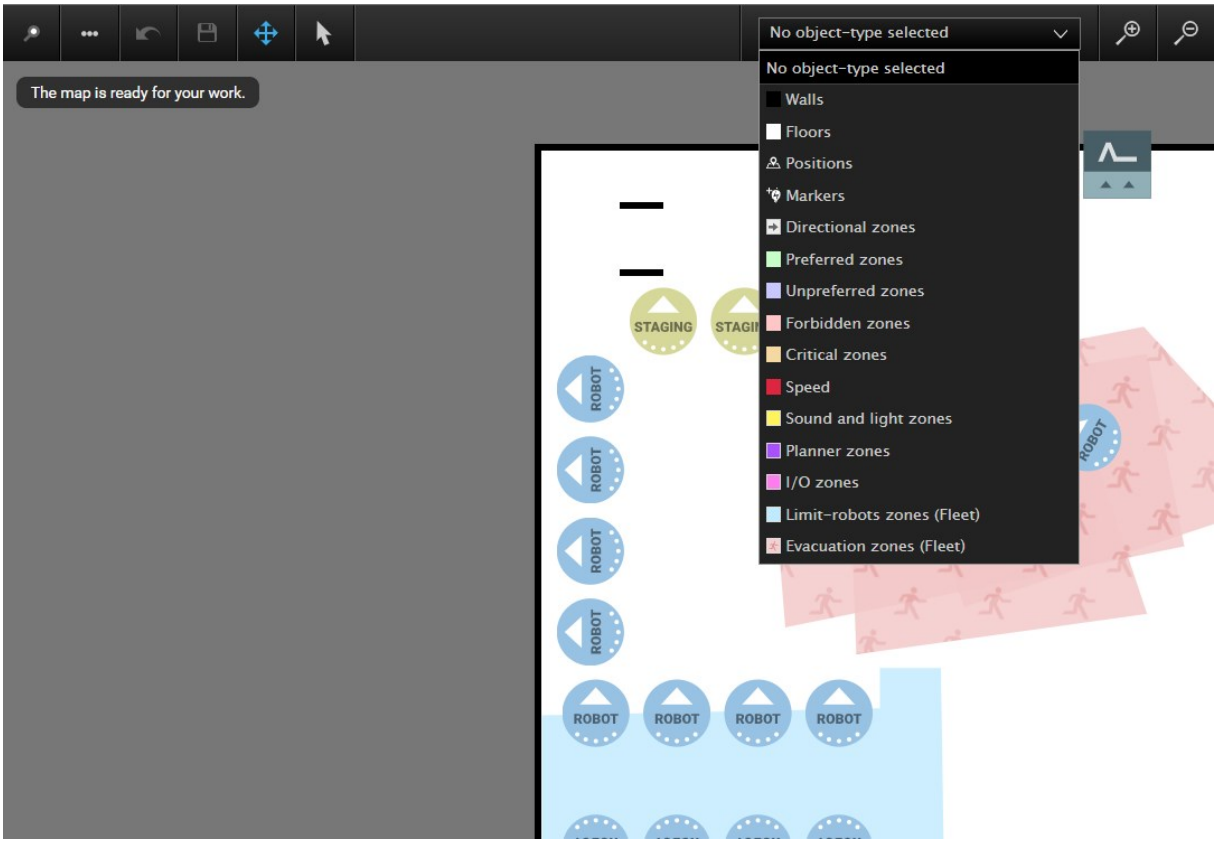
The right-hand side tool bar has tools for controlling the map view.



- **Zoom in**
  Zoom in on the map.
- **Zoom out**
  Zoom out on the map.

Object types

From the list, select which part of the map you want to edit. **Walls** and **Floors** let you remove unwanted objects and add straight lines to create a more legible map. The other objects define the positions and markers robots can go to as well as different types of zones that set the rules for where and how the robots move.



Walls

When mapping, physical objects detected by the scanners are recorded as “walls” in the system. Apart from real walls, these objects could also be shelves, chairs, tables, and even people passing by. Some of these recordings are regarded as “noise” and will, if they are not removed, potentially send the robot on unnecessary detours during its path planning. It is therefore recommended to remove the objects that are not permanent.

Use the **Eraser** or the **Erase by selection-tool** to remove unwanted obstacles from the map. Use the **Draw new line** tool to add new walls to the map, and replace the coarse pixelated lines. The tool works by adding lines between each point you add to the map. Select the check mark when the line is done.

Use the **Select shape or line** tool to change an added object. You can add extra points or move the existing ones to change the shape. To erase a whole shape, select the **Erase shape or line** tool and select a shape to delete it.

Floors

When mapping, the floor is created automatically. You can use the **Floor** tool to touch up the existing floor, for example if the mapped floor contains gray areas, which the robot is not able to pass. You may also add a whole new floor on top of the existing one

Use the **Eraser** or the **Erase by selection** tool to remove unwanted areas of the floor from the map. Use the **Draw a new shape** tool to add a new floor or patch up the exiting one. The tool works by filling the area between each point you add to the map with gray color. You may add as many points as needed and drag to where you want them on the map. Select the check mark when the shape is done. The gray shape will be converted to white indicating that it represents floor.

Use the **Select shape or line** tool to change an added object. You can add extra points or drag the existing ones to change the shape. To erase a whole shape, select the **Erase shape or line** tool and select on a shape to delete it.

Hold down the shift key while drawing a line or an area if you want straight lines.

Positions

Positions are defined as X-Y coordinates in the map and are used as part of missions.

Positions are used either as destination positions or as waypoints on a route. To define a position, select the **Position** tool, select somewhere on the map and rotate the icon until the arrow points in the direction you want the robot to orient to when landing. In the dialog window that opens, it is then possible to adjust the position and the orientation manually or select **Use robot position** to use the current position of the robot.

If two or more positions overlap, then, when you select one of the overlapping positions, a list of the overlapping positions is displayed. This enables you to easily select the position you want.

The **Use robot position** button is available only if you are editing the currently active map.

Optional positions:

- Cart positions for picking up and dropping off carts are available if a hook is applied.
- Emergency positions are positions that the robots go to when the **Evacuate all zones** is given and are available if the robot is part of a fleet
- Shelf positions for picking up and placing shelves are available if a shelf lift is applied.
- Staging positions used as waiting positions become available when the robot is part of a fleet.

Hook, Shelf, or Fleet must be enabled in the Features section under **System** > **Settings** > **Features** before the positions can be viewed.

Markers

Markers are position types used by the robot to dock to physical V, VL, L, or straight bar-shaped objects. Markers are used for example to make the robot dock to a conveyor belt or a charging station.

To define a marker, first place the robot either facing front or rear to the marker, depending on which way you want the robot to dock. For Charging station markers, the robot must always be placed facing front.

When you select the **Marker** tool, the quickest way to set the position is to use **Detect marker**. If the robot can detect the marker, the position, offset and orientation fields will automatically fill. Otherwise, move the robot a bit closer, and try again. The values can be adjusted manually afterwards if required.

The **Detect marker** button is available only if you are editing the currently active map.

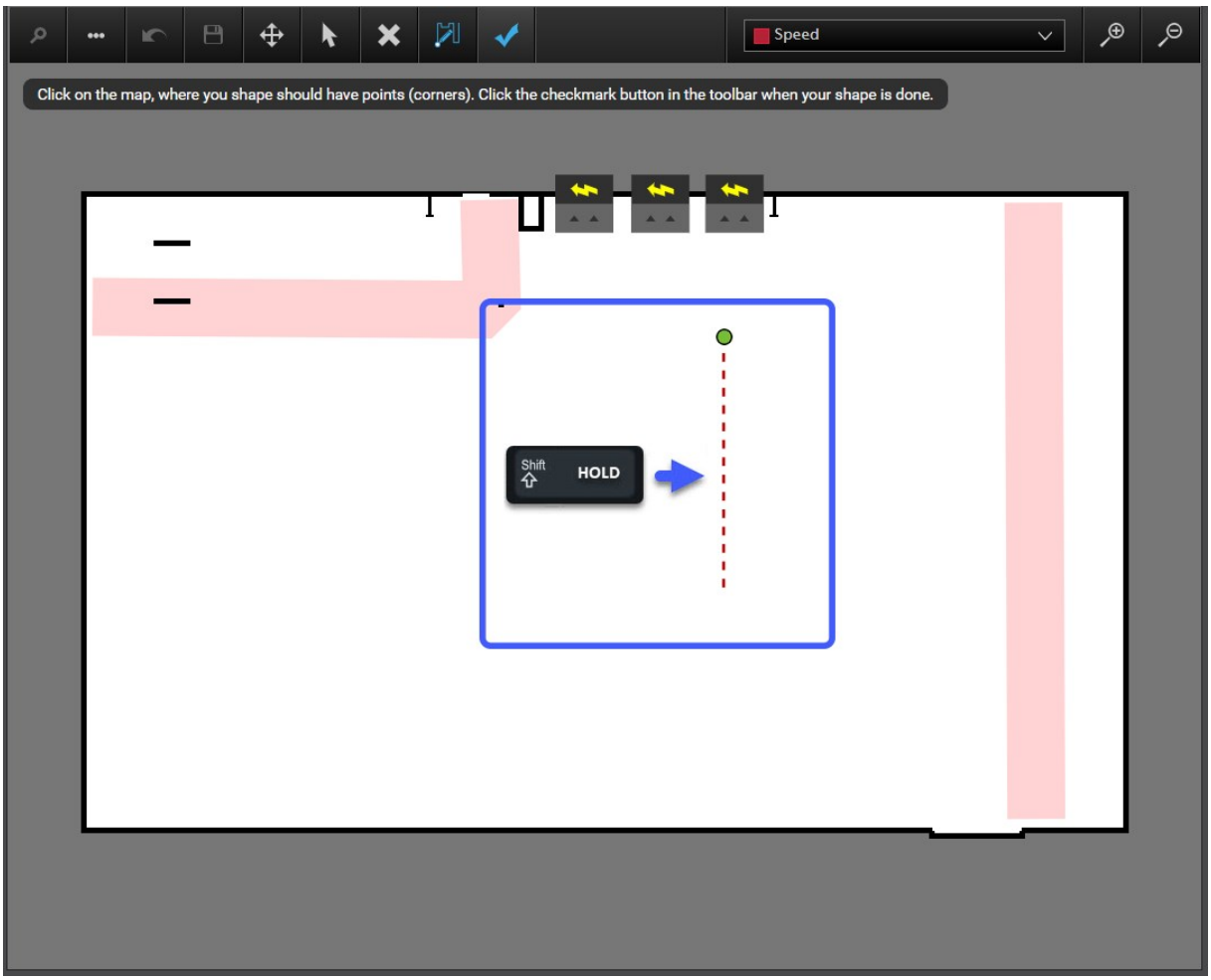
You can see and edit the entry position of a marker by selecting on the marker and selecting **Show entry position(s)**. The entry position stays visible until you select again and select **Hide entry position(s)**.

Zones

Zones are actions that are automatically triggered when a robot enters the area in which one of these actions apply. The zones apply both when the robot operates autonomously and when it is driven in manual mode. It is possible to create overlapping zones so that multiple events have affect at the same time, for example blinking and slowing down the speed of the robot when it drives in a certain zone.

Each zone has its own color in the map. To add a zone, select it on the drop-down list, then select the shape or line tool on the icon bar and draw the shape or line where you want it on the map.

Hold down the shift key while drawing a line or an area if you want straight lines.



Select the check mark on the tool bar to finish the shape or line. To edit or remove a shape or line, select the type, for example **Preferred zones**, on the drop-down list. Then, to edit, select the **Select shape or line** tool and select the object to edit. You can change a shape or line by pulling the points, add extra points or change the thickness of a line. To add extra points, first select on an existing point, then select where you want to add the point and pull to change the shape if needed. To delete a line or shape, select the **Erase shape or line** tool and select the object to delete.

Directional zones

Directional zones let you organize the motion of robots by specifying the directions in which the robots can move in specific zones. When you create a directional zone, you specify its direction, and the map shows the direction with arrows drawn on the zone.

When a robot is in a directional zone, the following rules apply to the motion of the robot:

- The robot is not allowed to move in the direction opposite to the direction of the arrow.
- The robot can move perpendicular to the direction of the arrow or at any angle less than 90° to the arrow.

There are two types of directional zones: directional shape and directional line. A directional shape is a shape on the map with a direction defined. The direction on a shape can have any value from 0° to 360° with an increment of 45°.

A directional line is a line with a direction defined. The direction of a line is from one of its ends to the other end.

To work with directional zones: In the map editor, select **Directional zones**.

Creating a directional shape

To create a directional shape:

- In the toolbar, select **Draw a new shape** and create a shape by placing points on the map.
- To specify the direction of the zone, use the **Select shape or line** tool to select the created shape. The option **Select the direction of a directional zone** is displayed. Once selected, the **Select direction** dialog appears and enables you to select a direction out of eight directional options.
- Select the check mark to finish editing the zone.

Creating a directional line

To create a directional line:

- In the toolbar, select **Draw a new line** and create a line by placing points on the map.
- Select **Line settings** to change the width of the line. Use one of the presets or enter a custom width. Select **Close** to save line settings.
- Select the check mark to finish editing the line.

To reverse the direction of a line, select a line and select **Reverse direction** in the toolbar.

Directional zones in combination with forbidden and unpreferred zones let you organize efficient robot traffic.

- Create a thin forbidden zone in the middle of the corridor parallel to the corridor walls. This is the lane separator.
- Create directional zones on both sides of the forbidden zone. Make the directions of the zones opposite.

With such a configuration, robots going in the opposite directions use different lanes and do not get in each other's way. Replacing the Forbidden zone with an Unpreferred zone gives robots more space for maneuvers.

Preferred zones

The robot tries to run within a preferred area taking into account dynamic obstacles.

Unpreferred zones

The robot tries to avoid an unpreferred zone but may go into it if there are no other possibilities.

Forbidden zones

The robot never enters a forbidden zone.

Critical zones

The obstacles detected from the cameras and scanners are ignored, allowing the robot to move close to obstacles without entering protective stop. As soon as the robot leaves the zone, nearby obstacles can trigger protective stops again. This zone is useful to use in narrow doorways where the robot can physically fit through.

Zone settings: Zone settings allow the user to customize a certain zone to their needs. One or more actions can be set. While the robot is in the zone, it will perform the actions. When the robot leaves the zone, it will go back to the default settings.

The following zones have zone settings.

Speed zones

The robot slows down or increases its speed when driving in the zone. Slowing down may be used if driving in a zone with many people, and speeding may be used to traverse a zone free of people and obstacles quickly.

Zone settings

- **Name**
  Enter a name for the zone.
- **Desired speed**

  Enter the speed (m/s) the robot should drive with in this zone. Default: 0.8, minimum: 0.1, maximum: 1.5 m/s

Sound and light zones

The robot can play a sound and/or blink when driving in the zone. May be used to warn people about the presence of the robot.

Zone settings

- **Light**
  The robot drives with the lights on.
- **Sound**
  Select the sound you want the robot to play.

Planner zones

The robot can turn off the laser scanners and localize with encoders, decrease the field of view to run smoothly in populated areas, optimize the time and distance of paths and ignore obstacles.

Zone settings

- **No localization**
  The robot turns off the laser scanners and uses encoders only to localize. Useful for special driving like ramps.
- **Look-ahead**
  Look-ahead is used to define a decreased field of view. Maximum is 3 meters (default). Minimum is 0.
- **Path timeout**
  Maximum amount of time the robot keeps trying and will not deviate from the current path if the path is blocked. Default is 5 seconds. Minimum is -1, which means that the feature is disabled.
- **Path deviation**
  Maximum allowed distance the robot can deviate from the path. Default is 0.5 meters. Minimum is 0. Maximum is 3 meters.

- **Ignore obstacles**
  The robot detects all obstacles with the 3D camera, but they are ignored with this action. This is useful if you experience problems with the robot stopping in front of windows because of sunlight.
- **Obstacle history clearing**
  Select how the robot will clear its obstacle history while driving. **No clearing**: the robot remembers all obstacles and only clears those in the field of view of cameras and laser scanners. **Clear in front of robot**: the robot disables obstacle history in a cone shape in front of the robot, starting with the width of the footprint and increasing the width by 0.3 m per meter. **Clear all**: the robot disables obstacle history altogether, and only avoids obstacles that it detects with its sensors while driving.

I/O module zones

The robot activates an I/O module when entering the zone. An I/O zone may be used instead of controlling I/O activation through a mission.

Zone settings

- **I/O module**
  Select the I/O module you wish to use.
- **PLC registers**
  Index:Index is the register number and spans from 1-200. Registers 1 to 100 are reserved for integers and registers from 101-199 for floating point numbers.
  Entry action: An Entry 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.
  Entry value: Enter the value that will apply to the Entry action.
  Exit action: An Exit 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.

Limit-robots zones (Fleet)

Applies only when robots are controlled by MiR Fleet. Only a defined number of robots may enter the zone at the same time. Used to keep a zone clear of other robots, for example in areas where MiR Hook robots unload and pick up carts.

Zone settings

- **Robot limit**
  Enter the number of robots that are allowed to drive in the zone. Minimum is 1.

Evacuation zones (Fleet)

Evacuation zones make it possible to evacuate all robots in case of an emergency situation.

One or more evacuation zones can be marked up on the map and will appear on a list under **Evacuation zones**. It is possible to evacuate one certain zone or all zones at once.

Select **Evacuate all zones** to evacuate all zones (in the top bar or under **Evacuation zones**) or select **Evacuate** next to a specific evacuation zone to evacuate that zone. All robots will leave the selected evacuation zones and go to the nearest evacuation positions.

To give the all clear when the emergency is over, remove the check marks from the boxes from one or more zones under **Evacuated**. When the all clear has been given, the robot(s) will wait at their Evacuation position(s) for new missions.

Evacuation zones should only be used in case of an emergency as all missions are discontinued.

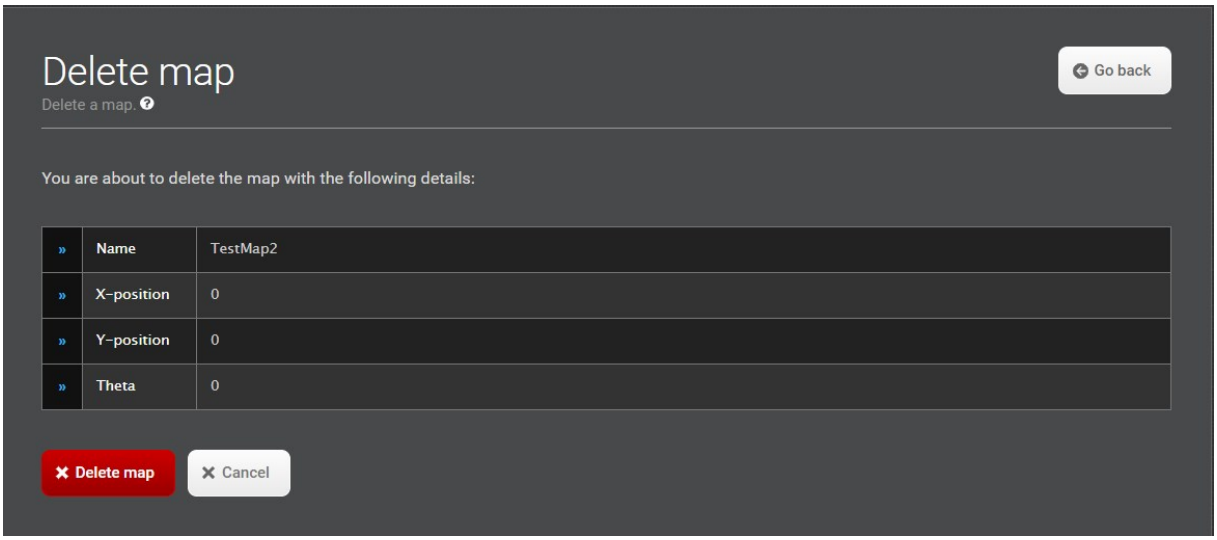
Note: There must be at least one evacuation position per robot when Evacuation zones are applied.

Zone settings

- **Evacuation zones (Fleet)**
  Select whether or not the evacuation zone is active. 0 is inactive and 1 is active.

Delete map

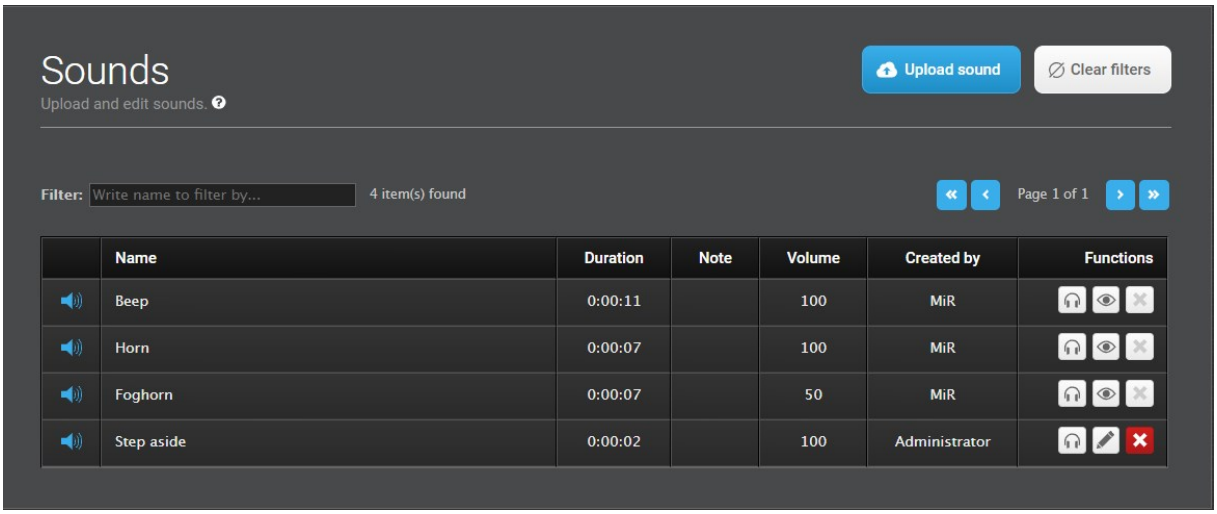
You can delete maps that are created by you or another member of the user group you belong to.



4.6 Sounds

In the Sounds menu, you can upload new sounds to the robots or edit the volume and length of the sounds.

Sounds are used in missions and can be used as alerts: “Please step aside” or to attract peoples attention for example, when the robots have arrived at a position.



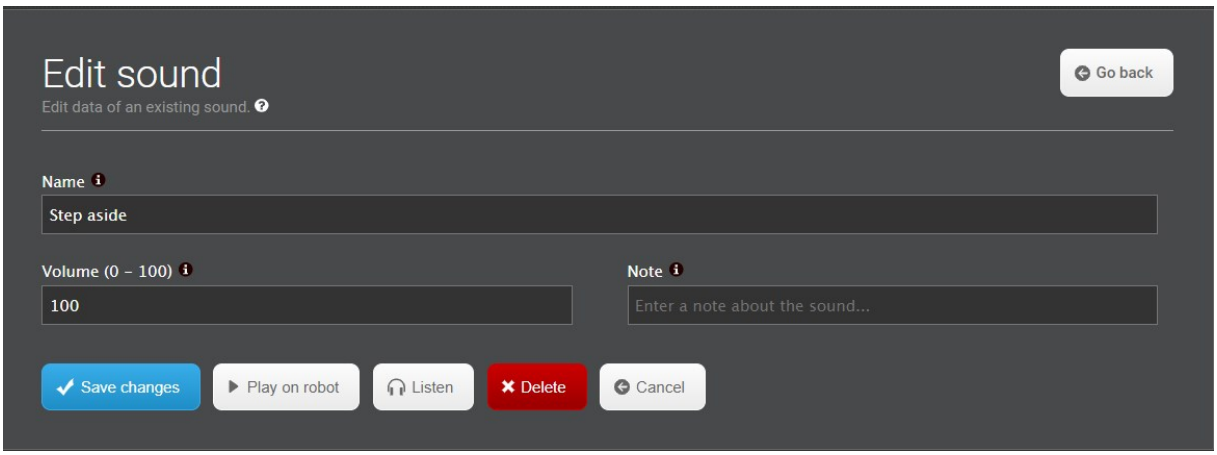
Edit sound

You may rename any of the user added sounds on the robot and adjust the volume.

Select the **Play** icon to listen to the sound on the robot itself.

Select the **Listen** icon to listen to the sound on your computer.

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



The **Edit sound** dialog contains the following fields:

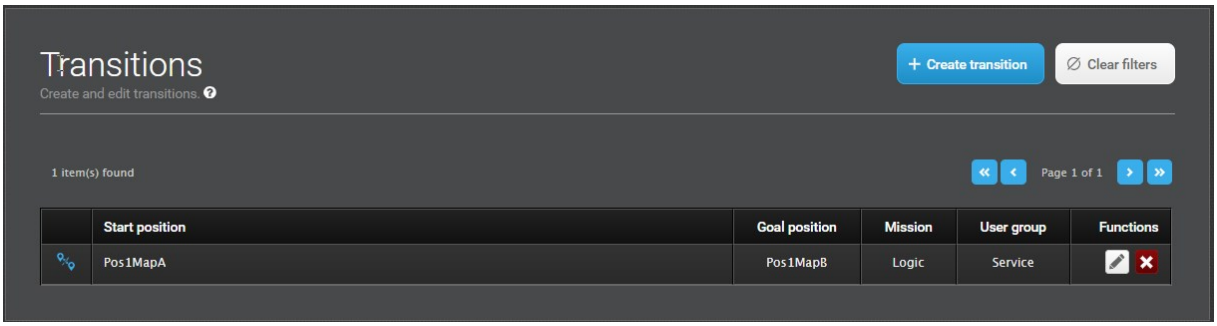
- **Name**
  You may change the names of user uploaded sounds. The names of the standard system sounds cannot be changed.
- **Volume (0-100)**
  The maximum of 100 is approximately 80 dB.
- **Note**
  You can write a small note about the selected sound (optional).
- **Delete**
  You can delete user uploaded sounds from the robot.
- Select **Save changes** to save the settings.

4.7 Transitions

Transitions are used to handle changeovers from one map to another within the same site. Map transitions are used, for example, where two adjoining production halls have separate maps.

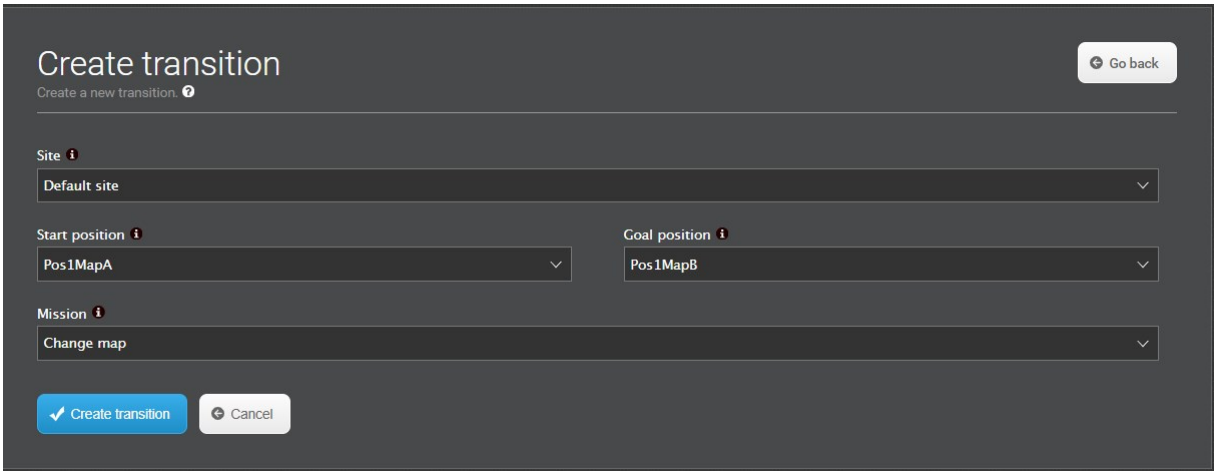
A transition entry consists of two robot positions, a start and a goal position, one in each map at a physical point where the two maps overlap. Furthermore, it requires pre-defined missions including **Switch map** actions. Going from map A to map B and from map B to map A requires two different missions.

Once the transition is set up in the user interface, the robot handles switches from one map to another automatically. You just set up your mission as you would in a single map-environment, and the system will include the switch positions, the **Switch map** mission and the transition action invisibly. The transition is visible only in the way that the robot stops for a short while at the switch positions while positioning itself in the new map.



Create transition

To create a transition, 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.



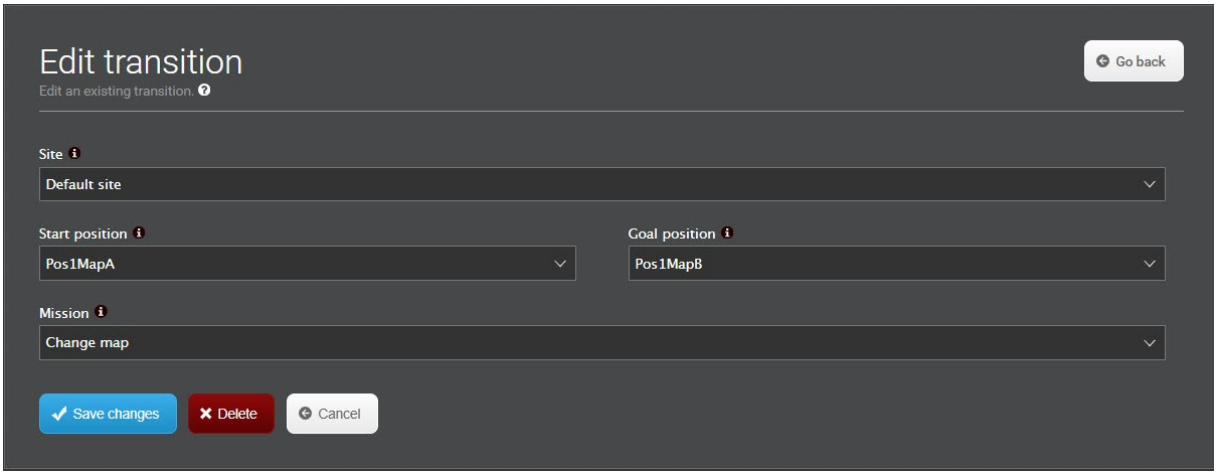
The **Create transition** dialog contains the following fields:

- **Site**
  Select the site in which the two maps are represented.
  Both maps must be part of the same site for a map transition to be possible.
- **Start position**
  Select the start position of the transition.
  The start position must be of the type Robot position and have been created in advance in a place where the two maps overlap. Start and goal positions must be placed on the exact same spot physically but named differently, for example, "Map A_posA" and "MapB_posA" to indicate the relation between the two.
- **Goal position**
  Select the goal position of the transition.
  The goal position must be of the type Robot position and have been created in advance in a place where the two maps overlap. Start and goal positions must be placed on the exact same spot physically but named differently, for example, "Map A_posA" and "MapB_posA" to indicate the relation between the two.
- **Mission**
  Select a mission that includes a **Switch map** action.
  The **Switch map** mission must have been created in advance and include two **Switch map** actions: the first switch map action must include the "from" map and the defined Start position, and the second one must include the "to" map and the defined Goal position.

Select **Create transition** to save the settings.

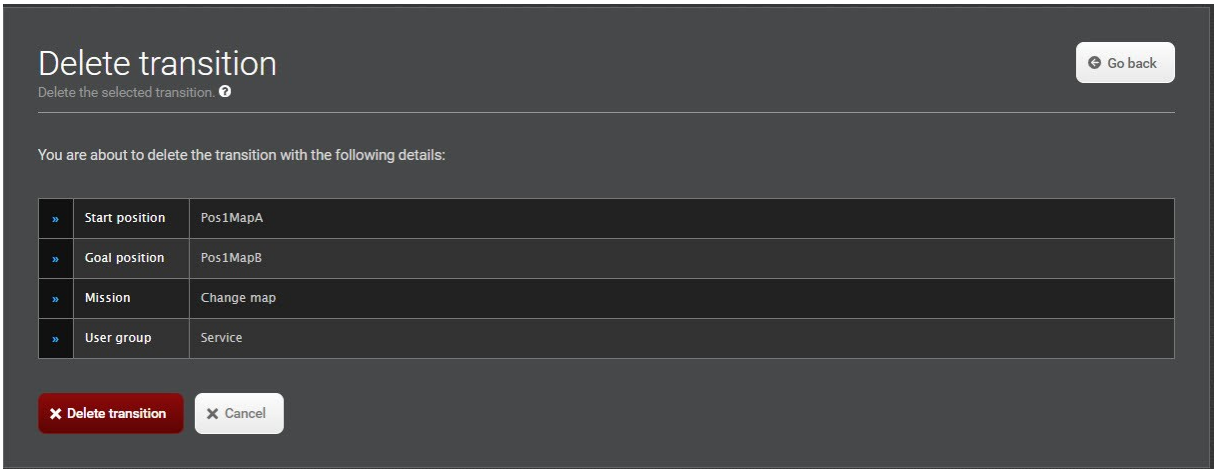
Edit transitions

To edit a transition you must 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.



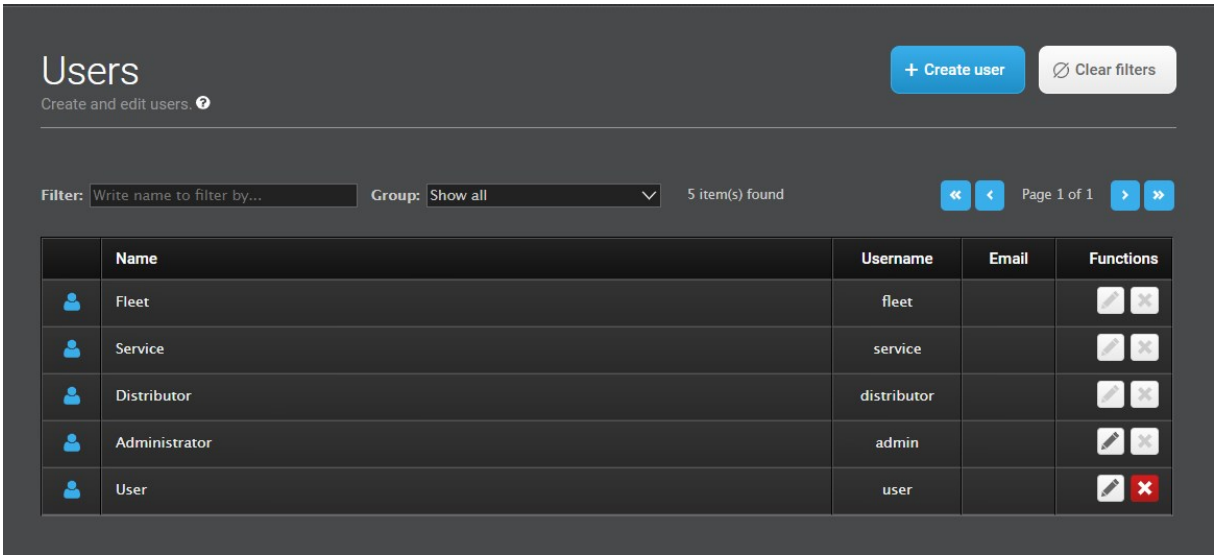
Delete transitions

You can delete transitions that are created by you or another member of the user group you belong to.
If you delete a transition, the start and goal positions and attached mission are deleted as well.



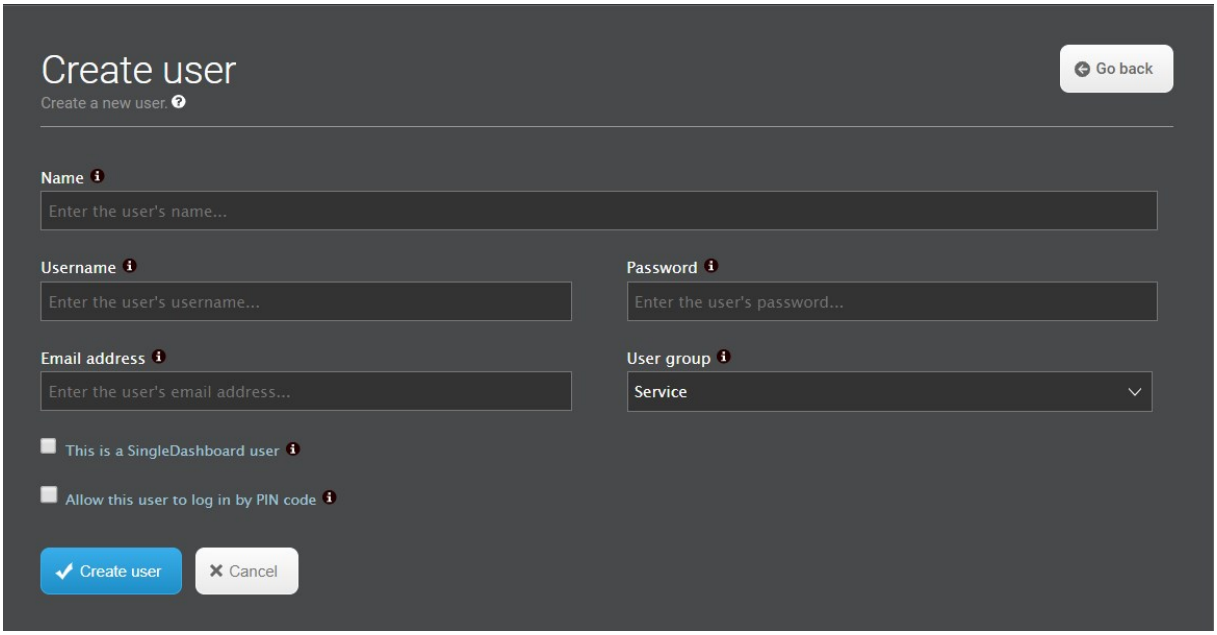
4.8 Users

All users of the fleet, from daily operators to system administrators, must have a user profile in the system. Users are administered in the Users section where you set up, edit, and delete system users.



Create user

In **Create users** you set up new users by entering master data such as name, email, user credentials, and access rights. Access rights are given by associating each user with a User group that delimits which sections of the user interface the user has access to.**Note:** User groups should be defined prior to setting up Users.



The Create user dialog has the following fields:

- **Name**
  Enter the name of the user, e.g John Smith.

  The name is shown in the upper right-hand corner of the web interface when the user is logged in and is not to be confused with the Username.

- **Username**
  Enter the name that the user should use to sign in to the system, for example John.
- **Password**
  Enter a password that the user should use to sign in to the system. Passwords are case sensitive.

  Users can change their own password when logged in by selecting their login name in the upper right-hand corner of the window and changing the password in the window that pops up.

- **Email address**
  Enter the user's email address. Email addresses can be used as part of a mission, for example, to notify a user about a completed mission.
  See Create mission **Setup > Missions > Create Mission**.
- **User group**
  Select a user group for the user. Each user must be attached to a pre-defined user group. The user group specifies which parts of the system the user has access to. User group permissions are defined for each system command or feature and are granted as read-only or write permissions.
- **SingleDashboard user**
  Select the check box if the user's only task is to control the robot(s) from a dashboard, for example, if the user's task is to start missions from a tablet attached to a top module.

  Single dashboard users do not have access to any other parts of the user interface.

  Select a dashboard for the SingleDashboard user.

  When the SingleDashboard user logs in, the selected dashboard will be the one that's available to this user.

- **PIN code**

  Select the check box if the user is allowed to enter the system using a PIN code.

  Each PIN code user must have a unique code.

Select **Create user** to save the settings.

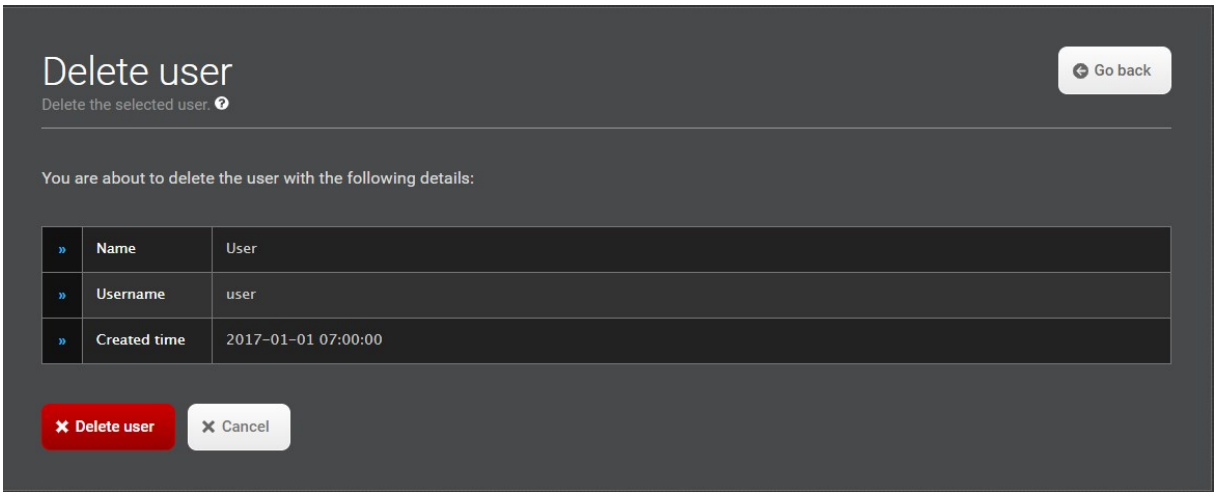
Edit user

In **Edit user** you can change the settings of a user's profile.

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

Delete user

When you select **Delete user**, only the user's master data as shown below disappear. All possible settings and updates made in the system by the user in question stay unchanged.



4.9 User groups

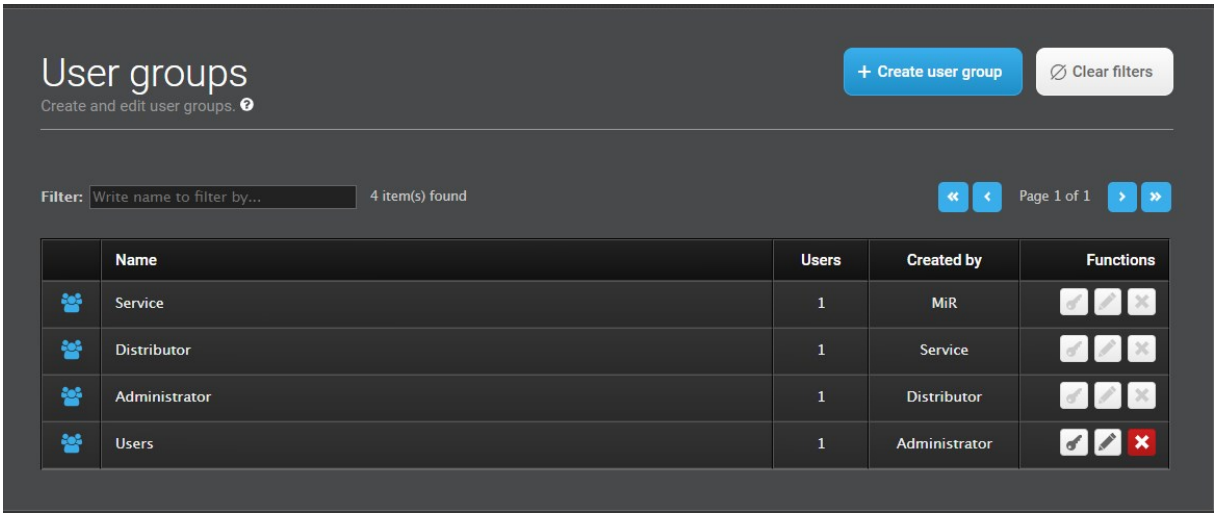
The User groups section is used to create user groups and assign permissions to each group.

A user group defines which sections of the user interface users have access to and whether the access rights should involve viewing only or give full write access. To edit permissions for a group, click the key icon next to the name of the user group to open the User group permissions section.

The MiR user interface comes with a number of default user groups:

- Distributors have full read/write access to the user interface and can administer the permissions of the Administrators and Users groups.
- Administrators per default have full read/write access to the user interface and can administer the permissions of the Users group.
- Users per default have access to view the whole user interface and permission to create and edit dashboards. Users with write access to the User groups section, for example, Administrators may also create additional user groups.

Related items: When setting up users in the Users section, each user must be assigned to a user group.

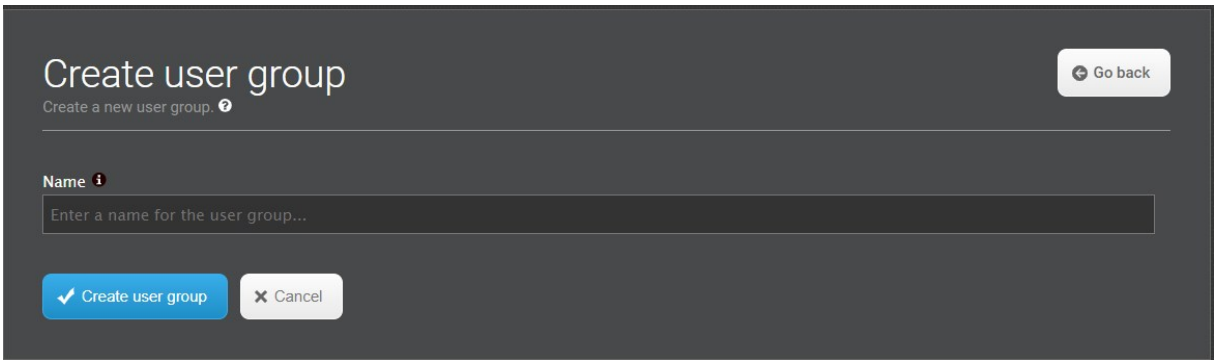


Create user group

Fill out the name field to create a new user group.

Besides the default user groups, you can create as many additional user groups as needed. The number of user groups needed depends on how many different tasks and permission levels are required. 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.



The **Create user** dialog has the following field:

- **Name**
  The name must be unique and is used to identify the group of users it represents.One way of naming user groups is to select names that characterize the tasks of the users in the

particular group. For example, a group of users operating the robot by starting and queing missions could be named Operators.

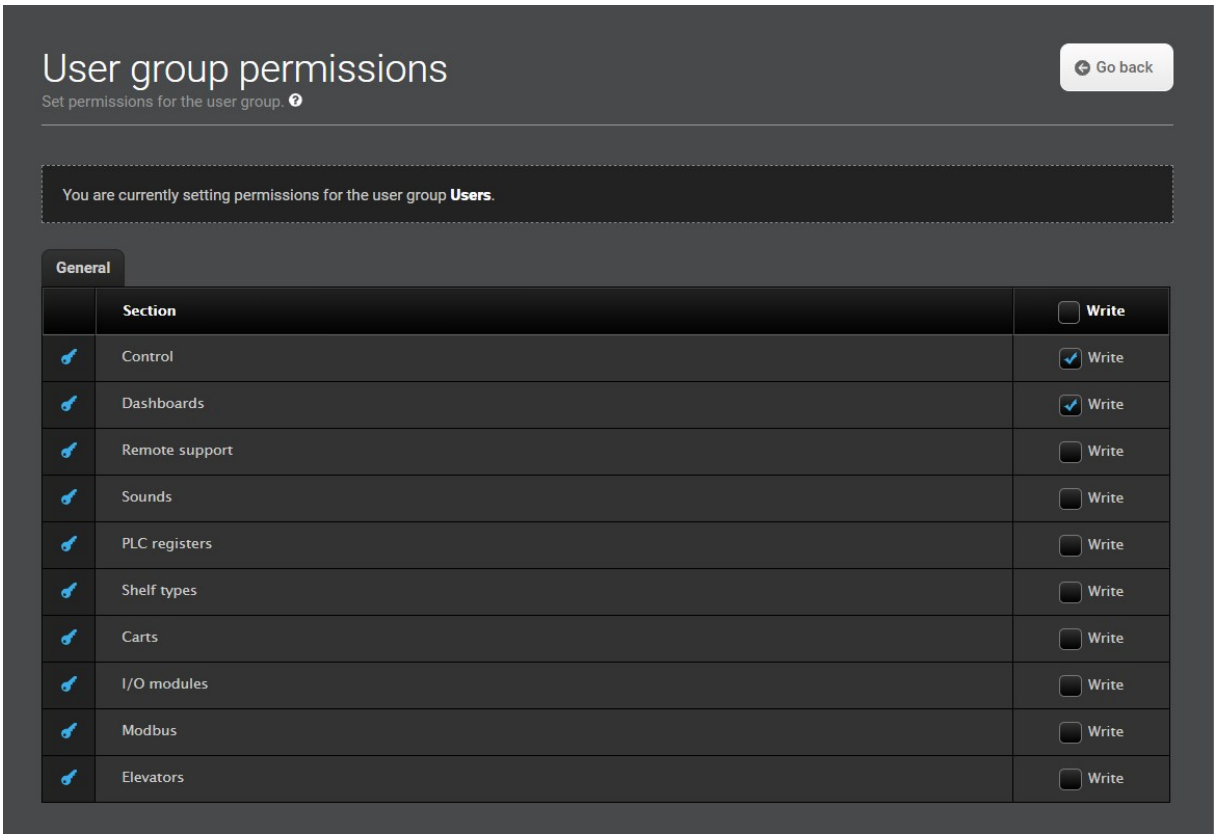
Select **Create user group** to save the settings.

User group permissions

Permissions can be given to all parts of the system that are available to the user group the creator belongs to.

Select which sections of the system the user group should have access to. User group permissions are divided into groups of related items, for example Maps and positions, and you can select a whole group or individual items in a group.

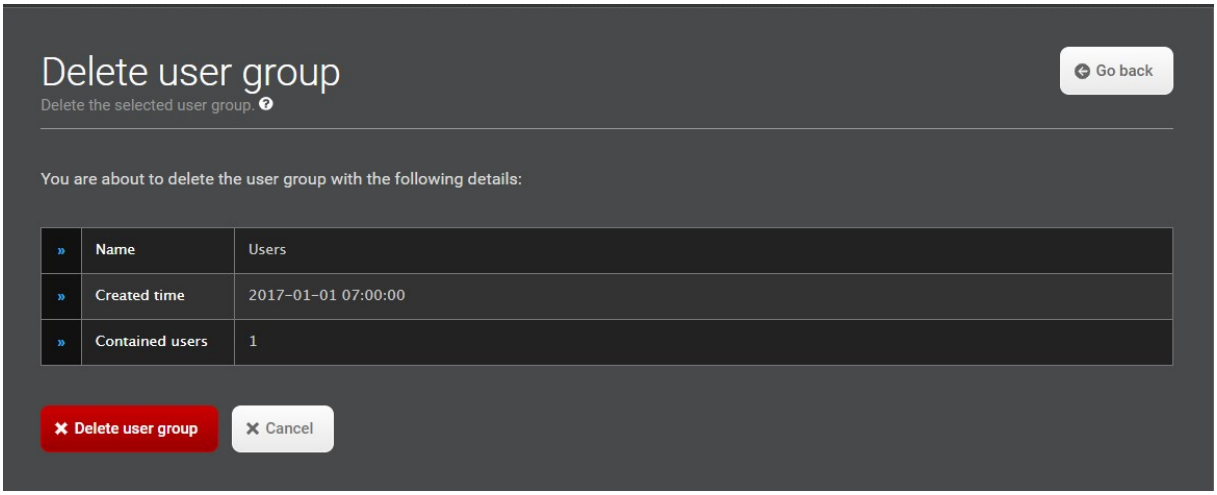
The user group will have access to all the items you select for the group. All other items will be visible but not editable to the users of the group.



Delete user group

To delete a user group you must be signed in as user of the user group that created the group.

When you delete a user group, all users belonging to that group will be deleted as well. To avoid deleting one or more users of the group you are about to delete, go to the **Users** section and associate those users with a different user group.



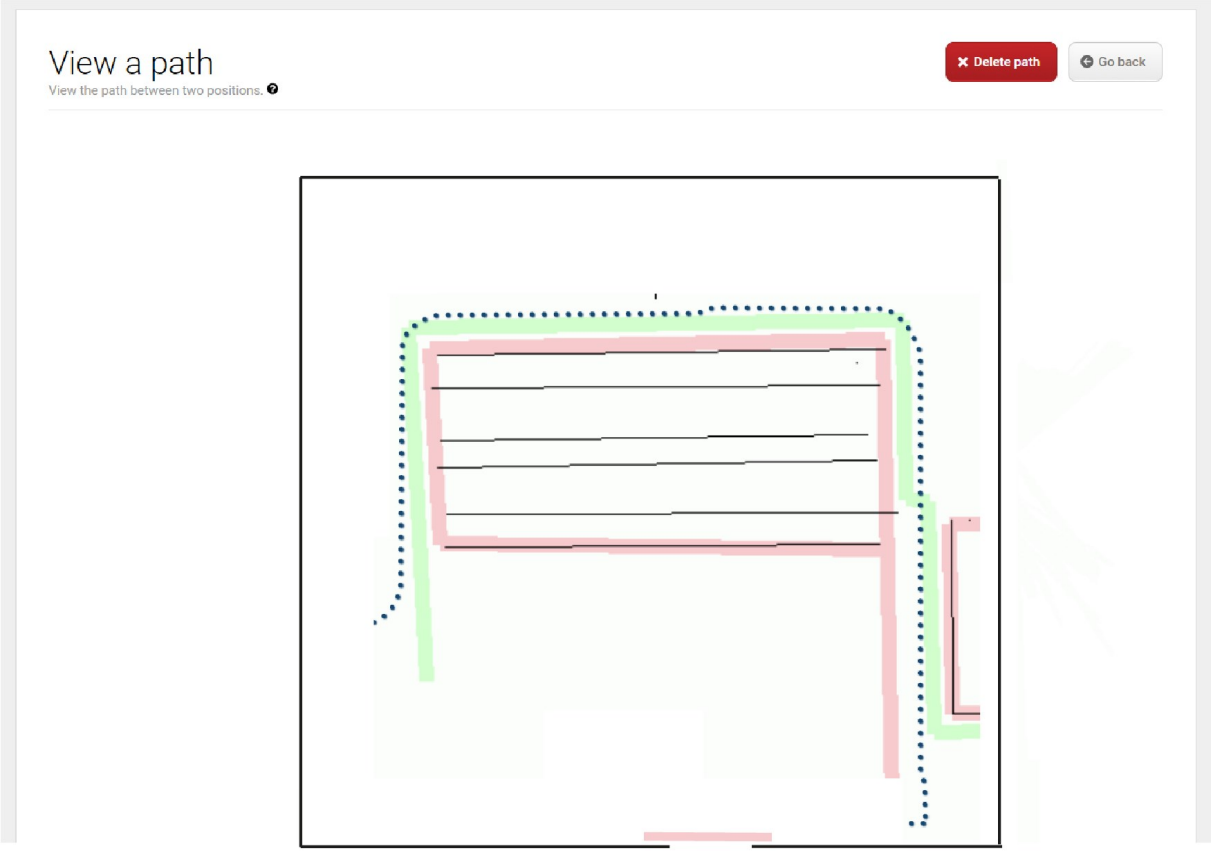
4.10 Paths

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.

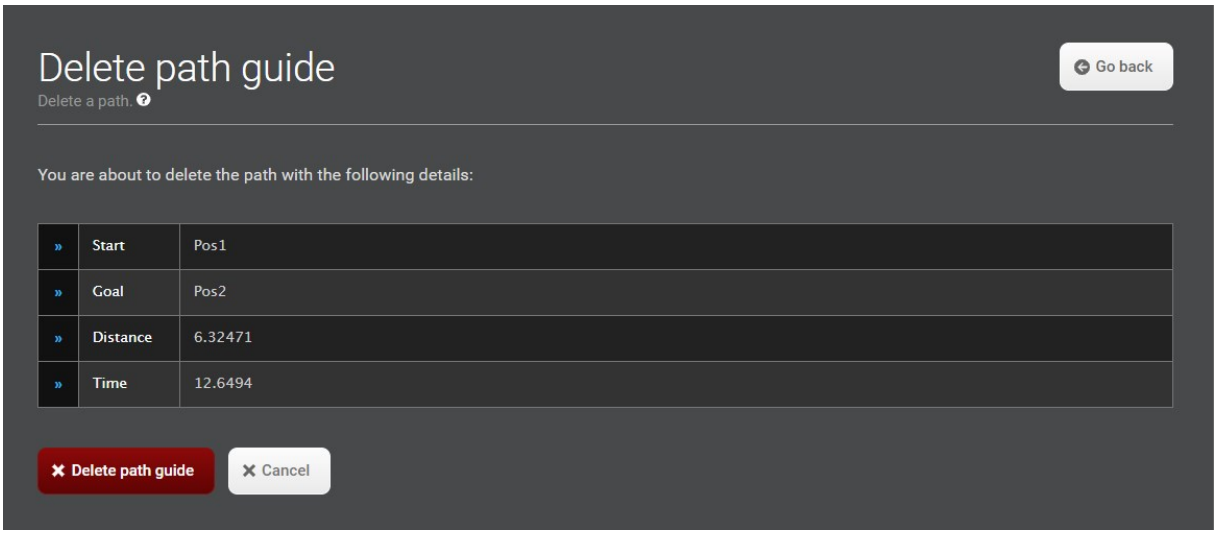
Paths can also be created manually by drawing Preferred zones in the Maps section. To do this, you must first delete any automatically created paths between the affected positions before the preferred zone will take effect.



- **View a path**
  The path is shown as a dotted line between two positions on the map. The view can be used to check if calculated paths look appropriate.

Delete path

Paths may be deleted if you want the robot to recalculate the route between two positions or if you have manually created a preferred path on the map.



4.11 Path guides

A path guide makes it possible to define paths that the robots should follow between two positions. Path guides can be very useful in locations where you want the robots to follow a certain path, for example, along a wall.

In environments where multiple robots operate, an obvious application of path guides would be to create right-hand drive paths where two robots can pass each other without stopping to recalculate each time they meet. This is done by creating one path guide going from A to B and another one in the opposite lane going from B to A.

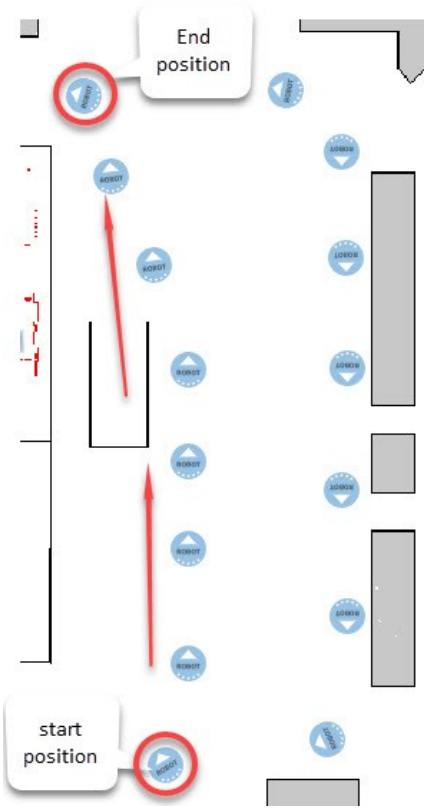
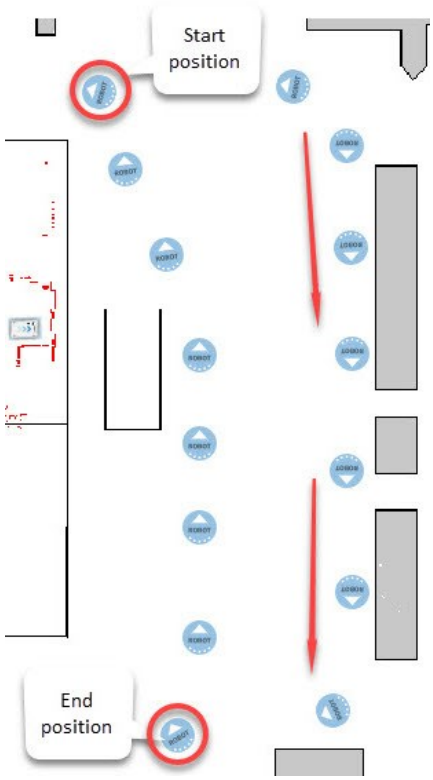
To create a path guide, you must first create a number of robot positions that act as waypoints on the map. The positions must be placed on the path in succession, for example, with a distance of 3-5 meters and they must be oriented in the driving direction.

When the positions are made, you create the path guide. A path guide consists of one or more start positions, one or more goal positions, and a number of waypoints in between. You may use the same path to go between more start and goal positions.

When you set up missions that include positions used as start and end positions, the robot will automatically use the path guide.

Two examples

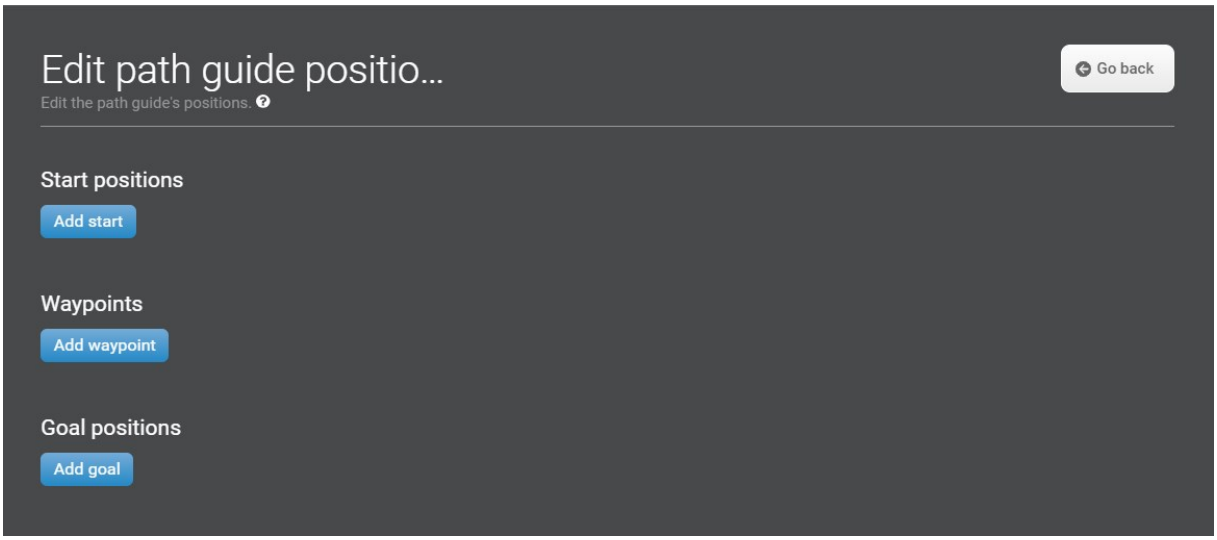
The two examples below illustrate how robots avoid planning around each other every time they pass each other while crossing the production hall.

Example 1	Example 2
	
Path guide 1: south to north	Path guide 2: north to south

Path guide 1 forces the robot to follow one lane going south to north, and Path guide 2 forces the robot to follow another lane going north to south. The same two positions are used for start and end positions but reversed in the two path guides.

Create a path guide

To create a path guide, first enter a name for the path guide and select the map it should belong to. After selecting **Create path guide**, you are directed to the section where you select start and goal positions as well as the waypoints that make up the path guide between them.



- **Add start**
  Select one or more start positions for this path guide.
- **Add waypoint**
  Select the waypoints created for this path guide.
  The waypoints must have been created pointing in the driving direction.
- **Add goal**
  Select one or more end positions for this path guide.

Delete path guide

You can delete path guides that are created by you or another member of the user group you belong to.

4.12 Marker types

To set up the robot for lifting, moving, and placing shelves or tables, shelf types with unique names and dimensions must be set up in the robot interface. This will enable the robot to dock and undock correctly, and to plan routes taking the shelf size into account.

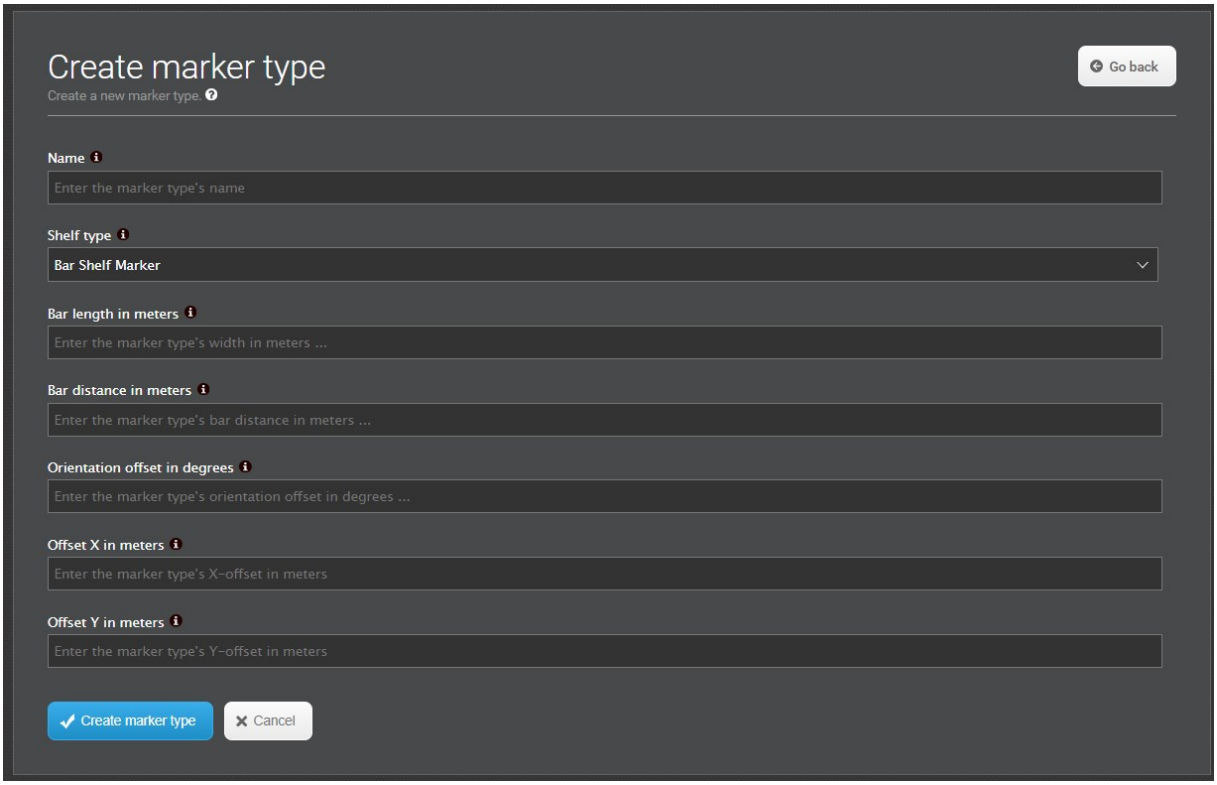
Create marker type

To create a marker type, you must first select if it is a **Bar shelf marker** or a **Leg shelf marker**.

Bar shelf markers are used for MiR100 and MiR200 robots.

Leg shelf markers are used for MiR500 and MiR1000 robots.

After selecting the marker type, you must enter the dimensions of the shelf plus two offsets (X and Y), which the robot uses to fine-adjust its position when docking to the shelf.



- **Name**
  Enter a name for the marker type.
  The Marker type name must be unique and is used to identify the marker type. Marker types are used in missions to define pick up and place shelf actions.
- **Shelf type**
  Select which shelf marker type you want to create.

  The selection must fit the type of shelf you are going to use:

  Bar shelf markers for MiR100 and MiR200 are for shelves with two side bars.

  Leg shelf markers for MiR500 and MiR1000 are for for shelves with four legs.

- **Bar length in meters**
  Enter the length of one of the side bars in meters with up to two decimals.

  Enter the length of one of the side bars.

  Minimum length: 0.4 m

  Maximum length: 0.75 m

- **Bar distance in meters**
  Enter the distance between the two side bars in meters with up to two decimals.

  Measure the distance between the two bars inner side to inner side.

  Minimum distance: 0.4 m.

  Maximum distance: 0.75 m.

- **Orientation offset in degrees**
  Enter the orientation offset in degrees.

  An orientation offset is used to fine-tune the robot's position when docking to the shelf.

  Minimum offset value is 0.

- **Offset X in meters**
  Enter the marker type's X-offset in meters with up to two decimals.

  An X-offset is used to fine-tune the robot's position when docking to the shelf.

  Minimum offset value is 0.

- **Offset Y in meters**
  Enter the marker type's Y-offset in meters with up to two decimals.

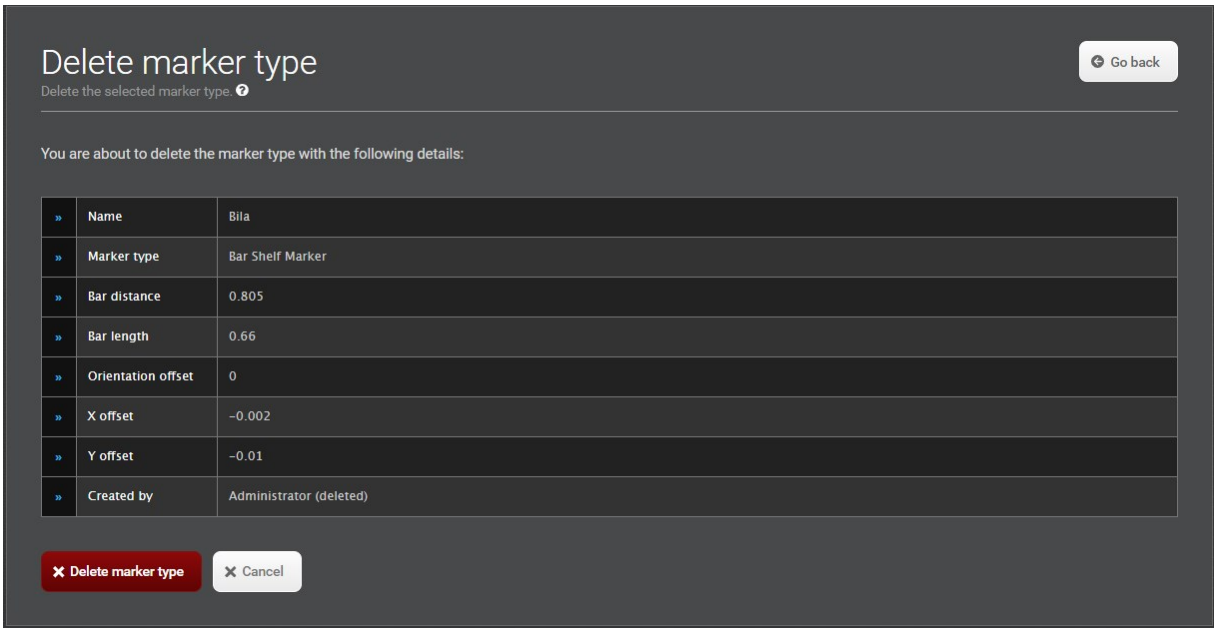
  A Y-offset is used to fine-tune the robot's position when docking to the shelf. Minimum offset value is 0.

- **Leg asymmetry in meters** (Only for Leg Shelf Markers)
  Enter the value in meters that defines the offset between the two front shelf legs.
  The value must be measured on the shelf that you are going to use. Minimum value: 0 (the legs are symmetric). Maximum value: 0.5.

Select **Create shelf type** to save the settings.

Delete shelf type

You can delete shelf types that are created by you or another member of the user group you belong to.



4.13 Footprints

A footprint is the amount of space the robot occupies including its top application and load. It consists of a horizontal shape around the robot, slightly bigger than the robot itself, and a maximum height. The horizontal shape is defined as coordinates relative to the robot's center coordinate system.

If your robot carries a load with larger dimensions than the robot itself, for example a shelf, you must change the footprint to fit the dimensions of the shelf. You can choose from the list of default footprints or you can define your own.

Create footprint

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

- **Name**
  Enter the name of the footprint ... The name is used to identify the footprint.
- **Select robot type**
  Select the correct robot type, for example, MiR500-1000.

Select **Create footprint** to save the settings and continue to the footprint editor.

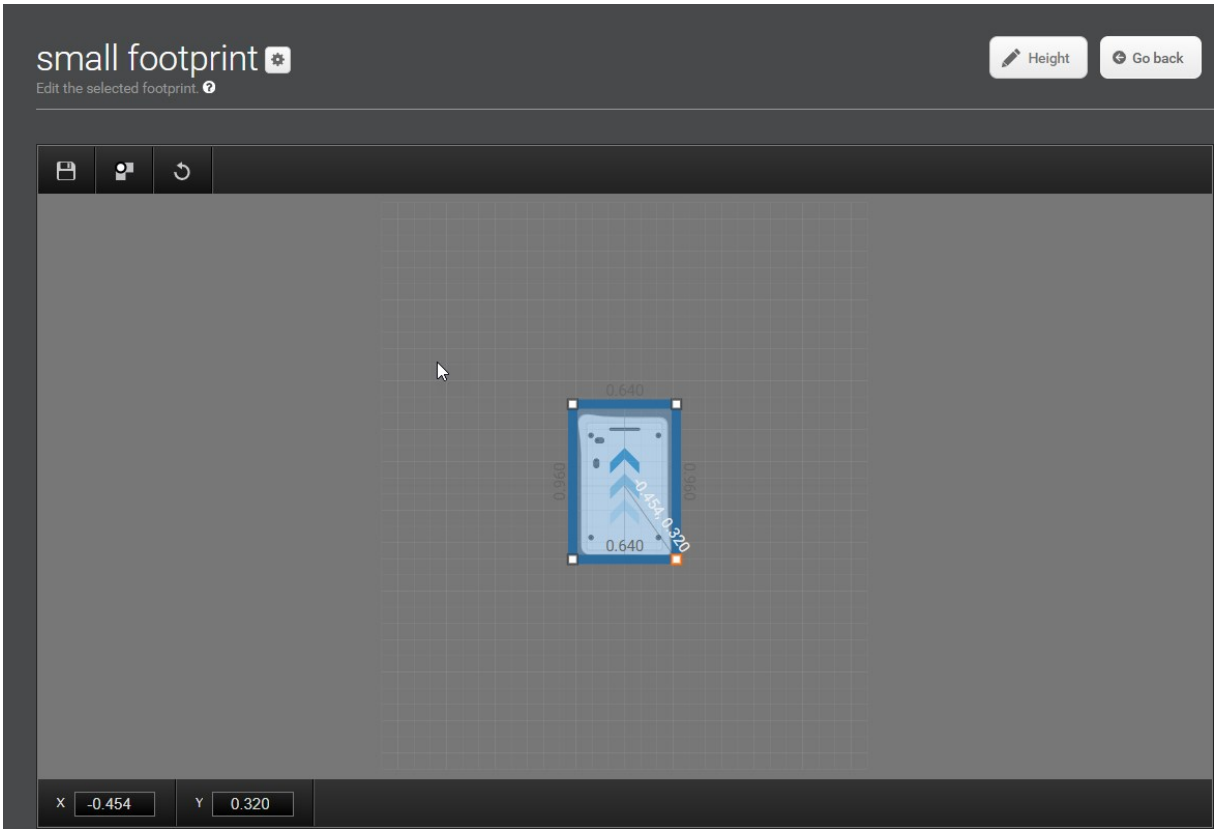
Edit footprint

You can edit a footprint in a simple or in an 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.

- Use the **Toggle** icon to switch between simple and advanced edit modes.
- 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.
- Select the **Arrow+** icon to add extra points to the shape.
- Select the **Arrow-** icon to remove points from the shape.
- Select the **Edit height** button to open the footprint height editor.
- Select the **Save** icon to save the changes.



Delete footprint

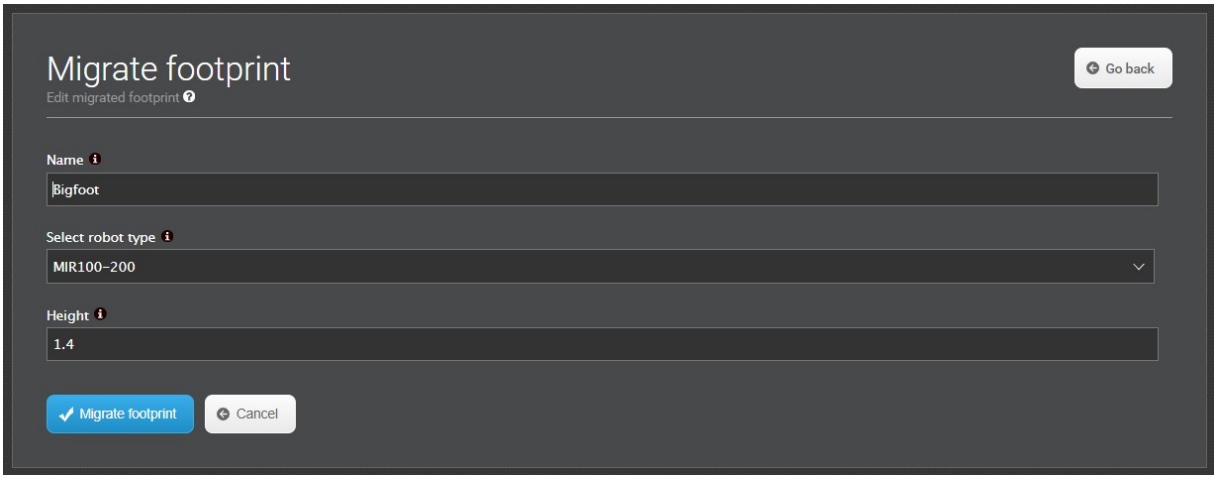
You can delete footprints that are created by you or another member of the user group you belong to.

Note! If you delete a footprint, it will affect missions in which it is used.

Migrate footprint

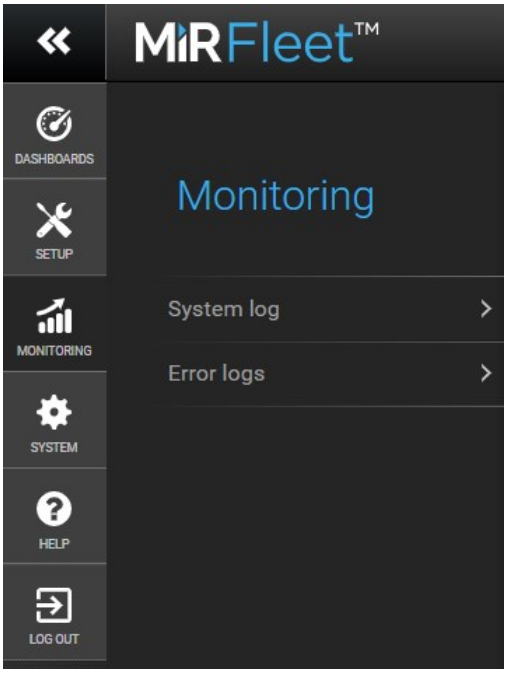
A migrated footprint comes from a site file with a software version that is older than the version in which the footprint editor was introduced.

You can edit name, robot type, and height of the migrated footprint.


Migrate footprint
Edit migrated footprint
Go back
Name
Bigfoot
Select robot type
MIR100-200
Height
1.4
Migrate footprint
Cancel

5. Monitoring

This section describes the items in the Monitoring menu.



The Monitoring menu contains the following items:

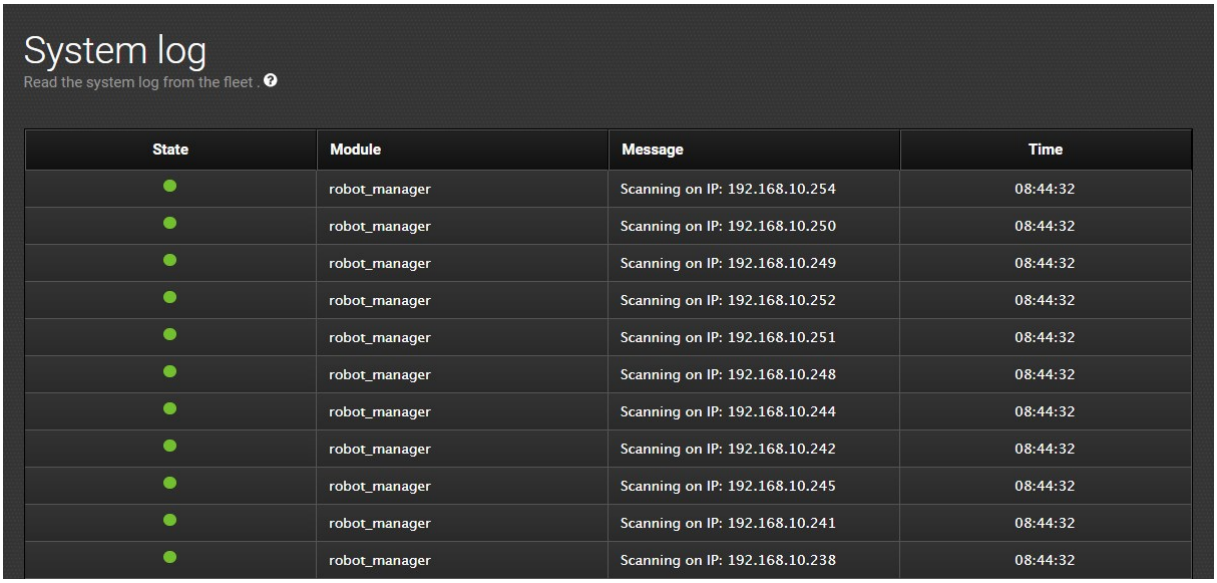
5.1 System log **106**

5.2 Error logs **107**

5.1 System log

The system log contains events that are logged by the operating system components. The system log contains information about system state at a given time (shown by color-codes), the affected module, a short explanation, and a time stamp.

The system log is mainly used by system supporters for troubleshooting.



State	Module	Message	Time
	robot_manager	Scanning on IP: 192.168.10.254	08:44:32
	robot_manager	Scanning on IP: 192.168.10.250	08:44:32
	robot_manager	Scanning on IP: 192.168.10.249	08:44:32
	robot_manager	Scanning on IP: 192.168.10.252	08:44:32
	robot_manager	Scanning on IP: 192.168.10.251	08:44:32
	robot_manager	Scanning on IP: 192.168.10.248	08:44:32
	robot_manager	Scanning on IP: 192.168.10.244	08:44:32
	robot_manager	Scanning on IP: 192.168.10.242	08:44:32
	robot_manager	Scanning on IP: 192.168.10.245	08:44:32
	robot_manager	Scanning on IP: 192.168.10.241	08:44:32
	robot_manager	Scanning on IP: 192.168.10.238	08:44:32

The System log table has the following columns:

- **State**
  State is a visual color-indication of the system state at the time of logging.
- **Module**
  Module indicates in which module the logged event has taken place.
- **Message**
  The message is a short description of the logged event.
- **Time**
  The time the event was recorded; hh:mm:ss.

5.2 Error logs

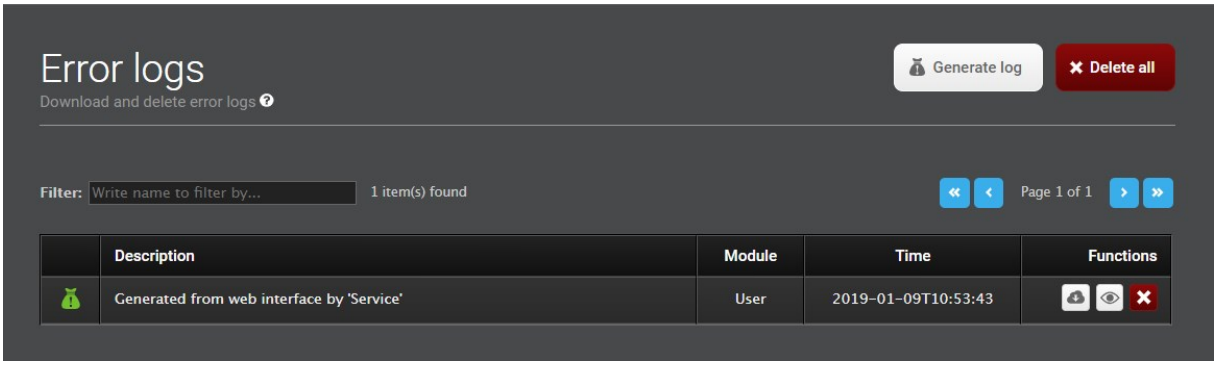
Error log is a list of all detected system errors. Each entry is shown with a description, an indication of which module is affected and the time when the error occurred.

When further examination of a log entry is required, it can be downloaded in an encrypted file format and sent to MiR Support. Each file contains detailed information plus a recording of the last 30 seconds of robot action(s) before the error occurred.

It is also possible to create a user generated log with a recording of the last 30 seconds of the robot's actions.

Select **Generate log** to record the last 30 seconds of the robot's actions.

Select **Delete all** to delete the entire error log.

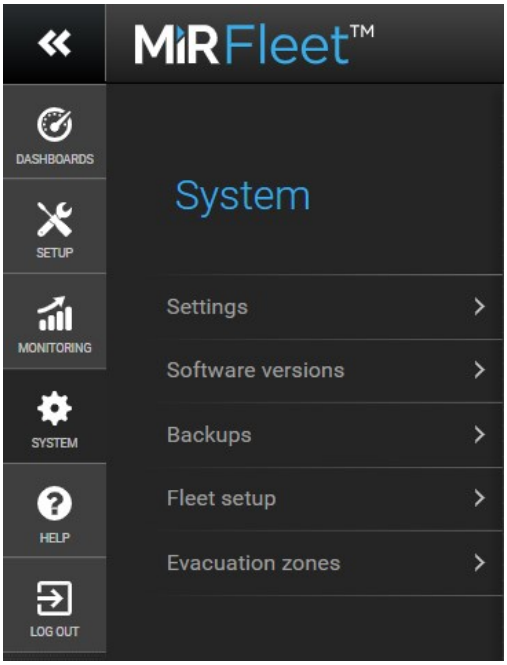


The Error logs table has the following columns:

- **Description**
  A short description of the logged event.
- **Module**
  Shows which of the robot's modules has caused the error, for example /Hook/Connection.
- **Time**
  Shows the exact time the error occurred.
- **Download**
  Select the Download icon to download the log entry in an encrypted file format.
- **Delete error log**
  Log entries can be deleted individually by clicking the x-icon next to the selected entry.

6. System

This section describes the items in the System menu.



The System menu contains the following items:

6.1 Settings **110**

6.2 Software versions **114**

6.3 Backups **114**

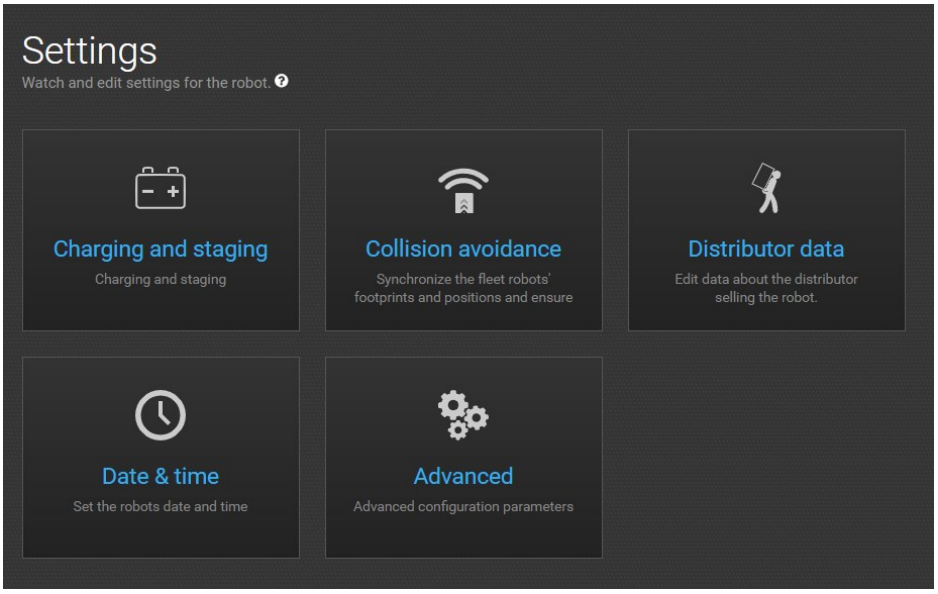
6.4 Fleet setup **115**

6.5 Evacuation zones **116**

6.1 Settings

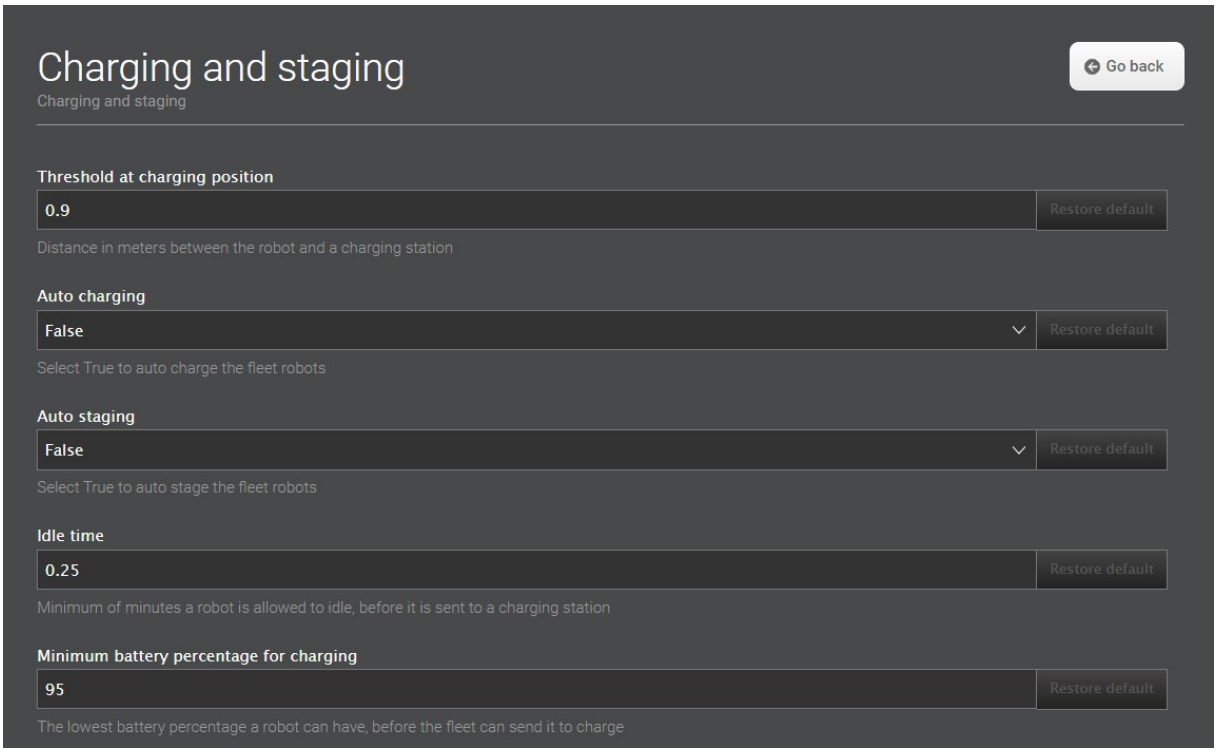
Settings contains MiR Fleet's parameter settings.

The settings are divided into sub groups, and all parameters have context help texts.



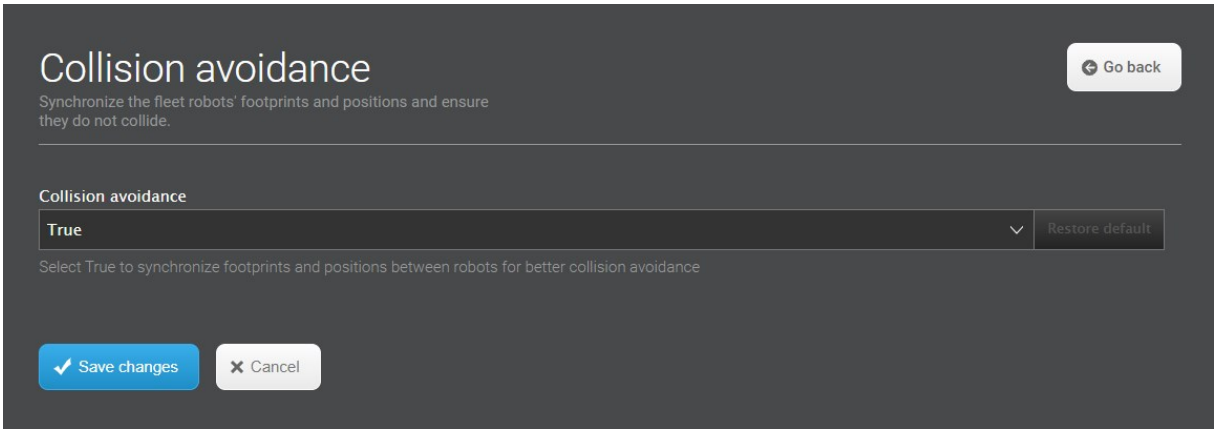
Charging and staging

In **Charging and staging** , you can set and change charging and staging settings for the robots in the fleet.



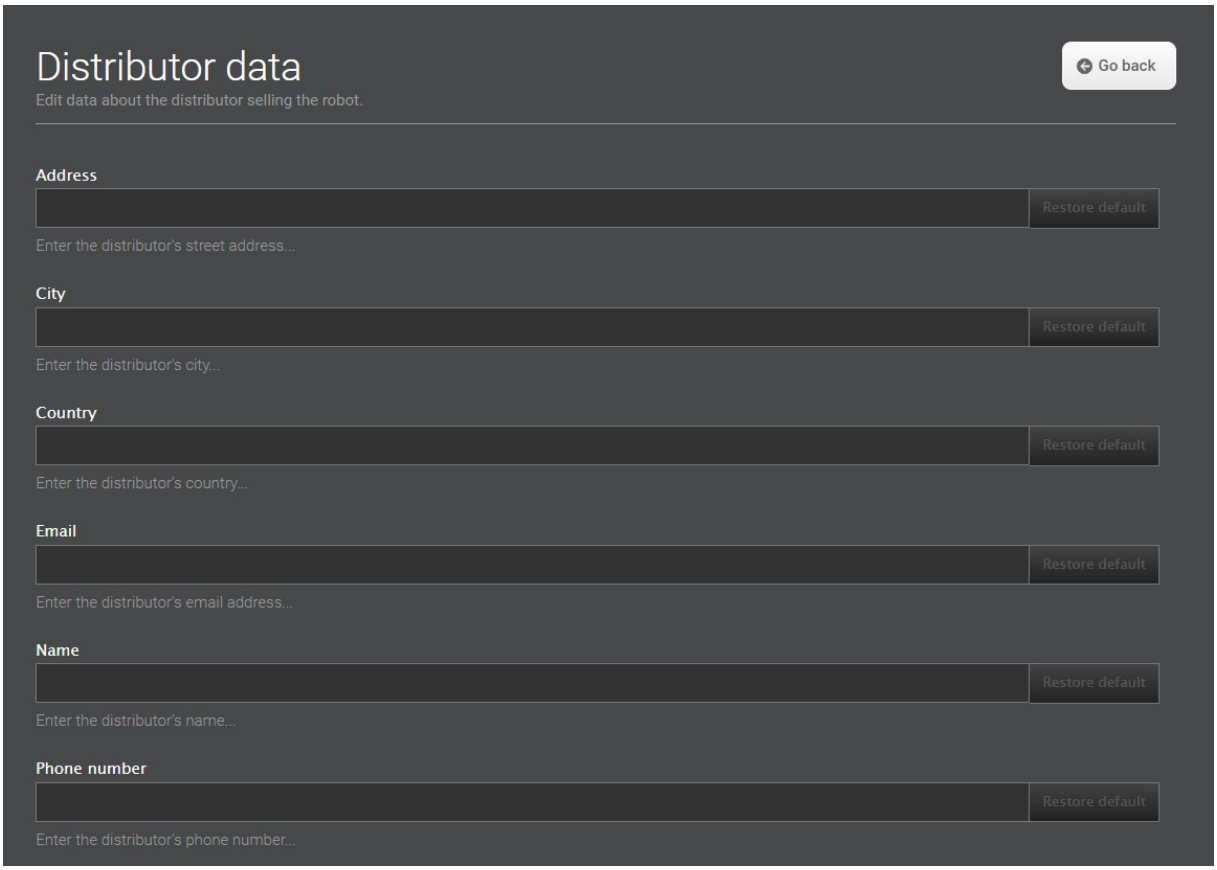
Collision avoidance

Synchronize the fleet robots' footprints and positions and ensure they do not collide.



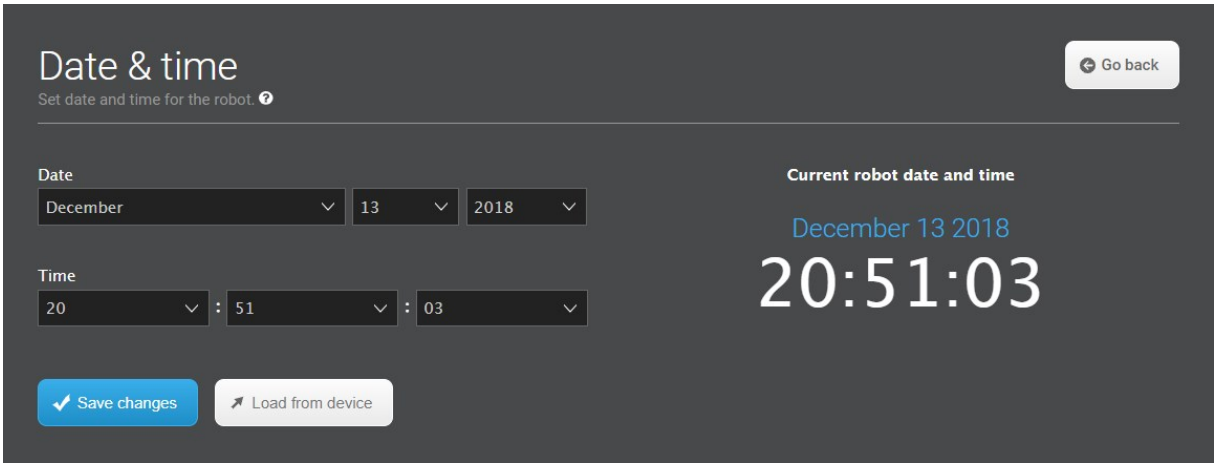
Distributor data

Edit data about the distributor selling MiRFleet.



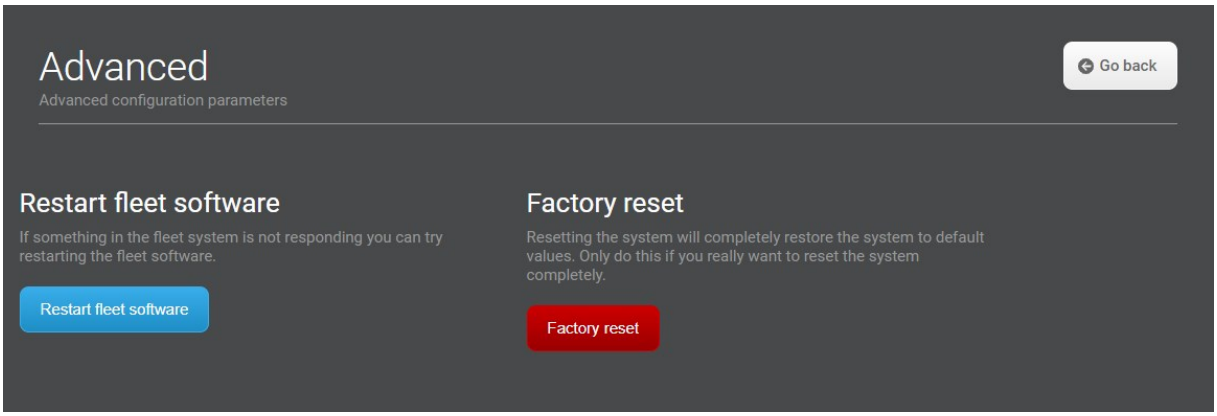
Date and time

You can set the system date and time manually by entering values in the fields or automatically by selecting **Load from device**. The latter option sets the system time to the time of the computer connected to the robot.



Advanced

Advanced configuration parameters



The dialog contains the following fields:

- **Restart fleet software**
  If something in the fleet system is not responding you can try restarting the fleet software.

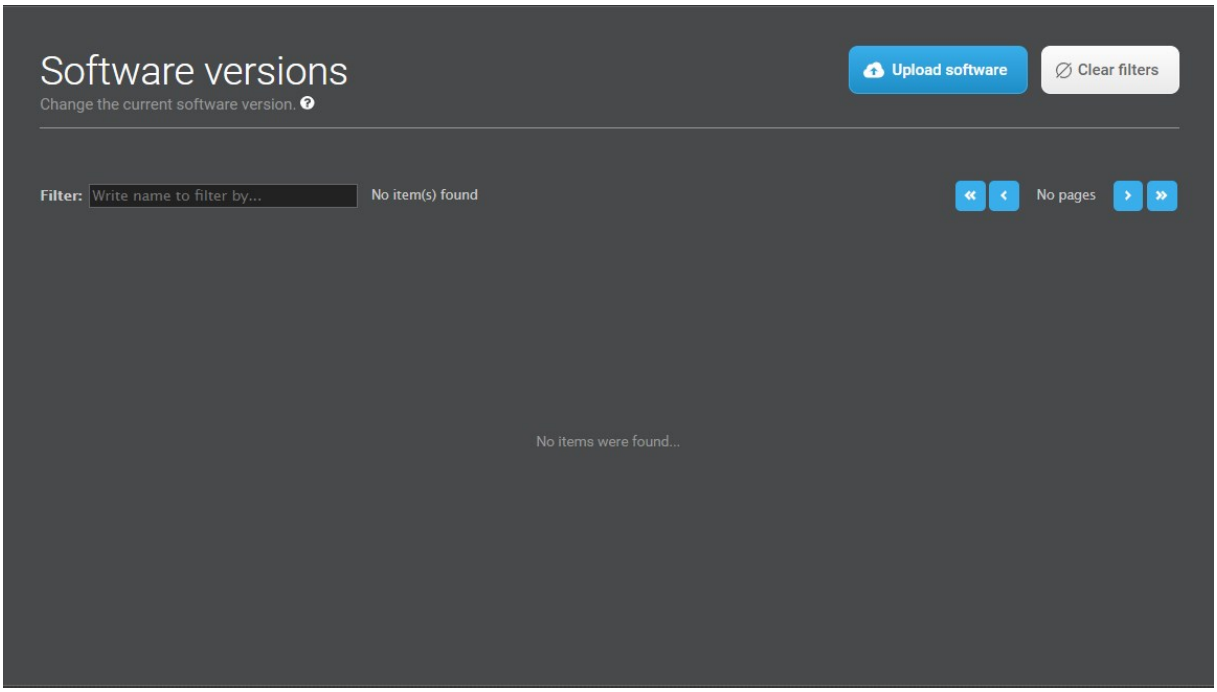
- **Factory reset**
  Resetting the system will completely restore the system to default values. Only do this if you really want to reset the system completely.

6.2 Software versions

In the Software versions section, you can update the fleet to run the newest software and see a list of all previous versions installed on the fleet.

Select **Upload software** and select the software file on your computer to start the upload. You can follow the upgrade process on-screen. When finished, restart the fleet, and log on to the interface again. The fleet is now ready to operate with the new software version.

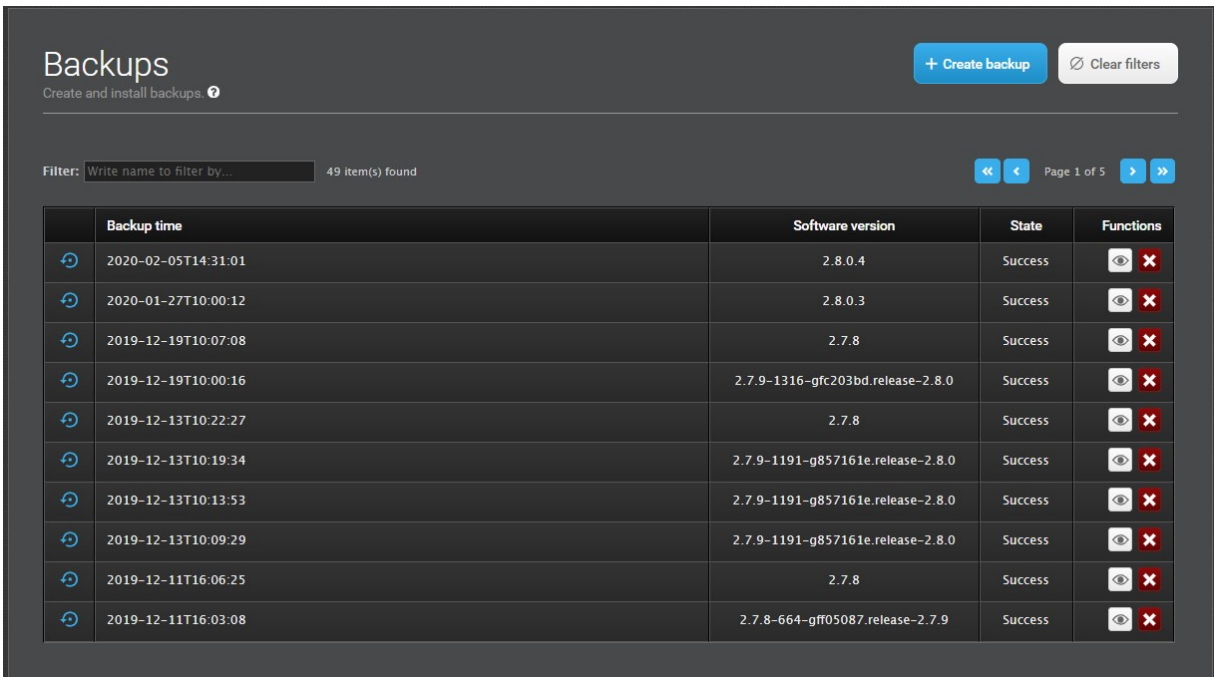
Note: If a hook is mounted on the robot, the hook must be updated to the same software version. Go to **Hook** > **Software versions** and follow the same procedure as for updating the robot.



6.3 Backups

In the Backups section, you can create a backup of the current system state and restore to a previous version of the software.

Select **Backup** to create a backup of the current version. It can be useful to create a backup (snapshot) if you want to be able to revert to the exact state of the current software including data such as settings, missions, reports etc. at a later stage.



It can be useful to create a backup (snapshot) if you want to be able to revert to the exact state of the current software including data such as settings, missions, reports etc. at a later stage.

Delete backup

Backups may be deleted individually. Select **Delete backup** to remove the selected file from the system.

6.4 Fleet setup

This section contains the basic configuration properties.

Configuration

You can edit the name of the product in the **Name** field.

6.5 Evacuation zones

In case of an emergency, all robots can be evacuated from one or all zones.

Evacuation zones make it possible to evacuate all robots in case of an emergency situation.

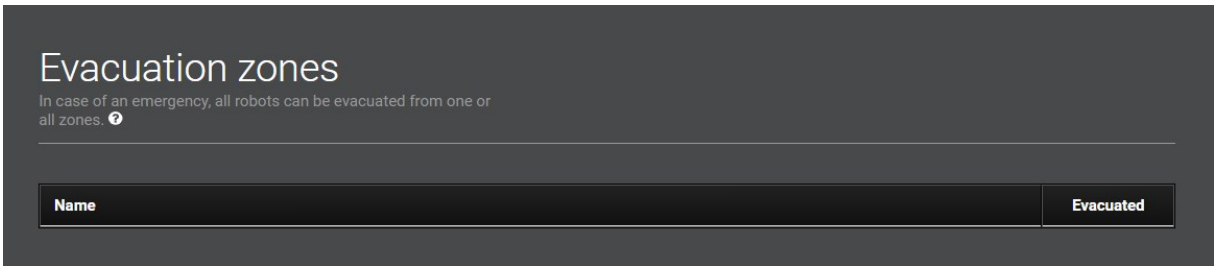
One or more evacuation zones can be marked up on the map and will appear on a list under **Evacuation zones**. It is possible to evacuate one certain zone or all zones at once.

Select **Evacuate all zones** to evacuate all zones (in the top bar or under **Evacuation zones**) or select **Evacuate** next to a specific evacuation zone to evacuate that zone. All robots will leave the selected evacuation zones and go to the nearest evacuation positions.

To give the all clear when the emergency is over, remove the check marks from the boxes from one or more zones under **Evacuated**. When the all clear has been given, the robot(s) will wait at their Evacuation position(s) for new missions.

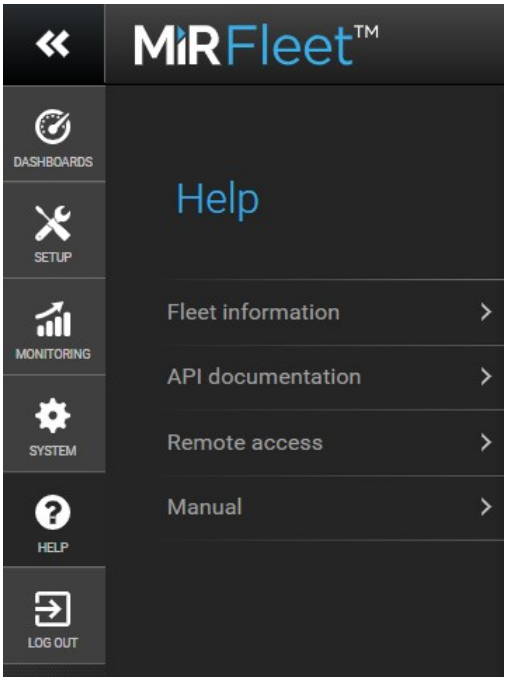
Evacuation zones should only be used in case of an emergency as all missions are discontinued.

Note: There must be at least one evacuation position per robot when Evacuation zones are applied.



7. Help

This section describes the items in the Help menu.



The Help menu contains the following items:

7.1 MiR Fleet information **118**

7.2 API documentation **118**

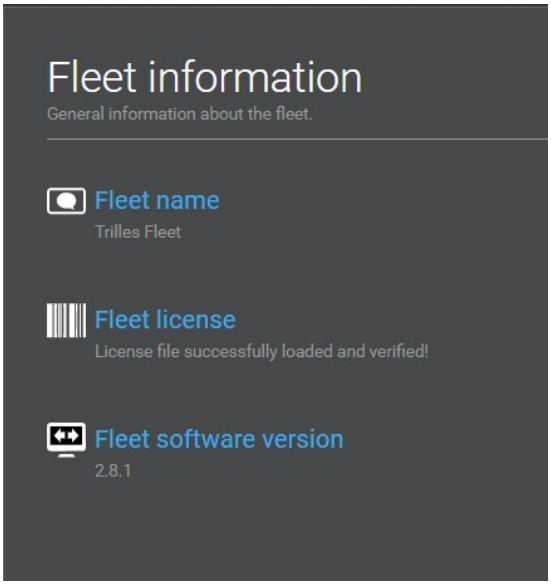
7.3 Remote access **119**

7.4 Manual **119**

7.1 MiR Fleet information

This menu item contains the following information:

- **MiR Fleet name**
  This field shows the MiR Fleet name.
- **MiR Fleet serial**
  This field shows the MiR Fleet serial number.



7.2 API documentation

All functionality found in the fleet interface can also be accessed through the fleet's REST API. In fact, the REST API is what the fleet interface uses to communicate with the robots.

You can connect to the fleet using either **http://mir.com:8080** or **http://mir.com/api**. Alternatively, you can use the fleet's IP address if you are not connected to the fleet's own WiFi.

For authorization, please refer to the given example, automatically generated when you enter your username and password.

Select **Launch API documentation** to get the list of available commands. Selecting a particular command opens the dialog with extra details and the **Try it out** button.

7.3 Remote access

MiR Remote enables the MiR Technical Support team to remote access the fleet's software. This will in many cases help solving 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 fleet if the problem you need solved allows it.

7.4 Manual

A copy of this reference guide is available in the interface. To access the guide, go to: **Help** > **Manual**.