AUGALLERY & AUNUDGING MANUAL

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v.1.0

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Producer

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TABLE OF CONTENTS

1. DOCUMENT INFORMATION

This document contains the following information:

- Start-up and operation of AUGallery & AUNudging.
- Safety of use
- Product presentation
- Guidelines for the correct use and maintenance of the robot

1.1 More information

Dealer Site > Manuals

https://www.a-units.com/AUGallery-manualer/

This page contains the following resources:

- **AUGallery Quick Start**
  A short guide that allows you to start using the robot quickly. The document can be found in printed form in the box with the robot.
- **MiRCharge 24V guide**
  The operating instructions for how to set up the MiRCharge 24V and configure the MiR100 for automatic battery charging in the charging station.
- **AUGallery product page**
  https://www.a-units.com/gallery/
  This page contains specifications, photos and brochures for AUGallery.
- **AUNudging product page**
  https://www.a-units.com/nudging-robot/
  This page contains specifications, photos and brochures for AUNudging.
- **auController User Manual**

This manual contains a guide for operating AUGallery and AUNudging via the proprietary software.

1.2. Document history

The latest and previous versions of this document and their interrelationship with product and software versions.

Revision	Release date	Description	SW	HW
1.0	05.10.2022	User Manual	1.0	1.0

2. SECURITY

Please read the information in this section before operating AUGallery and AUNudging.
Pay particular attention to safety instructions and warnings.

> **(!) Note**
> Autonomous Units disclaims any liability if the robot or its accessories are damaged, altered or modified in any way. Autonomous Units cannot be held responsible for damage to robots, accessories or anything else if safety instructions for safe use are not complied with.

2.1. Types of security notifications

> **⚠ Warning**
> Indicates a potentially dangerous situation that could result in death or serious injury.
>
> • Take the right precautions to avoid bodily injury.

> **⚠ Caution**
> Indicates a potentially dangerous situation that may result in minor or moderate injury. Warns of unsafe practices.
>
> • Take the right precautions to avoid bodily injury.

> **(!) Note**
> Indicates important information including situations that may result in damage to equipment or property.

2.2. General security measures

This section describes the general safety precautions to take before operating AUGallery or AUNudging.

⚠ **Warning**
Using a charger other than the one provided by the manufacturer may cause a fire.

• Only use the original charger.

⚠ **Caution**
Even though the robot has Stair Detection installed, precautions must still be taken in connection with stairs, holes in the ground, etc.

• Mark stairs, holes, etc. on the robot's map as "Forbidden Zones".
• Always keep the maps updated with any changes in interior design or the like.

⚠ **Caution**
Use airplane setting when the robot is controlled with smartphone.

• If you control the robot with a smartphone, make sure the phone is set in flight mode. An incoming call on the smartphone will interrupt the control of the robot and there will be a risk of injury and/or damage to the robot.

> **(!) Note**
> **Always** set up warning signs before use in areas where people move around during the operation of the robot.

2.3. Intended use

AUGallery and AUNudging are intended for use in indoor environments with people moving around during the operation of the robot.

The robot must be put into operation according to **5.1 Start-up** on **page 17** of this guide and prepared for the environment in accordance with the guidelines. This is a prerequisite for the safe use of AUGallery and AUNudging.

2.4. Predictable misuse

The robot is meant for intended use only. If there is a deviation from intended use, it is considered incorrect use. This includes, but is not limited to:

• **Using the robot as a means of transport or increasing**
 Risk of injury.

• **Steep ramps on the route**
 Risk of damage. Steep driving surfaces (e.g., ramps) can cause the robot to skid.

• **Outdoor use**
Risk of injury. AUGallery and AUNudging are designed and intended exclusively for indoor use.

• **Non-compliance with the start-up guidelines**
See section 4.0.

• **Operation outside the permitted rated operating parameters and environmental specifications**
Risk of instability, shock, or overturning.

- **Use in potentially explosive environments**

  Risk of explosion and serious injuries to people or robot.

- **Use around ladders and scaffolding**

Risk of injury.

2.5. Safety-related functions and interface

AUGallery and AUNudging are, together with the MiR100/200 platform, equipped with a number of built-in safety-related functions and safety-related electronic interfaces. Each safety function and interface is designed in accordance with the ISO 13849-1 standard.

2.5. Limiting safety-related features

The robot has several built-in safety-related features that are used to achieve safe operation in the environment in which it is designed to be used.

This means that the safety functions are not triggered by intended use. This will only happen when the limits are exceeded, triggering a Category 0 stop (stop in the form of "immediate interruption of power to the machine's activators according to IEC 60204-1"), after which a controlled braking is performed, and the robot stops.

See the technical specifications on our website for further information.

Collision Avoidance

Safety Mode ensures that the robot is stopped before it crashes into a human or object. The function measures the speed of the driving wheels and scans the predefined protection fields. The higher the speed, the larger the protection fields the robot scans. This ensures that the robot is stopped if a human or object is detected within the so-called active protective field.

Stop due to collision avoidance is automatically deactivated two seconds after the protection field is free again.

Avoidance of overspeed

The safety system monitors whether the speed of each engine is above the maximum rated speed limit, indicating whether the speed control has been lost.

The safety function, avoidance of overspeeding, must be disabled manually upon activating the restart button - the blue button at the right front wheel.

Emergency stop

AUGallery and AUNudging are equipped with a red emergency stop button, intended primarily for use in an emergency.

Emergency stop is manually deactivated by first turning the emergency stop button until it clicks and is back in the normal position, and therefore pressing the restart button - the blue button at the robot's right front wheel.

2.6. Lithium battery

This section contains safety measures related to lithium batteries in the MiR platform.

> **Warning**
> Lithium battery packs can become hot, self-ignite, or explode, causing serious damage if misused electronically or mechanically. Observe the following precautions for handling and using lithium batteries:
>
> - Do not short-circuit, recharge, or connect the battery with the wrong polarity.
> - Do not expose the battery to temperatures outside the specified temperature range.
> - Do not crush, perforate or disassemble the battery. The battery contains safety and protection devices that can cause the battery to generate heat, explode, or ignite if damaged.
> - Make sure the battery doesn't get wet.
> - If the battery leaks and someone gets the liquid in their eyes, do not rub your eye. Rinse with plenty of water and seek medical advice immediately. Without treatment, there is a risk of eye damage.
> - Use only the original charger (cable charger or charging station) and always follow the instructions of the battery manufacturer.

3. PRODUCT PRESENTATION

AUGallery

Gallery is created in close collaboration with an innovative customer and their customers.

Your customers get the right information in the right place with its two screens. Customers capture the movement of the robot and remember the information because of the unique experience.

With a MiRCharge 24V, the robot can automatically move to a charging station. All it takes is defining a charging mission and a charging position on the map.

AUNudging

Want to nudge your customers? Want to catch their attention.

Behaviour! An analysis has shown that AUNudging can increase the number of people using hand sanitizer by 50% to 96%, the robot's friendly messages "nudge" your customers in the direction you want.

With a MiRCharge 24V, the robot can automatically move to a charging station. All it takes is defining a charging mission and a charging position on the map.

3.1. Main functions of AUGallery

The main features of AUGallery are:

• **Display graphics and/or play video on the dual monitors.**

• **Play audio through the built-in speakers.**

• **Maneuver safely and efficiently in furnished and dynamic environments.**

3.2. Identification label

The MiR200 identification label is placed in the bottom right handside next to the rear wheel, next to the MiR identification label.

Example of AUGallery and AUNudging robot identification label.

Autonomous Units ApS
Nyhavevej 6
DK-5550 Langeskov
Denmark

Model: AUGallery Rev. 1.0
Serial no. 22-0002-30-100-0001
Made in Denmark 2022

Serial number	Serial number is the robot's unique identifier. The last four digits are included in the robot's original name, such as Gallery: 22-0002-30-100-XXXX Nudging: 22-0002-20-100-XXXX

3.3. External parts to AUGallery

This section describes the parts on the AUGallery that are visible on the outside.

- Tower with two screens and one or more antennas.
- Red emergency stop button flanked by a blue button.
- SICK Stair Detection (red dot on the floor in front of the robot).
- LED lights around the underside of the screens.

3.4. Interior parts on AUGallery

This section describes the parts on the AUGallery that are visible on the inner side.

- DFI with SIM module.
- LED rails along the bottom of the screens.
- SICK sensors (Stair Detection).
- Extra battery.
- Inverter 24V to 230V.
- Antenna

- Multi-socket.
- Capacitor.

3.5. External parts to AUNudging

This section describes the parts of AUNudging that are visible on the outside.

- Tower with two separated and one or more antennas.
- Red emergency stop button flanked by a blue button that is pressed after triggering emergency stop.
- Possibly a liquor dispenser.
- SICK stair detection.

3.6. Interior parts on AUNudging

This section describes the parts of AUNudging that are visible on the inner side.

- DFI with SIM module.
- Extra battery.

3.7. Sensor system

The collaboration between the robot's internal and external sensors ensures that the robot can navigate the environment and function safely among people and objects such as furniture, stairs, etc.

3D Cameras

Two 3D depth cameras located at the front and back of the robot detect objects, while the robot's local planning function adjusts the planned routes around various obstacles.

The 3D cameras detect objects within the following parameters:

• Vertical up to 1800 mm. at up to 1950 mm. in front of the robot.

• Walked 180 mm. where the camera's sight felled the first time hits the floor.

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The 3D cameras do not detect objects within 50 mm. from the lenses.

The camera's readouts are used as 3D point cloud data. They do not detect recognizable objects or people.

Ultrasonic sensors

Four ultrasonic sensors are located on the robot: two front and two rear. The ultrasonic sensors detect transparent objects.

3.8. Light indicators

This section describes the light indicators the robot communicates with.

The status indicators led light band that goes all the way around the robot indicate the current operating state of the robot. Colors are used as part of the missions. By default, the robot comes with the following setup.

Color	Meaning
Red	Emergency stop
Green	Ready to work
Cyan	Driving to destination
Pink	Goal/route blocked
White	Planning/Calculating
Yellow	Mission set to pause
Gradient yellow/white	Starting sygnal, becfore DFI activates
Fading yellow	Shutting down
Blinking yellow	Relative movement/ ignore obstacles
Pink-Yellow	General fail, e.g hardware, localization
Blue	Manual drive, joystick
Gradient blue	Mapping
Rainbow	Charging: charging station
Gradient white/grey	Prompt user/waiting for users response

4. HOW TO GET STARTED

4.1. Contents of the box

When you receive AUGallery or AUNudging, the box contains the following:

- 1x User manual
- 1x Quick start guide
- 1x *username and passwords*
- 1x AUGallery or AUNudging
- 1x Charging station with cabling.

4.2. Unpacking AUGallery or AUNudging

1. Remove the pallet lid and remove the box with the kit.
2. Remove the top layer of foam, the foam blocks on the sides and pallet collars.
3. Place the pallet cover as a ramp at the rear of the robot.

5. SET-UP GUIDE

> **(!) Note**
> Read the safety chapter before starting up the robot.
> The robot must always be set up by a trained technician.

> **⚠ Warning**
> Drawing of the driving areas **must always be** carried out by an educated technician. If changes are made in the in entered maps, Autonomous Units disclaims all responsibility when using the robot.

5.1 Start-up

How to starts AU-GALLERY.

Step 1	Press the blue button at the bottom of the front of the robot. The robot will then start flashing yellow.	

Step 2	Wait for the yellow light to stop flashing. The light now changes to glow red.	
Step 3	When the robot lights up red at the bottom, the blue button on top of the tower will flash. Press the blue button and a clicking sound will be heard.	
Step 4	After the clicking sound, the robot lights up yellow. The robot is now in **the pause position.**	See start-up of driving function under section 4.3

> ⚠ **Note**
> The robot's automatic and manual routes must be mapped by a trained technician.

5.2. Connecting to the robot's WEB-interface

When the robot is turned on, it allows it to connect to its Wi-Fi access point. The access point name appears in the list of available connections on your PC, tablet, or phone.
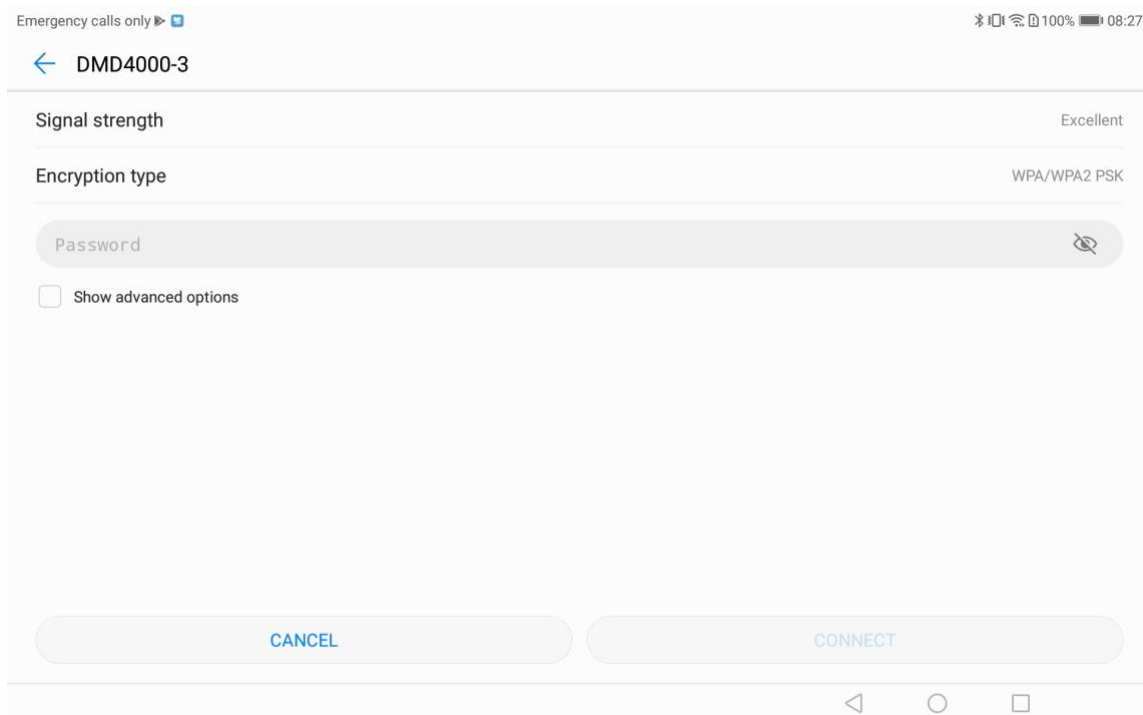
> ⊘ **Note**
> The username and password of the robot's WiFi access point and for opening the web interface can be found in *the document AU-GALLERY username and passwords*. The document can be found in the box with the robot.

To connect to the robot's WEB interface, follow these steps:

Use a PC or mobile device to connect to the robot's WiFI access point.

1. The access point's name has the following format: AU-GALLERY-XXX

   MiR platform; Joystick MUST only run 0,6m/s otherwise the robot will go into e-stop.

2. Enter the password

Emergency calls only ▶ ▣   ✴ ⅰ◐ 🔌 🔋 100% 🔋 08:27

← DMD4000-3

Signal strength   Excellent

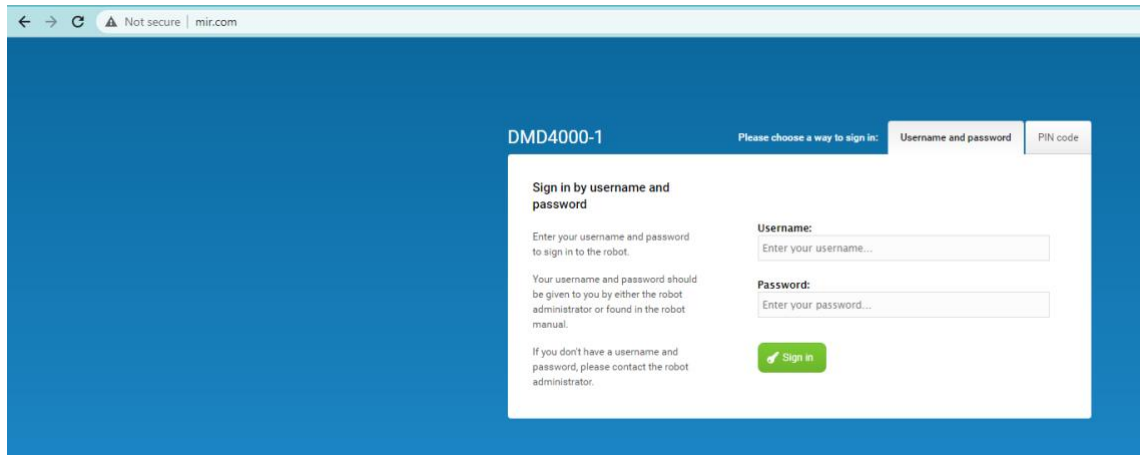Encryption type   WPA/WPA2 PSK

Password   ⌀

☐ Show advanced options

CANCEL   CONNECT

◁   ○   □

The robot is now connected to Wi-Fi

Now, using browser, one can login into the MiR interface. Type **mir.com** into the browser. Log-in window will show.

Use credentials given in the document with usernames and passwords.

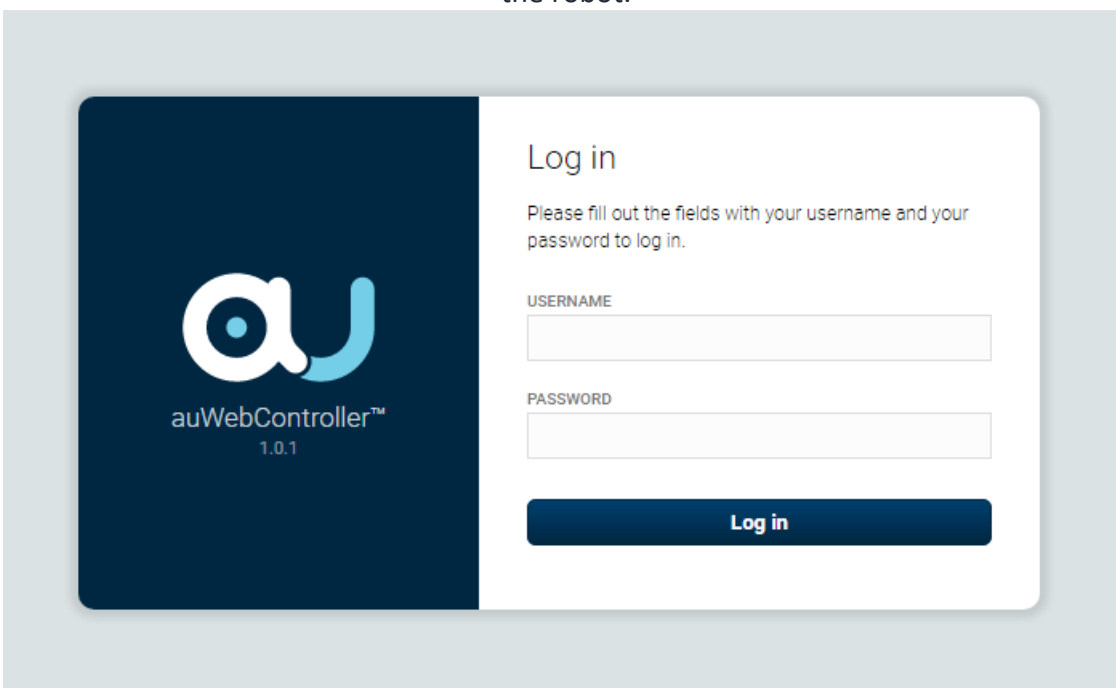# 6. CONTROL THE ROBOT WITH AUCONTROLLER

To configure a mission for the robot, either connect to the robot's Wi-Fi. See the previous section on Startup. Open either the auController app on your mobile device or alternatively auWebController.

If you do not have the app, you can connect to the robot via auWebController by entering the robot's IP address in the URL bar.

192.168.12.253:5081

Log-in window will show up in your browser.
Use credentials given in the document with passwords and usernames, provided with the robot.

For information about auController and auWebController see: AuController User Guide (EN).

7. EMERGENCY STOP, CHARGING AND SHUTDOWN

The following pages guide you to handle the robot in connection with emergency shutdown, manual charging, and shutdown.

7.1. Activation and deactivation of emergency stop during traffic

If the emergency stop button is activated while the robot is running, then it immediately stops its process and the bottom lights up red. In addition, the web interface will display the Emergency stop by glowing red in the top bar.

1. **Restart robot after emergency stop**
   The robot is restarted by turning the red emergency stop button.
2. Then press the blue button next to the emergency stop button. At pressure, a clicking sound is heard that signals that the robot is re-recording the work. The robot's bottom is now glowing green.

7.2. Manually charging the robot

The robot comes with a charged battery and can run for up to three hours before recharging is necessary. Follow these steps to charge the robot using the enclosed charging cable.

1. Remove the back corner by pulling the black plastic cover outward.

ℹ️ *To avoid rapid battery discharge, we recommend that you turn off the robot while charging with cable.*

ℹ️ *If two robots are charging one after the other with a cable, wait about a minute from the first robot disconnects until the second robot is connected. This ensures that the charger detects that a new robot is charging.*

2. Connect the charger to the robot's charging socket and a power outlet. Turn on the tilt switch by pressing the red button to start charging.
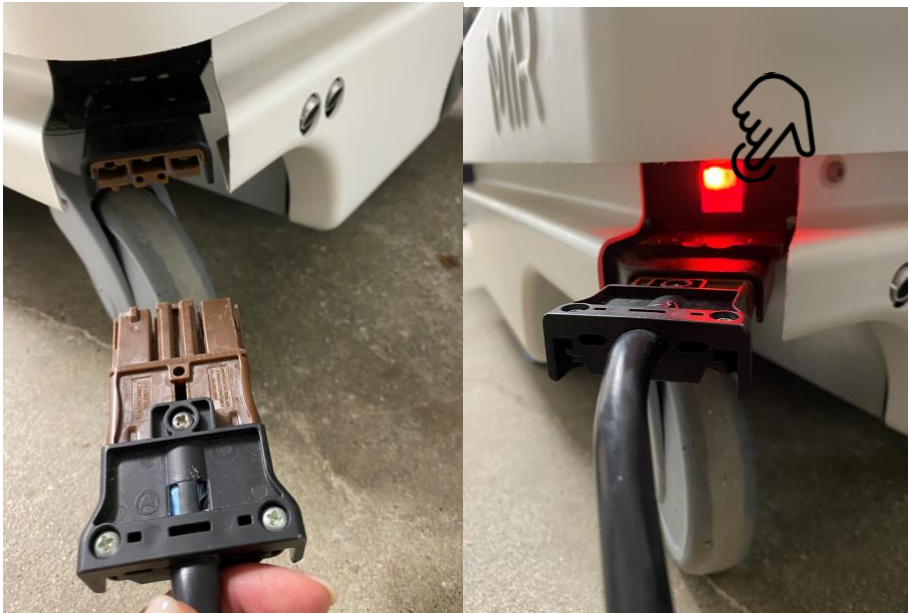
ⓘ *Use only the original charging cable.*

3. After a maximum of 4.5 hours, the robot is fully charged.

4. Turn off the tilt switch - the red button above the charging connector - and remove the charging cable from the robot. Put the corner cover back in place.

ⓘ *The robot detects both the cable and the activated charging button. Charging triggers emergency stop in both cases.*

7.3. Shutdown of the robot

Follow these steps to turn off AUGallery.

1. Make sure the robot is neither moving nor performing a mission.
2. Press the power button. It's the blue one in the right front corner.

3.   The robot will start the shutdown process. During the shutdown, the status indicators - the LED bands on the bottom - show a yellow light that fades out.

4.   You can see that the shutdown is complete when the status indicators are no longer lit.

 If you turn off the robot for transport or service/repair, the battery switch - the round red button in the left rear corner - **must** also be turned off and the battery cable disconnected

8. MAINTENANCE

The following maintenance program provides an overview of procedures for regular cleaning and replacement of parts.

> **ⓘ** *The specified intervals are indicative and depend on operating environment, wear, etc.*

8.1. Weekly control and maintenance tasks

Once a week, the following maintenance tasks should be performed.

Component	Brief Instructions
Laser scanners	Clean the optics covers on the scanners - the black plastic bubbles at the front and back of the bottom of the robot. Avoid aggressive or scrubbing detergents. Clean the laser scanners with a damp cloth. This should also be done before contacting your local technical support regarding issues mentioned below. We recommend that the laser scanners be cleaned daily to reduce the risk of avoiding these problems. Possible problems with not cleaning the laser scanners: • The robot cannot detect markers • The robot goes into emergency stop for no apparent reason **⚠ Note** Static electricity causes the optics cover to attract dust particles. You can reduce this effect by using an antistatic plastic cleaner
Steering wheel (the four corner wheels)	Remove dirt with a damp cloth and make sure nothing is tangled in the wheels.

LED-light strip	Check that the LED light strip is intact and there is light all the way around the robot.
Screens / Dispensers / Signs	Clean AUGallery's screens and AUNudging's signs and hand sanitizer dispensers to ensure correct function.

8.2. Biannual inspection

The resident technicians conduct a visual inspection of the robot at least twice a year.

The following are examples of things to look for.

Is the robot scratched? Has it been in a crash and is it potentially damaged under the shield?

Does the robot sound weird in operation? Does it go into e-stop frequently and/or inexplicably?

8.3. Yearly inspection

The robot must be inspected by a technician from Autonomous Units or a certified service partner at least once a year.