

Charging Station User Manual



Customized charging station
AgileX Robotics Team
Charging station user manual V.1.0.0 2024.08

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1	V.1.0.0	2024/8/19	Cynthia	xxx	First version

Safety Information

This chapter contains important safety information. Before using the charging station for the first time, any individual or organization must read and understand this information before using the equipment. If there are any questions related to its use, please contact us at support@agilex.ai. It is crucial to follow and implement all assembly instructions and guidelines provided in other chapters of this manual. Special attention should be paid to the text related to warning signs.

The information in this manual does not include the design, installation, and operation of a complete charging station application,

nor does it cover all peripheral devices that might impact the safety of the complete system. The design and use of the entire system must comply with the safety requirements established by the standards and regulations of the country where the charging station is installed.

It is the responsibility of the integrators and end customers using the charging station to ensure compliance with relevant regulations and applicable laws to ensure that there are no significant hazards in the complete charging station application. This includes, but is not limited to, the following:

1. Effectiveness and Responsibility

- Conduct a risk assessment for the complete charging station system.
- Connect additional safety devices defined by the risk assessment to other machinery.
- Be aware of any potential safety risks before operating and using the equipment.

2. Environment

- Before first use, carefully read this manual to understand the basic operations and operating guidelines.
- Use within an ambient temperature range of 0°C to 45°C.
- If the charging station is not custom-built with a specific IP protection rating, it does not have waterproof or dustproof capabilities.

3. Inspection

- Ensure that the charging station has no obvious abnormalities.
- Check whether the power supply to the charging station is functioning properly.

4. Operation

- Ensure that the surrounding area is relatively clear during use.
- If the equipment malfunctions, stop using it immediately to avoid secondary injuries.
- If the equipment malfunctions, contact relevant technical personnel; do not attempt to handle it yourself.
- Use the equipment in environments that meet the IP protection rating requirements of the device.
- When charging, ensure the surrounding environment temperature is above 0°C.

5. Maintenance

- Regularly check the condition and positioning of the charging station.
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1 Introduction

This section provides a basic introduction to the robot charging station to help users and developers have a basic understanding of the charging station. The charging station only provides a complete set of contact-based charging hardware. If paired with AgileX Robotics' self-developed Navis commercial navigation system, automatic charging can be achieved. However, if using a non-AgileX navigation system, you will need to solve the positioning and docking software issues independently.

Note: There are two versions of the charging station, with identical appearances. If the chassis battery voltage is 24V, refer to the 29.4V charging station. If the chassis battery voltage is 48V, refer to the 54.75V version.



- 1: Charging electrode (Positive on top, Negative on bottom)
- 2: Telescopic mechanism
- 3: Charging station indicator light
- 4: Charging station cooling grid
- 5: Charging station fixing screws
- 6: Vertical position adjustment mechanism

1.1 Product List

Name	Quantity
Charging station body	X1
Charging station cable	X1

1.2 Performance parameters

Name	Item	Parameter
Dimension	Dimension	431.5*210*400mm
Specification	Self-weight	11.2kg
	Installation	Bolt to the ground
Charge	Output voltage	54.75V/29.4V(According to different mobile base)
	Charging current	MAX: 20A
	Note	Be careful not to get wet
Temperature	Temperature	0-45℃

1.3 Charging principle introduction

After the charging station is powered on, the charging contacts are charged at about 5V. When the robot automatically returns to charge, the on-board electrodes contact the charging contacts. The charging station detects a level jump at the charging contacts and turns on the relay to connect the charger and the charging contacts. At this time, the charging contact level is 29.4V/54.75V. The on-board electrodes detect a level of 29.4V/54.75V, turn on the relay to start charging the car. When the robot is fully charged and drives away, the charging contacts detect no current output and disconnect the charger and the charging contacts.

2 Getting Started

This section mainly introduces the basic operation and use of the charging station platform.

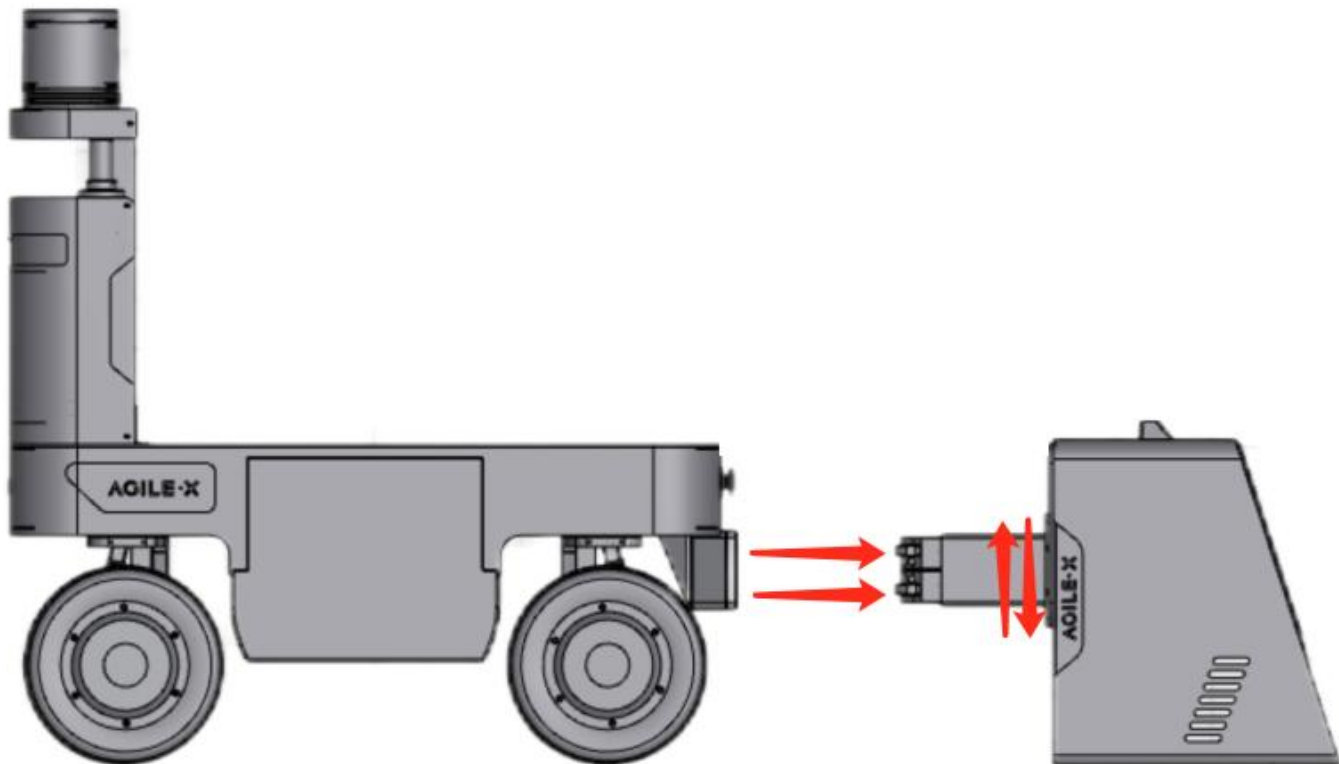
2.1 Operation

Check

- Check the charging station for any obvious abnormalities; if any are found, contact after-sales support.
- Connect the charging station cable (the three-prong interface of the charging station to the household power connection). Note: If the input voltage is not 220V, it cannot be used directly.
- Check if the indicator light on the charging station is solid red after powering on.
- Ensure that the charging station is securely fixed in place.
- After installation, if the positions of the vehicle's electrode plate and the charging station's electrode plate do not align, you can slightly adjust the charging station's electrode module to align it with the vehicle's electrode plate.

Charging:

- Ensure that the vehicle's battery level is above 10%. If it is below 10%, the vehicle will cut off external power supply, and the vehicle's electrode plate will not be powered, making charging impossible.
- Ensure that the vehicle's electrode plate and the charging station's electrode plate are aligned correctly, positive to positive and negative to negative, to avoid short circuits or charging failure due to misalignment.
- Use low speed to control the chassis or move the entire machine to align the electrode plate.
- Move the chassis or the entire device to the charging station, ensuring that the vehicle's electrode plate and the charging station's electrode plate make full contact and press the charging station's electrode plate into the discharge state (indicated by the indicator light flashing green).



Power off

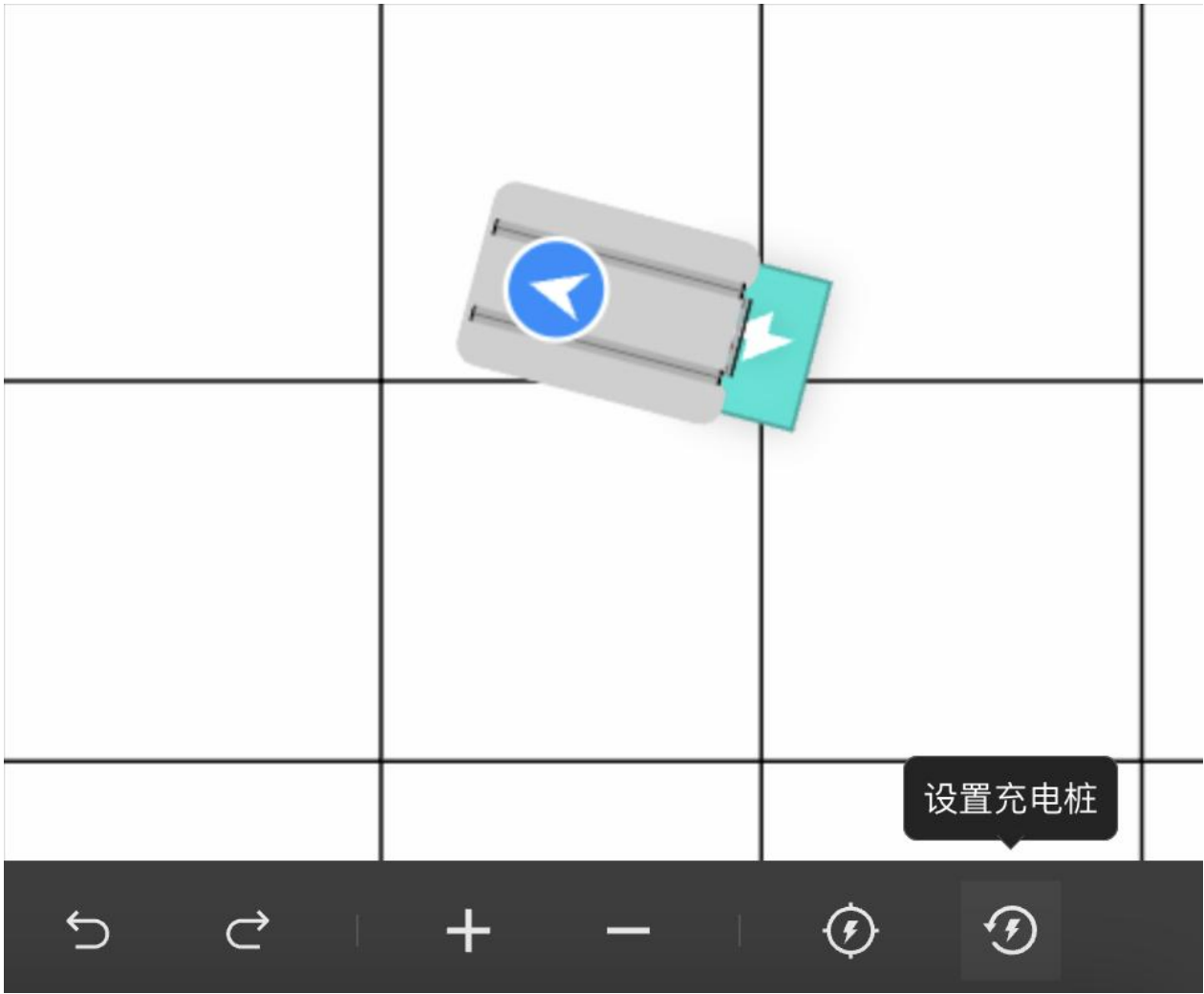
- Unplug the charging pile cable to cut off the power supply;

2.2 Indicator status

Num	Status	Description
1	Solid Red Light	The charging station is powered on but has not started discharging.
2	Flashing Red Light	The charging station is short-circuited or malfunctioning.
3	Flashing Green Light	The charging station is in the discharge state.
4	Solid Green Light	The charging is complete.

2.3 Automatic Navigation Function for the Charging Station

If using the AgileX NAVIS navigation system, refer to the NAVIS user manual to set the charging station point on the map at the corresponding location. The device will return to the charging station for recharging based on the coordinates set.



If using a non-AgileX navigation system, you need to set the charging strategy manually. Note that this charging station does not have infrared or geometric shape docking markers. Users can obtain information such as charging current, discharging current, and battery level by reading the battery's BMS (Battery Management System) feedback.

3 Attention

This section contains some important considerations for using the charging station.

3.1 Charging Precautions

- **Storage Conditions:** The optimal storage temperature is 0°C~45°C.
- **Charging:** Do not charge the battery at temperatures below 0°C. Do not use non-original batteries, power supplies, or chargers.

3.2 Environmental Precautions

- The relative humidity requirement for the charging station's operating environment is a maximum of 80% and a minimum of 30%.
- Do not use the charging station in environments with corrosive, flammable gases, or near flammable materials.
- Avoid using it near heaters or large coil resistors and other heat-generating devices.
- Unless specially customized (with IP protection rating customization), the charging station is not waterproof. Do not use it in environments with rain, snow, or standing water.
- The recommended altitude for use is not more than 1000 meters.
- The recommended day-night temperature difference in the operating environment should not exceed 25°C.

3.4 Safety Precautions

- If you have any questions during use, please refer to the relevant instruction manual or consult technical personnel.
- Before operating the equipment, be aware of the on-site conditions to avoid safety issues caused by misuse.
- Do not modify the internal structure of the equipment without technical support and authorization.

3.5 Other Precautions

- When transporting or setting up the equipment, do not drop or invert it.
- Non-professionals should not attempt to disassemble the equipment.

4 Q&A

Q: What should I do if the robot is completely out of power and can't be charged when pushed back to the charging station?

A: When the battery is completely drained, you need to first check if the battery protection has been triggered (especially for the Ranger and UMR series). If the vehicle is completely without power, you need to use a wired charger to provide it with some power before you can continue charging with the charging station. (It is recommended to charge with the wired charger for 15-30 minutes.)

Note that when using the charging station, the battery level of the chassis and the entire device should not be less than 10%.

Q: What does it mean if the charging station's red light is flashing, but the device isn't charging and the battery level is decreasing?

A: A flashing red light on the charging station indicates that there is a voltage output from the station, but it does not necessarily mean that charging is taking place. You need to further check the current signal to determine if charging is actually occurring.

5 Product Dimensions

5.1 Product dimension diagram

