

GS-Ecobot Scrubber

50

SERVICE MANUAL



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INTRODUCTION

The Cleaning Robot Scrubber 50 by Gausium (alias "Gaussian Robotics"), Singapore, is a fully autonomous cleaning robot that can automatically charge, dispense, and refill all by itself.

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1. GENERAL

1.1. Product Overview

Scrubber 50 Pro is an AI-powered floor-cleaning robot that goes beyond the scope of “automation”. Deep-learning algorithms are integrated within a sensor fusion of 2D LiDAR, 3D, and RGB cameras, which grant the robot high-accuracy environmental perception and the ability to make advanced operation decisions according to the real-time situation.

**NOTE:**

- Additional requirements shall be specified in the Appendixes to this document which form an integral part thereof.

1.2. Product Introduction

Scrubber 50 Pro is an AI-powered floor-cleaning robot that goes beyond the scope of “automation”. Deep-learning algorithms are integrated within a sensor fusion of 2D LiDAR, 3D, and RGB cameras, which grant the robot high-accuracy environmental perception and the ability to make advanced operation decisions according to the real-time situation.

**Minimal Human Intervention**

Scrubber 50 cleans on schedule, requiring no human intervention in its cleaning operations.

Fleet Management System

Operators can monitor the Scrubber 50's performance and access cleaning reports through a user-friendly and interactive dashboard.

Zone Cleaning

Scrubber 50 can be deployed into pre-selected areas for zone cleaning. Lift integration is an option that allows the robot to clean multiple levels of a building autonomously.

Integrated Working Station

Automatically docks itself, charges the batteries, empties, and rinses the dirty water tank. It also automatically refills the clean water tank so that it is ready for its next cleaning task.

1.3. Component Checklist



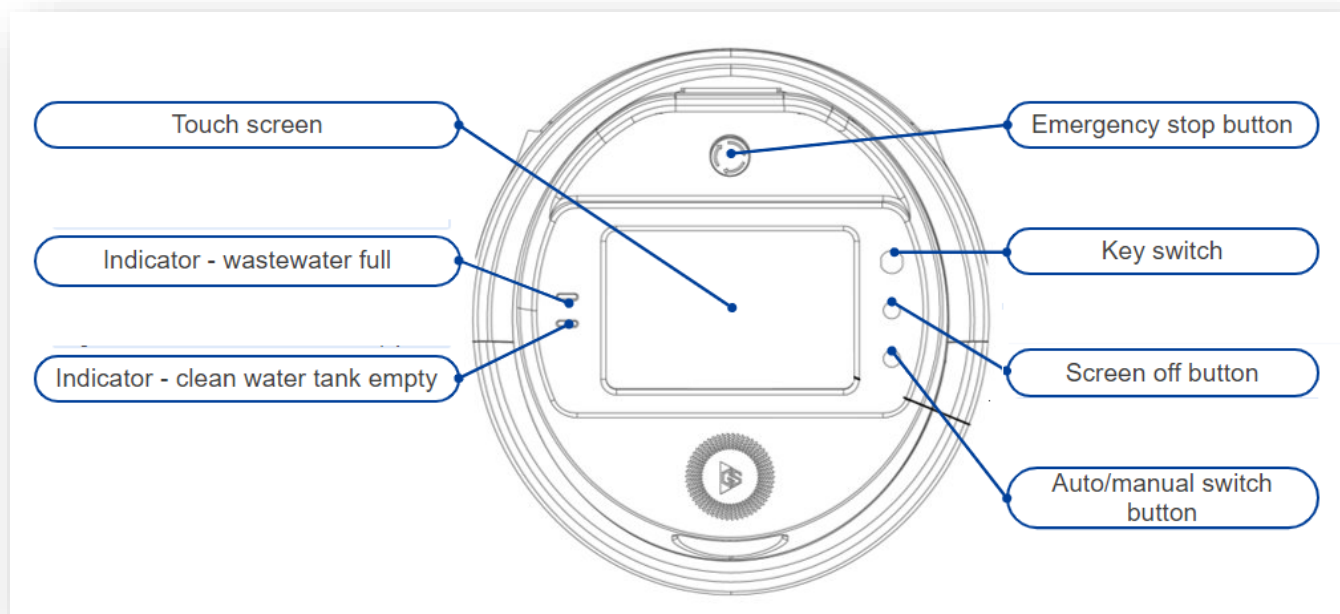
Name	Description
Front Cameras	Obstacle avoidance and obtaining real-time colored pictures.
Tile Camera	Obstacle avoidance and obtaining real-time colored pictures.
Horizontal Camera	Obstacle avoidance and obtaining real-time colored pictures.
Bumper	Buffer from a crash, avoiding secondary damage.



Name	Description
Ultrasonic Radar	Detect obstacles in the back and avoid them.
Manual Charging Port	For manual charging the robot.



Name	Description
Push-handrail	Push the robot to move
Water inlet - auto water-fill	Fill the water tank with clean water.
Wastewater drainage pipe	Drain wastewater
Charging port	Contact with workstation for auto charging



Name	Description
Touch screen	Robot operation and configuration.
Indicator - wastewater tank full	Light ON when the wastewater tank is full.
Indicator - clean water tank empty	Light ON when the clean water tank is empty.
Emergency STOP button	To stop the robot immediately after pressing it.
Key switch	Turn the robot ON/OFF.
Screen OFF button	Press the button to turn the display OFF.
Auto/manual switch button	Long press it for 3 seconds to do the mode switch.

1.4. Technical Specification

Parameter Type	Parameter	Value
ROBOTICS	Navigation Technology	Integrated Lidar-Visual SLAM
	3D LIDAR	No
	Primary Laser detection distance	25 m
	Laser scanning angle	270°
	Secondary Laser detection distance (level)	No
	Secondary Laser detection distance (inclined)	No
	Depth Cameras	3* Real sense camera
	Ultrasonic Sensors	Yes
	Anti-drop Sensor	by using an inclined laser
	Collision sensor	Yes
	Mapping Process	Easy onsite mapping (off-line, on-screen)
	Mapping Efficiency (e.g., 3,000 sqm)	1 hour
	Map Editing	On-site, Off-line, On-Screen
	Single map coverage	Max. 30,000 m ²
	Dynamic Map updating	Yes, a maximum of 30%
	Minimum distance close to the wall	7-10 cm
	Ability to detect thin poles and hanging obstacles	Able
	Dynamic path planning	Yes
	Obstacle avoidance strategy	slow down-stop-wait-bypass-replan path
	Start the task anywhere on the map	Yes
SOFTWARE & DIGITAL	Continue the previous task after interrupting/switching to manual mode	Continue from where it stopped
	Ability to work in complicated and dynamic scenes	Able
	Can detect obstacles higher than N cm	10 cm
	Cloud Platform to check the statistics and monitor	Yes
	Task Reports and Alerts	Auto-generated and comprehensive email
	Mobile App	Yes
	Account with different access levels	Yes
	Scheduling function	Yes
	OTA	Yes
	Ability to work offline	Yes

CLEANING PERFORMANCE	Manual mode	Yes, Push behind
	Adjustable cleaning mode	Yes
	Working width	50 cm
	Water absorption width	72 cm
	Disc Brush RPM	270
	Cleaning down-pressure	12,5/15 kg
	Number of main brushes	2 pcs
	Optional Rolling brush	Yes
	Clean Water Tank Capacity	24 l
	Recovery Tank Capacity	18 l
	Filtration function	4-stage filtration system
	Cleaning speed	1.1 m/s
	Charging time	1-2 hours
	Is employed Operation time	2.5 hours
	Cleaning efficiency	800-1200m ² /h
	Max. cleaning area/Charge	2,000 m ²
KEY COMPONENTS AND OTHERS	Battery capacity	24V / 40Ah Li-ion
	The weight of the body (including the battery)	150 kg
	Warning lights	Yes
	Dimensions (mm)	860 (L) X 700 (W) X 1030 (H)

1.5. Structural Parameters

Parameter	Value	Remarks
Length	0.86 m	
Width	0.70 m	
Height	1.03 m	
GVW	Disc brush: 150kg Roller brush: 140kg	It indicates the weight of the scrubber in a no-load state, that is, the state in which both the freshwater tank and the recovery tank are empty. The weight includes the battery weight.
Transportation Weight	Disc brush: 150kg Roller brush: 140kg	
Battery weight	15 kg	
Water tank capacity	42 L	Recovery Tank: 18L Clean Water Tank: 24L
Vibration	ah \leq 2.5 m/s ²	
Noise	LpA \leq 70dB(A)	

LwA ≤82dB(A)

1.5.1. Electrical Parameters

Parameter	Value
Battery type	Lithium-ion battery
Maximum operating time	<ul style="list-style-type: none"> ➤ Floor washing mode: 2h ➤ Dust pushing mode: 6h ➤ Standby mode: 16h (Equipped with Charging Dock to realize unlimited endurance.)
Maximum power	1200W
Rated voltage	24 V
Rated power of drive motor	300 W
Rated power of brush motor	2 X 150 W
The rotational speed of the roller brush	Up to 270 RPM
The rotational speed of the disk brush	Up to 1000 RPM
Rated power of pumping motor	280 W
Maximum pumping pressure	18 kPa

	Frequency band	Maximum output power
2.4G Wi-Fi	2400-2483.5MHz	EIRP=18.01dBm
433MHz	433.03-434.79MHz	EIRP=9.35dBm
4G	LTE Band 1/3/7/8/20/28/40	EIRP=32.5dBm

Charging Dock	Value
Input: <ul style="list-style-type: none"> ➤ 100-240V~ ➤ 50-60Hz ➤ 8.1A 	Output: <ul style="list-style-type: none"> ➤ 23A
Battery Charge	IC0650-024
Input: <ul style="list-style-type: none"> ➤ 100-240V~ ➤ 50-60Hz ➤ 720W 	Output: <ul style="list-style-type: none"> ➤ 24V ➤ 27, 1A ➤ 650 W

1.5.2. Cleaning Parameters

Parameter	Value
Cleaning width	460mm (Roller brush)

	500mm(Disc brush)
Cleaning efficiency	Up to 1656 m ² /h
Safety system	<ul style="list-style-type: none"> ➤ Laser radar*1 ➤ depth camera*3 ➤ ultrasonic sensor*6 ➤ fender wheel ➤ anti-collision sensor ➤ foot guard sensor
Traveling speed	0-1 m/s

1.5.3. Atomization Disinfection Parameters

Parameter	Value
Quantity of Atomization Cartridge	8 PCS
Min. Atomization Rate	1.5L/h
Max. Atomization Rate	1.8L/h
Battery Life	6h-Disinfection Mode 3h-Scrub & Disinfection Mode
Atomization Particles	1~5μm
Atomization Distance	1m
Atomizer Gasket Life Span	≥5000h
Recommended Disinfectant	Hypochlorous Acid
Requirement of Water Quality	Purified Water/Distilled Water
Disinfectant PH Value	4~12
Water Tank Capacity	5L (Water Added Shall Not Exceed 3L)

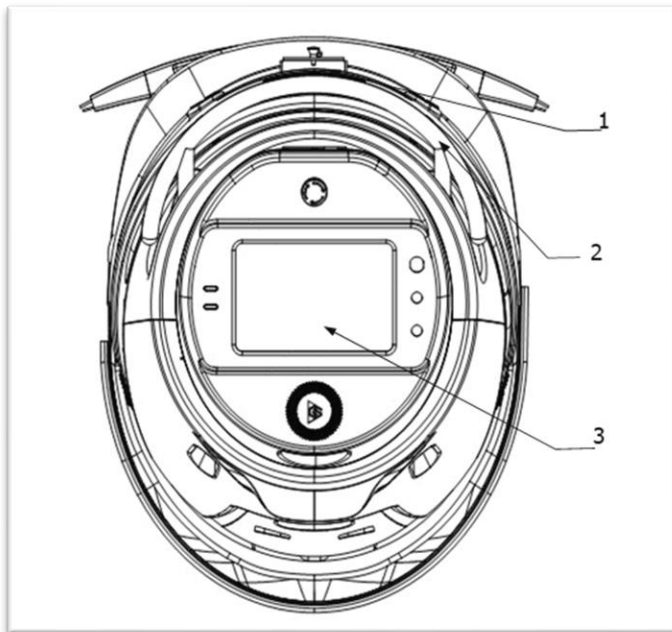
1.5.4. Other Specifications

Parameter	Value
Operating Temperature	0°C ~ +45°C
Operating Humidity	20% ~ 75% RH
Storage Temperature	-20°C ~ +45°C (Note: if it is necessary to store at a low temperature (lower than 0°C), the water tank and all water pipes shall be drained to ensure the storage without water.)
Storage Humidity	20% ~ 93% RH
Operation Noise	55 ~ 70 dB(a)
Operating Slope	Less than 8 degrees (Note: The scrubber is not recommended to climb a slope under the automatic mode. It can climb a slope ≤8 degrees when it is pushed manually.)

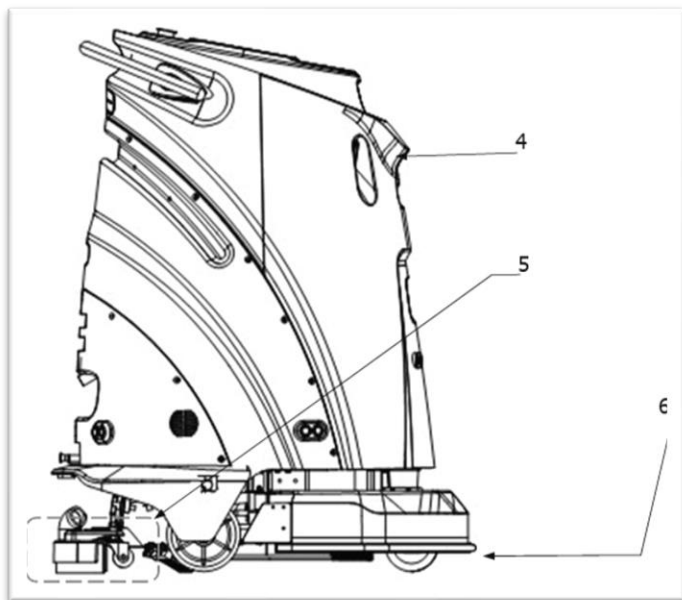
2. STRUCTURE DESCRIPTION

2.1. External View of Scrubber 50 (Sprayer)

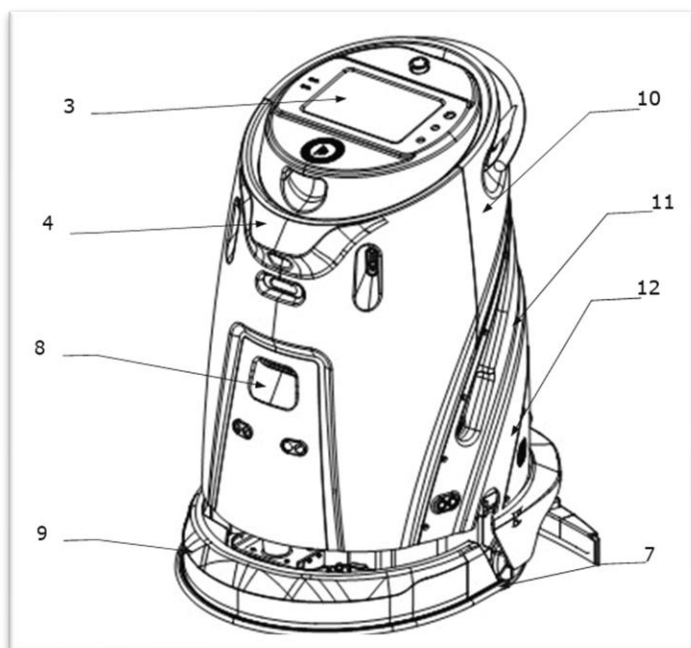
Vertical View



Side View

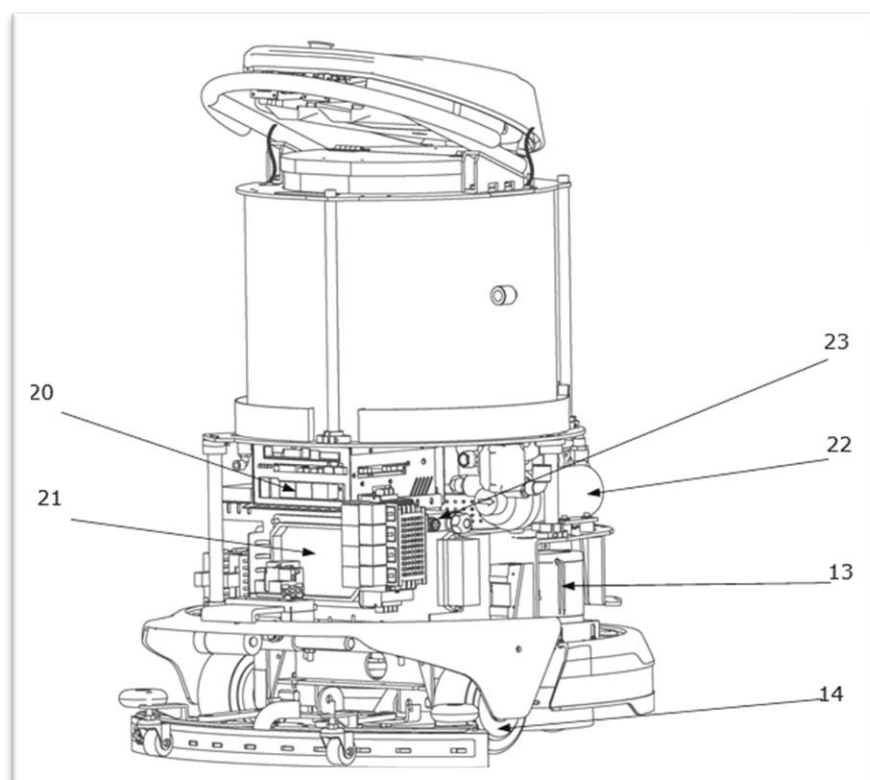
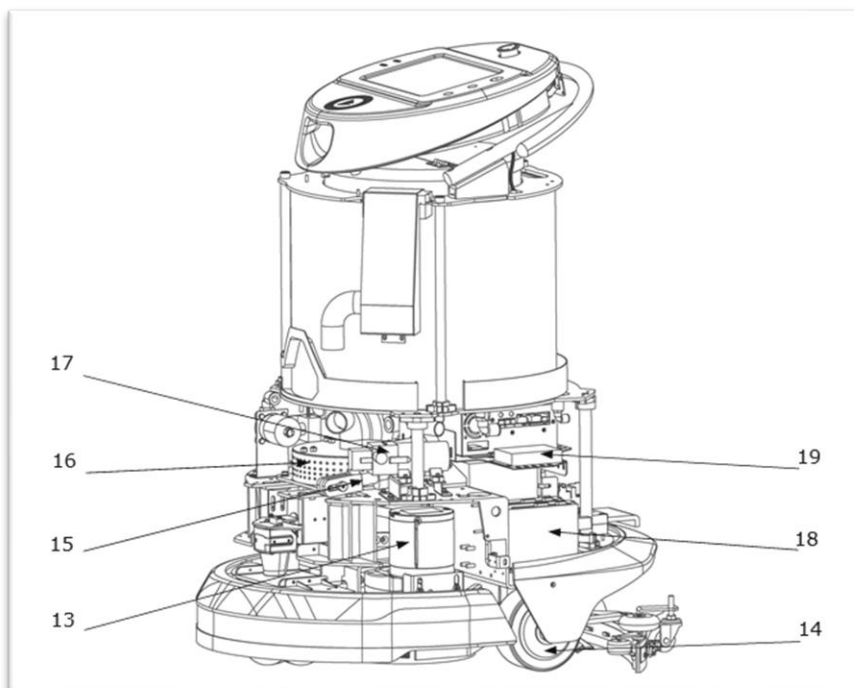


Axonometric View



No.	Name	Remarks
1	Pedal	Standard
2	Handle	Standard
3	Tablet	Standard
4	Front cover	Standard
5	Squeegee Mount	Standard
6	Brush	Standard
7	Back Wheel	Standard
8	Front Door	Standard
9	Front Bumper	Standard
10	Upper Back Cover	Standard
11	Back Cover	Standard
12	Lower Back Cover	Standard

2.2. Structure of Electrical System | Power & Battery



No.	Name	Remarks
13	Brush Motor	Standard
14	Hub Motor	Standard

15	Actuator Motor	Standard
16	Vacuum Motor	Standard
17	Water-Spray Motor	Standard
18	Servo Driver	Standard
19	Ultrasonic Module	Standard
20	Control Box	Standard
21	Motor Controller	Standard
22	Filtration Motor	Standard
23	Battery	Standard

1. The control box processes all data efficiently and records all running logs.
2. The driver accurately controls the information transmission and feedback of each motor and the control box during the operation.
3. Intelligent scrubbers can automatically finish all cleaning tasks through the control of the electrical system, which can improve efficiency and ensure the quality of cleaning at the same time.

2.2.1. Charging Socket

The charging socket is placed in the lower right-side shell.

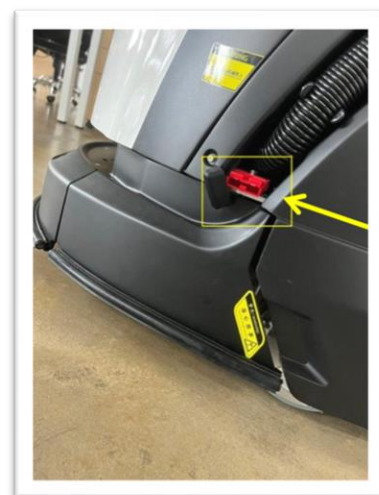
Purpose:

The charging socket is employed for manual charging (no matter whether the robot is ON or OFF).

2.2.2. Main Power Air Switch

Check if the air switch is turned ON:

- Switch placed vertically: switch towards up means ON.
- Switch placed horizontally: switch towards left means OFF.





2.2.3. Battery

Position:

- Remove the left lower shell to get access to the battery.

Purpose:

- Main power supply to the whole machine.

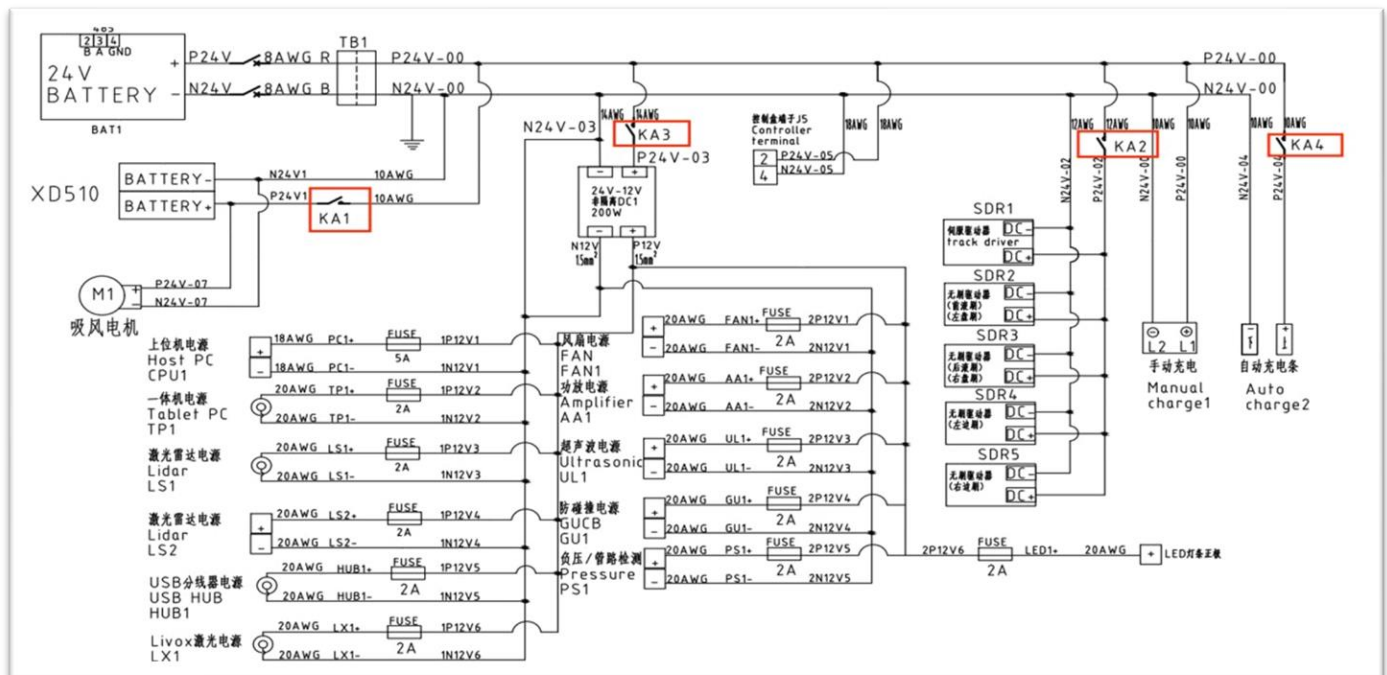
Output Voltage:

- 24V



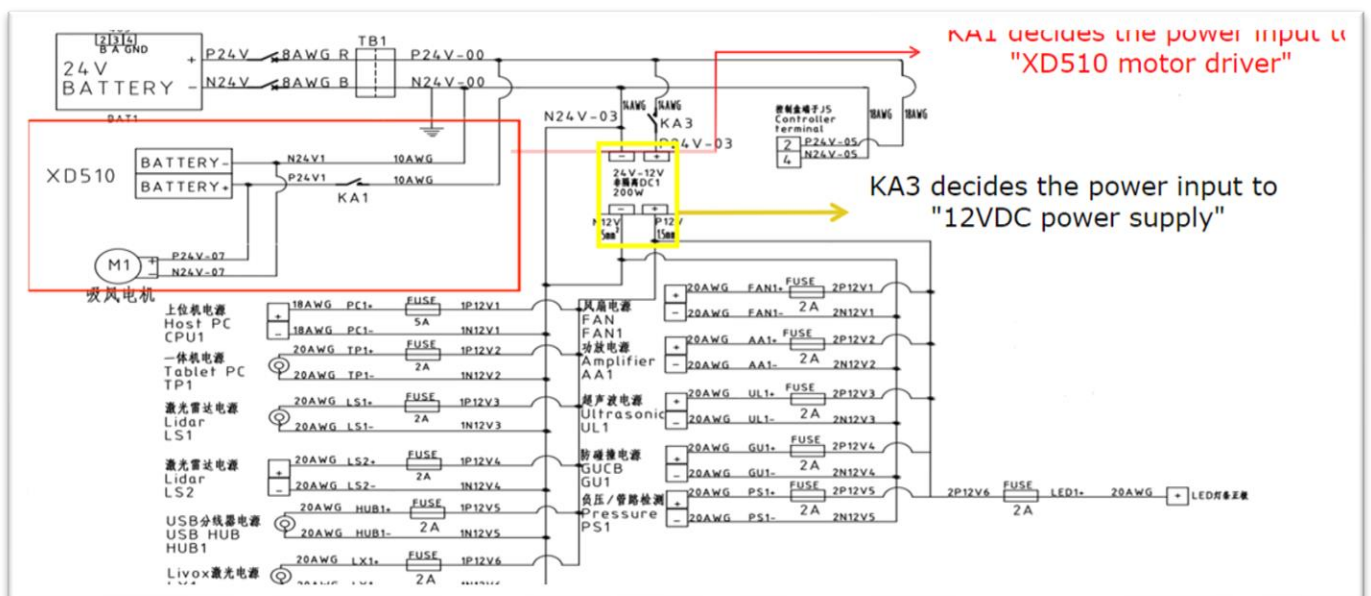
2.2.4. Main Power Distribution

The main 24VDC power is distributed to 4 respective circuits through 4 KA relays.



NOTE:

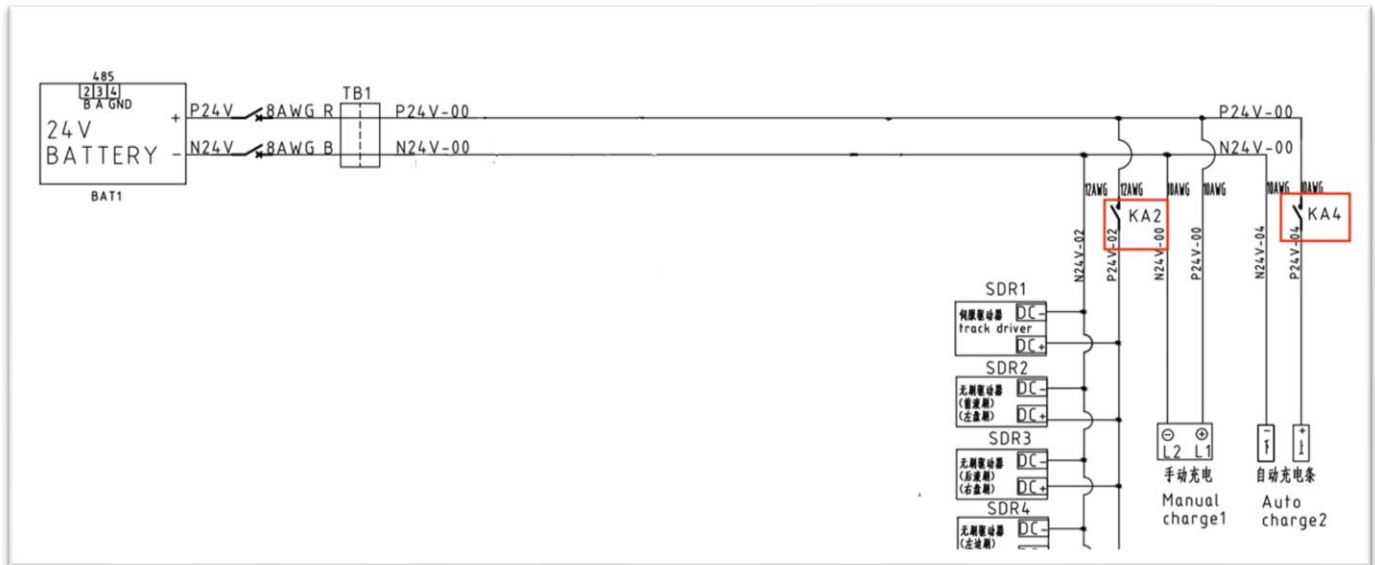
- KA1 decides the power supply to the "XD510 motor driver".
- KA3 decides the power supply to "12VDC power supply".



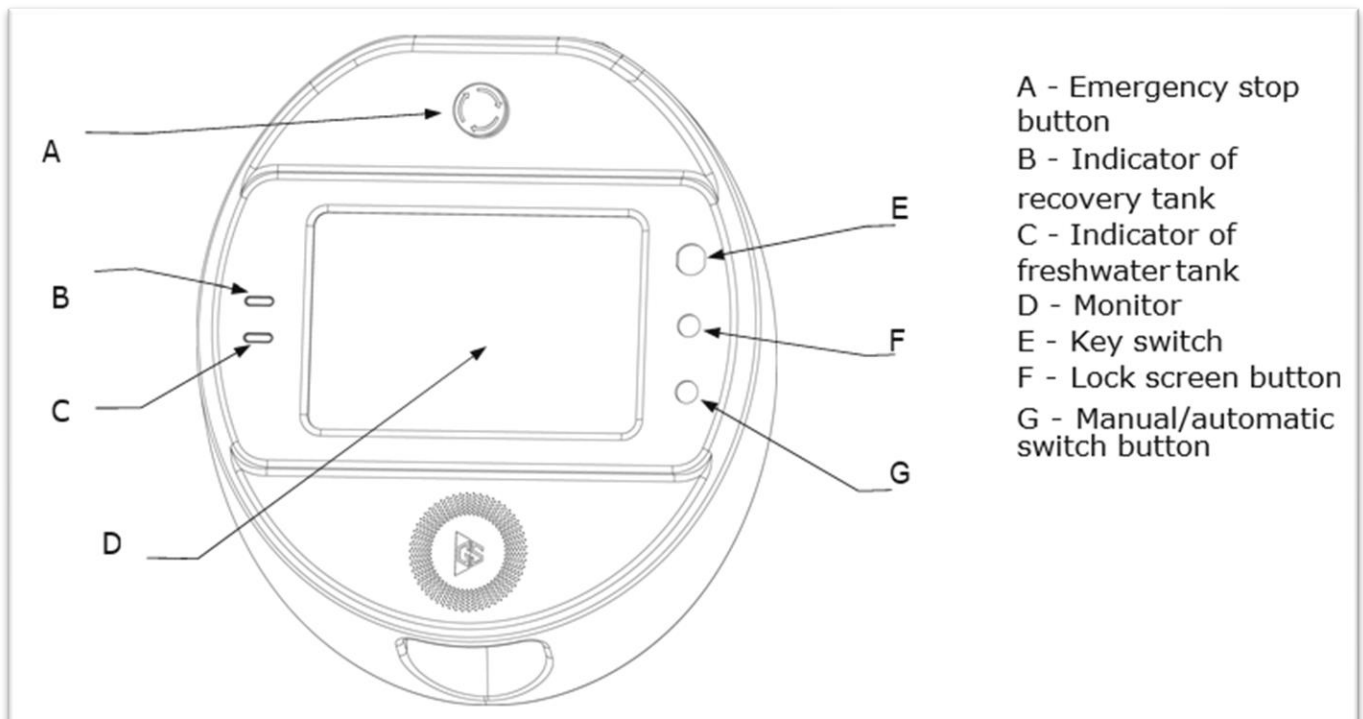


NOTE:

1. Relay - KA2 decides the power supply to motor drivers, side brush & disk brush.
2. Relay - KA4 is employed for auto-charging. It will be activated when starting auto-charging.



2.3. Structure of Control System



2.3.1. Monitor

The main area of the Scrubber 50 (Sprayer) operation panel is a touch display screen that automatically loads the GS User App after the scrubber is started. Through this application, you can select cleaning tasks for the scrubber to execute and perform a series of advanced settings and deployments for the scrubber.

2.3.2. Key Switch

The start-up keyhole of Scrubber 50 (Sprayer) is located in the upper right corner of the scrubber control panel. The operator can insert the start-up key into the keyhole, switch the key from Off to On, wait about 30 seconds for the scrubber to start, and then conduct cleaning operations.

When the scrubber is to be stored in the storeroom after completing its cleaning tasks, please switch the start-up key from On to Off to shut it down. Do not move the scrubber until it is completely shut down. Then the operator can pull out the key and store it.

2.3.3. Manual/Auto Switch Button

The manual and auto switch button of Scrubber 50 (Sprayer) is located at the lower right of the scrubber control panel. This button is used to switch between the two modes of controlling the scrubber to cope with different usage scenarios. The automatic mode is turned on by default after the scrubber is turned on. If you need to turn off the automatic mode, you need to log in to the APP and then press and hold the button for 3 seconds. When the button light ring goes out, the automatic mode is off, and the scrubber switches to manual mode.

For non-cleaning tasks, such as moving the scrubber from the storeroom to the area to be cleaned or moving the scrubber back from the cleaned area to the storeroom, cleaners can manually push the scrubber to its destination in manual mode; for cleaning tasks, the operator can switch the scrubber to the auto mode, then select the cleaning task in the control panel and execute it.



NOTE:

- When manual mode is activated, the scrubber does not have an automatic obstacle avoidance function, so the movement control of the scrubber depends on the operator's observation and control. At this time, the operator shall pay attention to the conditions of the surrounding environment and respond in case of an emergency.

2.3.4. Emergency Stop Button

The emergency stop button is easy to use. Simply press the button to stop the scrubber, and the light ring of the cover changes from blue to red. At this time, the scrubber cannot be pushed artificially, and no other operations can be performed. If necessary To resume the operation of the scrubber before pressing the emergency stop button or perform other operations on the scrubber, please turn the emergency stop button clockwise and release it. After the scrubber is restored, you can continue to run or work.

**NOTE:**

- Do not press the emergency stop button randomly but only in case of emergencies. The emergency stop button works normally both in manual and auto modes. In addition, since the robot does not support the operation on the sloping ground, operators are not advised to perform emergency stop operations on slopes, to achieve the expected emergency braking effect and avoid unnecessary personal and property losses.

2.3.5. Water Level Indicator of Recovery Tank

The full-tank indicator of the recovery tank of Scrubber 50 (Sprayer) is located on the upper left of the scrubber control panel. When the indicator blinks red, it indicates that the recovery tank is full, and the scrubber is unable to continue cleaning work at this time. It is necessary to manually control the scrubber to discharge sewage at designated places before moving to the next operation.

2.3.6. Water Level Indicator of Fresh Water Tank

The water level indicator of the freshwater tank of Scrubber 50 (Sprayer) is located on the lower left of the scrubber control panel. When the indicator blinks red, it indicates that there is no clean water in the freshwater tank. At this time, the scrubber cannot continue cleaning work. It is necessary to add clean water at the designated place before proceeding with the next step.

2.3.7. Screen Lock Button

The screen lock button is located on the middle right of the Scrubber 50 (Sprayer) panel. The operator can turn the screen on or off with the switch. Turning the screen on makes it convenient for operators to control the scrubber or complete cleaning tasks by using the tablet mobile application through the tablet mobile application and turning off the screen. It can save power, on the other hand, it can prevent the operator from accidentally touching the screen and causing maloperation.

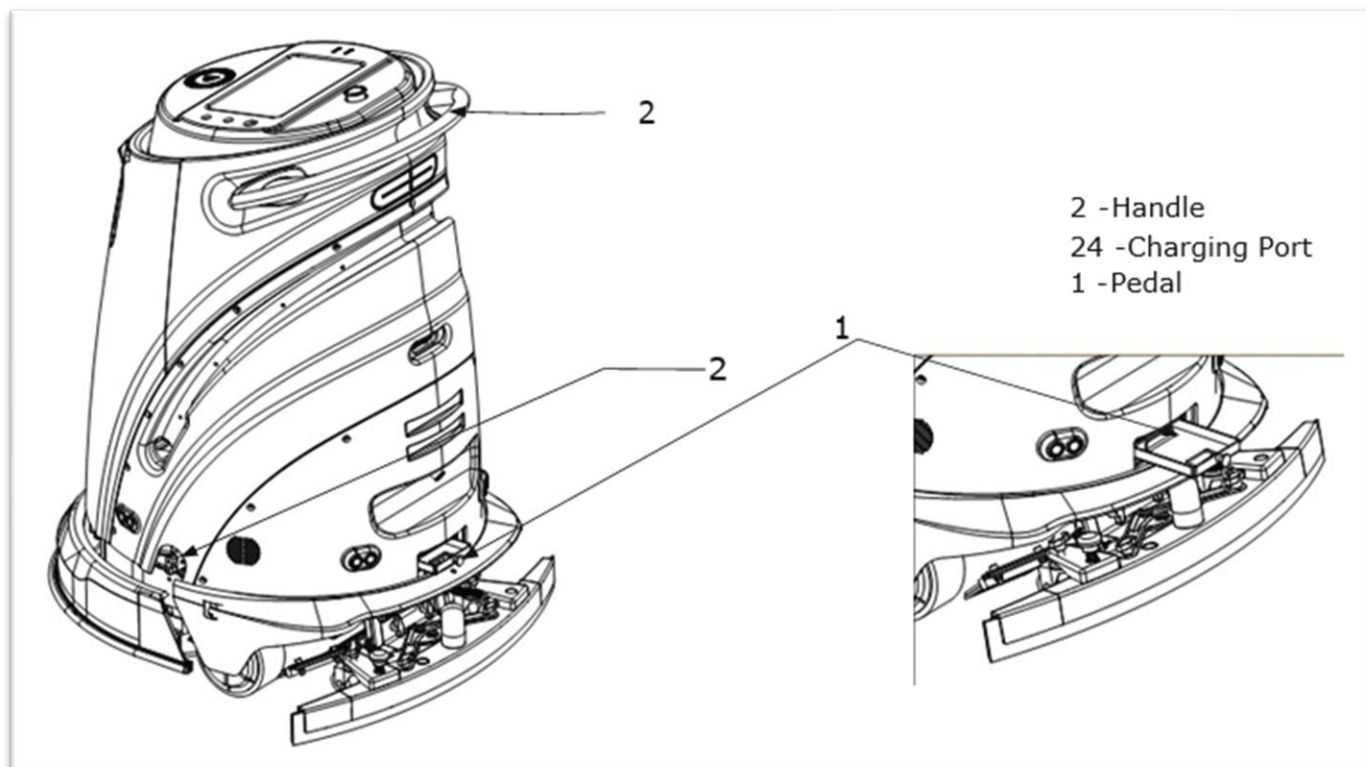


Figure: Pedal and Handle of Scrubber 50 (Sprayer)

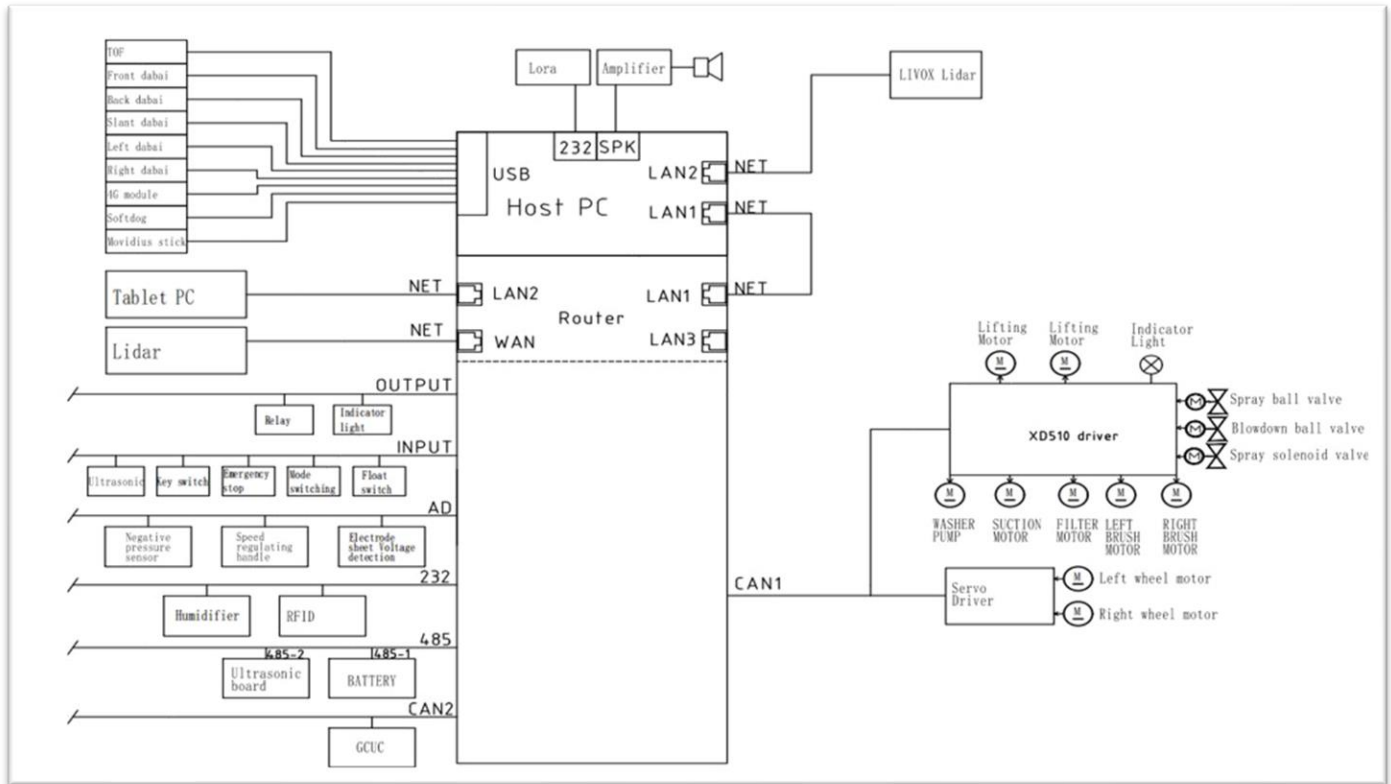
2.3.8. Pedal

The pedal is located at the lower rear of the scrubber, as shown in the Figure above. It is generally used in manual mode when the operator pushes the scrubber through uneven ground. And it should be retracted when it is not used. When using the pedal, please pull the pedal out manually. Then hold the handle tightly with both hands, step on the pedal with one foot, gently lean back about 10 degrees, control the scrubber to slowly cross the obstacles, and then loosen the pedal slowly. If there is more than 80% water in the tank, please do not execute this operation, which may cause water to overflow, leading to further dangers.

2.3.9. Charging Port

The charging port is located on the lower right-hand side of the scrubber, as shown in the Figure above. When charging the scrubber, please turn off the scrubber through the key switch, and charge it following the steps: plug in the DC output plug of the charger → plug in the AC input plug of the charger.

2.3.10. Topological Graph



2.3.11. Overall Control Module | Tablet

Position:

- The Tablet is located in the center of the top lid.

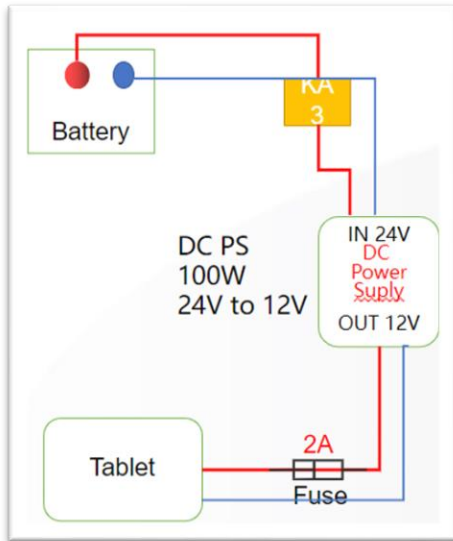
Purpose:

- For robot operation, config adjustment, as well as sending specific instructions.

Circuit Diagram:

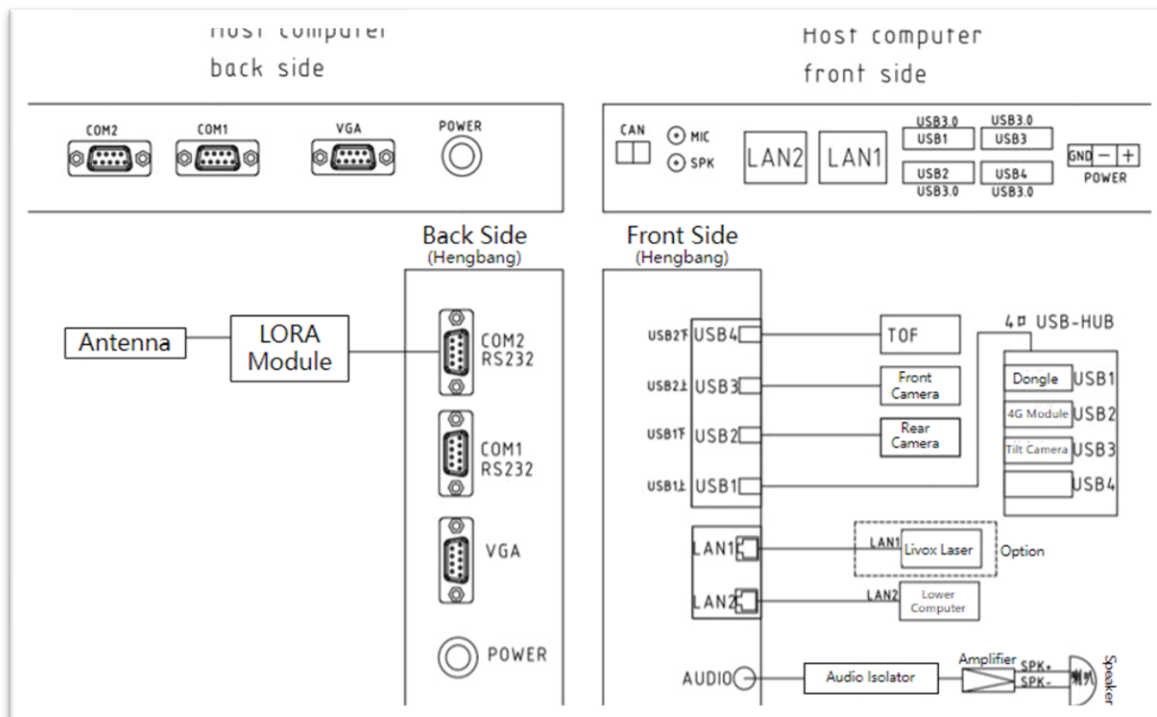
- The Tablet communicates to the lower computer via a LAN cable. It is powered by 12VDC and protected by a 2A fuse. (Use the right circuit diagram based on the robot version accordingly).



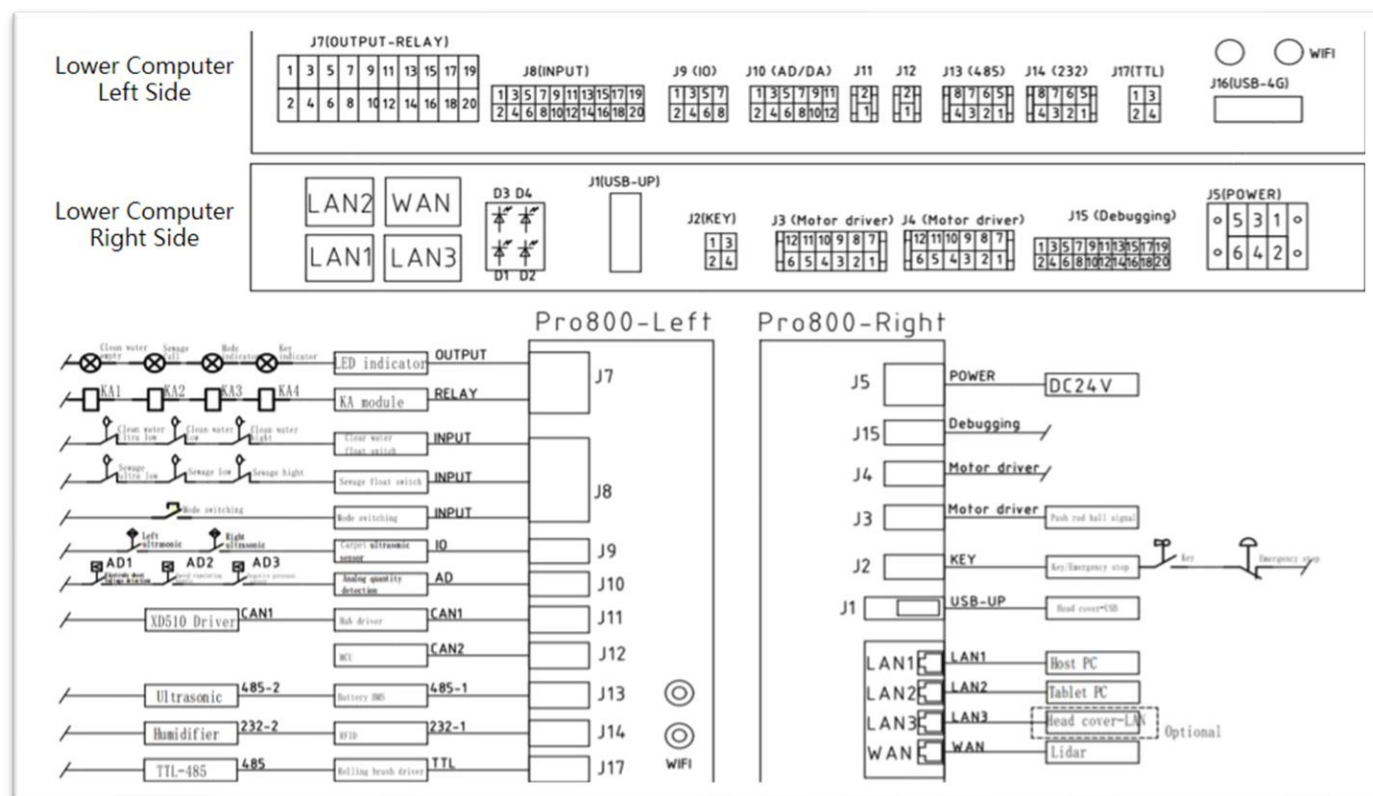


2.3.12. Overall Control Module | Upper Computer

1. Generally, COM-2 is for Lora Module.
2. It is a 4-core cable, 2 - for R232 data communication, and 2 - for a 5VDC power supply (equipped with an independent power adapter).



2.3.13. Overall Control Module | Lower Computer



2.3.14. Overall Control Module | Motor Driver (XD510)

Position:

- Remove the rear shell to get access to it.

Purpose:

- The motor controller (such as suction motor, disk brush, filter pump, etc.).

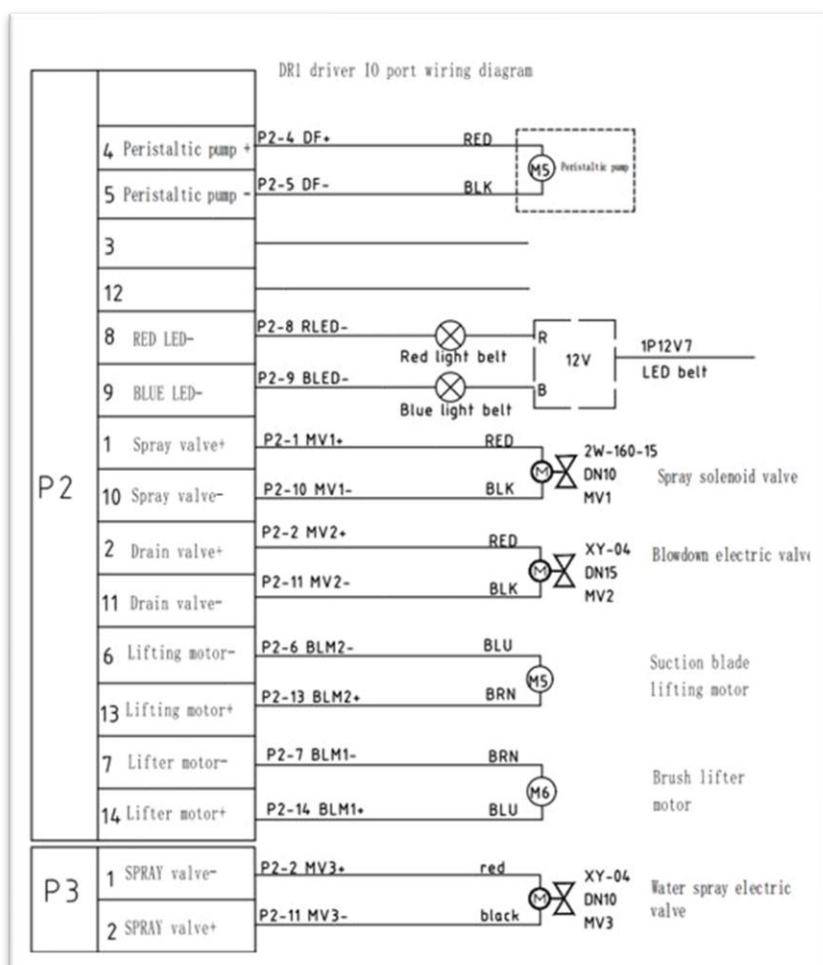
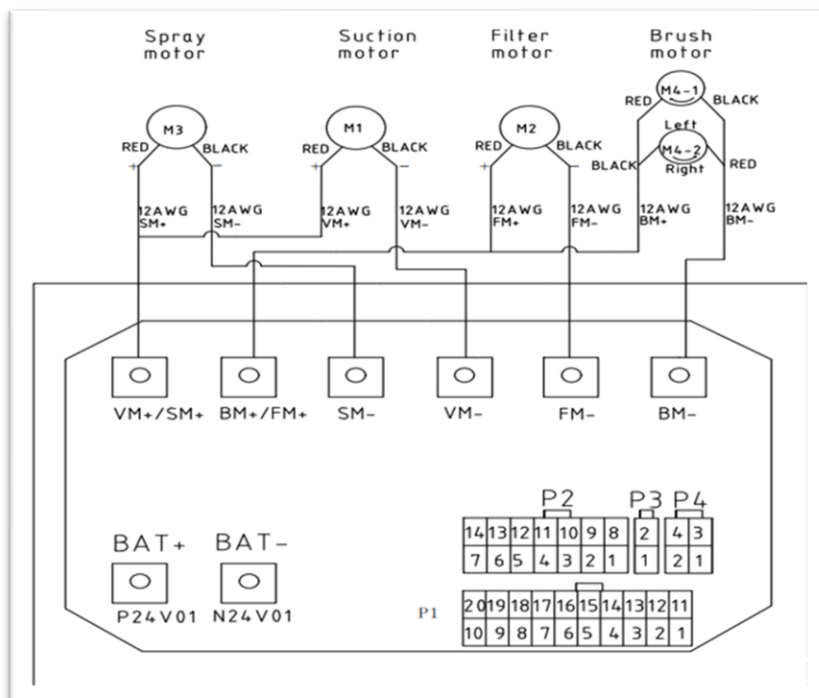
Circuit Diagram:

- BAT is for 24VDC power input.
- P1, P2, P3, and P4 are for data/instructions communication.



NOTE:

- P2 is for linear lights, the solenoid of water spray & drain, and lifting motors.
- P3 is just for the electric ball valve of the water spray.
- P4 is for debugging.



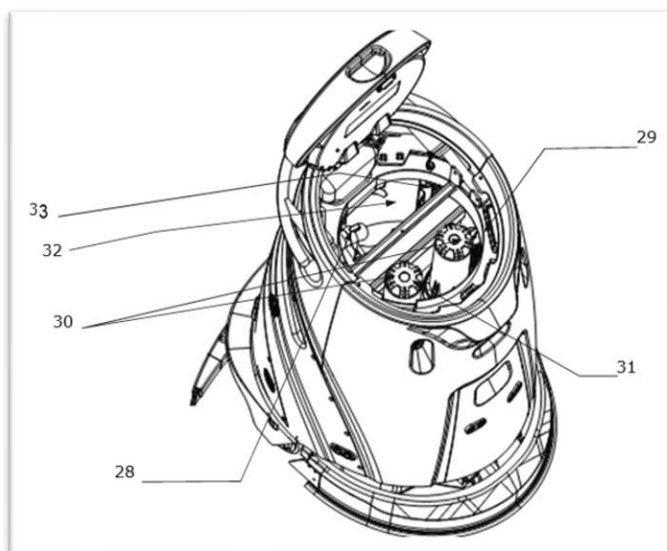
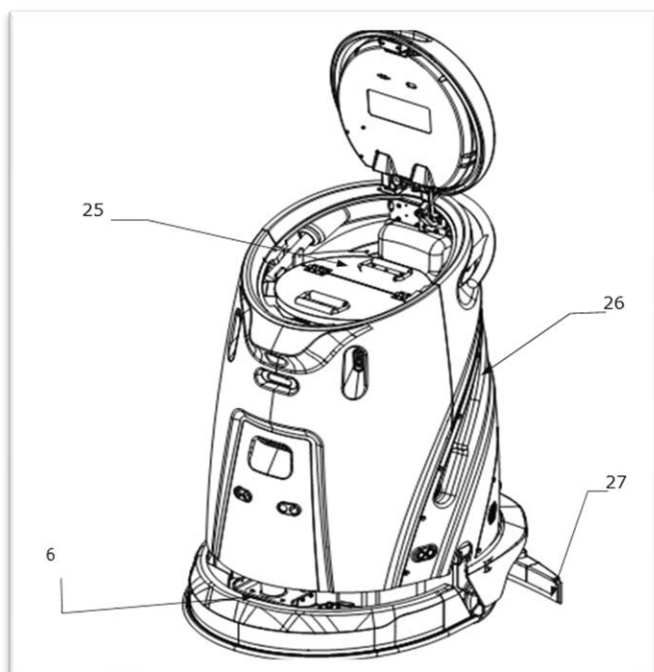
2.4. Structure of Cleaning System

Cleaning Mechanism

The water tanks are divided into a freshwater tank and a recovery tank.

When the cleaning operation starts, the water spray motor first transports clean water from the freshwater tank to the brush plate. The brush plate placed close to the ground cleans the ground through high-speed rotation. The squeegee blade at the back of the brush gathers the water and absorbs it into the recovery tank through the air suction hose.

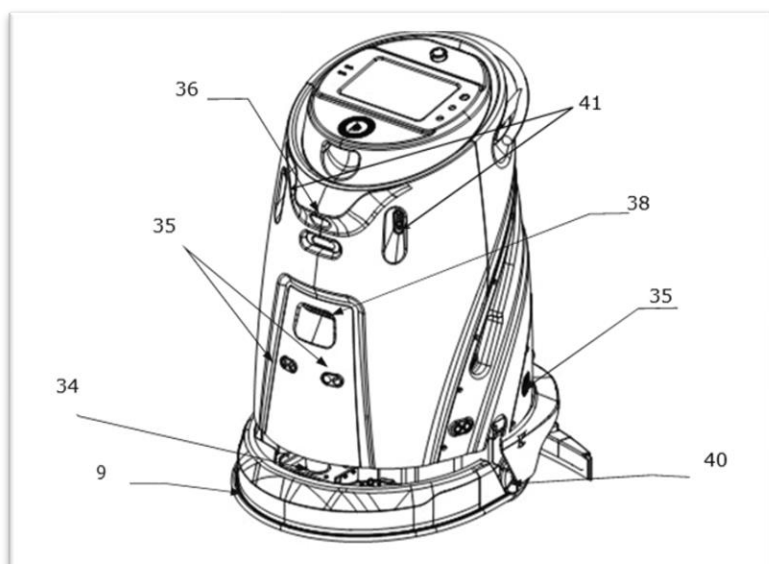
When the volume of sewage in the recovery tank reaches more than **80%** of the capacity of the recovery tank, the scrubber will automatically turn on the filter system. And the sewage will pass through the 3-stage filter element and enter the clean water tank to realize the recycling of water resources.

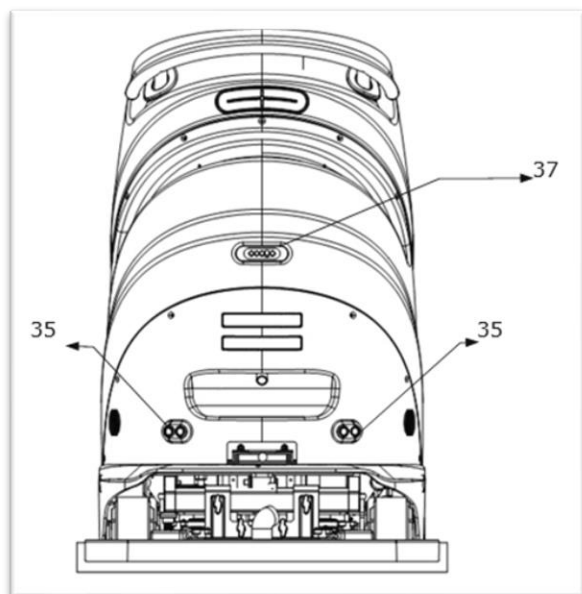


Item No.	Cleaning Device	Quantity	Description	Remarks
25	Tank Cover	1	The freshwater tank has a volume of 24 L, and the recovery tank has a volume of 18 L.	Standard
6	Brush	2	The brush is located at the bottom of the scrubber. It is used for spraying water and scrubbing the ground.	Standard
26	Drain Hose	1	There is 1 drain hose located at the back of the scrubber.	Standard

27	Squeegee Blade	2	The squeegee blade is located at the bottom of the front of the scrubber and the rear side of the brush. It is used to gather the water stains after the cleaning of the brush and absorb them into the recovery tank.	Standard
28	Sewage Filtering Steel Cartridge	1	It is located in the middle of the recovery tank, functioning as the second-stage filtration.	Standard
29	Clean Water Filtering Steel Cartridge	1	It is located on the right of the freshwater tank.	Standard
30	Filter	2	There are three filters in the freshwater tank, which constitute a complete 2-stage filtration circulation system, namely, the third-stage filtration and fourth-stage filtration.	Standard
31	Plug	1	It is the connection switch between the freshwater tank and the recovery tank.	Standard
32	Dirt Sieve	1	At the suction hose in the recovery tank, there is a dirt sieve. It is used for filtering sand, gravel, and other solid impurities.	Standard
33	Water Level Sensor	2	It is located on both the freshwater tank and recovery tank and is used to measure the water level of the freshwater tank.	Standard

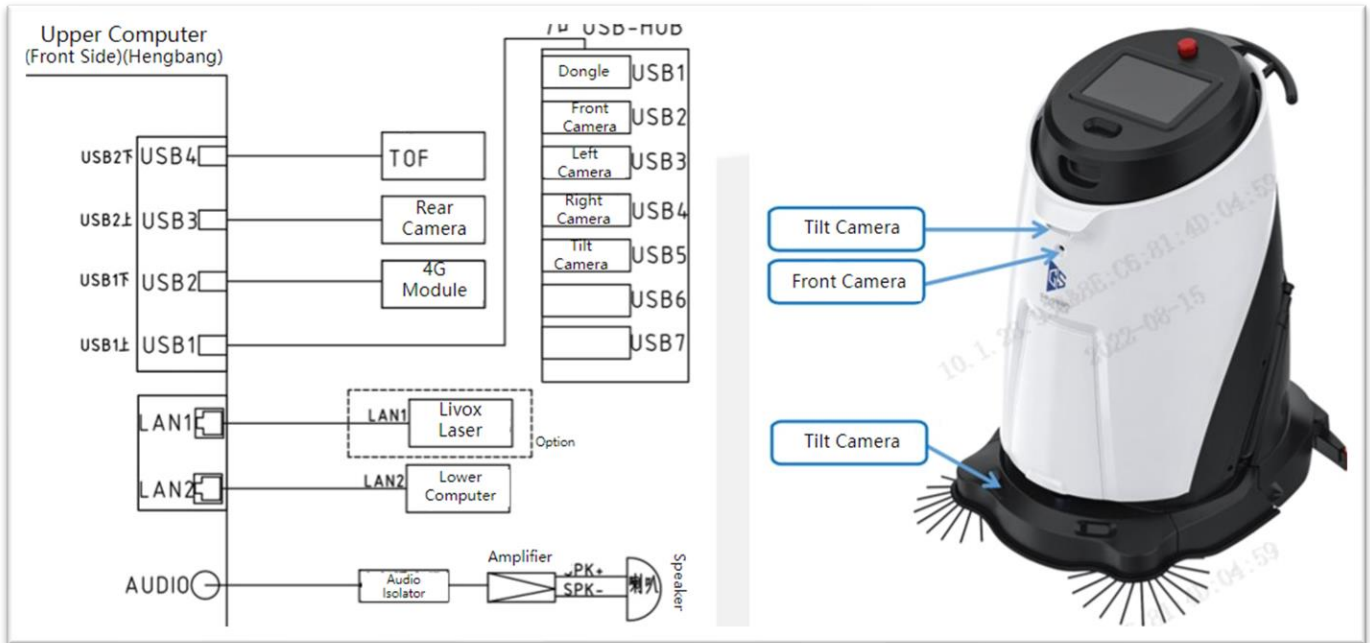
2.5. Structure of Safety System





Item No.	Sensor Type	Quantity	Description	Comments
34	Primary Laser	1	Type I: 25 meters, used for map scanning, positioning, and obstacle avoidance.	Optional
		1	Type II: 10 meters, used for map scanning, positioning, and obstacle avoidance.	Optional
35	Ultrasonic Probe	12	Obstacle avoidance	Standard
36	Front Camera	1	Obstacle avoidance and real-time color image	Standard
37	Rear Camera	1	Obstacle avoidance and real-time color image	Standard
38	Loudspeaker	1	Used for voice broadcasting to remind pedestrians to avoid it.	Standard
9	Front Bumper	1	Collision buffer: avoid secondary damage	Standard
39	Collision Avoidance Wheel	4	Collision buffer	Standard
40	Anti-presser foot switch	2	Touch switch, anti-presser foot	Standard
41	Left/right cameras	1	Obstacle avoidance and real-time color image	Optional

2.5.1. Sensors | Camera



Purpose:

- Recognize obstacles and increase recognition areas.



NOTE:

- The front and rear cameras and the horizontal laser of GS50 are its eyes. If the surface of them is contaminated by drops, dust, or anything else, then intermittent lags and abnormal behaviors could appear during movement.
- If abnormal behaviors appeared, please check whether the surface of the cameras and laser are contaminated or blocked.
- Use a clean, dry, and lint-free wipe to clean the sensors. Do not clean them with your hands or wet wipes.

2.5.2. Sensors | Laser (Lidar)

Position:

- Placed underneath the front shell.

Purpose:

- Map scanning, locating.

Name	Description
Horizontal Laser - IP	10.7.5.100
Channels	Single beam
Wavelength	905nm
Ranging capability	25m (8m@10% remission)
Accuracy (typical)	max ±20mm (0.05m~8m@ 10% NIST)
Scanning range	270°
Divergence	0.33°



Name	Description
Frequency	15Hz
Data communication via Ethernet cable	network interface (TCP/IP, 100M Bit/s)
Power rate	3W
Working temperature	-25°C ~ +50°C
Safety classification	Class 1 eye-safe
Ingress protection	IP66



2.5.3. Sensors | Anti-collision Switch Sensor



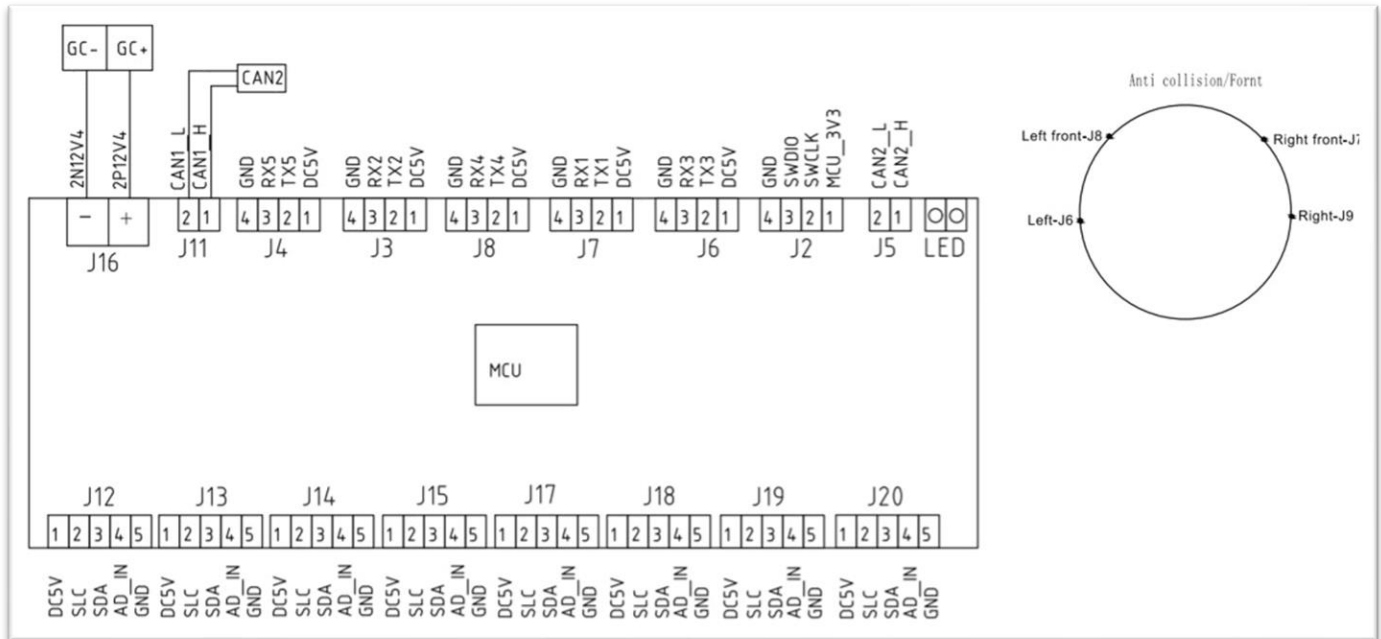
Position:

- Inside the anti-collision shell.

Purpose:

- Stop the robot after a collision, preventing a secondary crash.

2.5.4. Sensors | Anti-collision Switch Sensor - Circuit Diagram



2.6. Structure of Traction System

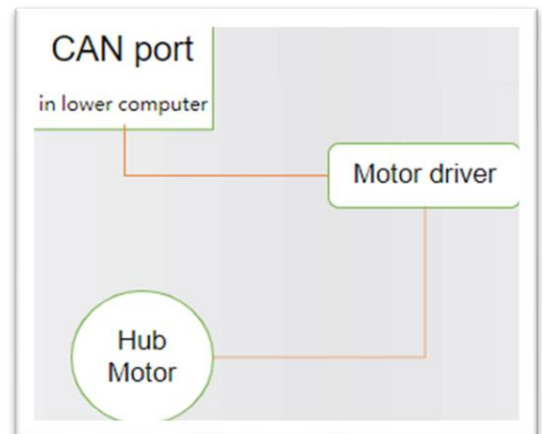
2.6.1. System Composition | Hub motor (Wheel)

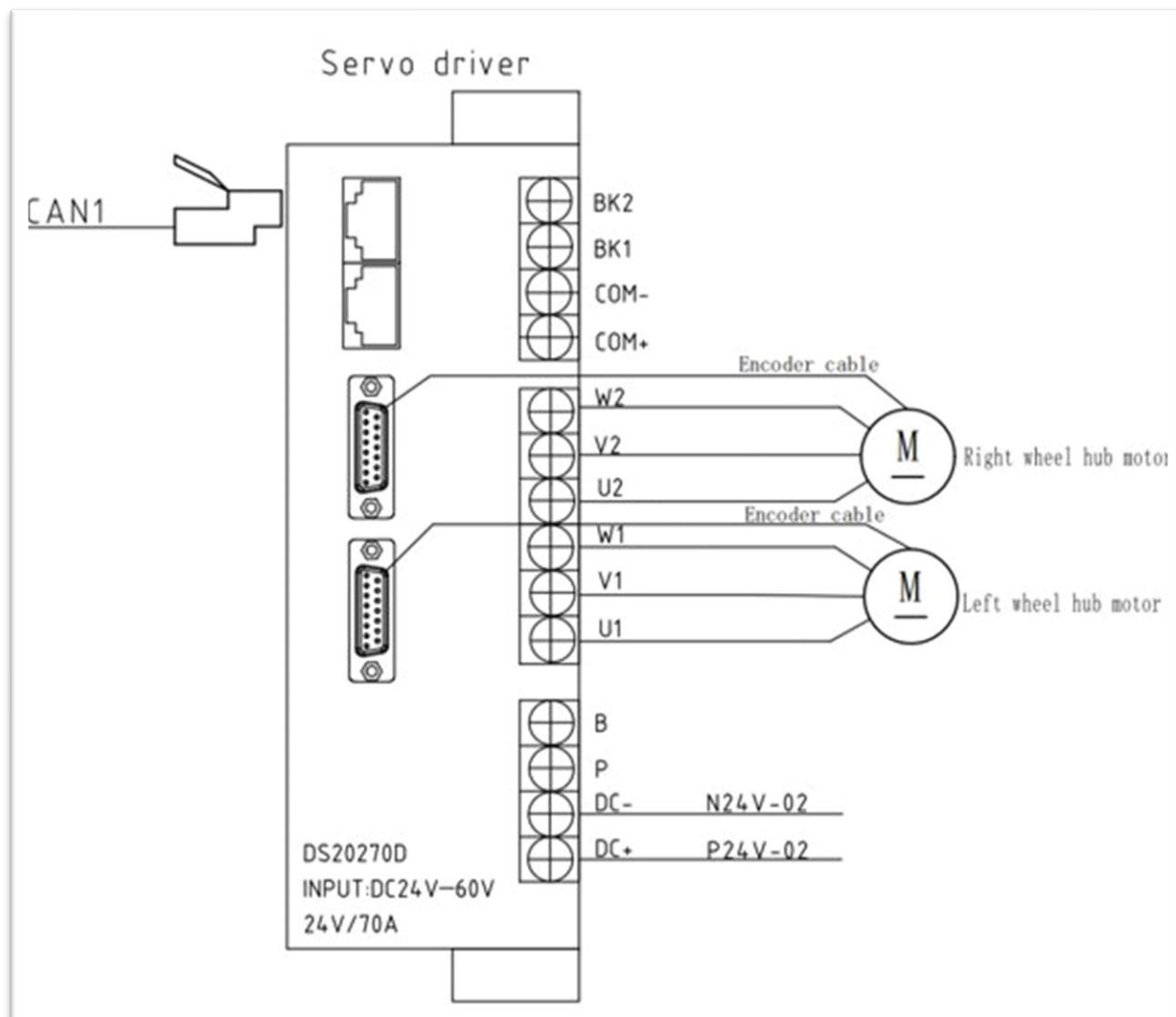
Position:

- Assembled with 2 hub wheels.

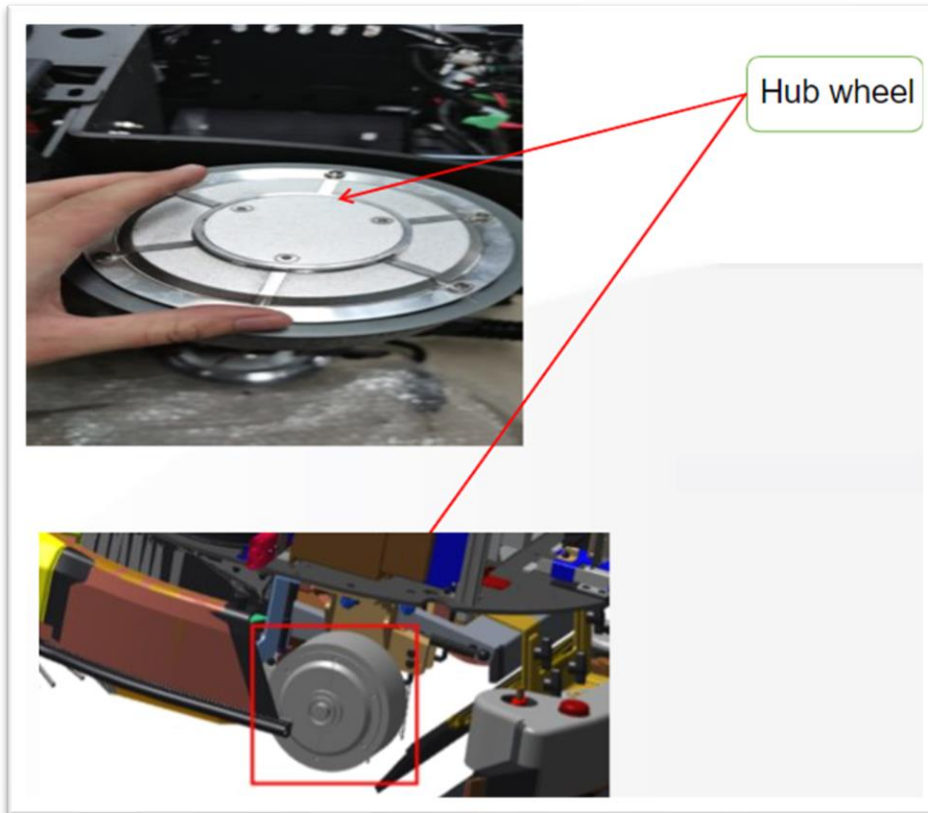
Purpose:

- Drive the robot to move, controlled by a motor driver.



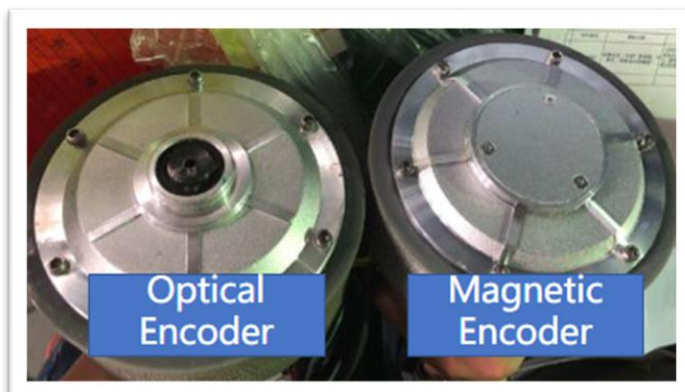


2.6.2. System Composition | Hub wheel



NOTE:

- An optical encoder and a magnetic encoder are not universal, and neither is the sensor type value.

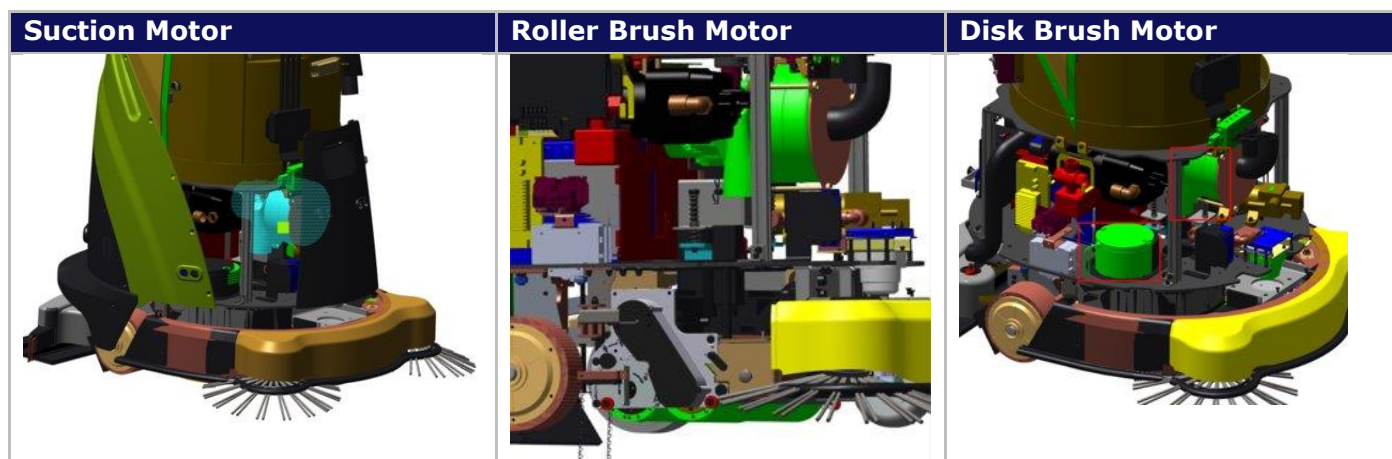


2.7. Structure of Suction System

2.7.1. Suction System Function

The main function of the Suction System is to absorb the ground particle wastes into the dust bag to enhance the cleaning effect.

The Suction System comprises



The suction motor generates a vacuum to absorb particle waste on the ground and is similar to a household vacuum cleaner. It gets a 24VDC power supply from the motor driver directly.

2.8. Structure of Sweep System

2.8.1. Sweep System Function

The main function of the Sweep System is to sweep the garbage on the ground.

The Sweep System consists of the tablet, lower computer, motor driver, roller brush, side brush, and other components, etc.



2.8.2. Sweep System Composition | Roller/Side brush motor

Position:

- The roller brush motor is located underneath the chassis, and side brush motors are placed on the L/R side.

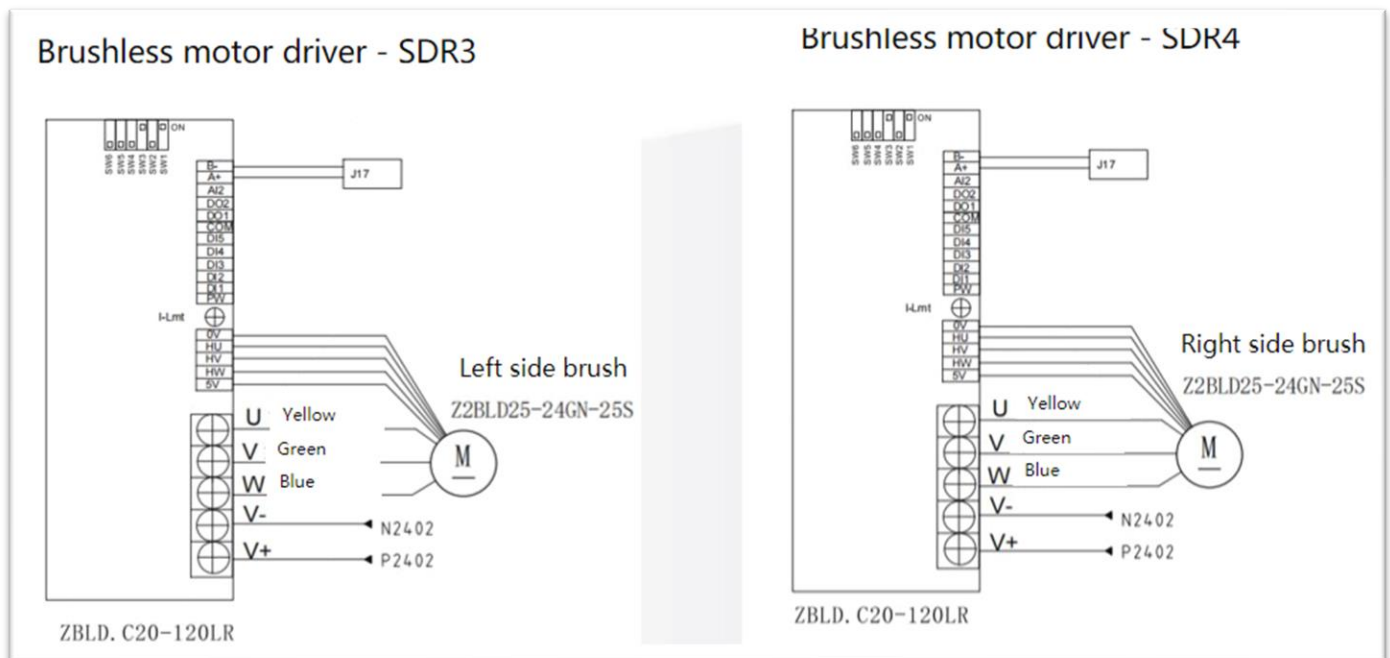
Function:

- Making the drive roller & side brush rotate.

2.8.3. Sweep System Composition | Side brush motor

Circuit diagram:

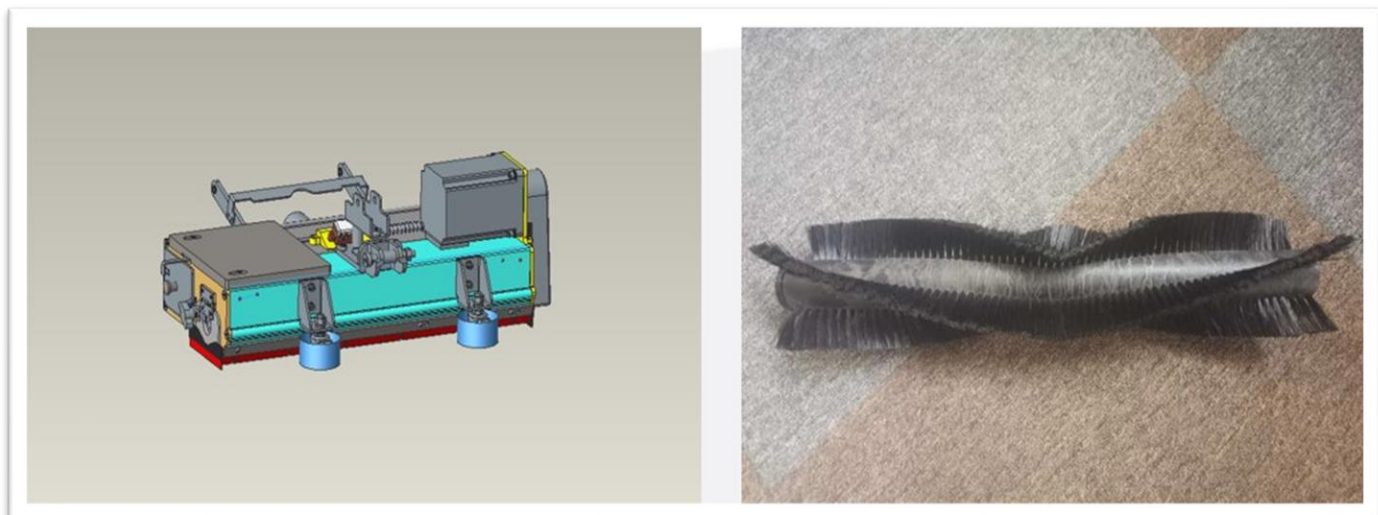
- The motor driver controls the motor of the roller/disk brush.



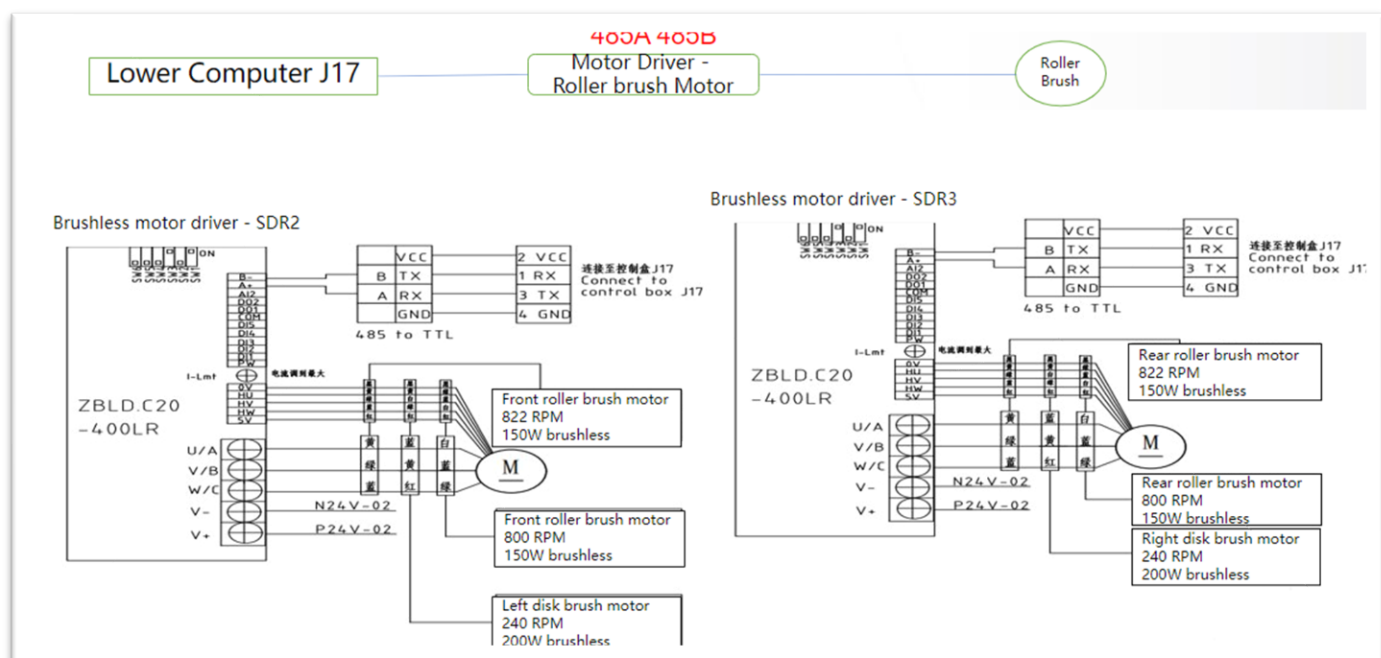
2.8.4. Sweep System Composition | Roller brush

Circuit diagram:

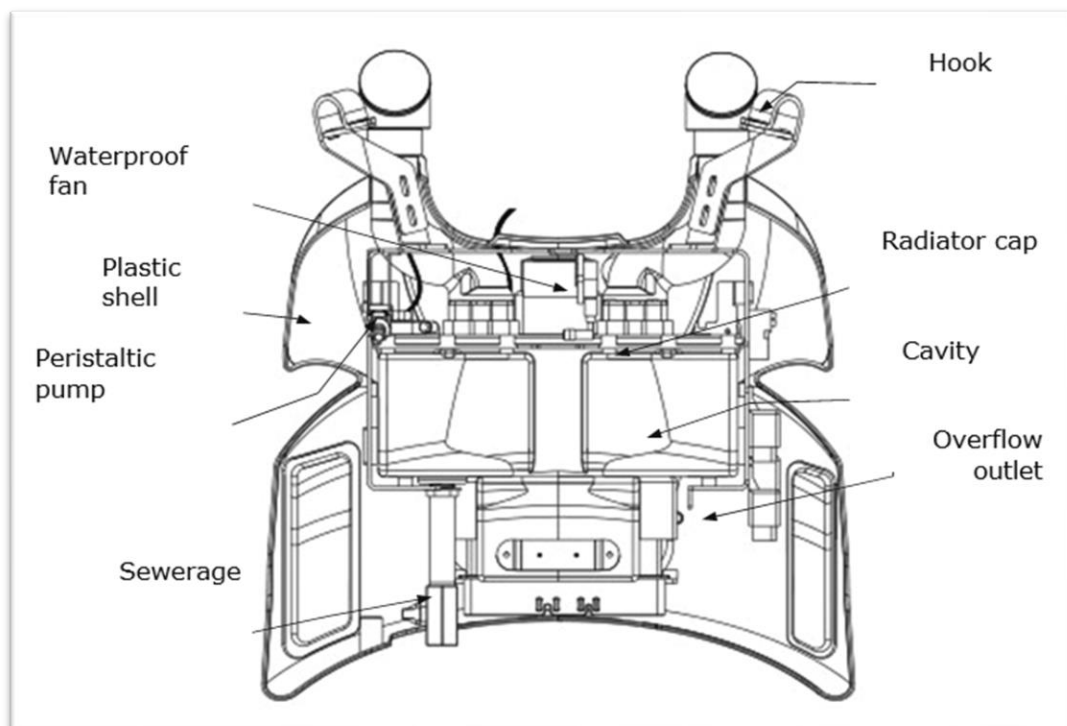
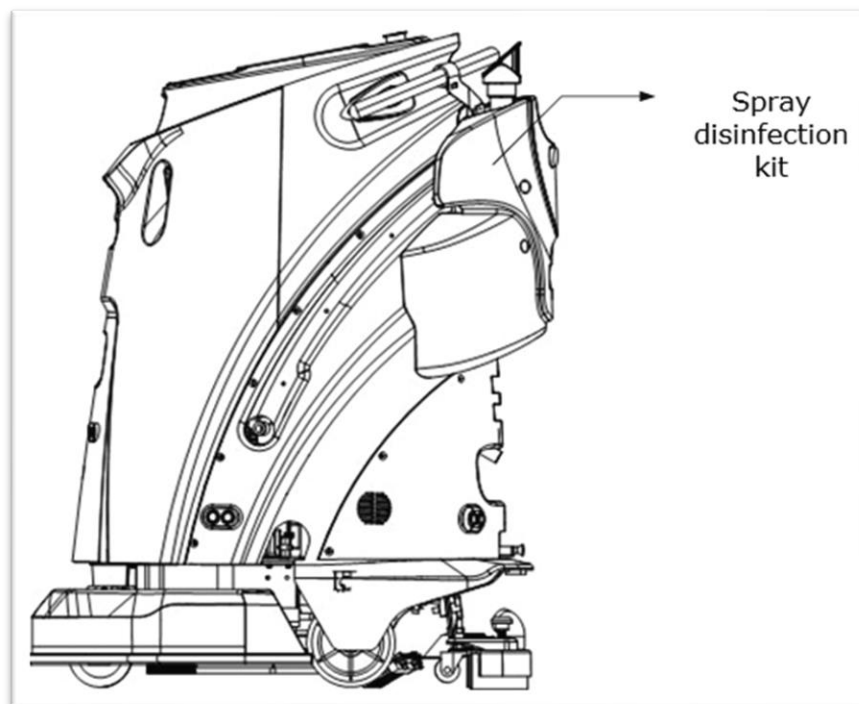
The lower computer sends instructions to the motor driver via the **TTL485** module. Then the motor translates the instructions and controls the roller brush motor performance.

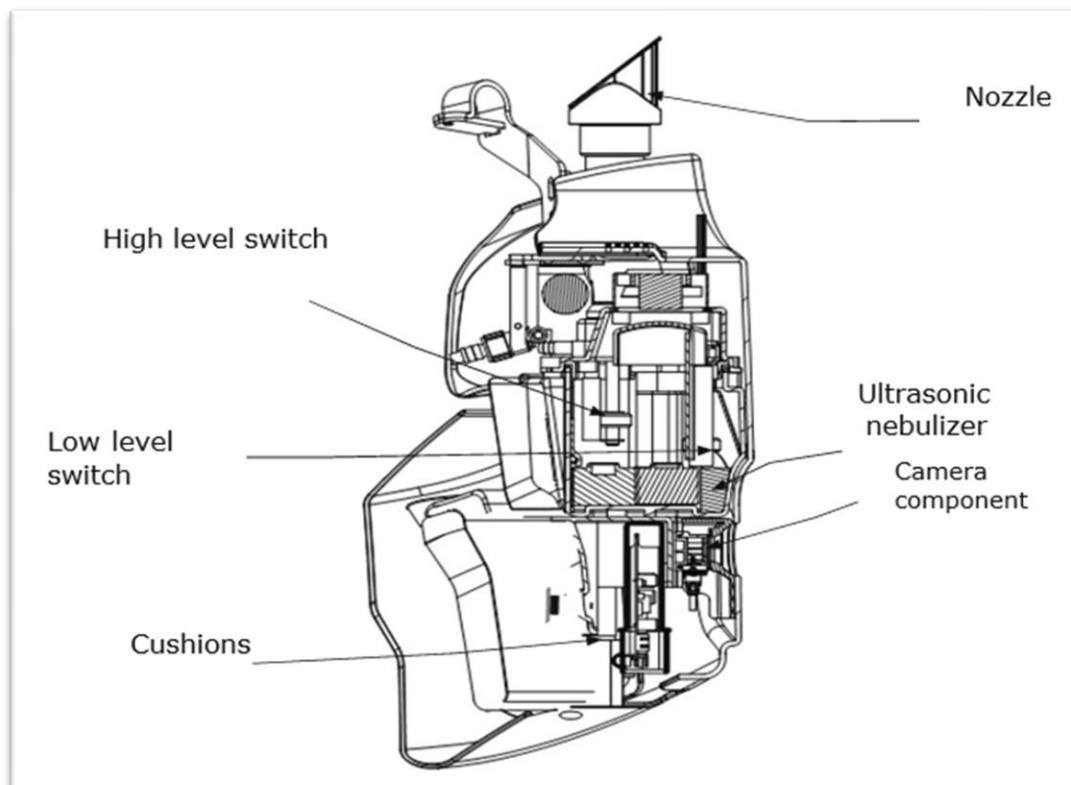


2.8.5. Sweep System Composition | Roller brush motor controlled by the motor driver directly



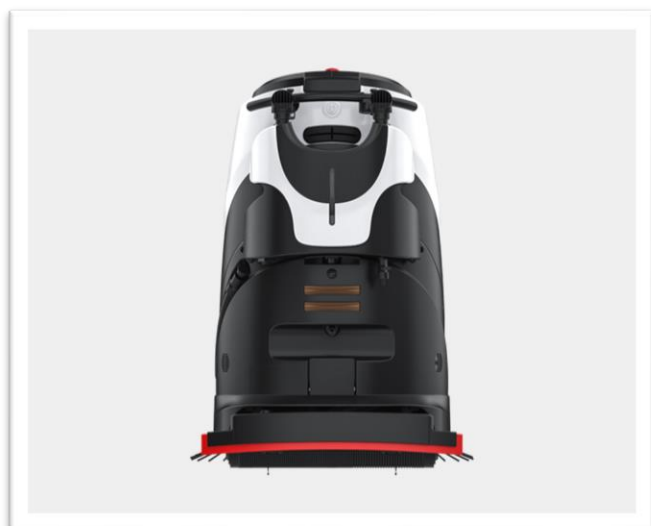
2.9. Structure of Disinfection System



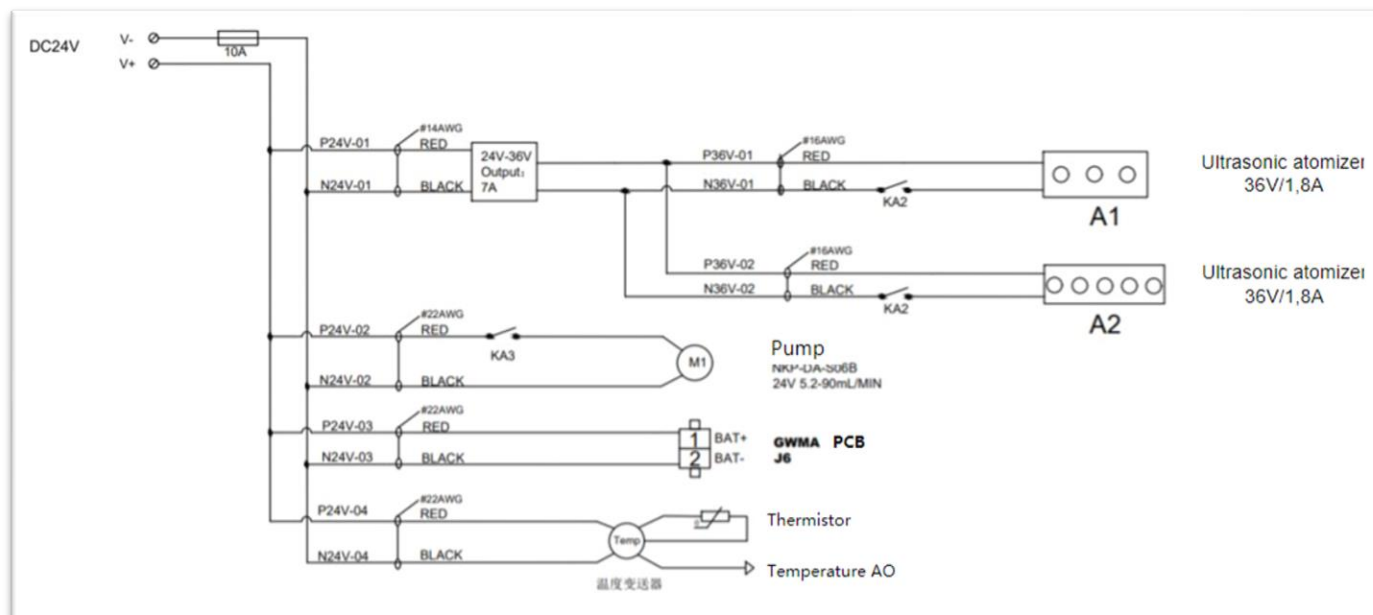


2.9.1. Disinfection System | Disinfection package

There is a PCB to run disinfection features, such as mist spray, liquid level, alarm, etc.



2.9.2. Disinfection System | Circuit Diagram



3. MAINTENANCE INSTRUCTIONS

In the operating process of the Vacuum 50 cleaning robot, operators need to perform maintenance to the robot before and after each operation, periodically inspect and maintain the equipment, and periodically replace consumables, to ensure the best performance of the robot and maximize its service life.

3.1. Daily Maintenance Process

During daily use, you should maintain the automatic scrubber to minimize the consumption of parts, give full play to the advantages of the scrubber, and prolong its life.

- ❖ Before maintenance, be sure to turn off the key switch and unplug the power plug, to prevent accidental electric shock or parts damage.
- ❖ The machine should be placed in a dry and ventilated place to prevent the humid environment from affecting electronic and electrical components and shortening its service life.
- ❖ If the storage environment temperature is lower than 5°C, please ensure that there is no water in the entire waterway.
- ❖ If detergent is added to the clean water tank to prevent the accumulation of foam inside the water tank, be sure to add a defoamer to the recovery tank (the amount of defoamer should be matched according to the proportion of detergent used).

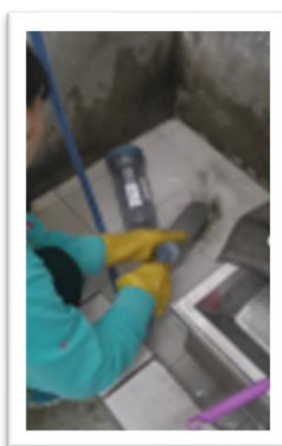
1. Push the machine to the maintenance point for daily maintenance operations.



2. Open the drain cover and take out the drain/wastewater tank pipe for drainage.



3. Remove the filter bag, remove the filter bottle with the tool, remove the filter element, and rinse. Filter element specifications are different, do not install reverse.



4. Use clean water for internal cleaning, repeat several times to make sure the inside of the tank is clean.



5. Open the soft rubber plug of the charging port and plug in the charger to charge. When charging, make sure the plug is properly connected.



6. Open the anti-collision front cover.



7. Remove dust boxes on both sides and clean them.



8. Open both end-covers of the roller brush.



9. Remove the roller brush and clean.



10. Install the parts back after cleaning.



3.1.1. Everyday Maintenance

1. Drain the water from the recovery tank and clean the tank with a water hose or a spray gun. Ensure that the inner surface of the recovery tank is clean, prevent the accumulated dirt from blocking the recovery tank, and avoid water spilling to other places in the process. Please off the recovery tank valve in time after draining the sewage.
2. **Filter element cleaning:** tiny solid particles will adhere to the filter element. Please use flowing water to rinse the filter element.

3. **Filter bag cleaning:** Because some sediment will sometimes weaken the filtering effect, please use a brush, running water, or pressurized water gun to clean the filter bag, and need a periodic inspection.
4. Check whether there is any silt/debris in the recovery tank, if any, remove it immediately.
5. Clean the inside of the squeegee mount to prevent the accumulation of hair and other dirt, which will affect the wiping effect. And keep the surface clean, to reduce wear and tear, and prolong its service life. At the same time, the whole squeegee mount stand needs to be cleaned.
6. After the scrubber has completed the task, please check the power supply and charge it in time if necessary.
7. The water tank of the disinfection atomizer needs to be maintained and cleaned regularly and the recommended cleaning frequency is one (1) time per month.

3.1.2. Weekly Maintenance

1. Check whether there is dirt on the sensor. Please use a soft cloth or paper to wipe it gently to avoid scratches and other damage.
2. Check if the squeegee blade is worn out and replace it in time if necessary.
3. Check the steel filter of the recovery tank and freshwater tank, and clean or replace it in time if necessary.
4. Check whether the spring, screw, and sheet metal assembly are loose, deformed, and rusted everywhere.
5. Clean the skirt to avoid more dirt.
6. Remove the brush plate every week and clean the brush plate. There will be hair or other dirt entangled on the brush plate.
7. Check whether the suction pipe is damaged and remove the inner surface of the flushing pipe to prevent the accumulation of lint and debris and affect the water absorption effect.
8. Check the wear of the cleaning pad. If it is damaged or seriously worn, please replace it.
9. If the water tank has a peculiar smell, you can use self-purchased deodorant to deodorize the water tank according to the product instructions.
10. It is recommended that the water tank be treated with disinfectant twice a week, and the proportion of disinfectant should be used according to the product instructions.
11. **Flushing pipeline:** after cleaning the water tank, add clean water, and clean the ground with a large amount of water for 3-5 minutes, so that the large flow of clean water can fully flow through the pipeline, to clean the pipeline.

3.1.3. Long-term maintenance

1. Check whether the spring, screw, and sheet metal parts of the water suction structure are loose, deformed, or damaged.

2. Check whether the sealing ring of the water tank cover is damaged and whether there is leakage in the drainpipe.
3. Check whether there is abnormal noise in the structure of the whole machine, which affects normal use.
4. Apply grease on the water suction pulley and other frequently rotating or rubbing parts.
5. If the brush disc is worn to the Yellow bristles, please replace it.
6. The filter on the water intake shall be replaced regularly.

3.2. Description of Consumables

The main consumables of Scrubber 50 (Sprayer) include a squeegee blade, brush, cleaning pad, filter cartridge, filter, filter bag, etc. Replacement cycles of these consumables depend on floor materials in usage scenarios. For details, [see the table below](#).

If the operating frequency of the scrubber is too high or too low in the actual application scenarios, the user can appropriately shorten or extend the replacement cycle of the Scrubber 50 (Sprayer) consumables. Timely adjustments shall be made according to the observed cleaning effect of the scrubber.

3.3. Battery Maintenance

Batteries are not allowed to be disassembled and replaced privately to avoid unnecessary losses.

1. Batteries should be kept away from heat sources and high-pressure places and avoid long-time exposure to sunlight.
2. Batteries should not be put into water or fire.
3. Do not conduct short circuits of the positive and negative terminals of the battery with metal.
4. Avoid excessive physical shock and impact on the battery. Do not hit, drop, or step on the battery.
5. It is prohibited to disassemble or assemble the battery without the permission and guidance of the manufacturer. This appliance contains batteries that are only replaceable by skilled people.
6. Do not mix batteries of different manufacturers, types, and models for use.
7. It is prohibited to use or store the battery in a high-temperature environment (>45 degrees), to avoid battery heating, fire, or reduction of service life.
8. If the battery has run out, please charge it in time (within 2 hours).
9. In case of long-term storage (more than one week), be sure to turn off the circuit breaker switch after full charge, otherwise, the battery may be damaged, and the battery should be flushed once a month.
10. **WARNING:** To recharge the battery, only use the **CD-01** or **IC0650-024** provided with this appliance.

- 11.If the battery has a peculiar smell, discoloration, noise, leakage, serious deformation, and other abnormal conditions, please stop using it. The battery must be removed from the appliance before it is scrapped.
- 12.The appliance must be disconnected from the supply mains when removing the battery.
- 13.The battery is to be disposed of safely.
- 14.Battery safety treatment process: recovery and follow-up treatment by AROS or the third-party recycling organization established by AROS.
- 15.When electrolyte leakage splashes into the skin and eyes, please rinse with water and see a doctor immediately.
- 16.Please keep the battery out of the reach of pets and children. Children are not allowed to touch the battery.
- 17.When loading and unloading the battery during transportation, please pay attention not to fall, do not stack and turn over more than 3 layers, and ensure that the front is facing up.

3.4. Procedure for Manual Charging

3.4.1. Battery

The Battery (24VDC) is the main power supply for the machine. It is placed in the battery cabinet at the lower part of the robot's body.

3.4.2. Charging Socket

The socket can be used for manual charging. The charging plug is located on the left of the battery cabinet.

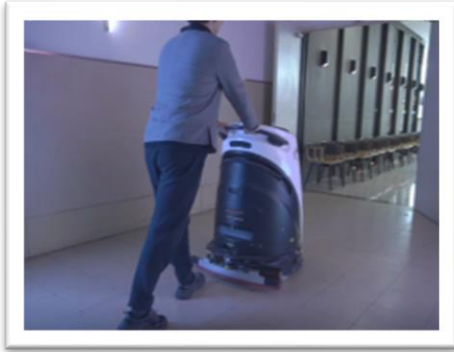
1. Remove the dust cover of the charging port and charge the robot.



2. When the plug is inserted into the socket, the machine gets a power supply.

3.4.3. Charging the Battery

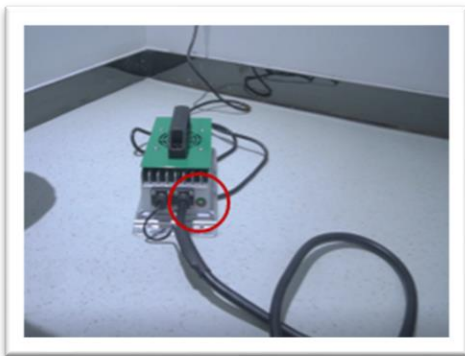
1. Long press the auto/manual switch for 3 seconds, and ensure the light indicator is OFF.



2. Then push the robot to the maintenance point.
3. Start charging.



4. Insert the red plug of the power adapter into the red charging port of the robot, then connect the power adapter to the 220V power socket.
5. The **flashing red** indicator light means charging is ongoing.
6. When the battery is full, the indicator turns **green**.



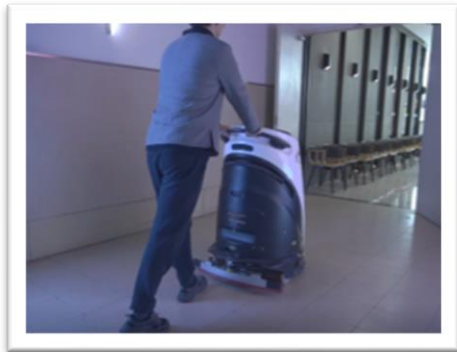
7. Disconnect the power adapter with the 220V power socket first, then disconnect the plug of the power adapter with the robot. Manual charging is completed.

3.5. Procedure for Manual Water-Fill & Drain

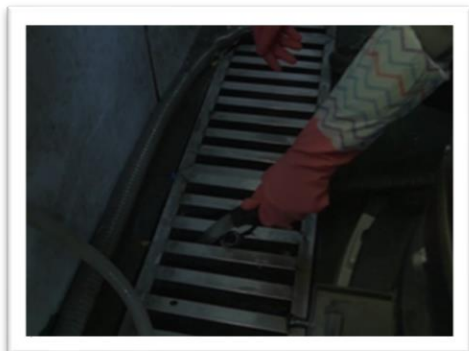
1. Switch the robot to manual mode.



2. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.
3. Push the robot to the maintenance point.



4. Take the wastewater pipe out and drain.



5. Open the cap of the wastewater pipe and quickly put it down to the drain.
6. **Kind reminder:** hold the pipe upward when opening the cap.
7. Close the cap tightly after the drain is completed.



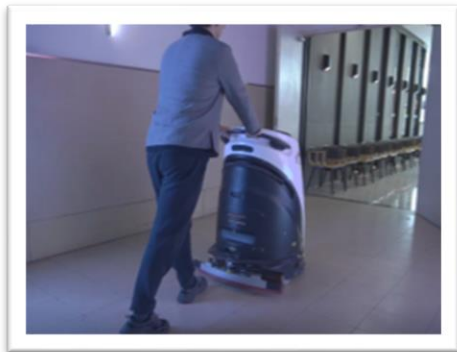
8. Withdraw the wastewater pipe.

3.6. Facade Cleaning

1. Switch the machine to manual mode. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



2. Push the robot to the maintenance point.



3. Using a damp, lint-free cloth, wipe the facade of the machine (be careful not to rub the camera and sensor).



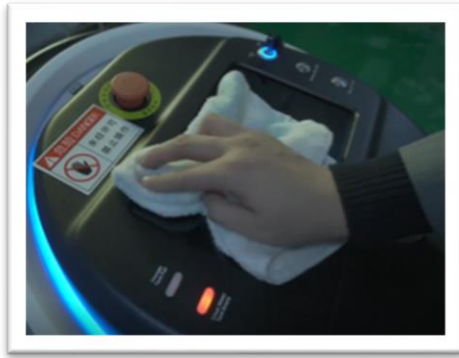
4. Using a clean, soft, lint-free cloth, gently wipe the laser, camera, and sensor.



5. Pull up the front bumper shell buckle, open the front bumper shell, and wipe the front horizontal laser inside.



6. Using a clean, soft, lint-free cloth, gently wipe the top-view camera. Finally, press the screen-off button and wipe the touch screen.



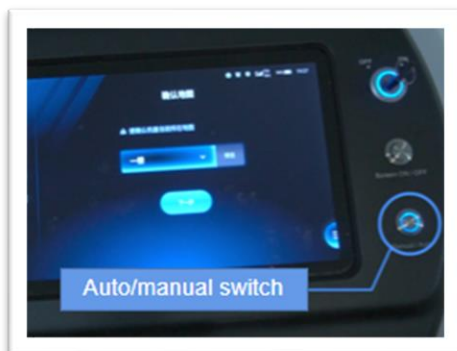
3.7. Water Tank Maintenance

After a cleaning task is completed, necessary maintenance is required for the water tank. Empty the freshwater tank and recovery tank and clean the tanks with clean water. Take down the filter of the recovery tank and the 2-stage filter of the freshwater tank and clean them with clean water. Note that the 2-stage filters cannot be mixed. Make sure the black seal ring of the filter is correctly installed back. Take down the dirt sieve of the recovery tank and clean it.

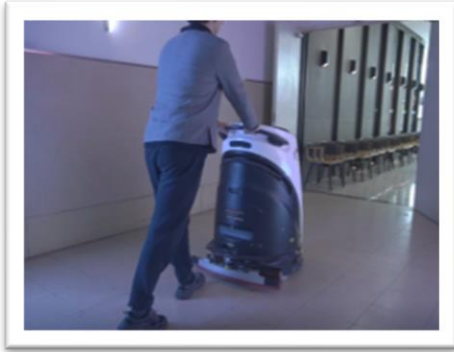
3.8. Water Tank Cleaning

Switch the machine to manual mode.

1. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



2. Push the robot to the maintenance point.

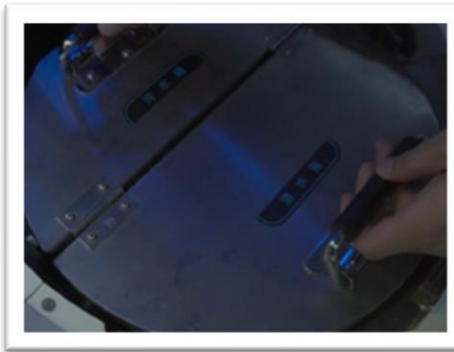


3. Open the top lid.



Open the tank cover.

1. Remove the entire tank cover.



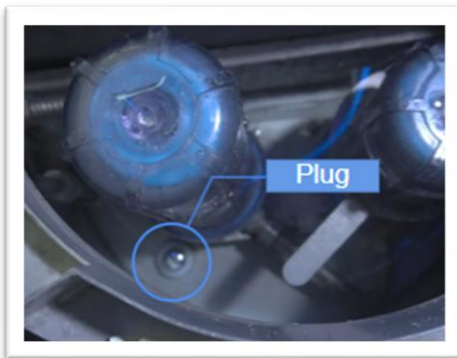
Take the wastewater pipe out and drain.

1. Open the cap of the wastewater pipe and quickly put it down to the drainage (*Kind reminder: hold the pipe upward when opening the cap*).



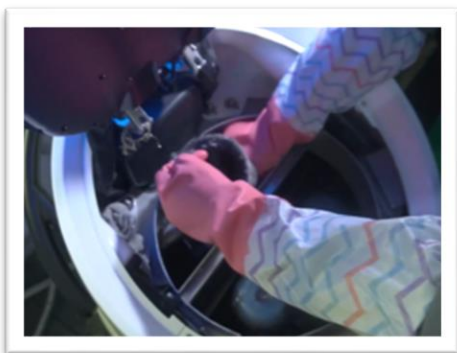
Empty the clean water tank.

1. Unplug the plug in the clean water tank after the wastewater tank has been emptied.
2. The water in the clean water tank will flow into the wastewater tank.
3. Then, continue to empty the wastewater tank using a wastewater pipe.



Remove and clean the filter bag.

1. Remove the rope from the hook and lift the filter bag.
2. Squeeze water out from the filter bag.
3. Hold the filter bag in one hand and take it out with the other hand.
4. Then, put it on the ground and clean it.



Remove and clean the steel wire filter in the wastewater tank.

1. Rotate and lose the steel wire filter anti-clockwise.
2. Take it out with two hands and put it on the ground.
3. Clean it with clean water.



Remove and clean the filter bottle and cartridge.

1. Use the wrench to loosen the filter bottle anti-clockwise.
2. Take the filter bottle and cartridge out, put them on the ground, and clean them with clean water.
3. Remove and clean the other filter bottle and cartridge in the same way.



Flush the inner wall of the clean water tank.

1. Place the water pipe into a clean water tank before flushing.
2. Then open the water valve to flush it. This helps to avoid water splashing to damage other components.



Clean the float switch sensor in the clean water tank.

1. Move the float sensor up and down when flushing it.



Flush the inner wall of the wastewater tank.

1. Place the water pipe into the wastewater tank before flushing.
2. Then open the water valve to flush it. This helps to avoid water splashing to damage other components.



Flush the float switch sensor in the wastewater tank.

1. Move the float sensor up and down when flushing it.



Take the pipe out.

1. Close the water valve, drain water from the pipe, and take the pipe out.



Plug in the plug to the clean water tank.



Clean the filter bag.

1. Trash the garbage in the filter bag and flush the inside and outside of it.



Clean steel wire filter.

1. Flush the two steel wire filters. The two steel wire filters are the same, no worry about mixing them up.



Flush filter bottle and cartridge.



Install the steel wire filter.

1. Align it to the hole and tighten it clockwise. One for the clean water tank, and one for the wastewater tank.



Install the filter bottle and cartridge.

1. Place the cartridge first, then install the filter bottle, and tighten it clockwise.
2. Install the other set of filter bottle and cartridge in the same way.



NOTE:

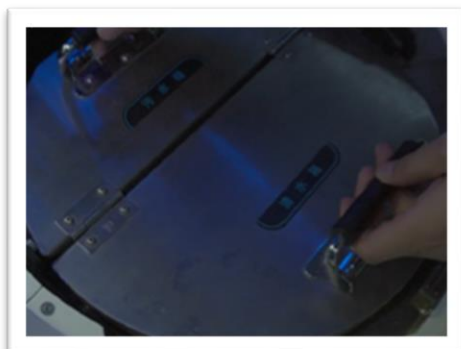
- The 50-micron filter should be installed on the left side of the machine and the 30-micron filter should be installed on the right side. Tighten the bottles with a wrench.

Install the filter bag

1. Hook the rope on the filter bag hook. The filter bag rope can be rotated and knotted and fixed on the filter bag hook.



Put the water tank cover back.



Close the top lid.



Withdraw drainpipe.

1. Ensure the cap of the pipe is tightly closed and withdrew the pipe.



3.9. Rolling Dust Push Maintenance Operation Process

1. Loosen the knob and remove the rolling dust push.



2. Remove the rolling dust cloth and clean or replace it.



3. Loosen the knob, remove, and clean the dust box.



4. Remove the cleaning roller and clean the roller with a sharp tool.



5. After cleaning, install it in reverse order.



3.10. Rolling Cloth Dust Pushing Maintenance Operation Process

1. Open the anti-collision front cover.
2. Remove the front bumper shell.



3. Pull up the buckle to remove the front bumper shell.
4. Remove dust boxes on both sides and clean them.



5. Open both end-covers of the roller brush.



6. Take the front roller brush out from the left side of the robot.
7. Long press the button on the latch and take the latch out.
8. Then remove the metal cover and take the roller brush out.
9. Take the rear roller brush out from the right side of the robot in the same way as the front roller brush.



10. Remove the roller brushes and clean them.



11. Take the front and rear roller brushes out, place and clean them on the ground.
12. Use a steel bristle brush shipped with the robot to clean roller brushes.
13. Clean cloth wiper with detergent.

14. Install after cleaning.



3.11. Squeegee Blade Maintenance

Material:

Natural rubber

Service life:

It depends on the actual service condition. Please check whether the squeegee blade is worn out and if the water absorption effect is affected thereby. If so, replace it.

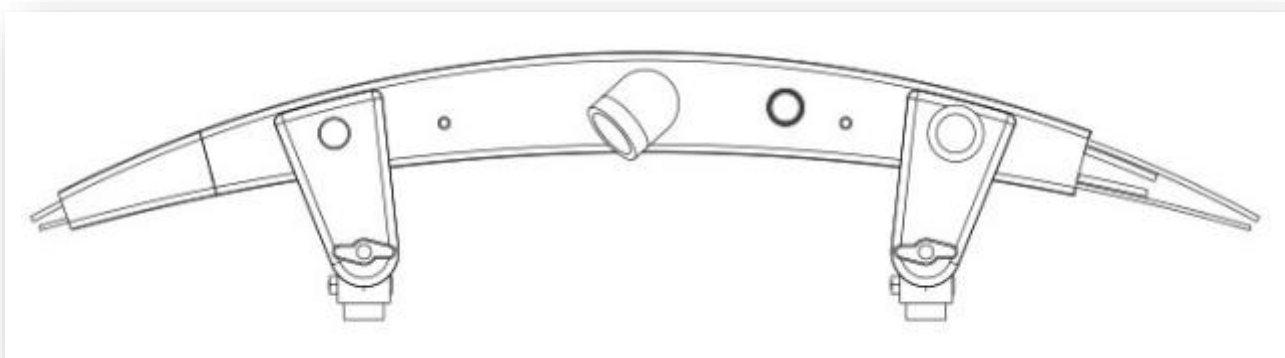


NOTE:

- If the water absorption effect gets worse, but the squeegee blade is not worn out, please check whether the tank cover is placed properly first. You can start the air suction function first separately, and then pull the pull ring on the water tank. If the tank cover is not opened by pulling, it means that the tank cover has been placed properly.

Replacement method:

The squeegee blade is fixed by latches shown in the following figure.



Gently release the latch to remove and replace the blade. If the squeegee mount has to be removed, use the lever to remove the screws on the platen, and then remove the squeegee blade.

3.12. Squeegee Cleaning

Wipe the surface of the inner and outer rubber strips.

1. Use a wet wipe to clean the surface of the inner and outer rubber strips.



Wipe the gap between the inner and outer strips.

1. Use a wet wipe to clean the gap between the inner and outer strips.



Clean the appearance of the squeegee.



3.13. Workstation Cleaning

1. Unplug the power cable.



2. Use a wet wipe to clean the facade of the workstation. Do not touch the charging port.



3. Take the sink and filter foam off.



4. Flush the filter foam.



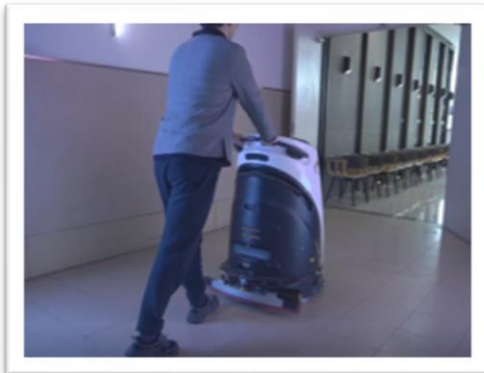
5. Install the sink and filter foam.



3.14. Filter Bag Replacement

Push the robot to the maintenance point in manual mode.

1. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



Take out the pipe and drain.

1. Open the cap of the wastewater pipe and quickly put it down to the drainage (**Kind reminder:** hold the pipe upward when opening the cap).
2. Close the cap tightly after the drain is completed.



Remove the filter bag.

1. Open the top lid and remove the water tank cover.
2. Remove the rope from the hook and lift the filter bag.
3. Squeeze water out from the filter bag.
4. Hold the filter bag in one hand and take it out with the other hand.
5. Then, put it on the ground and clean it.

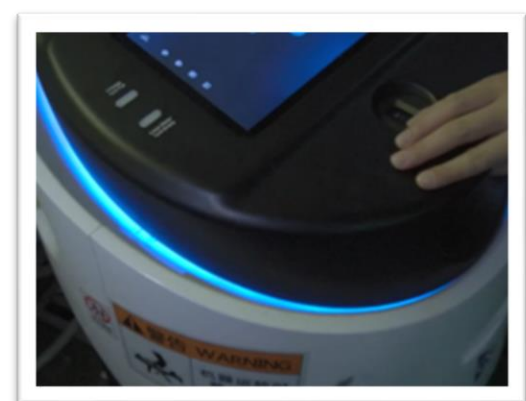


Replace the filter bag.

1. Prepare a new filter bag and wrap the rope around the hook.
2. The filter bag rope can be rotated and knotted to fix it on the filter bag hook).
3. Then close the water tank cover.



Close the top lid.



Withdraw drainpipe.

1. Withdraw the drainpipe after ensuring the cap is tightly closed.



3.15. Filter Maintenance

Material:

Polypropylene pleated filter

Replacement criterion:

When the service time reaches the specified consumable replacement time or the effect of the cleaned floor is still not ideal, it can be considered that the filters need to be replaced or cleaned.

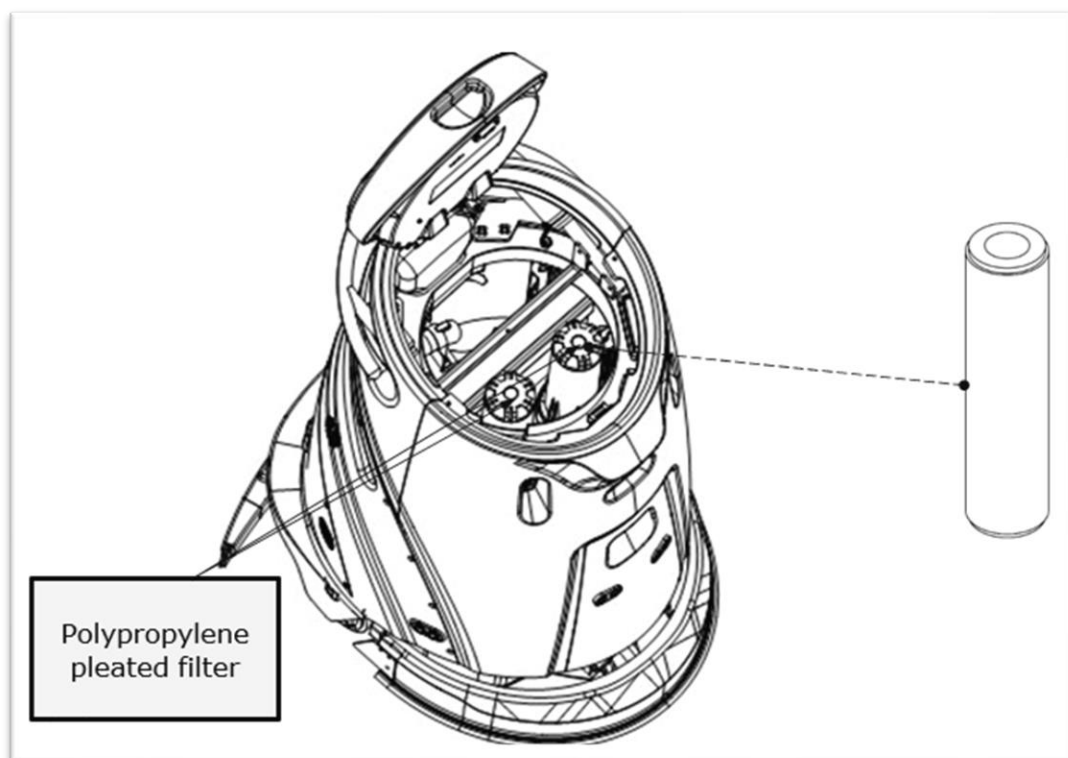
Replacement/cleaning method:

As shown in the figure below, open the tank cover. You shall see that there are two filters in the freshwater tank. To facilitate the removal and replacement of the filters, corresponding auxiliary tools have been designed. The operator only needs to turn the filters anticlockwise to remove them, and then replace or clean the filters.



NOTE:

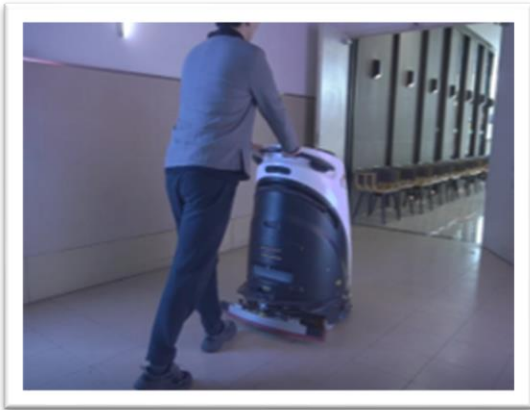
- Be careful when dismantling the filter, to prevent your hand, arm, or head from hitting the edge of the water tank or the tank cover due to excessive force.



3.16. Steel Wire Filter Replacement

Push the robot to the maintenance point in manual mode.

1. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



Take out the pipe and drain.

1. Open the cap of the wastewater pipe and quickly put it down to the drainage (**Kind reminder:** hold the pipe upward when opening the cap).
2. Close the cap tightly after the drain is completed.



Empty the clean water tank.

1. Unplug the plug in the clean water tank after the wastewater tank has been emptied.
2. The water in the clean water tank will flow into the wastewater tank.
3. Then, continue to empty the wastewater tank using a wastewater pipe.



Remove the right filter bottle and cartridge.

1. Use a wrench to loosen the filter bottle, remove the bottle and cartridge and place them on the ground. (**Prompt:** no need to remove the left filter bottle and cartridge).



Remove the steel wire filter in the clean water tank.

1. Rotate the steel wire filter in the clean water tank anti-clockwise.
2. Hold and drain it with 2 hands and put it aside.



Install a new steel wire filter.

1. Prepare a new steel wire filter, align it to the hole, and tighten it clockwise.



Install the filter bottle and cartridge.

1. Place the cartridge first, then install the bottle and rotate it clockwise. Use the wrench to tighten it at last.
2. Put the wrench on the bottle and close the water tank cover.



Close the top lid.



Withdraw the drainpipe.

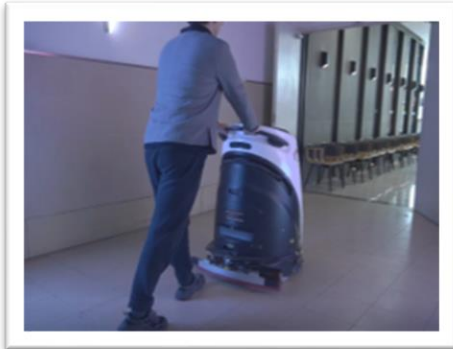
1. Withdraw the drainpipe after ensuring the cap is tightly closed.



3.17. Filter Cartridge Replacement

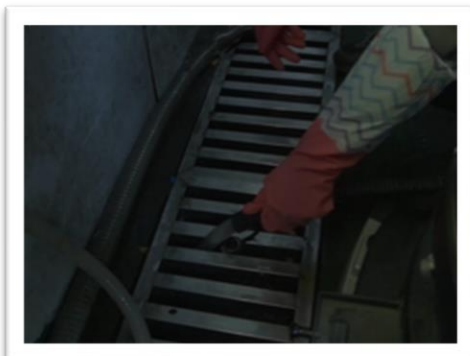
Push the robot to the maintenance point in manual mode.

1. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



Take out the pipe and drain.

1. Open the cap of the wastewater pipe and quickly put it down to the drainage (**Kind reminder:** hold the pipe upward when opening the cap).
2. Close the cap tightly after the drain is completed.



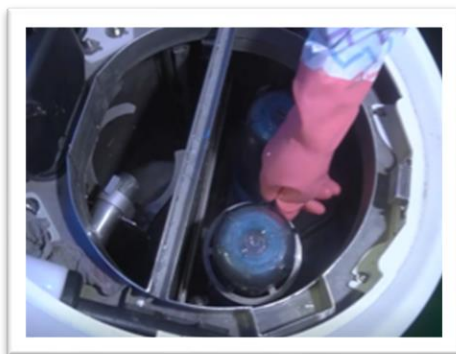
Empty the clean water tank.

1. Unplug the plug in the clean water tank after the wastewater tank has been emptied.
2. The water in the clean water tank will flow into the wastewater tank.
3. Then, continue to empty the wastewater tank using a wastewater pipe.



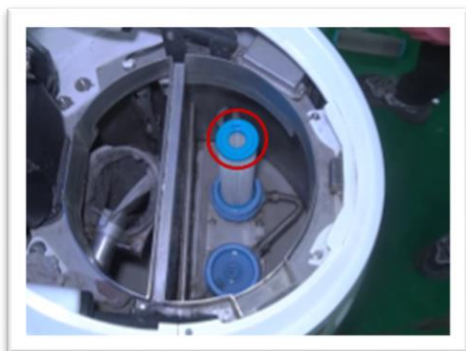
Remove the right filter bottle and cartridge.

1. Use a wrench to loosen the filter bottle anti-clockwise and take the bottle and cartridge out.
2. Put the cartridge in the bottle and place them aside.
3. Take the other set of bottle and cartridge in the same way.



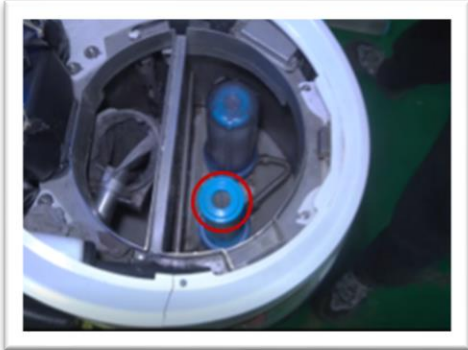
Replace and install a 30-micron filter.

1. Prepare a new cartridge. Ensure one end of the filter is marked 30 microns.
2. Place it on the filter near the side of the water tank wire strainer.
3. Then, put on the filter bottle and use the filter bottle wrench to tighten the filter bottle.



Replace and install a 50-micron filter.

1. Prepare a new cartridge. Ensure one end of the filter is marked with 50 microns.
2. Place it on the filter on the side away from the water tank wire strainer.
3. Then, put on the filter bottle and use the filter bottle wrench to tighten the filter bottle.



Close the water tank cover.



Close the top lid.



Withdraw the drainpipe.

1. Withdraw the drainpipe after ensuring the cap is tightly closed.



3.18. Roller Brush Maintenance

Material:

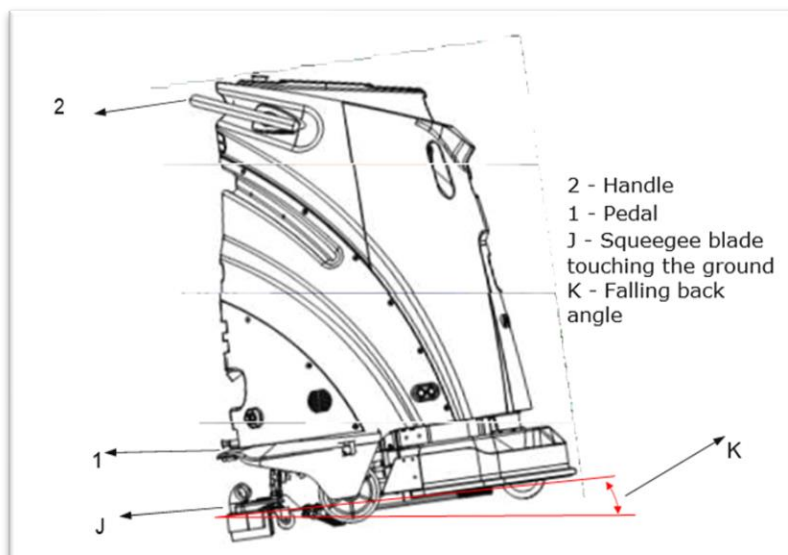
Nylon brush

Replacement criterion:

The service time reaches the specified consumable replacement time, or the brush is severely worn out.

Brush replacement method:

One person needs to hold the handle tightly with both hands and step on the pedal with one foot, which slowly causes the scrubber to fall back. When the squeegee blade touches the ground, it stops reclining. Another person should stretch his hand under the brush tray, touch the edge of the brush tray, press down slightly with his hands, and then take the opportunity to remove the brush tray.



3.19. Roller Brush Replacement

Remove the front bumper shell.

1. Pull up the buckle to remove the front bumper shell.



Remove the roller brush.

1. Take the front roller brush out from the left side of the robot.
2. Long press the button on the latch and take the latch out.
3. Then, remove the metal cover and take the roller brush out.
4. Take the rear roller brush out from the right side of the robot in the same way as the front roller brush.



Install a new roller brush.

1. Prepare a new roller brush, insert its front left side, and reach for the gear, while holding it with one hand.
2. When the gear is joined, install the metal cover.
3. Push it from the bottom up to the two locking screws.
4. Then, align the hole of the latch, and insert the latch.
5. Make sure the latch was locked tightly.



Close the front shell.



NOTE: Replacement for different brush

- The replacement steps for front&rear roller brush, bristle brush, and cloth brush are the same.

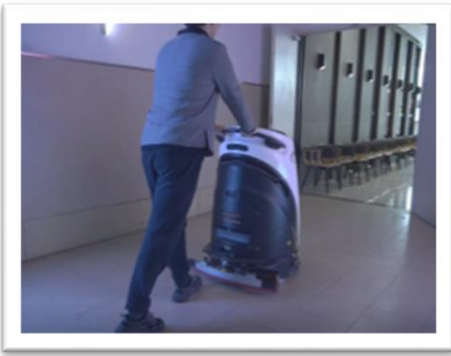
3.20. Rubber Strip Replacement

Switch the robot to manual mode.

1. Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off.



2. Push the robot to the maintenance point.



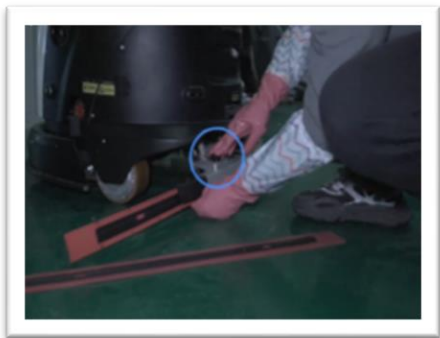
Remove the rubber strips

1. Press the **black** button on the squeegee and remove the inner and outer rubber strips.



Install new rubber strips.

1. Prepare a new set of rubber strips.
2. Install the inner strip first which has gaps in it.
3. Press the button on the squeegee and install the strip.



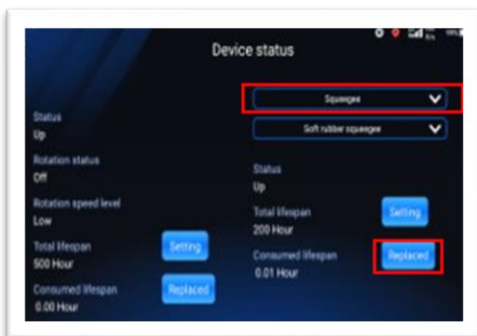
Check the stability of the rubber strip.

1. Shake the strip after installation to ensure it is installed correctly. Use the same way to install the outer strip.



Reset the lifespan.

1. After the replacement, click the left navigation bar and select "**Device status.**"
2. Go to "**Squeegee/dust mop.**"
3. Click "**Replaced.**"
4. Click "**Confirm.**"



3.21. Procedure for Disinfection Package Deployment

Get access to a disinfectant box:



1. Open the top lid.
2. Open the cleaning water tank.
3. Open the disinfectant tank.



NOTE:

- Toggle the buckle left or right, then take the disinfectant tank out.

4. Add the disinfectant to the tank carefully.



IMPORTANT:

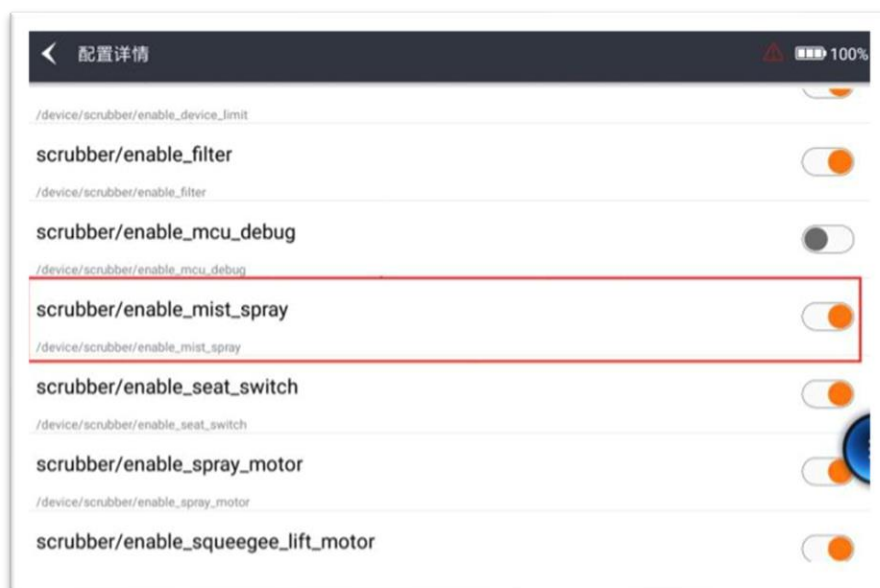
- Smoothly add disinfectant to avoid overflow.
- Disinfectant: hypochlorous acid (recommended).
- Observe the liquid level while filling the disinfectant.
- Stop filling when it is close to full.
- Load in the disinfectant tank: maximum - 5 liters.
- Load in the water tank: maximum - 20 liters.

Pay attention to the liquid level when filling the disinfectant without a measuring cup.

Config settings

Complete the following steps during deployment:

1. In "advanced," please enable mist spray to turn on the feature.



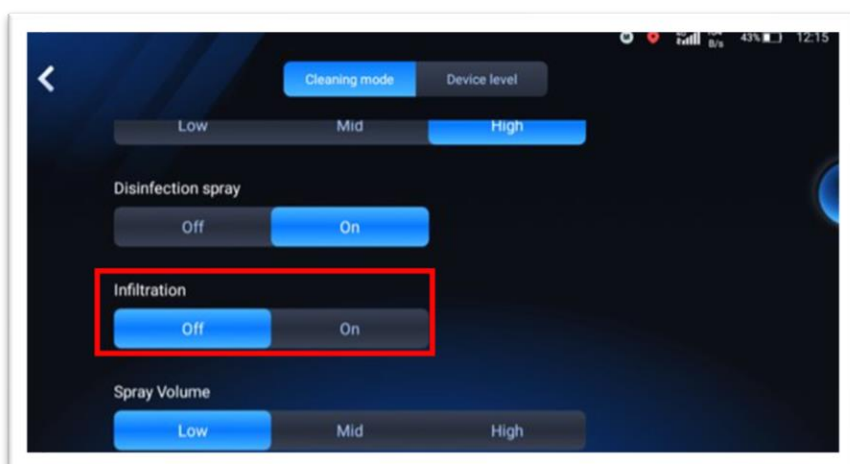
2. Restart the robot to activate this feature after turning it on.

For operator:

1. After enabling the disinfection feature, turn "**Disinfection spray**" on in the cleaning mode interface. It is available in both auto and manual modes.



2. The "**Disinfection Spray**" option is set to open by default.
3. If the "Disinfection Spray" option is not displayed, "scrubber/enable_mist_spray" may not be enabled. Enable it first.



NOTE:

- Set the "Spray" feature enabled to have it work together with the cleaning task. If it is set to "disabled," it will not work together with the cleaning task.
- The spray will be paused when the robot moves backward.
- The spray is not restricted by turning and speed with a regular value of 0.8L/H
- The "Spray" feature has two statuses: "on/off." The speed and level are adjustable.



When the spray feature was turned on, and if there is no disinfectant, there will be an alarm message pop-up in UI.

If the low liquid level of disinfectant was detected during operation with the spray on, the spray will be stopped, and an alarm message will pop up - *"20043 ran out of disinfection"*. Pause the operation and add disinfection in time.

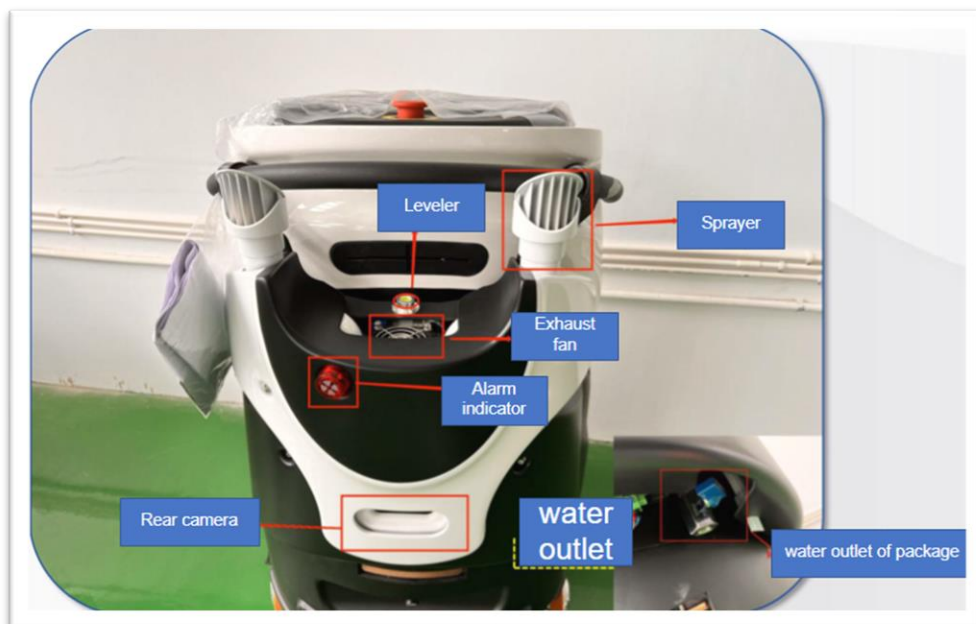


If the spray was turned off, the liquid level will not be monitored, the alarm will not pop up during cleaning tasks.

The liquid level sensor will not be affected by water waves. It monitors the consistent level.

Cleaning procedure

1. Drain disinfectant from the outlet first.
2. Fill the tank with clean water.
3. Drain the clean water.
4. Keep the outlet open and fill the tank with clean water for 1 minute.



4. TROUBLESHOOTING

The scrubber may not work as you expected. Based on the data fed back by the technical support personnel, we have measured the most common failure situations, and given effective troubleshooting methods and solutions for the above failure situations. In the event of a failure, you can refer to the following table for first-time troubleshooting.

Fault Phenomenon	Probable Causes of Fault	Solution
Unclear or double-created map	The scrubber moves at a high speed, resulting in an inadequate quality of the created map.	Please control the scrubber to move at a slow speed during mapping.
	The sensor is contaminated with dust or blocked by obstacles.	Clean the outside of the laser sensor with a dust-free cloth. Check whether there is any foreign object near the sensor. If so, please remove it in time.
	The environment where the scrubber is located is complicated, and there are high-transparency materials such as glass walls.	During mapping, if it is found that there are high-transparency materials in the surrounding environment, please draw a visual wall in time to control the map boundary.
Indistinct or ghosting drawing	The traveling speed of the robot is too fast, resulting in poor-quality mapping.	Please control the robot to run at a slower speed to scan the map.
	The sensor is dusty or obscured by obstacles.	Clean the outside of the laser sensor with a dust-free cloth, check if there are foreign objects near the sensor, and remove them if any.
	The environment is more complex, and there are glass walls and other high-permeability materials.	When mapping, if high-permeability materials are found in the surrounding environment, please draw a virtual wall to control the map boundary.
Initialization failed	<ol style="list-style-type: none"> 1. The wrong map has been chosen 2. Not located at the marked point 3. Surrounded by the crowd at a short distance 	<ol style="list-style-type: none"> 1. Choose the correct map 2. Push to the marked point 3. It is prohibited to be surrounded by the crowd
Robot does not move	The robot has no power, cannot turn on, and cannot move.	Please connect the charger to the charging port of the robot to charge, and then control the movement of the robot after the battery is fully charged.

	The scrubber is powered off, and it cannot be started and moved.	Please insert the key into the start-up keyhole on the control panel and rotate the key to start the scrubber. Then, try to control the scrubber to move.
	The implemented mode is the automatic mode	It is necessary to switch to manual mode by hand.
	The red emergency stop button on the control panel is pressed, which results in emergency braking of the scrubber and prevents it from moving.	Please turn the red emergency stop button clockwise and release it to restore the movement function of the scrubber.
The robot roller brush fails to rotate	The roller brush button on the control panel is closed and cannot start cleaning.	Open the roller brush button on the control panel and turn it on to see if the roller brush is put down close to the ground.
	The brush is wound around the wire garbage, and it is stuck and thus fails to rotate.	Please remove the roller brush for cleaning. After cleaning, install it back into the scrubber.
	The full-tank indicator of the recovery tank or the empty-tank indicator of the freshwater tank on the control panel is steady red, indicating that the recovery tank is full or no clean water is in the freshwater tank, and the scrubber cannot continue cleaning.	Drive the scrubber to the maintenance zone to drain sewage, add clean water, and then continue cleaning.
The scrubber fails to absorb water	The squeegee mount is not set down.	Press the button of the squeegee blade on the control panel to open it and observe whether the squeegee blade is put down.
	The suction button on the control panel is closed so water cannot be absorbed.	Press the suction button on the control panel to open it and check whether the suction function works.
	The full-tank indicator of the recovery tank or the empty-tank indicator of the freshwater tank on the control panel is steady red, indicating that the recovery tank is full or no clean water is in the freshwater tank and the scrubber cannot continue cleaning.	Drive the scrubber to the water room to drain sewage or add clean water, and then continue cleaning.

	The connection of the water suction hose is improper, or the water suction hose inhales unidentified objects, causing a blockage.	Check whether the water suction hose is properly connected to the front of the squeegee blade and the recovery tank and whether there is any blockage. If there are any, please adjust or remove them in time.
	There is solid residue adhered to the squeegee blade, or the squeegee blade deforms or is severely damaged and worn, affecting the water-gathering effect.	Clean the squeegee blade, adjust the structural shape, or directly use a new squeegee blade.
The cleaning effect of the scrubber is poor	The brush has not been cleaned for a long time and is contaminated with a lot of dust and dirt, which affects the cleaning effect.	Remove the roller brush for cleaning and install it back into the scrubber after cleaning.
	The brush is severely worn, and the cleaning performance is poor.	Replace with a new roller brush of the same specification.
	The type of brush does not apply to the floor type. For example, a brush is used to clean an epoxy floor.	Please refer to the instructions for consumables, and select a brush or cleaning pad suitable for the floor material for cleaning.
	The floor to be cleaned is quite dirty or there is a large solid waste on it, so the scrubber cannot clean it all at a time.	Pick up the solid waste on the floor before cleaning, and then repeat the cleaning several times to ensure the best cleaning effect.
The scrubber cannot be charged	The power outlet is powered off and does not supply power.	Please make sure that the power outlet is powered. It is recommended that the charger be connected to another outlet for verification.
	The charger is damaged and cannot be charged.	Please check whether the indicator of the charger is steady red. If it is, charging is normal. If it is off or blinking, the charger is working abnormally. In this case, please contact AROS Technical Support personnel to apply for repair.
	The battery is damaged and cannot be charged normally.	If the charger functions normally, but the percentage of battery level does not increase with the extension of the charging time, it means that the battery is damaged or abnormal. In this case, please contact AROS Technical Support personnel to apply





		for battery replacement.
The scrubber cannot be started	<ol style="list-style-type: none"> 1. The air switch is off. 2. The battery runs out. 3. The key switch is not turned on. 	<ol style="list-style-type: none"> 1. Turn on the air switch. 2. Charge the battery. 3. Turn on the key switch.



If you have tried all the solutions to the above problems still exist, or if the problems you have met are not listed above, please contact AROS Technical Support for further assistance. Thank you for your co-operation.




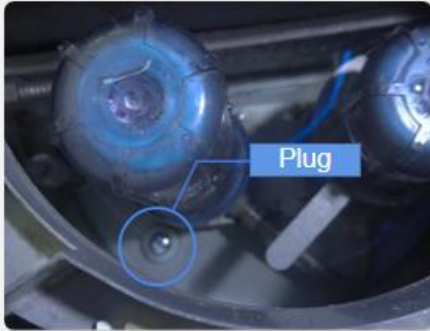

5. APPENDIX A. SOLUTIONS FOR COMMON PROBLEMS

Problems	Possible Reasons	Solutions
Power-on failure	Air Switch 	Check if the air switch has been turned on.
	Battery Activation 	Remove the dust cover of the charging port in the robot and charge the robot for a while, then try to power it on again.
	Emergency STOP button engaged 	The robot will pause the current cleaning task when the emergency STOP button is pressed. Press the button again to continue the current cleaning task.
Intermittent lag		Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off. Then, push the robot to the maintenance point in manual mode.
	Wipe external sensors	Check if there is contamination on the surface of the camera or laser, or if they are blocked by something





		else. Use a soft, clean, and lint-free wipe to clean the surface of the sensors.
	Clean front horizontal laser 	Lift the latch of the front bumper and open the shell and clean the front horizontal laser. Close the shell after cleaning.
No actions after starting auto-operation	Emergency STOP button engaged 	Check if the emergency STOP button was pressed. (Red liner light indicator means it was pressed, blue light means it has been released). If it was pressed, click "confirm" on the screen, and press the button again to continue the cleaning task.
	Robot lost locating 	Check if the robot lost locating. (White icon means locating is normal, red means lost). If the robot lost locating, push the robot to the landmark point for re-locating.
	Alarm message	Open "Health management" and check if there are alarm messages. If they cannot be resolved, please take photos, and contact us for support.



		
An abnormal noise from rubber strips	<p>Something adhered to strips</p> 	<p>Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off. Then, push the robot to the maintenance point. Lift the squeegee and clean the strips with a clean wet wipe.</p>
	<p>Strips damaged or worn</p> 	<p>If the strip is damaged or worn, please do the replacement.</p>
Water stains left on the ground	<p>Something adhered to a strip</p> 	<p>Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off. Then, push the robot to the maintenance point. Put on gloves and lift the squeegee to check if something is adhering to the strip. Clean strips with a clean wet wipe.</p>
	<p>Air leakage into the water tank</p>	<p>Remove the water tank cover and check if the sealing strip on it is good.</p>

		
	<p>Cap of drainage pipe</p> 	<p>Check if the cap of the drainage pipe was closed tightly.</p>
	<p>The suction pipe is blocked</p> 	<p>Check if the suction pipe was inserted well or blocked. Loosen the locking screw and remove it and check for any blockage inside it.</p>
	<p>Improper height of squeegee</p> 	<p>Engage the squeegee to touch the ground. Check the height of casters and adjust it to achieve a 30-45° between the strip and the ground.</p>
	<p>The rubber strip is damaged or worn</p>	<p>If the strip is damaged or worn, please refer to the maintenance guide - rubber strip replacement to do the replacement.</p>

		
<p>No or low water spray</p>	<p>Filter timeout or overload</p>    	<ul style="list-style-type: none"> ➤ Press the auto/manual mode switch button for 3 seconds and confirm that the button indicator light is turned off. Then, push the robot to the maintenance point. ➤ Open the cap of the wastewater pipe and quickly put it down to drainage (<i>Kind reminder: hold the pipe upward when opening the cap</i>). ➤ Unplug the plug in the clean water tank after the wastewater tank has been emptied. The water in the clean water tank will flow into the wastewater tank. Then, continue to empty the wastewater tank using a wastewater pipe. ➤ Remove the filter bag, filter bottle & cartridge, and steel wire filter. ➤ Flush and clean the filter bag, filter bottle & cartridge, and steel wire filter. ➤ Put the water tank cover back. ➤ Close the top lid. ➤ Ensure the cap is closed tightly, then withdraw the drainage pipe.



Auto-charging failure	Power supply failure	Check the power supply to the workstation.
		
	Rear camera contaminations	Check if there is contamination on the surface of the rear camera, or if it is blocked by something. Clean it with a soft, clean lint-free wipe.
		
	Obstacles around	Remove all obstacles around the workstation and charging pile.
		
	QR code for docking dirty or damaged	Check if the QR code is dirty or damaged. Clean it with a clean wet pipe.
		
	Improper air switch position	Check and turn the air switch of the robot on.

		
		
Poor water absorption	The power adapter is damaged	Connect the power adapter with the robot first. Then connect the adapter to the 220VAC power supply. The flashing red indicator means charging is ongoing. If the indicator is off, it means the power adapter could be damaged. Please contact AROS Technical Support for assistance.
	The rubber is worn and damaged	Change rubber.
	The suction outlet of the water-sucking scratcher is blocked	Remove dirt.
	The water tank cover is not well covered	Readjust the water tank cover.
	The suction volume of the cleaning configuration is too small	At least, ensure that the suction volume is greater than 70%.
	The caster wheel is loose	Readjust the height of the caster wheel to make the rubber contact the ground best.
	Excessive water, over 30%	The amount of water sprayed on the marble floor should be kept at 20% ~ 25%.
Filtration overload	The steel mesh of the sewage tank is damaged or dirty	If damaged, it should be replaced; if it is too dirty, it should be cleaned.
	The filter element of the clean water tank is too dirty	Clean or replace the filter element.
	Problems with the filter pump body	Replace the pump.
	The water pipe is bent or blocked	Straighten the water pipe and replace it if it cannot be restored. If the blockage is serious, replace it.
Water-spraying overload	The steel filtering screen of the clean water tank is too dirty	Clean or replace the steel filtering screen.

No spraying	The solenoid valve is damaged	Replace the solenoid valve.
	The amount of clean water in the clean water tank is too small	Add clean water.
	The steel filtering screen of the clean water tank is too dirty	Clean or replace the steel filtering screen.
	The solenoid valve is damaged	Replace the solenoid valve.
	The electric ball valve is damaged	Replace the electric ball valve.
	The water pipe is broken or leaked	Replace the water pipe.
No filtering	The filtering function is turned off by the tool on the APP main interface	Turn it on manually.
	The water level of the sewage tank did not make the third floating ball float	Without treatment, the sewage will be automatically filtered when it reaches a certain water level.
	The steel mesh of the sewage tank is too dirty	Clean or replace the steel mesh.
	The filter element of the clean water tank is too dirty	Clean or replace the filter element.
	The filter pump body is damaged	Replace the filter pump.
There are wheel marks on the ground	Check the wheels for dirt	Clean the rubber coating of the rear wheel with a brush.
	There is a stained layer on the surface of the ground	Clean it with Gaussian special detergent.
	The wheel encapsulation is hard	Replace it with the wheel with softer encapsulation.
Locating failed	The robot is not within 2 m of the landmark point	Push it within 2 m of the landmark point.
	The wrong floor is selected	Move it to the right floor.
	The location and environment of landmark points change too much	Delete old landmark points and create new landmark points.
Running is stuck or the head swings	Dirty sensor	Please wipe it gently.
	Scratched sensor	Replace parts.
	Impacted by strong and direct light	Contact the after-sales personnel for handling.
	Inaccurate TF	Calibrate TF.
No voice for obstacle avoidance	The power amplifier is turned off	Turn on the power amplifier.
	No voice files	Contact the after-sales personnel for assistance. In the future, customized voice content will be supported.
	System problems	Contact the after-sales personnel for assistance.

	Speaker failure	Replace the speaker.
Robot cannot be charged	The air switch is disconnected	Close the air switch manually.
	Damaged charger	Contact the after-sales personnel to replace parts.
	The plug-in row is not powered	Replace the plug row or change the charging position.
Stop in automatic task	Full sewage tank	Discharge sewage.
	Empty clean tank	Add clean water.
	The wheel is stuck	Move the robot manually and solve environmental problems.
	Other faults	Check the APP alarm and contact after-sales personnel for handling.
Unable to enter APP	Loose network cable leads to disconnection of host and slave computers	Re-insert the network cable and tighten it.
	Loose network cable of the all-in-one robot	Re-insert the network cable and tighten it.
	All-in-one robot failure	Replace the all-in-one robot.
	Control box failure	Replace the control box.
	System failure	Update the system version.
The brush/water-sucking scraper cannot be lowered	No lowering is set under cleaning mode	Reset the cleaning mode.
	Structural interference results in the inability to lower	Confirm the interference position for structural adjustment or replacement of components.
	Push-rod motor failure	Replace the pushrod motor.
	Drive failure	Update parameters and replace the drive.

6. APPENDIX B: CONSUMABLE REPLACEMENT SUGGESTION

Power consumption level		High consumption	Medium consumption	Low consumption
Consumables	Remarks	Supermarket, planning scene – 4-6 working hours per day. Rough ground like Cement floor – 3-4 working hours per day. The ground with heavy sewage.	Wear-resistant floor, terrazzo, and other slightly rough ground – 3-4 working hours per day. Rough ground – 1-2 working hours per day. Smooth ground – 3-5 working hours per day. The ground with some sewage.	Epoxy floor, plastic floor (PVC or else floor that can be cleaned via dust-mop or bristle brush). Marble, artificial tile, and other smooth surfaces. Relatively clean floor.
Filter Cartridge	30µm - cartridge	2 times/month	1-time/month	1-time/month
	40µm - cartridge	2 times/month	1-time/month	1-time/month
	50µm - cartridge	2 times/month	1-time/month	1-time/month
Rubber strips of the squeegee	Front strip	2 times/month	2 times/month	1-time/month
	Rear strip	2 times/month	2 times/month	1-time/month
Steel wire filter	Steel wire filter in the clean water tank	1-time/quarter	1-time/quarter	1-time/semi-annual
	Steel wire filter in the wastewater tank	2 times/quarter	2 times/quarter	1 time/quarter
Disk brush	10 inch - bristle disk brush	2 times/quarter	1-time/2 months	1-time/quarter
	10 inch - disk brush	2 times/quarter	1-time/2 months	1-time/quarter
	10 inch - disk brush assembly (magnet) (needle plate together with cleaning pad)	2 times/quarter	1-time/2 months	1-time/quarter
Cleaning pad	Cleaning pad-GS75.1.1.1.1.3	4 times/month	2 times/month	2 times/month

Needle plate	FB0679245mmGX - compound needle brush	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
Castles	1.6-inch castle (M8-L40)	1-time/month	1-time/2 months	1-time/quarter
Roller brush	V-type roller brush - left side	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
	V-type roller brush - right side	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
	Double row roller brush - L	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
	Double row roller brush - R	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
Upper suction pipe	Upper suction pipe	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
	Sewage suction pipe -50	1-time/semi- annual	1-time/semi- annual	1-time/semi-annual
Filter bag	Non-woven filter bag 150 mesh 5L	2 times/month	2 times/month	1-time/month
	Nylon filter bag 200 mesh, 5L	2 times/month	1-time/month	1-time/month

7. APPENDIX C: TECHNICAL SPECIFICATION

Parameter Type	Parameter	Value
ROBOTICS	Navigation Technology	Integrated Lidar-Visual SLAM
	3D LIDAR	No
	Primary Laser detection distance	25 m
	Laser scanning angle	270°
	Secondary Laser detection distance (level)	No
	Secondary Laser detection distance (inclined)	No
	Depth Cameras	3* Real sense camera
	Ultrasonic Sensors	Yes
	Anti-drop Sensor	by using an inclined laser
	Collision sensor	Yes
	Mapping Process	Easy onsite mapping (off-line, on-screen)
	Mapping Efficiency (e.g., 3,000 sqm)	1 hour
	Map Editing	On-site, Off-line, On-Screen
	Single map coverage	Max. 30,000 m ²
	Dynamic Map updating	Yes, a maximum of 30%
	Minimum distance close to the wall	7-10 cm
	Ability to detect thin poles and hanging obstacles	Able
	Dynamic path planning	Yes
	Obstacle avoidance strategy	slow down-stop-wait-bypass-replan path
	Start the task anywhere on the map	Yes
	Continue the previous task after interrupting/switching to manual mode	Continue from where it stopped
	Ability to work in complicated and dynamic scenes	Able
	Can detect obstacles higher than N cm	10 cm
SOFTWARE & DIGITAL	Cloud Platform to check the statistics and monitor	Yes
	Task Reports and Alerts	Auto-generated and comprehensive email
	Mobile App	Yes
	Account with different access levels	Yes
	Scheduling function	Yes
	OTA	Yes

	Ability to work offline	Yes
	Manual mode	Yes, Push behind
	Adjustable cleaning mode	Yes
CLEANING PERFORMANCE	Working width	50 cm
	Water absorption width	72 cm
	Disc Brush RPM	270
	Cleaning down-pressure	12,5/15 kg
	Number of main brushes	2 pcs
	Optional Rolling brush	Yes
	Clean Water Tank Capacity	24 l
	Recovery Tank Capacity	18 l
	Filtration function	4-stage filtration system
	Cleaning speed	1.1 m/s
	Charging time	1-2 hours
	Operation time	2.5 hours
	Cleaning efficiency	800-1200m ² /h
	Max. cleaning area/Charge	2,000 m ²
KEY COMPONENTS AND OTHERS	Battery capacity	24V / 40Ah Li-ion
	The weight of the body (including the battery)	150 kg
	Warning lights	Yes
	Dimensions (mm)	860 (L) X 700 (W) X 1030 (H)

8. APPENDIX D: SCRUBBER 50 Consumables

Nº	CODE	PART NAME	DESCRIPTION	PRICE (€)	1 SET/ 6 months	SET PRICE (€)
1	A0304020327	Hem Strips - Magnetic Suction	5037180009 S00 Natural Rubber	8.00	1	8.00
2	A0304020328	Brush Plate Front Strip - Magnetic Suction	5037180014 S00 Natural Rubber	6.88	1	6.88
3	A0304020332	Suction Stripping Front Rubber	5037080003 S00 NR	14.80	2	29.60
4	A0304020333	Absorb Water and Scrape Back Rubber	5037080004 S00 NR	15.68	2	31.36
5	A0304000463A	Brush Skirt	7504180004 Brush hem front A00 rubber +PA	27.28	1	27.28
6	S0100000176	Hexagonal Magnetic Brush Tray Set - Red	5037180027 A00 9 Inch Magnetic Brush Disc (Medium), Wiring Diameter 0.35mm, Red, Life Span 500h	42.64	2	85.28
7	S0100000101	Needle Hook Tray	5037180020 S00 9 inches, gray	43.12	1	43.12
8	A0312010340	Wool Mat	Customized Part, 9 Inch, Red, T 25mm. Used to remove slight scratches and dirt to form a smooth and shiny bright surface. It is an ideal product for daily cleaning and polishing.	5.20	3	15.60
9	A0303010653	Dust Cloth Gray (Good Water Absorption)	T501003, 3.3.1, GS 50, 170*720, 1PCS, with good vacuum effect.	4.72	3	14.16
10	A0306010312	Manyfold Filter	Filtering Accuracy 50 µ, Dims: Inner Diameter 28mm, Outer Diameter 69mm, Total Length 250mm, Washable.	4.32	3	12.96

11	A0306010313	Manyfold Filter	Filtering Accuracy 100 μ , Dims: Inner Diameter 28mm, Outer Diameter 69mm, Total Length 250mm, Washable.	4.32	3	12.96
12	A0306010004	Clean Water/Sewage Filter	1/2 Inch Outer Thread L 30, Filter Cartridge L ϕ 45*180	38.88	2	77.76
13	A0312012138	Nylon Mesh Bag	Material: Nylon, Mesh: 100 Mesh, Specification: 300* 450mm, Opening Width: 300mm (With Drawstring).	1.92	4	7.68
14	S0100000102	Filter B Component	Extended Filter Wool, Applicable to V3.5.2 Squeegee.	62.96	1	62.96
15	A0305040312	Suction Tuyere Honeycomb Filter Cotton Mesh	T50330040, V3.3	2.56	1	2.56
16	A0308010302	1.6 Inch Wheels	Standard Part; 1.6 Inch Caster Wheel; M8-L40	1.84	2	3.68
TOTAL:						338.72