

Sa600/660 Ride On Floor Scrubber

Instructions



Please read this manual carefully before use

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Chapter one Explanation

1.1 Content and purpose

The following content points out the potential danger. Read these descriptions carefully and take necessary prevention and protection measures. The essence of the machine operation manual is to prevent damage. Safety prevention without accident is necessary. Most accidents are at work and do not pay attention to basic security rules. A careful and cautious user is the best guarantee to stay away from the accident, even stronger than some other preventive measures. When using machines, be sure to pay attention to people around and nearby, especially children.

1.2 General description

- Before any maintenance and maintenance, adjust the start -up switch to the off position, and remove the key to the total power supply.
- The machine must be used by qualified authorized personnel. Children and disabled people are not allowed to use the machine.
- Keep the battery away from Mars, Flame and smoke.
- Do not use it in danger, flammable or explosive gas, liquid, and water vapor.
- Please keep loose clothing, hair, fingers, and other parts away from the air outlet and any activity part of the machine.
- When the machine stops, remember to turn off the power.
- Do not use machines where the slope exceeds the rated value of the machine.
- Please do not smoke when charging the battery.
- Do not use this machine in a dirty area. If the ground dust is thick, please use this product machine after cleaning.
- The machine should be collected between temperature -10 degrees and 40 degrees.
- When using the machine, the temperature should be between -10 degrees and 40 degrees, and the humidity should be between 30%and 95%.
- Don't make the machine as a transportation tool.
- When the machine does not continue, do not let the brush continue to rotate to avoid damage to the ground.
- If a fire occurs,please remember to use powder fire extinguisher instead of water extinguishing fire
- When the machine operates fails, it must be determined that the fault is not caused by the lack of timing maintenance.
- If some parts need to be replaced, you can buy spare supplies from us or authorized dealers.
- Confirm the proper operation and safety conditions of the machine. Professionals or service centers must work in accordance with the maintenance chapter of this manual.

- Even when the machine is to disassemble and scrap, someone should pay attention to it. Because some harmful substances (such as batteries, waste oil, etc.) have met the standards, they should be sent to specific centers for treatment.

1.3 Safety requirements on battery

- It is necessary to avoid the battery in a low voltage state, and it should be charged as soon as possible
- To avoid leakage, please keep the battery dry and clean, especially clear pollutants such as metal dust
- It is forbidden to place metal parts (such as tools) on the battery, to prevent the battery from burning short circuit
- Keep a good ventilation in the charging room
- When the key switch is in the connection (on) position, forbidden to connect and dismantle battery
- Before disassembling the battery, first disconnect the negative (-) battery wire, and then disconnect the positive (+) battery wire. When re-wiring, be sure to pay attention to the polarity of the battery, and the error will damage the electrical element
- Avoid direct contact with positive electrodes and negative electrodes, Because it can cause short circuit, the possibility of high fever even causes fire

1.4 Security provisions

In addition to the provisions made in this manual, it is necessary to comply with the general safety regulations required by the required and accident prevention criteria. Even if you have used a similar floor washing machine before, please read the instructions carefully. Reading the instruction manual in advance will save you a lot of time in the future. Before you use it, familiar with all accessories and control parts and functions are essential to you. Read this manual to prevent you from being busy after booting.

Chapter two Performance Parameters

Product	Units	Specifications	Remark
Cleaning efficiency	m ² /h	4000 m ² /h	
Brush width	inch/pcs	21inchx1/13inch×2	
Width of water absorption	mm	900mm/1000mm	
Cleaning width	mm	600mm/660mm	
Brushing speed	Rpm	225Rpm	
Swiping motor power	W	24V/380W*2	
Water absorption motor power	W	24V/500W	
Drive motor power	W	24V/450W	
Water Tank	L	80L	
Sewage tank	L	80L	
Battery capacity	V/AH	DC24V/100–120AH	
Working time	H	3-4H	
Weight	KG	330KG	
Product Size	mm	1560*1000*1190mm	

Chapter three Use of machine

3.1 Machine button: Panel introduction



Sa600/660 Control Panel

- 1. Lighting light
- 2. Control panel insurance (reset)
- 3. Electric meter (Can display working hours, voltage, power, below 21V machines will be powered off, prompting that it needs to be charged in time)
- 4. Controller indicator light (If there is a flash, it means that the walking function is abnormal, you need to contact after-sales for maintenance)
- 5. Trumpet
- 6. Brush the motor (start this button, the brush disk automatically falls, step on the acceleration pedal, the brush motor starts to work, turn off this button, and the brush disk will be automatically lifted.)
- 7. Water absorption (Starting this button, the water absorption steak will automatically fall, the water absorption motor starts to work, turn off this button, and automatically lift the water pump.)
- 8. Sewage box water level alarm (The green light is on, it means that the sewage tank is full, and the opportunity of water absorption is stopped.)
- 9. Forward and backward switch
- 10. Power switch, emergency stop switch. (Pressing this button in an emergency situation will cause the machine to power off and stop)

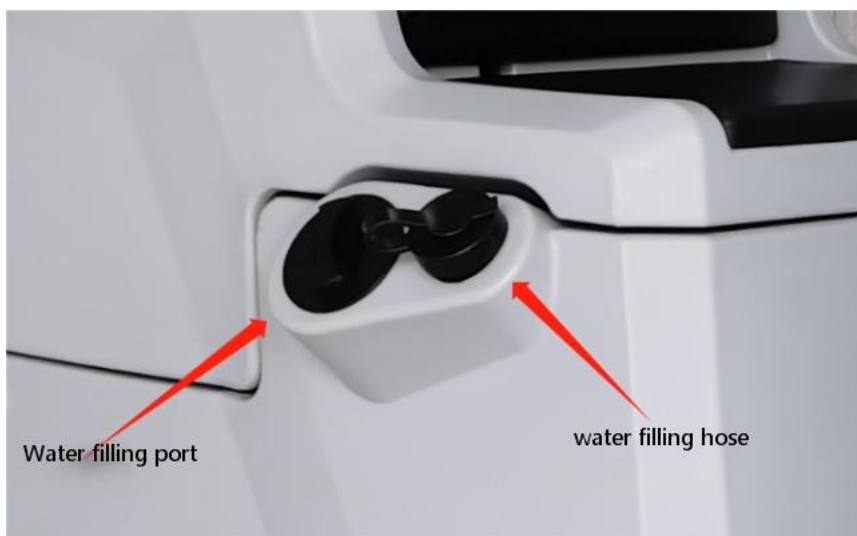
3.1.2 Battery Charging

- The charging socket line requires at least a power cord with a diameter of 4mm.
- Attention: Place the charger on a stable platform and pay attention to moisture-proof, waterproof, and fall proof measures.
- Each charging must ensure sufficient charging time (6-8 hours in summer; 6-10 hours in winter). Ensure that the battery is fully charged during operation.



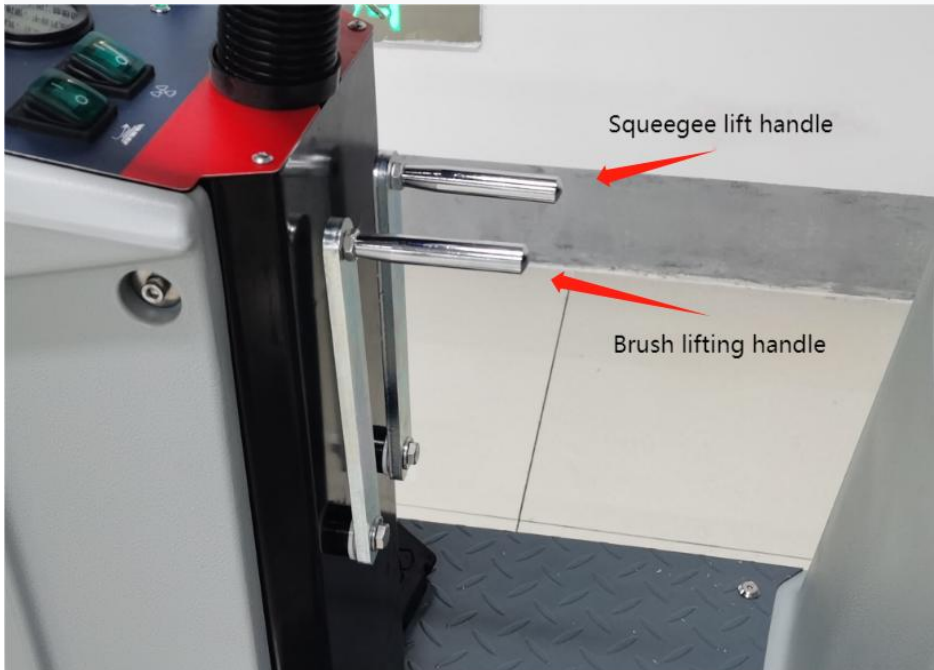
3.1.3 Water tank plus water

Water inlet: The machine is equipped with a water pipe with a water pipe. You can add water or open the water tank cover before using it. Inject clean water into the water tank. Pay attention to the clean water quality to prevent blocking the water road.



3.1.4 Brush tray/suck lift handle

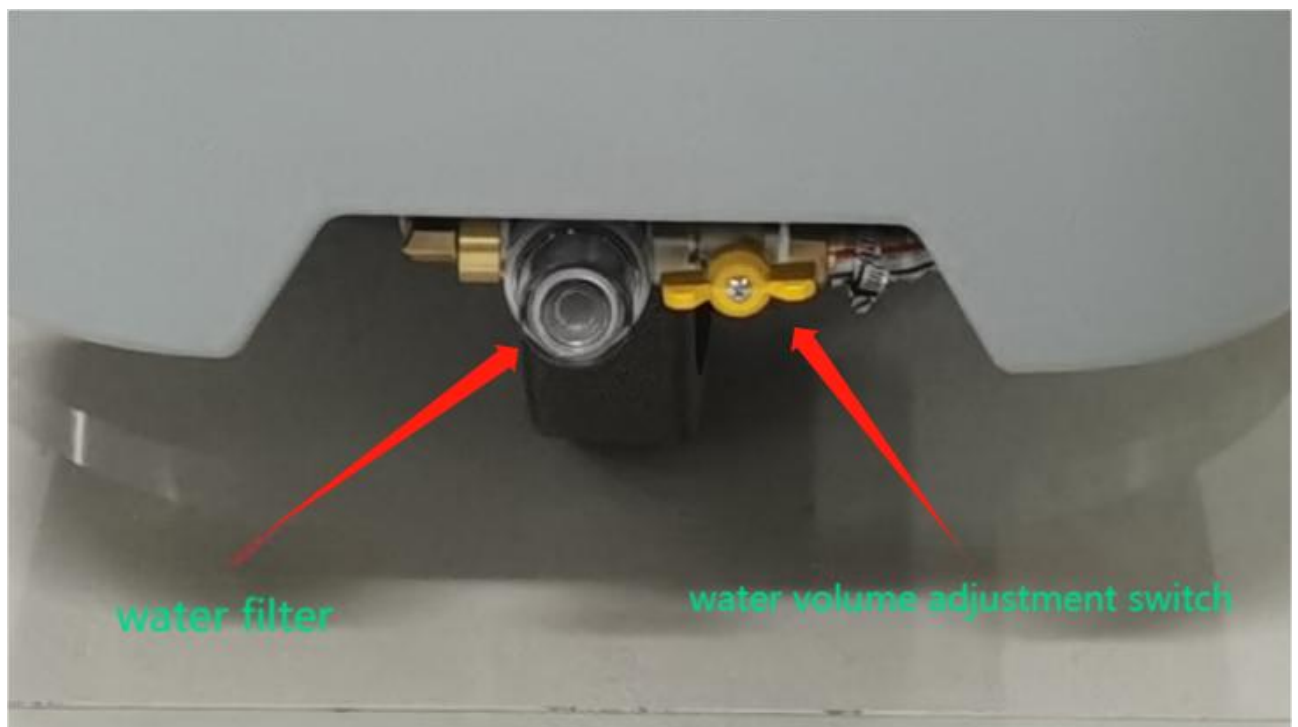
1. Before the machine starts working, put down the two working handles at the same time and turn on the power switch (brush plate + water absorption).
2. This machine adopts a linkage design between the brush plate and the accelerator. When you step on the accelerator pedal, the brush plate will rotate and release it to stop.



3.2 Machine operation process

Before starting

- Before normal operation of the machine, confirm that the suction hose has been installed correctly and insert the sewage pipe into the suction port of the suction hose
- Adjust the water volume to the appropriate position through the water valve switch under the machine head (Depending on the degree of dryness on the ground, the machine must be operated with water and not dry suction to prevent the suction motor from entering dust and causing damage to the suction motor)



first step: Insert the conical port of the sewage suction pipe into the sewage hole of the water tank, and insert the other end into the suction port of the suction pump



two step: Put the brush cover with a brush bracket and use a plastic knob to tighten.



three step: Open the panel work buttons 6 and 7, and the brush and suction cup will automatically fall down. Press the accelerator pedal to start working.

Correct working steps

1. Turn on the power switch and wait for 3 seconds. The controller indicator light (4) is always on and the voltmeter (3) displays the battery voltage value. When the voltage is lower than 21V, please charge it in time.
2. Press the work button to brush the disc, absorb water (6.7), and then put down the brush disc to absorb water.
3. Place the machine in forward gear, lightly press the accelerator pedal, and keep the machine running smoothly (note: it should not be too fast during cleaning).
4. If it is necessary to stop quickly or operate on a sloping surface, the machine can be controlled by releasing the accelerator pedal.

Stopping the machine

- 1. Turn off the brush-brushed water absorption switch button, brush the dish, and automatically lift it (the water absorption with a delay function, 5-7 seconds)
- 2. Turn off the total power switch.

3.3 Precautions for machine operation

- Avoid stopping the machine in the same place for a long time and allowing the brush to clean; This will leave unnecessary marks on the ground.
- When cleaning the epoxy floor, it is necessary to add a cleaning pad or replace a soft bristle brush to prevent the brush from damaging the epoxy floor
- When filling the machine with clean water, it is necessary to ensure that the water quality is clean to avoid clogging the drain valve and filter screen with impurities and prevent water from flowing out
- After the machine has been working for a period of time, it is necessary to timely discharge the sewage from the sewage tank to avoid excessive infiltration of the sewage into the suction motor and damage.
- To clean the ground with serious oil stain, please put an appropriate amount of detergent in the clean water tank to achieve better cleaning effect, and at the same time, drip an appropriate amount of defoamer into the sewage tank to prevent the foam in the sewage tank from immersing in the air suction motor and causing burning
- After each work is completed, please rinse the dirty water tank in a timely manner to keep the machine well maintained.
- After winter operation, please drain the clean water tank in a timely manner to avoid freezing and affecting reuse.

Sewage tank discharge sewage

- Turn off the main power supply and ensure that the machine stops.
- Open the drain pipe cover and implement drainage
- The sewage tank can be properly flushed with clean water



Preservation and maintenance of the machine:

1. The daily, weekly, and monthly maintenance procedures must be strictly followed so that the machine can be maintained in optimal working condition.
2. Clean the squeegee assembly, sewage suction pipe/drainage pipe assembly, and machine water filter regularly (monthly/weekly) to keep all piping systems in optimal working condition at all times, and replace consumables regularly. .
3. Clean the suction motor filter element at the float port regularly according to the working environment conditions to prevent the garbage from clogging the filter screen and affecting the work of the suction motor if it is not cleaned for a long time. After each cleaning, the filter cotton must be put back in place in time to avoid leakage. Install any components and tighten the float cap tightly



1. Daily maintenance (after each use)

Drain and clean the sewage tank.

Drain the clean water tank and clean it with hot water no higher than 60 degrees if necessary.

Remove the scouring pad and brush for cleaning. If worn, flip or replace the scouring pad.

Wipe the absorbent strip and lift the absorbent strip to prevent damage to the strip.

Check the wear on the edge of the absorbent strip. If there is any wear, swap the two sides of the strip up and down.

Use an all-purpose cleaner and a damp cloth to wipe down the machine. For safety reasons, do not spray or hose down the machine with high pressure when cleaning it. To avoid causing electronic parts

failure.

Check the brush head skirt for wear and replace it if it is worn or damaged.

Charge the battery. In order to extend the life of the battery and ensure the best performance of the machine, the battery must be charged after the machine has been used for at least 30 minutes.

2. Monthly maintenance

Remove the solution tank filter from under the machine and clean the filter, making sure to empty the solution tank before removing the filter.

Clean the top of the battery to prevent corrosion of the electrodes.

Check whether the battery cable is loose.

Check and clean the sealing strip of the sewage tank cover and replace it if damaged.

Spray silicone dry lubricant on all pivots and rollers, and then cover them with a layer of waterproof lubricant to keep the axles running smoothly.

Check whether the nuts and bolts on the machine are loose.

Check the machine for leaks.

3. Quarterly maintenance

Check the wear of the drive motor, vacuum motor and brush motor every 250 hours. When the length of the carbon brush is worn within 10 mm, the carbon brush needs to be replaced. If you want to send the machine for repair, please contact the authorized service center.

WARNING: ELECTRIC SHOCK HAZARD. Please disconnect the battery cable before servicing the machine.

Handling machine

When moving the machine using a truck or trailer, be sure to follow the lashing procedures below

Raise the brush head into the handling position and load the machine using the recommended loading pad.

Place the front of the machine against the front of the truck or trailer. After the machine is placed, lower the brush head and turn off the power.

Place a barrier behind each drive wheel to prevent the machine from sliding.

Use ropes to secure the top of the machine to prevent it from tipping. You must install brackets on the bed of your truck or trailer. **FOR SAFETY:** When moving the machine, use the recommended loading dock to load and unload the machine from a truck or trailer and secure the machine to the bed with ropes.

storage machine

Please charge the battery before storage. Do not store when the battery is exhausted.

Completely drain and rinse the sink tank inside the sink.

Store the machine in a dry place with the brush head in the raised position.

Open the recovery tank cover to ventilate it. Note: Never expose the machine to rain and store it indoors.

If the machine is stored in a cold environment, be sure to drain all liquids inside the machine.

Chapter four Daily maintenance and disassembly of damaged parts

4.1 Regular inspection

Regular maintenance and inspection			Interval time (h)				
			4	50	100	200	500
1	Battery level detection		√				
2	Whether the main brush is wired, the silk wrapped		√				
3	Check if there are any debris in the water tank		√				
4	Check the buttons and electronic products on the control panel			√		√	
5	Check the wear of the brush			√	√		
6	Check the filter for impurities		√				

4.2 Brush replacement and install

4.2.1 Park the machine on a flat surface and lower the floor scrubber.

4.2.2 Rotate the plastic cross nut counterclockwise to remove the brush disc cover

4.2.3 Press the brush tray work button again, lift the floor cleaning brush tray, grasp the brush tray holder, slightly lift it up, quickly swing left and right, and the brush tray can be removed; When installing the brush disc, ensure that the flange is aligned with the brush disc buckle hole, and rotate in any direction to complete the installation. Reminder: The driving brush disc adopts both front and back buckles, and installation can be completed regardless of the direction of rotation.

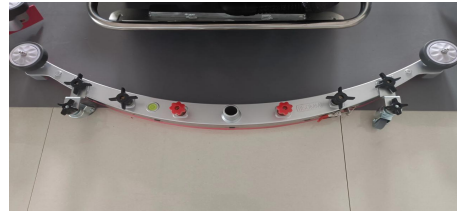


4.3 Water absorption glue replacement and install

4.3.1 Park the machine on a flat surface, turn off the main power switch, and ensure that the machine is in a power off state.

4.3.2 Put down the suction scoop through the handle; After rotating the plastic handle in

reverse, take out the water suction lever component.



4.3.3 Unscrew the nut of the water suction lever component, remove the bottom plate of the water suction lever component, and remove the front and rear rubber strips of the water suction lever



4.3.4 Install the water absorbing adhesive strip.

1.Align the eyelet of the front adhesive strip with the protrusion of the water absorbing plastic component.

2.Fix the plastic components on the water absorbing cast aluminum base plate

3.Align the hole of the rear adhesive strip with the protrusion of the water absorbing plastic component.

4.Clamp both ends of the pressure strip together

5.Tighten the nut



4.4 Battery maintenance maintenance

Sa600/660 Washing Motor Power System is connected to the two 12V -free leader acid batteries in series, the system voltage 24V

4.4.1 After the machine has been operating for a period of time, the battery level drops, and when the last cell of the battery indicator flashes,Indicates that the battery is low and needs to be charged in a timely manner

4.4.2 When maintaining the battery, please wear protective gloves to avoid contact with acidic substances in the battery

4.4.3 Check if the battery connection wires are worn and if the contacts are loose, and replace them if necessary

4.4.4 The battery end should be kept clean and dry, and there should be no debris or dust covering it, which is extremely detrimental to the battery. In severe cases, it may burn out the battery.

Attention! ! !

◆ To ensure a long service life of the battery, it should be charged promptly after the machine is completed, and deep discharge is strictly prohibited.

◆ The correct charging method for lead-acid batteries: first insert the battery, then plug in the mains; After fully charging, disconnect the mains power first, and then unplug the battery.

◆ If the machine is not in use for a long time, please fully charge the battery and disconnect the positive pole of the battery for storage.

Warn! ! !

◆ During the use of batteries, the capacity of deep discharge batteries will decrease and their lifespan will be shortened

4.5 Precautions and disassembly of wind suction motor

4.5.1 After daily use of the machine, please discharge the sewage in the sewage tank in a timely manner to prevent the water level from being too high and being sucked into the suction motor, which may burn the motor.

4.5.2 In the process of using the machine, if there is too much foam, it is recommended to use defamer solution to prevent foam from entering the filter screen, entering the suction motor and causing the motor to burn.

4.5.3 Disassembly of suction motor: The suction motor is fixed at the bottom of the sewage tank. Before removal1. First, empty the sewage tank and turn off the main power switch to keep the machine powered off;2. Flip over the dirty water tank and pull out the opposite socket of the suction motor3. Loosen the fixing nut of the suction motor and take out the suction motor.

4.5.4 Installation of suction motor: 1. Align the installation hole of the suction motor with the screw of the sewage tank, and then tighten it with the anti-skid nut. 2. Insert the opposite socket of the suction motor into the machine circuit to complete the installation.



4.6 Controller function, diagnosis and disassembly

4.6.1 Machine controller; Fixed inside the control box under the seat.

4.6.2 **Drive function** : Full bridge Power MOSFET control enables stepless control of forward, backward, driving and braking, and soft start and flexible braking.

Host operation : Full bridge Power MOSFET control enables stepless control of forward, backward, driving and braking, and soft start and flexible braking.

4.6.3 **Downhill speed limit and anti slip function** : Do not exceed the maximum allowed speed when driving downhill, and limit the speed when parking on a slope.

4.6.4 **Brake function** : When the brake switch is effective, the vehicle immediately slows down and brakes, ultimately reaching a stop

4.6.5 **Diagnostic function** : The number of flashes of the panel indicator light can be observed to determine the corresponding fault cause. For example, when the controller malfunctions, the control panel indicator light flashes continuously for 7 times, pauses for 2-3 seconds, and then flashes continuously for 7 times, repeating this process.

Sa600/660 DC3-102A3S fault code

error code	LED flashing	Fault content	Troubleshooting
E[01]	Flash 1 time	Precharge failure 1	1. The brake output is short-circuited to ground. 2. The controller's walking motor control MOS is damaged or the brake control MOS is damaged. Troubleshooting method: Remove the brake from the controller. If the fault disappears, check whether the brake is short-circuited to ground. If the fault does not disappear, it is an internal fault of the controller.
E[03]	Flash 3 time	PVDD1 Overvoltage fault	P2-1 voltage exceeds 34V
E[04]	Flash 4 time	PVDD1 Undervoltage fault	P2-2 voltage lower than 12V
E[07]	Flash 7 time	12V-CPU Overvoltage fault	Controller internal failure
E[08]	Flash 8 time	12V-CPU Undervoltage fault	Controller internal failure
E[12]	1 slow and 2 fast	Key switch overvoltage fault	P4-14/13 voltage higher than 34V
E[13]	1 slow and 3 fast	Key switch undervoltage fault	P4-14/13 voltage lower than 12V
E[14]	1 slow and 4 fast	Battery undervoltage fault	battery voltage is higher than 34V
E[15]	1 slow and 5 fast	Battery overvoltage fault	battery voltage is lower than 12V
E[16]	1 slow and 6 fast	Battery voltage limit low fault	battery voltage is lower than 12V
E[17]	1 slow and 7 fast	High battery voltage limit fault	battery voltage is higher than 36V
E[25]	2 slow and 5 fast	UART Overvoltage fault	Controller internal failure
E[26]	2 slow and 6 fast	UART Undervoltage fault	Controller internal failure
E[29]	2 slow and 9 fast	Relay 1 connection failure	Travel motor short circuit or electromagnetic brake short circuit
E[30]	Flash slowly 3 times	Walking motor phase A NTC fault	Controller internal failure
E[31]	3 slow and 1 fast	Walking motor B phase NTC fault	Controller internal failure
E[32]	3 slow and 2 fast	Brush motor NTC failure	Controller internal failure

4.6.6 Controller disassembly and assembly:

1. Unscrew the battery connection cable and keep the machine powered off; Use M4 Hex key to unscrew the fixing screws of the driver's seat and open the seat cover.

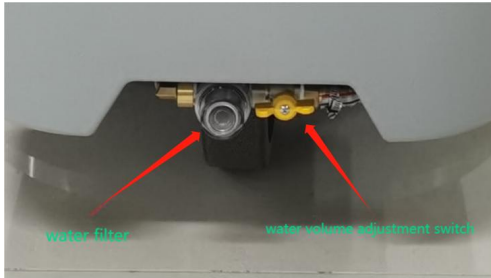


2. Unplug the control panel cable and controller connector port, unscrew the positive and negative wiring of the controller, and the positive and negative wiring of the traveling motor; unscrew the fixing screws of the controller and the machine head iron plate, and the controller can be disassembled.

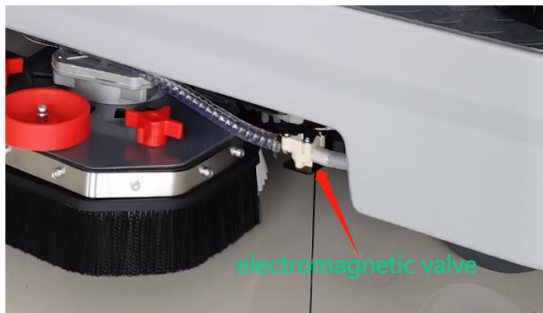
3. The reverse process of controller installation and removal. (Note: When wiring the controller, the positive and negative wires must not be misconnected)

4.7 Solenoid valve, filter disassemble

4.7.1 Filter disassembly and assembly: The filter is located on the right side of the front wheel of the machine. After using it for a period of time, if it is found that the machine has low or no water output, most of the reasons are due to clogging of filter particles and impurities. You need to loosen the transparent cover at the bottom of the filter and remove the internal filter to clean it.



4.7.2 Disassembly and assembly of solenoid valve: The solenoid valve is located directly in front of the brush disc motor and is fixed to the iron plate by a nylon tie; When replacing, simply cut the tie and pull out the solenoid valve outlet pipe. (Note: During installation, the clean water pipe should fully enter and exit the solenoid valve outlet nozzle)



Chapter five Scrubber frequently problem analysis form

Problem	Reason	Processing method
Machine cannot operate	Battery is not electric	Battery charging
	Battery fault	Replace the battery
	Battery wiring loose	Tighten the battery wiring
	Main fuse blown	Better fuse
Brush disc motor does not work	Brush leave the ground	lower Brush
	Circuit circuit broken router triggering power jumping	Reset the brush circuit circuit breaker button
	Main brush switch failure	Please contact the service center
	Carbon brush wear	Please contact the service center
Fan not working	Excessive noise from the suction motor	Please contact the service center
	Suction motor is burnt out	Replace the suction motor
	Carbon brush wear	Please contact the service center
Small or no water outflow	drain valve or water pipe of the clean water tank is blocked	Clean or replace the drain valve of the clean water tank
	Damage of solenoid valve	Replace the solenoid valve
Low efficiency of wastewater recycling	sewage tank is full	Drain the sewage tank
	Water absorption glue strip wear	Replace the water absorption
	Wind-absorbing motor failure	Replace the wind-absorbing motor
	Damage to sewage tank sealing	Replace the sealing strip
Shortened working time	Two battery voltage is not equal	Please contact the service center
	Battery charging failure	Maintenance or replacement charger
Problem	Reason	Processing method

Chapter six Maintenance

The life and operation of the machine must be ensured by the correct and conventional maintenance of the machine. The following will make conventional maintenance requirements. Under suitable working conditions, the time interval of maintenance can be changed, which must be determined by professionals responsible for maintenance.

If the maintenance operation is performed, the machine stops (unplugged the switch key), so please read the instructions carefully about safety chapters.

Use conditions:

- Environmental temperature: $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$;
- The relative humidity of the air: 5 % to 70 %;
- Non-conductive dust environment without explosion
- Environments without corrosive gases or vapors
- Indoor use, ventilated, vibration free environment, with a minimum front and rear space of 300mm

Maintenance schedule:

Maintenance Operations	Delivery time	Every 10h	Every 50h	Every 100h	Every 200h	Every 500h
Inspection of brush disc height adjustment						
Whether the disk is wired and the silk is wrapped						
Clean and inspect the integrity of the suction scraper						
Inspection of sealing strip for water tank cover						
Screw and nut tightening inspection						
Check the wear of the brush disc						
Replacement of water absorbing adhesive strip						

Warranty scope:

- Under the following usage conditions, there is no warranty
- Failure to carry out maintenance according to the maintenance manual, resulting in mechanical damage or malfunction
- Significant damage to the mechanical appearance or structure caused by improper human operation
- Dismantling or modification without the consent and approval of the original factory
- Damage caused by weather or force majeure
- Exceeding the warranty period of 1 year or using for more than 1500 hours

