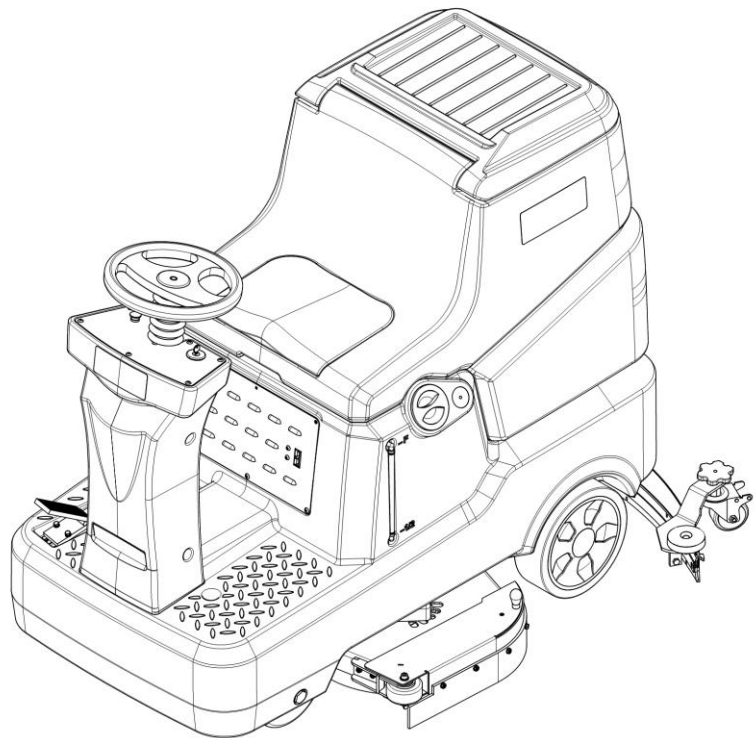


Operator Manual

NR810 Rider Scrubber



WARNING

Do not use the pallet truck before reading and understanding these operating instructions.

NOTE:

- **Please check the designation of your present type at the last page of this document as well as on the ID-plate.**
- **Keep this manual for future reference.**

Version 12/2024

NR810-SMS-004-EN

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INTRODUCTION



NOTE

The code of related components in () can be found in the chapter of machine description.

MANUAL PURPOSE AND CONTENT

- This manual is to provide the operator with the necessary information for the correct and safe use of the machine, which includes the technical data, safety, operation, storage, maintenance, accessories and dispose of the machine.
- Before performing any operation or maintenance on this machine, the operator and the qualified technicians must read this manual carefully.
- If you have any questions about the explanation of this manual or want more related information, please contact our after-sales or agency.
- The operator is not allowed to perform the steps that must be completed by the technicians. All instructions in this manual should be seriously followed, otherwise our company shall not be liable for any losses arising therefrom.

HOW TO KEEP THIS MANUAL

- The Manual must be kept near the machine, inside an adequate case or bag, away from liquids and other substances that can cause any damage to it.

DECLARATION OF CONFORMITY

- The declaration of conformity is provided with the machine to prove that the machine complies with relevant criteria and regulations.



NOTE

The copy of the original declaration of conformity is provided together the machine documentation.

ACCESSORIES AND MAINTENANCE

- All necessary operation, maintenance and repair procedures must be performed by qualified personnel or the maintenance center designated by our company. Only original spare parts and accessories are allowed to be used on the machine.
- If you need service or want to order spare parts or accessories, please contact our company's after-sales service department or the agent, and provide the model and serial number of the machine.

CHANGE AND IMPROVEMENT

- Our company is committed to the continuous improvement of the products and reserves the right to notify the improvements and changes of the products that have been sold.

INTENDED USE

- This scrubber can be used in commercial and industrial environments, and it is suitable for cleaning smooth and hard floors (washing and sewage collecting). It must be used in a safe environment by a qualified operator. This scrubber is not suitable for cleaning outdoors floors, carpets or rough floors.

MACHINE IDENTIFICATION

- The model and serial number of this machine are marked on the identification label. The information on this label is very important, which is required to be provided when you order the accessories for the machine.

TRANSPORT AND UNCRATING

- Carefully check machine for signs of damage. Report damages at once to carrier. Record the damages on paper to reserve the right for compensation.

After uncrating, check if the machine is equipped with the following items:

1. Technical documents, including operation manual;
2. Battery connecting cable.

SAFETY

- The following symbols indicate potential dangers. In any case, please read this information carefully and take necessary precautions to avoid possible injury and property loss.

VISIBLE SYMBOLS ON THE MACHINE



WARNING!

Read all the instructions carefully before performing any operation on the machine.

SYMBOLS THAT APPEAR IN THIS INSTRUCTION MANUAL



DANGER!

It indicates the danger that may cause death of the operator.



WARNING!

It indicates a potential hazard of injury to people and objects.



CAUTION!

It indicates a caution related to important or useful functions. Pay attention to the paragraphs marked by this symbol.



NOTE

It indicates notes on important matters and useful functions.



CONSULTATION

It indicates the necessity to refer to the instructions of this manual before performing any procedures.

GENERAL SAFETY INSTRUCTION

Specific warnings and cautions for potential damages to personnel and machine are notified as follows:



DANGER !

- This machine must be operated by trained and authorized personnel according to guidance of the manual.
- Before performing any cleaning, maintenance, repair or replacement procedure, read all the instructions carefully, ensure to turn the machine OFF and disconnect the battery connector.
- Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapors. This machine is not suitable for collecting dangerous powders.
- Do not wear jewels when working near electrical components.

- Do not work under the lifted machine without supporting it with safety stands.
 - x When using lead (WET) batteries, they may emit inflammable gas under normal use, must keep sparks, flames, smoking materials and radiating, illuminating and burning items away from the batteries.
- x When charging lead (WET) batteries, they may emit hydrogen gas which may cause explosive. Must ensure the charging environment is well ventilated and away from naked flames.



WARNING !

- This machine is intended for COMMERCIAL USE, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses.
- Machines left unattended shall be secured against unintentional movement.
- In order to prevent unauthorized use of the machine, the power source shall be switched off or locked, for example by removing the key of the main switch or the ignition key.
- Check the machine carefully before each use. Ensure that all the components have been well assembled before use. Or it may cause damages to people and properties.
- Before using the battery charger, ensure that the values of frequency and voltage indicated on the machine serial number label match those of mains.
- Never move the machine by pulling the battery charger cable. Do not let the cable through a closed door, or winding on sharp edges or corners.
- Do not run the machine on the battery charger cable.
- Keep the battery charger cable away from heated surfaces.
- Do not charge the batteries if the battery charger cable or the plug are damaged.
- To reduce the risk of fire, electric shock, or injury, make sure machine is off before leaving.
- Use or store the machine indoors in dry conditions, it is not allowed for outdoor use.
- The machine both storage and working temperature must be between 0 °C and +40 °C, the humidity of air must be between 30% - 95%.
- Do not use the machine on slopes with a gradient exceeding as specification show.
- When using and handling floor cleaning detergents, follow the instructions on the labels of the detergent bottles and wear suitable gloves and protections.
- Use brushes and pads supplied with the machine or defined in the manual. Using other brushes or pads could reduce safety.
- In case of machine malfunctions, ensure that these are not due to lack of maintenance. If necessary, request assistance from the authorized personnel or from an authorized Service Center.
- Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.
- Do not use the machine in particularly dusty areas.
- Do not wash the machine with direct or pressured water jets, or with corrosive substances.
- Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.
- Do not lean liquid containers on the machine, use the relevant can holder.
- To avoid damaging the floor, do not allow the brush/pad to operate while the machine is stationary.
- In case of fire, use a dry powder fire extinguisher. Do not use liquid fire extinguishers.
- Do not remove or modify the machine stickers.

- Do not tamper with the machine safety guards and follow the ordinary maintenance instructions scrupulously.
- Pay attention during machine transportation when temperature is below freezing point. The water in the recovery tank and in the hoses could freeze and cause seriously damage to the machine.
- If spare parts need be replaced, order ORIGINAL spare parts from an Authorized Dealers or Retailers.
- Return the machine to the Service Center if it doesn't work as usual or is in condition such as damaged, placed outdoors, dropped into water.
- To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual, must be performed by the authorized personnel or an authorized Service Center.
- The machine must be properly disposed of, because the presence of toxic-harmful materials (batteries, etc.), which are subject to standards that require disposal in special centers (see Scrapping chapter).
- This machine as a cleaning tool only, not for any other purpose use.
- Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow. Do not use the machine if the openings are clogged.
- Use the machine only where a proper lighting is provided.
- This machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge.
- Close attention is necessary when used near children.
- Children should be supervised to ensure that they do not play with the machine.
- While using this machine, take care not to cause damage to people or objects.

MACHINE DESCRIPTION

MAIN COMPONENTS

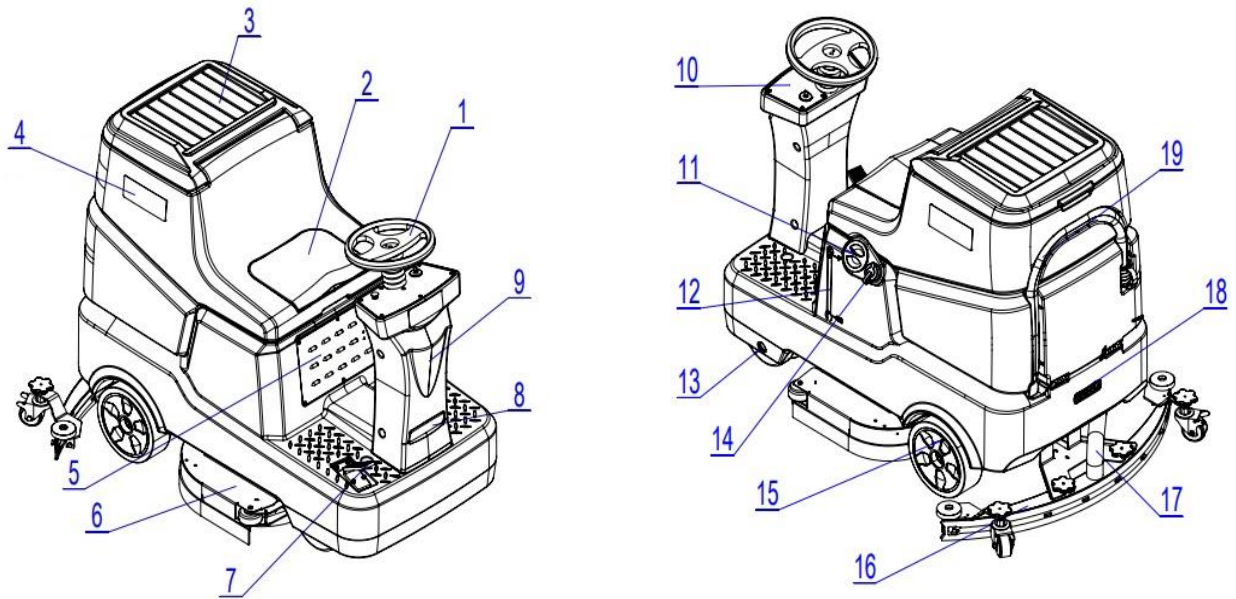


Figure 1

- | | |
|-------------------------------------|---|
| 1. Steering wheel | 11. Solution tank water inlet |
| 2. Seat cushion | 12. Solution tank water level indicator |
| 3. Recovery tank lid | 13. Empty water indicator |
| 4. Recovery tank | 14. Solution tank water filling hose |
| 5. Controller box & charging socket | 15. Rear wheel |
| 6. Brush disk | 16. Squeegee assembly |
| 7. Accelerator pedal | 17. Vacuum hose |
| 8. Front LED lamp | 18. Rear warning lamp |
| 9. Front column | 19. Drain hose |
| 10. Control panel | |

CONTROL PANEL FUNCTION DESCRIPTION (as shown in Figure 2)

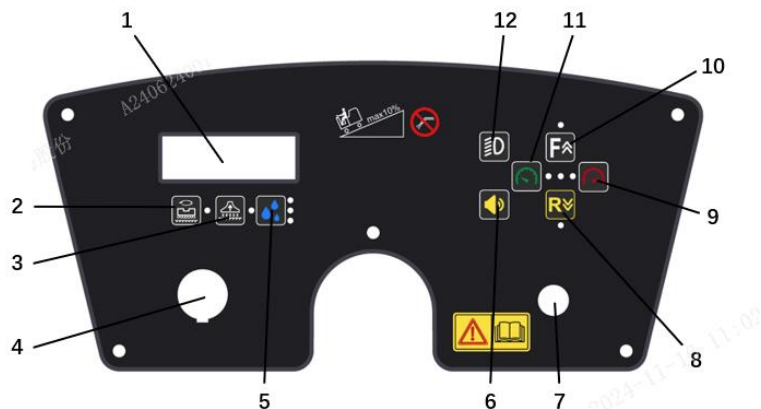
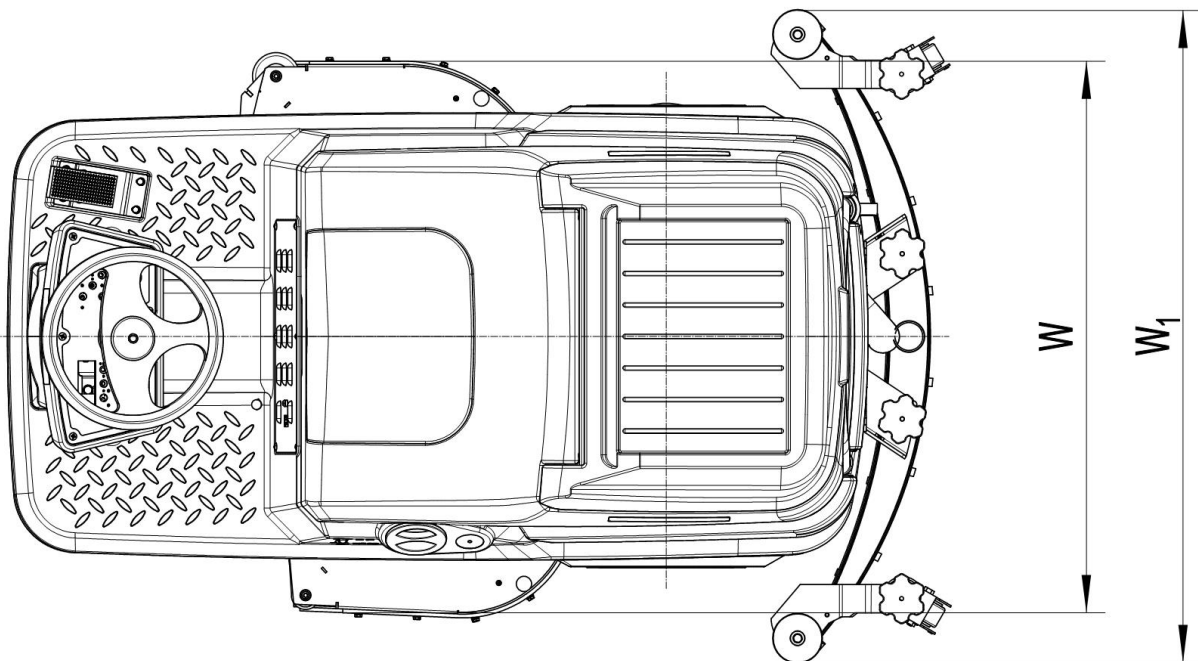
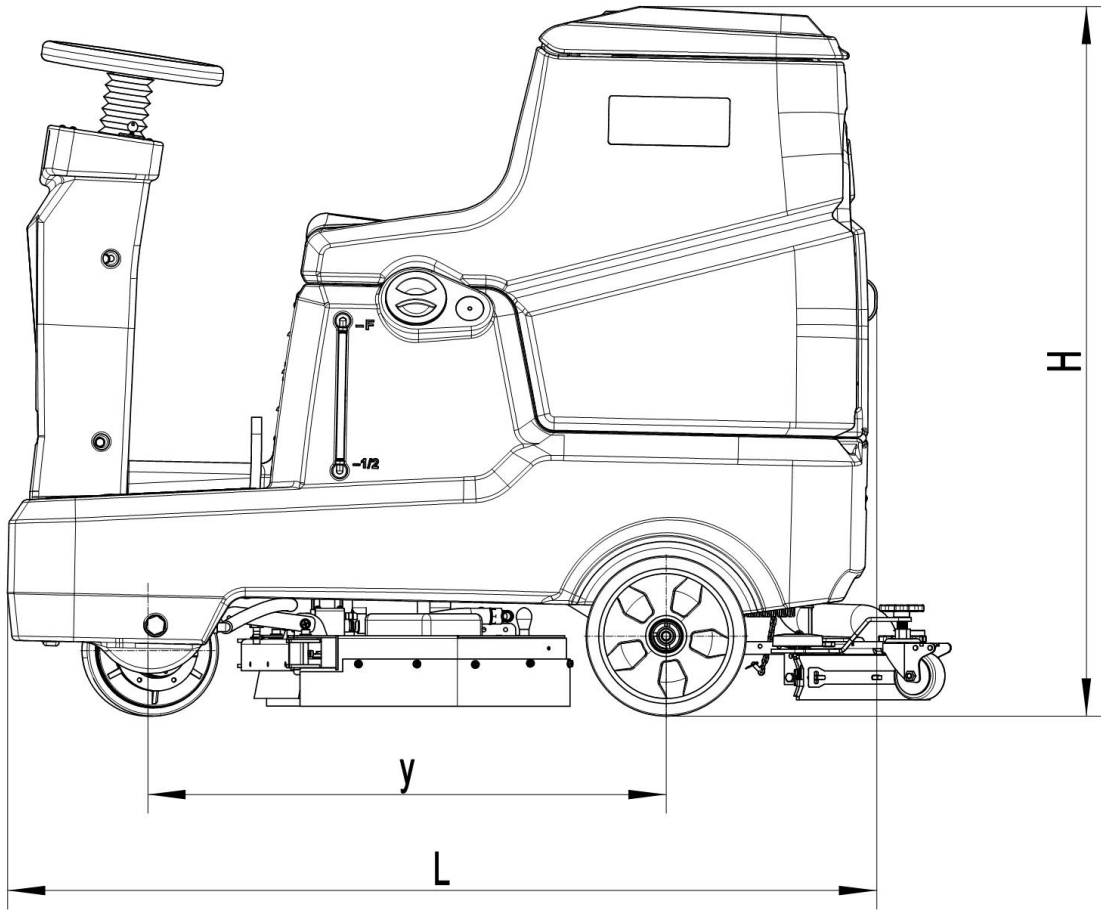


Figure 2

NO.	Description	Function
1	LCD display	Display the functional status of the machine.
2	Brush motor button	Short press the button, the brush disk push rod drops and the brush motor works.
3	Vacuum motor button	Long press the button, perform automatic brush loading.
		Short press the button, lower the squeegee assembly, and vacuum motor works.
4	Key switch	Long press the button to enter ECO energy-saving mode.
5	Solution flow button	Control the main power supply of the machine. Turn the key to "OFF" when charging.
		Short press the button to adjust the amount of liquid, the flow increases step by step.
6	Horn button	Long press the button, perform automatic brush unloading.
7	Emergency button	Press the horn button and a beep will be issued.
8	Backward button	Press the emergency button, the machine stops working.
9	Acceleration button	Press the backward button, step the accelerator pedal, the machine will move backward.
10	Forward Button	Press the button with rabbit symbol to increase the speed, 3 indicator lights on indicate the fastest speed.
11	Deceleration button	Short press the button with turtle symbol to reduce the speed, 1 indicator light on indicate the slowest speed.
12	Front lamp button	Short press the button to turn the front lamp on/off.
		Long press the button to enter the LCD display interface and the working state of the machine can be read.

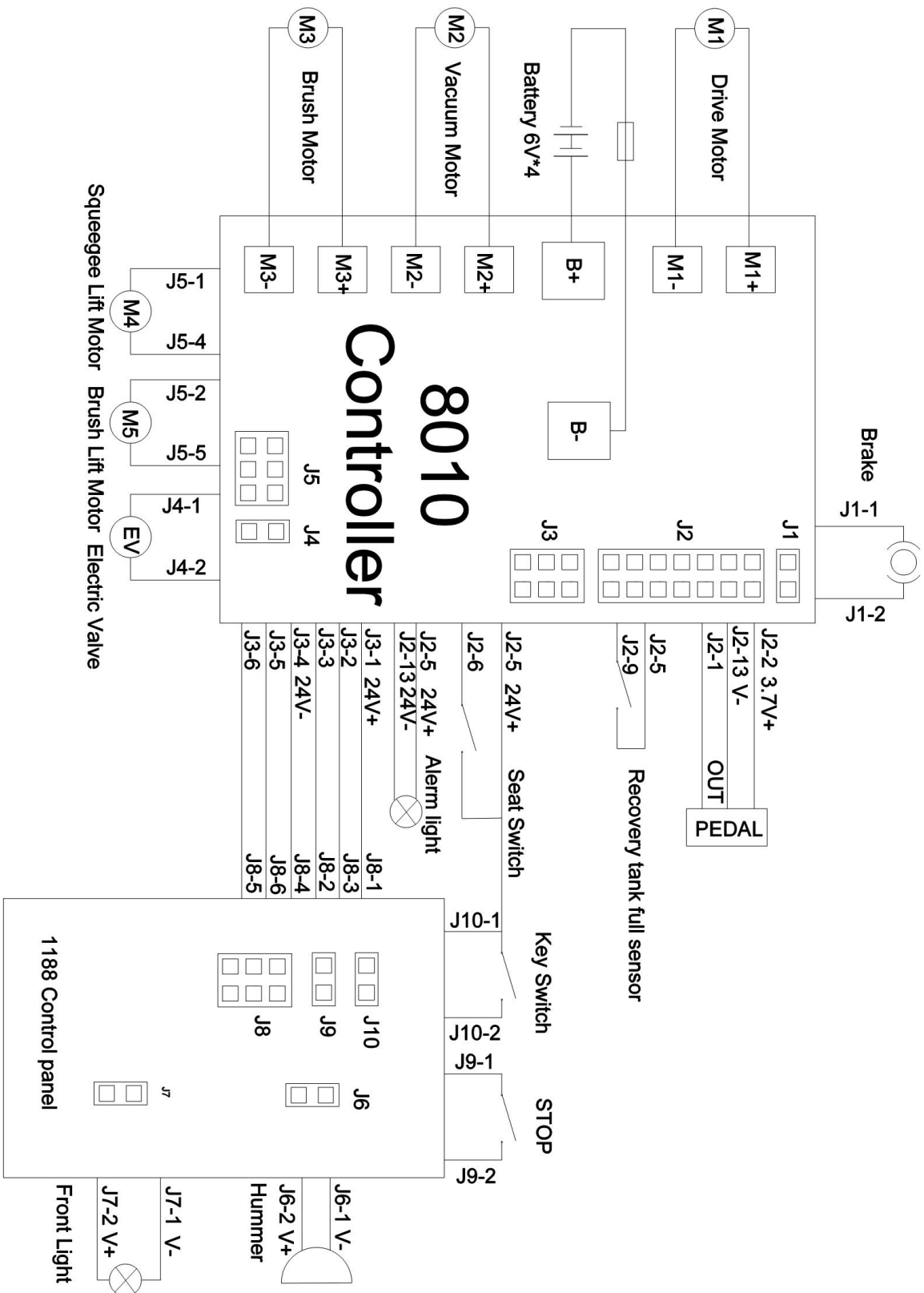
TECHNICAL DATA



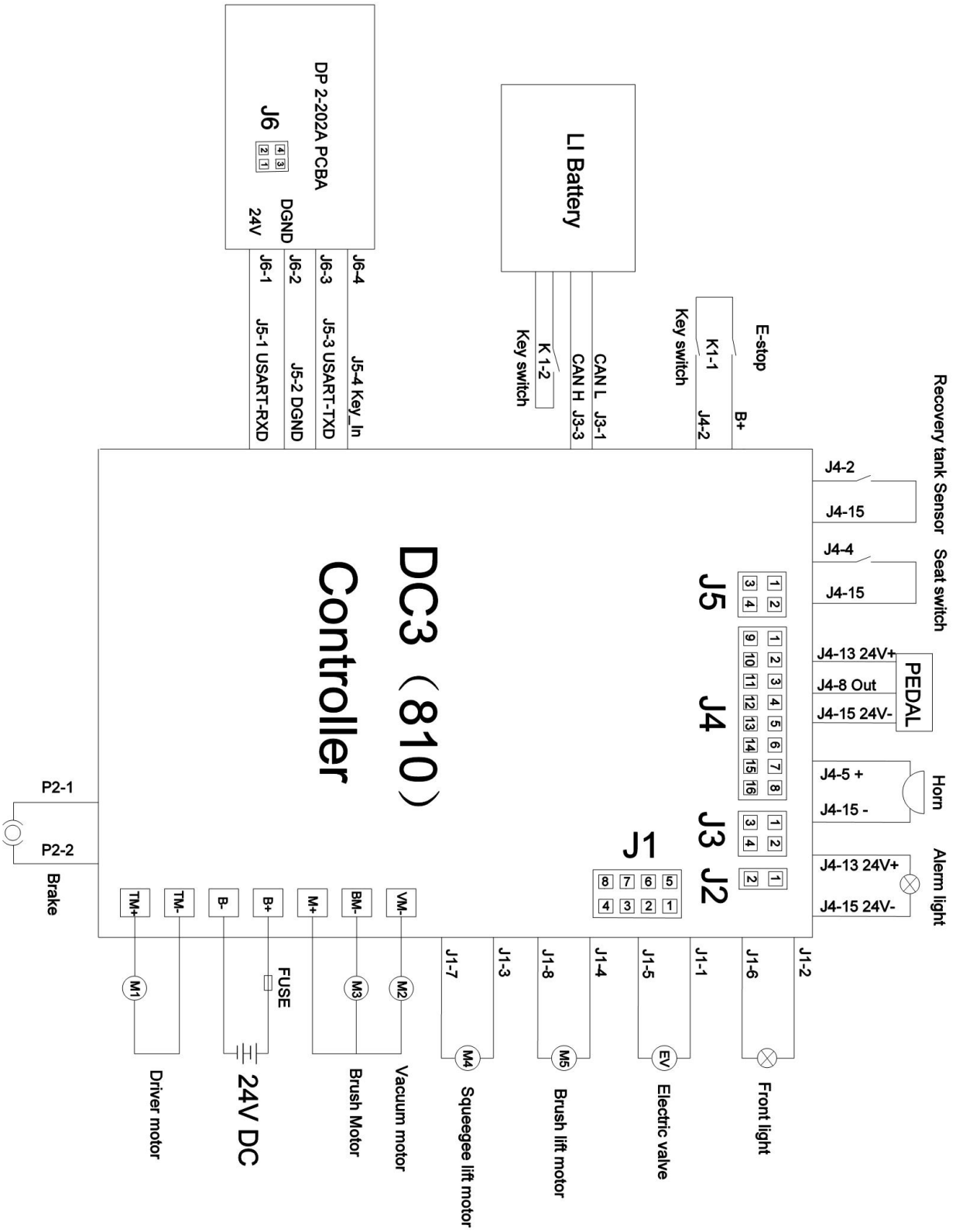
Cleaning vehicle parameter table		
Manufacturer`s type designation		NR810
Drive		Battery
Operator type		Sit down
Wheelbase	y (mm)	820
Service weight (Without battery)	kg	195
Tire size,front	∅ x w (mm)	∅210×70
Tire size,rear	∅ x w (mm)	(∅250×80)*2
Brush/ Pad diameter	∅ x w (mm)	410*2
Length to face of forks	L(mm)	1415
Overall width	W(mm)	890
Squeegee width	W ₁ (mm)	1030
Overall height	H (mm)	1120
Solution tank capacity	L	120
Recovery tank capacity	L	120
Cleaning path	mm	810
Speed	km/h	0~6
Brush speed	Rpm	180
Max. gradeability	%	10
Brush pressure	kg	45
Continuous working time	h	3~4
Clean productivity	m ² /h	4860
Water flow	L/ min	2.5
Service brake		Electromagnetic
Brush motor rated power	W	380*2
Drive motor rated power	W	650
Vacuum motor rated power	W	500
Vacuum capacity	kPa	>15.5
Battery voltage, nominal capacity	V/Ah	24/200 ¹⁾
Battery weight	kg	33.7*4
Battery size (L x W x H) (mm)	mm	260×180×275

Note: 1) The lithium battery capacity is 24V205Ah.

ELECTRICAL WIRING DIAGRAM(Lead-acid battery)



ELECTRICAL WIRING DIAGRAM(Lithium battery)



OPERATION INSTRUCTIONS



WARNING!

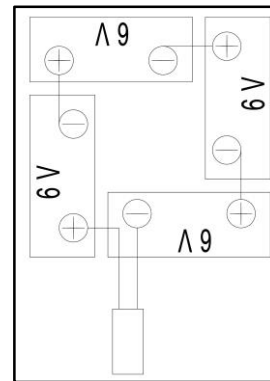
If the battery is installed or wired incorrectly, the electrical components of the machine may be seriously damaged. The battery must be installed by qualified personnel. Equip the machine with correct charger according to the battery. Please check if the battery is damaged before assembling. Disconnect the battery connector and charger plug. Handle the batteries with great care.



NOTE

The machine requires 4pcs 6V200Ah batteries or one 24V lithium battery, please follow the drawing for wiring.

1. Open the recovery tank lid to check if the recovery tank is empty, if not, drain it through the drain hose .
2. Hold the grip under the seat to open the recovery tank till the tank rope is in tension.
3. Carefully and correctly place the battery into the battery compartment. (see picture)
4. Complete the wiring as shown in the right figure. Tighten the lock screw on the battery.
5. Connect the battery with machine through the connector.
6. Hold the grip under the seat to close the recovery tank carefully.



INSTALLING BATTERIES



NOTE

Ensure to hold the grip under the seat when close the recovery tank in case of hand-pinching.

EMERGENCY BRAKING

If there is any emergency during operation, press the emergency button on the control panel, then all functions of machine will stop, nothing will be displayed on the control panel. Press emergency button again to restore the power supply.

INSTALLING AND REMOVING THE DISK BRUSHES/PADS



NOTE

According to the conditions of the floor to choose the appropriate brush disc or pad driver for cleaning.



CAUTION

Before manually installing or uninstalling the brush disc or pad driver, ensure that all switches of the machine are off. Protective gloves must be worn during operation to avoid injury by debris.



NOTE

The machine uses the special clamp for holding the brush disc/ pad driver. The specific installation and uninstallation steps are as follows:

1. Turn the key to the key switch and turn it to "ON" position (the brush disk and squeegee assembly will automatically return to the original position).
2. Open the brush deck apron and insert the brush disk/ pad driver.
3. Short press the "brush motor button". Lower the brush deck and manually adjust the brush disk/pad driver to align with the center of the motor flange.
4. Short press the "brush motor button" to return the brush deck.
5. Long press and hold the "brush motor button" until the brush motor rotates, and the brush disk/pad driver is automatically connected to the motor flange.
6. Long press and hold the "solution flow button" until the brush motor rotates to realize the automatic unloading of the brush disk/pad driver.



WARNING

Do not operate this machine until the brush disk/pad driver is installed.

ATTACHING THE SQUEEGEE ASSEMBLY

1. Turn the key switch (4, Fig. 2) to "ON" position.
2. Press the "vacuum motor button" (3, Fig. 2), the squeegee assembly will be automatically lowered to the ground.
3. Unscrew the two knobs on the squeegee assembly and lock it into the groove on the squeegee holder.
4. Tighten the knobs on the squeegee assembly and connect the vacuum hose (17, Fig. 1) to the squeegee assembly.

FILLING THE SOLUTION TANK

1. Open the fill-port lid in the front of the machine.
2. Fill the cleaning water or suitable detergent with hose. The solution tank water level can be checked by the indicator pipe on the side. When the float ball reaches "F" position, indicating that the solution water tank is full. The temperature of the filling water or detergent shall not exceed +104F (+40°C).
3. Or pull out the solution tank water filling hose on the machine and connect it with the water tap to add

water to the tank. The length of the water hose is 1.5 meters.



NOTE

When the float ball exceeds "F" position, excess water will be spilled from the top of the water level indicator pipe. Avoid the float ball exceeding "F" position when filling water.



WARNING

Use only low-foam and non-flammable detergent, which should be applicable to the scrubber.

START AND STOP OF MACHINE

1. Prepare the machine as shown in previous paragraph. Operator sits on the seat and turn the key switch to "ON" position. If the BDI display 100% of battery charge, it means that the battery is fully charged and available for use. If the BDI displays 10%, the battery needs to be charged. Turn the key switch to "OFF" and charge the battery fully. (See Maintenance Chapter)
2. Press the "brush motor button" and "vacuum motor button", the indicator light will be on, the squeegee and the brush will be automatically lowered to the ground. Brush motor and vacuum motor start running.
3. According to the cleaning demand, the solution liquid flow can be adjusted by operating the "solution flow button" on the control panel, three different flows are available. Three indicator lights on indicates the maximum flow. After the solution water tank is empty, the machine will emit a beeping alarm for adding water. Or visually check the water level indicator pipe on the side of the solution tank. When the float ball reaches the bottom, the water of the solution tank is going to be empty, fill the water accordingly.
4. The speed of the machine can be adjusted through the "tortoise/rabbit button" on the panel. Press the "tortoise button" to decelerate, and press the "rabbit button" to accelerate. Three levels of speed are available. Speed can be adjusted by operating the accelerator pedal, the more force applied on the pedal, the faster machine travels. Reduce the force applied on the accelerator pedal slowly, move the steering wheel and start scrubbing.
5. Press "R" button to move the machine backwards. When the machine moves backwards, the squeegee assembly and brush deck will be automatically lifted and the machine will stop cleaning automatically.
6. In case of sudden crowd or crowded situation, operator can press "horn button" for warning, the machine will issue a "beep" sound.
7. If work in the dark area, press "front lamp button" to turn on the front LED lamp.
8. Press "emergency button" to stop the machine immediately in case of emergency.
9. Release the accelerator pedal to stop the machine.
10. Press the "brush motor button" and "vacuum motor button" again, the indicator light will be off and the squeegee assembly and the brush deck will be automatically lifted. The brush motor shuts down and the vacuum motor shuts down after a few seconds.
11. Make sure to park the machine and turn the key switch to "OFF" position.

**CAUTION!**

To avoid any damage to the floor surface, turn off the brush/pad driver when the machine stops in an area.

**CAUTION!**

Do not use the machine when the battery charge is low, to avoid damaging the batteries and reducing the battery life.

DRAINING TANKS

1. When the recovery tank is full, the sensor of the recovery tank will work, the brush deck and the squeegee assembly will be lifted automatically, and the machine cannot clean the floor.
2. Move the machine to the designated drainage area, restart the machine after draining the recovery tank to empty.
3. Drain the recovery tank through the drain hose, then rinse the recovery tank with clean water.

**WARNING!**

When the recovery tank is full, please stop working immediately to avoid the sewage entering the vacuum motor.

DRAINING THE SOLUTION TANK

Remove the solution tank tap cover under the accelerator pedal to drain the solution tank.

AFTER USE

After working, complete the following steps before leaving the machine:

1. Remove the brush disk/pad driver according to the procedures shown in previous chapter.
2. Drain the solution tank and recovery tank according to the procedures described above.
3. Perform the daily maintenance procedures (see the maintenance chapter).
4. Lift or remove the brush disk/ pad driver and the squeegee assembly, and store the machine in a clean and dry area.

LONG-TERM INACTIVITY

If the machine is not going to be used for more than 30 days, proceed as follows:

1. Perform the procedures shown in chapter of After Use.
2. Disconnect the battery and the machine.

USING THE MACHINE FOR THE FIRST TIME

After using this machine for 8 hours for the first time, check if the fixing and connecting parts of the machine

are loose, and check for visible damage and leakage.

MAINTENANCE



WARNING!

The procedures must be carried out after the machine is turned off and the battery charging cable is disconnected. Moreover, carefully read the instructions of Safety Chapter in this manual before performing any maintenance procedures.

REGULAR MAINTENANCE CHECKLIST



CAUTION!

The check items marked with (1) must be performed when the machine is used for 8 hours for the first time. The check items marked with (2) must be performed by an authorized service center.

Check Item	Daily (after use)	Each week	Semi- -yearly	Each year
Charge the battery				
Clean the squeegee				
Clean the brush/pad				
Clean the solution tank and recovery tank				
Check the seal of tanks				
Check the squeegee, replace if necessary				
Clean the solution tank filter				
Clean the vacuum motor filter				
Check if all screws and nuts are tightened			1	
Check the brush/ pad driver, replace if necessary				2
Check the carbon brush of vacuum motor, replace if necessary				2
Check the carbon brush of drive motor, replace if necessary				2

CHARGING THE BATTERY



NOTE

Charge the battery when the state of battery charge displayed on the LCD screen shows less than or equal to two notches, or charge the battery

after every use.



CAUTION

Keep the battery fully charged to extend the service life of the battery.



CAUTION

Charge the battery as soon as possible when the battery is low, otherwise the service life of the battery will be reduced. Check the battery charge at least once a week.

1. Move the machine to designated charging area.
2. According to the type of the battery, choose the appropriate charger for charging.
3. Connect the charger connector to the socket under the seat of the machine, and then connect the charger plug to the power supply.
4. After charging the battery, disconnect the charger plug from the power supply, and then disconnect the connector from the machine.

CLEANING THE DISK BRUSH/ PAD



CAUTION!

Wear protective gloves when cleaning the brush/pad in case of the injury caused by the sharp debris.

1. Remove the brush disk/ pad driver from the machine, as shown in the previous chapter.
2. Clean the brush disk (pad driver) and brush (pad) with cleaning solution and water.
3. Check the condition of the brush/pad for wear, and replace it if necessary.

CLEANING THE SOLUTION FILTER

1. Turn off the water tap of the solution tank.
2. Remove the filter cover and clean the filter, then fit it back in place.
3. Turn on the water tap of the solution tank and check if the filter is properly installed without leakage.

CLEANING AND STORING THE SQUEEGEE



NOTE

The squeegee must be clean and its blades must be in good conditions in order to have better scrubbing performance.



CAUTION

It is advisable to wear protective gloves when cleaning the squeegee in case of the injury caused by the sharp debris.

1. Loosen the knobs on the squeegee assembly and remove the vacuum hose from the squeegee.
2. Clean the aluminum squeegee bracket and the vacuum hose. Check the front blade and the rear blade for integrity, cuts and tears; replace them if necessary.
3. Assemble the squeegee in the reverse order of disassembly.

CHECKING AND REPLACING THE SQUEEGEE BLADE

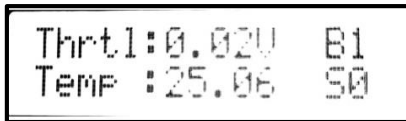
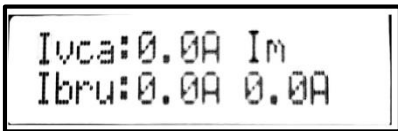
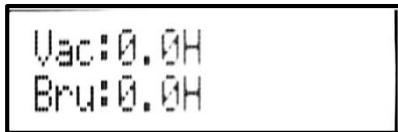
1. Check the front blade (C) and the rear blade (D) for integrity, cuts and tears; if the bottom edge (E) of the front blade (C) or the bottom edge (F) of the rear blade (D) is worn while the top edge (the other edge) is intact, turn it upside down. If the top edge is also worn, replace the blade according to the following procedures:
2. Loosen the knob (I) and remove the lock block (L) from aluminum bracket, then replace the front blade (C)/ rear blade (D) or turn the blade upside down. Assemble the front blade (C)/ rear blade (D) in the reverse order of removal.

CLEANING THE RECOVERY TANK AND CHECKING THE SEAL

1. Drain the recovery tank by the drain hose.
2. Open the recovery tank and remove the recovery tank lid, then rinse the recovery tank lid and recovery tank with clean water.
3. Check whether the bearing surface of the seal of the recovery tank is intact and sealed, remove the sealing from the groove of the tank and replace if necessary.
4. Fit the recovery tank lid in place.

WORKING DATA ACCESS

Long press the "front lamp button" to enter the LCD interface, working data of the machine can be read. There are four interfaces in total.



LCD Display	Description
ECO	Energy saving mode: 0 for off, 1 for on
F	Brush deck push rod motor state, 1-3 is down, 4-6 is up.
B	Squeegee system push rod motor state, 1-3 is down, 4-6 is up.
Pwr	The battery voltage value, above is the 10 stages of power display.
Vac	Total working time of vacuum motor.
Bru	Total working time of brush motor.
Ivca	Real-time working current of vacuum motor
Ibru	Real-time working current of brush motor
Thrt1	Accelerator input value
Temp	Controller temperature
B0/B1	The electromagnetic brake of drive motor is disconnected/connected
S0/S1	Seat switch close/open

TROUBLE SHOOTING

Trouble	Possible Cause	Remedy
The machine doesn't work and the LCD display doesn't light up	Battery connector is disconnected	Connect the battery connector
	Battery is completely discharged	Charge the battery
The machine doesn't work, and the battery charge is displayed at 10%	Low battery	Charge the battery
The machine cannot go-forwards/ backwards	Control circuit board failure	Replace the control circuit board
	Operator is not on the seat or seat switch is defective	Sit on the seat or replace seat switch
	Accelerator pedal is unconnected or damaged	Check the cable or replace the accelerator pedal
The brush motor doesn't work	Control circuit board failure	Replace the control circuit board
	Brush motor overload	Replace the brush disc with soft brush to be applicable to the floor being cleaned
	Brush motor carbon brush is worn out	Contact after-sales service
	Obstacles prevent the brush rotating	Clean the brush holder
The vacuum motor doesn't work	Vacuum motor damage	Check and replace vacuum motor
	Control circuit board failure	Replace the control circuit board
Insufficient suction, sewage cannot be sucked in	Recovery tank is full	Empty the recovery tank
	Drain hose and squeegee are not well-connected	Connect the drain hose and squeegee correctly
	Squeegee is dirty or worn	Check and clean the squeegee
	Recovery tank lid is not closed properly, or the seal is damaged, or the hose is clogged	Close the lid correctly, or replace the seal or clean the hose.
	Recovery tank is dirty	Clean the recovery tank
Insufficient solution supply to brush disk	Solution filter is dirty	Clean the filter
	Dirty solution tank or a clogged pipeline	Clean the solution tank and pipeline
Squeegee leaves scratch on the floor	There are debris under the squeegee blade	Remove the debris
	Squeegee blade is worn, cracked, brittle	Replace the squeegee blades

LCD DISPLAY FAULT CODE

Machine (lead-acid battery) fault description:

Fault Code	Possible Cause	Remedy
Keyoff longer	Power-on-off interval is too short	After shutting down, wait 3 seconds before turning the machine on
Low battery	Low voltage	1. Charge the battery. 2. Check the voltage detection circuit of the controller.
Traction error	Drive motor wire connection open	Check if the drive motor and electromagnetic brake are normal.
High temperature	Controller temperature is too high.	1. Whether the machine has been overloaded and climbing continuously for a long time. 2. Whether the motor is overloaded because the machine has cleaned the extremely rough roads for a long time. 3. Whether the controller installation position is well ventilated or other heat sources are there. 4. Check the temperature detection circuit of the controller.
Brush overcurr	Brush motor current is too high.	1. Check if the machine has been working on extremely rough roads for a long time. 2. Check the brush motor.
Vacuum overcurr	Vacuum motor current is too high.	Check the vacuum motor.
Vacuum open	Vacuum motor wire connection open	The vacuum motor is faulty or the connection is disconnected.
Brush open	Drive motor wire connection open	The brush motor is faulty or the connection is disconnected.
Fjmk overcurr	Brush deck push rod motor over current	1. Check whether the machine is blocked 2. Check the brush deck push rod motor.
Bjmk overcurr	Squeegee assembly push rod motor over current	1. Check whether the machine is blocked . 2. Check the squeegee lifting push rod motor.
Prechange error	Charge failure	1. The battery voltage is low. 2. Check the controller.
Pedal error	Accelerator pedal release issue	1. Step on the accelerator pedal when the key switch is turned on. 2. Check whether the input voltage of the pedal is normal, check the wiring of the J2 of pedal. 3. Check the wiring of J3 to J8.
Drive open	Drive motor wire connection open	Check the drive motor and related wiring.

Drive overcurr	Drive motor current is too high.	Check the drive motor and electromagnetic brake.
Brake open	Electromagnetic brake open circuit	Check the electromagnetic brake position and coil resistance.
Solution Tank E	Solution tank is empty	Fill the solution tank before working
Recovery Tank F	Recovery tank is full	Empty the recovery tank before working
No LCD display	LCD display is broken.	Replace the panel.
No battery charge notches and F6B6 on LCD display, and voltage displays 0 after booting	1. The controller is not powered on.	1. Check if there is voltage on the 5th pin of J2 of the controller;
	2. The signal cable between the controller and the panel is not connected.	2. Check whether the connection cable between J3 of controller and J8 of panel is connected.
LCD display voltage is 0 after booting	Communication between the drive circuit of the controller and control panel is not established.	Check whether the 5th and 6th pins of the controller J3 are connected to the J8 of panel.
The LCD does not display the battery charge notches after power on	Communication between the vacuum circuit of the controller and control panel is not established.	1. Check if the 3rd and 4th pins of controller J3 are connected to the panel. 2. Turn off the machine and restart.

Machine (lithium battery) fault description:

LED Display	Fault Code	Possible Cause	Remedy
Low battery	E04、 E14、 E16	1. The PVDD1 undervoltage is faulty 2. The battery undervoltage is faulty 3. The battery voltage limit is low	1. Charge 2. Check the voltage detection loop of the controller
Traction error	E41、 E42、 E43、 E44、 E64、 E65	1. The MOS voltage of the traveling motor is high 2. The MOS low voltage of the traveling motor is faulty 3. MOS short-circuit fault of traveling motor	Check whether the traveling motor and electromagnetic brake are normal
High temperature	E34、 E35、 E36 E37、 E38、 E39、 E40	1. The throttle connection is faulty 2. The high pedal cannot be faulty	1. Whether the slope is continuously overloaded for a long time 2. Whether the motor is overloaded by cleaning the very rough road surface for a long time 3. Check whether the controller installation position is well ventilated and whether other heat sources enter 4. Check the temperature detection loop of the controller
Brush overcurr	E69	Brush motor overload fault	1. Check if you work on very rough roads for a long time 2. Check the brush motor
Vacuum overcurr	E71	Vacuum motor overload fault	Check Vacuum motor
Vacuum open	6A	Vacuum motor open circuit fault	The Vacuum motor is faulty or disconnected
Brush open	67	Brush motor open circuit fault	The brushing motor is faulty or disconnected
Fjmk overcurr	74	Brush lifting motor overload fault	1. Check whether the machine is blocked 2. Check brush lifting motor
BLiftM Open	72	Brush lifting motor open circuit fault	1. Check cable connections 2. Check brush lifting motor
BLiftM Short	73	Brush lifting motor short circuit fault	1. Check cable connections 2. Check brush lifting motor
Bjmk overcurr	77	Squeegee lifting motor overload fault	1. Check whether the machine is blocked 2. Check squeegee lifting motor
VLiftM Open	75	Squeegee lifting motor open	1. Check cable connections

		circuit fault	2. Check squeegee lifting motor
VLiftM Short	76	Squeegee lifting motor short circuit fault	1. Check cable connections 2. Check squeegee lifting motor
Prechange error	01	Precharge fault	1. The battery voltage is low 2. Check the controller
Pedal error	99/A1	1. The throttle connection is faulty 2. The high pedal cannot be faulty	1. Put your foot on the gas pedal while the key is open 2. Check whether the input voltage of the pedal is normal, and check the cable connection to the pedal
Drive open	66	Drive motor overload fault	Check the traveling motor and related wiring
Drive overcurr	63	Drive motor open circuit fault	Check the travelling motor and electromagnetic brake
Brake open	8A	Electromagnetic brake open circuit fault	Check electromagnetic brake position and coil resistance
High battery	03/15/17	1. The PVDD1 overvoltage is faulty 2. The battery overvoltage is faulty	Check P2-1 and battery voltage
12V-CPU-VHigh	07	12V- The CPU overvoltage is faulty	Internal controller fault
12V-CPU-VLow	08	12V- The CPU undervoltage is faulty	Internal controller fault
KeyIn_VHigh	12	Key switch overvoltage fault	P4-14/13 voltage is higher than 34V
KeyIn_VLow	13	The key switch undervoltage fault	The P4-14/13 voltage is lower than 12V
UART_VHigh	25	The UART overvoltage is faulty. Procedure	Internal controller fault
UART_VLow	26	The UART undervoltage is faulty. Procedure	Internal controller fault
Relay1 Error	29	Relay 1 connection is faulty	Short circuit of traveling motor or short circuit of electromagnetic brake to ground
TM-A NTC Err	30	The A-phase NTC of traveling motor is faulty	Internal controller fault
TM-B NTC Err	31	The B-phase NTC of traveling motor is faulty	Internal controller fault
BM NTC Err	32	Brush motor NTC fault	Internal controller fault
VM NTC Err	33	Vacuum motor NTC fault	Internal controller fault
BM-MOS VHigh	45	Brush motor MOS voltage high fault	Internal controller fault

BM-MOS VLow	46	Brush motor MOS low voltage fault	Remove the brush motor from the controller and restart it. If the fault disappears, check whether the brush motor is short circuit to the ground. If the fault persists, the controller is faulty
VM-MOSVHigh	47	Vacuum motor MOS voltage high fault	Internal controller fault
VM-MOS VLow	48	Vacuum motor MOS low voltage fault	Remove the Vacuum motor from the controller and restart it. If the fault disappears, check whether the suction motor is short circuit to the ground. If the fault persists, the controller is faulty
BM Short	68	Brush motor short circuit fault	Brush motor short circuit, restart to check whether the fault disappeared. If it occurs every time you run, check whether the motor is damaged or there is a short circuit to the outside
VM Short	70	Vacuum motor short circuit fault	The Vacuum motor is short circuited, restart to check whether the fault disappears. If it occurs every time you run, check whether the motor is damaged or there is a short circuit to the outside
P1-5 Open	86	Output point 1 (P1-5) solenoid valve open circuit fault.	1. Remove the output point and measure whether the output point is disconnected 2, check whether the wiring is correct, whether there is a broken line in the middle
P1-5 Short	87	Output point 1 (P1-5) solenoid valve short circuit fault.	1, check whether the output point between the two wires short circuit, the resistance is very small 2. Check whether the output point is short-circuited to B- or B+
P1-6 Open	88	Output point 2 (P1-6) Headlight open circuit fault.	1. Remove the output point and measure whether the output point is disconnected 2, check whether the wiring is correct, whether there is a broken line in the middle
P1-6 Short	89	Output point 2 (P1-6) Headlight short circuit fault.	1, check whether the output point between the two wires short circuit,

			the resistance is very small 2. Check whether the output point is short-circuited to B- or B+
Brake Short	90	Electromagnetic brake short circuit fault.	1. Check whether there is a short circuit between the two wires of the electromagnetic brake and the resistance is very small 2. Check whether the electromagnetic brake is short circuited to B- or B+
P4-5 Open	91	Output point 4 (P4-5) speaker open circuit fault.	1. Remove the output point and measure whether the output point is disconnected 2, check whether the wiring is correct, whether there is a broken line in the middle
P4-5 Short	92	Output point 4 (P4-5) speaker short circuit fault.	1, check whether the output point between the two wires short circuit, the resistance is very small 2. Check whether the output point is short-circuited to B- or B+
BM VLow	A2	Brush function low voltage fault	The battery voltage is lower than the set brush protection voltage. Refer to the battery type to determine the protection voltage value
VM VLow	A3	Vacuum function low voltage fault	The battery voltage is lower than the set suction protection voltage. Determine the protection voltage value by referring to the battery type
SysTime Save Err	A4	The system time store is faulty	Internal controller fault
Param Save Err	A5	Parameter storage failure	Internal controller fault
SysData Save Err	A6	The system information storage is faulty	Internal controller fault
PCF Save Err	A7	The PFC file storage is faulty. Procedure	Internal controller fault
Program Err	A8	Program file failure	Internal controller fault
EM-Stop Err	A9	Emergency stop fault	The battery is overcharged. Procedure
Reverse Lock Err	AA	Reverse lock failure	Internal controller fault
Communicate Err	FF	Communication failure	
Battery Error CAN Timeout		The lithium battery communication is faulty	



CAUTION!

When there is a fault alarm, please turn off the power and wait 5 seconds before restarting.

SCRAPPING AND DISPOSING

1. Have the machine scrapped by a qualified disposal institution.
2. Before scrapping the machine, remove and separate the following materials, which must be properly disposed of according to relevant laws and regulations:
 - Battery
 - Brush disk/pad driver
 - Plastic hoses and plastic components
 - Electrical and electronic components (*)

LITHIUM BATTERY



Temperature range for using the battery is from +5°C to +40°C. Low temperatures reduce the effective battery capacity, high temperatures reduce the battery's life time. The temperature difference between the two sides of the battery shall not exceed 5°C.

Only approved battery chargers must be used to charge the lithium battery.

Do not try to make any repairs or servicing of lithium batteries. Replacement of parts is not assumed.



Risk of electric shock and burning

The battery's charging and discharging connectors have open terminals, avoid any body contacts, contamination or direct contacts with objects which can cause short circuit connection of terminals. Use necessary pre-cautions and protective caps to secure the open terminals. The connectors should be maintained in clean and dry conditions.



Use only batteries designed and approved by the manufacturer for the truck.

Do not try to modify or alter the battery.



Any damage or defects to the charger can result in accidents. Use only charger approved by the manufacturer of the truck, which is suitable for used battery.

In case charger has any damages or defects, exclude the charger from operation and contact your service provider. Do not modify or try to repair the charger.



Improper use of charger or use of wrong charger can cause damages to a battery or charger. Follow the required charger specifications; If the operation voltage of the charger is out of the applicable voltage range, the charger or battery may be damaged causing serious safety risks. The charger in use must be approved by the battery (truck) manufacturer.

Reversed connection of charging plug is prohibited. Follow the instruction for correct connection. For disconnection of charging plug use dedicated grip and never pull out the plug by means of cable.

Stop charging immediately if any abnormalities are detected, e.g. severe temperature increase, deformation of battery case, smoke, noise etc.



Intermediate charging

Lithium batteries support so called opportunity charging. The lithium battery, which is not fully discharged can be charged in any time. However, frequent opportunity charging not to the full charging state and stop of charging process before the appearance of corresponding indication of charger may result in dis-balance voltage of cells which increases the battery BMS calculation error. In order to effectively deal with this phenomenon, charge the battery in full allowing the automotive balancing process to be completed at least once a week.



Do not charge a fully charged battery

Note that in order to prevent the battery from continuing restart of charging under fully charged condition causing reduction of battery lifetime, the BMS has a protection function that prohibits recharging of fully charged battery.

Potential hazards

If equipment is used according to its design purpose, following the correct operations procedures, there are no hazards anticipated.

The following hazards can arise in the event of improper use:

- Physical damage to the battery in case a battery falls or is deformed through impacts. Mechanical damages can cause leakages of harmful materials, fire or battery explosion.
- Short circuits may be caused by short connection of battery terminals, for instance, by water or other intentional/unintentional short connections.
- Temperature damages caused by placing of batteries in overheated environment conditions or being exposed to impact of fire, open sunlight etc. can cause leakages of harmful materials, fire or battery explosion.





In order to avoid fire, explosion and/or leakage of harmful materials, a safe place for storing non-functional or damaged batteries until the service arrives on site must satisfy the following criteria:

- Do not store in places where personnel is located.
- Do not store in places with valuable objects and close to valuable objects.
- A Class D fire extinguisher must be available on demand.
- There should not be any fire or smoke detectors in the storage area in order to ensure that an automatic fire detection system is only activated in the event of actual danger (e.g. flames).
- No ventilation intake pipes should be in the facility to exclude spreading of discharged content within a building.

Examples of where to store a non-functional battery:

- Roofed outdoor position.
- Ventilated container.
- Covered fire resistant box with pressure and smoke discharge option.

Symbols - Safety and Warnings

	<p>Used lithium-ion batteries must be treated as hazardous waste. Lithium-ion batteries marked with the recycling symbol and the sign showing a crossed-out waste bin must not be disposed of with ordinary household waste.</p>
	<p>Avoid fire and short circuits causing overheating. Do not ignite or locate batteries close to open flame, heat sources or sparks. Keep lithium-ion batteries away from heat sources.</p>
	<p>Caution! Battery short-circuit is prohibited.</p>
	<p>Protect the lithium-ion battery from solar radiation or other forms of heat radiation. Do not expose the lithium-ion battery to heat sources.</p>

Explosion and fire hazard



Physical damage, thermal impacts or incorrect storage in the event of a defect can result in explosions or fire. The battery materials can be flammable.

Particular hazard from combustion products

The lithium batteries may be damaged by a fire. When extinguishing a lithium battery fire, the following information must be taken into consideration.



Contact with combustion products can be hazardous

Fire produces combustion products, which can occur in the form of smoke, through leaking fluids, escaping gases, debris as well decomposition products of certain chemicals. These combustion products are substances that enter the body through the respiratory tract and/or the skin, can produce and adverse effects such as choking.



- **Avoid contact with combustion products.**
- **Use protective equipment.**

Special firefighting protective equipment

Use self-contained breathing apparatus.

Wear protective equipment.

Additional firefighting instructions

To prevent secondary fires, the lithium-ion battery must be cooled from the outside.

Suitable extinguishing agents

- Carbon dioxide extinguisher (CO₂)
- Water (not on mechanically opened or damaged batteries) •

Unsuitable extinguishing agents

- Foam
- Grease fire extinguishing agents
- Powder extinguishers
- Metal fire extinguishers (PM 12i extinguishers)
- Metal fire powder PL-9/78 (DIN EN 3SP-44/95)
- Dry sand

Instructions for cooling an overheated, non-physically damaged battery

This type of damage may be caused by a short circuit inside the battery, which may result in leakage of harmful materials, fire or battery explosion.

Material discharge

Battery electrolyte fluid can be hazardous

Electrolyte fluid can be discharged if the battery is physically damaged. Avoid its contact with skin or eyes. If the contact happened:



- Rinse the affected parts with big amount of water and request for medical assistance immediately.
- In case of skin irritation or if any substances are breathed in request the medical assistance

immediately.

Precautionary measures for personnel

- Keep personnel away, avoid any contact with smoke or discharged materials.
- Block off the affected area and ensure its reasonable ventilation.
- Wear personal protective equipment. If vapors, dust or aerosols are presented use self-contained breathing apparatus.

Precautionary measures for the environment

Do not allow spilled fluids to enter the water system, drainage system or the underground water.

Cleaning measures

The leaked fluid must be removed professionally following the related protocols.

Battery lifetime, maintenance and storage

The lithium-ion batteries are maintenance-free.

Deep discharge can damage the battery

Self-discharge without periodical recharge can lead the battery to fully discharged state. Full discharge shortens the service life of the battery and can cause deep discharge and activation of related safety protocols when battery will not be able to be charged anymore.

Before a long period of inactivity, the battery must be charged to 40%~60%.

Control the level of battery charge at least every 12 weeks and re-charge if necessary.

The temperature range for storing of the battery should be within the range of 0°C to 30°C.

If the battery is deeply discharged or if the battery temperature is below the permissible level, the battery cannot be charged. Deeply discharged batteries can never be charged. Due to the risk of condensate formation, batteries that have been stored at 0°C or below must only be charged after natural warming up to at least +5°C, forced heating is forbidden.

Instructions for safe handling of batteries

- Do not modify the battery.
- Do not open, damage, drop, penetrate or deform the battery.
- Do not throw the battery into a fire.
- Protect the battery from overheating.
- Protect the battery from direct sun light.
- Follow storage and charging procedures
- Protect the battery from water damages and other impacts

Failure to comply with these safety instructions can result in fire and explosion or the leakage of harmful materials.

Pre-shift checks before the system is put into operation

Check that the battery is in its normal condition, has no evidence of damages, leakages, abnormal findings, e.g. high temperature, smell, smoke etc. The surface of the battery should be clean and dry, without evidence of water damages, marks of rust on terminals and housing (if applicable). Connecting cables and plugs are in good condition.

Faults

If any damage is found to the battery or battery charger contact the service provider immediately.



Do not open the battery or attempt to repair it.

Disposal and transport of a lithium-ion battery

Instructions for disposal

Lithium-ion batteries must be disposed in accordance with the relevant national environmental protection regulations. Batteries must be treated as hazardous waste. Batteries must not be disposed with ordinary waste.

Shipping information

The lithium-ion battery is a hazardous material. The applicable regulations must be fulfilled during transportation.

Shipping functional batteries

Functioning batteries can be shipped in accordance with the related regulations

Shipping faulty batteries

To transport faulty lithium-ion batteries, contact the service provider. Faulty lithium batteries require following of special transporting procedures.