

# Operator Manual

## NR530 Rider Scrubber



### **WARNING**



Do not operate the rider scrubber before reading and understanding the operator manual.

### **NOTE:**

- Please check product type and parameters of your scrubber in this manual as well as on the ID-plate.
- Keep this operator manual for future reference.

Version 12/2024

NR530-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 THE 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 with 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.

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## INTENDED USE

- This floor 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.

## TRANSPORTING 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.

### SAFETY SYMBOLS



#### WARNING!

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



#### DANGER!

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



#### WARNING!

It indicates a potential hazard that may cause people injury and objects damage.



#### 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 INSTRUCTIONS

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 the instructions of this manual.
- Before performing any procedures of cleaning, maintenance, repair or replacement, read all the instructions carefully, and ensure to turn off the machine 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 safety support.
- Lead-acid battery may emit inflammable gas under normal use, must keep the battery away from sparks, flames, smokes and radiating, illuminating and burning objects.
- During charging, lead-acid battery may emit hydrogen gas which may cause explosion. Must keep the charging environment well-ventilated and away from naked flames.



### WARNING!

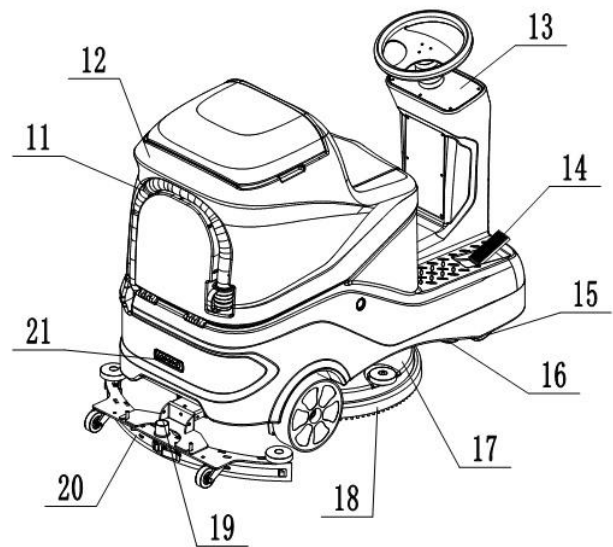
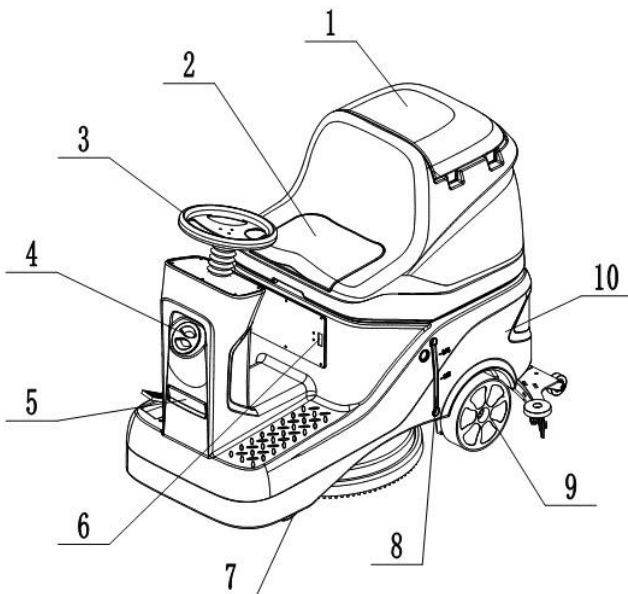
- Check the machine carefully before each use to ensure that all parts of the machine are installed correctly, otherwise it may cause harm to people or property.
- Please check if the values of voltage and frequency indicated on the serial number label match with the main power before using the charger.
- Do not move the machine by pulling the charger cable, do not let the cable pass through a closed door, or wind with sharp edges or angles, and do not let the machine run over the cord. Keep the battery charger cable away from heated surfaces.
- In order to avoid fire, electric shock or personnel injury, make sure that the machine is off before leaving.
- This machine is not intended for outdoor use, it is only suitable for indoor use, please store the machine in a dry indoor environment when not in use.
- The storage temperature and working ambient temperature of the machine must be between 0-40°C (32°F~104°F). The humidity must be between 30%-95%.
- Do not use the machine on a ramp that exceeds the specified slope.
- When using and handling floor cleaning detergents, follow the instructions on the labels of the detergent container and wear suitable gloves for protection.

- 
- Please use the brush disk and pad driver provided with the machine and the parts specified in the user manual. Other brush disk and pad driver use may 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 avoid the dangers of hair, jewelry and loose clothes that may be caught by the moving parts of the machine.
  - Do not use the machine in particularly dusty areas.
  - Do not rinse the machine directly with water, pressured water jets or corrosive substances.
  - Avoid collision with surrounding objects when using the machine, especially when the collision may cause the danger of falling objects.
  - For stationary machine, stop the working brush/ pad driver to avoid damage to the ground.
  - In case of fire, use a dry powder fire extinguisher. Do not use liquid fire extinguishers.
  - Do not remove or modify the stickers on the machine.
  - Do not tamper with the safety protection of the machine or disobey the maintenance instructions.
  - Pay attention to the transportation when temperature is below 0°C (32°F). The water in the recovery tank and hoses may freeze and cause serious damage to the machine.
  - If spare parts need be replaced, order ORIGINAL spare parts from an Authorized Dealer or Agency.
  - Send the machine to the service center if it cannot work normally due to damage, being placed outdoors or being dropped into the water.
  - To ensure proper and safe operation of the machine, the regular maintenance shown in the relevant chapter of this manual must be performed by the authorized personnel or an authorized service center.
  - This machine must be properly disposed because of the toxic and hazardous materials (batteries, etc.) that must be disposed by a specific center in accordance with relevant regulations (see the chapter for disposal and scrapping).
  - This machine can only be used as a cleaning tool, any other purpose use is not allowed.
  - Keep the working area unobstructed and do not use the machine in blocked aisle. Remove dust, hair and any objects that may obstruct the air circulation from the aisles.
  - Use the machine in a well-lit area.
  - This machine can only be used by properly trained or authorized personnel. Children or unsuitable people cannot use this machine.  
Close attention is necessary when operate the machine nearby children. Ensure that children do not play with the machine to avoid injury.
  - When using the machine, please be careful not to injure people or objects around.
  - Avoid damage to people or objects when using the machine.

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## MACHINE SETUP

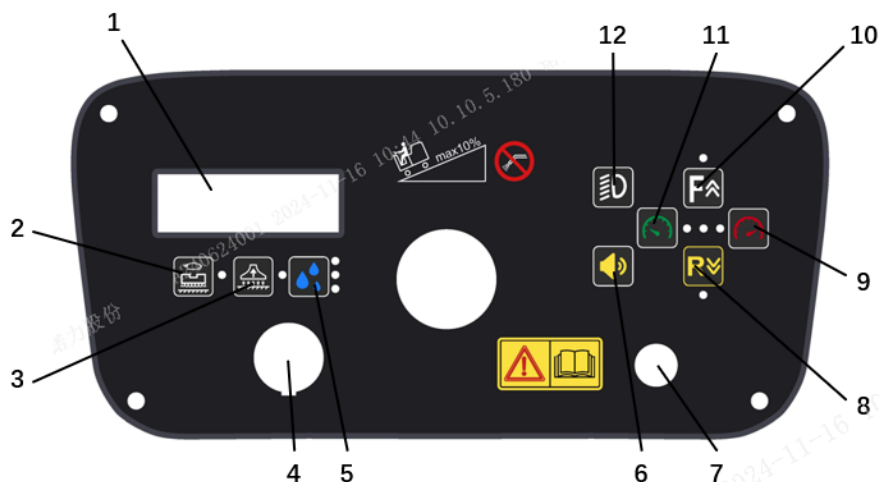
### MAIN COMPONENTS



1. Recovery tank lid
2. Seat
3. Steering wheel
4. Fill-port lid
5. Front lamp
6. Charging socket
7. Filter
8. Liquid level hose
9. Rear wheel
10. Solution tank level hose
11. Drain hose

12. Recovery tank
13. Control panel
14. Accelerator pedal
15. Drive unit
16. Solution tank drain valve
17. Brush deck
18. Brush disk/ Pad driver
19. Vacuum hose
20. Squeegee assembly
21. Warning lamp

## CONTROL PANEL



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.
		Long press the button, perform automatic brush loading.
3	Vacuum motor button	Short press the button, lower the squeegee assembly, and vacuum motor works.
		Long press the button to enter ECO energy-saving mode.
4	Key switch	Control the main power supply of the machine. Turn the key to "OFF" when charging.
5	Solution flow button	Short press the button to adjust the amount of liquid, the flow increases step by step.
		Long press the button, perform automatic brush unloading.
6	Horn button	Press the horn button and a beep will be issued.
7	Emergency button	Press the emergency button, the machine stops working.
8	Backward button	Press the backward button, step the accelerator pedal, the machine will move backward.
9	Acceleration button	Press the button with rabbit symbol to increase the speed, 3 indicator lights on indicate the fastest speed.
10	Forward Button	Press the forward button, step the accelerator pedal, the machine will move forward.
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.

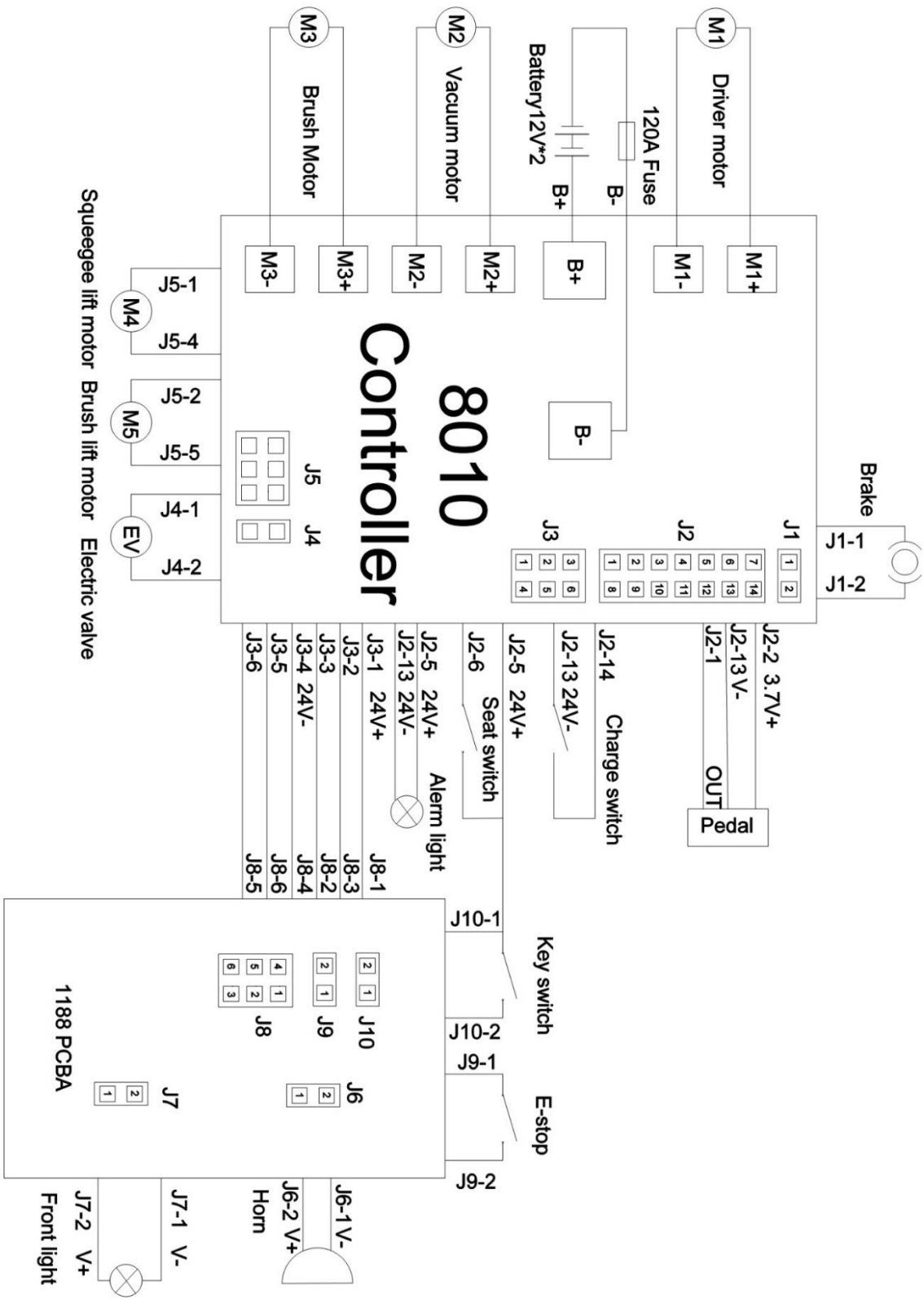




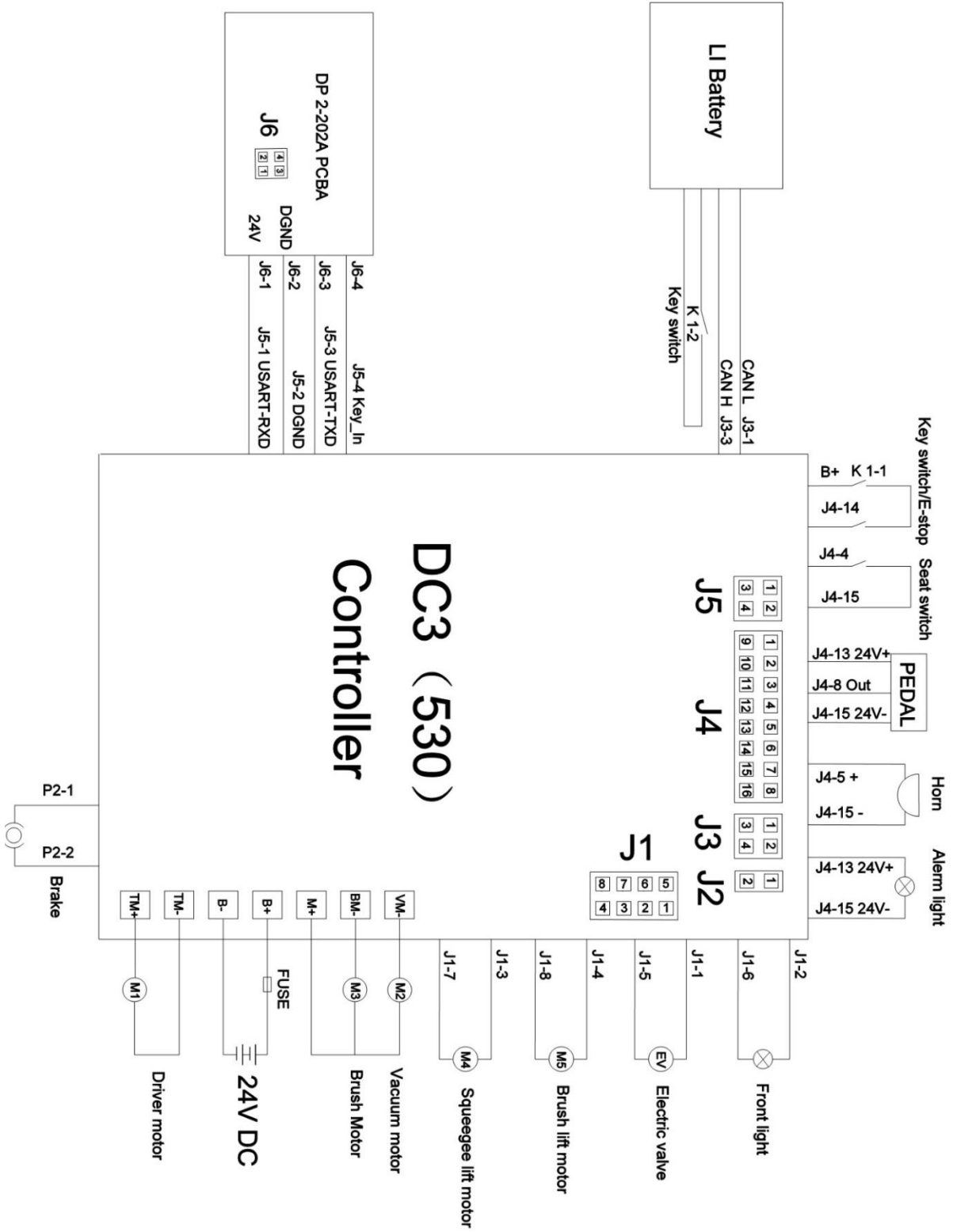
Cleaning vehicle parameter table		
Manufacturer`s type designation		NR530
Drive		Battery
Operator type		Sit down
Wheelbase	y (mm)	745
Service weight (Without battery)	kg	120
Tire size,front	∅ x w (mm)	∅180×75
Tire size,rear	∅ x w (mm)	(∅225×65)*2
Brush/ Pad diameter	∅ x w (mm)	530
Length to face of forks	L(mm)	1260
Overall width	W(mm)	600
Squeegee width	W <sub>1</sub> (mm)	760
Overall height	H (mm)	1010
Solution tank capacity	L	70
Recovery tank capacity	L	70
Cleaning path	mm	530
Speed	km/h	0~6
Brush speed	Rpm	180
Max. gradeability	%	10
Brush pressure	kg	35
Continuous working time	h	3~4
Clean productivity	m <sup>2</sup> /h	3180
Water flow	L/ min	1.2
Service brake		Electromagnetic
Brush motor rated power	W	550
Drive motor rated power	W	550
Vacuum motor rated power	W	400
Vacuum capacity	kPa	>12
Battery voltage, nominal capacity	V/Ah	24/120 <sup>1)</sup>
Battery weight	kg	39.5*2
Battery size (L x W x H) (mm)	mm	405×175×210

Note: 1) The lithium battery capacity is 24V100Ah.

# ELECTRICAL WIRING DIAGRAM(Lead-acid battery)



# ELECTRICAL WIRING DIAGRAM(Lithium battery)



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## 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.

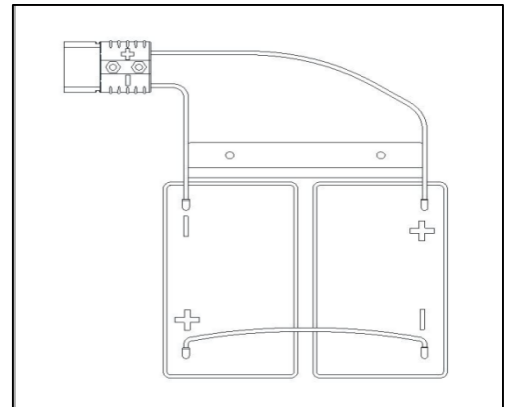


### NOTE

This machine requires two 12V batteries or one 24V lithium battery, please follow the drawing for wiring.

## INSTALLING BATTERIES

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



### CAUTION!

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

## EMERGENCY STOP

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

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## INSTALLING AND REMOVING 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 has the function of automatic loading and unloading of brush disc/ pad driver. It is not recommended to manually install/ remove the brush disc or pad driver. Specific steps are as follows:

1. Turn the key switch to "ON" position (the brush disk and squeegee assembly will automatically return to the original position).
2. Put the brush disk/ pad driver under the brush deck and place it in the center.
3. Long press the "brush motor button", the brush motor indicator flashes, the brush deck is lowering and the brush motor rotates until the brush/pad is locked by the buckle. Release the "brush motor button", the brush loading is completed, the brush motor stops, and the front push rod is lifted.
4. Long press the "solution flow button" to enter the automatic brush unloading mode. When three indicator lights flash, you can release the button, and the controller will automatically complete the brush unloading process and the solution flow indicator lights stop flashing.
5. Manually loading/unloading the brush/pad. Align the brush/pad driver with the central axis, manually rotate the brush/pad counterclockwise for installing. Removing the brush/pad by rotating contrariwise.



### WARNING!

Do not operate the machine until the brush/pad is well-installed.

## ATTACHING SQUEEGEE ASSEMBLY

1. Turn the key switch to "ON" position.
2. Press the "Vacuum motor button", 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 to the squeegee.

## SOLUTION TANK FILLING

1. Open the fill-port lid in the front of the machine.

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2. Fill the cleaning water or suitable detergent with hose. The solution tank water level can be checked by the indicator hose on the side. When the float ball reaches "F" position, the solution water tank is full. The temperature of the filling water or detergent shall not exceed +104F (+40°C).



#### **NOTE**

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



#### **WARNING!**

**Use only low-foam and non-flammable detergent, which should be suitable for 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 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 through the "solution flow button" on the control panel, three different flows are available. Three indicator lights on indicates the maximum flow. Visually check the water level indicator hose 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 on the pedal, the faster machine travels. Reduce the force on the accelerator pedal slowly, move the steering wheel and start scrubbing.
5. Press the "R" button to move the machine backwards. When the machine backward, the squeegee assembly and brush disc will be automatically lifted and the machine stops cleaning automatically.
6. In case of sudden crowd or crowded situation, operator can press the "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 and the brush 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. The float shut-off screen will block the inspiratory path of vacuum motor when the recovery tank is full, and the vacuum motor can not suck the floor dry. Please stop working immediately.
2. Turn off the brush motor and vacuum motor to lift the brush disk and squeegee assembly.
3. Move the machine to the designated drainage area.
4. 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 sewage entering the vacuum motor.

**DRAINING SOLUTION TANK**

Unscrew the solution tank tap cover under the accelerator pedal to drain the solution liquid.

**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. Store the machine in a clean and dry place, with the brush disk/ pad driver and the squeegee lifted or removed.

**AFTER 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.

**INITIAL USE**

After the first 8 hours of use, check if the fastening and connecting parts of the machine are loose, and check for visible damage and leakage.



## MAINTENANCE

### WARNING!



The procedures must be carried out with the machine off and the battery disconnected. Moreover, read carefully the instructions in the Safety chapter before performing any maintenance procedures.

## REGULAR MAINTENANCE CHECKLIST

### CAUTION!



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

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

## CHARGING BATTERY

### NOTE



Charge the battery when BDI on the LCD display 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 shortened. Check the battery 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 DISK BRUSH/ PAD****CAUTION!**

Wear protective gloves when cleaning the brush/pad in case of the injury 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 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.

**SQUEEGEE CLEANING AND STORAGE****NOTE**

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



### **CAUTION!**

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

1. Loosen the knobs on the squeegee assembly and remove the vacuum hose from the squeegee.
2. Clean the aluminum bracket squeegee 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.

## **SQUEEGEE BLADE CHECK AND REPLACEMENT**

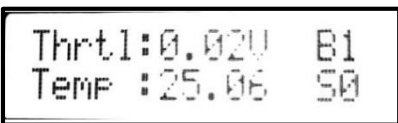
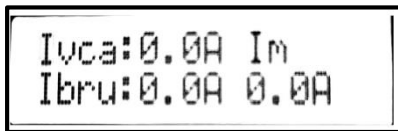
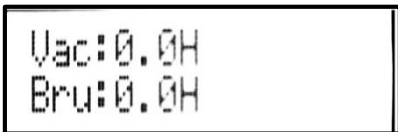
1. Check the edges of front blade and rear blade for integrity, cuts and tears; if the bottom edge of the blade is worn, turn it upside down (the top edge is intact). If the top edge is worn, replace the blade according to the following procedures:
2. Loosen the buckle, release pressure strip from the retainers and remove the retaining strip. Replace the worn blade and assemble the new rear blade in the reverse order of removal.
3. Unscrew the knob and remove the retaining strip, then replace the front blade. Assemble the front blade in the reverse order of removal.

## **RECOVERY TANK CLEANING AND CHECK**

1. Drain the recovery tank by 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 sealing of the recovery tank is intact and sealed, remove the sealing from the tank and replace it if necessary.
4. Fit the recovery tank lid in place.

## READ RUNNING DATA

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

<b>Trouble</b>	<b>Possible Cause</b>	<b>Remedy</b>
The machine doesn't work and the LCD display doesn't light up	The battery connector is disconnected	Connect the battery connector
	The batteries are completely discharged	Charge the batteries
10% The machine don't work, and the battery is displayed at 10%	Low battery	Charge the batteries
The machine do not go-forward/backward	Control circuit board failure	Replace the control circuit board
	Operator is not on the seat or seat switch failure	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 does not work	Control circuit board failure	Replace the control circuit board
	Brush motor overload	Use soft bristle brush that is suitable for cleaning, and reset the brush motor overload protector
	Brush motor carbon brush wearing	Contact after-sales service
	Obstacles prevent the brush rotating	Clean the brush
The vacuum motor does not work	Vacuum motor damage	Check and replace vacuum motor
	Control circuit board failure	Replace the control circuit board
Insufficient suction, the floor cannot be dried	Recovery tank is full	Empty the recovery tank
	Drain hose and squeegee poor connection	Connect the drain hose and squeegee correctly
	Squeegee is dirty or wearing	Check and clean the squeegee
	Recovery tank cover is not closed properly, or the seal is damaged, or the hose is clogged	Close the cover correctly, or replace the gasket or clean the Bend tube.
	Recovery tank is dirty	Clean the recovery tank
Insufficient solution supply to brush plate	Solution filter is dirty	Clean the filter
	Dirty solution tank or a clogged pipeline	Clean the solution tank and piping
Squeegee leaves scratch on the floor	There are debris under the squeegee blade	Remove the debris
	Squeegee blade wear, crack, aged	Replace the squeegee blades

## LCD DISPLAY FAULT CODE

Machine (lead-acid battery) fault description:

LED Display	Possible Cause	Remedy
Low battery	Low voltage	<ol style="list-style-type: none"> <li>1. Charge the battery.</li> <li>2. Check the voltage detection circuit of the controller.</li> </ol>
Traction error	Drive motor wire connection open	Check if the drive motor and electromagnetic brake are normal.
High temperature	Controller temperature is too high.	<ol style="list-style-type: none"> <li>1. Whether the machine has been overloaded and climbing continuously for a long time.</li> <li>2. Whether the motor is overloaded because the machine has cleaned the extremely rough roads for a long time.</li> <li>3. Whether the controller installation position is well ventilated or other heat sources are there.</li> <li>4. Check the temperature detection circuit of the controller.</li> </ol>
Brush overcurr	Brush motor current is too high.	<ol style="list-style-type: none"> <li>1. Check if the machine has been working on extremely rough roads for a long time.</li> <li>2. Check the brush motor.</li> </ol>
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	<ol style="list-style-type: none"> <li>1. Check whether the machine is blocked</li> <li>2. Check the brush deck push rod motor.</li> </ol>
Bjmk overcurr	Squeegee assembly push rod motor over current	<ol style="list-style-type: none"> <li>1. Check whether the machine is blocked .</li> <li>2. Check the squeegee lifting push rod motor.</li> </ol>
Prechange error	Charge failure	<ol style="list-style-type: none"> <li>1. The battery voltage is low.</li> <li>2. Check the controller.</li> </ol>
Pedal error	Accelerator pedal release issue	<ol style="list-style-type: none"> <li>1. Step on the accelerator pedal when the key switch is turned on.</li> <li>2. Check whether the input voltage of the pedal is normal, check the wiring of the J2 of pedal.</li> <li>3. Check the wiring of J3 to J8.</li> </ol>

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.
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 circuit fault	1. Check cable connections 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.**

## SCRAPING AND DISPOSE

1. Have the machine scrapped by a qualified scrapper.
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 components
  - Electrical and electronic components (\*)

## HAZARDOUS SUBSTANCE AND CONTENT

Item	Hazardous substance					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
Battery	X	o	o	o	X	X
Charger	X	o	X	o	o	o
Chassis	X	o	o	o	o	o
Electronic accessories	X	o	X	o	X	X
Hose	X	o	o	X	X	o
Motor	X	o	o	o	X	X
Cable	X	o	X	X	o	o
Basic parts	o	o	o	X	o	o
Controller	X	o	o	o	o	o
Treatment/sewage	o	o	o	o	X	X
Brush/broom	o	o	o	o	X	X
This table compiles in accordance with SJ/T 11364.						
O: Indicates that the content of the hazardous substance in all homogeneous materials of the part is below the limit requirement specified in GB/T 26572.						
X: Indicates that the content of the hazardous substance in at least one of the homogeneous materials of the part exceeds the limit requirement of GB/T 26572.						

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## 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.</p> <p>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.</p> <p>Do not ignite or locate batteries close to open flame, heat sources or sparks.</p> <p>Keep lithium-ion batteries away from heat sources.</p>
	<p>Caution!</p> <p>Battery short-circuit is prohibited.</p>
	<p>Protect the lithium-ion battery from solar radiation or other forms of heat radiation.</p> <p>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 (CO<sub>2</sub>)
- 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.

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## 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%.

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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**

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### **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.