



## AS5160 & AS5160T / AS5160TO

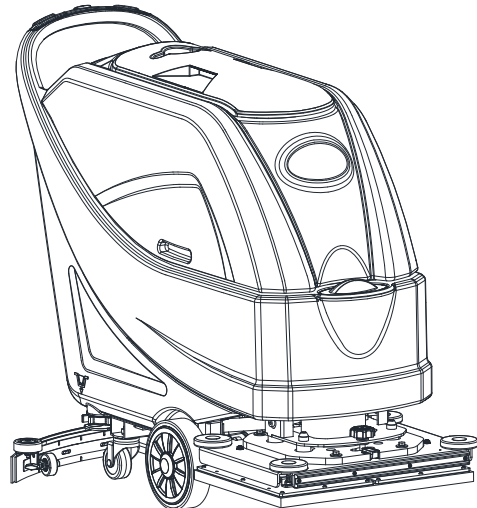
### USER MANUAL



AS5160 & AS5160T



AS5160TO



Model: 50000401 / 50000406 / 50000539



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**INTRODUCTION**



**CAUTION!**

Some general and detailed machine information is not included in this guide. Please refer to Instruction for Use Manual on supplied CD-ROM reading by Adobe® Reader®.



**NOTE**

The numbers in brackets refer to the components shown in Machine Description chapter.

**GUIDE PURPOSE AND CONTENTS**

The purpose of this Quick Start Guide is to provide the operator with all basic information to use the machine properly. For information about technical characteristics, operation, machine inactivity, spare parts and safety conditions etc., please refer to Instruction for Use manual on supplied CD-ROM.

Before performing any procedure on the machine, the operators and qualified technicians must read the Instruction for Use manual. Contact our company in case of doubts concerning the interpretation of the instructions or for any further information.

**HOW TO KEEP THIS GUIDE**

The Quick Start Guide must be kept near the machine, inside an adequate case, away from liquids and other substances that can cause any damage to it.

**DECLARATION OF CONFORMITY**

Declaration of Conformity is supplied with the machine and certifies machine conformity with the law in force.



**NOTE**

The copies of the original declaration of conformity are provided together with the machine documentation.

**ACCESSORIES AND MAINTENANCE**

All the necessary operation, maintenance and repair procedures must be made by qualified personnel, our company appointed repair center. ONLY original or approved spare parts and accessories can be used.

Contact our company customer service for any service or purchase of accessories or spare parts if necessary.

**CHANGE AND IMPROVEMENT**

We committed to continuous improvement of its products, the company reserves the right to the machine changes and improvements without informing in additional.

**SCOPE OF APPLICATION**

The scrubber applies to commercial and industrial use. It is suitable for cleaning smooth and solid floor, operating by a qualified personnel in safety circumstance. It is not suitable for outdoor use or carpet or rough floor cleaning.

**MACHINE IDENTIFICATION DATA**

The machine serial number and model name are marked on the serial label.

This information is useful. Use the following table to write down the machine identification data when requiring spare parts for the machine.

MACHINE MODEL.....
MACHINE SERIAL NUMBER.....

## TRANSPORT AND UNPACKING

When the carrier delivers the machine, make sure the packaging and machine are both whole and undamaged. If any damaged, make the carrier know the damage and before accepting the goods, reserve the right in compensation of the damage.

Follow the instructions on packing strictly when unpacking the machine.

Check the package to ensure following items are included:

1. Technical documentations including Quick Start Guide manual, Instruction for Use Disk and on-board charger manual if on-board charger is equipped.
2. Charger cable if on-board charger is equipped.
3. Two fuses, the low power circuit fuse (5A) and the Brush release fuse (20A).

## SAFETY

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

### VISIBLE SYMBOLS ON THE MACHINE



#### WARNING!

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



#### WARNING!

Do not wash the machine with direct or pressurized water jets.



#### WARNING!

Do not use the machine on slopes with a gradient exceeding that is defined in the specification.

### SYMBOLS THAT APPEAR ON THE INSTRUCTION FOR USE MANUAL



#### DANGER!

It indicates a dangerous situation with risk of death for the operator.



#### WARNING!

It indicates a potential risk of injury for people.



#### CAUTION!

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



#### NOTE

It indicates a remark related to important or useful functions.



#### CONSULTATION

It indicates the necessity to refer to the Instruction for Use manual before performing any procedure.

## GENERAL SAFETY INSTRUCTION

Specific warnings and cautions to inform about potential damages to people and machine are shown below.



### **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 vapour. 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.
- 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.
- 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!**

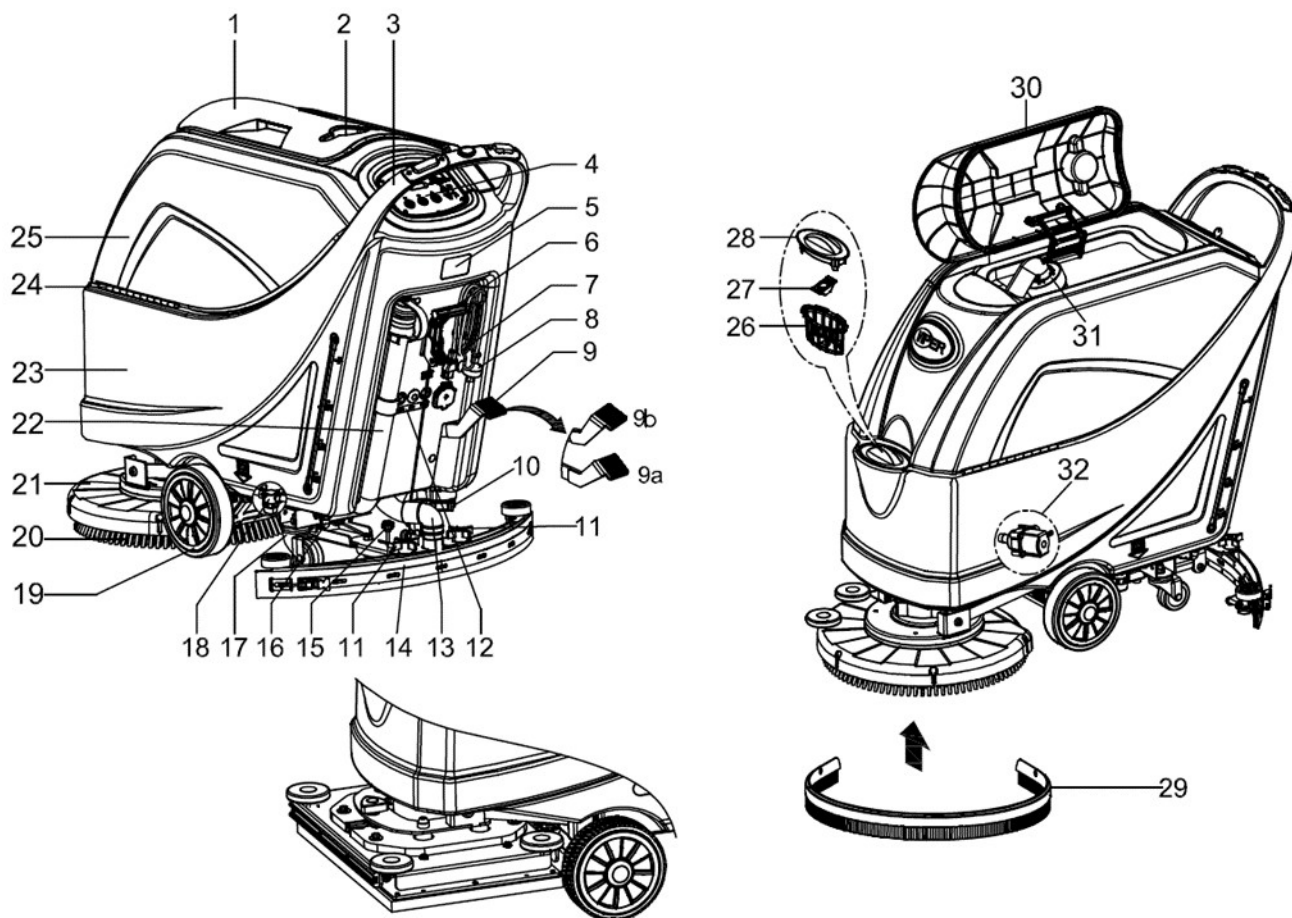
- This machine is intended for **COMMERCIAL USE**, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses.
- Machines left unattended shall be secured against unintentional movement.
- In order to prevent unauthorized use of the machine, the power source shall be switched 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 causes 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 storage 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 it 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**

**MACHINE STRUCTURE (as shown in Figure 1)**

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Recovery tank lid</li> <li>2. Can holder</li> <li>3. Handlebar</li> <li>4. Control panel</li> <li>5. Serial number plate/technical data</li> <li>6. Squeegee lifting/lowering lever</li> <li>7. Power supply cable holder</li> <li>8. Power cable</li> <li>9. Deck lifting/lowering pedal (only for disc machine)             <ol style="list-style-type: none"> <li>a) Pedal position when deck is lifted</li> <li>b) Pedal position when deck is lowered</li> </ol> </li> <li>10. Outlet cover</li> <li>11. Squeegee knobs</li> <li>12. Reset label</li> <li>13. Squeegee vacuum hose</li> <li>14. Squeegee</li> <li>15. Squeegee balance adjusting knob</li> <li>16. PA Connector</li> <li>17. Rear steering wheels</li> <li>18. Solution filter</li> </ol> | <ol style="list-style-type: none"> <li>19. Front wheels on fixed axle (A).<br/>Driving wheels (B)</li> <li>20. Brush/pad-holder</li> <li>21. Brush/pad-holder deck</li> <li>22. Recovery water drain hose</li> <li>23. Solution tank</li> <li>24. Hinge</li> <li>25. Recovery tank</li> <li>26. Filter support</li> <li>27. Filler hose holder</li> <li>28. Filter cover</li> <li>29. Splash guard bristle 510mm</li> <li>30. Tank cover gasket</li> <li>31. Float ball filter</li> <li>32. Solenoid valve</li> </ol> <p>(*): Optional<br/>             (A): Only for machine without traction<br/>             (B): Only for machine with traction</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



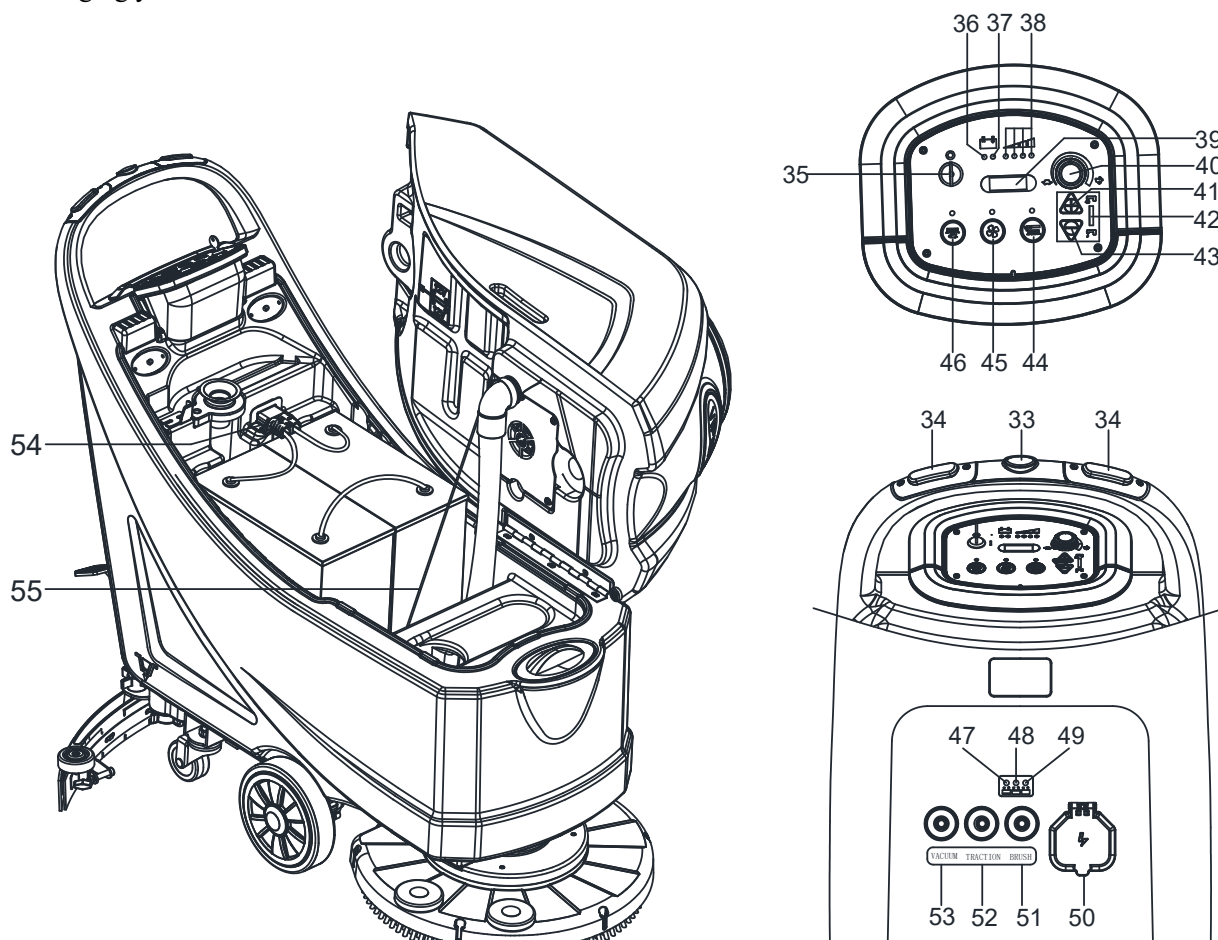
**Figure 1**

**CONTROL PANEL (as shown in Figure 2)**

- 33. Machine backward switch (B)
- 34. Safe switch
- 35. Ignition key (0 - I)
- 36. Discharged battery warning light (red)
- 37. Semi-discharged battery warning light (yellow)
- 38. Charged battery warning light (green)
- 39. Hour meter
- 40. Speed adjuster (B)
- 41. Flow increase switch
- 42. Solution flow indicator
- 43. Flow decrease switch
- 44. Brush/pad-holder release switch (only for disc machine)  
Extra pressure active (only for orbital machine)
- 45. Vacuum system switch
- 46. Brush/pad-holder and vacuum system switch (only for disc machine)  
Pad deck moving up/down and Brush/pad-holder and vacuum system switch (only for orbital machine)
- 47. Charging red LED
- 48. Charging yellow LED

- 49. Charging green LED
- 50. Security cover of charging jack
- 51. Overload protector of brush
- 52. Overload protector of traction (B)
- 53. Overload protector of vacuum
- 54. Battery connector (red).
- 55. Tank safety cable

(\*): Optional  
 (A): Only for machine without traction  
 (B): Only for machine with traction



**Figure 2**

**DISPLAY WINDOW OF CHARGER INDICATON LIGHT (as shown in Figure 2)**

1. At the beginning of charging, the red LED (47) of charger normally on. It is the first stage of charging.
2. After charging some time, the red LED (47) turns off, the yellow LED (48) turns on, this is the second stage of charging.
3. After charging finish, the yellow LED (48) off, the green LED (49) turns on to indicate that the battery is fully charged.





**NOTE**

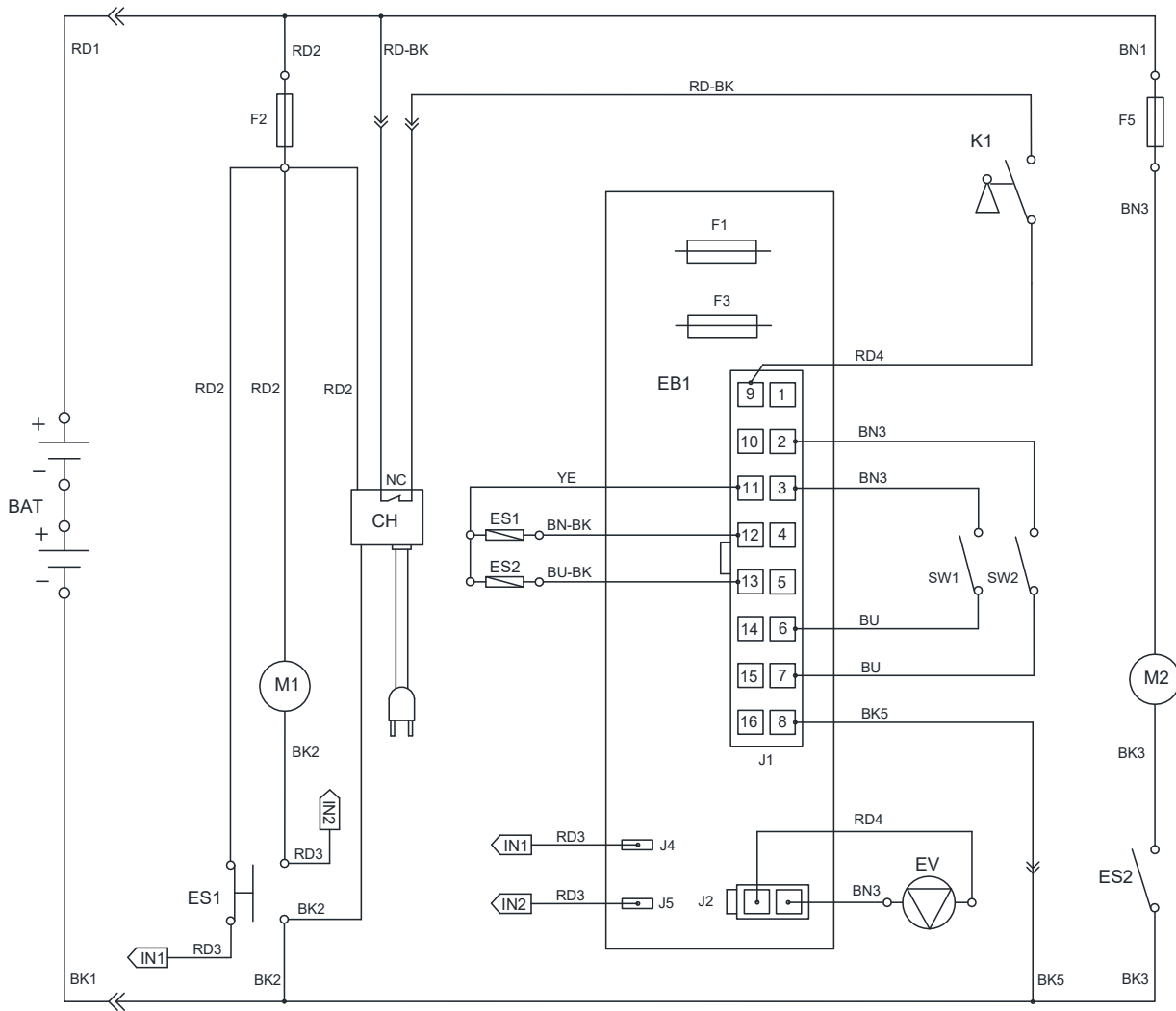
**When charging, if the yellow LED (48) of charger is on, it may be caused by: Battery and charger does not match, battery is not connected well, or output is short-circuited.**

**The red LED of charger flashing may be caused by charger internal short circuit.**

**TECHNICAL PARAMETERS**

Parameter Type	Units	Model		
		AS5160	AS5160T	AS5160TO
Packing dimensions ((L X W X H)	mm	1370 x 600 x 1220		
Machine Height	mm	1000		
Machine Length	mm	1310		
Machine Width (without squeegee)	mm	550		
Machine weight with empty tanks (without batteries)	Kg	85	93	120
Gross vehicle weight (GVW)	Kg	214.8	222.8.	240
Shipping weight	Kg	115	123.	150
Solution tank capacity	L	61		
Recovery tank capacity	L	61		
Vacuum motor power	Watt	350		
Vacuum capacity	mm H <sub>2</sub> O	1200		
Climbing capacity (Max)	%	2%		
Front wheel diameter	mm	200		
Rear wheel diameter	mm	76		
Sound level	dB(A)	69 +/- 3		
Solution Flow (max) per setting	L / minute	0.7/1.2/1.7/2.2		0.4/0.8/1.4/2.2
Working width	mm	510		
Squeegee width	mm	790		
Brush/pad diameter	mm	510		510 x 360
Brush motor power	Watt	450		750
Brush speed	RPM	150		2200
Brush/pad pressure(Max)	Kg	27	23	40 - 50
Drive motor power	Watt	N/A	150	250
Working speed	Km/h	N/A	0 - 4.0	0 - 3.2
Forward speed	Km/h	N/A	0 - 4.0	
Reverse speed	Km/h	N/A	0 - 2.0	
Handle Vibration Level (max)	m/S <sup>2</sup>	2.5		
Voltage	V DC	24 V DC		
Batteries	Ah	12V 100—115Ah		
On-Board Battery Charger	V/A	24 V/10 A		24 V/13 A
Battery compartment size (L x W x H)	mm	350 X 350 X 300		

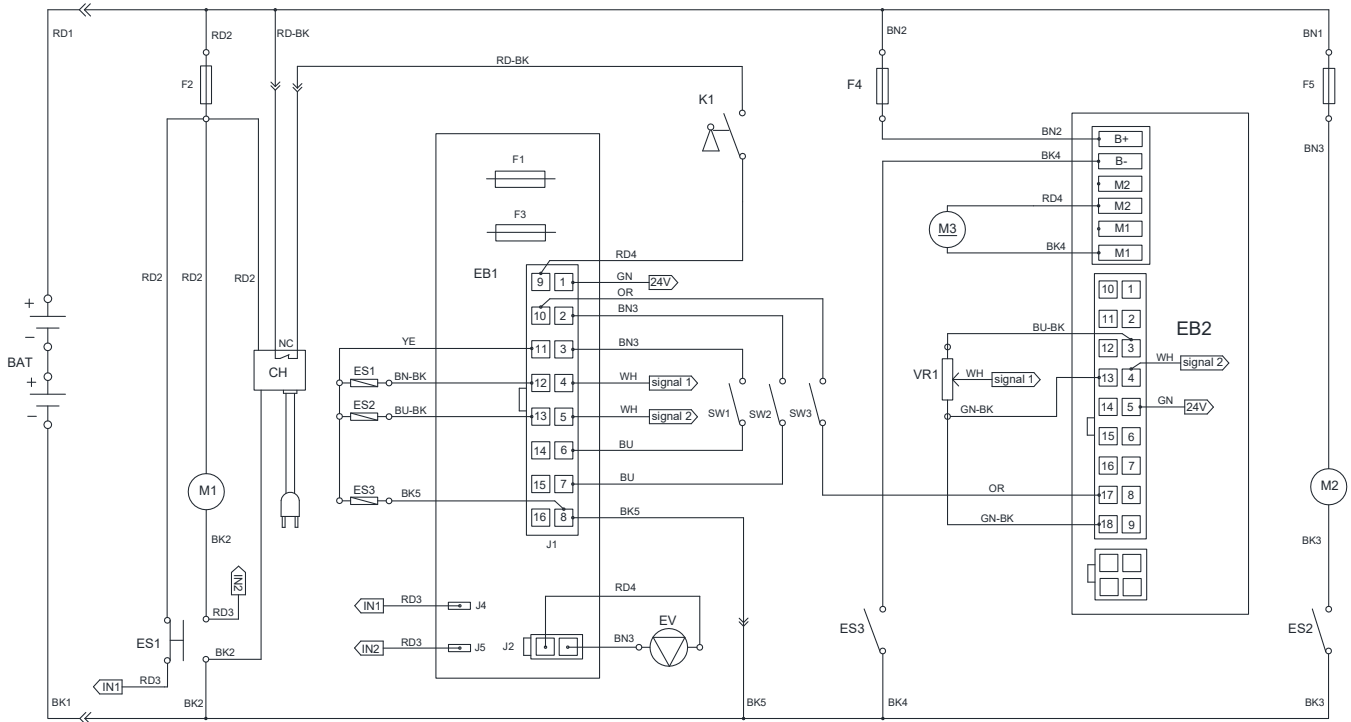
**WIRING DIAGRAM (ONLY FOR DISC MACHINE WITHOUT TRACTION)**



COMPONENTS	
BAT	24V BATTERIES
CH	BATTERY CHARGER
EB1	CONTROL PANEL BOARD
ES1	ELECTROMAGNETIC SWITCH 24V(BRUSH MOTOR)
ES2	RELAY 24V(VACUUM MOTOR)
F1	LOW POWER CIRCUIT FUSE
F2	CIRCUIT BREAKER(BRUSH MOTOR)
F3	BRUSH RELEASE FUSE
F5	CIRCUIT BREAKER(VACUUM MOTOR)
K1	KEY SWITCH
M1	BRUSH MOTOR
M2	VACUUM MOTOR
EV	SOLENOID VALVE
SW1	SAFETY SWITCH(BRUSH)
SW2	SAFETY SWITCH(BRUSH)

GAUGE	
RD1	RED/6AWG
RD2	RED/10AWG
RD4	RED/20AWG
BK1	BLACK/6AWG
BK2	BLACK/10AWG
BK3	BLACK/12AWG
BK5	BLACK/20AWG
BK6	BLACK/16AWG
RD-BK	RED-BLACK/20AWG
BN1	BROWN/12AWG
BN3	BROWN/20AWG
BN-BK	BROWN-BLACK/20AWG
BU	BLUE/20AWG
BU-BK	BLUE-BLACK/20AWG
YE	YELLOW/20AWG
WH	WHITE/20AWG

WIRING DIAGRAM (ONLY FOR DISC MACHINE WITH TRACTION)



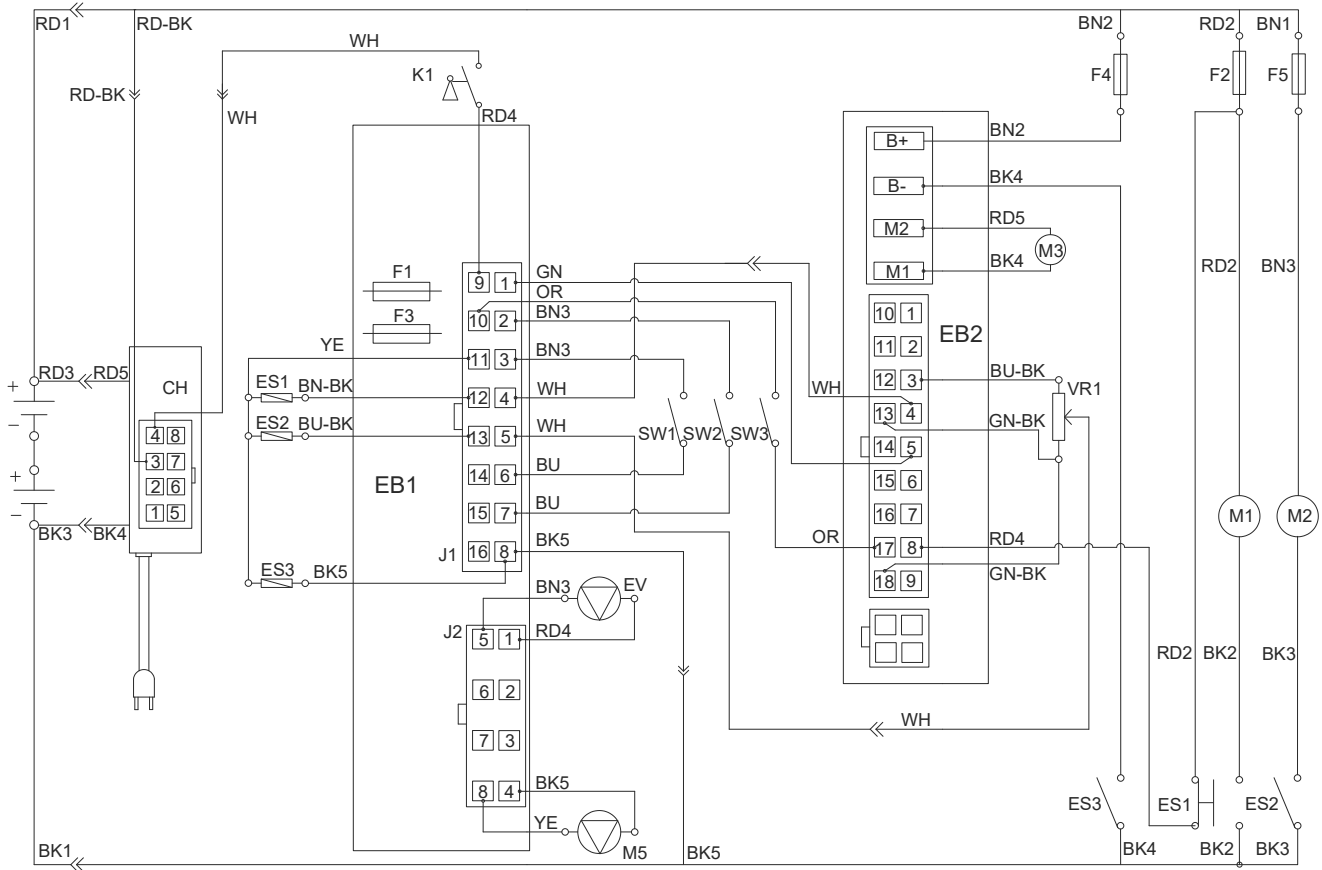
COMPONENTS

BAT	24V BATTERIES
CH	BATTERY CHARGER
EB1	CONTROL PANEL BOARD
EB2	ELECTRONIC BOARD(TRACTION SYSTEM)
ES1	ELECTROMAGNETIC SWITCH 24V(BRUSH MOTOR)
ES2	RELAY 24V(VACUUM MOTOR)
ES3	RELAY 24V(TRACTION SYSTEM)
F1	LOW POWER CIRCUIT FUSE
F2	CIRCUIT BREAKER(BRUSH MOTOR)
F3	BRUSH RELEASE FUSE
F4	CIRCUIT BREAKER(TRACTION SYSTEM)
F5	CIRCUIT BREAKER(VACUUM MOTOR)
K1	KEY SWITCH
M1	BRUSH MOTOR
M2	VACUUM MOTOR
M3	DRIVE MOTOR
EV	SOLENOID VALVE
SW1	SAFETY SWITCH(BRUSH/TRACTION)
SW2	SAFETY SWITCH(BRUSH/TRACTION)
SW3	REVERSING SWITCH
VR1	SPEED POTENTIOMETER

GAUGE

RD1	RED/6AWG
RD2	RED/10AWG
RD4	RED/20AWG
BK1	BLACK/6AWG
BK2	BLACK/10AWG
BK3	BLACK/12AWG
BK4	BLACK/14AWG
BK5	BLACK/20AWG
BK6	BLACK/16AWG
RD-BK	RED-BLACK/20AWG
GN	GREEN/20AWG
GN-BK	GREEN-BLACK/20AWG
BN1	BROWN/12AWG
BN2	BROWN/14AWG
BN3	BROWN/20AWG
BN-BK	BROWN-BLACK/20AWG
BU	BLUE/20AWG
BU-BK	BLUE-BLACK/20AWG
OR	ORANGE/20AWG
YE	YELLOW/20AWG
WH	WHITE/20AWG

**WIRING DIAGRAM (ONLY FOR ORBITAL MACHINE)**



COMPONENTS	
BAT	24V BATTERIES
CH	BATTERY CHARGER
EB1	CONTROL PANEL BOARD
EB2	ELECTRONIC BOARD(TRACTION SYSTEM)
ES1	ELECTROMAGNETIC SWITCH 24V(BRUSH MOTOR)
ES2	RELAY 24V(VACUUM MOTOR)
ES3	RELAY 24V(TRACTION SYSTEM)
F1	LOW POWER CIRCUIT FUSE
F2	CIRCUIT BREAKER(BRUSH MOTOR)
F3	BRUSH RELEASE FUSE
F4	CIRCUIT BREAKER(TRACTION SYSTEM)
F5	CIRCUIT BREAKER(VACUUM MOTOR)
K1	KEY SWITCH
M1	BRUSH MOTOR
M2	VACUUM MOTOR
M3	DRIVE MOTOR
EV	SOLENOID VALVE
M5	BRUSH LIFT MOTOR
SW1	SAFETY SWITCH(BRUSH/TRACTION)
SW2	SAFETY SWITCH(BRUSH/TRACTION)
SW3	REVERSING SWITCH
VR1	SPEED POTENTIOMETER

GAUGE	
RD1	RED/6AWG
RD2	RED/10AWG
RD3	RED/12AWG
RD4	RED/20AWG
RD5	RED/14AWG
BK1	BLACK/6AWG
BK2	BLACK/10AWG
BK3	BLACK/12AWG
BK4	BLACK/14AWG
BK5	BLACK/20AWG
BK6	BLACK/16AWG
RD-BK	RED-BLACK/20AWG
GN-BK	GREEN-BLACK/20AWG
BN1	BROWN/12AWG
BN2	BROWN/14AWG
BN3	BROWN/20AWG
BN-BK	BROWN-BLACK/20AWG
BU	BLUE/20AWG
BU-BK	BLUE-BLACK/20AWG
OR	ORANGE/20AWG
WH	WHITE/20AWG

## OPERATING GUIDE

**WARNING!**

On some points of the machine there are some adhesive plates indicating:

- DANGER!
- WARNING!
- CAUTION!
- CONSULTATION

While reading this Manual, the operator must pay particular attention to the symbols shown on the plates. Do not cover these plates for any reason and immediately replace them if damaged.

## BATTERY CHECK/SETTING ON A NEW MACHINE

**WARNING!**

The electric components of the machine can be seriously damaged if the batteries are either improperly installed or connected. The batteries must be installed by qualified personnel only. Set the function electronic board and the built-in battery charger according to the type of batteries used (WET or GEL/AGM batteries). Check the batteries for damage before installation. Disconnect the battery connector and the battery charger plug. Handle the batteries with great care. Install the battery terminal protection caps supplied with the machine.

**NOTE**

The machine requires two 12 V batteries, connected according to the diagram (Figure3).

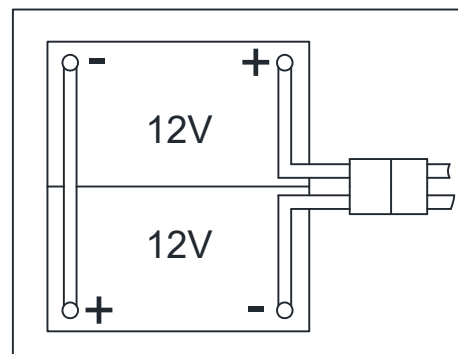


Figure 3

The machine can be supplied in one of the following modes:

**A) Batteries (WET or GEL/ AGM) already installed and charged**

1. Check that the batteries are connected to the machine with the connector (54).
2. Insert the ignition key (35) and turn it to "I". If the green warning light (38) turns on, the batteries are fully charged. If the yellow (37) or red warning light (36) turns on, the batteries must be charged (see the procedure in Maintenance chapter).

**B) Without batteries**

1. Buy appropriate batteries (see the Technical Data paragraph).
2. For battery choice and installation, apply to qualified battery Retailers.
3. Set the machine and the battery charger according to the type of batteries (WET or GEL/ AGM), as shown in the next paragraph.

### BATTERY INSTALLATION AND BATTERY TYPESETTING (WET OR GEL/ AGM)

According to the type of batteries (WET or GEL/AGM), set the machine and electronic board of the battery charger as follows: **(only for disc machine)**

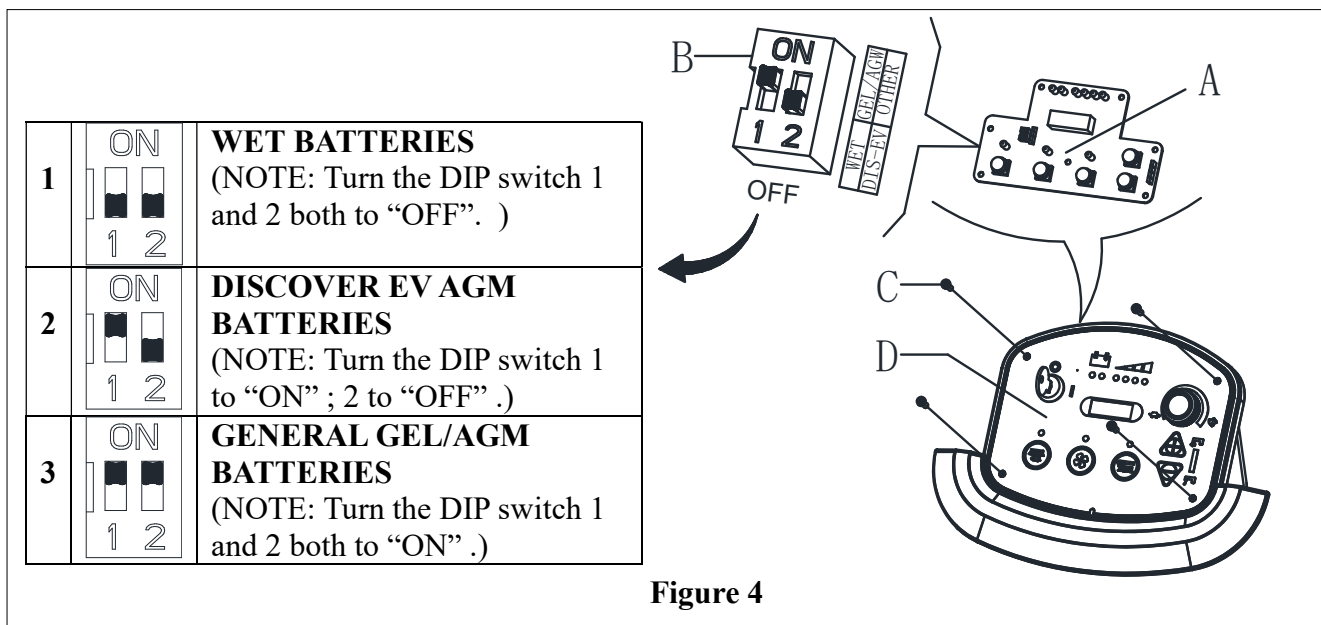


Figure 4



**NOTE**

When install new batteries please refer to figure 4 to adjust the DIP switches. Otherwise the batteries may be damaged.

#### Machine setting (only for disc machine)

1. Turn the ignition key (35) to “I” and in the very first seconds of machine operation pay attention to the following:
  - If the first green warning light (38) is flashing, the machine is set to GEL/AGM.
  - If the yellow warning light (37) is flashing, the machine is set to Discover EV AGM.
  - If the red warning light (36) is flashing, the machine is set to WET.
  - If the setting need to be changed, perform the following procedure.
2. The factory setting is for WET batteries. If the setting correspond to the battery installation, go to step6 directly. Otherwise, follow next steps 4~5.
3. Remove the screws on control panel (C, Figure 4), then turn over the PCB (A Figure 4) to find the DIP switch (B, Figure 4) for setting battery type (WET or Discover EV AGM or GEL/AGM), (Refer to 1 or 2 or 3).
4. If the setting complete to the battery option. Install the screws on control panel.

#### Battery charging (only for disc machine)

5. Charge the batteries. (See procedures in maintenance chapter).



**CAUTION!**

Cut off all the power of the machine before perform the following procedure!

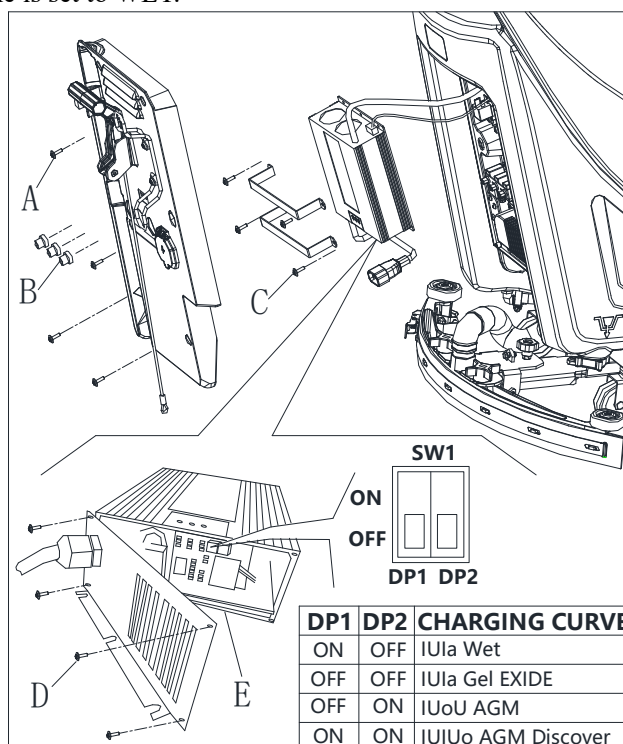


Figure 4.1

**Battery charger setting (for disc machines with on-board battery charger)**

6. Remove the screws (A, B, C, D, Figure 4.1).
7. Open the charger and find the sw1 (E, Figure 4.1).
8. Set the switches as the table of (Figure 4.1).
9. Install the screws (A, B, C, D, Figure 4.1) after setting complete.

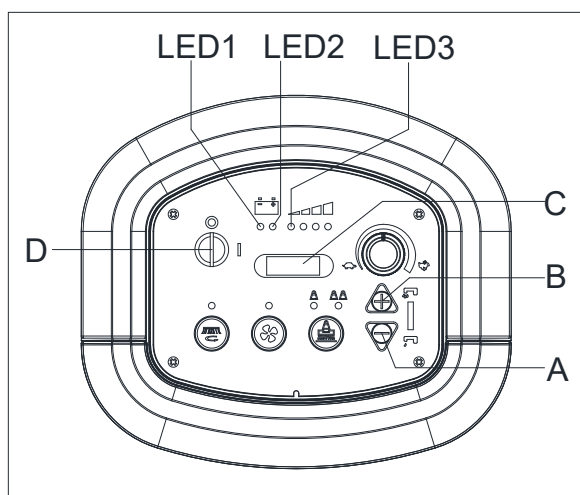
**ACCORDING TO THE TYPE OF BATTERIES (WET OR GEL / AGM), SET THE MACHINE AS FOLLOWS: (only for orbital machine)**



**NOTE**

Regarding the factory setting, learn the battery type from boot time display according to above table

1. Press both the buttons (A, Figure. 4) and (B) at the same time, Insert the ignition key (D) and turn on the power, after 0.5 second, enter battery setting mode. LED display during setting (C), Release the buttons.
2. The mode can be shift from 0 to 5 by pressing button (B), or shift from 5 to 0 by pressing button (A). After the battery mode setting is completed, turn off the power (D) and the new setting of battery mode can be saved automatically.
3. The battery type setting is completed.



**Figure 4.2**

Mode	Battery type/Battery manufacturer	Battery charging curve	LED display during setting (C, Figure. 4.2)	Boot time display
0	WET	General WET curve		LED1 blink twice
1	GEL/AGM	General GEL/AGM curve		LED2 blink twice
2	DISCOVER	DISCOVER EV GEL		LED3 blink twice
3	OPTIMA	OPTIMA GEL		Both LED1 and LED2 blink twice
4	EXIDE	EXIDE GEL		Both LED1 and LED3 blink twice
5	FULLRIVER	FULLRIVER GEL		Both LED2 and LED3 blink twice

### Battery installation

1. Open the recovery tank cover (1) and check that the recovery tank (25) is empty; otherwise empty it with the drain hose. (22)
2. Close the recovery tank cover (1).
3. Overturn the recovery tank (25) carefully.
4. The machine is supplied with cables suitable to install 2X12V batteries. Carefully put the batteries into the compartment, then install them correctly.
5. Route and install the battery cable as shown in (Figure 3), then carefully tighten the nut on each battery terminal.
6. Place the protection cap on each terminal, then connect the battery connector (54).
7. Carefully lower the recovery tank (25).

### BRUSH/PAD-HOLDER INSTALLATION AND UNINSTALLATION (only for disc machine)



**NOTE**

Install either the brush (A, Figure 5) or pad-holder (B and C, Figure5) according to the type of floor to be cleaned.



**CAUTION!**

Before installation or uninstallation of brush or pad-holder, make sure all the switches on machine are in off position and lifting the squeegee from the floor. The operator must be equipped with suitable personnel protection devices, such as gloves to reduce the risk of accidents.

**Proceed as following:**

1. Insert the ignition key (35) and turn it to "O".
2. Lift the deck by pressing the pedal (9).
3. If equipped, turn the speed adjuster (40) to idle by turning it counter-clockwise.
4. Place the brushes (A, Figure5) or the pad-holder (B) under the deck (21).
5. Lower the deck on the brushes/pad-holders by pressing the pedal (9).
6. Turn the ignition key (35) to "I".
7. Brush/pad-holder and vacuum system switch (46).
8. Press one of the Brush/forward gear switch (34) to engage the brush/pad-holder, then release it. If necessary, repeat the procedure until the brushes/pad-holders are engaged.
9. If Step No.8 above proves to be difficult, use the manual method by turning the brush/pad-holder in the direction opposite to the normal turning direction, and it can be taken off. (as shown in Figure 5)



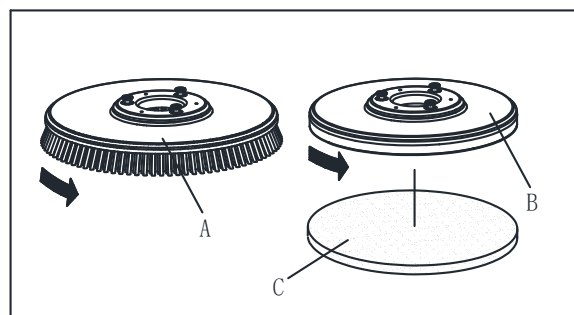
**WARNING!**

(Only for machine with traction)Turn the speed adjuster (40) counter-clockwise to drive the machine at the minimum speed.

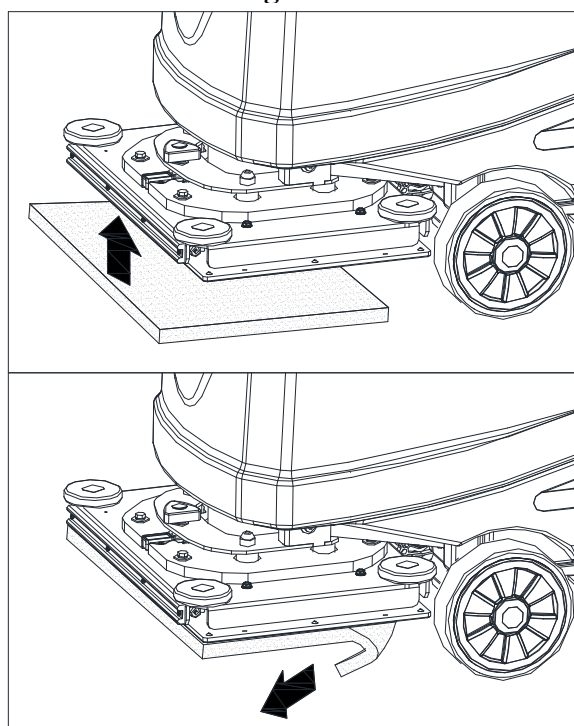
Slightly press the switch (34), otherwise the machine starts to move.

To engage the brush/pad-holder press the switch (34) which turns on the brush/pad-holder motor.

10. To remove the brush/pad-holder lift the deck by pressing the pedal (9), then press the switch (44),the brush/pad-holder will be remove.



**Figure 5**



**Figure 5.1**



## PAD INSTALLATION AND UNINSTALLATION (only for orbital machine)

1. Lift the deck by pressing the switch (46).
2. Install and uninstall the pad (A, Figure 5.1)

### ADJUSTING THE BALANCE OF SQUEEGEE

1. Install the squeegee and screw up the nut (H), then connect the vacuum hose (G) to the squeegee.
2. Adjust the squeegee by squeegee adjusting handle (A, Figure 6).
  - a) If there is gap between the ground and middle section of rear squeegee blade (B), adjust the knob (A) in counterclockwise direction (F) until all section of rear squeegee blade good contact with ground, the front blade touch the ground slightly.
  - b) If there is gap between the ground and both end section of rear blade (C and D), adjust the knob (A) in clockwise direction (E) until all section of rear blade good contact with the ground, the front blade touch the ground slightly.

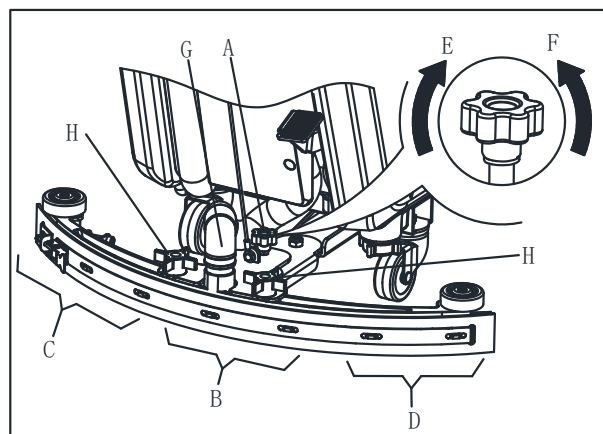


Figure 6

### SOLUTION OR WASHING WATER TANK FILLING

1. Open the water inlet cover (B, Figure 7).
2. Filling water or solution suitable for work performance through the water inlet with filter.  
The solution temperature must not exceed +104F (+40°C).
3. Do not overfill the tank, refer to water level indicator (H) for the water volume.



**WARNING!**

Use only low-foam and non-flammable detergents, intended for automatic scrubber applications.

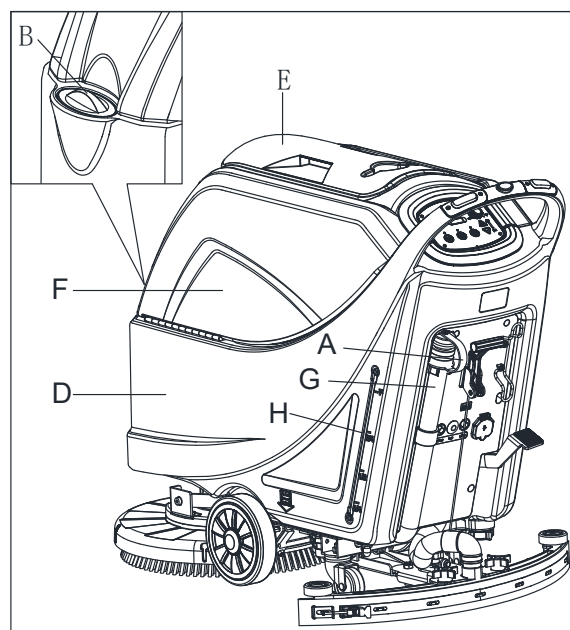


Figure 7

## MACHINE START AND STOP

### Starting the machine

1. Prepare the machine as shown in the previous paragraph.
2. Insert the ignition key (A, Figure 8) and turn it to "I". Check that the green warning light (B) turns on (charged battery). If the yellow (C) or red warning light (D) turns on, turn the ignition key back to "0" and charge the batteries (see the procedure in Maintenance chapter).
3. Drive the machine to the working area:
  - By pushing it with the hands on the handlebar (E) (only for machine without traction).
  - By pushing it with the hands on the handlebar (E) and pressing the switch (F) to move forward, or pressing the switch (F) together with the switch (G) to move backward (only for machine with traction). The forward speed can be adjusted with the adjuster (H).
4. Lower the squeegee (I) with the lever (J).
5. Lower the brush/pad-holder deck (K) by lifting the pedal (L). (only for disc machine)
6. Press the brush/pad-holder switch (M) and the vacuum system switch (N).
7. Press the washing water flow control switches (O) as necessary, depending on the type of cleaning to be performed.
8. Start cleaning:
  - (only for machine without traction) by pushing the machine with the hands on the handlebar (E) and pressing the switch (F).
  - (only for machine with traction) by pushing the machine with the hands on the handlebar (E) and by pressing the

switch (F). If necessary, the forward speed can be adjusted with the adjuster (H).



**NOTE**

To move the machine forward, press either the left or right switch (F) or both.

**Stopping the machine**

9. Stop the machine by using the handlebar (E) (only for machine without traction). Stop the machine by releasing the switches (F) (only for machine with traction).
10. Stop the brushes and the vacuum system by pressing the switch (M). The vacuum system stops after a few seconds.
11. Lift the brush/pad-holder deck (K) by pressing the pedal (L) (only for disc machine)
12. Lift the squeegee (I) with the lever (J).
13. Turn the ignition key (A) to "0".
14. Make sure that the machine cannot move independently.

**ADJUSTING THE LEVEL OF ORBITALDECK (ONLY FOR ORBITAL MACHINE)**

1. Lower the brush/pad-holder deck by press the Brush/pad-holder switch (M Figure 8).
2. Adjust the level of orbital deck by adjusting handle (A, Figure 8.1).made the bubble in the middle (B Figure 8.1).

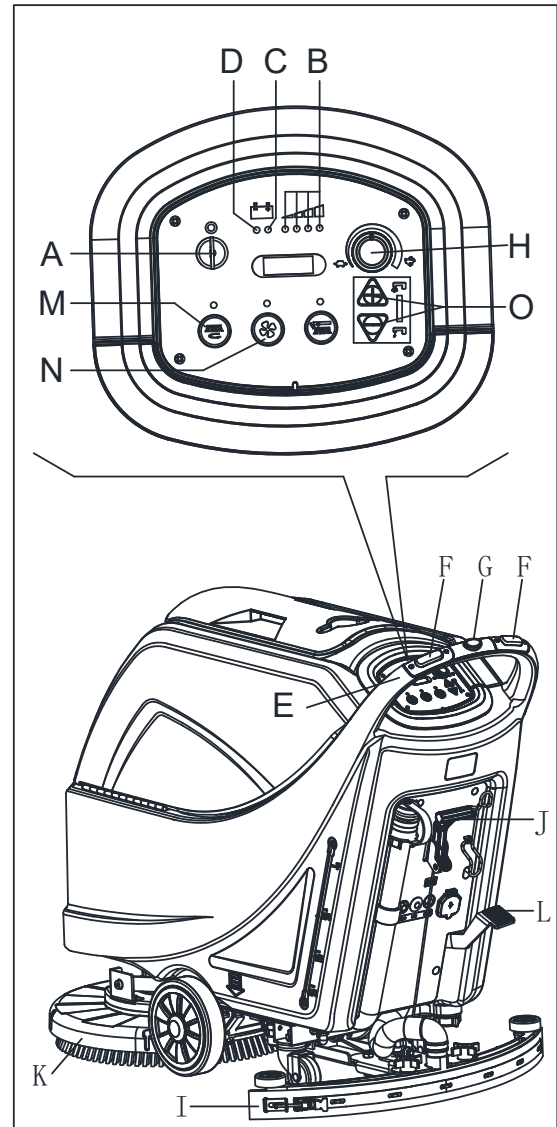


Figure 8

**MACHINE OPERATION (SCRUBBERING AND DRYING)**

1. Start the machine as shown in previous paragraphs.
2. While keeping both hands on the handlebar press the safety switch (F, Figure 8), then manoeuvre the machine and start scrubbing/drying the floor.
3. If necessary, stop the machine then adjust squeegee according to section "Adjusting balance of squeegee".

**NOTE**

For correct scrubbing/drying of floors at the sides of the walls, Suggests to go near the walls with the right side of the machine (A and B, Figure 9) as shown in the figure.

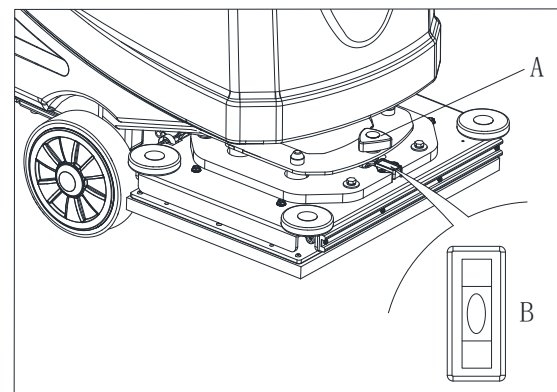


Figure 8.1



**CAUTION!**

To avoid any damage to the floor surface, turn off the brushes/pad-holders when the machine stops in one place.

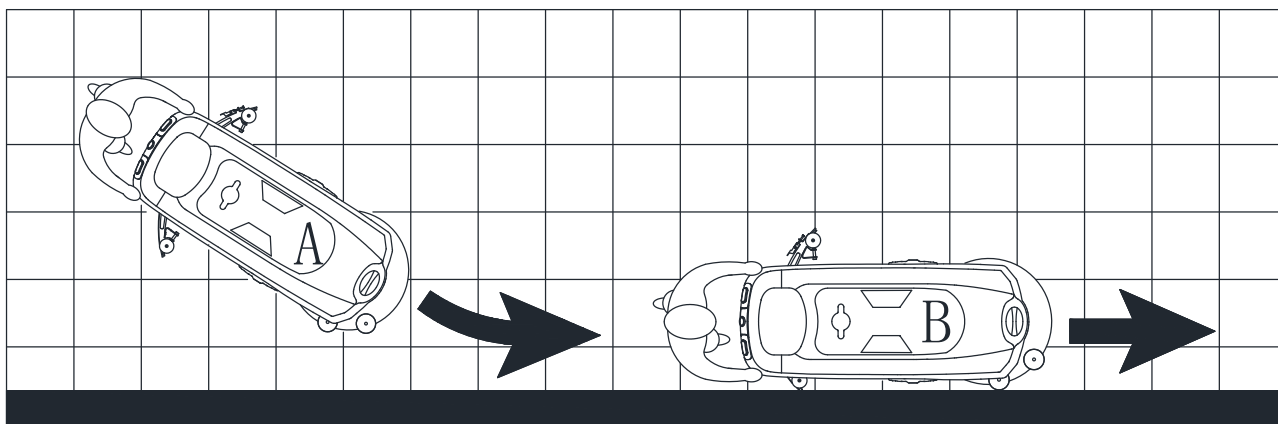


Figure 9

**Battery discharge during operation**

Until the green warning light (A, Figure 10) stays on, the batteries allow the machine to work normally. When the green warning light (A) turns off, and the yellow warning light (B) turns on, it is advisable to charge the batteries, because the remaining charge will last for a few minutes (depending on battery characteristics and work to be performed). When the red warning light (C) turns on, batteries are fully discharged. After a few seconds, the brush/pad-holder is automatically tuned off, while the (only for machine with traction) drive system stay on, to finish drying the floor and drive the machine to the appointed recharging area.



**CAUTION!**

Do not use the machine with discharged batteries, to avoid damaging the batteries and reducing the battery life.

**TANK EMPTYING**

An automatic float shut-off system (A, Figure 11) blocks the vacuum system when the recovery water tank (B) is full. The vacuum system deactivation is signaled by a sudden increase in the vacuum system motor noise frequency, also the floor has not dried.

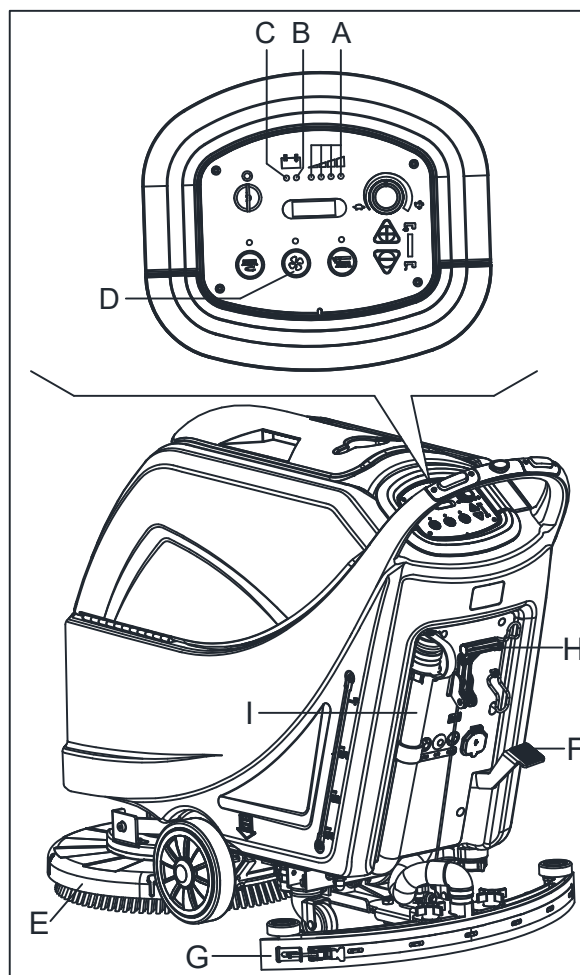


Figure 10



**CAUTION!**

If the vacuum system turns off accidentally (for example, when the float is activated because of a sudden machine movement), to resume the operation: turn off the vacuum system by pressing the switch (D, Figure 10), then open the cover (C, Figure 11) and check that the float inside the grid (A) has gone down to the water level. Then close the cover (C) and turn on the vacuum system by pressing the switch (D, Figure 10).

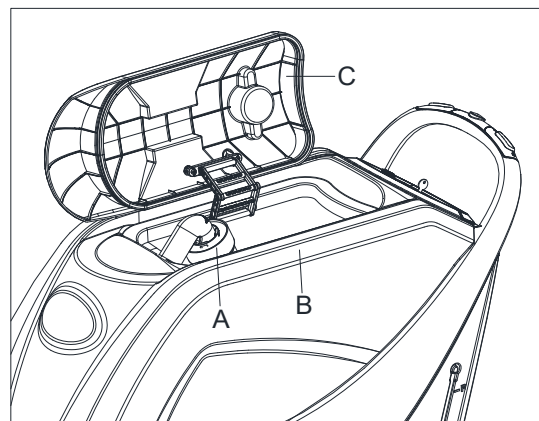


Figure 11

When the recovery water tank (B, Figure 11) is full, empty it according to the following procedure.

**Recovery water tank emptying**

1. Stop the machine.
2. Lift the brush/pad-holder deck (E, Figure 10) by pressing the pedal (F, Figure 10). (only for disc machine)
3. Lift the squeegee (G, Figure 10)) with the lever (H, Figure 10).
4. Drive the machine to the appointed disposal area.
5. Empty the recovery water tank with the hose (I, Figure 10). Then, rinse the tank (B, Figure 11) with clean water.

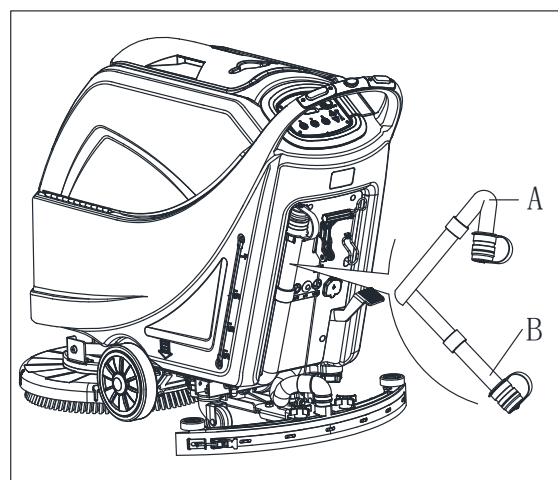


Figure 12



**CAUTION!**

When draining the wastewater, the vacuum tube for waste must be folded (A, Figure 12) and lowered to a lower position (B, Figure 12), and then open the lid of the vacuum tube for waste to drain the water. Do not make the outlet of the vacuum tube for waste face upward to drain the water vertically. This is to avoid wastewater spilling onto the operator.

6. Perform steps 1 to 4.

**Solution/clean water tank emptying**

7. Empty the solution tank with the outlet cover (A, Figure 13). After working, rinse the tank with clean water.

**AFTER USING THE MACHINE**

After working, before leaving the machine:

1. Remove the brushes/pad-holders.
2. Empty the tanks (B and C, Figure 13) as shown in the previous paragraph.
3. Perform the daily maintenance procedures (see the Maintenance chapter).
4. Store the machine in a clean and dry place, with the brushes/pad-holders and the squeegee lifted or removed.

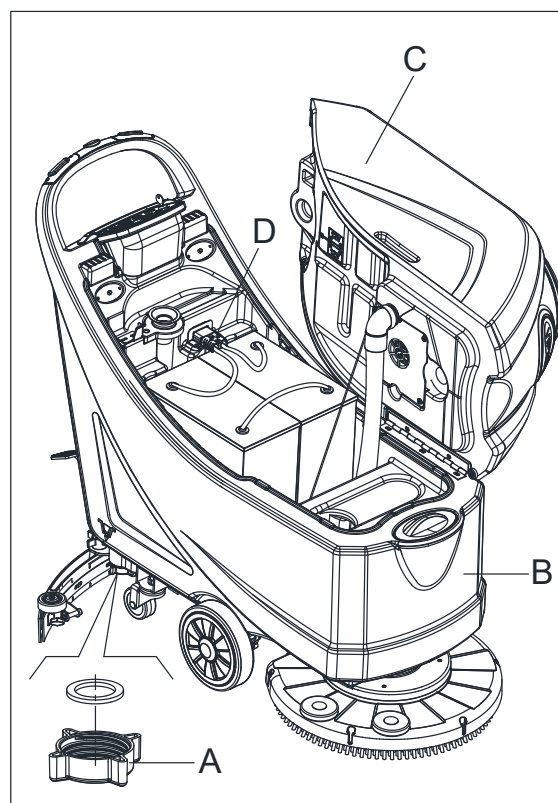


Figure 13

**MACHINE LONG INACTIVITY**

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

1. Perform the procedures shown in After Using the machine paragraph.
2. Disconnect the battery connector (54).

**FIRST PERIOD OF USE**

After the first 8 hours, check the machine fastening and connecting parts for proper tightening and check the visible parts for wear and leakage.

**MAINTENANCE**



**WARNING!**

**Maintenance procedures must be performed after the machine is turned off and the battery charger cable is disconnected. In addition, carefully read the safety chapters in the manual.**

All scheduled or extraordinary maintenance procedures must be performed by qualified personnel or an authorized Service Center. This manual only describes the general and common maintenance procedures.

For other maintenance procedures that are not in below maintenance schedule table, please refer to the Service Manual that can be consulted at any our company Service Center.

**SCHEDULED MAINTENANCE TABLE**



**CAUTION!**

**The procedure marked with (1) must be performed when the machine is used after 9 hours for the first time. The procedure marked with (2) must be done by Service Center that qualified by our company.**

Procedure	Daily, after each use	Weekly	semiannually	Yearly
Battery charging				
Squeegee cleaning				
Brush/Pad-holder cleaning				
Tank cleaning				
Tank sealing strip inspection				
Float ball filter cleaning				
Pad cleaning				
Squeegee blade check and replacement				
Cleaning water filter cleaning				
Suction filter cleaning				
WET battery fluid level check				
Screw and nut tightness inspection			(1)	
Lower Isolator			(2)	
Brush/Pad-holder carbon brush check or replacement				(2)
Suction motor carbon brush check or replacement				(2)
Drive system motor carbon brush check or replacement (only for machine with traction)				(2)

## BATTERY CHARGING



### NOTE

Charge the batteries when the yellow (F, Figure 14) or red warning light (G) turns on, or when finishing cleaning.



### CAUTION!

Keeping the batteries charged make their life last longer.



### CAUTION!

When the batteries are discharged, charge them as soon as possible, as that condition makes their life shorter. Check for battery charge at least once a week.



### WARNING!

WET battery charging produces highly explosive hydrogen gas. Charge the batteries in well-ventilated areas and away from naked flames. Do not smoke while charging the batteries. Keep the tank open while charging the batteries.



### WARNING!

Pay careful attention when charging the batteries as there may be battery fluid leakages. The battery fluid is corrosive. If it comes in contact with skin or eyes, rinse thoroughly with water and consult a physician.

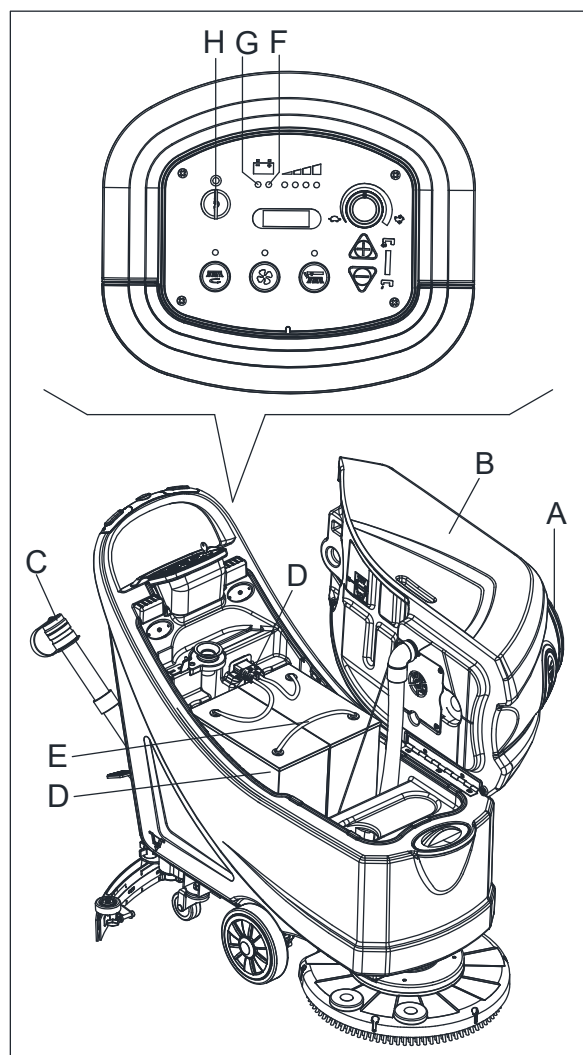


Figure 14

### Preliminary procedures

1. Open the cover (A, Figure 14) and check that the recovery water tank (B) is empty, otherwise empty it with the drain hose (C).
2. Drive the machine on a level floor.
3. Turn the ignition key (H) to "0".
4. Carefully lift the tank (B).
5. For WET batteries only:
  - Check the level of electrolyte inside the batteries (D); if necessary, top up through the caps (E).
  - Leave all the battery caps (E) open for next charging.
  - If necessary, clean the upper surface of the batteries (D).
6. Charge the batteries according to the following procedure.

### Battery charging with battery charger installed on the machine

7. Connect the battery charger cable (A, Figure 15) to the electrical mains (G) (the electrical mains voltage and frequency must be compatible with the battery charger values shown on the machine serial number plate (F)). When the battery charger is connected to the electrical mains, all machine functions are automatically cut off. If the red warning light (B) on the battery charger control panel stays on, the battery charger is charging the batteries.
8. When the green warning light (C) turns on, the battery charging is completed.
9. When the battery charging is completed, disconnect the battery charger cable (A) from the electrical mains (G) and wind it round its housing (D).
10. Carefully lower the tank.



**NOTE**

For further information about the operation of the battery charger (E, Figure 15), see the relevant Manual.

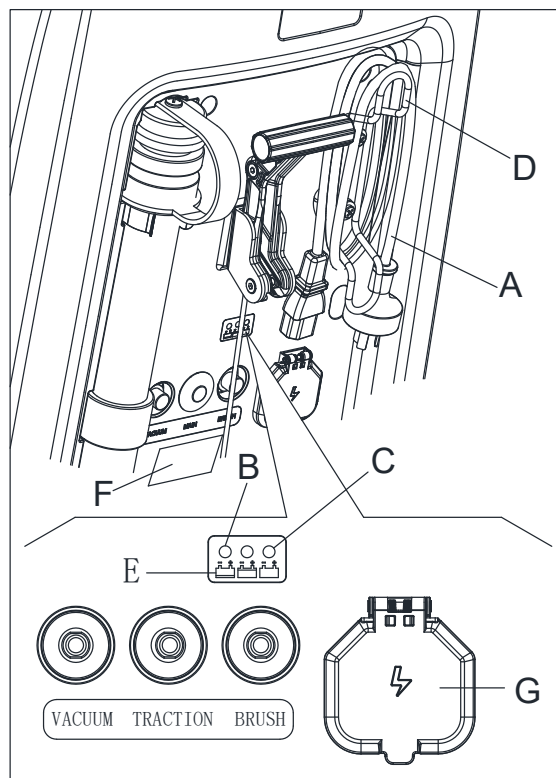


Figure 15

### BRUSH/PAD CLEANING



**CAUTION!**

It is advisable to use protective gloves when cleaning the brush/pad because there may be sharp debris.

1. Remove the brush/pad from the machine, as shown in the Use chapter.
2. Clean and wash the brush/pad with water and detergent.
3. Check that the brushes/pads are in working condition and not excessively worn; if necessary replace them.

### SOLUTION FILTER CLEANING

1. Drive the machine on a level floor.
2. Ensure that the machine is off and the ignition key (35) has been removed.
3. Emptying the solution tank (Advice).
4. Remove the transparent cover (D, Figure 16), then remove the filter strainer (E). Clean and install them on the support (F).



**NOTE**

The filter strainer (E) must be correctly positioned on the housing (H) of the support (F).

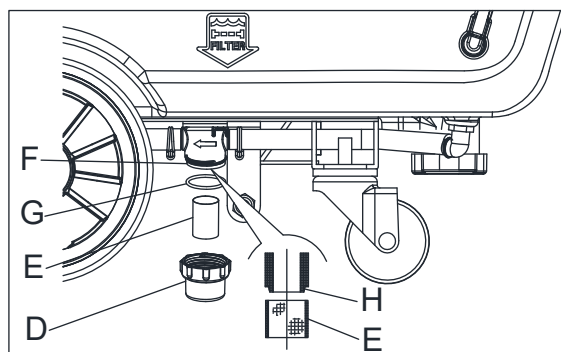


Figure 16

**SQUEEGEE CLEANING**



**NOTE**

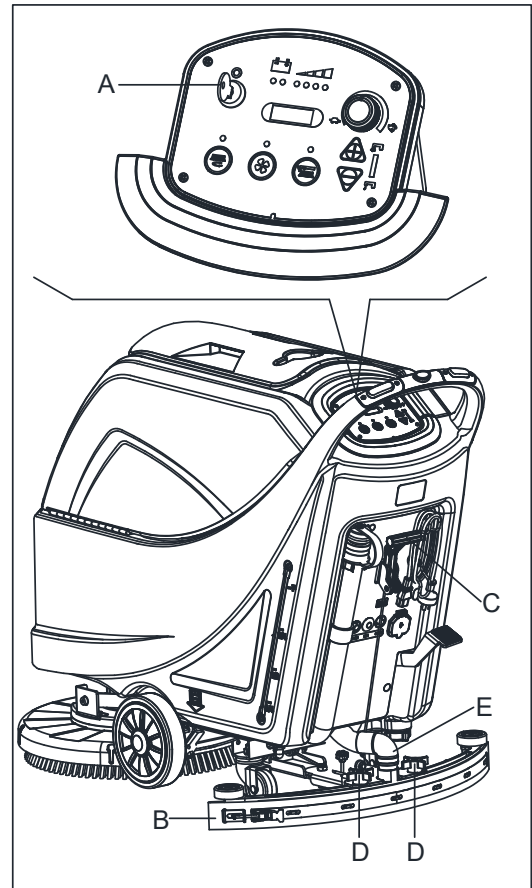
The squeegee must be clean and its blades must be in good conditions in order to get a good drying.



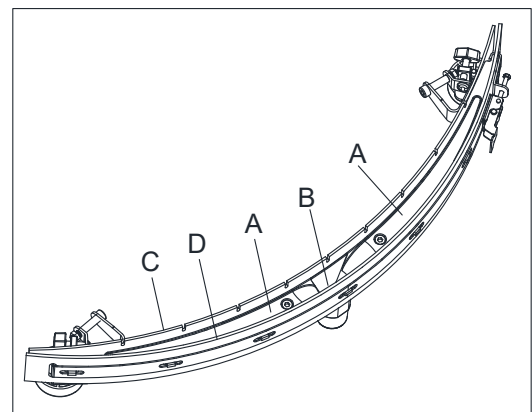
**CAUTION!**

It is advisable to wear protective gloves when cleaning the squeegee because there may be sharp debris.

1. Drive the machine on a level floor.
2. Turn the ignition key (A, Figure 17) to "0".
3. Lower the squeegee (B) with the lever (C).
4. Loosen the knobs (D) and remove the squeegee (B).
5. Disconnect the vacuum hose (E) from the squeegee.
6. Clean the steel or the aluminum squeegee (Figure 18). Clean the compartments (A) and the hole (B) especially. Check the front blade (C) and the rear blade (D) for integrity, cuts and tears; if necessary replace them (see the procedure in the following paragraph).
7. Assemble the squeegee in the reverse order of disassembly.



**Figure 17**



**Figure 18**



### SQUEEGEE BLADE CHECK AND REPLACEMENT

1. Clean the steel or the aluminum squeegee, as shown in the previous paragraph.
2. Check that the edges (E, Figure 20) of the front blade (C) and the edges (F) of the rear blade (D) lay down on the same level, along their length; if necessary adjust their height according to the following procedure:
  - Remove the tie rod (G), disengage the fasteners (M) and adjust the rear blade (D), then engage the fasteners (M) and install the tie rod (G).
  - Loosen the knobs (I) and adjust the front blade (C), then tighten the knobs.
3. Check the front blade (C) and rear blade (D) for wear, cuts and tears; if necessary replace them according to the following procedure. Check that the front corner (J) of the rear blade (D) is not worn; if necessary; overturn the blade to replace the worn corner with an integral one. If the other corners are worn too, replace the blade according to the following procedure:
  - Remove the tie rod (G), disengage the fasteners (M) and remove the retaining strip (K), then replace/overturn the rear blade (D). Assemble the blade in the reverse order of disassembly.
  - Unscrew the knobs (I) and remove the retaining strip (L), then replace the front blade (C). Assemble the blade in the reverse order of disassembly. After the blade replacement (or overturning), adjust the height as shown in the previous step.
4. Connect the vacuum hose (A, Figure 19) to the squeegee.
5. Install the squeegee (B) and screw down the knobs (C).
6. If necessary, adjust the squeegee balance adjusting knob (D).

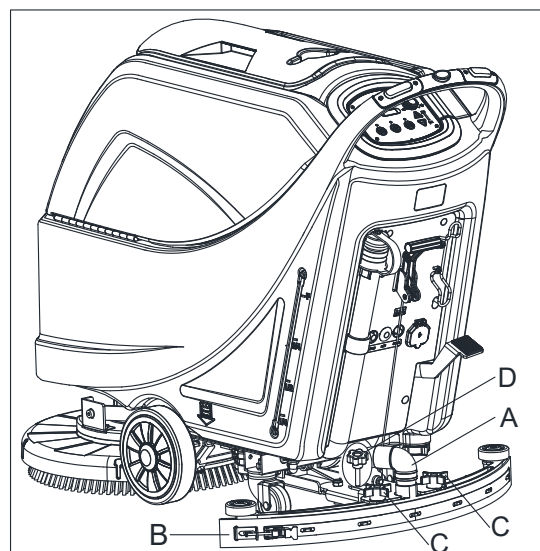


Figure 19

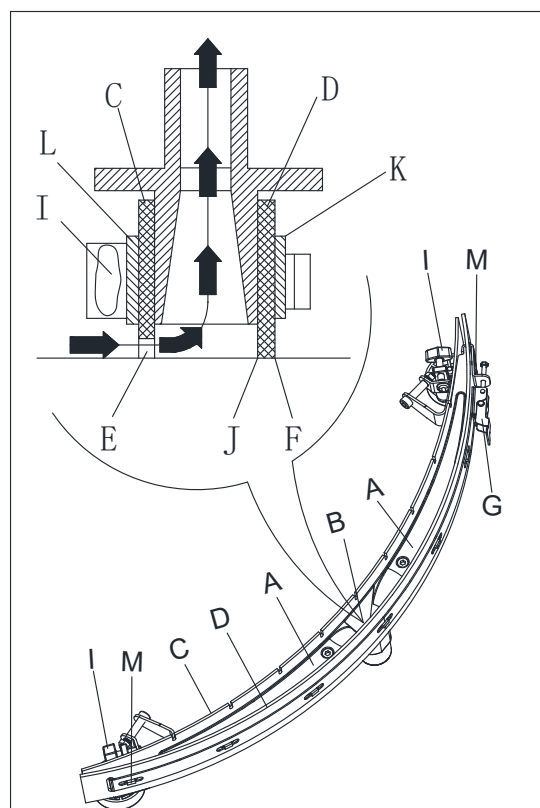


Figure 20

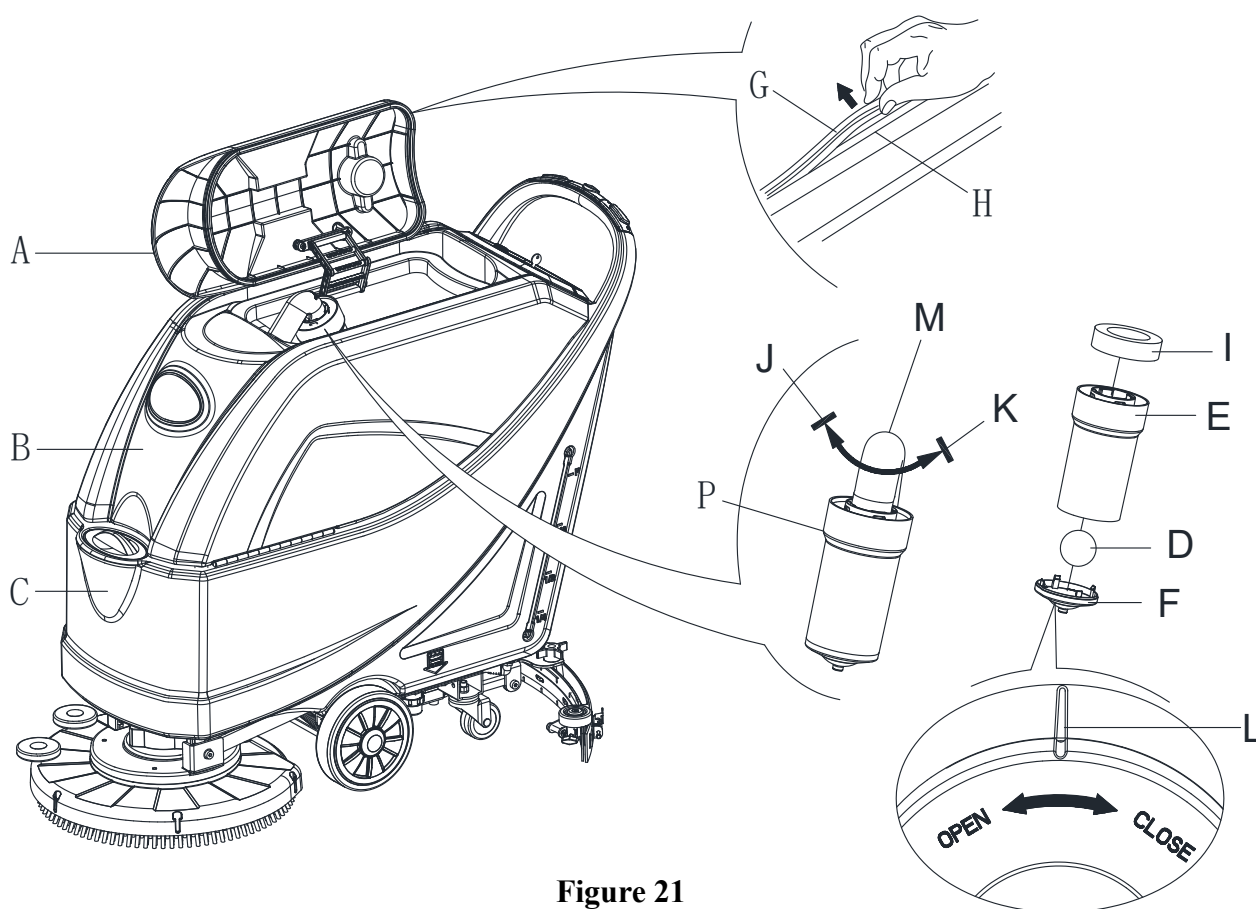
**TANK AND VACUUM GRID WITH FLOAT CLEANING, AND COVER GASKET CHECK**

1. Drive the machine on a level floor.
2. Ensure that the machine is off and the ignition key (54) has been removed.
3. Turn the recovery tank lid (A, Figure 21) 90 degree position where it can be taken off from the tank, and then take down the float ball filter (P) from the tank.
4. Clean the recovery tank lid (A), recovery tank (B), clean water tank (C) and the float ball filter support frame (E). Empty the recovery tank with the drain hose (B, Figure 23).
5. If necessary, follow the symbols "OPEN" and "CLOSE" as shown in (Figure 21) to open the bottom cover (F) of float ball filter and then clean the float ball (D), filter support frame (E) and filter sponge (I). After cleaning, fix the float ball (D) into the filter support frame (E) and then align the mark groove (L) of the bottom cap (F) of the float ball filter with the mark groove (L) of the float filter support frame (E). Screw the bottom cap of the float ball filter tight, and fix the filter sponge (I) onto the float filter support frame (E). Finally, connect it to the sewage suction hose (M).
6. Inspect the integrity of the tank sealing strip.

**NOTE**

**Tank sealing strip (G) makes to produce the vacuum inside the tank when suction motor works. The tank must be sealed can effectively absorb the water from the ground to recovery tank.**

7. Check whether the contact surface of sealing strip (G) is integrity and sealing is sufficient. If necessary, take the sealing strip of the tank out of the groove (H) and replace it. Assemble the new sealing strip as shown in (Figure 21), the joint should be back in the middle area.
8. Close the recovery tank lid (A).

**Figure 21**

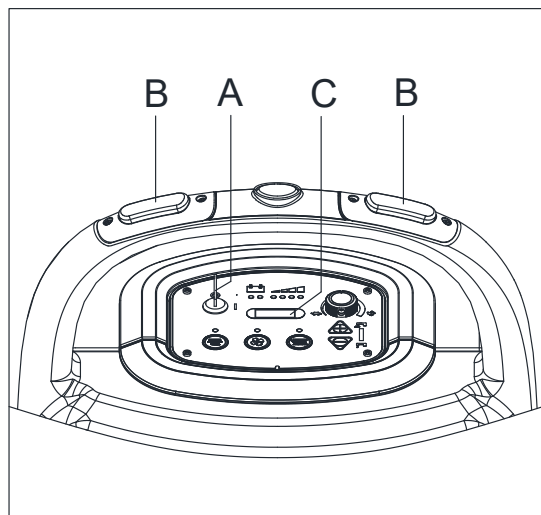
**MACHINE WORKING HOUR CHECK**

1. Turn the ignition key (A, Figure 22) to "I".
2. Press the switch (B), the hour meter (C) begins to work and it at the same time shows the total number of working hours (scrubbing/drying) performed by the machine.
3. Release the switch (B).
4. Turn the ignition key (A) to "0".

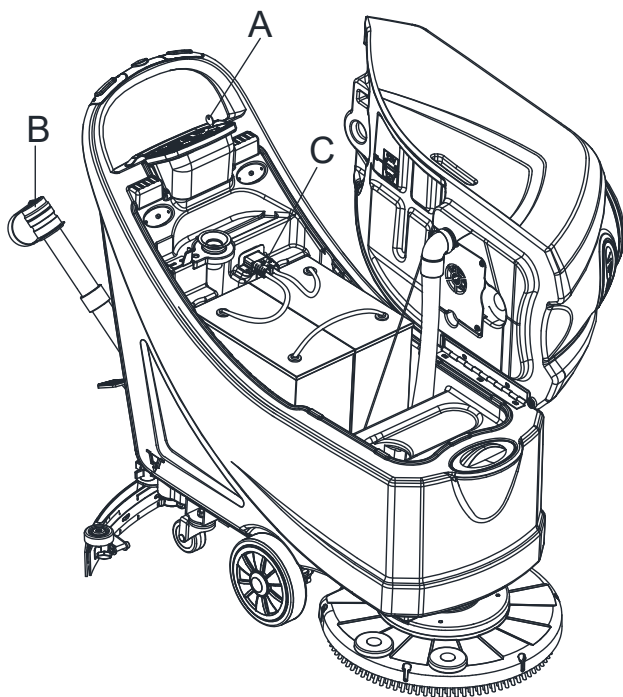
**FUSE CHECK/REPLACEMENT**

1. Turn the ignition key (A, Figure 22) to "0".
2. Disconnect the power supply cable(C, Figure 23) from the electrical mains.
3. Remove the screws(C .Figure 24) on control panel (D), then turn over the PCB to find the fuse (A, B, Figure 24).
4. Check/replace the following fuses:
  - A) F1 fuse, low power circuit fuse: (5A)
  - B) F3 fuse, Brush release fuse: (20A)
5. Perform steps 1 to 3 in the reverse order.
6. Check/press down or replace the following breakers:
  - E) F5breaker, vacuum motor circuit breaker: (30A) (only for disc machine)
  - F) F4 breaker, drive system circuit breaker: (17A) (\*) (only for disc machine)
  - G) F2breaker, brush motor circuit breaker: (30A)

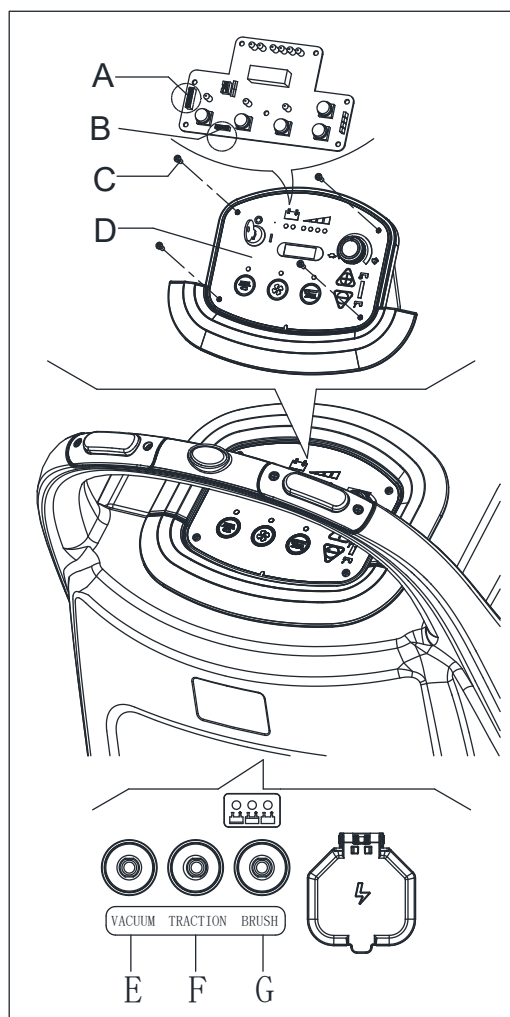
(\*): Only for machine with traction



**Figure 22**



**Figure 23**



**Figure 24**

**ACCESSORIES/OPTIONS**

In addition to the standard components, the machine can be equipped with the following accessories/options, according to the machine specific use:

For further information concerning the above-mentioned optional accessories, contact an authorized Retailer.

**ACCESSORIES/OPTIONS**

See “Parts List” section

1. GEL/AGM batteries
2. Pads of different materials

**TROUBLESHOOTING**

Trouble	Probable causes	Remedy
The motors do not work; no warning light turns on.	The battery connector is disconnected.	Connect the battery connector.
	The batteries are completely discharged.	Charge the batteries.
The machine does not move (Only for machine with traction)	The machine has been turned on by using the ignition key and by keeping one of the switches pressed.	Turn the ignition key to “0”, then try to start the machine again without pressing the switches.
The 3 battery charge indicators are flashing simultaneously.	Brush motor overload.	Use less aggressive brushes
	Foreign materials (tangled threads, etc.) which may prevent the brush from rotating.	Clean the brush hub.
The brushes do not work, the red warning light is on.	The batteries are discharged.	Charge the batteries.
The recovery water vacuuming is insufficient.	The recovery water tank is full.	Empty the tank.
	The hose is disconnected from the squeegee.	Connect.
	The vacuum grid is clogged or the float is stuck closed.	Clean the grid or check the float.
	The squeegee is dirty or the squeegee blades are worn or damaged.	Clean and check the squeegee.
	The tank cover is not properly closed, or the gasket is damaged, or the Bend tube is clogged.	Close the cover correctly, or replace the gasket or clean the Bend tube.
	The recovery water tank is dirty.	Clean.
The solution flow to the brushes is insufficient.	The solution/clean water filter is dirty.	Clean the filter.
The squeegee leaves marks on the floor.	There are debris under the squeegee blades.	Remove the debris.
	The squeegee blades are worn, chipped or torn.	Replace the blades.
	The squeegee has not been adjusted with the knob.	Adjust.



**NOTE**

**Machine with battery charger installed, cannot operate if the charger is not on board. In case of battery charger malfunction, contact an authorized Service Center.**

**For further information refer to the Service Manual, available at any Service Center.**

**SCRAPPING**

Scrap the machine by the qualified waste treatment institution.

Before the machine is scrapped, please take away and segregate below subassembly that relevant laws and regulations request must be disposed in appropriate way.

- Battery
- Brush/Pad-holder
- Plastic hose and plastic parts
- Electrical and electronic components (\*)

(\*) Please contact our company service center for any destroy of electrical and electronic components.

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The logo for VIPER, featuring the word "VIPER" in a bold, black, sans-serif font. The letters are set against a light gray, horizontally-oriented oval background.

**Company information:**  
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