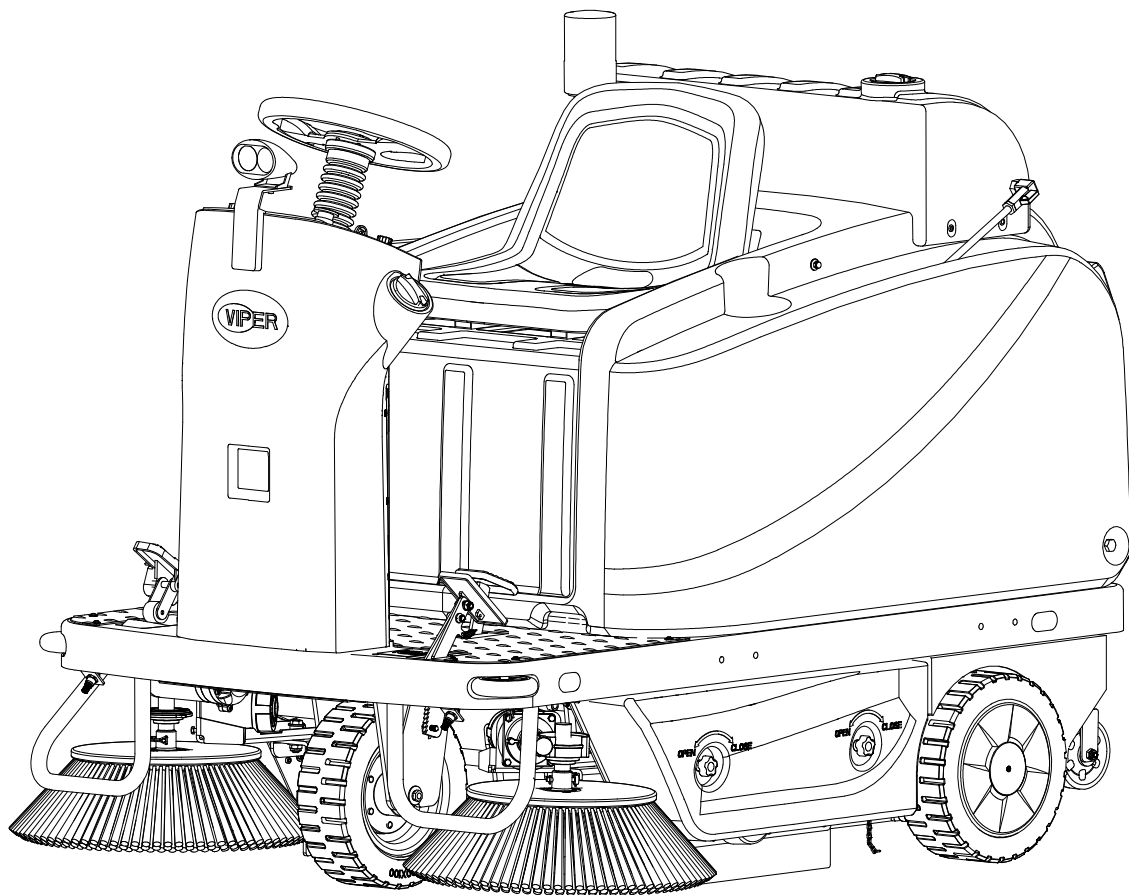


# ROS1300

## INSTRUCTION FOR USE



Model No.: 50000605  
55940533 / Rev. A / JUNE 2021  
Original instructions



The logo for the brand 'VIPER', featuring the word 'VIPER' in a bold, sans-serif font. The text is set against a light gray oval background.





UK Declaration of Conformity

We,  
Nilfisk Ltd  
Nilfisk House, Bowerbank Way Gilwilly Industrial Estate  
Penrith Cumbria  
CA11 9BQ UK

Hereby declare under our sole responsibility that the

Product: FC - Floor Scrubber/Sweeper - Battery  
Description: Charging mode: 220-240V 50-60Hz; Working mode: 24V DC, IP24  
Type: ROS1300

Is in compliance with the following standards:

EN 60335-1:2012+A11:2014+A13:2017  
EN 60335-2-72:2012  
EN 61000-3-2:2019+A1:2021  
EN 61000-3-3:2013+A1:2019  
EN 61000-6-2:2019  
EN 61000-6-4:2019

Following the provisions of:

Supply of Machinery (Safety) Regulations 2008/1597  
Electromagnetic Compatibility Regulations 2016/1091

Penrith, 19-10-2021

A handwritten signature in black ink, appearing to read "Stewart Dennett". The signature is written in a cursive style with a long horizontal stroke at the end.

Stewart Dennett  
GM/MD

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**INTRODUCTION**



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

**GUIDE PURPOSE AND CONTENTS**

The purpose of this instruction for use is to provide the operator with all basic information and technical characteristics, operation, machine inactivity, spare parts, and safety conditions etc.  
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 INSTRUCTION FOR USE**

The Instruction for Use 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, or our company appointed repair center. ONLY original or approved spare parts and accessories can be used.  
Contact our company's customer service for any service or purchase of accessories or spare parts if necessary.

**CHANGE AND IMPROVEMENT**

We are committed to continuous improvement of our products, and the company reserves the right to machine changes and improvements without additional information.

**SCOPE OF APPLICATION**

The machine applies to commercial and industrial use. It is suitable for cleaning smooth and solid floor, being operated by qualified personnel in safe circumstances.

**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 damage is observed, inform the carrier of the damage before accepting the goods, to reserve the right to compensation for the damage.

Follow the instructions on packing strictly when unpacking the machine.

Check the package to ensure following items are included:

1. Technical documentation - Instruction for Use
2. Battery connection components
3. On-board charger manual (if installed) (\*)

## 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 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 to work on slopes with a gradient exceeding that is defined in the specifications section.

### SYMBOLS THAT APPEAR ON THE INSTRUCTION FOR USE



**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 the machine is OFF and disconnect the battery connector.
- Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids, or vapor. This machine is not suitable for collecting dangerous powders.
- Do not wear jewelry 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, you 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 an explosion. You must ensure the charging environment is well ventilated and away from flames.



### WARNING!

- This machine is intended for **COMMERCIAL USE**, for example in hotels, schools, hospitals, factories, shops, and rental businesses etc.
- Machines left unattended shall be secured against unintentional movement.
- To prevent unauthorized use of the machine, the power source shall be switched off or locked, for example by removing the key to the main switch or the ignition key.
- Check the machine carefully before each use. Ensure that all the components have been well assembled. Loose components may cause damage to people and properties.
- Never move the machine by pulling the battery charger cable. Do not pass the cable through a closed door or wind the cable around sharp edges or corners. Do not run the machine over 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, do not leave the machine unattended when it is charging. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.
- The machine storage and working temperature must be between 0 °C and +40 °C, the humidity of air must be between 30% - 95%.
- Do not use the machine on slopes with a gradient exceeding the specifications shown.
- Use brooms supplied with the machine or defined in the manual. Using other brooms 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, jewelry, and loose clothes from being caught by the machine moving parts.
- Do not wash the machine with direct or pressurized 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 broom 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 labels.
- Do not tamper with the machine safety guards and follow the scheduled maintenance instructions closely.
- Pay attention during machine transportation when temperature is below freezing point. The water in the solution tank and in the hoses could freeze and cause serious damage to the machine.

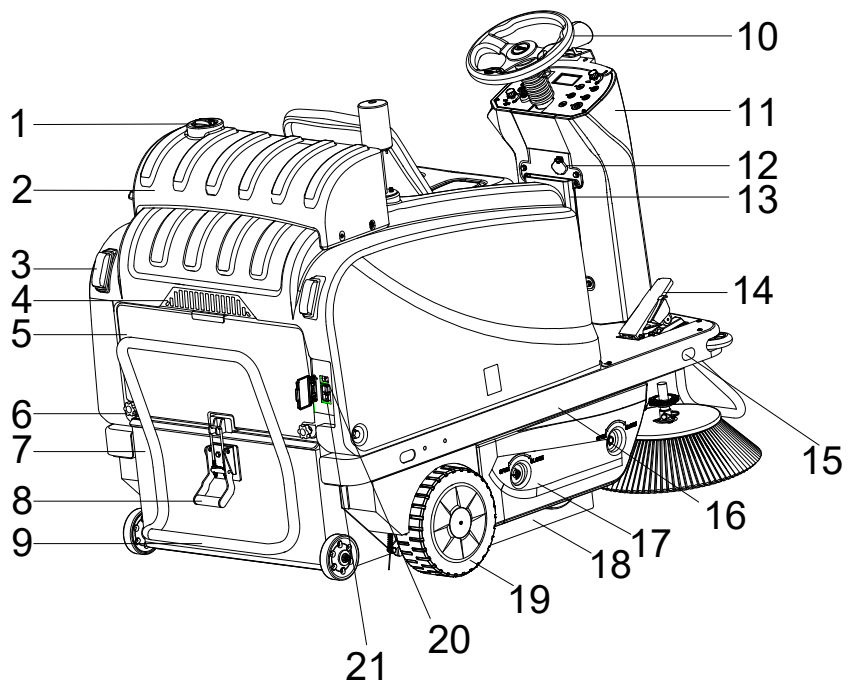
- If spare parts need be replaced, order **ORIGINAL** spare parts from an Authorized Dealers or Retailers.
- Return the machine to the Service Center if it doesn't work as usual or is damaged.
- To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this manual, must be performed by the authorized personnel or an authorized Dealer or Retailer.
- The machine must be properly disposed of, due to the presence of toxic-harmful materials (batteries, etc.), which are subject to standards that require disposal in special centers (see Scrapping chapter).
- This machine is a cleaning tool only and is not intended for any other purpose.
- 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 proper lighting is provided.
- Front light must be used only to enhance visibility on the floor to be cleaned, but it does not authorize anyone to use the machine in dark environments.
- 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.
- Operators shall be adequately instructed on the use of this machine.
- Do not use the machine without a falling object protective structure (FOPS) in areas where it is likely that the operator could be hit by falling objects.
- Always protect the machine against rain, and bad weather, under both operating and inactivity conditions. Store the machine indoors, in a dry environment: this machine must be used in dry conditions and must not be used or kept outdoors in wet conditions.
- Adjust the operation speed to suit the floor conditions.
- Avoid sudden stops and drive at low speed when the machine goes downhill. Avoid sharp turns.
- This machine cannot be used on roads or public streets.



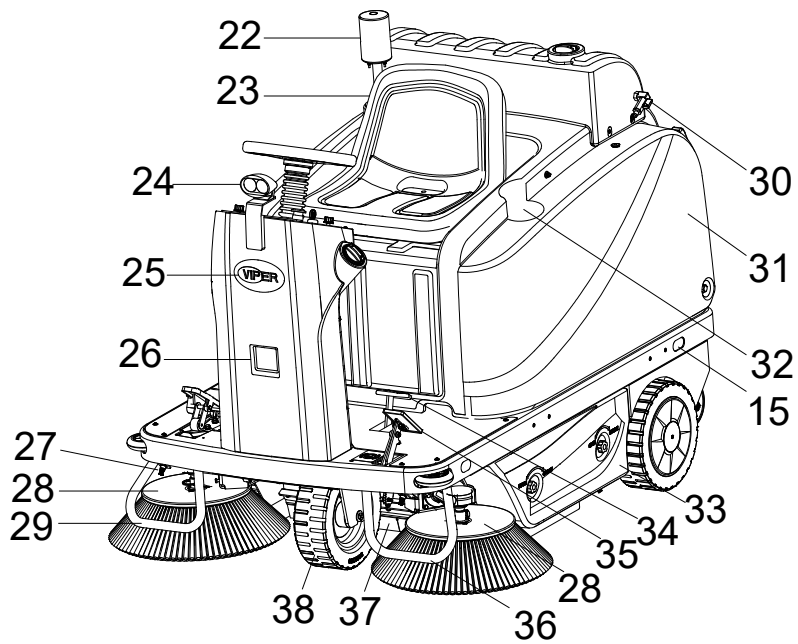
**MACHINE DESCRIPTION**

**MACHINE STRUCTURE**

1. Tank cover
2. Solution tank (\*)
3. Turn indicator
4. Air outlet bracket
5. Filter compartment cover
6. Knurled knob
7. Hopper
8. Latch
9. Hopper rear wheel
10. Steering wheel
11. Solution tank
12. USB charging port
13. Phone bag
14. Accelerator pedal
15. Machine lift anchor
16. Chassis
17. Right cover
18. Side blade
19. Drive wheel (with mechanical brake)
20. On-board charger plug (\*)
21. External charger connector
22. Warning light
23. Adjustable seat (with safety switch)
24. Blue light (\*)
25. Logo label
26. Headlight
27. Spray nozzle
28. Side broom
29. Right bumper
30. Solution valve
31. Cover
32. Cup holder
33. Left cover
34. Flap pedal
35. Parking brake
36. Left bumper
37. Front blade
38. Front wheel



**Figure 1**



**Figure 2**

- 39. On-board charger (\*)
- 40. Main broom adjuster
- 41. Hood support cable
- 42. Circuit breaker box
- 43. Battery connector
- 44. Battery (\*)
- 45. Battery tray
- 46. Main broom

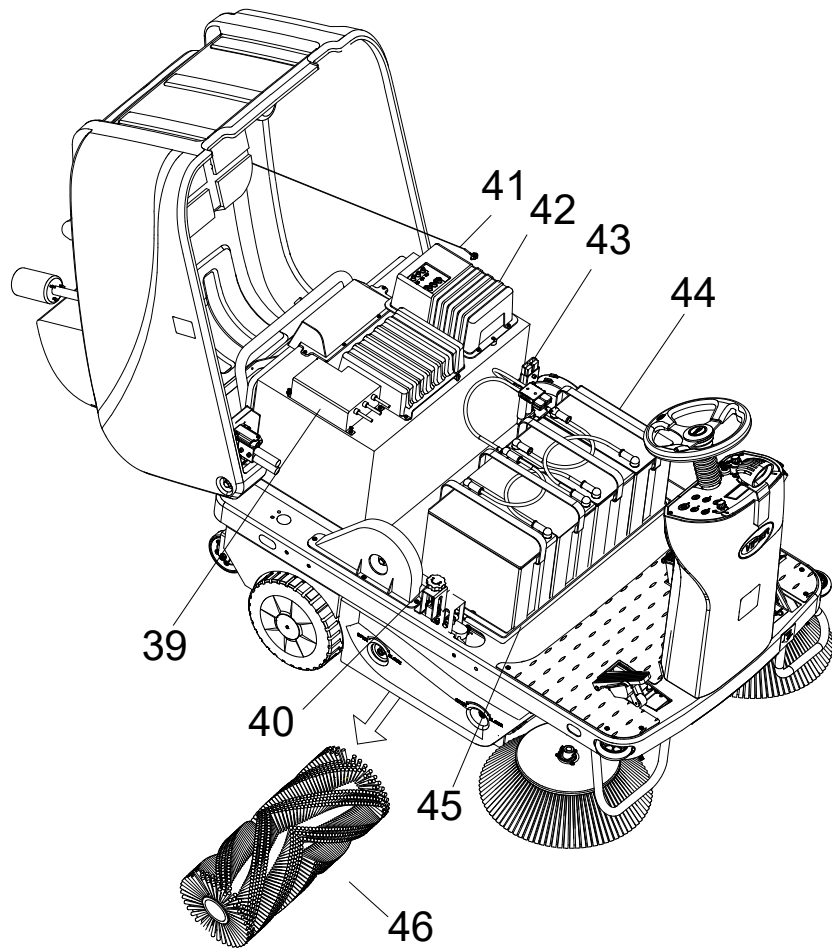
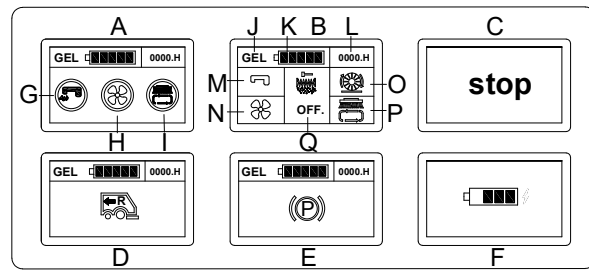


Figure 3

**CONTROL PANEL**

- 47. Multifunction display  
Items displayed:  
A) Pump/Vacuum motor/Side-broom separate running mode  
B) One-button start mode  
C) Safety stop mode (seat safety switch off)  
D) Reverse mode  
E) Braking/parking mode  
F) Battery charging mode  
G) Pump working  
H) Vacuum motor working  
I) Side broom working  
J) Battery type  
K) Battery level  
L) Runtime (Hour meter)  
M) Pump off-working  
N) Vacuum motor working  
O) Main broom working  
P) Side broom working  
Q) Filter shaker off-working



- 48. Speed adjusting knob
- 49. Vacuum button  
· Turn on/off the vacuum motor
- 50. Pump button  
· Turn on/off the pump
- 51. Side broom button  
· Turn on/off the side broom
- 52. Filter shaker button  
· Turn on/off the filter shaker  
· Press for 1 second to switch to Auto cleaning mode (LED of filter shaker flashes) and press for 1 second again to exit.
- 53. One-button start button  
· Turn on/off all vacuum motor, main broom and side brooms
- 54. Forward-reverse button
- 55. Horn button
- 56. Ignition key (I=ON, O=OFF)
- 57. Side broom speed adjusting knob
- 58. Headlight button  
· Turn on/off the headlight  
· Press for 1 second to turn on/off the blue light (if equipped)
- 59. Left-turn indicator button
- 60. Right-turn indicator button
- 61. Emergency stop button
- 62. F8 side broom (L) motor circuit breaker (10A)
- 63. F9 side broom (R) motor circuit breaker (10A)
- 64. F7 main broom motor circuit breaker (30A)
- 65. F11 vacuum motor circuit breaker (10A)
- 66. F6 main controller circuit breaker (5A)
- 67. F10 filter shaker motor circuit breaker (10A)
- 68. F5 controller power fuse (150A/70VDC)

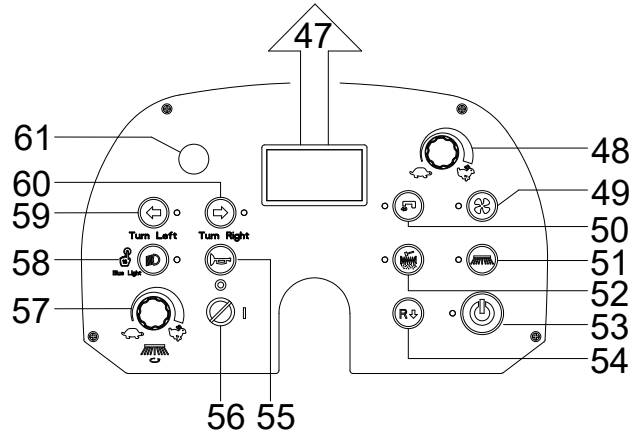


Figure 4

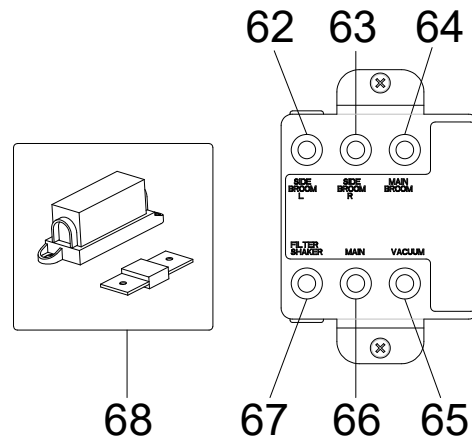
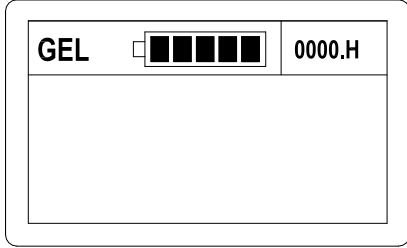
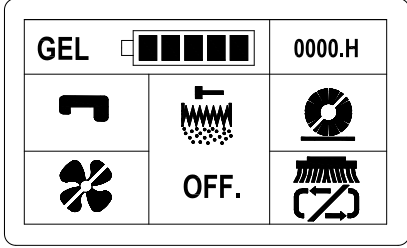
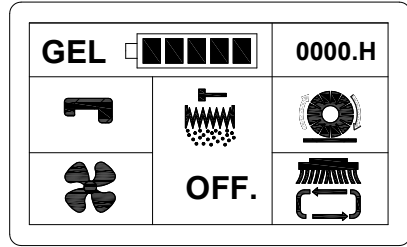
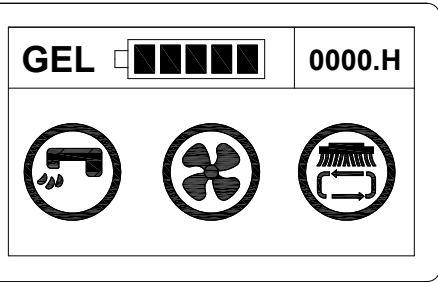
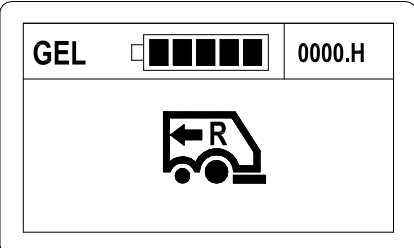


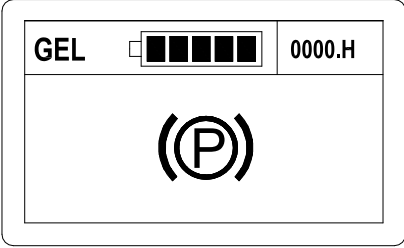

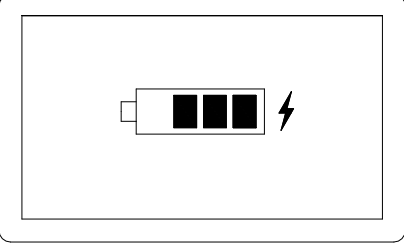
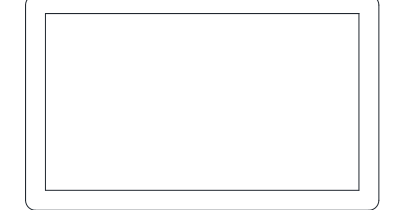
Figure 5



**NOTE**  
(Circuit breaker maintenance see Troubleshooting chapter)

## WORKING MODE DESCRIPTION

HOW TO OPERATE	DISPLAY	DESCRIPTION
<b>Standby mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) on</li> <li>- One-button start (53) off</li> </ul>		<ol style="list-style-type: none"> <li>1. The point in the hour meter does not flash.</li> <li>2. LCD only displays battery type, battery level and runtime.</li> <li>3. All pump, vacuum motor, filter shaker, main and side brooms functions are off. (Vacuum motor will be off in several seconds if it is on.)</li> </ol>
<b>One-button start mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) on</li> <li>- One-button start (53) on</li> </ul>		<ol style="list-style-type: none"> <li>1. The point in the hour meter does not flash.</li> <li>2. The tap water drop icon does not display.</li> <li>3. The fan icon does not rotate.</li> <li>4. Filter shaker icon displays "OFF".</li> <li>5. Main and side broom arrow icon does not rotate.</li> </ol>
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- One-button start (53) on</li> <li>- Seat safety switch (23) on</li> <li>- Accelerator pedal (32) pressed</li> </ul>		<ol style="list-style-type: none"> <li>1. The point in the hour meter flashes.</li> <li>2. The tap water drop icon does not display.</li> <li>3. The fan icon rotates.</li> <li>4. Filter shaker icon displays "OFF".</li> <li>5. Main and side broom arrow icon rotates.</li> </ol>
<b>Separate running mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) on</li> <li>- One-button start (53) off</li> <li>- Vacuum button (49) / pump button (50) / side broom button (51) / filter shaker button (52) on</li> <li>- Accelerator pedal (32) pressed</li> </ul>		<ol style="list-style-type: none"> <li>1. The point in the hour meter flashes.</li> <li>2. The tap water drop icon flashes.</li> <li>3. The fan icon rotates. (If filter shaker is on, vacuum motor will be off.)</li> <li>4. Side broom arrow icon rotates.</li> </ol>
<b>Reverse mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) on</li> <li>- Forward-reverse button (54) on</li> </ul>		Horn sounds for reverse warning

HOW TO OPERATE	DISPLAY	DESCRIPTION
<b>Braking/parking mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) on</li> <li>- Mechanical parking brake (35) pressed</li> </ul>		Machine stops moving. Other functions remain in their original state.
<b>Safety stop mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) on</li> <li>- Seat safety switch (23) off (Operator leaves the seat of the machine)</li> </ul>		<ol style="list-style-type: none"> <li>1. "STOP" icon alternates with the status bar on the screen.</li> <li>2. All functions are shut down except for horn and light control.</li> </ol>
<b>Charging mode</b>		
<ul style="list-style-type: none"> <li>- Connect charger plug to power supply</li> </ul>		<ol style="list-style-type: none"> <li>1. LCD displays charging status.</li> <li>2. All functions are shut down.</li> </ol>
<b>Power off mode</b>		
<ul style="list-style-type: none"> <li>- Key (56) off</li> <li>- Or emergency stop button (61) on</li> </ul>		<ol style="list-style-type: none"> <li>1. The power is cut off.</li> <li>2. LCD is off.</li> </ol> <p><b>Note: Before turning off the key (56), turn off the one-button start (53) and wait for the broom to rise to the fully up position.</b></p>

## ACCESSORIES

The following accessories are optional:

1. WET/GEL/AGM/TPPL batteries
2. Battery charger
3. Main and side brooms with harder or softer bristles
4. Blue light
5. Overhead guard
6. Rear mounted solution tank

For further information concerning the optional accessories, contact an authorized retailer

## TECHNICAL DATA

Parameter	Value
Machine length	1,680 mm /66.1 Inches
Machine width (without side brooms)	1,055 mm /41.5 Inches
Machine maximum height	1,300 mm /51.2 Inches
Cleaning width (without side brooms)	700 mm /27.6 Inches
Cleaning width (with two side brooms)	1,350 mm /53.1 Inches
Minimum distance from the floor (blades not included)	60 mm/2.4 Inches
Main broom size (diameter x length)	300x700 (mm) / 11.8x27.6 (Inches)
Side broom diameter	500 mm/19.7 Inches
Main broom speed	600 rpm
Side broom speed	0~98 rpm
Front wheel specific pressure on the floor	0.88 N/mm <sup>2</sup>
Rear wheel specific pressure on the floor	0.6 N/mm <sup>2</sup>
Machine weight (without batteries)	361 kg/794.2 Lbs.
Gross vehicle weight (GVW)	688 kg/1516.8 Lbs.
Shipping weight	495 kg/1089 Lbs.
Shipping size	1810x1180x1500(mm) / 71.3x46.5x59.1 (Inches)
Hopper capacity	130 L/34.3 Gal.
Main broom motor	Input 624 W Output 500 W / Input 0.85 HP Output 0.68 HP
Side broom motors	Input 280 W Output 100 W / Input 0.38 HP Output 0.14 HP
Drive system motor	Input 936 W Output 650 W / Input 1.2 HP Output 0.88 HP
Vacuum system motor	Input 168 W Output 139 W/ Input 0.23 HP Output 0.19 HP
Filter shaker motor	Input 144 W Output 100 W / Input 0.2 HP Output 0.14 HP
Rated Power	2640 W/3.6 HP
Power consumption	950 W/1.3 HP
Sound pressure level at workstation (ISO 11201, ISO 4871) (LpA)	72 ± 3 dB(A)
Machine output acoustic power (ISO 3744, ISO 4871) (LwA)	86 ± 3 dB(A)
Vibration level at the operator's arms (ISO 5349-1) (*)	<2.5 m/s <sup>2</sup>
Vibration level at the operator's body (ISO 2631-1) (*)	<1.5 m/s <sup>2</sup>
IP protection class	IP 24

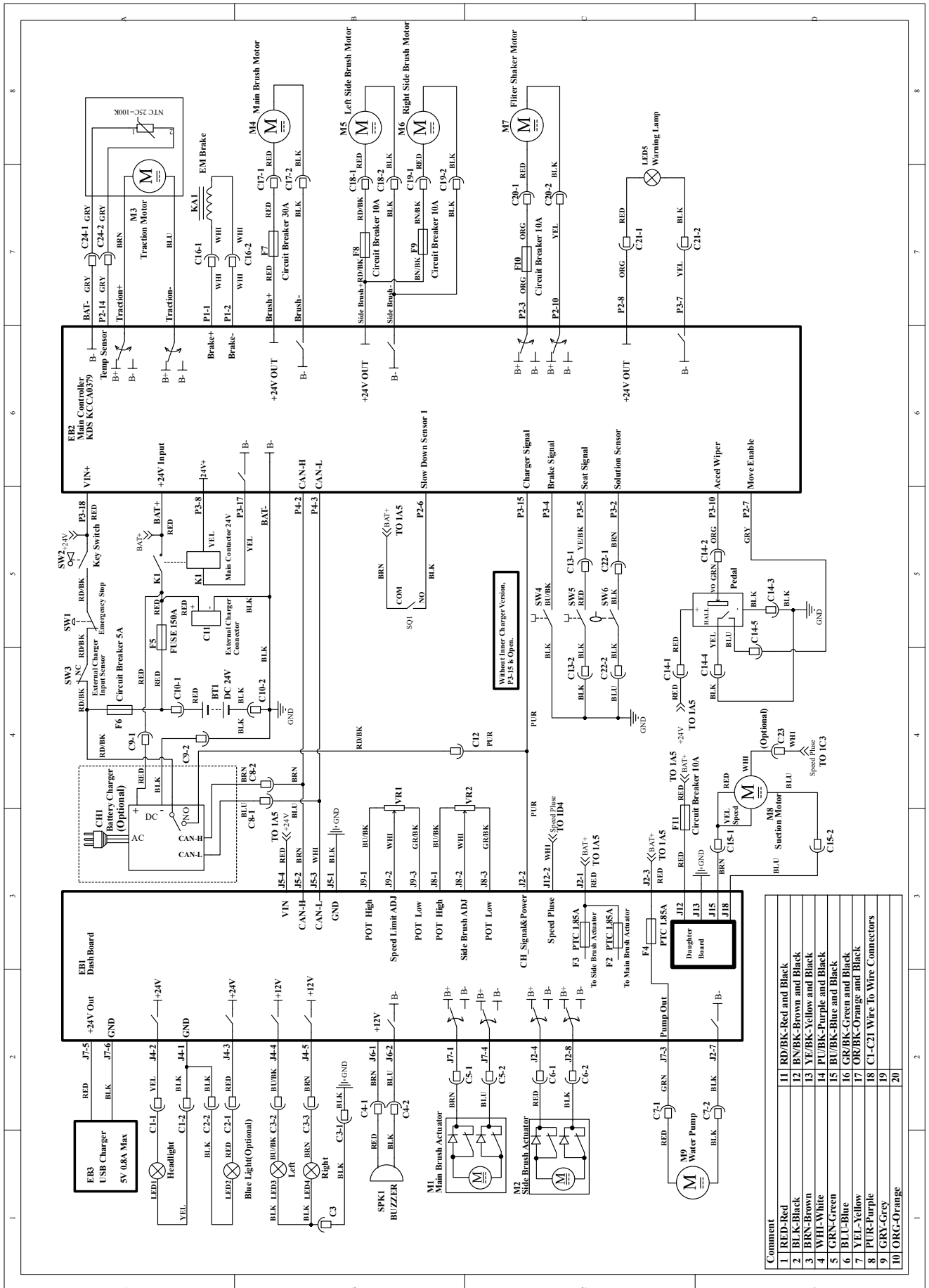
(\*) Under normal working conditions, on a level asphalt surface.

Performance	Value
Maximum forward speed	8 km/h /5 Miles per hour
Maximum reverse speed	4 km/h / 2.5 Miles per hour
Gradeability (transport mode only) Max.	20%
Gradeability (working mode) Max.	16%
Min. turn-around aisle width	2550 mm/100.4 Inches

Battery	Value
Battery voltage	DC 24 V
Battery compartment inner size (length x width x height)	762 x 330 x 370 (mm)/ 30x13x14.6 (Inches)

Vacuuming and filtering	Value
Dust filter	3.5 m <sup>2</sup> / 37.7 ft <sup>2</sup>
Main broom compartment vacuum	8.8 mm H <sub>2</sub> O
Filter shaker	Electric

WIRING DIAGRAM



## OPERATING GUIDE



### WARNING!

On some points of the machine there are some labels indicating:

- DANGER!
- WARNING!
- CAUTION!
- CONSULTATION

While reading this Manual, the operator must pay attention to the symbols shown on the labels. Do not cover these labels 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 battery type using the procedures below according to the type of batteries used (WET or GEL/AGM/DIS/EXI/FUL/OPT/ENE(TPPL)). Check the batteries for damage before installation. Disconnect battery connector and battery charger plug. Handle the batteries with great care. Install the battery terminal protection caps supplied with the machine.



### NOTE

The machine requires four 6V batteries, connected and installed in the positions shown in Figure 6.

### Batteries already installed on the machine

1. Ensure that the battery connector is connected.
2. When first using the machine with new batteries, perform a full charging cycle (see the procedures in Maintenance chapter).

### Without batteries

1. Buy appropriate batteries (see "Technical Data" chapter). For battery choice and installation, contact qualified battery retailers.
2. Set battery type according to the procedures below.

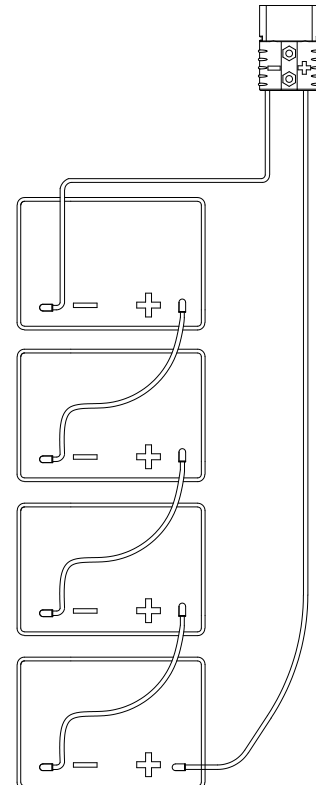


Figure 6



## BATTERY INSTALLATION AND BATTERY TYPE SETTING (WET /GEL/ AGM/ DIS/EXI/FUL/OPT/ENE(TPPL))

### Battery Installation

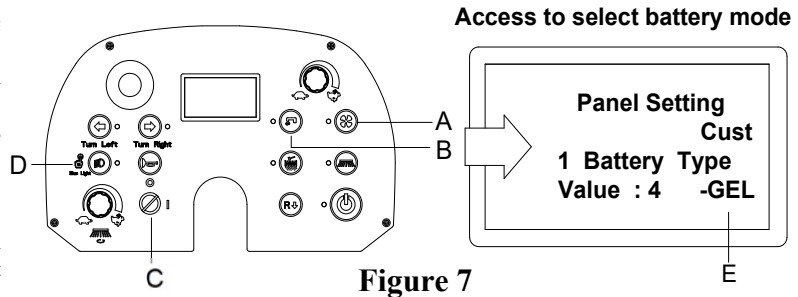
1. Make sure that the machine is turned off with the ignition key and the parking brake is engaged.
2. Tip back the cover (31, Figure 2) carefully.
3. The machine is equipped with battery cables suitable for installing 4X6V batteries. Carefully put the batteries into the compartment, then install them correctly.
4. Route and install the battery cables as shown in (Figure 6), then carefully tighten the nut on each battery terminal.
5. Place the protection cap on each terminal, and then connect the battery connector to the connector on the machine.
6. Turn back the cover carefully.

### Battery type setting (WET/GEL/AGM/DIS/EXI/FUL/OPT/ENE(TPPL))

#### Access to select battery mode

According to the type of batteries (WET/GEL/AGM/DIS/EXI/FUL/OPT/ENE(TPPL)), set up the machine as follows:

7. Press vacuum button (A, Figure 7) and pump button (B, Figure 7) at the same time.
8. Insert ignition key (C, Figure 7) and turn it to "I".
9. Several seconds later the system enters select battery mode (Figure 7).
10. Release both vacuum button (A, Figure 7) and pump button (B, Figure 7).
11. Press vacuum button (A, Figure 7) and pump button (B, Figure 7) to select battery type (E, Figure 7).
12. Press headlight button (D, Figure 7), about 1 second later the screen displays "Update OK", indicating that battery type is set up, then restart machine. (C, Figure 7).

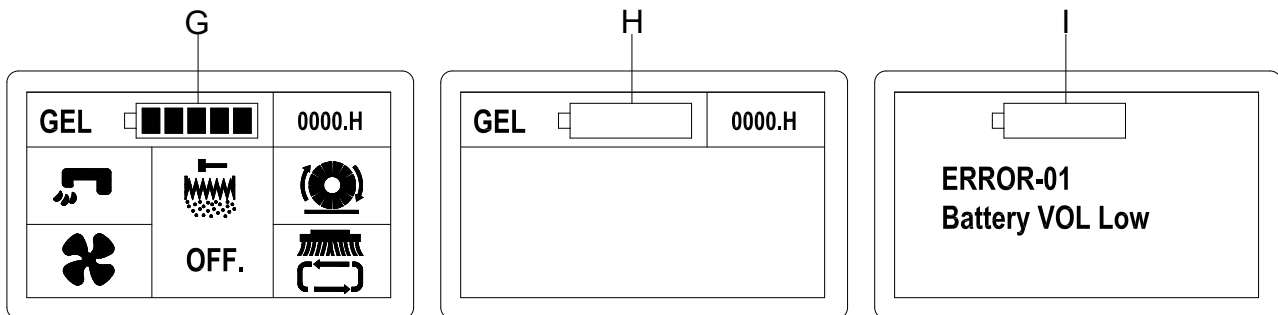


### Battery charging

Fully charge the batteries (see the procedures in Maintenance chapter).

### Battery discharging

1. When the battery icon displays full battery level (G, Figure 8), the batteries are fully charged.
2. When the battery icon displays low battery level (H, Figure 8), the batteries must be charged. Several seconds after the low battery level is displayed, the Main broom/Side broom/Vacuum/Pump/Filter shaker motors are automatically turned off, while the drive system remains on. Drive the machine to the designated charging area to charge immediately.
3. When battery voltage is very low, an error warning "Battery VOL Low" (I, Figure 8) will flash on the screen. Main broom/Side broom/Vacuum/Pump/Filter shaker motors are automatically turned off, and the drive system is also turned off to protect the batteries.



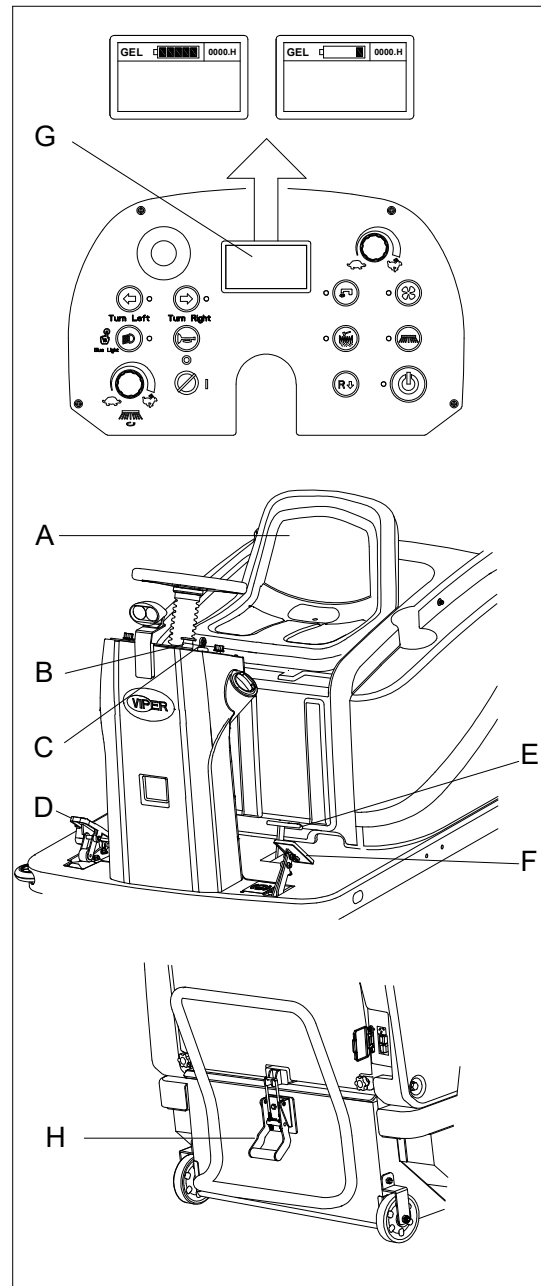
**BEFORE MACHINE START-UP****Checklist**

1. Have a full knowledge of the machine operating controls and their functions.
2. Sit on the seat (A, Figure 9), insert the ignition key (C, Figure 9), and start the machine. (See the procedures in the following paragraph)
3. Check the battery level. If the battery icon on the LCD (G, Figure 9) is of 5 bars, the batteries are fully charged for use. If it is of 1 bar or less, batteries must be charged before operation. (Refer to Maintenance chapter for battery charging)
4. Check the parking brake (F, Figure 9). The brake must hold its setting (locked) firmly without easily being released (report all defects immediately to Nilfisk Service Center).
5. Check the flap pedal (E, Figure 9) for proper operation.
6. Press the accelerator pedal (D, Figure 9) slightly then release it to check if the machine can be steered forward and stopped.
7. To ensure safety, confirm the machine can be stopped immediately when pressing the emergency stop button (B, Figure 9). Turn the emergency stop button to reset it.

**WARNING!**

**If the pedal is “spongy” or fades under pressure without an efficient braking force, do not drive the machine (report all defects immediately to Nilfisk Service Center).**

8. Make sure that there are no open covers/hoods and that the machine is in normal operating conditions.
9. Make sure that the hopper (H, Figure 9) is properly closed.

**Figure 9****Cleaning planning**

1. Arrange long runs with a minimum of stopping or starting.
2. Allow a small amount of broom path overlap to ensure complete coverage.
3. Avoid making sharp turns, bumping, or scraping the side of the machine.

## STARTING AND STOPPING THE MACHINE

### Preliminary operations

1. Sit on the driver's seat (A, Figure 10) and adjust its position with the lever (C, Figure 10) to allow easy reach of all controls.



#### NOTE

The driver's seat (A, Figure 10) is equipped with a safety sensor, which allows the machine to be driven only when the operator is on the driver's seat.

### Starting the machine

1. Sit on the seat (A, Figure 10), insert the ignition key (J, Figure 10), and turn it to "I".
2. Disengage the parking brake and drive the machine to the working area.
3. Press one-button start button (M, Figure 10) to start the machine, the side brooms and main broom are lowered to the floor automatically.
4. Press the accelerator pedal (E, Figure 10), drive the machine forward or backward with steering wheel (B, Figure 10) and forward-reverse button (L, Figure 10). Driving speed can be adjusted with speed adjusting knob (N, Figure 10). Main/side brooms and vacuum motor begin to work.
5. Adjust side broom speed with side broom speed adjusting knob (I, Figure 10) based on cleaning requirements.
6. The USB charging port (D, Figure 10) can be used to charge mobile phone or pad when ignition key (J, Figure 10) is turned to "I".
7. Press the horn button (K, Figure 10) to warn people when necessary.



#### NOTE

The main broom and side brooms (F and H, Figure 10) can be lowered and lifted even when the machine is moving. The main broom and side brooms do not rotate when they are lifted.

8. Start sweeping by turning the steering wheel (B, Figure 10) and driving the machine forward with the accelerator pedal (E, Figure 10).

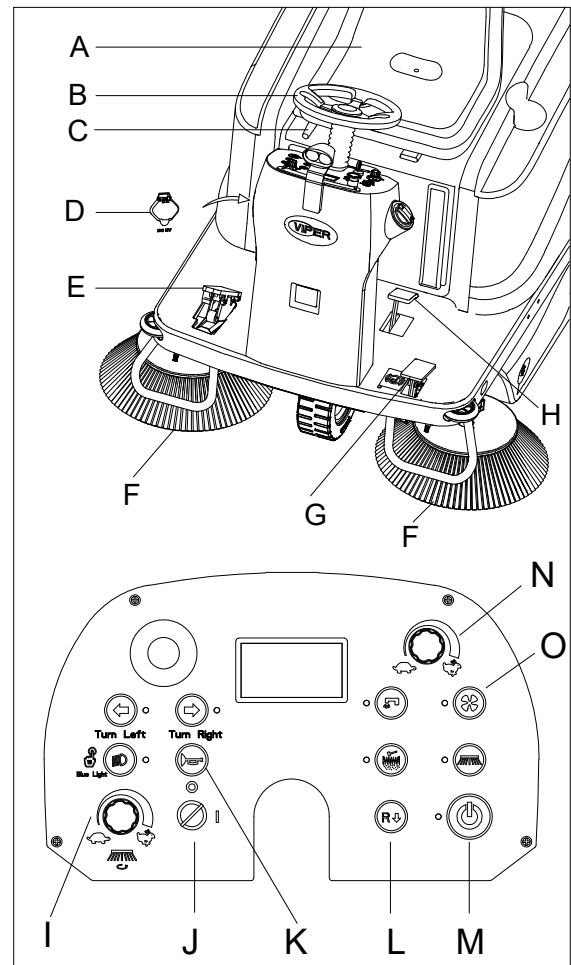


Figure 10

### Stopping the machine

9. Release the accelerator pedal (E, Figure 10), and the machine stops moving.
10. Press one-button start button (M, Figure 10) again to turn off brooms, vacuum motor and pump. The main broom and side brooms are lifted from the floor automatically. The vacuum system is turned off after a delay of several seconds.
11. Turn the ignition key to "O".
12. Engage the parking brake.

## PARKING BRAKE

1. Engage the parking brake by pressing on the front of the pedal (A, Figure 11) and engaging the lever (B, Figure 11).
2. Disengage the parking brake by pressing on the back of the pedal (C, Figure 11) and releasing it.



**WARNING!**  
Before performing any maintenance, repair, cleaning or replacement procedure, engage the parking brake. Don't park the machine on a ramp.

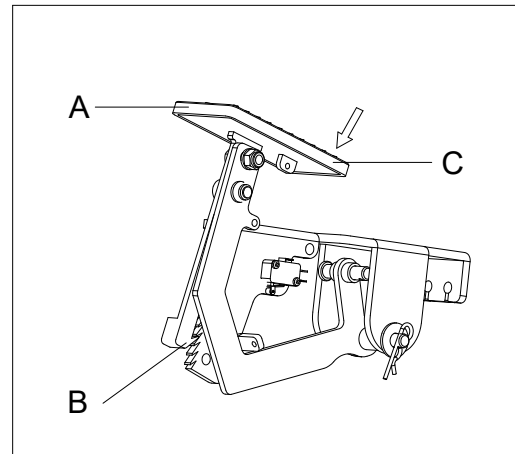


Figure 11

## MACHINE OPERATION



**WARNING!**  
When using the machine on slopes, follow the maximum gradient values marked on the machine (see “Technical Data” chapter).



**WARNING!**  
Pay careful attention when operating the machine at high speed: sudden steering could cause this three-wheel machine to become unstable due to weight distribution. Always reduce the speed before steering.

1. Drive the machine to the work area as shown in the previous paragraph.
2. Drive the machine straight forward at high speed. Drive the machine slower when sweeping a large amount of dust or debris or when safe operation requires slower speed. To achieve optimal results, overlapping sweeping paths by over 10 cm (4 inches) is recommended.
3. Avoid stopping the machine in the same position for a long time with the brooms rotating: this could create unwanted marks on the floor.
4. To collect light and bulky waste materials, lift the front blade by pressing the flap pedal (H, Figure 10); take into consideration that the machine vacuum capability is reduced when the front blade is lifted.



**CAUTION!**  
When operating on wet floors, it is essential to turn off the vacuum system by pressing the vacuum button (A, Figure 12) to prevent the dust filter from being damaged.

5. For machine proper operation, the dust filter must be as clean as possible. To clean it while sweeping, turn on the filter shaker by pressing the filter shaker button (B, Figure 12). During this operation the vacuum motor is automatically shut off. After cleaning the filter, the vacuum system resumes working automatically; then start sweeping again. While working, “filter auto cleaning” mode can be activated by pressing filter shaker button (B, Figure 12) for 1 second, which can repeat the filter cleaning procedure every 10 minutes on average (depending on the dustiness of the area to be cleaned, interval can be set from 1 to 60 minutes, parameter setting refer to the Service Manual).

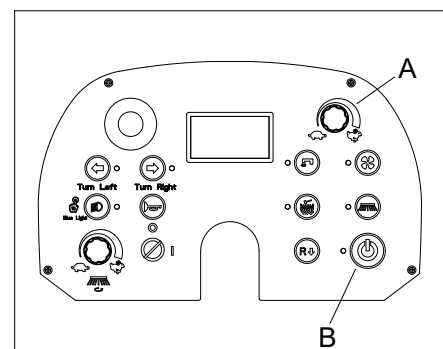


Figure 12



**NOTE**  
This procedure can also be performed when the machine is moving.



**CAUTION!**  
When the dust filter is clogged and/or the hopper is full, the machine cannot collect dust and debris anymore.

6. The hopper (D, Figure 13) should be emptied after each working cycle and whenever it is full (see the procedure in the following paragraph).

## HOPPER DUMPING

1. Stop the machine (see the procedures in the previous paragraph).
2. Engage the parking brake.
3. Disengage the latch (A, Figure 13) by pulling its lower end.
4. Remove the hopper (D, Figure 13) by disengaging it from the inner guides with the handle (B, Figure 13).
5. Discharge all the debris into special containers. To make discharging procedure easier, there are three inner boxes (optional) with handle (C, Figure 13) inside the hopper.
6. Install the inner boxes with handle (C, Figure 13), if equipped.
7. Install the hopper (D, Figure 13) and engage it to the inner guides, then fasten it with the latch (A, Figure 13).

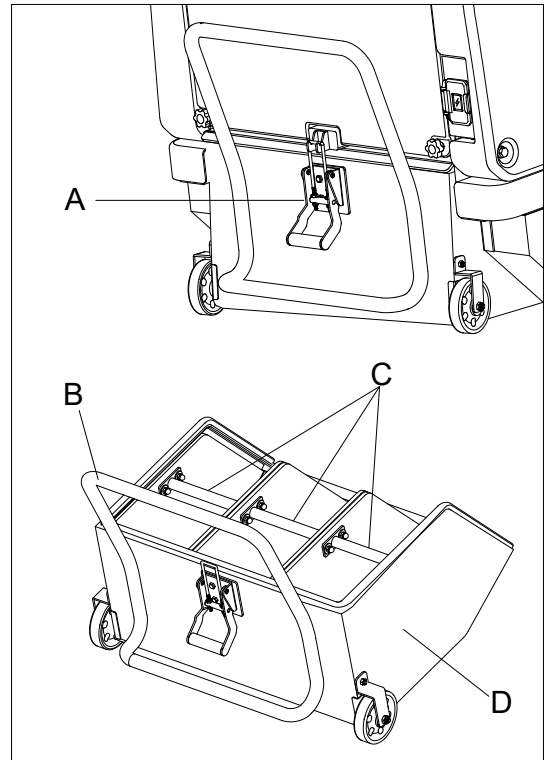


Figure 13

## SIDE BROOM INSTALLATION



### WARNING!

It is advisable to wear protective gloves when replacing the side brooms because there can be sharp debris between the bristles.

1. Drive the machine onto level ground and engage the parking brake.
2. Turn the ignition key to "O".
3. Release the spring (A, Figure 14), and remove the pin (B, Figure 14) from the side broom (C, Figure 14) shaft.
4. Install the side broom on the gearmotor shaft, insert the pin in the holes (D, Figure 14) and engage the spring (A, Figure 14).

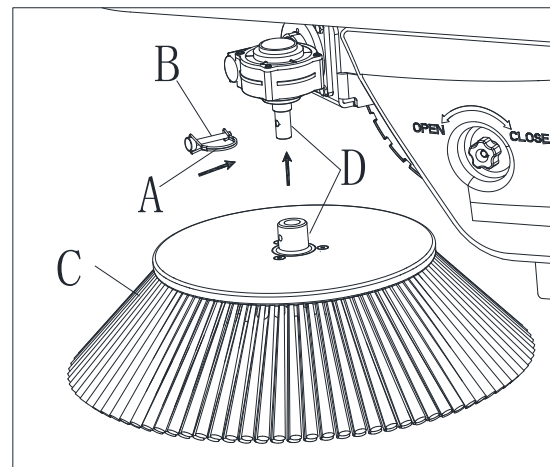


Figure 14

## WATER SPRAY FLOW SETTING

Set up the machine as follows:

1. Press “vacuum button” (A, Figure 15) and “pump button” (B, Figure 15) at the same time.
2. Insert ignition key (C, Figure 15) and turn it to "I".
3. Several seconds later the system enters user setting mode (Figure 15).
4. Release both “vacuum button” (A, Figure 15) and “pump button” (B, Figure 15).
5. Press “Turn Left button” (E, Figure 15) to select the Item 4 “4Water Spray Spd” (F, Figure 15).
6. Press “vacuum button” (A, Figure 15) or “pump button” (B, Figure 15) to select water spray speed value (50%, 60%, 70% ...) (G, Figure 15).
7. Press “headlight button” (D, Figure 15), about 1 second later the screen displays "Update OK", indicating that water spray flow is set up, then restart the machine. (C, Figure 7).

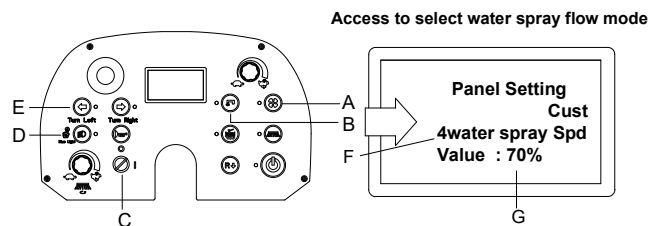


Figure 15

## AFTER USING THE MACHINE

After operation, before leaving the machine, perform the following procedures.

8. Press one-button start button (C, Figure 16) to turn off all functions (vacuum, main/side brooms and pump), and then main broom and side brooms will be lifted.
9. Press filter shaker button to turn on the filter shaker (B, Figure 16)
10. Empty the hopper (D, Figure 13) (see the procedures in the previous paragraph).
11. Turn the ignition key (A, Figure 16) to “O” and remove it.
12. Engage the parking brake.
13. If necessary, charge the batteries (see the procedures in Maintenance chapter).

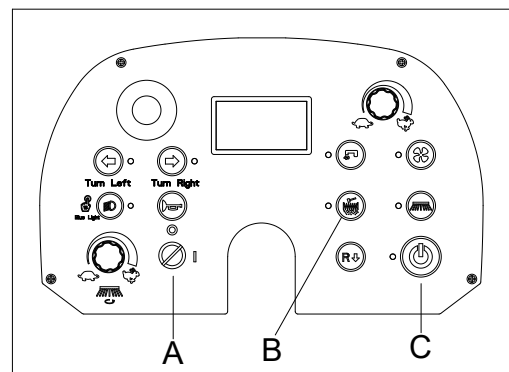


Figure 16

## PUSHING/TOWING THE MACHINE

To push/tow the machine when it is turned off, perform the following procedures:

1. Open the cover (A, Figure 17).
2. Pull the drive motor handle (B, Figure 17) outwards.
3. Insert the screwdriver (C, Figure 17) to the slot (D, Figure 17). Turn back the cover, then the machine can be pushed or towed.
4. When the machine is moved to the destination, take out the screwdriver (C, Figure 17), then the machine can work normally.

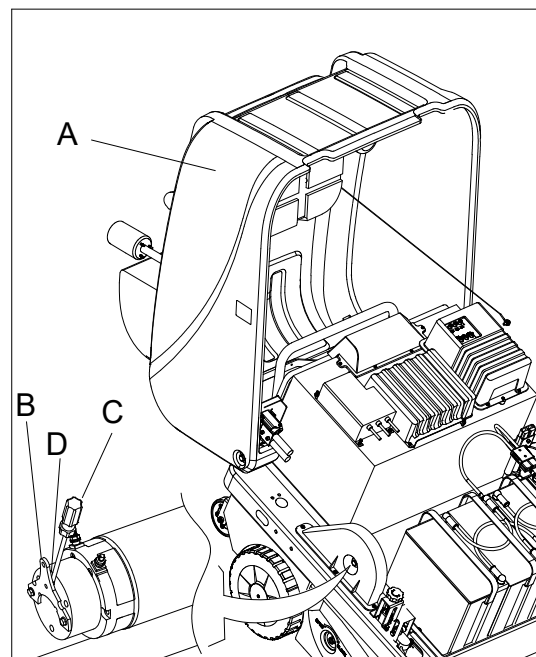


Figure 17

## MACHINE STORAGE DURING 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 chapter.
2. Disconnect the battery connector.

## FIRST PERIOD OF USE

After the first 8 hours of use, check the machine fasteners and connecting parts for proper tightness and check the visible parts for integrity 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 chapter in this instruction.**

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 contact our Technical Support Department.

## SCHEDULED MAINTENANCE TABLE

Procedure	Upon delivery	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours
Battery charging						
Battery (WET) electrolyte level check		(2)				
Main broom cleaning						
Side and main broom height check and adjustment						
Dust filter cleaning and integrity check		(3)				
Blade height and operation check						
Filter shaker operation check			(*)			
Main broom drive belt visual inspection			(*)			
Flap pedal check and adjustment				(*) (4)		
Steering chain check and cleaning					(*)	
Main broom drive belt replacement					(*)	
Main broom motor and drive system motor carbon brushes check or replacement						(*)

1. (\*) For relevant procedures, refer to the Service Manual.
2. Daily or after using the machine.
3. Or before machine start-up.
4. Or more frequently in dusty areas.

## BATTERY CHARGING

**NOTE**

Charge the batteries when battery level is low.

**CAUTION!**

Keeping the batteries charged can extend their life.

**CAUTION!**

When the batteries are discharged, charge them as soon as possible, as that can shorten their life. Check WET battery electrolyte level at least once a week.

**WARNING!**

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

**WARNING!**

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

**Preliminary procedures**

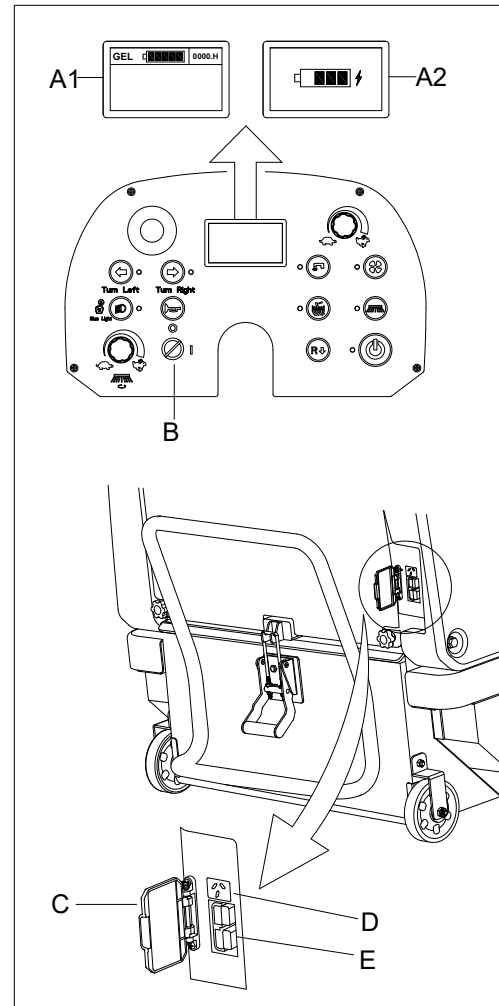
1. Drive the machine to the designated charging area.
2. Turn the ignition key (B, Figure 18) to "O".
3. Charge the batteries according to the following procedures.

**Battery charging (Machine with external charger)**

4. Open the protective cover (C, Figure 18). Connect the external charger connector to the connector (E, Figure 18) on the machine. When the external charger is connected to the machine, all machine functions are automatically shut down.
5. Plug the external charger into the wall socket.
6. When battery charging is completed, unplug the charger from the wall socket, then disconnect the external charger cable from the machine.
7. Check electrolyte level after the batteries are charged (for WET battery only).
8. Insert the ignition key (B, Figure 18) and turn it to "I". Check the battery level on multifunction display (A1, Figure 18).

**Battery charging (Machine with on-board charger)**

9. Open the protective cover (C, Figure 18). Connect the power cord to the on-board charger plug (D, Figure 18) on the machine, then plug the other end of power cord into the wall socket.
10. The charging status can be checked on multifunction display (A2, Figure 18).
11. When battery charging is completed, unplug the power cord from the wall socket, then disconnect the power cord from the machine.
12. Check electrolyte level after the batteries are charged (for WET battery only).
13. Insert the ignition key (B, Figure 18) and turn it to "I". Check the battery level on multifunction display (A1, Figure 18).



**Figure 18**



## MAIN BROOM HEIGHT CHECK AND ADJUSTMENT

**NOTE**

Brooms with harder or softer bristles are available. This procedure is applicable to all types of brooms.

1. Check the main broom distance from the floor according to the following procedures:
  - Drive the machine onto a level ground.
  - Adjust speed adjusting knob (A, Figure 19) to minimize driving speed.
  - Press one-button start button (B, Figure 19) to lower the main broom and turn it on for about one minute by pressing the accelerator pedal.
  - Stop and lift the main broom, then move the machine and turn it off.
  - Check that the main broom print (A, Figure 20), along its length, is 2 to 4 cm wide.

If the print (A, Figure 20) is not within specifications, adjust the main broom height according to the following procedures.

2. Engage the parking brake.
3. Turn the ignition key to "O".
4. Open the cover.
5. Turn the main broom adjuster (B, Figure 21) on the right side of the machine as shown below:
  - To increase the print width, turn it counterclockwise to lower the broom.
  - To decrease the print width, turn it clockwise to lift the broom.

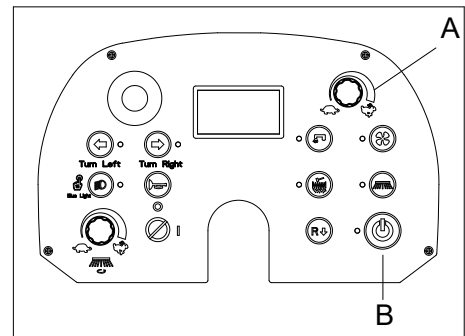
**NOTE**

The broom height can be adjusted according to bristle wear of the broom to make sure the print is within specifications.

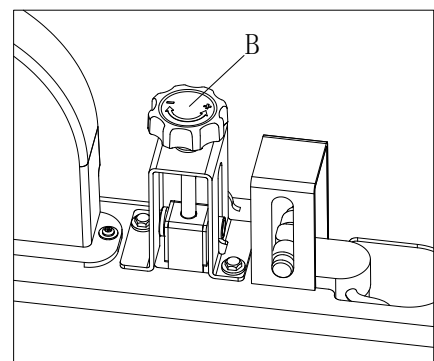
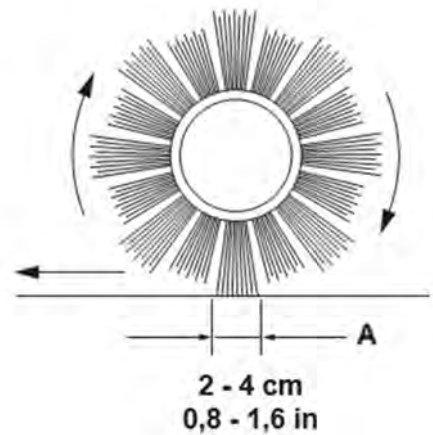
6. Perform step 1 again to check the proper adjustment of the main broom height.
7. When the broom is too worn to be adjusted, replace it as shown in the following paragraph.

**NOTE**

If the print (A, Figure 20) can't be adjusted properly due to different length of bristles resulting in different pressure on the floor, refer to the Service Manual.



**Figure 19**



**Figure 21**

## MAIN BROOM REPLACEMENT

**WARNING!**

It is advisable to wear protective gloves when replacing the main broom because there can be sharp debris between the bristles.

1. Drive the machine onto a level ground and engage the parking brake.
2. Turn the ignition key to "O".
3. Unscrew the knobs (A, Figure 22) and remove the left cover (B, Figure 22).
4. Unscrew the knob (A, Figure 23) and remove the drive hub bracket (D, Figure 23).
5. Unscrew the knobs (B, Figure 23) and remove the broom compartment cover (C, Figure 23).
6. Remove the main broom (E, Figure 24) along with the hub (J, Figure 26).
7. Check that the drive hub (F, Figure 24) is free from dirt or foreign materials (strings, cords, etc.) accidentally rolled up.
8. The new main broom must be installed with the bristle pattern as shown in the figure (G, Figure 24).
9. Install the new main broom and ensure that the hexagonal mesh (H, Figure 24) correctly fits into the drive hub (F, Figure 24).
10. Install the hub (J, Figure 26) into the main broom.
11. Install the broom compartment cover (C, Figure 25) by tightening the knobs (B, Figure 25).
12. Install the drive hub bracket (D, Figure 23) by tightening the knob (A, Figure 23).
13. Install the left cover (B, Figure 22) by tightening the knobs (A, Figure 22).
14. Check and adjust the main broom height as shown in the previous paragraph.

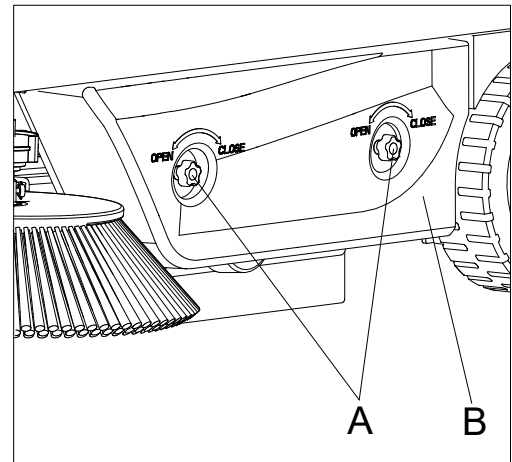


Figure 22

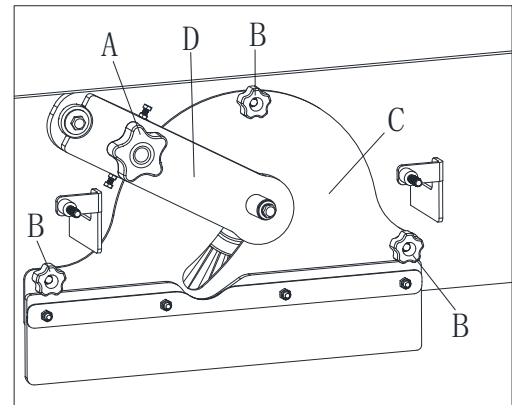


Figure 23

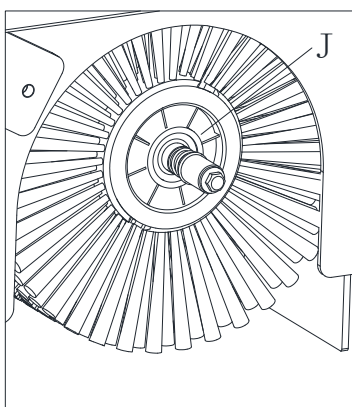


Figure 26

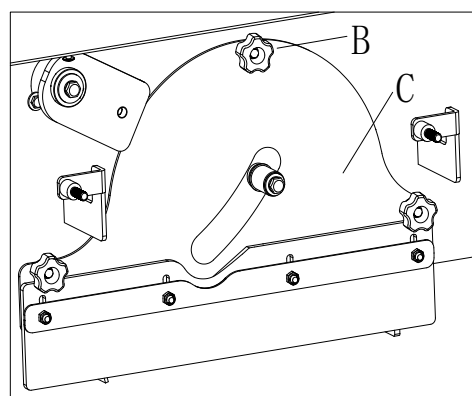


Figure 25

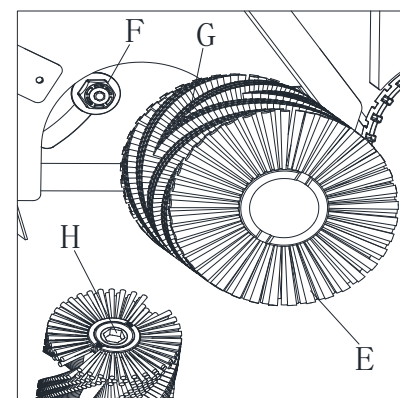


Figure 24

## SIDE BROOM HEIGHT CHECK AND ADJUSTMENT

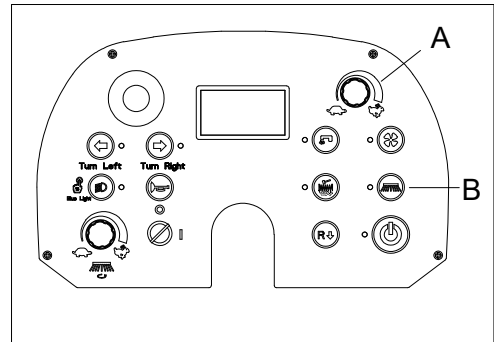
**NOTE**

**Brooms with harder or softer bristles are available.  
This procedure is applicable to all types of brooms.**

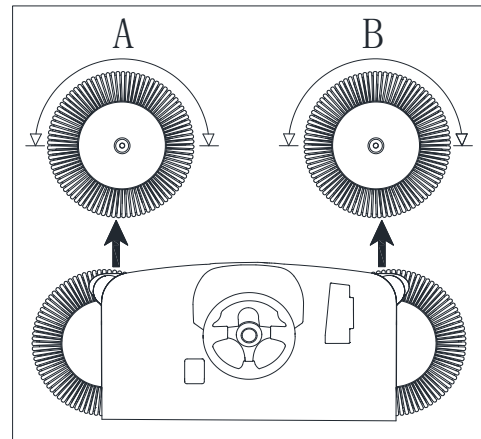
1. Check the side broom distance from the floor according to the following procedures:
  - Drive the machine onto level ground.
  - Adjust speed adjusting knob (A, Figure 27) to minimize driving speed.
  - Press side broom button (B, Figure 27) to lower the side broom and turn it on for about one minute by pressing the accelerator pedal.
  - Check that the side broom prints are as shown in the figure (A and B, Figure 28).

If the print is not within specifications, adjust the side broom height according to the following procedures.

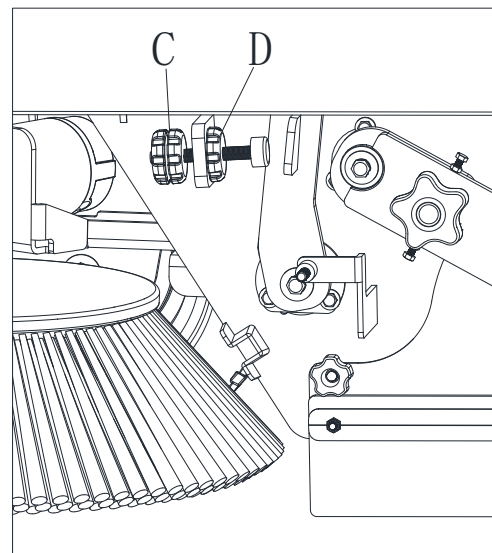
2. Engage the parking brake.
3. Turn the ignition key to "O".
4. Unscrew the knobs (A, Figure 22) and remove the left cover (B, Figure 22).
5. Adjust the side broom adjuster (C, Figure 29) until the proper print (A and B, Figure 28) is achieved. Then fasten the adjuster with the ring nut (D, Figure 29).
6. Perform step 1 again to check the proper adjustment of the side broom height.
7. When the broom is too worn to be adjusted, replace it as shown in the Side Broom Installation chapter.



**Figure 27**



**Figure 28**



**Figure 29**

## DUST FILTER CLEANING AND INTEGRITY CHECK

**NOTE**

Besides standard polyester filter, paper filters are also available. The following procedure is applicable to both types.

1. Drive the machine onto level ground and engage the parking brake.
2. Turn the ignition key to "O".
3. Remove the cover (A, Figure 30)
4. Disengage the latch (F, Figure 30) by pulling its lower end.
5. Remove the hopper (E, Figure 30) by disengaging it from the inner guides with the handle (C, Figure 30).
6. Unscrew the knobs (D, Figure 30) and remove the filter compartment cover (B, Figure 30).
7. Unscrew the knobs (A, Figure 31).
8. Disconnect the filter shaker motor (C, Figure 31) connector (B, Figure 31).
9. Remove the dust filter fixing frame (D, Figure 31).
10. Remove the dust filter (E, Figure 31).
11. In an outdoor area, clean the filter by shaking it on a level and clean surface, tapping the side (A, Figure 32) opposite to the wire gauze (B, Figure 32). Complete the cleaning procedure by using compressed air (C, Figure 32) at a maximum of 6 bars (85 psi), blowing only from the side of the wire gauze (B, Figure 32), at a minimum distance of 30 cm. According to the filter type, observe the following cautions:
  - Paper filter (optional): Do not use water or detergents to clean it, otherwise it can be damaged.
  - Polyester filter (standard): For better cleaning, the filter can be washed with water and non-lathering detergents. This provides better cleaning quality but reduces the life of the filter and causes it to be replaced more frequently. Using improper detergents can damage the filter.
12. Check the filter body for integrity. If necessary, replace the filter.
13. Clean the rubber gasket (A, Figure 33) of the cover and check it for integrity and efficiency. If necessary, replace it.
14. Assemble the components in the reverse order of disassembly, and note the following:
  - Install the filter (E, Figure 31) with the wire gauze (B, Figure 32) facing upwards.

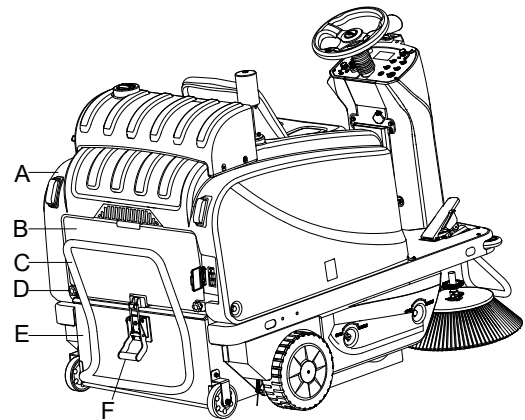


Figure 30

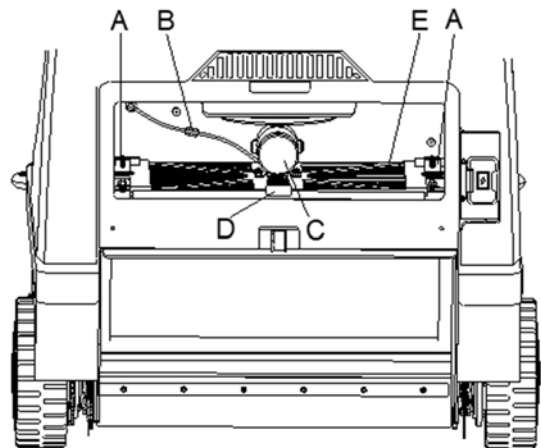


Figure 31

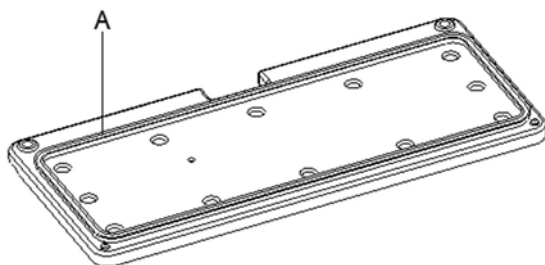


Figure 33

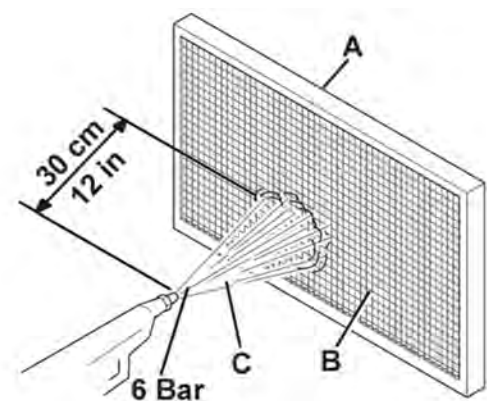


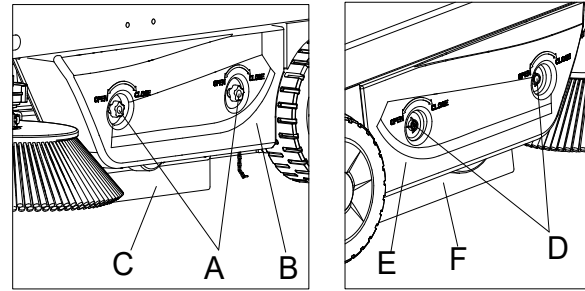
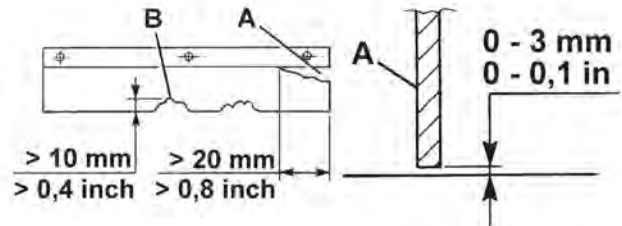
Figure 32

**BLADE HEIGHT AND OPERATION CHECK**

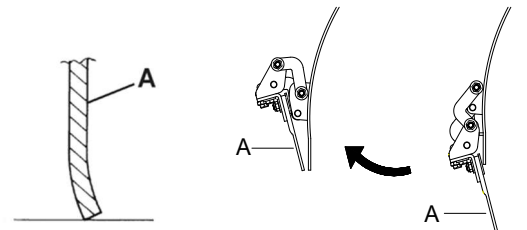
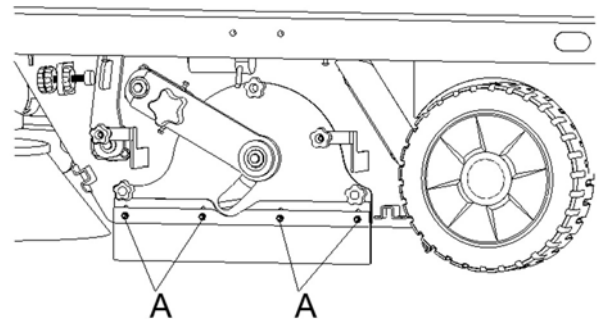
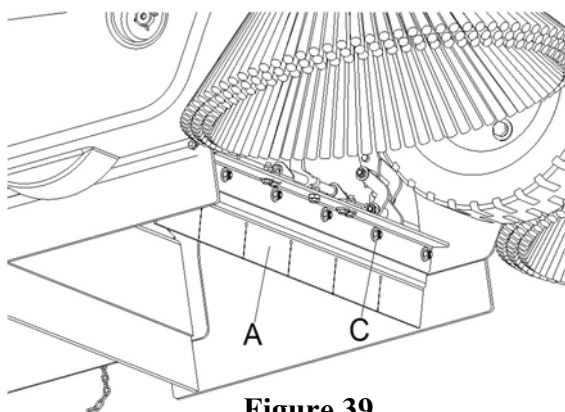
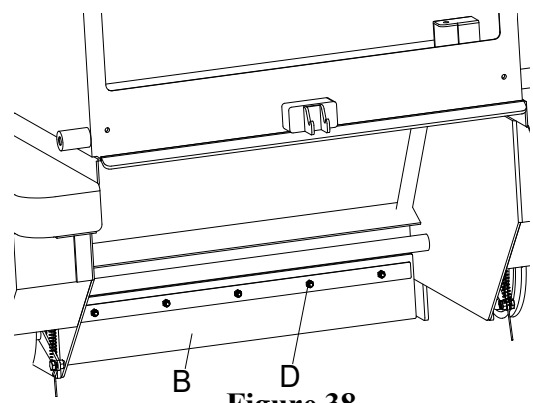
1. Drive the machine onto level ground.
2. Engage the parking brake.
3. Turn the ignition key to "O".

**Side Blade Check**

4. Unscrew the knobs (A and D, Figure 34) and remove both left (B, Figure 34) and right (E, Figure 34) covers.
5. Check the side blades (C and F, Figure 34) for integrity. Replace the blades when they have cuts (A, Figure 35) larger than 20 mm or cracks (B, Figure 35) larger than 10 mm (for blade replacement, refer to the Service Manual).
6. Check that distance from the ground to the side blades (C and F, Figure 34) is within 0-3 mm (A, Figure 35). If necessary, adjust the blade height by adjusting the slots with the screws (A, Figure 37).
7. Assemble the components in the reverse order of disassembly.

**Figure 34****Figure 35****Front and Rear Blade Check**

8. Remove the main broom as shown in the relevant paragraph.
9. Check the front (A, Figure 39) and rear blades (B, Figure 38) for integrity. Replace the blades when they have cuts (A, Figure 35) larger than 20 mm or cracks (B, Figure 35) larger than 10 mm (for blade replacement, refer to the Service Manual).
10. Check that:
  - The front blade (A, Figure 36) slightly touches the ground.
  - The distance from the ground to the rear blade (B, Figure 38) is within 0-3 mm (A, Figure 35).
11. If necessary, adjust the blade height by adjusting the slots with the screws (C and D, Figure 39 and 38).
12. Press the flap pedal and check that the front blade (A, Figure 36) is lifted; then release the pedal and check that the blade does not remain in an intermediate position but returns to its initial position. If necessary, for the front blade control cable adjustment or replacement, refer to the Service Manual.
13. Assemble the components in the reverse order of disassembly.

**Figure 36****Figure 37****Figure 39****Figure 38**

## WHEEL CHAIN CHECK AND ADJUSTMENT

1. Drive the machine onto level ground.
2. Engage the parking brake.
3. Turn the ignition key to "O".
4. When the front wheel is loose, adjust the wheel chain adjusting screw (A, Figure 40) on the front of the machine to make sure the wheel chain is of proper tightness.
5. When the rear wheel is loose, open the cover (C, Figure 41) and the wheel chain cover (A, Figure 41), adjust the wheel chain adjusting screw (B, Figure 41) to make sure the wheel chain is of proper tightness.

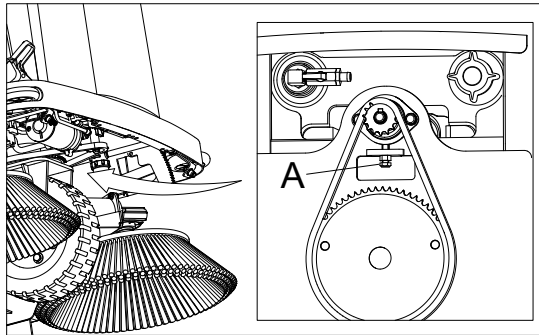


Figure 40

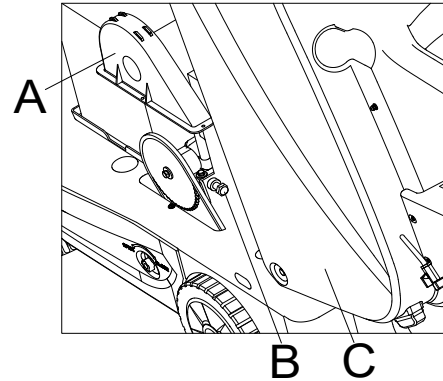


Figure 41

## TROUBLESHOOTING

Trouble	Possible cause	Remedy
The machine does not start when turning the ignition key to "I".	The battery connector is disconnected.	Connect the battery connector.
	The F6 circuit breaker is open.	Reset it by pressing relevant switch.
	The external charger cable is connected to the machine.	Disconnect the external charger cable from the machine.
The machine does not move when pressing the accelerator pedal.	The parking brake is engaged.	Disengage the parking brake.
	When starting the machine with the ignition key, the accelerator pedal is being pressed, or the operator is not yet on the driver's seat.	Start the machine with the ignition key, only after being on the driver's seat and without pressing the accelerator pedal.
	The seat switch isn't activated for not sitting in the right position.	Sit in the right position on the seat.
The main broom does not work.	The F5 fuse is blown.	Replace the fuse.
	The F7 circuit breaker is open.	Reset it by pressing relevant switch.
	One-button start button is not pressed.	Press one-button start button.
The side brooms do not work.	The F5 fuse is blown.	Replace the fuse.
	Side broom button or one-button start button is not pressed.	Press side broom button or one-button start button.
	The F8/F9 circuit breaker is open.	Reset it by pressing relevant switch.
The machine collects little debris/dust.	The F5 fuse is blown.	Replace the fuse.
	The vacuum system is turned off.	Turn on the vacuum system.
	The F11 circuit breaker is open.	Reset it by pressing relevant switch.
	The dust filter is clogged.	Clean the dust filter with the filter shaker or remove it for cleaning.
	The hopper is full.	Empty the hopper.
The filter shaker does not work.	The blades are not properly adjusted or are worn.	Adjust/replace the blades.
	The brooms are not properly adjusted.	Adjust the broom height.
	The F10 circuit breaker is open.	Reset it by pressing relevant switch.
The machine exits one-button start mode and only supports travel mode.	The F5 fuse is blown.	Replace the fuse.
	The batteries are discharged.	Charge the batteries. If the trouble persists, replace the batteries.
The battery run-time is low.	The batteries are dead.	Replace the batteries.
	The battery capacity is low.	Replace batteries with higher capacity (see the Technical Data chapter).

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

**ERROR CODE OF DISPLAY app: detail**

Error 01	Battery VOL low	Battery voltage low
Error 02	Tra overload	Traction motor overload
Error 03	Main brush overload	Main broom motor overload
Error 04	Side brush overload	Side broom motor overload
Error 05	Filter clean M overload	Filter shaker motor overload
Error 06	Pump overload	Pump overload
Error 07	Charger COMM Error	Charger communication error
Error 08	Charger connect Error	Charger to controller connection error
Error 09	Charger Temp high	Charger temperature high
Error 10	Charging low VOL	Battery charging voltage low
Error 11	Battery reversed	The positive and negative terminals of the batteries are reversed.
Error 12	Charging high VOL	Battery charging voltage high
Error 13	CC charging timeout	Charging timeout at CC charging phase
Error 14	AC power low	AC power voltage for charger is low in on-board charging mode
Error 15	ENE Bat. Ch. Match Error	ENE battery charging match error
Error 16	Pedal switch SRO	When key switch is turned on, accelerator pedal is being pressed
Error 17	Electric Brake Failure	Electric brake failure
Error 18	Spray Water Depleted	Spray water is depleted
Error 19	Side brush open circuit	Side brush circuit is open
Error 20	Main brush open circuit	Main brush circuit is open
Error 21	Pump open circuit	Pump (water spray device) circuit is open
Error 22	Filter C motor open circuit	Filter clean motor circuit is open
Error 23	Tract motor over-temperature	Traction motor is over temperature
Error 24	Tract Motor THERMO-SENSOR open	The circuit of traction motor THERMO-SENSOR is open

**SCRAPPING**

Have the machine scrapped by a qualified waste treatment institution.

Before scrapping the machine, remove and separate the following materials, which must be disposed of properly according to the law in force.

- Batteries
- Polyester dust filter
- Main and side brooms
- Plastic components
- Electrical and electronic components (\*)

(\*) Please contact our company service center when scrapping any electrical and electronic components.

**Machine material composition and recyclability**

Type	Recyclable percentage	Weight percentage
Aluminum	100%	1%
Electric motors-various	29%	20%
Ferrous materials	100%	55%
Wiring harness	80%	1%
Liquids	100%	0%
Plastic-non-recyclable material	0%	1%
Plastic-recyclable material	100%	20%
Rubber	20%	2%





**Company information:**  
[www.vipercleaning.eu](http://www.vipercleaning.eu) [www.nilfisk.us](http://www.nilfisk.us)  
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