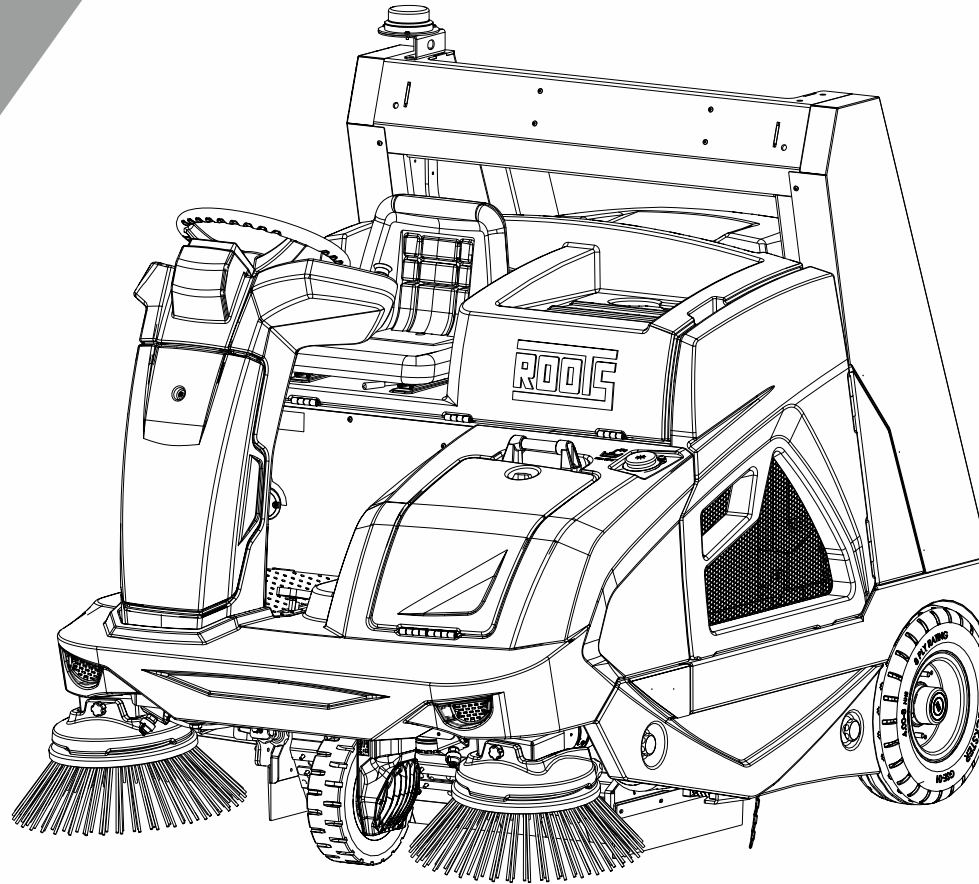


# RootsSweep RD120

Ride-On-Sweeper  
Diesel



24V

## Operator's Manual

Read this manual completely and understand the instructions before operating the machine.  
"English Version"



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## IMPORTANT NOTE:

Roots Multiclean Ltd. (RMCL) is not liable for any legal claims that may arise as a direct or indirect result of the contents of this manual.

Roots Multiclean Ltd.  
R.K.G. Industrial Estate, Ganapathy,  
Coimbatore - 641 006, India.

### MACHINE DATA

*Please fill at the time of commissioning for future reference:*

**Model** - \_\_\_\_\_

**Serial No.** - \_\_\_\_\_

**Engine Serial No.** - \_\_\_\_\_

**Commissioning Date** - \_\_\_\_\_

## USER MANUAL

ROOTS philosophy is to continually improve all of its products. For this reason we may modify the design, appearance and engineering of our products periodically.

Therefore, some changes, modifications and improvements may not be covered in this manual.

For the latest Operator's Manual, visit:

[www.rootsmulticlean.com/user-manual/](http://www.rootsmulticlean.com/user-manual/)

For the latest Spare Parts List, refer:

**RMCL - PartsApp**

**P/N: 557610070-00, Rev-A, 01/2023**

Prepared by KM, NPM TD Dept.

# INTRODUCTION



## **PREFACE**

### ***Dear Customer,***

We are pleased with you having chosen the **RootsSweep RD120** for your cleaning requirements. Backed by our industry expertise that spans across two decades, we assure you that the machine comes with ROOTS promise of quality, efficiency and performance.

We advise you to carefully read through the instructions prior to the operation of the machine. This manual contains detailed instructions for the proper operation of the machine, along with important information regarding its handling, care, maintenance and service needs.

We are sure that you will find the machine and its performance to your utmost satisfaction. Once again, we thank you for choosing us as a trusted partner for your cleaning requirements.

### ***Usage, Handling & Modification***

Use of the product beyond the specified scope of functioning is deemed improper and the manufacturer cannot be held liable for any damages which may arise due to this.

This machine may be used only by persons who are trained or are familiar with the machine and are aware of the possible hazards involved. The appropriate Accident Prevention Regulations as well as applicable general regulations pertaining to Safety and Health at the work place must be adhered to by the user.

Modifications made to machine without the manufacturer's consent will relieve the manufacturer of responsibility and any possible liability for consequential damage.

## ***Notes on Warranty***

Refer the Warranty manual supplied along with the machine.

## ***Acceptance of the Machine***

On arrival of the machine at the shipping address, please check for any damage that may have occurred as a result of transit. In the event of any such damage, the purchaser is bound by responsibility to send a claim letter to the concerned authorized dealer with a copy of the invoice. The letter should be sent within 24 hours of receipt of the machine.

---

### ***NOTE:***

***ROOTS reserves the right to change the product or contents of this manual without prior information.***

***For Engine, Battery, Motors, Blowers or other OEM components related information kindly refer to their manufacturers manual supplied along with the machine for instructions regarding usage, maintenance and service.***



***Prior to first operation, read the manual carefully and strictly comply with the instructions contained.***

***The Operator's Manual is an integral part of the machine and must not be misplaced.***

## INTRODUCTION - INTENDED USE



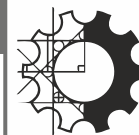
### ***INTENDED USE***

This machine is intended for industrial/commercial use, for example in factories, large open spaces, car parks, warehouses, schools, airports, retail centers, etc. It is designed to sweep hard floor surfaces in an outdoor environment. This machine is not intended for sweeping wet or slushy areas. Do not use the machine on soil, grass or artificial turf. Use only recommended brooms.

This machine is not intended for use on public roadways.

Do not use this machine in any other way other than described in this Operator's Manual.

# TECHNICAL SPECIFICATION



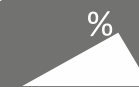
## DRIVING PERFORMANCE

Forward Speed - 9 - 10 km/h  
 (Transport mode)  
 Reverse Speed - 2 - 3 km/h  
 Sweeping Speed - 7 - 8 km/h



## SWEEPING PERFORMANCE

With Right Side Broom - 9600 m<sup>2</sup>/hr  
 (Theoretical)



## GRADABILITY

Max - 20 %  
 (for 1 min. max)



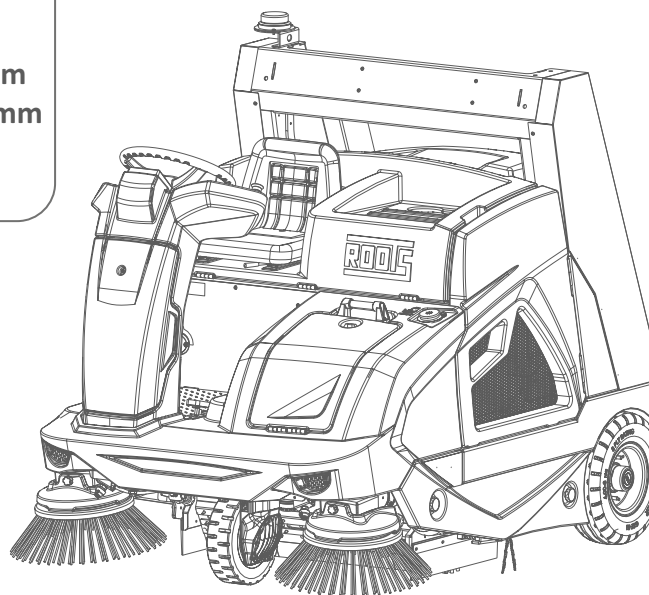
## SWEEPING PATH

With Main Broom - 850 mm  
 With Right Side Broom - 1200 mm



## WEIGHT

Dead Weight - 880 kg  
 Admissible Total Weight  
 (operator wt 80 kg) - 960 kg



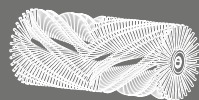
## WATER SPRAY

Side Broom Water  
 Tank Capacity - 40 Liters



## TURNING RADIUS

Turning  
 Radius - 1800 mm  
 (Max.)



## MAIN BROOM

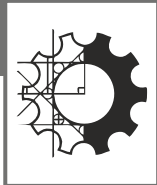
Main Broom Length - 850 mm  
 Main Broom Diameter - 360 mm  
 Wear Limit (Diameter) - 295 mm  
 Broom Speed (Min.) - 500 rpm  
 Sweeping Track - 40 - 50 mm  
 Quantity of Bristle Row - 8 x 2 Rows, V-Shape



## SIDE BROOM


Side Broom Diameter - 500 mm  
 Speed (Min.) - 125 rpm

# TECHNICAL SPECIFICATION



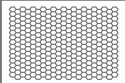

**SEALING STRIP**

Sealing Strips (Left, Right, Rear) - **1.0 / 1.0 / 4.0 mm**  
 (Ground clearance)  
 Sealing Strip (Front) - **With contact to the floor**




**HOPPER**

Theoretical Hopper Volume - **155 Litres**  
 Maximum Lifting Height - **1640 mm**  
 Maximum Lifting Weight - **240 kg**




**FILTER**

Filter Surface - **7.1 m<sup>2</sup>**  
 Panel Filter - **1**



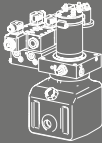
**TYRES**

Rear Tyre Size - **4.00-8**  
 Inflation Pressure - **8 bar**  
 Solid Rubber Tyres (Optional) - **4.00-8**




**SOUND LEVEL**

Sound Pressure Level (at 1.5 m distance) - **85 dB(A)**




**HYDRAULIC**

Model - **Bucher**  
 Power - **24V, 800W, 0.75 cc**  
 Hydraulic Oil - **Mineral Oil HLP 46 / ISO VG 46**  
 Tank Capacity - **2.5 Litres**



**ENGINE**

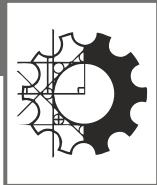
Manufacturer - **Kubota**  
 Working Process - **4 Stroke**  
 No. of Cylinders - **2**  
 Cubic Capacity - **479 ccm**  
 Rated Power - **9.8 kW**  
 Engine Oil - **SAE 15W40**  
 Fuel Tank Capacity - **10 Liters**  
 Alternator (PMG) - **PMG 24V, 3.0kW**  
 Radiator Coolant - **Antifreeze Coolant**  
 Radiator Coolant Capacity - **3.5 Liters**



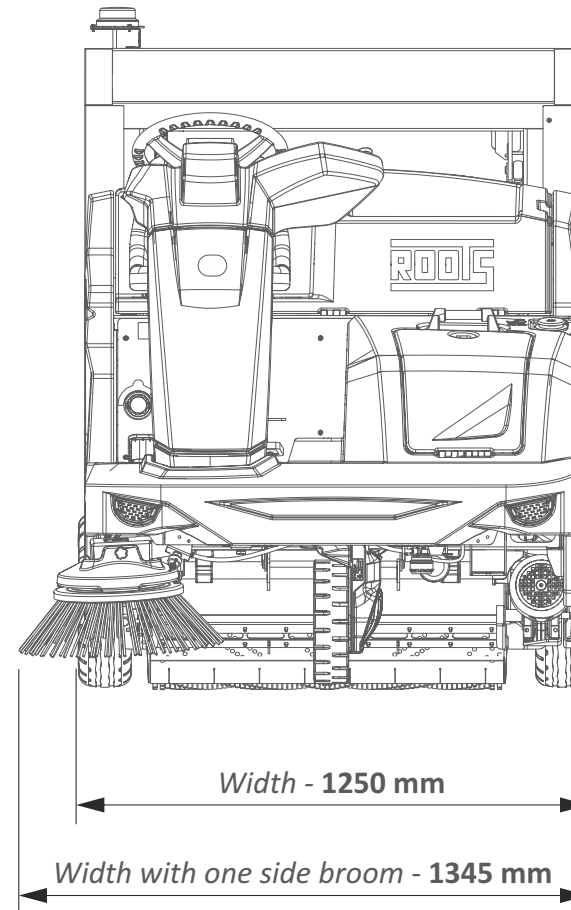
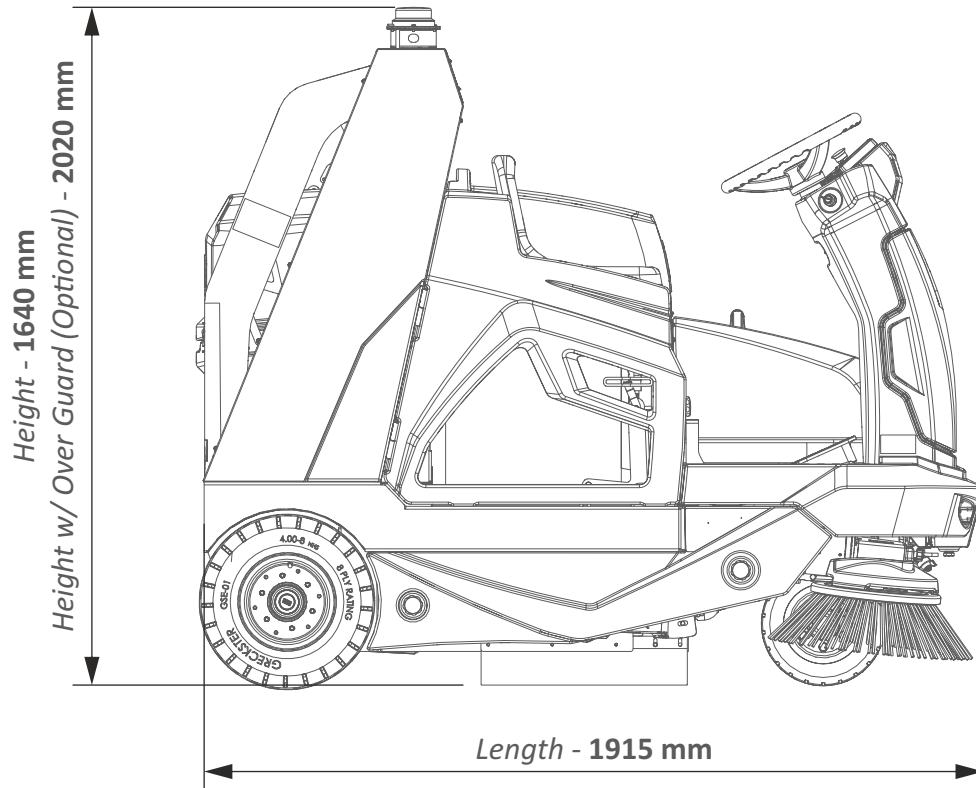
**ELECTRICAL SYSTEM**

Service Voltage - **24V / DC**  
 AC Drive Motor (24V AC) - **1200 Watts**  
 Main Broom Motor - **1200 Watts**  
 Side Broom Motor - **250 Watts**  
 Suction Fan Motor - **300 Watts**  
 Vibrator Motor - **150 Watts**

# TECHNICAL SPECIFICATION



## Dimensions:





# SAFETY INSTRUCTIONS



## GENERAL SAFETY SYMBOLS



**Read  
manual**

Prior to first operation, read the manual carefully and strictly comply with the instructions contained.



**Caution  
(the machine)**

Important information on handling the machine in order to maintain operability.



**Ecological hazard  
(the environment)**

Due to use of substances representing an inherent danger to health of environment.



**Safety Provisions  
(persons & goods)**

Safety provisions in dangerous situation caused by misuse, inaccurate adherence to instruction or prescribed work routine.

## SAFETY INSTRUCTIONS

### Application

- The machine with working equipment must be checked to ensure that it is in proper working order and is operating safely prior to use. Otherwise, the machine must not be used.
- The machine is not suitable for sweeping dust which endangers health, unless expressly specified otherwise. Please follow the safety instructions in the operating manual.
- Never sweep explosive liquids, combustible gases, explosive dusts as well as undiluted acids and solvents. This includes petrol, paint thinner or heating oil which can generate explosive fumes or mixtures upon contact with the suction air. Acetone, undiluted acids and solvents must also be avoided as they can harm the materials on the machine.
- Do not sweep any burning or glowing object.
- The machine should not be used in sub-zero temperatures.
- If the machine is used in hazardous areas (e.g. filling stations) the corresponding safety provisions must be observed.
- The machine may only be operated on the surfaces approved by the company or its authorised representatives.
- Protect the machine from frost.

### Operation

- This machine is not intended for use by persons (including children) with limited physical, sensoric or mental capacities or lack of experience and/or skills, unless such persons are accompanied and supervised by a person in charge of their safety or if they received precise instructions on the use of this machine.
- Children should be supervised to prevent them from playing with the machine.
- The operator must use the machine properly. The person must consider the local conditions and must pay attention to third parties, in particular children, when working with the machine.

# SAFETY INSTRUCTIONS



- For devices fitted with ignition key, remove the ignition key to prevent accidental or unauthorized use.
- Prior to starting work, the operator must ensure that all protective devices are properly installed and function correctly.
- The operator of the machine is liable for accidents with other individuals or their property.
- Ensure that the operator wears tight-fitting clothes. Wear sturdy shoes and avoid wearing loose-fitting clothes.
- Check the immediate vicinity prior to starting (e.g. children). Ensure sufficient visibility.
- The machine may only be used by persons who have been instructed in handling the machine or have proven qualification and expertise in operating the machine or have been explicitly assigned the task of handling the machine.
- Do not open the hood when the engine is running.
- On sloped surfaces, the sloping angle and the driving direction should not exceed the values given in the Operating Instructions.

## Transport

- The machine has to be secured properly during transportation. Drain water from the tank before transporting on a truck.

## Maintenance

- Maintenance work may only be carried out by approved customer service outlets or experts in this field who are familiar with the respective safety regulations.
- Please observe the local safety regulations regarding portable commercially used machines.
- Always use appropriate gloves while working on the device.
- First switch off the machine and remove the ignition key before performing any cleaning or maintenance tasks on the machine, replacing parts or switching over to another function.

- Always disconnect the battery when working on the electrics.
- Do not clean the machines with a high-pressure water jet (danger of short circuits or other damage).

## Spare Parts & Accessories

- To avoid risks, all repairs and replacement of spare parts may only be carried out by the authorised service personnel only.
- Use only accessories and spare parts which have been approved by the manufacturer. The exclusive use of original accessories and original spare parts ensures that the machines can be operated safely and trouble free.

## Pneumatic Tyres Equipped Machines

- In machines with screwed wheel rims: Check and confirm that all the screws of the rim are tightened before correcting the tyre filling pressure.
- Check the pressure reducer on the compressor for the correct setting before correcting the tyre pressure.
- Do not exceed maximum tyre pressure.



**WARNING!**

**DO NOT SWEEP CORROSIVE/BATTERY  
FLUIDS/EXPLOSIVE/FLAMMABLE/  
MAGNETIC/RADIOACTIVE/BIOHAZARD MATERIALS**

**DO NOT SWEEP**

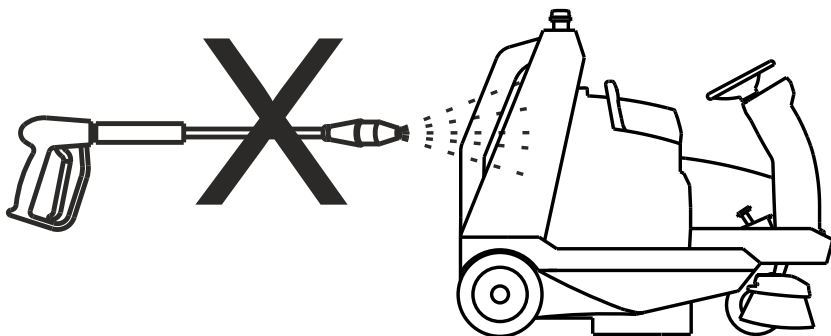


# SAFETY INSTRUCTIONS

*Wear PPE as necessary.*



## Cleaning Instructions:



**⚠ WARNING!**

**DO NOT CLEAN THE MACHINE WITH A HIGH PRESSURE CLEANER. THERE IS RISK OF DAMAGING THE ELECTRICAL PARTS OR RISK OF SHORT CIRCUIT.**

## ENVIRONMENTAL RESPONSIBILITY



The packaging material can be recycled. Please do not place the packaging into the ordinary refuse for disposal, but arrange for the proper recycling.



Old machines contain materials that can be recycled. Please arrange for the proper recycling of old machines. Batteries, electrical & electronic components contain substances that must not enter the environment. Please dispose off your old machine, batteries, electrical & electronic components using appropriate collection systems at the end of the product's life cycle.



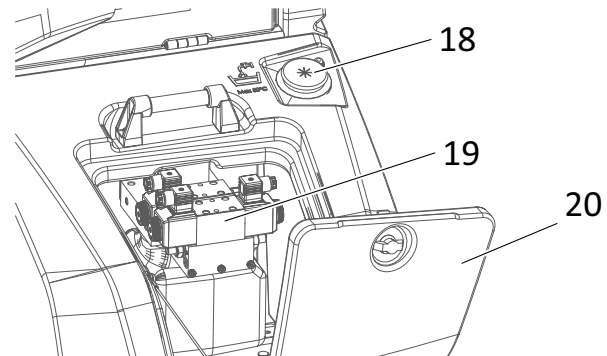
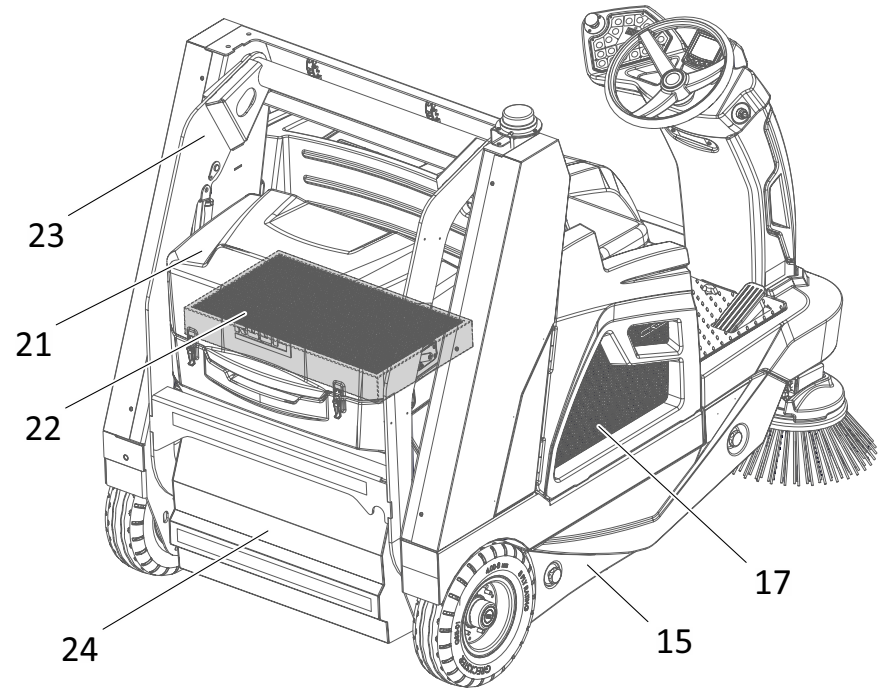
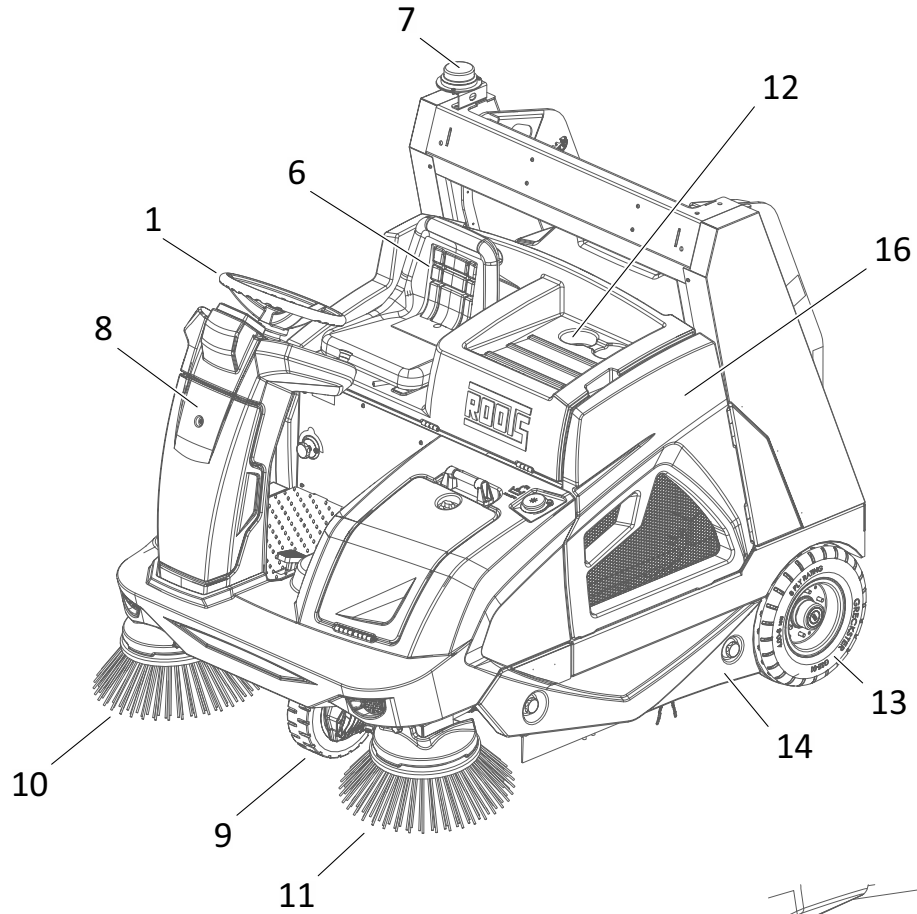
# SAFETY INSTRUCTIONS

## SYMBOLS & HAZARDS PICTORIAL DEFINITIONS

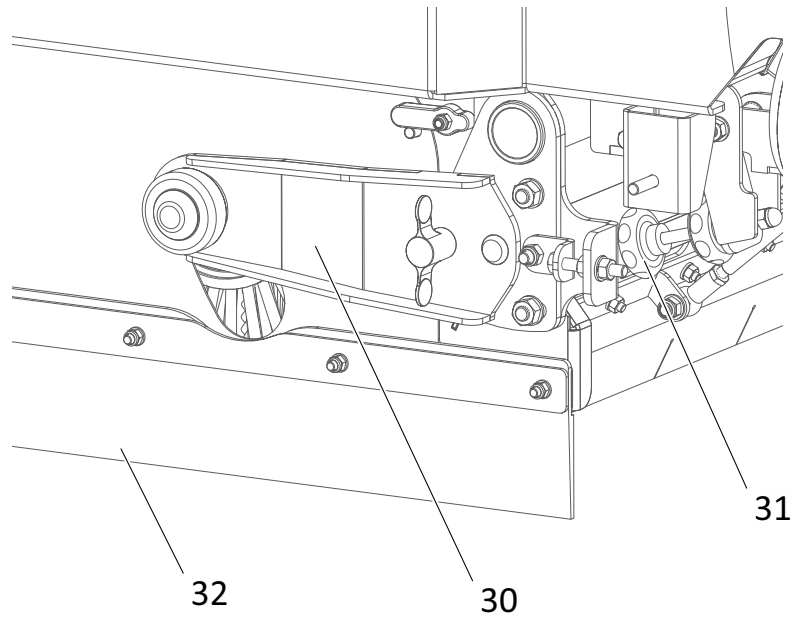
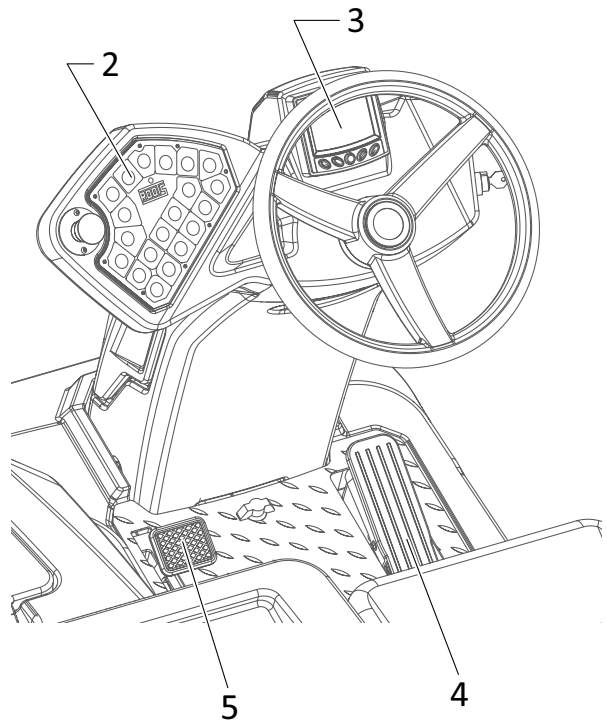
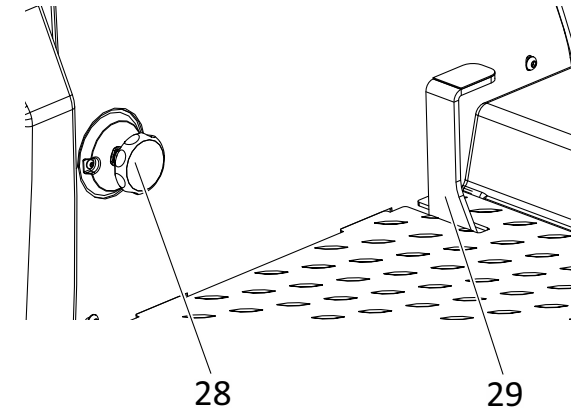
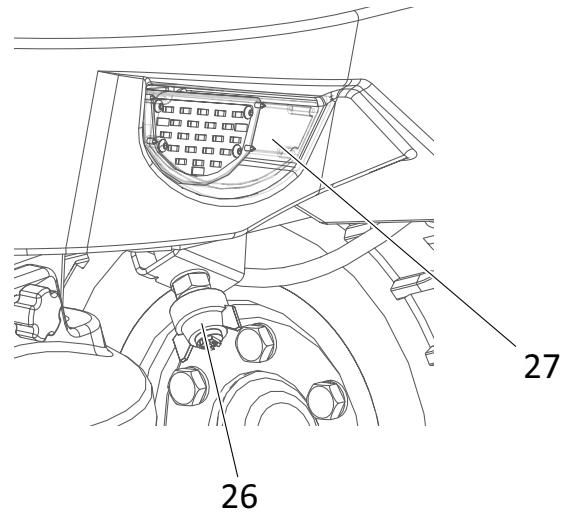
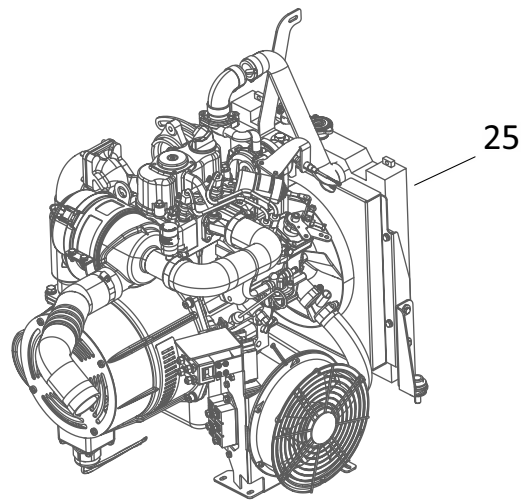


 <p><b>Read Manual</b></p>	 <p><b>Information</b></p>	 <p><b>General Warning</b></p>	 <p><b>Caution</b></p>	 <p><b>Toxic Hazard</b></p>
 <p><b>Recycle/Do Not Throw In Garbage</b></p>	 <p><b>Environmental Hazard</b></p>	 <p><b>Battery: Recycle</b></p>	 <p><b>No Fire/Matches</b></p>	 <p><b>No Smoking</b></p>
 <p><b>No Passengers</b></p>	 <p><b>Do Not Throw In Garbage</b></p>	 <p><b>Hand Crush Hazard</b></p>	 <p><b>Do Not Start Tag</b></p>	 <p><b>No HPJC</b></p>
 <p><b>Wear Gloves</b></p>	 <p><b>Wear Safety Shoes</b></p>	 <p><b>Wear Safety Glasses</b></p>	 <p><b>Wear Safety Helmet</b></p>	 <p><b>Wear Ear Muff</b></p>

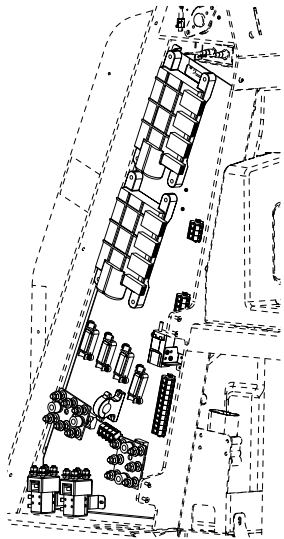
# KNOW YOUR MACHINE



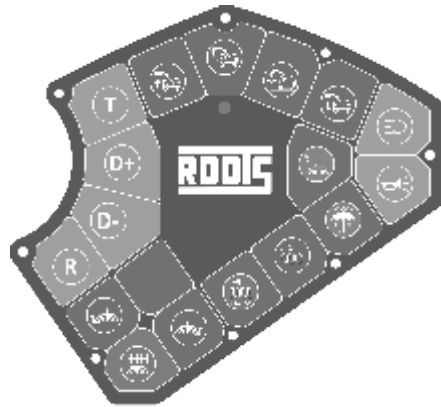
# KNOW YOUR MACHINE



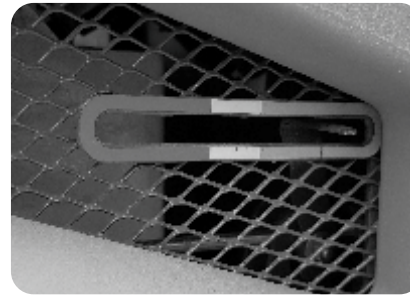
# KNOW YOUR MACHINE



33



34



35



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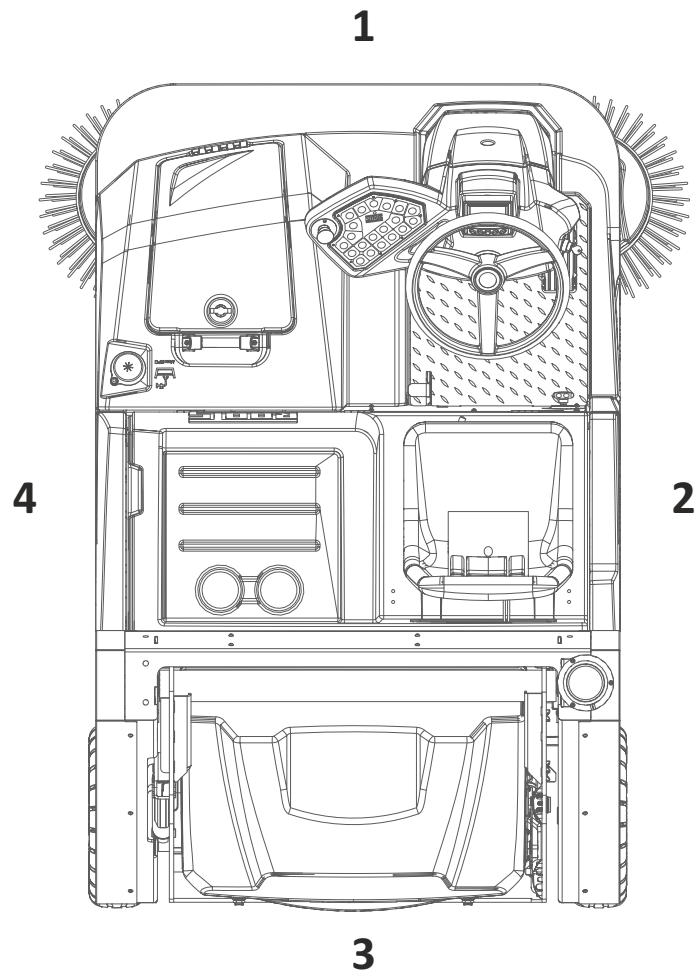


37

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>1. Steering Wheel</li> <li>2. Control Panel</li> <li>3. Display Panel</li> <li>4. Accelerator Pedal</li> <li>5. Brake Pedal</li> <li>6. Operator Seat</li> <li>7. Beacon Lamp</li> <li>8. Front Column Cover</li> <li>9. Drive Motor</li> <li>10. Right Side Broom</li> <li>11. Left Side Broom (if equipped)</li> <li>12. Top Cover w/Cupholders</li> <li>13. Rear Tyres</li> <li>14. Bottom Side Cover - Left</li> <li>15. Bottom Side Cover - Right</li> </ul> | <ul style="list-style-type: none"> <li>16. Side Cover - Right</li> <li>17. Side Cover - Left</li> <li>18. Fresh Water Fill Port</li> <li>19. Hydraulic Power Pack</li> <li>20. Cover Panel</li> <li>21. Filter Box</li> <li>22. Panel Dust Filter</li> <li>23. Lifting Arm</li> <li>24. Hopper</li> <li>25. Engine &amp; PMG</li> <li>26. Water Spray Nozzle</li> <li>27. Headlamp</li> <li>28. Main Broom Adjustment Knob</li> <li>29. Front Flap Open/Close Pedal</li> <li>30. Main Broom Access Door</li> </ul> | <ul style="list-style-type: none"> <li>31. Side Broom Adjustment Knob</li> <li>32. Main Broom Dust Sealing Strips</li> <li>33. Electrical Components Panel</li> <li>34. Control Panel Buttons</li> <li>35. Main Broom Wear Indicator</li> <li>36. Diesel Fuel Tank w/Fuel Filter</li> <li>37. Emergency Engine Stop Cable</li> </ul> |
|--|--|--|

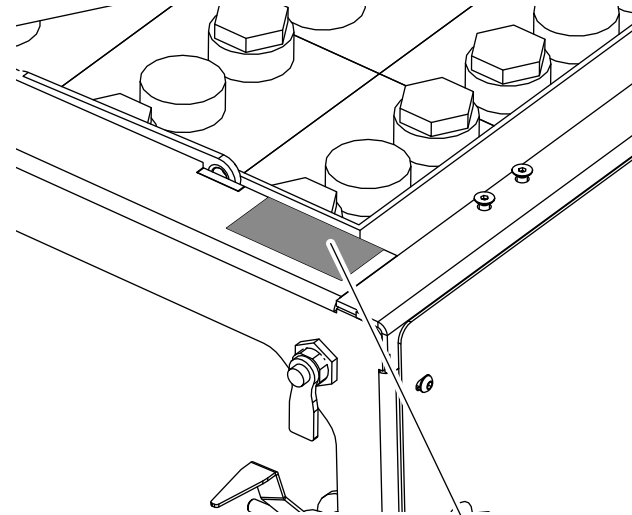
# KNOW YOUR MACHINE

## Operator Orientation:



- 1. Front
- 2. Right
- 3. Rear
- 4. Left

## Machine Nameplate

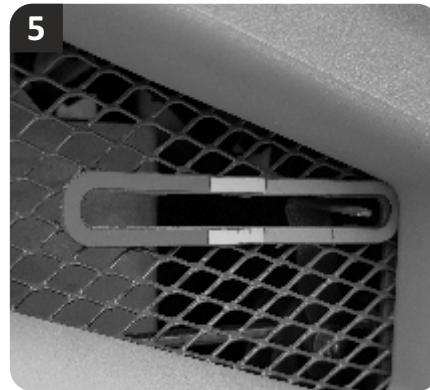
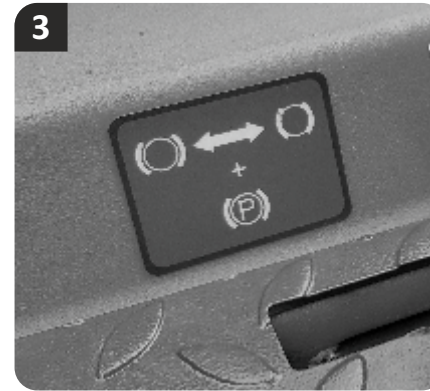
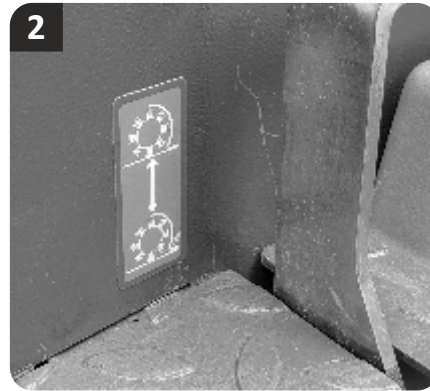
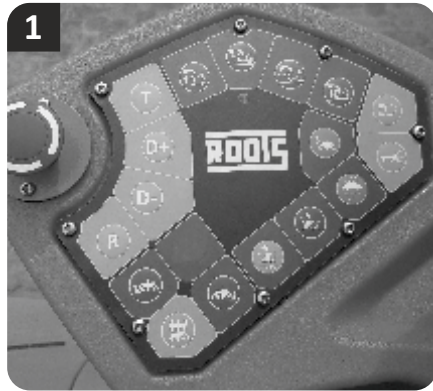


Machine Nameplate

<b>ROOTS</b>	Roots Multiclean Ltd., Coimbatore-India
Type	_____
SI.Number	_____
_____	_____
_____	Working weight _____

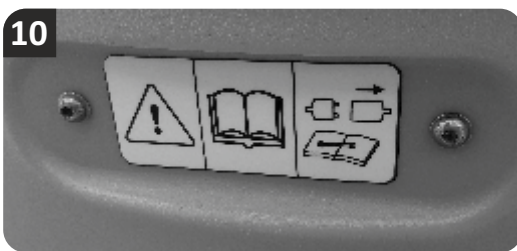
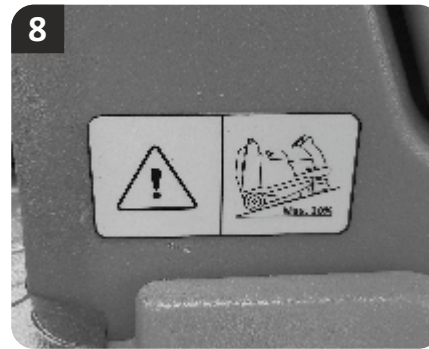
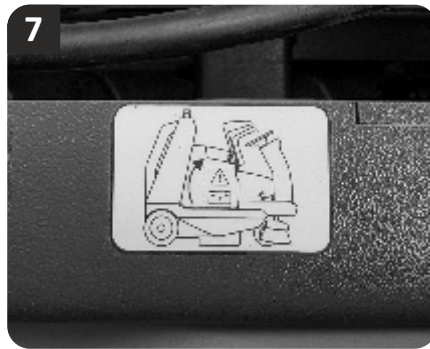
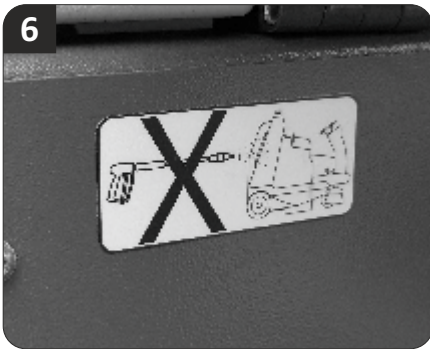
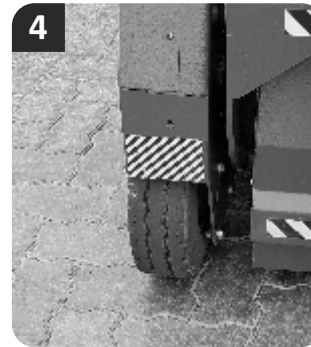


## KNOW YOUR MACHINE - FUNCTIONAL STICKERS



1. Control Panel
2. Front Flap Open/Close
3. Parking Brake Engage/Disengage
4. Main Broom Pressure Adjustment
5. Main Broom Wear Indicator

# KNOW YOUR MACHINE - SAFETY STICKERS

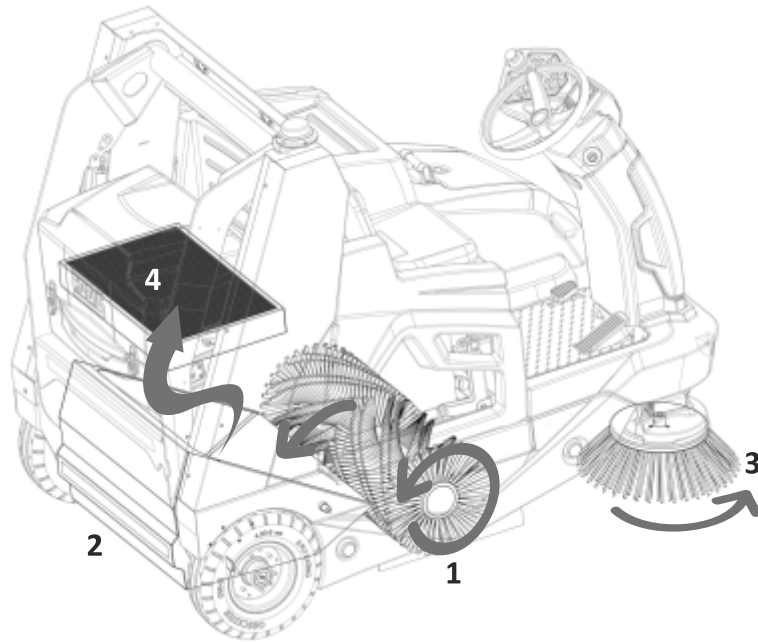


- 1. Safety Stopper
- 2. Lift Arm
- 3. Hopper
- 4. Chassis Rear
- 5. Crush Hazard
- 6. Do Not Use HPIC

- 7. Charging Safety
- 8. Max. Gradient Allowed
- 9. Emergency Engine Stop
- 10. Read Manual
- 11. Diesel Fuel Warning

# WORKING PRINCIPLE

## Working Principle



### **Working principle:**

- The rotating main broom (1) throws the debris directly into the hopper (2).
- The side broom (3) sweeps the edges and corners and moves the debris to the path of the main broom.
- The vacuum system pulls the dust through the panel filter (4).

## **USEFUL TIPS:**

- ✓ Never sweep long packing straps, ropes, threads, twines or wires as it could get entangled with the main and side broom and damage its mechanism.
- ✓ Make sure the area to be swept is dry.
- ✓ Position the machine in the direction of the wind, so that the wind blows the dust away from the machine.
- ✓ For optimum cleaning results, match the driving speed with the area to be swept.
- ✓ Switch off suction fan while sweeping in a damp area as it may damage the filter.
- ✓ Clean the dust filter at regular intervals depending on the intensity of the dust.
- ✓ When sweeping on a bad road make sure that the main broom is in float mode.
- ✓ Plan to sweep in long runs with minimal stopping or starting.
- ✓ Allow at least 5 inches of broom path overlap to ensure complete coverage of the area that is being swept.
- ✓ Avoid making sharp turns, bumping into posts or scraping the sides of the machine.



# OPERATOR RESPONSIBILITY

## OPERATOR RESPONSIBILITY

The operator's responsibility is to take care of the machine's daily maintenance and routine checkups to keep the machine in good working condition.

The operator must also inform the supervisor when scheduled maintenance of the machine is to be carried out.

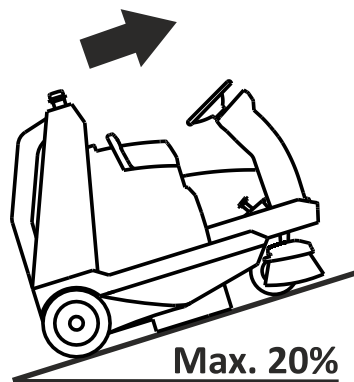
### CAUTION



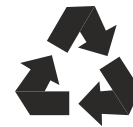
*Read this manual completely and understand before operating this machine. Also ensure that the persons who are going to operate this machine have also read and understood the contents of this manual.*

*Do not use this machine to collect any hazardous debris.  
Do not use this machine as a transport equipment.*

**WARNING:** *Do not use this machine on surfaces exceeding a maximum of the given value for the gradient or slope.*



## ENVIRONMENTAL RESPONSIBILITY



The packaging material can be recycled. Please do not place the packaging into the ordinary refuse for disposal, but arrange for the proper recycling.

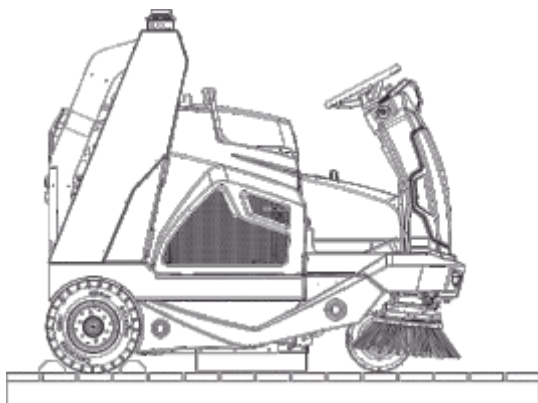


Old machines contain materials that can be recycled. Please arrange for the proper recycling of old machines. Batteries, electrical & electronic components contain substances that must not enter the environment. Please dispose off your old machine, batteries, electrical & electronic components using appropriate collection systems at the end of the product's life cycle.




# INITIAL SET-UP

## UNPACKING



Unpacking and commissioning of the machine is done by authorized Roots personal only.

 **CAUTION: Owner's personnel are not allowed to unpack the machine.**

 **WARNING: The ramp's minimum load bearing capacity should be three tonnes. Risk of damage, Risk of injury.**

- Do not use a forklift.
- Observe carefully when loading in a ramp: Ground clearance should be 70 mm.
- Risk/Danger of tipping over if gradient is too high.
- Do not unload the machine on an inclined ramp.
- Do not unload the machine on wet areas.
- Use appropriate tools and safety devices.



## Upon Unloading

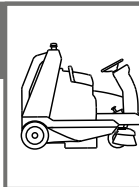
- Check the machine for any transit damage such as dents, paint damage, scratches, leaks, etc.
- Check battery charge level.
- Check the hydraulic oil level in the powerpack.
- Check the main and side broom for damage.
- Connect the battery plug to the machine.



### WARNING:

→ **Do not throw the packaging material into the environment.**

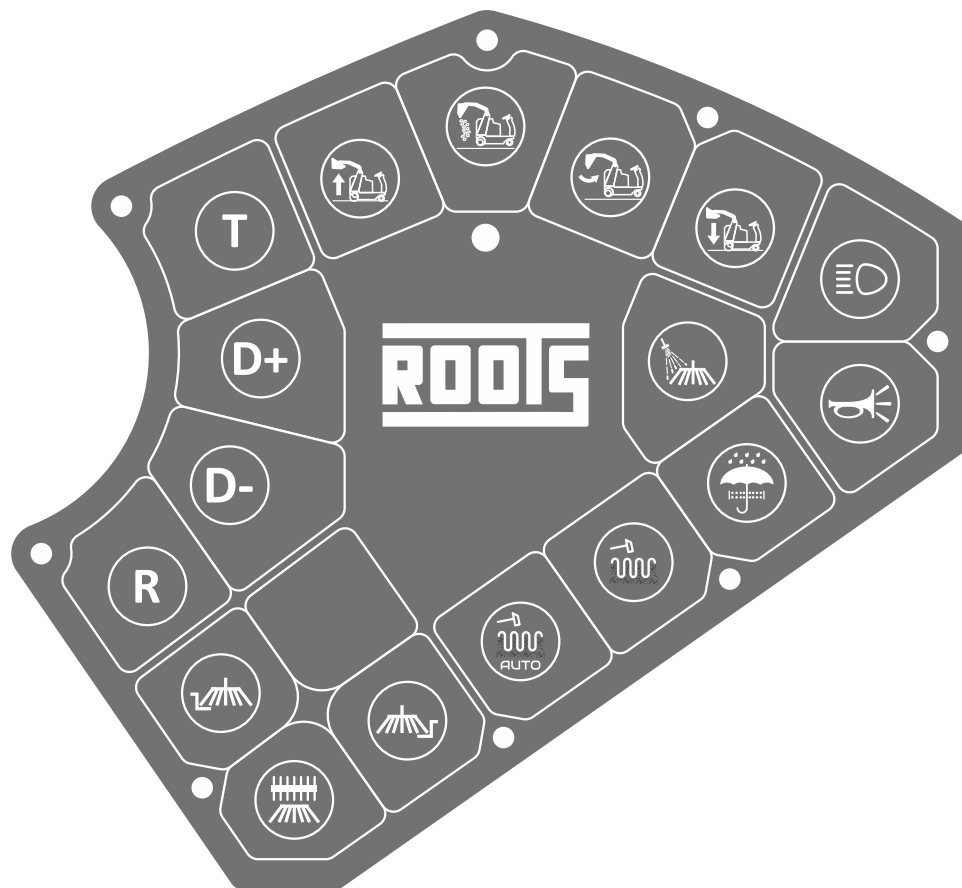
- Check the machine's invoice against the machine for the required accessories and serial number.



# CONTROLS

## CONTROLLING AND INDICATING ELEMENTS

### 1. CONTROL PANEL



## T

**Transport** - Upon pressing this switch the machine is set to transport mode. All sweeping functions are deactivated.

## D+

**Speed Increase** - To increase the speed of the machine in transport mode.

## D-

**Speed Decrease** - To decrease the speed of the machine in transport mode.

## R

**Reverse** - To engage reverse direction of travel.



**Hopper Raise** - To raise the hopper.



**Hopper Rotate** - To tip the hopper to discharge the debris.



**Hopper Sweep Position** - To return the hopper to sweeping position after tipping is complete.

# CONTROLS



**Hopper Lower** - To lower the hopper.



**Headlamp** - To switch On/Off the headlamps.



**Horn** - To activate the horn.



**Left Side Broom** - To activate left side broom sweeping function.



**Right Side Broom** - To activate right side broom sweeping function.



**Main Broom/Side Broom** - To activate main broom and side broom simultaneously.



**Water Spray** - To turn On/Off the dust suppression system.



**Filter Shaker** - To vibrate the panel filter to shake off the dust while sweeping via manual control.

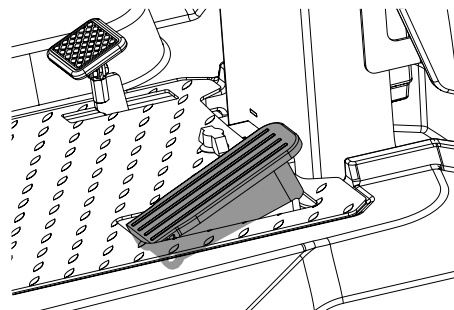


**Filter Shaker Auto** - The filter shaker activates automatically for a pre-set time of 5, 10, 15 and 30 minutes. Press to select the required frequency of time.



**Vacuum By-pass** - To cut off vacuum suction while sweeping damp debris/areas.

## 2. ACCELERATOR PEDAL



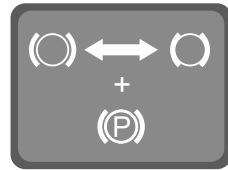
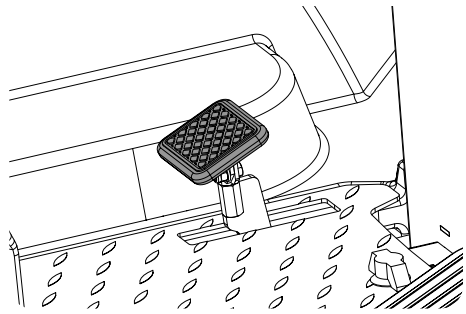
Press the pedal downwards to move the machine in forward/reverse direction.



# CONTROLS

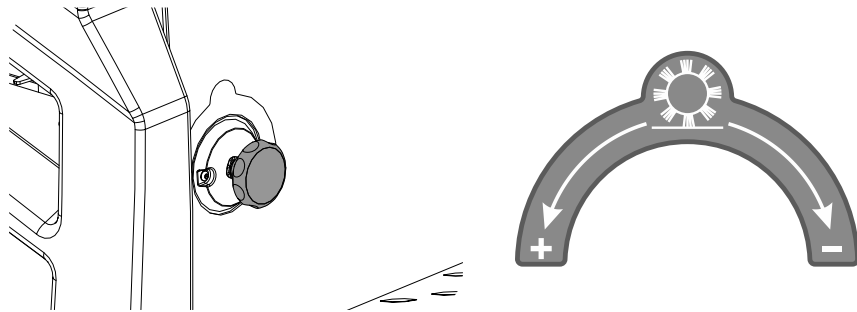


## 3. BRAKE/PARKING BRAKE PEDAL



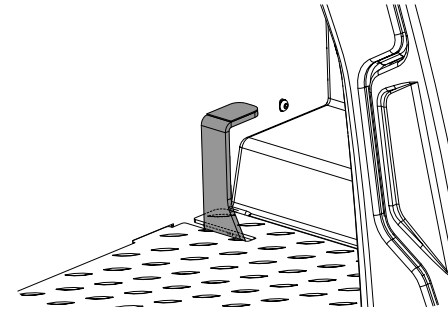
Press the pedal to stop the machine completely.  
To engage the parking brake press and move the pedal forward completely until it locks in place.  
To disengage the parking brake move the pedal a little towards right side.

## 4. MAIN BROOM PRESSURE ADJUSTMENT KNOB



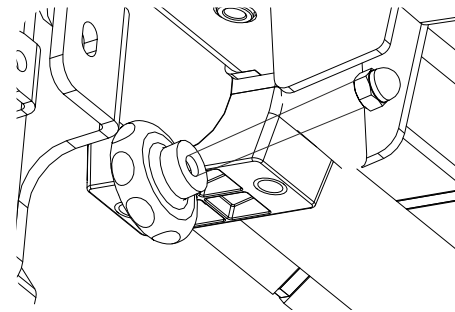
Turn the knob anti-clockwise to increase main broom pressure.  
Turn the knob clockwise to decrease main broom pressure.

## 5. FRONT FLAP PEDAL



To collect leaves and other oversize debris.  
Press the pedal forward to open the flap. Release the pedal to close the flap.

## 6. SIDE BROOM PRESSURE ADJUSTMENT KNOB

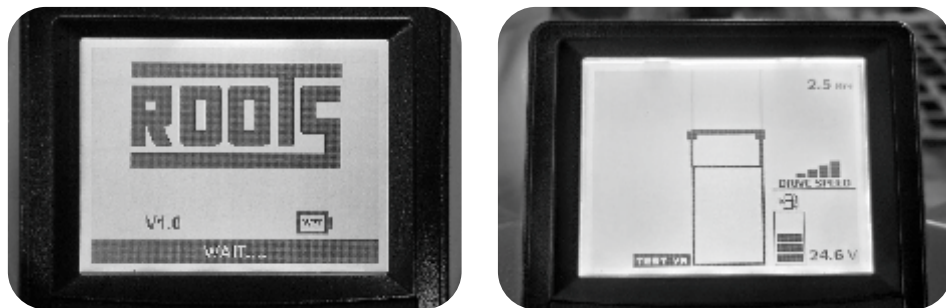


Turn the knob anti-clockwise to increase main broom pressure.  
Turn the knob clockwise to decrease main broom pressure.



# CONTROLS

## 7. DISPLAY PANEL
















This panel displays the functions of the machine. It also shows battery charge level, total hours of use, drive speed, main/side broom on/off function, filter shaker, vacuum on/off and any errors.

The icons displayed are as follows:
















These icons will be displayed as the particular function starts or stops. Some icons will be accompanied by a beep sound to alert the operator.  
**NOTE:** Some icons will only appear if the specified function is available in the machine.










-  **Logo** - Upon machine startup.
- R** **Reverse** - Reverse mode selected.
-  **Main Broom** - Main broom selected.
-  **Horn** - Horn switch pressed.
-  **Headlamp** - Headlamps switched on.
-  **Side Broom Water Spray** - When side broom water spray is On.
-    **Battery Type** - Battery type indication (Wet, AGM, Gel)
-  **Suction Turbine** - Suction turbine is On.
-  **Drive Speed Indicator** - Displays the drive speed from slow to fast.
-  **Filter Shaker** - Filter shaker is On.
-  **Filter Shaker Auto** - Filter shaker is in auto mode.
-  **Side Brooms** - Side broom Left or Right side selection.

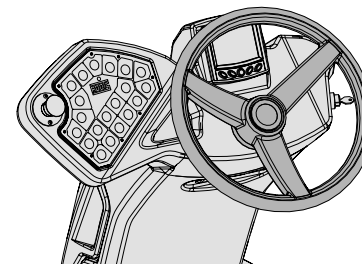
# CONTROLS



-  **Hopper** - Hopper raised.
-  **Hopper** - Hopper tipping.
-  **Hopper** - Hopper tipping error.
-  **Hopper** - Hopper close.
-  **Hopper** - Hopper lowered.
-  **Hopper** - Hopper lower error.
-  **General Warning** - Displays when a error is occurred.
- V1.0** **Software Version** - Software version installed.
- HHHHH** **Hour Meter** - Shows the total number of hours the machine has run.
-  **Service Indicator** - To set a reminder for a particular service.
-  **Main Broom Error** - Main broom wear limit reached.
-  **Side Broom Right Temp** - Side broom right motor overheat.
-  **Side Broom Left Temp** - Side broom left motor overheat.
-  **Main Broom Temp** - Main broom motor overheat.
-  **Fresh Water Level** - Fresh water level is low.

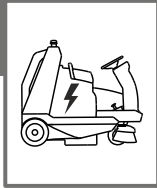
-  **Diesel Fuel Indicator** - Shows the amount of diesel fuel left in the tank.
-  **Ramp Sensor** - Will not allow any hopper functions.
-  **Parking Brake** - Parking brake is engaged.
-  **PMG Temp** - PMG temperature is high.
-  **Filter Clog** - Panel filter is clogged.
-  **Glow Plug** - Engine pre-heating.
-  **Engine Hour meter** - Total number of hours engine has run.

## 8. STEERING WHEEL



The steering wheel is used to turn the machine in left or right direction of travel.

# MACHINE OPERATION



## **Machine Operation:**

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure safety of oneself, others, animals, and property.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper machine use to the operator. The operator must be familiar with the machine operation and all associated safety practices before operating.

Proper operation of the machine, as detailed in this manual, will help ensure years of safe and satisfactory use of the machine. **READ, UNDERSTAND, and FOLLOW** the safety messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the safety messages. Always use good common sense to avoid hazards.



## **WARNING**

**Do not operate a damaged or malfunctioning machine. Risk of equipment failure or cause of injury or death or damage to property.**

## **Operator Requirements:**

Only qualified people are allowed to operate the machine. A qualified operator has to read and understand the owner's manual and should comply with its procedures. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for himself or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

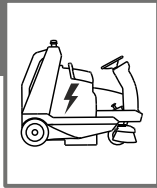
## **Employer Responsibilities:**

- a. Train the employee to operate the machine in a safe way.
- b. Permit only qualified personnel to operate and service the machine.
- c. Instruct all operators to maintain the shields and guards in its proper working condition at all times.
- d. Ensure that the operators use approved Personal Protective Equipment at all times or whenever required.
- e. Forbid the operators to carry additional people on the truck or the machine.
- f. Ensure that nobody including the operator modifies or alters the machine or any of its function, doing so may cause fatal injury or death or it may damage the machine itself.
- g. Ensure that children do not operate the machine.

## **Before Starting the Machine:**

Before operating the machine, ensure that the equipment is working properly and that you are prepared for sweeping operations by checking the Pre-operative checklist and testing the machine functions.

# MACHINE OPERATION



## **Pre-Operative Checklist:**

### **For the machine:**

- ✓ Check diesel fuel level.
- ✓ Check for any errors in the display panel.
- ✓ Check hydraulic oil level.
- ✓ Check seals and skirts for wear and damage.
- ✓ Check condition of the main/side brooms. Remove any straps, bands, ropes or other debris wrapped around them.
- ✓ Check sweeping pattern.
- ✓ Check hopper dust filter for blocks or damage.
- ✓ Check hopper seals and gaskets for wear and damage.
- ✓ Check brakes and steering for proper operation.
- ✓ Check if the debris hopper is empty.
- ✓ Check air pressure if equipped with pneumatic tires.
- ✓ Check for proper function of all electrical systems.
- ✓ Check for any leaks in the fresh water tank and filter.
- ✓ Check water spray nozzles for any block.
- ✓ Check whether the right brooms are equipped for the floor type.

### **Worksite:**

- Visually inspect the worksite before starting sweeping operation.
- Ensure that the operator is aware of the type of material to be collected.
- Ensure that there are no flammable materials in the vicinity of the machine during the sweeping operation.

### **Start-Up Test:**

By identifying any problems before traveling to the worksite, you'll save unnecessary travel time and will be able to make repairs more easily with the proper tools.

## **Driving in/around worksite:**

Always follow the rules and regulations of the worksite while driving the machine.

While traveling the worksite road, always maintain a safe speed for the haul road conditions and grades. Never allow the machine to coast.

Pay attention to worksite road conditions to avoid rocks, holes, or other obstacles. Such obstacles not only present hazards to safe operation, but can needlessly damage tyres if not avoided.

Always maintain a safe distance behind the machine ahead, particularly on downgrades. A good rule-of-thumb to follow is to allow two (2) machine-lengths between machines for each 10 km/h of travel speed under normal operating conditions. Under adverse conditions, allow more room for safe operation. Such regulations would be established for the safety of everyone on the job.

When approaching downgrades, select the proper speed and use the brakes as required to maintain safe descent speed without over-speeding the engine or gaining excess travel speed.

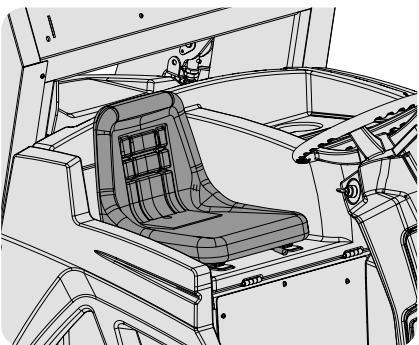
# MACHINE OPERATION

## MACHINE OPERATION:

### Driving the Machine:



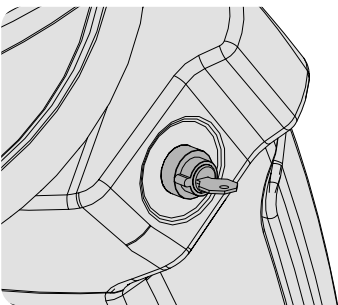
#### 1. Sit in operator seat.





The operator seat has a safety switch to prevent the machine from starting inadvertently. Sit firmly on the seat. Release the *Emergency Stop Switch* if activated.

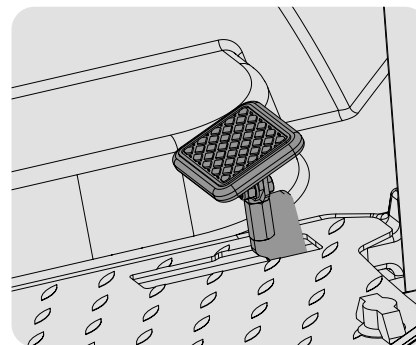
Ensure battery cutoff switch is disengaged.

#### 2. Insert key into ignition switch.

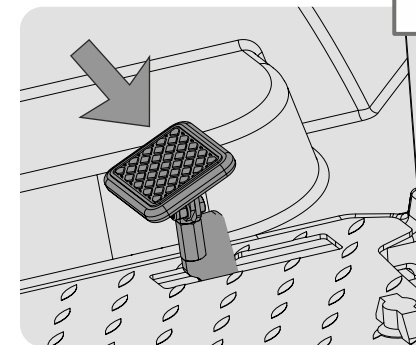


The ignition switch is located on the right hand side of the machine in the control panel. Insert the key and turn it clockwise once to power up. Turn again to initiate glow plug heating  for a few seconds, turn again to start the engine. Release key as soon as the engine starts. The engine icon  will be displayed in the LCD.

#### 3. Release parking brake.



Parking brake engaged

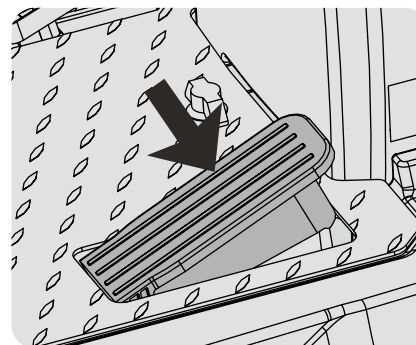


Parking brake disengaged

To disengage the parking brake, push the brake pedal towards the right till the brake is released. The icon on the display panel goes OFF.

The  icon goes off.

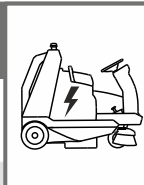
#### 4. Press the accelerator pedal.



Press the accelerator pedal downwards gently to propel the machine in either forward or reverse direction.

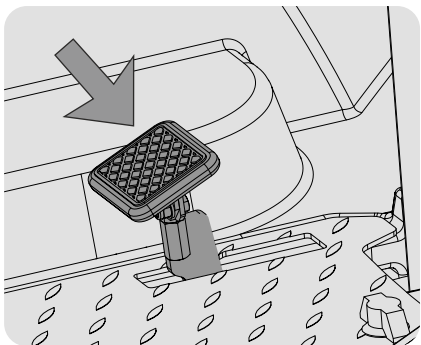
Press **T** to select transport mode. Press **D+/D-** to select travel speed.

Press **R** to select reverse mode.



## MACHINE OPERATION

5. To slow down, release the accelerator pedal gently. To stop the machine press the brake pedal.



**WARNING:** Do not press the brake pedal simultaneously while the accelerator pedal is operated. It will cause damage to the drive system.

### Driving on Inclined Surfaces:

- Drive slowly on downhill/uphill, on turns, wet grounds, ramps.
- Do not make sharp turns: machine might tip over.
- Do not drive with the hopper in raised position.
- Do not park the machine in slopes.
- Do not jack the machine in slopes.
- Do not go on a steep downhill with a raised hopper.
- Before entering a ramp, remove the main broom and side broom.

**CAUTION:** Exercise caution for oncoming vehicles and other equipments and stationary objects, people or animals.

**WARNING:** DO NOT DRIVE THE MACHINE OVER HUMPS, IT WILL DAMAGE THE APRONS AND FLAPS.

### Operator Presence Switch:

The machine is equipped with an operator presence switch as a safety system. When driving if the operator gets up from the seat, all functions of the machine will stop working. To resume activity, sit in operator seat and press accelerator pedal.

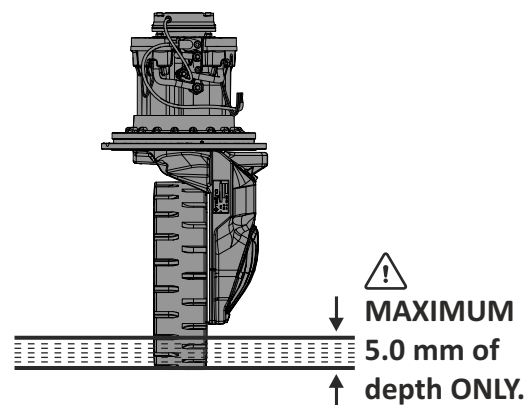
### Driving in Flooded Areas:

Extreme care should be taken when driving through flooded areas. Drive very slowly in a flooded area.

DO NOT drive through a flooded area beyond a depth of **5.0 mm**, it may damage the drive motor.

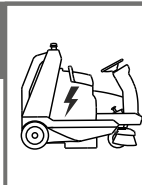
It is also recommended that the operator avoids driving through a flooded area whenever possible.

**DO NOT use the machine to collect flood water.**

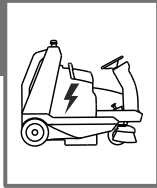


**WARNING:** DO NOT DRIVE THROUGH A FLOODED AREA BEYOND A DEPTH OF 5 mm. IT WILL DAMAGE THE DRIVE MOTOR.

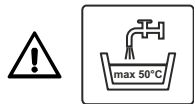
**WARNING:** Do Not use the machine to push or tow other vehicles or equipments. Risk of machine damage.



# MACHINE OPERATION

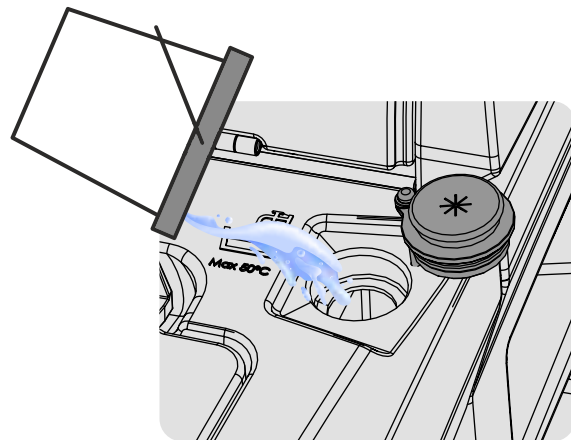
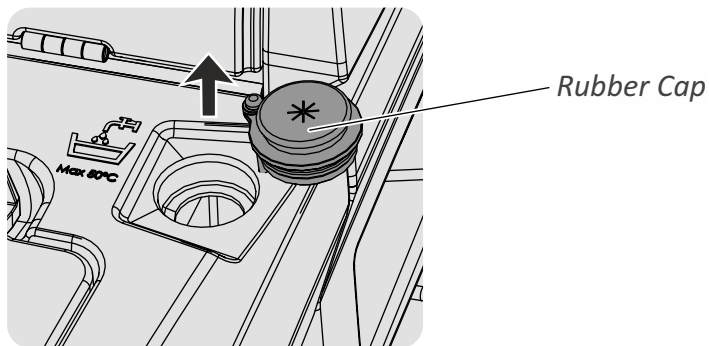


## Filling of Fresh Water:



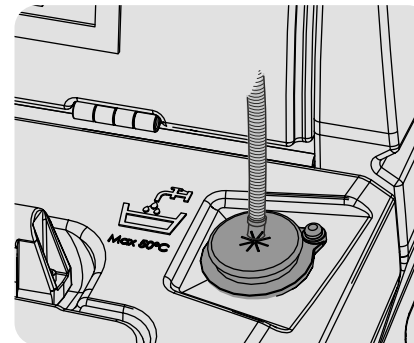
Fill only clean fresh water with Max. 50°C in the fresh water tank.  
**DO NOT** fill dirty or contaminated water.

**Bucket Filling** - Open the rubber cap located in the fresh water tank. Pull the cap upwards and slide out.



**Hose Filling** - Insert the water hose into the rubber cap from the top side.

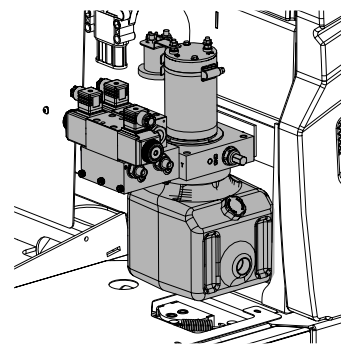
Fill only fresh clean water in the tank. Do not fill with water temperature beyond 50°C.



### WARNING:

- × Do not fill the tank with contaminated water.
- × Do not mix harsh acids and chemicals with the water.

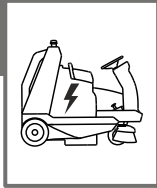
## Hydraulic Power Pack:



A electrically operated hydraulic power pack is used to raise/lower and for tipping functions of the hopper.

It is located at the front of the machine.

# MACHINE OPERATION

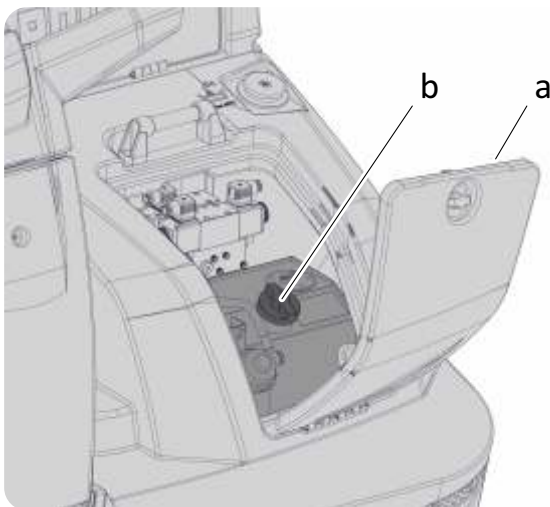


## Refueling the Diesel Fuel Tank:



To refuel the tank follow the steps below:

- Ensure that the engine is shut down.
- Open the cowling cover (a).
- Operate the key and open the fuel filler (b) slowly to vent out gases.
- Fill in the required quantity of **DIESEL** fuel.
- Close the fuel filler and lock it to prevent any unauthorized handling.
- Close the cowling cover.
- The amount of fuel is displayed in the LCD in the control panel.



	<b>WARNING</b>		<b>USE DIESEL FUEL ONLY</b>
	<b>ENGINE FUEL CAN CAUSE FIRE</b>	<ul style="list-style-type: none"><li>• Stop engine when fueling.</li><li>• Keep flame and spark away from tank.</li><li>• Avoid overfilling of tank.</li><li>• Do not smoke when fueling.</li><li>• Clean the spilled fuel before starting the engine.</li></ul>	

**DIESEL ONLY**



**Caution: Do not spill fuel into the environment while refueling. There is risk of contaminating the environment.**



- DO NOT add additives to the fuel.
- DO NOT mix contaminated fuel.
- DO NOT SMOKE WHEN REFUELING.
- DO NOT spill fuel on the floor.
- If any fuel spill is noticed on the floor or the machine, immediately wipe to avoid risk of fire which may damage the machine or cause risk of burns or death.
- DO NOT top up oil or coolant when engine is running.
- DO NOT use mobile phone when refuelling.

**WARNING**



**Avoid static electricity when fueling. Avoid death or serious injury from fire or explosion.**



**DO NOT USE MOBILE PHONE WHILE REFUELING THE FUEL TANK. THERE IS A RISK OF EXPLOSION.**



# MACHINE OPERATION

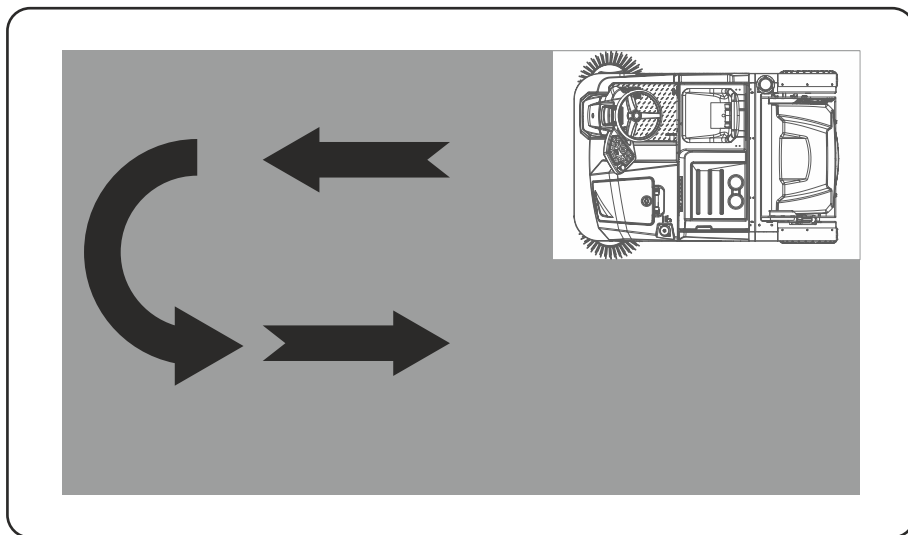
## SWEEPING

Pick up oversized debris before sweeping. Flatten or remove bulky cartons from aisles before sweeping. Pick up pieces of wire, ropes, string, etc., which could become entangled in brooms.

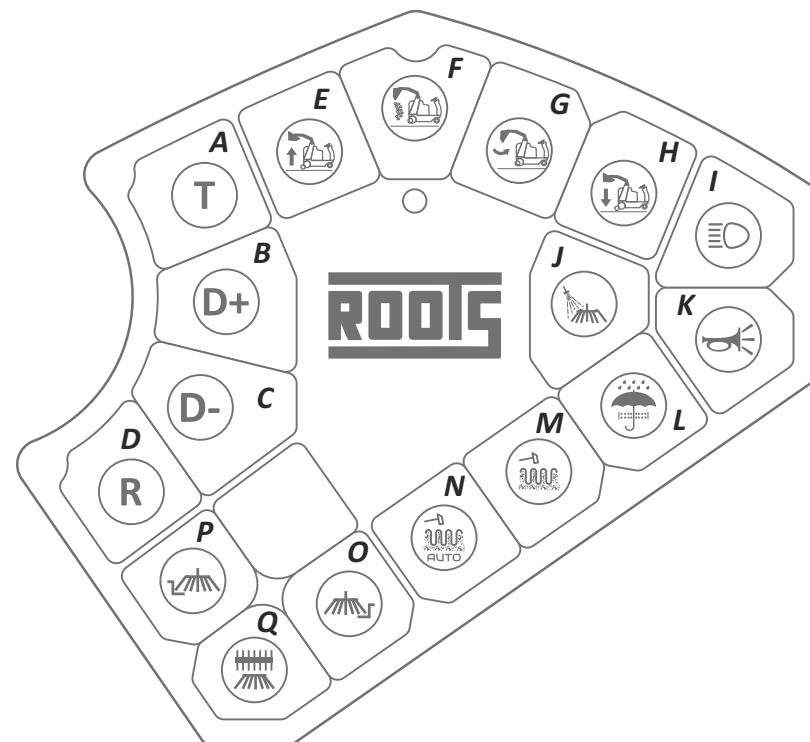
Plan the sweeping in advance. Try to work in long runs with minimum stopping and starting. Sweep debris from very narrow aisles into main aisles ahead of time. Work an entire floor or section at one time. Sweep in a straight path as possible.

Avoid bumping into power and lamp posts or scraping the sides of the sweeper.

Avoid turning the steering wheel too sharply when the machine is in motion. The machine is very responsive to the movement of the steering wheel. Avoid sudden turns, except in emergencies.



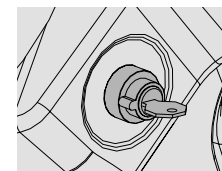
## Start of Sweeping:



S



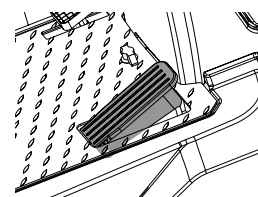
T



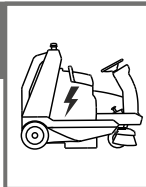
U



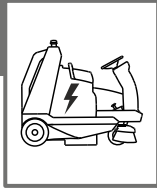
V



W



# MACHINE OPERATION



1. Sit firmly in operator seat.
2. Insert key into ignition switch (U) and turn key clockwise, start engine. Beacon lamp is activated.
3. Disengage the parking brake.
4. Drive the machine to the work area.
5. Press Main/Side Broom switch (Q) to activate the brooms.
6. Press (P) to select Left Side Broom and (O) to select Right Side Broom.
7. Press the accelerator pedal (W) to start sweeping the work area. If necessary, change the speeds using buttons
8. Press (J) to start water spray.
9. Press (M) to activate filter shaker manually. Pressing will activate the filter shaker 3 times.
10. Press (N) to activate filter shaker automatically with a pre set time.
11. Steer the machine in such a way that the swept area overlaps to get better results.
12. Drive the machine slower when sweeping large amounts of dust or debris or when safe operation dictates slower speeds.
13. Press (L) to activate vacuum by-pass when sweeping in a damp area or picking up damp debris.
14. To collect light and bulky waste materials, lift the front flap by pressing the pedal (S).
15. Press (I) to switch On headlamps to operate in dark or low lit areas.
16. Press (K) to use the horn to warn bystanders or other vehicles about your presence.
17. The hopper should be dumped after each working cycle and whenever it is full.
18. In case of an emergency press (V) to stop the machine.
19. Before switching off the engine wait for a few seconds after disengaging all sweeping functions.

## NOTE:

Switches **E, F, G & H** operate via the hydraulic power pack. **DO NOT operate these switches continuously for more than 1 minute at a time.**

## CAUTION!

- ***When the dust filter is clogged and/or the hopper is full, the machine cannot collect dust and debris anymore.***
- ***In the event of an overload of one of the broom motors, due to foreign object getting stuck, a safety system stops the motor to prevent any damage.***

20. During sweeping operation, if the hopper is raised, main broom, side broom and vacuum suction fill shut off automatically, only machine drive function will be available. This function is used to prevent any dust leak and prevent formation of a dust cloud which will hamper visibility for other vehicles or equipments on the worksite.

## DO NOT SWEEP

***Corrosive/Battery Fluids/Explosive  
Flammable/Magnetic/Radioactive  
Biohazard materials.***



## Hopper Dumping:



## WARNING!

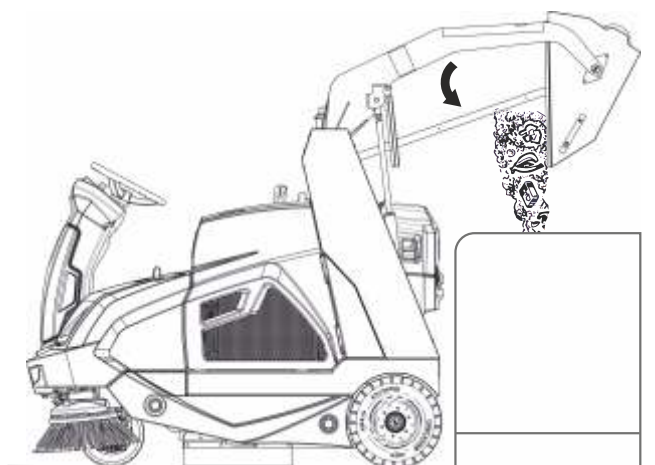
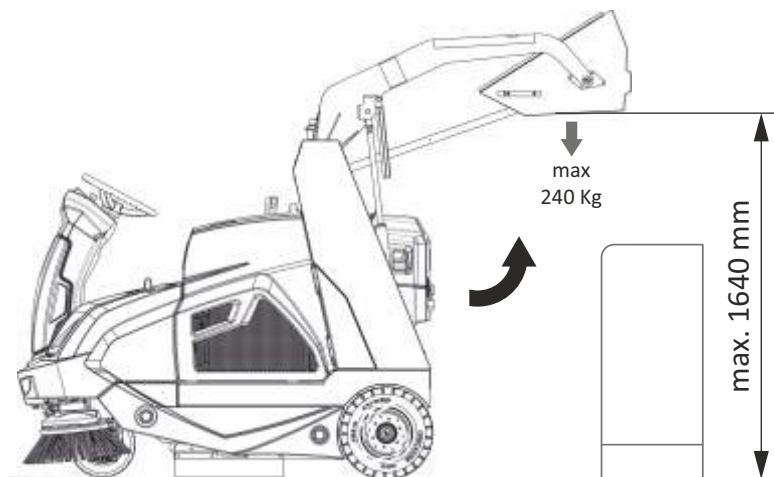
- ***The hopper must be emptied on level grounds only.***
- ***Do not lift the hopper when the machine is on a slope or on an uneven ground.***
- ***When lifting and dumping the hopper, always ensure that there are no people around the machine, especially near the hopper.***

1. Move the machine close to a dustbin or waste disposal area.
2. Lift the main and side brooms.
3. Turn Off vacuum system.
4. Raise the hopper by pressing (E) switch on the control panel to raise up to the desired position. *A buzzer will activate to notify the operator.*
5. Drive the machine to the dumping position and engage the parking brake.

## MACHINE OPERATION

6. Rotate the hopper by pressing (F) switch to dump the collected waste.
7. Rotate the hopper back by pressing (G) switch.
8. Lower the hopper by pressing (H) switch. Continue pressing the button till the hopper is lowered completely.
9. The machine is now ready to start sweeping again.

**NOTE:** The hopper will not raise if the machine is on an inclined surface.



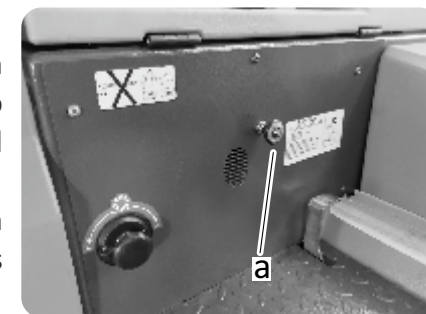
### End of Operation:

After working and before leaving the machine, perform the procedures as below:

- ➔ Activate the filter shaker briefly by pressing the switch (M)
- ➔ Empty the hopper.
- ➔ Raise the main broom and side brooms (R)
- ➔ Turn off the machine by turning the ignition switch (U) anti-clockwise.
- ➔ Remove key.
- ➔ Engage the parking brake (T).

### Emergency Engine Shutdown:

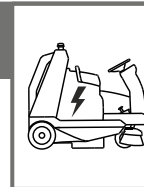
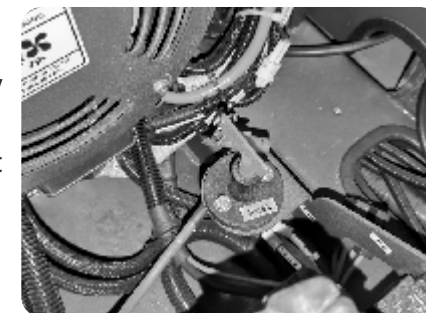
The machine is equipped with an emergency engine shut down cable (a) to turn the engine off if the electrical emergency stop button fails. Pull the knob to turn off the engine, when released the knobs goes back to its original position.



**⚠ WARNING:** This safety system should only be used during unavoidable emergencies. Do not use it to stop the engine on a regular basis.

### Starter Battery Cutoff Switch:

The machine is equipped with a battery cutoff switch to prevent unauthorised starting of the engine and to prevent battery drain.



# MAINTENANCE & TROUBLESHOOTING



## MAINTENANCE WORK

Compliance with our recommendations concerning maintenance work will give you the certitude always having a machine at your disposal, which is ready to work and in good operating condition.

Please contact your local Roots Multiclean Ltd. dealer. The people there will be glad to perform that work for you. Their well trained personnel and genuine Roots spare parts are at your disposal.

- Well trained personnel and genuine Roots spare parts are at your disposal.
- In case of any inquiry or order for spare parts, please always quote the machine's serial number mentioned on the nameplate.
- The name plate is fixed in the rear side of the machine.
- When cleaning or servicing the machine, and when replacing any part, shut off the machine and on principle disconnect the power plug from the power supply.
- For reasons of safety during cleaning and/or maintenance work in or on the tank, the tank lid - when lifted - must be secured so as to prevent accidental closing or tilting down.
- The machine may be taken into operation only if all guarding devices are fitted and in protective position. As far as possible, cleaning should not be done by hand, but using appropriate tools or equipment.
- Maintenance and repair work may be carried out only by means of suitable tools and by the people trained in the factory. For reasons of safety, only genuine Roots spare parts may be used.

## **WARNING**

- **Maintenance and/or repair operations must be done by skilled and authorized personnel; all operations on electrical devices are to be performed by specialized personnel only.**
- **Read this manual thoroughly before performing any repair or maintenance operations.**
- **For repair and/or maintenance of high reach areas of the machine, use a suitable work lift or working platforms.**
- **Use genuine Roots spare parts ONLY which are specifically designed for the machine.**
- **USE suitable PPE at all times when working or servicing the machine.**

## **IMPORTANT!**

- **ALWAYS SWITCH OFF AND REMOVE KEY BEFORE PERFORMING ANY MAINTENANCE OR REPAIR WORK.**
- **ALWAYS ATTACH A 'DO NOT START' OR SIMILAR WARNING SIGN TO THE KEY SWITCH OR A CONTROL BEFORE CLEANING OR SERVICING THE MACHINE.**



# MAINTENANCE & TROUBLESHOOTING



## SAFETY PRECAUTIONS

Do not allow unauthorized personnel to service or maintain this machine. Study the Operator's Manual and Maintenance Manual before starting, operating or servicing this machine. Always follow procedures and safety precautions detailed in the Maintenance Manual.

Always attach a 'DO NOT START' or similar warning sign to ignition switch or a control before cleaning, lubricating or servicing the machine.

Never allow anyone to work on the machine while it is moving. Make sure no one is on the machine before working on it.

Do not work under or near unblocked or unsupported hopper. Always use the hopper safety prop.

Do not work under or near any unblocked or unsupported linkage, part or truck.

Always relieve pressure before servicing any pressurized system.




When changing oil in the engine, transmission and hydraulic systems, or removing hydraulic lines, remember that the oil may be hot and can cause burns to unprotected skin.

When working on or around exhaust components, remember that the components may be hot and can cause burns to unprotected skin.

Always deflate tyre before attempting to remove any embedded objects or removing the tyre and rim assembly from the machine.

## WARNING

Escaping fluids under pressure can penetrate skin. When working around battery area, keep all flames and sparks away from batteries.

 <b>WARNING</b>	
	
<p><b>Injection Hazard.</b> Escaping fluid under pressure can penetrate skin, causing serious injury.</p>	<p>Relieve pressure before disconnecting hydraulic lines. Keep away from leaks and pin holes. Use a piece of cardboard to search for leaks. Do Not use hand.</p> <p>Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this type of injury or it may cause gangrene.</p>



## MAINTENANCE

This section describes the maintenance of the machine under the following topics:

- DISPLAY SERVICE SCREEN
- MAIN BROOM
- SIDE BROOM
- DUST FILTER
- SKIRTS
- WATER FILTER
- HYDRAULIC SYSTEM
- WHEELS & TYRES
- SEALING GASKETS
- SAFETY STOPPER
- ANTI STATIC DRAG CHAIN
- ENGINE & PMG GROUP
- SAFETY FEATURES IN THE MACHINE
- CLEANING THE MACHINE
- STORING THE MACHINE
- FREEZE PROTECTION
- ELECTRICAL MAINTENANCE
- MACHINE TRANSPORT
- MAINTENANCE SCHEDULE CHART
- TROUBLESHOOTING CHART

## DISPLAY SERVICE SCREEN

### Fault Error Codes

In an event of an error in the drive system or the machine an error code is displayed in the multi functional screen.



1. When the key is turned ON, initially the display shows the above screen while booting up.



2. After booting up, display shows the Home Screen.

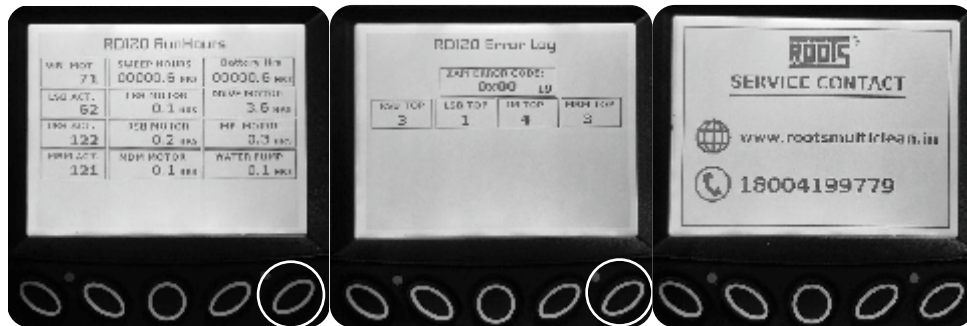


3. In home screen, if any faults are active a warning triangle is displayed. Press the right corner button to see the active faults.



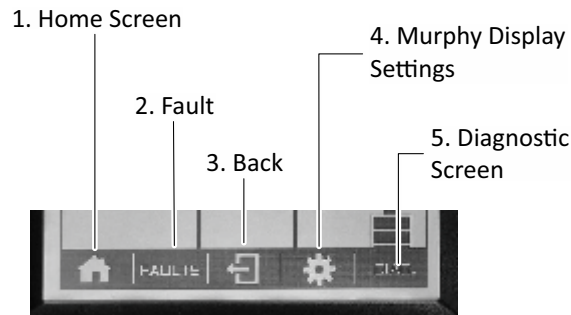
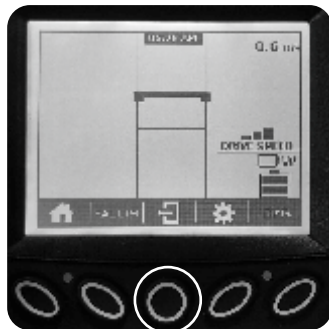
3.a. If faults active, buzzer also sounds. To turn OFF the buzzer press this key.

# MAINTENANCE & TROUBLESHOOTING



4. Subsequently press the right corner button to view Run Hour screen, Error Log screen, Service Contact screen.

## RB120 Menu



1. Press the center button for the menu bar.

## Diagnostic Screen Menu



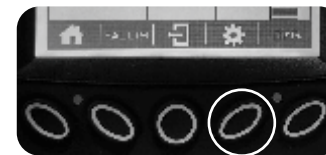
Press right side corner button to view the diagnostic screen.

Press right side corner button to view A1PCB screen.



Subsequently press the right side corner button to view the PDM.A, PDM.B Test screens, diagnostic screens, flag and display troubleshooting screens.

## Settings Main Menu Screen



To enter the settings main menu, press the button shown in the image.

## Brightness



After pressing the switch the following screens will be displayed. Press the up/down arrow to select the corresponding screen and press the enter button to view the screens.

In the above screen, use the arrow keys to navigate to Brightness, Date & Time, Software Version, User Settings, Advance Settings and RB120 Mode.

## Date & Time



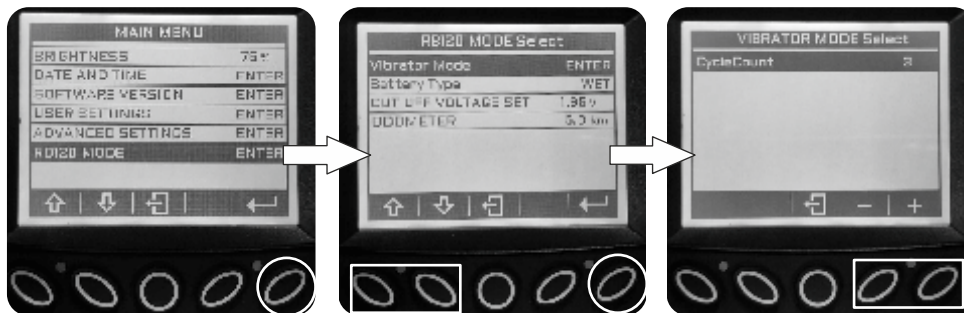
Press +/- key to set the date and time.



## Software Version



## RB120 Mode



Press the button to move previous/next mode

Press -/+ key to decrease/increase the cycle counts. (1-10)

## Main Broom Motor Current Limit Voltage Set



**Note:** This setting should be changed by authorised Roots Multiclean Ltd service engineer only.



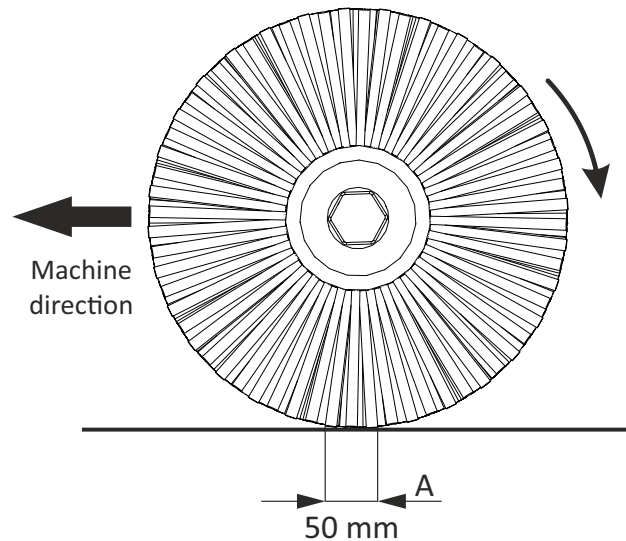


## MAIN BROOM

### Main Broom Height Check and Adjustment

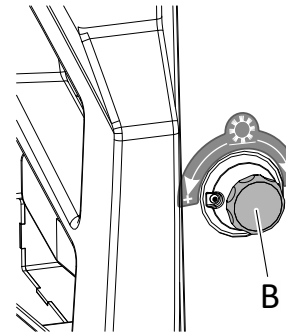
1. Check the main broom pattern (A) as given below:
  - Drive the machine on a level ground.
  - Engage the parking brake.
  - Lower the main broom.
  - Start broom rotation by pressing the accelerator pedal for 20 seconds.
  - After 20 seconds turn off the broom rotation, lift main broom.
  - Check the main broom print on the floor. It should be 50 mm.

If the pattern is not achieved, adjust the main broom height according to the following procedure:



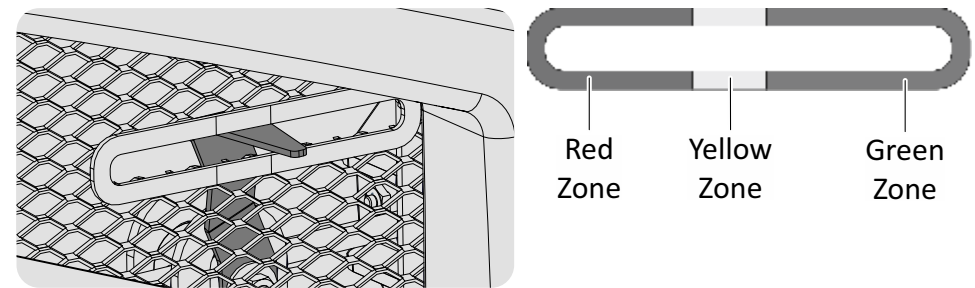
2. Turn the knob (B) as shown:
  - To increase the pattern width, turn the knob anti-clockwise.
  - To decrease the pattern width, lift the main broom, turn the knob clockwise.

**Note:** The knob can be used both to adjust the main broom pattern and to adjust the main broom according to bristle wear.



Perform Step 1 again to check if the main broom pattern is achieved.

### Main Broom Wear Adjustment



The main broom wear indicator is located on the right side of the machine. The indicator is divided into 3 zones: Green, Yellow & Red.

Green zone - Broom is good to use.

Yellow zone - Broom is worn out half way through.

Red zone - Broom must be replaced.

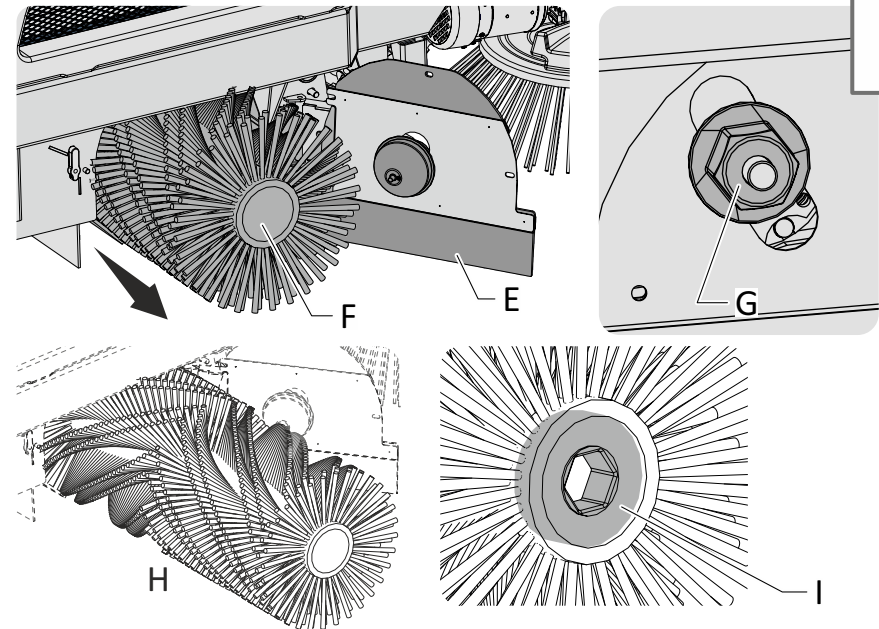
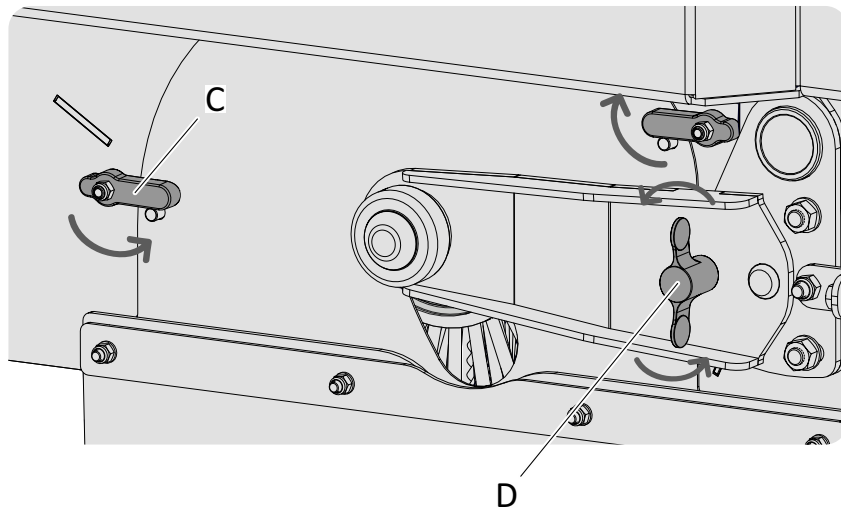
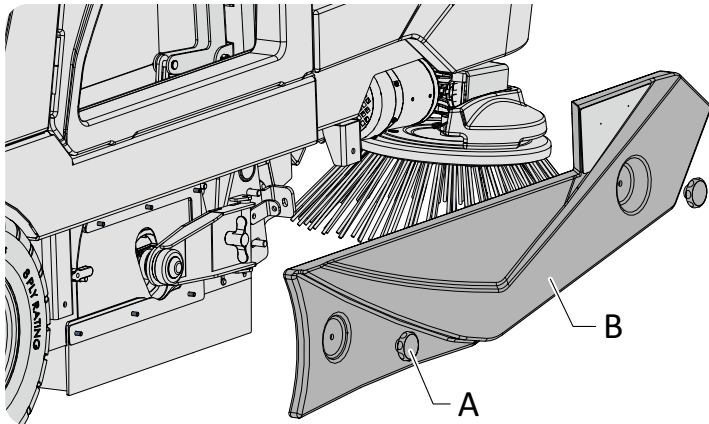
Rotate the knob (B) to adjust for broom wear. The indicator shows the current state of the main broom.

Adjust the wear by rotating the knob slowly. Do not turn the knob completely, it will cause excessive broom wear and will also overload the motor.

Always ensure a pattern width of 50 mm is achieved after adjusting the knob.

# MAINTENANCE & TROUBLESHOOTING

## Main Broom Replacement



1. Drive the machine on a level ground and engage the parking brake.
2. Ensure that the main broom is in lifted position.
3. Turn off the key switch and remove key.
4. Unscrew the two knobs (A).
5. Remove the right side bottom cover (B).
6. Turn the lock broom cover (C) anti-clockwise as in figure.
7. Unscrew the knob (D) completely.
8. Open the main broom cover (E).
9. Remove the main broom (F).
10. Check the drive hub (G) is free from dirt or foreign materials (cords, ropes, etc) accidentally rolled up.
11. The new broom must be installed with the bristles rows bent as shown in figure (H).
12. Install the new main broom and ensure that the hexagonal catch (I) fits into the drive hub (G).
13. Refit the main broom door and close it with the knob (D).
14. Refit the cover (B) and secure with knobs (A).



## SIDE BROOM

### Side Broom Height Check and Adjustment

1. Check the side broom pattern as given below:
  - Drive the machine on a level ground.
  - Keep the machine stationary, lower the side brooms and turn them on for a few seconds.
  - Stop and lift the side brooms, move the machine backwards.
  - Check the side broom pattern as in figure (A).

If the broom pattern is not within specifications, adjust the side broom height as below:

2. Engage the parking brake.
3. Turn on key switch.
4. For right side broom - Loosen knob (B), Turn knob (C) clockwise to increase pattern and turn knob (C) anti-clockwise to decrease pattern.  
After pattern is set tighten knob (B) to set.

If the side broom is too worn out to be adjusted, replace the side broom.

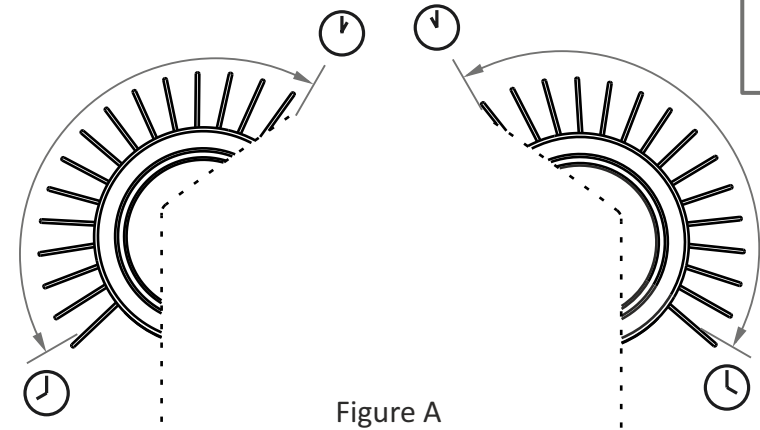
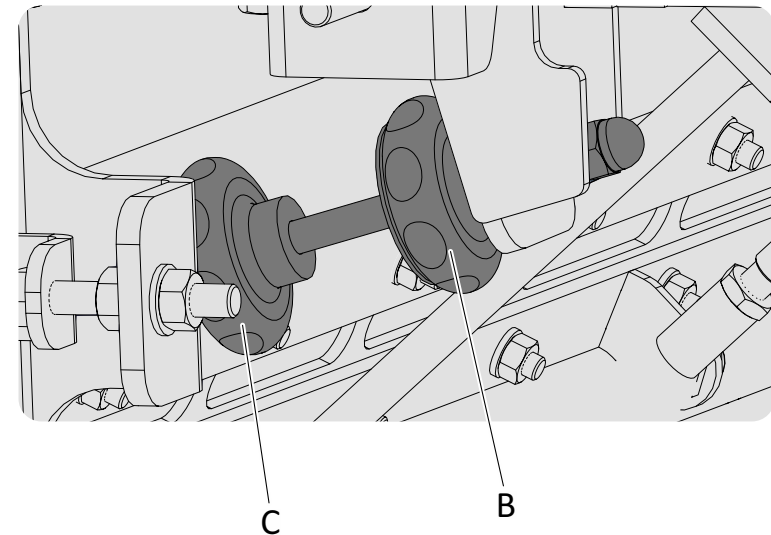


Figure A

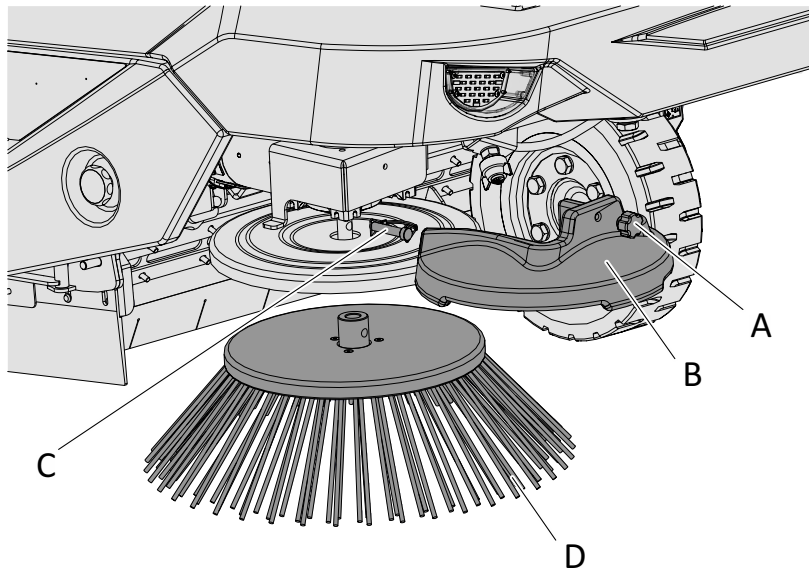




## Side Broom Replacement



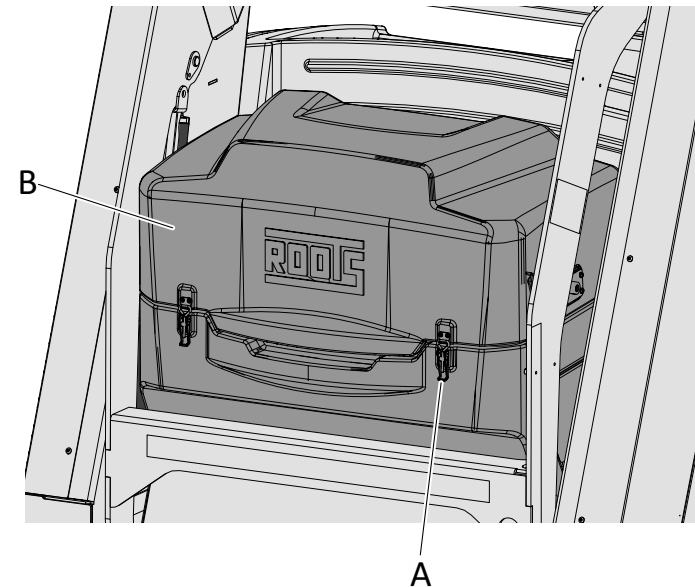
1. Drive machine on a level ground and engage the parking brake.
2. Remove the knob (A).
3. Remove the side broom guard (B).
4. Remove the locking pin (C).
5. Remove the side broom (D).
6. Insert a new side broom into the hub and insert the locking pin.
7. Install the side broom guard back in position and secure it with the knob.



## DUST FILTER

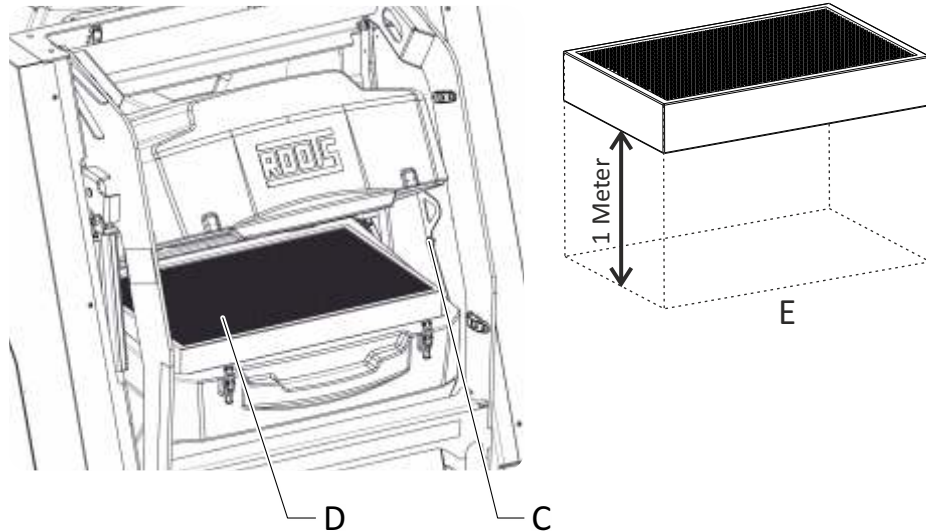
### Panel Dust Filter Cleaning

The dust filter must be cleaned regularly to maintain the efficiency of the vacuum system. To achieve longest filter life follow the recommended filter cleaning service intervals.



### WARNING:

- Wear safety glasses when cleaning the dust filter.
- Clean the dust filter only in a well ventilated area.
- Do not use sharp tools to clean the dust filter.
- Wear a dust mask to avoid breathing in dust particles.



1. Drive machine on a level ground and engage the parking brake.
2. Turn off key switch.
3. Open the filter compartment (B) by releasing the latches (A).
4. Secure the filter compartment by engaging the lock (C).
5. Lift the dust filter (D) and remove it from the machine.
6. Clean the dust filter by any of the methods as described below.

## Method "I"

Gently tap the filter on a smooth flat surface (dirty side downwards) to loosen the dust from the filter. Use an external vacuum machine to extract the dust.

The filter can be dropped from a height of 1 metre (E) to loosen dust. Ensure that the metal mesh is facing upwards.

 **CAUTION: Do not damage the metal casing of the filter.**

## Method "II"

Use compressed air to blow out the dust from the dust filter. Blow from the other side of the filter. Do not use more than 6 bar of air pressure.

 **CAUTION: Do not damage the metal casing of the filter.**

7. Before inserting the filter, clean the filter box.
8. Install the filter with the wire mesh upwards.
9. Disengage the lever and close the filter box.
10. Engage the latches.

## Method "III"

Show the mesh side of the dust filter under clean running water to remove dust. Clean the filter till all of the dust is removed.

**WARNING: Do not use high pressure jet to clean the filter.**

Before installing the cleaned filter in the machine, ensure that the filter is completely dry.

**WARNING: Do not install a wet or damp filter.**



**WARNING**

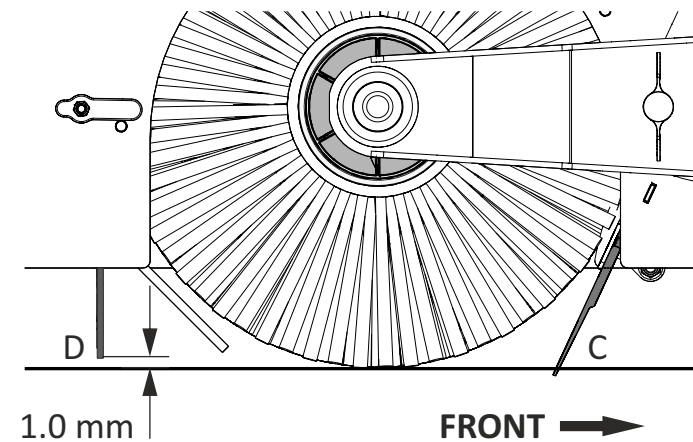
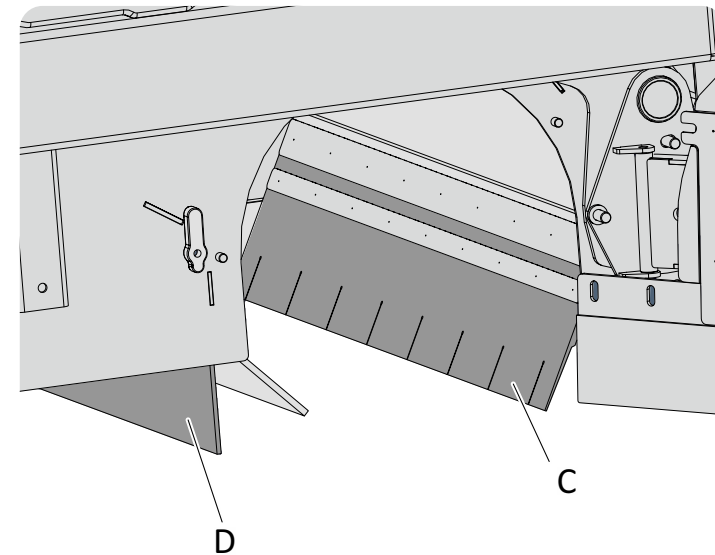
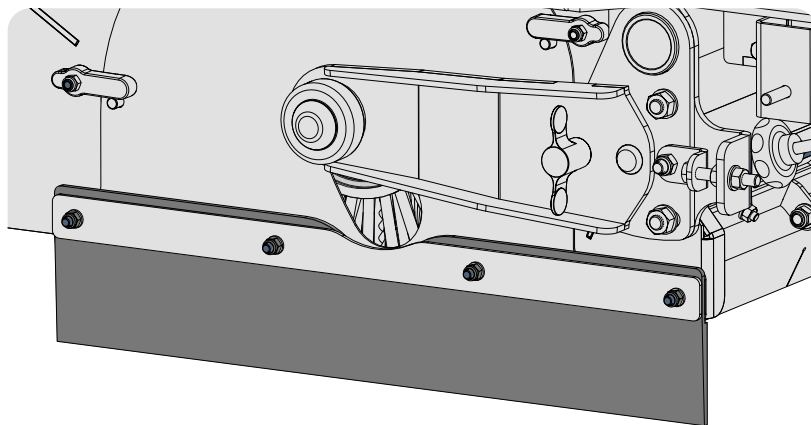
- **DO NOT dispose the used filter into the environment, There is risk of contaminating the environment.**
- **DO NOT dispose the used filter in regular garbage, use appropriate methods.**
- **DO NOT inhale the dust. Health hazard! Wear an appropriate dust mask.**
- **DO NOT wash the filter with chemicals.**
- **DO NOT contaminate the environment, use an appropriate cleaning chamber to dispose the dust.**



## SKIRTS

### Skirt Height Adjustment

1. Ensure that the hopper is empty, because the weight inside the hopper can affect the skirt height adjustment.
2. Drive the machine on a smooth flat level ground.
3. Turn off key switch and engage the parking brake.
4. Remove the left and right bottom covers by removing the knobs.
5. Visually check the condition of the skirts for cracks, cuts and tears.
6. Loosen the nuts (A) and adjust the skirt (B) for proper height. Tighten the nuts.
7. Remove the main broom.
8. Check the front (C) and rear (D) skirt rub the ground slightly.
9. If the skirts are worn out completely, replace them.
10. Assemble the components in reverse order for assembly.



#### WARNING:

Do not throw the used brooms, seals, aprons in the garbage. Risk of contaminating the environment.



# MAINTENANCE & TROUBLESHOOTING

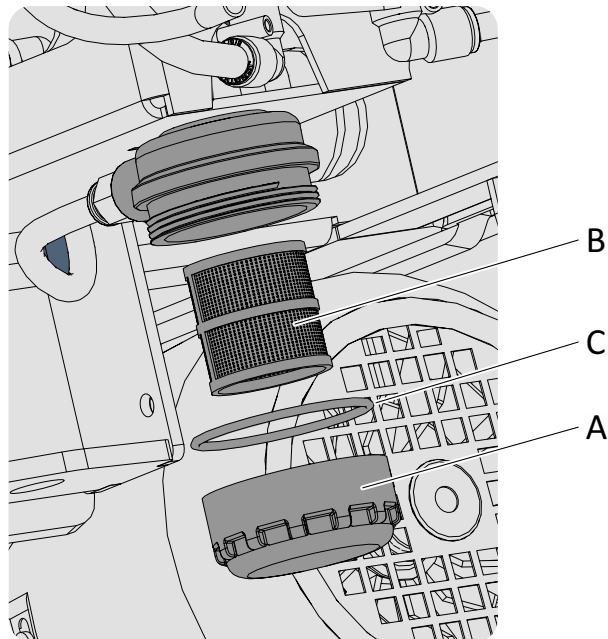


## WATER FILTER (if equipped)

### Water Filter Cleaning

NOTE: Ensure that the water spray system is off before removing filter.

1. Unscrew the filter cap (A).
2. Remove the strainer from the assembly (B).
3. Remove any debris from the strainer.
4. Clean the strainer under clean running water. Use mild detergent if required. A brush can be used to remove any salt deposit.
5. Clean the O-Ring (C). Use clean water only. Ensure that the O-Ring is placed in the proper position before tightening the assembly. If failed to do so, there is a risk of water leak.



**WARNING**

*Do not over tighten, risk of breakage, risk of leak and component damage.*

## HYDRAULIC SYSTEM

### Hydraulic Power Pack

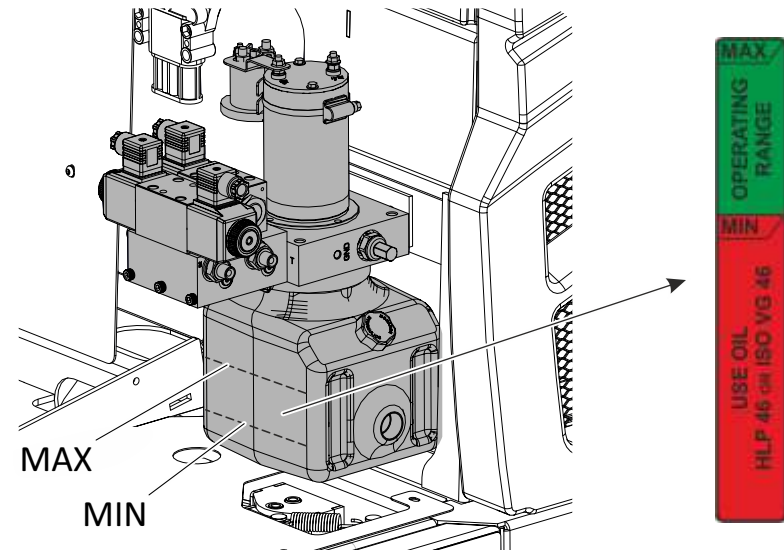
#### Hydraulic Oil Level Check



**WARNING**

*Ensure that the hopper is fully lowered before checking the hydraulic oil level.*

1. Turn off key switch and engage the parking brake.
2. Open the hood and secure it with the rope assembly.
3. Check the oil level in the hydraulic oil tank between the minimum (MIN) and maximum (MAX) mark.
4. If the oil level is low, top it up with the recommended hydraulic oil.
5. Close the hood.



**WARNING:**

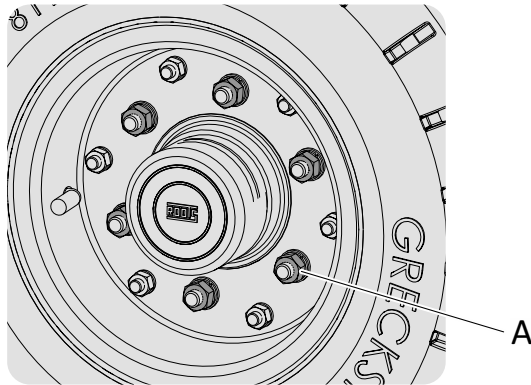
**DO NOT** operate the hydraulic power pack continuously for more than 1 minute at a time.



## WHEELS AND TYRES

### Wheels

Ensure that the left and right wheel bolts (A) are tight at all time.

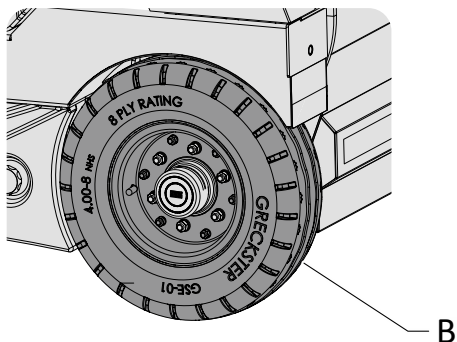


### Tyres

The machine is equipped with pneumatic tyres (B) at the rear as standard. Ensure that the tyre pressure is maintained 8 bar at all times.

If the tyre pressure is low, it will affect the sweeping performance of the machine.

The machine can also be equipped with solid tyres at the rear as an option. Check the tyres for foreign object damage. Remove any objects immediately if found.

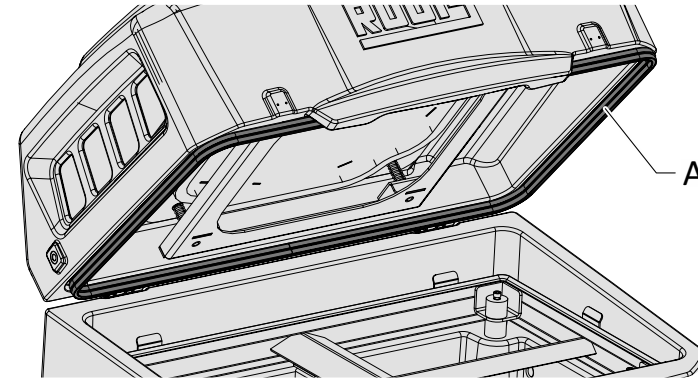


## SEALING GASKETS

### Filter Box Sealing Gasket

The filter box is equipped with a rubber sealing gasket (A) to prevent any dust and vacuum leak.

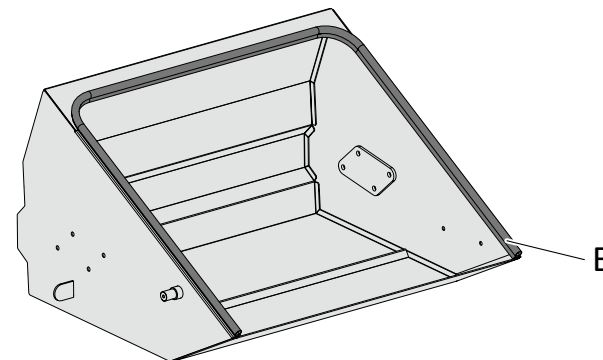
Check the gasket for wear and tear or damage. Replace if necessary.



### Hopper Sealing Gasket

The hopper is equipped with a rubber sealing gasket (B) to prevent any dust leak into the atmosphere during sweeping operations.

Check the gasket for wear and tear or damage. Replace if necessary.



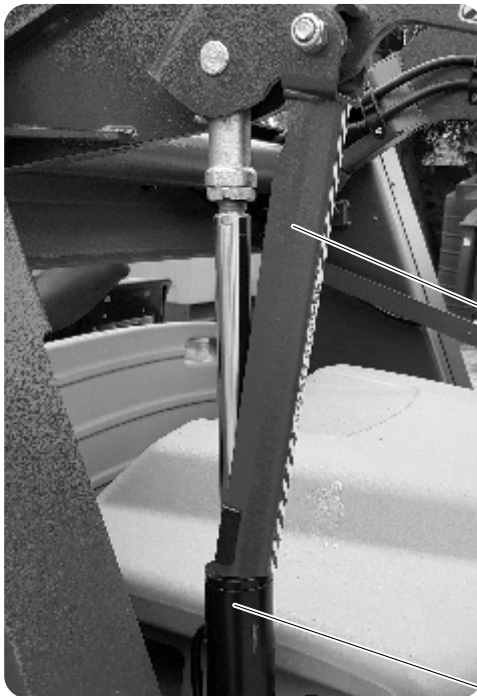


# MAINTENANCE & TROUBLESHOOTING

## SAFETY STOPPER

The machine is equipped with a safety stopper in the hopper list arm assembly to secure the lift arm during maintenance. To engage the safety stopper follow the steps below:

1. Drive machine on a flat ground.
2. Engage the parking brake.
3. Raise the hopper completely.
4. Position the safety stopper (A) on the lifting cylinder (B) and lower the hopper till it locks in place.
5. Turn Off key switch.
6. To disengage the safety stopper, raise the hopper till it releases from it's position.

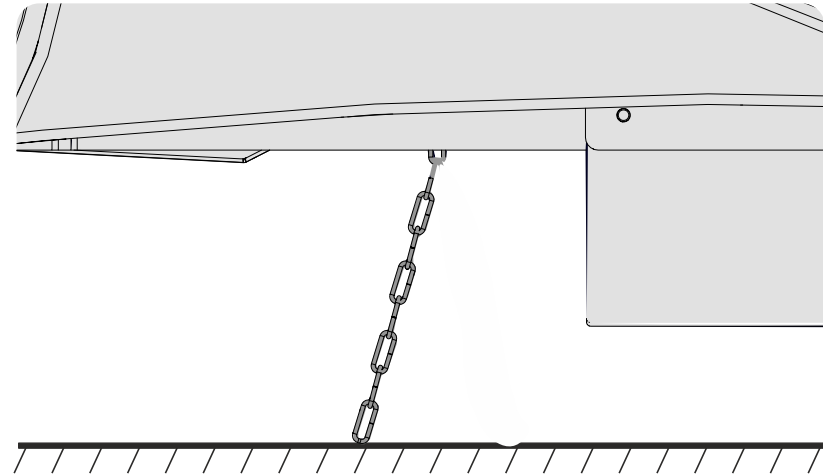


A

B

## ANTI STATIC DRAG CHAIN

The machine is equipped with a anti static drag chain to discharge static electricity when the machine is operating. Ensure that the drag chain touches the floor at all times.



**WARNING**

***Do not remove the anti-static drag chain from the machine.***



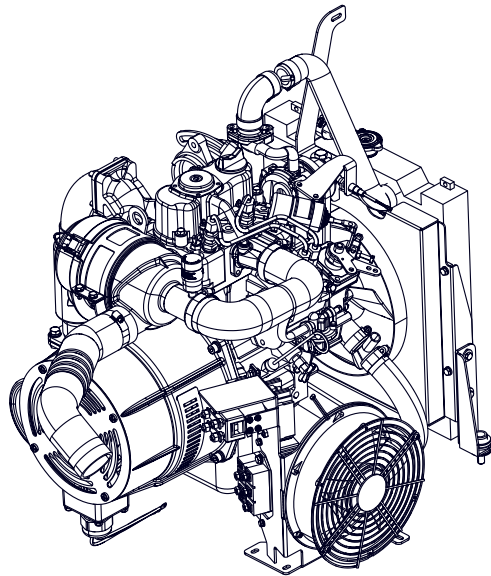
# MAINTENANCE & TROUBLESHOOTING



## ENGINE & PMG GROUP

For Kubota engine maintenance and troubleshooting kindly refer the engine manual supplied along with the machine.

For maintenance and troubleshooting the PMG group, contact Roots service only.



**WARNING**

**ONLY AUTHORISED ROOTS SERVICE ENGINEERS ARE ALLOWED TO WORK ON THE ENGINE & PMG GROUP.**

## SAFETY FEATURES IN THE MACHINE

The machine is equipped with the following safety features for operator safety and machine safety as below:

### **EMERGENCY STOP SWITCH**



This button switch is located in the main control panel to the left of the operator. It is RED in color and has to be pressed in case of emergency, to stop all machine functions.



### **OPERATOR SEAT SWITCH**

This switch is located inside the operator seat and it does not allow the machine to function if the operator is not seated on the seat.

### **MACHINE ANGLE SENSOR**

This sensor is located in the front of the machine within the cowling assembly. If the sensor is activated, the system will not allow the hopper to be lifted. A alarm and icon   will be displayed in the multifunction display panel.

### **HOPPER POSITION SENSOR**

When the hopper is lifted, the sensor reduces the machine speed, turns off the vacuum fan and stops the broom rotation.

### **HOPPER SAFETY VALVE (HYDRAULIC)**

When the hopper is lifted, a safety valve in the hydraulic system prevents the hopper to accidentally lower.

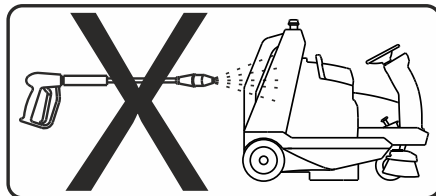
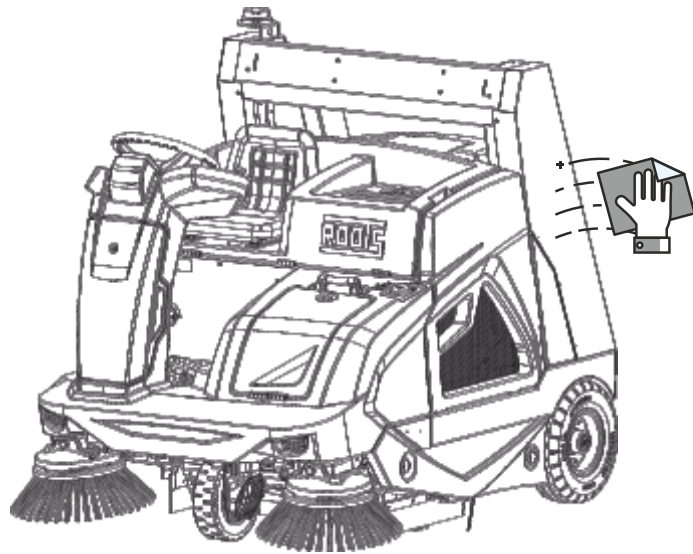
# MAINTENANCE & TROUBLESHOOTING



## CLEANING THE MACHINE



- Use a damp sponge with mild detergent to clean the exteriors of the machine.
- Ensure that water does not enter any electrical part.
- **DO NOT** use a high pressure jet or steam cleaning equipments to clean the machine.



**DO NOT CLEAN THE MACHINE BY MEANS OF VAPOUR JET OR HIGH PRESSURE CLEANING EQUIPMENT.**

## STORING THE MACHINE

The following steps should be taken when storing the machine for an extended period of time.

- Charge the engine battery before storing machine to prolong the life of the batteries. Recharge battery once a month.
- Disconnect battery before storing.
- Thoroughly drain fresh water tank.
- Store the machine in an indoor dry area.

**NOTE:** Do not expose the machine to rain, store indoors only.



**NOTE:** To prevent potential damage to the machine store the machine in a insect and rodent free environment.



## FREEZE PROTECTION

**NOTE:** Before leaving or servicing the machine, stop on a level surface, turn off key switch, engage the parking brake and remove key.

If the machine is used in a freezing environment change the Hydraulic Oil, Engine Oil & Radiator Coolant to the specification of that country immediately upon arrival to prevent machine damage.

Also do not store water and diesel fuel in the tanks for a longer period of time without mixing antifreeze.

# MAINTENANCE & TROUBLESHOOTING

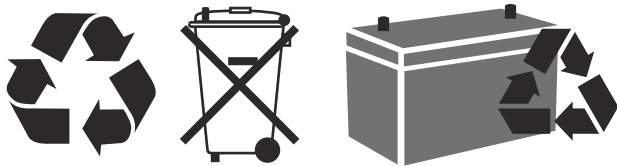
## CHECKING CONNECTIONS / CLEANING

After every 200 hours of use check for loose battery connection and clean the surface of the battery, including terminals and cable clamps, with a strong solution of baking soda and water. Replace any worn or damaged wire. Do not remove the battery cap when cleaning batteries.

### Operator Safety Tips:

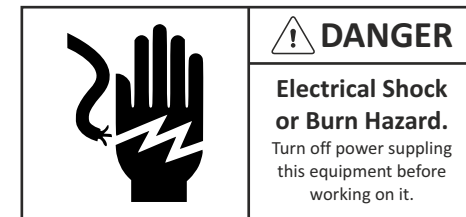
- ✓ Wash hands with soap after performing cleaning tasks on the battery.

## DISPOSAL OF BATTERIES



Old batteries with this sign are recyclable economic goods and should be brought back into the recycling process. Old batteries which are not brought back into the recycling process, have to be dealt with as dangerous materials under the observance of all regulations.

## ELECTRICAL MAINTENANCE



**NOTE:** Before leaving or servicing the machine, stop on a level surface, turn off key switch, engage the parking brake and remove key.

**IMPORTANT:** All electronic or electrical repairs should be done by authorized Roots Multiclean Ltd. Service Engineer *ONLY*.

The machine control board (electrical module) is located at the front of the machine, in the steering pillar assembly. To access the electronic components remove the front cover.

The man-machine interface control board is located at the top of the steering column assembly.

## ELECTRICAL FUSES

A variety of fuses are used to protect the electrical systems in case of a failure. In an event of a blown fuse, a blue LED glows near the appropriate fuse.

To change the fuse:

- Switch off ignition switch, remove key.
- Turn On battery cutoff switch.
- Open the side panel cover by removing the screws.
- Pull out the blown fuse from the socket.
- Insert a new fuse of the same rating into the fuse holder.
- Turn Off battery cutoff switch.
- Switch on key switch.
- Activate the corresponding system to check its function.

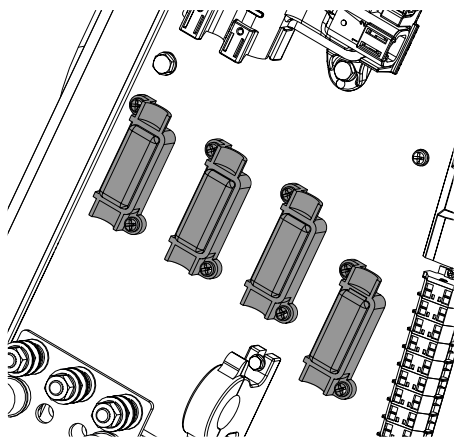
# MAINTENANCE & TROUBLESHOOTING

## **IMPORTANT:**

If there should be repeated cases of failure, look for reason.

### Fuse Ratings

POSITION	DESCRIPTION	RATING
F1	PDM-A FUSE	50A
F2	PDM-B FUSE	50A
F3	MAIN BROOM MOTOR	70A
F4	DC FUSE	125A
F5	PPM FUSE	70A
F6	KEY SWITCH FUSE	5A
F7	POSITIVE JUNCTION REAR	5A
F8	POSITIVE JUNCTION FRONT	5A
F9	DC-A10	10A
F10	DC-A3	10A
F11	SUCTION FAN MOTOR	30A



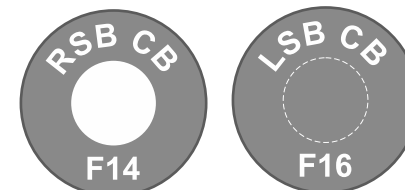
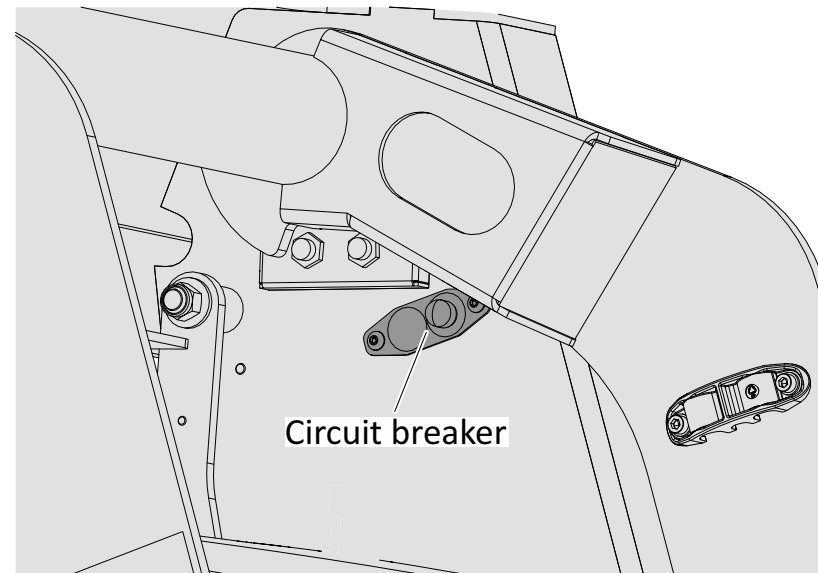
Fuse Location

### CIRCUIT BREAKER

A pair of circuit breakers for the right & left side brooms to protect them from damage. In an event of the circuit breaker getting tripped, reset the circuit breaker by pressing it.

**Wait for 30 seconds before reset.**

The circuit breakers are located on the hopper pillar RH side.



# MAINTENANCE & TROUBLESHOOTING



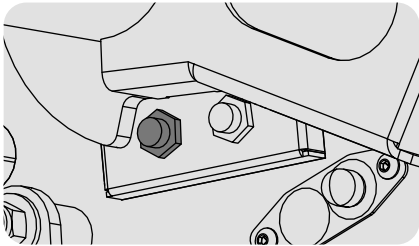
## SENSORS

The machine uses proximity sensors for the safety of the machine and operator.

These sensors should be checked regularly for safe operation.

Clean the sensors daily after the shift is complete. Clean the face of the sensor with a clean dry cloth.

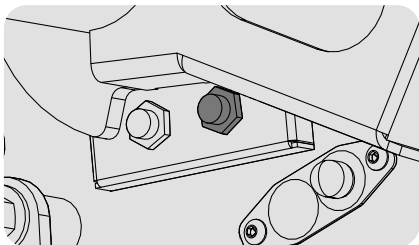
### SR1 - Open Hopper Sensor



Purpose - To identify whether the hopper arm is raised completely.

Location - Hopper pillar RH side top.

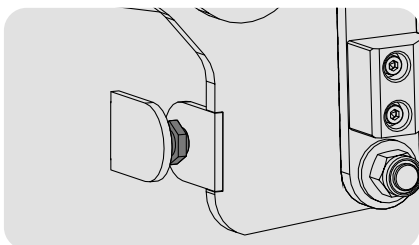
### SR2 - High Hopper Sensor



Purpose - To identify whether the arm is in tilt position.

Location - Hopper pillar RH side top.

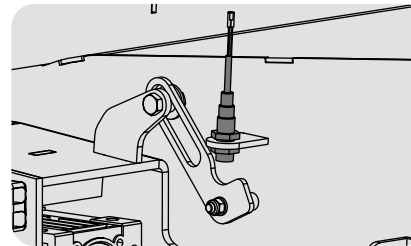
### SR3 - Rotated Hopper Sensor



Purpose - To identify whether the hopper is in closed position.

Location - Hopper link arm.

### SR4 - Main Broom Wear Sensor

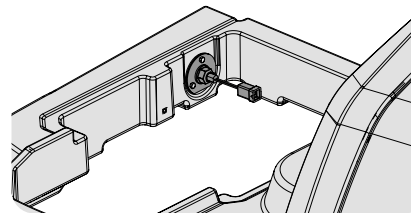


Purpose - To notify the operator that the main broom has reached its maximum operating limit.

The main broom has to be replaced.

Location - Main broom shield weldment.

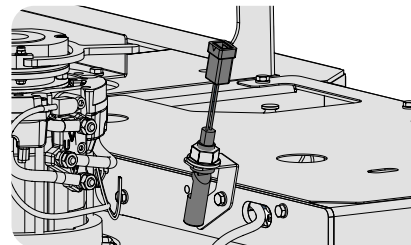
### S6 - Water Float



Purpose - To notify the operator that the fresh water level is low.

Location - Front cowl.

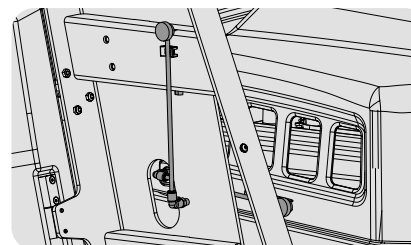
### S7 - Ramp Sensor



Purpose - To prevent the operator from raising the hopper when the machine angle exceeds 12°.

Location - Front of chassis.

### S8 - Filter Clog Sensor



Purpose - To activate the filter shaker automatically when the dust gets accumulated in the panel filter beyond its threshold.

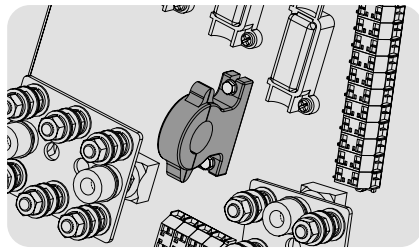
Location - Filter box.



Clean this surface

The sensors SR1, SR2, SR3, SR4 are proximity sensors. Clean the front surface of the sensor daily with a dry soft cloth as shown in the above figure. This will ensure proper functioning of the sensors.

## CS - Main Broom Current Sensor



**Purpose** - This sensor monitors the current flow to the main broom motor via a PDM. If the sensor detects an overload of current, it will instruct the PDM to trip the main broom motor to protect it from getting damaged.  
**Location** - Electrical panel LH side.

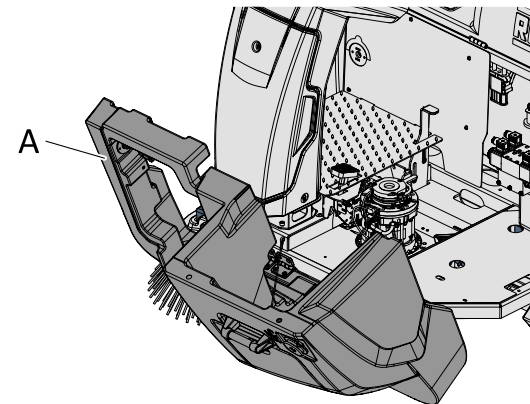
## MACHINE TRANSPORT

### Disabled Machine Transport

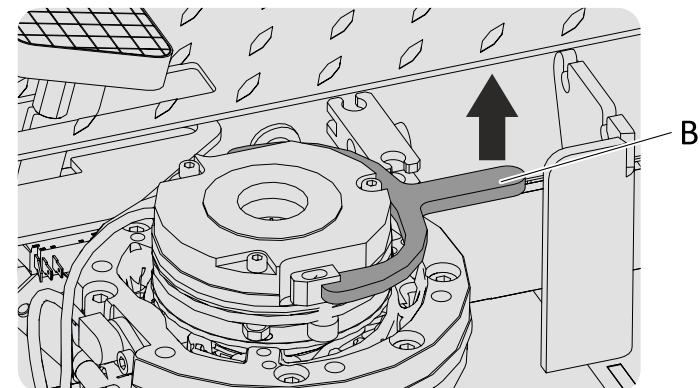
In case of drive motor/controller or machine failure, the machine can be moved by activating the brake release in the drive motor.

Follow the below procedure to do so:

1. Turn off key switch.
2. Engage the parking brake.
3. Open the front cowling (A).
4. Disengage the parking brake.
5. Pull the drive motor brake release lever (B) and hold while pushing the machine forward or backward.



**Do not push or tow the machine without deactivating the drive motor brake.**

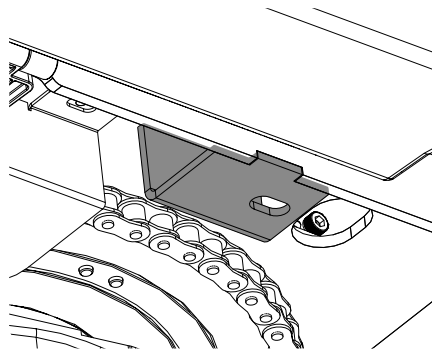




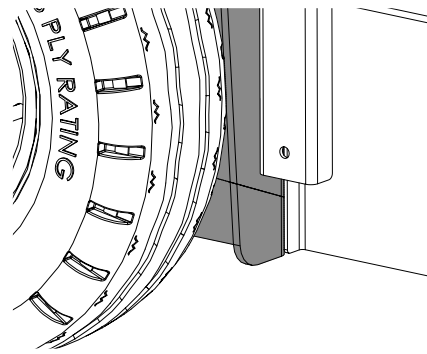
## Jacking the Machine

Always park the machine on a flat dry surface before jacking.  
Ensure that the hopper is empty before jacking the machine.  
The machine should be jacked up only using its designated jacking points, failure to do will cause damage/injury to machine or operator.  
Use a jack which will support the weight of the machine.  
Use jack stands to support the weight of the machine if hoisted up for a longer period of time.

The front jacking points are at the flat bottom portion of the machine.  
The rear jacking points are located near the rear wheels.



Front



Rear



***When servicing or changing tires, block the tires before jacking.***



# MAINTENANCE & TROUBLESHOOTING



## MAINTENANCE SCHEDULE CHART

The below table indicates the Person Responsible for each procedure:

**O = Operator**

**T = Trained Personnel**

Description	Person Resp.	Daily	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every year
Clean the machine everyday after sweeping is completed	O						
Check diesel fuel quantity	O						
Check for any fluid leaks around the engine	O						
Main and Side broom pattern check	T						
Main broom visual inspection	O						
Side broom visual inspection	O						
Hopper dust filter checking and cleaning	O						
Hopper lifting system hydraulic oil level check	O						
Safety stopper check	O						
Hopper gasket check	O						
Filter box gasket check	O						
Filter shaker check	O						
Dust filter check	O						
Skirt height check	T						
Water filter cleaning	O						
Proximity sensors cleaning	O						

# MAINTENANCE & TROUBLESHOOTING



## MAINTENANCE SCHEDULE CHART (continues)

The below table indicates the Person Responsible for each procedure:

**O = Operator**

**T = Trained Personnel**

Description	Person Resp.	Daily	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every year
Brake cables check and adjustment	T						
Tyres check	O						
Steering chain cleaning	T						
Steering chain check and adjustment	T						
Water spray nozzle check/clean	O						
Hydraulic system oil change	T						
Main broom carbon brush check and replacement	T						*
Side broom carbon brush check and replacement	T						*
Drive broom carbon brush check and replacement	T						*
Electrical systems check	T						
Headlamp, Beacon lamp & Horn check	O						
Visual inspection	O						

\* - Check every 100 hours after initial 1000 hours check.



## TROUBLESHOOTING CHART

Problem	Cause	Remedy
<b>When turning the key switch On, the display does not turn on and the machine does not function</b>	Emergency stop switch activated	Check and release emergency stop switch
<b>The machine does not move when the accelerator pedal is pressed, and an alarm message is activated</b>	Accelerator pedal is pressed when the key switch is in Off position	Turn the key switch to On position
	The operator is not seated properly on the seat	Sit down in operator seat
	Drive system fault	Turn off the machine and then turn it back on again. If the problem persists, contact Roots service
<b>No power - nothing works</b>	Faulty power switch	Contact Roots service
	Battery cutoff switch is engaged	Disengage battery cutoff switch
	No diesel fuel	Add diesel fuel
	Loose battery cable	Tighten cable
	Engine/PMG does not work	Contact Roots service
	Main fuse blown	Rectify the cause and replace the fuse
<b>Main broom motor does not work</b>	Accelerator pedal is not depressed	Press accelerator pedal
	Main fuse blown	Rectify the cause and replace the fuse
	Main broom motor fuse blown	Rectify the cause and replace the fuse
	Faulty broom motor or loose cable	Contact Roots service
<b>Side broom motor does not work</b>	Accelerator pedal is not depressed	Press accelerator pedal
	Main fuse blown	Rectify the cause and replace the fuse
	Side broom motor fuse blown	Rectify the cause and replace the fuse
	Faulty broom motor or loose cable	Contact Roots service
	Side broom circuit breaker tripped	After 30 seconds, press and reset the circuit breaker and try operating

# MAINTENANCE & TROUBLESHOOTING



## TROUBLESHOOTING CHART (continues)

Problem	Cause	Remedy
<b>Machine collects little debris</b>	Dust filter is clogged	Clean dust filter
	Hopper is full	Empty the hopper
	Skirts are not properly adjusted or broken	Adjust/replace skirts
	Main/Side brooms are not properly adjusted	Adjust the pattern
<b>Hopper does not lift</b>	Hydraulic system oil level is low	Check hydraulic system oil level, topup if needed
	Machine is not level	Move machine to flat surface
<b>Hopper does not dump</b>	Hopper is too low	Lift hopper till minimum dumping height
<b>Hopper does not lower</b>	Hydraulic oil taking time to flow through system	Wait for the hydraulic oil to flow
<b>Filter shaker does not work</b>	Filter shaker cable is loose	Check and reconnect cable
<b>Water spray system does not work</b>	Water tank empty	Fill the water tank
	Nozzle or filter is clogged	Clean nozzle or filter.
	Pump is faulty	Check, replace if needed.
<b>Machine moves after parking brake is engaged</b>	Brake pad worn	Check and replace brake pad.
	Parking brake cable loose	Adjust parking brake cable.
<b>Proximity sensors not working</b>	Dust accumulated	Clean the proximity sensors to resume operation

## DO'S & DON'TS



### DO'S

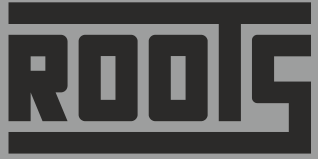
- ✓ Always use the machine only on a level flat surface.
- ✓ Use the machine to collect only dry debris.
- ✓ Check the machine visually for any damage before the start of the shift.
- ✓ Check the machine visually for any fluid leak before the start of the shift.
- ✓ The operator must have read the user manual completely before operating the machine.
- ✓ The operator must be always cautious while driving the machine.
- ✓ The warning beacon must be switched ON before driving the machine (if equipped).
- ✓ Always have an eye on the display panel for any warnings.
- ✓ Use the headlamps while operating the machine at night.
- ✓ Check the air pressure in the pneumatic tyres to avoid tyre and broom(s) wear.
- ✓ Use the filter shaker at regular intervals for efficient filtration of dust.
- ✓ Use the side brooms only during sweeping corners or curbs.
- ✓ Store the machine only in a covered garage.
- ✓ Only authorized service engineers should perform maintenance tasks on the machine.
- ✓ Always use only ROOTS genuine spares.
- ✓ Engine & PMG should be handled by Roots engineers only.

### DON'TS

- ✗ Do not drive the machine in bad roads.
- ✗ Do not leave the key in the machine when not in use or during service.
- ✗ Do not collect hazardous materials.
- ✗ Do not use the machine to transport people.
- ✗ Do not use the machine to transport goods.
- ✗ Do not use the machine as a platform to access overhead areas.
- ✗ Do not use the machine to push/pull other equipments.
- ✗ Do not drive the machine with the foot on the brake pedal.
- ✗ Do not drive the machine with the hopper raised.
- ✗ Do not transport the machine with the main broom lowered.
- ✗ Do not operate the machine with a wet filter.
- ✗ Do not make sudden and sharp turns.
- ✗ Do not operate the machine on a gradient or slope higher than that of the recommended value.
- ✗ Do not use a damaged or a leaking battery.
- ✗ Do not smoke.
- ✗ Do not drive the machine on soil, deep sand, slushy areas, etc.
- ✗ Do not operate the machine with very low fuel level.
- ✗ Do not skip scheduled engine service.







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