

RS - B6000

Truck Mounted Sweeper
Diesel



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 installation for future reference:

Model No. - _____

Serial No. - _____

Engine No. - _____

Installation Date - _____

P/N: 557460091-00, Rev-A, 08/2018

Prepared by KM, NPM TD Dept.





PREFACE

Dear Customer,

We are pleased with you having chosen the **RS-B6000 Truck Mounted Sweeper** 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:

ILLUSTRATIONS SHOWN IN THIS MANUAL ARE FOR REPRESENTATIVE PURPOSE ONLY. ACTUAL PRODUCT MAY VARY.

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.

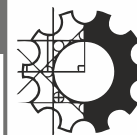


Prior to first operation, read the manual carefully and strictly comply with the instructions contained.

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



TECHNICAL SPECIFICATION



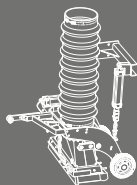
ENGINE

Model	-	Ashok Leyland
Induction system	-	Turbo
Combustion system	-	Direct Injection Diesel
No. of cylinders	-	4
Power rating	-	101HP @ 2200 rpm
Cooling system	-	Liquid
Starter	-	12 Volts
Alternator	-	12 Volts
Battery	-	12 Volt, 80 Ah
Oil filter	-	Spin-on
Air cleaner	-	Dry type
Safety shutdown	-	Automatic
Model	-	ALHT4CTIC3/1 or A2N23300



HOPPER

Capacity	-	6 Cubic meters
Water tank	-	1000 Litres
Dumping height	-	1100 mm
Dumping tilt angle	-	52°
Dumping	-	Hydraulic
Dumping controls	-	In cab
Inspection doors	-	One on each side
Construction	-	Stainless Steel
Warning	-	Overload



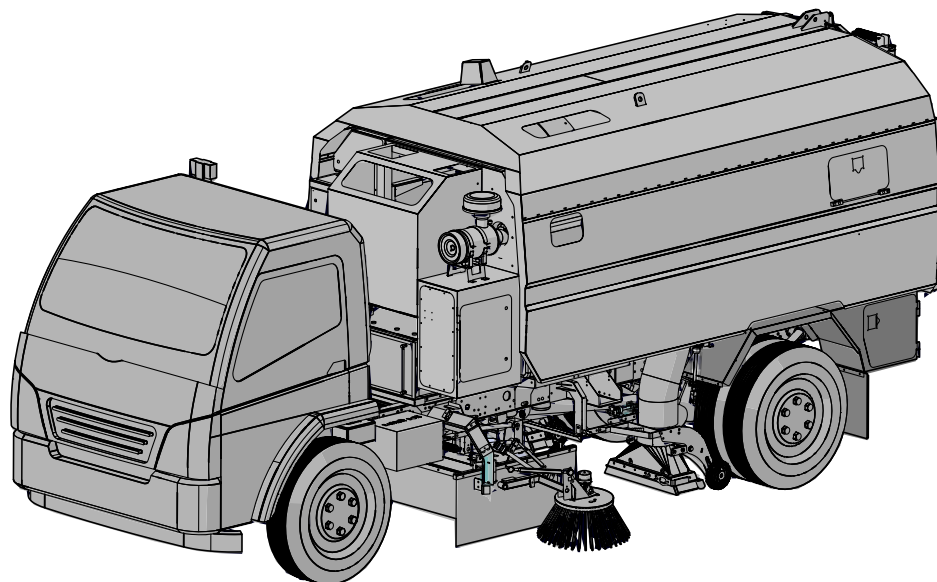
SUCTION HEAD

Fan type	-	Centrifugal Fan
Fan drive	-	Belt
Housing	-	Welded Mild Steel
Liner	-	Replaceable Rubber



SUCTION HEAD

Type	-	Gear Pump
Fluid capacity	-	70 Liters
Drive	-	Direct Drive
Filter	-	10 Micron Spin-on
Strainer	-	80 Mesh



TECHNICAL SPECIFICATION



SWEEPING

Overall sweeping width with two side brooms	- 3200 mm
Sweeping width with one side broom	- 2200 mm
Side broom diameter	- 600 mm
Side broom type	- Single segment steel tined
Main broom	- 400 mm x 1200 mm
Main broom type	- Cylindrical PP roller broom
Broom drive	- Hydraulic motor
Direction change	- Hydraulic cylinder
Suction nozzle	- 2 x 750 mm width
Suction nozzle type	- Independent suction nozzle
Operation direction	- Forward
Suction hose	- 250 mm diameter
Hose construction	- Reinforced moulded rubber
Wander hose	- 150 mm x 3000 mm (length)
Working speed	- 0 to 10 kmph
Controls	- Hydraulic raise & lower

Standard:

Auxiliary Engine Safety Shutdown
Work Lights on each side, Rear & Aux. Engine Bay
Additional high mount stop lights & Indicator lights
Two rotating amber beacons
High pressure hose for cleaning the sweeper

Dimensions:

(Chassis dependent)

Length	- 7200 mm
Height	- 3000 mm
Width	- 2300 mm



SUPPORT

AFTER SALES SUPPORT

CUSTOMER SUPPORT SYSTEM (CSS)

RMCL has a dedicated CSS Team to ensure prompt after sales service support. One call solution for all your complaints/concerns. Register your complaint or concern through the below toll free number for hassle free support. The customer support executive registers your complaint/concern and will keep you updated on the progress.

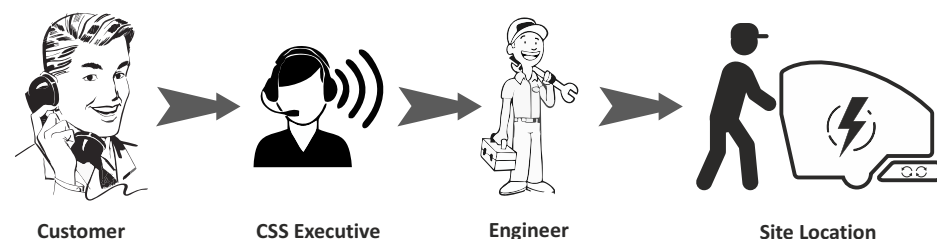
Toll Free Number:

1800 41 99 77 9

Our timings (Monday to Saturday):

8:00 am to 7:00 pm

Customer Support System Process



Our Address:

Roots Multiclean Ltd.

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

Phone: +91 (422) 4330 330, E-mail: rmclsales@rootsemail.com

Web: rootsmulticlean.in

Toll Free: **1800 41 99 77 9**

ANNUAL MAINTENANCE CONTRACT (AMC)

AMC or Annual Maintenance Contract is a professional and timely maintenance cover offered by RMCL to its customers. AMC takes care of scheduled and preventive maintenance services. Equipment under AMC qualifies for four scheduled visits and to a maximum of twelve unscheduled visits during the contract.

Advantages of AMC:

- ☒ Pan India network presence.
- ☒ Maximum equipment uptime.
- ☒ Focus on your business while we take care of your equipment.
- ☒ Well trained engineers to take care of the equipment.
- ☒ System driven scheduled periodic maintenance.
- ☒ Genuine spare parts.
- ☒ Toll free number assistance for breakdown.



AMC



SAFETY INSTRUCTIONS

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 of instruction or prescribed work routine.

SAFETY INSTRUCTIONS



- Apart from the information contained in this manual generally applicable legal provisions for safety and prevention of accidents must be adhered to.
- Do not put this manual aside without having read it, even if you have already operated similar equipment before.
- The warning and instruction plates attached to the sweeper give important advice on safe operation.
- Replace lost or illegible safety labels.
- Before starting to work, the operator has to check that the sweeper and its working implements are in proper and safe operating condition.
- Sweepers with known defects must not be used.
- It is important for operators and all persons likely to use the product, to familiarize themselves with all accessories and controls, as well as their functions, before starting operations.

General Safety Instructions

- Never operate the sweeper until you have read and completely understood this manual, the truck operator's manual, the auxiliary engine operator's manual.
- Never allow inexperienced or untrained personnel to operate the truck and sweeper without supervision.
- Always maintain the safety decals in good readable condition. If the decals are missing, damaged, or unreadable, obtain and install replacement decals immediately. Consult your authorized sales representative for decal replacements.

SAFETY INSTRUCTIONS



- All safety shields, guards and other protective safety devices should be used and maintained in good working condition. All safety devices should be inspected carefully for missing or broken components. **NEVER REMOVE PROTECTIVE SHIELDS AND GUARDS! NEVER MODIFY OR CUT PROTECTIVE SHIELDS OR GUARDS!**
- When shields or guards are removed to access areas for maintenance, they must be replaced and be in good condition before operating. Missing, broken, or worn shields, guards, and other protective devices must be replaced at once and prior to operation to reduce the possibility of injury or death from thrown objects, entanglement, or contact.
- The sweeper must be equipped with a fire extinguisher, rated for all fires, in an accessible and visible area. The fire extinguisher should be inspected routinely by a certified inspector for operational use and replaced as needed. Never obstruct access to the fire extinguisher.
- Operation of this equipment under certain conditions may generate airborne dust particles that could contain crystalline silica. In those conditions, personal protective equipment including an appropriate respirator must be used.
- Switch off the “Battery Cut Off” switch at the end of the day and if any electrical maintenance or any welding work has to be carried out.

Driver Safety Instructions

- New operators should be trained in an open area clear of obstructions before operating in the workplace. If operation of the entire machine (truck, auxiliary engine, and sweeper components) are not completely understood, consult your authorized sales representative for a detailed explanation. Never allow an untrained or unqualified driver to operate the sweeper.
- The sweeper driver must meet the requirements and possess a Motor Vehicle License as determined by the state/country in which the sweeper is operated.

- **NEVER use drugs or alcohol** immediately before or while driving or operating the sweeper. Drugs and alcohol will affect an operator’s alertness and coordination and therefore affect the operator’s ability to operate the sweeper safely. **NEVER** allow anyone to operate the sweeper when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol.
- ***Always wear approved Personal Protective Equipment (PPE) while operating, servicing, repairing, and/or cleaning the sweeper. PPE is designed to provide bodily protection during such activities.***

Personal Protective Equipment includes:

- *Protective Eye Wear*
- *Steel Toed Safety Footwear*
- *Gloves*
- *Hearing Protection*
- *Close Fitted Clothing*
- *Hard Hat* - When working around a raised hopper.
- *Respirator* - Depending on conditions and material being sucked. Specialized protective equipment may be required if dangerous or hazardous material is being swept or cleaned from the sweeper.
- Prolonged operation may cause fatigue affecting the safe operation of the sweeper. It is recommended that the operator takes scheduled work breaks to help prevent these potentially impaired operating conditions. If possible, completely shut down the sweeper, exit the cab and move around stretching your arms and legs.

SAFETY INSTRUCTIONS



- Do not operate, or perform maintenance to, the sweeper while wearing loose fitting clothing. Entanglement of loose clothing with the rotating elements can result in serious injury or death. Stay clear of all rotating elements at all times.
- *PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!* We recommend that you always wear hearing protection if the noise in the operator's position exceeds 80db. Noise over 85db, over an extended period of time will cause severe hearing loss.

Operational Safety Instructions

- Use both hands for support when getting on and off the truck.
- Make sure you have solid footing before stepping down. Be careful of your step and use extra caution when mud, ice, snow, or other matter has accumulated on the steps or handrails. Never rush to exit or jump off the machine.
- Do not attempt to mount the sweeper while it is moving.
- Never attempt to mount a runaway sweeper. Serious injury or death may occur from being run over by a moving sweeper.
- BEFORE leaving the truck's seat, always engage the parking brake and/or set the truck's transmission in parking gear, stop the engine, remove the key, and wait for all moving parts to stop.
- Never dismount a truck that is moving or while the truck and auxiliary engines are running.
- Always wear a seat belt while driving the sweeper during transport. Serious injury or even death could result from falling out of the truck or from being involved in a collision.

- Extract material only in conditions where you have clear visibility of the area being worked on, in daylight or with adequate artificial lighting. Never operate in darkness or foggy conditions where you cannot clearly see at least 50 feet in front and to the sides of the sweeper. Make sure that you can clearly see and identify passers by, slopes, ditches, overhead obstructions, power lines, and other ground equipments. If you are unable to see these types of items, discontinue sweeping until visibility improves.
- Transport the sweeper only at safe speeds. Serious accidents and injuries can result from driving the sweeper at unsafe speeds. Become familiar with the driving characteristics of the truck and how it handles before operating or transporting on highways (*for transporting only*).
- Make sure the truck's steering, brakes, and wheels are in good condition and operate properly.

Before transporting the sweeper determine the safe transport speeds for yourself and the machine. Make sure you abide by the following rules:

Test the sweeper at a slow speed and increase the speed slowly. Apply the brakes smoothly to determine the stopping characteristics of the truck . When driving down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. Do not operate the machine with weak, faulty brakes or worn out tires.

- *Obey all traffic laws and regulations. Never exceed the posted speed limit.*
- *The sweeper has a high center of gravity that may be further increased when carrying a loaded hopper. Use extreme caution when transporting at highway speeds. Slow down for sharp corners to avoid tipping or turning the sweeper over.*

SAFETY INSTRUCTIONS



- When operating in the work site/public roads, use the sweeper's directional indicator or signal lights to indicate your movement. Always use the sweeper's flashing signal lights and other equipped warning features to alert ground staff of your presence.
 - Do not exceed the rated operating speed for the truck and auxiliary engines. Excessive operating speeds can cause engine and sweeper component damage.
 - **KEEP AWAY FROM ROTATING ELEMENTS** including the belt and pulleys to prevent entanglement and possible serious injury or death.
 - Do not operate the sweeper if excessive vibration or noise exists. Shut down the sweeper components, truck and auxiliary engines. Inspect the sweeper to determine the source of the vibration or noise. If components are loose, damaged, or missing, replace them immediately. Do not operate the sweeper until all necessary repairs have been performed and the sweeper operates smoothly.
 - To reduce the possibility of property damage, serious injury, or even death, never operate the sweeper with missing or damaged components.
 - Never attempt to extract debris that is too large for the sweeper to pick up. Such objects may plug the suction components and cause serious mechanical damage to the sweeper.
 - Objects such as wire, cable, rope, and chain can get entangled in the rotating parts of the suction components causing mechanical damage.
 - Use extreme caution when dumping the contents. Be aware of bystanders and objects in the area. Select a dump site on level ground and clear of overhead obstructions, that could be hit when raising the hopper.
 - When positioning the truck at the dump station, choose an accessible location only on level ground. Raising the hopper on uneven ground increases the possibility of tipping.
 - Make sure the area is clear of ground and overhead obstructions.
 - Never raise the hopper unless you can clearly see all overhead structures. Make sure you stay clear of all utility lines.
 - Do not dump the hopper over a pit area where the ground may cave in or is unstable.
 - Wear eye and respiratory protection while dumping.
 - Use care when positioning the sweeper to the dumping site. Your vision, especially to the side and rear of the machine may be reduced by the size. Use side and rear view mirrors to aid vision.
 - If you cannot see the dump site clearly, stop the truck and examine the area. If necessary, request assistance to guide you while backing the truck into position.
 - If the hopper will be in the raised position for more time than is normally required to dump, or if someone is going to get under the hopper for repair, maintenance, cleaning or any other reason, secure the **safety prop** into position.
 - Never drive the truck with the hopper in the raised position. Traveling with the hopper in the raised position increases the chances of colliding with overhead obstructions. In addition, the center of gravity of the machine is higher with a raised hopper, making the unit more prone to tipping over.
- Do not allow the sweeper to come in contact with potentially dangerous and/or hazardous material. Such hazards may include, but are not exclusively limited to, the following:*
- **Fire Hazards** - Fuel spills, burning material,
 - **Chemical Hazards** - Chemical spills, discarded chemical containers, batteries,
 - **Biological Hazards** - Decaying carcasses, Biomedical waste,
 - **Radioactive Hazards** - Radioactive waste, Radioactive material,
 - **Cutting Hazards** - Broken glass, Lumber with protruding nails,
 - **Corrosive Materials** - Batteries, Acids and Bases.
 - Always wear required Personal Protective Equipment (PPE) when coming in contact with and removing potentially dangerous and hazardous material that has been collected by the sweeper or which is obstructing one or more suction components.

SAFETY INSTRUCTIONS



- Never sweep hot or burning debris. A burning object, even as small as a lit cigarette, has the potential of igniting the collected waste inside the hopper, possibly destroying the sweeper and inflicting serious injury or death to the operator or passers by.
- Verbal communication near the sweeper is difficult and dangerous. Operating instructions and operating directions should be made prior to starting the sweeper. Unclear and misunderstood communication may lead to operator and bystander's injury or death and equipment damage.
- Never allow anyone to approach the sweeper while in operation.
- Never allow children to play on, under, or around the sweeper nor allow children to operate its controls. Children can slip or fall off the sweeper and be injured or killed.
- Allow passengers only in situations where their presence is involved in the sweeping operation (operator training, supervision, maintenance inspection). Never carry passengers whose presence distracts from the safe operation or transport of the sweeper. Passengers must be seated securely and belted in the cab's passenger seat. Never allow any person to ride on any other location of the machine during operation or transport.
- Make sure that no bystander, animal or obstruction such as a vehicle, building, or street sign are behind the sweeper when backing up. The design of the sweeper impairs operator rear vision when backing. Use extreme caution to ensure that the sweeper is not backed into the path of pedestrian or vehicle traffic. Serious injury or death and property damage could result from running into, being crushed by, or run over by the sweeper.
- Avoid body contact with collected debris in the hopper. Use protective clothing including gloves and eye protection when servicing or working in or around hopper. Collected debris in the hopper can cut or puncture resulting in serious bodily injuries and the transmittal of diseases.
- Use extreme caution when operating the sweeper, to alert ground people of the sweeper's presence, the machine is equipped with warning signals, flashing lights. Optional electrical lights, flashers and a warning bar light, strobe, or beacon may be positioned on top of the cab.
- Before starting the sweeping operation, make sure all the warning signal lights are connected, visible and working. Routinely inspect the machine's headlights, brake lights, backup lights, and turn signal lights for operational condition. Repair non-functioning lighting immediately.
- Always turn on all safety lights and flashers when you operate the machine. It is recommended that you preset the beacon/strobe light switches to ON, so that the lights go on whenever the auxiliary engine is ON and lights go OFF whenever the auxiliary engine is turned OFF. This presetting action has the additional benefit of alerting the operator if the auxiliary engine is inadvertently left ON.

Important Safety Note:



Always follow the jobsite/road rules while driving or sweeping at all times.

SAFETY INSTRUCTIONS

SYMBOLS & HAZARDS PICTORIAL DEFINITIONS






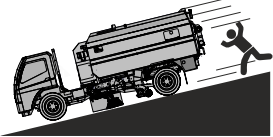



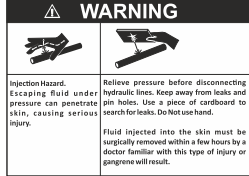


				
Read Manual	Information	General Warning	Caution	Toxic Hazard
				
Recycle/Do Not Throw In Garbage	Environmental Hazard	Battery: Recycle	No Fire/Matches	No Smoking
				
No Passengers	Do Not Throw In Garbage	Hand Crush Hazard	Suffocation Hazard	Static Electricity Hazard
				
Wear Overalls	Wear Gloves	Wear Safety Shoes	Wear Safety Glasses	Wear Safety Helmet

SAFETY INSTRUCTIONS

SYMBOLS & HAZARDS PICTORIAL DEFINITIONS



 <p>Wear Ear Muff</p>	 <p>Wear Respirator</p>	 <p>Overhead Obstacle</p>	 <p>Do Not Start Tag</p>	 <p>Rotating Belt Hazard</p>
 <p>Runaway Hazard</p>	 <p>Suffocation Hazard</p>	 <p>Dust Particle Hazard</p>	 <p>High Pressure Fluid</p>	 <p>High Pressure Fluid Note</p>

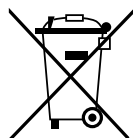
SAFETY INSTRUCTIONS



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 and actuators contain substances that must not enter the environment. Please dispose of your old machines, batteries and actuators using appropriate collection systems.



KNOW YOUR MACHINE

KNOW YOUR MACHINE

Main Components of the Sweeper



1. Hopper
2. Inspection Door
3. Rear Door
4. Wander Hose
5. Suction Head
6. Side Broom
7. Console Box
8. Throttle Lever
9. Rear Beacon lamp



KNOW YOUR MACHINE



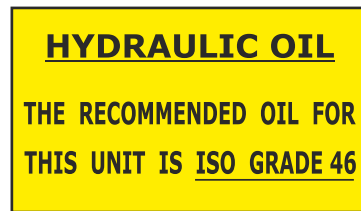
- 10. Storage Locker
- 11. Fluid Drain Hose
- 12. Rear Tail lamp
- 13. Front Spraybar
- 14. Hopper Tipping Cylinder



KNOW YOUR MACHINE - DECALS



(1)



(2)



(3)



(4)



(5)



(6)



(7)



(8)



(9)

1. Hose Safety Decal
2. Hydraulic Oil Decal
3. Warning - Stop Decal
4. Air Filter Safety Decal
5. Diesel Fuel Notification Decal
6. Warning - Rotating Element Safety Decal
7. Water Tank Notification Decal
8. Warning - Engage Safety Stopper
9. Warning - Lifting Cylinder Safety Decal



WORKING PRINCIPLE

WORKING PRINCIPLE



Working Principle

The sweeper is mounted on a regular transportation truck chassis which provide the operator with convenience and comfort. The water spray suppression system to control dust, maximize sweeping efficiency, minimize operating cost and emission of pollutants to the atmosphere. Fabricated dynamically balanced fan is used to induce vacuum in both the suction head, which powers the sweeping function. The fan's air may be vented out through the diffuser.

The sweeper unit is powered by an engine mounted on the sweeper frame on the rear of the truck cab. The engine propels a fan through belt and pulley drive system . Fully balanced, abrasion-resistant fan draws air from inside the hopper and forces it out of the fan housing. This produces a high vacuum inside the suction head . The exhaust air is vented out of the system, underneath the sweeper. To protect the fan housing from excessive wear, all sweeper fan housings are equipped with a replaceable rubber liner. The suction intake hose are on both sides of the suction head, draws debris up through the suction tube and transfer into the hopper. Once swiped dust suck into hopper the air stream become laminar and heavy swiped dust settle on bottom of hopper. The fan draws air through a filter screen within the hopper, which prevents airborne debris from being drawn into the fan.

For your convenience and safety, each Roots sweeper is controlled from a console in the truck cab. The console allows the operation of the hydraulic, water and lighting systems from cabin, as well as the sweepers auxiliary engine.

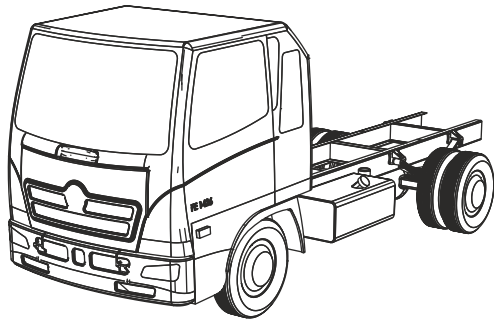


MAIN COMPONENTS OF THE SWEEPER

MAIN COMPONENTS OF THE SWEEPER

Main Components of the Sweeper

Truck:



The truck is the base in which the entire vacuum kit is mounted.



Kindly refer to the truck manufacturer's manual on how to operate the truck, safety, warranty policy and its maintenance.

Before driving the truck/machine ensure the following points:

- Ensure that the operator has checked the worthiness of the truck.
- Ensure that there is enough fuel to operate the truck.
- Ensure that the operator has fastened his seat belt before driving.
- Adjust the mirrors prior to starting the engine of the truck.
- Ensure that the operator is qualified to drive the truck.

In-Cab Controls:



The control panel is located inside the cabin and mounted within easy reach of the driver/operator. The engine controller unit ESU - AL02 is mounted on the control panel which indicates warning if engine is hot ,etc. The hour meter is located inside the engine rpm meter which is of analogue type.

Located along the top face of the console next is a volt meter, a temperature gauge, an oil pressure gauge and indicator with audio indication for low oil level, full load indicator, hopper open.

Sweeping operations are controlled from the cabin console control box.

One 4-position Rotary switch is used to activate either the right side sweeping or the left side sweeping or both. The middle top position is used for transport mode and all the functions will be deactivated. Switches toggle differently depending upon what sweeper devices they control. Most sweeper devices requiring simple activation and deactivation are operated with 2-position ON and OFF switches.

These devices perform the following functions: Safety indications (warning lights and safety flashers), Suction head operation, Side broom operation and sweep selection 4-position switch. These switches are used for components which employ extension and retraction or direction reversal. In many instances, one or both of the activation positions are momentary ON, meaning the switch will stay in that position only as long as it is manually held there. When released, the switch will automatically return to the center OFF position.

MAIN COMPONENTS OF THE SWEEPER

Low Voltage Monitor Module is interfaced in sweeper control circuit. It monitors the control circuit voltage and cut-off control supply while it drops below 10.2 volts for max 10 seconds and giving audio alarm if, voltage below 10.8. Also, cut in supply if, the voltage raise above 10.8V for trouble free operation of solenoids and relays.

- ⚠ **Only trained and authorized operators are allowed to operate the control panel.**
- Do not press all the switches at the same time.**
- Watch out for by-standers or objects in the vicinity of the function to be activated.**



Console Box In-Cab

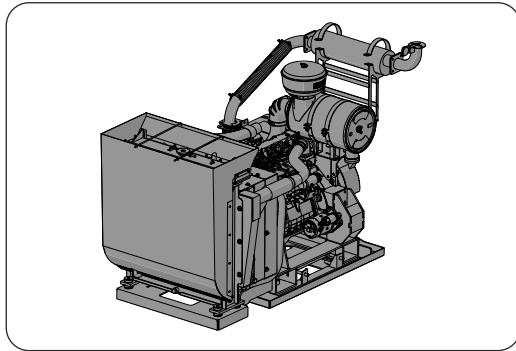
Throttle Lever



- | | |
|----------------------------|--------------------------------|
| 1. Main broom water | 16. Left side broom - On/Off |
| 2. Side broom water | 17. Main broom - On/off |
| 3. Suction head water | 18. Suction head - Up/Down |
| 4. Hopper water | 19. Right side broom - On/off |
| 5. Wander hose water | 20. Left suction head tilting |
| 6. Gravity water | 21. Right suction head tilting |
| 7. Water pump | 22. Voltmeter |
| 8. Hopper - Up/Down | 23. Side broom selector |
| 9. Rear door - Open/close | 24. Engine rpm w/hour meter |
| 10. Vibrator motor | 25. ESU-AL02 |
| 11. Right side broom light | 26. Ignition switch |
| 12. Engine room light | 27. LED PCB assy |
| 13. Front spray bar | 28. Temperature gauge |
| 14. Beacon light - On/off | 29. Oil pressure gauge |
| 15. Spare | |

MAIN COMPONENTS OF THE SWEEPER

Auxiliary Engine (Power Module):



The auxiliary engine is a diesel unit. The engine is mounted on its own cradle known as the “skid” which is also used to adjust the alignment of the belt drive used to power the suction fan. This engine is used to power the sweepers kit i.e: the suction fan, the hydraulics, electrical, dust suppression system, etc.

The auxiliary engine is also known as the “Power Module”. It has its own fuel tank which is located on the left hand side of the sweeper. For safety and ease of operation the engines’ control systems are located in the central control panel located in the cab.

Note: For detailed information on the sweeper’s engine, consult the engine Owner’s Manual which is attached separately.

To access the auxiliary engine:



- Park the truck on a flat level ground.
- Engage parking brake of the truck. If required additional wheel blocks can be used.
- Switch off the truck engine and remove key.
- Start the auxiliary engine.
- Raise the hopper till the desired position.
- Engage safety prop of the hopper.


- Shut down the auxiliary engine and remove its key.
- Use the step to climb onto the platform to access the engine.


Starting the auxiliary engine:

To start the auxiliary engine:

1. Insert key into key switch.
2. Ensure that all the console switches are in Off position.
3. Check if enough diesel fuel is in the tank.
4. Ensure that the throttle lever is in idle speed position.
5. Turn the key clockwise once, again turn it clockwise till the engine starts, release key.
6. Upon engine start, check for any warning lamps illuminated in the console.
7. To increase/decrease the engine speed use the throttle lever located near the driver’s seat.



 **Warning:** Do not crank the engine for more than 10 seconds. Wait for a few minutes before trying again. Risk of damaging the starter motor.

 **Caution:** During auxiliary engine start-up, suction fan also rotates. Ensure that there are no objects placed on the suction fan housing.

MAIN COMPONENTS OF THE SWEEPER

Refueling the Diesel Fuel Tank:



To refuel the tank follow the steps below:

- Ensure that the engine is shut down.
- Operate the key and open the fuel filler 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.
- The gauge in the control panel displays the amount of fuel in the tank.

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.



WARNING



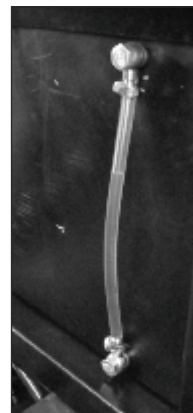
Avoid static electricity when fueling. Avoid death or serious injury from fire or explosion.



WARNING



DO NOT USE MOBILE PHONE WHILE REFUELING THE FUEL TANK. RISK OF EXPLOSION.



Fuel level indicator

A transparent pipe is located on the left hand side of the fuel tank to show the level of diesel fuel left.

This pipe should be kept clean always.

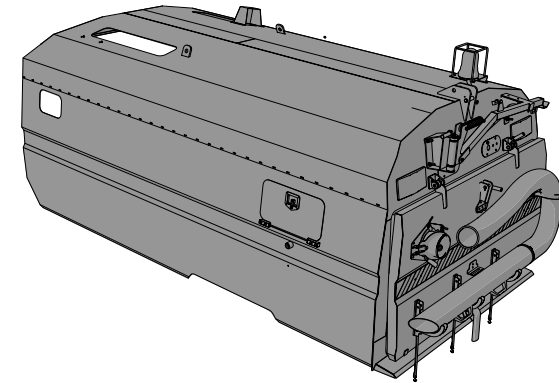


MAIN COMPONENTS OF THE SWEEPER

Shutting down the auxiliary engine:

- Disengage all sweeping elements.
- Decrease the auxiliary engine speed to idle.
- Let the auxiliary engine run for one minute in idle speed.
- Turn key anti-clockwise to shut down the engine.
- Remove key.

Hopper:



The sweeper's hopper is designed to contain the debris picked up by the suction head. It is constructed of heavy gauge steel for years of trouble-free service. The hopper is mounted to a heavy duty frame which is fastened to the truck's chassis. This provides a stable base to mount the hydraulic cylinders used to raise and lower the hopper into the dump and normal position.

A door on each side of the hopper, often called an inspection door, provides easy access to clean the hopper after dumping. These doors can also be used to directly place objects into the hopper that are too large to be picked up by the sweeping head.

The hopper also shrouds the auxiliary engine compartment from environmental elements.

The hopper is equipped with a rear door which opens up while dumping the debris. This door is opened and closed with the aid of hydraulic cylinders. The rear door has a drain mechanism to drain fluids collected by the sweeper during its sweeping operation.

MAIN COMPONENTS OF THE SWEEPER

Safety Prop:

The hopper safety prop is a safety device used to secure the hopper during maintenance or cleaning works.

The safety prop is located on the underside of the hopper.



Safety Prop

To engage the safety prop:

- Start the auxiliary engine.
- Raise the hopper upwards fully.
- Remove the safety prop from its storage position.
- Position the safety prop till it aligns with the securing notches on the chassis.
- Lower the hopper till it locks itself in position.
- Switch Off the auxiliary engine and remove key.



Caution:

- Risk of hand getting crushed while lowering the safety prop. Lower with caution.

To disengage the safety prop:

- Start the auxiliary engine.
- Raise the hopper upwards fully.
- Remove the safety prop from its locking position.
- Secure the safety prop in its storage position.
- Lower the hopper.
- Switch Off the auxiliary engine and remove key.



Caution: Pinch point.

Inspection Doors:

The inspection doors are located at the right hand and left hand sides of the hopper towards the rear.

They are used to inspect the hopper or to place large objects that cannot be swept by the suction head.

To open the inspection doors use the latch provided.



Inspection door



Caution: Close the doors after inspection is over. Risk of debris flying out of the hopper if not closed or secured properly.

MAIN COMPONENTS OF THE SWEEPER

Rear Doors:

The rear door in the hopper opens upwards during disposal of the debris collected by the sweeper. It is operated hydraulically.



Hopper rear door

The rear door also has a safety prop to secure it during maintenance or cleaning.

To engage the safety prop:

- Open the rear door fully.
- Remove the safety prop from its storage position and align it with the notch.
- Lower the rear door till it secures its position.

To disengage the safety prop:

- Raise the rear door till the safety prop detaches from its securing position.
- Place the safety prop in its storage position.



Caution: Pinch point.

Lifting Cylinders:

The hopper cylinders are used to tip the hopper. The cylinders have built-in safety features to prevent it from accidentally lowering itself, which may cause injury or death or damage to the hopper.



Hopper tipping cylinders




MAIN COMPONENTS OF THE SWEEPER

Fan:



The fan is a centrifugal type. This unique design results in reduced fan noise and requires less auxiliary engine power to operate. The fan produces the air pressure and vacuum required for the sweeper to operate. It is a balanced, reinforced, abrasion-resistant fan on a bearing mounted drive shaft. Construction is of heavy grade steel.

The fan is propelled by the engine, and is located within the fan housing attached to the rear of the power module.

	<p>WARNING</p> <p>Rotating fan element, do not place hand or objects. Risk of injury or damage to equipment.</p>
-------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------

Fan Housing:



The fan housing is mounted to the rear of the power module. Because of the sand blast effect of the airborne material traveling through the dust separation chamber and into the fan housing, the inside of the fan housing is protected by a bolt-on replaceable rubber liner.

A sweeping condition air bleeder (a), located at the side of the fan housing, just above the rubber exhaust hose. The bleeder is a damper door operated by an electric actuator. A switch on the control panel console mounted in the truck cab operates the actuator. During normal operating conditions, the bleeder door is closed and air from the fan is forced into the sweeper head.

In sweeping conditions where there are concentrations of leaves or other light debris, the force of the blast orifice air pushing against the rear side of the front curtain prevents light debris from entering the head. By opening the bleeder door, air from the fan is diverted away from the sweeping head's pressure chamber and exhausted out of the sweeper.

MAIN COMPONENTS OF THE SWEEPER

Suction Head:



The suction head is the actual 'sweeping component' of the sweeper. It is attached beneath the frame and linked through a set of drag arms. The head is fitted with pneumatic cylinders for raising and lowering. The sweeping component is rested on the ground at its rear by two wheels in sweeping mode. The raising and lowering are actuated by pneumatic solenoids which are controlled from the cabin.

 **Warning:**
Do not stand on the suction head.

Wander Hose:




The wander hose is an excellent feature designed to clean areas where hard to access light debris and collects (i.e. gully traps, parking islands and fence edges), normally inaccessible to the suction head. It is mounted to the rear of the sweeper. The wander hose operates on a vacuum produced by the fan within the hopper. In the case of the rear mounted hose assembly of 3 meters, 150 mm diameter, flexible hose, fitted with a plastic nozzle is attached to a hinged transition plate. This transition plate pivots across a hole in the hopper and is latched into position. Handles attached to the nozzle provide greater control.

MAIN COMPONENTS OF THE SWEEPER

Side Brooms:




The rotating side brooms have been designed to rip debris from the road side gutter or similar areas and direct it in front of the suction head where it can be picked up. The side brooms are mounted under the chassis to the rear of the truck cabin on both the left and/or right sides of the sweeper. They are suspended from the frame on a hydraulic-controlled arm which is operated from the control console inside the truck cab. The hydraulic motors turn the brooms. The bristles are mounted inside the disc that spins on the end of each arm. When not in use, the side brooms are held by the hydraulic cylinder with leak proof valves and tucked into position under the truck to avoid contact with the footpath. This unique design enables the sweeper to have the largest possible sweeping width and also provides maximum ground clearance, when the side brooms are in the travel position.

 **Warning:**
*Do not stand on the side brooms.
Stay clear when in operation.*

Main Broom:



The main brooms have been designed to sweep and move the debris from the middle of sweeping path towards the sweep head. The main broom is tiltable towards right side or left side for efficient sweeping. The sweeping efficiency will be maintained by keeping the brush contact pattern to the width 40 mm for the entire length of the brush. The contact pattern can be adjusted easily by eyebolt and chain link attached with main broom assembly. The main broom unit is mounted under the truck chassis. They are suspended from the frame on a pair of pneumatic cylinders. When not in use, the main brooms are pneumatically held and locked into position under the truck to avoid contact with the road.

 **Warning:**
Do not collect long ropes, straps or other long items, which may get entangled and cause damage to the main broom mechanism.

MAIN COMPONENTS OF THE SWEEPER

Dust Suppression System:

To avoid unnecessary wear of the fan, fan housing, suction head and hopper, it is necessary to control the amount of airborne dust within the sweeper. This is accomplished by introducing water spray at various locations on both the inside and outside of the sweeper.

The dust suppression system should be used whenever operating the sweeper, except when sweeping during wet conditions.

- Using excess water to wet down leaves and other light debris tends to make them stick to the sweeping surface.
- Turn on the auxiliary engine.
- Toggle ON the console switch which controls the water pump motor.
- Toggle ON the switches controlling the water functions desired.



- Before filling the tanks with water, allow the water to be flushed for some time to flush away any sediments.
- Always USE only clean water, failing to do so may clog the water line or damage the pump.



NOTE: During sweeping ensure that the dust suppression in the hopper and suction head are activated and should remain ON except in rainy conditions.

- Turn the water console switches 'ON' and 'OFF' as the conditions change. The amount of time required to empty the water reservoirs depends on the number of switches in use and length of time they are used.



Fresh water
fill port

Fresh water tank

Water is drawn from the sweeper's tank located on the right hand side. It is made of durable material. It is secured by retaining straps fastened to the frame.



Use only fresh clean water to replenish the tanks.

MAIN COMPONENTS OF THE SWEEPER

The water flows through a filter which has a stainless steel element which traps debris in the water, reducing the chance of dust suppression system failure due to clogged water nozzles.



Filter Nut

After having been filtered by the strainer, the water is pulled into the low pressure pump driven by a hydraulic motor. Water is then forced through a hose and into a water manifold. Solenoid valves, attached to the manifold, may be electrically opened from the sweeper's console to operate the desired part of the dust suppression system.

Remove the filter nut to drain the fresh water tanks.

Front Spray Bar:



The front spray bar is used to suppress the dust in front of the machine before sweeping operation commences.

Side Broom/Suction Head Spray Nozzles:



The side broom spray nozzles are used to suppress the dust during sweeping operation.

The suction head also uses spray nozzles internally to suppress dust while sweeping.

MAIN COMPONENTS OF THE SWEEPER

Hopper Spray Nozzles:



The water spray nozzles inside the hopper are used to dampen the fine dust to prevent it from circulating inside the hopper.

High Pressure Water System:



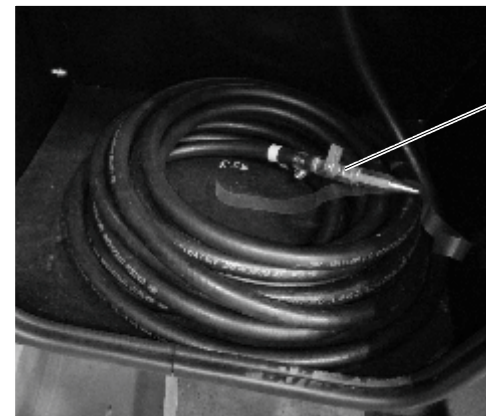
Water Pump

3 way ball valve

The sweeper is also equipped with an on-board pressure water system which can be used for either the dust suppression or the hand held lance system. The water pump is located at the rear right hand side of the machine which is driven by a hydraulic motor. This system uses water from the main tank which is used by the other water systems.

To use the high pressure system:

- Park the sweeper on a flat level ground.
- Apply the truck's parking brake.
- Start the auxiliary engine.
- Switch On the water system.
- Open the rear cabinet behind the wheel arch to pull out the hose with nozzle assembly. Use the valve to adjust the pressure.



Nozzle with valve



Warning: Do not direct the high pressure water to humans or animals. May cause serious injury or death.

MAIN COMPONENTS OF THE SWEEPER

Hydraulic System:



Hydraulic fluid is pulled from the reservoir into the hydraulic pump mounted on the auxiliary engine. The pump passes the pressurized hydraulic fluid into the manifold, located at the right hand side of the machine. Directional valves attached to the side of the manifold are operated electrically from the sweeper's in-cab console. These directional valves are used to channel fluid flow to the various sweeper functions (hopper dumping, the raising and lowering of the suction head, and side broom operation).



The hydraulic oil tank is located at the left hand side of the machine, ahead of the fresh water tank.

The hydraulic oil tank has a level gauge to identify the quantity of oil.

 ***Keep the level gauge clean at all times.***

MAIN COMPONENTS OF THE SWEEPER

Electrical System:



The sweeper uses a standard 24 volt electrical system. The main functions of the sweeper are controlled by a electronic module located at the left side of the sweeper in an enclosed box.

The electronic functions of the sweeper are protected by an array of fuses and circuit breakers located within the main module.

Pneumatic System:



The sweeper uses a pneumatic system for the side broom, suction head raise/lower and suction head tilt function.

The pneumatic system is located in an enclosed box attached to the side of the suction fan housing.



MAIN COMPONENTS OF THE SWEEPER



Auxiliary Lighting:

To increase operational safety, the sweeper must be equipped with a number of optional electric lights and flashers. Spotlights are available for the broom and hopper to enable the driver/operator to see well when operating at night. A flashing warning barlight, strobe or beacon may be positioned on the top of the cab.

These are used to alert motorists and pedestrians of the presence of the relatively slow moving sweeping machine. Additional small rear stop lights are positioned at the hopper rear door for added safety.

All lights are controlled by toggle switches mounted on the console inside the truck cab. Always keep all lights clean and operating properly.

In addition to other safety features, a backup warning alarm is standard. The high-pitched backup alarm warns bystanders that the sweeper is backing up.



Front beacon lamp



Rear beacon lamp and additional tail lamp



Side broom lamp



Auxiliary engine bay work lamp



SWEEPER OPERATION

SWEEPER OPERATION

Sweeper Operation

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the sweeper.

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

Proper operation of the sweeper, as detailed in this manual, will help ensure years of safe and satisfactory use of the sweeper. **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 sweeper. Risk of equipment failure or cause of injury or death or damage to property.

Operator Requirements:

Only qualified people are allowed to operate the sweeper. A qualified operator has read and understood 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 themselves 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 sweeper in a safe way.
- B. Permit only qualified personnel to operate and service the sweeper.
- 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 sweeper.
- f. Ensure that nobody including the operator modifies or alters the sweeper or any of its function, doing so may cause fatal injury or death or it may damage the sweeper itself.
- g. Ensure that the operator follows the state/country traffic rules at all times.
- h. Ensure that children do not operate the machine.

Before Starting the Sweeper:

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

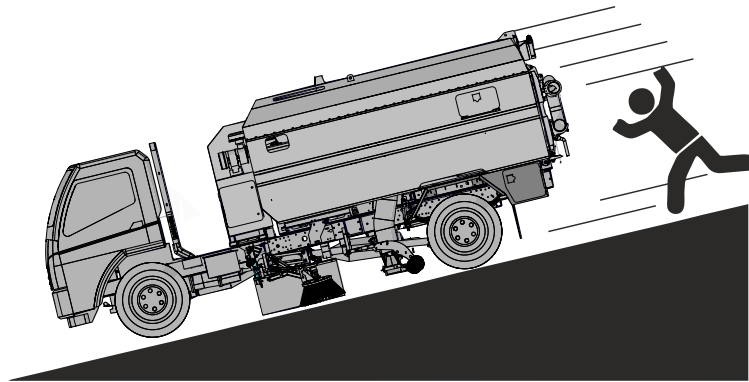


SWEeper OPERATION

Driving the Sweeper:

Always maintain a safe distance behind the machine ahead, particularly on downgrades. A good rule-of-thumb to follow is to allow two (2) truck-lengths between machines for each 15 km/h of travel speed under normal operating conditions. Under adverse conditions, allow more room for safe operation. On jobs in which minimum distance between machines is specified for the jobsite road, be sure to observe the regulations at all times. Such regulations would be established for the safety of everyone on the job.

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



DO NOT leave the truck on a slope or a flat ground without engaging the parking brake.

RISK OF A RUNAWAY MACHINE!



SWEEPER OPERATION

Pre-Operative Checklist:

For the sweeper:

- Visually inspect the sweeper for general condition.
- Check the auxiliary engine's oil level.
- Check the auxiliary engine's radiator coolant level.
- Check the hydraulic tank fluid level and fill as needed.
- Inspect the hydraulic system for leaks and faulty lines.
- Check the fresh water tank's level and fill as needed.
- Clean the fresh water strainer.
- Check the suction head's flaps for wear or damage.
- Check the side broom pattern and for smooth operation.
- Check the main broom pattern for smooth operation.
- Check if all moving parts are well lubricated.
- Check the operation of the dust suppression system.

For the truck:

- Inspect the rims and wheel nuts.
- Check the tires for wear, damage, and pressure.
- Inspect/check the braking system.
- Inspect/check the steering system.
- Inspect the suspension system.
- Inspect the exhaust system.
- Check the fuel level.
- Check the truck's engine oil and radiator fluid levels.
- Inspect the engine air filters.
- Check the transmission fluid level.
- Check the battery and terminals.
- Inspect all engine drive belts for wear.
- Check the windshield washer fluid level.
- Check operation of all lights and beacons.
- Adjust the mirrors of the truck.
- Verify that all emergency equipment is present and is working.

Start-Up Test:

After you perform a thorough inspection of the sweeper, always test the following components and adjust as needed:

- *Suction head, Side brooms & Dust suppression system*

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



Never run the sweeper in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health.

Sweeping Procedure:

Controls:

Before starting the sweeper's systems ensure that all the toggle switches are in **OFF** position.

Suction head:


- Lower the suction head till it touches the sweeping surface, without starting the auxiliary engine.

Auxiliary engine:

- Always check the auxiliary engine's oil and coolant level before its first startup of the day.
- Look at the control panel to make certain that all switches are turned off.
- Exception: If the optional beacon/strobe light switches are pre-set to ON, the lights will automatically flash when the auxiliary engine ignition switch is turned to ON.
- Start the engine with the throttle in the idle position.
- The sweeper is equipped with a safety shutdown system that will automatically shut the auxiliary engine off in the event of high coolant temperature or low oil pressure.
- Let the engine run for several minutes (until it warms up) before operating the sweeper.



SWEEPER OPERATION

 **Caution:** During auxiliary engine start-up, suction fan also rotates. Ensure that there are no objects placed on the suction fan housing.

Side brooms:

- Extend the side brooms in the required sweeping position.
- Lower the side brooms so that it just touches the sweeping surface.
- Turn On the motors, the brooms will rotate.
- If operating in a low lit area or during night, turn on the auxiliary work lamps.

Main broom:

- Lower the main broom.
- Set position to the left or right depending upon the direction of travel.

Dust suppression:

- Switch On the water spray wherever required.

Auxiliary engine monitor:

- Check the aux. engine display for any faults or error.

Drive the machine:

- Drive the machine at the required speed to commence sweeping operations.
- During driving the operator has to be very cautious with the surroundings, because he has to monitor the sweeping, driving the truck and monitoring the controls all at the same time.

Sweeping:

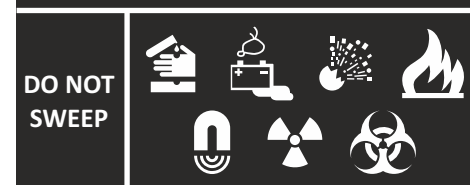


- Before beginning sweeping operation ensure that the operator has completed the pre-operative checklist.
- Insert key into the key switch and start the engine.
- Switch On the dust suppression system.
- Activate the required side broom via the rotary selector switch.
- Activate the main broom.
- Lower the suction head.
- Select required engine speed.
- Switch On all beacons lamps.
- Drive the truck forward to start sweeping.

  **Caution:**

- × **Do not sweep any burning debris.**
- × **Do not sweep any flammable materials.**
- × **Do not sweep long ropes, straps etc.**
- × **Do not sweep sharp objects.**
- × **Do not sweep toxic waste.**

DANGER/CAUTION



Warning:

- Do not carry a co-passenger, risk of distraction.**
- Do not use mobile phones, risk of distraction.**



SWEEPER OPERATION

End of sweeping:

- Switch off the side brooms.
- Raise the side broom and the main broom.
- Switch off the dust suppression system.
- Raise the suction head.
- Idle the auxiliary engine for a minute.
- Shut down the auxiliary engine.
- Drive the machine to a dump site or to another area to continue working.

Dumping:

Caution:

Before you dump, ensure that you are in a firm level ground.

Before dumping ensure that there is sufficient clearance from the bin or floor with the rear door.


Also ensure that the rear door is opened completely before tipping the hopper.

Ensure to drain the collected water before tipping the hopper.


Dump the hopper when it is full, or after you have finished sweeping for the day. Always dump on level ground and never attempt to dump over an open pit or dock. Back the sweeper up to a landfill, dumpster or other suitable dumping area. Before raising the hopper, check for overhead clearance restrictions, and engage the parking brake.

Raising the hopper:

Open the rear door completely, raise the hopper till it is completely raised. Activate the floor vibrator to loosen off any debris stuck to the hopper floor. Activate the screen vibrator to loosen off any debris stuck to the retaining screen.

 **Warning:** *If the hopper is raised for a long time, engage the safety prop.*

Before lowering the hopper, disengage the safety prop (if engaged), and make certain the area under the hopper is clear. Hold the dump switch in the 'DOWN' position to lower the hopper. Hold the switch till the hopper completely rests on the truck chassis.

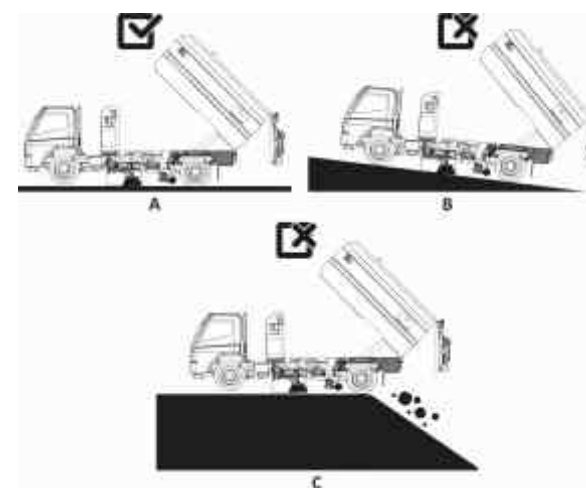
 **Warning:** *Watch out for by-standers or objects when raising/lowering the hopper. Risk of damage to equipment or risk of injury.*



WARNING

NEVER 'JUMP DUMP' the machine by bouncing the rear tyres against a stop block, or otherwise '**JARRING**' the body in its raised position to dislodge stuck or frozen material. The tremendous loads that this practice develops on the body pin area, chassis and hydraulic system can cause needless, extensive stresses.

DO NOT drive the machine with the hopper up. Apart from affecting the stability of the truck, there can be severe danger from contacting overhead electric cables, trees, or bridges over the jobsite route.



SWEEPER OPERATION

A: Always tip the hopper on a flat level ground.

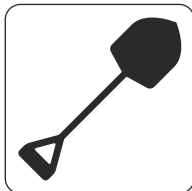
B: Do Not tip the hopper on a slope or on an incline.

C: Do Not tip the hopper over a ledge or where the ground can cave in due to the machine's weight.

- **When operating the machine in low lit areas or in dark ensure sufficient lighting is provided.**
- DO NOT park the machine with the material retained within the hopper. This may cause unnecessary wear on the hopper mounting pins and the truck tires.

Emergency Equipment:

When operating the machine, you should carry along the following emergency equipments, as well as hand tools to aid in removal of material. The following is a suggested list which can be adapted to suit your specific needs:



Shovel



Toolkit



Flashlight



Fire
Extinguisher



Spare Fuel Can



First Aid Kit

Sweeping Accessories:

When operating the sweeper, you should carry along the following emergency equipment, as well as hand tools to aid in removal of debris.

The following is a suggested list which can be adapted to suit your specific needs:

- Shovel
- Heavy push broom
- Tools box
- Water hose (to fill water in tank)
- Hydraulic jack
- Flashlight
- Jumper cables
- Fire extinguisher
- Spare fuel can



SWEEPER OPERATION

Cleaning the sweeper



Clean the sweeper at the end of the day. This will ensure that the sweeper will have a trouble free performance for years and an extended machine life.

The exteriors of the sweeper can be pressure washed.

DO NOT CLEAN THE INTERIOR OF THE HOPPER USING HARSH CHEMICALS.



RISK OF SUFFOCATION: Always ensure that nobody is inside the hopper before closing the door. There is risk of death due to suffocation.

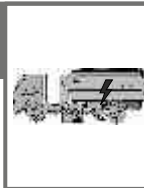


Parking the sweeper at the end of the day:

- Park the sweeper on a flat level ground.
- Turn Off the truck engine and engage parking brake.
- Turn On the auxiliary engine.
- Position the rear door of the hopper at a half open position.
- Raise the hopper upwards.
- Engage the hopper safety prop.
- Lower the suction head.
- Retract the side brooms completely.
- Raise the main broom completely.
- Turn Off the auxiliary engine and remove key.
- Drain the remaining water from the tanks.

Quick Reference Operating Guide:

1. Check the truck engine and auxiliary engine for the correct engine oil and coolant levels.
2. Fill the water storage tank.
3. Start the truck engine and check the control panel for the correct switch settings.
4. Start the sweeper engine.
5. Before sweeping, let the engine warm up to operating temperature.
6. Turn on the water flow valves.
7. Turn 'ON' all warning lights and flashers
8. Lower the sweep head to the pavement.
9. Throttle to desired sweeping RPMs.
10. Activate the dust suppression system.
11. If the side broom is to be used, turn it on.
12. Lower the main broom.
13. Put the truck in gear and begin sweeping.
14. Avoid surface obstacles.





MAINTENANCE

MAINTENANCE

General Maintenance

WARNING

- *Maintenance and/or repair operations must be done by skilled and authorized personnel; all operations on the electrical and pneumatic 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 ENGINE AND REMOVE KEY BEFORE PERFORMING ANY MAINTENANCE OR REPAIR WORK.**
- **ENSURE THAT THE BATTERY CUT-OFF SWITCH IS IN OFF POSITION.**

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 truck.

WARNING

Escaping fluids under pressure can penetrate skin.

When working around battery area, keep all flames and sparks away from batteries.

 WARNING	
	
<p>Injection Hazard. 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 SAFETY NOTES



Maintenance and Service Safety Instructions

Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this sweeper in good working order.

Inspect the entire sweeper before each use. Accidents may occur or damage to the sweeper may result if the sweeper is not maintained in good mechanical working order.

- Check for loose bolts, worn or broken parts, pinched hydraulic hoses, and leaky or loose fittings.
- Make sure all pins are secure and safety pins equipped.
- Make sure replacement parts (side brooms) are the correct size and properly installed.
- Make sure all fluid levels are full and replenish as necessary.
- Make sure fuel, oil, and coolant caps are replaced and tightened.
- Make sure that the water tank cap is replaced.
- Check tyre condition for tread wear and tire pressure at the rated PSI.
- Make sure that all safety shields and guards are attached and in good condition.
- Make sure all scheduled maintenance is up to date.
- Do not modify or alter this sweeper. Do not permit anyone to modify or alter this sweeper, any of its components or any sweeper function.
- Use extreme care when climbing onto the sweeper to perform repairs, maintenance, and cleaning. Use proper stands and ladders to access areas that cannot be reached from ground level. Slipping and falling off the sweeper can cause serious injury or death.
- Never attempt to repair, lubricate, adjust, clean, remove obstructions or perform any other type of service to any sweeper component while the sweeper is in motion or while the truck and auxiliary engine is running.
- Completely shut down the sweeping components and the truck engine and wait for all motion to come to a complete stop and remove keys before servicing the sweeper.

- Never leave the sweeper unattended while the hopper is in the raised position. Accidental operation of the controls or a hydraulic failure may cause a sudden drop of the unit which could result in injury or death by crushing. If the hopper must be raised for a purpose other than the time required to normally dump, or if someone is going to get under the hopper for any reason, always secure the hopper safety prop into position.
- Use proper protective equipment (gloves, safety eye wear, face shield, arm protection, possible respirator or particle mask) when handling side brooms during replacement, adjustment, and maintenance. Broom bristles, which are sharp and coarse, could inflict puncture and stab wounds to the hands, arms, and/or eyes if proper protective equipment is not worn.
- Never crawl under any raised sweeper component (side broom, suction head, hopper) unless the component is securely supported or blocked up and hydraulic pressure relieved.
- Always shut down the truck and auxiliary engine completely and wait for all motion to come to a complete stop before working on any sweeper component.
- Escaping pressurized hydraulic oil generated by hydraulic pumps has the potential to inflict serious injury and possible death. Never attempt to repair a pump or hose or tighten a connection while the system is pressurized. Always shut down the truck and auxiliary engine and relieve hydraulic oil pressure before performing any repairs to the hydraulic system.
- Water pressure generated by the high pressure water pump has the potential to inflict serious injury and death. Never attempt to repair a pump or hose or tighten a connection while the system is pressurized. Always shut down the truck and auxiliary engine and relieve water pressure by activating the system before performing any repairs to the high pressure water system.

MAINTENANCE SAFETY NOTES



- NEVER work on or near any engine component that has generated heat until it has cooled down. Use extra caution around the exhaust manifold near the water valve and the turbo charger manifold tubes. NEVER check or replenish the fluid levels of the truck and auxiliary engine coolant or hydraulic circuit oil levels until sufficient time has passed (up to 2 hours) to allow the system to cool down.
- Never remove debris from or unclog jams in the suction hoses, side brooms and all other areas of the sweeper until both the truck and auxiliary engine have been completely shutdown, all sweeping components have come to a complete stop and are lowered to ground level and hydraulic pressure relieved. Always wear Personal Protective Equipment (PPE) when removing collected material from the sweeper. Serious injury or death may occur if any of these precautions are not followed when removing plugged or jammed sweeping components.
- Use extreme caution when working in confined areas of the hopper or water tank for an extended period of time. Confined work areas may pose a danger because of the physical constraints imposed on the body. Routinely exit the confine to stretch and correct posture to prevent physical stress imposed on the body before bodily injury occurs.

Use extreme caution when refueling the sweeper, fuel is highly flammable and explosive if not handled safely. Always follow these precautions to reduce the dangers involved in refueling:

- Completely shut down the truck and auxiliary engines before refueling.
- Do not refuel while smoking or near an open flame.
- Do not store sweeper with fuel in the tank in a building where fumes can reach an ignition source.
- To prevent a fire and explosion caused by static electric discharge while filling the tank, use a plastic funnel. Avoid using a funnel that has a metal screen or filter.
- Avoid spilling fuel. Fuel is corrosive and can damage plastic and painted surfaces. Clean up spilled fuel immediately.

- Store fuel and all oils at a site protected from moisture, dirt, and other contaminants.
- Never run the truck or auxiliary engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous and deadly to your health. If it is necessary to run the truck engine in an enclosed area, remove the exhaust fumes from the area to the outdoors with an exhaust pipe extension.
- If you do not have an exhaust pipe extension, or if it is not possible to use one (sweeping within a building), open doors and circulate outside air into the area.
- Do not operate the sweeper with hydraulic oil or fuel leaking. Oil and fuel are dangerous and their presence could present a hazard. Do not check for leaks with your hand! Use a piece of heavy paper or cardboard. High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage.
- If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure.
- Always read carefully and comply fully with the manufacturer's instructions when handling fuels, oils, solvents, cleansers, and any other chemical agent.
- Battery posts, terminals and related accessories contain lead and lead compounds, chemicals which cause cancer and birth defects or other reproductive harm. **Wash Hands Thoroughly After Handling.**
- Avoid contact with hot surfaces on the bottom of the skid shoes. Use gloves and eye protection when servicing hot components. Contact with a hot surface can cause serious injury from burns or scalding.
- Remove the negative battery cable from the battery before performing any maintenance on the electrical system to prevent an accidental circuit shorting and sparks. Sparks can result in wiring damage, fire or personal injury.

MAINTENANCE SAFETY NOTES



- Use caution when working around the hopper doors. Do not let the doors fall uncontrolled onto bystanders or coworkers. Use the door safety props to hold the doors open while cleaning or performing maintenance in or around the hopper.
- Before conducting maintenance on the sweeper stop the truck, place the transmission in park and set the parking brake. Turn the truck engine and the auxiliary engine off and remove the keys to prevent inadvertent or accidental starting of the engines. Unexpected engine start up or truck movement can result in serious injuries.

WARNING - Voltage Sensitive Components

Do not use a boost starter. A boost starter might burn out the machines electronic control nodes. If batteries are not charged or dead - USE a fresh set.

WARNING

CB Radios and other electrical equipment used in the sweeper should be properly suppressed (EMC) to prevent the possibility of interference with the sweeper's electronic system.

MAINTENANCE

Electrical System

Safety Symbols For Battery System



The below instructions have been established for your safety and have to be strictly observed.



Observe the instruction which must be mounted clearly at the charging point!



No Smoking!
No naked lights, embers or sparks in the vicinity, risk of fire and explosion!



Wear protective goggles and protective clothing when working on the batteries!



Do not tilt the battery!
Only use certified hoisting and transport equipment.



Keep children away from batteries.



Any splashes of acid in the eyes or on the skin must be rinsed thoroughly with plenty of clear pure water.
Then consult a doctor immediately!



Risk of fire explosion, avoid short circuits!
Caution! Metal components in the battery cells are always under voltage, never place any foreign items or tools on the battery!



Electrolyte is highly corrosive!



Charge in a well-ventilated area



Do not throw in garbage!

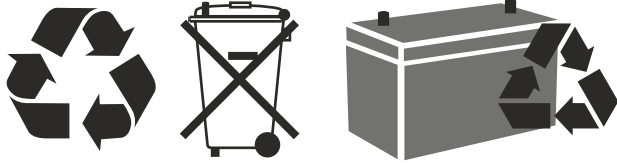
Lead Acid (LA) Battery Instructions

- Kindly ensure that the Warranty certificate of the battery is available at your end.
- Kindly read the Do's & Don't's of the battery, understand and follow.
- Check the electrolyte level before charging and top it up with battery grade distilled water if required.
- Match the battery to the correct charger.
- Keep the battery well ventilated while charging.
- Charge the battery immediately after it is discharged completely.
- Keep all inter cell connections and bolted terminals tight and covered with petroleum jelly.





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.

Areas to inspect in the electrical system:

Check if the battery has charge in it.

Check for any error display on the console box.

Check for any blown fuses, replace if necessary.

Check the cables for loose connection, wear and damage, replace if necessary.

Truck Lighting

The truck is equipped with headlamps and tail lamps, always ensure that they are working in perfect condition.

Check for loose connections, blown fuses, fused bulbs or broken lamps. Replace them immediately to ensure the safety of the machine and the people around the jobsite.



TROUBLESHOOTING



Troubleshooting:

This section describes about the various troubleshooting parameters for your sweeper.

Troubleshooting Chart:

<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Loss of vacuum - sweeper not picking up debris	Sweeping too fast	Slow down
	Sweeper engine throttle position too low	Throttle up sweeper engine
	Suction head not fully lowered	Lower suction head completely
	Worn flaps or skid plates out of adjustment	Adjust flaps, replace skids
	Faulty seal	Replace seal
	Torn hose(s)	Replace hose(s)
	Bent or uneven drag arms	Straighten or replace drag arms
	Blocked intake inlet	Remove hose and clean debris
	Loose drive belt	Tighten belt
	Low auxiliary engine RPM	Contact Service
	Fan housing exhaust bleeder set incorrectly	Adjust setting
	Worn fan	Replace fan
	Fan not located properly within the housing	Adjust fan
	Holes in hopper or fan housing	Repair holes
Unusual noise or Vibration	Worn bearings	Replace bearing(s)
	Fan out of balance	Clean debris, rebalance or replace fan
	Fan shifted within housing	Reposition the fan
	Loose drive belt	Tighten belt
	Loose bolts	Tighten bolts
	Fan blades worn or broken	Replace fan
	Auxiliary engine	Locate, determine problem, repair
	Loose shaft bearing bolts	Tighten bolts

TROUBLESHOOTING



AUXILIARY ENGINE		
Problem	Cause	Remedy
Auxiliary sweeper engine will not start	Dead battery	Charge or replace battery
	Bad starter solenoid	Replace solenoid
	No power to console	Find break in wire, reconnect or replace
	No power to shutdown solenoid	Check engine module wiring
	No fuel	Fill fuel in tanks
	Improper starting procedure	Refer engine owner's manual
	Loose battery connectors	Tighten connectors

AUTOMATIC ENGINE SHUTDOWN		
Problem	Cause	Remedy

For troubleshooting the automatic shutdown, refer the engine manufacturer's manual

DUST SUPPRESSION SYSTEM		
Problem	Cause	Remedy
No water exiting the pump	Out of water	Refill tank
	Suction line clogged	Clean strainer
	Air leak in fluid lines	Tighten plumbing
	Clogged filter	Clean or replace filter
	Crimped or clogged water line	Uncrimp or unclog line
Spray nozzle not working	Nozzle valve not On	Turn nozzle valve On
	No water	Refill water system
	Wiring on pump	Check power wire and ground
	Bad pump	Repair or replace pump
Low pressure	Worn nozzle	Replace nozzle of same type
	Air leak in inlet plumbing	Adjust relief valve on pump

HYDRAULIC SYSTEM		
Problem	Cause	Remedy
Extreme heat, unusual noise, poor performance from pump	Reservoir cap is not vented	Replace cap with vent
	Dirty hydraulic oil	Remove filters and clean or replace, change oil
	Low oil level	Check oil level and top-up
	Bad pump	Repair or replace pump
	Bad hydraulic motor	Repair or replace motor
	Restriction in return line filter	Replace filter and hydraulic oil if needed

TROUBLESHOOTING



HYDRAULIC SYSTEM		
<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Hydraulic system will not operate	Hydraulic pump not being powered	Engine must be running, check and repair or replace pump
	Directional valve faulty	Check or replace valve
	Major leak in hydraulic system	Repair leak
	Hydraulic pump pressure too low	Adjust pump relief valve
	Leaking cylinder seals	Replace seals

SIDE BROOM		
<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Broom disc spins too slow	Auxiliary engine throttle position	Throttle up, auxiliary engine is too slow
Broom hits frame	Broom hydraulic motor is bad	Repair or replace motor
	Too much down pressure	Adjust down pressure
	Spring tension too tight	Adjust tension
Debris trails between broom disc and side of sweeping head	Inner broom cylinder stroke is too short	Lengthen stroke
	Improper broom head adjustment	Adjust broom head tilt
Broom disc stalls in heavy debris	Broom bristles worn	Replace bristles
	Pressure to broom motor too low	Adjust relief pressure
	Motor or pump leaking	Repair or replace faulty motor or seals
Broom flings debris back to the sweeping surface	Too much down pressure	Adjust pressure
	Broom disc tilt angle too flat	Adjust broom disc tilt angle
Broom flings debris across the street	Tilt angle of broom head too much	Adjust suction head
Broom spins but will not extend/retract	Center flap worn or damaged	Replace flap
	Block in hydraulic lines	Clear blockage
	Directional valve malfunctioning	Check valve, repair or replace
Broom operates but will not lift	Switch or directional valve wiring loose or	Check wiring
	Block in solenoid valve	Replace valve
	Leaking cylinder seals	Replace seals
	Mechanical bind	Check broom hardware for binds

TROUBLESHOOTING



SIDE BROOM		
<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Broom spins but will not lower	Solenoid valve's electrical circuit incomplete	Check circuit
Broom raises but drops down immediately	Mechanical bind	Check broom hardware for binds
Broom operates but disc does not spin	Solenoid valve stuck open	Repair valve or replace
Broom drops but will not operate	Leaking cylinder seals	Replace seals
	Bad broom motor	Repair or replace motor
	Directional valve not operating	Repair or replace valve
	Directional valve's electrical circuit is incomplete	Check circuit
	Directional valve ports blocked	Contact service
	Bad pump or motor	Repair or replace pump or motor
HOPPER		
<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Hopper will not raise	Directional valve's electrical circuit is incomplete	Check circuit
	Main relief valve faulty	Check and repair or replace
	Bad pump or motor	Repair or replace pump or motor
	Sequence error	Check sequence
	Sequence valve setting error	Rectify error or call service
Rear door sequencing	Main relief valve faulty	Check and repair or replace
	Bad pump or motor	Repair or replace pump or motor
	Sequence error	Check sequence
PNEUMATIC SYSTEM		
<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Pneumatic cylinder will not function	Improper pressure setting	Set main regulator pressure to 8 bar
	Bore - Worn Out	Replace the cylinder
	Oil - Leak	Check and replace the seal
	Silencer is blocked	Check lubrication oil setting on FRL unit
		Clean or replace the silencer
5/2 Valve - No power supply	Blown fuse or Short circuit	Replace the fuse & check voltage
Side Brush - In/Out does not function	Improper pressure setting	Set pressure to 6 bar
	Exhaust resistance - due to blocked silencer element	Replace exhaust element/throttle
Extra pressure cylinder will not function	Improper pressure setting	Set pressure to 5 bar



DO'S & DON'TS

DO'S & DON'TS



Do's

- ✓ Always use the sweeper only on a level flat surface.
- ✓ Only Use the sweeper to collect only dry/damp debris.
- ✓ Check the sweeper visually for any damage before the start of the shift.
- ✓ Check the sweeper visually for any fluid leak before the start of the shift.
- ✓ The operator must have read the user manual completely before operating the sweeper.
- ✓ The operator must be always cautious while driving the sweeper.
- ✓ The warning beacon must be switched ON before driving the machine (if equipped).
- ✓ Always use the turn signal indicators before negotiating a turn.
- ✓ Always have an eye on the gauges for any abnormal warnings.
- ✓ Use the headlamps and auxiliary lamps while operating the sweeper at night or during the day with poor visibility during fog.
- ✓ Use the dust suppression system to prevent formation of a dust cloud.
- ✓ Check the air pressure in the pneumatic tyres to avoid tyre and brush wear.
- ✓ Use the vibrator during dumping to remove the debris completely.
- ✓ Use the side brooms during sweeping corners or curbs.
- ✓ Store the sweeper only in a covered garage.
- ✓ Only authorized service engineers should perform maintenance tasks on the sweeper.
- ✓ Always use only genuine ROOTS spares.
- ✓ Clean the sweeper at the end of the day without fail, this will ensure better performance of the sweeper.
- ✓ Carry out scheduled maintenance at the specified time.

Don'ts

- ✗ Do not drive the sweeper in bad roads at fast speeds.
- ✗ Do not leave the ignition key in the sweeper when not in use or during service.
- ✗ Do not collect hazardous materials.
- ✗ Do not use the sweeper to transport people.
- ✗ Do not use the sweeper to transport goods.
- ✗ Do not use the sweeper as a platform to access overhead areas.
- ✗ Do not use the sweeper to push/pull other equipments.
- ✗ Do not drive the sweeper with the foot on the brake pedal.
- ✗ Do not drive the sweeper with the hopper raised.
- ✗ Do not drive the sweeper with low diesel fuel or low hydraulic fluid.
- ✗ Do not transport the sweeper with the main broom lowered.
- ✗ Do not make sudden and sharp turns.
- ✗ Do not operate the sweeper on a gradient or slope higher than that of the recommended value.
- ✗ Do not tip the hopper before opening the rear door.
- ✗ Do not park the sweeper with debris contained inside the hopper.
- ✗ Do not continue sweeping when the 'Hopper Full' light glows.
- ✗ Do not delay the scheduled maintenance.

OPERATOR NOTES



A large rectangular area for taking notes, featuring horizontal dotted lines for writing.



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