M6

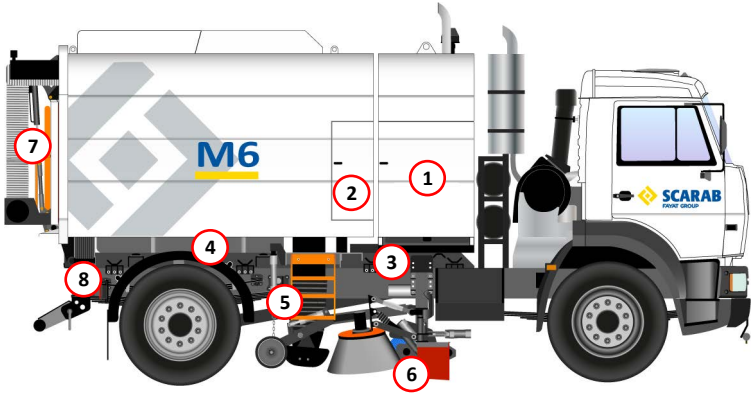
Skid mounted road sweeper

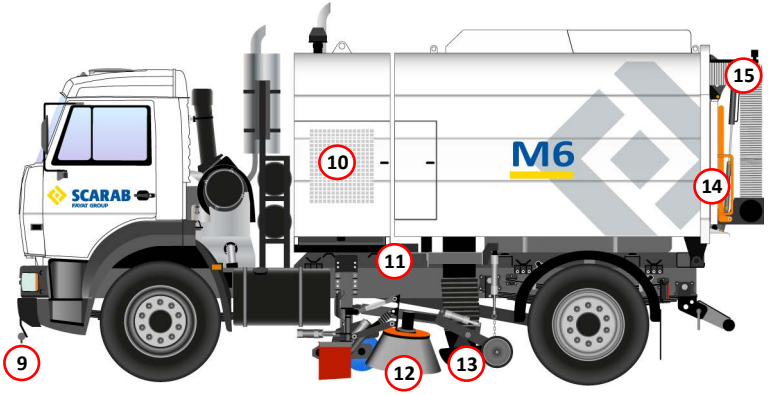
SCARAB
FAYAT GROUP

Operator Instructions

SCARAB ◆ **Leave nothing behind**

1. Access door to electrics, pneumatics, hydraulic oil tank and auxiliary engine fuel tank
2. Locker
3. LP water pump and valves
4. Water tank
5. Auxiliary engine access ladder (orientation determined by driving side)
6. Central brush (Wide sweep)
7. Rear door open/close ram
8. HP hose reel (option) (orientation determined by driving side)





9. LP and/or HP spray bar
10. Hydraulic valve block and hydraulic cooler access door
11. Auxiliary hand pump
12. Side brush assembly
13. Suction nozzle assembly
14. Rear loading hatch access ladder (option) (orientation determined by driving side)
15. Wander hose

M6

Operating Instructions for M6 Skid Mounted Road Sweeper

Incorporating Basic Operator's Maintenance Information

When re-ordering this document, please quote the following Part Number:

Part No. SCAZ042891

Version 3.0.01 .....16th January 2024

This manual is published by the Technical Publications Department of Scarab Sweepers Limited. and every effort is made to ensure that the information it contains is correct at the time of publication. Due to a policy of continuous development, however, the Company reserves the right to alter the specification and to supply when so altered without reference to illustrations and descriptions in this manual.

The M6 road sweeper has been designed and manufactured in the UK by Scarab Sweepers Limited, part of the FAYAT group of companies.

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General information

Typical capacities

Hopper gross volume 6.35m³
Fuel tank capacity - auxiliary engine ..... 120 litres
Hydraulic tank capacity ..... 40 litres
Water tank capacity ..... 1250 litre

Noise levels

In cab ..... Between 70 - 84 dB(A) dependent on operating speed
External ..... Maximum L_{WA} of 114 dB(A) in accordance with directive 2000/14/EC

Vibration

All dynamic prime moving components are resiliently mounted to minimise vibrations.In accordance with 2006/42/EC as amended
Whole body ..... Equipment does not exceed 0.5 m/s² (RMS, weighted)
Hand and arm ..... Equipment does not exceed 2.5 m/s² (VTV)

In view of the fact that many variables such as chassis and machine specification affect the weight and dimensions of the finished machine, it is not possible to quote these precise details. If this type of information is required, please contact our Technical Sales staff giving details of your intended chassis and any other relative information.

Identification plates

The SERIAL NUMBER PLATE is located at the base of the hydaulics enclosure on the lefthand side of the skid unit.
The Serial Number will comprise four or five numerical digits only (for example 5843 or 12345).
For the location of the Machine's VIN PLATE and CHASSIS NUMBER, refer to the chassis manufacturers' documentation.

Limitations of use

The M6 and FS6000 is classified as skid-mount heavy-duty suction road sweeper and, as such, is intended only for operation in the sweeping and associated roles for which it has been expressly designed.

Applicability

This manual covers the operating requirements of the Scarab M6 & FS6000 sweeper with the CANbus 3 operating system.

Electrical Equipment

WARNING - Voltage sensitive components
Never start the auxiliary engine with a fast charger. If batteries are not charged then use a fresh set of batteries.

CB radios and other electrical equipment used within the cab should be properly suppressed (EMC) to prevent the possibility of interference in the sweepers electronic system.

Towing

If towing is necessary then please refer to the chassis manufacturers' documentation for details on towing recommendations.

Cummins auxiliary engine

This manual does not cover the Cummins QSB 3.3 Tier 3A auxiliary engine.
Information such as the User Manual is available as a free download from the following web site:
https://quickserve.cummins.com/info/index.html

Table of contents

Health and safety advice

In the interests of your Health and Safety, it is important that the following points are followed all the time.

- Only trained operatives should be allowed to drive or work on this machine.
- Before driving this machine ensure that all relevant machine checks have been carried out and that all equipment is stowed.
- Do not overload the hopper.
- Do not drive the machine with the hopper in the raised position even if the hopper is empty.
- Never work under a raised cab, hopper or rear door without the appropriate safety prop in the correct position.
- Before operating the hopper or rear door controls, ensure that there is sufficient clearance and that it is safe to do so. Ensure that all personnel are clear of the rear door.
- Before working on the machine. Position the machine on firm, level ground, apply the handbrake, stop both engines and remove the ignition key.
- Always wear the appropriate personnel protective equipment (PPE) when operating or working on the machine.
- Before starting engines ensure that all controls are switched off and the machine is in neutral.
- Keep long hair, loose clothing and hands clear of moving parts.
- High pressure water can be hazardous, always wear suitable face protection when operating the high pressure water pump and when using the high pressure water lance. Do not direct the water jet at other persons. Beware of electrical installations on public buildings and lampposts etc. Use extreme caution when using in public places.
- The drivers seat should be correctly adjusted while the vehicle is stationary to give the driver a good posture whilst the vehicle is being driven.
- The mirrors should be adjusted while the vehicle is stationary to give the driver a good all round view of the sides and the sweeping equipment.
- When operating the machine in any mode always be aware of objects and people in the immediate vicinity, especially at the rear of the machine when reversing.
- Whatever the situation, remember that the rules of traffic and road safety must always be observed and obeyed.
- While operating this machine the safety and well being of other people around the machine are the sole responsibility of the driver/operator.
- Never ride in/on any part of the machine other than in the drivers cab.

*The universal safety symbol along with **RED** text is used throughout this manual and when encountered the related information must be adhered to.*

Refers to important information.

Identifies cautionary information and specific procedures when required.

Refers to visual examination to confirm the condition or status of a specific item.

Remember, failure to comply could result in serious injury.

Hazard Awareness

All operators and workshop personnel should be aware of the physical and biological risks that are inherent in the operation of a road sweeper. The risks fall into two main categories as follows:-

- Risks represented by the machine and its various systems.
- Risks represented by the sweeper's operating environment.

Both have the potential for exposure to a variety of hazards, ranging from hot surfaces to infectious diseases, that can occur during day-to-day operation, while carrying out adjustments or when involved in the general maintenance and servicing activities on the machine.

Typical machine related hazards are as follows:-

- Exposure to hot surfaces and sharp edges.
- Exposure to moving parts.
- Exposure to various fluids, including some that are hot and/or pressurised.
- Exposure to surface contamination resulting from general operating conditions.

Typical environmental hazards are as follows:-

- Exposure to sharp objects, e.g. broken glass, discarded hypodermic syringes/needles, while operating or working on the machine.
- Exposure to various infectious diseases, e.g. Legionnaire's, Leptospirosis, Weil's Hepatitis, Tetanus, while operating or working on the machine.

Safety Precautions

When using external equipment such as the high pressure water lance, or when dealing with potentially hazardous situations while sweeping, e.g. unblocking a suction nozzle, always wear the appropriate personnel protective equipment (PPE) and exercise extreme caution if required to handle any of the material being swept.

Before working on the machine, subject it to a thorough steam cleaning of high pressure hot water wash using appropriate detergents etc.

Even after taking all reasonable steps to reduce the risk from the hazards described, always wear the appropriate personnel protective equipment (PPE) when carrying out sweeping duties or when working on the machine. This includes the following items:-

 ***Safety gloves, including where necessary cut resistant knitted Kevlar.***	 ***Earplugs or ear defenders as appropriate.***
 ***Safety boots or shoes with protective soles and toecaps.***	 ***Eye/face protection, if necessary full face mask with under chin lip.***
 ***Respiratory masks.***	 ***High visibility jackets or waistcoats.***

Operating advice

Please remember, the information provided in this handbook is designed to ensure that the Scarab sweeper operates both safely and efficiently.
The design of this machine is for the removal of spoil on traffic or pedestrian areas also litter collection using the wander hose.
A poorly maintained machine will become unreliable, inefficient and potentially dangerous. Always observe the recommended maintenance and safety related advice provided.

Unless it is wet or raining, ALWAYS use the low-pressure water spray system when sweeping. This will not only reduce the amount of dust generated, it will also ensure more efficient collection of material. This is because wet material is heavier and will drop more readily from the air stream inside the hopper. If swept dry more of the finer material will pass through the screen, wearing out the fan blades on its way back to the environment behind you.

Operators should be trained in the following elements:

- Health and safety observations/notices
- Transit driving
- In-cab and external controls
- Hopper safety/cab prop use
- Brush setting
- Nozzle flap adjustment
- Correct sweeping operations
- Low & high pressure water systems
- Load discharge (tipping)
- Daily, weekly maintenance schedules
- End of day cleaning, ie: - suction fan, fan screen and machine body

Operator training can be provided by Scarab Sweepers upon request.

The LCD monitor's USB connection is for uploading/downloading information (ONLY) and must not be used for any other purpose.

It is the responsibility of employers to carry out they own risk assessment for the machine, operators or other persons using or affected by the machine and equipment.

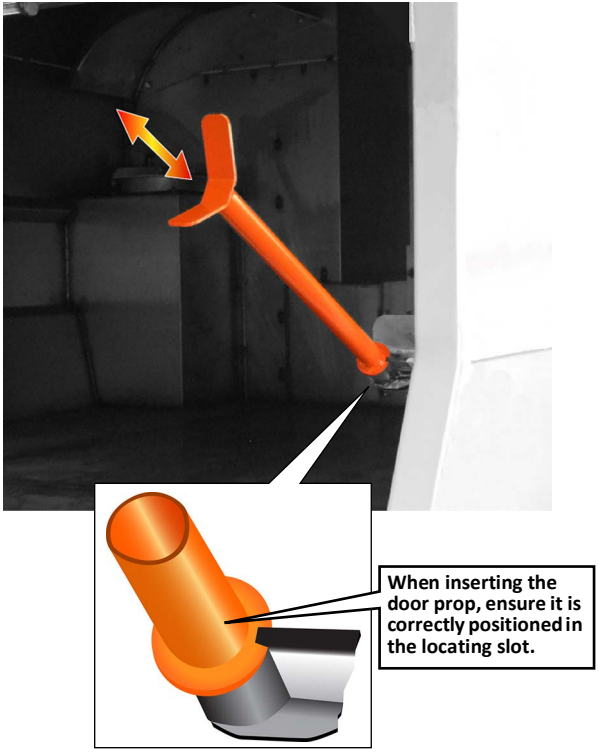
Various safety, hazard and user information labels are fixed to the machine. These must be observed.

Only personnel qualified in the relevant disciplines should be allowed to work on any of the machines hydraulic system.

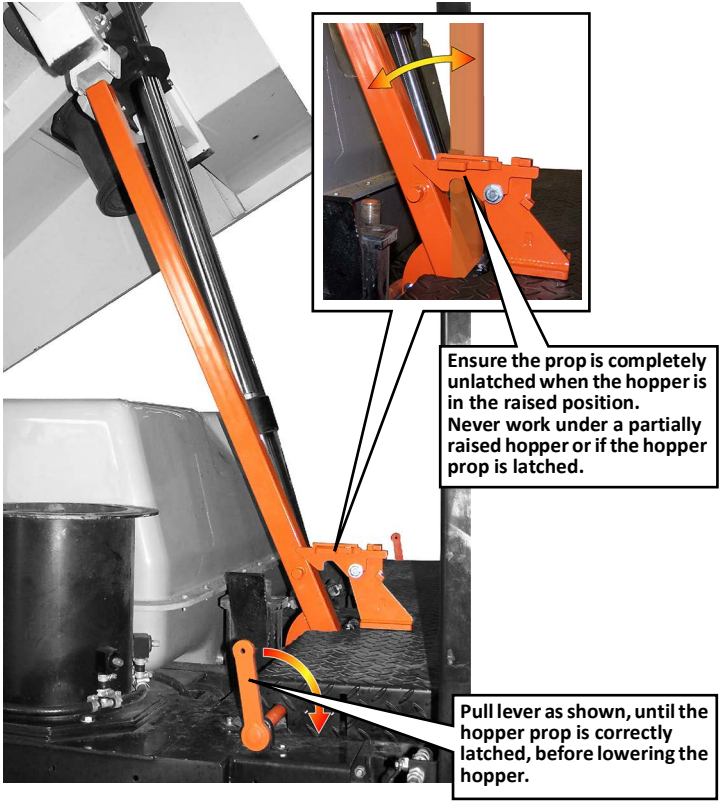
For information regarding vehicle operation and maintenance, refer to the chassis manufactures handbook

.Safety props

Door safety prop



Hopper safety prop



The CANbus System

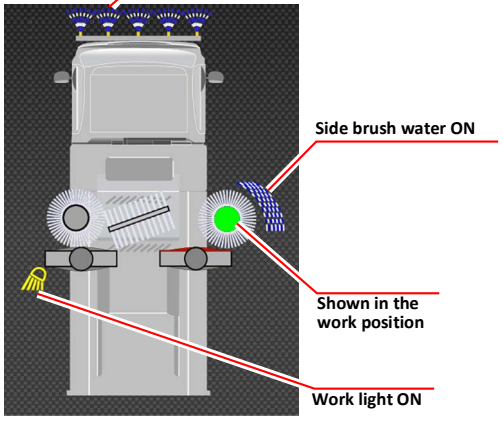
The CANbus system comprises of two control panels, main and auxiliary, an LCD monitor and a number of control nodes. The system controls and monitors all the sweeping functions and maintains a log of various operating parameters such as operating hours and fault conditions that may occur.

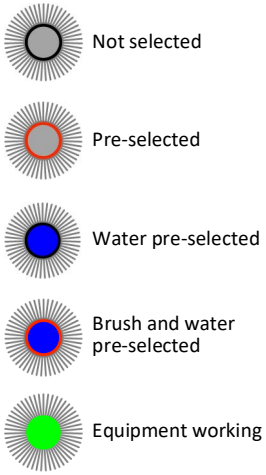
Switches

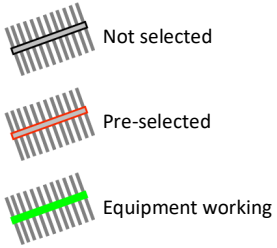
The various types of switch function on the main and auxiliary control panels are colour coded as follows:-

AMBER = Electrical functions such as lighting.
RED = Critical functions, e.g. Start/stop auxiliary engine and sweep mode.
GREEN = Sweeping functions.
BLUE = Water Spray functions.

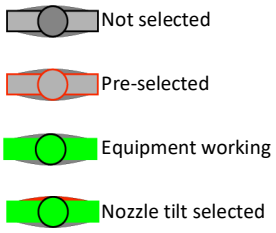
Each switch will illuminate a function related symbol on the LCD monitor, only installed equipment will be displayed. Each symbol is greyed out until its switch is activated. When a switch is activated the appropriate symbol will illuminate according to system status as illustrated below:-







On dual sweep machines with both side brushes operating, the wide sweep brush always swivels to the side of the first selected suction nozzle.If this suction nozzle is cancelled and the other side is still operating, the wide sweep brush will swivel to that side.



Main control panel switch functions

Switch functions are described from left to right and top to bottom.

F1, F2, F3 and F4 - Press to activate special options *.

System Start/Sweep Mode - Press to start/stop auxiliary engine and sweep mode.

Side Brush Pressure - Press to increase brush pressure.

Central Brush (Wide Sweep) Pressure - Press to increase brush pressure.

Left/Right Side Brush - Press to start/stop the side brush.

Left/Right Suction Nozzle - Press to lower/raise the suction nozzle.

Central Brush (Wide Sweep) - Press to start/stop the central brush (wide sweep).

Left/Right Work Lights - Press to switch on/off the work light.

Left/Right Side Brush/Nozzle Water - Press to switch on/off water for side brushes and nozzles *.

Central Brush (Wide Sweep) Water - Press to switch on/off water for central brush (wide sweep) *.

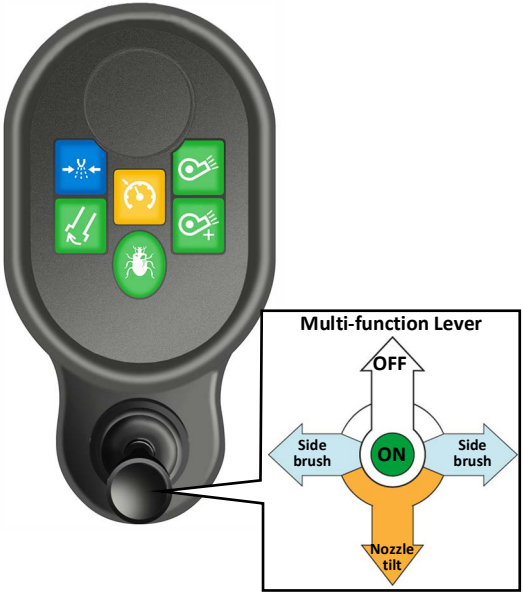
Decrease/Increase Auxiliary Engine Speed - Press to decrease or increase auxiliary engine speed.

Left/Right Suction Nozzle Additional Water * - Press to start/stop additional suction nozzle water *.

***** = Option.

Auxiliary Control Panel Switch Functions

Switch functions are described from left to right and top to bottom.



High Pressure Water Pump * - *Press to switch on/off the high pressure water pump.*

Suction Fan - *Press to start the suction fan.*

Cruise Control - *Not applicable.*

Suction Nozzle Tilt (Locking Mode) - *Press to tilt and lock the suction nozzle for larger items.*

Suction Fan 'BOOST' - *With the suction fan on, press to activate the fan boost mode.*

Favourite Setting - *Press to memorise your preferred sweeping setup. Hold the switch down until a 'beep' sounds. Thereafter, whenever the switch is pressed at system start-up, the memorised configuration will pre-selected/restarted. Repeat to override with another configuration.*

Multi Function Lever

ON - Moving lever to the ON position deploys all selected sweeping equipment.

OFF - Moving lever to the OFF position, stops and raises all sweeping equipment.

Side Brush - Whilst the lever is in the ON position the lever can be moved to the left and right to operate the side brushes.

On right hand drive vehicles move the lever to the right to swing the side brushes out and move the lever to the left to swing the side brushes in.

On left hand drive vehicles move the lever to the left to swing the side brushes out and move the lever to the right to swing the side brushes in.

Nozzle Tilt - Whilst in the ON position the lever can be moved back/downward to momentarily tilt open the suction nozzle or to close the suction nozzle if in the 'LOCKED' position.

***** = Option

Remote Control Switch Box Functions

The hopper raise/lower and rear door open/close switches are located on the remote control switch box. This is stowed in the cab, between the drivers seat and the cab door, it is connected to a socket via a coiled lead.

In the interests of health and safety and to avoid possible damage to the sweeper and/or adjacent structures, it is essential that the remote controls are not activated within the cab. Always use outside of the machine from a vantage point that affords a good view of the machine and its immediate surroundings. Wear a high visibility jacket/waistcoat.

Hopper Raise - Press and hold to raise the hopper.

The hopper safety prop should always be in the deployed position when the hopper is in the raised position. Failure to do so could result in serious injury. ***See page 14.***

Hopper Lower - Press and hold to lower the hopper.

Ensure that the hopper safety prop is returned to its stowage position before attempting to lower the hopper and no obstructions are present under the hopper. Failure to do so could result in damage to the machine and/or serious injury. ***See page 14.***

Rear Door Open - Press and hold down until the door is fully open, which is approximately 90° to the rear face of the hopper.

Ensure that the suction fan has been switched off before attempting to open the rear door because the fan creates a vacuum within the hopper space preventing the door from being opened.

The rear door safety prop must be in the deployed position whenever working under the rear door. ***See page 14.***

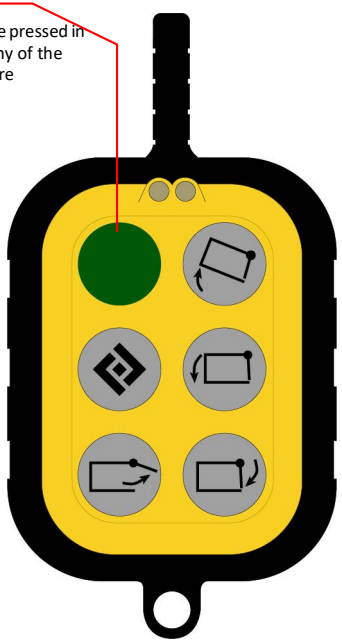
Rear Door Close - Press and hold until the rear door is closed and has finished its latching cycle. Only works when hopper is fully down. *See page 25.*

The rear door safety prop must be removed and no obstructions are present before lowering the rear door. ***See page 14.***

Option.

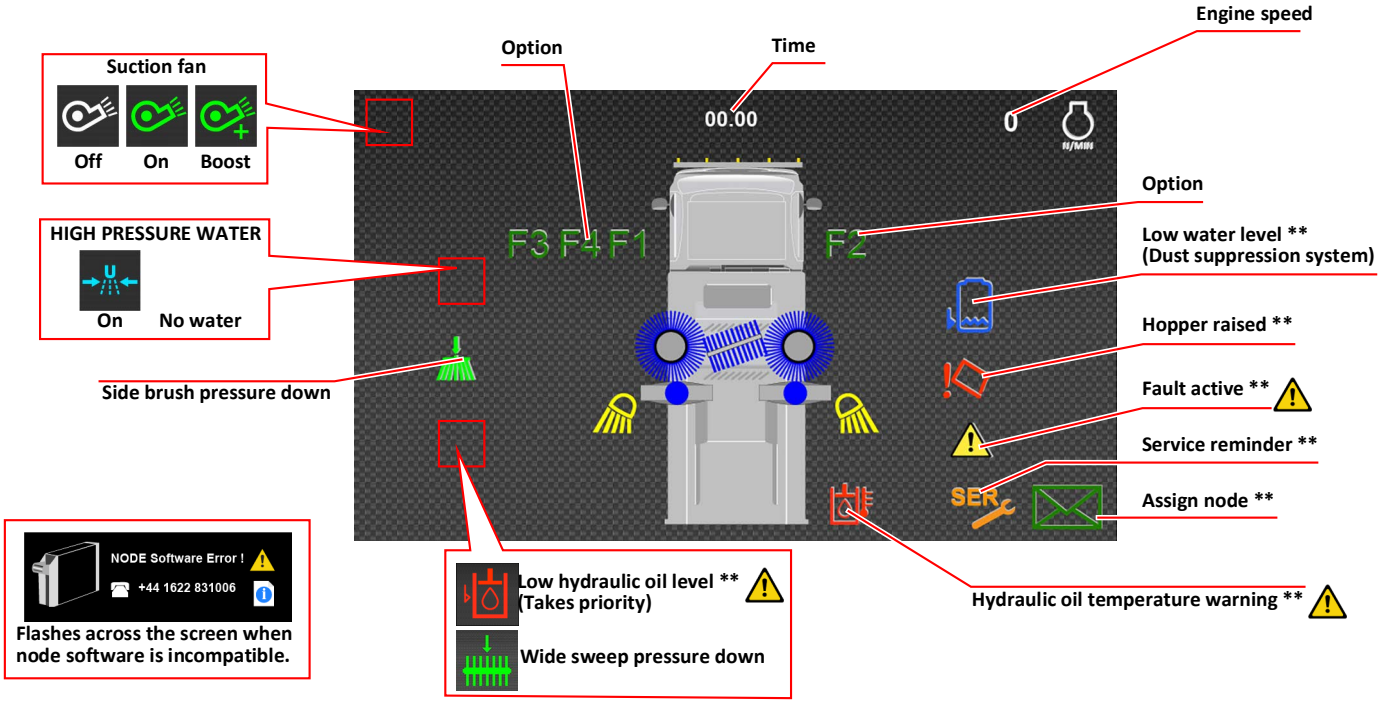
SAFETY INTERLOCK

This switch must be pressed in and held before any of the control switches are operated.



The LCD Monitor

The sweeping monitor displays information on the current status of the sweeper while it is in sweep mode, by indicating which items of equipment are active, plus other relevant information ie: fluid levels, fan speed and temperatures, it also alerts the user to any warnings by means of appropriate flashing symbols and, when appropriate, a warning buzzer. For warnings identified by ⚠, stop and investigate the cause. The accompanying illustration shows the range of information/alert symbols that can be displayed, however it should be noted that warning symbols (**) only illuminate when a specific condition occurs.



Additional Controls and Instruments

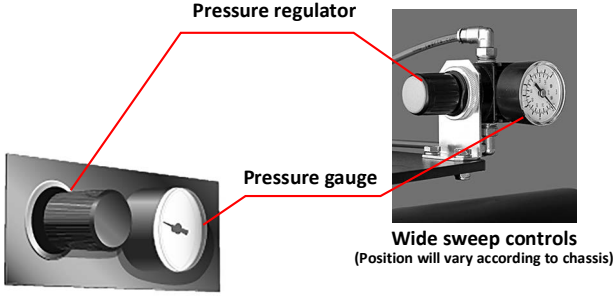
Do not exceed a pressure of 2.5 bar when adjusting brush pressure settings. Failure to comply will result in drastically reduced brush life.

Air pressure regulator - Used to adjust the amount of up/down-thrust applied to the brush(es).

Air pressure gauge - Indicates the amount of pressure being applied to the brush(es).

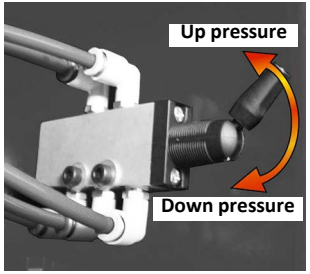
Brush pressure switch - This switch works in conjunction with the side brush down switch on the main control panel.

These functions are only effective while the relevant brushes are fully deployed.



Wide sweep controls
(Position will vary according to chassis)

In-cab controls
(Typical arrangement - Position will vary according to chassis)



Brush pressure switch
(In pneumatics enclosure)

Operating in Sweep Mode

Refer to the Health and Safety information on Page 11.

Reducing noise levels and fuel consumption: *Although it is important to always operate within the engine's optimum speed range, there are times when it is possible to reduce engine speed to the lower end of this, thereby reducing noise levels. This is most beneficial when sweeping at night, or in areas sensitive to noise pollution. Sweeping at reduced engine speeds can be achieved most satisfactorily when sweeping light or sparsely distributed materials. Experience will enable the operator to vary engine speed, according to sweeping conditions, without affecting sweeping performance.*
It should be noted that the operator also benefits from reduced noise levels within the cab and that any reduction in engine speed, also results in a corresponding reduction in fuel consumption.

Starting the auxiliary engine

When the Machine's ignition is turned on the following events occur:

- The CANbus system checks that all control nodes are present and functioning correctly and the LCD Monitor turns on, briefly displaying the Scarab logo (for approx. 12 seconds) before changing to display a basic truck graphic as well as the suction fan and auxiliary-engine speed scales.

If a system error is detected at this stage, the 'Fault Active' symbol will illuminate.
To identify the error, refer to the Options Screen menus (Driver's Fault Codes) on Page 44.

- The auxiliary engine's pre-heating cycle will commence.

To Start the auxiliary engine, proceed as follows:

1. Press and hold down the System Start/Stop switch until the engine starts. When the engine starts, its default IDLE speed (950 RPM) will register on the top right-hand section of the LCD monitor. With the engine running, the system is now effectively in Sweep Mode and a number of symbols representing the installed sweeping equipment will appear superimposed on the LCD monitor truck graphic.
2. On the control panels, select the desired sweeping equipment: Refer to Page 22.

Engine speed will increase when the following functions are selected.

- Suction Fan/High Pressure Pump 1200 RPM.
- Suction Fan Boost 1700 RPM.

Suction fan boost setting

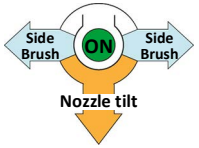
When required a boost setting is available for the suction fan. This increases fan speed and is used when sweeping heavy material. To operate the fan at the Boost setting, carry out the following procedure:

1. With the suction fan running press the BOOST switch . Refer to Page 17.

Sweeping

2. Switch on the hazard warning beacons.
3. Switch on the suction fan . The suction fan symbol on the LCD Monitor will change from WHITE to GREEN.
4. Select the desired configuration of brushes/suction boxes and water sprays (any combination of brushes and water can be selected) either manually or by pressing the Favourite Settings switch to recall your preferred arrangement. Switch on work-lights as required.
5. Move the Multi-Function Switch (located on the auxiliary control panel) to the 'Sweep Master Switch ON' position to start and deploy the pre-selected sweeping equipment.
   To stop and stow the sweep gear, return the switch to OFF. The sweeping equipment will raise to the stowed position and all water spray jets will stop (this will also occur automatically as soon as REVERSE is engaged, reverting to the original configuration as soon as REVERSE is disengaged).

6. Operate the multi-function switch to swing the side brushes OUT and the Nozzle Tilt switches (auxiliary control panel) as required to suit the sweeping conditions. The multi-function switch can also be used to control nozzle-tilt (Refer to page 17, for operating details).



While in the 'Sweep Master Switch ON' position, the multi-function switch will automatically return to the central position from the side brush and nozzle control positions.

7. Select the forward ratio best suited to the prevailing sweeping conditions and commence sweeping.

*If considered appropriate reduce/increase auxiliary engine speed to suit the prevailing sweeping conditions, by means of the engine speed controls on the main panel. Engine speed can only be adjusted between its minimum effective speed for the situation and the active preset default speed. Can not be adjusted in **SUCTION FAN BOOST MODE**.*

Be aware that too much reduction of engine speed can adversely affect suction performance.

Whatever the situation, remember that the rules of traffic and road safety must be observed.

Exiting sweep mode / stopping the auxiliary engine

1. Press the suction fan switch to stop the fan. The suction fan symbol on the LCD monitor will change from GREEN to WHITE.
2. Move the Multi-Function Switch (located on the lower extension of the auxiliary control panel) to the 'Sweep Master Switch OFF position. All active sweep systems will stop and retract.

If the Multi-Function Switch is not returned to the OFF position at this point, the sweeping equipment will not function upon any subsequent resumption of Sweep Mode until it has been first moved to the OFF position and then returned to the ON position.

3. Allow the auxiliary engine to idle for approximately two minutes and then press the System Start/Stop switch . The engine will stop and the sweeping equipment symbols displayed on the LCD monitor truck graphic will extinguish, to show that Sweep Mode is OFF.

Discharging the Hopper (Tipping)

Ensure that all personnel are clear of the door.
Ensure that the suction fan is turned OFF and that there is room for the door to open fully.

1. With the machine correctly positioned in the discharge area. Proceed as follows:

Before raising the hopper, ensure that the machine is on firm, level ground and there are no overhead obstructions.

2. Vehicle Engine OFF. Handbrake ON. Machine in Neutral. Multi-function lever OFF.
3. Auxiliary engine ON. Refer to Page 21.

The safety interlock button must be pressed in conjunction with the following buttons.

4. Open the rear door fully.
5. Raise the hopper fully.
6. With the load fully discharged, move the hopper prop lever as illustrated to engage with the prop latching assembly. Lower the hopper fully.

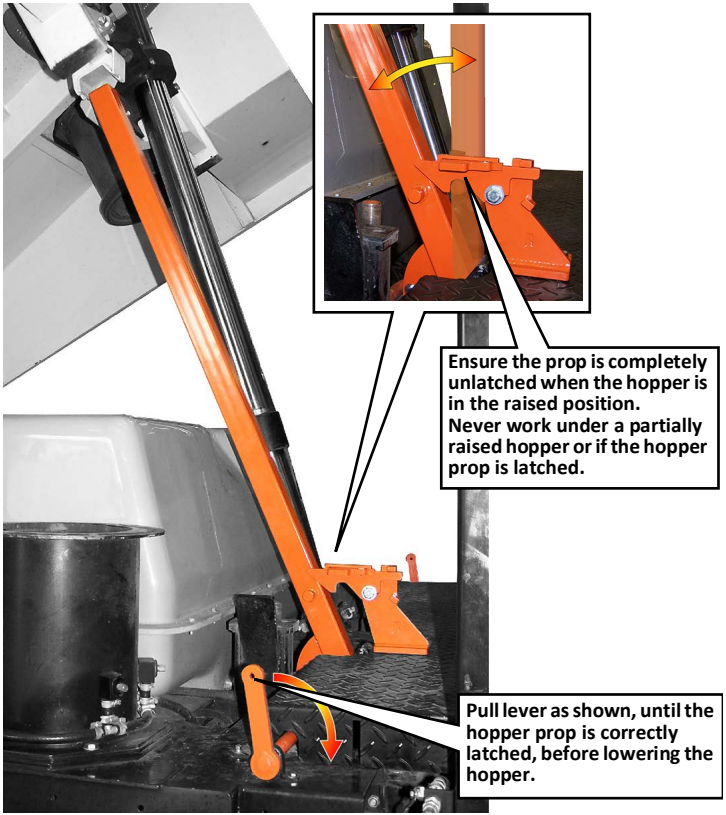
Before closing the door, ensure that the door seal, and mating faces on the hopper, are free from any foreign matter that might damage the seal or adversely affect the sealing function.

The rear door will not close via the remote control unless the hopper is in the fully down position as determined by the hopper down sensor.

7. Close the rear door making sure the locking mechanism has fully engaged.
8. Move machine clear of discharge area.

The hopper prop must always be in the deployed position when working beneath a raise hopper. Failure to do so could result in serious injury.

Hopper safety prop



Rear Door Operation

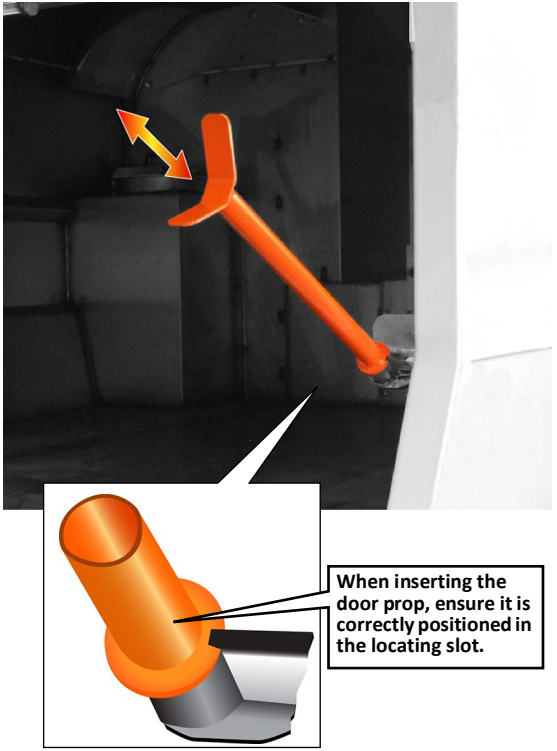
Ensure that all personnel are clear of the rear door and there is enough room for it to open fully.
Ensure that the suction fan has been switched off.
When working with the door in the fully raised position ensure that the door safety prop has properly deployed.

To open and close the rear door, proceed as follows:

1. Ensure the machine correctly positioned with plenty of room for door to open fully.
2. Turn vehicle engine off. Parking brake engaged. Vehicle in neutral.
3. Multi function lever off. See page 17.
4. Auxiliary engine on. See page 21.
5. The safety interlock button needs to be pressed and held in while using other buttons on the remote control.
6. Open rear door by pressing and holding until fully open.
7. Insert the rear door safety prop if working around or under the rear door.
8. Ensure that the rear door seal and its mating surfaces on the hopper are free from any foreign matter that might damage the seal or adversely affect the sealing function.
9. Remove and stow the rear door safety prop.
10. Close rear door by pressing and holding, the auxiliary engine speed will raise to 1500rpm, the auto blanking flaps will close and the suction fan will switch on. Continuing holding until the rear door has fully closed and the door locking mechanism has fully engaged. Releasing the close button will switch off the suction fan and engine speed will fall to tick-over after a small delay.
    This has been done to create a vacuum in the hopper which will help close and seal the rear door.

The rear door will not close via the remote control unless the hopper is in the fully down position as determined by the hopper down sensor.

Door safety prop



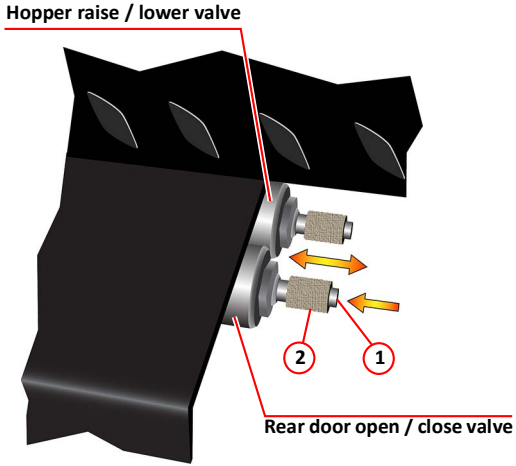
Using the Auxiliary Hand Pump

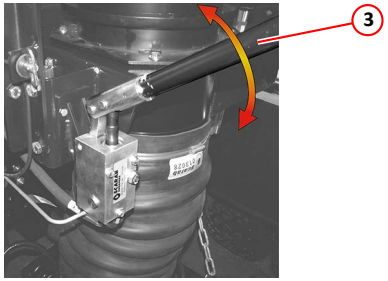
1. Engine OFF. Handbrake ON.
2. Turn ON the ignition (do not start the engine). Select sweep mode (main panel).
3. Insert the pump handle.
4. Press the required function button on the remote control and hold, while operating the pump handle.

If electrical power is unavailable proceed as follows.

1. Depress the locking button **(1)** and push/pull the control ring **(2)**, to operate either the hopper or rear door. Refer to illustration.
2. Operate the pump handle **(3)**.

The hopper prop must always be in the deployed position when working beneath a raised hopper. failure to do so could result in serious injury



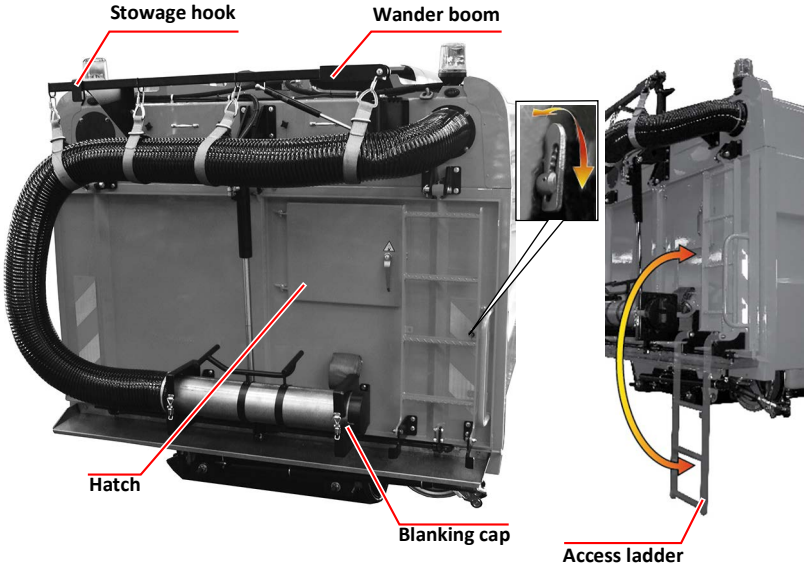


Rear Mounted Wander Hose

The rear-mounted wander hose arrangement is permenantly fitted. The weight of the hose/nozzle is supported by a gas strut attached to the boom assembly.

1. Vehicle engine stopped. Handbrake ON. Auxiliary engine ON. Sweeping equipment deselected and stowed. Suction fan ON.
2. Demount the suction tube from its stowage and swing-out the entire assembly to the required position.
3. When replacing ensure suction tube is correctly fitted into the blanking cup. Failure to do so will result in poor suction when sweeping.

For situations requiring maximum suction power ie: - when removing stubborn objects, etc, select fan boost



To visually inspect the hopper interior a hatch and ladder are installed in the rear door. Lower the ladder to gain access.

The machine must be off, ignition key removed and parking brake on.
Always exercise extreme caution when opening the hatch as debris may have gathered in the aperture

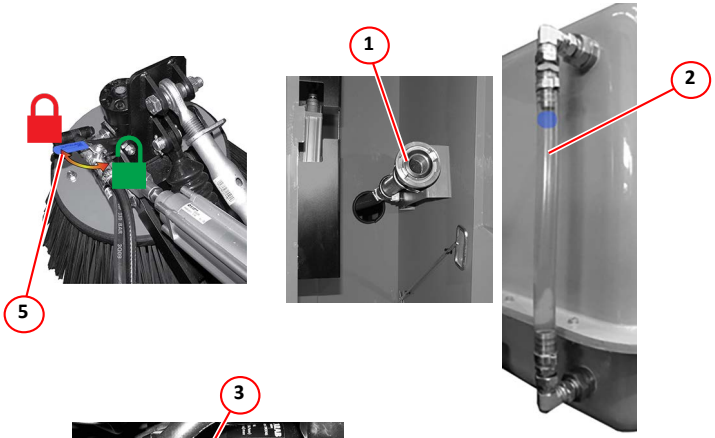
Full inspection of the hopper interior and screen should always be carried out with the rear door fully open.

Always ensure that all rear door items are correctly stowed, and the hatch is in the closed position before driving the machine.

Using the Dust Suppression System

Filling the water tank

Attach the appropriate coupling and water hose to the filler aperture **(1)** situated in the right hand tool locker, and fill until the blue float reaches the top of the water level sight tube **(2)** situated on the left hand side of the machine (use clean water).



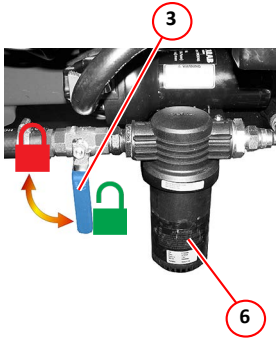
Using the low pressure water system

The low pressure water is used on the, side brush(es), suction tube(s), and wide sweep brush.
To operate any of these functions the relevant button(s) on the main panel must be selected when in sweep mode.

A shut-off valve is positioned between the pump and tank and must be open when the system is in use **(3)**.

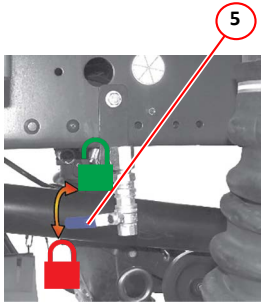
The side brush(es) are fitted with shut-off valves **(4)**.

It is vital that the water system is drained totally if the air temperature is expected to fall to 0°c or below.



Draining the system

Open tank Drain valve **(5)**. Remove water strainer **(6)**.



The hydraulic driven pump should NEVER be permitted to run dry.

Due to customers requirements, other water features may be present but not mentioned in this publication

Using the High-Pressure water System (Option)

High pressure water can be hazardous, always wear goggles or suitable eye/face protection.
Exercise extreme care when using the lance, do not direct the jet at other people or electrical connections.
Failure to comply can result in serious injury.

The high pressure water is used on the following options:-

- Front spray bar **(1)**.
- Hand lance and retractable hose* **(2)**.

To operate any of the above options the auxiliary engine must be ON. Press the high pressure water switch on the auxiliary control panel and open the appropriate valve(s) for the function(s) required.

Retractable hose

The hand lance **(2)** is attached to a 13 metre long rubber hose fitted to a hose reel **(3)**. When extending the hose, a ratchet mechanism allows the reel to lock in place. Further extending past the ratchet allows the reel to retract.
The position of the hose reel and hand lance is determined by the machine specification.

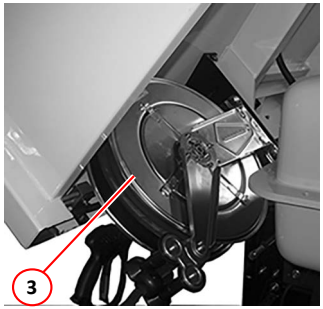
**These options always fitted on the drivers side.*

It is vital that the water system is drained totally if the air temperature is expected to fall to 0°c or below.

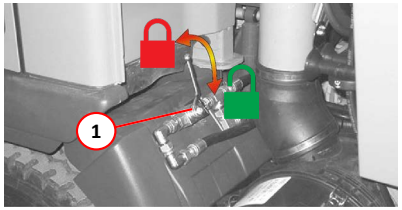
Draining the system *- Open tank Drain valve: Refer to Page 28. Remove water strainer **(4)**. Open pump drain valves **(5 and 6)**.*

This pump should NEVER be permitted to run dry.

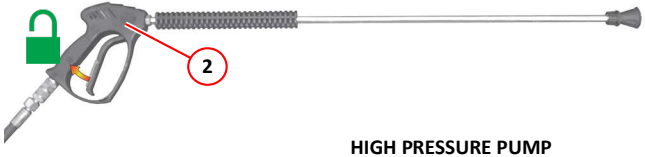
Hose reel



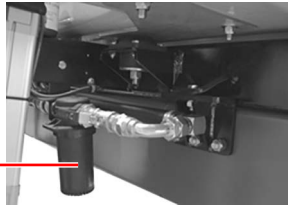
Front spray bar valve

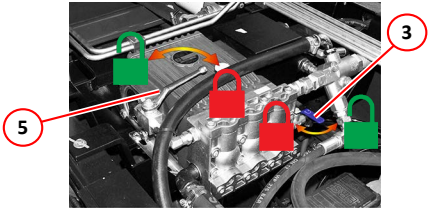


Hand lance



HIGH PRESSURE PUMP





Clearing a Blockage in the Suction Path

A blockage in the suction path will be indicated by a trail of material behind the machine. The most likely cause is an obstacle either in the suction nozzle, or the trunking immediately above it, around which other material collects as sweeping progresses. It is important that such problems are rectified as soon a possible.

Before this can be achieved, however, the following health and safety concerns must be addressed. These are important and are intended to maintain safe working conditions at all times, therefore:

⚠ **Never raise the hopper where the load it contains or the ground you are on could cause the machine to become unstable.**

Never attempt to work beneath a partially raised hopper, i.e. where the safety prop cannot be deployed.

Never attempt to clear a blockage while the brushes are operating. always stop and retract all brushes, stop the engine and remove the ignition keys before starting the procedure.

Always be aware of the risk from sharp objects and never place your hands into the blockage, even when wearing gloves. Exercise extreme caution when handling any items removed from the suction system, keeping such activities to the absolute minimum.

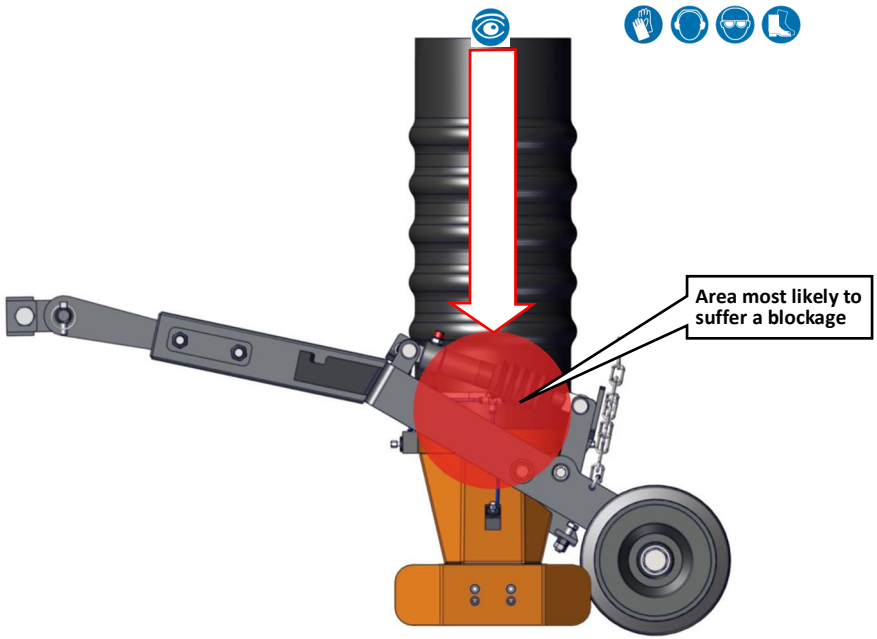
Only when all of the foregoing points have been complied with, should the clearance procedure commence.

If it is not possible to comply with these conditions you are advised to consult your supervisor before acting.

The procedure for clearing the suction path is as follows:-

1. Raise the hopper, ensuring the safety prop is deployed, to gain access to the top of the suction tube.
2. Visually check conditions inside the suction tube and nozzle box to determine the nature and location of the blockage and whether, without suction, the blockage has dropped back to the road surface.
3. If the blockage is still present, use a suitable implement (a stout length of wood is ideal), to remove the obstacle by pushing it downwards.
4. Once the offending item has been successfully removed, restart the Machine and use the high-pressure hand lance (if fitted) to thoroughly wash out the trunking and nozzle box.
5. Stow the hopper prop and lower the hopper but do not start the suction fan at this stage.
6. Move the Machine sufficiently to expose the cause of the blockage. Stop the Machine, apply the parking brake and remove the ignition key. Carefully isolate the blockage and remove to a safe location.
7. Resume sweep mode. Lower the suction box and switch on the fan. Assure the suction is correctly functioning.
8. Return to the start of the trail created by the blockage and continue sweeping.

Diagram showing the area to most likely to suffer a blockage.



Recommended Operator Routine Maintenance

⚠ **Always wear appropriate personal protective equipment (PPE).** 

It is important that the following routine maintenance procedures are carried out as directed. This will help to ensure that your Scarab sweeper performs at the optimum level of safety and efficiency. Refer to the pages immediately following this schedule and to the Table of Contents for more detailed information. For chassis servicing/maintenance, refer to the manufactures information.

	Maintenance Procedure - Daily Actions Before Use
1	Check vehicle/body for safety. All lighting equipment, tyres, fuel, oil, coolant, brake fluid, windscreen wash and water tank level.
2	Check auxiliary engine, fuel, oil and coolant levels
3	Check hydraulic oil level and inspect system for signs of leaks. Check oil cooler is clean.
4	If the vehicle was not previously used by ***YOU***, check suction fan is clean.
5	Check brushes/skirts for wear or damage. Remove entangled items, e.g. string and strapping. etc.
6	Check suction nozzle flaps for damage/correct ground clearance.
7	Check water spray jets for blockages.
8	Check that all equipment is securely stowed and brushes are retracted.

	Maintenance Procedure - Daily Actions After Use
9	Wash vehicle, particularly hopper screen, surrounding ledges and area above. Leave hopper door partially open, to allow air to circulate.
10	Wash oil cooler, ensuring that the fins are clean.
11	Lubricate as appropriate, all brush links, pivot.
12	Remove/clean the water filter elements.

	Maintenance Procedure - Weekly
13	Clean the suction fan thoroughly, using the scraper provided and high pressure water. *See page 34*.
14	Conduct a thorough inspection of the fan assembly to verify its condition. Report any defects. *See Page* 34.
15	Grease hopper ram (Top and bottom).
16	Visually check entire machine for wear/damage.
17	Check wiring and hoses for security of attachment and signs of wear and/or damage.
18	Check wear in suction tubes and deflectors in hopper.
19	Check seals on hopper door, side hatches and suction tubes.
20	Check oil level in high pressure water pump, top up if needed.
21	Grease all points. *See page 41*.
22	Check subframe to chassis fixing brackets.

Other Maintenance procedures
Lithium grease the low pressure pump after every 50 hours of the pump running and/or every service. 10 grams or 0.4oz (10 pumps).

It is vital that the water system is drained totally if the air temperature is expected to fall to 0°C or below.

The foregoing are general recommendations only.
Requirements vary from territory to territory and depend on vehicle usage/operating conditions.
IF IN DOUBT, CONTACT AND CONSULT WITH YOUR NEAREST SCARAB DEALER.

Key Maintenance Procedures

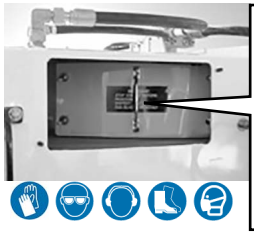
Cleaning the suction fan and screen

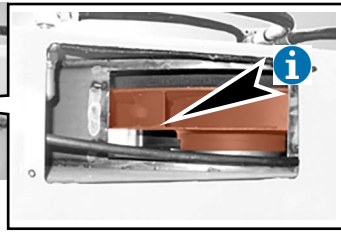
FAILURE TO COMPLY WITH THE FOLLOWING COULD RESULT IN SERIOUS INJURY.

Before working on the machine position it on firm, level ground and apply handbrake.

The fan is an extremely heavy rotating mass. Never attempt to slow or stop its rotation by using the hands or by inserting any item into the fan chamber, even at low speeds.

1. Turn engine OFF. Remove Ignition key. Use a suitable platform to enabling you to reach the area above the rear door.
2. With the fan stationary, remove the outer and inner inspection covers from the hopper to expose the fan.
3. Using the special scraper, thoroughly clean all parts of the fan. A steam-cleaner or high-pressure water from a remote source will greatly assist in cleaning severely contaminated fans.
4. Refit the inspection covers and open the rear door. Lower the screen. Wash the screen using steam or high-pressure water. Raise the screen and close the rear door.





Please pay particular attention to inner curve of the blade and also the unit where dirt accumulates around the hub area.

Never work under a raised rear door unless the safety door prop is in the deployed position.

Loose particles from the cleaning process can be ejected via the hopper cover when the fan is restarted, ensure that all personnel are clear before restarting.

5. Start the engine and switch the suction fan ON.
6. With the rear door shut, direct additional water onto the screen below the fan inlet cone, from an open rear-access flap (if fitted), until only clean water is expelled from the fan casing.

Auxiliary engine

The auxiliary engine is the responsibility of the operator, as is the chassis engine. The following instructions should be followed as detailed in the maintenance schedule on Page 32 and in the manufacturer's recommendations.

Raise the hopper in accordance with the instructions detailed on Page 24.

The hopper prop must always be in the deployed position when working beneath a raise hopper. Failure to do so could result in serious injury. When mounting the chassis always use the access steps and tread plates. Ensure they are free from contamination that may cause them to become slippery. Always wear suitable footwear with clean and dry soles.

Ensure that the sweeper is on a flat and level surface with the auxiliary engine stopped for a suitable period, to allow the oil to return to the sump.

Engine oil level

1. Remove the dipstick **(1)** from the holder.
2. Wipe clean with a lint-free cloth.
3. Replace in it holder. Remove again and check the oil level.

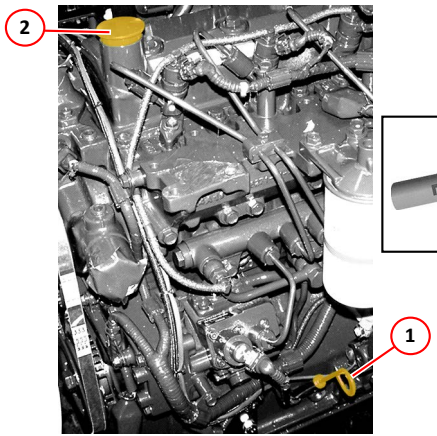
The oil should never fall below the minimum level or exceed the maximum level shown on the dipstick.

4. Remove the filler cap **(2)** and pour oil through the opening until the correct level is maintained.

Engine oil: (15w/40).

Allow time for the added oil to drain through to the sump before re-checking the level.

5. Replace filler cap.



Engine coolant level

If topping-up is required when the coolant is hot adequate precautions must be taken, as an overpressure will have built up in the system. Raise the hopper in accordance with the instructions detailed on Page 24.

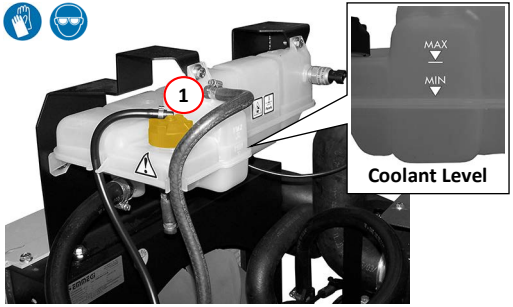
It is advisable to top-up the coolant level when the engine is cold.

Ensure that the sweeper is on a flat and level surface with the auxiliary engine stopped for a suitable period to allow the engine to cool.

Topping-up

1. Remove the filler cap from the coolant expansion tank **(1)**.
2. Run the engine for several minutes.
3. Stop engine and check coolant level.

Top-up to the appropriate level, using the correct coolant mixture. Replace the filler cap.
Coolant: Ethylene Glycol (Eskimo long life).



Hydraulic oil tank

It is advisable to top-up the Hydraulic oil level when the system is cold.

The hydraulic oil tank gauge is fitted with low level sensor. If the oil level drops too low the engine will cut-out preventing damage to the hydraulic pump.

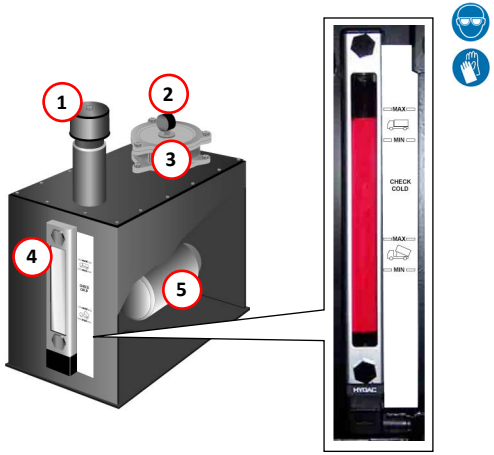
Ensure that the Machine is on a flat and level surface with the auxiliary engine stopped for a suitable period to allow the engine to cool.

Topping-up

1. Open the right hand engine gantry door to gain access to the hydraulic tank.
2. Using the appropriate size spanner, remove the filler cap **(1)**.
3. Top-up with HPL 32 or an equivalent hydraulic oil to the appropriate level.

Pay particular attention to the hopper orientation as indicated on the level label when filling.
Hydraulic oil: Renol 32.

4. Replace the filler cap.



Oil tank components

1. Fill/breather cap
2. Return filter gauge
3. Return filter
4. Sight glass
5. Suction filter

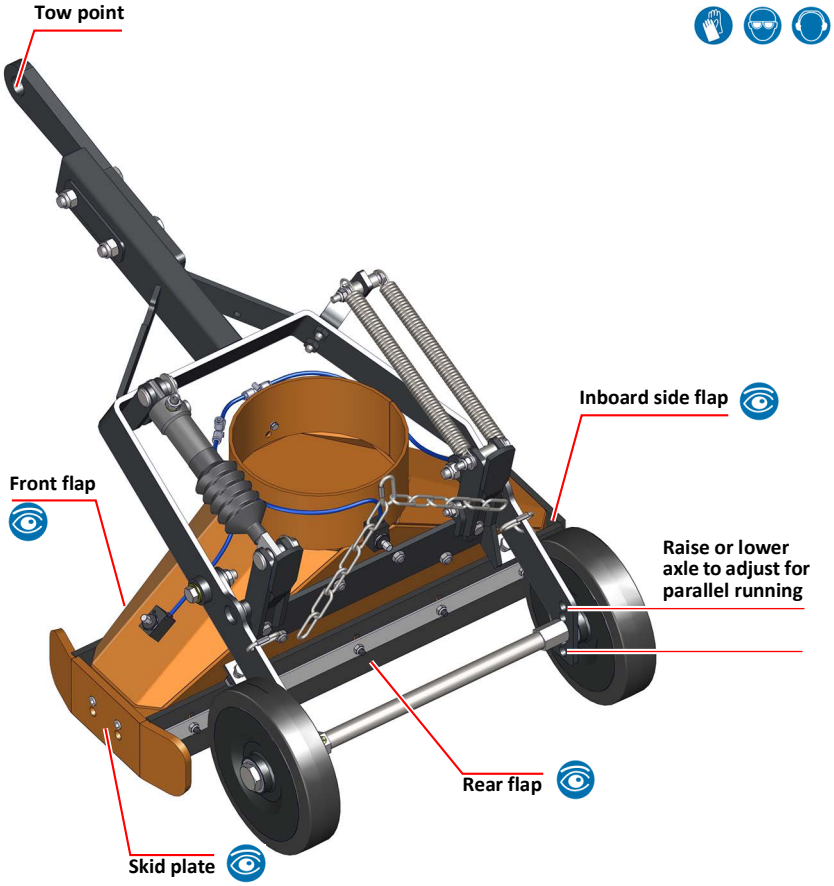
Suction nozzle clearances

Inspect the suction nozzle flaps to verify that they are in good condition and do not show excessive wear. Adjust as necessary to achieve the correct flap to ground clearances. The factory settings are:

- Inboard Side Flap = 15 mm
- Front Flap = 20 mm
- Rear Flap = 15 mm

Check and adjust or replace skid plate if required.

These clearances are based on the factory set-up.
For some operating conditions, it might be found that, alternative clearances are preferred.



Side brushes and skirts

Do not attempt to alter the brush settings while the brush is rotating.

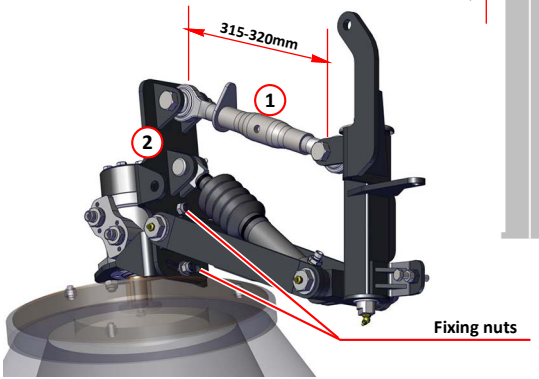
An effective brush set-up ensures good sweeping performance. The following settings produce excellent results in most conditions. Experience will determine if other settings are better suited to specific conditions.

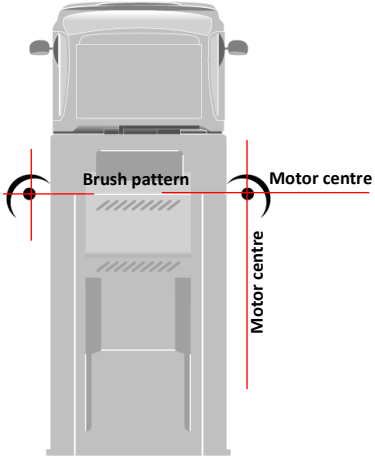
1. Vehicle stopped, handbrake ON, sweep mode ON, activate the desired brush(es) in their working positions.
2. Switch OFF ignition and remove the key.

Before proceeding ensure people and objects are clear of the brush area.

3. Locate the appropriate valve(s) in the pneumatic cabinet and activate the manual override to allow the brush(es) to extend.
4. Adjust the top link (**1**) and/or the motor plate (**2**) until the brush is at the correct contact with the road surface. Re-tighten any items slackened during adjustment.
5. Re-start vehicle, stow all sweeping equipment activated for adjustment.


Manual override



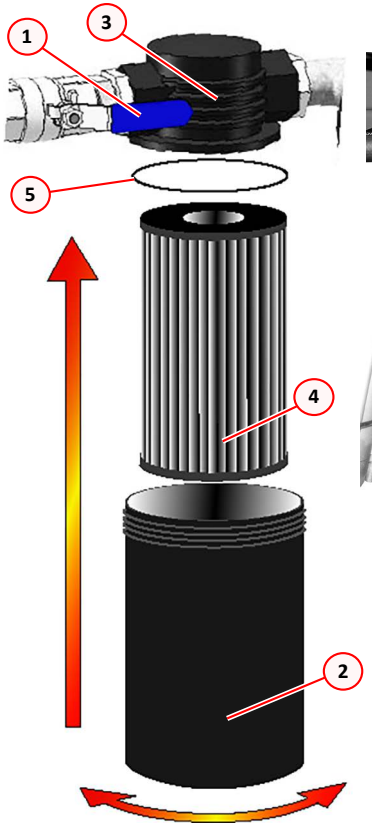


Removing and cleaning the water filter element(s)

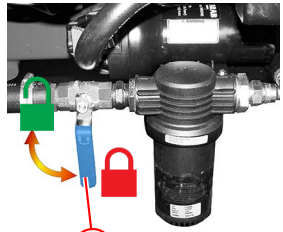
Both the low-pressure and, if fitted, the, high-pressure water pump are fitted with strainers to ensure that foreign matter does not enter the pump. The following steps detail the recommended cleaning procedure.

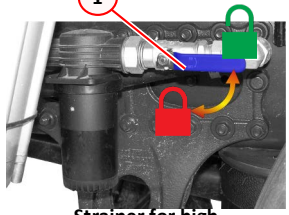
*It will be necessary to place the shut-off valve(s) **(1)** in the closed position.*

1. If the filter bowl has a shut-off valve on the bottom then open that to drain before removing the filter bowl.
2. Unscrew the filter bowl **(2)** clockwise from the housing **(3)** and remove the element **(4)**.
3. Wash out the element with clean water or replace if too contaminated.
4. Before re-assembling the unit, apply some grease to the O-seal **(5)** to ensure a water-tight fit for the filter bowl.
5. Refit the element and filter bowl.
6. Return the shut-of valve(s) to the ON position.



Strainer for low pressure water pump

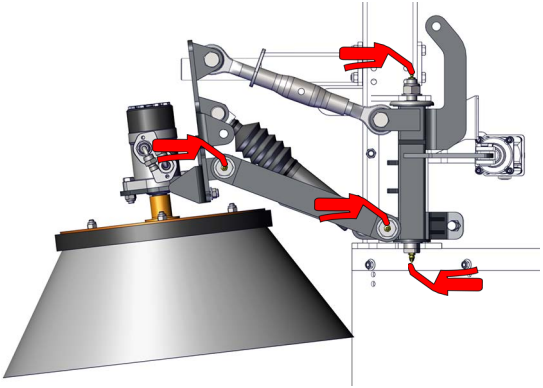




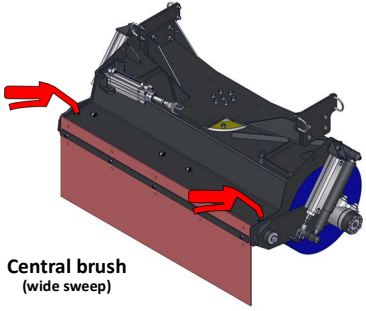
Strainer for high pressure water pump

Manual greasing and lubrication

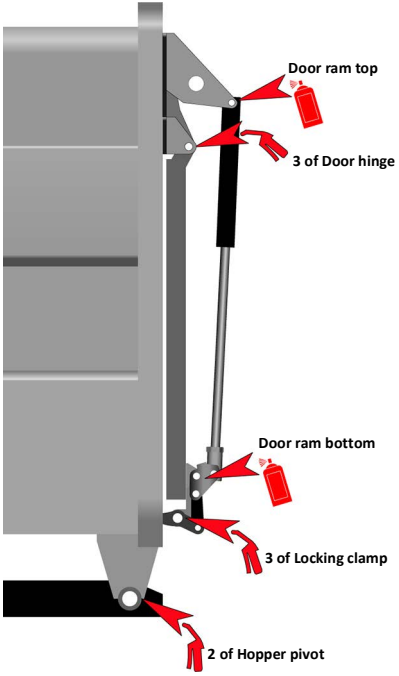
Carry out manual greasing in accordance with the appropriate schedule (Page 32) and by referring to the accompanying diagrams shown here.



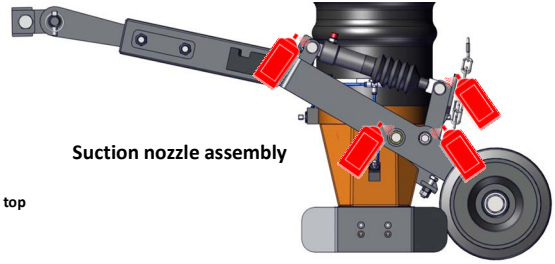
Side brush assemblies



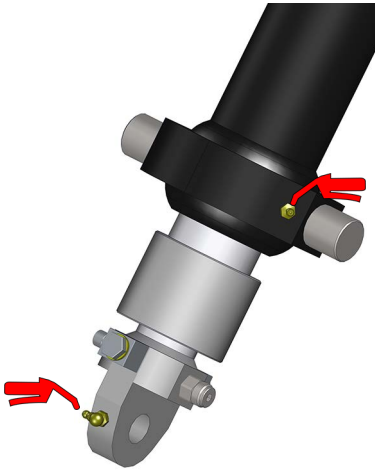
Central brush
(wide sweep)



Hopper body and rear door



Suction nozzle assembly



Hopper lift ram

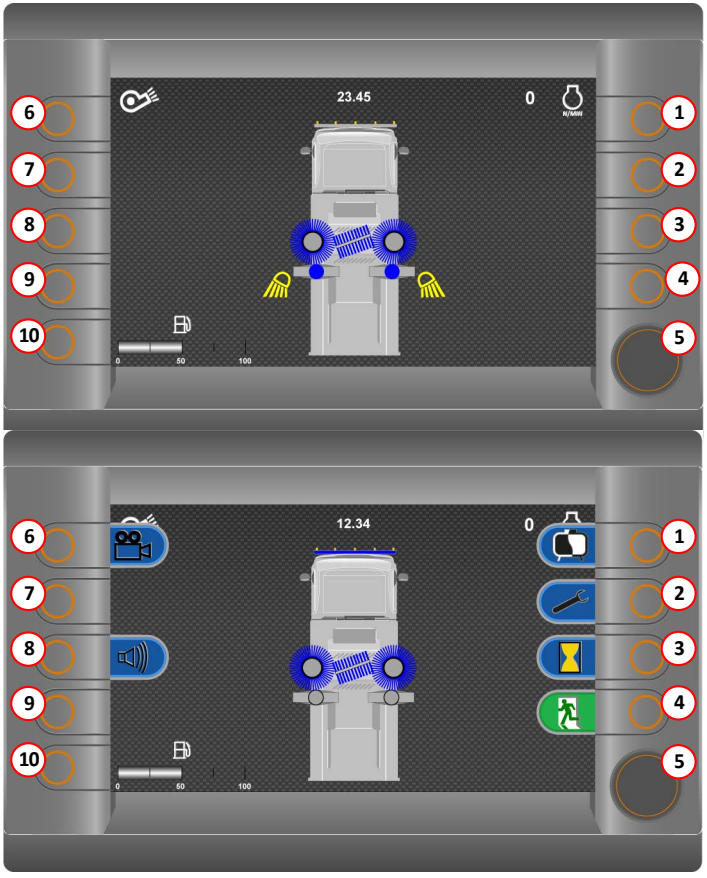
LCD monitor

Start Up/Drivers Screen

Button function

1. Display: Press to change background colours (black/white).
2. Menu: Press to access menu screen. *See page 43.*
3. Hours: Press to view hours logged.
4. Return: Press to return to previous screen.
5. Encoder: Turn to highlight required option, press to enter.
   Used in all screen modes.
   Press to display side tabs from the Start Up/Drivers screen.
6. Camera: Press to enable in forward drive. (rear view only)
7. Not used.
8. Hopper raise/lower and rear door open/close warning buzzer:
   Press to disable.
9. Not used.
10. Not used.

Images to the right show the Start Up/Drivers screen, the image at the bottom shows with the tabs overlaid.



Menu Screen

To access the Menu Screen from the Start Up screen press button **(2)**.

 Driver's fault codes. *See page 44*.

 EDC. *See page 46*.

 Screen settings. *See page 46*.

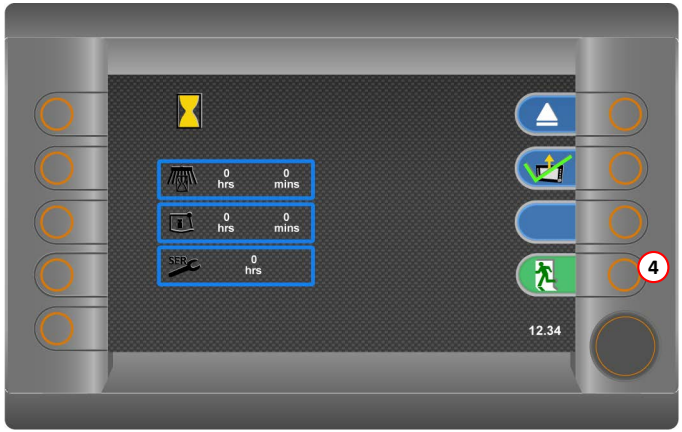
 Information. *See page 48*.

 Button check. *See page 49*.

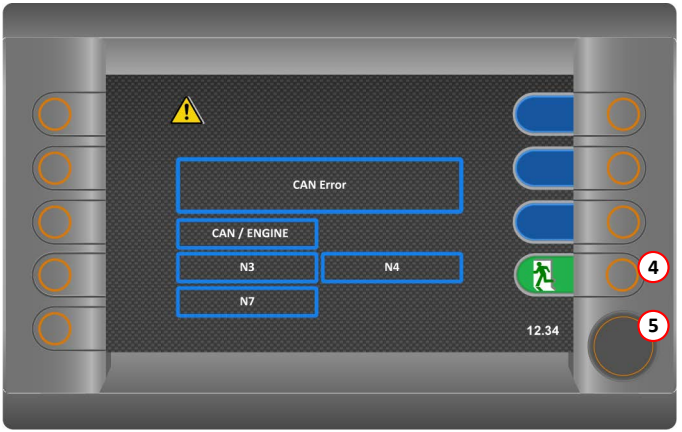
 CAN menu (*Password protected*)

Rotate the encoder **(5)** to select one of the above icons on the screen and then press the encoder **(5)** to activate that menu selection.

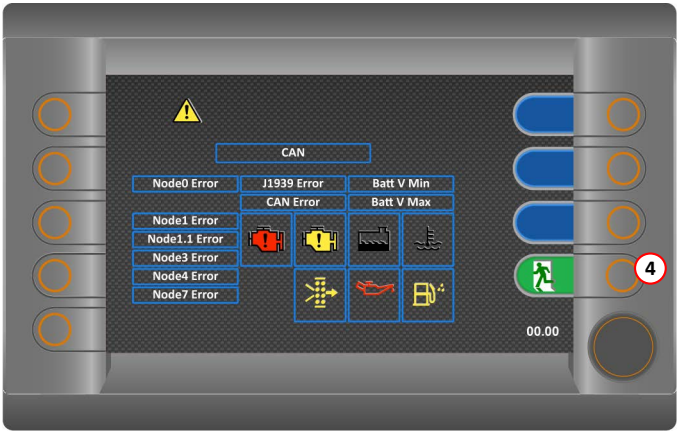
Press button **(4)** to return to the Start Up/Drivers screen.



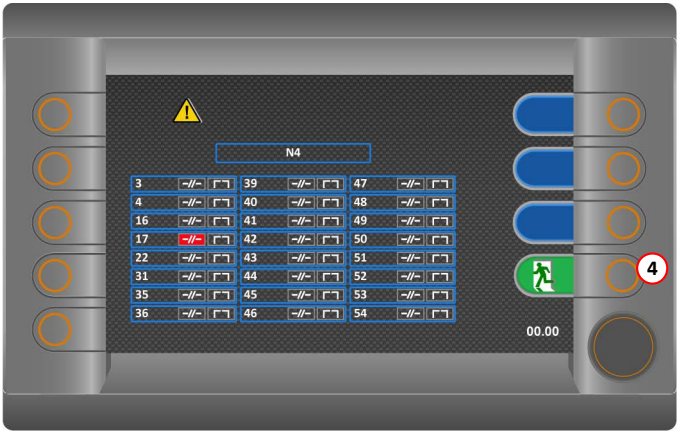
Hours worked
Displays the working time of various functions.
Service Hours only display when activated.
Press **(4)** to exit.



Driver fault codes
Highlight either the CAN or desired Node by rotating the encoder **(5)**.
Press the encoder **(5)** to enter.
Press **(4)** to exit.

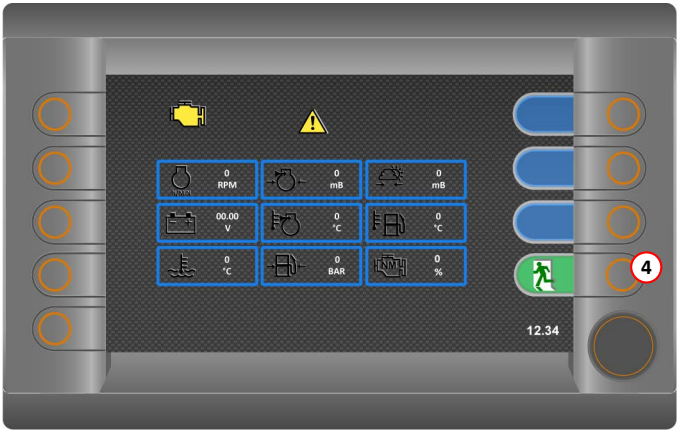


CAN error screen
Identifies location of system errors.
Highlighted in **RED** when active.
Press **(4)** to exit.



Driver fault codes
Entering a Node screen allows Pin-Contact view.
Pin numbers with an active fault are highlighted in **RED**.
⊣⊢ = Open Circuit
⌐¬ = Short

Press **(4)** to exit.



EDC

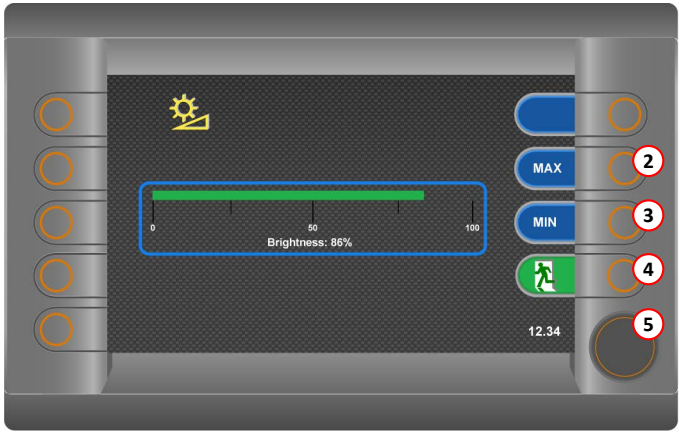
Displays the following current conditions:

- ***Engine Speed***
- ***Battery Voltage***
- ***Coolant Temperature***
- ***Turbo Boost Pressure***
- ***Turbo Air Pressure***
- ***Fuel Pressure***
- ***Barometric Pressure***
- ***Fuel Temperature***
- ***Engine Load***

Press **(4)** to exit.

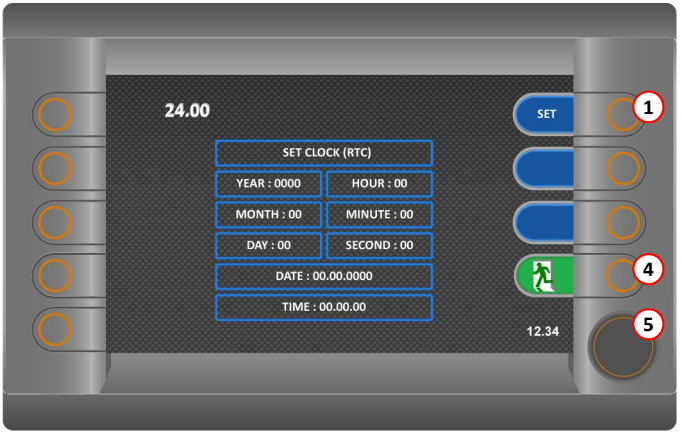
Screen Settings

Highlight the desired panel by rotating the encoder **(5)** and press the encoder **(5)** to enter the setting screen.
Press **(4)** to exit.



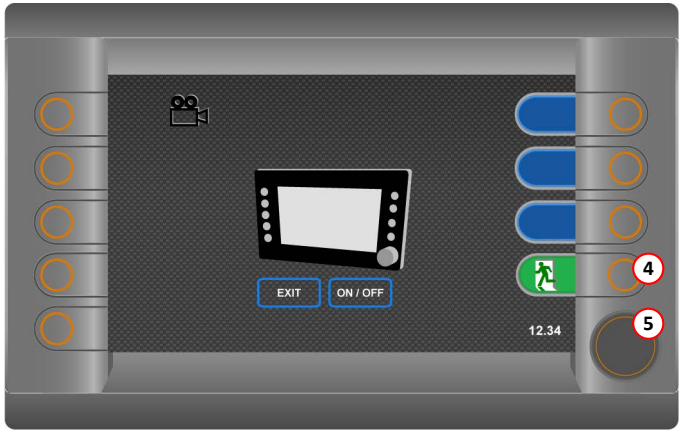
Screen brightness setting

Rotate the encoder **(5)** to adjust the screen brightness in (2% increments).
Pressing the MIN button **(3)** adjusts the brightness to 10%.
Pressing the MAX button **(2)** adjusts the brightness to 100%.
Press **(4)** to exit.



Time/date setting

Rotate the encoder **(5)** to the desired panel and press encoder **(5)**.
Rotate encoder **(5)** to the correct, Year, Day, Hour, etc and press the set button **(1)**.
Repeat above step as required.
Press **(4)** to exit.

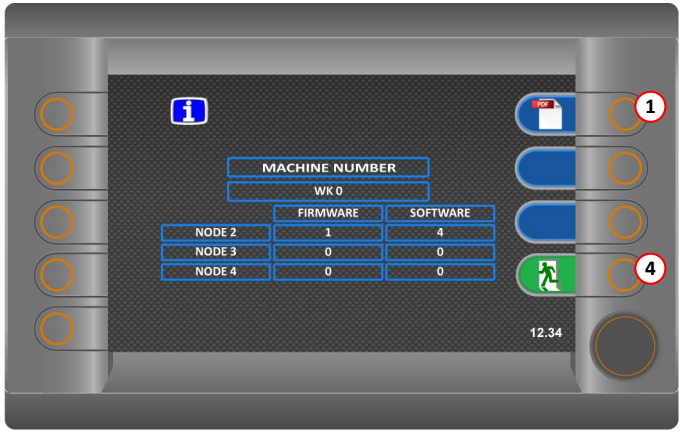


Rear camera

Enable/disable rear camera. When fitted.
A green tick displays in the centre of screen icon when camera is activated.
Rotate encoder **(5)** to choose option the press encoder **(5)** to select.

This function allows rear viewing when the vehicle is in forward drive. When reversing the screen activates automatically.

Press **(4)** to exit.



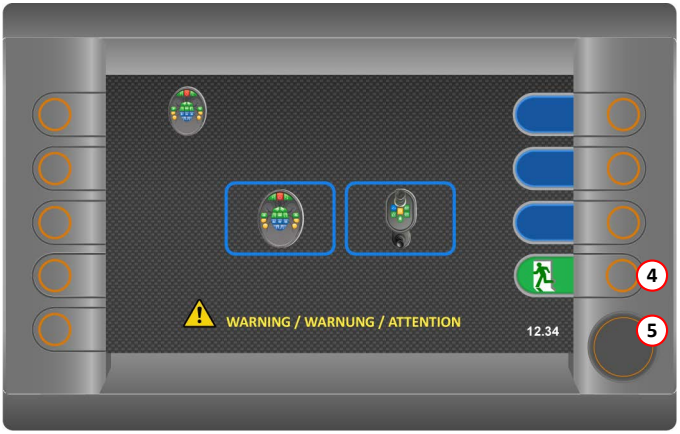
Information

Display works number and current Node program versions.
Press button **(1)** to access the PDF viewing screen. Follow the on screen directions.

Only to be used when vehicle is stationary and auxiliary engine is off.

On exiting PDF viewer, ignition must be cycled.

Press **(4)** to exit.



Button checks

Highlight the appropriate panel by rotating the encoder **(5)** and press the encoder **(5)** to select.

Press **(4)** to exit.

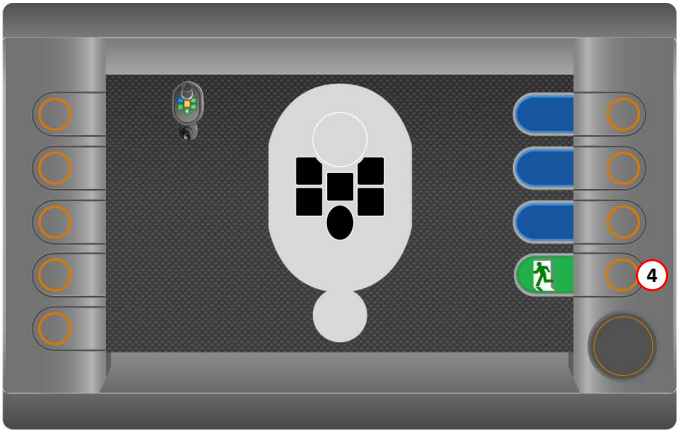
Main control panel button check

Press the appropriate button on the main control panel.

As each button is pressed the corresponding graphic will illuminate.

A beep will sound if the function is fitted.

Press **(4)** to exit.



Auxiliary control panel button check

Use the main control panel instructions to test buttons and joystick.
As each button is pressed the corresponding graphic will illuminate.
A beep will sound if the function is fitted.
Press (**4**) to exit.

Operator’s notes

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With a pioneering past in the industry, **SCARAB** is a leading manufacturer of high-quality, time-tested road sweeping solutions in the sub-compact, compact, mid-size and truck-mounted categories. **SCARAB** sweepers and products are durable and reliable industry standouts designed with operator efficiency, comfort and safety in mind.

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