



SCARAB
FAYAT GROUP

M6 & FS6000
Skid-Mounted Road sweeper



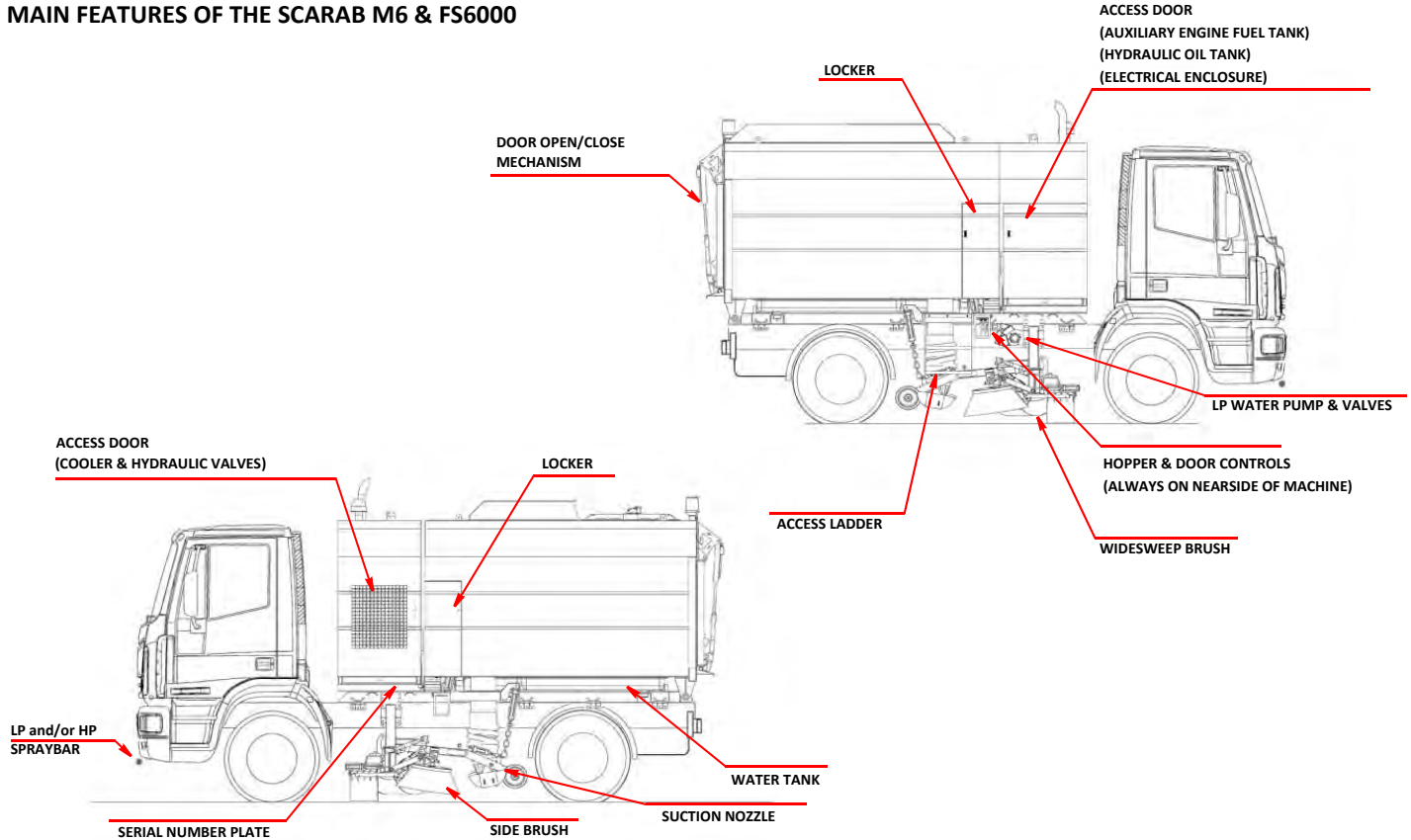
OPERATING INSTRUCTIONS CANbus3

Incorporating Basic Operator's Maintenance Information



This document contains important Health & Safety advice and must remain with the Machine at all times

MAIN FEATURES OF THE SCARAB M6 & FS6000



M6 & FS6000

OPERATING INSTRUCTIONS FOR M6 & FS6000 VEHICLES - CANbus 3 Incorporating Basic Operator's Maintenance Information

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GENERAL INFORMATION

 **WARNING - VOLTAGE SENSITIVE COMPONENTS**
NEVER START THE AUXILIARY ENGINE WITH A FAST CHARGER. IF BATTERIES ARE NOT CHARGED ALWAYS USE A FRESH SET.

TYPICAL CAPACITIES

HOPPER GROSS VOLUME	6.35m ³
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

Description ... 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 & 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.

TOWING (Machines equipped with a Reduction Gearbox)

SERIOUS DAMAGE TO THE TRANSMISSION COULD RESULT IF THE MACHINE IS TOWED WHILE THE REDUCTION GEARBOX IS ENGAGED.

If towing is necessary, it is imperative that the reduction box is disengaged before making any attempt to tow the Machine.

 **Warning** 

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

IDENTIFICATION PLATES

The SERIAL NUMBER PLATE is located at the base of the hydraulics enclosure on the lefthand side of the skid unit.

The Serial Number will comprise four numerical digits only (for example 5843).

For the location of the Machine's VIN PLATE and CHASSIS NUMBER, refer to the chassis manufacturers' documentation.

LIMITATIONS OF USE

The Scarab M6 & 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.

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://quickservice.cummins.com/info/index.html>

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* Indicates optional equipment.

HEALTH & SAFETY ADVICE

IN THE INTERESTS OF YOUR HEALTH AND SAFETY, IT IS IMPORTANT THAT THE FOLLOWING POINTS ARE OBSERVED AT ALL TIMES:

- ONLY TRAINED OPERATIVES SHOULD BE ALLOWED TO DRIVE OR WORK ON THIS MACHINE.
- BEFORE DRIVING THE MACHINE ENSURE THAT ALL RELEVANT MACHINE CHECKS HAVE BEEN CARRIED OUT, 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, REAR DOOR OR HOPPER UNLESS THE APPROPRIATE PROP IS IN THE CORRECT POSITION.
- BEFORE OPERATING EITHER THE HOPPER-TIP 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, REMOVE THE IGNITION KEY.
- ALWAYS WEAR THE APPROPRIATE PERSONAL PROTECTION EQUIPMENT (PPE) WHEN OPERATING OR WORKING ON THE MACHINE.
- BEFORE STARTING THE ENGINES ENSURE THAT ALL CONTROLS ARE SWITCHED OFF AND THAT THE MACHINE IS IN NEUTRAL.
- KEEP LONG HAIR, LOOSE CLOTHING AND HANDS AWAY FROM MOVING PARTS.
- HIGH PRESSURE WATER CAN BE HAZARDOUS, ALWAYS WEAR SUITABLE FACE PROTECTION WHEN OPERATING THE HIGH-PRESSURE WATER PUMP AND WHEN USING THE LANCE.
DO NOT DIRECT THE WATER JET AT OTHER PERSONS.
BEWARE OF ELECTRICAL INSTALLATIONS ON PUBLIC BUILDINGS & LAMP POSTS etc. AND ALWAYS EXERCISE EXTREME CAUTION IN PUBLIC PLACES.
- THE DRIVER'S SEAT SHOULD BE CORRECTLY ADJUSTED AS TO GIVE A GOOD POSTURE WHEN DRIVING
- THE MIRRORS SHOULD BE ADJUSTED SO THE DRIVER HAS A GOOD ALL-ROUND VIEW OF THE MACHINE SIDES AND 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 BE OBSERVED.
- WHILE OPERATING THIS MACHINE THE SAFETY AND WELL BEING OF OTHER PEOPLE ARE THE SOLE RESPONSIBILITY OF THE OPERATOR.
- NEVER RIDE ON ANY PART OF THE MACHINE OTHER THAN IN THE DRIVERS CAB.



The universal safety symbol along with red text is used throughout this handbook 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

OTHER SYMBOLS NOT SHOWN HERE MAY BE USED THROUGHOUT THIS HANDBOOK. WHEN ENCOUNTERED, THEY MUST BE OBSERVED.

REMEMBER, FAILURE TO COMPLY CAN 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 risk falls into two main categories as follows:

- Risks represented by the sweeper 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 with the general maintenance and servicing activities on the Machine.

Typical Machine-related hazards are:

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

Typical environmental hazards are:





- Exposure to sharp objects (e.g. broken glass, discarded hypodermic syringes) while operating or working on the Machine.
- Exposure to various infectious diseases (e.g. Legionnaire's, 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 Personal Protection 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 or 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 Personal Protection Equipment (PPE) when carrying out sweeping duties or when working on the Machine. This includes:

-  Safety Gloves (including where necessary cut-resistant knitted Kevlar).
-  Safety boots or shoes with protective soles and toecaps.
-  Eye/Face protection (including where necessary full-face mask with under-chin lip).
-  Earplugs or Ear defenders as appropriate

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 & safety observations/notices
- Transit driving
- In-cab & 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 & Machine body

Operator training can be provided by Scarab Sweepers upon request.

 *It is the responsibility of employers to carry out their 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.*
For information regarding vehicle operation and maintenance, refer to the chassis manufacturer's handbook.

DOOR SAFETY PROP



When inserting the door prop, ensure it is correctly positioned in the locating slot

HOPPER SAFETY PROP WHEN REMOTE CONTROLS ARE FITTED




















Ensure the prop is completely latched when the hopper is in the raised position. Never work under a partially raised or unlatched hopper













Pull lever as shown, until the hopper prop is correctly latched, before lowering the hopper.

SAFETY PROPS

SWITCH SYMBOLS

MAIN SWEEPING PANEL SWITCHES (FROM-TOP LEFT TO BOTTOM -RIGHT)			
	OTHER OPTIONS  (Additional information is appended at back of manual when applicable).		RIGHT HAND SIDE BRUSH - ON / OFF
	SYSTEM START/STOP (AUX ENGINE + SWEEP MODE)		LEFT HAND WORK LIGHTS - ON / OFF
	SIDE BRUSH PRESSURE - ON/OFF		LEFT HAND SIDE WATER SPRAYS - ON / OFF
	WIDESWEEP PRESSURE - ON/OFF		WIDESWEEP WATER SPRAY - ON / OFF
	LEFT HAND SIDE BRUSH - ON / OFF		RIGHT HAND SIDE WATER SPRAYS - ON / OFF
	LEFT HAND SUCTION NOZZLE - RAISE / LOWER		RIGHT HAND WORK LIGHTS - ON / OFF
	WIDESWEEP BRUSH - ON / OFF		ENGINE SPEED - DECREASE
	RIGHT HAND SUCTION NOZZLE - RAISE / LOWER		ENGINE SPEED - INCREASE

SWITCH SYMBOLS

AUXILIARY (DOOR) PANEL SWITCHES			
	HIGH PRESSURE WATER PUMP *		SUCTION FAN - ON / OFF
	SUCTION NOZZLE TILT		NA
	NA		FAVOURITE SETTING
REMOTE CONTROL SWITCH BOX			
	HOPPER BODY - RAISE		HOPPER BODY - LOWER
	REAR DOOR - OPEN		REAR DOOR - CLOSE
	NA		SAFETY INTERLOCK
* THIS SYMBOL INDICATES OPTIONAL EQUIPMENT FITS.			

THE CANbus SYSTEM

The CANbus system comprises two control panels (main and auxiliary) an LCD monitor and a number of control nodes. The system controls and monitors all sweeper functions and maintains a log of various operating parameters such as operating hours and any fault conditions that might occur.

Switches: The various types of switch function are grouped in two ways. Firstly they are colour coded as follows:

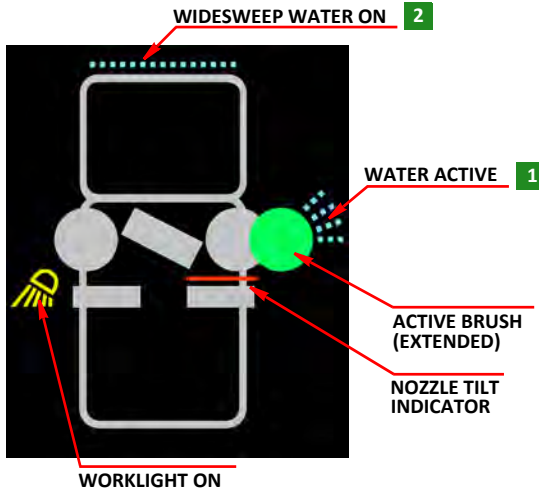
AMBER = Electrical functions such as lighting.














RED = Critical functions (e.g. Suction Fan).

GREEN = Sweeping functions.

BLUE = Water Spray functions.

Each switch illuminates a function-related symbol on the LCD monitor (installed equipment only) and visible in Sweep Mode (i.e. when the auxiliary engine is running). 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.



1. Function not selected 
2. Side brush/nozzle pre-selected   activated  
3. Side brush/nozzle water pre-selected 
4. Side brush/nozzle and water pre-selected 
5. Side brush/nozzle and water activated  1
6. Widesweep pre-selected  activated 
7. Widesweep water pre-selected 
8. Widesweep + water pre-selected  activated  2

MAIN CONTROL PANEL SWITCH FUNCTIONS

i Switch functions are described from Left to Right and Top to Bottom.

F1 **F1/2/3/4** - Press to activate special options.

⏻ **SYSTEM-START** - Press to start/stop auxiliary engine and sweep mode.

🧹 **SIDE BRUSH PRESSURE DOWN** - Press to increase brush pressure.

🧹 **WIDESWEEP PRESSURE DOWN** - Press to increase brush pressure.

🧹 **LEFT/RIGHT SIDE BRUSH** - Press to start the side-brush.

🧹 **LEFT/RIGHT SUCTION NOZZLE RAISE/LOWER** - Press to lower the suction nozzle.

🧹 **WIDESWEEP BRUSH** - Press to start the widesweep brush.

💡 **LEFT/RIGHT WORK-LIGHT** - Press to turn ON.







🧹 **LEFT/RIGHT SIDE BRUSH/NOZZLE WATER** - Press to start the side-brush and suction nozzle dust-suppression.

🧹 **WIDESWEEP WATER** - Press to start the dust-suppression spray for the widesweep brush.

⊕ **⊖** **INCREASE/REDUCE ENGINE SPEED** - Press and hold down to reduce the speed of the truck engine. A single press of the switch will cut engine speed by 50 RPM. Current engine speed is displayed along the top of the LCD monitor.



AUXILIARY CONTROL PANEL SWITCH FUNCTIONS

-  **HIGH-PRESSURE WATER PUMP (Option)** - Press to start.
-  **SUCTION FAN** - Press to start the Suction Fan.
-  **NA**
-  **NOZZLE TILT (LOCKING MODE)** - Press to tilt the suction nozzle for larger items.
-  **NA**
-  **FAVOURITE SETTING** - Press to memorise your preferred sweeping set-up. Hold the switch down until a 'beep' sounds. Thereafter, whenever the switch is pressed at system start-up, the memorised configuration will be automatically pre-selected/restarted. Repeat to over-ride with a new configuration.

FOUR-POSITION MULTI - FUNCTION - ON (deploys all selected sweeping equipment). To stop and raise all sweeping equipment, return the lever to the OFF position. In the ON position the lever can be used to control the side brushe(s) and suction nozzle(s). These additional positions i.e. Left, Right and Back, return to the central position when released.

The brush and nozzle functions are controlled as follows:

ON LEFT HAND DRIVE MACHINES

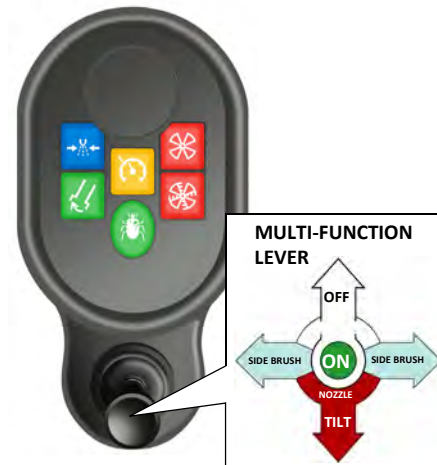
Move the lever to the left to swing OUT and to the right to swing IN the side brush(es).

ON RIGHT HAND DRIVE MACHINES

Move the lever to the right to swing OUT and to the left to swing IN the side brush(es).


NOZZLE-TILT FUNCTION


Move the lever back to momentarily tilt the suction nozzle or close it from TILT OPEN position.





REMOTE-CONTROL SWITCH BOX FUNCTIONS


The hopper Raise/Lower and rear door Open/Close switches are located in the remote control box. This is stowed in the cab, between the driver's seat and door and is connected to a socket via a coiled lead.


 **In the interest of health and safety and to avoid possible damage to the sweeper or adjacent structures, it is essential that the remote hopper/door controls are not activated from within the cab. Always use these controls outside of the machine from a vantage point that affords a good view of the sweeper and its immediate surroundings.**


 **HOPPER RAISE** - Press and hold down to raise the hopper.


 **The hopper prop must always be in the deployed position when the hopper is in the raised position. Failure to do could result in serious injury.**

 **HOPPER LOWER** - Press and hold down to lower the hopper.

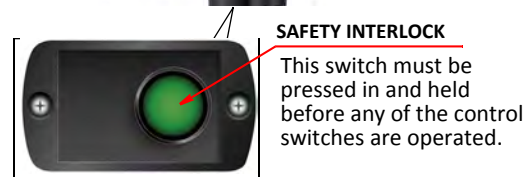
 **REAR DOOR OPEN** - Press and hold down until the door is Fully open (at approximately 90° to the rear face of the hopper).

 **Ensure that the suction fan is OFF. The door cannot open while the fan is running due to the low pressure created within the hopper.**

 **REAR DOOR CLOSE** - Press and hold down until the door is fully closed and the latching cycle has finished.

 **The door prop must always be in the deployed position when working under an open rear door.**

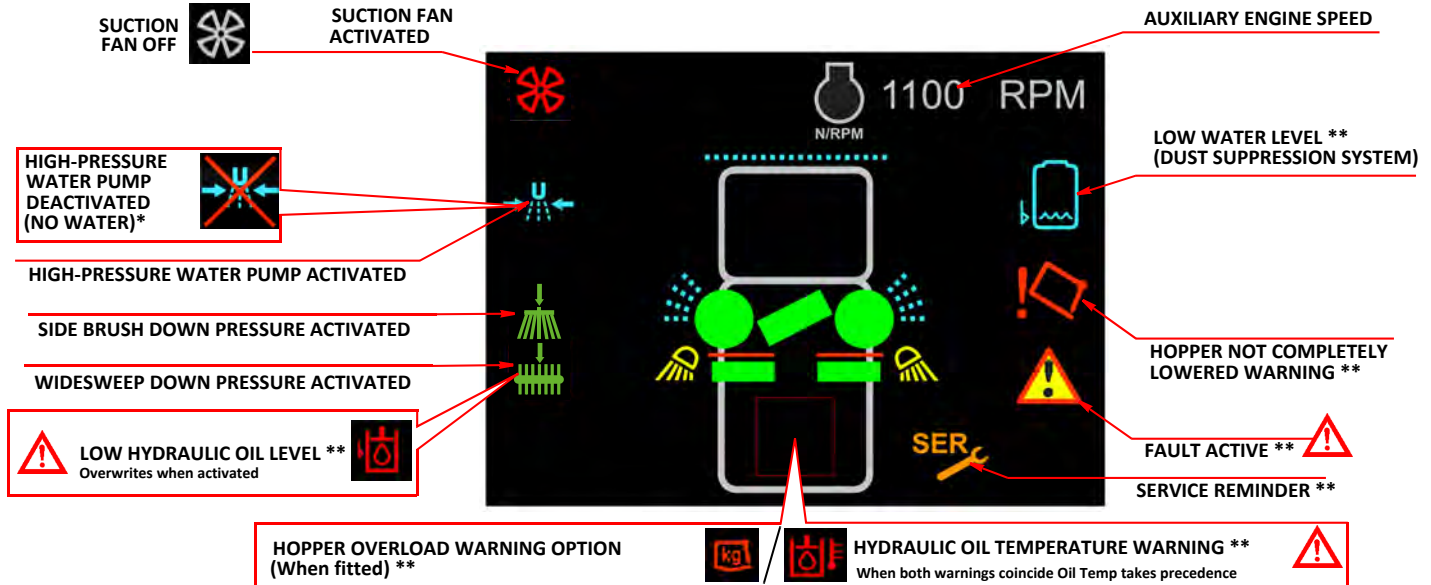
 NA




THE LCD MONITOR (refer also to Page 7)

The LCD monitor is the user interface with the control panels and with the various operating and information feedback systems incorporated in your Scarab sweeper. The display not only provides information on the current status of the sweeper while it is in sweep mode, by indicating which items of equipment are active, ie: fluid levels and temperatures, it also alerts the user to deficiencies and/or malfunctions 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 only those related to system status under normal operating conditions remain permanently illuminated - warning symbols ****** only illuminate when a specific condition occurs.



ADDITIONAL CONTROLS & INSTRUMENTS (The * symbol indicates optional equipment)

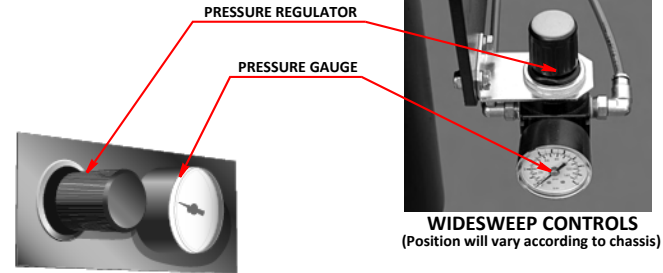
 Do not exceed a pressure of 2.5 bar when adjusting brush pressure settings. Failure to comply will result in drastically reduced brush life.

AIR-PRESSURE REGULATOR * - Used to adjust the amount of up/down-thrust applied to the brush(es).

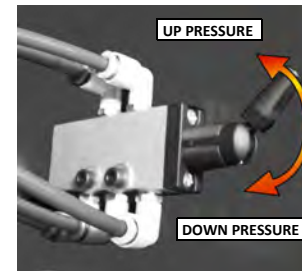
AIR-PRESSURE GAUGE * - Indicates the amount of pressure being applied to the brush(es).

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.



IN-CAB CONTROLS
(Typical Arrangement - Positions will vary according to chassis)



BRUSH PRESSURE SWITCH
(In Pneumatics Enclosure)

OPERATING IN SWEEP MODE

REFER TO THE HEALTH & SAFETY INFORMATION ON Page 1




REDUCING NOISE LEVELS & 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. 30 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 33.

- 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 (1200 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 14. Engine speed will automatically increase to one of two default settings as and when selected:
 - Normal Operation 1200 rpm
 - Fan/High Pressure Pump Operation 1600 rpm

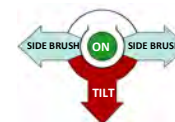
SWEEPING


 *If considered appropriate reduce/increase 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.*



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




1. Switch on the hazard warning beacons.
2. Switch on the suction fan  (approx. 2000 rpm). The suction fan symbol on the LCD Monitor will change from GREY to RED:  
3. 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.
4. 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).
5. 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 9, 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.*


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

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 RED to GREY:  
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) - MANUAL LEVERS

 **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.



The hopper & rear door controls are located on the sweeper subframe adjacent to the nearside suction nozzle.

The auxiliary engine must be running for the rear door and hopper tilt controls to function.

2. Push the rear door control lever away from you and hold it in this position until the door is fully open
3. Operate the manual dump valve controller as illustrated. Refer to Page 16, holding it in position while operating the hopper control lever.
4. Push the hopper control lever away from you and hold it in this position until the hopper is in the fully raised position. The hopper safety prop will automatically deploy during this step.



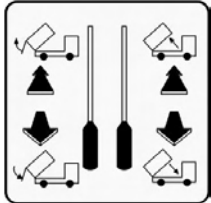
Before lowering the hopper, ensure that all personnel are clear of the immediate vicinity of the hopper & subframe.

5. With the load fully discharged, move the hopper prop lever as illustrated. Refer to Page 16 to engage with the prop latching assembly.
6. Operate the manual dump valve controller as illustrated. Refer to Page 16.
7. Operate the hopper control lever by pulling it towards you and hold it in this position until the hopper is fully lowered.

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

8. Operate the door control lever by pulling it towards you and hold it in position until the door is fully closed (door indicator in the closed position). Ensure that the door catches have engaged fully before releasing the lever.

! 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



ARRANGEMENT ON LEFT HAND SIDE OF MACHINE



PUSH TO OPEN
DUMP VALVE MANUAL CONTROL

HOPPER PROP LEVER

DOOR OPEN (PUSH LEVER INWARDS)
DOOR CLOSED (PULL LEVER OUTWARDS)

HOPPER PROP LEVER



RIGHT HAND VIEW

DOOR CLOSED INDICATOR



PULL TO OPEN
DUMP VALVE MANUAL CONTROL

HOPPER UP (PUSH LEVER INWARDS)
HOPPER DOWN (PULL LEVER OUTWARDS)

DISCHARGING THE HOPPER (TIPPING) - REMOTE CONTROL SWITCHES

⚠️ 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.


i 2. Vehicle Engine OFF. Handbrake ON. Machine in Neutral. Multi-function lever OFF.

3. Auxiliary engine ON. Refer to Page 13.

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

4. Open the rear door fully .

5. Raise the hopper fully .

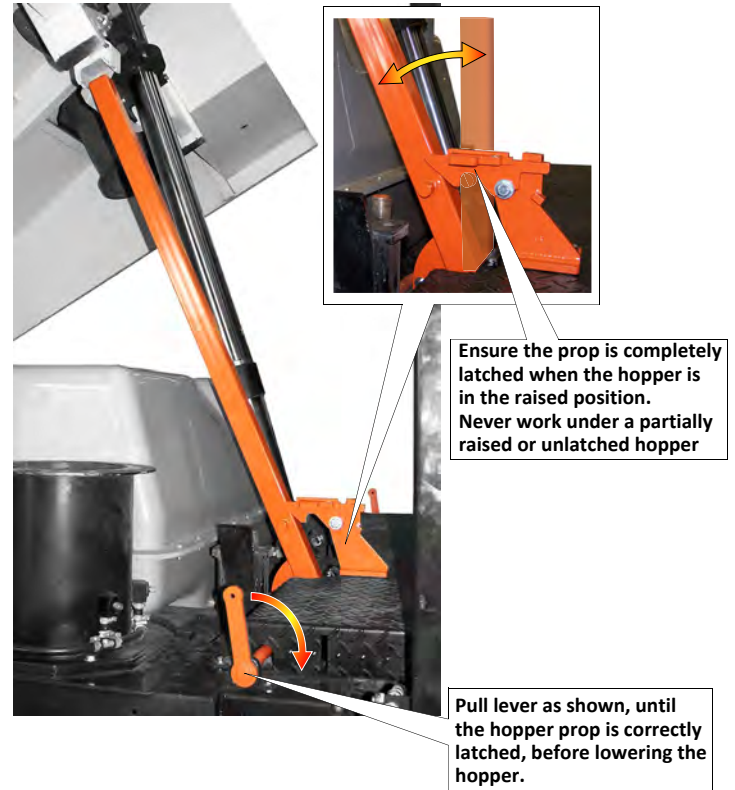
6. With the load fully discharged, move the hopper prop lever as illustrated to engage with the prop latching assembly. Lower the hopper fully .

⚠️ **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.**

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 raised hopper. Failure to do so could result in serious injury.**



USING THE AUXILIARY HAND PUMP - MANUAL LEVERS

In the event of hydraulic failure in powered mode, an auxiliary pump is fitted, to enable the rear door and hopper to be operated manually.

This adjacent to the operating levers.

i It will require a substantial number of pumping cycles to complete the following procedures.

1. Insert the handle into the auxiliary pump.
2. Hold the appropriate lever in the desired position (the pump operates the hopper and door in both directions).
3. Operate the pump handle.



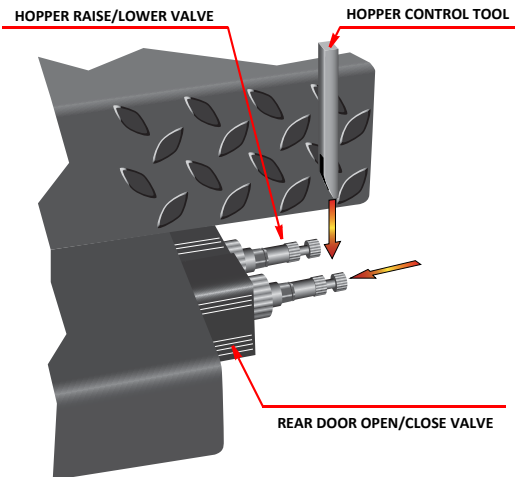
USING THE AUXILIARY HAND PUMP - REMOTE CONTROL SWITCHES

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.

i If electrical power is unavailable proceed as follows.

5. Insert the hopper control tool into the required valve to raise the hopper or open the rear door. Depress the required valve to lower the hopper or close the rear door. Refer to illustration.
6. Operate the pump handle.

! **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 permanently fitted. The weight of the hose/nozzle is supported by a gas strut attached to the boom assembly. The system incorporates a manually operating blanking flap.

1. Deselect any active suction nozzle. This will close the corresponding blanking flap. The nozzle symbol on the LCD monitor will turn GREY.
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.

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



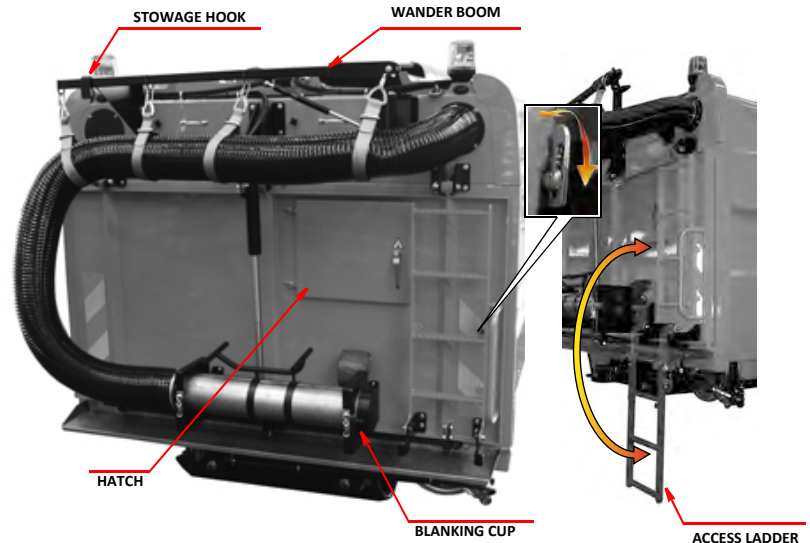
The machine must be off, ignition key removed and parking brake on. Always exercise extreme caution when opening the hatch as debris may have gathered in the aperture



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



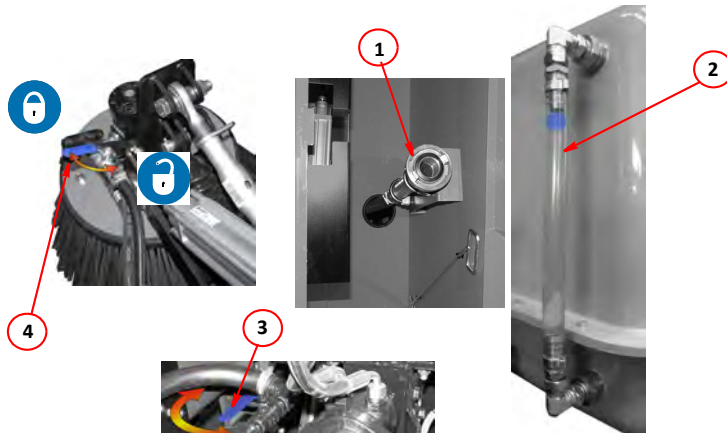
Always ensure the all rear door items are correctly stowed, and the hatch is in the closed position before driving the machine.



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 widesweep 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).

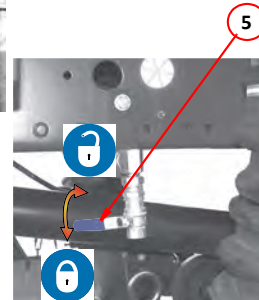
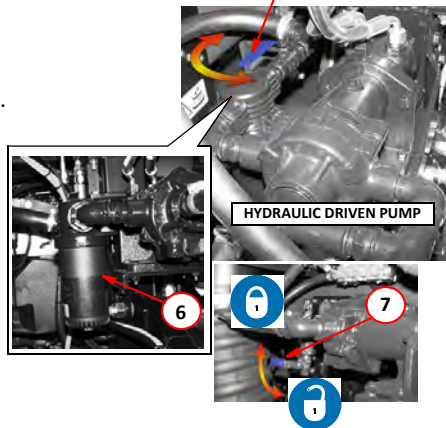
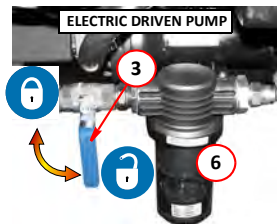
The side brush(es) are fitted with shut-off valves (4).

⚠ 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). Open all brush shut-off valves. Open pump drain valve (7).

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

i Due to the customer's 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 spraybar (1).
- Hand lance and retractable hose* (2).

To operate any of the above options the vehicle must be in hydrostatic drive, with sweep mode 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.

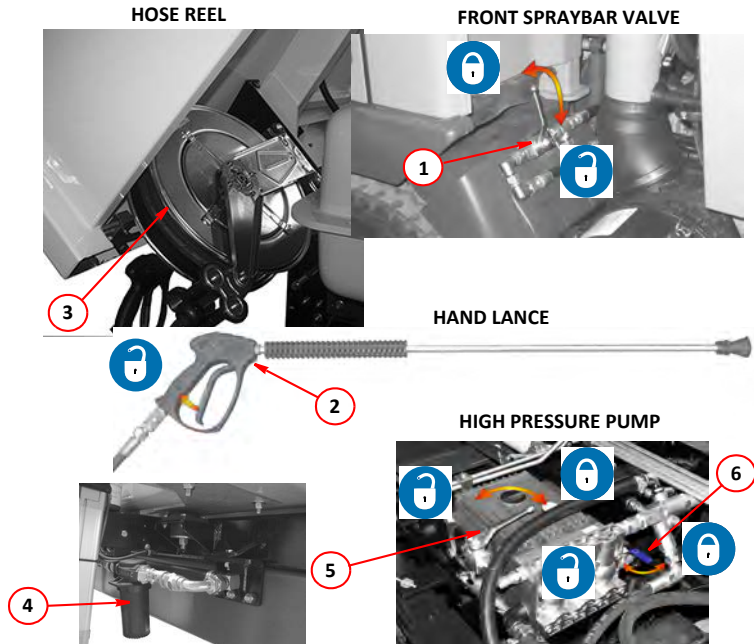
The position of the hose reel and hand lance is determined by the machine specification.

ⓘ *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 20. Remove water strainer (4). Open pump drain valves (5 and 6).

⚠ This pump should NEVER be permitted to run dry.



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 as 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.

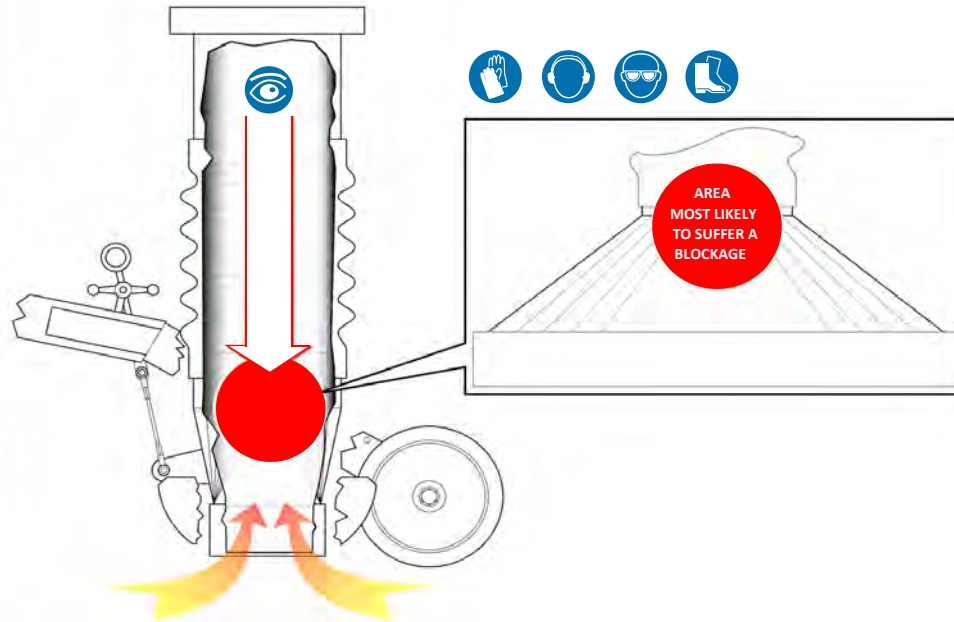
Never attempt to clear a blockage while the brushes are operating. always stop and retract all brushes, stop the engine and remove the ignition keys before starting the procedure.

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.



RECOMMENDED OPERATOR'S ROUTINE MAINTENANCE



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 paragraphs 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 / AFTER USE			WEEKLY	MAINTENANCE PROCEDURE	DAILY ACTIONS BEFORE USE / AFTER USE			WEEKLY
1. Check vehicle/body for safety. All lighting equipment, tyres, fuel, oil, coolant, brake fluid, windscreen wash and water tank level.	✓	✗	✗	✗	13. Clean the suction fan thoroughly, using the scraper provided and high pressure water (See Page 25).	✗	✗	✓	✓
2. Check auxiliary engine, fuel, oil and coolant levels	✓	✗	✗	✗	14. Conduct a thorough inspection of the fan assembly to verify its condition. Report any defects (See Page 25).	✗	✗	✓	✓
3. Check hydraulic oil level and inspect system for signs of leaks. Check oil cooler is clean.	✓	✗	✗	✗	15. Grease pro-shaft and check wear of universal joints (U/Js).	✗	✗	✓	✓
4. If vehicle not previously used by YOU, check suction fan is clean.	✓	✗	✗	✗	16. Grease hopper ram (Top and bottom).	✗	✗	✓	✓
5. Check brushes/skirts for wear or damage. Remove entangled items, e.g. string are strapping. ect.	✓	✗	✗	✗	17. Visually check entire machine for wear/damage.	✗	✗	✓	✓
6. Check suction nozzle flaps for damage/correct ground clearance.	✓	✗	✗	✗	18. Check wiring and hoses for security of attachment and signs of wear are damage.	✗	✗	✓	✓
7. Check water spray jets for blockages.	✓	✗	✗	✗	19. Check wear in suction tubes and deflectors in hopper.	✗	✗	✓	✓
8. Check that all equipment is securely stowed and brushes are retracted.	✓	✗	✗	✗	20. Check seals on hopper door, rear hatch and suction tubes.	✗	✗	✓	✓
9. Wash vehicle, particularly hopper screen, surrounding ledges and area above. Leave hopper door partially open, to allow air to circulate.	✗	✓	✗	✗	21. Check oil level in H-P pump, top-up if needed.	✗	✗	✓	✓
10. Wash oil cooler, ensuring that the fins are clean.	✗	✓	✗	✗	22. Grease all points (See Page 31).	✗	✗	✓	✓
11. Lubricate as appropriate, all brush links, pivot and nozzle wheel.	✗	✓	✗	✗	23. Raise & prop hopper. Run fan/brushes at normal speed. Check oil tank return filter gauge and if in the RED ZONE, replace filter element.	✗	✗	✓	✓
12. Remove/clean the L-P and H-P water filter elements.	✗	✓	✗	✗	24. Check subframe to chassis fixing brackets.	✗	✗	✓	✓

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

i In frosty weather leave the hopper slightly raised with the rear and side door partially open.

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

KEY MAINTENANCE PROCEDURES

CLEANING THE SUCTION FAN AND SCREEN

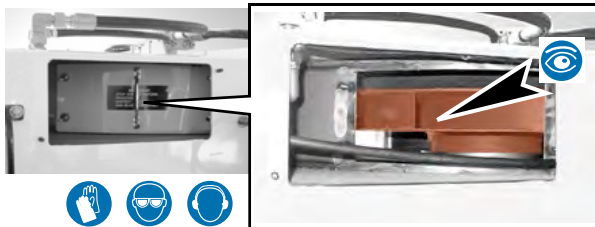
FAILURE TO COMPLY WITH THE FOLLOWING COULD RESULT IN SERIOUS INJURY.

! 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. Raise the hopper  and ensuring the safety prop is deploying. Turn engine OFF. Remove Ignition key.




! **The hopper prop must always be used when the hopper is in the raised position. Failure to do so could result in serious injury.**

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.





PLEASE PAY PARTICULAR ATTENTION TO INNER CURVE OF BLADE AND ALSO THE CENTRE OF THE UNIT WHERE DIRT ACCUMULATES AROUND THE HUB AREA



4. Lower the hopper,  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. 

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


C 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 23 and in the manufacturer's recommendations.*

 *Raise the hopper in accordance with the instructions detailed on Page 16 -1 7.*

 *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 Machine 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.**

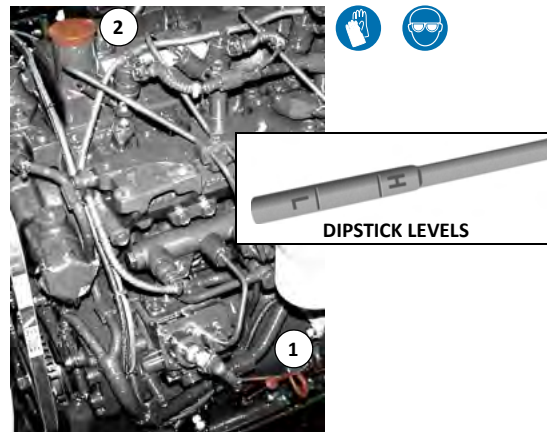
ENGINE OIL LEVEL

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. Refer to General Information, (Cummins Auxiliary Engine) for the correct oil specification.
5. Replace filler cap.

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



ENGINE COOLANT LEVEL



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



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 15.



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.

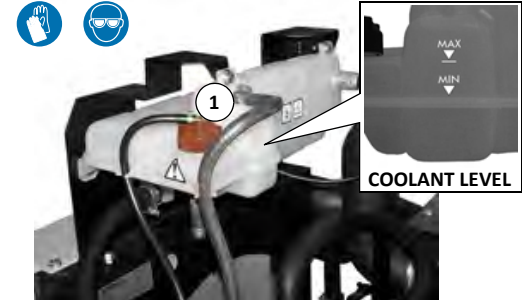
Topping-up

1. 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. Refer to General Information, (Cummins Auxiliary Engine) for the correct coolant information.


4. Replace the filler cap.



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.

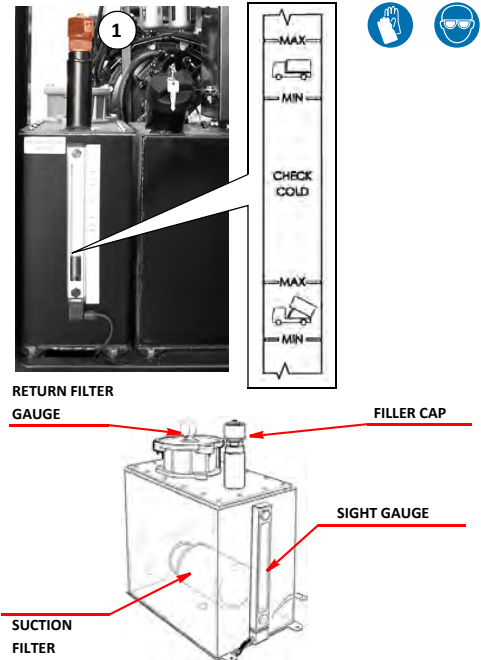
 Ensure that the Machine is on a flat and level surface with the auxiliary engine stopped for a suitable period to allow the engine to cool.

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 the hopper orientation as indicated on the level label when filling.

4. Replace the filler cap.



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 = 20 mm
- Front Flap = 20 mm
- Rear Flap = 30 mm

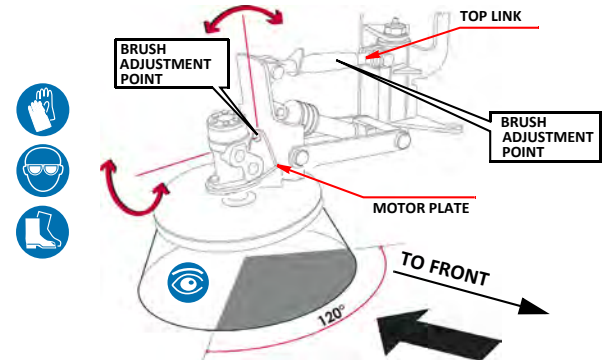
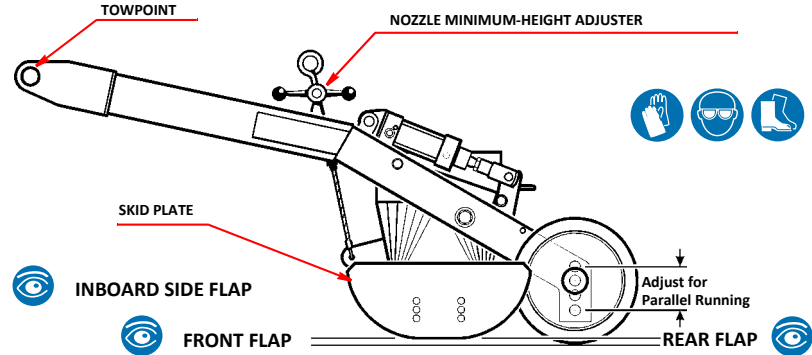
i These clearances are based on the factory set-up. For some operating conditions, it might be found that, alternative clearances are preferred.

SIDE BRUSHES & 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. The brush should be angled so that it sweeps with its outer leading edge. About 33% (120°) of its circumference should be in contact with the road surface.
2. The skirt adjacent to the brush, which positions material for the suction nozzle, should also be in good condition and set so that it just clears the ground.

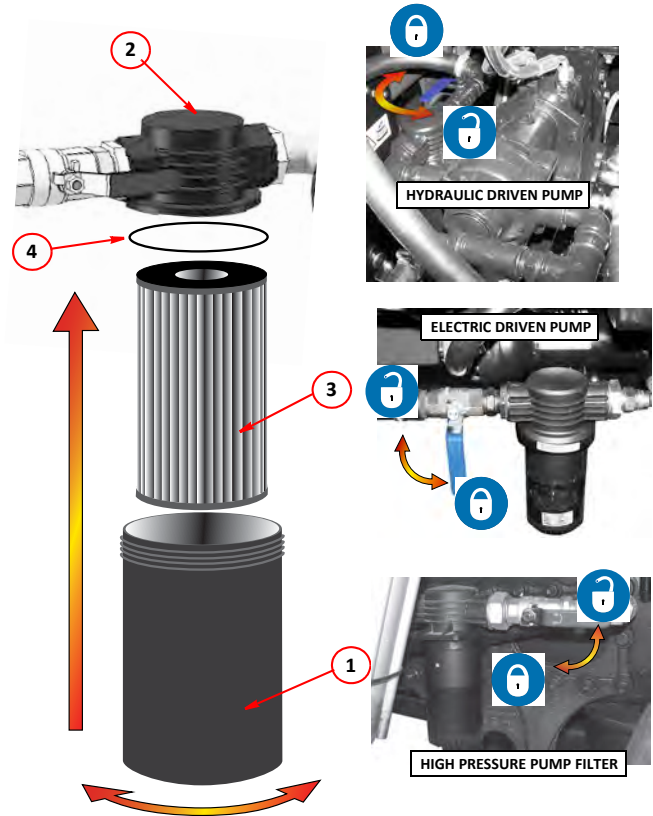


REMOVING & CLEANING THE WATER PUMP ELEMENT(S)

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.

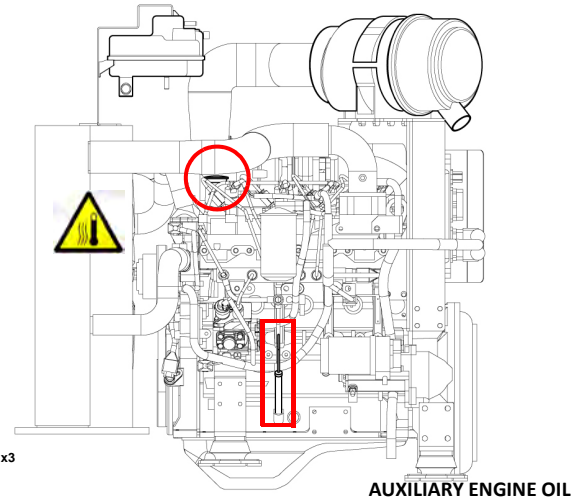
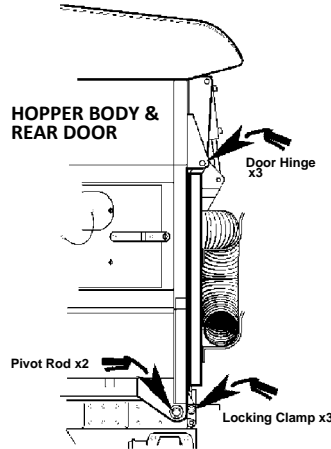
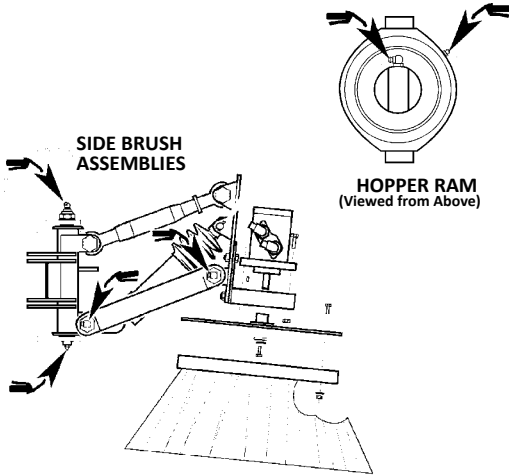
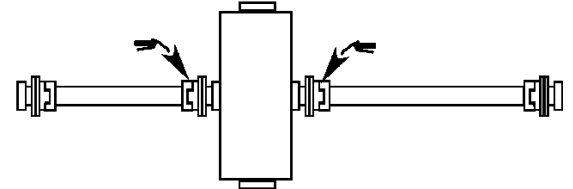
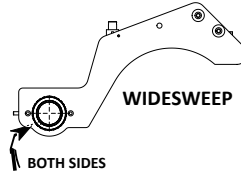
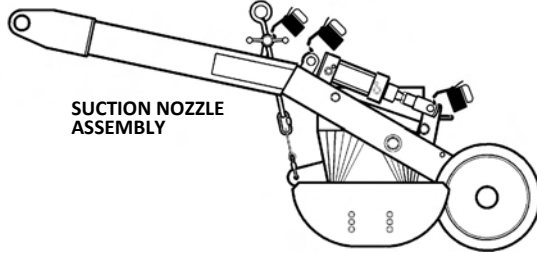
i It will be necessary to place the shut-off valve(s) in the closed position.

1. Unscrew the filter bowl (1) clockwise from the housing (2) and remove the element (3).
 2. Wash out the element with clean water or replace if too contaminated.
 3. Before re-assembling the unit, apply some grease to the O-seal (4) to ensure a water-tight fit for the filter bowl.
 4. Refit the element and filter bowl.
- Return the shut-of valve(s) to the ON position.



MANUAL GREASING & LUBRICATION

Carry out manual greasing in accordance with the appropriate schedule (Page 23) and by referring to the accompanying diagrams shown here.









LCD MONITOR - OPTIONS SCREEN

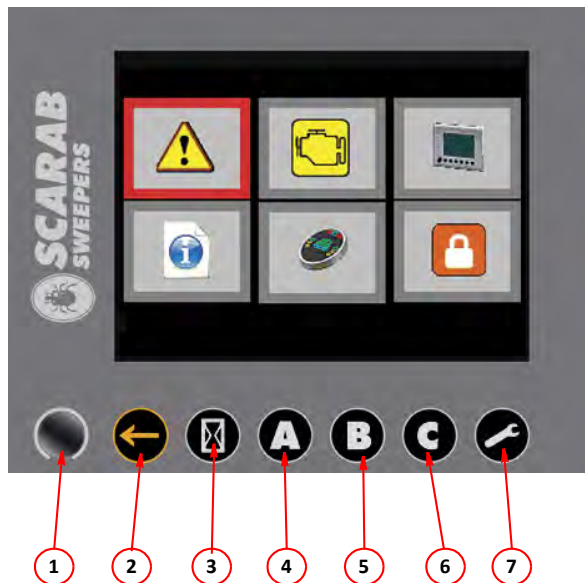
TO ACCESS THE OPTION SCREEN MODE FROM THE START-UP SCREEN PRESS THE OPTIONS BUTTON (7)

Button function

1. Controller: Turn to highlight required option, press to enter. Used in all screen modes.
2. Return: Press to return to previous screen.
3. Timer: Press to use display function.
4. Right cursor: Press to position cursor at desired point.
5. Left cursor: Press to position cursor at desired point.
6. NA
7. Options: Press to access protected options screen. Requires code number.

Screen menu description

	Driver's fault codes
	EDC
	Screen settings
	Information
	Button check
	CAN menu





Driver fault codes

Highlight either the CAN or desired Node, and press enter.



EDC screen displays the following conditions:

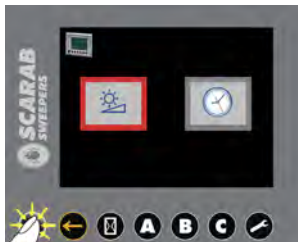
- Engine Speed
- Battery Voltage
- Coolant Temperature
- Turbo Boost Pressure
- Turbo Air Temperature
- Fuel Pressure
- Barometric Pressure
- Fuel Temperature
- Engine Load



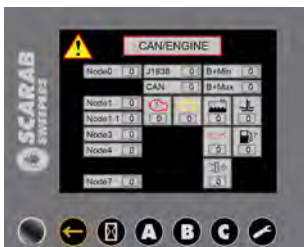
Entering a Node screen allows Pin-Contact view.

Pin numbers with an active fault are highlighted in RED.

- /— = Open Circuit
- □ = Short



Screen Settings



The CAN/ENGINE screen high-lights in red the location(s) of any system errors (in this example Node 4).

Press Arrow Button to exit to previous screen.

Rotate controller to highlight the error location (in this example Node 4).



Brightness adjustment.

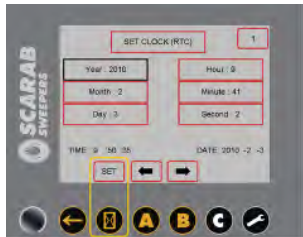
Rotate the controller to adjust screen brightness or:
Press the timer button to go to maximum brightness.

Clock adjustment.

With the desired field selected, use the 'A' and 'B' buttons to move the cursor to the left of the value to be adjusted. Press the controller to exit.



When all the desired fields are adjusted, press the timer button to set.



Information

Displays current system information ie: firmware, etc.



Button checks



Main control panel.

Press appropriate button on the main control panel. As each button is pressed the corresponding graphic will illuminate and a beep will sound. (See examples shown)



Auxiliary control panel

Use the main control instructions to test buttons and joystick.



OPERATOR'S NOTES

OPERATOR'S NOTES

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