SCARAB MISTRAL

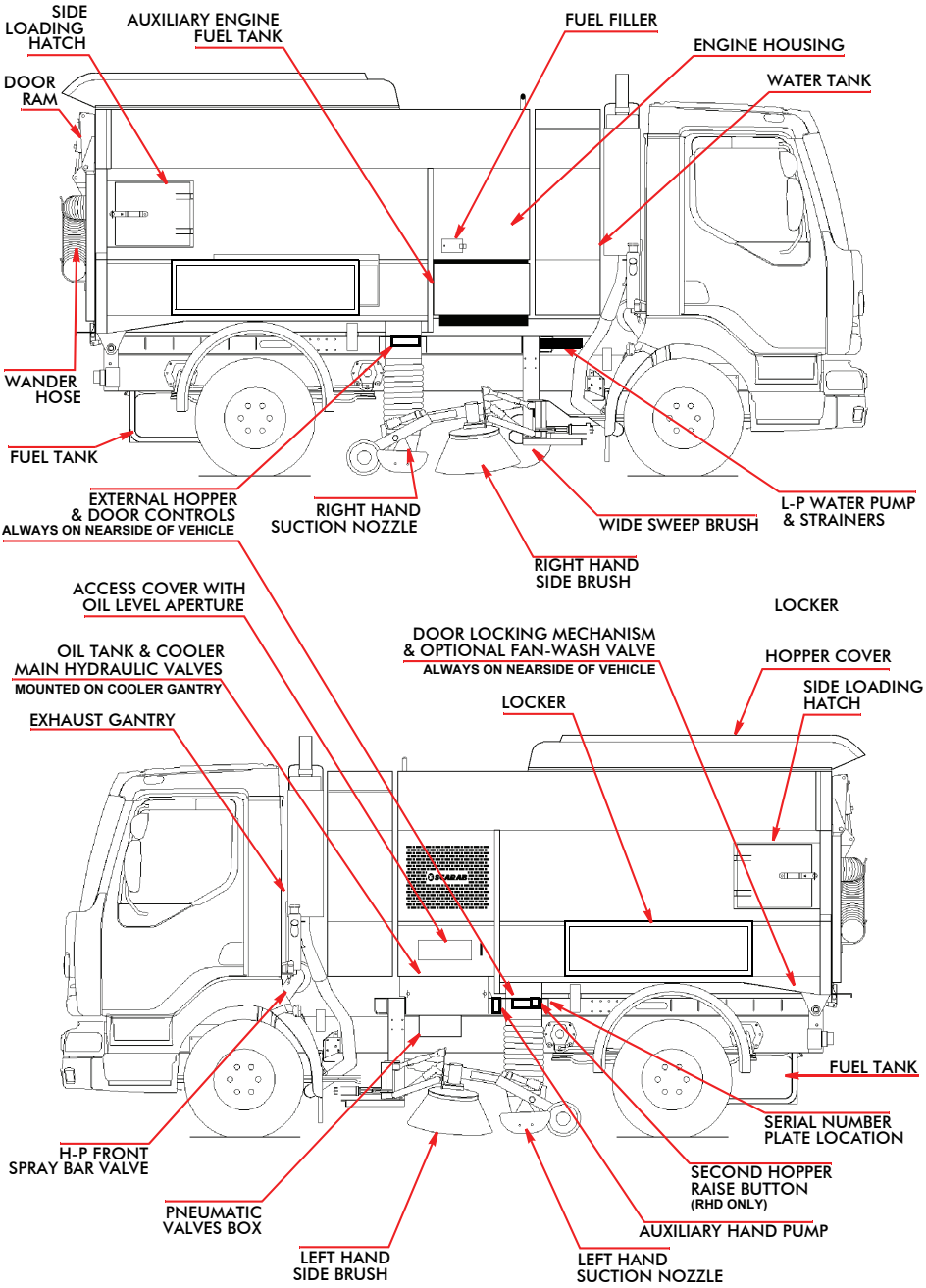
Truck-Mounted Sweeper

OPERATOR'S MANUAL CANbus

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

M/c Serial No:

MAIN FEATURES OF A TYPICAL SCARAB MISTRAL



OPERATOR'S MANUAL

SCARAB MISTRAL

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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.

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GENERAL INFORMATION

TYPICAL WEIGHTS, DIMENSIONS AND CAPACITIES

GROSS VEHICLE WEIGHT (GVW)
5.5 m^3 hopper . . . . . 7.5 tonne to 12.0 tonne
6.5 m^3 hopper . . . . . 13.0 tonne to 15.0 tonne
7.5 m^3 hopper . . . . . 18/19 tonne
PAYLOAD *
5.5 m^3 hopper * . . . . . 2300 kg to 6300 kg
6.5 m^3 hopper * . . . . . .6340 kg to 8540 kg
7.5 m^3 hopper * . . . . . TBD
OVERALL LENGTH * . . . . . .Typically 5500 mm
FRONT OVERHANG * . . . . . .Typically 1240 mm
REAR OVERHANG * . . . . . .Typically 1350 mm
WHEELBASE * . . . . . .Typically 3000 mm
OVERALL WIDTH * . . . . . .Typically 2220 mm
OVERALL HEIGHT (hopper lowered) * . . . . . .Typically 2980 mm
OVERALL HEIGHT (hopper raised) * . . . . . .Typically 4180 mm
HOPPER CAPACITY Ranges from . . . . . 5.5 m^3 - 7.5 m^3

FUEL TANK CAPACITY*
Chassis. . . . . .Typically 100 - 150 litres
Auxiliary. . . . . 117 - 135 litres
HYDRAULIC TANK . . . . . 15 litres
WATER TANK * . . . . . 900 litres to 2500 litres

**** Dependent upon chassis and specification***

NOTE

In view of the fact that many of the foregoing values are subject to variables such as chassis type and machine specification, it is not possible to quote precise details. If this type of information is required, Scarab recommend that you contact us giving your sweeper's Serial Number.

For individual vehicle height information always consult the label fitted adjacent to the driver's position in the cab.

IDENTIFICATION PLATES

The SERIAL NUMBER PLATE is located on the rear face of the left hand suction nozzle spigot. All MISTRALS have a four-digit number.

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

LIMITATIONS OF USE

The Scarab Mistral is classified as a truck-mounted 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 Mistral sweeper only. For information regarding the operation of the Hydrostatic and Unidrive ranges of sweepers, please refer to Manual No. Z027054 (Unidrive) or Z027055 (Hydrostatic)

WARNING:

VOLTAGE SENSITIVE COMPONENTS

DO NOT USE A BOOST STARTER / SUPER START. IF BATTERIES ARE NOT CHARGED ALWAYS USE A FRESH SET. A BOOSTED START WILL BURN OUT THE VEHICLES ELECTRONIC CONTROL NODES.

TABLE OF CONTENTS

HEALTH & SAFETY ADVICE

THIS OPERATORS MANUAL CONTAINS ESSENTIAL INFORMATION AND MUST REMAIN WITH THE VEHICLE AT ALL TIMES.

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

- AT NO TIME SHOULD UNQUALIFIED PERSONNEL BE PERMITTED TO OPERATE OR WORK ON THE SCARAB SWEEPER.
- BEFORE DRIVING THE VEHICLE ENSURE THAT ALL RELEVANT VEHICLE CHECKS HAVE BEEN CARRIED OUT, THAT ALL EQUIPMENT IS STOWED AND THAT THE BRUSHES HAVE BEEN RAISED.
- DO NOT OVERLOAD THE HOPPER.
- DO NOT DRIVE THE VEHICLE WITH THE HOPPER IN THE RAISED POSITION, EVEN IF THE HOPPER IS EMPTY.
- ALWAYS USE THE SAFETY PROP TO SUPPORT A RAISED HOPPER. NEVER WORK UNDER A RAISED CAB OR HOPPER UNLESS THE APROPRIATE PROP IS IN POSITION.
- BEFORE OPERATING EITHER THE HOPPER-TIP CONTROLS OR REAR DOOR, 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 VEHICLE ON FIRM, LEVEL GROUND, APPLY THE HANDBRAKE, STOP THE ENGINE, REMOVE THE IGNITION KEY.
- BEFORE STARTING THE ENGINE ENSURE THAT ALL CONTROLS ARE SWITCHED OFF AND THAT THE VEHICLE IS IN NEUTRAL.
- KEEP LONG HAIR, LOOSE CLOTHING AND HANDS AWAY FROM MOVING PARTS.
- HIGH PRESSURE WATER CAN BE HAZARDOUS, ALWAYS WEAR SUITABLE EYE 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 HAZARD SYMBOL ⚠ IDENTIFIES SAFETY RELATED TEXT THROUGHOUT THIS DOCUMENT. OCCASIONALLY THIS IS SUPPLEMENTED WITH ACTIVITY-SPECIFIC HAZARD SYMBOLS AS FOLLOWS:

REAR DOOR; HOPPER RAISE; RELEASE PRESSURE FIRST; HEAT HAZARD; CHECK VEHICLE BEFORE DRIVING; IN NEUTRAL & SWITCHES OFF BEFORE STARTING;

THE FOLLOWING ADDITIONAL SAFETY SYMBOLS ARE ALSO USED:
EYE PROTECTION, PROTECTIVE FOOTWARE AND GLOVES,
USE THE HOPPER PROP, DO NOT DRIVE WITH HOPPER RAISED,
SITE ON FIRM, LEVEL GROUND BEFORE RAISING HOPPER.

The **Caution Symbol** identifies where the observation of a specific procedure is required to avoid equipment damage or under-performance.
The **Information Symbol** ⓘ identifies text offering helpful advice additional to the main instructions.
The **Check Symbol** identifies text calling for a visual examination to confirm the condition or status of a specific item.

REMEMBER, FAILURE TO COMPLY CAN RESULT IN SERIOUS INJURY. IF IN DOUBT, ASK!

SWITCH OPERATING SYMBOLS

MAIN SWEEPING PANEL SWITCHES (FROM LEFT TO RIGHT & TOP TO BOTTOM)	
	WARNING BEACONS / LIGHT BAR - ON/OFF
	AUXILIARY ENGINE STOP
	AUXILIARY ENGINE START
	PANEL STANDBY MODE / SWEEP MODE
	DECREASE AUXILIARY ENGINE SPEED
	INCREASE AUXILIARY ENGINE SPEED
	LEFT/RIGHT HAND SIDE BRUSH - ON/OFF
	LEFT/RIGHT HAND SUCTION NOZZLE - RAISE/LOWER
	WIDE SWEEP BRUSH - ON/OFF
	LEFT/RIGHT HAND SIDE BRUSH AND SUCTION NOZZLE WATER SPRAYS - ON/OFF
	LEFT/RIGHT HAND SUCTION NOZZLE - EXTRA WATER SPRAY OPTION - ON/OFF ✪
	WIDE SWEEP BRUSH WATER SPRAY - ON/OFF
	LEFT/RIGHT HAND WORK LIGHTS
	SIDE BRUSH PRESSURE - UP ✪
	SIDE BRUSH PRESSURE - DOWN ✪
	WIDE SWEEP BRUSH PRESSURE - UP ✪
	WIDE SWEEP BRUSH PRESSURE - DOWN ✪
	SUCTION FAN - ON/OFF

Continued...

SWITCH OPERATING SYMBOLS

	INCREASE BRUSH SPEED 1 (125 RPM)
	HIGH-PRESSURE FRONT SPRAY BAR - RAISE/LOWER ✪
	HIGH-PRESSURE WATER PUMP ✪
	HOPPER UP (REQUIRES SAFETY INTERLOCK TO BE HELD DOWN)
	SAFETY INTERLOCK FOR HOPPER & DOOR CONTROLS
	SUCTION FAN - BOOST SETTING
	INCREASE BRUSH SPEED 2 (150 RPM)
	SPARE FOR OPTION
	REAR-MOUNTED WORK LIGHTS
	HOPPER DOWN (REQUIRES SAFETY INTERLOCK TO BE HELD DOWN)
	HOPPER DOOR OPEN (REQUIRES SAFETY INTERLOCK TO BE HELD DOWN)
AUXILIARY PANEL (DOOR POD)	
	SIDE-BRUSH SWING IN/OUT
	NOZZLE TILT (MOMENTARY MODE)
	MASTER SWITCH
	NOZZLE TILT (LOCKING MODE)
✪ = OPTIONAL EQUIPMENT	

LCD SCREEN INFORMATION

UPPER ROW	**AUXILIARY ENGINE SPEED / WATER TEMPERATURE / AUX FUEL LEVEL (%)**	
LOWER ROW	**SUCTION FAN SPEED / ANY ACTIVE WARNINGS (SEE BELOW)**	
	COMMON WARNINGS (number & text) & OPERATING CONDITIONS	**BUZZER**
	1: LOW OIL LEVEL, STOP (Aux. Engine running / All switches disabled *****)	YES
	6: LOW OIL LEVEL (Aux. Engine NOT running / All switches disabled *****)	NO
	2: HIGH OIL TEMP (Panel is ON / Auxiliary Engine running)	YES
	3: AIR FLOW (Determined by the Air Pressure Switch)	YES
	4: LOW WATER (Panel is ON / H-P pump switch is disabled)	NO
	5: HOPPER UP	NO
	7: BATTERY NOT CHARGING (< 24 Volts with Aux. Engine @ > 900 rpm)	NO
	12: LOW ENGINE OIL PRESSURE (Aux. Engine running @ > 500 rpm	YES
	8: HIGH AUXILIARY ENGINE WATER TEMP	YES
	11: LOAD INDICATOR (optional)	NO
DRIVE MODE (IGN ON / PANEL OFF)		
UPPER ROW	**AUX FUEL LEVEL (%)**	
LOWER ROW	**ACTIVE WARNINGS AS ABOVE (EXCEPT No's. 1: 2: 4 & 12)**	

***** When '*all switches disabled*' the following remain active: **Work-lights / Aux. Engine STOP**

OPERATING ADVICE

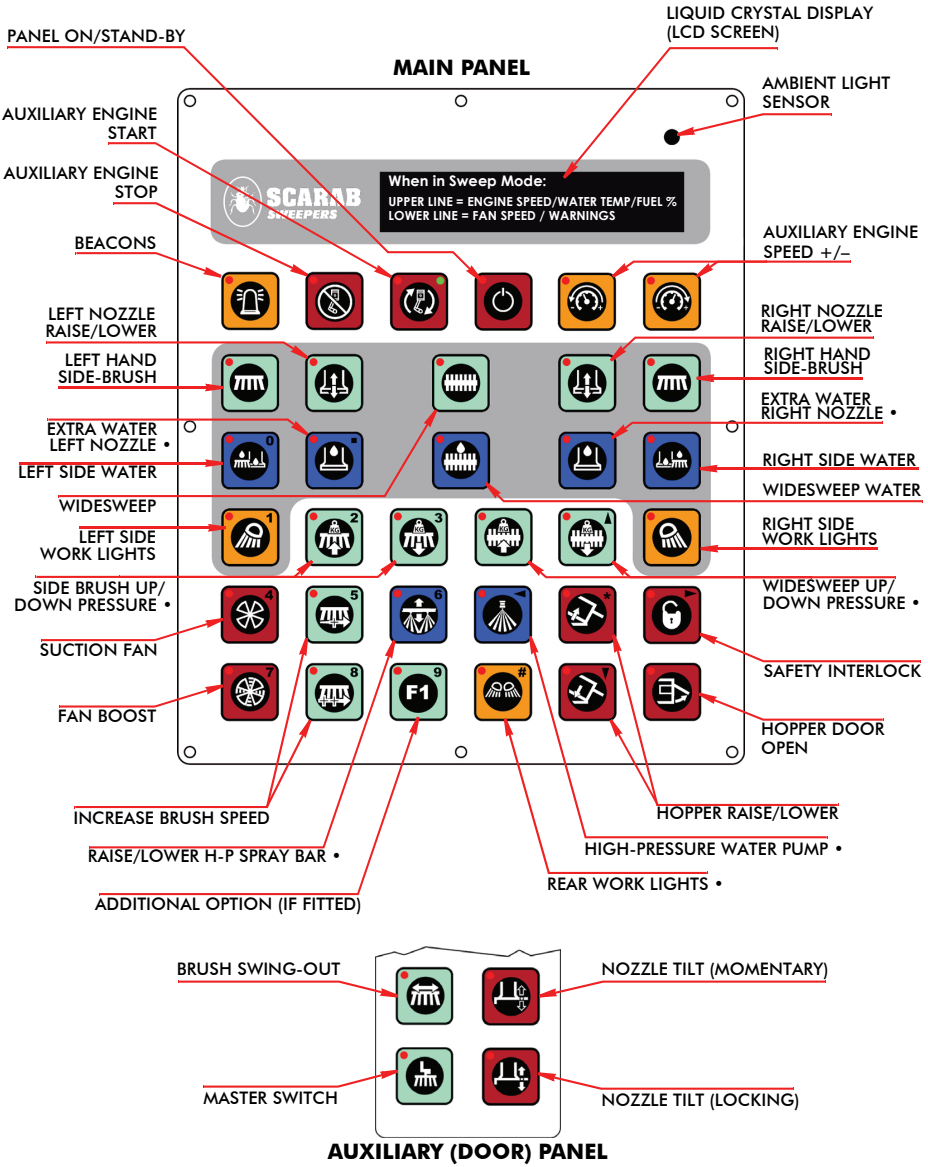
Please remember, the information provided in this handbook is designed to ensure that the Scarab sweeper operates both safely and efficiently.

A poorly maintained machine will become unreliable, inefficient and potentially dangerous. Always observe the recommended maintenance and safety related advice provided.

Many supposed operating problems can be traced to a lack of simple daily maintenance. Going out to sweep in a machine that has blocked screens, a dirt encrusted suction fan, poorly adjusted suction nozzles or brushes is not only a waste of time; it is also a waste of fuel.

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 screens, wearing out the fan blades on its way back to the environment behind you.

DESCRIPTION OF SWEEPING CONTROLS



• *indicates optional equipment*

Fig. 1 Sweeper Control Panel Layout

CONTROL PANELS (* INDICATES OPTIONAL EQUIPMENT)

The CANbus system comprises two control panels (main and auxiliary) and a number of control nodes (normally seven). The system controls and monitors all sweeper functions. The main panel contains a CPU which holds all the program information and also logs operating system errors. This greatly simplifies the process of identifying and curing operating faults. The control nodes are located adjacent to the sub-systems they control. The CANbus control panels use touch switches; these are covered by a flexible overlay to identify their functions. The various types of switch function are grouped in two ways.

Firstly they are colour coded as follows:

ORANGE = Electrical functions such as lighting.
RED = Critical functions (e.g. Hopper Raise).
PALE GREEN = Sweeping functions.
BLUE = Water Spray functions.

Secondly, switches that control functions that are available on both sides of the machine, e.g. side brushes, are grouped with left, right and centre function controls being positioned accordingly on the panel. These are positioned within the light grey area in the centre of the control panel.

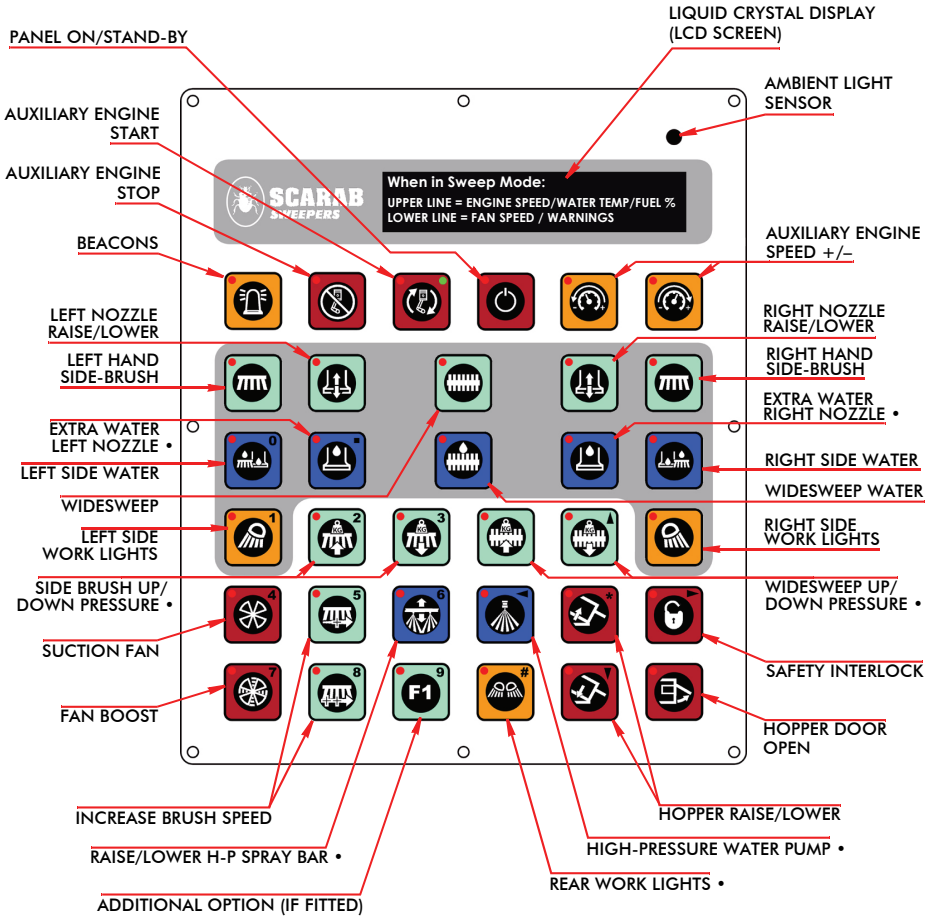
Each switch has a red LED located at its upper left hand corner. This illuminates when the switch is ON (latched) or PRESSED (non-latching).

The only exception to this is the auxiliary engine START switch which also has a green LED at its upper right hand corner (for further information refer to the description on Page 10 or STARTING THE AUXILIARY ENGINE on page 16.

Most switches are of the latching type (press once to turn ON and again to turn OFF) however there are a number of non-latching switches. These will only function while they are held down and are as follows:

Auxiliary Engine START	Safety Interlock
Auxiliary Engine STOP	Hopper Body RAISE
Auxiliary Engine Speed INCREASE	Hopper Body LOWER
Auxiliary Engine Speed DECREASE	Rear Door OPEN
Nozzle Tilt (Momentary)	- - - - - - - - - - - - - - - - -

Apart from switches for the sweeping equipment, the main panel also incorporates an LCD screen and a light-sensor. The LCD provides real-time information relevant to the operating status of the machine, in the form of warnings or feed-back, and acts as the inter-face when using the self-diagnostic facility. The light-sensor automatically controls the panel/LCD back-lighting to ensure legibility in low ambient light conditions.



• *indicates optional equipment*

Fig. 2 Sweeper Control Panel Layout

MAIN PANEL SWITCH DESCRIPTIONS

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

BEACON SWITCH - Press to operate hazard beacons (*cab beacon may have a seperate switch on some chassis*). Red LED illuminates when active.

AUXILIARY ENGINE STOP SWITCH - Press and hold until the auxiliary engine stops. Red LED illuminates while the switch is being pressed. When the auxiliary engine stops the switch's backlight extinguishes and the auxiliary engine START switch backlight illuminates.

AUXILIARY ENGINE START SWITCH - Press and hold until the auxiliary engine starts. Red LED illuminates while heaters are active then, after a few seconds, the red LED extinguishes and the green LED illuminates, remaining permanently lit. When the auxiliary engine starts the switch's backlight extinguishes and the switch is disabled to protect the starter motor. The Engine STOP switch backlight illuminates, confirming that the switch is now enabled.

PANEL STAND-BY MODE / SWEEP MODE SWITCH - Press to turn the sweeper panel ON or OFF. Red LED illuminates when sweep mode is selected.

AUXILIARY ENGINE SPEED-DECREASE SWITCH - Press and hold to reduce engine speed from its default maximum of 1700 rpm (see Note) to the desired level. The red LED illuminates while the switch is being pressed. The engine speed will be displayed on the upper line of the LCD screen.

AUXILIARY ENGINE SPEED-INCREASE SWITCH - Press and hold to increase engine speed to the desired level up to its absolute maximum of 1700 rpm (or 2000 rpm on vehicles equipped with the overhead suction boom). The red LED illuminates while the switch is being pressed. Engine speed is displayed on the upper line of the LCD screen.

Engine speed is initially controlled by the suction fan or, if fitted, the H-P water pump. When either is activated, engine speed automatically increases to the default operating maximum of 1700 rpm. The foregoing speed controls can then be used to adjust engine speed as desired between absolute max. & min.

LEFT HAND SIDE-BRUSH SWITCH - Press to start the side-brush. The red LED illuminates when the feature is selected. Brush will not deploy until the Master Switch is activated. On single-sweep machines the non-sweeping side's switch-backlight and LED will not illuminate. See also side brush SWING IN/OUT switch.

LEFT HAND SUCTION NOZZLE RAISE/LOWER SWITCH - Press to lower the suction nozzle. Red LED illuminates when the feature is selected. The nozzle will not deploy until the Master Switch is activated. On single-sweep machines the non-sweeping side's switch-backlight/LED do not illuminate.

WIDESWEEP BRUSH SWITCH - Press to start the widesweep brush. The red LED illuminates when the feature is selected. The brush will not deploy until the Master Switch is activated.

RIGHT HAND SUCTION NOZZLE RAISE/LOWER SWITCH - Press to lower the suction nozzle. The red LED illuminates when the feature is selected. The nozzle will not deploy until the Master Switch is activated. On single-sweep machines the non-sweeping side's backlight/LED do not illuminate.

RIGHT HAND SIDE-BRUSH SWITCH - Press to start the side-brush. The red LED illuminates when the feature is selected. Brush will not deploy until the Master Switch is activated. On single-sweep machines the non-sweeping side's switch-backlight and LED will not illuminate. See also side brush SWING IN/OUT switch.

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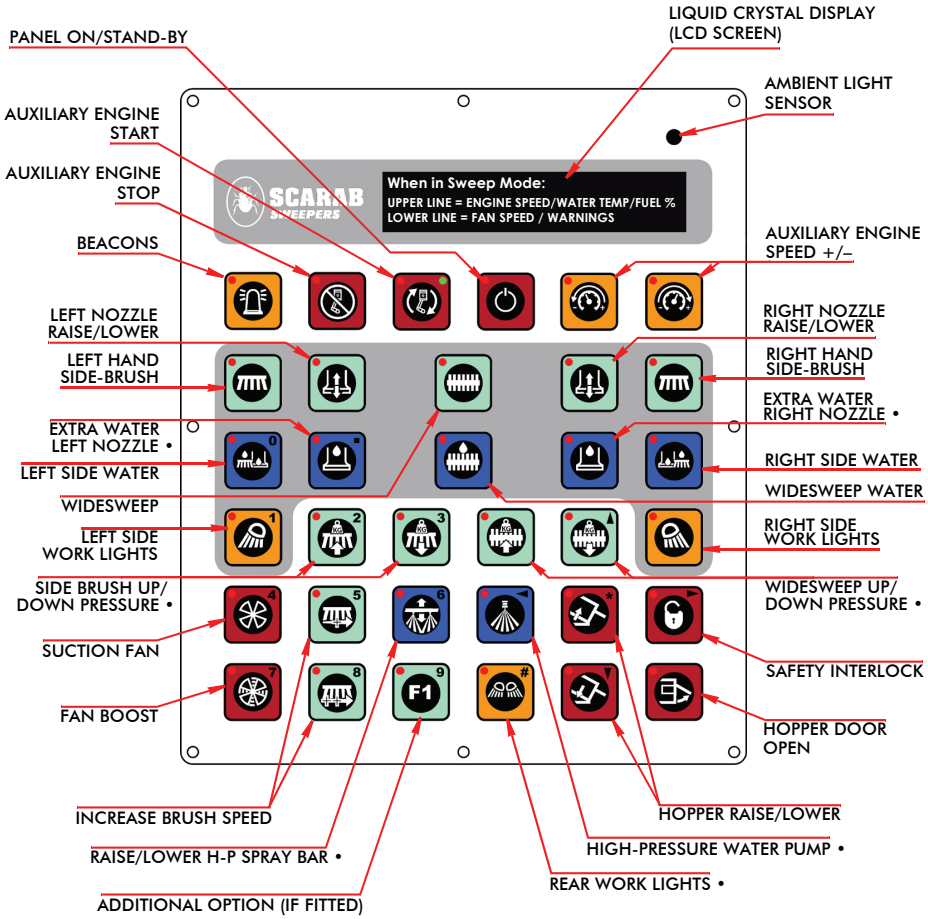

• *indicates optional equipment*

Fig. 3 Sweeper Control Panel Layout

LEFT HAND SIDE-BRUSH/NOZZLE WATER SWITCH - Press to start the dust-suppression water jets for the side-brush and suction nozzle. The red LED illuminates when the feature is selected. Water spray will not function unless the Master Switch is activated.

LEFT HAND SUCTION NOZZLE - ADDITIONAL WATER SWITCH * - Press to start the additional water jets for the suction nozzle. The red LED illuminates when the feature is selected. The feature will not function unless the Master Switch is activated.

WIDE SWEEP WATER SWITCH - Press to start the dust-suppression water jets for the widesweep brush. The red LED illuminates when the feature is selected. Water spray will not function unless the Master Switch is activated.

RIGHT HAND SUCTION NOZZLE - ADDITIONAL WATER SWITCH * - Press to start the additional dust-suppression water jets for the suction nozzle. The red LED illuminates when the feature is selected. The water jets will not function unless the Master Switch is activated.

RIGHT HAND SIDE-BRUSH/NOZZLE WATER SWITCH - Press to start the dust-suppression water jets for the side-brush and suction nozzle. The red LED illuminates when the feature is selected. The water spray jets will not operate until the Master Switch is activated.

LEFT HAND WORK-LIGHTS - Press to turn the work-lights ON. The red LED illuminates when the feature is selected.

SIDE-BRUSH 'UP' PRESSURE SWITCH * - Press to allow a controlled amount of pressure to the bottom of the brush lift ram(s) and reduce the brush's surface pressure. Use in conjunction with the air-pressure regulator. The red LED illuminates when the feature is selected. Brush pressure will not function unless the Master Switch is activated.

SIDE-BRUSH 'DOWN' PRESSURE SWITCH * - Press to allow a controlled amount of pressure to the top of the brush lift ram(s) and increase the brush's surface pressure. Use in conjunction with the air-pressure regulator. The red LED illuminates when the feature is selected. Brush pressure will not function unless the Master Switch is activated.

WIDESWEEP 'UP' PRESSURE SWITCH * - Press to allow a controlled amount of pressure to the bottom of the brush lift ram(s) and reduce the brush's surface pressure. Use in conjunction with the air-pressure regulator. The red LED illuminates when the feature is selected. Brush pressure will not function unless the Master Switch is activated.

WIDESWEEP 'DOWN' PRESSURE SWITCH * - Press to allow a controlled amount of pressure to the top of the brush lift ram(s) and increase the brush's surface pressure. Use in conjunction with the air-pressure regulator. The red LED illuminates when the feature is selected. Brush pressure will not function unless the Master Switch is activated.

RIGHT HAND WORK-LIGHTS - Press to turn the work-lights ON. The red LED illuminates when the feature is selected.

SUCTION FAN SWITCH - Press to start the fan. The red LED illuminates when the fan is ON. The fan speed (2000 rpm) will be displayed on the LCD screen. This switch remains active when the fan-boost swich is pressed.

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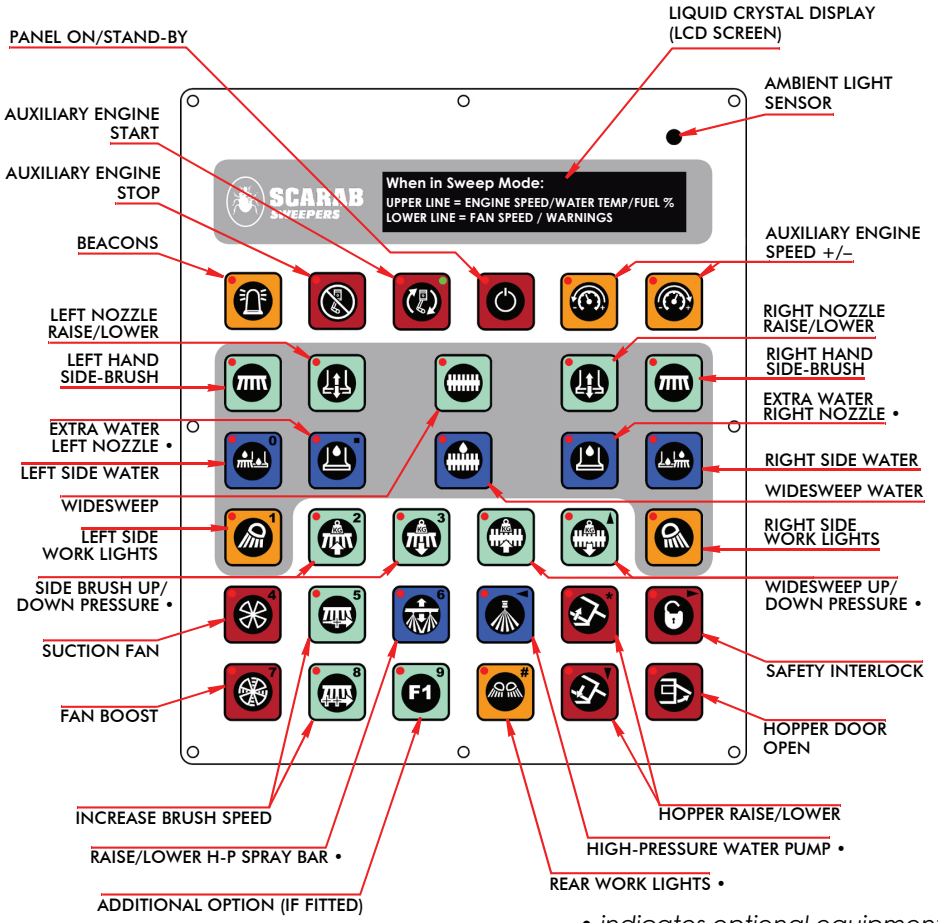


Fig. 4 Sweeper Control Panel Layout

BRUSH SPEED (+) SWITCH - Press to increase brush speed to 125 rpm. The red LED illuminates when the feature is active. Press again to return to normal brush speed (If Brush Speed (++) is selected when this feature is active Brush Speed (+) will be automatically deselected). Brush speed will not function unless the Master Switch is activated.

FRONT H-P SPRAY BAR RAISE/LOWER * - *With the high-pressure water pump running*: Press the switch to lower the H-P spray bar. The red LED illuminates when it is in the lowered position.

HIGH-PRESSURE WATER PUMP SWITCH ✱ - Press to start the H-P water pump. The red LED will illuminate when the feature is selected. *Please note that the pump will not operate if the water level in the tank is insufficient.*

HOPPER RAISE SWITCH - Press and hold down simultaneously with the safety interlock switch to raise the hopper. The red LED illuminates as soon as the hopper starts to rise. *Will not operate unless the vehicle is in Sweep Mode.*

NOTE:
For externally mounted hopper controls refer to Page 21.

SAFETY INTERLOCK SWITCH - Press and hold while operating the in-cab hopper RAISE/LOWER or rear door OPEN switches. The red LED illuminates when the switch is activated. *Will not operate unless the vehicle is in Sweep Mode.*

SUCTION FAN 'BOOST' SWITCH - Press to activate the fan boost mode. This increases fan speed from 2000 rpm to 2200 rpm. The red LED illuminates while the feature is selected and the fan speed indicated on the LCD will change to show 2200 rpm. Press again to revert to normal fan speed.

BRUSH SPEED (++) SWITCH - Press to increase brush speed to 150 rpm. The red LED illuminates when the feature is active. If this feature is selected when Brush Speed (+) is already active it will automatically deselect Brush Speed (+). Press again to revert to normal brush speed. Brush speed will not function unless the Master Switch is activated.

F1 SWITCH - This switch is only used for a non-standard option, if applicable refer to the back of the manual for details.

REAR WORK-LIGHTS SWITCH ✱ - Press to turn on the rear-mounted work-lights. The red LED illuminates while the feature is active. *Will not operate unless vehicle is in Sweep Mode.*

HOPPER LOWER SWITCH - Press and hold down simultaneously with the safety interlock switch to lower the hopper. the red LED will remain illuminated until the hopper is fully in the lowered position. *Will not operate unless the vehicle is in Sweep Mode.*

REAR DOOR OPEN SWITCH - Press and hold down simultaneously with the safety interlock switch to open the rear door. The red LED illuminates when the switch is operated. *Will not operate unless the vehicle is in Sweep Mode.*

NOTE:
For externally mounted rear door controls refer to Page 20.

Continued...

AUXILIARY SWITCH PANEL (Located Adjacent To Driver's Door)

SIDE BRUSH SWING IN/OUT SWITCH - Press to swing side-brushes OUT and again to swing brushes IN. *Will only function when Master Switch is active*.

NOZZLE TILT SWITCH (MOMENTARY MODE) - Press and hold to tilt the suction nozzle when larger items, such as bottles or rubble are encountered. The red LED illuminates when the switch is activated. Release the switch to revert to the normal nozzle position.

NOZZLE TILT SWITCH (LOCKING MODE) - Press to tilt the nozzle permanently to the raised position. The red LED illuminates while the feature is active. Press again to return the nozzle to the normal position.

BRUSH MASTER SWITCH - Press to deploy all sweeping equipment selected on the main control panel. The red LED illuminates while the feature is active. Press again to stop and raise all active items of sweeping equipment.

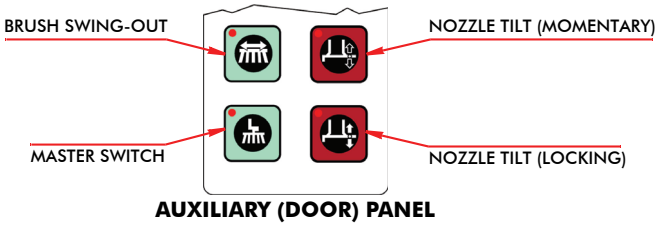


Fig. 5 Auxiliary (Door) Panel Layout

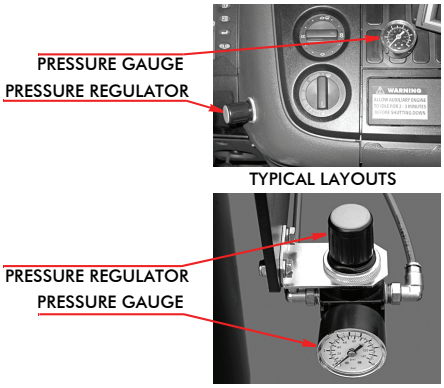
THE LCD SCREEN - Provides the operator with information in the form of warnings, e.g. fluid levels/temperatures, and confirmation of values such as sweeping speed or fan speed (refer to Page 6 for detailed information).

ADDITIONAL CONTROLS & INSTRUMENTS

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) #.

Side-brush regulators/gauges are mounted inside the cab. Widesweep regulators/gauges are located externally on chassis, at the rear of the near-side suction spigot mount.



TYPICAL LAYOUTS

OPERATING IN SWEEP MODE

REFER TO THE HEALTH & SAFETY INFORMATION ON Page 3

Some machines are fitted with a reduction gearbox. This has a motion sensor which will not allow reduction drive to be selected until the vehicle is stationary.

STARTING THE AUXILIARY ENGINE

If the vehicle has been driven to the worksite immediately prior to sweeping, the ignition must be turned OFF and then ON again to activate the auxiliary engine's heaters (glow-plugs).

ALWAYS ensure that the main control panel is OFF before starting the auxiliary engine.

When the vehicle's ignition is turned on, CANbus runs a number of system checks to confirm that all the control nodes are present and functioning correctly. The result of this check can be seen briefly in the form of an appropriate number of '**+**' or '**–**' symbols that appear along the lower display line on the LCD screen. A '**+**' symbol indicates that a node has passed while a '**–**' symbol indicates that a node has failed to respond as expected. Consequently, a display line such as '**+ + – + + +**' would indicate that node 3 has failed (in such circumstances, report the event to your supervisor or the appropriate service personnel).

The LCD then displays the following auxiliary engine status information:

- Top Line - Engine Speed (reads zero until the engine is running).
- Bottom Line - Fuel Level (displayed as a percentage).

The LEDs on the auxiliary engine START switch will flash alternately GREEN then RED (while the heaters operate) and finally back to GREEN, (accompanied by and audible 'beep').

1. With the vehicle's ignition ON, check the fuel level in the auxiliary engine's fuel tank by referring to the LCD screen.

2. When the green LED on the auxiliary engine START switch illuminates, press and hold the switch until the engine starts. As soon as the engine starts and attains IDLE speed, the switch's backlight will extinguish. At the same time, the auxiliary engine STOP switch's backlight will illuminate. The green LED will remain lit at all times but the switch is disabled to protect the starter motor from inadvertant operation while the engine is running.

ACTIVATING THE CONTROL PANEL

1. Press the stand-by/sweep mode switch to activate the sweeper controls. The red LED will illuminate to confirm that the panel is active. At the same time, the backlights for all available services will illuminate and red LEDs will illuminate on any active switches (i.e. sweeping equipment that remains selected from previous sweeping duties - this will not deploy/start unless the Master Switch is activated).

SWEEPING

1. Switch on the suction fan, selecting Normal (2000 rpm) or Boost (2200 rpm) as required. The auxiliary engine will automatically increase speed to 1700 rpm. Fan speed is displayed on the LCD screen on the main control panel.

2. Set the auxiliary engine speed for the prevailing sweeping conditions. For normal sweeping duties this should be circa 1700 rpm. However, the auxiliary unit can be run at any speed between 900 rpm (IDLE) and 1700 rpm (or 2000 rpm on vehicles equipped withe overhead suction boom) depending on the sweeping conditions. It should be noted, however, that reducing engine speed can, in extreme circumstances, adversely affect suction performance.

3. Select the desired configuration of brushes/suction nozzles and water sprays (any combination of the available sweeper functions can be selected). Switch on the beacons (and work-lights as required).
4. Press the Brush Master Switch (located on the door panel) to lower and start the sweeping equipment. When this switch is pressed a second time, the sweeping equipment will stop and rise to the stowed position. This will also occur when reverse gear is engaged.

5. Operate the side brush IN/OUT and nozzle TILT switches (also on the door panel) as required to suit the sweeping conditions.
6. On standard machines, select an appropriate forward gear ratio to suit the prevailing sweeping conditions, release the parking brake and commence sweeping. If the machine is fitted with a separate reduction gearbox, refer to the following instructions.

Reduction Gearbox Option

7. On machines equipped with a separate reduction gearbox engage Reduction Drive as follows:

The truck engine must be at IDLE and the vehicle MUST be stopped before operating the reduction geabox. The selector can only operate if the vehicle is stationary.

A road speed reduction of approximately 80% can be achieved by using the reduction gearbox.

(a) Stop the vehicle apply the parking brake and select Neutral.

(b) Keeping the clutch depressed, operate the **F1** switch, the switch's red LED will flash to denote that engagement is taking place and a bleeper will sound. When reduction gear has engaged successfully, the LED will illuminate permanently and the bleeper will cease. At the same time a remote LED on the vehicle dash will illuminate to confirm Reduction Box ENGAGED status.

*If the LEDs fail to illuminate or you hear gears grating, the gears in the reduction box have not meshed correctly. If this occurs, operate the **F1** switch again to restore Normal Drive. Move the vehicle forward slightly, then repeat Steps (a) and (b).*

(c) Select the required sweeping equipment and a suitable gear ratio for the prevailing sweeping conditions.

When reverse gear is selected, the reduction box will automatically disengage (allowing higher speeds)and the switch LED will extinguish. ***The reduction gearbox will re-engage automatically when a forward gear is selected, accompanied by the bleeper until engagement is successful.***

SUCTION FAN BOOST SETTING

When required, a boost setting is available for the suction fan. This increases fan speed by 10% and is used when sweeping densely distributed or heavy debris such as rubble.

To operate the fan at the Boost setting, press the Suction Fan Boost switch to select BOOST mode.

It might be necessary to increase engine speed to enable fan boost to be fully effective.

REVERTING TO NORMAL DRIVE MODE 1

If the machine is fitted with a separate reduction gearbox, refer to Page 19.

On standard machines the vehicle can be returned to normal drive mode without stopping the auxiliary engine if required. This is useful where a temporary pause in sweeping is required such as when traversing a busy road junction controlled by traffic lights or when it is known that you will be resuming sweep mode within a short distance beyond an obstacle. In this event proceed as follows at the end of the sweeping run:

1. Press the Master Switch to stop and raise all active sweep gear. The red LED will extinguish when the switch is released.
2. Press the panel ON/STAND-BY switch to turn off the control panel. This will allow the auxiliary engine to revert to IDLE.

3. If appropriate, switch off the work lights and hazard beacons.

Continued...

The vehicle can now be moved through the junction or obstacle to the next sweeping site.

REVERTING TO NORMAL DRIVE MODE 2

If the vehicle is being returned to normal drive mode for a period of time sufficient to warrant stopping the auxiliary engine, or it is intended to stop the vehicle, proceed as follows:

1. Press the Master Switch to stop and raise all active sweeping equipment. The red LED will extinguish when the switch is released.

Cancell all active sweeping equipment by pressing all switches that are illuminated by a red LED before switching off the panel.

2. Press the panel ON/STAND-BY switch to turn off the panel. This will allow the auxiliary engine to revert to IDLE.

CAUTION:

Before stopping the auxiliary engine allow it to run at IDLE speed for at least two minutes to allow the turbo-charger to cool. Failure to comply will result in premature failure of the turbo-charger bearings/oil seals.

If stopping the vehicle at the end of a sweeping run DO NOT remove the ignition key until the auxiliary engine has had sufficient IDLING time as removing the key will close-down the CANbus panel, stopping the auxiliary engine.

The LCD screen will continue to display information relevant to the sweepers operating mode even when the panel is not active.

3. After allowing the engine to idle for two to three minutes, press the auxiliary engine STOP switch to shut down the unit. The red LED will illuminate while the switch is being pressed and the backlight will extinguish. At the same time the backlight on the engine START switch will illuminate.

4. If appropriate, switch off the work lights and hazard beacons.

The vehicle can now be driven conventionally or stopped as required.

Reduction Gearbox.

5. Bring the vehicle to a complete stand-still, apply the hand brake and proceed as follows:
   - **(a)** Depress the clutch and select Neutral on the truck's gearbox.
   - **(b)** Keeping the clutch depressed, press the **F1** switch. The switch's LED will extinguish and a bleeper will sound during disengagement. The bleeper will cease when disengagement is complete and the remote LED will go out.

   - **(c)** Release the clutch.

The vehicle can now be driven conventionally.

6. To return to Normal Drive, proceed as detailed in 'Reverting to Normal Drive Mode 1 & 2'.

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 enginespeeds 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 reducing 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.

DISCHARGING THE HOPPER (TIPPING)

OPERATING THE REAR DOOR

The Rear Door controls are sited both inside the cab and externally. The in-cab controls are located on the sweeper control panel. The external controls are located on the sub-frame above the nearside suction nozzle. They are grouped with the hopper controls.

WARNING:

BEFORE OPERATING THE DOOR ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE IMMEDIATE AREA.

CAUTION

Ensure that the suction fan is turned OFF and that there is room for the door to open fully.

Always ensure that door is OPEN before raising the hopper. This will avoid the possibility of causing damage to the door in the event of a heavy load sliding back as the hopper tilts

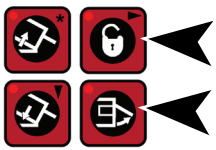
OPENING

NOTE:

To be able to open or close the rear door, the auxiliary engine must be running. For safety reasons, it is not possible to CLOSE the door using the in-cab controls. Use the external controls.

In-Cab Controls

1. Press and hold down the Safety Interlock switch, while simultaneously operating the door OPEN switch until the door is fully open. The red LEDs on both switches will illuminate while the switches are being pressed; they will extinguish when the switches are released



External Controls

1. Press and hold down, the door OPEN button until the door is fully open.

Continued ...

CLOSING

CAUTION:
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.

1. Press and hold the door CLOSE switch until the door is fully closed and the door-locking ram has completed its locking cycle.

OPERATING THE HOPPER

WARNING

THE HOPPER PROP MUST ALWAYS BE USED WHEN THE HOPPER IS IN THE RAISED POSITION. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY.

BEFORE RAISING THE HOPPER, ENSURE THAT THE VEHICLE IS ON FIRM, LEVEL GROUND AND THAT THERE ARE NO OVERHEAD OBSTRUCTIONS.

DO NOT DRIVE THE VEHICLE WHILE THE HOPPER IS RAISED.

The hopper controls are sited both inside the cab and externally as follows:

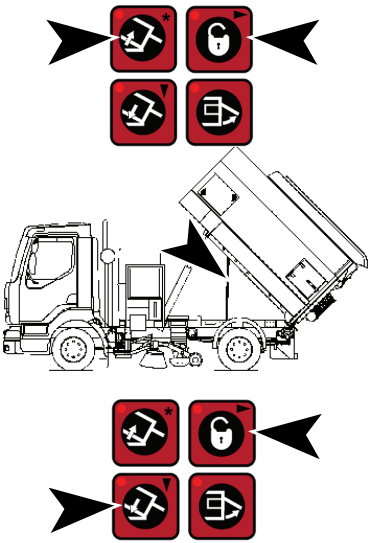
In-cab controls are located on the sweeper panel.

The external controls are located on the sub-frame above the nearside suction nozzle. They are grouped, in a yellow 4-gang switch box, with the rear-door controls.

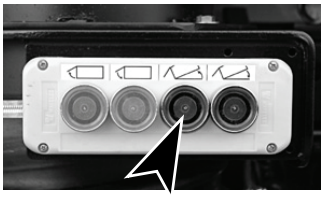
NOTE:
To be able to raise or lower the hopper, the auxiliary engine must be running.

THE IN-CAB CONTROLS

1. To raise the hopper, press and hold down the Safety Interlock and Hopper UP switches simultaneously until the hopper is fully raised. The Red LED will illuminate and remain lit while the hopper is raised.
2. Deploy the hopper safety prop, ensuring that its foot is securely located in its sub-frame pocket.
3. To lower the hopper, fold the hopper safety prop flush with the hopper base frame.
4. Press and hold down the Safety Interlock and Hopper DOWN switches simultaneously until the hopper is fully lowered.
   The switch's red LED will not extinguish until the hopper is completely down.



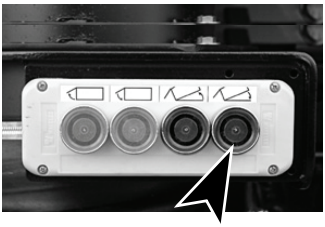
THE EXTERNAL CONTROLS



1. To raise the hopper, press and hold the Hopper Raise button until the hopper is in the fully raised position. The hopper warning light (RED), on the sweeper panel, will illuminate and remain lit while the hopper is up.
2. Unless discharging, deploy the hopper safety prop, ensuring that its foot is securely located in its pocket on the sub-frame.

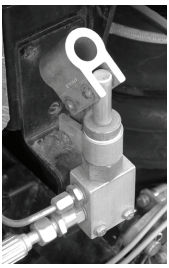
WARNING

WHEN OPERATING THE HOPPER-LOWER CONTROLS, ENSURE THAT NO PART OF YOUR PERSON, PARTICULARLY YOUR HAND IS IN THE PATH OF THE DESCENDING HOPPER.



3. To lower the hopper, fold the hopper safety prop into its stowage position flush with the hopper base frame.
4. Press and hold the Hopper Lower button until the hopper is in the fully lowered position. The hopper warning light in the cab (RED) will not extinguish until the hopper is completely down.

USING THE AUXILIARY HYDRAULIC PUMP



In the event of hydraulic system failure, an auxiliary hydraulic pump is fitted, to enable the rear door and hopper to be operated manually. This is located on the Left Hand side of the vehicle, adjacent to the hopper suction spigot. The pump handle is stowed in the cab.
It should be noted that it will require a substantial number of pumping cycles to complete either operation.

REAR DOOR

CAUTION:
Electrical power is required to use the auxiliary pump for this purpose.

NOTE:
On Right Hand Drive machines, it will be necessary to enlist the assistance of a second person for the foregoing operations.

TO OPEN THE REAR DOOR

1. If OFF, turn the vehicle's ignition ON.
2. Press the ON/STAND-BY switch to activate the control panel. The red LED on the switch and all other switch back-lights will Illuminate.

3. Operate the auxiliary pump, simultaneously pressing and holding the Door Open button (see NOTE) until the door is in the required position.

TO CLOSE THE REAR DOOR

CAUTION
Electrical power is required to use the auxiliary pump for this purpose.
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.

1. Turn the vehicle's ignition ON.
2. Press the ON/STAND-BY switch to activate the control panel. The red LED on the switch and all other switch back-lights will illuminate.

3. Operate the auxiliary pump, simultaneously pressing and holding the Door Close button, until the door is fully in the closed position.

HOPPER (ELECTRICAL SYSTEM OPERATIONAL)

WARNING

THE HOPPER PROP MUST ALWAYS BE USED WHEN THE HOPPER IS IN THE RAISED POSITION. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY.

BEFORE RAISING THE HOPPER, ENSURE THAT THE VEHICLE IS ON FIRM, LEVEL GROUND AND THAT THERE ARE NO OVERHEAD OBSTRUCTIONS.

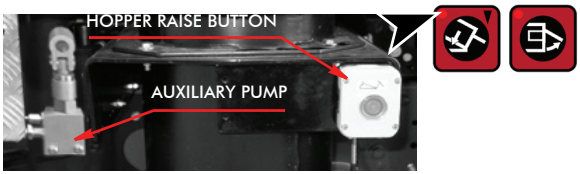
DO NOT DRIVE THE VEHICLE WHILE THE HOPPER IS RAISED.

TO RAISE THE HOPPER

1. Ensure that the vehicle's gearbox is in Neutral and turn the ignition is ON.
2. Press the ON/STAND-BY switch to activate the control panel. The red LED on the switch and all other switch back-lights will Illuminate.

3. Operate the hand-pump while simultaneously pressing and holding the Hopper Raise button, until the hopper has been raised sufficiently to deploy the safety prop.

Deploy the hopper safety prop.



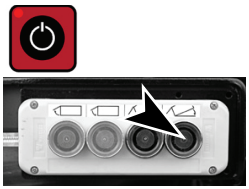
NOTE:
On Right Hand Drive machines only, an additional Hopper Raise button is positioned next to the pump.

Fig. 6 Additional Hopper-Raise button on Right-Hand Drive machines

TO LOWER THE HOPPER

The hopper ram is a double-acting unit and will require pumping all the way down.

1. If OFF, turn the vehicle's ignition ON.
2. Press the ON/STAND-BY switch to activate the control panel.



3. Stow the hopper safety prop.
4. Fit the pump handle and, while simultaneously pressing and holding the Hopper Down button, operate the pump until the hopper has been completely lowered. The red LED in the hopper RAISE switch on the main control panel will not extinguish until the hopper is completely down.

WANDER HOSE & WANDER BOOM

Scarab truck-mounted sweepers are equipped with either the standard Wander Hose, or the optional rear-mounted Wander Boom.

USING THE WANDER HOSE

1. Press the brush master switch on the auxiliary control panel to stop and any active equipment. The red LED on the master switch will extinguish to confirm that it is no longer active. Note that the suction nozzle blanking flaps will remain open.

2. If the fan is running, press the suction fan switch to turn it OFF. Allow the fan to run down. The red LED on the master switch will extinguish to confirm that it is no longer active.

3. When the fan has run down sufficiently, remove the blanking plate from one of the two wander hose apertures in the rear door and stow it on the captive fasteners provided below the aperture.
4. Attach the Wander Hose over the aperture, using the captive fasteners provided. If required, a second operator can use the wander hose during normal sweeping operations.

NOTE:
For situations requiring maximum suction power via the wander hose, such as when clearing drains, the suction nozzles should be blanked off as follows:

5. If a suction nozzle(s) is active, press the nozzle switch. This will close the nozzle blanking flap(s). The switch's red LED will extinguish to confirm that it is no longer active.

6. Press the suction fan switch to restart the fan. The red LED will illuminate to indicate that the feature is active. The wander hose is now ready for use.

USING THE WANDER BOOM

On machines fitted with the optional wander boom arrangement, the wander hose is permanently fitted to the hopper and is supported by a swing-out boom. The weight of the hose and nozzle is partially supported by a gas strut. The wander boom is equipped with its own dust suppression system and blanking flap. As with the standard wander hose, the rear-mounted version can be used while sweeping.

NOTE:
For situations requiring maximum suction power via the wander hose, such as when clearing drains, the suction nozzles should be blanked off as follows.

1. If a suction nozzle(s) is selected, press the nozzle switch(s) to close the nozzle blanking flap(s). The switch(s) red LED will extinguish.

2. Demount the hose assembly from its stowage hooks and swing-out the entire assembly by pulling down on the hose at the free-end of the support boom.

3. Rotate the wander boom switch to Position 1 'ON' (Fig. 7). The blanking flap will open and the dust suppression spray jets will start. The wander boom is now ready for use.

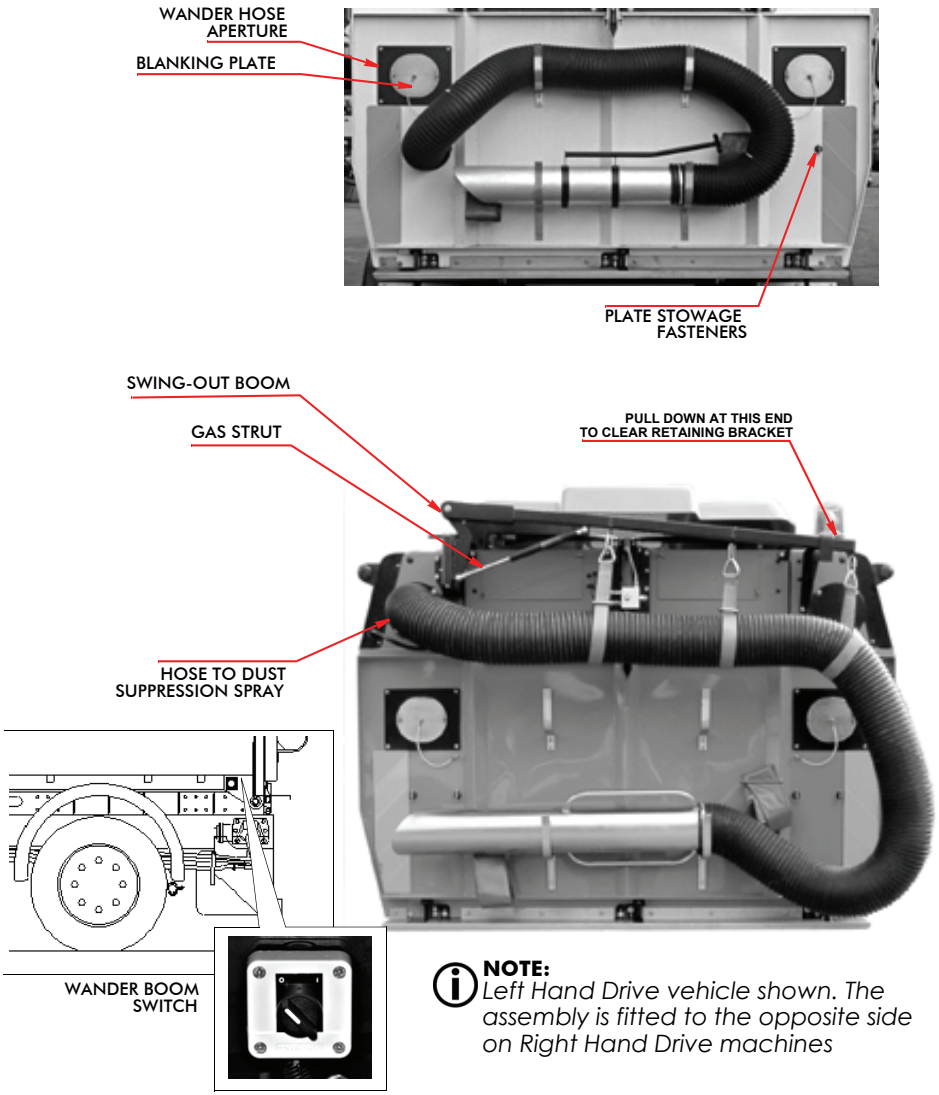


Fig. 7 Wander Hose & Wander Boom Arrangements

USING THE LOW-PRESSURE WATER PUMP

CAUTION
Unless the ground is wet, always use the dust suppression sprays.

Before using the dust suppression system, ensure that there is sufficient water in the water tank. Select the water spray configuration you require, according to the intended sweep pattern. This will start when the Brush Master Switch is operated (in Sweep Mode) to deploy the selected configuration.

Press the appropriate switches on the sweeper panel to start the water spray for each item of sweeping equipment as follows:

Side-brush & Suction Box - To start either or both the left hand or right hand spray nozzles, press the appropriate side-brush/suction nozzle water switches. The red LED will illuminate to confirm the the feature is active.

Widesweep Brush - To start the widesweep spray nozzles press the widesweep water switch. The red LED will illuminate to confirm the the feature is active.

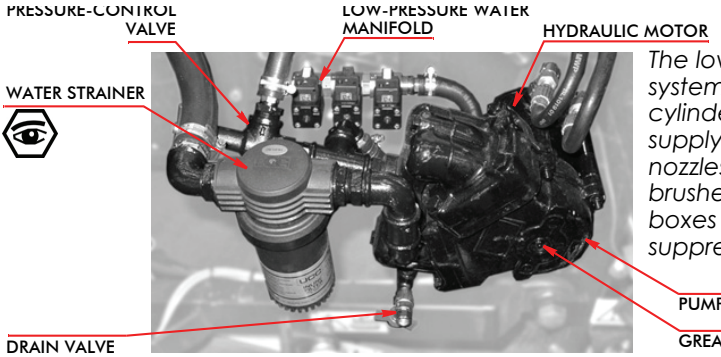
Suction Box - Dust Suppression (Optional) - Press the suction box Additional Water Spray switch. The red LED will illuminate to confirm that the feature is active.

LUBRICATION

The main bearings are 'sealed-for-life' and require no lubrication, however, on some pumps the crankcase void is provided with a grease nipple (the schedule on Page 31 gives frequency of applications).

DRAINING

1. It is vital that the strainer and pump are totally drained whenever the air temperature is expected to fall to 0°C or below. If allowed to freeze it is likely that damage will be incurred.
2. Drain the water tank and open the drain valve (Fig. 8). Switch on all sprays and run the Hardi water pump until the systems runs dry.



The low-pressure water system uses a twin-cylinder Hardi pump to supply water to the nozzles mounted on the brushes and suction boxes for purpose of dust suppression.

Fig. 8 Typical Low-pressure Water Pump Arrangement

USING THE OPTIONAL HIGH-PRESSURE WATER PUMP

WARNING

HIGH PRESSURE WATER CAN BE HAZARDOUS, ALWAYS WEAR GOGGLES OR SUITABLE EYE PROTECTION WHEN OPERATING WITH HIGH PRESSURE WATER. EXERCISE EXTREME CARE WHEN USING THE LANCE, DO NOT DIRECT THE JET AT OTHER PEOPLE.

WHEN CLEANING PUBLIC BUILDINGS OR STREET FURNITURE, ENSURE THAT NO ELECTRICAL CONNECTIONS ARE EXPOSED.

FAILURE TO COMPLY CAN RESULT IN SERIOUS INJURY.

CAUTIONS:

Do not direct the high pressure jet directly at paint work or at electrical connections, this could result in damage to the vehicle.
This pump should NEVER be permitted to run dry, as this will quickly destroy the piston seals and cause the pump to fail. If the pump shuts off in-use the most likely cause will be low water activating the auto shut-off float switch in the tank.

1. Ensure that there is sufficient water in the water tank. A float switch in the water tank will operate to stop the pump before the water level is too low for safe operation.
2. Start the auxiliary engine and activate the main control panel.

3. If the machine is fitted with a front-mounted high-pressure spray bar, adjust the ball valve to supply the spray bar or the hand-lance as required (Refer to Fig. 9).
4. Switch on the high pressure pump (engine speed will automatically increase to 1700 rpm) and, if using an adjustable spray bar, press the spray bar switch to lower the bar to its optimum operating height.

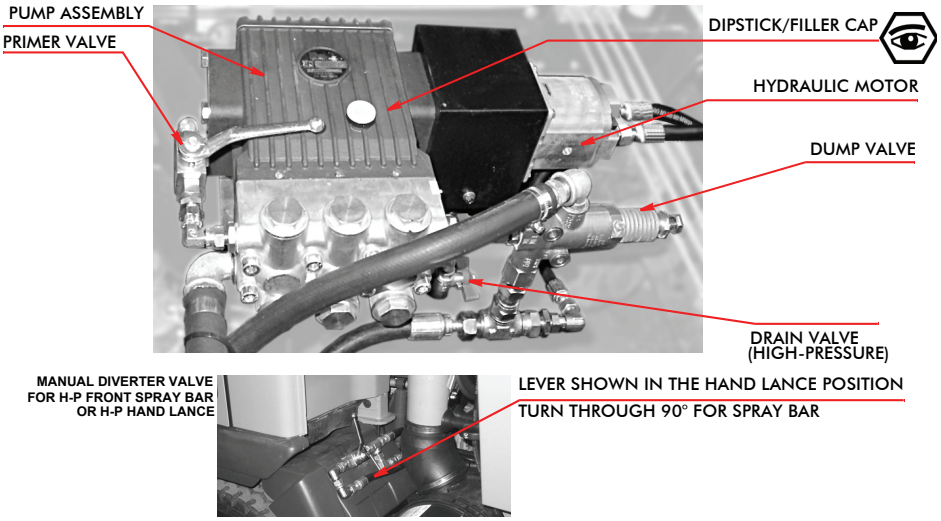


Fig. 9 Typical High-pressure Water Pump Arrangement

OIL LEVEL

1. The level of the oil in the pump's crankcase should be checked on a regular basis (See "RECOMMENDED OPERATOR'S ROUTINE MAINTENANCE" on page 31.)and topped up as necessary. There is a combined filler cap/dipstick on the top of the pump body (Refer to Fig. 9).

DRAINING

CAUTION:
This pump should NEVER be permitted to run dry, as this will quickly destroy the piston seals causing the pump to fail.

1. It is vital that the pump is drained of all water whenever the ambient temperature is expected to fall to 0°C or below. If the pump is allowed to freeze it is likely that damage will be incurred resulting in seizure.
2. Drain the water tank (refer to the maintenance schedule on Page 31),
3. To drain the high-pressure side of the pump, open the ball valve (Red tap).
4. To drain the low-pressure side of the pump, open the primer valve (plated lever).

PRIMING

1. When restarting the high-pressure pump after draining the circuit it will be necessary to prime the pump. This is achieved as follows
   (b) Ensure that the water tank has been filled
   (c) Open the primer valve (plated lever).
   (d) Start the auxiliary engine and activate the main control panel.
   (e) Start the High-pressure Pump. Engine speed will automatically increase to 1700 rpm.
   (f) As soon as a steady stream of water is flowing from the primer valve, close the valve. The system should is now primed and ready for use. Test the system by operating one of the high-pressure water appliances.

OPTIONAL SUCTION FAN WASH-ASSIST SYSTEM

This comprises a supply hose from the H-P pump to a spray nozzle in the suction fan case and a control valve mounted on the nearside of the vehicle adjacent to the door locking ram.

This system is not intended as an alternative to the normal fan cleaning procedures (see Page 34), but as an aid to this process.

Regular use of the system will greatly enhance fan performance by reducing the rate at which dirt is allowed to build up on the impellor blades and fan case. As such, it is suggested that this system is used

immediately following a days sweeping, or more often if sweeping in particularly arduous conditions. **It is, however, important to recognise that excess water and loose material will be ejected via the hopper hood when the suction fan is restarted. Consequently, this procedure should only be carried out at an appropriate location.**

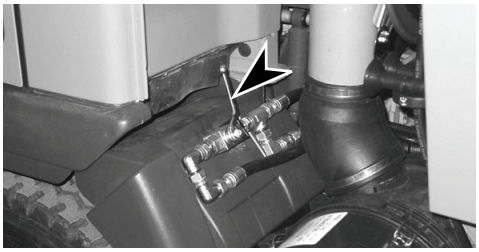
Fan inspection and cleaning procedures should always take place at the recommended intervals.

OPERATION

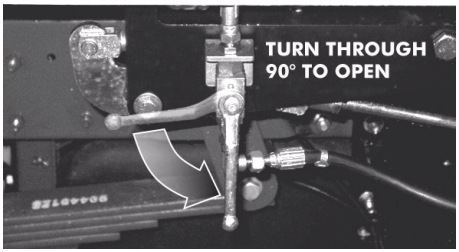
1. Ensure that there is sufficient water in the water tank.
2. Start the auxiliary engine and activate the main control panel.

3. If a front-mounted high-pressure spray bar is fitted, adjust the control valve to the OFF (hand-lance supply) position.
4. Set the wash-assist valve to **ON** (Refer to Fig. 10) and start the high-pressure pump. Engine speed will automatically increase to 1700 rpm and the fan-wash jet will start.

5. With the Fan Wash-assist still running, turn the Suction Fan ON and wait until clear water is being ejected. Turn the High-pressure Pump and Fan OFF and return the control valve to the OFF position.



FRONT H-P SPRAY BAR CONTROL VALVE '**OFF**'



SUCTION FAN WASH-ASSIST VALVE '**ON**'

Fig. 10 Operating the Suction Fan Wash-assist System

WARNING:

LOOSE PARTICLES FROM THE CLEANING PROCESS CAN BE EJECTED FROM THE FAN CASING VIA THE HOPPER COVER WHEN THE FAN IS RESTARTED. ENSURE THAT THE AREA AROUND THE MACHINE IS CLEAR BEFORE RESTARTING.

6. Start the Suction Fan . This will clear the water and any loose material from the fan case.

7. Stop the Suction Fan.
8. Switch off the control panel and allow the auxiliary engine to idle for at least two minutes.

9. Stop the auxiliary engine.

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 Unidrive Sweeper performs at the optimum level of safety and efficiency. Refer to the paragraphs immediately following this schedule and to the Table of Contents (Page 2) for more detailed information.

MAINTENANCE PROCEDURE	DAILY ACTIONS BEFORE USE	DAILY ACTIONS AFTER USE	WEEKLY ACTION
Check vehicle / body for safety. All lighting equipment, tyres, fuel, oil, coolant, brake fluid, windscreen wash and water-tank levels. Rectify in line with manufacturers specifications or report fault as necessary.	✔	✘	✘
Check auxiliary engine as follows: fuel, oil and coolant levels. Rectify or report as necessary.	✔	✘	✘
Check hydraulic oil level and inspect vehicle for signs of hydraulic leaks, including the pumps and hoses mounted on the auxiliary engine. Check oil cooler and radiator are clean. Rectify as necessary.	✔	✘	✘
If vehicle not previously used by YOU, check suction fan is clean. Rectify or report.	✔	✘	✘
Check brushes/skirts for wear. Remove any entangled items, e.g. lengths of string	✔	✘	✘
Check suction nozzle/flaps for damage/ correct ground clearance. Wrong settings will degrade suction performance.	✔	✘	✘
Check water spray jets for blockages.	✔	✘	✘
Check all equipment is stowed and brushes have been raised.	✔	✘	✘
Wash vehicle, particularly hopper screens, surrounding ledges and area above screen. Leave hopper door partially open for air to circulate. Avoid directing high-pressure water at electrical connections.	✘	✔	✘
Wash oil cooler, ensuring that fins are clean	✘	✔	✘
Lubricate as appropriate, all brush links, pivots and nozzle wheels.	✘	✔	✘
Remove and clean the water strainers	✘	✔	✘
On reduction gearbox equipped machines, grease prop. shafts and check for wear at the U/Js.	✘	✘	✔
Grease the Hopper Ram (Top & Bottom)	✘	✘	✔
Visually check entire machine for wear/ damage. Rectify or report as required	✘	✘	✔

Clean the suction fan thoroughly, using scraper provided and, if necessary, high-pressure water.	✘	✘	✔
Carry out a thorough inspection of the suction fan assembly to verify that it is in good condition. Report any defects.	✘	✘	✔
Replace return filter element in hydraulic oil tank.	✘	✘	✔
Check for wear in suction tubes & deflectors. Report any defects.	✘	✘	✔
Check seals on hopper-door, side-hatches, suction-tubes. Report any defects.	✘	✘	✔
Check hopper and subframe-to-chassis mounting points. Report any defects.	✘	✘	✔
Check wiring and hoses for security of attachment and for signs of chafing. Rectify or report defects as necessary.	✘	✘	✔
Check oil level in high-pressure pump, top up as necessary.	✘	✘	✔
Grease rear door hinges and locking bar.	✘	✘	✔
Check the air cleaner element (more often if working in dusty conditions). Clean/ replace or report as appropriate.	✘	✘	✔

LOW-PRESSURE WATER PUMP WHEN FITTED WITH A CRANKCASE GREASE NIPPLE

Use a hand operated grease gun apply 2 or 3 pumps after every 300 operating hours. Do not exceed because over-filling the crankcase can result in damage to the diaphragms.

IN FROSTY WEATHER

CAUTION
Do not, under any circumstances, operate the high pressure pump without water.

Drain the water tank (via the drain cock if fitted or by removing the water strainers).
Open the drain taps on each water pump.
Switch on the water sprays and run the low pressure pump until dry.
Remove the water-strainer elements.
Leave the hopper slightly raised with rear & side doors slightly open. This allows air to circulate and prevents damage caused by seals freezing to their mating faces.

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

*Detailed instructions covering the servicing of your Scarab sweeper are published in **Scarab Workshop Manual Z028603**.*

The fitting of genuine Scarab parts is highly recommended. Use of alternatives can compromise performance / reliability and could invalidate your warranty.

For chassis/auxiliary engine servicing and maintenance, refer to the relevant manufacturer's information or consult the appropriate agent or dealer.

KEY MAINTENANCE PROCEDURES

AUXILIARY ENGINE

The operator's responsibility for the auxiliary power unit is the same as for any other engine, including the chassis manufacturer's unit. The following instructions should be followed as detailed in the maintenance schedule on Page 31 and in the manufacturer's recommendations.

1. Raise the hopper in accordance with the instructions detailed on Page 21.
2. Allow a suitable period of time to elapse to enable an accurate reading of the oil level in the sump and for the cooling system's pressure/temperature to drop.
3. Carry out the fluid-level checks as follows:
   (a) Visually check the coolant level in the reservoir. If the level is at or below the minimum level indicator, top up the system using the correct coolant mixture as detailed in the table on Page 37.
   (b) Using the dipstick, check the oil level in the engine's sump. If the level is at or below the minimum level indicator, top up the system using the correct lubricant as detailed on Page 37.

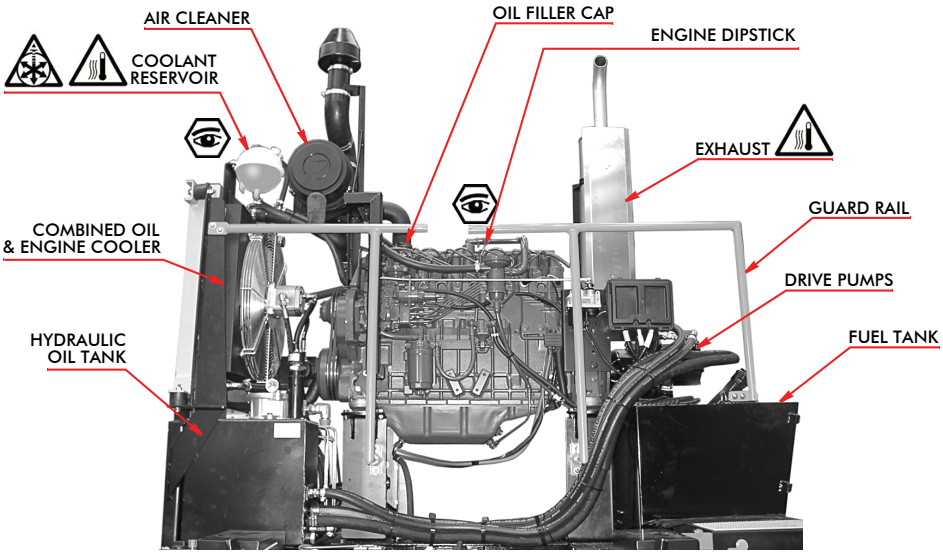


Fig. 11 The Auxiliary Engine Installation

CAUTION
If it is considered that the engine is loosing coolant or oil at an excessive rate, report the matter as soon as possible to your supervisor or to the appropriate service personnel.

CLEANING THE SUCTION FAN AND SCREENS

WARNINGS: FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY.

1. BEFORE WORKING ON THE MACHINE POSITION IT ON FIRM, LEVEL GROUND, APPLY HANDBRAKE AND, IF REQUIRED, RAISE THE HOPPER, STOP ENGINE & REMOVE IGNITION KEY.

2. ALWAYS USE THE HOPPER PROP TO SUPPORT A RAISED HOPPER.

3. 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.

4. BEFORE REMOVING THE SUCTION FAN ACCESS PANELS, ENSURE THAT THE ENGINE IS OFF AND THAT THE IGNITION KEY HAS BEEN REMOVED.

5. ALWAYS WEAR SUITABLE EYE & HAND PROTECTION WHEN USING THE LANCE.

1. Remove the outer inspection cover from the hopper and the inner cover from the fan housing to expose the fan (Refer to Fig. 12).

NOTE:
It is advisable to lower the hopper screens to allow displaced material, from the fan cleaning process, to drop into the hopper.

It will be necessary to prevent the fan from rotating while using pressurised water or steam to assist the cleaning process.

2. Using the special scraper, thoroughly clean all parts of the fan.
3. A steam-cleaner or high-pressure water from a remote source will greatly assist in cleaning severely contaminated fans (see also use of the optional Fan Wash-assist system on Page 29).
4. Clean the screens using the scraper and, where necessary, steam or high-pressure water.

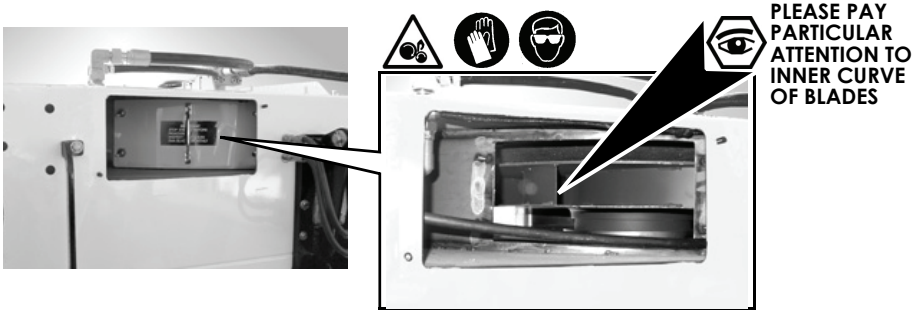


Fig. 12 Inspecting & Cleaning the Suction Fan

5. Refit the inspection covers and screens and lower the hopper.

WARNING:

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.

6. Start the auxiliary engine, activate the control panel and set the engine speed to its normal operating level.

7. Start the suction fan.
8. Direct additional water onto the screens below the fan inlet cone until only clean water is expelled from the fan casing.

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 (Refer to Fig. 13).

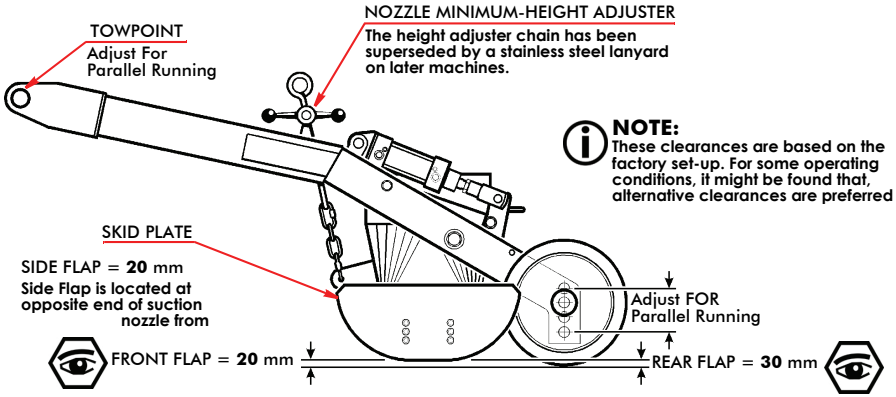


Fig. 13 Suction Nozzle Clearance - Factory Set-up

SIDE BRUSHES & SKIRTS

WARNING:

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.

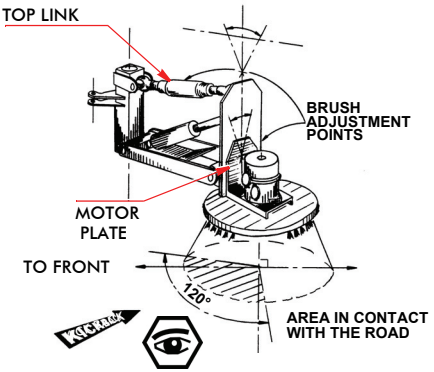
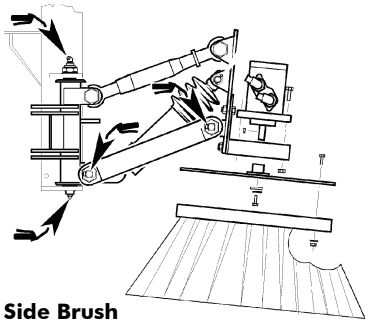


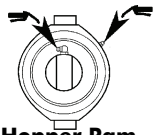
Fig. 14 Brush Tilt Adjustment

MANUAL GREASING & LUBRICATION

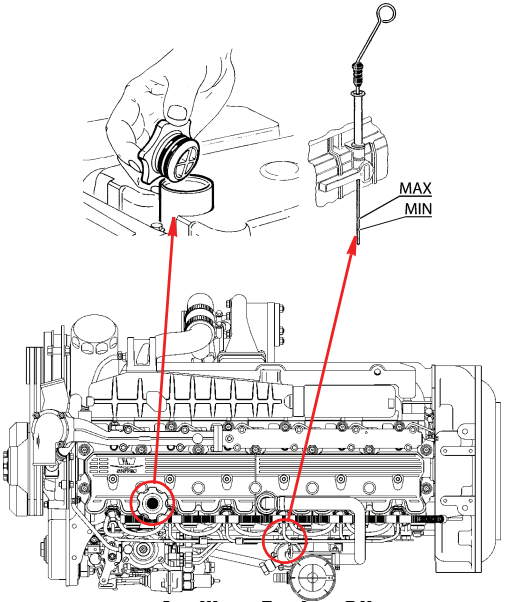
Carry out manual greasing and lubrication in accordance with the maintenance schedule on Page 31 and by referring to Fig. 15.



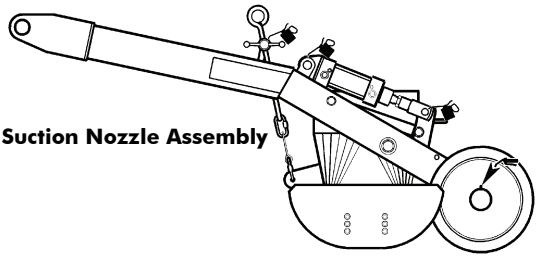
Side Brush Assemblies



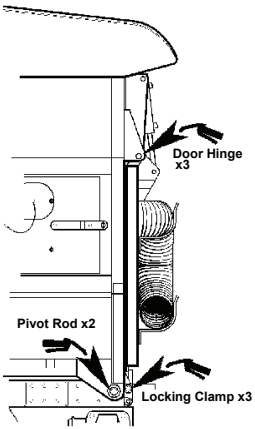
Hopper Ram
(Viewed from Above)



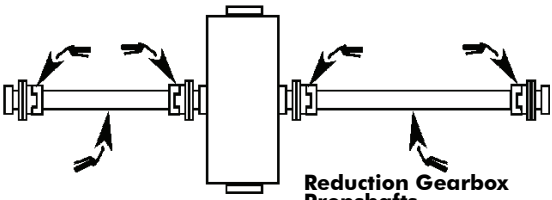
Auxiliary Engine Oil



Suction Nozzle Assembly



Hopper Body & Rear Door



Reduction Gearbox Propshafts

Please note that not all prop shafts will be fitted with grease points at all illustrated locations.

Fig. 15 Grease & Lubrication Points

RECOMMENDED LUBRICANTS AND CONSUMABLE PARTS

DESCRIPTION	SPECIFICATION	QUANT	SCARAB PART
Hydraulic Oil	Derwent 32	5 litres	005005
Hypoid Gear Oil (Scarab Reduction Box)	85W/90	5 litres	005003
Multi-purpose grease (Grease Points)	Super Lithium 2	400 g	005007
Motor Oil	15W/50	5 litres	005001
Pneumatic Lubricant	Scarab approved	50 ml	005046
Replacement Widesweep Brush Discs (400 mm Dia)	Normal Brush Extended Brush	33 45	023474
Replacement Widesweep Brush Discs (300 mm Dia)	Standard Brush Extended Brush	33 45	023471
Replacement Spacers (Widesweep)	-	32/44	023472
Replacement Side Brush	315 mm Dia	1/2	023470
Replacement Side Brush	400 mm Dia	1/2	014066
Rubber Skirt, Side Brush	2 slot	1	012216
Rubber Skirt, Side Brush	3 slot	1	010247
Rubber Skirt, Side Brush	5 slot		014069
Front Skirt, Wide Sweep	Standard Brush	1	022516
Front Skirt, Wide Sweep	Extended Brush	1	014069
Suction Tube	-	1	023154
Flap Kit, Suction Nozzle	-	Set of 3	024550
Clamp (Long), Suction Nozzle	-	2	013025
Clamp (Short), Suction Nozzle	-	1	013024
Seal, Suction Nozzle - Hopper	-	1	013601
Seal, Rear Door	-	1	010544
Seal, Side Loading Hatch	-	2	013599
Wander Hose (trunking only)	-	1	025214
Element, Hydraulic Return Filter	-	1	013125
Element, Water Filter	Banjo Type	1	010121
Element, Water Filter	UCC Type	1	023863

OTHER FLUID LEVELS

For checking/topping up the chassis engine's fluid levels, refer to the manufacturer's documentation.

The hydraulic system's oil-level sight glass and filler are located on the oil tank, which is mounted on the left hand side of the machine.

Access requires the hopper to be in the raised position.

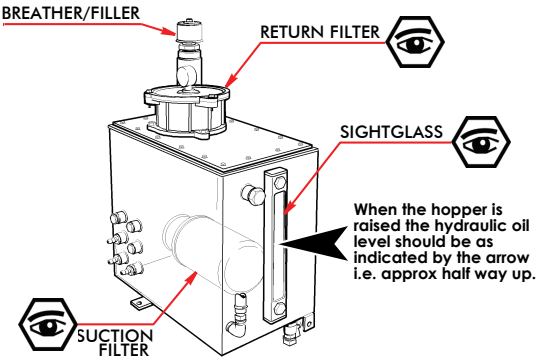


Fig. 16 Hydraulic Tank

ABOUT THE MISTRAL'S HYDRAULIC DRIVE SYSTEM

CAUTION

Ensure that the oil cooler is kept clean. If the hydraulic oil is allowed to exceed its maximum working temperature a warning buzzer will sound in the cab and a warning will flash up on the control panel. The auxiliary engine MUST be stopped IMMEDIATELY. Failure to comply will result in damage to hydraulic pumps or motors.

In the event of a severe oil leak, the appropriate warning will flash up on the control panel and the brush system will automatically shut down. If this situation occurs, stop the vehicle's auxiliary engine IMMEDIATELY and investigate the cause. The brush system will not operate until the hydraulic oil level is replenished.

The hydraulic pumps are driven directly from the vehicle's auxiliary engine and require no maintenance. The system is protected by a Temperature Control switch and a Low Oil-level switch, which function as follows:

1. The Temperature Control switch actuates warning on the sweeper control panel's LCD screen and sounds an alarm buzzer in the cab, in the event that the hydraulic oil temperature reaches 90° C. Stop the auxiliary engine immediately and, if possible, identify the cause and inform your area maintenance workshop.
2. The Low Oil-level switch actuates a warning on the sweeper control panel'S LCD screen and automatically stops the sweeping system if oil level drops below the minimum safety limit (e.g. a severe leak). In this event contact your area maintenance workshop immediately.
3. Should both conditions occur simultaneously the warnings on the LCD screen will alternate and the warning buzzer will sound.
4. A hand-operated pump is fitted, so that the hopper can be raised manually if a hydraulic pump failure occurs. This also enables access for refilling the hydraulic tank (refer to Page 23).

SCARAB PARTS & SERVICE PROVIDERS

AUSTRALIA
Rosmech Sales & Service Pty. Ltd
30 Stanbel Road
SALISBURY PLAIN SA 5019
Tel: 8 8182 7777

BELGIUM
MOL Cy nv
VDK Waste Systems
Dikstmuidesteenweg
B-8830
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CZECH REPUBLIC
Atec Services s.r.o.
Orlovska 22
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FRANCE
Dominique Declercq Distribution
Avenue d'Immercourt ZI Est
62000
Arras
Tel: 33 3 212 27590

GERMANY
Terra-Trade Import/Export GmbH
Terra-Vertlieb & Kundendienst West
Kruger & Co KG
Gewerbegebiet Nord
Lauchaer Höhe
D-99880 Waltershausen
Tel: 49 3622 6410

GREECE
D F Sarantopoulos
210 Lenorman Street
104 43 Athens
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ISRAEL
Gad-El Ltd.
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Kiryat-Ata 28103
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ITALY
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20089 ROZZANO (ML)
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Bankside, Falkirk
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Vejka Petrovica 6
Novi Sad 21000
Serbia
Tel: 381 21 450391

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Piquer Maquinaria, SA
Apartado de Correos, 3071
04080
Almeria
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SWEDEN
REN VÄG AB
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503 68 Boras
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Istanbul Cad
No 8/a Gokturk
Kemerburgaz
Istanbul
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LEGIONELLA STATEMENT

BACKGROUND

There is a growing awareness, through education and publicity, of LEGIONELLA (Legionnaires Disease). This is a respiratory disease, contracted by inhaling small droplets of contaminated water.

Concerns have been raised with regard to the possibility that the water supply system in road sweepers could be a breeding ground for Legionella bacteria, which occur naturally in fresh water, sea water and moist natural environments throughout the world. They do not become a health hazard until they have multiplied.

The conditions that are conducive to the multiplication of Legionella bacteria are:

- A water temperature between 20°C and 45°C.
  Legionella bacteria cannot grow below 20°C.
  Legionella bacteria cannot live above 60°C.
- The presence of sludge, rust, algae etc. in the storage tank or filtration system.
- Direct sunlight.

RECOMMENDATIONS

The water dust-suppression system used on all Scarab sweepers is of a TOTAL LOSS type i.e. there is no re-cycled water stored on the vehicle.

Provided that the water tank is replenished regularly with mains water, the risk of the bacteria growing is low, however, it might be prudent to take the following basic precautions:

- Drain the water system at the end of the working day, especially in hot weather.
- Flush/clean out the water tank and filtration system regularly to remove sludge, debris, algae etc.
- Ensure that, if the pipe runs have been modified, there are no 'dead legs' (i.e. no water flow) where the bacteria might grow.

After discussions with the UK Health & Safety Executive, the Scarab water system, is considered to be LOW RISK as it does not have any heaters, is not used for cooling and is not recycled.

The foregoing advice is for guidance purposes only. For further information or advice it is recommended that you consult your local environmental health authority.

OPERATOR'S NOTES

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