



# SCARAB

## MINOR Hydrostatic

Euro 4 & 5

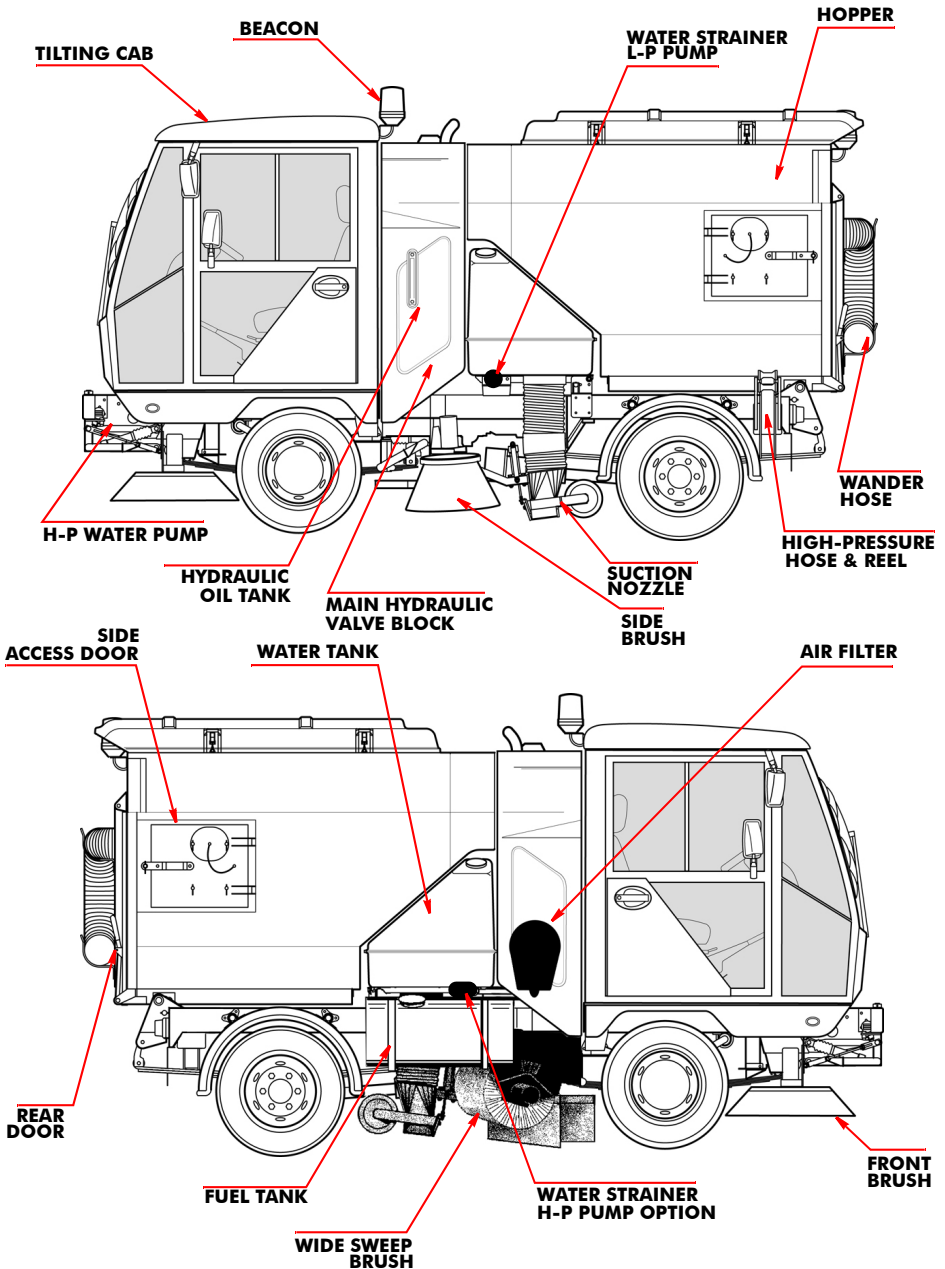


# OPERATOR'S MANUAL

 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 MINOR





**SCARAB  
SWEEPERS**

**OPERATOR'S MANUAL**

**SCARAB MINOR**

**HYDROSTATIC SWEEPER**

**EURO 4/5 MACHINES EQUIPPED WITH CANbus CONTROLS**

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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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# SCARAB MINOR - EURO 4 FL



**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.**

## WEIGHTS, DIMENSIONS AND CAPACITIES

Gross Vehicle Weight (GVW) . . . . .	Refer to VIN plate
Unladen Weight (Standard)* . . . . .	2.49 tonnes
Unladen Weight (Hi-Tip)* . . . . .	2.61 tonnes
Overall Length . . . . .	4230 mm
Front Overhang . . . . .	1148 mm
Rear Overhang . . . . .	1053 mm
Wheelbase . . . . .	2020 mm
Overall Width . . . . .	1650 mm
Overall Height (hopper lowered) . . . . .	2360 mm
Overall Height (hopper raised) . . . . .	3213 mm
Turning Circle (curb to curb) . . . . .	8.50 metres
Hopper . . . . .	2.0 m <sup>3</sup> - Hi-tip 1.6 m <sup>3</sup>
Fuel Tanks . . . . .	60 litres
Engine Oil . . . . .	5.90 litres
Coolant . . . . .	18 litres
Hydraulic Tank . . . . .	15 litres
Water Tank . . . . .	450 litres - Street Wash Conversion = 1000 litres
Brake System . . . . .	0.70 litres
High-pressure Water Pump . . . . .	0.55 litres

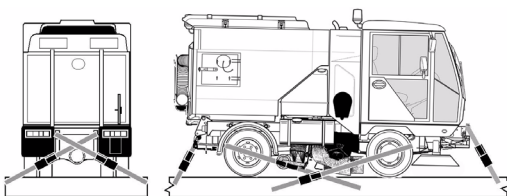
\* **Dependent upon specification**

## TOWING & TRANSPORTATION

SERIOUS DAMAGE WILL RESULT IF VEHICLE IS TOWED WITH PROP-SHAFT CONNECTED.  
If towing is considered necessary, it is imperative that the prop shaft is removed before any attempt to tow the vehicle.

When transporting the vehicle, it shall be secured to the transporter by means of suitable straps as follows:

- Front Wheels . . . . . One Strap per Wheel to a REARWARD lashing point.
- Rear Wheels . . . . . One Strap per Wheel to a FORWARD lashing point.
- Front of Body . . . . . One Strap each end of Front Bumper to a FORWARD lashing point.
- Rear of Body . . . . . One Strap over each Rear Spring Hanger to an OPPOSITE REARWARD lashing point.



## IDENTIFICATION PLATES

The SERIAL NUMBER PLATE is located on the outside rear face of the cab, at floor level to the right hand side. All Scarab Minors have a four-digit number.

The VIN PLATE is located above the serial number plate.

The CHASSIS NUMBER is stamped on the top face of the right hand chassis rail beneath the cab/tank.

The LOAD APPORTIONING VALVE (LAV) PLATE is located on the outer face of the left or right hand chassis rail (according to driving position).

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## 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 THE FOLLOWING POINTS HAVE BEEN OBSERVED:
  - THE CAB SAFETY LOCK IS PROPERLY ENGAGED IN THE LOCKED POSITION.
  - THAT ALL RELEVANT VEHICLE CHECKS HAVE BEEN CARRIED OUT.
  - THAT ALL EQUIPMENT IS STOWED AND THAT THE BRUSHES HAVE BEEN RAISED.
- BEFORE STARTING THE ENGINE ENSURE THAT ALL CONTROLS ARE SWITCHED OFF AND THAT THE VEHICLE IS IN NEUTRAL.
- DO NOT DRIVE THE VEHICLE WITH THE HOPPER IN THE RAISED POSITION, EVEN IF THE HOPPER IS EMPTY.
- DO NOT OVERLOAD THE HOPPER.
- ALWAYS USE THE SAFETY PROPS TO SUPPORT A RAISED CAB OR HOPPER. NEVER WORK UNDER A RAISED CAB OR HOPPER UNLESS ITS 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.
- 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 GENERAL SAFETY RELATED TEXT THROUGHOUT THIS DOCUMENT. WHERE APPROPRIATE, THE FOLLOWING ADDITIONAL SAFETY SYMBOLS ARE ALSO USED:  EYE PROTECTION,  PROTECTIVE FOOTWEAR AND  GLOVES.

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!**

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## ADDITIONAL SAFETY ADVICE SYMBOLS

CHECK VEHICLE BEFORE DRIVING	NEUTRAL & SWITCHES OFF BEFORE STARTING	CHECK ALL CLEAR TO RAISE BODY	FIRM LEVEL GROUND ONLY	USE CAB OR HOPPER SAFETY PROP	DO NOT DRIVE WITH BODY UP

## SWITCH OPERATING SYMBOLS











MAIN SWEEPING PANEL SWITCHES	
	STAND-BY/ON (SWEEP MODE)
	SUCTION FAN - ON/OFF
	LEFT HAND FRONT BRUSH - ON/OFF
	LEFT HAND SIDE BRUSH - ON/OFF
	LEFT HAND SUCTION NOZZLE - RAISE/LOWER
	WIDESWEEP BRUSH - ON / OFF
	RIGHT HAND SUCTION NOZZLE - RAISE / LOWER
	RIGHT HAND SIDE BRUSH - ON / OFF
	RIGHT HAND FRONT BRUSH - ON/OFF
	LEFT HAND FRONT BRUSH WATER SPRAY - ON / OFF
	HIGH-PRESSURE WATER PUMP - ON/OFF (Will also enable the street-wash option controls when option is installed)
	LEFT HAND SIDE BRUSH & NOZZLE WATER SPRAYS - ON / OFF
	WIDESWEEP WATER SPRAYS - ON/OFF
	RIGHT HAND SIDE BRUSH & NOZZLE WATER SPRAYS - ON / OFF
	RIGHT HAND FRONT BRUSH WATER SPRAY - ON / OFF

**Continued...**

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## SWITCH OPERATING SYMBOLS

### HOPPER & DOOR CONTROL SWITCHES

	SAFETY INTERLOCK (hold DOWN while operating HOPPER/DOOR switches)
	HOPPER - RAISE/LOWER
	REAR DOOR - OPEN ☼
<b>ELECTRICAL SERVICES CONTROL SWITCHES</b>	
	ENGINE SPEED - LOWER / RAISE
	WORK LIGHTS ON/OFF
	HOPPER BODY - RAISE / LOWER
<b>DOOR PANEL SWITCHES</b>	
	FRONT BRUSH IN/OUT (This feature is fitted to nearside only except on dual sweep models)
	CRUISE CONTROL (Only available in Sweep Mode)
	SUCTION NOZZLE TILT - MOMENTARY OR LATCHED ☼
	BRUSH MASTER (RAISES / LOWERS ALL PRE-SELECTED SWEEP GEAR)
☼ THIS SYMBOL INDICATES OPTIONAL EQUIPMENT FITS	



# SCARAB MINOR - EURO 4 FL

## CANbus LCD SCREEN INFORMATION

SWEEP MODE (PANEL ON)			
UPPER ROW	SUCTION FAN SPEED		
LOWER ROW	ENGINE SPEED (RPM) / ANY ACTIVE WARNINGS (SEE BELOW)		
	COMMON WARNINGS (number & text) & OPERATING CONDITIONS		BUZZER
	1: ENGINE HOURS		NO
	2: SWEEP HOURS		NO
	3: HOPPER UP		NO
	4: LOW BATTERY (shows when battery signal is less than 11 Volts)		YES
	5: LOW WATER LEVEL (optional - shows when panel is ON - activation will disable the H-P pump switch)		NO
	6: BEWARE LOAD (optional load indicator)		NO
7: PEDAL OUT OF RANGE (Hydrostatic Drive Potentiometer)		NO	
DRIVE MODE (IGN ON / PANEL OFF)			
UPPER ROW	SCARAB SWEEPERS		
LOWER ROW	ENGINE SPEED (rpm)		
* When 'all switches disabled' the <b>Work-lights</b> and <b>Beacons</b> remain active.			

## 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.

## CONTROLS & INSTRUMENTS

The Scarab Minor's control system can be divided into three distinct areas as follows:

- Dash-mounted switches for the conventional electrical system.
- The standard automotive steering column-mounted controls.
- The Scarab CANbus electronic sweeper controls.

### DASH-MOUNTED CONTROLS

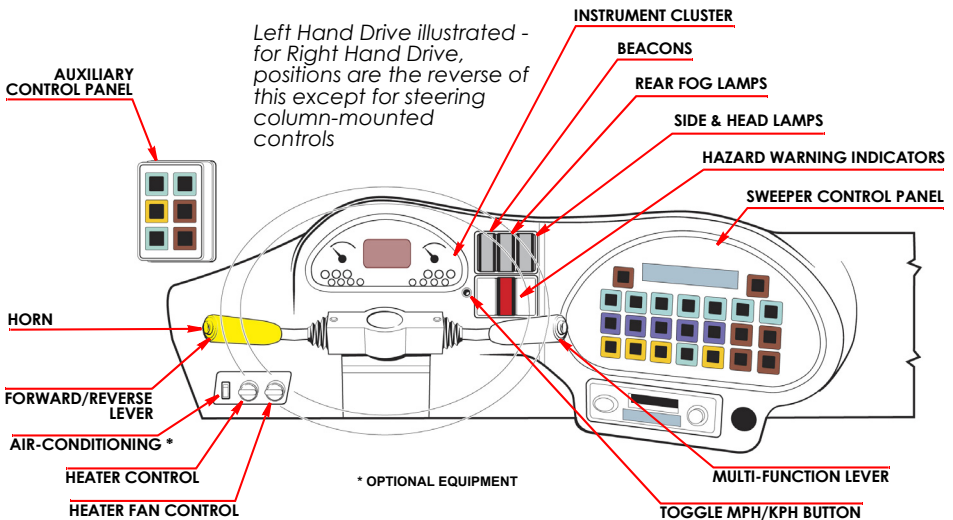
The dash-mounted switches control the following functions:

**BEACON SWITCH** - A two-position (OFF/ON) switch. Press to operate all hazard beacons fitted to the vehicle. Switch symbol illuminates when active.

**SIDE/HEADLAMPS SWITCH** - A three-position switch (OFF/ON/ON). Press to first position for side lamps (Switch symbol illuminates when active and ALL switch LEDs illuminate). Press to second position for headlamps.

**HIGH INTENSITY REAR LIGHTS SWITCH** - A two-position (OFF/ON) switch. Press to power the rear fog lights. Switch symbol illuminates when active.

**HAZARD WARNING INDICATORS SWITCH** - This is a red, two-position switch (ON/OFF). Press to activate all four direction indicators simultaneously.



**Fig. 1 General Arrangement of Dashboard and Controls (Left Hand Drive)**

**SWEEPER CONTROL PANEL** - CANbus control system, refer to page 10.

**MPH/KPH BUTTON** - Press to toggle between MILES and KILOMETRES on the speedometer LCD screen.

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**HEATER FAN CONTROL** - This is a four-position rotary switch (OFF - 1 - 2 - 3). Rotate clockwise to select desired fan speed.

**HEATER CONTROL** - Rotate in a clockwise direction to increase heat output.

**AIR-CONDITIONING SWITCH \*** - Press to activate air-con. When active the switch illuminates and the air-con LED in the instrument cluster illuminates.

**AUXILIARY CONTROL PANEL** - This is part of the CANbus control system, for further detail please refer to page 13.

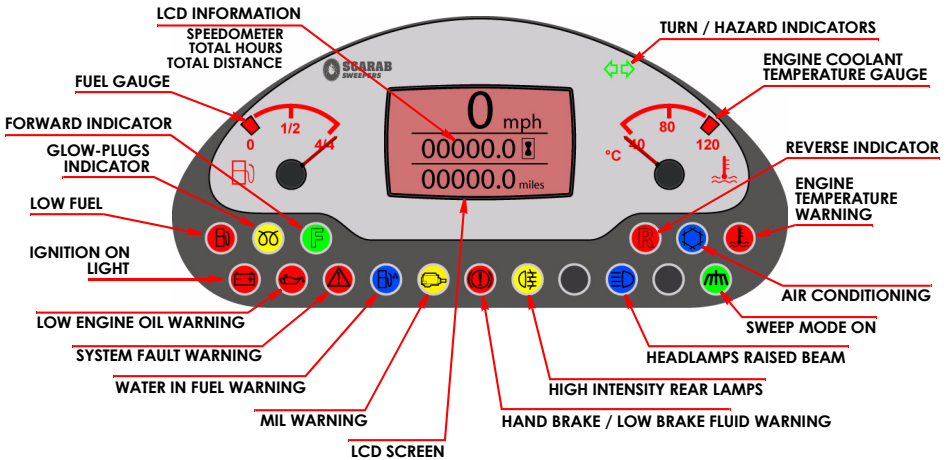


Fig. 2 Driving Instrument Cluster

## STEERING COLUMN-MOUNTED CONTROLS

**FORWARD/REVERSE SELECTOR** - This is a yellow three-position lever (F - N - R) mounted to the left of the steering column. The central position is NEUTRAL - lift the lever towards the steering wheel and then push it forwards to engage FORWARD drive or pull it back to engage REVERSE drive. A button in the end of the stalk operates the horn.

**MULTI-FUNCTION LEVER** - This lever controls the following functions:
















- **DIRECTION INDICATORS** - Conventional automotive control: Push the lever forwards to indicate LEFT or pull back to indicate RIGHT. The direction indicator tell-tale in the instrument cluster will flash in time with the indicators.
- **WINDSCREEN WASH/WIPE** - Press and hold the button in the end of the lever to activate the screen wash pump. Rotate the lever handle as follows: forwards from the OFF position to activate intermittent wipe or backwards from the OFF position to activate continuous wipe mode.

*Continued...*

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- HEADLAMP DIPSWITCH - Push fully forward for dipped beam pull fully back for main beam or flip back for FLASH only.

## DASHBOARD WARNING LIGHTS

SYMBOL	DESCRIPTION
	LOW FUEL-LEVEL WARNING
	CYLINDER HEATERS (GLOW PLUGS) OPERATING
	TRANSMISSION SET TO <b>FORWARD</b> TRAVEL
	TRANSMISSION SET TO <b>REVERSE</b> TRAVEL
	AIR-CONDITIONING SYSTEM OPERATING
	HIGH COOLANT-TEMPERATURE WARNING
	IGNITION LIGHT / BATTERY NOT CHARGING
	LOW ENGINE-OIL LEVEL
	<b>SYSTEM FAULT WARNING</b>
	<b>WATER IN FUEL WARNING</b>
	<b>MIL (ENGINE MALFUNCTION) WARNING</b>
	PARKING BRAKE APPLIED / LOW BRAKE-FLUID LEVEL WARNING
	HIGH-INTENSITY REAR LIGHTS <b>ON</b> WARNING
	HEADLAMP HIGH BEAM <b>ON</b> WARNING
	SWEEP MODE <b>ON</b> WARNING
<p>The time and date of each occurrence will be logged by the control system. When one of the warning conditions printed above in red occurs it must be reported without delay.</p>	

## THE CANbus SYSTEM (\* INDICATES OPTIONAL EQUIPMENT)

The CANbus system comprises two control panels (main and auxiliary) and a number of control nodes (normally two). 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. The main panel contains a microchip which holds all the program information and the data logs.

**Control nodes:** These are located on the cooler gantry mounted behind the cab.

**Switches:** 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 either on/or with both sides of the machine, e.g. side brushes and widesweep, are grouped with left, right and centre function controls being positioned accordingly on the 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).

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:

- (a) Safety Interlock
- (b) Hopper Body RAISE
- (c) Hopper Body LOWER
- (d) Rear Door OPEN (when powered rear door option is fitted)
- (e) Momentary Nozzle Tilt
- (f) Engine Speed Control +/-

The main panel also incorporates a Liquid Crystal Display (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 system inter-face when using the self-diagnostic facility.

The light-sensor automatically controls the switch/LCD back-lighting to ensure legibility in low ambient light conditions.

## MAIN PANEL SWITCH DESCRIPTIONS

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



Switches that are fully enabled ONLY when:

(A) The Master Switch is **ON** or

(B) Sweep Mode is **ON** are identified by the following symbols.



**PANEL STAND-BY/ON (SWEEP MODE) SWITCH** - Press to turn the sweeper panel ON or OFF. Red LED illuminates when SWEEP MODE is selected. If the panel is left on when the ignition is turned OFF, it will resume in this mode the next time the ignition is turned ON. Engine will automatically resume at previous Sweep Mode speed setting.

**SUCTION FAN SWITCH** - Press to start the fan. The red LED illuminates when the fan is ON. The fan speed will be displayed on the LCD screen.



**LEFT HAND FRONT-BRUSH SWITCH** - Press to start the brush and again to stop it. Red LED illuminates when the feature is selected. (See also brush SWING OUT switch \*).



**LEFT HAND SIDE-BRUSH SWITCH** - Press to start the side-brush. The red LED illuminates when the feature is selected. Press again to stop the brush. On single-sweep models the non-sweeping side's switch-backlight/LED will not illuminate.



**LEFT HAND SUCTION NOZZLE RAISE/LOWER SWITCH** - Press to lower the suction nozzle. Red LED illuminates when the feature is selected. Press again to raise the nozzle. On single-sweep machines the non-sweeping side's switch-backlight/LED will not illuminate.



**WIDESWEEP BRUSH SWITCH** - Press to start the widesweep brush. The red LED illuminates when the feature is selected.



**RIGHT HAND SUCTION NOZZLE RAISE/LOWER SWITCH** - Press to lower the suction nozzle and again to raise it. The red LED illuminates when the feature is selected. On single-sweep machines the non-sweeping side's switch-backlight and LED will not illuminate.



**RIGHT HAND SIDE-BRUSH SWITCH** - Press to start the side-brush and again to stop it. The red LED illuminates when the feature is selected. On single-sweep machines the non-sweeping side's switch-backlight and LED will not illuminate.



**RIGHT HAND FRONT-BRUSH SWITCH** - Press to start the brush and again to stop it. Red LED illuminates when the feature is selected. (See also brush SWING OUT switch \*).

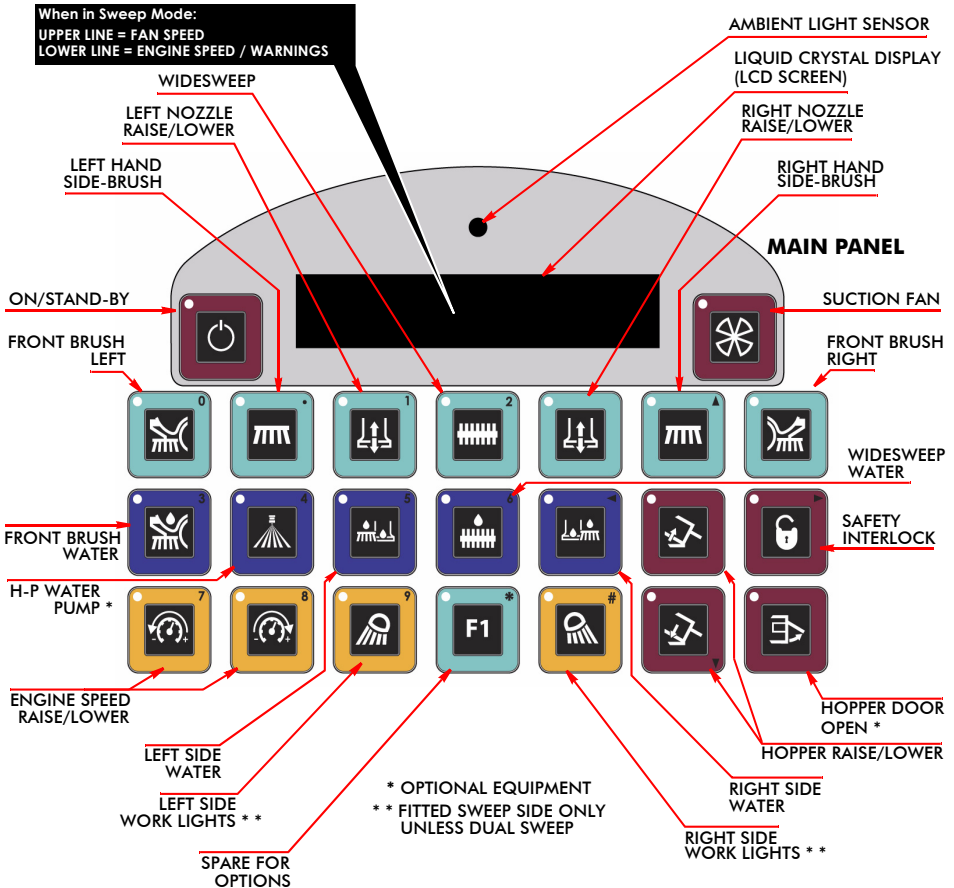


*\* On single-sweep models, the front brush Swing Out feature is normally only available on the nearside brush assembly*

**FRONT BRUSH WATER SWITCH** - Press to start the front brush water sprays and again to stop them. The red LED illuminates when the feature is active.



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**Fig. 3 Main Control Panel Layout**

**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 switch becomes disabled (symbol not illuminated) and the pump will not operate if the water level in the tank is insufficient.



**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.



**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.



**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.



**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.



**i** For details of externally mounted hopper controls refer to page 22.

**SAFETY INTERLOCK SWITCH** - Press and hold while operating the in-cab hopper or rear door switches. The red LED illuminates when the switch is activated.



**ENGINE-SPEED DECREASE SWITCH** - Press and hold until engine-speed, displayed on the sweeper panel's LCD screen, is at the desired level. The red LED illuminates while the switch is held down.

**ENGINE-SPEED INCREASE SWITCH** - Press and hold until engine-speed, displayed on the sweeper panel's LCD screen, is at the desired level. The red LED illuminates while the switch is held down.

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

**F1 SWITCH** - Spare position used for additional equipment fits.

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

**HOPPER LOWER SWITCH** - Press and hold down simultaneously with the safety interlock switch to lower the hopper. the red LED illuminates until the hopper is fully down.



**REAR DOOR OPEN SWITCH \*** - Press and hold down simultaneously with the safety interlock switch to open the rear door. Red LED illuminates when the switch is operated.



**i** The rear door cannot open while the suction fan is running due to the low pressure it creates within the hopper.  
For externally mounted rear door controls refer to page 23.

## THE LCD SCREEN

The LCD Screen provides the operator with information on the sweeper's operating status, such as water level, battery condition, engine speed and fan speed (refer to page 6 for details).

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

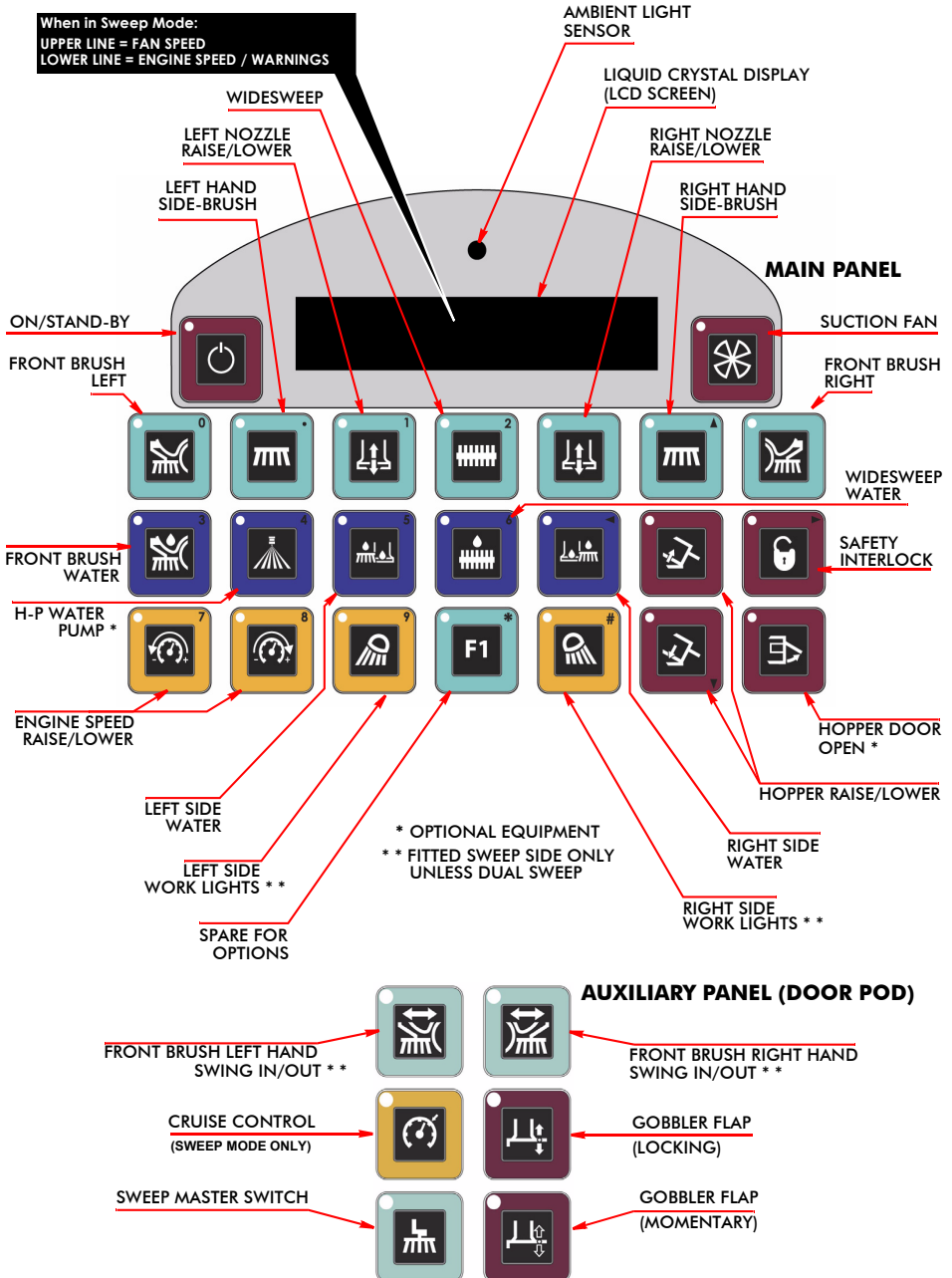
**FRONT BRUSH SWING IN/OUT SWITCHES** - These switches control the swing-out action of the left and right hand front brushes - Press to swing the appropriate brush out and press again to swing it in. The red LED illuminates while the brush is in the swung OUT position.



**i** Except on dual-sweep models the sweeping-side's front brush ONLY is equipped with this feature and the opposite brush switch's backlight and LED will not illuminate indicating that the feature is not available.





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**Fig. 4 Main & Auxiliary Control Panel Layouts**

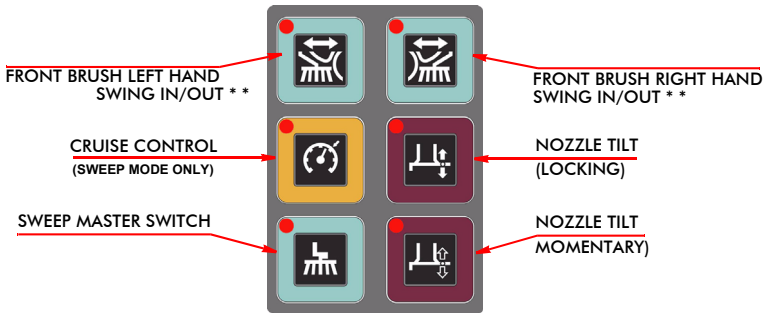
# SCARAB MINOR - EURO 4 FL

**CRUISE CONTROL SWITCH** - Press to engage cruise control when at the desired sweeping speed. Press again or apply the brakes to cancel the feature. Can be momentarily over-riden by use of the throttle, reverting to pre-set speed when throttle is released. The red LED illuminates while the feature is active. 

**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.

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



**Fig. 5 Auxiliary (Door) Panel Layouts**

## STREET-WASH OPTION CONTROLS

The street-wash spray bar can be moved through both vertically and horizontally, controlled by a dash-mounted joy-stick which is pushed in the appropriate direction until the spraybar is positioned as required. The spraybar can be raised and lowered parallel to the ground and also slewed to the left or the right to direct the spray jets as required.



**Fig. 6 Street-wash Controller**

## OPERATING MODES

There are two driving modes, Normal & Hydrostatic (Sweep), these are selected using the STAND-BY/ON (SWEEP MODE) switch on the control panel. This switch activates the sweeper control panel, simultaneously placing the vehicle in Sweep Mode. A red LED illuminates to indicate that Sweep Mode mode has been selected.



### ENGAGING SWEEP MODE

**REFER TO THE HEALTH & SAFETY INFORMATION ON page 3**



**Before activating the sweeper control panel, the following conditions must be observed:**

**The engine must be running.**

**The sweeping master switch should be OFF (LED extinguished).**

**The suction fan should be OFF (LED extinguished).**

**The vehicle must be stationary and the throttle pedal must completely released.**



1. Switch on the hazard warning beacons.
2. With the engine running, press the sweep mode switch to activate the sweeper control panel. The switch's red LED will illuminate, confirming that the vehicle is now in sweep mode. Unless the engine speed potentiometer is set at zero, engine speed will increase to the previously used setting.



*If engine speed remains at IDLE adjust to sweeping rpm by rotating the engine speed potentiometer in a clock-wise direction until the engine is operating at between 1200 and 1400 rpm (1380 rpm is considered to be the most efficient setting for normal sweeping duties).*

3. Switch on the suction fan. Fan speed can be confirmed by referring to the LCD on the main sweeper control panel.
4. Select the desired configuration of brushes/suction boxes and water sprays (any combination of the available sweeping equipment can be selected). Switch on work-lights as required.



5. Press the Brush Master Switch (located on the auxiliary control panel) to start and deploy the pre-selected sweeping equipment. To stop and stow the sweep gear, press the switch again. The sweeping equipment will raise to the stowed position. The sweep gear will also retract automatically as soon as REVERSE is engaged, returning to its original configuration as soon as FORWARD is resumed.

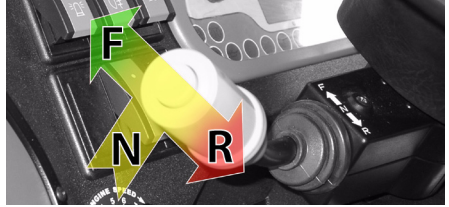


6. Operate the side brush IN/OUT and nozzle TILT switches (also on the auxiliary control panel) as required to suit the sweeping conditions.



**Continued...**

7. Select Forward drive using the yellow hydrostatic control lever on the steering column (the green LED on the dashboard will illuminate).
8. Slowly depress the throttle pedal to commence sweeping.



**i** In Sweep Mode, the vehicle is controlled, principally, by means of the throttle. The brakes are only necessary when manoeuvring in very confined areas. Releasing the throttle pedal at sweeping speeds produces marked deceleration with very little over-run, affording precise control while sweeping.

9. When Reverse is selected (dashboard LEDs change from green to red) in Sweep Mode, all sweeping equipment in use will stop and lift automatically. This will revert to the selected sweeping configuration when either **NEUTRAL** or **FORWARD** is re-selected.
10. Upon completion of the sweeping run, operate the Brush Master Switch to stop and raise the sweeping equipment permanently to the stowed position (the selected sweeping configuration will remain active and may be redeployed by returning this switch to the **ON** position).
11. Turn the suction fan **OFF**.



## CLIMBING GRADIENTS

**i** The maximum engine speed for 'full-load, up-hill' sweeping should NOT exceed 1800 rpm. Operating the engine beyond this level consumes more fuel without giving further performance advantage.

1. When sweeping up hill it might be necessary to increase engine speed to maintain sweeping performance. It is advisable to do this before you start to climb the hill. The amount of increase will depend on a range of variable factors:
  - (a) The current hopper load.
  - (b) The current sweeping load (e.g. light or heavy debris)
  - (c) The angle of the gradient.

To increase engine speed, do one of the following:

- **Use the engine speed-setting controls** as detailed at the rear of this manual (this method is most useful when a prolonged increase in engine speed is required).
- **Use the throttle pedal** to temporarily over-ride the pre-set engine speed (this method is more convenient for brief increases in engine speed).



## REDUCING NOISE LEVELS & FUEL CONSUMPTION

1. 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, thereby reducing noise levels. This is most beneficial when sweeping at night, or in areas sensitive to noise pollution.
2. 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 reducing sweeping performance.
3. 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.

## SELECTING NORMAL DRIVE MODE



**Before activating the sweeper control panel, the following conditions must be observed:**

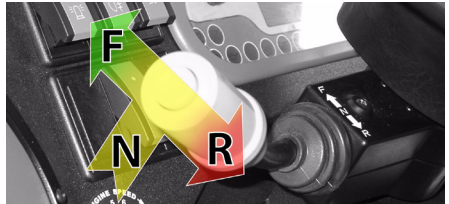
**The engine must be running.**

**The sweeping master switch should be OFF (LED extinguished).**

**The suction fan should be OFF (LED extinguished).**

**The vehicle must be stationary and the throttle pedal must completely released.**

1. Stop the vehicle and apply the hand brake.
2. Move the yellow hydrostatic control lever on the steering column to the central (NEUTRAL) position (the green LED on the dashboard will extinguish).



3. Stop the suction fan by pressing the Suction Fan switch. The red LED will extinguish, confirming that the fan is no longer operating.
4. Press the Brush Master Switch to lift all sweeping equipment to the stowed position.
5. Press the sweep mode switch, engine speed will drop to IDLE and the red LED will extinguish to confirm that the vehicle is no longer in sweep mode.
6. As soon as you no longer represent a hazard switch the beacons OFF.



## DISCHARGING THE HOPPER (TIPPING)



**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.**

## RECOMMENDED TIPPING PROCEDURES

### STANDARD REAR DOOR

On vehicles fitted with the manual rear door, the recommended load-tipping procedure is as follows:

- Position the vehicle ready to reverse to the discharge point and apply the parking brake.
- With the engine running, select sweep mode.
- Press the suction fan switch to start the fan.
- Release the door clamp (the action of the suction fan will keep the door closed).
- Reverse the vehicle into the discharge point.
- Press the suction fan switch to stop the suction fan.
- Press the Hopper Raise and Safety Interlock switches to raise the hopper. As the hopper's internal air pressure returns to normal and the load starts to slide, the door will open on its gas struts and the load will discharge.
- When the load has been discharged, press the Hopper Lower + Safety Interlock switches until the hopper is down.
- Move the vehicle clear of the discharge point.
- **Ensure that the door safety prop is correctly deployed** and, if necessary, wash the door seal and the seal-mating faces on the hopper to ensure that they are completely free from debris left behind during the tipping process.  
**Failure to carry out this check can permanently damage the seal causing the hopper to continuously leak dirty water while sweeping.**
- When the door seal and hopper are clean, release the door safety prop and close the door, securing the clamp by means of the locking pin.



*The door closing procedure is greatly assisted if you first start the suction fan. Remember to stop the fan once the door has been sealed.*

*Refer to Pages 20 to 23 for more detailed information concerning the correct operating sequences.*

## HYDRAULIC REAR DOOR

On vehicles fitted with the optional hydraulic rear door, the recommended load-tipping procedure is as follows:



- Reverse the vehicle into the discharge point.
- Ensuring that the suction fan is OFF, press the Door Open and Safety Interlock switches to open the rear door.
- Press the Hopper Raise and Safety Interlock switches to raise the hopper.
- After the tipping the load press and hold Hopper Down and Safety Interlock switches until the hopper is fully down.
- Move the vehicle clear of the discharge point.
- Wash the door seal and the seal-mating faces on the hopper to ensure that they are completely free from debris left behind during the tipping process.  
**Failure to carry out this check can permanently damage the seal causing the hopper to continuously leak dirty water while sweeping.**
- When the door seal and hopper are clean, press the Door Close button and hold it down until the door locking mechanism has closed.

## OPENING THE REAR DOOR

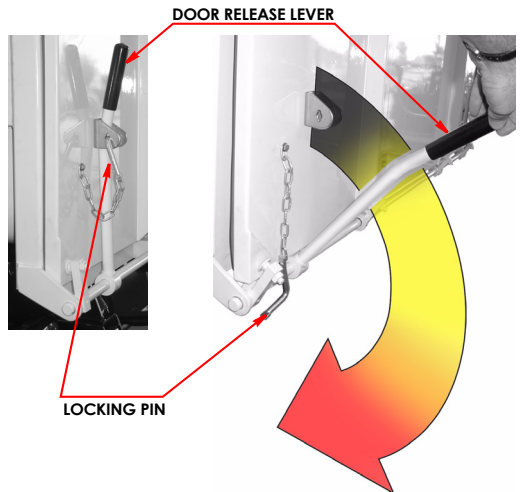
### STANDARD ARRANGEMENT

With the suction fan running, apply a firm inward pressure to the door release lever and withdraw the locking pin, then carefully release the door lever.

**i** *The hopper door will not open at this point because the suction fan is creating a low internal pressure inside the hopper.*

When correctly positioned to tip the load, stop the suction fan. This will leave the door free to open, as soon as the hopper is raised sufficiently for the load to move.

**The door safety prop will only deploy if the door opens to the required height.**





**Fig. 7 Door Release Arrangement**

**Continued...**

## HYDRAULIC ARRANGEMENT


### Using The In-cab Controls

-  **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.**
- 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**

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

With the suction fan OFF and the engine running at IDLE, press and hold down the Safety Interlock button, while simultaneously operating the Door Open switch until the door is fully open. The red LED in the Door Open switch will remain lit while the door is open.



-  *For safety reasons, it is not possible to close the door using in-cab controls. Use the external controls.*

## HYDRAULIC ARRANGEMENT

### Using The External Controls

With the with the suction fan OFF, the engine running at IDLE and the vehicle in Sweep Mode, hold down, the Door Open button until the door is fully open.





## OPERATING THE HOPPER



**APART FROM WHEN DISCHARGING THE HOPPER, ALWAYS USE THE HOPPER PROP WHEN THE HOPPER IS RAISED FOR CLEANING, MAINTENANCE OR ANY OTHER PURPOSE. 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.**



*On models equipped with the hydraulic rear door, the externally-mounted door control box also incorporates a set of duplicate hopper controls. When fitted, these are located adjacent to the nearside rear mudguard in a yellow 4-gang switch box.*

*To be able to raise the hopper the following conditions are required:*



- The engine must be running
- Sweep Mode must be engaged

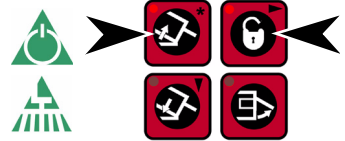
## USING THE IN-CAB CONTROLS



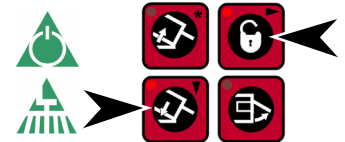
**Unless discharging, deploy the hopper safety prop, ensuring that its foot is securely located in its pocket on the sub-frame.**



1. To raise the hopper, press and hold down the Safety Interlock switch while simultaneously pressing the Hopper UP switch until the hopper is in the fully raised position. The switch's Red LED will illuminate and remain lit while the hopper is in the raised position.



2. To lower the hopper, fold the hopper safety prop into its stowage position flush with the hopper base frame.
3. Press and hold down the Safety Interlock switch 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.



## USING THE OPTIONAL 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 LRD (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.



**Continued...**



**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 red hopper warning LED in the switch will not extinguish until the hopper is completely down.



## CLOSING THE STANDARD REAR DOOR

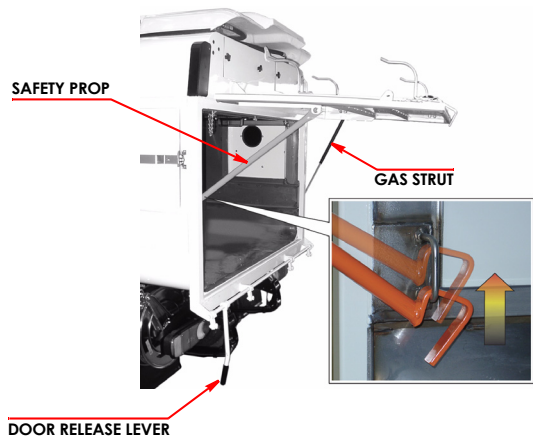


**Before closing the door, ensure that the seal, and mating faces on the hopper, are free from any foreign matter that might damage the seal or adversely affect the sealing function.**



With the suction fan running, slightly raise the door and release the door safety prop from its docking point inside the hopper door frame. Apply sufficient downward pressure on the door to compress the gas strut and close the door.

Raise the door clamping lever and apply forward pressure to position it in its docking position on the door. Insert the captive locking pin to secure the lever and seal the door then stop the suction fan



**Fig. 8 Door Safety Prop Arrangement**

## CLOSING THE HYDRAULIC REAR DOOR



**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.**



*For safety reasons, it is not possible to close the door using in-cab controls. Use the external controls.*

With the engine running at IDLE and the vehicle in Sweep Mode, press and hold the Door Close button until the door is fully closed and the door-locking ram has completed its locking cycle.






## THE WANDER HOSE

### USING THE WANDER HOSE





**BEFORE CONNECTING THE WANDER HOSE, ENSURE THAT THE SUCTION FAN IS TURNED OFF.**

1. Press the 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 auto-blanking flaps (if fitted) 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 either the wander hose aperture in the rear door, or the appropriate side loading flap and stow it on the spare fasteners located 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.

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

#### VEHICLES WITH AUTOBLANKING

1. If a suction nozzle is active, press the appropriate nozzle's switch to cancel the feature. This will close the nozzle blanking flap(s). The switch's red LED will extinguish to confirm that it is no longer active. 
2. Press the suction fan switch to restart the fan. The switch's red LED will illuminate. The wander hose is now ready for use. 

#### VEHICLES WITH MANUAL BLANKING

1. Refer to the hopper tilting instructions on page 22.
2. Release the securing pins and remove the blanking plate from its stowage position on the nearside rear mudguard.
3. Fit the blanking plate over the upper aperture of the suction tube i.e. on top of the water tank (Refer to Fig. 9).
4. Refer to the hopper lowering instructions on (page 22).
5. Turn on the suction fan.
6. Remember to remove the blanking plate when finished.



**Fig. 9 The Blanking-plate**

**Continued...**

## Preventing load-spills via the suction tube

7. The manual blanking plate should also be fitted over the suction tube when transporting a full load, especially a very wet load. This will prevent spillage via the suction tube caused by the movement of the load due to the effects of braking and cornering en-route to the tipping location.

## USING THE LOW-PRESSURE WATER PUMP



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

The type of low-pressure water pump fitted to the Minor is an electrically driven unit and this is fitted to all current machines. It is located on the right hand side of the cooler gantry just inboard of the exhaust and air cleaner stacks.

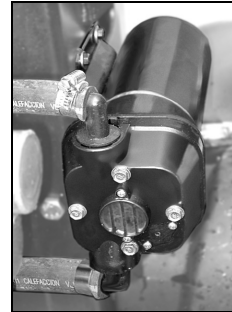


Before using the dust suppression system, ensure you have sufficient water in the tank. Select the spray jets and sweep pattern you require as follows:

**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 that the feature is active.

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

Press the Brush Master Switch (in Sweep Mode) to start the selected configuration.



**Fig. 10 Low-pressure Pump**



## LUBRICATION

The pump bearings are 'sealed-for-life' and require no lubrication.

## 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. Switch on all sprays and run the water pump until the system runs dry.

## USING THE OPTIONAL HIGH-PRESSURE WATER PUMP



**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.**



**Do not direct the high pressure jet directly at paint work or at electrical connections, this could result in damage to the vehicle.**

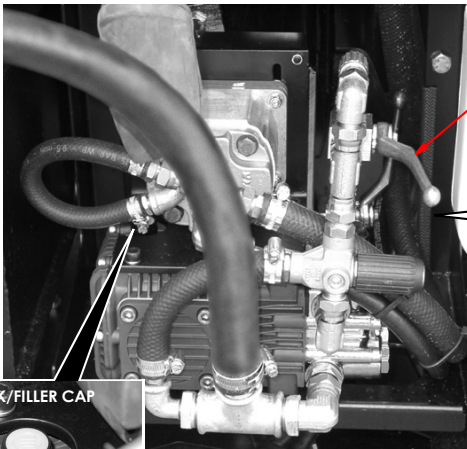
**This pump should NEVER be permitted to run dry, as this will quickly destroy the piston seals and cause the pump to fail. If the pump shuts off in-use the most likely cause will be low water activating the auto shut-off float switch in the tank.**



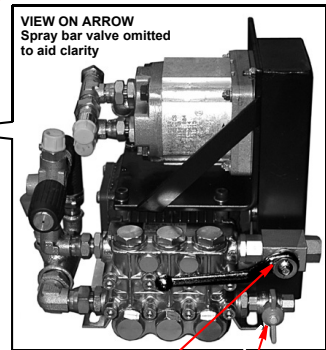
1. Ensure that there is sufficient water in the water tank.
2. Select Sweep Mode and set engine speed to the high end of its optimum range.
3. If the machine is fitted with a front-mounted high-pressure spray bar, adjust the ball valve to supply the spray bar or the hand-lance as required.
4. Switch on the high pressure pump. The red LED will illuminate to confirm that the feature is active.



*When washing the hopper using the H-P pump, set engine speed to IDLE.*



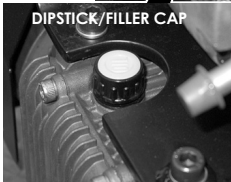
BALL VALVE TO FRONT  
H-P SPRAY BAR



VIEW ON ARROW  
Spray bar valve omitted  
to aid clarity

BALL VALVE  
H-P BLEED/DRAIN

L-P DRAIN VALVE



DIPSTICK/FILLER CAP

**Fig. 11 Typical High-pressure Water Pump Arrangement**

## BASIC MAINTENANCE

### OIL LEVEL



1. The level of the oil in the pump's crankcase should be checked on a regular basis (See "OPERATOR'S ROUTINE MAINTENANCE" on page 28.) and topped up as necessary. There is a combined filler cap/dipstick on the top of the pump body (Refer to Fig. 11).

### DRAINING



**This pump should NEVER be permitted to run dry. Failure to comply 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 OPERATOR'S ROUTINE MAINTENANCE on page 28).
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:

(d) Ensure that the water tank has been filled

(e) Open the primer valve (plated lever) on the high-pressure pump assembly.



(f) Ensure that the vehicle is in NEUTRAL and start the engine.

(g) Press the Sweep Mode switch on the main control panel. The red LED will illuminate to confirm selection.



(h) Adjust engine speed to the upper end of its optimum range, using the Engine Speed +/- switches on the main control panel.



(i) Switch on the high pressure pump. The red LED will illuminate to confirm that the feature is active.



(j) As soon as a steady stream of water is flowing from the primer valve, close the valve. The system should now be fully primed and ready for use. To confirm this, test the system by operating one of the high-pressure water appliances.


# SCARAB MINOR - EURO 4 FL

## 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 Minor performs at the optimum level of safety and efficiency. Refer to the paragraphs following this schedule for more detailed information.

MAINTENANCE PROCEDURE	DAILY ACTION		WEEKLY ACTION	MONTHLY ACTION
	BEFORE	AFTER		
Check vehicle / body for safety. All lighting equipment, tyres, fuel, oil, coolant, brake fluid, windscreen wash and water-tank levels	✓	✗	✗	✓
Check hydraulic oil level and inspect vehicle for signs of hydraulic leaks. Check oil cooler and radiator are clean	✓	✗	✗	✓
If vehicle not previously used by YOU, check suction fan is clean. Rectify as required	✓	✗	✗	✓
Check brushes/skirts for wear. Remove any entangled items, e.g. lengths of string	✓	✗	✗	✓
Check suction nozzle/flaps for damage/correct ground clearance. Wrong setting will impair suction performance	✓	✗	✗	✓
Check all equipment is stowed and brushes have been raised	✓	✗	✗	✓
Check water spray jets for blockages	✓	✗	✗	✓
Wash vehicle, particularly hopper screens and area above. Leave hopper door partially open, allowing air to circulate. Avoid directing high-pressure water at electrical connections.	✗	✓	✗	✓
Wash suction fan thoroughly, using scraper provided and high-pressure jetting lance	✗	✓	✓	✓
Carry out a thorough inspection of the fan assembly to verify that it is in good condition	✗	✗	✗	✓
Wash oil cooler, ensuring that the fins are clean	✗	✓	✗	✓
Wash the radiator, ensuring that the fins are clean	✗	✓	✗	✓
Lubricate as appropriate, brush links, pivots, nozzle wheels and the wide sweep bearing	✗	✓	✗	✓
Remove and clean the water strainer elements	✗	✓	✗	✓
Grease prop. shaft and check for wear on U/Js	✗	✗	✓	✓
Check entire machine for wear/damage. Rectify as required	✗	✗	✗	✓
Raise/prop hopper. Run fan/brushes (normal speed). Check, if fitted, the oil tank return filter gauge, if in RED zone, replace element	✗	✗	✗	✓
Check for wear in suction tubes and deflectors	✗	✗	✗	✓
Check seals on hopper-door, side-hatches, suction-tubes	✗	✗	✗	✓

# SCARAB MINOR - EURO 4 FL

MAINTENANCE PROCEDURE	DAILY ACTION		WEEKLY ACTION	MONTHLY ACTION
	BEFORE	AFTER		
Check hopper and subframe-to-chassis mounting points	X	X	X	✓
Check wiring and hoses for security of attachment and for signs of chafing. Rectify as necessary	X	X	X	✓
Check oil level in high-pressure pump, top up as necessary	X	X	X	✓
Clean air cleaner (more often if working in dusty conditions)	X	X	X	✓
<b>IN FROSTY WEATHER</b>				
 <b>Do not, under any circumstances, operate the high pressure pump without water.</b>				
Drain the water tank (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.				



*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.*

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

*The fitting of genuine Scarab parts is highly recommended. The use of alternatives might compromise the performance and reliability of your sweeper and could invalidate your warranty.*

*For chassis servicing/maintenance, refer to the chassis manufacturer's information or consult the manufacturer's agent or dealer.*

## TILTING THE CAB



**Before tilting the cab, ensure that there is sufficient space to do so and that all loose items are safely stowed.**

1. Operate the cab-locking lever (located between the seats) by moving it through approximately 180° (see Fig. 12).
2. Close the cab door and raise the cab safety latch, simultaneously lifting the rear of the cab until it reaches its maximum tilt position.
3. Deploy the cab prop, locating it in its retaining pocket on the chassis rail.



**Before lowering the cab, ensure that area below it is clear of any items or equipment used while the cab was in the raised position.**

4. Lower the cab and engage the locking lever.



**BEFORE DRIVING THE VEHICLE, ENSURE THAT THE CAB LOCKING LEVER IS FULLY ENGAGED IN THE LOCKED POSITION.**



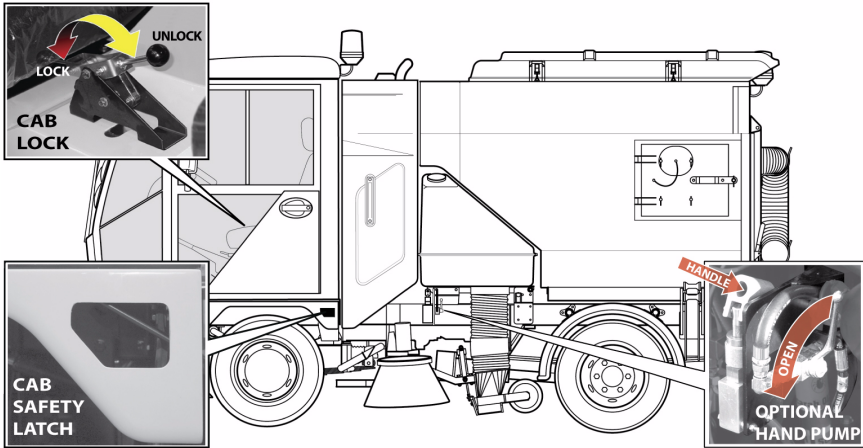


Fig. 12 Cab-tilt Systems

## OPTIONAL HYDRAULIC CAB-TILT

**Before tilting the cab, ensure that there is sufficient space to do so and that all loose items are safely stowed.**

1. Operate the cab-locking lever (located between the seats) by moving it through approximately 180° (see Fig. 12).
2. Fit the pump handle into its socket on the hand-pump.
3. Move the lever on the ball valve to the closed (upright) position.
4. Holding the cab safety latch open, operate the hand-pump until the cab clears the latch plate. Release the latch and continue pumping until the cab has been raised sufficiently to deploy the safety prop.
5. Deploy the cab prop, locating it in its retaining pocket on the chassis rail.

**Before lowering the cab, ensure that area below it is clear of any items or equipment used while the cab was in the raised position.**

6. Fold the cab safety prop into its stowage position, then move the lever on the ball valve slowly to the open (horizontal) position. This will allow the cab to lower progressively under its own weight.

**i** *There will be an audible 'click' as the cab reaches the fully down position and the safety latch re-engages.*

7. Engage the cab locking lever by moving it through approximately 180°, ensuring that it engages with the cab anchor point attached to the chassis and locks into position.



**BEFORE DRIVING THE VEHICLE, ENSURE THAT THE CAB LOCKING LEVER IS FULLY ENGAGED IN THE LOCKED POSITION.**

## KEY MAINTENANCE PROCEDURES

### CLEANING THE SUCTION FAN



**FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY.**

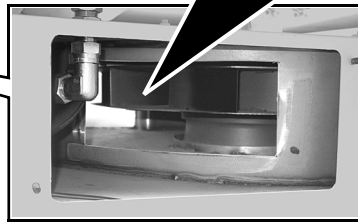
- 1. BEFORE WORKING ON THE MACHINE POSITION IT ON FIRM, LEVEL GROUND, APPLY HANDBRAKE, STOP ENGINE & REMOVE IGNITION KEY.**
- 2. ALWAYS USE THE HOPPER PROP TO SUPPORT A RAISED HOPPER.**
- 3. THE FAN IS AN EXTREMELY HEAVY ROTATING MASS. NEVER ATTEMPT TO SLOW OR STOP ITS ROTATION BY USING THE HANDS OR 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 PROTECTION WHEN USING THE HAND LANCE.**



1. Raise the hopper and deploy the hopper prop.
2. Switch off the engine and remove the ignition keys.
3. Remove the outer inspection cover from the hopper and the inner cover from the fan housing to expose the fan (Refer to Fig. 13).
4. Using high-pressure water from a remote source and the special scraper, as necessary, thoroughly clean the fan. Pay particular attention to the inside curve of each impeller blade and to the area around the fan hub.
5. Refit the inspection covers, lower the hopper and close the door.



**PLEASE PAY PARTICULAR ATTENTION TO INNE CURVE OF BLADES AND ALSO THE CENTRE OF THE UNIT WHERE DIRT ACCUMULATES AROUND THE HUB AREA**



To remove the hopper cover for cleaning and inspection of the fan exhaust duct area, release the five clips arrowed above.

**Fig. 13 Inspecting & Cleaning the Suction Fan**



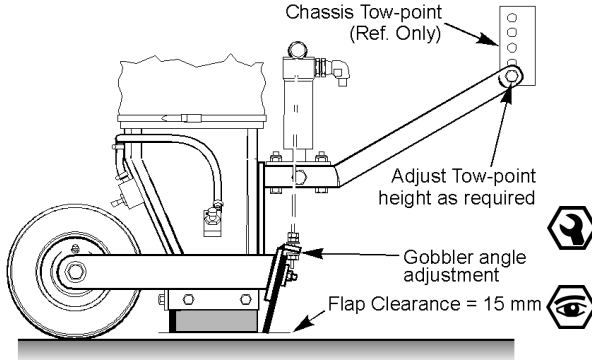
**LOOSE PARTICLES FROM THE CLEANING PROCESS CAN BE EJECTED FROM THE FAN CASING VIA THE HOPPER COVER WHEN THE FAN IS RESTARTED. ENSURE THAT THE AREA AROUND THE MACHINE IS CLEAR BEFORE RESTARTING.**

6. Start the engine and switch the suction fan ON.
7. Direct additional water onto the screens below the fan inlet cone, via a side access hatch, **until 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 exhibit excessive wear. Adjust as necessary to achieve the correct flap to ground clearances (Refer to Fig. 14).

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



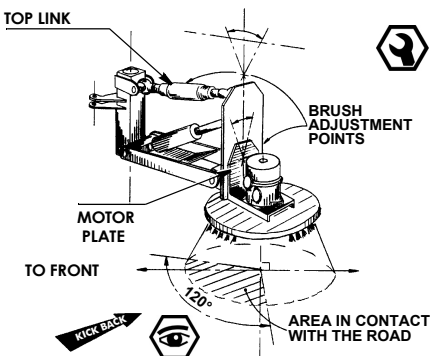
**Fig. 14 Suction Nozzle Clearance - Factory Set-up**

## SETTING UP THE BRUSHES & SKIRTS

Maintaining an effective brush set-up is essential to good sweeping performance. The following instructions are based on the factory settings, which produce excellent results in virtually all conditions.

It should be remembered, however, that there is no substitute for experience and if it is found that, for a specific task, an alternative set-up is more effective, this may be adopted when necessary.

**! DO NOT ATTEMPT TO ADJUST BRUSH SETTINGS WHILE THE BRUSH IS TURNING.**



**Fig. 15 Brush Tilt Adjustment**

## SIDE BRUSHES

The side brush should be angled so that, when deployed, about **33% (120°)** of the outer/leading edge of its circumference is in contact with the road surface.

The rubber skirt adjacent to the side brush collects / positions material in the path of the suction nozzle. Condition and adjustment are very important. Position the skirt so that it is just clear of the ground.

## FRONT BRUSHES



**DO NOT ATTEMPT TO ADJUST BRUSH SETTINGS WHILE THE BRUSH IS TURNING.**



**An incorrect front brush set-up affects not only sweeping efficiency, but can also greatly influence the rate of brush wear.**

1. There are two sweeping configurations with the Front Brushes.
  - When both brushes are lowered straight down onto the road.
  - When the curb-side brush is extended outwards to the gully.

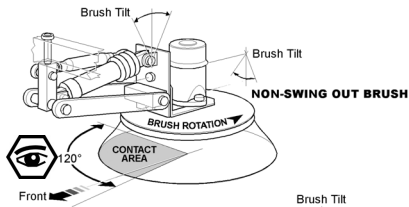


*On dual sweep machines, both brushes can be extended.*

2. On single sweep machines, front brush tilt-angle differs from side to side. For general sweeping duties, a greater proportion of the outward-extending brush is in contact with the road surface.
3. To set the correct tilt angles, adjust the Top Link and/or swivel the Motor Plate, to obtain a satisfactory setting as follows:

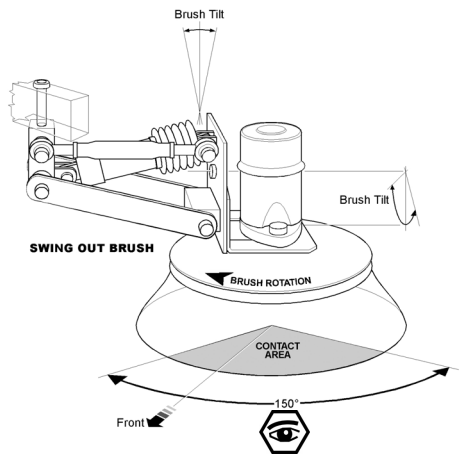
### 4. Extending Brush.

Set the brush so that about **40% (150°)** of its circumference, at the outer/leading edge, is in contact with the road surface, **when the brush is in the extended position.**



### 5. Non-extending Brush.

Adjust so that about **33% (120°)** of its circumference, at the outer/leading edge, is in contact with the road surface.



## DUAL SWEEP MACHINES



1. Adjust the Top Link and/or Motor Bracket of each brush, until about **40%** or **150°** of its circumference, at the outer/leading edge, is in contact with the road surface.

**Fig. 16 Front Brush Adjustment**

# SCARAB MINOR - EURO 4 FL

## FLUID LEVELS

For coolant and hydraulic filler points refer to Fig. 17. The brake and screen-wash reservoirs are in the cab. Access to the brake fluid reservoir is gained via a flap on top of the dash panel. For engine oil filler and dipstick refer to Fig. 18.

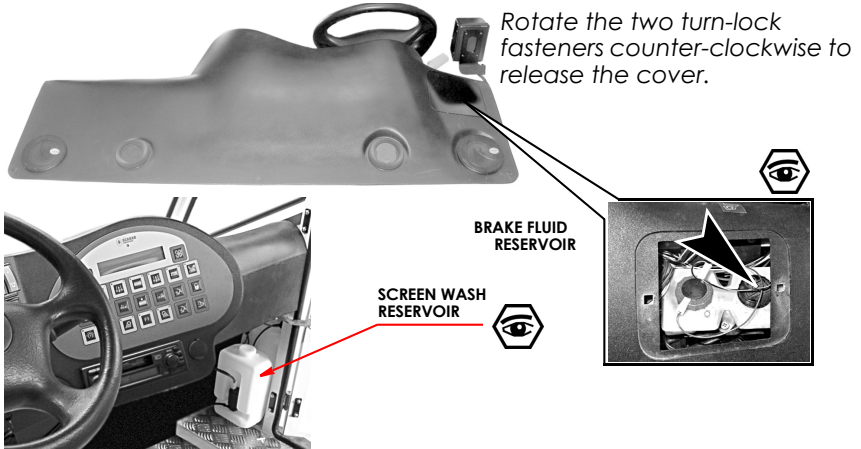


Fig. 17 In-Cab Fluid Reservoir Locations

**⚠ TAKE CARE TO AVOID CONTACT WITH HOT FLUIDS OR COMPONENTS WHEN CHECKING/TOPPING UP FLUID LEVELS.**

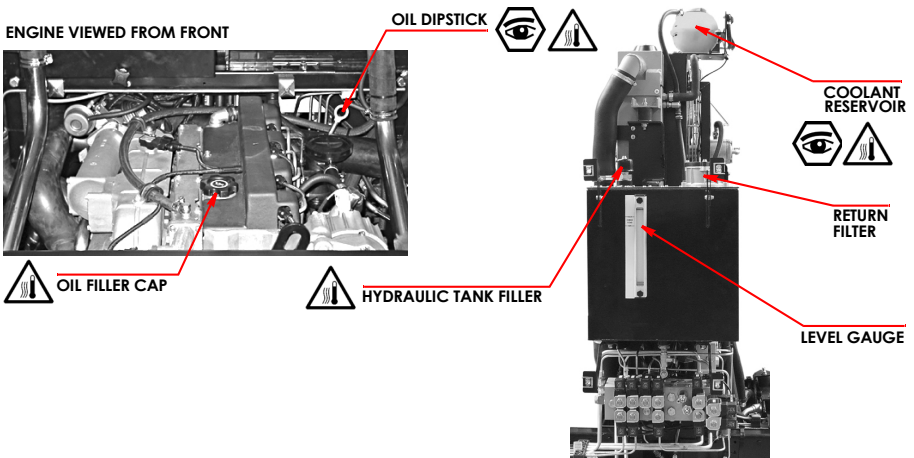


Fig. 18 Engine & Hydraulic Oil Reservoirs

# SCARAB MINOR - EURO 4 FL

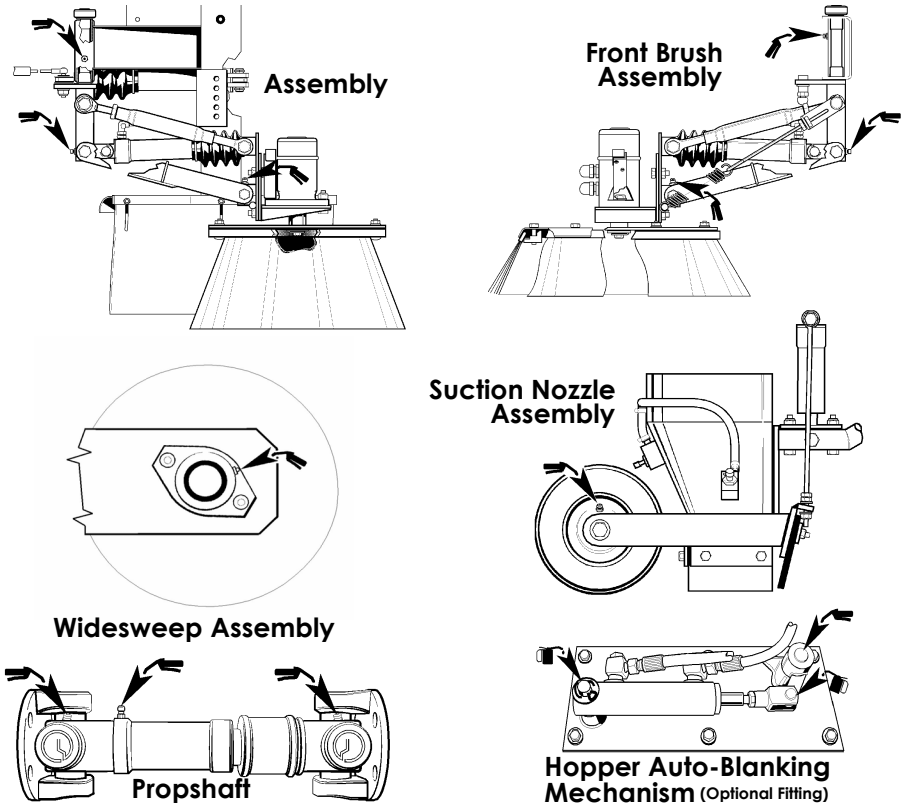
## SWEEPING FAULTS - DIAGNOSIS & RECTIFICATION

FAULT	SOLUTION
LIGHT MATERIAL IS CARRIED ROUND SIDE BRUSH & DEPOSITED BACK IN CHANNEL	THE SIDE BRUSH IS SET TOO FLAT ON THE ROAD SURFACE. CHECK/RESET BRUSH ANGLE
A TRAIL OF SMALL STONES IS LEFT BEHIND THE SUCTION NOZZLE	1. SUCTION NOZZLE FLAPS ARE SET TOO HIGH 2. SUCTION NOZZLE TOW-POINT SET TOO HIGH 3. FAN SPEED IS TOO LOW

## RECOMMENDED LUBRICANTS AND CONSUMABLE PARTS

DESCRIPTION	SPECIFICATION	SCARAB PART
HYDRAULIC OIL	DERWENT 32	005005
MULTI-PURPOSE GREASE (GREASE POINTS)	SUPER LITHIUM 2	005007
MOTOR OIL (HIGH-PRESS WATER PUMP)	15W/50	005001
REPLACEMENT BRUSH DISCS (WIDE SWEEP)	-	023471
REPLACEMENT SPACERS (WIDE SWEEP)	-	023472
REPLACEMENT SIDE BRUSH	-	023470
REPLACEMENT FRONT BRUSH	-	023469
RUBBER SKIRT (2 SLOT), SIDE BRUSH	-	012216
RUBBER SKIRT (3 SLOT), SIDE BRUSH	-	010247
FRONT SKIRT, WIDE SWEEP	-	022516
SUCTION TUBE	-	023154
FLAP KIT, SUCTION NOZZLE	-	011593
FLAP CLAMP (LONG), SUCTION NOZZLE	-	011592
FLAP CLAMP (SHORT), SUCTION NOZZLE	-	013615
GOBBLER ROD, SUCTION NOZZLE	-	011811
SPRING, SUCTION NOZZLE BOX	-	010521
SEAL, SUCTION NOZZLE - HOPPER	-	013601
SEAL, REAR DOOR	-	010544
SEAL, SIDE LOADING HATCH	-	013599
SEAL, FRONT APERTURE	-	013594
WANDER HOSE	-	010119
ELEMENT, HYDRAULIC RETURN FILTER	-	011972
ELEMENT, WATER FILTER	-	010121
DISC PAD SET	-	020138

**MANUAL GREASING**



**Fig. 19 Grease-point Locations**

## 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 the 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 work has 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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