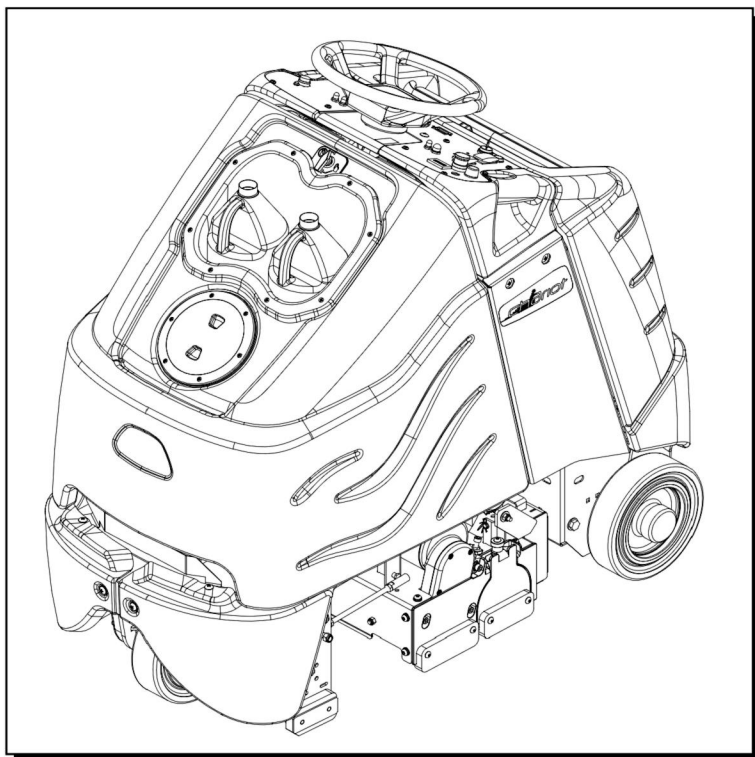




iCapsol

Operating Instructions (ENG)



MODELS : **CI24** **CIE24**
 10060170 **10060190**

CE
IPX4

Read these instructions before using the machine.

MACHINE DATA LOG/OVERVIEW

MODEL _____

DATE OF PURCHASE _____

SERIAL NUMBER _____

SALES REPRESENTATIVE # _____

YOUR DEALER

Name: _____

Address: _____

Phone Number: _____

OVERVIEW

The **Chariot iCapsol** is a battery powered, stand-on, carpet maintainer intended for commercial use. The **Chariot iCapsol** Carpet Maintainer is designed to maintain your carpet using the iCapsol Encapsulating Interim Carpet Cleaning Process. The machine has two counter rotating brushes that help scrub chemical into the carpet. The chemical, Red Carpet iCapsol Encapsulating Interim Cleaning Chemical, encapsulates the dirt, allowing both to be vacuumed up once the chemical has dried. The brushes also help to raise the pile of the carpet, giving it a lush groomed appearance.

TABLE OF CONTENTS

Machine Data Log/Overview	2
Table Of Contents	3

HOW TO USE THIS MANUAL

How To Use This Manual	1-1
------------------------------	-----

SAFETY

Important Safety Instructions	2-1
Hazard Intensity Level	2-2
Safety Label Location	2-3

OPERATIONS

Technical Specifications	3-1
How The Machine Works	3-3
Components	3-4
Drive Controls	3-5
Scrub Controls	3-9

Machine Operation	3-11
Pre-Run Machine Inspection	3-11
Starting Machine	3-11
Emergency Stop Procedures	3-11
Filling Solution Tank	3-12
Normal Scrubbing	3-12
To Begin Scrubbing	3-13
Priming Pump	3-13
To Stop Scrubbing	3-14
Double Scrub	3-14
Emptying and Cleaning Tanks	3-14

MAINTENANCE

Service Schedule	4-1
Batteries	4-2
Scrub Deck	4-6
Scrub Brushes	4-9
Circuit Protection	4-11
Solution Strainer & Pump	4-12
Drive Motor & Brake	4-14
Transporting Machine	4-17
Machine Troubleshooting	4-18

PARTS LIST

Bumper	5-1
Control Panel	5-3
Control Panel Housing	5-5
Decal	5-7
Frame-Lower	5-9
Frame-Upper	5-11
Pedal Platform(From SN)	5-13A-B
Pedal Platform(To SN)	5-14A-B
Rear Cover	5-17
Scrub Deck	5-19
Scrub Deck Lift Actuator	5-21
Scrub Deck Lift Linkage	5-23
Solution	5-25
Steering	5-27
Tank	5-29
Wheel-Front Drive, Chain	5-31
Wheel-Front Brake	5-33
Wheel-Rear	5-35
Wiring-Batteries	5-37
Wiring-Components	5-39
Wiring-Control Panel	5-41
Wiring-Drive Motor	5-43
Wiring-Main Harness	5-45
Wiring-Pedal Platform (From SN)	5-47A-B
Wiring-Pedal Platform (To SN)	5-48A-B
Wiring Diagram	5-49
Hose Diagram	5-50
Suggested Spare Parts	5-51
Back-Up Alarm – Option	5-53
Battery Cart – Option	5-55
Seat – Option	5-59
Warning Light – Option	5-61
EC Declaration	5-63
Serial Number	5-64
Warranty	

HOW TO USE THIS MANUAL

This manual contains the following sections:

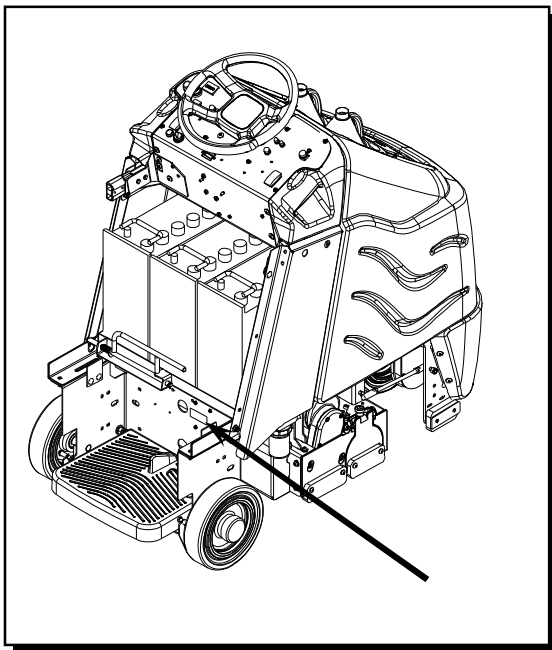
- HOW TO USE THIS MANUAL
- SAFETY
- OPERATIONS
- MAINTENANCE
- PARTS LIST

The HOW TO USE THIS MANUAL section will tell you how to find important information for ordering correct repair parts.

Parts may be ordered from authorized Windsor dealers. When placing an order for parts, the machine model and machine serial number are important. Refer to the MACHINE DATA box which is filled out during the installation of your machine. The MACHINE DATA box is located on the inside of the front cover of this manual.

MODEL _____
DATE OF PURCHASE _____
SERIAL NUMBER _____
SALES REPRESENTATIVE # _____

The model and serial number of your machine are located below the battery compartment of the machine.



The SAFETY section contains important information regarding hazard or unsafe practices of the machine. Levels of hazards are identified that could result in product or personal injury, or severe injury resulting in death.

The OPERATIONS section is to familiarize the operator with the operation and function of the machine.

The MAINTENANCE section contains preventive maintenance to keep the machine and its components in good working condition. They are listed in this general order:

- Batteries
- Scrub Brushes
- Service Schedule
- Machine Troubleshooting

The PARTS LIST section contains assembled parts illustrations and corresponding parts list. The parts lists include a number of columns of information:

- **REF** – column refers to the reference number on the parts illustration.
- **PART NO.** – column lists the part number for the part.
- **PRV NO.** – reference number
- **QTY** – column lists the quantity of the part used in that area of the machine.
- **DESCRIPTION** – column is a brief description of the part.
- **SERIAL NO. FROM** – If this column has an (*) and a Reference number, see the SERIAL NUMBERS page in the back of your manual. If column has two asterisk (**), call manufacturer for serial number. The serial number indicates the first machine the part number is applicable to. The main illustration shows the most current design of the machine. When a boxed illustration is shown, it displays the older design.
- **NOTES** – column for information not noted by the other columns.

NOTE: If a service or option kit is installed on your machine, be sure to keep the KIT INSTRUCTIONS which came with the kit. It contains replacement parts numbers needed for ordering future parts.

IMPORTANT SAFETY INSTRUCTIONS

When using an battery powered appliance, basic precaution must always be followed, including the following:

READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE.



To reduce the risk of fire, electric shock, or injury:

Use only indoors. Do not use outdoors or expose to rain.

Use only as described in this manual. Use only manufacturer's recommended components and attachments.

If the machine is **not working properly**, has been dropped, damaged, left outdoors, or dropped into water, return it to an authorized service center.

Do not operate the machine with any openings blocked. Keep openings free of debris that may reduce airflow.

This machine **is not** suitable for picking up hazardous dust.

Machine can cause a fire when operating near flammable vapors or materials. Do not operate this machine near flammable fluids, dust or vapors.

This machine is suitable for commercial use, for example in hotels, schools, hospitals, factories, shops and offices for more than normal housekeeping purposes.

Maintenance and repairs **must be done** by qualified personnel.

If foam or liquid comes out of machine, **switch off immediately**.

Disconnect battery before cleaning or servicing.

Before the machine is discarded, the batteries **must be removed** and properly disposed of.

Make sure all warning and caution labels **are legible and properly attached** to the machine.

During operation, attention shall be paid to other persons, especially children.

Before use all covers and doors shall be put in the positions specified in the instructions.

When leaving unattended, secure against unintentional movement.

The machine shall only be operated by instructed and authorized persons.

When leaving unattended, switch off or lock the main power switch to prevent unauthorized use.

Only chemicals recommended by the manufacturer shall be used.

This appliance has been designed for use with the brushes specified by the manufacturer. The fitting of other brushes may affect its safety.

Do not use on surfaces having a gradient of over 10% (6 degrees).

SAVE THESE INSTRUCTIONS

HAZARD INTENSITY LEVEL

The following symbols are used throughout this guide as indicated in their descriptions:

HAZARD INTENSITY LEVEL

There are three levels of hazard intensity identified by signal words -**WARNING** and **CAUTION** and **FOR SAFETY**. The level of hazard intensity is determined by the following definitions:



WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.



CAUTION - Hazards or unsafe practices which could result in minor personal injury or product or property damage.

FOR SAFETY: To Identify actions which must be followed for safe operation of equipment.

Report machine damage or faulty operation immediately. Do not use the machine if it is not in proper operating condition. Following is information that signals some potentially dangerous conditions to the operator or the equipment. Read this information carefully. Know when these conditions can exist. Locate all safety devices on the machine. Please take the necessary steps to train the machine operating personnel.

FOR SAFETY:

DO NOT OPERATE MACHINE:

Unless Trained and Authorized.

Unless Operation Guide is Read and understood.

In Flammable or Explosive areas.

In areas with possible falling objects.

WHEN SERVICING MACHINE:

Avoid moving parts. Do not wear loose clothing; jackets, shirts, or sleeves when working on the machine. Use Windsor approved replacement parts.



Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep battery compartment open during charging. Keep sparks and flames away from the batteries. Do not smoke around batteries.



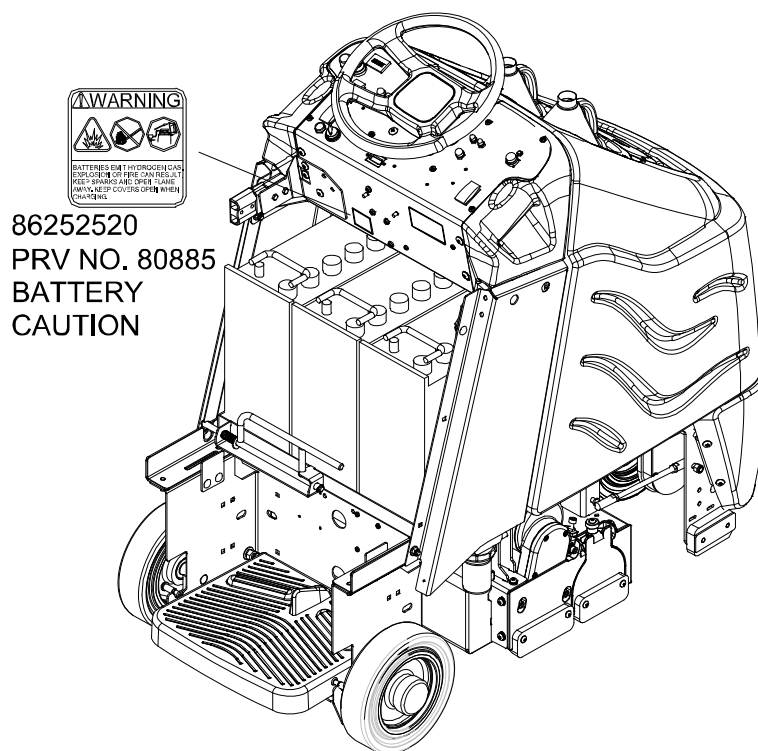
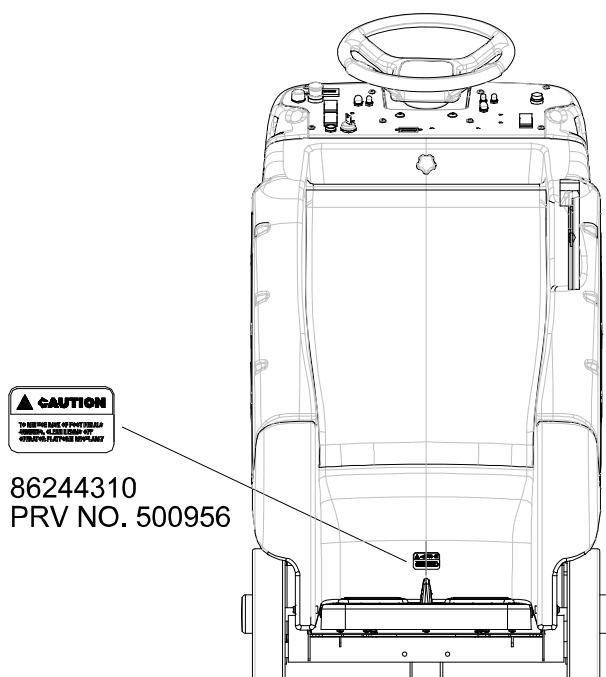
Disconnect batteries before working on machine. Only qualified personnel should work inside machine. Always wear eye protection and protective clothing when working on or near batteries. Avoid skin contact with the acid contained in the batteries.



Never allow metal to lie across battery tops.

SAFETY LABEL LOCATION

NOTE: These drawings indicate the location of safety labels on the machine. If at any time the labels become illegible, promptly replace them.

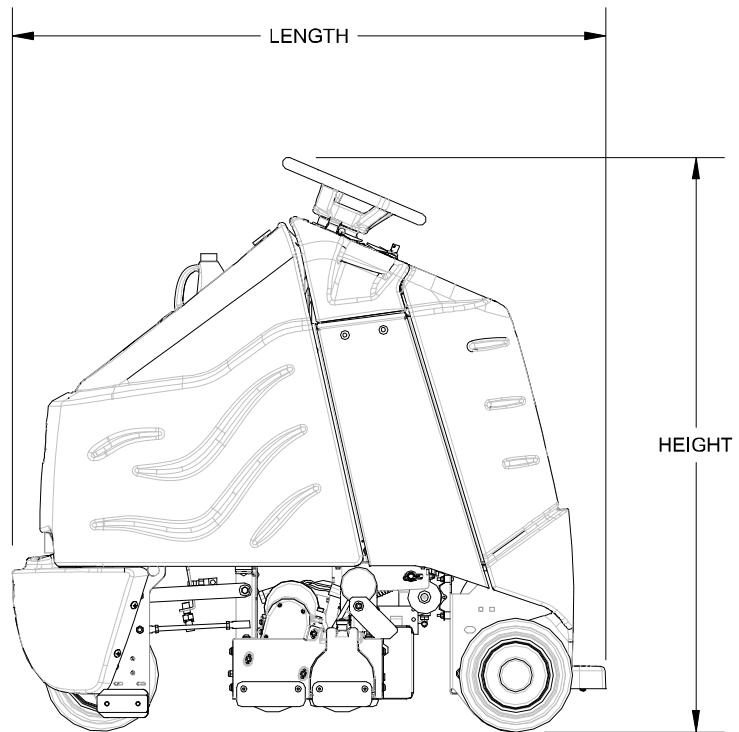
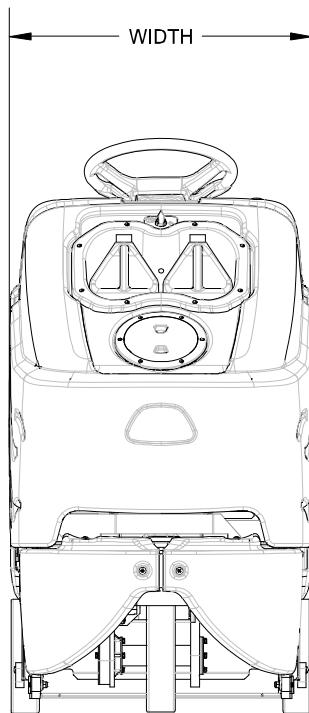


TECHNICAL SPECIFICATIONS

ITEM	DIMENSION/CAPACITY
Nominal Power	1800 W
Rated Voltage	36 Volts DC
Rated Amperage	50 amps
Batteries	3 X12 Volt 195-215 AH @ 20 hr. rate
Battery Compartment Dimensions	21 in. x 16 in. x 17 in. tall (533mm x 406mm x 432mm)
Propelling Motor	.75 HP (560 W)
Mass (GVW)	1245 lbs (565 kg)
Weight Empty Without Batteries	550 lbs (249 kg)
Solution Control	Metered flow with automatic shut-off in neutral and reverse
Spray Pump Pressure	100 psi
Solution Capacity	16 gal (60.5 Liter)
Number Of Spray Jets	2
Chemical Capacity	2 x 1 Gallon Bottles (3.8 Liter)
Chemical Mix Ratio	1:16 or 8oz per gallon
Scrub Brush Diameter	6 inch (152 mm)
Scrub Brush Motors	2 x .75 HP (560W)
Scrub Brush Pressure	Floating
Scrub Brush Speed	800 rpm
Tires	10 in. (254mm) Solid Gray non-marking
Foundation Pressure	104 psi (715 Kpa)
Maximum Speed	3.5 miles/hour (5.6 Km/hour)
Scrubbing Speed	1.5 miles per hour (2.4 Km/hour)
Frame Construction	Powder coated steel
Brake	Electrical parking brake, sets automatically whenever operator steps off platform or engages emergency stop.
Minimum Aisle U-Turn Width	56 in. (1425 mm)
Maximum Rated Climb And Descent Angle	7.5 degrees

TECHNICAL SPECIFICATIONS

ITEM	MEASURE
Height	50.6 inches (1285 mm)
Length	52.5 inches (1330 mm)
Width	26.5 inches (670 mm)
Width of scrub path	23 inches (585 mm)



SPECIAL NOTES:

The sound pressure level at the operator's ear was measured to be 67 dBA. This was a nearfield, broad-band measurement taken in a typical industrial environment on a tile floor. This appliance contains no possible source of impact noise. The instantaneous sound pressure level is below 63 Pa.

The weighted root mean square acceleration at the operator's arms was measured to be below 2.5m/s^2 . This was a tri-axial, third-octave-band measurement made during normal operation on a composite tile floor. The measurement and related calculations were made in accordance with ANSI S3.34-1986.

HOW THIS MACHINE WORKS

The Chariot iCapsol is a battery powered, self-propelled Carpet Maintainer intended for commercial use. The machine is designed to maintain your carpet using the iCapsol Encapsulating Interim Carpet Cleaning Process. By using the iCapsol Carpet Maintainer in conjunction with Windsor Red Carpet iCapsol Encapsulating Interim Cleaning (86952260, PRV NO. W450-4) or iCapsol Encapsulating Interim Cleaning with Carpet Protection (86952270, PRV NO. W455-4) chemical solution, you can perform a regular light cleaning and grooming of your carpet very quickly, and have the carpet dry and ready for traffic within 30 minutes.

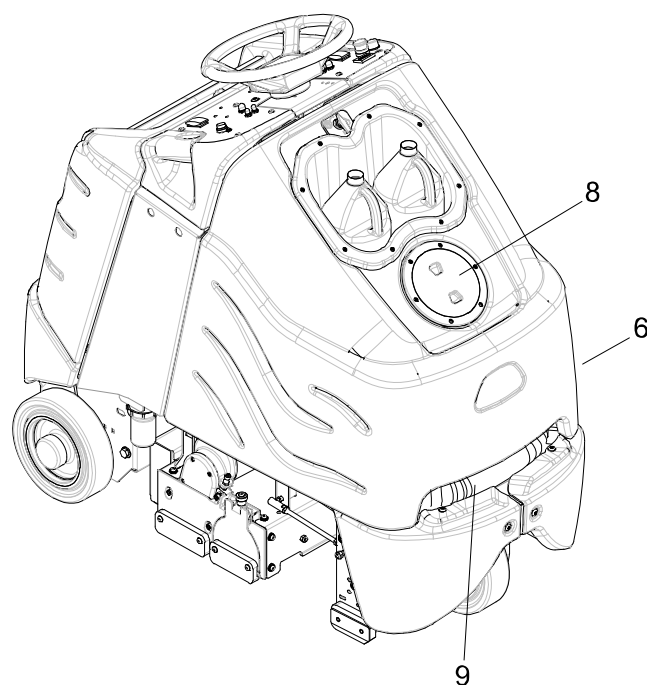
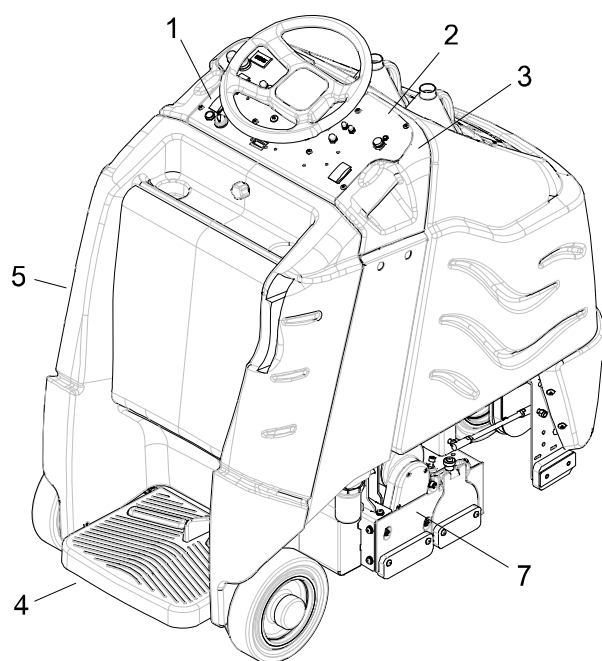
The machine's primary systems are the solution system, scrub system, and operator control system.

The function of the solution system is to store water and iCapsol Encapsulating Interim Cleaning chemical; mix them proportionally and deliver cleaning solution to the spray jets. The solution system consists of the solution tank, strainer, pump, selector valve, injector, shut-off valve, spray jets and controls. The solution tank stores water until it is delivered through the strainer and pump to the injector and spray jets. The strainer protects the pump from debris. The selector valve allows the operator to flush clean water (from the solution tank) through the injector system to keep it clean. The injector siphons iCapsol Encapsulating Interim Cleaning at an 8oz/gallon rate (1:16 ratio). The shut-off valve automatically prevents solution flow unless the scrub brushes are turned on and the machine is being propelled forward. The solution pump switch controls the cleaning solution flow to the spray jets.

The function of the scrub system is to scrub the carpet, mix the iCapsol Encapsulating Interim Cleaning solution with the soil so as to encapsulate it, and lift and groom the carpet pile. The scrub system consists of two cylindrical brushes, motors, hopper, lift actuator, and controls. The brushes scrub the carpet as the motors drive the brushes. The counter-rotating action of the brushes picks up debris and throws it into a removable hopper. The actuator switch controls the lift actuator and brush motors to lower the deck and turn the motors on, or raise the deck and turn the motors off. The brush motors will automatically turn off when the throttle pedal is in neutral.

The function of the operator control system is to control the direction and speed of the machine. The directional control system consists of the direction control switch, throttle pedal, speed control switch, drive reset switch, emergency stop/brake switch, steering wheel, propel controller, drive wheel and operator presence pedal, prior to Serial Number (10*). The directional control switch signals forward or reverse direction. The controller interprets signals from the throttle pedal to command the drive wheel to propel or slow the machine. The drive reset switch is to make sure the operator is on platform before machine will propel. The steering wheel points the drive wheel in the direction desired by the operator. The parking brake automatically engages when the operator steps off the platform. The emergency stop/brake can be used to hold the machine on slopes.

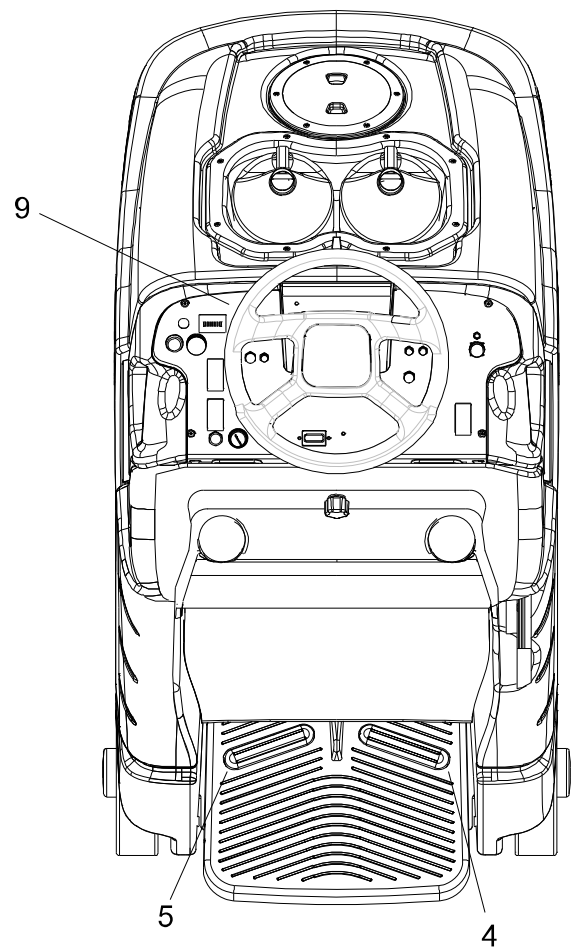
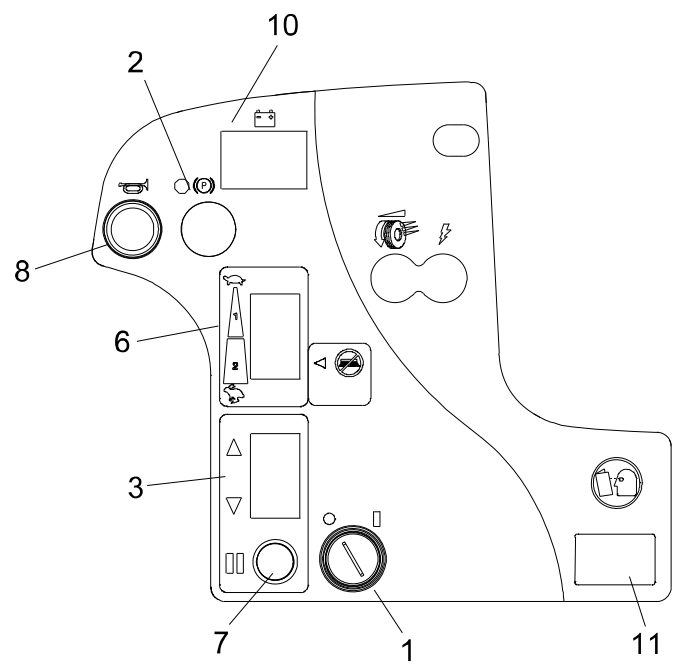
*See Serial Number page.



-
1. *Control Panel-Drive*
 2. *Control Panel-Scrub*
 3. *Control Housing*
 4. *Pedal Platform*
 5. *Rear Cover*

6. *Tank*
7. *Scrub Deck*
8. *Solution Cover*
9. *Solution Drain Hose*

DRIVE CONTROLS



- | | |
|--|---|
| 1. <i>Key Switch</i> | 6. <i>Speed Control Switch</i> |
| 2. <i>Emergency Stop/Brake Switch</i> | 7. <i>Drive Reset Switch</i> |
| 3. <i>Directional Control Switch</i> | 8. <i>Horn Button</i> |
| 4. <i>Throttle Pedal</i> | 9. <i>Steering Wheel</i> |
| 5. <i>Operator Presence Pedal - Prior to SN (10*)</i> | 10. <i>Battery Discharge Indicator</i> |
| | 11. <i>Hour Meter</i> |
-

1. KEY SWITCH

Controls the power for machine functions.

To turn the machine power on, rotate key clockwise.

To turn the machine off, rotate key counterclockwise.

2. EMERGENCY STOP/BRAKE SWITCH

This safety feature is designed to cut all power to the machine at any time and apply parking brake.

To shut the machine power off, push the Emergency Stop Switch, this will also engage the parking brake and cause the machine to stop immediately.

To reset the machine, rotate the switch clockwise.

3. DIRECTIONAL CONTROL SWITCH

Controls the direction of travel of the vehicle. The position of the switch indicates direction of travel.

To travel forward, press the top of the switch.

To travel in reverse, press the bottom of the switch.

DRIVE CONTROLS

4. THROTTLE PEDAL

Controls the speed of the vehicle within the speed control setting selected. Pressing the pedal causes the machine to travel in the direction selected by the Directional Control Switch.

To increase speed, increase pressure on the pedal.

To decrease speed, decrease pressure on the pedal.

5. OPERATOR PRESENCE PEDAL - Prior to Serial Number (10*)

The operator must have left foot on Operator Presence Pedal for machine to move.

6. SPEED CONTROL SWITCH

Controls the maximum speed of the machine. Speed 1 is intended for scrubbing. Speed 2 is recommended for transport only, not scrubbing.

To increase speed, press the top of the switch.

To decrease speed, press bottom of the switch. Speeds can be adjusted at any time, whether machine is moving or not.

7. DRIVE RESET SWITCH

This safety feature is designed to ensure safe engagement of propel drive. Each time the machine power is turned on, and each time an operator steps on to the platform, the Drive Reset Switch must be pushed before machine will propel.

8. HORN BUTTON

The horn is activated by pressing the horn button.

9. STEERING WHEEL

The steering wheel turns the front wheel causing the machine to change direction.

*See Serial Number page.

10. BATTERY DISCHARGE INDICATOR

Indicates the charge level of the batteries.

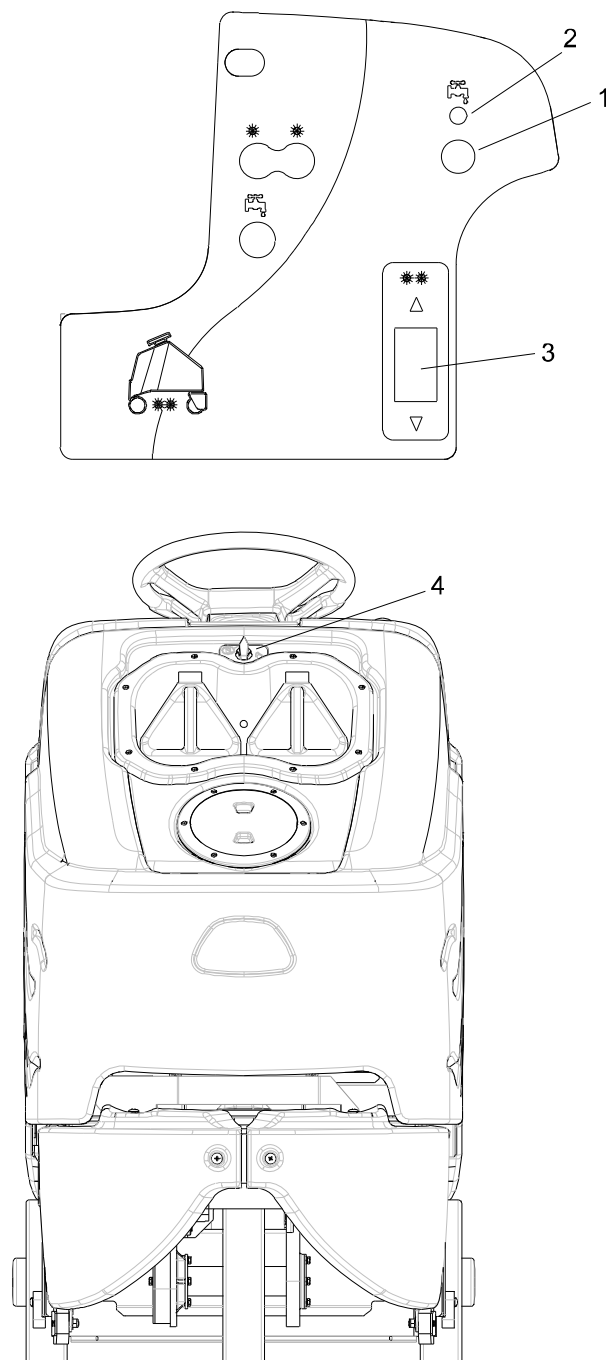
The meter display is divided into 10 vertical bars. Bars illuminated on the far right indicate full charge. Bars flashing near the left side indicate the batteries should be recharged. Further operation of the machine could damage the machine or the batteries. Bars flashing near left side also indicate that machine has been left unattended with key on for more that 15 minutes. Turn key off then on to reset.

When the machine is left overnight with less than a full charge, the display may initially indicate a full charge. It will also indicate a full charge if the batteries are disconnected, then reconnected. After a few minutes of operation the meter will give the correct charge level.

11. HOUR METER

Records the number of hours the machine has been in operation. This information is useful in determining when to service the machine.

SCRUB CONTROLS



-
- | | |
|----------------------------------|----------------------|
| 1. Solution Pump Switch | 3. Scrub Deck Switch |
| 2. Solution Pump Indicator Light | 4. Selector Valve |

1. SOLUTION PUMP SWITCH

Controls solution flow to scrub deck.

If the throttle pedal is in neutral, or direction control switch is in reverse position, the flow is automatically interrupted. This feature prevents application of solution without scrubbing it in to carpet.

2. SOLUTION PUMP INDICATOR LIGHT

The solution pump indicator light is illuminated when the pump is on.

3. SCRUB DECK SWITCH

Raises and lowers the scrub deck, and turns the scrub brush motors on and off.

To lower the scrub deck and turn on scrub brush motors, press the bottom of the switch. The brush motors will automatically turn off when the throttle pedal is in neutral.

To raise the scrub deck and turn off the scrub brush motors, press the top of the switch.

4. SELECTOR VALVE



This position allows chemical to flow from the bottle, be mixed by injector with water from the tank, and cleaning solution to be delivered to spray jets.



This position allows no chemical flow and instead flushes clean water from the tank through entire system. At the end of each use, flush system for 30 seconds or more.

MACHINE OPERATION

PRE-RUN MACHINE INSPECTION

Do a pre-run inspection to find possible problems that could cause poor performance or lost time from breakdown. Follow the same procedure each time to avoid missing steps.

NOTE: See maintenance section for pre-run machine inspection checklist items.

STARTING MACHINE

NOTE: Perform pre-run machine check before operating machine.

FOR SAFETY: Before starting machine, make sure that all safety devices are in place and operating properly.

1. Stand on the operator platform. Throttle pedal must be in neutral position.

Note: Prior to Serial Number (10*) Place left foot on operator presence pedal. Throttle pedal must be in neutral position.

2. Turn the machine power on by turning key switch clockwise to the "ON" position.
3. Check the position of the Directional Control Switch to make sure the machine will travel in the direction intended.
4. Press the Drive Reset Switch.
5. Press lightly on the throttle pedal with right foot.

*SEE SERIAL NUMBER PAGE.

EMERGENCY STOP PROCEDURES

1. Release the throttle pedal by lifting right foot.
2. Turn machine power off with key switch by turning key switch counterclockwise.
3. If an electrical problem is suspected, push in emergency stop button. This will also engage the parking brake and cause the machine to stop immediately.

MACHINE OPERATION

FILLING SOLUTION TANK

FOR SAFETY: Before leaving or servicing machine; stop on level surface, turn off machine and remove key.

1. Turn the machine power off.
2. Remove solution cover.
3. Fill the solution tank with clean water. The solution tank capacity filled to fill inlet is 16 gallons (60 liters). The water must not be hotter than 140° F (60°C) to prevent damage to the tank.
4. Replace solution tank cover.

⚠ WARNING: Flammable materials can cause an explosion or fire. Do not use flammable materials in the tanks.

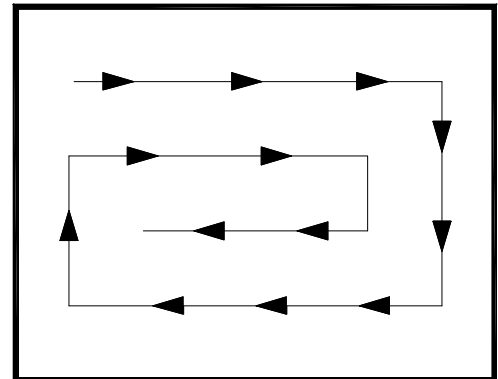
NORMAL SCRUBBING

Plan the scrubbing pattern in advance. For efficient operation, the runs should be the longest possible without turning, stopping, or raising or lowering scrub deck. The longest track is around the perimeter of the area to be cleaned and a collapsing rectangle pattern is most efficient.

In order to achieve the best possible results, the area which is to be cleaned should be swept before scrubbing. Large debris, strings and wire must be removed to prevent being caught in brushes.

If the machine is allowed to stand in neutral with the scrub deck down for more than 2 seconds, the solutions flow stops and brush motors stop. When forward travel is resumed, the solution flow and the scrub brush motors will continue. Overlap the brush path and avoid transporting over previously cleaned areas.

RECOMMENDED SCRUBBING PATH



MACHINE OPERATION

TO BEGIN SCRUBBING

When operating the machine around people, pay close attention for unexpected movement. Use extra caution around children.

1. Position Selector Valve so that chemical will be drawn from the bottle.
2. Stand on the operator platform. Throttle pedal must be in neutral position.

Note: (Prior to Serial Number (10*)) Place left foot on operator presence pedal. Throttle pedal must be in neutral position.

3. Turn machine power on.
4. Check position of Directional Control Switch to ensure that machine is set to travel in direction intended.
5. Press the Drive Reset Switch.
6. Lower the scrub deck to floor.
7. Drive machine forward to begin scrubbing.

*See Serial Number page.

PRIMING PUMP

If the solution system has gone dry or has been unused for a period of time, it may be necessary to follow the pump priming procedure.

1. Fill solution tank.
2. Loosen, but do not completely remove the strainer bowl. Solution should flow out of the strainer. If it does not, check the strainer screen inside the solution tank. Insure it is clear of debris. Tighten the strainer bowl.
3. Begin normal scrubbing. Solution flow should begin within 2 minutes.

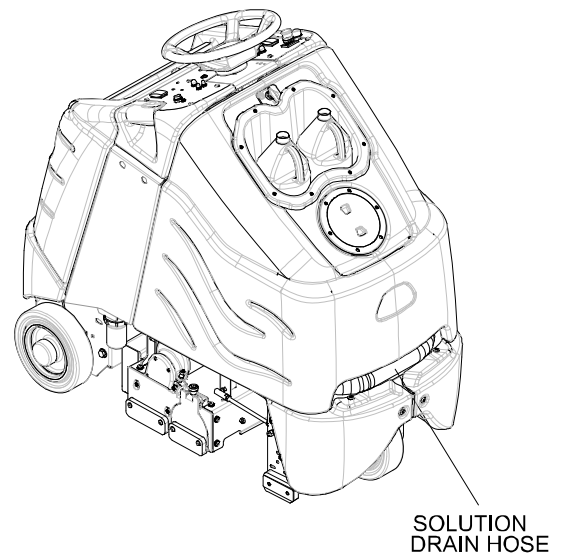
MACHINE OPERATION

TO STOP SCRUBBING

1. For last 30 seconds (minimum) of last run, switch the Selector Valve to the "no chemical" position to flush the injection system and jets.
2. Raise the scrub deck.
3. Allow the throttle pedal to return to neutral.
4. Turn machine power off.

FOR SAFETY: Before leaving or servicing machine: stop on level surface, turn off machine and remove key.

FOR SAFETY: When using machine, go slow on inclines and slippery services.



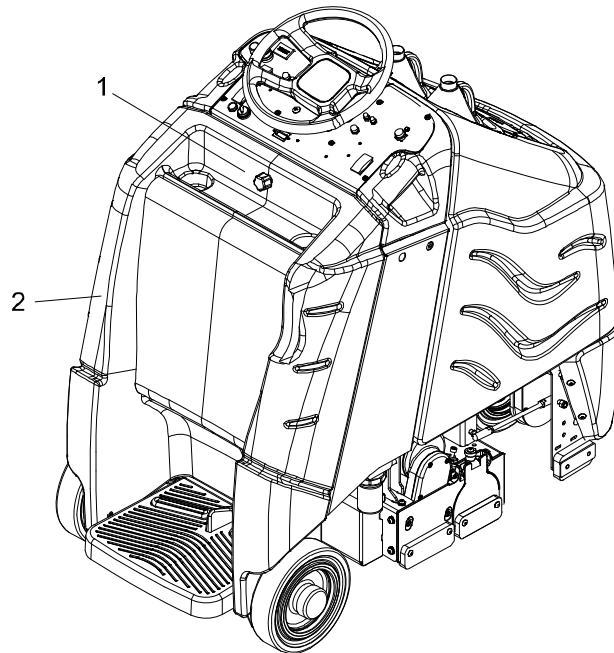
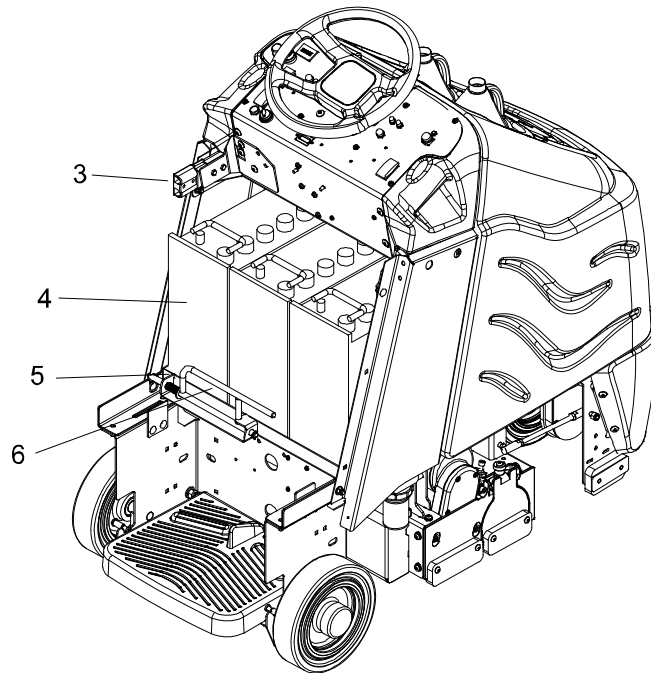
EMPTYING AND CLEANING SOLUTION TANK

1. Park the machine next to a floor drain. Drain hose is at the front of the machine.
2. Turn the machine power off.
3. Pull the large drain hose from under the front of the tank. Unscrew cap, then lower hose in direction of the drain. Do not stand in front of end of hose. Solution will come out with force.
4. Remove the solution tank cover.
5. Flush the solution tank out with clean water and run several gallons of clean water through systems. Do not use water hotter than 140°F (60°C) to clean tank. Damage may occur.
6. Replace the drain cap and secure drain hose under tank.
7. If machine is to be stored, leave the solution tank cover off.

MAINTENANCE

SERVICE SCHEDULE

MAINTENANCE	BEFORE EACH WORK PERIOD	AFTER EACH WORK PERIOD	50 HRS	100 HRS	200 HRS
Check water level of batteries after charging; add distilled water if necessary.	*				
Check brushes and debris hopper for proper installation.	*				
Check for securely attached drain hose, plug and cap.					
Check that solution cover seals tightly	*				
Visually check for damaged or worn tires.	*				
Check pedal(s), brake and steering for proper operation.	*				
Observe spray pattern and clean jets if necessary.	*				
Switch Selector Valve to "no chemical" position to flush injector system and jets.		*			
Clean brushes and check wear.		*			
Empty debris hopper and clean underside of scrub deck.		*			
Clean out solution tank.		*			
Clean and inspect solution filter strainer.		*			
Store with solution cover off tank to allow tank to dry.		*			
Clean outside of tank, check for damage.		*			
Charge batteries.		*			
Clean off top of batteries.			*		
Check battery cells with hydrometer.			*		
Check battery connections are tight.			*		
Clean battery cases and battery compartment.				*	
Clean and check drive tension chain for wear and tension.				*	
Check parking brake.					*
Clean chains and slides for scrub deck lift					*
Clean pivot points on scrub deck.					*
Check all motors for carbon brush wear.					*
Check motor commutators.					*
Check steering chain tensioner.					*



-
1. *Rear Cover Retainer Knob*
 2. *Rear Cover*
 3. *Battery Connector-Machine*

4. *Batteries*
5. *Battery Tray*
6. *Battery Tray Latch*

MAINTENANCE-BATTERIES

BATTERIES

The batteries provide the power to operate the machine. The batteries require regular maintenance to keep them operating at peak efficiency.

The machine batteries will hold their charge for long periods of time, but they can only be charged a certain number of times. To get the greatest life from the batteries, charge them when their charge level reaches 25% of a full charge. Use a hydrometer to check the charge level.

Do not allow the batteries to remain in a discharged condition for any length of time. Never expose a discharged battery to temperatures below freezing. Discharged batteries will freeze causing cracked cases. Do not operate the machine if the batteries are in poor condition or if they have a charge level below 25% (specific gravity below 1.155).

Keep all metallic objects off the top of the batteries, as they may cause a short circuit. Replace worn or damaged cables and terminals.

Check the electrolyte level in each battery cell before and after charging the batteries. Never add acid to the batteries, use distilled water. Do not allow water level to fall below the battery plates. Portions of plates exposed to air will be destroyed. Do not overfill. Keep plugs firmly in place at all times.

 **CAUTION:** When servicing machine, avoid contact with battery acid.

 **WARNING:** Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep covers open when charging.

 **WARNING:** Wear eye protection and protective clothing when working with batteries.

 **WARNING:** Charge batteries in a well ventilated area.

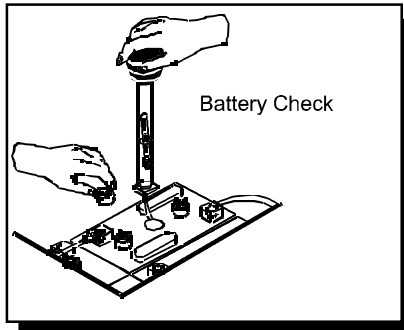
BATTERY MAINTENANCE

1. When cleaning the batteries, use a solution of baking soda and water. Do not allow the cleaning fluid to enter the battery cells, electrolyte will be neutralized.
2. Maintain the proper electrolyte level in each battery cell. If a cell should accidentally overflow, clean immediately.
3. Wipe off the top of the batteries at least once a week.
4. Test battery condition with a hydrometer at least once a week.
5. Ensure that all connections are tight and all corrosion removed.
6. Every 4 to 6 months, remove that batteries from the machine and clean the battery cases and battery compartment.

MAINTENANCE-BATTERIES

CHECKING BATTERY SPECIFIC GRAVITY

Use a hydrometer to check the battery specific gravity.



CHECKING GRAVITY

- A. Hydrometer
- B. Battery

NOTE: Do not take readings immediately after adding distilled water, if the water and acid are not thoroughly mixed, the reading may not be accurate.

Check the hydrometer readings against this chart.

SPECIFIC GRAVITY @ 80° F (27°C)	BATTERY CONDITION
1.265	100% CHARGED
1.225	75% CHARGED
1.190	50% CHARGED
1.155	25% CHARGED
1.120	DISCHARGED

NOTE: If the readings are taken when the battery electrolyte is any temperature other than 80°F (27°C), the reading must be temperature corrected.

To find the corrected specific gravity reading when the temperature of the battery electrolyte is other than 80°F (27°): Add (+) to the specific gravity reading 0.004 (4 points), for each 10°F (6°C) above 80° (27°C).

Subtract (-) from the specific reading 0.004 (4 points), for each 10°F (6°C) below 80°F (27°C).

CHARGING BATTERIES

CAUTION: When servicing machine, avoid contact with battery acid.

WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep covers open when charging.

WARNING: Wear eye protection and protective clothing when working with batteries.

WARNING: Charge batteries in a well ventilated area.

Use a 36 volt, 20 amp maximum output DC charger which will automatically shut off when the batteries are fully charged.

1. Stop the machine in a clean, well ventilated area next to the charger.
2. Turn "OFF" machine.

FOR SAFETY: Before leaving or servicing machine; stop on level surface, turn off machine and remove key.

3. Remove rear cover, unplug batteries from machine, unlatch battery tray and pull out to expose batteries.

WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep covers open when charging.

4. Check the electrolyte level in each battery cell. Before charging, add just enough distilled water to cover the plates. After charging is complete, add just enough distilled water to bring up the level to the indicator ring. If the water level is too high before charging, normal expansion rate of the electrolyte may cause an overflow resulting in a loss of battery acid balance and damage the machine.

MAINTENANCE-BATTERIES

5. Replace the battery caps, and leave them in place while charging.
6. Unplug the battery connector from the machine.

FOR SAFETY: When charging, connect the charger to the batteries before connecting the charger to the AC wall outlet. Never connect the charger to the AC wall outlet first. Hazardous sparks may result.

7. Plug the charger connector into the battery connector. Connect the charger AC plug to a wall outlet. The charger gauge should indicate that the batteries are charging.
8. When the batteries are fully charged, disconnect the charger from the AC wall outlet, then disconnect the charger from the batteries.
9. Connect the batteries to the machine connector.
10. Check the electrolyte level. It should be up to the indicator ring. If necessary, add distilled water.
11. Install the rear cover.

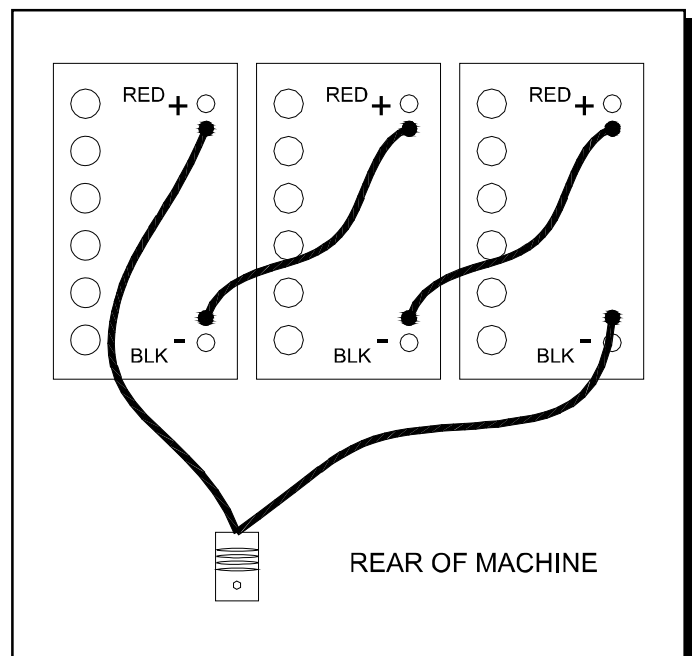
CHANGING BATTERIES

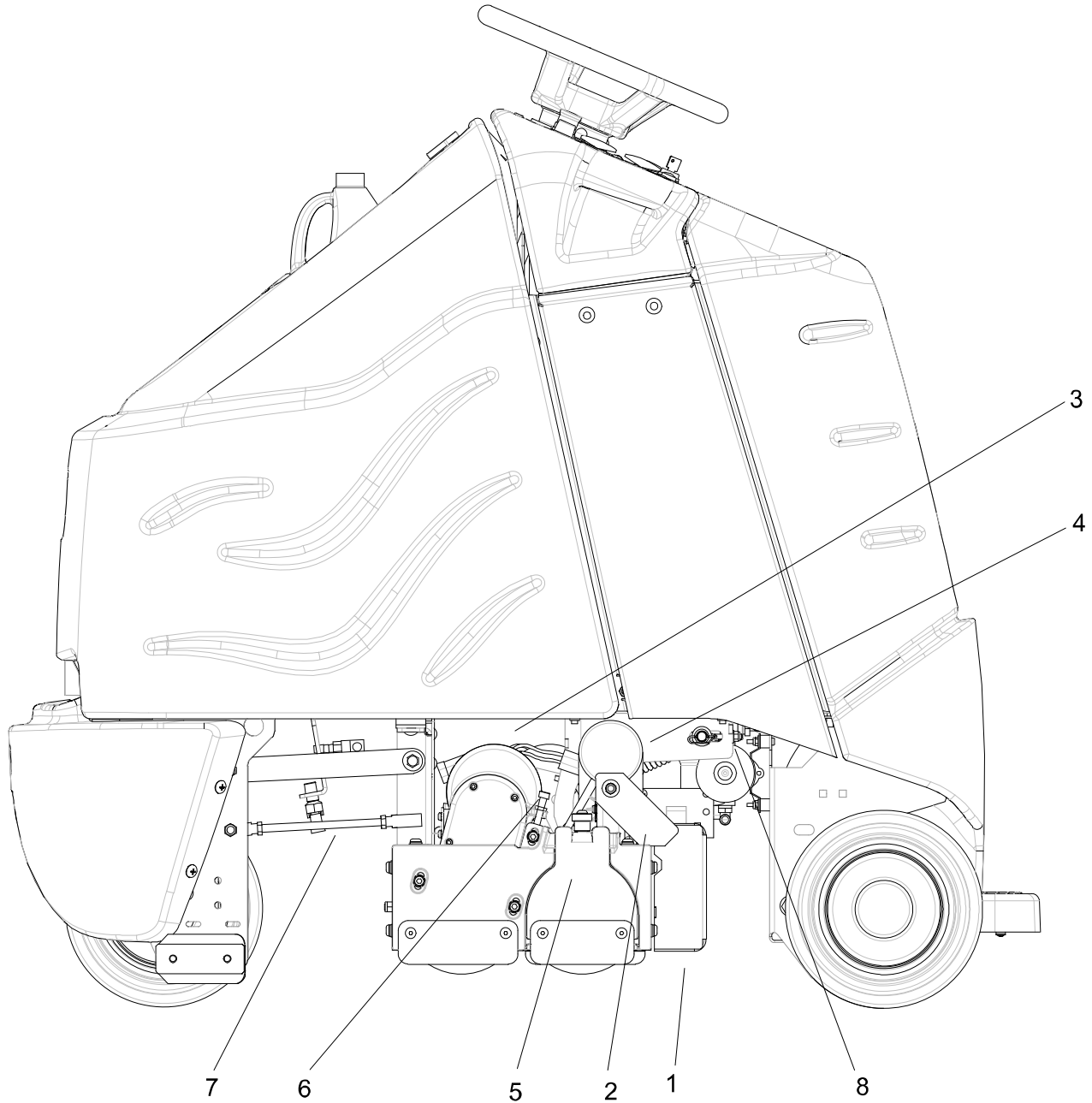
Stop the machine in a clean area next to the charger. Turn off machine.

FOR SAFETY: Before leaving or servicing the machine; stop on level surface, turn off machine and remove key.

1. Remove the rear cover.
2. Disconnect battery pack from machine.
3. Unlatch battery tray from machine and pull out to expose batteries.
4. Use the proper size open end wrench to disconnect main ground wire first and secure cable terminal away from batteries.
5. Disconnect main positive lead and secure cable terminals away from batteries.
6. Loosen both terminals on each jumper cable and remove one at a time.
7. Prepare a suitable site to place the batteries.
8. Attach suitable battery lifting device and lift batteries from the machine.

⚠ WARNING: Batteries are a potential environmental hazard. Consult your battery supplier for safe disposal methods.





- 1. *Hopper*
- 2. *Hopper Retainer Plate*
- 3. *Scrub Brush Motor*
- 4. *Scrub Deck Lift Actuator*

- 5. *Brush Door*
- 6. *Motor Assembly Jack Screw*
- 7. *Lower Links*
- 8. *Brush Pressure Adjustment*

MAINTENANCE-SCRUB DECK

SCRUB HEAD

The dual cylindrical scrub head is designed to scrub chemical into the carpet. The chemical, Red Carpet Rombus Clean Chemical, encapsulates the dirt allowing both to be vacuumed up once the chemical has dried. The brushes, turning in a counterclockwise rotation, also pick up the debris and throw it into a removable hopper, and raise the pile of the carpet, giving it a lush groomed appearance.

MAINTENANCE

The brushes should wear evenly side to side if properly adjusted. Scrub brushes should be exchanged front to back every 50 hours to ensure even wear. It is not necessary to rotate end for end since swapping front to back puts the brushes in the opposite rotation, as well as balancing wear. Scrub brushes should be replaced as a set when bristle length wears to height of yellow PerformAlert™ bristles.

SCRUB BRUSH REMOVAL

The scrub brushes are removed from the side of the machine. The front is removed from the right side and the rear is removed from the left side.

1. Unscrew knob on brush door but do not remove.
2. Pull out on top of door until lip on door clears brush head.
3. Push down on door until hooks on bottom of door are free of scrub head side.
4. Pull out on door with a rocking motion to free idler door from end of brush.
5. Pull brush out with a rocking motion to free brush from drive hub.

SCRUB BRUSH REPLACEMENT

1. Lift the drive side of the brush and push it onto drive hub until a positive stop is felt. The brush door cannot be installed until the brush is fully seated on the drive hub.
2. Allow end of brush to drop below scrub deck. Fully insert brush door onto brush.
3. Line up bottom hooks on brush door with notches on side of scrub head.
4. Slide brush door up until lip rests on top of scrub head.
5. Hand tighten knob to secure door into place.

DUMPING HOPPER

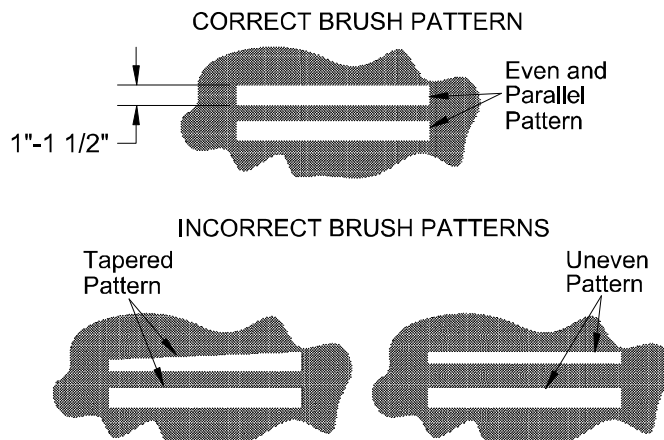
The removable hopper is located behind the rear scrub brush and can be removed from the left side of the machine. Remove the hopper by rotating the hopper retaining plate and sliding the hopper out. The hopper can be dumped from the top. Flush the hopper clean with running water.

SCRUB DECK ADJUSTMENT

Scrub deck adjustment consists of three types of adjustments. The first is to insure the individual brushes make the same width pattern end to end. Any tapered brush pattern should be adjusted out. The second is to make the pattern of equal width between front and rear brushes. Unequal patterns are caused by the scrub deck not being parallel to the floor. The third is to make the contact patterns on the floor the correct width. Proper adjustment is obtained when the contact patterns of the brushes on the floor show two equal 1-1.5 inch (25-38 mm) rectangles the width of the brushes. The rectangles should be parallel to each other.

TESTING, ADJUSTMENT OF INDIVIDUAL BRUSHES

1. Move the machine to an unfinished area of hard floor to avoid marking carpet.
2. With pump off, lower scrub head to floor. Allow brushes to run for approximately 30 seconds. It may be necessary to repeat this step in the same location until a good mark can be seen on the floor. This can be accomplished by touching lightly the throttle pedal to restart the scrub deck without moving the machine.
3. Raise the scrub deck and note the brush patterns on the floor. There should be two rectangles with parallel sides. If the pattern is tapered, proceed as follows.



ADJUSTMENT OF INDIVIDUAL BRUSHES

The brush pattern is adjusted from the motor side only of both brushes.

1. Determine if motor end is to be moved up or down to balance the pattern.
2. Loosen the 3 hex socket head screws on the end of the housing.
3. Loosen the jam nut on the jack screw and rotate the jack screw to move the motor assembly up or down as needed.
4. Tighten the 3 hex socket head screws.
5. Tighten the jam nut on the jack screw.
6. Re-test and readjust as necessary.

LEVELING THE SCRUB HEAD

Leveling the cylindrical head is accomplished by adjusting the lower links that attach the deck to the frame. Links should be adjusted to equal lengths. To increase pattern width on rear brush, loosen lock nuts and shorten the lower links by screwing the rod into the threaded ends. To increase pattern width on front brush, lengthen the lower links by screwing the rod out of the threaded ends. After adjustment, be sure to tighten lock nuts.

ADJUSTING BRUSH PRESSURE

Changing the brush pressure is accomplished by adjusting the take-up nuts on the deck counter-balance spring. To increase brush pressure or pattern width, loosen the nuts. To decrease brush pressure or pattern width, tighten the nuts.

MAINTENANCE-SCRUB DECK



WARNING: Do not use a pressure washer to clean around the brush motors. Use tap pressure only.

TO REPLACE SCRUB BRUSH MOTORS

1. With the scrub deck in the raised position, disconnect brush motor wiring connector from harness.
2. Remove brushes and brush door.
3. Remove aluminum end housing from deck.
4. Separate brush motor with gear box from end housing.
5. Reverse to reassemble.
6. Adjust brush levelness as described in earlier section.

BRUSH MOTOR CARBON BRUSH REPLACEMENT

1. Scribe alignment mark on motor barrel to motor cap. Remove two bolts.
2. Remove end cap from motor.
NOTE: Motors contain two wave washers in cap. Do not lose these.
3. Release brush from spring tension. Remove screw connecting brush wire lead to brush holder. Clean brush holder to insure free movement.
4. Retract spring and install new brush. Install connector screw and lead.
5. When all new brushes are installed. Place all in retracted position, held into brush holder by spring tension.
6. Carefully place end cap onto bearing on motor shaft.
NOTE: Use care to assure wave washer alignment.
7. With end cap in partially installed position, release all brushes to contact position with motor commutator.

NOTE: Failure to insure all brushes are released will result in motor failure.
8. Reset end cap and realign with scribe marks on motor barrel. Reinstall the two attach bolts from cap into base.
9. Maintain alignment between motor barrel base and cap.

MAINTENANCE-SCRUB DECK

ACTUATOR SCRUB DECK REMOVAL/REPLACEMENT

FOR SAFETY: Before leaving or servicing machine, stop on a level surface. Turn off machine.

1. Lower scrub deck.
2. Disconnect spring assembly from actuator slide link.
3. Remove the clevis pin retaining the top of the actuator.
4. Remove slide link and actuator as an assembly by removing the two bolts connecting them to the deck through the bushings.
5. Either unthread the actuator main lead screw from the barrel, or remove the two bolts connecting the barrel to the slide link.
6. Reverse for re-installation.

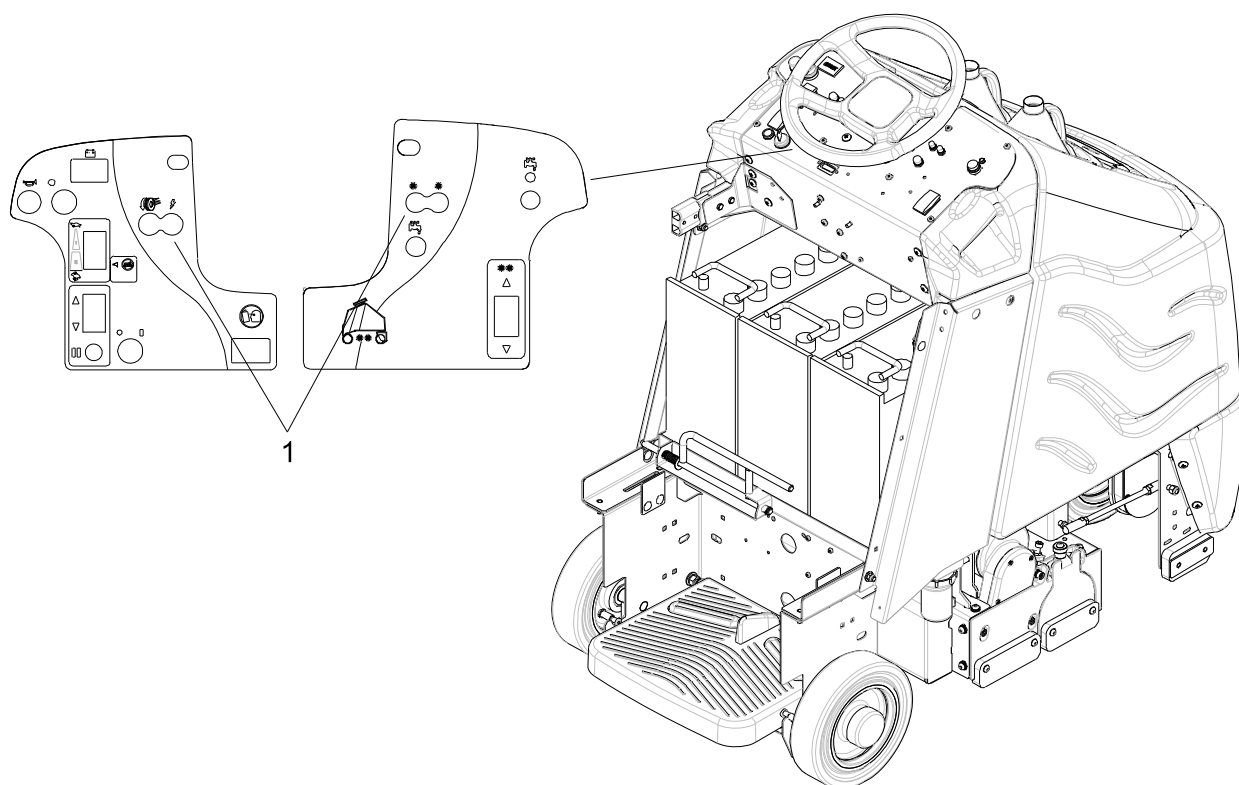
SCRUB DECK ACTUATOR ADJUSTMENT

The actuator will need to be adjusted when replaced.

To adjust the actuator:

1. While holding actuator barrel to prevent it from spinning, apply power to the actuator such that it is fully extended. Positive power to white wire, and negative/ground to black. Limit switch within actuator will stop it.
2. Turn barrel out one or more full turns to assure that when it is retracted it will not bind against itself.
3. While holding actuator barrel to prevent it from spinning, apply power to the actuator such that it is fully retracted. Positive power to black wire, and negative/ground to white wire. Limit switch within actuator will stop it.
4. With actuator fully retracted, turn barrel in until it touches the base of the threaded shaft.
5. At the bottomed out position, turn the barrel out only enough to allow connection to slide link.
6. Connect actuator.
7. Check travel of actuator during operation.

MAINTENANCE-CIRCUIT PROTECTION



1. CIRCUIT BREAKERS

Circuit breakers interrupt the flow of power in the event of an electrical overload. When a circuit breaker is tripped, reset it by pressing the exposed button. If a circuit breaker continues to trip, the cause of the electrical overload should be found and corrected.



18 Amp. Protects the left scrub brush motor.



18 Amp. Protects the right scrub brush motor.



30 Amp. Protects the propel motor.

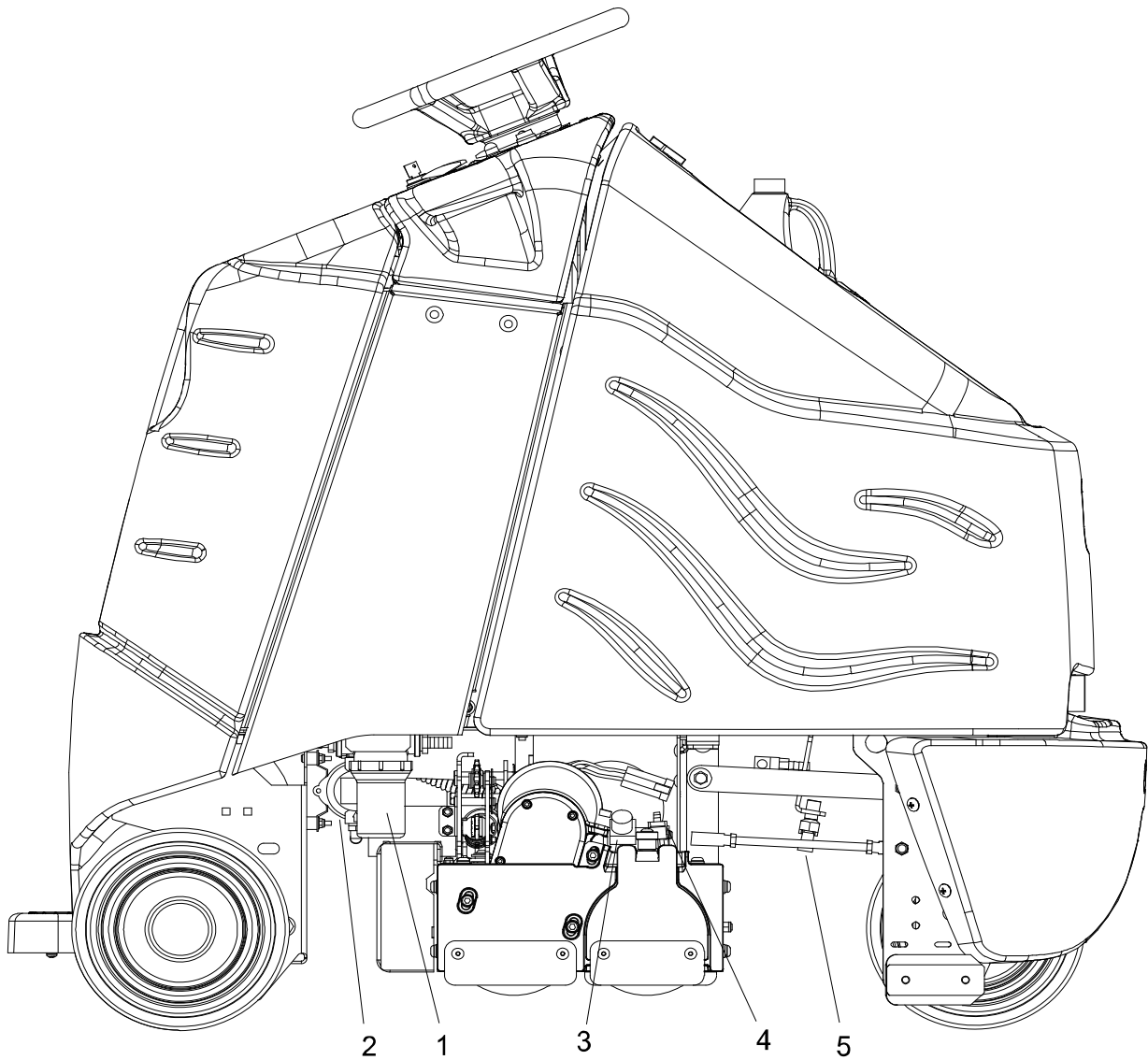


3 Amp. Protects the machine controls.



3 Amp. Protects the pump.

MAINTENANCE-SOLUTION STRAINER & PUMP



- 1. *Solution Strainer*
- 2. *Pump*

- 3. *Solenoid Valve*
- 4. *Injector*
- 5. *Jets*

MAINTENANCE-SOLUTION STRAINER & PUMP

1. SOLUTION STRAINER

The fine strainer is located on right side of machine. The strainer protects the pump, injector, solenoid valve and jets from debris. If there is little or no solution flow to the ground, check the strainer for debris. Drain the solution tank and clean the solution strainer. To remove the strainer, turn the bottom part of the strainer counterclockwise until the bottom is separated. Clean out the debris from the wire mesh and re-assemble. Make sure the O-ring gasket is in place when re-assembled.

2. PUMP

The pump is located under the tank on the right side of machine. The pump delivers solution from the tank to the scrub deck.

To repair or replace pump:

1. Remove rear cover.
2. Remove screws that secures pump mounting plate to frame.

3. SOLENOID VALVE

The solenoid valve is mounted on the front of the scrub deck, on right side.

The solenoid valve shuts off solution flow to scrub deck whenever scrubbing stops. To repair or replace solenoid valve, remove screws that secure it to deck.

4. INJECTOR

The injector is mounted to the solenoid valve.

The injector siphons chemical from bottle or clean water from tank, depending on the position of selector valve, and mixes it proportionally with water from tank.

5. JETS

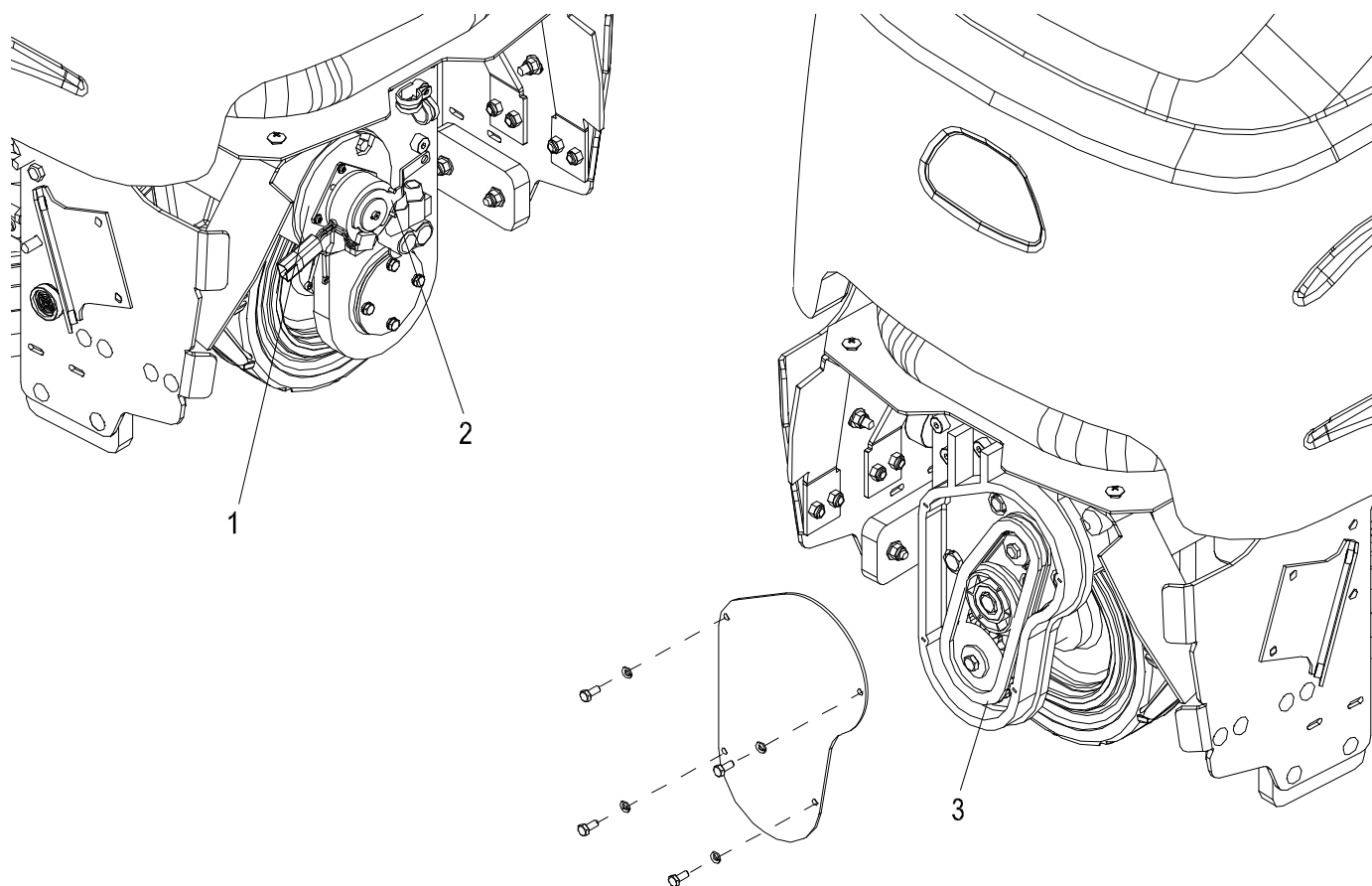
The two jets are located in front of and above the scrub deck.

The jets spray cleaning solution onto the carpet. The spray pattern should be checked regularly and if jets become clogged they should be cleaned or replaced immediately.

To clean jets:

1. Remove jet from jet body by rotating it counterclockwise.
2. Blow debris back through orifice if possible. Do not use pointed object to unplug jet. This will damage jet and cause improper spray pattern and solution flow through jets.
3. If jet cannot be cleaned by blowing debris back through its orifice, submerge jet in small container or acetic acid and let soak for up to six hours.
4. After soaking jet, use a soft brush to remove debris and rinse thoroughly.
5. Install jet in jet body by rotating it clockwise firmly into place.

MAINTENANCE- DRIVE MOTOR & BRAKE



-
1. *Drive motor*
 2. *Parking brake*
 3. *Drive chain*

MAINTENANCE-DRIVE MOTOR & BRAKE

ELECTRIC PARKING BRAKE ENGAGEMENT

FOR SAFETY: Before leaving or servicing machine, stop on a level surface, turn off machine and remove key.

Electric Brake Engagement

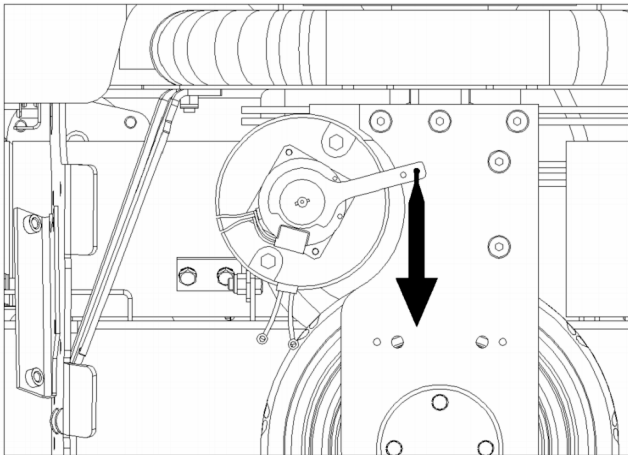
This machine is equipped with an electric parking brake.

The brake automatically engages and keeps the machine from moving whenever the operator steps off the platform or when emergency stop is engaged.

The brake has a mechanical over-ride that can be engaged so machine can be pushed or towed (slowly).

When the mechanical over-ride is engaged the machine cannot be driven.

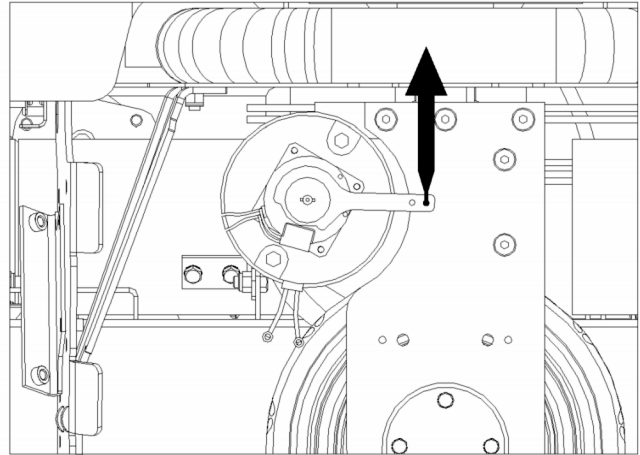
To engage brake:



1. Mechanical over-ride engaged.
Machine can be pushed or towed (slowly).
2. Push lever firmly in direction of arrow

Note: There is an intermediate stop. Make sure lever is fully in the down position.

To disengage brake:



1. Mechanical over-ride disengaged
Machine can be driven.
2. Push lever firmly in direction of arrow.

MAINTENANCE-DRIVE MOTOR & BRAKE

DRIVE MOTOR CARBON BRUSH REPLACEMENT

⚠ WARNING: Do not use a pressure washer to clean around the motors. Use tap pressure only.

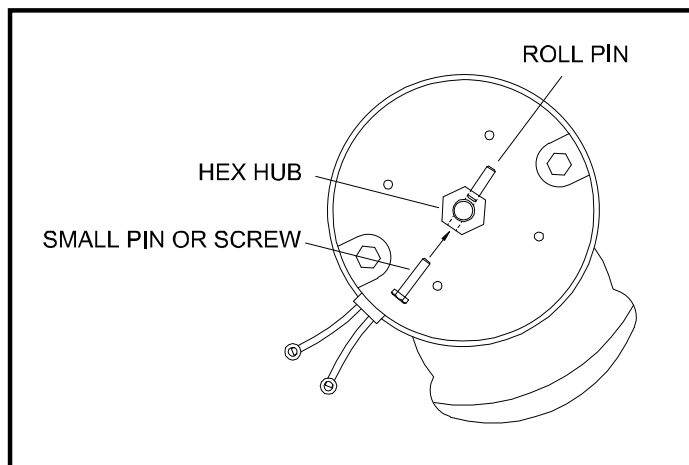
FOR SAFETY: Before leaving or servicing machine, stop on a level surface, turn off machine and remove key.

1. Disconnect batteries from machine.
2. Disconnect the electrical connection to the traction motor.

BRAKE REMOVAL

(Must be done to access carbon brushes)

3. Remove 4 mounting screws and remove brake.
4. Drive roll pin out of the hex hub enough to allow hex hub to slide off shaft. It is recommended that the roll pin be left partially in the hex hub.



7. Install new brush and reinstall connecting screw and lead.
8. When all new brushes are installed. Place all in retracted position, held into brush holder by spring tension.
9. Carefully replace brush cap.

Reinstalling:

10. When replacing the hex hub, use a small pin or screw to help align the holes.
11. Drive the pin into the hub and make sure it is flush to the hex surface. The brake will not fit on the hub if the roll pin is protruding from the hub.
12. Replace the hub and use Lock-Tite on the screws.

5. Remove brush cap.
6. Release brush from spring tension. Remove screw connecting brush wire lead to brush holder. Clean brush holder to insure free movement.

MAINTENANCE-TRANSPORTING

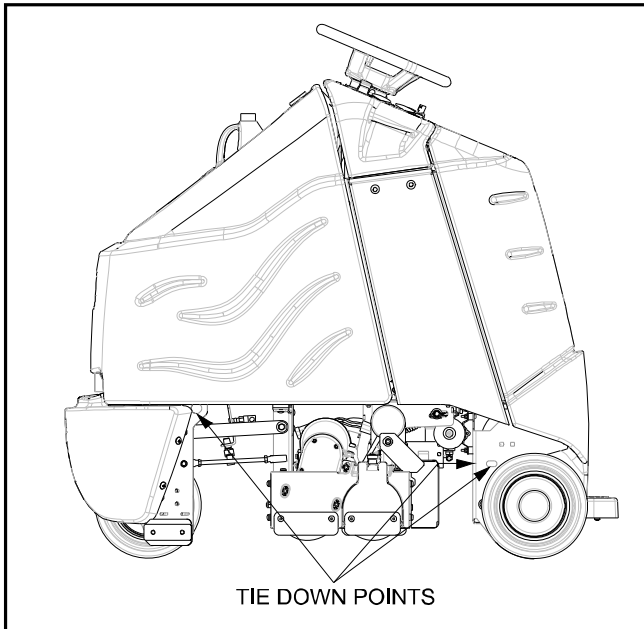
PUSHING MACHINE

The machine may be pushed for short distances at speeds not to exceed 5 mph. Be careful to avoid damaging machine. The machine may be pushed by hand from the rear.

NOTE: To avoid damage caused by regenerative voltage, disconnect traction motor before towing or pushing machine.

MACHINE TIE-DOWNS

There are two tie points located at front and each side of foot box frame and two at the front side of frame. Tie-down devices must be of the proper type and strength. The combined strength of all tie-downs must be strong enough to lift two times the weight of the machine. Tie-downs must be positioned to prevent the machine from moving forward, backward, or either side to side. Use all four corners of the machine with the tie-downs running out opposite directions. Tie-downs must be attached to the transporting vehicle securely.



PREPARATION FOR LOADING /UNLOADING TRAILER

Before loading or unloading machine from trailer, remove scrub brushes to eliminate interference with tie-downs.

Scrub head must be in the up position before loading.

NOTE: When transporting the machine on a trailer or in a truck, in addition to using tie-downs, be sure to set the parking brake, and block the tires to prevent the machine from rolling.

MACHINE TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
No power to machine	Battery disconnected	Check all battery cable connections
	Emergency shut-off activated	Reset
	Battery cables corroded	Clean connections
	Faulty key switch	Replace switch
Little or no propel	Low battery charge	Charge batteries
	Machine turned on with pedal not in neutral position	Allow pedal to return to neutral. Restart
	Tripped circuit breaker	Reset circuit breaker and check brush
	Controller overheated	Allow cool down period
	Loose motor connection	Check wires and connections from controller to motor
	Faulty throttle circuit or potentiometer	Check wires and connections from throttle to controller and potentiometer resistance
	Faulty drive reset circuit or switch	Check wires, connections and switch
	Faulty operator presence pedal circuit or switch - Prior to Serial Number (10*)	Check switch engagement, wires, connections and switch
	Faulty platform circuit or switch	Check wires, connections and switch
	Brake over-ride engaged	Disengage brake over-ride
	Faulty brake circuit or over-ride switch	Check wires, connections and switch
Machine does not change speeds	Faulty speed control circuit or switch	Check wires, connections and switch
Forward speed only Reverse speed only	Faulty forward/reverse switch	Replace switch

**Call manufacturer for Serial Number.

*See Serial Number page.

MACHINE TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Poor scrubbing performance	Debris caught in scrub brushes	Remove debris
	Low scrub brush down pressure	Increase brush pressure
	Low battery charge	Charge batteries
Little or no solution flow to the floor	Solution tank empty	Fill solution tank
	Solution pump turned off	Turn on pump
	Solution strainer plugged	Clean solution strainer
	Solution system plumbing obstructed	Clear obstruction from plumbing
	Pump obstructed	Clean or replace pump
	Injector obstructed	Clean or replace injector nozzle
	Solution solenoid valve obstructed or stuck	Clean or replace valve
	Jet(s) obstructed	Clean or replace jet(s)
	Faulty pump circuit or pump	Check wiring, connections, and pump.
	Faulty solenoid	Check solenoid valve
Little or no chemical flow	Chemical bottle empty	Replace chemical bottle
	Selector valve in "no chemical" position	Rotate valve handle position
	Chemical strainer plugged	Clean or replace strainer on tube inside bottle
	Chemical system plumbing obstructed	Clear obstruction from plumbing
	Injector metering tip obstructed	Clean or replace metering tip
Brush motors do not run, or run slowly	Circuit breaker(s) tripped	Reset circuit breaker(s) and check brush pressure.
	Low battery charge	Charge battery
	Fault brush circuit or motor	Check wires, connections and motor
	Worn brush motor brushes	Replace brushes, check commutator
Scrub deck will not go down/up	Actuator circuit breaker tripped	Reset breaker
	Faulty actuator circuit or actuator	Check wires, connections and actuator

MACHINE TROUBLESHOOTING- CONTROLLER FAULT CODES

PROPEL CIRCUIT BOARD TROUBLESHOOTING

Curtis 1228 LED DIAGNOSTICS- Basic and Cylindrical

During normal operation, with no faults present, the status LED is steadily on. If the controller detects a fault, the status LED provides two types of information. First, it displays a slow flash (2 Hz) or a fast flash (4 Hz) to indicate the severity of the fault. Slow-flash faults are self-clearing; as soon as the fault is corrected, the vehicle will operate normally. Fast-flash faults (“.” in Table 2) are considered to be more serious in nature and require that the key switch be cycled to resume operation after the fault is corrected.

After the severity indication has been active for 10 seconds, the status LED flashes a 2-digit fault identification code continuously until the fault is corrected. For example, code “1,4”—low battery voltage—appears as: one LED flash, followed by a pause, then 4 LED flashes, and then repeats.

LED CODE	PROGRAMMER LCD DISPLAY	EXPLANATION	POSSIBLE CAUSE
1,1	THERMAL CUTBACK	over-/under-temperature cutback	1. Temperature >92°C or < -25°C. 2. Excessive load on vehicle. 3. Operation in extreme environments. 4. Electromagnetic brake not releasing.
1,2	THROTTLE FAULT 1	throttle fault	1. Throttle input wire open or shorted. 2. Throttle pot defective. 3. Wrong throttle type selected.
1,3	SPD LIMIT POT FAULT	speed limit pot fault	1. Speed limit pot wire(s) broken or shorted. 2. Broken speed limit pot.
1,4	LOW BATTERY VOLTAGE	battery voltage too low	1. Battery voltage <17 volts. 2. Bad connection at battery or controller.
1,5	OVERVOLTAGE	battery voltage too high	1. Battery voltage >36 volts. 2. Vehicle operating with charger attached. 3. Intermittent battery connection.
2,1	MAIN OFF FAULT	main contactor driver Off fault	1. Main contactor driver failed open.
2,3	MAIN CONT FLTS	main contactor fault	1. Main contactor welded or stuck open. 2. Main contactor driver fault. 3. Brake coil resistance too high.
2,4	MAIN ON FAULT	main contactor driver On fault	1. Main contactor driver failed closed.

MACHINE TROUBLESHOOTING- CONTROLLER FAULT CODES

LED CODE	PROGRAMMER LCD DISPLAY	EXPLANATION	POSSIBLE CAUSE
3,1	PROC/WIRING FAULT	HPD fault present for >10 sec.	1. Misadjusted throttle. 2. Broken throttle pot or throttle mechanism.
3,2	BRAKE ON FAULT	brake On fault	1. Electromagnetic brake driver shorted. 2. Electromagnetic brake coil open.
3,3	PRECHARGE FAULT	precharge fault	1. Low battery voltage. 2. KSI and throttle turned on at same time.
3,4	BRAKE OFF FAULT	brake Off fault	1. Electromagnetic brake driver open. 2. Electromagnetic brake coil shorted.
3,5	HPD	HPD (High Pedal Disable) fault	1. Improper sequence of throttle and KSI, push, or inhibit inputs. 2. Misadjusted throttle pot.
4,1	CURRENT SENSE FAULT	current sense fault	1. Short in motor or in motor wiring. 2. Controller failure. *
4,2	HW FAILSAFE	motor voltage fault (hardware)	1. Motor voltage does not correspond to throttle request. 2. Short in motor or in motor wiring. 3. Controller failure. *
4,3	EEPROM FAULT	EEPROM fault	1. EEPROM failure or fault.
4,4	POWER SECTION FAULT	power section fault	1. EEPROM failure or fault. 2. Short in motor or in motor wiring. 3. Controller failure.