



Operating instructions (ENG)

MODELS:

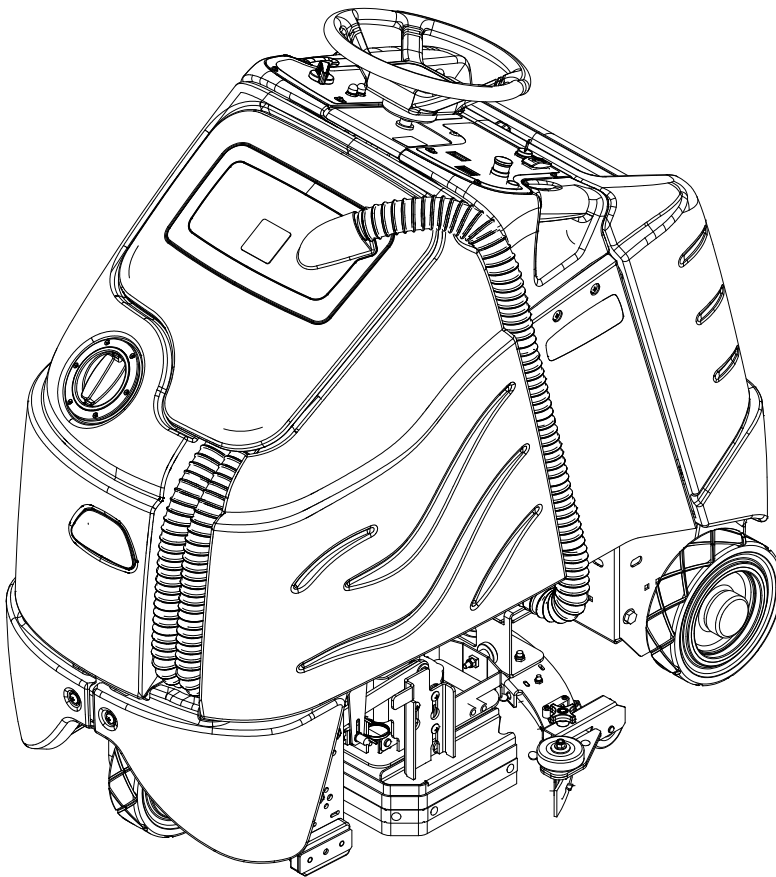
CSX24
10061090

CSX24X
10061100

CSXE24
10061120

CS26SP
10061160

CS26SPX
10061170



Read these instructions before using the machine.



Model: _____

Date of Purchase: _____

Serial Number: _____

Dealer: _____

Address: _____

Phone Number: _____

Sales Representative: _____

OVERVIEW

The Chariot Scrubber is a battery powered, stand-on, hard floor scrubber intended for commercial use. The appliance applies a cleaning solution onto a hard floor, scrubs the floor with brushes or pads, and then vacuums the soiled water back into the recovery tank.

Warranty Registration

Thank you for purchasing a Windsor product. Warranty registration is quick and easy. Your registration will allow us to serve you better over the lifetime of the product.

To register your product go to :
www.windsorind.com/WarrantyRegistration.aspx

For customer assistance:
1-800-444-7654



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How to Use This Manual

This manual contains the following sections:

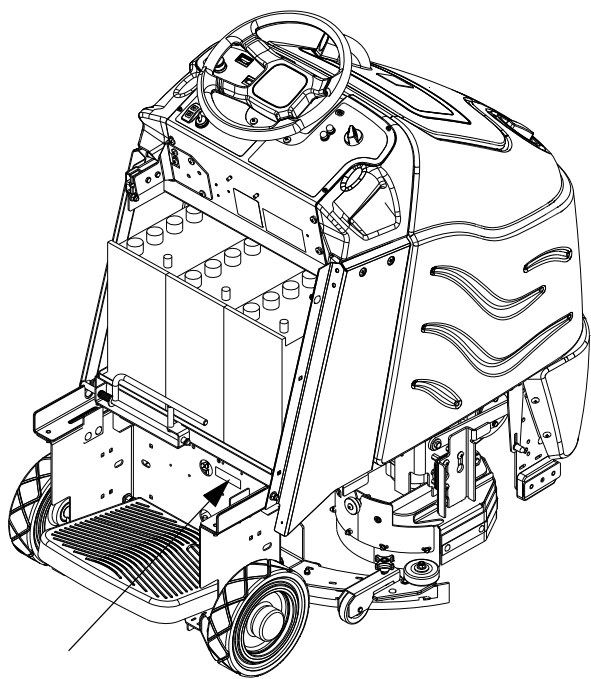
- HOW TO USE THIS MANUAL
- SAFETY
- OPERATIONS
- MAINTENANCE
- PARTS LIST

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:	_____
Dealer:	_____
Address:	_____
Phone 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
- Adjusting Squeegee
- 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 No.

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.

NOTE: The number on the lower left corner of the front cover is the part number for this manual.

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.

⚠ WARNING:

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

Safety

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:

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

! CAUTION:

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.

! WARNING:

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.

! WARNING:

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.

! WARNING:

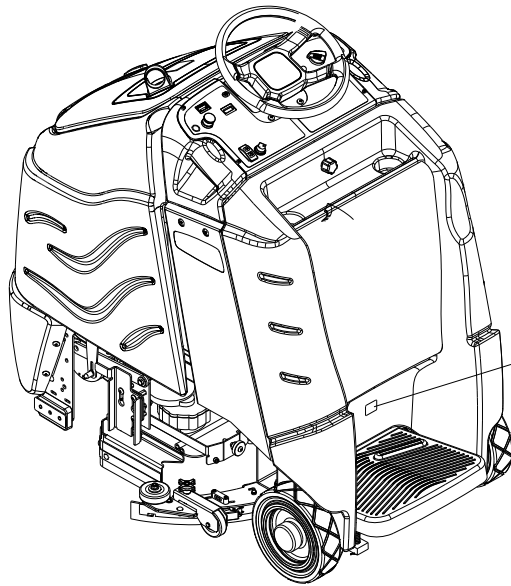
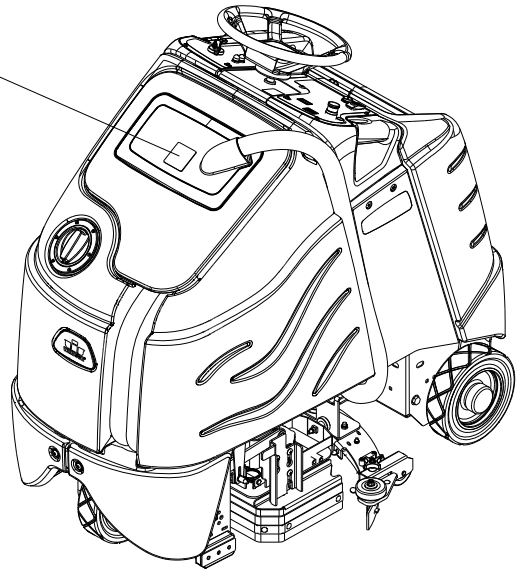
Never allow metal to lie across battery tops.

Safety Label Locations

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



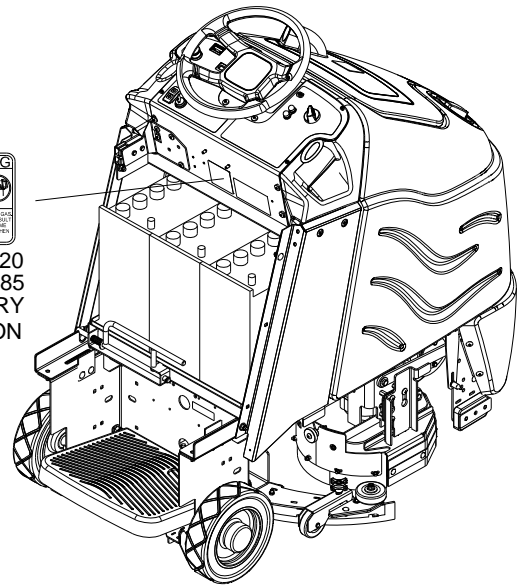
86244300
PRV NO. 500955
WARNING LABEL



86244310
PRV NO. 500956



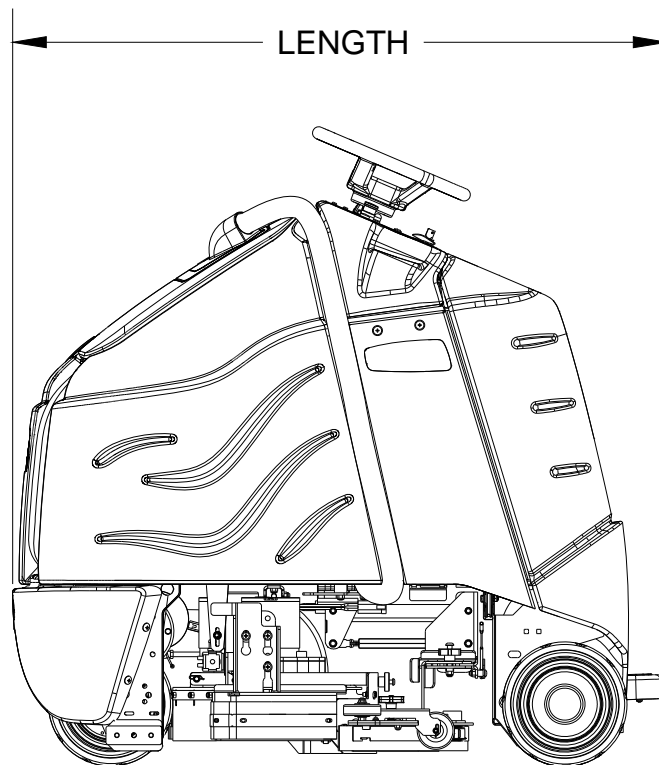
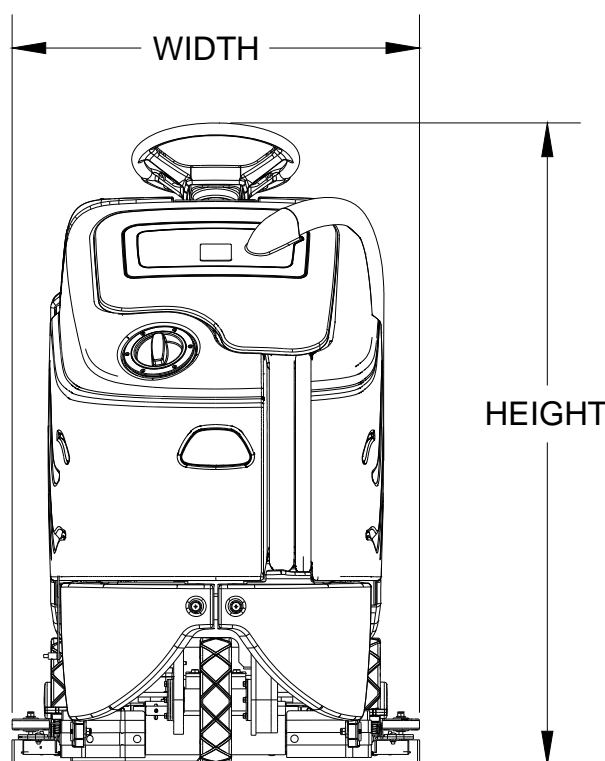
86252520
PRV NO. 80885
BATTERY
CAUTION



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)
Scrub Brush Motors - Disk Machine	2 x .3 HP (190 W)
Scrub Brush Motors - Cylindrical Machine	2 x .75 HP (560 W)
Vacuum Motor(s)	.63 HP (470 W)
Maximum flow rate of vacuum motor	72 cfm (33.98 liters per second)
Maximum suction of vacuum motor	47.3 inches of water (11.7 kPa)
Propelling Motor	.75 HP (560 W)
Mass (GVW)	1245 lbs (565 kg)
Weight empty without batteries	558 lbs (253 kg)
Solution Control	1.3 GPM pump, fully variable with automatic shut-off in neutral
Solution capacity	25 gal (95 L)
Recovery capacity	25 gal (95 L)
Scrub brush diameter - Disk Machine	12 inch (305 mm)
Scrub brush diameter - Cylindrical Machine	4.1 inch (105 mm)
Scrub brush pressure	0-150lbs (0-667N)
Scrub brush speed - Disk Machine	300 rpm
Scrub brush speed - Cylindrical Machine	500 rpm-slow, 800 rpm-medium, 1300 rpm-fast
Tires	10 in. (254mm) Solid Scrubber Compound
Foundation Pressure	104 psi (715 Kpa)
Maximum Speed	3.5 miles/hour (5.6 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	10%

ITEM	MEASURE
Height	50.6 inches (1285 mm)
Length	52.5 inches (1330 mm)
Width without squeegee	26.5 inches (670 mm)
Width of squeegee - Disk Machine	32.7 inches (830 mm)
Width of squeegee - Cylindrical Machine	37 inches (970 mm)
Width of scrub path - Disk Machine	24 inches (610 mm)
Width of scrub path - Cylindrical Machine	26 inches (650 mm)



SPECIAL NOTES:

The sound pressure level at the operator's ear was measured to be 68 dBA (Disk), 76dBA (cylindrical). 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 3.6m/s² and at the operators feet/pedal was measured to be 0.7m/s². The measurement and related calculations were made in accordance with ISO 5349, references Standard EN 60335-2-72.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

How This Machine Works

The Chariot® is a battery powered, self-propelled, hard floor scrubber intended for commercial use. The appliance applies a cleaning solution onto a hard floor, scrubs the floor with brushes, and then vacuums the soiled water back into the recovery tank.

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

The function of the solution system is to store cleaning solution and deliver it to the scrub system. The solution system consists of the solution tank, strainer, pump, valve. The solution tank stores cleaning solution (water and detergent) until it is delivered to the scrub system. The strainer protects the pump from debris. The valve automatically prevents solution flow unless the scrub brushes are turned on and the machine is being propelled.

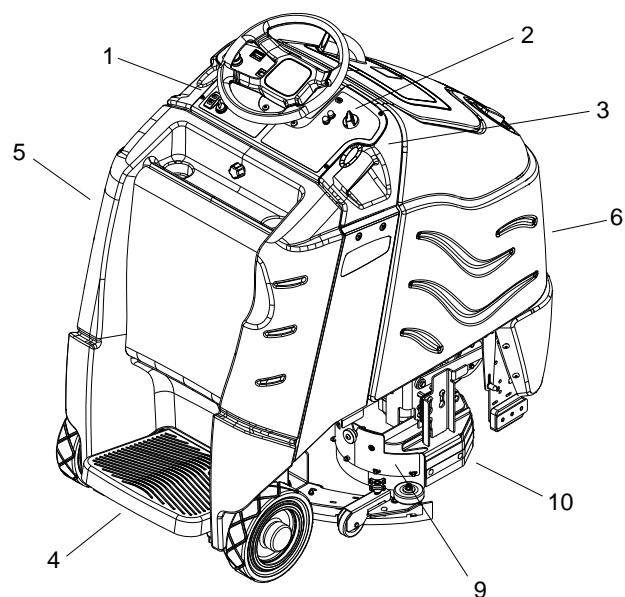
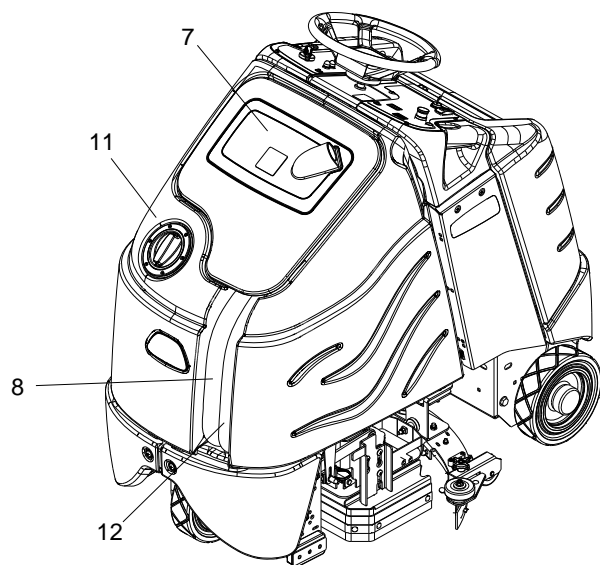
The function of the scrub system is to scrub the floor. The disk scrub system consists of two rotary type disk scrub brushes, motors, scrub deck skirt and lift actuator. The brushes scrub the floor as the motors drive the brushes. The brush drive hubs allow the scrub brushes to follow irregularities and changes in the floor without losing contact with the floor. The scrub deck skirts control the cleaning solution on the floor so that the squeegee can pick it up.

The scrub plus system consists of two cylindrical type brushes, motors, scrub deck side squeegees, hopper, lift actuator. The cylindrical scrub head is designed to eliminate debris that may be caught in the squeegee while scrubbing. Water is applied to the first scrubbing brush turning in a clockwise rotation when viewed from the right side of machine. The first brush scrubs dirt and debris between the brushes. The second scrubbing brush, turning in a counter clockwise rotation, picks up debris and throws it into a removable hopper. Water is allowed to drain out the hopper into the squeegee path where it is recovered from the floor.

The scrub deck side squeegees control the cleaning solution on the floor so that the squeegee can pick it up.

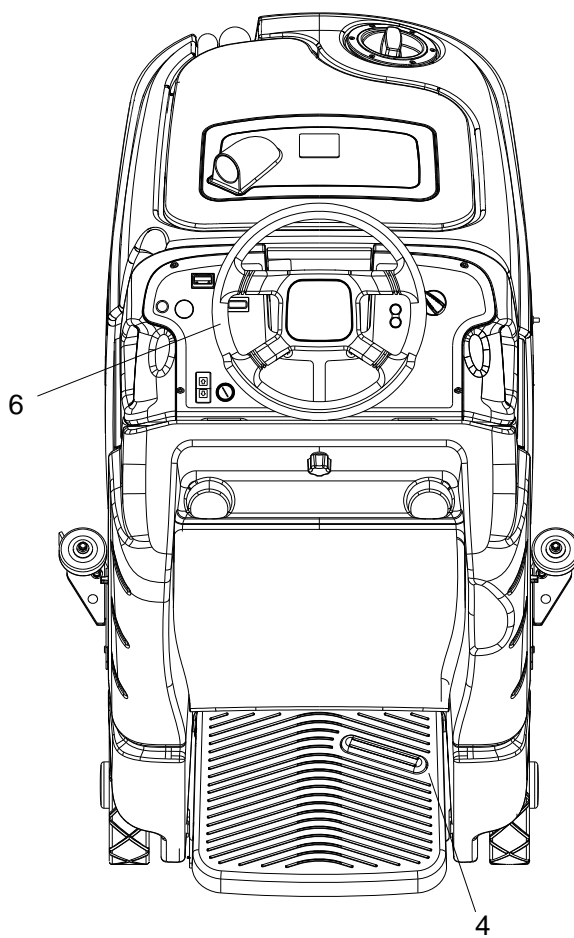
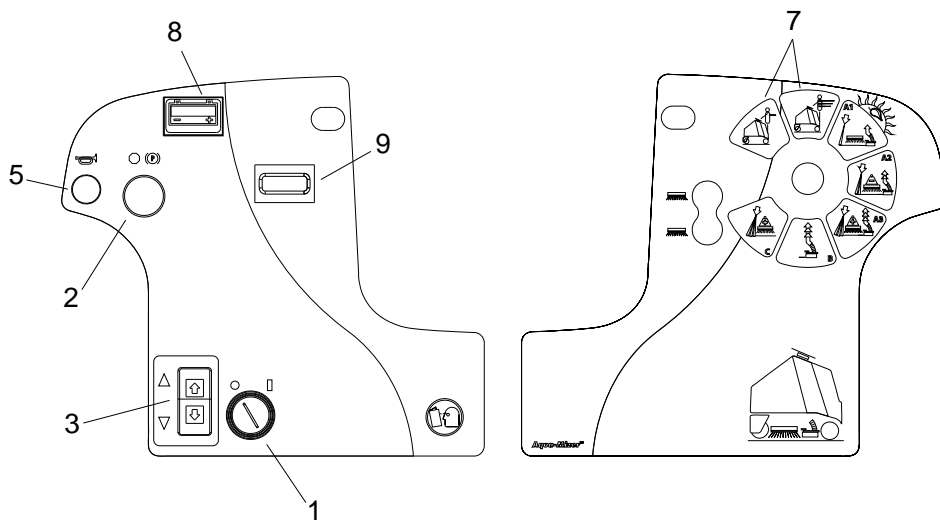
The function of the recovery system is to vacuum the soiled water back into the recovery tank. The recovery system consists of the squeegee, vacuum motor, float ball filter, recovery bag. The squeegee wipes the dirty solution off the floor as the machine moves forward. The vacuum motor provides suction to draw the dirty solution off the floor and into the recovery bag. The float ball filter protects the vacuum fan from debris and foam. The recovery bag stores the dirty solution.

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 drive reset switch, throttle pedal, emergency stop/brake switch, steering wheel, propel controller, and drive wheel. The directional control drive reset switch signals forward or reverse direction and makes sure the operator is on platform before machine will propel. The controller interprets signals from the throttle pedal to command the drive wheel to propel or slow the machine. 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.



- 1. Control Panel-Drive
- 2. Control Panel-Scrub
- 3. Control Housing
- 4. Pedal Platform
- 5. Rear Cover
- 6. Tank
- 7. Recovery Dome
- 8. Recovery Drain Hose
- 9. Scrub Deck Aqua-Mizer™
- 10. Scrub Deck Skirts/Side Squeegees
- 11. Solution Cover
- 12. Solution Drain Hose

Drive Controls



- | | |
|---|--------------------------------|
| 1. Key Switch | 6. Steering Wheel |
| 2. Emergency Stop/Brake Switch | 7. Speed Control |
| 3. Directional Control / Drive Reset Switch | 8. Battery Discharge Indicator |
| 4. Throttle Pedal | 9. Hour Meter |
| 5. Horn Button | |

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.

When the key is turned on the battery symbol will flash while the system runs self-diagnostics and returns scrub deck and squeegee to their raised positions, if necessary. The controller will not respond to other commands until this routine is complete.

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 / DRIVE RESET SWITCH

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

Controls the direction of travel of the vehicle. The lit arrow on 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.

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. HORN BUTTON

The horn is activated by pressing the horn button.

6. STEERING WHEEL

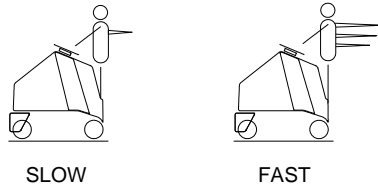
The steering wheel turns the front wheel causing the machine to change direction.

7. SPEED CONTROL

Controls the maximum speed of the machine. There are two transport settings, slow and fast.

To change speed, rotate the dial to either slow or fast position. The slow position is to the left (counterclockwise), fast to the right (top position).

The throttle pedal will always regulate the speed between 0 and maximum



8. BATTERY CHARGE LEVEL INDICATOR

Indicates the charge level of the batteries.

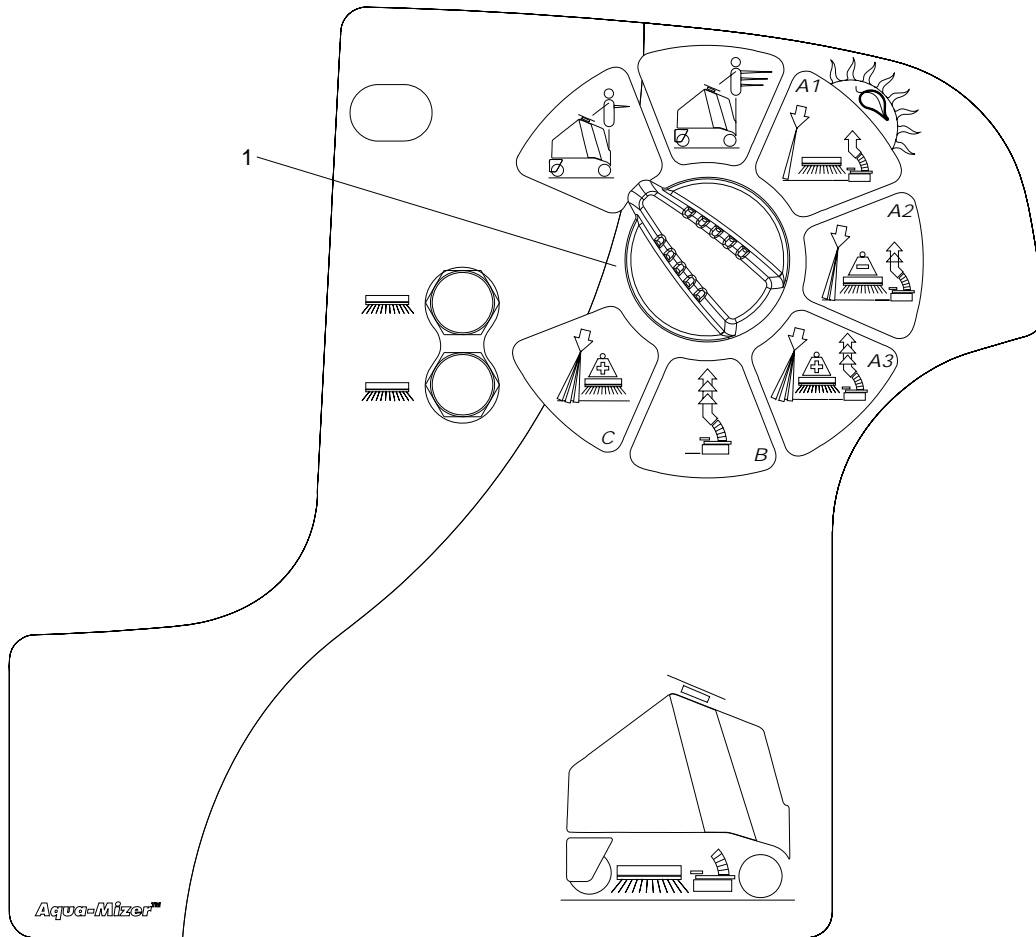
The meter display is divided into 10 vertical bars. Bars illuminated on the far right indicate full charge. Bars flashing near the left side indicate the batteries should be recharged. Further operation of the machine could damage the machine or the batteries.

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.

9. HOUR METER

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

Scrub Controls



1. FUNCTION MODE SWITCH

The first two positions are for transport only. See drive controls section.

A1 - Daytime cleaning/light cleaning

This mode is used for light cleaning. In this mode the machine will propel at a maximum of medium speed. The scrub deck will automatically lower to a lower down pressure setting. The water will flow at a low rate. Water will automatically shut off in neutral and restart when pressure resumes. The squeegee will automatically lower and vacuum will continue on at a low flow. (Squeegee will continue to lower and the vacuum will continue to run in neutral. The squeegee will raise in reverse.)

A2 - Medium scrub level cleaning

This mode is used for medium level cleaning. In this mode the machine will propel at a maximum of medium. The scrub deck will lower at a medium down pressure. The water will flow at a medium rate. The vacuum will flow at a medium.

A3 - Heavy scrub level cleaning

This mode is used for heavy level cleaning. In this mode the machine will propel at a maximum of slow speed. The scrub deck will lower to a heavy down pressure. The water will flow at a high rate. The vacuum will flow at a high rate.

B - Vacuum only mode

This mode is used for picking up solution only. The brushes and water will both be up and off. In this mode the machine will propel at a maximum of medium speed. The squeegee will automatically lower and the vacuum will come on. The vacuum will flow at a high rate. The squeegee will raise during reverse propelling. The squeegee and vacuum will remain down and on in neutral propel.

C - Double Scrub cleaning

This mode is used for putting down solution and scrubbing without picking it back up. In this mode the machine will propel at a maximum speed of slow. The scrub deck will automatically lower to a heavy scrub level. The solution will flow at a high rate. The brushes and water will shut off and raise when the machine is in neutral. They will resume when propelling is resumed.

1. FUNCTION MODE SWITCH (CYLINDRICAL)

The first two positions are for transport only. See drive controls section.

A1-Daytime cleaning/light cleaning

This mode is used for light cleaning. In this mode the machine will propel at a maximum of medium speed. The scrub deck will automatically lower and spin brushes at low speed. The water will flow at a low rate. Water will automatically shut off in neutral and restart when propel resumes. The squeegee will automatically lower and vacuum will continue on at a low flow. (Squeegee will continue to lower and the vacuum will continue to run in neutral. The squeegee will raise in reverse.)

A2-Medium scrub level cleaning

This mode is used for medium level cleaning. In this mode the machine will propel at a maximum of medium speed. The scrub deck will lower and spin brushes at medium speed. The water will flow at a medium rate. The vacuum will flow at a medium rate.

A3-Heavy scrub level cleaning

This mode is used for heavy level cleaning. In this mode the machine will propel at a maximum of slow speed. The scrub deck will lower and brushes spin at high speed. The water will flow at a high rate. The vacuum will flow at a high rate.

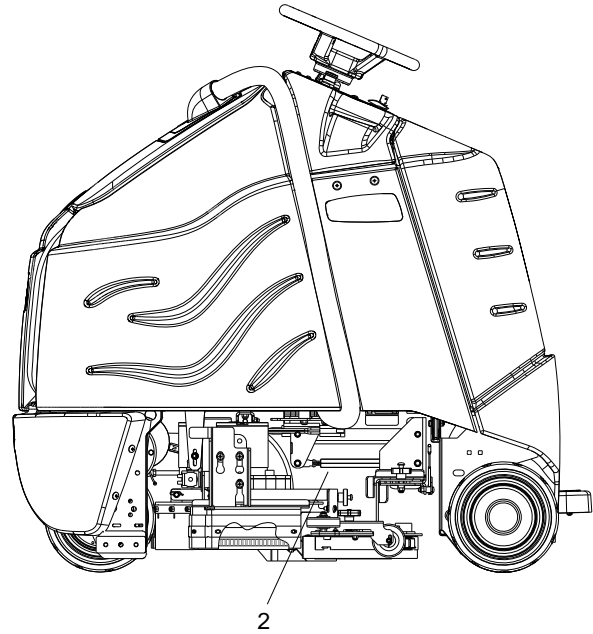
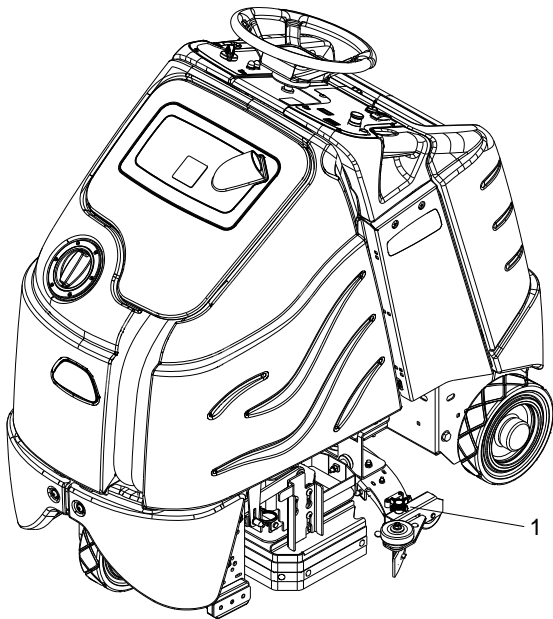
B-Vacuum only mode

This mode is used for picking up solution only. The brushes and water will both be up and off. In this mode the machine will propel at a maximum of medium speed. The squeegee will automatically lower and the vacuum will come on. The vacuum will flow at a high rate. The squeegee will raise during reverse propelling. The squeegee and vacuum will remain down and on in neutral propel.

C-Double Scrub cleaning

This mode is used for putting down solution and scrubbing without picking it back up. In this mode the machine will propel at a maximum speed of slow. The scrub deck will automatically lower and spin brushes at high speed. The solution will flow at a high rate. The brushes and water will shut off and raise when the machine is in neutral. They will resume when propelling is resumed.

Scrub Controls-Squeegee



1.Squeegee Deflection Adjustment Knobs

2.Squeegee Pitch Adjustment Rod

Squeegee Deflection Adjustment Knobs (Disk Scrubber)

Adjusts the deflection along the entire length of the squeegee.

To increase squeegee blade deflection, turn the two knobs at the ends of the squeegee counterclockwise.

To decrease squeegee deflection, turn the two knobs at the ends of the squeegee clockwise.

Squeegee Pitch Adjustment Rod (Disk Scrubber)

Adjusts the deflection at the ends of the squeegee.

To increase squeegee blade deflection at the ends, turn rod counterclockwise.

To decrease squeegee blade deflection at the ends, turn rod clockwise.

Squeegee Deflection Adjustment (Cylindrical Scrubber)

Adjusts the deflection along the entire length of the squeegee.

To increase squeegee blade deflection, loosen the bolt at the wheel axle and raise in the slots.

To decrease squeegee deflection, lower the wheel axle in the slots.

Squeegee Pitch Adjustment (Cylindrical Scrubber)

No adjustments are necessary for this squeegee style.

Machine Operation

Pre-Run Machine Inspection

Do a pre-run inspection to find possible problems that could cause poor performance or lost time from break-down. 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. The operator should be on the pedal platform. The throttle pedal must be in the 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 Directional Control Switch to reset and set the intended direction for travel.
5. Press lightly on the throttle pedal with right foot

Emergency Stop Procedures

1. Push in emergency stop button. This will also engage the parking brake and cause the machine to stop immediately.

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, leaving enough room for the required amount of cleaning solution. The solution tank capacity filled to fill inlet is 25 gallons (95 liters). The water must not be hotter than 140° F (60°C) to prevent damage to the tank.
4. Measure the chemical into the solution tank. The solution cover is also a 2 oz. (60 ml) measuring cup. Liquid chemicals should be added to the solution tank after filling with water. Dry chemicals should be thoroughly mixed before being added into solution tank. Commercially available, high alkaline floor cleaners, are suitable for use in the solution system.

NOTE: Read the chemical manufacturers recommended proportion instructions.

5. Replace solution tank cover.

⚠ WARNING:

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

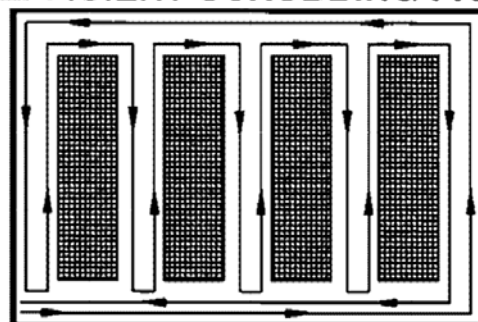
Normal Scrubbing

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

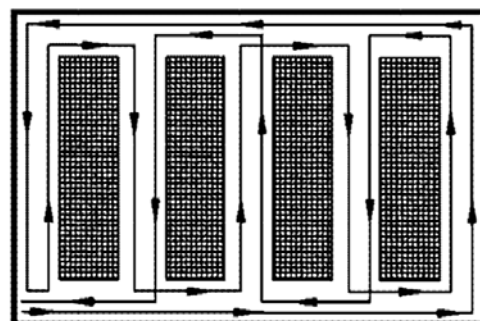
In order to achieve the best possible results, the area which is to be cleaned should be swept before scrubbing. Large debris, strings and wire must be removed to prevent being caught in brushes or squeegee.

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. If either forward or reverse travel is selected, the solution flow will continue in the same setting and the scrub brush motors will continue in their same setting once movement of machine begins. Overlap the brush path and avoid transporting over previously cleaned areas.

INEFFICIENT SCRUBBING PATH



RECOMMENDED SCRUBBING PATH



To Begin Scrubbing

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

Flammable liquids and/or reactive metals can cause explosions or fire! Do not pick up.

1. Stand on the operator platform. Throttle pedal must be in neutral position.
2. Turn machine power on.
3. Press the Drive Reset / Directional Control Switch, selecting the desired travel direction.
4. Position the function control knob to the desired operation. The brush motors will start, the scrub deck will lower, the solution will begin to flow, the squeegee will lower to the floor and the vacuum motors will start.
5. Drive machine forward to begin scrubbing.

NOTE: Shut machine off immediately if water or foam is expelled from the machine.

NOTE: Solution flow is automatically shut off when brush motors stop. When brush motors are activated, flow automatically resumes.

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. Disconnect the squeegee hose from the recovery dome.
4. Begin normal scrubbing. Solution flow should begin within 2 minutes.
5. Connect squeegee hose to recovery dome.

To Stop Scrubbing

1. Rotate the function knob to either transport position. The brush motors will stop and the scrub deck will rise to the park position. After 10 seconds the squeegee will raise, and 10 seconds later the vacuum motor will turn off. This delay is to clear the vacuum hose of recovered solution.
2. Allow the throttle pedal to return to neutral.
3. Turn machine power off.

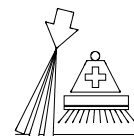
FOR SAFETY: Before leaving or servicing machine: stop on level surface, turn off machine and remove key.

Double Scrub

For floors which are heavily soiled or have thick accumulations of floor finish, may not clean sufficiently with one pass. In these cases it will be necessary to double scrub.

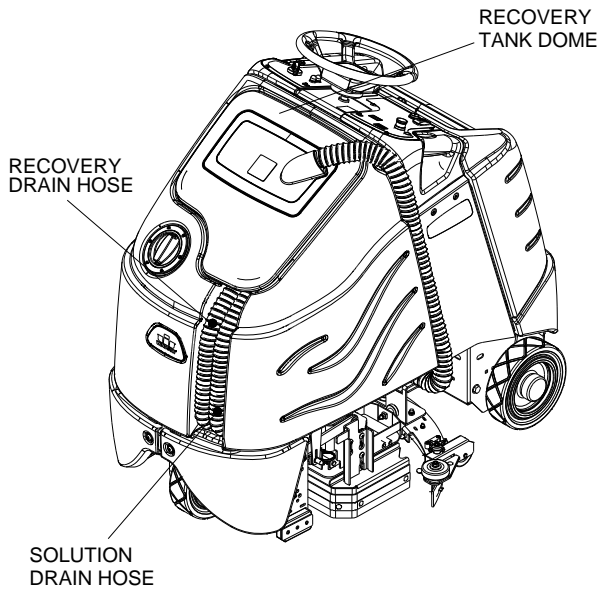
Rotate the knob to the double scrub position.

Make the first pass over the surface being cleaned with



the squeegee up, vacuum off and the solution on. For best results also remove the Aqua-mizer™, this will allow the solution to stay in contact with the soil while loosening the surface accumulation with the brushes. Allow time for the first application to stay in contact with the floor. Length of time between the first and second pass depends on amount of accumulation and the type of chemical being used. A second scrubbing with the function knob in one of the normal scrubbing modes will lower the squeegee and will keep the solution on and brushes down to further loosen soil. The additional application of solution will further assist the difficult cleaning job.

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



SOLUTION TANK

1. Remove the recovery tank dome.
2. Pull the solution drain hose from its mounting pocket. Unscrew the cap, then lower hose in direction of drain.
3. Remove the solution tank lid.
4. 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.

NOTE: *Never allow solution to remain in tank. Damage to tank, seals and valves could occur.*

Emptying and Cleaning Tanks

1. Park the machine next to a floor drain. Drain hoses are at the front of the machine.
2. Turn the machine power off.

RECOVERY TANK

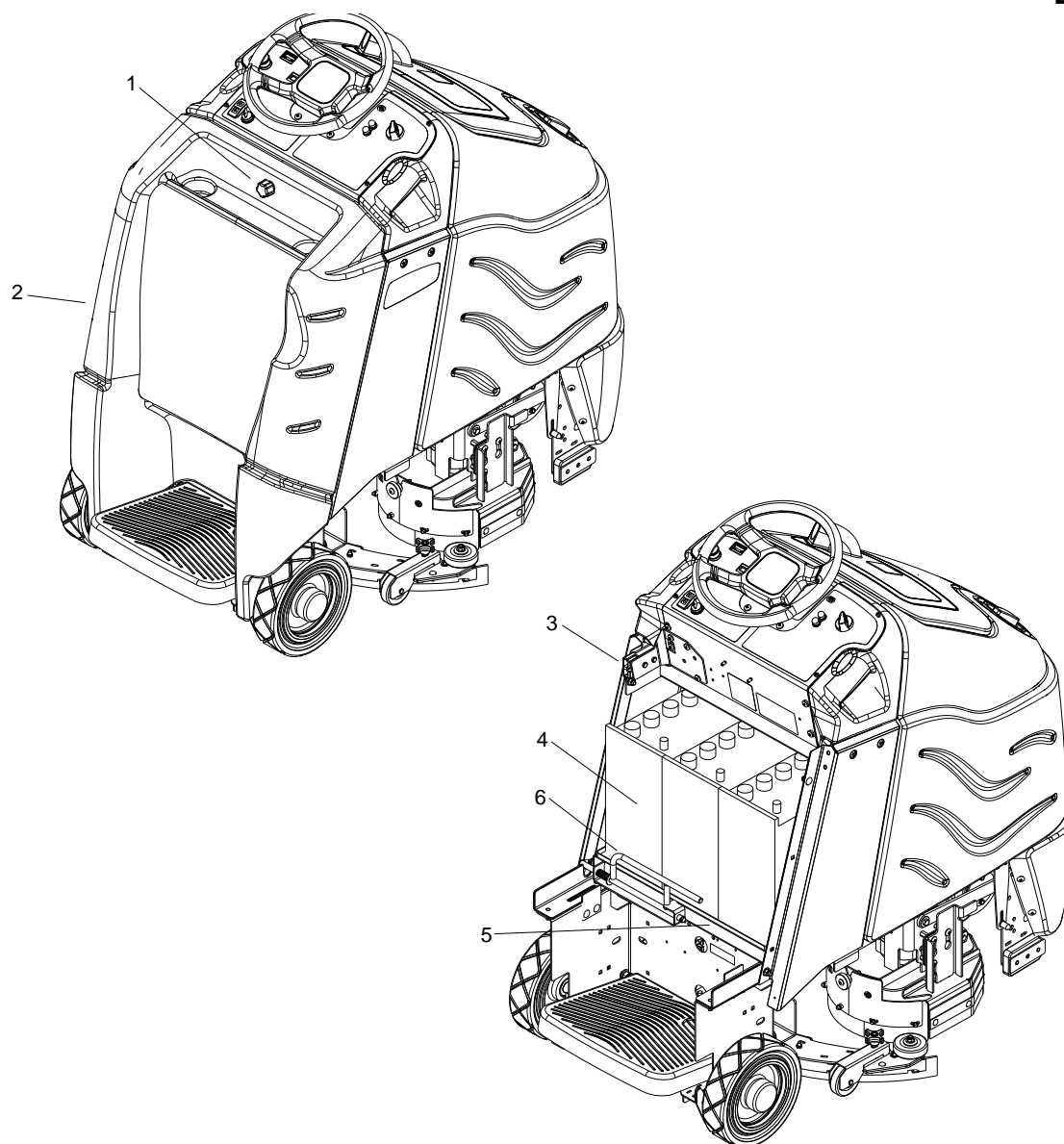
1. Remove the recovery tank dome. Pull the large drain hose from the mounting pocket. Unscrew cap, then lower hose in direction of the drain. Do not stand in front of end of hose. Recovered solution will come out with force.
2. Flush the recovery bag out with clean water. Do not use water hotter than 140°F (60°C) to clean tank. Damage may occur.
3. Clean debris from dome basket.
4. Clean off the float shut-off system and inspect for free movement of float. The float shut-off system is located in the rear of the recovery tank.
5. Replace the drain cap and secure drain hose under tank. Replace the drain cap and secure drain hose to front of tank.
6. If machine is to be stored, leave the recovery tank dome off, or propped open.

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. (Wet cell only)	*				
Check that dome and cover seal tightly.	*				
Visually check for damaged or worn tires.	*				
Check brushes or pads for proper installation.	*				
Check vacuum hose connections.	*				
Check that squeegee is securely attached and properly adjusted.	*				
Check for securely attached drain hoses, plug and cap.	*				
Check pedal, brake and steering for proper operation.	*				
Clean out recovery tank and dome basket.		*			
Clean and inspect float shutoff.		*			
Clean out solution tank and filter, check flow.		*			
Clean and inspect solution filter strainer.		*			
Run vacuum motors to dry.		*			
Clean brushes or pads and check wear.		*			
Clean squeegee blades and check wear.		*			
Clean outside of tanks, check for damage.		*			
Store with dome off tank or propped open.		*			
Charge batteries if needed.		*			
Clean off top of batteries.			*		
Check battery cells with hydrometer. (Wet cell only)			*		
Inspect scrub deck skirts and Aqua-Mizers.			*		
Clean solution strainer inside tank.			*		
Check battery connections are tight.			*		
Clean battery cases and battery compartment.				*	
Check parking brake.					*
Clean cables and pulleys for squeegee lift.					*
Clean pivot points on squeegee and scrub deck.					*
Check all motors for carbon brush wear.					*
Check motor commutators.					*
Check steering chain tensioner.					*

Traction drive, wheels and batteries should be serviced based on traction drive hour meter (Deluxe). The scrub brush hour meter should be used for all other service schedule items.

Batteries



1. Rear Cover Retainer Knob
2. Rear Cover
3. Battery Connector-Machine
4. Batteries
5. Battery Tray
6. Battery Tray Liner

BATTERIES (WET CELL ONLY)

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:

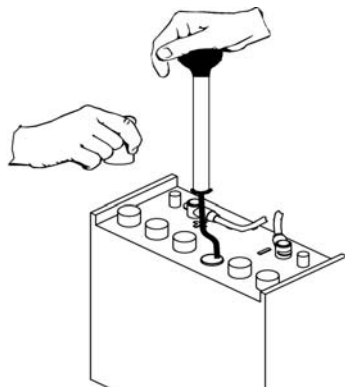
Charge batteries in a well ventilated area.

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.

CHECKING BATTERY SPECIFIC GRAVITY

Use a hydrometer to check the battery specific gravity.



CHECKING GRAVITY

- Hydrometer Battery
- 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°C): 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.

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

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

- 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.

- 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.

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

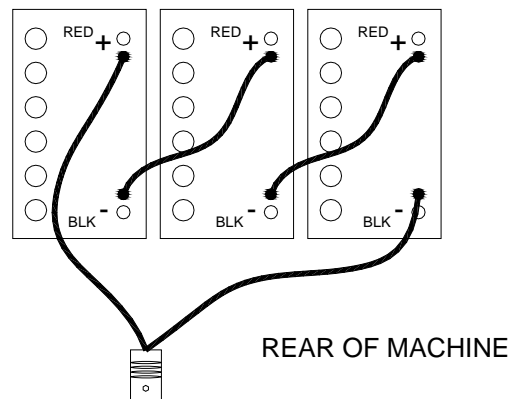
Stop the machine in a clean area next to the charger. Turn off machine.

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

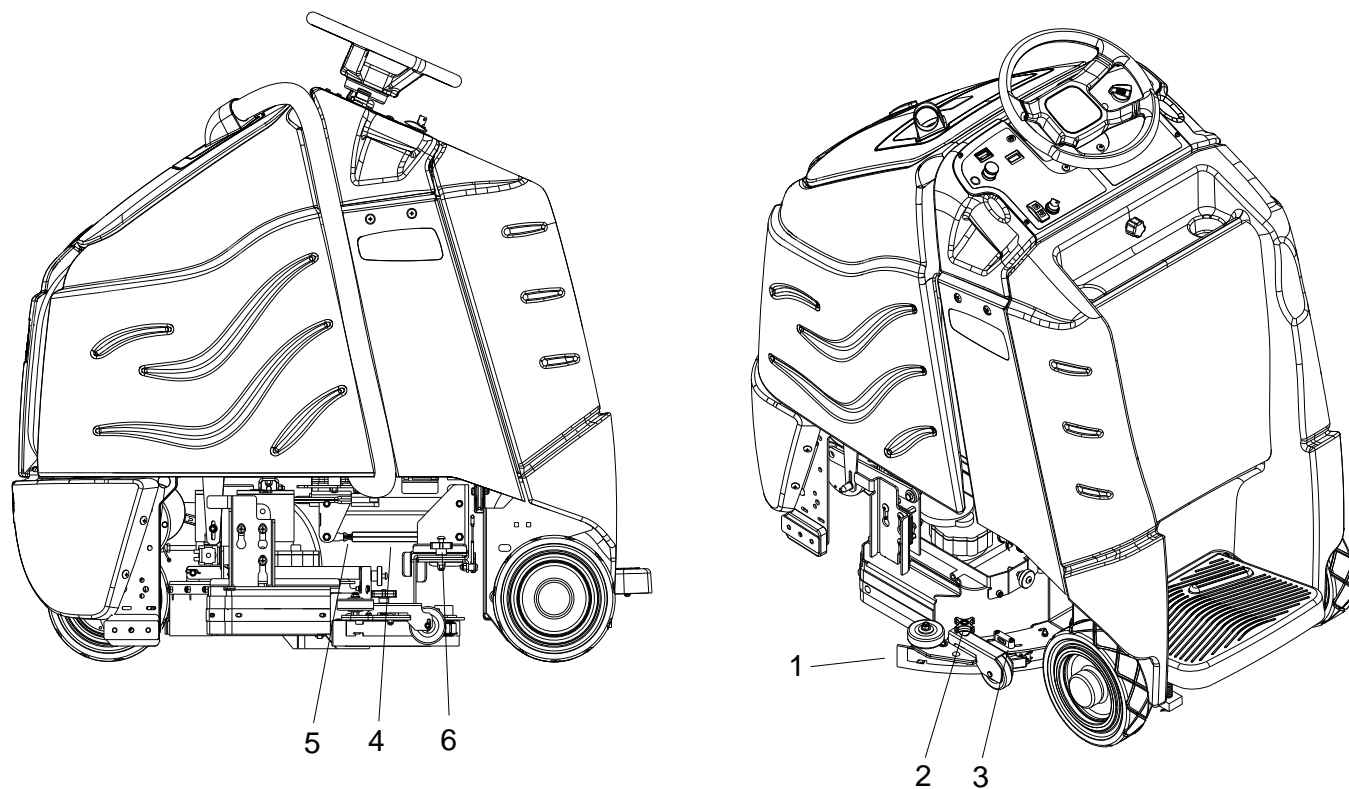
1. Remove the rear cover.
2. Disconnect battery pack from machine.
3. Unlatch battery tray from machine and pull out to expose batteries.
4. Use the proper size open end wrench to disconnect main ground wire first and secure cable terminal away from batteries.
5. Disconnect main positive lead and secure 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.

! WARNING!

Attach suitable battery lifting device and lift batteries from the machine. Batteries are a potential environmental hazard. Consult your battery supplier for safe disposal methods.



Squeegee



- 1. Squeegee
- 2. Squeegee Deflection Adjustment Knobs
- 3. Squeegee Level Indicator
- 4. Squeegee Pitch Adjustment Rod
- 5. Squeegee Pitch Adjustment Lock Nut
- 6. Squeegee Retainer Knob

Squeegee Blades

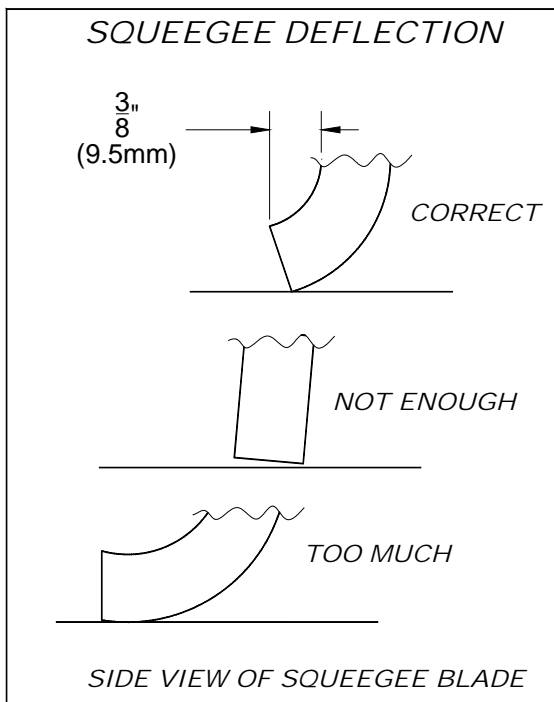
The front squeegee blade allows solution to pass through channels in the blade into the squeegee assembly while maintaining vacuum to provide lift. The front blade has four wear surfaces and can be rotated for extended life. The front blade should not require regular replacement under normal use.

The rear blade wipes the floor to a near dry condition. It is important the rear blade be in good condition to properly do its job. As with the front, each squeegee blade assembly has four wear surfaces for extended service.

Check both the front and rear squeegee blades for damage, wear, and adjustment each day in the pre-run check. Change the front blade if it is torn or has an uneven edge. Change the rear blade if it is less than 1/2 the original thickness.

Adjusting Squeegee

Adjusting the squeegee is a two-part process. First, the squeegee assembly must have correct pitch in order for the squeegee blade to have the same deflection at each tip as well as the center. The rod on the squeegee linkage controls the pitch adjustment. The second adjustment is the deflection. Knobs on each end of the squeegee control this.



To Remove Squeegee Assembly

1. With the squeegee in the up position, turn key switch "OFF".
2. Disconnect vacuum hose from squeegee and loosen knob on left side of squeegee lifting carrier.
3. Pull squeegee assembly from the lifting carrier.
4. Inspect or repair as necessary and reinstall.

To Replace or Rotate Squeegee Blades

1. With the squeegee in the up position, turn key switch "OFF".

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

2. Remove the squeegee assembly from the machine. Unlatch and remove blade retainer strap and remove squeegee blade.
3. Rotate the squeegee to new edge position or replace as required. Each blade has four new edge positions.
4. Install blade on locating pins of squeegee assembly.
5. Install squeegee retainer strap.
6. Fasten and lock latch, adjust latch only tight enough to take up slack in retaining strap.

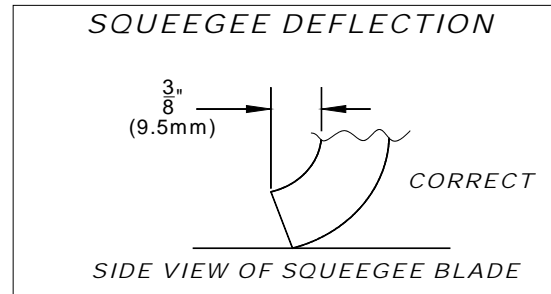
To Replace or Rotate Front Squeegee Blades

1. With the squeegee in the up position, turn key switch "OFF".
2. Remove the squeegee from the machine. Loosen thumbscrews and remove the retainer strap and squeegee blade.
3. Rotate the squeegee to new edge position or replace as required. Each blade has four new edge positions. When installing the front blade, tighten the center thumbscrew first. Insure that the retainer strap is pressed against the blade before tightening the outer screws.

To Adjust Squeegee Pitch

1. Choose a smooth, level surface. Turn "ON" the key switch. Lower the squeegee and drive forward at least 2 feet (60cm.).
2. With the squeegee down, stop the machine. Do not allow machine to roll back.
3. **FOR SAFETY:** Before leaving or servicing the machine; stop on level surface, turn off machine and remove key.
4. Determine the differences, if any, in deflection of the squeegee blade between each end and the middle. Proper adjustment is obtained when deflection is equal all the way across the squeegee blade. The bubble level should also indicate when the squeegee is adjusted properly. When the air bubble is in the center of the vial, the deflection should be even across the squeegee blade.
5. To decrease the deflection of the squeegee blade at the ends, loosen wing nut and rotate the rod clockwise. To increase the deflection at the ends of the squeegee assembly, rotate the rod counter-clockwise knob.
6. Check the deflection of the squeegee blades again. Repeat steps 1 through 4 until the deflection is equal across the entire rear squeegee blade. Tighten wing nut.

To Adjust Amount of Rear Squeegee Deflection



1. Choose a smooth, level surface. Lower the squeegee and drive forward at least 2 feet (60cm).
2. With the squeegee down, stop the machine. Do not allow machine to roll back.

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

3. Observe the amount of squeegee deflection. It should deflect 3/8 in. (9.5mm) across the entire width of the squeegee.
4. To increase the squeegee deflection, turn the 2 knobs at the squeegee ends counter-clockwise. To decrease the deflection, turn the knobs clockwise.

NOTE: *The deflection should be consistent along the length of the squeegee. If the deflection varies from end to end the knobs can be adjusted independently to correct the variation.*

5. Turn on the key switch. Raise, then lower squeegee assembly. Drive forward at least 2 feet (60cm).
6. Repeat steps 2 through 4 until deflection of 3/8 in. (9.5mm) is reached.

Scrub Brushes

There are four different types of brushes available to cover applications from cleaning heavily soiled floors to polishing. A pad driver is also available to take advantage of the many cleaning pads on the market. Please refer to the following to assist in selecting the proper brush or pad for the work at hand.

Uncoated Floors

Aggressive Grit is a nylon fiber impregnated with silicone carbide grit. It grinds away stain, soil, and removes surface material.

Mild Grit is a less aggressive silicone carbide grit suitable for cleaning medium soil conditions. Advantages are faster ground speed than nylon bristles on light solid applications.

Polypropylene is a general-purpose scrub brush with stiff bristles. Polypropylene works well for maintaining concrete, wood and tile floors.

Finished Floors

Nylon bristles are used in a variety of applications on coated or uncoated surfaces.

White Pads (Polishing) are used for dry polishing to achieve a high-gloss appearance, or surface washing on highly polished or burnished floors.

Red Pads (Buffing) are used for light-duty scrubbing. When used with a mild detergent they will provide surface cleaning without removing the finish.

Blue Pads (Scrubbing) are used for heavy-duty scrubbing and light stripping. The blue pads remove less finish than brown stripping pads, yet will remove black marks, stains and dirt.

Black Pads (Stripping) are used for easy and complete removal of old floor waxes/finishes. They will quickly remove ground in dirt, black heel marks, and spills. When used with the proper stripper, this pad leaves the floor clean and ready for finishing.

The scrub brushes should be checked before each days work for wire, string, wear and damage.

Replacing or Installing Scrub Brushes (Disk)

1. Turn machine function dial to transport mode, allowing deck to return to "up" position. Turn the machine power off.

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

2. Remove scrub deck skirts on left and right sides by lifting directly up and pulling out.
3. Locate release lever on top of brush or pad driver. Rotate release lever counterclockwise and the brush/pad driver will release and drop down.
4. To reinstall, center the brush/pad driver under the brush drive hub. Raise it until it contacts brush driver assembly. Turn clockwise until release lever plate locks into position.
5. Replace scrub deck skirts on both sides.

NOTE: Check that release lever/plate is completely closed and pad/brush is securely attached. Damage to driver or brush could occur if not securely attached.

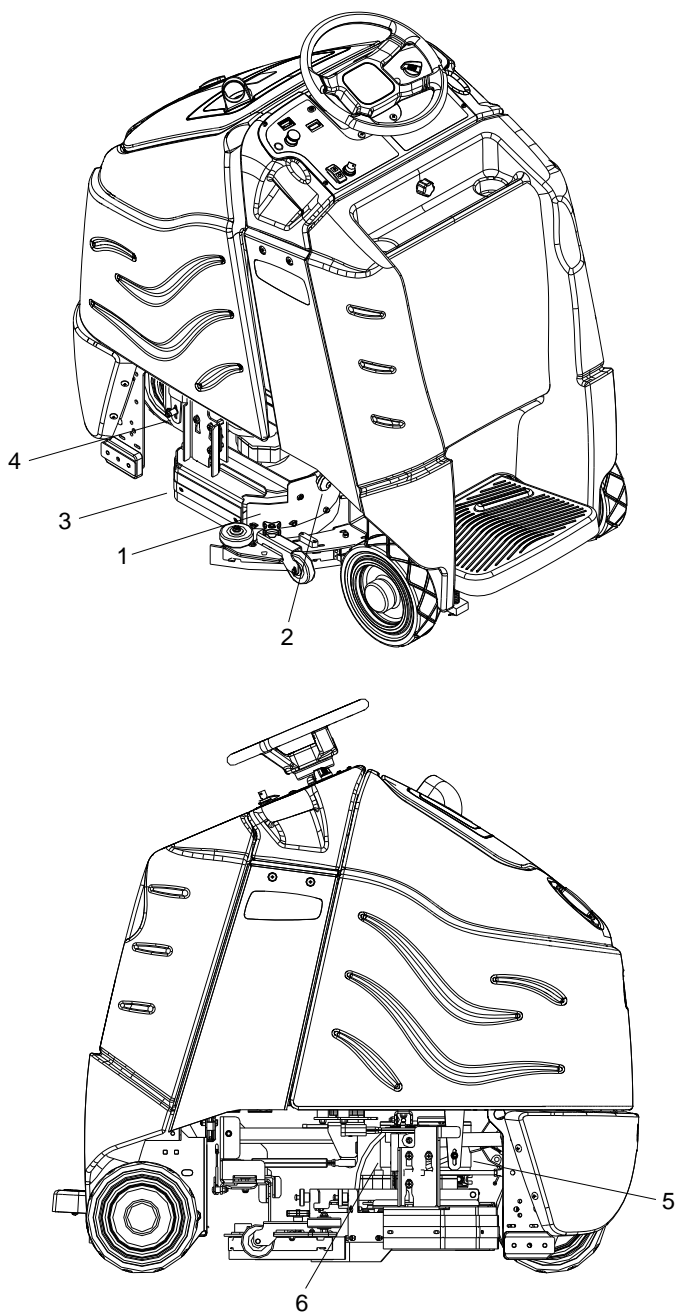
Replacing or Installing Scrub Brushes (Cylindrical)

1. Turn machine function dial to transport mode, allowing deck to return to "up" position. Turn the machine power off.

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

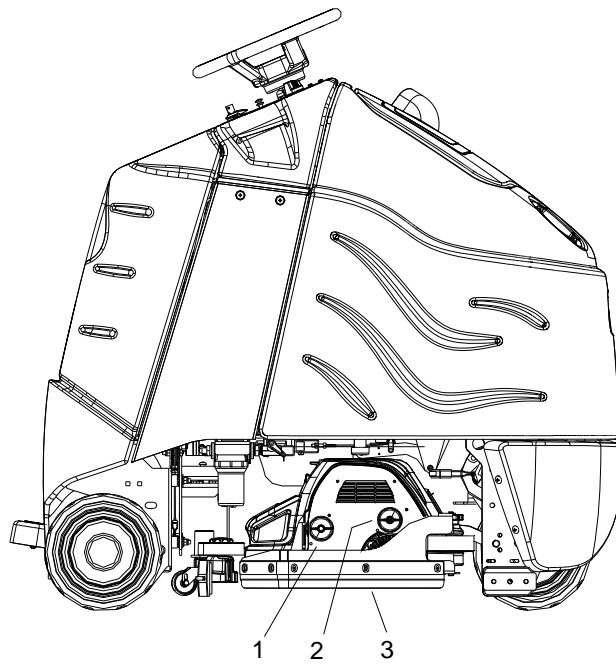
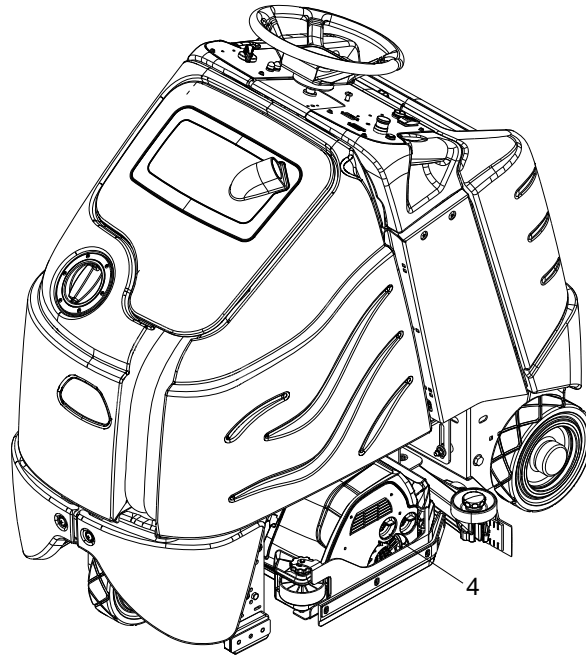
2. On right and left sides of deck, turn both brush and skirt releases 1/4 turn counter-clockwise.
3. Swing deck skirts out. Remove brush end caps. Slide brushes out the sides of deck.
4. To reinstall, slide brushes into deck. Replace brush end caps. Lift end cap up and turn brush release 1/4 turn clockwise, locking brush in place. Swing deck skirt back to deck. Turn skirt release 1/4 turn clockwise, locking skirt into place.

NOTE: Check that brush end cap is properly secured into deck housing. Check that brush is suspended off ground while deck is in "up" position.



Scrub Deck-Disk

- | | |
|------------------------------|-----------------------------|
| 1. Scrub deck Aqua-Mizer™ | 4. Scrub deck skirt stop |
| 2. Aqua-Mizer™ retainer knob | 5. Scrub brush motor |
| 3. Scrub deck skirt | 6. Scrub deck lift actuator |



Scrub Deck-Cylindrical

1. Skirt Release
2. Brush Deck
3. Skirt
4. Brush End Cap

⚠ WARNING:

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

To Replace Scrub Brush Motors

With the scrub deck in the raised position, disconnect brush motor wiring connector from harness.

Remove skirts from scrub deck to access and remove scrub brushes or pad drivers.

1. Remove Aqua-Mizers™ from scrub deck.
2. Remove retaining bolt, lock washer, flat washer and star drive from brush motor shaft.
3. Remove 4 brush motor mounting bolts located under scrub deck.
4. Lower scrub deck.
5. Remove brush motor.
6. Reverse steps to install.

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.

Actuator Scrub Deck Removal / Replacement

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

1. Remove the two screws that secure actuator spring plate and pull actuator barrel from stud on actuator spring bracket.
2. Remove clevis pin from upper bracket of actuator.
3. Disconnect actuator from wiring harness.
4. Reverse steps to install.

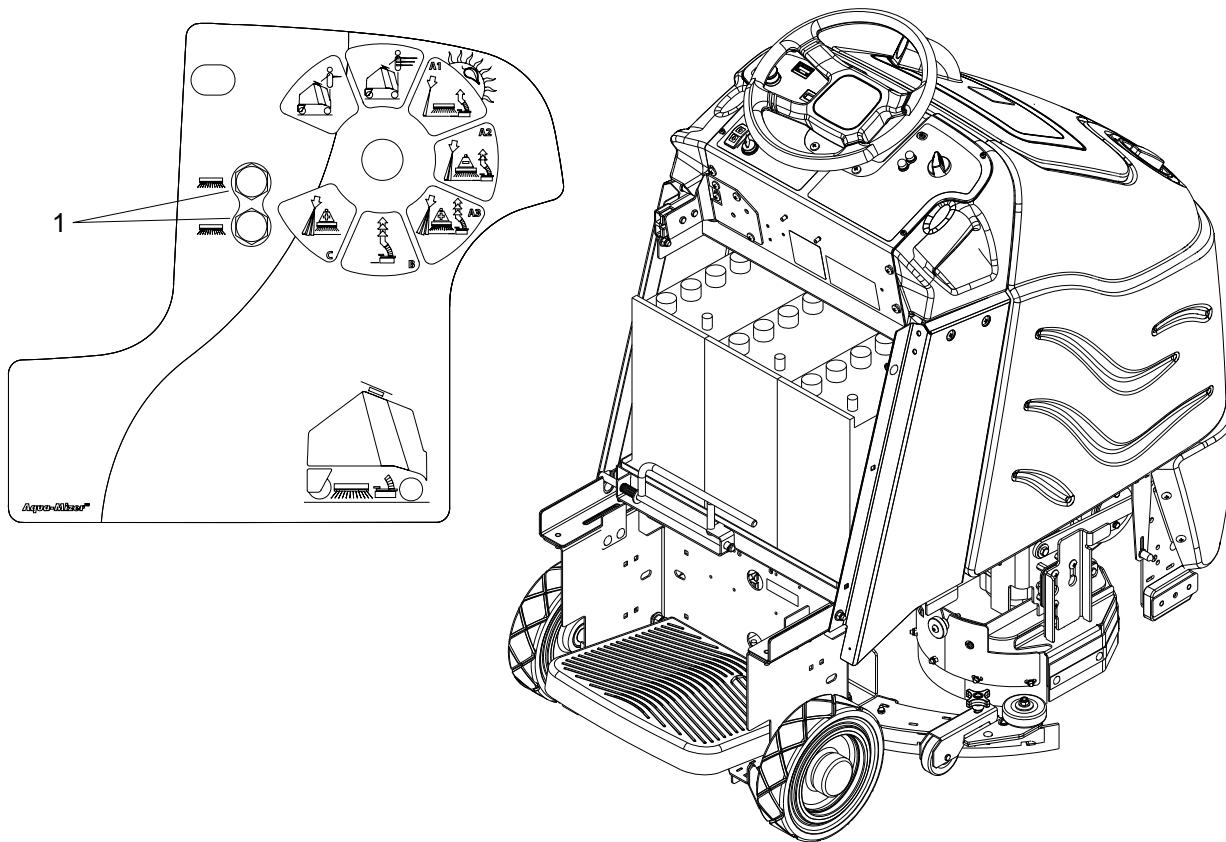
Scrub Deck Actuator Adjustment

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 full turn, then enough more to allow connection to lift linkage.
6. Connect actuator to lift linkage.
7. Check travel of actuator during operation.

Circuit Protection



Circuit Breakers

1. 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. (Disk) Protects the left scrub brush motor.

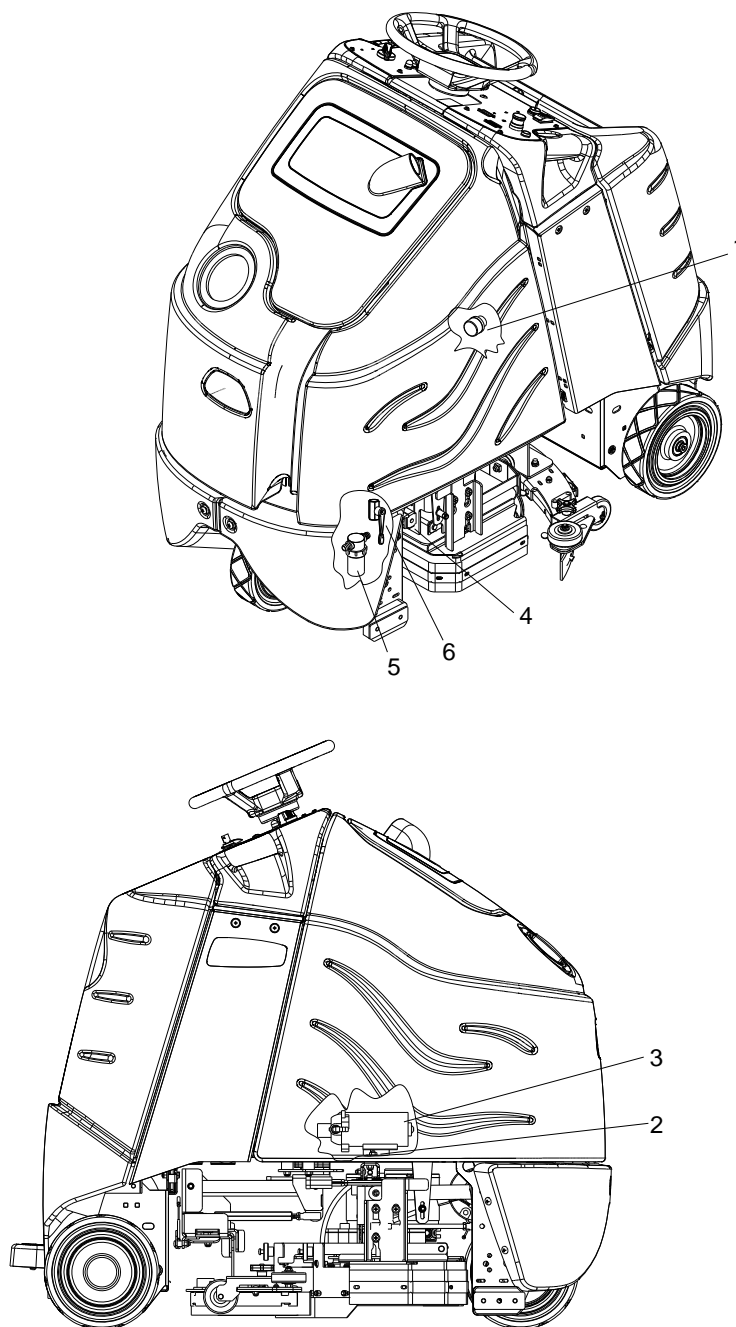
30 Amp. (Cylindrical) Protects the front scrub brush motor.



18 Amp. (Disk) Protects the right scrub brush motor.

30 Amp. (Cylindrical) Protects the rear scrub brush motor.

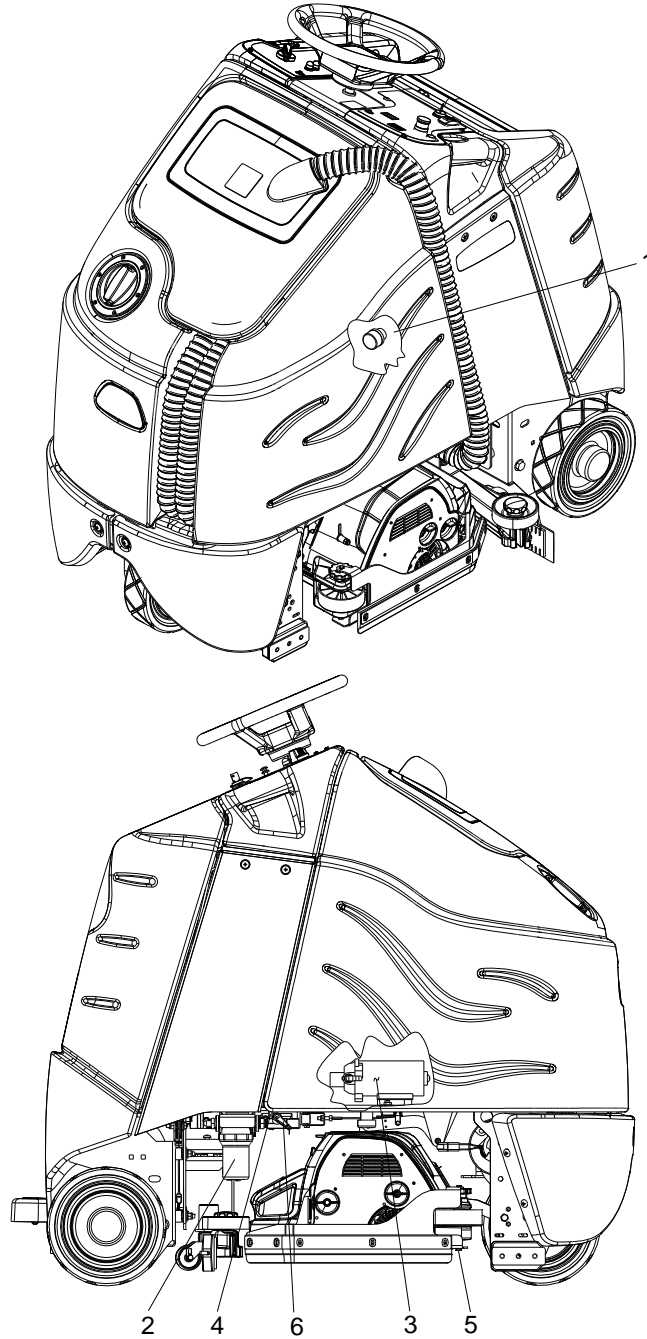
Solution Strainer & Pump-Disk



- 1. Solution Strainer-Coarse
- 2. Pump Mounting Plate
- 3. Pump

- 4. Solenoid Valve
- 5. Solution Strainer Fine
- 6. Shut-off Valve

Solution Strainer & Pump-Cylindrical



- 1. Solution Strainer-Coarse
- 2. Solution Strainer-Fine
- 3. Pump

- 4. Solenoid Valve
- 5. Spray or Drip Bar
- 6. Shut-off Valve

1. SOLUTION STRAINER-COARSE

Located in bottom of tank. The coarse strainer protects the finer strainer from large debris. If the fine strainer is clean and the pump and solenoid valve are not working, then check the coarse strainer for debris. Drain the solution tank and clean the coarse strainer. To remove the strainer, rotate the strainer counterclockwise. Cleanout the debris from wire mesh and re-assemble.

2. SOLUTION STRAINER (FINE) AND SHUT-OFF VALVE

The fine strainer is located in front left corner of machine on disk models and in right rear corner of cylindrical models. The fine strainer protects the pump and solenoid valve from debris. If there is little or no solution flow to the ground, first check to make sure the shut-off valve is open. Next, check the strainer for debris. To remove the strainer, first turn the shut-off valve to the off position. Then, 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. To resume flow, turn the shut-off valve to the open position.

3. 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 scrub deck skirts, Aqua-Mizer, and squeegee from machine.
2. Lower scrub deck to gain access to pump mounting plate.
3. Remove screw that secures pump mounting plate to frame.
4. The pump is located under the tank on the right side of machine. The pump delivers solution from the tank to the scrub deck. Pull pump mounting plate forward and down to expose pump.
5. Reverse steps to install.

4. PUMP MOUNTING PLATE

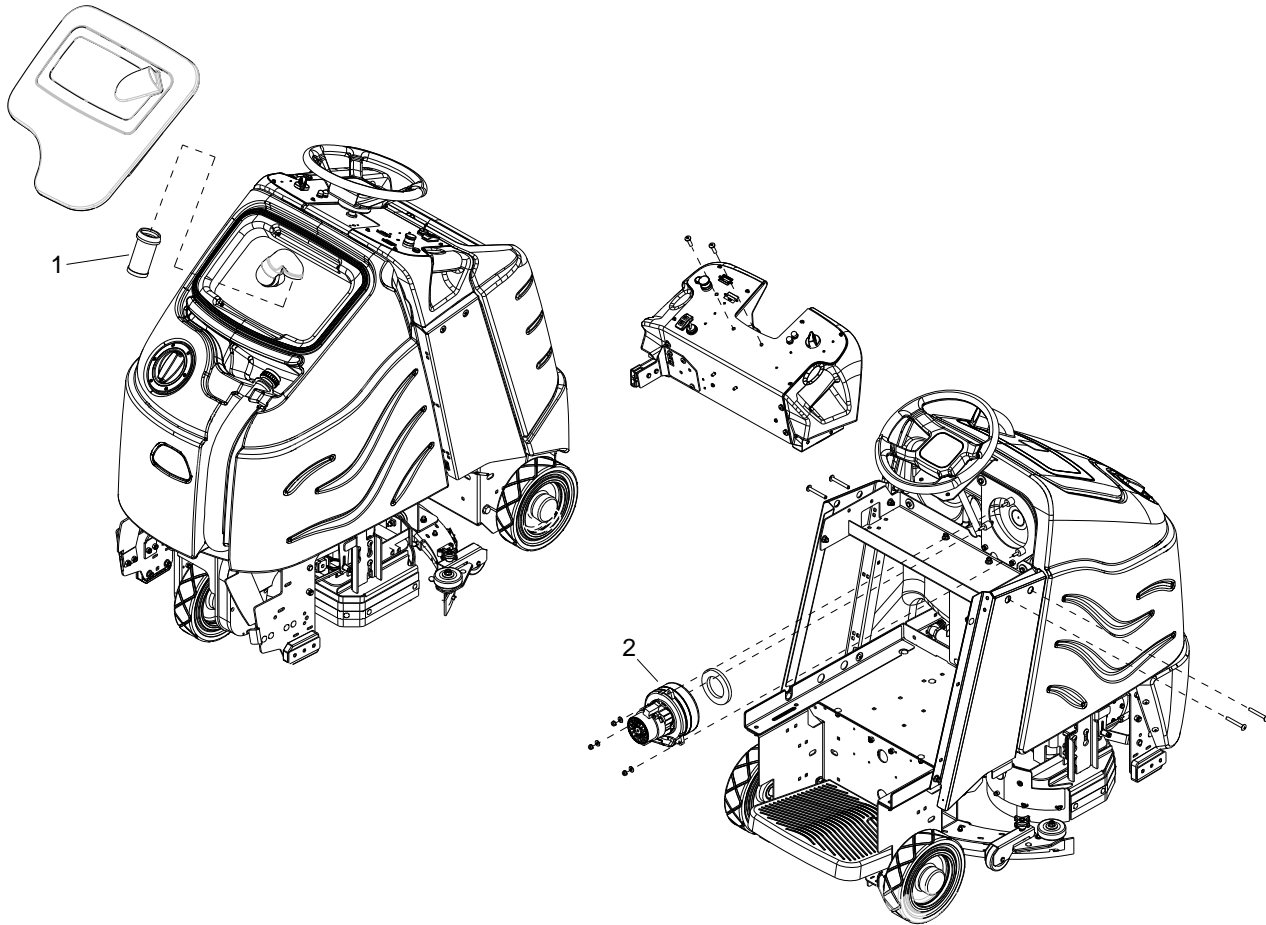
See graphic representation on previous page.

5. SOLENOID VALVE

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

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

Vacuum & Float Shutoff



1. Recovery Tank Float Shut-off
2. Vacuum Motor

Recovery tank Float Shut-off

When water is no longer being vacuumed from the floor and the vacuum fan is operating, the ball float has engaged. The vacuum motor will not vacuum water with recovery tank full. The recovery tank must be drained.

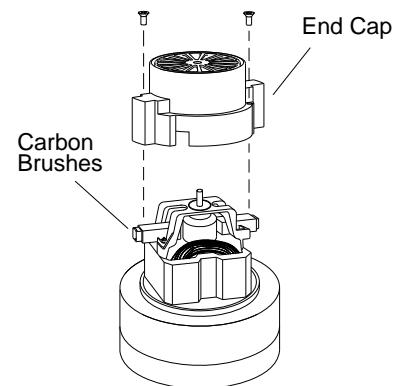
1. The float shut-off screen can be cleaned in or out of the machine.
2. To clean the float shut-off while it is inside the machine wipe material off screen then rinse. Check that the ball is also clean and moves freely.
3. To remove the float shut-off, grasp the screen with one hand and the connected tube with the other. Tilt and pull the float screen assembly to pull it off the barb on the tube.
4. To install, place one hand on the tube, and then tilt and push the float screen assembly over the barb on the tube.

FOR SAFETY: before leaving or servicing machine, stop on a level surface, turn off machine and disconnect power.

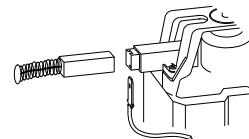
To Repair or Replace Vacuum Motor

1. Remove rear cover from machine.
2. Remove two screws from top of control panel and four screws from sides of control housing.
3. Slide control housing back from tank to expose vacuum motor.
4. Disconnect electrical connector from the vacuum motor. Remove the muffler hose from the vacuum motor outlet.
5. Remove three nuts that secure vacuum motor.
6. Reverse steps to install. Make sure that gasket is on vacuum so that vacuum seals against tank.

Vacuum Motor Carbon Brushes

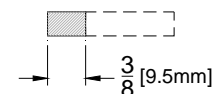


If armature commutator is grooved, extremely pitted or not concentric, the motor will need to be replaced or sent to a qualified service center.



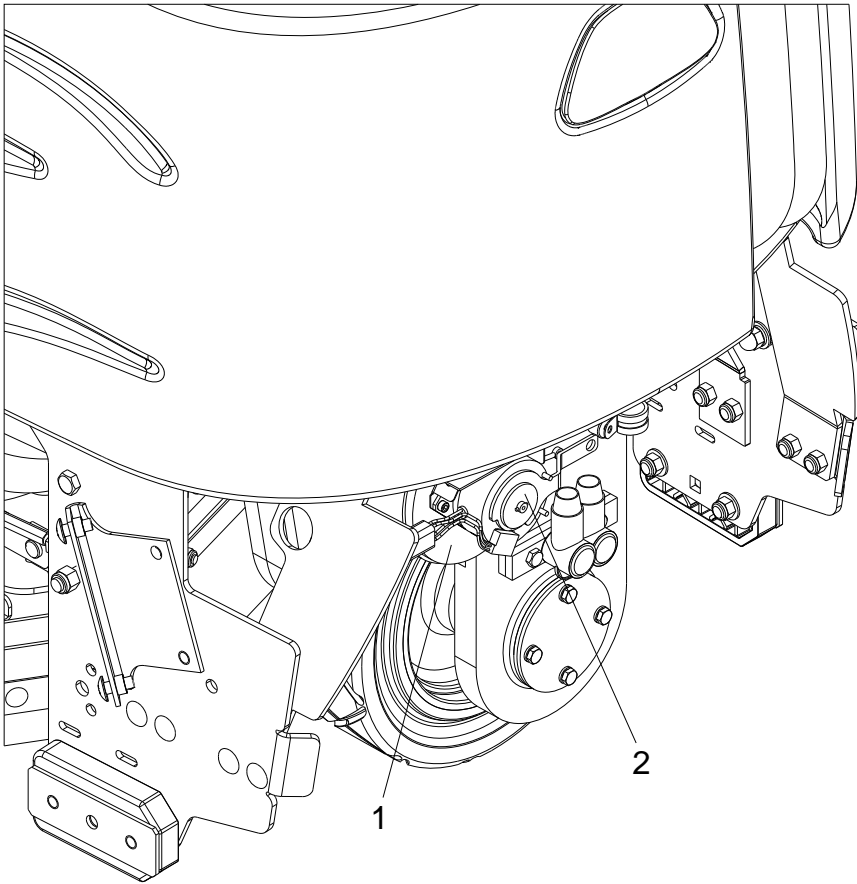
Important:

These brushes wear quicker as the length shortens due to increased heat. Spring inside brush housing will damage motor if brushes are allowed to wear away completely.



Periodically check the length of the carbon brushes. Replace both carbon brushes when either is less than 3/8" (9.5mm) long.

Drive Motor



1. Drive Motor
2. Parking 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

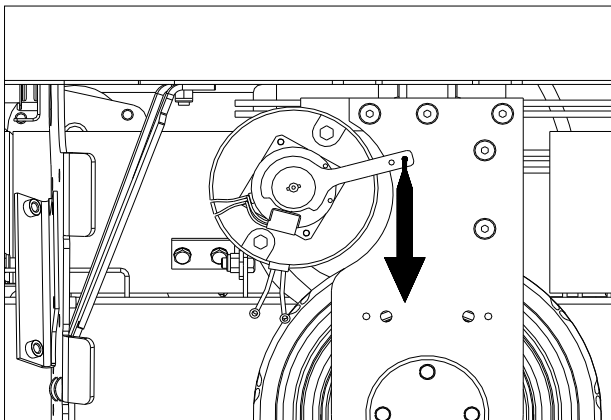
This machine is equipped with an electric parking brake.

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.

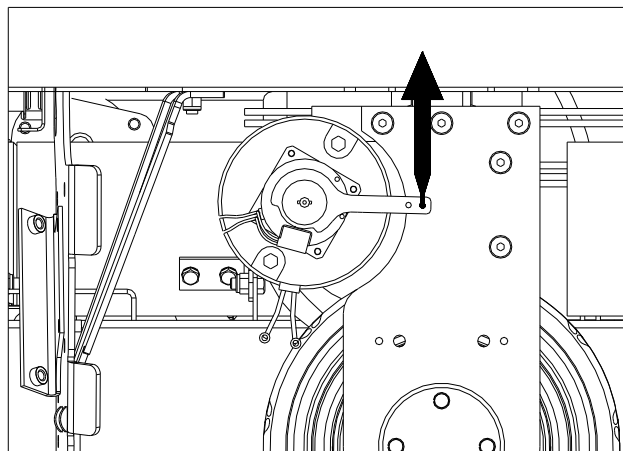
To engage brake:



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.

Drive Motor Carbon Brush Replacement

⚠ WARNING:

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

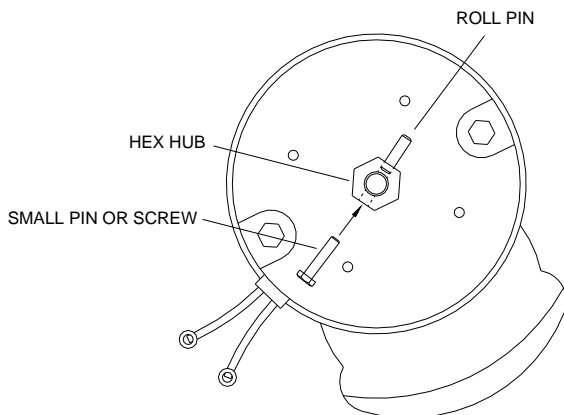
FOR SAFETY: Before leaving or servicing machine, stop on a level surface, turn off machine and remove key.

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.
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.

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.

Removing or Replacing Bag

1. Disconnect batteries and make sure parking brake is not overridden.
2. Remove Dome and set aside.
3. Drain all solution from both sides of the bag and rinse well.
4. Remove float cage, loosen screw on elbow and remove elbow. (You can remove the bag by only removing the float cage and sliding the bag opening over the elbows.)
5. Remove threaded mandrel from the bottom of the bag. Turn counterclockwise, remove by grabbing the attached handle. The mandrel washer should come off with the mandrel.
6. Lift the bag assembly out of the tank. The dome gasket, plastic collar, and metal frame can all be removed as one assembly. The bag can be cleaned as an assembly or further disassembled.
7. To replace with a new bag remove the four screws that go through the collar and into the frame. Feed the frame through the loops at the top of the bag.
8. Re-assemble frame, collar and bag if they were disassembled.
9. Place bag assembly into tank.
10. Align bag drain hole with fitting in bottom of tank and thread in mandrel with washer attached. Turn clockwise to tighten. Tighten only by hand, do not use a tool. Ensure mandrel is tight, the bag should be unable to move or spin around the mandrel.
11. Seat the collar, gasket, frame assembly to the tank rim opening. At the same time slide the vacuum collar opening over the float cage elbow assembly.
12. Replace the rest of the elbow and float cage assembly with its mounting screw, if it was removed.
13. Install dome and connect squeegee hose.

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

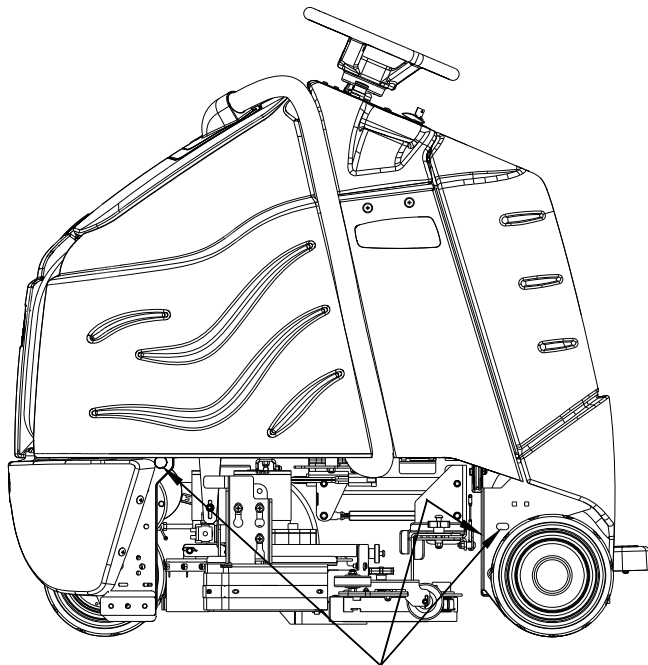
There are two tie points located at front and each side of foot box frame and two at the front side of frame. Tie-down devices must be of the proper type and strength. The combined strength of all tie-downs must be strong enough to lift two times the weight of the machine. Tie-downs must be positioned 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 squeegee, scrub deck, side skirts or side squeegees, Aqua-Mizers and scrub brushes (pads) to eliminate interference with tie-downs.

Scrub head must be in the up position before loading.

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



TIE DOWN POINTS




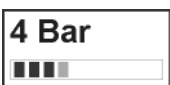






Troubleshooting

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
	Wheels spin	Decrease brush pressure
	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 and potentiometer resistance
	Faulty drive reset circuit or switch	Check 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
Forward speed only Reverse speed only	Faulty forward/reverse circuit	Check wires & connections
Poor or no water pickup	Squeegee out of adjustment	Adjust squeegee
	Debris caught on squeegee	Remove debris
	Worn squeegee blades	Rotate or replace squeegee blades
	Vacuum hose clogged	Clear obstruction from hose
	Vacuum hose disconnected from squeegee or recovery tank dome	Reconnect vacuum hose
	Recovery tank float system dirty	Clean float system
	Recovery tank not sealed	Place recovery tank dome on tank. Replace damaged gaskets
	Float-ball shut-off engaged Tank full	Empty recovery tank
Foam filling recovery tank	Empty recovery tank. Use less or different detergent. Use defoamer.	

Maintenance

PROBLEM	CAUSE	SOLUTION
Vacuum motor does not run, or runs slowly	Faulty vacuum circuit or switch	Check wires & connections
	Worn vacuum motor brushes	Replace brushes, check commutator
Squeegee will not go up/down	Faulty circuit or actuator	Check wires, connectors and actuator
	Faulty cables or pulleys	Repair/replace cables or pulleys
Poor scrubbing performance	Debris caught in scrub brushes	Remove debris
	Worn brushes or pads	Replace brushes or pads
	Improper detergent, brush or pad used	Contact equipment or application specialists
	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 strainer plugged	Clean solution strainer
	Solution system plumbing obstructed	Clear obstruction from plumbing
	Pump obstructed	Clean or replace pump
	Solution solenoid valve obstructed or stuck	Solution solenoid valve obstructed or stuck
	Solution shut-off valve is closed	Open shut-off valve
	Faulty pump circuit or pump	Check wiring, connections, and pump.
	Faulty solenoid	Check solenoid valve
Brush motors do not run, or run slowly	Circuit breaker(s) tripped	Reset circuit breaker(s)
	Low battery charge	Charge battery
	Faulty brush circuit or motor	Check wires, connections and motor
	Worn brush motor brushes	Replace brushes, check commutator
Scrub deck goes down, then raises	Faulty actuator circuit or actuator	Faulty actuator circuit or actuator
	No brushes or pad drivers on machine	Install brushes or pad drivers

Controller Fault Codes

ERROR CODE DELUXE	PROBLEM	SOLUTION
1 Bar 	LOW BATTERY VOLTAGE	THE BATTERY NEEDS CHARGING OR THERE IS A BAD CONNECTION TO THE BATTERY
2 Bar 	TRACTION MOTOR DISCONNECTED	THE TRACTION MOTOR HAS A BAD CONNECTION, CHECK CONNECTIONS TO MOTOR
3 Bar 	BRUSH MOTOR DISCONNECTED	THE BRUSH MOTOR HAS A BAD CONNECTION, CHECK CONNECTIONS TO MOTOR
4 Bar 	AUX FAULT	CHECK AUX OUTPUT DEVICES, CHECK ALL ASSOCIATED WIRING TO AUX DEVICES
5 Bar 	VACUUM MOTOR DISCONNECTED	THE VACUUM MOTOR HAS A BAD CONNECTION, CHECK CONNECT
6 Bar 	CONTROL SYSTEM INHIBITED	THE TRIO IS BEING INHIBITED FROM DRIVING, IE, ON-BOARD CHARGER IS IN USE
7 Bar 	THROTTLE TRIP ERROR	THE THROTTLE IS DEFLECTED OR ASSOCIATED WIRING HAS A BREAK OR SHORT CIRCUIT
8 Bar 	CONTROL SYSTEM TRIP	THE CONTROL SYSTEM IS IN ERROR, CHECK ALL CONNECTIONS TO CONTROLLER
9 Bar 	SOLENOID BRAKE	THE SOLENOID HAS A BAD CONNECTION , CHECK CONNECTION TO BRAKE
10 Bar 	HIGH BATTERY VOLTAGE	EXCESSIVE BATTERY VOLTAGE, CHECK FOR POOR BATTERY CONDITION

Notes:
