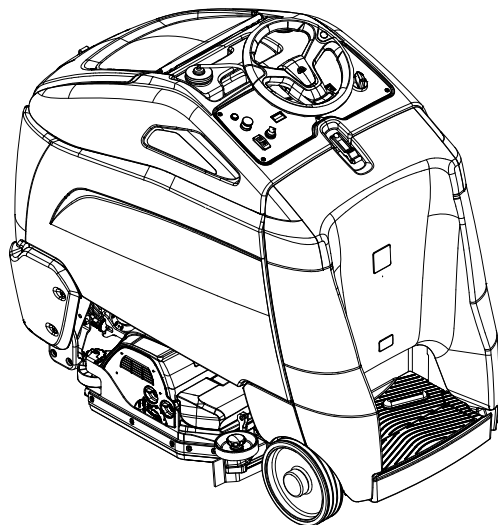
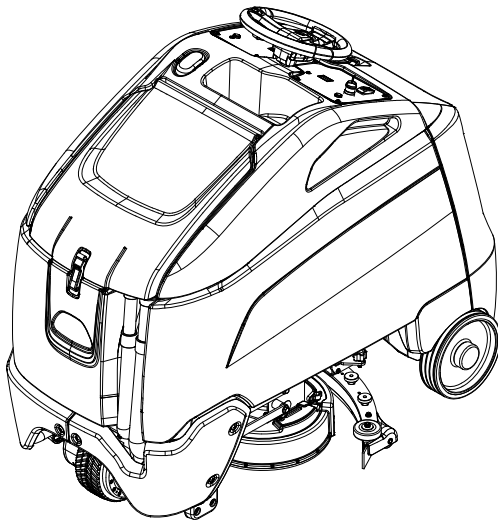


# KÄRCHER

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## Chariot 3 iScrub 26

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**Register  
your product**

[www.kaercher.com/welcome](http://www.kaercher.com/welcome)



86446680-B 07/15/21

## Machine Data Label / Overview

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.

#### MODELS:

- |             |                                       |             |  |
|-------------|---------------------------------------|-------------|--|
| 1.008-074.0 | ISCRUB 26, 225AH SHELF POLY BRUSH     | 1.008-103.0 | ISCRUB 26, 205AH SHELF PAD DRIVER        |
| 1.008-075.0 | ISCRUB 26, 205AH SHELF POLY BRUSH     | 1.008-104.0 | ISCRUB 26, 234AH AGM SHELF PAD DRIVER    |
| 1.008-076.0 | ISCRUB 26, 234AH AGM SHELF POLY BRUSH | 1.008-105.0 | ISCRUB 26, 225AH OBC PAD DRIVER          |
| 1.008-077.0 | ISCRUB 26, 225AH OBC POLY BRUSH       | 1.008-106.0 | ISCRUB 26, 205AH OBC PAD DRIVER          |
| 1.008-078.0 | ISCRUB 26, 205AH OBC POLY BRUSH       | 1.008-107.0 | ISCRUB 26, 234AH AGM OBC PAD DRIVER      |
| 1.008-079.0 | ISCRUB 26, 234AH AGM OBC POLY BRUSH   | 1.008-108.0 | ISCRUB 26, PKG ONLY SHELF PAD DRIVER     |
| 1.008-080.0 | ISCRUB 26 SP, 225AH SHELF             | 1.008-109.0 | ISCRUB 26, 225AH SHELF MC PAD DRIVER     |
| 1.008-081.0 | ISCRUB 26SP, 205AH SHELF              | 1.008-110.0 | ISCRUB 26, 205AH SHELF MC PAD DRIVER     |
| 1.008-082.0 | ISCRUB 26SP, 234AH AGM SHELF          | 1.008-111.0 | ISCRUB 26, 234AH AGM SHELF MC PAD DRIVER |
| 1.008-083.0 | ISCRUB 26 SP, 225AH OBC               | 1.008-112.0 | ISCRUB 26, 225AH OBC MC PAD DRIVER       |
| 1.008-084.0 | ISCRUB 26SP, 205AH OBC                | 1.008-113.0 | ISCRUB 26, 205AH OBC MC PAD DRIVER       |
| 1.008-085.0 | ISCRUB 26SP, 234AH AGM OBC            | 1.008-114.0 | ISCRUB 26, 234AH AGM OBC MC PAD DRIVER   |
| 1.008-086.0 | ISCRUB 26, 205AH OBC MC POLY BRUSH    | 1.008-147.0 | CHARIOT 3 ISCRUB 26 LI SHELF PAD DRIVER  |
| 1.008-087.0 | SCRUB 26, 234AH AGM OBC MC POLY BRUSH | 1.008-150.0 | Chariot iScrub 26SP Li shelf             |
| 1.008-088.0 | ISCRUB 26 SP, 225AH SHELF MC          | 1.008-152.0 | ISCRUB 26, INTL POLY BRUSH               |
| 1.008-089.0 | ISCRUB 26SP, 234AH AGM SHELF MC       | 1.008-153.0 | ISCRUB 26, PKG ONLY SHELF POLY BRUSH     |
| 1.008-090.0 | ISCRUB 26 SP, 225AH OBC MC            | 1.008-154.0 | ISCRUB 26SP, INTL                        |
| 1.008-091.0 | ISCRUB 26SP, 234AH AGM OBC MC         | 1.008-155.0 | ISCRUB 26SP, PKG ONLY SHELF              |
| 1.008-102.0 | ISCRUB 26, 225AH SHELF PAD DRIVER     |             |  |

## Warranty Registration

Thank you for purchasing a Kärcher North America 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 :

<https://www.kaercher.com/us/support/professional-services/professional-warranty-registration.html>

For customer assistance:

1-800-444-7654

**KÄRCHER**

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## How To Use This Manual

This manual contains the following sections:

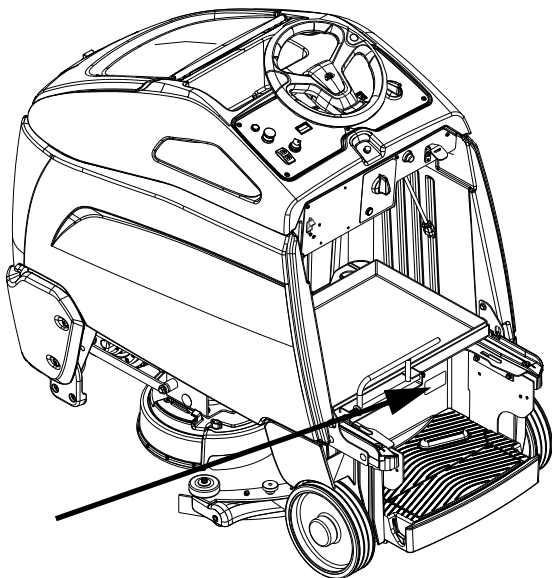
- How to Use This Manual
- Safety
- Operations
- Maintenance
- Suggested Spare Parts

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 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 on the back of the machine.



The SAFETY section contains important information regarding hazardous or unsafe practices of the machine. Levels of hazards are identified that could result in product damage, 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:

- Service Schedule
- Batteries
- Squeegee
- Scrub Brush
- Vacuum
- Drive Motor
- Troubleshooting

*NOTE: The manual part number is located on the lower right corner of the front cover.*



# IMPORTANT SAFETY INSTRUCTIONS

**When using this machine, 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.

Do not operate this machine near flammable fluids, dust or vapors. Do not expose to fire.

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.

Do not use a visibly damaged battery pack or appliance. If the battery housing is damaged, do not touch exposed contents.

Do not modify or attempt to repair the appliance or the battery pack.

Lithium Battery Option: For use only with Discover Lithium battery 12-36-6700 and Delta Q QuiQ 1000 Charger with lithium algorithm.

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).

## READ AND SAVE THESE INSTRUCTIONS

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 Kärcher North America 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.**

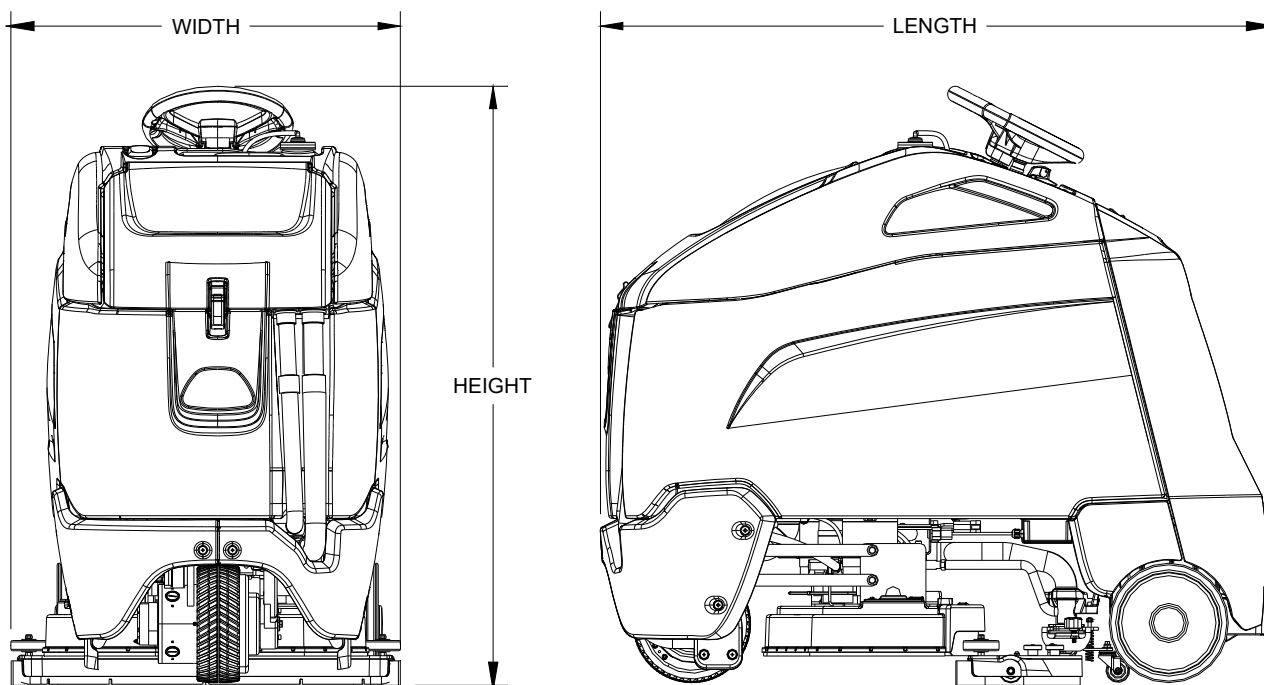
## Operations

### Technical Specifications

ITEM	DIMENSION/CAPACITY
Nominal power	1800 W
Rated Voltage	36 Volts DC
Rated Amperage	50 amps
Batteries, Wet	3 X12 Volt 205-234 AH @ 20 hr. rate
Battery, Wet - Compartment Dimensions	21 in. x 16 in. x 17 in. tall (533mm x 406mm x 432mm)
Battery, Lithium	38.4 Volts
Battery, Lithium - Dimensions	(375mm x 347.5 x 471.5 mm)
Scrub Brush Motors - Disk Machine	2 x.5 HP (350 W)
Scrub Brush Motors - Cylindrical Machine	2 x .75 HP (560W)
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	0.8 HP (600 W) 36V DC motor
Mass (GVW)	1274 lbs (578 kg)
Weight empty without batteries	420 lbs (191 kg)
Solution Control	Variable with automatic shut-off in neutral
Solution capacity	25 gal (95 L)
Recovery capacity	27 gal (102 L)
Scrub brush diameter - Disk Machine	13 inch (330 mm)
Scrub brush diameter - Cylindrical Machine	4.1 inch (105 mm)
Scrub brush pressure	0 -150lbs (0-667N)
Scrub brush pressure - Cylindrical Machine	0 - 44 lbs
Scrub brush speed - Disk Machine	300 rpm
Scrub brush speed - Cylindrical Machine	720 - 950 rpm
Tires	10 in. (254mm) Solid scrubber compound rear, urethane front
Foundation Pressure	135 psi (928 Kpa)
Maximum Speed	4.1 miles/hour (6.5 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	60 in. (1524 mm)
Maximum rated climb and descent angle	10% (6 degrees)
Sound Pressure Level	66 dBA



ITEM	MEASURE
Height	50.0 inches (1270 mm)
Length	56.1 inches (1425 mm)
Width without squeegee	29.5 inches (749 mm)
Width of squeegee - Disk Machine	32.7 inches (830 mm)
Width of squeegee - Cylindrical Machine	33.5 inches (850 mm)
Width of scrub path	26 inches (660mm)



**⚠ CAUTION:**

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.

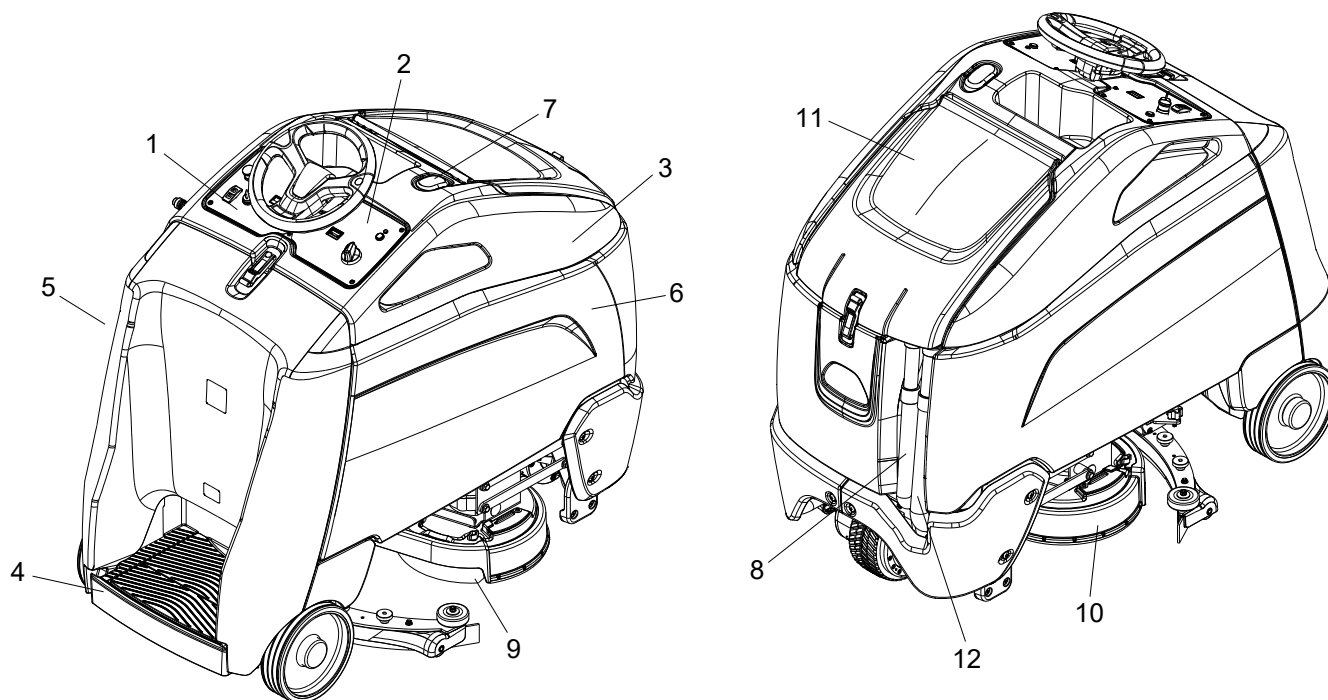
The machine's primary systems are the solution system, scrub system, recovery system, and operator control system.

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, valve and an optional chemical metering pump and reservoir are available. The solution tank stores cleaning solution (water and detergent) until it is delivered to the scrub system. The strainer protects the valve 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 skirt controls 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 tank. 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 tank. The float ball filter protects the vacuum fan from debris and shuts off suction to the tank when tank is full. The recovery tank stores the dirty solution.

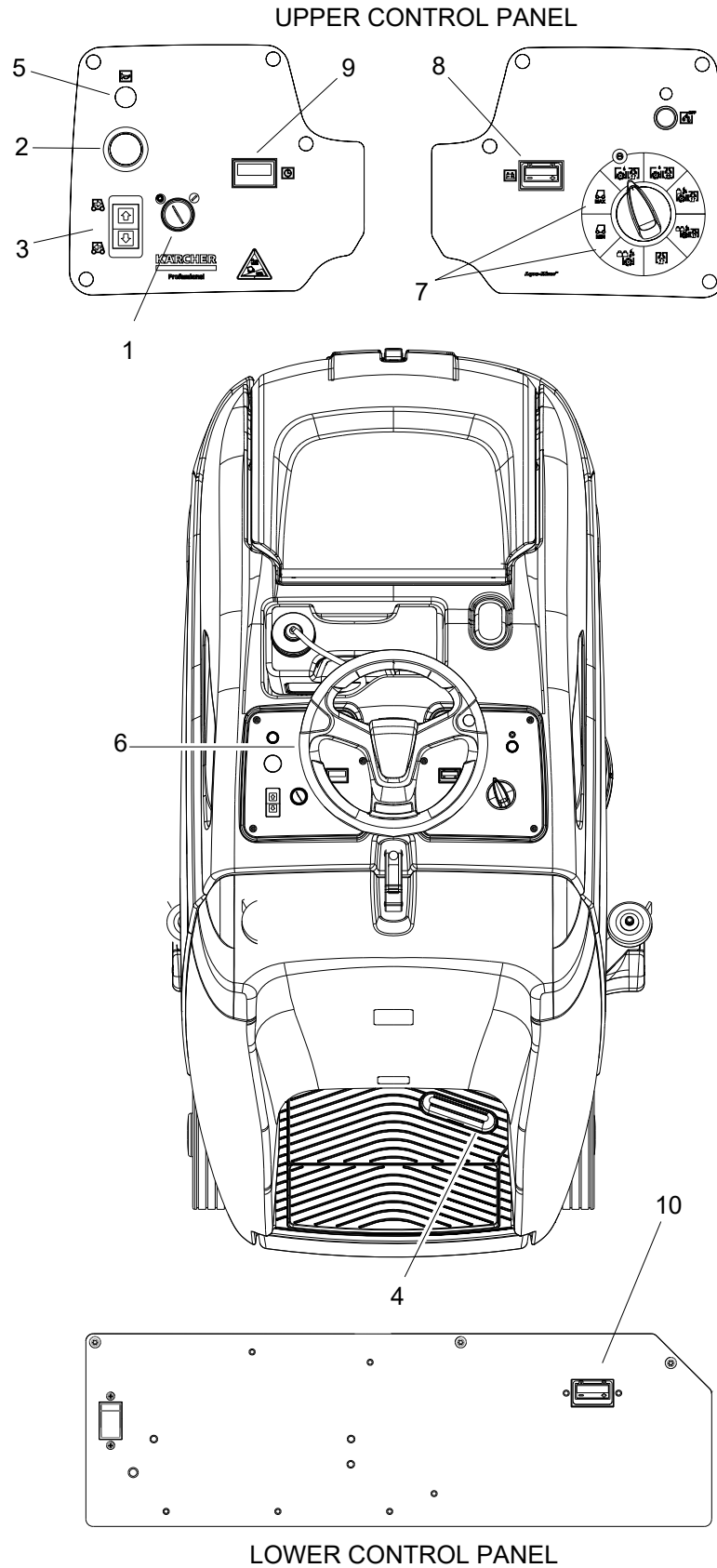
The function of the operator control system is to control the direction and speed of the machine. The directional control system consists of the direction control drive reset switch, throttle pedal, emergency stop/brake switch, steering wheel, propel controller, and drive wheel. The directional control 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.



**Components**

- 1. Control Panel-Drive
- 2. Control Panel-Scrub
- 3. Console
- 4. Pedal Platform
- 5. Rear Cover
- 6. Tank

- 7. Recovery Sight Dome
- 8. Solution Drain Hose
- 9. Scrub Deck Aqua-Mizer™
- 10. Scrub Deck Skirt
- 11. Recovery Lid
- 12. Recovery Drain Hose



## **Drive Controls**

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

### **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. Excessive emergency stop usage can cause premature brake wear; use only when necessary.

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.

## Operations

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### 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.

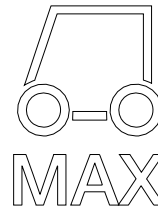
### 6. STEERING WHEEL

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 speed for fast and slow are as indicated on the control panel by the symbols shown below. 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 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.

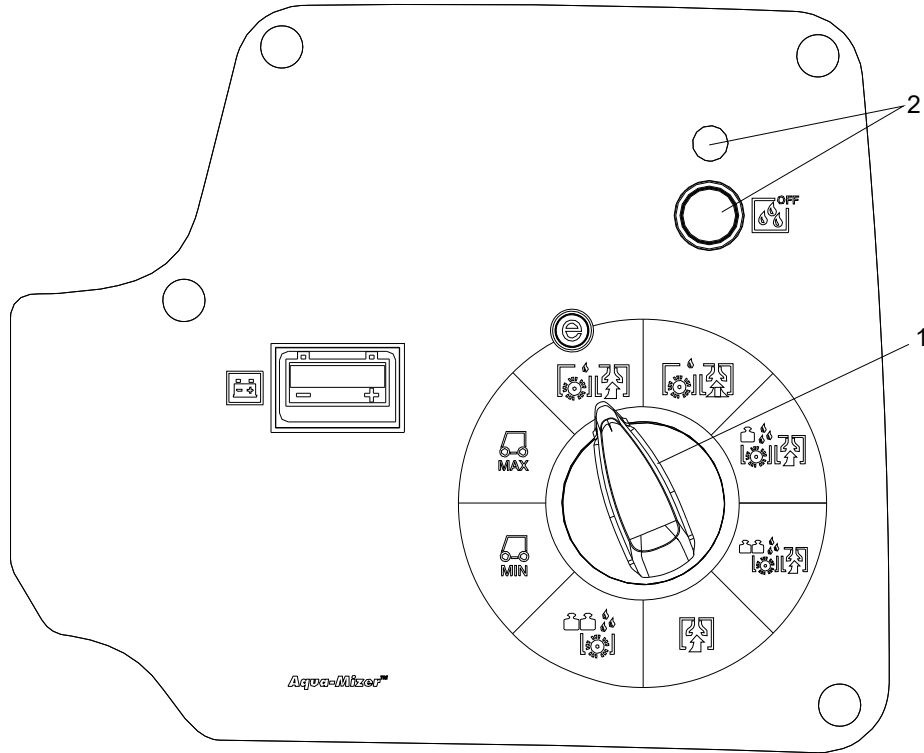
**9. HOUR METER**

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

**10. ERROR INDICATOR (LITHIUM ONLY)**

Indicates any errors that the machine may experience when the machine is equipped with lithium batteries.

## Scrub Controls



### 1. Function Mode Dial

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

#### 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 flow at a slow rate. (Squeegee will continue to lower and the vacuum will continue to run in neutral. The squeegee will raise in reverse.)



#### Daytime Plus 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 flow at a medium rate.



#### 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 rate.





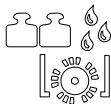
### Heavy scrub level cleaning

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.



### 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 slow speed. The squeegee will automatically lower and the vacuum will flow at a high rate. The squeegee will raise in reverse. The squeegee and vacuum will remain down and on in neutral propel.



### 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.

## 2. Solution Button and Indicator

The button enables and disables solution flow. When the green indicator is illuminated, solution flow is enabled.

### 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: Perform Pre-run Machine Check before operating machine listed in Service Schedule in Maintenance Section.*

#### Starting 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. Press the Drive Reset Directional Control Switch to reset and set the intended direction for travel.
4. 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 detergent. 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.**

**Optional Chemical Metering System**

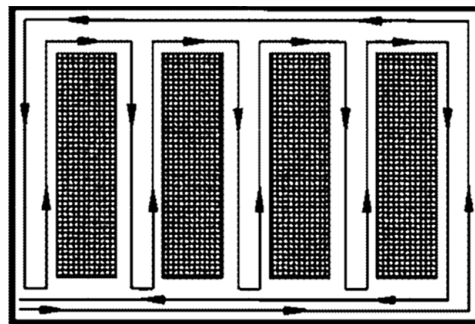
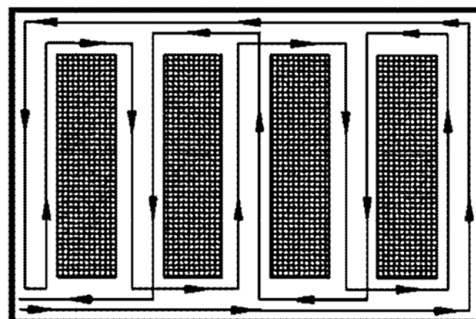
1. Fill chemical container and place into console recess. Attach lid.
2. Open rear cover and turn chemical selection knob to chemical manufacturers recommended dilution.
3. Press and hold prime button for 30 seconds or until chemical has filled line to scrub deck.

**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, 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**

## Operations

### To Begin Scrubbing

#### **⚠ WARNING:**

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

#### **⚠ WARNING:**

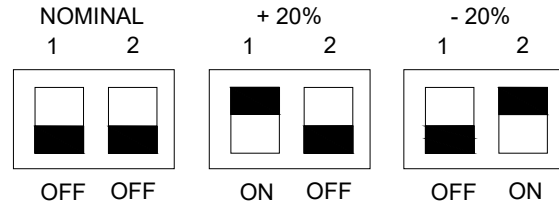
Flammable liquids and/or reactive metals can cause explosions or fire! Do not pick up.

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 scrub deck and squeegee will lower, and the vacuum will turn on.
5. Drive machine forward to begin scrubbing. The scrub brush motors will run and solution will flow when the throttle is depressed.

*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.*

*NOTE: The solution flow can be adjusted up or down approximately 10 percent by changing the dip switch settings on the control board. The dip switches are located on the left side of the control board, mounted on the lower control panel.*



### To Stop Scrubbing

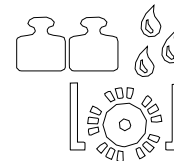
1. Rotate the function knob to either transport position. The brush motors will stop and the scrub deck will rise to the park position. After 10 seconds the squeegee will raise, and 10 seconds later the vacuum motor will turn off. This delay is to clear the vacuum hose of recovered solution.
2. Allow 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 may be necessary to double scrub.

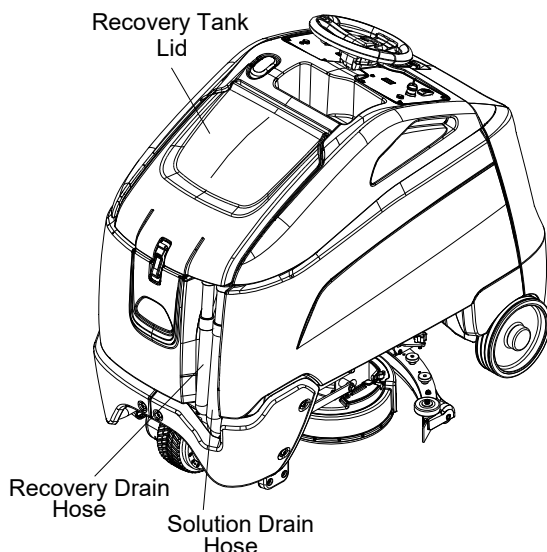
Rotate the knob to the double scrub position.



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.**



## 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. Open the recovery tank lid. Pull the recovery drain hose from the mounting bracket. Open 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 tank out with clean water. Do not use water hotter than 140°F (60°C) to clean tank. Damage may occur.
3. Clean debris bin.
4. Clean off the float shut-off system and inspect for free movement of float.
5. Replace the drain hose cap and secure drain hose.
6. If machine is to be stored, leave the recovery tank lid propped open.

## Solution Tank

1. Remove the recovery tank lid.
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 cap.
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.
5. If machine is to be stored, leave solution cap off.

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

## Optional Chemical Metering System

1. Remove chemical container from machine and store unused chemical. Flush chemical container with water.
2. Fill chemical container partway with clean water. Press and hold prime button for 1 minute.
3. Empty chemical container. press and hold prime button for 30 seconds to purge chemical lines.

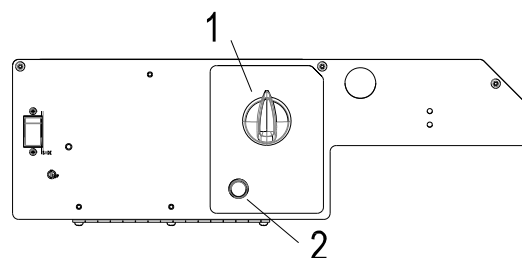
## Chemical Metering Controls

1. CHEMICAL METERING SYSTEM SELECTION DIAL (OPTIONAL)

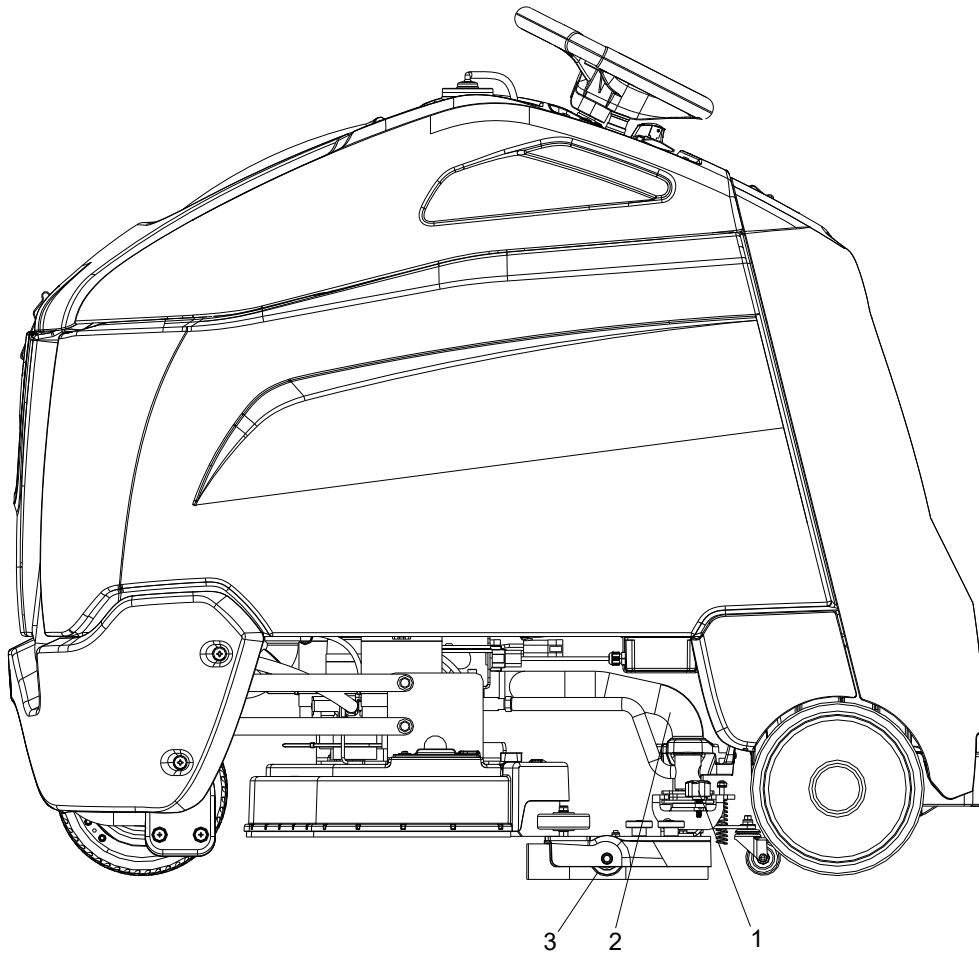
Eight position dial which controls chemical system operation. Upper five positions turn chemical system on and controls dilution from .5 to 4.0 oz/gal. Three lower positions turn chemical system off.

2. CHEMICAL METERING SYSTEM PRIME BUTTON (OPTIONAL)

Runs chemical pump when pressed. Press for 30 seconds to prime empty chemical system. Fill chemical reservoir with clean water and press prime button for one minute to flush chemical system.



### Squeegee Disk



**1. Squeegee Handle**

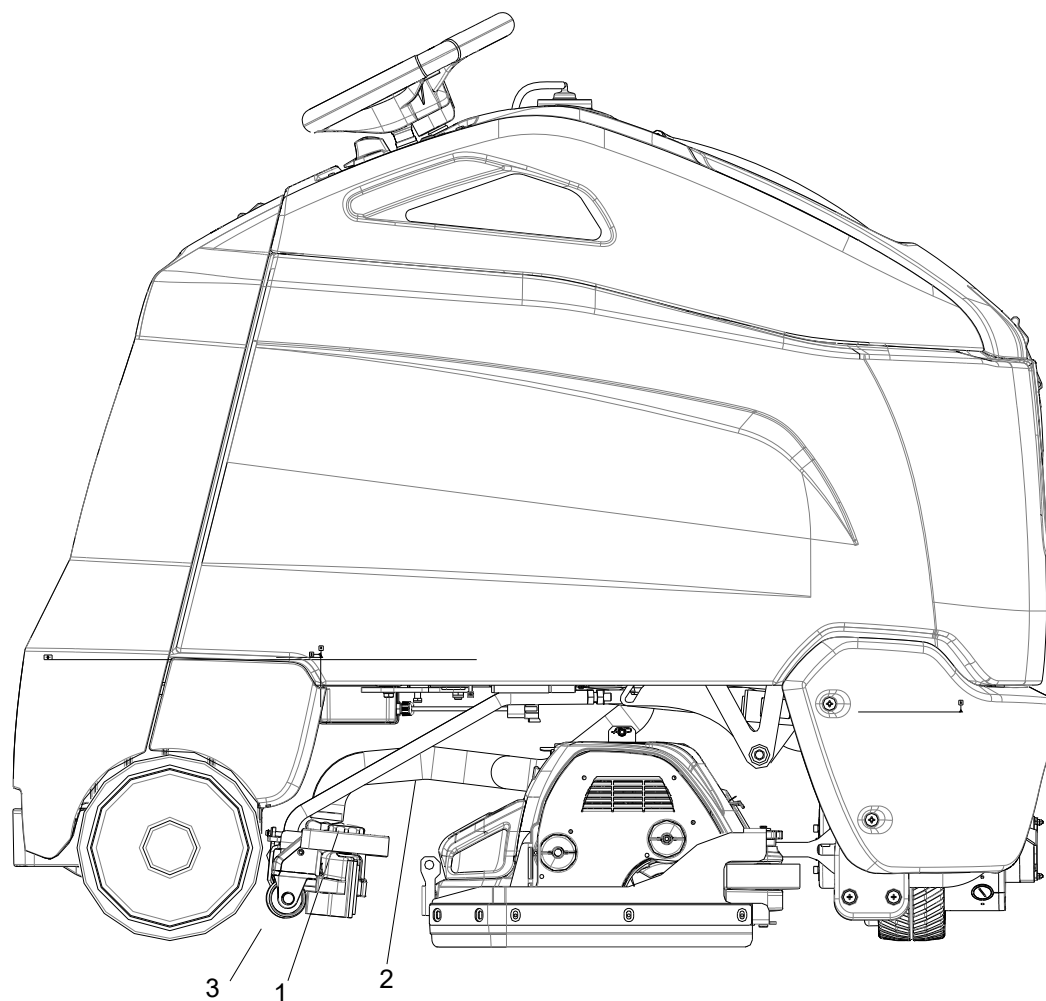
The squeegee handle holds the squeegee in place.

**2. Squeegee Hose and Tube**

The squeegee hose and tube carry the recovered solution to the recovery tank.

**3. Squeegee Wheels**

The squeegee wheels support the squeegee at the correct height and angle to automatically obtain optimum suction. The squeegee requires no adjustment.

**Squeegee - Cylindrical****1. Squeegee Knobs**

The squeegee knobs hold the squeegee in place.

**2. Squeegee Hose and Tube**

The squeegee hose and tube carry the recovered solution to the recovery tank.

**3. Squeegee Wheels**

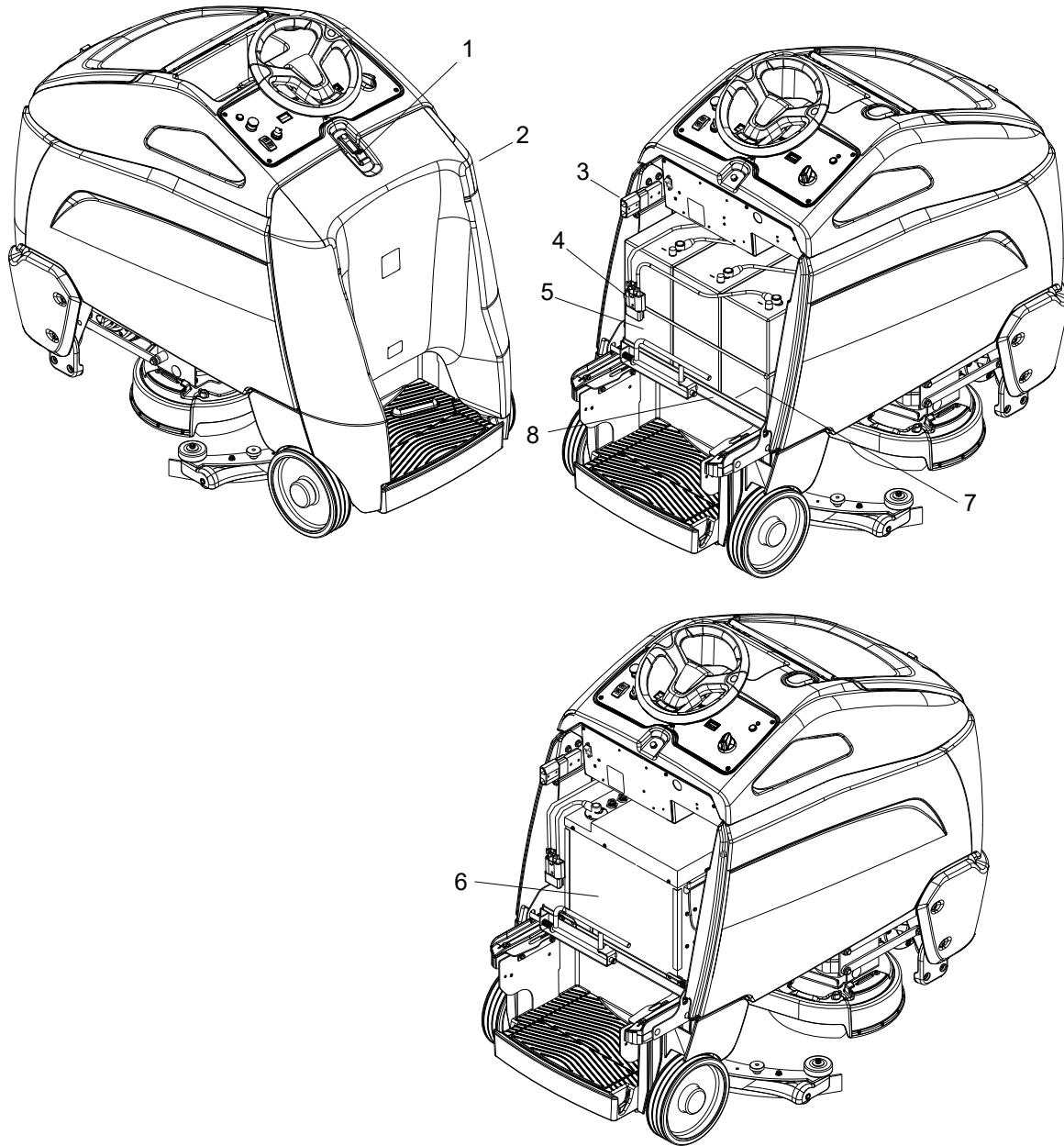
The squeegee wheels support the squeegee. The height can be adjusted by turning the knobs.





**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 recovery lid seals tightly.	*				
Visually check for damaged or worn wheels.	*				
Check brushes or pads for proper installation.	*				
Check vacuum hose connections.	*				
Check that squeegee is securely attached.	*				
Check for securely attached drain hoses, plug and cap.	*				
Check pedal, brake and steering for proper operation.	*				
Clean out recovery tank and debris bin.		*			
Clean and inspect float shutoff.		*			
Clean out solution tank.		*			
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 recovery lid propped open.		*			
Charge batteries if needed.		*			
Flush chemical system (if equipped).		*			
Clean off top of batteries.			*		
Check battery cells with hydrometer. (Wet cell only)			*		
Inspect scrub deck skirts and Aqua-Mizers.			*		
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 tension.					*
Check chemical pump peristaltic tube					*



### Batteries

1. Rear Cover Latch
2. Rear Cover
3. Battery Connector-Machine
4. Battery Connector-Battery
5. Batteries - Wet Cell
6. Battery - Lithium Option
7. Battery Tray Liner
8. Battery Tray

### **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.

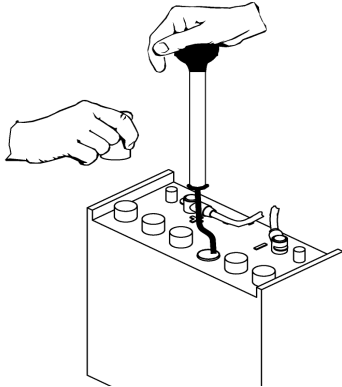
#### **⚠ WARNING:**

**Not all batteries require maintenance. AGM batteries are maintenance free. Do not attempt to remove sealed caps from AGM batteries. Warranty is void if caps are removed from AGM battery.**

## Maintenance

### 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.

<b>SPECIFIC GRAVITY @ 80° F (27°C)</b>	<b>BATTERY CONDITION</b>
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.

#### **CAUTION:**

Switch main circuit breaker off before charging.

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. Open 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.
5. Replace the battery caps, and leave them in place while charging.

**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.**

6. 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.
7. When the batteries are fully charged, disconnect the charger from the AC wall outlet, then disconnect the charger from the batteries.
8. Connect the batteries to the machine connector.
9. Check the electrolyte level. It should be up to the indicator ring. If necessary, add distilled water.
10. Close the rear cover.

## Maintenance

### Changing Batteries

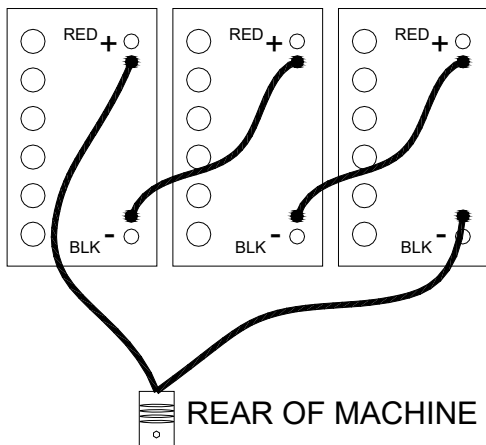
Stop the machine in a clean area next to the charger.  
Turn off machine.

**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.**



## Onboard Charger (Optional)

### **⚠ CAUTION:**

Circuit Breaker must be off before unplugging batteries.

### Onboard Charger Programming

*For machines equipped with optional on-board charger. When replacing batteries, charger programming changes may be required. If replacing batteries with same type, (e.g. maintenance free batteries with maintenance free) no programming is required. When batteries with different type (e.g. maintenance free with wet cell), programming change are required. Failure to make programming changes may lead to reduced battery life.*

1. Remove upper control panel.
2. Peel back label on charger to access dip switches.
3. Change switches to correct battery type.



	DIP 1	DIP 2	DIP 3	DIP 4	DIP 5	DIP 6	DIP 7	DIP 8
LEAD ACID	OFF	ON	ON	ON	OFF	ON	ON	OFF
DISCOVER AGM	ON	OFF	OFF	OFF	OFF	ON	ON	OFF

4. Replace charger label and install upper control panel.

## **Maintenance**

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### **Lithium Battery (Optional)**



This product must be recycled and is made of recycled products

#### **Chemical Risk**

### **!WARNING:**

**Lithium batteries are chemical risk if mis-operated, mishandled or abused.**

#### **Do:**

- Do protect terminals from short circuit before, during, and after installation
- Do wear electrically insulated gloves
- Do use electrically insulated tools
- Do wear eye protection
- Do wear safety toe boots / shoes
- Do handle battery carefully
- Do secure battery safely
- Do always assume battery terminals are energized

#### **Do Not:**

- Do not lift or carry the battery during usage or operation
- Do not operate or store battery outside of operating limits
- Do not short circuit battery
- Do not puncture battery
- Do not expose battery to flames, or incinerate
- Do not open battery case or disassemble battery
- Do not wear rings, watches, bracelets or necklaces when handling or working near battery
- Do not drop or crush battery
- Do not lift battery by the terminal cables
- Do not vibrate battery
- Do not expose battery to water or other fluids
- Do not expose battery to direct sunlight
- Do not dispose of battery
- Do not connect with other types of batteries
- Do not expose battery to high temperatures
- Do not install with other battery types or brands



## Transportation

If the battery is not installed in equipment, it must be transported in the original package or equivalent.

Batteries are tested according to UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC. 10/11/ Rev.5). For transport, the batteries belong to category UN3480, Class 9, Packaging Group II.

## Operating Limits

The battery should not be operated outside these operating limits:

Operating Limits	12-36-6700
Continuous Charge Current	150A
Continuous Discharge Current	150A
Charge Voltage	40.8 V
Operating Voltage (Min / Max)	33.6 V / 43.8 V
Charge Temperature (Min / Max)	0°C / 45°C (32°F / 113°F)
Discharge Temperature (Min / Max)	-20°C / 50°C (-4°F / 122°F)
Storage Temperature (Min / Max)	-20°C / 45°C (-4°F / 113°F)

## CAUTION:

**Do not install batteries in series. Select the appropriate AES battery model for the voltage of your system.**

*NOTE: Intentional bypassing of BMS to operate battery outside maximum and minimum limits voids warranty.*

## Fuse

Fuse provides back-up over-current protection.

## Fuse Replacement

A blown fuse requires service from a qualified technician. Contact your Discover supplier for more information.

## Maintenance

### Handling

#### **! WARNING:**

Read Safety Section before installing the battery.

- Battery should be off.
- Battery cables should be disconnected.
- Battery terminals should be protected.
- Battery handle should be used to lift battery.
- Battery should be handled by two people or mechanical lift equipment.
- Do not lift or carry the battery during usage or operation.

### Installation - Single Battery

#### **! WARNING:**

Read Safety Section before installing the battery.

#### Tools

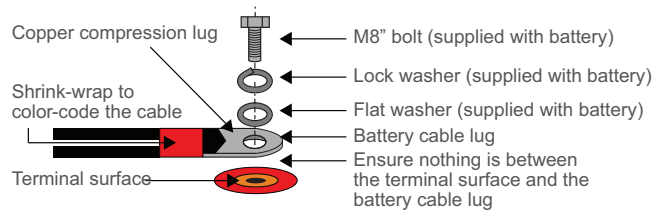
- Insulated tools sized to match nuts, bolts and cables in use
- Voltmeter
- Post cleaner and wire brush
- Personal protective equipment

#### Securing Battery

- Battery can be strapped in place with non-conductive nylon straps
- Battery may have hold down brackets at the base of the battery

#### Installation

- Check that battery is switched off
- If battery circuit has disconnect, open disconnect to isolate battery
- Clean cable connections. Broken, frayed, brittle, kinked or cut cables should be replaced
- Install and secure new battery. Be careful not to ground the terminals to any metal mounting, fixture, or body part
- Connect battery cables. Connect ground cable last to avoid sparks
- Recommended terminal torque is 9.0 Nm (6.64 ft-lb)
- Close circuit disconnect (if open)
- Turn battery switch on



*NOTE: All cable ends must be connected to battery terminals without any washers between terminal bushings and cable ends.*

#### Terminal burnout is caused by:

- Discharge currents exceeding allowable limits
- Improper cable installation
- Improper cable sizing
- Improper terminal torque

*NOTE: Without exception, product experiencing terminal burnout will not be warranted.*

#### Operation

*NOTE: Review operating limits.*

#### On-Off

- To turn the battery on press and hold switch for 2-3 seconds
- To turn the battery off press and hold switch for 2-3 seconds



## Charging

Before operating the charger make sure to read and understand the instructions that come with the charger. Never attempt to charge a battery without first reviewing and understanding the instructions for the charger being used

### **⚠ CAUTION:**

**Always make sure the chargers charging curve meets the battery's charging requirement; never charge a visibly damaged battery; never charge a frozen battery.**

1. Connect the charger leads to the battery.
2. Make sure that the charger lead, both at the charger and the battery side, connections are tight.
3. Turn the charger on.
4. Turn the battery on (if required).

### **⚠ CAUTION:**

**NOT ALL CHARGERS ARE CAPABLE OF CHARGING LITHIUM BATTERIES! During system design CONFIRM that your chosen charger is not capable of transient spikes that exceed the published MAXIMUM TERMINAL RATINGS of the battery.**

## Discharging

- Turn on battery.
- Turn on load

*NOTE: Do not discharge battery below recommended minimum operating voltages.*

*NOTE: Do not discharge battery at rates greater than recommended operating currents.*

## Storage

Systems should be stored out of direct sunlight under the following temperature conditions:

Minimum Storage Temperature	-20°C / -4°F
Maximum Storage Temperature	45°C / 113°F

System should be put into storage at 80% SOC and checked monthly to ensure the system SOC (state of charge) does not fall below 20%/ At 2-% SOC the battery will self discharge in approximately 2 months.

## Protection & Faults

- BMS (battery management system) generates faults when maximum operating limits are reached.
- BMS sounds a buzzer when fault limits are triggered.
- BMS monitors the following information for faults and warning:
  - Cell module voltage
  - Battery current
  - Battery temperature

## Faults & Corrective Actions

In the event of a fault the BMS (battery management system) will sound an audible buzzer warning and the system will shut off after a 120 second delay.

FAULT LEVELS	
Parameter	Trigger Point
High Temperature	60°C / 140°F
High Voltage	3.7 V in any cell module
Low Voltage	2.5 V in any cell module
Over Current	150 A

## Maintenance

CORRECTIVE ACTIONS	
<b>High Temperature</b>	Stop discharge or charge Leave the battery to cool
<b>Low Temperature</b>	Stop discharge or charge
<b>High Voltage</b>	If charging, stop charge
<b>Low Voltage</b>	Do not discharge the battery. Any discharge current detected will force the battery into Low Voltage Fault The user can charge the battery in Low Voltage Recovery If no charge current is detected within 2 minutes, the BMS will turn off the battery
<b>Over Current</b>	Reduce current
<b>Low SOC</b>	Stop discharge Charge the battery

## Service & Maintenance

Batteries should be carefully inspected on a regular basis in order to detect and correct potential problems before they can do harm. This routine should be started when the batteries are first received.

### Inspection

- Look for cracks in the case
- Check the battery, terminals and connections to make sure they are clean, free of dirt, fluids and corrosion
- All battery cables and their connections should be tight, intact, and NOT broken or frayed
- Replace any damaged batteries
- Replace any damaged cables
- Check torque on terminal bolts

## Troubleshooting

Battery Won't Turn On:

<b>Symptom</b>	Does the battery turn on for a short time, then turn itself off?
<b>Description</b>	The battery is likely in a low voltage or low SOC.
<b>Action</b>	Connect to charger and turn on the battery.

<b>Symptom</b>	Was the battery left on or stored for extended periods of time?
<b>Description</b>	The battery will turn itself off at 5% SOC. If left sitting at a low SOC, the battery may have discharged itself completely and cannot be used.
<b>Action</b>	Do not use. Replace and recycle.

## Changing Battery

Stop the machine in a clean area. 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 from machine.
3. Unlatch battery tray from machine and pull out to expose battery.
4. Use the proper size open end wrench to disconnect main ground wire first and secure cable terminal away from battery.
5. Disconnect main positive lead and secure cable terminals away from battery.
6. Prepare a suitable site to place the battery.

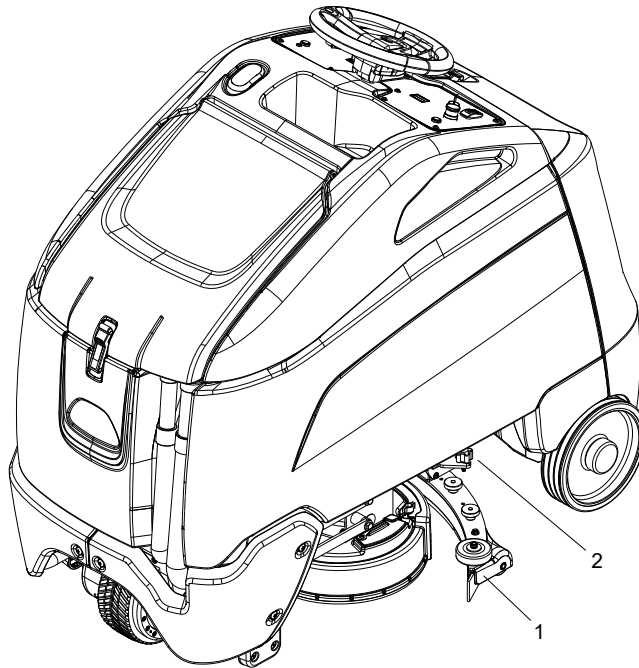
### **! WARNING:**

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

## Recycling and Disposal

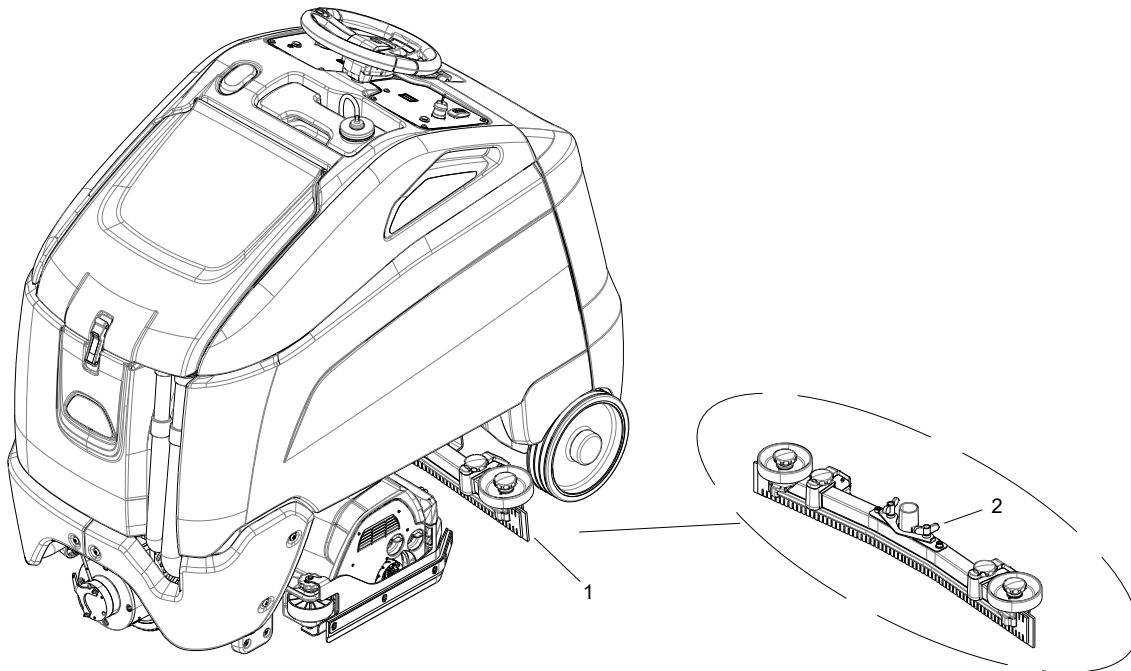
Batteries must not be mixed with domestic or industrial waste. Discover's Advanced Energy Systems are recyclable and must be processed through a recognized recycling agency or dealer. Please contact Discover® or your servicing dealer for details.





**Squeegee - Disk**

- 1. Squeegee
- 2. Squeegee Retainer Knob



**Squeegee - Cylindrical**

- 1. Squeegee
- 2. 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 squeegee is self adjusting.

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 and wear 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 half the original thickness.

## To Remove Squeegee Assembly

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

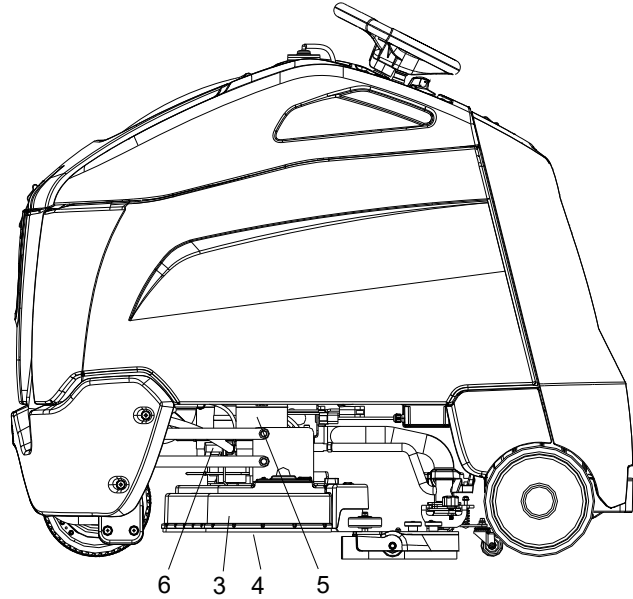
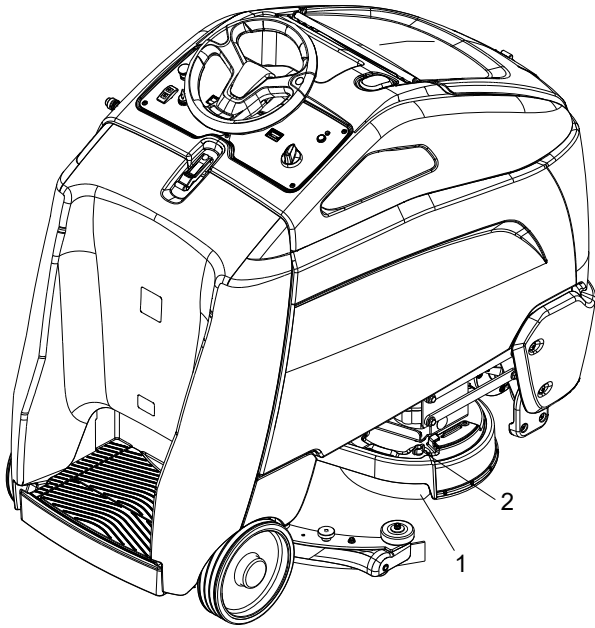
1. With the squeegee in the up position, turn key switch "OFF".
2. Disconnect vacuum hose from squeegee and loosen retainer knob on left side of squeegee lifting carrier.
3. Pull squeegee assembly from the lifting carrier.
4. Inspect or repair as necessary and reinstall.

## To Replace or Rotate Squeegee Blades - Disk

1. With the squeegee in the up position, turn key switch "OFF".
2. Remove the squeegee assembly from the machine.
3. Unscrew each of the four knobs until they are nearly removed from the squeegee assembly. Grasp the squeegee assembly and push on the knobs to remove the blade retention plate.  
Remove the knobs and pull the retention plate out.
4. Remove blades from squeegee housing. Rotate the squeegee blade to a new edge position or replace as required. Each blade has four new edge positions.
5. Install the blades in the squeegee housing by hooking blades on retention features.
6. Install blade retention plate in squeegee housing and assemble knobs.

## To Replace or Rotate Squeegee Blades - Cylindrical

1. With the squeegee in the up position, turn key switch "OFF".
2. Remove end-cap from squeegee assembly.
3. Pull blades out of Squeegee.
4. Rotate or Replace squeegee blades and insert into squeegee assembly.
5. Replace end-cap on squeegee assembly.



### Scrub Deck - Disk

1. Scrub Deck Aqua-mizer™
2. Aqua-mizer™ Retainer Knob
3. Scrub Deck Skirt
4. Scrub Deck Skirt Brush Strip
5. Scrub Brush Motor
6. Scrub Deck Lift Actuator



## 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.

## Maintenance

### Replacing or Installing Scrub Brushes - Disk

*NOTE: Damage to driver or brush could occur if not securely attached.*

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

1. Turn machine power off.
2. Open access cover on deck shroud.
3. Locate release lever, press release lever towards front of machine to release brush pad. The pad will drop down when released. Lift deck shroud up and slide brush/pad assembly out.



4. Remove brush/pad from holder and replace with new brush/pad.
5. To reinstall, lift deck shroud upward as shown.  
Center the brush/pad driver under the brush drive hub. Raise brush/pad until it contacts brush driver assembly. Turn clockwise until release lever plate locks into position.



6. Check that release lever/plate is completely closed and pad/brush is securely attached.

**! 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.

1. Remove skirt 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.

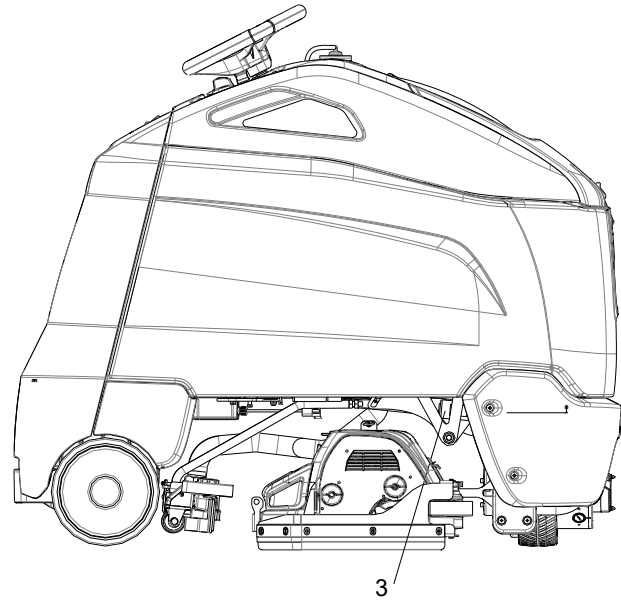
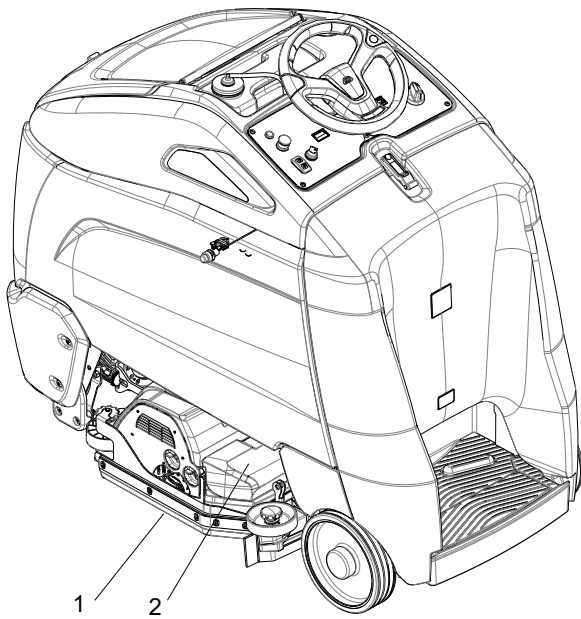
*NOTE: Use care to assure wave washer alignment.*

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.

Maintain alignment between motor barrel base and cap.



### Scrub Deck - Cylindrical

1. Scrub Deck Skirt
2. Debris Hopper
3. Scrub Deck Lift Actuator

## 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.***

### **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.

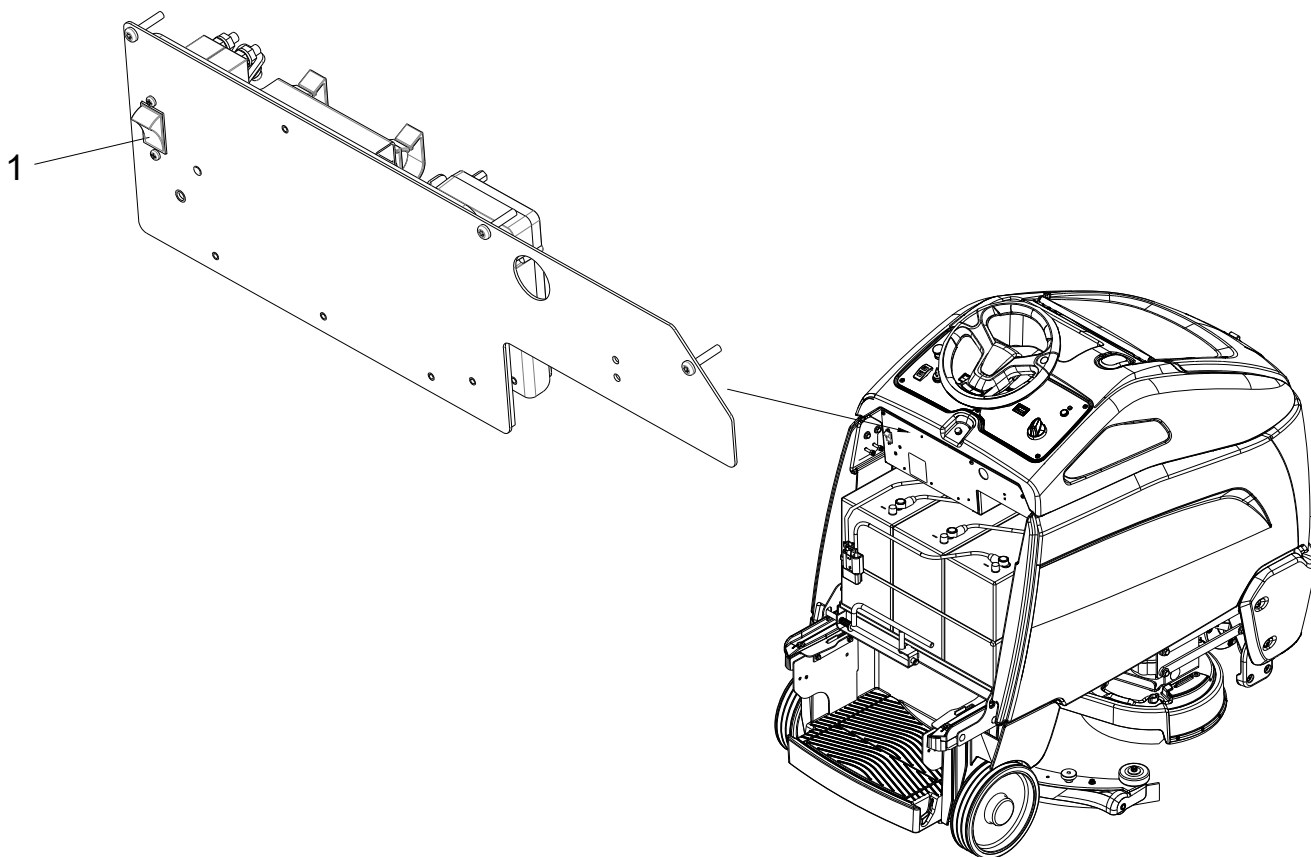
### **Scrub Deck Actuator Adjustment**

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

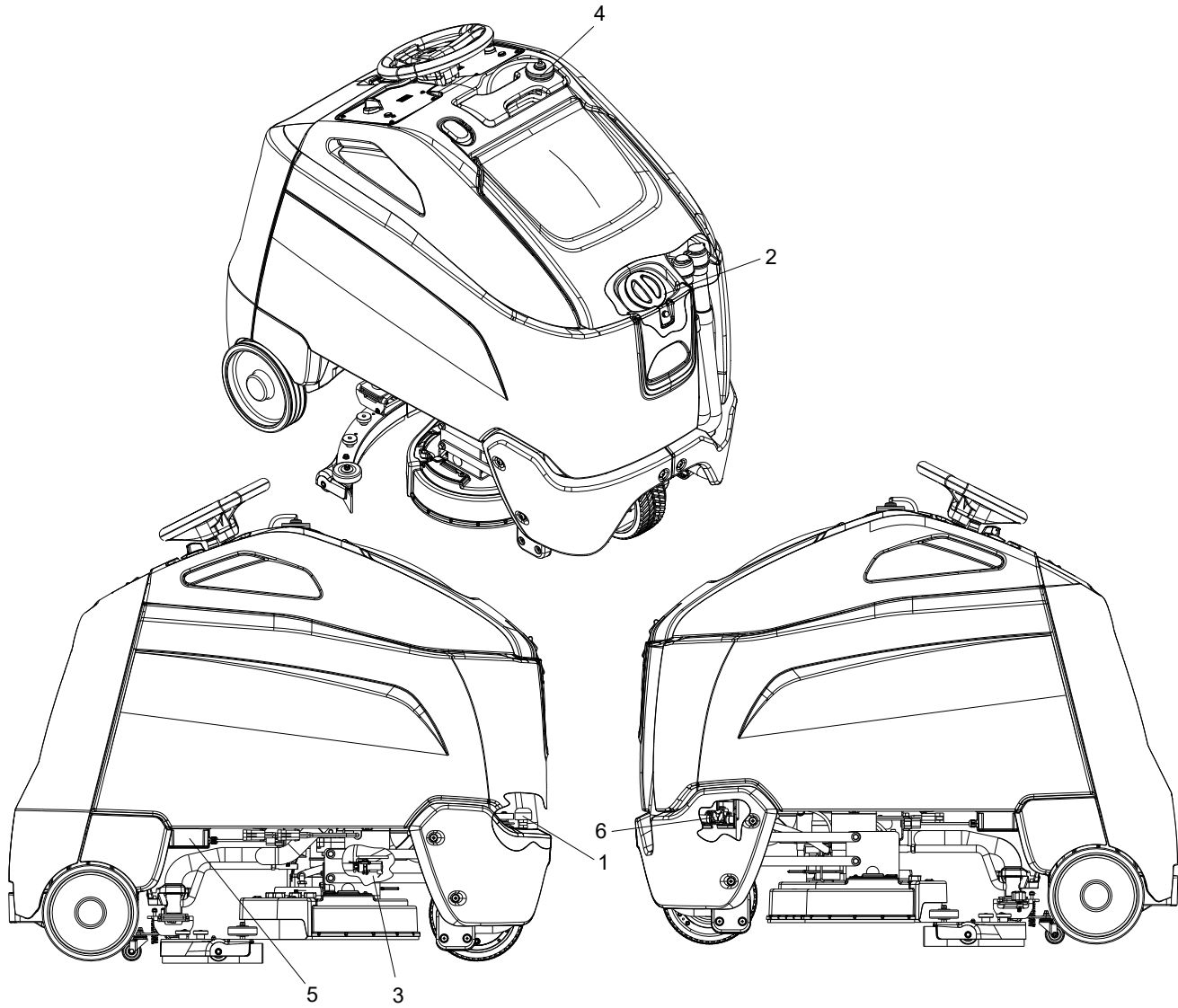
## Circuit Protection



## Circuit Breakers

### 1. MAIN CIRCUIT BREAKER

Interrupts the flow of power from batteries in the event of an electrical overload. When the circuit breaker is tripped, it can be reset by pressing the toggle switch. If the circuit breaker continues to trip, the cause of the electrical overload must be corrected.



### Solution

1. Strainer
2. Solution Cap
3. Solenoid Valve
4. Chemical Bottle (Optional)
5. Chemical Pump (Optional)
6. Flow Meter (Optional)



**Solution Strainer**

Located in bottom of tank. Protects system from debris.

**Solenoid Valve**

The solenoid valve is mounted on the front of the scrub deck, on left side. The solenoid valve opens and closes to meter the correct amount of solution to the scrub deck.

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.

**Chemical Bottle (Optional)**

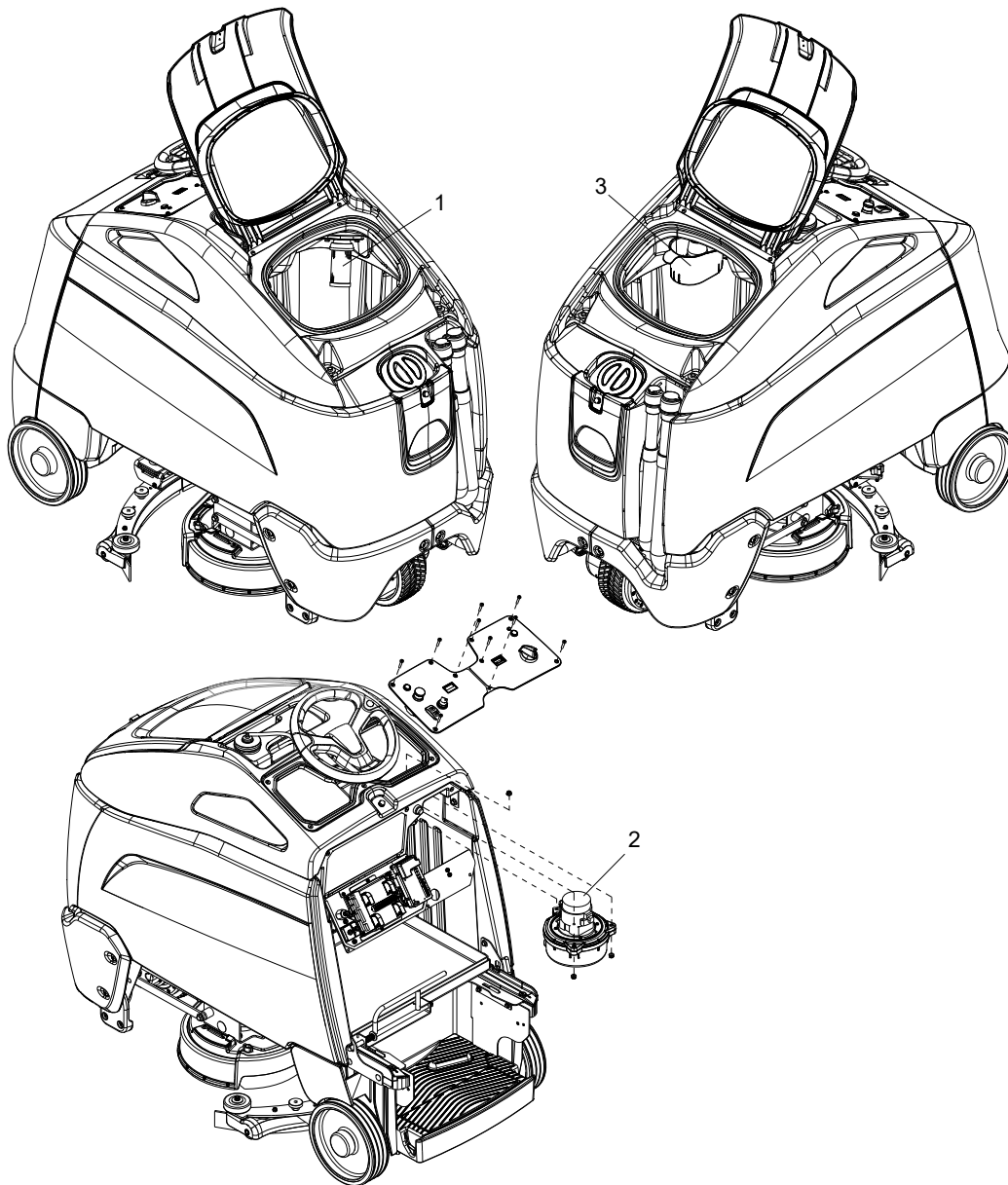
Holds chemical for optional metering system.

**Chemical Pump (Optional)**

Located in front of operator platform on left side. Pump meters chemical into water flow from solution tank.

**Flow Meter (Optional)**

Located front left side of machine. Measure water flow being delivered to scrub deck for accurate chemical dilution.



### Vacuum

1. Recovery Tank Float Shut-off
2. Vacuum Motor
3. Debris Bin

## 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.

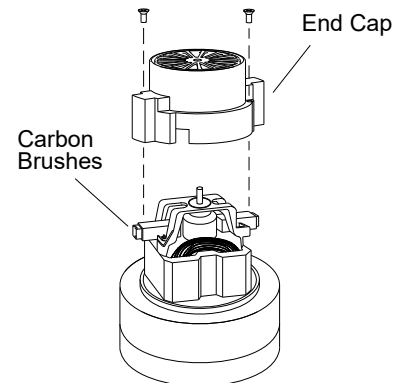
1. The float shut-off screen can be cleaned in or out of the machine.
2. To clean the float shut-off while it is inside the machine wipe material off screen then rinse. Check that the ball is also clean and moves freely.
3. To remove the float shut-off, tilt and pull the float screen assembly off the tank fitting barb.
4. To install, tilt and push the float screen assembly over the tank fitting barb.

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

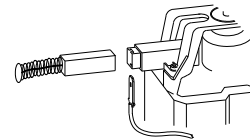
## To Repair or Replace Vacuum Motor

1. Remove rear cover from machine.
2. Remove upper control panel.
3. Remove three screws on lower panel and hinge panel down.
4. Disconnect electrical connector from the vacuum motor.
5. From topside, remove one nut in front of vacuum motor.
6. From backside, support vacuum motor and remove two remaining nuts on vacuum housing.
7. Lower vacuum motor, remove front rubber isolator from stub. Pull vacuum motor and upper housing out of machine. Lower housing and hoses stay with machine.
8. Remove upper housing from vacuum motor by removing four screws.
9. Reverse steps to install. Make sure that gasket is on vacuum so that vacuum seals against tank.

## Vacuum Motor Carbon Brushes

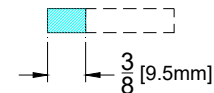


If armature commutator is grooved, extremely pitted or not concentric, the motor will need to be replaced or sent to a qualified service center.

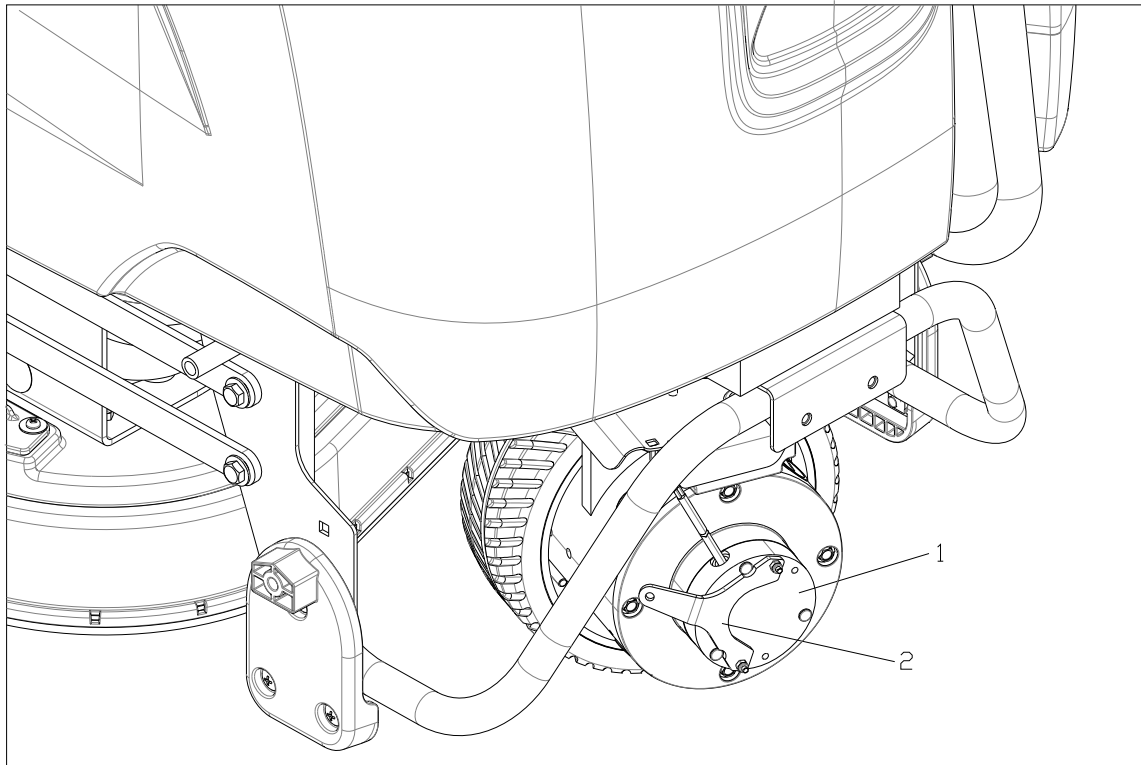


Important:

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.

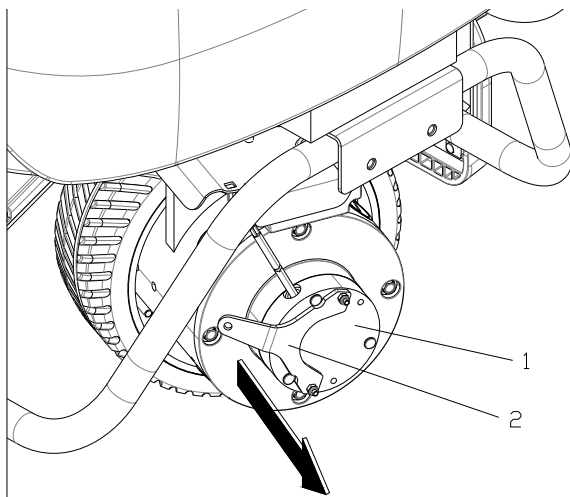
## Electric Brake Engagement

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).

### To disengage brake:



1. Pull lever away from brake housing.
2. Insert material to hold brake lever in place.

### **⚠ WARNING:**

Do not operate machine with brake disengaged.

## 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. Remove brush caps from motor housing.
3. Replace brushes.
4. Install brush caps to motor housing.

## 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

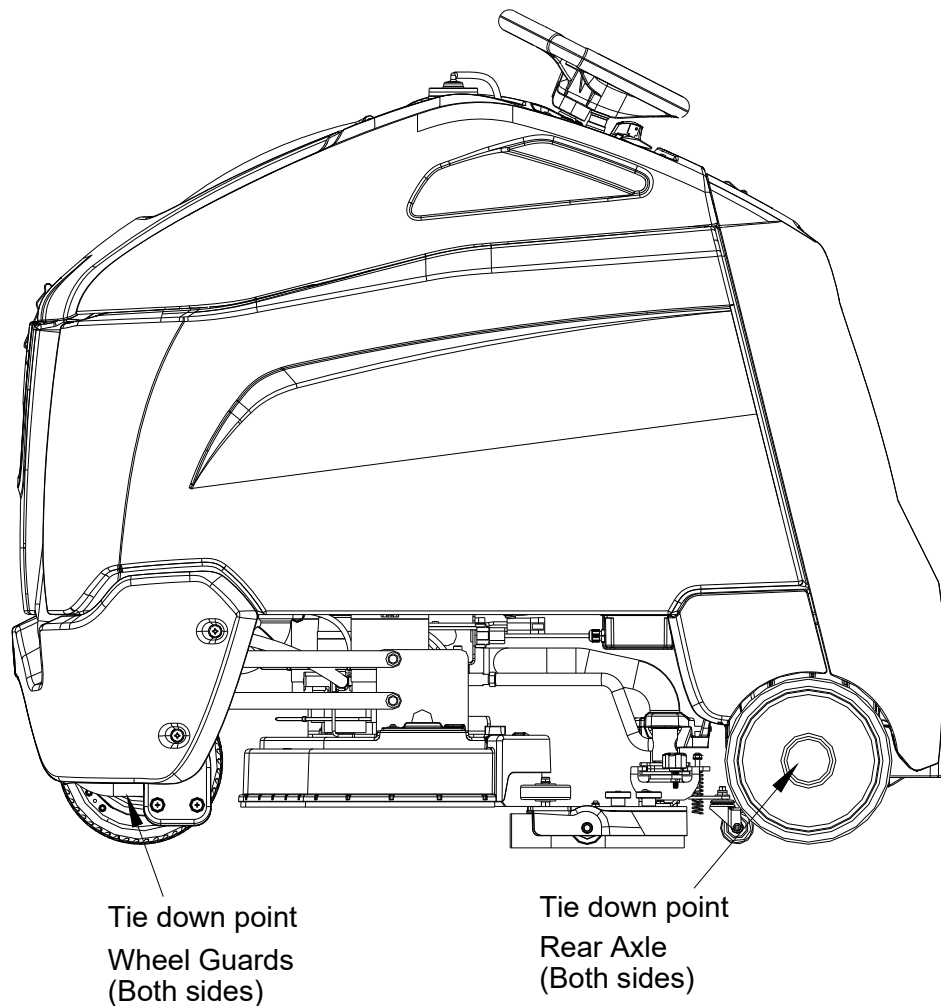
There are four tie down points, two on the front wheel guards, and two on the rear axle located on either side of the foot box.

### 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





## Maintenance

### Troubleshooting

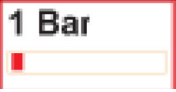




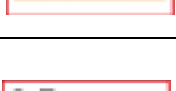
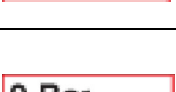
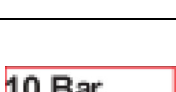

PROBLEM	CAUSE	SOLUTION
No power to machine	Battery disconnected	Check all battery cable connections
	Emergency shut-off activated	Reset
	Battery cables corroded	Clean connections
	Faulty key switch	Replace switch
	On board charger plugged in	Unplug and stow cord
	Main circuit breaker tripped	Reset circuit breaker
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
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	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	Latch recovery tank lid to 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.

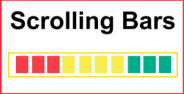


<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Vacuum motor does not run, or runs slowly	Faulty vacuum circuit or switch	Check wires connections and motor
	Worn vacuum motor brushes	Replace brushes, check commutator
Squeegee will not go up/down	Faulty circuit or actuator	Check wires, connectors and actuator
	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 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
	Solution solenoid valve obstructed or faulty	Repair or replace solenoid valve
Brush motors do not run, or run slowly	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	Check wire connections and actuator
	No brushes or pad drivers on machine	Install brushes or pad drivers
Chemical Metering System does not operate	Chemical Reservoir empty	Fill reservoir
	Chemical Cap Strainer clogged	Clean strainer
	Chemical System plumbing obstructed	Clear obstruction
	Faulty Flow Meter	Press prime button. If chemical flows, Repair/replace flow meter.
	Faulty Chemical Pump	Press prime button. If chemical does not flow, repair/replace pump.

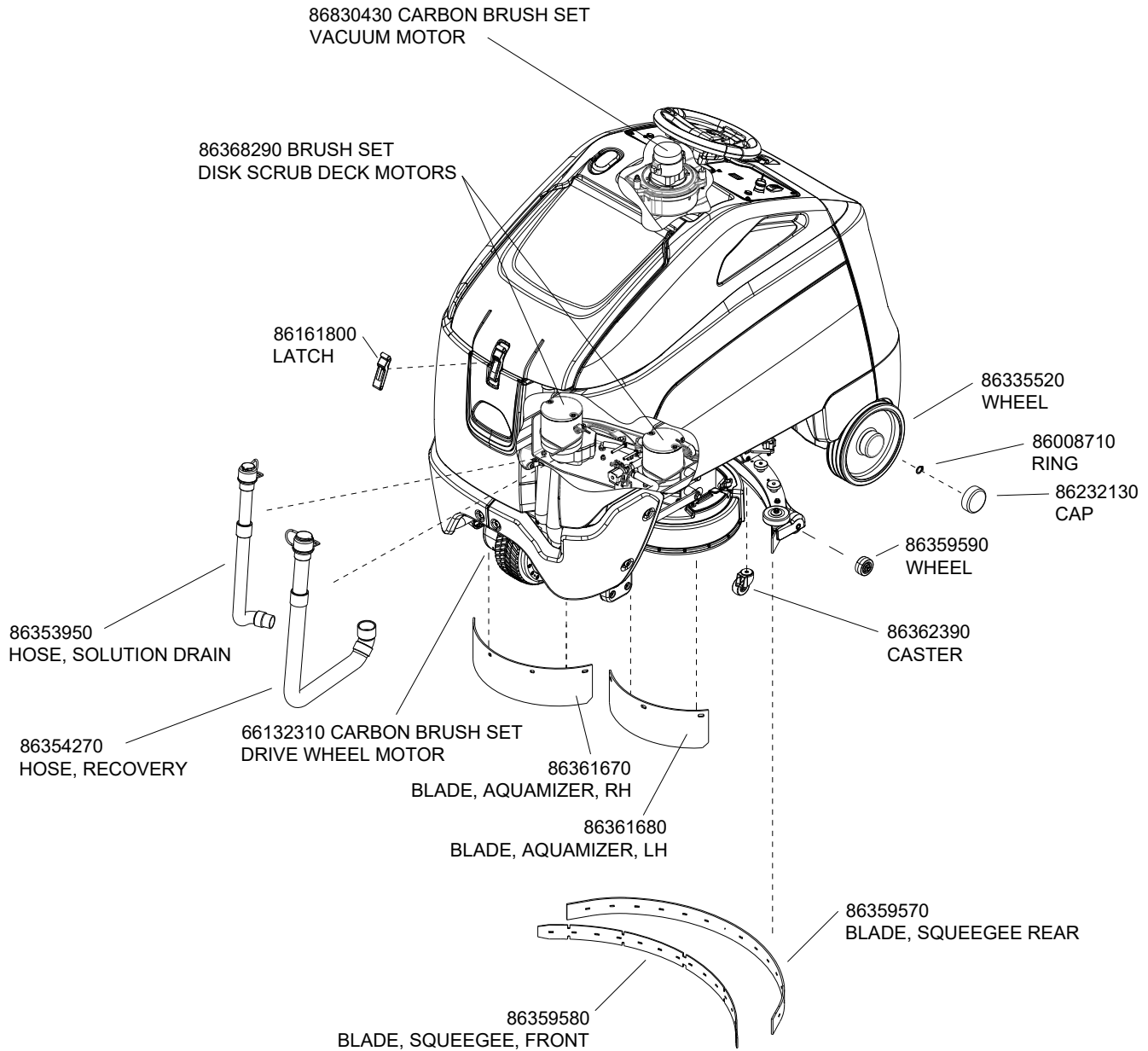
## Maintenance

### Controller Fault Codes

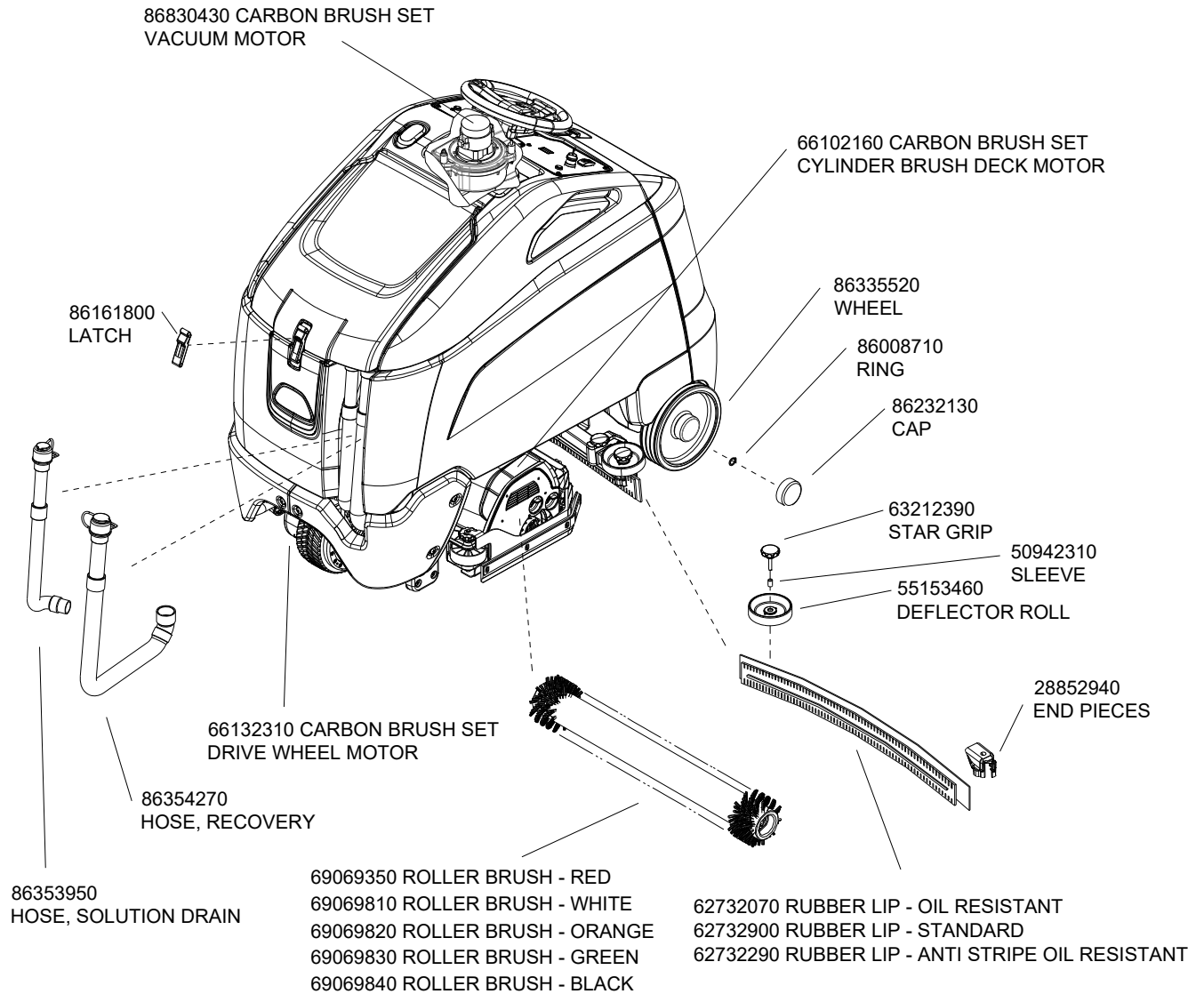
ERROR CODE DELUXE	PROBLEM	SOLUTION
	TRACTION MOTOR AND CONTROLLER ERROR	THE BATTERY NEEDS CHARGING OR THERE IS A BAD CONNECTION FROM THE BATTERY TO THE TRACTION CONTROLLER. CHARGE BATTERY OR CALL FOR SERVICE AND HAVE TECHNICIAN CHECK WIRING.
	TRACTION MOTOR DISCONNECTED	THE TRACTION MOTOR HAS A BAD CONNECTION. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK WIRING.
	TRACTION MOTOR SHORT CIRCUIT	THE TRACTION MOTOR HAS A SHORT CIRCUIT TO THE BATTERY. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK FOR SHORT CIRCUIT.
	AUX FAULT or ACTUATOR (DECK or SQUE) OVERCURRENT	CALL FOR SERVICE AND HAVE TECHNICIAN CHECK AUX OUTPUT DEVICES AND ASSOCIATED WIRING.
	VACUUM MOTOR TRIP	THE VACUUM MOTOR HAS EXCESSIVE CURRENT. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK FOR SHORT CIRCUIT OR OTHER DAMAGE.
	BRUSH MOTOR TRIP	THE BRUSH MOTOR HAS EXCESSIVE CURRENT, CALL FOR SERVICE AND HAVE TECHNICIAN CHECK FOR SHORT CIRCUITS, PADS OR OTHER DAMAGE.
	THROTTLE TRIP ERROR	THE THROTTLE IS DEFLECTED OR ASSOCIATED WIRING HAS A BREAK OR SHORT CIRCUIT. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK THROTTLE AND ASSOCIATED WIRING.
	CONTROL SYSTEM TRIP	THE TRACTION CONTROL SYSTEM IS IN ERROR. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK ALL CONNECTIONS TO THE CONTROLLER.
	SOLENOID BRAKE	THE BRAKE SOLENOID HAS A BAD CONNECTION. CALL FOR SERVICE AND HAVE TECHNICIAN CHECK CONNECTIONS TO THE BRAKE.
	HIGH BATTERY VOLTAGE	EXCESSIVE BATTERY VOLTAGE, CALL FOR SERVICE AND HAVE TECHNICIAN CHECK BATTERY CONDITION.

ERROR CODE DELUXE	PROBLEM	SOLUTION
 <p>Scrolling Bars</p>	MACHINE IS NOT REPORTING TO KÄRCHER FLEET	MACHINES WITH KÄRCHER FLEET SUPPORT, CALL FOR SERVICE. MACHINES WITHOUT KÄRCHER FLEET SUPPORT, NO ACTION REQUIRED.

## Suggested Spare Parts - Disk



## Suggested Spare Parts - Cylindrical







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