

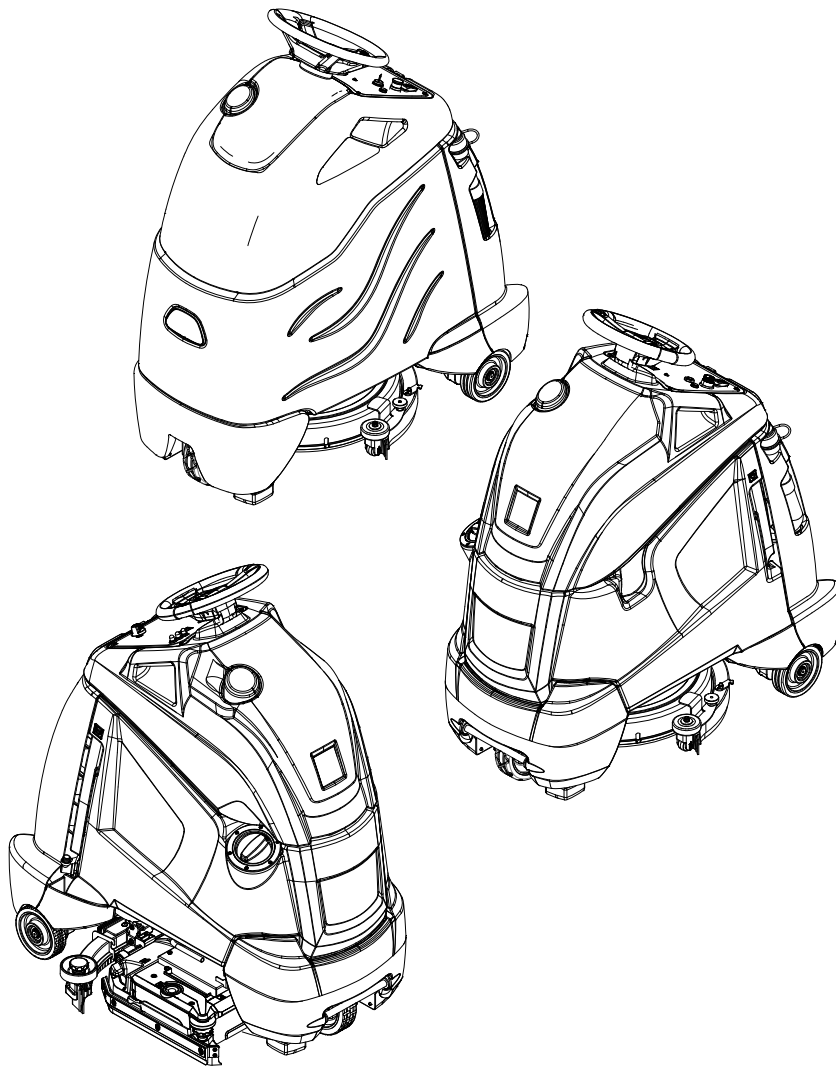
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Chariot 2 iVac 24 ATV

English

02



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86446760 - B 03/12/21

Machine Data Label / Overview

Model: _____

Date of Purchase: _____

Serial Number: _____

Dealer: _____

Address: _____

Phone Number: _____

Sales Representative: _____

OVERVIEW

The Chariot® iVacuum 24™ is a battery powered, stand-on, wide area vacuum intended for commercial use. The Chariot® iVacuum 24™ brushes and vacuums debris from indoor hard and carpeted surfaces and deposits the debris in the debris tray and filter bags.

The unit also has an accessory wand and hose for cleaning small areas and non-floor surfaces.

Models:

- 1.008-067.0 iVACUUM 24, 130 A/H
- 1.008-068.0 iVACUUM 24, 114 A/H AGM
- 1.008-069.0 iVACUUM 24, 114 A/H AGM OBC
- 1.008-070.0 iVACUUM 24 OBC PACKAGING ONLY
- 1.012-617.0 iVACUUM 24, LITHIUM

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 :
<http://warranty.karcherna.com>

For customer assistance:
1-800-444-7654

KÄRCHER

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How To Use This Manual

This manual contains the following sections:

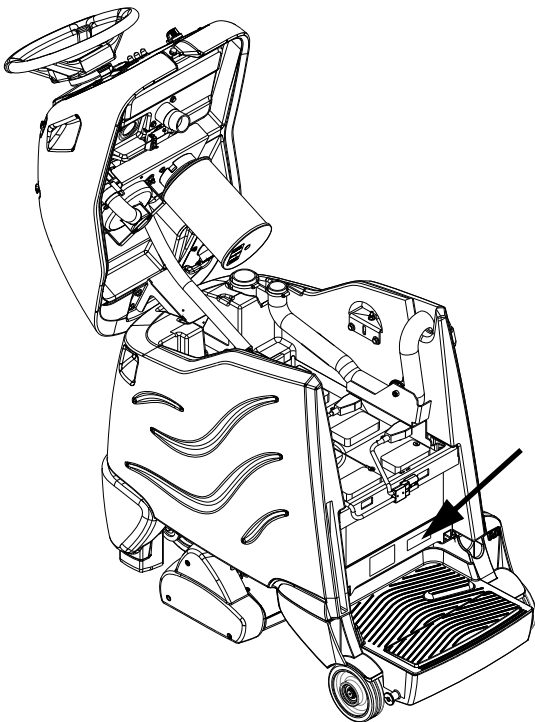
- How to Use This Manual
- Safety
- Operations
- Maintenance

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 is 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:

- Batteries
- Brush Deck
- Drive Motor
- Service Schedule
- Machine Troubleshooting

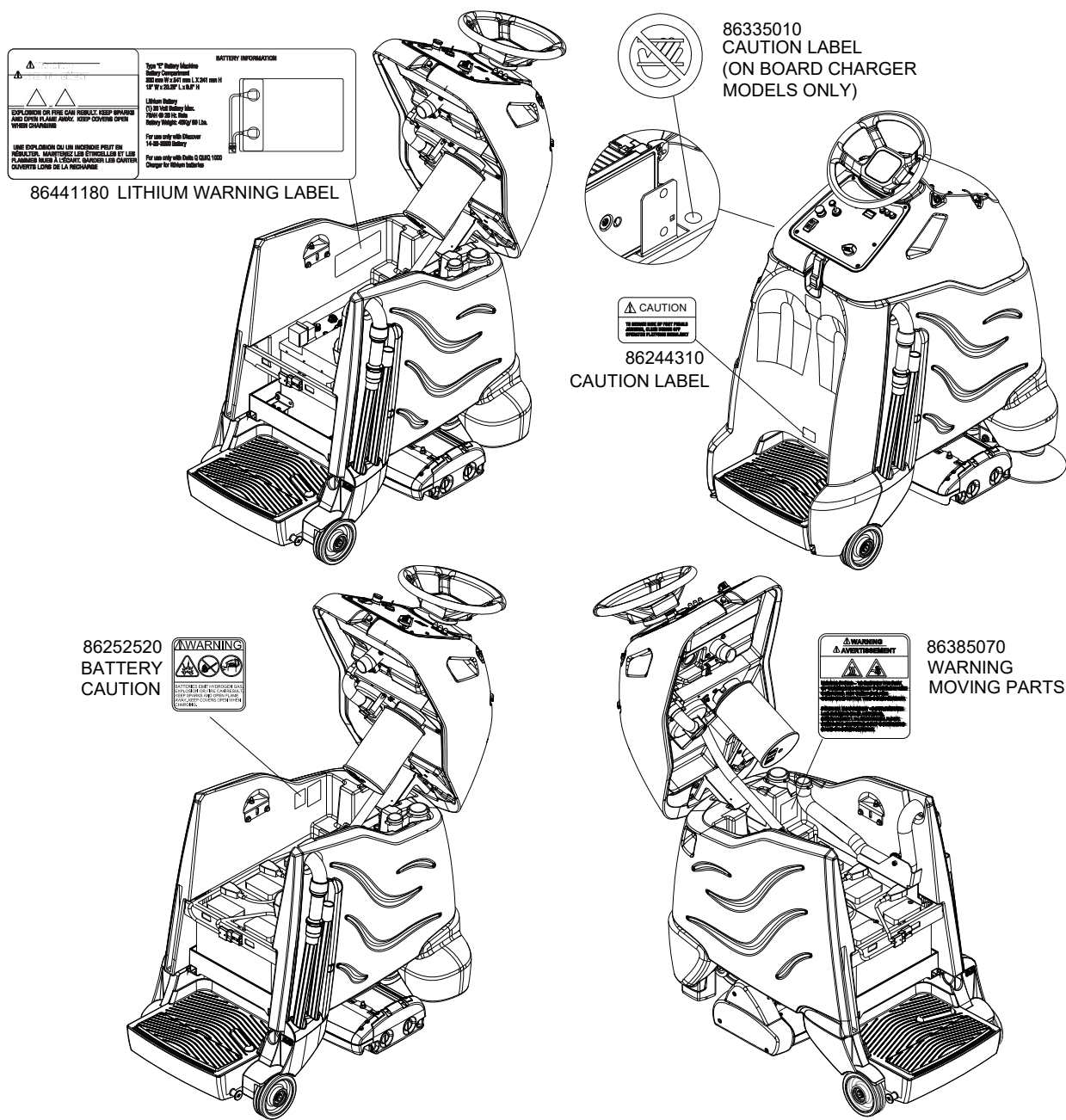
The manual part number is located on the lower right corner of the front cover.

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.

Emplacement De L'étiquette De Sécurité

REMARQUE : Ces dessins indiquent l'emplacement des étiquettes de sécurité sur la machine. Si, à tout moment, les étiquettes deviennent illisibles, contactez votre représentant autorisé pour un remplacement rapide.



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

MESURES DE SÉCURITÉ IMPORTANTES

Lors de l'utilisation d'un appareil à batteries, il est nécessaire de respecter systématiquement des mesures de sécurité de base, comme suit :

NOTE DE TOUTES CES MESURES AVANT D'UTILISER CETTE MACHINE.

▲ AVERTISSEMENT:

Pour réduire les risques d'incendie, de chocs électriques, ou de blessures :

Ne jamais l'utiliser à l'extérieur ou dans la pluie.

Utiliser cet appareil conformément aux instructions du présent manuel uniquement. N'utiliser que les composants et les accessoires conseillés par le fabricant.

Lorsque la machine ne fonctionnant pas correctement, a fait l'objet d'une chute ou d'une détérioration, a été laissée à l'extérieur, est tombée dans l'eau, la retourner au centre de service agréé.

Ne pas opérer la machine lorsque les conduits de ventilation sont bloqués. Débarrasser les débris des conduits, car ils peuvent réduire l'écoulement d'air.

Cette machine n'est pas adaptée au ramassage de poussières dangereuses

Ne pas l'utiliser près de liquides, de poussières ou de vapeurs inflammables. Ne pas exposer au feu.

L'entretien et les réparations de la machine doivent être effectuées par un personnel qualifié.

Si de la mousse ou du liquide sort de la machine, la mettre hors tension immédiatement.

Déconnecter les batteries avant de nettoyer la machine ou de la soumettre à un entretien.

Ne pas utiliser de bloc-batterie ni d'appareil visiblement endommagé. Si le compartiment de batterie est endommagé, ne pas toucher au contenu exposé.

Ne pas modifier ni tenter de réparer l'appareil ou le bloc-batterie.

Option pour batterie lithium-ion: Pour utilisation avec batterie au lithium Discover 12-36-6700 et chargeur Delta Q QuiQ 1000 avec un algorithme au lithium.

Avant de se débarrasser de la machine, il est nécessaire de retirer les batteries et de les jeter correctement.

S'assurer que toutes les plaques d'avertissement ou de précaution sont lisibles et fixées correctement sur la machine.

Durant la manoeuvre de la machine, prendre garde aux personnes environnantes et notamment aux enfants.

Avant l'utilisation de la machine, veiller à positionner tous les couvercles et portes comme indiqué dans les instructions.

Lorsque la machine est laissée sans surveillance, s'assurer qu'elle ne se déplace pas de manière accidentelle.

Cette machine ne doit être manoeuvrée que par un personnel expérimenté et qualifié.

Lorsque la machine est laissée sans surveillance, la mettre hors tension ou verrouiller l'interrupteur principal afin d'empêcher un emploi non autorisé.

Seuls les produits chimiques recommandés par le fabricant doivent être utilisés.

Cette machine a été conçue pour être utilisée avec des brosses spécifiées par le fabricant. L'utilisation d'autres brosses peut affecter sa sûreté.

N'employez pas sur des surfaces ayant un gradient de plus de 10% (6 degrés).

CONSERVER CES 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 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.

Les symboles ci-dessous sont utilisés à travers ce manuel comme illustré dans leurs descriptions :

DEGRÉS DE RISQUES EN CAS DE DANGER

Il existe trois degrés de risques identifiés par les termes signalétiques -AVERTISSEMENT et ATTENTION et POUR VOTRE SÉCURITÉ. Le degré de risque est défini de la manière suivante:

AVERTISSEMENT:

AVERTISSEMENT - Dangers ou méthodes dangereuses qui POURRAIENT provoquer de graves blessures ou entraîner la mort.

ATTENTION:

ATTENTION - Dangers ou méthodes dangereuses qui pourraient provoquer des blessures légères ou une détérioration du produit ou des biens immobiliers.

POUR VOTRE SÉCURITÉ: ce signe permet d'identifier les mesures de précaution à prendre pour assurer un bon fonctionnement du matériel.

Rendre compte immédiatement d'une défaillance ou d'une détérioration de la machine. Ne pas utiliser la machine si celle-ci ne fonctionne pas correctement. Lire soigneusement les informations ci-dessous signalant certains dangers potentiels pour l'opérateur de la machine. L'opérateur doit être absolument au courant de ces dangers potentiels. Localiser tous les dispositifs de sécurité sur la machine. Il est conseillé de prendre les mesures nécessaires pour former le personnel opérateur.

POUR VOTRE SÉCURITÉ:

NE PAS MANOEUVRER LA MACHINE:

Lorsqu'on n'est pas expérimenté ou qualifié.

Lorsque le guide d'utilisation n'est pas été lu ou compris.

Dans des zones inflammables ou explosives.

Dans des zones où des objets peuvent tomber.

LORS DE L'ENTRETIEN DE LA MACHINE:

Éviter les parties amovibles. Ne pas porter de vêtements amples, tels que des vestes, des chemises ou des vêtements avec manches lors de l'utilisation de la machine. Utiliser les pièces détachées Kärcher North America homologuées.

AVERTISSEMENT:

Les batteries émettent le gaz d'hydrogène. L'explosion ou le feu peut résulter. Étincelles de subsistance et flamme nue loin. Compartiment de batterie de subsistance ouvert en chargeant. Étincelles et flammes de subsistance loin des batteries. Ne fumez pas autour des batteries.

AVERTISSEMENT:

Déconnecter les batteries avant de travailler sur la machine. La machine ne doit être confiée qu'à un personnel qualifié. Porter systématiquement des lunettes et des vêtements de protection lors d'une intervention sur les batteries ou aux alentours. Éviter tout contact de la peau avec l'acide contenu dans les batteries.

AVERTISSEMENT:

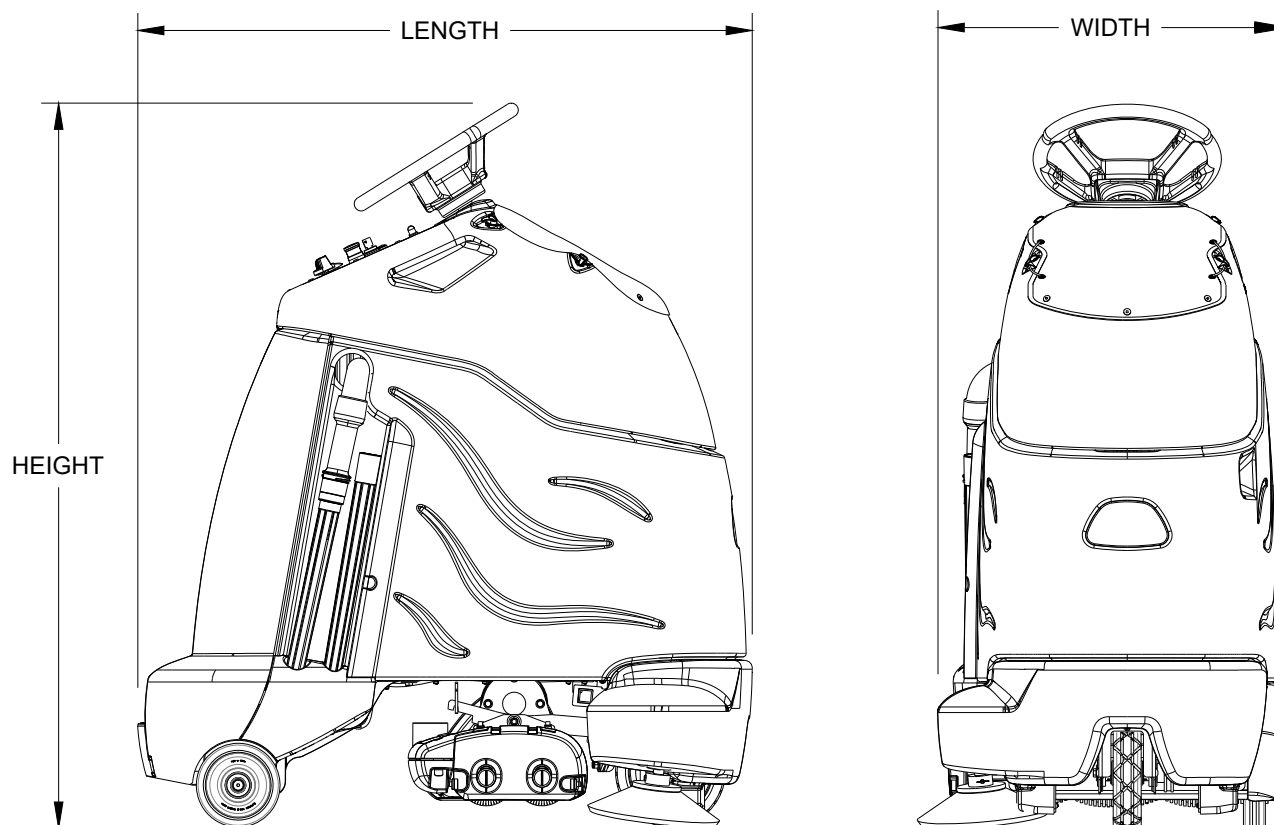
Ne jamais placer d'objets métalliques sur le dessus des batteries.

Operations

Technical Specifications

ITEM	DIMENSION/CAPACITY
Nominal power	1224 W
Rated Voltage	36 Volts DC
Rated Amperage	34 amps
Batteries	3 X12 Volt 130 AH @ 20 hr. rate
Battery Compartment Dimensions	20-1/2 in. x 13 in. x 10 in. tall (330mm x 521mm x 254mm)
Battery, Lithium	38.4 Volts
Battery, Lithium - Dimensions	(330 mm x 339 mm x 256 mm)
Propelling Motor	.38 HP (280 W)
Cylindrical Brush Motor	.5 HP (373 W)
Side Broom Motor	.06 HP (47W)
Cylindrical Brushes	Two 20 in. (51cm) by 4 in. (10cm) diameter
Side Broom	9 in. (229 mm) diameter
Cylindrical Brush speed	1030 RPM
Side Broom speed	90 RPM
Vacuum Motor	.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)
Bag Capacity	1100 in ³ 18L
Mass (GVW)	613 lbs (280 kg)
Weight empty without batteries	250 lbs (115 kg)
Tires	8 in. (203mm) drive, 6 in. (156mm) rear, polyurethane
Maximum Speed	2.3 mph (3.7 KPH)
Brake	Electrical parking brake, sets automatically whenever operator stops.
Minimum aisle u-turn width	51 in. (1295 mm)
Maximum rated climb and descent angle	10% (6 degrees)
Sound power dBA (IEC 60704-1)	80.6 dBA
Sound pressuer dBA (IEC 60704-1)	68.4 dBA
Vibration arms m/s ² (ISO 5344)	1.6 m/s ²
Vibration feet m/s ² (ISO 5344)	0.54 m/s ²
Sound power uncertainty dBA	3.00 dBA
Sound pressure uncertainty dBA	3.00 dBA
Vibration uncertainty m/s ²	0.50 m/s ²

ITEM	MEASURE
Height	51.8 in (1316 mm)
Length	44.0 in (1118 mm)
Width without deck	24.5 in (622 mm)
Width of deck	23.25 in (581 mm)
Width with side broom	25.9 in (658 mm)



⚠ 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.

⚠ ATTENTION:

Cet appareil n'est pas prévu à l'usage des personnes (enfants y compris) avec des possibilités physiques, sensorielles ou mentales réduites, ou le manque d'expérience et de connaissance, à moins qu'ils aient été donnés la surveillance ou l'instruction au sujet de l'utilisation de l'appareil par une personne chargée de leur sûreté. Des enfants devraient être dirigés pour s'assurer qu'ils ne jouent pas avec l'appareil.

How This Machine Works

The Chariot® iVacuum 24 ATV™ is a battery powered, self-propelled, vacuum intended for commercial use. The appliance vacuums debris and dirt from the carpet and collects it in a disposable bag.

The machine's primary systems are the brush system, vacuum system, and operator control system.

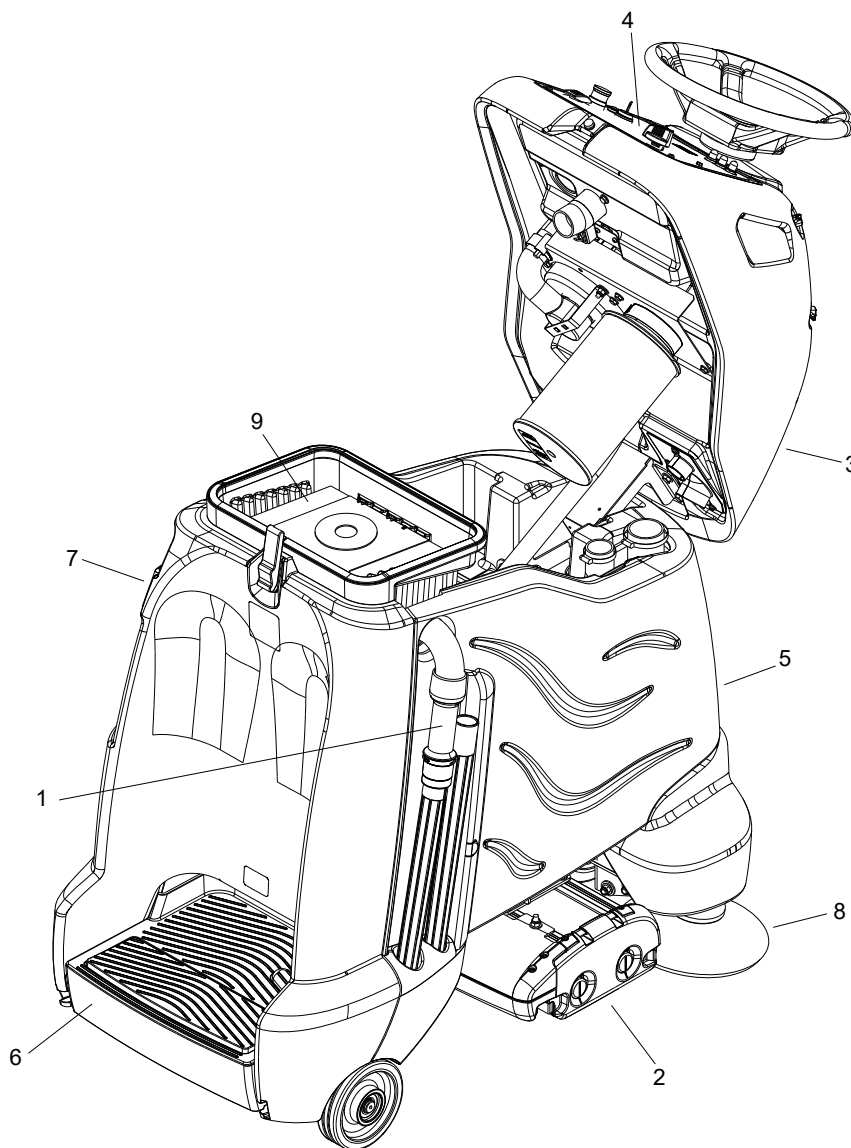
The function of the brush system is to brush the carpet.

The brush system consists of two cylindrical type brushes, side brush, motors, brush deck, and controls.

The right side brush is used to sweep debris from along edges into the path of the brush deck. The front cylindrical brush sweeps debris backwards. The rear brush sweeps debris forwards. Both cylindrical brushes work to agitate the carpet and to route the debris up into the debris tray assembly.

The function of the vacuum system is to vacuum fine dirt and debris into the vacuum bag. The recovery system consists of the debris tray assembly, vacuum motor, paper vacuum bag and post filter. The vacuum draws the dirt off the floor as the machine moves forward. The vacuum motor provides suction to draw the fine dirt into the vacuum bag, and the debris tray holds large debris. The vacuum bag holds the fine dirt.

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

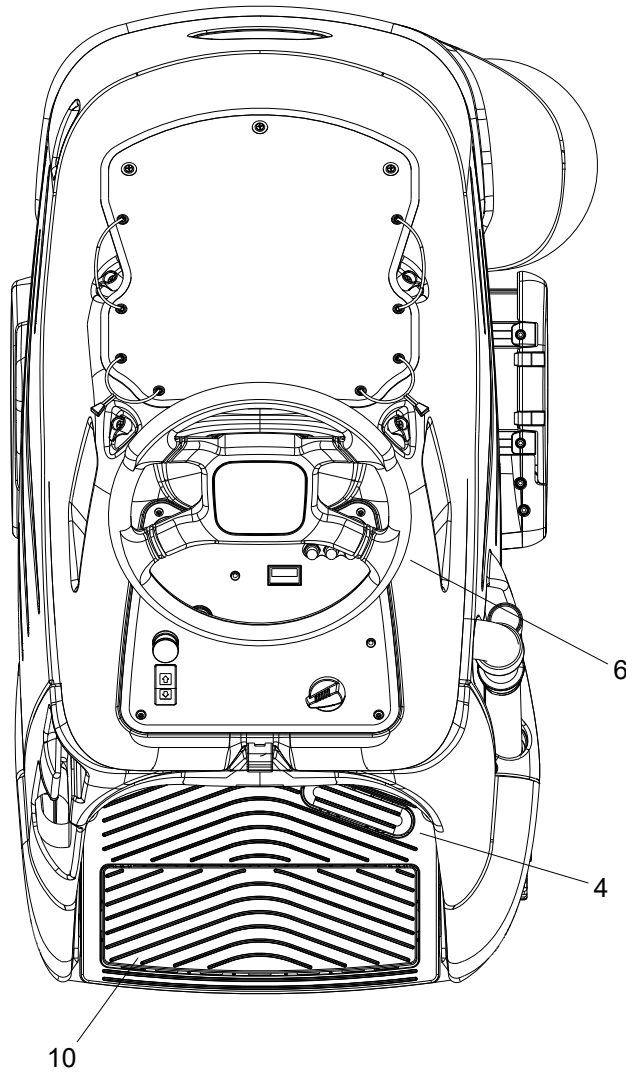
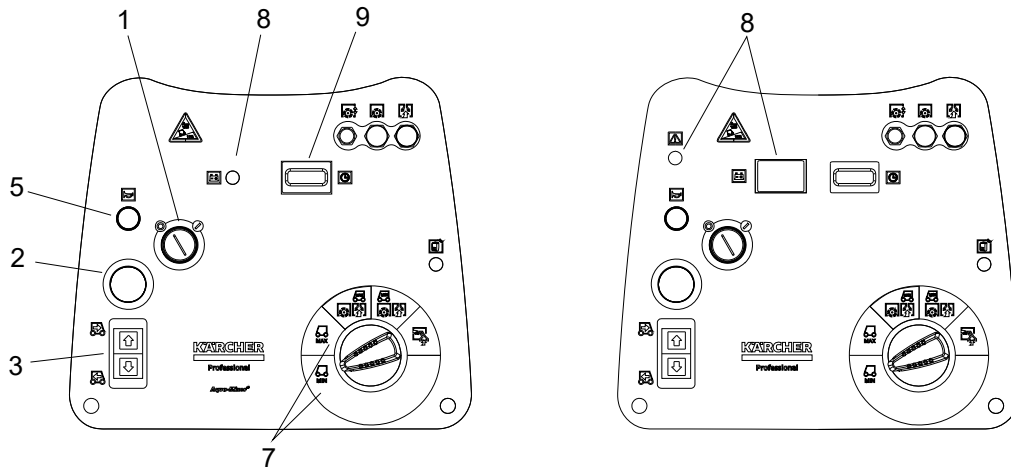


Components

- 1. Accessory Hose
- 2. Brush Deck
- 3. Console
- 4. Control Panel
- 5. Main Cover
- 6. Pedal Platform
- 7. Rear Cover
- 8. Side Broom
- 9. Vacuum Bag

Operations

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 Light**
 9. **Hour Meter**
 10. **Operator Presence Switch**
-

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 discharge indicator light will flash once and stay on continuously.

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. The switch will pop-up indicating reset machine.

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.

The switch controls the direction of travel of the vehicle. The lighted 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

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

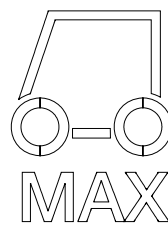
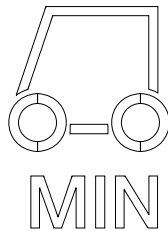
The steering wheel turns the front wheel causing the machine to change direction.

7. SPEED CONTROL

Controls the maximum speed of the machine. There are two travel-only 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 DISCHARGE INDICATOR

WET AND AGM

Indicates the charge level of the batteries.

The indicator will be illuminated if the batteries have a sufficient charge. A slow, continuous flash indicates the batteries require charging.

LITHIUM

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.

ALL BATTERIES

The Battery Lockout function will activate when the batteries are low.

Once active, the LED status indicator will begin to flash slowly and the controller will inhibit the side broom, main brushes, and vacuum operation. The drive remains functional. Return the unit to the charging station and charge the batteries.

NOTE: *Continuing usage may damage the batteries.*

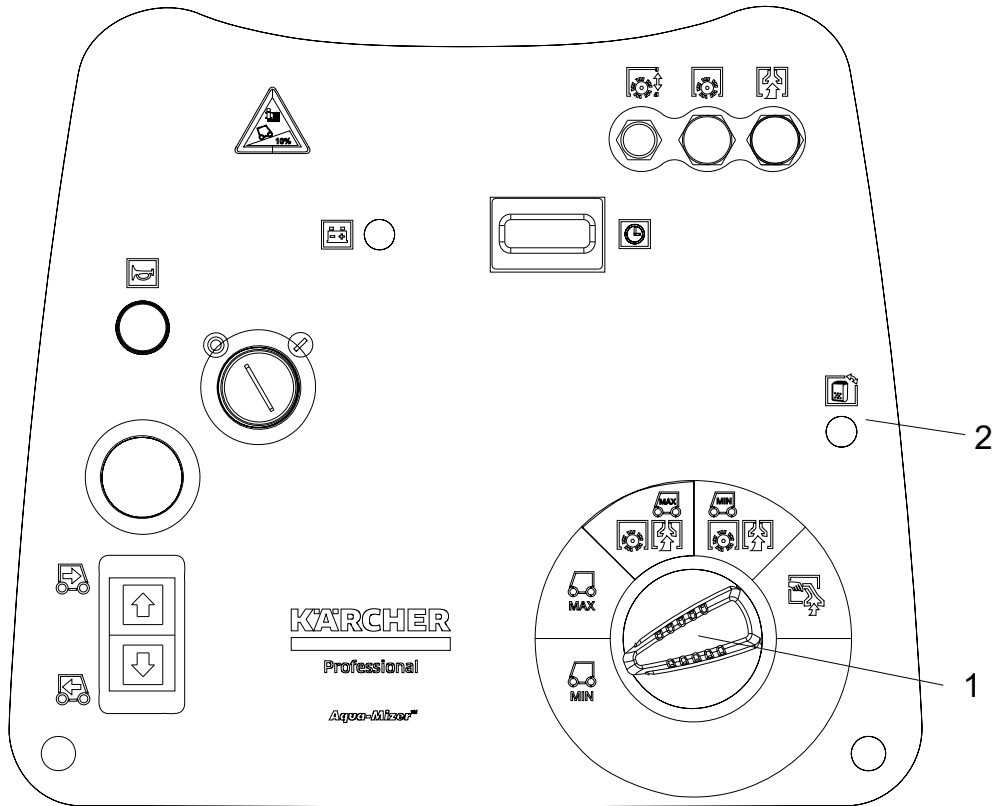
When the machine is left overnight with less than a full charge, the display may initially indicate a full charge. It will also indicate a full charge if the batteries are disconnected, then reconnected. After a few minutes of operation the indicator will give the correct charge level.

9. HOUR METER

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

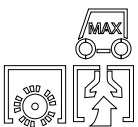
Operations

Vacuum Controls



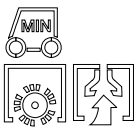
1. Function Mode Switch

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



Light vacuuming

This mode is used for light vacuuming. In this mode the machine will propel at fast speed. The 'floating' brush deck is in the down position. The brushes will agitate, the side broom will bring debris into the path of the deck. The vacuum will draw the dirt and debris into the debris tray and the vacuum bag.



Deep vacuuming

This mode is used for deep vacuuming. In this mode the machine will propel at a slow speed. The 'floating' brush deck is in the down position. The brushes will agitate, the side broom will bring debris into the path of the deck. The vacuum will draw the dirt and debris into the debris tray and the vacuum bag.



Accessory mode

This mode is used for using the accessory hose and attachments only. The brush and vacuum deck will both be up and off. In this mode the machine will not propel.

2. Vacuum Bag Status Light

Light is green when bag is in place and vacuum operating conditions are good.
Light is red if bag is missing or full or vacuum operating conditions are poor.

Pre-run Machine Inspection

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

NOTE: See Maintenance Service Schedule 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. Push machine while off to verify parking brake is functioning correctly.
2. Stand on the operator platform. Throttle pedal must be in neutral position.
3. Turn the machine power on by turning key switch clockwise to the "ON" position.
4. Check the position of the Directional Control Switch to make sure the machine will travel in the direction intended.
5. Press the Drive Reset Switch.
6. Press lightly on the throttle pedal with right foot.

Emergency Stop Procedures

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

Operations

Normal Vacuuming

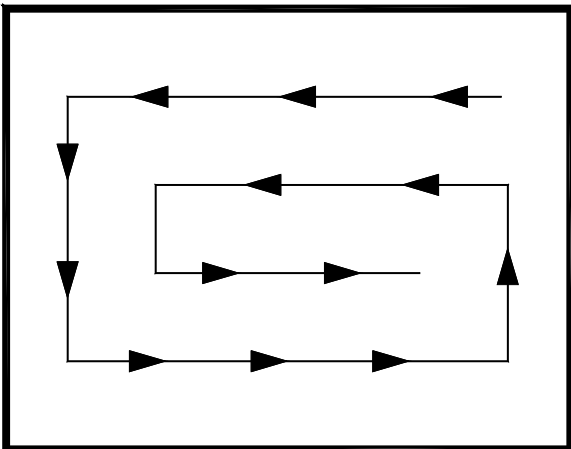
Plan the vacuuming pattern in advance. The longest track is around the perimeter of the area to be cleaned. For efficient operation, the runs should be the longest possible without turning or stopping.

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

NOTE: Check and empty debris tray as needed during operation.

If machine is allowed to stand in neutral with the vacuum deck down for more than 2 seconds, the brush motor stops. If either forward or reverse travel is selected, the brush motor will continue once movement of machine begins. Overlap the brush path and avoid transporting over previously cleaned areas.

Recommended Path



To Begin Vacuuming

⚠ CAUTION:

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

⚠ ATTENTION:

Lorsque vous utilisez la machine en présence de gens, portez une attention particulière aux mouvements inattendus. Soyez plus prudent, surtout en présence d'enfants.

1. Stand on the operator platform. Throttle pedal must not be depressed.
2. Turn key switch to turn machine power on.
3. Check position of Directional Control Switch to ensure that machine is set to travel in direction intended.
4. Rotate the Speed/Function Control Knob to one of the two vacuum settings.
5. Drive machine forward to begin vacuuming.
6. Adjust the speed of the machine as necessary.

To Stop Vacuuming

1. Remove foot from throttle pedal allowing pedal to return to neutral.
2. Turn machine power off or switch to transport only mode.

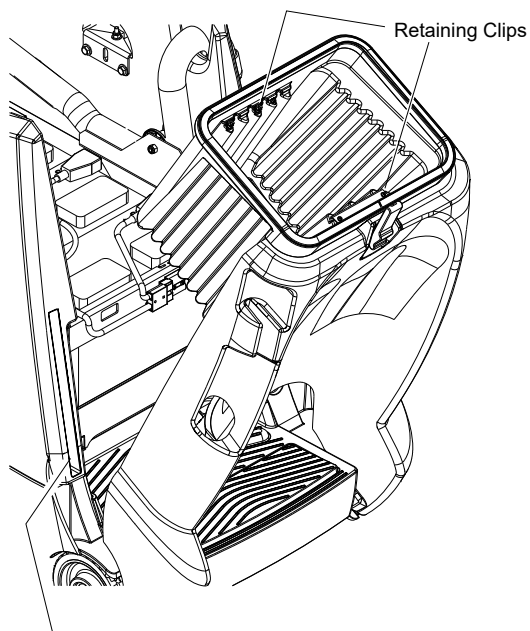
FOR SAFETY: Before leaving or servicing machine: stop on level surface, turn off machine and remove key.

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

Changing Vacuum Bag

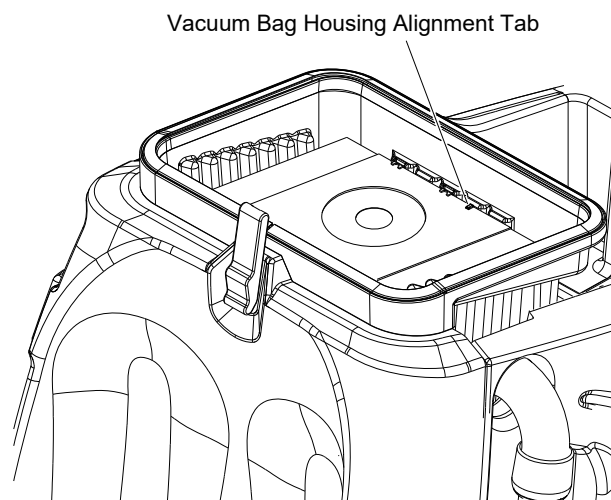
A convenient bag storage is built into side of machine.

1. Park machine on level area.
2. Turn the machine power off.
3. Unlatch and open top of machine.
4. Remove backing from vacuum bag's sealing tag. Seal top of bag.
5. Remove full vacuum bag from vacuum bag housing.
6. Clean vacuum bag housing and remove any debris.



Vacuum Bag Storage Compartment

7. Tilt back panel to retrieve a new clean paper bag from the storage compartment in left side wall of main cover.
8. Return back panel to operating position.
9. Unfold bag. There is a notch in cardboard on top of bag. Align notch with housing front edge aligning tab. Slightly bow cardboard to slide under housing's front and rear retaining tabs.



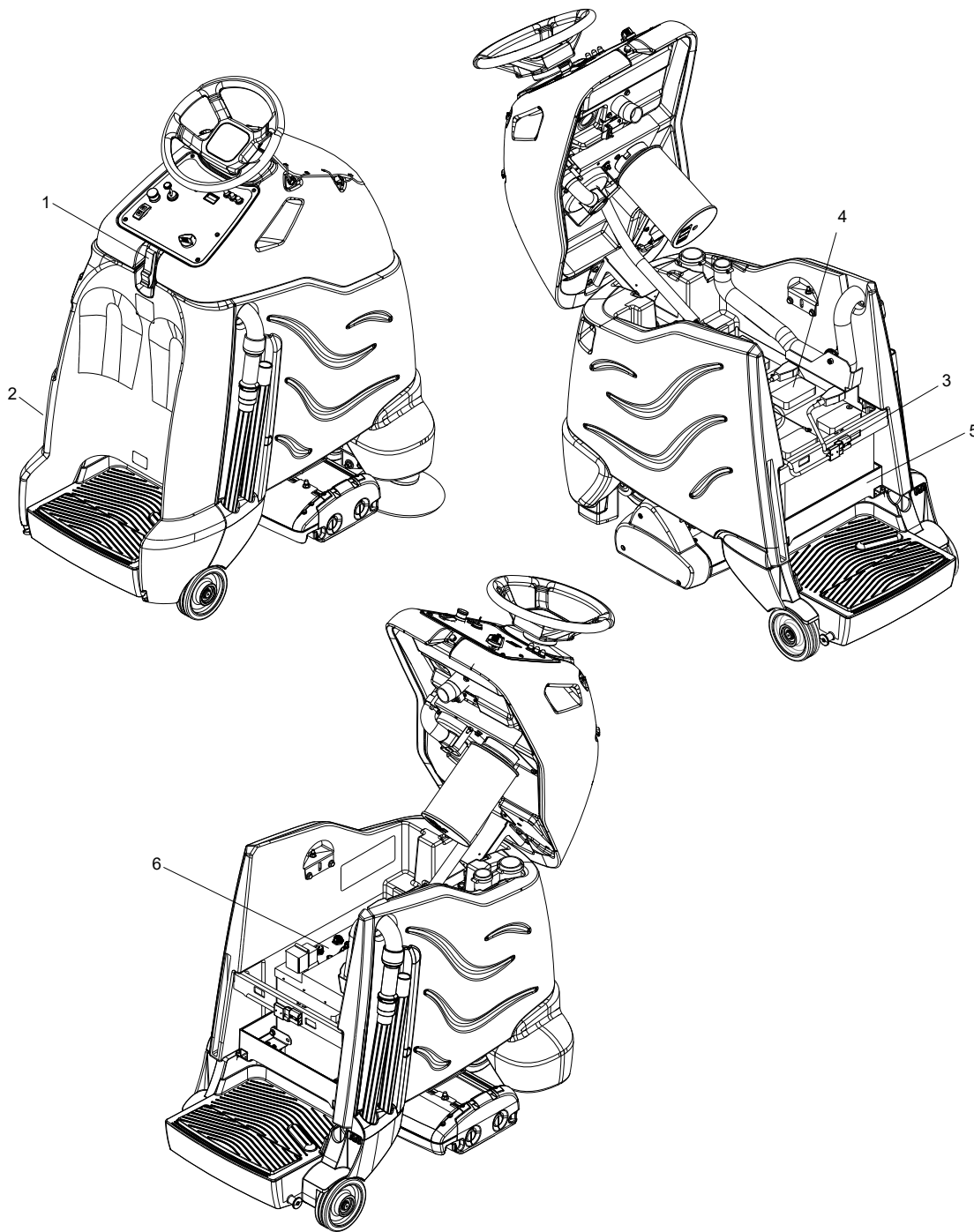
10. Close and latch machine top.

Maintenance

Service Schedule

MAINTENANCE	BEFORE EACH WORK PERIOD	AFTER EACH WORK PERIOD	50 HRS	100 HRS	200 HRS	250 HRS
Check water level of batteries after charging; add distilled water if necessary	*					
Check that the vacuum box lid seal tightly	*					
Visually check for damaged or worn tires.	*					
Check vacuum hose connections.	*					
Check hoses for debris buildup.	*					
Empty debris tray	*					
Check pedal(s), brake and steering for proper operation	*					
Check vacuum bag fullness and change if necessary.	*					
Clean brushes and check wear.		*				
Remove bearing cap. Clean bearings and cap.		*				
Empty debris tray		*				
Charge batteries.		*				
Clean off top of batteries.			*			
Check battery cells with hydrometer. (Wet cell only)			*			
Check battery connections are tight.			*			
Clean battery cases and compartment.				*		
Clean and check drive tension chain for wear and tension.				*		
Clean chains, cables and pulleys for brush deck lift.					*	
Check all motors for carbon brush wear.					*	
Check motor commutators.					*	
Check steering chain tensioner.					*	
Replace Filter						*

Batteries



1. Cover Retainer Latch
2. Rear Cover
3. Battery Connector-Machine
4. Batteries
5. Battery Tray
6. Batteries - Lithium Option

Maintenance

Batteries (Wet Cell)

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.

⚠ 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.

⚠ AVERTISSEMENT:

L'entretien n'est pas nécessaire pour toutes les batteries. Les batteries AGM ne nécessitent pas d'entretien. N'essayez pas d'enlever les bouchons scellés des batteries AGM. La garantie est annulée si les bouchons sont retirés des batteries AGM.

⚠ CAUTION:

When servicing machine, avoid contact with battery acid.

⚠ ATTENTION:

Lors de l'entretien de la machine, évitez tout contact avec l'acide de batterie.

⚠ WARNING:

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

⚠ AVERTISSEMENT:

Les batteries émettent du gaz hydrogène. Une explosion ou un incendie peut en résulter. Maintenez les étincelles et les flammes nues à l'écart. Gardez les carters ouverts lors du chargement.

⚠ WARNING:

Wear eye protection and protective clothing when working with batteries.

⚠ AVERTISSEMENT:

Portez des lunettes de protection et des vêtements de protection lorsque vous travaillez avec des batteries.

⚠ WARNING:

Charge batteries in a well ventilated area.

⚠ AVERTISSEMENT:

Chargez les batteries dans un endroit bien ventilé

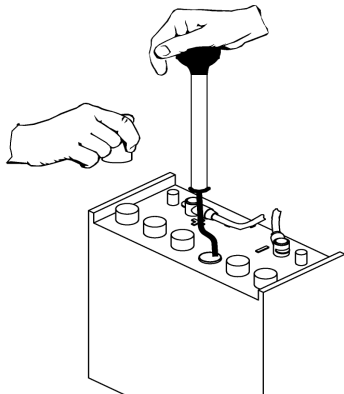
Battery Maintenance

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 the batteries from the machine and clean the battery cases and battery compartment.

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.

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.

⚠ ATTENTION:

Lors de l'entretien de la machine, évitez tout contact avec l'acide de batterie.

⚠ WARNING:

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

⚠ AVERTISSEMENT:

Les batteries émettent du gaz hydrogène. Une explosion ou un incendie peut en résulter. Maintenez les étincelles et les flammes nues à l'écart. Gardez les carters ouverts lors du chargement.

⚠ WARNING:

Wear eye protection and protective clothing when working with batteries.

⚠ AVERTISSEMENT:

Portez des lunettes de protection et des vêtements de protection lorsque vous travaillez avec des batteries.

⚠ WARNING:

Charge batteries in a well ventilated area.

⚠ AVERTISSEMENT:

Chargez les batteries dans un endroit bien ventilé

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

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

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

3. Remove rear cover, unplug batteries from machine.

⚠ WARNING:

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

⚠ AVERTISSEMENT:

Les batteries émettent du gaz hydrogène. Une explosion ou un incendie peut en résulter. Maintenez les étincelles et les flammes nues à l'écart. Gardez les carters ouverts lors du chargement.

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

Maintenance

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

1. 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.

2. Open the console cover.
3. Tilt the rear cover back. The rear cover can also be removed for better access.
4. If equipped with optional on board charger, tilt charger mount to rear of machine.
5. Disconnect battery pack from machine.
6. Use the proper size open end wrench to disconnect main ground wire first and secure cable terminal away from batteries.

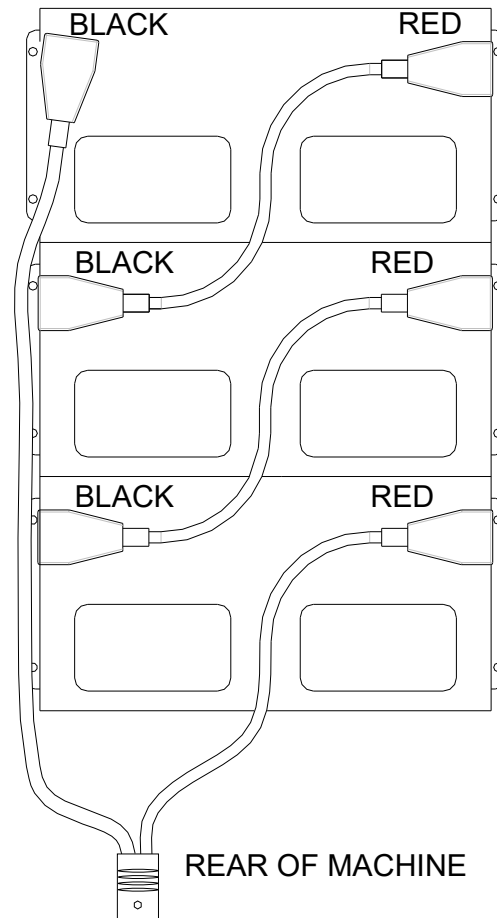
7. Disconnect main positive lead and secure cable terminals away from batteries.
8. Loosen both terminals on each jumper cable and remove one at a time.
9. Prepare a suitable site to place the batteries.

⚠ 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.

⚠ AVERTISSEMENT:

Fixez le dispositif de levage de batterie approprié et levez les batteries de la machine. Les batteries constituent un danger potentiel pour l'environnement. Consultez le fournisseur de votre batterie pour connaître les méthodes d'élimination sûres.

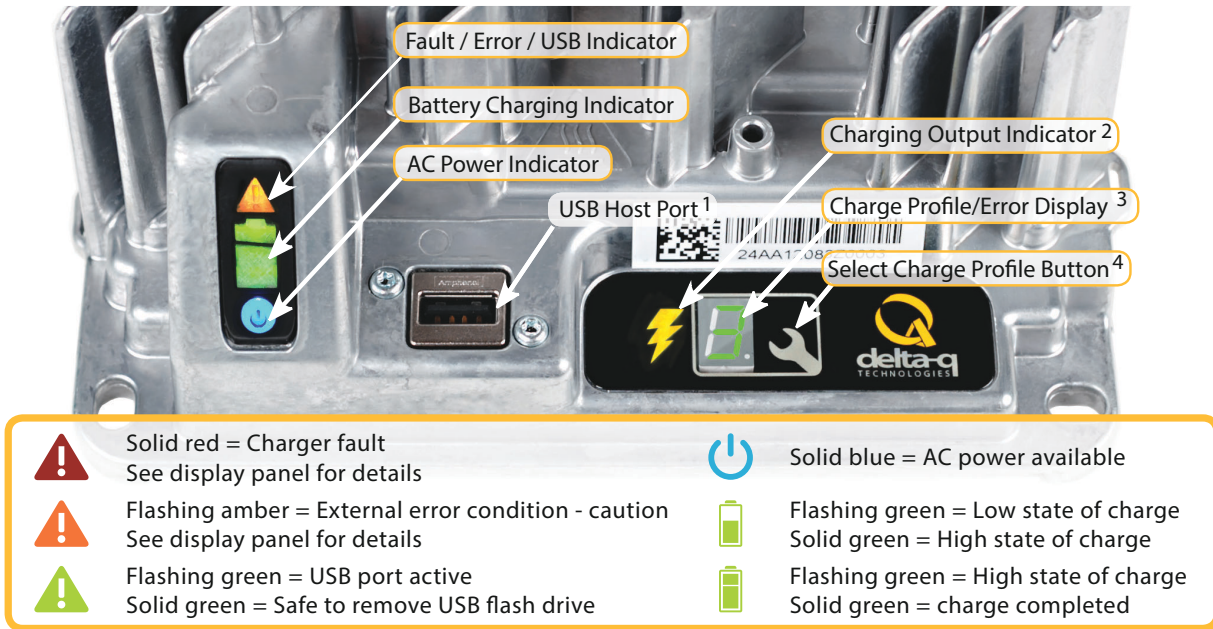


Delta Q IC650 Charger Maintenance Instructions

1. Do not expose charger to oil, dirt, mud or direct heavy water spray when cleaning the vehicle or machine.
2. The enclosure of the charger meets IP66, making it dust-tight and protected against powerful water jets. The AC inlet connection itself, when mated, is rated to IP20, which is not protected against water. Protect the AC connection if used in wet or dusty environments.
3. If the detachable input power supply cord set is damaged, replace with a cord that is appropriate for your region:
 - North America: UL or CSA listed / approved detachable cord at least 1.8m in length (≥ 6 feet), 3 conductor, 16AWG minimum and rated SJT; terminated in a grounding type IEC 60320 C14 plug rated 250V, 13A minimum.
 - All other regions: Safety approved detachable cord, 3 conductor, 1.5mm² minimum, rated appropriately for industrial use. The cord set must be terminated on one end with a grounding type input connector appropriate for use in the country of destination and, on the other end, an output grounding type IEC 60320 C14 plug.

Delta Q IC650 Charger Operating Instructions

- The charger may become hot during charging. Use hand protection to safely handle the charger during charging.
- Extension cords must be a 3-wire cord no longer than 30m (100') at 10 AWG or 7.5m (25') at 16 AWG, per UL guidelines.



1. The USB Host Port allows data to be transferred to and from the charger using a standard USB flash drive, including the downloading of charge tracking data and updating of the charger's software and / or charge profiles.
2. The Charging Output Indicator means that the charger output is active, and there is a potential risk of electric shock.
3. The Charge Profile / Error Display shows one of four possible codes to indicate different conditions:
 - 'F' codes meaning that an internal fault condition has caused charging to stop.
 - 'E' codes meaning that an external error condition has caused charging to stop.
 - 'P' code meaning that the charger programming mode is active.
 - 'USB' code meaning that the USB interface is active, and the USB flash drive should not be removed.

The 'E,' 'F' and 'P' codes will appear, then are followed by three numbers and a period to indicate different conditions (e.g. E-0-0-4). "See the Charger Fault Codes" or "Charger Error Codes" sections for details on these conditions and their solutions.

4. The Select Charge Profile Button is used to select a charge profile from those stored on the charger. Up to 25 charge profiles can be stored. See the "Selecting A Charge Profile" section for instructions.

Maintenance

Configuring the IC650 Charger Using a USB Flash Drive

Using the Delta Q software, USB storage drives can be pre-programmed to certain charger configuration.

To use the USB port, follow these steps:

1. Insert the USB flash drive at any time, except during a charge cycle. Stop the charge cycle by removing AC power or the DC connection to the batteries. The charger will power the USB port from the remaining AC connection.
2. If there is enough disk space, the charger will write charge tracking data to the drive. The Fault/Error/USB Indicator will flash green during reading and writing.
3. If the drive contains compatible configuration files, the charger will load them.
4. The IC650 Charger will briefly reset.
5. Remove the drive when the Fault/Error/USB Indicator is solid green.



Figure 4, Insert the USB flash drive to begin the reprogramming process. When complete, the Fault/Error/USB Indicator will be solid green as shown.

Troubleshooting

If the alarm indicator flashes amber, note the error code and retry the update. If there is no response to inserting the USB drive when the charger is being used off-board, check that AC power is available and connected. If the charger is installed on-board, ensure that the charger either has AC power and / or batteries are connected.

Confirming a Software Update

After using a USB flash drive to update the charger firmware, the update can be confirmed by reviewing the .txt file written to the flash drive by the charger. It will be located in the folder labelled 'syslog' (e.g. F:\CHARGER\RESP\serialno\syslog\00000000.txt).

Open this file using a text editing program such as Notepad or Microsoft Word. If the update has been successful, near the end of the text you will see a description resembling "SM Task: Successful upgrade at Major[001].Minor[991].Build[000]variant[008]."

Charge Tracking Data

All IC650 Chargers record data such as amp hours returned, charge cycle completion or interruption, and the charge profile being used. This data can be very useful in vehicle or machine diagnostics.

To retrieve this data, follow these steps:

1. After a charge cycle is complete, or the charger is disconnected from the battery pack, insert a USB flash drive with at least 2MB of free space into the IC650 Charger's USB hose port. The charger will automatically begin to download the data, shown on the Fault/Error/USB Indicator with a flashing green light.

If you plan to download data from a large number of chargers, having more free space on your USB flash drive is recommended. If you want to update the software on only some of your chargers, it is recommended that you use separate USB flash drives for updating and downloading charge tracking data.



Figure 5, Insert the USB flash drive to begin the charge data download process. This step can be completed using the same USB flash drive programmed to update the charger's software. The process is complete when the USB indicator is solid green, and no longer flashing.

2. The downloading process is complete when the Fault/Error/USB Indicator is solid green. The USB flash drive can be removed from the charger.

Maintenance

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

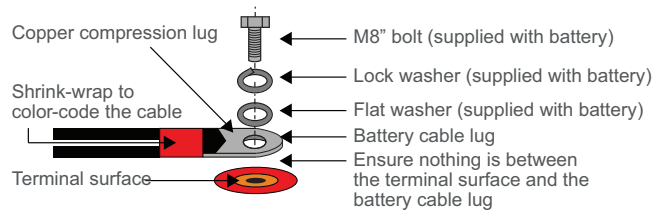
- Insulated tools sized to match nuts, bolts and cables in use
- Voltmeter
- Post cleaner and wire brush
- Personal protective equipment

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	
High Temperature	Stop discharge or charge Leave the battery to cool
Low Temperature	Stop discharge or charge
High Voltage	If charging, stop charge
Low Voltage	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
Over Current	Reduce current
Low SOC	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:

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

Symptom	Was the battery left on or stored for extended periods of time?
Description	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.
Action	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:

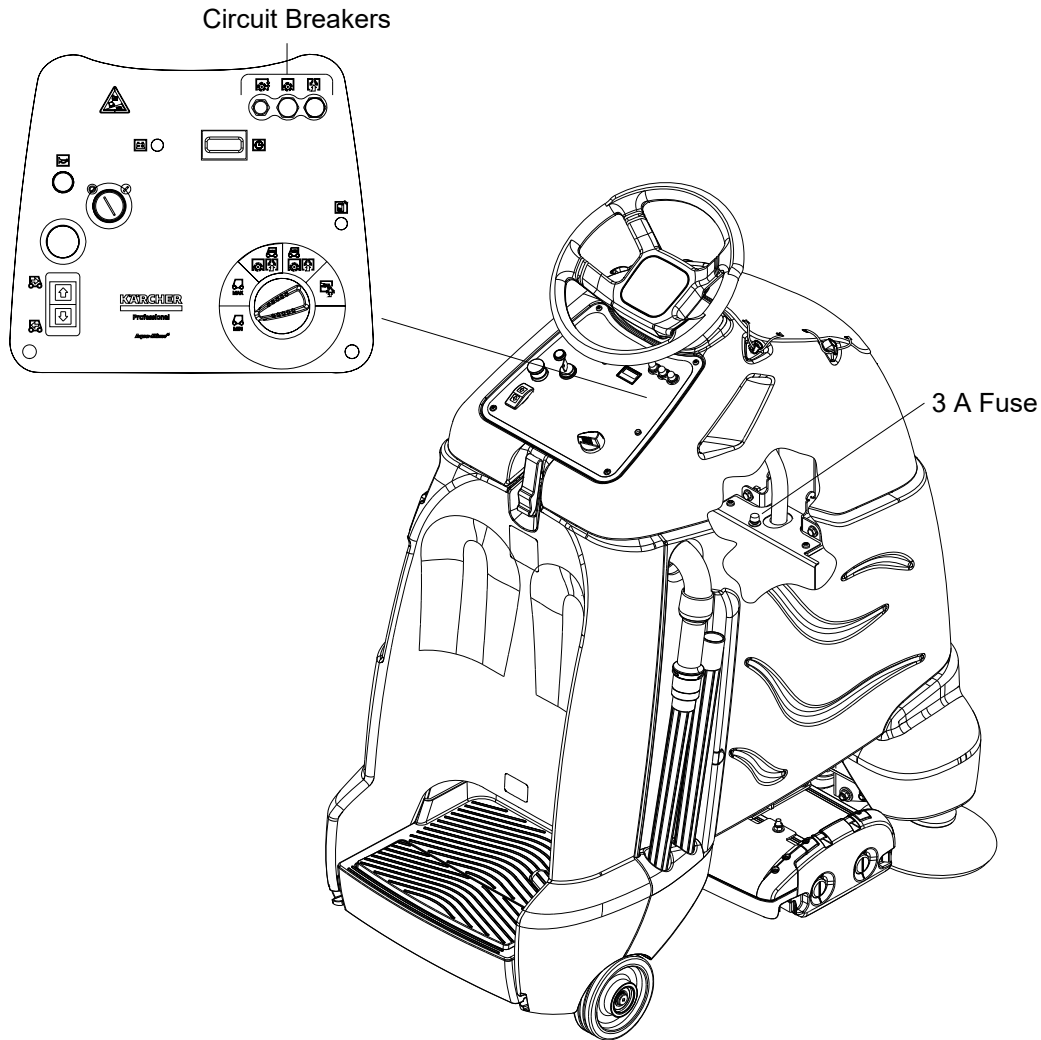
Attach suitable battery lifting device and lift battery from the machine. Batteries are a potential environmental hazard. Consult your battery supplier for safe disposal methods.

Recycling and Disposal

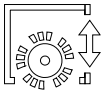
Batteries must not be mixed with domestic or industrial waste. Discover's Advanced Energy Systems are recyclable and must be processed through a recognized recycling agency or dealer. Please contact Discover® or your servicing dealer for details.



Circuit Protection



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.



1.5 Amp. Protects the deck actuator.



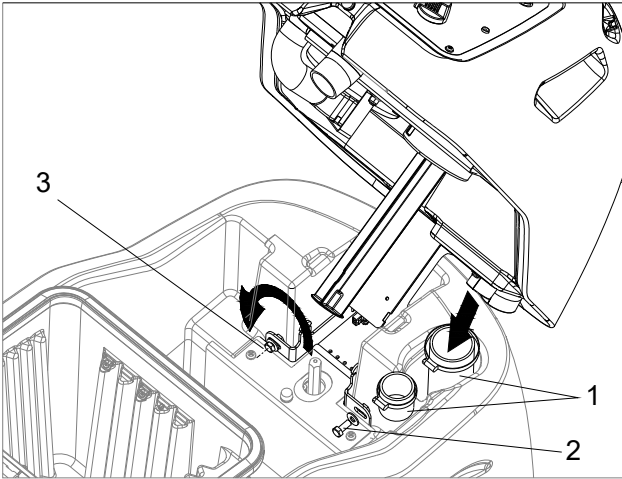
18 Amp. Protects the brush motor, 3 Amp fuse protects the side broom motor.



18 Amp. Protects the vacuum motor.

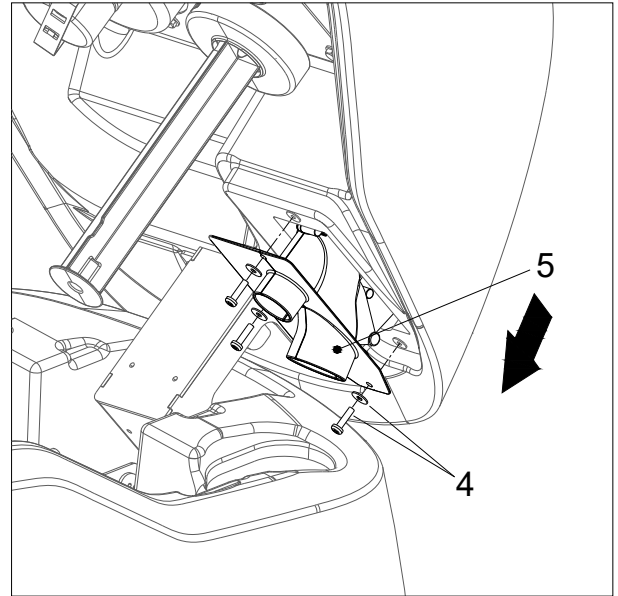
Vacuum Diverter Valve Maintenance

For maintenance and removal of the vacuum diverter valve follow the steps below.

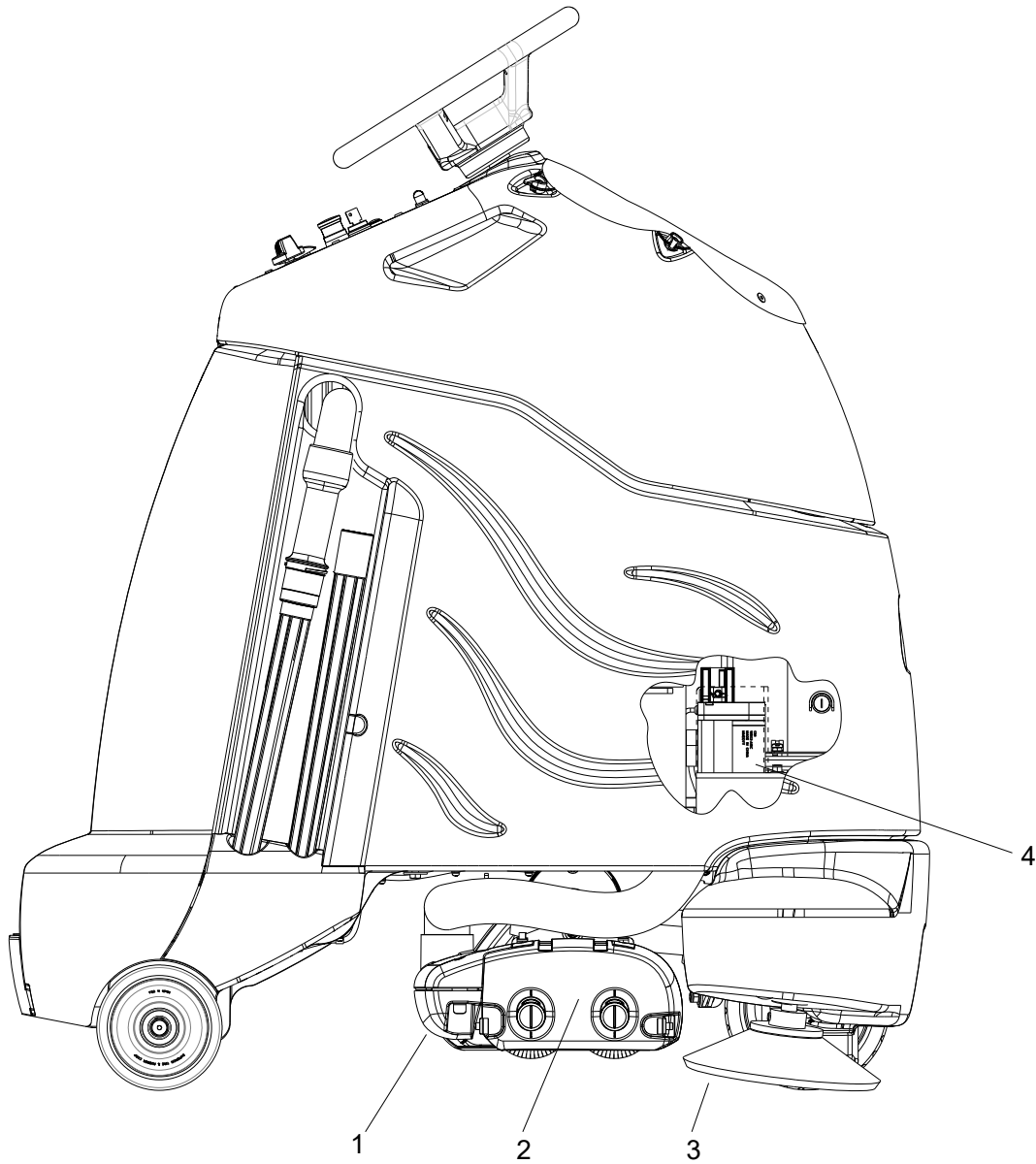


1. Remove hoses from diverter valve.
2. Remove screw and washer (1) on right side of hinge bracket.
3. Loosen screw on left side to allow tank to rotate to the left (do not remove screw). This will allow better access for valve removal.

NOTE: Remove the post filter for easier access.



4. Remove the three (3) screws and washers retaining the diverter valve assembly to the console.
5. Gently pull valve assembly from console to avoid damaging valve.
6. Reverse steps to re-install.



Brush Deck

1. Debris Tray
2. Brush Deck Door
3. Side Broom
4. Deck Lift Actuator

Brush Deck

The dual cylindrical head is designed to agitate the carpet while vacuuming. The first brush pushes debris backwards. The second brush, brushing forward picks up debris and throws it into the debris tray.

NOTE: The brushes should wear evenly side to side. Brushes should be replaced as a set when bristle length wears to height of yellow PerformAlert™ bristles.

Brush Removal

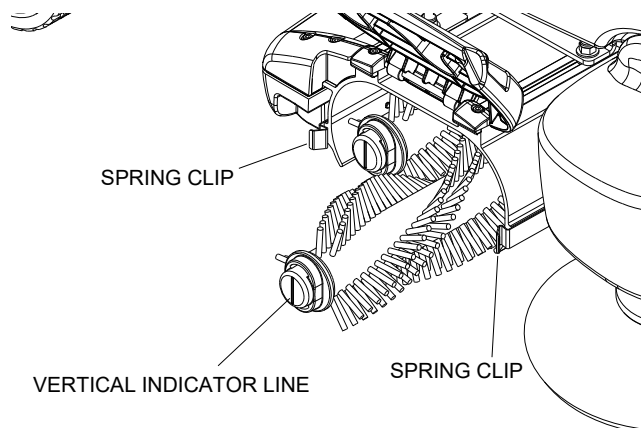
The brushes are removed from the right side of the machine.

1. Release door spring clips and raise the brush door.
2. Slide the brushes out the side opening. Remove bearing cap. Clean bearings and cap.



Brush Installation

1. Slide brush through door opening and onto drive shaft. Make sure it is fully seated and is driven by the deck system.
2. Rotate the brush end caps until the indicator lines on the ends are vertical.
3. Lower the brush door and secure with spring clips.

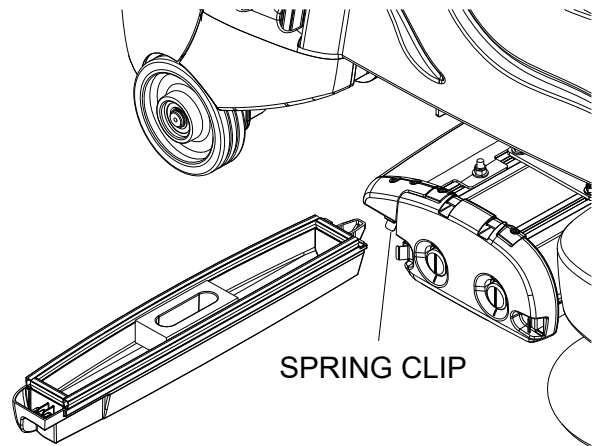


Debris Tray Removal

1. Release the debris tray spring clip.
2. Slide the debris tray away from machine.

Debris Tray Installation

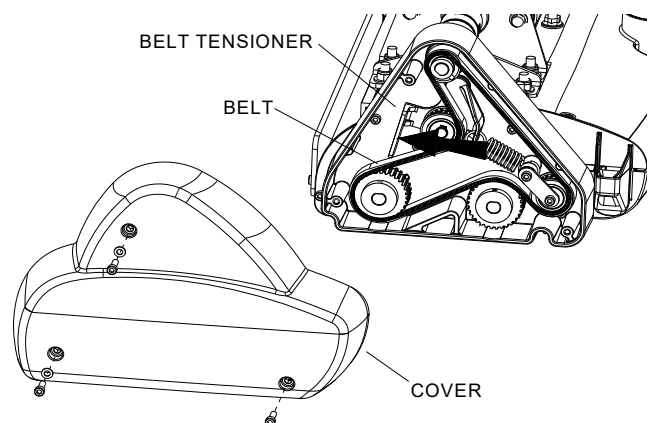
1. Slide the debris tray into the debris tray mount notch.
2. Secure with debris tray spring clip.



Belt Replacement

1. Remove three (3) cover screw and cover.
2. Push belt tensioner to the left as shown to release belt tension. Remove belt and discard.
3. Thread new belt through pulley's and tensioner.
4. Re-install cover.

NOTE: Belt must be installed with lettering facing out. If installed incorrectly this may cause excessive noise



⚠ CAUTION:

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

⚠ ATTENTION:

N'utilisez pas de nettoyeur haute pression pour nettoyer autour des moteurs des brosses. Utilisez seulement la pression du robinet.

Remove Brush Deck

1. Lower brush deck.
2. Turn off machine
3. Disconnect motor harness connectors and remove vacuum hose from top of deck.
4. Remove bumper bolts and bumper to access linkage mount brackets.
5. Pull down and disconnect spring mount bracket from deck lift arm. Keep spring attached to mount bracket.
6. Remove four (4) bolts and associated hardware that connect deck lift arm to linkage mount brackets on drive assembly.
7. Remove two (2) bolts and associated hardware that connect deck lift arm to lift linkage plate.
8. Pull out deck with attached deck lift arm.
9. Reverse to reassemble.

Replace Brush Deck Motor

1. Remove brush deck from machine.
2. Remove two (2) nuts to free rear mounting bracket from deck.
3. Remove six (6) motor mount bracket face screws.
4. Remove rear mounting bracket.
5. Remove motor with attached coupler, leaving front motor mounting bracket still attached to deck.
6. Remove coupler from old motor for reuse.
7. Inspect spider coupler for wear replace as needed.

Reverse process to reassemble with new motor.

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.

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

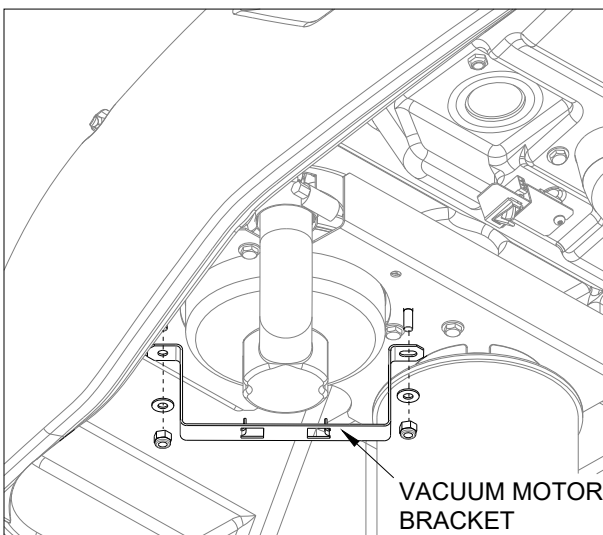
Replacing Coupler Spider

1. Remove three (3) cover screws and drive housing cover from end of brush deck.
2. Remove four (4) drive housing mounting screws
3. Slide out brush drive housing assembly with attached coupler from end of brush deck extrusion.
4. Replace coupler spider.
5. Reverse to assemble.

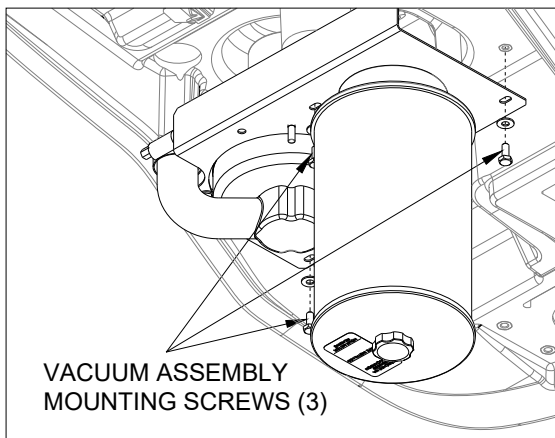
NOTE: Align coupler jaws when sliding in brush drive housing assembly.

To Repair or Replace Vacuum Motor

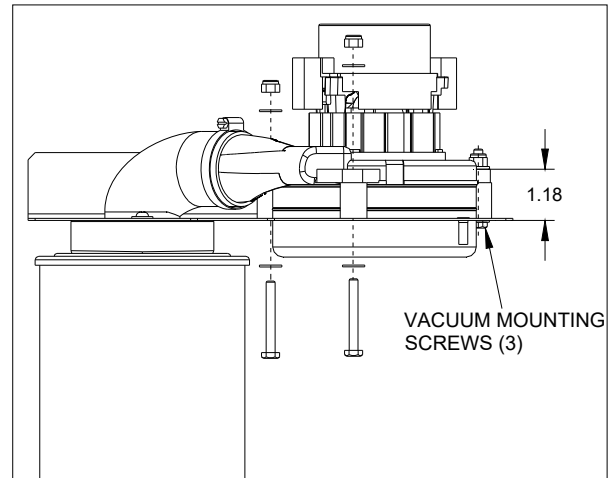
1. Remove four (4) screws from top of control panel.
2. Tip control panel back from console to expose vacuum motor wires.
3. Disconnect electrical connector from the vacuum motor.
4. Replace one screw to secure control panel to console.
5. Open console.
6. Remove the two (2) nuts from vac motor bracket, as shown below.



7. Remove three (3) screws that secure vacuum motor assembly in place. Remove vacuum motor assembly, as shown below.



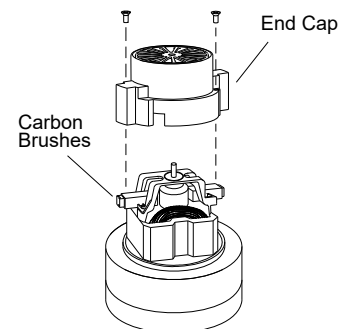
8. Remove three (3) screws that secure vacuum motor. Replace motor.



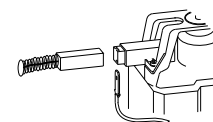
9. Reverse steps to install.

NOTE: If vacuum motor is not mounted as shown, vacuum may not seal properly, resulting in poor performance.

Vacuum Motor Carbon Brushes

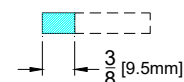


If armature commutator is grooved, extremely pitted or not concentric, the motor will need to be replaced or sent to a qualified service center.



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

Drive Motor Carbon Brush Replacement

⚠ CAUTION:

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

⚠ ATTENTION:

N'utilisez pas de nettoyeur haute pression pour nettoyer autour des moteurs des brosses. Utilisez seulement la pression du robinet.

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

1. Open the console cover.
2. Tilt the rear panel back until it stops on the lanyard.
3. Grasp the lower end of the flexible steering shaft and pull it straight up until it is disengaged with the hex steering shaft.
4. Remove the cover and gasket at the steering shaft area.
5. Grasp the drive wheel by reaching under the front bumper and turn it to near the left steering stop.
6. The drive motor carbon brushes are located under the metal band. Remove the band to access the 4 brushes.
7. Remove the phillips screw that holds each lead. Remove the brushes.
8. Install the new brushes and reinstall the band.
9. Replace the gasket and cover, set the drive wheel straight ahead, set the steering wheel straight ahead, and gently align the steering shaft coupling and slide onto the lower shaft.
10. Slowly close the cover and make sure the shaft slides without binding.

Drive Chain Tension

The drive chain should deflect about 1/4 inch on either side of the loop when the opposite side is tight.

To adjust chain tension:

1. Remove bumper.
2. Loosen the 1/4" nut behind the idler sprocket.
3. Tighten the front screw to increase chain tension.
4. re-tighten the 1/4" nut behind the idler.
5. Reinstall the bumper.

Transporting Machine

This machine is equipped with a drive gear engagement/disengagement lever.

The brake automatically engages and keeps the machine from moving whenever the operator stops the machine.

The drive gear can be disengaged so the machine can be pushed or towed (slowly).

When the drive gear is disengaged the machine cannot be driven.

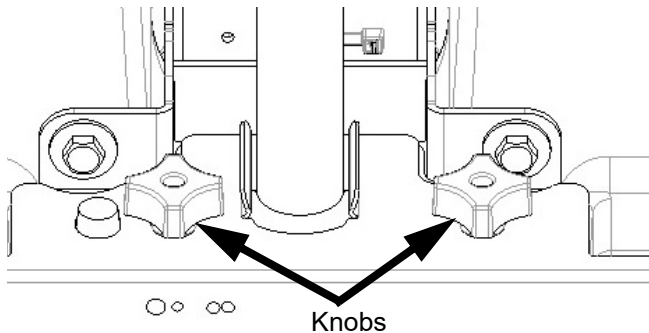
Lever access

Turn wheel to the right and remove internal cover plate.

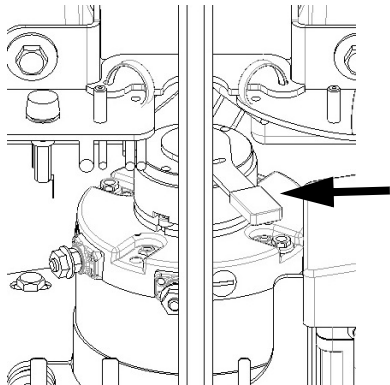
Brake Override

1. Disconnect battery to prevent injury.
2. Turn wheel slightly to the right.
3. Remove the knobs that hold the access panel in place. Then remove the access panel.

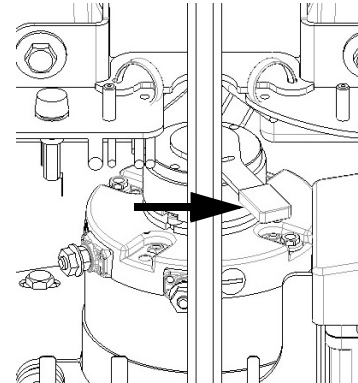
NOTE: The access panel is located near the batteries.)



4. Push the lever as indicated to disengage the brake.



5. Push the machine slowly. Take care as voltage is generated while pushing the machine and may cause the controller to temporarily stop the machine.



6. To re-engage the brake, push the lever as indicated.
7. Reinstall the access panel and reconnect the batteries.

Inclines

When navigating an incline the machine may come to a stop. Turn the machine off. Wait 5 minutes and start the machine and proceed up the incline.

⚠ CAUTION:

Overheating may occur if you do not wait the full 5 minutes.

⚠ ATTENTION:

Une surchauffe peut se produire si vous n'attendez pas les 5 minutes complètes.

Maintenance

Preparation for Loading/Unloading Trailer

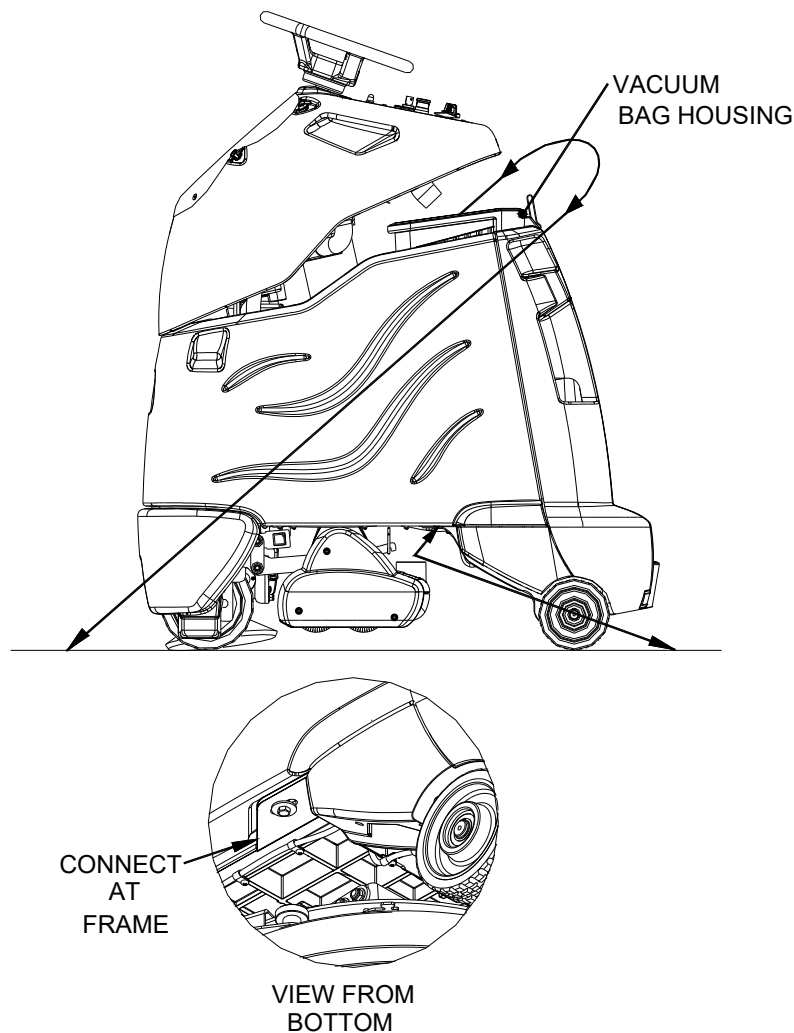
Before loading or unloading machine from trailer, brush deck must be in the up position.

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

Machine Tie-Downs

There are two tie points located in front of the rear wheels on the frame, and a Tie-down wrap point on the vacuum bag housing. 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.

Recommended Tie-Down Points



Troubleshooting

PROBLEM	CAUSE	SOLUTION
No machine function	Console lid is open	Close console lid
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
	Batteries not plugged in	Plug batteries in
	On Board charger plugged in	Un-plug and stow cord
Little or no propel	Low battery charge	Charge batteries
	Tripped circuit breaker	Reset controller circuit breaker
	Machine turned on with pedal not in neutral position	Allow pedal to return to neutral. Restart
	Controller protecting motor from overload	Controller limits motor amperage. Allow unit to cool down for several minutes.
	Machine is stalled against an obstacle (threshold, curb, etc.)	Remove obstacle or push machine away from obstacle
	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, connection 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
	Drive Lever disengaged	Engage drive
Machine does not change speeds	Faulty speed control circuit or switch	Check wires & connections
Forward speed only	Faulty forward/reverse circuit	Check wires & connections
Reverse speed only		
Battery indicator light flashing	Battery needs charged	Charge Battery
	Controller is indicating a fault code	See fault code table

Maintenance

Troubleshooting

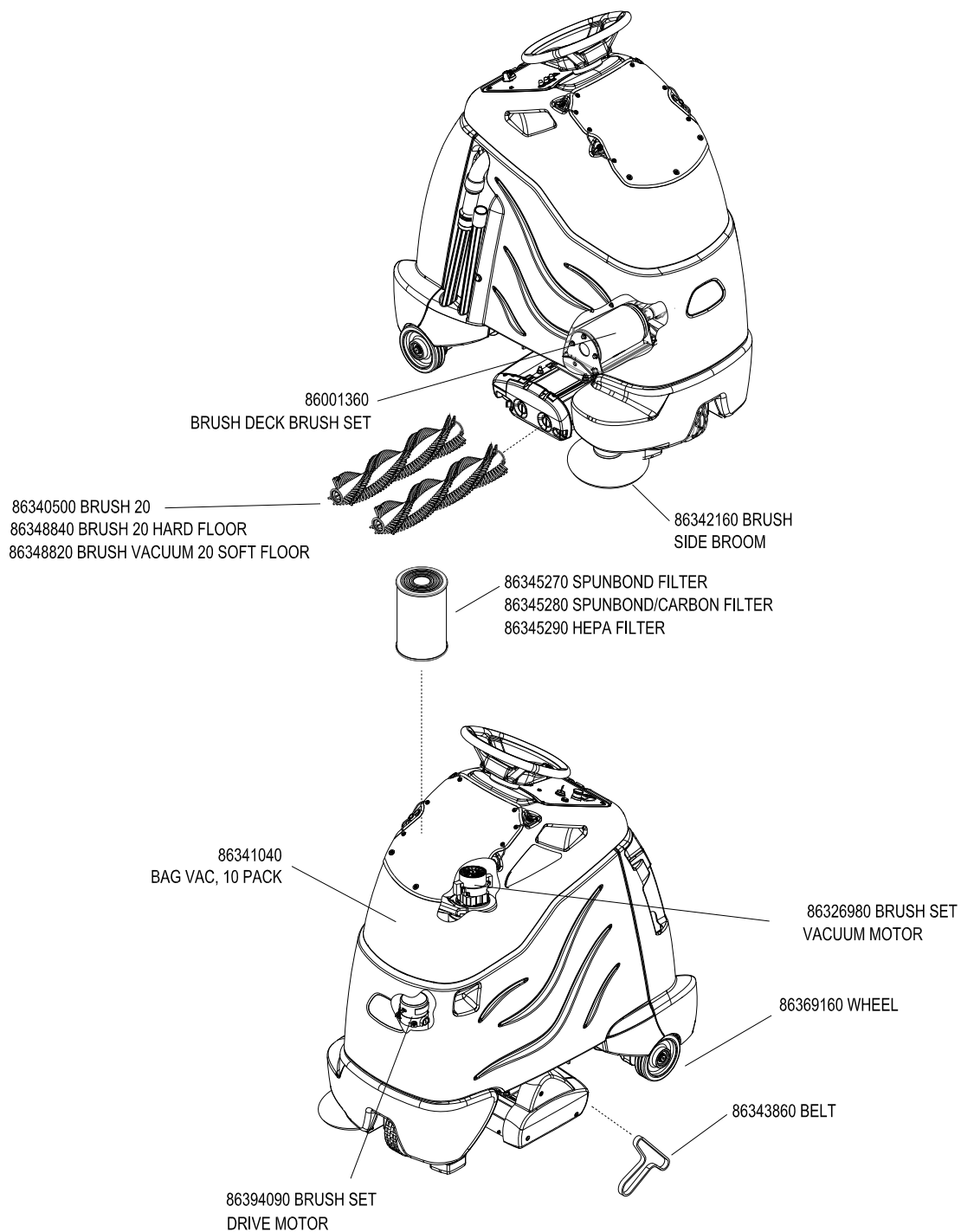
PROBLEM	CAUSE	SOLUTION
Vacuum motor does not run, or runs slowly	Faulty vacuum circuit or switch	Check wires & connections
	Worn vacuum motor brushes	Replace brushes, check commutator
	Vacuum circuit breaker tripped	Reset circuit breaker
Vacuum and brush do not turn on	Circuit breaker tripped	Reset
	Full bag or clog in system (bag full light on)	Replace bag, empty debris tray, check for and remove clogs
Poor vacuum performance	Debris caught in system	Remove debris
	Low battery charge	Charge batteries
	Lid is not closed correctly	Close and latch lid correctly
	Faulty gaskets	inspect and replace gaskets
	Accessory hose is not sealed shut.	assure hose is tight in hose holder
	Bag or debris tray are full	Empty tray, replace bag
	Vacuum diverter valve not actuating	Check for debris
		Check electrical connections
	Check timer circuit board	
Brush motors do not run, or runs slowly	Circuit breaker tripped	Reset circuit breaker
	Low battery charge	Charge battery
	Faulty brush circuit or motor	Check wires, connections and motor
	Bag full light on	Replace bag, empty debris tray or remove clog.
	Worn brush motor brushes	Replace brushes, check commutator
Deck won't go down	Actuator circuit breaker tripped	Reset actuator circuit breaker
Side broom not running	Fuse is blown	Clear foreign objects from broom that inhibit free motion, replace fuse.
Brush door won't close	Cylindrical brushes not installed correctly.	Align brushes to drive shaft assemblies, close door.

Battery Discharge Indicator Troubleshooting

The battery indicator flashes when a problem occurs. The table below list solutions for the indicated problems.

Number of flashes	Problem	Solution
1	The battery needs charging, there is a bad connection to the battery or dependent on the programming, may indicate that the battery lockout function is active and the controller is in a restricted mode of operation. Check the connections to the battery.	If the connections are good, try charging the battery.
2	There is a bad connection to the drive motor.	Check all connections between the motor and the controller.
3	The drive motor has a short circuit to a battery connection.	Contact your service agent.
4	The battery charge level has fallen below the battery Lockout Level and the controller is inhibiting brush and vacuum functions	Charge the battery.
5	Not used.	-
6	The controller is being inhibited from driving, this may be because the battery charger is connected (on board charger only).	Disconnect battery charger.
7	A throttle fault is indicated.	Make sure that the throttle is in the rest position before switching on the machine.
8	A controller fault is indicated.	Make sure that all connections are secure.
9	The parking brake has a bad connection.	Check the parking brake and motor connections. Make sure the controller connections are secure.
10	An excessive voltage has been applied to the controller. This is usually caused by a poor battery connection.	Check the battery connections.
-	Blinks once every 5 seconds	Sleep mode, cycle key switch

Suggested Spare Parts





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