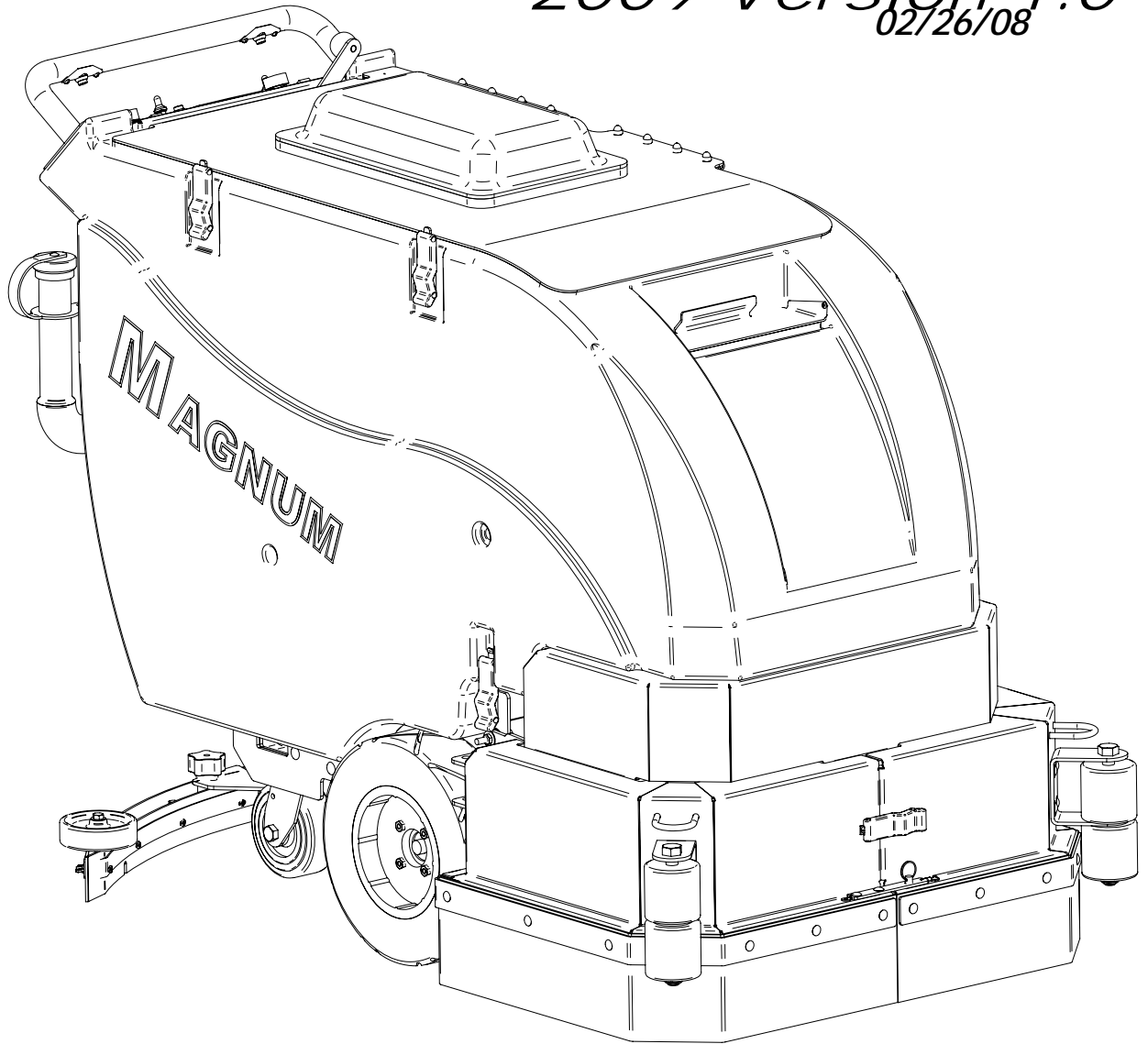


MAGNUM SERIES

MAGNUM

Operator Manual

2009 Version 4.1.0
02/26/08



R.P.S. Corporation
P.O. Box 241
Racine, Wisconsin 53401

Phone: 1-800-450-9824
Fax: 1-866-632-6961

HOW TO USE THIS MANUAL

This manual contains the following sections:

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

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

Parts may be ordered from authorized dealers. When placing an order for parts, the machine model and serial number are important.

Refer to ***MACHINE INFORMATION*** on page one of this manual, which is filled out during the installation of your machine.

The serial number of your machine is located on the lower half of the control panel of the machine. **(See Picture Below)**

The ***SAFETY*** section contains important information regarding hazard or unsafe practices of the machine.

Levels of hazards are identified that could result in product or personal injury, or severe injury resulting in death.

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

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

- Batteries
- Scrub Brushes
- Adjusting Squeegee
- Service Schedule
- Machine Trouble Shooting

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

- **ITEM** - Column refers to the reference number on the parts illustration.
- **PART NO.** - Column lists the part number for the part.
- **QTY** - Column lists the quantity of the part used in that area of the machine.
- **DESCRIPTION** - Column is a brief description of the part.
- **COMMENTS** - Column for information not noted by the other columns.



- Serial Number

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

* As our policy is one of constant improvement, all information and specifications are subject to change without notice. *



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TRADITIONAL DRUMS / TOTES



DEMO / RENTAL QUARTS



WALL-MOUNTED SUPERCON



ONBOARD AUTO DISPENSING



Onboard
Availability

FORMULAS

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Approved



707 Citrus Green

An environmentally cleaner that works! It is a solvent free degreaser that works on oil, carbon, even rubber marks. Incorporates the latest technology in "Green Cleaning".

SUDS
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733 Low pH

Safe on most surfaces not harmed by water alone. Low scale formula to prevent alkali buildup in cleaning equipment, while offer detergent to emulsify oil.

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Approved



755 High Power

Ideal solvent fortified degreaser. This butyl based detergent is penetrating, fast acting, and deep cleaning with built-in corrosion inhibitors. It is our most effective degreaser.

SUDS
Approved



757 Gloss

A high gloss detergent designed to dry to a bright shine. It is ideal for use on finished surfaces, tile, epoxy, or enamel. The special formula removes salt residue, scuff marks and dirt, while leaving no residue behind. The result is a clean, non-slip surface, ready for immediate use.

SUDS
Approved



797 HD

The Heavy Duty concentrate is a Super alkaline detergent, formulated for heavy soil, grease, and thick buildup. Popular in machine shops, auto and truck repair, and other facilities with oil, hydraulic fluids and cutting oils.

***Below Sold in bulk concentrate only. Not available as a SuperCon, PowerDose or SUDS product.*

727 Pretreat**

Designed to quickly remove tire marks, oil stains and buildup that has accumulated. This pretreat uses the powerful cleaning of natural citrus extract and is intended to be used directly on the floor at 100% concentrate.

744 Tough Stuff**

Ideal for applications with Hard Water problems. It is safe to use in pressure washers and automatic scrubbers. The formulation enhances soil suspension, digests oil and grease, while supporting extra water conditioner.

PowerCat
P.O. Box 503
Racine, WI 53404-0503
Phone: 414-745-9337
Fax: 262-632-1630
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MACHINE INFORMATION

Please fill this area out at the time of installation for future reference.

Model Number:_____

Serial Number:_____

Installation Date:_____

Installing Dealer:_____

Dealer Contact: _____

Address:_____

City, State, Zip: _____

Phone Number:_____

This operator and parts manual should be considered a permanent part of the unit and should remain with the unit at all times. This operator and parts manual covers all the Magnum series scrubbers. You may find descriptions and features that are not on your particular model. The information and specifications included in this publication were in effect at the time of printing. R.P.S. Corp. reserves the right to make changes without notice or incurring any obligation.

To register for warranty, fax your warranty registration form today!

FAX # (886)-632-6961

MACHINE DELIVERY FORM

Dealer: _____

Installed By: _____

Location: (City, State) _____

Install Date: _____

Customer Information

Name: _____

Contact: _____

Address: _____

City/State: _____ Zip _____

Phone Number : _____

Fax Number: _____

Model Number: _____ Serial Number: _____ Hour Meter: _____

Squeegee Size: _____ Squeegee Material: Gum Linatex Neoprene (circle one)

Buyer's representative has received instruction in proper operation of the following controls and features:

- ☐ Filling Solution Tank, Solution Tank Sight Tube, Solution Drain Valve
- ☐ Adjusting Controls and "Uni-Touch" operation, Double Scrubbing, Squeegee Delay & Vac Timer
- ☐ Recovery Tank Draining and Cleaning, Vac Screen Removal and Cleaning
- ☐ Shroud and Pad Removal
- ☐ Shroud Adjustment
- ☐ Solution Valve and Filter Operation (removal and cleaning)
- ☐ Drain Saver Feature
- ☐ Charging Operation
- ☐ Seat and Steering Wheel Adjustment
- ☐ LCD Screen Display Operation, 3 Hour Meters (keyswitch, brush, traction drive)
- ☐ Tank Tilt Back Feature
- ☐ Parking Brake Override
- ☐ Checking Battery Electrolyte Level
- ☐ Squeegee Hose Removal and Checking For Clogs
- ☐ Battery Guide Poster Hung Up & Reviewed
- ☐ Maintenance Guide Poster Hung Up & Reviewed

In addition to the items listed above the buyers representative has received the operator's manual and been advised to read the manual before operating the machine.

Installed By (print) _____ Signature _____

Buyer's Representative (print) _____ Signature _____

BUYER AGREES TO PAY FOR ANY REPAIRS, ADJUSTMENTS, OR SECONDARY TRAINING THAT MANUFACTURER DETERMINES IS EXCLUDED FROM THE WARRANTY

COMPLETE AND FAX FORM to 866-632-6961

MACHINE SPECIFICATIONS

SPECS

BODY CONSTRUCTION

Tank Construction:
Frame Construction:
Drive Wheel:
Casters:
Body Dimensions (L x W x H):
Width (squeegee):
Weight (w/out batteries):
Weight (w/ standard batteries):

BRUSH/PAD SYSTEM

Brush/Pad Diameter:

Motor Power (standard):
Motor Power (HD Option):
Brush Speed:
Brush Pressure:
Brush Pressure Settings:

BATTERY SYSTEM

Battery AH Rating (Standard):
Battery AH Rating (Optional):
Battery Run Time:
Charger (110v / 60 Hz / auto):

SOLUTION SYSTEM

Solution Tank Capacity:
Solution Flow Rate:

RECOVERY SYSTEM

Recovery Tank Capacity:
Vacuum Horsepower:
Vacuum (Water Lift / Cubic ft/min):

DRIVE SYSTEM

Transaxle Description:
Speed Control:

PRODUCTIVITY

Cleaning Width & Rate/Hour:

Disk

(7/16") Roto-Poly
3/16" Steel
(2) 12" diameter x 3-1/2"
(2) 5" diameter x 2"
56" x 24" x 43"
35", 38" or 45"
489 pounds
967 pounds

26D - (2) 13 inches
30D - (2) 15 inches
34D - (2) 17 inches

(2) 0.75 hp / 270 rpm
(2) 1.0 hp / 270 rpm
270 rpm
0-250 pounds
(1-5) automatic

210 AH
Up to 325 amp hour
Up to 5 hours
24-v / 25-amp

30-gallons
0 - 0.75 gal/min.

30-gallons
0.8 hp / 3-stage
68" / 72 cfm

0.75 hp, gear / sealed
0 – 230 ft/min

26" / 26,000 sq.feet / hour
30" / 30,000 sq.feet / hour
34" / 34,000 sq.feet / hour

Cylindrical

(7/16") Roto-Poly
3/16" Steel
(2) 12" diameter x 3-1/2"
(2) 5" diameter x 2"
56" x 24" x 43"
35", 38" or 45"
494 pounds
974 pounds

24C - (2) 22" x 5.5"
27C - (2) 25" x 5.5"
*30C - (2) 28" x 5.5"
*34C - (2) 32" x 5.5"
(2) 0.75 hp / 350 rpm (24" & 27")
(2) 1.0 hp / 350 rpm (30" & 34")
750 rpm
0-250 pounds
(1-5) automatic

210 AH
Up to 325 amp hour
Up to 5 hours
24-v / 25-amp

30-gallons
0 - 0.75 gal/min.

30-gallons
0.8 hp / 3-stage
68" / 72 cfm

0.75 hp, gear / sealed
0 – 230 ft/min

24" / 24,000 sq.feet / hour
27" / 27,000 sq.feet / hour
30" / 30,000 sq.feet / hour
34" / 34,000 sq.feet / hour

* HD STANDARD

R.P.S. Corporation

P.O. Box 368

Racine, WI 53401

Phone: (800) 634-4060

Fax: (866) 901-3335

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Since our policy is one of constant improvement, all
specifications are subject to change without notice.

COMMON WEAR PARTS

BRUSHES	MODEL 26"-DISK	MODEL 30"-DISK	MODEL 34"-DISK
SUPER-GRIT	13-421SS	15-421SS	17-421SS
TOUGH-GRIT	13-421S	15-421S	17-421S
MIDI-GRIT	13-421C	15-421C	17-421C
LIGHT-GRIT	13-421PS	15-421PS	17-421PS
POLY (.028)	13-421P	15-421P	17-421P
NYLON (.016)	13-421N	15-421N	17-421N
TAMPICO	13-421T	15-421T	17-421T
PAD DRIVER	13-421D	15-421D	17-421D
DIAMOND DRIVER	13-421DD	15-421DD	17-421DD

NOTE: # In Disk Column Denotes Pad Size: 13,15, 17

PADS	DISK	LEVEL	COLOR
SUPER BLACK	##422BB	VERY HIGH	BLACK
BLACK	##422B	HIGH	BLACK
BROWN	##422BR	HIGH	BROWN
GREEN	##422G	MEDIUM	GREEN
BLUE	##422BL	MODERATE	BLUE
RED	##422R	MODERATE	RED
WHITE	##422W	LIGHT	WHITE

NEW STYLE CYL BRUSHES FOR MACHINE SERIAL #50000 & GREATER

BRUSHES	MODEL 24"-CYL	MODEL 27"-CYL	MODEL 30"-CYL	MODEL 34"-CYL
SUPER-GRIT	N/A	N/A	N/A	N/A
TOUGH-GRIT	225-821S	255-821S	285-821S	325-821S
MIDI-GRIT	225-821C	255-821C	285-821C	325-821C
LIGHT-GRIT	225-821PS	255-821PS	285-821PS	325-821PS
POLY (.028)	N/A	N/A	N/A	N/A
NYLON (.016)	225-821N	255-821N	285-821N	325-821N

OLD STYLE CYL BRUSHES FOR MACHINES PRIOR TO SERIAL #50000

BRUSHES	MODEL 24"-CYL	MODEL 27"-CYL	MODEL 30"-CYL	MODEL 34"-CYL
SUPER-GRIT	N/A	N/A	N/A	N/A
TOUGH-GRIT	22-521S	25-521S	28-521S	32-521S
MIDI-GRIT	22-521C	25-521C	28-521C	32-521C
LIGHT-GRIT	22-521PS	25-521PS	28-521PS	32-521PS
POLY (.028)	N/A	N/A	N/A	N/A
NYLON (.016)	22-521N	25-521N	28-521N	32-521N
TAMPICO	N/A	N/A	N/A	N/A

EXTRA PAD DRIVER RETAINING CLIP: 40-433

BRUSH REPAIR KIT: 40-423 REPLACEMENT LOCATING CLIP FOR ALL DISK BRUSHES.

SQUEEGEE SIZE'S	GUM RUBBER	LINATEX
32" SQUEEGEE "OPTIONAL".	22-770G	22-770L
35" SQUEEGEE "STANDARD" ON 24", 26" & 27" MACHINES.	25-770G	25-770L
38" SQUEEGEE "STANDARD" ON 30" MACHINES.	28-770G	28-770L
45" SQUEEGEE "STANDARD" ON 34" MACHINES.	290-770G	290-770L

NOTE: Squeegee Assemblies (complete) listed below all come with Linatex blades.

SIZE	P/N
32"	23-7180
35"	25-7180
38"	28-7180
45"	290-7180

SOAP

Heavy Duty Degreaser

Citrus

Freezer

Tire Mark Remover

For more soap information call PowerCat 414-745-9337

www.powercatsolutions.com

SQUEEGEE KITS INCLUDE: (1) Rear Blade, (1) Front Blade, and (2) Backup Wheels with hardware.

NOTE: Size is stamped into the top of the painted steel squeegee body on all squeegee's.

NOTE: The squeegee is designed for narrow isles and may not have the same water control around tight turns as the larger squeegees.

SAFETY MESSAGES

Your safety, and the safety of others, is very important, and operating this unit safely is an important responsibility.

To help you make informed decisions about safety, we have provided operating procedures and other safety information in the manual. This information informs you of potential hazards that could hurt you or others.

It is not practical or possible to warn you of all the hazards associated with operating this unit. You must use your own good judgment.

This machine is intended for commercial use. It is designed to be used on hard floors in an indoor environment, with the recommended pads or brushes.

1. DO NOT OPERATE UNIT:

Unless trained and authorized.
Unless operator manual is read and understood.
If unit is not in proper operating condition.

2. WHEN OPERATING UNIT:

Remove loose objects from the floor that may be projected from the revolving brushes.
Keep hands and feet away from revolving brushes.
Do not operate machine where flammable liquids are present.
Use extreme caution when maneuvering.

3. BEFORE LEAVING:

Drain Tanks
Make sure machine is turned off.
Stop on level surfaces.
Disconnect batteries.

4. BEFORE SERVICING:

Stop on level surface, and secure machine.
Disconnect batteries.

!! SAFETY PRECAUTIONS!!

WARNING: Hazardous voltage. Shock, burns or electrocution can result. Always disconnect the batteries before servicing machine.

WARNING: Batteries emit hydrogen gases. Explosion or fire can result. Keep sparks and open flames away.

WARNING: Charge unit in a well ventilated area, and keep battery compartment open when charging. Explosion or fire could result.

WARNING: Battery acid can cause burns. Wear protective eye wear and gloves when servicing batteries.

WARNING: Do not store outdoors or pressure wash. Prevent electronic components from getting wet.

WARNING: The use of parts and solutions other than that recommended by the manufacturer may cause damage or endanger people.

WARNING: Dress safely. Do not wear rings or metal wrist watches while working on this machine. They can cause an electrical short, which, can cause serious burns. Do not work on this machine while wearing a tie, scarf or other loose, dangling neckware or clothing. These loose items can tangle in the rotating parts and cause serious injury or even death.

WARNING: Do not use the machine as a step ladder or chair.

WARNING: Only operate this machine from the operators position. It was not designed to carry passengers.

WARNING: Do not operate this machine on ramps or uneven surfaces. When climbing a ramp, always drive the machine in forward straight up or down the ramp. Never drive across the incline. Do not back down or turn on ramps!

WARNING: Always use the charger provided by the manufacturer to charge the machine. It is an automatic charger, specifically designed to charge at the appropriate rate. If you must use a different charger, disconnect the batteries before charging. This will prevent damage to the electronic speed controller.

WARNING: Understand the dynamic braking system before you operate the machine on ramps. Machine may coast.

WARNING: Do not park the machine on ramps or slopes.

WARNING: Do not operate the machine if any parts have been removed or damaged.

WARNING: Do not remove, paint over, or destroy warning decals. If warning decals become damaged, they must be replaced.

WARNING: Do not operate machine in unsafe condition. If the machine is in need of repair or is in any way unsafe to operate, the matter should be reported immediately to the shift supervisor. Do not operate the machine until it is returned to proper operating condition.

WARNING: This machine must only be operated by trained operator. As part of his or her training, they must read this manual thoroughly. If extra copies are needed, contact your local dealer.

WARNING: Always turn off the machine, before leaving it unattended.

WARNING: Do not operate over electrical floor outlets. May result in serious injury.

MACHINE CONTROLS AND FEATURES

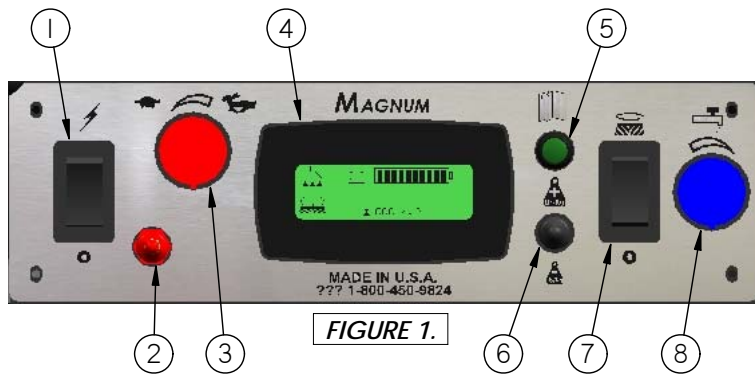


FIGURE 1.

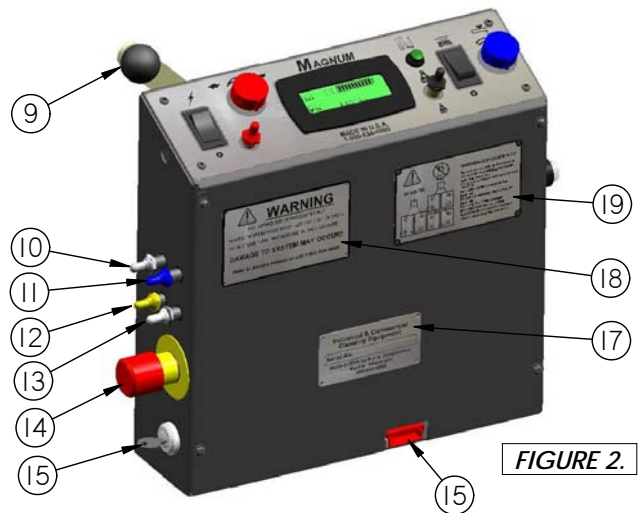


FIGURE 2.

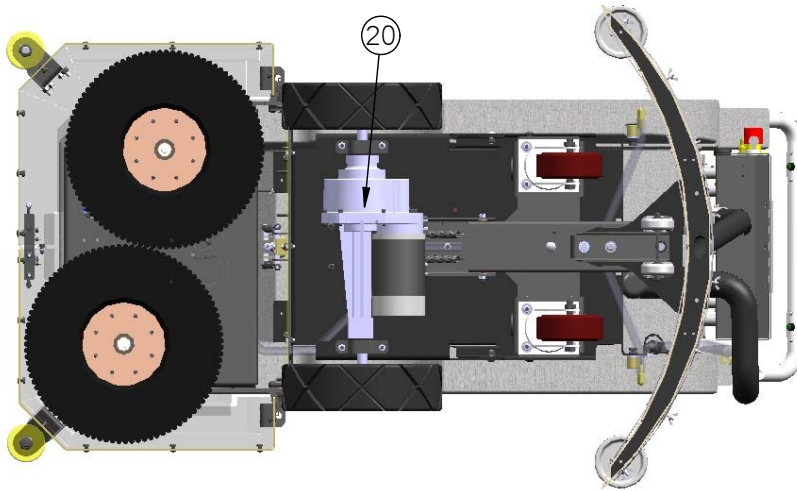


FIGURE 3.

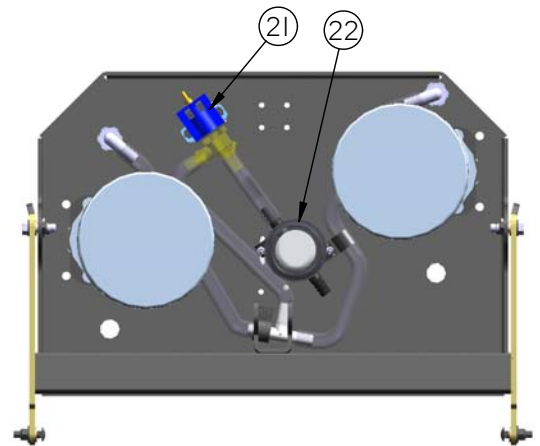


FIGURE 4A.

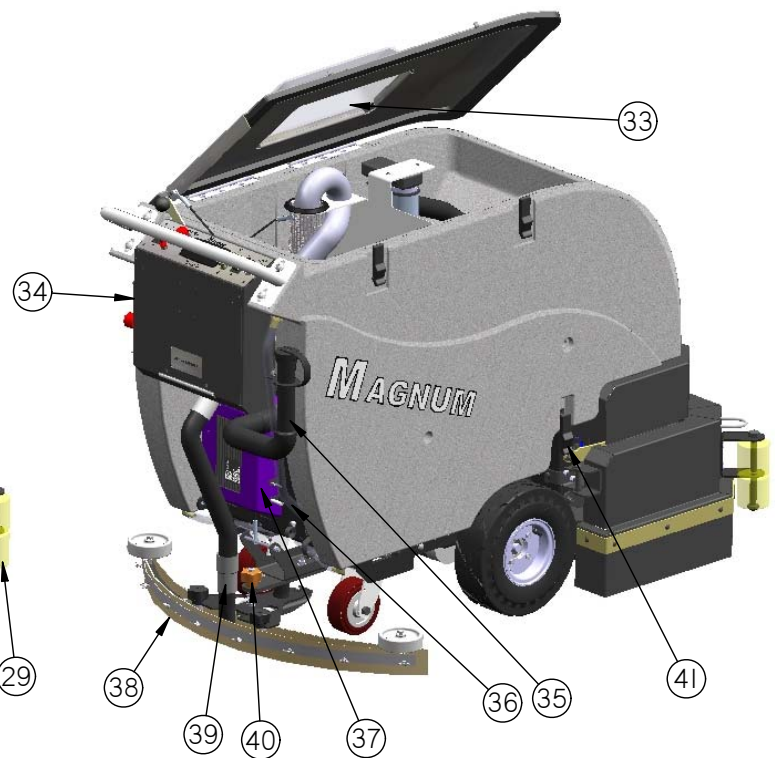


FIGURE 4B.

CONTROLS AND FEATURES

SEE FIGURES (1-4) ON PAGE 7

SEE FIGURE 1

1. **MAIN POWER SWITCH:** Turns the machine on and off.
2. **FORWARD/REVERSE SWITCH (RED):** Controls the direction of the Traction Drive, Pull back for reverse.
3. **SPEED CONTROL KNOB:** Controls the speed of the Traction Drive, Turn counter-clockwise to reduce speed.
4. **LCD SCREEN:** Lists functions and settings of the machine. (See Page 9)
5. **MENU CONTROL:** Scrolls through different options on the LCD display, there are 3 different screens.
6. **SCRUB DECK DOWN PRESSURE SWITCH:** Controls the pressure on the Scrubdeck, push forward for more down pressure.
7. **SCRUB DECK SWITCH:** Raises and lowers the Scrubdeck.
8. **SOLUTION FLOW CONTROL KNOB:** Turn clockwise to reduce & counter-clockwise to increase flow.

SEE FIGURE 2

9. **SQUEEGEE LIFT LEVER:** Raises and lowers Squeegee.
10. **SPRAY JET (BLUE) (OPTIONAL):** Activates Spray Pump for remote Spray Wand.
11. **ELECTRIC SQUEEGEE LIFT (GREY) (OPTIONAL):** Electronically raises and lowers Squeegee.
12. **SIDE BROOM SWITCH (YELLOW) (OPTIONAL):** Turns on the Side Brooms.
13. **"ON BOARD" SOAP SYSTEM (GREEN) (OPTIONAL):** Dispenses soap into Solution Tank.
14. **EMERGENCY STOP (OPTIONAL):** Shuts off power to the machine.
15. **CHARGER PORT:** Red 50 used to receive charger input. **NOTE:** Only use charger provided (**24 VOLT ONLY!**).
16. **KEY SWITCH (OPTIONAL):** Turns power on to the machine.
17. **SERIAL NUMBER PLATE:** Machine identification.
18. **WARNING PLATE:** Detergent/Water warning.
19. **WARNING PLATE:** Explosion warning.

SEE FIGURE 3

20. **TRACTION DRIVE:** Propels machine forward/backward.
21. **SOLUTION FLOW VALVE:** Controls solution flow rate.
22. **SOLUTION FILTER:** Filters water solution prior to scrubbing.

SEE FIGURE 4A

23. **DRIVE BUTTON:** Depress to drive forward, release to stop. (starts & stops the drive motor)
24. **"DRAIN SAVER" STRAINER:** Helps prevent clogging of drain ports.
25. **VAC SCREEN:** Protects Vac Motor from debris.
26. **CASTER:** Twin casters for stability.
27. **MAIN TIRE:** Drive Tires.
28. **JAWS:** Protects Scrubdeck from collision damage.
29. **POLYURETHANE ROLLERS:** Helps protect machine when scrubbing near walls.
30. **TANK-IN-TANK:** Solution/Recovery Tank(30 gallons capacity each).
31. **SOLUTION FILL LID:** Fill port for filling Solution Tank.
32. **RECOVERY LID:** Used for flushing out Recovery Tank area with fresh water.

SEE FIGURE 4B

33. **CLEAR COVER:** For viewing inside Recovery Tank area.
34. **CONTROL PANEL:** Machine controls and access to electrical components.
35. **RECOVERY DRAIN HOSE:** Allows for controlled draining of Recovery Tank.
36. **SOLUTION LEVEL INDICATOR & DRAIN TUBE:** Shows precise level of cleaning solution in Tank & Drain Port.
37. **"ON BOARD" BATTERY CHARGER (OPTIONAL):** Recharges Batteries.
38. **SQUEEGEE BLADE:** Recovers dirty water from floor to be recovered by Vacuum Hose.
39. **VACUUM HOSE:** Vacuumizes Squeegee. **NOTE:** Keep free and clear of blockage.
40. **SQUEEGEE PITCH ADJUSTMENT:** Adjusts pitch of Squeegee. Deflection should be even across entire blade.
41. **TANK LATCH:** Secures tank to frame.

MACHINE SETUP

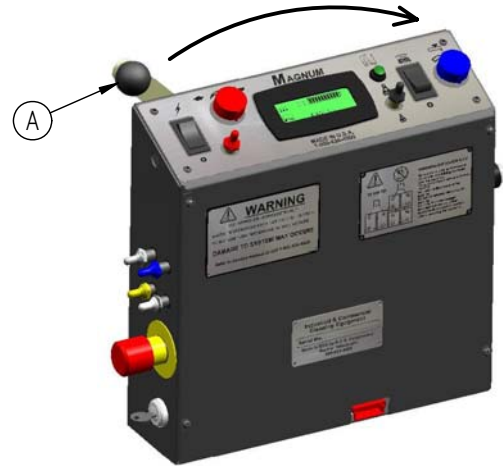
UNCRATING MACHINE

Carefully check the crate for any signs of damage and that the batteries are in the unit. To uncrate the machine, remove banding from around the crate. Take off the top and sides and dispose of properly. Carefully roll the machine off of the base. Notify the carrier immediately if concealed damage is discovered. Cylindrical brushhead is screwed to the pallet via screws located in the front solution trough. **DO NOT TURN ON MACHINE UNTIL THESE SCREWS HAVE BEEN REMOVED.** (SEE BELOW)

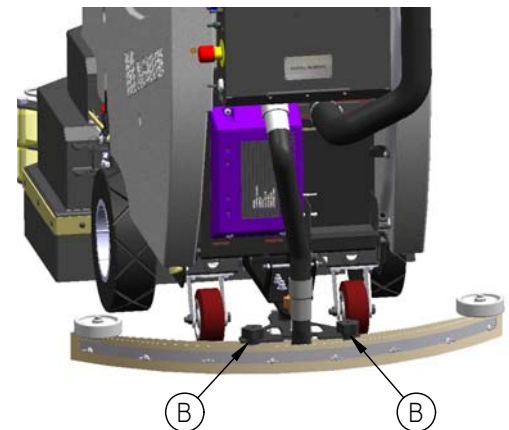


ATTACHING SQUEEGEE

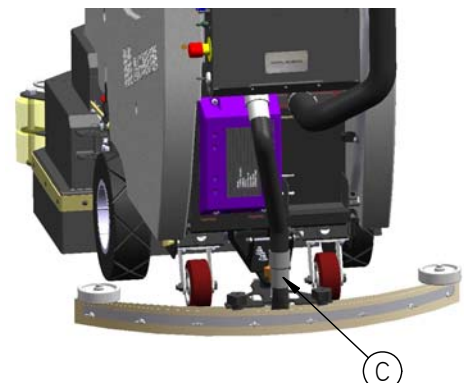
1. Lower the squeegee mounting plate by rotating the lift lever "A" clockwise. (SEE BELOW)



2. Loosen the two knobs "B" on the squeegee and slide them into the slots in the squeegee mounting plate. (SEE BELOW)



2. Tighten the two knobs, and connect the vacuum hose "C" from the machine to the squeegee. (SEE BELOW)



4. You may have to adjust the squeegee pitch. (SEE ADJUSTING SQUEEGEE ON NEXT PAGE.)

CONNECTING BATTERIES

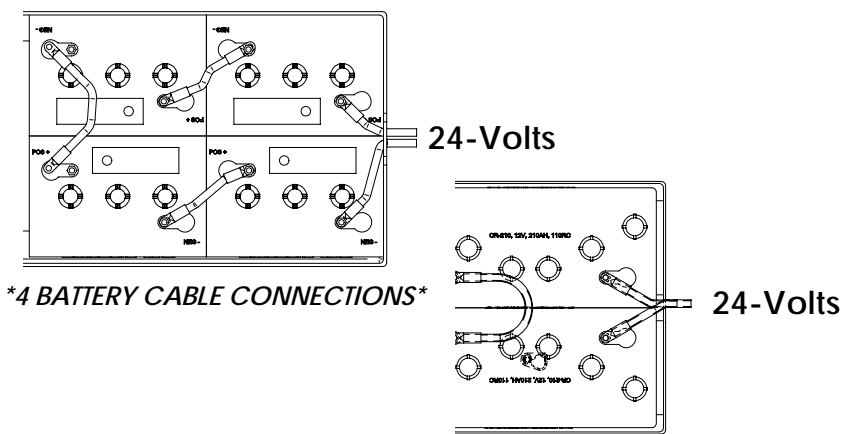
Your machine is equipped with (2) 12-volt/205 AH, (4) 6-volt/245 AH or (4) 6-volt/325 AH, deep cycle, batteries, which form a 24 volt system.

(SEE PICTURE BELOW FOR CORRECT CABLE CONNECTIONS.)

1. Turn all switches to the off position and remove key (if machine is equipped with optional key switch).
2. Turn on main power switch and check the battery condition meter to ensure correct installation. Charge batteries if needed. (SEE BATTERY CHARGING.)

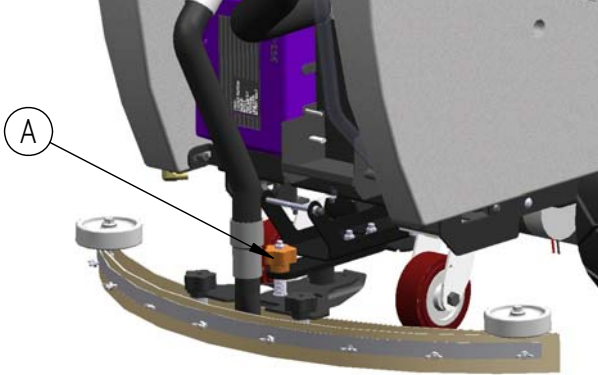
WARNING! Batteries are a possible environmental hazard. Consult your battery supplier for safe disposal methods.

NOTE: Orientation of batteries is critical for cables to reach!



ADJUSTING SQUEEGEE

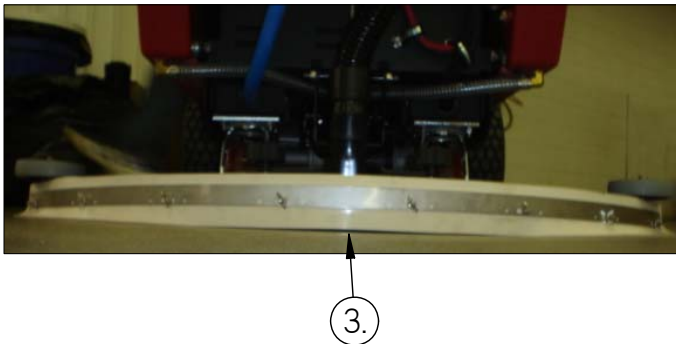
1. Turning adjustment knob "A" clock-wise (tightening) will lower tips & raise center. *(SEE PICTURE BELOW.)*



2. This squeegee is adjusted too far back and will not pick up on the corners. **note tips off the floor*.* *(SEE BELOW)*



3. This squeegee is adjusted too far forward and will not pick up in the center. **note center spaced off the floor*.* *(SEE BELOW)*

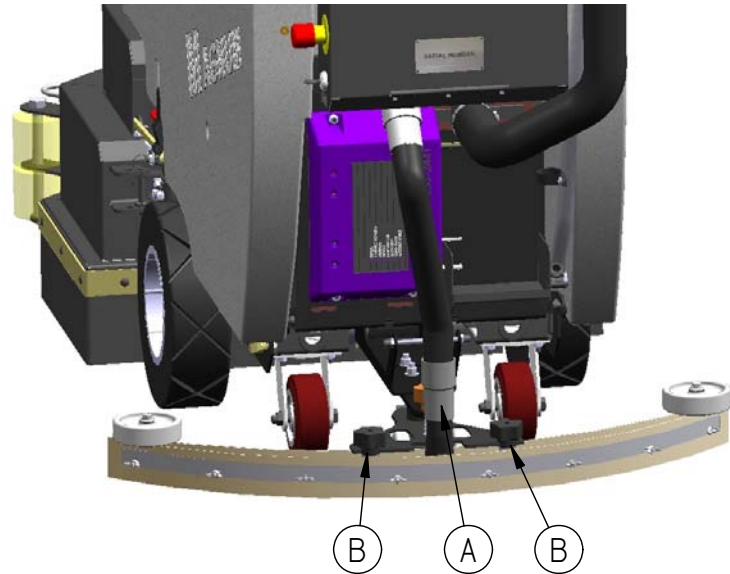


4. This squeegee is adjusted just right with good deflection across the entire rear blade. *(SEE BELOW)*



REMOVING SQUEEGEE

1. With the squeegee in the up position, turn machine power off.
2. Disconnect vacuum hose "A" from squeegee and loosen both knobs "B". *(SEE BELOW)*
3. Pull squeegee assembly rearward from the lifting carrier.
4. Inspect or repair as needed and reinstall.



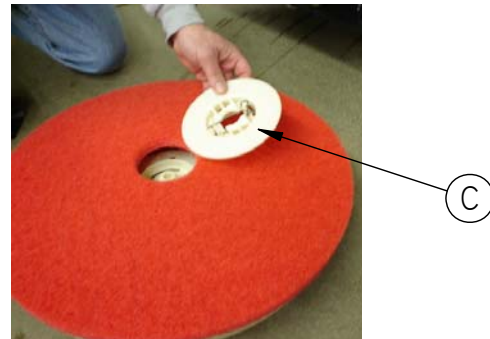
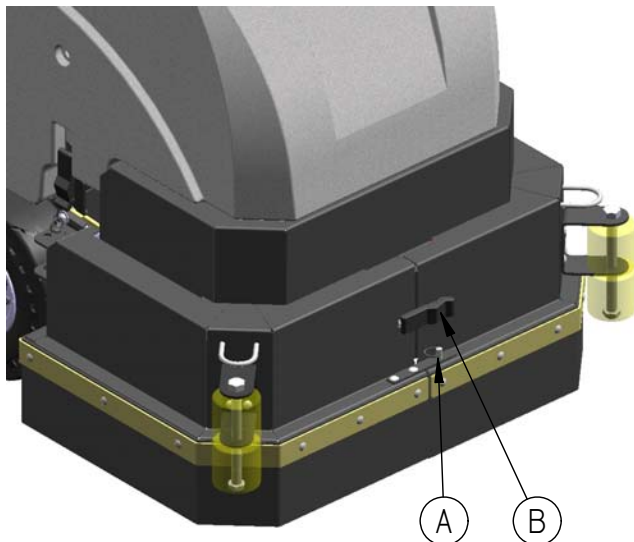
REPLACING OR ROTATE SQUEEGEE BLADES

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

1. Remove the squeegee assembly from the machine. Remove blade retainer strap and remove squeegee blade.
2. Rotate the squeegee to new edge position or replace as required.
3. Install blade on the locating pins of squeegee assembly.
4. Install squeegee retainer strap.
5. Fasten and lock knobs.

INSTALLING DISK PAD DRIVER OR BRUSH

1. Turn on machine power.
2. Raise the scrub deck by depressing the brush switch (O) to the up and off position and turn machine power back off.
3. The machine is equipped with jaws. Remove pin "A" and undo latch "B" on front of jaws to open them. *(SEE BELOW)*
4. Select the correct pads or brushes that best meet your cleaning application. Consult your local dealer for assistance.
5. Pad installation: attach pads to pad drivers before connecting drivers to motor hub. center clip "C" should click twice. *(SEE BELOW)*



6. Attach brushes or pads to motor hubs. Squeeze the scissor locking device and lift brush up on to the motor drive hub. Make sure the scissors close and lock once the brushes are on. *(SEE BELOW)*



7. With brushes locked in place, close jaws, secure latch and insert pin.

SCRUB BRUSHES

There are many 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

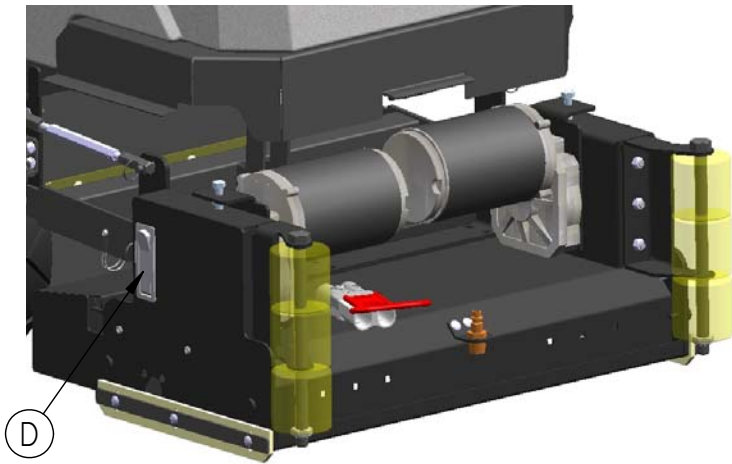
<u>Brush Type</u>	<u>Disk</u>	<u>Cylindrical</u>	<u>ABRASION</u>	<u>(10 The Highest)</u>	<u>Color</u>
Super-grit	## 421SS	NA	Very High	10	Red/Orange
Tough-Grit	##421S	##521S	High	9	Black
Midi-Grit	##421C	##521C	High	8	Blue/Grey
Light-Grit	##421PS	##521PS	Moderate	6	Grey
Poly (.028)	##421P	NA	Moderate	5	Black
Nylon (.012)	##421N	##521N	Light	2	White
Tampico	##421T	##521T	Light	1	Tan
Pad Driver	##421D	NA	Not Applicable		NA

<u>Pads</u>	<u>Disk</u>	<u>Cylindrical</u>	<u>Level</u>	<u>(10 The Highest)</u>	<u>Color</u>
Super Black	##422BB	NA	Very High	10	Black
Black	##422B	NA	High	8	Black
Brown	##422BR	NA	High	7	Brown
Green	##422G	NA	Medium	6	Green
Blue	##422BL	NA	Moderate	4	Blue
Red	##422R	NA	Moderate	3	Red
White	##422W	NA	Light	1	White

FOR CORRECT PAD APPLICATION , CALL YOUR LOCAL DEALER

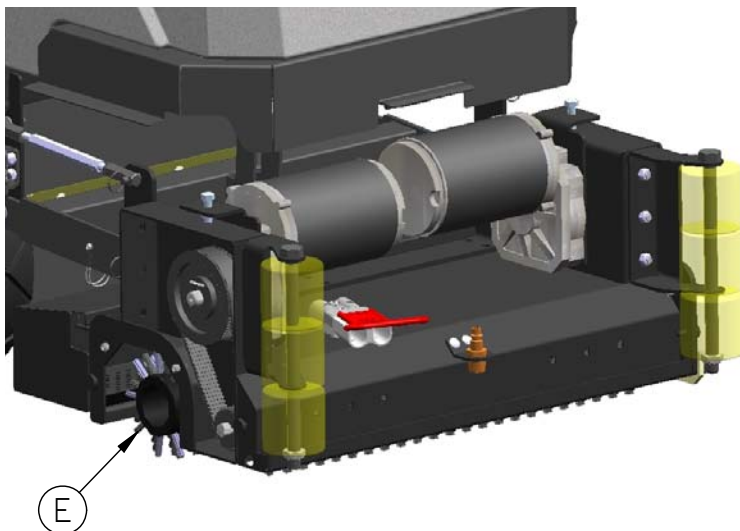
INSTALLING CYLINDRICAL BRUSHES

1. Turn on machine power.
2. Raise the scrub deck by depressing the brush switch (O) to the up and off position and turn machine power back off.
3. Disconnect batteries.
3. Remove side access door "D" on each side of scrubdeck. *(SEE BELOW)*

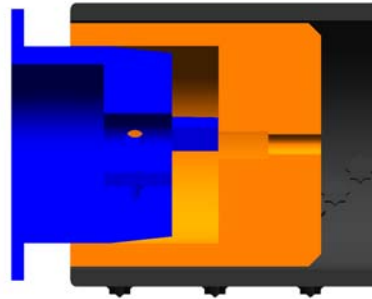


4. Slide brush "E" in onto brush driver on opposite side and spin until you feel it catch and drop in. *(SEE BELOW)*
5. When the brushes are engaged, replace the brush access door.
6. Lift up on the wipers first to close the side door and depress the latch until the door is secured.

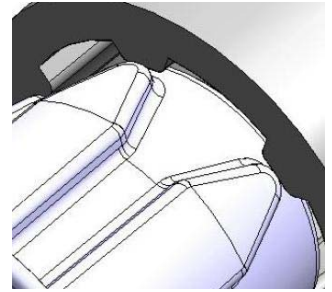
NOTE: If the brushes are not fully engaged with the drivers the brushes will be damaged. Do not force the access door back on. This usually indicates improper brush installation.



7. Brush driver shown misaligned. *(SEE BELOW)*

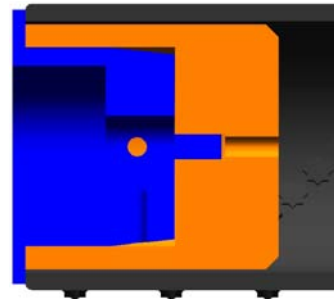


Old Style Driver

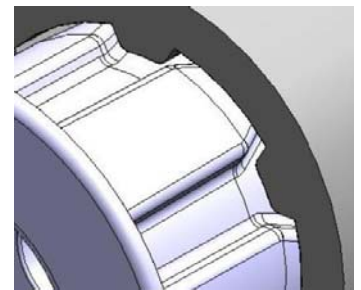


New Style Driver

8. Brush driver shown properly aligned. *(SEE BELOW)*

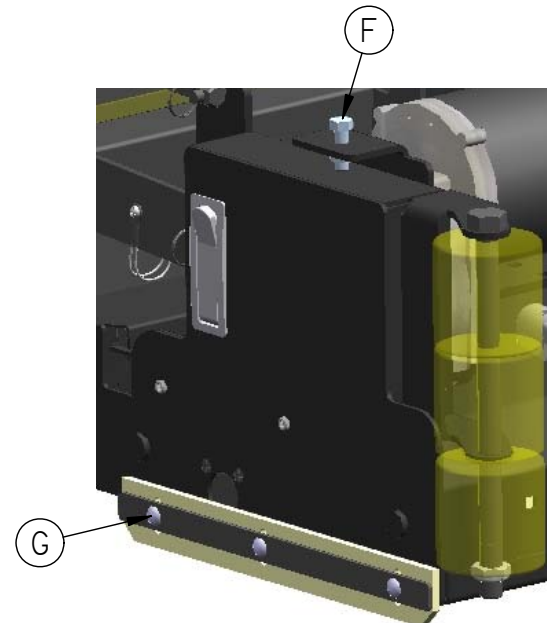


Old Style Driver



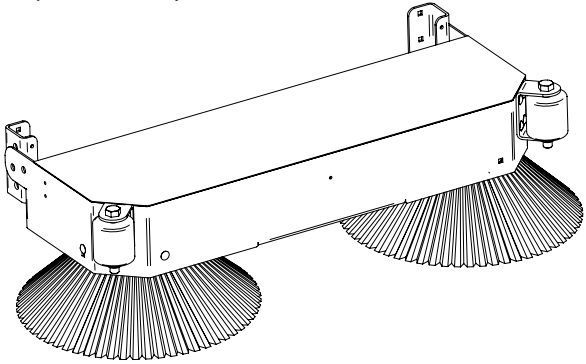
New Style Driver

9. To adjust the tension of the belts turn adjustment screw "F" clock-wise to tighten, counter-clockwise to loosen. *(SEE BELOW)*
10. To adjust the height of the wipers loosen the 3 screws "G" and slide wiper blades up or down in the slots. *(SEE BELOW)*



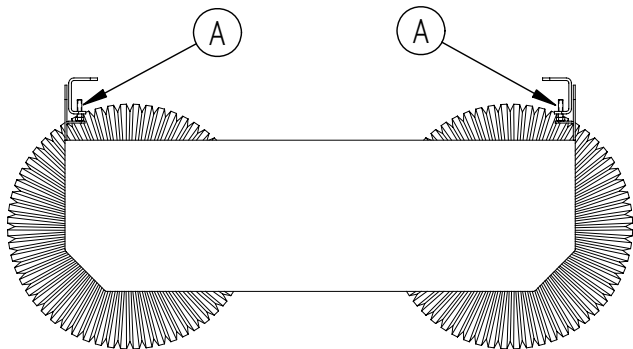
SIDE BROOM SYSTEM

1. Your machine may come equipped with the *"optional"* side broom system. *(SEE BELOW)*

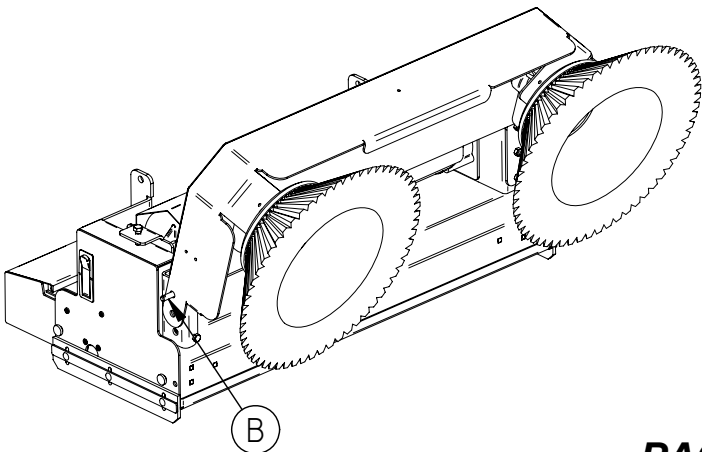


2. Flip side broom switch up to engage broom. *(yellow toggle on left side of the control panel.) (SEE MACHINE CONTROLS ON PAGE 7.)*

3. To adjust side broom height turn adjustment screws "A" clock-wise to raise, counter-clockwise to lower the brooms. *(SEE BELOW)*



4. To move side broom system out of the way when not in use just pull the pin "B" on each side of deck and rotate side broom system to the up position and reinsert pin. *(SEE BELOW)*



5. Brooms adjusted to low. *(SEE BELOW)*



6. Brooms adjusted to high. *(SEE BELOW)*



7. Brooms adjusted just right. *(SEE BELOW)*



OPERATION

PRE-CLEANING CHECK LIST

Read and understand the safety section on pages 5 and 6 before operating the machine.

1. Check battery condition gauge on the control panel.
Make sure batteries are fully charged before using.
2. Check the condition of the pads or brushes.
3. Check the condition of the squeegee blades.
4. Transport the machine to the filling station.
Raise the scrubhead and squeegee when transporting.
5. Turn machine off.
6. Fill the tank with up to 30 gallons of clean water either at front fill port "A" or rear fill port "B". Access rear fill port by raising the recovery tank lid. **(SEE BELOW)**

*The clear tube "C" at the rear of the machine indicates the amount of water in the tank. **(SEE BELOW)**

8. Add "approved" cleaning chemical. Use the proper dilution ratio indicated on the bottle. Call if unsure.

Note: Use only non-flammable commercial cleaning chemicals. Your authorized distributor can assist you in selecting a proper chemical.



OPERATING HINTS

1. Observe the amount of solution the machine is dispensing on the floor and adjust to the desired flow. To increase the solution flow rate, rotate the solution control knob counter-clockwise. To shut the solution off completely, just release the drive button.
2. Keep an eye on the clear vacuum cover to make sure there is not any foamy buildup in the recovery tank. If excess foam begins to develop, pour a recommended foam control solution into the recovery tank. Foam is usually an indication of excessive soap.
3. Always operate at lower speeds when scrubbing around walls and objects. You should reduce the speed, to maintain control when turning.
4. If squeegee starts to streak, raise and wipe the blades with a clean cloth. If the problem continues, check the blades for wear or damage, and rotate if needed. You need to presweep before scrubbing.
5. Change or turn over pads when dirty. Rotate the scrub brushes every week.
6. Stay clear of objects protruding from the floor, such as sockets, grates, for they will damage the pads and squeegee blades.
7. During brief stops you do not have to turn anything off, the brushes and solution will automatically stop when the drive button is released.
8. Always keep an eye on your gauges. They let you know the status of a particular system at a glance. If your battery gauge is reading low, you must stop immediately, and recharge. Running the batteries dead, will result in damage to the batteries.
9. When you run out of solution, raise the brushes, and continue to vacuum the remaining water until it is consumed. The solution sight hose is used to indicate the level of detergent remaining in the tank.
10. When you are ready to stop, pick up the brushes, turn off the solution switch, pick up the squeegee, and drive the machine back to the charging area. Be sure to drain both tanks before storing the machine.

(SEE BELOW)

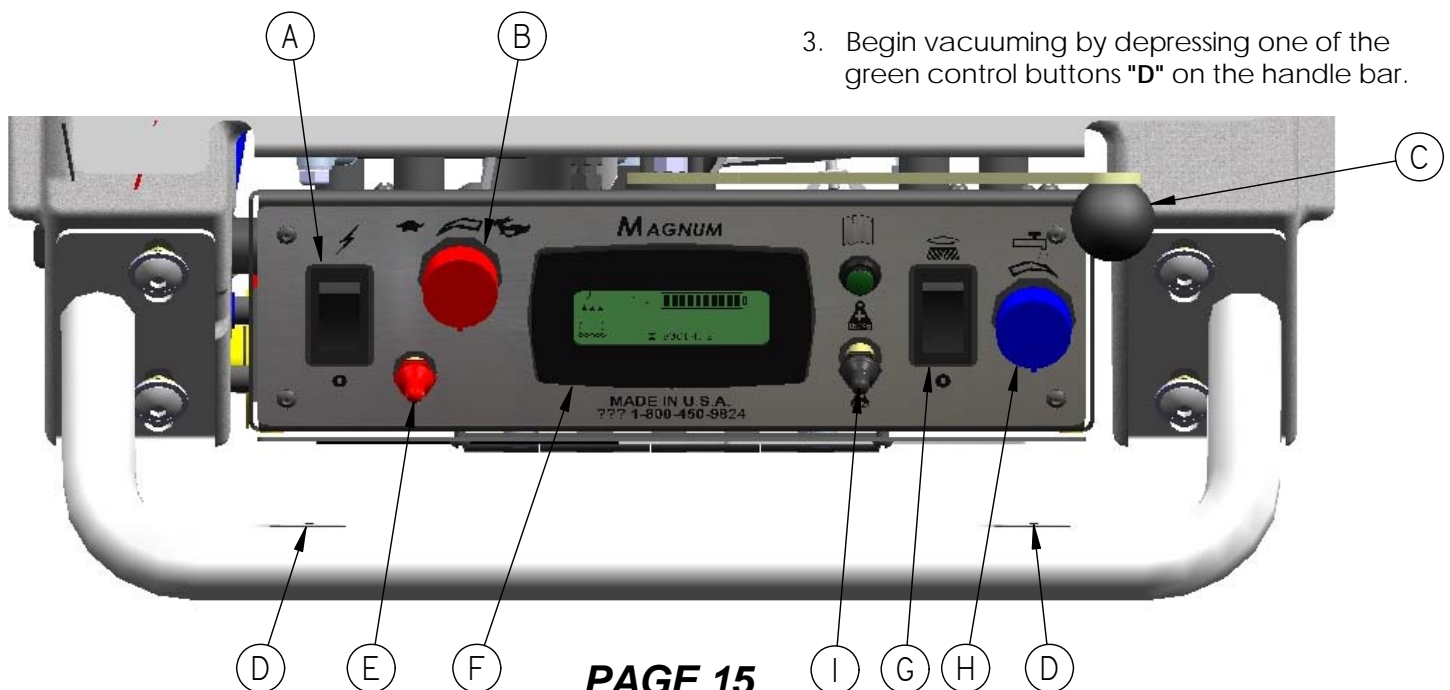
1. Turn on machine power switch "**A**", make sure the speed control knob "**B**" is at it's lowest setting.
2. Lower squeegee by rotating the squeegee lift lever "**C**" all the way to the right (vac motor will turn on automatically.)
3. Lower scrub head to the floor, use the top half (+) of the brush switch "**D**".
4. Turn the solution flow adjustment knob "**H**" to regulate the amount of solution flow.
5. Begin scrubbing by depressing one of the green control buttons "**D**" on the handle bar. Adjust the speed control knob "**B**" to the desired setting.
6. Once the machine begins to move, check the down pressure on the LCD screen "**F**". To adjust the down pressure, push toggle switch "**I**" forward to increase pressure backward to decrease pressure. Start scrubbing at the #1 or #2 marks. Do not use the #4 or #5 marks without management's approval.
7. To operate the machine in reverse, simply pull the forward/reverse switch "**E**" back towards the handle bar. The reverse speed is set to approximately 50% of the forward speed.
8. To stop the machine, let go of the green control button "**D**".

(SEE BELOW)

1. Turn on machine power switch "**A**" make sure the speed control knob "**B**" is at it's lowest setting.
2. Lower scrub head to the floor, use the top half of the brush switch "**G**".
4. Turn the solution flow adjustment knob "**H**" to regulate the amount of solution flow.
5. Begin scrubbing by depressing one of the green control buttons "**D**" on the handle bar. Adjust the speed control knob "**B**" to the desired setting.
6. Once the machine begins to move, check the down pressure on the LCD screen "**F**". To adjust the down pressure, push toggle switch "**I**" forward to increase pressure backward to decrease pressure. Start scrubbing at the #1 or #2 marks. Do not use the #4 or #5 marks without management's approval.
7. To operate the machine in reverse, simply pull the forward/reverse switch "**E**" back towards the handle bar. The reverse speed is set to approximately 50% of the forward speed.
8. To stop the machine, let go of the green control button "**D**".

(SEE BELOW)

1. Turn on machine power switch "**A**", make sure the speed control knob "**B**" is at it's lowest setting
2. Lower squeegee by rotating the squeegee lift lever "**C**" all the way to the right (vac motor will turn on automatically.)
3. Begin vacuuming by depressing one of the green control buttons "**D**" on the handle bar.



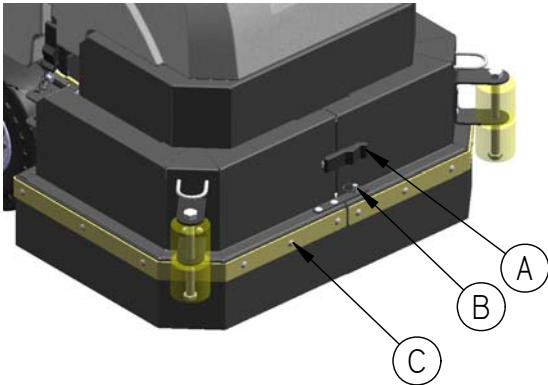
ADJUST SOLUTION FLOW

1. Turn solution valve adjustment knob "A" counter-clockwise to increase solution flow, clockwise to decrease solution flow. (SEE BELOW)

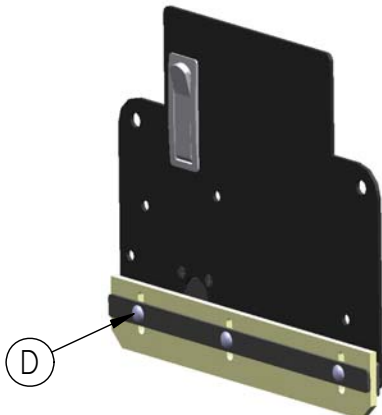


ADJUST CURTAINS/WIPERS

1. For Jaw curtains release latch "A" and remove pin "B" on front of jaws to open jaws. (SEE BELOW.)
2. Loosen curtain band screws "C".
3. To adjust curtain to the desired height just slide the curtain up or down in the slots and tighten screws.
4. Close jaws, reconnect latch and reinsert pin.



1. For cylindrical side wipers loosen wiper band screws "D". (SEE BELOW)
2. To adjust wiper to the desired height just slide the wiper up or down in the slots and tighten screws.



DRAINING SOLUTION TANK

To drain unwanted cleaning solution from the solution tank, perform the following steps.
(SEE BELOW)

1. Pull the clear sight tube/drain hose "A" off barbed fitting.
2. Rinse out tank and solution flow system with clean water.



DRAINING RECOVERY TANK

Always empty recovery tank when refilling the solution tank. You can refill the solution tank while the recovery tank is draining. To drain the recovery tank, remove drain hose from hook at rear of tank and unscrew cap. (SEE BELOW)

NOTE: LEAVE RECOVERY LID OPEN WHEN DRAINING TANK!



OPEN RECOVERY LID

1. Release both latches "A" on recovery tank lid. *(SEE BELOW)*
2. Rotate lid fully open.



FLUSH RECOVERY TANK

1. Rinse the recovery tank after every use. This will prevent heavy buildup on the bottom of the tank, foul odors, and clogging of the drain hose. *(SEE BELOW)*



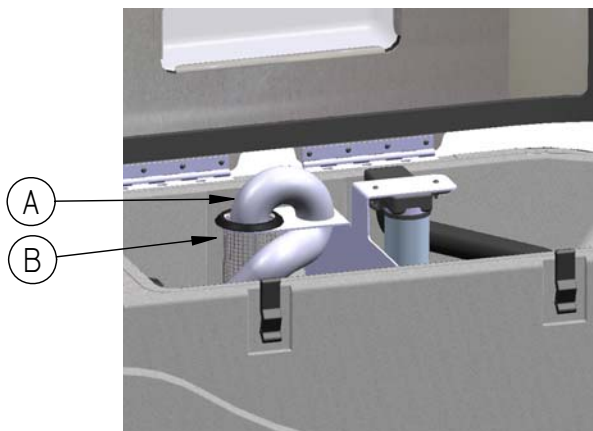
3. After rinsing, reattach drain hose "B" on hook. *(SEE BELOW)*



CLEAN "DRAIN SAVER"

WITH RECOVERY LID OPEN & TANK FULLY DRAINED

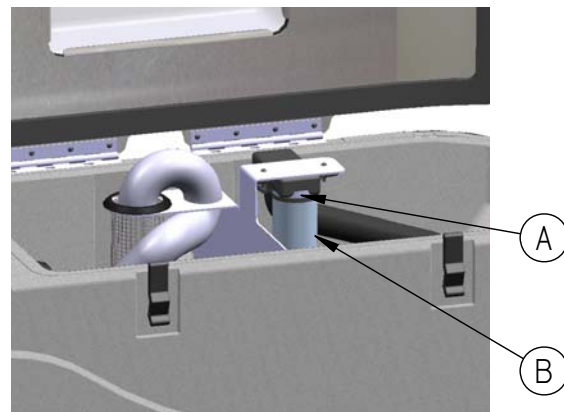
1. Remove 2" squeegee intake hose "A" from "Drain Saver" strainer "B". *(SEE BELOW)*
2. Remove stainless screen, dispose of debris.
3. Rinse screen with fresh water from the outside to the inside holding screen upside down. This will allow for better cleaning.
4. Replace the screen into the bracket.
5. Replace 2" squeegee intake hose.



CLEAN VAC SCREEN

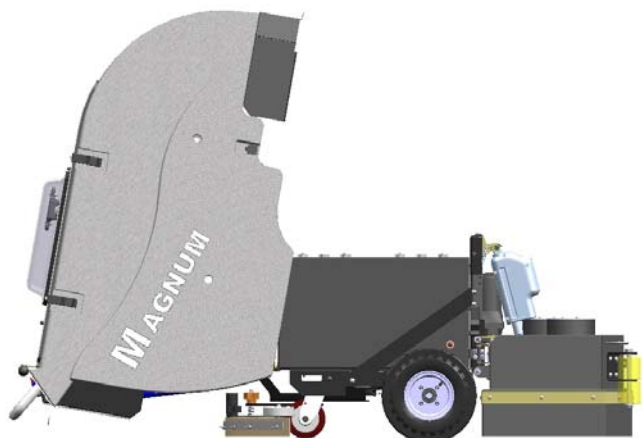
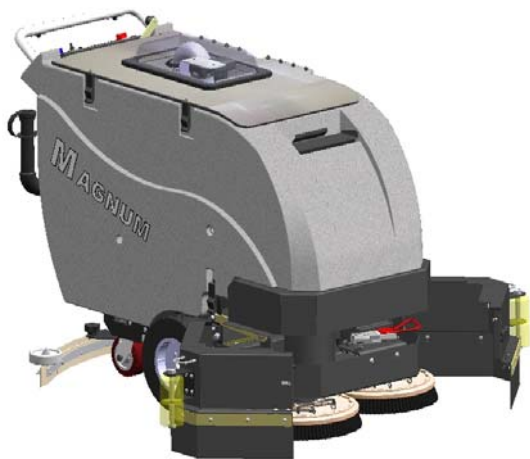
WITH RECOVERY LID OPEN & TANK FULLY DRAINED

1. Remove vac screen retaining clip "A". *(SEE BELOW)*
2. Pull vac screen and float ball assembly (B) off the vac box.
3. Rinse with hot water.
4. Dry thoroughly.
5. Replace vac screen onto box.
6. Replace and tighten retaining clip.



TIP TANK

1. Fully drain solution tank.
2. Fully drain recovery tank.
3. Remove squeegee.
4. Unlatch tank latch "A" on each side of machine.
(SEE BELOW)
5. Open Jaws. (SEE BELOW)
6. Tip tank back carefully until supported by strap.
(strap not shown) (SEE BELOW)



SQUEEGEE UP

1. To raise the squeegee off the floor rotate squeegee lift lever "A" counter-clock-wise all the way to the left. (SEE BELOW)



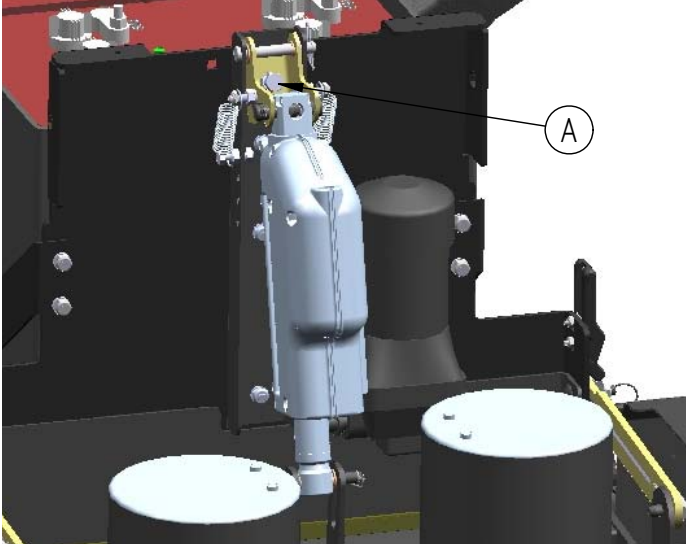
SQUEEGEE DOWN

1. To lower the squeegee to the floor rotate squeegee lift lever "B" clockwise all the way to the right. Vac motor will turn on automatically. Use with remote vac wand. (SEE BELOW)



DECK HEIGHT ADJUSTMENT

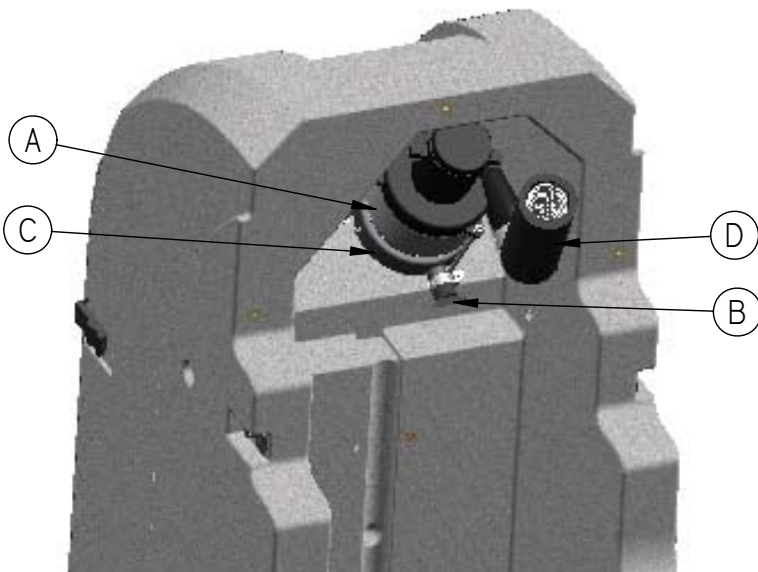
1. To adjust deck height for brush clearance, loosen jam nut on adjustment bolt "A", turn adjustment bolt clock-wise to raise deck, counter-clockwise to lower deck. Retighten jam nut. (SEE BELOW)



VAC MOTOR

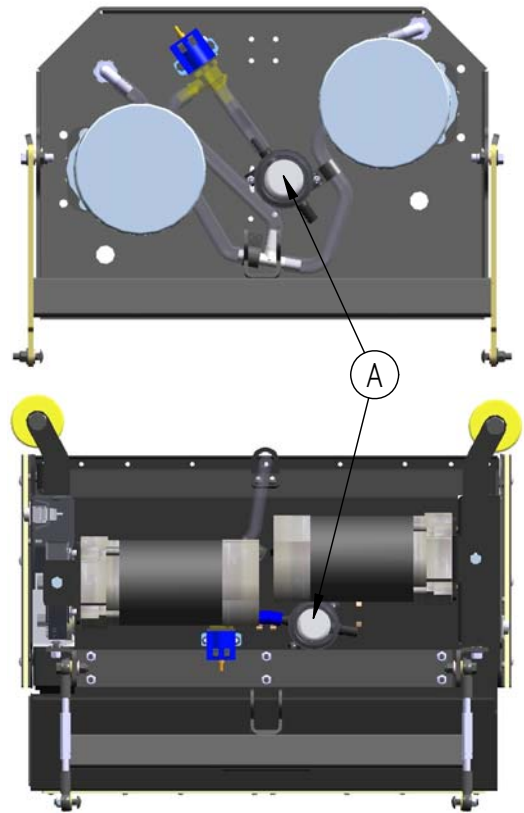
(SEE BELOW)

1. The machine is equipped with a 24 volt, 3/4 hp, vac motor "A".
2. If foam or water gets past the recovery tank's vac screen/ball system the "UNLOADER VALVE" "B" will drain it from the "VAC BOX" "C".
3. The vac motor has an "optional" "FOAM MUFLER" "D" available for quiet machine operation.



SOLUTION FILTER

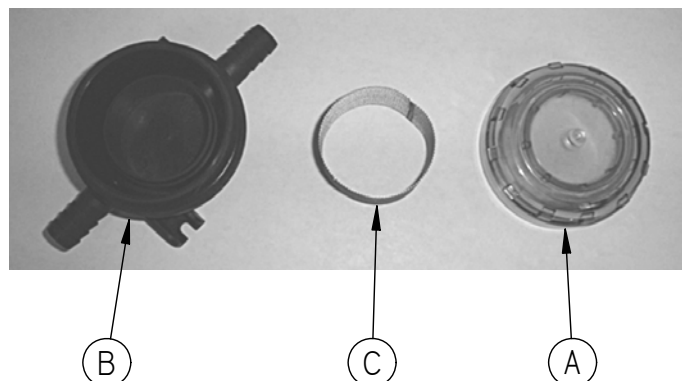
1. The solution system has a "INLINE FILTER" "A" to filter out cleaning solution prior to scrubbing. (SEE BELOW)



CLEANING SOLUTION FILTER

(SEE BELOW)

1. To clean the "SOLUTION FILTER" Unscrew the clear cap "A" from housing "B" and remove the "STAINLESS STEEL" screen "C".
2. Rinse any debris from the screen with clean water.
3. Reinstall screen and screw cap back on tightly.



BATTERY CHARGING

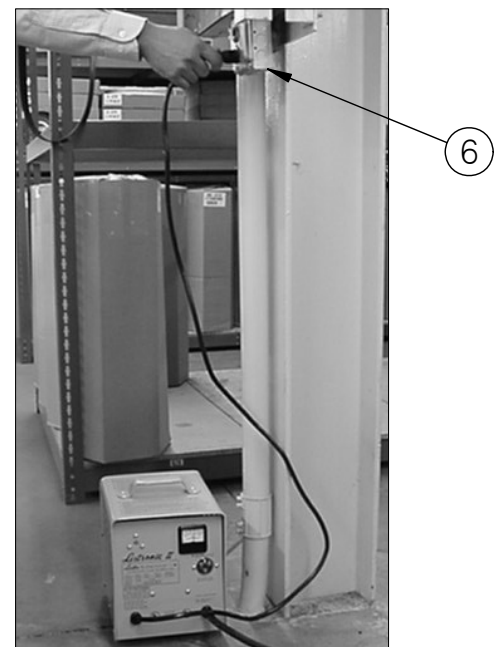
CAUTION: The following instructions are intended for the 24v charger supplied with the machine.
Do not use any other charger with this machine.

CHARGER SPECIFICATIONS

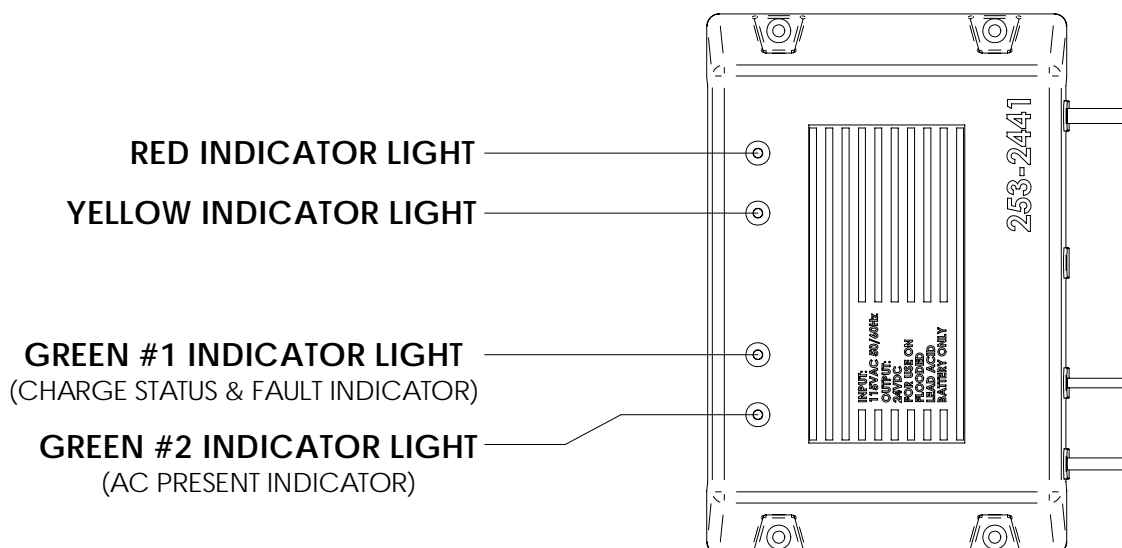
- * OUTPUT VOLTAGE OF 24 VOLTS.
- * OUTPUT CURRENT OF 25 AMPS MAX (STANDARD).
- * OUTPUT CURRENT OF 36 AMPS MAX (OPTIONAL).
- * INPUT VOLTAGE OF 110 VOLTS/60 HZ.
- * AUTOMATIC SHUT OFF CIRCUIT.
- * MADE FOR DEEP CYCLE BATTERIES.

DANGER: Always charge batteries in a well ventilated area. Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and flame away. Shield eyes when servicing batteries and avoid contact with battery acid.

1. Transport machine to a well ventilated area for charging.
2. Turn the machine off.
3. **CAUTION ALWAYS WEAR EYE PROTECTION WHEN BATTERIES ARE EXPOSED.**
4. Check the water level through "pro-eye" window in each battery. (**SEE TOP PICTURE.**) Do not charge the machine unless the water is slightly higher than the plates. If needed, add enough **distilled** water to just slightly cover the plates. Be careful not to over fill. Batteries can overflow during charging. Replace caps before charging.
5. With the red 50 charger plug connected to the machine **"FIRST"** (**SEE MIDDLE PICTURE.**) plug the charger power cord into a grounded 110 volt standard wall outlet **"SECOND"**. (**SEE BOTTOM PICTURE.**)
6. The charger will automatically begin charging, and automatically shut off when fully charged. (**check gauge**)
7. After the charger has turned off, unplug the charger from the wall outlet **"FIRST"**, then unplug the red 50 charger plug from the machine **"SECOND"**.
8. Recheck the cell level after charging. If needed, add distilled water up to the correct level. Be certain to replace the caps securely and to wipe off the top of the batteries with a clean cloth.



ON-BOARD CHARGER



OPERATING THE CHARGER

The LED Function Chart below describes the charging process.

NOTE: The LEDs discussed below in the table are the Charge Status LEDs.

NOTE: The AC Present LED green#2 is lit at all times when AC is connected, and off when AC is not connected.

Display	Operating Condiiton
Red = on Yellow = off Green#1= off	When the red LED is on, it indicated that your battery is discharged and the model 2820-24 is recharging the battery at the "Bulk" rate (Stage 1). This charging rate is approximately 20 Amps. While the red LED is on, the voltage measured (with the charger on) will be approximately 23 to 28 Volts. If an excessive amount of time is taken to complete this stage, the charger will time out and present a fault indicator. (See section 5.)
Red = on Yellow = on Green#1 = off	When both the yellow and the red LED's are on, it is charging at the "absorption" rate. (Stage 2). During this second charging stage, the charger holds the battery voltage at approximately 29 VDC, and gradually reduces the amount of current delivered to the battery. If an excessive amount of time is taken to complete this stage, the charger will time out and present a fault indicator. (see section 5)
Red = on Yellow = on Green#1 = on	When all three charge status LEDs are on, the model 2820-24 is charging at a "Finish" rate of 10 Amps, (Stage 3). The "Finish" stage will charge the battery up to approximately 30.5-31 VDC. If an excessive amount of time is taken to complete this stage, the charger will time out and present a fault indicator. (see section 5.)
Red = off Yellow = off Green#1 = on	When the green#1 LED is on, and red and yellow are off, the charge cycle is completed and the battery is ready for use. At least 100% of charge has been returned to the battery. If the battery voltage falls below approximately 24 VDC, the charger will automatically restart the charge process.

ON-BOARD CHARGER

TROUBLESHOOTING

Problem	Cause	Solution
1. Red LED stays on for more than 18 Hrs.	1. One or more defective or damaged cells. 2. Charger has reduced its output voltage below the normal level due to a DC overload or a DC short. 3. On-board DC systems are drawing more current than the charger can replace. 4. Excessive ambient temperature has forced the charger to cutback output current in order to self protect.	1. Load test the batteries and replace if necessary. 2. Remove the source of the overload or short. Disconnect the charger's black (NEGATIVE) ring terminal from the battery. Reapply AC power and the green LED only should now light. 3. Turn off all DC equipment while charging. 4. Determine the cause of the excessive ambient temperature and correct.
2. The red and yellow LED's stay on for more than 10 Hrs.	1. On-board Dc systems are drawing in excess of 10 amps. 2. One or more defective or damaged cells. 3. Extremely low AC voltage at the battery charger.	1. Turn off all DC equipment while charging. 2. Load test the batteries and replace if necessary. 3. Apply a higher AC voltage source or reduce the length of the extension cord.
3. Green #1 LED stays on when the battery is known to be low.	1. Open DC output fuse. 2. Faulty or contaminated terminal connections. 3. One or more defective or damaged cells.	1. Replace DC output fuse with a Bussmann (ABC-30 or MDA-30.) 2. Clean and tighten or repair all terminal connections. 3. Load test the batteries and replace if necessary.
3. The AC Present Green#2 LED does not turn on when AC power is applied.	1. No AC power available at the charger. 2. Component failure.	1. Connect AC power or reset the AC breaker on the main panel. 2. Return charger to R.P.S. Corp.
4. The yellow LED is blinking continuously.	1. Charge cycle has timed out, charging process took an excessive amount of time.	1. See fault codes below.
5. The red LED is blinking continuously.	1. Corrupt Microprocessor memory.	1. See fault codes below. 2. Return charger to R.P.S. Corp.

Fault Codes:

- Flashing red LED: Corrupt program memory in microcontroller detected, charger microprocessor has become corrupted. Charger must be returned to R.P.S. Corp.
- Flashing yellow LED: Timer has expired. The 2820-24 uses a timer to independently monitor each mode of the charge cycle: bulk, absorption, and finish. If the timer expires during any of these modes of the charge cycle, there could be a problem with the battery set. The timer may expire if there is a damaged battery cell in the battery set, an abnormally high ambient temperature at the charger, or some other external fault, which prevents completion of charge cycle. These problems need to be addressed by user intervention. **Charger must be AC powered down in order to reset fault condition.** Before resetting the charger, investigate potential problems with battery or other external faults. Once external problem is resolved, reconnect charger output cable fuse and reconnect AC power.

5. MAINTAINING THE CHARGER

Periodically clean both battery terminals with baking soda and tighten all connections. No other maintenance on the charger is required.

BATTERY CHARGER

OPERATING MANUAL

GENERAL INFORMATION AND WARNING

- Electronic automatic battery charger with microprocessor suitable for any battery type.
- Fully automatic charging cycle with electronic setting; protected against overload, short-circuit at clamps and reversed polarity.
- Never disconnect the battery while charging; this could cause sparks.
- Never use the equipment in the rain, in areas used for washing and in damp areas.
- Before starting to charge, make sure the voltage of the equipment suits the voltage of the battery and that the selected charging curve (for lead-acid free batteries and airtight gel batteries) is correct for the type of battery to be charged. In addition, make sure the rated input voltage of the charger suits the available supply voltage and the system is equipped with grounding.
- If necessary, replace the fuse with another of the same type and value as indicated on the rating plate.
- Pay attention to any remarks of the battery manufacturer.

For lead-acid batteries with liquid electrolyte:

- Control the water level after each charging process.
- Refill with distilled water only.
- Caution! The gases generated during charging are explosive. Do not smoke in the vicinity of the batteries. When working with cables and electrical equipment, avoid open flame and sparks.
- Attention: Use protective glasses and gloves during battery maintenance. Battery acid causes injuries. In case of contact with battery acid, wash the affected parts with a lot of fresh water and consult a doctor if necessary.

CONTROLS (see figure behind the cover)

1. Three-digit display + symbol (1), to view A = the charging current, U = the battery voltage, h = the charging time, C = the charging ampere-hours [AH], E = the energy used [KWh].
2. Button for the Selection of the display mode (2): A, U, h, C, E. After about 10 seconds the display returns to the visualization of the charging current.
3. Red control indicator (3): when it is on, the charging cycle has started.
4. Yellow control indicator (4): when it is on, the final phase of the charging cycle has started.
5. Green control indicator (5): when it is on, the charging cycle has finished.

OPERATION

- Plug the cord into the socket.
- Connect the battery, checking the polarity.
- Now, the battery charger's display will show a sequence of details on the charger's internal programming: after the name "SPE", it will show the software release installed in the equipment, then, in sequence, the following parameters: battery voltage, charging current, charging curve number, and finally the words "GEL" or "Acd" depending on the set up charging curve being suitable for airtight gel batteries or lead-acid batteries. **Make sure the type of batteries to be charged (gel or lead-acid batteries) matches the displayed details ("GEL" or "Acd", respectively). If it doesn't, contact our dealer.** Now, a test is run on the battery voltage to decide if the charging process should be started or not. If the battery is not connected to the battery charger, the display will show the word "bat". The word will stay on, even if the test is failed (for instance, reversed polarities or incorrect battery connection). If the test is passed, the display will show the battery voltage for approximately 5 seconds and the battery will begin to

continued on next page

BATTERY CHARGER

be charged. The charging cycle progress will be shown by red (3), yellow (4), and green (5) LED indicators.

At the end of the charge, when the green indicator (5) is on, unplug the cord from the socket and operate the machine.

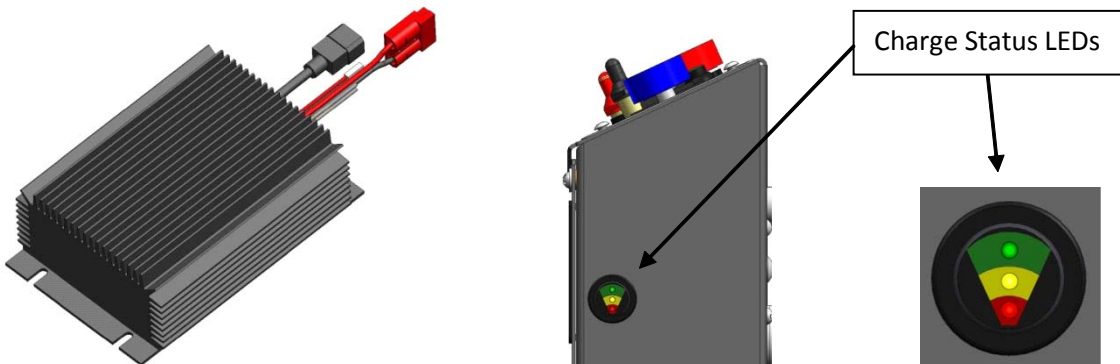
PROBLEMS	SOLUTIONS AND CHECKS
The battery charger does not switch on.	Check that the plug is connected to the supply mains and that the fuse is efficient.
The charging cycle does not start and the message "bat" is displayed.	Check the connection to the battery and polarity.
The yellow indicator (4) will not light up even 15 hours from the starting of the charging cycle, and the display shows E03 .	Check the battery for possible faulty components.
The message E01 is displayed.	This means that the maximum voltage admissible by the battery has been exceeded. The charging is interrupted.
If the battery charger is provided with a safety thermostat and the message E02 is displayed.	This means that the maximum temperature has been exceeded. The charging is interrupted.
The message E03 is displayed.	This means that the maximum time for the charging phase has been exceeded. The charging is interrupted.
The message Sct is displayed.	This means that the total safety timer has interrupted the charging.
The message Srt is displayed.	This signals a possible internal short circuit.

Power Cat 24 Volt 25 Amp Sealed Battery Charger

The Power Cat 2425S is a sealed high frequency electronic battery charger with an on board microprocessor that can be programmed for different types of batteries. The charger features a fully automatic charging cycle and has built in protection against short circuits and reverse polarity.

THE CHARGER UNIT

The charger is equipped with a remote “EZlamp” 3 LED charge state indicator, located on the side of the central command, to show charge cycle information as well as diagnostic codes.



OPERATION

The 2425S is initially switched on by plugging the unit into the wall. The “EZlamp” charge state indicator then displays whether the unit is set for flooded lead or AGM type batteries by flashing the corresponding LEDs. For flooded lead batteries the “EZlamp” will display ONLY the RED LED flashing for about 5 seconds. For AGM batteries the “EZlamp” will display a flashing GREEN & RED LED for about 5 seconds.

continued on next page

Power Cat 24 Volt 25 Amp Sealed Battery Charger

EZlamp Code	Charger Phase
Flashing RED	Internal charger check – “Flooded Lead Settings”
Flashing RED & GREEN	Internal charger check – “AGM Settings”
Steady RED	Indicates first and second phase of charge
Steady YELLOW	Indicates finish charge in progress
Steady GREEN	Indicates charge cycle is complete

TROUBLE SHOOTING

In the event that there is a problem with charger here is a simple trouble shooting guide.

If the unit does not power on, assure that the plug for the charger is placed firmly in the wall receptacle and that that the circuit breaker for that receptacle is not blown. Watch the “EZlamp” indicator to see if any LEDs illuminate when it is plugged in. If no LEDs light try a different power cord. If this does not fix the problem the charger needs to be replaced.

EZlamp Fault Codes	Problem	Solution
Continuous flashing RED	<ul style="list-style-type: none"> - No connection to battery - Battery connected in reverse 	-Check connections to battery
Flashing RED & YELLOW	<ul style="list-style-type: none"> - Poor Connection 	<ul style="list-style-type: none"> - Check all connections - Verify battery was not disconnected during charge
	<ul style="list-style-type: none"> - Problem with battery 	<ul style="list-style-type: none"> - Check battery - Verify battery electrolyte levels (lead acid only)

Maintenance

Daily Maintenance

1. Remove and clean pads or brushes. Never use soiled pads when cleaning. Replace pads when they become packed with residue.
2. Remove and clean debris from the float shut-off screen and drain saver located inside the recovery tank.
3. Drain and rinse tanks thoroughly
4. Inspect vacuum hose for any objects obstructing the air flow.
5. Raise squeegee and wiper blades with a clean cloth. Store squeegee in the raised position to prevent damage or setting of the blades.
6. Wipe down machine if needed. Use a nonabrasive, non solvent cleaner, or a clean damp cloth.
7. Recharge the batteries if needed.

Weekly Maintenance

1. Check battery water level in each cell of the batteries, and fill as needed. Always use distilled water to refill batteries. Batteries should be filled approximately 3/4" to 1" above the plates. Overfilling will cause the batteries to leak during charging. The charging process creates gas bubbles inside the battery, which effectively increases the volume of the electrolyte.
2. Clean battery tops to prevent corrosion.
3. Rotate brushes. Rotate the left to the right and right to left. On cylindrical models from front to back, or end to end if using different materials.
4. Drain and rinse tanks thoroughly. To thoroughly flush out any solution chemicals in solution line and valves, refill solution tank with a few gallons of warm clean water and run machine until tank is empty.

Monthly Maintenance

1. Check scrub head and squeegee lifting cables for wear and spring tension.
2. Check machine for water leaks and loose nuts and bolts.
3. Check to see if battery cables are tightened (Tighten if needed)
4. Check parking brake

Yearly Maintenance

1. Call your local dealer for yearly maintenance

Storing Machine

1. Be sure to flush the tanks out completely. To thoroughly flush out any solution chemicals in solution line and valves, refill solution tank with a few gallons of warm clean water and run machine until tank is empty.
2. Open the recovery tank lid to promote air circulation.
3. Raise brushes and squeegee.

Checking Battery Specific Gravity

Use a hydrometer to check the battery specific gravity.

Checking Gravity

A. Hydrometer

B. Battery

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

Check the hydrometer 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).

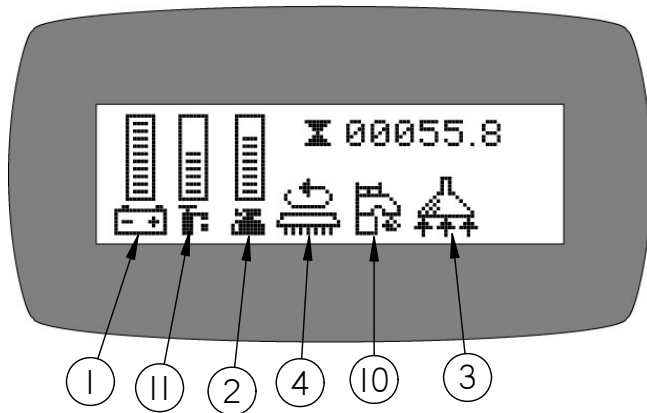
PREVENTATIVE MAINTENANCE RECORDS

CUSTOMER INFORMATION						
CUSTOMER						
ADDRESS						
CITY			STATE		ZIP CODE	
MACHINE INFORMATION						
MODEL #			SERIAL #			
WORK ORDER#			HOUR METER:			
BATTERY CONDITION	Cell #1	Cell #2	Cell #3	Cell #4	Cell #5	Cell #6
Battery # 1 Hydrometer						
Battery # 1 Water Condition						
Battery # 2 Hydrometer						
Battery # 2 Water condition						
Battery # 3 Hydrometer						
Battery # 3 Water Condition						
Battery # 4 Hydrometer						
Battery # 4 Water condition						
Clean Battery Tops. Check Battery Cable and Terminal Condition						
NOTES:						
BRUSH CONDITION						
Scrub Brush Fiber Length		Rotated Brushes				
Brush Drive Sockets	Good	Worn	Needs Replacement			
Drive Hubs	Good	Worn	Needs Replacement			
CHECK OPERATION AND CONDITION OF:						
	IN SPEC	REPAIR	PROBLEM			
Main Power Switch or Key Switch						
Handle Bar Switches						
Speed Potentiometer						
Reverse Switch						
LCD Display						
Page Switch						
Brush Pressure Switch						
Brush Pressure Managers Lock Out						
Reverse Switch						
Brush Switch						
Brush Deck Lift System						
Brush Motor						
Brush Drive Belt						
Solution Potentiometer						
Solution Solenoid						
Vacuum Switch						
Vacuum Motor Performance						
Vacuum Filter						
Recovery Drain Hose & Plug						
Squeegee Lift System						
Squeegee Adjustment						

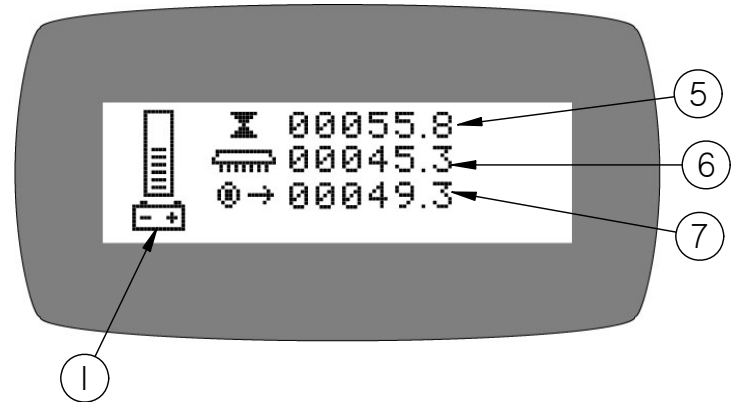
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LCD Screen Menu Displays

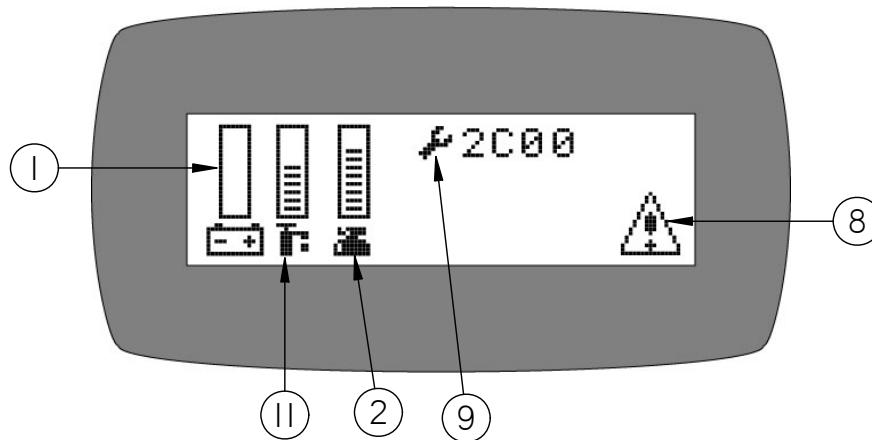
SCREEN # 1 (Operator)



SCREEN #3 (Maintenance)



SCREEN W/ERROR CODE



Use green menu selection button on control panel to change screens

1. **Battery level indicator** - Indicates the energy level remaining in the batteries. *(Shown on all menu displays)*
2. **Scrubdeck down pressure gauge** - Sets the down pressure on the brushes.
3. **Vacuum on** - Indicates the vacuum is "on".
4. **Scrub motors on** - Indicates the brush motors are "running".
5. **Key switch hour meter** - Tells you the total hours the machine has been on.
6. **Scrub brush hour meter** - Tells you the total hours the brush motors have been used.
7. **Transport hour meter** - Tells you the total hours the drive system has been used.
8. **Error warning symbol** - Indicates when there has been a diagnostic code error.
9. **Diagnostic code** - When the machine has detected an error it will display the warning symbol and a diagnostic code which tells you what's wrong.
10. **Water on** - Indicates the solution flow is "on"
11. **Solution level** - Indicates the gallons per minute (G.P.M) 0 - 1.0 .

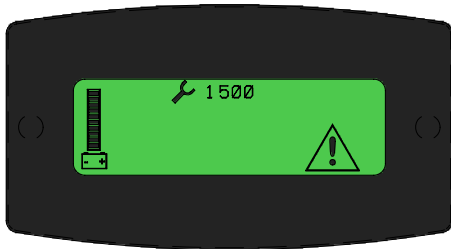
(For common error codes and descriptions see pages 27 & 28.)

TROUBLESHOOTING CENTRAL COMMAND II

NOTE: This machine is operated by a sophisticated electronic "**CONTROLLER**" that has many fail-safes within it. The controller self-analyzes problems and flashes a four-digit numeric code of what is wrong in the LCD window.

Most of these codes require a technician's attention. You should not attempt repairs you are uncomfortable with, especially if you are not used to working on electronics.

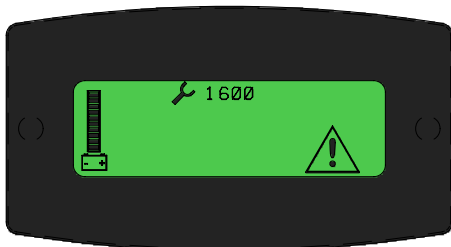
The complete list of codes is published in the simplified electronic troubleshooting manual, which is available to technical people. However, we have included the basic codes that you can usually resolve yourself.



1. **1E03 AND 1E04 ERROR.** Check the small safety switch next to the red plug below the dashboard. This switch will turn off the traction drive and brushes as a safety feature while the charger is plugged in. The switch may be stuck, or the plug twisted at an angle, engaging the switch. This code will also flash if the wiring becomes very wet. In this case, either wait until the wiring dries out, or call a technician.



2. **7601 AND 7602 ERROR.** Pads or brushes current over load. This can occur when the pads/brushes hit a bump in the floor. To restart the pads, turn off the key and turn it on again. To avoid this error, either slow down on bumpy parts of the floor, or reduce downpressure on the pads or brushes.

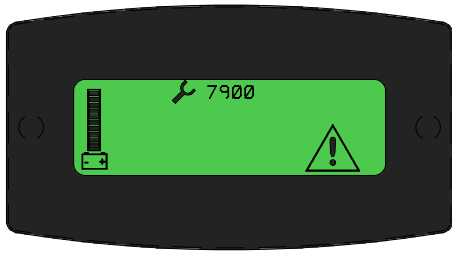


3. **1600 ERROR.** Voltage exceeds the maximum. Either the batteries are mis-wired, or the charger is still plugged into the machine.

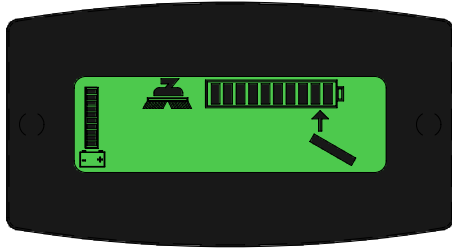


4. **7700, 7701, 7702, AND 7703 ERROR.** The vacuum motor has exceeded it's authorized power limit. Turn off main power switch and turn on again to clear.

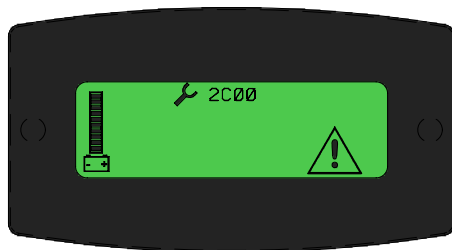
TROUBLESHOOTING CENTRAL COMMAND II



5. **7900 AND 7901 ERROR.** The emergency stop button is out.



6. **HIGH THROTTLE ERROR.** You pressed the drive button before turning on the key. Turn off the key, release the drive button and try again.



7. **2C00 AND 2C01 ERROR.** Low voltage warning. Voltage has dropped down below the minimum required to operate the machine. If you wait a few minutes, the batteries may coast up a bit in voltage, allowing you to drive very slowly to the recharge station.



8. **7802 ERROR.** The traction motor was used to climb a ramp, and was running up the ramp for more than the 60 seconds allowed for this. Turn off the key, turn on again, and continue. You should not use this machine to climb ramps so steep and so long that this code comes up repeatedly, or you could overheat and damage the traction motor.

9. All other error codes. Turn off the main power switch and disconnect the positive battery cable from the batteries for more than one minute (*the time is needed to drain the controller's on-board capacitor*). Reconnect the cables being sure they are tight; too loose will burn the batteries. If you overtighten the cables you can damage the battery's lead terminal. Try again.

10. If the problem cannot be solved by any of these remedie's call your local dealer's service department.

TROUBLESHOOTING CENTRAL COMMAND II V4

Code	Fault Description	Course of correction
0700	Bias Voltage Error	High reference signal is grounded
0701	Mid Rail Voltage High	
0702	Mid rail bias voltage high	
0704	12V supply failure	
0705	2.5 V reference error	
0706	High reference ground fault	5 Volt reference is Contacting 0 Volt Reference
0810	Throttle High reference error	For all Throttle Diagnostic Codes
0811	Throttle Max Wiper Difference Error	Check throttle wiring for shorts or opens. Repair or replace as necessary.
0812	Throttle Max Pull Down Difference Error	If diagnostic code is not cleared, then replace the throttle potentiometer
0813	Throttle Max Pull Safe Difference Error	
0814	Throttle Reference Error	
0815	Throttle Lo Reference Error	
0816	Throttle Hi Reference ISO Error	
0817	Throttle Lo Reference ISO Error	
0818	Throttle Error: Both have Readings	
0A01	Power down error	Check the wiring to the the main power switch. This code indicates rapid power cycling
1310	Excessive Current Trip	Current Draw on Control exceeds maximum limit of 250 amps Resistance in the machine's Main Breaker and/or battery cable to control Gives a false reading to the control.
1311	Brush head actuator, excessive current	Device connected to the brush head actuator has exceeded maximum limit of 21 amps surge value and 7 amps continuous. Check that the arms are not too tight (torque = 25 inch lbs, almost finger loose). check that actuator system is not binding.
1312	Squeegee actuator, excessive current	Device connected to squeegee actuator (on riders) has exceeded max limit of 21 amps surge value and 7 amps continuous load. Check that the arms are not too tight (torque = 25 inch lbs, almost finger loose). check that actuator system is not binding.
1313	Solution valve circuit, excessive current	Current exceeded seven amps max. Check valve operation. Coil may be corroded, or short in wires.
1314	Soft Aux 4 Over current Occurred	Aux 4 is not used by us at this time.
1318	Soft Brake light Over current Occurred	Brake light circuit not used by us at this time.
131C	Backup Alarm Over current occurred	Backup alarm drew more than 2 amps max allowed. Check inline resistor on some models. If resistor is bad, remove it, and put piece of duct tape over speaker of alarm. (Reverse EMF from the echo is causing the problem)
1321	Aux 1 (Brush Actuator) Over current 2 Occurred	Brush actuator exceeded 12 amps for less than 0.1 sec. See notes for 1311
1322	Aux 2 (Squeegee Actuator) Over current 2 Occurred	Squeegee actuator exceeded 12 amps for less than 0.1 sec. See notes for 1312
1400	Bridge Fault 1 - Brush or traction motor not in correct voltage range.	Possible short between B+ and the high amperage outputs
1401	Bridge Fault 2 - Voltage difference on traction bridge too great	
1402	Brush Bridge Fault - Battery/Brush bridge voltage difference too great	
1411	Brush actuator positive wire is shorting	Find appropriate wire and remove short.
1412	Brush actuator negative wire is shorting	Find appropriate wire and remove short.
1413	Squeegee actuator positive wire is shorting	Find appropriate wire and remove short.
1414	Squeegee actuator negative wire is shorting	Find appropriate wire and remove short.
1500	Brake Fault - Solenoid brake circuit is open	Parking Brake is disconnected or coil of brake is open.
1501	Brake Fault - Solenoid brake circuit is shorted	Parking Brake coil or wiring is shorted.
1502	Brake Fault - Brake Over Current Error	Parking brake coil is shorted internally or wiring too it is shorted
1503	Solenoid brake driver fault	
1504	Solenoid brake interlock fault	
1507	Brake Over current	Parking Brake is drawing too much power. Check wiring and brake.
1600	High Battery Error	Battery voltage is too high. Batteries hooked up wrong, or still on charger.
1D02	Spec Change Trip	This is normal--comes up when you reprogram the control. Turn key off and on to reset the program.
1E03	Inhibit activated	Inhibit is power signal intended to turn off control. We don't use it.
1E04	Inhibit Activated 2	Inhibit is power signal intended to turn off control. We don't use it.
1E06	Inhibit Input Out of Range	Inhibit circuit voltage is too low or high to work. We don't use Inhibit.
2C00	Low Battery Error	Voltage in battery is too low (18 volts min on 24V system; 28V on 36V system)
2C01	Low Battery Error--2	Recharge the battery in either case. check voltage under load to see if bad cell is pulling down voltage.
2C02	Battery lockout occurred	
2C03	Battery Lockout occurred--2	
2F01	Throttle Displaced Error	Pedal was pushed before key turned on. Not a problem. Restart machine.
3A00	Bad Program Settings	You reprogrammed the control with settings that are not authorized.
3100	Low bridge voltage	Probable short circuit of output device or wiring
3101	Traction bridge fault	
3102	Brush/Vac bridge fault	
3103	Waiting for bridge to charge	
7000	Startup With Push Selected	Freewheel input signal selected at startup. Disconnect freewheel switch.

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TROUBLESHOOTING CENTRAL COMMAND II V4

CONTINUED FROM PREVIOUS PAGE

7001	Push Activated in Drive Mode	Freewheel input signal activated while driving. Disconnect freewheel switch. <i>NOTE: As of this reading, we do not use Freewheel. This permits pushing machine more easily by disconnecting traction motor from control.</i>
7500	Throttle Comms Time Out	Problem with LCD dash module or with wiring to it. Check and replace as necessary.
7501	LCD Module settings corrupt	Disconnect batteries and wait 2 minutes to reconnect
7600	Brush motor not connected	Check for open circuit
7601	Soft Brush Current Fold back	Too much load on brush motor. May be from hitting a bump or wire tangled in brush drive mechanism. Possible wiring or brush motor short.
7602	Soft Brush Current Foldback--2	Same as above.
7603	Soft Brush Current Foldback--3	Same as above.
7604	Brush Inhibit is on	We do not use Brush Inhibit at this time.
7605	Brush startup over current detection	You may have started brushes on carpet or rubber or other high resistance material. This may have stalled motor before actuator could react to lift brush head up. If chronic problem, call Factory to discuss reprogramming machine for application.
7700	Soft Vacuum Motor Disconnected Error	Check wiring to vac motor. On 390, check wiring to Hella relay for vac motor
7701	Vac Motor Current Fold back	Too much amp load on vac circuit. Check wiring. May come from picking up large column of water.
7702	Soft Vacuum Current Foldback--2	Same as above
7703	Soft Vacuum Current Foldback--3	Same as above
7800	Traction Motor Fault No. 1	Check traction motor wiring and connectors. Include connector at steering pivot under floor cover!
7801	Traction Motor Over current Error	Too much current due to bad motor or wiring to motor.
7802	Soft Traction Motor in Fold back State	Traction motor being overloaded, or ramp climbing that took longer than 60 seconds. (Fold back means normal low amp setting to motor. There is one minute ramp climbing surge that may be 4 times as high as the fold back rate).
7803	Motor Line Voltages Instability Timeout	May be loose wire at motor or at control. Possible motor problem
7880	Traction Speed Input Out of Range	Throttle setting wrong for motor speed. Check throttle pot. and wiring.
7900	Emergency Stop Error	Emergency Stop Button is Actuated when you tried to move. Optional button.
7901	Soft Belly Button Actuated	Belly Button Switch activated. We don't use this.
8000	Service Mode	Service Timer Limits have been reached. We don't normally use them; they are dealer option.
9000	Brushes not fitted	Check brush deck to make sure brushes are on, and on securely.
0003	Possible terminal short in system	For all of these Diagnostic Codes:
0100		1. Turn off keyswitch and disconnect battery for two minutes, using your watch to measure time.
0204		
0A01		2. When you reconnect battery, you must see a spark. This shows the control's on-board capacitor has been discharged and has been refilled.
0B02		
1704		3. Restore the battery connection. Make sure battery cable is on tight before trying machine or you could burn battery posts and cable.
1705		
1706		4. Turn on machine. If diagnostic code still shows, then replace the control.

TROUBLE SHOOTING

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
NO POWER, NOTHING OPERATES	FAULTY POWER SWITCH BATTERIES NEED CHARGING FAULTY BATTERY LOOSE BATTERY CABLE MAIN CIRCUIT BREAKER TRIPPED	CONTACT LOCAL SERVICING DEALER SEE CHARGING BATTERIES REPLACE BATTERY TIGHTEN LOOSE CABLE WAIT 5 MINUTES FOR AUTO RESET DETERMINE CAUSE AND CORRECT
BRUSH MOTOR(S) DO NOT OPERATE	GREEN BUTTON IS NOT DEPRESSED CIRCUIT BREAKER TRIPPED CARBON BRUSHES WORN FAULTY BRUSH MOTOR OR WIRES	DEPRESS BUTTON ON HANDLE BAR RESET & REDUCE PRESSURE DETERMINE CAUSE AND CORRECT CONTACT LOCAL SERVICING DEALER CONTACT LOCAL SERVICING DEALER
VACUUM MOTOR DOES NOT OPERATE	FAULTY VACUUM SWITCH CIRCUIT BREAKER TRIPPED FAULTY VACUUM MOTOR CARBON BRUSHES WORN	REPLACE SWITCH RESET & CHECK HOSE DETERMINE CAUSE AND CORRECT CONTACT LOCAL SERVICING DEALER CONTACT LOCAL SERVICING DEALER
INSUFFICIENT SOLUTION FLOW	SOLUTION TANK LOW FLOW KNOB TURNED DOWN SOLUTION FILTER CLOGGED SOLUTION LINE CLOGGED SOLUTION VALVE CLOGGED	REFILL SOLUTION TANK TURN KNOB MORE OPEN REMOVE COVER AND CLEAN REMOVE AND BLOW OUT WITH COMPRESSED AIR REMOVE COVER AND CLEAN

TROUBLE SHOOTING

PROBLEM

CAUSE

SOLUTION

NO SOLUTION FLOW

NO SOLUTION IN TANK
SOLUTION SWITCH OFF
SOLUTION SCREEN CLOGGED
FAULTY SOLUTION SOLENOID
FAULTY SOLUTION SWITCH

FILL SOLUTION TANK
TURN SOLUTION SWITCH ON
REMOVE AND CLEAN SCREEN
CONTACT LOCAL SERVICING DEALER
CONTACT LOCAL SERVICING DEALER

POOR WATER RECOVERY

RECOVERY TANK IS FULL
BALL/SCREEN IS CLOGGED
VACUUM HOSE IS CLOGGED
SQUEEGEE IS CLOGGED
SQUEEGEE BLADE IS WORN
FAULTY VACUUM HOSE
VACUUM MOTOR GASKET TORN
TANK GASKET FAULTY
DRAIN PLUG LOOSE
VAC MOTOR FAULTY
BATTERY CHARGE LOW

EMPTY RECOVERY TANK
REMOVE SCREEN AND CLEAN
REMOVE DEBRIS
REMOVE DEBRIS
ROTATE OR REPLACE BLADES
CONTACT LOCAL SERVICING DEALER
CONTACT LOCAL SERVICING DEALER
CONTACT LOCAL SERVICING DEALER
TIGHTEN PLUG
CONTACT LOCAL SERVICING DEALER
CHARGE BATTERIES OVERNIGHT

POOR WATER RECOVERY ON TURNS

WIPERS WORN
WIPERS CHATTER
SQUEEGEE SWING IS BINDING
INCORRECT SQUEEGEE SIZE

REPLACE WIPER MATERIAL
TIGHTEN PIVOT POINTS
CONTACT LOCAL SERVICING DEALER
CONTACT LOCAL SERVICING DEALER

TIRES NOISY

BEARING DRY
FAULTY HUBS

GREASE BEARINGS
CONTACT LOCAL SERVICING DEALER

POOR TRACTION

EXCESSIVE BRUSH PRESSURE
WORN DRIVE TIRE
HEAVY SOAP CONCENTRATION

REDUCE PRESSURE WITH SWITCH
REPLACE TIRES
CONTACT LOCAL SERVICING DEALER

SHORT RUN TIME

BATTERIES RUN DOWN
BATTERIES STILL DOWN
BATTERIES LOW ON WATER

BATTERIES OVER CYCLED

CHARGE BATTERIES TWICE
CONTACT LOCAL SERVICING DEALER
FILL WITH DISTILLED WATER TO 3/4"
ABOVE THE LEAD PLATES
CONTACT LOCAL SERVICING DEALER

