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Operation & Maintenance Manual

For Commercial Use Only



20" FLOORKEEPER "EZ" BRUSH DRIVE

MODEL NOS.

99105A & 99105B

For Parts List see L2621EFP

NOTES

Write your machine serial number here: _____

This illustrated instruction book covers:

MODEL	20"	20"
CAT. NO.	99105A*	99105B*
VOLTS	24V	24V
SERIES	F	F

All specifications are subject to change without notice.



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Long-term buyer protection warranties

Tornado® Standard Warranty Program *	
<p>Warranties do not cover components subject to normal wear or abuse and misuse, and have other limitations not specified here. For full details, contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.</p> <p>Tornado sales and service representatives are not authorized to waive or alter the terms of this warranty, or to increase the obligations of Tornado under the warranty.</p>	<p>10 Years: <i>All plastic tanks and rotationally-molded bodies ^{1) 2)}</i></p>
	<p>2 Year: <i>Parts on all Tornado and Tornado/Karcher cleaning equipment ^{1) 2) 3)}</i></p>
	<p>1 Year: <i>Labor on all Tornado and Tornado/Karcher cleaning equipment ²⁾</i></p>
	<p>1 Year: <i>Warranty on batteries and chargers, one year pro-rated.</i> ** 6 Month Warranty on Gel Batteries All battery warranties are handled by the battery manufacturer, please call customer service for more information.</p>

Thank you for choosing Tornado products. We are proud to offer the most complete line of commercial and industrial cleaning equipment in the industry. Our reputation for quality, innovation and durability is unsurpassed.

*Effective January 1st, 2005. Terms subject to change without notice.

- 1) Windshear™ Blower-Dryer, Insulation Blowers, T191, T201, T12/1, CV 30, CV 38, CW 50, CW 100, Pro PAC Vacs, Duo-Upright Carpetkeepers™, Gas & Electric Pressure Washers, and all chargers are warranted for 1 (one) year for both parts and labor.
- 2) Warranties on all riding sweepers including the ICC1, KM 100/100 R, KMR 1250, and KMR 1700 are 24 months parts/6 months labor OR 1000 hours of operation, whichever comes first. Warranties on the 75/140 & 90/140 are 24 months parts/12 months' labor OR 1,000 hours of operation whichever comes first.
- 3) All non-wear item parts purchased after warranty expiration are warranted for 90 days.
- 4) Warranty starts from the date of sale to the consumer or, at Tornado's discretion, 6 months after dealer purchased the unit from Tornado, whichever comes first.

Note: Tornado, The Latest Dirt, Floorkeeper, Carpetkeeper, Carpetrinser, Carpetrinser/Dryer, Headmaster, Taskforce, PAC-VAC, T-Lite, Glazer, Windshear, Max-Vac, CV 30, CV 38, and Trot-Mop are trademarks of Tornado Industries.

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**IMPORTANT SAFETY INSTRUCTIONS
FOR COMMERCIAL USE
WHEN USING AN ELECTRICAL APPLIANCE, BASIC PRECAUTIONS SHOULD ALWAYS BE
FOLLOWED INCLUDING THE FOLLOWING:**

READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE



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

Do not leave machine when plugged in. Unplug from outlet when not in use and before servicing.

Use indoors only. Do not use outdoors, do not expose to rain.

Do not allow to be used as a toy. Use caution when operating near children.

Use only as described in this manual. Use only manufacturer's recommended accessories.

Do not use with damaged cord or plug. If charger is not working as it should, has been dropped, damaged, left outdoors, or dropped into water, return it to a Tornado Service Center.

Do not pull or carry by cord, use cord as a handle, close a door on cord, or pull cord around sharp edges or corners. Do not run machine over cord. Keep cord away from heated surfaces.

Do not unplug by pulling on cord. To unplug, grasp the plug not the cord.

Do not handle plug or machine with wet hands.

Do not put any object into openings. Do not use with any opening blocked; keep free of dust, lint, hair, and anything that may reduce air flow.

Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.

Turn off all controls before unplugging.

Also:

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



CAUTION: This machine is not suitable for picking up health endangering dust.

If foam/liquid comes out, switch off immediately.

Instructions for the water level limiting device to be regularly cleaned and examined for signs of damage.

Save These Instructions

This manual describes procedures for preparation, operation and maintenance of the following Breuer/Tornado® product:

- EZ 20®BD Floorkeeper (brush drive model)

BEFORE OPERATING MACHINE




WARNING: Failure to adhere to these instructions could result in serious bodily injury or property damage.


Read this manual completely before attempting to operate the machine. This manual has important safety information. This machine will provide years of satisfactory service if operated and maintained according to recommendations in this manual. If additional information is needed, please contact your local distributor or:


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Important Safety Information


SAFETY FIRST!


	WARNING: Charge batteries in a ventilated room. Gases given off during charging could ignite in a confined space. To avoid explosion, top cover should be open and battery caps installed when charging.
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	WARNING: Disconnect all positive and negative battery terminals before attempting any adjustment or maintenance. Brush drive and vacuum motors and components can cause injury if accidentally started.
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	WARNING: Battery acid can cause injury to the eyes or burn skin. Wear protective goggles, face shield, gloves and clothing BEFORE filling or charging batteries.
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	WARNING: Make certain the main power switch is OFF before removing or installing pad or brushes.
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	CAUTION: NEVER operate the machine if you are tired, or under the influence of drugs and/or alcohol.
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	CAUTION: ALWAYS operate the machine while standing behind it.
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	CAUTION: Use care when working on electrical terminals. Short circuits can cause burns.
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CAUTION: Back the machine down inclines or ramps. Do not store machine on inclines.



CAUTION: Use indoors only. Do not use outdoors.



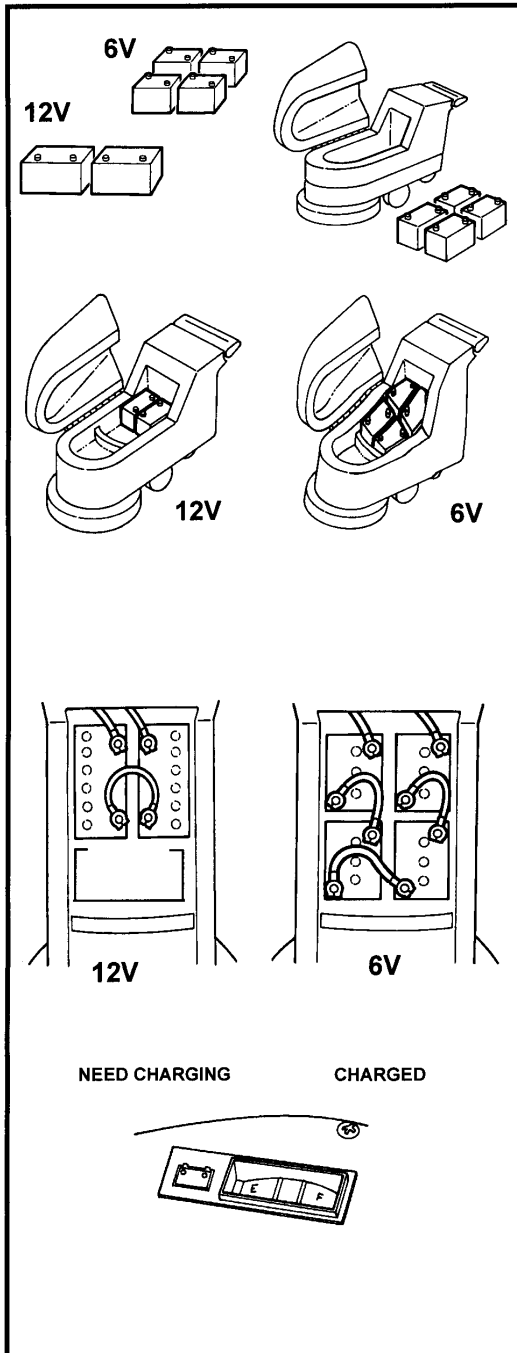
CAUTION: Do not allow to be used as a toy. Use extra caution when operating near children.



CAUTION: Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.

Machine Set-up

How To Install Batteries



	CAUTION: Batteries are heavy. Use 2 people and lift them to avoid injury.
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Install (2) 12-volt or (4) 6-volt batteries. New batteries should be given a full charge before first use. Limit use of new batteries during first 5 cycles.

- 1 Place batteries alongside machine.
- 2 Recovery tank should be empty. Lift the top cover to the open position.
- 3 Place batteries in tray. If you use (2) 12-volt batteries, position on rear of tray. Use the bracket to secure them.
- 4 Position them correctly.

	CAUTION: Make sure you connect RED (+) cable terminals to positive (+) posts and BLACK (-) cable terminals to negative (-) posts. Machine will not operate if not connected properly. Failure to do so will result in damage to batteries and possible explosion.
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- 5 Follow the diagram inside the top cover and connect all cables.
- 6 Spray each post with a protective lubricant. Place battery terminal protectors over all posts.

How To Charge Batteries

	WARNING: Battery acid can cause severe burns. Wear protective goggles, face shield, gloves and clothing BEFORE filling or charging batteries.



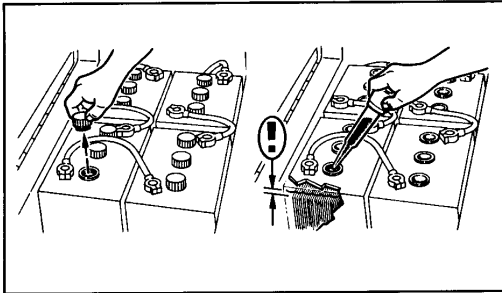
CAUTION: Fill batteries with distilled or purified water only (1/4" to 1-1/2" above the lead plates). DO NOT use any other type of water or fluid in the battery.



CAUTION: DO NOT use metal containers to fill battery cells.



CAUTION: BEFORE charging batteries, put machine in a ventilated area and always leave machine top open.



NOTE: Give all new batteries a full charge before they are used.

NOTE: Limit extended use of new batteries during the first 5 operating cycles.

NOTE: Do not excessively discharge batteries. Excessive discharge can cause polarity reversal and complete failure of battery.

NOTE: Make sure the recovery tank is empty before charging batteries.


- 1 Open machine top.
- 2 BEFORE charging, remove all battery caps and inspect each cell. The lead plates should be completely covered with 1/4" to 1/2" of battery fluid.
- 3 If the plates are not covered with the proper amount of fluid, use a battery filling device and carefully add distilled or purified water. DO NOT overfill the cells. If you overfill, remove the excess fluid. Discard excess in accordance to local and state rules.
- 4 Check each cell for proper fluid level.
- 5 Replace all battery caps and tighten.
- 6 Use ammoniated window cleaner and spray top of batteries. Use a cloth and wipe the battery tops to remove and clean up spills.

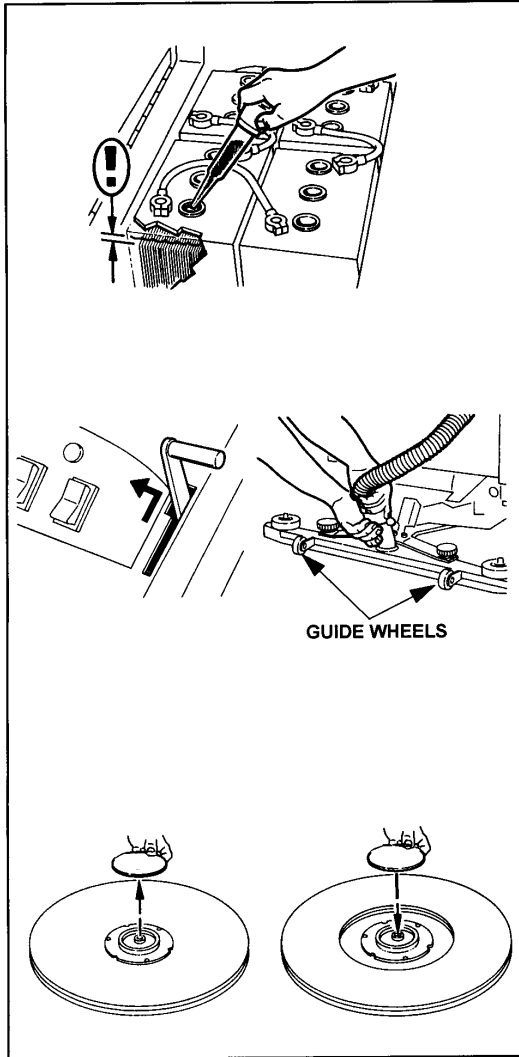


CAUTION: Only use a battery charger designed for the machine. Failure to do so can result in damage to the batteries.

- 7 Connect the charger Anderson Clip to the terminal located at the back of the battery compartment.

- 8 Plug the charger AC cord into a grounded wall outlet. The charger will automatically begin to charge the batteries.
- 9 Check to see if charger is working by looking at the charger amp meter. Batteries that need charging will show approximately 20 amps on the meter. Allow approximately 2-3 hours of charging for each hour you use the machine. Batteries that are charged will show approximately 7 amps on the meter, and will turn off automatically.
- 10 If the charger is still **ON** unplug the charger AC line from the wall. If the charger is OFF disconnect the Anderson plug from the unit.

	<p>CAUTION: If the charger is on unplug the charger from the wall outlet BEFORE you disconnect it from the machine. Failure to do so may result in damage to the machine and charger.</p>
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- 11 After batteries are charged unplug the charger from the wall outlet.
- 12 Disconnect the Anderson Clip from the machine.
- 13 Let the batteries cool down for at least 30 minutes.
- 14 Remove all battery caps and check the fluid level of all the cells. If necessary fill again. Make sure all plates are covered with at least 1/4" to 1/2" of distilled water.
- 15 Replace and tighten all battery caps.
- 16 Close top cover of the machine.

How To Install the Squeegee

- 1 Put squeegee position lever in the UP and locked position.
- 2 Position the squeegee blade assembly on the swing arm. Make sure the guide wheels face the **rear** of the squeegee.
- 3 Tighten the 2 thumb screws.
- 4 Place the solution recovery hose over the nozzle. Make sure it fits tight.

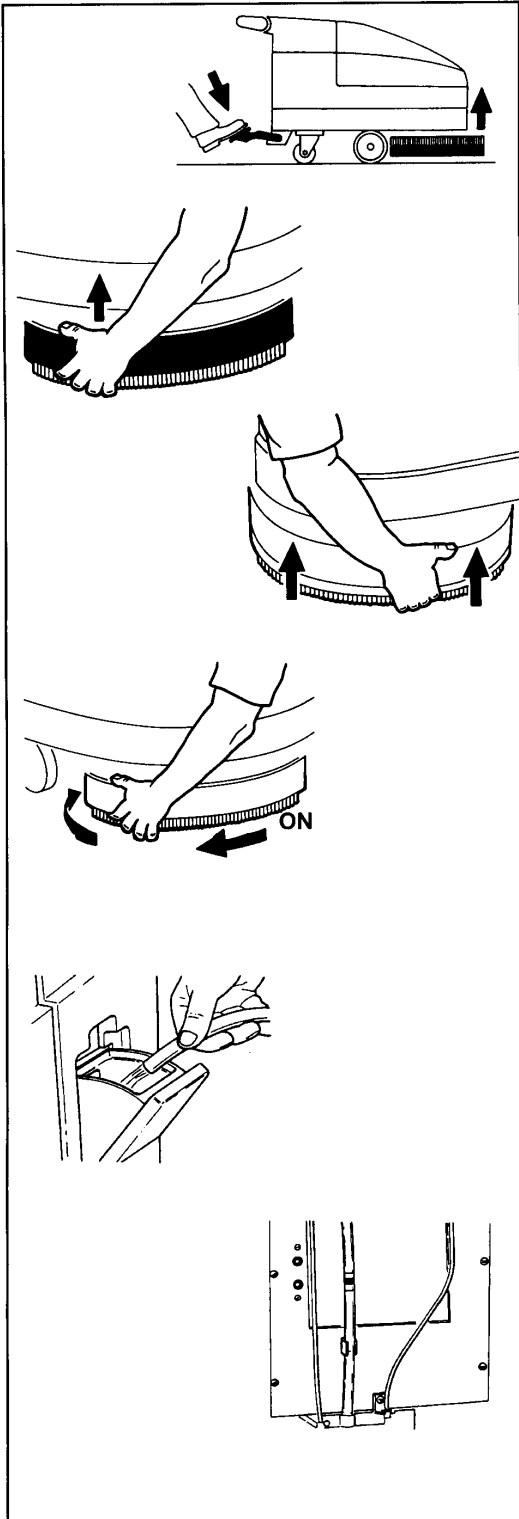
How To Install Pad Holder and Brush

The EZ uses 1 pad holder or 3 types of brushes.

	<p>CAUTION: Always use Breuer/Tornado plastic clutch plate in the center of the pad holder. Aluminum clutch plates are not recommended for use with EZ machines.</p>
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Installing the pad

- 1 Remove the center locking device located on the underside of pad holder/brush.



- Center the pad brush on top of the holder and replace the locking device. The locking device should be tight.

NOTE: The installation steps are the same for both pad holder or brush.

- Raise the brush pad by stepping on the round foot pedal at the rear of machine. You will hear a click when the deck is up and locked.
- Pull the splash guard up (black splash bumper).
- Kneel in front of the machine. Slide the pad holder/brush under the machine and hold the pad/brush with your hands in the 3:00 and 9:00 positions.
- Lift the pad holder/brush up and turn slowly clockwise until the pad/brush clutch engages the motor mount.
- If the pad/brush is installed correctly it will remain on the machine. If it drops after you have turned it, it is not installed correctly.
- To lower the brush/pad, step down completely on BOTH the round foot pedal and the square pedal next to it. When fully depressed, slide your foot to the inside to release the square pedal and SLOWLY let the round pedal raise to the UP position.
- Slide splash guard down around the entire brush housing. It should be slightly above the floor.

How To Fill the Solution Tank



CAUTION: DO NOT overfill. To prevent overfilling refer the clear tube located at the back of the machine. Never fill above the red line. Fill with water to the BLUE and GREEN line and then add your cleaning solution.

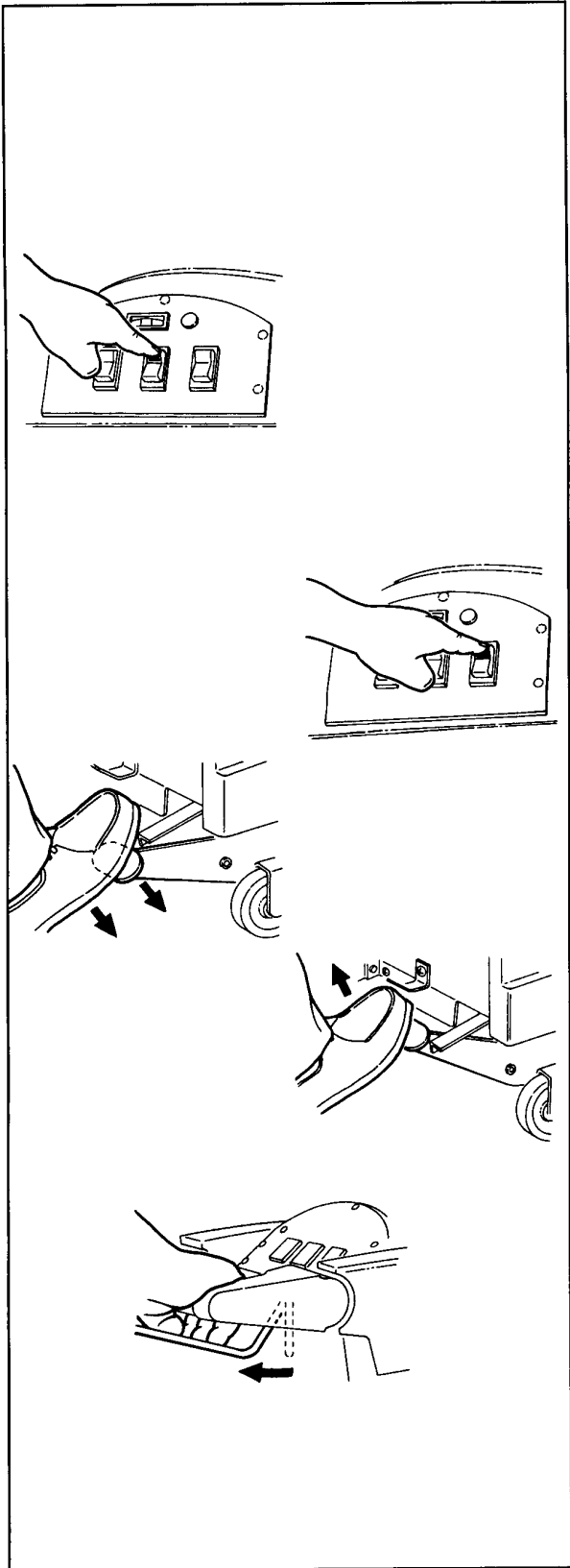
The EZ machine has a capacity of 13 gallons (50 liters).

- Open the solution fill chute.
- Fill the tank to the desired level with clean water.
- Add cleaning chemical.
- Check the level at the back of machine.

Final Installation and Set-up Checklist

- Batteries installed and charged
- Pad or brush installed
- Squeegee assembly installed
- Solution tank filled

How To Operate The Machine



How To Turn the Machine ON and OFF

- 1 Push the top half of the left switch down. This turns the main power switch ON. A red light indicates machine is ON.
- 2 To turn the main power switch OFF push the lower half of the left switch down. The red light is not lit when machine main power is OFF.

How to Turn the Brush Drive Motor ON and OFF

- 1 Push the top half of the middle switch down. This turns the brush drive motor ON.
- 2 To turn the brush drive motor OFF push the lower half of the middle switch down.



CAUTION: Turn off the brush motor when the brush deck is in the UP position.

How to Turn the Vacuum Motor ON and OFF

- 1 Push the top half of the right switch down. This turns the vacuum motor ON.
- 2 To turn the vacuum motor OFF push the lower half of the right switch down.

How to Lower/Raise the Brush/Pad

- 1 Hold the drive handle with both hands.
- 2 To raise the brush/pad, step down on the round foot pedal until you feel it lock.
- 3 To lower the brush/pad, step down completely on BOTH the round foot pedal and the square pedal next to it.
- 4 When fully depressed, slide your foot to the inside to release the square pedal and SLOWLY let the round pedal raise to the UP position.
- 5 With the brush head lowered, slide the splash guard down around the entire brush housing. It should be slightly above the floor.

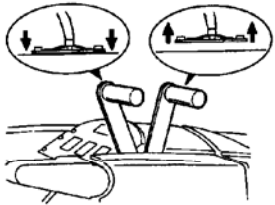
How to Engage the Brush Drive (20" EZ BD)

- 1 Hold the drive handle with both hands.
- 2 Pull up on the Control Bar under the drive handle. This activates the brush motor and makes the machine go forward or reverse depending on the dial setting.

- 1 Hold the drive handle with both hands.

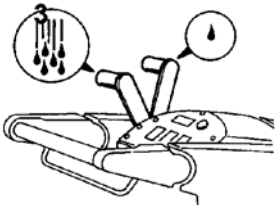
How to Lower/Raise the Squeegee

- 1 Pull the handle towards you to lower the squeegee.
- 2 To raise it, push the handle forward until it locks.

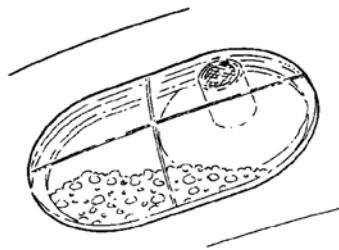
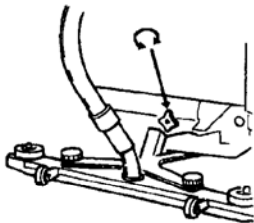
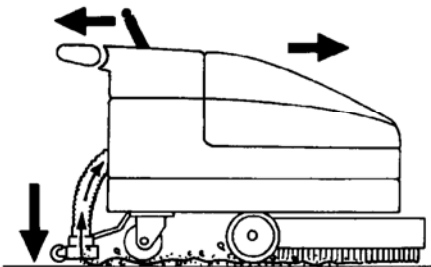
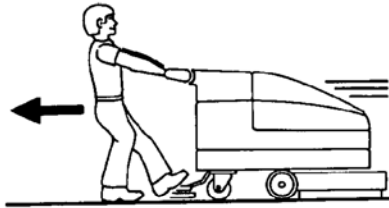
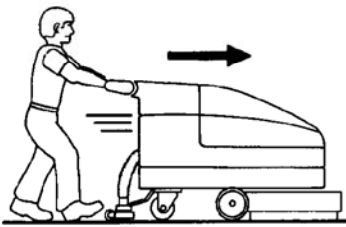


How to Set the Solution Flow

- 1 Pull the lever halfway to begin dispensing solution.
- 2 Adjust the solution flow. Use different settings of solution flow for different jobs.



What To Do When You're Operating Machine



How To Go Forward and Backward

(20" EZ BD)

- 1 Stand behind the machine.
- 2 Make sure the brush drive motor switch is ON.
- 3 Lower the brush head as described.

The machine will start to move forward in a straight line. To go backward, just pull the machine back.

How To Steer the Machine

The machine is very easy to steer. Just point the machine in the direction you want to go. At the end of a long hallway or aisle, go slow and stand a bit to the side of machine as you turn it around. NEVER let go of the machine.

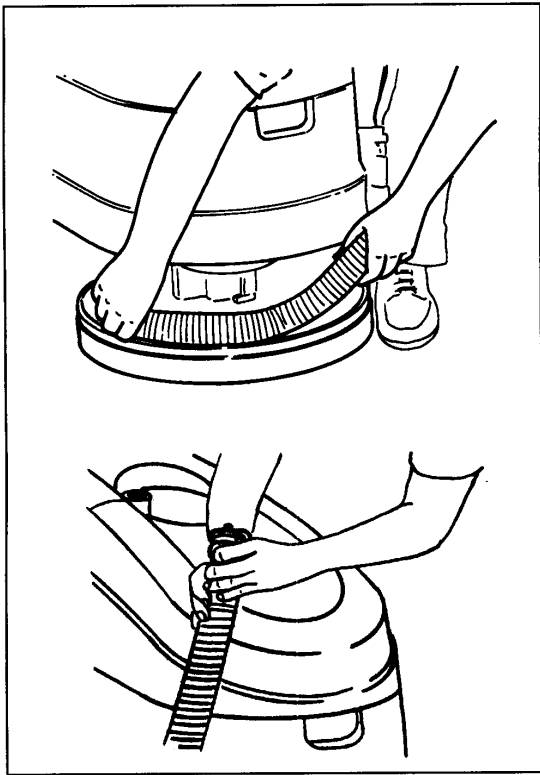
Vacuumping Up Solution

- 1 Make sure the squeegee is in the down position.
- 2 As the machine moves forward and solution is dispensed, the squeegee will vacuum it up into the recovery tank.
- 3 If necessary adjust squeegee pressure by turning knob.

If solution is missed, reduce the amount of solution flow and pull the machine back over the missed area. You can go forward or backward and pick up solution.

How To Control Excess Foam in Recovery Tank

Watch the liquid as it accumulates in the recovery tank. If you notice excess foaming, stop the machine. Add a small amount of chemical defoamer in the recovery tank.



How To Empty the Recovery Tank

The machine will automatically shut the vacuum motor OFF when the recovery tank is full of dirty water.

A red light comes on at the control panel.

- 1 Stop the machine by releasing the Control Bar and raising the brush drive housing.
- 2 Stop the solution flow.
- 3 Turn OFF all 3 power switches (brush motor, vacuum motor, main power).
- 4 Move the machine to an area that will allow you to empty the recovery tank into a floor drain or basin.
- 5 Lower the brush deck.
- 6 Remove the recovery tank drain hose from the front of the machine.
- 7 Raise the hose above the solution tank and remove the plug.
- 8 Put the hose over a drain or in a basin and remove the plug.
- 9 Empty the tank.
- 10 Replace the plug and tighten it.
- 11 Replace the hose and secure it with the clips.

Remember to fill the solution tank with fresh water before operating the machine.

Maintenance

Preventative Maintenance Schedule

Daily-

- 1 Empty and rinse the recovery tank with clean water. Leave the tank cover open on top to air dry.
- 2 Remove and clean pad or brush.



CAUTION: Avoid getting water into the vacuum intake with filter screen in the recovery tank.

- 3 Clean the filter screen located at the top of the vacuum inlet.
- 4 Remove the squeegee assembly, rinse and wipe clean. Check the squeegee inlet for clogs or debris.
- 5 Clean and wipe the tops of batteries with an ammoniated window cleaner.
- 6 Charge the batteries as described in this manual.

Weekly-



CAUTION: Never test the strength of the battery unless it is fully charged and cool.

Check the battery cells with a hydrometer.

Monthly-

- 1 Lubricate brush and squeegee lift mechanisms with light oil.
- 2 Check for wear or damage of clutch plate, brushes, pads, or squeegee blades.
- 3 Clean all battery terminals.
- 4 Check all electrical connections and tighten if any are loose.
- 5 Clean the entire machine with all purpose cleaner.

Problems During Operation

<p>Problem: Solution is not being picked up</p>	<p>Possible Cause: Vacuum motor is not running Vacuum filter is clogged Recovery tank is full Squeegee or vacuum hose is clogged, broken or disconnected Bad seal at tank cover, vacuum motor or squeegee Worn or misaligned squeegee blades Incorrect squeegee pressure Squeegee swing arm mechanism not functioning properly</p>
<p>Problem: Squeegee is leaving streaks</p>	<p>Possible Cause: Debris is on blade Blades are torn or damaged Floors not properly swept before cleaning</p>
<p>Problem: Solution is not feeding or turning off properly</p> <p>Problem: Batteries are not holding a charge</p>	<p>Possible Cause: Clogging of hose or valve</p> <p>Possible Cause: Batteries need to be replaced High current draw from high brush pressure Charger needs servicing Battery is run down</p>
<p>Problem: Floors are not being scrubbed, stripped or buffed properly</p>	<p>Possible Cause: Brush motor not working Excessive pad or brush wear Going too fast over dirty spots Inadequate solution feed Inadequate cleaning procedure</p>