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WWW.TORNADOVAC.COM



Operations & Maintenance Manual
For Commercial Use Only



20" FLOORKEEPER EZ BRUSH DRIVE
MODEL NOS: 99105A,99105B

Write your machine serial number here: _____

This illustrated instruction book covers:

Model	20"	20"
Cat. No.	99105A**	99105B**
Volts	24	24
Series	G	G

**



All specifications are subject to change without notice.

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NOTES



Long Term Buyer Protection Limited Warranty

Tornado Industries, LLC. (Tornado) warrants to the end/user customer that the Tornado product(s) will be free from defects in material and workmanship for the duration(s) described below. This limited warranty DOES NOT cover machines and/or components subject to normal wear and tear, damage that occurs in shipping, failures resulting from modification, accident, unsuitable operating environment, misuse, abuse, neglect, or improper maintenance by you. For full details, contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department. 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.

10 Years*

Plastic water tanks and Rotationally-molded bodies

2 Years*

Parts on all Tornado cleaning equipment

1 Year*

Labor on all Tornado cleaning equipment

1 Year*

Warranty on batteries, one year prorated

All battery warranties are handled directly by the battery manufacturer, on a one year prorated basis

Terms subject to change without notice

1. Except all Windshears™ Blowers, Storm, TV 2, Side and Dowlndraft, Insulation Blowers, CV 30, CV 38, CK14/1 PRO, CK 14/2 PRO, SWM 31/9, CK LW13/1, CV 38/48 Dual, PV6, PV10, and all chargers are warranted for 1 (one) year for both parts and labor.
2. All non-wear item parts purchased after warranty expiration are warranted for 90 days.
3. Warranty starts from the date of sale to the consumer or, at Tornado's discretion, 6 months after the dealer purchased the unit from Tornado, whichever comes first.
4. The EB 30 is warranted for a period of 90 days for both parts and labor.
5. The warranty on engines used on propane powered equipment is limited to motor manufacturer's warranty.
6. Ride-on Scrubbers are warranted for 24 months, parts, 6 months labor or 1,000 hours, whichever occurs first.

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

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Address 3101 WICHITA COURT
FORT WORTH, TX 76140



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:



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 suitable for commercial use, for example in hotels, schools, hospitals, factories, shops and offices and 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

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:

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.



WARNING: Disconnect all positive and negative battery terminals before attempting any adjustment or maintenance. Traction drive and vacuum motors and components can cause injury if accidentally started.



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.



WARNING: Make certain the main power switch is OFF before removing or installing pad or brushes.



CAUTION: NEVER operate the machine if you are tired, or under the influence of drugs and/or alcohol.



CAUTION: ALWAYS operate the machine while standing behind it.



CAUTION: Use care when working on electrical terminals. Short circuits can cause burns.



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.

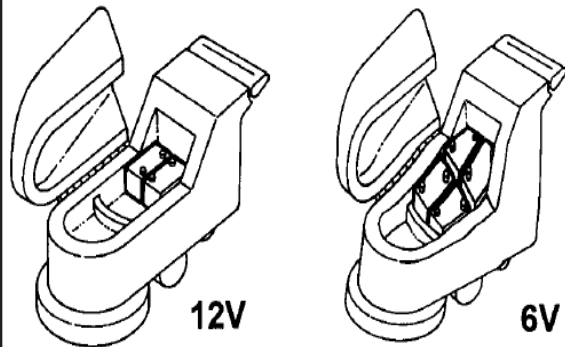
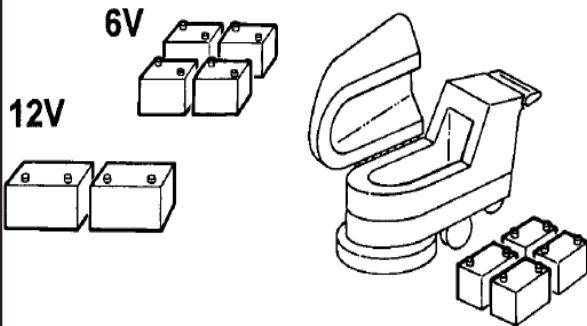


CAUTION: Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.

How To Install Batteries



CAUTION: Batteries are heavy. Use 2 people and lift them to avoid injury.

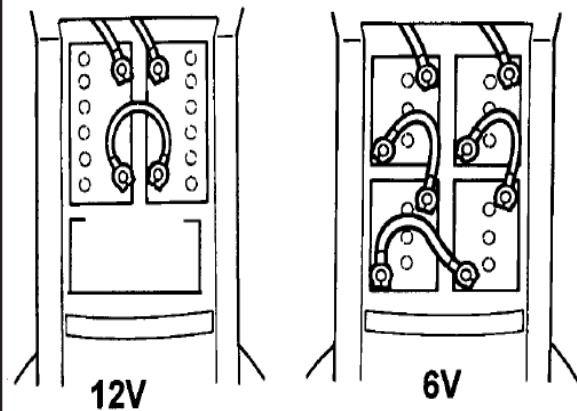


Install (2) 12-volt or (4) 6-volt batteries. New batteries should be given a full charge before first use. Limit use of new batteries during first 5 cycles.

1. Place batteries alongside machine.
2. Recovery tank must 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 brace 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.



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



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



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.

- Open machine top.
- Use ammoniated window cleaner and spray top of batteries. Use a cloth and wipe the battery tops.

How to Charge Batteries

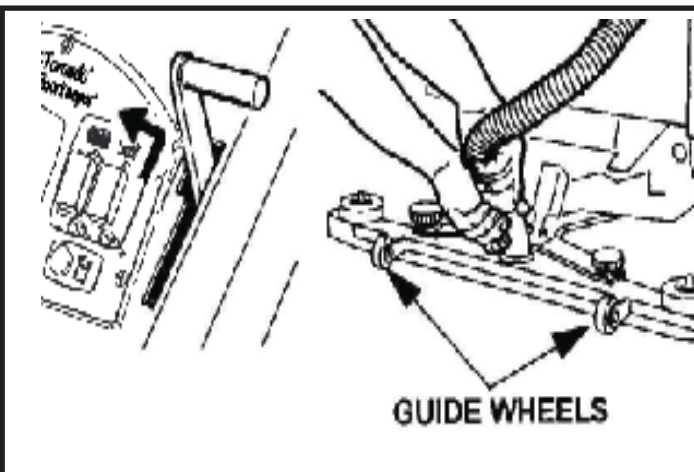
- Plug the charger AC cord into a grounded wall outlet. The charger will automatically begin to charge the batteries.
- After batteries are charged unplug the charger from the wall outlet.
- Close top cover of the machine.



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



CAUTION: Only use a battery charger designed for the machine. Failure to do so can result in damage to the batteries. The charger was pre set at the factory for the configuration of your unit. If another type of battery is installed the charger will have to be programmed to match the batteries that are being installed. Please see page 8 for charger programming instructions



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.

The battery charger comes programmed for Wet, lead-acid batteries. If you desire to change to some other type of battery you will need to change the charger to match the batteries. Follow the instructions below to change the charging curve of the charger.



Fig 6

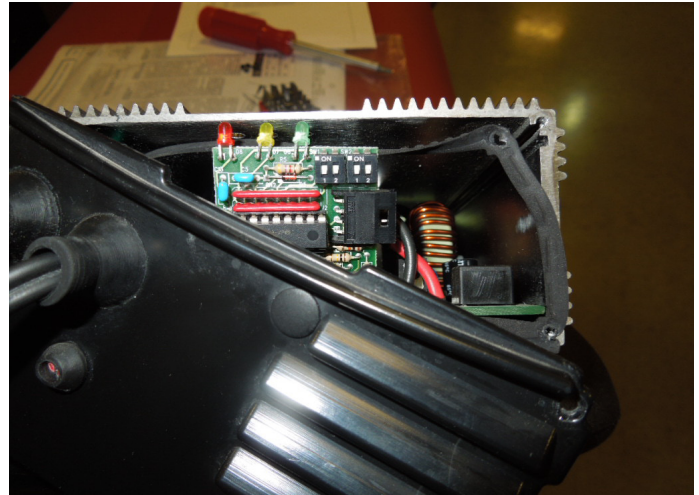
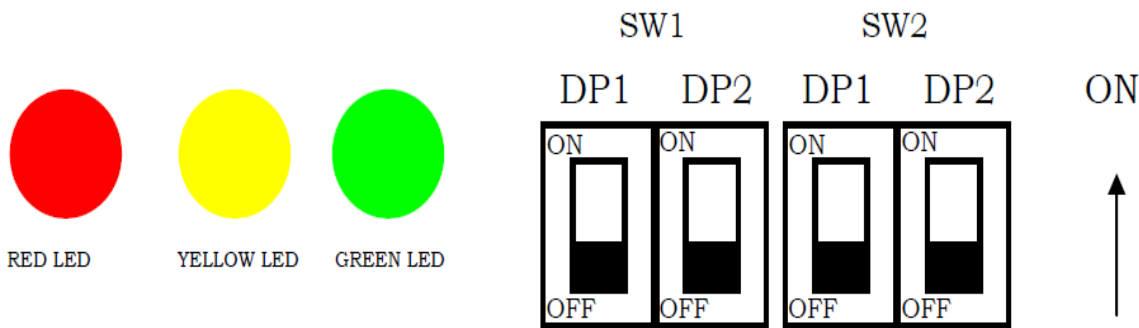


Fig 7

The Dipswitches are located behind the end plate that has the wires coming out of it (fig 6). Remove the end plate (Fig 7). Next to the green led you will find 2 sets of dipswitches (SW1 and SW2).

The set of dipswitch SW1 (the one immediately next to the green led) controls the charging curve selection. The set of dipswitch SW2 controls the charging current (DIP1) and battery voltage (DIP2).

Once you have finished to setting the charger with the desired charging curve, according to the battery pack type you have installed in the machine, please replace the end plate you removed previously.



DP1	DP2	CHARGING CURVE
ON	OFF	IUIa-ACD for Lead-acid (Wet) batteries
OFF	OFF	IUIa-GEL for Gel batteries of Exide-Sonnenschein and Haze
OFF	ON	IU0U-AGM for Fullriver AGM batteries
ON	ON	IUIa-AGM for Discover AGM batteries

DP1	CHARGING CURRENT
ON	8A
OFF	10A

99722 Battery Charger Operating Instructions

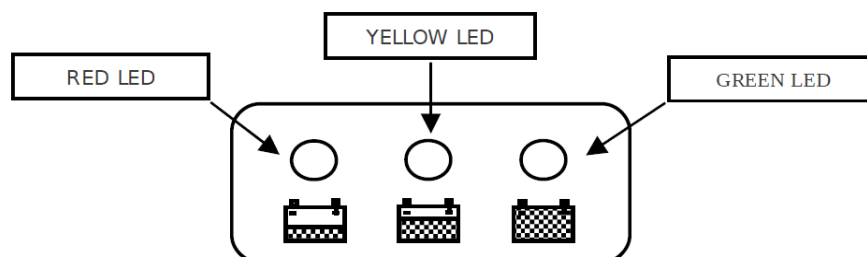
Warnings:

- The battery charger must not be used by persons with reduced physical, sensory and mental capabilities or with lack of experience and/or knowledge, unless they are properly supervised and instructed by a person responsible for their safety.
- The battery charger must not be used by children. The battery charger is not a toy and must not be treated as such.
- Do not use the battery charger outdoors.
- Do not expose the battery charger to rain, water splashes or steam.
- Do not install the battery charger in caravans and / or similar vehicles.
- Do not install the battery charger near any heat sources or in areas with high concentrations of dust.
- Do not install the battery charger near any potential sources of flammable material, for example methane gas pipes or fuel depots (petrol, kerosene, ...).
- Working in the vicinity of a lead-acid battery is dangerous, as batteries generate explosives gases during charging. Therefore smoking and/or generating open flames and/or sparks must be avoided.
- Never charge a frozen battery.
- Do not transport the battery charger by pulling on the cables as they could be damaged.
- Use the handles, if provided.
- Before using the battery charger, check that the sleeving on the electrical cord and battery cables is in good condition. Should one of the cables be damaged, have it replaced by a qualified technician.
- Check that the input voltage of the battery charger given on the data plate is in line with the voltage available.
- The battery charger must be plugged into a socket fitted with a ground wire. Should the socket not be equipped with an earth connection, do not use the device before having a suitable socket installed by a qualified technician.

VISUAL SIGNALS

Please find in the following table a list of the visual signals of the 99722.

SIGNAL (LED) MEANING	
Red LED flashing (twice)	Battery charger set to charge Lead-Acid batteries
Green LED flashing (twice)	Battery charger set to charge GEL and/or AGM batteries
Red LED on	First phase of charge in progress
Yellow LED on	Second phase of charge in progress
Green LED on	End of charge or maintenance phase
ANOMALIES	
Yellow LED flashing	UNSUITABLE BATTERY OR BATTERY NOT CONNECTED OR OUTPUT SHORT CIRCUIT
Red LED flashing	SAFETY TIMER EXCEEDED INTERNAL SHORT CIRCUIT



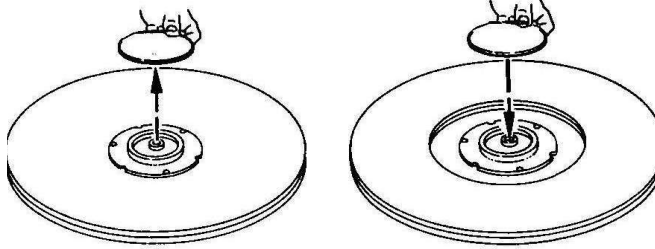
How To Install The Pad Holder and Brush

The EZ uses 1 pad holder or 2 types of brushes.

 **CAUTION:** Always use Tornado® plastic clutch plate in the center of the pad holder. Aluminum clutch plates are not recommended for use with the EZ machines.

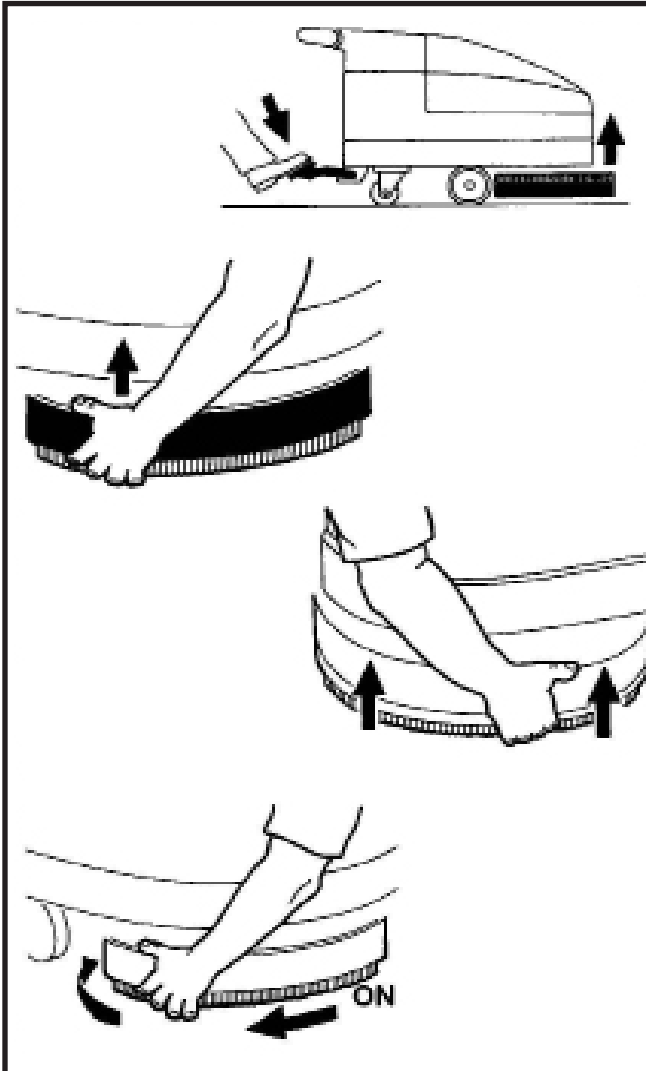
Installing the pad

- 1 Remove the center locking device located on the underside of pad holder/brush.
- 2 Center the pad brush on top of the holder and replace the locking device. The locking device should be tight.

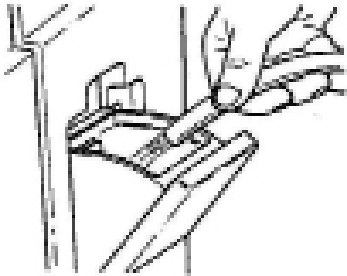


NOTE: The installation steps are the same for both pad holder or brush.

- 1 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.
- 2 Pull the splash guard up (black splash bumper).
- 3 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.
- 4 Lift the pad holder/brush up and turn slowly clockwise until the pad/brush clutch engages the motor mount.
- 5 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.
- 6 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.
- 7 Slide splash guard down around the entire brush housing. It should be slightly above the floor.



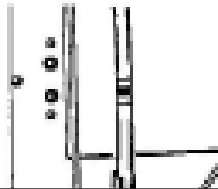
How To Fill the Solution Tank



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).

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



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 the machine main power is OFF

How to Turn the Brush Drive Motor ON and OFF

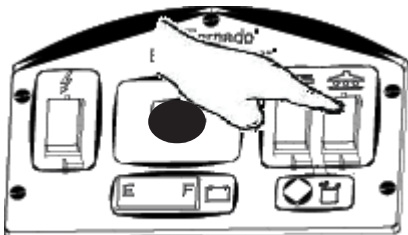


- 1 Push the top half of the middle switch down. This turns the brush drive motor ON.
- 2 To turn the brush drive motor OFF push the lower half of the middle switch down.

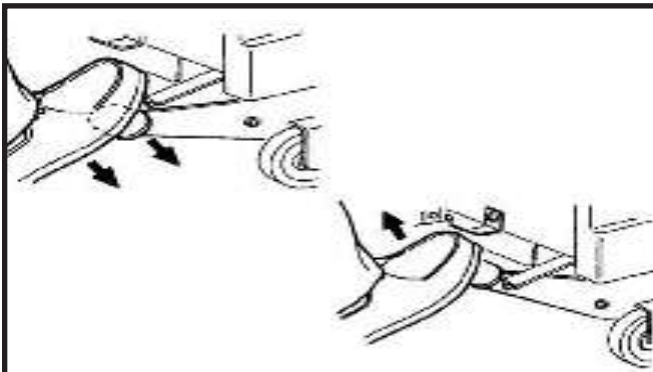


Caution: Turn Off the brush motor when the brush deck is in the UP position

How to Turn the Vacuum Motor On and OFF

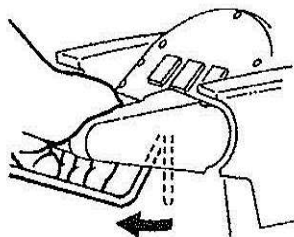


- 1 Push the top half of the right switch down. This turns the vacuum motor ON
- 2 To turn the vacuum motor OFF push the lower half of the right switch down.



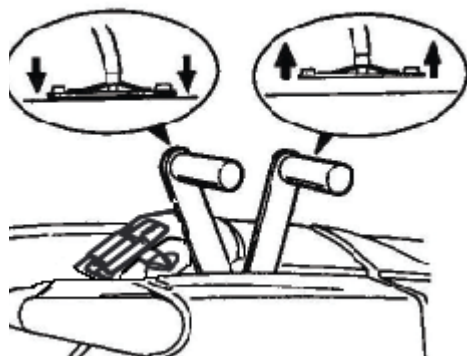
How to Lower/Raise the Brush/Pad

- 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.



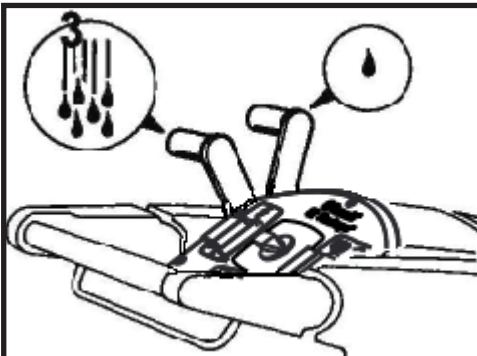
How to Engage the Brush Drive (20" EZ BD)

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.



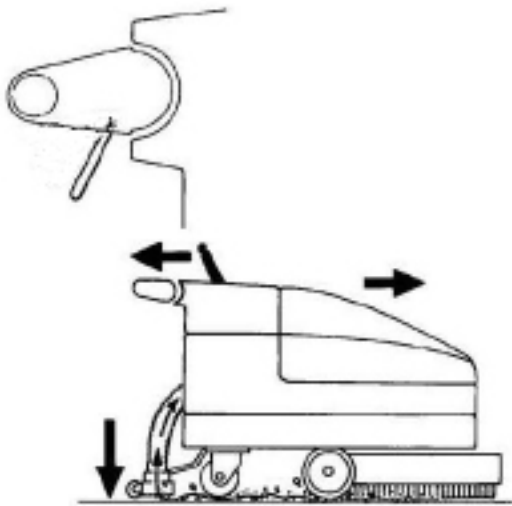
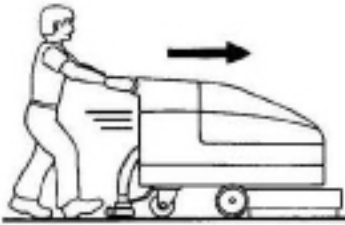
How to Lower/Raise the Squeegee

- 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

(20" & 24" EZ Traction Drive)

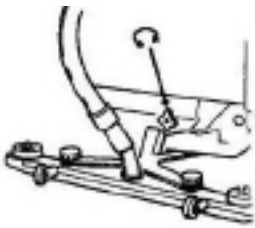
- 1 Stand behind the machine.
- 2 Make sure the brush drive motor switch is ON.
- 3 Lower the brush deck as described.
- 4 Pull up on the Control bar under the drive handle.

The machine will start to move forward in a straight line. To go backward, release the control bar under the drive handle and 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.

Vacuuming Up Solution



- 1 Make sure the squeegee is in the down position.
- 2 As the machine moves forward and the 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 move 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.

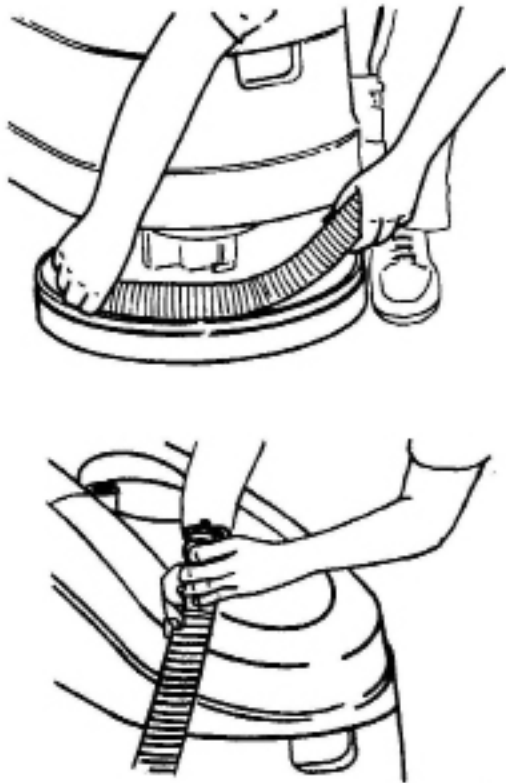
How To Empty the Recovery Tank

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

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

Daily-

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



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

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 entire machine with all purpose cleaner.

Troubleshooting

Problem: Solution is not being picked up	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
Problem: Squeegee is leaving streaks	Debris is on blade
	Blades are torn or damaged
	Floors are not properly swept before cleaning
Problem: Solution is not feeding or turning off properly	Clogged hose or valve
Problem: Batteries are not holding a charge	Batteries need to be replaced
	High current draw from high brush pressure
	Charger needs servicing
	Battery is run down
Problem: Floors are not being scrubbed, Stripped or buffed properly	Brush motor is not working
	Excessive pad or brush wear
	Going too fast over dirty spots
	Inadequate solution feed
	Inadequate cleaning procedure

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Warranty Registration Form

Please provide additional information on
Tornado equipment: (Check choices below)

- | | |
|---|---|
| <input type="checkbox"/> Automatic Scrubbers | <input type="checkbox"/> Sweepers |
| <input type="checkbox"/> Propane Floor Machines | <input type="checkbox"/> Rotary Floor Machine |
| <input type="checkbox"/> High Speed Burnishers | <input type="checkbox"/> Carpet Vacuums |
| <input type="checkbox"/> Carpet Extractors & Spotters | <input type="checkbox"/> Wet/Dry Vacs |
| <input type="checkbox"/> Steam Cleaners | <input type="checkbox"/> Jumbo Vacs |
| <input type="checkbox"/> Ride-On Equipment | <input type="checkbox"/> Pressure Washers |

See complete product info at www.tornadovac.com

Selling Dealer: (Required) _____

Please Print Clearly

Company/Institution	
Contact Name	Title
Address	City/State/Zip Code
Phone	Fax
Date of Purchase	Email

See white metal plate or sticker on unit for this information.

MACHINE TYPE/MODEL NUMBER:	MACHINE SERIAL NUMBER:
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____

Facility Description (please circle all that apply)

- | | | |
|------------------------|---------------------------|---------------------|
| 1. School | 9. Hospital | 17. U.S. Govt. |
| 2. Retail Store | 10. Nursing Home | 18. Other Govt. |
| 3. Restaurant | 11. Religious Institution | 19. Auto Service |
| 4. Office Building | 12. Airport | 20. Airport |
| 5. Contract Cleaning | 13. Warehouse | 21. Non-Profit |
| 6. Light Manufacturing | 14. Apartment/Condo | 22. Other (specify) |
| 7. Heavy Manufacturing | 15. Warehouse | |
| 8. College/University | 16. Supermarket | |

How did you first learn about Tornado cleaning and maintenance equipment?	In square feet (<i>meters</i>)	
	Total Hard Floor Area	Total Carpeted Area Square feet (square meters)
<input type="checkbox"/> Contacted by local dealer <input type="checkbox"/> Previous experience with Tornado products <input type="checkbox"/> Reputation/ Recommendation <input type="checkbox"/> Advertising <input type="checkbox"/> Direct mail <input type="checkbox"/> Internet <input type="checkbox"/> Other	<input type="checkbox"/> 0-10,000 (0-930) <input type="checkbox"/> 10-50,000 (930-4,650) <input type="checkbox"/> 50-250,000 (4,650-23,250) <input type="checkbox"/> Over 250,000 (over 23,260)	<input type="checkbox"/> 0-10,000 (0-930) <input type="checkbox"/> 10-50,000 (930-4,650) <input type="checkbox"/> 50-250,000 (4,650-23,250) <input type="checkbox"/> Over 250,000 (over 23,260)

Damage or defect arising from abuse, neglect or other misuse is excluded from this warranty. Other items may or may not apply based on your specific machine. If any defect occurs, the warranty is voided if service is attempted by non-Authorized Tornado Service Centers.

Return to:
Tornado Industries 3101
WICHITA COURT
FORT WORTH, TX 76140
Fax: (817)-551-6507

