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**Operations & Maintenance Manual  
For Commercial Use Only**



**CASCADE 20SP SERIES**

- MODEL NO: 98856 CASCADE 20SP**
- MODEL NO: 98858 CASCADE 20SP w/WAND, COMBO TOOL, and 33' HOSE**
- MODEL NO: 98860 CASCADE 20SP OZ**
- MODEL NO: 98862 CASCADE 20SP OZ w/ WAND, COMBO TOOL, and 33' HOSE**

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**Save These Instructions**



## Long -Term Buyer Protection Limited Warranty

Tornado Industries, LLC. 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**. 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. All Windshear™ Blowers, Storm, TV2SS, Side and Dowlndraft, Insulation Blowers, CV 30, CV 38, CK14/1 PRO, CK 14/1 BSE, CK14/2 PRO, SWM 31/9, CK LW13/1, CK LW 13/1 ROAM, CV 38/48 Dual, PV6, PV10, PV6 ROAM, Wall Mount Vacuum 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 either: The date of sale to the consumer, or 6 months after the dealer purchased the unit from Tornado (at Tornado's discretion), whichever comes first.
4. The EB 30 is warranted for a period of 90 days for both parts and labor.
5. Propane-powered equipment engines are limited to the engine manufacturer's warranty.
6. Ride-on Scrubbers are warranted for 24 months parts, and 6 months labor, or 1,000 hours, whichever occurs first.

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

**Website:** [www.tornadovac.com](http://www.tornadovac.com)

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Fort Worth, TX 76140

**NOTES**

Serial Number

The serial number of the machine is located on the nameplate, located next to pressure regulator. This information is needed when ordering parts or scheduling repairs. Fill in the information below for future reference:

Serial Number \_\_\_\_\_

Part Number \_\_\_\_\_

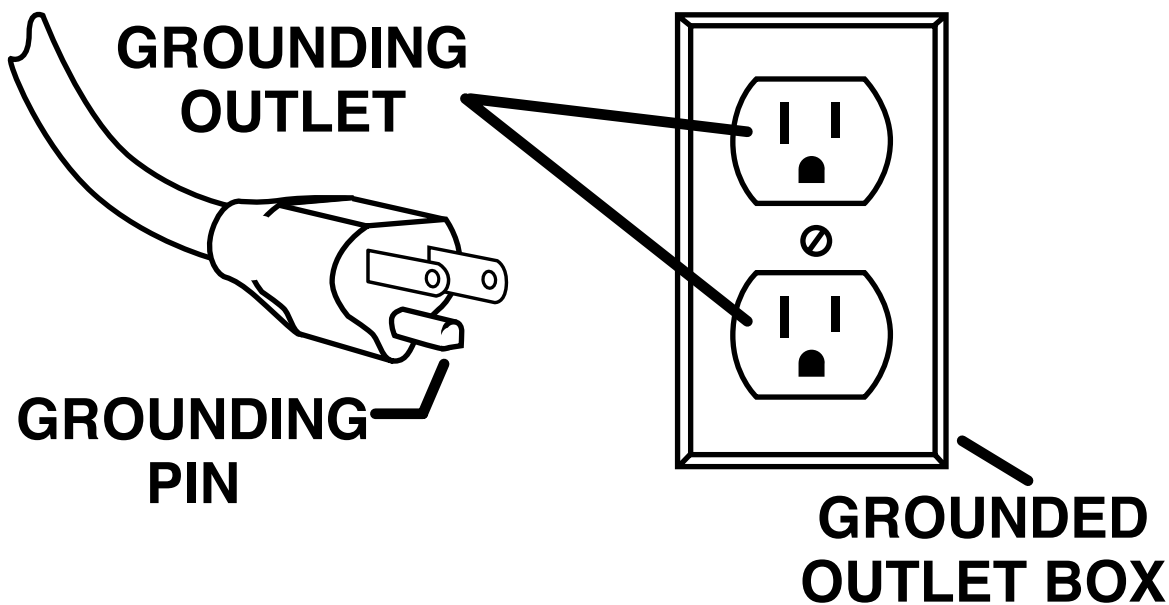
Purchase Date \_\_\_\_\_

## GROUNDING INSTRUCTIONS

This appliance must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk electric shock. This machine is equipped with a cord having an equipment -grounding conductor and grounding plug. The plug must be inserted into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

**WARNING:** Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or service person if you are in doubt as to whether the outlet is properly grounded. Do not modify the plug provided with the appliance - if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

This appliance is for use on a nominal 120-volt circuit, and has a grounding plug that looks like the plug illustrated in sketch A.



A

Your new Tornado unit is a high quality, precision-made product. All parts used in the manufacturing of this unit have passed rigid quality control standards prior to assembly. Please safeguard the original receipt / invoice. If you experience any problems with your unit during the warranty period, the original receipt / invoice will act as proof of purchase. Contact Tornado for any warranty inquiries.


## **IMPORTANT SAFETY INSTRUCTIONS**


### **READ AND UNDERSTAND ALL INSTRUCTIONS BEFORE USING THIS UNIT**

Read and understand this owner's manual and all labels on the unit before operating. Safety is a combination of common sense, staying alert and knowing how your unit works. Use this unit only as described in this manual. Use only manufacturer's recommended attachments. To reduce the risk of personal injury or damage to your unit use only Tornado recommended accessories.

### **SAFETY INSTRUCTIONS**

These guidelines are provided for your protection and convenience. Please read them carefully. If you have any questions regarding the use of your equipment call Technical Service at 800.533.2557. Failure to adhere to instructions provided can potentially void any warranties. Precautions and safety warnings are provided for your protection. Failure to observe these warnings could result in personal injury and damage to the equipment. When using an electrical appliance, basic safety precautions should always be followed.

 **WARNING!** Do not attach any device that would engage the trigger in the on position.

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

1. This machine should only be used by trained and authorized personnel. Operators must read and understand this manual completely and view the training video before operating the equipment.
2. Do not leave unit unattended when plugged in when not in use. Always unplug the equipment from outlet when not in use and before servicing.
3. Connect to a properly grounded outlet only. (See Grounding Instructions)
4. Do not use with damaged cord or plug.
5. Do not handle plug or unit with wet hands.
6. 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.
7. Turn off all controls before unplugging.
8. Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
9. 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.
10. Do not use without filters in place.
11. Do not use to pick up flammable or combustible liquids such as gasoline or use in areas where they may be present.
12. Do not expose to rain. Store indoors.
13. If unit is not working as it should, has been dropped, damaged, left outdoors, or dropped into water, take it to a local service center.

**CASCADE20 Series**

Model	98856	98858	98860	98862
Tank Size	25 Gallon	25 Gallon	25 Gallon	25 Gallon
Speed	0 - 114ft./min	0 - 114ft./min	0 - 114ft./min	0 - 114ft./min
Drive Motor	0.18 hp/134W	0.18 hp/134W	0.18 hp/134W	0.18 hp/134W
Tools	No	Yes	No	Yes
Power	115V/20A	115V/20A	115V/20A	115V/20A
Power Cords	75' Detachable	75' Detachable	75' Detachable	75' Detachable
Vacuum Motor	Single 3 Stage	Single 3 Stage	Single 3 Stage	Single 3 Stage
CFM	92	92	92	92
Waterlift	130"	130"	130"	130"
Solution Pump (Adjustable)	400 P.S.I.	400 P.S.I.	400 P.S.I.	400 P.S.I.
Ozone Assist	No	No	Yes	Yes
Body Construction	Powder-coated aluminum chassis and rotationally-molded polyethylene tank	Powder-coated aluminum chassis and rotationally-molded polyethylene tank	Powder-coated aluminum chassis and rotationally-molded polyethylene tank	Powder-coated aluminum chassis and rotationally-molded polyethylene tank
Front Wheels	2-4" Dia Swivel Casters	2-4" Dia Swivel Casters	2-4" Dia Swivel Casters	2-4" Dia Swivel Casters
Rear Wheels	2-10" Dia	2-10" Dia	2-10" Dia	2-10" Dia
Weight	202 lbs.	104 lbs.	202 lbs.	96 lbs.
Dimensions	45" x 24' x 43"	29" x 20' x 35"	45" x 24' x 43"	29" x 20' x 35"

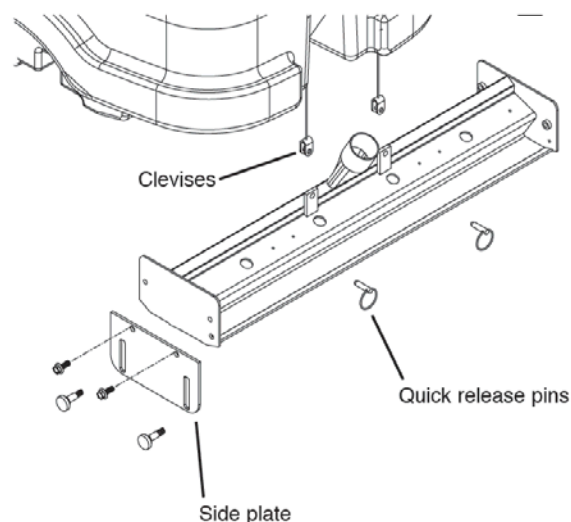
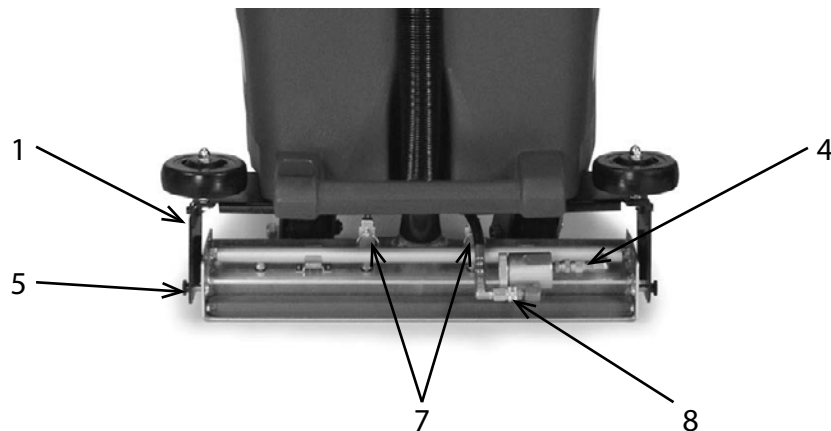
Tool kit consist of: 11" Rapid Recovery Wand (Type R), part number 77003, 3" Combination Tool, part number 77001, and 33' Flexible Hose, part number 77002

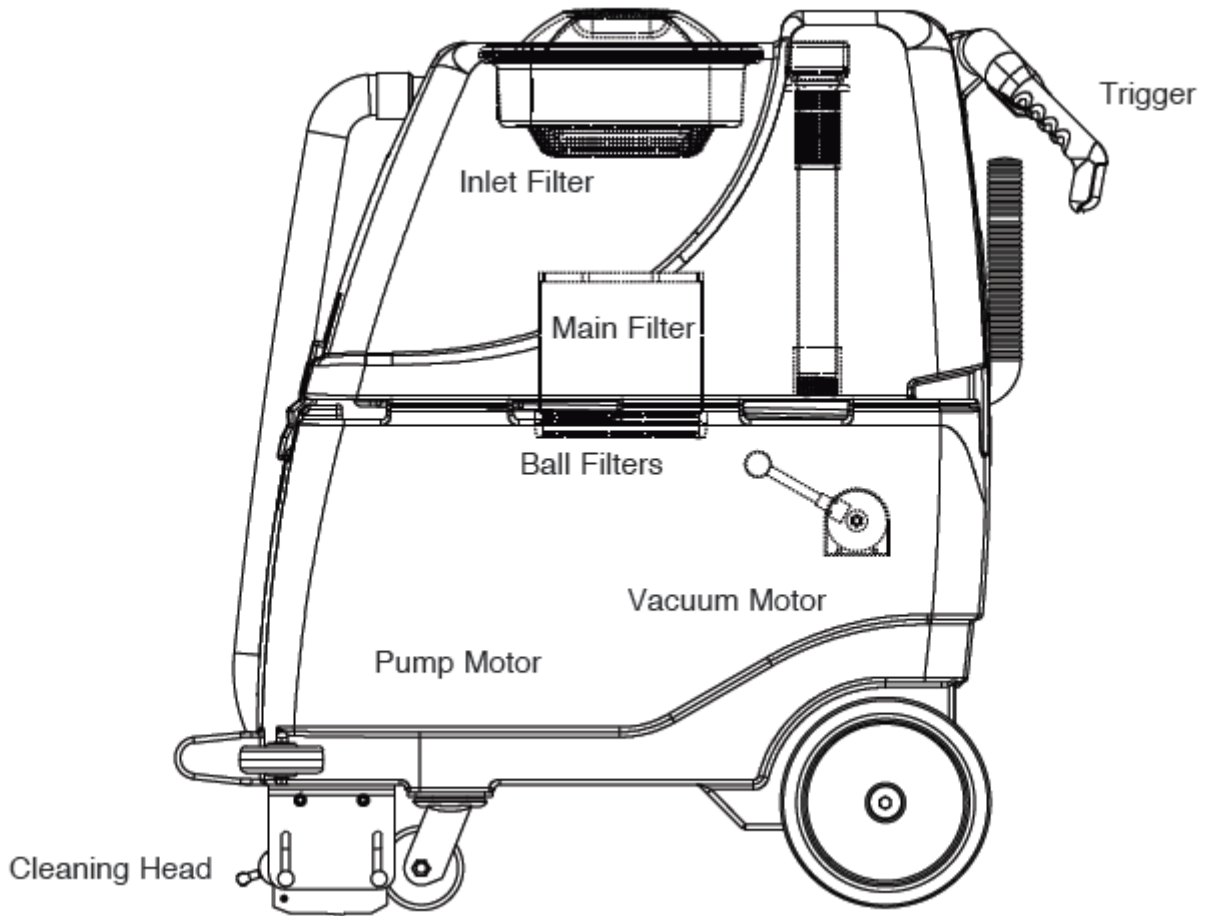
## UNPACKING INSTRUCTIONS

The Cascade is shipped with the tool head unattached. The tool head must be assembled and then attached prior to using the machine.

Note: The Cascade ships complete with tool head, spray bar, 2 side plates for tool head, 4 thumb screws for tool head, 4 black screw for tool head, 2 quick release pin, extension cord, manual, main filter, inlet filter, tank lid, vacuum hose, and priming hose

1. Position a side plate on each side of the tool head bracket by aligning the two holes in the side plates with the two holes in the bracket. The side of the plate with the foam should be placed on the inside of the bracket.
2. Secure the side plates to the tool head bracket using two black hex screws per side plate.
3. Slide the tool head underneath the tool head bracket with the tube facing away from the Cascade.
4. Take the solution hose and place it over the tool head.
5. Insert a thumbscrew on each slot of the tool head bracket and screw it into the tool head.
6. Take the two clevises that are coming out from underneath the Cascade and slide them around the tabs that are attached to the tool head.
7. Insert a quick release pin in each of the clevis.
8. Press the quick disconnect of the solution hose onto the quick disconnect of the inline strainer assembly.





**Control Panel**

Vacuum Motor Switch.....Turn vacuum motor on/off.

Pump Motor Switch.....Turn pump motor on/off.

Ozone Switch.....Turn ozone on/off.

Speed Dial.....Select speed control from 0-11.

Pump Circuit Breaker.....5 AMP breaker provides overload protection for the pump motor. The breaker will pop out if tripped. To reset, wait several minutes and push the breaker back in.

Hour Meter.....Displays number of hours machine has been used. The hour meter only runs when the pump is on.

Trigger.....Activates solution dispensing.



**⚠ WARNING!** Do not turn power off on the machine by disconnecting the cord. The electronic drive control will sense a power failure and shut off, requiring it to be reset. Always turn off all switches before you turn off the power.

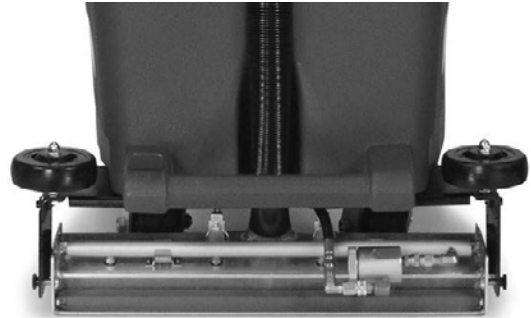
**⚠ WARNING!** Do not force the engagement of the trigger by tying or taping the trigger in in the “on” position. The electronic drive control will sense a power failure and shut off, requiring it to be reset.



## Transporting the Cascade

To transport the Cascade from one location to another, it is recommended that the complete tool head be removed.

1. Disconnect vac hose and solution line from cleaning head.
2. Remove two quick release pins.
3. Unscrew the 4 screws on the side of the tool head.
4. Remove the tool head from the machine.
5. Replace the tool head when machine is set up at new location.



## Preparing for Cleaning

### Planning

The area to be cleaned should be reviewed to determine the most efficient cleaning plan to minimize turns and utilize power outlets advantageously.

If you have a rectangular room:

- Establish a path down the length of the room, overlapping each pass by a minimum of 2 inches.

If you have an irregularly shaped room:

- Establish a path down the length of the room at the longest point, overlapping each pass by a minimum of 2 inches.

### Vacuuming

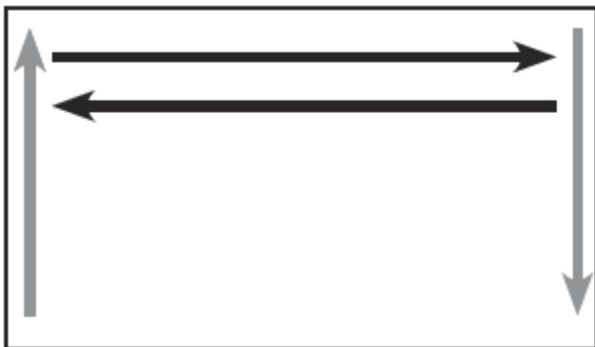
Vacuuming is very important to the maintenance of carpet. Vacuuming removes the dry soil; loose dust, dirt and soil before it is worked down into the carpet. Built up soil is much more difficult to clean out of the carpet.

### Pre-Spraying

Doorways and other heavy traffic areas will require additional maintenance and care. Pre-spraying these areas prior to cleaning will allow the chemicals additional time to work.

### Spotting


The difference between a spot and a stain is how long it sits on the floor. Pre-vacuuming provides an excellent opportunity to locate and pre-treat spots



## OPERATING INSTRUCTIONS

All operators should read this entire manual prior to using the machine.

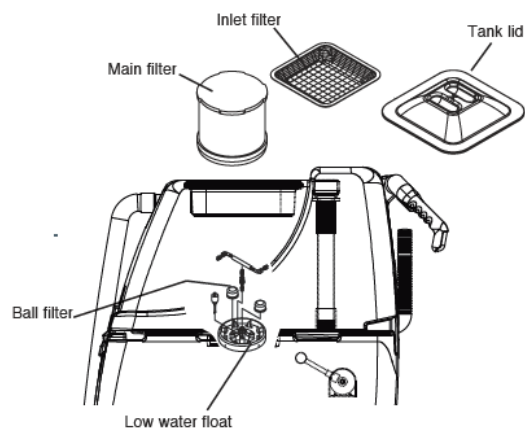
### Pre-Use Inspection

 **WARNING!** Do not fill the Cascade tank prior to the pre-use inspection.

1. To prepare the Cascade for use, remove the clear tank lid and disconnect the vacuum hose.
2. Unlatch the fasteners on the front of the machine, open the top.
3. Inspect the solution lines and the vacuum hose checking for any damage.
4. Close the machine fastening the latches.
5. Reconnect the vacuum hose and replace the clear tank lid.


The Cascade utilizes multiple filters in the recycling of cleaning solution. It is imperative to the operation of the machine that filters are kept clean and in good working order with no tears, holes, or obvious signs of wear. Visually check all filters prior to use.


6. Remove the inlet filter, the main filter and both ball filters inspecting them for damage.
7. Check the low water shut off float, making sure the float moves freely.
8. Replace each filter.



## Filling the Tank


1. Fill the tank with water to the desired level. For the full 25 gallon capacity fill to the 25 gallon mark on the level gauge inside the tank. The Cascade requires a minimum of approximately 15 gallons to operate properly. This partial fill level is perfect for smaller areas or when you are doing maintenance cleaning.

 CAUTION! Water should never be higher than the inlet filter. Doing so will activate the automatic vacuum shut off and the machine will not operate.

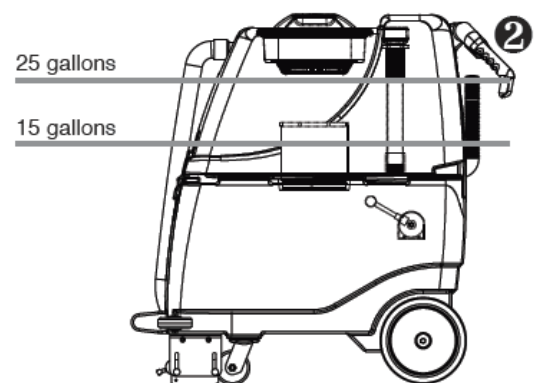
 CAUTION! Water temperature above 140° F (60°C) will cause the tank to buckle from the strong suction of the vacuum motor.

2. Add in-tank cleaner at the proper ratio as described on the chemical label instructions. In-tank cleaners are A Excell, Excell and Perform-All.

3. Add Defoam to the tank, per label instructions, to prevent excess foaming.

 WARNING! Do not use any other defoaming product other than Defoam.

**The user MUST only use chemicals that have been specifically formulated to work with CFR technology in this machine.**



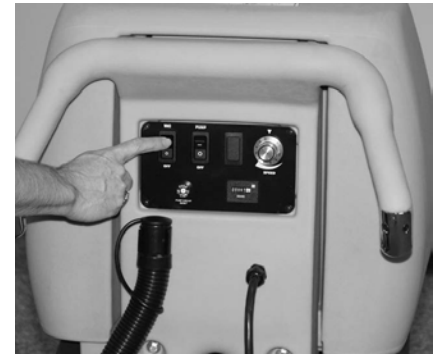
## Operating the Cascade

P20SP – The easy to use, self-propelled Cascade cleans in the forward direction. The speed dial allows the operator to select the appropriate speed for the area to be cleaned. The slower you drive the machine the deeper the cleaning. Machine cleaning performance can be monitored visually through the tank lid.

1. Prior to cleaning you will need to be sure the pump is well primed.

- Turn speed dial to 0 (zero).
- Lower the floor tool.
- Turn vacuum switch on.
- Turn pump switch on.
- Squeeze the trigger for 30 seconds.
- Adjust p.s.i. from 0 to 400, if necessary.

Note: For P20 OZ models, turn on vacuum, pump and ozone switches and let machine run for 15 minutes before use.



### **Operating the Cascade**

2. The Cascade provides the ability to clean in 2 different modes.

Maintenance Mode - Routine Maintenance is performed on a regular basis to maintain the appearance and the cleanliness of the carpeting.


- Adjust the p.s.i. to 200 and set the speed dial at 7.

Restorative Mode - Restorative Cleaning allows for the deepest cleaning of heavily soiled carpets or high traffic areas.

- Adjust the p.s.i. to 400 and set the speed dial at 4.

3. Engage the trigger.

4. Begin cleaning by driving the machine forward in a straight line. Overlap each pass by 2 inches.

 **CAUTION!** Monitor foam in the machine's tank through the clear plastic lid. Excessive foam may cause vacuum motor flooding and machine damage.

5. When cleaning, monitor foam in the solution tank. Residue left in the carpeting or upholstery from other cleaning methods may cause excessive foam to collect in the solution tank. If vacuum flooding occurs foam and fluid will spill out onto the floor.

6. If flooding occurs turn off the pump switch.

7. Remove the vacuum hose from the machine.


8. Remove clear plastic lid.

9. Add DEFOAM to the tank according to bottle instructions.

10. Let vacuum run for 3-5 minutes to clear foam and dry vacuum turbines.

11. Replace clear plastic lid.

12. Continue cleaning.

 **CAUTION!** If foam continues to cause flooding, empty the solution tank and refill with fresh fluid, adding DEFOAM before restarting.

13. When finished cleaning, drive the Cascade to the janitor's closet or to where the waste water can be dumped.

14. Follow instructions for routine daily maintenance.

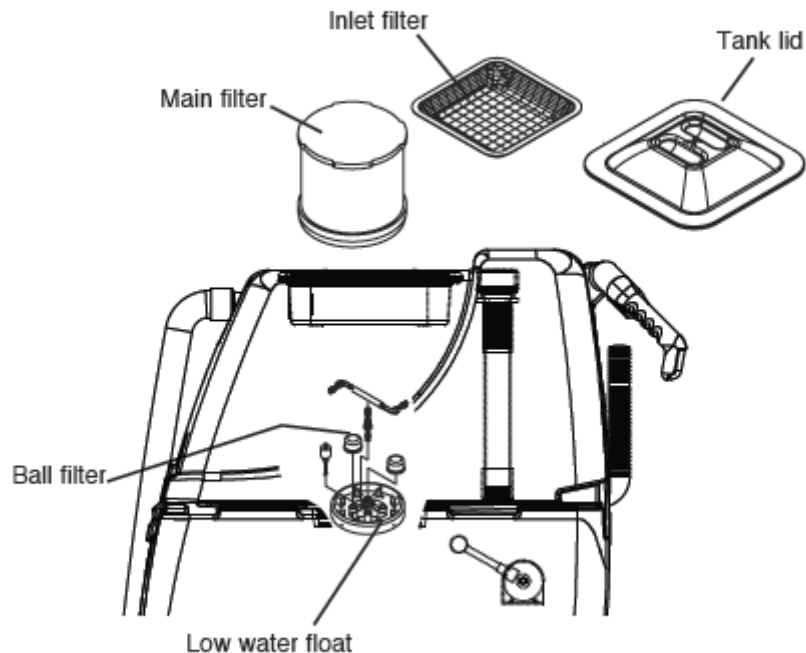
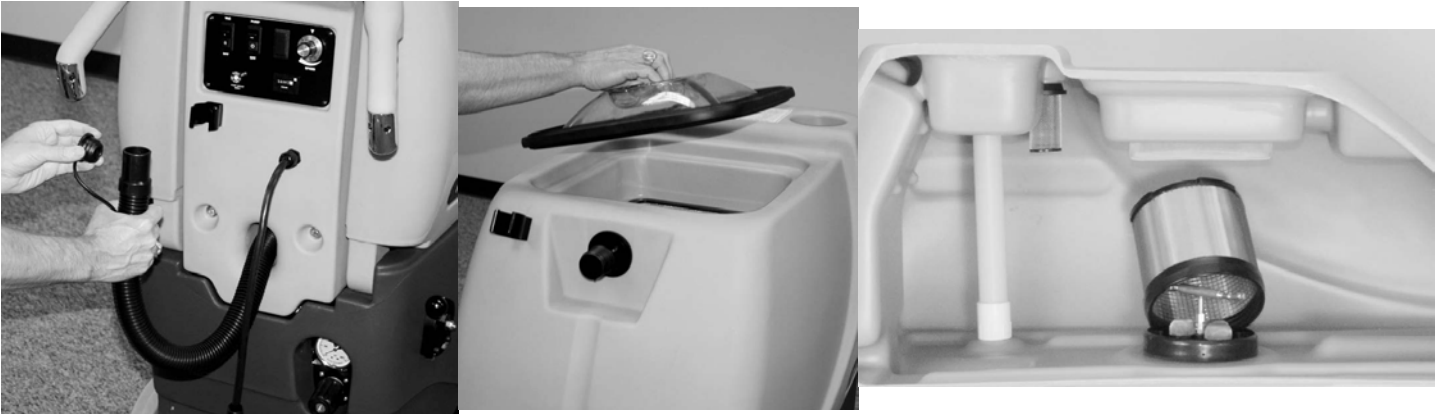
## MAINTENANCE

### Routine Daily Maintenance

To maintain optimum performance the equipment, tools and filters should be cleaned after each use. Replace any filters that are damaged. Nozzles that cannot be cleared should be discarded.

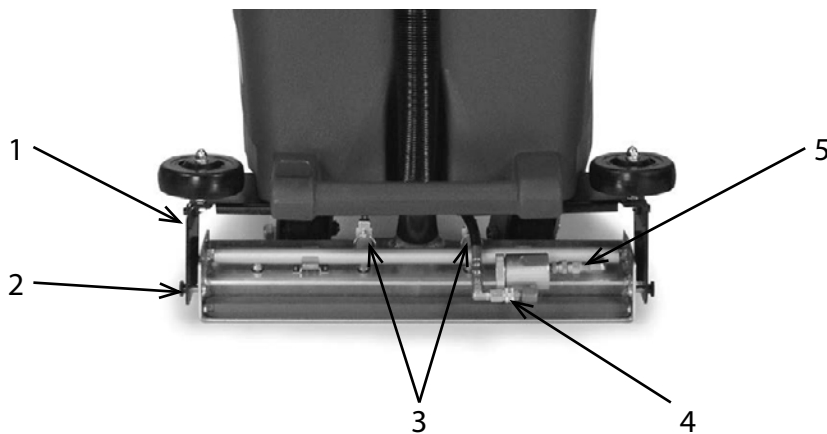
### Tank and Filters

1. Make sure all power is off.
2. Empty the tank.
  - Remove the drain hose from the clamp on the rear of the machine.
  - Remove the plug and hold hose over the drain area until tank is empty
3. Remove clear plastic lid.
4. Remove the inlet filter and rinse.
5. Rinse out the tank and drain hose with clean water.
6. Remove the main filter and the ball filters, rinse and replace.
7. Replace the inlet filter.
8. Replace the clear plastic lid.

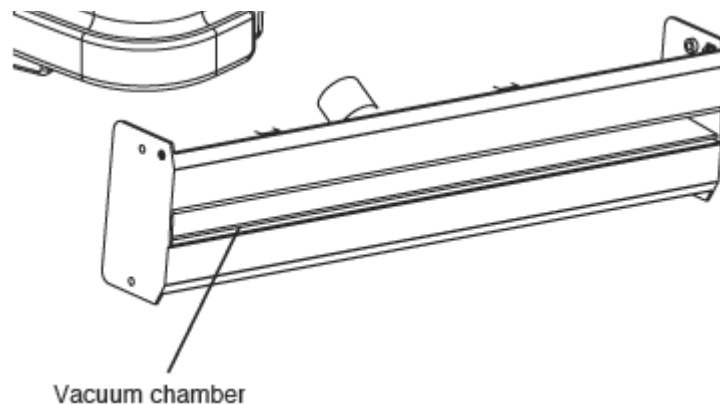


## Tool Head

1. Lower the tool head.
  2. Disconnect the vacuum hose.
  3. Disconnect and remove the tool head.
    - A. Disconnect the solution hose.
    - B. Remove the two quick release tool pins.
    - C. Unscrew the two thumbscrews from each side of the tool head and slide the tool head off.
  4. Remove the spray bar and rinse.
  5. Visually inspect quick disconnect spray tips for blockage.
  6. Open and clean the in-line strainer filter and replace.
    - Disconnect the in-line strainer filter by using the quick disconnect coupler.
    - Remove any debris from the strainer.
    - Keep o-ring and threads of the plug lubricated.
- DEFOAM is a good lubricant or use a non-petroleum based lubricant. This will ensure a tighter seal.
7. Remove any large debris from underneath the tool head. Rinse the vacuum chamber on the tool head.
  8. Replace spray bar.
  9. Connect the tool head.
    - Connect the solution hose.
    - Replace the two quick release tool pins.
    - Replace the two thumbscrews from each side of the tool head.
  10. Connect the vacuum hose.
  11. Raise the tool head for storage.



1	Side Plate
2	Thumbscrew
3	Quick Release Pin
4	Inline Strainer Filter
5	Solution Hose



## General

1. Wipe down the equipment with a damp cloth.

Do not use abrasive chemicals or solvents.

2. Remove clear plastic lid for storage.

Hand tools & wands

1. Rinse opening of tool with water to eliminate any debris.

2. Wand only – open and clean in-line strainer.

A. Disconnect the In-line Strainer by using the quick disconnect coupler.

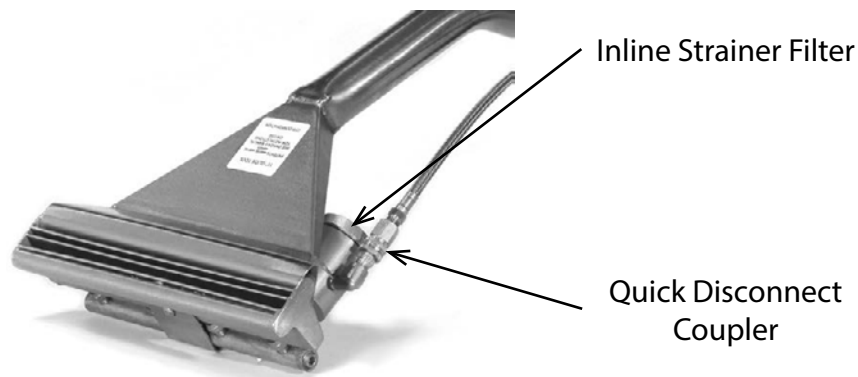
B. Remove the filter and rinse with water.

C. Remove any debris from the strainer.

D. Keep o-ring and threads of the plug lubricated.

DEFOAM is a good lubricant or use a non-petroleum based lubricant. This will ensure a tighter seal.

3. Wipe tool with damp cloth and store with head up to prevent clogging of nozzle.



## OPTIONAL ACCESSORIES

Wand and Tool Usage

Attaching Wand/Hand Tool

The Cascade self-contained cleaning system works with all recycling extractor wands and tools. To attach a wand or hand tool:

1. Verify that all power is off.

• Turn speed dial to 0.

• Turn pump switch off

• Turn vacuum switch off.

2. Disconnect the vacuum hose on the Cascade.

3. Connect the wand hose to the vacuum intake.

4. Connect the solution hose using the quick disconnect.

5. Prime solution hose by placing hose end in tank (without tool attached)

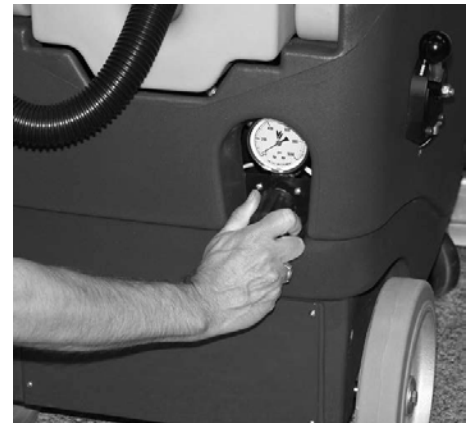
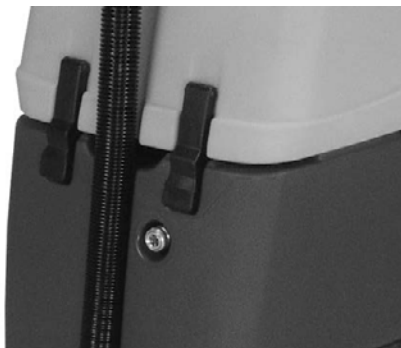
6. Turn the vacuum switch on.

7. Turn the pump switch on.

8. Engage trigger until trapped air is removed from the line.


9. Verify the p.s.i. setting.

10. Attach optional accessory.




### Carpets/Hard Floor and Surfaces

1. Place the wand on the surface to be cleaned and move it at the rate of a slow walk.
2. Apply solution by engaging the trigger.

 **CAUTION!** When using carpet wands, solution is applied on the forward stroke only. Use only enough downward pressure on the wand to move it effectively on both the push and pull stroke. Use of excessive downward pressure on the wand will decrease the efficiency.


3. Always finish cleaning with a dry stroke.

 **CAUTION!** It is very important to keep wands properly seated to the surface being cleaned to produce maximum cleaning effectiveness and minimum dry times.

### Upholstery

1. Place tool on surface to be cleaned.
2. Move (pull and push) tool at a rate of about one foot per second.
3. Apply solution on the pull stroke only.
4. Overlap passes by about 1 inch.

When cleaning upholstery edges, hold finger over part of the tool to prevent overspray. Edges can also be cleaned by placing the tool on the edge of the upholstery and moving it parallel to the edge.

 **CAUTION!** When using hand tools, solution is applied on the pull stroke only. Use only enough downward pressure on the tool to move it effectively on both the push and pull stroke. Use of excessive downward pressure on the hand tool will decrease the efficiency.



## Periodic Maintenance

1. Check power cord for any breaks, separations, or cuts. Make sure the ground pin on the connector is intact or the machine will be unsafe. Make sure the ground pin on all three prongs on the connector are intact.
2. It is very important to monitor machine operating hours for proper maintenance of the motors and pumps. After 700 hours of operation or once a year, the vacuum motor brushes should be inspected by an authorized repair center and replaced if worn (length is 1/2 inch or less). When replacing brushes, carefully insert brushes without crimping brush follower spring.
3. Check vacuum motor performance using a vacuum gauge. Place this gauge on the tank inlet fitting with the vacuum turned on. Water lift should be between 120 and 135 inches. If the reading is lower, check for air leaks in the tank, cover gasket, and drain hose.
4. Check pump performance occasionally against built-in pressure gauge. Pump running pressure should be 380-400 p.s.i. When pumping fluid through the tool head, the minimum pressure should be 310-350 p.s.i. If the pumping pressure is outside of this range, check and clean the main filter and the ball filters to ensure the pump is getting enough fluid. After 500 hours, check pressure regulator and pump. If signs of wearing present, rebuild.
7. For extended storage or between uses in cold climates drain the system and flush pump with automobile windshield washer fluid. If the pump is frozen it can be severely damaged.
8. Check main filter for blockage. A blocked filter will cause problems not only to daily operations but to the equipment itself. Once the filter is blocked, rinsing is not enough. Clean the tank and fill with fresh water. Using filter cleaning nozzle assembly with pressure of 400 p.s.i. washes off all debris inside out.

## Cascade Chemicals

Name	Use	Part Number
A Excell (4 x 1 gallon)	Light acid based cleaner	78006
Excell (4 x 1 gallon)	Alkaline based cleaner	78004
Excell (5 gallon)	Alkaline based cleaner	78005
Perform-All (4 x 1 gallon)	Neutral pH cleaner	78007
Perform-All (5 gallon)	Neutral pH cleaner	78008
Perform-All Plus (4 x 1 gallon)	Neutral pH cleaner	78009
Defoam (12 x 1 Pint)	Defoamer	78033
Defoam (1 gallon)	Defoamer	78015
Defoam (4 x 1 gallon)	Defoamer	78016
Defoam (5 gallon)	Defoamer	78017
O-Z Clean (4 x 1 gallon)	In-tank cleaner	78012
O-Z Clean (5 gallon pail)	In-tank cleaner	78032

## Trouble Shooting Guide

Vacuum and pump will not run

- Check that electrical cord is firmly seated in wall outlet.
- Check and reset building circuit breaker if tripped.
- Check main power switch.

Trips building circuit breaker

- Circuit is overloaded – move cord to a different wall outlet.
- If using an extension cord, make sure it is in good condition, less than 70 feet long and #10 gauge or heavier.
- Check pigtail plug, and extension cord for damage.

Vacuum won't run

- Check vacuum switch, it should be in the "on" position.
- Check fuse inside.

Pump won't run

- Check pump switch – it should be in the "on" position.
- Check pump circuit breaker (5 amp) and reset if tripped.
- Check fluid level – there must be enough water to float the low water shut-off
- Lift the low water float. Pump should come on. If it doesn't contact Technical Service.

Pump tries to run and then trips circuit breaker

- Check pigtail and extension power cord for frayed, cut or worn spots.
- Check plugs and connectors.
- If using an additional extension cord, make sure it is in good condition, less than 70 feet long and #10 gauge or heavier.
- Check pump static p.s.i. – must be 400 p.s.i.  $\pm$  10 p.s.i.
- Check wall outlet voltage. If below 105 volts, pump will not work.

Pump starts and stops

- Thoroughly clean main filter.
- Check fluid level – there must be enough water to float the low-water shut-off.

Excessive pressure drop when cleaning (exceeds 100 p.s.i. drop)

- Adjust static pressure to 400 p.s.i. when not cleaning.
- Check and clean main filter and ball strainers in tank.
- Check and replace worn spray nozzles and loose or leaking fittings/inline strainer.
- Re-prime pump.
- Rebuild pump or pressure regulator, if necessary.

Water dripping from bottom of machine exhaust

- Check machine for excess foaming. Add Defoam to tool hose and tank. Open machine top cover and let vacuum run for 10 minutes to dry out vacuum motor, then close lid and resume cleaning.

Poor recovery.

- Check tool head and hose for any obstructions.
- Check tool head - it must seat firmly on carpet in lowered position.
- Check clear lid cover sealing properly. Is lid gasket in good shape with no cuts, cracks, or worn/compressed areas?
- Check drain hose and fittings for cracks and tears. Make sure drain plug is securely fastened.
- Check wand hose for holes, cracks, or cuts.
- Check vacuum hose cuffs – it must seat firmly on inlet fitting and tool head.
- Check carpet installation. Some carpets are installed on uneven surfaces with ridges and bumps. It is difficult to get good drying times with this type of installation.
- Check drain hose plug, it must be securely fastened to prevent air leaks to vacuum causing vacuum flooding. Hose will vibrate if there is an air leak.

Streaks on carpet or no fluid from tool head

- Check nozzles for full spray. Clean if clogged or replace if worn.
- Check tool and hose for obstructions.
- Check and clean inline strainer filter.
- Check and clean main filter and ball filters.

Pump will not prime

- Attach priming hose assembly to quick disconnect on front of machine. Place hose end in solution tank and run pump for 30 seconds.
- Remove priming hose assembly, attach main solution line and check p.s.i.
- If above does not work, reattach priming hose. Seal priming hose end in the vacuum hose inlet on front of machine. Run vacuum and pump motors for 30 seconds to siphon solution into pump.

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# TORNADO<sup>®</sup>

## Warranty Registration Form

Please Print Clearly

Company/Institution	
Contact Name	Title
Address	City/State/Zip Code
Phone	Fax
Date of Purchase	Email
Selling Dealer:(Required)	

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

<p>How did you first learn about Tornado cleaning and maintenance equipment?</p> <ul style="list-style-type: none"> <li><input type="radio"/> Contacted by local dealer</li> <li><input type="radio"/> Previous experience with Tornado products</li> <li><input type="radio"/> Reputation/Recommendation</li> <li><input type="radio"/> Advertising</li> <li><input type="radio"/> Direct mail</li> <li><input type="radio"/> Website: _____</li> <li><input type="radio"/> Blog: _____</li> <li><input type="radio"/> Other</li> </ul>	<p><b>You can complete this form online at</b>  <a href="http://www.tornadovac.com/services/warranty-registration-form.aspx">www.tornadovac.com/services/warranty-registration-form.aspx</a></p> <p>This form may also be returned to :</p> <p>Tornado Industries          3101 Wichita Court          Fort Worth, TX 76140          Fax: 817-551-0719</p>
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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, and service is attempted by non-Authorized Tornado Service Centers, the warranty will be void.