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Operation and Maintenance Manual

For Commercial Use Only

Model No.: 98150

Operations and Parts Manual



Form No. L9724 FOR COMMERCIAL USE ONLY
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Long-term buyer protection warranties

Tornado Standard Warranty Program*	
<p style="text-align: center;">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 Service Department.</p> <p style="text-align: center;">Tornado sales and services 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</i></p>
	<p>2 Year: <i>On all Tornado components *except as shown below</i></p>
	<p>1 Year: <i>Labor on all Tornado cleaning equipment *except as shown below</i></p>
	<p>1 Year: <i>Warranty on batteries and chargers, one year, pro-rated</i> 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, 2007 Terms subject to change without notice

1)Windshear™ Blower-Dryers, Insulation Blowers, CK LW 13/1, CK 14/1, CV 30, CV 38, Pro PAC Vacs, PV 6 Back Pack Duo-Upright Carpetkeepers™, and all chargers are warranted for 1 (one) year for both parts and labor

2)Warranties on the EB30 are 90 days (batteries, charger, parts, accessories)

3)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 all riding scrubbers including the 75/140 & 90/140 are 24 months parts/12 months labor OR 1,000 hours of operation whichever comes first.

4)All non-wear item parts purchased after warranty expiration are warranted for 90 days

5)Warranty starts from the date of sale to the consumer 6 months after dealer purchased the unit from Tornado, whichever comes first

Note: Tornado, The Latest Dirt, Floorkeeper, Carpetkeeper, Carpetmiser, Carpetmiser/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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This manual is furnished with each new model. It provides necessary operation and maintenance instructions and an illustrated parts list.

Read this manual completely and understand the machine before operating or servicing it.

Use the illustrated Parts Lists to other parts. Before ordering parts or supplies, be sure to have your machine model number and serial number handy. Parts and supplies may be ordered by phone or mail from any authorized parts and service center, distributor or from any of the manufacturer's subsidiaries.

- The machine is operated with reasonable care.
- The machine is maintained regularly – per the maintenance instructions provided.
- The machine is maintained with manufacturer supplied or equivalent parts.

MACHINE DATA

Please fill out at time of installation for future reference.

Model No. – _____

Install Date – _____

Serial No. – _____

TABLE OF CONTENTS:


SAFETY PRECAUTIONS	2	DRAINING TANKS	
GROUNDING INSTRUCTIONS	3	DRAINING RECOVERY TANK	6
SAFETY LABELS	3	DRAINING SOLUTION TANK	6
MACHINE COMPONENTS	4	FILTER MAINTENANCE	7
MACHINE SETUP	4	MACHINE MAINTENANCE	7
MACHINE OPERATION	5	DAILY MAINTENANCE	7
PRE-OPERATION	5	WEEKLY MAINTENANCE	8
CLEANING CARPETS	5	MONTHLY MAINTENANCE	8
WHILE OPERATING	5	QUARTERLY MAINTENANCE	8
CLEANING WITH ACCESSORY TOOLS	6	STORING MACHINE	8
		TROUBLESHOOTING	9

SAFETY PRECAUTIONS

This machine is intended for commercial use. It is designed to clean carpet and upholstery in an indoor environment and is not constructed for any other use. Use only recommended cleaning solutions and accessory tools.

All operators must read, understand and practice the following safety precautions.

The following safety alerts symbols are used throughout this manual as indicated in their description:

 **WARNING:** To warn of hazards or unsafe practices which could result in severe personal injury or death.

FOR SAFETY: To identify actions which must be followed for safe operation of equipment.

The following information signal potentially dangerous conditions to the operator or equipment:

FOR SAFETY:

1. **Do not operate machine:**
 - Unless trained and authorized.
 - Unless operator manual is read and understood.
 - In flammable or explosive areas.
 - Unless cord is properly grounded.
 - With damaged cord or plug.
 - If not in proper operating condition.
 - In outdoor areas.
 - In standing water.
 - With the use of an extension cord.
2. **Before operating machine:**
 - Make sure all safety devices are in place and operate properly.

3. When using machine:


- Do not run machine over cord.
- Do not pull machine by plug or cord.
- Do not pull cord around sharp edges or corners
- Do not unplug by pulling on cord.
- Do not stretch cord.
- Do not handle plug with wet hands.
- Keep cord away from heated surfaces.
- Report machine damage or faulty operation immediately.
- Follow mixing and handling instructions on chemical containers.


4. Before leaving or servicing machine:


- Turn off machine.
- Unplug cord from wall outlet.

5. When servicing machine:

- Unplug cord from wall outlet.
- Avoid moving parts. Do not wear loose jackets, shirts, or sleeves.
- Use manufacturer supplied or approved replacement parts.

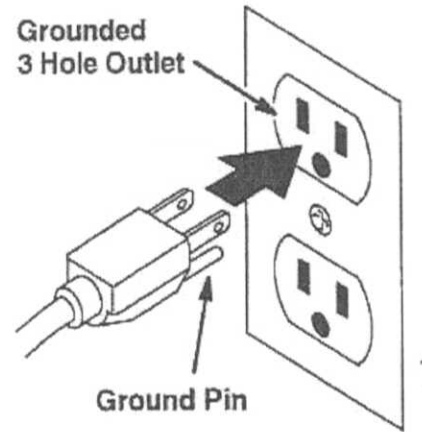
 **WARNING:** Hazardous Voltage. Shock or electrocution can result. Always unplug machine before servicing.

 **WARNING:** Flammable materials can cause an explosion or fire. Do not use flammable materials in tank(s).

 **WARNING:** Flammable materials or reactive metals can cause an explosion or fire. Do not pick up any of these items and materials.


GROUNDING INSTRUCTIONS

Machine must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electrical shock. This machine is equipped with a cord having an equipment-grounding conductor and grounding plug. The plug must be plugged into an appropriate outlet that is properly installed in accordance with all local code and ordinances. Do not remove ground pin; if missing, replace plug before use.



SAFETY LABELS

The safety labels appear on the machine in the locations indicated. Replace labels if they become damaged or illegible.

 **WARNING LABEL-** Located on cover. Label warns operator of safe practices of equipment – English text.


FOR SAFETY LABEL –
located on rear panel.



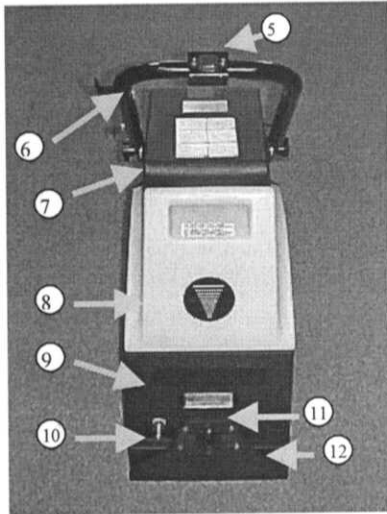
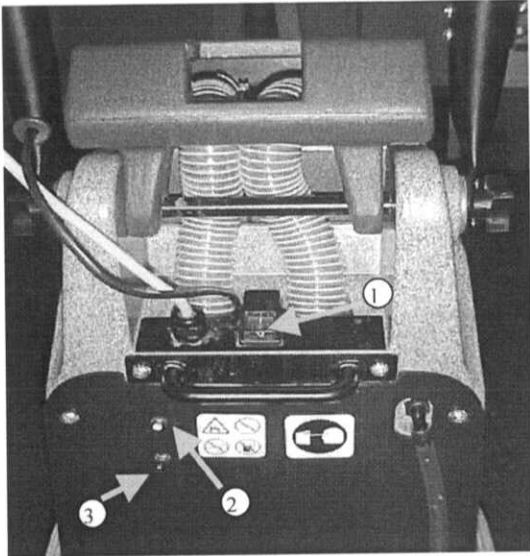
FOR SAFETY:
Read manual before
operating machine.



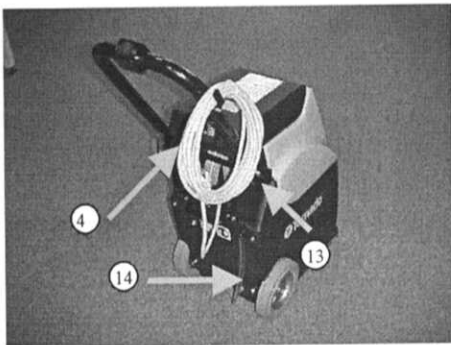
**FLAMMABLE
MATERIALS/SPILLS
LABEL –** Located near
solution tank fill port and on
recovery tank lid.

 **WARNING:** Flammable materials can cause an explosion fire. Do not use flammable materials in tank(s). Flammable materials or reactive metals can cause explosion or fire. Do not pick up these types of products.

MACHINE COMPONENTS



1. Main Power ON/OFF Switch
2. Pump Reset button
3. Brush Reset Button
4. Power Chord Holder
5. Solution Switch
6. Folding Handles
7. Recovery Tank Cover
8. Recovery Tank
9. Solution Tank
10. Accessory Tool Solution Hose Coupler
11. Accessory Tool Vacuum Hose Port
12. Pick-Up Head Lock Knob
13. Folding Handle Lock Knob
14. Solution Tank Drain Hose



MACHINE SETUP

1. Carefully check carton for signs of damage. Report damages at once to carrier. The machine is shipped fully assembled and is ready for use.
2. Adjust handle from transport position. To adjust, rotate handle knob to outward position and lift handle to desirable operating height, turn knob inward to lock handle (Figure 1).

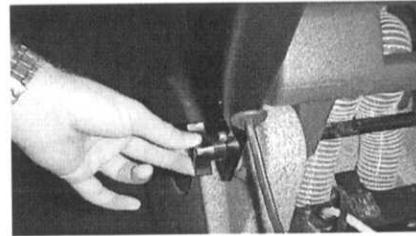


Figure 1

3. Hinge open cover and remove recovery tank from machine. Make sure the float shut-off screen and solution tank strainer are in place before use (Figure 2)



Figure 2

4. Using a clean bucket or hose, fill solution tank with 15L (4gal) of hot water, 60°C (140°F) maximum (Figure 3). Observe solution tank hose at rear of machine when filling. The hose indicates the amount of water in solution tank. Do not use Recovery tank to fill machine. Use a clean bucket. (Figure 3)

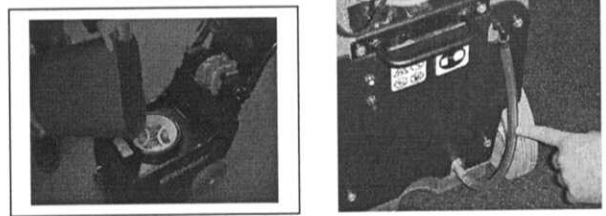


Figure 3

ATTENTION: Do not use recovery tank to fill solution tank. Residual dirt or debris could cause damage to solution pump.

! WARNING: Flammable materials can cause an explosion or fire. Do not use flammable materials in tank(s).
 5. Add a recommended Lundmark cleaning chemical.

FOR SAFETY: When using machine, follow mixing and handling instructions on Lundmark chemical containers.

6. Replace recovery tank and close cover after filling.
7. Plug machine's power cord into a grounded wall outlet (Figure 4).

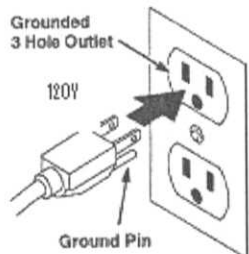


Figure 4

FOR SAFETY: Do not operate machine unless cord is properly grounded.
FOR SAFETY: Do not operate machine with the use of an extension cord.

MACHINE OPERATION

FOR SAFETY: Do not operate machine unless operator manual is read and understood.

PRE-OPERATION

1. Vacuum carpet and remove other debris.
2. Perform MACHINE SETUP procedures.
3. Inspect power cord for damage.

CLEANING CARPETS

1. Turn main power switch on (Figure 5).

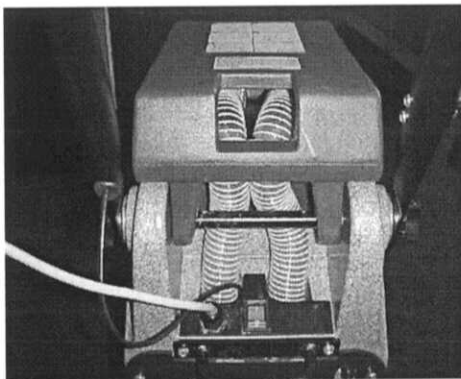


Figure 5

2. To begin cleaning carpets, push switch and slowly pull machine backwards (Figure 6).



3. Release switch at end of path and continue to pull machine to pick up excess solution.
4. Tip machine back on wheels and push machine forward to begin next path.

WHILE OPERATING

1. Overlap each path by 50 mm (2in).

! WARNING: Flammable materials or reactive metals can cause an explosion or fire. Do not pick up these types of materials.

2. Work away from outlet and power cord to prevent cord damage.
3. Periodically check for excessive foam buildup in recovery tank. Use Defoamer foam control solution to prevent vacuum motor damage.

ATTENTION: Excessive foam buildup will not activate the float shut-off screen.

4. If brush stops, the circuit breaker may have been tripped. Unplug power cord check brush for obstruction. Push brush reset button to resume (Figure 7).

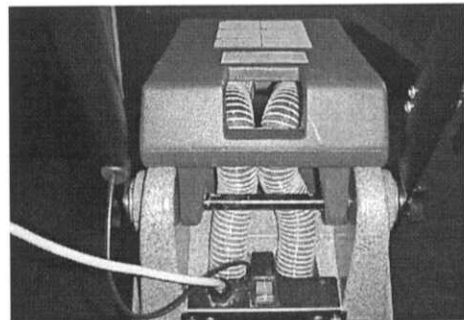


Figure 7

1. To clean heavily soiled areas, repeat cleaning path from different direction.
2. Observe recovery site window, when recovery appears to stop, drain recovery tank (See DRAINING TANKS).

CLEANING WITH ACCESSORY TOOLS

1. Connect accessory tool hoses to solution hose coupler and vacuum hose port located at front of machine (Figure 8).

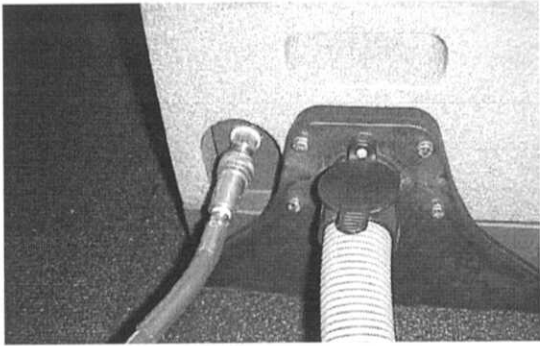


Figure 8

2. Turn main power switch on (Figure 9).

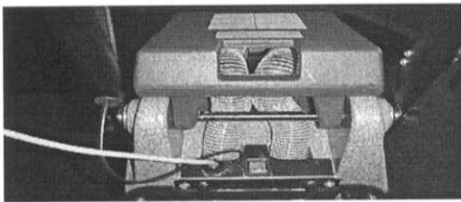


Figure 9

3. Operate accessory tools as normal.
NOTE: When cleaning upholstery, always check cleaning instructions sewn in furniture by manufacturer.



Figure 10

4. After cleaning, relieve water pressure from tool before disconnecting hose. Push switch for five seconds after turning main power switch off.

DRAINING TANKS

FOR SAFETY: When servicing machine, unplug cord from wall outlet.

DRAINING RECOVERY TANK

1. Turn machine off and unplug power cord.
2. Hinge open cover; lift recovery tank out and empty (Figure 11).



Figure 11

NOTE: Make sure to rinse out recovery tank after each use. Do not use this tank to fill machine with cleaning solution.

DRAINING SOLUTION TANK

1. Pull solution tank drain hose off of hose barb at rear of machine and empty remaining solution (Figure 12).

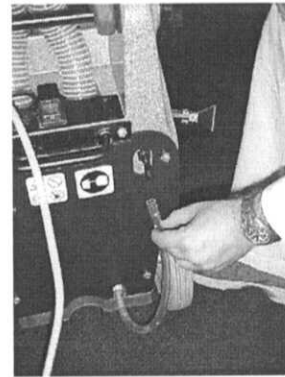


Figure 12

2. Replace drain hose.

Filter Maintenance

To clean the external filter, remove the recovery tank and locate the filter, grasp the inner handles and pull out the filter. Rinse the filter bag inside and out. You can then replace the filter by snapping the filter back into place.



Figure 13

To clean internal filter, take off the back cover by removing the four screws. Locate the filter next to the vacuum motor and unscrew the cap. Remove the filter screen from the cap and rinse it thoroughly. Once finished, reassemble the screen, cap, and fasten the back cover back on.

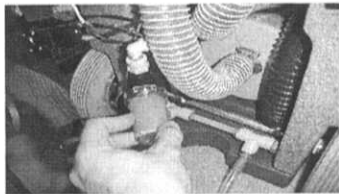


Figure 14

MACHINE MAINTENANCE

To keep machine in good working condition, simply follow machine's daily, weekly and monthly maintenance procedures.

FOR SAFETY: When servicing machine, unplug cord from wall outlet.

DAILY MAINTENANCE (EVERY 4 HOURS OF OPERATION)

1. Empty and rinse out recovery tank thoroughly (Figure 15).

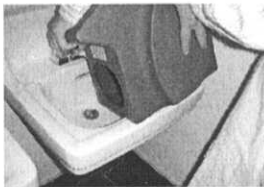


Figure 15

2. Remove float shut-off screen from recovery tank cover and clean (Figure 16).



Figure 16

3. Drain remaining water from solution tank (Figure 17).

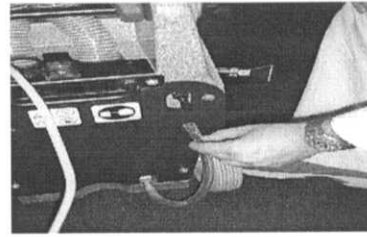


Figure 17

4. Clean solution tank fill port strainer.
5. Remove any entangled carpet fibers and debris from brush (Figure 18).

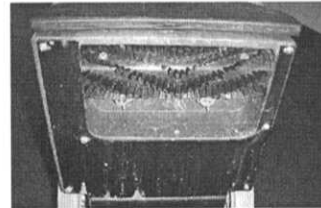


Figure 18

6. Remove any debris lodges in pick up head (Figure 19).



Figure 19

7. Wipe off power cord and check for damage, replace if necessary. Coil cord neatly after use.
8. Clean machine with All Purpose Cleaner and damp cloth (Figure 20).

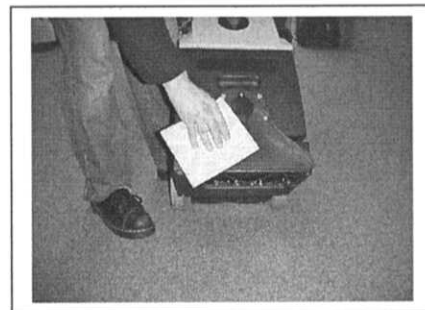


Figure 20

**WEEKLY MAINTENANCE
(EVERY 20 HOURS OF OPERATION)**

1. Inspect vacuum hoses for holes and loose cuffs.
2. Inspect spray pattern for plugging. If plugged, remove spray tips by twisting spray tip body counter-clockwise and clean orifices. (Figure 21).



Figure 21

FOR SAFETY: When using machine, follow mixing and handling instructions on chemical containers.

3. Inspect cord and cord grip for damage. Replace immediately if damaged.

**MONTHLY MAINTENANCE
(EVERY 80 HOURS OF OPERATION)**

1. Flush solution system with recommended liquid neutralizer to dissolve normal chemical buildup.
 - a. Pour 7.5L (2 gal) of hot water 60°C (140°F) into solution tank. Add a liquid neutralizer according to mixing instructions on bottle.

FOR SAFETY: When using machine, follow mixing and handling instructions on chemical containers.

- b. Position brush over floor drain and operate machine for one minute.
 - c. Then connect hand tool solution hose to machine and also over a floor drain operate tool for one minute.
 - d. Shut off machine and allow remaining solution to break down chemical buildup overnight.
 - e. Next day, spray out remaining solution and flush system with 11L (3gal) of clean water.
2. Lubricate wheels with water resistant oil.
 3. Inspect machine for water leaks and loose hardware.

**QUARTERLY MAINTENANCE
(EVERY 250 HOURS OF OPERATION)**

Check vacuum motor for carbon brush wear. Replace brushes if worn to a length of 10mm (3 / 8) or less.

STORING MACHINE

1. Before storing machine, be certain to drain and rinse tanks of all water.
2. Store machine in a dry area in the upright position.
3. Open recovery tank cover to promote air circulation.

ATTENTION: Do not expose to rain. Store indoors.

ATTENTION: Do not store in freezing temperatures of 32°F (0°C) or below.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Machine does not operate.	Faulty switches or wiring.	Contact Tornado.
	Faulty power cord.	Contact Tornado.
	Building circuit breaker tripped	Reset breaker.
Brush motor does not operate.	Brush motor circuit breaker tripped.	Let motor cool and reset brush motor breaker button at rear of machine,
	Switch not pushed.	Push solution switch.
	Loose or broken brush belt.	Contact Tornado.
	Faulty switch or wiring.	Contact Tornado.
	Faulty brush motor.	Contact Tornado.
Solution pump does not operate.	Solution pump circuit breaker tripped.	Let pump cool and reset pump breaker button at rear of machine.
	Switch not pushed.	Push solution switch.
	Faulty switch or wiring.	Contact Tornado.
	Faulty solution pump motor.	Contact Tornado.
Vacuum motor does not operate	Loose or broken wiring.	Contact Tornado.
	Faulty main power switch.	Contact Tornado.
	Defective vacuum motor.	Contact Tornado.
	Worn carbon brushes.	Contact Tornado.
Poor solution pick-up.	Defective recovery tank cover gasket.	Replace gasket.
	Clogged float shut-off screen.	Open recovery tank cover and clean lint off screen.
	Accessory tool vacuum hose port cover is loose or missing.	Check vacuum hose port cover.
	Loose vacuum hose cuffs.	Secure connections under cover.
	Pulling machine too fast.	Slow down cleaning process.
	Uneven or no spray.	Plugged spray tips.
Improper spray tip size or spray angle.		Replace with proper tips.
Clogged solenoid valve.		Contact Tornado.
Worn spray tips.		Replace spray tips.
Solution tank low or empty.		Refill solution tank.
Faulty solution pump.		Contact Tornado.
Pump needs priming.		Prime pump by pressing solution hose coupler tip located at front of machine.