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Tornado®

Operation & Maintenance Manual

For Commercial Use Only

The PS Series of Carpet Spotters (Series G)

Catalog No.

98220 (115v, 60Hz)

98221 (230v, 50HZ)

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NOTES

This instruction book covers:

CATALOG NO.	98220	98221
SERIES	G	G
PUMP	55 PSI	55 PSI
VACUUM	94 CFM 84"H^2O	82 CFM 68"H^2O
CAPACITY	2 Gal	2 Gal (7.6L)
VOLTS	115V	230V
AMPS	8	4
CERTIFICATION	*	N/A

CONTROL #119875 CONTROL #119875

*This product conforms to ANSI/UL Standard 561 and is certified to CAN/CSA Standard C22.2 No. 10.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

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Tornado® Standard Warranty Program*	
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.	**10 Years:** ***All plastic tanks and rotationally-molded bodies***
	2 Years: ***Parts on all Tornado and Tornado/Karcher cleaning equipment 1) 2)***
	1 Year: ***Labor on all Tornado and Tornado/Karcher cleaning equipment 1) 2)***
	1 Year: ***Warranty on batteries, one full year, Not pro-rated.***

*** Effective January 1st, 2001. Terms subject to change without notice.**

1) Windshear™ Blower-Dryer, Insulation Blowers, Pro PAC Vacs, CW 50, CW 100, and Duo-Upright Carpetkeepers™ are warranted for 1 (one) year for parts and labor.

2) Warranties on the ICC1, KMR 1200, KMR 1250, and KMR 1700 are 24 months parts/6 months labor OR 1000 hours of operation, whichever comes first. Warranties on the BR and BD 1000 are 24 months parts/12 months labor OR 1000 hours of operation, whichever comes first.

IMPORTANT SAFETY INSTRUCTIONS

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:

1. Do not leave machine unattended when plugged in. Unplug from outlet when not in use and before servicing.
2. Use indoors only. Do not use outdoors and do not expose to rain.
3. Do not allow to be used as a toy. Close attention is
4. necessary when used by or near children.
5. Use only as described in this manual. Use only manufacturer's recommended attachments.
6. Do not use with damaged cord or plug. If machine is not working as it should, has been dropped, damaged, left outdoors, or dropped into water, return it to a service center.
7. 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.
8. Do not unplug by pulling on cord. To unplug, grasp the plug not the cord.
9. 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.
10. Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.
11. Turn off all controls before unplugging.
12. Use extra care when cleaning on stairs.
13. Do not use to pick up flammable or combustible liquids, such as gasoline, or use in areas where they may be present.
14. Connect to a properly grounded outlet only. See Grounding Instructions.

SAVE THESE INSTRUCTIONS

IMPORTANTES MESURES DE SÉCURITÉ

L'UTILISATION D'UN APPAREIL ÉLECTRIQUE DEMANDE CERTAINES PRÉCAUTIONS: LIRE TOUTES LES INSTRUCTIONS AVANT DE FAIRE FONCTIONNER CET APPAREIL.

AVERTISSEMENT. POUR RÉDUIRE LES RISQUES D'INCENDIE, DE CHOC ÉLECTRIQUE OU DE BLESSURE:

1. Ne pas laisser l'appareil sans surveillance lorsqui'il est branché. Débrancher lorsque l'appareil n'est pas utilisé et avant l'entretien.
2. Ne pas utiliser à l'extérieur et ne pas aspirer de matières humides.
3. Ne pas permettre aux enfantes de jouer avec l'appareil. Une attention particulière est nécessaire lorsque l'appareil est utilisé par des enfantes ou à proximité de ces derniers.
4. N'utiliser que conformément à cette notice avec les accessoires recommandés par le fabricant.
5. Ne pas utiliser si le cordon ou la fiche est endommagé. Retourner l'appareil à un atelier de réparation s'il ne fonctionne pas bien, s'il est tombé ou s'il a été endommagé, oublié à l'extérieur ou immergé.
6. Ne pas tirer soulever ni traîner l'appareil par le cordon. Ne pas utiliser le cordon comme une poignée, le coincer dans l'embrasure d'une porte ou l'appuyer contre des arétes vives ou des coins. Ne pas faire rouler l'appareil sur le cordon. Garder le cordon à l'écart des surfaes chaudes.
7. Ne pas débrancher en tirant sur le cordon. Tirer plutôt la fiche.
2. Ne pas toucher la fiche ni l'appareil lorsque vos mains sont humides.
3. N'insérer aucun objet dans les ouvertures. Ne pas utiliser l'appareil lorsqu'une ouverture est bloquée. S'assurer que de la poussière, de la peluche, des cheveux ou d'autres matières ne réduisent pas le débit d'air.
4. Maintenir les cheveux, les vétements amples, les doigts et toutes les parties du corps à l'écart des ouvertures et des pièces mobiles.
5. Mettre toues les commandes à la position ARRÊT avant de débrancher l'appareil.
6. User de prudence lors du nettoyage des escaliers.
7. Ne pas aspirer des liquides inflammables ou combustibles, comme de l'essence, et ne pas faire fonctionner dans des endroits où peuvent se trouver de tels liquides.

14 Ne brancher qu'à une prise de courant avec mise à la terre. Voir les instructions visant la mise à la terre.

INSTRUCTIONS VISANT LA MISE À LA TERRE

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

OPERATING THE PROSPOT:

1. Turn the switch, located on the rear panel, to **"VACUUM/SPRAY"**.

2. Place the hand tool on the surface to be cleaned and squeeze the solution lever. Move tool over surface to be cleaned. Note: Do not apply too much solution to upholstery to minimize dry time.

3. Always monitor recovered solution in the recovery tank. Excess water can be drawn into the vacuum motor resulting in damage to the motor. Turn machine off and empty recovery tank periodically. This machine is equipped with a float shut off to help prevent damage to the vacuum motor.

4. At the end of job turn switch to **'OFF'** and disconnect power cord from outlet. Empty recovery tank (turn upside down and empty through hose intake) and solution tank of any solutions. Thoroughly rinse both tanks to remove any residue and to keep tanks fresh.

CLEANING TIPS:

- Check the condition of the carpeting. If the carpet is loose, heavily soiled, stained, spotted or badly worn, point this out to the person in charge.

- Locate an inconspicuous spot on the area to be cleaned. Test carpet for colorfastness before proceeding. Pour the concentrated cleaning solution on the spot, cover with a white towel and place a heavy object on top to absorb the cleaning solution. Wait 10 minutes for any reaction to take place. Remove weight. If there is no color transfer, it should be safe to clean.

- Clean the area first with a Clean-Air Carpetkeeper, upright vacuum. Do not use the ProSpot as a dry vacuum! Heavily soiled carpet or areas of concentrated foot traffic should be treated with
- recommended pre-spotting or pre-spray chemicals, using a hand spray trigger bottle or pump up sprayer. Do not allow any spotter or pre-spray to dry on the carpet. Use a small hand held carpet brush to agitate the carpeting. Always agitate toward the center of the spot.
- After spot cleaning the carpet, place a small square of aluminum foil or 6 mil poly square under the furniture legs to prevent moisture from

damaging the finish or rusting the metal glides, if placing furniture on moist carpeting.

- Identify the type of carpet fiber to be cleaned. Most carpet fibers in use are nylon or acrylic based. Best results in cleaning would be obtained if hot water is used to clean these types of fibers. On the other hand, hot water could shrink natural fiber carpeting, like wool and cotton in particular. Exercise caution when cleaning natural fibers. Use cool water test for colorfastness and apply the least amount of cleaning solution as possible.

- Furnishings have many different types of fabric. Be sure that the proper chemicals are used and that you follow the chemical manufacturer's directions.

- When the ProSpot runs out of cleaning solution, noted by streaking or no solution flow, turn off the machine and drain the recovery tank. Refill solution tank and continue cleaning.

- To decrease drying time go over the carpet and/or furnishings without squeezing the spray lever or turn the power switch to "VACUUM ONLY". To further decrease the drying time, use the Windshear 3000 Carpet Blower.

PROTECT FROM FREEZING

If it becomes necessary to store in temperatures that could drop below 40 degrees F, the pumping system, hoses and valves must be protected from freezing with a methyl hydrate window washer antifreeze solution. Do not use ethylene glycol or cooling system antifreezes.

- Add one quart of windows washer antifreeze to the solution tank, turn on the pump and squeeze the spray lever until antifreeze solution fills the solution lines.

- Always allow the unit to reach room temperature before turning on to remove the antifreeze from the system.

MAINTENANCE:

<u>WARNING!!</u> Always unplug power cord before cleaning, making adjustments or repairs.

AFTER EACH USE:

- Thoroughly flush out both tanks. HINT: To clean the recovery tank, turn upside down and lightly spray into the vacuum intake. This will "backflush" the filter screen and float shut-off ball. Drain tank through the hose intake.
- Wipe down entire unit with cleaning solution.
- Flush pump system with 1 quart clean water with 1 ounce white vinegar.
- Remove and clean foam vacuum filter. Remove lint from vacuum motor intake screen. Store with tanks exposed in clean dry place.
- Inspect power cord for damage. Replace if necessary. Wipe and coil the cord from machine to the plug then place coiled cord through molded handle for storage or transport.
- Remove lint from hand tool opening. HINT: Back-flush through vacuum hose end.

PERIODIC MAINTENANCE

- It is highly recommended that once a month you flush the ProSpot out with a 8 to 1 ratio of water to white vinegar or anti-browning solution through the extractor. This will help to prevent the build up of alkaline residue.
- If the spray jet becomes clogged, remove and wash it thoroughly and blow dry. Do not use wire or pins to clean the nozzle as this will cause the spray pattern to become distorted, thereby giving you a streaking pattern on the carpeting.
- Once a month, inspect all electrical cables, hoses, filters and connections in the ProSpot. If you see something that should be repaired or replaced this should be reported and repaired. Little things are easy to forget, but as these little things add up you end up with a cluster of problems that will cost you more in the long run.
- Inspect the vacuum motor carbon brushes after every 700 hours of use replace, if necessary.
- Be sure to use genuine Tornado parts and that service is provided by an authorized Tornado Service Center. 1-800-VACUUMS Use of non-OEM parts will void the warranty.

PS SERIES CARPET SPOTTERS

98220 & 98221

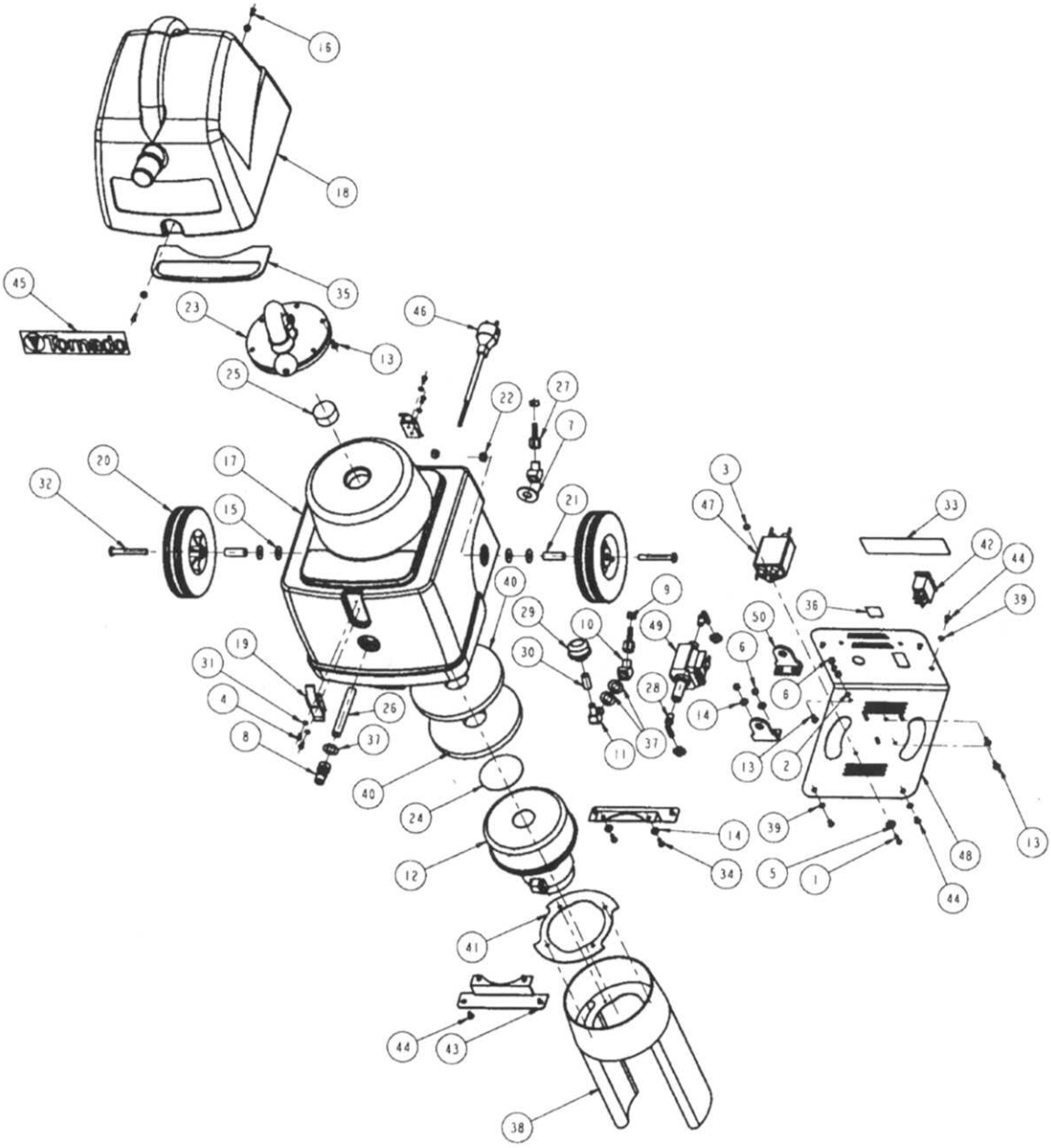
MAIN ASSEMBLY (REF. DWG. 98221)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	SCREW-SLOTTED ROUND HEAD MACHINE #8-32 x ¾	00600	2
2	WASHER-LOCK (H/S) #10	01713	1
3	NUT-HEX LOCK (KEPS) #8-32	02956	2
4	SCREW-PHILLIPS PAN HD. MACH. # 8-32 X 3/8"	02995	4
5	WASHER – SEALING ¼	07741	2
6	NUT-HEX.LOCK(KEPS) #10-24	10892	6
7	WASHER-PLAIN 1/2"	12957	1
12	MOTOR-VACUUM,115V/50-60HZ **(98220 ONLY)**	14800	1
(12)	MOTOR-VACUUM,230V/50-60HZ **(98221 ONLY)**	17425	1
8	FITTING-BRASS NIPPLE 1/4"FPT X 1/4"Q.C.	14881	1
9	CLAMP-HOSE(CRIMP TYPE) .433"-.512"(2-EAR)	15065	4
10	FITTING-BRASS ELBOW(45D) 1/4"FPT X 1/4"MPT	15075	2
11	FITTING-BRASS ELBOW 1/4"MPT X 3/8"HB	15223	1
13	SCREW - PHILLIPS TRUSS HD. MACH. #10-24 X 1/2" (SS)	17848	11
14	WASHER-PLAIN #10 (SS)	17850	8
15	WASHER-PLAIN 5/16" (SS)	19191	4
16	SCREW-PHILLIPS FLAT HD. MACH. # 8-32 X 1/2" (BLK.ZINC)	19255	2
17	TANK-SOLUTION	19490	1
18	TANK-RECOVERY	19491	1
19	LATCH-DRAW W/ KEEPER	19504	2
20	WHEEL- 6" DIA. X 1-1/4" (BLACK W/ BLK HUB)	19505	2
21	SPACER-5/16" DIA.	19506	2
22	NUT-HEX.LOCK (NYL.INS.) 5/16-18	19513	2
23	ASSEMBLY-VACUUM STACK/FLOAT CAGE	19516	1
24	SCREEN-VAC.MOTOR INTAKE	19517	1
25	FILTER-VAC.MOTOR INTAKE (FOAM)	19520	1
26	PIPE-NIPPLE, PVC 1/4"MPT X 4" LG.	19522	1
27	FITTING-BRASS ADAPTOR 1/4"FPT X 1/4" HB	19523	2
28	FITTING-NYLON ELBOW 1/8"MPT X 1/4"HB	19524	2
29	FILTER-SOL. SCREEN	19525	1
30	HOSE-SOLUTION (SCREEN)	19528	1
31	WASHER-LOCK (I/T) # 8	19530	4
32	SCREW-PHILLIPS PAN HD. MACH. 5/16-18 X 2-1/2" (SS)	19532	2
33	LABEL-"WARNING!TO REDUCE THE RISK OF ELECTRIC..."	19533	1
34	SCREW-PAN HEAD #10-16 X 1/2" LG.	19565	4
35	GASKET-SOLUTION TANK	19610	1
36	LABEL-"VACUUM ONLY-OFF-VACUUM/SPRAY"SWITCH(PS)	19611	1
37	WASHER-PLAIN 1/2" (SS)	19616	3
38	SHROUD, VAC MOTOR	19937	1
39	WASHER - LOCK E/T #10	30019	6
40	GASKET-VAC. MOTOR BOTTOM	30456	2
41	GASKET, MOTOR TOP	30457	1
42	SWITCH-ROCKER, DPDT (3 POS.) 15A	30472	1
43	BRACKET-VAC. MOTOR MT'G	30475	2
48	BRACKET-PUMP MT'G	31471	1
44	SCREW-PHILLIPS PAN HEAD MACHINE # I0-24 x 3/8	30678	10
45	DECAL-"TORNADO"	30814	1
47	LINE FILTER	31067	1
51	HOSE-SOLUTION (PUMP)	19527	2
46	ASS'Y POWER CORD 115V **(98220 ONLY)**	19499	1
(46)	ASS'Y POWER CORD 230V **(98221 ONLY)**	31059	1
49	PUMP- 55 PSI/115VAC - **(98220 ONLY)**	31479	1
(49)	PUMP- 55 PSI/230VAC - **(98221 ONLY)**	31480	1
50	BRACKET-PUMP MTG(RUBBER)	31490	2

* = NOT SHOWN

( ) = ITEMS TO BE USED WHERE APPLICABLE

PS SERIES CARPET SPOTTERS
98220 & 98221
MAIN ASSEMBLY – EXPLODED VIEW
(REF. DRAWING 98221)

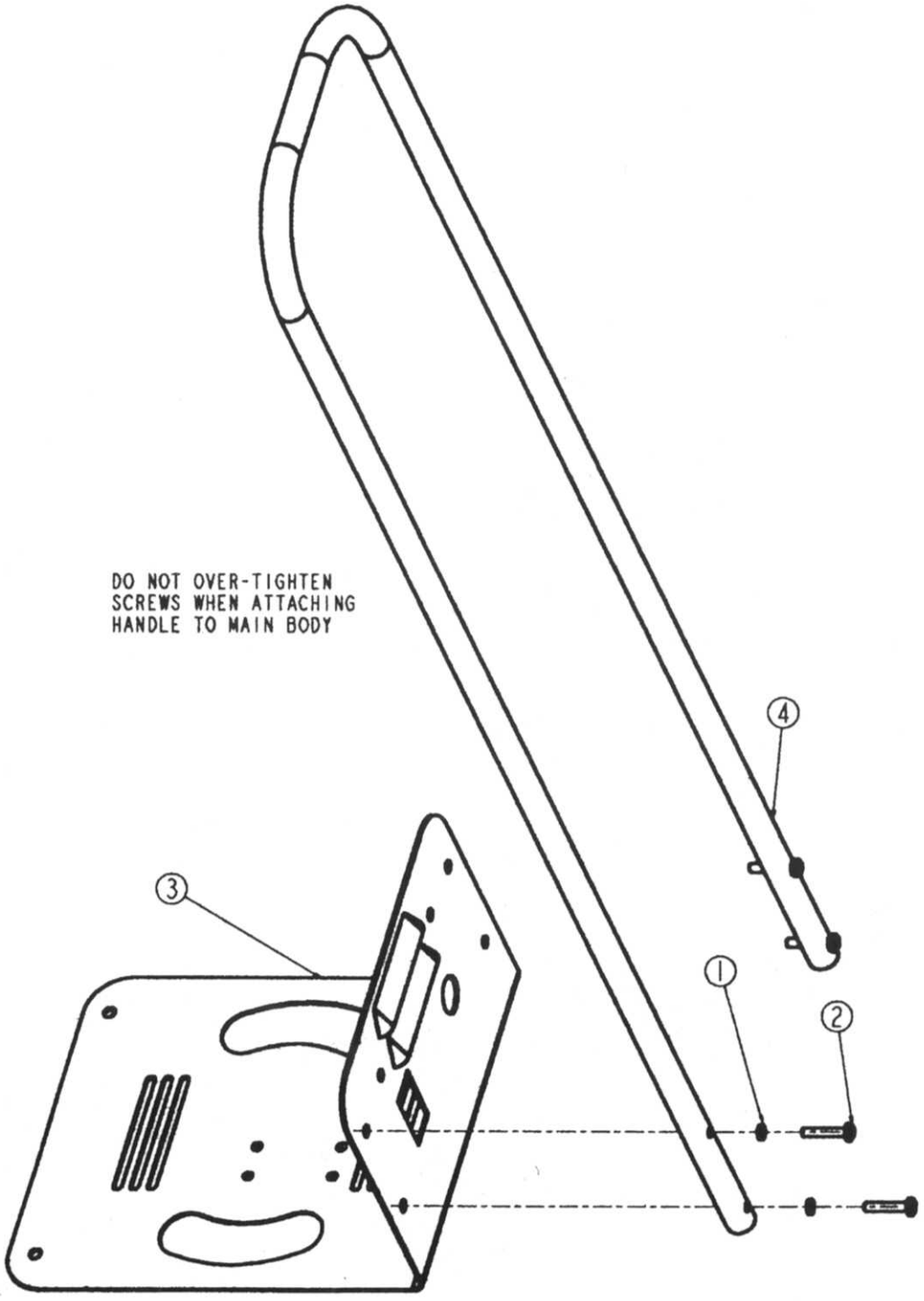


PS SERIES PORTABLE CARPET SPOTTERS

98220, & 98221

HANDLE ASS'Y (REF. DWG. 31215)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	Washer-Lock E/T #10	01713	4
2	Screw-Phillips Pan Head Machine #10-24 X 1.000	19617	4
3	Bracket-Pump Mounting (For Reference)	31471	1
4	Handle-Transport	31214	1



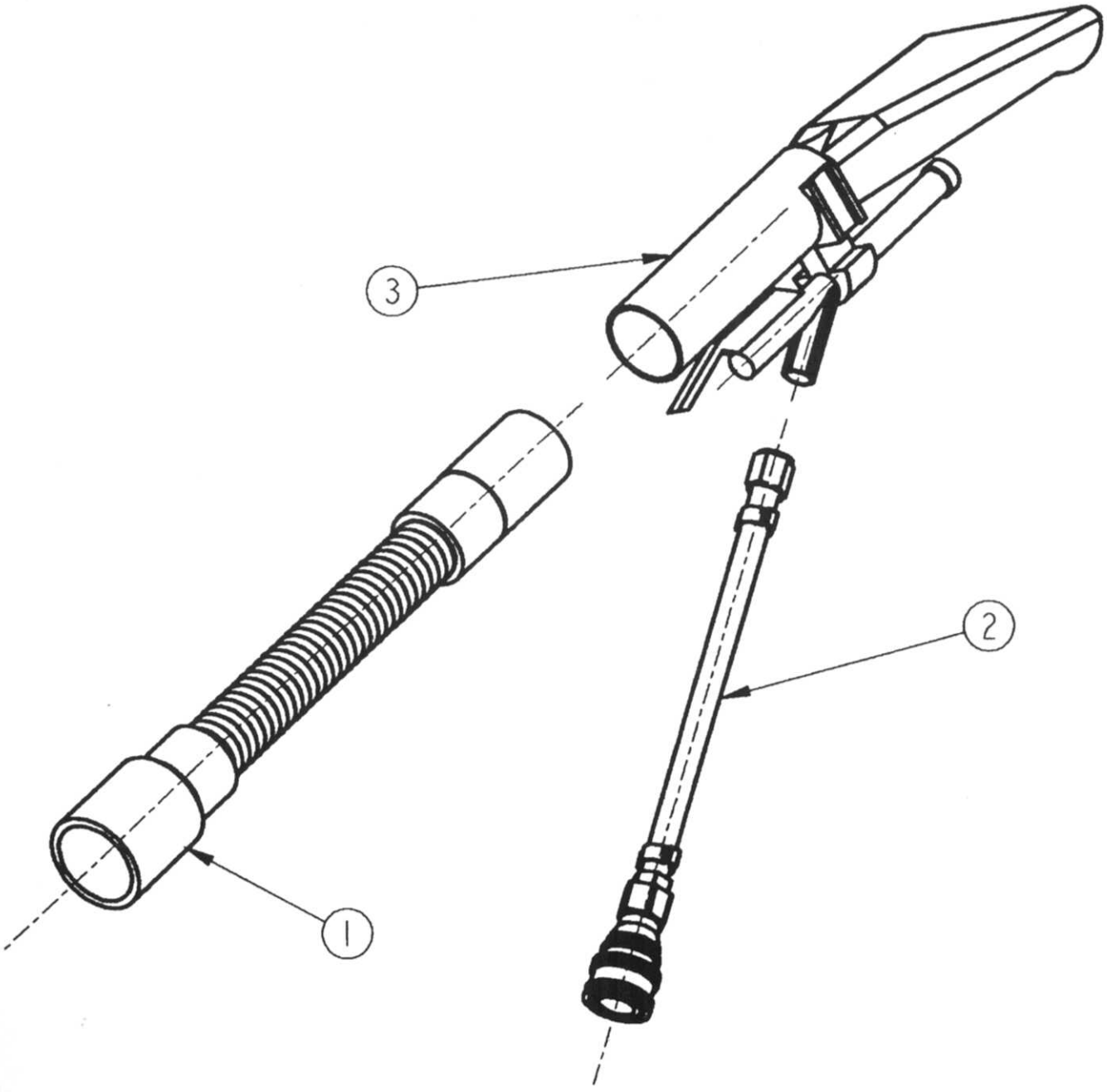
PS SERIES PORTABLE CARPET SPOTTERS

98220, & 98221

ASS'Y VAC./PRESSURE HOSE (REF. DWG. 30744)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	Suction Hose, 8'	30735/19529	1
2	Solution Hose Ass'y	30801/19639/19535	1
3	Tool-Utility	30857	1
*4	Plastic Ties-Black	18706	4

* = NOT SHOWN



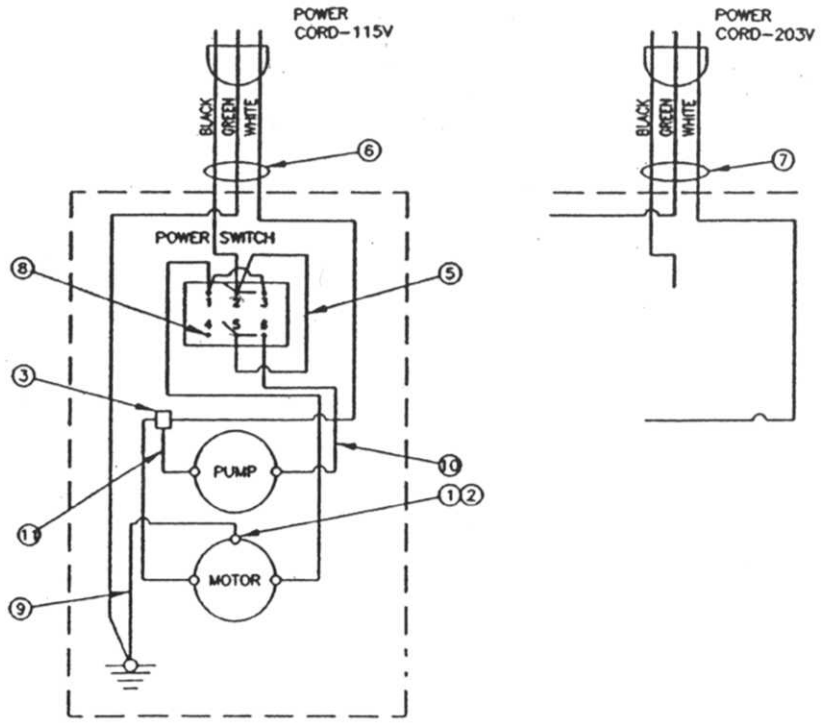
PS SERIES PORTABLE CARPET SPOTTERS
98220
CIRCUIT ASSEMBLY (REF. DWG. 98220A)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	WASHER-LOCK (H/S) #10	01713	1
2	SCREW-TCT (F) PAN HEAD #10-32 X 3/8"	03261	1
3	TERMINAL-CLOSED END CRIMP(INS)	06824	1
*4	STRAIN RELIEF(LIQ.TITE) .35 DIA. CORD	18793	1
5	LEAD-14 GA. X 3" BLACK	19466	2
6	ASSEMBLY-POWER CORD,115V (SPOTTER) (INCLUDES ITEM 4)	19499	1
7	ASSEMBLY-POWER CORD,230V (SPOTTER)	19500	1
8	TERMINAL-Q.D.FEMALE 1/4" X 22/18GA. (FUL.INS)	19503	1
9	LEAD-18 GA. X 12"GREEN	19536	1
10	LEAD-16 GA. X 12"BLACK	19537	1
11	LEAD-16 GA. X 12"WHITE	19538	1

OPTIONS AND ACCESSORIES

ITEM NO.	DESCRIPTION	PART NO.	QTY.
*	TOOL-UTILITY DETAILER (DELUXE) 3-1/2" SPRAY/VAC.	98341	1
*	TOOL-CREVICE DETAILER SPRAY/VAC.	98342	1
*	TOOL-UPHOSTERY/CURTAIN (PERFORATED) 4"SPRAY/VAC.	98343	1
*	TOOL-UTILITY/STAIR 6" SPRAY/VAC.	98344	1

* = NOT SHOWN



PS SERIES PORTABLE CARPET SPOTTERS (230V)

MODEL 98221

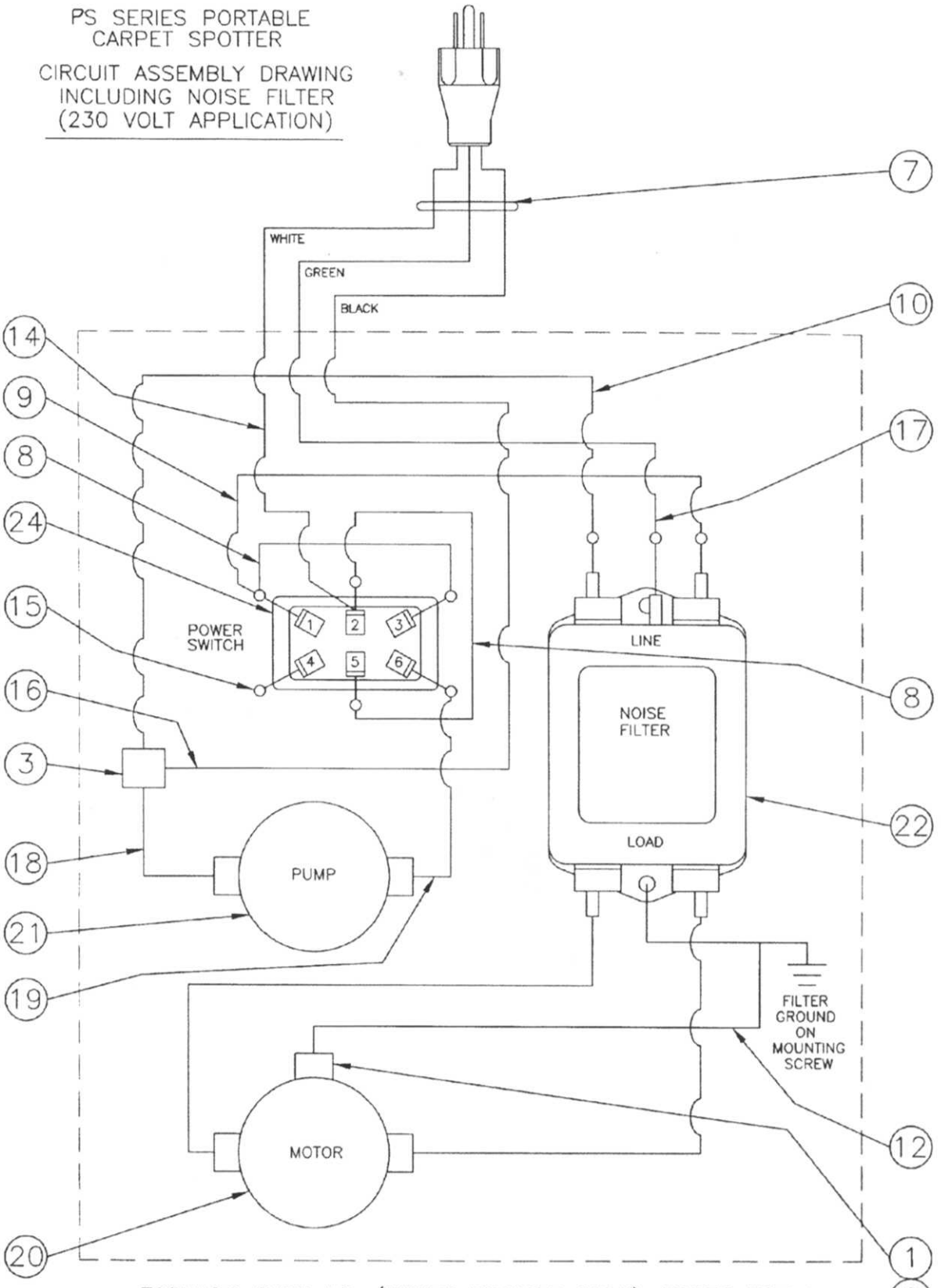
CIRCUIT ASSEMBLY /PARTS LIST (ref. drawing 31078)

ITEM NO.	DESCRIPTION	PART NO.	QTY.
*1	WASHER-LOCK (H/S) #10	01713	1
*2	SCREW-TCT (F) PAN HEAD #10-32 X 3/8"	03261	1
3	TERMINAL-CLOSED END CRIMP(INS)	06824	1
*4	STRAIN RELIEF(LIQ. TITE) .35 DIA. CORD	18793	1
*5	1/4" INSOLATED FEMALE CONNECTOR(S)	15139	9
*6	ASSEMBLY-POWER CORD, 115V (SPOTTER) (INCLUDES ITEM 4)	19499	1
7	ASSEMBLY-POWER CORD, 230V (SPOTTER)	19500	1
8	LEAD-14 GA. X 3" BLACK ON POWER SWITCH (INCLUDES ITEM 5 ON ONE END AND ITEM 11 ON THE OTHER END)	19466	2
9	LEAD-16 GA. X 12" BLACK (INCLUDES ITEM 5 ON EACH END)	19537	1
10	LEAD- 16 GA. X 12" WHITE (INCLUDES ITEM 5 ON EACH END)	19538	1
*11	5/16" NON-INSOLATED PIGGY-BACK FEMALE END CONNECTOR(S)	15391	2
12	LEAD- 14 GA. X 12" GREEN FROM MOTOR (INCLUDES ITEM 5 ON ONE END AND ITEM 13 ON THE OTHER END)	80673	1
*13	3/16" NON-INSOLATED LOOP END CONNECTOR(S)	15200	1
14	BLACK LEAD WIRE FROM POWER CORD (INCLUDES ITEM 5 ON THE END)		1
15	TERMINAL-Q.D.FEMALE 1/4"X 22/18GA. (FUL. INS)	19503	1
16	WHITE LEAD WIRE FROM POWER CORD (ICONNECTED TO ITEM 3)		1
17	GREEN LEAD WIRE FROM POWER CORD (INCLUDES ITEM 5 ON THE END)		1
18	LEAD- 16 GA. X 12" WHITE FROM PUMP (INCLUDES ITEM 5 ON ONE END AND AND IS CONNECTED TO ITEM 3 ON THE OTHER END)	19538	1
19	LEAD- 16 GA. X 12" BLACK FROM PUMP (INCLUDES ITEM 5 ON EACH END)	19537	1
20	VACCUM MOTOR 230V/50-60HZ	17425	1
21	PUMP-55 PSI/230VAC	31480	1
22	FILTER	31067	1
*23	POWER CORD 230V	31059	1
24	POWER SWITCH	30472	1

* = NOT SHOWN

PS SERIES PORTABLE
CARPET SPOTTER

CIRCUIT ASSEMBLY DRAWING
INCLUDING NOISE FILTER
(230 VOLT APPLICATION)



TORNADO PART NO. (WIRING DIAGRAM ONLY): 31078 REV A