

TORNADO INDUSTRIES
7401 W. LAWRENCE AVENUE
CHICAGO, IL 60706
(708) 867-5100 FAX (708) 867-6968
www.tornadovac.com



Operation & Maintenance Manual
For Commercial Use Only



12 Gallon CarpetRinser/Dryers[®]

Catalog #
98245

Model
2-500 H Professional

L8245BA 1/05 ©2005 Tornado Industries All rights reserved.

This instruction book covers:

CATALOG NO.	98245
SERIES	A
VOLTS	115 VAC
AMPS, VAC MOTOR	13
AMPS, HEATER	14.6
CERTIFICATION	Pending

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.

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.

10 Years:
All plastic tanks and rotationally-molded bodies^{1) 5)}

2 Years:
Parts on all Tornado and Tornado/Karcher cleaning equipment^{1) 2) 3) 5)}

1 Year:
Labor on all Tornado and Tornado/Karcher cleaning equipment^{2) 5)}

1 Year:
Warranty on batteries and chargers, One year pro-rated.

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

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

Inspection

Unpack and inspect your extractor for shipping damage. Each unit is tested and inspected prior to shipping. For any concerns regarding shipping damage, contact your dealer immediately. All returns must have a Return Authorization (RA) number.

Grounding Instructions

The extractor **MUST BE GROUNDED**. If the machine should stop working or malfunction, grounding offers a path of least resistance for electrical current, reducing the risk of electrical shock. This machine is equipped with a cord that has an equipment grounding conductor and a 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. Cutting off the ground wire or using a cord that is not properly grounded will void the manufacturers warranty on this machine.

Safety

Warning - To reduce the risk of fire, electrical shock or Injury:

- READ ALL INSTRUCTIONS BEFORE USING.
- Use only as described in this manual.
- Plug power cord into the nearest outlet (20A preferred).
- Never attempt any adjustments or repairs while the machine is plugged in.
- Do not use outdoors, in standing water, or on wet surfaces.
- Pay close attention when using unit near children.
- Do not leave unit outdoors, or in extreme heat or cold. Harsh weather elements will damage components and void warranty.
- Lift using only the appropriate handles.
- Always wear appropriate clothing and safety equipment when operating unit.
- Keep all body parts, hair, and loose clothing away from openings and moving parts
- Use extra care when cleaning on stairs. Do not move up or down stairs with fluid in the unit.
- Use common sense to protect yourself and others from injury when using an extractor.

Warnings

- Do not run the pump without water in the solution tank.
- Do not use hot liquids in the solution tank.
- Do not pick up combustible or flammable materials.
- Do not use your extractor with a damaged cord.
- Do not operate without the float shut-off assembly in place.

Precautions

- Do not run the pump dry. This will void the manufacturer warranty.
- Do not run hot fluids through the pump. This can cause pump cavitation and will void the warranty. This is a water-cooled pump.
- Always be sure the solution tank and hoses and filters are clear of debris. Running the pump with clogged filters or hoses can cause pump damage.
- Replace any damaged cords or hoses before use.

Chemical Use

- Only use chemicals approved for use with extraction.
- Keep the appropriate MSDS sheets on hand at all times.
- Flush the solution pump with clean water after each use to extend the life of the pump.

Electrical

- Do not pull your machine by, close a door on, or run over the cord, and keep it away from heated surfaces.
- Do not pull on the cord to unplug the machine.
- Turn all machine switches to OFF before unplugging.
- Connect to a properly grounded outlet only.

Special Electrical Requirements for the 98245 2-500 H Professional

Locate and use separate 20-amp outlets in good condition, each controlled by separate 20-amp circuit breakers. Use only the two 25' extension cords supplied with the unit, and temporarily disconnect all other devices on those circuits if possible.

The 98245 is a super-high performance industrial model using two vac motors, a twin-element heater, and a large 500psi pump. Because of high total amp draw, power for these components is supplied by two independent power cords. These cords are intended to be plugged into two separate wall outlets, and these outlets should also be on *separate* 20-amp circuits having independent circuit breakers. For best performance, each of these circuits should be as free of other appliances and equipment as possible.

If both cords are plugged into the same circuit, the circuit breaker will trip and/or the heater will not power up properly. Since in commercial buildings it may be more difficult to know if particular outlets are on different circuits, a red indicator light has been added to machines produced since 2004. If this light comes on as a steady, strong red, then the plugs are on two different circuits and the unit should run properly. If the light does not come on, is a very faint red color, or flickers on and off, then the unit is on the same circuit or too many other devices are on one (or both) of the circuits. Note that if the unit does not have enough available current, then *the heating element will not function properly*.

Two 25' extension cords are supplied with the unit. The use of longer extension cords, additional cords, or worn/loose wall outlets can lower voltage and raise amp draw, resulting in a tripped circuit breaker and/or overheating of any worn outlets. If the unit is being used in a residential setting, look for independent 20-amp wall outlets in good condition. These are most often found at the garbage disposal, washer and dryer, and in a bathroom.

Priming the 2-500H Professional Extractor

(Note: 2-100 & 2-100H Extractors are self-priming)

- Fill the solution tank with clean water/solution at least 3/4 full.
- Turn on the vacuum motor.
- Turn the Auto Prime Lever (located on the back of the machine close to the left cord) to the ON position (vertical).
- Cover the vacuum inlet (where the wand normally attaches) with your hand for about 5-10 seconds.
- Turn the Auto Prime Valve to the OFF position and remove your hand from the vacuum inlet.
- Turn ON the solution pump. The pressure should rise to about 500psi. If pressure does not rise, repeat this process.
- Attach the wand purchased with your extractor. You are ready to use the machine.
- Flush the extractor with clean water after every use.
- Do not run the solution pump dry, or you will need to prime it again.

Operational Instructions

- Use only a (20 amp) electrical outlet, usually found In Bathroom, Kitchens, or Laundry rooms. Plug your machine in.
- Attach vacuum and solution hoses to appropriate connections on the machine and your wand. As you do this, always Inspect hoses for cracks or fraying. Do not use if hoses are cracked or frayed.
- Mix water and approved extractor detergent in the solution tank at the front of the machine. Use a clean hose to fill the solution tank. If a hose is not available, use a clean bucket. DO NOT OVERFILL.

Machine Maintenance

1. Regular dally maintenance Is required to keep this equipment In the best working condition. A detailed list of preventative maintenance is outlined below. Thoroughly clean all equipment and accessories after each use:
 - Rinse solution and vacuum recovery tank with clean water.
 - Flush entire pumping system with clean water. This includes all solution hoses and wand(s). Do not allow liquids to remain in equipment after use.
 - Clean all filters and dump valve.
2. The solution system has one filter located in the solution tank, and high-pressure machines (200psi and higher) have an in-line filter in the pump compartment. Check filters dally and clean when dirty in order for them to properly filter debris from the solution tank. If the filter Is missing or becomes damaged It must be replaced before the machine Is used.
3. Lubricate all quick disconnects with a quality silicone lubricant.
4. Do not use the same pail to fill the solution tank that is used to empty the waste tank. This would introduce dirt and debris into the solution lines, block the fitters, orifices, and generally degrade the pumping system.

Winterizing Your Extractor

This unit should be winterized between uses if it is to be exposed to freezing temperatures. To winterize your machine, pour a 50/50 mix of anti-freeze and water into the empty solution tank. Aim the spray gun into the solution tank. Run the pump and spray the gun into the solution tank until the fluid flows from the gun into the tank.

Serial #'s

The serial number is located on the back of the machine just above the dump valve.

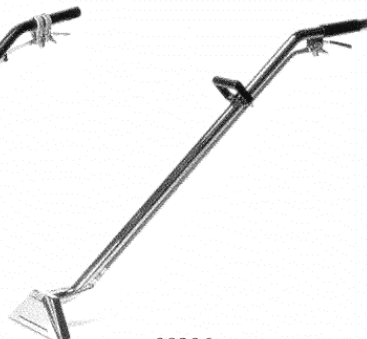
ACCESSORIES FOR ALL MODELS



98393
10" Standard Drag Wand
for 100 PSI or less



98394
12" Deluxe Drag Wand
for 100 PSI or less



98396
12" Professional Drag
Wand for 101 PSI or more



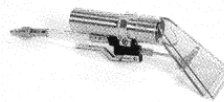
95567 - 20' Vac/Low Pressure Hose for 100 PSI or less
or
95568 - 20' Vac/High Pressure Hose for 101 PSI or more



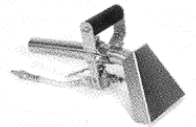
98342
Crevice Detailer
Extraction Tool



98343
Upholstery Hand Tool



98340
Standard Utility Tool



98344
Deluxe Utility Stair Tool

**12 GALLON CARPETRINSER/DRYERS
98245**

Item #	Qty	Part #	Description
1	2	20002	Vac Motor 2-Stage
2	2	20003	Gasket Vac Motor
3	1	20004	Plate-Pump
4	As Req'd	20006	Screws for Pump Mounting
5	1	20007	Heating Element
6	1	20008	Pump-Adjustable 50-500
8	1	20010	Hose-Vacuum 1.5" (Blk)
9	1	20011	Standpipe--1-1/2" X 20' Blk
(10)	As Req'd	20012	Spade (Insul) Disconnect
(11)	As Req'd	20013	Flat Washer
(12)	As Req'd	20014	Rivet
13	2	20015	Elbow-90 Deg (Vac Hose)
(14)	2	20016	Extension Cord-25'
15	1	20017	Strainer 1/2" (Sol. Tank)
16	2	20018	Nut-Strain Relief Pigtail
(17)	As Req'd	20020	Pigtail--CarpetRinsers/Dryer
(18)	As Req'd	20021	Connector--Butt (Insul)
19	1	20022	Adapter-Pipe (Recovery Tank)
(20)	As Req'd	20023	Washer
21	2	20024	Bolt-Top Tank
22	6	20025	Bolt-Motor Manifold
23	4	20026	Bolt-Tank Strap
24	2	20027	Strap-Tank
25	1	20028	Screen-Float Assembly
26	1	20029	Clamp-Vac Hose
27	1	20030	Ball-Float Assembly
(28)	As Req'd	20031	Rivet
29	2	20034	Hinge Keeper
30	4	20040	Screw-Control Panel
31	2	20041	Clamp-Cooling Duct Hose
(32)	As Req'd	20044	Connector--Solderless
33	As Req'd	20047	Service Use #20046 Cooling Duct 3" X 30"
34	3	20048	Exhaust Grate
35	2	20049	Lock Washer-Caster
36	2	20050	Hinge
37	2	20051	Bolt-Caster
38	2	20052	Axle
39	2	20053	End Cap-Axle
40	2	20054	Pigtail
41	3	20055	Switch-Splash Proof
42	1	20056	Valve-Dump
43	1	20057	Plate-Switch (3) Holes
44	1	20058	Hatch-Cover
45	1	20059	Gasket-Hatch Cover
46	2	20060	Caster
47	2	20061	Wheel
48	1	20062	Hose-Black Lined Gray
49	1	20063	Prime Hose
51	1	20065	1/4" MPT Nipple
52	1	20066	Priming Valve

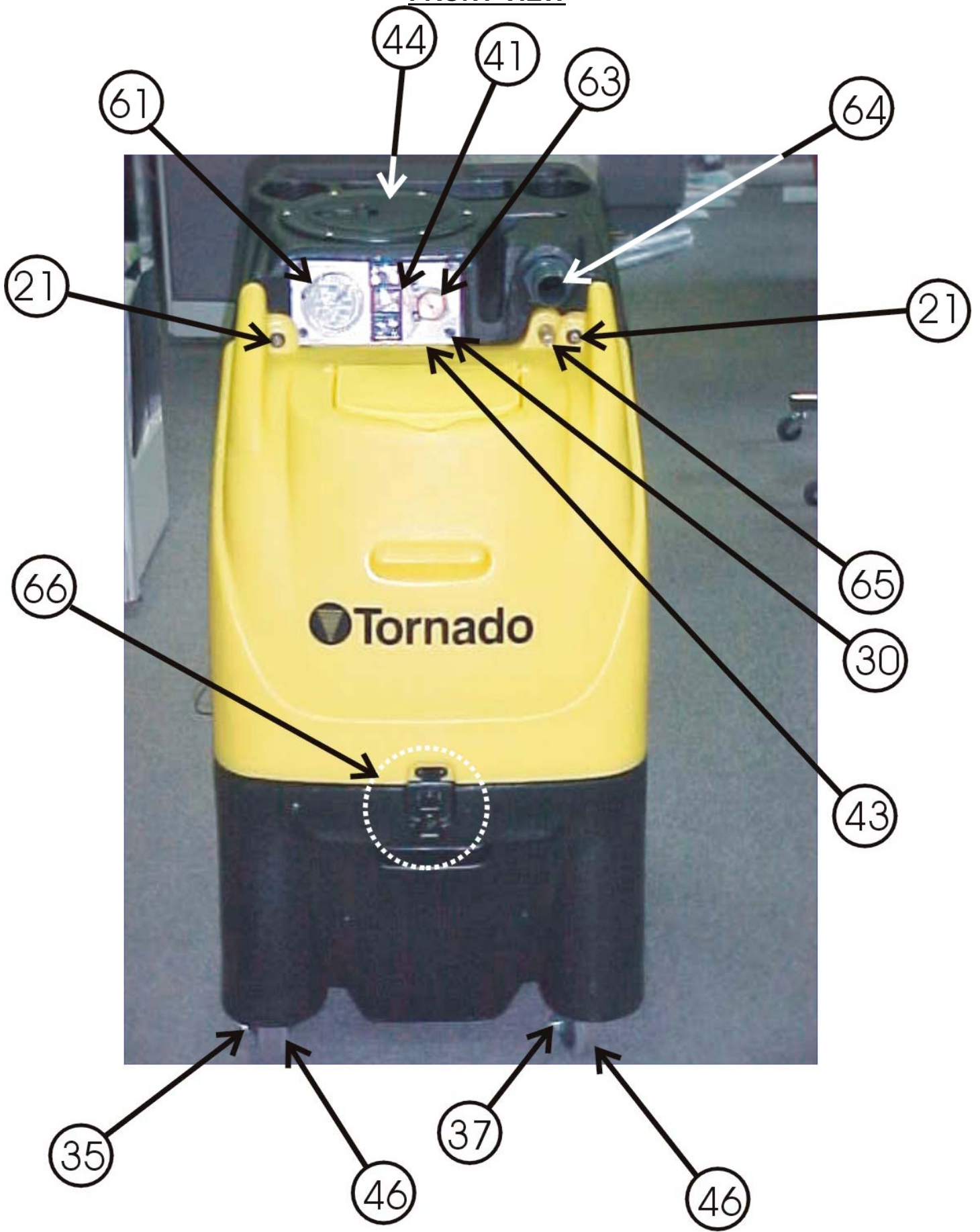
54	1	20068	1/4" F Bulkhead Fitting
55	1	20070	90 Deg. 1/4"MPT X 1/2"Barb
56	1	20071	3/8"MPT X 1/2"Barb
57	As Req'd	20072	Hose
59	2	20074	3/8"Barb X 3/8"MPT
60	As Req'd	K63903240	Hose
61	1	22189	Gage-Pressure
62	1	24520	1/4"MPT X 3/8"MPT Nipple
63	1	24521	200-500 PSI Regulator Valve
64	1	24522	Vacuum Hose Adapter
65	1	24523	Use 14881—Fitting-Brass Nipple 1/4" FPT x 1/4" QC
66	1	24524	Latch Assembly
67	1	24525	Exhaust Adapter
68	1	24526	Water Filter
69	1	22007	Kit-High Pressure Hose

() ITEM NOT SHOWN

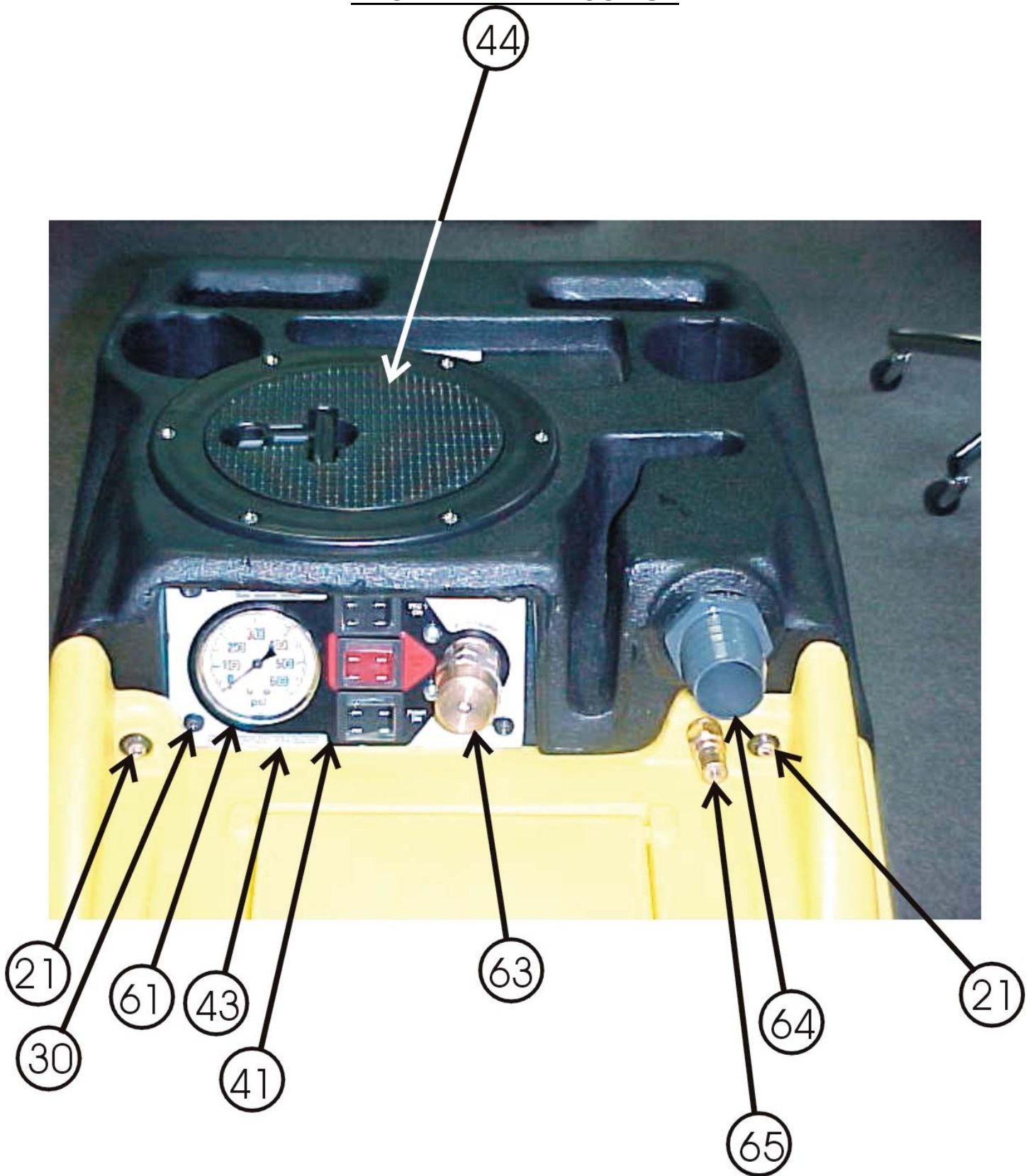
Troubleshooting Guide

SYSTEM	PROBLEM	POSSIBLE CAUSE	REMEDY
Vacuum System	No Vacuum / Weak Vacuum	<ul style="list-style-type: none"> • Vac tank full • Float shut-off screen dirty • Float ball stuck • Damaged or loose vac hose • Dump valve open • Access lid not sealed • Vac hose clogged • Air intake grid clogged • Leak in recovery tank 	<ul style="list-style-type: none"> • Empty tank • Spray off screen • Tap float and clean • Attach or replace • Close valve • Replace gasket • Clear debris • Clean • Clean and dry area and silicone
Electrical System	No Power to Pump or Vac motor	<ul style="list-style-type: none"> • Unit not plugged in • Switch not "ON" • Building circuit overloaded • Wiring connections loose 	<ul style="list-style-type: none"> • Plug In machine • Check switches • Reset circuit • Unplug machine, check for loose wires
	Burning smell	<ul style="list-style-type: none"> • Vac motor hung up • Pump motor hung up 	<ul style="list-style-type: none"> • Replace vac motor • Release pressure on hose and jog or replace pump
Pumping System	No Flow / Weak Flow	<ul style="list-style-type: none"> • No power to pump • Jet on wand clogged • H2O filter clogged • Debris in solution tank covering inlet • Hose kinked or loose • Pump failed 	<ul style="list-style-type: none"> • Check electrical • Clean jet filter • Clean filter • Clear debris, do not use powder soaps • Check hoses • Replace pump

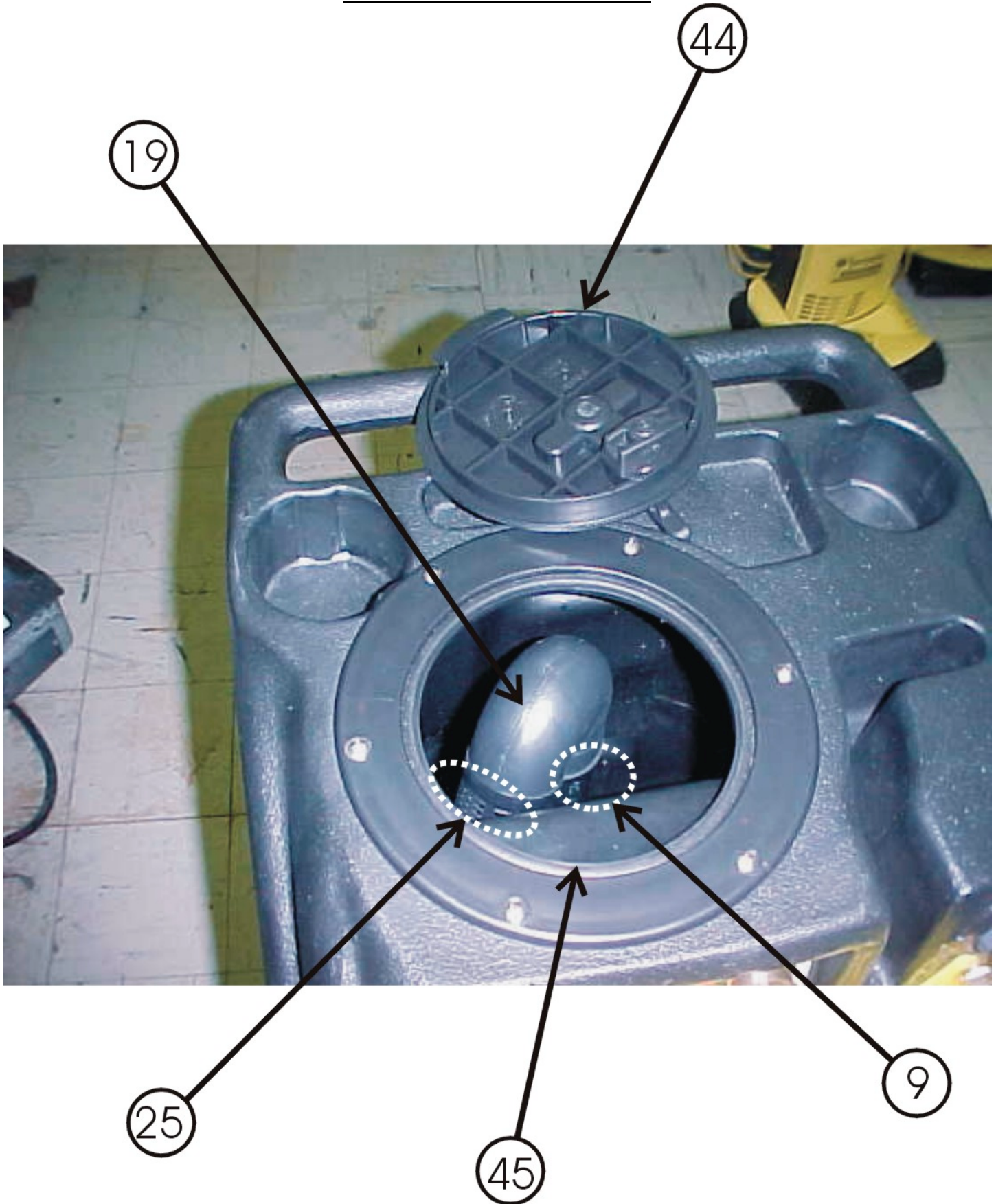
FRONT VIEW



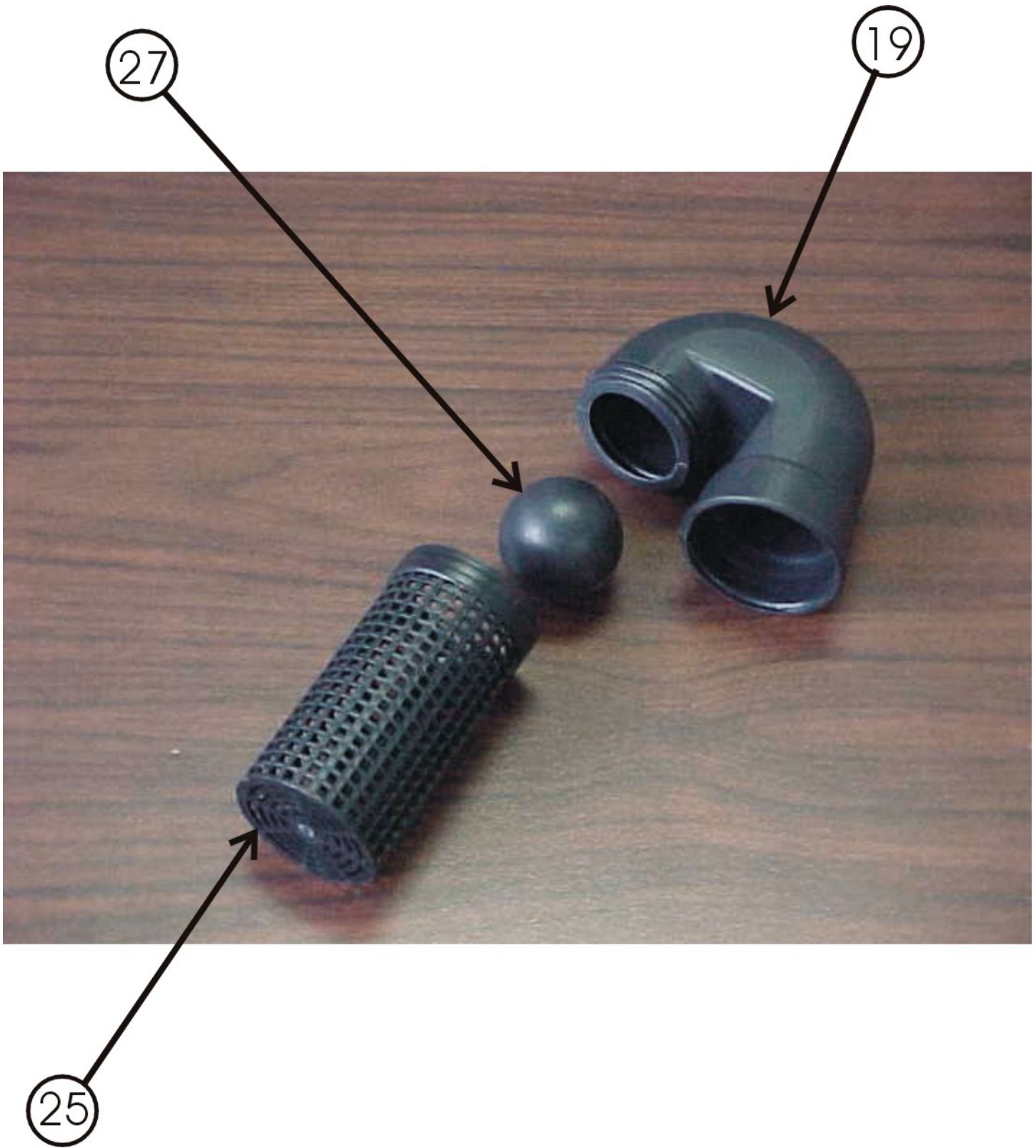
FRONT VIEW—CLOSE UP



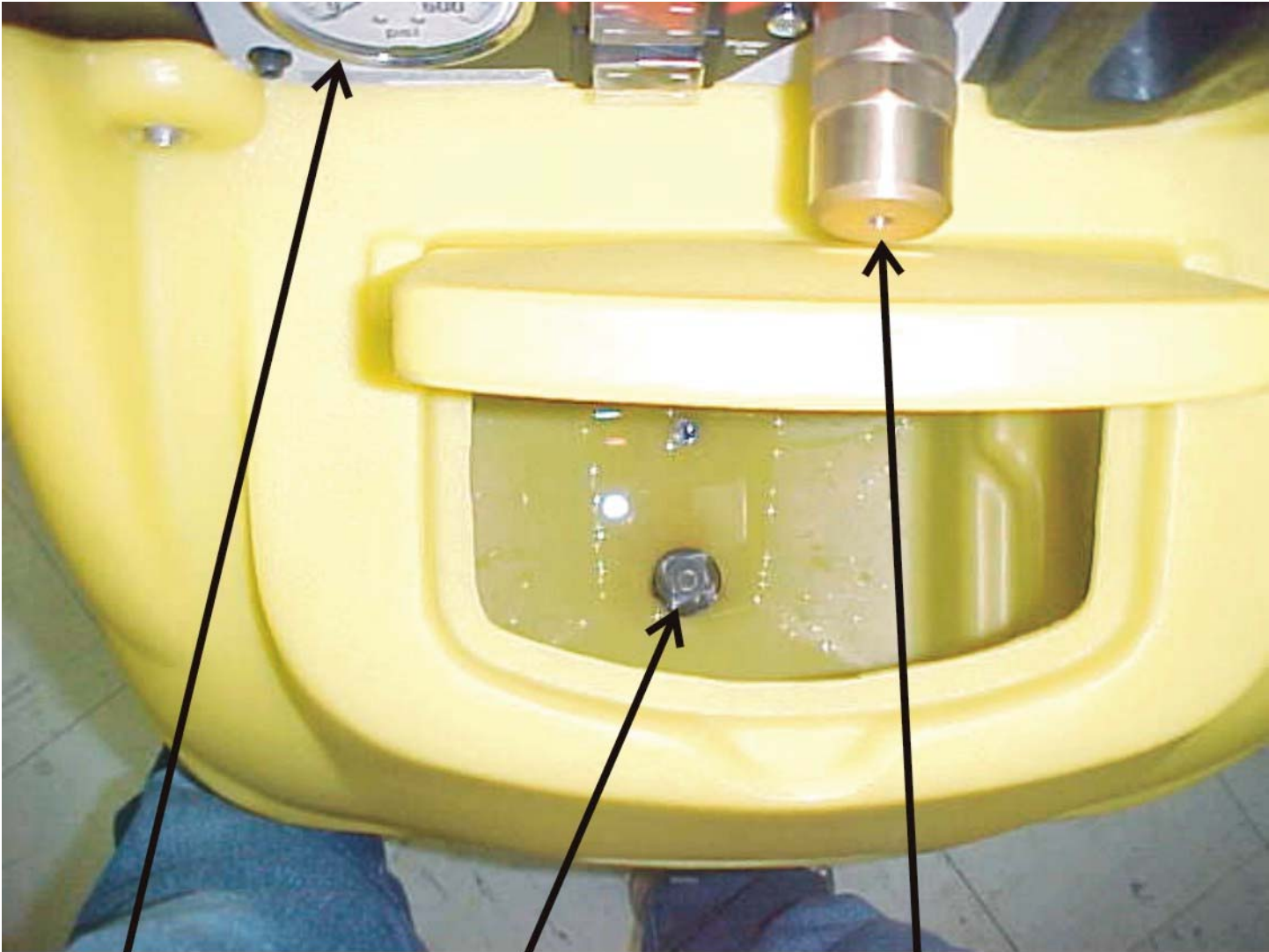
TOP & RECOVERY TANK



RECOVERY TANK PARTS



SOLUTION TANK

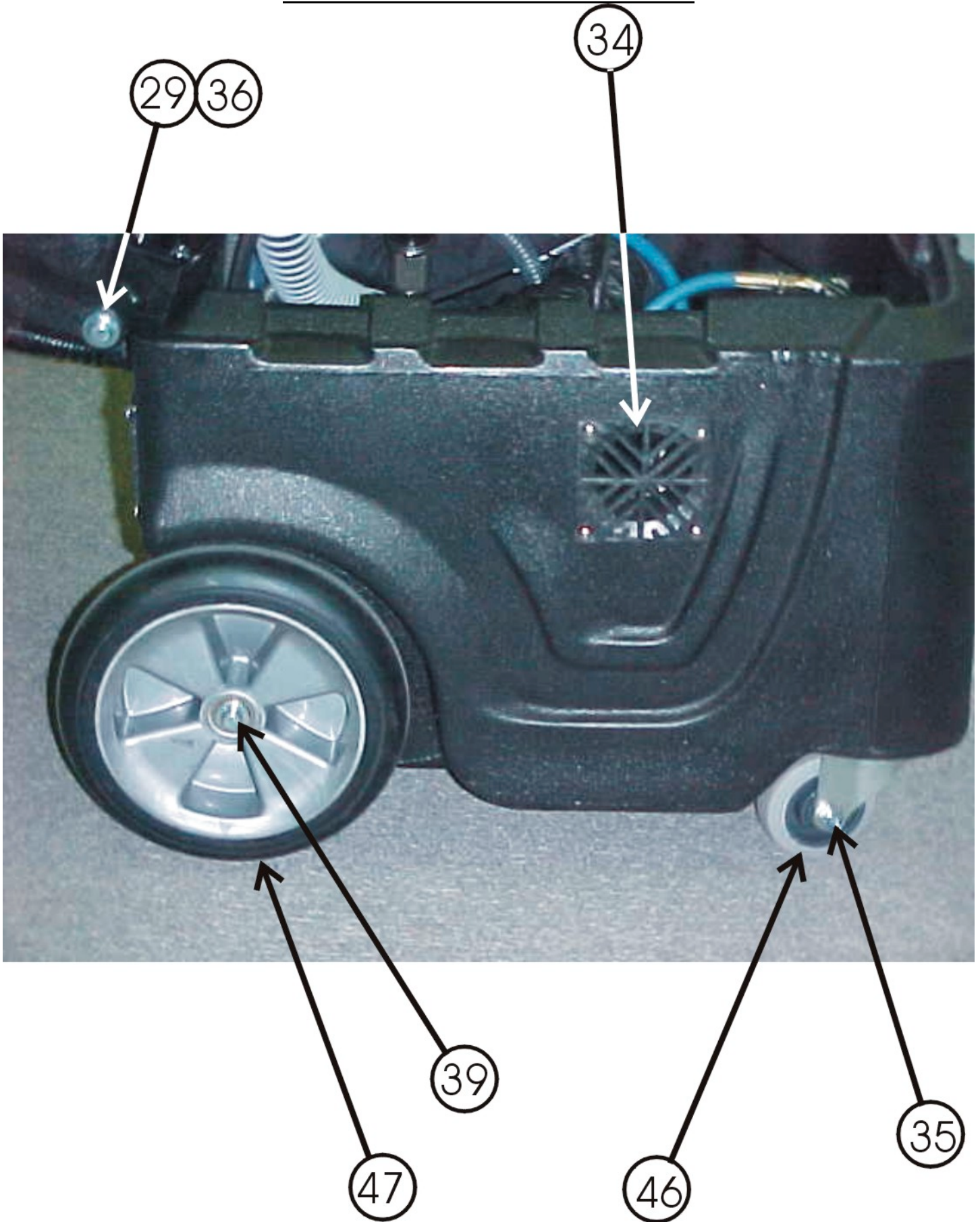


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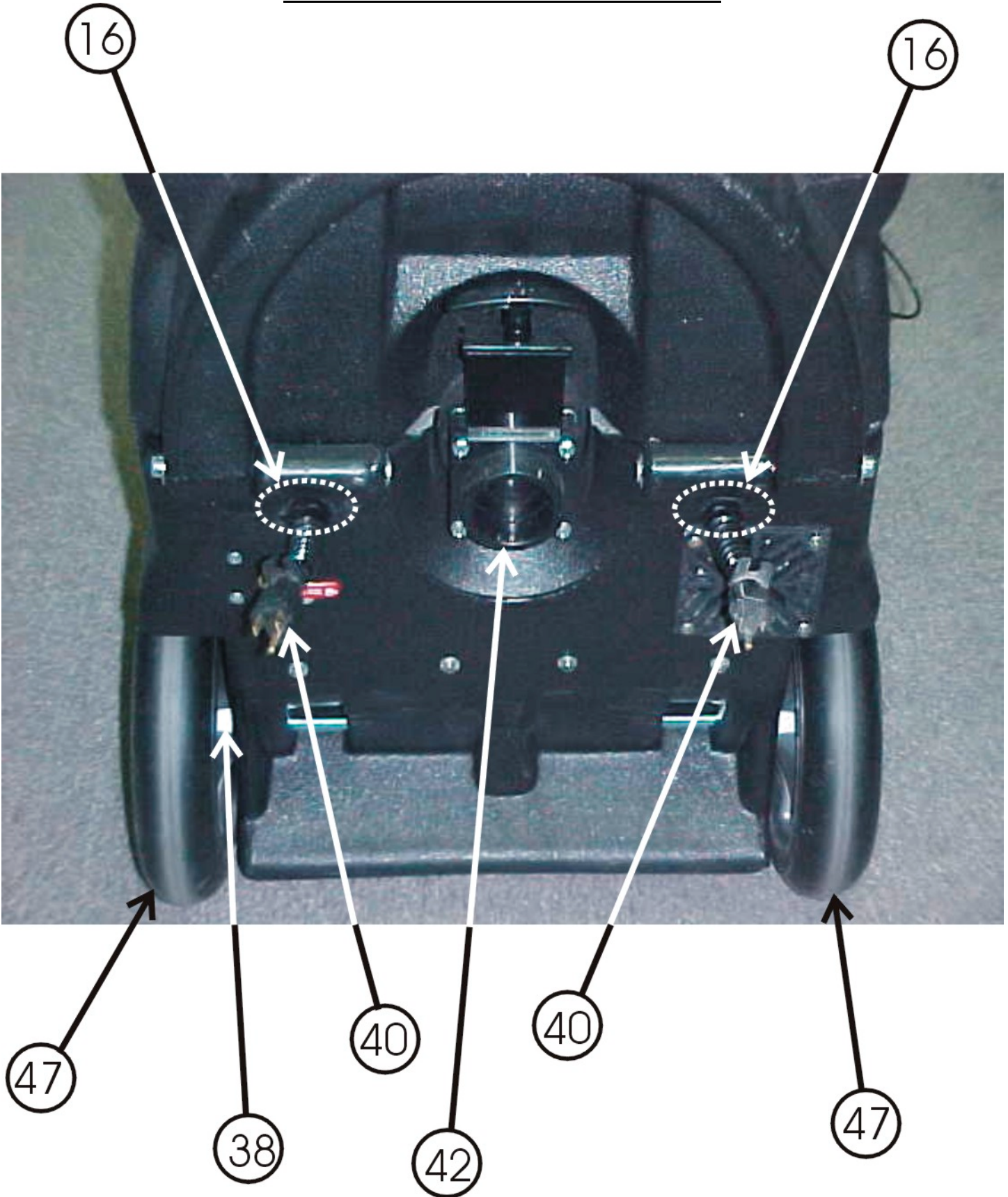
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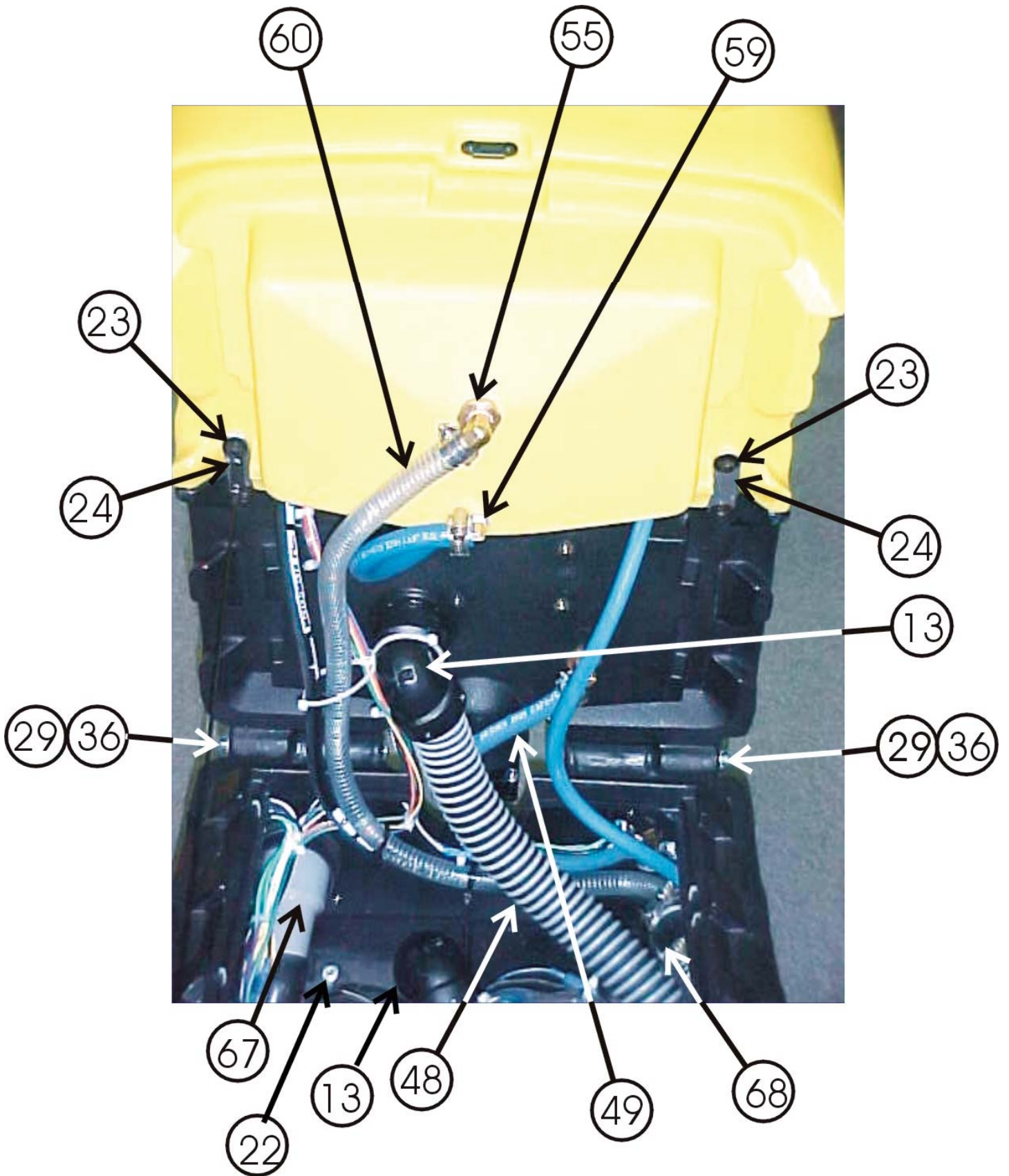
SIDE VIEW—BOTTOM ASSEMBLY



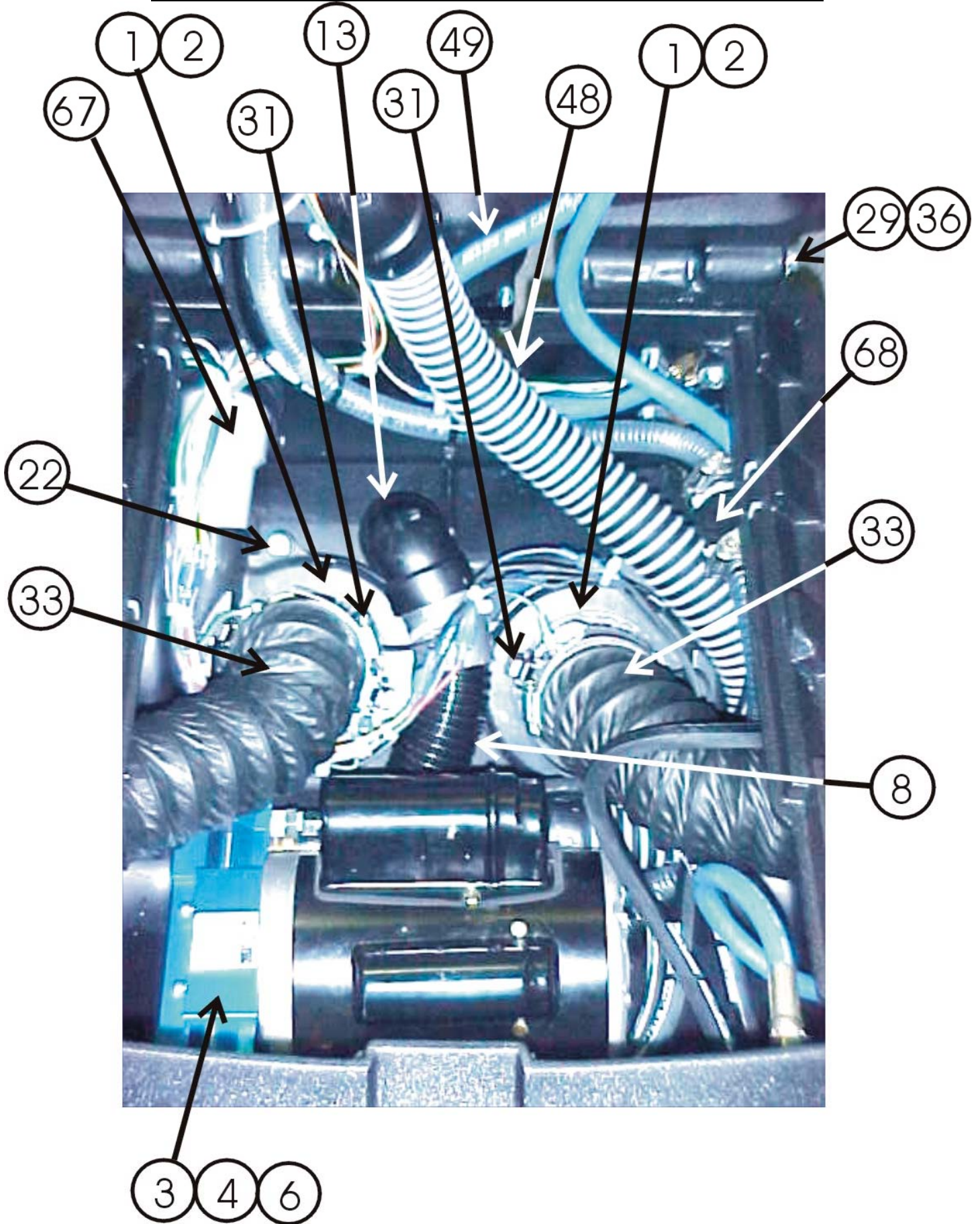
REAR VIEW—BOTTOM ASSEMBLY



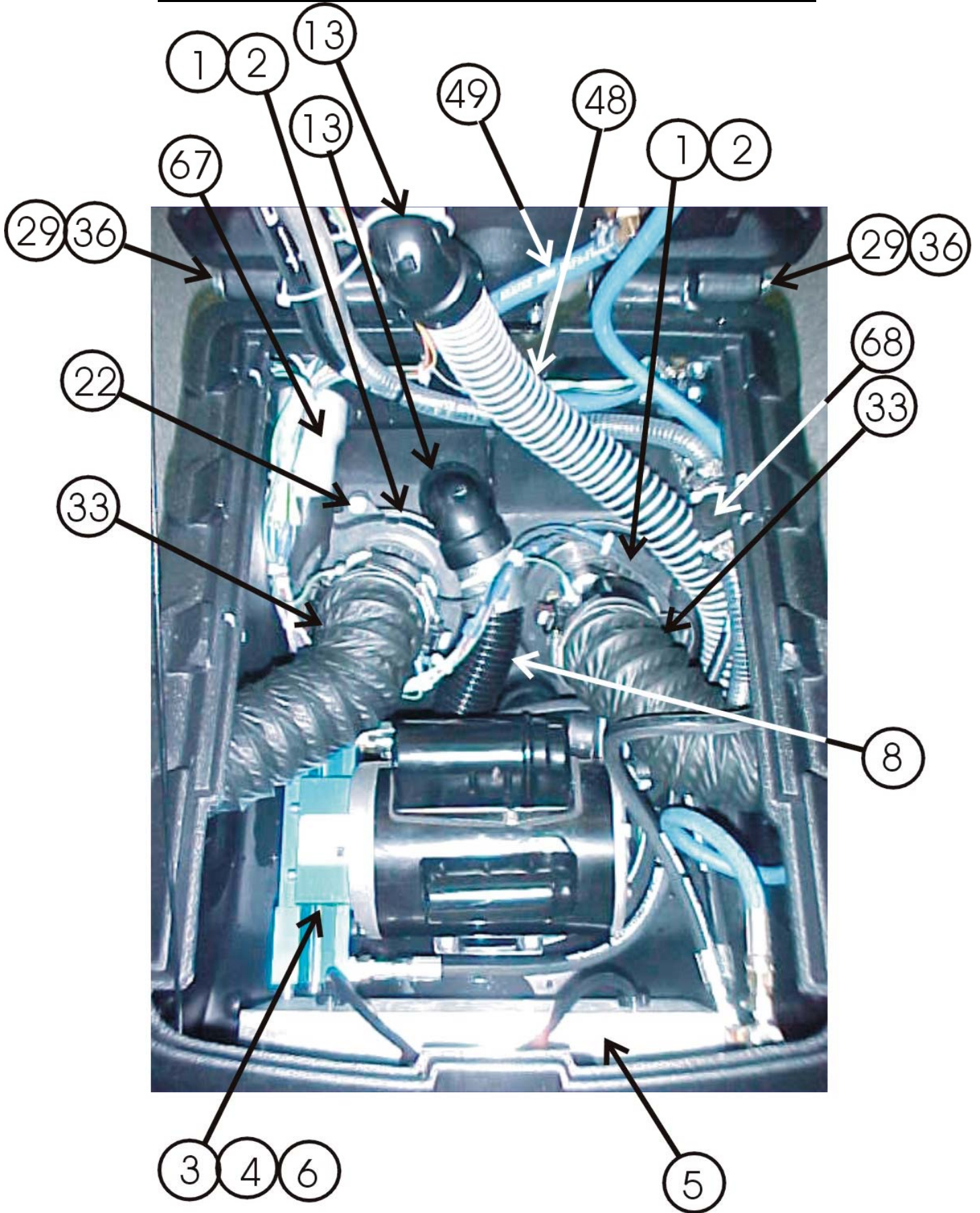
CONNECTIONS—SOLUTION TANK



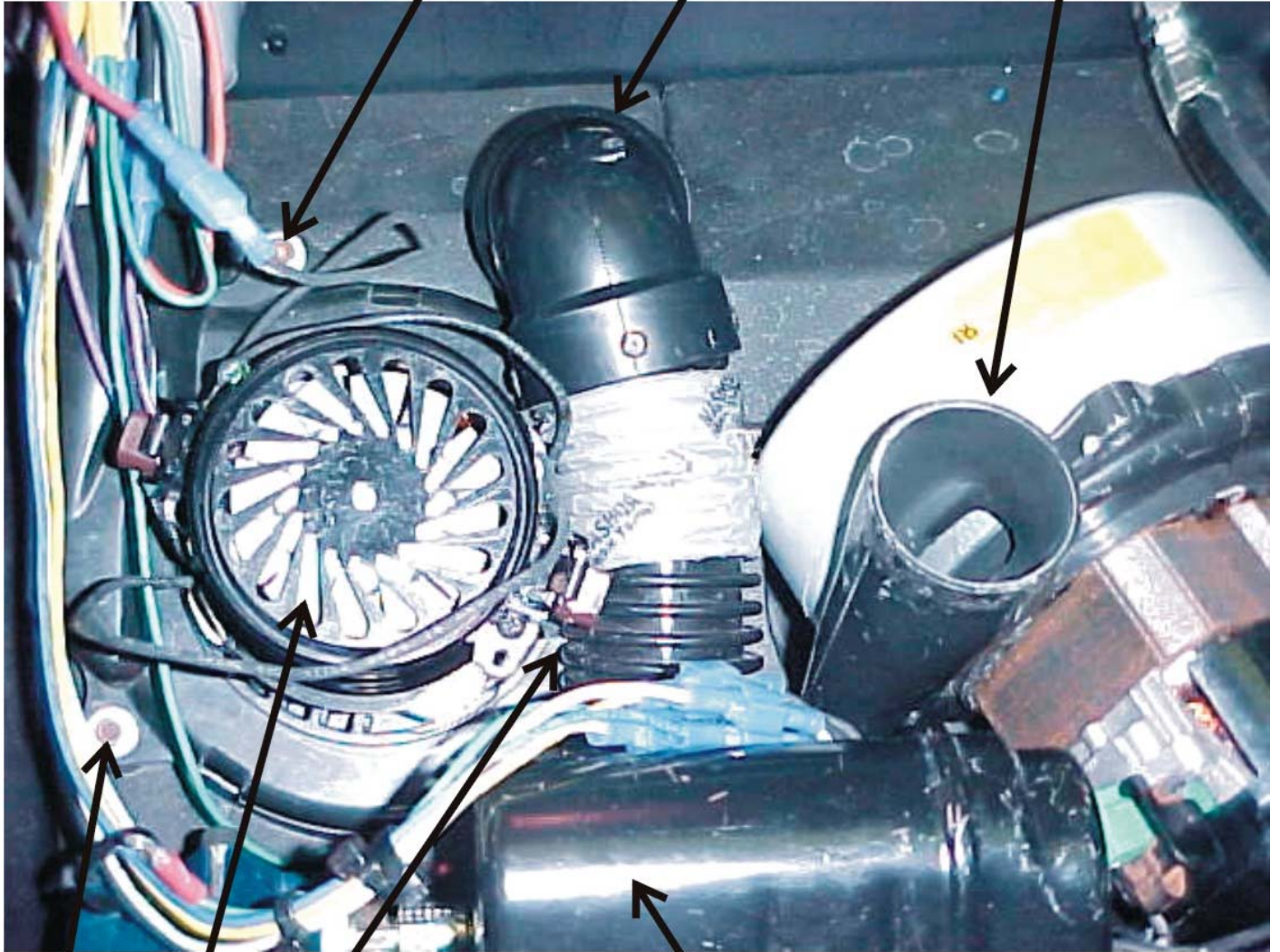
INTERNAL VIEW WITH COOLING—BOTTOM ASSEMBLY



INTERNAL VIEW WITH HEATER—BOTTOM ASSEMBLY



VACUUM MOTORS



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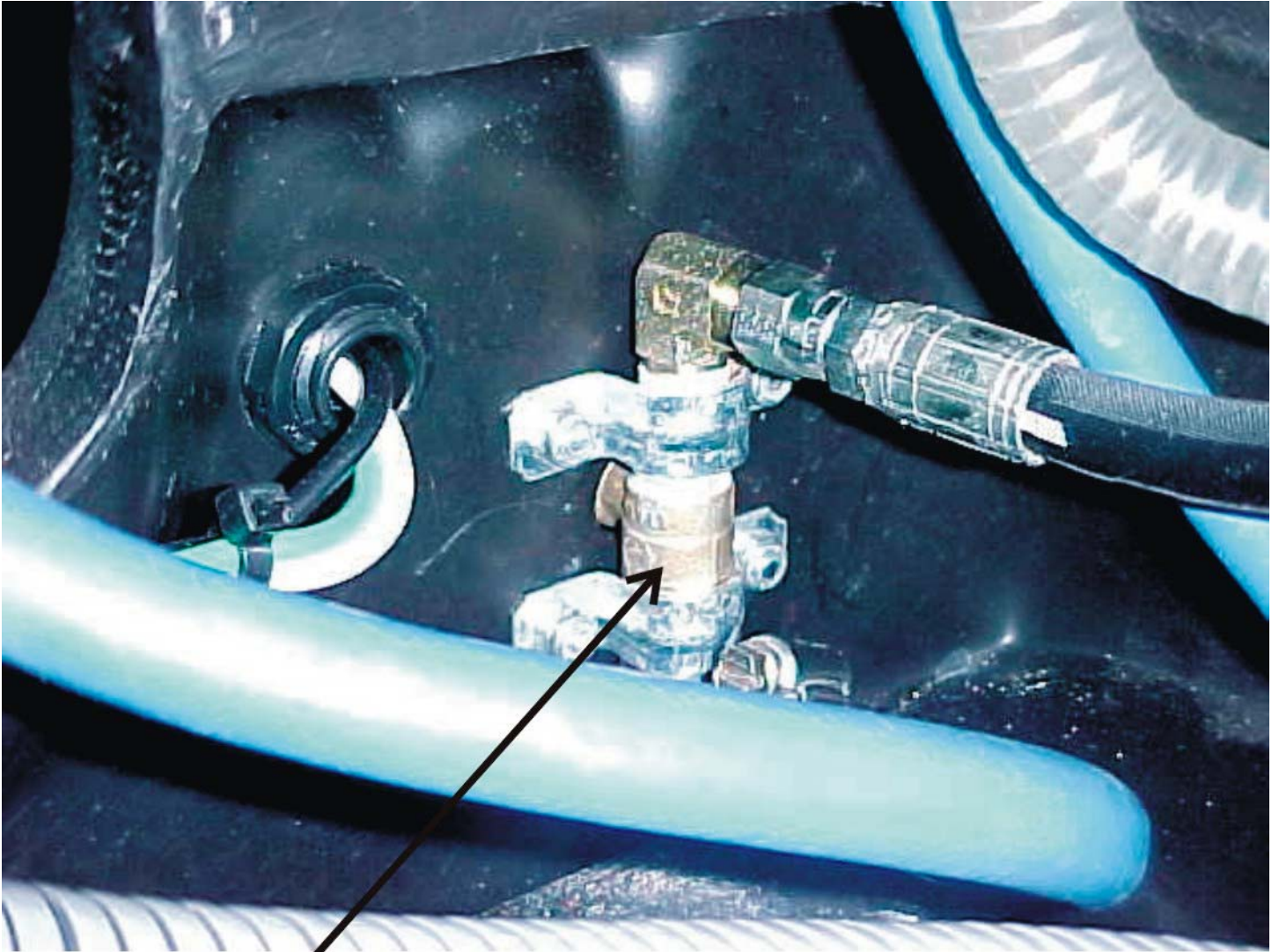
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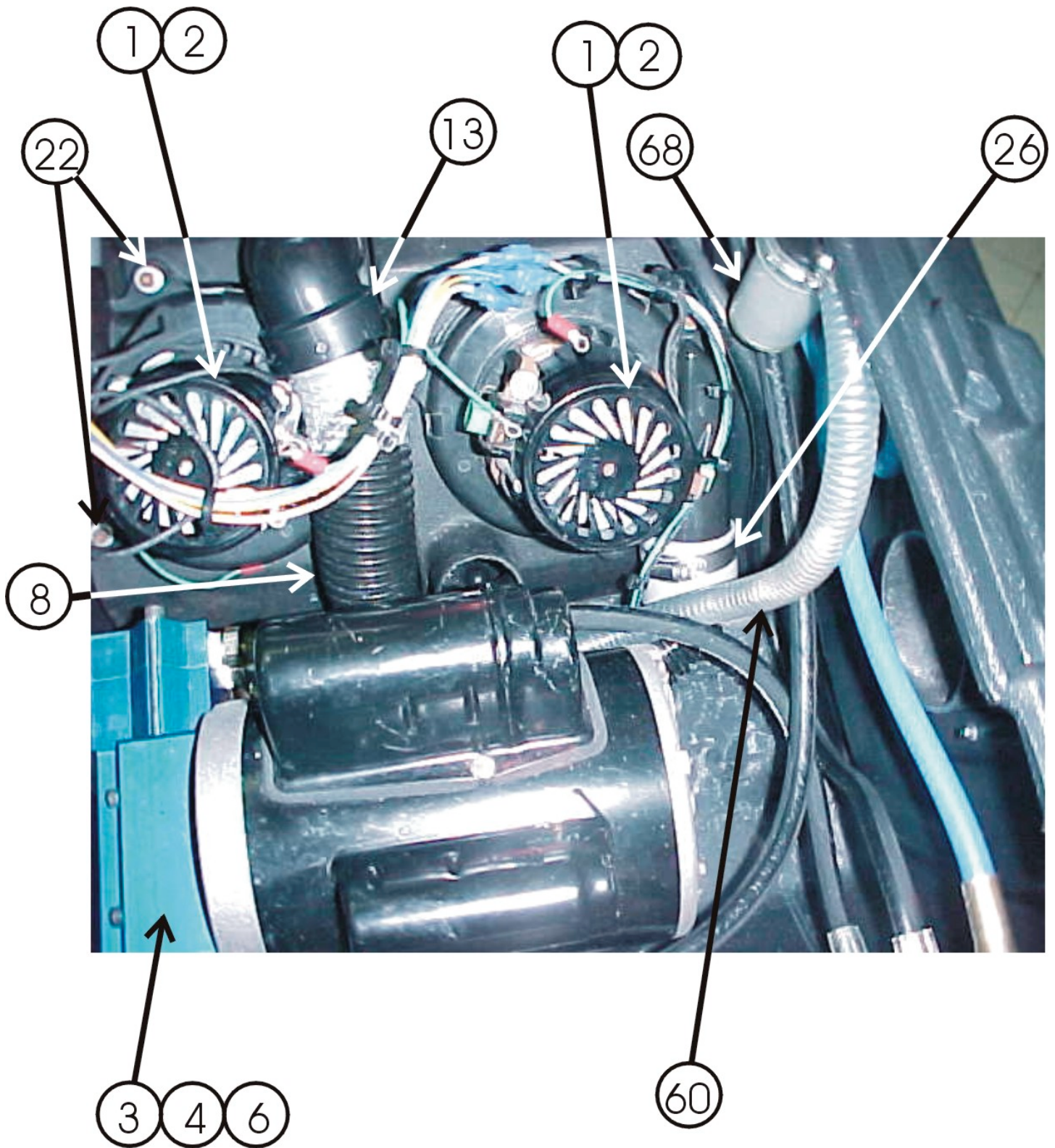
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INTERNAL VIEW OF FITTINGS—BOTTOM ASSEMBLY

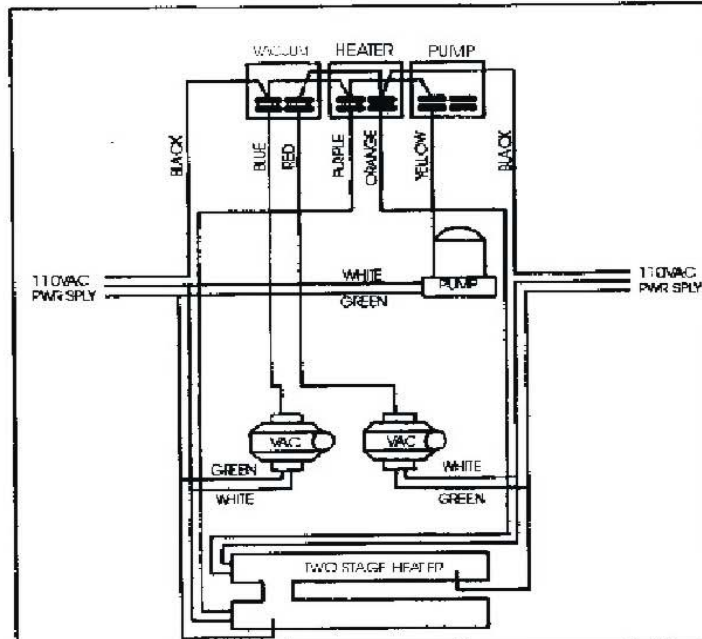


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INTERNAL VIEW—BOTTOM ASSEMBLY

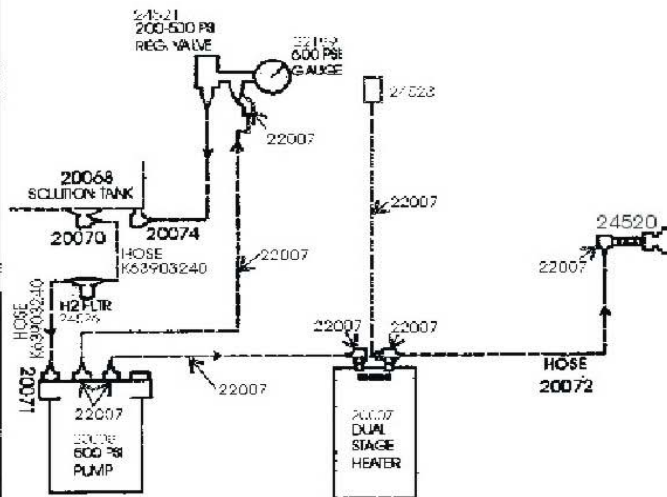


ELECTRICAL & PLUMBING SYSTEM



110 VOLTS AC SYSTEM
2-100 H
2-500 H

PUMP SYSTEM WITH HEATER



100-150 PSI SYSTEM
2-500 H