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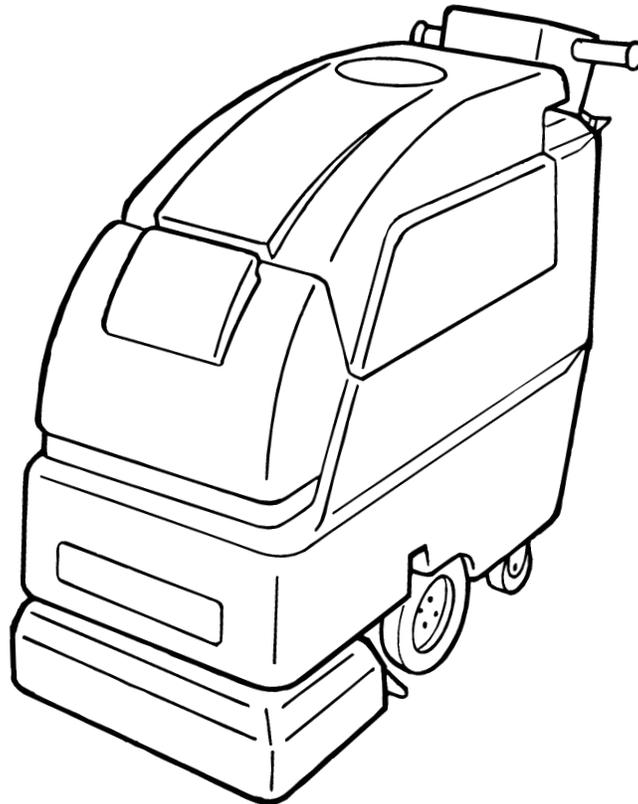


1500

Battery Automatic Carpet Extractor

Model No.:
607647
607653 - Pac

Operator and Parts Manual



TENNANT COMPANY
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607648
Rev. 00 (11-99)

OPERATION

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.

When ordering replacement parts use the illustrated Parts Lists in this manual. 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 Service Center or Distributor.

This machine will provide excellent service. However, the best results will be obtained at minimum costs if:

- The machine is operated with reasonable care.
- The machine is maintained regularly - per the machine 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.- _____

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Specifications and parts are subject to change without notice.

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SAFETY PRECAUTIONS

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

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

The following safety alert 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 signals potentially dangerous conditions to the operator or equipment:

FOR SAFETY:

1. **Do not operate machine:**
 - Unless trained and authorized.
 - Unless operation manual is read and understood.
 - In flammable or explosive areas unless designed for use in those areas.
2. **Before starting machine:**
 - Make sure all safety devices are in place and operate properly.
3. **When using machine:**
 - Go slow on inclines and slippery surfaces.
 - Use care when reversing machine.
 - Always follow safety and traffic rules.
 - Report machine damage or faulty operation immediately.
 - Follow mixing and handling instructions on chemical containers.
4. **Before leaving or servicing machine:**
 - Stop on level surface.
 - Turn off machine.

5. When servicing machine:

- Avoid moving parts. Do not wear loose jackets, shirts, or sleeves.
- Block machine tires before jacking machine up.
- Use hoist or jack of adequate capacity to lift machine.
- Disconnect battery connections before working on machine.
- Wear protective gloves when handling batteries or battery cables.
- Avoid contact with battery acid.
- Use manufacturer supplied or approved replacement parts.

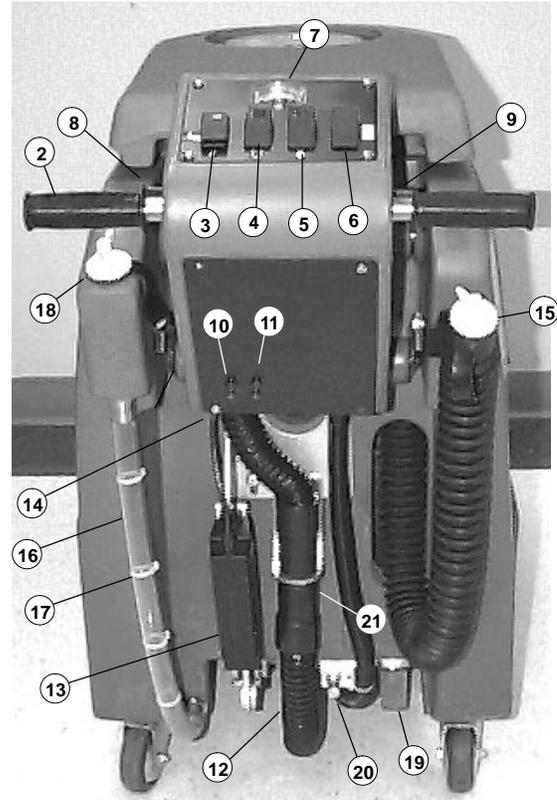
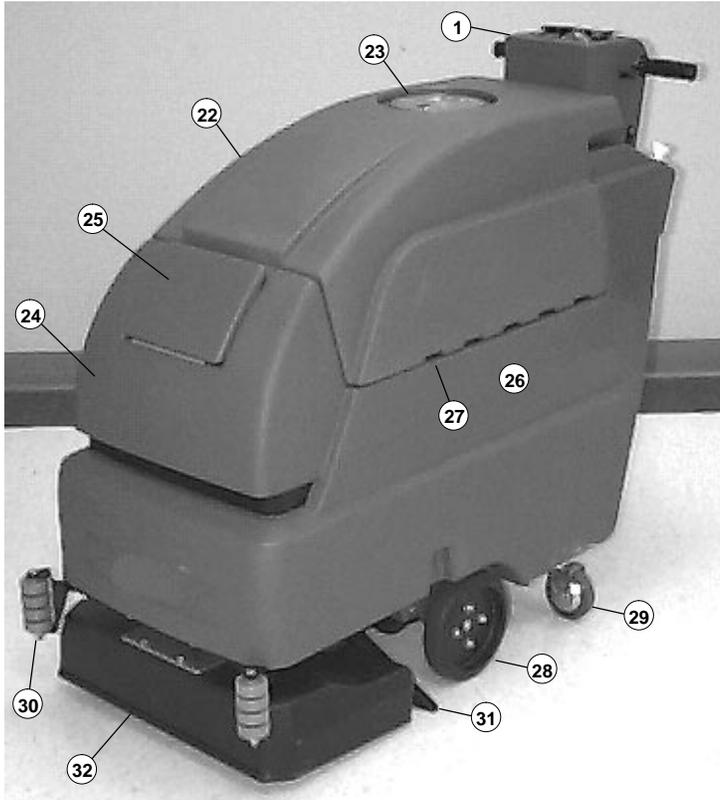
 **WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep battery compartment open when charging.**

 **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 explosion or fire. Do not pick up.**

OPERATION

MACHINE COMPONENTS



- | | | |
|--------------------------------------|---------------------------------------|-----------------------------|
| 1. Control Console | 12. Intake Vacuum Hose | 23. Recovery Tank Lid |
| 2. Control Roll Grips | 13. Brush/Pickup Head Actuator | 24. Solution Tank |
| 3. Main ON/OFF Switch | 14. Adjustable Control Console Levers | 25. Solution Tank Fill Door |
| 4. Pump ON/OFF Switch | 15. Recovery Tank Drain Hose | 26. Battery Compartment |
| 5. Vacuum ON/OFF Switch | 16. Solution Tank Drain Hose | 27. Charger Plug |
| 6. Brush/Pickup Head Actuator Switch | 17. 19L (5 Gal) Increment Markers | 28. Drive Wheels |
| 7. Battery Meter | 18. Rear Fill Port | 29. Rear Casters |
| 8. Reverse Switch | 19. Inline Solution Filter Strainer | 30. Wall Rollers |
| 9. Speed Control Knob | 20. Accessory Solution hose Coupler | 31. Pick-up Head |
| 10. Main/Pump/Brush Circuit Breaker | 21. Accessory Vacuum Hose Connector | 32. Brush Base |
| 11. Vacuum/Drive Circuit Breaker | 22. Recovery Tank | |

CONTROL PANEL SYMBOLS

 Main Power	 Less Brush Pressure	 Fast Speed	 Read Manual Before Operating
 Pump	 More Brush Pressure	 Slow Speed	 Main Power Circuit Breaker
 Vacuum	 Reverse	 Battery Charge Meter	 Vacuum/drive Motor Circuit Breaker

MACHINE INSTALLATION

UNCRATING MACHINE

Carefully check carton for signs of damage. Report any damage at once to carrier.

Batteries and battery charger are packaged separately.

ATTENTION: Battery installation must be accomplished after removing machine from shipping crate.

To uncrate your machine, remove shipping straps and carefully lift or make a ramp using crate boards to remove machine from pallet.

ATTENTION: Do not roll machine off pallet, damage may occur.

INSTALLING BATTERIES

⚠ WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep battery compartment open when charging.

FOR SAFETY: When servicing machine, wear protective gloves when handling batteries or battery cables. Avoid contact with battery acid.

Battery Specifications:

Two 12 volt, deep cycle batteries. Consult with an Authorized Distributor for specific batteries. Maximum battery dimensions are 178 mm (7 in) W x 381 mm (15 in) L x 356 mm (14 in) H.

1. Turn all switches to the OFF position.
2. Carefully hinge open recovery tank to access battery compartment. Remove loose battery cable from compartment (Figure 1).

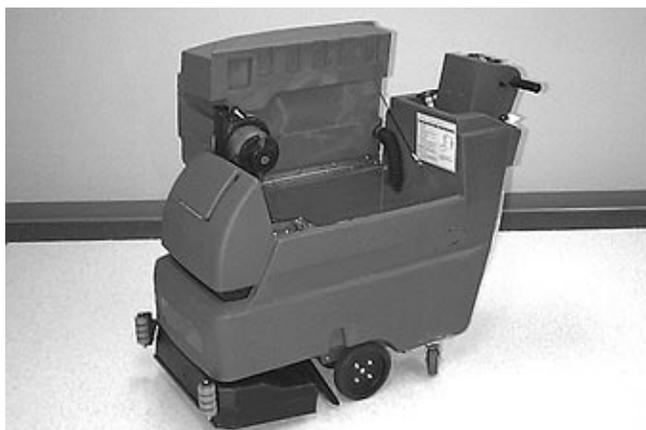


FIG. 1

3. Carefully install batteries into battery tray at bottom of compartment and arrange battery posts as shown (Figure 2).

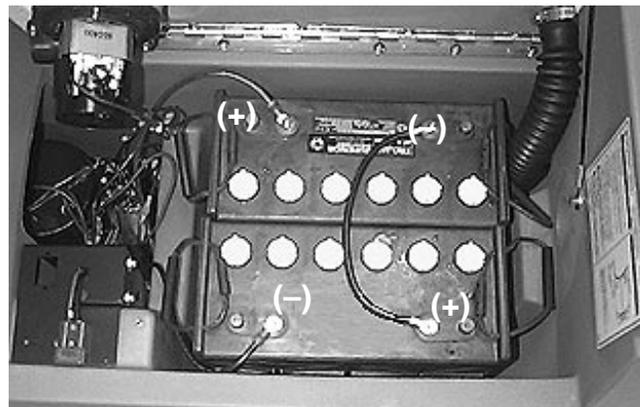


FIG. 2

ATTENTION: Do not drop batteries into compartment, battery and machine housing damage may result. This damage is not covered by warranty.

4. Connect battery cables to battery posts as shown (RED TO POSITIVE & BLACK TO NEGATIVE) (Figure 2).
5. After batteries are properly installed, turn on the main switch and check battery meter charge level to ensure batteries are fully charged. Charge if necessary, See Battery Charging (Figure 3).



FIG. 3

OPERATION

MACHINE SETUP

FILLING SOLUTION TANK

1. Transport machine to filling station. Raise brush/pick-up head when transporting.
2. Turn off main switch.
3. Open solution fill door at front of machine and fill solution tank with 64 L (17 gal) of clean water, 60°C (140°F) maximum temperature. Or you can use the rear fill port to fill solution tank. Twist off plug and insert hose to fill. The clear tube below the fill port has 19 L (5 gal) increment markers to indicate amount of water in tank (Figure 4).



FIG. 4

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

NOTE: If filling with a bucket, be certain that bucket is clean. This will prevent possible solution line clogs.

4. Add cleaning chemical. See proper dilution ratio instructions on bottle.

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

ATTENTION: Use only recommended cleaning chemicals, DO NOT use substitutes. Consult an authorized distributor to assist you with the recommended cleaning chemicals.

ADJUSTING CONTROL GRIP HEIGHT

The machine has three control grip height settings.

1. Locate two spring loaded levers below console.
2. Squeeze levers together and lift or lower control grips to a comfortable operating height (Figure 5).

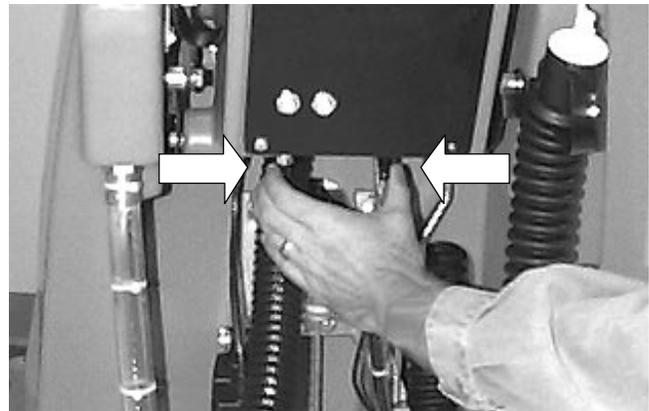


FIG. 5

MACHINE OPERATION

PRE-OPERATION CHECKS

- Vacuum floor and remove any debris.
- Check battery meter charge level to ensure batteries are fully charged (See Battery Charging).
- Check that spray bar is installed.
- Check that inline strainer filter is installed.
- Inspect spray tips for proper spray pattern (See Weekly Maintenance).

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

1. Turn on main switch.
2. Lower brush/pick-up head to floor by depressing brush height switch (Figure 6).

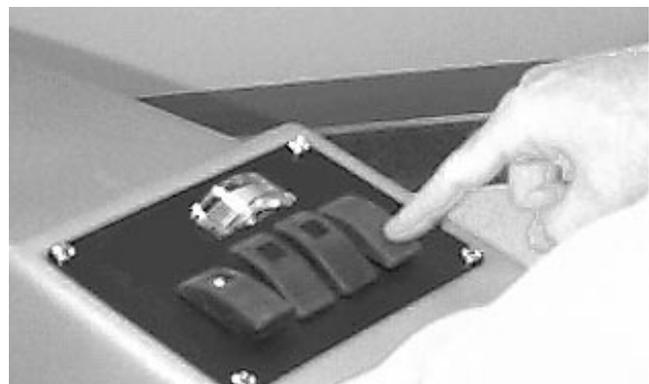


FIG. 6

3. Turn on vacuum and pump switches.

NOTE: The brush and pump will start once control grips are rotated.

- Before you begin cleaning, turn speed control knob to slowest speed (Figure 7).



FIG. 7

- To begin cleaning, rotate control grips completely forward and gradually turn speed control knob to desired cleaning speed (Figure 7).

For optimum cleaning results, operate at a cleaning speed of 15 m (50 ft) per minute for deep cleaning and 30 m (100 ft) per minute for interim cleaning.

⚠ WARNING: Flammable materials or reactive metals can cause explosion or fire. Do not pick up.

- To stop machine, release control grips.
- To operate machine in reverse, simply pull reverse switch backwards one speed (Figure 8).



FIG. 8

- After cleaning carpets, allow sufficient time for carpet to dry. Use a carpet blower to reduce drying time.

WHILE OPERATING MACHINE

- Periodically check for foam buildup in recovery tank (*look through clear lid*). If excessive foam buildup begins to develop, pour a recommended foam control solution into recovery tank.

ATTENTION: Do not allow foam or water to enter float shut-off screen, vacuum motor damage will result. Foam will not activate float shut-off screen. Vacuum damage due to foam or water is not covered by warranty.

- Always operate at a slower speed when cleaning around walls or obstacles.
- Always reduce speed to maintain control when turning machine.
- Overlap each pass by 50 mm (2 in).
- Before reaching end of cleaning path, turn off pump switch and continue to drive machine forward to extract solution.
- Periodically check battery meter discharge level. When needle drops to the red zone, recharge batteries.

ATTENTION: Do not continue to run machine when battery meter needle is in the red zone, battery damage will result.

- While cleaning, view clear hose gallon marker for remaining cleaning solution. Each mark on hose indicates 19 L (5 gal).
- When solution tank runs dry, turn off pump and vacuum switches, raise brush, and transport machine to draining area (See Draining Tanks).
- If the cleaning path leaves streaks, spray tip cleaning is required (See Weekly Maintenance).

CIRCUIT BREAKERS

The machine is equipped with two resettable circuit breakers, Main (15A) and Vacuum/Drive (60A), to protect machine from damage. If a circuit breaker should trip, determine cause and reset breaker by depressing circuit breaker button.

The main and vacuum/drive circuit breakers are designed to stop current flow by manually pulling out the circuit breaker button. Pull out the main circuit breaker button to protect you from electric shock when servicing machine, or when machine is left unattended. Pull out vacuum/drive circuit breaker button to keep machine stationary while performing specific maintenance procedures. Circuit breakers are located below control console (Figure 9).

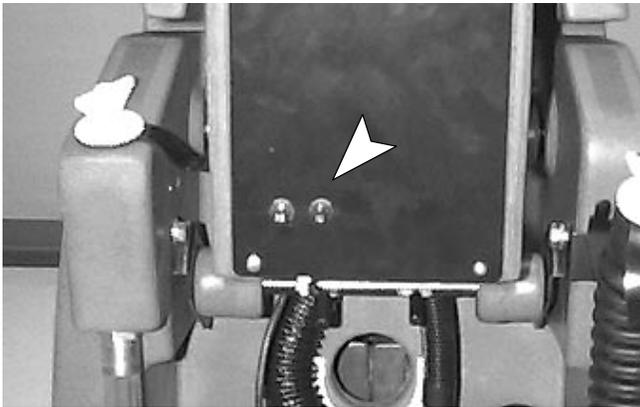


FIG. 9

OPTIONAL ACCESSORY TOOL SETUP AND OPERATION

Machine is equipped with accessory tool connections. Accessory tool enables you to reach areas that the machine is unable, such as alcoves, stairs and corners (See Options).

1. Vacuum area before cleaning.
2. Fill solution tank and add cleaning chemical (See Filling Solution Tank).

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

3. Disconnect lower vacuum hose at rear of machine and replace with accessory vacuum hose (Figure 10).

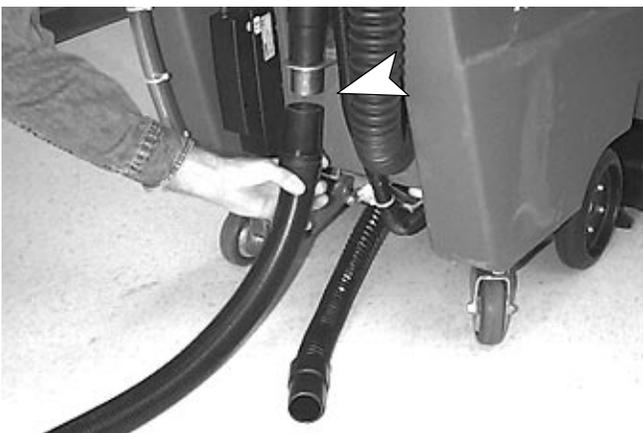


FIG. 10

4. Connect solution hose to accessory tool coupler, located at lower rear of machine (Figure 11).

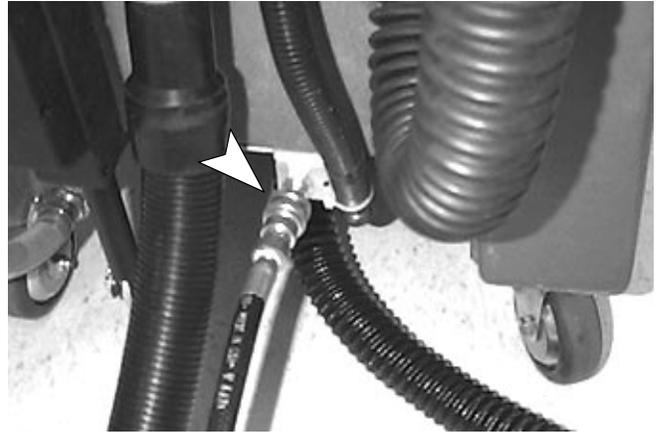


FIG. 11

5. Connect accessory tool to solution hose and vacuum hose (Figure 12).

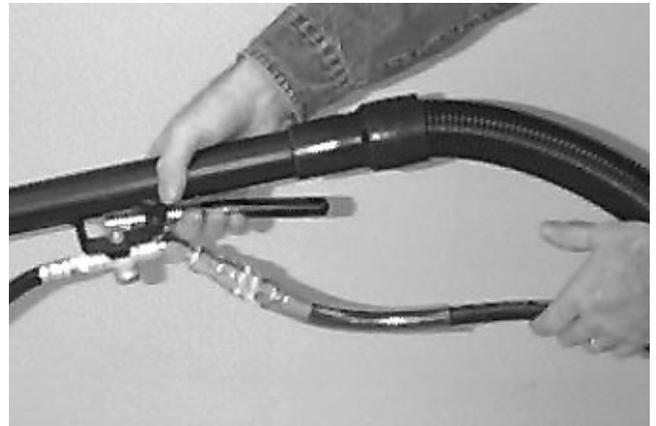


FIG. 12

6. Turn on main, pump and vacuum switches.
7. Take accessory tool and begin cleaning at top of area and work backwards toward machine.

⚠ WARNING: Flammable materials or reactive metals can cause explosion or fire. Do not pick up.

8. Place accessory tool head on area to be cleaned; squeeze trigger, apply downward pressure on accessory tool head, and slowly pull tool backwards. Release trigger 152 mm (6 in) from end of stroke (Figure 13).



FIG. 13

- When returning for next stroke, push accessory tool forward over same path with trigger released. Continue this pull and push method with a 50 to 102 mm (2 to 4 in) overlap of each stroke.

NOTE: For heavily soiled areas, repeat stroke or change angle of stroke.

- Empty recovery tank when solution tank runs dry (See Draining Tanks).

ATTENTION: Do not allow foam or water to enter vacuum standpipe, vacuum motor damage will result. Ball float shutoff will not keep foam out of standpipe. Vacuum damage due to foam or water is not covered by warranty.

DRAINING TANKS

ATTENTION: Raise brush/pickup head when transporting machine to floor drain.

FOR SAFETY: Before leaving or servicing machine, stop on level surface and turn off machine.

DRAINING RECOVERY TANK

Always empty recovery tank when refilling solution tank. You may refill solution tank while emptying recovery tank. To drain recovery tank, perform the following steps:

ATTENTION: If recovery tank is not emptied between fill-ups, foam or water will enter vacuum standpipe and damage vacuum motor. Float shut-off screen will not keep foam out of standpipe. Vacuum damage due to foam or water is not covered by warranty.

- Remove drain hose from holder, position hose over floor drain and twist off drain hose plug. To completely drain recovery tank, hinge open tank and flip up tank support stand to rest tank on (Figure 14).

NOTE: Use different buckets for filling and emptying tank. This will prevent possible solution line clogs.



FIG. 14

- Rinse out recovery tank after each use. This will prevent a foul odor and residue buildup in tank. Unscrew clear lid on recovery tank and rinse out the tank with hose. Be careful not to spray water into float shut-off screen.
- Replace drain hose plug tightly when tank is empty.

DRAINING SOLUTION TANK

To drain leftover cleaning solution from solution tank, follow steps below:

- Pull clear hose off hose barb at rear of machine and drain solution into floor drain or bucket (Figure 15).



FIG. 15

OPERATION

2. Rinse out solution tank and solution system with clean water after each use. This will prevent clogging due to chemical buildup. Use clear hose to drain solution tank when rinsing.
3. When reconnecting clear hose to hose barb, be certain hose is completely pushed onto hose barb.

BATTERY CHARGING

NOTE: Recharge batteries **ONLY** after a total of 30 minutes of use or more. This will prolong battery life.

The following charging instructions are intended for chargers supplied with machine. Only use a battery charger with the following specifications to prevent battery damage.

CHARGER SPECIFICATIONS:

- OUTPUT VOLTAGE - 24 VOLTS
- OUTPUT CURRENT - 25 AMPS MAXIMUM
- AUTOMATIC SHUTOFF CIRCUIT
- FOR DEEP CYCLE BATTERY CHARGING

NOTE: For optimum machine operation, keep batteries charged at all times. Never leave batteries discharged for lengthy periods.

ATTENTION: Do not continue to run machine when battery meter needle is in the red zone, battery damage will result.

⚠ WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep battery compartment open when charging.

FOR SAFETY: When servicing machine, wear protective gloves when handling batteries or battery cables. Avoid contact with battery acid.

1. Transport machine to a well ventilated area for charging.
2. Turn main switch off.
3. Hinge open recovery tank to access battery compartment. Make sure recovery tank is empty before opening (Figure 16).



FIG. 16

4. Check fluid level (A) in each battery cell before charging. If battery plates (B) are exposed, add just enough distilled water to cover plates by approximately 3 mm (0.13 in). DO NOT OVERFILL. Overfilled batteries can overflow during charging due to fluid expansion. Replace cell caps before charging (Figure 17).

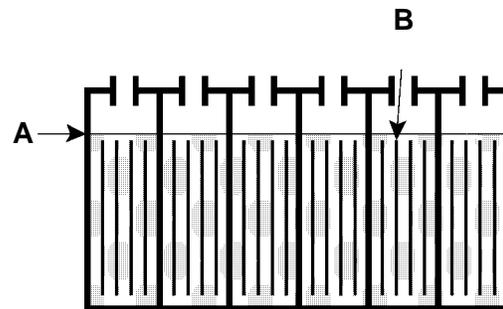


FIG. 17

5. With charger disconnected from machine, plug charger's power cord into a grounded wall outlet (Figure 18).

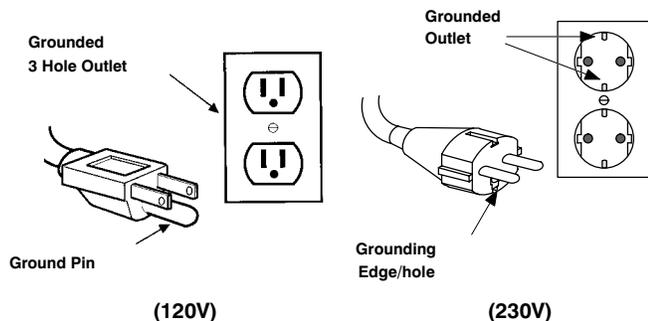


FIG. 18

6. Connect battery charger to machine as shown. Flip up tank support stand to promote ventilation (Figure 19).

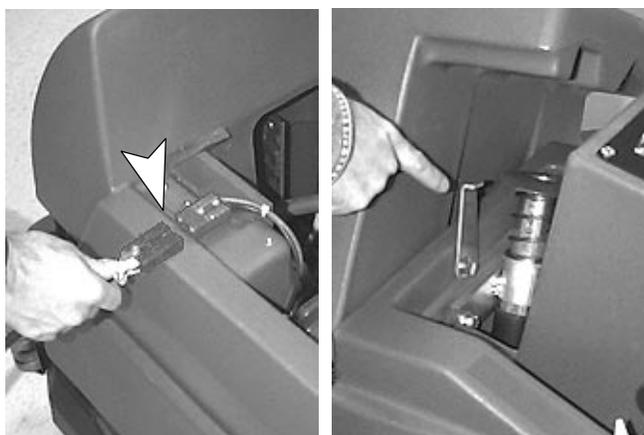


FIG. 19

NOTE: The machine becomes inoperable once charger is connected.

7. Charger will automatically begin charging and shut off when fully charged.
8. When disconnecting charger, always unplug charger from wall outlet first.
9. After charging, check battery fluid level. Fluid level should be within 3 mm (0.13 in) of full level indicator. Add distilled water if needed. **DO NOT OVERFILL.**

MAINTENANCE

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

FOR SAFETY: When leaving or servicing machine, stop on level surface and turn off machine.

FOR SAFETY: When servicing machine, disconnect battery connections before working on machine.

ATTENTION: Contact an Authorized Service Center for machine repairs. Machine repairs performed by other than an authorized person will void your warranty.

DAILY MAINTENANCE (Every 4 Hours of Operation)

1. Recharge batteries if discharged below 50%.
2. Remove float shut-off screen and rinse off. Screen is located in recovery tank (Figure 20).



FIG. 20

3. Drain and rinse tanks thoroughly. After draining tanks, hinge recovery tank open and remove any clogging debris in inlet hole if necessary.
4. Clean machine housing with a nonabrasive, nonsolvent cleaner.
5. Inspect brush for entangled debris.

WEEKLY MAINTENANCE (Every 20 Hours of Operation)

1. Check electrolyte level in battery cells (See Battery Maintenance).
2. Clean battery tops to prevent corrosion (See Battery Maintenance).
3. Check for loose or corroded battery cables.
4. Remove inline strainer filter and rinse out. Make sure solution tank is empty before removing filter. Filter is located under machine at rear (Figure 21).

OPERATION

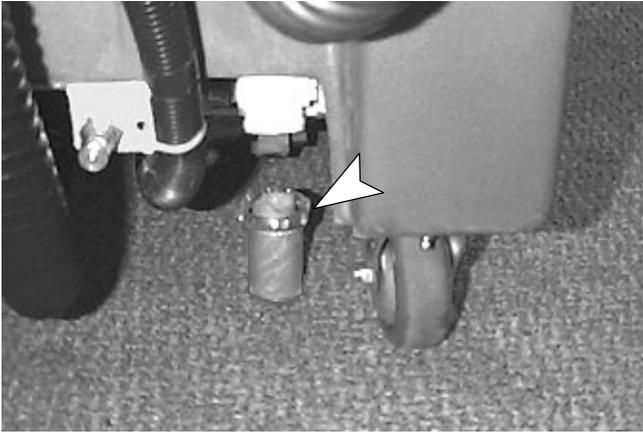


FIG. 21

5. Inspect spray tips for proper spray pattern:
 - a. Pull out vacuum/drive circuit breaker button, located at rear of control console.
 - b. Lower brush/pick-up head and remove detachable spray bar from brush base. Do not disconnect bar from quick coupler. Raise brush after removing spray bar (Figure 22).
 - c. Turn on main and pump switches.
 - d. Rotate control grips and observe spray pattern. Pattern should fan out evenly across the width of the spray bar.
 - e. Clean or replace defective twist-out spray tips if necessary (See Weekly Maintenance).



FIG. 22

MONTHLY MAINTENANCE (Every 80 Hours of Operation)

1. Flush out tanks and solution lines:
 - a. Pull out the vacuum/drive circuit breaker button, located at rear of control console.
 - b. Pour 750 ml (24 oz) of an acetic acid solution with 11.3 L (3 gal) of hot water into solution tank; do not exceed 60°C (140°F).

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

- c. Turn on the main and pump switches.
 - d. Over a floor drain, rotate control grips and hold for one to two minutes.
 - e. Shut off power and let machine set overnight to allow acetic acid solution to breakdown alkaline buildup.
 - f. Next day, operate pump to disperse remaining acetic acid solution.
 - g. Then rinse out solution tank and solution lines with clean water.
 - h. Reset drive circuit breaker button when completed.
2. Remove detachable spray bar from brush base. Remove twist-out spray tips from spray bar and soak in 118 ml (4 oz) acetic acid solution for up to 6 hours. After soaking tips, use a small brush to remove excess alkaline and rinse thoroughly. DO NOT use pointed objects to unplug spray tips (Figure 23).

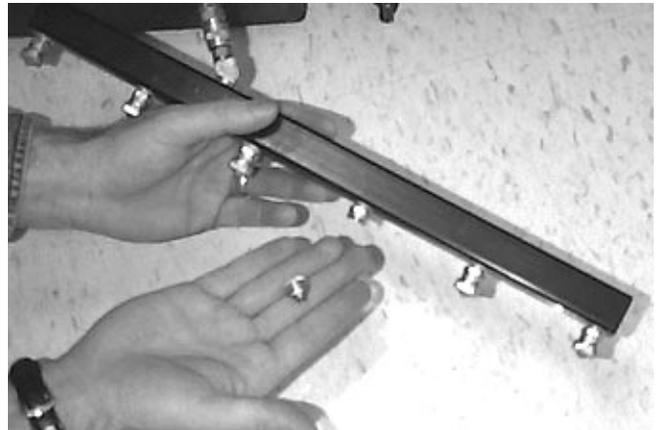


FIG. 23

3. Lubricate caster grease fittings with a water resistant grease.
4. Lubricate all linkage pivot points with silicone spray, then coat with a water resistant grease to maintain a smooth operation.
5. Check machine for water leaks and loose nuts and bolts.

EVERY 250 HOURS OF OPERATION

Check drive and vacuum motors for carbon brush wear, replace brushes if worn to a length of 10 mm (0.38 in) or less.

BATTERY MAINTENANCE

⚠ WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep battery compartment open when charging.

FOR SAFETY: When servicing machine, wear protective gloves when handling batteries and battery cables. Avoid contact with battery acid.

1. Always follow proper charging instructions (See Battery Charging).
2. After charging, check fluid level (A). Fluid level should be within 3 mm (0.13 in) of full level indicator. Add distilled water if needed. **DO NOT OVERFILL.** Overfilled batteries can overflow during charging due to fluid expansion (Figure 24).

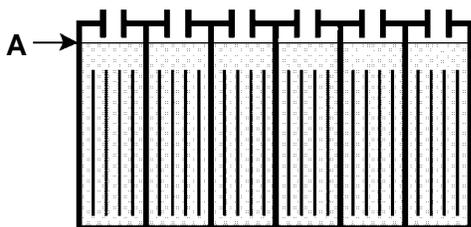


FIG. 24

3. Keep battery tops and terminals clean and dry. To clean batteries:
 - a. Mix a strong solution of baking soda and water (Figure 25).



FIG. 25

- b. Brush solution sparingly over battery tops, terminal and cable connectors.

NOTE: Do not allow baking soda solution to enter battery cells.

- c. Use wire brush to clean terminal post and cable connections.

- d. After cleaning, apply a coating of clear battery post protectant to terminals and cable connections.

4. Check for loose or worn cables. Replace if worn.

ADJUSTING BRUSH HEIGHT

Brush height is factory preset and should not require any adjustment. If brush height adjustment is necessary, follow steps below.

Proper brush height is correct when bristles slightly bend creating a flicking action on the carpet.

To adjust brush height:

1. Stop machine on level surface and pull out main circuit breaker button to shut-off power. Button is located at rear of control console.
2. Carefully hinge open recovery tank to access brush height adjustment screws.
3. Loosen the two brush height lock screws as shown. Do not remove screws (Figure 26).

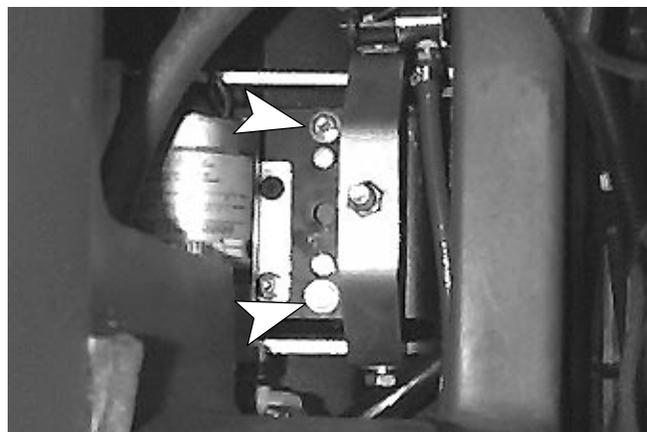


FIG. 26

4. Then turn the two adjustment screws an equal amount of turns as shown (clockwise to raise). It is very important that screws are turned an equal amount, otherwise the brush will tilt causing premature brush wear and ineffective cleaning (Figure 27).

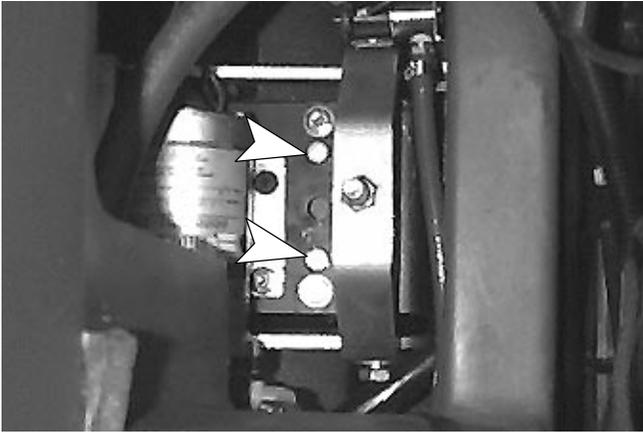


FIG. 27

5. Retighten lock screws once proper brush height is achieved.

ADJUSTING PICK-UP HEAD PRESSURE

Pick-up head pressure is factory preset and should not require any adjustment. If pick-up head adjustment is necessary, follow steps below.

Proper pick-up head pressure is correct when pick-up head glides smoothly with minimal drag restriction.

To adjust pick-up head pressure:

1. Stop machine on level surface and pull out main circuit breaker button to shut-off power. Button is located at rear of control console.
2. Carefully hinge open recovery tank to access pick-up head adjustment nut.
3. Turn adjustment nut clockwise for more pick-up head pressure or counter-clockwise for less. Do not remove nut (Figure 28).

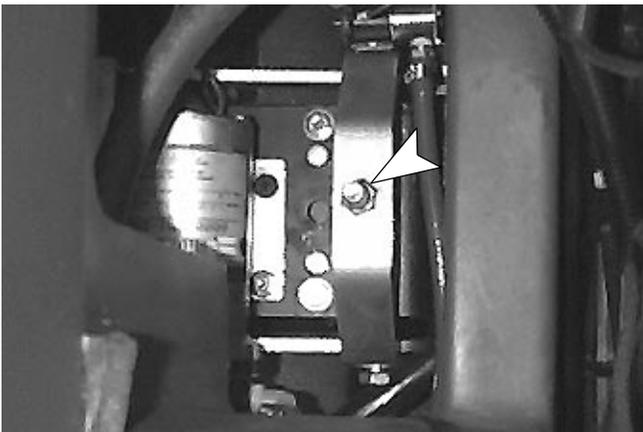


FIG. 28

STORING MACHINE

1. Before storing machine, be certain to rinse tanks and drain machine of all water.
2. Store machine in a dry area.
3. Remove recovery lid to promote air circulation.
4. Raise the brush/pickup head off the floor.
5. If storing machine in freezing temperatures, be certain to circulate an undiluted anti-freeze solution throughout the machine.

ATTENTION: Do not allow machine to freeze without anti freeze. Damage due to freezing temperatures is not covered by warranty.

ATTENTION: Do not expose machine to rain and store indoors.

RECOMMENDED STOCK ITEMS

Refer to Standard Parts section for recommended stock items. Stock Items are clearly identified with a Bullet preceding the parts description. See example below:

Ref.	Part No.	Description	Qty.
1	701183	ASM, STANDPFC	1
2	388513	•FLOAT, SHUTOFF	1
3	228187	•NIPPLE	1
4	101714	•GASKET	1
5	218249	NUT, FLANGED	1

TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
No power.	Faulty main switch.	Contact Service Center.
	Batteries need charging.	See Charging Batteries.
	Main circuit breaker is pulled out.	Depress main circuit breaker.
	Faulty battery(s).	Replace battery(s).
	Loose battery cable.	Tighten loose cable.
	MAIN circuit breaker has tripped.	Determine cause and reset circuit breaker button.
Brush motor does not operate.	Pump switch is not on.	Turn on pump switch.
	Control grips are not rotated.	Rotate control grips.
	Brush circuit breaker has tripped or is pulled out.	Remove obstruction from brush and reset brush circuit breaker button.
	Faulty brush motor or wiring.	Contact Service Center.
	Carbon brushes worn.	Contact Service Center.
	Loose or broken belt.	Replace, or contact Service Center.
Vacuum motor does not operate.	Faulty vacuum switch.	Contact Service Center.
	Vacuum motor thermal overload activated.	Remove obstruction and wait 20 minutes for motor to cool.
	Faulty vacuum motor or wiring.	Contact Service Center.
	Carbon brushes worn.	Contact Service Center.
Drive motor does not operate.	Drive motor circuit breaker has tripped.	Determine cause and reset breaker.
	Faulty speed control board or connection.	Contact Service Center.
	Faulty solenoid.	Contact Service Center.
	Faulty drive motor.	Contact Service Center.
	Faulty wiring.	Contact Service Center.
	Worn carbon brushes.	Contact Service Center.
Drive motor operates, but not correctly.	Faulty potentiometer or speed control board.	Contact Service Center.
	Loose wire connection.	Contact Service Center.
Uneven or no solution spray.	Twist-out spray tips are plugged.	Remove and clean.
	Control grips are not rotated.	Rotate control grips.
	Solution line or solution tank filter is clogged.	Remove hose and blow compressed air through it. Flush solution tank after each use.
	Inline strainer filter is plugged.	Drain solution tank, remove filter and clean. Located under machine at rear.
	Faulty pump switch.	Contact Service Center.
	Faulty pump or solenoid.	Contact Service Center.
Short run time.	Batteries not fully charged.	Charge batteries.
	Bad cell in one or more batteries.	Replace battery.
	Batteries need maintenance.	See Battery Maintenance.
	Faulty charger.	Replace battery charger.

OPERATION

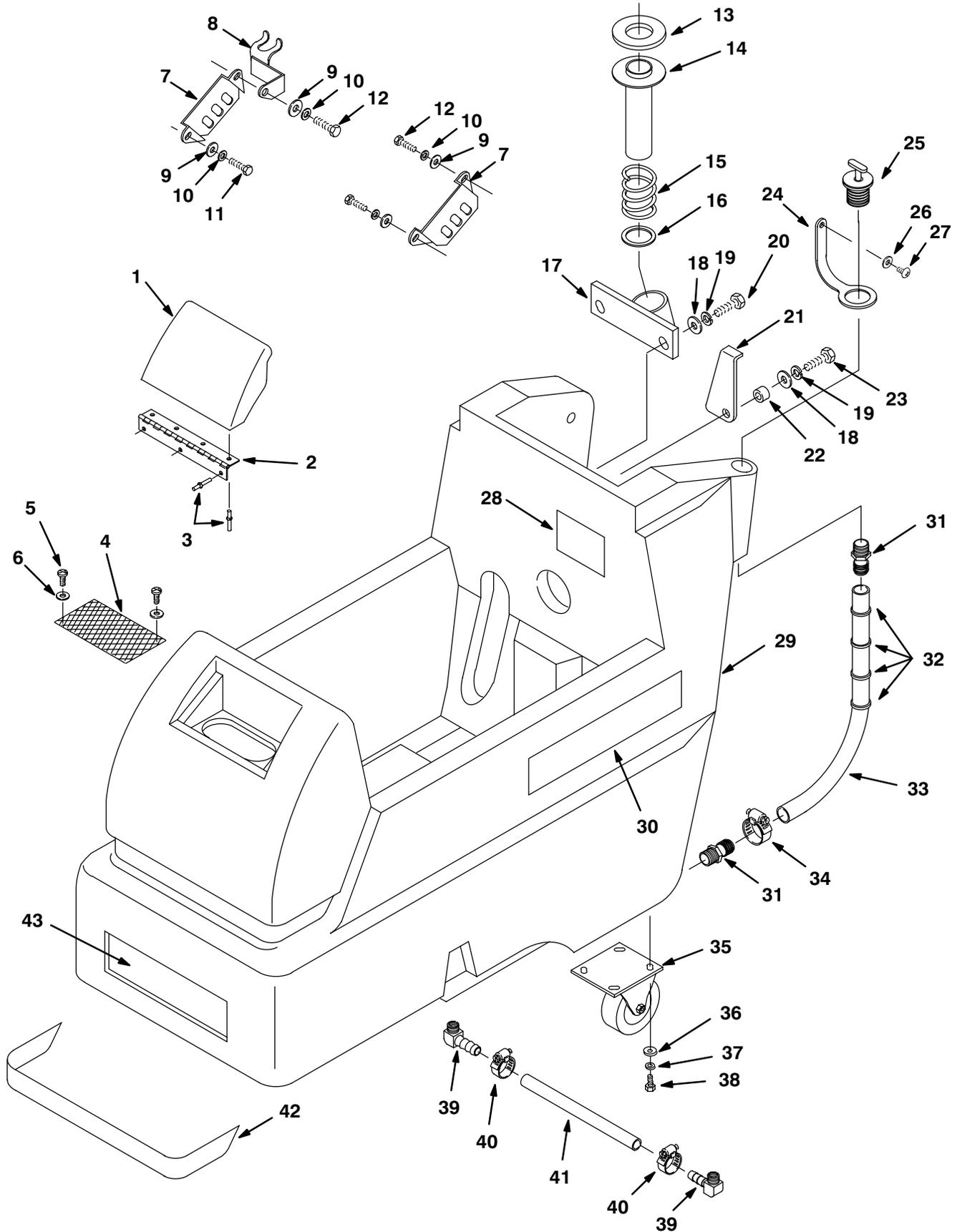
TROUBLE SHOOTING –Continued

PROBLEM	CAUSE	SOLUTION
Poor vacuum recovery.	Recovery tank is full.	Empty recovery tank.
	Float shut-off screen inside recovery tank is clogged.	Remove screen and clean.
	Pick-up head is clogged with debris.	Remove debris, use coat hanger.
	Pick-up head is not sealed to carpet.	Adjust pick-up head.
	Faulty actuator.	Contact Service Center.
	Vacuum hose connections are loose or hose has a hole.	Push hose cuffs firmly on connections. Replace hose if damaged.
	Vacuum hose is clogged with debris.	Remove clogged debris.
	Recovery tank inlet hole is obstructed.	Empty recovery tank and tilt tank sideways to access inlet hole, remove obstruction.
	Tank gasket is defective.	Replace gasket.
	Drain hose plug is loose.	Tighten drain plug.
	Recovery tank lid is loose.	Tighten lid.
	Vacuum motor is loose.	Contact Service Center.
	Battery charge level is low.	Charge batteries. Do not run machine when battery meter is in the red zone.

SPECIFICATIONS

MODEL	1500
LENGTH	1270 mm (50 in)
WIDTH	559 mm (22 in)
HEIGHT	990 mm (39 in)
WEIGHT	170 kg (375 lbs) –w/ batteries 272 kg (600 lbs)
SOL./REC TANK CAPACITY	64 L (17 gal)
SPEED CONTROL	Variable Fwd. / Fixed Reverse.
CLEANING SPEED (MAX)	418.05m ² (4,500 sq. ft) per hour
CLEANING PATH WIDTH	559 mm (22 in)
PAD PRESSURE	Variable 36–68Kg (80–150 lbs)
SOLUTION PUMP	6.9 bar (100 psi) max., 24V
DRIVE SYSTEM	Transaxle, .2 h.p., 24V
BRUSH MOTOR	.2 h.p., 2000 rpm, 24V, 8A, 192W
VACUUM MOTOR	1 h.p., 2–stage 7.2", 24V, 30A, 720W
WATERLIFT	2057 mm (81 in)
BATTERIES	2–12V, 215AH
RUN TIME PER CHARGE	Up to 4.5 hours
DECIBEL RATING AT OPERATOR'S EAR, INDOORS ON CARPET	75dB(A)

SOLUTION TANK GROUP



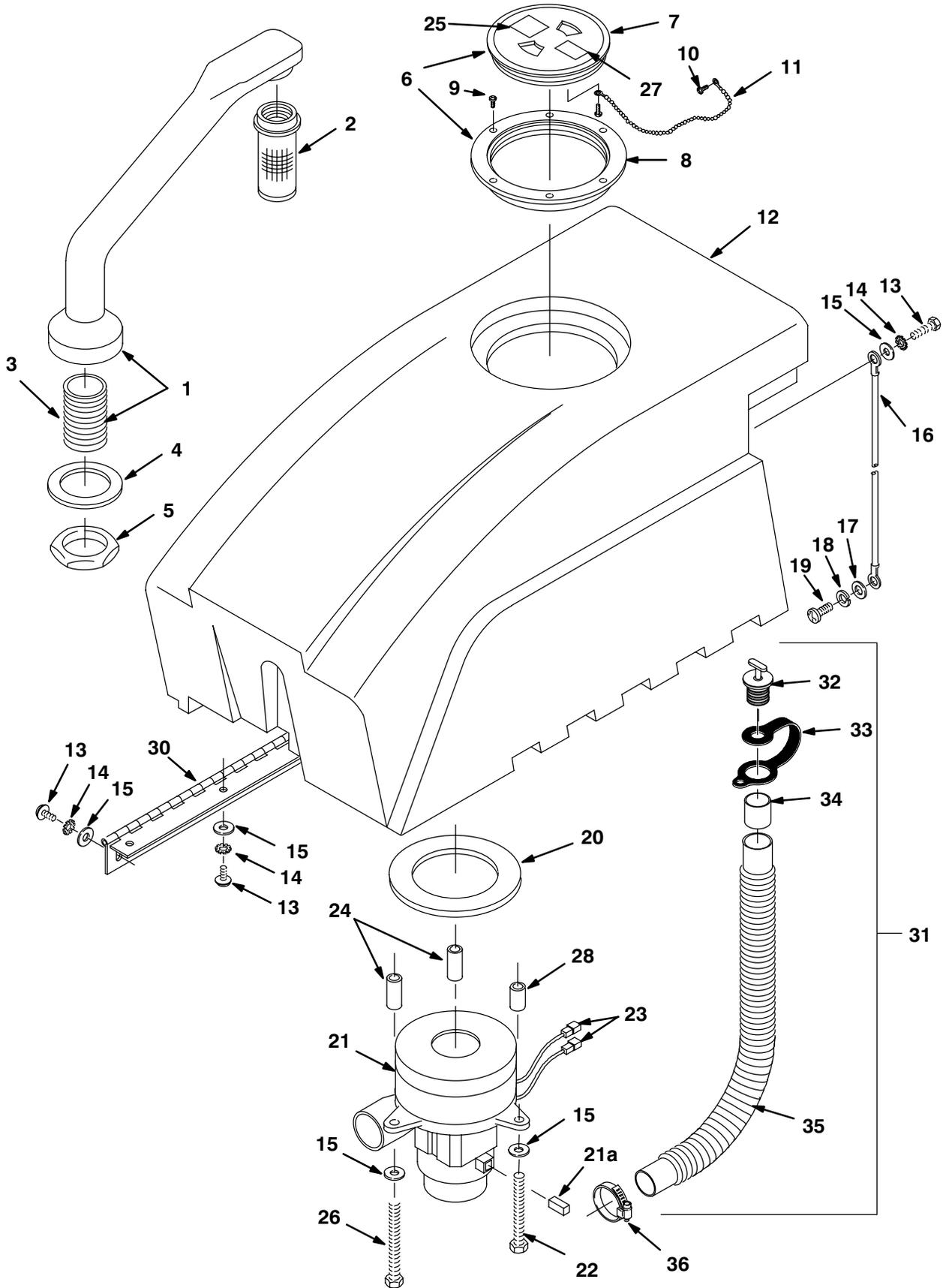
SOLUTION TANK GROUP

REF	PART #	DESCRIPTION	QTY.
1	607515	COVER, TANK, TEAL	1
2	230626	HINGE, COVER	1
3	140706	RIVET, POP	7
4	602529	SCREEN, FILL	1
5	140826	SCREW, #6X3/4	2
6	140032	WASHER, FLAT	2
7	230661	PLATE, LOCK CONTROL HOUSING	2
8	602641	WELDMENT, DRAIN HOSE	1
9	140027	WASHER, FLAT	4
10	140015	WASHER, LOCK	4
11	140275	SCREW, M8X1.25X16MM	4
12	200 031 488	SCREW, M08X20MM	4
13	100151	●GASKET, TUBE ADAPTER	1
14	230664	TUBE, ADAPTER	1
15	140424	SPRING, ADAPTER TUBE	1
16	602878	WASHER	1
17	602847	BRACKET, VAC TUBE	1
18	140027	WASHER, FLAT	2
19	140015	WASHER, LOCK	2
20	200 031 486	SCREW, M08X16MM	2
21	230925	SUPPORT, RECOVERY TANK	1
22	140116	BUSHING	1

REF	PART #	DESCRIPTION	QTY.
23	140275	SCREW, M8X1.25X16MM	1
24	600476	STRAP, PLUG	1
25	621324	●PLUG, EXPANSION	1
26	140011	WASHER, FLAT	1
27	140350	SCREW, #10X1/2	1
28	603233	DECAL, BATTERY DIAGRAM	1
29	607552	TANK, SOLUTION, TEAL	1
30	608155	DECAL, 1500	2
31	150529	HOSE BARB	2
32	130040	WIRE TIE	4
33	607309	HOSE, 3/4" X 24"	1
34	630369	CLAMP, HOSE	1
35	630002	CASTER 4"	2
36	140036	WASHER, FLAT	8
37	140333	WASHER, LOCK	8
38	140276	SCREW, M10X1.5X16MM	8
39	150419	ELBOW, 1/4M X 3/8H 90°	2
40	140310	CLAMP	2
41	607310	HOSE, 3/8" X 17.5"	1
42	600730	DECAL, RECESS	1
43	120192	DECAL, "TENNANT"	1

● RECOMMENDED STOCK ITEMS

RECOVERY TANK GROUP



RECOVERY TANK GROUP

REF	PART #	DESCRIPTION	QTY.
1	701103	ASM.,STANDPIPE	1
2	180613	●FLOAT, SHUTOFF	1
3	606088	NIPPLE	1
4	101714	●GASKET	1
5	210240	NUT, FLANGED	1
∇6	100102	●ASM.,LID CLEAR W/STD HOLE	1
▲7	100105	●LID, CENTER CLEAR ONLY	1
▲8	100109	●LID, OUTER RING ONLY	1
9	140826	SCREW, #6X3/4	7
10	3701.6	SCREW, #6X3/8	1
11	230513	CHAIN	1
12	607554	TANK, RECOVERY, TEAL	1
13	578 187 000	SCREW, M06X12MM	1
14	140052	WASHER, LOCK	1
15	140000	WASHER, FLAT	1
16	140960	CABLE	1
17	140027	WASHER, FLAT	1
18	140015	WASHER, LOCK	1
19	200 031 488	SCREW, M08X20MM	1
20	100001	●GASKET, VAC MOTOR	1

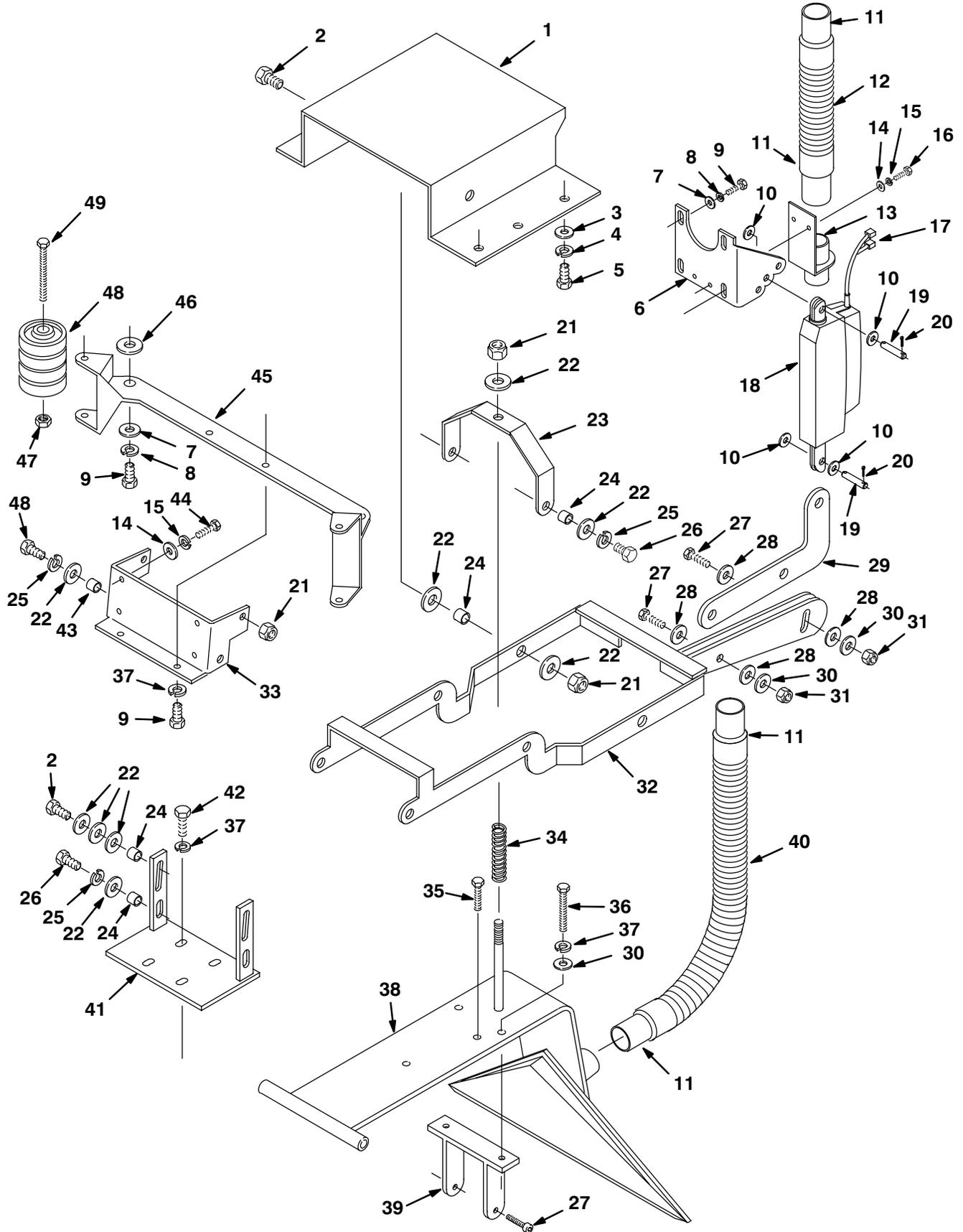
REF	PART #	DESCRIPTION	QTY.
21	602656	●MOTOR, VAC 7.2 /2 STAGE 24 VDC	1
	604403	CARBON BRUSH, SET OF 2	2
22	200 031 441	SCREW M6X1.0X25 HXHDCP	1
23	130192	TERMINAL, MALE 1/4 #10 12-10	2
24	603963	SPACER 6.5X12.7X41.2	2
25	578729	DECAL, READ MANUAL	1
26	603962	SCREW M6X1.0X60 HXHDCP	2
27	120906	DECAL, IMPORTANT DRAIN...	1
28	019 686 055	SPACER 6.5X15.8X6.4	1
29	140000	WASHER, FLAT	11
30	600311	●HINGE, RECOVERY TANK	1
∇31	603217	ASM., DRAIN HOSE	1
▲32	621324	PLUG, EXPANSION	2
▲33	578441	STRAP	1
▲34	630394	SLEEVE	1
▲35	630068	HOSE, DRAIN	1
▲36	140308	CLAMP	1

∇ ASSEMBLY

▲ INCLUDED IN ASSEMBLY

● RECOMMENDED STOCK ITEMS

LIFT GROUP



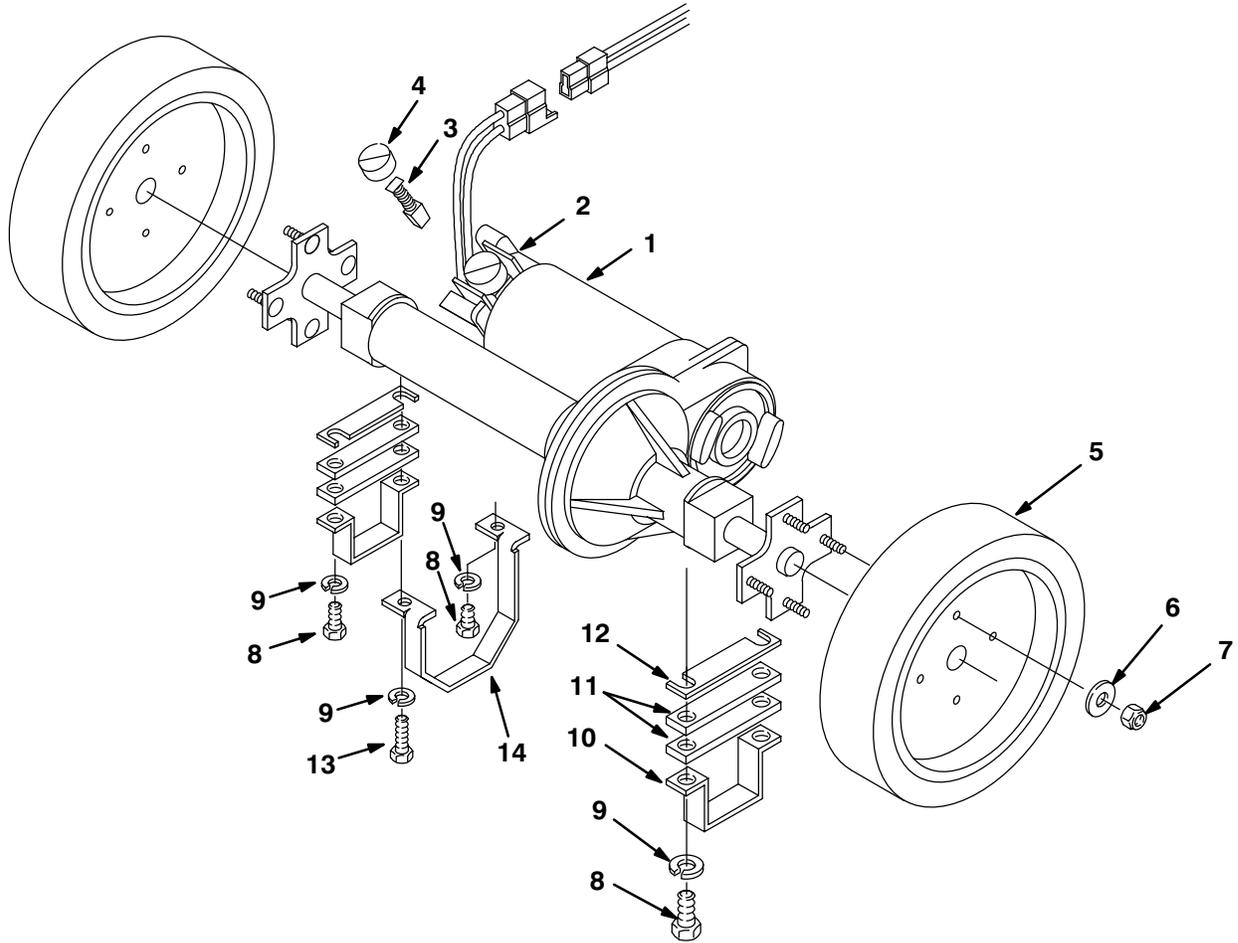
LIFT GROUP

REF	PART #	DESCRIPTION	QTY.
1	600288	PLATE, BASE TRANSAXLE	1
2	140236	SCREW, 1/2-13X1 1/4	4
3	140028	WASHER, FLAT	2
4	140333	WASHER, LOCK	2
5	140276	SCREW, M10X1.5X16MM	2
6	600292	BRACKET, ACTUATOR	1
7	140027	WASHER, FLAT	4
8	140015	WASHER, LOCK	6
9	200 031 488	SCREW, M08X20MM	8
10	140036	WASHER, FLAT	4
11	160486	●CUFF, HOSE	4
12	160426	●HOSE, VAC 1.5X15" W/CUFFS	1
13	603084	BRACKET, VAC HOSE	1
14	140000	WASHER, FLAT	6
15	140016	WASHER, LOCK	6
16	200 031 432	SCREW, M06X10MM	2
17	130129	TERMINAL FM DSCNT 22-18 RED	2
18	600952	●ACTUATOR, 24VDC	1
19	604076	PIN, CLEVIS	2
20	578421	PIN, COTTER	4
21	140516	NUT	3
22	140045	WASHER, FLAT	17
23	602567	BRACKET, SPRING	1
24	602882	BUSHING	8
25	140024	WASHER, LOCK	6

REF	PART #	DESCRIPTION	QTY.
26	140352	SCREW, M12X1.75X25	4
27	140564	BOLT, SHOULDER 3/8X3/4	4
28	140036	WASHER, FLAT	4
29	603044	PLATE, ACTUATOR LIFT	4
30	140027	WASHER, FLAT	1
31	140546	NUT, NYLOCK	4
32	600305	BRACKET, LIFT EXTRACTOR	2
33	602977	BRACKET, MOUNT CARPET TOOL	1
34	602565	SPRING, CARPET TOOL	1
35	140221	SCREW, 5/16-18X1 1/4	2
36	140220	SCREW, 5/16-18X2 1/2	2
37	140015	WASHER, LOCK	8
38	600306	TOOL, CARPET	1
39	603046	BRACKET, BASE LEVELER	1
40	160613	●HOSE, VAC 1.5X30" W/CUFFS	1
41	600307	BRACKET, MOUNT EXTRACTOR	1
42	140226	SCREW, 5/16-18X5/8	4
43	140139	BUSHING, BRUSH LIFT PEDAL	2
44	140272	SCREW, M6X1.0X16MM	4
45	603093	BRACKET, BUMPER WHEEL	1
46	25732	WASHER, FLAT	2
47	140515	NUT, NYLOCK	2
48	630477	WHEEL, 2" GRAY	8
49	590248	SCREW, 38-16X4.75	2

● RECOMMENDED STOCK ITEMS

DRIVE GROUP



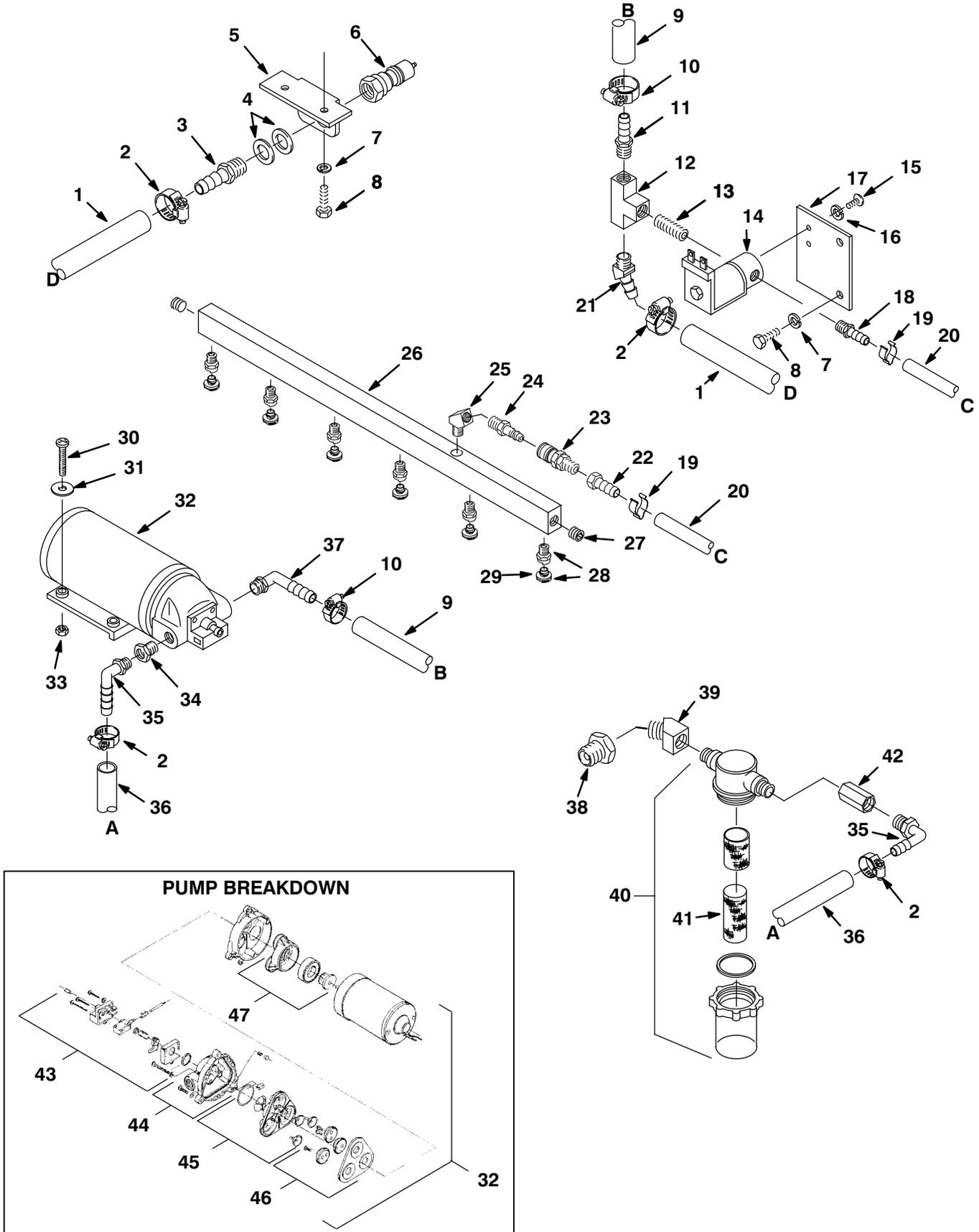
REF	PART #	DESCRIPTION	QTY.
▽1	630126	TRANSAXLE	1
▲2	600606	END BELL, TRANSAXLE MOTOR	1
▲3	630504	CARBON BRUSH	2
▲4	630503	CAP	2
5	640013	WHEEL, 8"	2
6	140000	WASHER, FLAT	8

REF	PART #	DESCRIPTION	QTY.
7	630268	NUT	8
8	612 255 000	SCREW, M10X35MM	4
9	140333	WASHER, LOCK	4
10	602881	BRACKET, TRANSAXLE MOTOR	2
11	600304	SPACER, AXLE 3/4X4X1/4	4
12	602883	SPACER, 3/4X4X1/8	2

▽ ASSEMBLY

▲ INCLUDED IN ASSEMBLY

PLUMBING GROUP



PLUMBING GROUP

REF	PART #	DESCRIPTION	QTY.
1	607704	HOSE, 3/8" X 24.5"	1
2	140310	CLAMP, HOSE	4
3	150516	HOSE BARB	1
4	140058	WASHER	2
5	603063	BRACKET, QC MOUNT	1
6	150933	PLUG, QUICK COUPLER	1
7	140016	WASHER, LOCK	4
8	578 187 000	SCREW, M06X12MM	2
9	607705	HOSE, 1/2" X 24" RED	1
10	630369	CLAMP, HOSE	2
11	150517	HOSE BARB	1
12	150706	TEE	1
13	150615	NIPPLE 1/4 CLOSE	1
14	603030	●SOLENOID, WATER 24 VDC	1
15	140801	SCREW, 8-32X3/8	2
16	140023	WASHER, LOCK	2
17	603055	BRACKET, SOLENOID	1
18	150515	HOSE BARB	1
19	140325	CLAMP	2
20	607706	HOSE, 1/4" X18"	1
21	28303	HOSE BARB	1
22	150520	HOSE BARB	1
23	150915	COUPLER, QUICK	1
▽	700423	ASM., SPRAY BAR	1
▲24	150921	PLUG, QUICK COUPLER	1
▲25	150422	ELBOW, STREET 1/8MX1/8F 45°	1
▲26	230407	MANIFOLD, SPRAYBAR	1

REF	PART #	DESCRIPTION	QTY.
▲27	150208	PLUG	2
▲28	201011	●NOZZLE, TWISTOUT (80015)	6
29	201013	●TIP, REPLACEMENT (80015)	6
30	140899	SCREW, 10-24X1 1/4	2
31	140012	WASHER, FLAT	2
32	603031	●PUMP, 100 PSI 24 VDC	1
33	140552	NUT, NYLOCK	2
34	150006	BUSHING	1
35	150409	ELBOW, 90	1
36	607305	TUBING, 3/8" X 30" GRAY VINYL	1
37	150425	ELBOW, 3/8MX1/2H 90°	1
38	150101	BUSHING	1
39	150403	ELBOW, STREET 1/4X45°	1
40	180619	FILTER, 1/4 NPT CLEAR BOWL	1
41	180638	●SLEEVE, NYLON FILTER	1
42	150302	COUPLING, 1/4FX1/4F	1
43	190129	●KIT, PUMP PRESSURE SWITCH	1
	190172	●KIT, PUMP PRES SWITCH (VITON)	1
	190134	●KIT, PUMP DIAPHRAGM ONLY	1
44	190128	●KIT, PUMP UPPER HOUSING	1
	190124	●KIT, PUMP CHECK VALVE ONLY	1
45	190171	●KIT, PUMP VALVE (VITON)	1
46	190131	●KIT, PUMP SERVICE	1
47	190130	●KIT, PUMP LOWER HOUSING	1

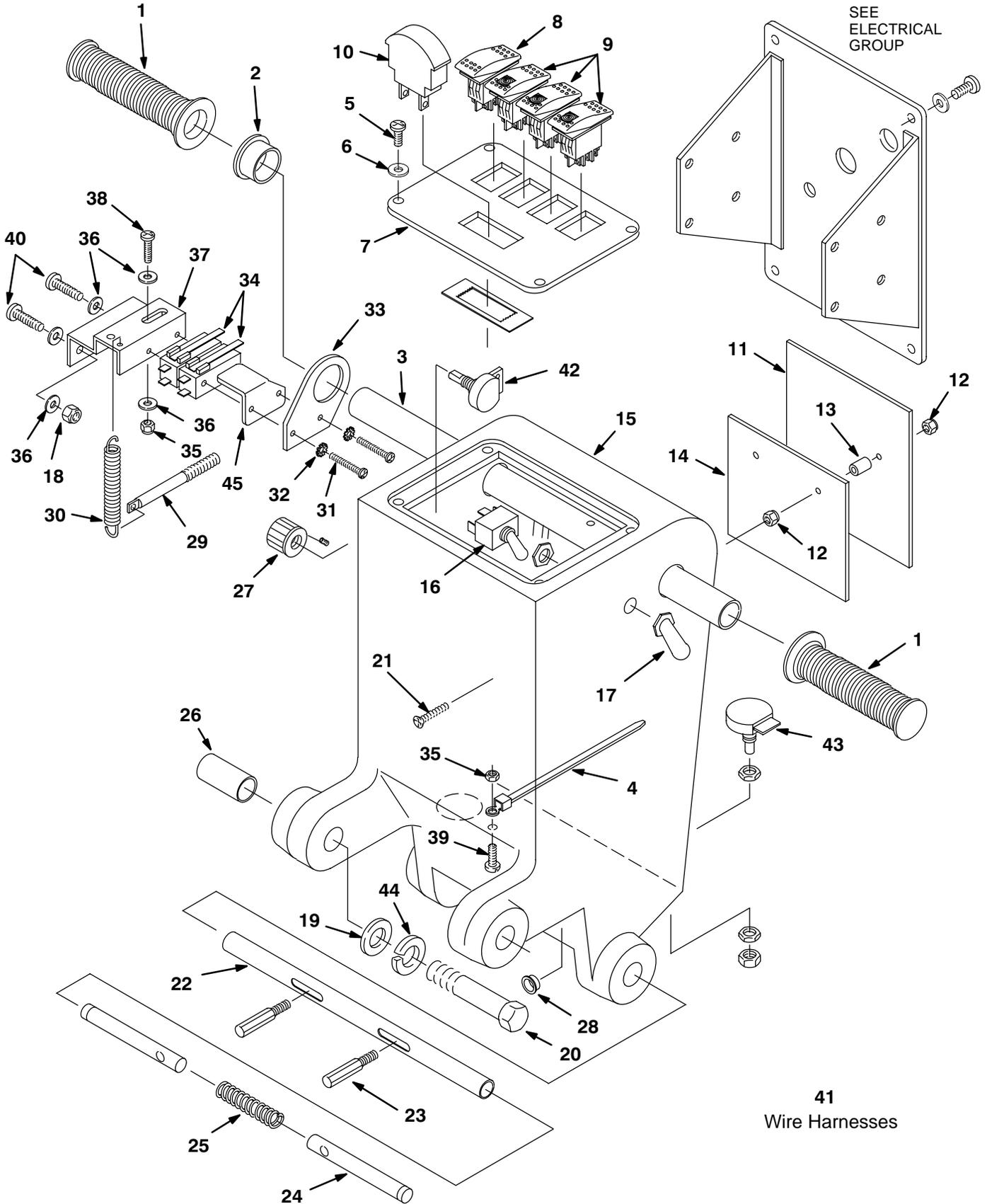
▽ ASSEMBLY

▲ INCLUDED IN ASSEMBLY

● RECOMMENDED STOCK ITEMS

PARTS LIST

CONSOLE GROUP



CONSOLE GROUP

REF	PART #	DESCRIPTION	QTY.
1	200823	GRIP, HANDLE TUBE	2
2	27099	BUSHING	1
3	603050	HANDLE, TUBE	1
4	26561	CABLE TIE	1
5	578 141 000	SCREW, M5X10MM	8
6	140018	WASHER, LOCK	8
7	602978	PANEL, CONTROL W/SILKSCREEN	1
8	602919	●SWITCH, DPDT ON/ON	1
9	601107	●SWITCH, LIGHTED ROCKER	3
10	130015	METER, BATTERY VOLTAGE 24V	1
11	630104	●SPEED CONTROL, PMB, 55 AMP	1
12	200 160 014	NUT	4
13	630261	SPACER	2
14	630128	HEAT SINK	1
15	607556	HOUSING, CONTROL, TEAL	1
16	601108	●SWITCH, TOGGLE	1
17	130753	BOOT, SWITCH	1
18	140284	NUT	2
19	140045	WASHER, FLAT	2
20	140351	SCREW, M12X1.75X70MM	2
21	630304	SCREW, M4X35MM	2
22	230715	TUBE, HANDLE ADJUSTMENT	1
23	230649	PIN, HANDLE ADJUSTMENT	2

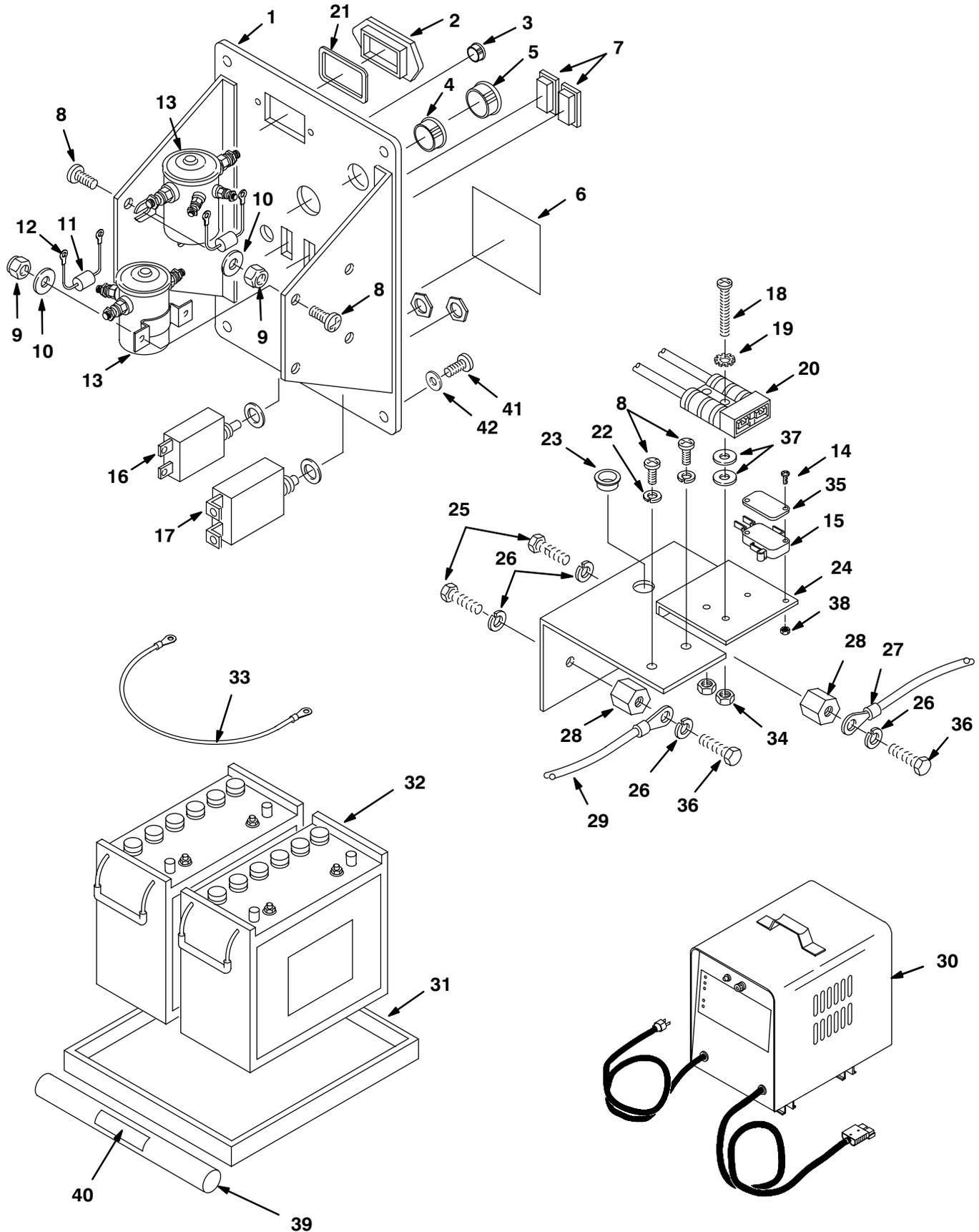
REF	PART #	DESCRIPTION	QTY.
24	230710	PIN, HANDLE LOCK	2
25	140415	SPRING, LOCK PIN	1
26	140155	BUSHING	2
27	601110	KNOB, SPEED CONTROL	1
28	603007	BUSHING, SNAP	1
29	602886	PIN, SPRING RETURN	1
30	601118	SPRING, EXPANSION	1
31	140830	SCREW 6-32X1-5/8	2
32	140019	WASHER, LOCK	2
33	27098	BRACKET, SWITCH	1
34	130729	●SWITCH, ROLL	2
35	140552	NUT	2
36	140000	WASHER, FLAT	4
37	25671	MOUNT, SWITCH	1
38	140890	SCREW. 10-24X1/2	1
39	140900	SCREW 10-24X3/4	2
40	578 321 000	SCREW, M6X16MM	2
41	602873	HARNESS CONSOLE W/POT. (N/S)	1
	603188	HARNESS, WIRE MAIN (N/S)	1
42	130776	●POTENTIOMETER, 50K	1
43	130775	●POTENTIOMETER, 50K LOCKABLE	1
44	140024	WASHER, LOCK	2
45	603830	PLATE, GUARD SWITCH	1

● RECOMMENDED STOCK ITEMS

N/S= NOT SHOWN

PARTS LIST

ELECTRICAL GROUP



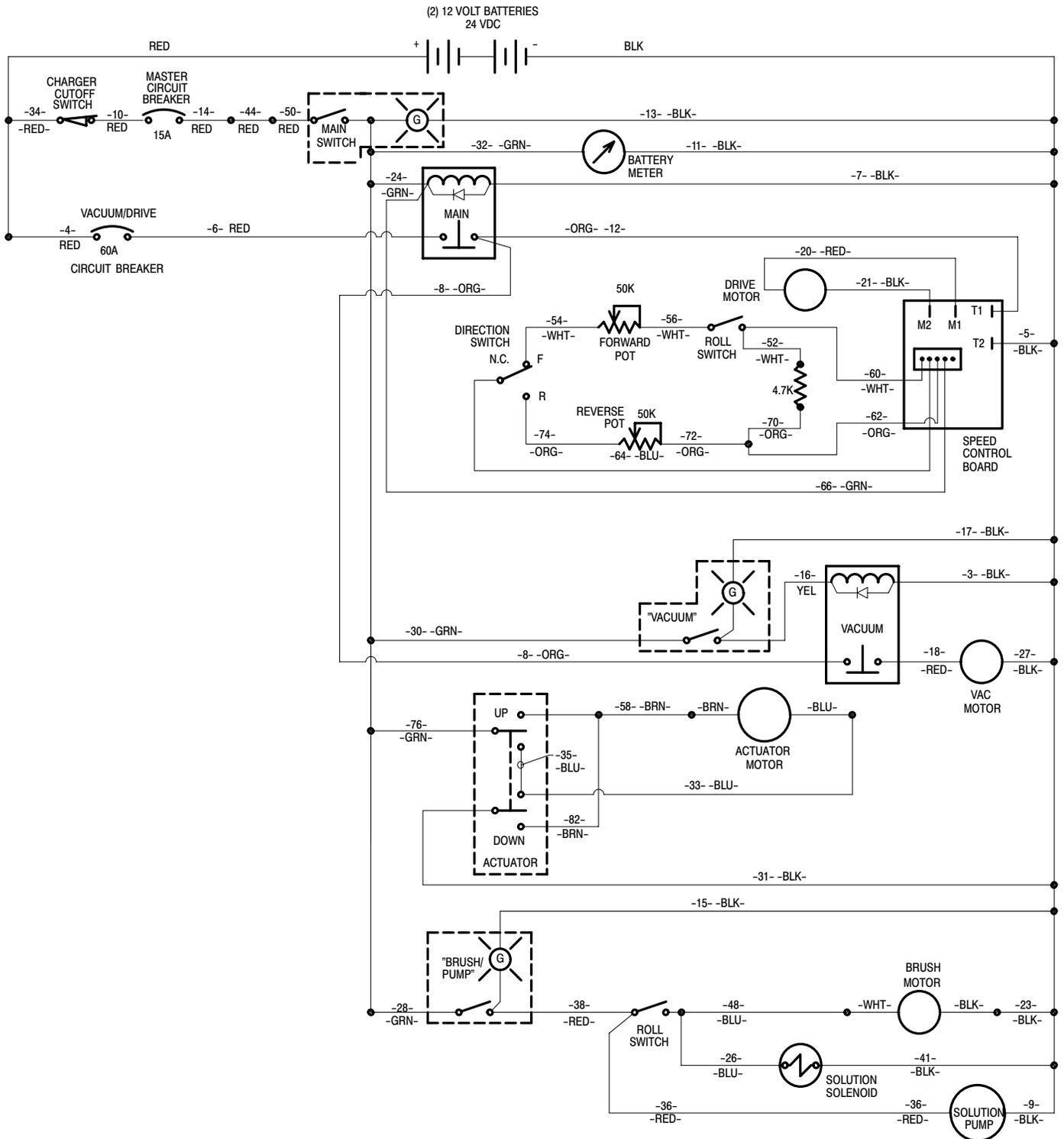
ELECTRICAL / BATTERY GROUP

REF	PART #	DESCRIPTION	QTY.
1	602559	PANEL, CONTROL HOUSING	1
2	222519	PLUG	1
3	069 764 626	PLUG, HOLE 012.7	1
4	130161	PLUG, DOME .875	1
5	130175	PLUG, DOME .750	1
6	630420	DECAL, FLAMMABLE MATERIAL	1
7	582150	PLUG, ACCESSORY SWITCH	2
8	578 321 000	SCREW, M6X16MM	6
9	140284	NUT	4
10	140000	WASHER, FLAT	4
11	130423	●DIODE, 400V	2
12	130125	RING, TERMINAL	4
13	130218	●SOLENOID, 24V	2
14	578 403 000	SCREW, M3X20MM	2
15	600437	●SWITCH, ROLLER	1
16	603487	●BREAKER, CIRCUIT BRUSH 15AMP	1
17	130739	●BREAKER, CIRCUIT 60AMP	3
18	140829	SCRW, 6-32X1	2
19	140019	WASHER, LOCK	2
20	27833	CONNECTOR, 50A WO/CONTACTS	1
21	603224	O RING .926ID X .996OD	1

REF	PART #	DESCRIPTION	QTY.
22	140018	WASHER, LOCK	2
23	130698	BUSHING, SNAP	4
24	603191	BRACKET, CHGR W/STANDOFF	1
25	140553	SCREW, 1/4-20X1/2	2
26	140016	WASHER, LOCK	4
27	602871	CABLE, BATTERY #6 BLACKX24"	1
28	578427	STANDOFF	2
29	603192	ASM., WIRE #6X650MM RED	1
30	603235	CHARGER 24DC/20A	1
31	601991	TRAY, BATTERY	1
32	600394	BATTERY, 12V 215A	2
33	130364	CABLE, BATTERY #6 BLACKX15"	1
34	140539	NUT	2
35	601359	PLATE, SWITCH BACKING	1
36	140259	SCREW 1/4-20X5/8 HXHDPC	2
37	140032	WASHER, FLAT	4
38	579211	NUT, LOCK	1
39	602592	SUPPORT TUBE BATTERY	1
40	603828	DECAL, BATTERY PLACEMENT	1
41	578141000	SCREW M5X10 PANPHL	4
42	140018	WASHER #10 INT	4

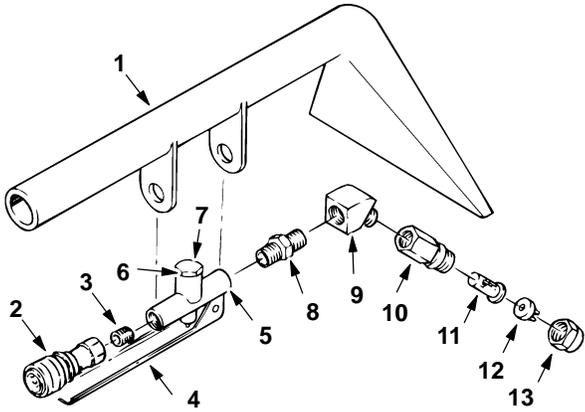
● RECOMMENDED STOCK ITEMS

LADDER DIAGRAM



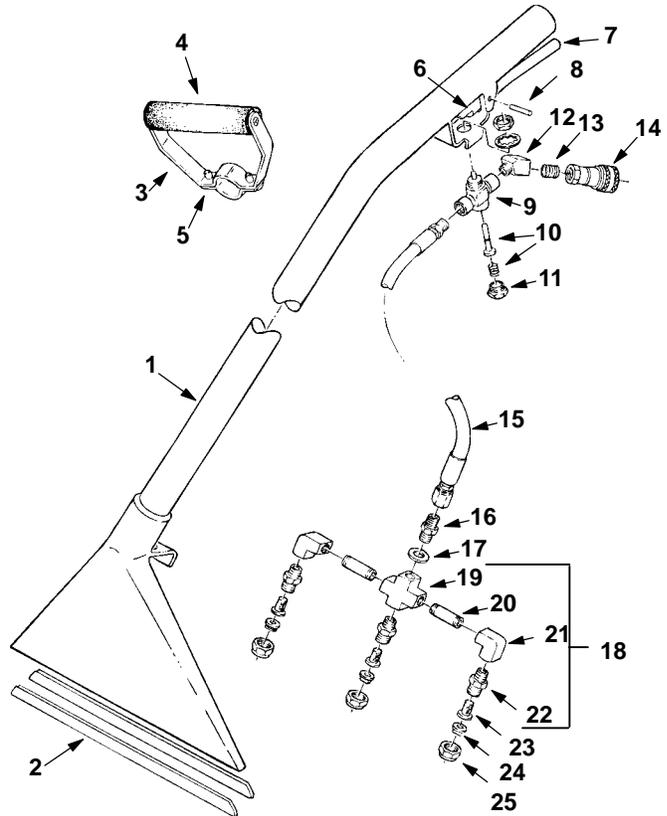
OPTIONS

127 mm (5 in) HAND TOOL



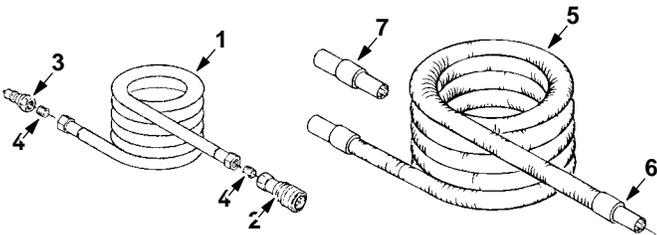
REF	PART #	DESCRIPTION	QTY.
	200505	TOOL, HAND (COMPLETE)	1
1	200431.BK	TOOL, HAND	1
2	150913	COUPLER, QUICK (SER. 60)	1
3	150615	NIPPLE, CLOSE	1
4	200905	TRIGGER, HAND TOOL	1
5	210210	VALVE, FLOW CONTROL	1
6	190600	VALVE PIN & SPRING (NOT SHOWN)	1
7	N/A	CAP, VALVE	1
8	150606	NIPPLE, HEX 1/4	1
9	150403	ELBOW, ST 1/4 45°	1
10	200992	BODY, SPRAY 1/4F	1
11	200996	SCREEN, SPRAY NOZZLE	1
12	200965	TIP, SPRAY #8002	1
13	200994	CAP, SPRAY BODY	1

FLOOR TOOL



REF	PART #	DESCRIPTION	QTY.
	600048	FLOOR TOOL (COMPLETE)	1
1	200403.BK	TOOL, FLOOR	1
2	200939	SHOES, S/S, FLOOR TOOL	2
3	200927	GRIP, ADJUSTABLE (COMPLETE)	1
4	200912	GRIP, FOAM	1
5	140259	SCREW, 1/4-20X5/8	1
6	200902	TRIGGER, FLOOR TOOL	1
7	200809	SLEEVE, TRIGGER	1
8	140605	PIN	1
	140520	NUT, PUSH (NOT SHOWN)	2
9	210150	VALVE, FLOW CONTROL	1
10	190603	KIT, VALVE PIN & SPRING	1
11	N/A	CAP, HEX, VALVE	1
12	150403	ELBOW, 1/4-45°	1
13	150615	NIPPLE, CLOSE 1/4	1
14	150913	COUPLER, QUICK SER. 60	1
15	160170	HOSE, SOLUTION, LP	1
16	150606	NIPPLE, HEX 1/4"	1
17	140058	WASHER	1
∇18	700062	ASM., SPRAY BAR	1
▲19	150700	CROSS	1
▲20	150600	NIPPLE	2
▲21	150401	ELBOW, 90° 1/4FX1/4F	2
▲22	200993	SPRAY BODY	3
23	200996	SCREEN, SPRAY BODY	3
24	200964	TIP	3
25	200994	CAP, SPRAY BODY	3

SOLUTION AND VACUUM HOSES



REF	PART #	DESCRIPTION	QTY.
∇1	160185	HOSE, SOLUTION 15'	1
∇1	160186	HOSE, SOLUTION 25'	1
▲2	150913	COUPLER, QUICK SER. 60	1
▲3	150933	PLUG, QUICK COUPLER	1
▲4	150615	NIPPLE	2
∇5	160400	HOSE, VACUUM 15' W/ CUFFS	1
∇5	160401	HOSE, VACUUM 25' W/ CUFFS	1
▲6	160430	CUFF, HOSE 1-1/2"	2
▲7	160451	CONNECTOR, VACUUM HOSE 1-1/2"	1

∇ Assembly

▲ Included in Assembly