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Operation and Illustrated Parts Manual
For Commercial Use Only



Long-Range Floorkeeper Automatic Scrubber

Catalog No.
99328 & 99332

NOTES

This illustrated parts book covers:

MODEL	99328	99332
SIZE	28"	32"
VOLTS (CHARGER)	36V	36V
AMPS	20	20
CAPACITY	20 GAL. (79l)	20 GAL (79l)
SERIES	A	A

All specifications are subject to change without notice.

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

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

1) Windshear™ Blower-Dryer, Insulation Blowers, 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.

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INTRODUCTION

Congratulations on the purchase of your new Tornado Floorkeeper! The Floorkeeper combines many advanced features to maximize reliability, performance, and ease of use. The most notable addition is the incorporation of the industry's first fully functional digital control and display system on an automatic floor scrubber. With it, you'll be able to easily and accurately monitor an assortment of system settings and conditions. Tornado's new digital controller has a unique soft-start feature that increases both efficiency and powertrain lifespan.

This new Floorkeeper's simplified wiring harness uses quick-disconnects, and combined with the digital controller, it makes servicing and troubleshooting easy. A tough new rotomolded housing extends over an advanced one-piece steel weldment, making this new Long-Range both more rugged and much lighter than previous Long-Range models.

Additional features include removable 20-gallon solution and vacuum tanks, a reliable 18:1 gear ratio transaxle, non-marking 11" tires, easy-access batteries, and error code generation on its LCD display. The new Long-Range Floorkeeper automatic scrubber was designed and built to exceed your needs for durability and serviceability in demanding commercial environments.

This manual is designed to instruct your personnel in the operation, maintenance and methods of troubleshooting on your Tornado Floorkeeper. Please read through this manual and keep it handy to ensure that you get maximum satisfaction and value from this new advance in floor care.



OBSERVE THESE PRECAUTIONS FOR SAFE USE OF THIS MACHINE

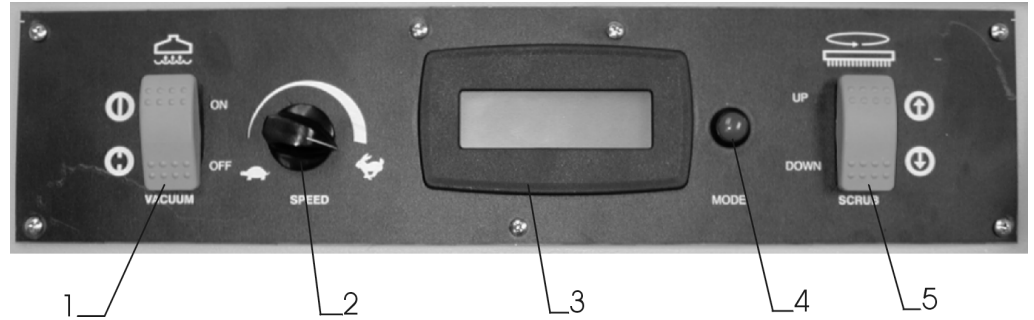
TO AVOID DANGER:

- **Back the machine down inclines or ramps. Do not store machine on inclines.**
- **Make certain that the power switch is OFF before removing or installing brushes.**
- **Use care when working on electrical terminals —short circuits can cause burns and throw sparks.**
- **Disconnect both positive and negative battery terminals before attempting any adjustment or maintenance. Brush or traction drive motors and drive components could cause injury if started while being worked on.**
- **Charge batteries in a ventilated room where gases cannot accumulate. Gases given off during charging could ignite in a confined space. Make certain that the top covers are open when charging so gases cannot accumulate.**
- **Battery acid can cause injury to the eyes or burn the skin.**

Unit Controls and Indicators

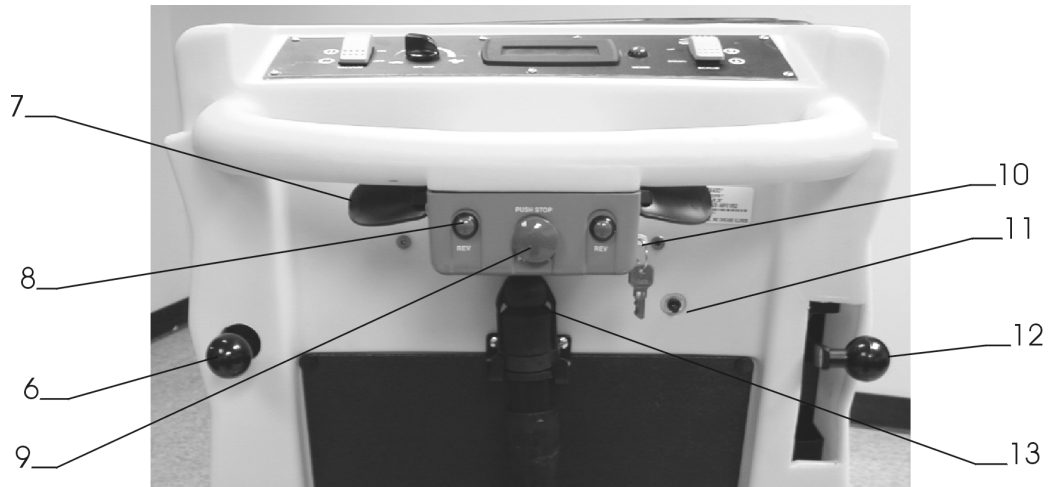
Control Panel

1. Vacuum Motor Switch
2. Variable Speed Control Knob
3. LCD Display
4. Display Mode Button
5. Brush Pressure Switch



Rear Controls

6. Adjustable Solution Control
7. Dual Drive Levers
8. Dual Reverse Buttons
9. Emergency Stop Switch
10. Key Lock
11. Circuit Breaker
12. Squeegee Control Lever
13. Recovery Tank Drain Hose

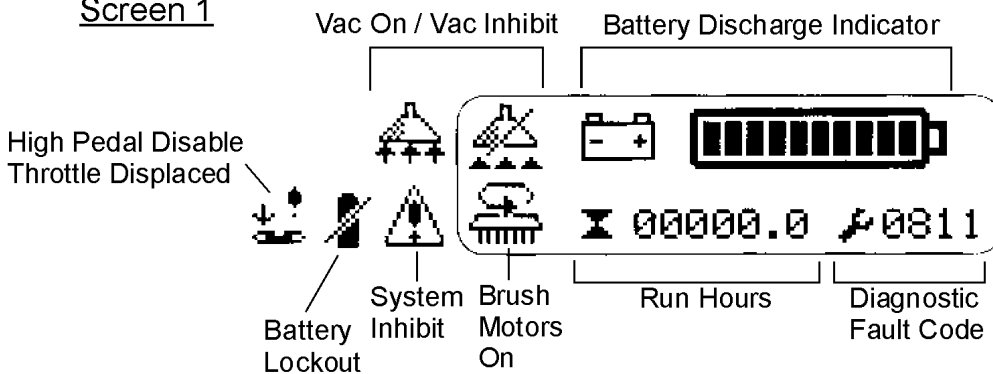


Unit Controls and Indicators

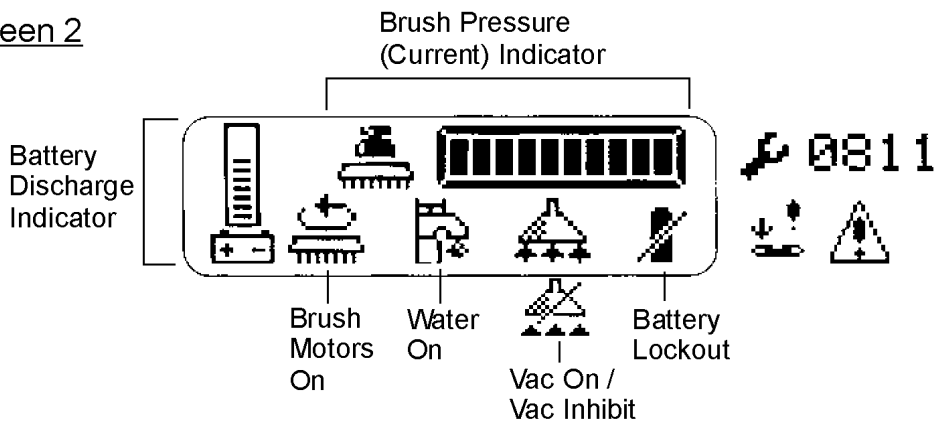
Display Screens

Use the Display Mode Button (to the right of the display) to toggle between three unique screens. Each screen displays a different set of icons and numerical readouts to give you useful information about your Long-Range's operating status. For particulars on diagnostic fault code information, see page 24.

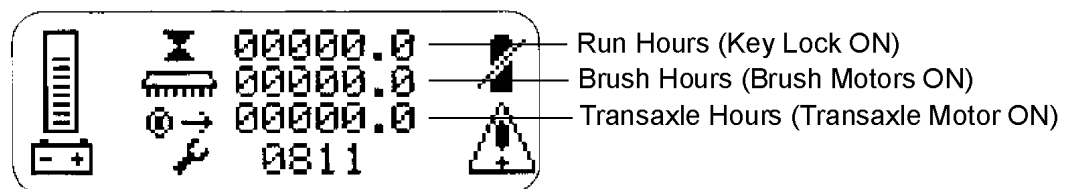
Screen 1



Screen 2



Screen 3



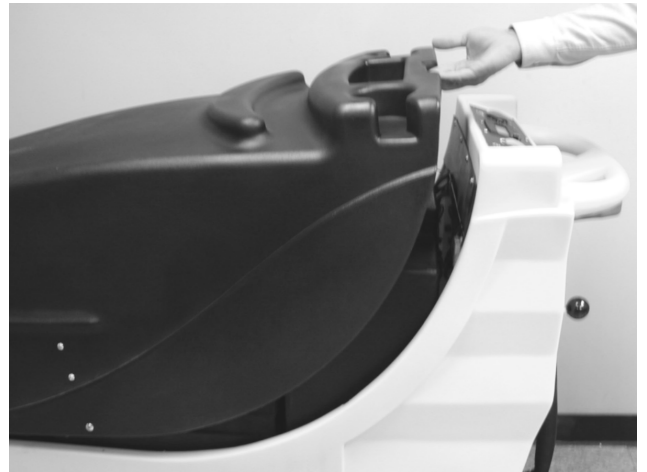
INSTALLATION

Batteries

Raise top cover using handle, and pivot forward until retainer cords are taut.

CAUTION

Batteries are heavy. To avoid injury, use two people to lift into position.



Place batteries in metal tray liner. Orient each battery exactly as shown in bottom photo, or refer to chart located under the hood. Ensure that positive and negative terminals are positioned and connected correctly.

CAUTION

Observe polarity.



Place battery terminal protectors over posts.

WARNING

Battery acid can cause severe burns. Make sure battery caps are tight to avoid spills or splashing of acid.

Close cover.



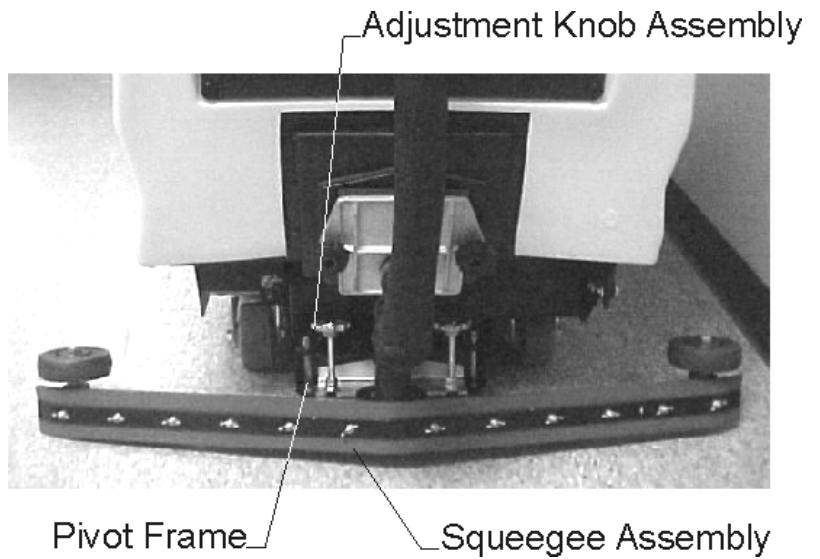
INSTALLATION

Squeegee

1. Make sure squeegee adjustment lever is locked in UP position.

Install two adjustment knob assemblies on squeegee assembly. Do not thread in all the way.

2. Slide squeegee assembly on pivot frame and tighten adjustment knobs.



3. Insert hose end into squeegee assembly nozzle throat. Press down tightly.



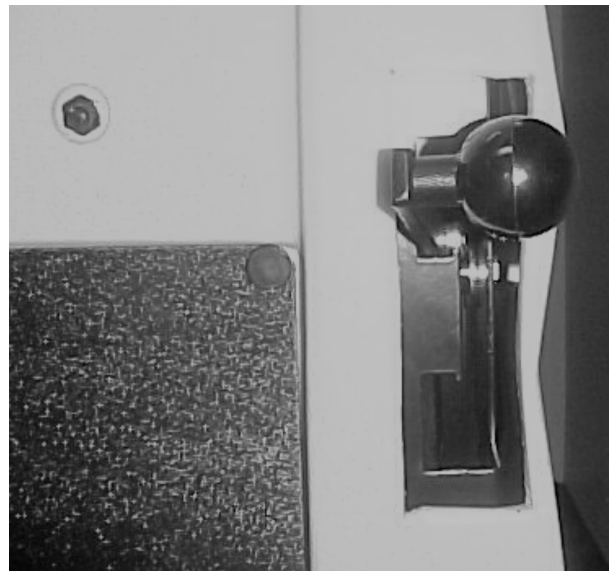
Squeegee can be locked in UP position by raising lever and moving it to the left.

Squeegee can be locked in DOWN position by pushing lever down and moving it to left.

NOTE: For even floors, squeegee can be set to float by setting lever halfway between UP and DOWN positions. Lock in DOWN position for uneven floors.

NOTE: Never store machine with squeegee in down position.

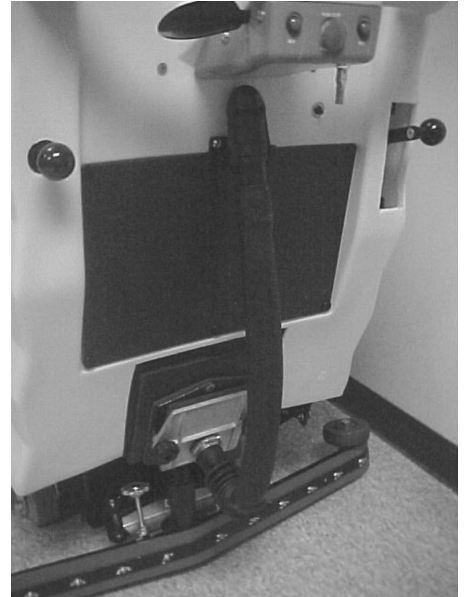
NOTE: **Always raise squeegee while backing up.**



INSTALLATION

Recovery Tank Drain

Install drain door on mounting hardware. Make sure thumb screws are tight. Place top of hose on hose bracket.



Brushes

1. Raise brush heads using switch on control panel.
2. Place brushes or pad holders under cover. Locate brush coupler. Pull up to lock in place.



3. Check to see that two solution feed hoses are connected to fittings on top of brush cover.



PRE START-UP

Turn key and power switch on and lower brushes to test. Brush motors will automatically turn on when brushes are lowered.

Filling Solution Tank

1. Raise top cover.
2. Always empty recovery tank before filling solution tank. This will eliminate overfilling of recovery tank.
Lift solution tank cover and fill.
3. Close top covers by pushing covers down.



You are now ready to operate your machine.

Follow maintenance schedule on page 23 to ensure proper operation of your machine.

TORNADO FLOORKEEPER PREVENTIVE MAINTENANCE PROGRAM

Introduction

This section is designed to instruct your personnel in methods of maintenance on the Tornado Floorkeeper. By following these procedures, repair costs and down time will be greatly reduced. These procedures are for simple repairs that can easily be done by your own personnel.

WARNING

Battery acid is toxic and corrosive; avoid bodily contact.

First Aid:

EYES: Wash with liberal quantities of running water for 15 minutes.

SKIN: Flush area with plentiful amounts of running water.

INGESTION: Give milk to drink, DO NOT induce vomiting, call a physician.

SPILLS: Wash with water or neutralize with sodium carbonate or bicarbonate (baking soda).



Battery Care

Batteries must be checked daily. The water level must be maintained at least 1/4" above top of cell plates in each battery.

1. Raise top covers and lock in place.
2. Remove battery caps and fill.

NOTE: Fill batteries with distilled water only. This will increase battery life substantially.



MAINTENANCE

CAUTION

Do not overfill the battery cells. Do not use a hose or pail. If batteries are accidentally overfilled, remove excess water with the hydrometer provided with the machine. Dispose of excess in accordance with local, state and federal regulations.



3. After filling batteries, replace the battery caps. Using baking soda or ammonia and water solution, saturate a cloth and wring until drip dry. Use this cloth to wipe the battery tops.



4. The battery terminals and connections need to be coated with a protective lubricant to prevent corrosion.

WARNING

Avoid accidental contact with battery terminals and possible electrical shock. Replace protective plastic terminal covers after battery maintenance.



MAINTENANCE

Battery Charging

The charger is fully automatic:

1. It turns on when plugged in.
2. It switches to equalizing charge.
3. It shuts off when it reaches full charge or when batteries are defective.

NOTE: It is recommended that new batteries be fully discharged at least once (more in some cases) to enable batteries to hold a full charge.

The batteries must be charged after each use of 3 or more hours. Failure to do so will result in shortened running time.

To charge the batteries, raise top covers and lock in position.

WARNING

To avoid explosion keep covers open during charge to insure proper ventilation of gases.

1. Connect charger cable by plugging it into *Andersen™* connector located under rear top cover.
2. Plug AC cord into proper electrical receptacle. The red "CHARGER ON" light will automatically come on along with the "INCOMPLETE" light, meaning batteries are being charged.
3. The charger will automatically turn off when the batteries are charged to their maximum capacity. The "CHARGER ON" light will go out when the charge cycle is complete.
4. To stop the charge cycle push the "INTERRUPT" button. (Do not unplug A.C. cord while the charger is on.)
5. Check the lights on the battery charger after charger shuts off ("CHARGER ON" light should not be lit):

A. Green light: Batteries are fully charged and are in good condition.

B. Amber light: All cells are OK but the total battery capacity is reduced. This usually indicates that the batteries are aging.

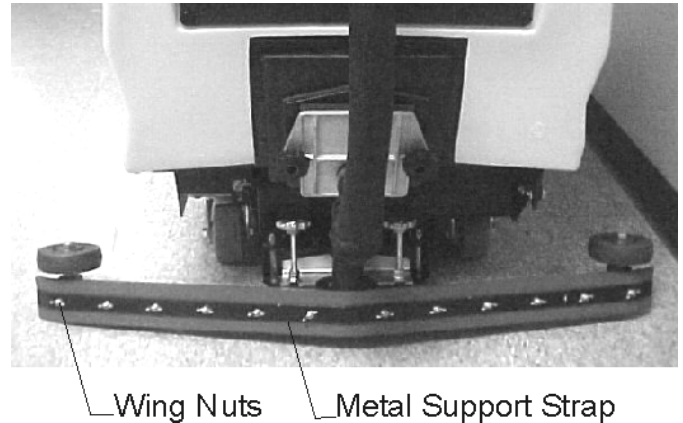
C. Red light: The battery capacity is low and the entire charger/battery system needs to be inspected by a qualified Tornado serviceman.



MAINTENANCE

Squeegee Blades

1. If a squeegee blade is worn or ripped, raise the squeegee assembly and remove the entire squeegee assembly. Disconnect vacuum hose, loosen two thumb screws and slide pivot frame out. Remove the wing nuts on the rear of the squeegee housing. Then remove the metal support strap.



2. Squeegee blades can be repositioned to provide a new edge. See Figure 1

The front blade has two working edges (ref. #1, 2).
Flip blade for new edge when worn.

The rear blade has four working edges (see ref. #3 through 6).
When edge is worn, turn blade so new edge is on bottom, facing front of squeegee.

NOTE: Edges of front and rear blades must be parallel to each other.

3. Place the metal support strap back into position. Replace the wing nuts on rear of the squeegee housing. Do not over-tighten wing nuts as this will wrinkle the squeegee blade and cause streaking during recovery.

Always keep the squeegee blade edge straight for best results.

Clean squeegee blades with a damp cloth.

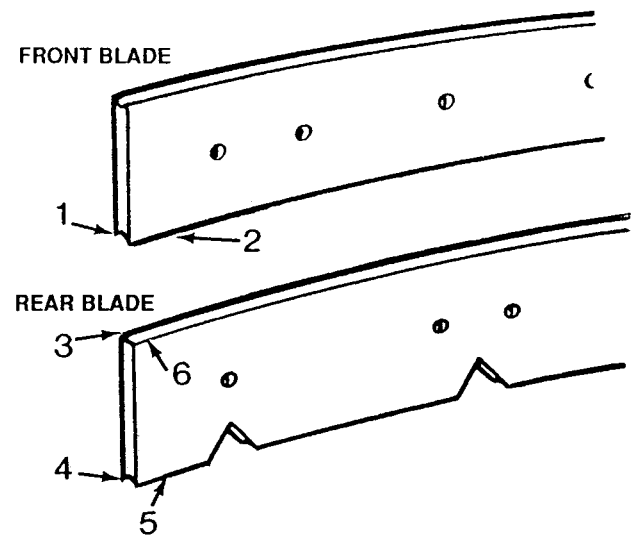
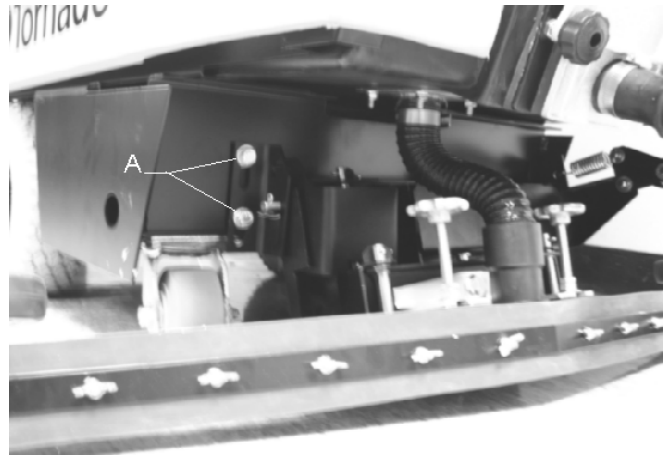


FIGURE 1

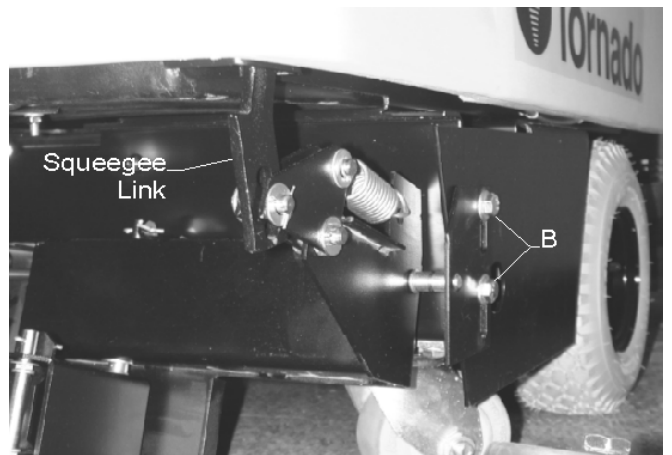
MAINTENANCE

Squeegee Adjustment

1. **Height and flatness** adjustments are made by loosening the four screws (A & B) and lifting or lowering the entire squeegee mechanism as desired.
2. Turn machine on and move machine forward slightly.



3. Look down at the contact being made between the squeegee blades and the floor. Make adjustments as required.
4. Correct adjustment is made when squeegee blades rest evenly on the floor. Tighten four screws (A & B).



Blade pressure is adjusted by lengthening or shortening the length of the squeegee link.

There are three holes at each end of link which are used for adjustments.

For Smooth Floors:

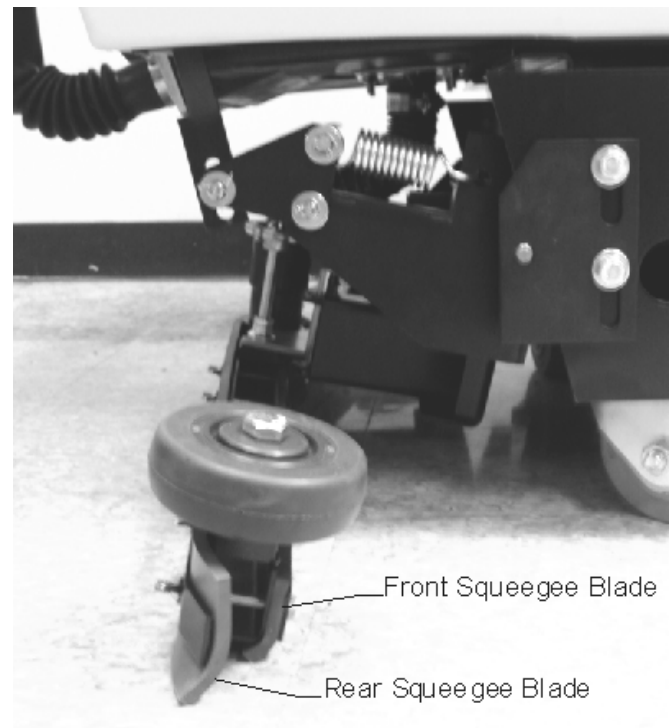
Use the soft (3/16") rear squeegee blade. (Standard)

Release the squeegee lever above and allow the squeegee to rest on the floor.

For Rough Floors:

Use the firm (1/4" thick) rear squeegee blade.

Lock the handle in the down position so that squeegee is forced down to floor.



MAINTENANCE

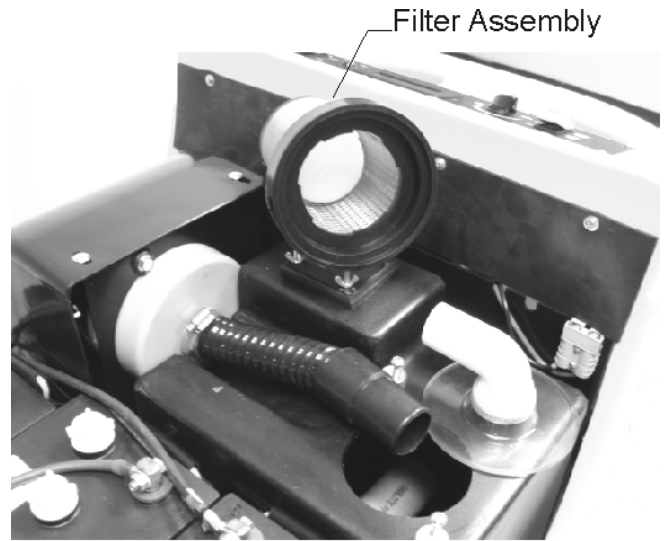
Vacuum and Water Recovery System

NOTE: A dirty or clogged filter will greatly reduce suction and ability of machine to recover water.

Inspect vacuum filter after each use as follows:

1. Disconnect hose.
2. Turn the two cam-shaped thumb locks.
3. Remove filler assembly.
4. Remove foam filter and rinse with clean water.
5. Drain and flush tanks with clean water.
6. Leave filter assembly out of tank to allow system to dry when not in use.

A liquid shutoff is built into the filter system to prevent overfilling tank.

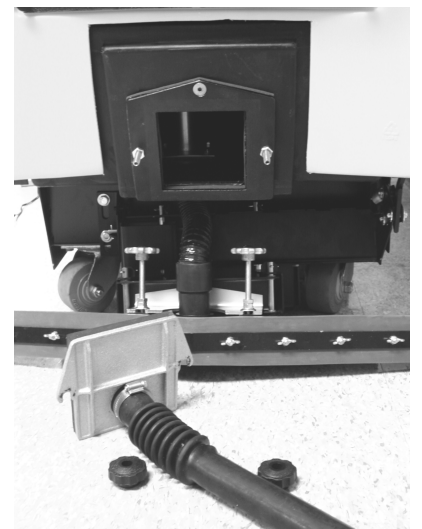
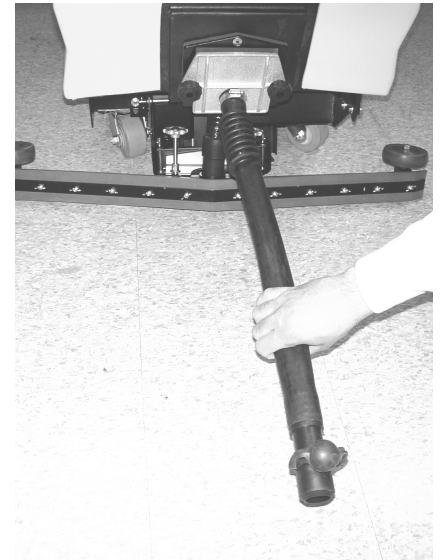


Thumb Lock

Solution and Recovery (Vacuum) Tanks

Draining Recovery (Vacuum) Tank:

1. Lift drain hose and remove from hook.
2. Insert end of hose into large pail or drain area.
3. Push ball to the side and drain. (Do not remove ball from hose.)
4. For more extensive cleaning of tank, loosen two thumb nuts and remove cover. Flush out tank with clean water as necessary.



MAINTENANCE

Draining Solution Tank:

1. Locate drain hose at front of unit and position over acceptable floor drain or container.
2. Turn valve handle to open drain valve.
3. Return valve handle to closed position. Tuck drain hose back on machine.



Flush and clean tanks after each use and allow to air dry to eliminate odors and corrosion of vacuum motor.



Vacuum Motor

To service vacuum motor which is located above recovery tank:

1. Disconnect vacuum hose clamp.
2. Remove four screws.
3. Disconnect wires and remove cover.
4. Remove vacuum motor to service.



Wheels

Machines are equipped with either "foam-filled" or hard urethane tires. No service is required.

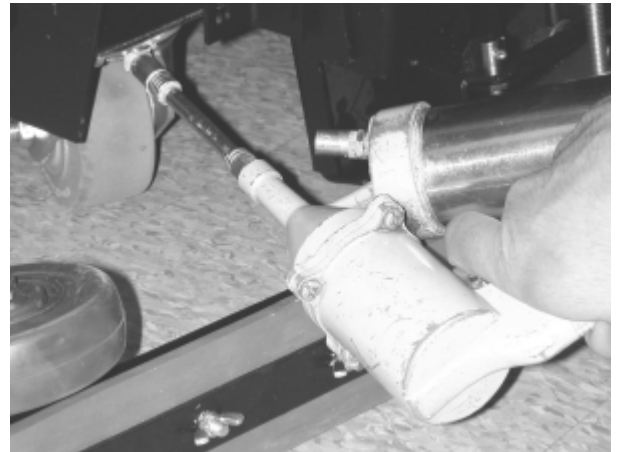
MAINTENANCE

Lubricating Your Machine

WARNING

Unit must be switched “OFF” before greasing wheel fittings. Wipe off excess.

Once a week grease swivel casters with grease gun provided. Each caster has two fittings: one at the axle (A) and one on the swivel part of caster (B).



Motor Brush Replacement

Use the appropriate hour meter on the LCD Display to monitor runtimes for each motor. Tornado recommends changing motor brushes at the intervals specified below in order to avoid potential damage to the commutators. Replacement brushes need to be inspected and changed more often due to commutator wear. Always permanently record any brush inspections and replacements you make.

Don't attempt to use the Motor Fault Error feature of the LCD Display as a signal that motor brushes need changing. A Motor Fault that occurs directly from brush wear would indicate a high risk of motor damage.

Motor	Recommended Motor Brush Change Interval
Transaxle	1800 hours initially, 900-1400 hours for replacements
Brush	2600 hours initially, 1300-2000 hours for replacements
Vacuum	600-650 hours initially, 400-500 hours for replacements

TORNADO FLOORKEEPER®

TROUBLESHOOTING INSTRUCTIONS

This section is designed to instruct your personnel in methods of troubleshooting on the Tornado Floorkeeper.

Vacuum System (Poor Suction)

During machine operation, if the vacuum motor is running but the solution is not being picked up, do the following:

Check for:

1. Full recovery tank. When tank is full, liquid shutoff closes to prevent water from entering vacuum motor.
2. Loose hose on float/filter, creating an air leak.
3. Clogged filter.
4. Clogged stand pipe near filter. Remove cap to inspect and clean with hose.
5.
 - A. Check to see that ball closure is in place on end of drain hose.
 - B. Check to see that thumb nuts on recovery tank drain cover are tight.
 - C. Check to see if liquid shutoff unit is properly seated on top of recovery tank, the filter gasket is not damaged, and cam lock nuts are tight.

TROUBLESHOOTING

6. Remove vacuum hose from squeegee by pulling hose off squeegee throat.



7. With the vacuum motor on, place your hand over the vacuum hose intake. If suction is strong, a blockage is in the squeegee throat.

Clear this blockage by pushing a screwdriver, or any similar tool, downward through the top of the squeegee throat.

NOTE: Performing these maintenance procedures will avoid problems with the recovery system requiring outside repair service. Always be very sure the vacuum system is clear of any blockage before calling for service.



Poor Solution Flow

If an inadequate supply of solution is reaching the floor, check the solution hoses for kinks. These hoses are connected to the brush drive assembly. If there are no kinks in the solution hoses, pull the hoses from the brush cover fitting and check the entire line for blockage.

TROUBLESHOOTING

Electrical Problems

If brush motors do not run, check the following:

1. Emergency Stop is pulled out.
2. Key switch is in ON position.
3. Power switch is on.
4. Brushes are in down position.
5. Check the circuit breaker button in the back lower panel of the machine.
6. Replace control board.

Batteries Not Holding Charge

Check that the batteries have been given enough charge time to reach their full charge. This will vary according to condition of the batteries.

Check the lights on the battery charger after charger shuts off:

- A. Green light — Batteries are fully charged and are in good condition.
- B. Amber light — All cells are OK but the total battery capacity is reduced. This usually indicates that the batteries are aging.
- C. Red light — The battery capacity is low and the entire charger-battery system needs to be inspected by a qualified serviceman.

The automatic charger is designed to keep batteries at optimum operating charge levels.

NOTE: If red light comes on, inspect battery connections and water level.

TROUBLESHOOTING

Check each cell with a hydrometer before and after charging to determine if batteries are weak. Do not charge or use batteries when the liquid in any one or more cells measures less than 1.150 specific gravity. A fully charged battery should read 1.270 or better after cooling 1/2 hour.

Batteries that have been properly charged and still do not reach a full charge should be discarded. One defective battery can weaken the other batteries. Replace the defective battery if the battery pack is less than two years old. If over two years, replace the entire battery pack.

Daily Battery Maintenance Precautions

1. Add distilled water only.
2. Never add acid.
3. Keep vent caps tight when operating.
4. Keep battery tops clean and dry.
5. Keep water level 1/4" above cell plates.
6. Keep excessive heat and metal away from batteries.
7. Use TORNADO charger with correct voltage and current rating.

TROUBLESHOOTING SYMPTOMS
Poor Solution Pickup — Vac motor not running; Vac filter is clogged; Recovery tank is full; Squeegee or vac hose clogged, broken, disconnected; Poor or no seal at filter, at squeegee or at vac motor; Worn or misaligned squeegee blades; Incorrect squeegee pressure; Swing mechanism not functioning properly.
Squeegee Leaving Streaks — Floors not properly swept; debris on blades; Blades torn or otherwise damaged; Solution Feed/Shutoff Problems — Clogging of screen, hose or valve; control rod disconnected.
Inadequate Scrub, Strip or Buff — Brush motor not working - overload tripped; Excessive brush or pad wear; Going over very dirty spots too last; Inadequate solution feed.
Losing Running Time — Batteries or charger need servicing; High current draw for high brush pressure.

TROUBLESHOOTING

Diagnostic Fault Codes

Error codes displayed in the LCD Display indicate that the Electronic Control System may be detecting problems with electrical connections, worn parts, power system controls, or batteries. Be sure to write down the error code before calling your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.

Error Codes Available in the LCD Display

Code	Detected Error	Description
07xx	Switch Reference Faults	May indicate incorrectly wired input switches.
081x	Throttle Faults	May indicate incorrectly wired or faulty potentiometer.
0A01	Power Down Error	
1310	Supply Over Current	
150x	Solenoid Brake Faults	May indicate open or short-circuited Solenoid Brake.
1600	High Battery Voltage	
1D02	Throttle Specification Modified	Power down to clear this error code.
1E03	Inhibit Activated	
2C0x	Low Battery Voltage	
2C02	Battery Lock Out	
2F01	Throttle Displaced Error	May indicate incorrectly wired or faulty potentiometer.
310x	Bridge Supply Faults	May indicate problem with connection of Motors.
700x	Freewheel Errors	Check condition of Freewheel Switch and connections.
750x	LCD Module Communications Errors	Serial connections to LCD Module may be intermittent.
760x	Brush Motor Fault	May indicate open, shorted, or disconnected Brush Motor.
770x	Vacuum Motor Fault	May indicate open, shorted, or disconnected Vacuum Motor.
780x	Transaxle Motor Fault	May indicate open, shorted, or disconnected Transaxle Motor.
790x	Emergency Stop Button Error	

Any other error code is an internal error and cannot be rectified externally. Contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.

MODEL 99328 and 99332

PREVENTIVE MAINTENANCE CHECKLIST

START OF OPERATION

DAILY MAINTENANCE

1. Unplug charger from Floorkeeper circuitry.
2. Close the solution tank dispenser drain and attach the drain plate to the recovery tank.
3. Assemble and install the vac filter and float cage on the recovery tank.
4. Give the machine a general visual inspection.

END OF OPERATION

1. Clean and wipe squeegee blades.
2. Remove float/filter from the vac tank, take the filter off of the float cage, clean and leave to air dry.
3. Drain both tanks, remove the recovery drain plate and open the solution tank drain valve. Flush both tanks and leave them open to air dry.
4. Add distilled water to battery cells if required.
5. Charge the batteries.

WEEKLY MAINTENANCE

1. Clean and lubricate the caster wheels - use grease gun supplied with Floorkeeper.
2. Check the specific gravity of fully-charged battery cells: allow a 30 minute cool-down after charging (specific gravity should be 1.270 to 1.280). Use hydrometer supplied with Floorkeeper.

MONTHLY MAINTENANCE

1. Lubricate lift mechanisms (both brush and squeegee) with a light oil.
2. Adjust the brush pressure (mercury switch) if needed.
3. Check for wear or damage of brushes, pads and squeegee blades, replace if necessary.
4. Clean all battery terminals with baking soda and water.
5. Check batteries for damage, acid spills, cracks.
6. Lubricate handles and check for looseness.
7. Check the drain gaskets for wear and damage, replace if necessary.
8. Make sure all electrical connections are tight.

SEMI-ANNUAL MAINTENANCE

1. Check all motors, especially check for carbon brush wear, replace if necessary.
2. Grease all bearings.

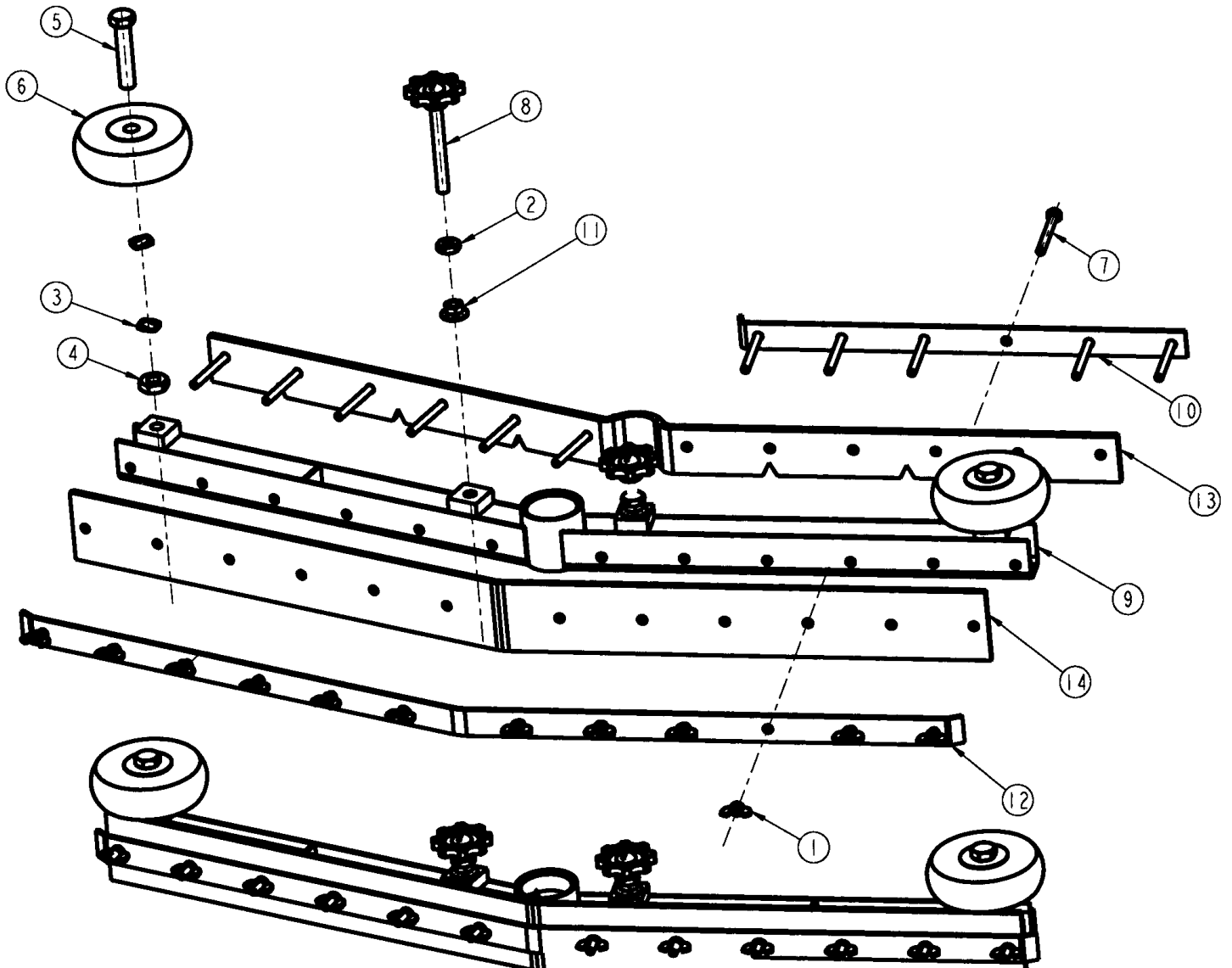
ANNUAL MAINTENANCE

1. Tighten all loose linkages, screws and nuts on entire machine.

#99328 SQUEEGEE ASSEMBLY – PARTS LIST

(Ref drawing 31185)

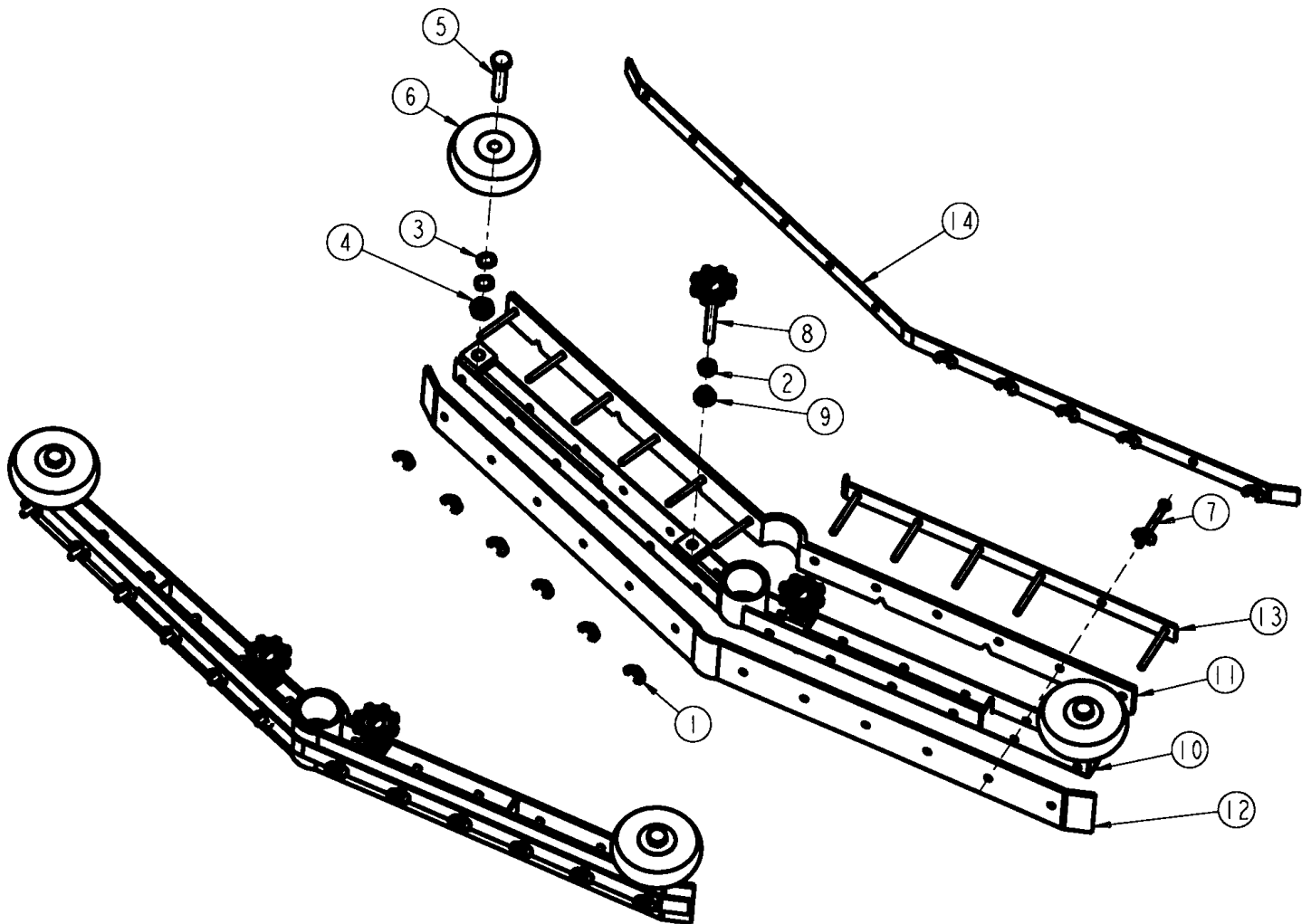
ITEM	QTY	PART NUMBER	DESCRIPTION
1	12	01019	NUT - WING 1/4-20
2	2	05025	NUT - HEX JAM
3	4	07723	WASHER - SPRING 1/2"
4	2	10513	NUT - HEX JAM
5	2	14500	SCREW - HEX HEAD CAP 1/2-13 X 2-1/2
6	2	14817	WHEEL, 4 X 1-1/4
7	12	15669	SCREW – HEX HEAD CAP 1/4-20 X 2-1/2
8	2	16365	KNOB ASSY
9	1	30947	SQUEEGEE WELDMENT 28
10	2	30950	RETAINER - FRONT 28 INCH
11	2	16876	NUT - HEX FLANGE 3/8-16
12	1	30951	RETAINER WELDMENT 28 IN.
13	1	30948	FRONT BLADE 28
14	1	30949	SQUEEGEE BLADE REAR 28 IN.



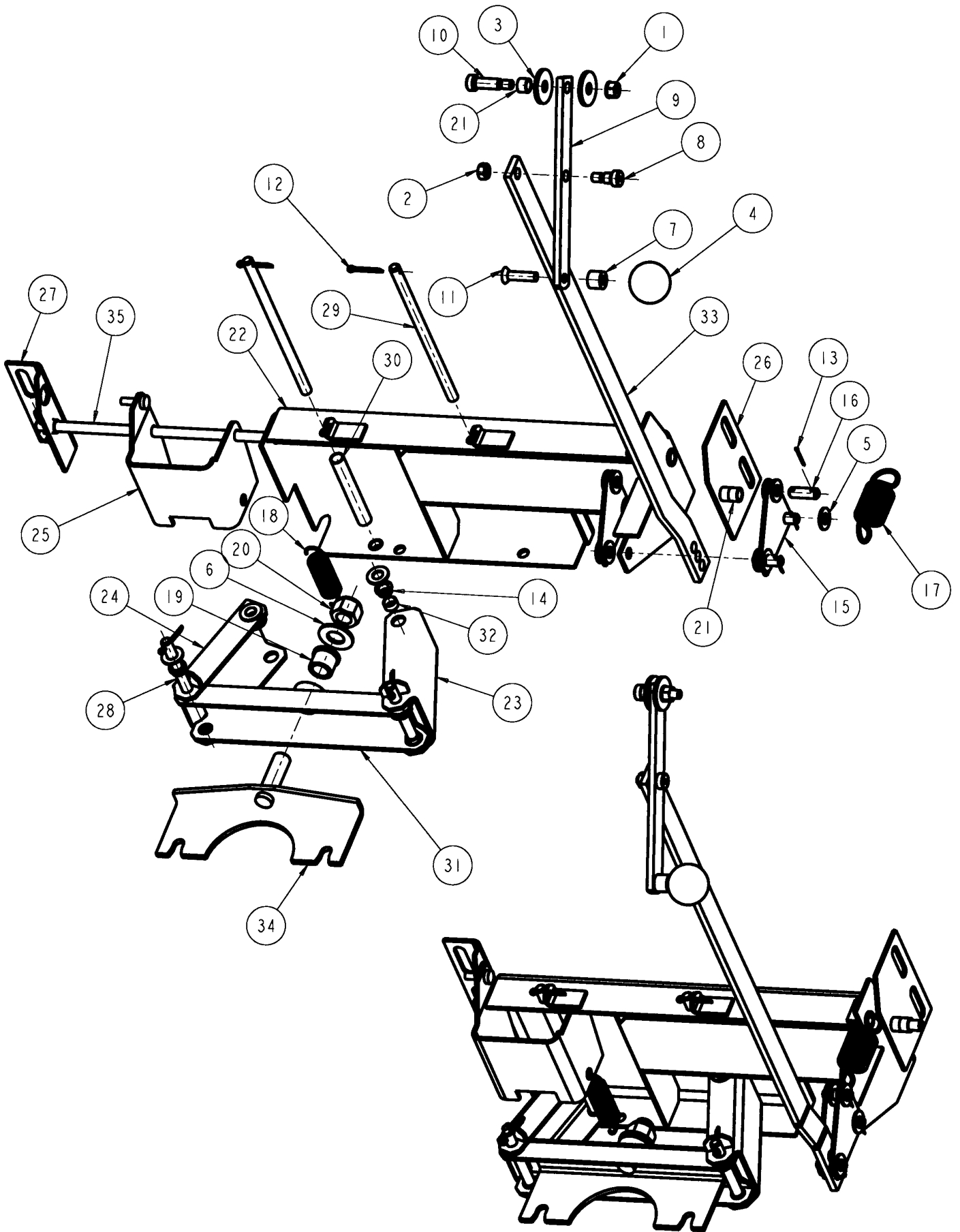
#99332 SQUEEGEE ASSEMBLY – PARTS LIST

(Ref. Drawing 31281)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	12	01019	NUT - WING 1/4-20
2	2	05025	NUT - HEX JAM
3	4	07723	WASHER – SPRING 1/2"
4	2	10513	NUT - HEX JAM
5	2	14500	SCREW - HEX HEAD CAP 1/2-13 X 2-1/2
6	2	14817	WHEEL, 4 X 1-1/4
7	12	15669	SCREW - HEX HEAD CAP 1/4-20 X 2-1/2
8	2	16365	KNOB ASSY
9	2	16876	NUT-HEX FLANGE 3/8-16
10	1	31273	SQUEEGEE WELDMENT 32 IN.
11	1	31274	SQUEEGEE, 32 IN. FRONT
12	1	31275	SQUEEGEE, 32 IN. REAR
13	2	31276	RETAINER STRIP, FRONT
14	1	31277	RETAINER WELDMENT 32 IN.



SQUEEGEE PIVOT FRAME ASSEMBLY – EXPLODED VIEW



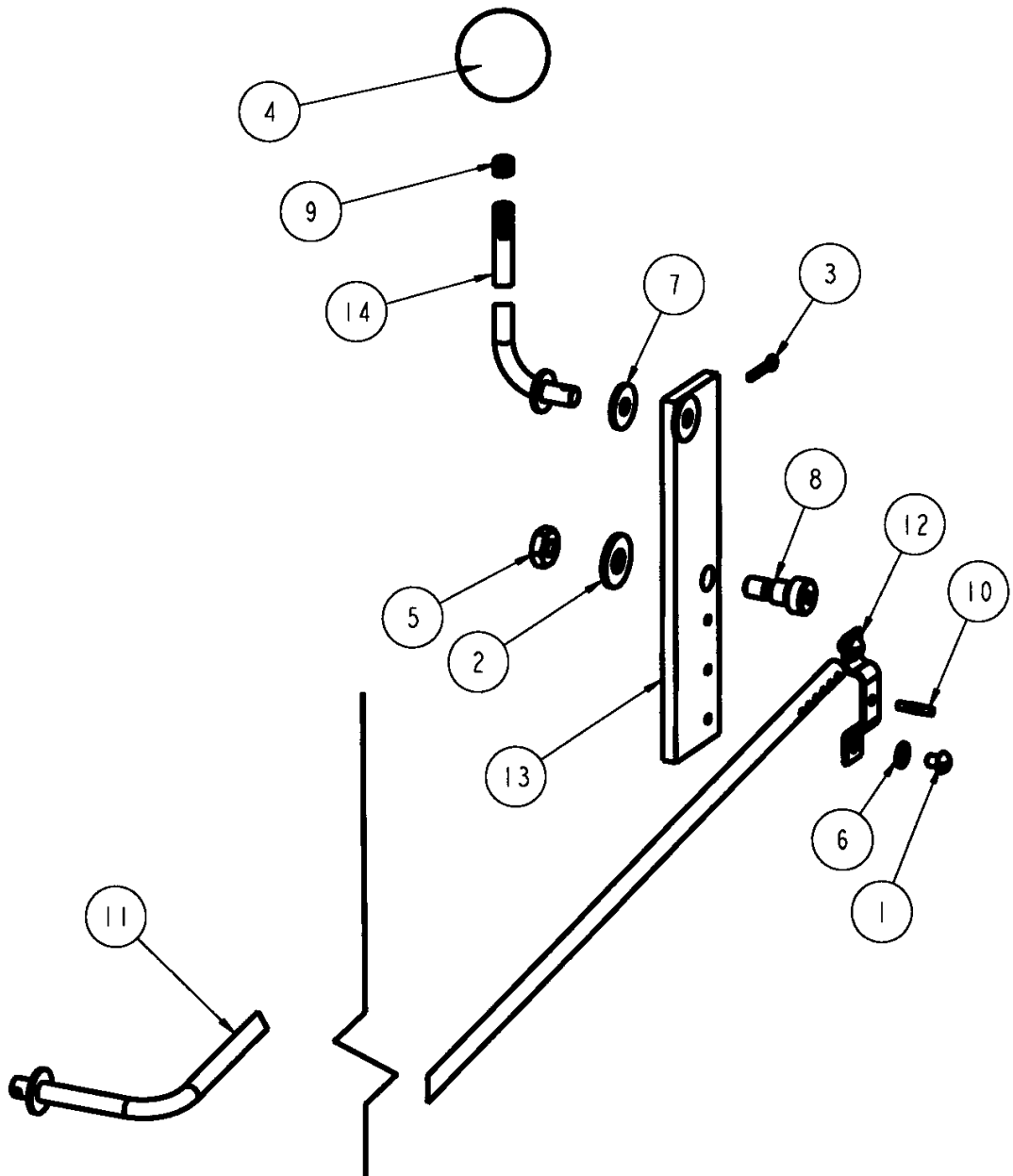
SQUEEGEE PIVOT FRAME PARTS LIST
(Ref. Drawing 31184)

ITEM	QTY	PART #	DESCRIPTION
1	1	00067	NUT - LOCK 5/16-18
2	1	01589	NUT - FINISHED HEX 5/16-18
3	2	03321	WASHER - PLAIN .391
4	1	03418	KNOB, HANDLE
5	18	03736	WASHER - PLAIN 3/8
6	1	03931	WASHER - PLAIN 5/8
7	1	15666	SPACER, SQUEEGEE LIFT
8	1	15677	SCREW-SOCKET HD SHOULDER 3/8D x 3/8
9	1	15684	LEVER, SQUEEGEE LIFT
10	1	15869	SCREW - SOCKET HD SHOULDER 3/8D x 1.00
11	1	16069	SCREW - FLAT HEAD SOCKET CAP
12	5	16254	COTTER PIN 1/8 x 1.00
13	6	16255	COTTER PIN 1/16 x 3/4
14	10	16347	BEARING
15	2	16354	ROCKER
16	3	16361	PIN
17	1	16367	SPRING - EXTENSION
18	1	16464	SPRING - EXTENSION
19	1	16687	GROMMET
20	1	16689	NUT - HEX LOCK (NYLON INSERT) 5/8-18
21	3	16796	SPACER
22	1	16844	PIVOT FRAME WELDMENT
23	1	16850	R.H. ARM WELDMENT
24	1	16851	L.H. ARM WELDMENT
25	1	16852	CATCH WELDMENT
26	1	16855	BRACKET - RIGHT HAND
27	1	16856	L.H. BRACKET WELDMENT
28	2	16858	PIN, PIVOT
29	2	16859	PIN, PIVOT
30	1	16861	SPACER
31	1	16863	PIVOT BRACKET WELDMENT
32	1	16869	SPACER
33	1	16915	SQUEEGEE LINK
34	1	17287	PIVOT FRAME WELDMENT
35	1	31187	PIN, PIVOT

SOLUTION CONTROL ASSEMBLY PARTS LIST

(Ref. Drawing 31180)

ITEM	QTY	PART #	DESCRIPTION
1	2	01858	SCREW - SLOTTED ROUND HEAD MACHINE #10-24 x 1/4
2	1	02568	WASHER-PLAIN 5/16
3	1	03395	PIN, COTTER
4	1	03418	KNOB, HANDLE
5	1	05282	NUT - HEAVY HEX JAM 5/16-18
6	2	11007	WASHER - LOCK (//T) *10
7	2	14142	WASHER - PLAIN .265
8	1	15677	SCREW - SOCKET HD SHOULDER 3/8D x 3/8
9	1	15737	SCREW, SET 5/16-18 UNC X .25
10	1	15738	PIN, GROOVE, TYPE 5
11	1	16801	ROD, VALVE S/A
12	1	16804	KEEPER, ROD VALVE
13	1	16805	ROCKER PLATE
14	1	31222	ROD, KNOB S/A

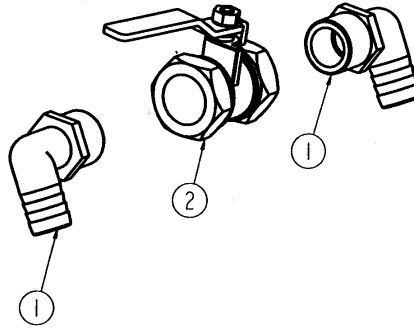


DRAIN VALVE AND SOLUTION VALVE ASSEMBLIES – PARTS LISTS

(Ref. Drawings 31074 & 31075)

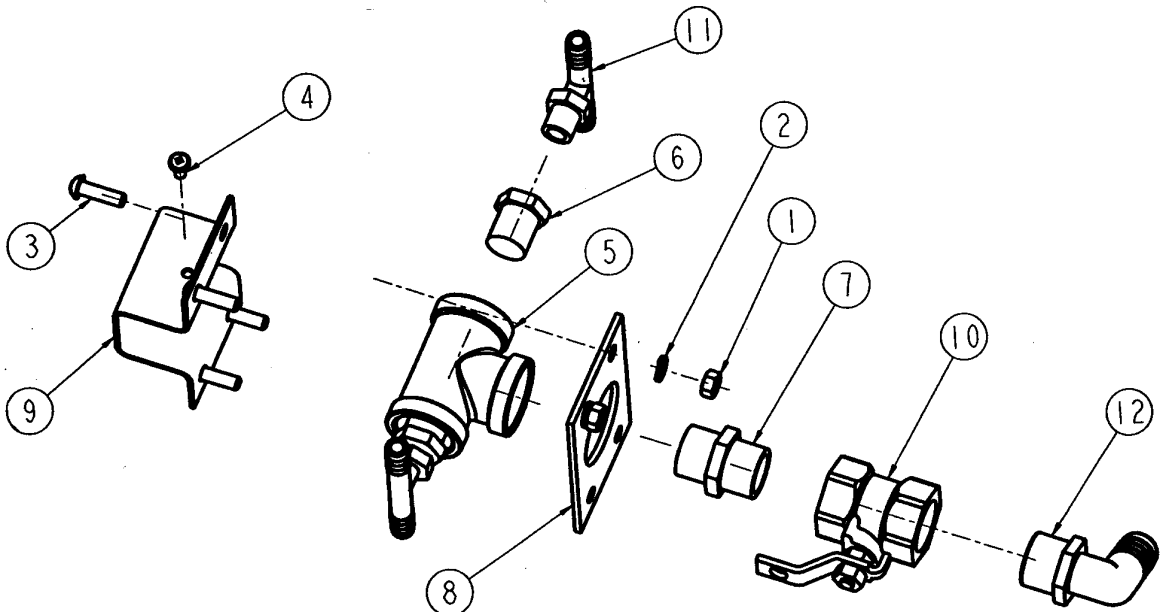
DRAIN VALVE ASSEMBLY

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	16680	FITTING, BARBED ELBOW
2	1	16681	VALVE, DRAIN

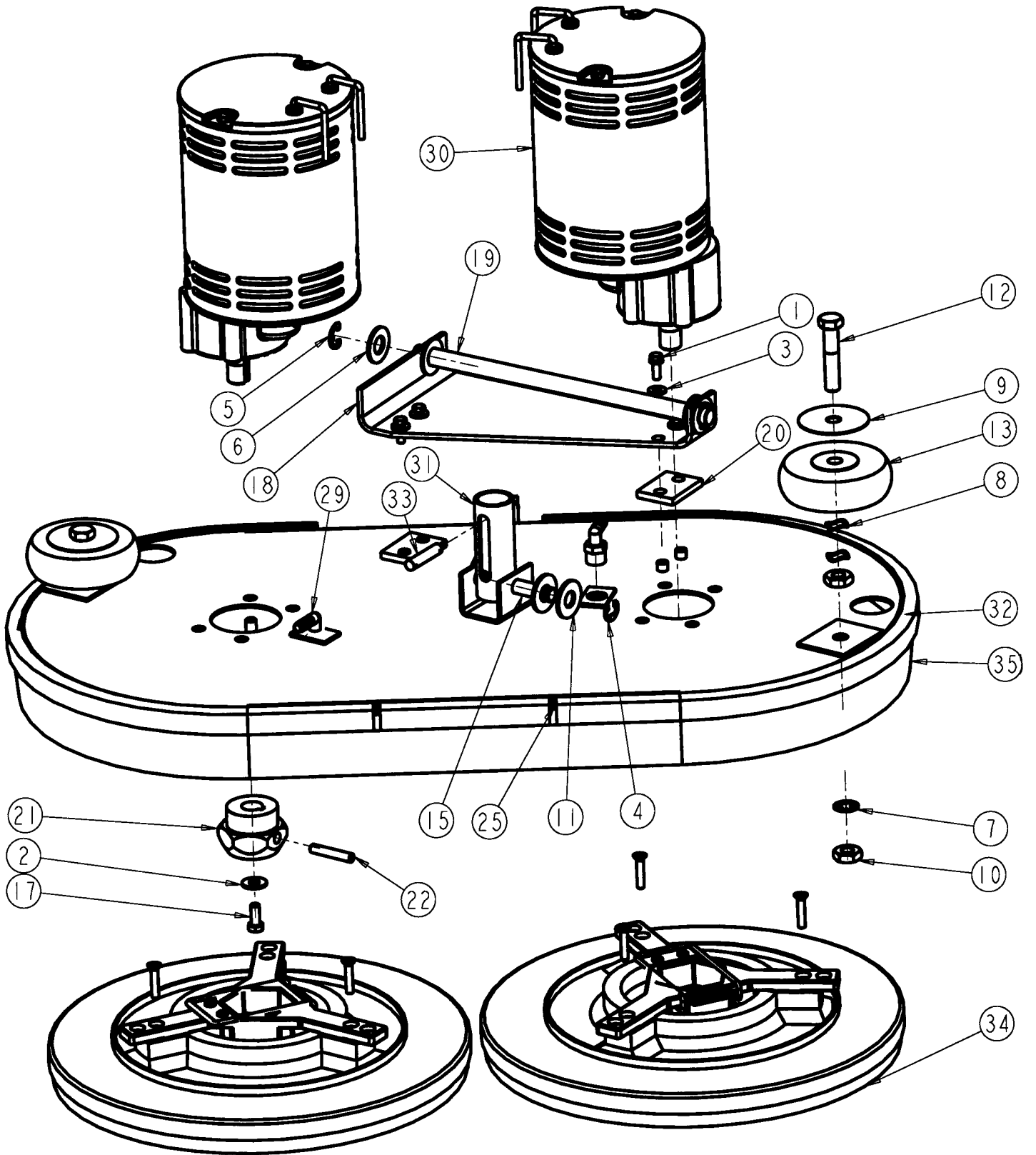


SOLUTION VALVE ASSEMBLY

ITEM	QTY	PART #	DESCRIPTION
1	2	01497	NUT - FINISHED HEX 1/4-20
2	4	01514	LOCK WASHER 1/4"
3	4	02053	SCREW - PHILLIPS ROUND HEAD MACHINE 1/4-20 X 1/8
4	1	03261	SCREW, TCT PANHEAD, #10-32 X 3/8
5	1	11323	PIPE TEE
6	2	13491	3/8 - 16 UNC GRADE5
7	1	15721	NIPPLE, 3/4 PLASTIC
8	1	15770	FLAT, MOUNTING
9	1	15771	CLAMP
10	1	16070	VALVE, SOLUTION
11	2	16446	FITTING, BARB, MINI TEE
12	1	16680	FITTING, BARBED ELBOW

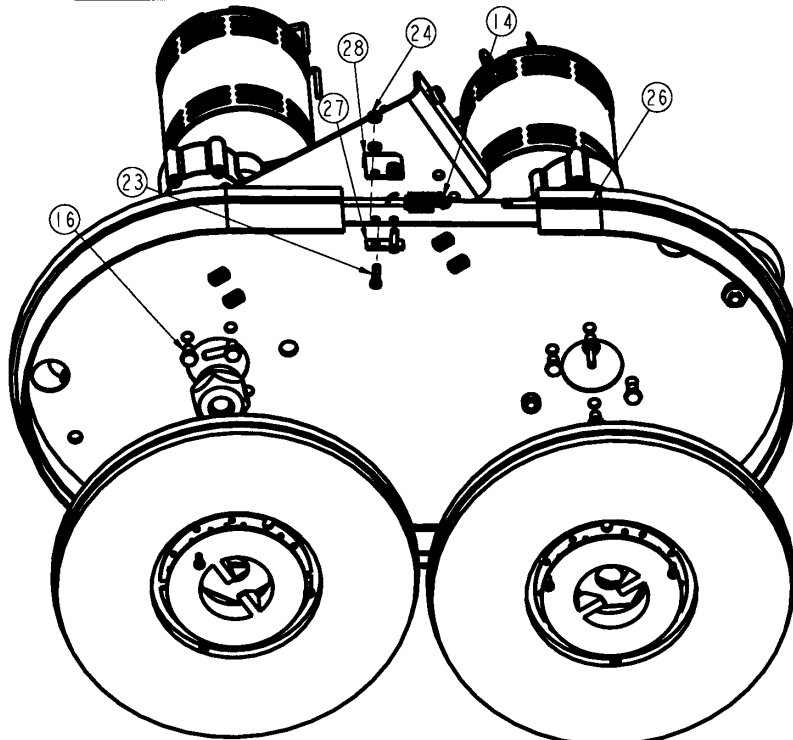


#99328 BRUSH MOTOR ASSEMBLY – EXPLODED VIEW (Ref. drawing 30877)

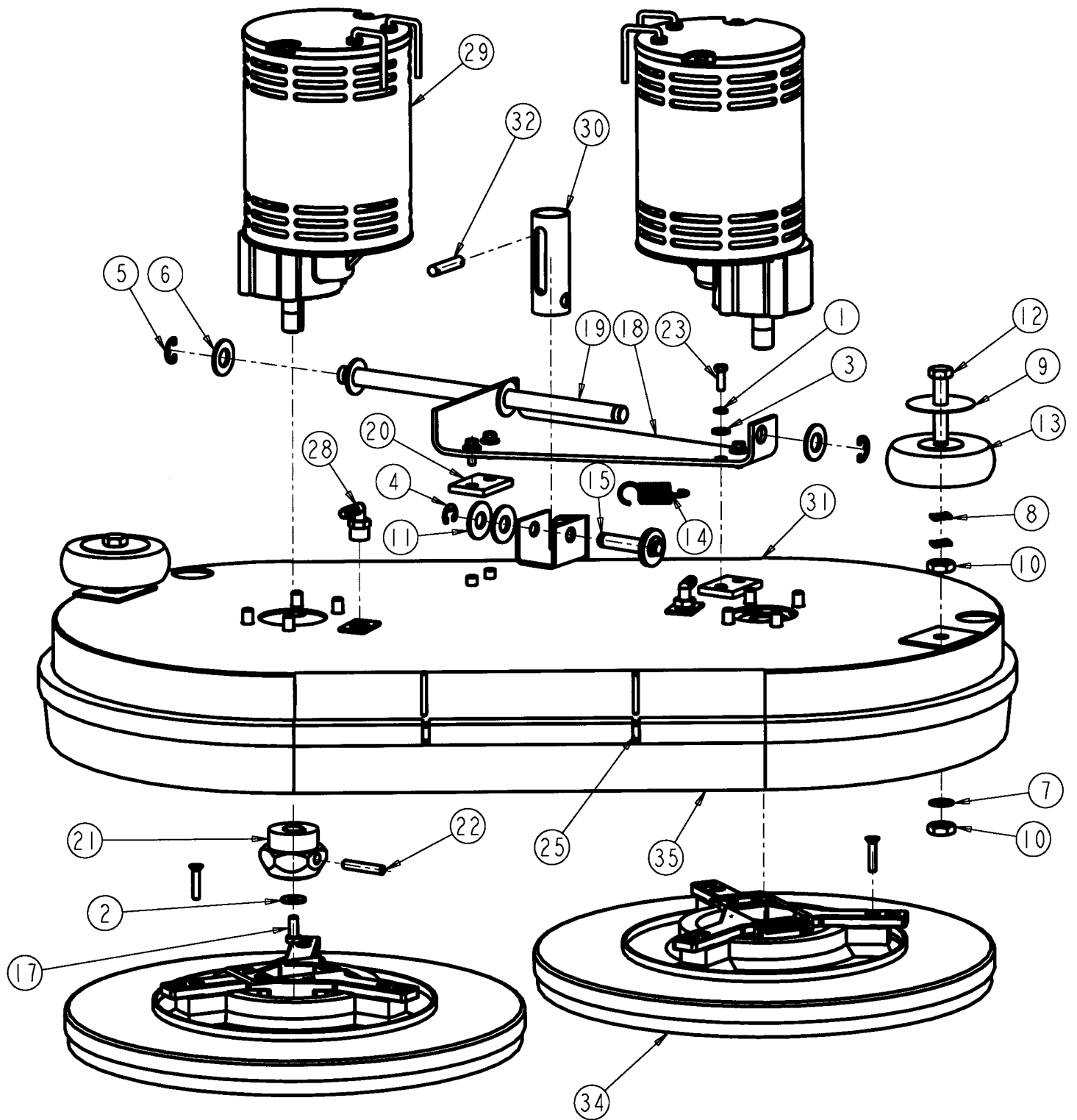


#99328 BRUSH MOTOR ASSEMBLY PARTS LIST
(Ref. drawing 30877)

ITEM	QTY	PART #	DESCRIPTION
1	6	01574	LOCK WASHER 1/4"
2	2	02568	WASHER-PLAIN 5/16"
3	4	03218	WASHER-PLAIN 1/4"
4	2	03470	RING-RETAINING EXT. "E" 1/2" (HEAVY DUTY)
5	2	03472	RING, RETAINING, 5/8"
6	4	03931	WASHER-PLAIN 5/8"
7	2	06387	LOCK-WAHER
8	4	07723	WASHER-SPRING 1/2'
9	2	10436	COVER, RUB WHEEL
10	4	10513	NUT-HEX JAM
11	4	12957	WASHER-PLAIN 1/2"
12	2	14500	SCREW-HEX HEAD CAP 1/2-13 X 2-1/2
13	2	14817	WHEEL, 4 X 1-1/4
14	1	16472	SPRING - EXTENSION
15	1	16558	PIN, ACTUATOR TUBE
16	8	16671	SCREW-HEX HEAD CAP 3/8-16 X 5/8
17	2	16672	SCREW-HEX HEAD CAP 5/16-18 X 3/4
18	1	16727	BRACKET
19	1	16734	SHAFT, GROOVED
20	2	16736	ABSORBER BLOCK
21	2	16737	3/8-16 UNC GRADE5
22	2	17093	SET SCREW 5/16-18 X 1-3/4" LG.
23	6	17160	SCREW-HEX HEAD CAP 1/4-20 X 3/4
24	2	17508	NUT-FINISHED HEX 1/4-20
25	2	17733	KEEPER
26	1	17736	STRAP-BUMPER
27	1	17751	FLAT W/2 HOLES
28	1	11752	RESTRAINER
29	2	18486	FITTING, PLASTIC ELBOW
30	2	18564	MOTOR-3/4 HP. 36 VDC. 200 RPM
31	1	30757	ACTUATOR TUBE
32	1	30792	28 INCH BRUSH COVER
33	1	31092	PIN-BRUSH SHAFT
34	2	99152	PAD HOLDER. ASSEMBLY
35	1	31284_F	BUMPER

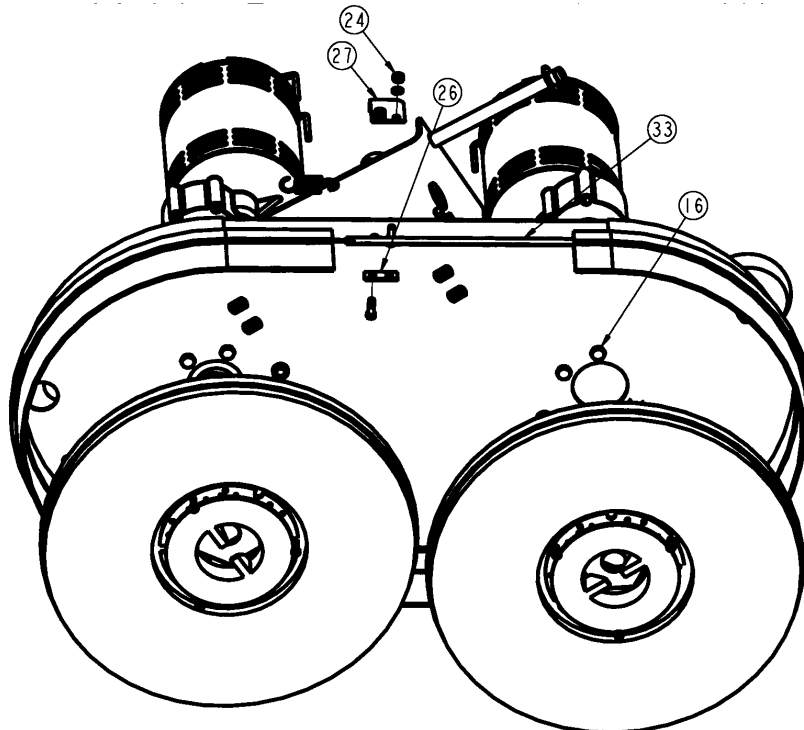


#99332 BRUSH MOTOR ASSEMBLY – EXPLODED VIEW
(Ref drawing 30913)



#99332 BRUSH MOTOR ASSEMBLY PARTS LIST
(Ref. Drawing 30913)

ITEM	QTY	PART #	DESCRIPTION
1	6	01574	LOCK WASHER 1/4"
2	2	02568	WASHER - PLAIN 5/16
3	4	03218	WASHER - PLAIN 1/4
4	2	03470	RING - RETAINING EXT. "E" 1/2" (HEAVY DUTY)
5	2	03472	RING, RETAINING. 5/8
6	4	03931	WASHER - PLAIN 5/8
7	2	06387	LOCK - WASHER
8	4	07723	WASHER - SPRING 1/2"
9	2	10436	COVER, RUB WHEEL
10	4	10513	NUT - HEX JAM
11	4	12957	WASHER - PLAIN 1/2
12	2	14500	SCREW - HEX HEAD CAP 1/2-13 X 2-1/2
13	2	14817	WHEEL. 4 X 1-1/4
14	1	16412	SPRING - EXTENSION
15	1	16558	PIN, ACTUATOR TUBE
16	8	16671	SCREW - HEX HEAD CAP 3/8-16 X 5/8
17	2	16672	SCREW - HEX HEAD CAP 5/16-18 X 3/4
18	1	16727	BRACKET
19	1	16734	SHAFT, GROOVED
20	2	16736	ABSORBER BLOCK
21	2	16737	3/8-16 UNC GRADE 5
22	2	17093	SET SCREW 5/16-18 X 1-3/4' LG.
23	6	17160	SCREW - HEX HEAD CAP 1/4-20 X 3/4
24	2	17508	NUT - FINISHED HEX 1/4-20
25	2	17733	KEEPER
26	1	17751	FLAT W/2 HOLES
27	1	17752	RESTRAINER
28	2	18486	FITTING, PLASTIC ELBOW
29	2	18564	MOTOR - 3/4 HP, 36 VDC. 200 RPM
30	1	30757	ACTUATOR TUBE
31	1	30783	32 BRUSH COVER WELDMENT
32	1	31092	PIN - BRUSH SHAFT
33	1	31286	STRAP - BUMPER
34	2	98566	PAD HOLDER, ASSEMBLY
35	1	31285_F	BUMPER



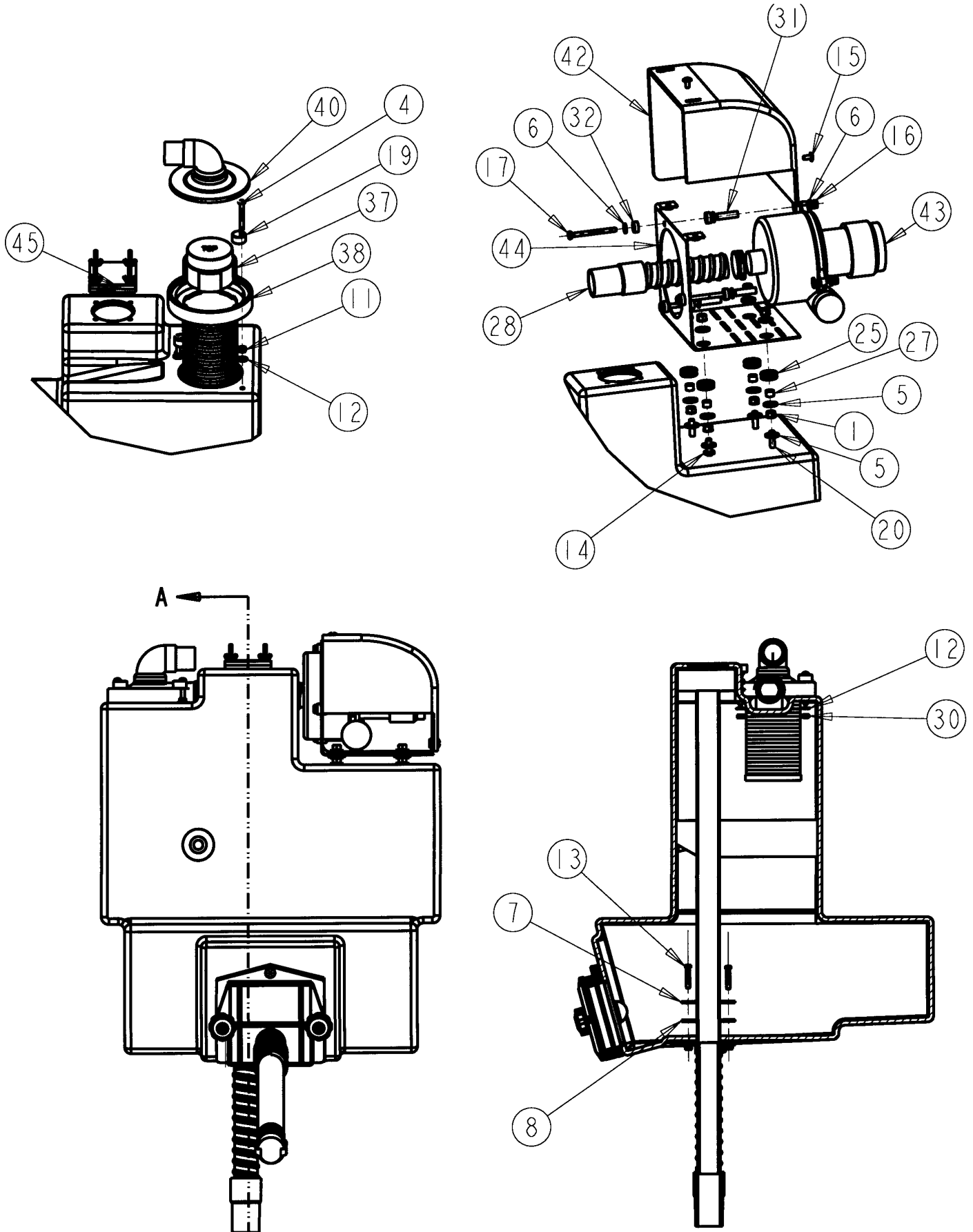
RECOVERY (VACUUM) TANK ASSEMBLY PARTS LIST

(Ref. Drawing 30868)

ITEM	QTY	PART #	DESCRIPTION
1	8	00067	NUT - LOCK 5/16-18
2	4	01497	NUT - FINISHED HEX 1/4-20
3	4	01574	LOCK WASHER 1/4"
4	2	01979	SCREW-PHILLIPS ROUND HEAD MACHINE 1/4-20 X 2.00
5	12	02568	WASHER - PLAIN 5/16
6	12	03218	WASHER - PLAIN 1/4
7	1	03397	FLANGE, STAND PIPE
8	2	03419	GASKET, STAND PIPE
9	2	03493	NUT, THUMB 5/16-18
10	2	05282	NUT - HEAVY HEX JAM 5/16-18
11	2	07533	NUT - HEX LOCK 1/4-20
12	4	07741	WASHER - SEALING 1/4
13	4	07744	SCREW - HEX HEAD MACHINE 1/4-20 X 1-5/16
14	4	10260	WASHER - SEALING
15	3	10353	SCREW - SLOTTED TRUSS HEAD MACHINE 1/4-20 X 1/2
16	3	13854	LOCK NUT, 1/4-20
17	3	15181	SCREW - HEX HEAD CAP 1/4-20 X 3.00
18	1	15535	TANK DRAIN PLATE
19	2	15776	RETAINING KNOB
20	4	16031	SCREW - HEX HEAD CAP 5/16-18 X 1-1/2
21	1	16089	STOPPER, RETAINED
22	3	16091	CLAMP
23	1	16620	HOSE W/BELLOWS SECTION
24	1	16621	DRAIN BACKING PLATE
25	4	16678	GROMMET
26	1	16784	STAND-PIPE ASSEMBLY
27	4	16796	SPACER
28	1	16874	HOSE I 1/2" x 9" VINYL BLACK
29	2	17093	SET SCREW 5/16-18 X 1-3/4' LG.
30	2	17508	NUT - FINISHED HEX 1/4-20
31	3	17608	SPACER, VAC MOTOR
32	6	17610	WASHER - ISOLATOR
33	1	17646	GASKET, DRAIN PLATE
34	1	17647	GASKET, BACKING PLATE
35	1	17700	FLAT HEAD CAP SCREW 5/16-18 X 5/8" LG.
36	1	18563	DRAIN HOSE, NOZZEL
37	1	18771	FLOAT
38	1	18772	FLOAT CAGE
39	1	18832	HOSE I 1/2" x 12" VINYL GREY
40	1	18965	ASSEMBLY, FLOAT COVER
41	1	19127	TANK RECOVERY 24"-28"
42	1	30776	COVER, MOTOR
43	1	31073	MOTOR, VAC. 36VDC
44	1	31183	WELDMENT, MOTOR MOUNT
45	1	31230	COVER ASS'Y

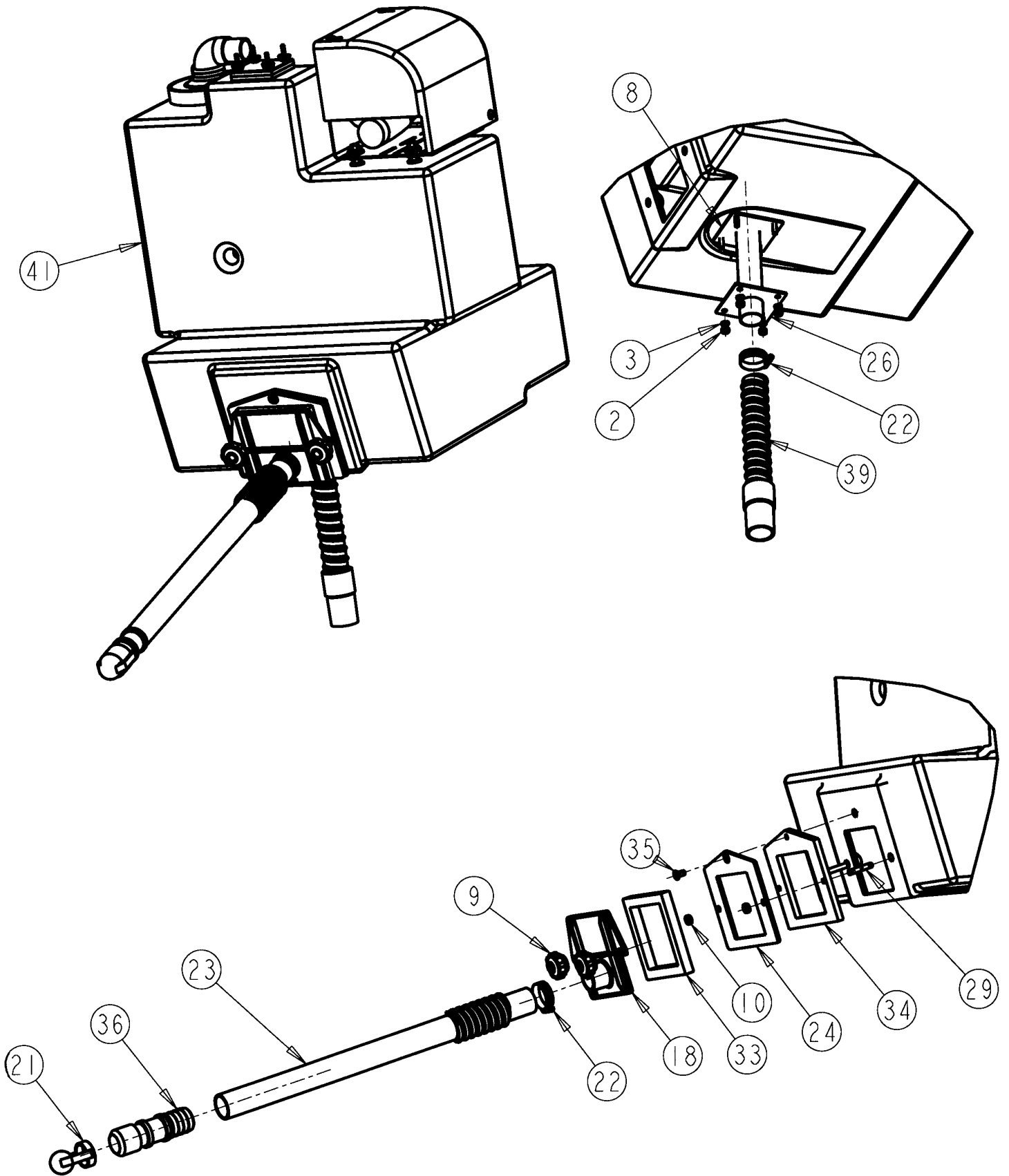
RECOVERY (VACUUM) TANK DIAGRAM 1

(Ref. Drawing 30868)



RECOVERY (VACUUM) TANK DIAGRAM 2

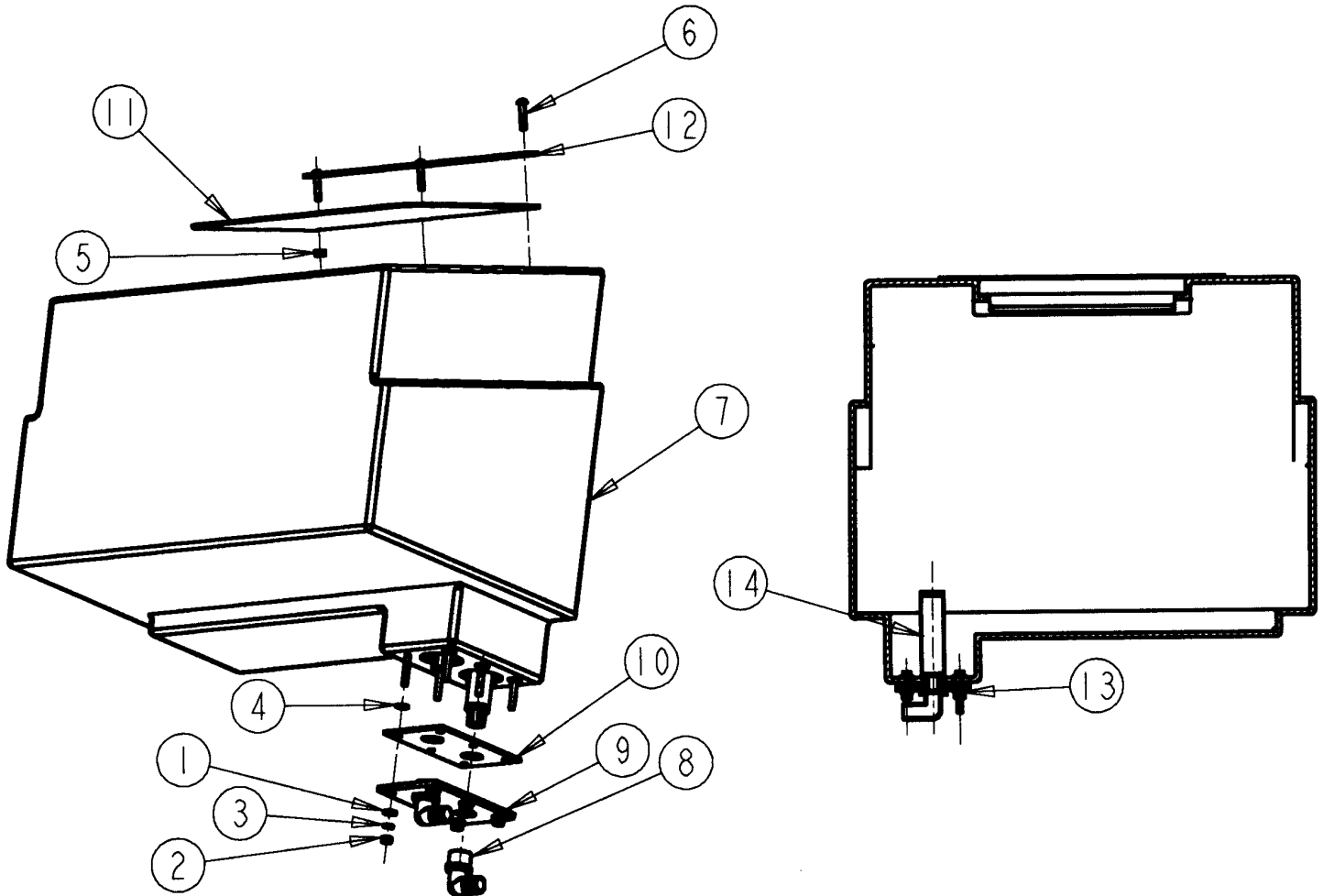
(Ref. Drawing 30868)



SOLUTION TANK ASSEMBLY

(Ref. Drawing 30867)

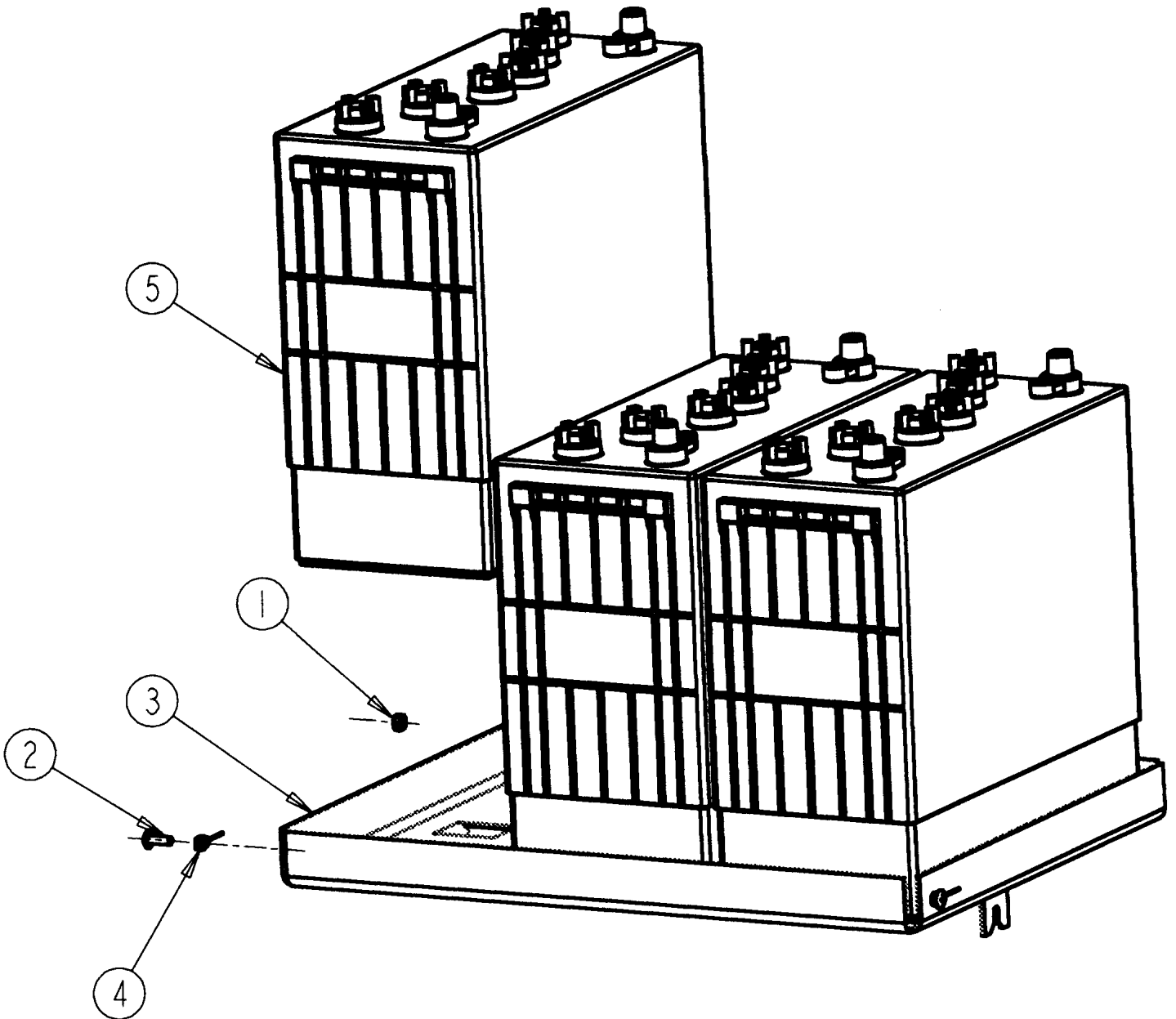
ITEM	QTY	PART #	DESCRIPTION
1	6	00851	WASHER - PLAIN 1/4"
2	6	01497	NUT - FINISHED HEX 1/4-20
3	6	01574	LOCK WASHER 1/4"
4	2	07741	WASHER - SEALING 1/4
5	3	13854	LOCK NUT, 1/4-20
6	3	15461	SCREW - SLOTTED ROUND HEAD MACHINE 1/4-20 x 1-1/4
7	1	16679	SOLUTION TANK, 25 GAL.
8	2	16680	FITTING, BARBED ELBOW
9	1	16798	MOUNTING PLATE
10	1	16799	GASKET
11	1	16800	COVER, SOLUTION TANK
12	1	16803	MOUNTING STRIP
13	6	18641	SCREW - HEX HEAD CAP 1/4-20 X 1-3/4
14	2	19096	FILTER - SOLUTION BLADDER PUMP



BATTERY ASSEMBLY PARTS LIST

(Ref. Drawing 30862)

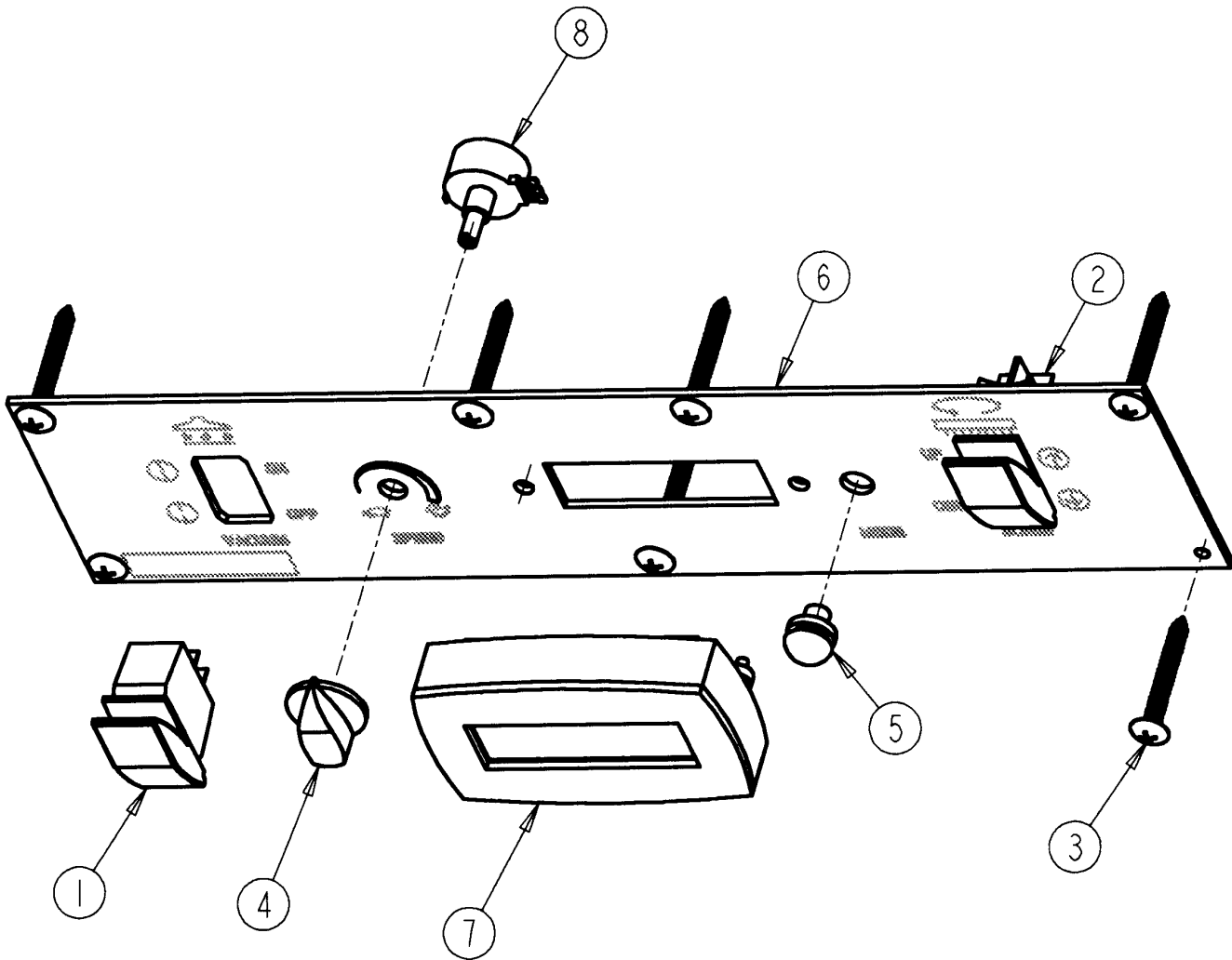
ITEM	QTY	PART #	DESCRIPTION
1	2	16129	NUT - HEX LOCK (KEPS) 1/4-20
2	2	16619	SCREW - PHILLIPS TRUSS HEAD MACHINE 1/4-20 X 3/4
3	1	16822	BATTERY TRAY - 3
4	2	18359	CAST
5	3	99512	BATTERY



CONTROL PANEL ASSEMBLY PARTS LIST

(Ref. Drawing 30863)

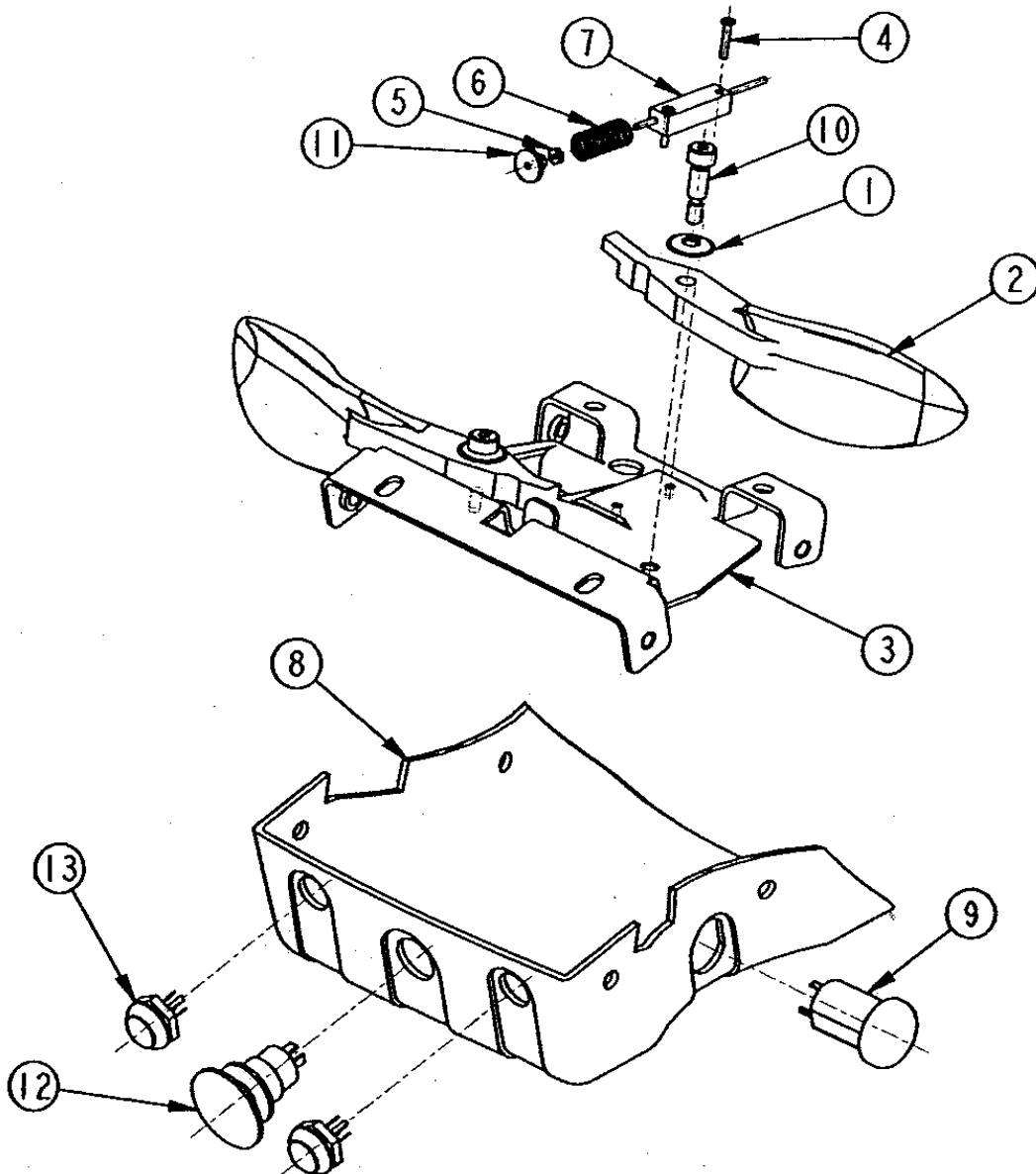
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	18030	SWITCH
2	1	18031	SWITCH
3	7	18253	SCREW-T.F. PAN HEAD *8-16 X 3/4"
4	1	18863	KNOB
5	1	30526	BUTTON-REV (MOMENTARY)
6	1	30977	CONTROL PANEL (L/R)
7	1	30978	SPEED CONTROLLER, DIGITAL
8	1	31076	SPEED



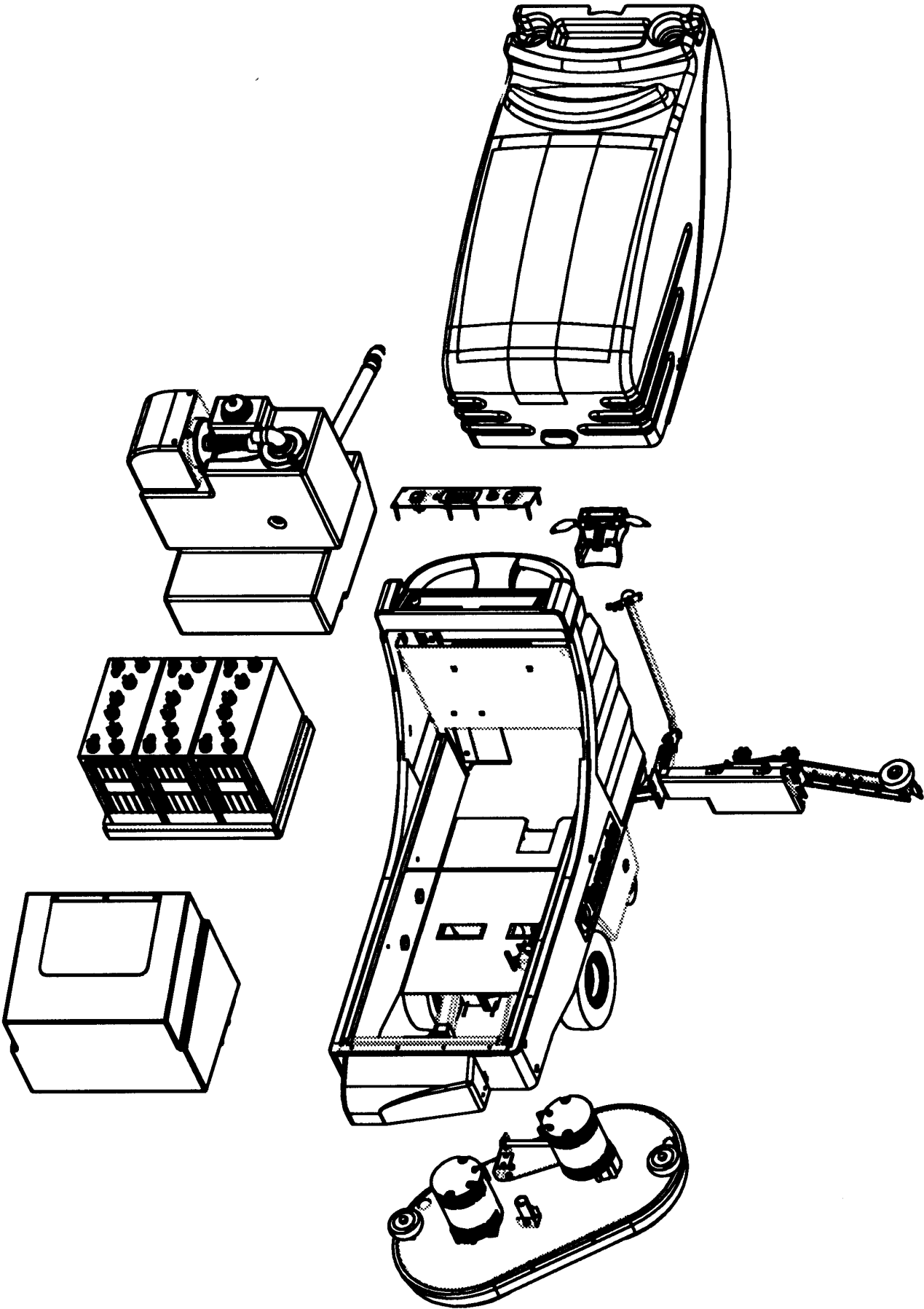
TRIGGER ASSEMBLY PARTS LIST

(Ref. Drawing 19968)

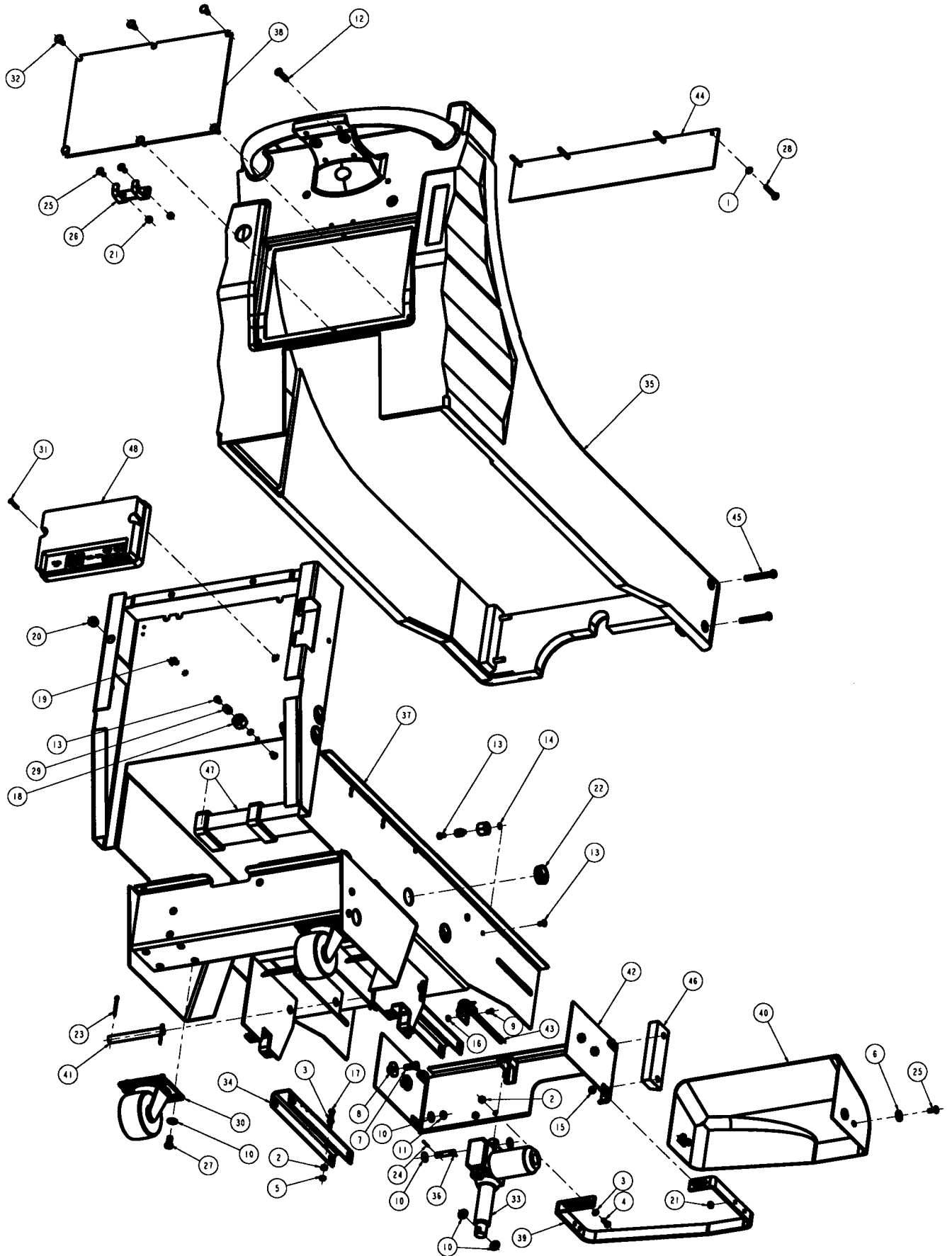
ITEM	QTY	PART #	DESCRIPTION
1	2	07741	WASHER – SEALING ¼"
2	2	19358	LEVER – HANDLE SWITCH
3	1	19593	BRACKET – POTENTIOMETER
4	2	19655	SCREW – PHILLIPS PAN HEAD MACHINE #2-56 X ½
5	1	19656	NUT – FINISHED HEX #2-56
6	1	19685	SPRING – COMPRESSION
7	1	19688	POTENTIOMETER – LINEAR 5K
8	1	19690	SADDLE COVER
9	1	19691	KEY SWITCH
10	2	19692	SCREW – SOCKET HEAD SHOULDER 1/4Dia x ½"
11	1	19920	CYLINDER – POTENTIOMETER
12	1	30496	PUSH BUTTON – STOP
13	2	30526	BUTTON - REV



MAIN VIEW "A" – MAJOR SUBASSEMBLIES



MAIN VIEW "B" – EXPLODED VIEW
(Ref. Drawing 31192)

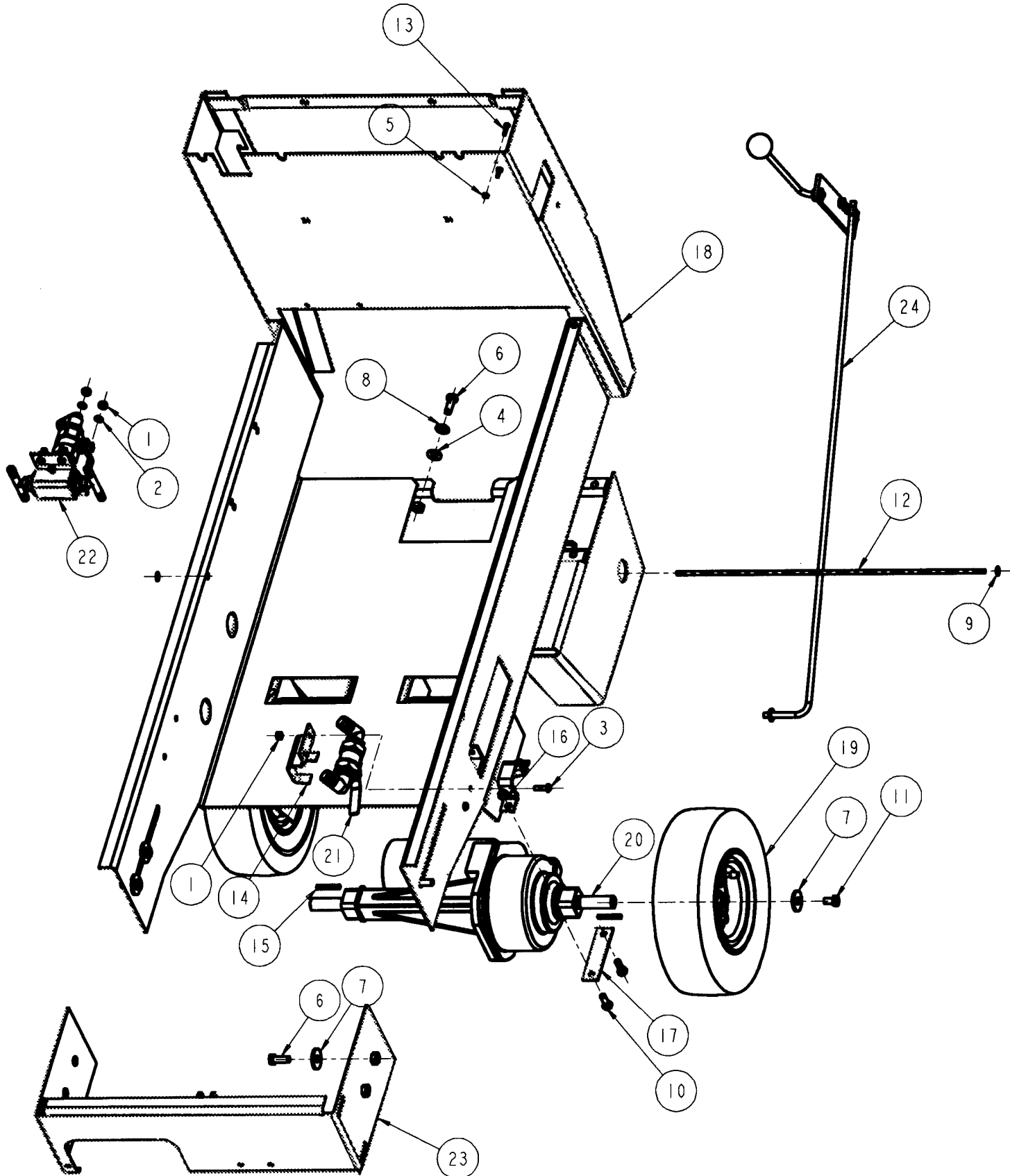


MAIN VIEW "B" PARTS LIST

(Ref. Drawing 31192)

ITEM	QTY	PART #	DESCRIPTION
1	4	00696	WASHER - PLAIN #10
2	3	01497	NUT - FINISHED HEX 1/4-20
3	4	01574	LOCK WASHER 1/4"
4	3	02053	SCREW - PHILLIPS ROUND HEAD MACHINE 1/4-20 X 7/8
5	1	02217	NUT - HEX JAM LOCK (NYLON INSERT) 1/4-20
6	4	02568	WASHER - PLAIN 5/16
7	4	03320	SCREW - HEX HEAD CAP 3/8-16 X 1.000
8	4	03321	WASHER - PLAIN .391
9	2	03660	SCREW - PHILLIPS PAN HEAD MACHINE #10-24 X 7/16
10	16	03736	WASHER - PLAIN 3/8
11	4	03868	NUT - HEX JAM LOCK (NYLON INSERT) 3/8-16
12	2	03944	SCREW - FLAT CAP 5/16-18 x 1-1/2
13	8	04442	SCREW - PHILLIPS PAN HEAD MACHINE 1/4-20 X 1/2
14	4	07870	WASHER - LOCK (I/T) 1/4"
15	1	10694	NUT - HEX JAM
16	2	10894	NUT - HEX LOCK (P/T)
17	1	13909	SCREW - HEX HEAD CAP 1/4-20 X 3-1/2
18	4	15345	BUSHING, INSULATOR
19	2	15642	NUT - RETAINER #8-32
20	1	16068	BUSHING, SNAP
21	6	16129	NUT - HEX LOCK (KEPS) 1/4-20
22	4	16219	BUSHING - SNAP
23	4	16253	COTTER PIN 1/8 x 1-1/2
24	2	16255	COTTER PIN 1/16 x 3/4
25	6	16619	SCREW - PHILLIPS TRUSS HEAD MACHINE 1/4-20 X 3/4
26	1	17273	BRACKET - DRAIN HOSE (RETAINING)
27	8	17575	SCREW - HEX HEAD CAP 3/8-16 X 3/4
28	4	18253	SCREW - T.F. PAN HEAD *8-16 X 3/4'
29	4	18712	STANDOFF, 1/4-20 (M/F)
30	2	18773	CASTER
31	2	18897	SCREW - PHILLIPS FLAT HEAD MACHINE #8-32 X 1-1/4
32	6	19329	PIN, RETAINING
33	1	30762	ACTUATOR, AO-I/MC
34	2	30766	ARM, BRUSH
35	1	30768	BOTTOM COVER ROTO
36	1	30771	PIN, ACTUATOR
37	11	30778	FRAME WELDMENT
38	11	30788	PANEL, ELECTRICAL ACCESS
39	1	30924	BRACKET, BRUSH MOTOR
40	1	30954	COVER, BRUSH MOTOR
41	2	31019	PIN, BRUSH
42	1	31085	WELDMENT - FRONT BRACKET
43	1	31098	SWITCH, ANGLE MTG LEVER
44	1	31125	COVER, SPLASH GUARD
45	4	31127	SCREW - HEX HEAD CAP 3/8-16 X 2-3/4
46	2	31197	SPACER BLOCK
47	1	31227	BLOCK W/GASKET ASSEMBLY
48	1	30988-7	SPEED CONTROLLER

MAIN VIEW "C" – EXPLODED VIEW
(Ref. Drawing 31179)



MAIN VIEW "C" PARTS LIST

(Ref. Drawing 31179)

ITEM	QTY	PART #	DESCRIPTION
1	4	01497	NUT - FINISHED HEX 1/4-20
2	4	01574	LOCK WASHER 1/4"
3	2	02053	SCREW - PHILLIPS ROUND HEAD MACHINE 1/4-20 X 7/8
4	3	02568	WASHER - PLAIN 5/16
5	2	02958	3/8-16 UNC GRADES
6	7	03320	SCREW - HEX HEAD CAP 3/8-16 X 1.000
7	6	03321	WASHER - PLAIN .391
8	3	03736	WASHER - PLAIN 3/8
9	2	15365	FASTENER - ROD
10	4	16654	SCREW - HEX HEAD CAP 5/16-18 X 7/8
11	2	16671	SCREW - HEX HEAD CAP 3/8-16 X 5/8
12	1	16824	ROD
13	2	16924	SCREW - PHIL. PAN HD. #6-32 X 3/4"
14	1	17290	CLAMP
15	2	18499	KEY, 3/16 SQUARE X 1.5
16	4	19513	NUT - HEX LOCK (NYLON INSERT) 5/16-18
17	2	30765	BRACKET, TRANSAXLE
18	1	30778	FRAME WELDMENT
19	2	30797	WHEEL, 11-1/2" DIA.
20	1	30848	TRANSAXLE L/R
21	1	31074	ASSEMBLY, DRAIN VALVE
22	1	31075	ASSEMBLY, SOLUTION VALVE
23	1	31085	WELDMENT - FRONT BRACKET
24	1	31180	SOLUTION CONTROL SYSTEM

COVER ASSEMBLY PARTS LIST

(Ref. Drawing 31186)

ITEM	QTY	PART #	DESCRIPTION
1	2	00600	SCREW – SLOTTED ROUND HEAD MACHINE #8-32 X ¾
2	2	02956	NUT – HEX LOCK (KEPS) #8-32
3	8	04735	SCREW – PHILLIPS TRUSS HEAD MACHINE #10-24 X ¾
4	8	10892	NUT – HEX LOCK
5	1	15640	WARNING LIGHT
6	4	19945	SCREW – PHILLIPS TRUSS HEAD MACHINE ¼-20 X 5/8"
7	1	30767	COVER, TOP
8	1	30774	HINGE 21" LONG
9	1	30775	PLATE, HINGE
10	1	31082	TOP-COVER BRACKET

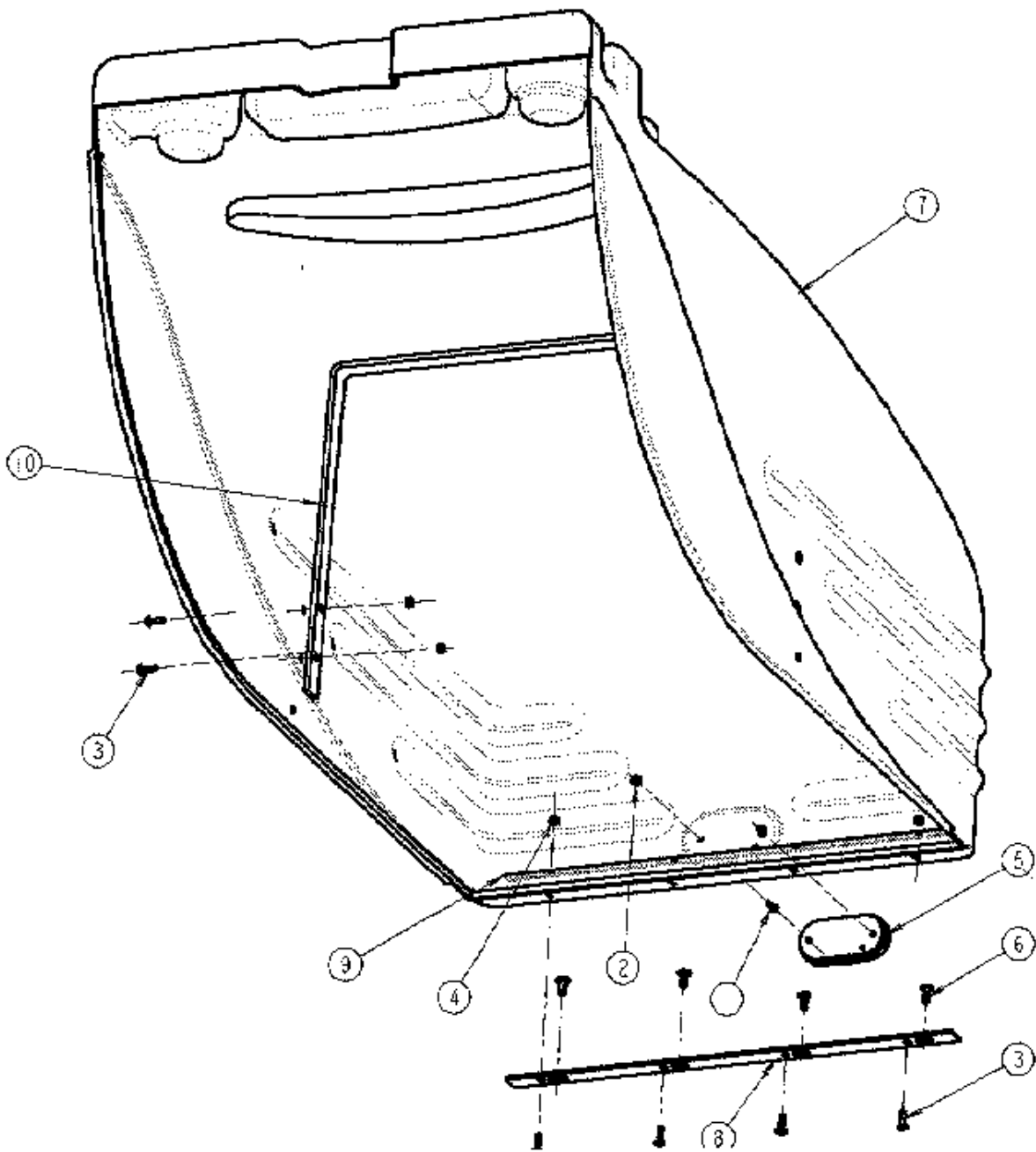


TABLE A

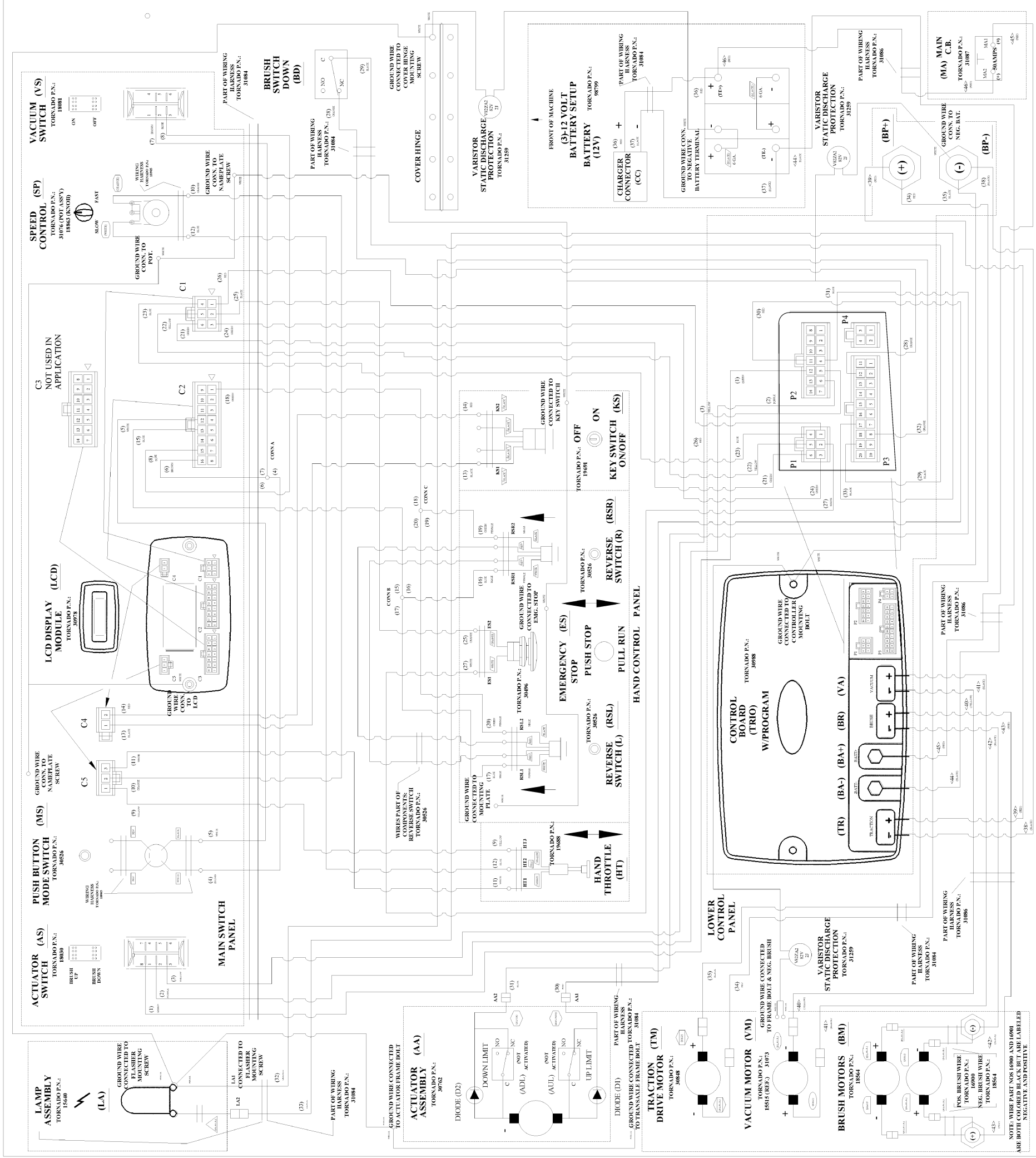
WIRE NOS	AWG	TYPE	COLOR	FROM	TO
1	18	UL1569	GREEN	AS1	PP12(TEO)
2	18	UL1569	PURPLE	AS2	PP26(TEO)
3	18	UL1569	YELLOW	AS3	PP25(TEO)
4	18	UL1569	BROWN	MS1	CONN A
5	18	UL1569	WHITE	MS2	C2P12(LCD)
6	18	UL1569	BROWN	CONN A	C2P16(LCD)
7	18	UL1569	BROWN	CONN A	VS2
8	18	UL1569	BLUE	VS3	C2P15(LCD)
9	18	UL1569	YELLOW	CSP1(LCD)	HT3
10	18	UL1569	ORANGE	CSP2(LCD)	SP2
11	18	UL1569	WHITE	CSP3(LCD)	HT1
12	18	UL1569	BLUE	HT2	SP1
13	18	UL1569	BLACK	C2P14(LCD)	KS1
14	18	UL1569	RED	C2P2(LCD)	KS2
15	18	UL1569	BLUE	C2P13(TEO)	CONN B
16	18	UL1569	BLUE	RSR1	CONN B
17	18	UL1569	BLUE	CONN B	RS1
18	18	UL1569	GREEN	C2P1(LCD)	CONN C
19	18	UL1569	GREEN	CONN C	RS2
20	18	UL1569	GREEN	CONN C	RS1,2
21	18	UL1569	GREEN	C1P4(LCD)	PP16(TEO)
22	18	UL1569	YELLOW	C1P5(LCD)	PP15(TEO)
23	18	UL1569	BLUE	C1P4(LCD)	PP14(TEO)
24	18	UL1569	GREEN	C1P3(LCD)	PP13(TEO)
25	18	UL1569	BLACK	C1P2(LCD)	ES2
26	18	UL1569	RED	C1P1(LCD)	PI1(TEO)
27	18	UL1569	WHITE	ES1	PI2(TEO)
28	18	UL1569	ORANGE	BDNC	PI2(TEO)
29	18	UL1569	BLACK	BDC	PP19(TEO)
30	18	UL1569	RED	PP11(TEO)	AA1
31	18	UL1569	BLUE	PP10(TEO)	AA2
32	18	UL1569	ORANGE	PP18(TEO)	LA1
33	18	UL1569	BLACK	PP17(TEO)	LA2
34	10	UL1015	RED	BP+	TM+
35	10	UL1015	BLACK	BP-	TM-
36	10	UL1015	RED	CC+	TE+
37	10	UL1015	BLACK	CC-	TE-
38	10	UL1015	BLACK	TR-(TRIO)	BP-
39	10	UL1015	RED	TR+(TRIO)	BP+
40	14	UL1569	YELLOW	VA-(TEO)	VM-
41	14	UL1569	BLACK	VA+(TRIO)	VM+
42	10	UL1015	BLACK	BR-(TRIO)	BM-
43	10	UL1015	RED	BR+(TRIO)	BM+
44	10	UL1015	BLACK	BA-(TRIO)	TE-
45	10	UL1015	RED	BA+	MA1
46	10	UL1015	RED	MA2	TE+

TABLE B

POT 2K OHM RESISTOR TORNADO P.N.: 18881	(COLOR)	POT 2K OHM RESISTOR TORNADO P.N.: 18881	(COLOR)
VACUUM MOTOR TORNADO P.N.: 16090	(COLOR)	POS. RSR SWITCH TORNADO P.N.: 30626	(COLOR)
BRUSH MOTOR TORNADO P.N.: 16544	(COLOR)	E-STOP TORNADO P.N.: 30496	(COLOR)
TRACTION DRIVE MOTOR TORNADO P.N.: 16090	(COLOR)	KEY SWITCH TORNADO P.N.: 16091	(COLOR)
ACTUATOR TORNADO P.N.: 30762	(COLOR)	MODE BUTTON TORNADO P.N.: 30626	(COLOR)
LAMP ASSEMBLY TORNADO P.N.: 16440	(COLOR)	BRUSH EXT. WIRE NEGATIVE TORNADO P.N.: 30001	(COLOR)
BATTERY CONNECTIONS	(COLOR)	BRUSH EXT. WIRE POSITIVE TORNADO P.N.: 30000	(COLOR)

GROUNDING HARNESS (ESD)

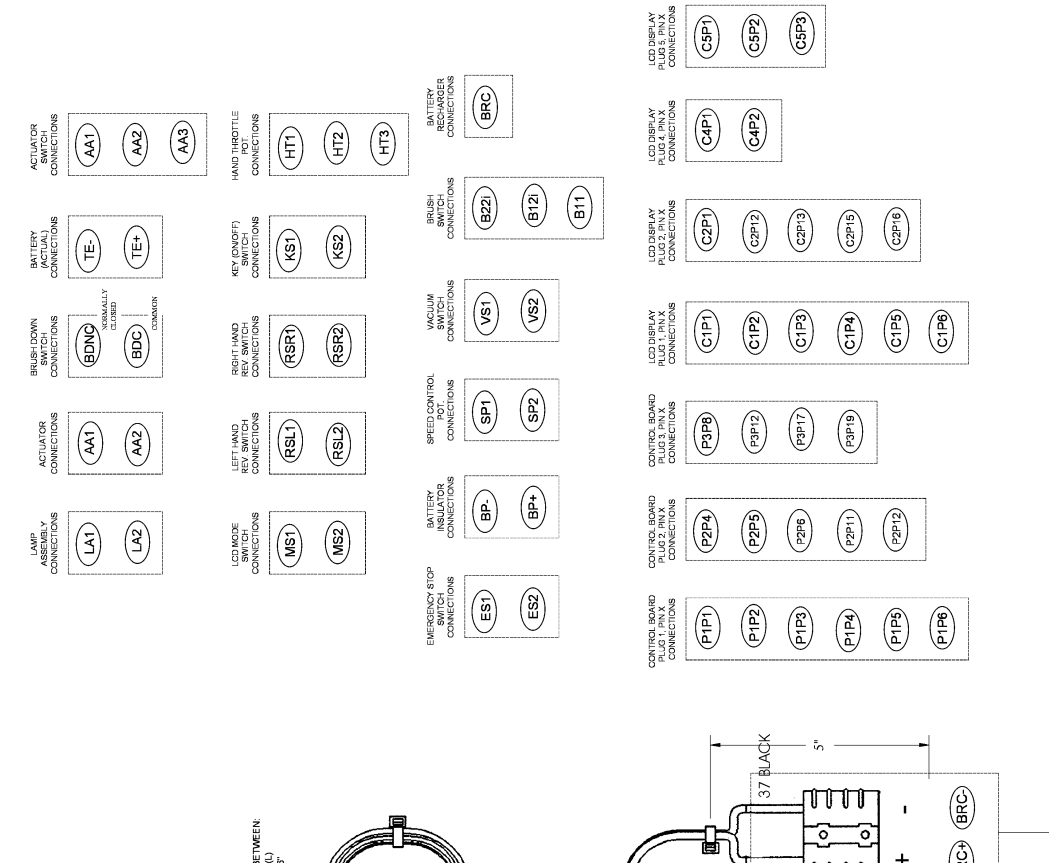
PART NUMBER FOR GROUNDING HARNESS: 31324



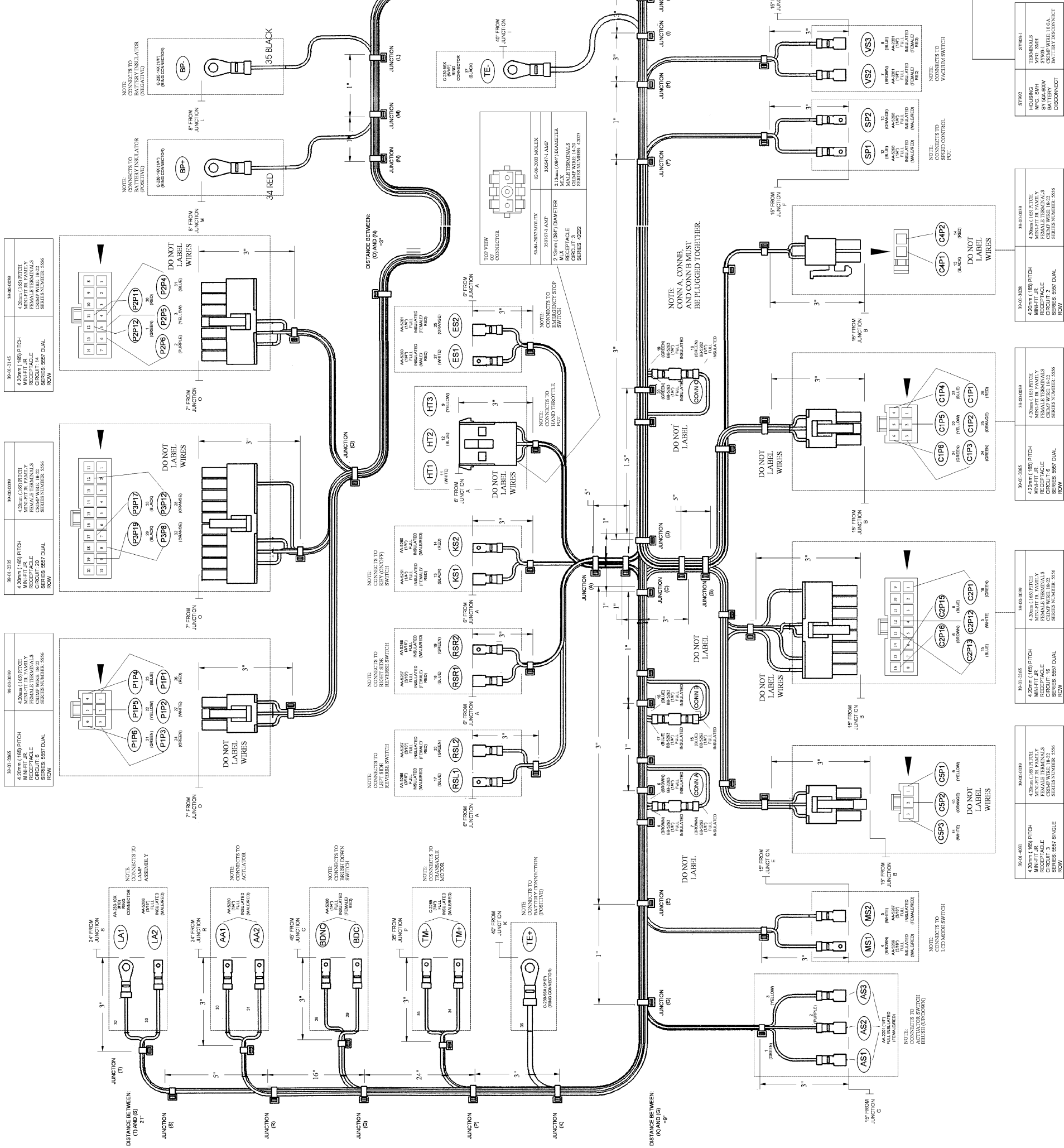
WIRING DIAGRAM
(Ref. Drawing 31072)

NOTE: WIRE NOS 16090 AND 16091 ARE BOTH COLORED BLACK BUT ARE LABELED NEGATIVE AND POSITIVE.

NO.	GAGETYPE	COLOR	LENGTH	FROM		TO	
				PIN NO.	TERMINATION	PIN NO.	TERMINATION
1	18	UL1007 GREEN	50"	AS1	P2P12(TRIO)	30-00-0039	
2	18	UL1007 PURPLE	50"	AS2	P2P12(TRIO)	30-00-0039	
3	18	UL1007 YELLOW	50"	AS3	P2P12(TRIO)	30-00-0039	
4	18	UL1007 BROWN	50"	MS1	CONN A	BB-5763	
5	18	UL1007 WHITE	45"	MS2	C2P12(LCD)	BB-5763	
6	18	UL1007 BROWN	26"	CONN A	C2P12(LCD)	30-00-0039	
7	18	UL1007 BROWN	26"	CONN A	VS1	30-00-0039	
8	18	UL1007 BLUE	44"	C2P12(LCD)	VS2	02-08-2003	
9	18	UL1007 YELLOW	35"	C2P12(LCD)	VS3	AA-5260	
10	18	UL1007 ORANGE	42"	C2P12(LCD)	VS4	AA-5260	
11	18	UL1007 WHITE	35"	C2P12(LCD)	VS5	AA-5260	
12	18	UL1007 BLUE	30"	HT1	HT1	02-08-2003	
13	18	UL1007 BLACK	35"	HT2	HT2	AA-5260	
14	18	UL1007 RED	35"	C2P12(LCD)	KS1	AA-5260	
15	18	UL1007 BLUE	24"	C2P12(LCD)	KS2	AA-5260	
16	18	UL1007 BLUE	15"	CONN B	CONN B	BB-5262	
17	18	UL1007 BLUE	15"	CONN B	RS1	AA-5266	
18	18	UL1007 GREEN	25.5"	C2P12(LCD)	CONN C	AA-5262	
19	18	UL1007 GREEN	14.5"	CONN C	RS2	AA-5267	
20	18	UL1007 GREEN	14.5"	CONN C	RS2	AA-5267	
21	18	UL1007 GREEN	62"	C1P4(LCD)	PIP4(TRIO)	39-00-0039	
22	18	UL1007 YELLOW	62"	C1P4(LCD)	PIP5(TRIO)	39-00-0039	
23	18	UL1007 BLUE	62"	C1P4(LCD)	PIP6(TRIO)	39-00-0039	
24	18	UL1007 GREEN	62"	C1P4(LCD)	PIP7(TRIO)	39-00-0039	
25	18	UL1007 ORANGE	35"	C1P2(LCD)	ES1	AA-5260	
26	18	UL1007 RED	50"	ES1	ES1	39-00-0039	
27	18	UL1007 WHITE	125"	BDNC	BDNC	39-00-0039	
28	18	UL1007 BLACK	125"	BDC	BDC	39-00-0039	
29	18	UL1007 ORANGE	120"	P2P12(TRIO)	AA1	AA-5260	
30	18	UL1007 RED	120"	P2P12(TRIO)	AA2	AA-5260	
31	18	UL1007 BLUE	120"	P2P12(TRIO)	AA3	AA-5260	
32	18	UL1007 ORANGE	124"	P3P17(TRIO)	LA1	AA-233-10X	
33	18	UL1007 BLACK	124"	P3P17(TRIO)	LA2	AA-233-10X	
34	10	UL1015 RED	88"	BP+	BP+	C-230-1HX	
35	10	UL1015 BLACK	87"	BP-	BP-	C-230-1HX	
36	10	UL1015 RED	72"	BRC-	BRC-	TE+	
37	10	UL1015 BLACK	50"	BRC-	BRC-	TE-	

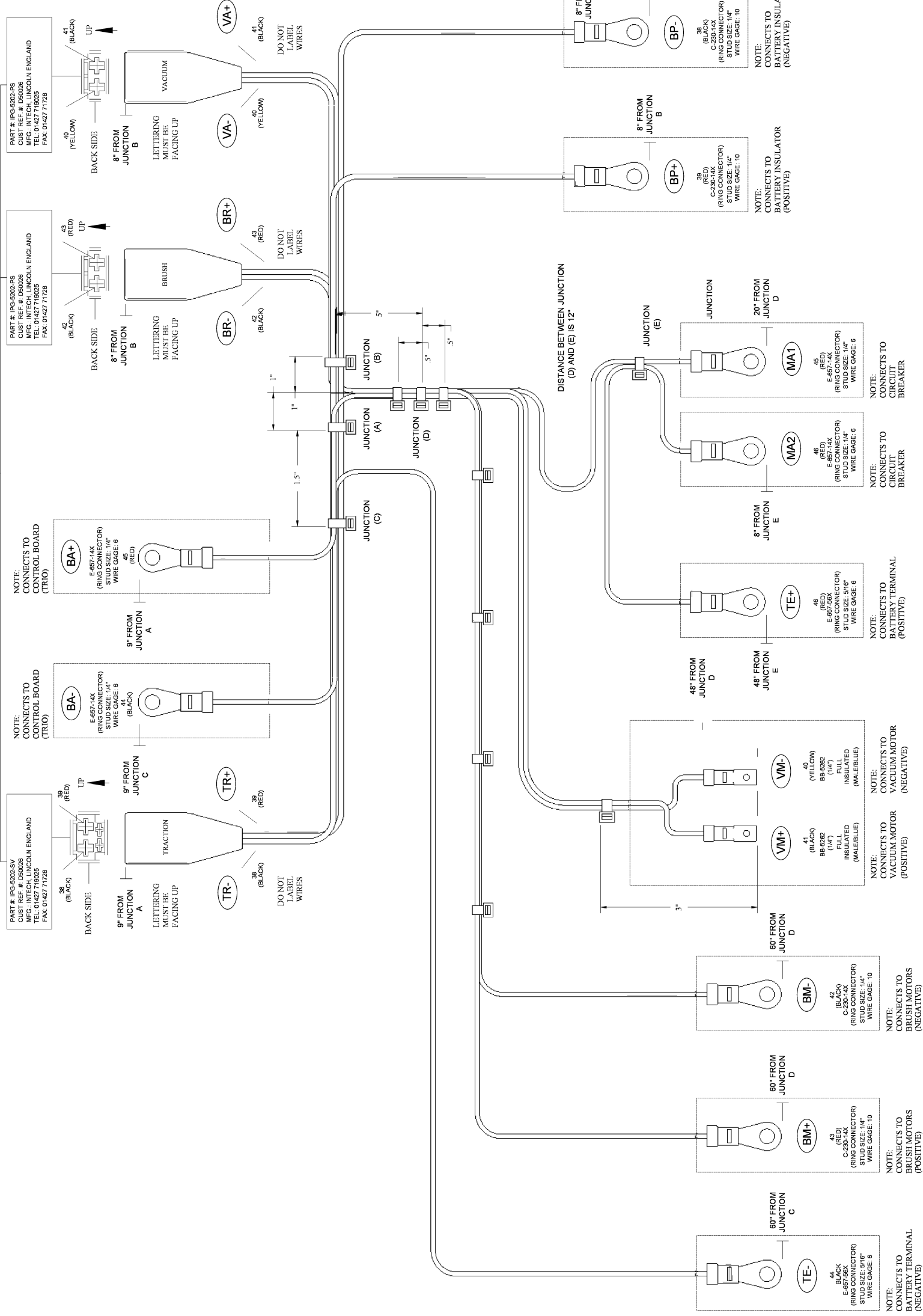


WIRING HARNESS CONTROL FUNCTIONS (Ref. Drawing 31084)



NO.	GAGETYPE	COLOR	LENGTH	FROM		TO	
				PIN NO.	TERMINATION	PIN NO.	TERMINATION
38	10	UL1015	BLACK	19"	TR-(TRIO)	BP-	C-230-1HX
39	10	UL1015	RED	19"	TR-(TRIO)	BP+	C-230-1HX
40	14	UL1569	YELLOW	62"	VA-(TRIO)	VM-	BB-5262
41	14	UL1569	BLACK	62"	VA-(TRIO)	VM+	BB-5262
42	10	UL1015	BLACK	74"	BR-(TRIO)	BM-	C-230-1HX
43	10	UL1015	RED	74"	BR-(TRIO)	BM+	C-230-1HX
44	6	UL1015	BLACK	69"	BA-(TRIO)	TE-	E-657-56X
45	6	UL1015	RED	35"	BA-(TRIO)	TE+	E-657-56X
46	6	UL1015	RED	56"	MA2	MA1	E-657-56X

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 1000 W. 15TH AVENUE
 DENVER, CO 80202
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 FAX: 1-317-978-9512



WIRING HARNESS POWER FUNCTIONS (Ref. Drawing 31086)