

Operation, Maintenance and Parts Manual

PHOENIX *Lite*

Combination Lane Machine

September 2008 / 61-900026-000

for the

110V Phoenix Lite Lane Machine 61-860333-110
220V Phoenix Lite Lane Machine 61-860333-220



Caution: Read this instruction manual before using the lane machine

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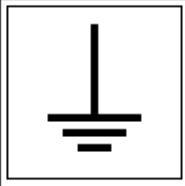

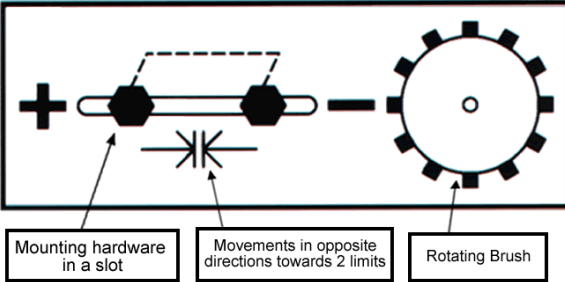
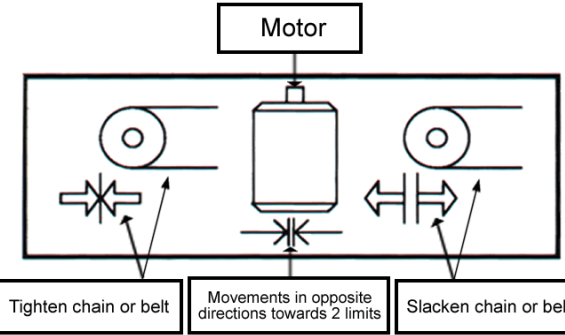
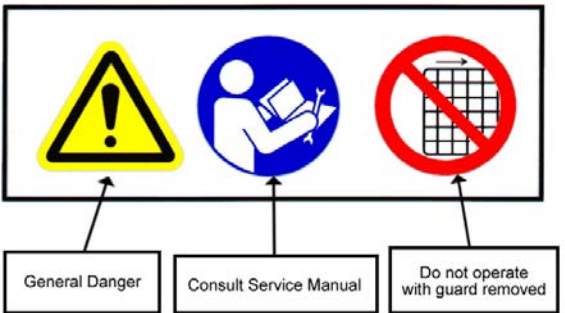
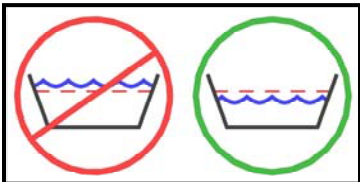
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Section 1
SAFETY INFORMATION

1.1 OVERVIEW OF LABEL SYMBOLS

This Guide contains information needed to properly operate and maintain the **Phoenix-Lite Combination Lane Machine**. If any terms, concepts, or operations contained in this Guide are not clear to you, consult an experienced professional or call the Brunswick Customer Response Center at 1-800-323-8141, 24 hours a day, 7 days a week. Below you will find the different safety labels that indicate potential hazards associated with various machine components as well as a brief description of the hazard. This section also contains a number of safety precautions that should be observed when operating and servicing the machine.

SINGLE ICON LABELS	DESCRIPTION
	Electric Shock Hazard/Electrocution Part Number 294-115-236
	Heat, Hot Surface, Burn Hazard Part Number 294-115-238
	Hand Crush/Force From Side Part Number 294-115-237
	Hand Entanglement Hazard (chain drive) Part Number 294-115-245
	Hand Entanglement Hazard (notched belt drive) Part Number 294-115-246
	Hand Crush Roller Pinch Point Part Number 252-002-151
	Hand Cut Fan Warning Part Number 294-115-666

	<p>Earth (Ground) Part Number 294-115-256</p>
	<p>Protected Earth (Ground, Main) Part Number A-1058</p>
<p>MULTIPLE ICON LABELS</p>	
 <p>Mounting hardware in a slot Movements in opposite directions towards 2 limits Rotating Brush</p>	<p>Buffer Adjustment Part Number 294-001-019</p>
 <p>Motor</p> <p>Tighten chain or belt Movements in opposite directions towards 2 limits Slacken chain or belt</p>	<p>Buffer or Drive Motor Belt Adjustment Part Number 294-001-018</p>
 <p>General Danger Consult Service Manual Do not operate with guard removed</p>	<p>Danger, Read Tech Manual, Do Not Operate with Guards Removed Part Number 294-009-005</p>
	<p>Do Not Overfill Part Number 294-115-667</p>



IMPORTANT SAFETY INFORMATION

WARNING! The following basic safety-related items must be followed in order to ensure the safe operation of your lane machine. Failure to follow these precautions could result in serious personal injury, damage to the lane machine, or both.

- Read this instruction manual before using this appliance.
- This machine is to be operated by authorized and adequately instructed personnel only. Prevent unauthorized use by turning off power, pressing the emergency stop switch and removing the key when the machine is not in use.
- Ensure the pinsetters for the lanes you are conditioning are turned off.
- The only authorized use of this machine is to clean and condition the surface of bowling lanes. DO NOT use for any other purpose.
- DO NOT use this machine to pick up hazardous dust such as the residue from resurfacing lanes.
- This lane machine is very heavy. Obtain the assistance of a second person when transferring the machine between the operating and storage positions. Exercise care to prevent the machine from tipping when moving the machine while it is in the upright position.
- ALWAYS operate the lane machine on a dedicated and grounded electrical circuit of the proper voltage.
- Inspect the power cord prior to each use. DO NOT operate this machine with a damaged power cord or plug.
- DO NOT allow the lane machine to run over the power cord.
- Unplug and inspect the power cord for damage if the machine runs over the power cord. Should the power cord become entangled in the machine, unplug the power cord from the bowling center's electrical receptacle before attempting to clear the power cord from the machine.
- DO NOT use any other extension cord in place of, or in addition to, the one provided. Replacement extension cords are available from Brunswick (see the Parts Section of this manual).
- Disconnect the power cord when cleaning, replacing parts, or performing maintenance.
- DO NOT operate the lane machine on a lane when someone is working on the lane or in the vicinity of the pinsetter.
- DO NOT operate the lane machine with a hood assembly open or removed except when required to make adjustments.



IMPORTANT SAFETY INFORMATION, cont.

- DO NOT use flammable or toxic materials in the lane machine. Use only cleaners and conditioners specifically formulated for use by the bowling industry.
- Avoid splashing liquid when filling the cleaner tank and oil tanks. Follow all instructions and precautions on the product label. In case of eye contact, flush with water for 15 minutes.
- DO NOT fill the oil tanks on or near the approach. Conditioner spilled on the approach presents a hazard to the bowler.
- Turn off the machine if foam or liquid comes out of the vacuum exhaust.
- Be aware of the possibility of the machine continuing onto the approach when it returns to the foul line. Stay out of the path of machine travel when the machine is approaching the foul line.
- DO NOT wear loose personal items such as neckties, necklaces, bolos, or long hair around rotating machinery.
- Keep hands away from solenoid linkages, gears, chains, and belts. These components can pose a severe pinching hazard.
- Exercise caution whenever the hood is open, removed, or when making adjustments. Some components may become hot during use.
- DO NOT modify the machine's wiring except as specified in Brunswick Bowling-supplied publications.
- DO NOT use, clean, or store the machine outdoors and/or in wet conditions.
- Use only brushes supplied with this appliance or those supplied by Brunswick for use in this machine.
- Ensure all of the machine's doors are closed and latched before placing the machine in the storage position.
- The possibility exists of a slipping hazard on any wet surface which could come about by operating, moving, or storing the lane machine.
- DO NOT modify any safety apparatus, shield, or electrical components except by a qualified technician for the sole purpose of adjusting and/or repair testing the machine. In completing this function all safety aspects must be restored prior to regular operation.
- When not in use, secure the machine to prevent it from falling over and from other unintentional movement.
- During operation, pay attention to other persons in the area, especially children.

Section 2

INTRODUCTION

The Phoenix-Lite Lane Machine, shown in Figure 2-1, is a versatile, total lane care machine that performs three operations: cleaning, conditioning (oiling), and standalone buffing. The cleaning operation removes dirt and oil from the lane. This can be performed alone or in combination with conditioning. The conditioning operation buffs an oil pattern onto the lane. The standalone buffing operation buffs oil that is already on the buffer brush onto the lane and redistributes the oil already on the lane. The buffing operation is automatically activated with the conditioning operation, but it can be performed alone.

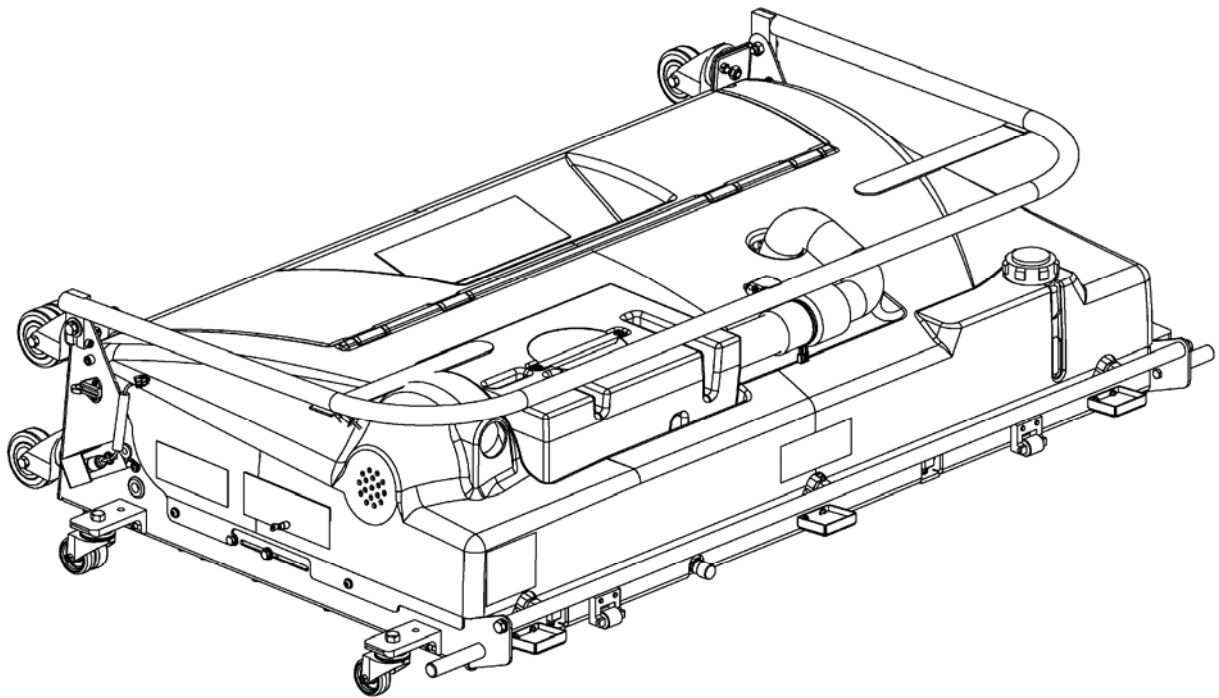


Figure 2-1

The cleaning operation wets the lane by spraying a cleaning solution through three spray heads. The factory-set flow rate and the spraying pattern give gutter-to-gutter coverage without getting overspray into the gutters. To boost the effectiveness of the cleaning solution, it is applied more heavily down the middle of the lane, where the oil is usually heaviest, and it is mixed into the oil by an agitator foam. The residue is then picked up by the machine's floating vacuum head. The floating action allows the vacuum head to conform to changes in the lane surface. The cleaning operation is performed only as the machine travels from the approach to the pin deck during the first pass of either a single pass or double pass program.

The conditioning operation (also known as lane conditioning, oiling, or dressing) applies oil by brushing it onto the lane. When you first turn on your Phoenix-Lite lane machine, all three machine operations (cleaning, oiling, and buffing) are automatically selected. You can select or deselect any combination of operations. If you select the oiling operation without first selecting the buffing operation, the Phoenix-Lite automatically selects the buffing operation for you. Oil application is divided into six segments. Each segment has its own wicking foam and adjustment bar. When conditioning your lanes using the Phoenix-Lite as set at the factory, oil application is low across the outer 8 inches of each side of the lane, a little higher across the next 3 inches on each side of the lane, and high across the middle 20 inches of the lane, which is divided into two ten-inch segments.

Factory Programming

As supplied from the factory, the machine is set up to perform two complete oiling and buffing passes. Each pass is divided into two segments: a forward segment, and a reverse segment. On the first pass forward segment, the lane is stripped of any existing oil over its entire length while new oil is applied and buffed out for the distances entered at the factory. On the return segment, the lane is buffed and then oiled to approximately one foot from the foul line using the same distance settings. The machine automatically makes a second pass oiling and buffing operation applying oil and buffing to the second pass settings that were also entered at the factory. You can customize the oiling and buffing program settings to suit your specific needs.

A printout of the specific cross-lane oil pattern produced by your lane machine was included with your machine. This printout contains important information about your machine's initial settings and should be retained in your records.

The cross-lane oil output pattern and the overall application pattern (the oiled area and buffing taper along the lane) can be changed by using different densities of wicking foams and different oiling and buffing distances as well as through the use of multiple conditioning passes. A set of replacement wicking foams in a variety of densities was shipped with the machine, and must be cut to size before installation.

Buffing can be performed with or without applying new oil. When used alone, the buffing operation applies the oil already on the brush and redistributes the oil already on the lane. Since very little new oil is being applied to the lane during this operation, the resulting oil pattern will not match the oil pattern you achieve when you condition the lane; it will only be an approximation of that pattern. For more information about oil output and patterns, refer to Section 6.0 - *Determining Your Oiling Pattern*.

2.1 UNPACKING THE PHOENIX-LITE LANE MACHINE

After uncrating, inspect your lane machine for any damage that may have occurred in shipping. Any shipping-related damage claims should be filed with the freight carrier. Brunswick is not responsible for damage that occurs during shipment.

Before your first use of the Phoenix-Lite Lane Machine, you should ensure all the components were shipped and that they arrived in good condition. We also strongly suggest you familiarize yourself with how to operate the machine.



IMPORTANT

The oil transfer roller is tied in place to prevent damage during shipment. You must complete the steps below before using the machine or you will damage the machine.

1. Unlatch the hood door and open the compartment door.
2. Cut the plastic wire tie on the transfer roller and remove the red tag and wire tie.
3. If the silver roller (oil transfer roller) does not drop down against the buffer brush, gently push it down to rest it against the buffer brush. Do not force it.
4. Close the hood door and refasten the clasps.

2.2 SPECIFICATIONS, DIMENSIONS, AND CAPACITIES

The following table provides the electrical use, machine weight and dimensions, and tank capacities of the Phoenix-Lite Lane Machine.

Electrical	Single phase, 50/60 Hertz, 3360 watts 110 V (US) 200 – 240V (other countries)
Main Power Circuit Breaker	30 amp protection (110V), 14 amp protection (220V)
Overcurrent Protection	Each motor and solenoid is individually protected against an overcurrent condition either by a thermal overload protection device or fuses. The Machine must be operated on a dedicated and grounded electrical circuit.
Weight (wet)	250 pounds (113.4 kg)
Machine Dimensions	13.93 inches (35.4 cm) H x 35.6 inches (90.4 cm) L x 55.48 inches (140.9 cm) W
Power Cord	3-conductor, 110V, 12 AWG (US), 220V, 14 AWG (2.5 mm ² harmonized), 125 feet (38.1 m) L
Cleaner Tank Capacity	1.75 gallons (6.62 liters), enough to clean 10 to 12 lanes from the on-approach start position. Use only cleaners specifically manufactured for use on bowling lanes.
Waste Tank Capacity	Holds waste for 12+ lanes when a defoamer is used.
Oil Tank Capacity	37.5 ounces (1.11 liters), enough to condition up to 24 lanes. Use only oil products specifically manufactured for use on bowling lanes.
Foams: Standard Alternates	Outside - 3-1/2 inches (8.9 cm) H x 7.85 inches (19.9 cm) L Track – 3-1/2 inches (8.9 cm) H x 3 inches (7.6 cm) L Middle - 3-1/2 inches (8.9 cm) H x 10 inches (25.4 cm) L The above represents one side (half) of the oil tank. Identical foams are installed on the other side of the oil tank. 3-1/2 inches (8.9 cm) H x 48 inches (121.9 cm) L

The following table lists the contents of the Phoenix-Lite Lane Machine package.

Item	Part Number
Phoenix-Lite Lane Machine	61-860333-110 (110V) 61-860333-220 (220V)
Power Cord	294-002-359 (110V) 294-115-269 (220V)
Large Red Funnel (for cleaning solution)	RP-115
Small Funnel (for oil)	RP-116
Quick Start Information Card	400-294-003
Buffer Pressure Adjusting Tool	RP-43
Oil Pattern Printout	Not Applicable
<ul style="list-style-type: none"> • Defoamer, 1 Gallon (3.78 liter) 	<ul style="list-style-type: none"> • 294-115-161
Yellow Envelope for 110V Phoenix-Lite <ul style="list-style-type: none"> • Warranty Card • 4A Relay Board Fuse (2) • 10A Relay Board Fuse • 6.3A Relay Board Fuse • 8A Relay Board Fuse (4) • 2A Relay Board Fuse • 500mA Fuse • 1/16-inch Hex Wrench • Oil Tank Feeler Gauge (yellow) • Cotter Pin, 1/16 x 1/2 (6) 	<ul style="list-style-type: none"> • 294-115-166 • 294-115-373 • 294-115-374 • 294-115-375 • 294-115-366 • 294-115-419 • 294-115-693 • 294-115-694 • 01-080
Yellow Envelope for 220V Phoenix-Lite <ul style="list-style-type: none"> • Warranty Card • 4A Relay Board Fuse (3) • 1A Relay Board Fuse • 2A Relay Board Fuse • 5A Relay Board Fuse • 500mA Fuse • 1/16-inch Hex Wrench • Oil Tank Feeler Gauge (yellow) • Cotter Pin, 1/16 x 1/2 (6) 	<ul style="list-style-type: none"> • 294-115-166 • 294-115-365 • 294-115-366 • 294-115-367 • 294-115-419 • 294-115-693 • 294-115-694 • 01-080
Standard Foams (in the machine) <ul style="list-style-type: none"> • Super-High Output (#4), 10 in. (25.4 cm) L x 3 1/2 in. (8.9 cm) H • Medium-Low Output (#10), 7.8 in. (19.9 cm) L x 3 1/2 in. (8.9 cm) • Medium-Low Output (#10), 3 in. (7.6 cm) L x 3 1/2 in. (8.9 cm) H 	<ul style="list-style-type: none"> • 294-115-551 • 294-115-665 • 294-115-553

Item	Part Number
Alternate Foams, 3½ in. (8.9 cm) H x 48 in. (121.9 cm) L (Field cut to size) <ul style="list-style-type: none"> • Super-High Output (#4) • High Output (#5) • Medium-High Output (#6) • Medium Output (#8) • Medium-Low Output (#10) • Low Output (#11) • Extra-Low Output (#12) • Super-Low Output (#13) 	<ul style="list-style-type: none"> • 294-115-490 • 294-115-488 • 294-115-486 • 294-115-484 • 294-115-482 • 294-115-652 • 294-115-653 • 294-115-654

Section 3

OPERATION

Operating the Phoenix-Lite Lane Machine is straightforward and easy to do. The basic steps are:

- Place it on the lane,
- Fill the tanks,
- Plug in the machine,
- Select the operation,
- Press the Start button (twice).

But giving you only that bare information is like telling a new driver how to operate a car by telling them to turn the key in the ignition and press the accelerator. In both examples, there are many things each operator needs to know about preparing the machine for use, how the machine functions, and how to use the machine to perform the functions for which it was designed. This section contains the detailed information you need to know in order to use the Phoenix-Lite Lane Machine safely, effectively, and efficiently.

3.1 OVERVIEW OF HOW THE PHOENIX-LITE LANE MACHINE OPERATES

NOTE

When you first apply power to the machine, the vacuum solenoids energize and raise the vacuum head. If at any time during operation the machine is left idle (a cleaning or conditioning cycle is not run) for 5 minutes, the solenoids de-energize and the vacuum head lowers to the down position. Cycle the power rocker switch to reset.

The Phoenix-Lite Lane Machine is separated into the cleaning section and the conditioning section. In the cleaning section, the cleaner pump takes the cleaning solution from the cleaner tank and delivers it to the spray head nozzles. The nozzles atomize the cleaner and direct it onto the lane. The amount of cleaner applied to the lane is controlled by the flow control valve which returns excess cleaner to the cleaner tank. On the lane, the cleaner combines with the lane oil and forms an emulsion which is then stirred up by the agitator foam to increase cleaning efficiency and is then removed by the vacuum head and transferred to the waste tank.

In the conditioning section, the oil transfer roller motor drives the transfer roller which rotates against the wicking foams of the oil tank. The transfer roller picks up oil which is then transferred to the buffer brush and brushed onto the lane. When the buffing-only operation is performed, the transfer roller does not turn, so the buffer brush does not pick up any oil; it only redistributes the oil that is already on the brush and on the lane.

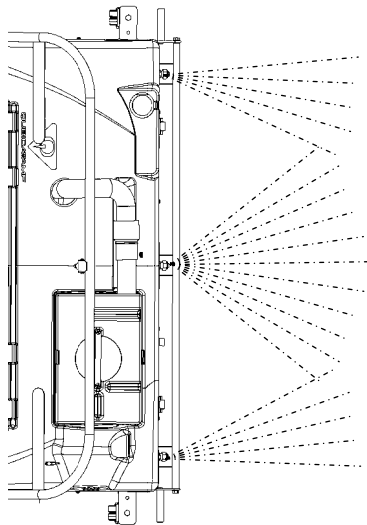
When oiling and buffing have been completed, the buffer solenoids deenergize, and the buffer brush is lifted up off the lane by spring pressure.

The machine is propelled along the lane by the AC drive motor and is equipped with front and rear optical sensors and guide rollers to keep it correctly positioned on the lane. The front optical sensor senses the end of the lane, and the rear optical sensor is used as a backup device for stopping the lane machine when it returns to the foul line. The primary device for this purpose is the counter wheel in conjunction with the control box settings. The counter wheel is a distance counter that determines the machine's position on the lane. The Phoenix-Lite continuously compares this counter to the factory setting or to a distance you enter for an operation so it knows where on the lane to start and stop an operation. When cleaning the lanes, the drive motor propels the machine until the end of the lane is reached, then it reverses direction and propels the machine back to the approach. When only conditioning the lanes (no cleaning) or only buffing the lanes, the drive motor propels the machine until the buffing distance is reached, then it reverses direction and propels the machine back to the approach.

The cleaning section main components:

- The cleaner tank
- The cleaner filter
- The cleaner spray pump
- The spray heads
- Flow control valve
- The vacuum head
- The vacuum head solenoids
- The vacuum motor
- The waste tank

The vacuum head contains the agitator foam and the squeegees. When cleaning, the Phoenix-Lite performs the following actions:



1. The spray heads dispense the cleaner over the lane, as shown in Figure 3-1.
2. The agitator foam mixes the cleaner into the oil on the lane.
3. The front squeegee directs the residue into the vacuum chamber that is created by the front and back squeegees.
4. The residue in the chamber is vacuumed into the waste tank.

The cleaning operation can be performed separately or simultaneously with the conditioning operation. Cleaning occurs only during the forward leg of the first pass of the lane program.

Figure 3-1

The conditioning section is made up of the following main components:

• Oil tank	• Oil transfer roller	• Buffer brush & solenoids
• Wicking foams	• Oil transfer roller motor	• Buffer brush motor

The Phoenix-Lite Lane Machine uses wicking foams to transport the oil from the oil tank to the transfer roller. The density and contact area of the wicking foams control the rate at which oil is moved to the transfer roller. The Phoenix-Lite comes installed with six foams in two densities. The two outside foams on each side are medium-low output foams and apply oil to the outside 11 inches of the lane. The middle two foams are super-high output foams that apply oil to the middle 20 inches of the lane.

The oil output can be changed by replacing the installed foams with the alternate wicking foams that were shipped with your machine. For more information about changing the oil output, refer to Section 6.0 - *Determining Your Oiling Pattern*.

3.2 THE PHOENIX-LITE LANE MACHINE CONTROLS

You control the operations of the Phoenix-Lite Lane Machine by selecting options and specifying information on the control dashboard, shown in Figure 3-2. This section describes the control dashboard and how to use it.

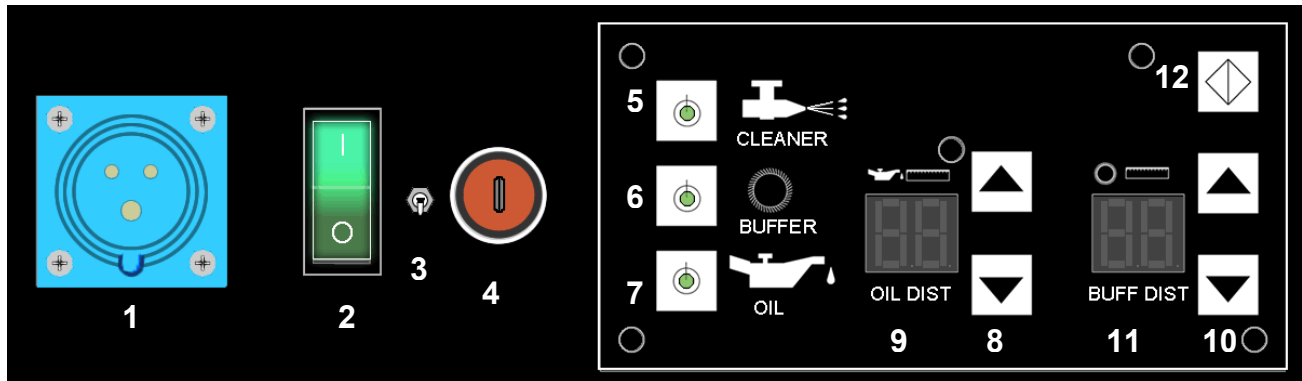






Figure 3-2

The controls and information displays on the control dashboard are described below. **The recommended start-up sequence is given in the *Cleaning and Conditioning the Lanes* instructions starting on page 3-20.**

ID	Control or Display	Description
1	Power Inlet	This blue plug is where you connect the power cord. To ensure you properly and safely connect the power cord, the large blue plug is designed to fit into the power inlet in only one way. The machine must only be plugged into a grounded, 110-volt (US) or 240 volt (other countries) outlet.

ID	Control or Display	Description
2	POWER Switch	This rocker switch is the circuit breaker for the Phoenix-Lite. It turns power to the machine on and off and provides overcurrent (30 amp) protection (14amp on 240V machines).
3	Drive Motor Kill Switch	This switch will stop the drive motor only.
4	E-STOP Button	<p>This large, red button stops all machine operations. It does not power off the machine.</p> <p>After you press the E-STOP button, you must reset it by inserting the key (provided) and pulling the switch out. Then use the POWER rocker switch to power off and then power on the machine to restart it.</p>
5	<p>CLEANER</p> 	<p>This touch-sensitive button selects and deselects the cleaning operation.</p> <p>The Phoenix-Lite automatically selects this operation when you turn on the machine.</p> <p>The CLEANER button glows green when the cleaning operation is selected.</p>
6	<p>BUFFER</p> 	<p>This touch-sensitive button selects and deselects the buffing operation.</p> <p>The Phoenix-Lite automatically selects this operation when you turn on the machine.</p> <p>If you select the oiling operation without first selecting the buffing operation, the machine automatically selects the buffing operation.</p> <p>The BUFFER button glows green when the buffing operation is selected.</p>
7	<p>OIL</p> 	<p>This touch-sensitive button selects and deselects the oiling operation.</p> <p>The Phoenix-Lite automatically selects this operation when you turn on the machine.</p> <p>The OIL button glows green when the oiling operation is selected.</p>

ID	Control or Display	Description
8	OIL DIST ▲ Up Arrow ▼ Down Arrow	<p>These touch sensitive buttons are used to scroll up and down through numbers to specify where the machine is to stop and resume oiling.</p> <p>When the machine is moving toward the pin deck, the setting is the number of feet from the starting point (foul line) at which the machine is to stop oiling. When the machine is moving toward the approach, the setting is the number of feet from the foul line at which the machine is to resume oiling. The numbers are displayed in the Oil Dist window.</p> <p>The Phoenix-Lite remembers the distance used in the last lane conditioning session and assumes that distance when you next start up the machine.</p>
9	Oil Dist	This window displays the distance, in feet from the foul line that will be oiled as described in 8 above.
10	BUFF DIST ▲ Up Arrow ▼ Down Arrow	<p>These touch sensitive buttons are used to scroll up and down through numbers to specify where the machine is to stop and resume buffing. This setting must be equal to or greater than the OIL DIST setting.</p> <p>When the machine is moving toward the pin deck, the setting is the number of feet from the starting point (foul line) at which the machine is to stop buffing. When the machine is moving toward the approach, the setting is the number of feet from the foul line at which the machine is to resume buffing. The numbers are displayed in the Buff Dist window.</p> <p>The Phoenix-Lite remembers the distance used in the last lane conditioning session and assumes that distance when you next start up the machine.</p>
11	Buff Dist	This window displays the distance in feet from the foul line that will be buffed as described in 10 above.

ID	Control or Display	Description
12	<p>START</p>  <p>You can also use the START button on the handle.</p>	<p>This touch-sensitive button starts up the components for the operation(s) you have selected then starts the machine down the lane.</p> <p>NOTES</p> <p>You must press the START button twice in rapid succession to start the drive motor.</p> <p>For your safety, the START button has a time-out feature. If your second touch of the START button is more than five seconds after your first touch, the start-up sequence halts and you have to begin again.</p> <p>When you have selected only the cleaning operation, the first touch of the start button turns on the spray pump so cleaner starts spraying on the lane, starts the vacuum motor, and lowers the vacuum head onto the lane. The second touch turns on the drive motor to propel the machine down the lane. If you have also selected buffing, the second touch also starts the buffer motor and lowers the buffer onto the lane, and if oiling, starts the transfer roller motor.</p> <p>When you only select either the conditioning or buffing-only operation, nothing happens on the first touch of the START button. The second touch starts the oil transfer roller motor (if conditioning), the buffer motor to rotate the buffer brush, and turns on the drive motor to propel the machine down the lane.</p>

3.3 PUTTING THE PHOENIX-LITE LANE MACHINE INTO POSITION

The Phoenix-Lite Lane Machine has two positions: operating and storage. The machine must be in the operating position, shown in Figure 3-3, to perform any of its operations.

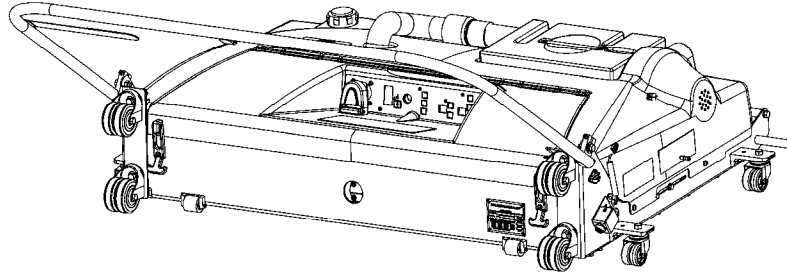


Figure 3-3

Though you can move and store the machine in the operating position, we recommend that you place it into the storage position, as shown in Figure 3-4, for storage.

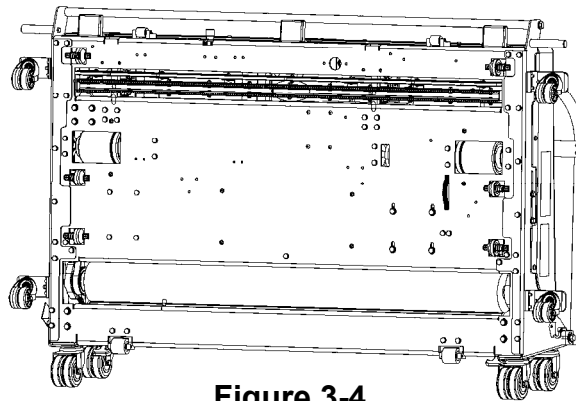


Figure 3-4

To put the Phoenix-Lite into the operating position from the storage position, stand facing the bottom of the machine and grab the lifting handle with both hands and slowly lower the machine onto its small caster wheels (Figure 3-5). Do not release the lifting bar until all four wheels are on the approach.

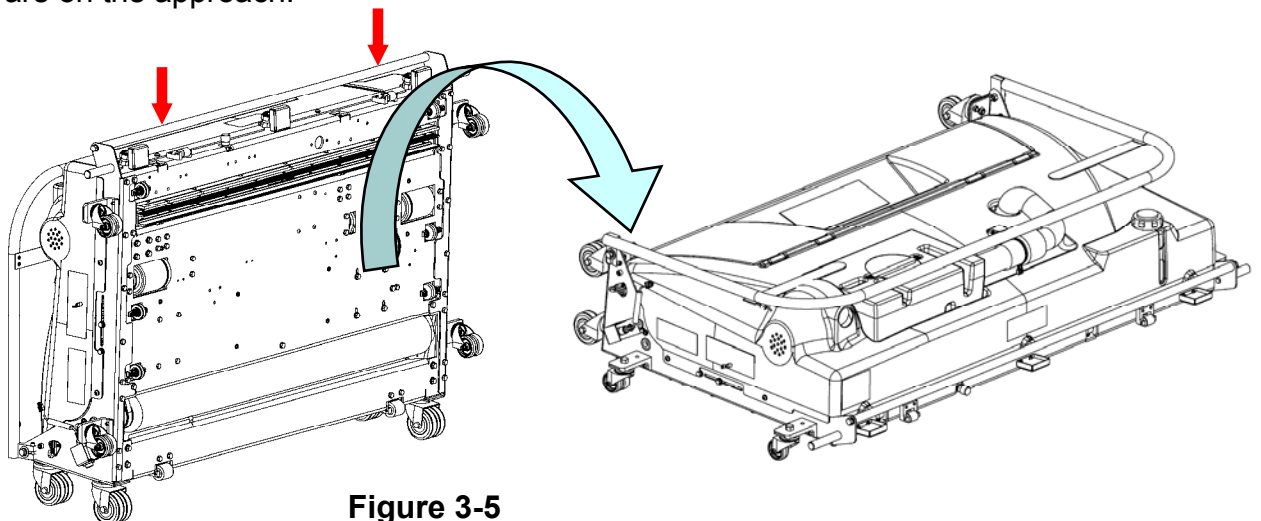


Figure 3-5

To put the Phoenix-Lite into the storage position from the operating position, fold the handle across the machine, and then stand in front of the machine (the side with the spray heads) and grab the lifting bar with both hands. Carefully tip up the machine onto its wheels. Do not release the lifting bar until all four large caster wheels are on the approach, and don't allow the machine's momentum to take it beyond the upright position.

NOTE

Most of the machine's weight is located at the back/bottom of the machine. This helps keep the machine balanced while you place it into position. However, the machine weighs more than 200 pounds, and while it is not necessary to lift its entire weight, obtain the assistance of a second person or take appropriate lifting precautions when moving it from one position to another.

3.4 THE HANDLE

The handle, shown in Figures 3-6a and 3-6b, can be placed in any position – from flat against the Phoenix-Lite housing to parallel with the floor. This allows you to put the handle in whatever position is comfortable for you when operating, moving, or storing the Phoenix-Lite.

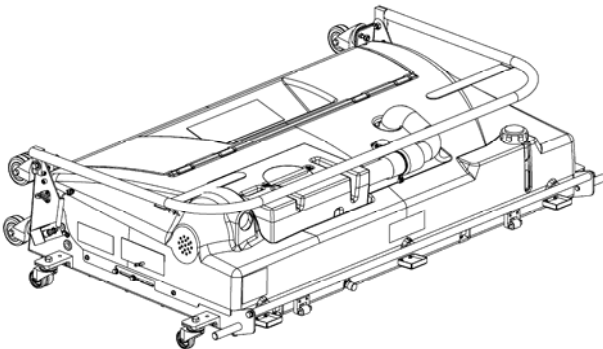


Figure 3-6a

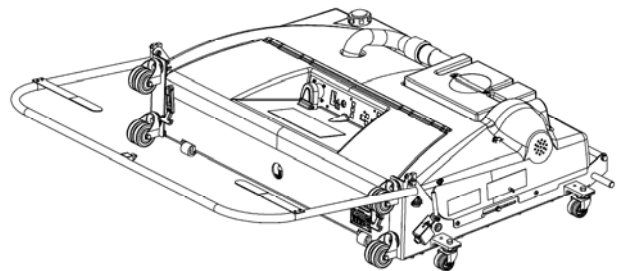


Figure 3-6b

SUGGESTION

Before releasing the handle when the Phoenix-Lite starts to move down the lane, we strongly recommend that you lower the handle as you release it. This ensures the handle will not scrape the underside of your lane mask or pinsetter.

The handle has a START button and hook-and-loop straps. The START button works just like the one on the control dashboard. It is placed on the handle so you don't have to reach across to the machine to start an operation.

The hook-and-loop straps hold the power cord up and away from the moving parts of the machine and help prevent it from dragging on the lane as the machine moves up and down the lane (see Figure 3-7). It also relieves stress on the power cord as it is pulled when the machine moves.

The recommended power cord path is:

- Bring the power cord along the handle.
- Wrap the power cord around the left side of the handle and secure it with the hook and loop strap.
- Clip the power cord's strain relief into the hook located on the left side of the Phoenix-Lite frame.
- Plug the power cord into the machine.

This path keeps the cord away from the back optical sensor so that it doesn't inadvertently stop the machine.

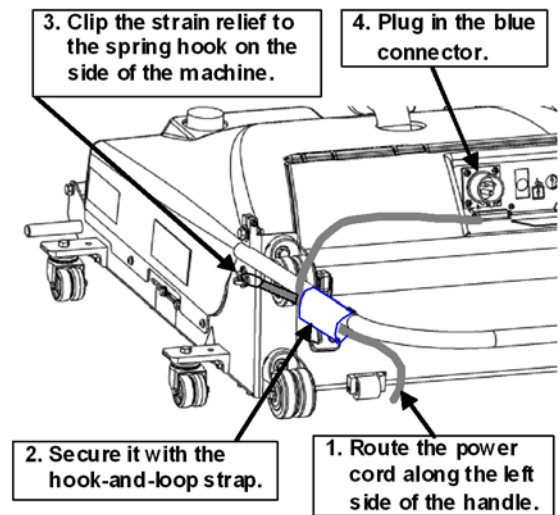


Figure 3-7

3.5 OPTICAL SENSORS

The front and rear optical sensors detect when the Phoenix-Lite Lane Machine has reached the back of the pin deck or the approach.

The front sensor is located on the underside of the Phoenix-Lite just ahead of the agitator and vacuum head, as shown in Figure 3-8. It is positioned so that it “looks” down on the lane. Information from this sensor is used only when the machine is traveling from the approach to the pin deck. The sensor is continually testing for a change in height where the lane drops off. When the sensor detects the drop off, it sends a signal to the machine that it has reached the end of the pin deck. This prevents the machine from running into the pit.

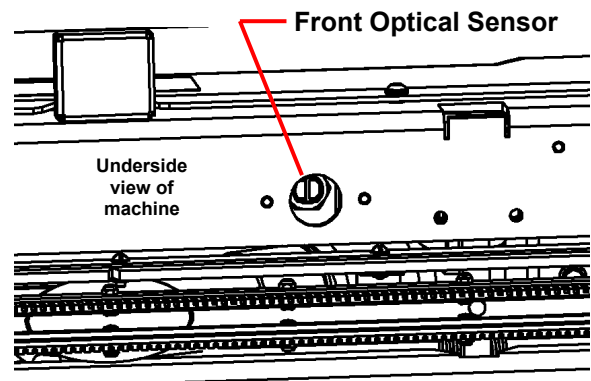


Figure 3-8

The rear optical sensor is located above the right rear side caster bracket, as shown in Figure 3-9. It is positioned so that it “looks” behind and slightly to the right of the machine. Information from this sensor is used only when the machine is traveling from the pin deck to the approach. The sensor is continually testing for changes in height such as caused by the gutter ramps (transition blocks) or where the gutter abuts the approach. When the sensor detects the change, it signals the machine that it has reached the approach and turns off the drive motor. This is a backup function to the counter wheel reading which is the primary means of signaling the machine to stop.

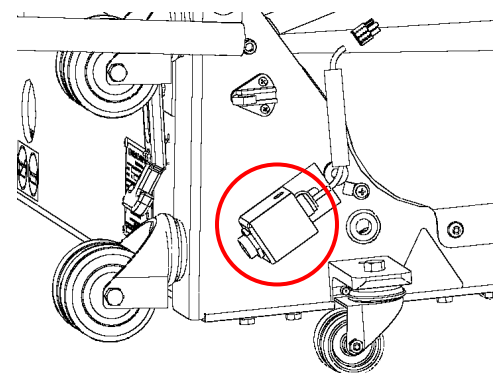


Figure 3-9

NOTES

- When the rear sensor detects something in the gutter, it will assume it is “seeing” where the gutter abuts the approach. Therefore you should remove items from the gutters before starting the Phoenix-Lite down the lane. Missing straps, peeling paint, and holes in the gutters can cause the rear sensor to stop the machine.
- To ensure the power cord does not affect the sensors, we recommend you route the cord as described earlier in this section.
- If the machine turns off in the middle of an operation, it must be returned to the foul line to restart the operation, but you can do that from where the machine stopped without having to drag it back to the foul line. For information about restarting the machine, refer to Troubleshooting Section 5.2.
- Brightly colored gutter ramps may not register with the sensor as quickly as darkly colored ramps. If you have brightly colored ramps, the rear optical sensor may need to be adjusted for it to function correctly. Refer to the *Maintenance and Adjustments* Section for information on making this adjustment.

3.6 CLEANING OPERATION COMPONENTS

The components used in the cleaning operation are shown in Figures 3-10 and 3-11, and described below.

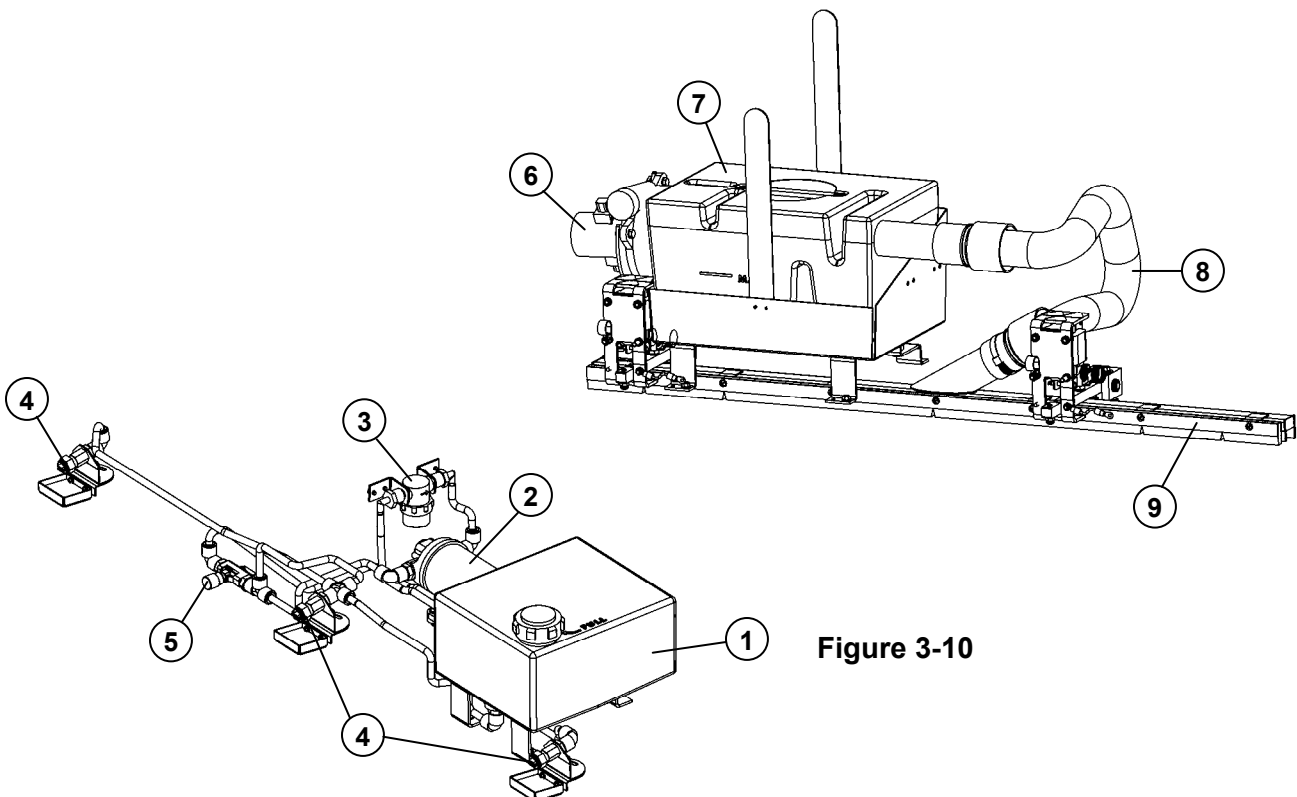


Figure 3-10

ID	Component	Description
1	Cleaner Tank	This tank holds the cleaning solution. It holds enough to clean approximately 12 lanes. When placing the machine in the storage position, <u>ensure the cleaner level is below the level of the cap or cleaner could drip from the cap's vent hole.</u>
2	Cleaner Pump	This pump transfers cleaner at a moderate pressure from the cleaner tank to the spray heads.
3	Cleaner Filter	Located in the tubing running from the cleaner tank to the cleaner pump, the filter is designed to strain out any particles that could lodge in the pump or spray nozzles.
4	Spray Heads	<p>The three spray heads distribute the cleaner on the lane. The spray head pattern is set to overlap and to distribute more cleaner in the areas where the oil pattern is thicker.</p> <p>The spray heads are adjustable.</p> <p>Refer to the Maintenance Section for information about how to clear clogs and how to change the amount of cleaner dispensed from the spray heads.</p>
5	Cleaner Flow Control Valve	This manually operated valve is used to control the amount of cleaner being supplied to the spray heads. Throttling (closing) the valve increases cleaner flow to the spray heads. Excess cleaner is routed back to the cleaner tank.
6	Vacuum Motor <i>(Figure 3-10)</i>	<p>This unitized motor and pump assembly provides the suction power for removing the cleaner and conditioner residue from the lane.</p> <p>The unit contains a replaceable seal that provides an air-tight connection between the vacuum pump and the waste tank.</p>
7	Waste Tank <i>(Figure 3-10)</i>	<p>This tank is large enough to hold the cleaner, dirt, and oil from the cleaning of a minimum of 12 lanes.</p> <p>To keep suds from being sucked into the vacuum pump, pour one to two ounces of defoamer into the waste tank before every lane cleaning session and whenever foaming is observed.</p> <p>You should empty the waste tank every time you fill the cleaner tank during a lane cleaning session and before you store the machine. The waste tank also has a line marked "MAX" and it should be emptied once the level of the waste reaches that line. Though a full waste tank will not leak when the machine is in the storage position, we recommend that you empty and clean the waste tank before storing the Phoenix-Lite.</p>

8	Vacuum Hose <i>(Figure 3-10)</i>	This flexible tube is used to transport the residue from the vacuum head to the waste tank. The hose slips onto the waste tank inlet tube. This slip fitting makes it easy for you to take off the hose when you remove the waste tank.
9	Vacuum head	The metal tube on the top provides an attachment point for the vacuum hose. The agitator foam and squeegees are attached to the body of the vacuum head.
10	Rear Squeegee	This squeegee positions its smooth side against the lane to create a seal to ensure the residue is kept in the vacuum chamber until it is vacuumed from the lane.
11	Front Squeegee	This squeegee positions its segmented surface against the lane to direct the residue into the vacuum chamber.
12	Agitator Foam	This foam strip mixes the cleaner into the oil on the lane to improve cleaning efficiency.

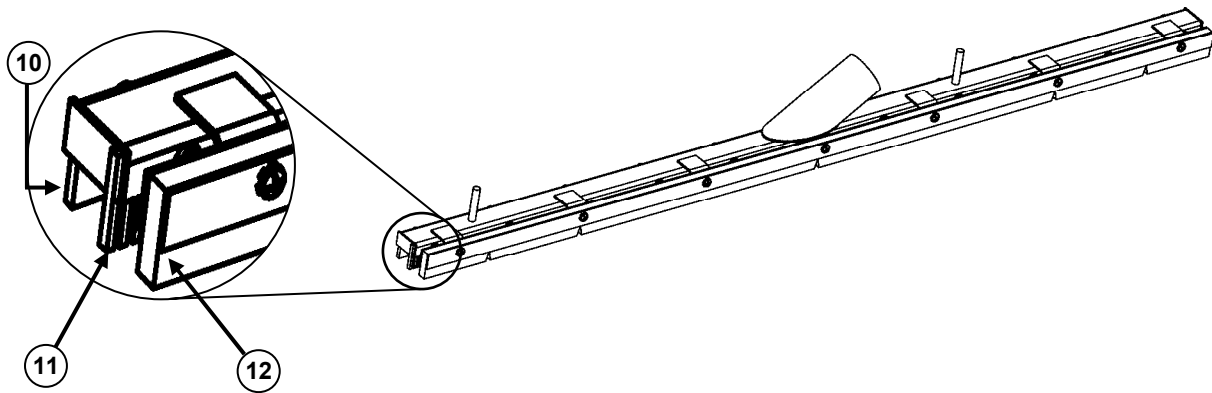


Figure 3-11

3.7 LANE CONDITIONING COMPONENTS

The lane conditioning components are shown in Figures 3-12 through 3-14 and described below.

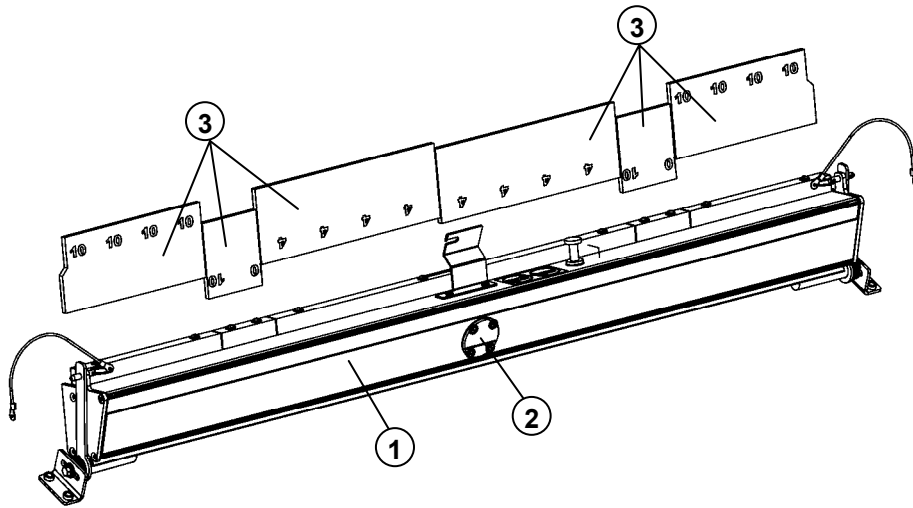


Figure 3-12

ID	Component	Description
1	Oil Tank Assembly	The tank holds enough oil to condition 24 lanes. You should top off the oil tank before each conditioning session to ensure a consistent amount of oil is kept in the wicking foams.
2	Oil Tank Level Indicator	This indicator shows the level of oil in the oil tank. The line on the indicator indicates the maximum oil level with the tank in its normal operating position against the transfer roller. Fill the tank in its normal operating position to the bottom of the line. Add oil to the tank before the oil level drops below the bottom of the sight glass and before every lane conditioning session. This will help keep the oil pattern consistent.
3	Wicking Foams	The wicking foams reside in the oil tank trough where they constantly absorb oil. Capillary action causes the oil to move to the top of the foam where it is picked up by the transfer roller. The different sizes, types, and densities of foam determine the pattern in which the oil is distributed onto the transfer roller. The higher the number stenciled on the foam, the higher the density and the lower the oil output. For more information about oil patterns, refer to Section 6.0 - <i>Determining Your Oiling Pattern</i> .

IMPORTANT

ALWAYS fill the oil tank **slowly** to allow the oil level in the indicator to adjust to the level in the tank.

NEVER fill the oil tank above the mark on the oil tank level indicator or oil will overflow into the machine and onto the lane.

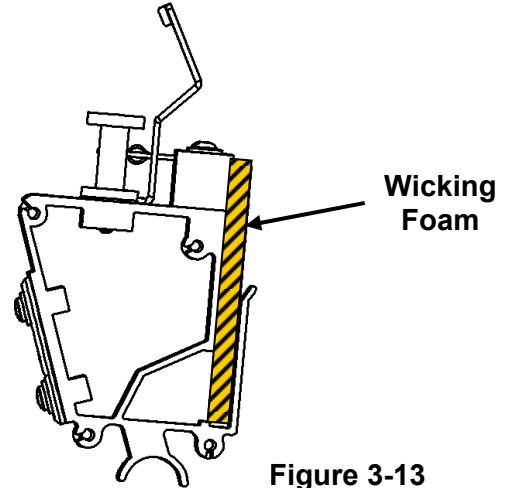


Figure 3-13

4	Oil Transfer Roller	The oil transfer roller picks up oil from the wicking foams and holds it for pickup by the buffer brush.
5	Buffer Brush	The buffer brush picks up oil from the transfer roller and applies it to the lane.

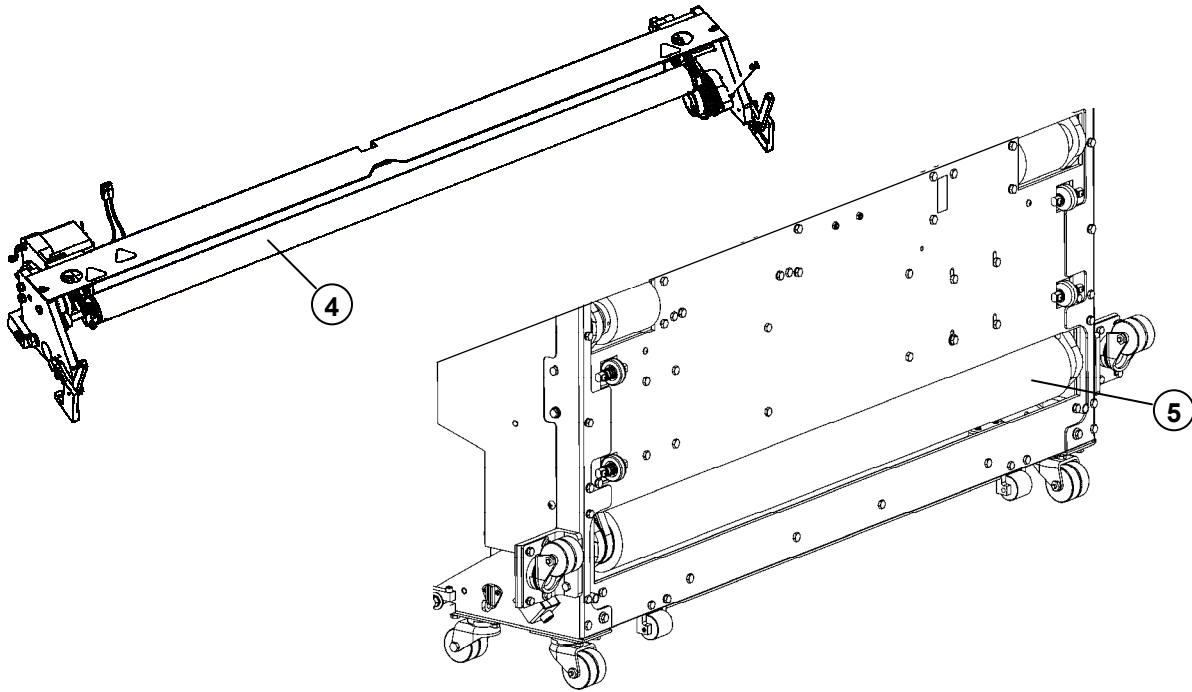


Figure 3-14

3.8 PREPARING FOR USE

Before every lane conditioning session you should perform the following steps to prepare the Phoenix-Lite Lane Machine for use.

- Check the wicking foams, agitator foam, squeegees, and buffer brush for wear.
- Move the handle through its full range of motion to ensure it moves easily and is not damaged.
- Check the fluid levels and fill the cleaner and oil tanks if necessary.
- Check the vacuum connections and add defoamer to the waste tank.

3.8.1 Filling and Preparing the Tanks

The tanks have been designed to allow you to clean, condition, and store the vacuumed residue for at least 12 lanes. We recommend you fill the cleaner and oil tanks away from the lane. However if you do fill them on the lanes, position the machine at least 2 feet down the lane from the foul line to ensure you do not get cleaner or oil on the approach which, even after it is cleaned up, can adversely affect the bowler's delivery by changing the sliding characteristics of that part of the approach.

Complete the steps below to fill the cleaner and oil tanks and to prepare the waste tank.

3.8.1.1 Adding Cleaner

You cannot use just any cleaner in the Phoenix-Lite Lane Machine or on your lanes. Listed below are the things you need to keep in mind when filling the cleaner tank.

- Use only cleaners that are manufactured for use on bowling lanes.
- Follow the manufacturer's directions to properly dilute the cleaner. The hardness of the water in your area can affect the effectiveness of any cleaner, and (with consideration for the amount of oil your specific pattern places on the lanes) may require a dilution ratio that differs from what is recommended on the label.
- DO NOT put undiluted cleaner in the cleaner tank.
- Do not overfill the tank.



Avoid splashing the cleaner. Follow all instructions and precautions on the product label. In case of eye contact, flush with water for 15 minutes.

Follow the steps below to fill the cleaner tank.

1. Remove the cap from the cleaner tank and set it aside.
2. Insert the **large** red funnel into the tank opening. Leave a small gap to allow air to exit from the tank as you fill it.

Note: The large red funnel must have a screen in place. Replace the funnel if the screen is missing or damaged.

3. Pour **diluted** Brunswick lane cleaner solution (or equivalent) into the tank until it is about an inch below the tank inlet.
4. Remove the funnel.
5. Replace the cap.
6. Wipe up any drips or spills that may have occurred.

3.8.1.2 Adding Oil

As with the cleaner, there are things you must keep in mind when filling the oil tank.

- Use only oil or lane dressing that is manufactured specifically for use on bowling lanes.
- Fill the tank while it is in the normal operating position.
- Do not overfill the tank. The correct level is just to the bottom of the fill line on the sightglass.
- Pour the oil in slowly. Allow time for the oil to disperse throughout the tank.



Because bowlers can slip and fall on oil spilled on the approach, DO NOT fill the oil tank on the approach. Fill it 2 to 3 feet down the lane or in an area away from the lanes, such as the service area by the pinsetters.

Avoid splashing the oil. Follow all instructions and precautions on the product label.

Follow the steps below to fill the oil tank.

1. Undo the clasps holding the oil tank cover to the hood, and open the oil tank compartment door to access the oil tank.
2. Remove the plug from the top of the oil tank and set it aside (see Figure 3-15).

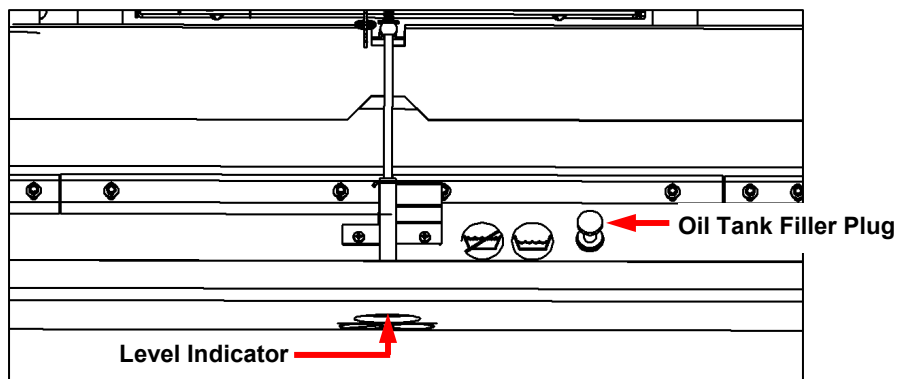


Figure 3-15

3. Insert the **small** funnel into the opening. Leave a small gap to allow air to exit from the tank as you fill it.

4. SLOWLY pour oil into the tank until the oil level in the oil level indicator, as shown in Figure 3-16, is at the mark. DO NOT OVERFILL!
5. Remove the funnel.
6. Replace the plug.
7. Wipe up any drips or spills that may have occurred.
8. Close the oil tank cover and fasten the clasps.

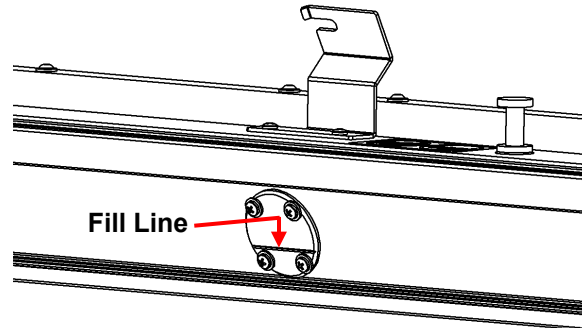


Figure 3-16

3.8.2 Defoaming the Waste Tank and Checking the Hose Connections

As the emulsion of cleaner and oil is vacuumed, air is forced into it. This action produces suds that can get sucked into the vacuum pump and discharged into the machine or back onto the lane. To alleviate this problem, pour one to two ounces of defoamer into the waste tank before starting a cleaning session. The defoamer should remain effective for your entire cleaning session, even after you empty the waste tank. However, if you notice suds accumulating, pour one to two more ounces of defoamer into the waste tank.



CAUTION

The defoamer, a silicone-based liquid, can damage lane surfaces. Therefore, perform this process away from the lane and approach, and pour the defoamer directly into the waste tank.

The vacuum hose connections must be tight and the waste tank must be properly seated against the vacuum pump seal to ensure the proper vacuum seal. If the seal between the parts leaks, the Phoenix-Lite will not be able to pick up the residue from the lane. Perform the steps below to check the connections and tank placement.

1. Gently tug on the vacuum hose where it is clamped to the vacuum head. You should not be able to feel the hose move.
2. Firmly push the other end of the vacuum hose onto the waste tank inlet port.

NOTE

Whenever you place the waste tank in the machine, be sure not to fold, wrinkle, roll, or abrade the vacuum pump seal.

3.9 Cleaning the Lane Head Area

There are two ways you can place the Phoenix-Lite Lane Machine on the lane for its starting position. The first is to place only the front caster wheels in the gutters. The second is to place all four caster wheels in the gutters. Placing only the two front caster wheels in the gutters allows you to use the Phoenix-Lite to clean the lane near the foul line. Placing all four caster wheels in the gutters, positions the Phoenix-Lite to start cleaning about 30 inches down the lane from the foul line and to start conditioning a few inches from the foul line.

To clean the lane head area:

1. Position the machine on the lane with only the front caster wheels in the gutters.
2. Press the POWER switch to ON.
3. Press the START button **once**. The Phoenix-Lite starts spraying the cleaning solution, lowers the vacuum head, and starts the vacuum motor.
4. Push the Phoenix-Lite forward until all four caster wheels are in the gutters and press the start button a second time. The machine will continue on to clean and/or condition the lane.

3.10 CLEANING AND CONDITIONING

The Phoenix-Lite Lane Machine was designed to start up with the settings from the last time you used the machine. This feature means you can repeat your lane cleaning and conditioning settings without having to re-enter them every time you use the machine.

NOTE

We strongly suggest you dust the lanes before cleaning them. Dusting the lanes will prolong the life of the foams, squeegees, and buffer brush and ensures quality results.

Ensure the bumpers, if installed on your center's lanes, are fully retracted before operating the Phoenix-Lite on a lane.

IMPORTANT!

ENSURE THE PINSETTERS ARE TURNED OFF ON THE LANES YOU ARE CONDITIONING.

When you first energize the Phoenix-Lite, the cleaning, oiling, and buffing operations will be turned on; the software version will momentarily flash in the oil distance window; and then the machine will display the first pass oiling and buffing distances. You can use the factory settings, or you can enter your own. The second pass is discussed on the next page

- To only clean the lanes, turn **off** the oiling and buffing operations.
- To only buff the lanes, turn **off** the oiling and cleaning operations.

- To enter oiling and buffing distances, press the up or down arrow buttons for each operation until the window displays the distance you want. The distance you are setting is the number of feet from the approach.

The machine is set up from the factory to condition for two passes, but you can change to a one pass program as described in the following paragraph.

- To view the second pass settings, **press and hold** the **OIL** pushbutton until the *Oil Distance* and *Buff Distance* indicators flash (approximately 3 to 5 seconds). The display will flash the factory supplied second pass oiling and buffing distances which can be changed as desired. **Setting these distances to zero will have the effect of turning off the second pass oiling feature.** To again display the first pass settings, press and hold the **OIL** pushbutton until the distance indicators stop flashing. The Phoenix-Lite will remember the last first and second pass oiling and buffing distances entered the next time the machine is turn on.

BUFFING NOTES

When only buffing, the redistributed oil will only approximate the oil pattern that was originally put down when oil was applied to the lanes.

Because you are using the existing oil on the lane, **do not clean the lanes** before performing a buff-only operation.

OILING NOTE

The machine is sent with wicking foams that provide the optimal lane conditioning for most centers. This factory-set pattern can be altered by many factors, such as by changing the wicking foam density, the oiling and buffing distances, adding or removing a second pass oiling run, and the type of oil being used. For information about changing the oil pattern, refer to Section 6.0 - *Determining Your Oiling Pattern*.

3.10.1 Cleaning and Conditioning the Lanes

The following table lists the steps you perform to clean, oil, and buff a lane. Skip any that do not apply to the operation you are performing.

Startup Checklist

	Check the cleaner and oil tank levels. Add cleaner and oil as needed.
	Pour defoamer into the waste tank.
	Place the machine into the starting position.
	Plug the power cord into the appropriate electrical outlet.
	Insert the large, blue plug into the power inlet on the machine and secure the cord to the handle.
	Press the POWER rocker switch to ON. <i>The internal distance counter resets to zero.</i>
	Check that the Cleaner, Oil, and Buffer indicators are green. Turn off those functions that are not going to be used.
	Verify that the buffing and oiling distances are correct. If they are not, set the distances you want. <i>The buffing distance number must be equal to or greater than the oiling distance number.</i>
	Press the START button (on the control dashboard or on the handle) once . When you press the START button the first time, the Phoenix-Lite performs the following actions: <ul style="list-style-type: none"> • If CLEANER is selected, the spray heads begin spraying solution onto the lane, the vacuum head drops to the lane, and the vacuum motor starts. • If OIL and/or BUFFER are selected without CLEANER, no actions are performed.
	Press the START button (on control dashboard or handle) a second time* . The drive motor (and buffer motor if oiling or buffing are selected) starts and the machine begins to move down the lane. If oiling, the transfer roller motor also starts. *You must press the START button the second time within five seconds of pressing the START button the first time or the Phoenix-Lite will shut down.
	Push the handle down (either across the machine or toward the approach) then release it to allow the machine to travel down the lane.

As the Phoenix-Lite makes its circuit down and up the lane to complete the operations you have selected, it performs the actions shown in the table below. The table separates each action by operation, but the Phoenix-Lite performs the actions simultaneously when multiple operations are selected.

CLEANER OPERATION	OIL OPERATION	BUFF OPERATION
<ul style="list-style-type: none"> ▶ Sprays cleaner. ▶ Turns on the vacuum motor. ▶ Turns on the drive motor. ▶ Vacuum head drops down onto the lane 	<ul style="list-style-type: none"> ▶ Turns on the oil transfer roller motor. ▶ Turns on the buffer motor and lowers the brush. ▶ Turns on the drive motor. 	<ul style="list-style-type: none"> ▶ Turns on the buffer motor and lowers the brush. ▶ Turns on the drive motor.
<ul style="list-style-type: none"> ▶ Sprays cleaner continuously until the counter reaches 30 feet from the foul line then sprays cleaner intermittently (pulses) until it reaches the front of the pin deck, where it sprays one last time. ▶ Vacuums the entire length of the lane and pin deck. 	<ul style="list-style-type: none"> ▶ Brushes oil onto the lane until the counter reaches the specified number of feet from the foul line and then turns off the transfer roller motor. 	<ul style="list-style-type: none"> ▶ Brushes the oil already on the brush and on the lane until the counter reaches the specified number of feet from the foul line and then turns off the buffer motor and retracts the brush.
<ul style="list-style-type: none"> ▶ When the sensor detects the back of the pin deck, it performs the following end-of-lane actions: <ul style="list-style-type: none"> • Positions the vacuum head beyond the end of the lane, then stops. • Raises then quickly drops the vacuum head twice to shake off excess residue from the agitator and squeegees, then retracts the vacuum head. • Reverses the direction of the drive motor and begins to travel toward the approach. ▶ Runs the vacuum motor for 10 feet toward the approach. 	<ul style="list-style-type: none"> ▶ On the return pass at the programmed number of feet from the foul line, the transfer roller motor is turned on (and if not already in operation the buffer brush motor turns on and the buffer brush is engaged against the lane.) 	<ul style="list-style-type: none"> ▶ On the return pass when the counter reaches the programmed number of feet from the foul line, the buffer motor is turned on and the buffer brush is engaged against the lane. ▶ Brushes the oil already on the brush and on the lane.

CLEANER OPERATION	OIL OPERATION	BUFF OPERATION
Travels toward the approach until the counter wheel counts down to 1 foot or the sensor detects the gutter transition block.	Applies oil until the counter wheel counts down to 1 foot or the rear optical sensor detects the gutter transition block.	Brushes the existing oil until the counter wheel counts down to 1 foot or the sensor detects the gutter transition block.
Turns off the drive motor.	<ul style="list-style-type: none"> ▶ Turns off the oil transfer roller motor. ▶ Turns off the buffer motor and retracts buffer. ▶ Turns off the drive motor. 	<ul style="list-style-type: none"> ▶ Turns off the buffer motor and retracts buffer. ▶ Turns off the drive motor.
Second Pass: Cleaner system does not operate.	Second Pass: Performs the above steps out to the second pass distance settings.	Second Pass: Performs the above steps out to the second pass distance settings.

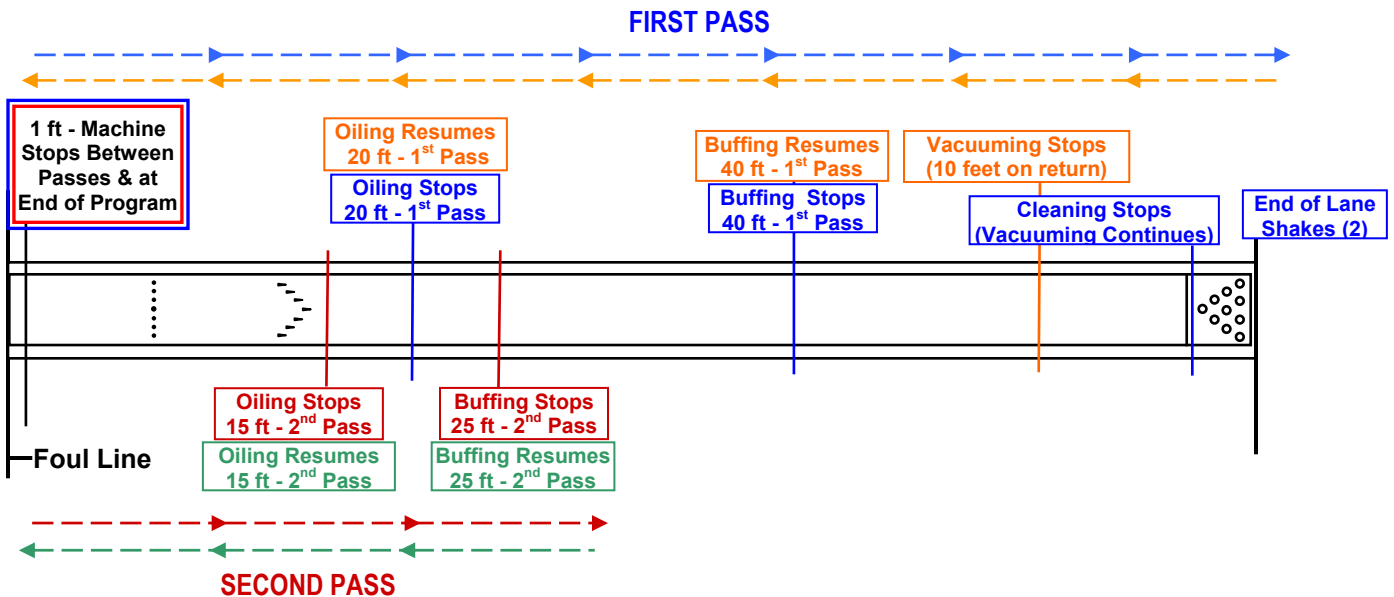
NOTE

Though the vacuum, buffer, and drive motors are turned off, the Phoenix-Lite is still powered on. The machine will de-energize the vacuum head solenoids and lower the vacuum head if left idle for more than 5 minutes. Cycle the power rocker switch to reset.

Once the Phoenix-Lite has returned to the approach and turned off the motors for the operations you selected, you can move it to the next lane or press the POWER rocker switch to turn off the machine. For information about storing the Phoenix-Lite, refer to the *Maintenance and Adjustments* section.

3.10.2 Illustration

The following drawing illustrates where the Phoenix-Lite performs actions when you select Cleaning, Oiling for 20 feet, and Buffing for 40 feet on the first pass; and then oiling to 15 feet, and buffing to 25 feet on the second pass. Your actual settings might be different.



MAINTENANCE AND ADJUSTMENTS

The design of the Phoenix-Lite Lane Machine makes it as easy to care for as it is to use. The cleaner, oil, and waste tanks are all sealed, so you do not need to empty them between uses. The agitator foam and squeegees are vacuumed of excess moisture through normal use of the machine, and the oil transfer components do not require special maintenance. By performing the simple, periodic maintenance procedures given in this section, you will keep the Phoenix-Lite Lane Machine in good working order to ensure high quality lane conditioning.

In addition to the periodic maintenance procedures, this section also contains information about how to adjust and test the machine's performance and how to replace the parts that wear out from normal use.



Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

4.1 PERFORMING AFTER-USE MAINTENANCE

After you have completed a conditioning session, you should clean the Phoenix-Lite Lane Machine and perform the maintenance tasks listed below. By performing these tasks, you keep the Phoenix-Lite in good operating condition and have the machine ready for your next conditioning session.

NOTES

We recommend that you perform the tasks in the order they are listed, but you can perform them in any order.

When cleaning the machine, it is important that oil does not get into the cleaning components of the machine and that cleaning solution does not get into the oiling components of the machine.

Perform the following tasks with the machine in the **operating** position:

Oiling Area

- Check the oil level and add oil if needed.
- Ensure the cap is in place and securely tightened.
- Check the wicking foams for nicks, tears, and missing pieces along the edge.
- Unlatch the tank pull rod and tilt the tank rearward. With a clean cloth, gently wipe the wicking foams and the front of the oil tank. Relatch the tank pull rod.

Cleaning Area

- Check the amount of cleaning solution in the cleaner tank and add cleaning solution if needed. Do NOT refill the cleaner tank prior to storing the machine or cleaner could leak out of the vent hole in the cap.
- Ensure the cap is in place and securely tightened.
- Check the foam pads in the drip pans below each spray head. Rinse, squeeze out excess moisture, and replace the pads as needed.

Waste

- Empty the waste tank. Rinse the waste tank under running water until the water runs clear.
- Add 1 or 2 ounces of defoamer to the tank through the vacuum hose inlet nozzle.
- Replace the waste tank being careful that you do not bend or abrade the vacuum pump to waste tank seal.

Power Cord

- Unplug the power cord from the power inlet on the control panel.
- Unplug the power cord from the outlet.
- Coil the power cord around the base of the handle.

Frame and Exterior Components

- Wipe the optical sensor's lens with a clean, soft cloth.
- Wipe the nozzles.
- Wipe the frame.

Perform the following tasks with the machine in the **storage** position:

Cleaning Area

- With a clean cloth, wipe the agitator foam and squeegees.
- Check the agitator foam and squeegees for nicks, tears, and gaps in their edges.
- Check the squeegees to see if the edges have become hard and for places where the edges have permanently warped out of shape.

Oiling Area

- With a clean, dry cloth, wipe the bristles on the buffer brush. Turn the brush and wipe each exposed section of bristles until you have wiped all of the bristles.
- Check the buffer brush for numerous broken bristles and uneven wear patterns that could indicate the buffer brush pressure is uneven or that the buffer brush pressure is too high.



Do not use any kind of heating apparatus to dry the brush as it may damage the bristles.

Other Exterior Components

To clean these areas, use the cloth you used to wipe the cleaning area or use a clean cloth.

- Wipe the casters and wheels.
- Wipe the top and sides of the machine.
- Wipe the base plate - starting at the cleaning area and finishing with the oiling/buffing area.

NOTE

The optical sensors should only be cleaned with a dry or damp clean cloth, and it should have no cleaner on it.

4.2 PERFORMING WEEKLY MAINTENANCE

In addition to the maintenance procedures you perform after each lane conditioning session, you should also perform the following tasks each week. The steps to perform these tasks are given in the following sections.

- Test the machine's performance.
- Clean the cleaner tank and cleaner tank area.
- Check the waste tank seal.
- Clean the waste tank and waste tank area, the in-line filter, the oil tank area, and the buffer brush.
- Clean the oil tank drip pad located under the oil tank.

4.2.1 Testing the Phoenix-Lite Lane Machine's Performance

The Phoenix-Lite Lane Machine has been designed and manufactured to give you years of worry-free lane conditioning. However, you should check the cleaning and conditioning operations to ensure the components are set correctly and that the Phoenix-Lite is performing as you expect.

4.2.1.1 Checking the Cleaning Function

If you always clean and condition your lanes (cleaning, oiling, and buffing), you can't tell how well the Phoenix-Lite is cleaning the lanes. To ensure the Phoenix-Lite is removing the cleaning residue from the lanes, pick two or three lanes in your center and perform only the cleaning operation on them. After the Phoenix-Lite has cleaned the lanes, examine them for residue.

If the Phoenix-Lite leaves residue on the lanes, check the condition of the squeegees, agitator, and the vacuum seal as described in the *Performing After-Use Maintenance*. Also refer to the *Troubleshooting* section for other possible causes and solutions.

NOTE

If you apply a very high volume of conditioner in the head area, the machine might not completely remove all of the oil with a single cleaning operation.

4.2.1.2 Measuring the Buffer Brush Pressure

The pressure put on the lane by the buffer brush must be consistent across the width of the brush to ensure the oil is applied in a consistent amount across the lane. When the Phoenix-Lite Lane Machine leaves the factory, the buffer brush pressure is set to give you optimal lane conditioning and is tested to ensure the pressure is the same across the brush.

Unless you found you needed a higher setting when you determined your oiling pattern, the best setting for the buffer brush pressure is between B and C on the Pressure Adjusting Tool, shown in Figure 4-1. As the bristles on the buffer brush wear and break off through normal wear and tear, the pressure will lessen. Even though it is possible to adjust the pressure to remain within the recommended range, brushing efficiency will degrade over time. While you can extend the life of the buffer brush by adjusting the buffer brush pressure, following the recommendations found in Section 4.4.4, *Replacing the Buffer Brush*, will assure continued optimal performance. For information about changing the buffer brush pressure, refer to Section 4.3.1, *Adjusting the Buffer Brush Pressure*.

NOTE

It is possible for the pressure on one side of the brush to be different from the other side. Both sides need to be adjusted to the same pressure to ensure the oil application is consistent across the width of the brush.

To measure the buffer brush pressure, perform the steps on the following page. Perform these steps with the machine in the **operating** position.

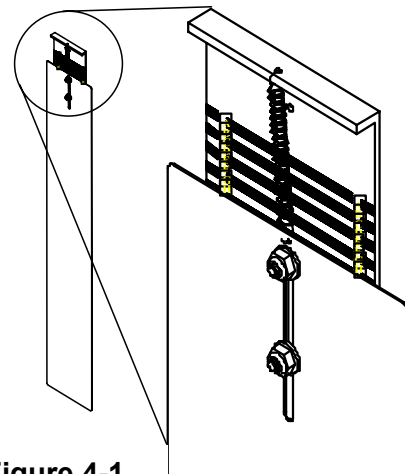


Figure 4-1

Tools Needed:	• Pressure Adjustment Tool, RP-43
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1. Position the Phoenix-Lite on a lane, about 2 feet down the lane from the foul line.
2. Reposition the oil tank pull rod to the intermediate position (the notch in the rod) to position the wicking foams away from the transfer roller.
3. Plug the Phoenix-Lite into a power source.
4. Turn ON the machine's POWER rocker switch.
5. Press and hold the BUFF pushbutton for approximately 10 seconds until the buffer brush engages and the buffer motor turns on. The drive motor will NOT start. Buffer operation will time out after approximately 45 seconds. Repeat as necessary.
6. From the rear of the machine, position the vinyl strip of the Pressure Adjusting Tool under the middle of the buffer brush, with at least 3 inches of the vinyl strip extending from the other side of the buffer brush. (You will feel it engage under the buffer brush.)
7. While observing the scale, hold the aluminum plate just off the surface of the lane, and slowly pull the tool away from the machine until you eventually pull it out from under the machine.
 - Pull the tool away from the brush in a straight path without lifting the aluminum plate away from the lane.
 - Take the reading while you are pulling the tool, not as the vinyl strip initially releases from the buffer brush.
8. Repeat the test at the left and right sides of the buffer brush.
9. If all the readings are not between B and C, you need to reposition the buffer brush until the buffer brush pressure is the same at each test point across the width of the brush. For instructions about how to perform this task, refer to the *Adjusting the Buffer Brush Pressure* information on page 4-10.

If the readings are between B and C for all of the areas you tested, unplug the Phoenix-Lite from the power source.

10. Reposition the tank pull rod to engage the wicking foams against the transfer roller.

4.2.2 Cleaning the Cleaner Tank Area

To clean the cleaner tank area, wipe the outside of the tank with a cloth dampened with the same, diluted cleaning solution you use on the lanes.

4.2.3 Cleaning the In-Line Filter

To keep particles out of the cleaner solution delivery system, the Phoenix-Lite has an in-line filter. To check and clean the in-line filter, complete the steps below. Perform these steps with the machine in the **operating** position.



Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:	Ratchet and 7/16" socket or 7/16" wrench Small clamps (2) or locking pliers
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1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-2), and lift the hood from the frame. Set the screws aside.

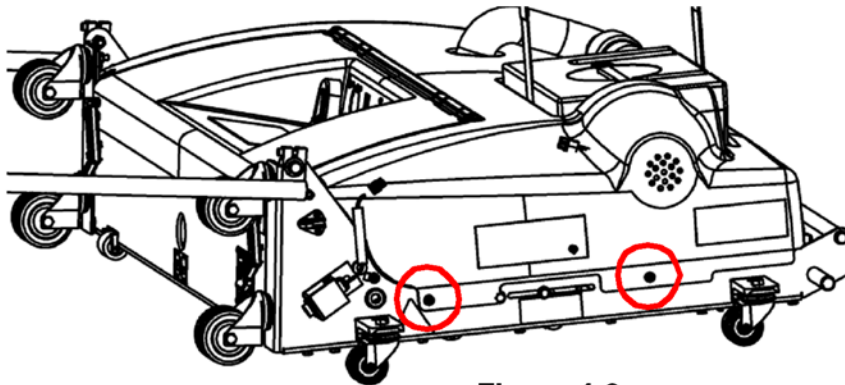


Figure 4-2

2. Locate the filter, which is attached to the front of the waste tank support bracket as shown in Figure 4-3.

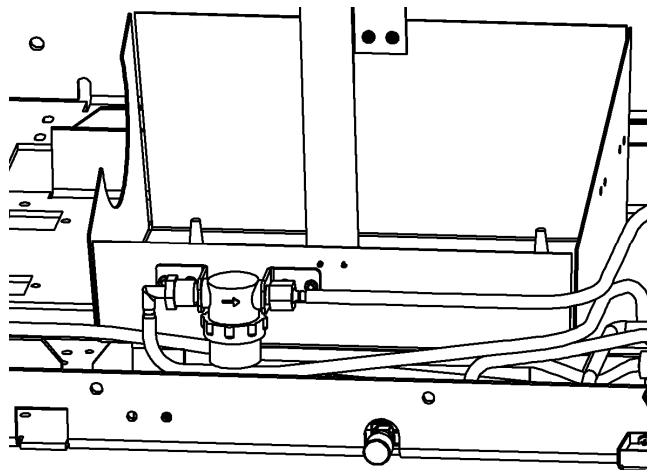


Figure 4-3

3. Pinch off the tubing on both sides of the filter assembly. When you remove the bowl, some cleaner will probably drain. Stopping the flow of cleaner is important to prevent unnecessary spills from occurring.
4. Remove the bowl and screen by unscrewing the bottom of the filter assembly.
5. Clean the bowl and screen under running water.
6. Reassemble the screen and bowl.
7. Remove the clamps from the tubing and check for leaks.
8. Wipe up any spills.
9. Replace the hood on the frame and secure it in place with the two screws on each side.

4.2.4 Checking the Waste Tank Seal

To ensure the proper vacuum is achieved, the waste tank seal must function correctly. Therefore, each week you should closely inspect the waste tank seal to ensure it doesn't have nicks or cuts, isn't rolled or bent, doesn't have excessively frayed or abraded areas, and is securely attached to the vacuum pump. Also, with the waste tank in place, check from the top and sides to see if there is a gap between the seal and the tank that could affect vacuuming efficiency. Adjust the vacuum motor mounting bracket as needed to correct the problem.

4.2.5 Cleaning the Waste Tank

In addition to rinsing the waste tank after each use, you should also clean it weekly by completing the steps below. Perform these steps with the machine in the **operating** position.

1. Disconnect the vacuum hose and remove the waste tank from the Phoenix-Lite.
2. Pour a few drops of cleaner into the waste tank and add water until the waste tank is about half full.
3. Carefully swish around the solution in the waste tank. Be sure to get the upper corners and around the intake opening.
4. Empty the cleaning solution from the waste tank.
5. Rinse the waste tank under running water until the water runs clear.
6. Reinstall the waste tank in the Phoenix-Lite and reconnect the vacuum hose.

4.2.6 Cleaning the Oil Tank Area

Oil will accumulate on the sides and front of the oil tank, in the wicking foam areas, and on the frame below the tank. To clean these areas, complete the steps below. Perform these steps with the machine in the **storage** position away from the lane or the approach. The oil tank can also be removed with the machine in the operating position by first removing the hood. **Keep the tank horizontal at all times to prevent spilling oil.**

Tools Needed:	None
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1. Unfasten the clasps of the oil tank compartment and open the compartment door. Overlap the door with the folding handle to keep the door open.

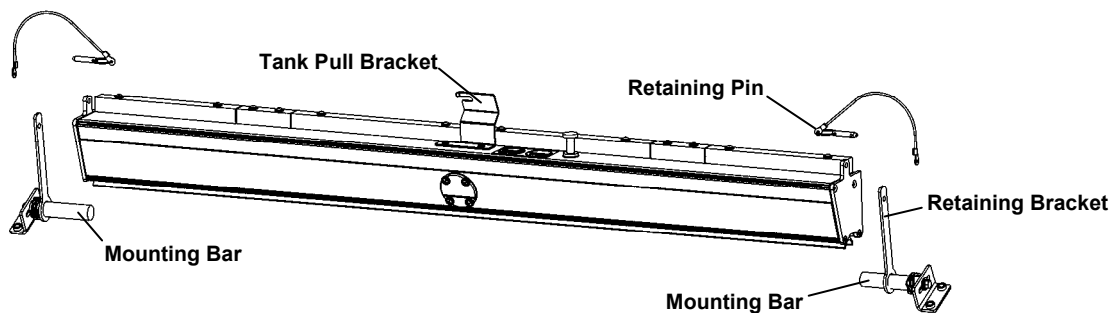


Figure 4-4

2. Remove the retaining pins from the retaining brackets at each end of the oil tank (see Figure 4-4).
3. While supporting the tank, unlatch the pull rod from the oil tank pull bracket.
4. Keeping the tank horizontal, move the tank away from the mounting bars, then position the tank to one side as far as it will go so that the other end can clear the hood opening. Remove the tank from the machine.
5. Wipe the oil transfer roller, the wicking foam areas, and the oil tank with a clean, dry cloth.
6. Remove the foam drip pad from the frame area. Rinse the pad in soapy water and then in clean water, wring it out, and hang it to dry. When dry, place it back in the machine.
7. Reinstall the oil tank in the machine by reversing the actions specified in steps 2 through 4.
8. Close the oil tank compartment door, and refasten the clasps.

4.2.7 Cleaning the Buffer Brush

The buffer brush bristles can get tangled and they can pick up lint or other things too large to be removed from the lane by the vacuum head. The buffer brush cannot apply the oil correctly if it has tangles and debris in the bristles. To clean the buffer brush, complete the steps below. Perform these steps with the machine in the **storage** position.

Tools Needed:	Coarse-toothed comb or stiff-bristled brush (optional)
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1. Wipe the buffer brush with a clean, dry cloth.
2. Turn the buffer brush to expose another section.
3. Turn and wipe the buffer brush until the entire brush has been cleaned.

NEVER wipe the brush with a cloth, comb, or brush that has been dampened with cleaner!

TIPS

If the bristles have become tangled or matted, use a coarse-toothed comb or stiff-bristled brush to comb through the bristles.

If the buffer brush bristles are in good condition but there is dirt in the brush, refer to the information about how to remove the buffer brush and follow those instructions to remove and reinstall the buffer brush from the machine. With the brush removed from the machine, use a coarse-toothed comb or stiff-bristled brush to comb out the dirt.


Dusting the lanes before conditioning will help keep the buffer brush clean.

4.3 PERFORMING OCCASIONAL MAINTENANCE

At some point you might need to replace or adjust parts as they wear out from use. This section describes how to adjust or replace those parts that undergo the most wear and tear, and contains information about some of the repairs you might have to perform. For more information, refer to the Troubleshooting section of this manual. If you encounter a problem that is not described here or in the Troubleshooting section, contact Technical Support.

4.3.1 Adjusting the Buffer Brush Pressure

For a consistent application of oil across the lane, the buffer brush pressure must be the same across the width of the buffer brush. The best setting for the buffer brush pressure is between B and C on the Buffer Pressure Adjusting Tool. If the buffer brush pressure readings are not the same on both sides or no longer show the buffer brush pressure between B and C, complete the steps below to adjust the buffer brush.

 **CAUTION** Although increasing the buffer brush pressure can condition low spots on the lane where insufficient oil was being applied, the pressure increase will shorten the life of the buffer brush and put undue strain on the buffer motor. Also, an overall slight reduction in the amount of oil applied to the lane could occur. Weigh the benefits against the detriments before setting the pressure higher than recommended.


NOTES

The buffer brush and transfer roller are kept in alignment by virtue of their being mounted to common components. The oil tank and transfer roller must also be in alignment for the consistent transfer of oil between the two. Any time the buffer brush is adjusted, check and adjust the alignment of the oil tank to the transfer roller in accordance with Section 4.3.2.

Any adjustment you make to one side of the brush will affect the other side. Adjust both sides to the same reading on the Pressure Adjustment Tool. (Too much pressure on one side can cause the machine to drive at an angle on the lane.

If adjusting the buffer brush still does not give you the oiling pattern you want, refer to Section 6 - *Determining Your Oiling Pattern*.

To change the buffer brush position, follow the steps below. Perform these steps with the machine in the **operating** position on the lane.

 **WARNING** Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, adjustment, replacement, or repair task.

Tools Needed:	Ratchet and 7/16" socket or 7/16" wrench
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1. While it is not absolutely necessary to remove the hood in order to perform this procedure, removing the hood will improve access to the buffer linkages, but will require you to reinstall the hood to check the adjustment. To remove the hood, unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-5), and lift the hood from the frame. Set the screws aside.

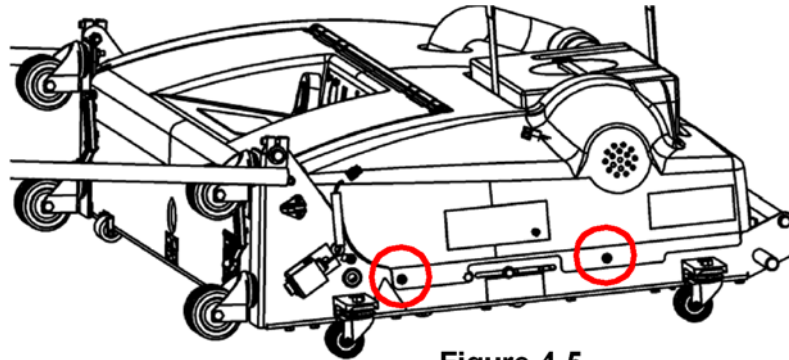


Figure 4-5

2. On each side of the machine frame, locate the buffer brush pressure screws. Figure 4-6 shows the screws on the side near the transfer roller motor.
3. **Loosen** the screws just enough to allow you to move the buffer brush linkage. **Do not** remove the screws.

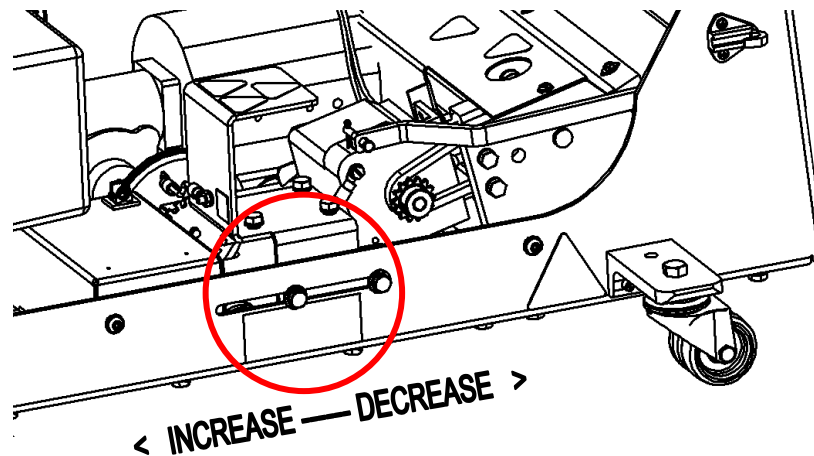


Figure 4-6

4. Position the buffer brush linkage as follows (Use the decal as a guide if needed):
 - To increase the buffer brush pressure, move the buffer brush linkage toward the vacuum head.
 - To decrease the buffer brush pressure, move the buffer brush linkage toward the oil tank.
5. Tighten the screws.

6. Reinstall the hood and check the buffer pressure and repeat adjusting the screw positions as needed.

TIP

Make small, incremental adjustments to the buffer brush position and repeat the pressure tests after each adjustment until you get the pressure set where you want it.

4.3.2 Checking and Adjusting Oil Tank Alignment



Always ensure the Phoenix-Lite Machine is disconnected from any power source before starting any maintenance, adjustment, replacement, or repair task.

Tools Needed:	<ul style="list-style-type: none"> • Ratchet and 7/16" socket or 7/16" wrench • Large clamps (2)
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The oil tank to transfer roller alignment should be checked and adjusted as needed whenever the buffer brush has been adjusted. Perform this procedure with the machine in the **operating** position.

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-5), and lift the hood from the frame. Set the screws aside.
2. Unlatch the pull rod from the oil tank pull bracket and move the tank away from the transfer roller.
3. Clamp the buffer solenoids in the fully engaged position.
4. Loosen the screws that secure the oil tank adjusting bars to the top of the tank, move the bars back away from the leading edge of the oil tank, and tighten the screws.
The adjusting bars must be behind the leading edge of the oil tank to ensure they do not influence the pressure reading.
5. Position the oil tank against the transfer roller, **BUT DO NOT LATCH THE PULL ROD TO THE TANK BRACKET.**
6. Use the yellow oil tank feeler gauge, included with your machine, to check the wicking foam pressure against the transfer roller by inserting and removing the feeler gauge from between the foam and the roller while observing the amount of resistance or drag. Do this near both ends of the oil tank.

If the resistance on each end is noticeably different, adjustment is needed. The oil tank mount assemblies are secured to the machine's frame with four bolts in slotted holes that are accessible from the underside of the machine (see Figure 4-7). Changes made to one side of the tank will affect the adjustment on the other side. It will probably be necessary to adjust both sides to achieve the correct alignment.

7. Loosen the mounting screws just enough to allow adjustment and move the tank assembly on the side with the lower resistance, a slight amount toward the transfer roller. Make sure the lip of the oil tank trough does not contact the transfer roller. Tighten the screws.

NOTE

The screws are installed against the rear of the slotted holes in the frame at the factory, so for the initial field adjustment the assembly can only be moved toward the transfer roller. It is more important that the foam pressure be nearly identical than to achieve a specific foam pressure since this will change when the oil tank pull rod is engaged.

—Slotted Hole—
machine shown in storage
position with screw
removed for clarity

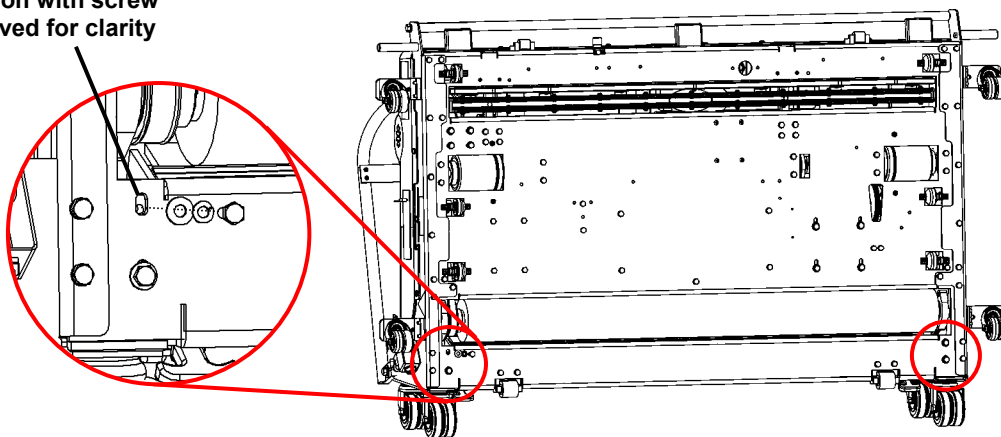


Figure 4-7

8. Check the wicking foam pressure at both ends of the oil tank, and repeat the adjustment as needed on both ends of the oil tank until the resistance is the same. Tighten the screws securely.
9. Engage the pull rod in the oil tank pull bracket.
10. Loosen the screws on the adjustment bars and slide them forward until they contact the wicking foams. Apply gentle, even pressure to the foam across the length of the adjustment bars and then tighten the screws. DO NOT attempt to compress the foam or apply excessive pressure. The bars are designed to increase the contact area between the foam and transfer roller. Too much pressure will give inconsistent results.
11. Remove the clamps from the buffer solenoids and reinstall the hood.

4.3.3 Rotating the Wicking Foams

Whenever the Phoenix-Lite starts leaving a wavy oil pattern, you need to replace the wicking foam surface. This can be done by replacing the foams or by rotating the wicking foams so that a new surface is applying oil to the oil transfer roller. For information about replacing the wicking foams, refer to the instructions later in this section. Follow the steps below to rotate the wicking foams.

NOTES

After rotating the wicking foams, ensure they are completely saturated with conditioner before conditioning the lanes.

When you use the Phoenix-Lite after rotating the wicking foams, clean, oil, and buff the first lane twice to ensure the proper amount of oil is applied.

To rotate the wicking foams, perform the steps below. Perform these steps with the machine in the **storage** position in the maintenance area.

Tools Needed:	None
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1. Unfasten the clasps of the oil tank compartment and open the compartment door.
2. Slide the oil tank latch sideways out of the slot in the retaining bracket to release the oil tank.
3. Tip the oil tank away from the oil transfer roller to expose the oil transfer roller and wicking foams area.
4. Spread clean, dry cloths over all of the components, leaving only the wicking foams and oil tank tray exposed.
5. Remove a wicking foam from one end of the oil tank and set it aside on a clean surface.
6. Remove the wicking foam from the other end of the oil tank, rotate it end for end, and reinstall it in the opposite end of the tank. The result will be that the front face becomes the back face with the top remaining at the top, as shown in Figure 4-8. The end wicking foams are notched along their outside edges to prevent drips. When rotating these wicking foams, they must be reinstalled at the opposite end of the oil tank otherwise a gap would exist between the adjacent foams.
7. Install the wicking foam that was removed in Step 5 in the other end of the oil tank. Install it with its unused side facing out.

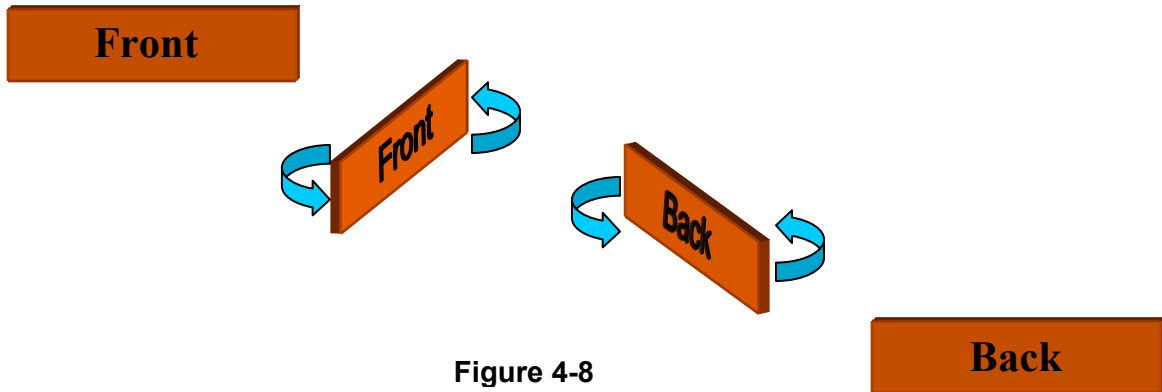


Figure 4-8

8. Repeat the operation for the remaining wicking foams. They can be reinstalled in their original locations. Ensure the wicking foams line up evenly across the top, with 1½ inches of foam showing above the tray edge, and that they are firmly seated in the oil tray.
9. Wipe up any spills immediately with a clean, dry cloth.
10. Tip the oil tank forward against the oil transfer roller, and latch the oil tank in place with the pull rod. Close and latch the compartment door.

4.3.4 Lubricating the Chains

Approximately every three months you should lubricate the drive chain and sprocket and the oil transfer roller motor chain and sprocket with a good quality 80- to 90-weight gear oil. **DO NOT USE GREASE.** Be sure to wipe off any excess oil.

4.3.4.1 Drive Chain and Oil Transfer Roller Chain

Depending on how often you condition your lanes, you may need to lubricate the oil drive chain and transfer roller chain more frequently than every three months. Perform the steps below with the machine in the **storage** position.



Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:	<ul style="list-style-type: none"> • Oil can with nozzle dispenser or small, long-handled, stiff-bristled brush • Ratchet and 7/16" socket or 7/16" wrench
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1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-9), and lift the hood from the frame. Set the screws aside.
2. Locate the drive chain along the left side of the drive shaft and the oil transfer roller chain at the left rear of the machine, as shown in Figures 4-10 and 4-11.
3. Apply a small amount of oil to the chain links.
4. Manually move the chains and apply oil until all the links have been lubricated.
5. Wipe off any excess oil.
6. Reinstall the hood.

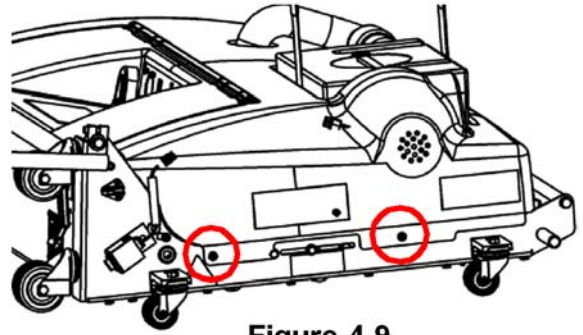


Figure 4-9

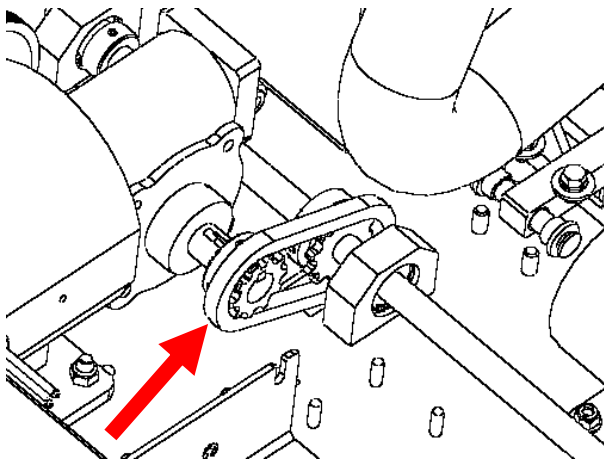


Figure 4-10

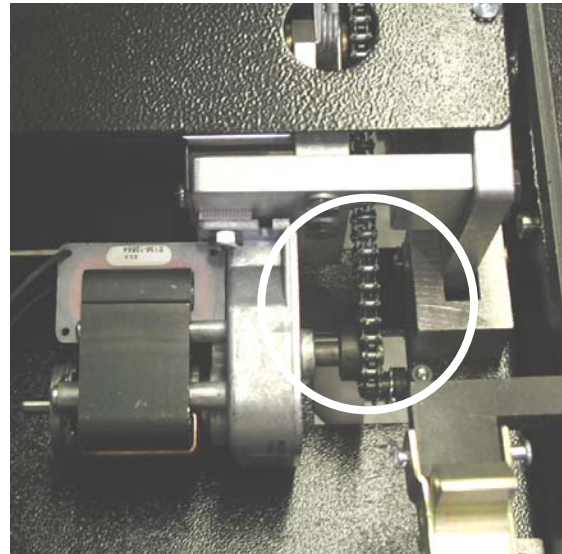


Figure 4-11

4.3.5 Adjusting Cleaner Spray

To ensure that the machine removes all of the existing oil when cleaning the lanes, the lanes must have adequate coverage of cleaner. Too little cleaner will leave conditioner on the lane, while too much cleaner is wasteful and will cause cleaner to be sprayed into the gutters.

Cleaner flow is adjustable in a couple of ways. The AMOUNT of cleaner being sprayed onto the lanes is a factor of the cleaner pressure at the inlet side of the spray nozzles. This is determined by the cleaner flow control valve located at the front of the machine (see

Figure 4-12). The valve is throttled to an intermediate position to achieve the correct balance of cleaner being directed to the spray nozzles and being recirculated back to the cleaner tank. Closing down on this valve increases cleaner flow to the spray nozzles. This setting should be checked first before attempting to adjust the individual spray heads. The correct setting should allow the machine to clean 10 to 12 lanes on a tank of cleaner. Perform the following steps with the machine in the **operating** position.

Tools Needed:	<ul style="list-style-type: none"> • 1/16" hex wrench • Ratchet and 7/8" & 3/8" sockets or wrenches
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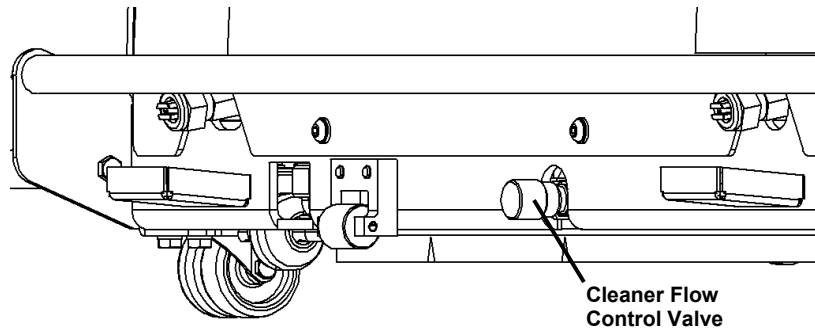


Figure 4-12

To adjust cleaner flow:

1. Unlock the valve using a 1/16-inch hex wrench to loosen the set screw in the valve's knurled knob. The knob has two set screws. The smaller one (the one closest to the valve body) is the correct one. The other set screw is used to zero the valve's vernier scale.
2. OPEN the valve slightly to DECREASE cleaner spray, or CLOSE the valve slightly to INCREASE cleaner spray.
3. Lock the valve setting by tightening the smaller set screw to prevent machine vibration from changing the setting.

The PATTERN of cleaner spray is determined by the setting of the spray nozzles. The spray nozzles emit a fan-shaped pattern (the center nozzle has a wide spray pattern while the outside nozzles have narrow spray patterns) that can be adjusted in two ways. First, the nozzle can be rotated to spray cleaner in either a more horizontal or more vertical orientation depending on the position of the nozzle. Secondly, angle of the entire spray head can be adjusted to aim the spray more towards the middle of the lane or more towards the outside of the lane, as needed. Together, the spray pattern can be fine-tuned to meet your needs.

To rotate the spray head:

1. Loosen the tip retainer (collar) that secures the spray nozzle to the body.
2. Rotate the nozzle to the desired position.

3. Tighten the tip retainer.

To adjust the spray head angle:

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-13), and lift the hood from the frame. Set the screws aside.
2. Loosen the lock nut in the spray head's adjustment slot (see Figure 4-14).
3. Angle the spray head to achieve the desired coverage. Be careful not to position it where cleaner can be sprayed into the gutter.
4. Tighten the lock nut.

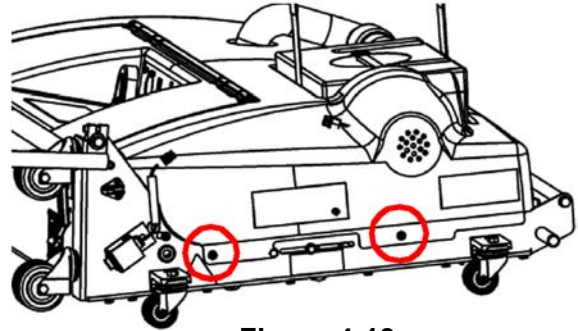


Figure 4-13

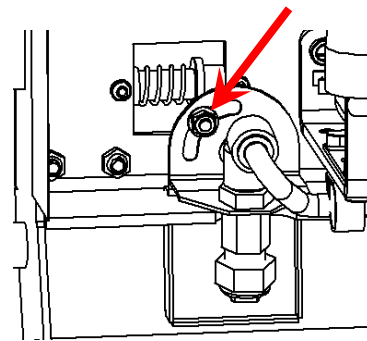


Figure 4-14

4.3.5.1 Clearing Clogged Nozzles

The nozzles are designed to be clog free and the in-line filter should keep out particles that could clog the nozzles, but a clog may still occur. To clear a clogged spray head, follow the steps below. Perform these steps with the machine in either the **operating** or the **storage** position.

Tools Needed:	Ratchet and 7/8" socket or wrench
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1. Unscrew the spray head collar (tip retainer) to release it from the body. The collar, spray nozzle, and strainer/check valve will be released (see Figure 4-15).
2. Soak the spray nozzle and strainer/check valve in warm water for several minutes then blow air through them from the tip end.
3. Reassemble the strainer, nozzle, and spray head collar and screw onto the spray head body. Before tightening, ensure the spray nozzle is positioned to deposit cleaner spray in the desired direction.

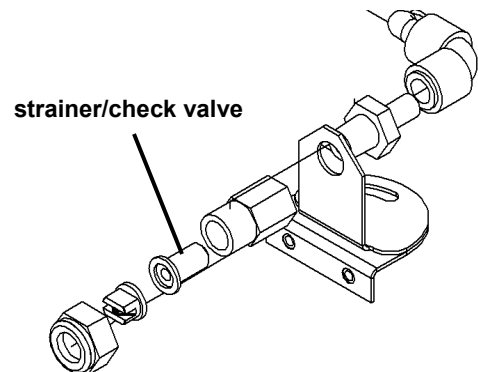


Figure 4-15

4.3.6 Adjusting the Vacuum Head

The vacuum head linkage is designed to allow the vacuum head to float on the lane so that it maintains its cleaning efficiency over the bumps and potholes that can form on a lane's surface over time. Correct adjustment of the vacuum head is important. The agitator and squeegees should be well clear of the lane when the vacuum head is retracted while allowing the agitator and squeegees to contact the lane with the correct amount of deflection when extended.

When the machine is turned on, the vacuum head solenoids energize to pull the vacuum head up away from the lane. During a cleaning operation, the solenoids deenergize to allow the vacuum head to drop down onto the lane surface. This allows the vacuum head to float. If power is lost while the machine is on the lane, the vacuum head will drag along the lane surface if the machine is moved. Perform the following steps with the machine in the **operating** position on a lane.



WARNING

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, adjustment, replacement, or repair task.

Tools Needed:

- 5/32" hex wrench
- Ratchet and 7/16" socket or 7/16" wrench

TIP

While it is not necessary to remove the hood to adjust the vacuum head, doing so could make it easier.

To adjust the vacuum head:

1. Turn off the machine and unplug the power cord.
2. Loosen the jam nut on each of the two vacuum head height adjustment screws. They can be accessed through the cutouts in the frame at the front of the machine (see Figure 4-16).
3. Rotate the height adjustment screw **COUNTERCLOCKWISE** to **RAISE** the vacuum head or **CLOCKWISE** to **LOWER** the vacuum head. (You might be able to do this without the use of a tool.) Do this to both height adjustment screws so that the agitator and squeegees deflect approximately 1/4-inch in the rearward direction. Move the machine a few inches forward to allow the adjustment to be fully realized.
4. When the correct deflection is achieved evenly over the length of the vacuum head, tighten the jam nuts.

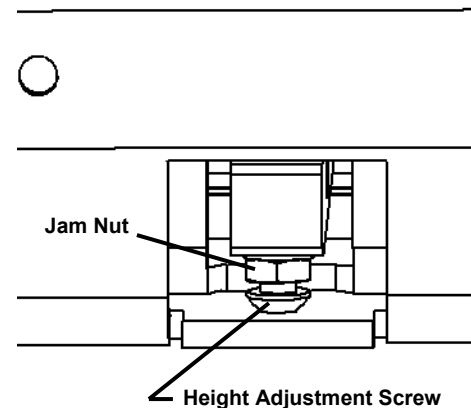


Figure 4-16

4.4 REPLACING PARTS

The agitator foam, squeegees, buffer brush, and waste tank seal all wear with use so they will eventually need to be replaced. This section tells you how to replace these parts.

4.4.1 Replacing the Agitator Foam

Since the agitator foam is the first component to contact the oil and dirt on the lanes, it undergoes a lot of wear and tear and should be replaced at least every three months. Depending on how often you clean your lanes, you may need to replace the agitator foam more frequently. To replace the agitator foam, complete the steps below. Perform these steps with the machine in the **operating** position to start.

TIP

After you have removed the vacuum head from the machine, position it upside down on blocks that are high enough to allow the output port to hang down without touching the work surface. This keeps the vacuum head level and positions the components for easy access.



WARNING

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:

- #2 Philips screwdriver
- Medium flat blade screwdriver
- Ratchet and 7/16" and 9/16" sockets or wrenches

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-17), and lift the hood from the frame. Set the screws aside.
2. Loosen the screw on the vacuum hose clamp and remove the vacuum hose from the vacuum head.
3. Remove the two nuts and washers to release the vacuum head from the pivot arms, and remove the vacuum head from the **underside** of the machine as shown in Figure 4-18a.

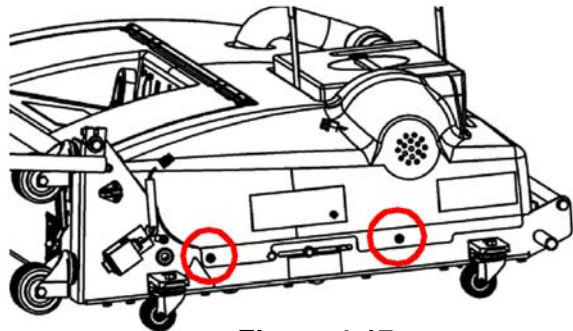


Figure 4-17

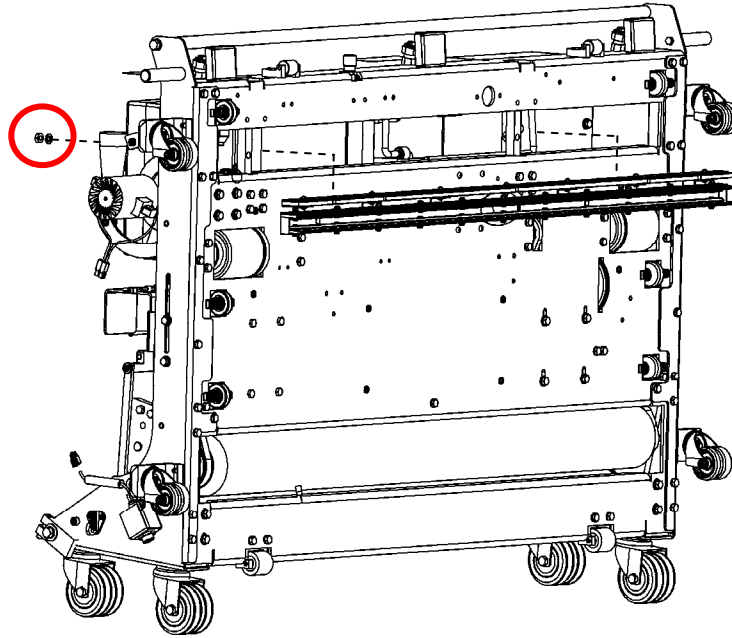


Figure 4-18a

4. Remove the seven #10 screws from the vacuum head to release the agitator foam and clamps as shown in Figure 4-18b, and set the screws aside.

5. Place one of the foam clamps over the new agitator foam and the other behind the foam. Align the top of the foam to the top of the clamps and center it along the clamps.

6. Secure the assembly to the vacuum head with the six #10 screws.

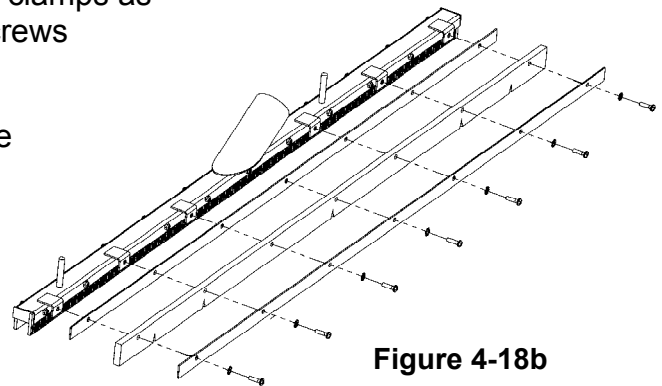


Figure 4-18b

7. Reinstall the vacuum head in the machine, and secure it in place with the two nuts that were removed earlier.
8. Attach the vacuum hose to the vacuum head and tighten the screw on the vacuum hose clamp.
9. Replace and secure the hood to the frame.

4.4.2 Replacing the Squeegees

The squeegees should be replaced at least every 12 months, whenever they show wear and tear, or become stiff or brittle.

IMPORTANT

When reattaching the back squeegee (squeegee 2), tighten the hex nuts only until the end of the stud shows. To do otherwise will cause the squeegee to deform which will allow residue to remain on the lane.

NOTE

You should replace both squeegees during the repair.

Perform these steps with the machine in the **operating** position to start.

TIP

After removing the vacuum head from the machine, place it upside down on blocks that are high enough to allow the output port to hang down without touching the work surface. This keeps the vacuum head level and positions the components for easy access.



WARNING

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:

- Medium flat blade screwdriver
- Ratchet and 5/16", 7/16", and 9/16" sockets or wrenches

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-19), and lift the hood from the frame. Set the screws aside

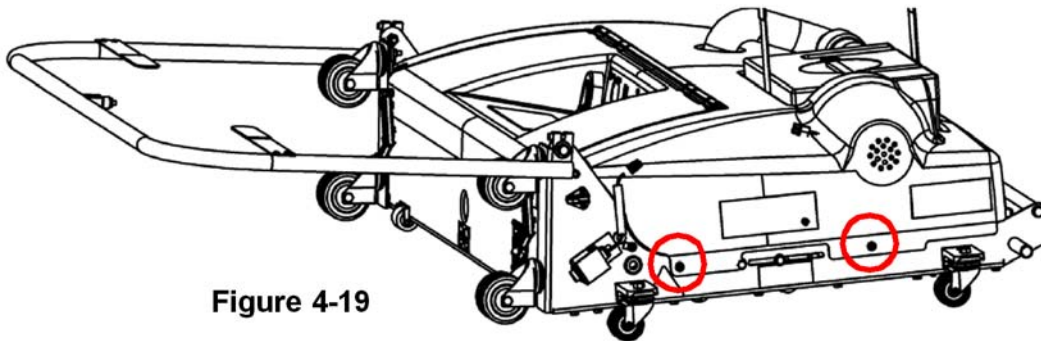


Figure 4-19

2. Place the machine in the **Storage** position.
3. Loosen the screw on the vacuum hose clamp and remove the vacuum hose from the vacuum head. Remove the two nuts and washers to release the vacuum head from the pivot arms and remove the vacuum head from the **underside** of the machine as shown in Figure 4-20.

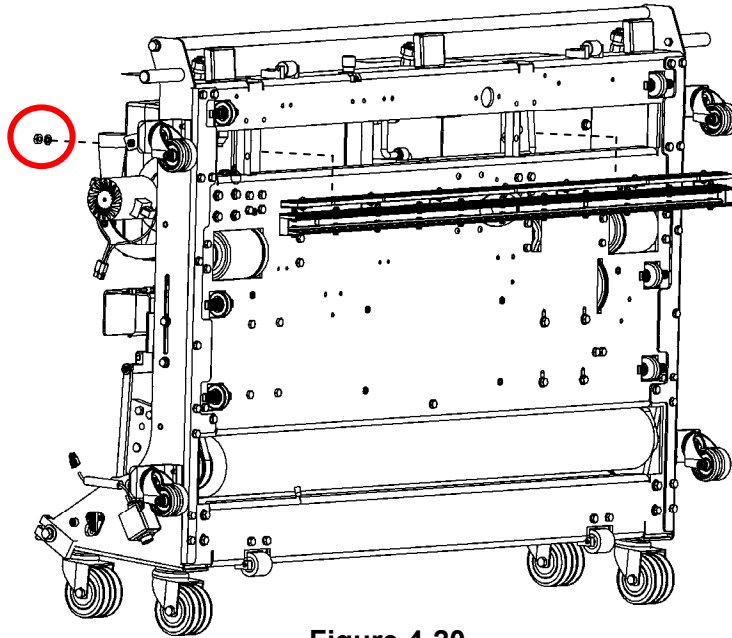


Figure 4-20

4. Remove all except the center screw of the agitator assembly. This will detach the agitator from the vacuum head without disassembling it.
5. Remove the 11 nuts from the stud bar and remove the bar and squeegee from the vacuum head.
6. Remove the old squeegee from the stud bar.
7. Attach the new squeegee to the stud bar with the **smooth** side against the stud bar.
8. Reinstall the squeegee and stud bar into the vacuum head.
9. Reinstall the 11 nuts to attach the stud bar to the vacuum head. Reinstall the nuts in the following pattern: one end, other end, middle, then all remaining nuts.

IMPORTANT

When replacing the back squeegee, **DO NOT OVERTIGHTEN THE NUTS**. Tighten them until the nuts are just flush with the studs.

10. Replace the other squeegee by repeating steps 5 through 9.
11. Reinstall the vacuum head in the machine.
12. Secure the vacuum head in the machine with the two hex head nuts, and put machine back into **operating** position.
13. Attach the vacuum hose to the vacuum head and tighten the screw on the vacuum hose clamp.
14. Reinstall the hood and secure it to the frame.

4.4.3 Replacing the Wicking Foams

Depending on conditions such as how many lanes you have and how often you clean and condition them, the wicking foams should last between four to six months. However, whenever the Phoenix-Lite starts leaving a wavy oil pattern or the oil output has decreased and rotating the wicking foams does not alleviate the problem, you need to replace them.

NOTES

The Phoenix-Lite cannot be used for approximately two hours after you have replaced the wicking foams. This waiting period is required to allow the oil to be wicked to the top of the foam. To verify the oil has wicked to the top of the foam, check the color of the wicking foam. Because the wicking foam darkens as it wicks oil, you can easily identify the lighter (no oil) area of the wicking foam. When the wicking foam is all the same color, it is ready for use. When you use the Phoenix-Lite after replacing the wicking foams, clean, oil, and buff the first lane twice to ensure the proper amount of oil is applied.

You can replace the foams with the oil tank in or out of the machine. To remove the tank from the machine, follow the steps in Section 4.2.6.

To replace the wicking foams, perform the steps below. Perform these steps with the machine in the **storage** position in the maintenance area.

Tools Needed:	<ul style="list-style-type: none"> • Container for catching oil dripping from wicking foams • Clean, dry cloths
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1. Unfasten the clasps over the oiling components at the back of the Phoenix-Lite and open the compartment door.
2. Slide the oil tank latch sideways out of the slot in the retaining bracket to release the oil tank.
3. Tip the oil tank away from the oil transfer roller to expose the wicking foams.
4. Pull out the wicking foams from the oil tank slot and put them in a container to catch the oil.
5. Wipe up any spills immediately with a clean, dry cloth.
6. Insert the new wicking foams so they rest on the bottom of the oil tank slot, as shown in Figure 4-21a. There should be 1½ inches of foam showing above the edge of the oil tank slot.

Replacement wicking foams of various densities are included with your lane machine. Each has a number stenciled on it that indicates the foam's relative density. **The lower the number; the lower the foam's density. The lower the foam's density; the higher the foam's oil output.** Cut the foams to the necessary lengths. The end foams should be profiled like the original factory foams, as shown in Figure 4-21b, to prevent

dripping. You can experiment with different density foams to create various oil patterns. (For more on oil patterns, see Section 6 – *Determining Your Oil Pattern.*)

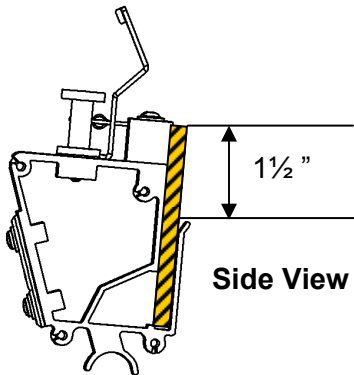


Figure 4-21a

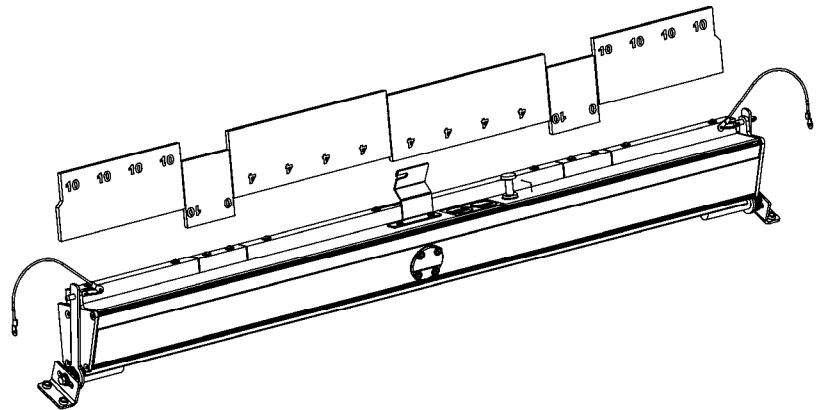


Figure 4-21b

IMPORTANT

Ensure that the wicking foam edges firmly abut each other with no gaps at the top and that the tops of the wicking foams are even.

7. Tip the oil tank against the oil transfer roller, relatch the oil tank, close the compartment door, and refasten the clasps.

4.4.4 Replacing the Buffer Brush

As the bristles wear and break off the buffer brush and it becomes dirty through use, it can no longer apply the oil properly. As a general guideline, the buffer brush should be replaced yearly in a 24-lane center that conditions their lanes once a day, or every two years in a 12-lane center that conditions once a day. But this is just a guideline. When adjusting the brush doesn't significantly improve its performance, it's time to replace it.

NOTE

The buffer brush can be adjusted to help maintain its performance. As the buffer brush wears, its bristles become thin and tapered and its performance degrades. Even though you might still be able to adjust its pressure to between B and C using the buffer pressure adjusting tool, it will not hold as much oil or function as well, and should be replaced.

Tools Needed:	None
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Perform the steps below to replace the buffer brush. Complete these steps with the machine in the **storage** position.

1. Face the base plate.
2. Grasp the left end of the buffer brush.
3. Gently slide the buffer brush to the right while slightly pulling the left end towards you (out of the opening). Pull out the left end until it is just clear of the slot in the base plate, as shown in Figure 4-22.



Figure 4-22

4. Pull the buffer brush towards the left to release its right side from the machine.
5. Pull the entire buffer brush out from the machine.

6. Lightly oil the spring-loaded end (right hand side) of the new buffer brush. Use the same 80- to 90- weight gear oil you use to lubricate the chains.
7. Insert the right end of the brush into the sprocket on the right side of the opening.
8. Grasp the left end of the buffer brush and push it gently towards the right while positioning it into its drive sprocket on the left side.
9. Release the left side of the buffer brush into its sprocket.
10. After replacing the brush, check and, if necessary, adjust the buffer brush pressure in accordance with Sections 4.2.1.2 and 4.3.1.

4.4.5 Replacing the Waste Tank Seal

The waste tank seal should be smooth and flat. If it is wrinkled, warped, buckled, or has started to pull away from the vacuum pump housing, it will not provide the seal needed to create the vacuum to remove the cleaning residue from the lane, and must be replaced.

Perform the steps below to replace the waste tank seal. Perform these steps with the machine in the **operating** position.

Tools Needed:	<ul style="list-style-type: none"> • Scraper • Solvent
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1. Remove the vacuum hose from the waste tank inlet port.
2. Remove the waste tank from the machine to expose the waste tank seal (see Figure 4-23).

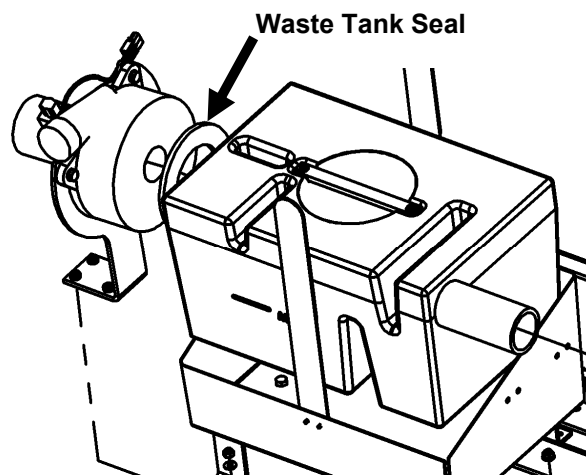


Figure 4-23

3. Carefully peel the waste tank seal from the vacuum pump.
4. Scrape off any remaining pieces of the seal and any adhesive.



WARNING

Some solvents are flammable. Do not use while smoking or near open flames. Solvents can give off harmful vapors. Use in a well ventilated area. Follow the manufacturer's precautions.

5. Wipe the waste tank seal area with a solvent to remove any remaining residue.
6. Allow the solvent to completely evaporate from the sealing surface. Failing to do so will prevent the new seal from adhering properly.
7. Remove the plastic backing from the new waste tank seal.
8. Center the new seal over the vacuum pump inlet and press firmly.

NOTE

Allow the adhesive 15 to 20 minutes to set before installing the waste tank.

4.4.6 Replacing Fuses

There are eight fuses in the Phoenix-Lite: the main power board fuse and seven others for the motors and solenoids. All except one are located on the back of the control box. The remaining fuse is located in a fuse holder (along with a spare fuse) in the area between the control box and the buffer motor. This fuse provides electrical protection for the buffer motor. To replace the fuses, perform the steps below with the machine in the **operating** position.

Tools Needed:

- Ratchet and 7/16" & 3/8" sockets or wrenches



WARNING

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-24), and lift the hood from the frame. Set the screws aside.

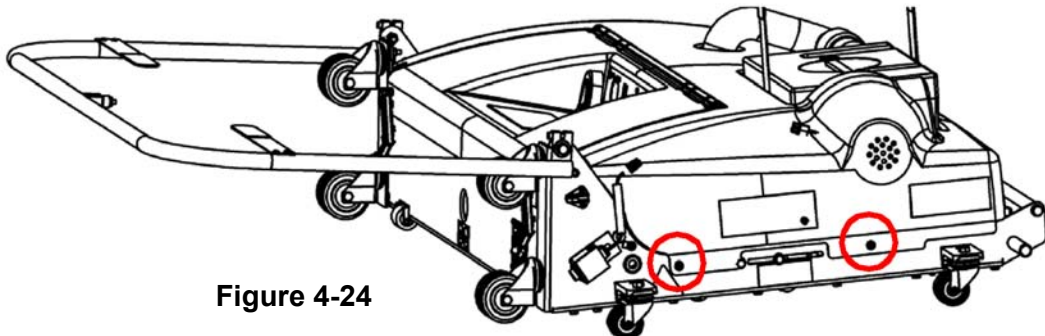


Figure 4-24

2. Remove the electrical cover from the back of the control box. The fuses can be identified using the label on the back of the cover.
3. Remove the protective fuse cover by unscrewing it in the counterclockwise direction.
4. To remove the fuse, pull it straight out and away from the back of the control box.

NOTE

Replacement fuses must have the identical voltage, current, and time delay ratings.

5. To insert the new fuse, line up the fuse contact wires with the holes in the socket and push the fuse straight in. Be careful not to bend the fuse contact wires.
6. Reinstall the protective fuse cover.
7. Reinstall the electrical cover on the back of the control box.
8. To replace the buffer motor fuse, flip open the fuse holder and open the cover as shown in figures 4-25a, b, & c. The cover's design aids in the removal and replacement of the fuse. After replacing the fuse, close the cover and pivot the fuse holder back into its original position.



Figure 4-25a

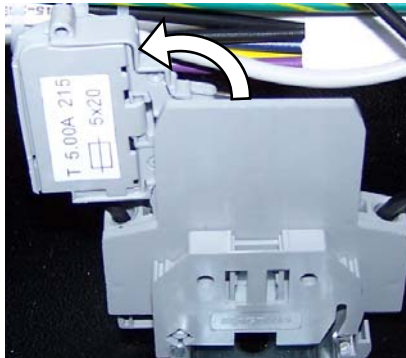


Figure 4-25b

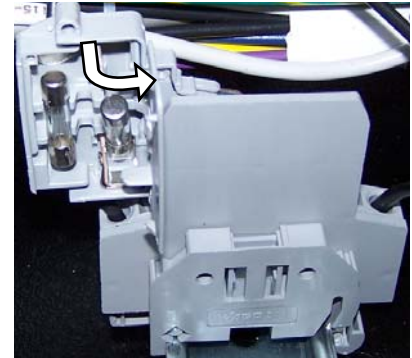


Figure 4-25c

4.4.7 Repositioning and Replacing the Optical Sensors

The optical sensors control where the Phoenix-Lite stops. If they are not functioning properly, the Phoenix-Lite may stop before it reaches the end of the lane or the approach, or may not stop at all. The information below tells you how to adjust the rear sensor and how to replace the front and rear sensors.

4.4.7.1 Adjusting the Rear (Approach) Sensor

The Phoenix-Lite is designed to stop upon its return to the foul line when its on-board counter counts down to one foot (either at the end of the program or between passes of a two-pass oiling program). The Approach sensor is designed as a backup sensor to stop the machine should the on-board counter lose track of the machine's position on the lane as might occur if the counter wheel skids when traveling through a heavily oiled section of the lane.

Also, if you have brightly colored gutter transition blocks, missing gutter straps, peeling paint, or holes in the gutters, the rear sensor could turn the Phoenix-Lite off before it reaches the foul line since it can "see" these things from a further distance. To correct this, replace the missing or damaged parts of the gutter and adjust the sensor so that it does not sense the transition blocks too soon. Complete the steps below to adjust the position of the rear sensor. Perform these steps with the machine in the **operating** position.

Tools Needed:	<ul style="list-style-type: none"> • Philips screwdriver (magnetic tip recommended but not required) • 7/16" wrench
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1. Locate the sensor on the bracket over the right rear caster wheel, as shown in Figure 4-26.
2. Loosen the bolt just until you can move the bracket. **DO NOT REMOVE THE BOLT.** The sensor bracket rotates and moves up and down in the slot on the bracket, as shown in Figure 4-27.
3. Make the position changes in small increments.
 - To position the sensor so the distance it looks down the gutter is shorter, move the bracket lower down on the side of the machine.
 - To position the sensor so the distance it looks down the gutter is longer, move the bracket higher up the side of the machine.
 - To position the sensor so the angle at which it looks into the gutter is steeper, rotate the front of the bracket down.

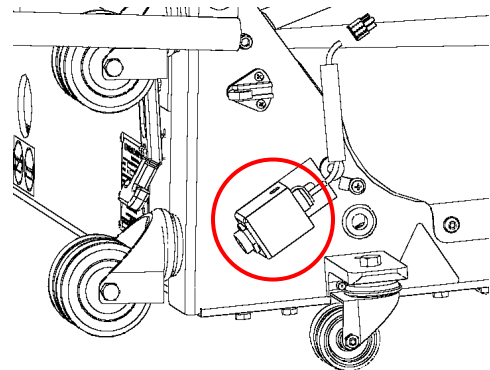


Figure 4-26

- To position the sensor so the angle at which it looks into the gutter is broader, rotate the front of the bracket toward the top of the machine.
4. Tighten the bolt just enough to hold the sensor in place then run the Phoenix-Lite to test the positioning.
 5. If the machine comes up the lane and turns off only at the approach, fully tighten the bolt to secure the rear sensor in place. If the Phoenix-Lite stops before it reaches the approach, repeat these steps until the sensor is correctly positioned.

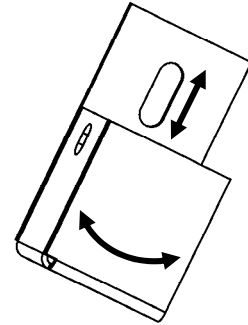


Figure 4-27

The sensor's sensitivity can also be adjusted. There is a small adjustment screw in the side of the sensor that controls the electronic circuitry within the sensor. This screw can be accessed through a slot in the side of the sensor bracket (see Figures 4-26 & 4-27.) Use a very small flat blade screwdriver to turn the screw counterclockwise to decrease sensitivity or clockwise to increase sensitivity. Make small adjustments, and only use this method if the previous steps do not give the desired results.

4.4.7.2 Replacing the Front (Pin Deck) Sensor

To replace the front sensor, complete the steps below. Perform these steps with the machine in the **operating** position.

**WARNING**

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:

- Phillips screwdriver
- Socket set or equivalent
- 15/16" wrench

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-28), and lift the hood from the frame. Set the screws aside.

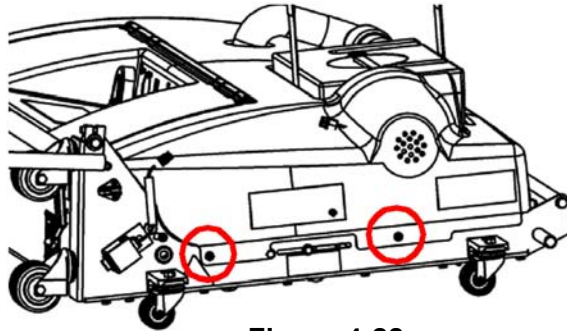


Figure 4-28

2. From within the machine, locate the sensor on the front of the base plate near the center spray nozzle.
3. From under the sensor bracket, unscrew the jam nut on the sensor. (This might be easiest done using a socket and ratchet.) Pull the sensor out of the hole in the bracket. Set aside the jam nut.
4. Unscrew the other jam nut from the sensor and set it aside.
5. Remove the electrical cover from the back of the control box.
6. Follow the path of the sensor wire through the wire harness to the connector at the back of the control box. The connector is attached to the slot on the right in the bottom row, as shown in Figure 4-29.
7. Gently squeeze the outer tabs of the connector and pull it from the housing on the control box.

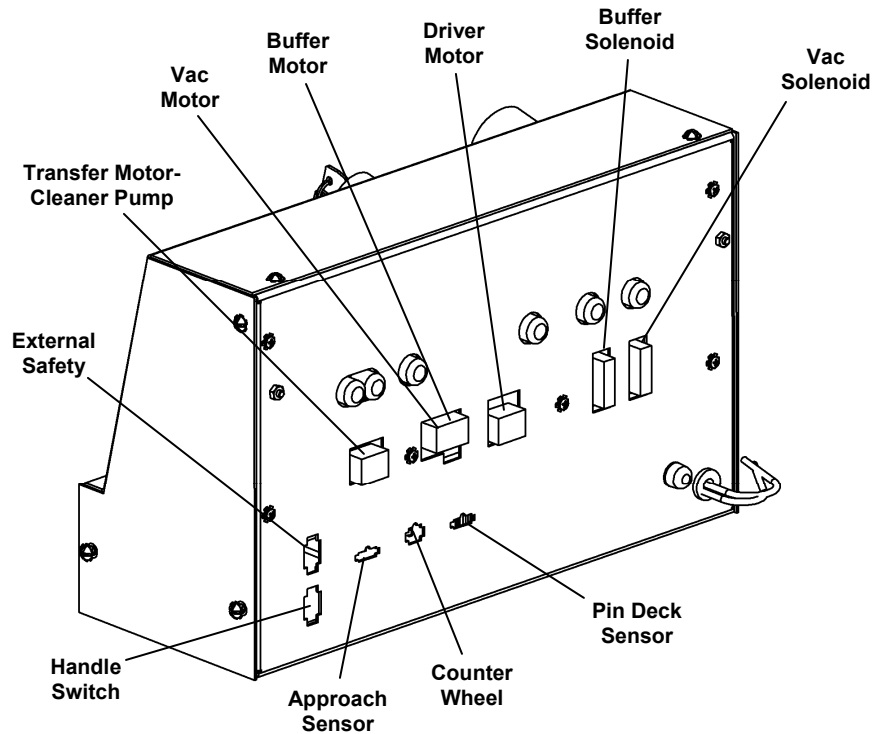


Figure 4-29

8. Insert the new sensor connector into the housing on the control box, and route the wire and sensor to the sensor bracket.
9. Thread a jam nut part way onto the sensor and insert the sensor through the hole in the sensor bracket.
10. From under the sensor bracket, thread the other jam nut onto the sensor so the bracket is sandwiched between the two jam nuts.
11. Tighten the jam nuts (finger tighten only) until the sensor is securely positioned.

4.4.7.3 Replacing the Rear (Approach) Sensor

To replace the rear sensor, complete the steps below. Perform these steps with the machine in the **operating** position.



WARNING

Always ensure the Phoenix-Lite Lane Machine is disconnected from any power source before starting any maintenance, replacement, or repair task.

Tools Needed:

- Ratchet and 15/16", 7/16", & 3/8" sockets or wrenches
- Wire cutters

1. Unlatch the oil compartment door latches, disconnect the vacuum hose and remove the waste tank, remove the cap from the cleaner tank, remove the two screws from each side of the hood (see Figure 4-30), and lift the hood from the frame. Set the screws aside.

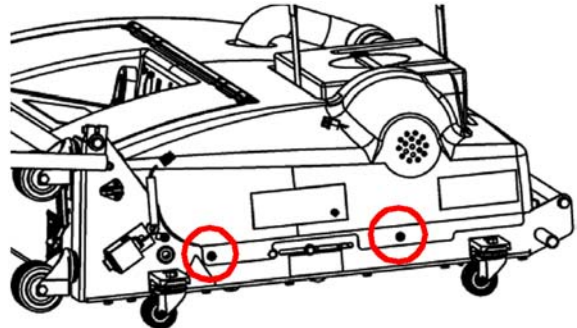


Figure 4-30

2. Locate the sensor and bracket over the right rear caster wheel, as shown in Figure 4-31.
3. While holding the sensor, unscrew the bottom jam nut (under the bracket) and remove it from the sensor. Pull the sensor up from the bracket. Set aside the jam nut.
4. Unscrew the top jam nut and set it aside.
5. Remove the electrical cover from the back of the control box.

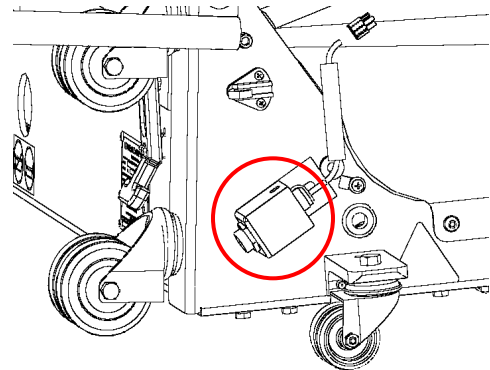


Figure 4-31

6. Follow the sensor wire through the hole in the side of the machine, to the wire harness, and to the connector at the back of the control box. (The one on the bottom row that is two to the left of the pin deck sensor, as shown in Figure 4-29)
7. Gently squeeze the outer tabs of the connector and pull it from the housing on the control enclosure.
8. Route the wire/connector through the hole in the side of the machine and discard.

NOTE

To release the sensor wire from the wire bundle, you can either cut the tie around the bundle or cut the connector off the end of the sensor wire and pull the sensor wire out of the bundle.

9. Thread one of the jam nuts onto the new sensor then place the sensor into the hole in the bracket.
10. From under the bracket, thread the other jam nut onto the end of the sensor so the bracket is sandwiched between the two jam nuts. Tighten the jam nuts (finger tighten only) until the sensor is secured in the position you want.
11. Route the wire from the sensor through the hole in the side of the machine to the connector at the back of the control box and insert the connector into the housing.
12. Be sure to secure the sensor wire to the wire bundle with wire ties.
13. Reinstall the electrical cover on the back of the control box.
14. Reinstall the hood.

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Section 5

TROUBLESHOOTING

This section contains a list of some of the problems you might encounter while using the Phoenix-Lite Lane Machine and some possible solutions to those problems. Also included in this section are the procedures to follow when the Phoenix-Lite stops in the middle of an operation.

5.1 OPERATIONAL PROBLEMS AND SOLUTIONS

The problems are grouped into three categories:

General Operation	Problems with the machine that are not related to a specific operation.
Cleaning Operation	Problems specific to the cleaning operation.
Conditioning Operation	Problems specific to the oiling and buffing operations.

If you cannot resolve a problem with the possible solutions that are listed here, contact the Brunswick Customer Response Center. Their number and hours of operation are given below.

1-800-323-8141 or 231-725-3300 (International)
24 hours a day, 7 days a week

NOTE

The solutions given in this section should be performed only by persons who are accustomed to working with machines, electrical components, and parts drawings. Do not attempt to repair or adjust the Phoenix-Lite Lane Machine, if you do not understand any of the steps given for a possible solution.


5.1.1 General Operation, continued

PROBLEM	SOLUTION
The drive motor continues to run after the machine returns to the approach.	<p>There are two malfunctions if this happens:</p> <ol style="list-style-type: none"> 1) The counter wheel didn't count down to 0. 2) The rear sensor is malfunctioning. <p>Check counter wheel for freedom of movement. Look for a "sticky" spot that might cause it to momentarily stop and not record some machine movement.</p> <p>Ensure that the encoder and toothed wheel are aligned correctly.</p> <p>Ensure that the rear sensor is not dirty, blocked, or out of alignment.</p> <p>Test that the rear sensor is working by passing your hand back and forth across the sensor path about three inches away from the sensor. If the indicator light on the sensor doesn't blink as it momentarily detects your hand, replace the sensor.</p> <p>NOTE</p> <p>If you have brightly colored gutters, the rear (approach) sensor may not be detecting the gutter ramp.</p> <p>Refer to the <i>Maintenance and Adjustments</i> section for information about adjusting or replacing the sensor.</p>
The machine stops on the lane.	<p>This indicates either:</p> <ol style="list-style-type: none"> 1) The rear sensor is detecting something in or near the gutter. 2) The counter wheel is not working properly. For example, it skidded along the lane failing to count. This can be caused by debris on the lane or by a sticky counter wheel. The encoder connector could be loose either at the control box or the encoder. <p>Remove everything from the gutter. If the power cord is attached to the sensor side of the machine, switch it to the other side. The sensor could be detecting it. If there are permanent fixtures near the gutter that are setting off the sensor, refer to the <i>Maintenance and Adjustments</i> section for instructions about how to reposition the sensor so the fixture does not trigger it.</p> <p>Check the counter wheel to see if it rotates freely. Disassemble and clean the shaft and check the bearings as necessary.</p>

5.1.1 General Operation, continued

PROBLEM	SOLUTION
<p>The machine hesitates or stops while traveling down the lane.</p>	<p>The guide rollers are set at the factory to fit against wood lanes and synthetic lanes. Depending on your lanes, the guide rollers can be too tight and stop the machine. Complete the steps below FOR ALL SIX GUIDE ROLLERS to remove the spacer in the guide roller assembly.</p> <ol style="list-style-type: none"> 1. With the machine in the storage position, remove the Phillips screw on each end of the guide roller shaft to release the guide roller assembly. Refer to the drawing located in the <i>Parts</i> section. The guide roller assembly configuration is: a spacer (guide roller washer), a spring, and a guide roller. 2. Remove the spacer. 3. Reassemble the guide roller assembly and secure it in place with the two Phillips screws. 4. Repeat for the remaining guide rollers.
<p>The machine does not fit tightly against the sides of the lane or runs crooked down the lane.</p>	<p>The guide rollers are set at the factory to fit wood lanes and synthetic lanes. Depending on your lanes, the guide rollers may need to hug the sides of the lane more tightly. To tighten the fit against the lanes, complete the steps below FOR ALL SIX GUIDE ROLLERS to add a spacer in the guide roller assembly.</p> <ol style="list-style-type: none"> 1. With the machine in the storage position, remove the Phillips screw on each end of the guide roller shaft to release the guide roller assembly. Refer to the drawing located in the <i>Parts</i> section. <p>The guide roller assembly configuration is: a spacer (guide roller washer), a spring, and a guide roller.</p> <ol style="list-style-type: none"> 2. Insert another spacer next to the existing spacer. 3. Reassemble the guide roller assembly and secure it in place with the two Phillips screws. 4. Repeat for the remaining guide rollers. 5. Don't pull on the power cord. Make sure to feed slack as the machine runs down the lane toward the pin deck, and take up slack as the machine returns to the foul line to keep the machine from running over the power cord.

5.1.1 General Operation, continued

PROBLEM	SOLUTION
The machine turns on but doesn't do anything when the Start button is pressed (first or second time).	<p>This occurs when the EMERGENCY STOP button has been pressed, the front cover is not closed, or the front cover switch is not working correctly. Check that the access door is closed and latched. To reset the machine, turn the rocker switch OFF, wait a few seconds, then turn the rocker switch ON.</p> <p>If this does not correct the problem, check the fuses. Refer to the <i>Maintenance and Adjustments</i> section for instructions about how to access the fuses.</p>
The machine buzzes.	<div data-bbox="824 653 1247 772" style="text-align: center;">  WARNING </div> <p>Use extreme care when servicing solenoids. The surfaces can be very hot and a severe pinching hazard exists under the hood.</p> <p>One or more of the solenoids that operate the vacuum head, and buffer brush might not be fully engaged. You might be able to locate the buzzing solenoid by feeling NEAR the solenoids; a solenoid that is not fully engaging will feel hot.</p> <p>Solenoids that do not fully engage are usually out of alignment. If you find a misaligned solenoid, turn off power, loosen the adjustment screws, realign the solenoid, tighten the screws, and recheck. Any time you adjust the position of a solenoid, you must check to see if the vacuum head or buffer brush, as applicable, needs adjustment.</p> <p>It is also possible that oil or debris has gotten on the solenoid shaft and it is preventing the solenoid from engaging. Wipe the solenoid shaft with a clean, dry cloth.</p> <p>If the solenoid continues to buzz or feel hot and adjusting it does not correct the problem, replace it. Refer to the <i>Parts</i> section for part numbers.</p>

5.1.2 Cleaning Operation

PROBLEM	SOLUTION
None of the nozzles are spraying cleaner.	<p>Make sure the cleaning operation is selected.</p> <p>Ensure there is cleaner in the cleaner tank.</p> <p>Ensure the cleaner pump is running. If not, check the cleaner pump fuse. (refer to the <i>Maintenance and Adjustments</i> section for information on how to access the fuses.)</p> <p>Clean the in-line filter. Refer to the <i>Maintenance and Adjustments</i> section for filter cleaning instructions.</p> <p>Adjust the cleaner flow at the flow control bypass valve to dispense more cleaner by turning it clockwise in small increments until cleaner begins spraying. Refer to the drawing located in the <i>Maintenance and Adjustments</i> section to locate the flow control bypass valve.</p> <p>Check for severely kinked tubing.</p> <p>Check the spray nozzles to see if they are clogged. Refer to the <i>Maintenance and Adjustments</i> section for information on how to unclog spray head nozzles.</p>
A nozzle is not spraying or is spraying erratically.	<p>The nozzle or check valve/strainer is clogged. Refer to the <i>Maintenance and Adjustments</i> section for information about how to unclog spray head nozzles.</p> <p>The tubing has been pushed too far into a quick connector. This can cause a flow restriction. Remove the tubing from the connector, make sure the end is cut cleanly and is not folded under or collapsed, and reconnect.</p>
Foam is coming out the exhaust port of the vacuum motor.	<p>The waste tank needs to be emptied.</p> <p>The action between the cleaner, oil, and agitator foam creates suds in the waste tank. This foam can be sucked through the vacuum pump. To reduce the amount of suds, pour one to two ounces of defoamer into the waste tank before the lane cleaning session.</p>
Residue is left on the lane after the Phoenix- Lite passes over it.	<p>Check that the waste tank is seated correctly against the waste tank seal and that the seal is not rolled or damaged. Refer to the <i>Maintenance and Adjustments</i> section for information about how to install a seal</p> <p>Check the squeegee edges to ensure they are not worn, broken, or warped. Ensure that the squeegees are making full contact with the lane surface. If necessary, replace them. Refer to the <i>Maintenance and Adjustments</i> section for information about how to install the squeegees.</p> <p>Check that the vacuum hose is installed correctly (both ends), and that it has not developed a split.</p>

5.1.3 Conditioning Operation

PROBLEM	SOLUTION
Oil is not being applied to the lane.	<p>Make sure there is oil in the oil tank and that the oil level is above the bottom of the bullseye.</p> <p>Verify that the oil tank foams are in contact with the transfer roller and that the tank is not latched in the intermediate position.</p> <p>Check the wicking foams. Rotate or replace them if needed.</p> <p>Check that the buffer solenoids are working. If they are not working, trace the wiring back to the control box enclosure to ensure the wiring is intact and the connections have not worked loose. Check the fuse. Refer to the <i>Maintenance and Adjustments</i> section for information about accessing and replacing the fuses. If the solenoids are still not working, replace them. Refer to the <i>Parts</i> section for part numbers.</p> <p>Check to ensure that the transfer roller motor is operating. Check the electrical connectors and fuse.</p> <p>Verify that the buffer motor is operating. If not, check that the connector is firmly plugged into the control box. Check the fuse. Check that the buffer drive belt has not slipped off or broken. Check the belt tensioner for sufficient tension.</p>
Parts of the oil pattern look like a “washboard”.	<p>Check the condition of the wicking foams and rotate or replace as needed. Refer to the <i>Maintenance and Adjustments</i> section for instructions on how to rotate or replace the foams.</p> <p>Increase the buffer pressure. Refer to the <i>Maintenance and Adjustments</i> section for instructions about how to do this. If changing the buffer pressure does not eliminate the problem, replace the buffer brush.</p>
The amount of oil being applied is less than it used to be.	<p>Ensure the oiling and buffing distances have not been changed.</p> <p>Ensure the oil level is above the bottom of the bullseye.</p> <p>The buffer brush might be worn.</p> <p>Rotate or replace the wicking foams. Refer to the <i>Maintenance and Adjustments</i> section for information about how to rotate or install new wicking foams.</p>
The machine hums or chatters when it is buffing.	<p>The buffer brush pressure is too high. Reposition the buffer brush to reduce the pressure. Check for sufficient buffer belt tension. Refer to the <i>Maintenance and Adjustments</i> section for information about adjusting the buffer brush.</p>

5.1.3 Conditioning Operation, continued

PROBLEM	SOLUTION
<p>The buffer brush doesn't lift off the lane when it has reached the distance at which it should stop buffing.</p>	<p>Check the buffer return springs. The springs should be connected to studs at the rear corners of the frame.</p> <p>If the springs are not connected, thread the loop at the end of the spring onto the stud and secure it in place with a 1/4-20 lock nut. If the springs no longer have sufficient tension, replace them. Refer to the Parts section for part numbers.</p>

5.2 RECOVERING WHEN THE PHOENIX-LITE STOPS ON THE LANE

There are only six reasons the Phoenix-Lite would unexpectedly stop on the lane:

- The machine became unplugged or lost power.
- The rear sensor has been tripped by something in the gutter.
- The encoder stopped counting or missed too many counts
- The oil compartment door became unlatched and tripped the interlock switch.
- The guide rollers were too tight against the lane.
- Some component within the Phoenix-Lite stopped working.

Pressing the EMERGENCY STOP button will also stop the machine, but this would be intentional.

When the machine stops on the lane, it will generally result in an encoder error signified by the letters “EN” flashing in the Buff Distance window. If the machine was cleaning the lane, the vacuum head solenoids will energize to lift the vacuum head off the lane. To return the machine to the foul line, complete the following:

1. Press the handle START button **ONCE**. The machine will start and return to the foul line, and will stop when the approach sensor senses the gutter transition blocks.

Only the drive motor starts when you press START. Regardless of what the machine was doing when it stopped, the machine will return to the foul line.

If a drive motor failure caused the machine to stop on the lane, the machine will not return to the foul line under power. If possible, leave the machine energized to keep the vacuum head lifted off the lane, and then manually assist the machine back to the foul line before turning off power to the machine.

Once the Phoenix-Lite has returned to the foul line and the problem has been corrected, restart the machine to have it perform the same operation(s) it was performing when it stopped.

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DETERMINING YOUR OILING PATTERN

The lane experts agree that knowing how much oil to put on a lane and just where to put it is as much an art as a science. The amount of oil you need on your lanes is determined by numerous factors, such as

- The type and viscosity of oil
- The condition of the wood or synthetic surface
- The bowling skill level of your bowlers
- The type of lanes
- The temperature of the oil and lane and the humidity in the bowling center
- The types of balls your bowlers use

Of all the factors affecting oil patterns, there are only three you can control: the amount of oil you apply, the distance you apply it and buff it out, and the oil's viscosity. Of these three factors, the Phoenix-Lite allows you change the amount of oil it applies, the oiling and buffing distances, and can be used with oils of various viscosities.

This section describes how the Phoenix-Lite applies oil, how to check if the factory settings will work for your center, what factors to adjust for different conditioning problems, and the various wicking foams that can be used in the Phoenix-Lite.

NOTES

The information in this section cannot address every oiling and buffing situation, nor is it intended as a full discussion of how to condition lanes. Only by experimenting with the wicking foams, oiling and buffing distances, buffer brush pressure, and oil viscosity will you be able to find the perfect mix of factors for your center.

When changing the settings, work with only one factor at a time.

6.1 HOW THE PHOENIX-LITE APPLIES OIL

The Phoenix-Lite uses wicking foams to transport the oil from the oil tank onto a roller. The roller then “holds” the oil for pickup by the buffer brush. The buffer brush picks up the oil from the roller and then brushes the oil onto the lane surface. Because the roller only holds the oil and the buffer brush only applies what it picks up from the roller, the majority of the oiling pattern is determined by the amount and placement of oil put on the roller by the wicking foams.

The wicking foams use capillary action¹ to move the oil. Capillary action virtually “sucks up” the oil from the bottom of the foam to the top of the foam, moving the oil through the channels created by the holes in the foam. The density - the number of holes per square inch - determines how much oil is moved in a given amount of time and space. Less dense foams hold less oil but the oil moves quickly because the channels created by the holes are large and relatively straight. Denser foams hold more oil but the oil moves slowly because the channels created by the holes are small and winding. Each foam supplied with your Phoenix-Lite Lane Machine is stenciled with a number that indicates its relative density. **The higher the number, the higher the density, and the lower the wicking foam’s oil transfer rate.**

6.2 TESTING YOUR CURRENT DISTANCES

The Phoenix-Lite lane machine can oil with either a single pass (down the lane and back) or a double (second) pass. As the machine comes from the factory, the Phoenix-Lite is set up to automatically perform a second pass oiling program. You can view the second pass settings by pressing the **OIL** pushbutton and holding it down (for approximately 3 to 5 seconds) until the distance display windows begin to flash. Pushing it again for 3 to 5 seconds returns the machine to the first pass settings (which do not flash).

The factory settings for your machine provide a desirable, playable condition.

After you have unpacked the Phoenix-Lite and familiarized yourself with it, fill the tanks. After initially filling the oil tank, you must wait a sufficient amount of time (up to two hours) for the wicking foams to saturate. Each time you power up your lane machine, all three functions: Cleaning, Oiling, and Buffing are selected. They can be deselected as desired. The factory first pass oiling and buffing distances will be displayed. Enter the oiling and buffing distances you currently use as the machine’s first pass settings. Select the second pass settings and decrease them to zero using the DOWN arrow buttons. This effectively turns

¹ Capillary action is caused by adhesion, cohesion, and surface tension. Adhesion is the attraction of molecules of different materials - in this case, the wicking foam and oil. Cohesion is the attraction of molecules of the same material - in this case, oil. Surface tension is the “skin” that keeps the molecule from breaking apart. In the foams, the oil is attracted to a foam molecule at the bottom edge of the foam. Because the surface tension of the oil keeps the molecule together, the molecule has no place to go but up. And as it goes up, it finds the edge of another foam molecule to which it becomes attracted. Because of cohesion, as that first oil molecule crawls from one foam molecule to the next, another oil molecule comes with it. And a third comes with the second, and so on. As each additional oil molecule joins the chain, the higher and higher the first oil molecule gets supported as it crawls up until it no longer has new foam molecules to get attracted to - in this case, the top edge of the foam.

off the second pass oiling feature. Now clean and condition each lane **twice** to see how well the Phoenix-Lite machine conditions your lanes with the oiling and buffing distances you normally use. (Doing this twice ensures that any previous conditioning doesn't affect the results.) After cleaning and conditioning the lanes, perform the checks listed below for each lane to determine if you need to change any of the settings. Remember, your goal is to find the best pattern for all your lanes.

The table below lists the checks you should perform to ensure the Phoenix-Lite is applying the amount of oil you want in the pattern you want. For each check, the table also lists where to get information about adjusting the Phoenix-Lite to obtain the correct settings for your lanes. If you don't find any of the problems listed below, you don't need to make any adjustments to the settings.

<p>Dry spots in the oiled area (from depressions, undulating lane surfaces, etc.)</p>	<p>If there are some dry spots but the rest of the lane has the amount of oil you want, you can increase the buffer brush pressure. This will not affect the amount of oil applied in the rest of the oiled area. Keep in mind that increasing the buffer brush pressure shortens the life of the buffer brush and puts undue strain on the buffer motor.</p> <p>If there are some dry spots and the rest of the lane does not have the amount of oil you want, you may need to change the wicking foams to one with higher output. For information about this, refer to <i>Creating Oil Output Patterns</i> in this section. If changing the wicking foams does not eliminate the problem, you can increase the buffer brush pressure but, as explained in the paragraph above, it will affect the life of the buffer brush, and the buffer motor. For information about checking and testing the buffer brush, refer to the <i>Maintenance and Adjustments</i> section.</p>
<p>Washboard Pattern In The Oiled Area</p>	<p>This indicates one of three things: the buffer brush pressure is not consistent across the lane, the oil output is too low, or the buffer brush pressure needs to be increased.</p> <p>Test the buffer brush pressure across the entire width of the brush. The pressure should be at the same point between B and C on the Buffer Pressure Adjustment Tool at each place you test on the buffer brush. If they are not, adjust the buffer brush pressure until the pressure is the same across the width of the brush. For information about measuring the pressure and adjusting the buffer brush pressure, refer to the <i>Maintenance and Adjustments</i> section. Condition the lane after making the adjustments to see if the adjustments eliminate the problem.</p> <p>If the pressure is the same across the width of the brush and the washboard pattern occurs, check the amount of oil applied to the lane. If you want more oil, change the wicking foams to a</p>

	<p>higher output. For information about this, refer to <i>Creating Oil Output Patterns</i> later in this section. Condition the lane after changing the wicking foams to see if their oil output eliminates the problem. If the problem still remains, you may need to replace the buffer brush. For more information about the buffer brush, refer to the <i>Maintenance and Adjustments</i> section.</p>
<p>Washboard Pattern In The Buffed Area</p>	<p>If the washboard pattern occurs in both the oiled area and the buffed area, correct the condition in the oiled area first. That correction may automatically correct the condition in the buffed area.</p> <p>If the washboard pattern occurs only in the buffed area, it is caused by too little oil in the brush after applying oil in the oiled area. To correct the condition, increase the buffer brush pressure. For information about increasing the buffer brush pressure, refer to the <i>Maintenance and Adjustments</i> section.</p>

6.3 CHANGING THE AMOUNT OF OIL APPLIED TO THE LANE

If the front part of your oil pattern becomes depleted of oil too quickly, the first pass is not providing enough oil, and a second pass is needed. The second pass oiling feature allows you to increase the amount of oil applied to the lane far beyond what was achievable with the previous model. The second pass settings are accessed by pressing and holding the **OIL** pushbutton until the distance displays begin to flash.

Oiled Area

If your initial testing of the oil pattern within your normally oiled area shows that there is not enough oil, you can add a second pass or change the wicking foams to ones with higher output, as needed. For information about the wicking foam oil outputs, refer to the *Creating Oil Output Patterns* information in this section. For information about changing the wicking foams, refer to the *Maintenance and Adjustments* section.

You can change the second pass oiling and buffing distances to help achieve the desired oil pattern. The second pass settings are independent of the first pass settings. After entering your second pass settings and starting the machine, it will make two complete passes based on the settings you have entered (or the factory settings if you haven't changed them). After the two passes have been made, check to see if the amount of oil in the oiled area is the amount of oil you want. If you have a lane reading machine, run a tape at your usual distance and compare your previous results with the readings you get after running the Phoenix-Lite. If you do not have a lane reading machine, use whatever method you have developed for testing the oil amount in the oiled area and compare your previous results with the oil amount applied by the Phoenix-Lite.

If the amount is more or less than you want, you can change the oiling distance, number of passes, and/or the wicking foams to fine tune your pattern.

Buffed Area

If the amount of oil in the buffed area is different from what you want, there are four things you can change:

- the buffing distance,
- the oiling distance,
- the amount of oil applied in the oiled area,
- the number of buffing passes,

Increasing the buffing distance will result in less oil being applied toward the end of your pattern. Shortening the buffing distance will give you more oil near the end of the pattern.

If changing the buffing distance does not result in the amount of oil you want in the buffed area, consider changing the oiling distance. A shorter oiling distance will result in less total oil being applied to the buffed area; a longer oiling distance will result in more oil total being applied in the buffed area. Refer to the *Oil Taper* information of this section for information about how the oil is applied in the buffed area.

If changing the oiling distance is not an option or does not result in the amount of oil you want in the buffed area, consider changing the wicking foams to change the amount of oil applied in the oiled area. A lower amount of oil applied in the oiled area will result in less oil being applied to the buffed area; a higher amount of oil will result in more oil being applied in the buffed area.

If none of the above gives the results you are looking for, you can add a second buffing pass (to an existing single pass oiling program) without an additional oiling pass. Buffing out a second time provides more oil down lane without increasing the amount of oil in the head area.

NOTES

The viscosity of the oil also affects the amount of oil applied to the oiled and buffed areas. If you choose to use a higher or lower oil viscosity than the type shipped with your Phoenix-Lite, you will need to experiment to find the correct combination of factors for your lanes.

6.4 CREATING OIL OUTPUT PATTERNS

To create different oil output patterns across the lane, you can change the wicking foams that deliver the oil to the oil transfer roller. The Phoenix-Lite is shipped with two medium-low output foams for the outside 8 inches of both sides of the lane, two medium-low foams along the next three inches (the track) on each side of the lane, and two super-high output foams (10 inches each) for the middle 20 inches of the lane. This creates the pattern used by most bowling centers: less oil along the outside and more down the middle, as shown in Figure 6-1. A graph of the oil pattern that your machine applied with the wicking foams that were installed at the factory was included with your lane machine. While the conditions in your bowling center can cause the amount of oil applied to your center's lanes to differ from what was obtained at the factory, the overall profile of the pattern should be the same.

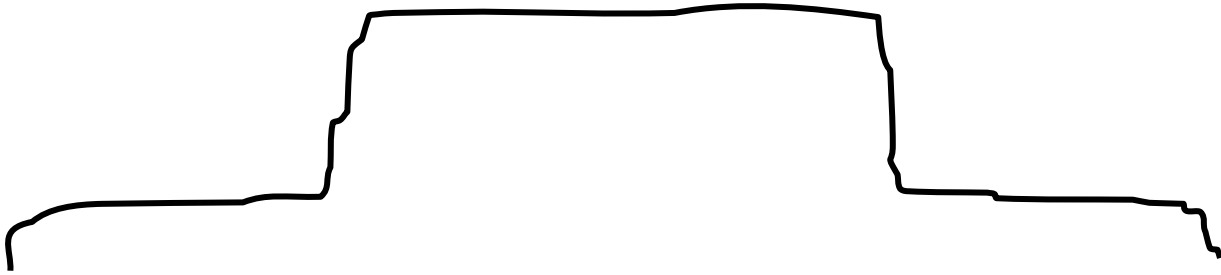


Figure 6-1

By using wicking foams of various densities along the 42 inch width of the oil tank, the Phoenix-Lite can apply numerous oiling patterns. For example, if you use the same output wicking foam across the entire oil tank, the pattern will be similar to the one shown in Figure 6-2. Because of the numerous factors that affect lane conditioning (some of which were listed at the beginning of this section), the actual pattern may not exactly match the one shown below.



Figure 6-2

Conversely, if you use the following wicking foam densities:

Left and Right Outside	8 inches of high output wicking foam each
Left and Right Track	3 inches of super high output wicking foam each
Middle	Two 10-inch sections of low output wicking foam

The resulting oil pattern will be similar to the one shown in Figure 6-3.

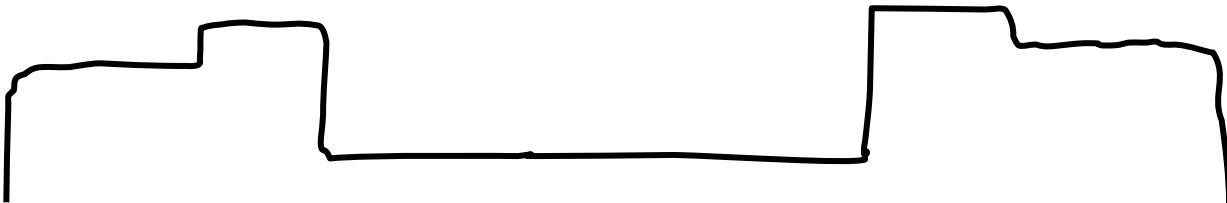


Figure 6-3

Though you would probably never want to use this pattern, it does show that you can mix and match wicking foams to achieve the pattern profile you want.

6.4.1 Wicking Foam Densities

A set of replacement wicking foams of different densities was supplied with your Phoenix-Lite lane machine. Each density of wicking foam is stenciled with a number for easy identification. The higher the number stenciled on the foam, the higher the foam's density. As a general rule, the higher the foam's density, the lower the foam's oil output. This is because higher density foam has many more, smaller cells that the oil must travel through which decreases the volume of oil that can pass through the foam in a given amount of time. Having different density foams as well as having the ability to change the location of each foam type allows you to easily create many different oil patterns.

The table below shows the correlation between the number stenciled on the wicking foam and the comparative oil output from each type of foam. For replacement wicking foam part numbers, refer to either the *Introduction* or *Parts* sections of this manual.

Super High Output (4)	High Output (5)	Medium High Output (6)	Medium Output (8)	Medium Low Output (10)	Low Output (11)	Extra Low Output (12)	Super Low Output (13)
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The six wicking foams shipped installed in the Phoenix-Lite are of two different densities. Changing wicking foam types can result in significant changes to the amount of oil being applied to the lane, while adjusting the adjustment bars on the top of the oil tanks will result in smaller changes.

6.4.2 Preparing Custom-Sized Wicking Foams

Replacement wicking foams come in lengths of 48 inches. When cutting a replacement foam section, try to make the cut as clean and as straight as possible. Using a straight edge as a guide and a fresh blade in you cutter can help. This will help prevent ragged edges and gaps between foam sections and in your pattern. One trick is to slightly overlap two foams keeping their top edges aligned, and make a single cut through both of them. The resulting cut will match perfectly even if its angle is a little off.

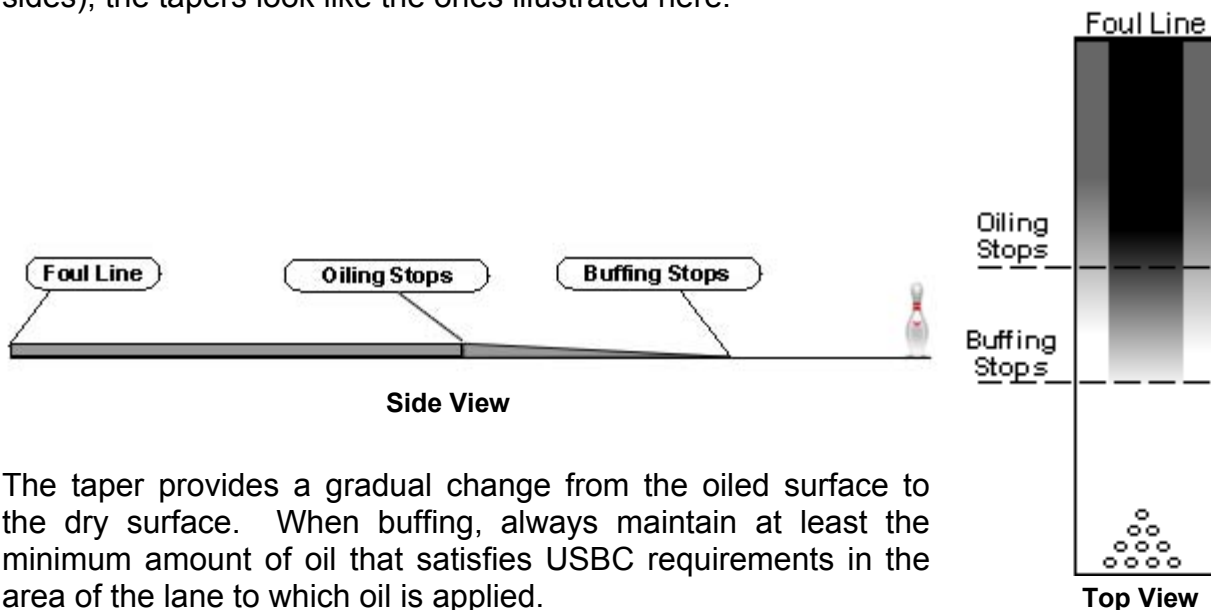
The outside wicking foams that were shipped with your machine have a profiled edge. When making replacement foams, cut the same profile in the new foam. This will prevent drips from occurring along the ends of the oil tank.

Before putting the wicking foams into the machine, line them up on a flat surface to ensure the edges and top meet, and that they total 42 inches across. When putting the wicking foams in the oil tank tray, start at one side and insert the wicking foams across to the other side.

6.5 OIL TAPER

When you select the oiling operation, oiling begins at the foul line and ends at the distance you specify. You can either stop the buffer brush where you stop oiling or you can have the buffer brush continue to buff after the oiling distance has been reached. If you do not buff after the oiling distance is reached, you create a sharp break between the oiled and dry surfaces. If you continue to buff, the Phoenix-Lite applies the oil that remains in the brush from the oiling operation. It will continue towards the pin deck in a taper on the lane until the buffer brush runs dry or reaches the end of the buffing area (distance set for the buffing operation).

The amount of oil tapers off in both length and width as the brush buffs down the lane. If you are using the standard oiling pattern (more oil down the middle and less oil down the sides), the tapers look like the ones illustrated here.



The taper provides a gradual change from the oiled surface to the dry surface. When buffing, always maintain at least the minimum amount of oil that satisfies USBC requirements in the area of the lane to which oil is applied.

The amount of oil the Phoenix-Lite applies to the buffed area of the lane is determined by the amount of oil applied to the oiled area, the oiling distance, and the buffing distance. Generally, the higher the amount of oil and the longer the oiling distance, the more oil that remains in the buffer brush and therefore the more oil that is applied in the buffed area. For example, if you have a high amount of oil in the oil area, where the oiling distance is 28 feet, and the buffing distance is 40 feet, the buffed area will start out with that high amount of oil and taper off to a low amount of oil at 40 feet. Conversely, if you have that same amount of oil applied to the oil area, but the oiling distance is 24 feet, and buffing distance is 50 feet, the buffed area will start out with that high amount of oil and taper off to little or no oil at 50 feet.

The difference between the two amounts of oil in the buffing area is caused by the difference in the amount of time the buffer brush is picking up oil from the transfer roller. The higher the amount of oil that gets into the brush, the higher the amount of oil that can be applied to the remainder of the lane. Think of it like a paint brush. If you quickly dip the bristles into the can of paint, you don't get much of the wall covered before you need to get more paint. But if you

leave it in the paint for a few seconds allowing the paint seep between and coat more bristles, you can cover a lot more of the wall before you need to get more paint.

Since the amount of oil applied to the buffed area is directly related to the combination of the amount of oil applied in the oiled area and the distance of the oiled area, the only ways to change the amount of oil in the buffed area — without changing the amount of oil applied to the oiled area — is to change the distance of the oiled area or the buffer brush pressure. Unfortunately, because every lane differs in how it accepts oil, there is no formula for determining how long to set the oiling distance to get a given amount of oil taper in the buffed area. Nor is there a formula for determining what buffer brush pressure is required for a taper. You will have to experiment with different oiling distances and buffer brush pressures to find the right settings for your lanes.

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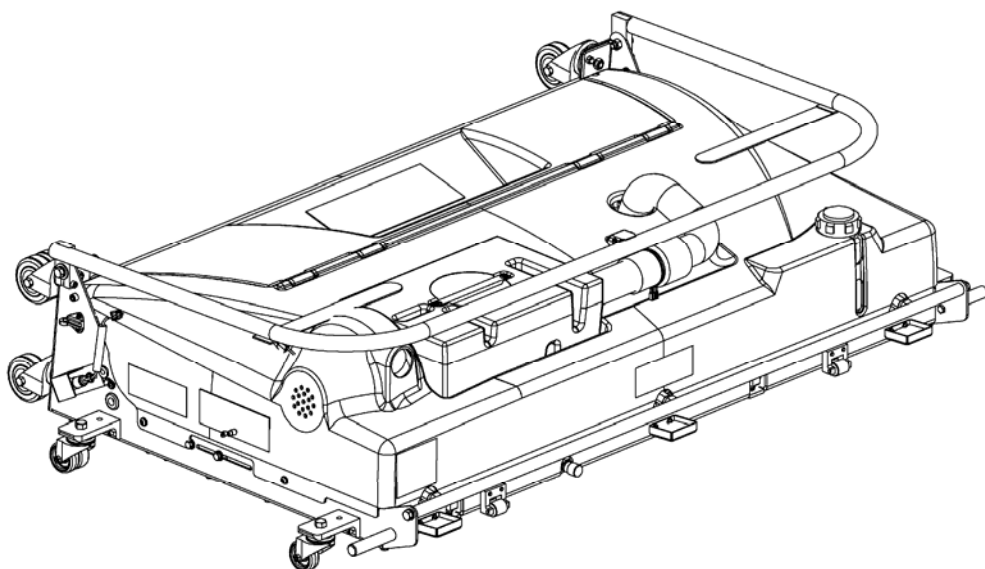
Section 7

PARTS

This section contains parts drawings as well as the Phoenix-Lite Lane Machine wiring diagram. The drawings are shown within functional groupings, as listed on the next page. **Assemblies listed in bold type in the parts lists have exploded view drawings on the pages that follow.**

Use the part numbers in this section to order parts.

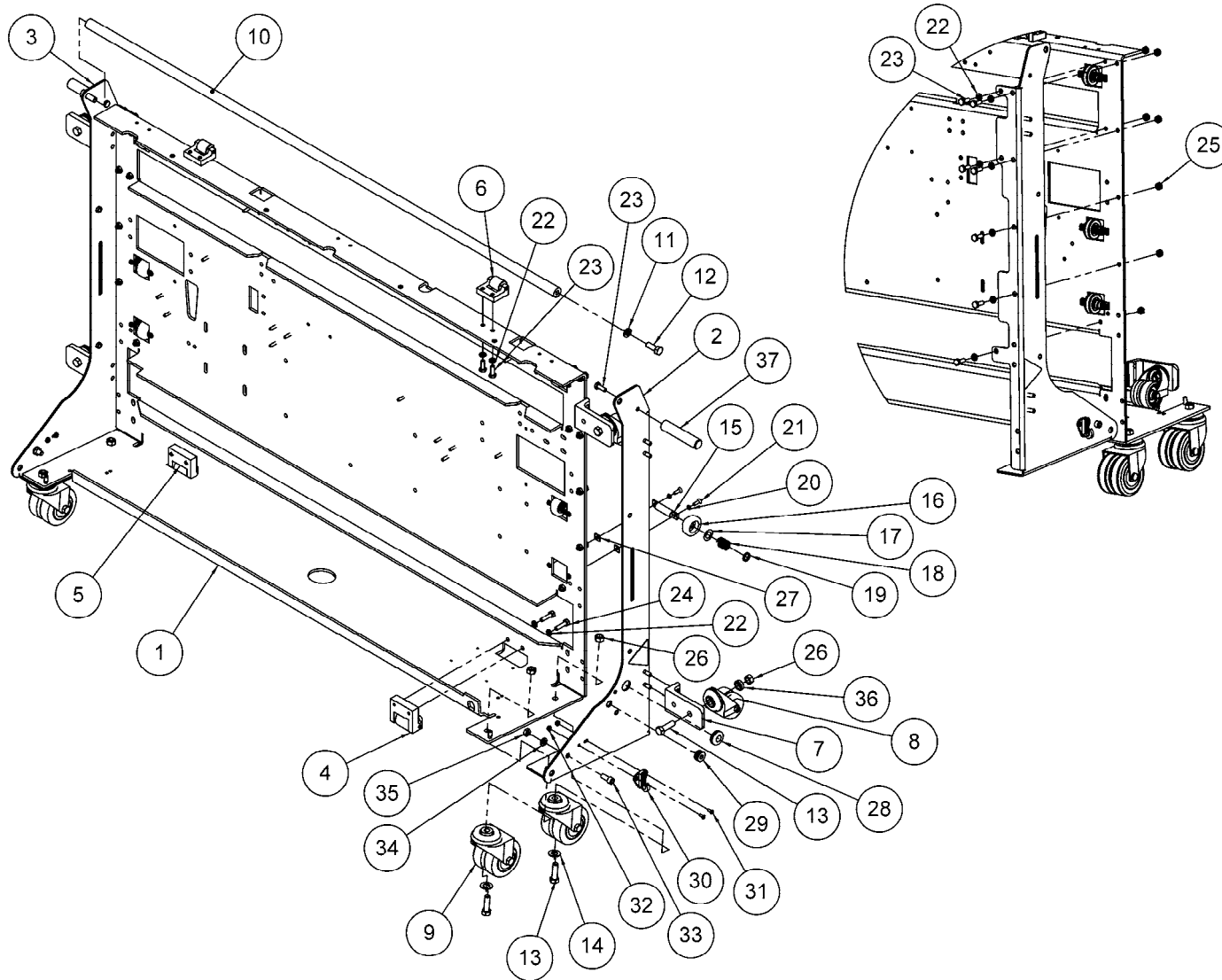
If you know the part number and want to find the drawing on which it is shown, use the Parts Index at the back of this manual.



<p>FRAME and BODY</p>	<p>OILING and BUFFING</p>
<p>Base Plate and Side Plates Hood Assembly</p>	<p>Oiling and Buffing System Oil Tank Assembly Replacement Foam Wicks Transfer Roller Assembly Transfer Roller Motor Assembly Belt Tensioner Assembly Buffer Motor Assembly Oil Tank Lift Assembly Buffer Side Plate Assembly Buffer Solenoid & Bracket Assembly – Right Side Buffer Solenoid & Bracket Assembly – Left Side</p>
<p>VACUUM and CLEANER SYSTEMS</p>	<p>CONTROL SYSTEM</p>
<p>Vacuum System Vac Head & Agitator Assembly Vac Solenoid & Bracket Assembly – LH & RH Vac Head Pivot Assembly Vacuum Hose Assembly Vacuum Motor Assembly Waste Tank & Bracket Assembly Cleaner System Cleaner Pump Assembly Cleaner Filter & Flow Control Valve Cleaner Tank Assembly</p>	<p>Control System Components Control Box Assembly Fuses Handle Assembly Optical Sensors, Approach and Pin Deck Counter Wheel Assembly</p>
<p>DRIVE SYSTEM</p>	<p>MISCELLANEOUS</p>
<p>Drive Assembly Drive Shaft Assembly Drive Motor Assembly Drive Wheel Cover Assemblies, LH & RH</p>	<p>Power Cord Assemblies, 110V & 240V Buffer Brush Adjusting Tool Wiring Diagram, 110V Machine Wiring Diagram, 240V Machine</p>

FRAME and BODY

Frame Assembly – Base Plate and Side Plates



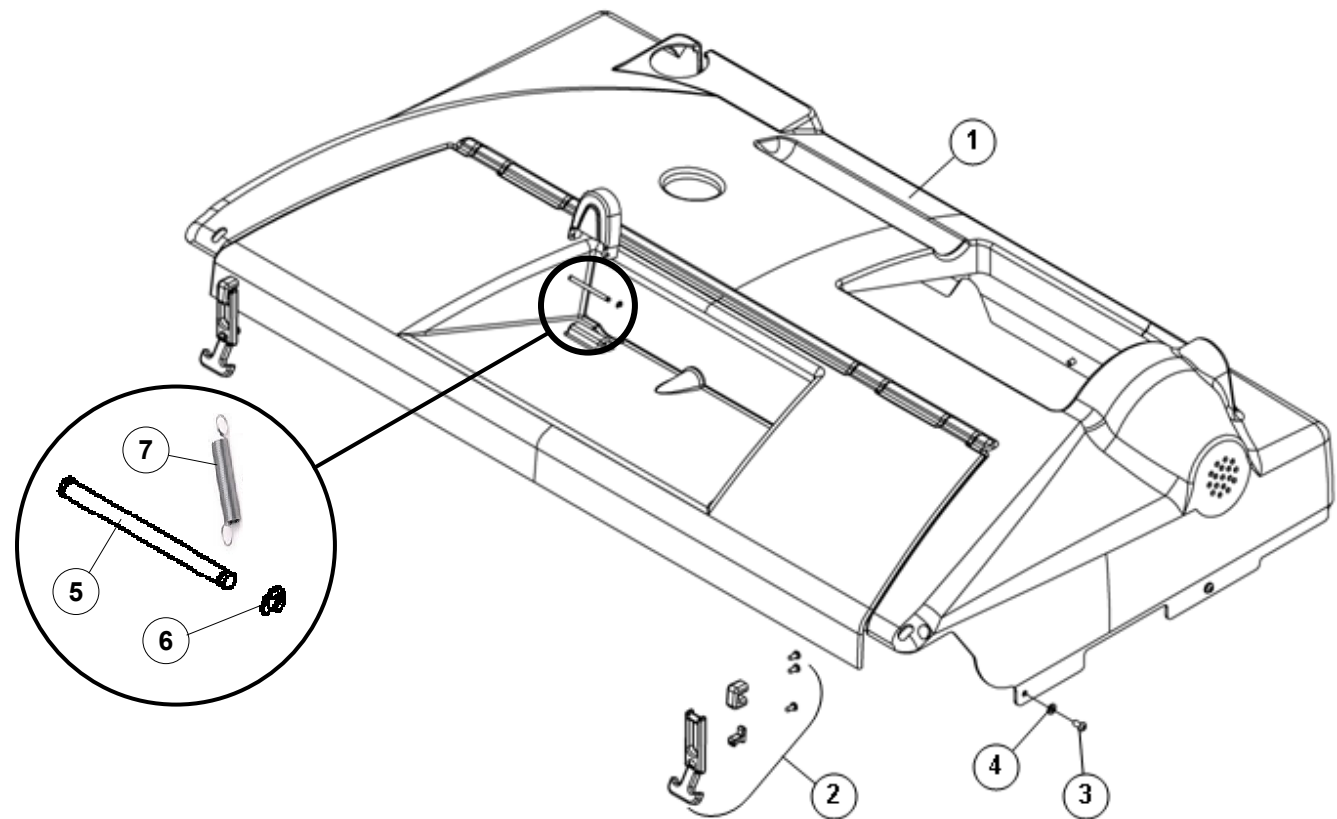
Frame Assembly – Base Plate and Side Plates

	NUMBER	DESCRIPTION
1	294-115-633	Base Plate
2	294-115-618	Side Plate, Right
3	294-115-619	Side Plate, Left
4	294-002-527	Idler Wheel Assembly, Right
5	294-002-528	Idler Wheel Assembly, Left
6	SA-3012	Duster End Plate Roller
7	294-115-613	Caster Bracket, 2-inch
8	294-115-614	Caster, 2-inch
9	294-115-615	Caster, 3-inch
10	294-115-081	Handle Tube
11	951-164-002	Washer, 3/8, Split, Black
12	809-865-165	Screw, Hex, 3/8-16 x 1, Black
13	809-865-205	Screw, Hex, 3/8-16 x 1-1/4, Gr 8, Black
14	948-767-138	Washer, 3/8, Flat, Black
15	294-115-058	Guide Roller Axle
16	SA-0244	Guide Wheel Assembly
17	01-161	Phenolic Washer
18	A-0024	Guide Roller Spring
19	A-0025	Guide Roller Washer

	NUMBER	DESCRIPTION
20	951-638-068	Washer, #10, External Tooth, Countersunk, SS
21	01-123	Screw, Phillips Flat Head, 10-32 x 5/8
22	951-148-008	Washer, 1/4, Split, Black
23	809-849-125	Screw, Hex, 1/4-20 x 3/4, Black
24	809-865-165	Screw, Hex, 1/4-20 x 1, Gr 8, Black
25	844-049-002	Nut, 1/4-20, Stover
26	844-065-002	Nut, 3/8-16, Stover
27	294-115-573	Guide Roller Spacer
28	711-504-046	Grommet, 1/2-inch
29	04-078	Rubber Grommet
30	A-2037	Power Cable Hook
31	01-001	Screw, Phillips Round Head, 6-32 x 3/8
32	01-416	Nut, 6-32, Nylon Locking
33	810-257-120	Screw, Socket Head, 5/16-18 X 3/4, Black
34	01-063	Washer, 5/16, Split
35	01-062	Nut, Hex, 5/16-18
36	A-0794	Caster Spacer
37	294-115-259	Handle

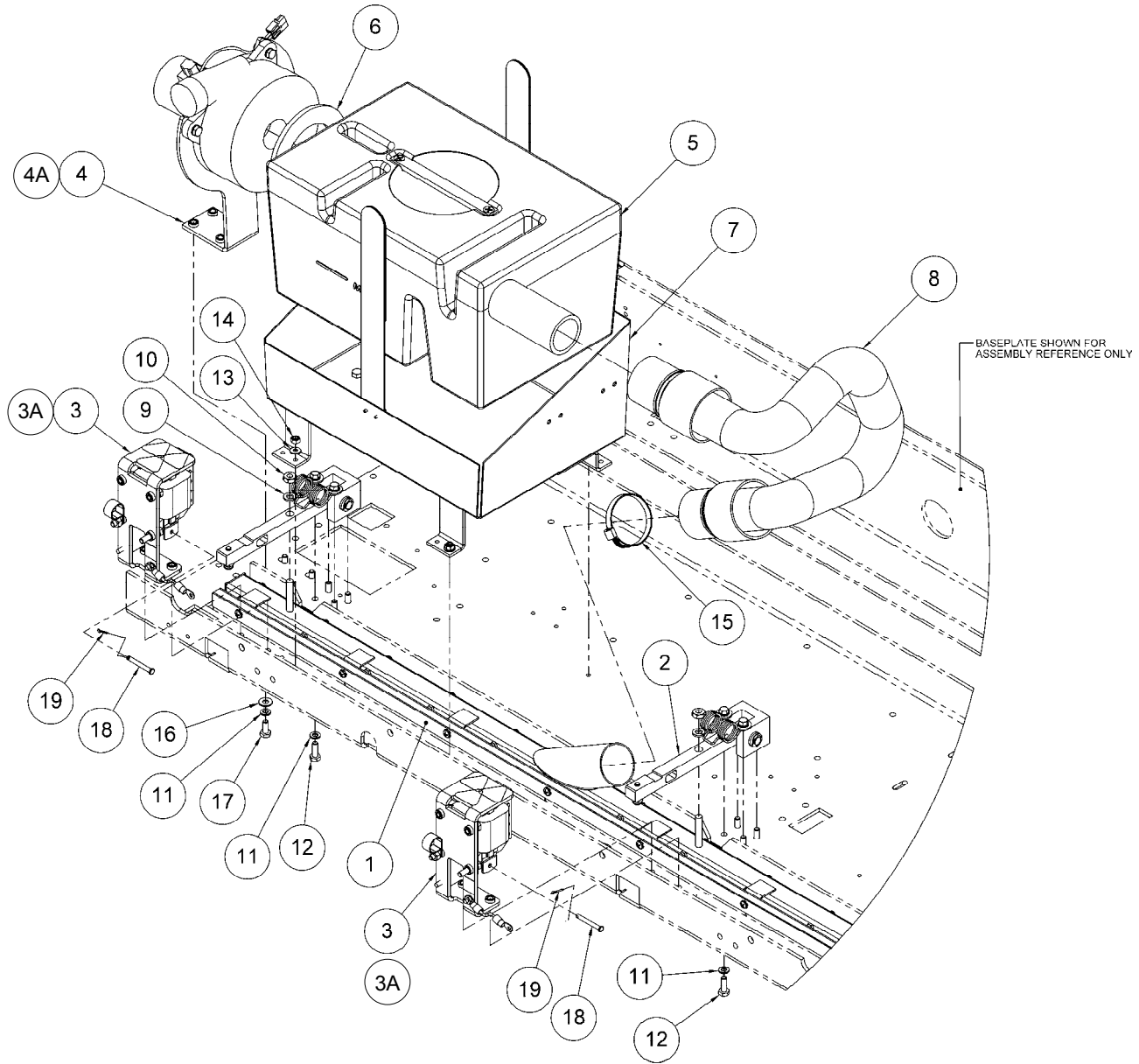
HOOD ASSEMBLY – 294-115-562BR

	NUMBER	DESCRIPTION
1	294-115-634BR	Hood Assembly (includes items 1, 5 & 6)
2	294-115-566	Draw Latch Assembly
3	808-549-080	Screw, Hex Socket Button Head, ¼-20 x ½
4	945-548-000	Washer, ¼, Black
5	294-115-560	Clevis Pin
6	294-115-561	E-Clip
7	A-0113	Extension Spring



VACUUM and CLEANER SYSTEMS

Vacuum System



Vacuum System

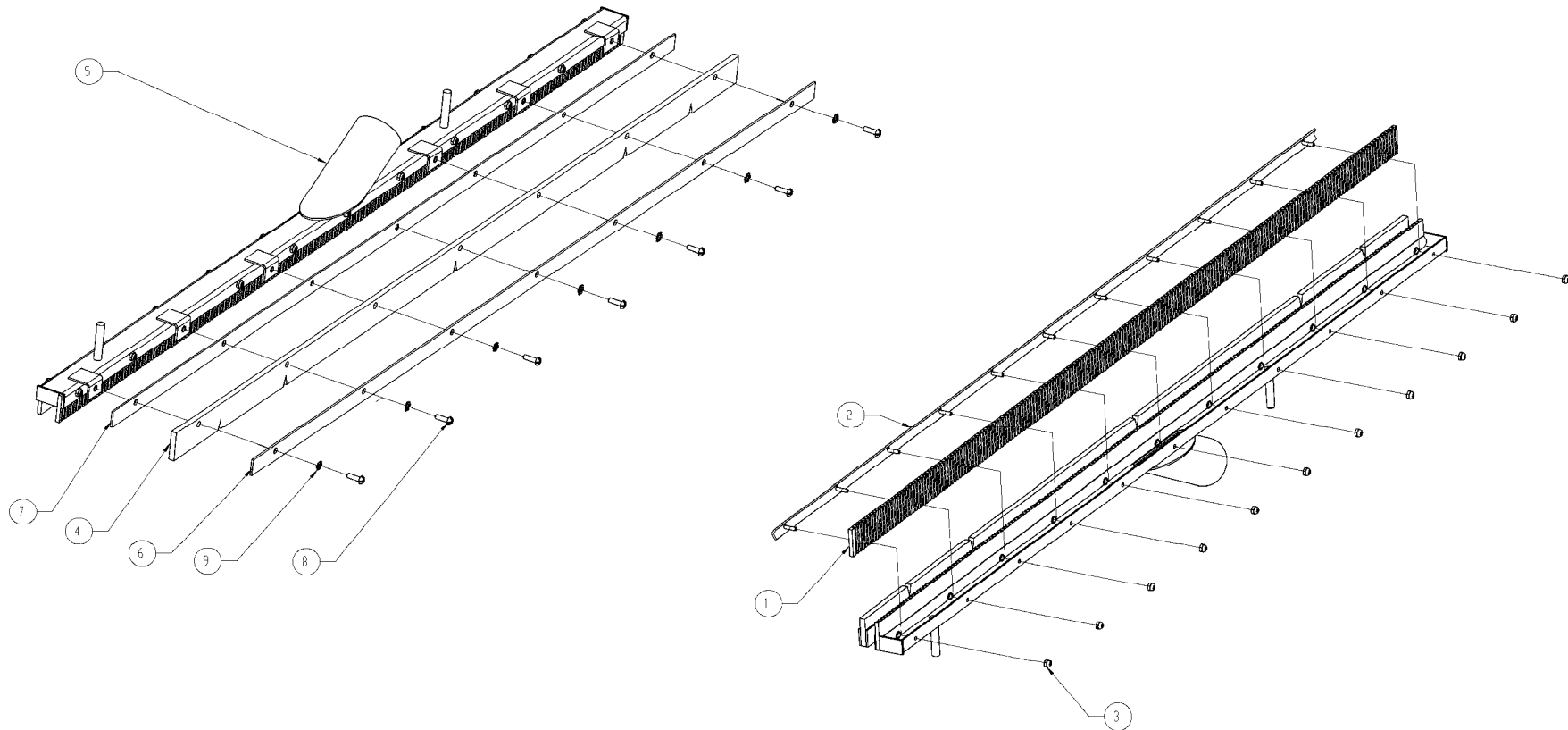
	NUMBER	DESCRIPTION
1	294-115-386	Vac Head Assembly
2	294-115-506	Vac Head Pivot Assembly
3	294-115-661	Vac Solenoid & Bracket Asy, 110V, Right
3a	294-115-662	Vac Solenoid & Bracket Asy, 240V, Right
4	294-115-474	110V Vac Motor & Bracket Assembly
4a	294-115-475	220V Vac Motor & Bracket Assembly
5	SA-1129	Waste Tank Assembly
6	A-8307	Waste Tank Seal
7	294-115-233	Waste Tank Guard Assembly
8	294-115-113	Vacuum Hose Assembly
9	01-063	Washer, 5/16, Split
10	834-557-002	Nut, Hex, 5/16-18, Jam
11	951-148-008	Washer, 1/4, Split, Black
12	809-849-125	Screw, Hex, 1/4-20 x 3/4
13	01-030	Washer, #10, Flat
14	838-740-002	Nut, Hex, 10-32, Nylon Locking
15	04-120	Waste Tank Hose Clamp
16	948-753-101	Washer, 1/4, Flat, Black
17	809-849-100	Screw, Hex, 1/4-20 x 5/8, Black
18	01-038	Clevis Pin, 3/16 x 1-1/2
19	01-080	Cotter Pin, 1/16 x 1/2

294-115-386 - Vac Head & Agitator Assembly

	NUMBER	DESCRIPTION
1	SV-72	Squeegee
2	SV-A4	Squeegee Bracket
3	01-229	Nut, Hex, 6-32, Nylon Locking
4	294-115-656	Cleaner Foam (agitator)
5	294-115-385	Vac Head Weldment
6	294-115-100	Foam Holder
7	294-115-446	Foam Holder Assembly
8	813-240-128	Screw, Philips Pan Head, 10-32 x 3/4, SS
9	951-638-078	Washer, #10, External Tooth Lock, SS

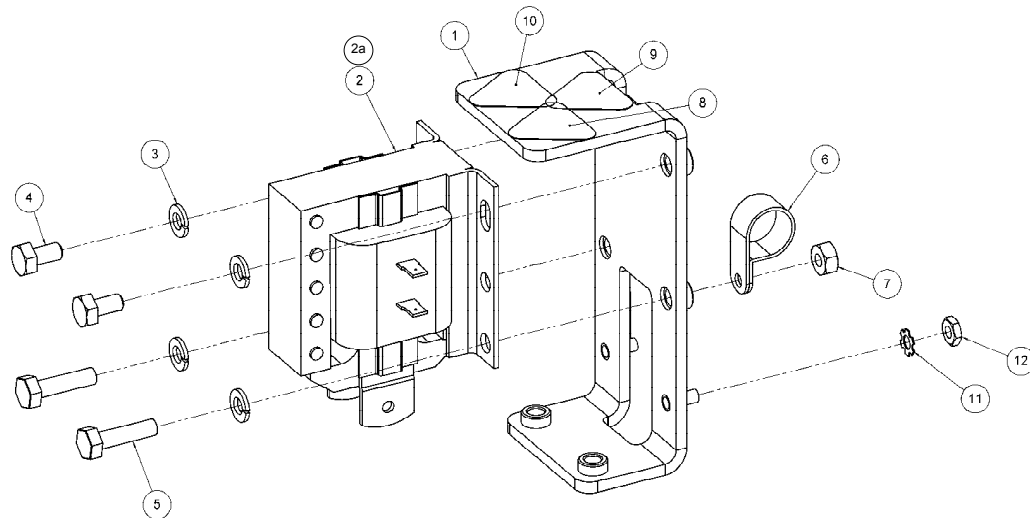
Notes

- Face of nuts (item 3) to be flush with studs.
- Top of foam (item 4) to be flush with top of foam holder (item 6) and foam holder assembly (item 7).
- Tighten screws (item 8) to completely compress foam (item 4).
- Squeegee (item 1) to be pushed up firmly against weldment (item 5) prior to tightening nuts (item 3).



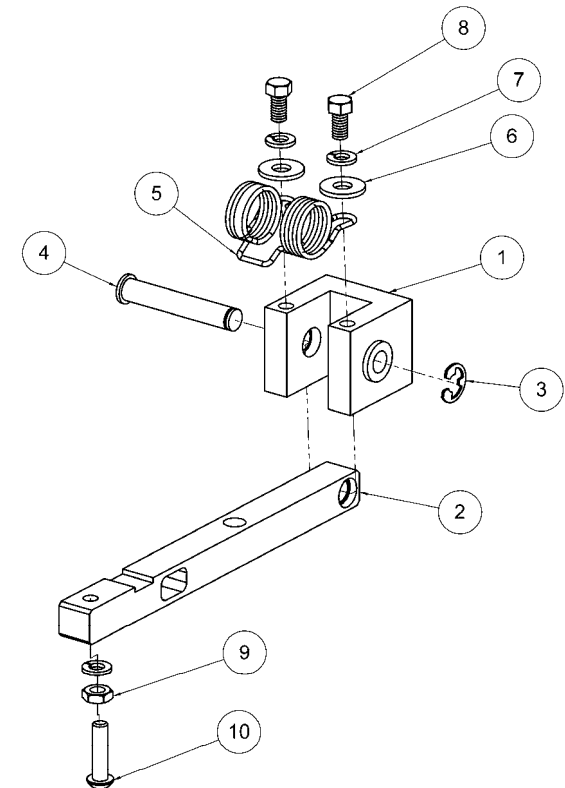
Vac Head Solenoid & Bracket Assembly – LH & RH

	NUMBER	DESCRIPTION
1	294-115-505	Vacuum Solenoid Bracket
2	294-002-032	Solenoid, 110V, 3000 Series, Right
2a	294-002-275	Solenoid, 240V, 3000 Series, Right
3	951-148-002	Washer, ¼, Split
4	809-849-085	Screw, Hex, ¼-20 x ½, Gr 8, Black
5	809-849-165	Screw, Hex, ¼-20 x 1, Gr 8, Black
6	02-086	Wire Clamp, ¾"
7	01-052	Nut, Hex, ¼-20
8	294-115-237	Sticker, Crush Hazard
9	294-115-238	Sticker, Hot/Burn Hazard
10	294-115-236	Sticker, Electrical Shock Hazard
11	01-033	Washer, #10, External Tooth, Lock
12	835-540-002	Nut, Hex, 10-32



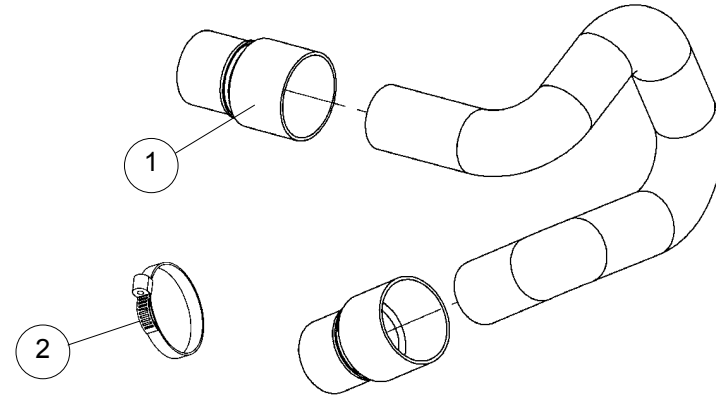
Vac Head Pivot Assembly – 294-115-506

	NUMBER	DESCRIPTION
1	294-115-225	Vac Pivot Block Assembly
2	294-115-504	Vac Pivot Arm Assembly
3	919-010-400	Retaining Ring, E-Style
4	294-115-062	Pivot Pin, 3/8 X 2-1/4, SS
5	294-115-503	Spring
6	01-056	Washer, ¼, Flat
8	01-115	Screw, Hex, ¼-20 X ½
9	835-549-002	Nut, Hex, ¼-20 Jam
10	808-549-160	Screw, Button Head, ¼-20 X 1, Black



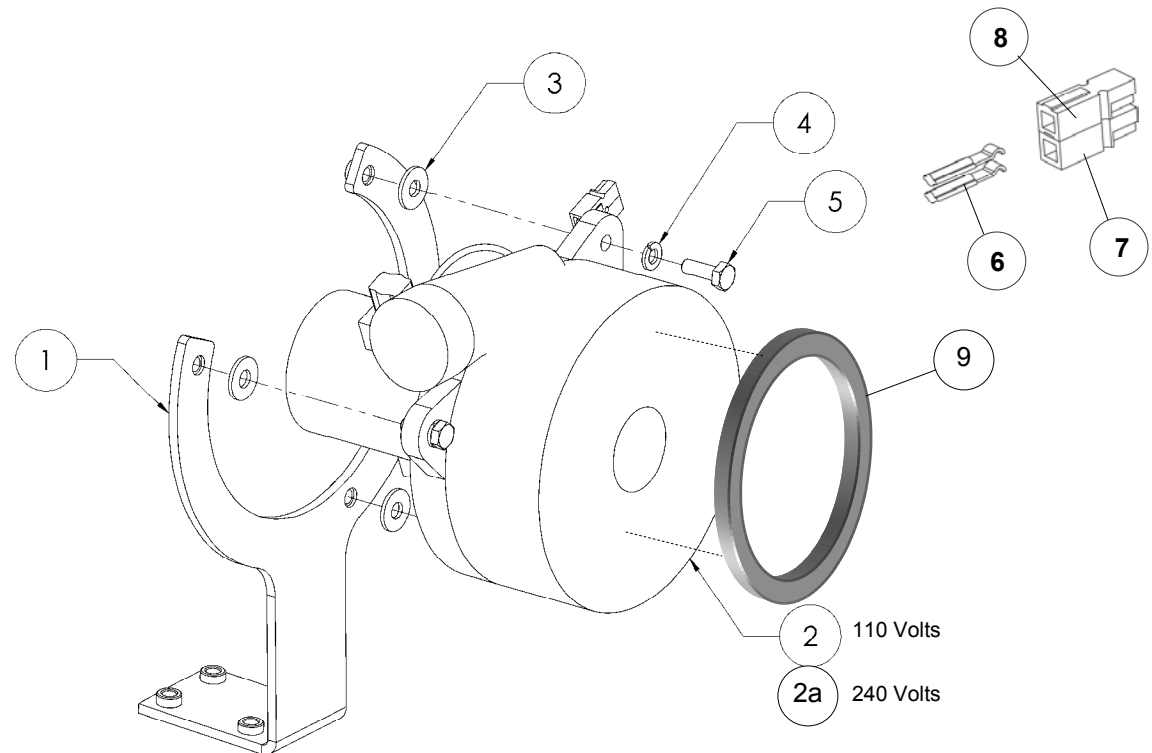
Vacuum Hose Assembly & Clamp

	NUMBER	DESCRIPTION
1	04-150	Slip Adapter
2	04-120	Hose Clamp



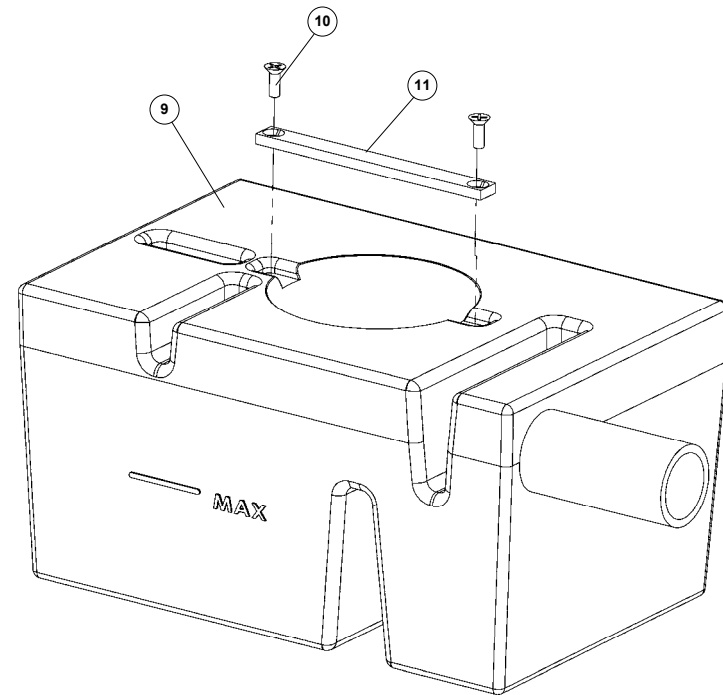
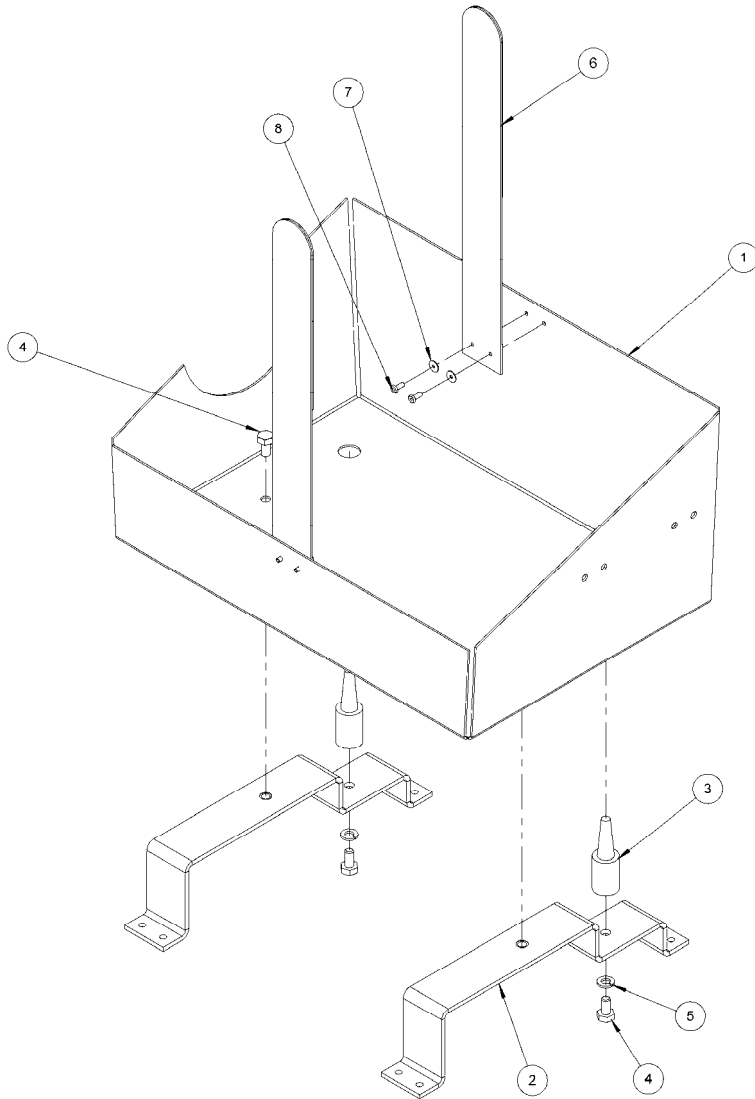
Vacuum Motor & Bracket Assembly

	NUMBER	DESCRIPTION
1	294-115-041	Vac Motor Bracket Assembly
2	294-115-042	110-Volt Vac Motor Assembly
2a	294-115-343	240-Volt Vac Motor Assembly
3	01-056	Washer, 1/4 Flat
4	01-054	Washer, 1/4, Split
5	809-849-125	Screw, Hex, 1/4-20 x 3/4, Black
6	02-793	Terminal Contact
7	294-115-304	Housing, Black
8	294-115-305	Housing, White
9	A-8307	Waste Tank Seal

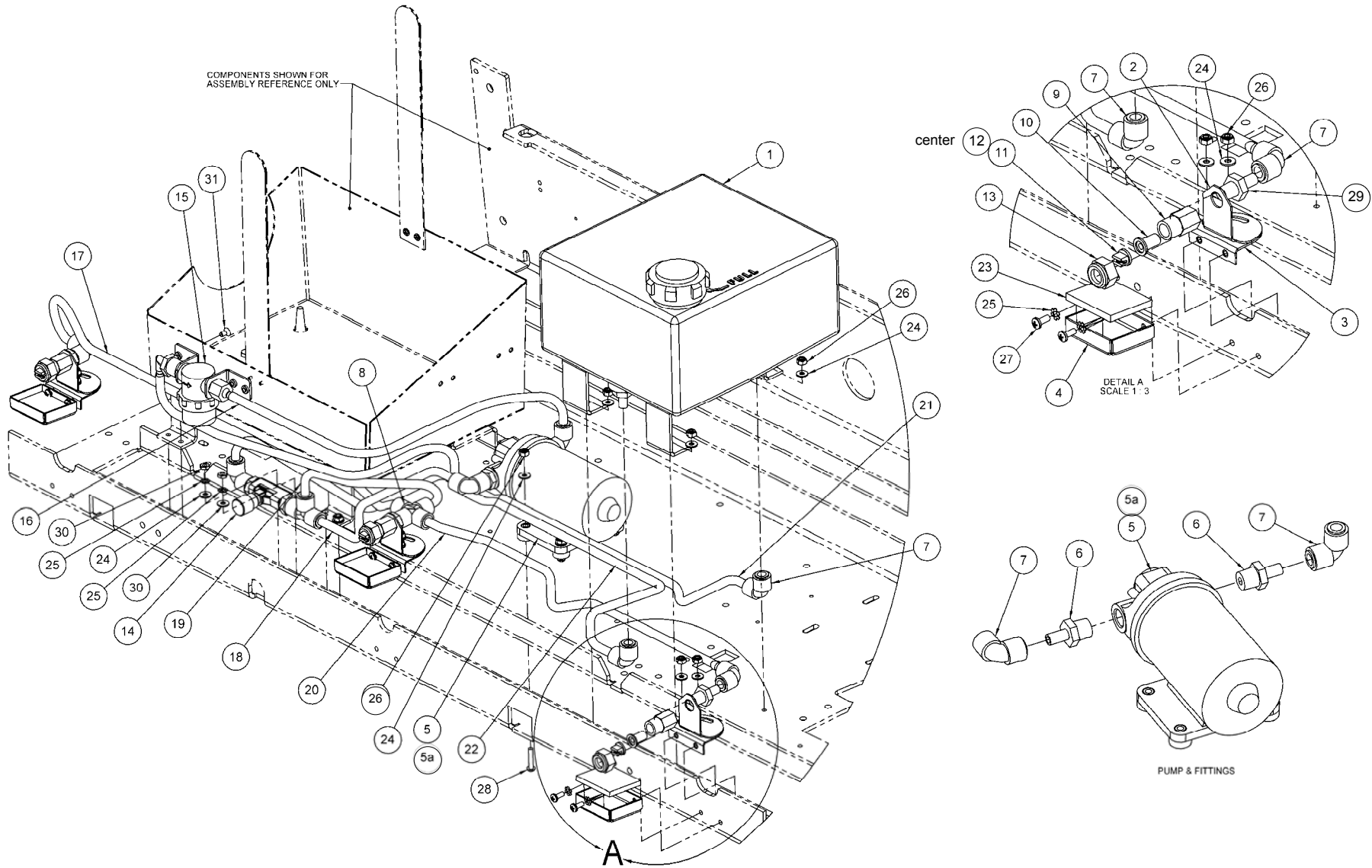


Waste Tank & Bracket Assembly

	NUMBER	DESCRIPTION
1	294-001-227	Waste Tank Guard
2	294-115-040	Waste Tank Bracket
3	A-8331	Tank Locating Pin
4	809-849-085	Screw, Hex, 1/4-20 x 1/2, Gr 8, Black
5	951-148-008	Washer, 1/4, Split, Black
6	294-115-247	Cord Strap
7	01-303	Washer, .334 x .10 x .025, Black
8	01-089	Rivet, 1/8 x 1/4, Alum
9	C-8341	Polyethylene Tank
10	01-148	Screw, Flat Head, 1/4-20 x 3/4
11	A-8308	Tank Handle



Cleaner System



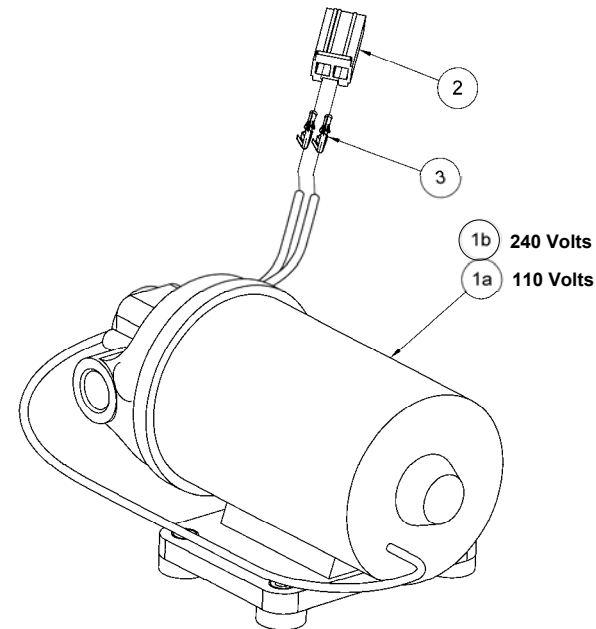
Base Plate Assembly – Cleaner System

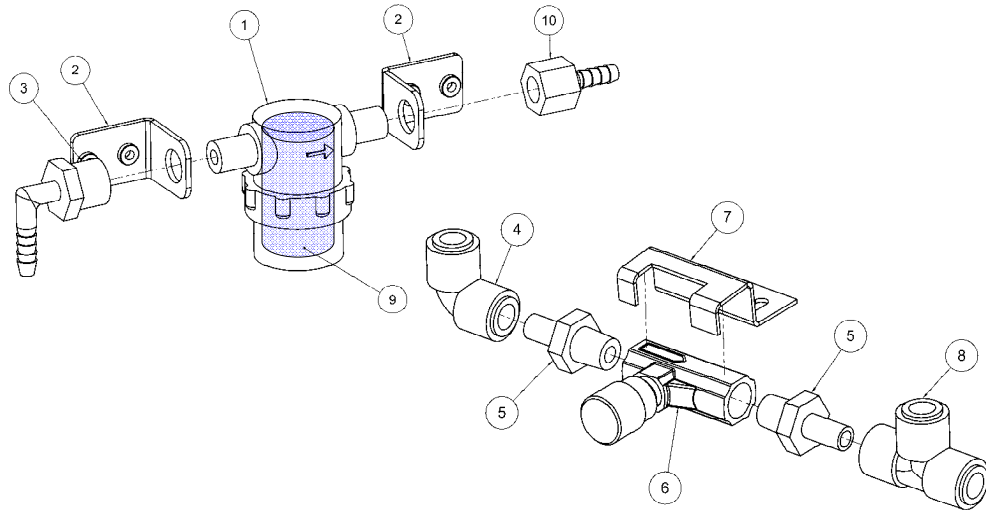
	NUMBER	DESCRIPTION
1	294-115-638	Cleaner Tank Assembly
2	294-115-647	Nozzle Swivel
3	294-115-648	Nozzle Bracket
4	294-115-650	Drip Tray
5	02-206	Cleaner Pump, 110-Volt
5a	294-115-287	Cleaner Pump, 240-Volt
6	294-115-072	Stem Adapter, 3/8 NPT x 3/8
7	294-115-073	Union Elbow, 3/8 x 3/8
8	294-115-076	Union, Quick Connect, Cross, 4 x 3/8
9	294-002-403	Nozzle Body
10	294-002-401	Strainer, Check Valve
11	294-002-407	Spray Nozzle – Outside
12	294-002-406	Spray Nozzle – Center
13	294-002-404	Tip Retainer
14	294-115-637	Flow Control Valve
15	294-115-449	Filter Assembly

	NUMBER	DESCRIPTION
16	294-115-640	Tygothane Tubing, 20"
17	294-115-641	Tygothane Tubing, 26"
18	294-115-642	Tygothane Tubing, 10"
19	294-115-643	Tygothane Tubing, 9"
20	294-115-644	Tygothane Tubing, 21"
21	294-115-645	Tygothane Tubing, 32"
22	294-115-646	Tygothane Tubing, 40"
23	294-115-554	Drip Tray Foam
24	01-030	Washer, #10, Flat
25	01-033	Washer, #10, External Tooth Lock
26	838-740-002	Nut, Hex, 10-32, Nylon Locking
27	01-021	Screw, Pan Head, 10-32 x 1/2
28	01-024	Screw, Round Head, 10-32 x 1
29	294-115-071	Stem Adapter, 1/4 NPT x 3/8
30	01-032	Nut, Hex, 10-32
31	811-940-062	Screw, Flat Head, 10-32 x 3/8

Cleaner Pump Assembly

	NUMBER	DESCRIPTION
1a	02-206	Cleaner Pump, 110V
1b	294-115-287	Cleaner Pump, 240V
2	746-013-498	Molex Connector
3	760-019-223	Female Crimp Terminal



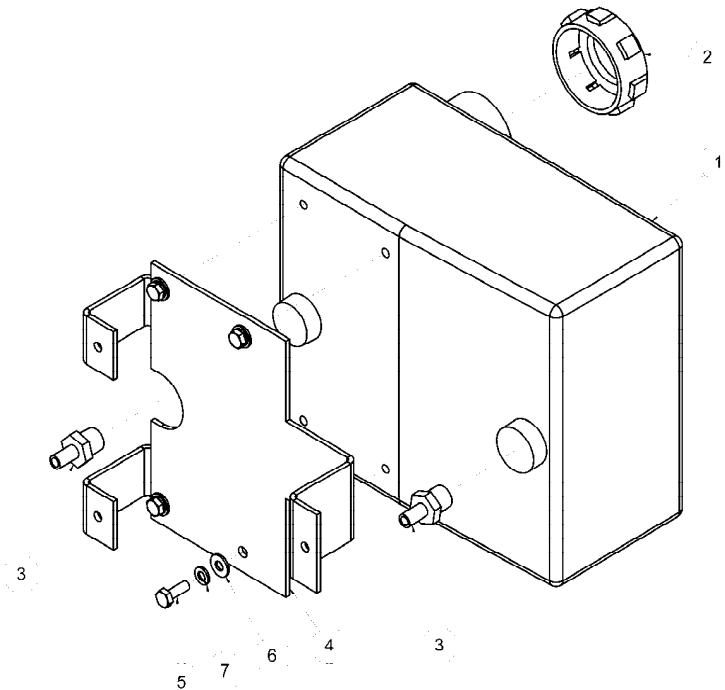


Cleaner Filter & Flow Control Valve

	NUMBER	DESCRIPTION
1	04-322	Filter Bowl
2	294-115-675	Filter Mounting Bracket
3	294-115-455	90 Degree Barbed Fitting, ¼ NPT x ¼
4	294-115-073	Elbow Union, 3/8 x 3/8
5	294-115-071	Stem Adapter, ¼ NPT x 3/8
6	294-115-636	Flow Control Valve
7	294-115-635	Bracket
8	294-115-074	Tee Union Quick Connect, 3/8 x 3/8
9	04-322-1	Mesh Screen
10	04-398	Barbed Fitting, ¼ NPT x ¼

294-115-638 - Cleaner Tank Assembly

	NUMBER	DESCRIPTION
1	294-115-525	Cleaner Supply Tank
2	294-115-092	Cleaner Tank Cap
3	294-115-072	Stem Adapter, 3/8 NPT x 3/8
4	294-115-639	Cleaner Tank Bracket
5	808-849-125	Screw, Hex, ¼-20 x ¾, Black
6	948-753-102	Washer, ¼, Flat, Black
7	951-148-008	Washer, ¼, Split, Black

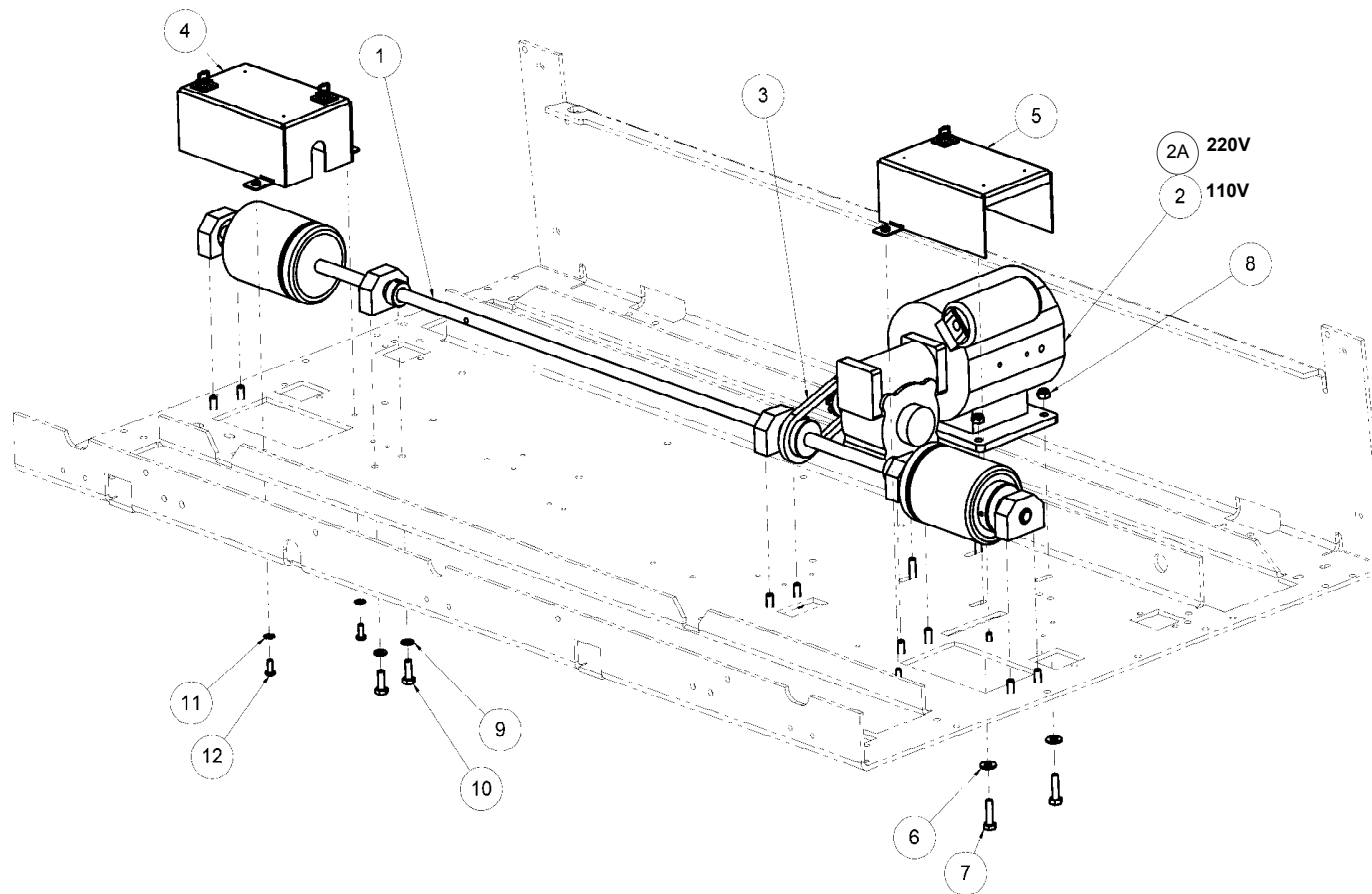


DRIVE SYSTEM

Drive Assembly

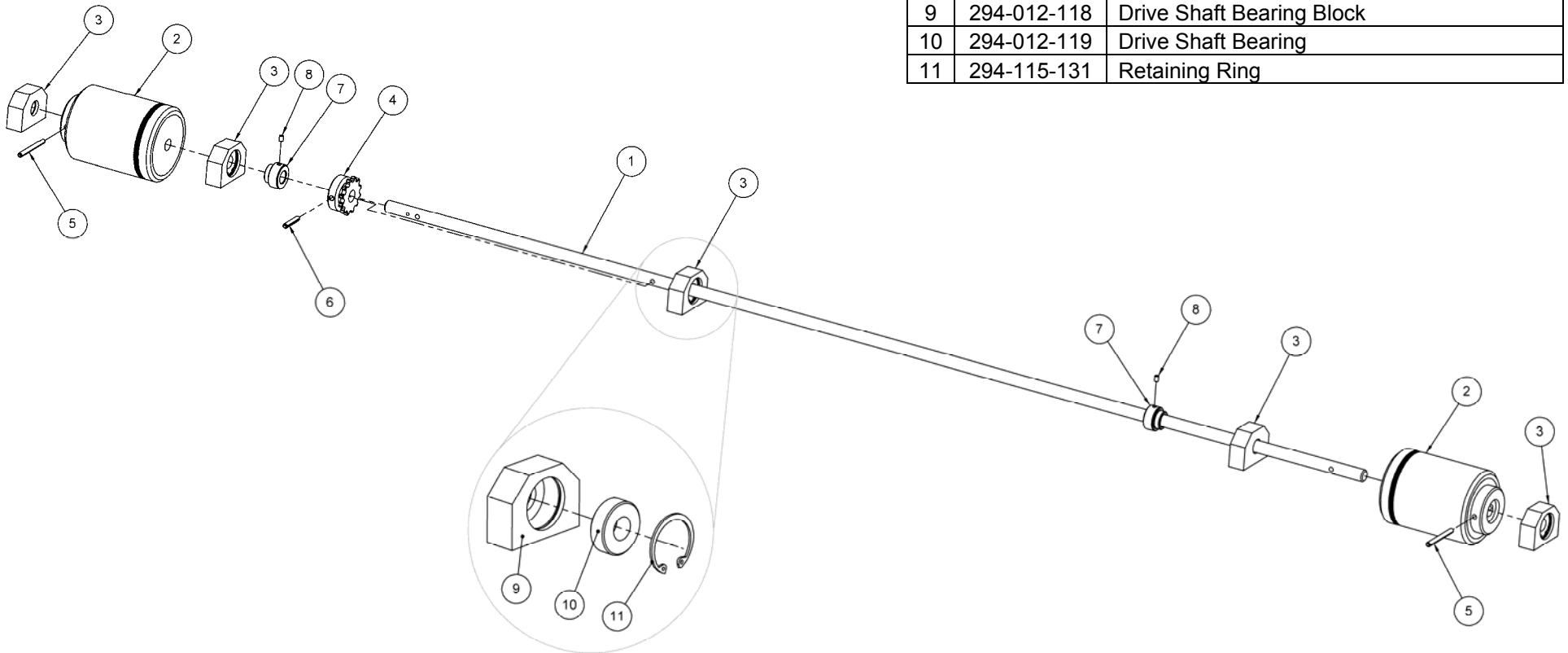
	NUMBER	DESCRIPTION
1	294-115-609	Drive Shaft Assembly
2	294-115-610	Drive Motor Assembly, 110-Volt
2A	294-115-628	Drive Motor Assembly, 220-Volt
3	294-115-080	Drive Chain
4	294-115-321	Drive Wheel Cover Assembly, Right
5	294-115-322	Drive Wheel Cover Assembly, Left
6	948-753-102	Washer, 1/4, Flat, Black

	NUMBER	DESCRIPTION
7	809-849-165	Screw, Hex, 1/4-20 x 1, Gr 8, Black
8	01-051	Nut, Hex, 1/4-20, Nylon Locking
9	951-148-008	Washer, 1/4, Split, Black
10	809-849-125	Screw, Hex, 1/4-20 x 3/4, Black
11	01-033	Washer, #10, External Tooth, Lock
12	01-021	Screw, Pan Head, 10-32 x 1/2



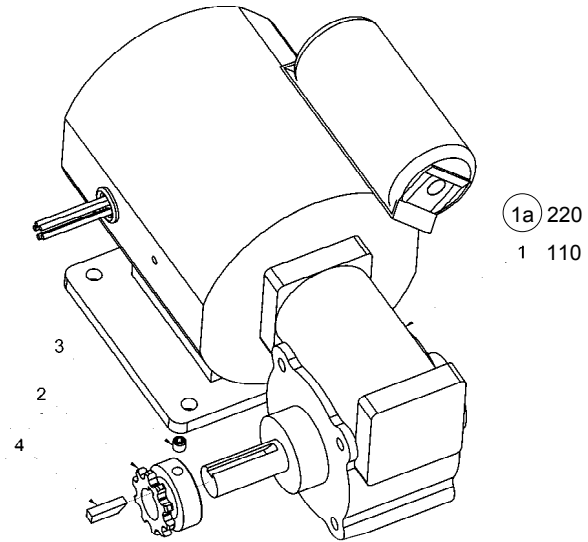
Drive Shaft Assembly

	NUMBER	DESCRIPTION
1	A-0337	Drive Shaft
2	294-115-404	Drive Wheel
3	294-012-120	Drive Shaft Bearing Block Assembly
4	A-0521	Drive Shaft Sprocket
5	01-087	Roll Pin, 3/16 x 2
6	01-082	Roll Pin, 3/16 x 1-1/8
7	294-012-216	Collar
8	01-007	Set Screw, 8-32 x 1/4
9	294-012-118	Drive Shaft Bearing Block
10	294-012-119	Drive Shaft Bearing
11	294-115-131	Retaining Ring



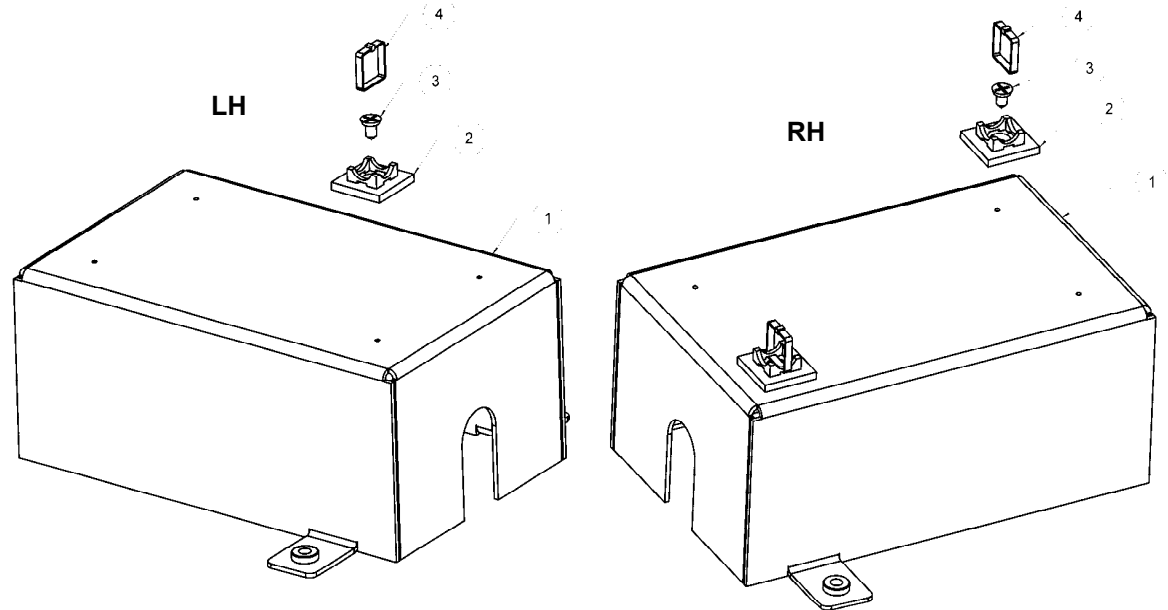
Drive Motor Assembly

	NUMBER	DESCRIPTION
1	02-525	Drive Motor, 110 Volt
1a	294-115-325	Drive Motor, 220 Volt
2	03-032	Sprocket
3	01-041	Set Screw, 1/4-20 x 1/4
4	A-0537	Key



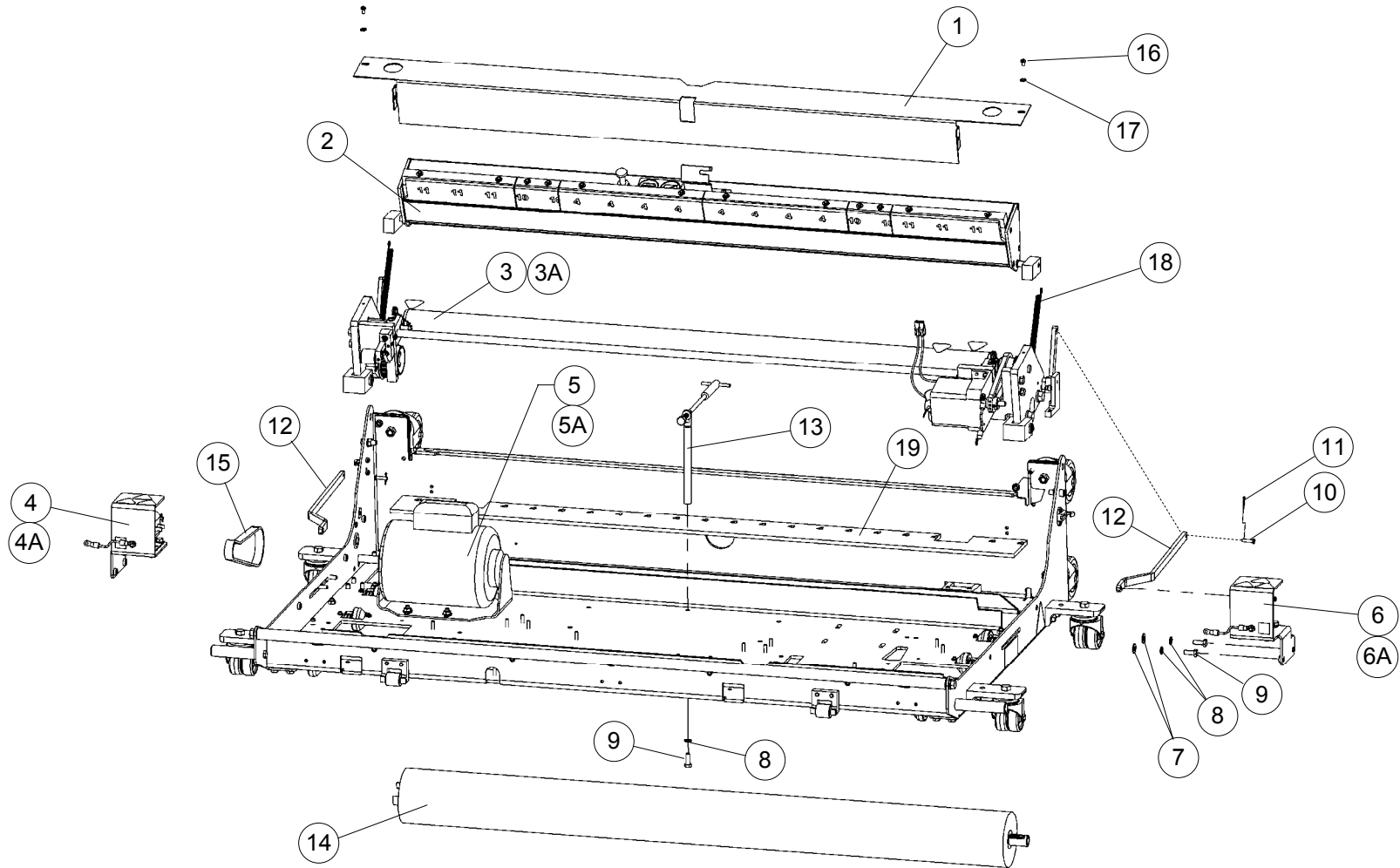
Drive Wheel Cover Assemblies, LH & RH

	NUMBER	DESCRIPTION
1	294-115-111	Drive Wheel Cover
2	02-539	Wire Tie Holder, Adhesive Backed
3	01-355	Screw, Flat Head, #6 x 1/4
4	04-064	Plastic Wire Tie



OILING and BUFFING SYSTEM

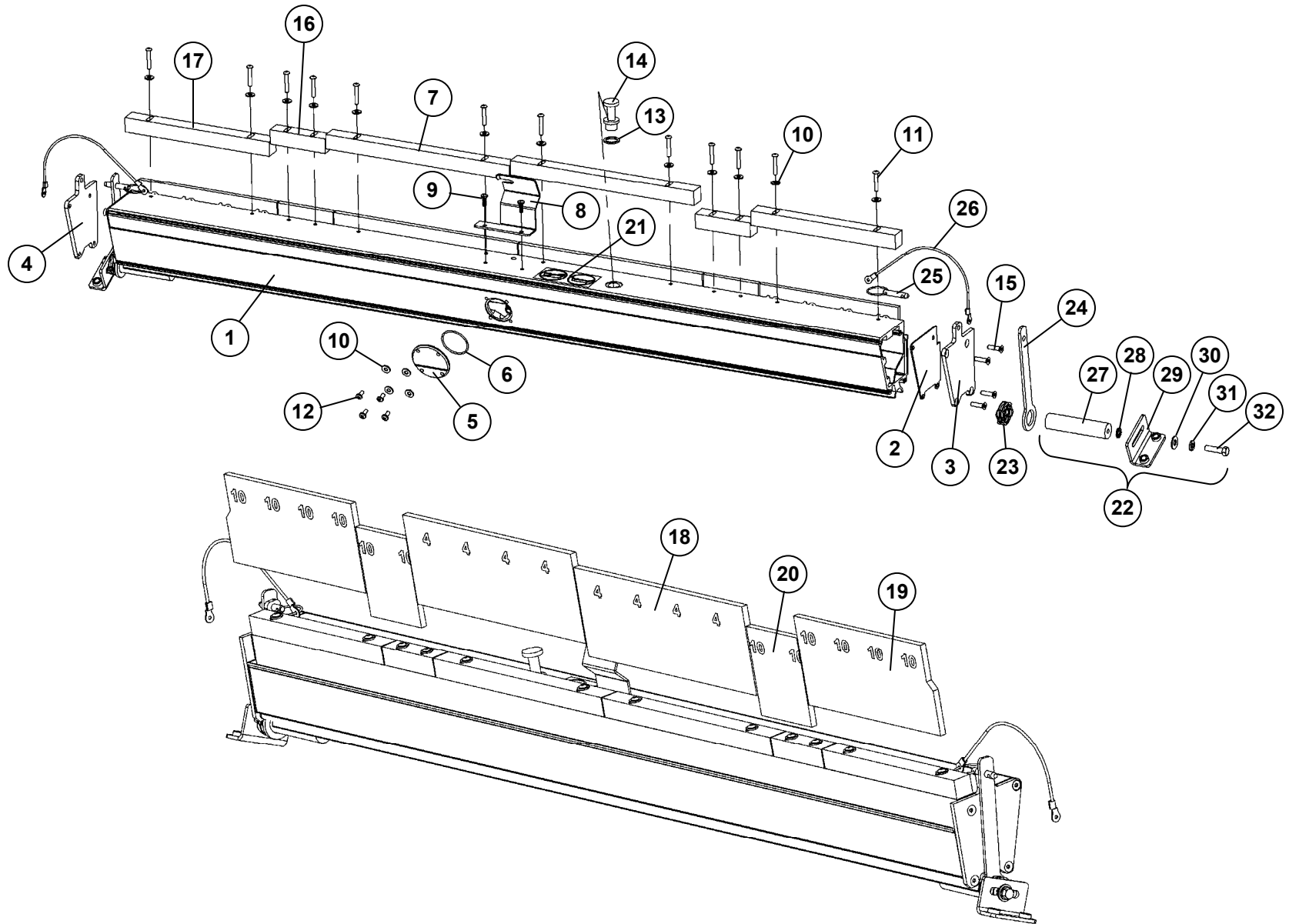
Oiling & Buffing System



Oiling & Buffing System

	NUMBER	DESCRIPTION
1	294-115-572	Buffer Splatter Shield
2	294-115-507	Oil Tank Assembly
3	294-115-607	Transfer Roller Assembly, 110-Volt
3A	294-115-626	Transfer Roller Assembly, 220-Volt
4	294-115-239	Buffer Solenoid & Bracket Assembly, 110-Volt, Right
4A	294-115-273	Buffer Solenoid & Bracket Assembly, 240-Volt, Right
5	294-115-038	Buffer Motor Assembly, 110-Volt
5A	294-002-270	Buffer Motor Assembly, 220-Volt
6	294-115-242	Buffer Solenoid & Bracket Assembly, 110-Volt, Left
6A	294-115-277	Buffer Solenoid & Bracket Assembly, 240-Volt, Left
7	948-753-102	Flat Washer, 1/4, Black
8	951-148-008	Washer, 1/4, Split, Black
9	809-849-125	Screw, Hex, 1/4-20 x 3/4, Black
10	01-215	Clevis Pin, 3/16 x 3/4
11	01-080	Cotter Pin, 1/16 x 1/2
12	294-115-664	Buffer Engagement Link
13	294-115-162	Oil Tank Lift Assembly
14	SA-1182	Buffer Tube Assembly
15	294-115-049	Buffer Brush Belt
16	01-019	Screw, Pan Head, 10-32 x 3/8
17	01-033	Washer, #10, External Tooth, Lock
18	294-115-171	Extension Spring
19	294-115-672	Oil Tank Drip Foam

Oiling & Buffing System – Oil Tank Assembly



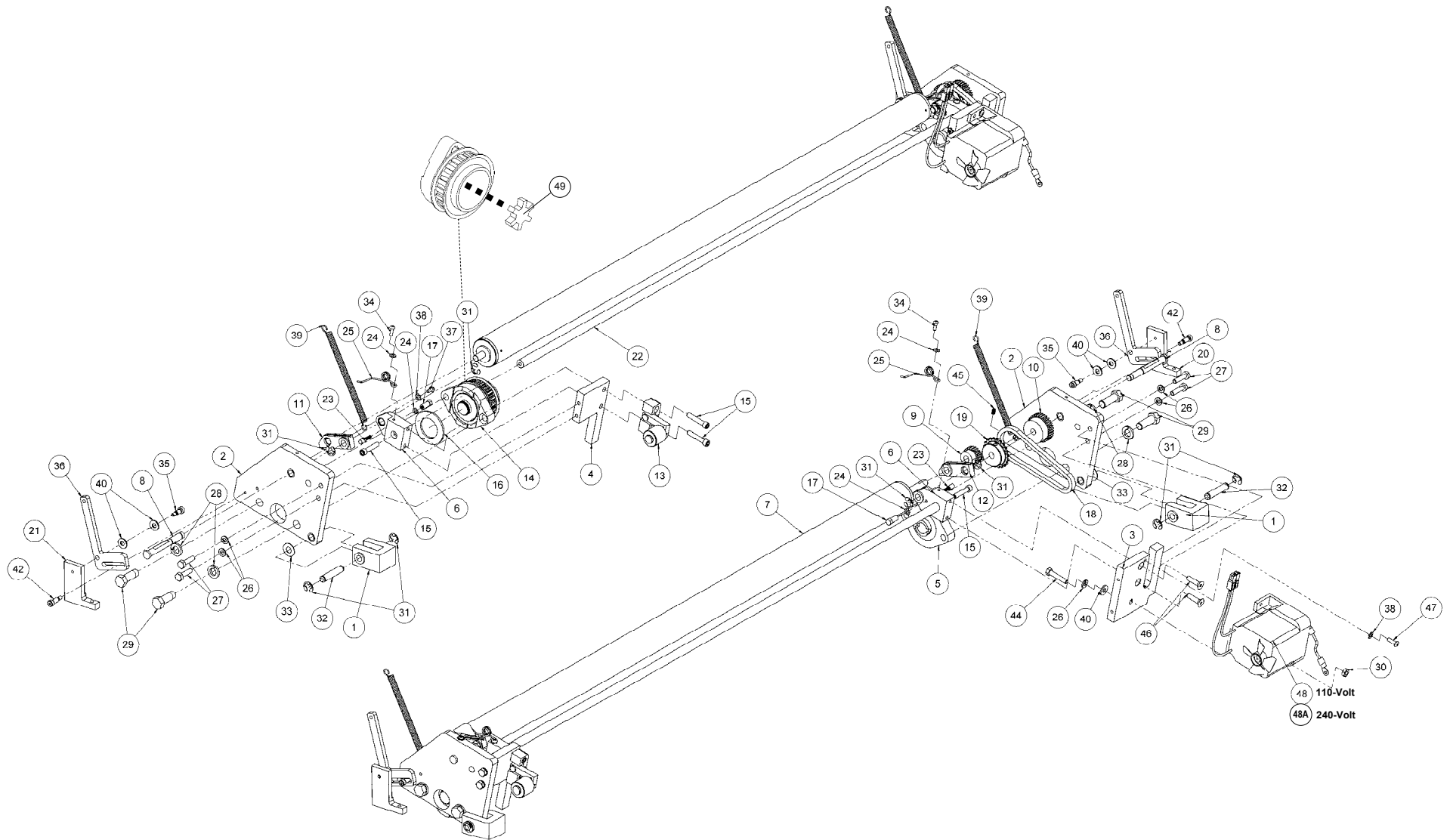
Oiling & Buffing System – Oil tank Assembly

	NUMBER	DESCRIPTION
1	294-115-508	Oil Tank, Machined
2	294-115-509	Oil Tank Gasket
3	294-115-510	Oil Tank End Cap – Right
4	294-115-511	Oil Tank End Cap – Left
5	294-115-512	Sight Glass Disk
6	294-115-513	O-Ring
7	294-115-515	10-inch Adjusting Bar
8	294-115-529	Tank Pull Bracket
9	01-010	Screw, Pan Head, 8-32 x ½
10	01-109	Wrought Washer, #8 USS
11	808-533-167	Screw, Hex Socket Button Head, 8-32 x 1
12	01-009	Screw, Pan Head, 8-32 x 3/8
13	04-093	Rubber Seal
14	A-0330	Tank Plug
15	294-115-516	Screw, Flat Head Torx, 10-24 x ¾
16	294-115-530	3-inch Adjusting Bar
17	294-115-531	7-inch Adjusting Bar
18	294-115-551	10-inch Foam Wick, SHO
19	294-115-665	7+-inch Foam Wick, MLO
20	294-115-553	3-inch Foam Wick, MLO
21	294-115-667	Overfill Sticker
22	294-115-682	Oil Tank Mount Assembly
23	294-115-705	Wave Spring
24	294-115-706	Oil Tank Retaining Bracket
25	04-118	Quick Release Pin
26	04-335	Cable Assembly, 8"
27	294-115-681	Oil Tank Mounting Bar
28	01-053	Lock Washer, ¼, External Tooth
29	294-115-683	Oil Tank Mounting Bracket Assembly
30	948-753-101	Flat Washer, ¼, Black
31	951-148-008	Lock Washer, ¼, Split, Black
32	01-048	Screw, Hex, ¼-20 x 1

Replacement Foam Wicks

Relative Oil Output	Stencil # Firmness/	Part Number	Length
Super Low (SLO)	13	294-115-654	48"
Extra Low (XLO)	12	294-115-653	48"
Low (LO)	11	294-115-652	48"
Medium Low (MLO)	10	294-115-482	48"
Medium (MO)	8	294-115-484	48"
Medium High (MH)	6	294-115-486	48"
High (HO)	5	294-115-488	48"
Super High (SHO)	4	294-115-490	48"

Oiling & Buffing System – Transfer Roller



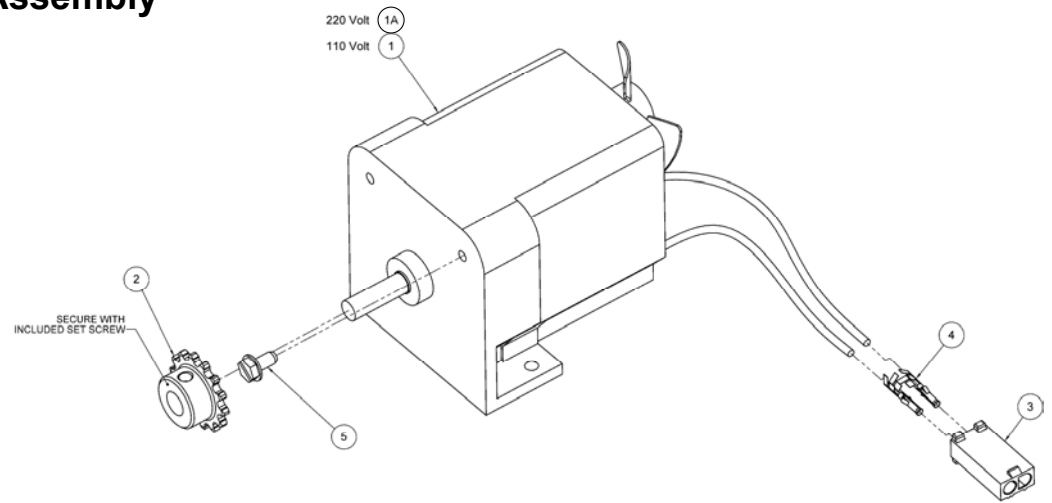
Oiling & Buffing System – Transfer Roller

	NUMBER	DESCRIPTION
1	294-115-021	Pivot Bracket Assembly
2	294-115-014	Buffer Side Plate Assembly
3	294-115-629	Transfer Motor Mounting Bracket
4	294-115-009	Transfer Roller Mount – Buffer Side
5	B-0077	Swivel End Bearing
6	294-115-407	Roller Shaft Support Arm Assembly
7	294-115-013	Roller Assembly
8	294-115-004	Transfer Roller Shaft
9	294-115-002	Transfer Roller Gear – Small
10	294-115-003	Transfer Roller Gear – Large
11	SA-1023R	Right Roller Support Assembly
12	SA-1023L	Left Roller Support Assembly
13	294-115-139	Belt Tensioner Assembly
14	SA-6002	Buffer Drive Assembly
15	810-349-200	Screw, Socket Head, ¼-20 x 1-1/4, Patch, Black
16	A-0575	Shim
17	A-0464	Positive Stop Nut
18	294-115-611	Transfer Roller Chain
19	A-0951	Sprocket
20	294-115-158	Pivot Mounting Link – Left
21	294-115-086	Pivot Mounting Link – Right
22	294-115-157	Upper Stiffener Bracket (Rod)
23	A-0463	Positive Stop Screw
24	01-016	Washer, #8, External Tooth, Locking
25	A-0583	Transfer Roller Spring

	NUMBER	DESCRIPTION
26	01-054	Washer, ¼, Split
27	809-849-165	Screw, Hex, ¼-20 x 1, Gr 8, Black
28	951-068-002	Washer, 7/16, Split
29	809-869-205	Screw, Hex, 7/16-14 x 1-1/4
30	835-549-002	Nut, Hex, ¼-20, Jam
31	919-010-400	Retaining Ring, E-Style
32	294-115-154	Clevis Pin, 3/8, SS
33	964-572-000	Thrust Washer
34	828-133-082	Screw, Round Head, 8-32 x ½
35	01-349	Shoulder Bolt, ¼ x 3/8, Black
36	294-115-088	L-Link
37	01-019	Screw, Pan Head, 10-32 x 3/8
38	01-033	Washer, #10, External Tooth, Locking
39	294-115-171	Extension Spring
40	948-753-102	Washer, ¼, Flat, Black
41	294-115-245	Decal, Hand Entanglement Hazard, Chain (not shown)
42	880-239-140	Shoulder Bolt, 1/4 x ½, Black
43	294-115-246	Decal, Hand Entanglement Hazard, Belt (not shown)
44	809-849-205	Screw, Hex, ¼-20 x 1-1/4, Gr 8, Black
45	01-098	Set Screw, Hex, 10-32 x 3/8
46	808-849-160	Screw, Flat Head, ¼-20 x 1, Black
47	01-608	Screw, Hex Socket Button Head, 10-32 x 5/8
48	294-115-006	Transfer Roller Motor Assembly, 110-Volt
48A	294-115-267	Transfer Roller Motor Assembly, 240-Volt
49	A-0079	Buffer Spider

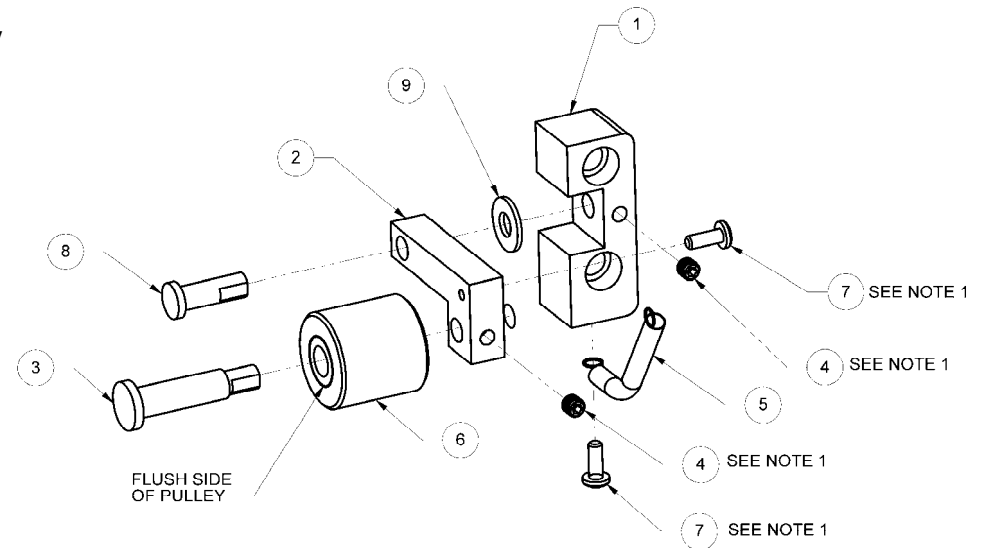
Oiling & Buffing System – Transfer Roller Motor Assembly

	NUMBER	DESCRIPTION
1	294-115-558	Transfer Roller Motor, 110-Volt
1A	294-115-559	Transfer Roller Motor, 220-Volt
2	294-001-006	Sprocket & Set Screw
3	746-013-198	Molex Connector
4	760-019-223	Female Crimp Terminal
5	294-115-292	Screw, Hex Washer Head, 10-32 x 3/8, Green



Oiling & Buffing System – Belt Tensioner Assembly

	NUMBER	DESCRIPTION
1	294-115-140	Belt Tensioner Mount
2	294-115-204	Idler Pivot Arm
3	A-5556	Roller Pin
4	01-029	Set Screw, 10-32 x 3/16
5	A-5558	Idler Spring
6	294-115-496	Tension Pulley Assembly
7	01-001	Screw, Round Head, 6-32 x 3/8
8	A-5557	Pivot Arm Pin
9	01-036	Washer, 3/16, Flat

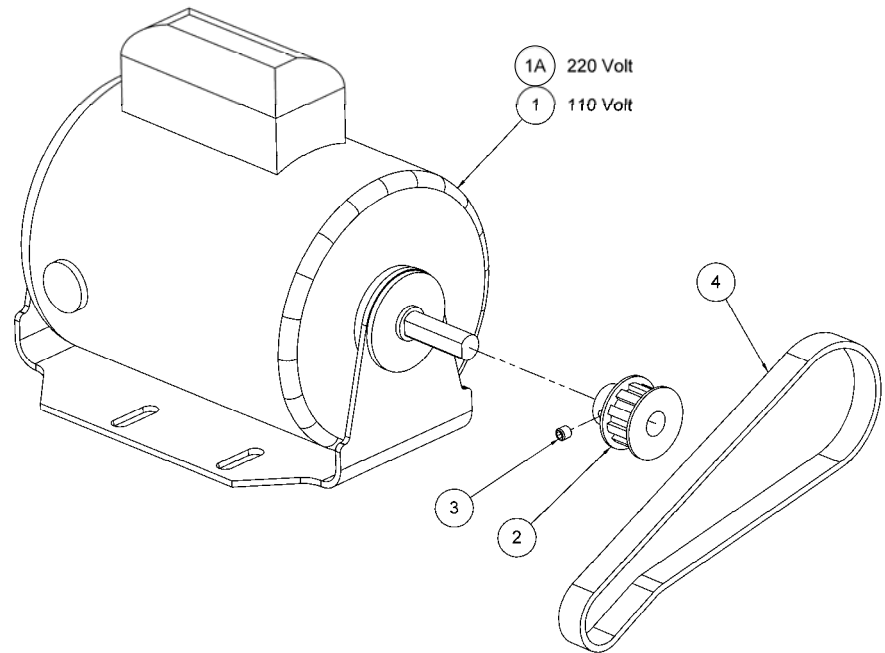


NOTES:

1. APPLY LOCTITE 242 TO SCREWS AS INDICATED. ENSURE NO LOCTITE GETS ON THE PINS (A-5556 & A-5557).

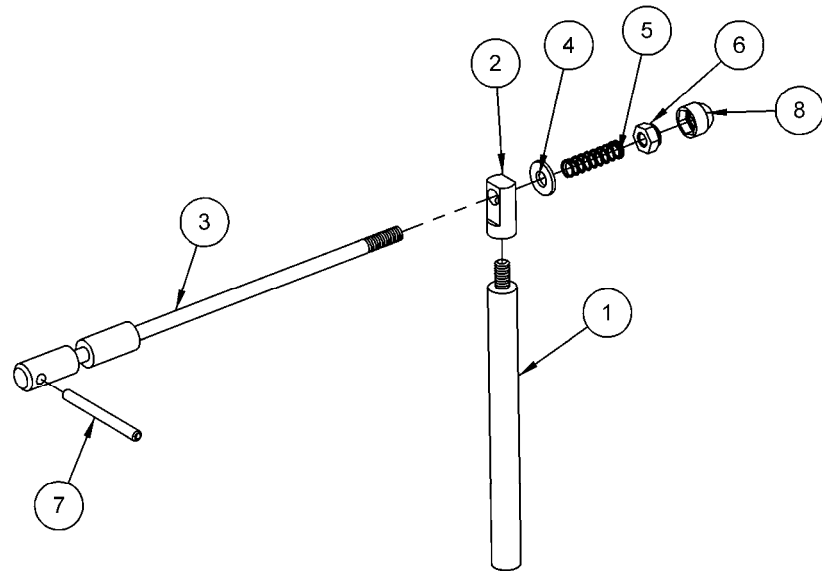
Oiling & Buffing System – Buffer Motor Assembly

	NUMBER	DESCRIPTION
1	294-115-038	Buffer Motor, 110-Volt (includes items 2 & 3)
1A	294-002-270	Buffer Motor, 220-Volt (includes items 2 & 3)
2	A-0425	Pulley
3	01-041	Set Screw, 1/4-20 x 1/4
4	294-115-049	Buffer Brush Belt



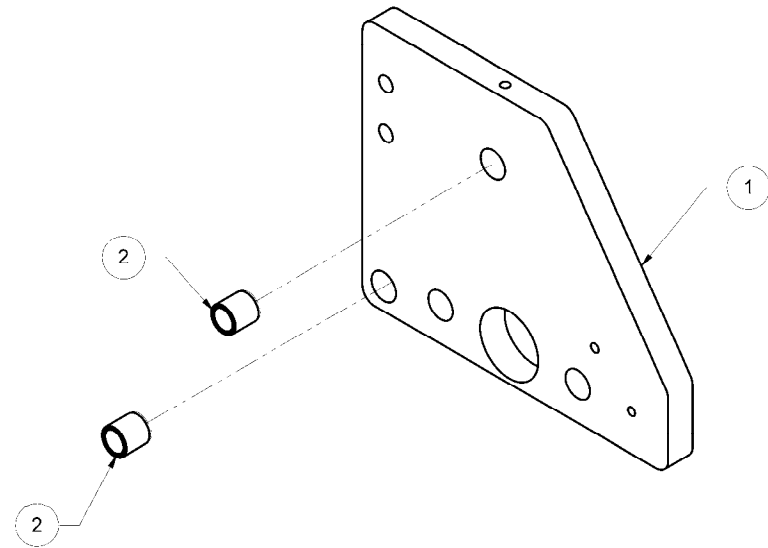
Oiling & Buffing System – Oil Tank Lift Assembly

	NUMBER	DESCRIPTION
1	294-115-492	Tank Pull Post
2	294-115-190	Tank Pull Post Pivot
3	294-115-168	Tank Pull Rod
4	948-753-102	Washer, 1/4, Flat, Black
5	294-002-174	Compression Spring
6	01-051	Nut, Hex, 1/4-20, Nylon Locking
7	01-087	Roll Pin, 3/16 x 2
8	294-115-468	Nut Cap, Hex, 1/4, Black



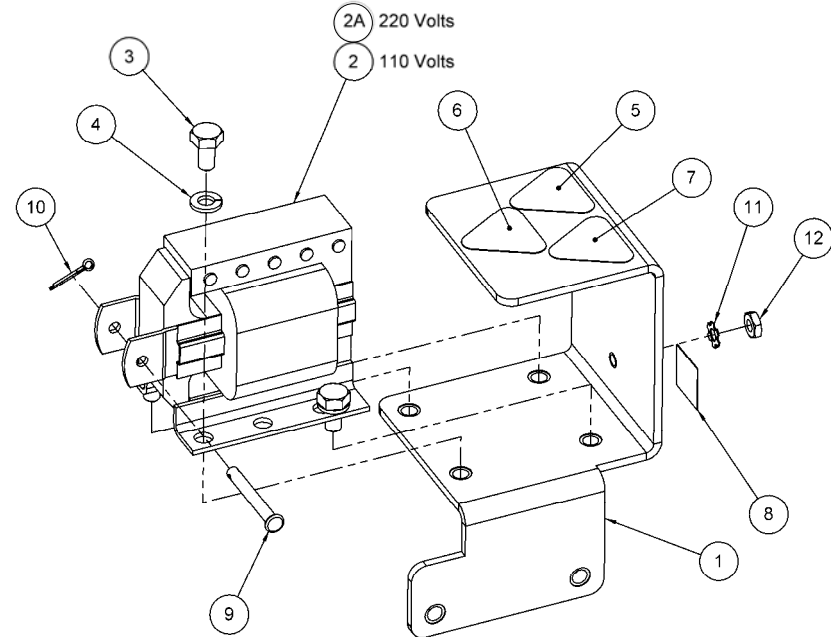
294-115-014 Buffer Side Plate Assembly

	NUMBER	DESCRIPTION
1	294-115-010	Buffer Brush Side Plate
2	294-115-015	Bushing: .5 OD X .38 ID X .5



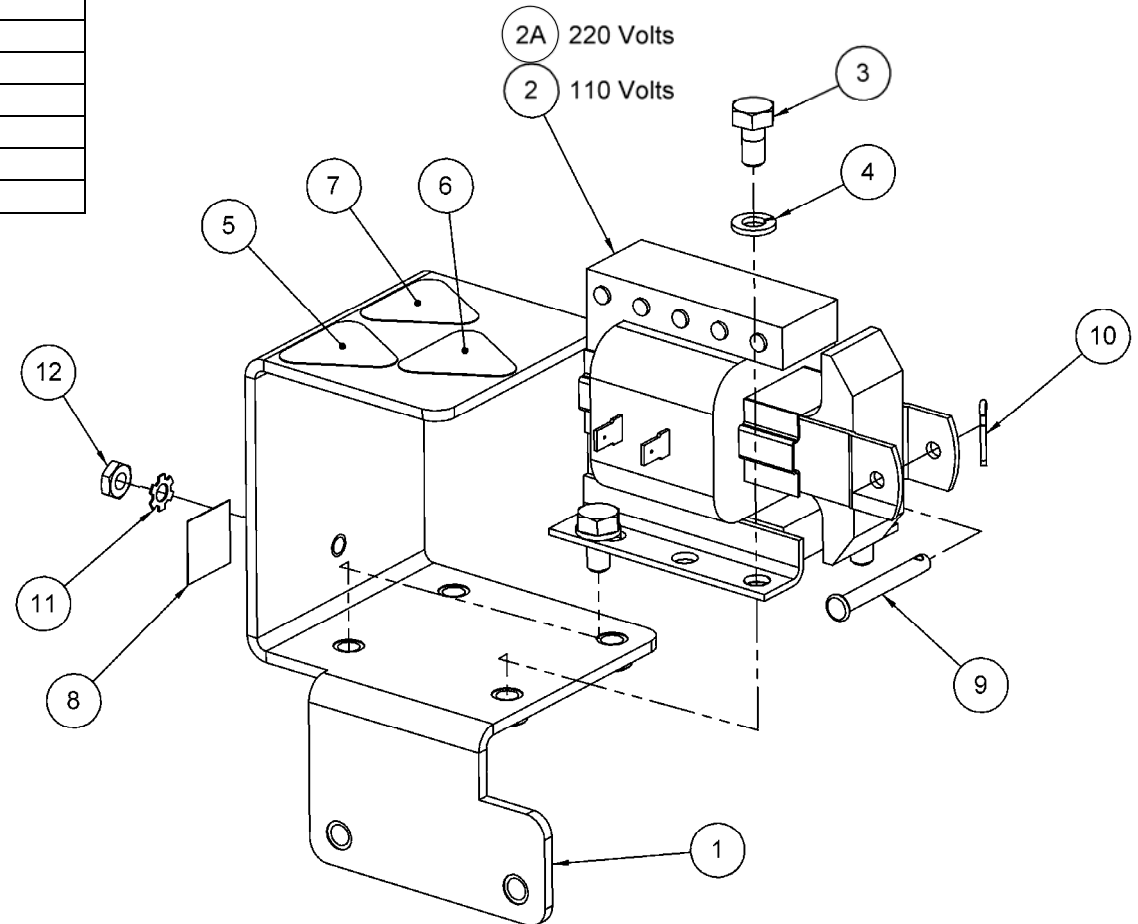
Buffer Solenoid & Bracket Assembly – Right Side

	NUMBER	DESCRIPTION
1	294-115-241	Buffer Solenoid Bracket Assembly – Right
2	294-002-033	Solenoid, 3000 Series, 110-Volt, LH Terminals
2A	294-002-274	Solenoid, 3000 Series, 240-Volt, LH Terminals
3	809-849-085	Screw, Hex, 1/4-20 x 1/2, Gr 8, Black
4	951-148-008	Washer, 1/4, Split, Black
5	294-115-236	Hazard Sticker, Electric Shock Hazard
6	294-115-237	Hazard Sticker, Hand Crush Hazard
7	294-115-238	Hazard Sticker, Hot Surface Hazard
8	294-115-256	Earth (Ground) Sticker
9	01-038	Clevis Pin, 3/16 x 1-1/2
10	01-080	Cotter Pin, 1/16 x 1/2
11	01-033	Washer, #10, External Tooth Locking
12	835-540-002	Nut, Hex, 10-32



Buffer Solenoid & Bracket Assembly – Left Side

	NUMBER	DESCRIPTION
1	294-115-244	Buffer Solenoid Bracket Assembly – Left
2	294-002-032	Solenoid, 3000 Series, 110-Volt, RH Terminals
2A	294-002-275	Solenoid, 3000 Series, 240-Volt, RH Terminals
3	809-849-085	Screw, Hex, 1/4-20 x 1/2, Gr 8, Black
4	951-148-008	Washer, 1/4, Split, Black
5	294-115-236	Hazard Sticker, Electric Shock Hazard
6	294-115-237	Hazard Sticker, Hand Crush Hazard
7	294-115-238	Hazard Sticker, Hot Surface Hazard
8	294-115-256	Earth (Ground) Sticker
9	01-038	Clevis Pin, 3/16 x 1-1/2
10	01-080	Cotter Pin, 1/16 x 1/2
11	01-033	Washer, #10, External Tooth Lock
12	835-540-002	Nut, Hex, 10-32

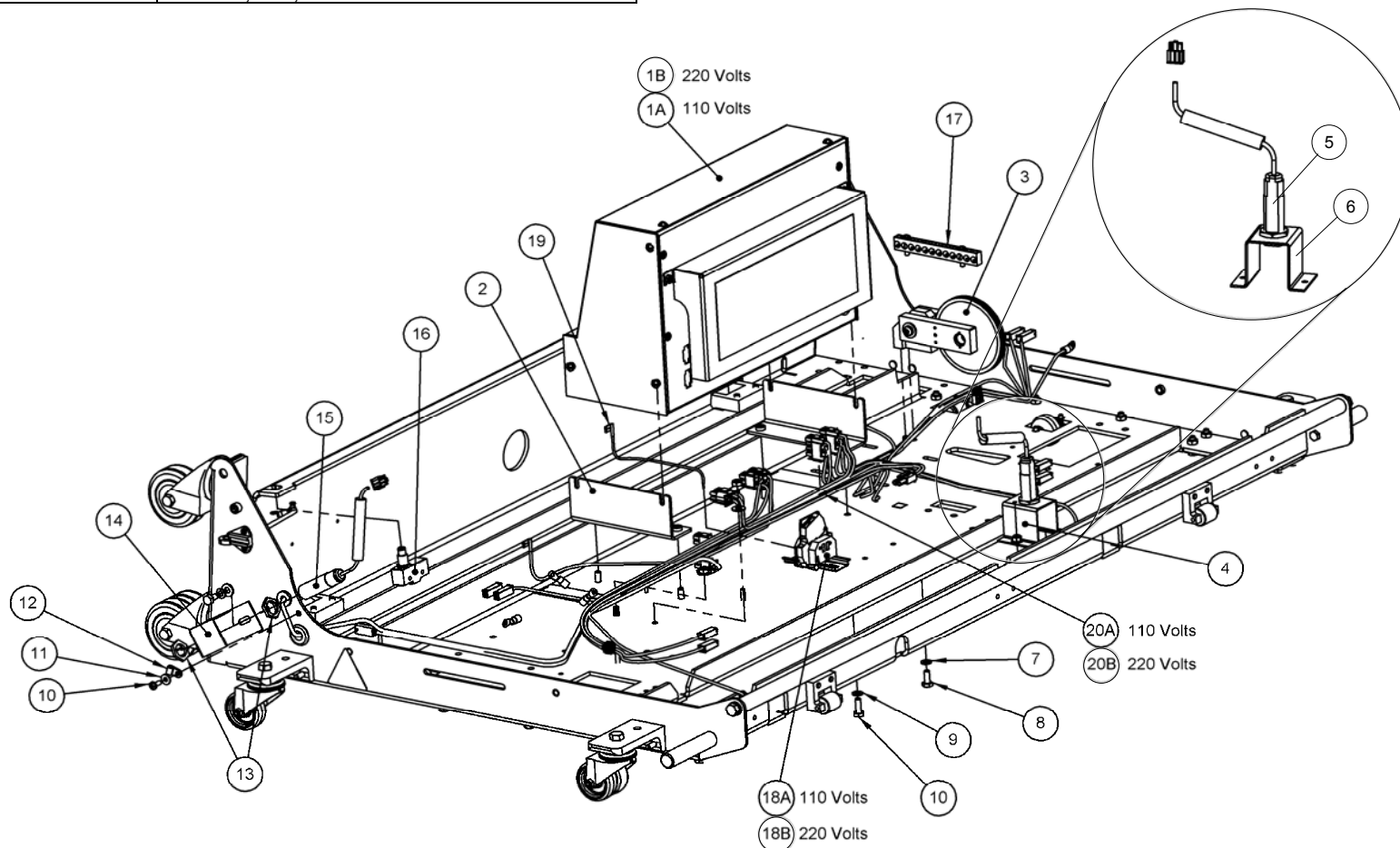


CONTROL SYSTEM

Control System Components

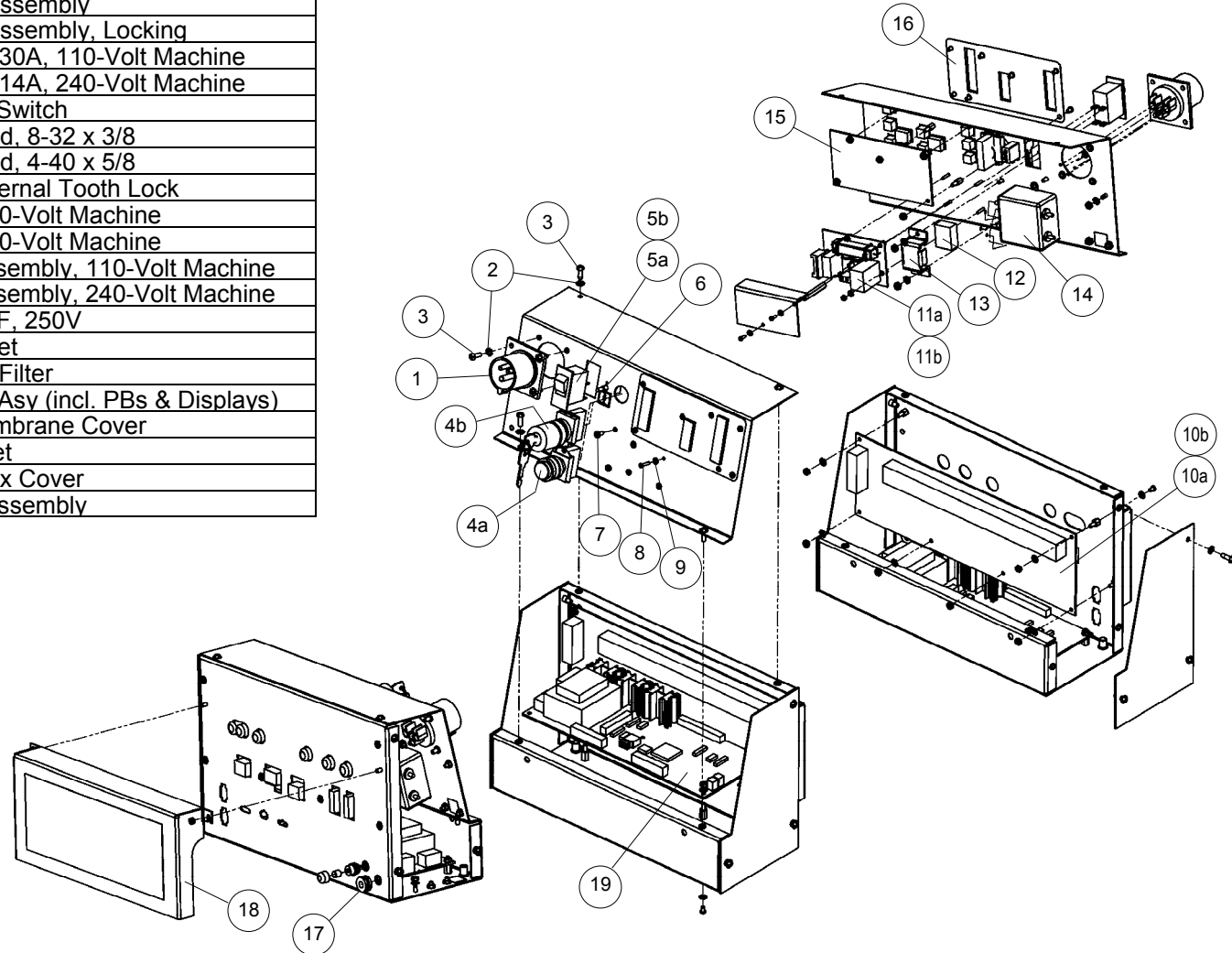
	NUMBER	DESCRIPTION
1A	294-115-658	Control Box Assembly – 110 Volts
1B	294-115-659	Control Box Assembly – 240 Volts
2	294-115-260	Control Box Mount Assembly
3	294-115-151	Counter Wheel Assembly
4	294-115-557	Pin Deck Sensor Assembly
5	294-115-300	Optical Sensor Assembly (includes hex
6	294-115-556	Pin Deck Sensor Bracket
7	951-148-008	Washer, ¼, Split, Black
8	809-849-100	Screw, Hex, ¼-20 x 5/8, Black
9	01-033	Washer, #10, External Tooth Lock
10	01-021	Screw, Pan Head, 10-32 x ½
11	01-030	Washer, #10, Flat

	NUMBER	DESCRIPTION
12	02-008	Plastic Wire Clamp, 3/16
13	294-115-201	Nut, 18MM, Thin, Jam, Metal
14	294-115-104	Approach Optical Sensor Bracket
15	294-115-299	Approach Optical Sensor Assembly
16	294-115-358	Switch
17	294-115-677	Ground Bar Assembly
18A	294-115-684	Fuse Assembly – 110 Volts
18B	294-115-671	Fuse Assembly – 220 Volts
19	294-115-708	Buffer Motor Power Wire
20A	294-115-692	Main Wire Harness – 110 Volts
20B	294-115-691	Main Wire Harness – 220 Volts

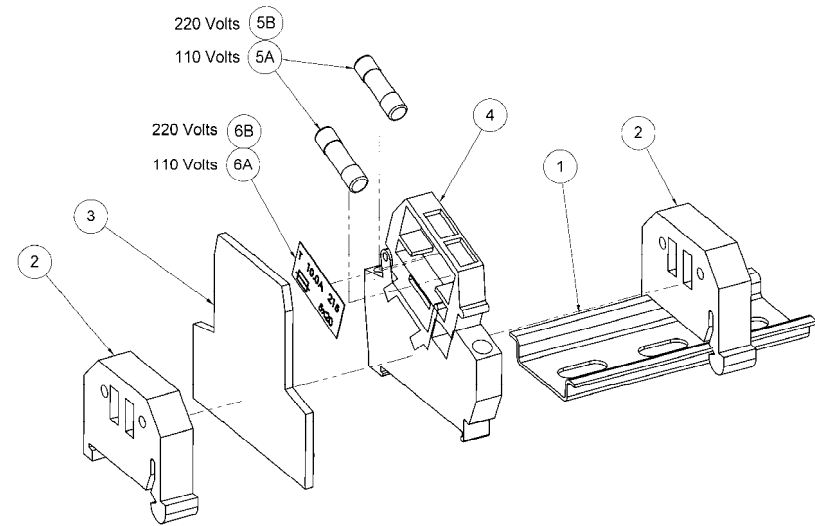
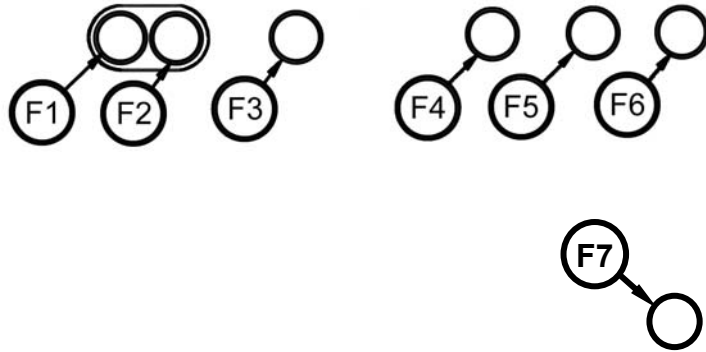


294-115-658 – Control Box Assembly, 110 Volt
294-115-659 – Control Box Assembly, 240 Volt

	NUMBER	DESCRIPTION
1	294-002-218	Power Inlet
2	01-033	Washer, #10 External Tooth Lock
3	01-022	Screw, Pan Head, 10-32 x 5/8
4a	294-115-197	E-Stop Switch Assembly
4b	294-115-678	E-Stop Switch Assembly, Locking
5a	294-002-323	Circuit Breaker, 30A, 110-Volt Machine
5b	294-002-214	Circuit Breaker, 14A, 240-Volt Machine
6	294-115-311	Drive Motor Kill Switch
7	01-009	Screw, Pan Head, 8-32 x 3/8
8	01-339	Screw, Pan Head, 4-40 x 5/8
9	01-402	Washer, #4, External Tooth Lock
10a	294-115-271	Relay Board, 110-Volt Machine
10b	294-115-202	Relay Board, 240-Volt Machine
11a	SA-1199	Brake Board Assembly, 110-Volt Machine
11b	SA-1200	Brake Board Assembly, 240-Volt Machine
12	02-038	Capacitor, 1.0mF, 250V
13	294-002-150	Capacitor Bracket
14	02-040	RFI Power Line Filter
15	294-115-026	Interface Board Asy (incl. PBs & Displays)
16	294-115-228	Control Box Membrane Cover
17	04-078	Rubber Grommet
18	294-115-231	Back Control Box Cover
19	294-115-663	Control Board Assembly



Fuses



115 Volt Fuses

FUNCTION	NUMBER	DESCRIPTION
F1 Cleaner Pump	294-115-366	2A Fuse
F2 Oil Transfer Roller Motor	294-115-166	4A Fuse
F3 Vacuum Motor	294-115-373	10A Fuse
F4 Drive Motor	294-115-374	6.25A Fuse
F5 Buffer Solenoids	294-115-375	8A Fuse
F6 Vac Head Solenoids	294-115-375	8A Fuse
F7 Logic Board Power	294-115-419	500 mA Fuse

Buffer Motor Fuse

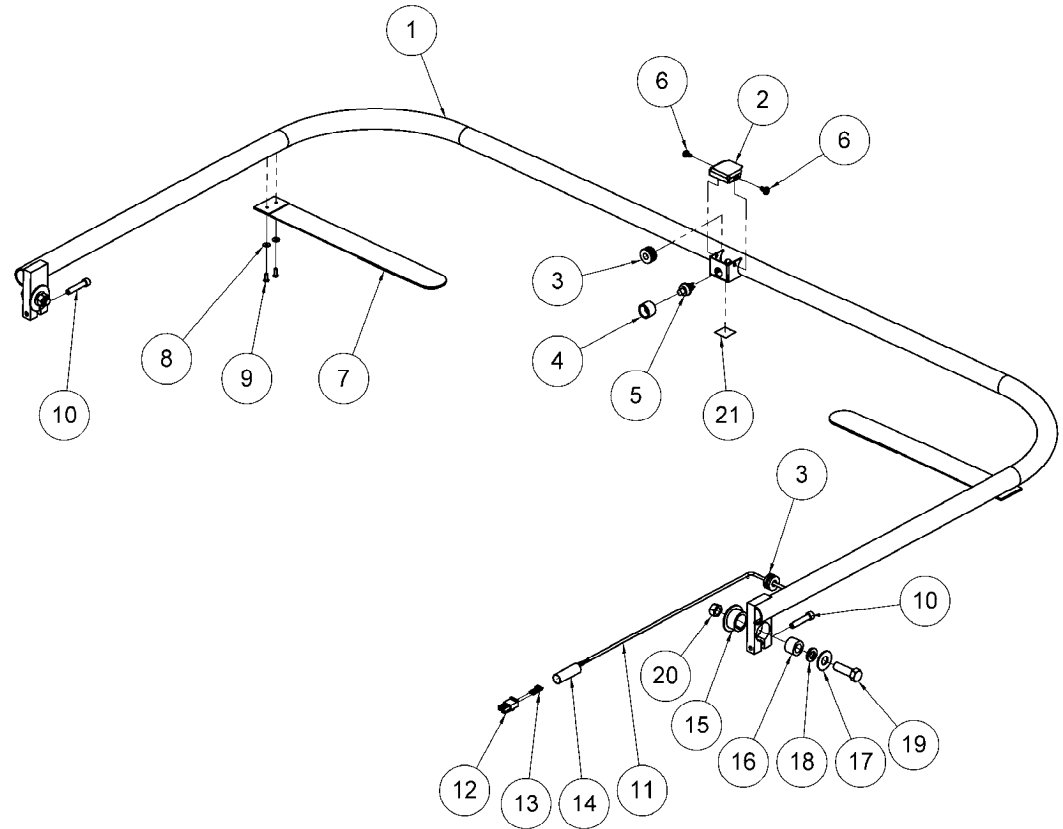
	NUMBER	DESCRIPTION
1	294-115-676	Din Rail, 3 inch
2	294-002-232	End Stop
3	294-002-240	End Plate
4	294-002-241	Fused Disconnect Terminal Block
5A	294-002-254	Fuse, 5 x 20, 5A, Time Delayed
5B	294-002-326	Fuse, 5 x 20, 10A, Time Delayed
6A	294-002-257	Label: 5A Time Delay Fuse
6B	294-002-322	Label: 10A Time Delay Fuse

230 Volt Fuses

FUNCTION	NUMBER	DESCRIPTION
F1 Cleaner Pump	294-115-365	1A Fuse
F2 Oil Transfer Roller Motor	294-115-366	2A Fuse
F3 Vacuum Motor	294-115-367	5A Fuse
F4 Drive Motor	294-115-166	4A Fuse
F5 Buffer Solenoids	294-115-166	4A Fuse
F6 Vac Head Solenoids	294-115-166	4A Fuse
F7 Logic Board Power	294-115-419	500 mA Fuse

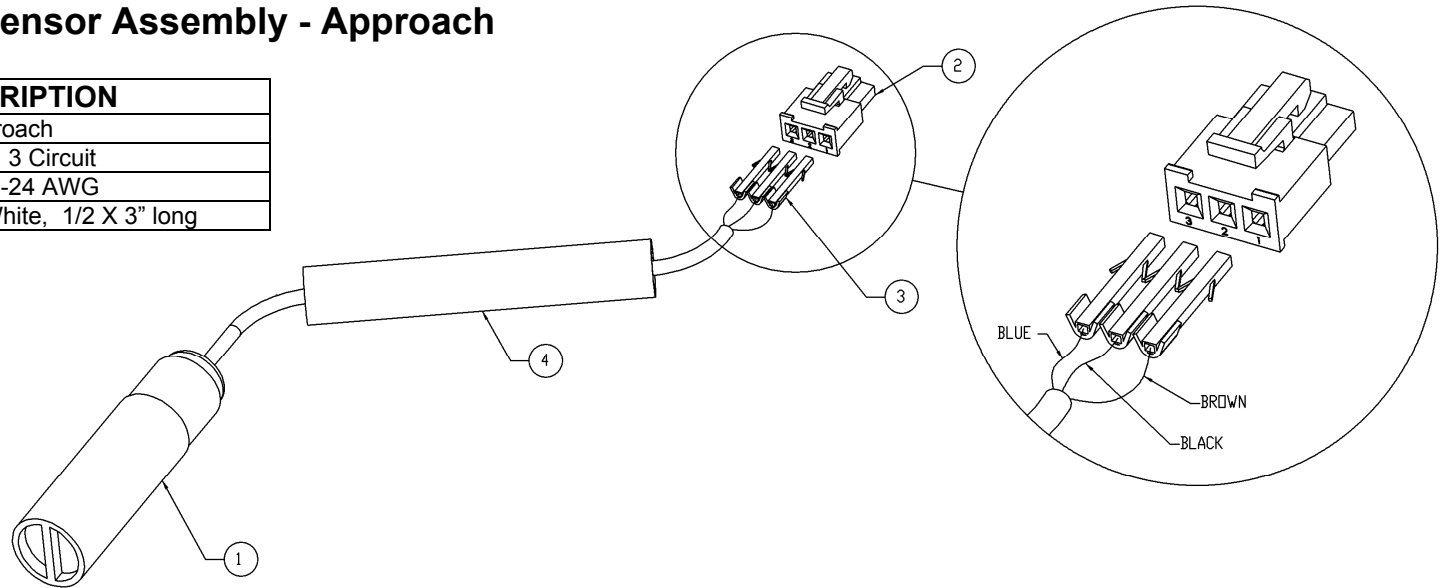
294-115-555 Handle Assembly

	NUMBER	DESCRIPTION
1	294-115-030	Handle Weldment
2	A-0448	Handle Switch Box Cover
3	04-078	Rubber Grommet
4	A-1028	Start Switch Cover
5	02-335	Switch
6	01-058	Screw, Hex, #8 X 3/8, Self Tapping
7	04-397	Cord Strap
8	01-303	Washer, Flat, SS
9	01-130	Rivet, 1/8 X 1/2, Aluminum
10	810-349-200	Screw, Socket Hd, 1/4 -20 X 1 1/4, Patch
11	02-307	Wire, 2 Conductor, Shielded, 22 AWG
12	02-336	Receptacle
13	02-299	Female Terminal, 18-24 AWG
14	02-208	Heat Shrink Tube, 1/2" ID, Black
15	294-115-695	Flanged Tension Bushing
16	294-115-082	Handle Pivot Boss
17	947-367-141	Washer, 3/8, Flat, Black
18	951-164-002	Washer, 3/8, Split, Black
19	809-865-205	Screw, Hex, 3/8-16 x 1 1/4, Gr 8, Black
20	844-865-002	Nut, Hex, 3/8-16, Stover Locking
21	294-115-709	Start Sticker



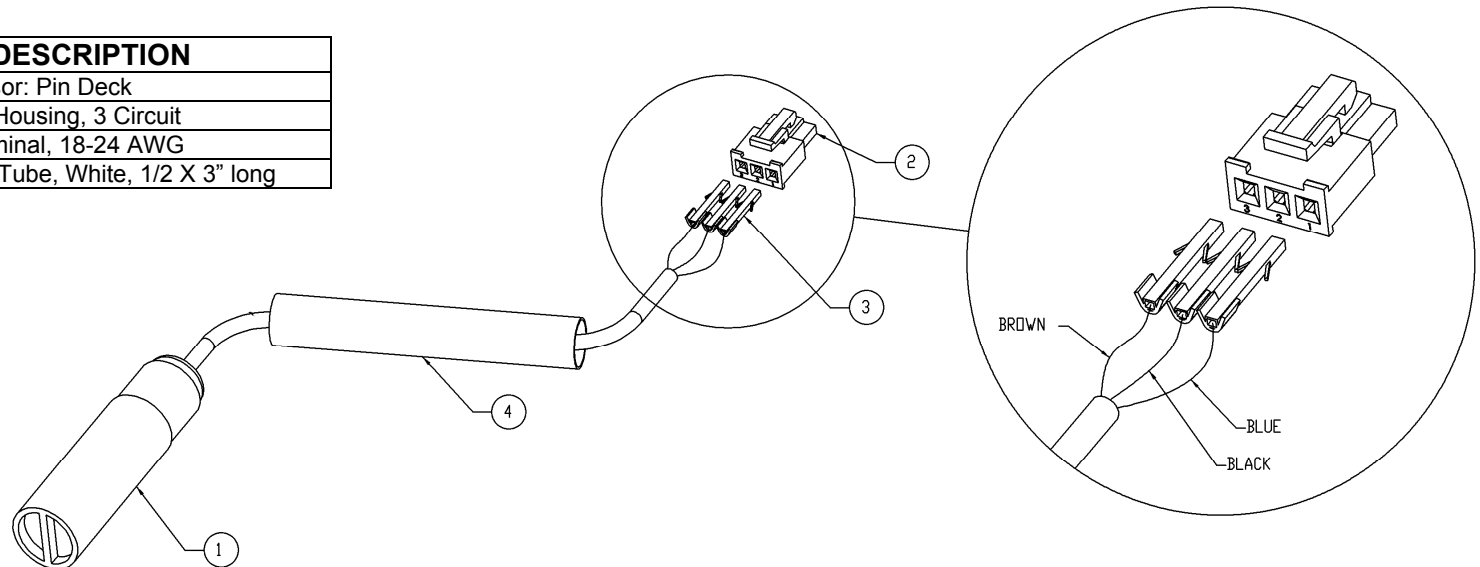
294-115-299 Optical Sensor Assembly - Approach

	NUMBER	DESCRIPTION
1	294-115-297	Optical Sensor: Approach
2	294-115-128	Receptacle Housing, 3 Circuit
3	294-115-310	Female Terminal, 18-24 AWG
4	294-115-352	Heat Shrink Tube, White, 1/2 X 3" long



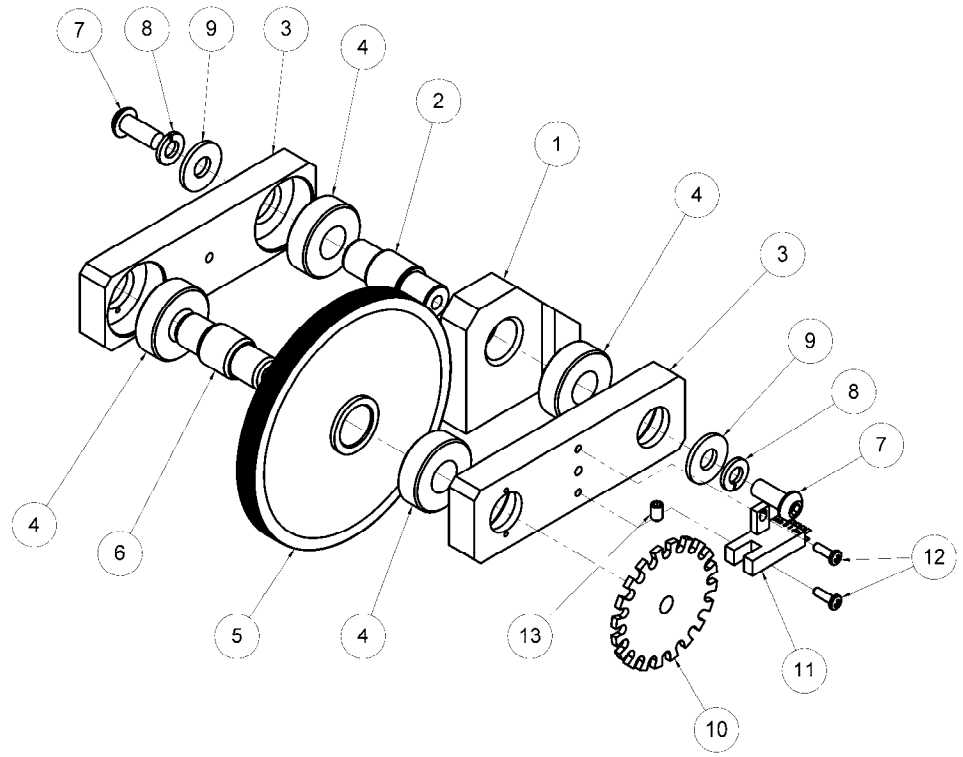
294-115-300 Optical Sensor Assembly - Pin Deck

	NUMBER	DESCRIPTION
1	294-115-298	Optical Sensor: Pin Deck
2	294-115-128	Receptacle Housing, 3 Circuit
3	294-115-310	Female Terminal, 18-24 AWG
4	294-115-352	Heat Shrink Tube, White, 1/2 X 3" long



Counter Wheel Assembly – 294-012-151

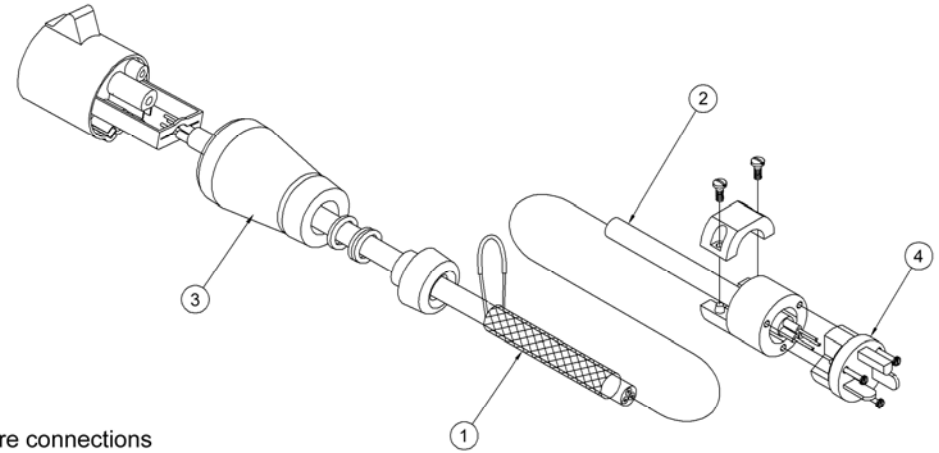
	NUMBER	DESCRIPTION
1	294-012-152	Counter Wheel Base
2	294-012-155	Counter Wheel Base Shaft
3	294-012-153	Counter Wheel Arm
4	294-012-119	Drive Shaft Bearing
5	294-012-154	Counter Wheel
6	294-012-156	Counter Wheel Shaft
7	808-549-102	Screw, Button Head, 1/4-20 x 5/8, Black
8	01-054	Washer, 1/4, Split
9	01-056	Washer, 1/4, Flat
10	294-115-612	Counter Wheel, 20-Tooth
11	294-115-046	Encoder
12	817-921-060	Screw, Pan Head, 4-40 x 3/8, SEMS
13	01-007	Set Screw, 8-32 x 1/4



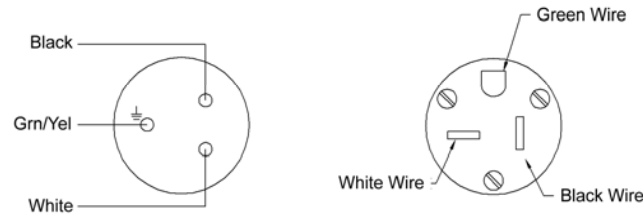
MISCELLANEOUS

294-002-359 110V Power Cord Assembly

	NUMBER	DESCRIPTION
1	04-443	Support Grip, Single Eye, Single Weave
2	02-238	Wire, 12/3, Type SJTO
3	294-002-219	Connector Body
4	02-397	125V, 20A, Male Plug

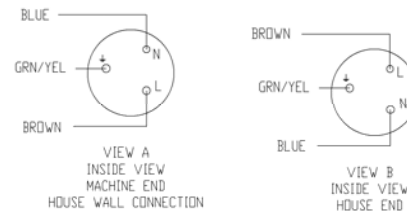
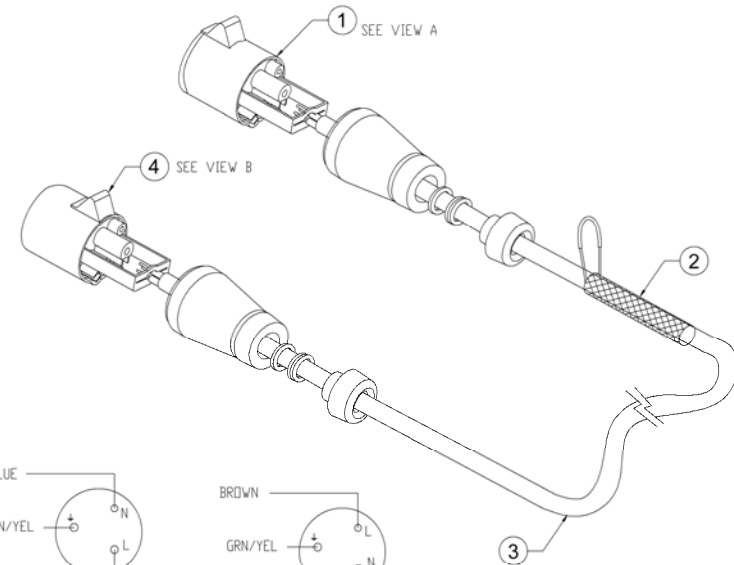


Detail for wire connections



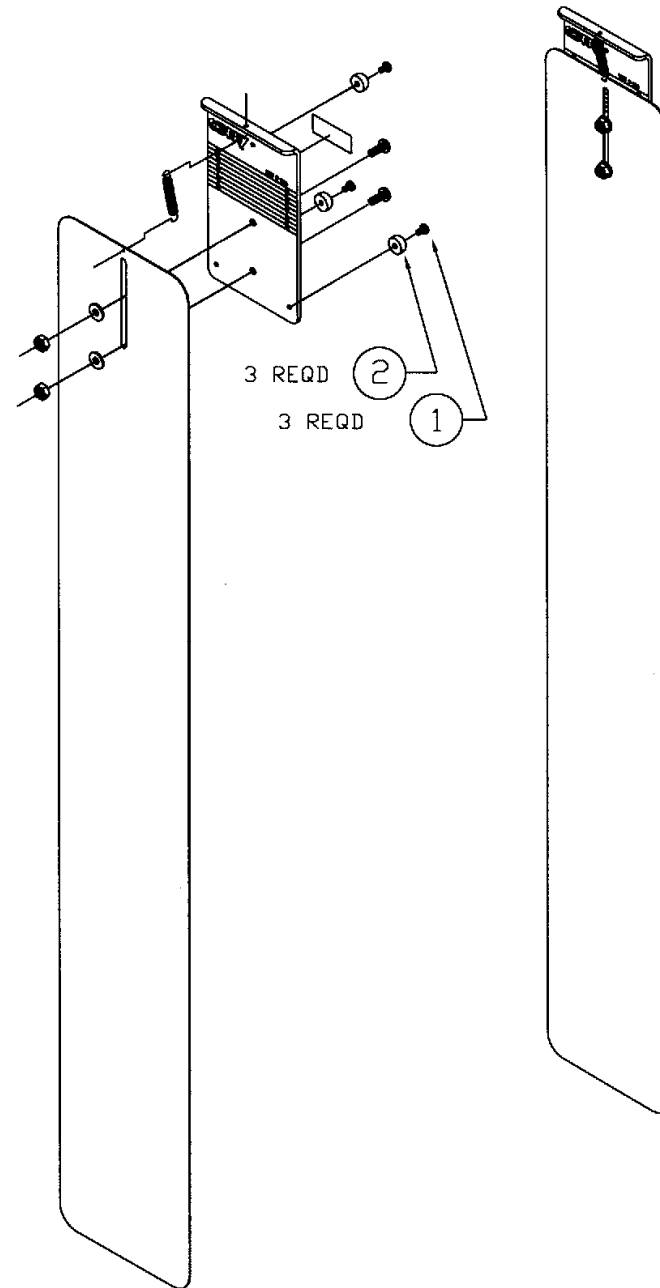
294-115-269 240V Power Cord Assembly

	NUMBER	DESCRIPTION
1	294-002-219	Connector Body
2	04-443	Support Grip, Single Eye, Single Weave
3	294-002-249	Harmonized Power Cord
4	294-115-344	Plug Body

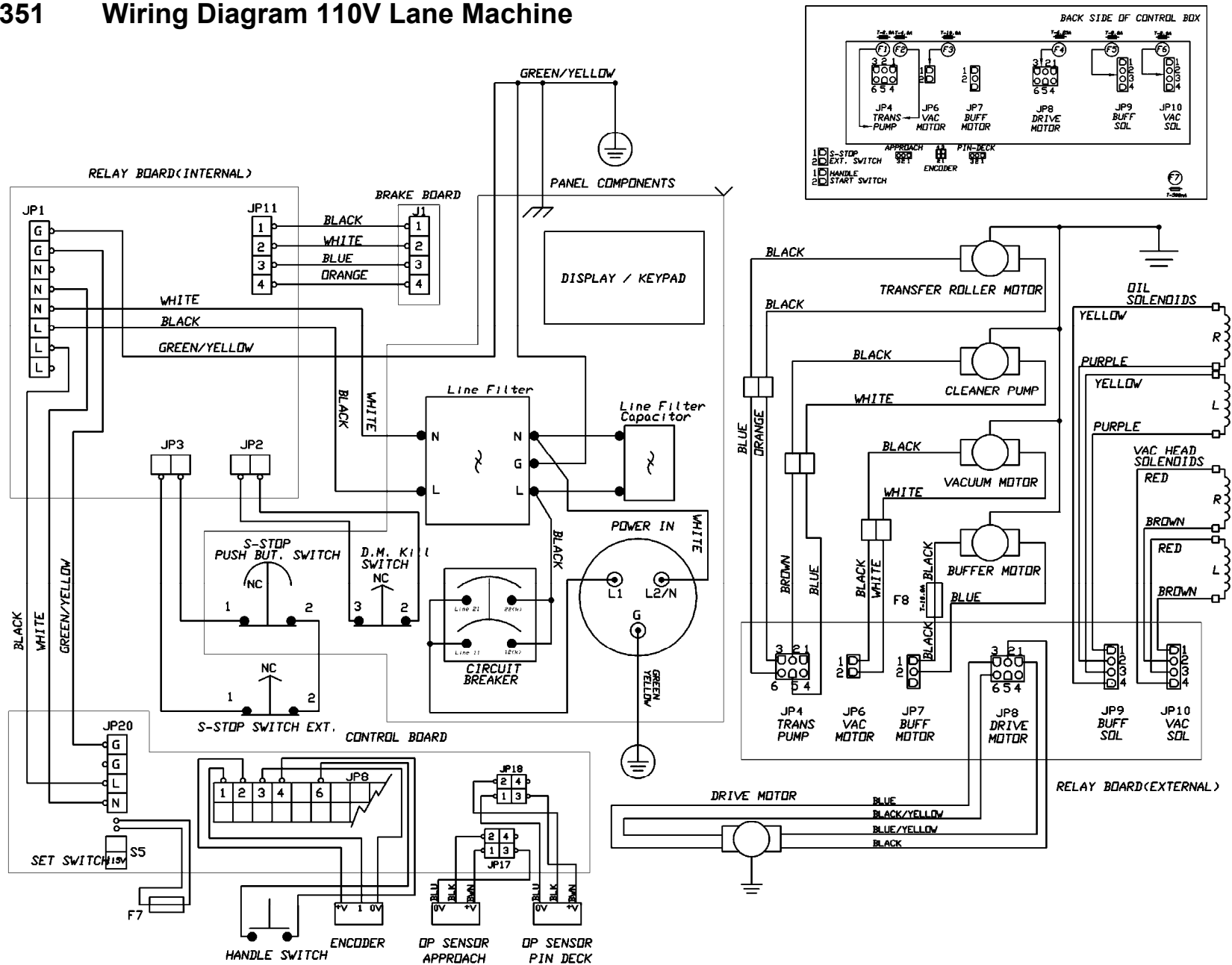


RP-43 Buffer Pressure Adjusting Tool

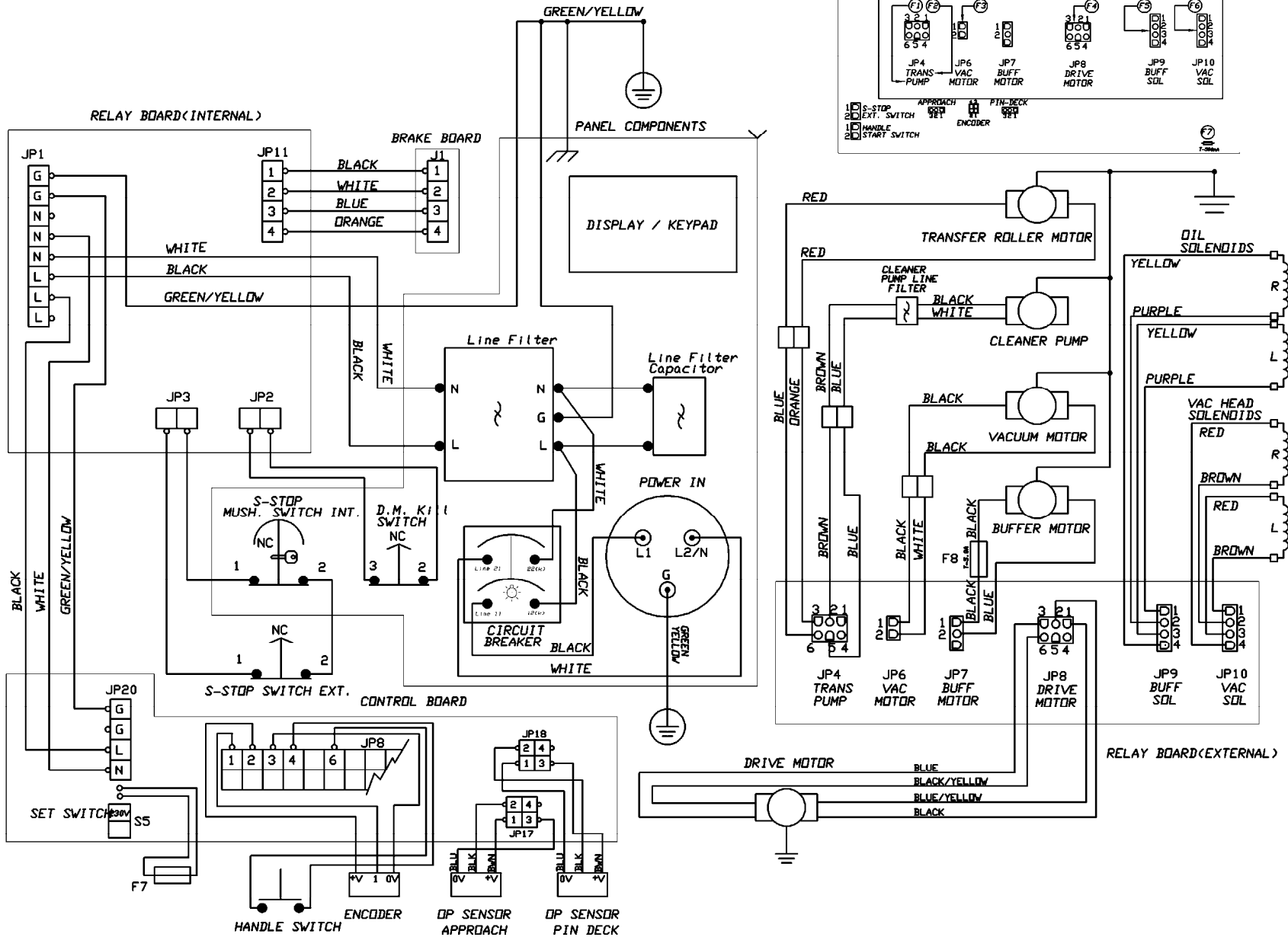
	NUMBER	DESCRIPTION
1	01-108	Screw, 6-32 X 1/4 Pan Head
2	04-403	Recessed Bumper



294-115-351 Wiring Diagram 110V Lane Machine



294-115-350 Wiring Diagram 240V Lane Machine



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