Sorting Elevator Operation Manual

V1.0

Apex Filling Systems, LLC
1001 Eastwood Road
Michigan City, IN 46360

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1.1 SAFETY

1.2 GENERAL SAFETY

Apex Filling Systems, LLC (APEX) manufactures and designs all of its products so they can be operated safely. However, the primary responsibility for safety rests with those who use and maintain these products. The following safety precautions are offered as a guide that if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment. The safety of personnel, equipment and plant facilities should be considered during equipment operation and with each changeover of product, or any machine modifications.

Only those who have been trained and delegated to do so and have read and understood this operator's manual should operate the equipment. Failure to follow the instructions, procedures and safety precautions in this manual can result in accidents and injuries.

DO NOT modify the equipment except with written factory approval. Unauthorized equipment modifications will void the warranty.

Each day walk around the equipment and inspect for leaks, loose parts, missing or damaged components, and parts out of adjustment. Perform all recommended maintenance noted in this manual.

EQUIPMENT SHOULD ALWAYS BE DE-ENERGIZED (POWER AND AIR) BEFORE MAKING MECHANICAL ADJUSTMENTS.

1.3 ELECTRICAL SHOCK

- To avoid electrical shock hazard, make sure this equipment is properly grounded.
- Dangerous voltages are present within the electrical enclosures. DO NOT operate this equipment with electrical covers open or removed.
- Keep all parts of the body, hand held tools, or other conductive objects away from exposed live-parts of the electrical system. Maintain dry footing and stand on insulating surfaces. DO NOT contact any portion of the equipment when adjusting or making repair to exposed live parts of electrical system.
- Attempt repairs only in a clean, dry, well-lighted, and ventilated area.

1.4 CONTACT MATERIALS COMPATIBILITY

APEX endeavors to make all contact parts compatible with buyer's products, if known. Because of the wide variety of possible products, Apex Filling Systems, LLC cannot be responsible or liable for ensuring compatibility of contact material with the products. Evaluate material compatibility prior to machine use. Failure to follow this procedure can result in machine damage, fire, operator injury or death.

1.5 SAFETY COMPLIANCE LIABILITY

APEX endeavors to make machinery as safe to operate as possible. National, state and local laws related to safety in the workplace apply primarily to the responsibilities of the employer, and not the equipment manufacturer. The seller agrees to cooperate with the buyer in finding feasible answers to compliance problems. However, because APEX has little control of the many factors which may significantly affect the environment in which this equipment is installed, the seller does not warrant this equipment to be in compliance with OSHA or any like state or local laws or regulations. It is the buyer's responsibility to provide the modifications necessary to assure compliance with the laws and regulations at the point of installation. ***A complete inspection of product is necessary until the machinery is proven to produce acceptable results. This should also be performed after every changeover.***

1.6 CONVENTIONS

To ensure the safety of personnel which will install, adjust, maintain and operate this equipment, it is imperative that they understand the dangers, warnings and caution notices. It is important to understand the **signal words** that may be used throughout this manual.

	Alerts to immediate hazard, which will result in death or severe personal injury, if not avoided
	Alerts to a hazard which will result in serious injury, or death in some cases, if not avoided.
	Alerts to a potential hazard that may result in a serious personal injury, if not avoided. It also alerts against an unsafe practice that will permanently damage equipment or property.
IMPORTANT	Indicates a suggestion as to how to use or adjust the equipment for best product results.
NOTE	Points out a proper use that will avoid damage to the equipment, or will extend the life of the parts.

2.1 MACHINE FEATURES & SPECIFICATIONS

2.2 INTRODUCTION:

APEX Sorting Elevators utilize a cleated belt to gently elevate and sort parts, typically caps, orienting parts into a discharge chute. Changeover for most caps typically involves little more than changing the angle of the elevator, adjusted with a hand crank.

2.3 FEATURES & BENEFITS

- **Robust**
  Anodized aluminum and stainless steel shells, frames, legs and housings maximize the working life of your machine, and minimize maintenance costs and downtime
- **Customizable**
  Whatever the production need, APEX has a design to meet
- **Flexible**
  Versatility and Simplicity are intrinsic to the design. Many cap sizes and shapes, and many products can be run on one machine
- **Easy Changeover**
  Simple mechanical adjustment for different bottle sizes. Quick to changeover, simple to use and easy to clean
- **Variable Speed DC Drives**
  Flexibility to match your production line speed

2.4 PERFORMANCE SPECIFICATIONS

Sorting Speed: up to 200 cpm (Depends on cap geometry)
Operating Temperature: 32 to 122 Degrees F (0 to 50 Degrees C) / 10% to 95% Room Humidity (non condensing)

2.5 MECHANICAL DIMENSIONS & LOADING

Standard Dimensions (ref): (48”L x 48”W x 96”H)
Shipping Dimensions (ref): (96”L x 48”W x 48”H)

Approximate Shipping Weight: (650 lb / 296kg) Varies with options

2.6 ELECTRICAL SPECIFICATIONS & REQUIREMENTS

Electrical Requirements: Standard - 120VAC / 50/60Hz / 1Φ / 8A
Power Consumption: 4 Amps for a standard Variable Drive DC motor
Electrical Enclosure: NEMA 12 standard (Optional enclosures available)
Other voltages available per application

2.7 AIR SPECIFICATIONS & REQUIREMENTS

Compressed Air Consumption: Standard configurations require no compressed air. Refer to machine specific documentation if applicable.

3.1 INSTALLATION & START-UP

3.2 INSTALLATION PROCEDURES

After clearing the desired area for your cap elevator, move the cap elevator into position. Using a level, check the unit to ensure it is level from side to side of the elevating belt. To level, adjust the leveling legs by loosening the jam nut and adjusting to the desired height. If needed, wrench flats are machined into the leveling leg to assist with adjustments. After adjusting, ensure that jam nut is re-locked.

3.3 START-UP & COMMISSIONING

This manual should be read completely before powering-up the machine. Commissioning of the machine should be performed by a trained technician only after complete understanding of the machine, and with products that match samples indicated to Apex Filling Systems, LLC if supplied. After the machine is adjusted for the bottle and cap combination, the machine can be put into operation with the following steps.

- Check the machine to see that guards are in place.
- Check the mechanical system for loose or missing parts.
- Check that all electrical connections are square
- Keep all personal clear of machine when starting
- Run equipment for 5 min before running production

Figure 3-1
Emergency Stop

1. Ensure the E-STOP button is engaged, and the unit is clear of personnel.

Figure 3-2
Main Disconnect

2. Remove any lock-out/tag-out devices and rotate the main power disconnect clockwise to ON
3. Rotate E-STOP button clockwise
4. Press the green CONTROL POWER button to power the Elevator
5. Verify that the caps are properly sorting (inside of cap facing out)
6. If adjustment is needed, see following section (Sec 4.1) for mechanical adjustments

4.1 OPERATION

4.2 THEORY OF OPERATION

APEX Sorting Elevator sorters are versatile and easy to use, able to sort a wide range of caps and designed with quick and simple changeover in mind. Caps are loaded into a bulk hopper, and a cleated belt travels under the caps and up the front of the elevator. Caps are sorted by their center of gravity, cavity-out caps will ride up the belt, and cavity-in caps will fall back into the hopper. The angle of the elevator belt determines which caps will fall or ride. At the top of the elevator, a piece of lexan helps push the caps off the belt and into the discharge chute for delivery to the capper. There are six primary sections to note regarding its assembly and function:

- Drive Mount
- Controls
- Belt Carry way and Return Way
- Tensioning system
- Elevator Angle Adjustment
- Cap Hopper

4.3 DRIVE MOUNT

A typical variable DC drive elevator sorter has a motor and gear reducer mounted at the drive end (top), bolted directly to the housing.

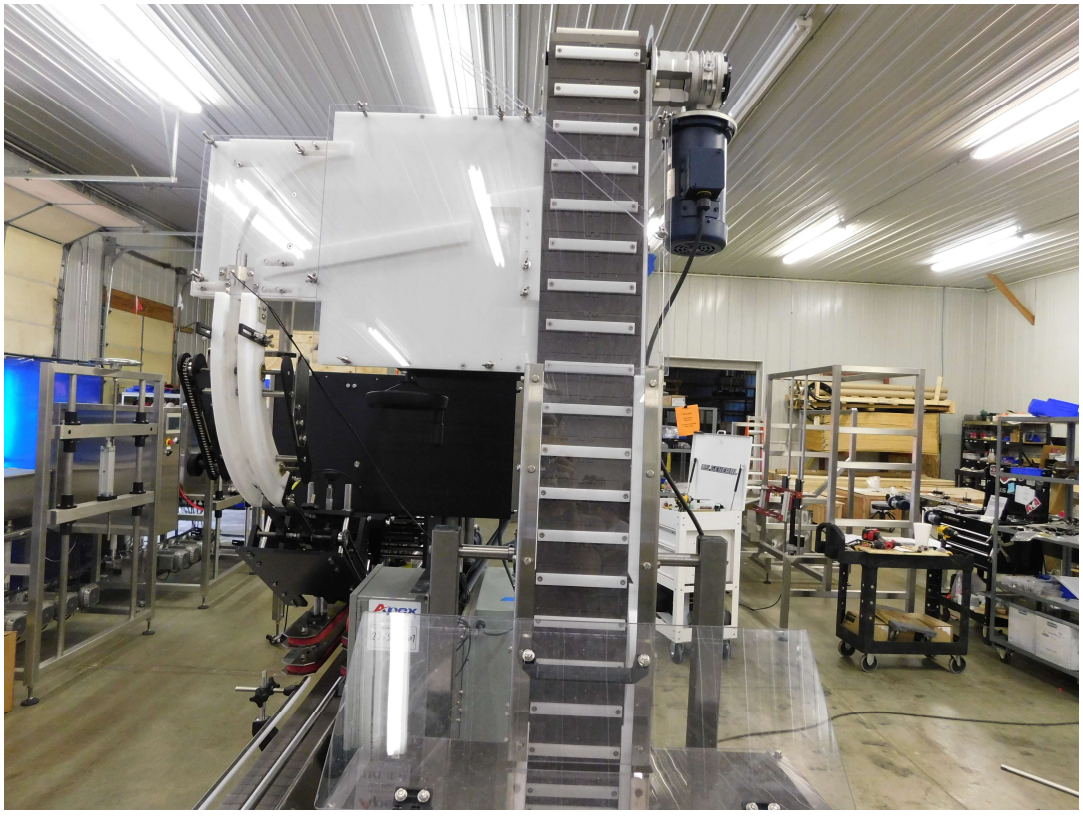


Figure 4-1.

4.4 CONTROLS

APEX Sorting Elevator Controls consist of on/off switch, speed potentiometer for variable DC drive board, and full-chute pause controls.

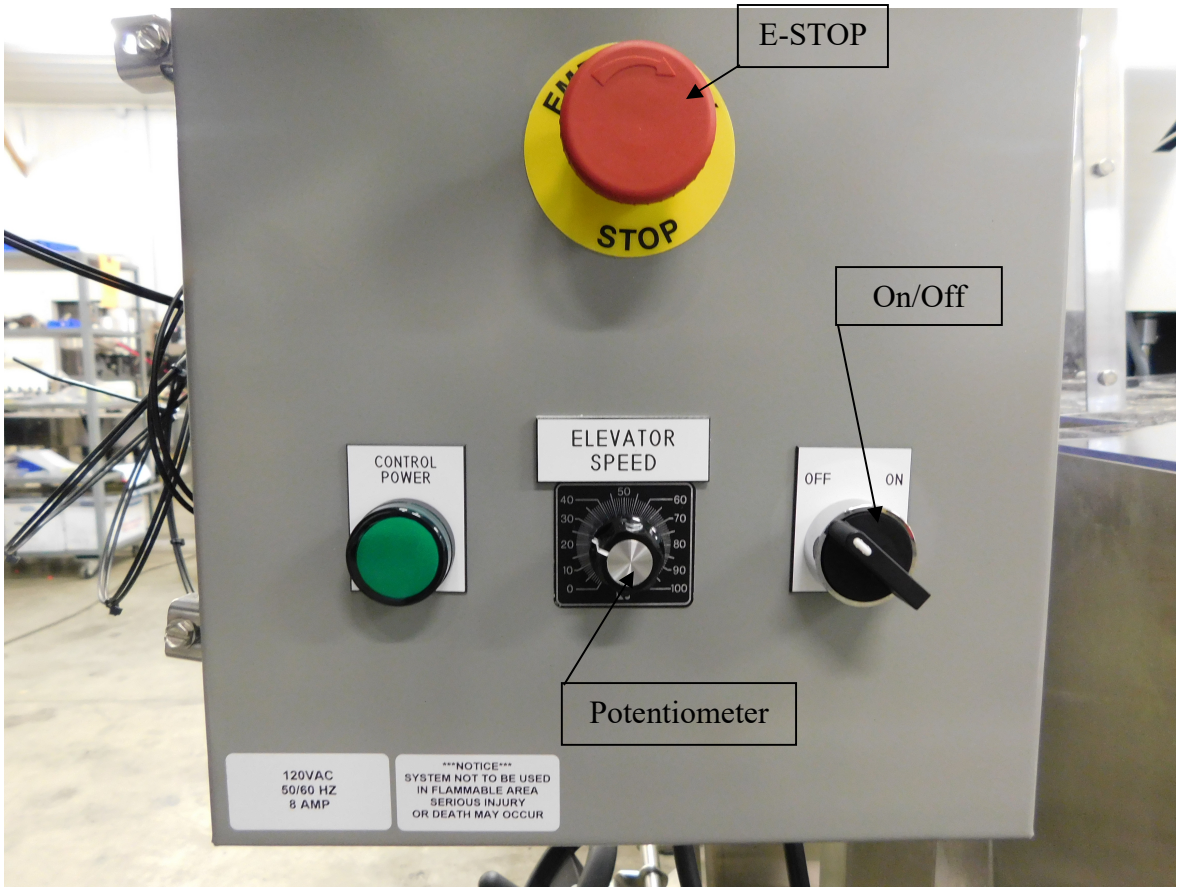


Figure 4-2.

4.5 BELT CARRY WAY

The belt carry way is the part of the elevator that supports the belt and caps that are being sorted. It is constructed of HDPE wearstrips

4.6 TENSIONING SYSTEM

The tensioning system removes the slack in the belt. It is also used for replacing belt and for maintenance. The tensioning system is adjusted by first loosening the lock nut shown in Figure 4-3. Next, loosen or tighten the idler shaft adjustment bolt until the desired belt tension is achieved. Because the drive is mounted at the top of the elevator, the cleated belt does not require the same amount of tension to travel properly as it would for a tabletop conveyor. Ensure that the shafts are perpendicular to the elevator shell. Retighten Jam and Lock nuts after proper tension is achieved.

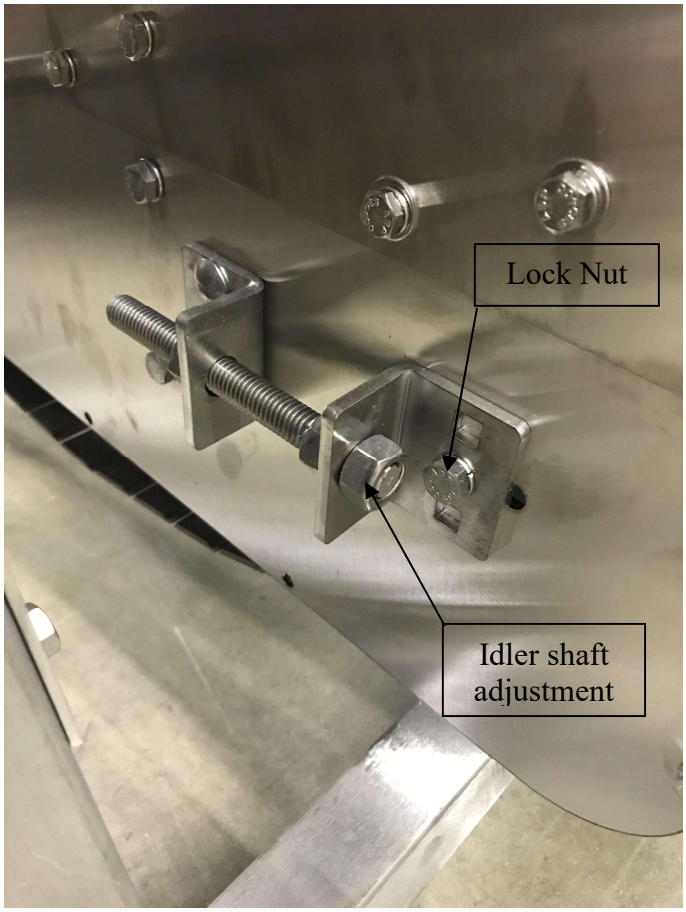


Figure 4-3.

4.7 ELEVATOR ANGLE ADJUSTMENT

The angle of the elevator determines which caps will ride up the belt, and which will fall back into the hopper. If non-qualified caps are climbing up on the cleats, the angle of the chute should be adjusted closer to vertical. If no caps are climbing then adjust toward horizontal. The jack is adjusted with the crank handle after loosening the angle lock bolts on both sides of the machine.

Figure 4-4.

Figure 4-5.

4.8 ADJUSTABLE DISCHARGE C-CHUTE

The chute is quickly adjusted by moving the Confinement and Cap Width adjustments to accommodate different diameter caps. The front guide, constructed of Lexan, can be adjusted in and out for different cap heights.

Figure 4-6.

4.9 CAP HOPPER

The sorting hopper design is funneled to allow the caps to be captured by the flights mounted to the belt where they are pulled toward the discharge chute near the top. While the caps rest on the belt, slightly pitched back to allow the caps to be captured, the caps will only be lifted if the center of gravity is toward the belt. In other words, if the cap top is facing out, gravity will cause the cap to fall back into the bulk supply hopper where it must qualify again.

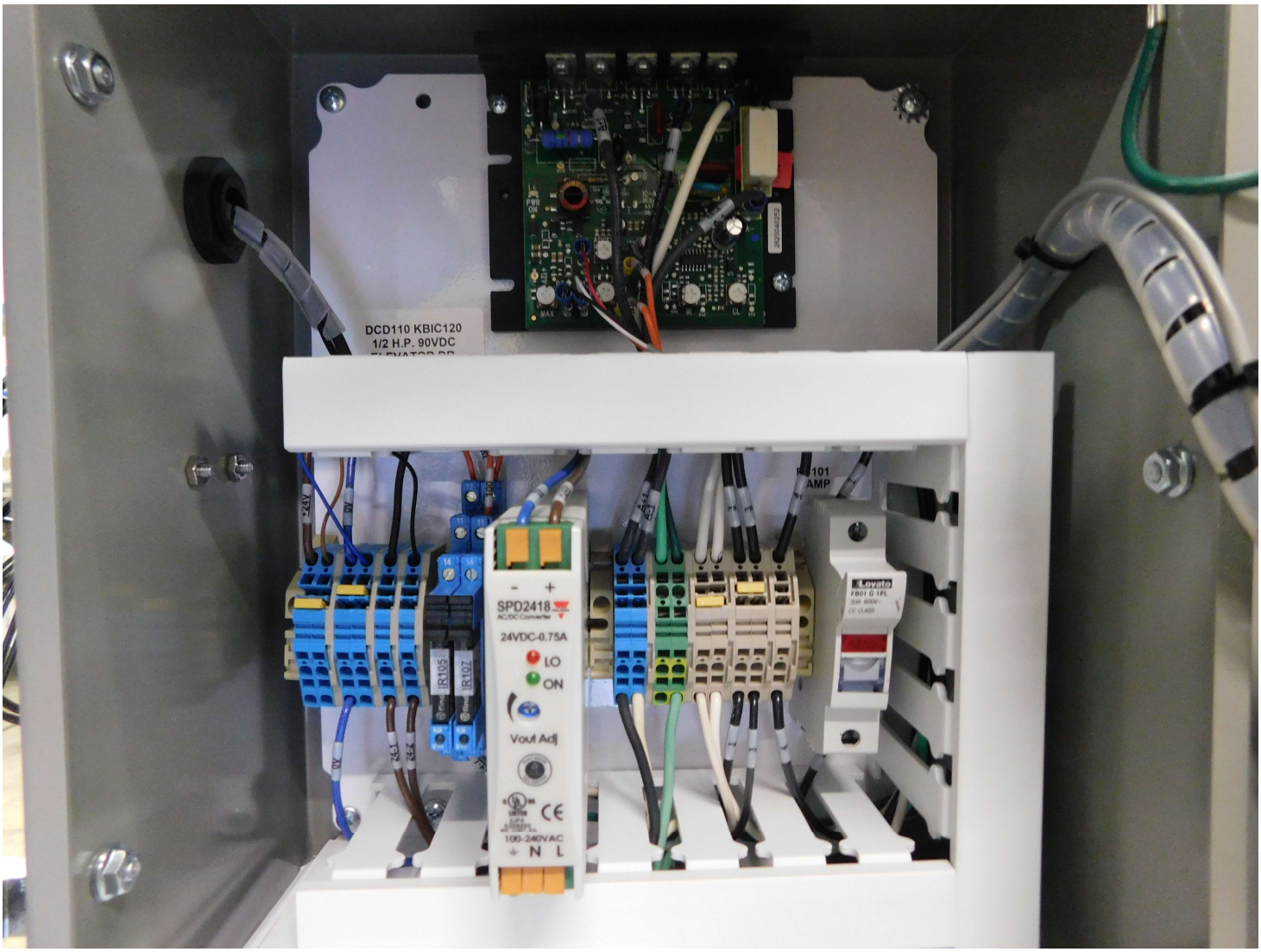
Figure 4-7.

4.10 CAP QULIFYING ASSIST INSERT

If a cap is especially evenly balanced, it is sometimes necessary to install the optional Cap Qualifying Assist Hoopdy (PN 11909-00001) to help qualify the caps properly. The two pieces are interchangeable with the straight Hoopdy (PN 11909-00002) by removing the wing nuts holding the guides in place and installing the standard parts.

5.1 ELECTRICAL

5.2 MAIN CONTROL BOX



Shown in ***Fig. 5-1*** is a typical main control box. Primary components are illustrated for reference only.
Refer to your machine specific documentation for schematics and components used.

6.1 SERVICING

6.2 CLEANING PROCEDURE

It is important that the machine is kept clean of dirt, broken glass, sand, etc. as these will reduce the wear life of the chain, wearstrips, etc. The machine should be cleaned with water or soap at regular intervals. Stronger detergents are often used in the food industry and can be corrosive on the machine components. Therefore, the machine should be washed down thoroughly immediately after cleaning with any harsh detergents.

WARNING: When using a high-pressure pistol with cold and hot water, as well as steam for cleaning, do not spray near any electrical enclosures.

6.3 RECOMMENDED MAINTENANCE & SCHEDULES

Itemized below are simple guidelines for maintenance. Several parts of the equipment should be inspected regularly to ensure the longest wear life possible. The following points should be controlled at the inspection:

COMPONENTS	DAILY	WEEKLY	QUARTERLY
Ensure that chain can run freely between wearstrips	X		
Check carry and return way for any foreign objects, caps, etc	X		
Clean Elevator thoroughly once a week, more depending on environment	X	X	
Check if Jam Nuts on leveling legs are right		X	
Check Chain/wearstrips for any wear		X	
Inspect and lubricate pillow block bearings			X
Visually inspect motor and check lubricant levels			X

Lubrication
If the conditions allow for it, the elevator should be lubricated to obtain the least possible pull and wear on the chain. If continuous lubrication is not possible the
elevator should be stopped and lubricated at regular intervals. The following lubricants are suitable:
• Oil: Vegetable or mineral oils are very good lubricants, and they provide corrosion protection as well. Mineral oil should be used for all steel chains.
• Soapy water: Is a good lubricant, which at the same time helps to keep the chain clean. Soapy water should be used for plastic or stainless steel chains.
• Water: Is not a very effective lubricant, which is why a permanent, thin water film should be aimed for. Water should be used for plastic or stainless steel chains.
• *Note: Gear reducers are sealed
The motor brushes require periodic inspection and replacement as wear indicates. Different applications result in different rates of wear on the brushes. A 500-hour interval is recommended for inspection of the brushes until wear rate is established. Experience will indicate the proper interval for inspection. Examine the brushes to see they are not cracked, broken or excessively worn. Replacement brushes should be installed before old brushes wear out to 9/16" long, measured on the long side. After replacing brushes, run the motor near rate speed for a least 1/2 hour with no load to seat the new brushes. Failure to properly seat new brushes may cause commutor damage and rapid wear of the new brushes.

Belt Replacement
To replace the belt, loosen the tensioning system completely. Next, press out the belt pin and remove the old belt. Thread the new belt into the return way and then up onto the carry way. Connect belt and insert pin. Adjust the new belt using the tensioning system.

6.4 MAINTENANCE LOG

COMPONENT	REPAIR DETAILS	REPLACEMENT DETAILS	DATE

6.5 SPARE PARTS LIST(S)

PART DESCRIPTION	PART NUMBER
Drive Motor	10505-00003
Gearbox	10506-00001
Drive Sprockets	10303-00003
Idle Sprockets	10303-00004
Pillow Block Bearing	10501-00001
KBIC Horsepower Resistor	10113-00003
Trade size 3AB, 8A, 250V AC/125 DC Fuse	10108-00004

6.6 FACTORY TECHNICAL SUPPORT

Apex Filling Systems, LLC
1001 Eastwood Road
Michigan City, Indiana 46360 USA
(219) 575-7493 www.apexfilling.com

Spare Parts
Direct: (219) 575-7493 ext. 107
Fax: (219) 575-7586
parts@apexfilling.com

7.1 TROUBLESHOOTING

7.2 TROUBLESHOOTING RECORD

To better assist you in troubleshooting, please record the following information with the model number from the frame, the problem that is occurring, speed of application, product characteristics (i.e. Foamy Product, High Viscosity, or Special Variation).

Company Name: _____

Your Name: _____

Phone Number: _____

FAX Number: _____

Date: _____

CONTAINER	COLOR	SIZE	PROBLEM
EXAMPLE: LDPE	*Blue*	*16oz.*	*Product overflowing.*

NOTES

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