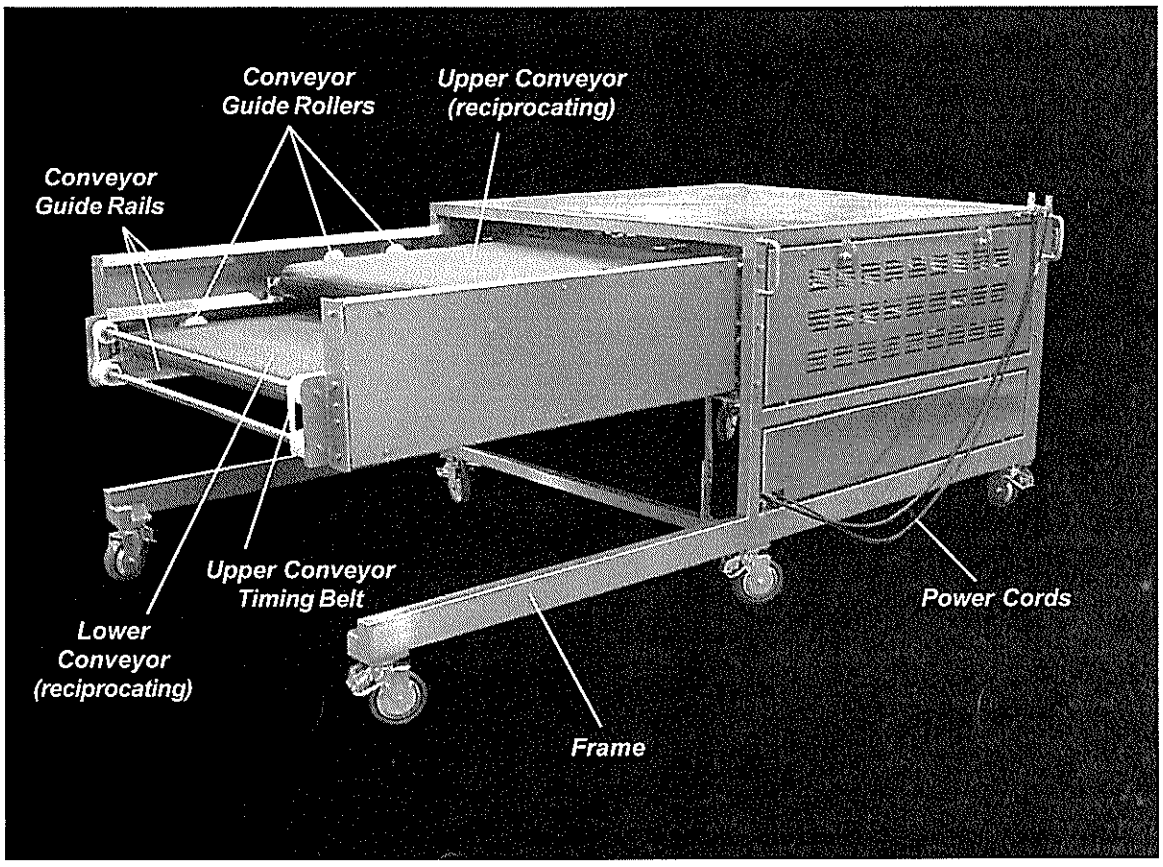
LAMINATOR (PORTABLE)

Machine Overview

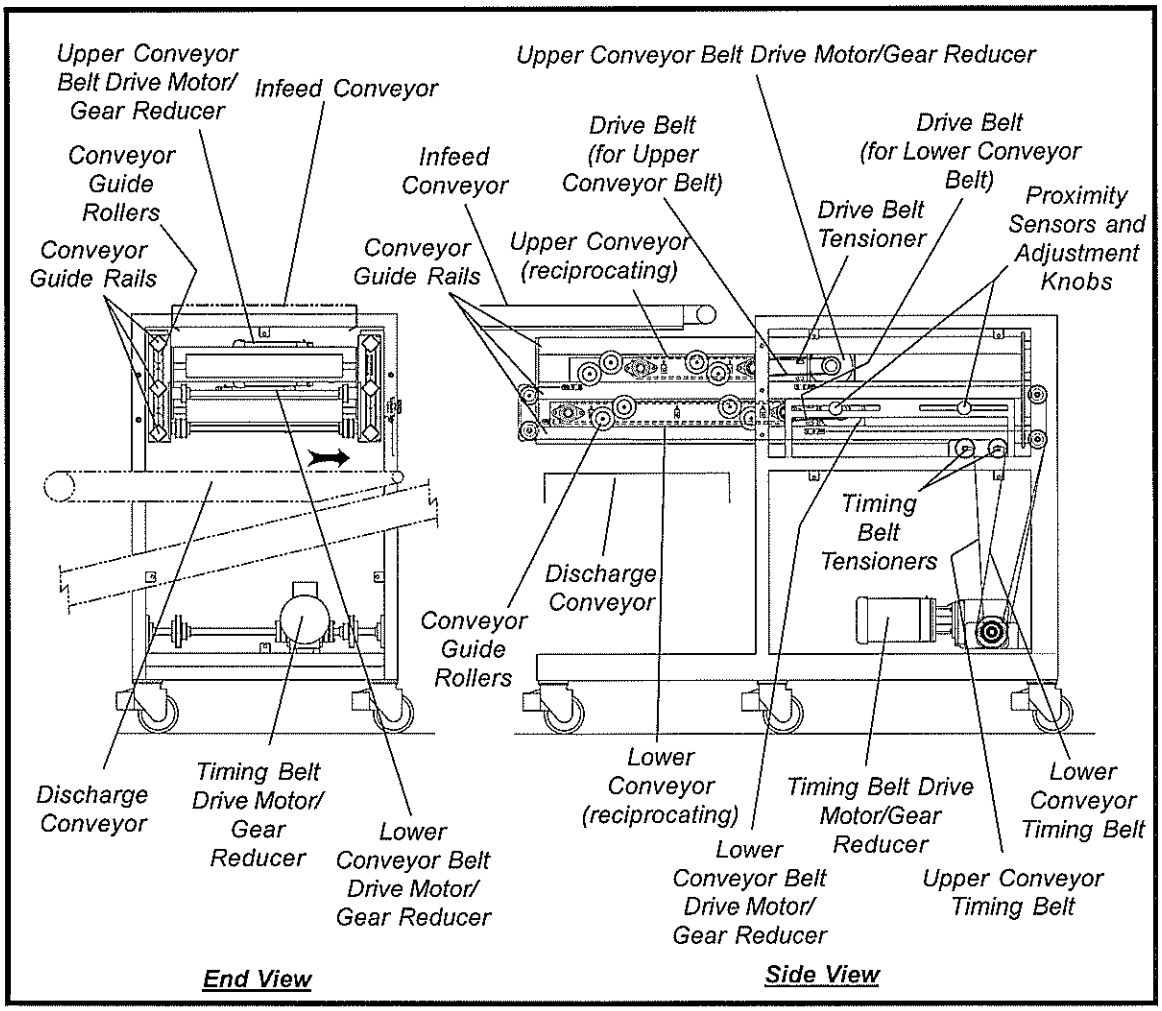
The Moline laminator is designed to produce a layered product such as puffed pastry, Danish, croissants and pie crusts. The laminator uses two reciprocating conveyors to layer the dough for final make-up.

Typically, the laminator is incorporated in a production line and is situated in a corner of the line between an infeed conveyor and a discharge conveyor. As the discharge conveyor is running, the infeed conveyor feeds dough onto the laminator's top reciprocating conveyor which in turn feeds the dough onto the bottom reciprocating conveyor. The bottom reciprocating conveyor folds the dough onto the discharge conveyor.

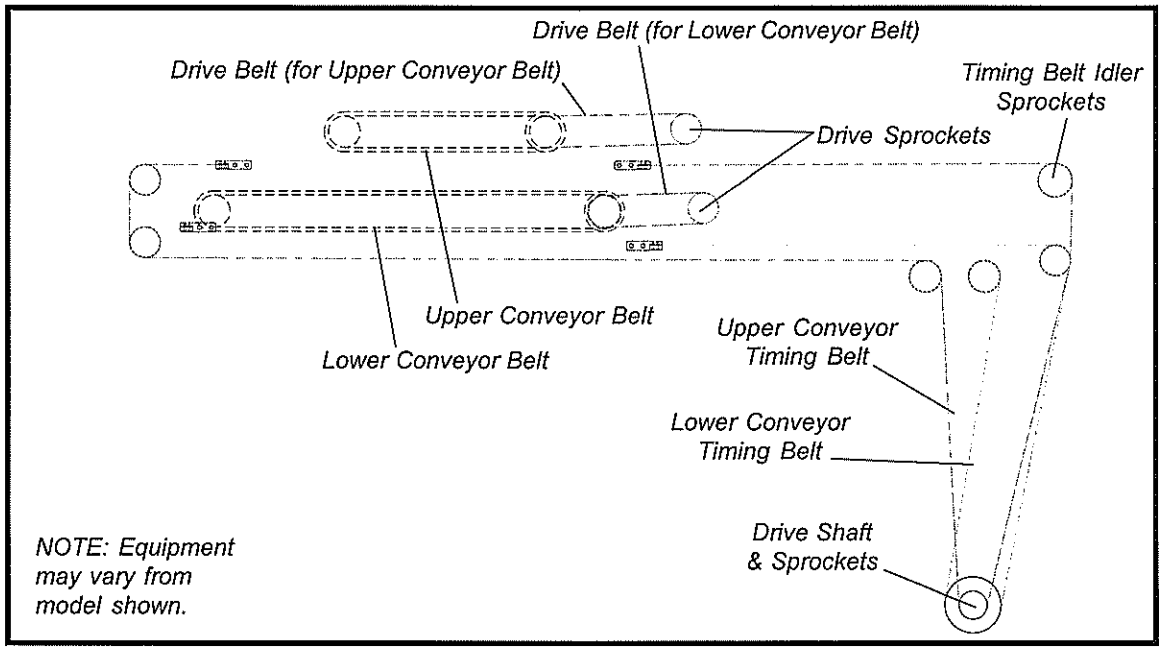
Laminators are typically "right angle" machines since the dough is laminated onto a discharge conveyor that runs 90° to the original direction of flow.



Laminator



Laminator (shown without guards)

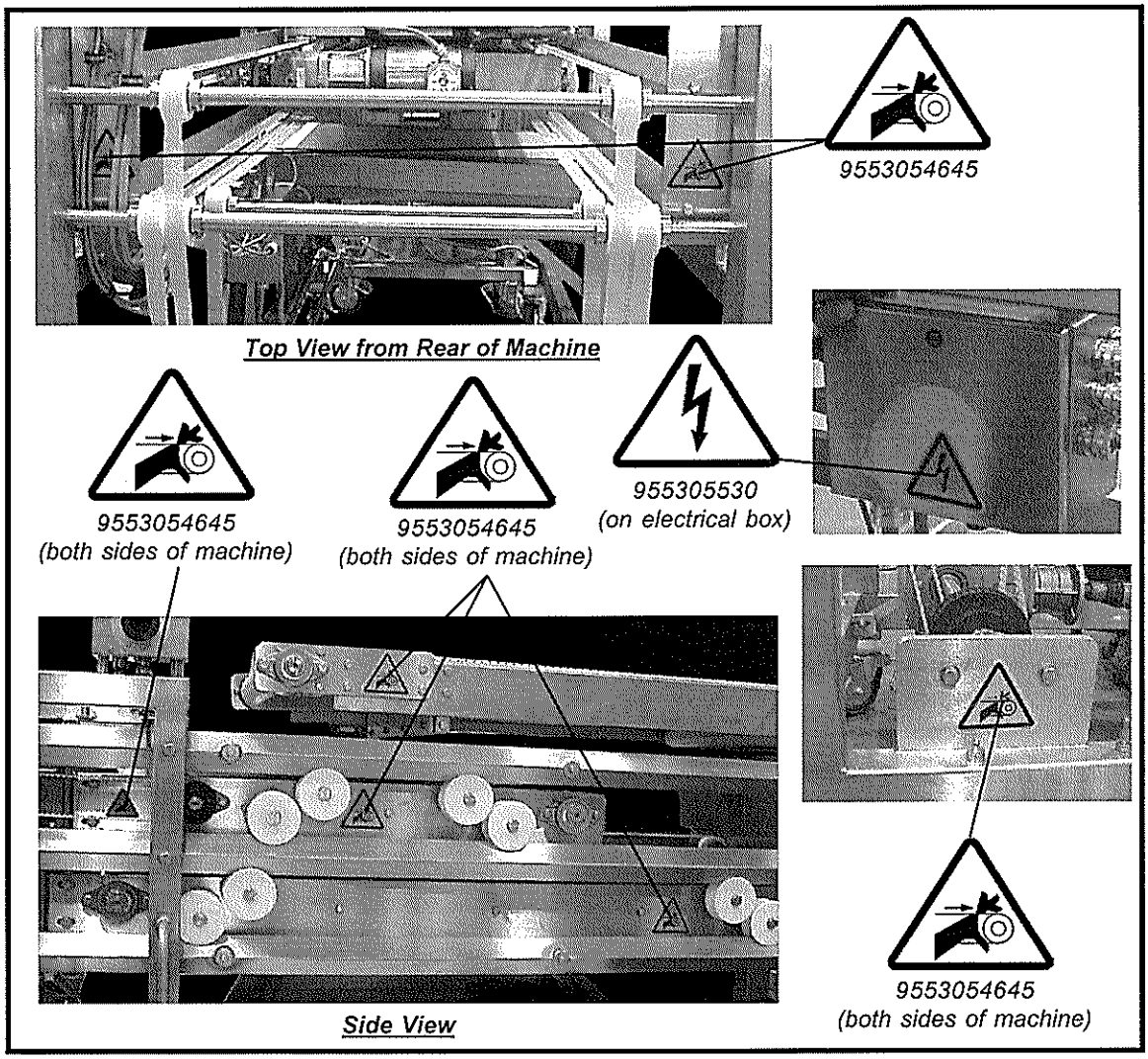


Laminator Belts and Conveyors

Safety Label Kit and Locations Diagram

QTY	PART NUMBER	DESCRIPTION
	BM16225	**LABEL KIT, Laminator (portable)**
1	955305530	LABEL, electrical hazard
12	9553054645	LABEL, roller hazard
1	A36894	SERIAL NUMBER TAG (not shown - apply where visible)

Locations Diagram



⚠ WARNING

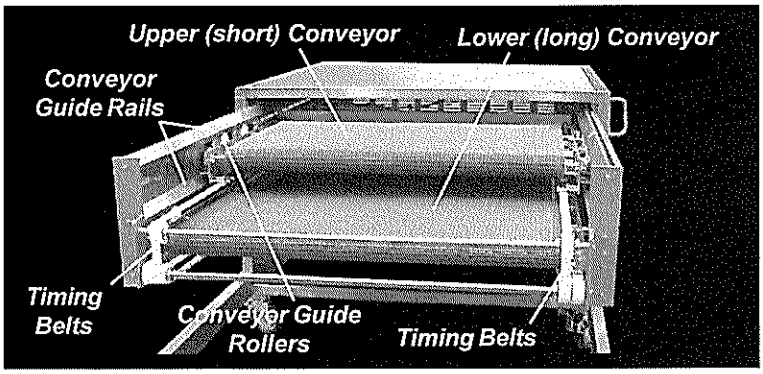
Do not alter or remove safety labels. Replace damaged or worn labels immediately.

Machine Components and Functions

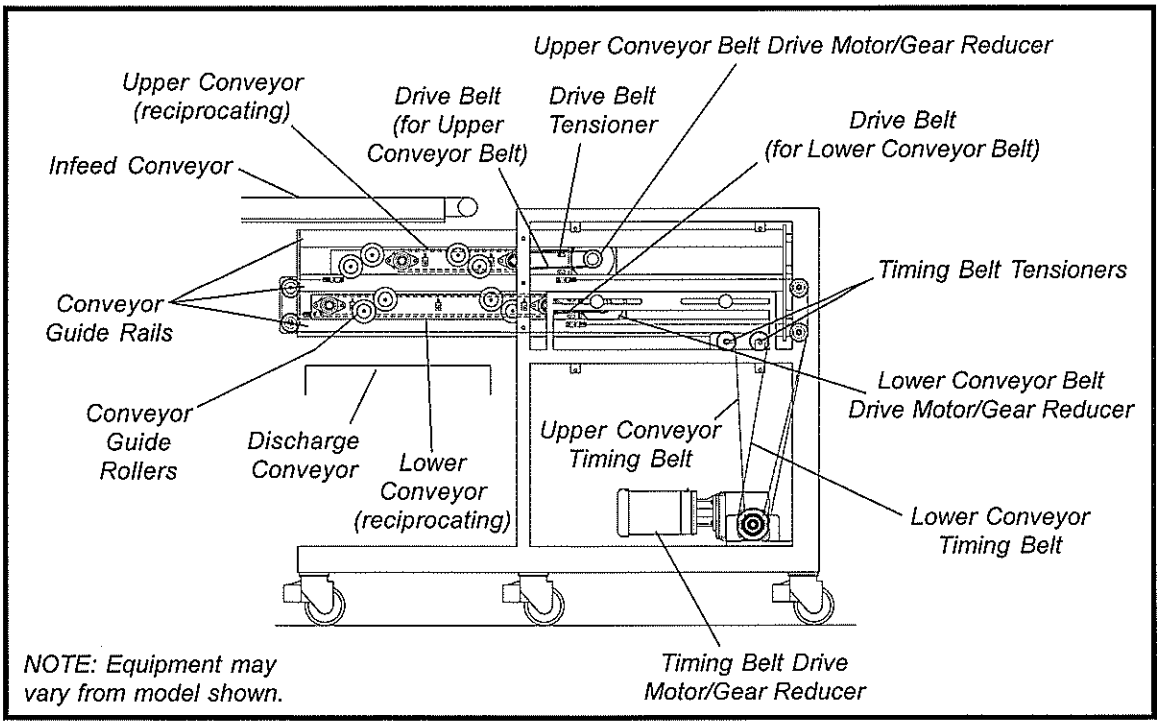
Reciprocating Conveyors

The laminator contains two reciprocating conveyors (the short upper conveyor and the long lower conveyor) which move back and forth along the guide rails on guide rollers to layer the dough. Conveyor reciprocation is activated by timing belts driven by a motor and gear reducer. Conveyor belt rotation on each conveyor is driven by a motor and gear reducer (see photo and drawing below).

NOTE: If it becomes necessary to remove one of the reciprocating conveyors, ensure that, upon reassembly, the spur gears are in the same relationship to the rack gears on both sides of the unit. Do not allow one side of the conveyor to be advanced or retarded in relationship to the other side.



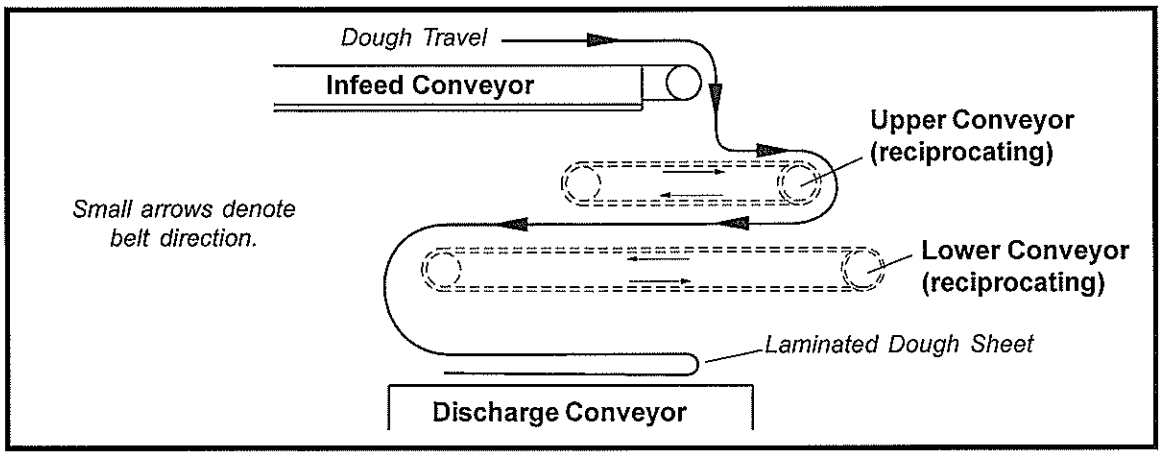
Reciprocating Conveyors and Components



Laminator Drives (side view)

Belt Direction and Dough Travel

The direction of dough travel is shown below. As the discharge conveyor is running, the infeed conveyor feeds the dough sheet onto the laminator's upper reciprocating conveyor which in turn feeds the dough onto the lower reciprocating conveyor, which causes the dough to fold onto the discharge conveyor.



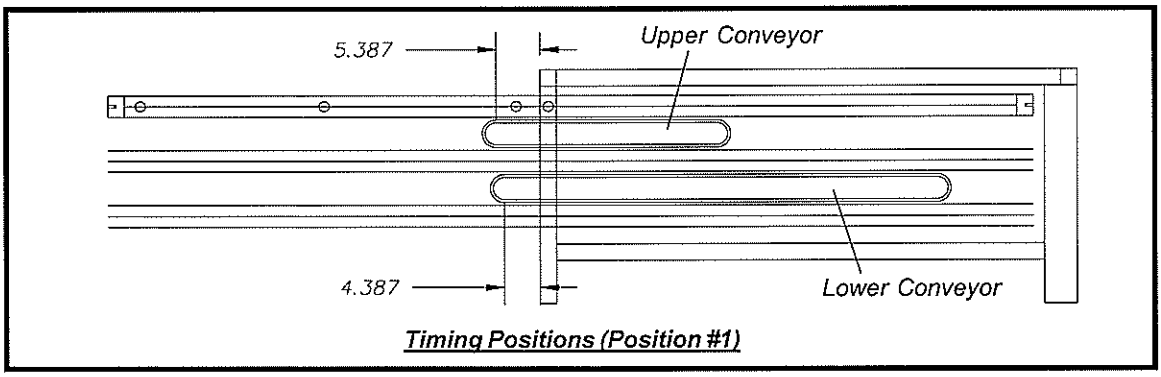
Direction of Dough Travel (side view of laminator)

As shown above, the small arrows, shown within the reciprocating conveyor belts, denote belt direction. The reciprocating conveyors move back and forth at different rates of speed allowing the dough sheet to fold, without tearing, as it feeds onto the discharge conveyor that runs 90° to the original dough travel direction.

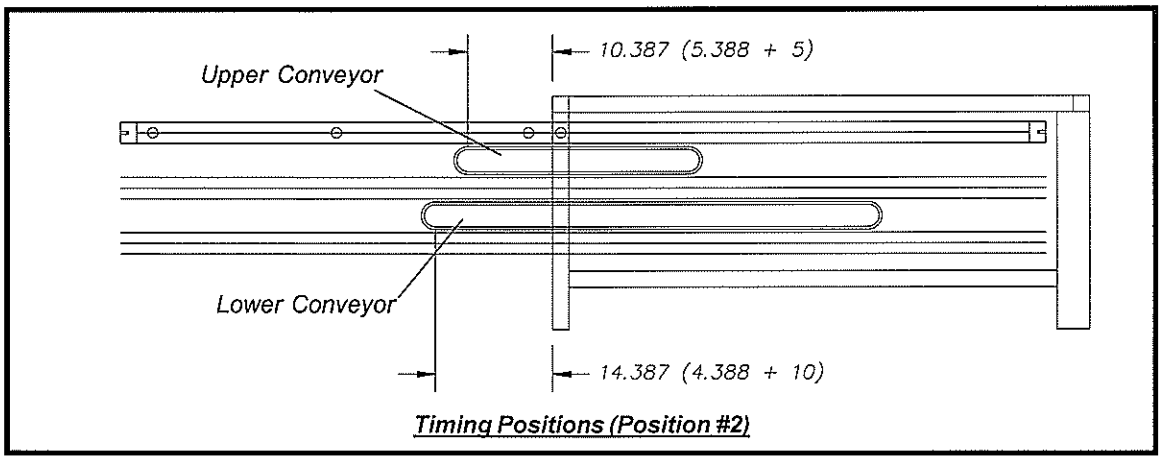
To adjust the laminated dough sheet, reposition the proximity sensors located on the lower reciprocating conveyor. See the Electrical System section under Proximity Sensors.

Timing

The unit is properly timed when both the upper and lower reciprocating conveyors are in the positions shown in the drawings below. The upper conveyor should travel 1/2" for every 1" that the lower conveyor travels.



Timing Positions (Position #1)



Timing Positions (Position #2)

Changing Conveyor Speeds

The infeed and discharge conveyor speeds can be adjusted as needed.

- For more layers of dough, lower the speed of the discharge conveyor.
- For less layers of dough, raise the speed of the discharge conveyor

To change the speed of the infeed conveyor:

1. On the PV600 operator interface, access the Leg 2 Screen #2 and touch the LAMINATOR INFEED SPEED button. Enter a number for infeed conveyor speed.

To change the speed of the discharge conveyor:

1. On the PV600 operator interface, access the Leg 3 Screen #1 and touch the LAMINATOR FEED THRU SPEED button. Enter a number for discharge conveyor speed.

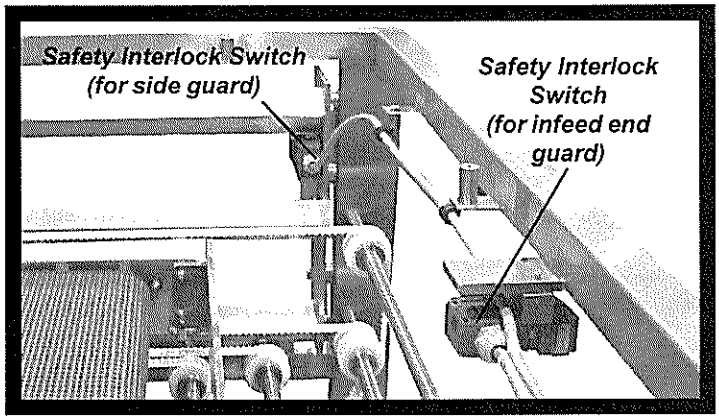
Electrical System

Safety Interlock Switches

The laminator contains three safety interlock switches: one on each side guard (only one is shown below) and one for the infeed end guards (see photo below). These switches prevent the machine from running when a guard is not properly installed and secured.

⚠ WARNING

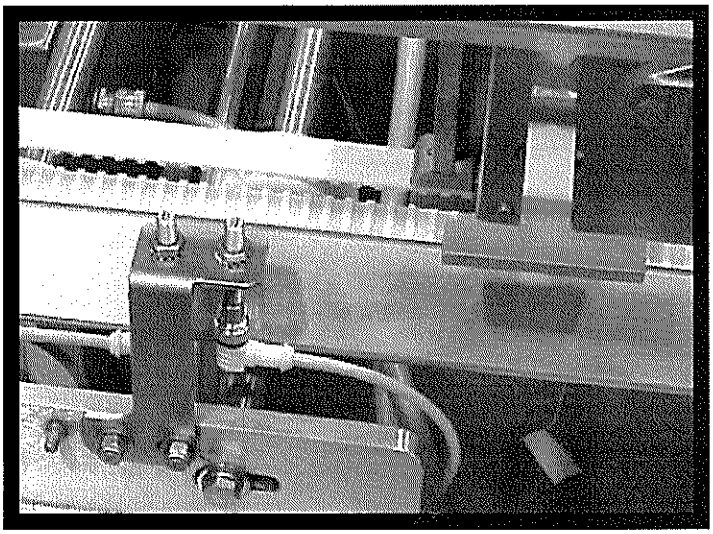
Safety interlocks are provided for personnel protection. Under no circumstances are these switches to be bypassed or disabled in any way.



Safety Interlock Switches

Proximity Sensors

The laminator contains three proximity sensors located on the lower reciprocating conveyor. Sensor locations can be altered as needed during production to change laminator output.



Proximity Sensors

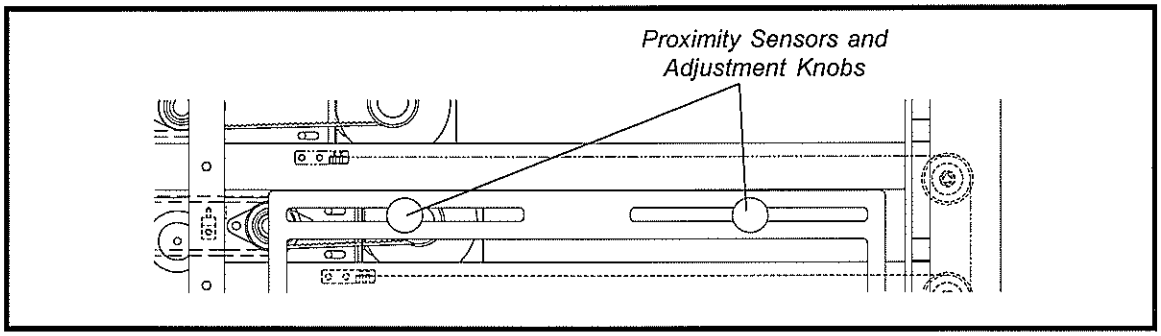
1) The location of the proximity sensors determines the travel of the lower reciprocating conveyor which dictates how narrow or wide the laminated dough sheet will be:

   For less travel (and a narrower laminated dough sheet) move the sensors closer together. For more travel (and a wider laminated dough sheet) move the sensors further apart.

2) The location of the proximity sensors also dictates where the dough sheet lands on the discharge conveyor:

   Moving the sensors far to the right deposits the dough sheet to the far side of the discharge conveyor. Moving the sensors far to the left deposits the dough sheet to the near side of the discharge conveyor.

To change the location of the sensors, loosen the adjustment knobs, slide them to the desired position and retighten.



Proximity Sensor Adjustment Knobs

Operation

NOTE: When the laminator is connected to the production system for operation, electronic functions automatically switch to laminator function rather than the 90° laminator bypass conveyor.

When the 90° laminator bypass conveyor is connected to the production system for operation, electronic functions automatically switch to the 90° laminator bypass conveyor rather than the laminator.

Start-Up Procedure

1. Ensure that laminator and production system electrical power is completely shut down.

2. Move the laminator into position on the production system and connect the unit to the system.

3. Ensure that all laminator guards and covers are securely and properly installed.

4. Reconnect electrical power to the laminator and production system.

   NOTE: Shutting down the production system electrical power before connecting the laminator ensures that all systems operate properly during start-up.

5. Start the production system. The laminator will automatically start and stop with the production system.

During Production

1. Monitor the laminated dough sheet for the number of laminated layers deposited on the discharge conveyor. For more layers of dough, lower the speed of the discharge conveyor. For less layers of dough, raise the speed of the discharge conveyor (see "Changing Conveyor Speeds").

2. Monitor the laminated dough sheet for the correct width. To change the width, alter the location of the proximity sensors (see "Proximity Sensors").

Shutdown Procedure

The laminator will automatically start and stop with the production system. To stop the laminator, stop the production system.

Sanitation

Clean the laminator daily after every production run.

1. Stop the lower reciprocating conveyor in its extended position for cleaning.

2. Make sure all electrical and pneumatic power to the unit is turned off and locked out. Follow your company's established procedure. If a procedure is not already provided, use the LOCKOUT/TAGOUT procedure in the Introduction section of this manual.

⚠ WARNING

Turn the machine off and disconnect all electrical and pneumatic power before performing ANY type of servicing or cleaning, maintenance or inspections. Follow the LOCKOUT/TAGOUT procedure. Failure to follow this warning could result in death or severe personal injury.

3. Empty any catch pans and remove excess flour from belts using a bench brush. Brush across belt width (90° to the direction of belt travel.)

4. Remove excess dough with a plastic scraper. The conveyor belts will rotate freely, by hand, so they can be scraped clean of any flour or dough buildup.

⚠ CAUTION

Do not use a metal scraper. Metal scrapers can cut or damage the belt and other components.

5. Remove any flour that may have accumulated between the conveyor belts and the end rollers.

6. Wipe down all surfaces with a clean, damp cloth. If necessary, wash the machine with warm water, mild soap, and a cloth. Use a stiff-bristle nylon or plastic brush if needed.

⚠ CAUTION

The machine can be hosed down for cleaning if all electrical components have been covered to prevent water from entering. Water or moisture in the electrical components and circuits can permanently damage the machine.

⚠ CAUTION

Do not use caustic cleaning solutions on the conveyor belts. Using cleaning solutions will shorten the life of the belt. Use only warm water and mild soap.

7. Rinse the machine thoroughly.

8. Dry the machine thoroughly.

9. Replace all scraper blades.

10. Ensure that all sensors are clean and free of dust or debris. Wipe off the face of each sensor with a clean dry cloth to prevent inaccurate readings from dust or debris.

11. After cleaning, check all equipment for proper lubrication. Lubricate any areas where lubricant has been washed away.

12. Verify that all components are properly installed and that guards are in place before reversing the LOCKOUT/TAGOUT procedure.

Maintenance

⚠ WARNING

Turn the machine off and disconnect all electrical and pneumatic power before performing ANY type of servicing or cleaning, maintenance or inspections. Follow the LOCKOUT/TAGOUT procedure. Failure to follow this warning could result in death or severe personal injury.

Preventive Maintenance Schedule

Description	Daily (24 hr)	Weekly (50 hr)	Monthly (200 hr)	Qrtrly (600 hr)	6 Mo (1200 hr)
Ensure that sensors are clean and free from flour dust or debris. Ensure that beam areas are clear.	●				
Check conveyor belts and timing belts for wear and proper tension. Adjustor replace as needed.			●		
Check timing belt sprockets for wear. Replace if needed.			●		
Check conveyor guide rollers for wear. Replace if needed.			●		
Lubricate all fittings with LPS Thermaplex H-2 Food Grade Grease.			●		
Check oil level in gear reducers. Fill according to gear reducer manufacturer's recommendations in vendor literature.				●	

Lubricants

The following lubricants are recommended for use on machine components.

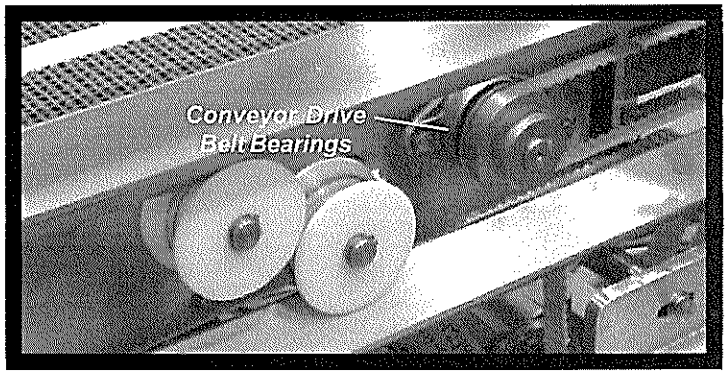
NOTE: Dispose of used lubricant in accordance with all applicable laws and regulations.

Application	Type of Lubricant
Bearings (general use)	LPS Thermaplex H-2 Food Grade Bearing Grease #70114 (use 2 - 3 grease gun applications on each fitting, once every 200 hours, or more often if operating conditions are severe).
Motors and Gearmotors	Varies, depending upon manufacturer. See Vendor Literature section under manufacturer's name.
Gear Reducers	Varies, depending upon manufacturer. See Vendor Literature section under manufacturer's name.

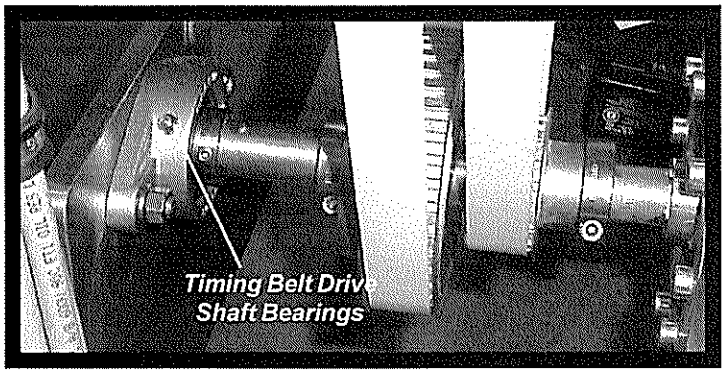
Lubrication Points

Bearing Grease Fittings

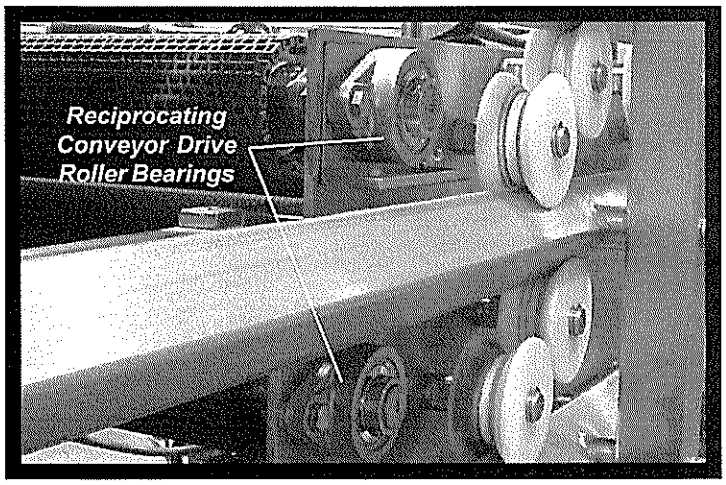
Lubricate the bearing grease fittings monthly with 2 - 3 grease gun applications of LPS Thermaplex H-2 Food Grade Grease #70114 (see photos below).



Conveyor Drive Belt Bearings



Timing Belt Drive Shaft Bearings



Reciprocating Conveyor Drive Roller Bearings

Troubleshooting Guide

⚠ WARNING

Turn the machine off and disconnect all electrical and pneumatic power before performing ANY type of servicing or cleaning, maintenance or inspections. Follow the LOCKOUT/TAGOUT procedure. Failure to follow this warning could result in death or severe personal injury.

Symptom	Probable Cause	Corrective Action
Machine will not start or stops during operation.	Machine is not on.	If operator interface is used, enable the machine. If a manual on/off switch is used, turn to ON.
	Electrical power is not connected to the machine.	Check main electrical connection and/or power plugs.
	A safety interlock switch has been activated meaning a door or guard is open.	Check main control panel alarm screen for indication of open door/ guard. Be sure all are securely closed and latched. Clear alarm and press manual reset button.
	An E-Stop has been activated.	Press manual reset button.
	Fuse blown.	Check fuses. Replace if needed.
Machine will not run and guards *are* closed properly.	Defective interlock switch.	Replace electrical interlock switch.
Speed varies.	Possible motor damage.	Check controller or speed potentiometer. Replace if needed (AC or DC motor). Check brushes; replace if necessary (DC motor only).
Noisy.	Gear reducer needs oil.	Check oil level in gear reducer.
Machine power shuts down.	Variable frequency drive fault from possible overload or "jam".	Check main control panel for lights indicating an overload. Reduce load and/or clear "jam" and reset drive.
Conveyor belt slipping.	Loose conveyor belt.	Re-tension conveyor belt.
Conveyor belt not tracking.	Conveyor belt out of alignment.	Tighten conveyor belt at the side toward which it is tracking. DO NOT overtighten.
	Conveyor belt too loose.	Re-tension conveyor belt.

Troubleshooting continued...

Symptom	Probable Cause	Corrective Action
	Dough buildup on rollers.	Clean conveyor rollers.
Conveyor belt not moving.	Conveyor belt needs cleaning.	Ensure that belt scraper is properly adjusted and is clean.
	Conveyor belt too tight or too loose.	Ensure conveyor belt is clean. Check for flour/dough build up on conveyor rollers.
		Re-tension conveyor belt.