645
SOLO® XL
Automatic Wrapper
Service Manual

For Series 2XXX
Models:
645-2013
645-2023
645-2033

A15715700A
(4/01).00

METTLER TOLEDO®

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METTLER TOLEDO SOLO XL Service Manual A15715700A 4/01

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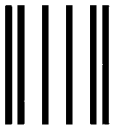

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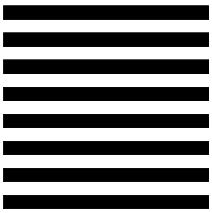

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This Service Manual covers servicing the Model 645 SOLO® XL with factory numbers 645-2013, 645-2023, and 645-2033 (Series 2XXX). For service information on the SOLO® Plus and the SOLO® XL with factory numbers of 645-1013, 645-1023, and 645-1033, refer to Service manual P/N A14761400A.

INTRODUCTION

This publication is provided solely as a guide for individuals who have received Technical Training in servicing the METTLER TOLEDO product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

Mettler-Toledo, Inc.
1900 Polaris Parkway
Columbus, Ohio 43240
(614) 438-4511

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

PRECAUTIONS

READ this manual BEFORE operating or servicing this equipment.

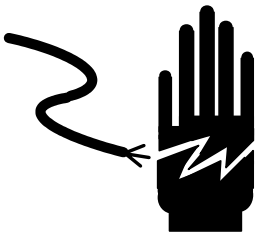
FOLLOW these instructions carefully.

SAVE this manual for future reference.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

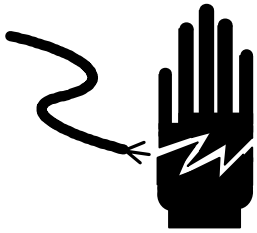
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



⚠ WARNING

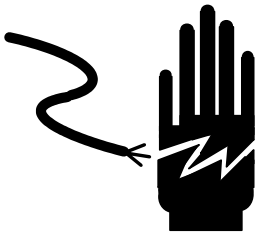
ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.



⚠ WARNING

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY.

DO NOT REMOVE THE GROUND PRONG.



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

⚠ CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT OR BODILY HARM.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

CONTENTS

1 General Description

Overview

The METTLER TOLEDO Model 645 Automatic Wrapper is designed to wrap tray-contained products with stretch films. The wrapper is not designed to wrap loose and/or liquid products.

The Model 645 Wrapper is designed for easy operation and reduced film and labor costs. The Model 645 can be used as a standalone wrapper, or as part of a complete labeling/wrapping system.

The complete backroom labeling/wrapping system offers dual-label printing capability (DayGlo, graphics, data, safe handling, NutriFacts), is very easy to use, and eliminates the need for the operator to change the film size during operation. In addition, the Model 645 Wrapper has a superior service diagnostic system, making it easier for the technician to troubleshoot and repair the machine.

The Model 645 is designed for use in prepackaging backroom environments. This unit is not intended for washdown or hazardous area operation, or for operation in environments of extreme dust, heat, cold, or humidity.

The Model 645 Wrapper maintains a high quality appearance with durable ABS side covers and a machined-aluminum frame.

Product Specifications

	SOLO XL Specifications
Agency Approvals	ETL Approved Conforms to UL 73 and CSA C22.2
Noise Level Specifications	Equivalent continuous weighted sound pressure level at the workstation is 74.4 dB. Tests performed in conformance with ISO 3746 Standard (UNI 7712-AFNOR S31-069)
Footprint	15 sq. ft.
Film size	13 inch
Packages Per Minute	20 maximum
Min. tray size: length	7.08 in. (180 mm)
Min. tray size: width	5.11 in. (130 mm)
Min. tray size: height	0.78 in. (20 mm)
Max. tray size: length	15.75 in. (400 mm)
Max. tray size: width	11.40 in. (290 mm)
Max. tray size: height	5.50 in. (140 mm)
Voltage/Amperes	115 VAC/50-60 Hz 30A Supply/2350 VA 208 VAC/50-60 Hz 20A Supply/2350 VA 230 VAC/50-60 Hz/ 20A Supply/2350 VA
Internal Operating Voltage	48 VAC
Shipping Weight	615 lb
Recommended Operating Temperature Range	40°F to 70°F (5°C to 20°C)
Humidity	5% to 95% Non-condensing

Dimensions

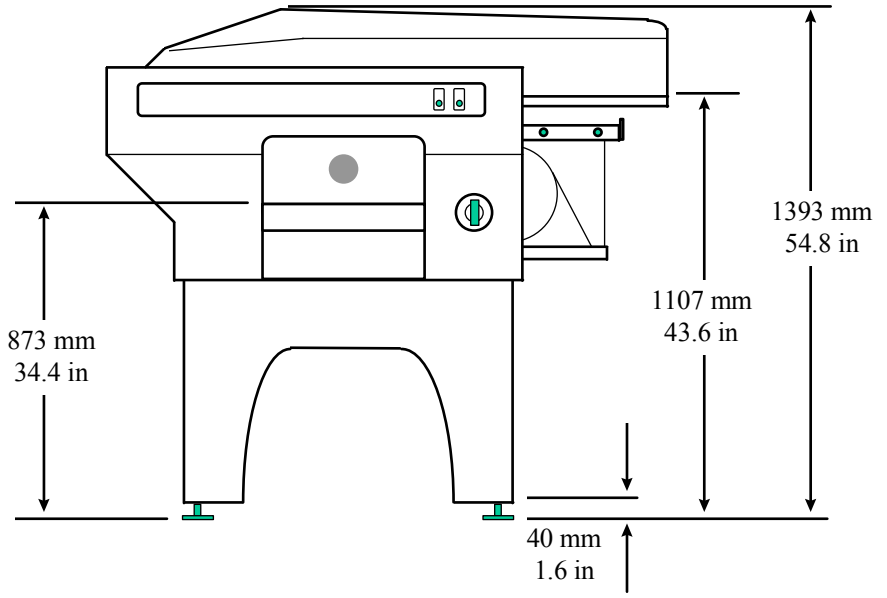


Figure 1-1: SOLO® XL Dimensions (Side View)

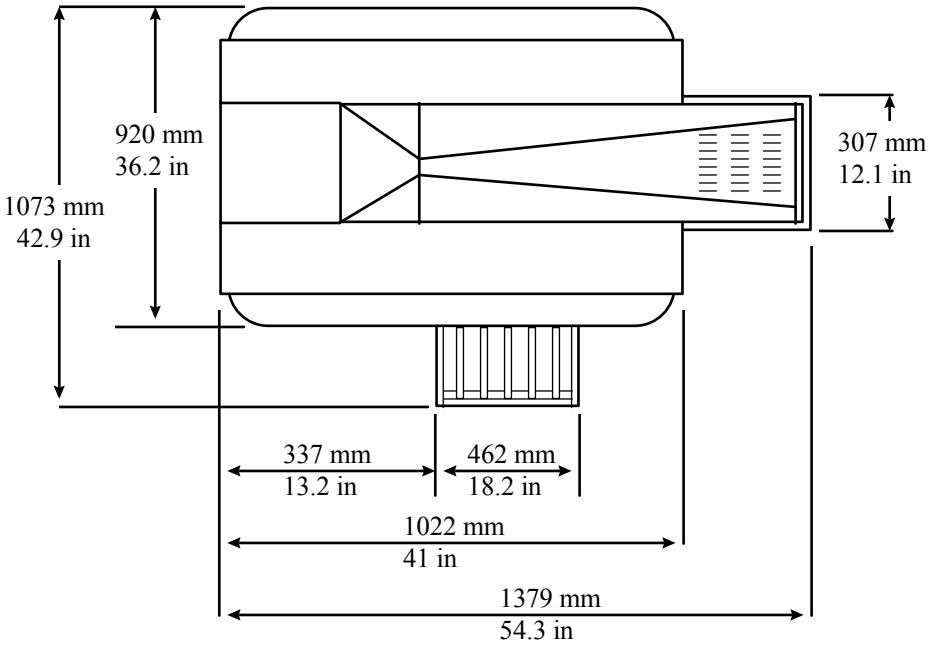


Figure 1-2: SOLO® XL Dimensions (Top View)

Sequence of Operation

The sequence of operation for a Model 645 Wrapper to wrap one package is as follows:

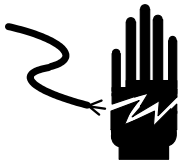
1. A package is placed on the Infeed conveyor against the Start Switch.
2. The Lifter moves down and the Infeed Door swings open.
3. The Infeed Conveyor moves the package over the Photoeyes to determine the dimensions.
4. The dimensions are used by the microprocessor to control the number of steps the Infeed Conveyor Stepper Motor is driven to center the package on the lifter. The size of the package will also determine how much film is required.
5. The proper length of film is pulled by the Center Clamp. The Distributor Magnets are then energized to hold the film.
6. The Film Lifter rises to the film as the Side Clamps move in.
7. The Center Clamp moves back further to pre-stretch the film length-wise.
8. The Side Clamps grip the film, the Distributor Magnets are de-energized, and the Side Clamps pull outward to stretch the film.
9. The Distributor Magnets are energized.
10. The Lifter elevates the package into the film. The Side Clamps move in under the pack and release the film.
11. The Lifter drops down, the package rests on the Side Clamps, and the Distributor Magnets de-energize.
12. The Center Clamp moves toward the package and tucks the film underneath as it discharges the pack.
13. During the discharge movement, the film is cut.
14. The package is wrapped and pushed onto the Sealing Belt to be sealed and discharged from the machine.

2 Safety Features and Precautions

Cleaning and Servicing Precautions

Before cleaning or servicing the Model 645:

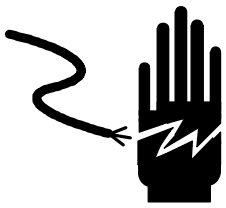
- Turn off the power switch (See section on **Applying Power** in Chapter 3), then unplug the AC line cord from the outlet.
- Failure to observe these precautions could result in bodily harm.



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Do not allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.



WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

Always take proper precautions when handling static sensitive devices.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Stepper Motors

The stepper motors are controlled through the microprocessor. Sensors on the various drives give position feedback to the microprocessor. If these sensors are not engaged within a predefined number of motor steps because of obstructed motion or other malfunction, the microprocessor recognizes this as an error and operation ceases.

Distributor Magnets

The Model 645 Wrapper has two 24-volt electromagnets that are energized with 70 VDC during operation. If the magnets are energized for more than 30 seconds during a diagnostic test, they are automatically turned off to prevent damage.

Auto Shut-off

The Model 645 comes equipped with two interlock switches which will stop operation of the machine if either one is open. One interlock is actuated by the infeed door and the other is actuated by the top cover.

3 Installation and Setup

Unpacking

The Model 645 SOLO® XL is shipped on a special shipping crate. Carefully inspect the wrapper for damage and report any shipping damage to your carrier immediately. Unbolt the wrapper from the shipping crate and remove all the packing straps and material.

⚠ WARNING

Use extreme caution when lifting and moving the equipment to the desired location. Do not attempt to lift and move the labeler by yourself or injury could occur.

Caution: The wrapper is top heavy. Use extreme caution when removing it from the shipping pallet. Lift the wrapper by the main frame only. ***Do not lift or move the wrapper using the Infeed Table or the Sealing Belt.*** Refer to Figure 3-1.

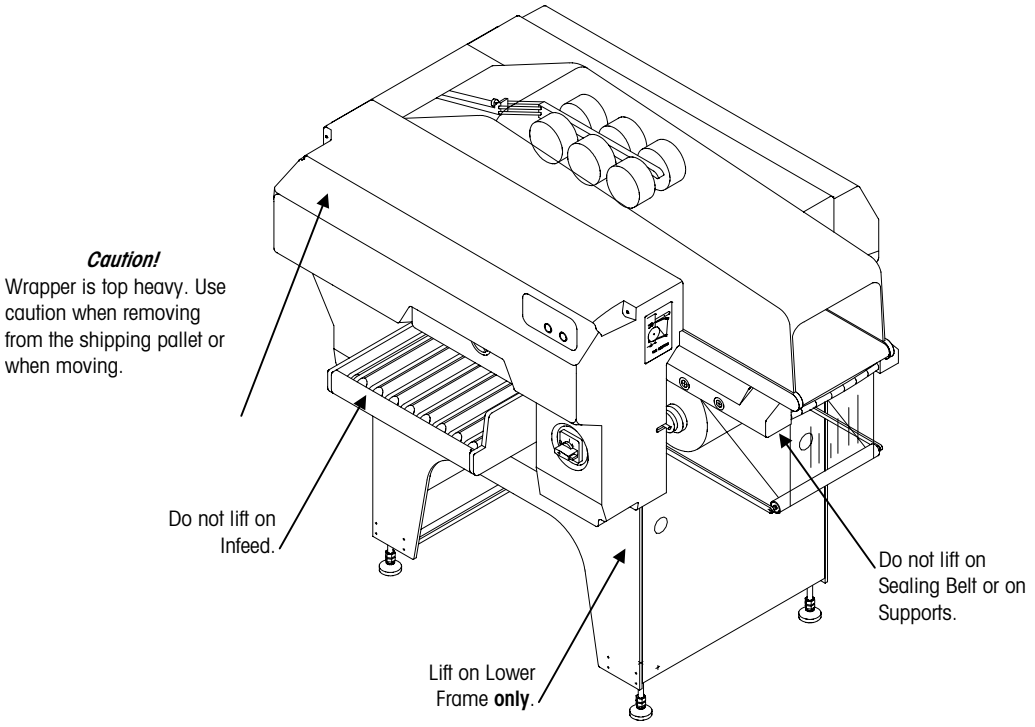


Figure 3-1

Configuration

The SOLO® XL Wrapper can be installed in several different configurations. Some common configurations that are used are shown here.

SOLO® XL/705/8361

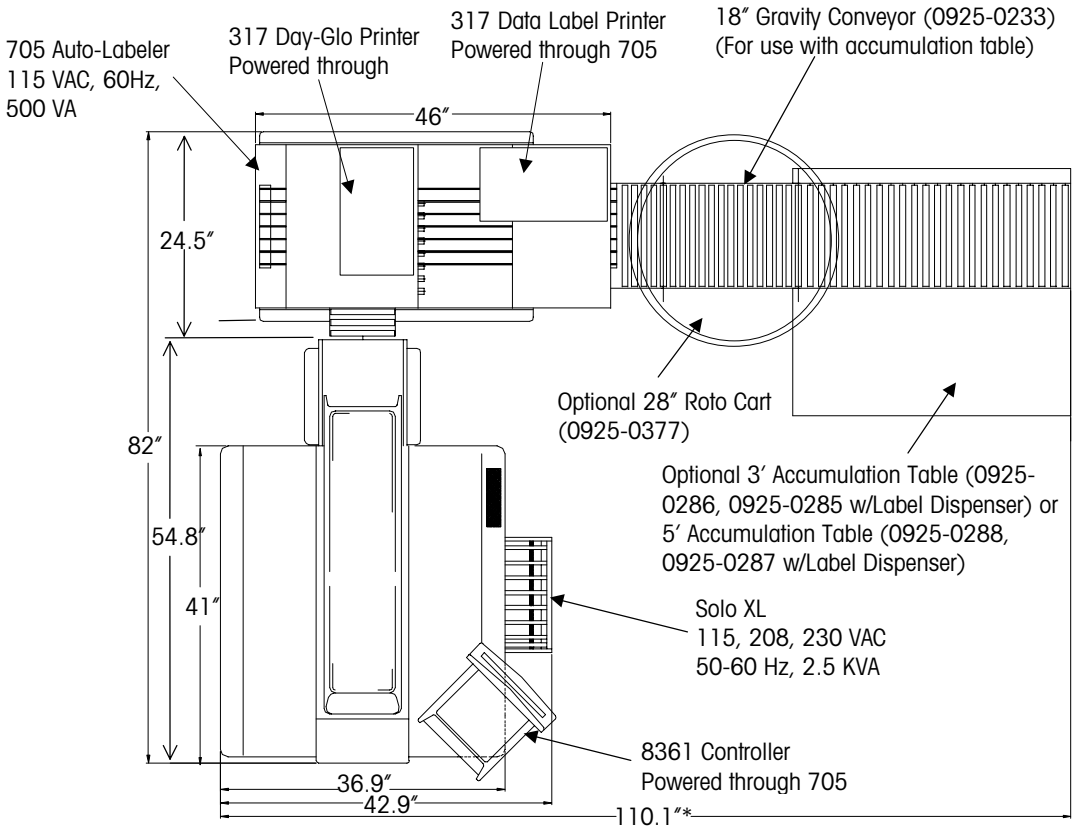


Figure 3-8

System Components

Description	Product I. D.
SOLO® XL	0645-20X3
705 Labeler, 1 Printer	0705-0001
705 Labeler, 2 Printers	0705-0002
8361 Controller	8361-XXXX
317 with applicator	0317-2001
Scale	8270-3000
Cable, 8360 to 8270	0925-0359
Cable, 8360 to 317	0925-0361
8360 Mounting Post	0925-0356
Optional 2nd Printer	
317 with applicator, Day-glo	0317-3001
Cable, 8360 to 317	0925-0361

* 80″ With Roto Cart
110.1″ With 3′ Accumulation Table
134.1″ With 5′ Accumulation Table

SOLO® XL /662/8361 on 662

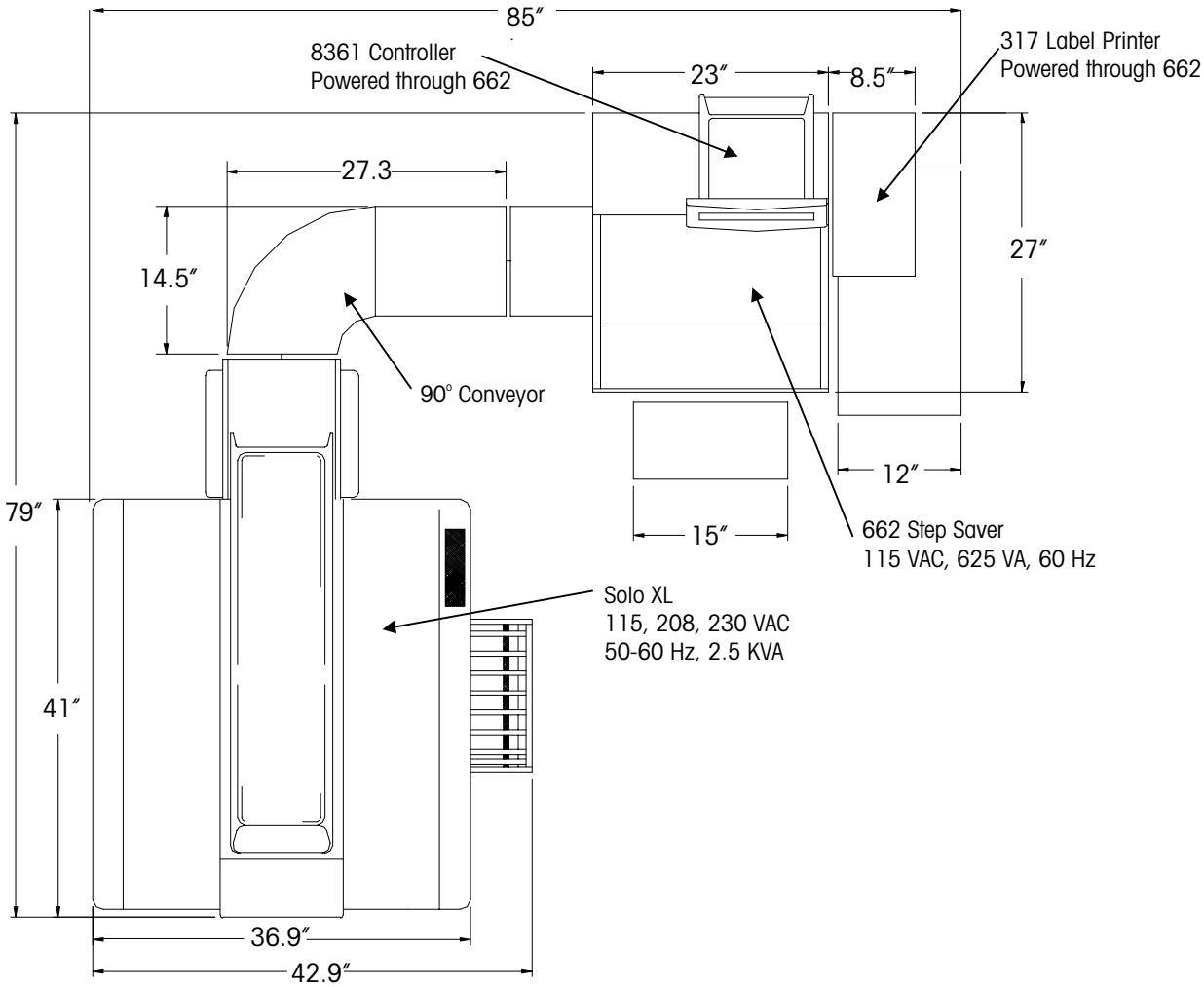
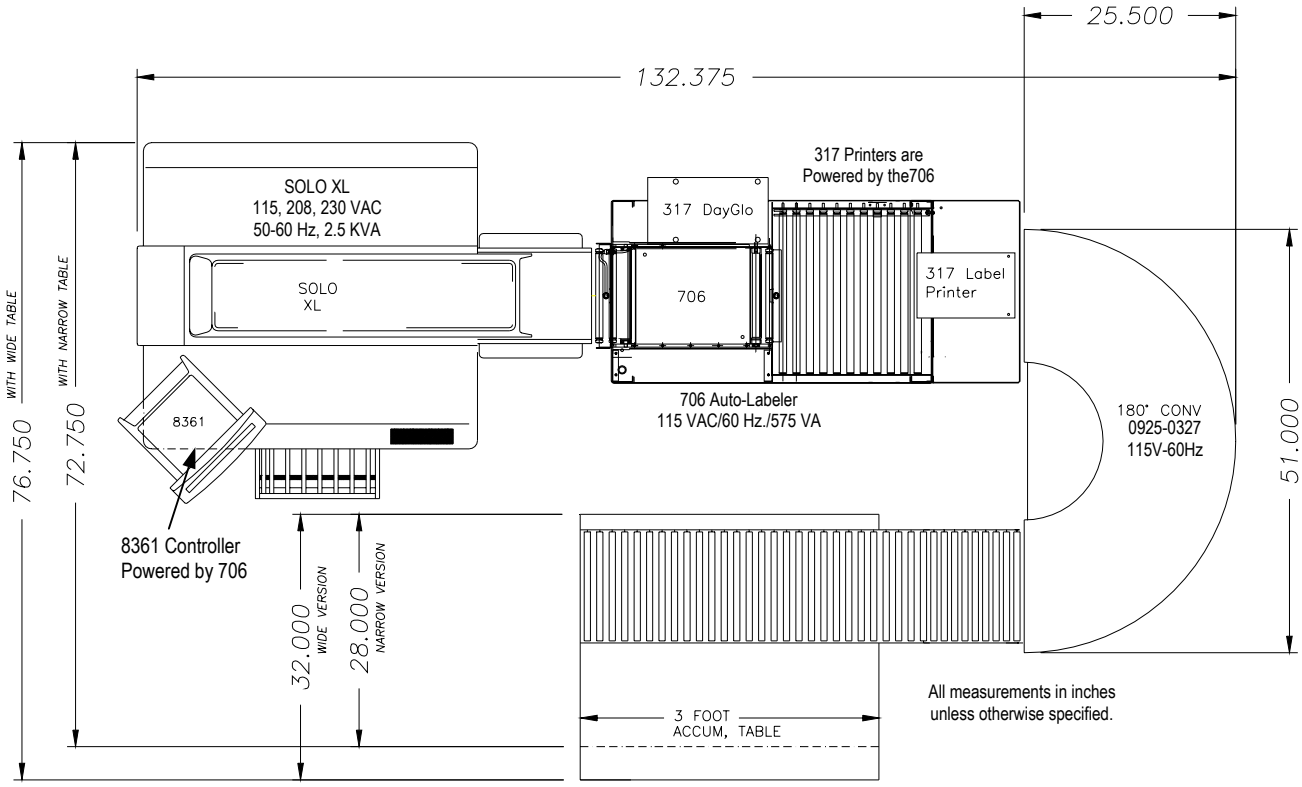


Figure 3-9

System Components

Description	Product I. D.
SOLO® XL	0645-20X3
2-roll Step Saver 3-roll Step Saver	0662-0200 0662-0300
Shelf for 317	0925-0352
662 side platter shelf	0925-0137
8361 Controller	8361-XXXX
317 stand-alone	0317-0001
Scale	8270-3000
Cable, 8361 to 8270	0900-0305
Cable, 8361 to 317	0900-0304
662 mounting post for 8361	0925-0345
90° gravity conveyor	0925-0376
8″ extension conveyor	0925-0385
8270 platter with rollers	0925-0383

SOLO® XL /706/8361 U-Shaped System



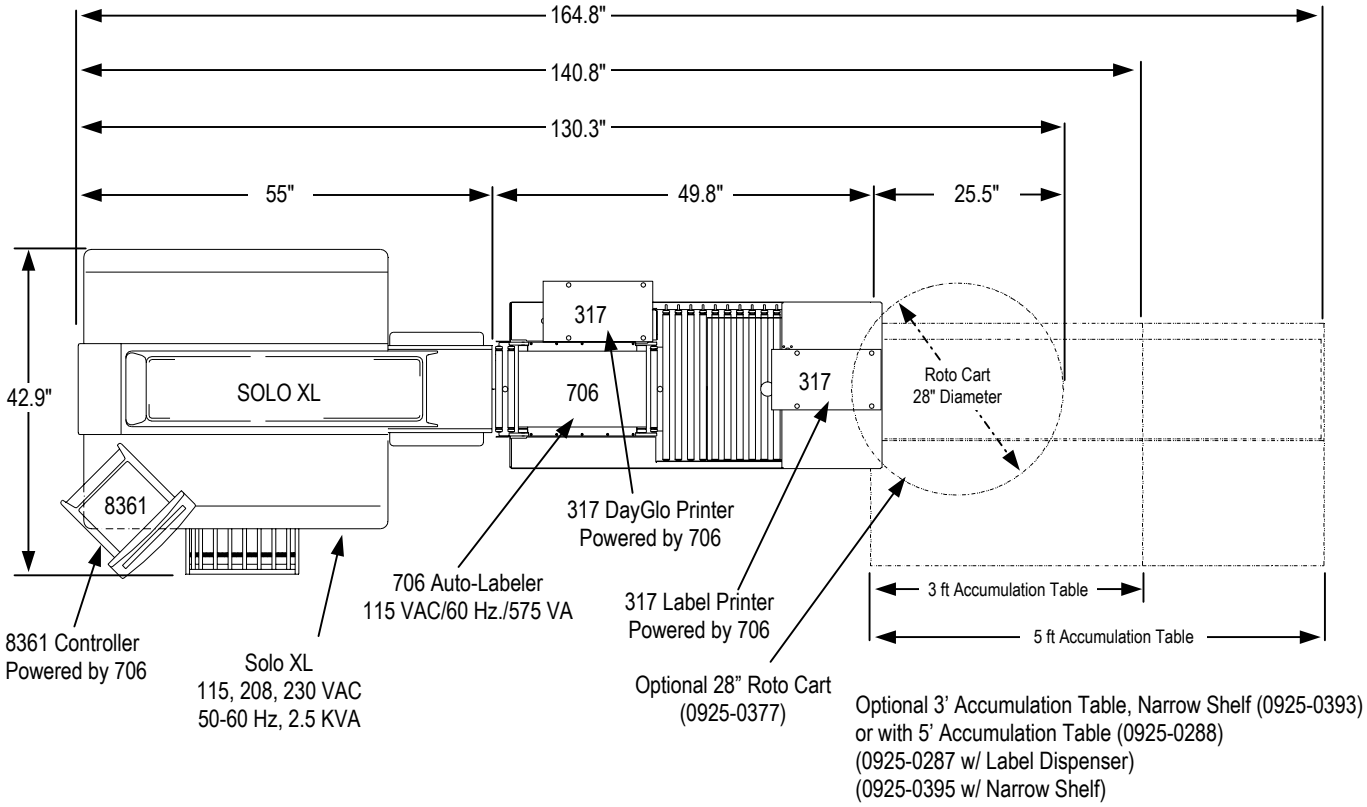
System Components

Description	Product I. D.
SOLO® XL	0645-20X3
706 Labeler, 1 317 Printer 706 Labeler, 2 317 Printers	0706-0001 0706-0002
180° Power Conveyor, L-R	0925-0327
8361 Controller	8361-XXXX
317 with applicator	0317-2001
Scale	8270-2000
Cable, 8361 to 8270	0925-0359
Cable, 8361 to 317	0925-0361
Accumulator Table	0925-0393
8361 Mounting Post	0925-0356

Optional 2nd Printer

317 with applicator, DayGlo	0317-3001
Cable, 8361 to 317	0925-0361

SOLO® XL/706/8361 Inline System



System Components

Description	Product I. D.
SOLO® XL	0645-20X3
706 Labeler, 1 317 Printer 706 Labeler, 2 317 Printers	0706-0001 0706-0002
8361 Controller	8361-XXXX
317 with applicator	0317-2001
Scale	8270-2000
Cable, 8361 to 8270	0925-0359
Cable, 8361 to 317	0925-0361
8361 Mounting Post	0925-0356

Optional 2nd Printer

317 with applicator, DayGlo	0317-3001
Cable, 8361 to 317	0925-0361

Leveling

The SOLO® XL and other system components must be leveled during installation. To level the wrapper, adjust the four support feet fixed to the lower part of the base using a level referenced to the infeed frame of the wrapper. The SOLO® XL and other components must be leveled front to back, and side to side. Position the sealing conveyor belt 1/16″ - 1/8″ higher than the infeed rollers on the Labeler or the gravity conveyor if used in the application. The labeler and the gravity conveyor come equipped with a connector bracket assembly to attach to the Model 645 Wrapper.

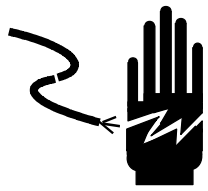
Transformer Voltage

AC wiring to the transformer must be performed by trained personnel only, and must be wired in accordance with all local and national electrical codes.

Should it be necessary to rewire a 645-20x3 to a different line voltage, the sealing plate wiring and fuses will also need to be wired differently. For transformer wiring changes refer to the wiring diagram installed inside the cover of the transformer assembly.

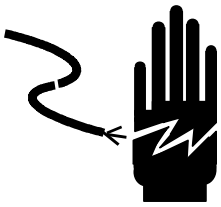
The SOLO® XL is ordered according to the AC voltage requirements. Two different transformers are installed to adapt the machine to different line voltages, either 115VAC or 208/230 VAC 50/60 Hz single phase. The 208/230 VAC models use the same transformer that is wired differently to accommodate the different input voltages. The output from the transformer is 48 VAC. The power requirement is 2350 VA.

Single Phase AC Voltage Supply	Factory Number
Solo XL 115 VAC/50/60 Hz/30A Supply/2350 VA	645-2013
Solo XL 208 VAC/50/60 Hz/20A Supply/2350 VA	645-2023
Solo XL 230 VAC/50/60 Hz/20A Supply/2350 VA	645-2033



⚠ WARNING

NOTE: Before connecting the Model 645 to a power source, first verify the supply voltage matches the Model 645 voltage requirements listed on the data plate. Failure to observe this warning may result in damage to the machine.



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The Model 645 operates on 48 VAC, which is supplied by an external transformer. The transformer is housed in a separate enclosure mounted to the rear machine frame inside the wrapper.

The primary side of the transformer has 3 voltage taps to match the line voltage. The Model 645 is supplied with a power cord with no plug. This must be supplied locally to match the line voltage outlet. The 115-Volt transformer is the same as used in the 208

and 230-volt units, however, the circuit breaker is different and the wiring is connected to different taps on the transformer. The transformer can be rewired for different line voltages ***only if the circuit breaker is changed***.

- Do not rewire a 115-Volt Transformer Assembly for 208 or 230 Volt without changing the circuit breaker. The 115-Volt units use a 25 Amp Circuit Breaker.
- Do not rewire a 208 or 230-Volt Transformer Assembly for 115 Volt without changing the circuit breaker. The 208 and 230-Volt units use a 16 Amp Circuit Breaker.
- A 208-Volt Assembly can be rewired for 230-Volt use and vise versa.

The secondary output of the transformer provides 48 VAC at 50 Amps to the wrapper. The tolerance is ±10%. The primary voltage must be within ±10% of the listed voltage. This is extremely important to prevent stress to electrical and electronic components.

When installing a Model 645, always verify the supply voltage by checking it with a voltmeter. Verify there is a good safety ground. Before connecting any voltage to the transformer, open the transformer enclosure and verify the wiring is correct for the voltage you will be connecting. The wiring diagram for the transformer is located on a label inside the transformer cover. Check all terminal connections to ensure they are tight. This should involve a visual inspection by looking at, and pulling on the wires, as well as tightening the screw terminals.

Before connecting the AC power, make sure the circuit breaker is turned off, and the Model 645 Power Switch is turned off. Plug in the input power supply and then turn on the circuit breaker and verify the incoming voltage is correct for the wiring in the transformer. Turn on the power switch and measure the secondary output of the transformer to ensure it is 48 VAC +/- 10 % (43 to 53 VAC). **If it is not within this range, correct the problem before proceeding.**

DIP Switch Settings

Verify the switch settings of SW1, located on the CPU Board.
(* = Recommended Setting).

SW1-1 Not Used, must be OFF = 0

SW1-2 Horizontal Photoeye Test at Powerup = 0, No Test = 1*

SW1-3 Not used, must be OFF = 0

SW1-4 Not used, must be OFF = 0

SW1-5 Heater/Blower OFF = 0, ON = 1*

SW1-6 Not used on RAM 20X3 machines, must be ON = 1

SW1-7 Normal Operation = 0*, Machine step-by-step operations 1 (Test 106)

SW1-8 Normal Operation = 0*, Continuous Operation = 1 (Test 107: program 95)

Variable Settings

Refer to the Diagnostic Pocket Chapter for operation of the Pocket. The following variables should be checked in the Pocket Variables Menu.

Test 122 Heater/Blower ON Temperature

The Heater/Blower heats the film to allow the film to be stretched more easily. The default temperature is set for 18°C. Your actual required setting may vary due to the ambient temperature in which the machine is used.

Test 123 Heater/Blower OFF Temperature

The default temperature is set for 23°C. This variable should be 5 degrees higher than the ON termperature to allow the Heater/Blower to cycle on and off.

Test 124 Sealing Belt Heater OFF Idle Time

This variable sets the delay time when the Sealing Belt Heater is set to the minimum temperature. The default setting is 4 hours. The range is 1 to 255 hours.

Mechanical Inspection

Before operating the wrapper, the following items must be checked to ensure that certain critical clearances did not change during shipping and installation.

- Distributor Clamp Plate Clearance must be 0.5mm ±0.1 mm across the entire width of the distributor.
- Clearance between the Underfold Plate on the Center Clamp and the Front Roller on the Sealing Belt must be 1 mm ±0.5 mm.
- With the Lifter in the down position, verify there is clearance between the top surface of the package supports and the top of the infeed belts.
- Check that the film is centered on the Dancer Bar, Curved Rollers, and Distributor Roller.
- After all clearances have been checked, run a selected mix of trays to verify operation.

4 Operation

Component Locator

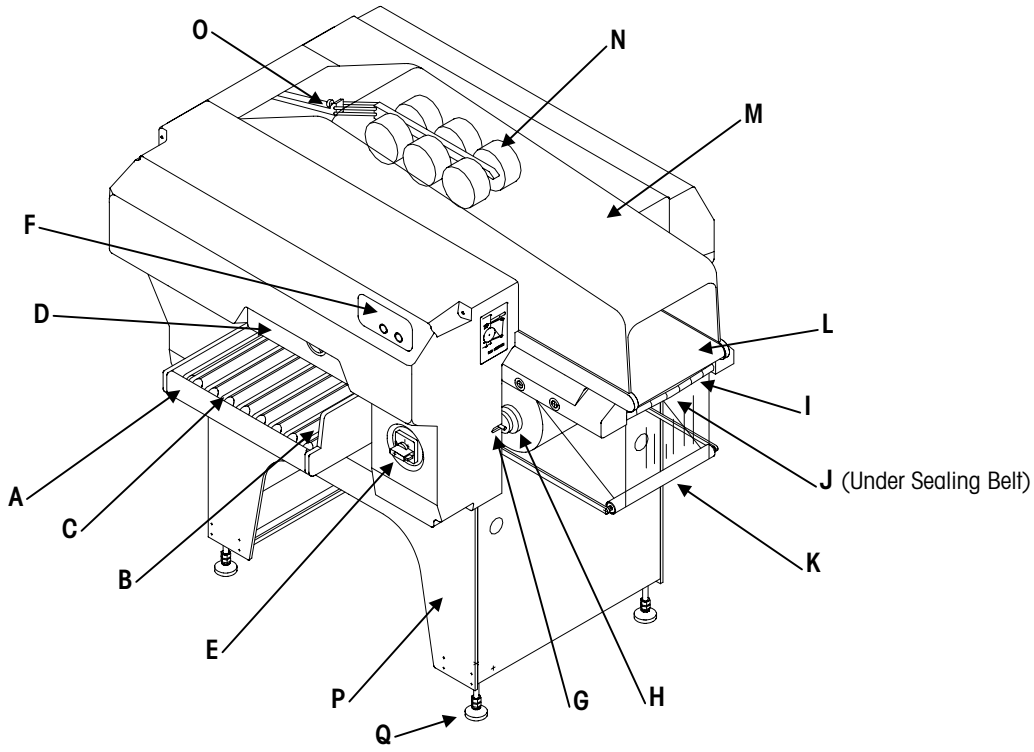


Figure 4-1: SOLO® XL

A Infeed Conveyor
B Start Switch
C Infeed Conveyor Belts
D Infeed door
E Power Switch/Circuit Breaker
F Control panel
G Bobbin Lock
H Film Bobbin
I Curved Roller Assembly
J Film Folders
K Dancer Bar
L Sealing Belt
M Top Cover
N Package Pressure Rollers
O Height Adjuster for Rollers
P Base
Q Adjustable Leveling Feet

Circuit Breaker

The main circuit breaker for the wrapper is mounted on the front machine frame next to the power switch. The circuit breaker disconnects power to the entire machine.

Power Switch

Verify the circuit breaker is turned on. To turn the 645 ON, rotate the Power Switch (E in Figure 4-1) clockwise from **0** to **1**, as shown in Figure 4-3. To turn the SOLO® XL OFF, rotate the Main Power Switch from **1** to **0**. When the SOLO® XL will not be used for extended periods of time, turn the Main Power Switch OFF.

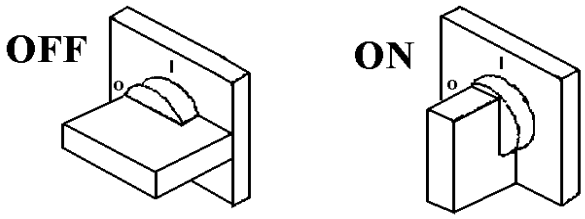


Figure 4-3: SOLO® XL Main Power Switch

Control Panel

The Control Panel (F in Figure 4-1) consists of two 2-digit LED displays and two pushbuttons. The **Status Display** shows status codes and the **Program/Belt Temp. Display** shows the wrap Program Number and Belt Temperature (see Figure 4-4). Below each display is a pushbutton, the **Reset Button F2** and the **Film Cut/Belt Temp. Button F1**. When the SOLO® XL power is first turned on, the displays will blink "**88**" for visual verification of the display segments followed by the display of the last four digits of the serial number. Following this brief test, the Status Display shows "**01**", indicating "*waiting to start the program.*" Once you push the Reset Button F2, the 645 goes through a series of self-checks to test movement of various components and to reset the machine. The Program Display will blink until the sealing belt temperature reaches the preset temperature level. ***NOTE:*** *The Program Display will blink the previously set program number, not the temperature level of the sealing belt.*

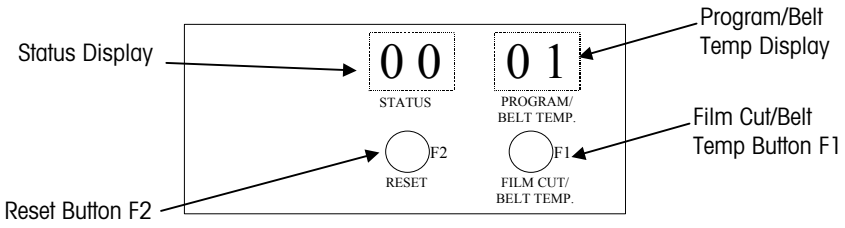
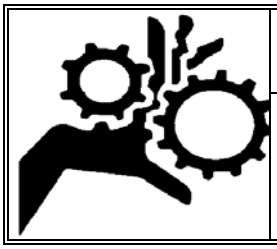


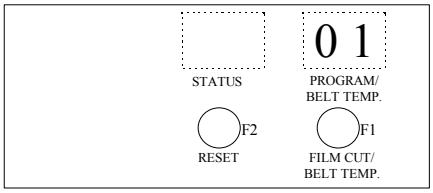
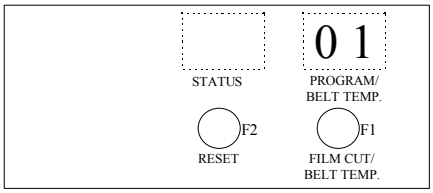
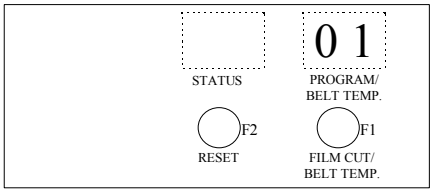
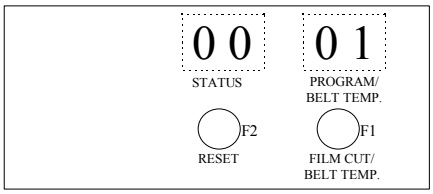
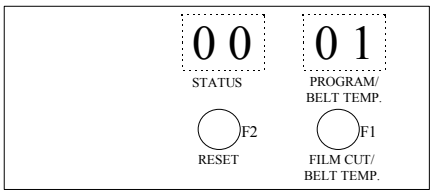
Figure 4-4: Control Panel



⚠ WARNING

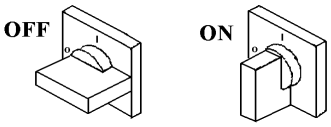
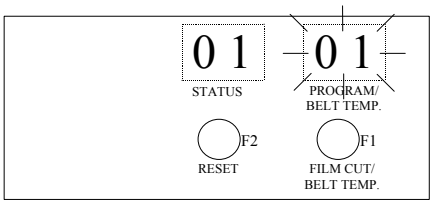
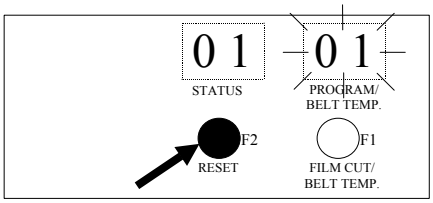
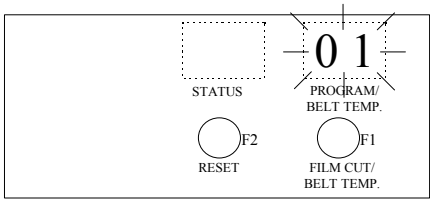
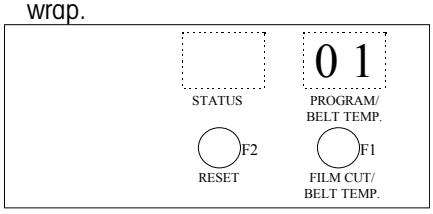
During self-test, the Infeed Belts are in motion and other motors are running. Do not place materials on the belts during this test. Keep hands clear of the machine during the test.

Control Panel Functions

Display on Control Panel	Status or Operator Action	Operation Description
	SOLO® XL ready to wrap.	Program Display shows the work program. Status Display shows status codes.
	To Select new Program. **01** Tightest Wrap **03** Standard Wrap **05** Reduced Stretch for delicate or soft items. **31** For use with Black Trays	Press and hold the Reset Button **F2** for more than 2 seconds. While holding Reset Button **F2**, select the new program by pressing the Film Cut/Belt Temp Button **F1.**
	To Change Sealing Belt temperature. **00** Heater Off **01** 78°C (172°F) **02** 81°C (178°F) ↓ Each step = +3°C (5.5°F) **30** 165°C (329°F) Max	Press and hold Belt Temp. Button **F1** for more than 2 seconds. While holding the Film Cut/Belt Temp. Button **F1**, select the new temperature setting by pressing Reset Button **F2.** Recommended temperature range is between 18-24. **18** = 128°C (262°F) **24** = 146°C (295°F)
	Machine stop. Check Status Code.	Status Display shows status code. Refer to the Status Code Table in the Troubleshooting Section. Correct the error condition, then press Reset **F2** to restart.
	To cut film.	Status Display must show **00** or **01**. Press and hold Film Cut/Belt Temp. Button **F1** until film is cut.

Wrapper Startup

Warning!
During the Self-Test, the machine conveyors are in motion. Keep clear of machine during the test. Do not place any materials on the Infeed Belts while the machine is running the test.

OPERATOR ACTION	DISPLAY PANEL
Turn power switch from **O** (off) to **I** (on) to turn power on. 	• Status display shows 01 • "PROGRAM/ BELT TEMP" display will blink off/on. 
Push **F2** button to reset the machine. 	• Machine starts Self Test • Status display will blank. • "PROGRAM/ BELT TEMP" display continues to blink. 
Wait for Sealing Belt to reach specified temperature.	• When "PROGRAM/ BELT TEMP" display stops blinking, the machine is ready to wrap. 

Film Installation

The SOLO® XL requires 13-inch film. The recommended film is a high quality, two-ply 16-micron stretch film that is available through METTLER TOLEDO® Aftermarket. Other films are available that will work on the machine. Contact METTLER TOLEDO® for additional information. To install film on the SOLO® XL, proceed as follows:

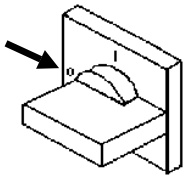


Figure 4-5

Turn the Main Power Switch to OFF.

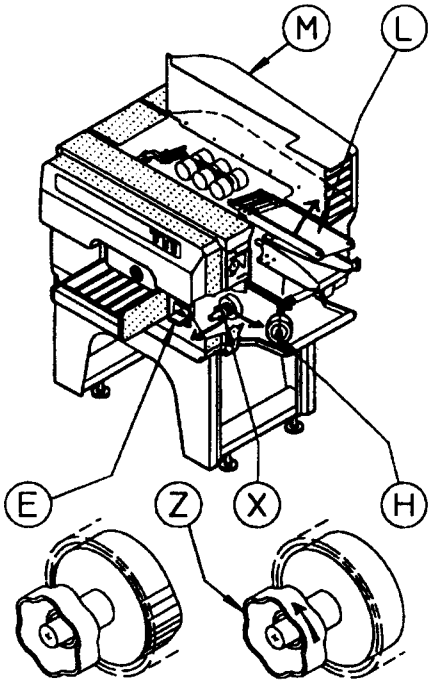


Figure 4-6

Open the top cover (M).

Lift the sealing belt (L).

Release the Bobbin (H) from its housing by moving latch (X) toward the operator side. Pivot the Bobbin outwards.

Hold the Bobbin and rotate the handwheel (Z) counter-clockwise to release the Bobbin Lock.

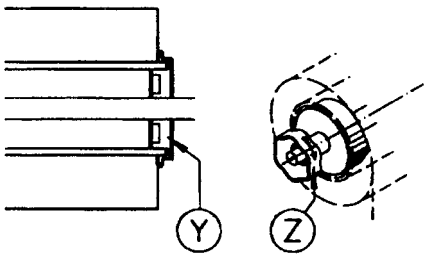
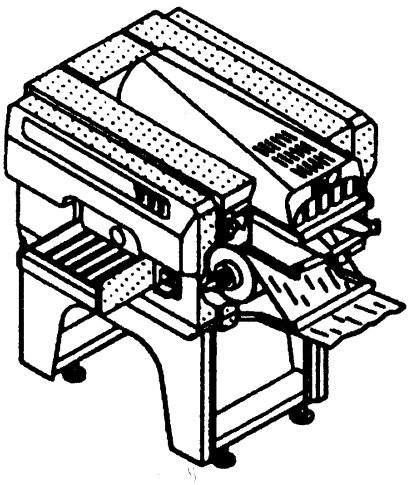


Figure 4-7

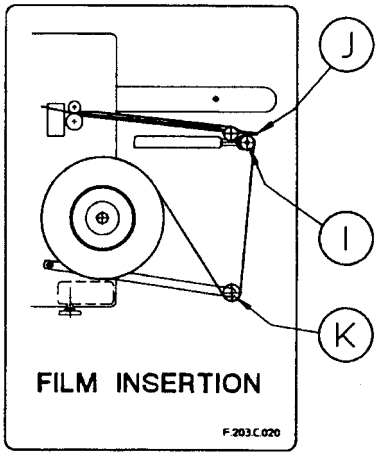
Slide the film roll onto the Bobbin until the roll edge touches the reference disk (Y) in Figure 4-7.

Rotate the handwheel (Z) clockwise to endstop.



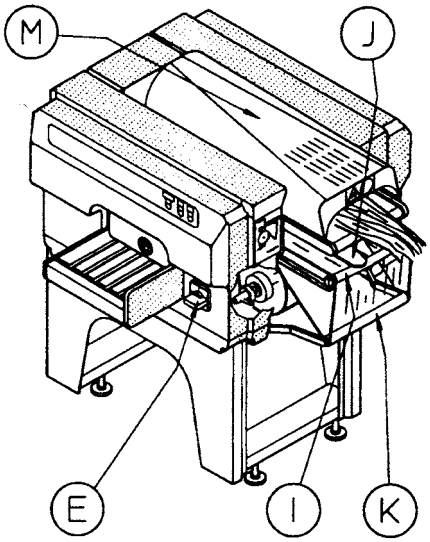
Pull the Bobbin Latch, pivot the Bobbin back to the work position until it locks.

Figure 4-8



Insert the film under the dancer roller (K), over the curved rollers (I), through the film folders (J), and past the distributor.

Figure 4-9



Lower the Sealing Belt back to the work position.

Pull out approximately 1 meter (3 feet) of film until it widens at the first roller of the Sealing Belt.

Lower the Top Cover (M) back to the work position.

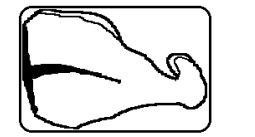
Turn the Main Power Switch (E) ON to the I position.

Press and hold **F1** until the film is cut, then remove the excess film.

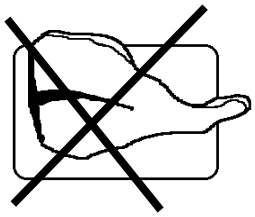
The SOLO® XL is now ready to wrap packages.

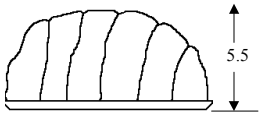
Figure 4-10

Loading Trays on the Infeed Conveyor

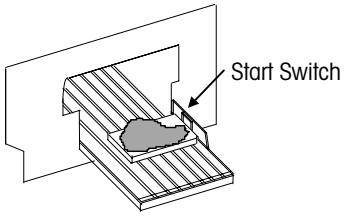


The trays must be stiff enough and the product must be contained within the tray.





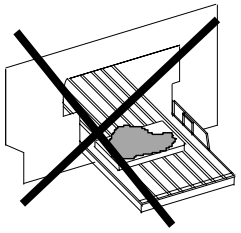
Height must be less than 5.5″



To start wrapping place the tray on the Infeed Belt and against the **Start Switch**.

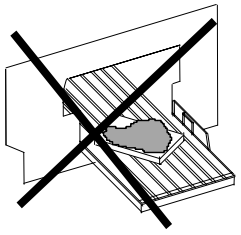
Caution!

Place the trays on the infeed conveyor only when the Infeed Conveyor Belts are stopped! Do not place a tray or any object on the moving conveyor belts.

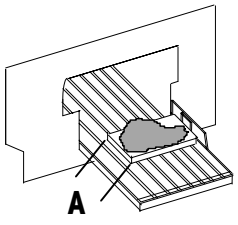


The trays must placed ***against*** the Start Switch to start wrapping. Allow belts to stop before placing next tray.

Refer to the Tray Orientation Label for proper feeding of trays into the machine.



Trays must be aligned square with the infeed conveyor.



The SOLO® XL will verify sizes and reject trays that exceed the maximum acceptable size. Any combination of tray sizes can be fed into the machine. The SOLO® XL automatically adjusts the amount of film and tension depending on the tray dimensions.

Pack Wrapping Check

- Check to verify the tray comes out of the machine well-wrapped and properly sealed underneath. Select the Program that provides the best results for the type of package/product being wrapped. Refer to Table 4-1.

Program Number	Wrapping Type
01	Wrapping with more film tension and lower items.
03	Standard wrapping for standard tray and items.
05	Wrapping with reduced film stretching for delicate and/or soft items.
31	Wrapping when using black trays.

Table 4-1

- The wrapping check should be made after the Sealing Belt temperature is stable indicated by a steady display on the Program Display.
- If sealing is inadequate, increase the temperature value. If the film appears burned, lower the temperature. Refer to Table 4-2. The recommended temperature setting is between 18-24 for most applications.

Code On Display	Sealing Belt Temperature
00	Heating OFF
01	172°F or 78°C
02	178°F or 81°C
⇓	Every time the code changes one unit, the temperature changes 5.5°F or 3°C.
30	329°F or 165°C

Table 4-2

Idle Time

The SOLO® XL power can be left on during short idle periods of time to maintain temperature to the Sealing Belt. If the SOLO® XL will not be used for an extended period of time, the power must be turned off.

If no activity is detected on the infeed Start Switch after a period of time, the SOLO® XL will automatically lower the temperature on the sealing belt to the minimum setting of 01. This time can be set between 1 and 255 using the Pocket Test 124.

Continuous Feeding

- Within the maximum and minimum size limits, the SOLO® XL will accept any tray size placed on the feed device in any order.
- The machines automatically adjust film quantity and tension, depending on the tray dimensions.

CAUTION!

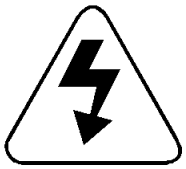
Do not place a tray on the feed device when the belts are moving.

- The wrapper starts when a package is placed against the Start Switch.
- Trays must be placed squarely against the Start Switch to be wrapped properly.

5 Maintenance

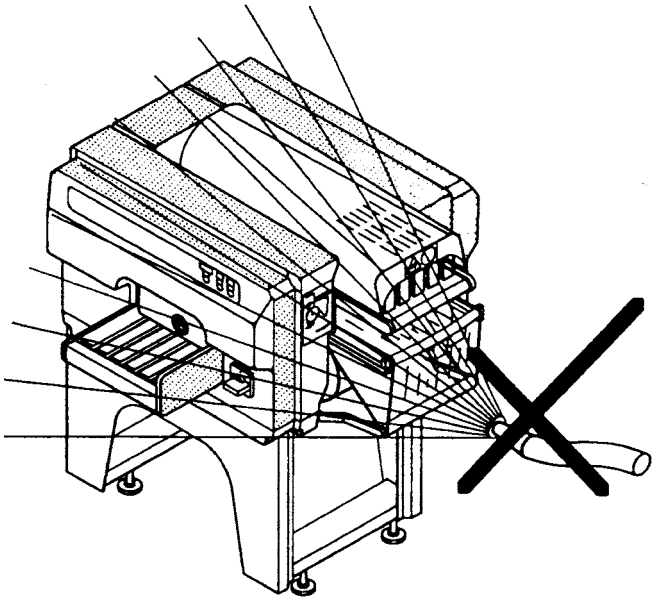
Cleaning Precautions

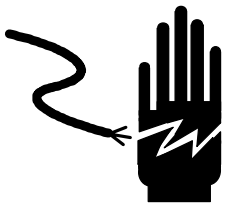
Advise your customer to follow the cleaning instructions in the Operator's Manual. It is important to clean the machine parts daily. Always make sure the power is turned off to the Model 645 and other system components before performing any cleaning. Never aim water directly inside the machine or at the electrical panel or control board.



⚠ WARNING

Always turn the power switch to off whenever the machine is left idle or during maintenance, cleaning, or film change operations. Failure to comply could result in personal injury and/or property damage.



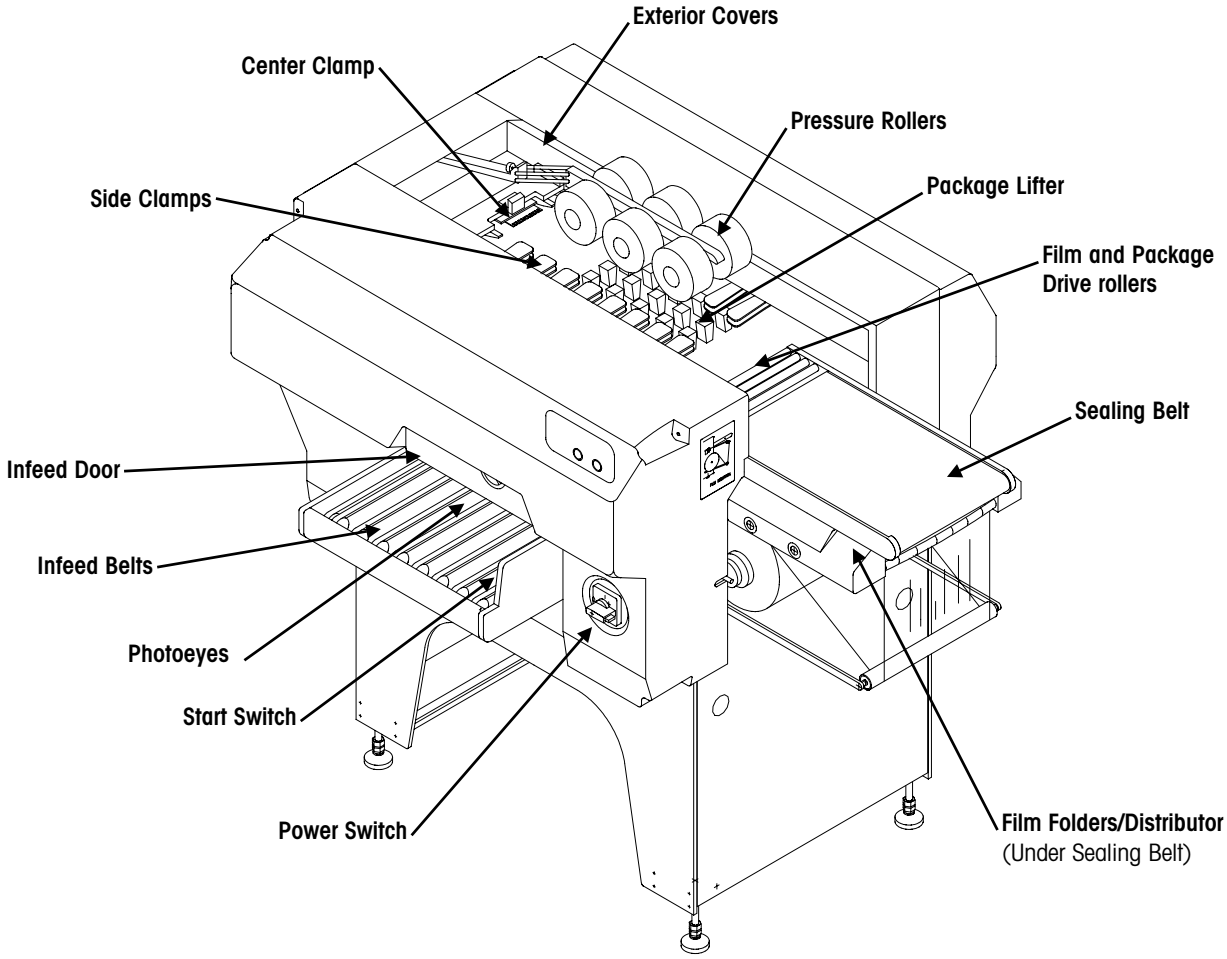


⚠ WARNING

Do not direct water or steam at the inside or outside of the machine. Keep moisture away from the inside of the electrical panel and control board. Failure to comply could result in property damage.

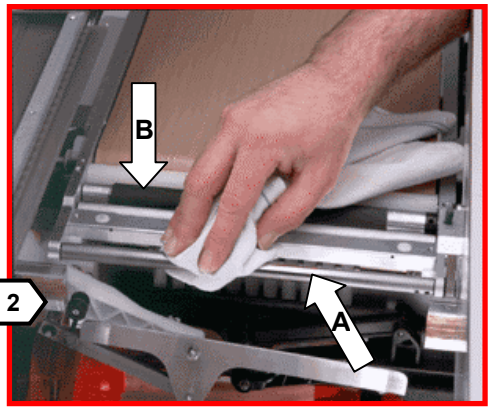
Daily Cleaning

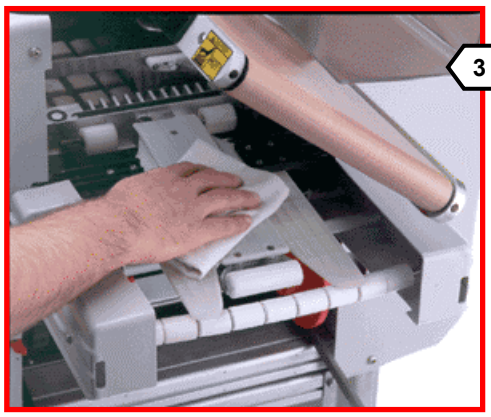
The Model 645 is designed to make cleaning operations simple and fast. The following items require attention daily or more frequent as required. Refer to the illustration below for locations of the components on the following pages. Always disconnect power before you start cleaning the unit.



Clean the sealing belt with a soft cloth dampened with hot water. **Caution! The belt may be hot. Allow the belt to cool before cleaning.**

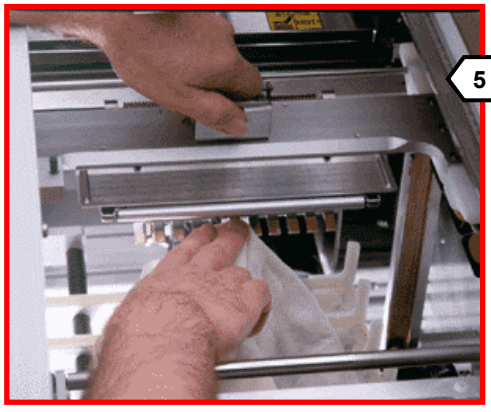
Clean the film drive roller (A) with a soft cloth dampened with isopropyl alcohol (recommended) or hot water. Clean the package drive roller (B) with a soft cloth dampened with hot water. Remove any debris from the roller.





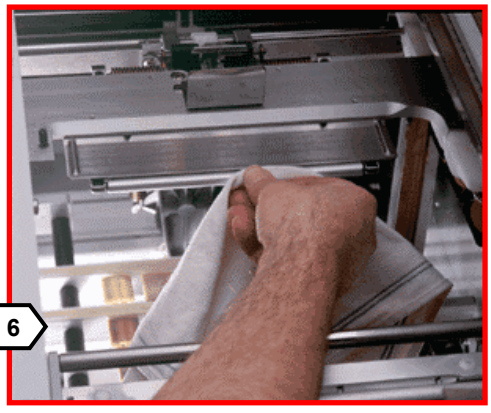
Raise the sealing belt using the handle for access to the distributor, film clamp, and folders below it. **Caution! The belt may be hot.** Clean the film folders, distributor, and curved rollers with a soft cloth dampened with hot water.

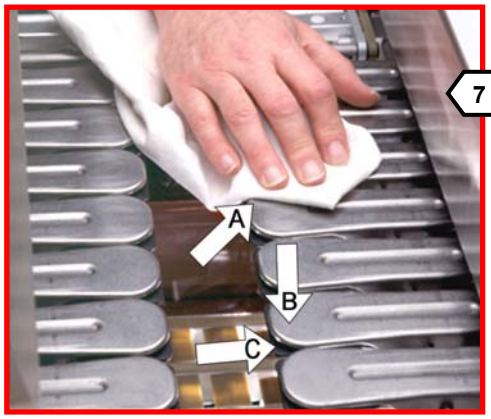
While the Sealing Belt is raised, Clean the distributor film clamp with a soft cloth dampened with hot water. When lowering the sealing belt, hold the handle and lower it gently to avoid alignment problems.



Remove any debris from the comb. Clean the film gripper on the center clamp with a soft cloth dampened with isopropyl alcohol (recommended) or hot water. Wipe the surfaces dry when done cleaning. (This must be dry before using the machine.)

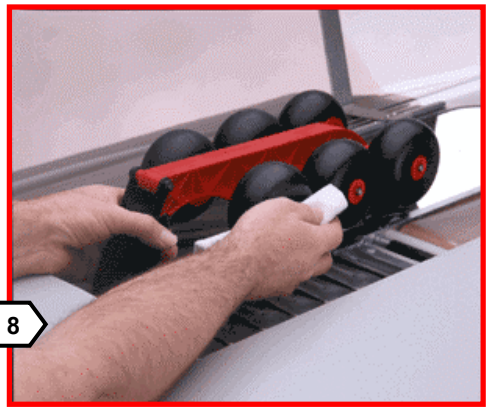
Clean the roller on the center clamp with a soft cloth dampened with hot water. Remove any debris from the roller.





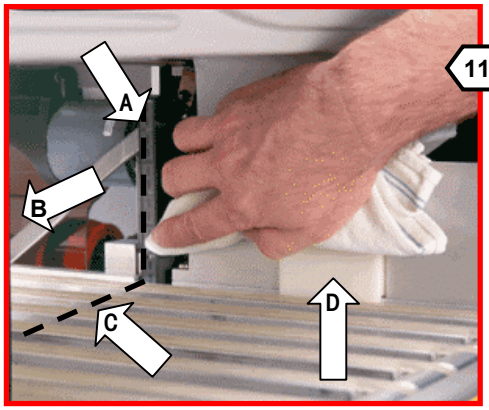
Clean the tops (A) of the side clamps with a soft cloth dampened with hot water. Press down on each of the clamps (B) to expose the gripper pads (C). Clean each of the pads (C) with a soft cloth dampened with hot water. Allow to dry before using the machine.

Clean the pressure rollers with a soft cloth dampened with hot water. Remove any debris from the rollers.



Raise the lifter by pulling it up. Clean the lifter supports with a soft cloth dampened with hot water. Remove any debris from the supports.

Clean the Infeed Belts and the Infeed Door with a soft cloth dampened with hot water. Wipe the belts and rollers to remove any grease or debris.



Clean the right (A) and left (B) photoeyes and horizontal photoeyes (C) with a soft cloth dampened with hot water. **Do not use a paper towel or other abrasive material. It will scratch the photoeye lens.** Clean Start Switch (D) with a soft cloth dampened with hot water. Remove any debris. Do not use any sharp objects to clean the switch cover.

Clean all exterior surfaces with a soft cloth dampened with hot water.

IMPORTANT!
After all cleaning is completed, turn the wrapper power switch back ON.

General Cleaning

The following sections cover items needing attention by a trained service technician during a service visit or preventive maintenance.

Start Switch

Do not use a sharp object to clean the Start Switch because you might cut the electrical wires that power the switch!

Before cleaning the Start Switch, turn off power to the Model 645. The Start Switch must be removed to clean it thoroughly. It is held on by two screws on the bottom of the flat spring underneath the infeed conveyor. When the cover is removed, you can safely remove the grime and properly clean the Start Switch without damaging the electrical wiring. During re-assembly, make sure the metal spacer bar is between the flat spring and the infeed frame when you replace the cover. To prevent sticking, be sure that the cover is not rubbing against the switch or the switch recess.

Infeed Belts

Remove the Infeed Belt Guard and clean the belts, belt guides, pulleys, and the front guard with a clean cloth dampened with hot water. After cleaning sparingly apply corn starch or talcum powder to the belt guide tracks to reduce friction in the tracks.

Photoeyes

Use a clean cloth dampened with hot water. Wipe all horizontal and vertical photoeyes. ***Do not use a paper towel. It will scratch the Photoeye lens. Only use a soft cloth.***

Side Clamps

Use a soft cloth moistened with hot water to clean the top surface of the side clamps. Remove all traces of dirt. Open the clamps and clean each of the clamp pads using a clean soft cloth dampened with hot water. Dry each with a dry soft cloth. Re-lubricate the top outside 2/3 surface of the clamps with a thin layer of light oil (FMO 350). Do not lubricate the ends of the clamps. **NOTE:** Be careful to prevent lubricant from getting on the clamp pads. ***The clamp pads must be thoroughly dried after cleaning and before using wrapper.***

Center Clamp

Use a soft cloth moistened with hot water to clean the Center Clamp. Remove all traces of dirt to prevent excess wear on these parts. Depress the film release handle located on top of the Center Clamp assembly. With the clamp in this position, use a clean soft cloth moistened with hot water to clean the shiny surface of the clamp. The opposing pad should be cleaned with a soft cloth moistened with hot water only.

Do not sand the shiny areas of the Center Clamp Gripper and the Sealing Belt Film Drive Roller. These parts must maintain a mirror finish to grip the film when pulled. If it is sanded, it will not hold the film during the pick or stretch process. The middle polished area of the roller must be shiny. If not, you'll be short on overwrap, or the package will be loose. Refer to Figure 5-1.

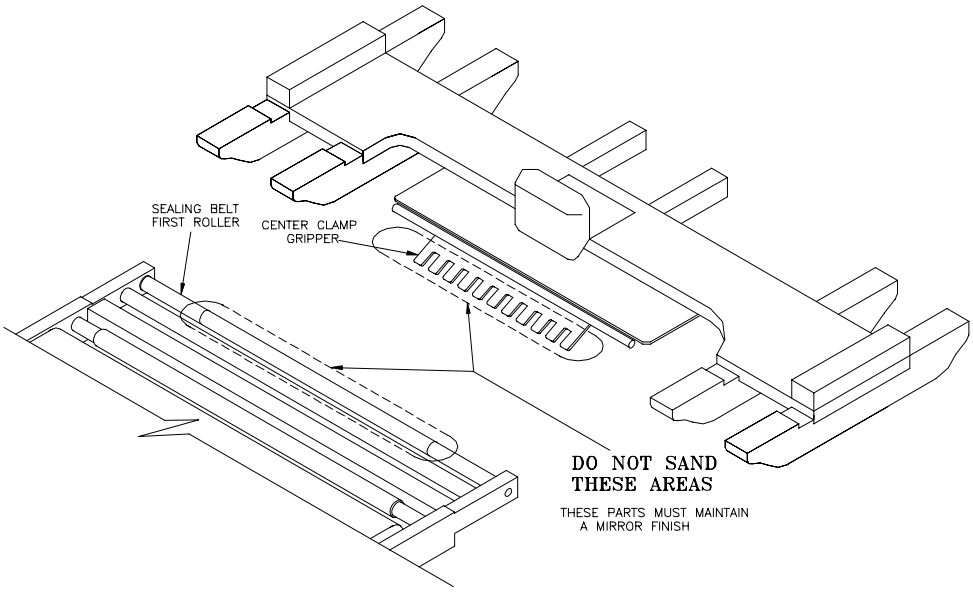


Figure 5-1

Foam Rubber/ Rubber Parts

Use a clean soft cloth moistened with hot water followed by a dry cloth to clean the following parts:

- Discharge rollers on sealing belt assembly.
- Curved Rollers below the sealing belt.
- Film pressure rollers mounted on the film folder beneath the sealing belt.
- Distributor Film Clamp pad.

Lubrication

Only a trained technician should lubricate the machine. Lubrication should be performed twice a year, or more frequently depending on package volume. Follow the instructions outlined below for the lubrication required on the Model 645 Wrapper.

General Lubrication

Use light oil (FMO350 Spray Oil, Part Number 81863500A) on the following parts:

- All plastic bearings
- The three mobile lifter segments, including the latches.
- Cutter Channel pivot points.
- Top of the side clamps. Do not lubricate the ends of the clamps. Lubricate only the outer 2/3 of the clamps. Distribute the oil using very light pressure on a piece of notebook paper. The paper allows a uniform layer of oil to remain. Avoid getting oil on the clamp pads. Refer to the next section on Side Clamp Lubrication.
- The four leadscrews in the linear actuator cases for the Side Clamps, the Lifter and the Center Clamp
- Any pivot points that can rotate or spin during the wrapping cycle.

Food-grade lithium grease (CPI Grease, Type GRS-460-F, Part Number 82909400A) should be applied to the following parts:

- The bearing guides for the Side Clamps Lifter, and the Center Clamp.
- The four tracks in the linear actuator cases for the side clamps, the lifter, and the Center Clamp.
- The clamp-opening cam, the Center Clamp cams (triangular cam mounted on the Center Clamp linear actuator, eccentric mounted on Center Clamp, hooked cam mounted on rear frame).

Side Clamp Lubrication

To prevent premature failure of the side clamps and the center clamp skis, it is necessary to do periodic cleaning and lubrication. If these parts are not kept properly cleaned and lubricated, the movement of the center clamp could be inhibited, causing encoder errors E33, E34 or E37. This maintenance should be performed during scheduled visits. Refer to Figure 5-2.

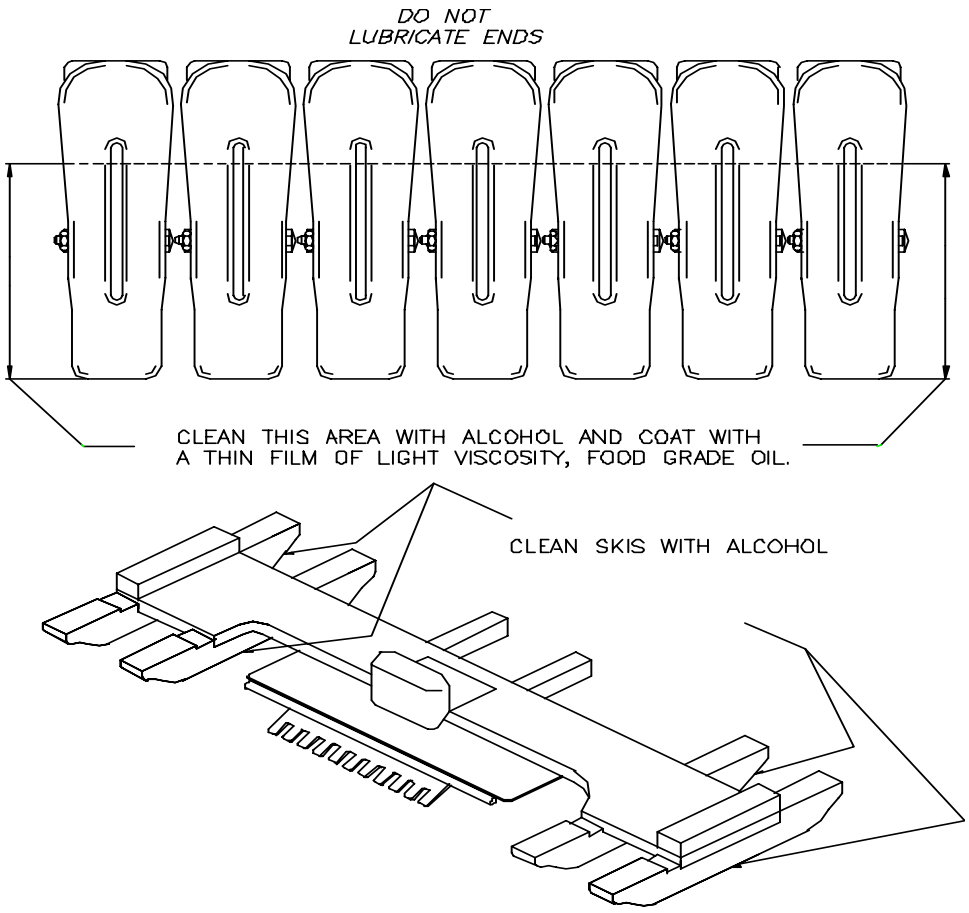


Figure 5-2: Side Clamp/Ski Lubrication

6 Diagnostic Pocket

Overview

The Diagnostic Pocket (Pocket) is an electronic diagnostic tool that interfaces to the Model 645 CPU and can be used to perform diagnostic tests that track down problems. The Diagnostic Pocket has a liquid crystal display (LCD) with a 21-key keyboard (10 numeric keys, four arrow keys, one CLEAR, one ENTER, and five function keys).

The ENTER key accepts entries and the CLEAR key cancels entries. Either key can be used to exit from the HELP screen while in the HELP mode.

The UP and DOWN arrow keys are used to scroll through sub-menus. While in a menu, the keys increase or decrease the displayed numeric value.

The LEFT and RIGHT arrow keys are used to scroll through menus one page at a time.

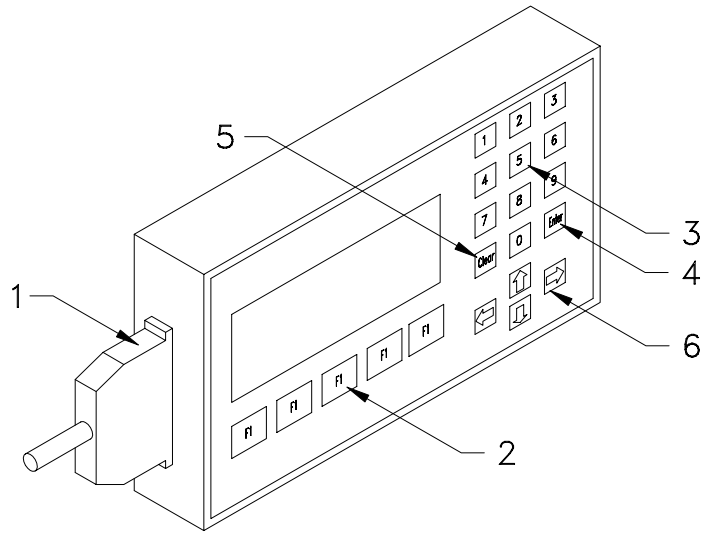


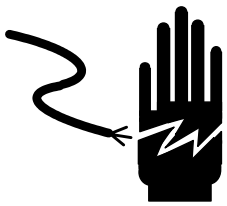
Figure 6-1: Diagnostic Pocket

1 = Cable connection for Diagnostic Pocket
2 = Function keys
3 = Numerical keys
4 = Enter key
5 = Clear key
6 = Arrow keys

Operation

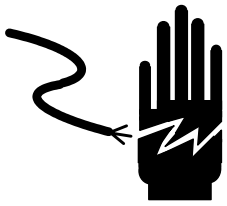
The Pocket connects to the Model 645 Interface Connector on the CPU board. (The power to the machine can be on or off when connecting the Diagnostic Pocket.)

To enter any series of tests, the Status Display on the Model 645 must display a code 00 or 01. If no error code is displayed, the selections on the Pocket are limited. A **01** code will appear immediately after the machine has powered up and a **00** code will appear after actuating an interlock switch (Infeed Door or Top Cover).



WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.



WARNING

When using the Pocket to run tests on the machine, be aware that some parts of the machine move and others receive electrical power. Remove any tools or foreign objects from the machine. DO NOT insert hands and arms inside the machine or lean on active parts during these tests.

Functions Available (No Status Code)

When no status code is displayed (on the Model 645) only the following selections are available (with or without a password entered):

F1—Help

F2—Info. (pack information)

The Pocket also displays a package count for the number of packs wrapped since the last power-up sequence.

Ex: Day Pack: XXX

Functions Available (With Status Code and No Password)

When a status code is displayed on the Model 645, the Pocket has the following capabilities without a password entered:

F1—Help

F2—Info. (pack information)

F3—Test (Limited to the list below.)

702 Day-pack Reset (Only)
Sensor microswitch test (200)
Single photoeye test (300)
Output test (500)
Movement test (600)

F4—Last Er. (last 10 status codes)

Functions Available (With Status Code using Password 255)

Using password **255** with a Status Code displayed on the Model 645, the Pocket will give three screen options. Before entering password **255,** a Status Code must be displayed on the Status Display of the Model 645 Control Panel. Press and hold **F5** for five seconds, enter password **255**, then press **ENTER**. (This is a universal password and cannot be changed.) Once the password is entered, the F5 key on the Pocket toggles through three screens.

Screen 1

F1—Help

This function accesses a help screen that gives an explanation of the emergency status code on the machine.

F2—Info.

This menu is active during normal operation and when there is an emergency status code. It presents all information relative to the last package's dimensions, the room temperature, and the sealing belt temperature. All measurements are displayed in millimeters and all temperatures in degrees centigrade.

- Pack Width/Size
- Pack Length
- Pack Height
- Pack Base
- Horizontal Base
- Pack Flare (Taper)
- Sealing Belt Temperature
- Room Temperature

Note: "room temperature" refers to the internal temperature of the machine. This is measured by the thermistor located beneath the distributor frame crossbrace.

F3—Test

200 = Sensor Microswitch Test
300 = Single Photoeye Test
400 = Display Test
500 = Output Test
600 = Movement Test
650 = Movement Test (Without re-timing)
700 = Various test
800 = Manual Check Test
900 = Special Test

F4—Oper.

100 = Software Version
101 = Error Statistics
102 = Last 10 status codes
103 = Machine Number Modification
104 = Wrapped Package Number Modification
105 = Machine CPU Reset
106 = Step-By-Step Motion ON/OFF
107 = Program 95 ON/OFF
108 = Modify System Clock
109 = Continuous Package Data

F5—etc. (switches to next screen)

Screen 2

F1—Var. (variable menu)

- 122 - Heater on temperature
- 123 - Heater off temperature
- 124 - Sealing plate standby time

F2—Stat. (error statistics)

The top line of this screen displays the number of packs wrapped since the last time the error statistics were reset. Below that, all machine error statistics are listed. Each error has two numbers associated with it. The first number displays how many times the machine did not recover from the error and needed to be manually reset by the operator using the **F2** reset button on the operator control panel. The second number displays how many times the error has occurred and the machine was able to recover and continue to operate without being manually reset. Use the up and down arrow keys to view more error statistics. To exit, press the clear key.

F3—Last Er. (last 10 errors)

This screen displays the last 10 recorded errors in chronological order. The first error shown is the last error that has occurred. Use the up and down arrow keys to view more error statistics. To exit, press the clear key.

F4—Memo. (not used)

F5—Etc. (switch to next screen)

Screen 3

F1—Pass. (Not used)

F2—Blank (no function)

F3—Blank (no function)

F4—Print (Not used)

F5—Etc. (switch to next screen)

Test Menu

The TEST menu requires entry of password 255. If no password has been entered, a **User Test Menu** is displayed. When password 255 is used, a complete menu of tests is displayed, grouped by category.

200 = Sensor microswitch test
300 = Single photoeye test
400 = Display test
500 = Output test
600 = Movement test
650 = Movement test without retiming
700 = Various tests
800 = Manual check test
900 = Special complex test

Select the desired test by using the up and down arrow keys, then press the ENTER key to execute. Press the CLEAR key to return to the test menu.

Sensor Microswitch Test (200)

The sensors and microswitches, as well as their inputs to the CPU, can be individually tested using the series 200 tests. The following information is displayed on the Pocket:

1. The status of the sensor, or switch.
2. The number of times that the input to the CPU has changed.

During execution of the tests, the display of emergencies is disabled.

TEST	DESCRIPTION	STATE
201	Top Cover Switch SB2 Infeed Door Switch SB1	0 = Open 1 = Closed
202	Start Switch S11	0 = Sensor Clear 1 = Sensor Blocked
203	Push-button F1	0 = Released 1 = Pressed
204	Push-button F2	0 = Released 1 = Pressed
205	Lifter Up Sensor S1	0 = Sensor Clear 1 = Sensor Blocked
206	Lifter Down Sensor S2	0 = Sensor Clear 1 = Sensor Blocked
207	Folder Retiming Sensor S3 (Center Clamp)	0 = Sensor Clear 1 = Sensor Blocked
208	Film Gripping Folder Sensor S4 (Center Clamp)	0 = Sensor Clear 1 = Sensor Blocked
209	Left Gripper Sensor S5 (Rear)	0 = Sensor Clear 1 = Sensor Blocked
210	Right Gripper Sensor S6 (Front)	0 = Sensor Clear 1 = Sensor Blocked
211	Clamp Opening Cam Sensor S9	0 = Sensor Clear 1 = Sensor Blocked
212	Not Used	N/A
213	Center Clamp Encoder 1 Sensor S7	0 = Sensor Clear 1 = Sensor Blocked
214	Center Clamp 2 Sensor S8	0 = Sensor Clear 1 = Sensor Blocked
215	Not Used	N/A

Single Photoeye Test (300)

The photoeyes, as well as their inputs to the CPU, can be individually tested using the series 300 tests. The following information is displayed on the Pocket:

1. Photoeye status (0 or 1).
2. Number of times the status has switched.
3. The signal level of the photoeye.

The Model 645 has two types of photoeyes:

1. **Reflective photoeye** - identified by the character (r) on the Diagnostic display.
2. **Direct photoeye** - identified by the character (d) on the Diagnostic display.

During the execution of the tests, the display of emergencies is disabled.

301—Inhibited photoeyes

This test will report the status of all photoeyes after the initial machine synchronization cycle. If a photoeye is not functioning correctly, proceed to the individual photoeye test to verify the results.

Photoeye Test Codes

For reflective type photoeyes, the output level must be 13 or less when clear, and 33 or more when blocked. For direct type photoeyes, the output level must be 83 or more when clear, and 32 or less when blocked.

Table 6.1 Key: H=Horizontal Photoeye, V=Vertical Photoeye, r=reflecting type cell, d=direct type photoeye.

TEST	DESCRIPTION	STATE	OUTPUT LEVEL
301	Inhibited photoeyes	E 99 - E63	Test N/A
302	H 01 (r) Tx01-Rx01	Clear 0/Blocked 1	Lo 13/Hi 33
303	H 02 (r) Tx02-Rx02	Clear 0/Blocked 1	Lo 13/Hi 33
304	H 03 (r) Tx03-Rx03	Clear 0/Blocked 1	Lo 13/Hi 33
305	H 04 (r) Tx04-Rx04	Clear 0/Blocked 1	Lo 13/Hi 33
306	H 05 (r) Tx05-Rx05	Clear 0/Blocked 1	Lo 13/Hi 33
307	H 06 (r) Tx06-Rx06	Clear 0/Blocked 1	Lo 13/Hi 33
308	H 07 (r) Tx07-Rx07	Clear 0/Blocked 1	Lo 13/Hi 33
309	H 08 (r) Tx08-Rx08	Clear 0/Blocked 1	Lo 13/Hi 33
310	H 09 (r) Tx09-Rx09	Clear 0/Blocked 1	Lo 13/Hi 33
311	H 10 (r) Tx10-Rx10	Clear 0/Blocked 1	Lo 13/Hi 33
312	H 11 (r) Tx11-Rx03	Clear 0/Blocked 1	Lo 13/Hi 33
313	H 12 (r) Tx12-Rx04	Clear 0/Blocked 1	Lo 13/Hi 33
314	H 13 (r) Tx13-Rx05	Clear 0/Blocked 1	Lo 13/Hi 33
315	H 14 (r) Tx14-Rx06	Clear 0/Blocked 1	Lo 13/Hi 33
316	H 15 (r) Tx15-Rx07	Clear 0/Blocked 1	Lo 13/Hi 33
317	H 16 (r) Tx16-Rx08	Clear 0/Blocked 1	Lo 13/Hi 33
318	H 17 (r) Tx17-Rx17	Clear 0/Blocked 1	Lo 13/Hi 33
319	H 18 (r) Tx18-Rx18	Clear 0/Blocked 1	Lo 13/Hi 33
320	V 01 (r) Tx19-Rx19	Clear 0/Blocked 1	Lo 13/Hi 33
321	V 01 (d) Tx19-Rx11	Clear 1/Blocked 0	Lo 32/Hi 83
322	V 02 (r) Tx20-Rx20	Clear 0/Blocked 1	Lo 13/Hi 33
323	V 02 (d) Tx20-Rx12	Clear 1/Blocked 0	Lo 32/Hi 83
324	V 03 (r) Tx21-Rx21	Clear 0/Blocked 1	Lo 13/Hi 33
325	V 03 (d) Tx21-Rx13	Clear 1/Blocked 0	Lo 32/Hi 83
326	V 04 (r) Tx22-Rx22	Clear 0/Blocked 1	Lo 13/Hi 33
327	V 04 (d) Tx22-Rx14	Clear 1/Blocked 0	Lo 32/Hi 83
328	V 05 (r) Tx23-Rx23	Clear 0/Blocked 1	Lo 13/Hi 33
329	V 05 (d) Tx23-Rx15	Clear 1/Blocked 0	Lo 32/Hi 83
330	V 06 (r) Tx24-Rx24	Clear 0/Blocked 1	Lo 13/Hi 33
331	V 06 (d) Tx24-Rx16	Clear 1/Blocked 0	Lo 32/Hi 83
332	Not used		
333	Not used		
334	Not used		

Table 6-1: Photoeye Test Codes

Display Test (400)

Using Display Segment Verification Test 401, all segments of the display and the emergency LED's will flash as a visual check that they are working correctly.

Output Test (500)

The following machine outputs can be tested using the series 500 tests as shown in Table 6.2.

TEST	DESCRIPTION	OUTPUT STATE
501	Not Used	
502	Distributor Electromagnets output YA1/YA2	Inactive 0/Active 1
503	Cutter magnet output YA3	Inactive 0/Active 1
505	Heater/blower output R2/M9	Inactive 0/Active 1
506	Not used	
507	Not used	

Table 6-2: Output Test Codes

Movement Test (600)

Movement of certain machine parts can be isolated and inspected individually using the series 600 tests. Table 6.3 lists the tests that are available.

Note: It is recommended that the "699 repeating test configuration" not be used.

TEST	DESCRIPTION	STATUS
601	Infeed movement M1	1. Forward rotation 2. Reverse rotation
602	Not Used	
603	Sealing belt movement M8	Forward movement
604	Clamp opening cam movement M4	1. Cam up 2. Cam middle 3. Cam down
605	Left clamp movement M6	1. Clamp middle 2. Clamp forward 3. Clamp back
606	Right clamp movement M7	1. Clamp middle 2. Clamp forward 3. Clamp back
607	Folder movement M5 (Center clamp)	1. Folder forward 2. Folder back 3. Folder on Retiming sensor
608	Lifter movement M2	1. Lifter down 2. Lifter up 3. Lifter waiting for pack
609	Not used	

Table 6-3: Movement Test Codes

Movement Test Without Retiming(650)

Movement of certain machine parts can be isolated and inspected individually using the series 650 tests. But unlike the series 600 tests, the series 650 tests are carried out without machine synchronization (retiming). **Always follow the instructions on the Pocket display when using these tests. Failure to do so may result in serious damage to the machine**.

Table 6.4 lists the tests that are available.

TEST	DESCRIPTION	STATUS
651	Infeed movement M1 (Without Retiming)	1. Forward rotation 2. Reverse rotation
652	Not Used	
653	Sealing belt movement M8 (Without Retiming)	Forward movement
654	Clamp opening cam movement M4 (Without Retiming)	1. Cam up 2. Cam middle 3. Cam down
655	Left clamp movement M6 (Without Retiming)	1. Clamp middle 2. Clamp forward 3. Clamp back
656	Right clamp movement M7 (Without Retiming)	1. Clamp middle 2. Clamp forward 3. Clamp back
657	Folder (Center clamp) movement M5 (Without Retiming)	1. Folder forward 2. Folder back 3. Folder on Retiming sensor
658	Lifter movement M2 (Without Retiming)	1. Lifter down 2. Lifter up 3. Lifter waiting for pack

Table 6-4: Movement Test Codes (Without Retiming)

Various Tests (700) (Password 255 Only)

The 700 series of tests are described in Table 6.5.

TEST	DESCRIPTION
701	Battery RAM reset. It is recommended that this test not be performed! The Model 645's historical data cannot be recovered once it is erased. This test executes the reset of all of the stored data in the battery RAM (e.g., statistics, total packs, machine cycle variables)
702	Day-Pack Reset. Resets only the number of packs wrapped since the machine was switched on.
703	Error Statistics Reset. Resets the error statistics, the last 10 emergency error codes, and the partial pack count.
704	Switch Bank SW1 Status. This test displays the status of switch bank SW1 on the Model 645 CPU board. SW1-1 Not used/Always = 0 SW1-2 Horizontal Photoeye Test at Powerup=0, No Test = 1 SW1-3 Not used/Always = 0 SW1-4 Not used/Always = 0 SW1-5 Heater/Blower Disabled = 0, Heater/Blower Enabled = 1 SW1-6 Not Used/Always = 1 SW1-7 Factory Test Mode Leave = 0 SW1-8 Factory Test Mode Leave = 0
705	Battery RAM Test. This test checks the battery RAM used for storing statistics, total packs, machine cycle variables, and the programmed packs. The tested blocks refer to the segments STATIC and STATIC ONLY. The byte addresses of the RAM undergoing testing, the number of defective bytes found, and the address of the last defective byte found will be reported on the display.

Table 6-5: Various Test Menu

Manual Check Test (800) (Password 255 Only)

The series 800 tests allow the technician to check various machine functions.

TEST	DESCRIPTION
802	Photoeye test
804	Lifter stroke test
805	Folder (center clamp) test without film
806	Not Used
807	Side clamps test without film
808	Side clamps test with film
810	Cam operation test
811	Not Used
812	Cutter channel positioning test
813	Distributor magnets closure test

Table 6-6: Manual Check Test Menu

802 Photoeyes Test

This test allows the operator to check the operation of all Photoeyes in one test. The lifter is brought to the low position (the infeed door raised and the Photoeyes CLEARED). This test will execute 10 readings of the Photoeyes and calculate the values of the signal levels for each (un-blocked).

The Pocket will prompt the operator to block all the vertical and horizontal Photoeyes as shown in Figure 6-2. After blocking all of the cells, press the ENTER key.

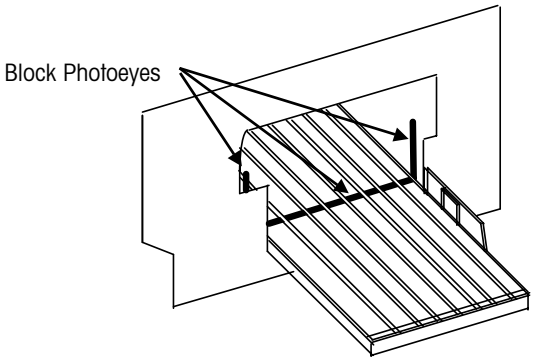


Figure 6-2: Photoeye Test

At the end of the test, the Pocket displays only the Photoeyes that exhibited errors as follows:

Reflective Photoeyes: Photoeye Clear 0; range 0-13
Photoeye Blocked 1; range 33-255

Direct Photoeyes: Photoeye Clear 0; range 83-255
Photoeye Blocked 1; range 0-32

804 Lifter Stroke Test

This test verifies correct movement of the lifter actuator and allows checking for proper sensor position.

The retiming of the machine is performed with the center clamp stopping in the left most position. The machine will stop the lifter in the up position and ask the operator to measure the distance between the top of the machine side frame and the top of the lifter as shown in Figure 6-3. If the measured value in this step is out of tolerance, the sensor positions require adjustment. Refer to the chapter on adjustments for the position of the Lifter Sensors.

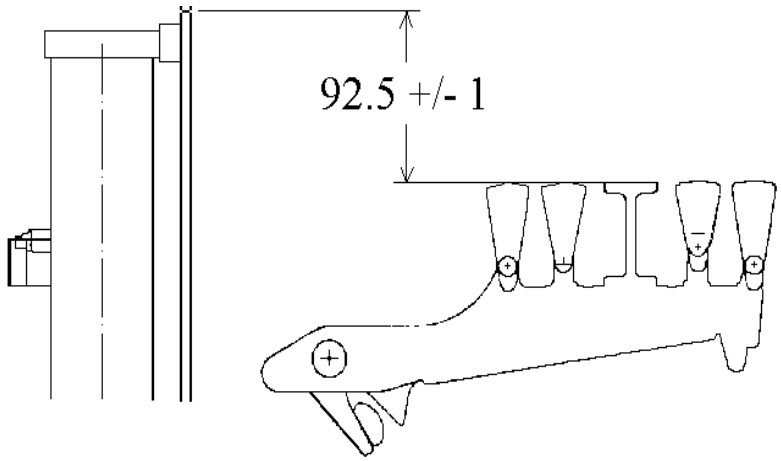


Figure 6-3: Lifter Stroke Measurement

805 Folder test without film (Center clamp)

Used to verify the operation of the center clamp, the position sensors, and the encoder. Refer to Figure 6-4. The Pocket displays the results of the test as follows:

"Error between sensors S3 - S4"

If the error exceeds the tolerance (±0.6mm), refer to the section on mechanical adjustments.

"Encoder error condition"

The error conditions which may be detected on sensor 1 (S7) and on sensor 2 (S8), are represented by a code as follows:

Code	Result
00	No error detected.
01	Sensor 1 (S7) malfunctioning.
02	Sensor 2 (S8) malfunctioning.
03	Both sensors malfunctioning.
04	The sensors have been reversed.
08	Double switching of sensors.
16	Encoder position not specified.
32	Two identical consecutive configurations detected; repeat the test.
33	Two identical consecutive configurations have been detected and sensor 1 is malfunctioning (as code 32 and 01).
34	Two identical consecutive configurations have been detected and sensor 2 is malfunctioning (as code 32 and 02).
35	Two identical consecutive configurations have been detected and sensor 3 is malfunctioning (as code 32 and 03).

"S4 synchronization error"

This part of the test is no longer used because the film pick position is fixed and therefore not adjustable.

806 Folder test with film (Center clamp)

This test is no longer valid.

807 Side Clamp Test

This test is no longer valid.

808 Side clamp test with film

This test permits the operator to verify the timing between the left and right side clamps, as well as the relative timing of the individual grippers on each clamp. Refer to Figure 6-4.

Make sure the film is inserted into the distributor before performing this test.

The side clamps go in, grip the film and stretch it transversely. The clamp opening cam then prepares to open the side clamps. By pressing <ENTER> the operator can drive the cam in steps and observe the opening of the side clamps and the subsequent release of the film.

NOTE: The film clamping must be equal in both the front and rear clamp assemblies. If clamping is not equal, correct the film tracking before completing this test. To more easily spot film release from the individual grippers, use a ball point pen to trace the profile of the grippers on the film.

Using the ENTER key, activate the movement of the cam opening grippers up to the point in which the film starts to exit out of the grippers, then note which gripper has released the film first. Gripper pairs (front and rear) should release the film within 2 steps of one another. If this does not take place, the timing between the side clamps may need adjustment. Refer to the chapter on mechanical adjustments.

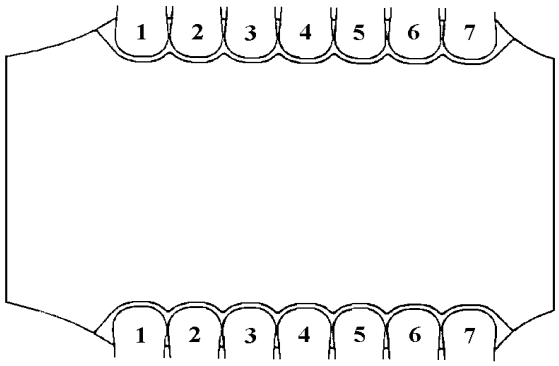


Figure 6-4: Side Clamp Test

Film release from the side clamps should proceed sequentially from the gripper closest to the center clamp, to the gripper closest to the distributor. If this sequence does not occur, the individual gripper openings may require adjustment. Refer to the chapter on mechanical adjustments.

Press <CLEAR> to terminate the test.

810 Cam Function Test

When ENTER is pressed, the cutter channel raises up and stays up for 30 seconds.

This test permits the operator to verify the position of the sensor flag on the cam shaft, the operation of the cam drive, and the position of the clamp eccentrics.

Machine re-timing is performed and the center clamp is brought to the leftmost position. Then the cam cycles 10 times through the various positions of the side clamps. While the machine cycles, watch carefully to be sure the T-bar follows the cam correctly. The technician must verify that these steps have occurred correctly. After this is verified, the cam is brought to the closed position of the Side clamps. Then the operator must measure the distance between the T-bar and the eccentrics on the side clamp drive levers.

811 Film Folder Roller Position Test

This test is no longer valid.

812 Cutter Channel Position Test

This test is used to check the low and high positions of the cutter channel. Refer to Figure 6-5. Prepare the test by raising the sealing belt assembly.

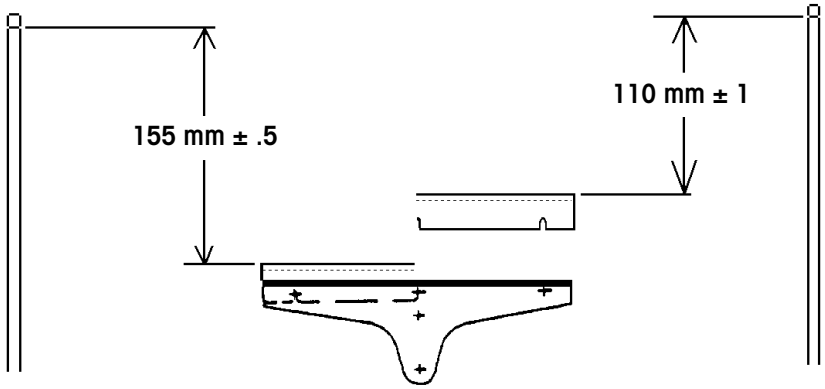


Figure 6-5: Cutter Channel Position Test

The Pocket will ask the technician to verify the existence of the cutter/ countercutter. Press **ENTER**. The Pocket will then ask the technician to remove the film. Do so and press **ENTER**. The Pocket will ask the technician to measure the down position. Measure the distance from the top of the machine frame to the top of the cutting channel. If this measurement is out of tolerance, the cutting channel requires adjustment. Refer to the chapter on mechanical adjustments. Be sure hands are clear then engage the solenoid by pressing <ENTER>. With the solenoid energized, quickly measure the distance from the top of the machine side frame to the top of the cutting channel. If this distance is out of tolerance, the cutting channel requires adjustment. Refer to the chapter on mechanical adjustments.

Execute the test a second time with the sealing belt down. Listen carefully to ensure the channel does not impact the knife mount on the sealing belt. If the channel does impact, the cutting channel requires adjustment. Refer to the chapter on mechanical adjustments.

813 Distributor Electromagnets Closure test

This test allows the technician to verify proper operation of the distributor film clamp and the distributor magnets. Refer to Figure 6-6. Raise the sealing belt assembly. Remove the film from the distributor area. Insert three strips of paper over the distributor clamp pad, as shown in Figure 6-6.

AFTER 30 seconds, the magnets automatically open.

To exit the test, press CLEAR.

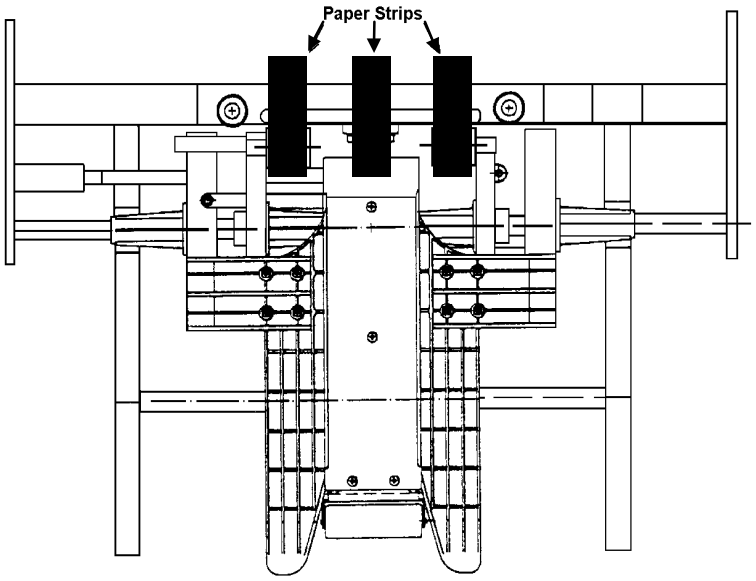


Figure 6-6: Distributor Electromagnets Test

Lower the sealing belt assembly. Press ENTER to energize the distributor magnets. With the magnets engaged, try to remove the paper strips. The strips should be held firmly with equal tension. If the strips are easily removed, the magnets or the distributor clamp requires adjustment. Refer to the chapter on mechanical adjustments.

Special Complex Test (900)

The 900 series test is for initial testing of the machine. It should not be used for service in the field.

Functions Menu

This menu is enabled if password 255 is entered.

100 - Software Release

Displays the software version and release date of the Diagnostic Pocket and of the CPU respectively. If the password 255 is used, a screen from which you may exit by pressing either CLEAR or ENTER is displayed. Otherwise after about five seconds, you automatically exit.

101 - Error Statistics

The top line of this screen displays the number of packs wrapped since the last time the error statistics were reset. Below that, all machine error statistics are listed. Each error has two numbers associated with it. The first number displays how many times the machine did not recover from the error and needed to be manually reset by the operator using the **F2** reset button on the operator control panel. The second number displays how many times the error has occurred and the machine was able to recover and continue to operate without being manually reset. Use the up and down arrow keys to view more error statistics. To exit, press the clear key.

102 - Last 10 Emergencies Display

This screen displays the last 10 recorded errors in chronological order. The first error shown is the last error that has occurred. Use the up and down arrow keys to view more error statistics. To exit, press the clear key.

103 - Modify Machine Number

This function permits the modification of the machine's serial number (0 - 9999) and should only be done when upgrading the software. The Diagnostic Pocket presents a display showing the actual value and requesting the input of a new value. The ENTER key confirms the selection while the CLEAR key cancels it.

104 - Modify Number of Packs Wrapped

Allows the technician to modify and reset the total number of packs wrapped by the machine.

The Diagnostic Pocket presents a display showing the actual value and requesting the input of a new value. The ENTER key confirms the selection while the CLEAR key cancels it.

105 - Reset CPU

Allows restart of the machine program from 0. The Pocket presents a display with a "confirm operation" request. Confirm with YES or cancel with a NO (using the directional keys to select). The ENTER key confirms the selection while the CLEAR key cancels it.

106 - Activate Movement at Intervals

This function serves to activate or deactivate the movement at intervals on the machine (step-by-step). Once this function has been enabled, the technician must place an empty tray against the pack-presence sensor and press the Reset Button F2 on the control panel. This function will remain active until the machine is switched off or the function is de-activated (using test 106 again).

The Pocket presents a display with a "confirm operation" request. Confirm with YES or cancel with NO (using the directional keys). The ENTER key confirms the selection while the CLEAR key cancels it.

Upon turning on the machine after the retiming, place a tray against the Start Switch. The Infeed Door rises. Press pushbutton F2 to step through the machine operations.

107 - Program 95 Function

This function will test the wrapper by putting it in a continuous cycle mode. Once this function has been enabled, the technician must press the Infeed Start Switch to activate the machine and start the continuous function. This function will remain active until the machine is switched off or the function is de-activated (using test 107 again).

The Diagnostic Pocket presents a display with a "confirm operation" request. Confirm with YES and to cancel with NO (using the directional keys). The ENTER key confirms it while the CLEAR key cancels it.

NOTE: Be sure the film is removed during this operation.

108 - Modify System Clock

Allows modification of both the date and time on the Pocket. With the up and down arrows, you can increase and decrease the respective fields. To move from one field to another, use the left and right arrows. The ENTER key confirms and sets the clock with the values input by the user. The CLEAR key cancels the changes and returns to the menu.

This function is activated by selecting YES at the prompt. Furthermore, this setting will remain active (even after power is removed on the Diagnostic Pocket) until the next setting is activated.

109 - Display Continuous Data Pack

Allows continuous display of the following information during the normal wrapping cycle:

- The dimensions of the last pack wrapped (width, length, height).
- The "advanced" dimensions of the pack read (the base, horizontal base, and flare).
- Elaboration's on the machine operation (total stretching and total folding).
- Temperature of the sealing belt and the room (internal machine), respectively.

Modify Variables

This menu is enabled if password 255 has been entered.

Heater/Blower

The Model 645 Wrapper is equipped with an internal heater/blower that is used to warm the inside of the machine. The factory pre-set temperature at which the heater turns On is 18 °C (65 °F); and the Off temperature is 23 °C (73 °F). It is recommended that a 5 °C differential be maintained between the two settings. The heater increases the temperature inside of the machine and allows the film to be stretched more easily. These values can be changed if film-stretching problems are encountered.

To modify a variable it is necessary to choose it in the Variable Test menu. At this point, the program displays the current value and asks for the input of a new value. If the CLEAR key is pressed the change is canceled; otherwise, type in the new value and press ENTER.

122 - Heater ON Temperature

Sets the temperature at which the heater is turned on. The temperature range is from 0°C - 40°C. The temperature is measured by the thermistor located beneath the distributor frame crossbrace.

123 - Heater OFF Temperature

Sets the temperature at which the heater is turned off. The temperature range is from 0°C - 40°C. The temperature is measured by the thermistor located beneath the distributor frame crossbrace.

124 - Sealing Belt Stand-By Time

This value is adjustable from a minimum of 1 hour to a maximum of 255 hours. If the set amount of time passes without the start switch being activated, the sealing plate temperature will decrease to a minimum value of 1 (temperature of 78 °C). Once the start switch is activated the sealing plate will automatically return to the temperature setting that is selected on the operator control panel.

Machine Error Codes

The Pocket screen displays the error code, the date (dd/mm/yy), a 24-hour clock (hh:mm:ss), and the number of packs wrapped since the last power up sequence. It will also display a menu at the bottom of the screen for the function keys. (Refer to Figure 6-7.)

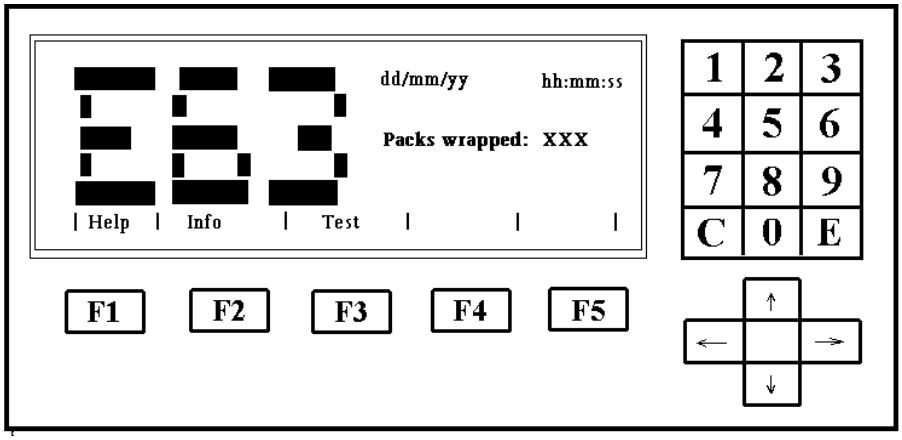


Figure 6-7: Pocket Display and Keyboard

The wrapper produces warnings and emergencies. A "warning" indicates a malfunction that will not stop the machine from operating. An "emergency" is considered a serious functional error for which a machine reset may be necessary.

For each warning and emergency message, it is possible to display a number of messages that will describe the error in more detail.

These messages will be displayed only if requested by pressing the HELP F1 key!

Interpretation of Error Codes

Error Code Description

00—Error code 03 was terminated. To exit, press the start F2 pushbutton.

01—The machine has just powered up. The program has started.

02—The electronic CPU has initiated a reset. The machine starts again automatically without start key actuation.

Possible causes:

- The presence of electrostatic disturbances.
- Check the grounding connections of the mechanical parts.

There is no voltage to the stepper motors in this condition.

03—Infeed door or top cover is open.

Possible causes:

- Infeed door microswitch not operating.
- Infeed door cam out of position.
- Top cover microswitch not operating.
- Open circuit in the wiring for the microswitch.

04—Machine start without check. After error 33 if the start/reset button is pressed without opening the top cover and checking and removing any obstruction.

06—The battery RAM is not functioning; it must be replaced.

07—The battery RAM has lost previously stored data. You must re-program the necessary data (e.g., the serial number/the heater blower variables/sealing belt temperature setting).

08—Optional module not functional during machine cycle. Faulty module operation.

- Press the F2 pushbutton.
- The machine starts working again excluding the module.

20—The high- and low-lifter sensors are both active when the lifter begins operation.

Possible cause:

- Check the operation of the two sensors.

21—The lifter's lower sensor is active when the lifter should NOT be in the low position.

Possible causes:

- Check the sensor operation.
- Check the lifter's movement.
- Check the lifter's stepper motor.

22—The lifter's low sensor is NOT active when the lifter should be in the low position:

Possible causes:

- Check the operation of the sensor.
- Check the lifter's movement.
- Check the connections of the motor.
- Check the lifter's stepper motor.

23—The lifter's high sensor is active when the lifter should NOT be in the high position.

Possible causes:

- Check the operation of the sensor.
- Check the lifter's movement.
- Check the connections of the motor.
- Check the lifter's stepper motor.

The encoder has four counts for every turn of the motor.

24—The lifter's high sensor is NOT active when the lifter should be in the high position.

Possible causes:

- Check the operation of the sensor.
- Check the lifter's movement.
- Check the connections of the motor.
- Check the lifter's stepper motor.
- Check the lifter breakaway arm position.

31—The center clamp flag is blocking the retiming sensor at the end of the center clamp stroke.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the center clamp.
- Check the connections of the stepper motor.
- Check the center clamp stepper motor.

32—The center clamp has not reached the retiming sensor at the end of the tray's discharge movement.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the center clamp.
- Check the connections of the motor.
- Check the center clamp motor.

33—The center clamp has not reached the film gripping-sensor at the end of the center clamp forward stroke.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the center clamp.
- Check the connections of the stepper motor.
- Check the center clamp stepper motor.

34—Error in the center clamp position detected by the center clamp encoder during the unwinding film phase. This occurs when the internal position of the center clamp movement program and the external position revealed by the encoder differs more than one turn of the motor.

Possible causes:

- Check the operation of the two sensors.
- Check the movement of the center clamp.

The encoder has four counts for every turn of the motor.

- Check the connections of the motor.
- Check the center clamp motor.

35—Incorrect count of the center clamp retiming sensor. Center clamp not in the correct position. This occurs during the forward movement of the center clamp operation if the timing sensor is seen outside a 50 mm window.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the center clamp.
- Check the connections of the motor.
- Check the center clamp motor.

36—Incorrect count of the film gripping sensor. Center clamp not in correct position. This occurs during the forward movement of the center clamp operation if the center clamp sensor is seen outside a 50 mm window.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the center clamp.
- Check the connections of the motor.
- Check the center clamp motor.

37—Error in the center clamp position detected by the encoder in the discharge movement of the tray operation. This occurs when the internal position of the center clamp movement program and the external position as revealed by the encoder differs by more than one turn of the motor.

Possible causes:

- Check the operation of the two sensors.
- Check the movement of the center clamp.
- Check the connections of the motor.
- Check the center clamp motor.

41—The cam has not exited from the sensor at the end of the side grippers' closing movement in the cam's retiming.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the cam.
- Check the connections of the motor.
- Check the cam's stepper motor.
- Check the sensor flag position.

42—The cam has not arrived on the sensor at the end of the small opening movement of the side clamps in the retiming of the cam.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the cam.
- Check the connections of the motor.
- Check the cam's stepper motor.
- Check the sensor flag position

52—No longer valid error code. Switch 1-6 on the main cpu board must be turned to the on position.

53—No longer valid error code. Switch 1-6 on the main cpu board must be turned to the on position.

54—No longer valid error code. Switch 1-6 on the main cpu board must be turned to the on position.

If the tray is within the range accepted by the machine, the problem can be in the reading of the Photoeyes.

60—Two packs are too close or the Photoeye signal has an intermittent error.

Possible causes:

- Check the cleanliness of the Photoeye lens.
- Check the operation of the Photoeyes.
- Check electrical connections.

If two trays are not close together then the problem can be in the operation of the Photoeyes.

61—Dimensions of pack too large.

A tray size larger than specifications has been entered into the machine.

Possible causes:

- Check and verify for proper tray size.
- Check the cleanliness of the Photoeye lens.
- Check the operation of the Photoeyes.
- Check electrical connections.
- Check for infeed belt slippage.

If the tray is within the range accepted by the machine, the problem can be in the operation of the Photoeyes or infeed belts are slipping.

62—Dimensions of pack too small. A tray size smaller than specifications has been entered into the machine.

Possible causes:

- Check the cleanliness of the Photoeye lens.
- Check the operation of the Photoeyes.
- Check electrical connections.

63—The horizontal or vertical Photoeyes are blocked prior to the pack entering into the machine, or Photoeyes are blocked during machine reset.

Possible causes:

- Check the cleanliness of the Photoeye lens.
- Check the operation of the Photoeyes.
- Check electrical connections.

65—Infeed Start Switch activated, but the tray has not arrived in front of the Photoeyes after five seconds.

Possible causes:

- Check the mechanical operation of the Start Switch on the machine infeed.
- Check the Start Switch connections.

66—Infeed Start Switch active continuously.

Possible causes:

- Check the mechanical operation of the Start Switch on the machine infeed.
- Check Switch operation.
- Check electrical connections.

67—Package not fed against infeed package guide.

Possible causes:

- The first horizontal Photoeye not activated.
- Re-arrange the tray on feed device.

71—Rear side clamp has not reached the sensor at the end of the film clamp movement.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamps.
- Check for correct positioning of the film clamp.
- Check the stepper motor connections.
- Check the stepper motor of the left side clamp.

72—Rear side clamp continues to block the sensor at the end of the clamp's outward stroke.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamp.
- Check stepper motor connections.
- Check the stepper motor of the rear side clamp.

74—Rear side clamp sensor signals are not correct.

The position of the clamp is not correct at the end of the step for the film clamp.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamp.
- Check stepper motor connections.
- Check the stepper motor of the rear side clamp.

75—Front side clamp has not reached the sensor during tuck operation or reset.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamps.
- Check for correct positioning of film clamp.
- Check the stepper motor connections.
- Check the front side clamp stepper motor.

76—Front side clamp has not exited the sensor during side stretch or reset.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamp.
- Check the stepper motor connections.
- Check the front side clamp stepper motor.

78—Front side clamp sensor out of time.

Possible causes:

- Check the operation of the sensor.
- Check the movement of the side clamp.
- Check the stepper motor connections.
- Check the front Side Clamp stepper-motor.

90—Output from the Sealing Plate Temperature Probe is too high.

Possible causes:

- Verify the continuity of the heater temperature probe connection.
- Check electrical connections.

91—Output from the sealing plate temperature probe is too low.

Possible causes:

- Verify the heater temperature probe connection.
- Check the connections.

92—Sealing Plate is not reaching the preset temperature.

Possible causes:

- Check the heater temperature probe connection.
- Check the continuity of the heater connection.
- Check electrical connections.

95—The Sealing Plate temperature is greater than preset temperature..

Possible causes:

- Verify the sealing plate temperature probe connection.
- Check electrical connections.

96—Ambient temperature probe not functioning. Incorrect temperature value furnished by the probe. The atmospheric heater is bad.

Possible causes:

- Check the continuity of the connection of the ambient/room temperature probe.
- Check electrical connections.

97—Input voltage less than 44VAC. Low secondary voltage out of the transformer.

Possible causes:

- Low line voltage.
- Check electrical connections.

98—Problems with one or more movements in the wrapper. The machine is forced to operate at a decreased speed.

This condition appears when more than 65,000 error codes are recorded for at least one of the controlled movements.

Possible causes:

- Refer to the specific emergencies of these movements.
- To restore the normal function speed, recycle the power.

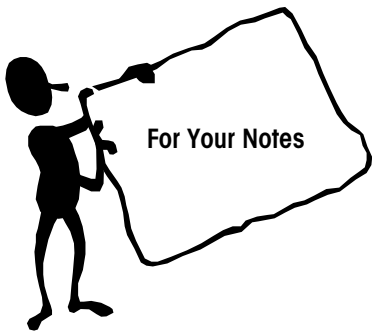
99—Problem with one or more Photoeyes, but the wrapper will still function.

Possible causes:

- Check for moisture in the Photoeye assemblies.
- Clean the Photoeye lens.
- Check the operation of the Photoeyes.
- Check electrical connections.
- To restore the Photoeye readings, remove the tray and then restart the machine.

GREEN (LED) LAMPS

The two green LED lamps flashing indicate the Sealing Belt Plate is not within ±5ºC of the preset temperature.


For Your Notes

7 Parts Replacement & Adjustments

Measurements

All of the measurements performed in this chapter are shown in millimeters (mm).

Torque Specifications

Table 7.1 lists recommended torque specifications for tightening stainless steel fasteners into aluminum. These limits are assuming a thread engagement of at least three times the thread diameter. Use this chart for reference when servicing METTLER TOLEDO backroom equipment.

Bolt Size	Recommended Torque (Maximum)
M3	15 in/lb
M4	45 in/lb
M5	100 in/lb
M6	175 in/lb
M8	350 in/lb

Torque Specifications
Stainless Fastener to Aluminum
Table 7-1

Note: Any tightening method involves certain inaccuracies that are the result of:

1. Estimating the friction factor
2. Manipulation errors of torque wrench
3. Tolerance of the torque wrench itself

Depending on how much these factors can be controlled, either a higher or lower tolerance can be considered.

Drive Belt Tension Adjustments

This section covers procedures for adjusting the tension on various belts used on the Model 645.

Timing belt installation should be a snug fit, neither too tight nor too loose. The positive grip of the belt eliminates the need for high initial tension. Consequently, a belt, when installed with a snug fit (that is, not too taut), assures longer life, less wear and quieter operation. Preloading (often the cause of premature failure) is not necessary. A belt that is too tight will not track properly. This causes the belt to ride up on the lip of the pulley. If the belt is too loose, it may jump a tooth. In such a case, the tension should be increased gradually until satisfactory operation is obtained.

All of the motors on the Model 645 wrapper are mounted on vibration isolation mounts. The isolation mounts are rubber molded between two stainless steel stampings. One mount is bolted to the motor and the other is bolted to the machine frame to isolate the motor from the frame. This helps to eliminate vibration and noise when the motor is operating. When checking the belt tension, make sure you do not squeeze the belt to the point that the rubber in the motor mount is distorted. If you put too much tension on the belt you will see the motor move. Figure 7-1 shows the center clamp actuator belt with a recommended deflection of 3mm using moderate force (8 oz.) The same example can be used for all other timing belts on the Model 645 wrapper.

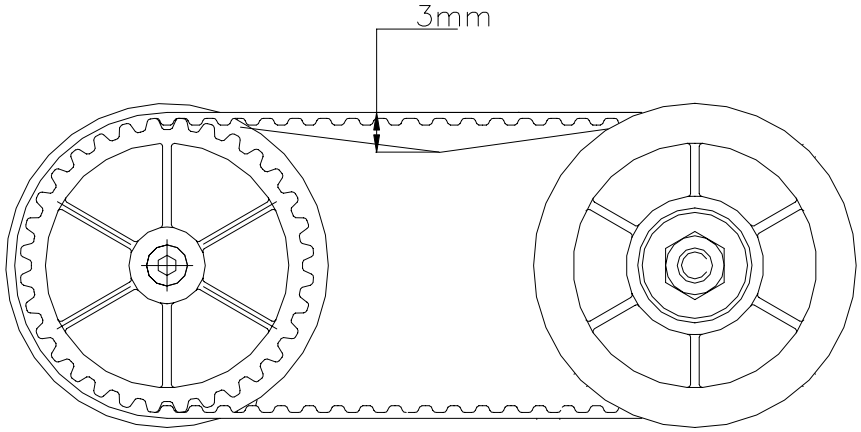


Figure 7-1: Belt Tension

Infeed Section

This section covers parts replacement and adjustments to the Infeed Section.

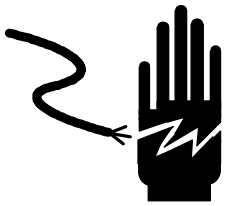
Conveyor Belt Repair and Replacement

Belt Repair

A broken belt can be repaired on the machine using the Belt Welding Kit, P/N 082536020, available from METTLER TOLEDO Aftermarket. Instructions are available with the kit. If the belt is otherwise intact, it is very easy to repair.

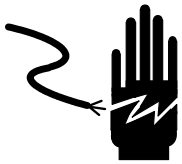
Belt Replacement

Should it become necessary to replace belts on the infeed conveyor, some disassembly may be required. Proceed as follows:



WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.



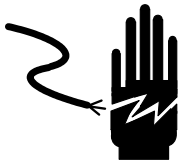
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Refer to Figure 7-2 for parts locations.
2. Disconnect power to the Model 645.
3. Remove the front cover from the machine.
4. Unplug infeed drive motor harness (Item 33).
5. Unplug Start Switch harness (Item 28).
6. Unplug the five connectors from the horizontal photoeyes noting the location of each connector.
7. Remove the grip ring securing the infeed-door connecting link.
8. Remove the four mounting screws (Item 38) that secure the infeed assembly to the main frame. At this point the infeed assembly may be removed from the machine.
9. Remove the infeed belt guard (Item 29) from the assembly.
10. At this point, the old belts may be removed, and the new belts installed.
11. Re-assemble the infeed assembly in reverse order. Be sure to use blue Loctite on the four mounting screws (Item 38).

Infeed Drive Belt Replacement

To replace the infeed drive belts, refer to Figure 7-2 for parts locations and proceed as follows:



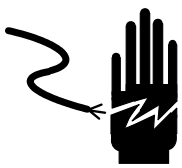
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Disconnect power to the Model 645.
2. Remove the front cover from the machine.
3. Unplug infeed drive motor harness (Item 33).
4. Remove the infeed belt guard (Item 29).
5. Relieve the tension on the infeed belts by slipping the belts off of the rear idler pulleys (Item 22).
6. CAUTION: The infeed drive pulley will be under tension from the three motor drive belts at this point. Carefully remove the two retaining screws (Item 39) from the ends of the infeed drive roller (Item 19). Ease the drive pulley toward the drive motor to relieve the tension on the drive belts.
7. Remove the four motor mounting nuts, and remove the drive motor and pulley (Item 32).
8. Remove the screws holding the front infeed cross brace (Item 11) in place.
9. Lift the front end (Operator side) of the infeed belt guides (Item 15) up far enough to remove the drive belts.
10. Remove the old drive belts, and install the new drive belts (Item 20).
11. Re-assemble in reverse order.

Infeed Drive Motor and Pulley Replacement

When replacing the motor or pulley, it is very important to follow this procedure to prevent pre-loading the motor bearings that will result in premature motor failure and noisy operation. (Refer to Figure 7-2).



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Disconnect power to the Model 645.
2. Remove the infeed drive belts as described in the infeed belt replacement section.
3. Loosen the setscrews and remove the drive pulley (Item 18) from the motor shaft.

4. Assemble the new motor and pulley together. NOTE: Do not tighten the setscrews at this time.
5. Install the motor pulley assembly onto the infeed. Install and tighten two mounting nuts on opposite corners of motor.
6. Align the drive pulley by sliding it completely over the bearing, and tighten the accessible setscrew against the flat on the motor shaft.
7. Remove the motor pulley assembly, and tighten the other setscrew. NOTE: Both setscrews must be installed using blue Loctite.
8. Re-install the drive motor and belts in reverse order.

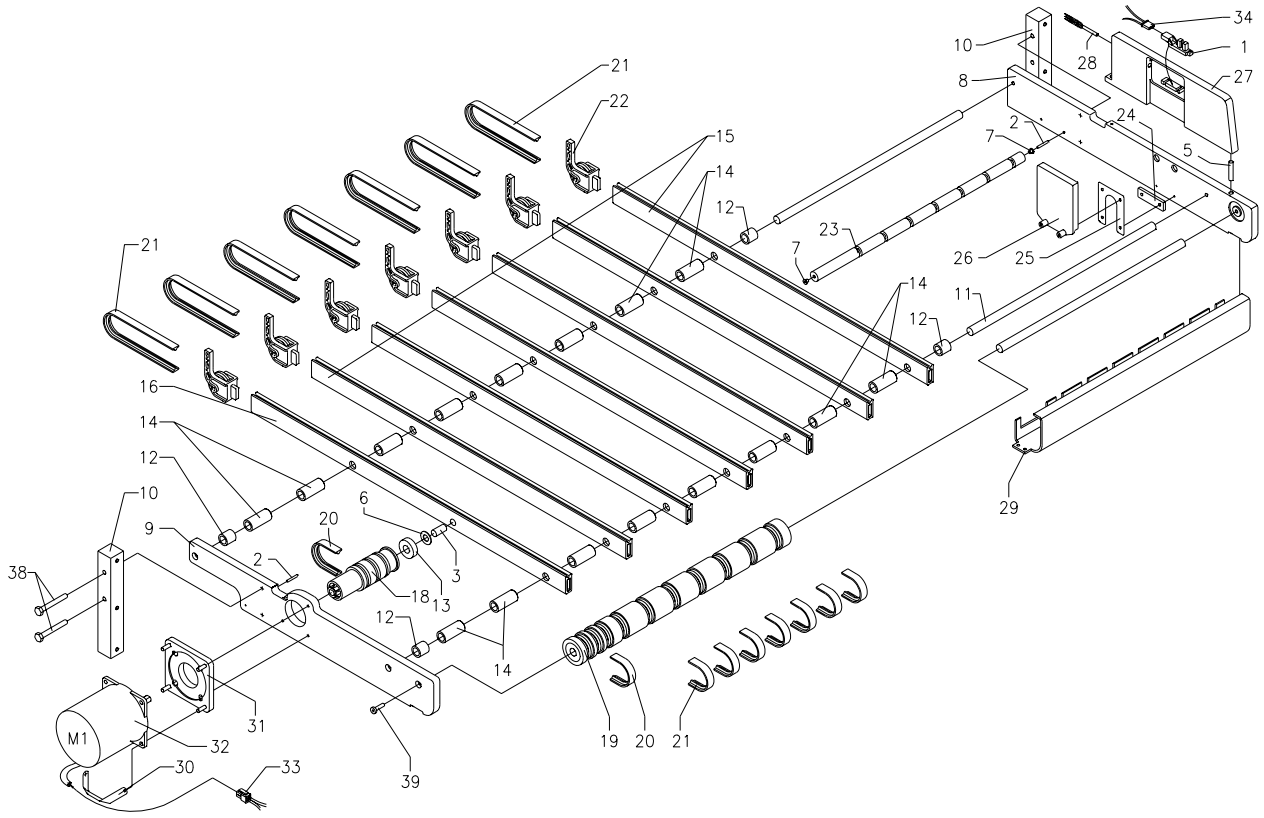


Figure 7-2: Infeed Conveyor Assembly

Infeed Conveyor Alignment

Infeed Height and Roller Adjustment

The alignment of the infeed conveyor assembly is critical to assure proper clearance between the infeed conveyor belts and the lifter when the lifter is in the down position. Misalignment can also cause the horizontal photoeyes to malfunction.

Check the infeed belt guides to make sure they are parallel with the top of the machine frame. Check this measurement at the guide - not the belt - and check it at both ends of the guide. Move the belt to one side to measure. Refer to Figure 7-3.

Associated Pocket Tests:
202 - Infeed start switch test
300 - Photoeye test
601 - Infeed motor movement test
802 - Photoeye test

Measure the distance from the right (discharge end) of the machine frame to the nearest belt guide as shown in Figure 7-4.

If either of the measurements are not within tolerance, loosen the four mounting screws (Item 38 in Figure 7-2). Remove one screw at a time, apply blue Loctite, and re-install. Align the infeed conveyor assembly. Once the infeed has been properly positioned, torque the mounting screws to 175 inch pounds.

After making adjustment, check for clearance between the infeed belt guides and the lifter package supports. Also check to make sure that the lifter is below the infeed belts when the lifter is in the down position. Refer to lifter adjustment section.

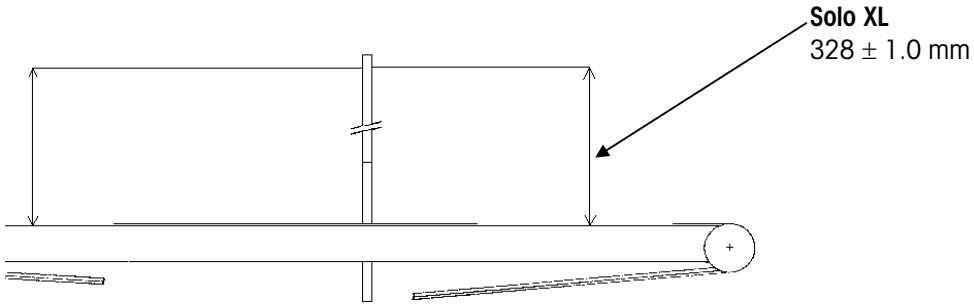


Figure 7-3: Infeed Height

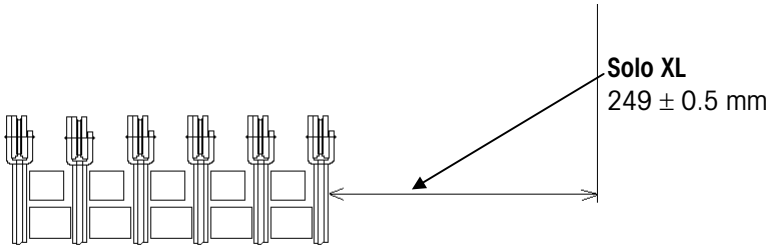


Figure 7-4

Infeed Door and Interlock Switch

The infeed door is equipped with a safety interlock switch. The infeed door and interlock switch are activated by the lifter.

Door Adjustment

With the lifter in the up position, the infeed door should be perpendicular to the Infeed Conveyor Frame. The infeed door must not block the photoeyes when it is in the closed position. With the lifter in the down position, the door should open and be parallel to the infeed conveyor. Verify that the infeed door does not interfere with the bottom of the side clamps as shown in Figure 7-5.

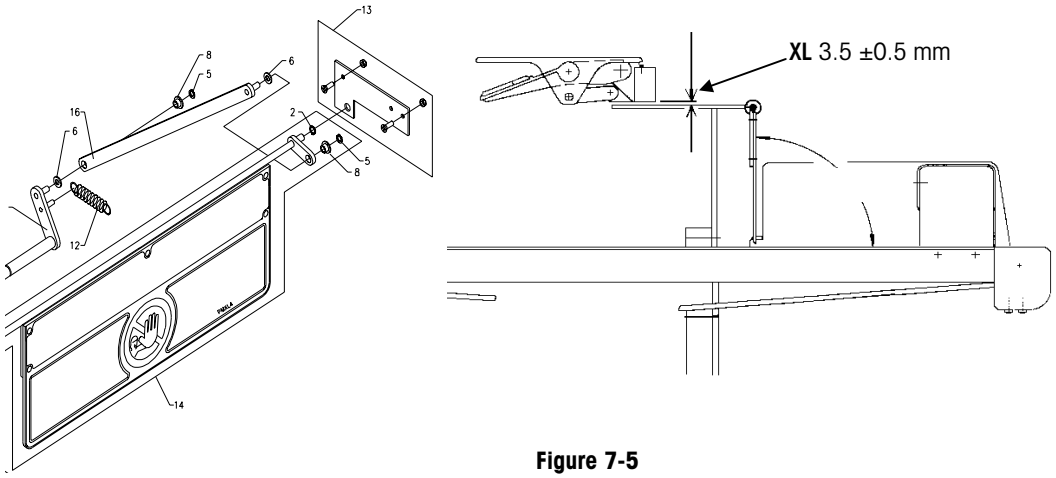


Figure 7-5

To adjust the position of the infeed door, loosen the infeed door actuator stop (Item 13 in Figure 7-5) and adjust to proper position with the lifter in the down position.

Associated Pocket Tests:
201 - Infeed door switch
608 - Lifter movement test
802 - Photoeye test

Interlock Switch Adjustment

The interlock switch (Figure 7-6) must be adjusted to open when the bottom of the infeed door is opened 75 to 100mm. To adjust the switch, loosen the two mounting screws, slide the switch in or out of the door actuator finger and re-tighten the mounting screws.

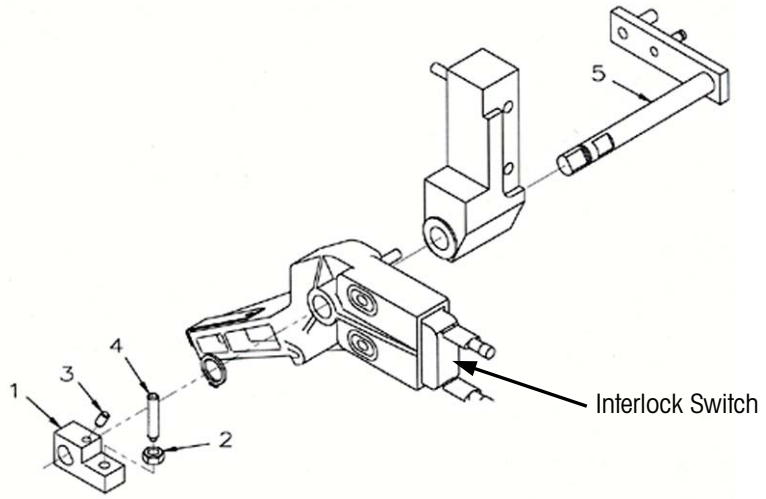
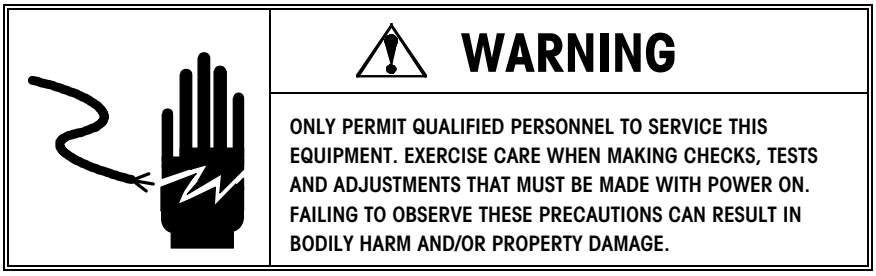


Figure 7-6: Infeed Door Interlock Switch

Photoeyes



The Photoeyes are infrared LED transmitter/receiver pairs used to measure the package width, length, and height as the package is conveyed into the wrapper. Each LED is sequentially turned on and the output of the corresponding receiver is read in through an analog input of the microprocessor. The time to read the entire array of LEDs is about 27 milliseconds.

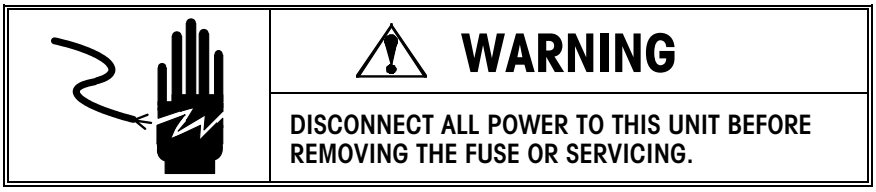
The right vertical Photoeye assembly contains both transmitters and receivers. The left Photoeye assembly contains only receivers. The receivers on the right side of the wrapper operate in a reflective mode. The receivers on the left side operate in a through beam mode. The bottom right horizontal Photoeye is used to detect whether the package is up against the right side of the infeed. If this Photoeye is determined to be faulty during the reset routine, the wrapper will not operate.

During the reset routine, the horizontal Photoeyes are tested by reflecting off the bottom of the front side clamp frame. If one or two Photoeyes are not functioning properly, the wrapper will continue to operate.

Photoeye Testing

Photoeye tests are found in Chapter 6: Diagnostic Pocket. Refer to test 802 Photoeyes test and (300) Single Photoeye Test.

Vertical Photoeye Replacement



Note: The Photoeye assembly must be perpendicular to the infeed assembly. On the right-side vertical Photoeye assembly, check for interference with the infeed door connecting rod.

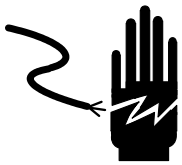
Removal

1. Remove the wrapper front cover.
2. Loosen the two mounting screws and slide the vertical Photoeye assembly away from the mounting frame.
3. Disconnect the harness from the back of the assembly.

Installation

Install in reverse order.

Horizontal Photoeye Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Removal

1. Remove the wrapper front cover.
2. Disconnect the harness from the horizontal Photoeye assembly. Relieve the tension on the infeed belts by slipping the belts off the rear idler pulleys.
3. Remove the three phillips head screws attaching the assembly to the infeed assembly.
4. Pull down and forward on the horizontal Photoeye assembly.
5. Carefully guide the assembly out from between the infeed belts and belt guides.

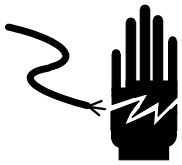
Installation

Install in reverse order.

Lifter Section

This section covers parts replacement and adjustments to the lifter section.

Lifter Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-7.

1. Disconnect power to the Model 645.
2. Remove the front and rear covers from the machine.
3. Remove the two mounting screws (Item 27) from the linear actuator carriage extension.
4. Remove the lifter assembly from the machine.
5. Apply CPI Grease Type GRS-460-F (p/n 82909400A) to the guide track.
6. Re-assemble lifter to machine in reverse order.
7. Check to assure that the guide bearing (Item 3) travels freely in the guide track.
8. Check for proper lifter alignment as outlined in the following lifter adjustment section.

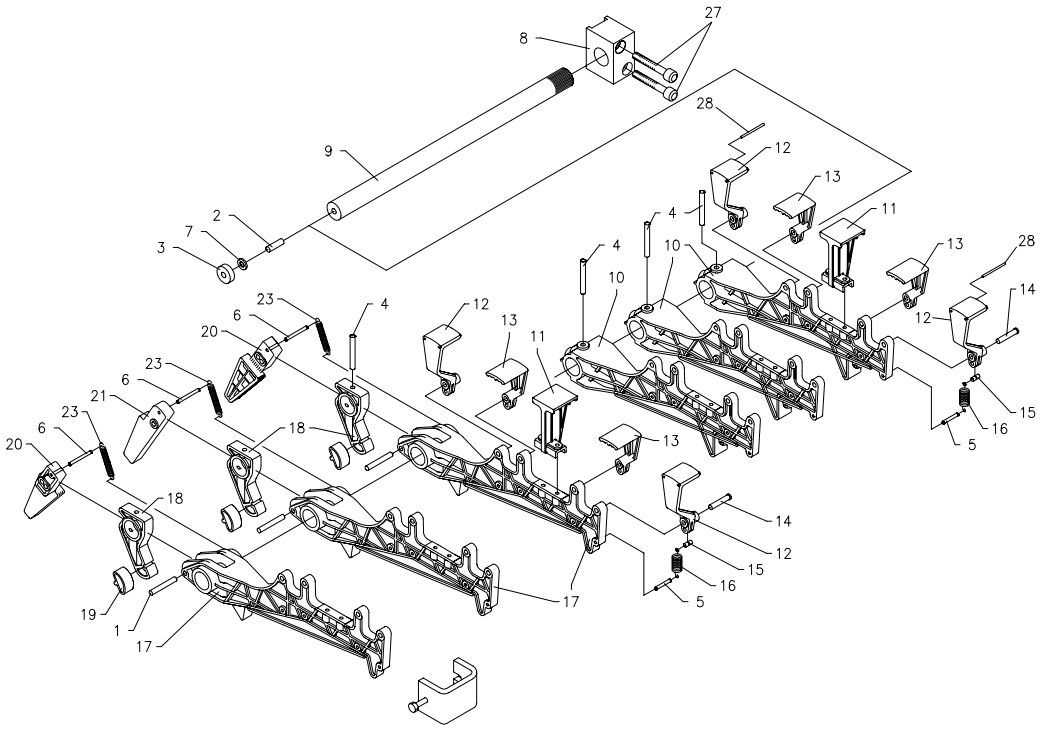
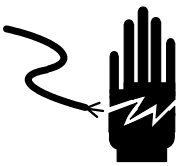


Figure 7-7: Lifter Replacement

Drive Motor Replacement



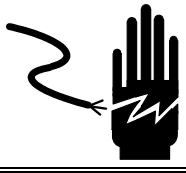
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Disconnect power to the Model 645.
2. Remove the rear cover from the machine.
3. Unplug lifter motor harness.
4. Remove the four mounting nuts and washers on the motor mount isolator, and remove the drive belt.
5. Remove the motor pulley by removing the pulley set screws.
6. Remove the motor and motor isolator from the machine, making note of the location of the motor ground strap and orientation of the motor leads.
7. Detach the motor isolator from the motor by removing the four retaining nuts and washers.
8. Assemble the motor isolator and ground strap to the new motor. Apply blue Loctite to the retaining nuts before assembly. Torque the retaining nuts to 50 inch pounds.
9. Re-install the motor and pulley assembly to the machine in reverse order.
10. Adjust the belt tension and torque the motor isolator nuts to 50 inch pounds. Do not use Loctite® on the mounting nuts for the motor damper.

Package Support Replacement

The individual package supports can be replaced without removing the lifter assembly from the machine. The center package supports are held in place with two screws. In order to replace the spring-loaded package supports, a special pin extraction tool, **P/N 82890400A** (available from METTLER TOLEDO Aftermarket), is required to remove the pivot pins. To replace the spring loaded package supports, proceed as follows:



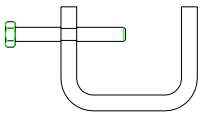
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-8 for parts locations.

1. Disconnect power to the Model 645.
2. Remove the front and rear covers from the machine.
3. Un-hook the spring from the lower spring hook (Item 5).
4. Carefully remove the spring (Item 16) and the spring hook (Item 15) from the package support.

Note: The pivot pin has a head on one end. An attempt to drive the pin out from the wrong side will damage the lifter arm. The head of the pin is located in the package support, while the small end (tail) is located in the lifter arm.



82890400A Pin Extraction Tool

5. Position the Pin Extraction Tool over the package support pivot pin so that the screw is aligned with the small end of the pin.
6. Tighten the screw in the Pin Extraction Tool to drive the pivot pin out of the lifter arm. The pin can be driven out about 2/3 of the way with the extraction tool, then removed the rest of the way by hand.
7. Some of the long (outer) package supports require installation of a dowel pin. Refer to Figure 7-9. Install dowel pin if necessary before installation of replacement package support.
8. Lubricate the pivot pin with FMO 350 lubricant.
9. Install the new package support and pivot pin using the Pin Extraction Tool. Drive the pin in until the small end (tail) of the pivot pin is flush with the lifter arm. Make sure that the package support pivots freely.
10. Re-install the spring hook (Item 15) and the spring (Item 16) to the package support.

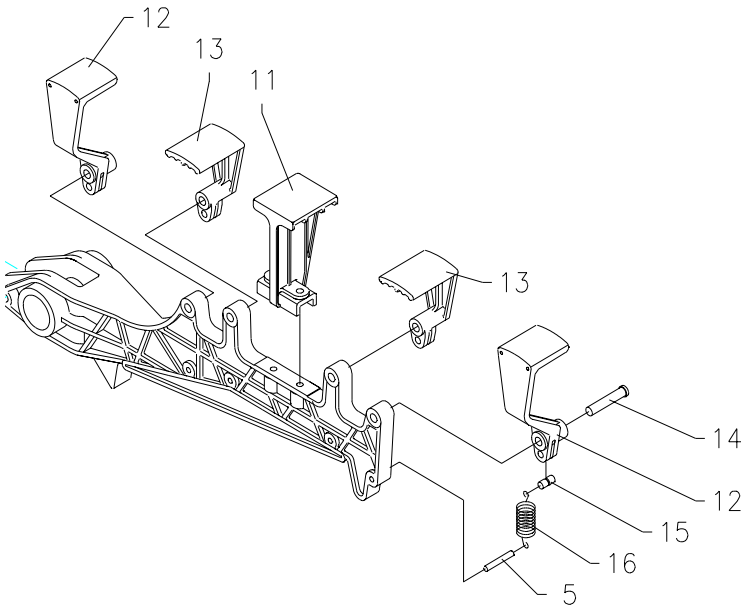
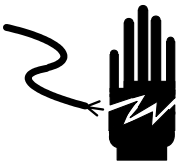


Figure 7-8: Lifter Support Replacement

Lifter Arm Replacement

Only the mobile lifter arms are field replaceable. If any of the stationary arms require replacement, the entire lifter assembly must be replaced. The mobile lifter arms are held in place by a cast aluminum arm stop that is adjustable by loosening the retaining bolt on the bottom of the stop. When disassembling the lifter assembly, be certain to note the location of the mobile lifter arms and reassemble in the same location on the support rod.

To replace the lifter arm, proceed as follows:



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Disconnect power to the Model 645.
2. Remove the front and rear covers from the machine.
3. Remove the lifter assembly from the machine and remove the lifter arm.
4. Remove the package supports and springs from the old lifter arm assembly, and install on the new lifter arm as described in the package support replacement section of this manual.
5. Clamp the lifter assembly mounting block in a vise so the support rod is level.
6. Slide the lifter arms and lifter arm stops onto the support rod.
7. Beginning with the lifter arm closest to the stationary arms, position the arm so that it is 50mm from the stationary arm and tighten the lifter arm stop clamp just enough to hold it in position (see Figure 7-9).
8. Rotate the lifter-arm stop so the top of the package supports are on the same plane as the stationary arm package supports. Tighten the lifter arm stop clamp in place by tightening the clamp screw to 175 inch pounds of torque.
9. Repeat this procedure for the remaining lifter arms using the dimensions shown in Figure 7-9.
10. As a final check, place a level across the front row of package supports. If not level, readjust as necessary.
11. Re-install the lifter assembly in the machine as described in the lifter replacement section of this manual.

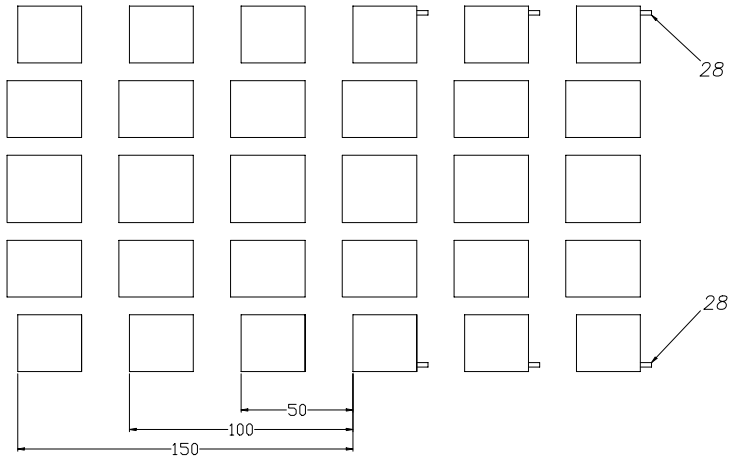
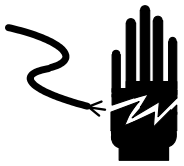


Figure 7-9

Lifter Linear Actuator Service

The procedure described here is for disassembly and reassembly of the lifter linear actuator. After 2.5 million packages, the actuator nut roller assemblies must be replaced. Other parts should be inspected for wear, and replaced as necessary.



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to figure 7-10 for the following service section.

1. Disconnect power to the Model 645.
2. Remove the rear cover from the machine.
3. Unplug lifter motor harness (Item 38 in Figure 7-10) .
4. Unplug the two sensor harnesses (Item 39 in Figure 7-10).
5. Remove the lifter assembly.
6. Remove the 4 mounting screws (Items 40 and 41 in Figure 7-10) holding the linear actuator to the machine frame, and remove the linear actuator.
7. Remove the end cap (Item 22 in Figure 7-10) from the linear actuator case.
8. Carefully pull the linear actuator carriage (Item 31 in Figure 7-10) and guide rollers (Item 20 in Figure 7-10) from the case.
9. Remove the carriage extension (Item 26 in Figure 7-10) from the carriage.
10. Remove the four actuator nut roller assemblies (Item 30 in Figure 7-10) from the carriage.
11. Remove the linear actuator case from the motor mount (Item 17 in Figure 7-10) by removing the four mounting screws.
12. Clean old grease and dirt from all parts and the inside of the case. Also clean off the lead screw (Item #19 in Figure 7-10).
13. Apply liberal amounts of CPI Grease Type GRS-460-F (p/n 82909400A) to the lead screw, bearings and guide rollers. Also apply to the channels in the linear actuator case.
14. Reassemble in reverse order.
15. When reinstalling the actuator nut roller assemblies (Item 30 in Figure 7-10), torque the M4 retaining screws to 30 in lb and secure with blue Loctite.
16. After reinstalling the linear actuator on the machine, perform all checks and adjustments for the lifter section.

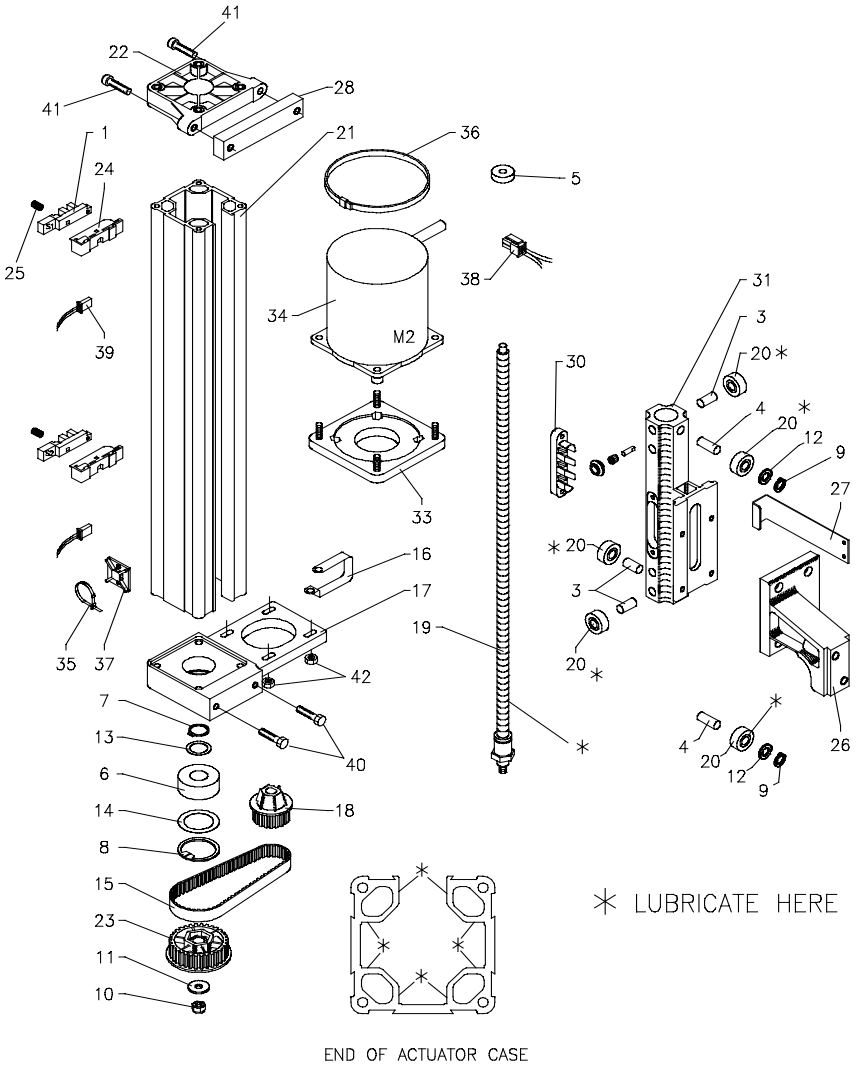


Figure 7-10: Lifter Linear Actuator Service

Lifter Alignment

Verify the lifter alignment with respect to the infeed guides (Figure 7-11). The clearance between the lifter package supports and the infeed belt guides must be at least 1 mm.

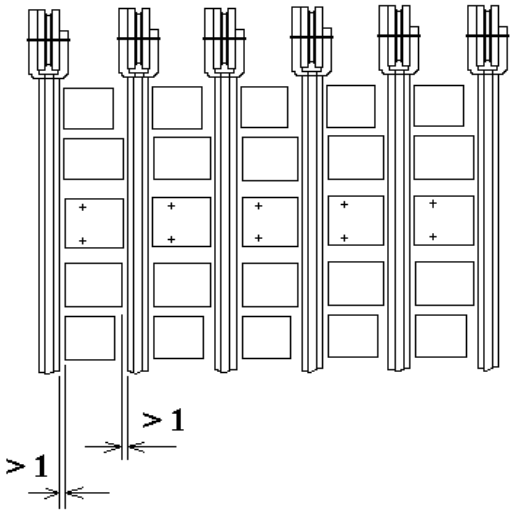


Figure 7-11

If the clearance is not sufficient, check the dimension from the end of the machine frame to the infeed belt guide, as shown in figure 7-12. To adjust, loosen the two mounting screws on one side of the infeed conveyor assembly, and slide it forward or backward until the correct dimension is obtained. If clearance is still not obtained, proceed to loosen the bolts that hold the lifter actuator to the rear machine frame and adjust as necessary.

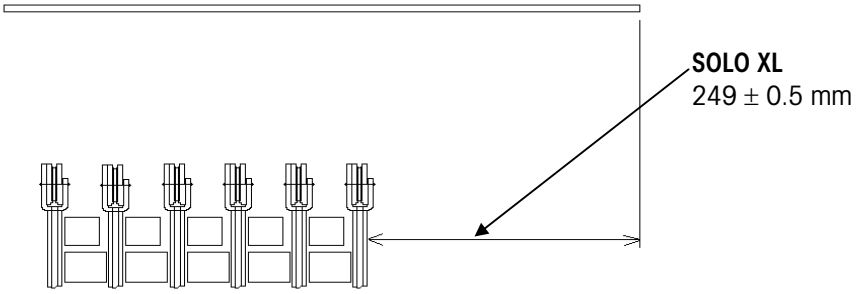


Figure 7-12

Lifter-Down Sensor Position

Associated Pocket Tests:
206 - Lifter down sensor S2 test
608 - Lifter movement test
658 - Lifter movement test without retiming
804 - Lifter stroke test

The bottom lifter sensor S2 controls both the up position of the lifter as well as the bottom end of run position. The top lifter sensor S1 is used only to determine if the upward movement of the lifter has been impaired (Error 24).

Run Test 804 using the Pocket. Pay particular attention to the measurement of the lifter up position. The distance should be 92.5 ± 1 mm from the top of the lifter package supports to the top of the machine frame (as shown in Figure 7-13). If the distance measured is greater than 93.5 mm (92.5 + 1 mm), the lifter is stopping at a position that is **too low,** and the bottom sensor S2 must be moved **up** by the difference. If the distance measured is less than 91.5 mm (92.5 - 1 mm), the lifter is stopping at a position that is **too high**, and the bottom sensor S2 must be moved **down** by the difference.

If an adjustment is made, repeat test 804 to verify the position of the sensor. Once the position of the lifter down sensor is correct, check the positioning of the up-lifter sensor.

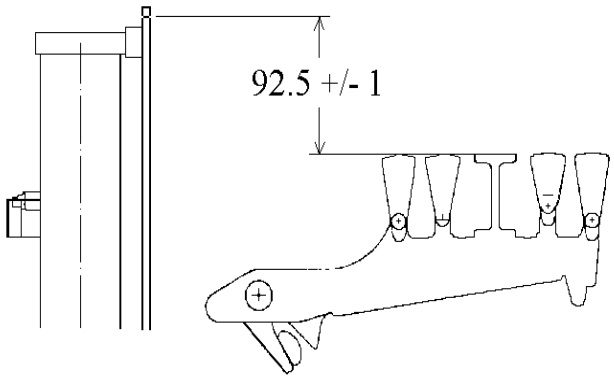


Figure 7-13: Lifter Stroke Measurement

Lifter-Up Sensor Position

Associated Pocket Tests:
205 - Lifter up sensor S1 test
608 - Lifter movement test
658 - Lifter movement test without retiming
804 - Lifter stroke test

The top lifter sensor S1 is used only to determine if the upward movement of the lifter has been impaired (Error 24).

At this point, the position of the lifter-down sensor should be correct. If it is not, refer to the previous section: Lifter-Down Sensor Position.

Run Test 804 using the Pocket. Pay particular attention to the error between the sensors. If the distance between the sensors is out of tolerance, the lifter-up sensor must be moved (refer to Figure 7-14). Using the reported error as a guide, adjust the position of the lifter-up sensor, and repeat test 804. Repeat the adjustment until the distance between the sensors is within tolerance.

As a final check, verify that the mobile lifter arms latch at least 1 mm before the downward end of run. NOTE: At the end of run, the lower edge of the lifter flag will be flush with the underside of the lifter-down sensor.

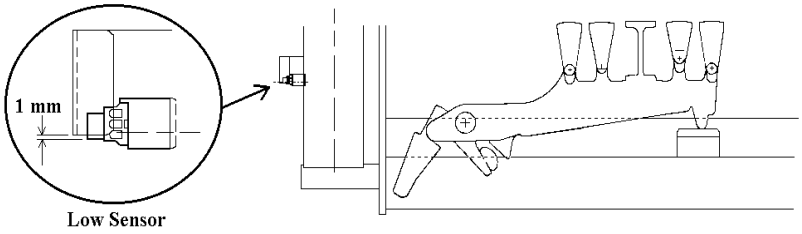


Figure 7-14

Infeed clearance with lifter in down position

With the lifter in the bottom end of run position, there should be at least 2 mm of clearance between the top surface of the package supports and the top of the infeed belts (Figure 7-15). If there is insufficient clearance, the lifter-up position is probably not correct and should be adjusted, or the infeed is out of alignment. Refer to the Infeed Conveyor Alignment section.

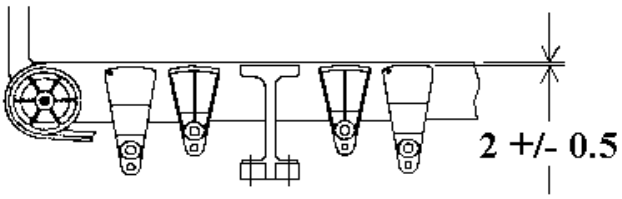


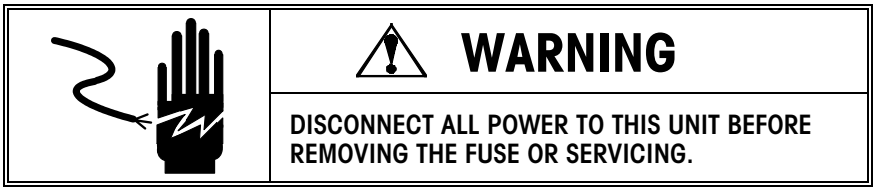
Figure 7-15

In addition, there must an overrun of 1 mm beyond the bottom of the end of run position. Push the lifter down until it stops and measure the length that the lifter sensor flag extends below the bottom lifter sensor S2. This must be at least 1 mm.

Center Clamp

This section covers parts replacement and adjustments to the Center Clamp Section.

Center Clamp Removal



1. Disconnect power to the Model 645.
2. Remove the front, rear and the end covers from the machine.
3. Remove the pressure roller cross bar and pressure roller assembly from the machine.
4. Remove the two screws (Item 54, Figure 7-16) holding the sensor flag (Item 19, Figure 7-16) in place. Note that there is an access hole in the machine frame near the upper left corner of the infeed opening.
5. Disconnect the lifter release tension spring (Item 10, Figure 7-17).
6. Remove the Center Clamp from the machine by removing the 4 retaining screws (Item 53, Figure 7-16). Slide the Center Clamp assembly out the left side of the machine.
7. To install the Center Clamp into the machine, reassemble in reverse order.
8. Proceed to the Center Clamp Adjustments section. All Center Clamp adjustments must be checked.

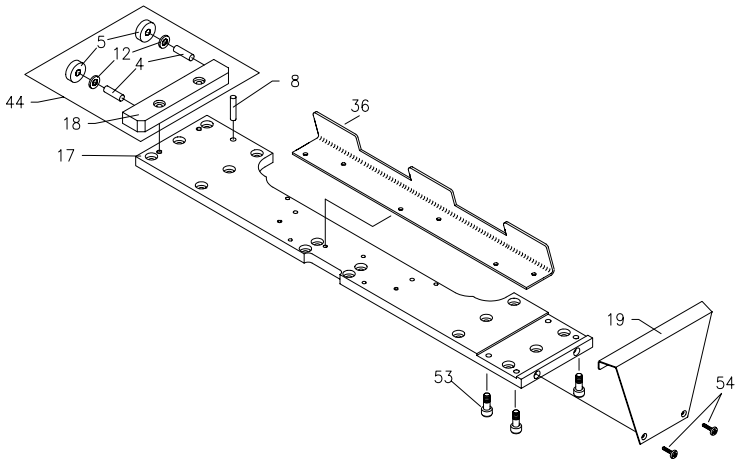


Figure 7-16: Center Clamp

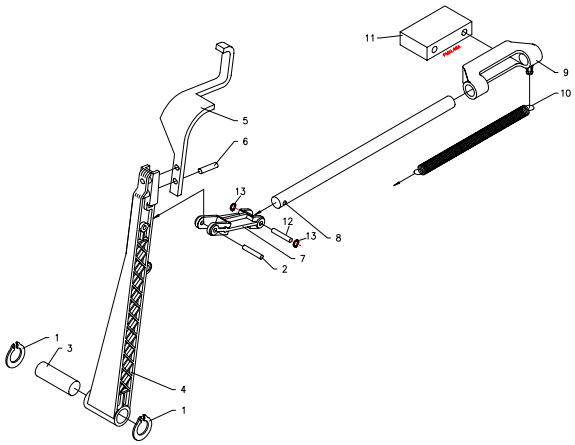
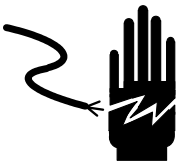


Figure 7-17: Lifter Release Assembly

Center Clamp Film Gripper Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to figure 7-18 for the following item locations.

1. Disconnect power to the Model 645.
2. Push the Center Clamp assembly to the center of the machine.
3. Remove the M4 self-locking nut and flat washer.
4. Remove the Center Clamp film gripper with rocker bearing attached.
5. Remove the two screws that hold the rocker bearing to the film gripper.
6. Attach the rocker bearing to the new film gripper.
7. Make sure that the two spring washers are installed as shown below.
8. Reinstall the new Center Clamp film gripper with rocker bearing attached.
9. Reinstall the flat washer and M4 self-locking nut.
10. Tighten the M4 self-locking nut until it is snug. DO NOT OVER TIGHTEN.
11. Loosen the M4 self-locking nut approximately one turn. This will allow the Center Clamp film gripper to freely rock back and forth. If there is any endplay, tighten the nut until there is no play or replace the spring washers.

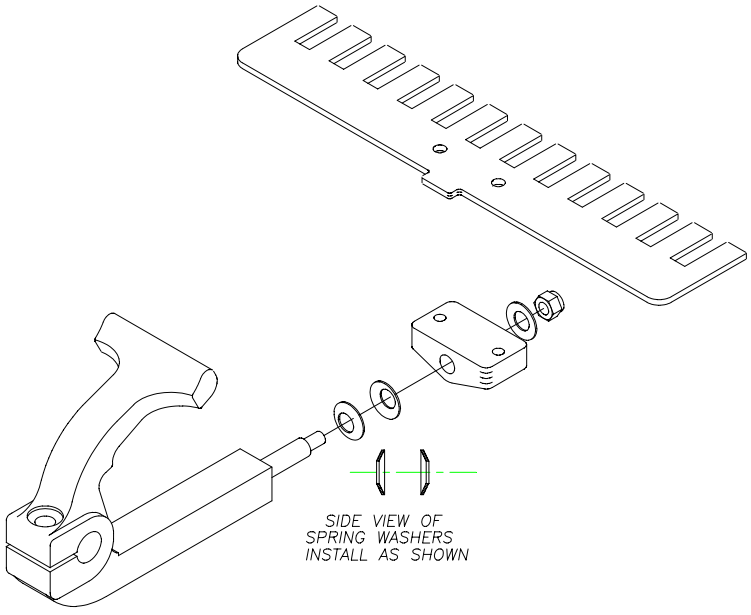
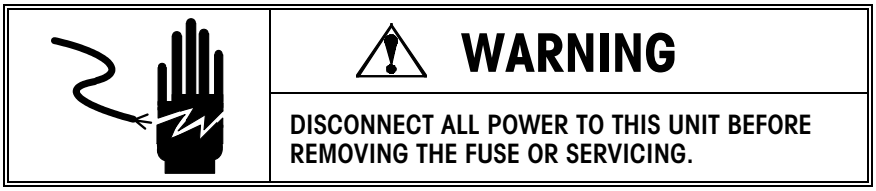


Figure 7-18: Center Clamp Film Gripper

Film Gripper Mounting Lever Replacement



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to figure 7-19 for parts locations.

1. Remove the front and rear covers.
2. Loosen the mounting lever screw (Item 55). ***Caution: The gripper actuator lever is under spring tension. Loosening this screw relieves the spring tension.***
3. Loosen and remove the rear set collar, rear torsion spring and the bearing washer (Items 13, 23 and 24).
4. Remove the pusher pad assembly (Items 36 and 37).
5. Remove the screws that hold the bearing blocks in place (Item 21). Slide the rear-bearing block off the actuator lever (Item 22).
6. Slide the gripper mounting lever and the upper jaw assembly off the actuator lever.
7. Remove the Film Gripper (Item 27), and install the replacement gripper mounting lever.
8. Reassemble the Center Clamp assembly in reverse order.
9. Proceed to the "Center Clamp Adjustments" section. All Center Clamp adjustments must be checked before applying power to the machine.

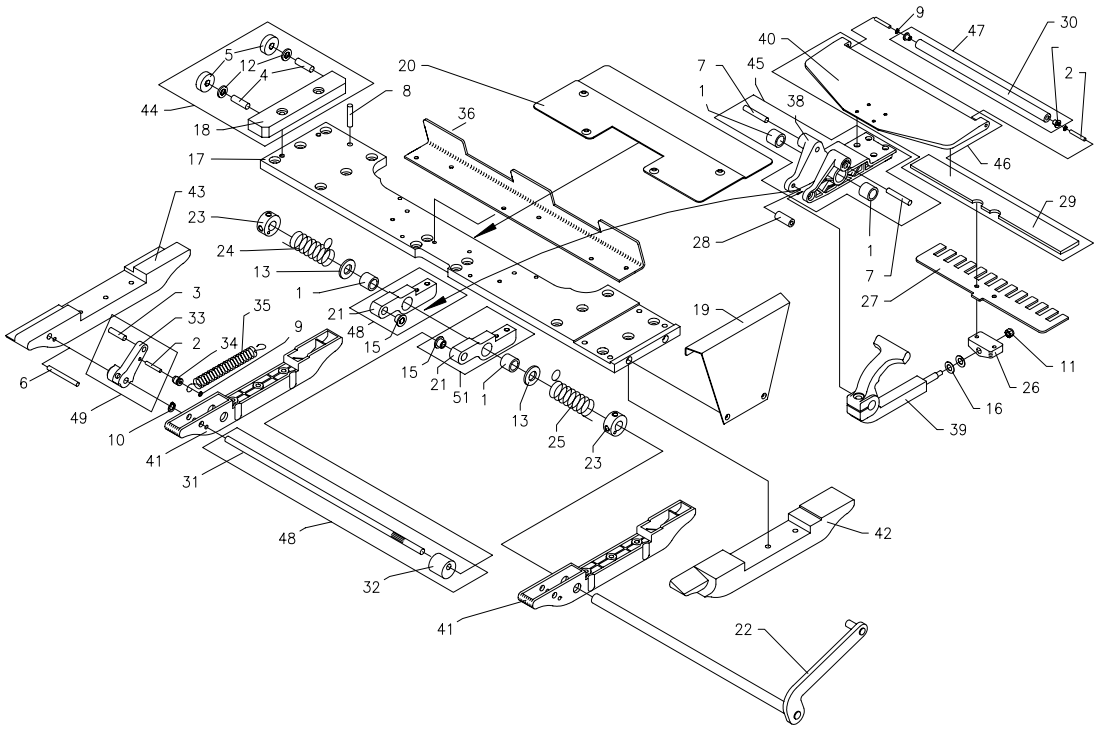
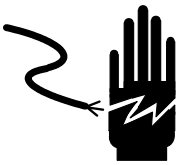


Figure 7-19: Film Gripper Mounting Lever Replacement

Gripper Torsion Spring Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to figure 7-19 for reference.

1. Disconnect power from the Model 645.
2. To replace the rear torsion spring (Item 24), carefully loosen the set collar (Item 23, Figure 7-20) and release the tension on the spring. ***Caution: the set collar is under spring tension!***
3. Remove and replace the spring and set collar.
4. Adjust the spring tension as described in the Gripper Actuator Lever Spring adjustment section.
5. To replace the front torsion spring (Item 25), disassemble the center clamp as described in the Gripper Mounting Lever Replacement section.
6. Once disassembled loosen the front set collar and slide the bearing block forward on the actuating lever to separate the eccentric assembly from the actuating lever.
7. Slide the bearing block off the actuating lever and replace the spring
8. Reassemble in reverse order.
9. Proceed to the "Center Clamp Adjustments" section. All Center Clamp adjustments must be checked before applying power to the machine.

Eccentric Drive Lever Replacement

WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove the Center Clamp assembly from the machine.
2. Remove the rear Center Clamp skate (Item 43, Figure 7-20) from the Center Clamp assembly.
3. Remove and replace the eccentric drive lever (Item 49, Figure 7-20).
4. Reassemble the Center Clamp assembly in reverse order, and reinstall in machine. Apply Blue Loctite to all setscrews.

Proceed to the Center Clamp adjustments section. All Center Clamp adjustments must be checked before applying power to the machine.

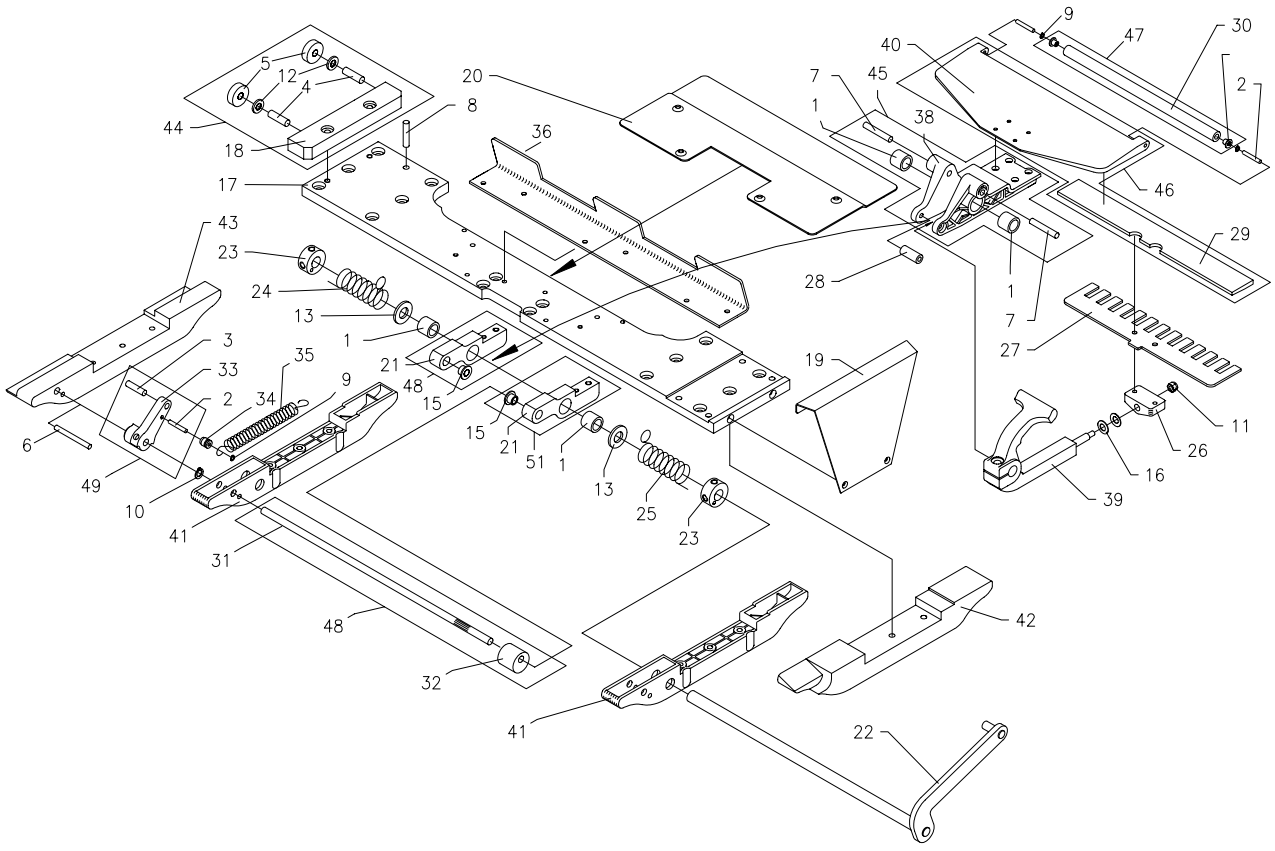
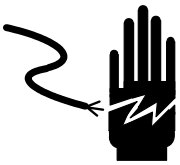


Figure 7-20

Gripper Eccentric Replacement



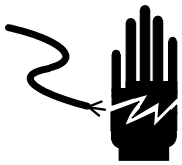
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove the Center Clamp assembly from the machine.
2. Remove the two Center Clamp skates (Items 41 and 43, Figure 7-20) from the Center Clamp assembly.
3. Remove the eccentric drive lever (Item 49, Figure 7-20).
4. Slide the grip ring (Item 10, Figure 7-20) off of the eccentric shaft.
5. Remove the pusher support (Item 36, Figure 7-20).
6. Remove the four retaining screws holding the gripper bearing blocks (Item 21, Figure 7-20) to the Center Clamp frame.
7. Rotate the eccentric shaft assembly (Item 48, Figure 7-20) and slide the shaft out of the front gripper-bearing block.
8. Rotate the rear-bearing block (Item 50, Figure 7-20) up, and remove the eccentric shaft.
9. Reassemble the Center Clamp in reverse order, and install in machine.
10. Apply a small amount of FMO 350 lubricant between the eccentric and the follower.
11. Proceed to the Center Clamp adjustments section. All Center Clamp adjustments must be checked before applying power to the machine.

Center Clamp Linear Actuator Service

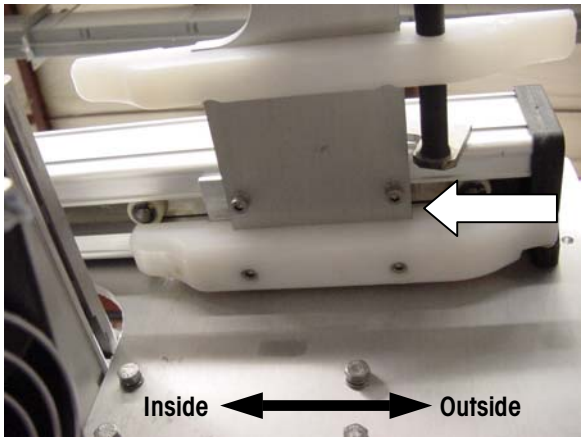
The procedure described here is for disassembly and reassembly of the Center Clamp linear actuator. After 2.5 million packages, the actuator nut roller assemblies must be replaced. Other parts should be inspected for wear, and replaced as necessary.



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove the Center Clamp assembly from the machine.
2. Unplug the Center Clamp motor harness (Item 39, Figure 7-22).
3. Unplug the two sensor harnesses (Item 40, Figure 7-22).
4. Remove the two display bracket mounting screws.
5. Remove the 4 mounting screws (Items 44 and 45, Figure 7-22) holding the linear actuator to the machine frame, and remove the linear actuator.
6. Remove the end cap (Item 27, Figure 7-22) from the linear actuator case.
7. Carefully pull the linear actuator carriage (Item 22, Figure 7-22) and guide rollers (Item 26, Figure 7-20) from the case.
8. Remove the four actuator-nut roller assemblies (Item 32, Figure 7-22) from the carriage.
9. Remove the linear actuator case from the motor mount (Item 15, Figure 7-22) by removing the four mounting screws.
10. Clean old grease and dirt from all parts and the inside of the case. Also clean off the lead screw (Item #18 in Figure 7-22).
11. Apply liberal amounts of CPI Grease Type GRS-460-F (p/n 82909400A) CPI Grease Type GRS-460-F (p/n 82909400A) to the lead screw (Item #18 in Figure 7-22), bearings and guide rollers. Also apply to the channels in the linear actuator case.
12. Reassemble in reverse order.



When reassembling the linear actuator, make sure the orientation is correct. When installed correctly, the mounting plate is flush towards the outside of the machine and will stick out slightly toward the inside of the machine.

13. When reinstalling the actuator nut roller assemblies (Item 32, Figure 7-22), torque the M4 retaining screws to 30 in lb and secure using blue Loctite.

14. After reinstalling the linear actuator on the machine, perform all checks and adjustments for the Center Clamp section.

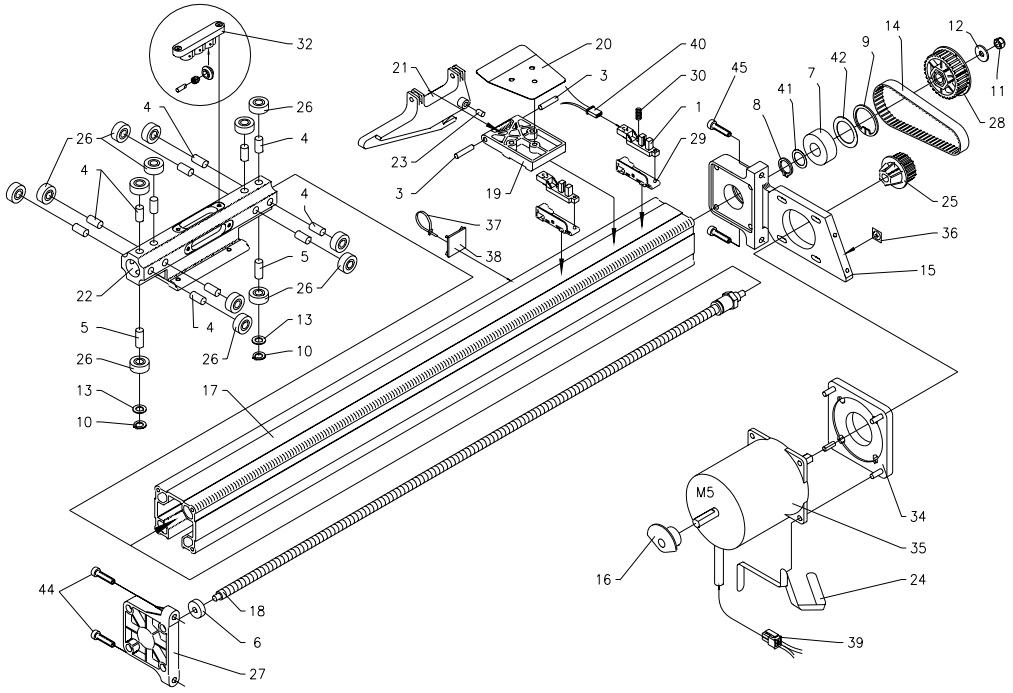
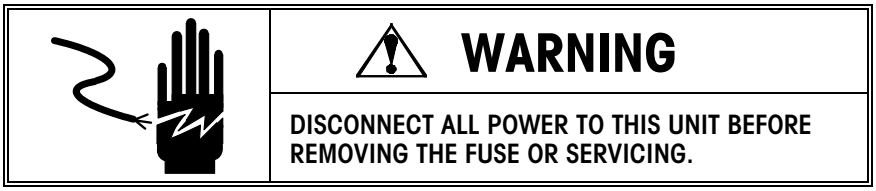


Figure 7-21: Center Clamp Linear Actuator Service

Gripper Actuator Lever Spring Adjustment

There must be equal spring tension on both sides of the gripper actuator lever. Low spring tension may cause film-pulling problems. However, excessive spring tension will not solve a film-pulling problem, and will lead to premature mechanical failure. To adjust the spring tension, proceed as follows.



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Use a pair of vise grips to hold the film gripper against the underfold plate. **Apply only enough pressure to hold in place without compressing the film gripper pad.**

1. Place the gripper actuator lever in the 38-mm position, as shown in Figure 7-22. This dimension is not critical at this time. This is only used to set the spring tension.
2. Rotate the set collar approximately 180 degrees until the setscrews are positioned as shown in Figure 7-22.
3. Apply blue Loctite to both set screws and tighten.
4. Repeat this procedure for the other torsion spring.

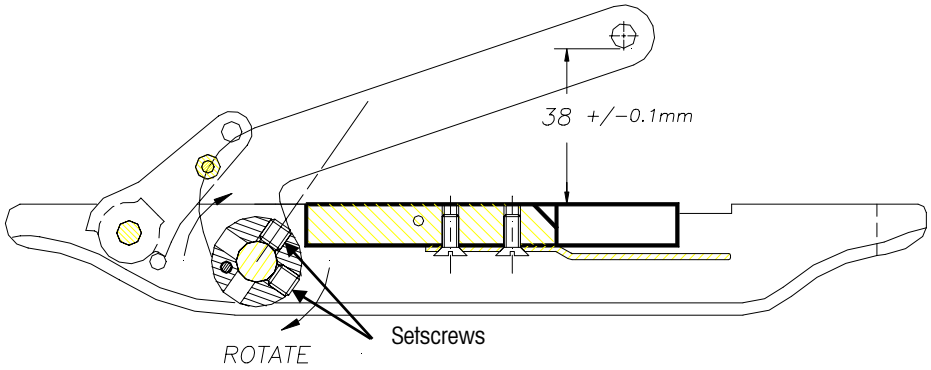


Figure 7-22: Gripper Actuator Lever Spring Adjustment

Clearance Between The Clamp and Exit Rollers

There should be clearance of 1-mm ± 0.5 mm between the underfold plate on the Center Clamp and the first roller on the sealing belt assembly (Figure 7-23). If the clearance is not correct, the underfold plate is bent, or the sealing belt assembly is out of position.

1. Check the alignment of the sealing belt assembly, paying particular attention to the distance from the top of the film drive roller to the top of the machine frame. Correct if necessary.
2. Assuming that the sealing belt position is correct, carefully bend the underfold plate to achieve the proper clearance.

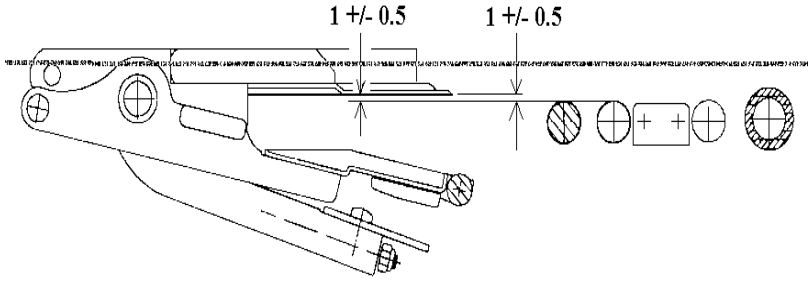


Figure 7-23: Clearance Between The Clamp and Exit Rollers

Film Clamp Eccentric Adjustment

1. Push the Center Clamp back so that it is clear of both the clamp opening cam and the clamp positioning cam.
2. Measure the position of the eccentric as shown in Figure 7-24. The film clamp eccentric should be located so that the distance from the back of the eccentric to the front of the gripper frame is 114 mm +/- 0.2 mm.
3. To adjust for the proper dimension, loosen the two set screws on the eccentric actuating lever and rotate the eccentric shaft until the correct dimension is obtained. Apply blue Locktite to the setscrews and retighten.
4. Check to make sure there is no free play between the underfold plate and the upper jaw of the film gripper. If there is vertical play, the eccentric follower requires adjustment.
5. To remove play, use a pair of vise grips to hold the film gripper against the underfold plate. **Apply only enough pressure to hold in place without compressing the film gripper pad.**
6. Loosen the two screws holding the eccentric follower in position. Pull the follower upwards so it is tight against the eccentric and retighten the screws. **Do not apply Loctite to these setscrews.**
7. Recheck for play and adjust if necessary.

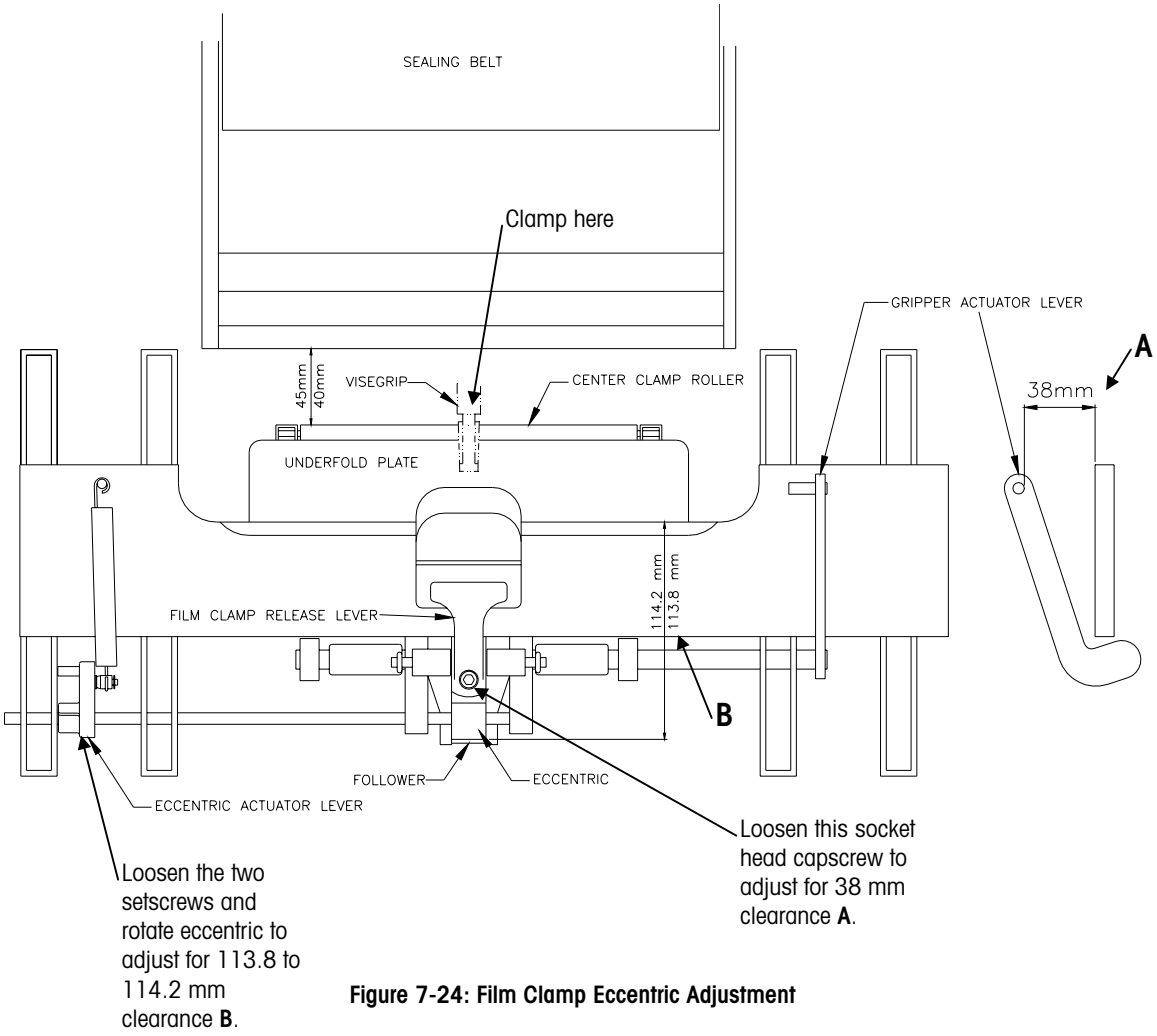


Figure 7-24: Film Clamp Eccentric Adjustment

Gripper Actuator Lever Adjustment

1. Check the distance between the bottom of the pin on the gripper actuator lever and the Center Clamp frame. The distance should be 38 mm +/- 0.1 mm (See Figure 7-24).
2. To adjust for proper distance, use a pair of vise grips to hold the film gripper against the underfold plate. **Apply only enough pressure to hold in place without compressing the film gripper pad.**
3. While holding the gripper actuator lever in position, loosen the socket head cap screw that secures the film-gripper mounting lever. **Caution: the lever in under spring tension.**
4. Adjust the lever up or down to obtain the proper distance, and retighten the screw.
5. Remove the vise grips, and verify the distance has not changed.

Film Clamp Clearance at the Distributor

Position the Center Clamp with the Center Clamp roller 18 mm from the backside of the distributor as shown in Figure 7-25. Check the clearance between the film clamp pad and the top surface of the distributor. This clearance must be 2.2 mm ± 0.2 mm. If this clearance is not correct, adjust as follows.

1. If there is insufficient clearance, check the eccentric position dimension. Increase the eccentric position dimension to the high end of its tolerance (114.2 mm). This should provide the additional clearance required.
2. If there is excessive clearance, check the eccentric position dimension. Decrease the eccentric position dimension to the low end of its tolerance (113.8 mm). This should provide the proper clearance.
3. After changing the eccentric adjustment, make sure there is no free play between the underfold plate and the upper jaw of the film gripper. If there is vertical play, the eccentric follower requires adjustment.
4. To remove play, use a pair of vise grips to hold the film gripper against the underfold plate. **Apply only enough pressure to hold in place without compressing the film gripper pad.**
5. Loosen the two screws holding the eccentric follower in position. Pull the follower upwards so it is tight against the eccentric and retighten the screws.

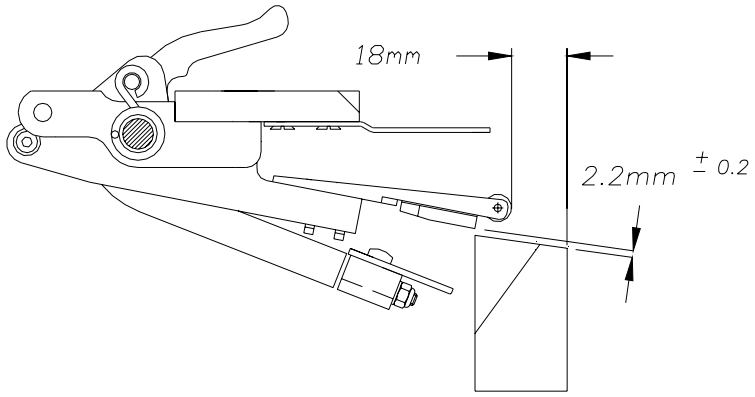
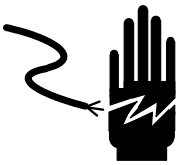


Figure 7-25: Film Clamp Clearance at the Distributor

Center Clamp Pressure Check



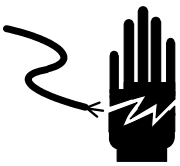
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Manually open the Center Clamp and position the end of 25mm x 100mm strip of paper in the middle of the film gripper.
2. Check the film clamping pressure by pulling the paper strip from the film gripper. Notice the amount of force required to pull the paper strip free.
3. Repeat at various locations across the width of the gripper.
4. The paper strips may be held with slightly less force at the ends of the gripper, but should never be loose. (Too loose and the film will pull free during the pre-stretch, even if the gripper is perfectly clean.
5. If the paper strips are held with insufficient force at some locations, the gripper should be reshaped slightly to increase the clamping pressure.

Center Clamp Adjustment Verification Procedure

The purpose of this procedure is to verify that all of the previous adjustments are correct.



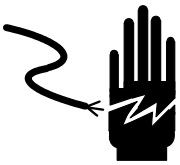
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Push the Center Clamp assembly back to the center of the machine.
2. Place a 1″ wide strip of notebook paper in the middle of the Center Clamp film gripper.
3. While holding the piece of paper taut, turn the Center Clamp motor pulley clockwise until the paper is released.
4. At this point, there should be a distance of 40-45 mm between the Center Clamp roller and the first roller of the sealing belt (See Figure 7-24).
5. If the paper is not released within this range, the most likely cause is the eccentric is not adjusted properly. However, other adjustments may also cause the release point to vary. Re-adjust the Center Clamp until proper results are obtained.

Center Clamp End-Of-Run Sensor (S4)

The position of the end of run sensor is critical to prevent the Center Clamp from running into the distributor. To check the sensor position proceed as follows:



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Push the Center Clamp assembly to the center of the machine.
2. Slowly turn the Center Clamp motor pulley clockwise until the film gripper just snaps shut.
3. At this point, the sensor flag should be 1 mm from being flush with the end of the sensor (S4) as shown in Figure 7-26.
4. Loosen the sensor mounting screw, and slide the sensor to the proper position. Retighten the sensor mounting screw. **Caution: Do not over tighten!**
5. As a point of reference, the Center Clamp carriage should be 139 mm from the edge of the machine frame at the closing point (See Figure 7-27). Since the gripper cam mount is drilled and pinned, this dimension cannot be changed.
6. After making this adjustment, the position of the retiming sensor must be checked.

Associated Pocket Tests:
208 - End of run sensor test (S4)
213 - Encoder sensor (S7)
214 - Encoder sensor (S8)

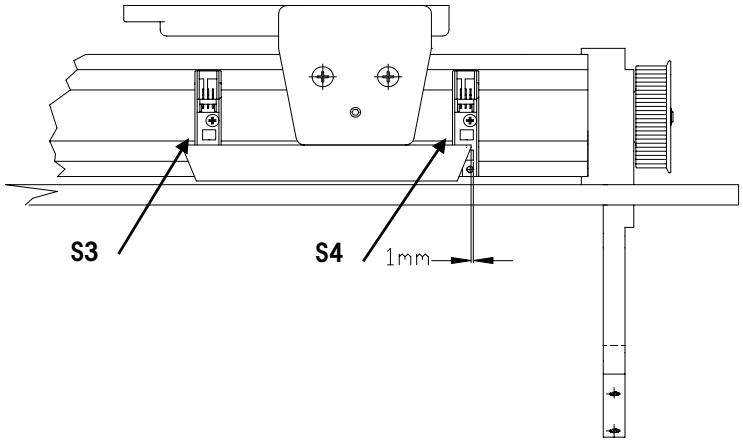


Figure 7-26: Center Clamp End-Of-Run Sensor (S4)

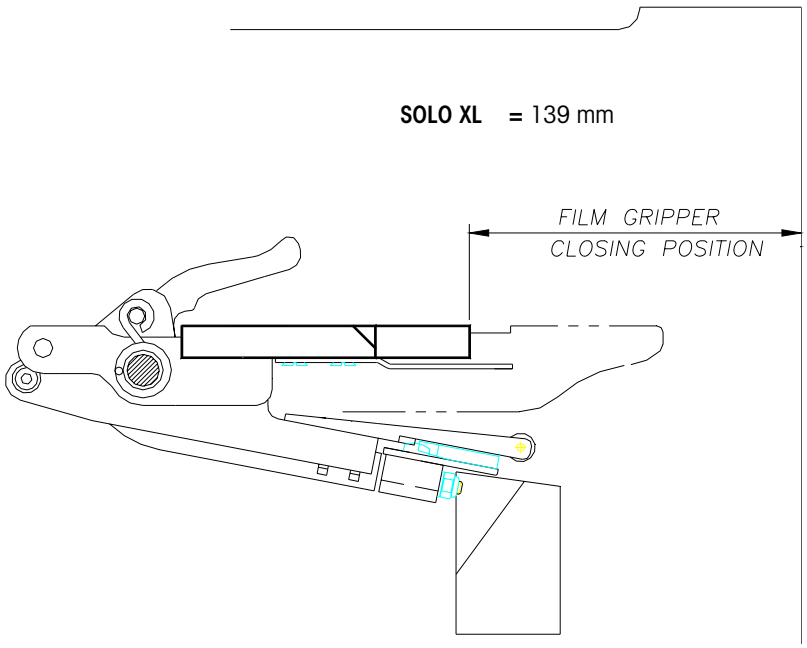


Figure 7-27

Retiming Sensor (S3)

The retiming sensor is used to help compensate for backlash in the Center Clamp drivetrain. The position of the retiming sensor relative to the end of run sensor is critical, as this is used to determine Center Clamp position errors. The position of the Center Clamp end of run sensor must be set prior to making any adjustments to the retiming sensor position. Refer to the section "Center Clamp End-of-Run Sensor (S4)" for detail on adjusting the sensor.

Associated Pocket Tests:
207 - Retiming sensor test (S3)
213 - Encoder sensor (S7)
214 - Encoder sensor (S8)

1. Remove the film from the Center Clamp and the distributor.
2. Using the Pocket, run test 805 and note the error between sensors S3 and S4. If this value is out of tolerance, the Retiming Sensor requires adjustment. Adjust the position of the sensor by first loosening the sensor mounting screw. Move the Retiming Sensor away from the End-Of-Run Sensor if the error is negative. Move the Retiming Sensor closer to the End-Of-Run Sensor if the error is positive. Retighten the sensor mounting screw. **Caution: Do not over tighten.**
3. Repeat the pocket test. Adjust the sensor until the value shown on the Pocket Test 805 is within tolerance (±0.6mm).

Over-run of Center Clamp

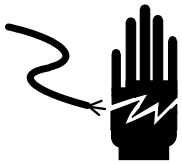
Manually check that once the Center Clamp reaches its end-of-run position, it can move an additional 1-mm before being physically blocked. If this extra travel is not possible, check for mechanical obstructions and correct.

Side Clamps

This section covers parts replacement and adjustments for the side clamps of the machine.

Foam Rubber Stretcher Pad Replacement

To replace either the upper or lower pads, proceed as follows.

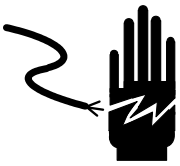


WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove the old pad by carefully lifting a corner of the pad and peeling it off. The pad should come off in one piece.
2. Inspect the mounting surface to make sure it is free of dirt, debris and oil. If necessary, use the adhesive side of the old pad to remove remaining adhesive or dirt. If necessary, clean any oil or grease off with isopropyl alcohol and a lint free cloth. Allow to dry thoroughly before installing new pad.
3. Peel the backing off and install the new pad.
4. After replacing any side clamp pad, perform pocket test 808 (side clamp test with film).

Side Clamp Spring Replacement

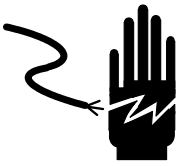


⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING.

1. Remove old spring if necessary.
2. Apply a liberal coating of CPI Grease Type GRS-460-F (p/n 82909400A) to the pivot points where the spring is attached.
3. Hook the large end of the spring onto the spring hook pivot pin.
4. Take a 3″ piece of 13 gauge music wire, or equivalent, and bend it in half leaving a 1/8″ diameter loop at the end. Clamp the bent wire in Vise Grip pliers and use the loop to stretch the small end of the spring over the spring hook setscrew.
5. With the side clamps in the closed position, manually depress the side clamp until it is fully open. Slowly release pressure on the side clamp. Check to make sure that the side clamp returns to the fully closed position. If not, make the necessary spring adjustment per the side clamp spring adjustment procedure.
6. After replacing any side clamp spring, perform pocket test 808 (side clamp test with film).

Side Clamp Assembly Replacement

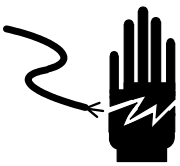


⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Push the Center Clamp back away from the sealing belt so that the skis are not touching the side clamps.
2. Rotate the clamp opening cam motor pulley until the side clamps are fully closed.
3. Remove the two retaining screws that secure the side clamp assembly to the linear actuator carriage.
4. Pull the side clamp out from the front or rear of the machine.
5. Reassemble in reverse order.
6. After replacement, perform the side clamp eccentric adjustment and the pocket test 808 (side clamp test with film).

Drive Motor Replacement



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-28.

1. Unplug side clamp motor harness (Item 23 or 24).
2. Remove the four mounting nuts and washers on the motor mount isolator, and remove the drive belt.
3. Remove the motor pulley (Item 16) by loosening the pulley set screws.
4. Remove the mounting screws holding the motor support mount (Item 28) to the machine frame.
5. Remove the four mounting screws holding the actuator case (Item 8) to the motor support stand (Item 28).
6. Carefully remove the shield retaining screw (Item 11) and separate the motor support mount (Item 28) from the actuator case (Item 8).
7. Remove the motor and motor isolator from the machine, making note of the location of the motor ground strap and orientation of the motor leads.
8. Detach the motor isolator from the motor by removing the four retaining nuts and washers.
9. Assemble the motor isolator and ground strap to the new motor. Apply blue Loctite to the retaining nuts before assembly. Torque the retaining nuts to 50 inch pounds.
10. Re-install the motor and motor support mount assembly to the machine in reverse order.
11. After the motor has been reinstalled, loosen the two sensor mounting screws. Apply tension to the shield to prevent rubbing on the actuator carriage. Retighten the two sensor mounting screws.
12. Adjust the belt tension and torque the motor isolator nuts to 50 inch-pounds. Do not Loctite the mounting nuts for the motor isolator.

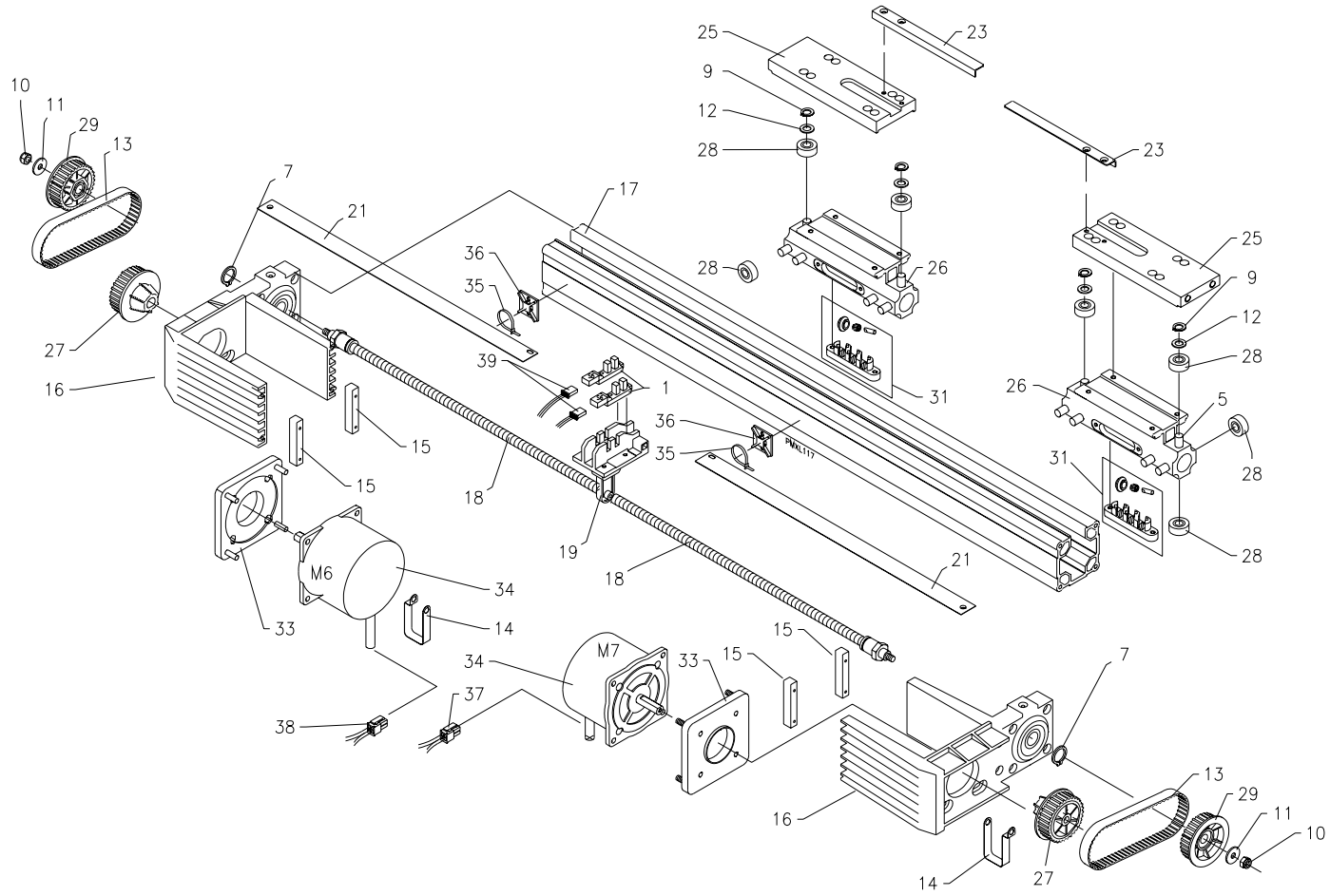
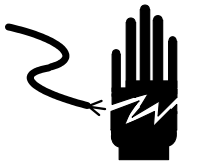


Figure 7-28

Side Clamp Linear Actuator Service

The procedure described here is for disassembly and reassembly of the side clamp linear actuators. After 2.5 million packages, the actuator nut assemblies should be inspected for wear and replaced as necessary.



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-28.

Remove the side clamp assemblies from the machine.

Unplug the side clamp motor harnesses (Items 37 and 38) .

Unplug the two sensor harnesses (Item 39).

Loosen the tension on both motor drive belts (Item 13).

Carefully remove the shield (Item 21) and the shield retaining screws (Item 52) and spacer (Item 20).

Remove the 4 mounting screws (Item 50) holding the actuator case (Item 17) to the rear motor support (Item 16).

Remove the 4 mounting screws (Item 53) holding the front motor-support stand (Item 16) to the front motor standoffs (Item 15).

Carefully slide the linear actuator assembly (with carriages) out the operator side of the machine. The lead screw for the rear side clamp will remain with the machine.

Remove the 4 mounting screws (Item 54) holding the actuator case (Item 17) to the front motor support (Item 16).

Carefully remove the front motor support stand and lead screw from the linear actuator case.

Carefully pull the linear actuator carriages (Item 26) and guide rollers (Item 28) from the case.

Remove the sensor flags and spacers (Items 23 and 24) from the gripper mounting plates (Item 25).

Remove the gripper mounting plates (Item 25) from the linear actuator carriages (Item 26).

Remove the four actuator-nut roller assemblies (Item 31) from each of the carriages.

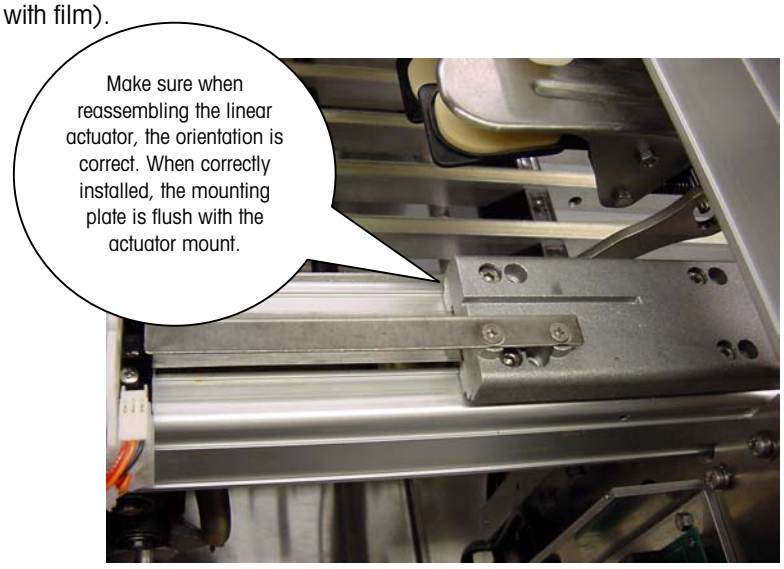
Remove the sensor support plate (Item 22) from the linear actuator case.

Clean old grease and dirt from all parts and the inside of the case. Also clean off the lead screws (Item 18). Apply liberal amounts of CPI Grease Type GRS-460-F (p/n 82909400A) to the lead screws, bearings and guide rollers. Also apply to the channels in the linear actuator case.

Reassemble in reverse order.

When reinstalling the actuator nut roller assemblies (Item 31), torque the M4 retaining screws to 30 in lb and secure using blue Loctite. After the linear actuator has been reinstalled, loosen the four sensor retaining screws. Apply tension to the shield (Item 21) to prevent rubbing on the actuator carriages. Retighten the two sensor mounting screws.

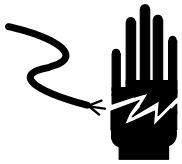
Perform the side clamp eccentric adjustment and the pocket test 808 (side clamp test with film).



Side Clamp Spring Adjustment

Before making any adjustments, lubricate and check for binds. Adjustment of the side clamp springs is critical to assure proper operation of the side clamps and Center Clamp assemblies. If the setscrews are set too low, the grippers may stick open. If the setscrews are too high, it may cause the Center Clamp to jam.

To test the spring settings, proceed as follows:



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Push the Center Clamp back away from the sealing belt so that the skis are not touching the side clamps.
2. Rotate the clamp opening cam motor pulley until the side clamps are fully closed.
3. Place a 250-gram weight on top of the side clamp to be tested. Depress the side clamp to the full open position and release slowly.
4. The side clamp should close, lifting the 250-gram weight. If the side clamp does not lift the weight, back both setscrews out slightly and repeat the test.
5. To be sure the side clamp springs are set properly, place a 300-gram weight on top of the side clamp to be test. Depress the side clamp to the full open position and release slowly.
6. The side clamp should remain open with the 300-gram weight, holding it in this position. If it does not stay in the open position, turn both setscrews in slightly and repeat the test.
7. As a point of reference, the setscrews should protrude 4.5 to 5.0 mm from the side clamp frame. If the dimension is significantly off, the spring(s) may be weak, or there may be a mechanical bind.
8. After replacing any side clamp spring, perform pocket test 808 (side clamp test with film).

Side Clamps Horizontal Plane Check

Using a straight edge, verify that all the Side Clamps are on a horizontal plane with each other. Maximum allowable error is ± 0.5 mm (Figure 7-29).

If a clamp is out of tolerance, use tool part number 084065020 to carefully bend the individual clamp up or down.

Proceed to the side clamp pressure adjustment procedure to test clamping pressure.

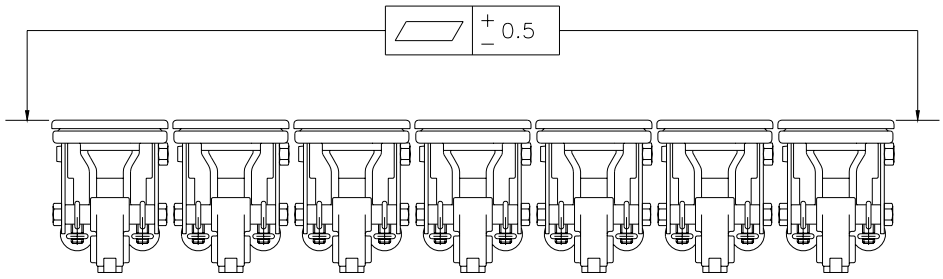
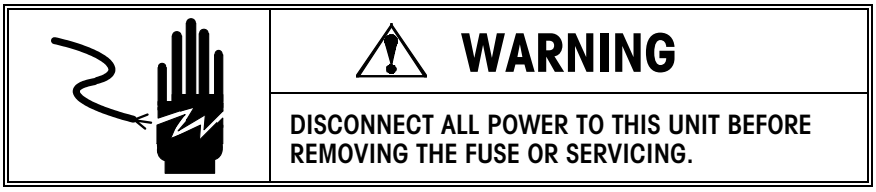


Figure 7-29: Side Clamps Horizontal Plane Check

Front to Rear Side Clamp Alignment

The vertical position of the side clamps is critical to prevent packages shifting sideways when the side clamps come in to tuck the film.



1. Push the Center Clamp back away from the sealing belt so that the skis are not touching the side clamps.
2. Rotate the clamp opening cam motor pulley until the side clamps are fully closed.
3. Push the side clamps all the way to the center of the machine.
4. Measure from the top of the machine to the top of the side clamps closest to the sealing belt.
5. If the side clamp vertical positions (D Rear and D Front) are not within 0.5 mm of one another, loosen the side clamp guide track(s), and adjust for proper alignment.

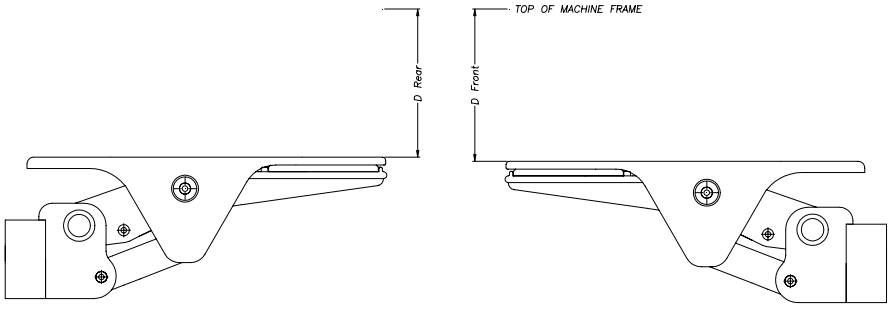


Figure 7-30: Front to Rear Side Clamp Alignment

Side Clamp Pressure Distribution

The clamping pressure on the pads of the side clamps must be set properly to prevent film tearing during the side stretch operation. Figure 7-31 shows the optimum pressure distribution. If the pad pressure is higher near the throat of a clamp, the film will have a tendency to tear at this clamp. This happens because during normal operation, the film moves somewhat in the clamp pad during the side stretch. If the edge of the film is held more tightly than the area closer to the nose of the clamps, a weak spot will develop between the two points and the film will have a tendency to tear.

To check the pressure distribution, use two strips of standard copier paper 12mm wide and at least 100mm long. Check the clamping pressure distribution front to back and left to right by placing the strips parallel about 25mm apart. Compare the amount of force required to pull out each strip. To adjust this pressure, the upper jaw should be bent or twisted carefully using tool P/N 084065020 to increase or decrease the pressure as required.

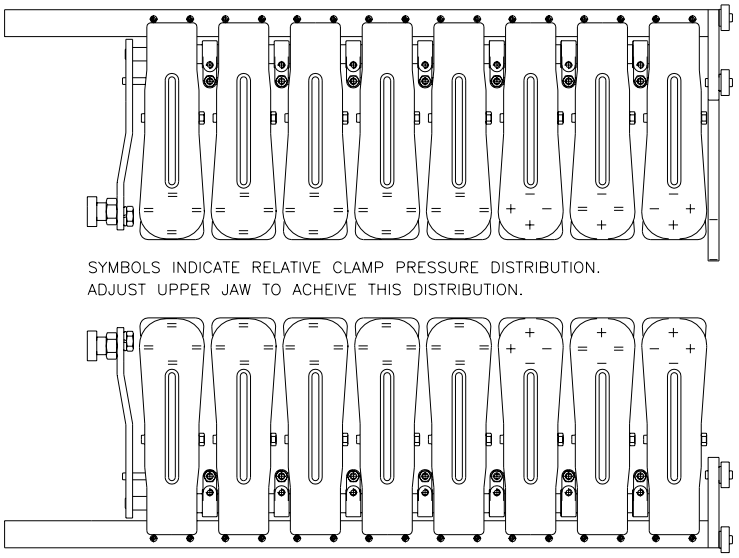
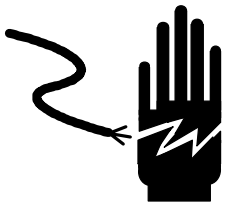


Figure 7-31

Side Clamp Sequential Opening - Individual

Associated Pocket Test:
808 Side Clamp Test with Film

To ensure a properly wrapped package, each side clamp should open sequentially starting with the clamp furthest from the sealing belt. This timing is checked using pocket test 808. If an individual clamp has fallen out of adjustment, the best solution is to adjust this clamp opening alone, using the Side Clamp Adjustment Tool P/N 084050020.



⚠ WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

Refer to Figure 7-32 and proceed as follows:

1. Be sure the actuator arm retaining screw (Item 41) has been tightened to 90 in-lb.
2. Loosen the jam nut (Item 39) holding the adjustment setscrew (Item 40) in place.
3. If the clamp is opening too soon, back the setscrew out slightly so the clamp opens in time with its neighbors. If the clamp is opening too late, turn the setscrew in slightly. **Note: the clamp farthest from the sealing belt is not adjustable in this manner and must be adjusted as described in the section Side Clamp Sequential Opening - Group.**
4. If there is insufficient travel in the setscrew to bring the clamp into adjustment, adjust the actuator arm as follows:
    - Loosen the clamp retaining screw (Item 41).
    - Turn the adjustment setscrew (Item 40) until it is centered in its travel.
    - Rotate the clamp opening cam until the clamps are in the closed position, or pull the side clamp out until the eccentrics are clear of the T-bar.
    - Rotate the actuator arm (Item 16) around the shaft until the adjustment setscrew rests against the clamp opening dowel pin (Item 4). Retighten the actuator arm retaining screw to 90 in-lb.
    - Proceed by adjusting the clamp opening timing as described previously.
5. Once the timing for the clamp has been set, retighten the jam nut (Item 39) while holding the adjustment setscrew in position.
6. As a final check of the adjustments, run pocket test 808.

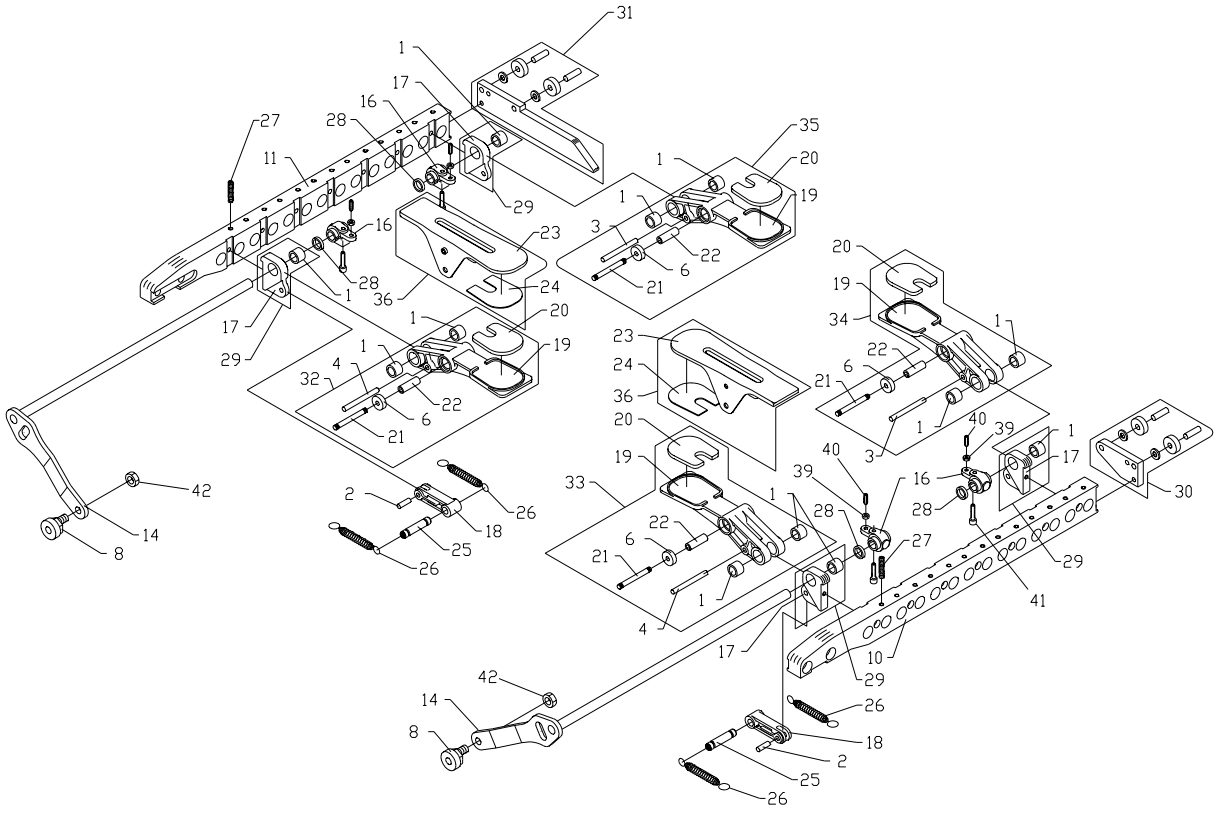

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Figure 7-32

Side Clamp Sequential Opening - Group

Associated Pocket Test:
808 Side Clamp Test with Film

To ensure a properly wrapped package, each side clamp should open sequentially starting with the clamp farthest from the sealing belt. This timing is checked using pocket test 808. The timing for the whole side clamp must be set if the clamp farthest from the sealing belt is not opening in time with its neighbors or the whole side clamp is excessively out of adjustment. The following procedure describes how to set the opening timing using feeler-gauges made of stacks of paper:

1. Be sure the actuator arm retaining screws (Item 41, Figure 7-32) have been tightened to 90 in-lb.
2. Loosen the jam nuts (Item 39, Figure 7-32) holding the adjustment setscrews (Item 40, Figure 7-32) in place.
3. Form rectangles of standard copier paper approximately 40mm x 100mm in size, into 8 stacks containing 1, 2, 3, 4, 5, 6, 7 and 8 rectangles respectively. Staple or otherwise secure one end of each stack. An alternate method is to use sticky notes to form the stacks. For later reference, the stacks can also be labeled with the number of pages each contains.
4. Push the side clamp requiring adjustment in towards the center of the machine.
5. Rotate the clamp-opening cam so that the largest stack of rectangles can be inserted into the clamp closest to the cam.
6. Block the cam in this position by inserting an Allen wrench or similar item into the opening between the belt and the pulley on the cam assembly. The stack of rectangles should be held somewhat loosely in the clamp at this point. If necessary, readjust and block the cam position to set this retention force.
7. Proceed to place the successively smaller stacks of rectangles in the remaining clamps. Open the clamps by hand to insert the stacks of rectangles.
8. Using the inserted stacks of paper as feeler-gauges, set the opening of each clamp by turning the adjustment setscrews (Item 40, Figure 7-32) in or out. For best results, use the retention force on the clamp furthest from the sealing belt as a guide for each clamp.
9. If there is insufficient travel in the setscrew to bring the clamp into adjustment, adjust the actuator arm as follows:
    - Loosen the clamp retaining screw (Item 41, Figure 7-32).
    - Turn the adjustment setscrew (Item 40, Figure 7-32) until it is centered in its travel.
    - Rotate the clamp opening cam until the clamps are in the closed position, or pull the side clamp out until the eccentrics are clear of the T-bar.
    - Rotate the actuator arm (Item 16, Figure 7-32) around the shaft until the adjustment setscrew rests against the clamp opening dowel pin (Item 4, Figure 7-32). Tighten the actuator arm retaining screw 90 in-lb.
    - Proceed by adjusting the clamp opening timing as described previously.
10. Once the clamp openings have been set, tighten all the jam nuts (Item 39, Figure 7-32) to secure the adjustment setscrews in place.
11. Recheck the size of the opening for each clamp and adjust if necessary.
12. **Remove the allen wrench previously inserted in the opening between the belt and pulley.** As a final check of the adjustments, run pocket test 808, paying particular attention to the sequential release of the film.

Side Clamp T-bar Leveling

Associated Pocket Test:
604 Clamp Opening Cam Movement
654 Clamp Opening Cam Movement w/o Retiming
810 Cam Operation Test

The T-Bar which operates the side clamps must be properly oriented in the machine in order for both side clamps to open at the same time. The timing between the front and rear side clamps is critical to prevent packages shifting sideways when the side clamps come in to tuck the film under the package.

To check the T-bar proceed as follows:

1. Push the Center Clamp back away from the sealing belt so that the ski's are not touching the side clamps.
2. Rotate the clamp opening cam motor pulley until the side clamps are fully closed.
3. Pull the side clamps all the way from the center of the machine.
4. Lay a straightedge across the machine frame. At one end of the T-bar, measure the distance from the bottom of the straight edge to the bottom of the T-bar (DIM. A). Repeat this procedure at the opposite end of the T-bar (DIM. B). See Figure 7-33.

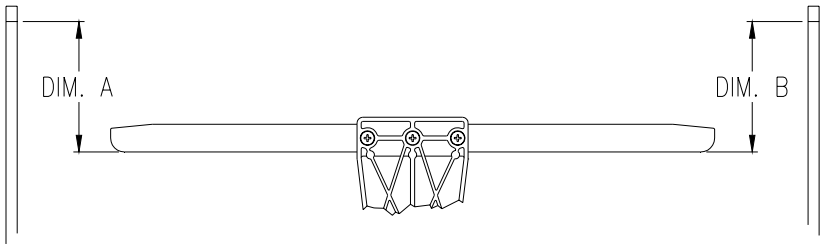

Figure 7-33: Side Clamp T-bar Leveling

5. Compare the measurements. They must be within 1mm of one another.
6. If the measurements differ by more than this, the alignment of the cam assembly must be changed.
7. Loosen the two retaining bolts (Item 29, Figure 7-34) and two retaining nuts (Item 30, Figure 7-34) at the base of the cam assembly. Slightly loosen, the dog point setscrews at the top (Item 7, Figure 7-34).
8. Tap the base of the gripper drive frame to swing it around the setscrews at the top and bring the T-bar into alignment. Note: If there is insufficient clearance in the screw holes to make this adjustment, something is bent or broken. Identify the offending item and replace it.
9. Retighten all screws. When tightening the alignment setscrews at the top, avoid overtightening them as they can bend the side clamp linear actuator case. When the jam nuts (Item 6, Figure 7-34) are tightened, the setscrews will be held securely.

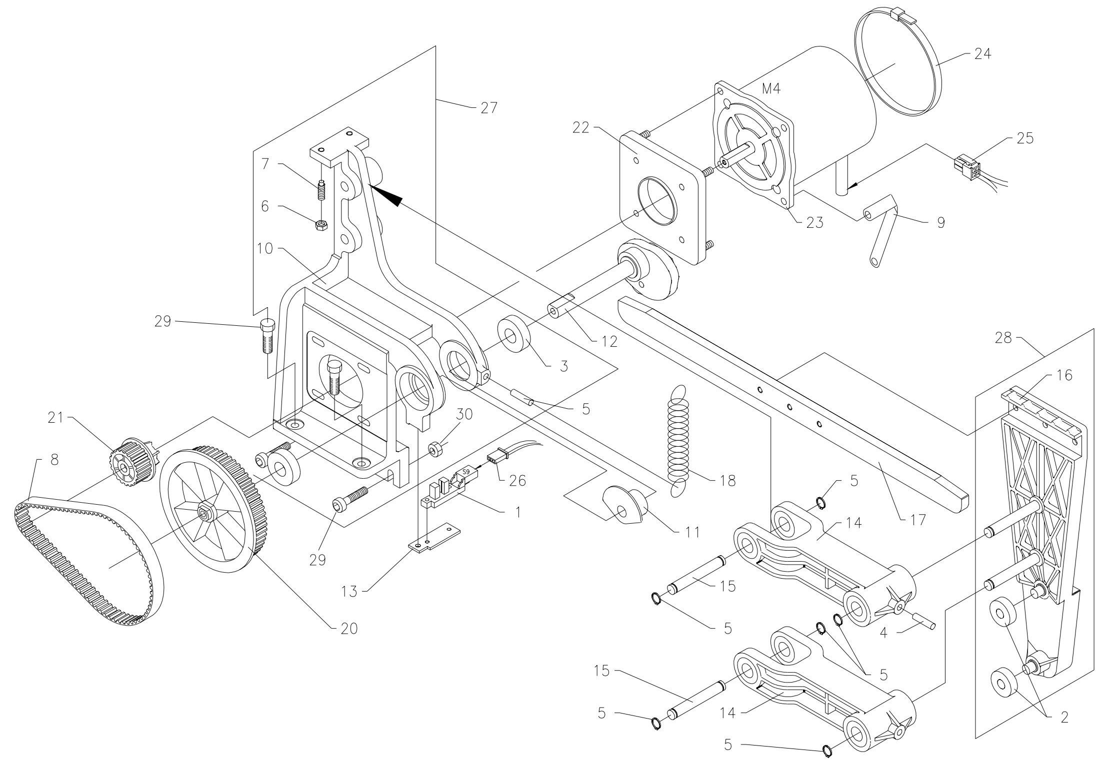
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Figure 7-34

Side Clamp Sensor

Associated Pocket Test:
211 Clamp Opening Cam Sensor
810 Cam Operation Test

The cam encoder disk (Item 11, Figure 7-34) allows the CPU to accurately position the cam to provide the three side clamp openings - closed, small opening, large opening. If the encoder is not positioned properly, the machine will not run and status code 41 or 42 will be displayed.

To properly position the encoder, proceed as follows:

1. Rotate the cam pulley until the side clamps come to rest in the small open position.
2. Position the encoder as shown in Figure 7-35. Tighten the visible setscrew just enough to hold the encoder in place.

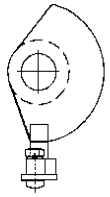


Figure 7-35: (Looking Toward Sealing Belt)

3. Using the pocket, run test 604. During this test, the machine will cycle through the different cam positions as the <ENTER> key is pressed. Watch the cam follower to be sure that the cam stops with the follower in the detents.
4. If the follower falls into the detents AFTER the motor stops, or the follower comes to rest on either side of a detent, loosen the previously tightened setscrew and rotate the encoder disk a little at a time as required to allow the CPU to always position the follower in the detents. Note: be sure to always keep the encoder disk centered in the sensor opening to avoid damage.
5. After setting the encoder flag, retighten the setscrews. **Do not Loctite these setscrews**.

Side Clamp Eccentric Position and Adjustment

Associated Pocket Test:
808 Side Clamp Test With Film

With the side clamps closed, there should be about 1.5 mm of clearance between the underside of the T-bar and the side clamp eccentrics. If this clearance is not maintained, the side clamps can prematurely release the film during the side stretch operation. The exact clearance is set using test 808, Side Clamp Test With Film:

1. Remove the film from the Center Clamp and unwind a little by hand. Proceed to run test 808 using the pocket.
2. The machine will position itself so subsequent <ENTER> keypresses will open the side clamps in stages. Count the number of keypresses required to release the film from the individual clamp furthest from the sealing belt on the rear side. **NOTE: Film tracking must be centered before operating this test.**
3. If the film is not released from this clamp within 8 to 10 keypresses, the eccentric (Item 8, Figure 7-32) needs to be adjusted.
4. To make the film release sooner, rotate the eccentric so the roller is closer to the T-bar. To make the film release later, rotate the eccentric so the roller is further from the T-bar.
5. To make this adjustment, loosen the 14mm nut (Item 42, Figure 7-32) securing the eccentric to the side clamp lever (Item 14, Figure 7-32).

6. Using a thin 17mm wrench, rotate the eccentric as required and retighten the nut.
7. Repeat the test and adjustment until the timing of the film release is correct.
8. Run pocket test 808 again. When the machine has stretched a web of film, trace the outline of the clamps with a marker so the film release is more easily seen.
9. Press and hold the <ENTER> key on the pocket and observe the film release. The film should be released first from the end closest to the clamp opening cam within the previously set 8-10 keypresses. As <ENTER> is continually pressed, the film should be subsequently released from clamps 1, 2, 3, and so on. See Figure 7-36.
10. The film release should be between opposing clamps within 3 keypresses. If the front side clamp is releasing the film more than 3 keypresses before the rear side, rotate the eccentric on the front side clamp so the roller is farther from the T-bar. On the other hand, if the rear side clamp is releasing the film more than 3 keypresses before the front side, rotate the eccentric on the front side clamp so the roller is closer to the T-bar.

Note: If the time required to completely release the film from one side once it has started releasing is significantly greater on rear side compared to the front (or vice versa), the sequential opening of the side clamps must be adjusted.

11. Repeat the test and adjustment until both sides release the film within 3 keypresses of one another.

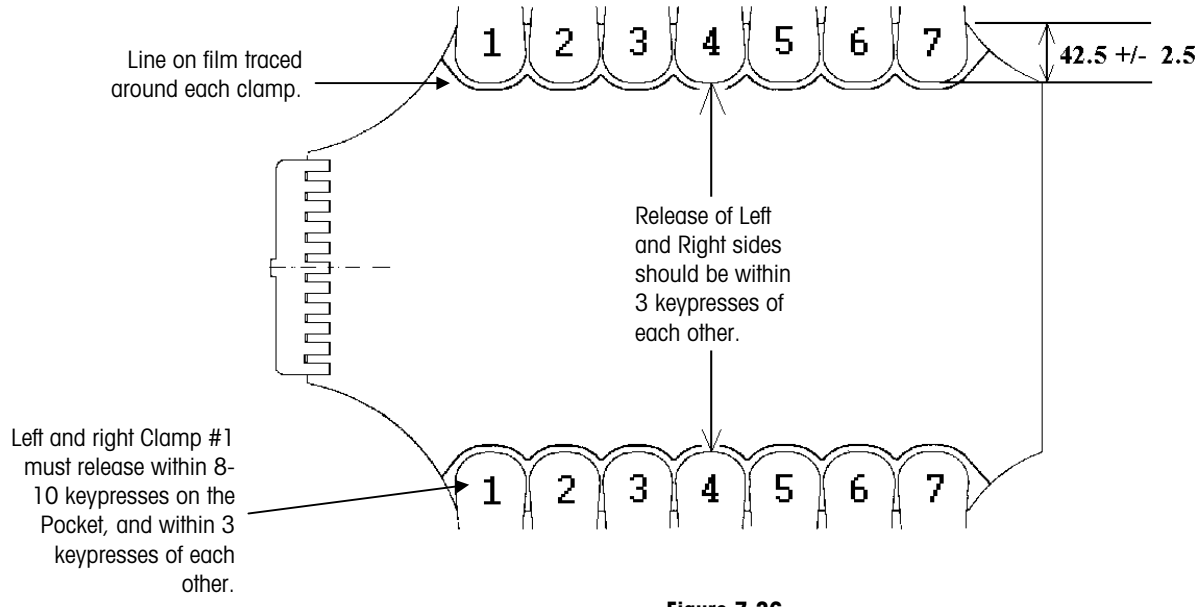


Figure 7-36

Side Clamp Test With Film

Test 808 should be used to verify the release timing of the side clamps, as well as the film tracking. When this test is run, the quantity of film grasped by each Side Clamp must be equal within 6mm (Figure 7-36). This is to verify the film is centered in the machine. If the film is not centered within this tolerance, refer to the section on Film Tracking.

The test reveals:

- The accuracy of the timing between the two side clamps, see Side Clamp Eccentric Position.
- The accuracy of the sequential opening, see Side Clamp Sequential Opening (Individual) and Side Clamp Sequential Opening (Group).
- The accuracy of the eccentric adjustments, see Side Clamp Eccentric Position.

Side Clamp Springs

Installation Tip: Take a 3" piece of 13 gauge music wire, or equivalent, and bend it in half leaving a 1/8" diameter loop at the end. Clamp the bent wire in Vise Grip pliers and use the loop to stretch the spring over the setscrew.

When replacing side clamp springs make sure that you apply a liberal coating of food grade grease, such as CPI Grease Type GRS-460-F (P/N 82909400A) or equivalent, to the pivot points where the spring is attached. If more than one or two springs are changed on the same side clamp, some adjustment may be required.

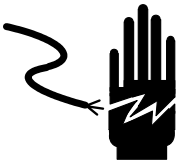
Distributor

This section covers parts replacement and adjustments to the distributor.

Film Clamp Pad Replacement

1. Lift the sealing belt assembly.
2. Remove the film from the distributor.
3. Remove the two Phillips-head screws that secure the film clamp pad.
4. Remove the film clamp pad.
5. Install the new film clamp pad.
6. Proceed to the distributor clamp adjustment section. All distributor clamp adjustments must be checked.

Distributor Electromagnet Assembly Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Disconnect power to the Model 645.
2. Remove front and rear covers from the machine.
3. Remove the Plexiglas interior shield located behind the film roll.
4. Disconnect the magnet from the power cable.
5. Remove the M4 self-locking nut from the bottom of the magnet, remove the defective magnet, and replace it with the new magnet.
6. Reassemble in reverse order.
7. Proceed to the distributor clamp adjustment section. All distributor clamp adjustments must be checked.

Position of the Distributor Clamp Plate (Toothed Side)

The distance between the tips of the distributor teeth and the teeth of the clamp plate must be 0.8 ± 0.2mm. Refer to Figure 7-37. Use a feeler gauge to determine the width of this opening, if necessary, adjust the opening as follows:

1. Loosen the two screws at each end of the knife mount, as well as the locking nuts on the clamp plate adjustment setscrews. Blue Loctite should be applied to the retaining screws at this time.
2. Rotate the knife mount a few degrees as required to increase or decrease the clearance between the clamp plate and the distributor. Retighten the screws enough to hold the knife mount in this position.
3. Turn the adjustment setscrews to roughly set the 0.5 mm clearance between the distributor and the raised area of the clamp plate. Use a feeler gauge to check the 0.8 mm gap at the tips of the teeth. If the width of the opening is not uniform from one end of the plate to the other, tap lightly on the knife mount near the end with the wider space.
4. If the 0.8 mm gap is still not within tolerance, repeat the adjustment and measurement.
5. Once the gap has been set, proceed to the adjustment of the Distributor Clamp Plate (clamping side).

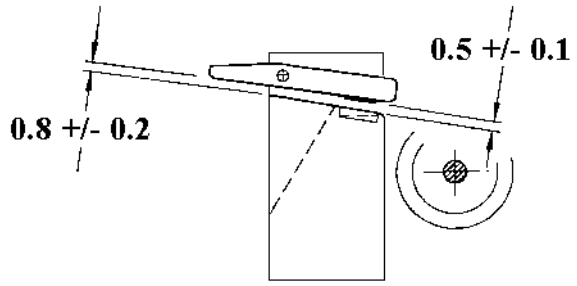


Figure 7-37: Position of the Distributor Clamp Plate (Toothed Side)

Position of the Distributor Clamp Plate (Clamping Side)

At this point, the opening between the teeth on the clamp plate and the teeth on the distributor should have been set. If not, go to the previous section.

The distance between the top face of the distributor and the raised area of the clamp plate must be 0.5 ± 0.1mm. Refer to Figure 7-37. Use a feeler gauge to determine the width of this opening. If necessary, adjust the opening as follows: (Note: When making the measurement, be sure the feeler gauge spans the recess in the distributor.)

1. Loosen the locking nuts on the clamp plate adjustment setscrews.
2. Back-out the front adjustment setscrew so it does not contact the clamp plate.
3. Turn the rear adjustment setscrew as required to set the size of the opening. Check the width of the opening at several positions across the clamp plate. **Note: The gap must be uniform for the machine to operate properly.**
4. If the width of the opening is not uniform from one end of the plate to the other, slightly loosen the screws holding the knife mount at the end with the wider space. Tap this end down to decrease the space between the clamp plate and the distributor. Retighten the screws and recheck the opening - the adjustment setscrew may have to be adjusted to allow the feeler gauge to be inserted.
5. If the width of the opening is still not uniform from one end of the plate to the other, loosen the screws holding the knife mount at the end with the tighter space. Thread an M4 screw into the opening on top of the knife mount and lift up on it to lift the knife mount and distributor clamp plate at this end. Retighten the screws and recheck the opening. **Note: Be sure to remove the lifting screw before running the machine - the adjustment setscrew may have to be changed to allow the feeler gauge to be inserted.**
6. The previous two steps may have to be repeated several times to achieve a uniform distributor opening.
7. Once the gap has been set the screws holding the knife mount should be tightened and secured with Blue Loctite®. Secure the distributor opening adjustment by carefully tightening the adjustment setscrew jam nuts.
8. Proceed to adjust the Position of the Distributor Magnets as described in the following section.

Position Of the Distributor Magnets

Associated Pocket Test:
502 Distributor Magnet Output
813 Distributor Magnet Closure Test

For proper operation, the distributor clamp plate must hold the film securely across its entire width. To check and adjust the clamping, proceed as follows:

1. Using the Diagnostic Pocket, run test 813, "Distributor Magnets Closure Test."
2. If the paper strips are held with equivalent, but inadequate force:

   Check the position of the magnets. If the magnets are protruding, lower both magnets slightly and repeat the test. Continue lowering the magnets until the strips of paper are clamped firmly, or the magnets are flush with the surface of the distributor.

   If the magnets are flush with the surface of the distributor, and there is inadequate clamping force, shim the distributor rubber 0.1mm and repeat the test. Be sure the surface of the rubber does not extend above the surface of the distributor.
3. If the paper strips are held with unequal force:

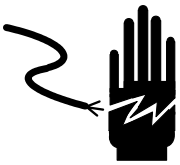
   Check the position of the clamp plate when the magnets are energized. If one of the magnets is higher than the other and preventing the clamp plate from holding the paper firmly, lower the height of the higher magnet slightly. Repeat the test.

   If the magnets protrude equally, and the distributor clearance (0.5 mm) is correct, position a 0.1 mm thick shim under the distributor rubber in the most weakly held area. Repeat the test.

Film Lifter

This section covers parts replacement and adjustments for the film lifter.

Film Lift Lever Replacement



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

To replace a broken film lift lever, proceed as follows (Refer to Figure 7-38):

1. Disconnect power to the machine.
2. Disconnect the film lifter tension spring (Item 16, Figure 7-38).
3. Remove the two screws securing the rear side clamp guide track (Item 36).
4. Remove the grip ring (Item 12) holding the film lifter link (Item 43) in place.
5. Remove the film lifter assembly.
6. Remove the snap ring (Item 11) holding the film lifter wrist pin (Item 22) and remove the film lift lever.
7. Reassemble in reverse order.
8. Be sure to check for proper height and movement.

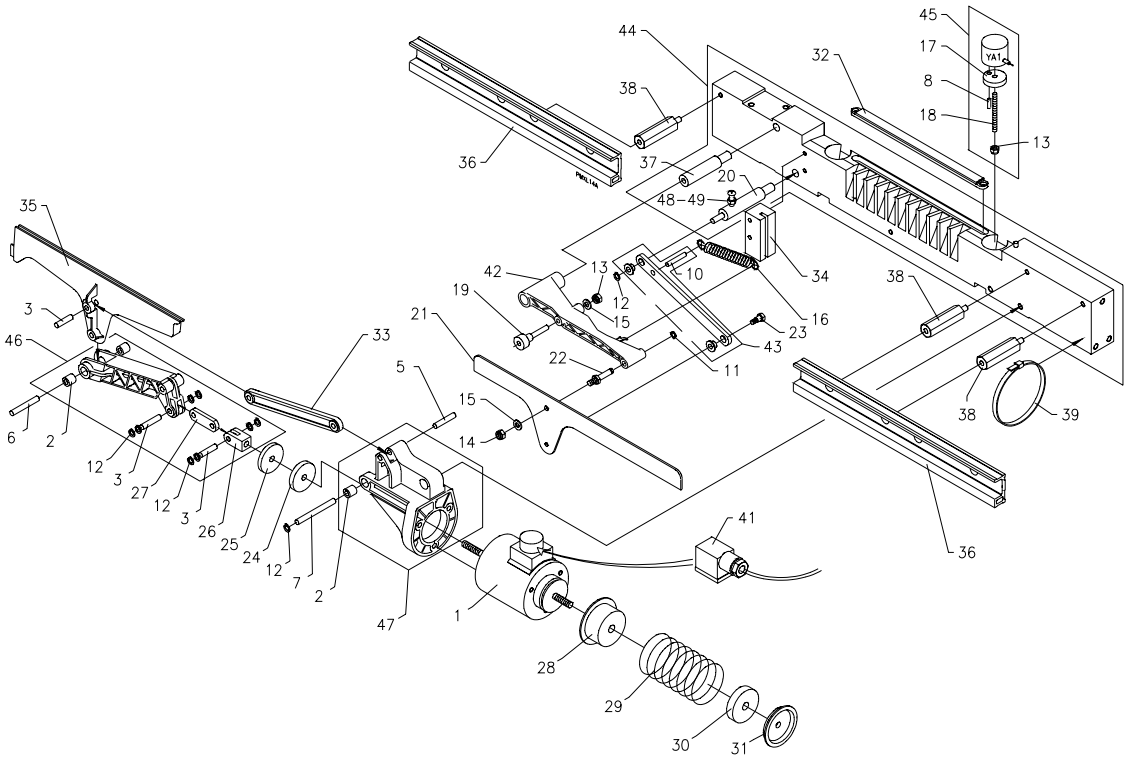
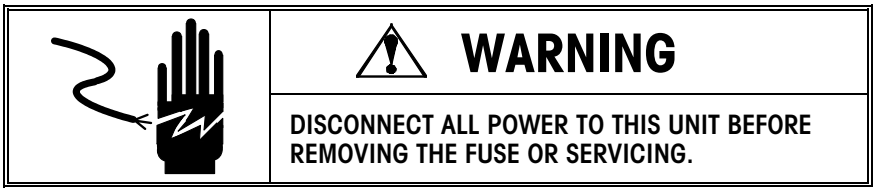


Figure 7-38

Film Lifter High Position Adjustment

Adjust the high position of the film lifter as follows:



1. Push the rear side clamp to the center of the machine. The film lifter will be raised to the high position.
2. Measure from the top of the machine frame to the top of the film lifter. Take this measurement at both the front and rear ends of the film lifter.
3. This distance should be 110 ± 0.5 mm on both ends see Figure 7-39. If these measurements are not correct, loosen the retaining nut (Item 14, Figure 7-38).
4. Move the film lifter about the hole clearance as required to bring it into alignment.
5. Retighten the nut.

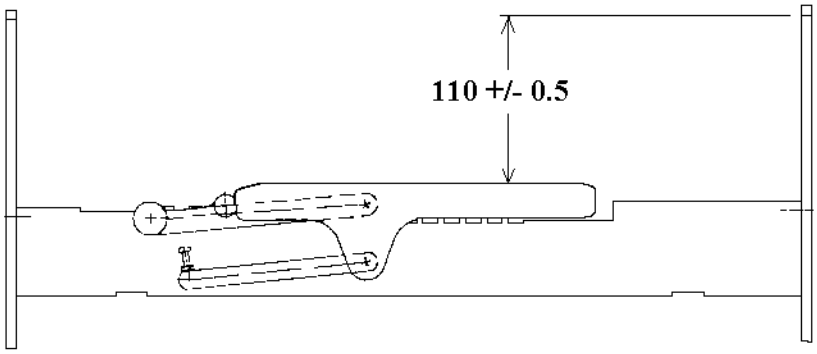
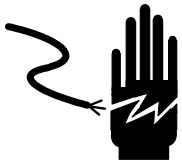


Figure 7-39

Film Lifter Low Position Adjustment

Adjust the low position of the film lifter as follows:



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Pull the rear side clamp to the full-stretch position. The film lifter will fall to its low position.
2. Measure from the top of the machine frame to the top of the film lifter.
3. This distance should be 170.0 ± 0.5mm (See Figure 7-40). If this measurement is not correct, loosen the jam nut holding the stop screw (Item 48, Figure 7-38) in place.
4. Adjust the stop screw as required to bring the film lifter into position.
5. Retighten the jam nut.

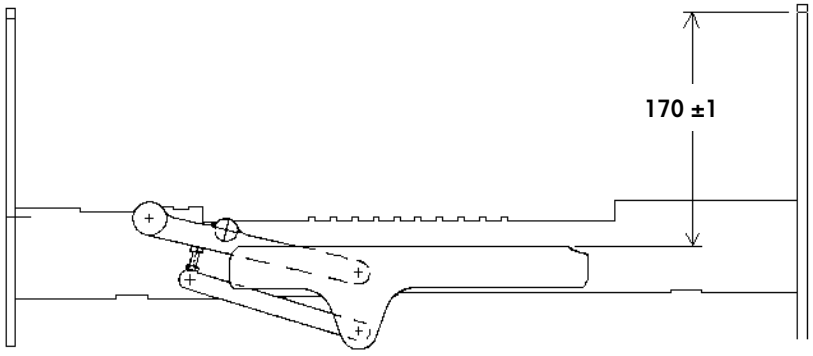


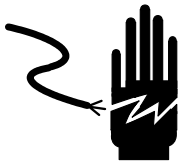
Figure 7-40: Film Lifter Low Position Adjustment

Cutter Assembly

This section covers parts replacement and adjustments for the cutting channel assembly.

Cutting Channel Replacement

To replace a broken cutting channel, proceed as follows:



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-41.

1. Disconnect the plug (Item 54) from the solenoid (Item 2) by loosening the plug retaining screw and pulling the plug free.
2. Remove the cutting assembly from the machine by removing the two retaining screws (Item 19).
3. Lay the cutting assembly on a sturdy work surface. Align the assembly over a deep-well socket so the lower pivot pin (Item 8) is positioned over the opening in the socket.
4. Using a drift punch and a hammer, drive the lower channel pivot pin (Item 8) through the front bearing (Item 3), out of the cutting channel and the rear bearing.
5. Drive the upper pivot pin (Item 5) out the rear of the channel (Item 45) using a similar procedure.
6. Position the new cutting channel so the lower pivot is aligned with the bearings in the channel drive lever (Item 35).
7. Insert the tapered end of the lower pivot pin (Item 8) into the front bearing (Item 3). Drive it through the cutting channel and into the rear bearing. The pin should be driven in until it is **flush** with the back surface of the channel drive lever. Be sure to provide adequate support at the rear of the channel drive lever to prevent breaking it.
8. Align the hole in the knife parallel link (Item 42) with the matching hole in the new cutting channel.
9. Drive the upper pivot pin (Item 5) into the front hole in the cutting channel, through the hole in the knife parallel link (Item 42), and into the rear hole in the cutting channel. The pin should be driven in until it is **flush** with the back of the cutting channel.
10. The bearings at the forked end of the channel drive lever should be positioned as shown in the auxiliary view of Figure 7-41. Doing so prevents the cutting channel moving toward the front and striking the knife during the film cut.
11. Reinstall the cutting assembly into the machine and adjust the high and low positions of the channel.

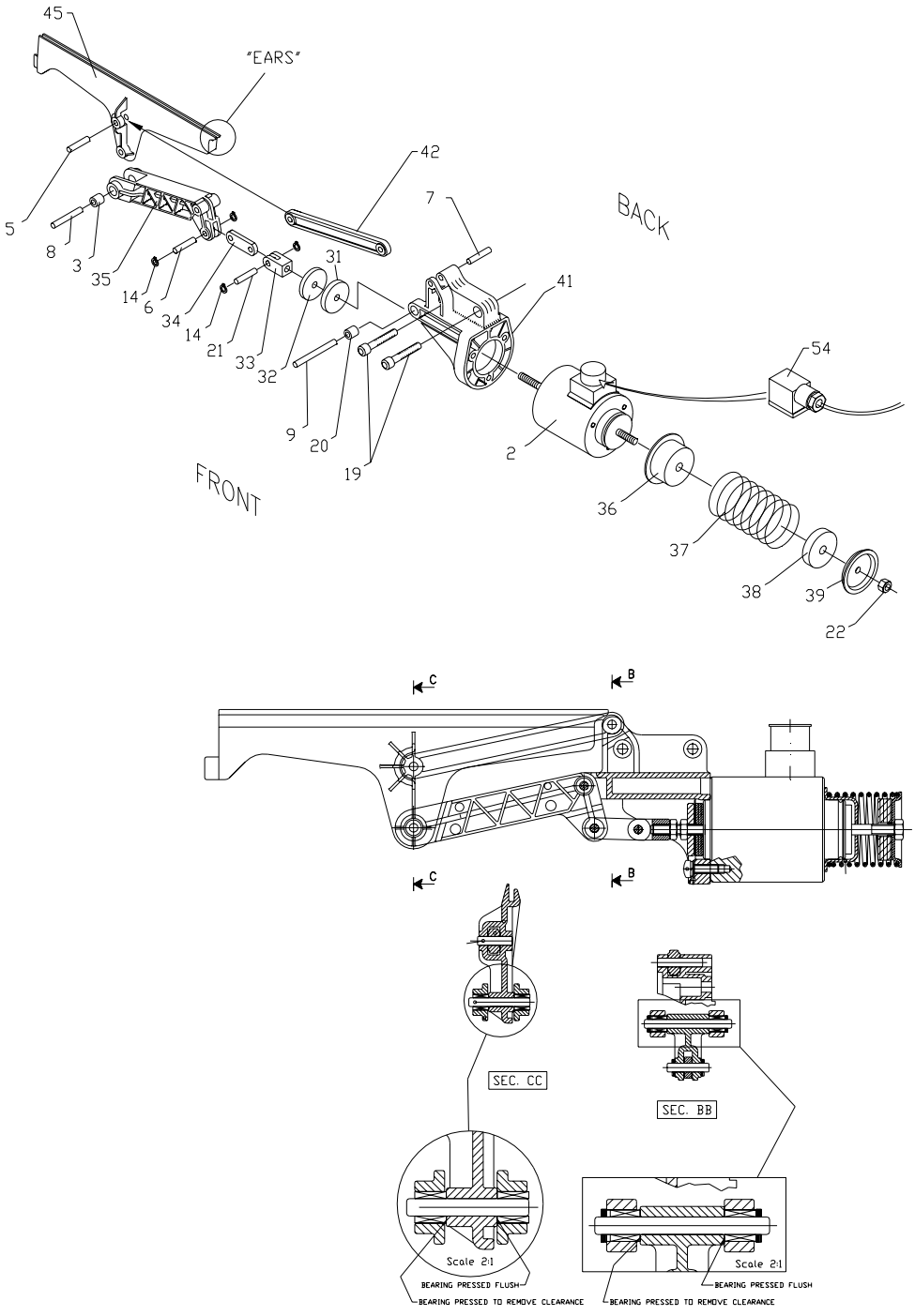
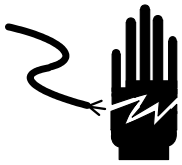


Figure 7-41: Cutting Channel Replacement

Channel Drive Lever Replacement

To replace a broken channel drive lever, proceed as follows:



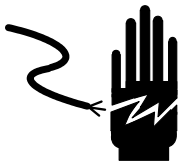
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-41.

1. Disconnect the plug from the solenoid (Item 2) by loosening the plug retaining screw and pulling the plug free.
2. Remove the cutting assembly from the machine by removing the two retaining screws (Item 19).
3. Lay the cutting assembly on a sturdy work surface. Align the assembly over a deep-well socket so the lower pivot pin (Item 8) is positioned over the opening in the socket.
4. Using a drift punch and a hammer, drive the lower channel pivot pin (Item 8) through the front bearing (Item 3), out of the cutting channel and the rear bearing.
5. Remove the grip rings from both ends of the lower mount pivot pin (Item 9)
6. Drive the lower mount pivot pin (Item 9) out the rear of the mount (Item 41) using a similar procedure.
7. Loosen the jam nut holding the clevis (Item 33). Unscrew the clevis and drive lever from the end of the solenoid plunger shaft.
8. Thread the clevis of the new drive lever assembly onto the end of the solenoid plunger shaft.
9. Align the hole in the new channel drive lever with the matching holes in the solenoid mount.
10. Insert the tapered end of the lower mount pivot pin (Item 9) into the front bearing (Item 20). Drive the pin through the channel drive lever and into the rear bearing. The pin should be driven in until it protrudes equally from both the front and back.
11. The bearings at the mounting end of the channel drive lever should be positioned as shown in the auxiliary view of Figure 7-41. Doing so prevents the cutting channel moving toward the front and striking the knife during the film cut.
12. Reinstall the grip rings on the lower mount pivot pin (Item 9).
13. Insert the tapered end of the lower pivot pin (Item 8) into the front bearing (Item 3) of the channel drive lever. Drive it through the cutting channel and into the rear bearing. The pin should be driven in until it is **flush** with the back surface of the channel drive lever. Be sure to provide adequate support at the rear of the channel drive lever to prevent breaking it.
14. The bearings at the forked end of the channel drive lever should be positioned as shown in the auxiliary view of Figure 7-42. Doing so prevents the cutting channel moving toward the front and striking the knife during the film cut.
15. Reinstall the cutting assembly into the machine and adjust the high and low positions of the channel.

Knife Replacement



⚠ WARNING

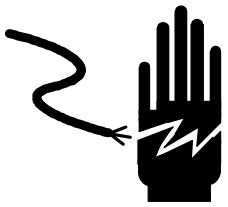
DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

To replace a dull or broken cutting blade, proceed as follows:

1. Loosen the setscrews.
2. Replace the blade.
3. Tighten the setscrews.
4. Follow-up with a Cutting Location Check as described later in this section.

Perform the cutting assembly adjustments and checks in sequence, starting with Internal Clearance.

Cutting Solenoid Internal Clearance Adjustment



WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

Associated Pocket Test:
503 Cutter Magnet Output

To prevent damage to the solenoid, adjust the internal clearances as follows:

1. Open the sealing belt. Run output test 503 using the Diagnostic Pocket. **WARNING: the solenoid will fire quite forcefully!** As the solenoid fires, listen carefully for any impact of the solenoid plunger with the solenoid body.
2. If an impact is heard, loosen the jam nut (Item 22, Figure 7-41) holding the adjustable solenoid stop (Item 39, Figure 7-41.)
3. Thread the solenoid stop (Item 39, Figure 7-41) further onto the plunger shaft until the solenoid just stops impacting internally.
4. Rotate the solenoid-stop an additional 1/2 turn. This will provide an additional 0.5 mm of internal clearance. Refer to Figure 7-42 for details.
5. Retighten the jam nut.
6. Follow-up with checks and adjustments of the channel high and low positions.

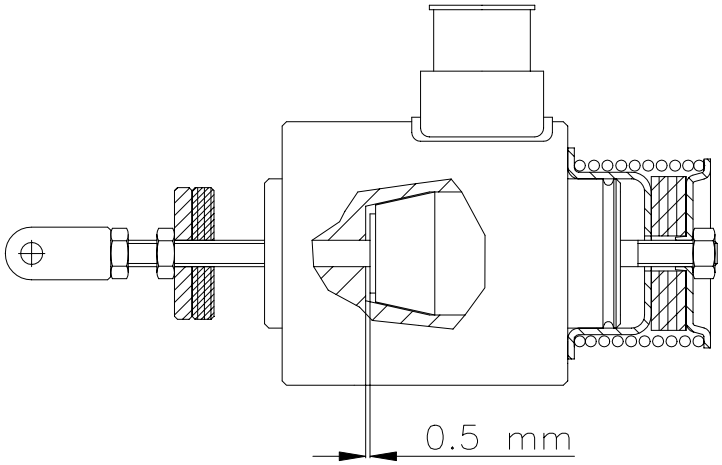
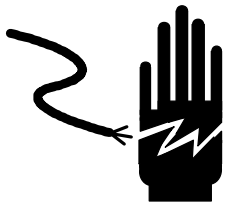


Figure 7-42: Cutting Solenoid Internal Clearance Adjustment

Cutting Channel High Position Adjustment

The internal clearance of the solenoid should be set at this point. If this clearance has not been checked or set, proceed to the previous section "Cutting Solenoid Internal Clearance Adjustment".

Associated Pocket Test:
503 Cutter Magnet Output
812 Cutter Channel Positioning Test



⚠ WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

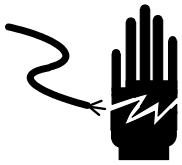
Best results are obtained by setting the upper channel position as follows:

1. Run output test 503 using the Diagnostic Pocket. **WARNING: the solenoid will fire quite forcefully!** While power is applied to the solenoid, measure from the top of the machine frame to the top of the cutting channel.
2. At the same time, check visually to be sure the cutting channel is parallel to the top surface of the distributor within 1mm. If it is not, proceed as follows:
   - Remove power from the machine.
   - Loosen the two mounting screws (Item 19, Figure 7-41.)
   - Pivot the mount as required to make the top edge of the channel parallel with the distributor.
   - Retighten the mounting screws.
3. The distance from the top of the machine frame to the top of the engaged cutting-channel should be 110 ± 0.5 mm.
4. If this measurement is not correct, make note of the actual dimension and remove power from the machine.
5. Loosen the jam nut securing the clevis (Item 33, Figure 7-41).
6. If the previously measured distance was too great, rotate the solenoid plunger counterclockwise (as viewed from operator position). This will raise the high position of the cutting channel. Conversely, rotating the plunger clockwise will lower the high position of the channel.
7. Repeat the test and adjustment until the correct measurements are achieved. While making these adjustments, pay close attention to the front end of the cutting channel so the extended "ears" do not strike the mount when in the low position. Refer to the section Cutting Channel Low Position Adjustment to see how to change the low position.
8. Secure the adjustment by tightening the jam nut against the clevis.
9. As a final check, close the sealing belt, engage the cutter solenoid (test 503), and listen carefully for impact of the cutting channel with the knife mount. If an impact is heard, lower the cutting channel as described previously until no more impact is heard. Be aware that the high position of the channel can vary depending on the local line voltage. **Having the "no impact" condition is more important than holding the 110 mm dimension.**

10. Perform the Cutting Channel Low Position Adjustment after making these checks and adjustments.

Cutting Channel Low Position Adjustment

The Cutting Channel High Position must be set properly before proceeding. If this adjustment/check has not been performed, proceed to the previous section "Cutting Channel High Position Adjustment".



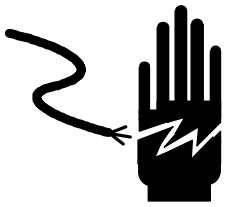
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Best results are obtained by setting the low channel position as follows:

1. Disconnect power to the machine.
2. With power removed from the machine, measure from the top of the machine frame to the top of the cutting channel. This measurement should be 155 ± 0.5 mm.
3. If this measurement is not correct, make note of the actual dimension.
4. Loosen the jam nut securing the solenoid stop (Item 32, Figure 7-41).
5. If the previously measured distance was too great, rotate the stop counterclockwise (as viewed from the operator position.) This will raise the low position of the cutting channel. Conversely, rotating the stop clockwise will lower the low position of the channel.
6. Repeat the measurement and adjustment until the correct distance is reached. As a rule of thumb, when the low position is properly set, there is less than 1mm of clearance between the "ears" on the front end of the cutting channel and the solenoid mount (Item 41, Figure 7-41).
7. Secure the adjustment by tightening the jam nut against the solenoid stop.
8. As a final check, close the sealing belt, and cycle the center clamp to the discharge end of the machine by hand. As the center clamp gets close to the film pick position, look to be sure there is at least 1mm clearance between the underside of the gripper pivot block (on the center clamp) and the top of the cutting channel.

Cutting Location Check



⚠ WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

To be sure everything has been adjusted properly, check the cutting channel position relative to the knife as follows:

Associated Pocket Test:
503 Cutter Magnet Output
812 Cutter Channel Positioning Test

1. Cover the top opening of the cutting channel with a length of masking tape.
2. Close the sealing belt.
3. Engage the cutting solenoid momentarily using Diagnostic Pocket test 503.
4. Inspect the cut tape to be sure the channel is centered over the knife.
5. If the cut is not centered, refer back to the channel and drive lever replacement sections. Pay particular attention to the position of the bearings in the drive lever and the solenoid mount. Also, check for debris between the solenoid mount and the distributor.

Sealing Belt

This section covers parts replacement and adjustments to the Sealing Belt section including the belt, rollers, and heater.

Sealing Belt Position Measurement

The vertical distance between the first roller on the sealing belt assembly and the top edge of the machine frame must be 101 mm ± 0.2 mm. To make the measurement perform the following steps:

Refer to Figure 7-43.

1. Use a straightedge to span from the front frame plate to the rear.
2. Measure from the underside of the straightedge to the top of one end of the first roller on the sealing belt. Repeat the measurement at the other end of the roller.
3. Compare the two measurements. They must be within 0.2mm of one another. To provide adequate clearance with the center clamp, both measurements must also fall into the range of 100.8 to 101.2 mm.
4. Also check to be sure there is 0.5 to 1mm clearance between the underfold plate on the center clamp and the first roller on the sealing belt. If the sealing belt is positioned properly and there is inadequate clearance, the underfold plate may be bent.

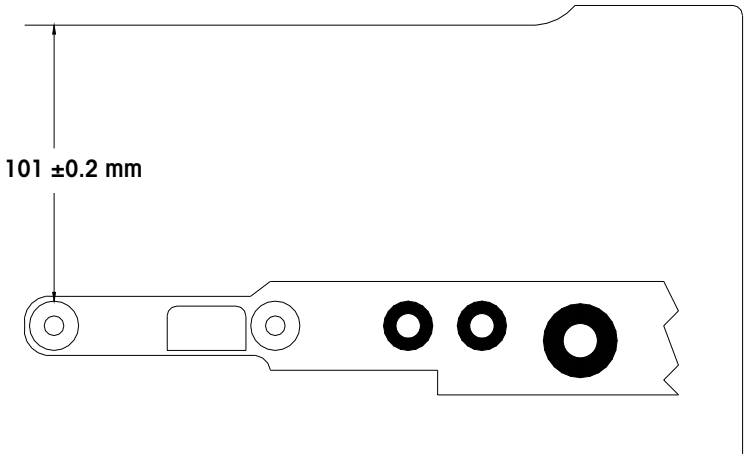


Figure 7-43: Sealing Belt Position Measurement

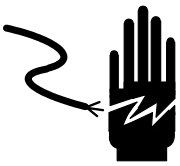
Sealing Belt Position Adjustment

If the measurements do not meet the criteria as described previously, adjust the sealing belt position as follows:

1. Locate the three screws and two pins connecting the hinge to the rear sealing belt frame. At the same time, locate the auxiliary sealing belt support(s) mounted to the curved roller supports.
2. Remove the two pins from the sealing belt hinge and loosen the three retaining screws slightly.
3. Remove the auxiliary sealing belt support(s) and re-form them as required to achieve the necessary dimensions at the first roller on the sealing belt. Reinstall the supports. Note: The "T" slot in the frame crossbraces can be used as a makeshift vise when making the adjustments to the auxiliary sealing belt support. On the SOLO® XL, the auxiliary support leg must also be adjusted to raise or lower the front roller.
4. Once the sealing belt has been properly positioned, retighten the hinge screws and jam nuts.
5. Measure the diameter of the pins removed from the sealing belt hinge. If the removed pins are 4mm in diameter, re-drill the receiving holes with a 5mm drill, and install new 5mm diameter pins (part number 82705000A). If the removed pins are already 5mm in diameter, the rear sealing belt frame and hinge must be replaced.
6. After making these adjustments, refer to the distributor adjustment section to set the distributor film clamp.

Heating Element Replacement

To replace the sealing plate on the Solo XL proceed as follows:



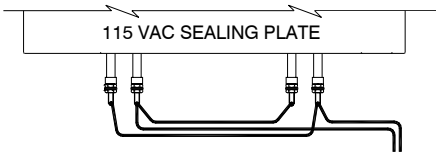
⚠ WARNING

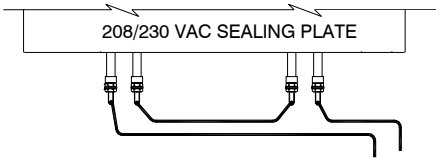
DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Refer to Figure 7-44 Remove power from the machine and allow the sealing plate to cool down.
2. Loosen the two setscrews (Item 5) on both the film drive roller (Item 6), and the package drive roller (Item 7).
3. Remove the belt and pulleys (Items 8, 9, 10).
4. Remove the two screws (Item 1) holding the front frame member (Item 2) in place.
5. Remove the two screws (Item 3) holding the knife mount (Item 4) in place.
6. Remove the pressure springs (Item 11) from the film pressure roller assembly (Item 13) by backing the pressure setscrews (Item 12) out of their holes.
7. Remove the front frame member and pressure roller from the machine. Be careful to not lose the pin (Item 16) in the end of the film pressure roller shaft. Also be

careful not to lose the belt tensioning spring (Item 14) as it is under pressure and will spring out the end of the frame.

8. Remove the sealing belt.
9. Disconnect and remove the old heating plate and move heater insulators (Item 17), and temperature sensor cable to the new plate.
10. Reinstall sealing belt. Note: the arrows printed on the belt should point toward the discharge end of the machine.
11. Insert and depress the belt tensioning spring (Item 14) in the end of the new frame.





12. Depress the belt tensioning spring (Item 14) further and install the frame member over the discharge roller shaft (Item 15).
13. Pivot the frame member around the discharge roller shaft (Item 15) and realign the front rollers with their respective bearings.
14. Reinstall the screws (Item 1) holding the front frame member in place. (Use blue Loctite®)
15. Reinstall the screws (Item 3) holding the knife mount in place. (Use blue Loctite®)
16. Reinstall the pulleys (Items 9, 10) and tighten the setscrews (Item 5). (Do not use Loctite)
17. Reinstall the film pressure roller (Item 13), dropping the pin (Item 16) into the receiving hole in the pressure roller shaft.
18. Reinstall the pressure springs (Item 11) and setscrews (Item 12). Install only one on each side until the film tracking has been adjusted.

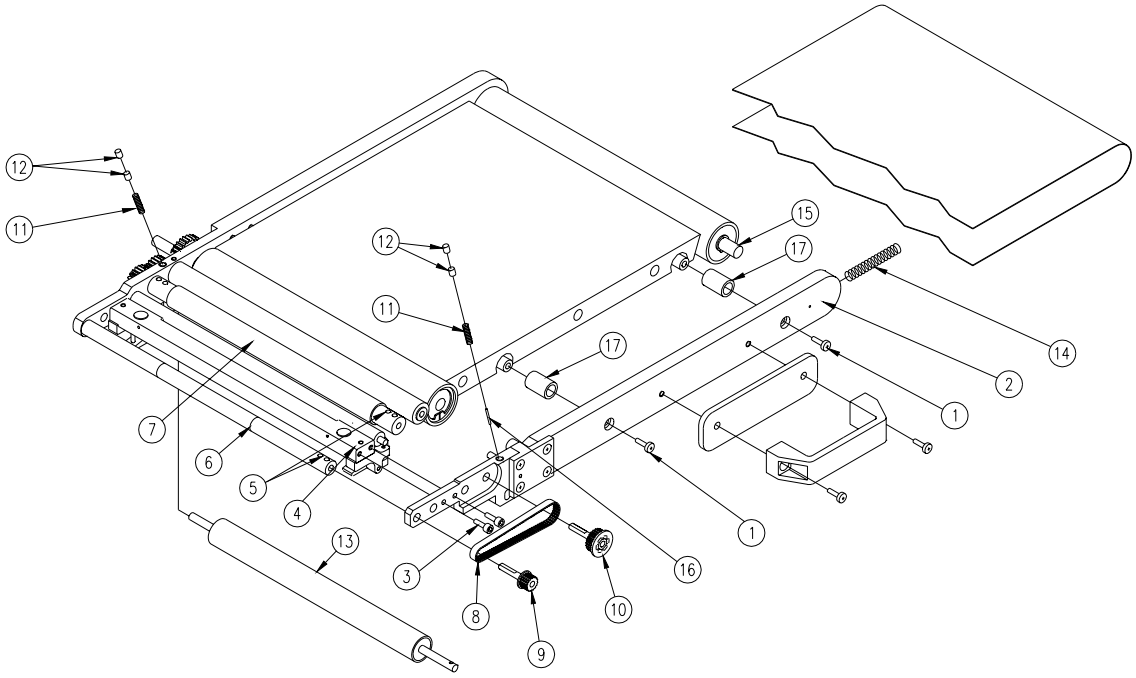
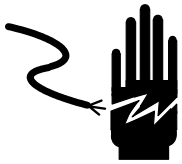


Figure 7-44: Heating Element Replacement

Thermistor, and Sealing Belt Replacement

To replace the temperature sensing Thermistor or the Sealing Belt on the wrapper sealing assembly, proceed as follows:



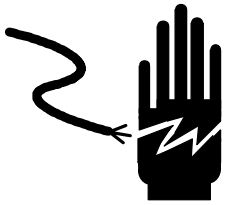
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Refer to Figure 7-44.

1. Disconnect power from the machine and allow the sealing plate to cool down.
2. Loosen the two setscrews (Item 5) on both the film drive roller (Item 6), and the package drive roller (Item 7).
3. Remove the belt and pulleys (Items 8, 9, 10).
4. Remove the two screws (Item 1) holding the front frame member (Item 2) in place.
5. Remove the two screws (Item 3) holding the knife mount (Item 4) in place.
6. Remove the pressure springs (Item 11) from the film pressure roller assembly (Item 13) by backing the pressure setscrews (Item 12) out of their holes.
7. Remove the front frame member and pressure roller from the machine. Be careful to not lose the pin (Item 16) in the end of the film pressure roller shaft. Also be careful not to lose the belt tensioning spring (Item 14) as it is under pressure and will spring out the end of the frame.
8. Remove the sealing belt.
9. Replace the Thermistor cable. (Skip this step if just replacing a defective sealing belt.)
10. Install the sealing belt.
11. Insert and depress the belt tensioning spring (Item 14) in the end of the new frame.
12. Depress the belt tensioning spring (Item 14) further and install the frame member over the discharge roller shaft (Item 15).
13. Pivot the frame member around the discharge roller shaft (Item 15) and realign the front rollers with their respective bearings.
14. Reinstall the screws (Item 1) holding the front frame member in place. (Use blue Loctite®)
15. Reinstall the screws (Item 3) holding the knife mount in place. (Use blue Loctite®)
16. Reinstall the pulleys (Items 9, 10) and tighten the setscrews (Item 5). (Do not use Loctite®)
17. Reinstall the film pressure roller (Item 13), dropping the pin (Item 16) into the receiving hole in the pressure roller shaft.
18. Reinstall the pressure springs (Item 11) and setscrews (Item 12). Install only one on each side until the film tracking has been adjusted.

Film Position and Tracking



WARNING

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Film Position

If you suspect that the film is not positioned properly, there are several items to check before adjustments are made:

- Check the position of the film on the Dancer Roller.
- Check the position of the film on the Film Extending Roller
- Check the position of the film on the Distributor Roller.

NOTE: All three film positions should be centered on the rollers. If the film is not centered, check the position of the film roll to verify it is installed properly on the carrier shaft. If this is correct, check the position of the film roll on the core.

Film Tracking

If the film is not tracking properly, but is positioned properly as described above, check the One-Way clutched roller adjustment.

The One-Way clutched pressure roller is spring loaded. Equal tension must exist on both ends to allow for proper film tracking. If the film is tracking towards one side of the machine, less tension should be applied to that side of the roller and more tension should be applied at the opposite end of the roller. Using a 3 mm allen wrench, adjust the set screws (Item 13, Figure 7-44) from the top of the sealing belt assembly. (Note: There should be two setscrews in each hole at each end of the roller.) When adjusting the pressure on the roller, adjust both ends at the same time. For example, if the set screw on one side is tightened 1/4 turn, loosen the opposite screw 1/4 turn. (Note: The infeed side (right) of the roller is pinned under the setscrew so that the roller shaft will not free spin freely.) Avoid bottoming out the setscrew on this pin or the roller may not spring properly. If this is the case, adjust the opposite end if tracking.

Checking the Film in the Center Clamp

Measure the length of film in the Center Clamp (15 mm ± 1 mm). The film must be gripped by all of the teeth. Refer to 7-45.

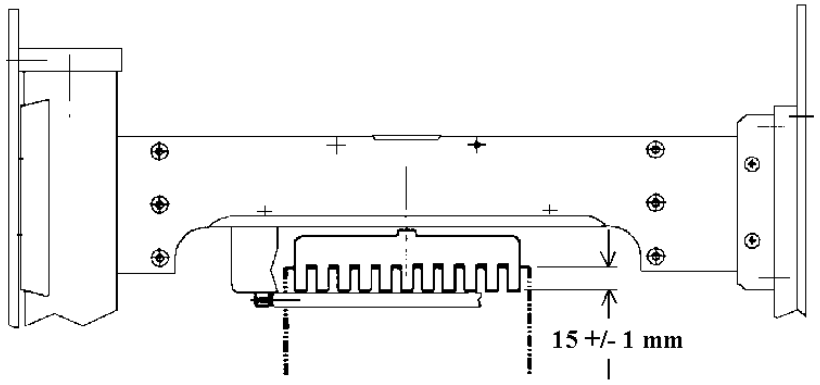
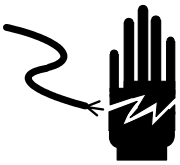


Figure 7-45: Checking the Film in the Center Clamp

Film Folders

This section covers parts replacement and adjustment to the Film Folders.

Folder Plate Replacement - Side



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Replace the side folder plates as follows:

1. Remove the 4 screws in the side film folder plate. Make note of where the shims are located for reinstallation purposes.
2. Install new plate and proceed to the film folder adjustment section to check for proper clearances. Note: Check the edges of the folder plate for burrs and remove with light sandpaper if necessary.

Folder Plate Position Adjustment - Side

The side film folder plates should perpendicular to the distributor within 0.5mm. Check this along the straight edge of the plate.

If a plate is not positioned properly, loosen the retaining screws, move the plate so it is perpendicular to the distributor, and retighten.

Folder Plate Clearance Adjustment

The clearance between the center and the side film folder plates must be from 1.5 to 2.9mm. Refer to Figure 7-46. The center and side film folders must also be parallel with each other within 0.5mm. If these clearances are not available, spacer washers must be placed between the folder plate mount and the folder plate until the necessary clearances are achieved.

At the same time, the distance between the side film folders and the curved rollers must be from 1.5 to 2.9mm. If these clearances are not available, spacer washers must be placed between the folder plate mount and the folder plate until the necessary clearances are achieved. Refer to Figure 7-46.

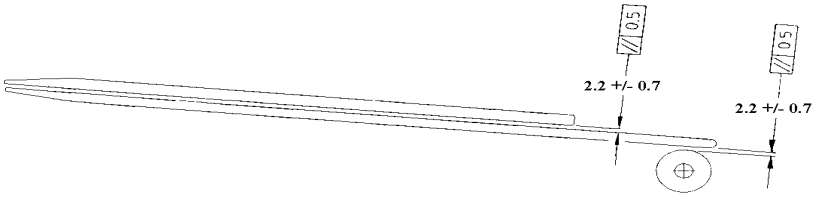


Figure 7-46

Center Plate Alignment Adjustment

The center film folder must be perpendicular to the film distributor within 0.5mm. If the plate is not perpendicular, loosen the screws and move the plate so it is properly positioned, and retighten the screws. Refer to Figure 7-47.

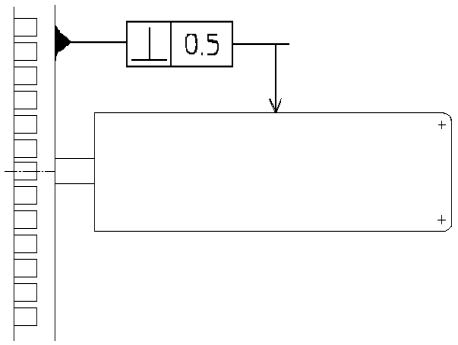
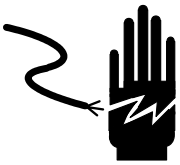


Figure 7-47: Center Plate Alignment

Heater/Blower Fan Replacement

Associated Pocket Test:
505 Heater/Blower Output

To replace a defective Heater/Blower Fan, proceed as follows:



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove power from the machine.
2. Remove the left end cover from the machine.
3. Disconnect the wires powering the blower assembly.
4. Remove the blower assembly from the machine by removing the two retaining nuts.
5. Disconnect the heater blower assembly from the mounting bracket.
6. Separate the heater from the blower and replace what is necessary.
7. Reassemble in reverse order. Test the operation of the fan using pocket test 505

Electrical

This section covers replacement of the various electrical and electronic parts on the Model 645 SOLO® XL.

Electronics Rack

Figure 7-48 shows the location of the different electronic components in the electronics rack.

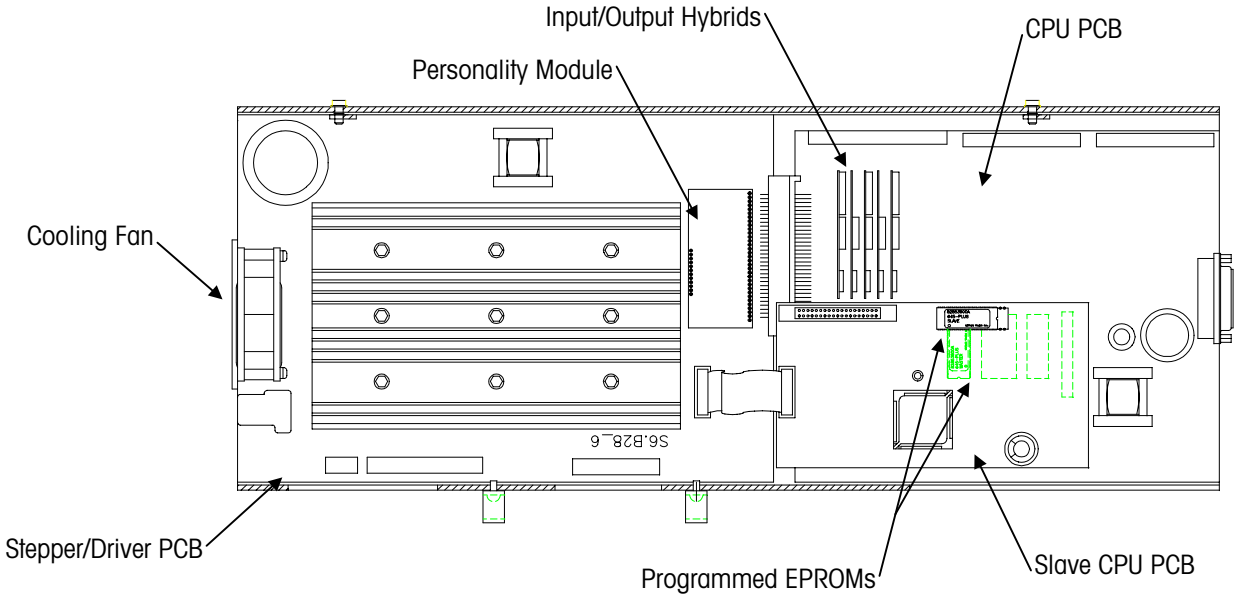


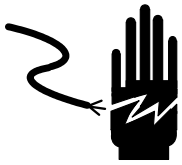
Figure 7-48: Electronics Rack

Fuses

Type	Rating	Part Number	Description
Time Delay	10A	82994800A	Heater/Blower
Time Delay	25A	82994900A	Main Power Supply
MDL-5	5A	82995000A	Sealing Plate Supply (208/230 VAC Machines)
MDL-9	5A	82995100A	Sealing Plate Supply (115 VAC Machines
.25x1.25in FA	3.2 A	82895900A	Cutter Solenoid
.25x1.25in FA	0.4 A	82896000A	Distributor Magnets

Display Board Replacement

To replace a defective Display Board, proceed as follows:



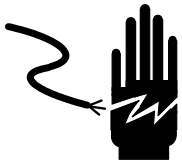
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove power from the machine.
2. Remove the front cover from the machine.
3. Unplug the harness connected to the end of the Display Board.
4. Remove the bottom two screws holding the display board and carefully pull the defective Display Board from the standoffs on which it is mounted. Be sure the standoffs remain attached to the stainless steel support. Replace the board with the new one.
5. Reassemble in reverse order, reset the machine, and test.

Main CPU PCB Replacement

To replace a defective Main CPU Board, proceed as follows:



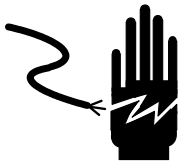
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove power from the machine.
2. Remove both the back cover and the circuit board cover.
3. Remove the Electronics Rack Assembly from the machine by sliding it away from the sealing belt and lifting it off the standoffs. Note: on some machines, the rack is secured to the machine by a screw located at the top of the rack between the two boards. On other machines, a long screw engages a hole in the rack from inside the machine to prevent the rack shifting.
4. Unplug the ribbon cable connecting the Slave CPU to the Stepper Driver Board.
5. Remove the screw holding the Slave CPU in place.
6. Carefully pull the Slave CPU from its position on the Main CPU Board.
7. Remove the defective Main CPU Board by removing the nine retaining screws, the Slave CPU standoff, and the four heatsink clips at the edge of the board. Replace the board with the new one. At the same time, remove the EPROM from the defective Main CPU board and install it on the new board.
8. Reassemble in reverse order, reset the machine, and test. When reassembling the CPU board to the rack, be sure to place the insulation sheet (if it is loose) between the rack and the MOSFETS before installing the heatsink clips.

Slave CPU PCB Replacement

To replace a defective Slave CPU, proceed as follows:



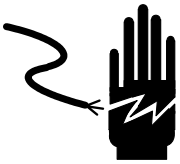
WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

1. Remove power from the machine.
2. Remove both the back cover and the circuit board cover.
3. Unplug the ribbon cable connecting the Slave CPU to the Stepper Driver Board.
4. Remove the screw holding the Slave CPU in place.
5. Carefully pull the defective Slave CPU from its position on the Main CPU board and replace it with the new one. At the same time, remove the EPROM from the defective Slave CPU and install it on the new board.
6. Reassemble in reverse order, reset the machine, and test. In general, if something is wrong with the Slave CPU, the machine will not run.

Stepper Driver PCB Replacement

To replace a defective Stepper Driver Board, proceed as follows:



WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

Note: Do not switch heat sinks between boards.

1. Remove power from the machine.
2. Remove both the back cover and the circuit board cover.
3. Remove the Electronics Rack Assembly from the machine by sliding it away from the sealing belt and lifting it off the standoffs. Note: a long screw engages a hole in the rack from inside the machine to prevent the rack shifting.
4. Unplug the ribbon cable connecting the Slave CPU to the Stepper Driver Board.
5. Remove the screw holding the Slave CPU in place.
6. Carefully pull the Slave CPU from its position on the Main CPU board.
7. Carefully pull the Personality Module from its position on the Stepper Driver Board.
8. Remove the Main CPU board by removing the nine retaining screws and the Slave CPU standoff.
9. Remove the seven screws holding the Stepper Driver Board in place -- there are five screws located on the board side, and two located on the rack side. Remove and replace the defective Stepper Driver Board.
10. Reassemble in reverse order, reset the machine, and test. When reassembling the CPU board to the rack, be sure to place the insulation sheet (if it is loose) between the rack and the MOSFETS before installing the heatsink clips.

8 Troubleshooting

Troubleshooting Guide

This section covers common symptoms that may occur and a guide to solve the problems.

Important Note
For cleaning instructions, refer to Chapter 5 Maintenance before attempting to clean any of the wrapper components.

SYMPTOMS	CAUSE	SOLUTION
• Film Tearing	• Film residue build-up on Film Folders	• Clean Film Folders
	• Bad Roll of Film	• Replace Film with New Roll
	• Film tracking	• Adjust one-way roller. See Film Tracking Section.
	• Center Clamp Comb not aligned with Distributor Frame	• Adjust per Tech Manual
	• Side Clamp pressure incorrect	• Adjust per Tech Manual
	• Distributor out of adjustment	• Adjust per Tech Manual
	• Burrs in path of film	• Sand off burrs
	• Heater/Blower not on	• Check on/off settings, fuses
	• Heater/Blower too hot	• Check settings
• Film short on back of tray (underfold)	• Film pulling too hard	• Check Distributor adjustment. Change film clamp pad. Check film folders for burrs, clearance between plates, or film residue. Check that the film is secure on the bobbin. Try a different roll of film. Make sure all rollers are spinning free.
	• Film pulling out of Center Clamp.	• Clean dirty comb or remove any debris in comb.
	• Comb is bent.	• Adjust per Tech Manual.
	• Center Clamp Comb not pivoting freely.	• Loosen tension at pivot.
	• Dirty/worn Clamp Pad.	• Replace pad.
	• No clearance between underfold plate and film drive roller.	• Check for loose or misaligned Sealing Belt assembly. • Bend plate to gain clearance.
	• Weak Distributor clamping.	• Adjust Distributor.

Important Note
If you continually use the same tray for testing, you may be short of film due to the wear on the tray.

Important Note
For cleaning instructions, refer to Chapter 5 Maintenance before attempting to clean any of the wrapper components.

SYMPTOMS	CAUSE	SOLUTION
• Film short on bottom of tray (overwrap)	• Film drive roller not driven • Hard to pull film through wrapper. • Dirty/bad film drive roller. • Package drive roller dirty. • Wrong program for tray used. • Sealing Belt Rollers Dirty.	• Check drive train. • Film is too tacky, or temperature is too hot. Also check distributor adjustments. • Clean with damp cloth/replace. • Clean with damp cloth. • Change to correct program (i.e. 31 for black trays, etc.) • Clean Rollers on Sealing Belt
• Film Tracking	• Residue build-up on Film Folders. • Bad roll of film. • Film is loose on the bobbin. • Film is not centered on core. • Dancer bar not square to frame. • Curved film rollers dirty or binding. • Film folders not symmetrical or spacing is incorrect. • One way roller not turning free. • Uneven pressure on one way roller. • Pressure rollers not turning free. • Pressure rollers not contacting one way roller. • Pressure rollers deformed/not round. • Distributor too tight or uneven. • Distributor film clamp pad too high or deformed.	• Clean Film Folders. • Try a new roll of film. • Check bobbin assembly. • Try a new roll or mount roll upside down. • Straighten dancer bar. • Clean/cut rubber sleeve on the outside of the roller. • Adjust per Tech Manual. • Repair or replace. • Adjust spring tension. • Repair or replace. • Adjust one way roller/replace pressure rollers. • Replace rollers. • Adjust per Tech Manual. • Remove shims/replace pad.
• Intermittent Error 00/03	• Bad interlock switch/wire connection. • Infeed door interlock switch not adjusted properly. • Infeed door hitting side clamp eccentric.	• Repair/replace. • Adjust per Tech Manual. • Adjust per Tech Manual.

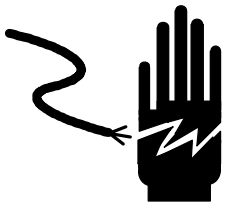
Important Note
For cleaning instructions, refer to Chapter 5 Maintenance before attempting to clean any of the wrapper components.

SYMPTOMS	CAUSE	SOLUTION
• Photoeye Errors	• Infeed door not opening or closing properly. Door is binding or out of adjustment. • Dirty reflective surface on front side clamp frame. • Dirty photocell lenses. • Moisture in photocell housing. • Reflection from rivets on infeed door.	• Adjust per Tech Manual. • Clean side clamp frame. • Clean lenses. • Remove and dry photocell assembly. • Blacken rivets with paint or marker.
• Package not centered on lifter.	• Belts slipping. • Loose set screws on drive pulley. • Infeed assembly loose/tilted. • Lifter too high. • Package not dimensioned properly.	• Clean/replace stretched belts. • Apply Blue Locktite and tighten. • Align and tighten assembly. • Check lifter re-latch (stop). Adjust down lifter sensor. • Check photoeyes.
• Package jams	• Lifter height incorrect. • Photoeyes dirty or malfunctioning. • Package not centered on lifter.	• Check lifter sensors. • Clean/replace.
• Package shifts during side clamp tucking.	• Lifter is too high or low. • Lifter arms not re-latching. • Side clamps not releasing film simultaneously.	• Check lifter sensors. • Check lifter sensors. • Adjust eccentrics on T-Bar.
• Not Picking Film	• Sealing Belt Not in Closed Position • Film Not Loaded Properly • Center clamp dirty • Film wrapped around film drive roller. • Film pulling hard through machine.	• Lift and Re-Close Sealing Belt • Re-Load Film • Clean Center Clamp and allow to dry. Remove any debris. • Remove any film or debris from film drive roller
• Error 20-24	• Drive belt too loose or too tight. • Drive pulleys loose. • Lifter hitting infeed frame.	• Adjust per Tech Manual. • Apply Blue Locktite and tighten. • Adjust infeed assembly/lifter actuator.

Important Note
For cleaning instructions, refer to Chapter 5 Maintenance before attempting to clean any of the wrapper components.

SYMPTOMS	CAUSE	SOLUTION
• Error 61 Displayed on Trays Normally Wrapped	• Infeed Belts Slipping	• Clean or replace Infeed Belts per Tech Manual.
• Error 71-78	• Infeed door opening too far and interfering with side clamps. • Side clamp bearing guide loose. • Pulley loose or dive belts worn on the side clamp linear actuator.	• Adjust per Tech Manual. • Adjust per Tech Manual. • Adjust per Tech Manual. • Adjust per Tech Manual.
• Error 99	• Photoeyes Dirty	• Clean Photoeyes
• Error 93	• Internal Temperature Setpoint has not been reached	• Normal temperature is set with the Pocket from 18-23. • Make sure all covers are on properly. • Reset the error by turning power off, then on.
• No Power	• Main switch turned to **0** • Circuit breaker tripped • Inadequate wiring	• Turn the Power Switch to **I** • Reset the circuit breaker on the transformer and/or the machine. • Check the store circuit breaker and wiring.
• Package wrapping with irregular film tension	• Film roll out of position • Center Clamp grasp insufficient • Side clamp grasp insufficient • Film Folder dirty • Film loading incorrect • Work program incorrect	• Arrange the film roll in the correct position. • Check and clean the film clamp. • Check and clean the side clamps. • Clean the Film Folder. • Reload the film. • Check the work program setting.
• Poor package sealing	• Sealing belt temperature incorrect	• Check temperature value. • If sealing belt is too hot, lower the temperature value. • If sealing belt is too cold, increase the value.

Voltage Checks



WARNING

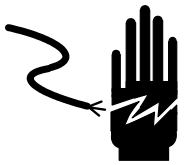
ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

The Solo XL Wrappers are supplied with a control power transformer to adapt the machine to different line voltages. Depending on the application, the transformer is wired for 115V, 208V, or 230V, 50/60 Hz, single phase input with a 48 VAC output. If the Model 645 Wrapper does not power up correctly or does not power up at all, the following voltage checks can be made to isolate the problem:

- Check for proper line voltage coming into the circuit breaker and out of the main power switch.
- 48 VAC ±10% on CN1 of the Stepper Driver board. (Located on the lower left-hand corner of the circuit board.)

If all of these voltages are correct but the wrapper will not power up, replace the CPU Board.

Resistance Checks



⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE REMOVING THE FUSE OR SERVICING.

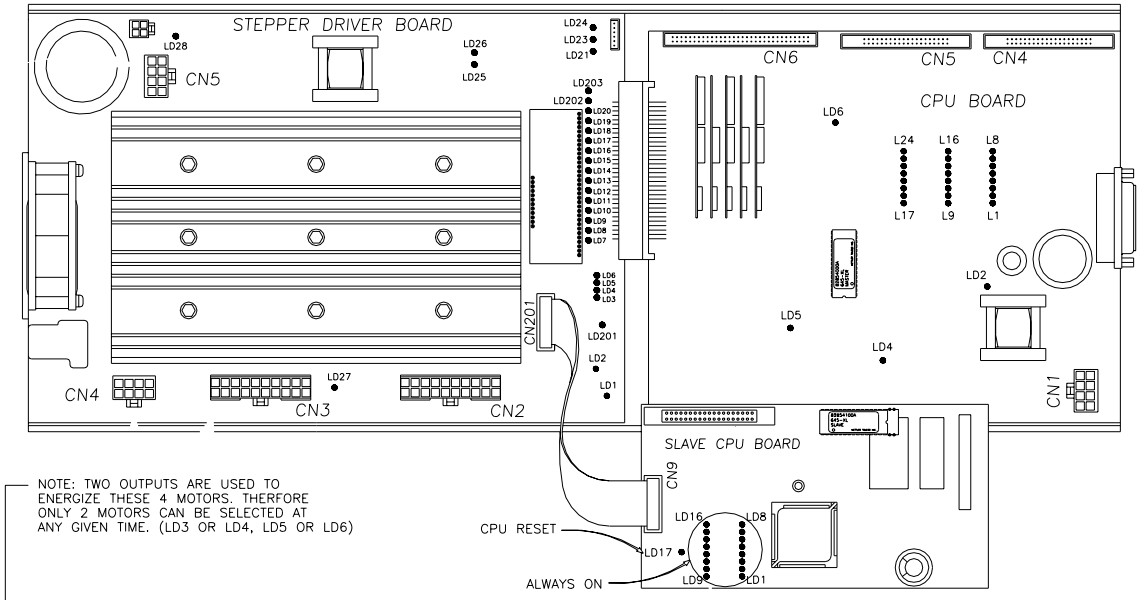
The stepper motors on the Model 645 Wrapper can be tested by measuring the resistance of the windings. Disconnect the suspect stepper motor at the connector that directly plugs into the stepper motor. Connect an ohmmeter between the black and orange wires and note the reading in ohms. Next, connect the ohmmeter between the red and yellow wires. The readings should be the same. You should read the following resistance on the eight stepper-motors:

- M1 - Infeed Stepper Motor .8 ohms (+/-10%).
- M2 - Lifter Stepper Motor .5 ohms (+/-10%).
- M4 - Drive Cam Stepper Motor .5 ohms (+/-10%).
- M5 - Center Clamp Stepper Motor .5 ohms (+/-10%).
- M6 - Rear Side Clamp Stepper Motor .5 ohms (+/-10%).
- M7 - Front Side Clamp Stepper Motor .5 ohms (+/-10%).
- M8 - Sealing Belt Stepper Motor .5 ohms (+/-10%).

Note: These resistance values are typical values for MAE motors. Resistance values may vary depending on manufacturer.

If any of the measurements are open or shorted, replace the stepper motor.

Stepper Driver & Slave CPU LEDs



STEPPER DRIVER BOARD			
LED	COLOR	Description	STATUS
LD1	YELLOW	DISTRIBUTOR MAGNETS	ON WHEN MAGNETS ON
LD2	RED	INFEED, LIFTER, FILM FOLDER MOTOR PROTECTION	OFF UNTIL FAILURE
LD3	YELLOW	INFEED MOTOR SELECT	ON WHEN ENERGIZED, (SEE NOTE)
LD4	YELLOW	LIFTER MOTOR SELECT	ON WHEN ENERGIZED, (SEE NOTE)
LD5	YELLOW	CLAMP OPENING CAM MOTOR SELECT	ON WHEN ENERGIZED, (SEE NOTE)
LD6	YELLOW	SEALING PLATE MOTOR SELECT	ON WHEN ENERGIZED, (SEE NOTE)
LD7	GREEN	LIFTER/INFEED ENABLE	ON WHEN MOTOR ENERGIZED
LD8	YELLOW	LIFTER/INFEED DIRECTION	ON WHEN LIFTER GOING UP OR INFEED BELTS GOING FORWARD
LD9	YELLOW	LIFTER/INFEED STEP	ON WHEN MOTOR ENERGIZED
LD10	GREEN	SEALING PLATE/CLAMP OPENING CAM ENABLE	ON WHEN MOTOR ENERGIZED
LD11	YELLOW	SEALING PLATE/CLAMP OPENING CAM DIRECTION	ON – ALWAYS
LD12	YELLOW	SEALING PLATE/CLAMP OPENING CAM STEP	ON WHEN MOTOR ENERGIZED
LD13	GREEN	CENTER CLAMP ENABLE	ON WHEN MOTOR ENERGIZED
LD14	YELLOW	CENTER CLAMP DIRECTION	ON WHEN CLAMP GOING IN TO PICK FILM
LD15	YELLOW	CENTER CLAMP STEP	ON WHEN MOTOR ENERGIZED
LD16	GREEN	SIDE CLAMP(BACK) ENABLE	ON WHEN MOTOR ENERGIZED
LD17	YELLOW	SIDE CLAMP(BACK) DIRECTION	ON WHEN GOING IN
LD18	YELLOW	SIDE CLAMP(FRONT AND BACK) STEP	ON WHEN MOTOR ENERGIZED
LD19	GREEN	SIDE CLAMP(FRONT) ENABLE	ON WHEN MOTOR ENERGIZED
LD20	GREEN	FILM FOLDER ENABLE	ON WHEN MOTOR ENERGIZED
LD21	YELLOW	CUTTER SOLENOID	ON WHEN CUTTER ENERGIZED
LD23	YELLOW	SEALING HEATERS ON	ON WHEN PLATE HEATING UP
LD24	GREEN	LOW VOLTAGE	ON – ALWAYS EXCEPT WHEN DOOR/HOOD INTERLOCK OPEN
LD25	GREEN	+ 12 VOLT SUPPLY	ON – ALWAYS EXCEPT WHEN DOOR/HOOD INTERLOCK OPEN
LD26	GREEN	OUTPUT AND MOTOR POWER	ON – ALWAYS EXCEPT WHEN DOOR/HOOD INTERLOCK OPEN
LD27	RED	CENTER CLAMP, OPENING CAM, SEAL PLATE MOTOR PROTECTION	OFF UNTIL FAILURE
LD28	RED	SIDE CLAMP (FRONT, BACK) MOTOR PROTECTION	OFF UNTIL FAILURE
LD201	YELLOW	FILM FOLDER STEP	ON WHEN MOTOR ENERGIZED
LD202	YELLOW	SIDE CLAMP(FRONT) DIRECTION	ON WHEN GOING OUT
LD203	YELLOW	FILM FOLDER DIRECTION	ON WHEN GOING OUT

CPU BOARD			
LED	COLOR	Description	STATUS
L1	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 1	ON WHEN PHOTCELL BLOCKED
L2	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 2	ON WHEN PHOTCELL BLOCKED
L3	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 3	ON WHEN PHOTCELL BLOCKED
L4	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 4	ON WHEN PHOTCELL BLOCKED
L5	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 5	ON WHEN PHOTCELL BLOCKED
L6	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 6	ON WHEN PHOTCELL BLOCKED
L7	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 7	ON WHEN PHOTCELL BLOCKED
L8	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 8	ON WHEN PHOTCELL BLOCKED
L9	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 9	ON WHEN PHOTCELL BLOCKED
L10	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 10	ON WHEN PHOTCELL BLOCKED
L11	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 11	ON WHEN PHOTCELL BLOCKED
L12	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 12	ON WHEN PHOTCELL BLOCKED
L13	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 13	ON WHEN PHOTCELL BLOCKED
L14	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 14	ON WHEN PHOTCELL BLOCKED
L15	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 15	ON WHEN PHOTCELL BLOCKED
L16	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 16	ON WHEN PHOTCELL BLOCKED
L17	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 17	ON WHEN PHOTCELL BLOCKED
L18	YELLOW	HORIZONTAL REFLECTIVE PHOTOCELL NUMBER 18	ON WHEN PHOTCELL BLOCKED
L19	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 1	ON WHEN PHOTCELL BLOCKED
L20	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 2	ON WHEN PHOTCELL BLOCKED
L21	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 3	ON WHEN PHOTCELL BLOCKED
L22	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 4	ON WHEN PHOTCELL BLOCKED
L23	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 5	ON WHEN PHOTCELL BLOCKED
L24	YELLOW	VERTICAL REFLECTIVE PHOTOCELL NUMBER 6	ON WHEN PHOTCELL BLOCKED
LD1	GREEN	70V POWER	ON WITH MAIN POWER
LD2	GREEN	22V POWER	NOT USED
LD3	YELLOW	SERIAL COMMUNICATION	FLASHES AS DATA TRANSMITS
LD4	GREEN	12V SERIAL POWER	ON – ALWAYS
LD5	RED	LOW VOLTAGE	ON WHEN LOW VOLTAGE DETECTED
LD6	RED	CPU RESET	ON WHEN RESET

829083.DWG

Board Replacement and Troubleshooting

The complete board rack assembly is not available as a service part. If you have a circuit board failure, you must replace the individual board that is defective. Symptoms of a defective Stepper Driver PCB include, but are not limited to:

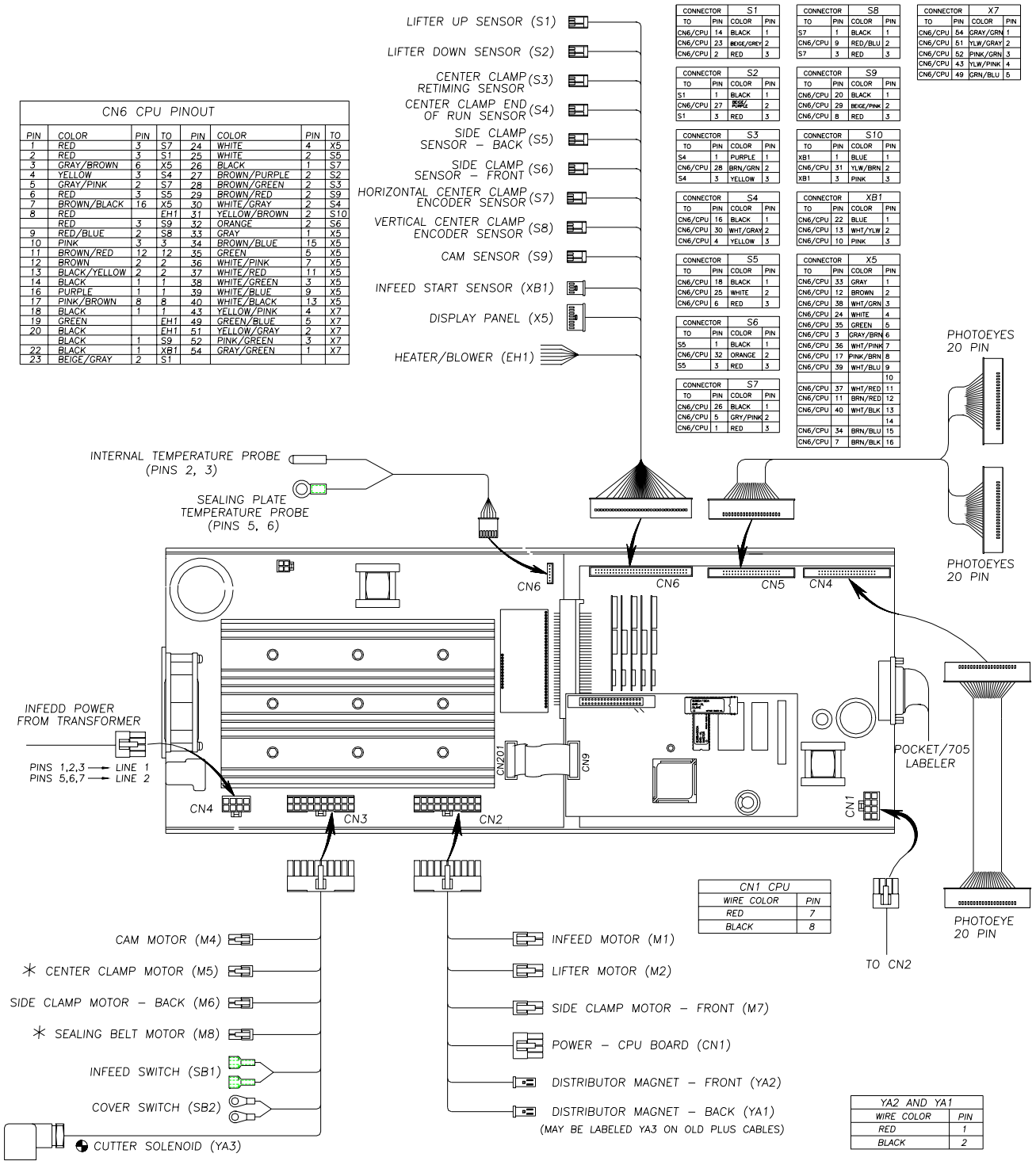
- No output to one or more Stepper Motors.
- No output to the Distributor Magnets.
- No output to the Cutter Solenoid.

If you have one of these conditions, first run the appropriate Pocket test to verify that there is no output from the stepper driver board to the suspected motor, etc. Next check all connectors, including the terminals inside of the Transformer, for loose connections. Check the wiring harness for continuity. Check the fuses for the Distributor Magnets, Cutter Solenoid, and Sealing Plate. If everything checks OK, then the Stepper Driver PCB is probably defective. (Note: You cannot test the Stepper Driver output with a voltmeter because it is constantly changing.)

The individual boards are part of the Model 645 first man KOP. Listed below are the KOP part numbers.

Part Number	Description
83009700A	645 XL First Man KOP

Interconnect Diagram



CN6 CPU PINOUT

PIN	COLOR	PIN	TO	PIN	COLOR	PIN	TO
1	RED	3	S7	24	WHITE	4	X5
2	RED	3	S1	25	WHITE	2	S5
3	GRAY/BROWN	6	X5	26	BLACK	1	S7
4	YELLOW	3	S4	27	BROWN/PURPLE	2	S2
5	GRAY/PINK	2	S7	28	BROWN/GREEN	2	S3
6	RED	3	S5	29	BROWN/RED	2	S9
7	BROWN/BLACK	16	X5	30	WHITE/GRAY	2	S4
8	RED		EH1	31	YELLOW/BROWN	2	S10
	RED	3	S9	32	ORANGE	2	S6
9	RED/BLUE	2	S8	33	GRAY	1	X5
10	PINK	3	3	34	BROWN/BLUE	15	X5
11	BROWN/RED	12	12	35	GREEN	5	X5
12	BROWN	2	2	36	WHITE/PINK	7	X5
13	BLACK/YELLOW	2	2	37	WHITE/RED	11	X5
14	BLACK	1	1	38	WHITE/GREEN	3	X5
16	PURPLE	1	1	39	WHITE/BLUE	9	X5
17	PINK/BROWN	8	8	40	WHITE/BLACK	13	X5
18	BLACK	1	1	43	YELLOW/PINK	4	X7
19	GREEN		EH1	49	GREEN/BLUE	5	X7
20	BLACK		EH1	51	YELLOW/GRAY	2	X7
	BLACK	1	S9	52	PINK/GREEN	3	X7
22	BLACK	1	XB1	54	GRAY/GREEN	1	X7
23	BEIGE/GRAY	2	S1				

CONNECTOR	S1		
TO	PIN	COLOR	PIN
CN6/CPU	14	BLACK	1
CN6/CPU	23	BEIGE/GREY	2
CN6/CPU	2	RED	3

CONNECTOR	S2		
TO	PIN	COLOR	PIN
S1	1	BLACK	1
CN6/CPU	27	BEIGE/PURPLE	2
S1	3	RED	3

CONNECTOR	S3		
TO	PIN	COLOR	PIN
S4	1	PURPLE	1
CN6/CPU	28	BRN/GRN	2
S4	3	YELLOW	3

CONNECTOR	S4		
TO	PIN	COLOR	PIN
CN6/CPU	16	BLACK	1
CN6/CPU	30	WHT/GRAY	2
CN6/CPU	4	YELLOW	3

CONNECTOR	S5		
TO	PIN	COLOR	PIN
CN6/CPU	18	BLACK	1
CN6/CPU	25	WHITE	2
CN6/CPU	6	RED	3

CONNECTOR	S6		
TO	PIN	COLOR	PIN
S5	1	BLACK	1
CN6/CPU	32	ORANGE	2
S5	3	RED	3

CONNECTOR	S7		
TO	PIN	COLOR	PIN
CN6/CPU	26	BLACK	1
CN6/CPU	5	GRY/PINK	2
CN6/CPU	1	RED	3

CONNECTOR	S8		
TO	PIN	COLOR	PIN
S7	1	BLACK	1
CN6/CPU	9	RED/BLU	2
S7	3	RED	3

CONNECTOR	S9		
TO	PIN	COLOR	PIN
CN6/CPU	20	BLACK	1
CN6/CPU	29	BEIGE/PINK	2
CN6/CPU	8	RED	3

CONNECTOR	S10		
TO	PIN	COLOR	PIN
XB1	1	BLUE	1
CN6/CPU	31	YLW/BRN	2
XB1	3	PINK	3

CONNECTOR	XB1		
TO	PIN	COLOR	PIN
CN6/CPU	22	BLUE	1
CN6/CPU	13	WHT/YLW	2
CN6/CPU	10	PINK	3

CONNECTOR	X5		
TO	PIN	COLOR	PIN
CN6/CPU	33	GRAY	1
CN6/CPU	12	BROWN	2
CN6/CPU	38	WHT/GRN	3
CN6/CPU	24	WHITE	4
CN6/CPU	35	GREEN	5
CN6/CPU	3	GRAY/BRN	6
CN6/CPU	36	WHT/PINK	7
CN6/CPU	17	PINK/BRN	8
CN6/CPU	39	WHT/BLU	9
			10
CN6/CPU	37	WHT/RED	11
CN6/CPU	11	BRN/RED	12
CN6/CPU	40	WHT/BLK	13
			14
CN6/CPU	34	BRN/BLU	15
CN6/CPU	7	BRN/BLK	16

CONNECTOR	X7		
TO	PIN	COLOR	PIN
CN6/CPU	54	GRAY/GRN	1
CN6/CPU	51	YLW/GRAY	2
CN6/CPU	52	PINK/GRN	3
CN6/CPU	43	YLW/PINK	4
CN6/CPU	49	GRN/BLU	5

CN1 CPU	
WIRE COLOR	PIN
RED	7
BLACK	8

YA2 AND YA1	
WIRE COLOR	PIN
RED	1
BLACK	2

CN3 PIN OUT

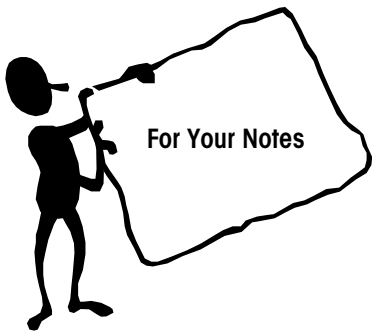
PIN	WIRE COLOR	TO	PIN	WIRE COLOR	TO
1	BROWN	M6–3	11	BLUE	M6–4
2	RED	SB2	12	RED	M6–1
3	RED	M5–1	13	BLACK	M6–2
4	BLACK	M5–2	14	PINK	SB1
5	BLACK OR RED	FUSE OR YA3	15	BLUE	M4–4
6	BROWN	M8–3	16	BLUE	M8–4
7	BROWN	M4–3	17	BLACK	M4–2
8	RED OR BLACK	YA3 OR FUSE	18	BLACK	M8–2
9	BROWN	M5–3	19	BLUE	M5–4
10	RED	M4–1	20	RED	M8–1

ALL MOTORS M1 THRU M7	
WIRE COLOR	PIN
RED	1
BLACK	2
BROWN	3
BLUE	4

CN2 PIN OUT

PIN	WIRE COLOR	TO	PIN	WIRE COLOR	TO
1	BLUE	M3–4	11	BLACK	M2–2
2	BROWN	M1–3	12	RED	M1–1
3	BROWN	M2–3	13	BLUE	M1–4
4	RED	M3–1	14	PINK	M2–4
5	BROWN	M3–3	15	RED	CN1–7
6	BLACK	M1–2	16	BLACK	CN1–8
7	RED	M2–1	17	RED	FUSE
8	BLACK	M3–2	18	BLACK	YA1/YA2
9	RED	M7–1	19	BLACK	M7–2
10	BROWN	M7–3	20	BLUE	M7–4

645 INTERCONNECT DIAGRAM
DWG #82907100A


For Your Notes

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