

# Model TF400/600V

## Tray Former

Operation and Maintenance Manual



**BW Integrated Systems**  
A **Barry-Wehmiller** Packaging Company

[www.bwpackagingsystems.com](http://www.bwpackagingsystems.com)



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# PREFACE

This manual provides operating and maintenance information, parts lists, and drawings for the Thiele Technologies, Inc. Model TF400V/TF600V Tray Former.

The equipment is intended for use only as described in this document. Thiele Technologies, Inc. cannot be responsible for the improper functioning of features and parameters not described.

Liability for any personal injury or property damage caused by the use of this manual as it relates to the maintenance, operation, or repair of the equipment is in no way assumed by Thiele Technologies, Inc.

Accordingly, personnel using procedures not recommended or approved by Thiele Technologies, Inc. should ensure that personal safety and equipment integrity will not be jeopardized in the method selected.

This manual is intended for use by personnel experienced in the use of complex packaging equipment. Maintenance personnel must have knowledge and experience working with electromechanical assemblies and components. Read and understand this manual before attempting to operate or perform routine service or maintenance on this equipment.

Photographs used in the manual may have been taken with certain guards or safety devices opened or removed. This in no way suggests that the machine is to be operated without these guards or safety devices in place!

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## Installation

**Schedule required personnel.** Thiele recommends that a Thiele factory-trained service technician be on site to supervise installation. Additional personnel required for the installation such as riggers, plumbers, electricians, and welders are the responsibility of the customer. Schedule installation with the Thiele Field Service department.

**Inspect & securely store equipment.** Customers should receive, inspect and unpack the equipment. Store the equipment in a secure location. If the equipment is damaged, file a claim with the carrier and notify Thiele per Thiele's Terms and Conditions of Sale.

**Position equipment.** Thiele recommends using professional rigging company to move and position large equipment. Customer must provide any required lifting devices including overhead cranes, fork lifts, or jacks. Thiele recommends using professional rigging companies for moving and positioning large equipment.

**Connection to required utilities.** Customer must supply required connections to pneumatic, electrical, and hydraulic power as well as all associated piping and connections. Also, provide any required supply of water and all associated piping, plumbing, and drainage systems.

**Site construction.** Customer is responsible for providing any required masonry work such as installation of concrete pads or modifications to existing plant walls, doorways, ceilings, walkways or other means of accessibility.

**Cleanup.** Customer is responsible for removal and disposal of any existing equipment as well as the removal and disposal of any waste generated from the project. This includes, but is not limited to equipment crating & packing materials.

**Assistance.** Customer must provide at least one part-time mechanical helper to assist with the install.

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## **Parts and Service**

Thiele Technologies offers parts sales staff at three locations. All teams have access to inventory data at other locations and can enter your order regardless of equipment type or model.

### **Minneapolis, MN**

Parts Hotline: (800) 932-3647 or (612) 782-1200

Legacy Brands: Bemis, Edmeyer, Master Palletizer, Slidell, Streamfeeder, Thiele, Zepf

### **Reedley, CA**

Parts Hotline: (800) 344-8951 or (559) 638-8484

Fax: (559) 638-7478

Legacy Brands: Dyna Pak, McDowell, Padlocker, Ro-An, Salwasser, SWF, Thiele Tisma, Tri-Sterling

### **Green Bay, WI**

Parts Hotline: (800) 950-4362 or (920) 494-4571

Fax: (920) 496-1322

Legacy Brands: Nigrelli, Thiele, Hudson-Sharp, Ro-An, Amplas, FMC

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## All Rights Reserved

All information, illustrations, and specifications contained in this manual are based on the latest product information available at the time of this publication's printing. Thiele Technologies, Inc. reserves the right to alter and substitute specifications and methods at any time.

No patent liability is assumed with respect to the use of information contained herein. While every precaution has been taken in the preparation of this manual, Thiele Technologies, Inc. assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

# **SECTION 1**

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## ***SAFETY***

## General Safety Recommendations

**Use emergency stop devices.** Your Thiele equipment is designed with a means by which personnel may immediately stop operation of the equipment without regard to product, machine timing, machine position, or relationship with adjacent equipment. Examples of emergency stop devices include but are not limited to detented push buttons and pull cords.

An emergency stop device should be used any time continued operation is perceived to harm personnel or cause damage to product or machinery.

Consult your electrical schematics for information on the application of these devices on your equipment.

**Avoid entanglement and snagging hazards.** Employees should not wear loose-fitting clothing, jewelry, or other items that could become entangled in machinery, and long hair should be worn under a cap or otherwise contained to prevent entanglement in moving machinery.

**Use equipment as intended.** Equipment should only be used as intended. Using equipment in any way other than its intended use may present a hazard.

**Provide instruction.** Adequate instruction in the safe use and care of machines is essential in preventing injuries to personnel and damage to equipment. Make sure personnel receive instruction on how to use this machinery. Only authorized personnel should operate machinery.

**Wear PPE.** Wear personal protective equipment (PPE) when operating or maintaining machinery. Follow your company's policy on the recommended PPE for routine machine operation in your facility.

**Practice good housekeeping.** Keep the work area around the machine clean and well organized. Remove slip, trip, and fall hazards from the areas surrounding machines. Remove waste stock and product as it is generated.

**Use guarding.** Guarding prevents exposure to an identified hazard; never attempt to defeat guarding or work on equipment where guarding is damaged, improperly installed, or missing.

**Maintain equipment.** Provide for regular equipment maintenance to prevent breakdowns that can create hazards. Inspect equipment for damaged, worn, or missing parts and replace immediately. Follow the recommendations in this manual for routine procedures regarding maintenance.

**Use safeguarding devices.** Safeguarding devices either prevent or detect operator contact with the point of operation or stop potentially hazardous machine motion if any part of an individual's body is within the hazardous portion of the machine. Examples of safeguarding devices include interlocks (guard switches), barriers, and latches.

**Heed safety label information.** Safety labels placed on machinery are intended to communicate hazard information. Labels typically contain a symbol or a symbol in conjunction with a signal word and message.

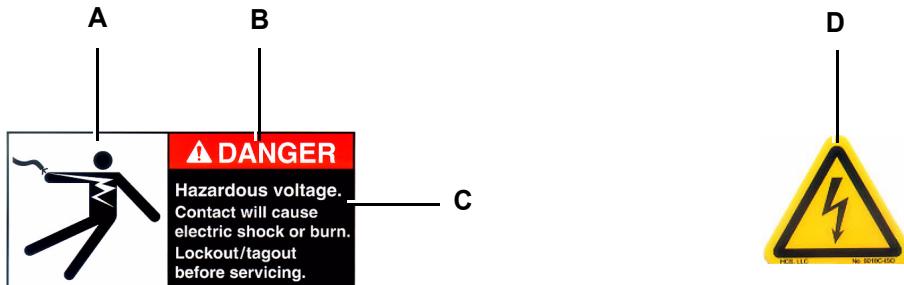
Signal words indicate the probability and severity of hazards using these terms:

**DANGER** indicates hazardous situations which if not avoided, will result in severe injury or death.

**WARNING** indicates hazardous situations which, if not avoided, could result in severe injury or death.

**CAUTION** indicates hazardous situations which, if not avoided, may result in minor or moderate injury.

**NOTICE** indicates information not related to personal injury.



**A. Symbol**

**B. Signal word**

**C. Message**

#### **D. Safety label without signal word or message.**

Messages identify the hazard, consequences of not avoiding the hazard, and instruction for avoiding the hazard.

If labels are removed, obscured, or damaged, contact the Parts Department at Thiele Technologies, Inc. for free replacements.

**Control hazardous energy.** Thiele equipment uses energy isolating devices to which or through which a lock may be affixed. An energy isolating device is any mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve, a block; and any similar device used to block or isolate energy.

Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Follow your company's specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities.

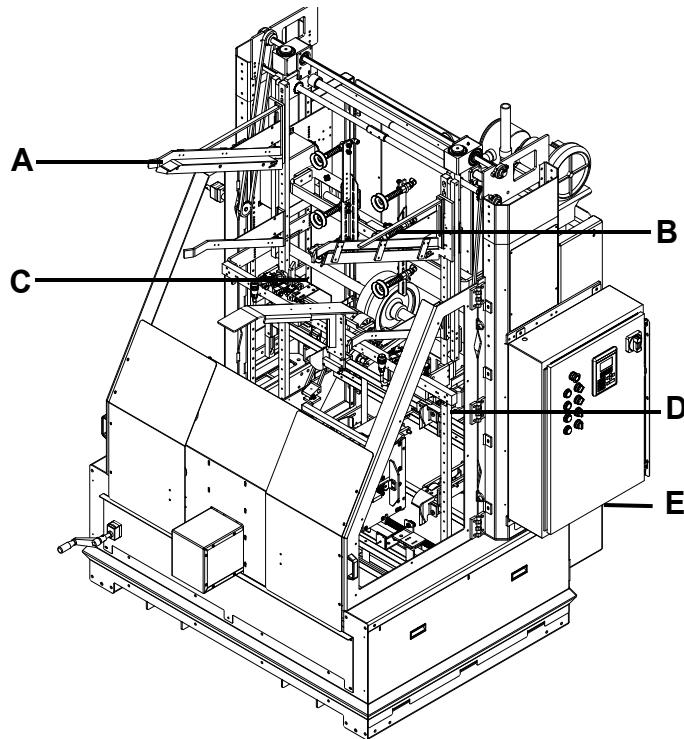
## **SECTION 2**

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### **OVERVIEW**

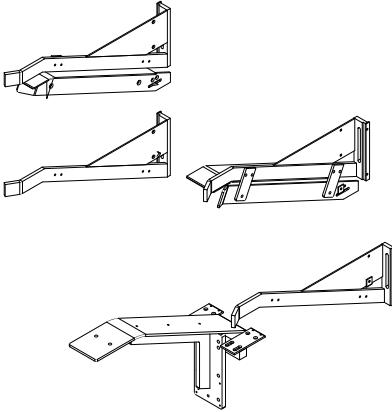
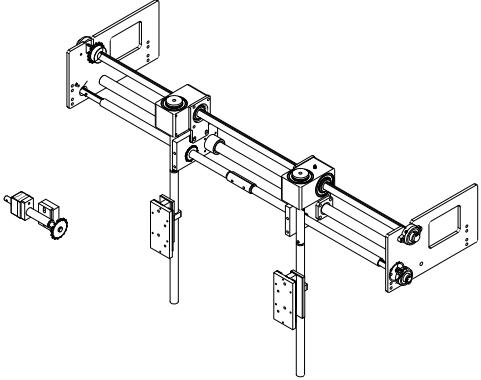
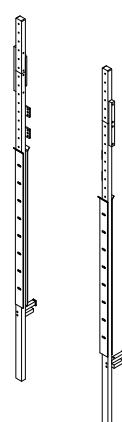
## Machine Function

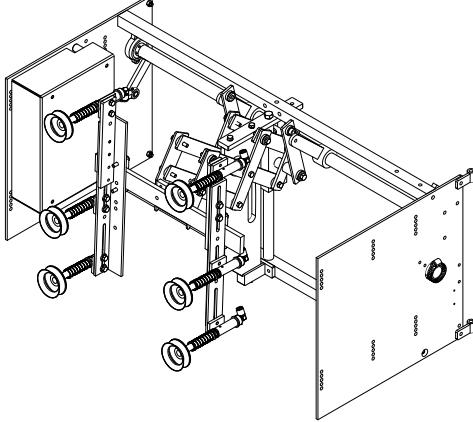
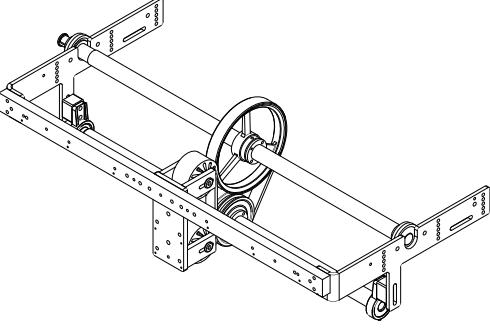
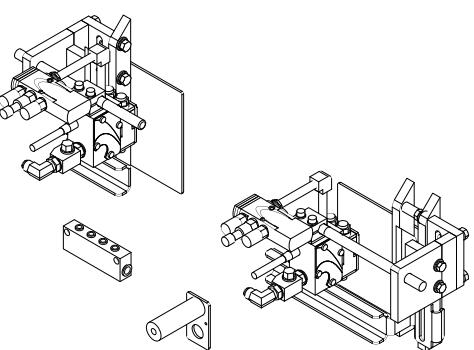
The TF400V/TF600V takes a single corrugated blank and constructs a one piece tray. The Tray Former can form various styles of tray cases. The TF400V/TF600V has five distinct operations to accomplish the forming process.

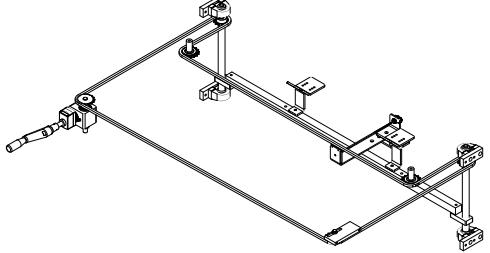
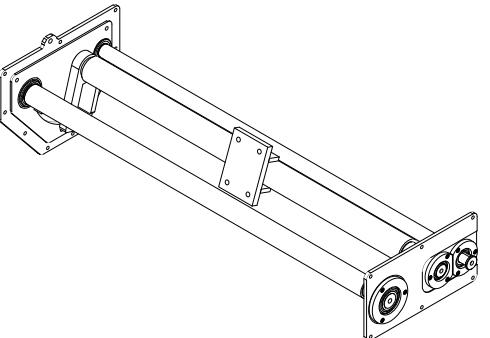
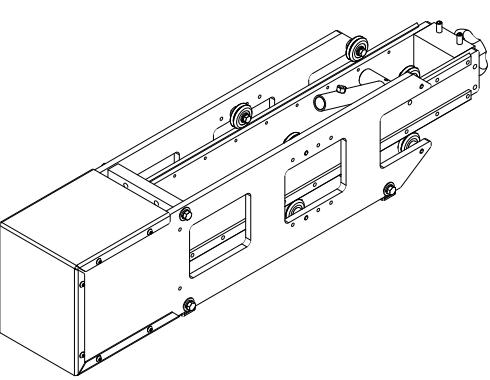


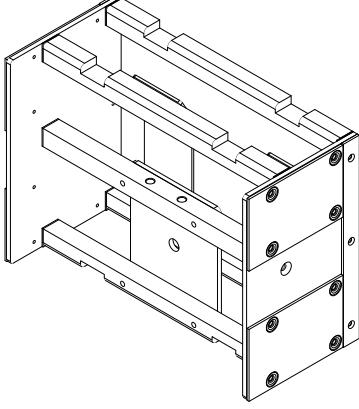
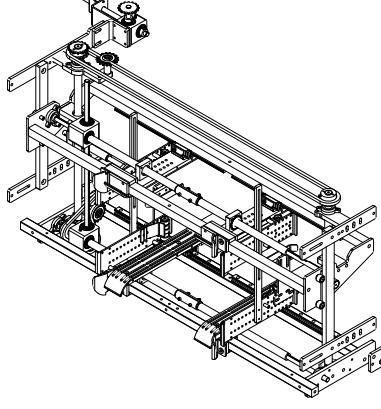
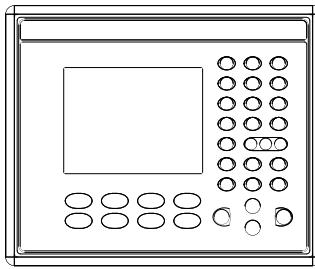
- A. Tray blanks are transferred on an optional powered infeed conveyor or on the standard hopper.
- B. Picks and transfers tray blanks from hopper.
- C. Glue is applied to blank.
- D. The blank is formed and compressed.
- E. The tray is discharged on an optional lidding attachment or conveyor.

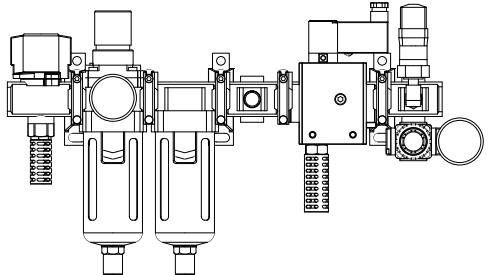
## Main Assemblies

Description	Assembly
<p>The Body Hopper holds stacks of trays for the Tray Former. A photoeye monitors the tray supply and alerts equipment operator when the supply is low or empty.</p>	<p><b>HPH Blank Hopper</b></p> 
<p>Turning the crank adjustment to the specified numerical value, the top spreader adjusts the in and out position of the vertical guides.</p>	<p><b>Top Spreader</b></p> 
<p>As trays are picked from the hopper they are guided downward across the vertical guides.</p>	<p><b>Vertical Guides</b></p> 

<b>Description</b>	<b>Assembly</b>
Vacuum cups secure a tray from the blank hopper and places the tray into the feed roller.	<p><b>Scissor Blank Pick</b></p> 
The blank feed rollers grab a tray blank from the blank pick and propel the blank downward.	<p><b>Feed Roll Assembly</b></p> 
As the tray blank travels through the feed rollers a photoeye triggers the glue guns to fire glue on the blank as it passes downward.	<p><b>Glue Guns</b></p> 

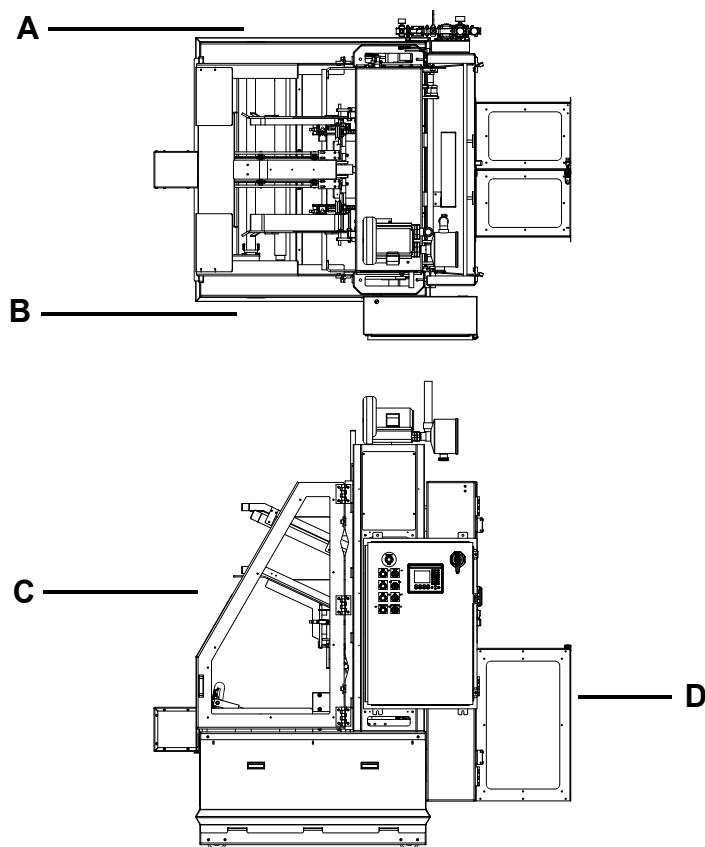
<b>Description</b>	<b>Assembly</b>
The tray blank will travel downward until it comes into contact with the bottom stop.	<p><b>Bottom Stop</b></p> 
The Transmission assembly powers the feed post which drives the mandrel in and out forming and pushing a tray blank through the compression assembly.	<p><b>Transmission</b></p> 
The mandrel is attached to the linear Mandrel Carriage which travels horizontally in and out forming and pushing a tray blank through the compression area.	<p><b>Linear Mandrel Carriage</b></p> 

<b>Description</b>	<b>Assembly</b>
<p>The mandrel travels horizontally in and out forming and pushing a tray blank through the compression area.</p>	<p><b>Mandrel</b></p> 
<p>Once glue is applied and the mandrel pushes a tray blank into the compression area, the compression area helps to form and to allow the glue to adhere to the newly formed tray.</p>	<p><b>Compression</b></p> 
<p>The human-machine interface (HMI) is used by operators to monitor and control operation of the machine. The enclosure of the HMI houses a touch screen as well as push buttons and a receptacle for a jog cord.</p>	<p><b>Human-Machine Interface (HMI)</b></p> 

Description	Assembly
<p>The main air supply uses several devices to control the pneumatic power of the equipment. It consists of a shutoff valve, filter, regulator, and a smooth start-valve.</p>	<p><b>Main Air Supply</b></p> 

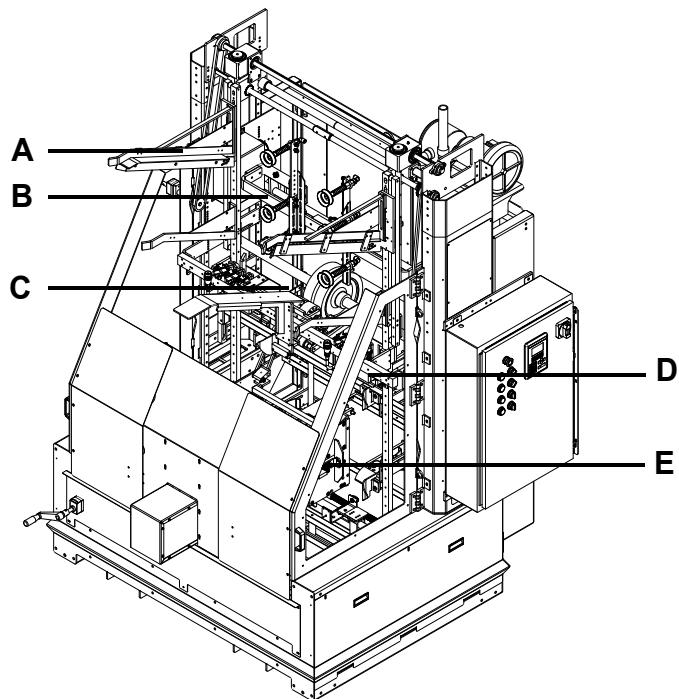
## Orientation—General

There are numerous commonly-used terms of relationship that refer to location and direction on the TF400V/TF600V. These terms are used in this manual, the machine's fault messages & control screens, and in assembly drawings and schematics.



- A. Left side or Non-operator side**
- B. Right side or Operator side**
- C. Infeed or front of machine**
- D. Discharge or back of machine.**

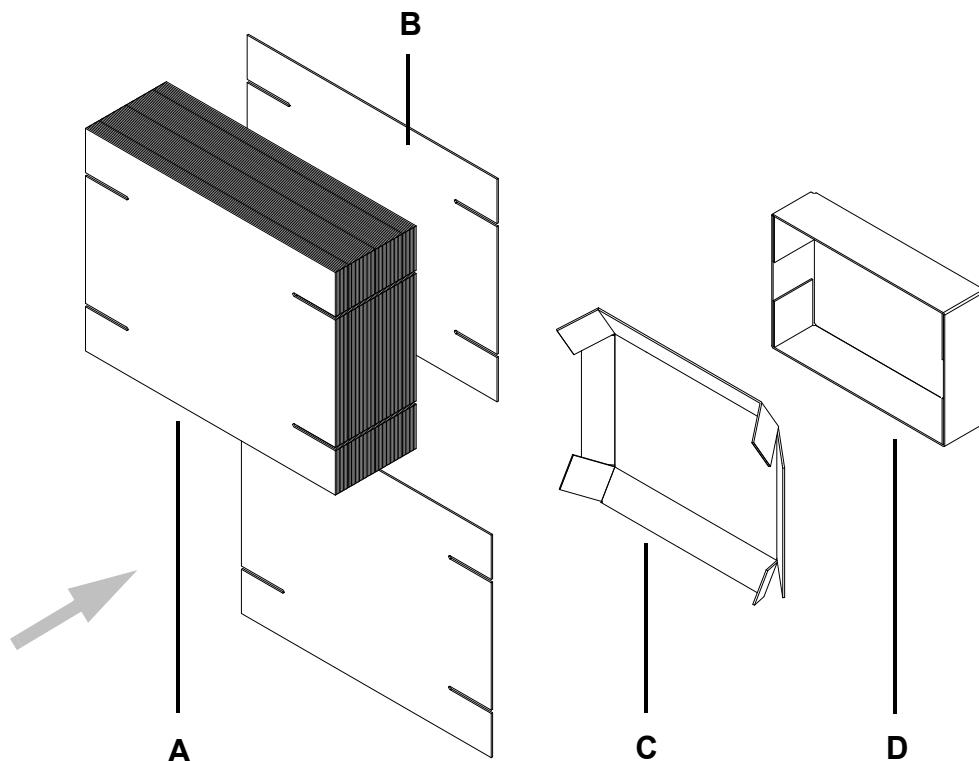
## Orientation—Stations



- A. Station 1: blank hopper**
- B. Station 2: blank pick**
- C. Station 3: blank feed roll**
- D. Station 4: compression**
- E. Station 5: linear Mandrel Carriage**

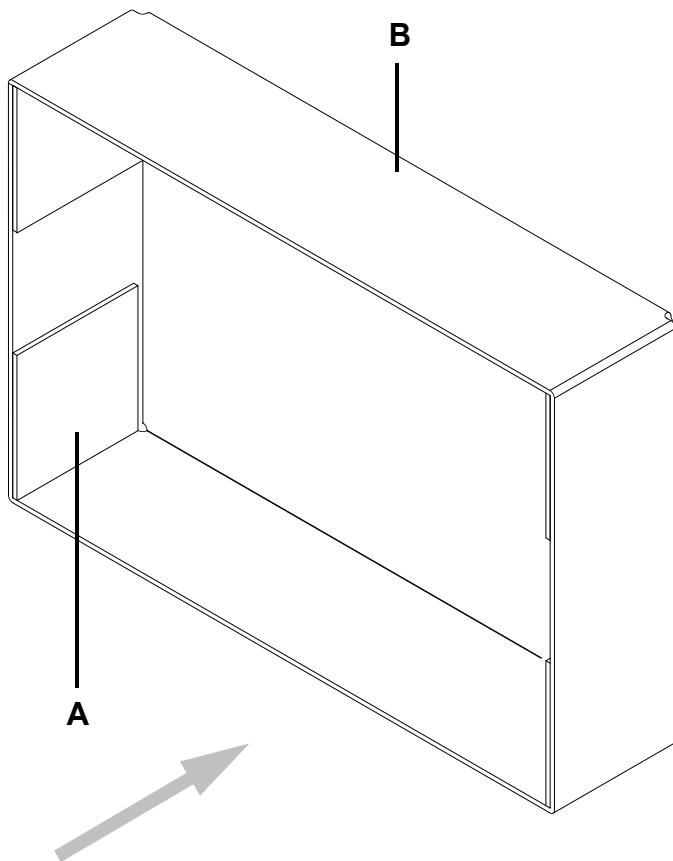
## Orientation— Tray Positions

The basic operations of the Tray Former can be viewed with a focus on product (tray). (A) Trays fill the body hopper. (B) A single tray is selected from the hopper, vacuum cups pick the blank and place it into the feed roll, glue is applied as blank moves through feed roll. The Blank drops down the Vertical Guides resting on Bottom Stop. (C) The Mandrel contacts Blank and pushes into compression. (D) Flaps are closed glue is set while in compression and is discharged by next entering box.



## Packaging Design & Features

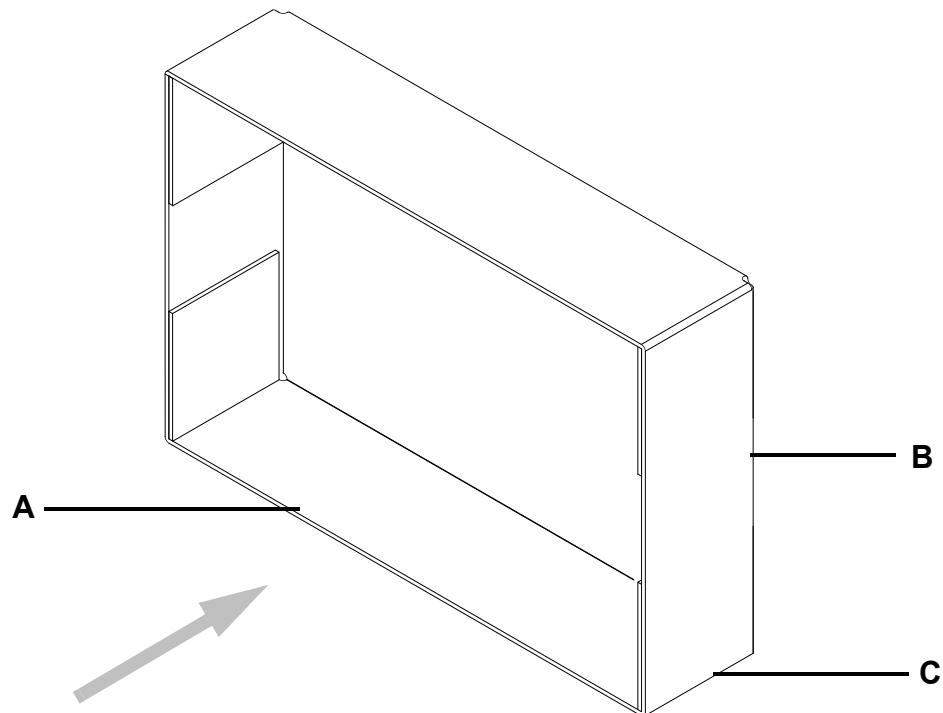
Though trays vary in size, their flap configuration is fairly consistent; usually with 4 flaps on each end that are folded to close the tray. In relationship to product flow, these flaps are designated as:



**A. Inside minor flaps**

**B. Top flap**

## Tray Dimensions



**A. Length**

**B. Width**

**C. Depth**

# Packaging Specifications & Quality Requirements

The Tray Former sets up, loads, and closes paperboard trays. Users must be aware of specifications and requirements of their trays to ensure proper operation of their equipment. Using damaged or poor-quality trays has a direct impact on efficiency of the equipment.

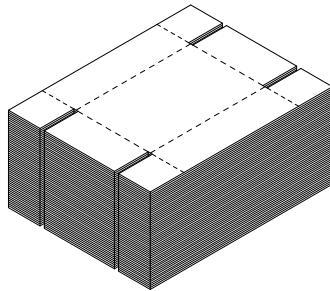
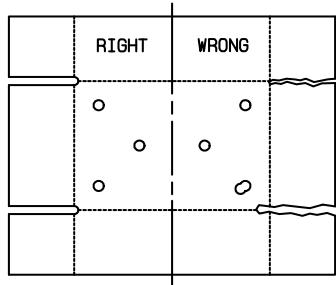
## Requirements for Paperboard Tray Blanks

- Tray must square so that the side panels are perpendicular to be manufactured within tolerance as specified for this machine. Trays specifications such as size(s) and tolerance, are described in the sales contract for this machine.
- Tray panels must be parallel to one another and to corresponding flaps.
- Score lines must permit setup of panels and folding of flaps without breaking or cracking.
- Trays must be free from tears, rips, scuffing, and other imperfections in quality of paperboard and its printing.
- Trays must be stored in a controlled environment to prevent damage from moisture or extreme temperature variations.
- Store trays in packaging from the manufacturer to prevent unwanted bending or warping.
- Trays must freely separate from one another.
- Adhesive must be applied uniformly and consistently.
- Trays must open freely.

## Corrugated: Storage Information

Check each order for accuracy. Do the blanks agree with the specification for which your machine is set (i.e. dimensions, flute, board weight, scoring, coatings, and slot width)?

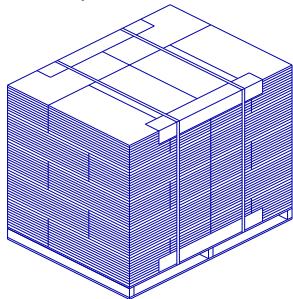
Are slots and vent holes clean and stripped of excess material? (See below.)



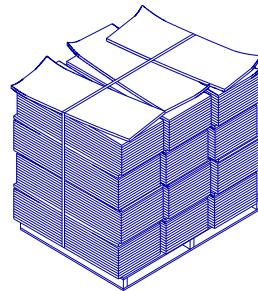
Verify the case blanks were not damaged due to bundling.

Use an interlocking pallet pattern to minimize warp in transit or storage.

Check unitizing for proper pallet size, use of dunnage, and strap tension. (See below.)



Right



Wrong

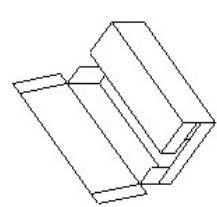
To minimize the loss of strength during storage, store the corrugate indoors to avoid extremes of temperature and humidity.

Keep storage time to a minimum through stock rotation. (First in - first out.)

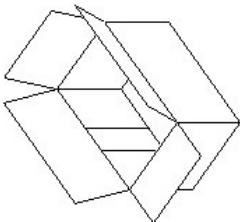
Use handling equipment to move the blanks. Never throw or drag the bundles.

These suggestions, in addition to normal shipping and handling practices, should lessen the chance of damaged containers

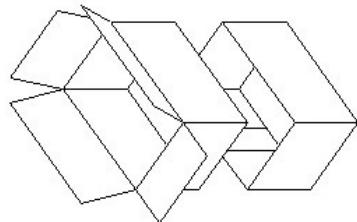
## Tray Types



Flap tray

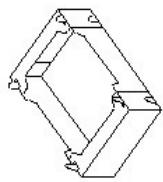


Double corner tray (BTB)

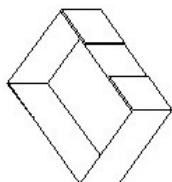


Tray with flaps

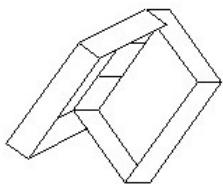
Tray with HSC cover



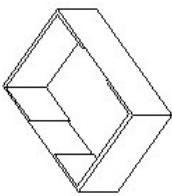
Single top flap



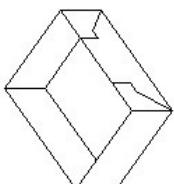
Flaps Outside



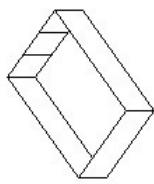
One-piece telescope



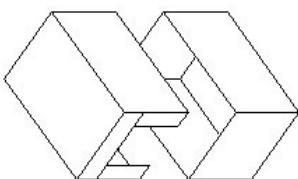
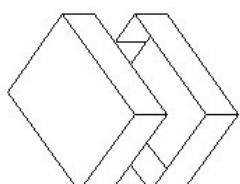
Tray and Bliss combination



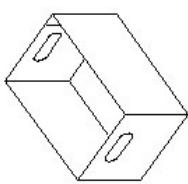
Leak-proof tray



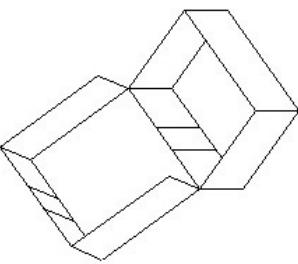
Slotted tray, min 1" depth

Econo lid  
Full telescope

Two piece, full telescope



Triple end tray



Six corner tray

## Overview

## **SECTION 3**

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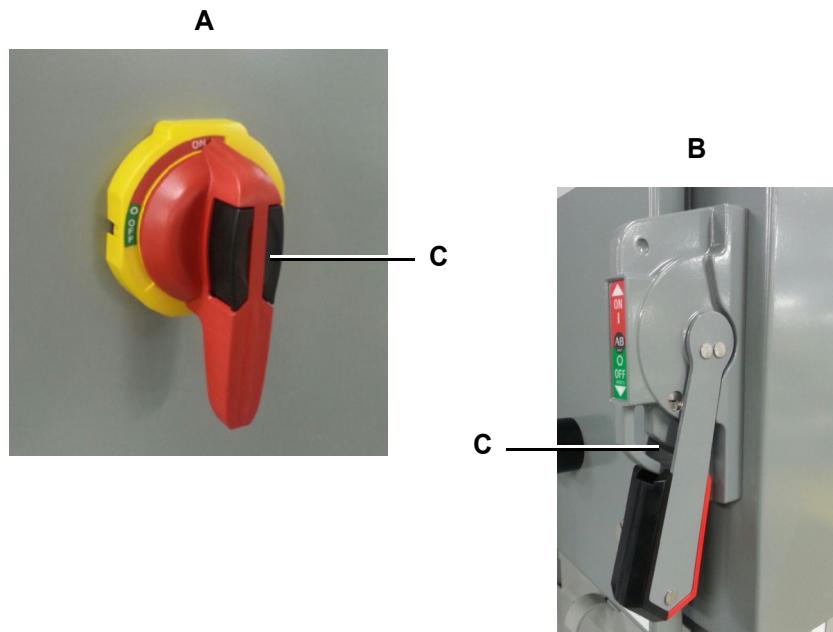
### ***OPERATION***

## Locking Out Main Incoming Electrical Power

Lock out the main incoming electrical power to the machine before performing any servicing or maintenance activities. The disconnect that controls the incoming electrical power is designed so that once it is in its OFF position, a lock may be affixed to prevent the disconnect from accidentally being moved to its ON position.

1. Move the main electrical power disconnect to its OFF position.
2. Lock out the disconnect according to your plant's standard operating procedure.

**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



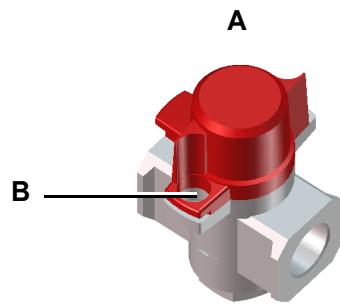
- A. Typical rotary disconnect
- B. Typical 'knife' type disconnect
- C. Location for lockout/tagout

## Locking Out Main Incoming Air Supply

Lock out the main incoming air supply to the machine before performing any adjustment, servicing or maintenance activities. The valve that controls the air is designed so that once it is in its EXHAUST (OFF) position, a lock may be affixed to prevent the valve from accidentally being moved to its SUPPLY (ON).

1. Turn the shutoff valve to its EXHAUST (OFF) position. All air will be evacuated from the machine.
2. Lock out the valve according to your plant's standard operating procedure.

**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



**A. Typical main air shutoff valve**

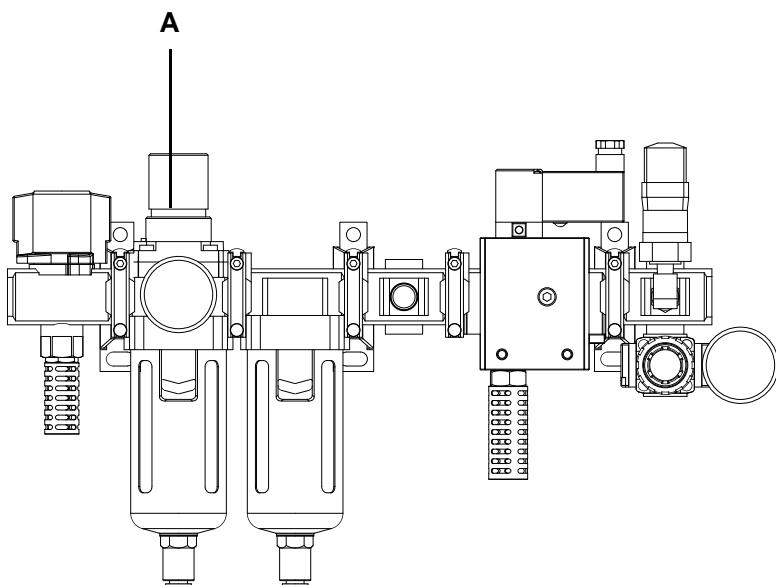
**B. Location for lockout/tagout**

## Adjusting Main Incoming Air Pressure

Use the regulator that controls the main incoming air to adjust the pressure of the pneumatic system. The regulator is a relieving type regulator which means that as the regulator is adjusted, air pressure controlled by the regulator will change simultaneously. (In contrast, air pressure controlled by a non-relieving type regulator will change more gradually, as system air is consumed by the machine.)

Consult your pneumatic drawing(s) for the proper operating pressure of your machine.

**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



**A. Typical air regulator (A).**

## Requirements for Operation

The Model TF400VB will be ready for operation when:

1. Hopper is loaded with bliss/trays.
2. Main air supply is open (ON) and supplied as specified by the pneumatic schematics.
3. Main electrical power is ON and supplied as specified by the electrical schematics.
4. Glue system is on and glue is at required temperature.
5. All safety circuit devices are in their normal operating position. This includes resetting emergency stop devices (e.g., e-stop buttons & pull cords) as well as closing and securing all guarding.
6. Vacuum is ON.
7. Desired operating mode is selected. [See “Jog/Run” on page 3-25](#)
8. Faults have been cleared.

## Starting Equipment Operation

### **WARNING**

**Machine starts automatically. Contact with or proximity to moving parts may cause severe injury. Keep away from moving parts.**

Verify the [Requirements for Operation](#) are complete.

Press the [Start](#) button. The selected operating mode determines how the machine will start.

## Stopping Equipment Operation

Routine stopping of equipment should be done using a **controlled stop**.

Controlled stops allow equipment to continue operation so that any production processes that may be sensitive to time, temperature, pressure, or position are allowed to complete before motion stops. The coordinated stopping of equipment in this manner minimizes potential for product waste as well as problems interfacing with adjacent equipment.

An **emergency stop** immediately removes power from equipment so that its operation is discontinued without regard to product, machine timing, machine position, or relationship with adjacent equipment. An emergency stop should be used any time continued operation is perceived to harm persons or cause damage to product or machinery.

Not all energy is removed from equipment after an emergency stop. Some equipment may store or maintain energy in electrical, pneumatic, hydraulic, and mechanical systems in order to maintain control or movement of parts and assemblies and prevent harm or damage.

## Initiating an Emergency Stop

Thiele equipment is designed with a means by which personnel may immediately stop operation of the equipment without regard to product, machine timing, machine position, or relationship with adjacent equipment. Examples of emergency stop devices include but are not limited to detented push buttons and pull cords.

An emergency stop device should be used any time continued operation is perceived to harm personnel or cause damage to product or machinery.

Consult your electrical schematics for information on the application of these devices on your equipment.

## Recovering from an Emergency Stop

1. Clear machine of foreign materials or objects.
2. Return all safety circuit devices to their normal operating position. This includes resetting emergency stop devices (e.g., e-stop buttons & pull cords) as well as closing and securing all guarding.
3. Reset the machine to clear machine faults.
4. Start the machine.

## Initiating a Controlled Stop

Press the STOP button to bring the equipment to a controlled stop. Control power will remain on after a controlled stop and is the preferred method of stopping equipment during normal operation.

## Machine Lockout

1. Close all guard doors.
2. Turn the main air shutoff to its EXHAUST position.
3. Install a lock to the main air shutoff.
4. Turn the main power shutoff to its OFF position.
5. Install a lock on the main power shutoff.

Locks must remain installed and secured during machine lockout.

## Accessing the Maintenance Screens

The HMI is configured with two access levels; one designated for routine operation of the equipment and another designated for machine and recipe configuration.

To access maintenance-level screens, press the [Maintenance Menu](#) button and enter the password using the numeric keypad.

## Understanding Touch Screen Buttons

Buttons and controls on the touch screen behave in different ways depending on button function. Button behavior on the HMI is defined by two things: 1) **action**—how the button behaves when pressed and 2) state—the ON or OFF status of the button. Button states are visible to the user when buttons change color or the text on the button changes. There are several button action types that are used on the HMI.

**Navigational (GoTo) Buttons** are links that take users to other screens in the HMI.

**Momentary push buttons** change value when pressed and change again when released.

**Maintained push buttons** toggle between two values.

**Latched push buttons** latch or maintain a position or value until they are unlatched by another button or process.

**Ramp push buttons** increase or decrease value.

## Audible Alarm

An audible alarm sounds to announce equipment startup. This audible alarm will sound for approximately 3 seconds to alert users to stand clear of the equipment.

## Stack Light

The stack light provides visual information to users about the operating status of the equipment. Stack light colors and status (flashing/not flashing) indicate particular conditions that may require operator intervention. For additional information on stack light states, see [HMI Messages](#) for flashing codes.

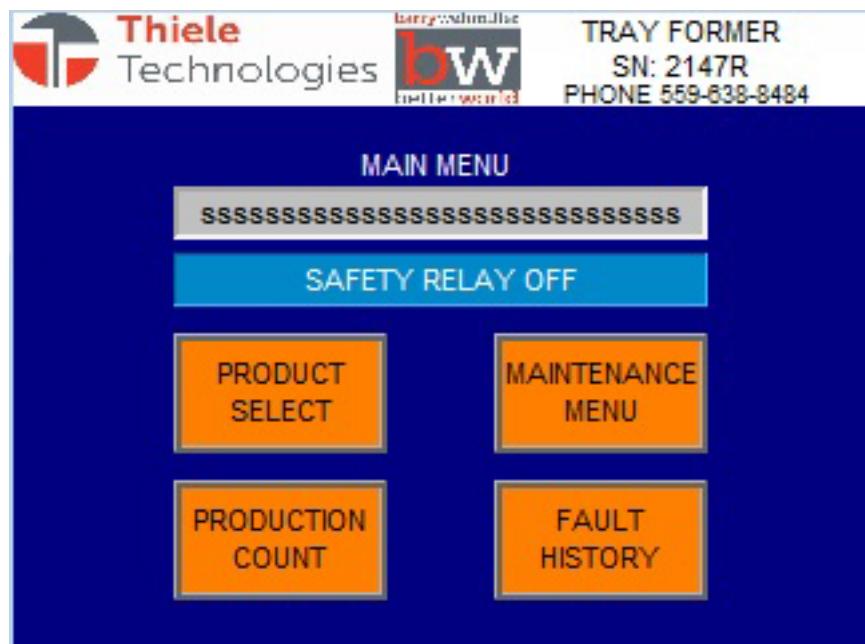
Stack Light Status	Definition
Red	Failure condition. Continuous or steadily illuminated red lamp indicates that the machine is stopped due to an open safety circuit. Control power is off.
Red, Flashing	Stopped condition. Flashing illuminated red lamp indicates that the machine is stopped under controlled conditions (controlled stop). Control power is on.
Amber	Warning condition. Continuous or steadily illuminated amber lamp indicates that the machine requires operator intervention. Machine may or may not be stopped.
Amber, Flashing	Warning condition. Continuous or steadily illuminated amber lamp indicates that the machine requires operator intervention. Machine may or may not be stopped.
Green	
Green, Flashing	Operational condition. Continuous or steadily illuminated green lamp indicates that the machine is operational and is cycling or will cycle automatically in production.
Blue	Paused but operational condition. Flashing illuminated green lamp indicates that the machine is operational but equipment is paused. This signal is also generated prior to starting in conjunction with an audible alarm.
Blue Flashing	Not used

# HMI Screens

## Main Menu

This navigational screen appears when the Tray Former has electrical power and provides users with a means to access other screens.

The serial number and important contact information appear on this screen as well.



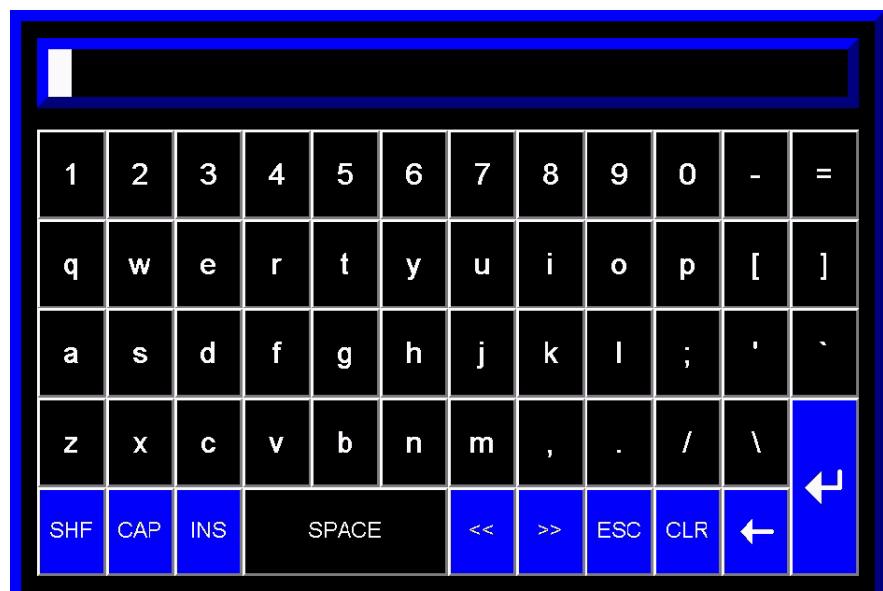
## Alphanumeric keypad

When alphanumeric input is required by a selection, this keypad will appear.

Press the key to accept the input and exits the keypad.

Pressing the **ESC** key discards the input and exits the keypad.

Pressing the **CLR** button erases the entire input line.



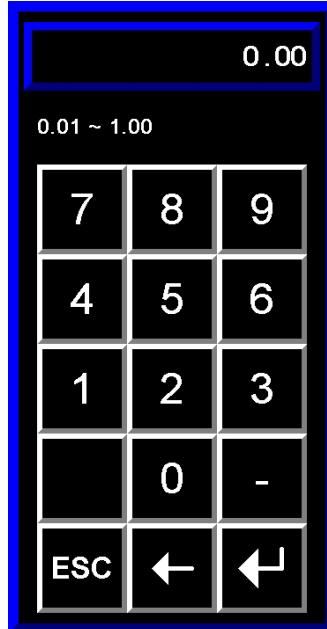
The input may contain as many as 32 characters.

## Numeric keypad

Pressing any of the parameter buttons on any of the Parameter screens calls up this keypad for entering numeric values.

Pressing the  (ENTER/SELECT) key accepts your input and exits the keypad.

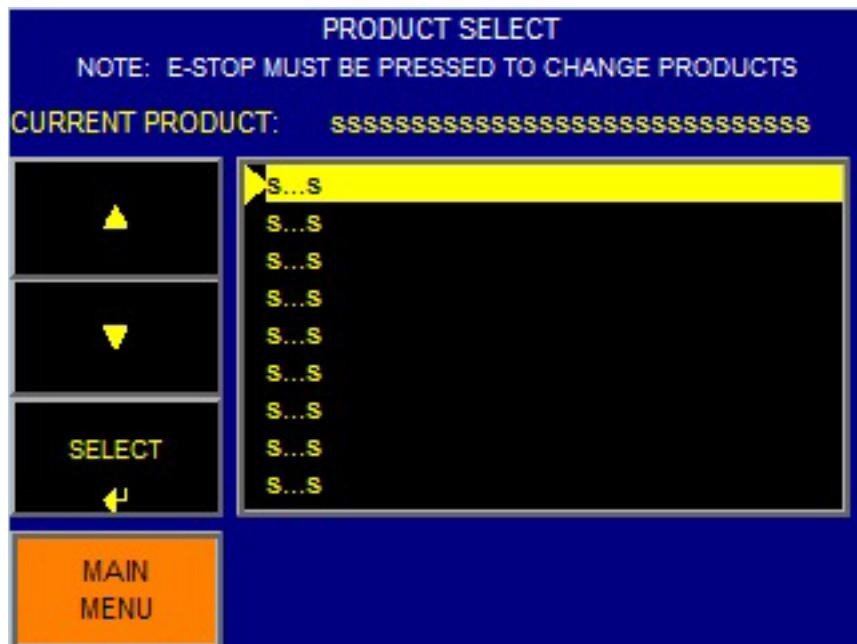
Pressing the ESC key discards your input and exits the keypad.



## Product Select

This screen is used to select other available product sizes. Users are able to scroll up and down the list of available products and select the product to load the recipe default settings.

Note: the e-stop must be pushed in to switch between products.

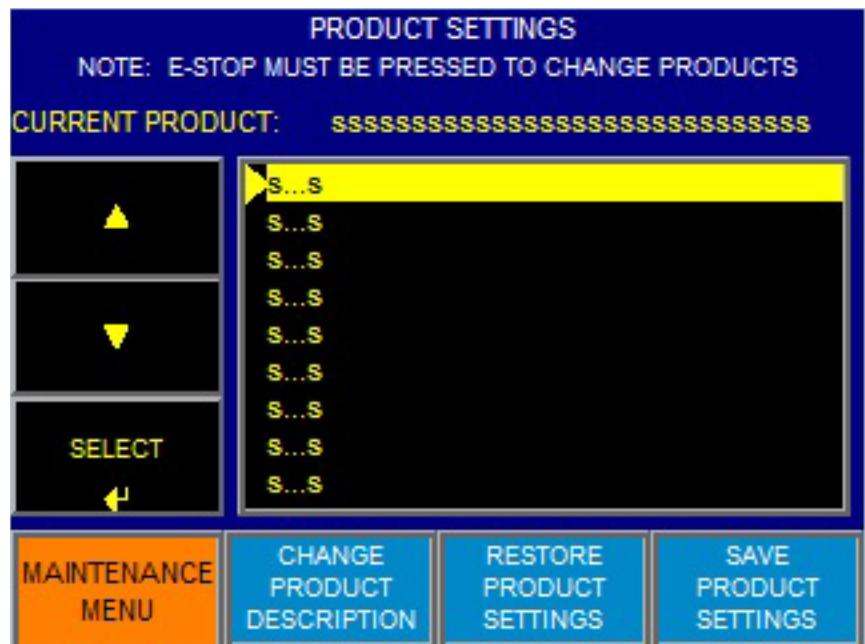


## Product Settings

Users are able to scroll up and down the list of available products and select a product to modify, load or save product settings.

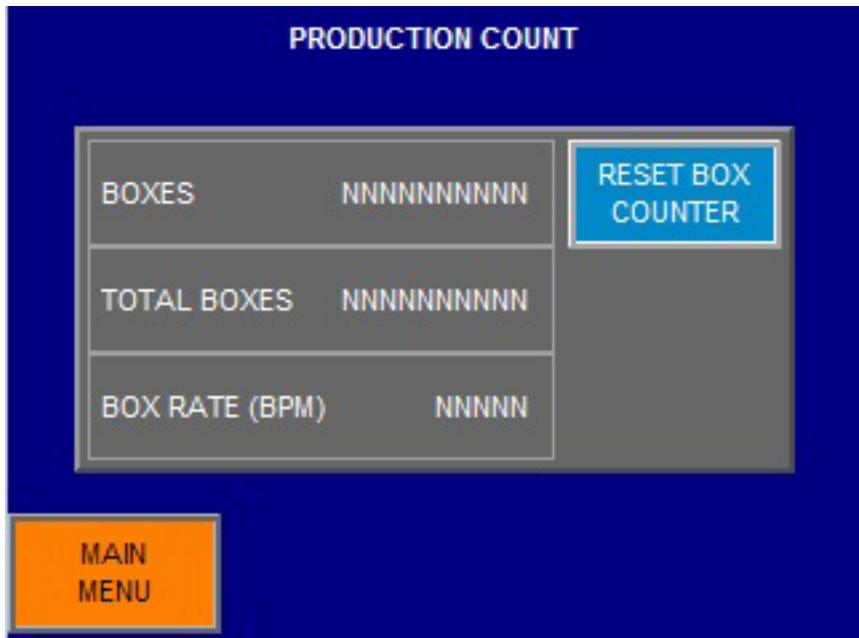
Note: The e-stop must be pushed in to switch between product settings and to restore product settings.

Once all parameters have been changed, press the Save Product Settings key. To load last parameters, press the Restore Product Settings key.



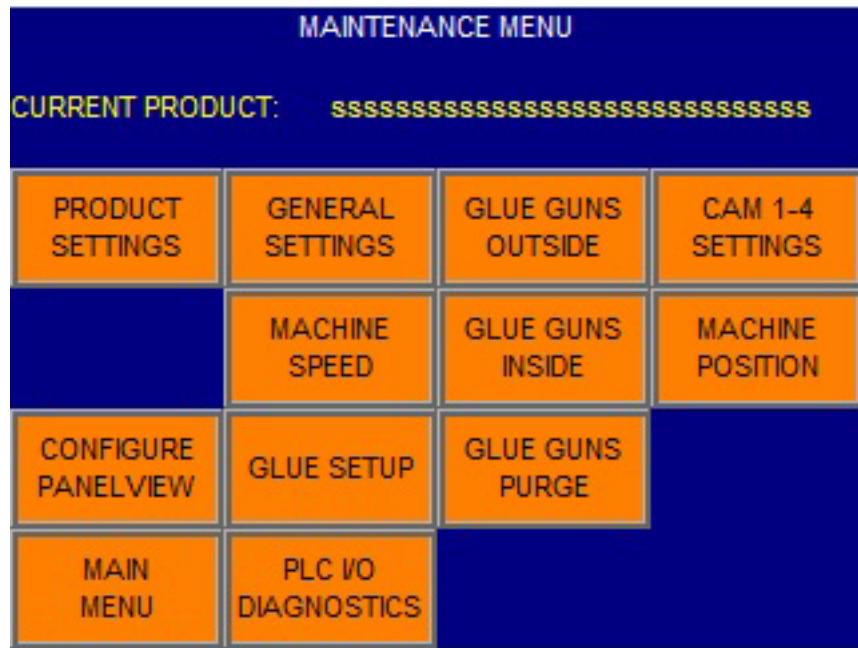
## Production Count Screen

This informational screen provides data to help users understand production. Totals are provided for good product count as well as various counts for product rejection. If numeric values vary from expected, this screen can help identify those operations which require inspection.



## Maintenance Menu Screen

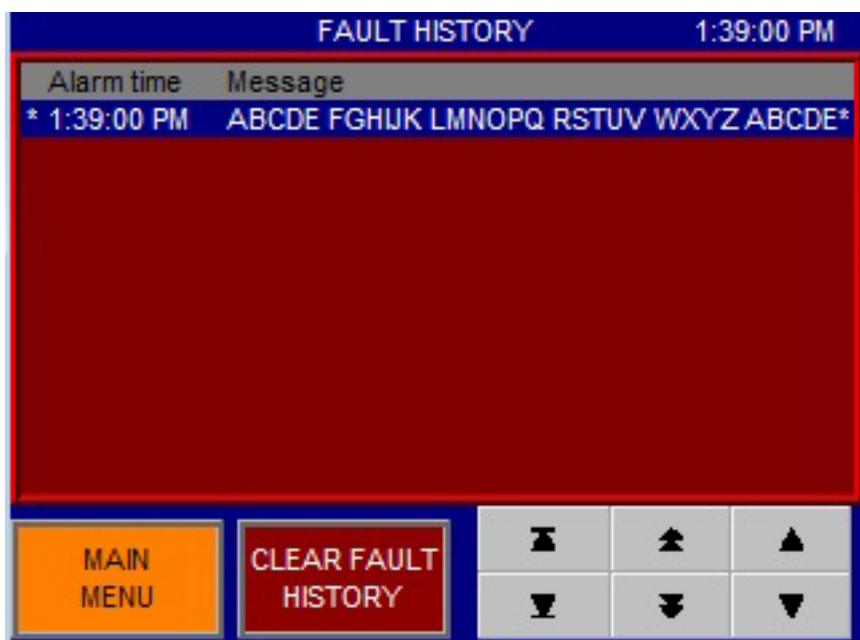
The maintenance screen is password protected and permits users to access maintenance-level screens.



## Fault History

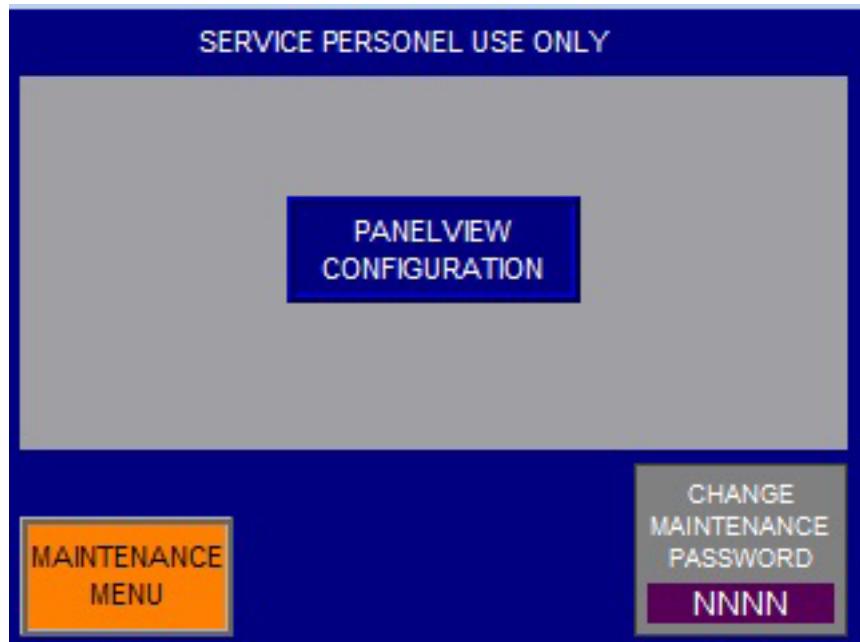
This screen shows alarm messages generated during the current production run.

Alarms are listed in chronological order with most recent alarms listed at the top of the list. The alarm history remains in memory until it is pressed.



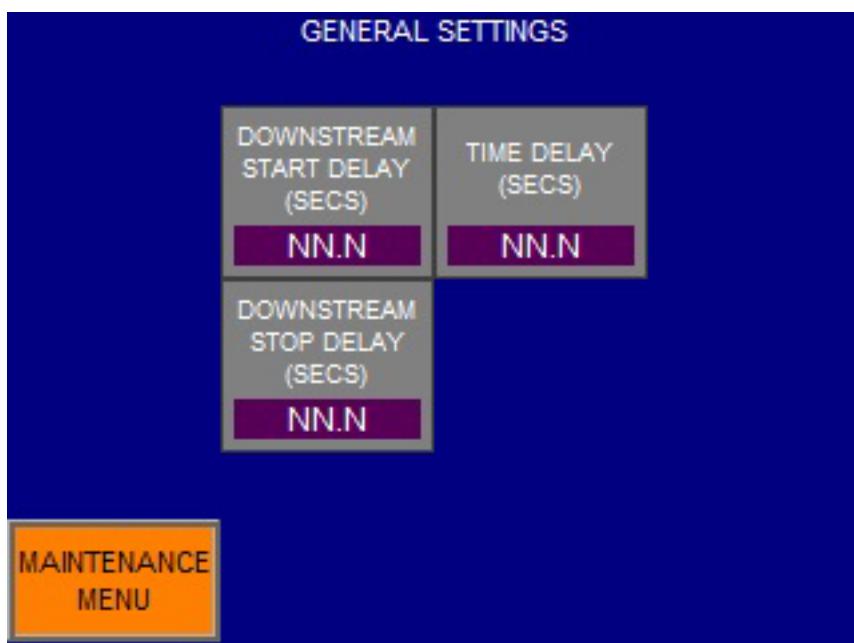
## Configuration Panelview Screen

The configuration screen is to warn users that they are going to exit the program and be directed to the PanelView+ configuration. Contact Thiele Technologies before changing parameters in this screen.



## General Settings Screen

This screen allows the operator to view, change and save parameters for the downstream start/stop delay.

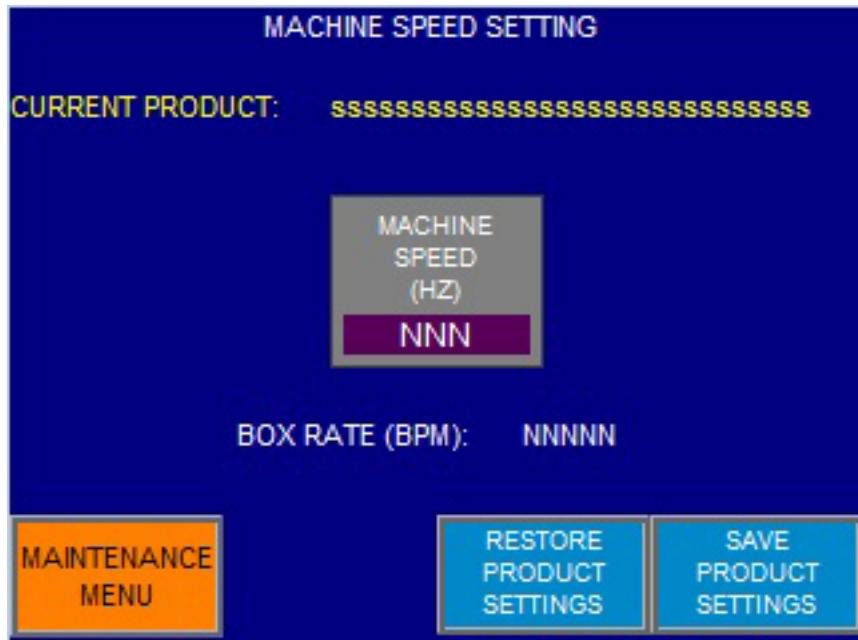


## Machine Speed Setting Screen

This screen is used to select other available machine speeds. Users are able to scroll up and down the list of available speed recipe's and select the speed recipe to load the recipe default settings.

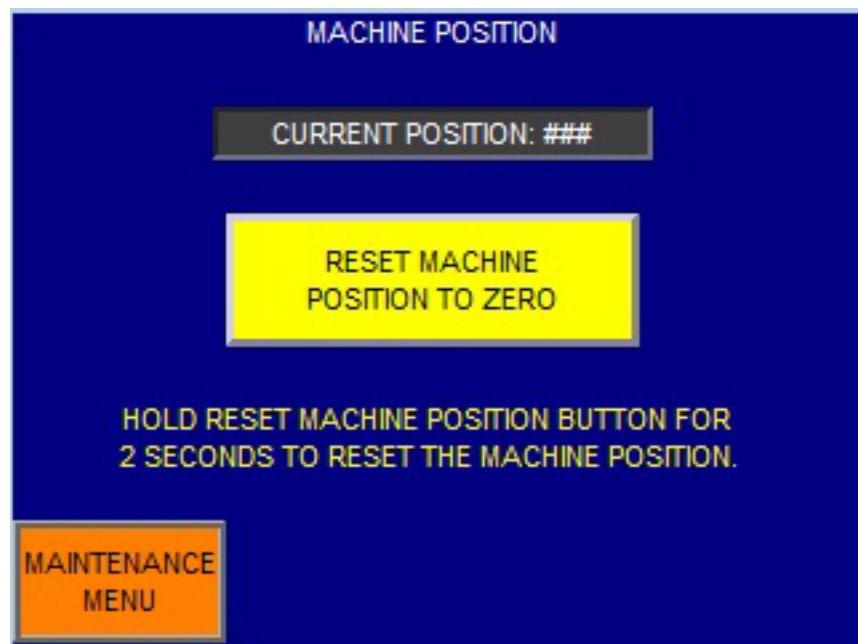
Note: the e-stop must be pushed in to switch between speeds.

Once all the parameters have been changed, press the PRESS TO SAVE RECIPE key. To load last saved parameters, press the PRESS TO LOAD RECIPE key.



## Glue Setup Screens

This screen allows the operator to view, change, load, and save parameters for the glue guns. The glue setup determines the trigger offset, speed compensation and scale factor of the glue strip.



## **Glue Guns Inside/Middle/ Outside Screens**

This screen allows the operator to view, change, load, and save parameters for the glue guns. The glue setup determines the trigger offset, speed compensation and scale factor of the glue strip.

GLUE PATTERN - OUTSIDE GLUE GUNS			
CURRENT PRODUCT:		SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	
OUTSIDE GLUE BEAD 1 OFFSET	NN.N	OUTSIDE GLUE BEAD 1 LENGTH	NN.N
OUTSIDE GLUE BEAD 2 OFFSET	NN.N	OUTSIDE GLUE BEAD 2 LENGTH	NN.N
OUTSIDE GLUE BEAD 3 OFFSET	NN.N	OUTSIDE GLUE BEAD 3 LENGTH	NN.N
OUTSIDE GLUE BEAD 4 OFFSET	NN.N	OUTSIDE GLUE BEAD 4 LENGTH	NN.N
MAINTENANCE MENU		RESTORE PRODUCT SETTINGS	SAVE PRODUCT SETTINGS

## **Glue Guns Middle Screens**

This screen allows the operator to view, change, load, and save parameters for the glue guns. The glue setup determines the trigger offset, speed compensation and scale factor of the glue strip.

After setting the current glue bead save pattern, return to the Maintenance Menu and navigate to the next glue bead option. Repeat setup sets until all glue bead settings are complete.

GLUE PATTERN - MIDDLE GLUE GUNS			
CURRENT PRODUCT:		SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	
MIDDLE GLUE BEAD 1 OFFSET	MIDDLE GLUE BEAD 1 LENGTH	MIDDLE GLUE BEAD 2 OFFSET	MIDDLE GLUE BEAD 2 LENGTH
NN.N	NN.N	NN.N	NN.N
MIDDLE GLUE BEAD 3 OFFSET	MIDDLE GLUE BEAD 3 LENGTH	MIDDLE GLUE BEAD 4 OFFSET	MIDDLE GLUE BEAD 4 LENGTH
NN.N	NN.N	NN.N	NN.N

## Glue Guns Inside Screens

This screen allows the operator to view, change, load, and save parameters for the glue guns. The glue setup determines the trigger offset, speed compensation and scale factor of the glue strip.

After setting the current glue bead save pattern, return to the Maintenance Menu and navigate to the next glue bead option. Repeat setup sets until all glue bead settings are complete.

GLUE PATTERN - MIDDLE GLUE GUNS			
CURRENT PRODUCT:    sssssssssssssssssssssssssssssssss			
MIDDLE GLUE BEAD 1 OFFSET	MIDDLE GLUE BEAD 1 LENGTH	MIDDLE GLUE BEAD 2 OFFSET	MIDDLE GLUE BEAD 2 LENGTH
NN.N	NN.N	NN.N	NN.N
MIDDLE GLUE BEAD 3 OFFSET	MIDDLE GLUE BEAD 3 LENGTH	MIDDLE GLUE BEAD 4 OFFSET	MIDDLE GLUE BEAD 4 LENGTH
NN.N	NN.N	NN.N	NN.N
<b>MAINTENANCE MENU</b>	<b>RESTORE PRODUCT SETTINGS</b>	<b>SAVE PRODUCT SETTINGS</b>	

## Glue Guns Purge Screen

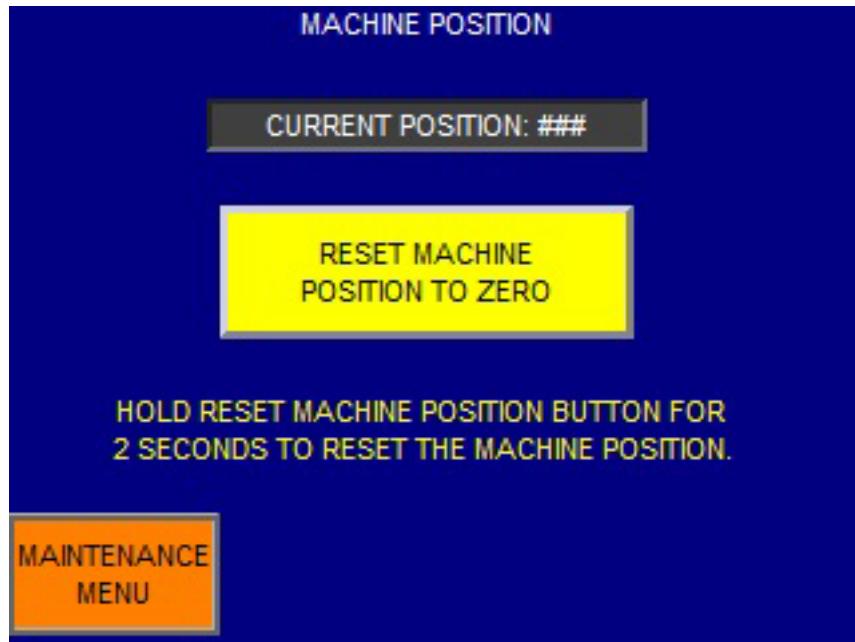
This screen allows the operator to purge a specific glue gun to test for glue consistency.

GLUE PATTERN - INSIDE GLUE GUNS			
CURRENT PRODUCT:    sssssssssssssssssssssssssssssssss			
INSIDE GLUE BEAD 1 OFFSET	INSIDE GLUE BEAD 1 LENGTH	INSIDE GLUE BEAD 2 OFFSET	INSIDE GLUE BEAD 2 LENGTH
NN.N	NN.N	NN.N	NN.N
INSIDE GLUE BEAD 3 OFFSET	INSIDE GLUE BEAD 3 LENGTH	INSIDE GLUE BEAD 4 OFFSET	INSIDE GLUE BEAD 4 LENGTH
NN.N	NN.N	NN.N	NN.N
<b>MAINTENANCE MENU</b>	<b>RESTORE PRODUCT SETTINGS</b>	<b>SAVE PRODUCT SETTINGS</b>	

## Machine Position Screen

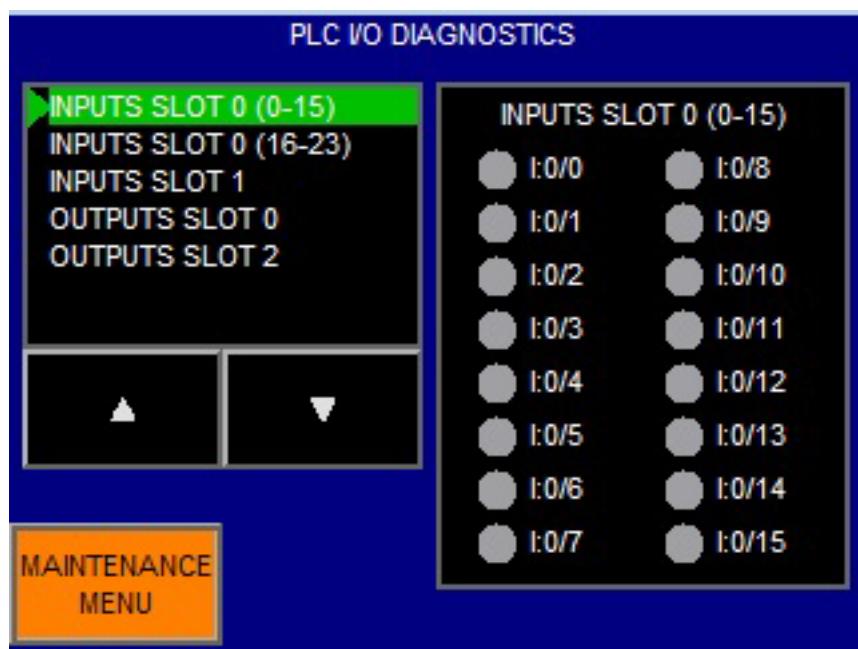
This screen allows the operator to view or reset the machines zero position.

Note: hold the reset machine position button for 2 seconds to reset the machine position.



## PLC IO Screen

This screen provides users with visual representation of the PLC's input and output modules. Each of the data points are identified for the selected module and users are able to see if a data point is ON (green) or OFF (red). Users are able to scroll up or down on the slot list and then press SELECT to view a particular slot's I/O data status.

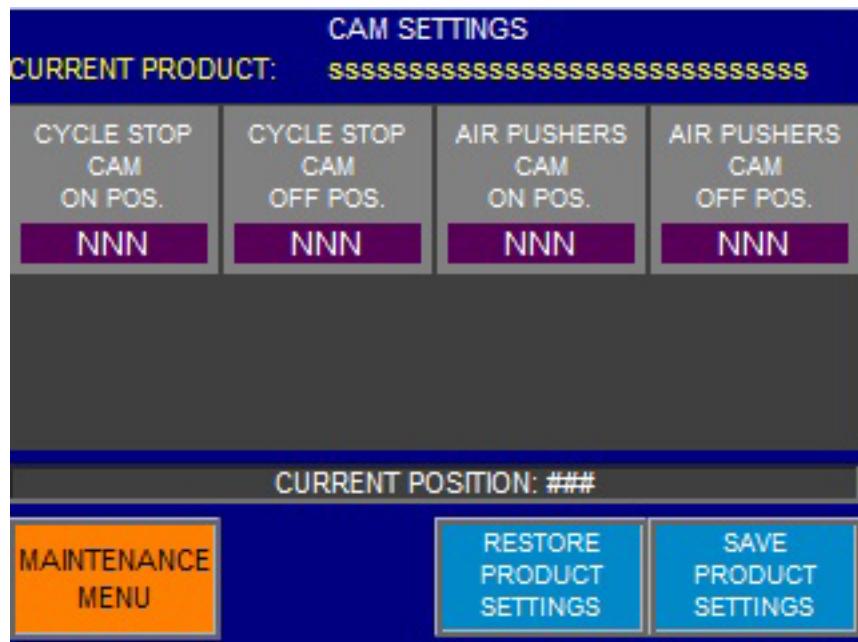


This screen is used primarily as a troubleshooting tool. Consult the schematics of the machine to verify whether or not a particular data point is connected to a field device.

### Cam 1 - 4 Settings Screen

There are ten cam settings screens which permits users to change the parameters of various cam settings.

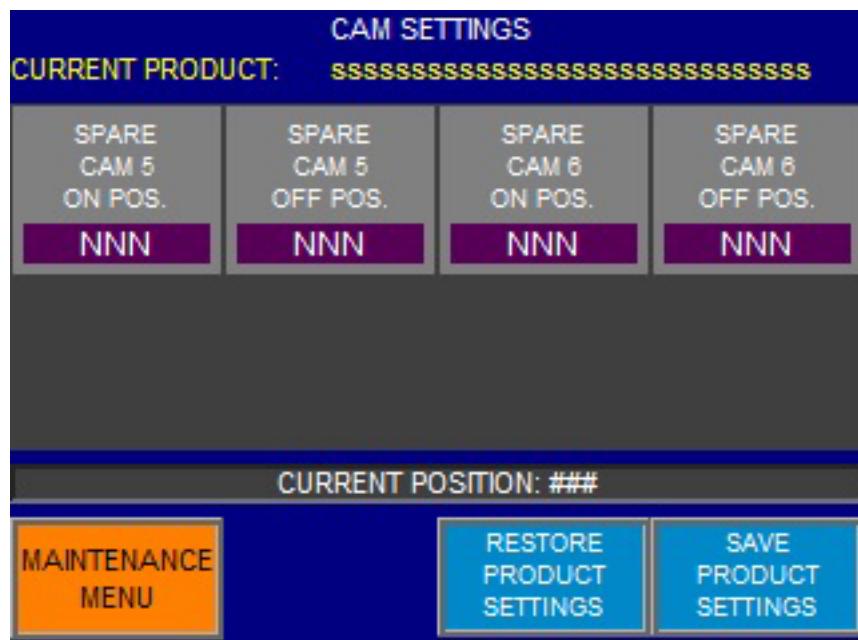
Once all the parameters have been changed, press the PRESS TO SAVE RECIPE key. To load last saved parameters, press the PRESS TO LOAD RECIPE key.



### Cam 5 - 8 Settings Screen

There are ten cam settings screens which permits users to change the parameters of various cam settings.

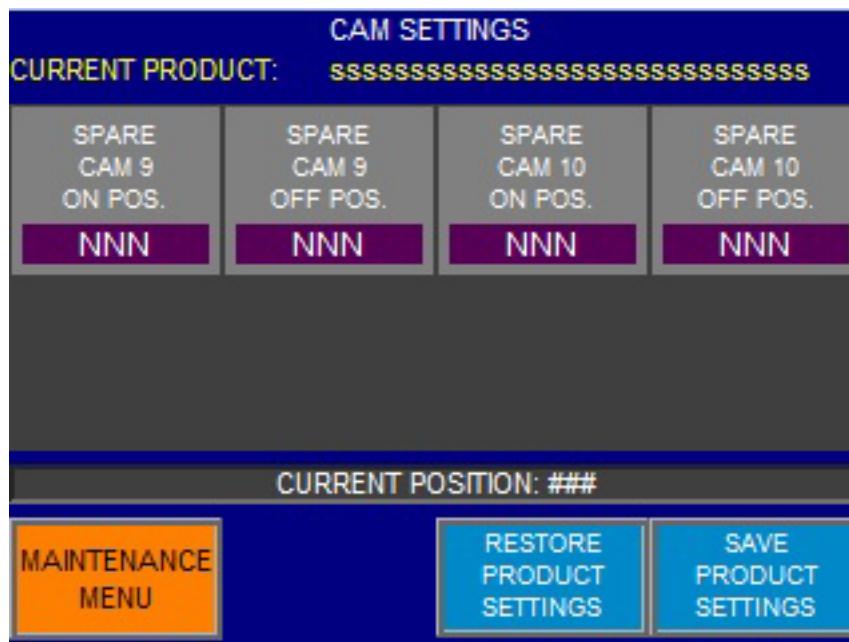
Once all the parameters have been changed, press the PRESS TO SAVE RECIPE key. To load last saved parameters, press the PRESS TO LOAD RECIPE key.



## **Cam 9 - 10 Settings Screen**

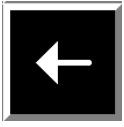
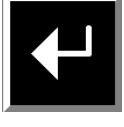
There are ten cam settings screens which permits users to change the parameters of various cam settings.

Once all the parameters have been changed, press the PRESS TO SAVE RECIPE key. To load last saved parameters, press the PRESS TO LOAD RECIPE key.



## Control Reference

The control reference is an alphabetical listing of the various controls found on the Model TF400V/TF600V Tray Former. These buttons include all controls which appear within the screens of the HMI or are mounted on the machine. Each button is listed with a definition of what the button does and in some bags links are provided to relevant procedures.

Button	Definition
<b>ESC</b>	Press this key to exit out of the keypad without making any changes to the values.
 (BK SP)	Press this key to erase the character to the left of the cursor position.
 (Bottom)	Pressing this button moves the selection bar to the bottom of the list.
 (Dn)	Press this button to move the selection bar one line down the list.
 (ENTER/SELECT)	Press this key to save your changes.
 (Pg Dn)	Press this button to move the selection bar one page down the list.
 (Pg Up)	Press this button to move the selection bar one page up the list.
 (Top)	Pressing this button moves the selection bar to the top of the list.

Button	Definition
 (Up)	Pressing this button moves the selection bar up to the next item in the list.
<b>Air Pushers Cam Off pos.</b>	This set point on the <a href="#">Cam 1 - 4 Settings Screen</a> allows the user to adjust the Air Pushers Cam Off position of the machine at each index using the numeric keypad.
<b>Air Pushers Cam On pos.</b>	This set point on the <a href="#">Cam 1 - 4 Settings Screen</a> allows the user to adjust the Air Pushers Cam On position of the machine at each index using the numeric keypad.
<b>Body Blank Length (IN)</b>	This set point setting allows the operator to enter the length in inches of the blanks body.
<b>Box Rate (BPM)</b>	This indicator is a counter that displays the total number of good products produced by the machine. See “ <a href="#">Production Count Screen</a> ” on page 3-13
<b>Cam 1-10 Settings</b>	Navigational button that displays the <a href="#">Cam 1 - 4 Settings Screens</a> .
<b>Clear Fault History</b>	<p>Pressing this button erases all current faults and resets the fault count to zero.</p> <p>Pressing this button erases all current faults.</p> <p>When this button is pressed, it changes to its other state, <a href="#">No Active Faults</a>.</p>
<b>CLR</b>	On the Alphanumeric Keypad, this button erases the entire input line.
<b>Configure PanelView</b>	Navigational button that displays the <a href="#">Configuration Panelview Screen</a> .
<b>Current Position</b>	This indicator shows the machines current timing position.
<b>Current Product</b>	This indicator shows the machines current run product.
<b>Current Speed</b>	This indicator shows the machines current speed.
<b>Cycle Stop Cam Off Pos.</b>	This set point on the <a href="#">Cam 1 - 4 Settings Screen</a> allows the user to adjust the OFF position of the machine at each index using the numeric keypad.

Button	Definition
<b>Cycle Stop Cam On Pos.</b>	This set point on the <a href="#">Cam 1 - 4 Settings Screen</a> allows the user to adjust the ON position of the machine at each index using the numeric keypad.
<b>Cycle Stop or Stop</b>	Press this button to initiate a controlled stop. <a href="#">See "Stopping Equipment Operation" on page 3-7</a>
<b>Downstream Off/On</b>	Place this switch to ON to enable the downstream control when the downstream photo eye is blocked. The machine will cycle a number of times before stopping. Placing switch to 'Off' will disable downstream photo eye.
<b>Downstream Start Delay (msec.)</b>	This set point on the <a href="#">General Settings Screen</a> is a delay timer that determines how long to wait before downstream equipment begins to cycle. This timer is expressed in milliseconds.
<b>Downstream Stop Delay (msec.)</b>	This set point on the <a href="#">General Settings Screen</a> is a delay timer that determines how long to wait before downstream equipment begins to stop. This timer is expressed in milliseconds.
<b>Emergency Stop</b>	Press the emergency stop button to immediately stop the machine. This drops power and air from the machine and stops the machine regardless of its position in the cycle. <a href="#">See "Stopping Equipment Operation" on page 3-7</a>
<b>Fault History</b>	Navigational button that displays the <a href="#">Fault History</a> screen.
<b>Forward/Off/Reverse</b>	<p>To jog the machine, place the machine in 'jog' mode. Using this spring-operated switch, rotate and hold the switch in the forward or reverse direction to jog the machine.</p> <p>This switch is only used to jog the machine. Under normal operating conditions, this switch returns to the center position.</p>
<b>General Settings</b>	Navigational button that displays the <a href="#">General Settings Screen</a> .
<b>Glue Bead 1-4 Length</b>	This set point on the <a href="#">Glue Guns Inside/Middle/Outside Screens</a> allows the user to adjust the length of the glue bead at each index using the numeric keypad.
<b>Glue Bead 1-4 Offset</b>	This set point on the <a href="#">Glue Guns Inside/Middle/Outside Screens</a> allows the user to adjust the distance from the leading edge of the body blank to the start of the glue bead at each index using the numeric keypad.

Button	Definition
<b>Glue Gun Inside/Middle/Outside</b>	Navigational button that displays the <a href="#">Glue Guns Inside/Middle/Outside Screens</a> .
<b>Glue Guns Purge</b>	Navigational button that displays the <a href="#">Glue Guns Purge Screen</a> .
<b>Glue Scale Factor (PULSEES/IN)</b>	This setting is calculated based upon the attachment drive chain speed and is used to convert the attachment glue beads into time based values.
<b>Glue Setup</b>	Navigational button that displays the <a href="#">Glue Setup Screens</a> .
<b>Glue Setup Mode (Main Menu)</b>	This indicator shows that the machine is in glue setup mode.
<b>Glue Speed Compensation (MSEC)</b>	This set point setting allows the operator to enter the speed compensation time in milliseconds.
<b>Glue Trigger Offset (IN)</b>	This set point setting allows the operator to enter the distance in inches the tray will travel from the glue trigger photoeye to the glue gun nozzle.
<b>Jog/Run</b>	<p>Place the machine in 'run' mode for normal operation and in 'jog' mode before jogging the machine. A machine in jog mode runs at a fraction of operating speed.</p> <p>To jog the machine, position this switch in 'jog' mode. Use the FOR/REV switch to jog the machine in the forward or reverse directions.</p>
<b>Jogging (Main Menu)</b>	This indicator shows that the machine is jogging.
<b>Loading Recipe</b>	<p>This indicator shows that the last saved recipe is being loaded.</p> <p>This indicator button will change to its other state, <a href="#">Press To Load Recipe</a>.</p>
<b>Machine Position</b>	Navigational button that displays the <a href="#">Machine Position Screen</a> .
<b>Machine Speed</b>	Navigational button that displays the <a href="#">Machine Speed Setting Screens</a> .
<b>Main Menu</b>	Navigational button that displays the <a href="#">Main Menu</a> .
<b>Maintenance Menu</b>	Navigational button that displays the <a href="#">Maintenance Menu Screen</a> .

Button	Definition
<b>No Active Faults</b>	<p>This indicator shows that there are no active faults.</p> <p>When a fault occurs, this indicator button will change to its other state, <a href="#">Clear Fault History</a>.</p>
<b>PanelView Configuration</b>	<p>Press this button to go to a configuration screen. This screen is used to adjust terminal settings. For further information about the configuration mode, see the manufacturer's manual.</p>
<b>Pattern # (Main Menu)</b>	<p>This indicator shows that the opener is running the specified pattern.</p>
<b>PLC I/O Diagnostics</b>	<p>Navigational button that displays the screen <a href="#">PLC IO Screen</a>.</p>
<b>Press To Load Recipe</b>	<p>Pressing this button loads ALL previously saved parameters to the active running recipe.</p> <p>When this button is pressed, it changes to its other state, <a href="#">Loading Recipe</a>.</p>
<b>Press To Save Recipe</b>	<p>Pressing this button saves ALL the parameters to the active running recipe. If this button is not used after making a parameter change, the changes will only be temporary. When the current recipe is reloaded, the previous settings will be applied.</p> <p>When this button is pressed, it changes to its other state, <a href="#">Saving Recipe</a>.</p>
<b>Product Select (Main Menu) (Maintenance Menu Screen)</b>	<p>Navigational button that displays the <a href="#">Product Select</a> screen.</p>
<b>Production Count</b>	<p>Navigational button that displays the <a href="#">Production Count Screen</a>.</p>
<b>Purge Glue Gun</b>	<p>Press this momentary button to manually fire a specific glue gun.</p> <p>When this button is held, it changes to its other state, <a href="#">Purging Glue Gun</a>.</p>
<b>Purging Glue Gun</b>	<p>This indicator shows that the specific glue gun is being purged.</p> <p>This indicator button will change to its other state, <a href="#">Purge Glue Gun</a>.</p>

<b>Button</b>	<b>Definition</b>
<b>Reset</b>	The reset button resets error conditions on the machine and prepares the machine to begin operation. Press this button to reset the safety circuit and energize control power before starting the machine.
<b>Running (Main Menu)</b>	This indicator shows that the machine is running.
<b>Safety Power Off (Main Menu)</b>	This indicator shows that the safety power is off.
<b>Saving Recipe</b>	<p>This indicator shows that the recently modified recipe is being saved.</p> <p>This indicator button will change to its other state, <a href="#">Press To Save Recipe</a>.</p>
<b>Spare Cam 9-10 On Pos.</b>	Spare cam and is not used.
<b>Spare Cam 9-10 Off Pos.</b>	Spare cam and is not used.
<b>Start</b>	Press this button to initiate operation in either manual or auto mode. This button must be pressed and held for 3 seconds while the alarm horn sounds before the machine initiates movement.
<b>Start Glue Setup Mode</b>	<p>Press this button to initiate glue setup mode.</p> <p>When this button is pressed, it changes to its other state, <a href="#">Running Setup Mode</a>.</p>
<b>Running Setup Mode</b>	<p>This indicator button shows that the glue setup mode is running.</p> <p>When the glue setup has finished, it changes to its other state, <a href="#">Start Glue Setup Mode</a>.</p>
<b>Stop</b>	Pressing the Stop button will stop the machine after it has completed its current cycle. After pressing the stop button You may restart machine by pressing the Start Button.
<b>Stopped (Main Menu)</b>	This indicator shows that the machine has stopped running.
<b>Total Boxes / Box Rate</b>	This indicator is a counter that displays the total number of good products produced by the machine. See “Production Count Screen” on page 3-13

## Operation

<b>Button</b>	<b>Definition</b>
<b>Vacuum - Off/On</b>	Turn the vacuum system ON before beginning operation. When the vacuum system is off, the vacuum cups cannot pick case blanks from the hopper.

## HMI Messages

### Air Pressure is Low

Type: *Fault Message*

Flash Code: 2

A fault has been detected due to low air pressure.

1. Check the pneumatic supply.
2. Ensure that the manual discharge valve is in the on position.
3. Ensure that the pneumatic pressure is set at 80 psi.
4. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### Body Hopper Overtravel

Type: *Fault Message*

Flash Code: 9

A fault has been detected when the body hopper is low and has reached the overtravel location.

1. Load body blanks in the hopper.
2. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### Body Not Detected

Type: *Fault Message*

Flash Code: 10

A body panel was picked from the hopper, but the sensor did not detect the body panel in the mandrel forming area.

1. Check for proper operation and alignment of the sensor.
2. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### Downstream Not Ready

Type: *Fault Message*

Flash Code: 7

A fault has been detected when the downstream control photoelectric sensor or control signal is not present to allow the machine to form boxes.

1. Check for proper operation and alignment of the sensor.
2. Clear any jams on the infeed conveyor.

3. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### **Hot Glue Unit Not Ready**

*Type: Fault Message*

*Flash Code: 6*

The glue unit is not ready for operation.

1. Ensure the tank is at an operational temperature and that the glue tank is filled with the correct amount of glue. For further information see Nordson manual.
2. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### **Machine is Jammed**

*Type: Fault Message*

*Flash Code: 8*

A fault has been detected that is preventing the main motor to cycle the machine.

1. Clear any jams on the machine.
2. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### **Main Drive VFD Faulted**

*Type: Fault Message*

*Flash Code: 5*

A fault has been detected with the main drive variable frequency drive (VFD).

1. Clear any jams on the conveyor.
2. Check the overload on the motor starter.
3. Check the output wiring on the motor starter.
4. Check the fuses.
5. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

### **MCR/Safety Power Off, Guard Door Opened or E-Stop Pressed**

*Type: Fault Message*

*Flash Code: 1*

This message displays when the controls are de-energized. This may occur due to an activated E-STOP button or an open guard door.

1. Make sure all E-STOP buttons are reset (pulled back out).

2. Check for any open guard doors and ensure they are closed.
3. Press the RESET pushbutton the operator station to turn on the control power. The button will be illuminated when the control power is on.

### **Vacuum Blower Overload/Over-Temperature**

*Type: Fault Message*

*Flash Code: 3(Overload)/4(Over-Temperature)*

A fault has been detected with the vacuum blower.

1. Clear any blockage or jams.
2. Check the overload on the vacuum blower starter.
3. Check the output wiring on the vacuum blower starter.
4. Check the fuses.
5. When the fault has been determined and corrected, press the RESET pushbutton to clear the fault message.

## Troubleshooting Guide

### **WARNING**

Always use extreme care and caution when performing any type of maintenance or troubleshooting.

The following are guides for correcting minor problems that may be encountered with the equipment. The guides are in alphabetical order and are categorized by common trouble areas.

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
GLUE STRIPES ON CORRUGATE IN WRONG PLACE OR SKIPPING	<ul style="list-style-type: none"> <li>• Blanks are either to wide or to narrow</li> <li>• Feed wheel drive chain loose</li> <li>• Feed wheel slipping, idler clearance to great</li> <li>• Loose sprocket on feed wheel shaft</li> <li>• Feed roll setscrew loose</li> <li>• Blanks are not feeding from the hopper properly</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust vertical guide bar</li> <li>• Tighten chain at the idler take up sprockets</li> <li>• Adjust blank feed idle roller</li> <li>• Tighten sprocket on the shaft</li> <li>• Tighten setscrew</li> <li>• Adjust hopper</li> </ul>
BLANKS ARE HITTING THE FORMING MANDREL	<ul style="list-style-type: none"> <li>• Warped Blanks</li> <li>• Blanks are being picked early</li> <li>• Loose Idle rollers</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the blank guides on the vertical guide bars</li> <li>• Break blanks on the opposite side of scoring to the warp</li> <li>• Adjust vacuum feed timing</li> <li>• Adjust the rollers</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
BLANKS WILL NOT FEED OUT OF THE HOPPER	<ul style="list-style-type: none"> <li>• Incorrect Blank width</li> <li>• Vacuum suction</li> <li>• Vertical guide bars out of adjustment</li> <li>• Warped blanks</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the Hopper</li> <li>• Adjust the Vacuum</li> <li>• Adjust Vertical Guide bars</li> <li>• If warp is over 1/4" per foot, break the blanks on the opposite side of the score or replace blanks.</li> </ul>
THE BLANK TRAVEL INTERRUPTED.	<ul style="list-style-type: none"> <li>• Idle roller too tight</li> <li>• Vertical Guide Bars out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust Idle roller</li> <li>• Ensure Mandrel is centered</li> </ul>
MANDREL CONTACTS THE BLANK BEFORE IT REACHES THE BOTTOM STOP	<ul style="list-style-type: none"> <li>• Idle rollers out of adjustment</li> <li>• The blank is binding on the vertical guides</li> <li>• Vacuum Timing is off</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust idle roller</li> <li>• Adjust Vertical Guides</li> <li>• Check blank width</li> <li>• Adjust Vacuum Feed Timing</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
THE INSIDE OR SEALING FLAPS ARE NOT EVEN WITH THE TOP OF THE CARTON.	<ul style="list-style-type: none"> <li>• Blank is not cut or scored correctly</li> <li>• Mandrel stroke is short</li> <li>• Box strippers are not making contact with the Mandrel Teflon</li> <li>• Flap pushers are not adjusted correctly</li> <li>• Inside flaps are hitting the pusher pawls</li> <li>• The Mandrel is not centered</li> <li>• The vertical guide bars are not centered</li> <li>• Bottom Stop is out of adjustment</li> <li>• Compression not compressing flaps</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure blanks are handled and stored correctly. Check with blank supplier</li> <li>• Adjust Mandrel Stroke</li> <li>• Adjust Stripper Pawl</li> <li>• Jog the former to put the cam roller on the high point of the pusher cam. Measure the distance from the rear edge of the mandrel to the pusher pawl face. The length should be the same as the box depth</li> <li>• Adjust Stripper Pawl, in a few cases the pawl will have to be cut on an angle so that the flap misses the top of the pawl</li> <li>• Center the mandrel</li> <li>• Adjust the Vertical Guide Bar</li> <li>• Adjust Bottom Stop</li> <li>• Adjust Compression</li> <li>• Adjust Forming Shoe</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
MINOR FLAPS ARE BEING TORN OFF DURING THE FORMING PROCESS.	<ul style="list-style-type: none"> <li>• Blank Guide not in correct position</li> <li>• Major Flap scores are weaker than the minor flap scores</li> <li>• Mandrel not hitting the center of the blank</li> <li>• Inside flap plows not in correct position</li> </ul>	<ul style="list-style-type: none"> <li>• Reposition guides</li> <li>• If top compression problem add or adjust existing top restraint finger. If bottom compression problem add or adjust the finger toward the rear of the former.</li> <li>• Adjust Mandrel</li> <li>• Thin blanks require plows to be spaced out from the top and bottom compression shoes. Spacing that is added to the inside of the plow must be taken from the outside of the plow</li> </ul>
THE TRAY BOTTOM HAS ROUNDED CORNERS.	<ul style="list-style-type: none"> <li>• Incorrect Mandrel size</li> <li>• Top compression out of adjustment</li> <li>• Side compression out of adjustment</li> <li>• Adhesive bond breaks away on one corner</li> <li>• Mandrel stroke to short</li> <li>• The box strippers not riding on the surface of the mandrel teflon plates</li> <li>• Blank scores not centered on the mandrel</li> </ul>	<ul style="list-style-type: none"> <li>• Changeout mandrel</li> <li>• Adjust compression</li> <li>• Check glue temperature. Check compression settings.</li> <li>• Adjust Mandrel Return Stroke</li> <li>• Adjust the stripper pawl</li> <li>• Adjust the bottom stop</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
TRAY FALLS APART AFTER COMPRESSION.	<ul style="list-style-type: none"> <li>Empty Glue Tank</li> <li>Improper clearance between the program segment and the pump drive wheel</li> <li>Glue temperature</li> <li>Compression is out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Fill tank with correct glue for current run</li> <li>Adjust the glue segments and wheel clearance</li> <li>Check glue temperature, adjust if necessary.</li> <li>Adjust the compression</li> </ul>
BLANK IS RELEASED FROM THE VACUUM CUPS BEFORE FEED WHEEL ENTRY.	<ul style="list-style-type: none"> <li>Vacuum cam not adjusted correctly</li> <li>Vacuum return stroke incorrect</li> <li>Vertical Guide bars too tight</li> </ul>	<ul style="list-style-type: none"> <li>Adjust Vacuum Cam</li> <li>Adjust Mandrel Return Stroke</li> <li>Adjust Vertical Guides Bars</li> </ul>
BLANK HITS THE TOP OF THE MANDREL ON THE RETURN STROKE.	<ul style="list-style-type: none"> <li>Timing Problem</li> </ul>	<ul style="list-style-type: none"> <li>Adjust Vacuum Timing</li> <li>Adjust Mandrel</li> </ul>
MANDREL ENGAGES THE BLANK BEFORE IT REACHES THE BOTTOM STOP.	<ul style="list-style-type: none"> <li>Timing Problem</li> </ul>	<ul style="list-style-type: none"> <li>Adjust Vacuum Timing</li> <li>Adjust Mandrel</li> </ul>
MORE THAN ONE BLANK BEING PULLED FROM THE HOPPER.	<ul style="list-style-type: none"> <li>The blank support knives are not holding the trailing blank.</li> <li>Vertical guide bar out of adjustment</li> <li>Banks are interlocking due to cut-outs or coating</li> <li>Varied Blank widths</li> </ul>	<ul style="list-style-type: none"> <li>Adjust Vertical Guide Bars</li> <li>Adjust Idle Roller</li> <li>Ensure Blanks are handled and stored correctly</li> <li>Check blank supplier</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
NO SUCTION AT THE VACUUM CUPS.	<ul style="list-style-type: none"> <li>• Inoperative Vacuum Blower.</li> <li>• Poly flow tubing is damaged</li> <li>• Hole in the vacuum cup bolt is clogged</li> <li>• Vacuum valve cover pad not seating on the manifold</li> <li>• The cup pads are damaged or worn</li> </ul>	<ul style="list-style-type: none"> <li>• See Vacuum Blower Troubleshooting below.</li> <li>• Check for cracks, holes, or loose connections.</li> <li>• Push foreign material through the rod while the blower is operating</li> <li>• Adjust Vacuum</li> <li>• Replace vacuum cup pads</li> </ul>
SUCTION DOES NOT RELEASE.	<ul style="list-style-type: none"> <li>• Vacuum valve out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust Vacuum Valve</li> </ul>
VACUUM BLOWER DOES NOT OPERATE.	<ul style="list-style-type: none"> <li>• Main disconnect is in the “OFF” position.</li> <li>• Blower switch off</li> <li>• Loose wiring or connectors</li> <li>• Bad motor starter.</li> <li>• Blower shuts off after short period of operation</li> <li>• Blower shuts off after a long period of operation</li> </ul>	<ul style="list-style-type: none"> <li>• Turn lever to “ON.”</li> <li>• Switch to “ON” position</li> <li>• Check wire and connectors</li> <li>• Replace starter.</li> <li>• Check incoming voltage vs. wired Voltage</li> <li>• Thermistor overheated. Allow motor to cool.</li> <li>Replace if faulty</li> </ul>

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
VACUUM FEED MECHANISM CYCLES BUT DOES NOT PULL A BLANK FROM THE HOPPER.	<ul style="list-style-type: none"> <li>• Blower does not operate.</li> <li>• Vacuum cup position</li> <li>• Lower set of vacuum cups</li> <li>• Knives holding up blanks</li> <li>• Too few blanks in the hopper</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Vacuum Blower Does not Operate above.</li> <li>• Vacuum cups try to “pick” blank over a hole or slot. Adjust the position of the vacuum cups.</li> <li>• Position them as per instructions contained within the vacuum cup adjustment section.</li> <li>• Adjust the vertical guide bars</li> <li>• Load the hopper</li> </ul>
FORMER STOPS SUDDENLY.	<ul style="list-style-type: none"> <li>• Blanks are jammed in the hopper</li> <li>• Guard doors are ajar or open</li> </ul>	<ul style="list-style-type: none"> <li>• Clear the jam</li> <li>• Check guard doors and safety interlocks</li> </ul>
MANDREL DOES NOT STOP AT THE “CYCLE START” POSITION	<ul style="list-style-type: none"> <li>• The micro switch cam is out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the micro cam switch</li> <li>• Adjust the mandrel</li> </ul>

## **SECTION 4**

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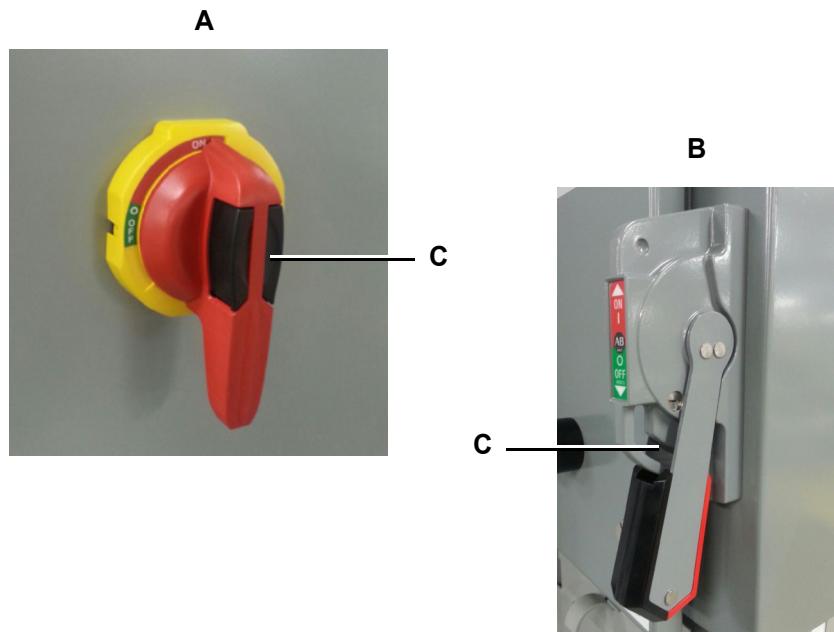
### ***ADJUSTMENTS & CHANGEOVER***

## Locking Out Main Incoming Electrical Power

Lock out the main incoming electrical power to the machine before performing any servicing or maintenance activities. The disconnect that controls the incoming electrical power is designed so that once it is in its OFF position, a lock may be affixed to prevent the disconnect from accidentally being moved to its ON position.

1. Move the main electrical power disconnect to its OFF position.
2. Lock out the disconnect according to your plant's standard operating procedure.

**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



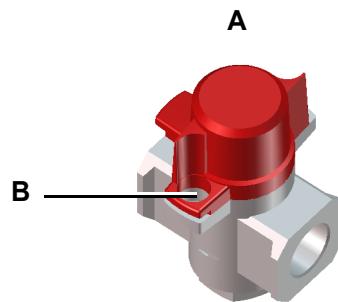
- A. Typical rotary disconnect
- B. Typical 'knife' type disconnect
- C. Location for lockout/tagout

## Locking Out Main Incoming Air Supply

Lock out the main incoming air supply to the machine before performing any adjustment, servicing or maintenance activities. The valve that controls the air is designed so that once it is in its EXHAUST (OFF) position, a lock may be affixed to prevent the valve from accidentally being moved to its SUPPLY (ON).

1. Turn the shutoff valve to its EXHAUST (OFF) position. All air will be evacuated from the machine.
2. Lock out the valve according to your plant's standard operating procedure.

**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



**A. Typical main air shutoff valve**

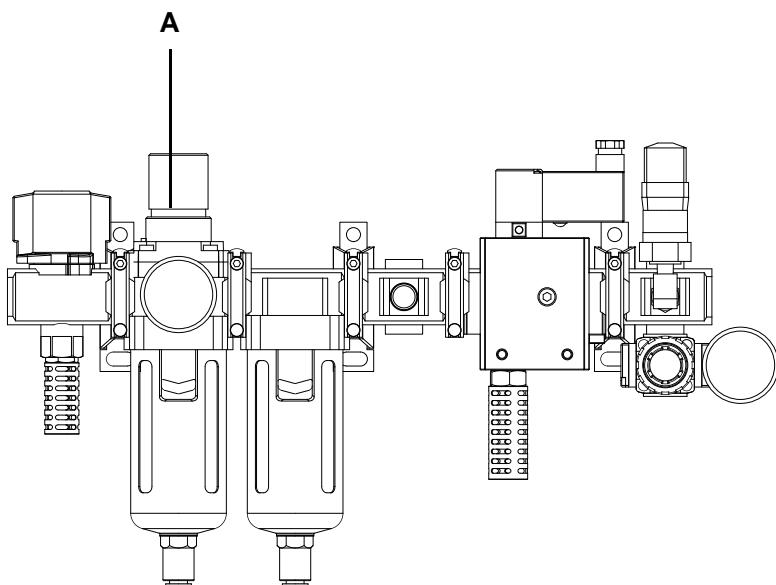
**B. Location for lockout/tagout**

## Adjusting Main Incoming Air Pressure

Use the regulator that controls the main incoming air to adjust the pressure of the pneumatic system. The regulator is a relieving type regulator which means that as the regulator is adjusted, air pressure controlled by the regulator will change simultaneously. (In contrast, air pressure controlled by a non-relieving type regulator will change more gradually, as system air is consumed by the machine.)

Consult your pneumatic drawing(s) for the proper operating pressure of your machine.

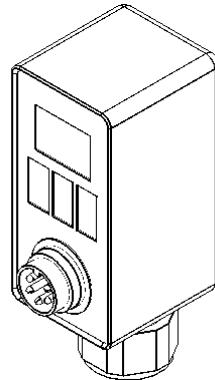
**NOTE:** Equipment design will vary depending on the options included for your application. Refer to your drawings and schematics for specific details related to your machinery.



**A. Typical air regulator (A).**

## Adjusting the Air Pressure Switch Setting

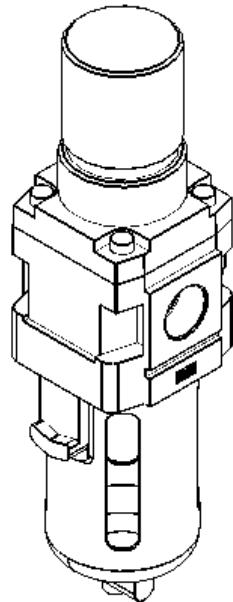
The air pressure switch generates a signal when air pressure drops below a minimum threshold in the range of 60-65 psi. The pressure switch is set at the factory and should only be changed if it is out of adjustment.



1. Press and hold the SET button shown for three seconds to put the switch in pressure mode.
2. Use the UP / DOWN arrow keys to change the value.
3. Press the SET button to enter the value.

## Adjusting Air Pressure

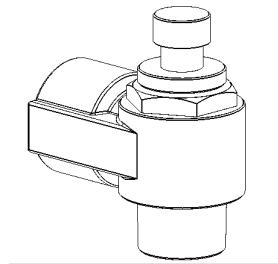
Refer to your schematics for information on air pressures and regulator locations on the machine. Air pressure can be adjusted by turning the air regulator.



**A. Typical air regulator shown with filter bowl.**

## Adjusting Air Cylinder Motion

Flow controls are typically used on air cylinders to adjust the speed of extension and retraction. Turn the adjustment to increase or decrease the flow of air to control the speed of the air cylinder.



A. Typical flow control.

## Machine Electrical Position

Machine position is determined by one of the machine's motor. This motor that provides the position information for the machine is identified within the programmable logic controller's (PLC's) program. Feedback information from this servo is provided to the PLC and is displayed on many of the HMI's touch screens.

Position is expressed in degrees; from 0° to 359° and represents one machine cycle. Rotation of the motor's shaft relays the position information via the motor's feedback cable which is then displayed on the HMI. Machine position is primarily used to time other moving parts or is used as a check to verify that mechanical assemblies are properly timed in accordance with the electrical machine position.

### **NOTICE**

It is possible to reset the electrical 'zero' position for the machine, however this can only be done via the control software. Resetting the 'zero' position of the machine is not recommended.

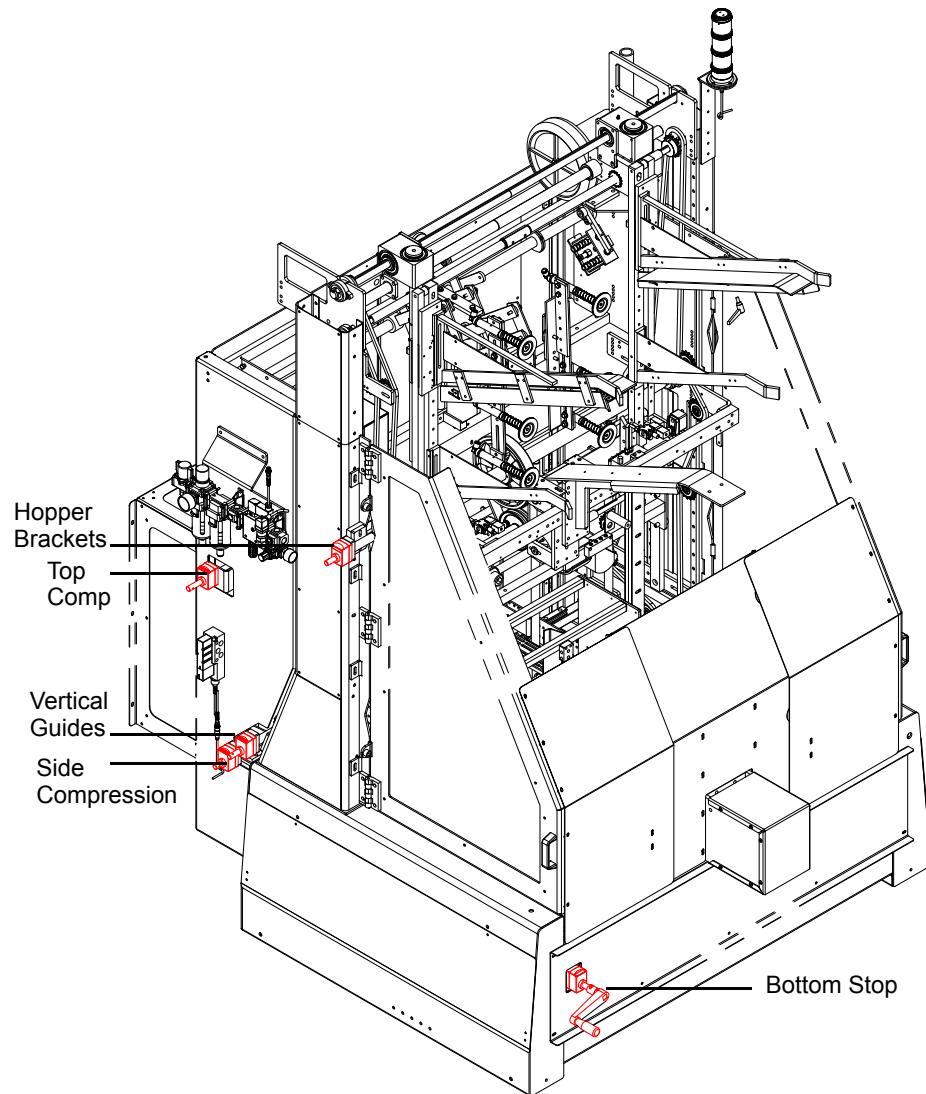
## Changeover Quick Reference Guide

The following table is a quick reference guide used for adjustments. Use this guide along with the photos and information on the following pages to correctly adjust the machine. It is important to note that these settings are approximate and may change.

LOC.	ADJUSTMENT	SETTING	
		Product 1 M2B Export 5" Body	Product 2 M2C 5" Lid
1.	Bottom Stops	00000	00000
2.	Hopper Brackets	00000	00227
3.	Vertical Guides	00052	99801
4.	Top Compression	99999	00170
5.	Side Compression	99994	99897
6.	Lower Hopper Bracket	Up Position (See photos)	Down Position (See photos)
7.	Front Vertical Guide Blank Guide	Blank Guide On (See photos)	Remove Blank Guides. Note: install additional vertical guide small bent guides (See photos)

## Tray Former Changeover

The digital indicator is a mechanical counter that operators manually adjust. The counters are used as a gauge to accurately adjust the changeover procedures on this machine. Typically a crank handle is used to drive an adjustment and the counter is attached to that adjustment.



## Vertical Guides and Side Compression



Turn hand crank to the numerical value on Changeover Quick Reference chart.

## Top Compression



Turn hand crank to the numerical value on Changeover Quick Reference chart.

## Hopper Brackets



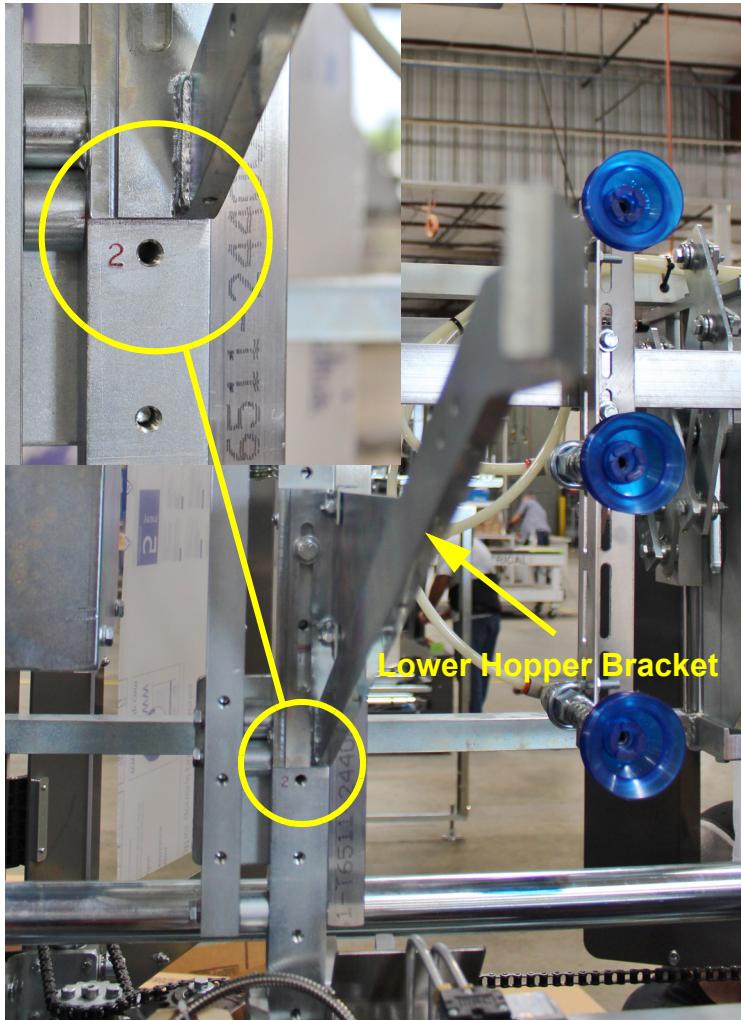
Turn hand crank to the numerical value on Changeover Quick Reference chart.

## Bottom Stops



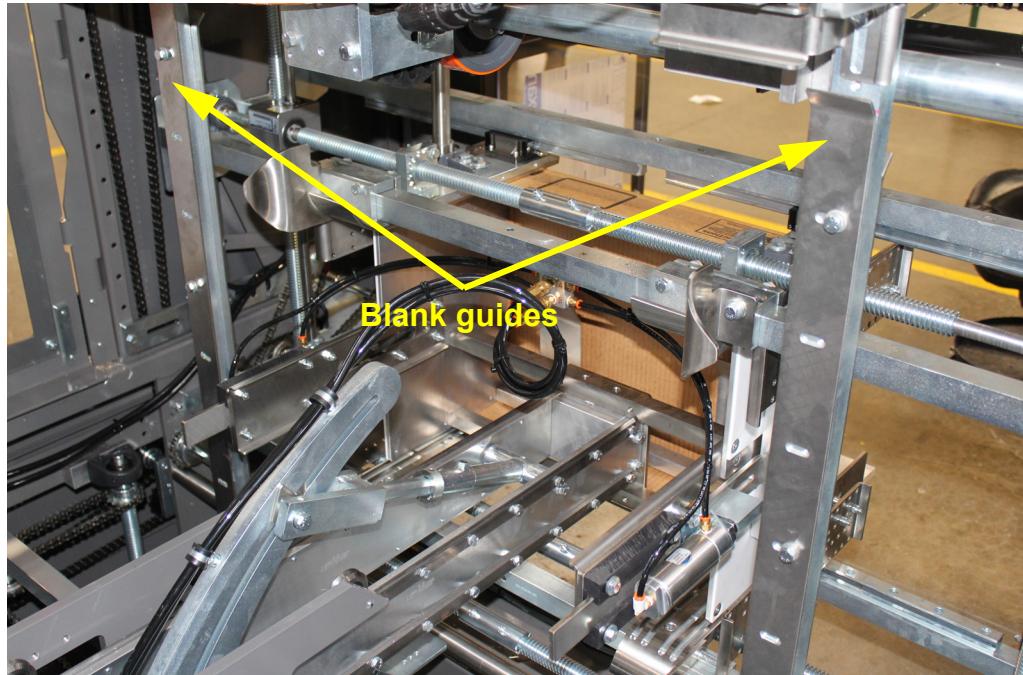
Turn hand crank to the numerical value on Changeover Quick Reference chart.

## Lower Hopper Brackets



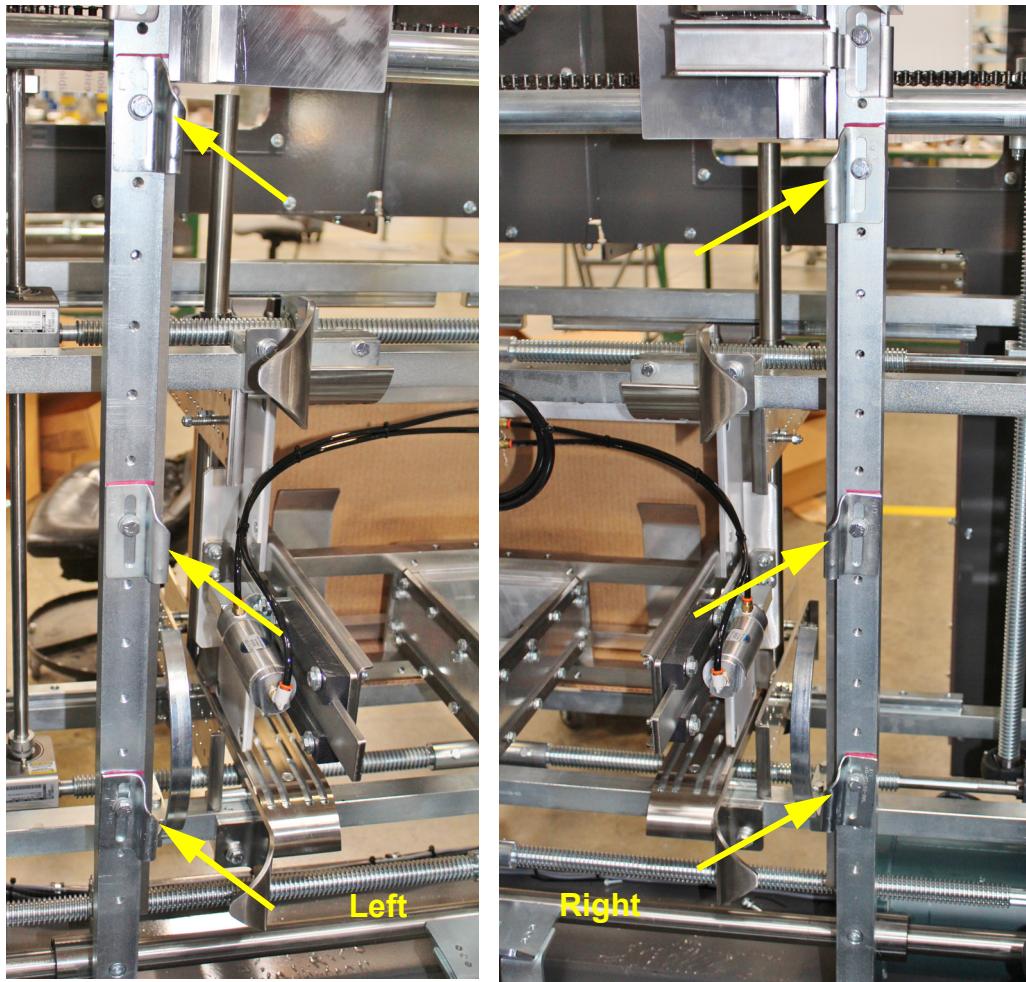
Adjust the right and left lower hopper brackets, for products 1 and 2, to the scribe lines as shown. Left hand lower hopper bracket for Product 2 shown.

## Blank guides for product 1



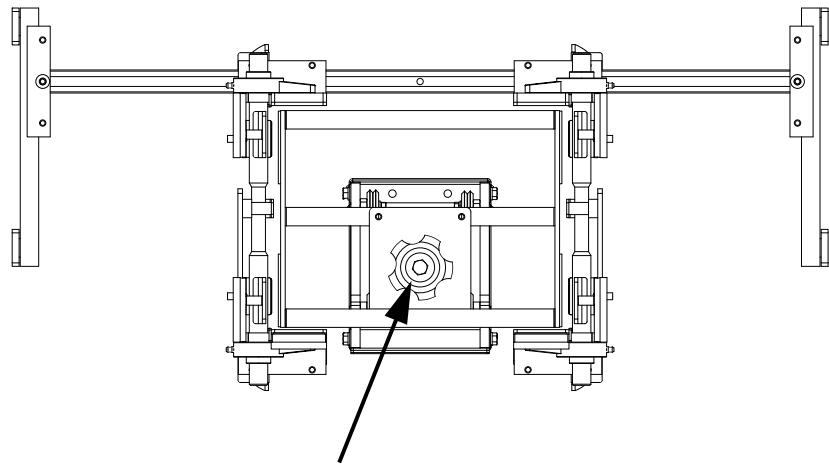
Install the blank guides shown in above photo for product 1 only.

## Small blank guides for product 2



Install the small blank guides as shown in above photo for product 2 only.

## Mandrel Change Out



Mandrel Change-out knob

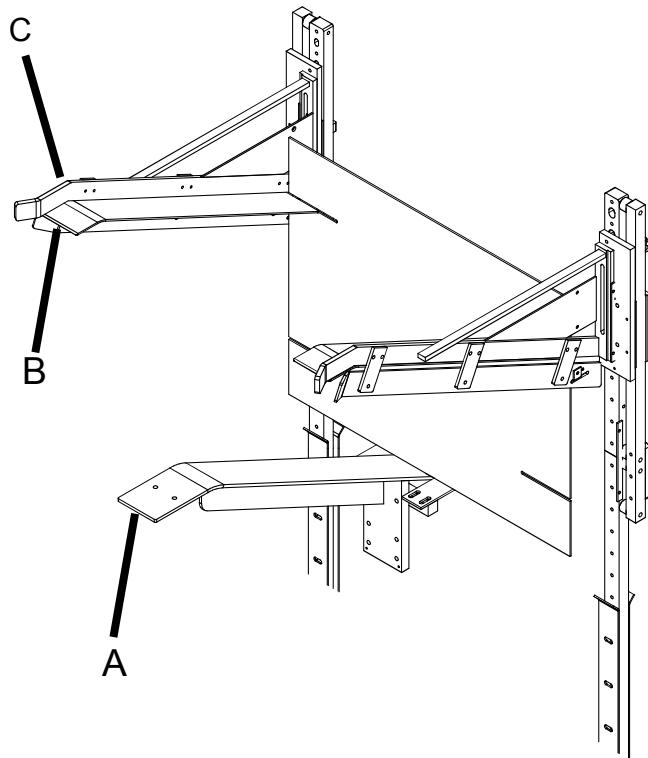
To ensure a clear path will be provided for mandrel change, we suggest the following steps be taken after powering down the machine.

1. Crank out the following in order:
  - a. Vertical Guide.
  - b. Top Compression
  - c. Side Compression
2. Mandrel "Full Return Stroke."
3. Loosen knob and remove mandrel.
4. Install new mandrel and tighten knob.
5. Crank in/out the vertical guide bars to a width of 1/8" plus the width of the tray blank.
6. Rest the tray blank on hopper support bar and crank the hopper blades up/down to align blades with the blank slots.
7. Rest the tray blank on the bottom stops and crank bottom stops up/down until the scores representing the tray bottom align with the outer perimeter of the forming mandrel.

8. Crank the side compression in/out to a clearance of two blank thickness plus 1/8".
9. Crank top compression up/down to a clearance of one blank thickness plus 1/32".
10. Adjust mandrel stroke. Re-check settings and "Jog" through a complete cycle.

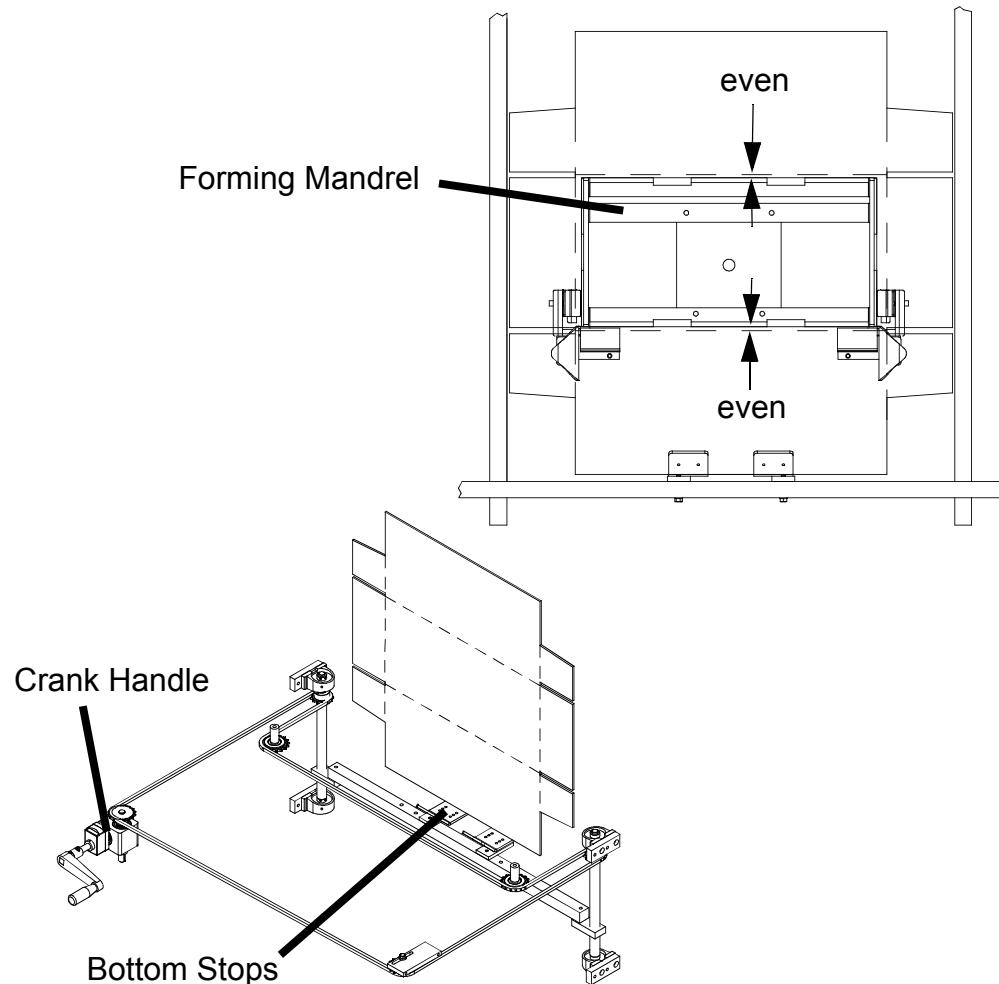
## Blank Hopper Adjustment

The Tray Former is designed to be quickly and easily adjustable, capable of producing a variety of tray types and sizes.



1. Set the corrugated blank on the horizontal plane of the hopper loading support bar (A).
2. Turn the blank hopper adjustment crank to center the support bar blades (B) and (C) between the tray slots as it sits on the support bar.
3. Compensate for uneven blank slotting by moving the support bars.

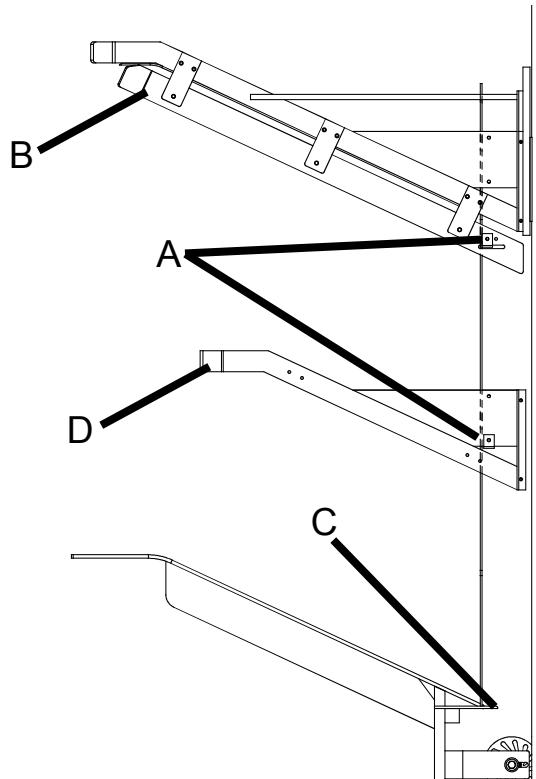
## Blank Bottom Stop Adjustment



1. Position the mandrel at the end of the return stroke.
2. Set a blank on the bottom stops.
3. "Jog" the mandrel up to the blank.
4. Hand crank the bottom stops up/down so that the mandrel "Frames" the blank bottom score lines.

The mandrel should "Frame" the scores, see upper schematic, with even clearance top and bottom.

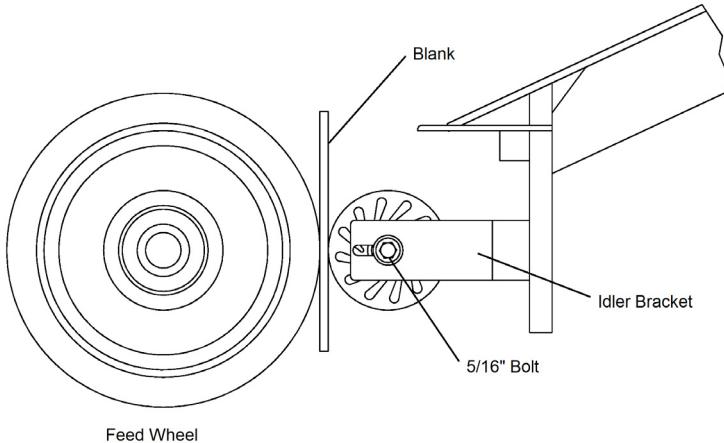
## Blank Support Knives Adjustment



1. Blank support knives (A) are located on the Hopper side guide (B), the hopper bottom stop plate (optional) (C), and the lower tray blank support bars (D).
2. Mount the knives to provide a restraint on the blanks, but also loose enough so one blank is pulled through the knives at each cycle.
3. Knife adjustment is accomplished by shimming the knife as needed with flat washers mounted between the knife and the hopper support guide (B) or (D).
4. Do not exceed the width plus 1/8" measurement or feeding/travel issues may occur.

NOTE: If there is not enough knife restraining the blank, two or more blanks can be pulled through each cycle. If there is too much restraint the blank will not be pulled through causing the vacuum pick cups to release from the corrugated blank.

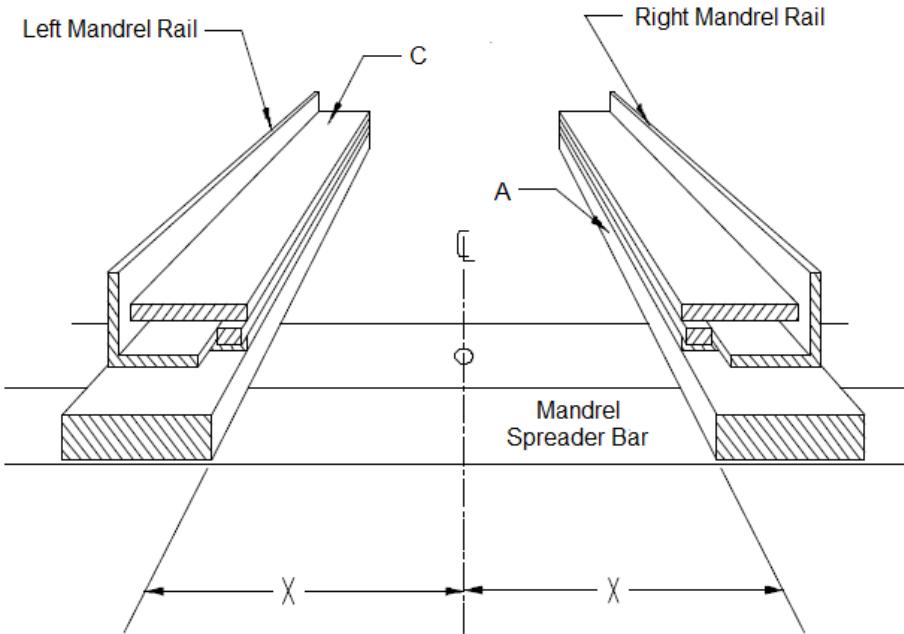
## Blank Feed Idler Roller Adjustment



Corrugated blanks vary in thickness and this must be taken into consideration when setting up a new tray of different board weight. (Example: "B" is thinner than flute "C")

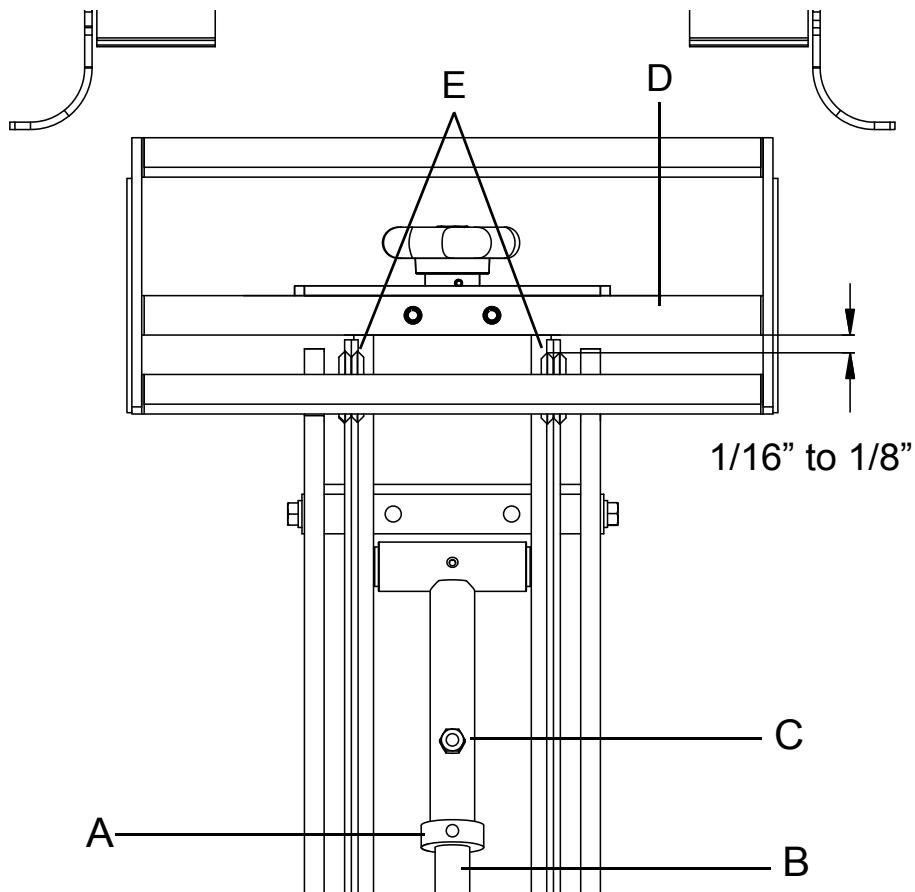
1. Loosen two 5/16" bolts on idler bracket.
2. Move roller in/out from feed wheel to obtain desired clearance. Blanks should pass through rollers without any slippage.
3. Tighten 5/16" bolts and recheck for movement of blanks through feed wheel.

## Square the Mandrel for Forming



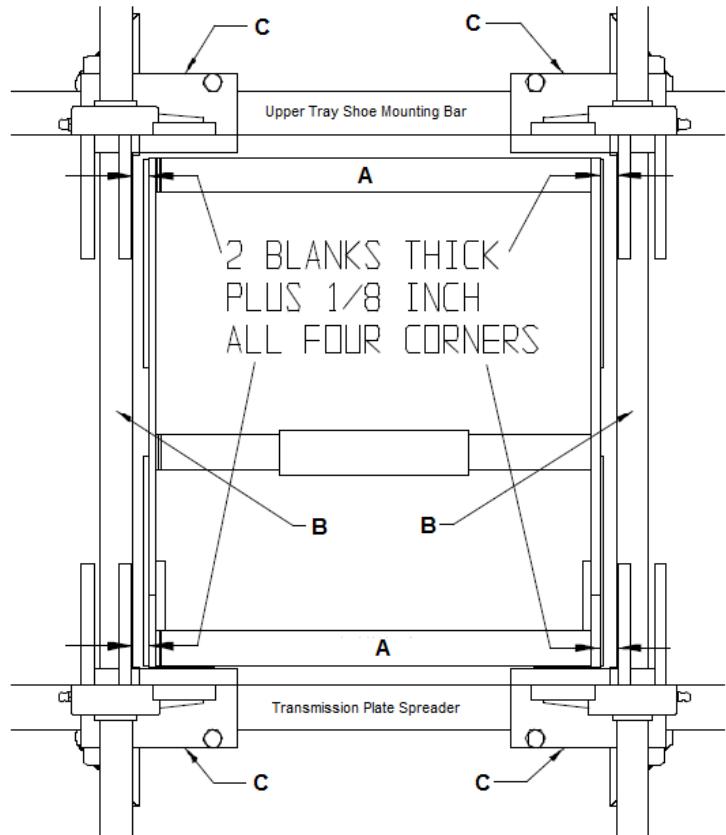
1. Position guides (A) equally from a centerline marked on the mandrel spreader bar.
2. The mandrel should slide freely with minimum play between the guides (C) with no clearance.

## Mandrel Return Stroke Adjustment



1. Set the mandrel feed post at the fully retracted or returned position.
2. Loosen the set screw on the set collar (A) and the 3/8-inch set screw on the mandrel connecting rod end (C) sliding over the mandrel connecting rod (B).
3. Adjust the mandrel connecting rod end (C) and set collar (A) until there is 1/16-inch to 1/8-inch clearance between the edge of the V-Wheels (E) and the mandrel spreader bar (D).
4. Re-tighten the set collar and the 3/8-inch set screw.

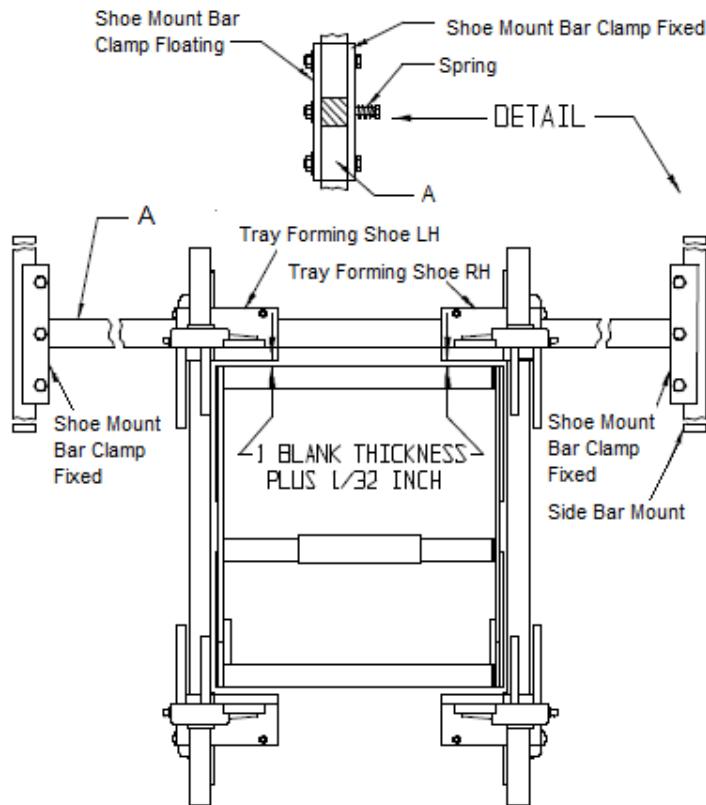
## Side Compression Bar



To apply correct pressure for bonding purposes.

1. Set the front of the mandrel spacer bars (A) even with the compression bars (B).
2. Loosen the bolts holding the top and bottom compression shoes (C).
3. With the mandrel in same position, set the distance of two blank thickness plus 1/8-inch from the mandrel to the compression bars.
4. Re-tighten all bolts.

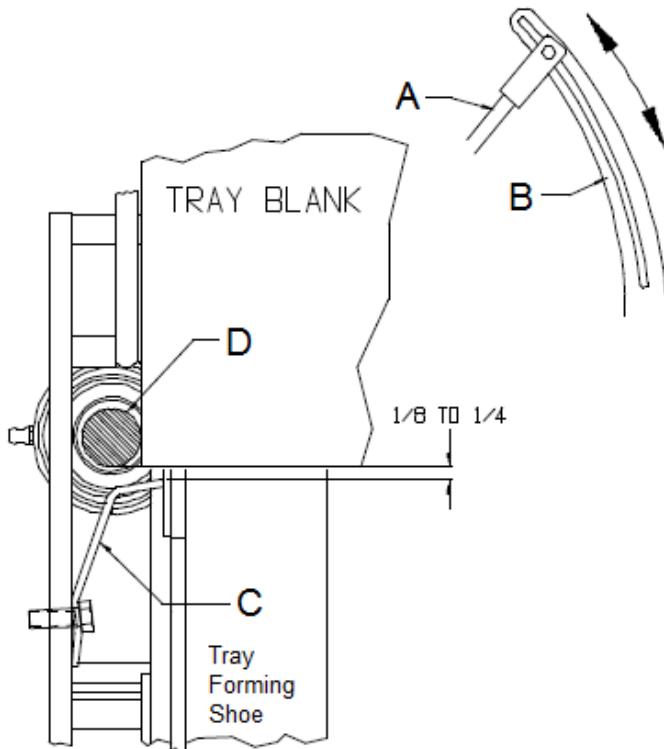
## Top Tray Forming Shoes



The top tray forming shoes apply the correct top pressure during forming.

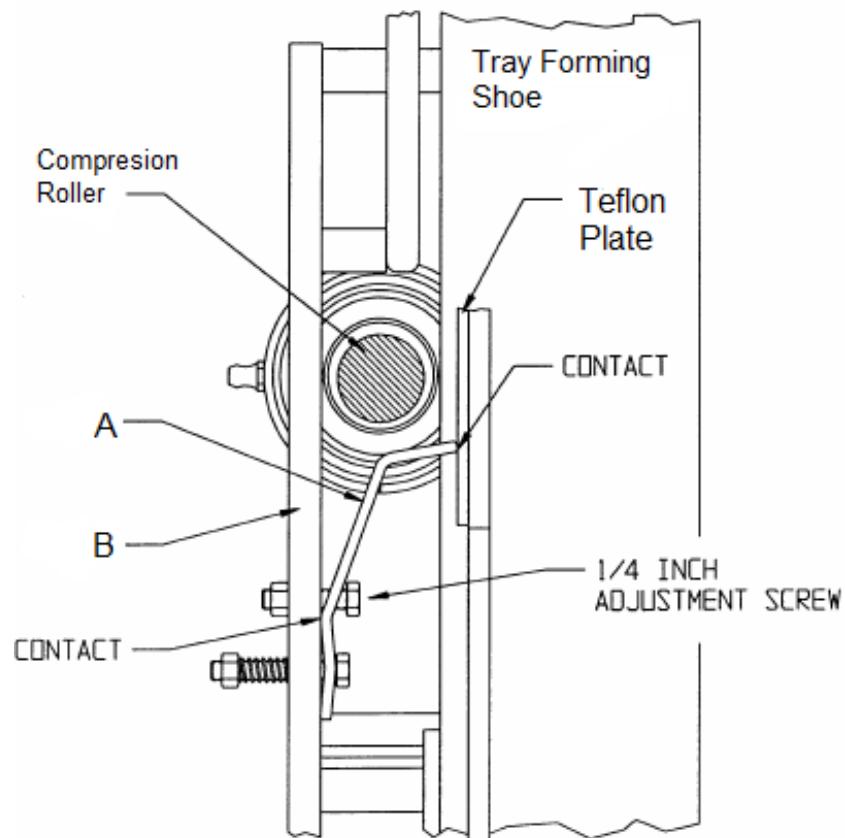
1. Jog the machine until the mandrel feed post arm is at the end of the forming stroke (the mandrel is fully into the compression chamber). This is done with a formed carton around the mandrel.
2. Loosen the bolts on the upper mount bar (A).
3. Move the bar vertically until obtaining a clearance of one blank thickness plus 1/32-inch between the mandrel top and the forming shoes.
4. Tighten the bolts and check the clearance again.

## Mandrel Travel Length Adjustment



1. Rest a blank on the bottom stops and between the vertical guides. Move the mandrel a full stroke forward into the compression chamber, forming a tray.
2. Loosen the yoke bolt securing the mandrel connecting rod (A) at the clevis end to the slot in the mandrel feed post (B).
3. Adjust the mandrel connecting rod (A), moving the mandrel carriage and attached mandrel until there is 1/8-inch to 1/4-inch clearance between the top of the tray depth wall and the tray stripper pawls (C), at all four stripper positions.
4. At this time the compression rod (D) should be directly adjacent to the outside of the tray.
5. Re-tighten the yoke bolt (A). Verify this adjustment by jogging the machine from a retracted or returned position to an advanced position.

## Stripper Pawl Adjustment

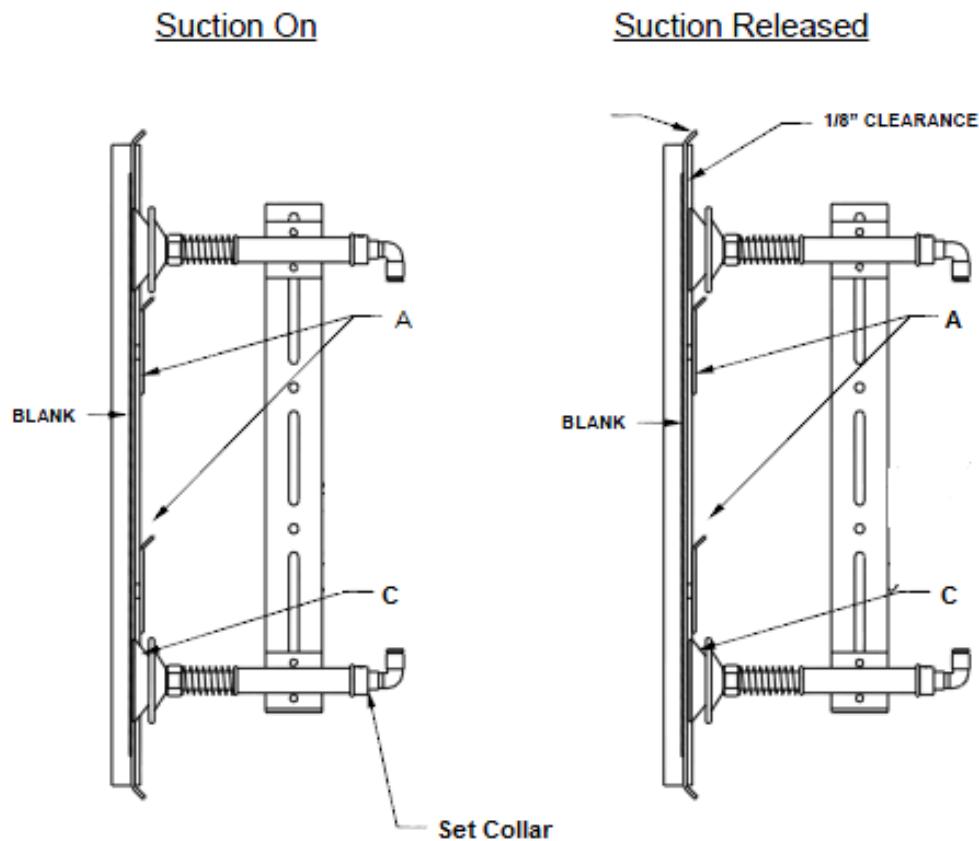


To adjust the box stripper pawls:

1. Verify the mandrel is clear of the compression chamber and is on the return stroke.
2. Tighten/loosen the box stripper pawl (A) until it contacts shoe (B), as per the illustration above.
3. Rotate the mandrel back into the compression chamber and tighten/loosen the adjustment screw until the stripper pawl *just* makes contact with the mandrel Teflon plates.
4. Do not over-tighten, as this tears the box.

## Suction Cup Mount Tube Adjustment

1. Vacuum **ON**. **JOG** the machine until one body blank is pulled from hopper and starts to insert it into the Feed Roll.
2. The blank at this point should be in contact with the rear Blank Guide (A) mounted on the Vertical Guides.
3. If not in contact, loosen the screw on the set collar and pull the tube back until the body blank touches the rear guide. Tighten the set screw.
4. **JOG** the body blank into the feed rolls.
5. When the vacuum releases, there should be 1/8" clearance between the suction cups (C) and the body blank.



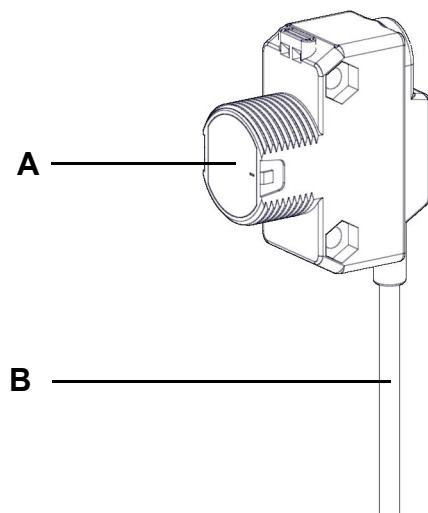
## Check—Photo Eyes

Photo eyes use light to detect the presence of objects made of any material; they are typically used in applications to detect the presence (or absence) of packaging products and materials.

**Check alignment.** Photo eyes, and their reflectors, need to be aligned so that light from the emitter reaches the receiver when the beam path is not interrupted.

**Check cleanliness.** The lens of photo eyes and their reflectors must be clean and free of debris. Use a soft cloth to wipe and clean photo eye lenses and reflectors.

**Check cable.** Verify the cable to the photo eye is securely connected.



A. Lens

B. Cable

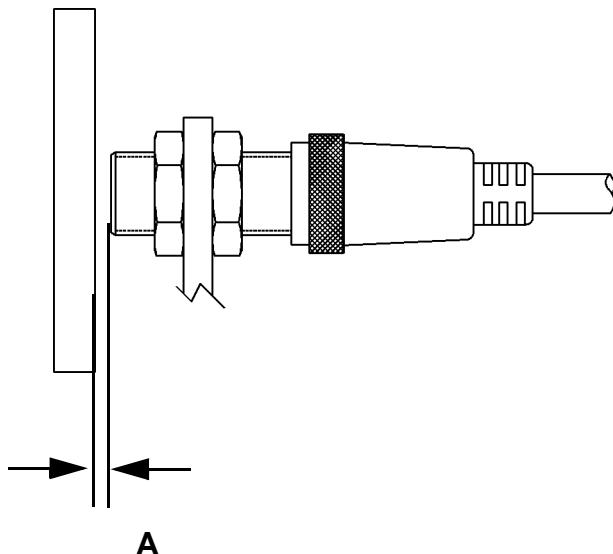
## Check—Proximity Switches

Proximity switches detect the presence of ferrous (iron-containing) targets such as parts or assemblies to verify position or location. The sensing end of a proximity switch uses a small magnetic field that generates a signal when interrupted by the target.

Proximity switches typically use LEDs to indicate power and signal generation. These features are useful for troubleshooting.

**Check position.** Proximity switches should be positioned so that the face of the sensing end is set to the recommended distance from its intended target. Loosen the locking nuts to adjust and then secure the position of the proximity switch.

**Check cable.** Verify the cable to the proximity switch is securely connected.



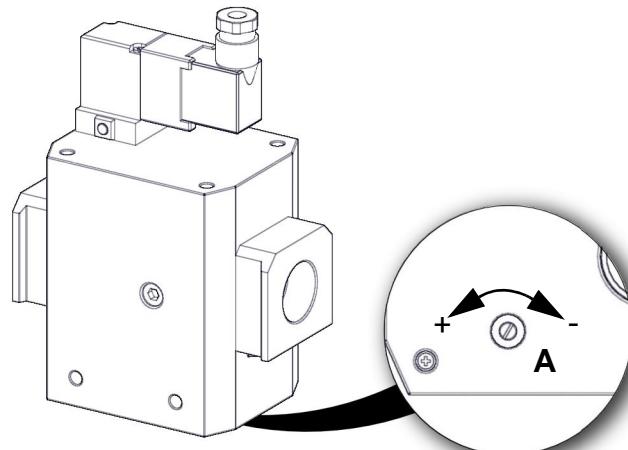
**A. 0.13" (3.3 mm) reference**

## Check—Soft Start Air Valve

The soft start air valve controls air flow to slowly pressurize the machine as the main air supply is opened. The slow pressurization ensures that assemblies are not damaged from moving too quickly and contacting other parts.

**Check rate of pressurization.** The soft start valve is set at the factory but may require adjustment if assemblies appear to move into position too quickly or too slowly. A metering screw on the bottom of the valve is used to increase or decrease the rate of flow. Adjust the screw so that maximum pressurization is achieved in 3-5 seconds.

**Check for signs of contamination.** Inspect the soft start valve every 400 hours of operation for accumulation of dirt, water or other debris.

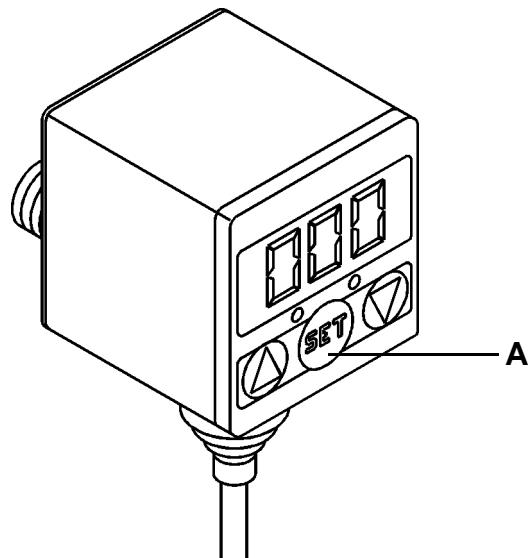


**A. Metering screw**

## Check—Digital Pressure Switch Setpoints

The pressure switch is used to monitor air pressure and is capable of storing up to 4 set points. This switch is adjusted at the factory and does not require regular adjustment. To view the values for a particular pressure switch, press the SET button to scroll through the values for n\_1, n\_2, n\_3, and n\_4.

Consult the machine schematics for information on specific setup and adjustment procedures and values.



**A. Press SET to view set point values.**

## **SECTION 5**

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### ***MAINTENANCE***

## Standard Tools

Thiele recommends that personnel performing routine maintenance have access to a standard set of tools. Be aware that equipment may use SAE, metric, or a combination of both SAE and metric fasteners.



- A. Wrenches: crescent, adjustable, allan**
- B. Screw Drivers: slotted, phillips**
- C. Pliers and Cutters: needle nose, wire cutters, regular, vise grips**
- D. Mallets and Hammers: rubber / plastic mallet, ball peen hammer**
- E. Screw Drivers: slotted, phillips**
- F. Mallets and Hammers: rubber / plastic mallet, ball peen hammer**
- G. Tape Measure**
- H. Torpedo Level**
- I. Multimeter**

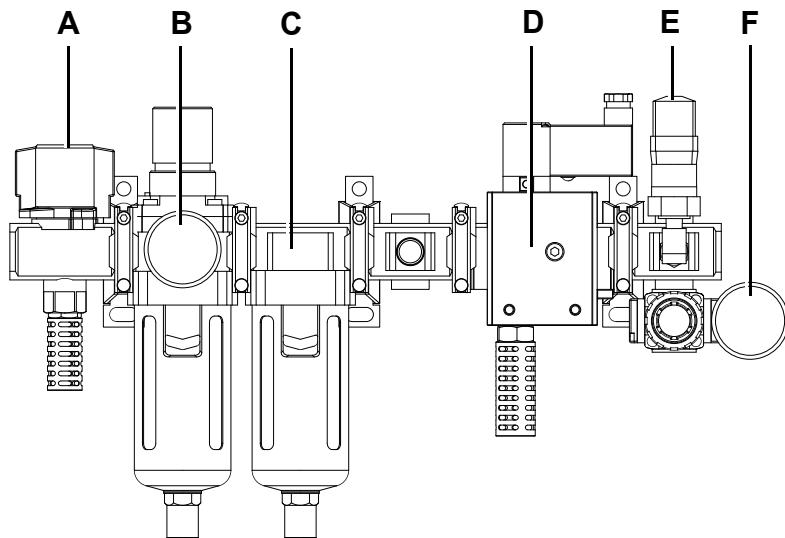
## Inspect—Main Air Supply

**Check the filter bowl.** Inspect the bowl for any accumulated water or fluid every 8 hours and drain as needed.

**Clean the filter.** Inspect the filter element for dust or debris every 8 hours of operation and clean as needed. Filter elements are typically cleaned by directing clean compressed air from the inside (clean side) of the filter to blow debris out of the filter element. Replace damaged filter elements before installing.

**Check for leaks.** Make sure supply lines, parts of the air supply's assembly are free from any leaks. Repair as necessary.

**Check the regulator.** Inspect the air regulator once a month for accumulation of dirt, water or other debris. Remove the bottom plug and clean the valve and seat.



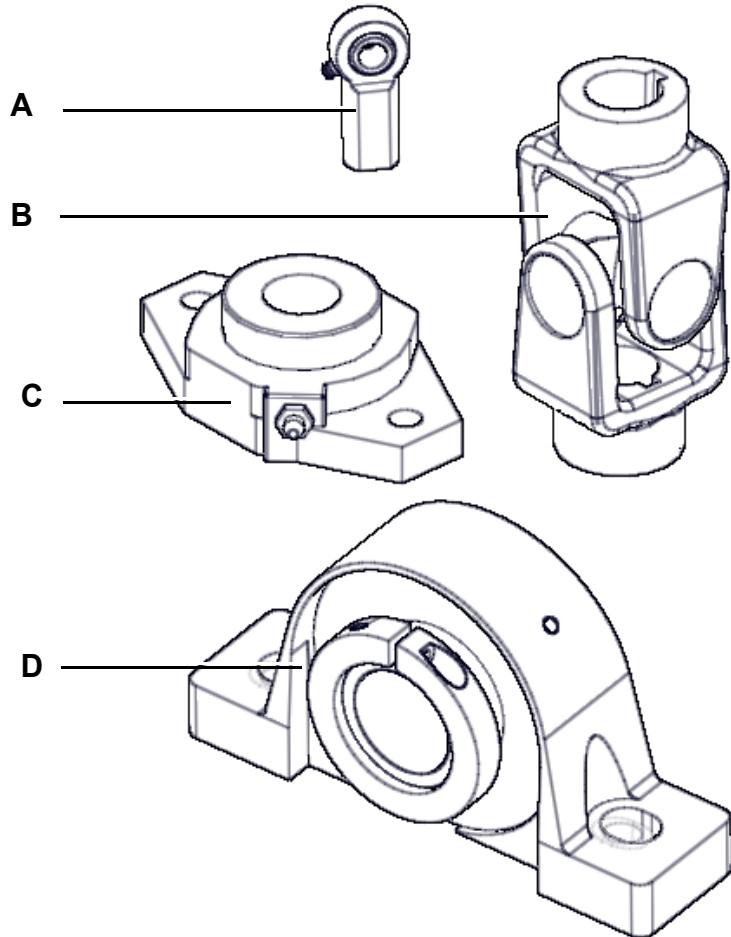
- A. Shut off
- B. Filter/Regulator
- C. Mist Separator
- D. Safety Quick Exhaust Valve

**E. Pressure Switch**

**F. Regulator (For Glue)**

## Lubricate—U-Joints & Bearings

These bearings must be lubricated periodically to ensure long life. The intervals between greasing depends on the number of hours of operation, the running speed, and the ambient temperature conditions. For normal operating conditions, use a premium grade of grease conforming to NLGI Grade 2 consistency.



**A. Rod end**

**B. U-Joint**

**C. Flange bearing**

**D. Pillow block bearing**

## Lubricate—Drive Chains

The drive chains at all stations must be properly lubricated. Keeping the chains properly lubricated provides a protective surface between the sliding surfaces of the pin and bushing and also between the bushing and roller.

A lack of lubrication increases friction between these surfaces, resulting in an increase in friction resulting in a higher absorption of power, therefore an increase in the working temperature of the components increasing the likelihood of granular products to coagulate and become abrasive.

### NOTICE

Be sure the lubricant is dry before using the bagger. Avoid over lubricating the chains. Excessive or wet lubrication could soil or mark the bags.

Lubricate the chains as needed with SAE 80-90 mineral oil or food grade lubricant. Use a clean brush to apply the lubricant. Brush the chain with oil over its entire length, both inside and outside. Be sure the lubricant seeps down thoroughly to lubricate the rollers and pins.



## Inspect—Chains and Sprockets

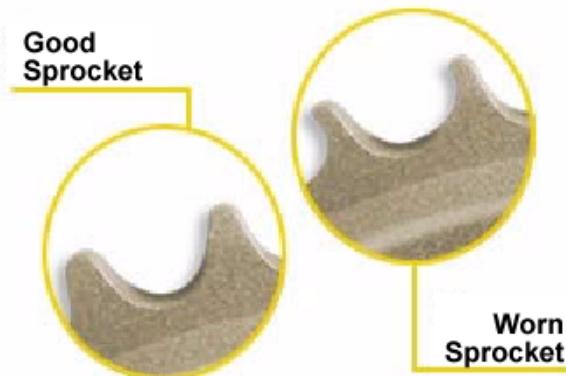
Keeping the chains clean and free of debris and product buildup is essential to maximize chain life. Granular products like sugar and salt are especially abrasive and, if allowed to collect on sprockets and chains, greatly reduce the life of these parts.

**Keep chains and sprockets clean.** Inspect the chains frequently for accumulation of product or other debris. Clean with pressurized air. For product that is not removed with air, use soft-bristled brushes or plastic tools to scrape away hardened product.

**Inspect sprocket and chain alignment.** Check the chains and sprockets for proper alignment at least once a month and keep them aligned.

**Inspect for chain stretch.** Check the chain for stretching or lengthening at least once a month, even more often, if under heavy use.

**Inspect sprocket teeth for wear.** Frequently check the teeth on the sprockets for wear. Replace worn sprockets as necessary.



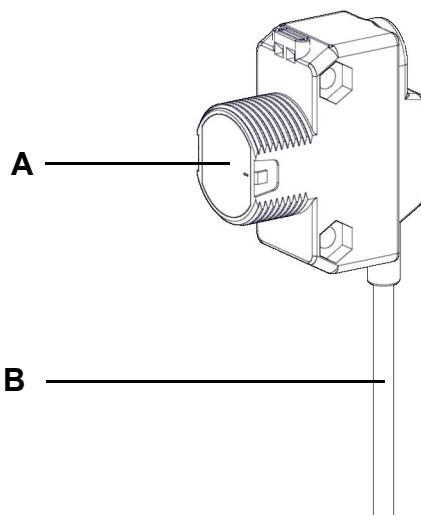
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**Check cleanliness.** The lens of photo eyes and their reflectors must be clean and free of debris. Use a soft cloth to wipe and clean photo eye lenses and reflectors.

**Check cable.** Verify the cable to the photo eye is securely connected.



**A. Lens**

**B. Cable**

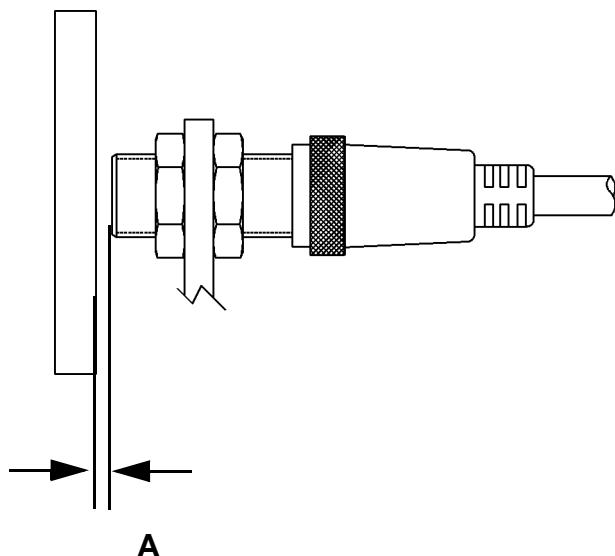
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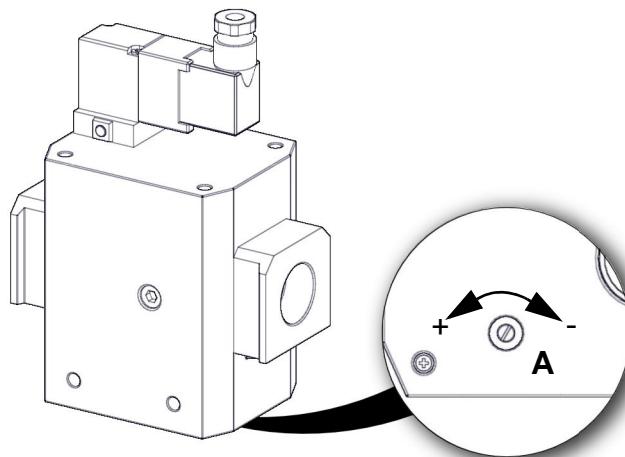
A. 0.13" (3.3 mm) reference

## Check—Soft Start Air Valve

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**Check rate of pressurization.** The soft start valve is set at the factory but may require adjustment if assemblies appear to move into position too quickly or too slowly. A metering screw on the bottom of the valve is used to increase or decrease the rate of flow. Adjust the screw so that maximum pressurization is achieved in 3-5 seconds.

**Check for signs of contamination.** Inspect the soft start valve every 400 hours of operation for accumulation of dirt, water or other debris.



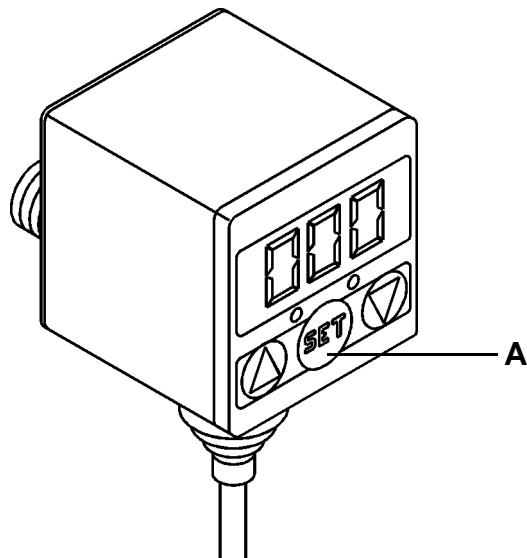
**A. Metering screw**

**B.**

## Check—Digital Pressure Switch Setpoints

The pressure switch is used to monitor air pressure and is capable of storing up to 4 set points. This switch is adjusted at the factory and does not require regular adjustment. To view the values for a particular pressure switch, press the SET button to scroll through the values for n\_1, n\_2, n\_3, and n\_4.

Consult the machine schematics for information on specific setup and adjustment procedures and values.



**A. Press SET to view set point values.**

## General Maintenance and Repair

Maintenance personnel are assumed to be experienced in working with electromechanical assemblies and components. Because of the many options involved, specific instructions are not provided for many of the suggested procedures and the method is left to the discretion of the service person. Accordingly, personnel using procedures not recommended or approved by Thiele Technologies, Inc. should ensure that personal safety and equipment integrity will not be jeopardized in the method selected.

Operators should keep the machine clean and free of debris. Any product or trays that become caught in the machine should be removed immediately to keep the machine running as efficiently as possible. Operators should also be alert for any unusual noises or leaks in the system because these may indicate machine malfunction, that if not repaired, could cause extensive damage to the equipment or its components.

Following is a chart listing specific components that require periodic maintenance. The chart also provides suggested maintenance intervals. Remember, these are suggested intervals only. Plant experience, combined with environmental conditions and desired equipment performance levels, will determine the best maintenance intervals for your machine. It is recommended that a copy of all maintenance schedules and service reports be filed with this manual.

Remember, if neglected, even the highest quality equipment will fail to meet acceptable performance standards.

## Replacement Parts

It is essential for maximum performance that only genuine Thiele parts (or Thiele specified parts) be used as replacement parts. Refer to the Recommended Spare Parts List and/or Bill of Material for the proper part number.

## General Lubrication

Plastic lines connect the zerk fittings on the lubrication manifolds to the sealed bearings that require periodic lubrication. Frequency of greasing will vary depending on duty cycle, operating temperature and environmental conditions.

## Completed Factory Lubrication

Main Gear Cam Follower, all Zerks . . . . .	FGL-1 (Lubriplate)
Main Gear, Vacuum Main Gear. . . . .	L0152-000 (Lubriplate)
Vacuum, Mandrel, Compression. . . . .	Industrial Food Grade Penetrating Oil NSHF H1 (CRC)

## Air System Maintenance

All air lines should be tagged before disconnection or disassembly to enable accurate and rapid re-assembly of the system. When servicing an air line or component, make sure that all open lines are capped or sealed to prevent internal contamination. All test points and surfaces immediately adjacent to these points must be cleaned prior to testing or making an adjustment

### CAUTION

Relieve all air lines of pressure before disconnecting. A pressurized air line that is disconnected will whip and fly about as the air escapes it and could result in serious personal injury.

- Accumulated moisture and dirt trapped in the air regulator bowl should be released by opening the petcock on the bottom of the regulator valve.
- Check the pneumatic and vacuum lines for damage and/or loose connections.
- Replace any pneumatic line that has become old and lost its flexibility.

## Bearing Maintenance

Frequent inspection of bearing set screws will help to eliminate the possibility of bearing-supported parts shifting out of position. Bearings are of sealed construction and require only periodic lubrication.

Since their flat position allows them to easily catch dust, bearings mounted on vertical shafts should be lubricated more frequently than bearings mounted on horizontal shafts.

Bearings should be greased as often as necessary to maintain a slight leakage at the seal. A full bearing with consequent slight leakage is the best protection against entrance of foreign materials.

A small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals. When applying lubricants, add grease slowly, with the shaft revolving whenever possible

Lubricate all bearings mounted on vertical shafts.

FGL-1 (Lubriplate)

## **6 Month Bearing Maintenance**

Lubricate all bearings mounted on horizontal shafts.

FGL-1 (Lubriplate)

- Inspect all bearing set screws.

### **Bearing Cluster Lubrication**

- Lubricate through cluster lube manifold(s)
- Use FGL-1 (Lubriplate)
- Pump grease while machine is in operation whenever possible. Pump very slowly one or two times until bead forms around seal.

## **Belt Maintenance**

- Inspect the belt tension and tighten as required.
- Visually inspect all belts for wear and repair/replace as required.

## **Sprocket Maintenance**

1. Check for uneven wear (Example: only on one side). If necessary, align with a straight edge.
2. Check for wear 1/8 inch (0.3 cm) or more, discoloring, broken teeth. If necessary, replace.
3. Check for hardening.
4. Check teeth pockets for clogging.

## **Bolt Maintenance**

When removing parts, bolts and nuts should be replaced in their respective holes so that the proper bolt will be on hand when reassembling the parts. All bolts

should be replaced if they are defective in any way. This is especially important for pillow block bolts. Periodically, personnel should inspect the machine for loose screws, bolts and nuts, and also for loose electrical connections.

- Check for loose bolts on all moving parts and mountings. Tighten or replace bolts as required.

## **Electrical Maintenance**

- Inspect for broken conduit on a monthly basis.
- Inspect for tears in electrical flex joints or broken Sealtite fittings each month.

## **Glue System Maintenance**

The glue system requires periodic maintenance. Consult the manufacturer's manual for specific maintenance procedures and safety precautions.

### **WARNING**

Prior to performing any maintenance, troubleshooting, adjustments or glue tank refilling, the operator must be wearing full-coverage protection over eyes, feet, legs, arms and hands—keeping skin and other body parts protected from the elements. Failure to do so could result in severe burns.

### **Daily Glue System Maintenance**

- Clean all exterior surfaces and clean the nozzles.
- Flush the adhesive filter.

### **Weekly Glue System Maintenance**

Clean the filter assembly

### **Six-month Glue Tank Maintenance**

- Inspect the glue gun wiring.
- Flush hot melt system with paraffin.

### **Guard Door Maintenance**

Guards should be kept clean to enable visual inspection of the moving components during equipment operation.

- Clean all polycarbonate guards with plastic lens cleaner and a soft cloth.
- Check operation of guard door interlock switches.

## **Photoeye Maintenance**

Photoeyes require little maintenance other than periodic cleaning and checks for proper alignment, mounting, and connection.

- Make sure all photoeyes are mounted securely to the machine or their brackets. Tighten any loose nuts.
- Verify emitter and receiver are centered with each other horizontally and vertically. (Opposed mode photoeyes only. Refer to your schematics for location of this type of photoeye).
- Verify photoeye is aligned with their sensing end perpendicular to their reflector. (Retro reflective photoeye only. Refer to your schematics for location of this type of photoeye).

## **Rod End Maintenance**

Stationary rod ends do not require lubrication. Continuously moving rod ends should be lubricated about once each week.

### **Weekly Rod End Maintenance**

Lubricate continuously moving rod ends.

Industrial Food Grade Penetrating Oil NSF H1 (CRC)

## **Vacuum Cup Maintenance**

Replacement vacuum cup part numbers are provided on the Recommended Spare Parts List.

- Never use solvents on suction cups unless approved by manufacturer.
- Clean each vacuum cup, stem and orifice with a wire.
- Visually inspect the vacuum cups and replace when noticeably worn or damaged.

- Change suction cups as needed. When in doubt, replace suction cups and needless downtime will be avoided. Maintain a good supply of suction cups.

## Vacuum Filter Maintenance

A vacuum filter is provided for most styles of vacuum systems.

- Unscrew the can and unscrew the filter element.
- Clean the assembly or replace if damaged in any way.

## Vacuum Line Maintenance

The amount of [bliss/tray](#) dust in the environment will determine how often the vacuum lines need to be cleaned. Blow out vacuum lines to clear of accumulated dust and dirt.

Vacuum pumps should be cleaned every 2 weeks.

1. Disconnect power to the machine.
2. Disconnect air coming to the machine.
3. Verify all air has been purged from the system.
4. Disconnect clear vacuum hose from the solenoid valve. On electric pumps disconnect the clear vacuum hose from the regulator.
5. Using air blow gun, apply air pressure through clear vacuum hose, through vacuum pump and suction cups.

## Cam Follower Maintenance

Cam Followers are the component that ride in the box cam track. These cam followers frequently are under high load pressure and need to be well maintained for long life expectancy.

## Maintenance Schedule

Following is a chart listing specific components that require periodic maintenance. The chart also provides suggested maintenance intervals. Remember, these are suggested intervals only. Plant experience, combined with environmental conditions and desired equipment performance levels, will determine the best maintenance intervals for your machine. It is recommended that a copy of all maintenance schedules and service reports be filed with this manual.

Remember, if neglected, even the highest quality equipment will fail to meet acceptable performance standards.

Item	Inspection	Freq	Action
Thermostat (SWF Glue)	Check the setting.	Hourly	Reset or recalibrate if necessary.
Cam follower at Main Gear	Check lubrication and bolt security	Daily	Grease zerk and tighten bolt if necessary
Glue pots & pumps (SWF glue)	Check for residual glue waste.	Daily	Scrape off the excess glue.
Vertical Guides, Compression bars (Top and Bottom)	Check for foreign material.	Daily	Remove excess glue with scraper.
Former overall	Check for cleanliness.	Daily	Blow former off with compressed air or brush entire machine.
Mandrel connecting rod	Check lubrication	Daily	Lubricate on the pivot point and feed post
Linear Mandrel V-Track	Check lubrication	Daily	Lubricate mandrel V-Track
Machine stop micro switch		Daily	Lube roller & pivot points on switch
Electrical Cabinet fan filter	Check for dust or debris	Daily	Clean or Replace if necessary
Bolted joints & set screws	Check for security	Daily	Tighten all loose hardware
Mandrel	Check for loose bolts, alignment or guide adjustment.	Weekly	Tighten all bolts. Align mandrel on support bars. Should be no clearance.

Item	Inspection	Freq	Action
Blank hoppers	Check alignment	Weekly	Adjust as necessary
Glue backup rollers (SWF glue)	Check for clearance	Weekly	Adjust as necessary
Glue pump (SWF glue)	Check drive wheel. Check clearance	Weekly	Replace if broken or bent. Adjust if necessary
Melt pot screen (SWF glue)	Check for damage or waste	Weekly	Remove, replace or clean
Corrugated material	Check specifications	Weekly	Replace material. Contact supplier.
Main gear	Check lubrication	Weekly	Lubricate with gear grease as required
Vertical Guide Bars	Check for inner spacing	Weekly	Align if required
Vacuum cup pads	Check for wear	Weekly	Replace if cracked or worn
Suction cup mount tubes	Check lubrication	Weekly	CRC Industrial Food Grade Penetrating Oil NSF H1
Vacuum cup tube support brackets	Check for wear	Weekly	Replace if necessary
Vacuum Blower Filter	Check for debris.	Weekly	Clean or Replace if necessary
Poly flow vacuum tubing	Check for wear & holes	Weekly	Replace tubing
Feed post cam track	Check lubrication	Weekly	Lubriplate FGL-1
Vacuum feed drive gear	Check grease	Weekly	Lubriplate L0152-00
Roller chain drive	Check for wear	Monthly	Oil
Electrical Conduit & Sealtite Flex Joints	Check for broken conduit. Inspect for tears in electrical flex joints or broken Sealtite fittings.	Monthly	Replace if necessary
Wiring	Check for connections or damaged wire	Monthly	Tighten connectors or replace wiring
Set screws & bolts	Check security	Monthly	Tighten or replace if damaged
Melt pots (SWF glue)	Check for charring	Monthly	Remove charred glue

Item	Inspection	Freq	Action
Bearings (on horizontal shafts)	Check grease	6 months	Lubriplate FGL-1
Matt Feed Wheel	Check for flat spots on the feed wheel	3 months	Rotate position of Matt Feed Wheel on shaft a 1/4 turn to prevent flat spots on wheel
Air Line filter elements	Clean/replace	Yearly	Clean/replace
Drive Chain		Yearly	Adjust slack: Remove excess slack and repeat for motor belt. Inspect condition pins and bushings

## Lubrication Procedures

Lubrication is critical to machine performance. Lubrication schedules are divided into three categories: daily, weekly, and monthly. The schedule however should be determined by visual examination of all equipment and lubricated as needed.

Use Lubriplate FGL-1, a food grade white grease, for all grease zerks mounted into tie rods, bearings, and any other moving assemblies. Use CRC Industrial Food Grade Penetrating Oil NSF H1 to lubricate moving or pivoting parts. Most moving parts requiring oil have oil holes and require lubrication on a daily basis.

## Daily Requirements

Item #	Part	Action	Lubrication Type
1	Mandrel Connecting Rod	Lubricate mandrel, pivot and feed post	Lubriplate FGL-1
2	Mandrel connecting bolt	Lubricate and check bolt security	CRC Industrial Food Grade Penetrating Oil NSF H1
3	Linear Mandrel V-Track	Lubricate mandrel V-Track	CRC Industrial Food Grade Penetrating Oil NSF H1
4	Idler sprockets	Lubricate	CRC Industrial Food Grade Penetrating Oil NSF H1
5	Vacuum Dump Valve (Scissor Vacuum)	Oil pivot joint	CRC Industrial Food Grade Penetrating Oil NSF H1
6	Vacuum Assembly (Scissor Vacuum)	Oil slide bearing block, bushing in cam top bracket.	CRC Industrial Food Grade Penetrating Oil NSF H1
7	Vacuum Assembly (Scissor Vacuum)	Oil cup shafts, linkage bushings	CRC Industrial Food Grade Penetrating Oil NSF H1
8	Vacuum gear con rod	Con rod end bearings	CRC Industrial Food Grade Penetrating Oil NSF H1

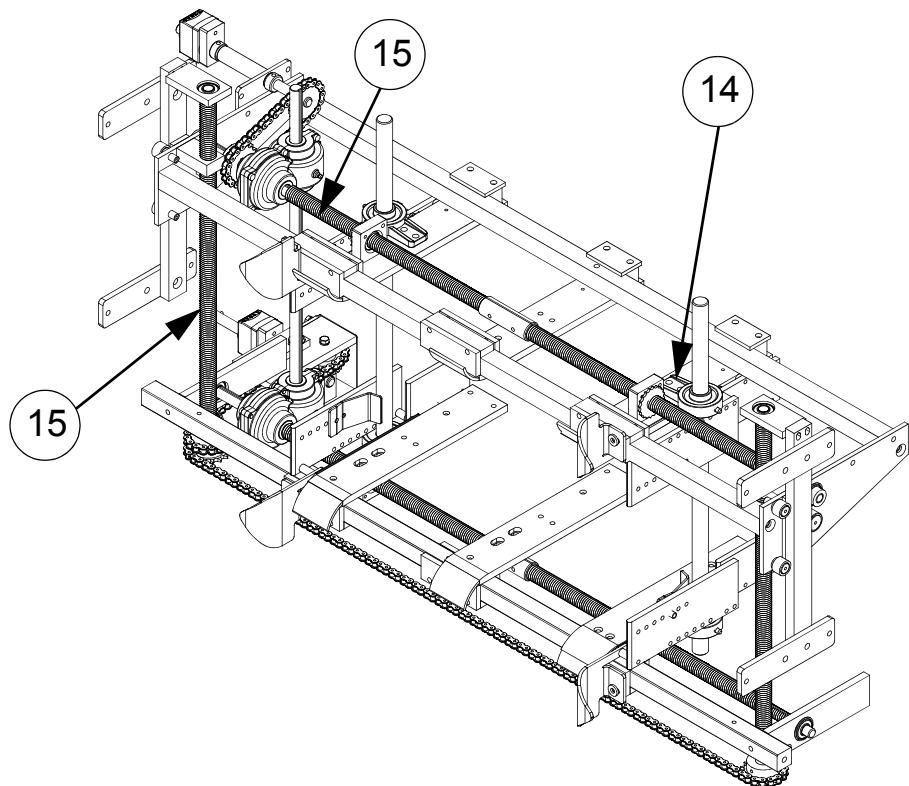
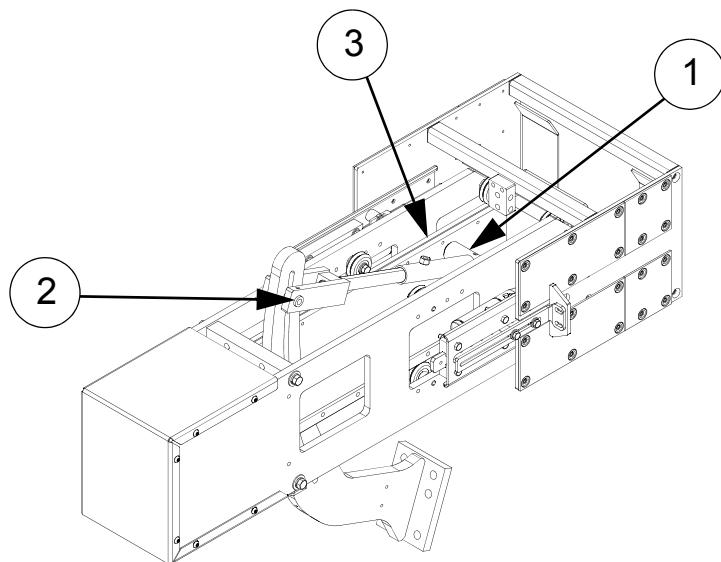
## Weekly Requirements

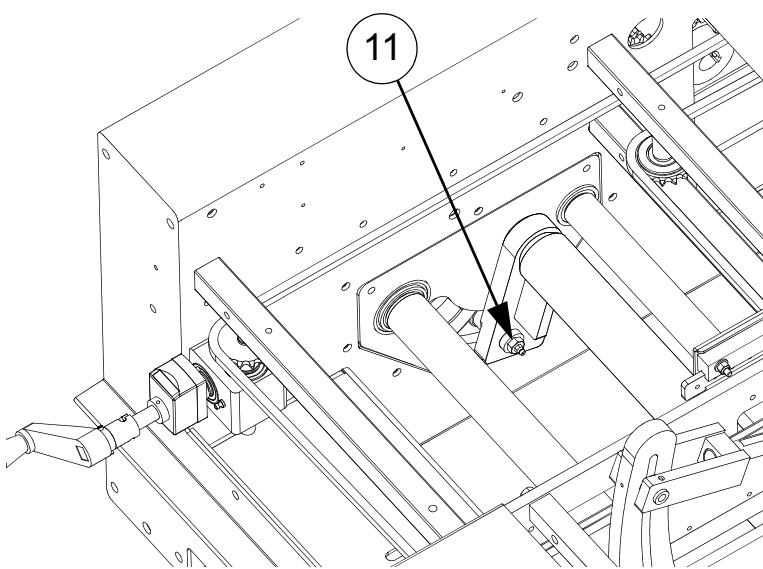
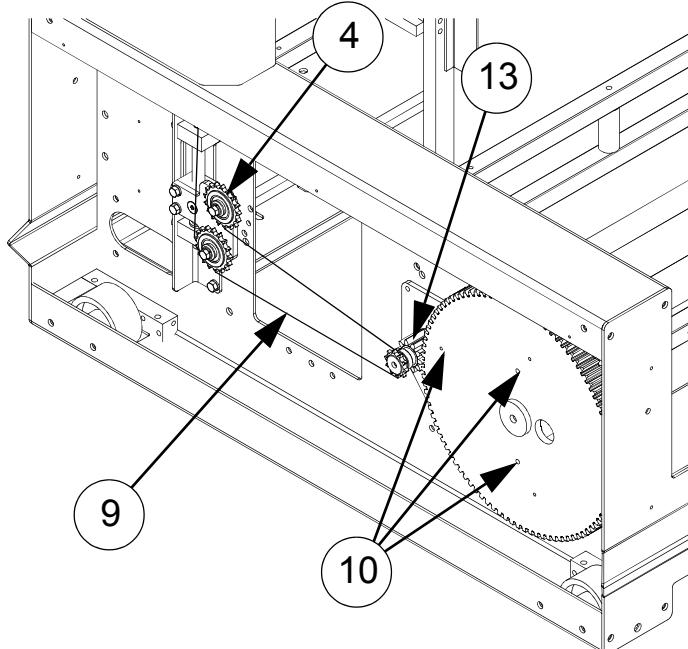
Item#	Part	Action	Lubrication Type
9	Drive chain	Use chain oil and keep well lubricated	CRC Industrial Food Grade Penetrating Oil NSF H1
10	Main Gear	Grease zerk	Lubriplate FGL-1
11	Cam Follower	Grease zerk and check bolt security as required	Lubriplate FGL-1

## Monthly Requirement

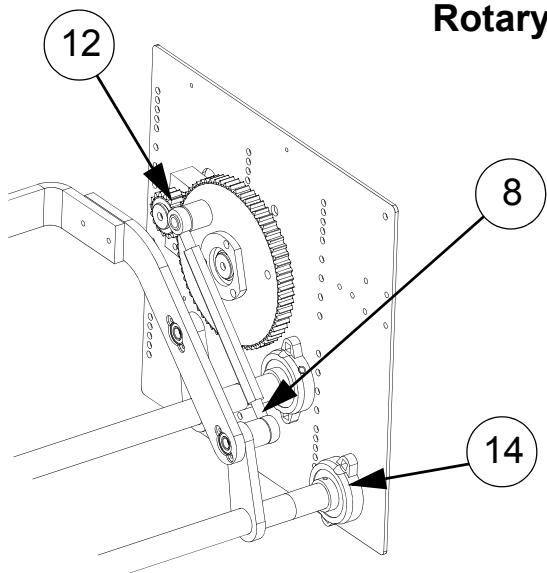
Item #	Part	Action	Lubrication Type
12	Vacuum drive gear	Use gear grease as required	Lubriplate L0152-00
13	Main Gear	Use gear grease as required	Lubriplate L0152-00
14	Bearings	Lubricate any bearing fitting with a grease zerk	Lubriplate FGL-1
15*	Horizontal and Vertical Compression Screw Shafts	Check for lubrication, grease if needed.	Lubriplate FGL-1

\* May be lubricated less often depending on frequency of use.





### Rotary Vacuum Feed



### Scissor Vacuum Feed

