



# SEMI AUTOMATIC CARTONER

MODEL: HC-120

SERIAL NUMBER: 10146

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## TABLE OF CONTENTS

INTRODUCTION .....	4
DESCRIPTION.....	5
AUXILIARY EQUIPMENT WITH THIS CARTONER .....	5
INSTALLATION.....	6
RECEIVING AND UNCRATING: .....	6
POSITIONING THE MACHINE: .....	6
PNEUMATIC CONNECTIONS: .....	6
ELECTRICAL CONNECTIONS: .....	6
DISPLAY .....	8
HOW TO NAVIGATE THROUGH THE SCREENS .....	9
SCREEN BACKLIGHT COLOURS.....	9
OPERATOR ACCESSIBLE SCREENS.....	10
UNLOCK THE MACHINE .....	10
MAIN SCREEN .....	10
SETUP SCREEN.....	10
ACCESS.....	11
LOCK.....	11
PRODUCT SCREEN.....	11
COUNTER SCREEN.....	12
GLUE SETTINGS.....	12
MODE.....	13
SERVICE ACCESSIBLE SCREENS .....	13
MACHINE SETTINGS.....	13
DISPLAY SETTINGS .....	13
MESSAGING.....	14
MORE DISPLAY .....	14
CLOCK.....	14
HANDSHAKING .....	14
CARTONER.....	15
SQUARING.....	15
GLUE GUNS.....	15
CARTON FEEDER (VACUUM).....	16
MORE (CARTONER).....	16
MACHINE ZERO .....	16
INDEX SETUP.....	17
MESSAGES .....	18
LOCK/UNLOCK AND PASSWORDS.....	18
FACTORY SET PASSWORDS .....	18
OPERATOR .....	18
SERVICE .....	18
MODES OF OPERATION.....	19
AUTOMATIC CONTINUOUS MODE.....	19
AUTOMATIC INDEXING MODE.....	19
JOG MODE.....	19
STOP .....	20
SHUT OFF .....	20

DISPLAY MESSAGES:	20
RUNNING	20
CLEANING	20
READY	20
BOX SIZE ERROR	21
SHUT OFF	21
EMERGENCY STOPPED	21
FRONT DOOR OPEN, REAR DOOR OPEN,	21
IDLE OVERTIME,	21
GLUE NOT READY	21
ENCODER ERROR	21
CONTACTOR ERROR	21
CARTONER DRIVE ERROR, FEEDER DRIVE ERROR	22
OVERTORQUE	22
MOTOR SENSOR ERROR	22
MOTOR TEETH DROPOUT	22
SETTING UP THE MACHINE:	23
DEFINITIONS:	23
SEMI-AUTOMATIC AND AUTOMATIC CARTONERS	23
FRONT AND REAR SIDE OF THE MACHINE	23
BOX DIMENSIONS:	23
CARTONER PITCH	24
ADJUSTING THE ACCUMULATOR TO CARTON DIMENSIONS	25
ADJUSTING GLUE GUNS HEIGHT	39
GLUE	40
GLUE PATTERN SETTINGS	40
GLUE GUNS	41
GLUE TROUBLESHOOTING	42
GLUE GUN SPRING ADJUSTMENT	44
MAINTENANCE	45
KEEPING CHAINS TIGHT AND BELTS TIGHT	45
RE-ESTABLISHING THE ZERO POINT OF THE MACHINE	47
LUBRICATION	48
EVERY TWO THOUSAND HOURS	48
CLEANING AND WASHING	48
AIR MAINTENANCE	48
GLUE MAINTENANCE	48

## INTRODUCTION

The manual provides all of the information to install, operate, maintain and troubleshoot the Semi-automatic cartoner model HC-120. It describes the equipment and typical applications, electrical and air requirements. Subsequent sections include installation and operation instructions, maintenance schedule, troubleshooting guide, electrical and pneumatic drawings.

It should always be remembered, that industrial machinery is potentially hazardous due to moving components, electricity and air pressure used to execute the tasks, that the equipment is designed to perform. The equipment should always be used for its intended purpose and at the performance levels for which it is designed. Only trained personnel should operate the machinery.

The equipment described in this manual has safety features built into the control system. These features must not be bypassed or disabled. The safety features supposed to prevent bodily harm if an operator tries to get inside to resolve a problem while the machine is still running. Opening a door or activating the emergency stop will deactivate the machine immediately. The guarding prevents operators from being injured.

It is very important to review and understand the contents of the manual. Following all the steps and procedures outlined in this manual will ensure reliable and secure machine performance.

## DESCRIPTION

The **Consolidated Technologies** Cartoner model **HC-120** is automatically controlled machine that opens flat cartons, closes and or seals the ends of the cartons. The cartoner will not insert the product into the carton. This must be done manually by the operator.

The HC-120 cartoner is mechanically synchronized with chain linked power transfer to the various sections of the machine to ensure secure and continuous machine operation with minimal electrical and software monitoring and control.

The principle machine control is the **programmable logic controller (PLC)**. The main function of the PLC is to ensure proper synchronization of the vacuum and the glue application system and to interface with the operator through the **touch screen**.

The machine is powered by a motor that drives the main chains and all of the accessories that manipulate the flaps.

Pneumatic system activates the vacuum cups that pull the cartons from the accumulator and open them, the glue guns if so equipped.

## AUXILIARY EQUIPMENT WITH THIS CARTONER

This cartoner is equipped with the hot glue application system to seal the ends of the cartons.

This unit is fully integrated to the cartoner. Air and electric power are taken from the cartoner. The PLC reads the photocell that detects the presence of the cartons passing through the glue area. The PLC signals the glue applicator heads to spray.

## INSTALLATION

### RECEIVING AND UNCRATING:

The first step in installation is to inspect the crate upon delivery of the equipment. Any obvious damage done in shipping must be reported in the presence of the transport company representative making the delivery. The crate top and sides can then be carefully removed. Inspect the contents of the crate for shipping damage before lifting the machine from the crate base. The time to call back the transport company to report damage inside the crate is before the machine is removed from the base. Photograph any damage found for future reference.

Verify that the equipment delivered is what was ordered and that all of the options features and auxiliary equipment are included in the shipment.

Once it is certain the machine is in good condition and delivered as ordered, it can be removed from the crate base with a lift truck of load capacity suitable to the weight of the cartoner and with forks long enough to pass across the width of the frame. The machine must be set on the floor gently to avoid causing any damage.

### POSITIONING THE MACHINE:

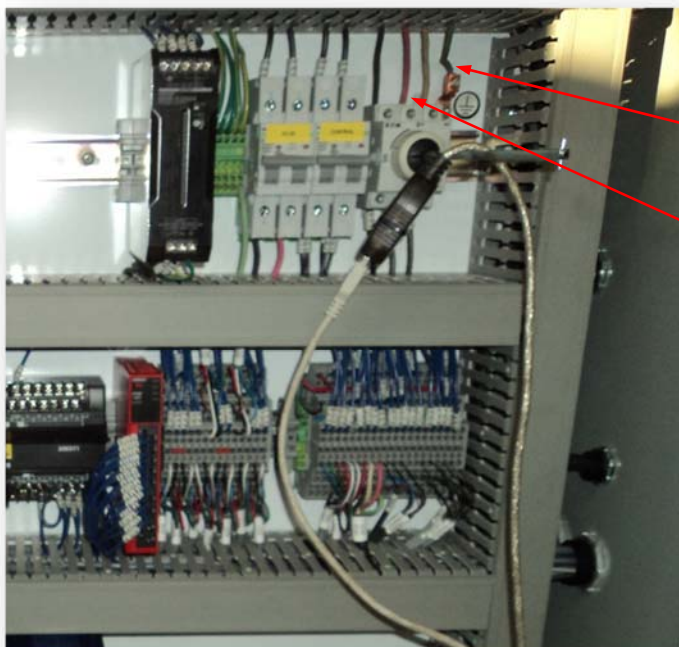
The machine placed at the desired location must be aligned with any equipment that will feed product to the cartoner or take away closed cartons. Power sources (air and electricity) must be routed near the machine to make the necessary connections. The machine is shipped without a power cord and must have one of sufficient gauge for the machine current requirements and the distance from the machine to the connection point. (Refer to local electrical and safety codes)

### PNEUMATIC CONNECTIONS:

Provide air supply with a minimum of 80 PSI (5.5 bars) up to a maximum of 150 PSI (10. bars) of clean, dry, oil-free air.

### ELECTRICAL CONNECTIONS:

Connect cable of appropriate gauge and voltage rating to handle, 208-240Volts AC, 60Hertz 20A per phase, 3 phases. **A voltage transformer is installed in the electrical cabinet to adapt the machine to 400V, 3ph, 50Hz. Always check with local electrical codes.**



Ground Wire

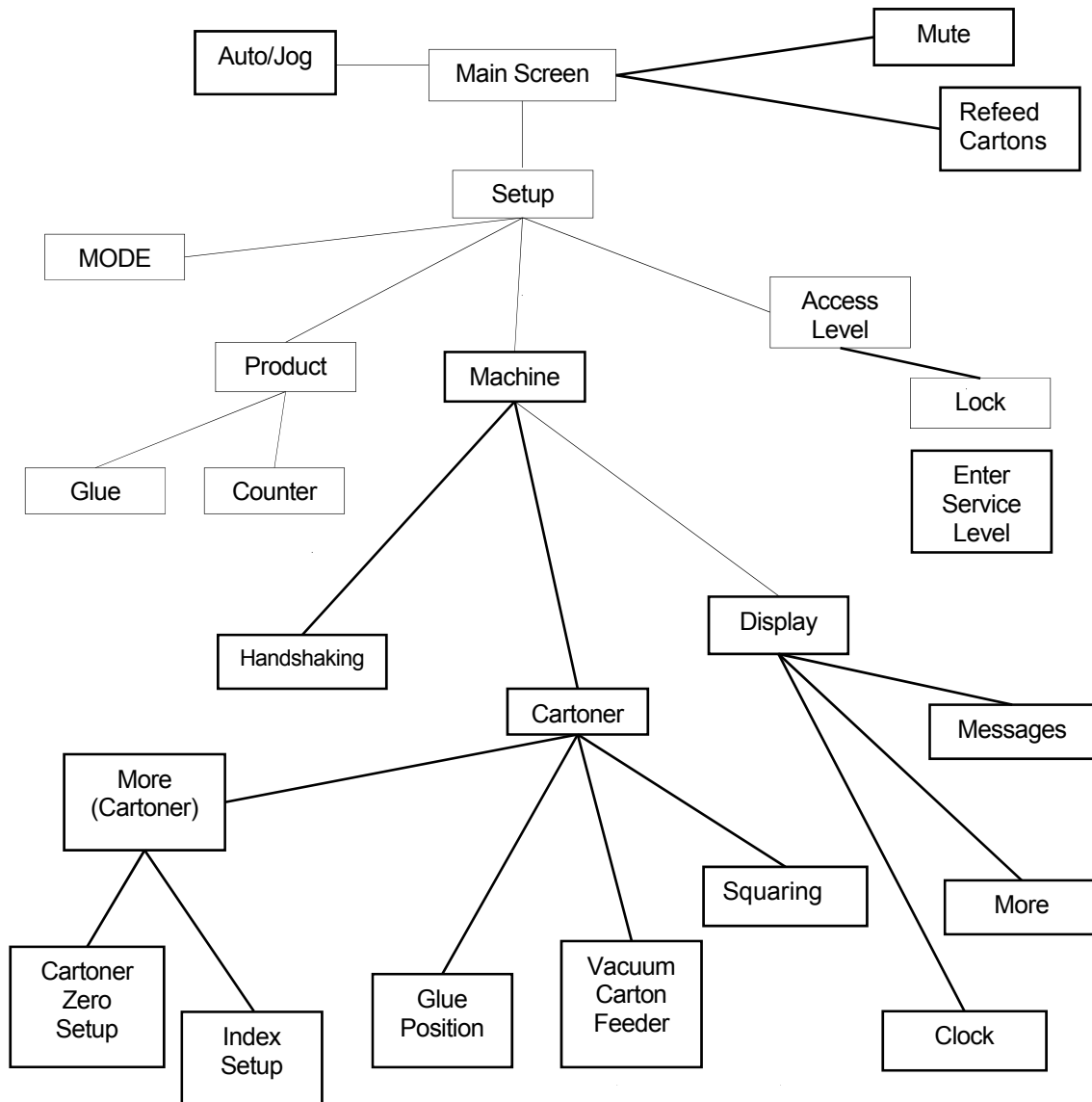
Phases



**Air connection**

## DISPLAY

The cartoner is equipped with a touch screen interface that displays machine operation status, diagnostic conditions for debugging, and permits entry of setup parameters in various screens at different levels of accessibility by means of password. The following diagram shows the Main screen and its submenus. **MACHINE** settings (bold squares) are accessible only in **SERVICE** level.





## HOW TO NAVIGATE THROUGH THE SCREENS

The display screens are organized as shown on the preceding page. Touching the screen buttons will take the display away from the main screen towards the ends of the branches. To leave a screen and return towards the main screen press the **EXIT** buttons on each screen. The most frequently changed parameters are closest to the main screen to minimize screen navigation.

In this manual, the full path from the main screen is used to describe screens.

Example: the Glue Position setting is located in the **SETUP/MACHINE/CARTONER/GLUE POSITION** screen.

Starting from the **MAIN SCREEN**, touch these buttons in order, as the screens switch, until the **BOX, SIZE** parameter appears on the screen.

To change a parameter with factory established choices, press the window that displays the setting and the choices will change in sequence. Press repeatedly until the desired choice is shown in the selection window.

To change a numerical parameter, touch the parameter button.

The current value will appear.

Touch the numeric value in order to modify it.

If the value is changeable from the display, a pop-up keyboard will appear on the screen,

Enter the new value and then press the **ENTER** key.

Values entered must be within the limits set for each parameter as described in the settings section.

The software may modify the entered data to suit existing conditions.

Some buttons are disabled under certain conditions and some are accessible only in **SERVICE** mode.

## SCREEN BACKLIGHT COLOURS

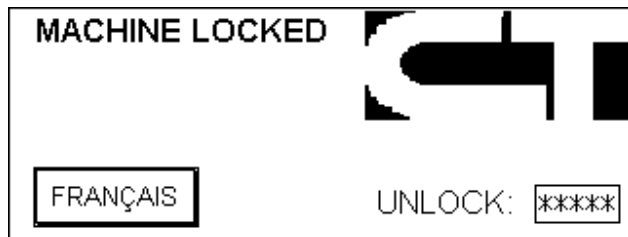
The display screen backlight is:

**GREEN** when the machine is in **OPERATOR** access.

**RED** when the machine is in **SERVICE** access.

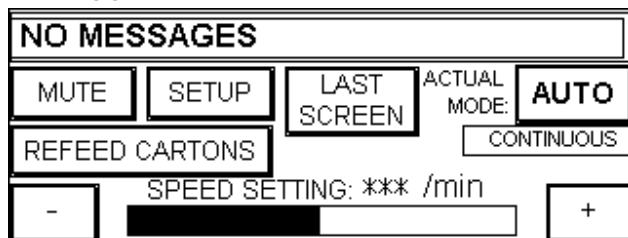
## OPERATOR ACCESSIBLE SCREENS

### UNLOCK THE MACHINE



This screen appears when the machine is powered on. Enter the password to unlock the machine.

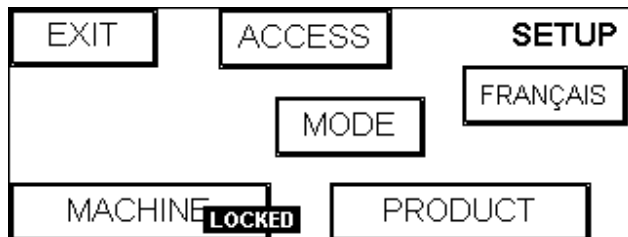
### MAIN SCREEN



The **MAIN SCREEN** is automatically displayed after unlocking the machine.

This screen supplies all the necessary information to put the machine into operation. If the cartoner will not start or, stops by itself, the information necessary to solve the problem will be displayed in the message window. It also has **AUTO/JOG** mode selector button and the speed setting for the machine. The buttons **-/+** are to decrease/increase the machine speed. The button **SETUP** opens settings screen. **MUTE** button is to disable audio alarm. **REFEED CARTONS** button is to force carton feeding to insertion area. **LAST SCREEN** is to return to previous screen.

### SETUP SCREEN



This screen is the path to all of the other screens. Touch the button for the desired screen.

**EXIT** button returns the display to the previous screen. Machine is available only in **SERVICE** level access.

#### ACCESS

EXIT	LOCK	ACCESS LEVEL
NOW IN OPERATOR ACCESS. ENTER PASSWORD FOR SERVICE ACCESS: *****		

This screen gives access to entering the passwords to change access codes.

Touch the box full of the letter \* and when the keypad pops up enter the password for the desired access level and touch the **ENTER SERVICE LEVEL** button.

#### LOCK

ARE YOU SURE YOU WANT TO SHUT OFF AND LOCK THE MACHINE?	
LOCK	NO

This screen has the button to lock the machine to prevent unauthorized personnel from running the machine.

The buttons on the screen are:

**LOCK** button locks the machine.

Pressing **NO** button returns the display back to the settings screen without locking the machine.

#### PRODUCT SCREEN

EXIT	MAIN	PRODUCT SETUP
BOX# **		
GLUE	<b>LOCKED</b>	COUNTER

This screen has the buttons to go to **GLUE** and **COUNTER** settings. The BOX # setting is to choose next carton # for which **GLUE** settings have been already pre-set and **COUNTER** screen will show production data for this carton # as well.

#### COUNTER SCREEN

EXIT	MAIN	COUNTER	
***** HOURS TOTAL MAIN DRIVE RUN			
PRODUCTION	RESET	D	M
*****	SINCE ** : **	**	/ **
*****	TOTAL		

This screen has the button to reset the production counter and it shows date and time of the production period.

#### GLUE SETTINGS

EXIT	BOX LENGTH: **.*		GLUE INCHES
REAR:	**.*	**.*	**.*
	CENTER GAP	DASH LENGTH (0=SOLID LINE)	
FRONT:	**.*	**.*	**.*



This screen is to change settings for the GLUE UNIT for each carton size, for front and rear gun independently. **EXIT** or **MAIN SCREEN** buttons return the display to the previous screen or to the main screen.

The parameters and the buttons in the **GLUE** screen consist of:

**BOX LENGTH** is needed to set glue spray pattern.

**DASH LENGTH** is to specify the length of the dashed line if applicable.

**GLUE FROM BOX EDGE** is the distance that glue starts and stops from the edge of the carton.

**CENTER GAP** is to specify the gap in the glue line.

#### MODE

EXIT		MAIN SCREEN		<b>ACTUAL MODE</b>	
FRONT GLUE GUNS		REAR		AUTO MODE: CONTINUOUS	
DISABLED <b>LOCKED</b>		DISABLED		CARTON FEEDING DISABLED <b>LOCKED</b>	
GLUE DISABLED IN JOG		CARTON PICKUP IN JOG: CONTINUOUS			

This screen is to change the running mode for various modules and has the following buttons:

- button to change running mode to INDEXING or to CONTINUOUS.
- button to enable or to disable front or rear guns
- button to disable the glue in JOG (manual) mode
- button to change the carton pickup in JOG mode: CONTINUOUS pickup or SINGLE CARTON when you press JOG pendant button.

#### SERVICE ACCESSIBLE SCREENS

All of the operator accessible screens are accessible in **SERVICE** access level. The following screens are accessible only in **SERVICE** mode.

#### MACHINE SETTINGS

EXIT		MAIN		<b>MACHINE SETUP</b>	
DISPLAY		HANDSHAKING			
				CARTONER	

This screen has all of the buttons DISPLAY, HANDSHAKING and CARTONER buttons to go to the various settings that configure and time the cartoner.

#### DISPLAY SETTINGS

EXIT		MAIN		<b>DISPLAY</b>	
PASSWORDS:		OPERATOR ****		SERVICE ****	
CLOCK		MORE		MESSAGES	

This screen has the paths to go to **ACCESS SETTINGS** and **MESSAGING** screens.

#### MESSAGING

EXIT	MAIN	MESSAGES
DISPLAY BLINKING DISABLED	WARNING SCREENS DISABLED	BUZZER DISABLED
MESSAGE TIME:		*.* sec

This is the screen to set the posting time for messages in the status window of the main screen and it gives the option for warning messages/display blinking or not. It has also the button to disable sound alarm (buzzer).

#### MORE DISPLAY

EXIT	MAIN	DISPLAY
CONTRAST		CONFIGURATION
PLC		

This screen is to adjust display contrast and to go to PLC settings screen. CLOCK button opens clock screen.

#### CLOCK

EXIT	MAIN	CLOCK				
+	+	+	+	+		
H	M	D	M	Y		
**	**	**	**	**		
-	-	-	-	-		

Clock screen is to count actual production hours.

#### HANDSHAKING

HANDSHAKING IN AUTO MODE WITH PRODUCTION LINE AND INTEGRATED EQUIPMENT			EXIT
MONITORING GLUE READY	MONITORING GLUE LOW	MONITORING PRINTER	
MONITORING DOWNSTREAM LINE		MONITORING BARCODE READER	

Several I/O are available to monitor the status of the equipment such as Downstream/Upstream conveyors, Glue Unit status, Glue Level and status of the printer. Please note, monitoring is enabled in **AUTOMATIC MODE** only.

#### CARTONER

EXIT	MAIN	CARTONER	
SQUARING		MORE	
GLUE POSITION		CARTON FEEDER	

This screen has the buttons to go to the **CARTON FEEDER**, **GLUE POSITION**, **SQUARING** and **MORE** setting screens.

#### SQUARING

EXIT	MAIN	SQUARING	
OFFSET: -**.*		EARLIER	LATER
TO SET ZERO: JOG TO THE ZERO POSITION (SEE THE LABEL ON THE MACHINE), THEN PRESS THE BUTTON BELOW.			
SET ZERO			

This screen is to set ZERO position (to calibrate) carton squaring module. Follow onscreen instructions to move the squaring module to its zero position. Then touch SET ZERO button. Calibration is done.

#### GLUE GUNS

EXIT	GLUE GUNS		
CARTONER POSITION: **.* " -INVALID			
REAR: **.* "	EARLIER	LATER	
GUN OFFSET	GLUE POSITION ON BOX		
FRONT: **.* "	EARLIER	LATER	

The gun timing is critical. This screen is used to set the encoder value when the trailing lugs of a pocket are lined up with the glue gun nozzles. This point must be set correctly in order to apply glue in the desired pattern. **EARLIER** button will decrement the timing value to activate the guns sooner.

**LATER** button will increment the timing value to activate the guns later.

The sooner and later buttons are required for adjustment. There is an inherent delay in the glue guns due to the fact that air activates the glue gun, and the glue has to travel from the tip of the gun to the carton. If the speed of the machine is increased, the glue pattern will end up farther back on the carton due to the fact that the carton will travel farther in the time that it takes for the glue gun to spray and the time for the glue to travel from the tip to the carton.

#### CARTON FEEDER (VACUUM)

EXIT	<b>CARTON FEEDER</b>			
	CARTONER POSITION: **. * "-INVALID			
	HEAD 1: AT **. *			
<b>RELEASE CARTON</b>		EARLIER	LATER	
PREBREAK: AT **. *		HEAD 2: AT **. *		
EARLIER	LATER	EARLIER	LATER	

This screen is where the start and release timing for the vacuum of the rotary carton feeder is set. The timing is adjusted with the **EARLIER** and **LATER** buttons. There are 2 pairs of vacuum heads therefore there are 2 independent adjustments for vacuum pickup/release. There is also vacuum adjustment for prebreak module on this screen. Prebreak module has to be adjusted so that when a carton picked up by feeder head touches prebreak module suction cups it activates for an instant and slightly opens the carton. Refer to prebreak module mechanical adjustment description below.

#### MORE (CARTONER)

EXIT	MAIN	<b>CARTONER</b>
ACTUAL MODE		ZERO
<b>CONTINUOUS</b>		
		INDEX SETUP

This screen is the path to machine **ZERO** screen and to **INDEX SETUP** screen. It also has the button to switch between **INDEXING** and **CONTINUOUS** running mode.

#### MACHINE ZERO

EXIT	MAIN SCREEN	<b>CARTONER ZERO</b>
	-INVALID	CARTONER POSITION: **. * "
TO SET ZERO: JOG TO THE ZERO POSITION (SEE THE LABEL ON THE MACHINE), THEN PRESS THE APPLICABLE BUTTON BELOW.		
THE CARTON FEEDER HEAD PRESENTLY AT RELEASE:		HEAD 1    HEAD 2

This screen is where the main timing value for the cartoner is set. The machine must be jogged until the carton is about to leave the glue area. Pressing **SET** button will enter the value of the encoder at that moment into the setting for machine zero. This becomes the basis for all of the timing of the glue guns, the carton vacuum release and the position to stop the machine when running in **INDEXING** mode. Follow onscreen instructions to move the cartoner to its zero position. Than touch the button HEAD 1 or HEAD 2.



## INDEX SETUP

EXIT	MAIN	INDEX SETUP	
CARTONER POSITION: **. * " -INVALID			
**	PITCHES, CARTONS:	*****	
STOP POSITION IS PRODUCT SETTINGS.			
STOP POSITION: **. * "		EARLIER	LATER

This screen helps to adjust the cartoner's stop position in indexing mode. You can set how many erected cartons will stop in the front of operators. By using the buttons **EARLIER** and **LATER**, you can adjust the stop position precisely.

## MESSAGES

The messages on top of the **MAIN SCREEN** indicate the status of the machine and display any faults causing the existing status. Messages are posted to the status window to inform the operator of any faults or problems. A single message will display until the condition that caused it is corrected and the **CYCLE START/STOP** button is pressed to clear the message. In the case of multiple messages, each message will be displayed for the **MESSAGE TIME** set in the **DISPLAY** screen.

Most error messages are latched so that the operator will know why the machine stopped in the event of a momentary fault or a false indication of a fault due to a mechanical or electrical problem with the fault detection apparatus. Messages are cleared when the **CYCLE START/STOP** button is pressed but will reappear if the condition generating the message is not corrected. Example: the **FRONT DOOR OPEN** may be indicated even after the door is closed.

## LOCK/UNLOCK and PASSWORDS

The cartoner is equipped with password access at two levels. The two levels are **OPERATOR** and **SERVICE**. The operator access code locks out unauthorized personnel from running the machine. This enables the machine to be kept powered for the glue applicator to maintain melt temperature. The **SERVICE** level gives access to all of the parameters for the technical people maintaining and setting up the equipment.

When the machine is first powered up it defaults to the locked state. The system is unlocked by entering the operator password. The system is locked the touching **LOCK** button in the **MAIN SCREEN**.

Once locked, the machine will not operate until unlocked by a password.

## FACTORY SET PASSWORDS

Operator: **1**

Service: **2**

The **OPERATOR** Password unlocks the machine, giving access to run the machine and to **PRODUCT SETTINGS** but no access to **MACHINE SETTINGS**.

The **SERVICE** Password unlocks the machine giving access to run the machine and access to **PRODUCT SETTINGS** and **MACHINE SETTINGS**.

The **SERVICE** access will be reset to **OPERATOR** access mode after a certain amount of time in the event that machine is forgotten in **SERVICE** access.

The passwords may be changed in the **SETTINGS/MACHINESETTINGS/DISPLAY** screen.

## MODES OF OPERATION

This cartoner is equipped with two modes of operation; an **AUTO** mode for running production and a **JOG** mode to permit an operator or setup technician do a controlled setup for a carton. The **JOG** mode enables the carton to be slowly advanced through the cartoner to set guide rails, align actuators, and aim glue guns as needed.

In both modes the green **CYCLE START/STOP** pushbutton must be pressed and all faults that stop the machine must have been corrected. The machine will not run in any mode with the doors open, the emergency stop activated or any other serious fault condition that disables the running of the machine.

### AUTOMATIC CONTINUOUS MODE

This mode is used to run production. All conditions required to run production must be met before the machine will run. The machine is going to start if the glue application system is up to temperature and indicating a ready signal.

When the machine is started in **AUTO** mode the whole machine will start the conveyor chains and feed cartons into the pockets on the chain.

Stopping the machine in **AUTO** mode is done with by pressing the green **CYCLE START/STOP** pushbutton while the machine is running. The green switch light will go off. This indicates the beginning of the stop sequence. The carton feed will stop and the conveyor will continue to empty the chain of cartons.

In this mode the operator must insert product into the carton while the chain is in motion. For products that are easy to insert into the carton this mode generates more production.

### AUTOMATIC INDEXING MODE

In automatic indexing mode, the cartoner will feed a series of cartons and then stop the erected cartons in front of the manual insertion area. The cartoner will then index to glue all of those cartons and fill the manual insertion area with cartons and then stop. This cycle is started with the **CYCLE START/STOP** push button. The cartoner is only going to put cartons into the pockets that will end up stopping in the manual insertion area. There will be positions in the chain with no cartons since the cartoner will glue all of the filled cartons. It takes more cycle to glue the filled cartons than it does to fill the insertion area with cartons. This mode of operation will give a lower output of cartons but will ensure quality production with difficult cartons or product where extra care is needed to insert the product into the carton.

### JOG MODE

**JOG** mode is a manual mode that is used to setup the machine. The machine can be advanced and stopped at any point in the machine cycle to align all of the components that form and close the carton.

In Jog mode the machine must be powered up by pressing the green **CYCLE START/STOP** pushbutton. The conveyor is jogged with the lower button on the yellow hand held remote station. The upper button toggles carton feed **ON** and **OFF**. The status of carton feed is indicated by the light in the **CYCLE START/STOP** button on the control panel. When the green light is illuminated the carton feed is activated.

The **AUTO/JOG** mode switch is located in the main screen.

## STOP

This is a condition where the cartoner is not moving but it is powered up. This is a state such as when the machine is being run in indexing mode and is waiting for another cycle to be activated or the machine has finished emptying the glued cartons and is waiting for more cartons to be fed.

## SHUT OFF

In this state, the machine is stopped and powered down. The machine can enter into this state manually by pressing the **CYCLE START/STOP** button and coming to a stop after emptying the machine of cartons and stopping in the set stop position.

The machine will immediately enter **SHUT OFF** mode if an **E-STOP** button is pressed or a safety door is opened. Some error faults will also stop the machine in the same fashion.

During shut off, all the voltage electric power to components inside the cartoner is cut.

The vacuum on the suction cups of the carton feed is maintained to prevent flat cartons from falling into the mechanisms of the cartoner and possibly causing jamming and the resulting down time to correct that situation

The glue applicator remains under power during shut off, in order to maintain glue melt temperature but the solenoids that spray the glue are controlled by the cartoner and will not apply glue.

The machine will **SHUT OFF** automatically after certain time of waiting such as when machine has emptied itself of cartons or if the machine is running in indexing mode and waiting for another cycle to be activated. If these conditions are not changed the machine will stop after the amount of time entered into **AUTO SHUT OFF AFTER XXXX sec IDLE** setting located in the **SETTINGS/MACHINE/SETTINGS/AUTO STOP** screen.

## DISPLAY MESSAGES:

**NOTE:** On power up of the machine the messages that appear may or may not be valid. If the machine was shut off after correcting a fault but without clearing a message it may reappear on the screen. Before trying to correct any conditions displayed on the screen, press the **CYCLE START/STOP** push button. The messages will be cleared if the fault was previously corrected.

## RUNNING

This indicates normal running mode

## CLEANING

Cartoner is emptying out the cartons after pressing the **CYCLE START/STOP** push button.

## READY

Machine is waiting to be cycled.

#### BOX SIZE ERROR

This message indicates that the time that the glue activation photosensor was active for a time that does not correspond the amount of time that the sensor should have been active for the box width set in the **BOX WIDTH** setting.

This can explain an incorrect glue spray pattern on the box.

This will not automatically stop the machine.

#### SHUT OFF

This indicates that the machine was shut off by the operator.

#### EMERGENCY STOPPED

This message indicates that the machine was stopped with an emergency stop push button

#### FRONT DOOR OPEN, REAR DOOR OPEN,

These messages indicate that the machine stopped because a door was opened

#### IDLE OVERTIME,

This message indicates that the machine at waited an idle state such as due to lack of cartons for the preset amount of time in the settings and then shut down.

#### GLUE NOT READY

This message indicates that the hot glue application system is in fault or not up to temperature.

This will prevent the cartoner from powering up and stop it, if it is running.

#### ENCODER ERROR

This message indicates that the Encoder value is out of valid range. Encoder counter does not reset or counts down. This will shut down the machine in **AUTO** mode. The machine will not function without the encoder because the carton release and glue guns are controlled with information from the encoder.

Check the encoder wiring, the timing belt, that turns the encoder and make sure all of the timing pulleys are tight on their respective shafts.

#### CONTACTOR ERROR

This message indicates that the contactor auxiliary contact is on while the coil power is off.

This indicates contactor failure. The message will appear also if the contactor was activated manually.

This fault will prevent the machine from starting in any mode. Check the contactor and the auxiliary contact.

Either could be the source of problem. The contactor may be physically jammed or the auxiliary contact may be shorted or welded closed.

## CARTONER DRIVE ERROR, FEEDER DRIVE ERROR

This message indicates that the AC inverter is not running. The PLC monitors the RUNNING output of the inverter to ensure that it is running when it starts the motor. The machine will not start without a running signal from the AC inverter and it will stop if the RUNNING output of the inverter goes off while the machine is running in any mode

Wrong drive settings, blown fuses, motor overload, and other faults of the drive may cause this error. (See inverter manual)

## OVERTORQUE

This message indicates that torque limiter slippage has been detected. This indicates that the machine has incurred mechanical resistance beyond normal operating conditions. This is a **CRITICAL** problem and must not be counteracted by adjusting the torque limiter. If the machine is experiencing increased mechanical loading, it is indicative of misalignment, broken components, debris jamming in the sprockets, actuators interfering with chain movement. The source of the binding must be found and corrected to avoid damage to the equipment and or personnel. This fault will shut of the machine in AUTO mode.

**Do not tighten the torque limiter- check the cartoner for possible overload first.**

**Do not over tighten the torque limiter. Damage to the cartoner could occur.**

## MOTOR SENSOR ERROR

This message indicates that the sensor at the output of the main gearbox does not detect the lobes on the sensor rotor while the encoder is indicating that the machine is running.

This fault will shut off the machine in **AUTO** mode.

**IMPORTANT:** This sensor is critical in detecting mechanical overload on the machine and **MUST FUNCTION CORRECTLY** to detect any binding.

## MOTOR TEETH DROPOUT

This message indicates a problem with the sensor at the output of the main gearbox. This message will occur if the sensor does not detect all of the lobes of the rotor. This may indicate that the sensor has slipped from its original position or is loose and vibrating causing an erratic signal while the main encoder is indicating smooth continuous motion. Check the sensor position and ensure that it is tight. Inspect the lobes of the rotor for damage. Replace rotor if evidence of damage to the lobes is found.

**IMPORTANT:** This sensor is critical in detecting mechanical overload on the machine and **MUST FUNCTION CORRECTLY** to detect any binding.

## SETTING UP THE MACHINE:

### DEFINITIONS:

Some terms in this manual must be defined with respect to the equipment in order to ensure clarity of the explanations in this manual.

### SEMI-AUTOMATIC AND AUTOMATIC CARTONERS

Cartoner with manual product insertion into box is defined as semi-automatic. The operator has to insert the product by hand.

Cartoner with automatic product insertion into box is defined as automatic.

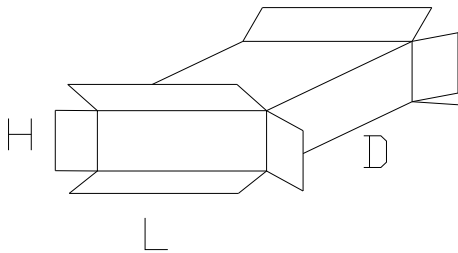
### FRONT AND REAR SIDE OF THE MACHINE

The operator station side (main control panel) of the machine is referred as **FRONT**.

The opposite side is referred as **REAR**.

### BOX DIMENSIONS:

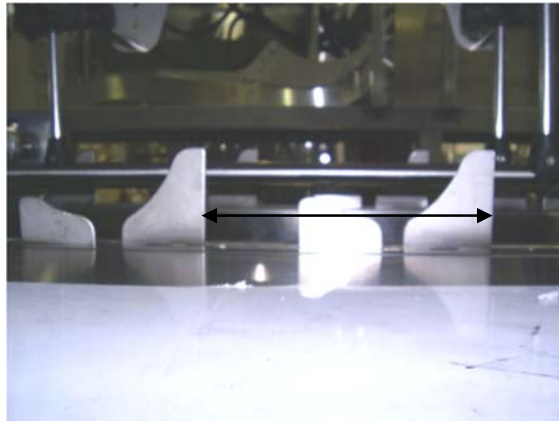
Box dimensions in this manual refer to orientation of the carton lying in the chain of the cartoner as shown in the following diagram.



Box Length, Height and Depth are defined as shown. The dimension commonly referred to as Height may be called Width in this Manual when more obvious.

## CARTONER PITCH

The CARTONER PITCH is the distance between similar points of two neighbor pushers (lugs).



This section explains the sequence of adjustments to make a change-over to another carton on the cartoner. At this point it is assumed that the machine is factory set with all of the relevant parameters and runs as designed. Critical machine timing parameters will be explained later on before the trouble shooting section.

The machine is a very simple machine in terms of what it actually does. This machine consists of a rotary carton feeder, a conveyor, typically two rotary minor flap closers and a hot melt glue application system. The machine pulls cartons out of the accumulator and then moves the cartons the length of the machine while the guides and closers fold all of the flaps and the glue guns apply glue. All of the rotary mechanical actuators are linked mechanically so that only minor adjustment is required to change over.

There is a logical sequence to setting up the machine and it is worth following that sequence in order to hopefully adjust each component only once. The goal is be able to do this in 15-20 minutes. With practice and an organized approach this is possible. The process is described through the photographs and written explanation in the following pages.

A change over consists of:

- Setting the dimensions of the accumulator to the flat carton
- Adjusting the width of the conveyor for carton depth
- Setting the spacing between the lugs for the carton length
- Adjusting the rotary carton feeder
- Adjusting all of the rotary flap closers, stationary flap folders and the hold down rails.



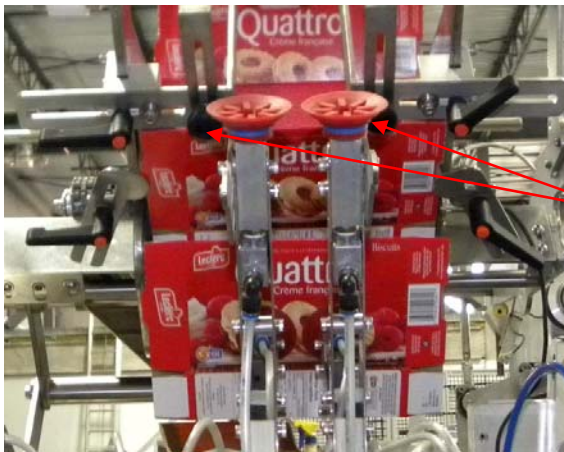
## ADJUSTING THE ACCUMULATOR TO CARTON DIMENSIONS

The first step in changing over to another carton is to determine which carton is going to be used. Once this is known, set up the accumulator for the carton. This is done as follows.

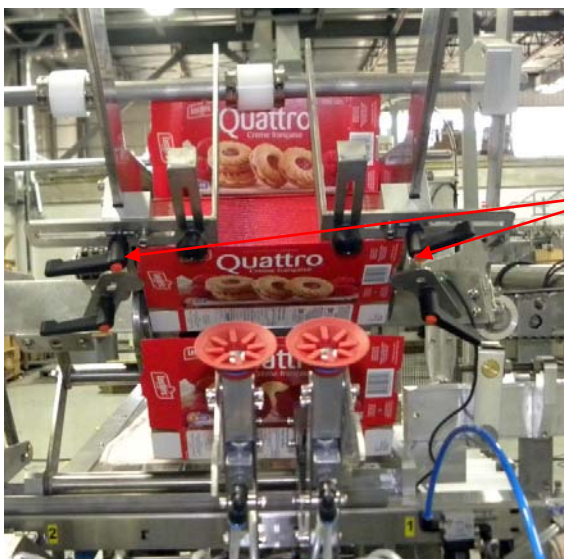
### ADJUSTING ACCUMULATOR TO CARTON'S LENGTH, DEPTH and HEIGHT



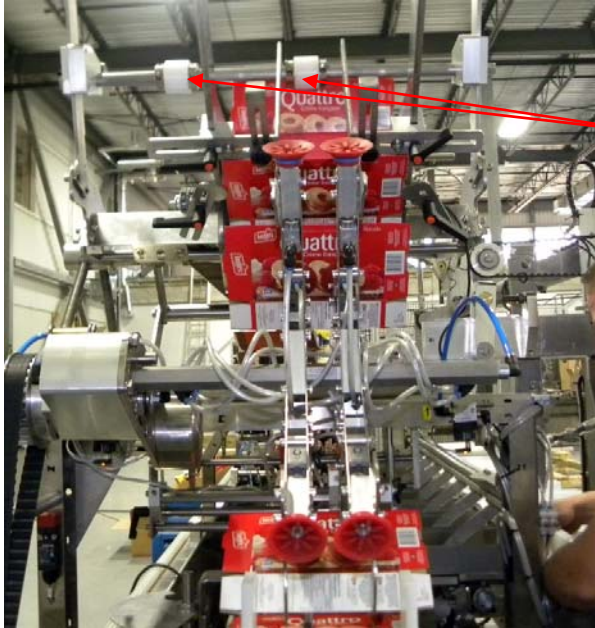
Release the ratchet clamps on both sides of the accumulator output carton holders. Move holders mounts up or down to adjust it to new carton's length. You can slide the links horizontally as well to adjust horizontal holders position. Carton holders are to hold cartons in the gravity portion of the accumulator. While adjusting the holders position make sure that pick up head pulls a single carton out from the accumulator.



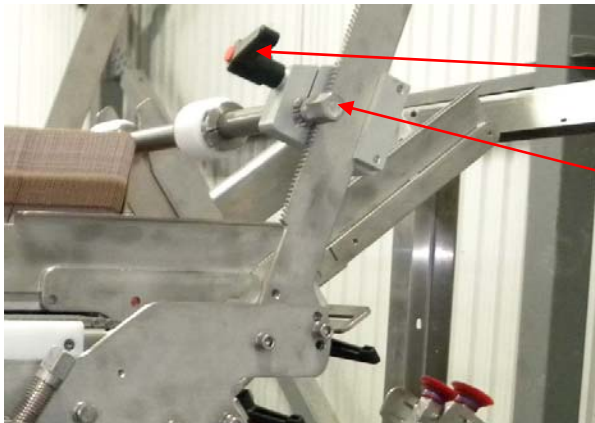
To adjust the holders vertically loosen both nobs and slide them to new position. When adjusting (positioning) the holders make sure the pile of cartons in the gravity portion does not sag (bend) in the middle.



Loosen ratchet clamps to adjust side holders. Same approach as for top carton holders: make sure vacuum feeder pulls out a single carton without disturbing other cartons.



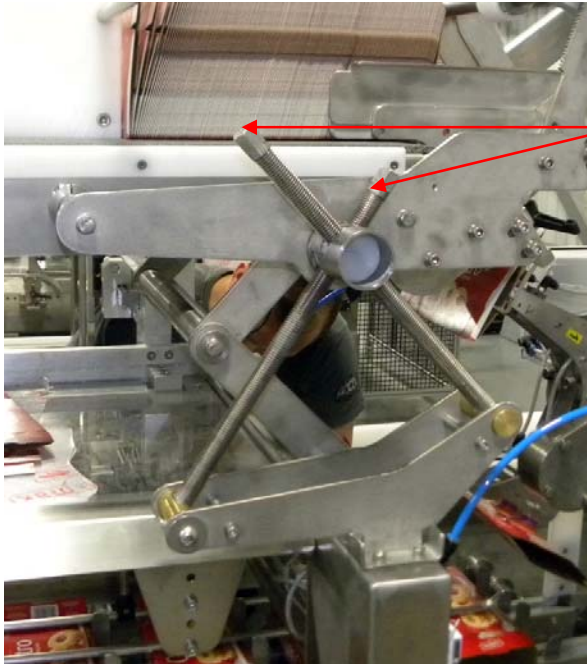
The adjustable roller is to control the number of cartons that is transferred from motorized portion of the accumulator to gravity portion of the accumulator.



Loosen the ratchet clamp

Rotate this hex-head screw to move the roll mount up or down to new carton's length. Tighten the clamp when done. When more cartons have to be added to gravity portion of the accumulator a sensor sends a signal to accumulator motor that activates chains and makes a slow motion to bring more cartons from motorized portion to gravity portion. When required number of cartons has been added the motor stops.

## ADJUSTING THE POSITION OF THE SUCTION CUPS ON THE CARTON



Adjust the height of the accumulator with the adjuster screw at the side of the accumulator to bring the center of the suction cups to 1.5 inches above the fold.

**Tool required:  $\frac{3}{4}$ " Socket or Wrench**

## ADJUSTING ACCUMULATOR SIDE WALLS



Belt Conveyor Wall is factory aligned with the front edge of the lug conveyor and when changing over to new carton the folding on the right side of the carton has to be aligned with the edge of the belt conveyor wall. Then the side wall of the accumulator has to be adjusted to the flap size. Next step is to adjust the left accumulator wall to new carton size.





To adjust the right wall release 32 ratchet clamps:

Clamp #1

And



Clamp #2

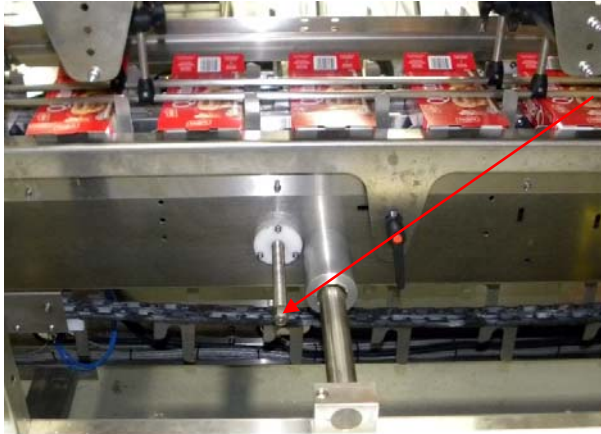
Adjust the wall to new carton size and tighten both clamps.



To move the left wall release this ratchet clamp and move the wall to adjust it to new carton depth. Tighten the clamp when done.

## ADJUSTING THE CARTONER CONVEYOR TO NEW BOX DEPTH

At this point, for the sake of good practices and safety it is recommended that all of the hanging rails over the conveyor be raised above the height of the conveyor lugs to prevent interference when adjusting the width of the conveyor. It is also recommended to move the rear vacuum arm towards the front of the machine for the same reason. It is easiest to do these adjustments using a manually erected carton as a setup jig.



If the conveyor is narrower than the depth of the carton, rotate the adjustment hex-head screw against direction of conveyor flow to widen the conveyor.

There may be more than one adjuster screw on the machine but they are all linked with a chain turning all of the screws together. Any one of them can be used for this adjustment.

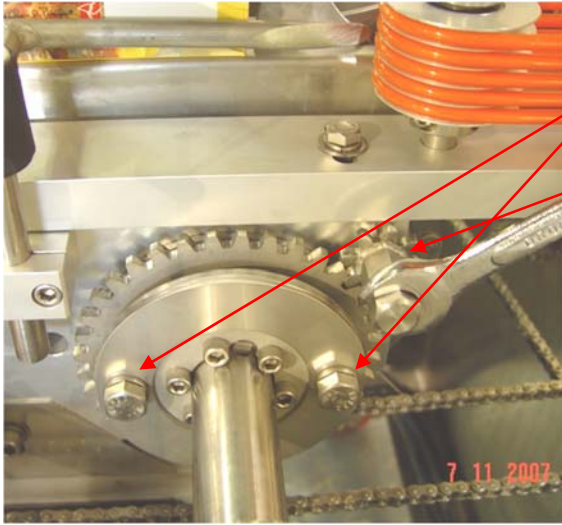
**Tool required: 3/4" Wrench or Socket**



With the conveyor set wider than the depth of the carton insert the manually erected carton into the orange discharge belts. Rotate the adjuster screw in the direction of conveyor flow to close down conveyor sides until the side flaps are flat but the carton is not deformed. It is easiest to do this with the screw at the near the discharge of the machine.

## ADJUSTING THE SPACING BETWEEN THE LUGS FOR THE CARTON LENGTH

Note: this has to be done on both sides independently.

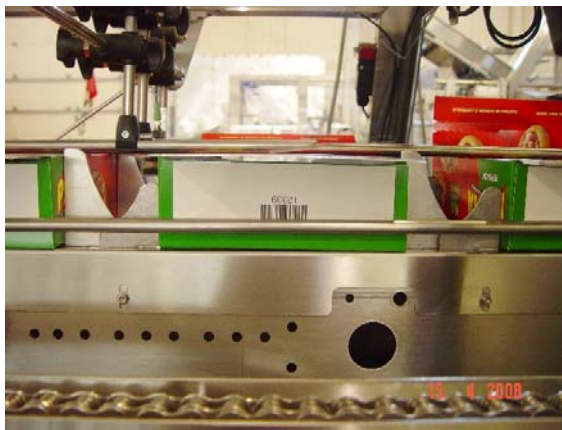


Release two locking screws on the lug chain driving sprocket.

Insert the adjuster tool into the hole next to the adjuster sprocket. Rotate the tool in the direction of the conveyor travel to reduce the space between the lugs. Against conveyor travel will increase the spacing. Use the erected carton as a jig. Be sure to retighten the locking screws when adjusted. The spacing adjustment can change while running if not locked.

**Always remember to remove the hex-head tool when changes have been completed.**

**Tool required  $\frac{3}{4}$ " Wrench or Socket**

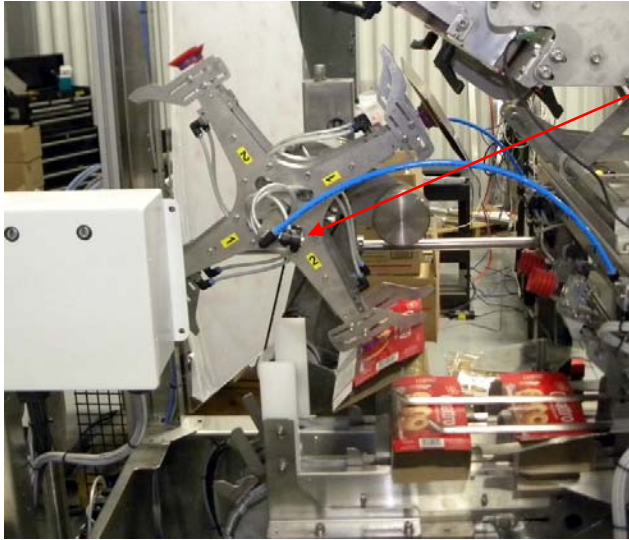


Allow visible clearance between carton and lugs, in order to prevent box deformation and marking.

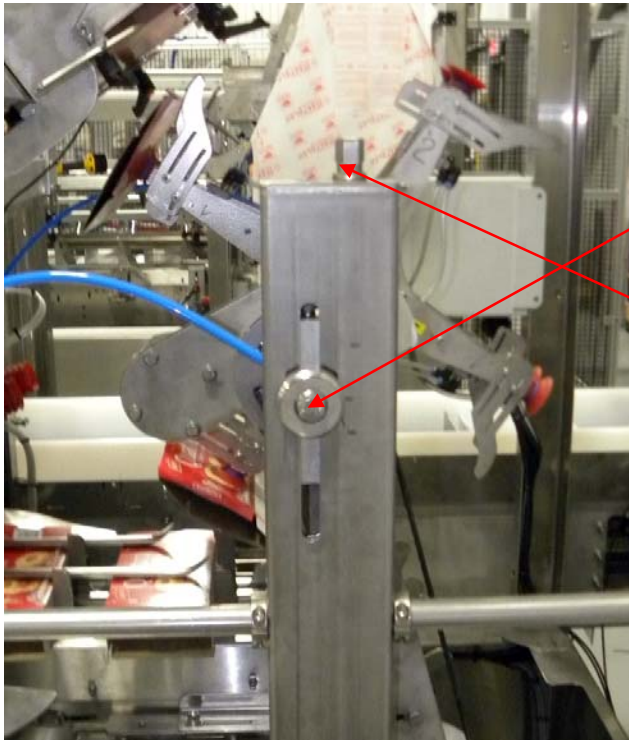
**REPEAT ON OTHER SIDE.**



## ADJUSTING THE CARTON FEEDER TO BOX HEIGHT



Jog the Cartoner until the rotary head has suction cups aligned **vertically** over a pocket in the main chain.



Loosen the clamp.

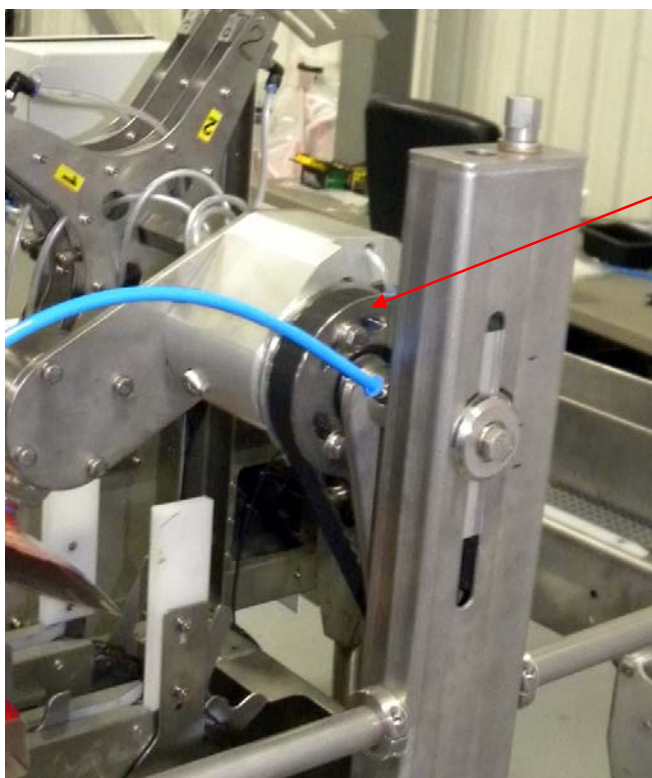
Rotate the hex-head adjustment screw to set the vacuum cups height up or down to the box height. Tighten the clamps when done.

**Tool: required  $\frac{3}{4}$ " wrench or socket**

## ADJUSTING THE ROTARY FEEDER POSITION TO THE CONVEYOR



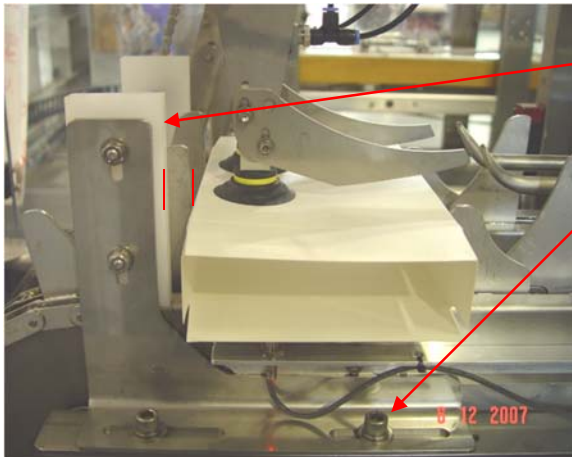
Jog until the rotary head suction cups touch the carton in the accumulator.



Loosen the bolts that lock the head drive. The rotary head should move by hand. Holding the rotary head in the vertical position, jog the conveyor until the trailing edge lugs (pushers) are 1.5 inches from the center of the suction cups. Lock the head drive clutch.



## ADJUSTING THE POSTION OF THE ERECTOR BUMPERS



Adjust the bumpers to about half of the length of the sides (Height) of the carton so that the carton will open and fall into the pocket in the chain

**Tool required 5/16" Allen Key**

## PREBREAK MODULE ADJUSTMENT



Carton Prebreak Module



1. Loosen two screws on this clamp.

2. Turn the ratchet to move the prebreak module up or down to adjust it to new carton/new feeder position

## ADJUSTING THE CARTONER CONVEYOR TO NEW BOX HEIGHT

It is easier to adjust the rails if an erected carton is inserted at each end of a length of rails so that both ends can be adjusted at the same time. It requires repeated fine-tuning if the rails are adjusted one end at a time. Adjust the height of all the top guide rails through the cartoner to the new box height. The rails should touch the top of the carton to flatten the top but not compress the folds. Scratching of the finish or dents in the folds are signs of too much pressure.



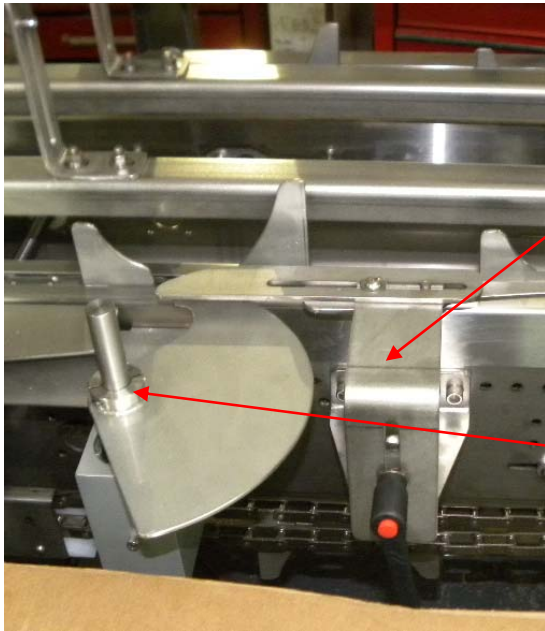
There are two sets of ratchet clamps to adjust top rail (guide) horizontally and vertically to new carton height/depth.

This is first set of ratchet clamps.



This is second set of ratchet clamps.

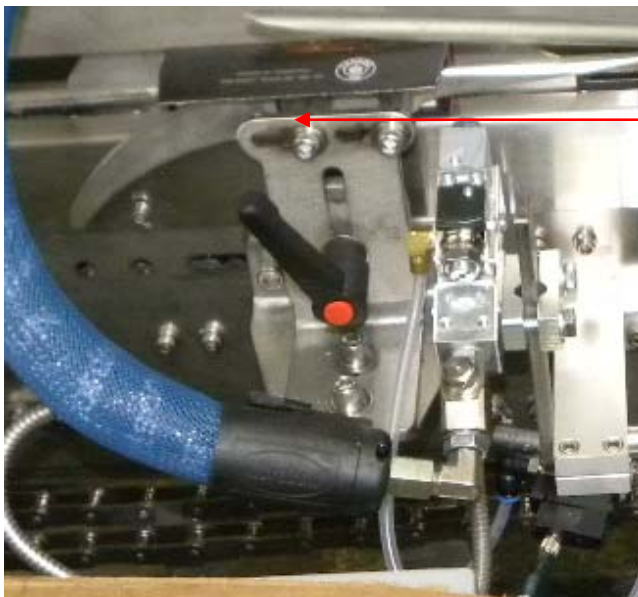
## FRONT MINOR LEADING FLAP CLOSING GUIDE / FRONT MINOR TRAILING FLAP KNOCKER



This guide is to close front minor leading flap. It is adjusted vertically (ratchet clamp) and horizontally (Two screws).

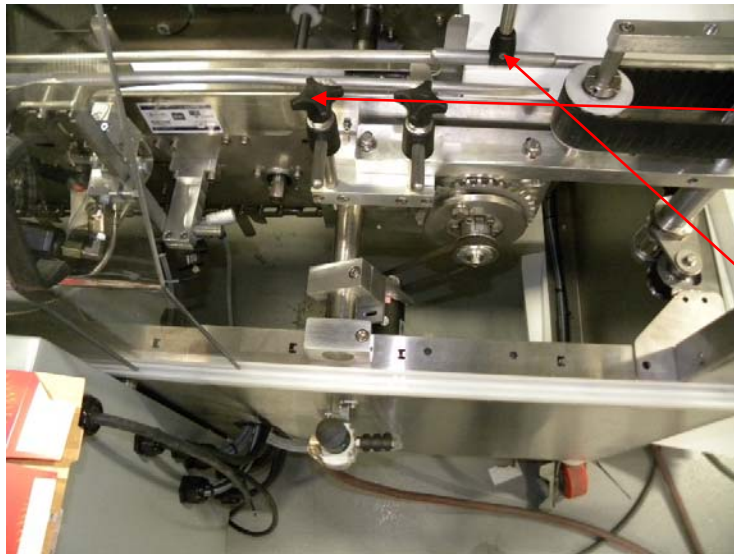
Rotary knocker is to close front trailing minor flap. It has vertical adjustment only. Release the clamp to move the knocker up or down to adjusted it to new carton (flap) size. Tighten the clamp when done.

## FRONT MAJOR FLAP CLOSING GUIDES



Lower major flap closing guide is adjusted vertically and horizontally





Front upper major flap closing guide is adjusted vertically and horizontally.

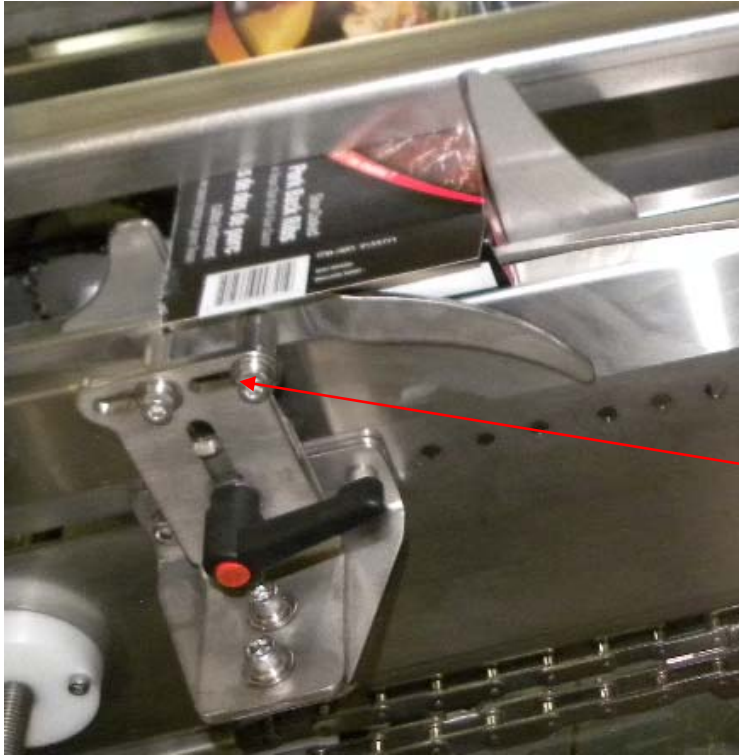
Top holding guide holds the carton entering evacuator area. There are two (front and rear) top holding guides. These guides have vertical adjustment only.

#### REAR MINOR LEADING FLAP CLOSING GUIDE / REAR MINOR TRAILING FLAP KNOCKER

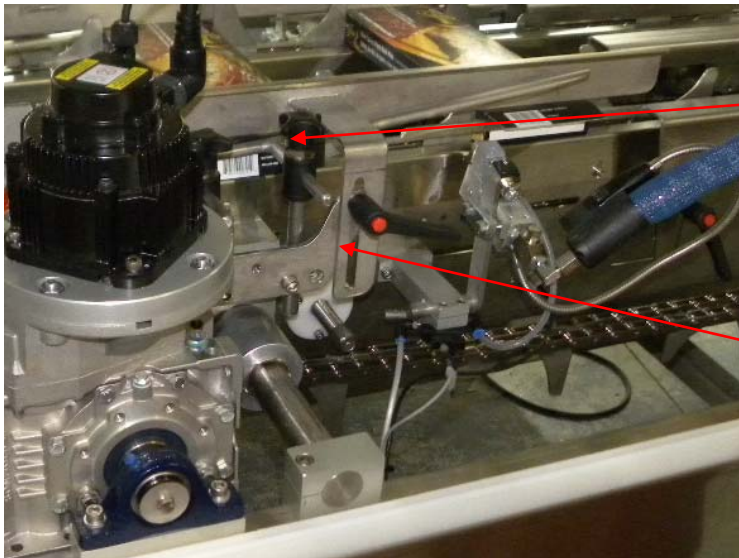


This guide is to close rear minor leading flap. It is adjusted vertically (ratchet clamp) and horizontally (Two screws)

Rotary knocker is to close rear trailing minor flap. It has vertical adjustment only. Release the clamp to move the knocker up or down to adjust it to new carton (flap) size. Tighten the clamp when done.



Lower major flap closing guide is adjusted vertically and horizontally



Rear upper major flap closing guide is adjusted vertically and horizontally

Top holding guide holds the carton entering evacuator area. There two (front and rear) top holding guides. These guides have vertical adjustment only

## ADJUSTING GLUE GUNS HEIGHT



Release the glue gun clamp and adjust the gun height for desired glue line position on the box.

This may require the side guide height readjustment, which guide must support the inner major flap. This may or may not be necessary to adjust since most cartons will probably be glued close to the bottom of the carton.

**Tool required 1/2" Wrench**

Be sure not to damage the glue gun nozzle tip against the guide.

Also, ensure that the glue jet will not hit the guide rail.

## GLUE

### GLUE PATTERN

Glue application pattern is always supposed symmetric on the box.  
It may be with or without middle gap.



### TWO SIDES OF BOX

Some machines allow independent glue pattern settings for each side of a box.

### GLUE PATTERN SETTINGS

The box length must be set correct in the SETUP/PRODUCT/GLUE menu.  
Glue pattern settings in the SETUP/PRODUCT/GLUE menu include:



### GLUE FROM BOX EDGE.

This is desired distance from box edge to glue start, on both glue start and end sides.

The real distance will always be shorter because of glue squeezing when closing the flap.



### GAP.

This is desired gap length in the middle of the glue line.  
Enter zero if no gap required.

The real gap will always be shorter because of glue squeezing when closing the flap.

See the OPERATOR ACCESSIBLE SCREENS/GLUE SETTINGS section for the DASH parameter, if applicable.

Some or all the settings described may be set independently for each side of a box.



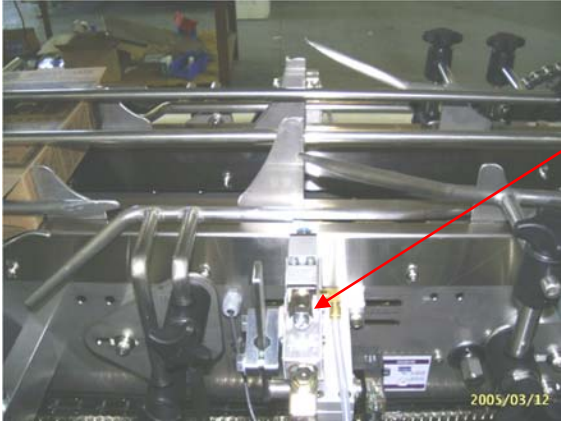
## GLUE GUNS

The MACHINE ZERO must be properly set prior to performing this setting.

Make sure that no ENCODER INVALID or ENCODER ERROR message is displayed.

The system will not accept invalid values for settings.

The encoder value becomes valid after one full pitch of the cartoner movement since powering up the control cabinet.



Jog the machine until the pushing lug edge is against the glue gun nozzle.

In the MACHINE/CARTONER/GLUE GUNS menu for this setting

adjust the setting on the machine running at regular operation speed.

Use the EARLIER/LATER buttons in the same menu to center the glue pattern on the box.

Use Units per Pitch reference on the screen for adjustment value estimation.

### SEPARATELY LOCATED GLUE GUNS

On some machines glue guns are located in different

places.

On such machines the GLUE ZERO may be adjustable independently for each gun.

Also, each gun may have own photo sensor.

## GUN PHOTOSENSOR

Gun photo sensor confirms the box presence for the glue application purposes.

It does not trigger the glue application and therefore should not be used for the glue pattern adjustments.

Severely displaced sensor may cause truncated glue pattern.

## GLUE APPLICATION CONDITIONS

Glue is applied only during the machine movement and with a box at the guns.

In the Jog mode the glue application is disabled (this may be a user switch on some machines).

## GLUE APPLICATOR STATUS AS A CONDITION FOR MACHINE OPERATION

The glue applicator must be in Ready status on order to operate the machine in AUTO mode.

The GLUE NOT READY message is displayed when actual.

In the JOG mode the glue status is ignored.

## GLUE TROUBLESHOOTING

Before any glue-related troubleshooting ensure, that:

- The glue applicator is On and Ready (the green Ready light lit).
- The air pressure on the glue applicator is in range.
- There is enough glue in the tank.
- The glue temperature settings are correct.
- The glue jet from each gun is not obstructed by the machine parts or extra objects, including the glue residue.
- Each glue gun is not disabled from the display (if applicable).

### IMPORTANT!

Comparing both glue guns operation is an important diagnostic tool.

In order to be comparable, the glue pattern must be set similar for both guns during troubleshooting.

With the similar glue settings for both guns:

- Wrong glue pattern or no glue on both guns indicates incorrect settings.
- Wrong glue pattern or no glue on single gun or different glue patterns on both guns indicate a problem with glue gun.

### WRONGLY SCALED GLUE PATTERN

The glue line or gap size is significantly different from the settings.

The entire pattern is stretched (and therefore truncated) or compressed.

The most possible reason is wrong box size (length) setting.

### GLUE PATTERN CORRECT BUT DISPLACED SIDEWAYS

If displaced only on one gun- displace this gun until the glue position is similar on both sides of the box.

If displaced on both sides equally- adjust the GLUE ZERO.

### GLUE PATTERN CORRECT BUT REPEATEDLY TRUNCATED

The glue pattern is truncated when the gun photo sensor does not confirm box presence while the glue should be applied.

This may appear when:

- The glue pattern is displaced due to wrong GLUE ZERO setting (see above), or
- The photo sensor is not located correctly.

The photo sensor must be located on the glue gun nozzles line or little before (~1/4").

NO GLUE APPLICATION or  
NON-REPEATABLE GLUE PATTERN

If on both guns:

- Verify the glue pattern settings.

The glue lines may be too short for glue guns proper activation.

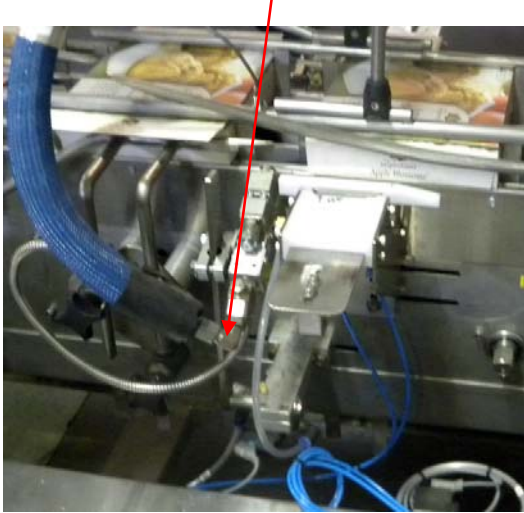
- Verify the GLUE ZERO setting and the gun photo sensor location.

If on single gun only:

- Run the machine and watch the gun solenoid light, if applicable.

No light on single gun indicates the electrical hardware failure.

- Activate the gun valve manually to test the gun for activation.



If the gun activates- the pneumatic valve solenoid is out of order.

If the gun does not activate- the gun is clogged or the gun spring is over tensioned.

See **GLUE GUN SPRING ADJUSTMENT**.

Remove the nozzle and repeat the test to distinguish between clogged nozzle and clogged hose filter.

DIFFERENT GLUE JET FROM EACH GUN

Ensure that the temperature settings and the nozzle size are similar for both guns.

Also may indicate the beginning of clogging.

GLUE JETS OUTSIDE THE BOX

If on both guns- check the gun photo sensor for proper location and functioning.

If on single gun- check the gun for proper closing and adjust the gun spring if necessary:

ONE OF THE GLUE GUNS HEATS UP TOO LONG

This indicates the gun heater partial failure.

Probably, one of two heating elements inside the gun is out of order.

## GLUE GUN SPRING ADJUSTMENT

Glue gun is activated pneumatically.  
It closes by the spring inside when the activation pressure is off.

Too tight spring causes activation delays or failures.  
Glue gun with severely over tensioned spring may never activate.

Too loose spring does not close the gun fast enough, which may cause residual glue jets after the proper glue pattern (including out of the box).

Glue gun with severely loosen spring may never close.

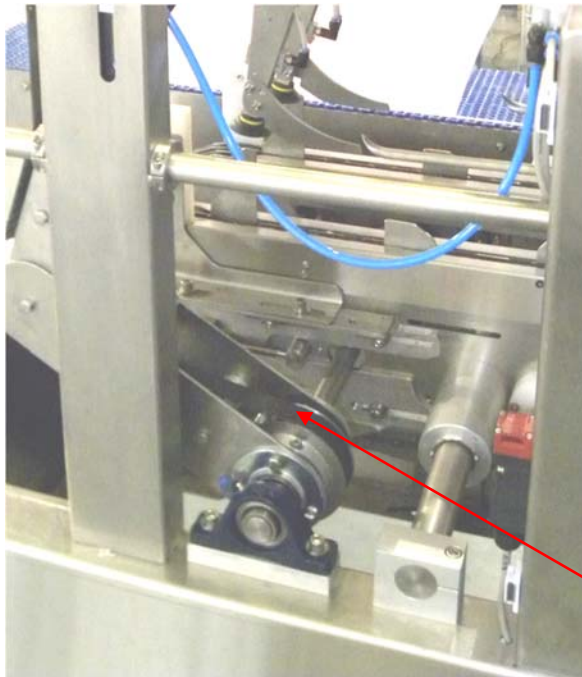
For adjusting the gun spring see Nordson/ Blue Series Pneumatic Guns/ Customer Product Manual/  
Part 1054960A / Gun Module Adjustment.



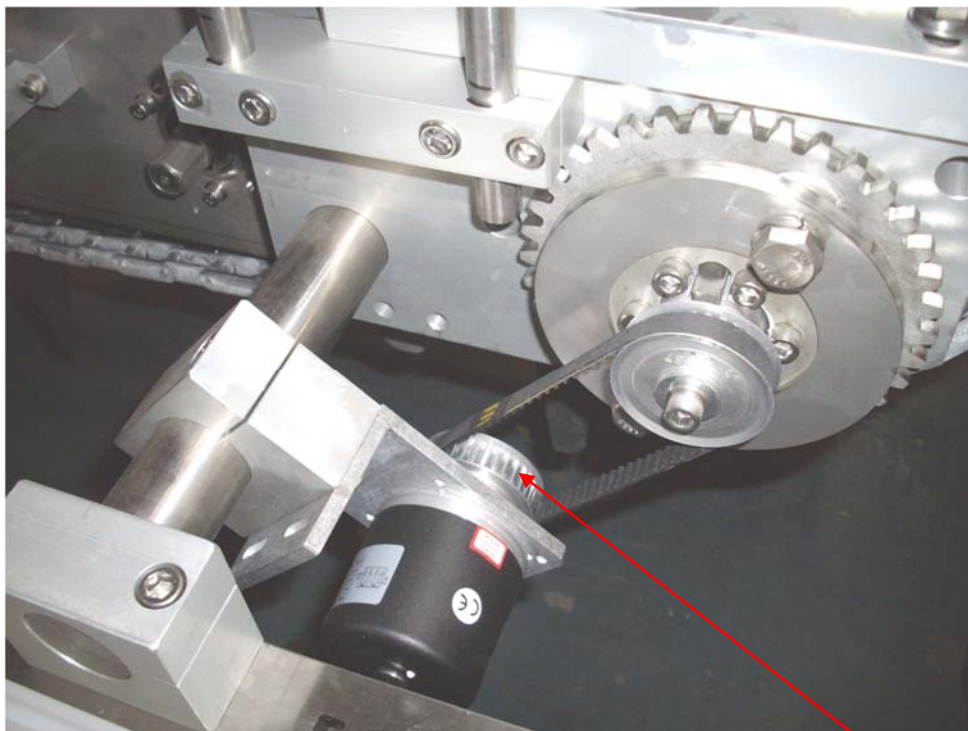
## MAINTENANCE

A scheduled periodic program of inspection, cleaning and lubrication will prevent most problems before they occur. Be alert to signs of wear or maladjustment. Keep the machine clear of dust and prevent glue buildup, which can occur if glue guns are out of alignment.

### KEEPING CHAINS TIGHT AND BELTS TIGHT



Always make sure that feeder belt is tight.



**Do not spray water flow directly on machine's and printer's encoder. (if installed)**

## RE-ESTABLISHING THE ZERO POINT OF THE MACHINE

All the Cartoner motion related timing is based on the rotary encoder reading. This includes index stop position, glue application, vacuum pickup, etc.

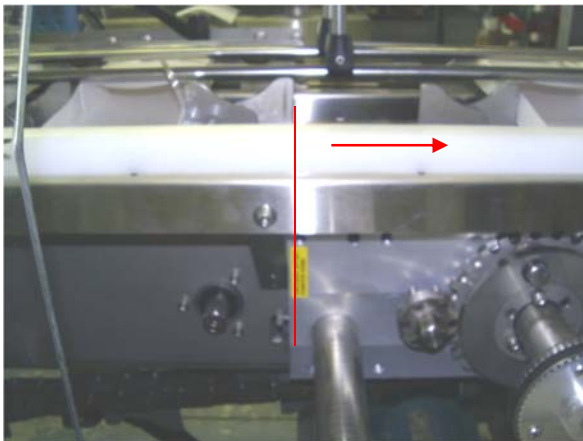
The MACHINE ZERO setting declares a certain position of the machine as zero, no matter how the encoder is installed on the machine.

All the Cartoner motion related settings are relative to the MACHINE ZERO.

If the encoder engagement with the machine is altered, only the MACHINE ZERO will need readjustment.

In order to set the MACHINE ZERO:

- Ensure that no ENCODER INVALID or ENCODER ERROR message is displayed.  
The system will not accept invalid encoder values for settings.  
The encoder value becomes valid after one full pitch cartoner movement after powering up the control cabinet.
- Slowly jog the cartoner to the following position:  
Pushing lug edge must be as shown below. The lug must line up with the edge of the conveyor drive mounting block.  
Stop as precisely as possible. Reattempt as many times as necessary.



- In the **SETTINGS/MACHINE/.../ MACHINE ZERO** menu press the **SET** button.

The machine position described above is the manufacturer standard for the MACHINE ZERO. However, the end user may choose any other specific position of the machine for this purpose.

### MACHINE ZERO FINE ADJUSTMENT

If previously correct settings are slightly out of adjustment after setting the MACHINE ZERO fine adjust the MACHINE ZERO instead of readjusting all the other settings of the machine.

Use **EARLIER** or **LATER** buttons to adjust the **MACHINE ZERO**.

Earlier/Later applies to all the actions on the cartoner, such as index stop, glue application, pickup vacuum release, etc.

Use Units per Pitch reference on the screen for adjustment value estimation.

## LUBRICATION

Most bearings are sealed and do not need to be greased.

Bearings, which have zerts, periodically lubricate by Lithium based grease of No.2 ½ or No.3 consistency.

Chains should be lubricated with a light coating of non-detergent oil (like SAE-10W).

Avoid over lubrication for the chain driving the torque limiter, since the excess oil may penetrate into the torque limiter and change its properties.

## EVERY TWO THOUSAND HOURS

Change the oil in the gearboxes as per manufacturer's specifications.

The W series gear units are listed as life-time lubricated by the manufacturer.

It is recommended to change oil after 2000 hours usage.

Standard 80/90 w gear oil to be used

## CLEANING AND WASHING

The glue residue should be removed from pushers and conveyors periodically. Do not use sharp items for cleaning. Do **not** use solvents to clean for sensors or plastic parts on the machine.

The machine is NOT washdown-proof unless directly specified as such.

Non washdown-proof machine may be wet cleaned and/or washed without water jets, but do not get water on the following parts of the machines:

- The rotary encoder body and shaft.
  - The motors.
  - Proximity of entries to the electrical enclosures, including motors, in order to avoid water penetration into the enclosures.
  - Chains and bearings, unless they are stainless.
  - Glue guns and main unit, including electrical connectors on the hoses.
- Do not use detergents, even on washdown-proof machines.

## AIR MAINTENANCE

- The supply air pressure has to be between 100 and 150 psi.
- The supply air has to be clean and dry.
- Operating air pressure is 90-100 psi.
- The air filter bowl has to be inspected regularly and collected water should be drained from it (disconnect input air first).

## GLUE MAINTENANCE

The glue manufacturer's recommendations should be followed carefully in order to insure sealing quality and trouble-free operation. Typical mistakes include glue contamination during storage or loading to the tank, overheating, maintaining glue at working temperature for no when not gluing which causes excessive glue aging resulting in reduced holding strength.

**See the Glue Application System manual for the following:**

- Glue selection.
- Operating and adjustments of the Glue Application System.
- The Glue Application System maintenance and troubleshooting.