OPERATIONS MANUAL

M-0235-3 (August 2000)

Adjustable Case Erector & Bottom Sealer

WARNING!

Before starting machine, read (as a minimum) the Safety Section and Chapters 3, 4, & 5 of this manual.
SAFETY PRECAUTIONS

Any personnel operating this R.A. Pearson R235 Adjustable Case Erector & Bottom Sealer MUST BE FAMILIAR WITH THESE SAFETY PRECAUTIONS AND CHAPTERS 3, 4 AND 5 OF THIS MANUAL.

IN CASE OF EMERGENCY, press one of the red EMERGENCY STOP push buttons to immediately stop machine operation.

It is intended that this machine be operated only by personnel trained in its use and familiar with the CONTENTS OF AND LOCATION of this manual.

ALWAYS take heed of “Warning” and “Caution” notes in this manual.

Caution! Failure to observe can cause DAMAGE TO EQUIPMENT.

WARNING! Failure to observe can cause equipment damage and/or INJURY TO PERSONNEL.

NEVER reach into the machine while it is running.

NEVER operate this or any machinery without wearing appropriate personal protective Equipment as described in OSHA 29 CFR 1910 Subpart I.

Make sure that all personnel other than the operator are AWAY FROM THE MACHINE before starting up.

REMOVABLE GUARDS are marked with yellow “Caution” labels. Always disconnect electrical power and air before removing any guards or shrouds.

Turn off and lockout the main power DISCONNECT switch prior to working on any electrical systems.

This machine is equipped with a pneumatic energy isolating valve in accordance with 29 CFR 1910.147. Turn off and lockout the main AIR SUPPLY valve prior to working on any pneumatic systems.
Always VISUALLY INSPECT the machine for loose or broken parts, and for proper cleanliness and maintenance before each start up.

Keep the R235 Adjustable Case Erector & Bottom Sealer CLEAN and properly LUBRICATED at all times.

Keep the operator area CLEAN and CLEAR of debris such as discarded cases or partitions.

Troubleshoot and correct any malfunctions IMMEDIATELY. Call R.A. Pearson Service at 800-732-7766 with any questions. DO NOT improvise repairs; R.A. Pearson assumes no responsibility or liability for any machines altered in any way or by anyone other than an authorized company representative.

When working around the higher areas of the machine, ALWAYS USE a proper step ladder or platform.

KEEP HANDS AWAY from air cylinders.

Never remove, alter, disconnect, or otherwise interfere with guard INTERLOCK switches.

Be sure COMPRESSED AIR is never blown toward any person. Compressed air should only be used when wearing appropriate protective eyewear.

Machines equipped with vacuum systems: SHUT OFF line to vacuum filter jar before using the “Blow-Back” feature.

Machines equipped with a hot glue system: Be familiar with the glue system vendor’s MANUAL as a part of this manual. Observe all vendor safety precautions. HOT GLUE BURNS! Turn off machine power before working around hot glue guns. ALWAYS expect the outside of glue guns and tanks to be hot. Make sure not to splash hot, melted glue when refilling the glue tank.
Be careful of your hands when working near springs, springs can pinch!

Relieve spring tension BEFORE adjusting cams or making any main drive adjustments.

Power off the R235 Adjustable Case Erector & Bottom Sealer before making adjustments.

On machines running at speeds less than 25 CPM there is one spring; there are 2 springs on machines running 25-35 CPM. The setup arm should be DOWN when the springs are released. Slide the spring off the spring holder to release tension. Make sure to replace the spring on the spring holder before starting up the machine, otherwise it will not function properly.

Fig. Safety-1: Setup arm extension springs
Pickoff Arm

Whenever taking the timing chain off the R235 Adjustable Case Erector & Bottom Sealer for maintenance, retiming, or any other reason, always make certain that the pickoff arm is at the 6:00 position (straight up and down) before making any adjustments. Otherwise the arm could fall over when the chain is removed and serious injury could occur. When the pickoff arm is at the 6:00 position, the actuator bar is horizontal, as seen in Fig. Safety-1.

Setup Arm

The setup arm must be all the way down before making any adjustments to the timing sequence, otherwise the arm assembly could descend suddenly and serious injury could occur. See Fig. Safety-2 Do not unhitch the setup arm extension springs (Fig. Safety-3) until after ensuring that the setup arm has been lowered.
HOW TO USE THIS ELECTRONIC MANUAL

INTRODUCTION

Welcome to the Pearson Packaging Systems Electronic Manual for the Model R235 Adjustable Case Erector & Bottom Sealer. This manual has been prepared in Adobe Acrobat portable document format (pdf); a freely distributable shareware version of Adobe’s Acrobat Reader has been included with manual to ensure that it can be used. For more information about Adobe and Adobe products, visit their internet site at http://www.adobe.com.

GENERAL NAVIGATION

The Adobe help file includes details about looking at and navigating through a pdf document; see pages 30-53 of the Acrobat Online Guide. The page forward and back buttons on the tool bar are used to scroll through the document. Briefly holding the cursor over the face of a button will bring up a box describing the button’s function. At the bottom of the Acrobat screen is a page box showing which page is currently in view and the total number of pages. Double-click in this box and type in the page number desired, then press enter, to immediately go to that page.

DOCUMENT-SPECIFIC NAVIGATION

The left-hand side of the pages of this R.A. Pearson Operations Manual shows a box that says “Return to Table of Contents.” Clicking on this text will jump to the appropriate page of the Table of Contents. Clicking on the chapter title showing in the header will initiate a jump to the first page of the chapter, and clicking on the manual number in the footer (M-0235-3) jumps to the index (if included). Green text is scattered throughout the document; clicking on these hyperlinks brings up a page related to the underlined material or goes directly to the item referenced (such as a Figure or a Table).
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<th>Description</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>approx.</td>
<td>approximately</td>
<td>max.</td>
<td>maximum</td>
</tr>
<tr>
<td>CSL</td>
<td>constant scoreline</td>
<td>min.</td>
<td>minimum</td>
</tr>
<tr>
<td>FBA</td>
<td>Fibre Box Association</td>
<td>opt.</td>
<td>optional</td>
</tr>
<tr>
<td>Fig.</td>
<td>Figure</td>
<td>para.</td>
<td>paragraph</td>
</tr>
<tr>
<td>FOLF</td>
<td>Full Overlap Flap</td>
<td>PH</td>
<td>phase</td>
</tr>
<tr>
<td>Hi-Cap Mag.</td>
<td>High Capacity Magazine</td>
<td>PMMI</td>
<td>Packaging Machinery Manufacturer’s Institute</td>
</tr>
<tr>
<td>HP</td>
<td>horsepower</td>
<td>psi</td>
<td>pounds per square inch</td>
</tr>
<tr>
<td>hr.</td>
<td>hour</td>
<td>RDC</td>
<td>Regular Slotted Case</td>
</tr>
<tr>
<td>HSC</td>
<td>Half Slotted Case</td>
<td>SCF</td>
<td>Standard Cubic Feet</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
<td>typ.</td>
<td>typical</td>
</tr>
<tr>
<td>KD</td>
<td>Knocked down</td>
<td>V</td>
<td>Volts</td>
</tr>
</tbody>
</table>
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CHAPTER 1
GENERAL INFORMATION

1.1 FOREWORD

Thank you for purchasing an R.A. Pearson. You have purchased one of the finest and most durable machines in the industry, designed to give years of smooth, trouble free operation. This manual gives direction on the installation, operation, and maintenance of the machine. Become familiar with the manual and accompanying material BEFORE beginning installation or operation.

Pay particular attention to the CAUTION and WARNING statements that appear throughout this manual. CAUTIONs and WARNINGS are included to protect both personnel and equipment. The following designations are used:

Caution! Failure to observe can cause DAMAGE TO EQUIPMENT

WARNING! Failure to observe can cause DAMAGE TO EQUIPMENT and/or INJURY TO PERSONNEL.

1.2 GENERAL INFORMATION

By convention, the infeed end of the machine is the “rear,” the discharge end is the “front.” Standing at the infeed end and looking forward at the machine in the direction of flow, the “right side” of the machine is to the operator’s right, and the “left side” to the operator’s left.

Safety considerations are taken into account during all phases of design, development, construction, and testing of R.A. Pearson machines. Potentially hazardous machine areas or parts are covered with protective guards or shrouds while other devices, such as locking pushbutton covers and interlocked guard limit switches, are used to provide further protection.

WARNING! Disconnect electrical power and air before removing any guards or shrouds or disabling any other protective device. NEVER OPERATE THE MACHINE WHEN IT IS UNPROTECTED! The R.A. Pearson Company assumes no responsibility or liability for any injury to personnel or damage to equipment if operated in such a condition.

Notice! As required by OSHA standard 29 CFR 1910.147, this machine is equipped with a pneumatic energy isolating valve. When in the exhaust position, this device isolates the equipment from the main air source and exhausts any air remaining in the machine. To prevent accidental startup while personnel are cleaning or servicing equipment, this valve should be locked or tagged-out in the exhaust position. To eliminate any uncertainty of valve status, when closed the yellow slide plate is pushed down and reads “Closed.” When up and open it reads “Open.”

Further, the R.A. Pearson Company will not be responsible for the successful operation of any of its products that have been modified in any way by anyone other than an authorized factory representative.
2.1 MODEL R235 (GLUE) CASE ERECTOR AND BOTTOM SEALER

2.1.1 Description

The Pearson Model R235 Adjustable Case Erector & Bottom Sealer is designed to erect a knocked down blank at production rates up to 35 cases per minute. Knocked down blanks are stacked on edge on the bed of the case hopper. The hopper is slave driven from the main machine and has easily accessible adjustments. Vacuum cups mounted on a translating and rotating mechanical arm grab one knocked down blank from the hopper and rotate it 90 degrees, placing it unerected directly into the set-up area with the leading edge constant. The blank is erected using vacuum in the direction of flow with a mechanical arm. Once erected, a pneumatic minor flap kicker kicks the leading minor flap closed, while the trailing minor is kicked closed with a mechanical flap kicker. The lower major flap is then plowed up with a mechanical flap folder to contain the minor flaps. The case is indexed via an upper and lower flight system into the compression station. As the case is transferred to the compression station, hot melt glue is sprayed onto the minor flaps and the major flaps are statically plowed approximately 90 degrees. The compression station has a pneumatic ram and a fixed back-up plate. The ram extends, thus compressing the flaps closed. The case at the compression station is driven out of the compression area by the upstream case. As the case exits the compression area it is tipped 90 degrees on the customer conveyor by a nonpowered tip-off. The operator’s control panel is clearly marked to make operating the machine extremely simple. Safety features include a fusible disconnect, lockable pneumatic energy isolating valve, easy-to-reach control panel, extra emergency stop buttons, and sturdy guards surrounding moving parts and chains.

Fig. 2-1: Case Set-Up Sequence, Glue Machine (R235)
## Standard Specifications
(Approximate and subject to change without notice)

### TABLE 2-1: Standard (Glue) Machine Corrugated Size Range

<table>
<thead>
<tr>
<th>KNOCKDOWN CASE SIZES (in.)</th>
<th>ERECTED CASE SIZES (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDL</td>
<td>KDW</td>
</tr>
<tr>
<td>Minimum</td>
<td>13.75” (349 mm)</td>
</tr>
<tr>
<td>Maximum</td>
<td>39.50” (1003 mm)</td>
</tr>
</tbody>
</table>

### TABLE 2-2: Utility Requirements & Standard (Glue) Machine Dimensions

<table>
<thead>
<tr>
<th>STANDARD ELECTRICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
</tr>
<tr>
<td>230/460</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPRESSED AIR CONSUMPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCF/Cycle @ 80 PSI</td>
</tr>
<tr>
<td>1.69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MACHINE FOOTPRINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
</tr>
<tr>
<td>20' 7/8” (6118 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHIPPING WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lbs.</td>
</tr>
<tr>
<td>6485</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GLUE SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot Melt</td>
</tr>
<tr>
<td>Nordson 3502 Vista with Pattern Control &amp; H201T Glue Head</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROGRAMMABLE LOGIC CONTROLLER (PLC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen-Bradley Micrologix 1000</td>
</tr>
</tbody>
</table>
2.2 MODEL R235-01 (TAPE) CASE ERECTOR AND BOTTOM SEALER

2.2.1 Description

The Pearson Model R235-01 (Tape) Case Erector & Bottom Sealer is designed to erect a knocked down blank at production rates up to 18 cases per minute. Knocked down blanks are stacked on edge on the bed of the case hopper. The hopper is slave driven from the main machine and has easily accessible adjustments. Vacuum cups mounted on a translating and rotating mechanical arm grab one knocked down blank from the hopper and rotate it 90 degrees, placing it unerected directly into the set-up area with the leading edge constant. The knocked down blank is erected using vacuum in the direction of flow with a mechanical arm. Once erected, a pneumatic minor flap kicker kicks the leading minor flap closed, while the trailing minor flap is kicked closed with a mechanical flap kicker. The lower major flap is then plowed up with a mechanical flap folder to contain the minor flaps. The case is indexed via an upper and lower flight system into the taping station. The major flaps are plowed closed and tape is applied from the large roll on the tape head. The case at the taping station is driven out of the compression area by the upstream case. As the case exits the tape station it is tipped 90 degrees onto the customer conveyor by a nonpowered tip-off. The operator's control panel is clearly marked to make operating the machine extremely simple. Safety features include a fusible disconnect, lockable pneumatic energy isolating valve, easy-to-reach control panel, extra emergency stop buttons, and sturdy guards surrounding moving parts and chains.
### Standard Specifications
(Approximate and subject to change without notice)

#### TABLE 2-3: Tape Machine Corrugated Size Range

<table>
<thead>
<tr>
<th>Knockdown Case Sizes (in.)</th>
<th>Erected Case Sizes (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KDL</strong></td>
<td><strong>KDW</strong></td>
</tr>
<tr>
<td>Minimum</td>
<td>17.25” (438 mm)</td>
</tr>
<tr>
<td>Maximum</td>
<td>39.50” (1003 mm)</td>
</tr>
</tbody>
</table>

#### TABLE 2-4: Utility Requirements & Tape Machine Dimensions

| Standard Electrical Specifications
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Phase</th>
<th>Hz</th>
<th>KVA (@ std. voltage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>230/460</td>
<td>3</td>
<td>60</td>
<td>2.42</td>
</tr>
</tbody>
</table>

| Compressed Air Consumption
<table>
<thead>
<tr>
<th>SCF/Cycle @ 80 PSI</th>
<th>m³ per cycle @ 591.2 KPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.83</td>
<td>0.024</td>
</tr>
</tbody>
</table>

| Machine Footprint
<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>13’ 67/8” (4138 mm)</td>
<td>5’ 5¼” (1657 mm)</td>
<td>6’ 4” ±6” (1930 mm ±152)</td>
</tr>
</tbody>
</table>

| Shipping Weight (with 4ft. Hopper)
<table>
<thead>
<tr>
<th>Lbs.</th>
<th>Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4620</td>
<td>2100</td>
</tr>
</tbody>
</table>

| Tape Head
| Dekka 22 |

| Programmable Logic Controller (PLC)
| Allen-Bradley Micrologix 1000 |
2.3 R235-02 (STAPLE) CASE ERECTOR AND BOTTOM SEALER

2.3.1 **Description**

The Pearson Model R235-02 (Staple) Case Erector and Bottom Sealer is designed to erect a knocked down blank at production rates up to 25 cases per minute. Knocked down blanks are stacked on edge on the bed of the case hopper. The hopper is slave driven from the main machine and has easily accessible adjustments. Vacuum cups mounted on a translating and rotating mechanical arm grab one knocked down blank from the hopper and rotate it 90 degrees, placing it unerected directly into the set-up area with the leading edge constant. The knocked down blank is placed un-erected directly into the set-up area with the leading edge constant. The blank is erected using vacuum in the direction of flow with a mechanical arm. Once erected, a pneumatic minor flap kicker kicks the leading minor flap closed, while the trailing minor flap is kicked closed with a mechanical flap kicker. The lower major flap is then plowed up with a mechanical flap folder to contain the minor flaps. The case is indexed via an upper and lower flight system to the staple gun station. The major flaps are plowed in as the case is indexed. A ram moves the case to the staple heads where staples are inserted, forming the sealed case bottom. The case at the staple gun station is driven out of the compression area by the upstream case. As the case exits the staple head station it is tipped 90 degrees onto the customer conveyor by a nonpowered tip-off. The operator's control panel is clearly marked to make operating the machine extremely simple. Safety features include a fusible disconnect, lockable pneumatic energy isolating valve, easy to reach control panel, extra emergency stop buttons, and sturdy guards surrounding moving parts and chains.

![Diagram of Case Set-Up Sequence, Staple Machine (R235-02)](image_url)

**Fig. 2-3: Case Set-Up Sequence, Staple Machine (R235-02)**
2.3.2 **Standard Specifications** *(Approximate and subject to change without notice)*

### Table 2-5: Staple Machine Corrugated Size Range

<table>
<thead>
<tr>
<th>Knockdown Case Sizes (in.)</th>
<th>Erected Case Sizes (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDL</td>
<td>KDW</td>
</tr>
<tr>
<td>Minimum</td>
<td>19.00” (483 mm)</td>
</tr>
</tbody>
</table>

### Table 2-6: Utility Requirements & Staple Machine Dimensions

<table>
<thead>
<tr>
<th><strong>Standard Electrical Specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Phase</td>
</tr>
<tr>
<td>230/460</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Compressed Air Consumption</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SCF/Cycle @ 80 PSI</td>
<td>m³ per cycle @ 551.2 KPA</td>
</tr>
<tr>
<td>1.59</td>
<td>0.045</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Machine Footprint (with 4 ft. Hopper)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>13’ 5/8” (4096 mm)</td>
<td>7’ 25/8” (2202 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Shipping Weight (with 4ft. Hopper)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lbs.</td>
<td>Kg.</td>
</tr>
<tr>
<td>4620</td>
<td>2100</td>
</tr>
</tbody>
</table>

**Programmable Logic Controller (PLC)**

Allen-Bradley Micrologix 1000
CHAPTER 3

INSTALLATION INSTRUCTIONS

3.1 HANDLING AND SHIPPING INFORMATION

3.1.1 The R.A. Pearson R235 Adjustable Case Erector & Bottom Sealer will arrive in an open crate and bolted to a skid. Before uncrating, inspect the machine to insure that no parts are damaged.

3.1.2 Uncrate carefully. If using a chain-hoist or fork-lift to remove machine from skids, insure that the chain or forks bear against main frame members only, and that they do not apply any undue pressure to other machine parts, especially electrical conduit or air plumbing.

Caution! Avoid bending or pressing on any wiring, conduit, hoses, piping, etc.

WARNING! Failure to lift properly could cause injury to personnel and/or severely damage machine.

3.1.3 A box of change parts is sometimes included in the crate with the main machine. If the machine arrived so equipped, unpack the box carefully and identify all parts. Insure that appropriate personnel are aware of the storage location of these parts so that they may be easily located when changeover is necessary.

3.2 SERVICE REQUIREMENTS AND ASSEMBLY INSTRUCTIONS

3.2.1 Position the R235 Adjustable Case Erector & Bottom Sealer in the appropriate position in the plant’s line layout. Leave ample space around the machine for operation and maintenance (removal of guards, troubleshooting, lubrication, etc.). Level the machine and bolt it down per the following instructions:

3.2.1.1 Have the following lifting equipment on hand:

1 Floor Jack - minimum 2 ton (8820 kg) (or Fork Lift Machine)
1 Bubble type Level - minimum 4 ft. (1219 mm) length

3.2.1.2 Once the Adjustable Case Erector & Bottom Sealer is in its proper location, use the floor jack or fork lift to level the machine. This can be done either one leg at a time or one section at a time.

3.2.1.3 When the machine is level, bolt it to the floor in order to prevent excessive movement during operation.

3.2.2 A protective coating is used during shipping. Wipe the machine with a clean rag to remove this coating from shafts and other bare metal parts.

3.2.3 Tighten any bolts, nuts, or other fastenings which may have vibrated loose during shipping.
3.2.4 Check all lubrication points (see Table 6-3) and lubricate as necessary. **DO NOT** overfill.

3.2.5 Certain machine parts may have been removed or added for shipping only. If this is the case, they will be appropriately tagged. Following any tagged instructions, replace or remove such items as directed.

3.2.6 **Hookups**

3.2.6.1 **Compressed Air:** Using a 3/4” NPT air line, connect plant air to the machine (see Figure 3-1, 3-2, or 3-3, depending on machine style).

**Notice!** As required by OSHA standard 29 CFR 1910.147, this machine is equipped with a pneumatic energy isolating valve. This device isolates the equipment from the main air source and exhausts any air remaining in the machine. To prevent accidental startup while personnel are cleaning or servicing equipment, this valve should be locked- or tagged-out in the exhaust position. To eliminate any uncertainty of valve status, when closed the yellow slide plate is pushed down and reads “Closed.” When up and open it reads “Open.”

3.2.6.2 **Electrical:** Connect plant power to machine at the main electrical control panel (see Figure 3-1, 3-2, or 3-3, depending on machine style).

**WARNING!** **DO NOT** turn the machine on at this time. Make certain all guards, shrouds, and other protective devices are in place before proceeding.

---

**Fig. 3-1: Utility Hook-ups—Glue Machine (R235)**
3.2.7 **Lockout Procedures**

3.2.7.1 **Air:** Slide the air supply valve to the “Closed” position to release air pressure from machine. Use an approved form to tag the machine “Locked Out.”

3.2.7.2 **Power:** Turn off machine power at the electrical disconnect located on the main panel. Using an approved form, tag the machine “Locked Out.”

### 3.3 TESTS AND CHECKS

3.3.1 Check to insure that any drive chains are tight enough. Tension if required.

3.3.2 Inspect the entire machine to see if any parts were obviously damaged during shipment. If so, advise the carrier and the R.A. Pearson Company at 800-732-7766.

**WARNING!** Read the Safety sheet and Chapters 4, 5, and 6 of this manual before turning on power or air, and insure that all personnel are clear of the machine before start-up.

3.3.3 Turn on both air and power. Referring to Chapter 5 for proper description and instructions, test each machine function.

**Caution!** Perform motor rotation check (see below) before running the R235 Adjustable Case Erector & Bottom Sealer.

---

*Fig. 3-2: Utility Hook-ups—Tape Machine (R235-01)*
3.3.4 To check rotation of conveyor motors, turn on “Cycle Start/Stop.” If the conveyor turns in the wrong direction, change two of the three motor leads at the motor overload fuses.

**NOTE:** If all the motors are running in the wrong direction, change two of the three leads at the main disconnect switch. If less than half of the motors on the machine are running in the wrong direction, it is simpler to change the individual motor leads at the motor overload fuses.

**WARNING!** Turn off main power before making any changes/adjustments to the machine.

---

**Fig. 3-3: Utility Hook-ups—Staple Machine (R235-02)**
CHAPTER 4

SET-UP AND CHANGEOVER PROCEDURES

The R235 Adjustable Case Erector & Bottom Sealer is an adjustable machine designed to run a range of case sizes and styles. Adjustments are made using quick adjust handles or bolts; scales and pointers have been added to most of the adjustments to facilitate changeover. The steps to initially set up your machine or change over to a different size/style of case are outlined in the paragraphs that follow. Before proceeding with any adjustment prescribed, take the following precautions:

**WARNING!** Read Chapter 5 and Chapter 6 of this manual before turning on power. Turn off power (main disconnect switch) before making any electrical adjustments. Turn off air and power before removing any guards, shrouds, or protective devices. NEVER OPERATE MACHINE UNPROTECTED! The R.A. Pearson Company assumes no responsibility or liability for any injury to personnel or damage to equipment if run unprotected.

**Notice!** As required by OSHA standards, this machine is equipped with a pneumatic energy isolating valve. This device isolates the equipment from the main air source and exhausts any air remaining in the machine when placed in the “exhaust” position. To prevent accidental start ups while personnel are cleaning or servicing the equipment, this valve should be locked out or labeled with a warning tag when in the “exhaust” position. To eliminate any uncertainty of valve status, when closed the yellow slide plate is pushed down and reads “Closed.” When up and open it reads “Open.”

4.1 CHANGE PARTS

*NOTE:* All change parts are optional, depending on the case sizes the machine is intended to run. Not all change parts are provided with all machines.

4.1.1 **Mandrel:** The machine may be provided either with fixed mandrels for each case size, or with a mandrel that is adjustable for a specified range of dimensions. Different mandrels have different ranges in size. See the Floor Plan drawing sent as an attachment to the manual to see which, if any, additional mandrels were provided with the machine.

<table>
<thead>
<tr>
<th>DWG. (Part #)</th>
<th>Mandrel Size</th>
<th>Length (In/(mm))</th>
<th>Width (In/(mm))</th>
<th>Open Depth (In/(mm))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td>C23859 4</td>
<td>#0</td>
<td>9.50 (241)</td>
<td>10.50 (267)</td>
<td>6.00 (152)</td>
</tr>
<tr>
<td>C23859 3</td>
<td>#1</td>
<td>10.00 (254)</td>
<td>14.00 (356)</td>
<td>8.00 (203)</td>
</tr>
<tr>
<td>C23819 5</td>
<td>#2</td>
<td>12.50 (318)</td>
<td>18.50 (470)</td>
<td>9.50 (241)</td>
</tr>
<tr>
<td>C23859 1</td>
<td>#3</td>
<td>17.50 (445)</td>
<td>23.00 (584)</td>
<td>11.50 (292)</td>
</tr>
<tr>
<td>C24064 8</td>
<td>#4</td>
<td>18.00 (457)</td>
<td>23.50 (597)</td>
<td>8.00 (203)</td>
</tr>
<tr>
<td>C24150 1</td>
<td>#6</td>
<td>13.50 (343)</td>
<td>19.50 (495)</td>
<td>6.00 (152)</td>
</tr>
<tr>
<td>C23818 4</td>
<td>#15</td>
<td>9.50 (241)</td>
<td>13.50 (343)</td>
<td>6.00 (152)</td>
</tr>
</tbody>
</table>
4.1.2 **Lower Flap Guide Rails:** The case support rails need to be changed out depending on which case size is being run. The rails are Pearson Parts #C261888R (3.25"), C261878R (1"), and E261893 (5"). Each guide rail is marked with its part number.

4.1.3 **Extended Case Vacuum Cup Manifold and Bracket:** While these parts do not change, they are used only for certain cases and need to be moved/deactivated when running other case sizes. The vacuum cup bracket is Pearson Part #B261926R and the manifold is Part #B261931R. These parts are only installed on machines designed to run extended case sizes. The individual case Adjustment Scale Settings sheet will indicate if these parts need to be used.

4.1.4 **Upper Flap Support:** The Adjustment Scale Setting sheets provided with the machine indicate which case sizes/styles require the use of Pearson Part #D261937R, the upper flap support.

4.1.5 **Flight Lug Paddle:** Pearson Part #C261938R is a change part provided for when running the largest case sizes.

4.1.6 **Bottom Blank Stripper:** This stripper, Pearson Parts #B208578 (stripper) and B261940 (block) are only used for certain cases and can be added or removed as indicated in the Adjustment Scale Setting sheets.

### 4.2 SET-UP AND CHANGEOVER ADJUSTMENTS

**WARNING!** Never make routine adjustments while the machine is running.

The adjustment section of this Chapter 4 has been divided into five sections; each section corresponds to a section of the machine.

Most adjustments on the machine are indicated with numbers and attached scales and pointers to indicate the appropriate settings. The Adjustment Scale Setting sheets at the end of this chapter list adjustments and adjustment numbers for each case and the proper scale settings. The scale settings correspond to a dimension on the case which is affected; that dimension is shown in parentheses after the adjustment name. For example, the “Overhead Hold Back” adjustment in the hopper section reflects the knocked-down blank length (“KDL”). The scale setting should be...
be the same as the KDL dimension of the case. There may be slight variances due to fine tuning and adjustment, but the basic case dimensions still apply.

4.2.1 **Hopper Section Adjustments**

4.2.1.1 **Overhead Hold Back** (KDL): Place a flat KD blank in the hopper. If the blank is larger than the last case run it may be necessary to back out the hopper side guides or raise the overhead blank hold back for the blank to fit into the hopper. Place the blank on the hopper deck with the manufacturer’s joint facing out (towards the vacuum cups) and the shortest panel closest to the hopper deck. See Figure 4-1 for proper orientation. To adjust the “overhead hold back,” locate the quick adjust handle in the hopper section. Loosen the adjusting handle and raise or lower the overhead hold back until the pointer on the assembly points to the KDL dimension on the scale mounted alongside. Once the correct scale setting is obtained, tighten the adjusting handle to lock the overhead in place.

4.2.1.2 **Hopper Side Guides**

**Long & Short**: To simplify the hopper loading process, the hopper side guides, which control the blanks in the hopper, are different sizes. The short side guide is located on the hopper load side for ease in refilling the hopper bed with new blanks. The long side guide is located on the opposite side to support the whole length of a board in the hopper. The load side may be on either the right or the left side of the machine.
**Fold Line Constant:** The *fold line constant* is a line that runs the length of the machine from the hopper to the compression section. It represents the bottom of the formed case and always remains constant. The constant may be located on either the right or left, depending on machine hand. The fold line constant is always on the same side as the Main Operator’s Station. Many of the adjustments are referenced from this “line.” There is one scale and pointer used to adjust the hopper side guides. It is *always* located on the fold line constant side of the machine.

4.2.1.2.1 **Fold Line Constant Side Guide** (Flap): The fold line constant side guide is located on the fold line constant side of the machine (same side as the Main Operator’s Station). It supports the side of the KD blank as it rests in the hopper. Changes in the flap width dimension on the case affect this guide. The score line of the bottom flap should align with the fold line constant. A scale and pointer are provided. The scale setting should correspond to the flap width dimension of the case.

4.2.1.2.2 **Open Depth Side Guide** (Open Depth): The Open Depth Side Guide is located on the opposite side of the hopper from the fold line constant side guide and supports that side of the KD blank as it rests on the hopper. Changes on the open depth dimension of the case affect this guide. Once the fold line constant side guide is adjusted for the flap dimension, adjust the open depth side guide, moving the guide until it is next to the blank. Allow a slight amount of clearance (1/16”-1/8”). This adjustment should correspond to the Open Depth dimension of the case.

**NOTE:**

The Pickoff Hopper Advance ("Pickoff Hopper Low") and Load Hopper Advance ("Load Hopper Full") photocells are located on the lower end of the blank side guide (which is not shown in this drawing). For clarity in this drawing the photocells are not shown in their exact location.

**Fig. 4-4: Functioning of Hopper Advance Photocells**
4.2.1.3 **Hopper Advance Photocells**

See Fig. 4-4 for photoeye set-up. The *pick-off hopper advance cylinder* advances every cycle of the machine once the “Cycle Start/Stop” button is pressed and will advance on pullout of a blank. The load hopper advance cylinder will advance when both photocells (“Pick off Hopper Low” & “Load Hopper Full”) do not detect blank. When either photocell detects a blank, the load hopper advance is shut down.

Photocells shoot at angles to each other, crossing beams at 4” (102 mm) to 5” (127 mm) from the corners of the blanks. The “Pick-Off Hopper Low” photoeye shoots at the single blank (rear corner). When the photoeye is not made, blanks are fed from the load hopper advance drive (cylinder). Approximately 8 blanks are released during the load hopper advance, depending on the speed requirements of the machine. Those released blanks block the “Load Hopper Full” photocell, causing the shutdown of the load hopper advance cylinder. Blanks are then ratcheted forward by the pick-off hopper advance cylinder. The “Pick-Off Hopper Low” photoeye detects the blanks about 1/2 way through the gap created between the angled and vertical blanks. When the “Pick-Off Hopper Low” photoeye detects the blanks it shuts down the load hopper advance. As the machine picks off blanks the cycle of the hopper repeats. Make sure the photocells are located to appropriately judge the presence of blanks. If the photoeyes need to be moved, loosen the attachment bolts and place them in an appropriate location. Make sure bolts are sufficiently tight so that machine vibration does not cause the photoeyes to shift.

4.2.1.4 **Vacuum Pick-Off Arm**: The Vacuum Pick-Off Arm is driven by the main machine drive system. As long as the main machine is running the Pick-Off Arm will actuate. Vacuum is controlled by the “Cycle Start/Stop” button and the machine’s PLC program. The timing for the pick-off arm is very straightforward (see Timing Addendum to this manual). When the board is dropped off the vacuum cups make sure the flights are far enough forward that the blank does not land on them. The Timing Addendum explains how to make minor adjustments if they are found to be necessary (although it is not expected).

4.2.1.5 **Pick-Off Vacuum Cups (No Scale)**: If required, adjust placement of the vacuum cups on the body of the blank. First, position the hopper carriage as far towards the blanks in the hopper as possible (push by hand). Next, loosen the clamp bolts and move the vacuum cups until they are 3”-6” from the edges of the blank. Do not position the cups over any holes in the blanks and avoid positioning the cups over any score lines (although this is sometimes necessary to get reliable operation). Except on narrow blanks, avoid positioning the cups together in the middle of the blank; reliability is better with the cups as widely separated as possible. Retighten the clamps, making sure that the face of each cup is vertical.
4.2.1.6 **Bottom Blank Stripper (If applicable; No Scale, Flap Width):** Using the attachment bolts, remove this part when the scale setting sheets indicate that the bottom stripper is not used.

4.2.2 **Case Set Up Section**

4.2.2.1 **Open Depth Rail (Depth/KDW):** The Open Depth Rail runs the length of the machine and is always located on the same side as the compression ram. It guides the case as it travels through the machine. The guide is adjusted for the open depth of the case by loosening the quick adjust handle located at the discharge end of the machine.

4.2.2.2 **Ram Up- or Downstream (Length):** The quick adjust handle used to adjust the ram up- or downstream is located underneath the base of the ram. The ram is adjusted up or downstream depending on the length of the case.

4.2.2.3 **Mandrel Wings (Length):** Once the ram has been adjusted up or downstream it is necessary to adjust the mandrel wings for the inside length of the case. Four flat head socket screws mount each wing. Scales are located on the top edge of each wing. Adjust accordingly.

4.2.2.4 **Mandrel:** Depending on customer preference the mandrel can be a change part with a fixed mandrel for each size case. If that is the situation, replace the current mandrel with the change part that matches the case being run. To change the mandrel, simply loosen and remove the four attachment bolts (two at each end). Remove the mandrel and replace with the appropriate part. Make sure the bolts are tightened snugly.

4.2.2.5 **Extended Case Vacuum Cup Manifold and Bracket (No Scale, Width):** When not in use (as indicated on the Adjustment Scale Setting sheet), use the two thumb knobs to lower the vacuum cup assembly as far as it will go. Tighten the knobs to keep the assembly in place. Then, turn off the valve at the manifold in order to lock air in and keep the vacuum cup held down. If it is necessary to use this vacuum cup, turn the valve on, then raise the bracket into position.

4.2.2.6 **Flight Lug Paddle (No Scale, Length):** The lower flight lug with the paddle helps keep extended size cases square as they are moving through the . If the Adjustment Scale Setting sheet indicates that it is necessary to use the flight lug with the paddle, simply loosen the two bolts on the side of the installed lug to remove it. The lug with paddle then attaches in the same manner.

4.2.2.7 **Fold Line Constant Rail (Flap):** The fold line constant rail is located on the opposite side from the compression ram. Changes in the flap width dimension of the case affect this guide. The scoreline of the bottom flap should align with the fold line constant. There are two adjustment handles, each with its own scale. One is located at each end of the guide. The scale setting should correspond to the flap width dimension of the case.
4.2.2 **Trailing Minor Kicker (Length):** The trailing minor kicker is located at the pick-up arm. The kicker folds the trailing minor flap in preparation for gluing. The kicker must be adjusted for the length of the case minus one flap length. To adjust, loosen the one adjusting handle and slide the kicker up- or downstream to the appropriate scale setting. Retighten the handle.

4.2.2.9 **Lower Case Support on Fold Line Constant Rail (Width):** This support should be positioned at the upstream side of the bottom major flap. The support is slotted and has two attachment bolts. Loosen the bolts and slide the support to the appropriate location. Retighten the bolts.

4.2.2.10 **Pick-Up Arm (Width):** The pick-up arm erects the case and must be adjusted for the width of the case. Loosen the two quick adjust handles and slide the arm up or down to the correct measurement on the scale. Be sure to retighten the handles.

**NOTE:** When vacuum is released there should be approximately 1/8" clearance between the flap and the vacuum cup to reduce cup damage.

4.2.2.11 **Upper Flap Support (Length):** Using the bolts provided, mount the upper flap support to the long adjusting rail when its use is necessary (noted on the Adjustment Scale Setting sheet). Make sure to put the shim between the support and the rail in back, and place the plate on the front of the support between the support and the bolt heads.

4.2.2.12 **Overhead Flight Assembly (Width):** The overhead flight assembly engages the case at the case set-up area. The flight lugs keep the case erected and square while transferring the case through the remainder of the machine. The overhead should be adjusted to the case width. Use the adjusting wrench located on top of the machine to raise or lower the overhead flights to the correct scale setting.

4.2.3 **Sealing Section—Model R235 (Glue) Machine**

4.2.3.1 **Hot Melt Glue Head (Width):** The glue head is adjusted in accordance with the width of the case. Turn the hand wheel to move the glue head up or down. A scale with a pointer is located beside the glue head. When properly adjusted, the glue nozzle should be located in the center of the erected case.

**WARNING!** Use caution around glue guns! Temperature of hot melt glue exceeds 300°F and can burn!

4.2.3.2 **Cold Glue Head (Option; Width):** Combined Hot and Cold Glue is an optional feature of the R235 Adjustable Case Erector & Bottom Sealer. The cold glue heads are tied into the mounting for the hot glue head and thus they are adjusted when the hot glue head is adjusted. No separate adjustment is necessary.
4.2.3.3 **Glue Pattern** (Length/Flap): The glue pattern is controlled by an electronic glue pattern controller located on the hot melt glue stand. The glue pattern is adjusted for the length of the case and the width of the flap. Two settings are given on the adjustment chart; the first is for the duration (length) of glue application, and the second is for the duration (length) of skip (pause) between glue applications. If the glue application were for the entire length of the flap, then the skip would be eliminated. There are two dials on the glue pattern controller. One is for the pattern and the other for the skip. The manufacturer’s manual for the glue pattern controller has been included with this manual. Refer to it for more detailed instructions on the glue pattern controller.

4.2.4 **Sealing Section—Model R235-01 (Tape) Machine**

Regardless of what tape head is installed on the machine, there are three adjustments for the tape head that should be checked. Refer to the tape head manufacturer’s guide (included as an attachment to this manual) for specific instructions for any additional adjustments.

4.2.4.1 **Tape Head** (Depth): The tape head is mounted to the machine in slotted mounts. This allows adjustment of the tape head closer or farther away from the bottom of the case. The tape head should be set so that the inside edge of the tape head (the side closest to the case) is 1/16” to 1/8” off of the fold line constant (or from the bottom of the case, which should be the same). If the tape head is too far back the minor flaps will not be closed all the way. If the tape head is too far in the case will drag on the tape head. If the tape head is set to the fold line constant and the minor flaps do not close all the way, check and readjust the **main rail** rather than the tape head.

4.2.4.2 **Tape Head** (Width): Turn the crank handle on the adjusting screw next to the tape head to adjust the head to the proper case width scale setting.

4.2.4.3 **Tape Tracking**: Each tape head manufacturer’s instructions provide information on tape tracking. It is important that this be set properly; refer to the attached manufacturer’s guide for specific instructions.

4.2.5 **Sealing Section—Model R235-02 (Staple) Machine**

Regardless of which staple heads are installed on the machine, there are two adjustments for the staple heads that need to be checked. Refer to the staple head manufacturer’s guide (included as an attachment to this manual) for specific instructions for any additional adjustments.

4.2.5.1 **Staple Head Height** (Width): The staple heads are attached to a flat mounting block (male) which slides into a channeled mounting post (female). Spacer blocks are supplied to properly space the staple heads. With two staple heads stacked one on top of the other, the center point between the two heads should be located at the center of the case. Add or remove the spacer blocks to raise or lower the heads to be properly centered on the case. The distance between
the centers of the staple heads should never change, so do not put a spacer between the heads.

4.2.5.2 **Staple Head Length** (Length): The upstream staple heads are constant. The downstream staple heads are mounted on a plate with a milled slot for adjusting up- or downstream on the machine frame. The staple head fires twice, placing staples 3/4" and 2" from the edge of the case. Quick adjust handles lock the plate in place. A scale corresponding to the case length is mounted on the staple head carriage. Loosen the quick adjust handles and slide the plate upstream or downstream until the pointer is on the case length measurement on the scale. Retighten the quick adjust handles.

**WARNING!** If using the Stanley Bostitch D60ADC Coil Fed Pneumatic Carton Closer, disconnect air supply to prevent accidental firing before making adjustments, when servicing tool, when clearing jams, when tool is not in use, and when moving to a different work area. Do not use oxygen or combustible gases as a power source for this tool or air supply sources which can potentially exceed 200 psi (14.14 kg/cm²) as the tool may explode.

4.2.6 **Compression Section**

4.2.6.1 **Lower Flap Guide Rails**: The Adjustment Scale Settings sheets included with this manual indicate which lower flap guide rail to use when one is necessary. Each guide rail has two thumb knobs which attach it to the R235 Adjustable Case Erector & Bottom Sealer. Make sure the knobs are fully tightened.

4.2.6.2 **Compression Back Stop** (Flap): For flap lengths of 2.50" (64 mm) to 5.00" (127 mm) set the backstop at 2.00" (51 mm) compression offset (off the constant fold line). For flap lengths 5.00" (127 mm) to 8.00" (203 mm) set the backstop and case stripper for 3.50" (89 mm) compression offset (off the constant fold line). There should be approximately 1/16" clearance between mandrel face and backstop when ram is fully extended.

*NOTE: If the compression backstop is moved the compression ram stroke will need to be adjusted accordingly.*

4.2.7 **Case Tip Off Section**

The Case Tip Off Section of the machine takes the case as it is pushed out of the erecting area and tips the case 90° to fall in an upright position on a discharge conveyor that runs beneath the tip off.

4.2.7.1 **Tip Off Back Stop** (Length): As the case is discharged it travels out on a tip off guide. The Tip-Off Bars support the side of the case until just before it reaches the Tip Off Back Stop. When the case reaches the back stop it is past the end of the tip off bars and with nothing supporting it on one side the case tips over and falls through to the discharge conveyor below. The Tip Off Back Stop should be adjusted for the length of the case. Loosen the adjusting handle and slide the back stop to the appropriate position. Be sure to retighten the adjusting handle.
4.2.7.2 **Tip-Off Guide** (Length): The Tip Off Guide supports the side of the case as the case is pushed out of the machine. The guide should be adjusted so that it supports the case past the flights. When the case is almost to the tip off stop, the trailing edge of the case should go past the end of the tip off bar, allowing it to roll out and drop onto the conveyor. Adjust by loosening the quick adjust handles and positioning the guide properly. Retighten the adjusting handles.

4.2.7.3 **Tip Up Discharge** (*Option*) The tip up discharge differs from the standard tip off discharge in that the case is “tipped up” by plows to land on its bottom on a plate at the discharge height of the machine. The discharge conveyor will run at the end of the plate or slightly under it.

4.2.7.3.1 The **Tip Up Plow** is mounted to the main rail. It moves in and out from the center of the machine when the rail is adjusted. It also has two quick adjust handles to allow adjustment for the length of the case. To set the tip up plow, loosen the quick adjust handles and place an erected case at the discharge of the machine. Make sure the case is far enough forward to be completely free of the flight chains. At this point adjust the plow so the beginning of the curve of the plow is at the leading edge of the case. Retighten the handles.

4.2.7.3.2 The **Tip Up Guide** is angled to catch the case as it is tipped over and to allow the case to slide down until it rests flatly on the discharge plate. The plate can be angled to help the case begin the slide down the guide. This adjustment is not precise; using the two bolts that mount the guide, adjust it until the case will tip over onto its bottom side smoothly.

### 4.3 OPTIONAL CASE STYLE ADJUSTMENTS

4.3.1 **RSC Case with Integral Divider**

Shock Stops: If running an RSC case ("Regular Slotted Case") with integral divider or a very short length case, it is necessary to adjust the shock stop to short stroke the mandrel cylinder. Extend the mandrel until it hits the back up plate. Next adjust the shock stop (square block in front of the shock absorber). Using a 5/16" Allen wrench, adjust the shock stop until the shock absorber is in the retracted position.

**WARNING!** Be sure air is locked out before attempting to adjust shock stops.
Fig. 4-6: Tip Up Discharge Plow

Fig. 4-7: Tip Up Discharge Guide

Fig. 4-8: Tip Up Discharge—Plow & Guide
4.3.2 **AFM Case**

To run an AFM case ("All Flaps Meet") through the machine requires that an additional flap rail be attached to the main adjustment rail. This part does not need adjustment after it has been attached. In addition to the AFM flap rail, a cylinder mounted vacuum cup is attached to the vacuum pick-off arm. The hopper pick-off advance signals the cylinder to actuate. This vacuum cup engages the minor flap and lifts it as the case blank is set up in the flights. This lift enables the minor flap to clear the funnel end of the above flap rail that has been attached to the main rail. A quick adjust handle clamping the cylinder assembly to the vacuum cup shaft allows adjustment to the middle of the flap.

**Fig. 4-9: AFM Case Flap Channel**

**Fig. 4-10: View of Pickoff Arm with AFM Vacuum Cup**

**Fig. 4-11: Top View of Pick Off Arm with AFM Vacuum Cup**
4.3.3 **FOL Case**

Running FOL cases ("Full Overlap Flap") requires an additional part, a slightly different flap folding sequence, and an adjustment change.

4.3.3.1 The lower vacuum cups are moved to the center flight rail assembly.

4.3.3.2 A lower major flap kicker cylinder is added. It is mounted vertically between the two minor flap kickers and requires no additional adjustments. The lower major flap is folded up by a cylinder actuated flap kicker that has been added to the machine. Then the leading minor flap is kicked closed (std. sequence). Once it is folded closed, the minor flap will hold the major flap, allowing the lower major flap kicker to retract. When the lower major flap kicker is retracted the trailing minor flap will be kicked closed (std. sequence). The minor flaps will then be sealed (std. sequence) and the top major flap will be plowed closed as the case advanced to the compression area (std. sequence).

![Flap Folding Sequence for FOL Case](image)

**Fig. 4-12: Flap Folding Sequence for FOL Case**

4.3.3.3 For FOL cases the sealing heads should be adjusted all the way down on the mounting bracket.
Normal position for lower vacuum cups

Vacuum cups are now located here for FOL case

Lower major flap kicker is located between minor flap kickers

**Fig. 4-13: Additions to Machine for FOL Case**
4.3.4 **Small Case**

With additional change parts, mandrel and flap kickers, it is possible to run a case that is below the minimum standard case size. See Figs. 4-14, 4-15, and 4-16.

4.3.4.1 The mandrel needs to be set back approximately 5" from the mounting of the regular mandrel. A second set of mounting holes has been provided.

4.3.4.2 The standard flap kickers should be replaced with the small case flap kickers.

---

**Fig. 4-14: Small Case Mandrel**

**Fig. 4-15: Small Case Flap Kickers**

**Fig. 4-16: Regular Case Flap Kickers**
4.3.5 **POL Case**

To run a POL case ("Partial Overlap Flap") can be added to the Model R235 (Glue) or Model R235-02 (Staple) machines. It requires some additional parts, changeover procedures, and control buttons.

4.3.5.1 **Partial Overlap Hold-Down Rollers**: Located in the compression area, these rollers hold the top flap further inside the case than the bottom flap. This is so that when the compression ram compresses the two major flaps the bottom flap will overlap the top flap. See Figs. 4-17 thru 4-19. There is no adjustment other than enabling the rollers when running POL cases. The rollers are disabled by sliding a flat piece of sheet metal behind the compression plate and compressing the roller springs so that the rollers remain behind the compression plate. To **enable** the rollers, remove the plate and let it hang from the short chain which attaches it to the Adjustable Case Erector & Bottom Sealer.

**Caution!** Make sure the rollers do not run through the glue bead applied to major flap. Readjust the glue head if that situation occurs.
4.3.5.2 **Partial Overlap Flap Plow**: The normal flap plow is replaced by a different plow that will work with both RSC and POL cases. This flap plow adjusts exactly like the other plow, except that the POL plow allows the operator to adjust the top major flap slightly lower than the standard flap plow.

---

**Fig. 4-21: POL Flap Plow**
4.3.5.3 **Additional Glue Head** *(R235 [Glue] Only)*: In addition to the regular glue head, another glue head is added for the POL option. This glue head applies a continuous bead of glue on the top major flap approximately 3/4" in from the edge of the flap. When setting up for the POL case, erect a case in the flights and jog the case to the sealing section. Adjust the glue head assembly in; raise and angle the glue head it until the glue bead is applied in the correct position.

4.3.5.4 **1 Glue Head/2 Glue Head Selector Switch**: Two position selector switch allows the operator to select the extra glue head when running the POL case and shutting off that glue head when running the RSC case.

4.3.5.5 **Loading**: When running the POL case it is critical that the case blanks be loaded properly into the hopper. POL blanks should be loaded with the manufacturer’s joint facing the vacuum cups and the long panel on top of the short panel.
4.3.6 **Extended Range Machine Small Case Option**

Some extended range ("wide") machines are supplied with a small case option. To make the changeover for that case, the following procedures must be observed:

4.3.6.1 **Change Parts**

Change parts for the small case option are the Upper and Lower Flap Plows, the Open Depth Rail, and the Vacuum Cup Plug. See Table 4-1 for a listing of change part numbers.

<table>
<thead>
<tr>
<th>PART/PART #</th>
<th>LARGE CASE</th>
<th>SMALL CASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER FLAP PLOW</td>
<td>B261781L</td>
<td>B247110L</td>
</tr>
<tr>
<td>LOWER FLAP PLOW</td>
<td>B261785L</td>
<td>B243954L</td>
</tr>
<tr>
<td>OPEN DEPTH FILLER RAIL</td>
<td>N/A</td>
<td>B262876L (tall)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B262877L (short)</td>
</tr>
<tr>
<td>VACUUM CUP PLUG</td>
<td>N/A</td>
<td>A094875 (Plug, 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A102046 (Coupling)</td>
</tr>
</tbody>
</table>

Table 4-1: Extended Range Small Case Change Parts

4.3.6.2 **Adjustments**

4.3.6.2.1 **Upper Flap Plow**: The Upper Flap Plow assembly is attached to the machine by means of two bolts on the top of the assembly. Remove these bolts to replace the plow with the proper size for the small case (see Table 4-1 for part numbers). Make sure to snugly retighten the bolts when affixing the appropriate plow. See Fig. 4-24.

4.3.6.2.2 **Lower Flap Plow**: To change out the lower flap plow, remove the two bolts on the plow section of the assembly. Replace the plow with that for the small case size (see Table 4-1 for part numbers) and replace the bolts. See Fig. 4-24.

4.3.6.2.3 **Open Depth Filler Rails**: The open depth filler rails (tall for infeed end and short for discharge end) need to be installed when running the small cases. Each rail has two flathead screws on the left side for attachment to the preexisting rail. Make sure screws are snug. See Fig. 4-25.

4.3.6.2.4 **Vacuum Cup Plug**: The far right vacuum cup (when looking into the machine from the infeed end) needs to be blocked off using the cup plug provided. Remove the vacuum hose from the mount behind the cup, and place one of the black plug sections on the hose. Place the other plug section (Attached to the coupling) on the cup mount where the hose was removed. If the center cup needs to be moved, adjust as described in para. 4.2.1.5 (Fig. 4-25).
4.3.6.2.5 **Minor Flap Kickers:**
Both the leading and trailing minor flap kickers need to be adjusted for the small case size. Loosen the two bolts in each of the clamp mounts holding on the plows and slide each plow to the proper marking ("’S’ = small size and L’ = large size). Retighten bolts. See para. 4.2.2.8.

4.3.6.2.6 **Trailing Flap Kicker Mount:** The trailing flap kicker mount needs to be rotated to the appropriate mark scribed into the mount. Loosen the two bolts, turn the mount as necessary (to “S” or “L”), and retighten the bolts.

---

**Fig. 4-24: Open Depth Filler Rail & Vacuum Cup Plug**

**Fig. 4-25: Flap Plow Adjustments**

**Fig. 4-26: Trailing Flap Kicker Mount**
The R235 (any model - glue, tape, or staple) can be provided with two hoppers rather than just the standard one. With the dual hopper option it is possible to run two different boards simultaneously, or to load both hoppers with the same board and replenish the hoppers less frequently than with just one. The following changes to the manual take effect when a machine with the dual hopper option is being run:

**I.1 GENERAL INFORMATION**

No Changes

**I.2 MACHINE DESCRIPTION AND SPECIFICATIONS**

**I.2.1** The Pearson Model R235 Dual Hopper Adjustable Case Erector & Bottom Sealer is designed to erect knocked down blanks at production rates up to 35 cases per minute. Knocked down blanks are stacked on edge on the bed of the case hoppers. The hoppers are motor driven and have easily accessible adjustments. Vacuum cups mounted on a translating and rotating mechanical arm grab one knocked down blank from a hopper and rotate it 90 degrees, placing it unerected directly into the set-up area with the leading edge constant. A selector switch is used to determine whether blanks are picked from alternating hoppers, or if a customer internal pick pattern will be used. At any time the Adjustable Case Erector & Bottom Sealer can pick from either one or both of the hoppers. The blank is erected using vacuum and a mechanical arm. Once erected,
flaps are closed. As the case is transferred to the compression station it is sealed closed (glued, taped or stapled). As the case exits the compression area it is tipped 90 degrees onto the customer conveyor. The operator’s control panel is clearly marked to make operating the machine extremely simple. Safety features include a fusible disconnect, lockable pneumatic energy isolating valve, easy-to-reach control panel, extra emergency stop buttons, and sturdy guards surrounding moving parts and chains.

I.2.2 See paragraph 2.4 for customer specific machine specifications.

1.3 INSTALLATION INSTRUCTIONS

No Changes

1.4 SET-UP AND CHANGEOVER PROCEDURES

1.4.1 Hopper Side Guides (para. 4.2.1.2)

Each of the hoppers is equipped with a crank nut to adjust the side guide width, and a scale and pointer is placed above the crank nut to ensure proper hopper setting (see Fig. Option I-2). Hopper #1 is the upstream hopper, and Hopper #2 is downstream. The crank nuts are located between the two hoppers, below deck level. Using the ratchet provided, turn each crank nut until its pointer is set to the appropriate number on the scale.

Fig. Option I-2: Hopper Side Guide Adjustment
I.4.2 **Open Depth Rail** (para. 4.2.2.1)

The open depth rails of the transition section must line up with those of the case set-up section. See Fig. Option I-3. This adjustment is located where the transition section meets the set-up section. A quick adjust handle, a scale, and a pointer are located on each side of the machine. Loosen the kip handles on the toothed rail and move both rails in or out as necessary to set the pointers to the proper spot on the scales. Be certain to retighten the quick adjust handles.

![Quick adjust handle, scale, and pointer](image)

**Fig. Option I-3: Open Depth Rail**

### I.5 OPERATING PROCEDURES

I.5.1 **Control Panel** (see Fig. Option I-4)

I.5.1.1 **Pickoff Arm Hopper #1 Jog** or **Pickoff Arm Hopper #2 Jog**: Two momentary push-buttons located on the operator station (top or side) that allow the operator to jog the machine forward, starting from either Hopper #1 (upstream) or Hopper #2 (downstream), for set-up and changeover purposes. The speed of the machine when in the jog mode is slower than the normal operating speed of the machine. As soon the the button is released the
machine will stop. The machine must be E-Stopped before the jog push-button can be used.

I.5.1.2 **Hopper Operation Auto/Manual:** This selector switch allows the operator to choose “Auto,” which is a program from the customers’ ethernet loaded directly into the PLC, or “Manual,” which is set at the machine.

I.5.1.3 **Hopper Select 1/Both/2:** When the Hopper Operation switch is set to “Manual”, this selector switch is used to determine if all board should be picked from Hopper #1 (upstream), if it should be picked alternately from both hoppers, or from Hopper #2 (downstream).

I.5.1.4 **Hopper #1 Count or Hopper #2 Count (Optional):** These selector switches, if installed, are used to determine the pickoff pattern other than alternating when using the Hopper Operation switch set to manual. The number selected on each switch shows the number of boards pulled from that hopper before the pickoff changes to the other hopper.

I.5.2 **Photoeyes and Proximity Switches**

I.5.2.1 **Load Hopper Full (or Low) Hopper #2:** An additional photoeye, the same as “Load Hopper Full (or Low)” in para. 5.1.2.1.

I.5.2.2 **Pickoff Hopper Low (or Full) Hopper #2:** An additional photoeye, the same as “Pickoff Hopper Low (or Full)” in para. 5.1.2.2.

I.5.2.3 **Board at Pickoff Hopper #1/Board at Pickoff Hopper #2:** When these photoeyes are blocked, they indicate that a board has been picked out of a hopper and placed on the flights. They work in conjunction with the “Case in Flights” photoeyes. In addition, “Board at Pickoff Hopper #2” will “see” if a board from Hopper #1 has been placed in the flights and will not pickoff if one has.

I.5.2.4 **Case in Flights Hopper #2:** An additional photoeye, the same as “Case in Flights” in para. 5.1.2.5.

I.5.3 **Illuminated Stack Beacon**

The illuminated stack beacon has four lamps, red, blue, amber, and green. The beacon indicates the conditions listed in Table Option I-1.
I.6 MACHINE MAINTENANCE REQUIREMENTS

No Changes

I.7 TROUBLESHOOTING GUIDES

No Changes

I.8 PARTS REPLACEMENT

No Changes

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**TABLE Option I-1: Machine Jams**

<table>
<thead>
<tr>
<th>COLOR</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Solid</td>
<td>See Table 5-1</td>
</tr>
<tr>
<td>Red Flash</td>
<td>See Table 5-1</td>
</tr>
<tr>
<td>Blue Solid</td>
<td>Tape Low Level</td>
</tr>
<tr>
<td>Blue Flash</td>
<td>Tape Low Jam (left at low level too long)</td>
</tr>
<tr>
<td>Amber Solid</td>
<td>Either hopper low level</td>
</tr>
<tr>
<td>Amber Flash</td>
<td>Cycle stop after hopper low level too long</td>
</tr>
<tr>
<td>Green Solid</td>
<td>Machine running</td>
</tr>
</tbody>
</table>

COLOR INDICATION
CHAPTER 5

OPERATING PROCEDURES

5.1 MACHINE CONTROLS

5.1.1 Control Panel

For a diagram of the control panel, identification of lamps, switches, and their operation and function, see the Electrical Schematic included in the packet of drawings sent with this manual. An extra copy can be found in the main electrical panel of the machine.

**WARNING!** In emergencies, depress any of the large red mushroom push buttons on the machine to immediately cease all operation and dump air off the machine.

**WARNING!** Disconnect main power before making any electrical re-adjustments.

**Notice!** As required by OSHA standards this machine is equipped with a pneumatic energy isolating valve. This device when in the exhaust position, isolates the equipment from the main air source as well as exhausting any air remaining in the machine. To prevent accidental start-ups while personnel are cleaning or servicing equipment, this valve, when in the exhaust position, may be locked or labeled with a warning tag. To eliminate any uncertainty of valve status, when closed the yellow slide plate is pushed down and reads “Closed.” When up and open it reads “Open.”

5.1.1.1 Control Power On: Green lamp lights to indicate power to PLC, inputs and outputs being read. Power on to master control circuit.

5.1.1.2 Cycle Start: Cycle Start push-button starts the machine when pushed. The green lamp in the push-button will illuminate when the machine is in the “Start” mode.

5.1.1.3 Cycle Stop: When the “Cycle Stop” push-button is pressed, the machine will cycle twice with the vacuum off before coming to a complete stop. This will complete any cases in progress.

5.1.1.4 Emergency Stop: A maintained “Push/Pull” mushroom-head push-button that cuts all operating power to machine and dumps the air when depressed. This push-button must be pulled back out before the machine can be restarted.

5.1.1.5 Machine Jam: A red lamp that illuminates in the operator station when the machine has jammed. If the electronic kick-out clutch has released the machine jam light will flash red. Electrical power is cut and air pressure is dumped from the machine. To restart the machine, press the “Cycle Start” push-button and the jam lamp will go dark.

5.1.1.6 Case Speed Low/High (Option): If this selector switch is present on the machine, it is used to change from one speed to another, based on the size of the case being run.
5.1.7 Jog: A momentary push-button located on the operator station (top or side) that allows operator to jog machine forward for set-up and changeover purposes. The speed of the machine when in the jog mode is slower than the normal operating speed of the machine. As soon the the button is released the machine will stop. The machine must be E-Stopped before the jog push-button can be used.

5.1.8 Tape Supply Low/No Tape Rotation (Tape Machine Option): An amber lamp that illuminates on the operator station when the tape roll gets low. After the light comes on, a predetermined count of cases starts. When that count finishes the machine will shut down and the operator will need to change the tape roll.

5.1.2 Photoeyes and Proximity Switches

NOTE: The photoeye and prox switch numbers (PE1, PE2, PRS1, etc.) may change for each machine [see electrical schematic], but the description remains the same.

5.1.2.1 Load Hopper Full (or Low): This photoeye works in conjunction with “Pickoff Hopper Low (or Full)”. When one or both photoeyes do not detect a KD case, the load chain advances until one or the other of the photoeyes is made.

5.1.2.2 Pickoff Hopper Low (or Full): This photoeye works in conjunction with “Load Hopper Full (or Low)”. When one or both photoeyes do not detect a KD case, the load chain advances until one or the other of the photoeyes is made.

5.1.2.3 Case Setup Detect: When this photoeye is blocked, it indicates that the case has been setup. If the eye is not blocked at the correct time it will cause a “case failed to setup jam.” See the section on “Jam Circuits” later in this Chapter.

5.1.2.4 Case Entering Mandrel or Case Entering Tape: When this photoeye is blocked, it tells the machine that a case is entering the compression area or tape application area (depending on machine type). If it is blocked for too long, a “case at mandrel jam” or “case at tape jam” will occur. See the section on “Jam Circuits” later in this Chapter.

5.1.2.5 Case in Flights: When this photoeye is blocked, it indicates that a board has been picked out of the hopper and placed on the flights. If the photoeye is not blocked for two entire machine cycles, a “failed to pickoff jam” will occur. If it is made too long, it will cause a “case in flights” jam. See the section on “Jam Circuits” later in this Chapter.

5.1.2.6 Discharge High Level (Option): When this photoeye is blocked, it indicates that the downstream conveyor is full, and tells the machine to stop making cases (cycle stop). After the photoeye has been cleared the machine will automatically resume operation.

5.1.2.7 Open Flap Detect (Tape Machine Option): This photoeye detects if a flap is open after the case has passed the tape head. When the photoeye detects an open flap, the machine will be cycle stopped.
5.1.2.8 **Flight Sync**: When this proximity switch is actuated by the flight lug, the PLC resets to “0” and begins a new internal machine timing cycle.

5.1.2.9 **Case at Glue** *(Glue Option)*: When this proximity switch is made, the machine recognizes that a case is in front of the glue head and it is appropriate for the glue pattern to begin.

5.1.2.10 **Tape Roll Motion Detect** *(Tape Machine Option)*: This proximity switch monitors a hole on the tape roll mount that rotates as the tape rolls. If the hole is not detected with each update of the flight sync a machine jam will occur. A lamp in the control panel (see 2.1.1.7 above) or the illuminated stack beacon (if so equipped) will light.

5.1.2.11 **Tape Roll Low Level** *(Tape Machine Option)*: This photoeye is placed so that it registers if the tape level is low. If the level is low, a lamp in the control panel (see 2.1.1.7 above) or the illuminated stack beacon (if so equipped) will light.

### 5.2 SEQUENCE OF EVENTS

#### 5.2.1 **Glue Machine (R235) Configuration**

5.2.1.1 Load the High Capacity Magazine with flat blanks following the machine loading instructions of Section 5.4, later in this chapter.

5.2.1.2 Follow the Start Up Procedures of Section 5.5, later in this chapter.

5.2.1.3 Upon pressing the “Cycle Start” push-button the motors will start, the flight chains will rotate, and the rotating vacuum pick off arm will extend and retract. The machine will cycle a pre-determined number of times (usually twice) before the vacuum generators will start creating vacuum at the vacuum cups. The primary hopper advance cylinder will start advancing blanks on the hopper deck immediately upon start up, and will advance when the pick off arm advances to grab a blank (see Chapter 4, para. 4.2.1.3, for description of hopper advance photocells and their operation).

5.2.1.4 As the KD board is advanced to the end of the hopper, the vacuum pickoff arm advances to the board. The vacuum generators are turned on and the vacuum cups mounted on the rotating mechanical arm engage one knocked down blank from the hopper and rotate it 90 degrees, laying it flat on the main machine flights.

5.2.1.5 The knocked down blank is indexed to the set up station where the top and bottom vacuum cups engage the blank. The mechanical set up arm retracts in the direction of flow, pulling the case erect. The leading edge is constant.

5.2.1.6 After the case is erected a pneumatic minor flap kicker kicks the leading minor flap closed while the trailing minor flap is kicked closed with a mechanical kicker.
5.2.1.7 Once the minor flaps are closed, a mechanical major flap lifter folds the bottom major flap up to approximately 45 degrees. This allows the bottom major flap to contain the minors as the case is indexed away from the set up area.

5.2.1.8 An upper and lower flight system indexes the case forward to the compression station.

5.2.1.9 As the case is transferred to the compression station, hot melt adhesive is applied to the minor flaps (in accordance with the pattern programmed into the glue system) and the major flaps are plowed to approximately 60 degrees.

5.2.1.10 The compression station has a pneumatic compression ram and a fixed back-up plate. The ram extends and compresses the flaps closed. After compression the erected and sealed case is driven from the compression area by the following case.

5.2.1.11 As the case exits the compression area it is tipped 90 degrees onto the customer's conveyor by a non-powered tip off.

5.2.1.12 The cycle repeats.

5.2.2 **Tape Machine (R235-01) Configuration**

5.2.2.1 Load the High Capacity Magazine with flat blanks following the machine loading instructions of Section 5.4, later in this chapter.

5.2.2.2 Follow the Start Up Procedures of Section 5.5, later in this chapter.

5.2.2.3 Upon pressing the “Cycle Start” push-button the motors will start, the flight chains will rotate, and the rotating vacuum pick off arm will extend and retract. The machine will cycle a pre-determined number of times (usually twice) before the vacuum generators will start creating vacuum at the vacuum cups. The primary hopper advance cylinder will start advancing blanks on the hopper deck immediately upon start up, and will advance when the pick off arm advances to grab a blank (see Chapter 4, para. 4.2.1.3, for description of hopper advance photocells and their operation).

5.2.2.4 As the KD board is advanced to the end of the hopper, the vacuum pickoff arm advances to the board. The vacuum generators are turned on and the vacuum cups mounted on the rotating mechanical arm engage one knocked down blank from the hopper and rotate it 90 degrees, laying it flat on the main machine flights.

5.2.2.5 The knocked down blank is indexed to the set up station where the top and bottom vacuum cups engage the blank. The mechanical set up arm retracts in the direction of flow, pulling the case erect. The leading edge is constant.

5.2.2.6 After the case is erected a pneumatic minor flap kicker kicks the leading minor flap closed while the trailing minor flap is kicked closed with a mechanical kicker.
5.2.2.7 Once the minor flaps are closed, a mechanical major flap lifter folds the bottom major flap up to approximately 45 degrees. This allows the bottom major flap to contain the minors as the case is indexed away from the set up area.

5.2.2.8 An upper and lower flight system indexes the case forward until it is in front of the tape head.

5.2.2.9 As the case is transferred forward the leading edge of the case hits the front wipe down roller, applying the tape to the end of the case. Tape is applied along the flap seam as the case travels past the tape head. The tape is cut when the trailing end of the case drops off the rear wipe down roller.

5.2.2.10 The case continues to be moved through the machine by the flight lugs until it reaches the non-powered tip off.

5.2.2.11 The case is tipped 90 degrees onto the customer’s conveyor by the non-powered tip off.

5.2.2.12 The cycle repeats.

5.2.3 Staple Machine (R235-02) Configuration

5.2.3.1 Load the High Capacity Magazine with flat blanks following the machine loading instructions of Section 5.4, later in this chapter.

5.2.3.2 Follow the Start Up Procedures of Section 5.5, later in this chapter.

5.2.3.3 Upon pressing the “Cycle Start” push-button the motors will start, the flight chains will rotate, and the rotating vacuum pick off arm will extend and retract. The machine will cycle a pre-determined number of times (usually twice) before the vacuum generators will start creating vacuum at the vacuum cups. The primary hopper advance cylinder will start advancing blanks on the hopper deck immediately upon start up, and will advance when the pick off arm advances to grab a blank (see Chapter 4, para. 4.2.1.3, for description of hopper advance photocells and their operation).

5.2.3.4 As the KD board is advanced to the end of the hopper, the vacuum pickoff arm advances to the board. The vacuum generators are turned on and the vacuum cups mounted on the rotating mechanical arm engage one knocked down blank from the hopper and rotate it 90 degrees, laying it flat on the main machine flights.

5.2.3.5 The knocked down blank is indexed to the set up station where the top and bottom vacuum cups engage the blank. The mechanical set up arm retracts in the direction of flow, pulling the case erect. The leading edge is constant.

5.2.3.6 After the case is erected a pneumatic minor flap kicker kicks the leading minor flap closed while the trailing minor flap is kicked closed with a mechanical kicker.
5.2.3.7 Once the minor flaps are closed, a mechanical major flap lifter folds the bottom major flap up to approximately 45 degrees. This allows the bottom major flap to contain the minors as the case moves away from the set up area.

5.2.3.8 An upper and lower flight system indexes the case forward until it is in front of the staple heads.

5.2.3.9 As the case advances the leading edge of the case blocks the “Case Entering Mandrel” photocell enabling the staple heads.

5.2.3.10 The staple head carriage is in its deenergized, upstream position. As the flights position the case in front of the mandrel, the mandrel extends. A proximity switch mounted next to the mandrel detects when the mandrel is extended and causes the staple heads to fire.

5.2.3.11 The staple head carriage shuttle valve is energized, shifting the carriage downstream, where the staple heads fire the second set of staples. The shuttle valve is then deenergized, shifting the carriage back to the upstream position where the mandrel retracts and the case is pushed out of the staple station by the following case.

5.2.3.12 The case continues to be moved through the machine by the flight lugs until it reaches the non-powered tip off.

5.2.3.13 The case is tipped 90 degrees onto the customer’s conveyor by the non-powered tip off.

5.2.3.14 The cycle repeats.

5.3 GAUGES AND INDICATORS

5.3.1 Air

5.3.1.1 Set the Main Air Regulator at 80 psi.

5.3.1.2 Set the Glue Tank Air Regulator (if applicable) at 40 psi.

5.3.2 Hot Melt Glue (option)

Set the hot melt glue unit internal temperature as indicated in the unit’s manual provided as an attachment to this machine manual.

5.4 MACHINE LOADING PROCEDURES

Load knocked down blanks in the hopper with the bottom flaps toward the adhesive side of the machine (glue gun, tape head, or staple heads) and the end panel of the case at the hopper deck. The manufacturer’s joint should be facing towards the vacuum cups. Load the blanks so the first group of blanks (approx. 8) are vertical between the blank stripper clips. Allow the rest of the blanks to rest at an angle against the first vertical blanks. This gap created between the angled blanks and the vertical blanks is necessary for the functioning of the two blank detect photocells.
The chain in the hopper bed will advance the blanks as the photocells detect blanks are needed. Those blanks angled will become vertical as they are advanced to the pick-off point.

NOTE: The machine will not cycle with insufficient blanks in the high-capacity magazine. Keep the hopper filled past the “Hopper Low” limit switch (a “minimum inventory” is required in the high-capacity magazine for reliable operation).

5.5 STARTUP PROCEDURES

5.5.1 Before startup of the machine, be sure to perform the initial setup instructions of Chapter 4.

WARNING! Insure all guards, shrouds, and other protective devices are in place before turning on power. NEVER OPERATE MACHINE UNPROTECTED! Be certain all operators wear appropriate protective gear. Pearson Packaging Systems assumes no responsibility for any injury to personnel or damage to equipment.

WARNING! Insure all personnel are clear of machine before turning on power or air.

Caution! Check gear reducer’s oil reservoir to insure proper level of lubricant. DO NOT overfill (See Table 6-3).

5.5.2 Turn on the main safety “Disconnect” switch.

5.5.3 Turn on the external air source (air will not pass the “dump” valve until the “Cycle Start/Stop” push-button is depressed).

5.5.4 Make sure adhesive systems are loaded with supplies:

5.5.4.1 On glue machines (R235), allow the hot melt glue system to come up to temperature. Check the level of glue and the temperature. Make sure that the glue is flowing freely.

5.5.4.2 On tape machines (R235-01) check tape supply on tape head.

5.5.4.3 On staple machines (R235-02) check the staple supply in the staple heads.

5.5.5 Pull out all red mushroom Emergency Stop buttons.

5.5.6 Momentarily depress the “Cycle Start/Stop” push-button to bring power to master control relay and subordinate control circuit, and to allow air pressure to machine components.

5.5.7 Wait briefly (approximately 3-4 seconds) for the “smooth start” valve to slowly build air pressure to the system, then set the air regulators to the appropriate pressure (see Section 5.3). The motors will start, the flight chains will rotate, and the pick off arm will extend and retract.

NOTE: The machine will cycle a pre-determined number of times (usually twice) before the vacuum pump will start. The machine will function automatically from this point on as necessary conditions are met. (See section 5.2 for a sequence of operation events.)
5.5.8 Push “Cycle Start/Stop” push-button again in order to start the machine cycle.

5.5.9 Observe the operation and output of product; make any necessary adjustments according to the Setup Procedures outlined in Chapter 4.

**WARNING!** Insure both power and air are off before making any adjustments.

### 5.6 PERFORMANCE CHECKS

5.6.1 Insure that blanks are properly loaded in the hopper. Remove badly deformed blanks or those out of tolerance with specifications.

5.6.2 Insure reliable stripping of blanks from hopper.

5.6.3 Make certain adhesive system is operating properly:

5.6.3.1 On glue machines (R235), insure the hot-melt is properly heated and flowing freely. Also make certain that glue guns and nozzles are clear and properly applying necessary glue in the correct patterns.

5.6.3.2 On tape machines (R235-01), insure that the tape head is applying tape to the case properly and along its entire length.

5.6.3.3 On staple machines (R235-02), insure that the staple heads are stapling the case through the mandrel notches and in the proper locations on the erected cases. Insure that the staple head carriage is shifting properly.

5.6.4 Insure all limit switch and photocells are correctly adjusted and functioning properly.

### 5.7 OPERATOR ADJUSTMENTS

5.7.1 Normal changeover and adjustments are listed in Section 4.2, and can be done by the machine operator. Machine performance adjustments, however, should be done **ONLY** by knowledgeable personnel.

5.7.2 Production speed adjustments can be fine-tuned by adjusting flow control valves and air pressures to change the operating speed of machine. These adjustments should be done by knowledgeable personnel **ONLY**. The main air setting is described in paragraph 5.3.1.1.

### 5.8 MACHINE JAMS

5.8.1 **Machine Lockout Procedures**

When a jam situation occurs in the machine, the machine should automatically shut down, and the air pressure to the machine is dumped. To insure the safety of the operator, push in any one of the Emergency Stop push-buttons. Use the overhead flight assembly adjustment to move any jammed blanks or cases through the Adjustable Case Erector & Bottom Sealer. Lockout the machine electrical disconnect switch and lockout the air supply valve in accor-
dance with the following instructions before attempting to clear out a jam. Once the jam is cleared, remove the lockouts and follow the start-up procedures of Section 5.5.

5.8.1 Air Lockout

Turn the air supply valve to “Exhaust” to release air pressure from machine. Use an approved form to tag the machine “Locked Out.” Explicit Lockout/Tagout instructions can be found in OSHA 29 CFR 1910.147(d)(4), “Lockout or tagout device application.”

5.8.1.2 Power Lockout

Turn off machine power at the electrical disconnect located on the main panel. Using an approved form, tag the machine “Locked Out.” Explicit Lockout/Tagout instructions can be found in OSHA 29 CFR 1910.147(d)(4), “Lockout or tagout device application.”

5.8.2 Jam Circuits in Machine

The machine will jam or receive a jam signal under various conditions. Table 5-1 lists the jam names, their causes, and remedies for the jam situation.

5.8.2.1 Two Failed Pickoffs: This jam occurs when a board is not picked out of the hopper after two repeated tries by the pickoff arm. If the vacuum manifold arm fails to pull a blank from the hopper on the first try it will not jam but try a second time. If it fails on the second try the machine will jam.

5.8.2.2 Overcurrent (Kickout): The current of the kickout clutch has exceeded the preset allowed. This can be caused by the motor starting to stall (product jammed).

5.8.2.3 Failed to Set-Up: This jam occurs when the “Case Set-up Detect” photo eye does not detect a case being set-up.

5.8.2.4 Case at Mandrel (glue and staple machines) or Case at Tape (tape machines): This jam occurs if the “Case Entering Mandrel” or “Case Entering Tape” photoeye is blocked at a particular point in the flight cycle when it shouldn’t be. The machine will jam and shut down.

5.8.2.5 Case in Flights (Option—Model 225 only): This jam is not applicable to Adjustable Case Erector & Bottom Sealer Models R235, R235-01, and R235-02.

5.8.2.6 Flight Time Out: The flights has a set amount of time (predetermined) to make one revolution for updating of the flight proximity switch. If the flights do not update within that set amount of time the machine will jam.

5.8.2.7 Tape Fail to Apply or Fail to Cut (Option—tape machines only): Jam occurs when a photocell detects that the tape is not being applied or the tape has not been cut.
5.8.3 Jam Recovery

5.8.3.1 If the machine jams (other than the electronic kick-out clutch) while blanks are halfway between stations (not in center of station), then all the blanks in-process will need to be cleared out. If the machine jams and the blanks are in the middle of a station, the machine should recover by removing only the jammed blank.

5.8.3.2 When a jam situation occurs in the machine, the machine should automatically shut down (electrical power is cut). To avoid possible injury to operator, push in any one of the Emergency Stop push-buttons, lockout the machine electrical disconnect switch and the air supply valve (see Section 5.3.1.1) before attempting to clear out a jam. Once the jam is cleared, remove the lockouts and follow the startup procedures of Section 5.5.

5.9 Shutdown and Restart Procedures

5.9.1 Emergency Shutdown

5.9.1.1 Momentarily depress any one of the “Emergency Stop” red mushroom pushbuttons. All operating power is immediately cut and the air is “dumped” (all operating lamps go out). Suddenly stopping the machine in this manner will not damage the equipment. All emergency stops are “maintained” stops and must be pulled out before power to machine will resume. However, when the machine is shutdown in this manner there may be cases inside the machine. Pull the Emergency Stop out and clear the cases from the machine.

WARNING! Insure all personnel are clear of machine before restarting.

5.9.1.2 To Restart, INSURE ALL PERSONNEL ARE CLEAR! Momentarily depress “Cycle Start/Stop” push-button to begin machine sequence. All operating lamps will again light. If the main disconnect has been turned off it may be necessary to clear any cases in process before restarting the machine.

### Table 5-1: Machine Jams

<table>
<thead>
<tr>
<th>FLASHERS SOLID</th>
<th>JAM INDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Two Failed Pickoffs</td>
</tr>
<tr>
<td>1</td>
<td>Overcurrent (Kickout)</td>
</tr>
<tr>
<td>2</td>
<td>Failed to Set-Up</td>
</tr>
<tr>
<td>3</td>
<td>Case at Tape or Mandrel Jam</td>
</tr>
<tr>
<td>4</td>
<td>Case in Flights Jam - Model R225 Only.</td>
</tr>
<tr>
<td>5</td>
<td>Flight Time-out</td>
</tr>
<tr>
<td>6</td>
<td>Tape Fail to Apply or Fail to Cut (Optional)</td>
</tr>
</tbody>
</table>
5.9.2  Temporary Short Shutdown

5.9.2.1 Press “Cycle Start/Stop” push-button. Machine will clear cases in process before stopping motors. Power will not be cut. Lamps will go out.

**WARNING! Insure all personnel are clear before restarting.**

5.9.2.2 To restart, INSURE ALL PERSONNEL ARE CLEAR! Push “Cycle Start/Stop” push-button again. All operating lamps again light.

5.9.3  Short Shutdown (e.g., Lunch Break)

5.9.3.1 Push “Cycle Start/Stop” push-button to complete cycle in process before shutting down. Power will not be cut. Operating lamps go out.

5.9.3.2 Depress any “Emergency Stop” push-button to cut power and air.

**WARNING! Insure all personnel are clear before restarting.**

5.9.3.3 To restart, INSURE ALL PERSONNEL ARE CLEAR! Pull out E-Stop previously depressed.

5.9.3.4 Momentarily depress “Machine Start/Stop” push-button (wait briefly for air pressure to reestablish). Push “Cycle Start/Stop” push-button (all operating lamps again light).

5.9.4  Extended Shutdown (e.g., Overnight)

5.9.4.1 Push “Cycle Start/Stop” push-button to complete cycle in process before shutting down. Operating lamps will go out.

5.9.4.2 Depress any “Emergency Stop” push-button to cut power and air.

5.9.4.3 Turn off main “Disconnect” switch to cut all power and air.

5.9.4.4 Turn off main air control (optional).

**WARNING! Insure all personnel are clear before restarting.**

5.9.4.5 To restart, INSURE ALL PERSONNEL ARE CLEAR! Turn on main air control (optional). Turn on main “Disconnect” and momentarily depress “Cycle Start” push-button to begin machine sequence (all operating lamps again light). If main disconnect has been turned off it may be necessary to clear any cases in process before restarting the machine.

5.9.5  Storage Shutdown

5.9.5.1 Push “Cycle Start/Stop” push-button to complete cycle in process before shutting down.

5.9.5.2 Depress any “Emergency Stop” push-button to cut power and air.
5.9.5.3 Turn off main “Disconnect” switch to cut all power and air.

5.9.5.4 Turn off main air control.

5.9.5.5 Clean and lubricate machine thoroughly.

5.9.5.6 Take tension off belts and chains.

5.9.5.7 Coat all unpainted metal surfaces with some type of protective anti-corrosion substance.

5.9.5.8 Keep machine dry. If practical, cover machine with a tarp or shroud.

5.9.5.9 To restart, **INSURE ALL PERSONNEL ARE CLEAR**! Follow the procedures of Chapters 3 and 4 and Section 5.5.

### 5.10 CLEANING REQUIREMENTS AND PRECAUTIONS

5.10.1 Next to regular lubrication, the most important item of preventive maintenance is **REGULAR CLEANING**! Keep your machine clean for longer, safer trouble-free operation. Keep dust out of the motors, chains, springs, and other key working parts. Routinely use compressed air to blow dust from the machine.

**WARNING!** **Insure personnel are clear of machine and wear proper eye protection! Never turn blower hose directly upon skin.**

5.10.2 Regularly wipe off dirt, dust, and excess grease and oil.

**Caution!** **Never hose-down or steam-clean this machine, as water and/or steam will harm electrical parts.**

5.10.3 Keep the operator’s area free of debris or discarded cases and partitions.

### 5.11 SPECIAL TIPS

5.11.1 Refer to the electrical schematic enclosed both with this manual and in the main electrical enclosure of the machine itself for a diagram of the locations of key photoeyes and proximity switches.

5.11.2 Periodically check all bushings, roll pins, and set screws on shafts and clevises and tighten or replace as necessary.

5.11.3 Check tension on drive chains and belts after initial eight hours of operation and tighten idler sprockets/pulleys as necessary. Continue to check every 24 hours of operation.

**Caution!** **Do not over-tension flight chains.**

5.11.4 As a general rule, never paint any surface that comes in contact with a moving case, tray, partition or carrier (paint causes drag).
5.11.5 Dust photoeyes and reflectors often. Some types of photoeyes used function by detecting visible light beams and may be affected by direct external light. Flash bulbs, movie strobe lights, or direct sunlight may trigger these photoeyes causing machine to malfunction.

5.11.6 Always insure positive transfer of moving case or bottles from one area to another; allow adequate clearances and avoid any protuberance which might interfere (bolt, nut, edge of plate, etc.).

5.11.7 Push buttons provide convenient manual overrides for key features for ease in clearing jams and trouble-shooting (solenoid valves also contain recessed manual override operators).

**WARNING!** Exercise extreme caution when using manual override features. Parts could move unexpectedly. Insure all personnel are clear of machine.

5.11.8 Periodically check vacuum cups and hoses to insure that they are not cracked and leaking.

5.11.9 Keep an adequate supply of spare parts on hand (See Chapter 8) and inform appropriate personnel where such parts are stored.

5.11.10 Do not let the glue tank get too low—the glue could “char.” If the tank runs completely out of glue, there will be a time delay to preheat new glue before operation can be resumed.

5.11.11 Periodically check oiler/lubricators and keep filled to proper level. Periodically check air line filters and drain excess moisture and sediment from the bowl.
CHAPTER 6

MACHINE MAINTENANCE REQUIREMENTS

6.1 INSPECTION AND CLEANING

Routine inspection and cleaning of your machine is mandatory if you wish to keep it operating satisfactorily and to enhance safety. (See Section 5.10). Additional excellent recommended practices are included in the pamphlet extracted here, “General Notes on Care and Maintenance of Automatic Packaging Machinery and on Storage and Handling of Empty Corrugated Fibreboard Boxes,” PMMI and Fibre Box Association (May 1976).

* * * Extract * * *

Part I

GENERAL NOTES ON CARE AND MAINTENANCE OF AUTOMATIC PACKAGING MACHINERY

A. General

1. Above all else, be certain that all those directly concerned with maintenance, adjustment and/or operation of the machines carefully read and fully understand the instruction manual supplied by the manufacturer.

B. Lubrication

1. If possible, appoint a single individual to have accountability for the proper machine lubrication.

2. The proper and timely lubrication of the machine and drives is fundamental to proper operation. Follow carefully the manufacturer’s recommendations.

3. Excess or spilled lubricants should be wiped up to preclude possible product or package contamination. Over-lubrication of a machine, its drives and other components is hazardous and is to be avoided.

C. Variable Speed Controls

1. All variable speed motor controls, flow controls, shock absorbers, etc., should be checked periodically for proper setting. Such devices are subject to “creep” due to vibration or drift in electrical components.

D. Pneumatic Systems

1. Check operating air pressure frequently for correct setting. Excessive or low pressure may affect machine timing and cylinder life by changing flow control action.

2. Keep moisture traps drained and free of excessive condensate accumulations.

3. Lubricators should be maintained at the proper fill level and their feed rates adjusted for adequate but not excessive oil supply to the system. Check for water in oil reservoir; drain and replace oil if necessary.

4. Check machine frequently for air leaks and correct them immediately when found.
5. Foreign materials removed from an air supply by the filter will eventually restrict the air flow. The filter element inside the transparent bowl of the air-line filter should be removed once a month, cleaned, and inspected in accordance with the manufacturer's recommendations. Whenever moisture or other substances appear in the bowl, open the bleed valve while the air pressure is on and permit these contaminants to be blown out.

6. Regulators are equipped with a screen filter to prevent abrasive solids, such as rust, sand and pipe scale, from reaching the valve. Clean this screen regularly for best performance of the regulator. The frequency of cleaning will depend upon the condition of the air supply. Most screens can be removed by removing the valve guide plug at the bottom of the regulator.

E. Chains

1. Chains must be kept under tension sufficient to maintain timed motions, to prevent a snapping effect upon starting or when going from a light to a heavy load condition, and to prevent the jumping of sprocket teeth under a normal load condition. A chain that is too tight produces an erratic motion. Correct tension is dependent upon the loading of the chain. Since a chain must be neither too tight nor too loose, the best guide is experience. While gaining the experience, a workable rule of thumb is to establish a chain sag equivalent to 2% of the center distance. Check sprockets for proper alignment.

F. Electrical Power Supply

1. Power to machines should be checked for proper voltage and frequency, particularly during voltage cut-backs such as “brown-outs”.

G. Indicators, Safeties, Etc.

1. All devices provided for indication of trouble or proper operation should be maintained in proper working condition. This particularly applies to jam or malfunction detectors.

H. Guards and Covers

1. These are provided to prevent accidents and should always be carefully replaced if removed for maintenance.

I. Vacuum Systems

1. Reference to the Operational Bulletin on Handling, Feeding and Set-Up of Corrugated Fibreboard Boxes on Automatic Packaging Machines Using Vacuum Equipment, issued by the joint PMMI/FBA Liaison Committee, is urged as part of any machine operation and maintenance program.

2. Examine the suction cups each day to make sure that they are in good condition. Stretch them and look for small holes that may have developed. Also check the edges for tearing, etc. If in doubt, replace them with new cups. A supply of these should be kept on hand.

3. Check the vacuum system for proper pressure and air flow as per I(1) above.

4. Clean the vacuum line filters as often as necessary. Be careful not to damage the gasket, in-as-much as a damaged gasket would cause a serious leak in the vacuum system.

5. Check the suction hoses occasionally for leaks in the hose itself or at the fittings.

6. Clean all suction head air passages by use of a wire or drill of proper size. Remove screw plugs to do so if necessary.

7. Vacuum pumps requiring lubrication should be checked to insure delivery of recommended type and volume of lubricant per manufacturer’s manual.
J. Glue Systems

1. Adhesive systems — hot and cold — must be kept free of contaminants. Pots, nozzles, filter and applicators must be checked and cleaned regularly.

2. Calibration of temperature monitors and controls should be verified.

3. Compression system should be free from adhesive build-up and improper alignment.

K. Spare Parts

1. Keep spare parts, as recommended by manufacturer, on hand and accessible should a quick change be required.

L. Housekeeping

1. A clean, well-maintained machine and work area invariably promotes better operation through improved operator pride. Do not tolerate accumulations of materials, lubricants or product in or around machinery. It is not only unsightly and demoralizing, but in most cases highly hazardous.

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Part II

GENERAL NOTES ON STORAGE AND HANDLING OF EMPTY CORRUGATED FIBREBOARD BOXES

Corrugated and solid fibre boxes are shipped to the user in “knocked down” or flat form and, so as to require a minimum of storage area, are almost always stored in this form until used. Like any other commodity, they can be damaged and, obviously, once damaged, lose some of their effectiveness. Damaged boxes may not run satisfactorily over automatic machinery and will not give all the protection they were engineered to provide; their use may result in damage to the product when it is shipped. A few simple precautions, over and above the common rules of good warehousing, should be observed in the storage and handling of boxes.

A. Use dunnage with a reasonably flat surface for storage of boxes; don’t store directly on the floor.

B. Store indoors and away from outside doorways that remain open or which may be opened frequently.

C. Avoid temperature and humidity extremes. Boxes which have been stored under adverse conditions may have altered dimensions and/or may be brittle. If the latter, bending of the flaps may cause rupture.

D. When it is impossible to store boxes under normal conditions of temperature and humidity, they should at least be brought to the packing line for a period of time before being used unless, as may exist in certain operations, the conditions around the packing area are either extremely humid or extremely dry. If both the storage area and packing area are at extreme conditions, it may be necessary to “condition” boxes in a third area to assure proper operation of the packing line.

E. After unbanding, boxes should be maintained in a “knocked down” form in a horizontal plane until fed into the machinery hopper. They should not be stacked on edge nor struck against a hard surface.

F. Where feasible, follow the accepted practice of “first in, first out”.

* * * End of Extract * * *
6.2 LUBRICATION

6.2.1 Lubrication Schedule

The proper and timely lubrication of the Pearson Packaging Systems R235 Adjustable Case Erector & Bottom Sealer and its drives is paramount to a sustained and successful operation. If practical, appoint a single individual to be accountable for insuring that the machine is suitably lubricated. Follow the schedule in Table 6-3 to ensure that the machine remains properly lubricated.

**WARNING!** Excess or spilled lubricants can cause package damage. Spilled lubricants must be cleaned up to prevent slips and falls by personnel which could result in serious injury. Avoid over-lubricating, as it is harmful to most parts.

In general, an acceptable rule-of-thumb for lubrication quantity is to apply grease until it is visible somewhere in the part being lubricated.

**Caution!** Use low pressure hand-guns and discretion for any part containing grease seals (e.g., pillow blocks). Excessive grease and/or pressure can "blow" grease seals.

### TABLE 6-1: Required Lubrication Points

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
</table>
| I.       | 1. Rod end on small cylinder  
           | 2. Rod end on large cylinder |
| II.      | 1. Small cam follower in cam track  
           | 2. Large cam follower in slide assembly  
           | 3. Two linear slide bearing blocks on slide shafts |
| III.     | 1. Three points on Universal Joint |
| IV.      | 1. Cam follower on cam  
           | 2. Two rod ends at end of pick-up arm |
| V.       | 1. Oil on felt pad for cutting knife |

6.2.2 Color Coded Lubrication Tags

The color codes shown in Table 6-2 are used by Pearson Packaging Systems for scheduling lubrication of components. If these tags are found on the machine the following intervals are recommended for lubricating that component.

### TABLE 6-2: Color Coded Lubrication Tags

- **Daily:** Red  
- **Weekly:** Green  
- **Monthly:** Blue  
- **Quarterly:** Yellow  
- **Semi Annually:** Black  
- **Annually:** Brown
<table>
<thead>
<tr>
<th>ITEM</th>
<th>LUBRICATION</th>
<th>INTERVAL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air Lubricator (for staple machines)</td>
<td>Mobil DTE Oil Light (or equivalent) See manufacturer’s data sheet</td>
<td>Check Daily</td>
<td>Keep container filled. Set for approximately one drop per ten cycles; observe exhaust” and re adjust if necessary.</td>
</tr>
<tr>
<td>2. Cam Followers (Hopper Pickoff Arm, Setup Arm)</td>
<td>Mobilith AW 2 or Mobilith SHC 220 grease (or equivalent)</td>
<td>Weekly</td>
<td>Zerk fittings in center of each cam follower.</td>
</tr>
<tr>
<td>3. Gear Reducer (Dodge “Tigear”)</td>
<td>See manufacturer’s data sheet. Use Fel Pro C5A Anti-Seize or MOBILTEMP 78 grease to re-lubricate the motorshaft extension if the motor is ever removed or replaced. Use Mobil SHC-634 or Ultrachem Chemlube 140 for gearbox replacement oil. (DO NOT USE MOBILGEAR 634, it is not the same and is not suitable).</td>
<td>See manufacturer’s data sheet. Replace gearbox oil only when performing maintenance that requires gearbox disassembly.</td>
<td></td>
</tr>
<tr>
<td>4. Optional: Eurodrive Gear-motor w/Brake</td>
<td>Mobilgear 636 or equivalent</td>
<td>Every 2 years or 10,000 hours operation.</td>
<td>Check oil levels and oil quality at regular intervals, determined by the usage and the environment. Grease and oil should be changed per the interval recommendation. See manufacturer’s data sheet.</td>
</tr>
<tr>
<td>5. Linear Pillow Block Ball Bearing (INA)</td>
<td>These bearings have been greased and sealed at the factory. They require no lubrication.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Linear Bearing Single &amp; Double Flange (80/20)</td>
<td>Those linear slides which use UHMW material as the slide bearing should not be lubricated with any lubricating medium.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Linear Slide Cylinders (PHD) &amp; Guide Rods</td>
<td>Rycon 32</td>
<td>Weekly</td>
<td>The cylinders themselves are lubricated either through the air line lubricator or are non-lube. The guide rods should be lubricated with a thin coat of Rycon 32 weekly.</td>
</tr>
<tr>
<td>8. Linear Slide Ball Bushings (PHD)</td>
<td>Silicon based lubrication should NOT be used on units with PHD’s TC bushings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Moving Roller Chain</td>
<td>A good grade of non-detergent petroleum base oil is recommended. SAE 30 or 40 weight for temperature from 40 to 120 degrees F.</td>
<td>Weekly</td>
<td>Apply with a brush or spout can to outside plate and inside plate edges.</td>
</tr>
<tr>
<td>10. Pillow Block &amp; Flange Bearings</td>
<td>These bearings have been greased and sealed at the factory. They require no lubrication.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Rod Ends (Set-up Arm)</td>
<td>Mobilith AW 2 or Mobilith SHC 220 grease (or equivalent)</td>
<td>Weekly</td>
<td>Zerk fitting on each rod end.</td>
</tr>
</tbody>
</table>
6.3 MAINTENANCE CHECKS

Periodic operations and maintenance checks are essential to avoid and/or spot and correct prospective trouble areas. Table 6-4 lists some of the more common items requiring periodic inspections.

### TABLE 6-4: Maintenance Checklist

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INSPECTION</th>
<th>FREQUENCY</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air and vacuum piping</td>
<td>Inspect for plugs and leaks</td>
<td>Weekly</td>
<td>Clean and/or replace defective hoses.</td>
</tr>
<tr>
<td>2. Air Cylinders</td>
<td>Inspect for leading or pounding.</td>
<td>Hourly</td>
<td>Rebuild/Replace.</td>
</tr>
<tr>
<td>3. Air line filter</td>
<td>Check for water or other sediment.</td>
<td>As required; by quantity of contaminants in your air system.</td>
<td>Clean as necessary.</td>
</tr>
<tr>
<td>4. Cam Followers and Bushings.</td>
<td>Inspect for excessive wear.</td>
<td>Weekly</td>
<td>Replace worn cam followers and/or bushings.</td>
</tr>
<tr>
<td>5. Chains &amp; Belts</td>
<td>Check tension</td>
<td>Daily: (drive, flight, and cam) Weekly: (adjusting)</td>
<td>Adjust idlers; rear flight chain adjusters or cam box.</td>
</tr>
<tr>
<td>6. Cylinder Cushions</td>
<td>Check for smooth operation.</td>
<td>Daily</td>
<td>Re-adjust as required; replace cushions (seals).</td>
</tr>
<tr>
<td>7. Fasteners (bolts, nuts, set screws, etc.)</td>
<td>Check for secureness</td>
<td>Weekly</td>
<td>Tighten loose fasteners.</td>
</tr>
<tr>
<td>10. Photocells, limit switches and limit switch arms</td>
<td>Check for dust and alignment.</td>
<td>Daily</td>
<td>Clean and re-align as necessary.</td>
</tr>
</tbody>
</table>

### TABLE 6-3: Lubrication Schedule

<table>
<thead>
<tr>
<th>ITEM</th>
<th>LUBRICATION</th>
<th>INTERVAL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. U-Joint Assy.</td>
<td>Mobilith AW 2 or Mobilith SHC 220 grease (or equivalent)</td>
<td>Monthly</td>
<td>Zerk fittings on each bearing CAUTION! Do not over grease seals.</td>
</tr>
<tr>
<td>13. Tape Head (Option)</td>
<td></td>
<td></td>
<td>See Manufacturer’s Manual</td>
</tr>
<tr>
<td>14. Staple Head (Option)</td>
<td></td>
<td></td>
<td>Lubricated via air line lubricator. See Manufacturer’s Manual</td>
</tr>
</tbody>
</table>

CAUTION! Do not over grease seals.
6.4 ROLLER CHAIN MAINTENANCE

NOTE: The following information was taken from American Chain Association "Identification, Installation, Lubrication and Maintenance of Power Transmission Roller Chains" in ANSI B29.1 and ANSI B29.3.

6.4.1 Lubrication

The R235 Adjustable Case Erector & Bottom Sealer may contain various sizes of roller chain, some used for drives and others for adjustments. The key to longevity of chain and sprockets is largely dependent upon the method and interval of lubrication. Generally, the drive chain is to be lubricated based on the loading and the speed at which the machine operates. Normal service of Pearson machines dictates a simple manual lubrication (see insert next page) whereas a faster surface speed chain might have a drip-type or automatic lubrication system. Any adjustment roller chains, of course, need only be oiled periodically (see insert), depending on the cleanliness of the work area.

It is normal for chain to sag a slight bit (about 2% of the two sprocket center distances is normal) but, because it is also normal for roller chains to “seat-in”, a slightly tensioned span might be found. An adjustment of the chain take-up may be necessary after run-in.

Not only will good maintenance conserve the life of the chain and sprockets, timely maintenance will also pay big dividends in equipment longevity and low downtime of the Adjustable Case Erector & Bottom Sealer. See Table 6-3 for suggested lubrication and maintenance intervals.

6.4.2 Installing Chain

If a chain is not the correct length, in pitches, to properly fit on the drive, a longer stock length may have to be shortened or several sections may have to be connected to make the chain the correct length. The American Chain Association publishes a brochure entitled “Connect and Disconnect Instructions for ANSI B29.1 Chains,” which describes how to do this.

When the correct chain length has been obtained, fit the chain around the sprocket and bring the free ends together on one sprocket, using the sprocket teeth to hold the chain ends in position. With large heavy chains it may be necessary to block the sprockets to prevent them from turning while the chain ends are brought together. Insert the pins of the connect-
Excerpt from
“Rex Roller Chain Lubrication Information”

Lubricant Specifications

The lubricant used must have the following properties:

1. It must be sufficiently fluid to reach the internal surfaces of the bushings and rollers.
2. It must have sufficient body to maintain a separating film between the bearing surfaces.
3. It must be free from corrosive elements.
4. It must be capable of maintaining its lubricating qualities under the operating conditions of temperature, moisture, etc.

For normal installations, a pure mineral oil is recommended. The operating conditions (speed, load temperature, method of application, etc.) determine the viscosity required, as follows:

### Method of Application

Unless properly applied, the best lubricant cannot perform its functions. For slow speeds and light loads, simple methods of application give satisfactory results; but as speeds and loads increase, more precise methods are required. When drives are run at high speeds, the system should provide a means of cooling the lubricant.

**Manual** lubrication is accomplished by applying the oil with a brush. For open drives, oil is applied to the inside of the chain at the edges of the link plates. As the chain rides on the sprockets, the oil will be carried by centrifugal force to the pin and bushing surfaces. Regulate the amount so that the entire chain is lubricated, but that no oil is thrown off. The frequency of application is governed by the local conditions and the chain speed.

**Drip** lubrication — a sight-feed lubricator, feeding through a pipe, delivers a continuous supply of oil to the chain. The oil should be delivered to the upper edges of the link plates on the lower strand of the chain, near the point where that strand engages with the sprocket. Oil delivery rates should be regulated to assure complete lubrication without flooding. Scheduled servicing is necessary to make sure that the lubricators are kept filled and dripping.

Drip lubrication should be used only in clean environments.
6.4.3 **Adjusting Chain Tension**

Turn one sprocket to tighten one span of the chain. Then use a straightedge and a scale to measure the total mid-span movement in the slack span (see Fig. 6-1). Adjust the drive center distance or the idler to produce 4 to 6% mid-span movement for drives that are on horizontal centers to 45 degrees inclined, and 2 to 3% for drives that are inclined 45 degrees to vertical or subject to high shock loads.

![Fig. 6-1: Chain Tension Adjustment](image)

6.4.4 **Align Shafts and Sprockets**

Good drive alignment is necessary to prevent uneven loading across the width of the chain and damaging wear between the sprocket teeth and the roller link plates of the chain. Aligning the drive is a straightforward, two-step procedure.

1. The shafts must be parallel within fairly close limits. This is readily done by using a machinist’s level and feeler bars (see Fig. 6-2). First, using the machinist’s level, make sure the shafts are level or in the same plane. Then, using the feeler bars, make sure the shafts are parallel in that plane. If the shafts can float axially, lock them in the normal running position before attempting to align.

![Fig. 6-2: Align Shafts](image)

Most single strand drives will perform acceptably if the shafts are parallel and in the same plane within .050 in/ft. (4.2 mm/m) or \(\frac{\pi}{4}\)°.

However, high speed, high horsepower, or multiple strand drives should be aligned within the tolerance obtained from the following formula:

\[
\text{Tolerance} = \frac{0.0133C \ (\text{in} / \text{ft})}{P \ n} \quad \text{or} \quad \frac{111C \ (\text{mm} / \text{m})}{P \ n}
\]

Where:
- \(C\) = center distance, in inches, or mm.
- \(P\) = chain pitch, in inches, or mm.
- \(n\) = number of chain strands.

### TABLE 6-5: Recommended Possible Mid-Span Movement, AC, in inches (mm)

<table>
<thead>
<tr>
<th>Drive Centerline</th>
<th>TANGENT LENGTH BETWEEN SPROCKETS, IN INCHES (CM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 (25)</td>
</tr>
<tr>
<td>Horizontal to 45°</td>
<td>0.4 - 0.6</td>
</tr>
<tr>
<td></td>
<td>(10 - 15)</td>
</tr>
<tr>
<td>45° to Vertical</td>
<td>0.2 - 0.3</td>
</tr>
<tr>
<td></td>
<td>(5 - 8)</td>
</tr>
</tbody>
</table>
2. The sprockets must be mounted on the shafts as closely in line axially as practicable. This normally is done with a straightedge or a length of piano wire (See Fig. 6-3). In practice, the maximum amount of axial misalignment is obtained from the following formula:

\[ \text{Max. offset} = 0.045 \, P \, \text{in. or mm.} \]

Where: \( P \) = chain pitch, in inches, or mm.

This formula applies to both single and multiple strand chains.

### 6.5 ROLLER CHAIN DRIVE MAINTENANCE

A roller chain drive requires proper and timely maintenance to deliver satisfactory performance and service life. It is assumed that the shafts, bearings, and supports; the chain and sprockets; and the lubrication type have been properly selected and installed. Then a maintenance program must be established to assure that:

1. The drive is correctly lubricated.
2. Drive interferences are eliminated.
3. Damaged chains or sprockets are replaced.
4. Worn chains or sprockets are replaced.
5. The sprockets are properly aligned.
6. The chain is correctly tensioned.
7. Guarding is in good condition and is properly installed.

A roller chain drive should be inspected after the first 50 hours of operation. After that, drives subject to heavy shock loads or severe operating conditions should be inspected after each 200 hours of operation, while more ordinary drives may be inspected after each 500 hours of operation. Experience may indicate a longer or shorter interval between inspections.

At each inspection, the following items should be checked and corrected when necessary. In addition, maintenance personnel should refer to the “Roller Chain Drive Trouble shooting Guide” at the end of this chapter.

#### 6.5.1 Lubrication System

For manual lubrication, be sure that the lubrication schedule is being followed and the correct grade of oil is being used. If the chain is dirty, clean it with kerosene or a nonflammable solvent and re-lubricate it.

For drip lubrication, check the flow rate and be sure that the oil is being directed into the chain correctly.

For oil bath, slinger disc, or oil stream lubrication, be sure that all orifices are clear and that the oil is being directed onto the chain correctly. Change the oil after the first 50 hours of operation, and after each 500 hours thereafter (200 hours in severe service).
6.5.2 **Drive Interferences**

Inspect for any evidence of interference between the drive components and other parts of the equipment. If any is found, correct it immediately. Rubbing between the chain or sprockets and other parts of the machine can cause abnormal wear and damage. Impact between the chain link plates and a rigid object can cause link plate fatigue and chain failure.

Also inspect for and eliminate any buildup of debris or foreign material between the chain and sprockets. A relatively small amount of debris in the sprocket roller seat can cause tensile loads great enough to break the chain if forced through the drive.

6.5.3 **Damaged Chain Or Sprockets**

Inspect the chain for cracked, broken, deformed, or corroded parts; and for tight joints or turned pins. If any are found, find and correct the cause of the damage, and replace the entire chain. Even though the rest of the chain appears to be in good condition, it very probably has been damaged and more failures are likely to occur in short time.

Inspect sprockets for chipped, broken, or deformed teeth. If any are found, find and correct the cause of the damage and replace the sprocket. Sprockets normally are stronger and less sensitive to damage than chain, but running a worn chain on new sprockets can ruin the sprockets in short time. This is because a worn chain rides very high on the sprocket teeth and wears the sprocket teeth in an abnormal pattern.

6.5.4 **Sprocket Wear**

A worn out sprocket is not nearly as well defined as a worn out chain. However, there are some characteristics that indicate when a sprocket should be replaced. Check for roughness or binding when a new chain engages or disengages the sprocket. Inspect for reduced tooth thickness and hooked tooth tips. If any of these conditions are present, the sprocket teeth are excessively worn and the sprocket should be replaced.

Do not run new chain on worn out sprockets because it can cause the chain to wear rapidly. The pitch of the new chain is much shorter than the effective pitch of the worn sprocket, so the total chain load is concentrated on the final sprocket tooth before disengagement. Thus, when the chain disengages from the sprocket, the roller is jerked out of the hooked portion of the sprocket tooth and that results in a shock load on the chain as the load is transferred from one tooth to the next.

6.5.5 **Sprocket Alignment**

Inspect for significant wear on the inside surface of the chain roller link plates and on the sprocket flange faces. If this type of wear is present, the sprockets may be misaligned. Re-align the sprockets to prevent further abnormal chain and sprocket wear. If 5% or more of the link plate thickness is worn away, or if there are sharp gouges in the link plate surface, the chain should be replaced immediately. If 10% or more of the sprocket tooth flange thickness is worn away, the sprocket should be replaced.
6.5.6 **Chain Tension**

Measure the total mid-span movement (Fig. 6-1). If it exceeds the tabulated limit, adjust the center distance to obtain the desired amount of slack. If elongation exceeds the available adjustment, and wear elongation still has not exceeded 3% or the functional limit, remove two pitches and reinstall the chain. If the minimum adjustment will not permit shortening the chain two pitches, the chain may be shortened one pitch by using an offset link or an offset section.

6.5.7 **Guards**

Inspect the guards to ensure they are in serviceable condition. The guards must not be bent or deformed so that intended clearance is reduced. Any designed openings in the guard (mesh) must not be enlarged. The guards must not be broken or damaged, especially at or near the mounting points.

If the guards are in serviceable condition, reinstall them on the drive making sure that all fasteners are secure and that all safeguarding devices (such as presence sensors and interlocks) are functioning.

<table>
<thead>
<tr>
<th>Condition/Symptom</th>
<th>Possible Cause</th>
<th>What To Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing Parts</td>
<td>• Missing at assembly</td>
<td>Replace chain.</td>
</tr>
<tr>
<td></td>
<td>• Broken and lost.</td>
<td>Find and correct cause of damage. Replace chain.</td>
</tr>
<tr>
<td>Rusted Chain</td>
<td>• Exposed to moisture.</td>
<td>Replace chain. Protect from moisture.</td>
</tr>
<tr>
<td></td>
<td>• Water in lubricant.</td>
<td>Change lubricant. Protect lubrication system from water. Replace chain.</td>
</tr>
<tr>
<td></td>
<td>• Inadequate lubrication</td>
<td>Provide or reestablish proper lubrication. Replace chain, if needed.</td>
</tr>
<tr>
<td>Excessive Noise</td>
<td>• Chain striking an obstruction</td>
<td>Eliminate interference. Replace chain.</td>
</tr>
<tr>
<td></td>
<td>• Loose casing or shaft mounts</td>
<td>Tighten fasteners.</td>
</tr>
<tr>
<td></td>
<td>• Excess chain slack</td>
<td>Re-tension chain.</td>
</tr>
<tr>
<td></td>
<td>• Excessive chain wear</td>
<td>Replace and retension chain.</td>
</tr>
<tr>
<td></td>
<td>• Excessive sprocket wear</td>
<td>Replace sprockets and chain.</td>
</tr>
<tr>
<td></td>
<td>• Sprocket misalignment</td>
<td>Replace chain and sprockets, if needed. Realign sprockets.</td>
</tr>
<tr>
<td></td>
<td>• Inadequate lubrication</td>
<td>Replace chain if needed. Reestablish proper lubrication.</td>
</tr>
<tr>
<td></td>
<td>• Chain pitch too large</td>
<td>Redesign drive for smaller pitch chain.</td>
</tr>
<tr>
<td></td>
<td>• Too few sprocket teeth</td>
<td>Check to see if larger sprockets can be used. If not, redesign drive.</td>
</tr>
<tr>
<td>Condition/Symptom</td>
<td>Possible Cause</td>
<td>What To Do</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Water on Inside of Roller link Plates and One Side of Sprockets</td>
<td>Sprocket misalignment. Replace sprockets and chain if needed. Realign drive. Re-tension chain.</td>
<td></td>
</tr>
<tr>
<td>Chain Clings to Sprocket</td>
<td>Excessive sprocket wear.</td>
<td>Replace sprockets and chain.</td>
</tr>
<tr>
<td></td>
<td>Sprocket misalignment. Replace sprockets and chain if needed. Realign sprockets</td>
<td></td>
</tr>
<tr>
<td>Chain Climbs Sprocket Teeth</td>
<td>Excess chain slack. Re-tension chain</td>
<td>Re-tension chain</td>
</tr>
<tr>
<td></td>
<td>Excessive chain wear. Replace and retension chain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excessive sprocket wear. Replace sprockets and chain.</td>
<td></td>
</tr>
<tr>
<td>Missing or Broken Cotters</td>
<td>Cotters installed improperly</td>
<td>Install new cotters per manufacturer’s instructions.</td>
</tr>
<tr>
<td>Exposed Chain Surfaces Corroded or Pitted.</td>
<td>Exposure to corrosive environment.</td>
<td>Replace chain. Protect from hostile environment.</td>
</tr>
<tr>
<td>Cracked Link Plates (Stress Corrosion)</td>
<td>Exposure to corrosive environment combined with stress from press fits.</td>
<td>Replace chain. Protect from hostile environment.</td>
</tr>
<tr>
<td>Tight Joints</td>
<td>Dirt or foreign material in chain joints.</td>
<td>Clean and relubricate chain.</td>
</tr>
<tr>
<td></td>
<td>Inadequate lubrication. Replace chain. Reestablish proper lubrication.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Misalignment. Replace sprockets and chain if needed. Realign sprockets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal corrosion or rust. Replace chain. Eliminate cause of corrosion or protect chain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overload bends pins or spreads roller link plates. Replace chain. Eliminate cause of overload.</td>
<td></td>
</tr>
<tr>
<td>Turned Pins</td>
<td>Inadequate lubrication. Replace chain. Reestablish proper lubrication.</td>
<td></td>
</tr>
<tr>
<td>Condition/Symptom</td>
<td>Possible Cause</td>
<td>What To Do</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Broken Pins</td>
<td>• Extreme overload.</td>
<td>Replace chain. Replace sprockets if indicated. Eliminate cause of overload or redesign drive for larger pitch chain.</td>
</tr>
<tr>
<td>Broken Link Plates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracked Link Plates (Fatigue)</td>
<td>• Loading greater than chain’s dynamic capacity.</td>
<td>Replace chain. Reduce dynamic loading or redesign drive for larger chain.</td>
</tr>
<tr>
<td>Battered Link Plate Edges</td>
<td>• Chain striking an obstruction.</td>
<td>Replace chain. Eliminate interference.</td>
</tr>
<tr>
<td>Worn Link Plate Contours</td>
<td>• Chain rubbing on casing, guide, or obstruction.</td>
<td>Replace chain if 5% or more of height worn away. Re-tension chain. Eliminate interference.</td>
</tr>
<tr>
<td>Broken, Cracked, or Deformed Rollers</td>
<td>• Speed too high.</td>
<td>Replace chain. Reduce speed.</td>
</tr>
<tr>
<td></td>
<td>• Sprockets too small.</td>
<td>Replace chain. Use larger sprockets, or possibly redesign drive for smaller pitch chain.</td>
</tr>
<tr>
<td></td>
<td>• Chain riding too high on sprocket teeth.</td>
<td>Replace chain. Re-tension chain more often.</td>
</tr>
<tr>
<td>Pin Galling</td>
<td>• Speed or load too high.</td>
<td>Reduce speed or load. Possibly redesign drive for smaller pitch chain.</td>
</tr>
<tr>
<td></td>
<td>• Inadequate lubrication.</td>
<td>Provide or re-establish proper lubrication</td>
</tr>
</tbody>
</table>

### 6.6 Replacement of Worn Parts

Regular lubrication, routine cleaning, and religious periodic inspections will help extend the lift of the working parts in your machine. However, most parts will wear eventually, in spite of all preventive maintenance efforts. The clue to prolonging the successful operation of the rest of your machine, is to identify early on any worn parts and immediately replace them. See Chapter 9 for a recommended spare parts list and replacement procedures.
CHAPTER 7

TROUBLESHOOTING GUIDES

7.1 INSTRUCTIONS FOR USE OF GUIDES

7.1.1 A Pearson machine is a meticulously manufactured machine and has been factory tested before shipment. With proper treatment, it should provide years of dependable service. Nevertheless, as with any piece of mechanical equipment, malfunctions will occur from time to time. Some hints and simple guides are provided to help isolate specific problems. Included are some of the most common troubles likely to be encountered, with general suggestions for correcting the abnormal condition.

7.1.2 The general guide (Table 7-1) is made of columns designated “TROUBLE”, “PROBABLE CAUSE”, and “POSSIBLE SOLUTION”. Where practical, the guide is arranged in the order of operation of the machine, from loading or infeed through to discharge. Merely scan the first column until you identify your particular “TROUBLE”, then follow the suggestions given. For ease of reference, an index of “TROUBLEs” precedes the guide (para. 7.2.1).

7.1.3 There are several factors which cause pneumatic problems. In the general troubleshooting guide (Table 7-1) for machines where compressed air is used, “Pneumatics” will often be listed as a “PROBABLE CAUSE” and the instruction “Check pneumatics” will be given as a “POSSIBLE SOLUTION.” In that event, follow these suggestions (recommended order):

a. Check external air to ensure it is on.
b. Check ball valves and flow controls; adjust or replace as necessary.
c. Check regulators, filters, and lubricators; adjust or replace as necessary.
d. Check solenoid valve; manually trip the valve and listen for air coming on and off. If air is present and valve is triggering, the problem is electrical. If there is no air the valve could be defective. If that is the case, replace the valve.
e. Check cylinder, air clutch, blower, etc.; reset/repair/replace as necessary.

WARNING! Use caution around air-driven parts. Turn off air when adjusting.

7.1.4 Following the general guide, there is a section and guide (Table 7-4) for help in troubleshooting the electrical operation. General information about the electrical system is found there. A step-by-step run through of the electrical system as seen on the schematic is found in Chapter 5 of this manual (“Sequence of Events”).

NOTE: One copy of the schematic is included with the other drawings in the accompanying packet; another copy is shipped in the main power panel of the machine.

The description of events is for the standard machine; if your machine has a custom electrical arrangement look for a special ADDENDUM in the rear of the manual to explain it. The electrical logic for the machine is quite basic and should be easy to follow. If the machine has been operating well and suddenly ceases to function, suspect the cause is an electrical malfunction. In that case, turn to the electrical troubleshooting guide (Section 7.2.2) and proceed line-by-line through the schematic using the electrical events description (Section 5.2) as a guide.
7.1.5 If, after trying the recommendations suggested in the troubleshooting guides, the problem is still unsolved and consultation with one of our factory servicemen is desired, contact:

Manager of Customer Service  
R. A. Pearson Company  
W. 8120 Sunset Highway  
Spokane, WA 99204  
Telephone: (509) 838-6226

7.2 GUIDES

7.2.1 General Troubleshooting Guide

Table 7-1 is the general troubleshooting guide; see ¶ 7.1.2 for instructions on its use. For ease of reference, an index is listed below.

Index of “TROUBLEs:”
1. Failure to run.
2. Flight chain won’t run properly.
3. Blanks from Hi-Cap don’t pull out correctly.
4. Blanks do not feed into machine from hopper properly.
5. Case Set-Up Section
6. Gluing
7. Sealing
8. Case does not tip off of tip-off chute; jams at discharge.
9. Jamming, General

WARNING! Take extra precautions to prevent injury or damage when troubleshooting. Disconnect power and/or air when in doubt.

Notice! As required by OSHA standards, this machine is equipped with a pneumatic energy isolating valve. When in the exhaust position, this device isolates the equipment from the main air source as well as exhausting any air remaining in the machine. To prevent accidental startups while personnel are cleaning or servicing equipment, this valve may be locked and labeled with a warning tag. To eliminate any uncertainty of valve status, when closed the yellow slide plate is pushed down and reads “Closed.” When up and open it reads “Open.”

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Failure to run</td>
<td>1A. No power.</td>
<td>1A-1. Turn on main “DISCONNECT” and follow “START-UP” Procedures of Section 5.5.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A-2. Check motor overloads.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A-3. Check fuses.</td>
</tr>
</tbody>
</table>
### TABLE 7-1: General Troubleshooting Guide

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Failure to run</td>
<td>1B. Jam detected. (See Chart Chapter 5 - Jam Circuits, Section 5.8.2)</td>
<td>1B-1. Clear jam, check functioning of jam detectors.</td>
</tr>
<tr>
<td></td>
<td>1C. Electronic Kickout clutch (<em>Variable Speed Controller</em>). (Machine Jam Indicator light - Red Flashing)</td>
<td>1C-1. Resets automatically when machine shuts down.</td>
</tr>
</tbody>
</table>

**Troubleshoot Variable Speed Controller** - (see Mfg.’s manual) **Factory settings are listed on electrical print.** The speed settings are **PRESET** (fixed) and should not be changed. Only the ramp up & down feature is used. **Consult Factory before changing the speed presets.**

A. Motor does not start *(no output voltage to motor)*

<table>
<thead>
<tr>
<th></th>
<th>A1. Check power circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Check supply voltage.</td>
</tr>
<tr>
<td></td>
<td>□ Check all fuses &amp; disconnects.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A2. Check motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify that motor is connected properly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A3. Check control input signals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify START, STOP, RUN FORWARD &amp; RUN REVERSE signals.</td>
</tr>
</tbody>
</table>

|   | A4. Check P46 -(Input Mode Select) is set to “2”, only the program keypad module START button will start the motor. |

B. Controller started but motor NOT rotating *(P01 - [Output Freq.] displays “0.0”).*

<table>
<thead>
<tr>
<th></th>
<th>B1. Check motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify that motor is properly connected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>B2. Check freq. source P06</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify freq. signal at TB3</td>
</tr>
<tr>
<td></td>
<td>□ Verify Preset Frequencies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>B3. Check control input signals.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify SW1, SW2, &amp; SW3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>B4. Check parameter settings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□ Verify P59 &amp; P58.</td>
</tr>
<tr>
<td>TROUBLE</td>
<td>PROBABLE CAUSE</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
</tr>
</tbody>
</table>
| Troubleshoot Variable Speed Controller | C. Motor not accelerating properly. | C1. Check motor  
☑ Verify that motor is connected properly.  
☑ Verify that no mechanical problem exist. |
| | C2. Check parameter settings.  
☑ Verify P30, P43, P38 are set properly. |
| | D. Can not operate in “RUN FWD/RUN REV” mode. | D1. Verify that P46 is set to “1”. |
| | D2. Verify that power has been cycled for above change to take effect. |
| | D3. Verify that both RUN FORWARD and RUN REVERSE switches are NOT closed. |
| | 1E. Drive System | 1E-1. Check drive chain. |
| | 1E-2. Check Motor/Brake. |
| | 1E-3. Check gearbox. |
| 2. Flight chain won’t run properly. | 2A. Power not on. | 2A-1. Turn on main “DISCONNECT” and use “START-UP” Procedures of Section 5.5. |
| | 2B. Flight chain slipping. | 2B-1. Tension chain by adjusting tighteners at extreme infeed end of machine. |
| | 2B-2. Insure flight lugs are not catching or rubbing on sprockets. |
| | 2C. Drive chain and/or belt slipping. | 2C-1. Tension chain and/or belt. Replace, if defective. |
| | 2C-2. Adjust pulleys to insure they are not binding or rubbing. |
| | 2D. Electrical | 2D-1. Troubleshoot electrical. |
## TABLE 7-1: General Troubleshooting Guide

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Flight chain won’t run properly.</td>
<td>2E. Defective drive components</td>
<td>2E-1. Check motor, gear reducers, pillow blocks, and chains. Lubricate, repair or replace defective components.</td>
</tr>
<tr>
<td>Continued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Blanks from Hi-Cap don’t pull out correctly.</td>
<td>3A. Vacuum System plugged/inoperative.</td>
<td>3A-1. Check vacuum cups. Replace if worn.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3A-2. Check regulator pressure setting - may need to be increased. (max. setting is 80 psi.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3A-3. Check vacuum generators for clogging or pressure drop. Clean or repair if necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3A-4. Check Pneumatics. (para. 7.1.3)</td>
</tr>
<tr>
<td>3B. Incorrect adjustment.</td>
<td>3B-1. Check all side and top guides - cannot be too tight or too loose.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3B-2. Check adjustment of strippers on ends of side guides. If adjusted in too much there will be multiple stripping.</td>
<td></td>
</tr>
<tr>
<td>3C. Hopper bed advance.</td>
<td>3C-1. First 8 blanks should be vertical between blank stripper clips. Make sure there is a gap between first 8 blanks and rest for correct functioning of photocells.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3C-2. Check location of vacuum cups. Should be set fairly wide and towards flap scorelines. Watch out for hand holes.</td>
<td></td>
</tr>
<tr>
<td>4. Blanks do not feed into machine from hopper properly.</td>
<td>4A. Incorrect Adjustment.</td>
<td>4A-1. Check adjustment of the Right and Left Side Guide in the Set-up Section.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4A-2. Check adjustment of hopper side guides.</td>
</tr>
<tr>
<td>4B. Vacuum System</td>
<td>4B-1. Check vacuum system for clogging.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4B-2. Check timing of vacuum release. To make a minor timing adjustment, utilize program timer for pick off vacuum duration.</td>
<td></td>
</tr>
<tr>
<td>4C. Hopper low levels</td>
<td>4C-1. Refill hopper with blanks.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4C-2. Proper alignment of photoeye and reflector.</td>
<td></td>
</tr>
<tr>
<td>TROUBLE</td>
<td>PROBABLE CAUSE</td>
<td>POSSIBLE SOLUTION</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>5. Case Set-Up Section</td>
<td>5A. Pick-up arm does not operate.</td>
<td>5A-1. Check bearings and pivot arms; lubricate, repair or replace as required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5A-2. Check Pneumatics (para. 7.1.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5A-3. Check all adjustments in Set-up Section.</td>
</tr>
<tr>
<td></td>
<td>5B. Pick-up arm won’t erect case or damages case (typically will tear corner on body of case).</td>
<td>5B-1. Check pick-up arm adjustments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5B-2. Check adjustment of minor flap guide - adjust as required.</td>
</tr>
<tr>
<td>6. Gluing</td>
<td>6A. Glue gun won’t fire.</td>
<td>6A-1. Check glue temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A-4. Check pneumatics (para. 7.1.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A-5. Troubleshoot electrical (Secs 7.1.4 &amp; 7.2.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A-6. Check glue pattern controllers for functionality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A-7. Check the permissive for the glue pattern (photo eye or limit switch)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A-8. Check glue unit manufacturer’s manual.</td>
</tr>
<tr>
<td></td>
<td>6B. Glue gun won’t shut off.</td>
<td>6B-1. Check pneumatics (para. 7.1.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6B-2. Check photo eye or limit switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6B-2. Troubleshoot electrical (Secs 7.1.4 &amp; 7.2.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6B-3. Check glue gun manufacturer’s manual.</td>
</tr>
<tr>
<td>7. Sealing</td>
<td>7A. Cases do not seal properly</td>
<td>7A-1 Check application of tape onto case. Check adjustment of tape head.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7A-2 Check location and function of staple heads. Adjust as necessary.</td>
</tr>
</tbody>
</table>
## TABLE 7-1: General Troubleshooting Guide

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Sealing</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Continued</em></td>
<td></td>
</tr>
<tr>
<td>7B.</td>
<td>Cases not square.</td>
<td>7B-1. If previously OK, check blanks for proper manufacture.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7B-2. Check position adjustment of case stops, guide rails, and overhead assembly. Check adjustment of mandrel and mandrel wings.</td>
</tr>
<tr>
<td>7C.</td>
<td>Mandrel and back-up ram won’t extend/retract.</td>
<td>7C-1. Check for damage to guide rods or bearings. Replace or repair as necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7C-2. Check pneumatics (para. 7.1.3).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7C-3. Trouble shoot electrical (sections 7.1.4 and 7.2.2)</td>
</tr>
<tr>
<td>7D.</td>
<td>Mandrel and back-up ram pounding or not bottoming together.</td>
<td>7D-1. Check adjustments, insure that mounts are secured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7D-2. Insure air pressure is constant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7D-3. Adjust flow control valves and/or cylinder cushions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7D-4. Check for loose mandrel; adjust and tighten as necessary</td>
</tr>
<tr>
<td>7E.</td>
<td>Cases do not seal properly.</td>
<td>7E-1. Check application of staples into box. If out of staples, replace staple head with spare or refill.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7E-2. If staples do not seal case check adjustment of mandrel. Make sure slots in mandrel are in line with staples.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7E-3. Check height and length adjustment of staple heads. See Chapter 4 - Set-up and Change-over Procedures.</td>
</tr>
<tr>
<td>7F.</td>
<td>Staple head carriage does not shift properly.</td>
<td>7F-1. Check air pressure to the staple head carriage. Check condition of cam followers and cylinder.</td>
</tr>
<tr>
<td>7G.</td>
<td>Staple Head does not function.</td>
<td>7G-1. Check staple head manufacturer’s instruction manual.</td>
</tr>
</tbody>
</table>
WARNING! Take special care to avoid injury or damage when troubleshooting. Disconnect power and/or air when in doubt.

### Electrical Troubleshooting Guide

#### 7.2.2.1 The format of the electrical troubleshooting guide is necessarily different from that of the general guide of the previous section; see §7.1.2 for instruction on its use. It is expected that troubleshooting will be done directly from the schematic with help from the narrative description of events (Section 5.2). However, before a schematic diagram can be fully understood and a particular machine’s control circuitry properly analyzed, it is first necessary to have a general understanding of the machine’s basic operation. In the previous sections of this manual, important features and characteristics of the machine have been described. A basic understanding of the machine would include:

a. What “job” does the machine perform? (Chapter 2)
b. What is the general order or sequence of mechanical operations that the machine cycles through in order to perform its “job”? (“Sequence of Events”, Section 5.2)
c. What are the setup procedures? (Chapter 4)
d. What are the operator’s procedures? (Chapter 5)

#### 7.2.2.2 The electrical control circuit is the “brain” and “nerve network” which allow the machine to automatically perform its mechanical functions. This means that the control circuits must turn each machine operation on and off at the proper time. Even though the electrical circuits allow the machine to function automatically, it operates the same as it would manually - one step at a time. It is vital to recognize that operations must be completed in the proper sequence and not be terminated prematurely. In working through a schematic, the quickest way to uncover a trouble spot is to methodically trace a circuit step-by-step and keep track of the functions as they occur. Short cuts tend to waste time rather than save it.

#### 7.2.2.3 A control circuit consists of an interconnection of various types of switches and contacts which combine to control the motors, solenoids, and other devices which operate the mechanical apparatus. In order for the mechanical devices to work in the proper sequence, the controlling switches and contacts must

---

### TABLE 7-1: General Troubleshooting Guide

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Case does not tip off of tip-off chute; jams at discharge end.</td>
<td>8A. Mis-adjustment</td>
<td>8A-1. Check adjustments of tip-off guides and back stop. (See Section 4.2, “Adjustments”)</td>
</tr>
<tr>
<td></td>
<td>9B. Erratic jamming (possibly no specific area).</td>
<td>9B-1. On PLC controlled machines, check controller and program.</td>
</tr>
</tbody>
</table>
open and close at the correct time and in the appropriate sequence. In order to accomplish these actions, relays, proximity switches, limit switches, cam switches and photoeyes, usually combined by a PLC (Programmable Logic Controller), are normally used.

7.2.2.3.1 A relay consists of an electromagnetic coil that operates a set (or sets) of switch contacts. When the circuit to the relay’s coil is completed (relay energized), the switch contacts of the relay are operated (open or close). Relays can be energized by other switches or contacts and will continue to operate their respective sets of contacts until the relays are de-energized at the proper time. ALL contacts of a particular relay normally work nearly “simultaneously”.

NOTE: In practice, some contacts are designed for “late break” or “early make”; when those types are used, they should be identified on the schematic.

There are special “latch” or “sequence” relays, which are used in certain “memory” circumstances, and require special conditions in order for contacts to open or close. Such relays are used on rare occasions by Pearson, but, when used, will be suitably identified. Relays can actuate mechanical devices directly or energize other relays.

7.2.2.3.2 A limit switch is operated when contacted by a mechanical device (moving case, guide rod, shaft, etc.) and is used to “signal” the control circuits that a case, carrier, blank, etc. has reached a certain spot or is in the proper position for the next mechanical action. Limit switches are equipped with a mechanical actuating (lever) arm and with either one or two sets of each “normally closed” or “normally open” contacts (defined later).

7.2.2.3.3 Cam switches are mechanically actuated by the rotation of a shaft (one rotation per machine cycle). A cam box (enclosure) is mounted on the machine with any number of cam switches enclosed. The shaft, which drives the cams, is connected by chain(s) to the main drive shaft which indexes the product. Cam switches are used when a certain operation is necessary once per cycle. Each switch has one set of each “normally open” and “normally closed” contacts. If a machine is equipped with one or more cam switches, there will be three special addenda (I, II, III) included in this manual, more completely describing the general function of cam switches.

7.2.2.3.4 A photosensitive cell (“photoeye”) consists of a beam projected from a light source across a space to a receiver or reflector. The switch can be actuated either when the beam is maintained (“light to operate”) or when it is broken (“dark to operate”). A photoeye is used to detect the presence or absence of some material or device (normally the product, case, carrier, blank, etc.). The photoeye performs the same function as a limit switch but is used where a mechanical actuation is impractical or impossible. The photoeye
(like the relay, limit switch, or cam switch) can directly actuate a mechanical device or energize/deenergize a relay for subsequent action.

7.2.2.3.5 A proximity switch is an inductive sensor designed to operate by generating an electromagnetic field and detecting the eddy current losses generated when ferrous and nonferrous metal objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger-signal level detector and an output circuit. As a metal object advances into the field, eddy currents are induced. The detection of this current generates a signal which will turn the solid-state output “ON” or “OFF”. The symbols used graphically show an open and closed state.

7.2.2.4 The schematic diagram that is included both in the accompanying packet of drawing prints and in the main power panel of the machine is “typical” of the type produced by R.A. Pearson and is based on standards established by the Joint Industrial Council (JIC). The symbols used on the schematic are designed to illustrate as reasonably as possible the actual operation of the devices.

7.2.2.4.1 Wire identification. All wires in the machine are designated with a wire number. On the schematic, the number for the wire is located (at least once) on the line that represents the wire. Wires may not necessarily be numbered consecutively (some numbers may be missing and others are frequently out of order). All wires that connect directly to each other are the same “circuit”, and are electrically the same (with the same wire number); junctions of schematic lines that represent connecting wires of the same “circuit” are indicated with a solid dot (intersecting lines without the dot represent different “circuits”). When a switch is connected between two circuits, each terminal of the switch (either side of the switch in the schematic line) will have a wire with a different number connected to it. All of the numbered wires (or circuits) can be found, connected to terminal strips or relay terminals in the machine’s main control panel or in junction boxes (with or without numbered terminal strips) placed strategically about the machine. When tracing circuits, voltage readings taken at a particular terminal should be the same for the entire circuit that is identified by that unique wire number on the schematic.

7.2.2.4.2 Line numbers. The consecutive numbers arranged vertically along the left side of the diagram are called “line numbers” and are reference numbers that are used to locate components on the schematic and do not identify wires in the machine. Occasionally, a schematic will be continued on another sheet; in that event, the line numbers will continue accordingly. It is a general practice to leave blank areas in a schematic; hence, it is not uncommon for line numbers to be listed, but not used. Schematics with line numbers are not usually used when the body of the control circuit is a PLC.
7.2.2.4.3 **Circuit legs.** AC-operated circuits are usually listed with two main legs connected “across” the line voltage supply. One leg is the “hot” side with the fuse and main control switch, and the other leg is the grounded or “common” side. By convention the “hot” side is on the left of the diagram and the grounded leg is on the right. It is generally considered that when a “circuit” is connected across, the electrical current “flows” down the left (“hot”) leg, left-to-right across the schematic and up the right (“common”) leg.

**WARNING!** A schematic is merely a diagram. In practice, the electrical current will follow any path in any direction along a closed circuit. Be certain that what constitutes a “closed circuit” is understood, in order to avoid dangerous and unexpected “feedback” or “reverse flow.”

Each device that requires full line power to operate is connected in a circuit across the line supply. The two circuit legs (“hot” and “ground”) are shown on the diagram as single lines; in the machine, connections are usually accomplished by connecting individual leads to the line, to an input, or output point on a PLC I/O module. The “hot” wires will all carry the same identification number(s); and all “common” wires will be designated “X2”. “Ground” wires are green and will have a label “GND”.

7.2.2.4.4 **Switches.** Each coil, solenoid, motor starter, and light that requires full line power to operate is connected in a separate leg across the line voltage supply. Also in each leg, there may be one (or more) controlling switch(es) (or “contacts”). The contacts of the switches close (to make) or open (to break) the circuit to the device that requires power. Sometimes a whole series of contacts and switches determines a complex set of conditions that must be satisfied before the device at the end of the circuit is actuated. It is by this means that separate operations of the machine are accomplished under the specific conditions dictated. The auxiliary contacts shown in the schematic are in the “home” or “power-off” position and will return to these “home” positions when power is cut. Each switch or set of contacts is identified by its own number-letter identification (e.g., LS1, CS3, CR4, PE2, etc.). See Table 7-2 for definition of abbreviations.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Device</th>
<th>Designation</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Control Relay</td>
<td>M</td>
<td>Motor Starter</td>
</tr>
<tr>
<td>CRL/CRS</td>
<td>Control Relay, Latch/Sequence</td>
<td>MF/MR</td>
<td>Motor Starter, Forward/Reverse</td>
</tr>
<tr>
<td>CS</td>
<td>Cam Switch</td>
<td>MTR</td>
<td>Motor</td>
</tr>
<tr>
<td>DISC</td>
<td>Disconnect Switch</td>
<td>OL</td>
<td>Overload Relay (Thermal)</td>
</tr>
<tr>
<td>FU</td>
<td>Fuse</td>
<td>PB</td>
<td>Push Button</td>
</tr>
<tr>
<td>GRD</td>
<td>Ground</td>
<td>PE</td>
<td>Photoeye</td>
</tr>
<tr>
<td>HTR</td>
<td>Heating Element</td>
<td>SOL</td>
<td>Solenoid</td>
</tr>
<tr>
<td>JUMPER</td>
<td>Jumper Wire</td>
<td>SS</td>
<td>Selector Switch</td>
</tr>
<tr>
<td>LS</td>
<td>Limit Switch</td>
<td>T</td>
<td>Transformer</td>
</tr>
<tr>
<td>LT</td>
<td>Light, Indicator (Pilot)</td>
<td>TGS</td>
<td>Toggle Switch</td>
</tr>
<tr>
<td>PRS</td>
<td>Proximity Switch</td>
<td>TR</td>
<td>Time Delay Relay</td>
</tr>
</tbody>
</table>

7.2.2.4.5 **Other general comments.** Main power inlet, disconnect switch, fuses, motors and trans-
former all appear at the top of the schematic diagram. Starters for motors appear in the main body of the schematic and indicate how the motors are actuated. Important explanatory notes about switches, controls, etc. appear in either margin and also sometimes within the body of the schematic, as appropriate.

7.2.2.5 The symbols and device designations appearing in Tables 7-2 and 7-3 are the most common Joint Industrial Council (JIC) standard abbreviations used on R.A. Pearson schematics.

NOTE: The actual devices on the machine are labeled with the same number-letter designations as shown in the schematic diagram.

### TABLE 7-3: Common Electrical Symbols

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESIGNATION &amp; TITLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Control Relay</td>
<td>When the circuit is completed to the control relay (relay energized) every pair of auxiliary contacts changes from the at rest position to the opposite position (when the relay is de-energized, they all switch back). The auxiliary contacts are identified with the same number-letter as the parent relay. The reference line numbers in the right margin indicate the lines where auxiliary contacts appear. Relays are numbered (CR1, CR2, etc.)</td>
</tr>
<tr>
<td>CRL</td>
<td>Control Relay Latch</td>
<td></td>
</tr>
<tr>
<td>CRS</td>
<td>Control Relay Sequence</td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td>Contacts</td>
<td>The symbol for auxiliary contacts is the same for control relays (CR), photoeyes (PSC), motor starters (M), thermal overloads (OL), etc. Normally open (NO) and normally closed (NC) refer to the condition of the contact when its parent coil is de-energized: (condition it would be in before installed in machine.) When coil is energized, contacts switch to opposite condition. Identified with same number letter as parent coil (CR1, PSC4, M2, OL2, etc.)</td>
</tr>
<tr>
<td>NC</td>
<td>(Normally Closed)</td>
<td></td>
</tr>
<tr>
<td>(Normally Open)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>Cam Switch</td>
<td>The symbol illustrates the switch function in a manner similar to that of the limit switch. For more complete discussion, see ADDENDUM III. Numbered (CS1, CS2, etc.)</td>
</tr>
<tr>
<td>NO</td>
<td>(Normally Closed)</td>
<td></td>
</tr>
<tr>
<td>(Normally Open)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DISC</td>
<td>Disconnect Switch</td>
<td>Main safety disconnect switch (usually 230/460 volts). The symbol illustrates the line terminal connections (open circles) and the two positions of the switch: &quot;ON&quot; or &quot;OFF&quot;, the dotted line indicates the operating device that throws all of the contacts simultaneously, usually a lever or toggle. Labeled DISC.</td>
</tr>
<tr>
<td>FU</td>
<td>Fuse</td>
<td>In main power panel as a part of the transformer or fusible disconnect. Numbered (FU1, FU2, etc.)</td>
</tr>
</tbody>
</table>

NOTE: The actual devices on the machine are labeled with the same number-letter designations as shown in the schematic diagram.
### TABLE 7-3: Common Electrical Symbols

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESIGNATION &amp; TITLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>GND Ground</td>
<td>Symbol used to indicate ground (common) leg of circuit (Wire #X2).</td>
</tr>
<tr>
<td>HTR</td>
<td>Heating Element</td>
<td>A resistor used to provide heat to a component. Used with hot melt glue units. Numbered (HTR1, HTR2, etc.)</td>
</tr>
<tr>
<td>JUMPER</td>
<td>Jumper wire</td>
<td>The symbol illustrates the line terminal connections and graphically depicts a jumper wire connecting the other two wires. It shows how a jumper wire is installed to provide optional features. To exercise the option, merely remove the jumper wire and install the feature.</td>
</tr>
<tr>
<td>LS</td>
<td>Limit Switch</td>
<td>The symbol illustrates the line terminal connections depicts how the switch operates. The wedge on the side of the movable contact represents an internal tension (spring tension, weight, etc.). The normally open (NO) symbol shows that this tension ordinarily holds the switch open; to close it, an external force must overcome the internal tension. The normally closed (NC) contact must be opened by an exterior force. In the “held” positions, the switch is ordinarily actuated by some external force which must be removed for the contacts to “fall” to their normal position. Switches are numbered and described in the schematic.</td>
</tr>
<tr>
<td>LT</td>
<td>Light, Indicator (Pilot)</td>
<td>Symbol represents illuminated lamp. When circuit is completed, lamp lights; and when circuit is broken, lamp goes out. Letter inside circle represents color of lens (A-amber, G-green, R-red, etc.). Numbered (LT1, LT2, etc.). (NOTE: Lamps contained in push buttons are frequently displayed on the schematic with the indicator light symbol, but are not normally numbered separately.)</td>
</tr>
<tr>
<td>M</td>
<td>Motor Starter</td>
<td>An electromagnetic coil (in main power panel) that, when energized, closes auxiliary contacts to start a motor. Numbered (1M, 2M, etc.)</td>
</tr>
<tr>
<td>MTR</td>
<td>Motor</td>
<td>Three phase AC Motor. Numbered (MTR1, MTR2, etc.) and named (“MAIN DRIVE”, “CONVEYOR”, etc.). Specifications (Hp, rpm, frame, etc.) are usually included.</td>
</tr>
</tbody>
</table>
### TABLE 7-3: Common Electrical Symbols

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESIGNATION &amp; TITLE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>OL</td>
<td>Overload Relay (Thermal)</td>
<td>A thermal overload relay operates on the same principle as a fuse; however, they can be manually reset, and do not have to be replaced. Appear in power lines ahead of motor (three for three-phase motor). Numbered (10L, 20L, etc.)</td>
</tr>
<tr>
<td>PB</td>
<td>Push Button (Normally Open)</td>
<td>The symbols for push buttons illustrate the “normal” position of the switch and graphically indicate what will happen if the button is depressed. The horizontal bar will contact the line terminal connections (open circles) to close the circuit; it will break contact to open the circuit; or it will switch from one set of contacts to another. The normally open contacts are used generally for “START” (or actuating) and the normally closed for “STOP”. Buttons are numbered (PB1, PB2, etc.) and labeled (“START”, “STOP”, etc.) Red, green, and black are most common. Some are equipped with lamps (see symbol and discussion for LIGHT).</td>
</tr>
<tr>
<td>PB</td>
<td>Mushroom Head</td>
<td>Large push button (usually red) used for emergency stop. Numbered with other push buttons (PB1, PB2, etc.) and labeled “EMERG. STOP.”</td>
</tr>
<tr>
<td>PE</td>
<td>Photoeye “Photosensitive Cell”</td>
<td>(Not standard JIC symbol) When circuit is completed to the photoeye (usually connected to “hot” leg), the photoeye is actuated, and its auxiliary contacts (one pair normally open and one pair normally closed) are energized in their normal position. When the beam is broken (or cleared, as the case may be), the contacts switch to their opposite position, and return to normal when original condition is again established. Photoeyes (and auxiliary contacts) are numbered (PE1, PE2, etc.)</td>
</tr>
<tr>
<td>PRS</td>
<td>Proximity Switch (Normally Open)</td>
<td>Inductive proximity sensors are designed to operate by generating an electromagnetic field and detecting the eddy current losses generated when ferrous and nonferrous metal objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger-signal level detector and an output circuit. As a metal object advances into the field, eddy currents are induced. The detection of this current generates a signal which will turn the solid-state output “ON” or “OFF”. The symbols used graphically show an open and closed state. The normally open (NO) symbol depicts that when the switch receives a signal it will turn the output to “ON”. The normally closed (NC) symbol depicts that when the switch receives a signal it will turn the output “OFF”. Switches are numbered (PRS1, PRS2, etc.) and described in the margin (and sometimes the body) of the schematic.</td>
</tr>
<tr>
<td>PRS</td>
<td>Proximity Switch (Normally Closed)</td>
<td></td>
</tr>
</tbody>
</table>

---

**NOTES:**
- Red, green, and black are most common.
- Some symbols are equipped with lamps (see symbol and discussion for LIGHT).
- Switches are numbered (PB1, PB2, etc.) and labeled.”EMERG. STOP.”
- Photoeyes (and auxiliary contacts) are numbered (PE1, PE2, etc.)
- Inductive proximity sensors are designed to operate by generating an electromagnetic field and detecting the eddy current losses generated when ferrous and nonferrous metal objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger-signal level detector and an output circuit. As a metal object advances into the field, eddy currents are induced. The detection of this current generates a signal which will turn the solid-state output “ON” or “OFF”. The symbols used graphically show an open and closed state. The normally open (NO) symbol depicts that when the switch receives a signal it will turn the output to “ON”. The normally closed (NC) symbol depicts that when the switch receives a signal it will turn the output “OFF”. Switches are numbered (PRS1, PRS2, etc.) and described in the margin (and sometimes the body) of the schematic.
### TABLE 7-3: Common Electrical Symbols

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESIGNATION &amp; TITLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOL</td>
<td>Solenoid</td>
<td>An electromagnet coil that is used to operate a valve (pneumatic or hydraulic). When voltage is applied to the solenoid coil, the device is operated. Pneumatic valves come as single solenoid or a double solenoid; regardless, each solenoid is treated individually on the schematic. Solenoids are numbered (SOL1, SOL2, etc.) and their function briefly described.</td>
</tr>
<tr>
<td>SS</td>
<td>Selector Switch</td>
<td>(Not standard JIC symbol) The symbol illustrates the line terminal connections (open circles) and the two (sometimes more) positions of the switch: “ON” or “OFF”. When “OFF” (arrow indicates) bar is lifted off connections and circuit is open; when “ON” bar makes contact with connections and closes circuit. Switch is usually equipped with one pair of each normally open (shown) and normally closed contacts. Numbered (SS1, SS2, etc.) and sometimes labeled (“CONVEYOR”, “VACUUM”, etc.). Positions named as appropriate (e.g., “HAND-AUTO”, “RETRACT-EXTEND”, etc.).</td>
</tr>
<tr>
<td>T</td>
<td>Transformer</td>
<td>Used to change the values of voltage and current from one circuit to another. Usually “step-down” from 230/460 volts to 115 volts (operating voltage). Numbered (1T).</td>
</tr>
<tr>
<td>TGS</td>
<td>Toggle Switch</td>
<td>Symbol is interpreted the same as all other standard switches. When manually closed, it remains closed until manually opened. Numbered (1TGS, 2TGS, etc.).</td>
</tr>
<tr>
<td>TR</td>
<td>Timer Contacts</td>
<td>Open circles depict the line terminal connections. The arrowhead on the lever of the timer contact symbol indicates the function of the switch according to the condition of the relay. The top two symbols represent the contacts when the relay is energized; the bottom two, when the relay is de-energized. Timing can thus be indicated under four separate conditions: two after energizing and two after the de-energizing. The first symbol indicates the contacts will close when the relay is energized, but are time delayed to close after a set interval (provided the relay is energized). The second symbol indicates the contacts will open when the relay is energized but time delayed to open. The third symbol indicates contacts will normally open when the relay is de-energized; however, they will not open immediately when the relay is de-energized, but are time delayed to open some interval after the relay is de-energized (if the relay remains de-energized). The fourth symbol shows the opposite: contacts normally closed when the relay is de-energized, but time delayed to close after the relay is de-energized. Contacts are numbered (1TR, 2TR, etc.).</td>
</tr>
</tbody>
</table>
7.2.2.6 Troubleshooting guide  Table 7-4 lists some logical general steps to follow in order to help isolate and correct common potential trouble items (note that the format is different from that of the General Guide). As a supplement to Table 7-4, the following list is composed of some general electrical tips you should consider and check in going through the schematic:

a. Check to see all switches are “ON”, when they are supposed to be
b. Look for any type of jam (pieces of cardboard, rags, tools, etc.)
c. Inspect for blown fuses or open circuit breakers
d. Check for thermal overloads for motors
e. Look for limit switches that have loosened, jammed, or gone bad
f. Check to insure lever arms on limit switches and actuators are engaging properly
g. Insure photoeyes and reflectors are clean, aligned, and operating
h. Check to be sure that photoeyes are not receiving false reflections from painted surfaces or external lights
i. If the trouble has been isolated and determined to be electrical, but is not caused by any of the above, then check for faulty wiring or defective equipment (motors, motor starters, solenoids, switches, relays, photoeyes, timers, etc.)

**WARNING!** Take all necessary precautions to prevent injury or damage when troubleshooting. Disconnect power and/or air when in doubt.

<table>
<thead>
<tr>
<th>GOAL</th>
<th>GENERAL TASK</th>
<th>SPECIFIC FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To determine the specific operational problem.</td>
<td>1A. Check setup and operating procedures.</td>
<td>1A-1. If necessary, review Chapters 4 &amp; 5 of this manual.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A-2. Check panel switch setting and other setup/operating adjustments and preparations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1A-3. Attempt to operate a normal automatic cycle.</td>
</tr>
<tr>
<td>1B. Proceed step-by-step to determine at what point in the cycle incorrect action occurs, and exactly which operation malfunctions.</td>
<td>1B-1. Note all machine operations that function normally.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1B-2. Note any operation that does not turn on or off at the right time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1B-3. Note any sporadic or intermittent operation.</td>
<td></td>
</tr>
<tr>
<td>1C. Before proceeding with electrical troubleshooting, rule out mechanical or other types of malfunctions.</td>
<td>1C-1. If non-electrical cause of trouble is suspected, refer to General Troubleshooting Guide (Table 7-1).</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 7-4: Electrical Troubleshooting Guide

<table>
<thead>
<tr>
<th>GOAL</th>
<th>GENERAL TASK</th>
<th>SPECIFIC FUNCTION</th>
</tr>
</thead>
</table>
| 2. To isolate and correct the problem. | Refer to the electrical schematic, and locate the device (relay, solenoid, etc.) that would most likely cause the problem in question. | **2A-1.** Note what auxiliary contacts, and switches, play a part in the operation of the suspected device.  
**2A-2.** By process of elimination, try to narrow the probable causes. |
| 2B. Determine whether voltage is applied (circuit completed) and/or is disconnected (circuit opened) at the proper time. | Connect one lead of a voltmeter or circuit tracing light to the neutral or common line. | **2B-1.** Connect one lead of a voltmeter or circuit tracing light to the neutral or common line.  
**2B-2.** Place the other probe of the meter or light to the “hot” side of the device in question.  
**2B-3.** Operate an automatic cycle and observe the meter reading or light. |
| 2C. If voltage is applied at the right time, but device still does not operate properly: | Replace or repair the defective device. | **2C-1.** Replace or repair the defective device.  
**2C-2.** Check again for mechanical problem (binding, sticking, misadjustment, etc.) See Table 7-1. |
| 2D. If voltage is not applied at the right time: | Trace back toward the “hot” line, through each switch or pair of contacts (identified in Step 2A-1 above) until you can determine where the circuit is not being completed when it should be (check voltage at switch contacts). | **2D-1.** Trace back toward the “hot” line, through each switch or pair of contacts (identified in Step 2A-1 above) until you can determine where the circuit is not being completed when it should be (check voltage at switch contacts).  
**2D-2.** Tighten any loose connection.  
**2D-3.** Readjust parts as necessary.  
**2D-4.** Repair or replace defective parts (contacts, switches, relays, etc.) |
| 2E. If devices are not “turned off” at the right time: | Check for a circuit that is closed when it should be open. | **2E-1.** Check for a circuit that is closed when it should be open. |
HOW TO USE THE MULTI-LEVEL BILL OF MATERIAL
SUPPLIED WITH MACHINE

BOM-1. INTRODUCTION

The Multi-Level Bill of Material (BOM) supplied with the machine can be helpful for finding part numbers and/or bubble numbers. These instructions explain the layout of the BOM, hopefully providing for understanding and ease of use of the bill. The BOM is a complete listing of the parts and purchased components used to assemble the machine and should be kept with other machine documentation for future reference (e.g., purchase of spare parts).

BOM-2. TITLES AND COLUMNS

The column headings show on each page are arranged as described below. From left to right they are: Mod Number, Position, Part Number, Quantity, and Part Description. A description of each column follows.

Main Assembly Number (leftmost column, bold numbers, no column title): Each main section of the machine has its parts listed separately. Examples of main assemblies include Guards (GED), Electrical Panels (ELE), and Modules (mechanical sections; MOD). The Main Assembly number indicates on which machine section (directly below the main machine serial number in the machine tree structure) each part is located.

Position: This column shows the bubble (position) number of the sub part with reference to the Assembly Drawing for the Level 1 parent part of which the sub part is a "child." This space is filled with an asterisk if no bubble number appears on the print.

Part Number: The Pearson Packaging Systems part number for each machine component is included on the list. Use this part number when ordering spares from Pearson at 1-800-732-7766.

Quantity: Indicates the total quantity of the subject part required for its parent module or assembly.

Part Description: A brief description of the part, its size, color, material, etc.
**BOM-3. HOW TO READ THE BILL**

The bill is sorted alphabetically by Main Assembly, then alphanumerically by Part Number. The first item shown will be the Electrical Bill of Materials (because the electrical Main Assembly begins with “E”). The parts making up the Electrical Assembly are listed, then the next assembly will be the Guard assembly, GRD-09XXXX and its component parts. After that the other main assemblies will be listed numerically; MOD-01XXXX, MOD-02XXXX, MOD-03XXXX etc.

To find the upper level Assembly to which a part is attached, look **UP** in the leftmost column to the nearest Main Assembly number. This will show the Main Assembly to which each part is attached (and thus the appropriate drawing number to visually locate that part).

**BOM-4. BRIEF EXPLANATION OF PART DESCRIPTIONS**

The first part of the description is based on a naming convention established to accommodate the Computer Aided Design (CAD) System used by Pearson Packaging Systems. The latter part of the description is intended to be a simple, layman’s description of the part. Thus you may find one part with a Position number of “1” is a door guard and the second part with a Position number of “1” is a machine frame. These descriptions allow the parts to be distinguished one from another.
CHAPTER 8

PARTS REPLACEMENT

8.1 REPLACEMENT INSTRUCTIONS

8.1.1 If the R235 Adjustable Case Erector & Bottom Sealer malfunctions, refer to the troubleshooting guides (Chapter 7) to determine if removal of any mechanical parts is necessary.

**WARNING!** If you must disassemble any part of the machine, make sure all power and air are off.

8.1.2 To remove most parts from the machine is rather straightforward. Bolts, brackets, holding screws, etc. are readily apparent. General subassembly drawings with parts identified are included in the accompanying packet of drawings.

8.1.3 Before reassembly, wipe all parts with a clean dry cloth and, as appropriate, apply a good grade of the proper type of lubricant (see Table 6-3) to each working part.

**Caution!** Do NOT over-lubricate.

8.2 PARTS LISTS

8.2.1 Replaceable Parts

In the packet supplied with this manual are prints of all key subassemblies of this Adjustable Case Erector & Bottom Sealer. Individual parts are identified by number on those drawings. Due to various circumstances, on occasion a part pictured in some of the drawings may need replacing. In such an event the prints will aid in that process.

8.2.2 Standard Hardware

When available, vendor data sheets are provided to aid in identifying, servicing, and replacing standard purchased parts. Those data sheets are enclosed in the accompanying packet, and a list indicating which were sent is an enclosure to this manual. See 8.3 for ordering procedures.

8.2.3 Recommended Spare Parts Lists

It is recommended that enough spare parts be stocked to ensure minimal “downtime” in the event something should break or wear out. What comprises “enough” is somewhat subjective. One customer bought a spare of nearly every working part on a very complex machine - perhaps an extreme approach. On the other hand, that plant has enjoyed a phenomenal production rate. Pearson Packaging Systems does not advocate purchasing enough spare parts to build an entire machine, but a liberal amount invested in emergency parts may bring a generous return later, compared to production dollars lost due to a disabled machine.
Pearson machines are widely reputed for their durability and sturdiness, so any stock of spare parts need not be overwhelming. As a minimum the items listed on the enclosed “Recommended Spare Parts List” should be purchased.

### 8.3 ORDERING PROCEDURES

#### 8.3.1 Replacement Parts

The R.A. Pearson Company maintains a stock of replacements and parts for most components on our machines, including standard parts purchased from outside vendors as well as those custom manufactured. To order any part (including those on the Recommended Spare Parts List), provide the following information:

- a. Machine Serial Number
- b. Pearson Part Number (if available; can be found on enclosed Bill of Materials or Recommended Spare Parts List)
- c. Quantity required
- d. Description
- e. Purchase Order Number
- f. Shipping Instructions

#### 8.3.2 Warranty Replacement Parts

To order parts still under warranty use the same procedure above and provide the following information:

- a. Serial Number of the machine and previous P.O. number
- b. Pearson Part Number (if available; can be found on enclosed Bill of Materials or Recommended Spare Parts List)
- c. Quantity required
- d. Description
- e. NEW Purchase Order Number (required)
- f. Shipping Instructions to:

The required information should be sent to:

Service Parts Dept.
R.A. Pearson Company
W. 8120 Sunset Highway
Spokane, WA
99224
Telephone: (509) 838-6226
Fax: (509) 747-8532

An authorization number will be issued to accompany and identify the return. Parts must be returned within 30 days. The defective part will be returned to the vendor for evaluation. If the defective part is determined to be covered under the warranty and is credited, the new purchase order will be credited.