

INSTRUCTION MANUAL

O.P.L.™

**One Person Loader
Spreader/Feeder**



©Chicago Dryer Company

Instruction Manual #3018-031h

CHICAGO DRYER COMPANY

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Chapter 1

INTRODUCTION

This chapter includes the following sections:

- 1.1 Warranty**
- 1.2 Scope of the Manual**
- 1.3 Safety**

The O.P.L.[™]—One Person Loading unit (Figure 1-1) is an ultra-compact spreader/feeder unit that attaches to an ironer to feed larger sheets and table flatwork. The unit will feed polyester/cotton blends, VISA[®], or all-cotton fabrics. Dual air cylinders are provided lift the unit out of the way to allow operators to feed pillow cases and other small flatwork.

Like the rest of the CHICAGO[®] product line, the O.P.L. is designed, manufactured, and assembled in Chicago, Illinois. Before the CHICAGO[®] nameplate is affixed to any unit, a final inspection is performed, including thorough testing under load conditions.

Any questions concerning the installation, operation, or repair of the unit should be directed to a local authorized CHICAGO[®] dealer or the Chicago Dryer Company factory Service Department at:

- | | |
|----------------------------------|--|
| ✉ Chicago Dryer Company | ☎ (773) 235-4430 |
| 2200 North Pulaski Road | Fax (773) 235-4439 |
| Chicago, Illinois USA 60639-3737 | Email service@chidry.com |

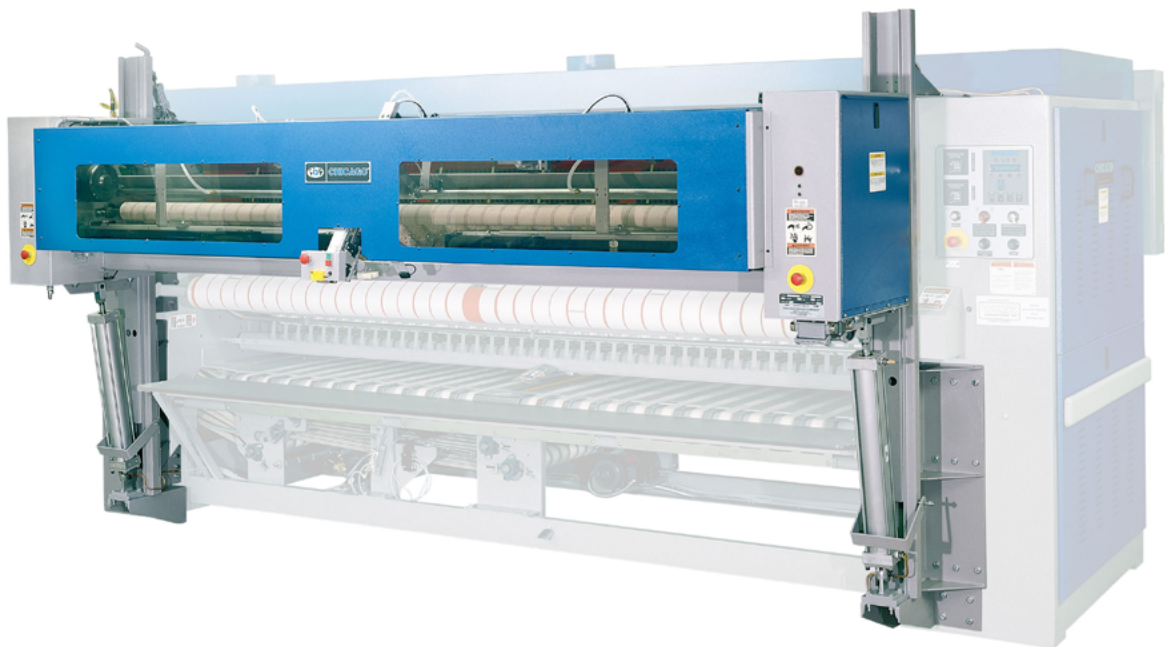


Figure 1-1: The O.P.L. is ultra compact and provides high quality spreading and feeding.

1.1 Warranty

A full page warranty statement is included in this *Instruction Manual*. Please take the time to review this warranty and understand its provisions.

1.2 Scope of the Manual

This instruction manual will help you keep your CHICAGO® product operating safely, efficiently, and with minimum expense. Individual chapters in this manual provide the necessary information required for safe installation, operation, maintenance, troubleshooting, and repair of the Comet Executive Gas ironer.

Updates

Occasionally, new information about the unit becomes available after the publication of this manual. If you receive a CHICAGO® FYI *Service Bulletin* pertaining to your unit, insert the bulletin in the front of the manual.

Chapter 1 - Introduction

Provides an overview of the unit and its key features, of this manual, and of important safety features.

Chapter 2 - Installation

Describes recommended procedures for determining a suitable location for the unit and connecting the utilities. This chapter also includes checkout procedures to ensure all systems are working properly. Local requirements often vary, so follow local codes at all times.

Chapter 3 - Operating Guidelines

Gives recommendations for operating the unit at maximum efficiency. This chapter includes instructions for operators and suggestions for work organization.

Chapter 4 - Preventive Maintenance

Contains procedures for **Daily**, **Weekly**, **Monthly**, **Semi-Annual**, and **Annual** maintenance. Follow these procedures to keep the unit operating safely and at maximum efficiency. A *Preventive Maintenance Schedule* is located at the front of this chapter.

Chapter 5 - Operating Principles

Describes the operation of the unit in detail. A good understanding of this chapter will help avoid operation errors and assist with troubleshooting and maintenance.

Chapter 6 - Troubleshooting

Contains issues, possible causes, and solutions in all areas of operation.

Chapter 7 - Repair

Contains procedures for making adjustments, repairs and parts replacement for the unit. Please follow all safety recommendations carefully.

Parts List

Contains detailed drawings and part specifications to assist in ordering replacement parts. It is divided into views in which the parts are grouped by function.

Schematics

Contains electrical drawings showing power and motor circuits, control and interlock circuits, and other relevant drawings, including part specifications.

Appendix

Contains *Technical Specifications*, a *Floor Plan*, and other relevant information for the unit.

Index

Contains an alphabetical listing/cross-reference of all topics and procedures within this *Instruction Manual*.

1.3 Safety

Safe operation and maintenance of the unit must be the first priority of all supervisors, operators, and maintenance personnel. Safety begins with safe work habits. In addition, the unit is equipped with built-in safety features for protection.

Safe Work Habits

During Daily Operation

- Take the flatwork only after it has cleared the unit. Do not pull on the finished flatwork while it is still in the machine.
- Post the “Operator Safety” reminders in a place where everyone will see it. Read these reminders and follow the recommendations.
- Read and follow all safety labels.
- Keep hands and clothing away from the moving parts of the ironer while it is operating.
- Always turn off the unit before clearing a jam.
- Operate the unit only with all guards and endframe doors in place and all safety features operating correctly. Never operate the unit with any safety features bypassed.

Maintenance and Repair

WARNING

Always use extreme caution when performing any repairs that require the unit to be operating.

Keep hands and loose clothing from coming into contact with any of the moving parts.

Serious Injury Could Result.

When the unit is running, one person should be ready at a red safety STOP button at all times to stop the unit if necessary.

Before attempting any repair work, review these safety steps and precautions to protect yourself and the machine.

- Safety should be the primary concern of anyone performing corrective maintenance.
- Except where specifically directed, make sure that the main disconnect switch to incoming power is OFF and the machine completely COOL.
- It is recommended that all maintenance procedures be handled by at least two qualified persons. Using the “buddy system” facilitates a quicker procedure and decreases the risk of an accident.
- Your site should have procedures that comply with government regulations and standards for equipment lockout/tagout during maintenance and repair. Ask your supervisor for specific information. It is the users’ responsibility to make sure they comply with all safety procedures.

WARNING

Know the proper procedure for locking out and tagging equipment during repair procedures.

Follow the rules of your work site. Failure to do so could result in serious injury.

Make sure the power is disconnected before servicing the unit.

Do not repair or correct any condition without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Safety Features

There are six categories of safety features:

- Main Disconnect Switch
- Safety Stop Buttons
- Safety Guards
- Safety Interlock Switches
- Safety Labels
- Safety Messages in this Manual

Main Disconnect Switch

The main disconnect switch is located on the outside of the main electrical box. When turned to OFF, this switch shuts off incoming electrical power to the unit.

Unless otherwise indicated, turn the main disconnect switch to OFF before performing any maintenance or repair work.

Safety Stop Buttons

There are three red safety STOP buttons arrayed around the unit, one at each corner and one at the operator station.

Pressing any of these buttons immediately stops all rotating and moving parts, releases compressed air pressure, and shuts down the machine. To reset a pressed red safety STOP button, twist it.

The preferred method of stopping the operation of the unit is by pressing one of the square red Stop buttons located at the operator station.

Safety Guards

A windowed front access guard allows operators to see the internal parts of the spreader/feeder when it is in operation while providing protection from moving parts.

Each endframe is covered by a protective door. These prevent fingers or hands from coming into contact with moving parts. They also serve to keep objects, other than flatwork, from entering the unit and damaging components.

Heavy duty latches securely hold the O.P.L. when it is in the raised position.

Safety Interlock Switch

Safety interlock switches are located behind each endframe panel and the front guard. Whenever any of these components is opened or removed, its associated interlock switch is opened and all rotating parts stop moving.

The safety interlock switches are not intended to lockout the unit. Site management is responsible for developing and implementing lockout/tagout procedures that comply with government standards for use when servicing the unit.

Safety Labels

WARNING (orange) and CAUTION (yellow) labels (Figure 1-2) are placed at locations around the unit to keep operators and maintenance personnel alert in particular areas.

WARNING labels alert personnel that **personal injury may result** from not following recommended procedures.

CAUTION labels alert personnel **the unit may be damaged** if conditions, practices, or procedures are not observed.

When training operators, take the time to locate, review, and understand all areas where labels are posted.

NOTE: Do not remove safety labels at any time. If a label needs to be replaced, contact Chicago Dryer Company for free replacements.

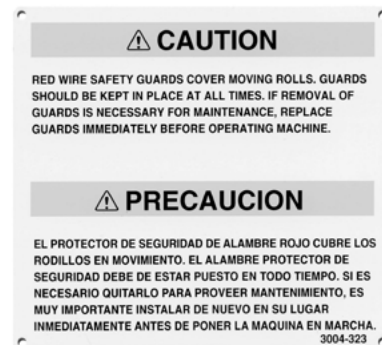


Figure 1-2: Safety labels remind operators and maintenance personnel that care must be taken when working near these areas.

Safety Messages in this Manual

WARNING and CAUTION messages appear in this manual to highlight essential safety information.

WARNING messages alert personnel that **personal injury may result** from not following recommended procedures.

WARNING

Never operate the unit unless all safety systems are working correctly and all access panels are in place.

BLACK BOX WARNING messages alert personnel of the operating condition a unit must be in before performing any procedure. **Personal injury may result** from not following recommended procedures.

Perform only when the unit is OFF with power disconnected and COOL.

CAUTION messages alert personnel that **the unit may be damaged** if conditions, practices, or procedures are not observed.

CAUTION

Never use compressed air on or around electronic components. Doing so may damage them.

Chapter 2

INSTALLATION

This chapter contains installation instructions for the O.P.L.[™] and includes the following sections:

2.1 Site and Utility Requirements**2.2 Installation Procedures****2.3 Pre-Operational Checkout**

The spreader/feeder is tested under load conditions at the factory and inspected to ensure proper operation. It is shipped in working condition and is completely assembled, requiring only setup of the exit conveyors. Sufficient strapping, blocking, and bracing were provided to give reasonable assurance that no shipping damage would occur.

NOTE: *If the spreader/feeder is received in damaged condition, notify the carrier at once.*

Chicago Dryer Company's responsibility for shipping damage, other than the standard warranty, ceases upon delivery to the carrier. For more information on the warranty, see the full page warranty statement at the front of this manual.

2.1 Site and Utility Requirements

The O.P.L. has no special clearances required beyond those for the ironer to which it is being attached. Proper and adequate spacing for the ironer will provide required clearances for the spreader/feeder.

This will ensure the minimums recommended for efficient production and service, as well as maintenance access. It is strongly recommended that enough clear space be provided around the ironer and spreader/feeder to allow for efficient access.

The exception to this is for ironers which have rear canopy exhaust discharge to low vertical clearances. In these cases make sure there is at least 100" (255 cm) of vertical clearance before installing the O.P.L.

NOTE: *The correct location of the ironer for proper use of the O.P.L. spreader/feeder is of extreme importance.*

The site must have a level, sturdy floor capable of supporting the spreader/feeder's weight in addition to the ironer's, without significant flexing. For weight specifications and other technical information refer to [APPENDIX: Technical Specifications](#).

No special foundation or other preparations are required for the O.P.L.'s installation. Foundation requirements for the ironer should be followed. Comply with local codes or conditions at all times.

Compressed air that is clean and dry must be provided for the unit. This is very important because the air will blow directly on the flatwork. The compressed air supply must meet the pressure and air flow requirements noted in [APPENDIX: Technical Specifications](#).

Note that these are requirements in addition to those of the ironer and remember that the O.P.L. takes its air supply from the ironer. Therefore, make sure the air supplied the ironer is of sufficient quantity, pressure and quality to handle the needs of both machines.

The electrical requirements of the O.P.L. are shown on the nameplate, located on the front of the right endframe (Figure 2-1). Additional information can be found in [APPENDIX: Technical Specifications](#).

Note that these requirements are also *in addition* to those of the ironer. The O.P.L. requires an electrical supply separate from the ironers.

Wiring and a separate, fused disconnect switch of suitable size must be locally supplied if local codes require one. Check local codes for clearance requirements to any electrical box.

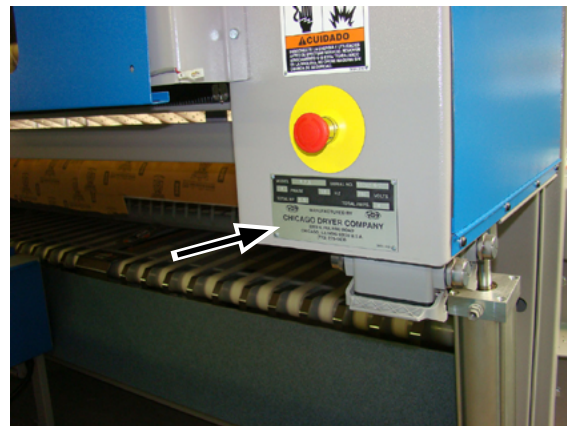


Figure 2-1: The nameplate gives important information about the O.P.L.

2.2 Installation Procedures

The spreader/feeder should be moved on its casters whenever possible. When this is impractical, and when removing it from the skids, be sure that it is handled only by qualified riggers using proper equipment.

Installation of the spreader/feeder includes:

- [Inspection](#)
- [Uncrating, Placement and Attachment](#)
- [Compressed Air Supply Connection](#)
- [Electrical Connection](#)
- [Final Protective Wrapper Removal](#)

Inspection

NOTE: *Notify the carrier if any damage has been done to the spreader/feeder during shipment.*

It is in the interest of the buyer to carefully inspect all shipments before they are accepted from the carrier. Upon delivery, be sure that all items listed on the bill have been received.

Any shortage, breakage, or damage noticed at the time of delivery should be indicated on the carrier's freight bill and signed by the driver or carrier's representative.

Damage noticed after delivery should be reported to the carrier at once. Request their inspection of the shipment and fill out a concealed damage inspection report.

Uncrating, Placement and Attachment



Required Tools

Crowbar
Forklift
Screwdriver
Sledgehammer
Wire cutter/knife
Wrenches: 9/16" (2)

1. Before unpacking the unit, make sure that the proposed site is acceptable and, if necessary, that vertical clearances are adequate.
2. Remove the crating, strapping, and other packaging materials from the unit. Leave the protective plastic covers on the controls. These protective coverings should be left in place until the unit is ready for use.
3. Open both endframe doors and remove any materials that shipped with the unit. Close and secure the doors.

CAUTION

The unit should only be moved by qualified riggers using proper equipment.

4. With the unit still on its skid, move it into approximate position. Remove the bolts which secure the unit to the skid.

CAUTION

Do not drop or twist the unit.

5. As appropriate:
 - If the unit is equipped with eye bolts, lift the unit straight up using the two eye bolts on top of each endframe and carefully remove the skid from under it.
 - OR
 - Lift one endframe and carefully remove the skid from under it and then repeat for the other endframe.
6. If the unit is equipped with eyebolts, skip to Step 9; otherwise, follow the next step.
7. Remove the front guard (Figure 2-2, A). Make sure to disconnect the tail photosensor connector inside the front of the unit, near the right endframe (B). Be careful to keep track of all screws. Place in a safe location.
8. Maneuver a forklift so that it is supporting the unit by both upper cross-members (Figure 2-3). Use caution not to snag or catch any belts, wires or hoses.

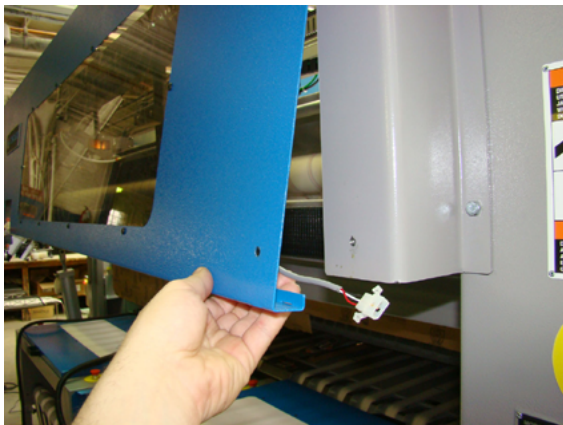


Figure 2-2: Remove the front guard to raise the unit by forklift.

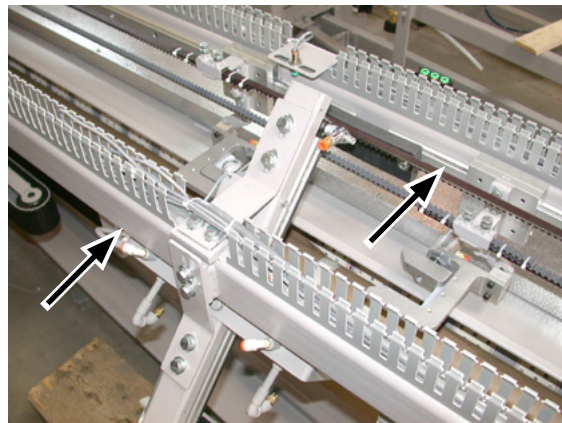


Figure 2-3: Make sure the fork lift uses both upper cross members to lift the unit.

9. Raise the unit a couple of feet off the ground and then open both endframe doors.
10. Now, raise the unit until the mounting holes in the back of each endframe are even with the mounting holes on the moving posts (Figure 2-4).
11. Using the provided bolts, secure the O.P.L. to the moving posts. Make sure to use all four bolts on both sides and that each is fully secured.
12. Figure 2-5 shows the desired relative positioning of the discharge conveyor and the ironer inlet.
13. If necessary, adjust the arm in the positioning slot of the discharge conveyor (Figure 2-6).
14. Loosen the bolts on each side to make the adjustment. Tighten the bolts securely to maintain the adjustment. Make sure the adjustment amounts are even and that the ribbons track properly.
15. If necessary, replace the front guard removed in Step 7 or disconnect the rigging from the eyebolts and then remove the eyebolts from the unit. In replacing the front guard, make sure to reconnect the tail photosensor.
16. Reposition the tail sensor reflector, which was moved for shipping. Refer to Figure 2-7.

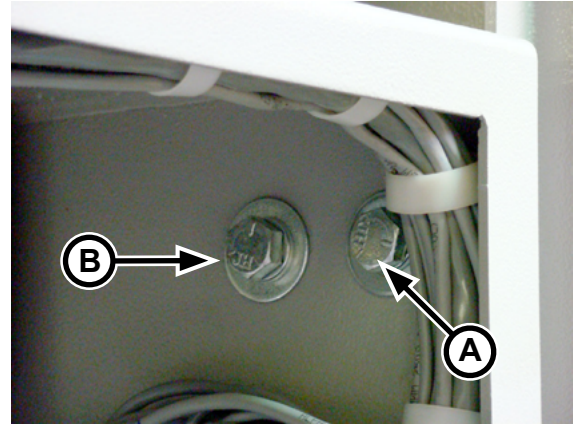


Figure 2-4: Make sure the O.P.L.'s mounting holes align with those on the moving posts.

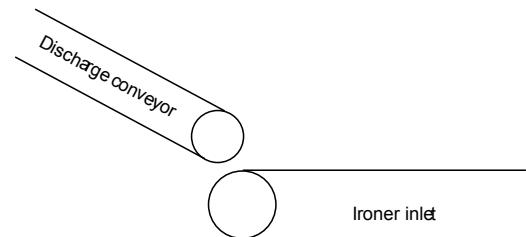


Figure 2-5: Position the discharge conveyor so that it is just slightly higher than the ironer inlet.



Figure 2-6: Discharge conveyor positioning slot.

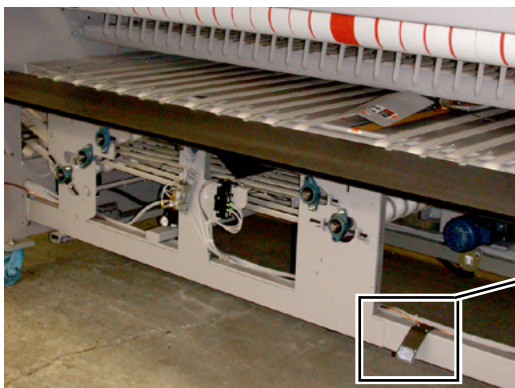
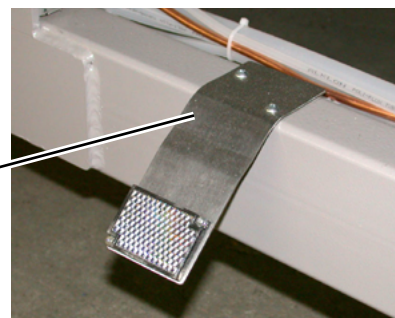


Figure 2-7: Tail reflector location.



Compressed Air Supply Connection

The unit requires a compressed air supply to drive certain parts of the machine and direct the laydown of the flatwork onto the discharge conveyor.

The air must be clean and dry to assure proper operation and long service life of the pneumatic components. Also, the air will come into direct contact with the flatwork.

The compressed air supply must meet the pressure and airflow requirements noted in [APPENDIX: Technical Specifications](#).

1. Make sure the compressed air supply to the ironer is OFF.
2. Connect the output fitting on the ironer (Figure 2-8, A) to the input fitting on the feeder (B). Use the flexible air hose provided.

CAUTION
**Do NOT turn on the
 compressed air supply at
 this time.**



Figure 2-8: Compressed air supply connection.

Electrical Connection

The nameplate (Figure 2-1), located on the right front endframe shows the electrical requirements of the unit. All labor and materials required to bring the electrical service to the unit are a local responsibility.

All electrical wiring must comply with local codes and a qualified electrician must size and connect the wiring.

CAUTION
**The incoming electric
 power service must match
 the specific electrical
 requirements as shown on
 the nameplate.**

See the unit's nameplate to determine the power supply requirements. If high or low voltage is suspected, check the electrical service to determine the actual voltage conditions. Improper or fluctuating voltage may damage motors and other electrical system components, and void the factory warranty.

NOTE: *A fused disconnect switch is incorporated into the electrical connection box. Check local regulations to determine whether a separate external fused disconnect switch is also required. Follow local codes at all times.*

Internal Electrical and Communications Cables

1. Locate the electrical receptacles beneath the right end frame (Figure 2-9, A).
2. Bring each of the electrical box's connectors to its respective receptacle. Each is a different size and only fits in one specific location.
3. Pull the locking lever to secure the connections.

CAUTION

Do not attempt to start the O.P.L. or the main unit at this time.

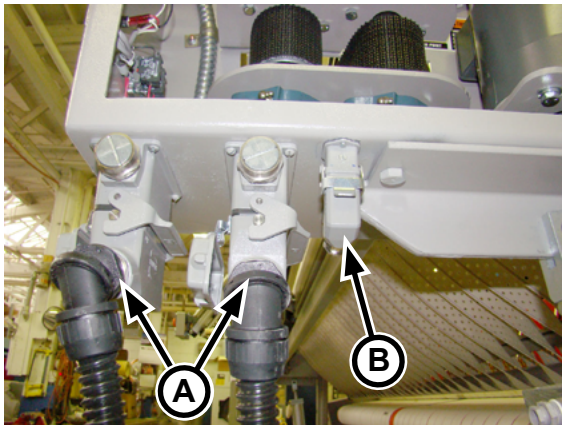


Figure 2-9: Electrical and communications receptacles.

Interconnected Stop Circuit (Option) Cable Connections

1. If the unit was shipped with the optional Interconnected Stop Circuit, it will be beneath the right endframe with the other connectors (Figure 2-9, B).

NOTE: Save this plug. It will be needed if the O.P.L. unit is ever run as a single machine.

2. Remove the feedback plug from the stop circuit connector.
3. Uncoil the stop circuit cable and attach it to the stop circuit connector. Pull the latch to secure the connection.
4. Remove the feedback plug from the ironer (Figure 2-10) and connect the stop circuit cable to its plug. Pull the latch to secure the connection.



Figure 2-10: Ironer stop circuit connection at the right front endframe.

External Electrical Wiring

WARNING

Only a qualified electrician should make the electrical connections to the unit. Improper installation could result in serious injury.



Required Tools

Allen wrench: 3/16"
Screwdriver

1. The main disconnect switch is located on the electrical connection box at the left rear of the unit (Figure 2-11, A). Turn it to the OFF position.
2. Turn the door latch (Figure 2-11, B) on the electrical connection box counterclockwise; then, open the electrical connection box.
3. Bring the supply lines to the electrical connection box. Use three wires for the power supply. A fourth wire for ground is required.
4. Extend the lines through conduit or greenfield. If it will be necessary to move the unit, leave plenty of slack in the greenfield for this purpose.

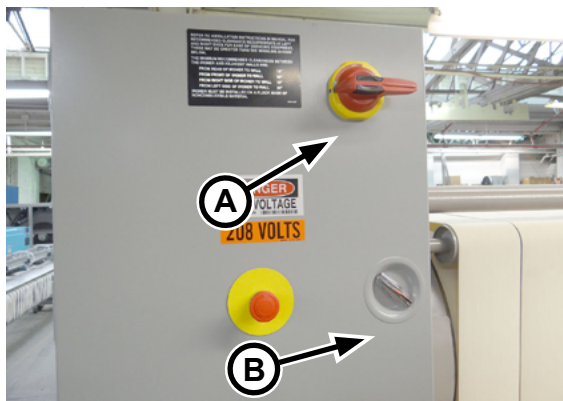


Figure 2-11: The main disconnect switch (A) and latch (B) secure the door of the electrical connection box.

5. Pull the external wiring through the hole in the top of the electrical box and secure the conduit or greenfield to the box. Follow local codes at all times.
6. Connect the three incoming power wires to the fused terminals of the main disconnect switch (Figure 2-12, A).
7. Connect the ground wire to the grounding lug (Figure 2-12, B) using the Allen wrench.

WARNING

The unit must be properly grounded to ensure operator safety.

8. Make sure the other end of the ground wire is connected to a proper earth ground.
9. Close and latch the electrical connection box after all electrical connections have been made.

CAUTION

Do not attempt to start the unit at this time. Leave the disconnect switch set to OFF.

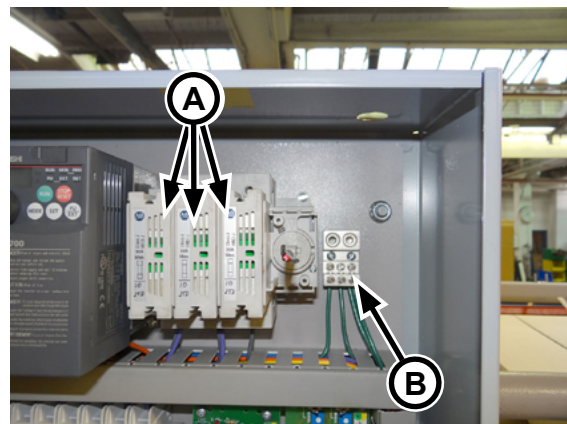


Figure 2-12: The electrical supply is connected at the top of the main disconnect switch.

Final Protective Wrapper Removal

Remove any and all remaining protective wrapping or packaging. Remove the protective plastic covers from the controls.

2.3 Pre-Operational Checkout

NOTE: For more information within this manual about the controls mentioned in the following procedures, refer to [Operating Controls on page 3-4](#).

The unit requires a thorough checkout before it can be placed into full operation. This includes:

- Security of Hardware
- Compressed Air Supply Checkout
- Safety Device and Control Function Checkout
- Check Speed Differential
- Spread/Feed Function Checkout
- Checkout Completion
- Cleaning the Unit

WARNING

Do not put the unit into service until all controls are functioning properly. Failure to do so may result in serious injury to operators or maintenance personnel.

Security of Hardware

Hardware may loosen during shipment or rigging.



Required Tools

Allen wrench set
Shim: 1 or 1.5 mm
Wrench set

1. Make sure power is OFF at the main disconnect switch.
2. Open both endframe doors.
3. The upper spreader encoder is located in the left endframe (Figure 2-13). It is mounted on a bracket very close to the teeth of the sprocket.
4. Make sure that the encoder does not touch the teeth of the sprocket - it should be .04" (1 mm) from the teeth.
5. Check all hardware connections and tighten as necessary.
6. Check that all setscrews are sufficiently tightened to hold their respective components in position.
7. Close and secure both endframe doors.
8. Make a final check that all protective wrappers and packaging have been removed.

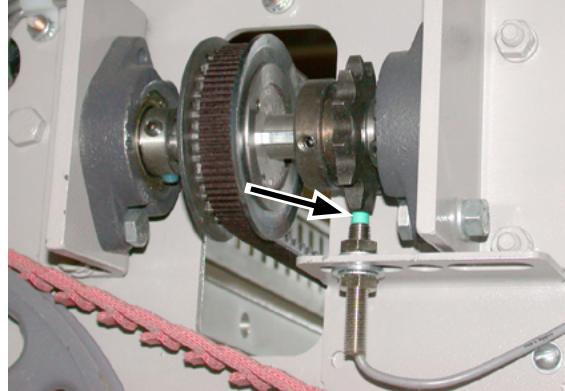


Figure 2-13: The upper spreader encoder in the left endframe.

CAUTION

Do not attempt to START the machine at this time.

Compressed Air Supply Checkout

Check the ironer's primary air pressure regulator and the O.P.L.'s internal pressure regulator and make sure each has the correct initial setting.

**Perform only when the unit is OFF
with power disconnected.**

WARNING
Wear protective eyewear
when working with
compressed air components.

1. Make sure the FEEDER UP/DOWN switch (Figure 2-14) is in the DOWN position.
2. Turn ON the compressed air supply to the ironer/O.P.L.
3. Wait a few seconds and then, open the ironer's the left endframe door. Check the incoming air pressure gauge and make sure it is set to 80 psi (550 kPa).
4. Close and secure the left endframe door.
5. Move to the front of the unit and look under the left front of the O.P.L. and locate its air pressure regulator (Figure 2-15). Make sure it is set to 60 psi (415 kPa).
6. Leave the compressed air supply turned on.



Figure 2-14: The O.P.L. UP/DOWN switch is located on the ironer's front endframe.

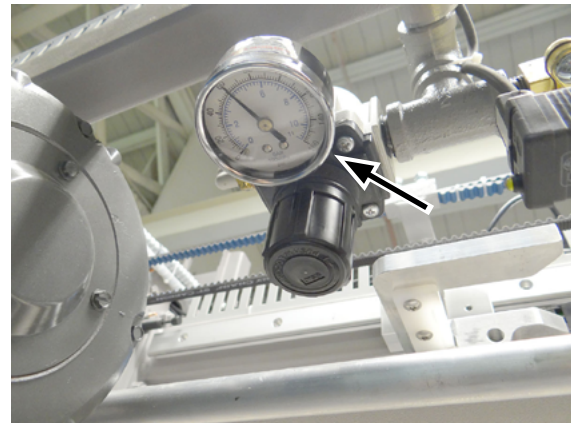


Figure 2-15: Air pressure gauge located inside the body of the machine.

Safety Device and Control Function Checkout

The machine can now be energized, checked for proper safety device and control function, and checked for correct operation. This includes:

- [Safety Device Check](#)
- [Control Function Checkout](#)

NOTE: *Work with another person. The “buddy system” is the safest system.*

All test procedures should be handled by at least two qualified people. Using the “buddy system” facilitates a quicker procedure and decreases the risk of an accident.

WARNING

Do not place the machine into service until all controls are functioning properly. Failure to follow this rule may cause serious injury to operators or maintenance personnel.

Safety Device Check

1. Turn power ON at the main disconnect switch for both the ironer and the O.P.L.
2. Press the ironer’s green START button.
3. Make sure both green indicator lamps on the front right of the O.P.L. are glowing (Figure 2-16, A).
4. Press the green Start button (Figure 2-17, A) on the O.P.L. unit. Make sure the various components of the unit start moving.

NOTE: *During normal operation, the Start/Stop buttons lamp glows steadily. The lamp flashes when a red operator STOP button or a red safety STOP button is pressed.*

NOTE: *If the unit is part of a line with the Interconnected Stop Circuit option, turn power ON at the main disconnect switch to the folder unit at the end of the line and turn ON its compressed air supply.*

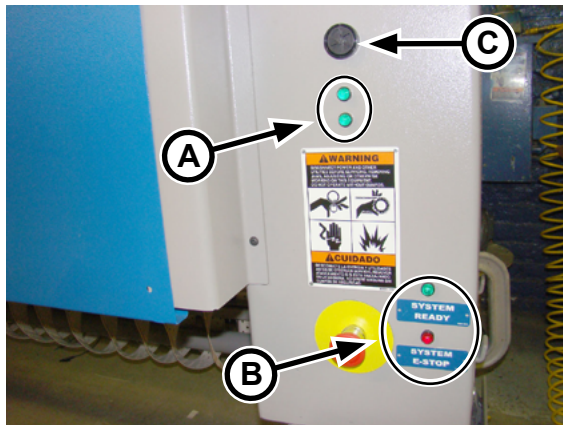


Figure 2-16: Both indicator lights must be lit for the unit to function.

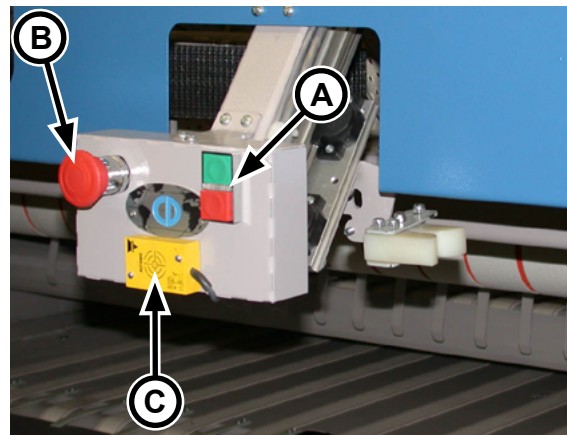


Figure 2-17: Feeder operator controls— inlet arm.

5. There are three red safety STOP buttons (Figure 2-17, B) across the front of the unit:
 - With the unit running, test each button in turn to make sure the O.P.L. comes to a complete stop, its compressed air pressure is released and both green indicator lamps go out.
 - Twist each button to release it before attempting to start the unit again.
 - Restart the unit after each red safety STOP button test.
 - Press a red safety STOP button on the ironer. The O.P.L. should shut down as if one of its STOP buttons was pressed.
 - Reset the ironer's STOP BUTTON; then, press the ironer's green start button. Check that both green lamps on the O.P.L. are glowing.
 - To test the interconnected stop circuit, start the folder unit and press a red safety STOP button on that machine.
 - Make sure the O.P.L. also stops and that the red SYSTEM E-STOP lamp on the O.P.L. lights (Figure 2-16, B).
 - Reset the stop button on the folder. The O.P.L.'s SYSTEM E-STOP light should go out and the green SYSTEM READY light should light.
6. Restart the O.P.L. and open one endframe door. Make sure that all its moving elements stop and its compressed air pressure released.
7. Close and secure the endframe door. Restart the unit and repeat this test with the other endframe door.

Control Function Checkout

1. Press the O.P.L.'s green START button.
2. Note the two green lamps on the front right of the unit. The upper light indicates the O.P.L. is properly energized. The lower light indicates the ironer is running. Both the green lamps must be lit for the O.P.L. to operate:
 - If the upper lamp glows and the lower lamp is out, the O.P.L. is ready but the ironer is not.
 - If both lamps are out and the ironer is running, there is a safety or electrical problem with the O.P.L.
 - There is not a condition where only the bottom lamp is lit.
3. Make sure everyone is clear of the O.P.L. unit.
4. On the ironer, flip the FEEDER UP/DOWN switch to the UP position.
5. After a short time, the O.P.L. unit should begin rising and continue to do so until the safety latches snap into place.
6. The Alarm (Figure 2-16, C) should sound in pulsing beeps.
7. After the unit has locked into its raised position, make sure everyone is clear of the O.P.L. unit. Then, flip the FEEDER UP/DOWN switch to the DOWN position.
8. After a couple of moments, the O.P.L. unit should be lowering and continue to do so until it is in operating position; the alarm should also be sounding.

If the ironer is running and power is turned on at the O.P.L.'s main disconnect switch, both green ready lamps on the O.P.L. should light.

Check Speed Differential

The O.P.L. should *always* be running at a slightly slower speed than the ironer to which it is attached; this should hold true across the entire speed range of both machines from slowest to fastest.

However, it is important to note that this difference is also very small. Only 1 or 2 feet per minute. Too small a differential can cause flatwork to buckle, jam and affect finish quality; too large a differential can damage flatwork. The lower speed range is always checked first.



Required Tools

Hand-held speedometer
Note paper
Pen/pencil

**Perform only when the unit is
RUNNING.
Use Extreme Caution.**

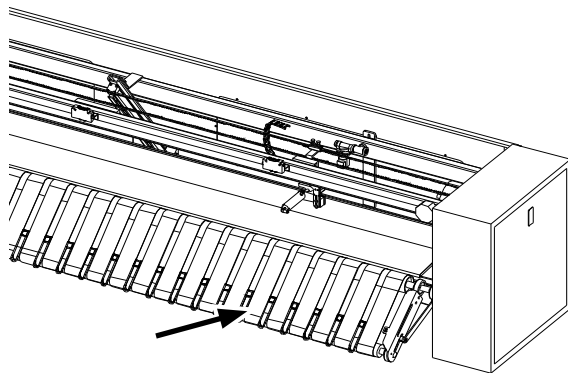


Figure 2-18: Measure the O.P.L. discharge ribbon speed.

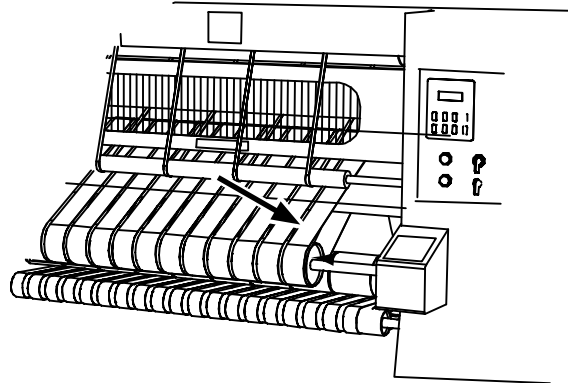


Figure 2-19: Measure the ironer feed ribbon speed.

1. Start the ironer unit and turn its speed control fully counter-clockwise to run it at its slowest speed.
2. Start the O.P.L.

WARNING

**Your hands will be close
to moving rolls.
Use Extreme Caution.**

3. Use a hand-held speedometer to determine the speed of the O.P.L. discharge ribbons (Figure 2-18). Make sure to hold the wheel over the ribbon against the turning roll.
4. Write down the roll speed. Take multiple readings and average them to ensure an accurate number.
5. Repeat Steps 4 and 5 with the feed ribbon drive roll (Figure 2-19).
6. Compare the readings. Remember, you always want the O.P.L. running slightly slower than the ironer. As appropriate:
 - If the O.P.L. readings are 1 to 2 feet per minute slower than the ironer readings, the speed differential is correct. As appropriate:
 - If you were performing the low speed check, repeat Steps 2 to 7, setting the ironer to its fastest speed in Step 2.
 - If you were performing the high speed check, go to the next step.
 - If the O.P.L. is running faster than the ironer, or if the ironer is running more than 2 feet per minute faster than the O.P.L., the differential needs adjustment. Refer to [Setting O.P.L./Ironer Speed Differential on page 7-19](#).
7. If both low and high speed differentials are correctly set, stop the ironer and the O.P.L.

Spread/Feed Function Checkout

1. Use a sheet or similar piece of flatwork to test the spreader/feeder.
 - a) Use a piece of test flatwork.
 - b) At center of feeder, place corners into the spring-loaded feeding clamps.
 - c) Touch the target pad (Figure 2-17, C) to activate.
 - d) The piece should be carried upward by the input air cylinder to the transfer point.
 - The upper spreader clamps should move to the middle of the machine and take the flatwork from the inlet clips.
 - The upper spreader clamps and lower spreader belts spread and smooth the flatwork.
 - The laydown air blast occurs and the piece travels onto the discharge ribbons.
2. Turn OFF the compressed air supply to the unit.
3. Turn power OFF at the main disconnect switch. The Start/Stop buttons lamp will go out as will both green ready lights.
4. Stop the ironer and turn power OFF at its main disconnect switch.
5. Each photosensor on the unit is physically aligned and sensitivity adjusted for testing purposes before shipment. However, different environments require alignment and sensitivity adjustments during installation to ensure reliable operation of the sensors.
6. If any sensor problems, such as missed pieces of flatwork or false signals, are detected during testing, adjustment is necessary. For more information, refer to [Sensors on page 7-27](#), and the appropriate sensor alignment/adjustment procedure.

Checkout Completion

If any checkout step is unsuccessful, refer to [TROUBLESHOOTING](#) and [REPAIR](#).

If a problem cannot be resolved, contact your local CHICAGO® distributor or Chicago Dryer Company's factory customer service department.

Cleaning the Unit

During shipment and installation of the spreader/feeder, some dirt or other contaminants may have accumulated that will mark processed flatwork. With the power disconnected, wipe down the unit.

Also, process several pieces of flatwork to clear any dirt from the moving components.

CAUTION

Make sure to lubricate the upper spreader rail and the carriage rails before initial use. For more information, refer to [Lubricate Upper Spreader Rail and Rail Bearings on page 4-5](#).

Chapter 3

OPERATING GUIDELINES

In order to operate the O.P.L.[™] safely and with maximum efficiency, it is necessary to become familiar following guidelines:

- 3.1 Safety Features
- 3.2 Operating Controls
- 3.3 Standard Operating Procedures
- 3.4 Operating Techniques

NOTE: *It is extremely important that the daily operation of the unit be properly supervised at all times. All operating and maintenance personnel must read, understand, and adhere to Operator Safety Reminders for CHICAGO® Feeders (Figure 3-1). This bulletin must be posted at the operating site.*

Operator Safety Reminders for Chicago® Feeders	
POST AND READ	
Read and Learn	The instruction manual MUST be carefully read by the person in charge of laundry operations BEFORE installing or operating the Feeder.
Training	Operators MUST be trained and instructed so that the Feeder is operated properly and all safety regulations are followed.
Safe Operation	The Feeder MUST never be left unattended while it is running. Always shut down the machine when it is not in use.
Emergency Shut-Down	All laundry personnel MUST be instructed on how to use stop buttons. Personnel should also be familiar with the location and method of stopping the Feeder by using the disconnect switch.
Safety Labels	Laundry personnel MUST be familiar with all safety labels and their meaning. Insure that labels are read, understood, and followed at all times. Explain all safety precautions to employees who CAN NOT read English.
Conveyors	Do not stand, sit or kneel on any conveyors. They are not designed to hold the weight of a person.
Utility Connections	The Feeder MUST be properly grounded and operated on the correct voltage as shown on the Feeder nameplate. Warranty will be voided and damage to motors may occur if the Feeder is operated at a different voltage than stated on the nameplate.
Safety Features	Safety guards and end panels MUST be installed at all times. If it is necessary to remove a guard or end panel for service work, use extreme care to avoid injury, and replace the guard or panel as soon as possible. NEVER operate the folder unless all safety guards and end panels are in place.
Safe Repair	The "buddy system" SHOULD be used when doing any repair or maintenance work. Follow local OSHA regulations for proper lock out - tag out requirements. One person should perform the work while the other monitors machine functions for safety.
Servicing the Feeder	When performing service or maintenance on the Feeder, always STOP THE FEEDER AND DISCONNECT POWER to the machine.
Clearing a Jam	NEVER reach into any part of the Feeder while it is running. If necessary, QUALIFIED PERSONNEL should remove jammed flatwork with the FEEDER OFF AND POWER DISCONNECTED TO THE MACHINE . Use the Jog Reverse button BRIEFLY to clear a jam if necessary.
Alteration	The Feeder MAY NOT be altered in any manner without written permission from Chicago Dryer Company.
Cleanliness	The Feeder MUST be kept clean and free of lint and debris.
Labels and Nameplates	DO NOT remove safety labels, nameplates, or any markings originally provided with the Feeder. If any item is damaged, contact Chicago Dryer Company for free replacements.

Figure 3-1: *The Operator Safety Reminders for CHICAGO® Feeders bulletin must be posted and be read by all personnel.*

3.1 Safety Features

The spreader/feeder is manufactured with several built-in features to promote safety and proper operating procedures.

WARNING
Never bypass any of the
safety devices.
Serious Injury Could Result.

These are the general categories of safety features:

- Main Disconnect Switch
- Safety STOP Buttons
- Safety Guards and Latches
- Safety Interlock Switches
- Safety Labels



Figure 3-2: The main disconnect switch is located at the right rear of the unit.

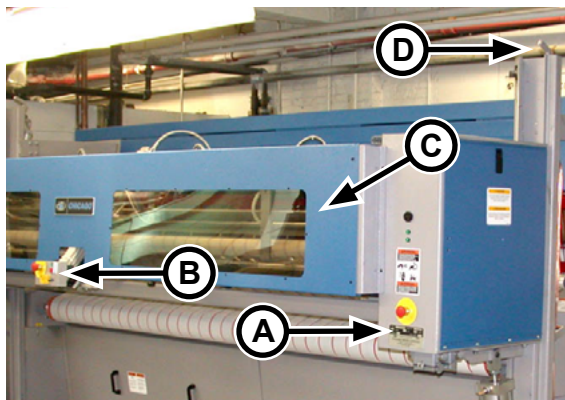


Figure 3-3: The front guard provides protection, yet machine operation can be seen.

Main Disconnect Switch

The main disconnect switch (Figure 3-2) is located at the right rear of the unit. When turned to OFF, the main disconnect switch locks out the incoming electrical power to the u-nit.

Unless otherwise indicated, turn the main disconnect switch to OFF before performing any maintenance or repair work.

Safety STOP Buttons

Pressing any of the 3 red safety STOP buttons (Figure 3-3, A) stops the spreader/feeder and locks out operation of the machine.

The other method of stopping the machine is to press the square red Stop button (Figure 3-3, B) at the front of the unit at the inlet point. This pauses the operation of the unit.

To completely stop the unit, press any red safety STOP button then twist to unlock it. The machine will completely shut down and release internal air pressure.

To re-start the machine, press the operator station green Start button. Power is always present as long as the main disconnect switch is on.

Safety Guards and Latches

A windowed front access guard (Figure 3-3, C) allows operators to see the internal parts of the spreader/feeder when it is in operation while providing protection from moving parts.

Each endframe is covered by a protective door. These prevent fingers or hands from coming into contact with moving parts. They also serve to keep objects, other than flatwork, from entering the unit and damaging components.

Heavy duty latches (Figure 3-3, D) click in place to securely hold the O.P.L. in the raised position.

Safety Interlock Switches

The spreader/feeder is equipped with safety interlock switches (Figure 3-4) behind each endframe door and the front access guard. When any of these is opened, all moving parts immediately stop.

Safety interlock switches are not intended to lockout the unit. Site management is responsible for developing and implementing lockout/tagout procedures that comply with government standards for use when servicing the unit.

Safety Labels

WARNING (orange) and CAUTION (yellow) labels (Figure 3-5) are placed at locations around the unit to keep operators and maintenance personnel alert in particular areas.

WARNING labels alert personnel that **personal injury may result** from not following recommended procedures.

CAUTION labels alert personnel **the unit may be damaged** if conditions, practices, or procedures are not observed.

When training operators, take the time to locate, review, and understand all areas where labels are posted.

NOTE: Do not remove safety labels at any time. If a label needs to be replaced, contact Chicago Dryer Company for free replacements.

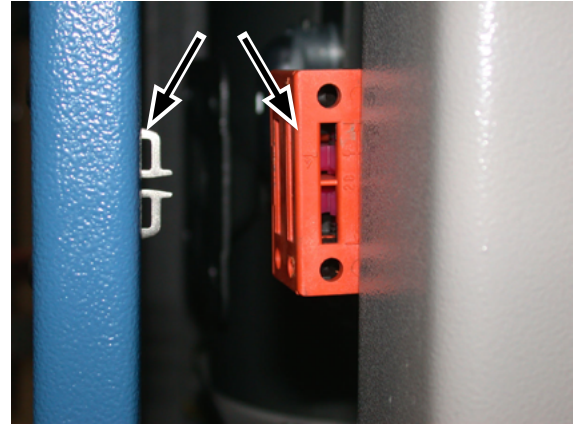


Figure 3-4: Each endframe door and the front access guard has a safety interlock switch.

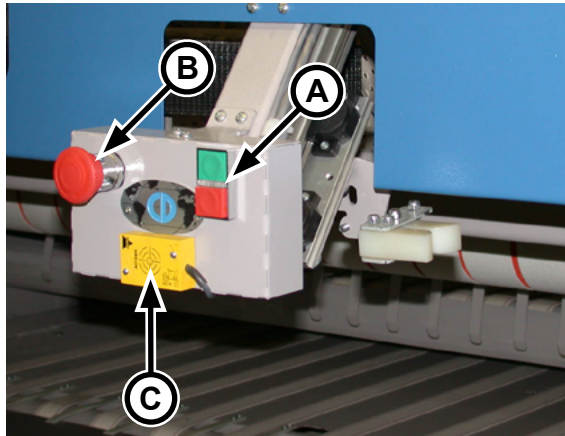


Figure 3-5: Safety labels remind operators and maintenance personnel that care must be taken when working near these areas.

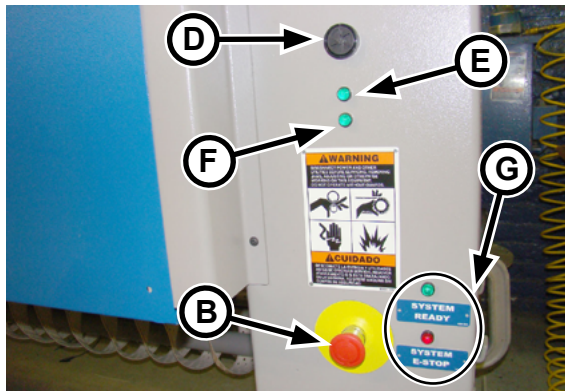
3.2 Operating Controls

All operating controls are externally mounted on the front of the unit and the ironer, some marked with nameplates.

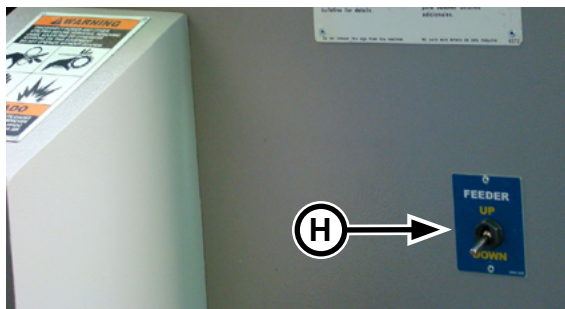
References to these functions are capitalized in this instruction manual for easy identification. Detailed descriptions are given in the following paragraphs.



Controls located at the front, center of the unit.



Controls located at the front, right of the unit.



Control located on the ironer.

Figure 3-6: O.P.L. Operating controls.

All controls are located at the front (Figure 3-6):

- Start/Stop buttons (A)
- Safety STOP buttons (B)
- Target pad (C)
- Alarm (D)
- O.P.L. Ready indicator light (E)
- Ironer Ready indicator light (F)
- Interconnected Stop Circuit (Option) indicator lights (G)
- FEEDER UP/DOWN switch (ironer) (H)

Start/Stop buttons (A):

Initiate and pause general machine operation. Each station has a set. The green Start button starts all moving parts while the square red Stop button pauses operation of the unit.

During normal operation, the integrated lamp glows steadily when the unit is running. The lamp flashes when either a square red station STOP button or a red safety STOP button is pressed.

Safety STOP buttons (B):

Provided to help assure operator safety and to prevent damage to the unit. There are three of these red safety STOP buttons, one at the operator station and one on each front endframe.

When pressed, these stop all moving parts, release internal air pressure, and lock out operation of the unit.

A red safety STOP button stays pressed down until manually reset by twisting.

Before restarting the unit, correct the problem that resulted in the red safety STOP button being pressed.

Target pad (C):

Initiates the spreading/feeding operation. After securing the parallel corners of a flatwork piece in the station clamps, the operator touches the target pad.

Alarm (D):

Makes a pulsing beeping sound when O.P.L. unit is in motion, either up or down.

O.P.L. Ready indicator light (E):

Indicates the O.P.L. unit is in the lowered position, power is turned on at its main disconnect switch and all electrical and safety devices are functioning correctly.

Ironer Ready indicator light (F):

Indicates the ironer is running, enabling O.P.L. operation if the other indicator lamp is lit (D above).

Interconnected Stop Circuit (Option) indicator lights (G):

If the unit has the optional Interconnected Stop Circuit system installed, lights indicate whether an interlock on a unit in the line is open.

If all lights on all units are green (SYSTEM READY), the line is operational.

If one unit light is green while the other unit(s) light's are red (SYSTEM E-STOP), the unit with the green light has an open interlock. Check it's CHI Panel for location.

FEEDER UP/DOWN switch (H):

Moves the O.P.L. unit conveyor up and down. When the switch is in the UP position, the O.P.L. unit raises to allow for hand feeding small pieces.

NOTE: *Be sure all personnel are clear before raising or lowering the O.P.L.*

When the switch is in the DOWN position, the O.P.L. unit lowers to allow for clip feeding large pieces.

3.3 Standard. Operating Procedures

In the daily operation of the unit, it is desirable to follow consistent operational procedures. By training operators to follow the same set of guidelines for daily procedures, operator safety and efficiency are maximized. This unit requires only one operator.

General daily routines include:

- [Start-Up](#)
- [Interconnected Stop Circuit \(Option\) Operation Notes](#)
- [Flatwork Handling](#)
- [Handling Jams Safely](#)
- [Shut-Down](#)

WARNING

Never run a unit when ribbons are missing or broken. Serious damage and injury could result.

Start-Up

The following steps are suggested for start-up of the spreader/feeder each day.

1. Perform all daily preventive maintenance and cleaning procedures. For more information, refer to [Daily PM on page 4-2](#).
2. Follow normal daily start-up procedures for the ironer.
3. Turn O.P.L. power ON at its main disconnect switch.
4. Make sure all personnel are clear of the O.P.L. Then, make sure the FEEDER UP/DOWN switch is in the DOWN position.
5. Press the green station Start button. The indicator lamp in the switch lights, all rotating and conveying elements begin to operate.

NOTE: *If the unit is part of a line with the Interconnected Stop Circuit option, turn power ON at the main disconnect switch to the folder unit at the end of the line and turn ON its compressed air supply.*

6. Perform a safety check:
 - Press a red safety STOP button. All moving parts should stop and compressed air in the O.P.L. unit released.
 - Reset the red safety STOP button by twisting it.
 - Restart the unit.
 - Test each of the 3 remaining red safety STOP buttons in the same manner.
 - Restart the unit.
 - Press a red safety STOP button on the ironer. The O.P.L. should shut down as if one of its STOP buttons was pressed.
 - Reset the ironer's STOP BUTTON; then, press the ironer's green start button. Check that both green lamps on the O.P.L. are glowing.
 - To test the interconnected stop circuit, start the folder unit and press a red safety STOP button on that machine.
 - Make sure the O.P.L. also stops and that the red SYSTEM E-STOP lamp on the O.P.L. lights.
 - Reset the stop button on the folder. The O.P.L.'s SYSTEM E-STOP light should go out and the green SYSTEM READY light should light.
7. The unit is ready for operation.

Interconnected Stop Circuit (Option) Operation Notes

If the unit is part of a line with the Interconnected Stop Circuit option, it will automatically shut down whenever any red safety STOP button on any machine in the line is pressed.

- Before any machine on the line can be restarted, the pressed red safety STOP button must be reset.
- After a shut down, each unit in the line must be re-started separately.
- To run one unit independently of the other units of the line, disconnect its interconnect cable and install the feedback plug which shipped with the unit (Figure 3-7).

NOTE: Units can only operate when they are connected to each other, or with the feedback plugs.

- Refer to [Operating Controls on page 3-4](#) regarding interpreting the indicator lights.

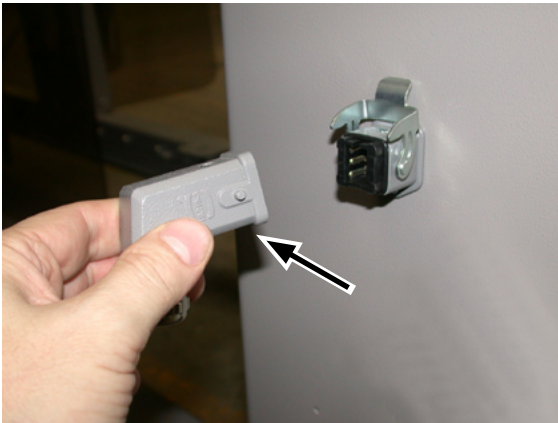


Figure 3-7: Use the feedback plug to run the unit independent of other units in the line.

Flatwork Handling

The way that operators use the feeder is very important. They can increase productivity, extend the life of the unit, and most importantly, promote safety.

Safety

- Always follow the site standards to avoid repetitive motion injury.
- If an item jams, do not reach inside the unit while the power is on. Refer to [Handling Jams Safely on page 3-8](#).
- If an item falls, leave it until the end of the batch.

Feeding Large Pieces

NOTE: The unit is designed to process large pieces of flatwork ranging in size from 54" (1370 mm) to 120" (3050 mm). It is NOT designed to feed folded flatwork.

1. Remove a sheet from the laundry basket.

NOTE: For best results, clip the fabric with as little material as possible on the outside of each clip.

2. Place one corner of the piece into one of the clips on the loading clamp. The spring loaded clip does not require any special technique; just push the corner upward between the nylon jaws.
3. Find a second parallel corner so that the selvage edges are on the sides of the piece. Press this into the other clip.

4. Touch the target pad.
5. The piece is carried upward by the rodless air cylinder.
6. After the piece is taken by the spreader clamps, the feeding clips return.
7. Remove another sheet and repeat Steps 2 to 4.
8. This process is continuous.

NOTE: *Always follow the site standards to avoid repetitive motion injury.*

Feeding Small Pieces

1. Make sure all personnel are clear of the O.P.L.
2. Flip the FEEDER UP/DOWN switch to the UP position.
3. Wait until the unit locks in its up position.
4. Lay small pieces flat and square onto the ironer ribbons.
5. When finished feeding small pieces, make sure all personnel are clear of the O.P.L. and press the FEEDER UP/DOWN button to the DOWN position.

Waxing the Ironer

To accommodate waxing the ironer, raise the O.P.L. to its UP position.

Handling Jams Safely

During normal operation, pieces of flatwork will occasionally feed incorrectly into the unit. Follow the directions below to safely remove these items.

If a piece of flatwork becomes jammed, the unit will shut down.

WARNING

Never reach into the machine while it is running. Serious Injury Could Result.

1. Stop feeding items into the unit.
2. Release air pressure by pressing and resetting a red safety STOP button.
3. Turn power OFF at the main disconnect switch.
4. Stop the ironer.
5. If necessary, duck under the front guard to gain access to the spreading area.
6. Remove the jammed material by hand.

NOTE: *Frequent jamming may indicate that the unit needs adjustment or repair. Operators should inform appropriate personnel if there is a consistent problem.*

Shut-Down

The following steps are suggested when shutting down the spreader/feeder at the end of each working day.

1. Follow normal ironer shut down procedure.
2. The O.P.L. can be left in either the up or down position.
3. Turn OFF the compressed air supply.
4. Turn power OFF at the main disconnect switch to both the O.P.L. and the ironer.

3.4 Operating Techniques

Many factors are involved in producing the best possible flatwork spreading and feeding. These include:

- Maximum Efficiency

Maximum Efficiency

- Always follow site standards to avoid repetitive motion injury.
- Place the flatwork into the clamps so that the selvage edges of the piece will be at the sides. Make sure there are no folds in the flatwork.
- Always follow the posted standards for the type of flatwork being processed.

NOTE: *It is important to write down the combination of washer/extractor and spreader/feeder settings that produce the best quality finish for each type of flatwork being processed. These standards should be posted. This removes "guesswork" from the daily routine and maximizes the efficiency and consistency of the entire laundry operation. Consistent washing, feeding, and ironing habits are the key to quality results.*

Chapter 4

PREVENTIVE MAINTENANCE

Various components and parts of the O.P.L.TM require scheduled attention to assure long life and trouble-free operation. The Preventive Maintenance (PM) Schedule below outlines all of the PM tasks required at regular intervals. All tasks are the responsibility of maintenance personnel unless otherwise indicated.

Since operators run the machines, they should be trained on site to visually inspect common areas daily and notify maintenance personnel when problems are found, such as worn or broken ribbons. All PM intervals are based on 8-hour/day operation. Increase the PM frequency for two- or three-shift operations.

Preventive maintenance should only be done when the power is turned OFF at the main disconnect switch. Specific preventive maintenance that requires the unit to be running should be done with extreme caution and attention to detail.

FREQUENCY OF TASKS BASED ON 40 HOURS PER WEEK OPERATION			
Preventive Maintenance	Operator	Maintenance	Unit Condition
4.1 DAILY (8 Hours)			
Watch and Listen for Anything Abnormal	X		Running
General Cleanliness	X		Off/Disconnect Power
Check Safety Equipment	X	X	Running
4.2 WEEKLY (50 Hours)			
Check and Clean Photosensors and Reflectors		X	Off/Disconnect Power
Check and Clean Inverters		X	Off/Disconnect Power
Check Spreader Clamp Linear Bearing Assemblies		X	Off/Disconnect Power
Lubricate Upper Spreader Rail and Rail Bearings		X	Off/Disconnect Power
Inspect Air Filter/Auto Drain		X	Off/Disconnect Power
Check Air Pressure Settings		X	Off/Disconnect Power
Check Discharge Ribbon Condition		X	Running
4.3 MONTHLY (200 Hours)			
Check Setscrews		X	Off/Disconnect Power
Clean and Lubricate Drive Chains		X	Off/Disconnect Power
Check Upper and Lower Spreader Belt Condition and Tension		X	Off/Disconnect Power
Inspect Drive Belt Condition		X	Off/Disconnect Power
4.4 SEMI-ANNUAL (1000 Hours)			
Clean Air Filter/Auto Drain		X	Off/Disconnect Power
Check and Grease Bearings		X	Off/Disconnect Power
4.5 ANNUAL (2000 Hours)			
Check All Electrical Connections		X	Off/Disconnect Power
Check Insulation Resistance to Earth Ground		X	Off/Disconnect Power

4.1 Daily PM (8 Hours)

WARNING

Do not repair or correct any of these conditions without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Make sure the unit power is turned OFF at the main disconnect switch.

Follow lockout/tagout procedures approved for your site. Follow local regulations. Failure to do so could result in serious injury.

Watch and Listen for Anything Abnormal

Perform only when the unit is **RUNNING**.
Use **Extreme Caution**.

Operators and maintenance personnel should learn to understand the usual sights and sounds around a unit. For example, when there is a noise at a roll, the bearings may be worn or other mechanical problems may exist. Stop the unit immediately and follow-up with the necessary maintenance or repair.

General Cleanliness

It is important to prevent the buildup of lint, dirt, dust and foreign material in the unit. General cleanliness prevents damage to components, jamming and soiling flatwork.

Keep the area as well as the spreader/feeder as clean as possible.



Required Tools

Cloth: soft, lint-free
Vacuum cleaner or compressed air

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.

CAUTION

Never use compressed air on or around electronic components. Doing so may damage them.

2. Check and clean the below listed items daily.
 - Drive shaft rollers and bearings.
 - Face of the clutch-brake roller.
 - Between the clutch roller and lower inlet conveyor belt drive.
 - Station carriage drive and idler rollers.
 - Small rollers above the transfer clamps-make sure they spin freely.
 - Spreader rail, clamps, and bearings.
 - Ribbons.
 - General components.
3. Make sure that there is no lint, tape or string build-up.

Check Safety Equipment

**Perform only when the unit is
RUNNING.
Use Extreme Caution.**

The unit should never be operated without all safety guards in place and all safety devices working properly.

Check that all three red safety STOP buttons and stopping the ironer bring the operation of the unit to a complete halt. For more information, refer to [Start-Up on page 3-6](#).

NOTE: *Repair any faulty safety devices before continuing to operate the unit.*

4.2 Weekly PM (50 Hours)

WARNING

Do not repair or correct any of these conditions without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Make sure the unit power is turned OFF at the main disconnect switch.

Follow lockout/tagout procedures approved for your site. Follow local regulations. Failure to do so could result in serious injury.

Check and Clean Photosensors and Reflectors

Most control problems can be avoided by keeping the photosensors (Figure 4-1) and any reflectors clean.



Required Tools

Cloth: soft, lint free

**Perform only when the unit is OFF
with power disconnected.**

Clean the photosensors with a soft, lint free cloth. For more information on photosensor locations, refer to [Photosensors on page 5-8](#).

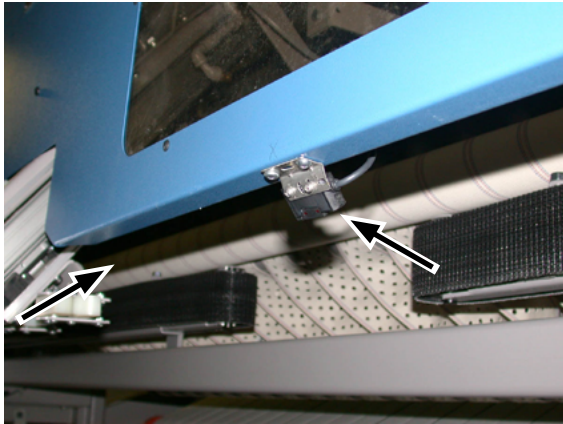


Figure 4-1: Photosensors and reflectors must be kept clean and lint-free.

Check and Clean Inverters

Check and clean the inverters and their cooling fins (Figure 4-2) weekly with a vacuum cleaner. Failure to do so may void your warranty.



Required Tools

Vacuum cleaner

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Open the main electrical panel door.

CAUTION

**Failure to clean the inverter
and its cooling fins could
void the warranty.**

**Never use compressed air
on or around electronic
components. Doing so may
damage them.**

3. Check and clean all inverters and their cooling fins with a vacuum cleaner.
4. Close and secure the electrical panel door.

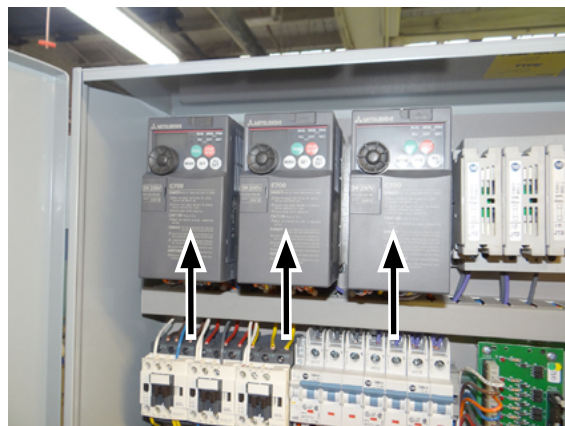


Figure 4-2: Inverters in the electrical box.

Check Spreader Clamp Linear Bearing Assemblies

**Perform only when the unit is OFF
with power disconnected.**

Check the grooved bearings in the assembly by taking the spreader clamp (Figure 4-3, A) in hand and shaking it from side to side. If there is free-play in the carriage, the grooved bearings need to be replaced.

For more information, refer to [Upper Spreader Clamp Grooved Bearing Replacement on page 7-8](#).

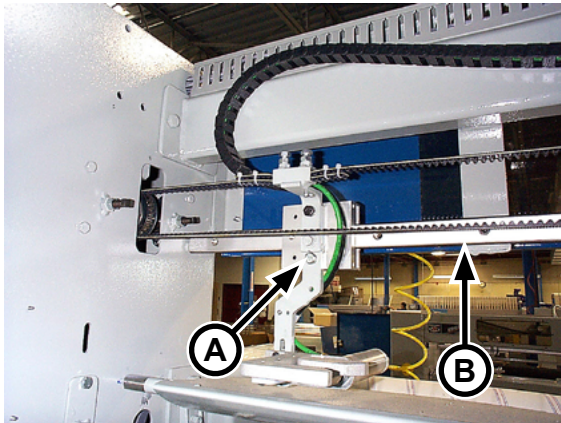


Figure 4-3: Lightly lubricate the upper spreader rail every 50 hours of operation.

Lubricate Upper Spreader Rail and Rail Bearings



Required Tools

Cloth: soft, lint-free
Silicon lubricant: dry

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Use a small amount of dry silicon lubricant on a clean, dry, lint-free cloth and wipe the upper spreader rails (Figure 4-3, B) after each 50 hours of operation.
3. Place a small amount of lubricant on the cloth.
4. Work the carriage back and forth, lightly holding the cloth so that the grooved bearings (Figure 4-4) picks up the lubrication.

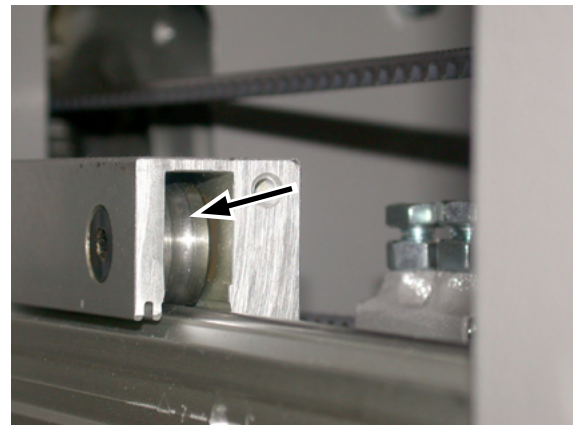


Figure 4-4: Lightly lubricate the spreader rail rollers.

Inspect Air Filter/Auto Drain

**Perform only when the unit is OFF
with power disconnected.**

The combination air filter with automatic drain unit (Figure 4-5, A) located inside the ironer, should be inspected on a weekly basis.

A visible coating of dirt or condensate on the filter element surface or excessive pressure drop is an indication that cleaning is necessary.

For instructions on cleaning the air filter/regulator, refer to [Clean Air Filter/Auto Drain on page 4-10](#).

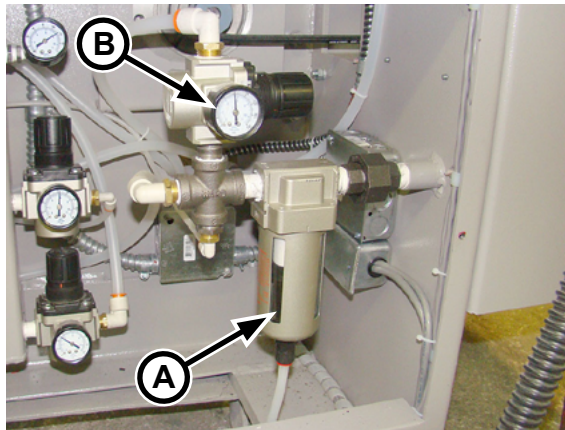


Figure 4-5: Check the air filter/regulator for dirt and condensate accumulation.

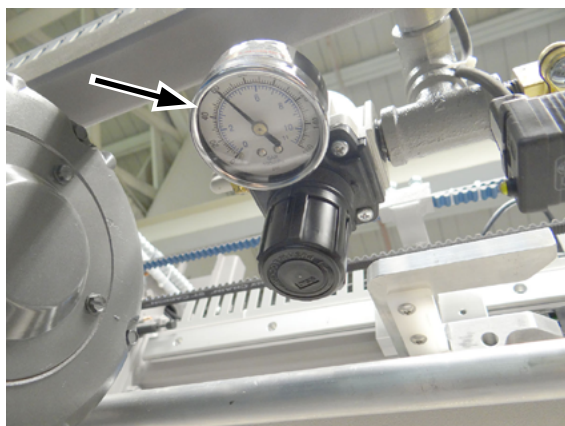


Figure 4-6: Air pressure gauge located inside the body of the machine.

Check Air Pressure Settings

Maintaining proper incoming and internal air pressures helps keep the machine operating at peak efficiency.

**Perform only when the unit is OFF
with power disconnected.**

WARNING

**Wear protective eyewear
when working with
compressed air components.**

1. Turn ON the compressed air supply to the ironer/O.P.L.
2. Wait a few seconds and then, open the ironer's the left endframe door. Check the O.P.L. incoming air pressure gauge (Figure 4-5, B) and make sure it is set to 80 psi (550 kPa).
3. Close and secure the left endframe door.
4. Move to the front of the unit and look under the left front of the O.P.L. and locate its internal air pressure regulator (Figure 4-6). Make sure it is set to 60 psi (415 kPa).

NOTE: These settings are pre-set at the factory. Air pressures can be changed to meet the needs of different weights of flatwork.

5. Turn OFF the compressed air supply.

Check Discharge Ribbon Condition

**Perform only when the unit is
RUNNING.
Use Extreme Caution.**

WARNING
**Never touch any part of the
unit while it is moving.
Serious injury could result.**

With the machine running, check the discharge conveyor ribbons for proper placement, tracking, tension (no visual sagging) and general condition (smoothness, fraying, and tears).

For ribbon adjustment and replacement instructions, refer to [Discharge Ribbon Tension Adjustment on page 7-13](#) and/or [Discharge Ribbon Replacement on page 7-14](#).



Required Tools

Vacuum cleaner or compressed air

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Check the holes on the discharge conveyor ribbons for signs of lint build up or clogging.
3. If necessary, clear with vacuum cleaner and/or compressed air.

4.3 Monthly PM (200 Hours)

WARNING

Do not repair or correct any of these conditions without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Make sure the unit power is turned OFF at the main disconnect switch.

Follow lockout/tagout procedures approved for your site. Follow local regulations. Failure to do so could result in serious injury.

Check Setscrews

**Perform only when the unit is OFF
with power disconnected.**

Setscrews (Figure 4-7) hold sprockets, bearings, and other rotating parts securely in place. Check and make sure that all setscrews are tight.

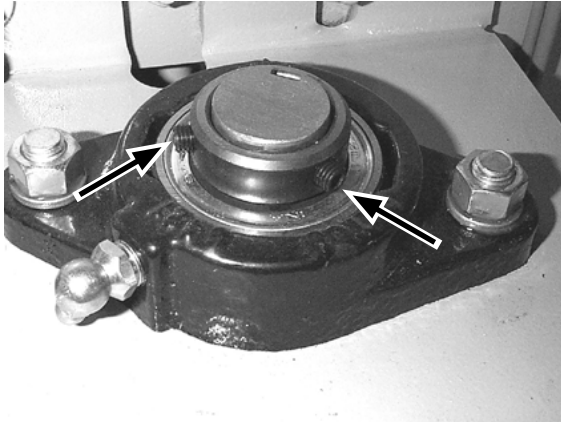


Figure 4-7: Make sure the setscrews are sufficiently tightened.

Clean and Lubricate Drive Chains



Required Tools

Clean cloth
SAE 90 grade oil

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Open the left endframe door.
3. Clean off old lubricant from the drive chains (Figure 4-8) and lightly lubricate the chain with a good quality SAE 90 grade oil.
4. Check the drive chains for proper tension. If a chain is worn and loose replace it.
5. Close and secure the endframe door.

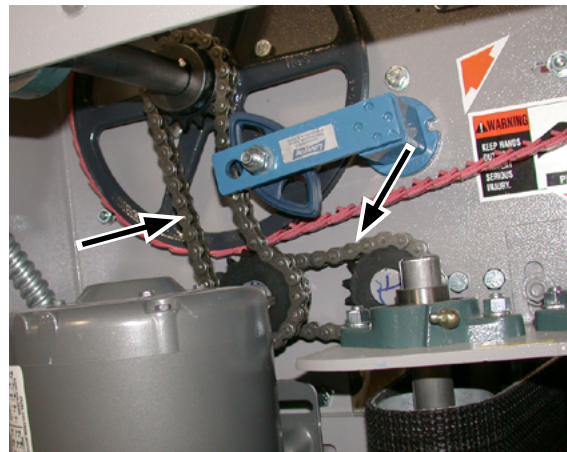


Figure 4-8: Drive chains in the right endframe.

Check Upper and Lower Spreader Belt Condition and Tension

Perform only when the unit is OFF with power disconnected.

1. Turn power OFF at the main disconnect switch.
2. Open both the left and right endframe doors.
3. Carefully inspect the two sets of lower spreader belts (one black set on each side) (Figure 4-9, A) and the upper spreader belts (Figure 4-10) on the unit.
4. Each belt should have the proper tension. If any belt is damaged replace the belt. For more information on adjusting belt tension and/or replacing belts, refer to [Spread Section on page 7-5](#), and the appropriate procedure.
5. Close and secure both endframe doors.

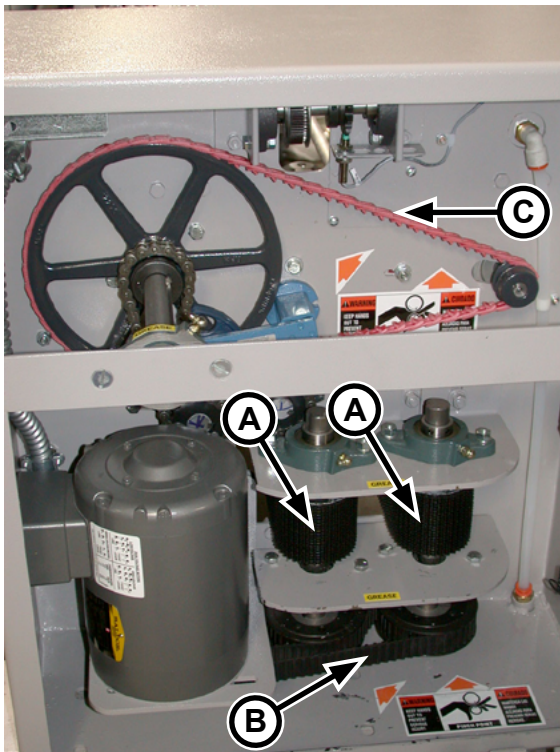


Figure 4-9: Inspect belts on both sides of the unit.

Inspect Drive Belt Condition

Perform only when the unit is OFF with power disconnected.

1. Turn power OFF at the main disconnect switch.
2. Open the left endframe door.
3. Carefully inspect the lower spreader drive belts (one in each endframe) (Figure 4-9, B) and the discharge conveyor drive belt (C).
4. Each belt should have the proper tension. If any belt is damaged replace the belt. For more information on adjusting belt tension and/or replacing belts, refer to [REPAIR](#), and the appropriate section and procedure.
5. Close and secure the left endframe door.

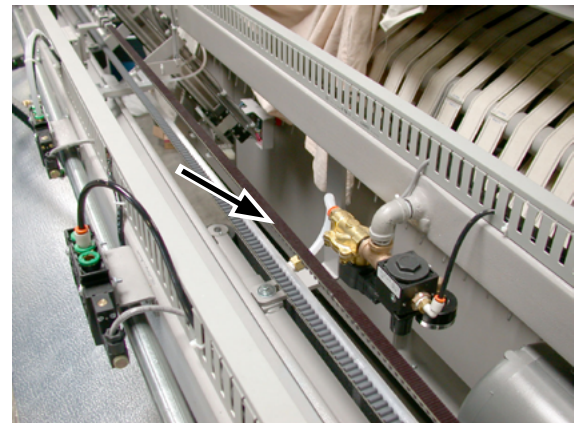


Figure 4-10: Check the upper spreader drive belt.

4.4 Semi-Annual PM (1000 Hours)

WARNING

Do not repair or correct any of these conditions without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Make sure the unit power is turned OFF at the main disconnect switch.

Follow lockout/tagout procedures approved for your site. Follow local regulations. Failure to do so could result in serious injury.

Clean Air Filter/Auto Drain

The air filter with auto drain requires periodic cleaning to maintain maximum filtering efficiency and to avoid excessive pressure drop.

The cleaner the compressed air supply, the less maintenance will be required. A visible coating of dirt or condensate on the filter element surface or excessive pressure drop is an indication that cleaning is necessary.

Refer to the ironer's *Instruction Manual*, PREVENTIVE MAINTENANCE chapter, Semi-Annual PM section, Clean Air Filter/Auto Drain procedure.

Check and Grease Bearings

Regularly grease bearings to help ensure smooth operation and dependability.

A special high temperature lubricant is required to properly grease all bearings. It is important that only an EP, bentonite clay, NLGI 2, 1000 cSt viscosity grease be used.

Use of unsuitable grease can cause bearing lockup or failure. Problems can also result if the new grease is incompatible with the grease that is already in the bearings.

Failure to use the correct lubricant will void the factory warranty.

CAUTION

Before using a grease other than specified, check with the factory service department to verify that the grease meets specifications and is compatible with the grease already in the bearings.

If any other grease is being considered:

1. Check with the Chicago Dryer Company service department to verify that the grease meets specifications and is compatible with the grease already in the bearings.
2. Follow directions on the grease gun packaging for other filling methods (dispenser, suction).

Be sure to grease the (Figure 4-11):

- Four spreader belt shaft bearings in each endframe (A).
- Jack conveyor drive roll bearings on both side of the left endframe (B).



Required Tools

Clean cloth
Grease gun
Grease: EP, bentonite clay, NLGI 2,
1000 cSt viscosity

**Perform only when the unit is OFF
with power disconnected and COOL.**

1. Turn power OFF at the main disconnect switch.
2. Open both endframe doors.
3. Wipe the old grease from the bearings.
4. Insert the grease gun nozzle firmly onto the grease fitting.

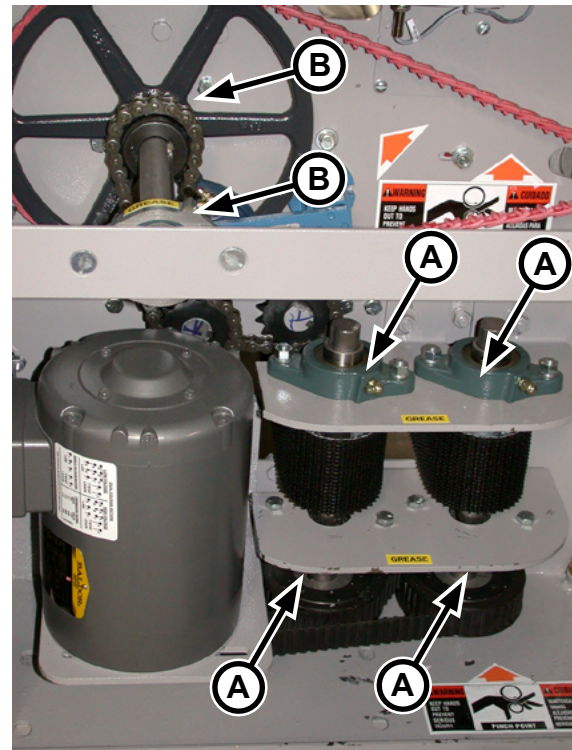


Figure 4-11: Roll bearings with grease fittings are located in both endframes of the unit.

CAUTION

Over-lubrication will destroy the bearing seals and cause premature failure.

5. Add lubricant slowly until a slight bead of lubricant forms at the seal. As soon as the bead forms, stop adding grease to prevent damage from over-lubrication.

CAUTION

Failure to wipe off excess lubricant will cause lint to adhere to the bearings and may cause premature failure.

6. Immediately wipe off the grease from the bearing. Failure to do so can cause lint accumulation and premature bearing failure.
7. Close and secure the endframe doors.

**4.5 Annual PM
(2000 Hours)**

WARNING

Do not repair or correct any of these conditions without reading and understanding the REPAIR chapter.

Only qualified personnel should troubleshoot and repair this unit.

Make sure the unit power is turned OFF at the main disconnect switch.

Follow lockout/tagout procedures approved for your site. Follow local regulations. Failure to do so could result in serious injury.

Check All Electrical Connections

Over time, the continued heating and cooling process can cause electrical connects to become loose.

**Required Tools**

Screwdriver

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Open the electrical box door.
3. Test each wire's connection by gently pulling on it.
4. Tighten any loose connections.
5. Close and secure the electrical box door.

Check Insulation Resistance to Earth Ground**Required Tools**

Voltmeter

**Perform only when the unit is OFF
with power disconnected.**

WARNING

**Only a qualified electrician
should make or correct any
electrical connections in or
to the unit.**

1. Turn power OFF at the main disconnect switch.
2. Connect a voltmeter between the unit's frame and a separate, known earth ground.
3. If there is a reading on the voltmeter, check and repair the spreader/feeder's ground connection.

Chapter 5

OPERATING PRINCIPLES

In order to maintain and troubleshoot the O.P.L.[™] safely and effectively, it is necessary to understand how the unit works. This chapter is divided into three operating systems and a review of how these systems are controlled in order to feed and spread flatwork:

- 5.1 Electrical System**
- 5.2 Compressed Air System**
- 5.3 Mechanical System**
- 5.4 Sequence of Operation**

Electrical System:	This section reviews incoming power requirements, how power is distributed throughout the spreader/feeder and the controls, sensors and switches operating the unit.
Compressed Air System:	This section reviews compressed air requirements, how air is distributed throughout the unit, and the controls and mechanisms operating the pneumatic system.
Mechanical System:	This section reviews the drive mechanisms which power all rotating and moving parts, how they move items through the unit to deliver spread sheets to the ironer.
Sequence of Operation:	This section provides a step-by-step guide to the unit's 6 phases of operation: Stand-By, Start-Up, Input, Transfer, Spread and Discharge. In addition, it will react to various error conditions. Refer to the schematic diagrams in the SCHEMATIC PARTS LIST to follow the timing and sequence of events.

Safety

The equipment described here has been designed to work together to provide a safe and reliable machine. Changing the equipment or controls may cause a malfunction that could injure someone. Do not bypass any of the safety features or controls. Do not replace components except with factory-approved repair parts.

Questions about the operation of the unit can be answered by your local authorized CHICAGO® dealer, or by the Chicago Dryer Company service department.

5.1 Electrical System

The electrical components of the unit are divided into two areas:

- [Power System](#)
- [Control System](#)

The power system moves the rolls and ribbons, activates the air valves, etc. The control system decides when all these activities should occur.

Power System

Components in the power system are located in the several places. The fused disconnect switch is incorporated into the electrical connection box door. If a line voltage transformer is required, it is located inside the right endframe.

The power system includes:

- [Disconnect Switch and Fuses](#)
- [Step-Down Transformers](#)
- [Electrical Connection Box Panel Components](#)

Disconnect Switch and Fuses

The unit comes equipped with a disconnect switch (DDS). This switch (Figure 5-1, A) is in the electrical connection box on the right rear endframe.

Included as a part of the disconnect switch are a set of fuses (B), which will isolate the unit from the mains if necessary. See the [SCHEMATIC PARTS LIST](#) for the rating of these fuses, which is dependent on line voltage.

NOTE: The power supplied to the unit must match the requirements listed on the nameplate.

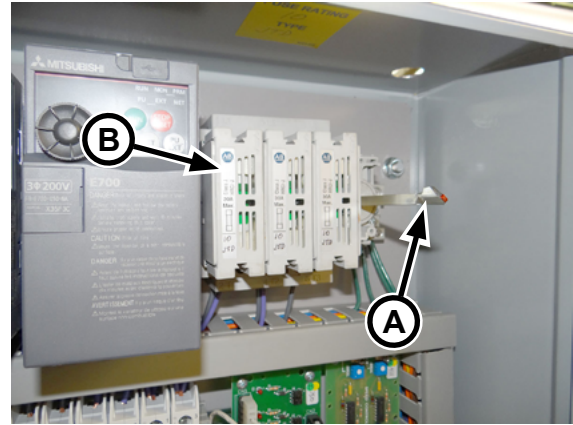


Figure 5-1: The disconnect switch (A) and fuse set (B) provides isolation from the mains.

Step-Down Transformers

If the unit is installed in a property with line voltage higher than 240 VAC, transformers T1 and T2 are provided (Figure 5-2). These adjust the voltage to 240 VAC which is used throughout the unit.

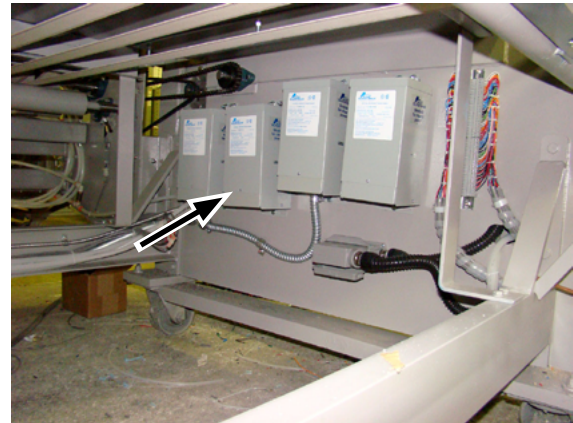


Figure 5-2: Step-down transformers are mounted near the bottom of the right endframe.

Electrical Connection Box Panel Components

Most power system components are located in the electrical connection box attached to the right rear endframe (Figure 5-3). The table on the next page provides an explanation of each item indicated in the picture.

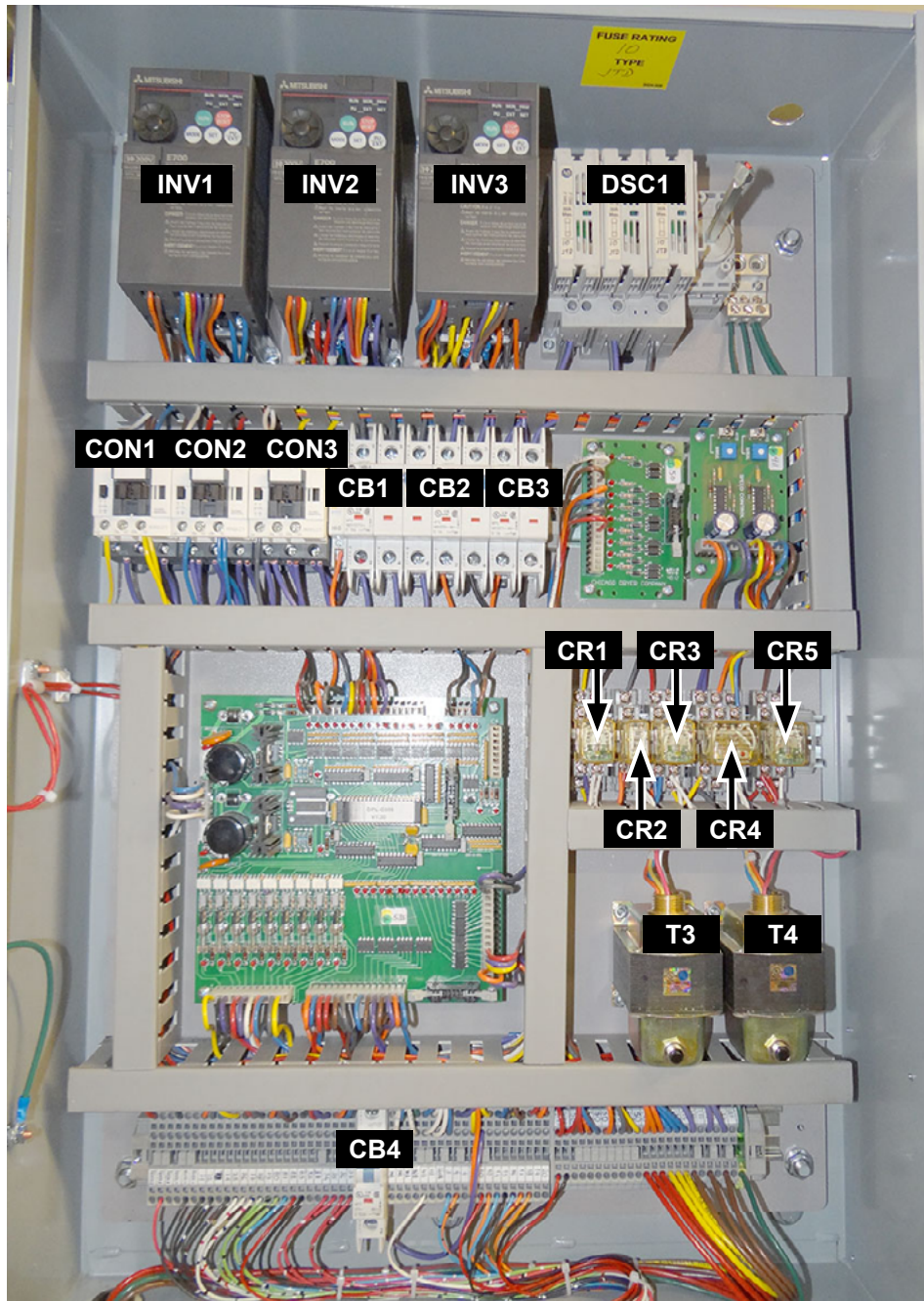


Figure 5-3: Components in the main electrical panel.

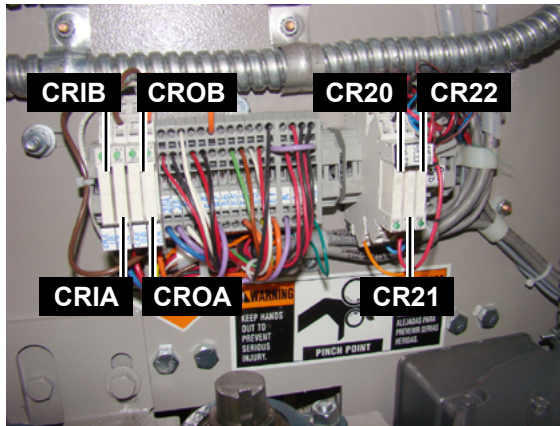


Figure 5-4: Right endframe components.

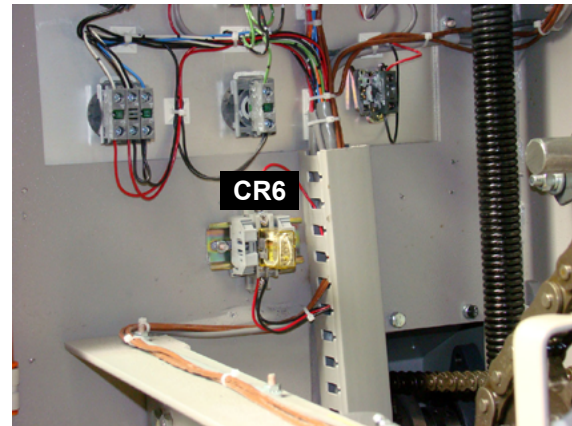


Figure 5-5: CR6 in ironer.

MAIN ELECTRICAL BOX COMPONENTS (Attached Right Rear Endframe)	
Schematic	Description
CB1	Circuit Breaker -
CB2	Circuit Breaker -
CB3	Circuit Breaker - T3
CB4	Circuit Breaker - T4
CR20	Control Relay - O.P.L. Motion Alarm
CR21	Control Relay - Control Relay - O.P.L. Interlock
CR22	Control Relay - O.P.L. Motion Alarm
CRIA/B	Control Relay - Interconnected Stop Circuit Input Signal (option)
CROA/B	Control Relay - Interconnected Stop Circuit Output Signal (option)
CON1	Contactors - Exit Conveyor (INV1)
CON2	Contactors - Upper Spreader Motor (INV2)
CON3	Contactors - Lower Spreader Motors (INV3)
CR1	Control Relay - Start Circuit
CR2	Control Relay - Inverter Fault Contacts
CR3	Control Relay - Interlocks
CR4	Control Relay - Conveyor Run
CR5	Control Relay - Ironer Run (in O.P.L.)
CR6*	Control Relay - Ironer Run (in ironer)
DSC1	Main Disconnect Switch
INV1	Inverter - Exit Conveyor Motor
INV2	Inverter - Upper Spreader Motor
INV3	Inverter - Lower Spreader Motors
T3	Transformer - Control
T4	Transformer - Power

Control System

Various components work together to control the work of the machine. This control system includes:

- [MPC1 Board](#)
- [Photosensors](#)
- [Proximity Sensors](#)

Control of the machine is done primarily via internal signals in the MPC1 control board.

MPC1 Board

The MPC1 board, located in the main electrical panel, accepts operator input via the control switches and machine input via various sensors. It provides all of the control logic for operating the unit.

Figure 5-6 and Figure 5-7 on the next page show MPC1 and its related control components. The table at the bottom of the page explains each item indicated in the pictures.

Communications and the Boards

All the input signals from the sensors go either through input cards which then pass them to the MPC1 control board, or directly into the MPC1, which also powers the sensors.

When the appropriate LED on the input card and/or on the MPC1 control board come on, it means that a signal has been received from a sensor. Each LED is numbered for easy identification.

In the same manner, output signals from the MPC1 are either direct or via an output card before they get to the output devices. These devices are also powered via the MPC1 board.

Most output devices like air valves, relays, and indicators run on the 24 VAC that comes from the MPC1 control board. For other devices that require a different voltage, the MPC1 control board or the output card sends an open collector output signal to drive the logic input on a separate driver board.

When the appropriate LED on the MPC1 control board comes on, it shows that a signal has been sent to a device. The LED on the MPC1 control board comes on to show that the board is functioning properly. The LED will light even if the output fuse on the board is blown.

For open collector output, the LED means that the MPC1 control board is sending the signal to the driver card. The LED will not come on if no driver is connected. Each LED is numbered for easy identification.

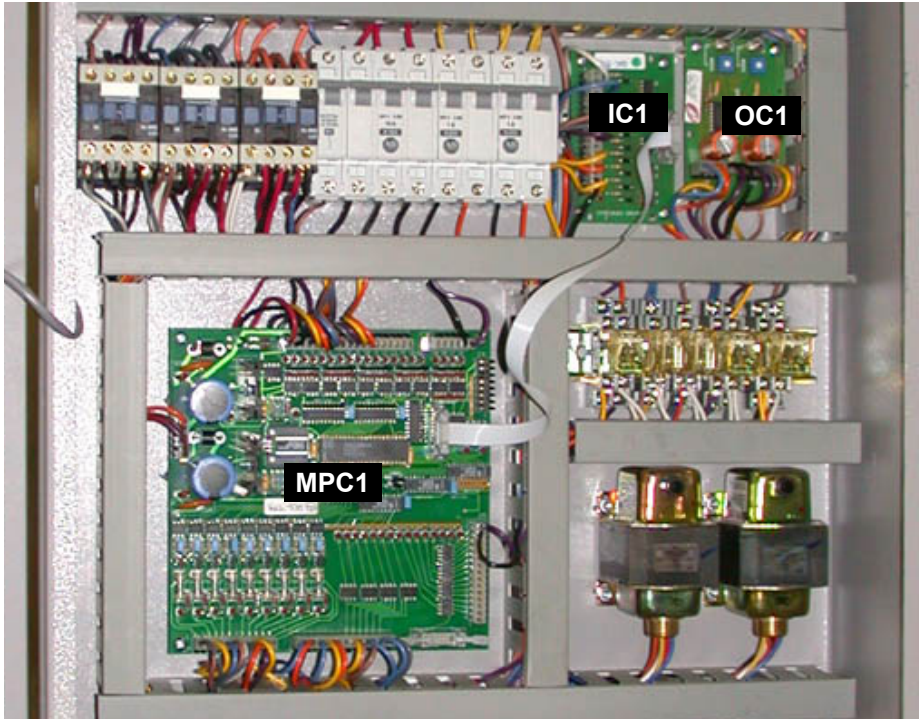


Figure 5-6: Control components in the main electrical panel.

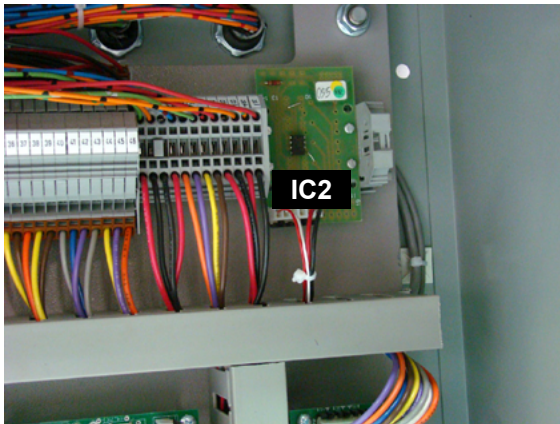


Figure 5-7: IC2 in the ironer.

MAIN ELECTRICAL PANEL COMPONENTS	
Schematic	Description
IC1	Input Card - Start/Stop
IC2	Input Card - Ironer Status
MPC1	Machine Controller Board - Spread/Feed Control Circuit Board
OC1	Output Card - Spreader Speed Control
OC2	Output Card -

Photosensors

The photosensors use a high-powered LED pulse output to detect items. When an item is present, this beam is reflected back into a sensitive detector built into the photosensor. A signal is then sent to the MPC1 board.

There are four photosensors located at various places around the unit (Figure 5-8). The table on the next page provides information about each photosensor.

Proximity Sensors

The proximity sensors use a magnetic field to detect the position of machine components. When a mechanism is in the proper position, this is detected by the disturbance of the magnetic field. A signal is then sent to the MPC1 board.

There are six proximity sensors located at various places around the unit (Figure 5-8). The table on the next page provides information about each proximity sensor.

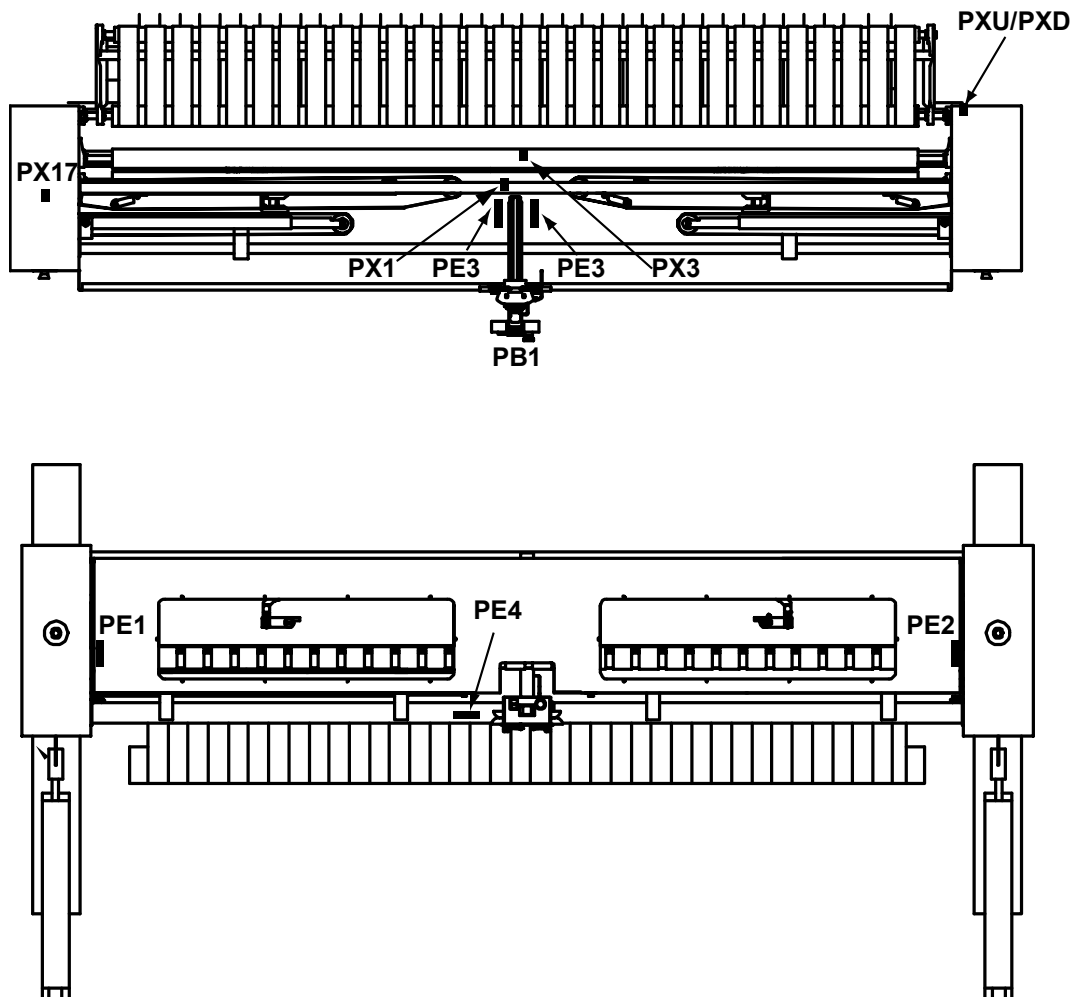


Figure 5-8: Sensor locations.

PHOTOSENSORS				
Sensor	Name	Function	Type & Setting	Control Board Red LED (Sensor NOT triggered)
PE3	Taut Sensors	Detects that the spread speed should be slowed when the flatwork is close to being completely spread.	Sharp Cutoff Dark Operate	ON
PE1	Left Wall Sensor	Detect and prevent material from entering and getting jammed in the spreader belt pulleys. When either of these sensors is tripped, the spreader reverses direction, and returns the flatwork to the center of the unit where it will be dropped.	Diffused Dark Operate	ON
PE2	Right Wall Sensor			
PE4	Tail Sensor	Detects the trailing edge of an item as it travels up the discharge conveyor. This sensor controls the sequencing of the spreading and laydown for the next item.	Retroreflective Light Operate	ON
PROXIMITY SENSORS				
Sensor	Name	Function	Type & Setting	Control Board Red LED (Sensor NOT triggered)
PB1	Touch Sensor	When a hand is sensed, the inlet clip assembly is activated.	Capacitive	OFF
PX1	Transfer Up Sensor	Detects when the transfer cylinder is all the way up. The inlet clip assembly stops and the spreader clamps activate.	12 mm	OFF
PX3	Spread Home	Detects the position of the spreader clamps in the transfer position at the center of the unit. This sensor initiates the transfer from the inlet clips to the spreader clamps and resets the upper spreader position to HOME (zero).	12 mm	OFF
PX17	Upper Spreader Encoder	Tracks the position of the spreading clamps during the spread and return functions.	8 mm	OFF
PXU	Feeder Up Sensor	When PXU is triggered, the feeder is locked out and cannot be operated. When PXD is triggered, the feeder is in position for operation. When neither sensor is triggered, an audible alarm is activated to signify the unit is in motion.	12 mm	OFF
PXD	Feeder Down Sensor			

5.2 Compressed Air System

It is important that the supply of compressed air be clean and dry and at 80 psi (550 kPa). All air is filtered before it is used. The major components of the pneumatic system are:

- Air Filter/Regulators
- Air Reservoir
- Air Valves
- Air Cylinders
- Air Bars/Air Jets

Air Filter/Regulators

Because the condition of the compressed air is so important, the unit uses air from the ironer, which includes a filter unit equipped with a drain (Figure 5-9, A). This helps keep the air clean and dry. This unit must be checked weekly for peak efficiency.

The unit uses two air pressure regulators, (Figure 5-9, B; Figure 5-10, A) to control the air pressure used to perform the inlet and spreading functions. The recommended setting for the main regulator located in the ironer is 80 psi (550 kPa). The recommended setting for the O.P.L. regulator is 60 psi (415 kPa). This can be adjusted to meet specific processing needs.

Air Reservoir

A crossbeam running down the center of the machine (Figure 5-10, B) is sealed and used as an air reservoir. This holds a supply of compressed air for use in various parts of the machine as required.

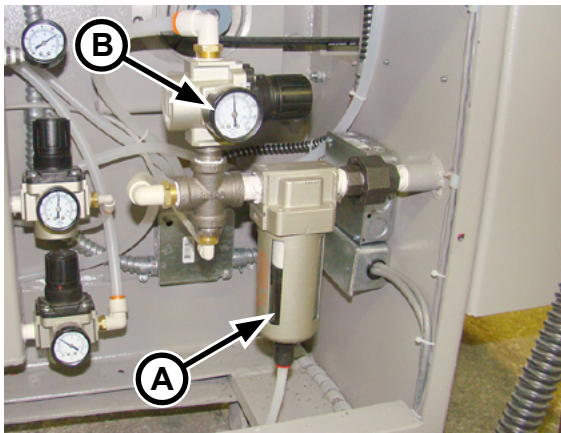


Figure 5-9: The ironer's filter unit provides clean, dry air to the spreader/feeder.

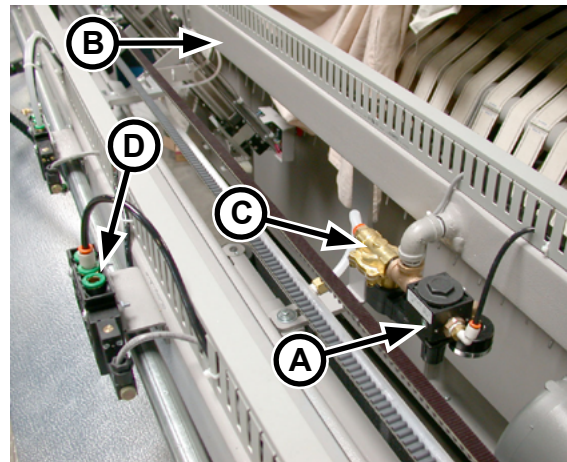


Figure 5-10: An air reservoir supplies the air valves and other compressed air components.

Air Valves

The machine uses a number of air valves which are actuated electronically by signals from the MPC1 control board. These valves (Figure 5-10, C, D) control the flow of compressed air to the various air cylinders and air bars incorporated into the unit.

Air Cylinders

The machine has a number of air cylinders (Figure 5-11), which use compressed air to create a mechanical movement.

Air Bars/Air Jets

The air bars (Figure 5-12, A) and jets (B) use compressed air to help create a smooth laydown of pieces onto the discharge conveyor.

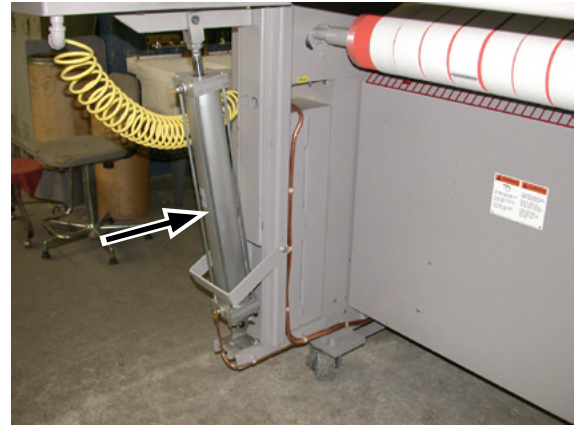


Figure 5-11: Air cylinders provide mechanical movement.

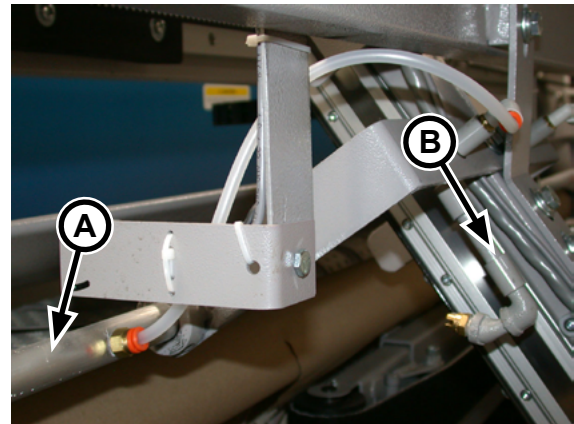


Figure 5-12: The air bar/air jet helps lay flatwork on the discharge conveyor ribbons.

5.3 Mechanical System

Components that make up the mechanical system include the following:

- Inlet Drive System
- Spread Drive System
- Discharge Drive System

Inlet Drive System

The only mechanical part of the inlet system is the corner clips and springs which secure the flatwork.

Spread Drive System

Use the illustrations (Figure 5-13/ Figure 5-14) below to identify the mechanical components of the spread drive system, which actually consists of separately powered upper and lower drive subsystems.

Upper Spread Subsystem

In the right endframe, the upper spread motor (A) powers the upper spread subsystem. A shaft from this motor extends directly into a timed drive pulley (B).

This pulley drives a belt (C) which spans the width of the machine to another pulley in the left endframe (D) which sits on a jackshaft (E).

When the belt moves, the two spreader jaws, one attached to the upper portion of the belt, the other to the lower, move in opposite directions.

The action of the spreaders is pneumatically controlled.

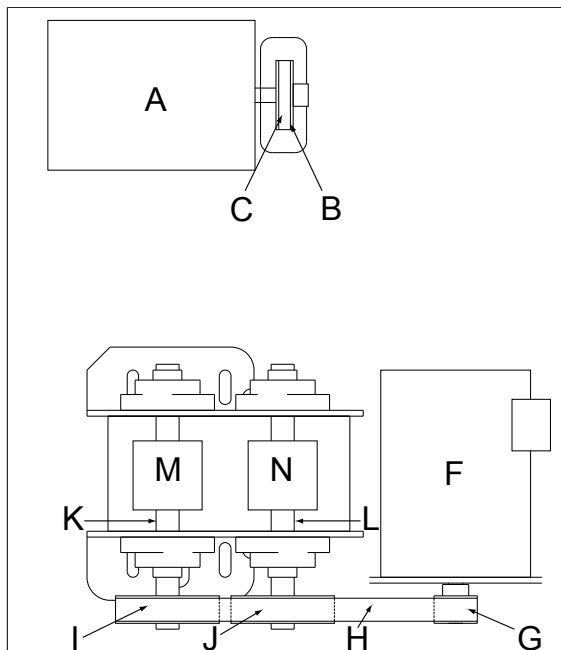


Figure 5-13: Drive components—right endframe.

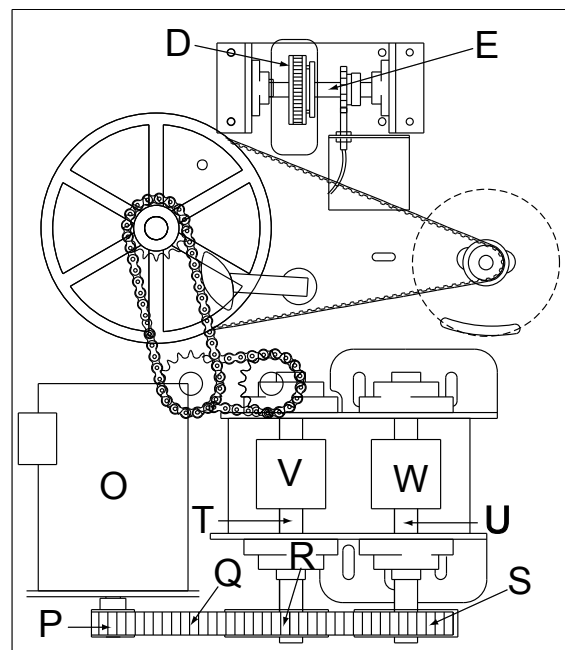


Figure 5-14: Drive components—left endframe.

Lower Spread Subsystem

There are two lower spread subsystems, each an exact mirror of the other. In each endframe, a lower spread motor (F, O) powers each lower spread subsystem.

A shaft from each motor extends directly into a drive pulley (G, P). These pulleys drive belts (H, Q) which in turn power two sets of oppositely turning pulleys (I-J, R-S). These pulleys turn two sets of shafts (K-L, T-U).

The shafts drive two sets of pulleys (M-N, W-V), which power the lower spreader belts, causing them to stretch the flatwork toward the left and right sides.

Discharge Drive System

Use the illustration (Figure 5-15) below to identify the mechanical components of the discharge drive system.

In the left endframe, the discharge motor (A) powers the discharge drive system. A shaft from this motor extends directly into a drive pulley (B).

This pulley drives a belt (C) which in turn powers a large speed reduction pulley (D). This pulley is attached to a jack shaft which extends into a drive sprocket (E).

This sprocket drives a chain (F) connected to the large piece discharge conveyor drive sprocket (G). A second sprocket on the shaft of this roll drives a second chain (H).

This chain is connected to the doffer roll drive sprocket (I). The adjustable idler arm (J) maintains proper tension on the large piece discharge conveyor drive chain.

Because sprocket G is slightly smaller than Sprocket I, the drive roll turns slightly faster, causing the flatwork to stretch slightly as it travels down the discharge ribbons.

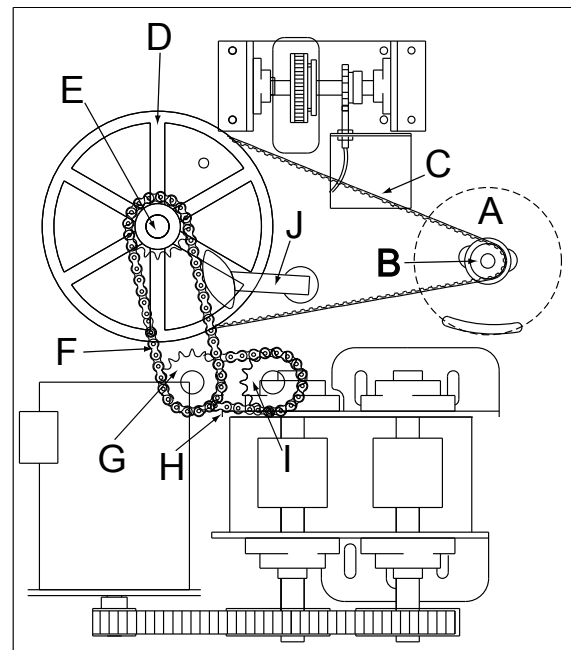


Figure 5-15: Drive components—right endframe.

5.4 Sequence of Operation

The unit has 6 phases of operation. In addition, it will react to various error conditions.

- Stand-by Phase
- Start-up Phase
- Input Phase
- Spread Phase
- Discharge Phase
- Position Change Phase
- Error Conditions

Stand-by Phase

During this phase, the incoming power is connected to the unit, but the unit is not operating.

When the main disconnect switch is turned ON, power is present in the control box. In addition:

- Line power terminates at:
 - CON1 (Exit inverter).
 - CON2 (Upper spreader inverter).
 - CON3 (Lower spreader inverters)
- One phase of incoming power supplies the transformers (T3, T4).
 - T3 provides 24VAC for the control circuit.
 - T4 provides 24VAC for the output circuit.
- When the compressed air is turned on, the air reservoir fills and the compressed air system is pressurized.

Start-up Phase

This phase begins when the operator pushes the green Start button:

- NO contacts for CR1 and CR5 are bypassed.
- The bypassed CR1 contact allows 24 VAC to be supplied to the power inlet pins of MPC1 in the main electrical panel.
- MPC1 energizes CR1, which closes the two NO CR1 contacts.
- One set of CR1 contactors allows power to flow to energize CON1, CON2 and CON3.
- CR2 is pre-energized by output from T4 if all inverter fault contacts are closed.
- CR3 is pre-energized by output from T4 if all safety contacts are closed.
- The CR4 O.P.L. run relay is energized.
- While this is happening, MPC1 sends signals to energize the AC frequency controllers: INV1 (exit motor), INV2 (upper spread motor), and INV3 (lower spread motors).
- When the Start button is released, the latching action of the CR1 and CR5 contacts keep the machine running.

Input Phase

This phase begins when an operator touches the target pad.

- MPC1 receives the signal from PB1.
- MPC1 energizes SV4, causing the rodless air cylinder to move upward until a signal is received from PX1, indicating it has reached the top of its travel.
- MPC1 signals INV1 to move the upper spreader transfer clamps toward the center of the unit.
- A signal from PX3 indicates when the clamps have reached their home position.

Spread Phase

This phase begins when the spread clamps take the flatwork piece from the transfer clamps.

- A signal from PX3 indicates the clamps have reached their home position and MPC1 de-energizes INV1.
- MPC1 energizes SV2L and SV2R, causing the spread clamps to close and grip the flatwork.
- Now Motor 1 (upper spreader) is energized via INV1, causing the spread clamps to move toward their respective endframes. Motors 2A/2B are also energized via INV2, driving the lower spread belts in opposite directions.
- As the piece spreads, the taut sensors (PE3) briefly detect the corner/edges of the item. At this point, both sensors must see the piece at the same time; otherwise, an error condition is assumed and the piece is dropped.
- In addition, the MPC1 board must receive a signal from PX17, indicating that the upper spreader belt is in motion. If it fails to receive the signal, an error condition is assumed. The machine stops.
- As the piece spreads, the MPC1 board uses the size data calculated during the Input Phase and internal programming to determine when to slow the spread speed.
- As the piece spreads, its top edge rises until it is detected by the taut sensors, which causes the machine to slow the spread process to its slowest speed.
- When MPC1 stops receiving a signal from PX17, it indicates that the piece has been fully spread. INV1 and INV3 are de-energized.

Discharge Phase

This phase begins after the piece has been spread. An air blast occurs to begin the process of laying the flatwork piece down on the discharge ribbons.

- MPC1 energizes SV3L and SV3R which produces an air blast that blows the top of the sheet onto the discharge conveyor.
- At the same time, MPC1 de-energizes SV2L and SV2R to open the spread clamps.
- Once the piece has cleared the tail sensor (PE4), the system is ready to process the next piece. This helps to prevent overlapping and to maintain a gap between items.
- The piece travels on the discharge conveyor ribbons until it completely clears the spreader/feeder.

Position Change Phase

The phase begins when the position of the FEEDER UP/DOWN switch is changed.

- When the switch is moved from to either DOWN or UP, the resulting mechanical movement is pneumatically generated.
- If the switch is moved to the UP position, the conveyor soon begins to raise.
- After a few moments, PXD will lose connection with the O.P.L. and stop sending a signal.
- When that happens, the coils for CR20 and CR21 are de-energized.
- When CR21 is de-energized, its contacts within the safety circuit open, causing the O.P.L. to shut down.
- When CR20 is de-energized, its normally closed contacts do close. Since PXU for is not sending a signal and therefore CR22 and its contacts are not energized, the Alarm sounds as a pulsing buzzer.
- When PXU is energized, CR22 is energized, which causes the alarm to stop. The O.P.L. remains locked out of operation because the unit cannot energize.
- Basically, the opposite happens when the conveyor switch is flipped to the DOWN position.
- When PXD is energized, CR20 and CR21 are energized, which stops the alarm and allows the safety circuit to be completed, respectively.

Error Conditions

Various operating conditions can result in an error condition.

- As noted, if, during the spread phase, the taut sensors (PE14A/B) do not simultaneously detect the piece, the resulting error condition causes the piece to be dropped to the floor.
- Also, as noted, if, during the spread phase, the MPC1 board does not detect a proper signal from PX9, one of two conditions occur:
 - If no signal is received, the machine is stalled. It shuts down.
 - If some signals are received, an error condition is assumed and the piece is dropped to the floor.
- If either of the wall sensors (PE1/2) detect the piece, an error condition is assumed and the piece is dropped to the floor.

Chapter 6

TROUBLESHOOTING

This chapter includes troubleshooting the O.P.L.[™] in the areas listed below.

- | | | | |
|------------|--------------------------|------------|------------------------------|
| 6.1 | LED Diagnostics | 6.5 | Spread Section |
| 6.2 | Electrical | 6.6 | Discharge Section |
| 6.3 | Mechanical System | 6.7 | Sensor Function |
| 6.4 | Inlet Section | 6.8 | Compressed Air System |

Unusual operating symptoms that occur during the checkout or operation of the unit must be diagnosed and corrected immediately. Mechanical and pneumatic problems can often be detected by visual inspection. Diagnosis of electrical malfunctions as well as some pneumatic problems requires maintenance personnel familiar with electrical/electronic circuitry and/or compressed air systems. Electrical component diagrams are located in the [SCHEMATIC PARTS LIST](#).

Several systems and subsystems work together to provide consistent, high quality results. It is important to consider each system when troubleshooting the unit. Each section in this chapter lists issues, possible causes, and solutions. If an issue occurs that is not addressed in this chapter, please contact your local authorized CHICAGO[®] dealer or the Chicago Dryer Company factory Service Department. For a list of common issues that can occur in each system, refer to [Troubleshooting Symptoms on page 6-2](#).

To better understand a component's function or how components work together, refer to [OPERATING PRINCIPLES](#). A complete understanding of the electrical operation will be of value when troubleshooting this unit.

Some remedies require repair by trained and experienced personnel. Please contact your local authorized CHICAGO[®] dealer or the Chicago Dryer Company factory Service Department.

WARNING

Never bypass any of the safety devices. This could result in serious injury to operators and maintenance personnel.

Only trained personnel with experience in steam, electrical, and mechanical repair should troubleshoot and repair the unit.

Unless otherwise indicated, perform troubleshooting, maintenance, and repair only when the unit is OFF, with power disconnected.

Troubleshooting Symptoms

- 6.1 LED Diagnostics..... 6-4**
- 6.2 Electrical**
 - Unit Does Not Start..... 6-6
 - Unit Does Not Start, O.P.L. Ready green lamp (top) lit,
Ironer Ready green lamp (bottom) dark 6-7
 - Unit Does Not Start, O.P.L. Ready green lamp (top) dark,
Ironer Ready green lamp (bottom) lit..... 6-7
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- 6.4 Inlet Section**
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- 6.5 Spread Section**
 - Flatwork Not Properly Spread.....6-11
 - Upper Spreader Clamps Bang or Drag at the Center of the Unit.....6-11
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6.6 Discharge Section

Laydown of Flatwork is Erratic 6-14

Flatwork Pieces Overlap 6-14

Leading Edge of Flatwork Folded Over 6-14

Leading Edge of Flatwork Misaligned 6-14

Excessive Gap Between Flatwork Pieces 6-15

Machine Stops 6-15

Discharge Ribbons Do Not Track Straight 6-15

6.7 Sensor Function

Photosensor Function Issue 6-16

Proximity Sensor Not Working 6-16

6.8 Compressed Air System

No Air Supply to Unit 6-17

Poor Air Pressure in Unit 6-17

No or Poor Air Supply to Air Devices 6-17

Compressed Air Supply System Error 6-18

6.1 LED Diagnostics

Most of the control circuits on the unit operate in a similar way. If there is a malfunction, use this procedure to trace each of the components to find the problem.

1. Turn power OFF at the main disconnect switch.
2. Open the electrical box door.
3. To diagnose the problem, start the unit, feed a piece and observe the problem area.

Use the information in:

- [Control System on page 5-6](#), and
- the [SCHEMATIC PARTS LIST](#),

to determine which LEDs to monitor during a given operation.

4. For the component/function that doesn't work, check the appropriate LEDs (Figure 6-1) against the chart below:
 - **SET 1**—Input LEDs.
 - **SET 2**—Microprocessor control board input LEDs.
 - **SET 3**—Microprocessor control board output LEDs.
 - **SET 4**—Output board LEDs.

LEDs	CHECK
Set 1 - OFF	- Component. Make sure it is properly aligned and functional
Set 1 - ON Set 2 - OFF	- Input board connection to microprocessor control board - Input board
Sets 1 & 2 - ON Set 3 - OFF*	- Microprocessor control board
Sets 1,2 & 3-ON Set 4 - OFF	- Microprocessor control board connection to output board - Output board
All LED's are ON. Device not functioning.	- Open circuit between output board and device. - Device faulty
*This means that the control board is receiving input but is not generating proper output.	

5. Turn power OFF at the main disconnect switch.
6. Repair/replace the component and then retest.

WARNING

Never operate the unit unless all safety covers are in place and all safety equipment is working correctly.

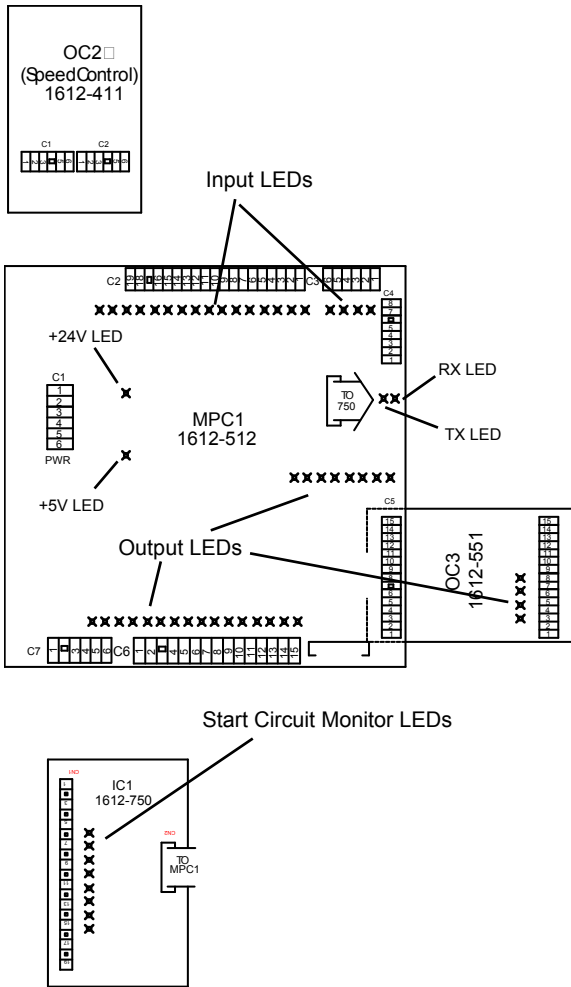


Figure 6-1: The microprocessor control boards are located in the electrical panel.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2>Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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6.2 Electrical

ISSUE	POSSIBLE CAUSE	SOLUTION
Unit Does Not Start	1. Main disconnect switch OFF.	• Turn main disconnect switch ON.
	2. One or more legs of the main power source is dead.	• Test and repair as necessary.
	3. Fuse(s) in the main disconnect switch have blown.	• Determine and correct cause before replacing fuse.
	4. Incoming power supply is incorrect.	• Check for fluctuating or incorrect incoming voltage. Machine power requirements are shown on the nameplate.
	5. 24VAC transformer T3 is tripped or bad.	• Reset. Test and replace as necessary.
	6. Circuit breaker CB3 is tripped, disabling 24VAC control supply.	• Reset. • If circuit breaker continues to trip, check for short in the circuit wiring and replace any defective components.
	7. Start button PB5 or an associated terminal block is bad.	• Test and replace as necessary.
	8. Contactor or Control Relay is bad.	• Test and replace as necessary.
	9. Connections to main control board are bad.	• Check connections to MPC1. Repair as necessary.
	10. Control latching circuit is defective.	• Press and hold the START button. If the screen lights up while the button is held, but shuts off when released, refer to Unit Starts, Then Shuts Down on page 6-8 .
	11. Problems with MPC1 control board.	• Test and replace as necessary.

WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.	Troubleshooting	WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.
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ISSUE	POSSIBLE CAUSE	SOLUTION
Unit Does Not Start O.P.L. Ready green lamp (top) lit, Ironer Ready green lamp (bottom) dark	1. The ironer is not running.	<ul style="list-style-type: none"> • Start ironer.
Unit Does Not Start O.P.L. Ready green lamp (top) dark, Ironer Ready green lamp (bottom) lit	1. See causes below	<ul style="list-style-type: none"> • See solutions below
Unit Does Not Start Both indicator lamps dark	1. Safety circuit fault in O.P.L.	<ul style="list-style-type: none"> • Check and reset all red safety STOP buttons. • Make sure endframes are securely closed.
	2. Electrical problems in O.P.L.	<ul style="list-style-type: none"> • Make power is turned ON a main disconnect switch. • Refer to Unit Does Not Start on page 6-6.
	3. Inverter needs to be reset.	<ul style="list-style-type: none"> • Reset the inverter: <ul style="list-style-type: none"> - Turn the power OFF at the main disconnect switch. - Wait one minute. - Turn power ON at the main disconnect switch. • If the fault repeats: <ul style="list-style-type: none"> - Input voltage is too high or low. The voltage should be between 185v and 245v. - There is a motor over current. Check for excessive physical load on the motor. - Open circuit between an inverter and its motor. - An inverter-powered motor is bad. - There is an overbraking problem. Contact the Chicago Dryer factory Service Department.

<p align="center">WARNING</p> <p>Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2 style="margin: 0;">Troubleshooting</h2>	<p align="center">WARNING</p> <p>Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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ISSUE	POSSIBLE CAUSE	SOLUTION
<p>Unit Starts, Then Shuts Down</p>	<p>1. Control latching circuit (hold) is defective.</p>	<ul style="list-style-type: none"> • Perform the following check: <ul style="list-style-type: none"> - Press a red safety STOP button or open an interlock switch. - Press START and check for message indicating open safety switch location. - See if message stays displayed or disappears after a few seconds. • If message disappears after a few seconds: <ul style="list-style-type: none"> - Check wiring connections between PB7 (start) and their associated contacts, PSC1, MPC1, OC1 and CR1. - Check PSC1/MPC1 and OC1. Replace if necessary or consult factory. - Check CR1. Replace if necessary. • If message stays displayed: <ul style="list-style-type: none"> - Close all safety switches. - Press the START button and make sure the momentary indicator does not light at all, even for 1-2 seconds. If indicator lamp lights for 1-2 seconds while the machine is running, see next cause.
	<p>2. RUN detect circuit faulty (No RUN/24VAC indicator on main board).</p>	<ul style="list-style-type: none"> • Check for 24VAC at PIN3 on DC power supply for 1-2 seconds after starting. <ul style="list-style-type: none"> - If there is 24VAC at PIN3 but no RUN/24VAC indicator, replace DC supply 1612-530. - If there is no 24VAC at PIN3, check and replace the start relay (CR1, CR2, or CR3), auxiliary contact, or wiring as necessary. • Do not try to measure 24VAC at the connection to the main controller. This is a logic signal provided by the power supply (0vdc = on, 5vdc = off).

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2>Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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6.3 Mechanical System

ISSUE	POSSIBLE CAUSE	SOLUTION
Noisy Operation	1. Mechanical components need lubrication.	<ul style="list-style-type: none"> Lubricate. Refer to Check and Grease Bearings on page 4-11.
	2. Inverter frequency setting is causing noisy motor operation.	<ul style="list-style-type: none"> Adjust frequency. For more information, contact the factory service department.
	3. Other component problem.	<ul style="list-style-type: none"> Refer to Rotating Elements Stop below.
Discharge Ribbons Not Working	1. Improper tension on ribbons.	<ul style="list-style-type: none"> Adjust. Refer to Discharge Ribbon Tension Adjustment on page 7-13.
	2. Discharge ribbon drive roll tracking tape worn smooth.	<ul style="list-style-type: none"> Replace. Refer to Discharge Conveyor Drive Roll Tracking Tape Replacement on page 7-18.
Rotating Elements Stop	1. Drive belt or chain is slipping or broken.	<ul style="list-style-type: none"> Adjust tension or replace if broken, worn, or frayed.
	2. Idler pulley loose or frozen.	<ul style="list-style-type: none"> Adjust tension or replace.
	3. One rotating element stationary: Check for broken shaft, bad bearing or loose/worn drive sprocket.	<ul style="list-style-type: none"> Replace as necessary.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2 style="margin: 0;">Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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6.4 Inlet Section

ISSUE	POSSIBLE CAUSE	SOLUTION
<p>Rodless Air Cylinder Does Not Transport Flatwork</p>	1. Touch pad (PB1) is malfunctioning.	<ul style="list-style-type: none"> • Check touch pad. Replace as necessary.
	2. Air pressure problem.	<ul style="list-style-type: none"> • Make sure compressed air supply is turned ON. • Check O.P.L. air pressure gauge. It should read 60 psi (415 kPa). • Other air problem. Refer to Compressed Air System on page 6-17.
	3. Transfer up sensor (PX1) not functioning.	<ul style="list-style-type: none"> • Check. For more information, refer to Proximity Sensor Not Working on page 6-16.
	4. Solenoid fuse on circuit board is burned out.	<ul style="list-style-type: none"> • Check/replace fuse on MPC1 prefeeder board.
<p>Station Carriage Continually Goes Up and Down</p>	1. Photosensor or connector is bad.	<ul style="list-style-type: none"> • Check PE31, PE35 as appropriate. Repair/replace as necessary.
<p>Flatwork Stops at the Top of Inlet Cylinder</p>	1. Cylinder up proximity sensor (PX1) not functioning.	<ul style="list-style-type: none"> • Check. For more information, refer to Proximity Sensor Not Working on page 6-16.
	2. Spread system malfunction.	<ul style="list-style-type: none"> • Check. For more information, refer to Spread Section on page 6-11.
	3. Solenoid fuse on circuit board is burned out.	<ul style="list-style-type: none"> • Check/replace fuse on MPC1 prefeeder board.
<p>Flatwork Jams at Inlet/Spread Clamp Pickup Point</p>	1. Poor flatwork condition.	<ul style="list-style-type: none"> • Make sure that the flatwork is free of knots, fold and tears.
	2. Insufficient air pressure at the main valve bank.	<ul style="list-style-type: none"> • Refer to Check Air Pressure Settings on page 4-6.
	3. Jamming occurs at low speeds.	<ul style="list-style-type: none"> • Insufficient motor torque. Inverter needs to be adjusted. Call the factory Service Department.

WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.	Troubleshooting	WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.
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6.5 Spread Section

ISSUE	POSSIBLE CAUSE	SOLUTION
<p>NOTE: The force required to move the upper spreader clamps along the linear rods is normally 2-5 pounds. If there is extra tension on the belt, the movement may be erratic or slow. If the belt is too loose it may skip on the pulley.</p>		
Flatwork Not Properly Spread	1. Excessive tension in the upper spreader belt.	• Refer to Upper Spreader Belt Tension Adjustment on page 7-6 .
	2. Excessive friction in the rail-carriage assembly.	• Lubricate the rail. Refer to Lubricate Upper Spreader Rail and Rail Bearings on page 4-5 .
	3. Upper spreader encoder (PX17) malfunction.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
	4. Home sensor (PX3) malfunction.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
	5. Taut sensors (PE3) malfunction.	• Check. Adjust/replace as necessary. Refer to Taut Photosensors Alignment on page 7-28 .
	6. The inverter may need to be adjusted.	• Adjust the inverter. Contact the factory Service Department.
	7. Defective run relay (CR4) or fuse.	• Test and/or replace.
Upper Spreader Clamps Bang or Drag at the Center of the Unit	1. Upper spreader encoder (PX17) out of adjustment/malfunctioning.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
	2. Home sensor (PX3) out of adjustment/malfunctioning.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
	3. The inverter may need to be adjusted.	• Adjust the inverter. Contact the factory Service Department.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2 style="margin: 0;">Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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ISSUE	POSSIBLE CAUSE	SOLUTION
Upper Spreader is not Reaching the Center Home Position	1. Rubber stops at center of machine out of position.	• Check. Adjust as necessary.
	2. Debris on the spread clamp rail.	• Check/clean as necessary.
	3. Home sensor (PX3) needs adjustment.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
Upper Spreader Speed Inconsistent	1. Taut sensors PE3 may be dirty, misaligned, or defective.	• Clean/adjust/replace as necessary. For more information, refer to Sensor Function on page 6-16 .
	2. INV1 malfunction.	• Check inverter. Repair/replace as necessary. For more information, contact the factory Service Department.
Excessive Spread Force on Flatwork	1. The inverter may need to be adjusted.	• Adjust the inverter. Contact the factory Service Department.
Too Little Spread Force on Flatwork	1. Tension on upper spreader belts needs adjustment.	• Check. For more information, refer to Upper Spreader Belt Tension Adjustment on page 7-6 .
	2. Spreader rail or rollers need lubrication.	• Lubricate. For more information, refer to Lubricate Upper Spreader Rail and Rail Bearings on page 4-5 .
	3. The inverter may need to be adjusted.	• Adjust the inverter. Contact the factory Service Department.
Flatwork Pulls Out of Clamps When Spreading	1. Spreader clamps out of adjustment.	• Adjust so the clamps close evenly across the jaw surface. Refer to Spreader Clamp Mechanical Adjustment on page 7-5 .
	2. Air pressure to the clamps is too low.	• Adjust.
	3. An incorrect inverter setting may be causing excessive torque.	• Adjust. Contact the factory Service Department for assistance.
	4. Mechanical problem with spread clamp.	• Check/adjust. Refer to Spreader Clamp Mechanical Adjustment on page 7-5 .

WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.	Troubleshooting	WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.
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ISSUE	POSSIBLE CAUSE	SOLUTION
Upper Spreader Clamps Return to the Center too Fast	1. Upper spreader encoder (PX17) malfunction.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
	2. Home sensor (PX3) malfunction.	• Check. Adjust/replace as necessary. Refer to Proximity Sensor Position Adjustment on page 7-31 .
Lower Spreader Belts Stop	1. Flatwork is jammed.	• Clear the jam. Refer to Handling Jams Safely on page 3-8 .
	2. Wall sensors may be dirty, misaligned, or defective.	• Clean/adjust/replace as necessary. For more information, refer to Sensor Function on page 6-16 .
Lower Spreader Belts Reverse Direction	1. Wall sensors may be dirty, misaligned, or defective.	• Clean/adjust/replace as necessary. For more information, refer to Sensor Function on page 6-16 .
	2. Debris on the belts.	• Clean the belts.
Excessive Pull to One Side	1. Lower spreader belt gap needs adjustment.	• Adjust. Refer to Lower Spreader Belt Gap Adjustment on page 7-12 .
	2. A defective solenoid, regulator, or cylinder is causing the spreader clamps to open at different speeds.	• Test and replace the defective component.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2 style="margin: 0;">Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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6.6 Discharge Section

ISSUE	POSSIBLE CAUSE	SOLUTION
Laydown of Flatwork is Erratic	1. Mechanical problem with spread clamp.	• Check/adjust. Refer to Spreader Clamp Mechanical Adjustment on page 7-5 .
	2. Air bars out of alignment.	• Adjust. Refer to Air Bar Alignment on page 7-35 .
	3. O.P.L./Ironer speed differential not correctly set.	• Adjust. Refer to Setting O.P.L./Ironer Speed Differential on page 7-19 .
	4. Early air blast occurs as the corners are detected by the taut sensors.	• Adjust. Refer to Taut Photosensors Alignment on page 7-28 .
Flatwork Pieces Overlap	1. Tail sensors may be dirty, misaligned, or defective.	• Clean/adjust/replace as necessary. For more information, refer to Sensor Function on page 6-16 .
Leading Edge of Flatwork Folded Over	1. The corners are too long.	• Check methods for clipping flatwork.
	2. Mechanical problem with the spread clamp.	• Check/adjust. Refer to Spreader Clamp Mechanical Adjustment on page 7-5 .
Leading Edge of Flatwork Misaligned	1. Mechanical problem with the spread clamp.	• Check/adjust. Refer to Spreader Clamp Mechanical Adjustment on page 7-5 .
	2. Corner sizes are not even.	• Check methods for clipping flatwork.
	3. Air bars out of alignment.	• Adjust. Refer to Air Bar Alignment on page 7-35 .
	4. Gaps between lower spreader belts are not even left side to right side, causing flatwork to pull to one side.	• Adjust. Refer to Lower Spreader Belt Gap Adjustment on page 7-12 .

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2>Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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ISSUE	POSSIBLE CAUSE	SOLUTION
<p>Excessive Gap Between Flat-work Pieces</p>	<p>1. Tail sensors may be dirty, misaligned, or defective.</p>	<ul style="list-style-type: none"> • Clean/adjust/replace as necessary. For more information, refer to Sensor Function on page 6-16.
<p>Machine Stops</p>	<p>1. Tail sensor PE4 is covered too long.</p>	<ul style="list-style-type: none"> • Check and clear any obstruction. • Clean photosensors if necessary.
<p>Discharge Ribbons Do Not Track Straight</p>	<p>1. Check the tension of the ribbons.</p>	<ul style="list-style-type: none"> • Adjust ribbon tension. Refer to Discharge Ribbon Tension Adjustment on page 7-13.
	<p>2. Check for string, lint, or debris build up on the unit.</p>	<ul style="list-style-type: none"> • Locate and remove any debris. The unit must be kept clean to operate correctly.
	<p>3. Ribbons are worn or clipper lacing broken.</p>	<ul style="list-style-type: none"> • Replace the associated pair of ribbons or the entire set. Refer to Discharge Ribbon Replacement on page 7-14.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2>Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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6.7 Sensor Function

ISSUE	POSSIBLE CAUSE	SOLUTION
Photosensor Function Issue	1. Photosensor/reflector is dirty.	<ul style="list-style-type: none"> • Clean. Refer to Check and Clean Photosensors and Reflectors on page 4-4.
	2. Incorrect alignment or adjustment.	<ul style="list-style-type: none"> • Check/adjust. Refer to Sensors on page 7-27, and the appropriate procedure.
	3. There is an open circuit between the sensor and the input card.	<ul style="list-style-type: none"> • Check connections between the sensor and input card. - Main control circuit board is defective. Replace. - Sensor is defective. Replace.
	4. Sensor is activated and the control board does not respond.	<ul style="list-style-type: none"> • Main control circuit board is defective and needs to be replaced.
	5. Damaged sensor cable.	<ul style="list-style-type: none"> • Replace the sensor. For more information, refer to Photosensor Replacement on page 7-30.
	6. Component is bad or failing.	<ul style="list-style-type: none"> • Check wiring and connections. Tighten/repair as necessary. • Check component. Replace as necessary. Refer to Sensors on page 7-27, and the appropriate procedure.
Proximity Sensor Not Working	1. Encoder is not properly positioned.	<ul style="list-style-type: none"> • Adjust. Refer to Proximity Sensor Position Adjustment on page 7-31.
	2. Encoder is failing or bad.	<ul style="list-style-type: none"> • Check component. Replace as necessary. • Check wiring and connections. Tighten/repair as necessary.
	3. Mechanical or compressed air device failure.	<ul style="list-style-type: none"> • Check the mechanical system or compressed air device associated with the sensor. Repair/replace as necessary.

WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.	Troubleshooting	WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.
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6.8 Compressed Air System

ISSUE	POSSIBLE CAUSE	SOLUTION
No Air Supply to Unit	1. Facility air supply is off.	<ul style="list-style-type: none"> • Turn facility air supply on. • Open air supply valve to unit.
	2. Air supply hose to unit is disconnected or clogged.	<ul style="list-style-type: none"> • Make sure compressed air connection to unit is secure. • Check supply hose and clear of any obstructions.
Poor Air Pressure in Unit	1. Check air pressure regulator settings.	<ul style="list-style-type: none"> • Make sure incoming air pressure is at least 80 psi (550 kPa). • Pressure must be set correctly. Refer to Check Air Pressure Settings on page 4-6.
	2. Air filter/regulator/auto drain is dirty.	<ul style="list-style-type: none"> • Service. Refer to Clean Air Filter/Auto Drain on page 4-10.
	3. Air supply pressure to unit too low.	<ul style="list-style-type: none"> • Check facility air pressure. Adjust/correct as necessary to meet unit requirements. Refer to APPENDIX: Technical Specifications.
	4. Air supply hose/piping too small.	<ul style="list-style-type: none"> • Make sure supply lines are 1/2" (25 mm) inside diameter.
	5. Air supply hose to unit is leaking, kinked or plugged.	<ul style="list-style-type: none"> • Check hose to unit. Repair/replace as necessary.
No or Poor Air Supply to Air Devices	1. Compressed air tubing problem.	<ul style="list-style-type: none"> • Make sure connections are secure. • Check tubing for leaks, kinks or plugs.
	2. Air valve malfunction.	<ul style="list-style-type: none"> • Make sure coil is properly connected to air valve. • Make sure coil is receiving electrical signal. • Replace coil/air valve.
	3. Air supply hose/piping too small.	<ul style="list-style-type: none"> • Make sure supply lines are 1/2" (25 mm) inside diameter.

<p>WARNING Only trained personnel with experience in electrical or mechanical repair should troubleshoot and repair the unit.</p>	<h2>Troubleshooting</h2>	<p>WARNING Read the REPAIR chapter and make sure that the power is disconnected before doing any repairs.</p>
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ISSUE	POSSIBLE CAUSE	SOLUTION
<p>Compressed Air Supply System Error</p>	<p>1. Electrical problem within compressed air system circuitry.</p>	<ul style="list-style-type: none"> • Test the system. - Look at the control board MPC1 for each air valve. An LED lights for each valve. Refer to the SCHEMATIC PARTS LIST. When the LED does not come on when the valve is supposed to open, the MPC1 is defective and must be replaced. - There is an open circuit between the control circuit board MPC1 and the actuator. - Actuator on the valve is defective and must be replaced.
	<p>2. A supply hose is obstructed or detached.</p>	<ul style="list-style-type: none"> • Check the hose to the valve in question. Reattach, clear the obstruction or replace.
	<p>3. Air filter/regulator with auto drain is dirty.</p>	<ul style="list-style-type: none"> • Clean the air filter/regulator with auto drain. Refer to Clean Air Filter/Auto Drain on page 4-10.

Chapter 7

REPAIR

Although designed for long service, some individual consumable parts of the O.P.L.™ eventually wear during normal use and must be cleaned, adjusted or replaced. This chapter includes the following sections:

- | | | | |
|------------|------------------------------|------------|------------------------------|
| 7.1 | Safety Considerations | 7.5 | Discharge Section |
| 7.2 | Parts Availability | 7.6 | Sensors |
| 7.3 | Inlet Section | 7.7 | Compressed Air System |
| 7.4 | Spread Section | | |

As a general rule:

- Replace ribbons when they are worn or break, when the tension can no longer be adjusted, or when flatwork does not properly enter or exit the unit.
- Replace tracking tape when it is worn smooth or when ribbons slip in place.
- Follow the [*Preventive Maintenance schedule beginning on page 4-1.*](#)

WARNING

Do not try to repair or correct any condition without reading and understanding this Repair Chapter. Only qualified personnel should troubleshoot and repair the spreader/feeder.

WARNING

Always make sure that the power is shut OFF at the main disconnect switch before servicing the unit.

7.1 Safety Considerations

Before attempting any repair work, review these safety steps and precautions to protect yourself and the machine.

- Safety must always be the primary concern of anyone making repairs or adjustments.
- Except where specifically directed, make sure that power is turned OFF at the main disconnect switch.

WARNING

Always use extreme caution when performing any repair procedure requiring the unit to be operating.

Take every precaution to keep hands and loose clothing from coming into contact with any of the moving rolls or other moving parts.

Serious Injury Could Result.

Whenever the unit is running, one person should be ready at a red safety STOP button at all times to stop the unit if necessary.

-
- All maintenance procedures should be handled by at least two qualified persons. Using the “buddy system” facilitates a quicker procedure and decreases the risk of an accident.

- Always keep hands and clothing away from the moving parts of the unit when it must be running to make repairs or adjustments.
- Never bypass any of the unit’s safety features. Only operate the unit with endframe doors and all guards in place and all safety features operating correctly.
- Your site should lockout/tagout procedures in place that comply with government standards for performing maintenance and repair. Ask your supervisor for specific information.

WARNING

Know the proper lockout/tagout procedures for equipment during repair. Follow the rules of your work site. Failure to do so could result in serious injury.

Do not repair or correct any condition without reading and understanding the repair procedure.

Only qualified personnel should troubleshoot and repair this unit.

Always make sure that power is disconnected before servicing the unit.

7.2 Parts Availability

Replacement and repair parts can be ordered through your local authorized CHICAGO® distributor. Questions about the operation, maintenance, troubleshooting, or repair of the unit can also be directed to your distributor.

In addition, parts orders may be placed directly with Chicago Dryer Company's Parts Department while questions may be directed to the Service Department: (773) 235-4430.

NOTE: *Use only factory approved and tested replacement parts when repairing a CHICAGO® unit. They are designed for each model and serial number machine. Overnight shipment of most parts is available.*

7.3 Inlet Section

Sheets and other pieces of large flatwork are brought into the unit through the inlet section. The following may require occasional adjustment:

- [Feed Clips Tension Adjustment](#)

Feed Clips Tension Adjustment

Dropped flatwork during feeding may indicate the feed clips are not properly gripping the flatwork. The clips can be adjusted to tighten their hold.



Required Tools

Phillips screwdriver: #2
Screwdriver
Wrenches:
3/8"
7/16"

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Loosen the screw (Figure 7-1, A) and adjust the position in the slot to increase spring tension.
3. If desired, a second spring (Figure 7-1, B) can be added.

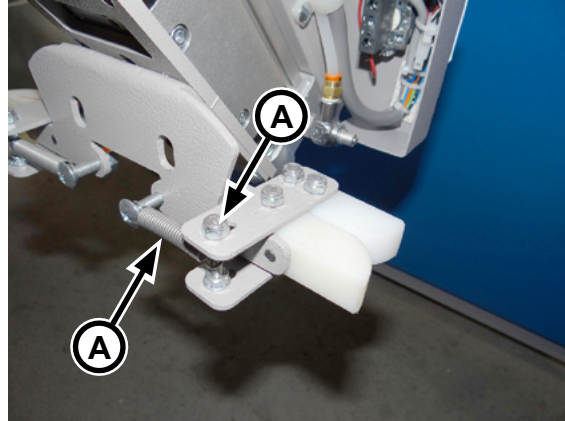


Figure 7-1: Feed clip tension is controlled by a spring.

7.4 Spread Section

Sheets and other larger pieces of flatwork are prepared for feeding in the large piece spread section, various components of which require periodic adjustment or replacement, or occasional repair. These procedures include:

- [Spreader Clamp Mechanical Adjustment](#)
- [Upper Spreader Belt Tension Adjustment](#)
- [Upper Spreader Belt Replacement](#)
- [Upper Spreader Clamp Grooved Bearing Replacement](#)
- [Lower Spreader Drive Belt Tension Adjustment](#)
- [Lower Spreader Drive Belt Replacement](#)
- [Lower Spreader Belt Tension Check/Replacement](#)
- [Lower Spreader Belt Gap Adjustment](#)

Spreader Clamp Mechanical Adjustment

Dropped flatwork during the spread operation may indicate the spreader clamps are not properly gripping the flatwork. The clamps can be adjusted to tighten their hold.



Required Tools

Wrenches:
3/8"
11/16"

**Perform only when the unit is OFF
with power disconnected.**

4. Turn power OFF at the main disconnect switch.
5. Loosen the jam nut (Figure 7-2).
6. Turn the cylinder rod for adjustment.
7. Once it is adjusted, retighten the jam nut.

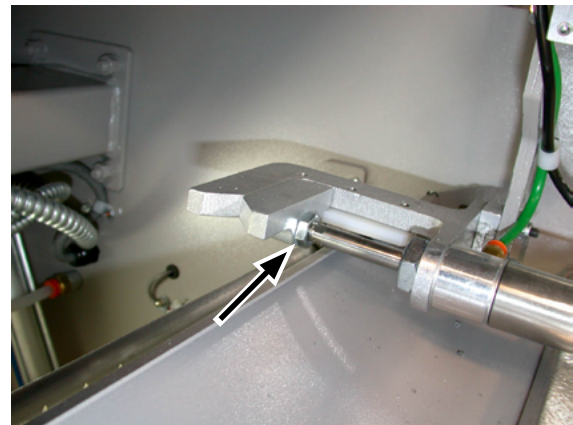


Figure 7-2: The spreader clamp air cylinder rod and jam nut.

Upper Spreader Belt Tension Adjustment

Adjust tension of the upper spreader belt when it begins to sag noticeably or to skip on the timed pulley. Both conditions cause excessive wear on the belt and shorten its life.



Required Tools

Ladder
Wrenches:
3/8"
9/16"

**Perform only when the unit is OFF
with power disconnected and COOL.**

WARNING

It will be necessary to stand on a sturdy ladder to perform this procedure. A fall could cause personal injury and/or damage to the machine. Use Extreme Caution.

1. Turn power OFF at the main disconnect switch.
2. Locate the upper spreader belt tension adjustment bolts on the inner wall of the upper left endframe (Figure 7-3, A).
3. Loosen the locknuts (Figure 7-3, B) and turn each bolt the same number of turns clockwise until the belt is properly tensioned.
4. Tighten the locknuts to secure the adjustment.
5. Start the unit and feed several pieces to verify the adjustment.
6. Repeat Steps 1 to 5 until the adjustment is satisfactory.

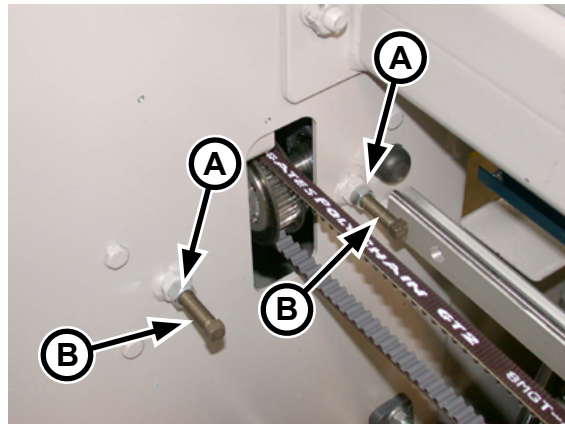


Figure 7-3: Upper spreader belt tension adjustment bolts on the inside of the left endframe.

Upper Spreader Belt Replacement

Replace the upper spreader belt when it can no longer be properly tensioned or if it becomes excessively worn, cracked or frayed.



Required Tools

C-clamps (2)
Ladder
Plastic wire ties
Scissors/knife
Wrenches:
3/8"
1/2"
9/16"

**Perform only when the unit is OFF
with power disconnected and COOL.**

WARNING

**It will be necessary to stand
on a sturdy ladder to perform
this procedure. A fall could
cause personal injury and/or
damage to the machine.
Use Extreme Caution.**

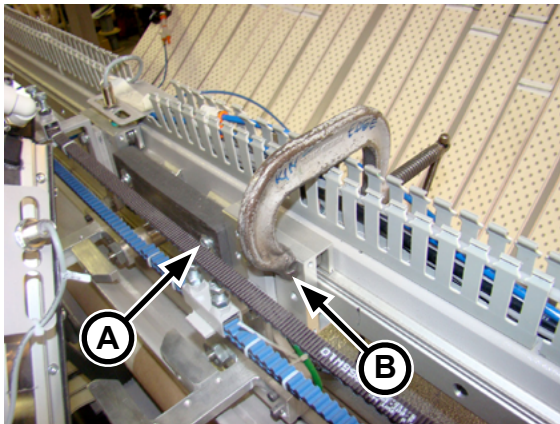


Figure 7-4: Make sure the spreader clamp carriage assemblies are firm against the center block.

1. Turn power OFF at the main disconnect switch.
2. Manually move the spreader clamp carriage assemblies toward the center of the machine until the rest firmly against the center block (Figure 7-4, A).
3. Use a C-clamp to secure each assembly in place against the block (Figure 7-4, B). Tighten the assembly against the guide rail. Use just enough pressure to prevent the assembly from moving during the following procedure.
4. Remove both upper endframe panels.
5. Locate the upper spreader belt tension adjustment bolts on the inner wall of the upper left endframe (Figure 7-3, A).
6. Loosen the locknuts (Figure 7-3, B) and turn each bolt the same number of turns counterclockwise to relax tension on the belt.
7. Locate one of the two bracket assemblies which secure the two sections of the belt (Figure 7-5, A) and cut the plastic wire ties which secure the ends (B).
8. Loosen the bracket bolts which secure the belt and remove the bracket assembly.
9. Repeat Steps 5 and 6 for the other bracket assembly.

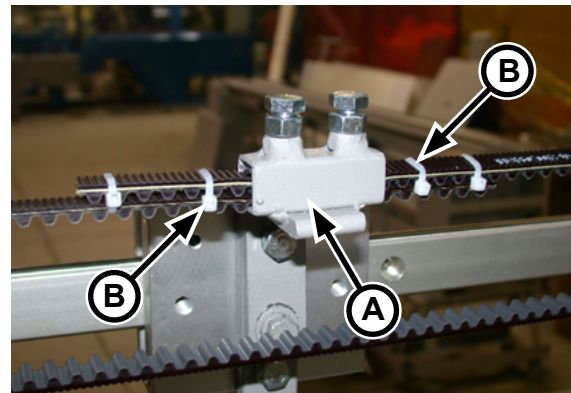


Figure 7-5: Brackets hold the sections of the upper spreader belt in position.

10. Remove the two sections of the belt from the machine and discard.
11. Secure one end of each of the two sections of the replacement belt by reversing Steps 4 and 5.
 - Make sure the “teeth” of each segment are properly oriented. If necessary, refer to Figure 7-5.
 - The belt ends should extend 1 to 3” (25 to 75 mm) beyond the edges of the bracket.
 - Make sure the plastic wire ties are pulled very snug. These keep the ends of the belt from interfering with proper operation.
12. Route the belts around the timed drive pulley in the upper right endframe and around the timed idler pulley in the upper left endframe.
13. Use the second bracket to secure the other two ends of the belt. Manually pull the two belt sections tight before completely tightening the bracket bolts.
14. Secure the ends with plastic wire ties.
15. Remove the C-clamps placed in Step 3.
16. Follow [Upper Spreader Belt Tension Adjustment on page 7-6](#).
17. Replace and secure both upper endframe panels.

Upper Spreader Clamp Grooved Bearing Replacement

These bearings usually wear down in pairs, either both upper or both lower. Even if only one grooved bearing shows signs of excessive wear, replacement should still be done in pairs.



Required Tools

Allen wrenches:

5 mm

3/16”

Clean lint-free cloth

Dry silicon lubricant

Ladder

Wrenches:

7/16”

13 mm

**Perform only when the unit is OFF
with power disconnected and COOL.**

WARNING

It will be necessary to stand on a sturdy ladder to perform these next steps. A fall could cause personal injury and/or damage to the machine.

Use Extreme Caution.

1. Turn power OFF at the main disconnect switch.
2. Remove the two bolts which secure the spreader clamp carrier assembly to the linear bearing assembly block (Figure 7-6). One bolt is longer than the other. Note its position for correct reassembly at the end of this procedure.
3. Remove a screw from the rubber block (Figure 7-7, A) and then push down on the block to pivot it out of the way.
4. Remove the upper rail screw closest to the rubber block (Figure 7-7, B) and then push the rail down or pull it up as necessary to gain clearance.
5. Slide the linear bearing block off the upper spreader rail and place on a work table.
6. Remove the screws which secure the worn bearings and remove the bearings from the block. Be sure to keep track of the spacer.
7. Use a clean cloth to wipe down the bearing block and the spacers.
8. Carefully reposition the spacers (Figure 7-8).
9. Insert the new bearings, making sure not to move the spacer out of position.
10. Secure with the screws removed in Step 8.
11. Slide the bearing block back onto the upper spreader rail.
12. Pivot the rail back into position and secure with the screw removed in Step 5.
13. Pivot the rubber block back into position and secure with the screw removed in Step 3.
14. Reattach the spreader clamp carrier assembly, making sure that the longer bolt goes into its original hole.
15. If necessary, lubricate the upper spreader rail. For more information, refer to [Lubricate Upper Spreader Rail and Rail Bearings on page 4-5](#).

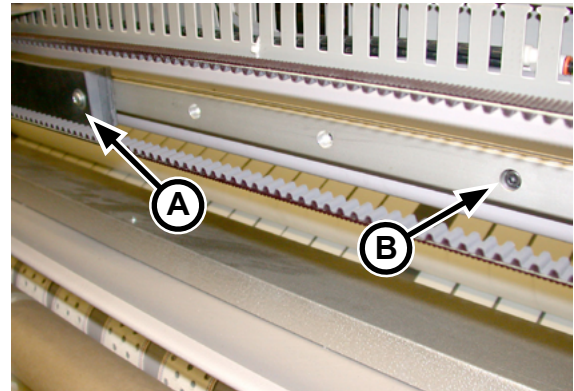


Figure 7-7: Remove one screw each from the rubber block and the spreader rail.

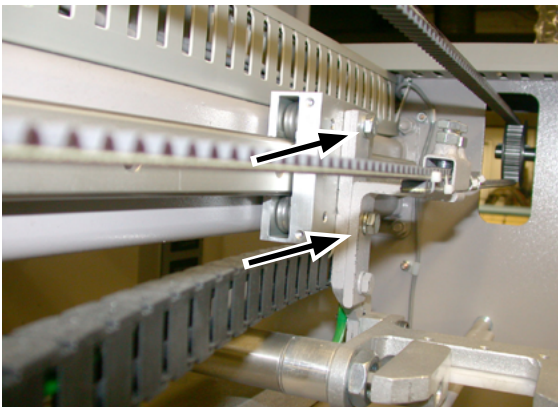


Figure 7-6: After removing these bolts, let the spreader clamp carrier assembly rest on the air foil.

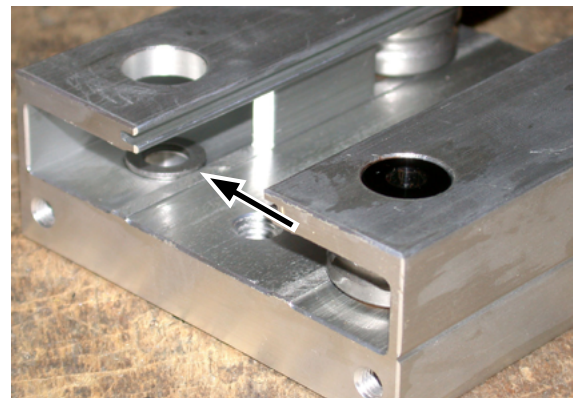


Figure 7-8: Make sure the spacer is in its proper position before inserting the new bearing.

Lower Spreader Drive Belt Tension Adjustment

Over time, the lower spreader drive belts will stretch due to normal wear. Adjust tension on a belt when it appears loose or begins to skip on the timed pulleys. Both conditions cause excessive wear on the belt and shorten its life.



Required Tools

Wrench: 9/16"

Perform only when the unit is OFF with power disconnected and COOL.

1. Turn power OFF at the main disconnect switch.
2. As appropriate, remove the upper right or upper left endframe panel to access the belt to be adjusted.
3. Tension on the belt is adjusted by moving the spreader belt drive motor (Figure 7-9, A) in its slotted mounting holes:
 - a) Loosen the nuts securing the motor bolts.
 - b) Move the motor to increase tension on the belt.
 - c) When tension on the belt is adequate, tighten the nuts.
4. Replace and secure the endframe panel.
5. Start the unit and feed several items to verify the adjustment is correct.
6. Readjust as necessary.

Lower Spreader Drive Belt Replacement

When a lower spreader drive shows signs of excessive wear or evidence of cracking, it must be replaced.



Required Tools

Wrench: 9/16"

Perform only when the unit is OFF with power disconnected and COOL.

1. Turn power OFF at the main disconnect switch.
2. As appropriate, remove the upper right or upper left endframe panel to access the belt to be replaced.
3. Release tension on the belt following [Lower Spreader Drive Belt Tension Adjustment on page 7-10](#).
4. Carefully note the path of the old belt (Figure 7-9, B) before removing it.
5. Install the new belt, following the correct path.
6. Adjust tension on the belt following [Lower Spreader Drive Belt Tension Adjustment on page 7-10](#).
7. Replace and secure the endframe panel.

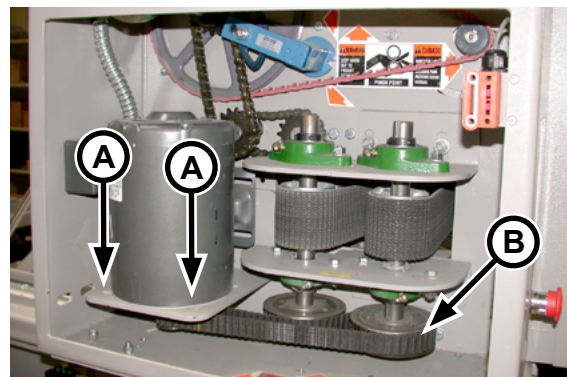


Figure 7-9: The bolts holding the lower spreader belt drive motor are in slotted holes.

Lower Spreader Belt Tension Check/ Replacement

There are two sets of lower spreader belts on the unit which will stretch and wear over time. Belt stretching is automatically compensated for by spring loaded tension arms (Figure 7-10).

Replace the belts if the spreader belt “teeth” have been damaged, when the pins have worn, or when the ribbons sag.

NOTE: Before replacing a sagging belt, check to make sure the tension spring has not been compressed.

Mechanical movement and vibration can cause the adjusting nut to compress the belt tensioning spring. Before replacing a sagging ribbon, check the position of the adjusting nut.

If belt sagging is corrected because the nut must be moved out and the belt/pin is otherwise sound, replacement will not be necessary.

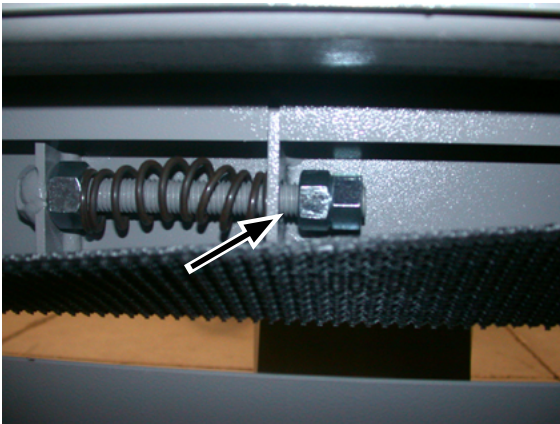


Figure 7-10: Proper gap between tensioning nut and fixed plate.



Required Tools

Pliers
Wrenches: 15/16" (2)

**Perform only when the unit is OFF
with power disconnected and COOL.**

NOTE: Belts should be replaced in front/back pairs (e.g. both left and right front belts) to prevent a single new belt from creating an excessive pull to one side.

1. Turn power off at the main disconnect switch.
2. Locate the spring tension adjustment bolt at the center of the arm under the belt (Figure 7-10). Tighten the nut to increase the tension on the spring until the belt can be moved by hand.
3. Pull the belts around until the lacing clips are accessible.
4. Remove the connecting pin and attach the new belt with the pin.
5. Pull the old belt through until the new belt is in place. Never turn on the power when pulling the belts through. This is dangerous and unnecessary.
6. Disconnect the old belt and secure the replacement belt with a new pin.
7. Loosen the nut holding the tension on the spring until the tension on the belts is correct.
8. Make sure there is a 1/4" gap between the tensioning nuts and the fixed retaining plate (Figure 7-10) to allow proper belt movement during operation.

Lower Spreader Belt Gap Adjustment

When the flatwork is pulled to one side as it is being spread, the gap between the belts on the pulling side is too small and needs to be adjusted.

When the spreading and laydown of the flatwork is not smooth, the gap between the belts may be too large.



Required Tools

Pliers

Wrenches: 9/16" (2)

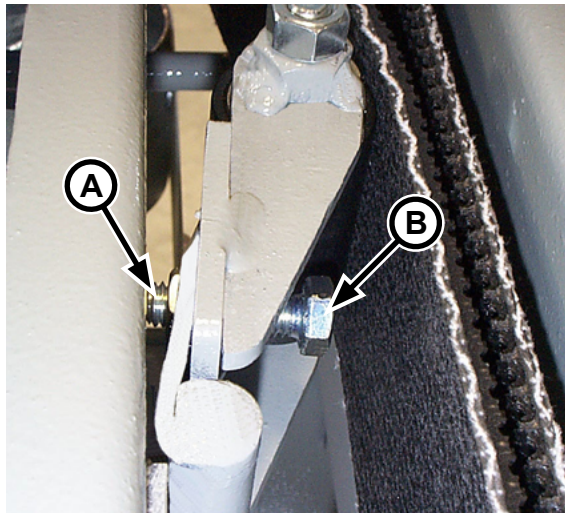


Figure 7-11: Spreader belt gap adjustment locknut (A) and bolt (B).

Perform only when the unit is OFF with power disconnected and COOL.

1. Turn power OFF at the main disconnect switch.
2. Locate the tension rollers between the black spreader belts.
3. Adjust the outside (closest to the end-frame) tension roller.
 - a) Loosen the locknut (Figure 7-11, A) and turn the bolt (B) to adjust the gap to about 1/8" (Figure 7-12, A).
 - b) Tighten the locknut to secure the adjustment.
4. Adjust the inside (closest to the center) tension roller.
 - a) Loosen the locknut and turn the bolt to adjust gap to about 3/8" (Figure 7-12, B).
 - b) Tighten the locknut to secure the adjustment.
5. Repeat Steps 3 and 4 for the other side.
6. Start the unit and process several pieces to verify proper adjustment.
7. Make further adjustments as necessary.

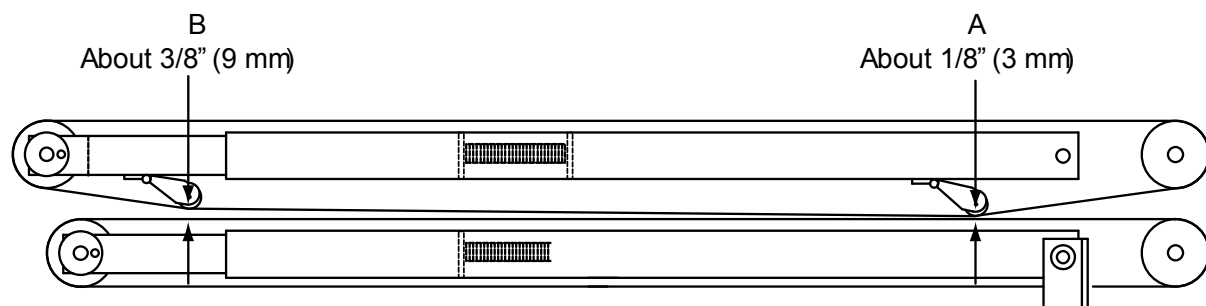


Figure 7-12: Lower spreader tension roller position-right spreader.

7.5 Discharge Section

Sheets and other larger pieces of flatwork exit the unit and are fed to the ironer through the discharge section, various components of which require periodic adjustment or replacement, or occasional repair. These procedures include:

- Discharge Ribbon Tension Adjustment
- Discharge Ribbon Replacement
- Discharge Conveyor Drive Belt Tension Adjustment
- Discharge Conveyor Drive Chain Tension Adjustment
- Discharge Conveyor Drive Roll Tracking Tape Replacement
- Setting O.P.L./Ironer Speed Differential

Discharge Ribbon Tension Adjustment

Tension on the discharge ribbons should be adjusted when ribbons sag or tend to track to one side. These conditions cause excessive wear on the ribbons and can shorten their life.



Required Tools

Wrenches:
3/8"
9/16" (2)

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Locate the roll adjustment bearings (Figure 7-13) at the ends of the discharge idler roll.
3. Loosen the nuts holding the bearings in place.
4. Locate the feed ribbons drive roll tension adjustment bolts (Figure 7-14, A). There is one on each side of the machine.
5. While holding each adjustment bolt in place, loosen its locknut (Figure 7-14, B).

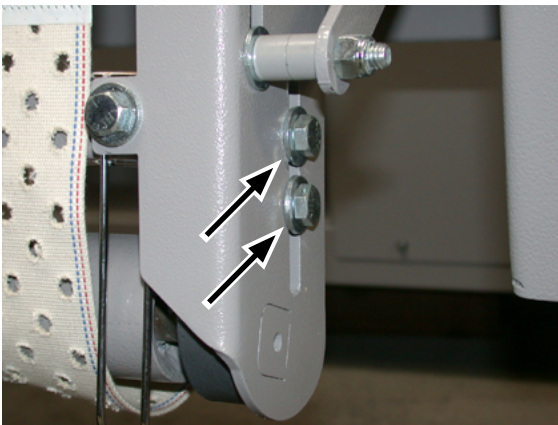


Figure 7-13: Roll bearing mounting bolts on the discharge and rear bypass conveyors.

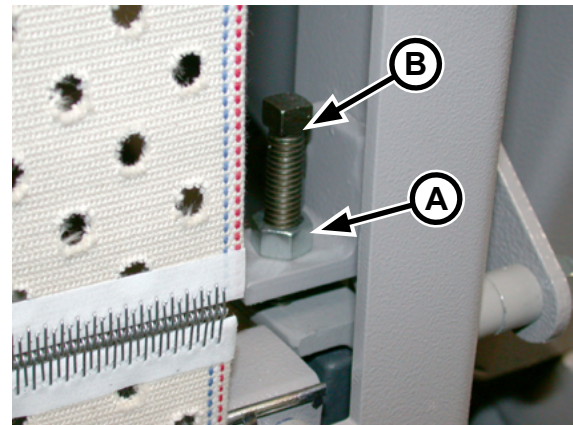


Figure 7-14: Loosen the locknut and adjust the roll equally on each side.

CAUTION

Do not over tension the ribbons. Too much tension can cause excessive motor amperage and premature ribbon wear.

6. Test the tension by pulling up lightly on the ribbon. Resistance should be felt within 1/4" to 1/2" (6 to 13 mm).
7. Turn power ON at the main disconnect switch.
8. Turn the SPEED knob to the slowest speed.
9. Run the unit briefly and make sure the ribbons track straight and do not rub on the ribbon guides under the feed table.
10. If tension on the ribbons is uneven, ribbons track toward the end of the drive roll where the tension is highest.
11. Stop the unit and turn power OFF at the main disconnect switch.
12. Either turn the adjusting bolt counterclockwise at the high tension end, or turn the adjusting bolt clockwise at the low tension end.
13. Repeat Steps 7 to 12 until the ribbons have the correct tension and track evenly.
14. Stop the unit and turn power OFF at the main disconnect switch.
15. While holding each adjustment bolt in place, secure its locknut.

Discharge Ribbon Replacement

When ribbon tension can no longer be adjusted, the entire set of discharge, front bypass or rear bypass ribbons must be replaced.

Ribbons that break should be replaced immediately. It is recommended that the entire set of ribbons be replaced in order to avoid excessive stress on only one new, slightly shorter ribbon. At a minimum, it is recommended that ribbons be replaced in pairs.

Replacing Worn Ribbons**Required Tools**

Pliers
Wrenches:
3/8"
9/16" (2)

**Perform only when the unit is OFF
with power disconnected.**

1. Verify the replacement ribbons are the correct size and sufficient quantity for completing the procedure. Refer to [Rolls and Ribbons on page PL-6](#).
2. Turn power OFF at the main disconnect switch.
3. Locate the roll adjustment bearings (Figure 7-13) at the ends of the discharge idler roll.
4. Loosen the nuts holding the bearings in place.
5. Locate the feed ribbons drive roll tension adjustment bolts (Figure 7-14, A). There is one on each side of the machine.
6. While holding each adjustment bolt in place, loosen its locknut (Figure 7-14, B).
7. Turn each bolt the same number of turns counterclockwise until the ribbons are easily moved by hand.

8. Pull the worn ribbons around their tracks until all the lacing clips are accessible and aligned.
9. Remove the connecting pin from an old ribbon and attach a new ribbon to one end.

WARNING

Never turn on power while pulling the ribbons through. This is dangerous and unnecessary.

10. Pull the old ribbon through until the new ribbon is in place.
11. Disconnect the old ribbon and secure the replacement ribbon with a new pin.
12. Repeat Steps 6 to 8 to replace additional worn ribbons. Stagger the positions of the lacing clips to give the flatwork a smooth flow.
13. Adjust ribbon tension following [Discharge Ribbon Tension Adjustment on page 7-13](#).
14. If the front bypass ribbon set was replaced, lower the conveyor by reversing Step 3.

Replacing Broken or Missing Ribbons

Ribbons that break should be replaced immediately. To avoid excessive stress on only one new, slightly shorter ribbon, the entire set of ribbons should be replaced. At a minimum, it is recommended that ribbons be replaced in pairs.



Required Tools

Pliers
Wrenches:
3/8"
9/16" (2)

Perform only when the unit is OFF with power disconnected.

1. Verify the replacement ribbons are the correct size and of sufficient quantity for completing the procedure. Refer to [Rolls and Ribbons on page PL-6](#).
2. Turn power OFF at the main disconnect switch.
3. Locate the roll adjustment bearings (Figure 7-13) at the ends of the discharge idler roll.
4. Loosen the nuts holding the bearings in place.
5. Locate the feed ribbons drive roll tension adjustment bolts (Figure 7-14, A). There is one on each side of the machine.
6. While holding each adjustment bolt in place, loosen its locknut (Figure 7-14, B).
7. Turn each bolt the same number of turns counterclockwise until the ribbons are easily moved by hand.
8. Remove a ribbon from each end of the unit and use one or both as replacement ribbons. The end ribbons can then be replaced by a pair of new ribbons.

WARNING
Never turn on power while pulling the ribbons through. This is dangerous and unnecessary.

9. Push the ribbon along its path around the drive and idler rolls.
10. Bring the ends of the ribbon together and connect them with a new pin.
11. Repeat Steps 5 to 7 to replace additional ribbons. Stagger the positions of the lacing clips to give the flatwork a smooth flow.

NOTE: *If the remaining ribbons are being replaced, refer to [Replacing Worn Ribbons on page 7-14](#).*

12. Adjust ribbon tension following [Discharge Ribbon Tension Adjustment on page 7-13](#).
13. If the front bypass ribbon set was replaced, lower the conveyor by reversing Step 3.

Discharge Conveyor Drive Belt Tension Adjustment

Over a period of time, the discharge conveyor drive belt will stretch from normal wear. When the belt is noticeably slack or begins to jump off track, tension must be adjusted. When tension can no longer be adjusted, replace the belt.



Required Tools

Pliers or
Wrenches: 9/16" (2)

Perform only when the unit is OFF with power disconnected.

1. Turn power OFF at the main disconnect switch.
 2. Open the right endframe door.
 3. Choose a method:
 - a) Locate the delivery drive motor mounting bolt (Figure 7-15, A) and loosen it.
 - b) Locate the adjustment bolt in the slotted hole and loosen it (Figure 7-15, B).
 - c) Carefully swing the motor until the belt has the proper tension.
 - d) Tighten both bolts.
- or

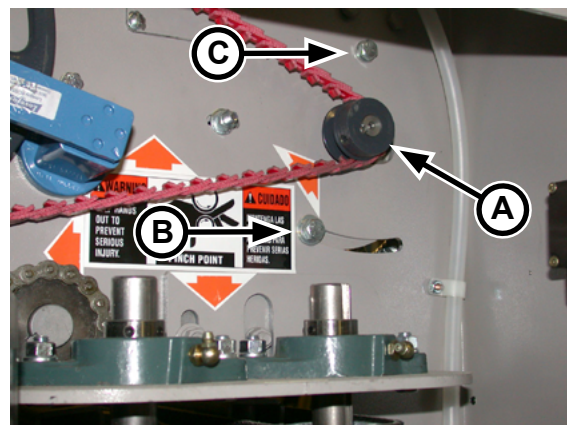


Figure 7-15: Discharge drive belt in the upper left endframe.

- a) Roll the drive belt off its pulleys.
- b) Remove a link from the belt:
 - 1) Use a pair of pliers to twist the tab of one link until the tab can slide through the hole in the next link.
 - 2) Repeat this for the tab of the next link so the first link can be removed.
- c) Reconnect the belt by pushing the unused tab through the unused hole.

NOTE: Additional belt links can be removed if necessary to properly tension the belt.

- d) Roll the belt back onto its pulleys.
4. Close the right endframe door.
5. Turn power ON at the main disconnect switch. Start the unit to check the adjustment.

Discharge Conveyor Drive Chain Tension Adjustment

Over time, the drive chain will stretch due to normal wear and tear. Tension on the chain must be adjusted if it is noticeably slack or if it begins to jump off track.



Required Tools

Wrenches:
 11/16"
 1-3/8" or Crescent

Perform only when the unit is OFF with power disconnected and COOL.

1. Turn power OFF at the main disconnect switch.
2. Remove the upper left endframe panel.
3. Locate the chain tensioning idler arm (Figure 7-16)



Figure 7-16: Tensioning idler arm in the upper left endframe.

4. Locate the idler arm mounting bolt (Figure 7-17) on the other side of the endframe.
5. Loosen the mounting bolt just enough to allow turning of the idler arm base with a crescent wrench.
6. Turn the idler arm base to apply tension to the chain.
7. Tighten the mounting bolt to hold the adjustment.

NOTE: A stretched chain that has been adjusted may not fit the sprocket correctly and may need to be replaced.

8. Replace and secure the upper left end-frame panel.
9. Turn power ON at the main disconnect switch. Start the unit to check the adjustment.

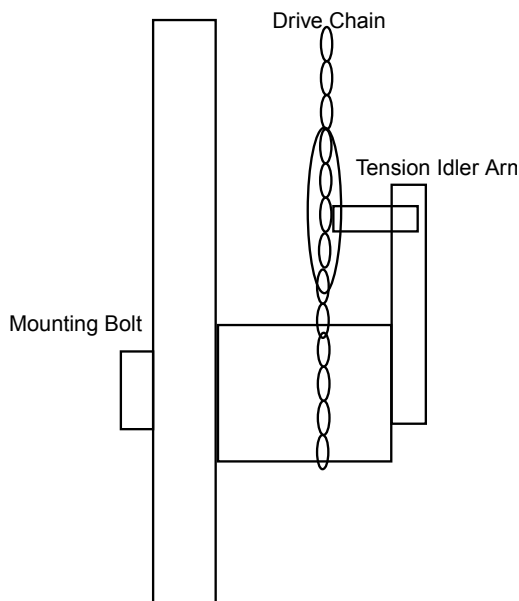


Figure 7-17: After loosening the mounting bolt, use a crescent wrench to move the tensioning idler arm.

Discharge Conveyor Drive Roll Tracking Tape Replacement

Tracking tape is used to hold discharge ribbons in proper position during operation to keep ribbons from moving laterally or overlapping each other.

Tracking tape is positioned underneath the center of each ribbon on the discharge conveyor drive roll. The tape is wound around the outside of the drive roll.



Required Tools

Chain puller
 Clean cloth
 Pen/pencil
 Permanent marker
 Phillips screwdriver: #2
 Pliers
 Protective covering
 Ruler/measuring tape
 Scissors/knife
 Scraper/sandpaper/steel brush
 Wrenches:
 3/8"
 1/2"
 9/16" (2)

Perform only when the unit is OFF with power disconnected.

1. Make sure there is enough 1" (25 mm) tape available to replace the old material. One roll of tracking tape is required.
2. Turn power OFF at the main disconnect switch.
3. Follow [Discharge Ribbon Tension Adjustment on page 7-13](#) to relieve tension on the discharge ribbons.
4. Pull the discharge ribbons around their tracks until all the lacing clips are accessible and aligned at the idler roll.
5. Remove the connecting pins from all the ribbons and move them out of the way to work. It is not necessary to remove them from the machine.

6. Remove the old tape from the drive roll. Mark the center position of each tape with a permanent marker so new tapes can be properly positioned.
7. Scrape off any old cement which remains on the roll using a scraper, coarse sandpaper or a wire brush. Wipe away any remaining residue with a clean cloth.
8. To apply the tape:
 - a) Cut a 9-7/16" (238 mm) for each placement.
 - b) Remove the backing from the tape
 - c) Line the tape up with the center mark.
 - d) Wrap the tape around the roll and butt the ends together.
9. Repeat Steps 6 to 8 for each tracking tape location.
10. Bring the ribbons back into position and replace the connecting pins.
11. Stagger the positions of the lacing clips to give the flatwork a smooth flow.
12. Adjust ribbon tension following [Discharge Ribbon Tension Adjustment on page 7-13](#).

Setting O.P.L./Ironer Speed Differential

The O.P.L. should *always* be running at a slightly slower speed than the ironer to which it is attached; this should hold true across the entire speed range of both machines from slowest to fastest.

However, it is important to note that this difference is also very small. Only 1 or 2 feet per minute. Too small a differential can cause flatwork to buckle, jam and affect finish quality; too large a differential can damage flatwork.

The following details the procedure for setting the differential at the low and high ends of ironer speed operation. By doing this, the differential will be set across all speed ranges. The lower speed range is always checked/set first.



Required Tools

Crescent wrench
 Hand-held speedometer
 Inverter parameter unit: PU04
 (optional)
 Note paper
 Pen/pencil
 Screwdriver: small

**Perform only when the unit is
 RUNNING.
 Use Extreme Caution.**

Check Speed Differential

1. Turn power ON at the main disconnect switch.
2. Start the ironer unit and turn its speed control fully counter-clockwise to run it at its slowest speed.
3. Start the O.P.L.

WARNING
Your hands will be close
to moving rolls.
Use Extreme Caution.

4. Use a hand-held speedometer to determine the speed of the O.P.L. discharge ribbons (Figure 7-18). Make sure to hold the wheel over the ribbon against the turning roll.
5. Write down the roll speed. Take multiple readings and average them to ensure an accurate number.
6. Repeat Steps 4 and 5 with the feed ribbon drive roll (Figure 7-19).
7. Compare the readings. Remember, you always want the O.P.L. running slightly slower than the ironer. As appropriate:
 - If the O.P.L. readings are 1 to 2 feet per minute slower than the ironer readings, the speed differential is correct. As appropriate:
 - If you were performing the low speed check, repeat Steps 2 to 7, setting the ironer to its fastest speed in Step 2.
 - If you were performing the high speed check, go to Step 14.
 - If the O.P.L. is running faster than the ironer, or if the ironer is running more than 2 feet per minute faster than the O.P.L., the differential needs adjustment. Go to the next step.

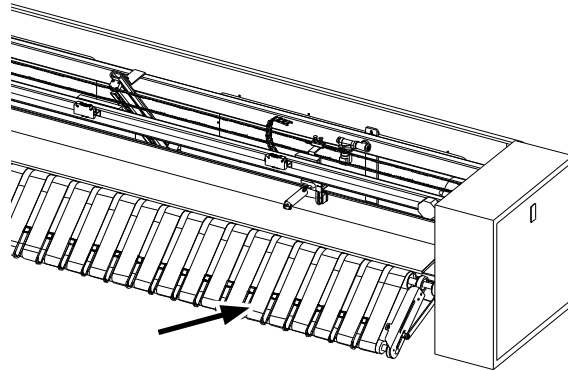


Figure 7-18: Measure the O.P.L. discharge ribbon speed.

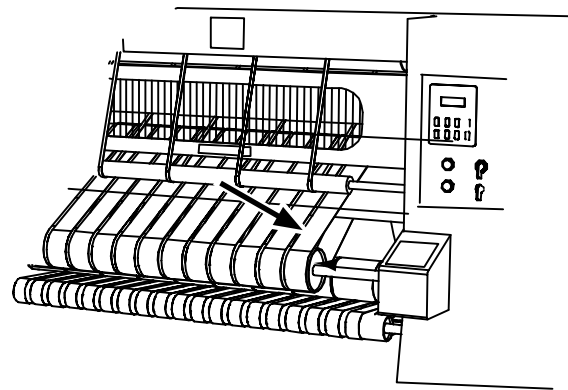


Figure 7-19: Measure the ironer feed ribbon speed.

8. Stop the O.P.L. Leave the ironer running.
9. Turn power OFF at the main disconnect switch on the O.P.L. electrical box at the right rear of the unit.
10. Open the O.P.L. electrical box door. Use a crescent wrench to manually turn power ON at the O.P.L. disconnect switch.
11. Locate the speed control board and turn the speed toggle switch to MANUAL (Figure 7-20).

WARNING

The adjustment potentiometer on the speed board is a precision electronic device. Forcing it beyond its range and/or using too large a screwdriver may cause irreparable damage.

12. Using a small screwdriver, turn the potentiometer (Figure 7-21) to the appropriate setting. Do not force it:
 - If performing the low speed adjustment, turn it fully *counterclockwise* to its lowest setting.
 - If performing the high speed adjustment, turn it fully *clockwise* to its highest setting.

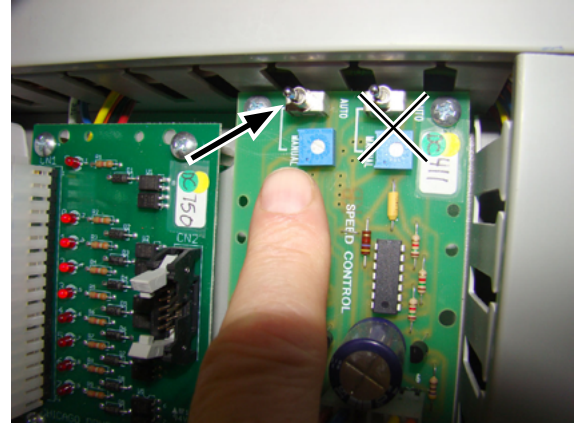


Figure 7-20: Turn the speed toggle to MANUAL before adjusting its potentiometer.

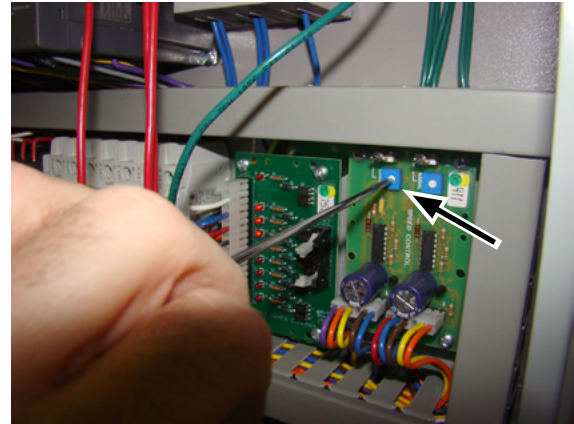


Figure 7-21: Be sure to use an appropriately sized screwdriver to adjust the potentiometer.

13. Locate the exit conveyor inverter (Figure 7-22). As appropriate:
 - If using a PU04 parameter unit, go to [Parameter Unit Method on page 7-22](#).
 - If using the inverter’s controls, go to [Inverter Control Method on page 7-24](#).
14. When both low and high speed differentials are correctly set:
 - a) Stop the ironer and the O.P.L.
 - b) Make sure the speed toggle is turned to AUTO (Figure 7-20).
 - c) If appropriate, disconnect the PU04 parameter unit.
 - d) Use a crescent wrench to manually turn the O.P.L. disconnect switch to OFF.
 - e) Close and secure the O.P.L. electrical box door.
15. Start the ironer and O.P.L. and process several pieces to make sure the desired stretch is being achieved.

Adjusting Inverter Settings

Parameter Unit Method

1. Plug the PU04 parameter unit into the inverter’s communications port.
2. Press the PU button.
3. Press the SET button.
4. As appropriate:
 - For setting the low speed differential, use the keypad to enter 902.
 - For setting the high speed differential, use the keypad to enter 903.
5. Press the READ button 2 times.
6. Enter the appropriate base frequency setting shown in the table in Figure 7-23. Be careful to use the correct low (902) or high (903) setting for the correct ironer.
7. Press the WRITE button 2 times.
8. Turn the speed toggle switch to AUTO.
9. Leave the O.P.L. disconnect switch manually turned to ON. Leave the PU04 parameter unit plugged in.
10. Start the O.P.L.

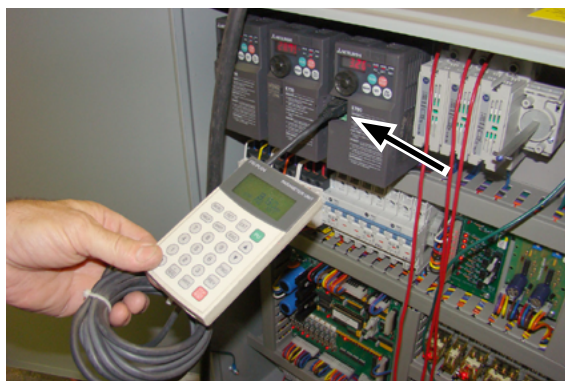


Figure 7-22: Plug the parameter unit into the communications port of Inverter 3.

Machine	Base Setting	
	902	903
Tri-Star 24	1.00	40
Tri-Star 28	1.50	44
Tri-Star 32	0.00	60
CrosStar 36	0.00	70
Imperial 224	0.10	61
Imperial 232	1.00	68
GO 24	1.75	40

Figure 7-23: Base settings for low and high speeds.

WARNING
Your hands will be close
to moving rolls.
Use Extreme Caution.

11. Use a hand-held speedometer to determine the speed of the O.P.L. discharge ribbons (Figure 7-18). Make sure to hold the wheel over the ribbon against the turning roll.
12. Write down the roll speed. Take multiple readings and average them to ensure an accurate number.
13. Repeat Steps 11 and 12 with the feed ribbon drive roll (Figure 7-19).
14. Compare the readings. Remember, you always want the O.P.L. running slightly slower than the ironer. As appropriate:
 - If the O.P.L. readings are 1 to 2 feet per minute slower than the ironer readings, the speed differential is correct.
 - If you were performing the low speed check, go to [Check Speed Differential on page 7-20](#), and repeat Steps 2 to 7, setting the ironer to its fastest speed in Step 2.
 - If you were performing the high speed check, go to [Check Speed Differential on page 7-20](#), Step 14.
 - If the O.P.L. is running faster than the ironer, or if the ironer is running more than 2 feet per minute faster than the O.P.L., further adjustments are needed. Go to the next step.

15. If further adjustments are needed:

- a) Repeat Steps 2 to 5 above.

NOTE: *If you are adjusting the low speed differential, the inverter frequency setting is already at 0.00 and the O.P.L. is still too fast, the ironer inverter will require adjustment. Contact the Factory Service Department.*

- b) For Step 6, gradually change the frequency in very small increments as necessary to achieve the desired speed differential. Adjust it up to increase the O.P.L. speed; down to decrease it.
- c) Repeat Steps 7 to 14 above.

Inverter Control Method

Follow the appropriate set of steps for setting the low or high speed differential. There is a difference so be careful to follow the correct set of steps. Refer to Figure 7-24.

Setting the Low Speed Differential

1. Press the PU/EXT button.
2. Press the MODE button.
3. Turn the wheel counterclockwise until “C...” appears in the LED display.
4. Press the SET button. “C---” should now display.
5. Turn the wheel until C2 displays.
6. Press the SET button to view the parameter setting.
7. Use the wheel to enter the appropriate base frequency setting shown in the table in Figure 7-25. Be careful to use the correct low setting (C2) for the correct ironer.
8. Press the SET button to save the new value.
9. Turn the wheel until C3 displays.
10. Press the SET button to view the parameter setting. *Do not make any changes.*

11. Press the SET button again to save the parameter setting.
12. Turn the wheel until “C---” again appears in the LED display.
13. Press the SET button so that “PR.CL” displays.
14. Press the MODE button 2 times to exit (“0.00” should display).
15. Press the PU/EXT button 2 times to exit.
16. Turn the speed toggle switch to AUTO.
17. Leave the O.P.L. disconnect switch manually turned to ON.
18. Start the O.P.L.

WARNING
Your hands will be close to moving rolls.
Use Extreme Caution.

19. Use a hand-held speedometer to determine the speed of the O.P.L. discharge ribbons (Figure 7-18). Make sure to hold the wheel over the ribbon against the turning roll.
20. Write down the roll speed. Take multiple readings and average them to ensure an accurate number.

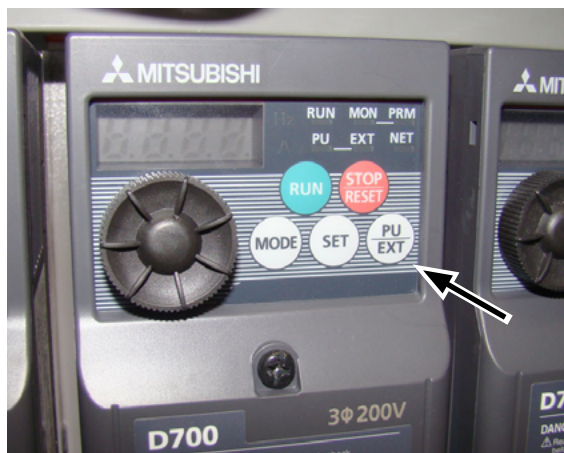


Figure 7-24: Inverter controls.

Machine	Base Setting	
	C2	125
Tri-Star 24	1.00	40
Tri-Star 28	1.50	44
Tri-Star 32	0.00	60
CrosStar 36	0.00	70
Imperial 224	0.10	61
Imperial 232	1.00	68
GO 24	1.75	40

Figure 7-25: Base settings for low and high speeds.

21. Repeat Steps 19 and 20 with the feed ribbon drive roll (Figure 7-19).
22. Compare the readings. Remember, you always want the O.P.L. running slightly slower than the ironer. As appropriate:
 - If the O.P.L. readings are 1 to 2 feet per minute slower than the ironer readings, the speed differential is correct.
 - If you were performing the low speed check, go to [Check Speed Differential on page 7-20](#), and repeat Steps 2 to 7, setting the ironer to its fastest speed in Step 2.
 - If you were performing the high speed check, go to [Check Speed Differential on page 7-20](#), Step 14.
 - If the O.P.L. is running faster than the ironer, or if the ironer is running more than 2 feet per minute faster than the O.P.L., further adjustments are needed. Go to the next step.
23. If further adjustments are needed:
 - a) Repeat Steps 1 to 6 above.

NOTE: *If you are adjusting the low speed differential, the inverter frequency setting is already at 0.00 and the O.P.L. is still too fast, the ironer inverter will require adjustment. Contact the Factory Service Department.*

- b) For Step 7, gradually change the frequency in very small increments as necessary to achieve the desired speed differential. Adjust it up to increase the O.P.L. speed; down to decrease it.
- c) Repeat Steps 8 to 22 above.

Setting the High Speed Differential

1. Press the PU/EXT button.
2. Press the MODE button.
3. Turn the wheel clockwise until 125 appears in the LED display.
4. Press the SET button.
5. Use the wheel to enter the appropriate base frequency setting shown in the table in Figure 7-25. Be careful to use the correct high setting (125) for the correct ironer.
6. Press the SET button to save the new value.
7. Turn the wheel counterclockwise until “C...” appears in the LED display.
8. Press the SET button. “C---” should now display.
9. Turn the wheel until C4 displays.
10. Press the SET button to view the parameter setting. *Do not make any changes.*
11. Press the SET button again to save the parameter setting.
12. Turn the wheel until “C---” again appears in the LED display.
13. Press the SET button so that “PR.CL” displays.
14. Press the MODE button 2 times to exit (“0.00” should display).
15. Press the PU/EXT button 2 times to exit.
16. Turn the speed toggle switch to AUTO.
17. Leave the O.P.L. disconnect switch manually turned to ON.
18. Start the O.P.L.

WARNING
Your hands will be close
to moving rolls.
Use Extreme Caution.

19. Use a hand-held speedometer to determine the speed of the O.P.L. discharge ribbons (Figure 7-18). Make sure to hold the wheel over the ribbon against the turning roll.
20. Write down the roll speed. Take multiple readings and average them to ensure an accurate number.
21. Repeat Steps 19 and 20 with the feed ribbon drive roll (Figure 7-19).
22. Compare the readings. Remember, you always want the O.P.L. running slightly slower than the ironer. As appropriate:
 - If the O.P.L. readings are 1 to 2 feet per minute slower than the ironer readings, the speed differential is correct.
 - If you were performing the low speed check, go to [Check Speed Differential on page 7-20](#), and repeat Steps 2 to 7, setting the ironer to its fastest speed in Step 2.
 - If you were performing the high speed check, go to [Check Speed Differential on page 7-20](#), Step 14.
 - If the O.P.L. is running faster than the ironer, or if the ironer is running more than 2 feet per minute faster than the O.P.L., further adjustments are needed. Go to the next step.
23. If further adjustments are needed:
 - a) Repeat Steps 1 to 4 above.
 - b) For Step 5, gradually change the frequency in very small increments as necessary to achieve the desired speed differential. Adjust it up to increase the O.P.L. speed; down to decrease it.
 - c) Repeat Steps 6 to 22 above.

7.6 Sensors

The spreader/feeder uses two types of sensors: photosensors, which rely on visual signals, and proximity sensors, which rely on magnetic signals.

Each sensor on the unit is physically aligned and its sensitivity is adjusted during installation. This is important for reliable operation of the unit. Sensors that are misaligned or out of adjustment can miss a piece of flatwork or give a false signal when no material is there.

The single most common source of unreliable sensor operation is dirt on the lens of a photosensor or a reflector. Make sure all of the photosensors and reflectors are free of lint or dust. Use either a clean, soft cloth to clean each lens.

In addition, periodic adjustment or replacement of some sensors may be required. These procedures include:

- [General Photosensor Alignment](#)
- [Taut Photosensors Alignment](#)
- [General Photosensor Sensitivity Adjustment](#)
- [Photosensor Replacement](#)
- [Proximity Sensor Position Adjustment](#)
- [Proximity Sensor Replacement](#)

General Photosensor Alignment

The alignment of photosensors is critical to proper and productive operation of the machine.

Most photosensors are mounted in a fixed position and do not need adjustment. The only adjustable sensors are the taut photosensors.

Taut Photosensors Alignment

On occasion, the tail of the sheet going onto the conveyor may fly up and be seen by the taut sensors, triggering an early air blast. This can be corrected by changing the angle of the taut sensors to “see” higher.



Required Tools

Phillips screwdriver: #1

**Perform only when the unit is OFF
with power connected.
Use Extreme Caution.**

1. Turn power ON at the main disconnect switch.
2. Press the green start button.
3. Press any of the red Safety STOP buttons.
4. Set the sensitivity to maximum. For more information, refer to [General Photosensor Sensitivity Adjustment on page 7-29](#).
5. Loosen the bracket mounting screws (Figure 7-26).

NOTE: Make sure the taut sensors are not “seeing” the air foil.

6. Rotate the sensor slowly to see higher. As the ‘eye’ clears the exit ribbon roll, the red LED will turn on and the green LED will flicker. Move it slightly higher and the green LED will become steady.
7. Mark this position and tighten the adjustment screws.
8. Repeat this procedure for the other taut sensor.
9. Re-start the unit and test the adjustment by processing several pieces of flatwork.

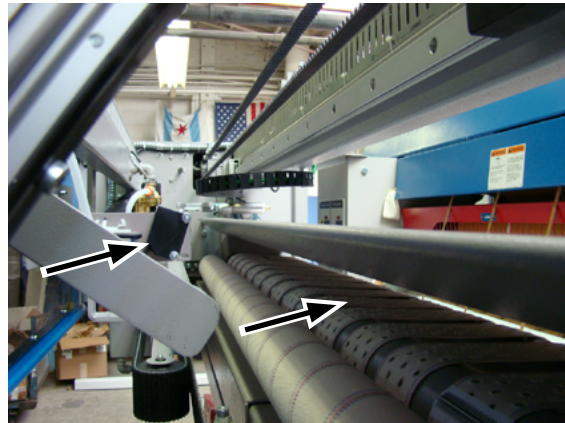


Figure 7-26: Taut photosensor aiming.

General Photosensor Sensitivity Adjustment

The correct sensitivity for a sensor depends on its location. Some sensors have slightly reduced sensitivity to eliminate false triggering by background objects.

There are two parts to adjusting the sensitivity of a photosensor:

- The first is to adjust the sensitivity so that the green LED glows bright and steady. In the case of retroreflective sensors, both the green and red LEDs will glow.
- The second is to either, as appropriate, turn on or turn off the red LED while checking the control system input cards to make sure the communications signal is being received.

NOTE: *This procedure is best performed by two workers. The “buddy system” is the safest system.*



Required Tools

Screwdriver: small, thin

Perform only when the unit is OFF with power connected. Use Extreme Caution.

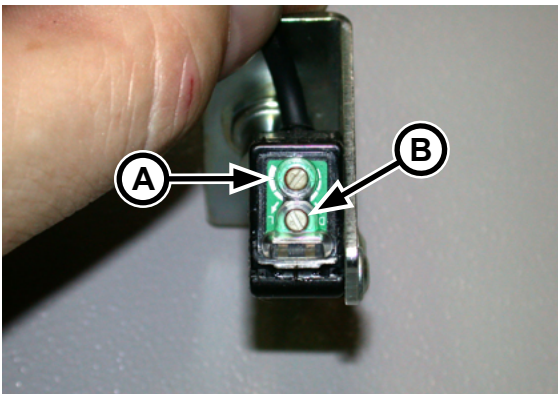


Figure 7-27: Photosensor sensitivity is adjusted using the potentiometer.

1. Turn power ON at the main disconnect switch.
2. Press the green START button.
3. Press any of the red safety STOP buttons.

CAUTION

The sensitivity potentiometer on photosensors is a precision electronic device. Forcing it beyond its range and/or using too large a screwdriver may ruin it.

4. Use the proper size screwdriver to fit the slot in the potentiometer (Figure 7-27, A). Note that there is a different slot for switching between LO and DO (B). Do not change this setting.
5. With no material in view, turn the potentiometer clockwise until the green LED on the photosensor lights bright and steady (both green and red LEDs in the case of retroreflective photosensors).
 - A bright LED means a stable signal.
 - A dim or flickering LED means a non-stable signal.
6. Open the left endframe door and position a worker at the control system input boards.
7. Manually trigger the photosensor so that, as appropriate, either the red LED lights or goes out.
8. At the same time, have the other worker check the input card red LED to make sure it turns on or off as appropriate. For more information, refer to [Photosensors on page 5-8](#), and [Fold Control Circuit on page SC-10](#).

Photosensor Replacement

If a photosensor fails or is erratic, it should be replaced immediately. All photosensors are connected using a quick-release connector.



Required Tools

Nut driver: 7/32"
 Phillips screwdriver: #1
 Plastic wire ties
 Pliers
 Screwdriver: small, thin
 Scissors/knife

**Perform only when the unit is OFF
 with power disconnected.**

1. Make sure you have the correct type for the photosensor to be replaced. For more information on sensor location and type, refer to [Photosensors on page 5-8](#).
2. Turn power OFF at the main disconnect switch.
3. Locate the photosensor to be replaced.

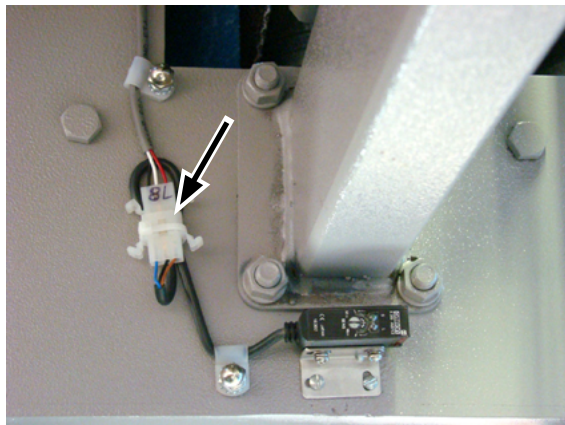


Figure 7-28: Photosensors are connected to the unit using white connection plugs.

Trace its wiring to the sensor's connector plug (Figure 7-28) and disconnect.

4. Cut any plastic wire ties securing the sensor wiring along its path.
5. Unscrew the photosensor from the mounting bracket. Be careful to save the screws and nuts.
6. Using this hardware, secure the new photosensor in position.
7. Plug the photosensor into its connector receptacle. Secure the sensor wiring along its path, using plastic wire ties as necessary.
8. Check that the new photosensor is positioned properly by following the appropriate sensor alignment procedure earlier in this section.
9. Set to Dark Operate (DO) or Light Operate (LO) as appropriate. Match the setting to the sensor being replaced.
10. Properly set the new photosensor's sensitivity following [General Photosensor Sensitivity Adjustment on page 7-29](#).
11. Start the unit and process several pieces of flatwork to make sure the new photosensor is working correctly.

Proximity Sensor Position Adjustment

Proximity sensors are mounted close to the surface of the objects to be sensed. These sensors activate when their magnetic field is disturbed as the surface of the target object comes into view.



Required Tools

Screwdriver
Shim: 1 mm
Wrenches:
1/2"
11/16" (2)

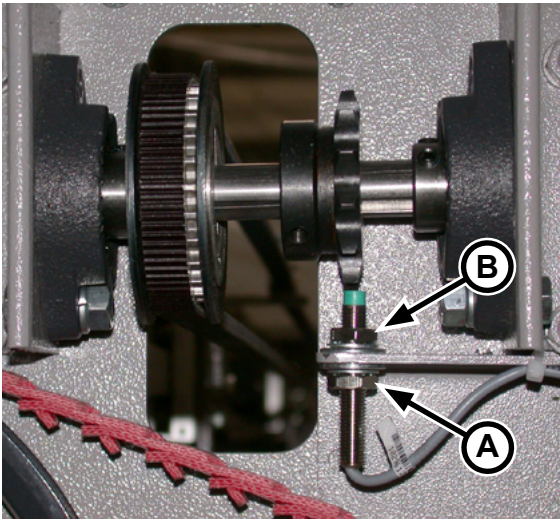


Figure 7-29: The upper spreader encoder is located in the left endframe.

Perform only when the unit is OFF with power disconnected.

1. Turn power OFF at the main disconnect switch.
2. Refer to [Proximity Sensors on page 5-8](#) to locate the positions of the various proximity sensors and to determine the best way to access each one.
3. Loosen the outer nut (Figure 7-29, A) and move the sensor closer to the target surface. Tighten the inner nut (B) to hold the sensor in the new position.

CAUTION

Adjust the position of the proximity sensor very carefully. If it is struck, the sensor must be replaced.

4. Use the shim to position the encoder/sensor 1 mm (.04") from its sensing surface.
5. If adjusting the upper spreader encoder, slowly move the upper spreader belt to fully rotate the sprocket, making sure none of the teeth strike the sensor.
6. If necessary, close or secure any part of the machine used to gain access to the encoder/sensor.
7. Start the unit and process several pieces of flatwork to make sure the proximity sensor is working correctly.

Proximity Sensor Replacement

If a proximity sensor fails or is erratic, it should be replaced immediately. All proximity sensors are connected using a quick-release connector.



Required Tools

Phillips screwdriver: #2

Plastic wire ties

Scissors/knife

Shim: 1 mm

Wrenches:

3/8"

7/16"

13 mm (2) or 11/16" (2)

**Perform only when the unit is OFF
with power disconnected.**

1. Make sure you have the correct type for the proximity sensor to be replaced. For more information on sensor location and type, refer to [Proximity Sensors on page 5-8](#).
2. Turn power OFF at the main disconnect switch.
3. Locate the proximity sensor to be replaced. Trace its wiring to the sensor's connector plug (Figure 7-28) and disconnect.
4. Cut any plastic wire ties securing the sensor wiring along its path.
5. Unscrew the proximity sensor from the mounting bracket. Be careful to save the nuts.
6. Using these nuts, secure the new proximity sensor in position.
7. Plug the sensor into its connector receptacle. Secure the sensor wiring along its path, using plastic wire ties as necessary.
8. Make sure the new proximity sensor is positioned properly. For more information within this section, refer to [Proximity Sensor Position Adjustment on page 7-31](#).
9. Start the unit and process several pieces of flatwork to make sure the new photosensor is working correctly.

7.7 Compressed Air System

The compressed air system provides the air which controls movement of various components of the spreader/feeder.

In addition to periodically checking the system for leaks and performing routine maintenance, various components require periodic adjustment or replacement, or occasional repair. These procedures include:

- O.P.L. Lift/Safety Air Cylinders Mechanical Adjustment
- O.P.L. Lift/Safety Air Cylinders Air Flow Adjustment
- Air Bar Alignment
- Air Valve Repair

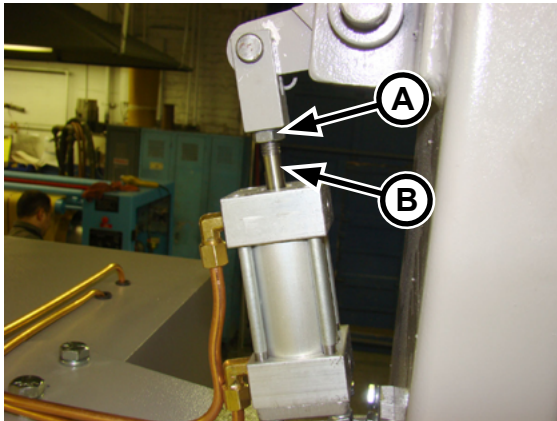


Figure 7-30: Lift/safety air cylinder mechanical adjustment.

O.P.L. Lift/Safety Air Cylinders Mechanical Adjustment

It is critical that the safety latches properly engage when the O.P.L. is in the raised position to protect operators.

If either or both latches do not securely engage, it is necessary and important to lengthen the stroke of the lift/safety air cylinder(s).



Required Tools

Wrenches:
5/16"
9/16"

Perform only when the unit is OFF with power disconnected and COOL.

WARNING

Perform only when the O.P.L. is in the down position.

1. Make sure the O.P.L. unit is in the down position.
2. Turn power OFF at the main disconnect switch.
3. Loosen the lift/safety air cylinder rod jam nut (Figure 7-30, A).
4. Turn the air cylinder rod (Figure 7-30, B) clockwise one or two turns to lengthen its stroke.
5. Tighten the jam nut.
6. If necessary, repeat for the other lift/safety air cylinder.
7. Start the machine and raise the O.P.L. unit and make sure the latches securely engage.

O.P.L. Lift/Safety Air Cylinders Air Flow Adjustment

It is important for operator safety to make sure the O.P.L. unit raises and lowers smoothly and evenly.

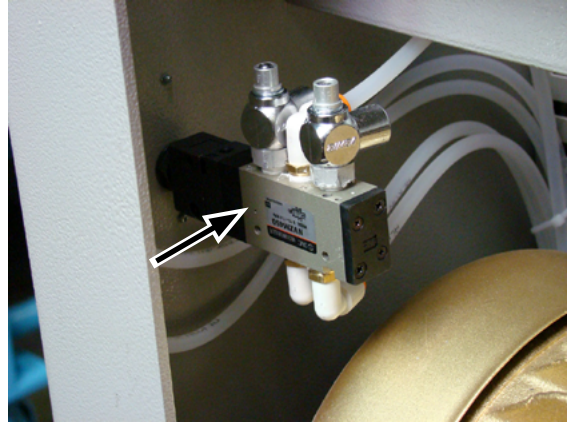


Required Tools

Screwdriver: small

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. Turn ON the compressed air supply to the unit.
3. Open the ironer right endframe door.
4. Flip the FEEDER UP/DOWN switch to the UP position.
5. Check to make sure the O.P.L. raises smoothly and evenly until the safety brackets engage.
6. Flip the FEEDER UP/DOWN switch to the DOWN position.
7. Check to make sure the O.P.L. lowers smoothly and at a moderate pace.
8. If necessary, adjust the lower flow control valves (Figure 7-31).
9. Repeat Steps 4 to 8 until the discharge conveyor is operating properly.
10. Close and secure the endframe door.



*Figure 7-31: Adjust the lower flow control valves so that the O.P.L. safely rises and lowers.
Figure 7-32: Air bar setscrew location.*

Air Bar Alignment

There are two air bars used to lay down the leading edge of the flatwork. The two air bars should always point horizontally, with the air blast blowing between the discharge ribbons and the air foil.

The air bars may require adjustment when the lay down of the fabric is erratic.



Required Tools

Allen wrench: 1/8" 5/32"

**Perform only when the unit is OFF
with power disconnected.**

1. Turn power OFF at the main disconnect switch.
2. The adjustment point is located slightly above and in front of the discharge drive roll at the center of the unit. Access the adjustment point from the front of the unit.
3. Before making any adjustments, mark the original air bar position for reference.
4. Loosen the setscrews at both ends securing the air blast bar (Figure 7-32).
5. Align the rows of air manifold holes horizontally across the left and right bars. The holes on both bars should be blowing at the same level.
6. Tighten all setscrews.
7. Start the unit and process several pieces to test the adjustment.

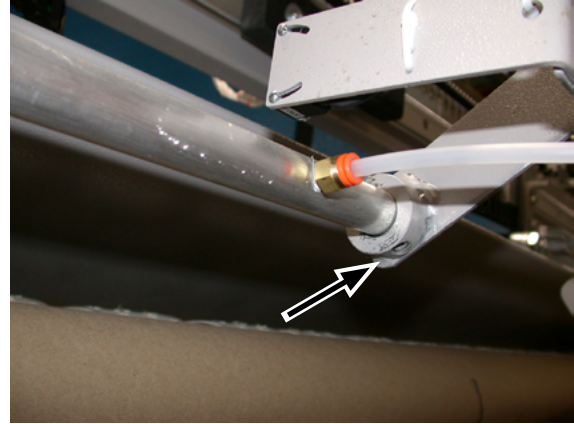


Figure 7-33: Be sure to keep track of all air valve

Air Valve Repair

Perform only when the power is disconnected and the air system is depressurized.



Required Tools

Clean cloth/brush
Phillips screwdriver: #2

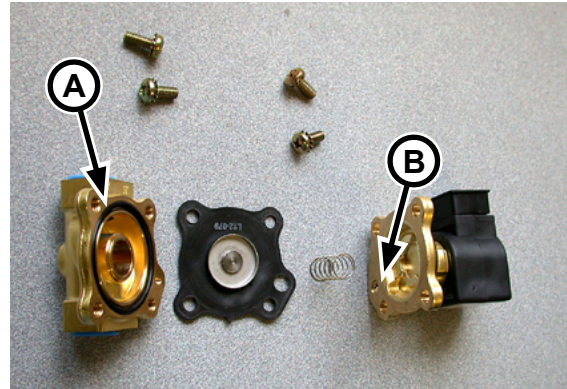
**Perform only when the unit is OFF
with power disconnected and COOL.**

WARNING

**Perform only when the air
system is depressurized.**

**Wear eye protection when
working with compressed
air components.**

1. Turn power OFF at the main disconnect switch.
2. Turn OFF the compressed air supply and purge the compressed air from the unit.
3. Carefully disassemble the valve (Figure 7-33). Be careful with the small parts.
4. Clean off any small particles stuck to the diaphragm with a soft cloth or brush.
5. Reassemble the valve. Make sure that both the large (A) and small (B) O-rings are correctly positioned.
6. Start the machine and test the valve.
7. If the diaphragm is clean, but the valve will not operate correctly, replace the valve.



components.

NOTE: *When ordering parts, please provide the serial number and a complete description of the O.P.L., including any non-standard features. Electrical part numbers can be found in the SCHEMATICS section (when available).*

O.P.L.

Picture Parts List

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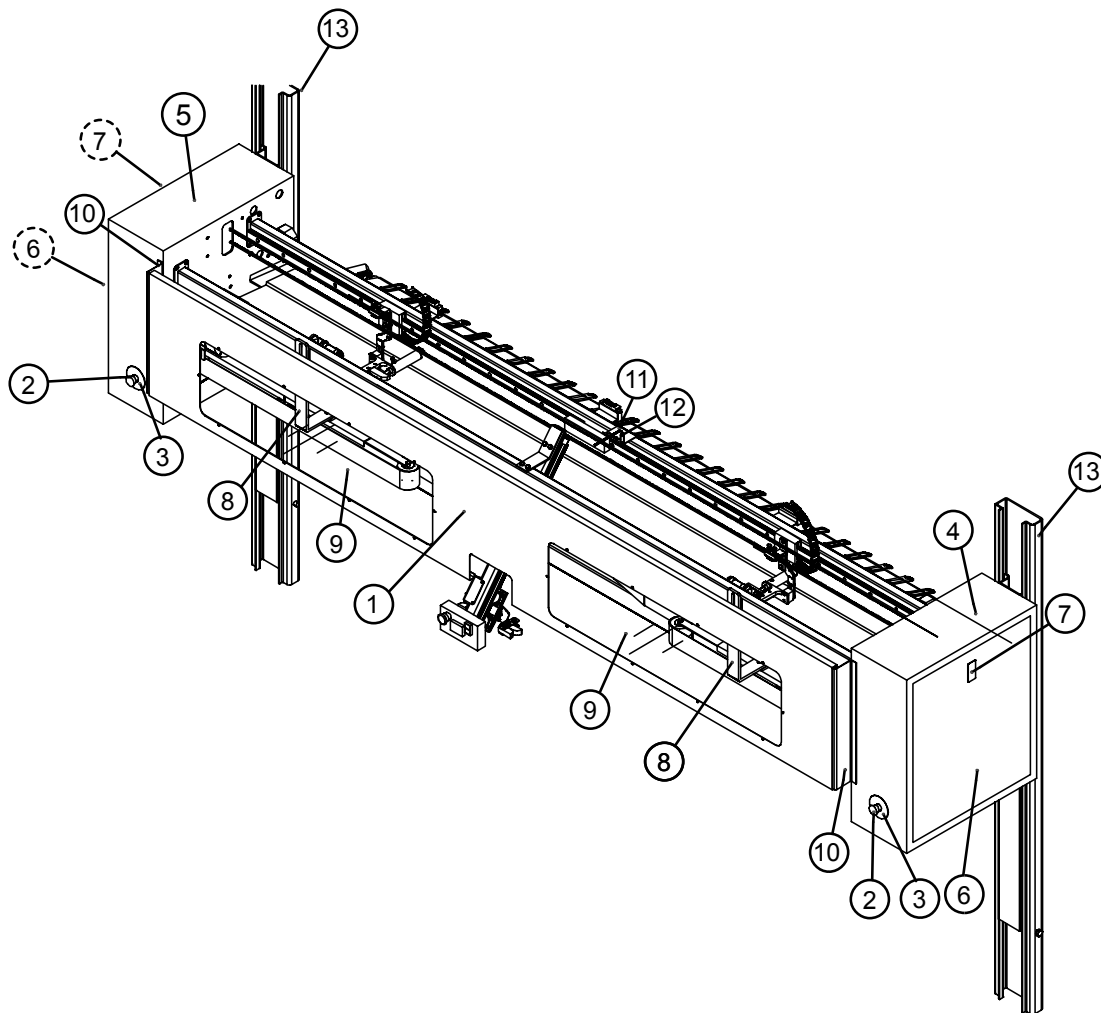
Inlet Components

Feed Station Assembly	PL-14
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Spread Section Components

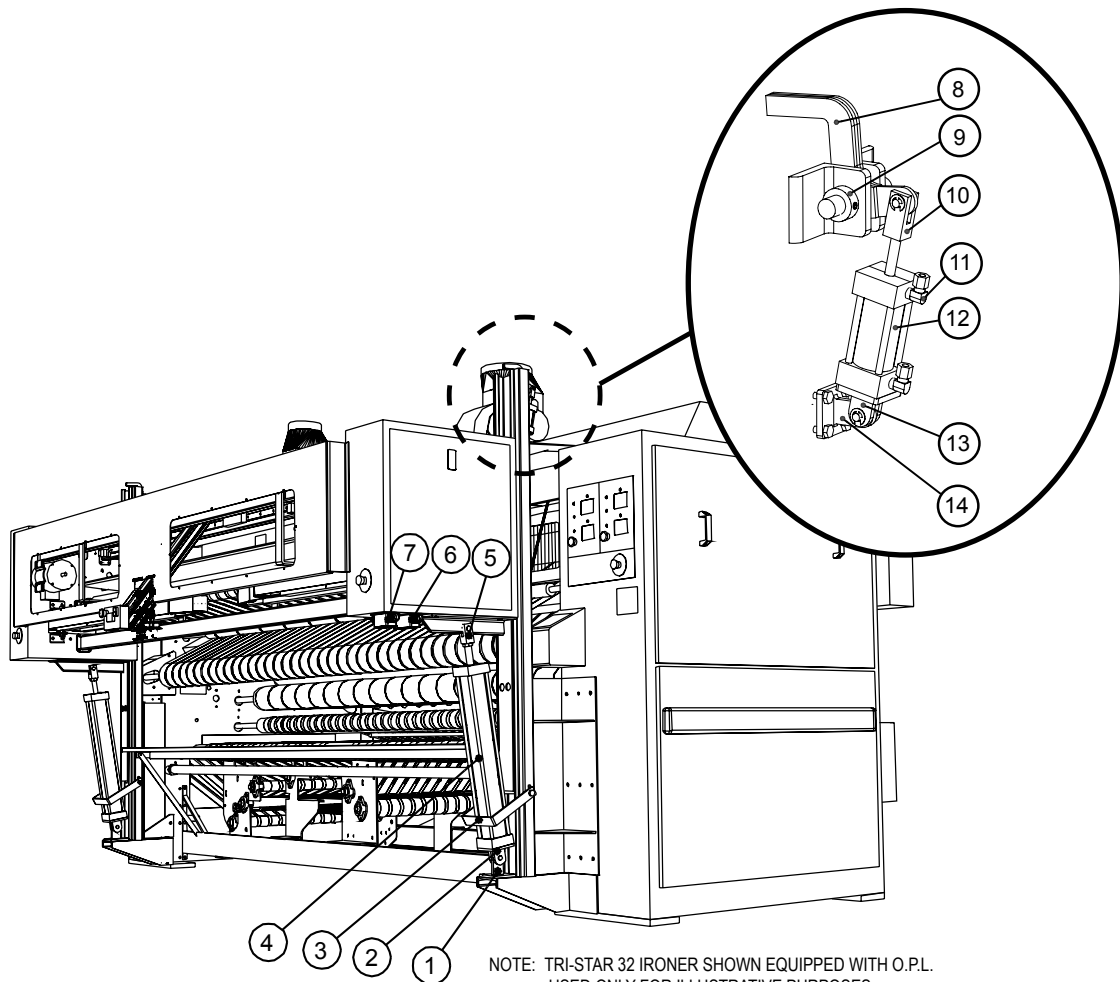
Upper Spreader - Left	PL-16
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Upper Spreader - Right	PL-20
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Front View



ID	Part Number	Qty	Description
1	3403-173	1	FRONT COVER 27" x 129" x 18 GA
2	1411-700	2	RED STOP BUTTON TURN RELEASE 1 N/C
	or 1411-545		RED MUSHROOM BUTTON STOP TURN RELEASE
3	1418-075	2	PLATE YELLOW
4	2001-595	1	RIGHT SIDE FRAME ASSEMBLY OPL
5	2001-596	1	LEFT SIDE FRAME ASSEMBLY OPL
6	2001-593	2	DOOR ENDFRAME COVER ASSEMBLY OPL
7	2001-995	2	LOCK, LIFT & TURN NON LOCKING
8	0608-650	2	OUTSIDE FRONT BELT SPREADER SUPPORT BRKT
9	1807-317	2	SHEET PLEXIGLASS 14" x 46" x 1/4 THK
10	0608-653	2	FRONT COVER MOUNTING BRACKET RH & LH
11	0608-375	1	INLET/REJECT SENSOR MOUNT
12	1608-002	1	MACHINE SPEED SENSOR-SHORT 12MM
13	1807-026	2	OPL SLIDER GUIDE ASSEMBLY

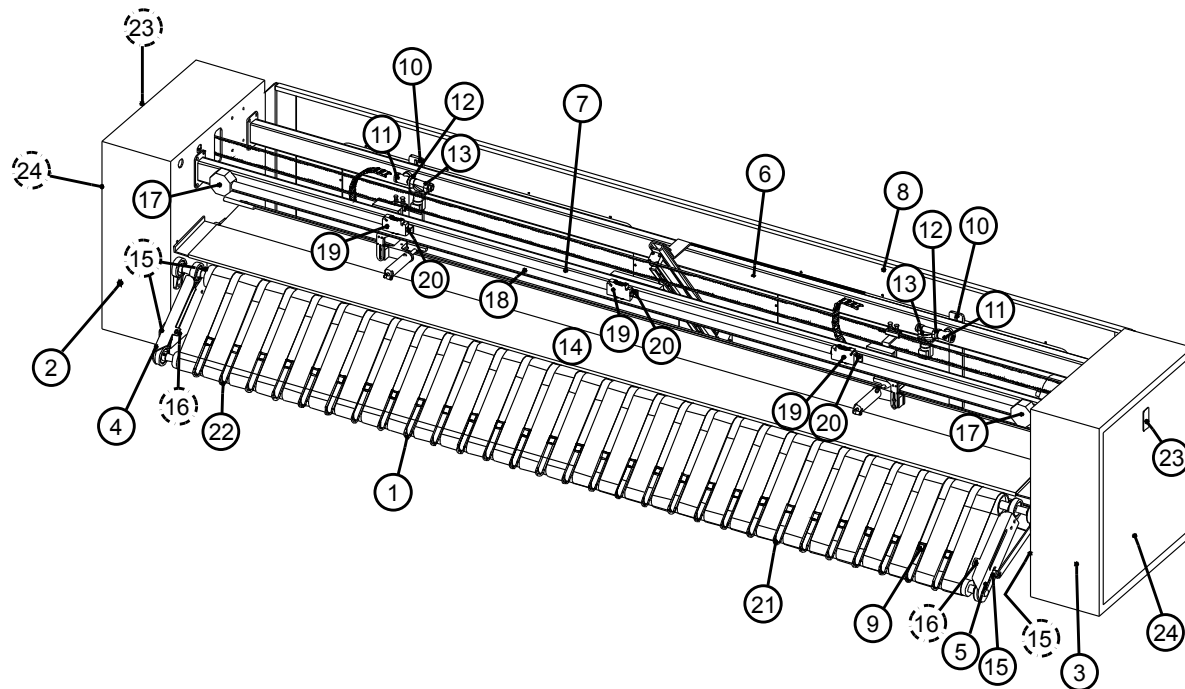
Lift Cylinders



NOTE: TRI-STAR 32 IRONER SHOWN EQUIPPED WITH O.P.L.
USED ONLY FOR ILLUSTRATIVE PURPOSES
YOUR INSTALLATION MAY DIFFER FROM ILLUSTRATION.

ID	Part Number	Qty	Description
1	0208-066	2	EYE MT ASSY 3-1/2" BORE
2	0208-065	2	CLEVIS MT ASSY 3-1/2" BORE
3	0608-897	2	CYLINDER RETAINER OPL
4	0208-385	2	CYLINDER 3-1/2" BORE 24" STROKE
5	0208-156	2	CLEVIS ROD END FOR 1-3/4" 2" 3" BORE CYL
6	1422-530	1	HOUSING SURFACE MOUNT
7	1422-430	1	HOUSING SURFACE MOUNT
8	0607-418	1	SAFETY HOOK ASSY
9	0614-049	2	COLLAR 3/4" ID LOCKING
10	0208-155	1	ROD CLEVIS D 12 FOR 1-1/4" BORE CYLINDER
11	0205-585	2	COMPRESSION ELBOW 1/8" NPT 1/4"
12	0208-075	1	AIR CYLINDER 1-1/4" BORE 1" STROKE
13	0208-010	1	CLEVIS BRKT & PIN FOR 1-1/4" BORE CYL
14	0208-015	1	EYE BRKT FOR 1-1/4" BORE CYLINDER

Rear View

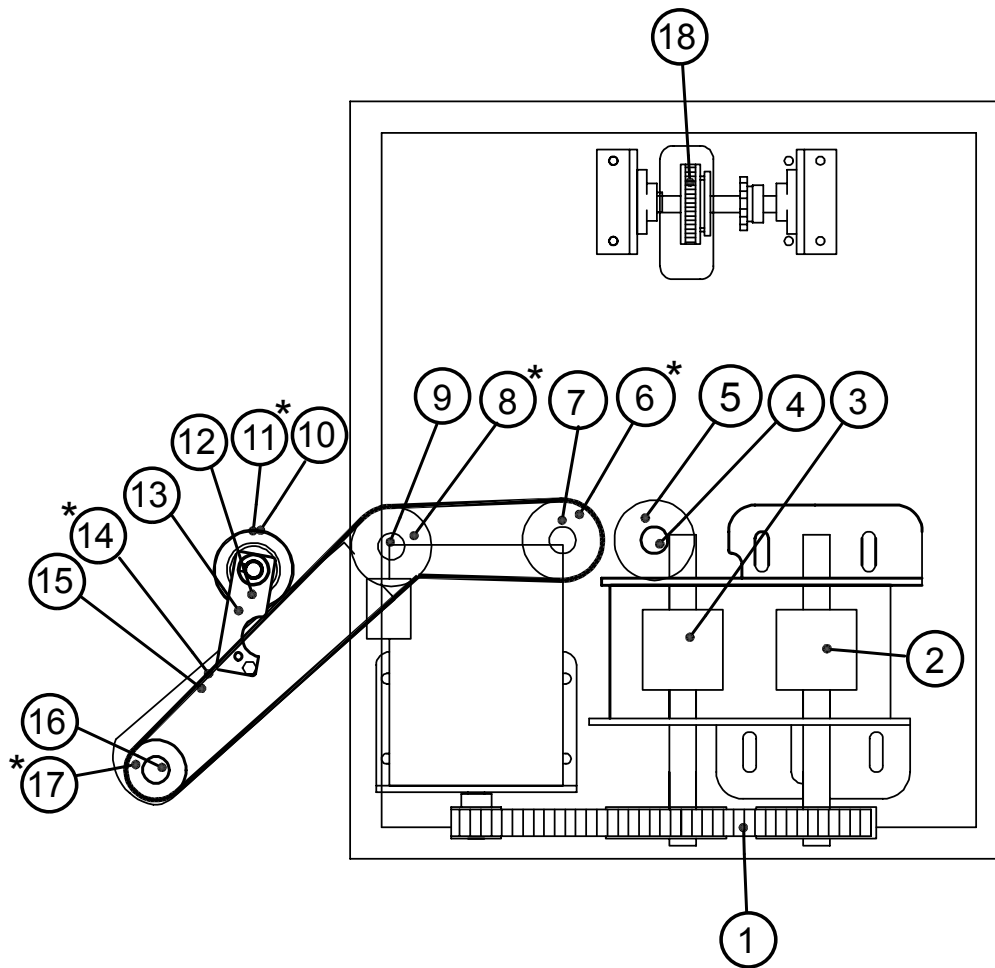


ID	Part Number	Qty	Description
1	2006-137	1	WIRE FINGERS 6" x 38" KING EDGE
2	2001-595	1	RIGHT SIDE FRAME ASSEMBLY OPL
3	2001-596	1	LEFT SIDE FRAME ASSEMBLY OPL
4	2010-293	1	R.H. DISCHARGE ARM
5	2010-294	1	L.H. DISCHARGE ARM
6	2007-099	1	CONNECTING CHANNEL UPPER FRONT OPL
7	2007-100	1	CONNECTING CHANNEL UPPER REAR OPL
8	3403-173	1	FRONT COVER 27" x 129" x 18 GA
9	2007-121	1	SQUARE TUBING 1-1/4" x 120-1/2" x 1/8 GA
10	0608-650	2	OUTSIDE FRONT BELT SPREADER SUPPORT BRKT
11	5206-020	2	TEE, 1/2 x 1/2 x 1/2 BRASS
12	5001-149	2	NIPPLE 1/2" x CLOSE
13	0202-960	2	VALVE AIR 1/2" 24 VAC
14	1807-014	1	AIRBLAST SHEET DEFLECTOR PLATE ASSEMBLY
15	0614-050	10	COLLAR 3/8" ID LOCKING

Rear View continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
16	0410-009	2	BUSHING 5/8" OD x 1/2" L x 3/8" ID
17	E04-150	2	OUTLET BOX 3" OCTAGON 1-1/2"
18	0209-018	1	ALUMINUM TUBING 7/8" OD x 118
19	0202-450	3	VALVE IN LINE SPRING RETURN 1/4" OD
20	0608-652	3	VALVE MOUNTING BRACKET
21	2006-193	1	WIRE FINGERS 6" x 41"
22	2006-194	1	WIRE FINGERS 6" x 30"
23	2001-995	2	LOCK, LIFT & TURN NON LOCKING
24	2001-593	2	DOOR ENDFRAME COVER ASSEMBLY OPL

Rolls and Ribbons



NOTE: * = 136" Width Only

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	1223-300	1	BELT TIMING 1" WIDE
2	1003-232	1	RUFF TOP RIBBON 3" x 92" W/PIN BLACK
3	1003-230	1	RUFF TOP RIBBON 3" x 126" W/PIN
4	3209-343	1	DRIVE ROLL 3"x120"x11 GA W/CANVAS COVER
5	3209-557	1	DRIVE ROLL 3" x 136 x 11 GA W/CANVAS
6*	3209-559	1	RAW DRIVE ROLL 3" x 136" x 11 GA
7	3209-342	1	DRIVE ROLL 3" x 120" x 11 GA W/30 RINGS
8*	3209-399	1	DRIVE ROLL 3-1/2" x 12" x 11 GA W/FLEXTRA
9	3203-232	1	RAW IDLER ROLL 3" x 120" x 11 GA
10	3211-031	1	DOFFER ROLL 3"x120" W/RUBBER & CANVAS

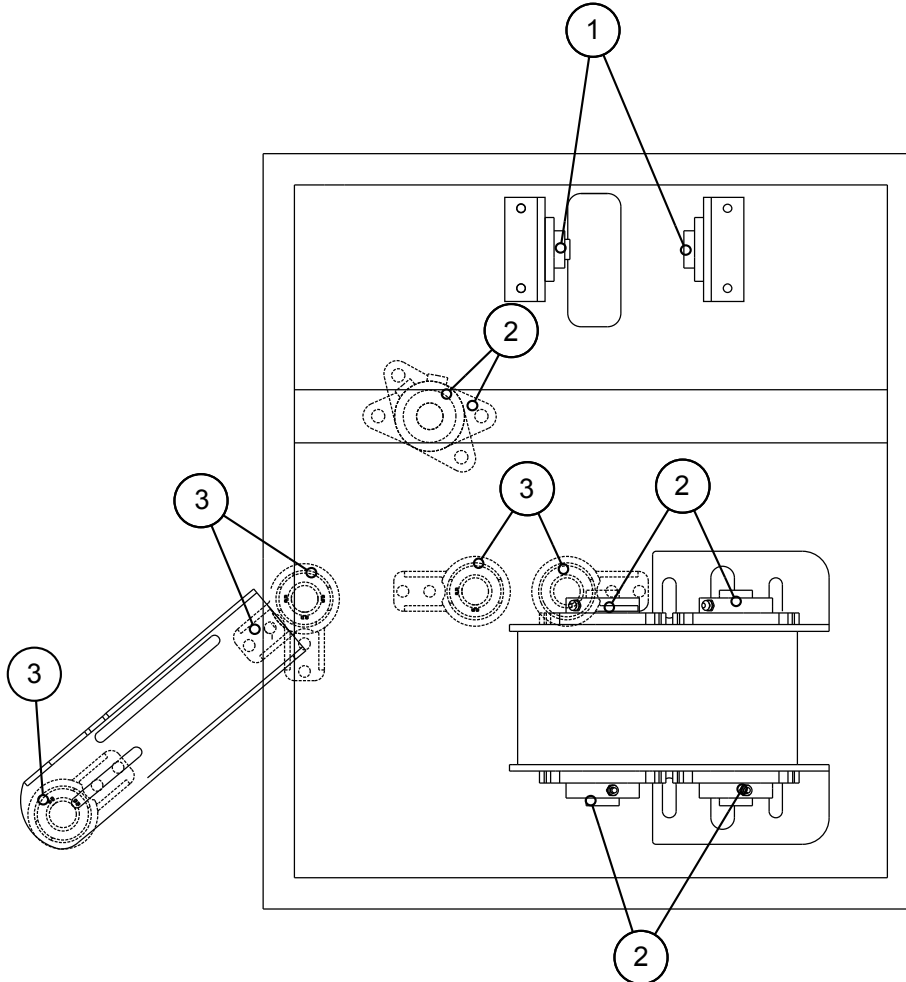
Rolls and Ribbons continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
11*	3211-051	1	DOFFER ROLL 3"x136" W/RUBBER & CANVAS
12	0607-415	1	L.H. DOFFER ROLL BRKT W/ 5/8" ID COLLAR
13	0607-265	1	R.H. DOFFER ROLL BRKT W/ 5/8" ID COLLAR
14*	1001-088	34	PERFORATED RIBBON 3" x 44" W/PIN
15	1001-088	30	PERFORATED RIBBON 3" x 44" W/PIN
16	3203-266	1	RAW IDLER ROLL 2-1/4" x 120" x 11 GA
17*	3203-398	1	IDLER ROLL 2-1/4" x 136 x 11 GA
18	1223-900	1	BELT POLY CHAIN GT

*** = 136" Width Only**

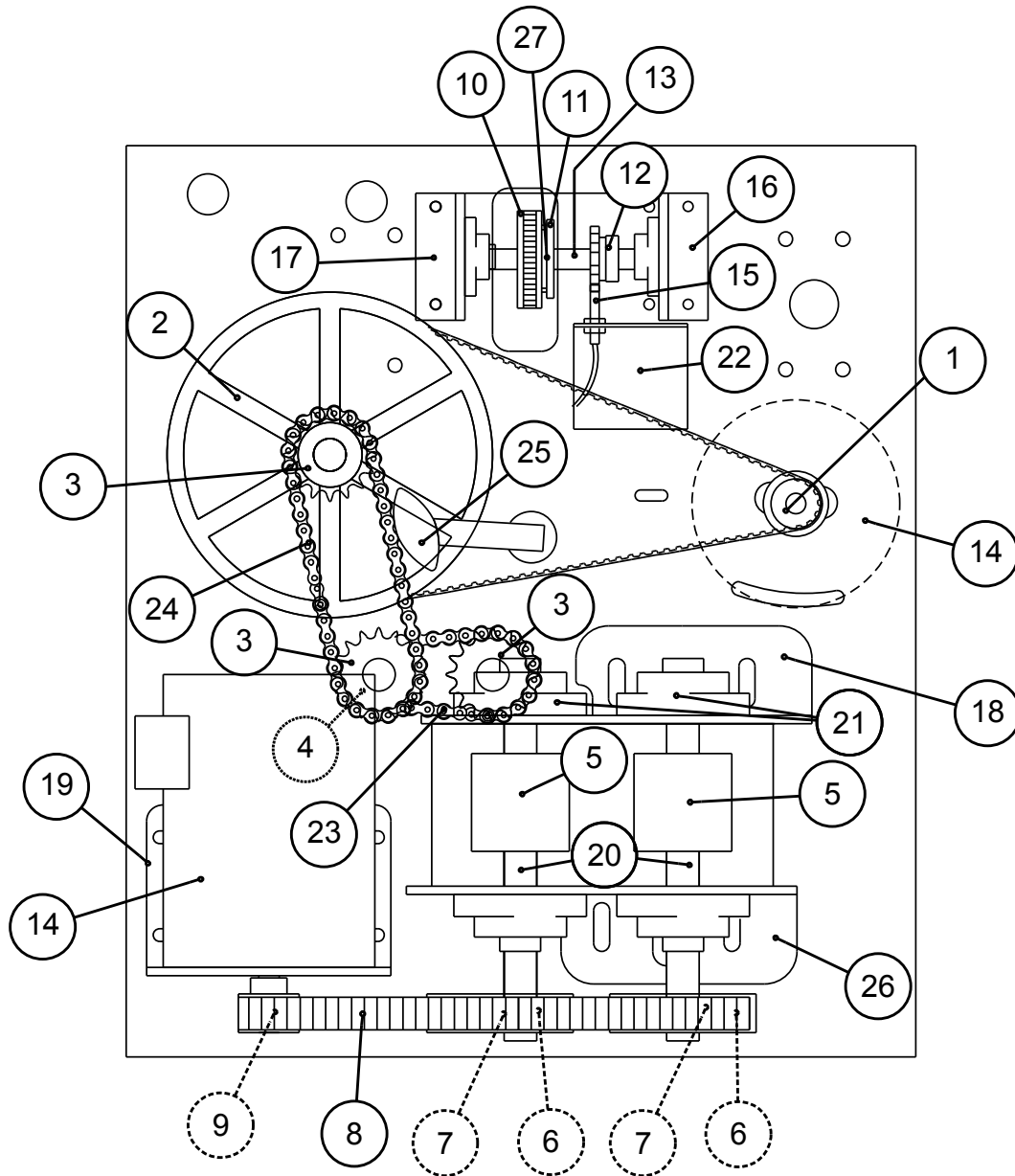
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Left Side Bearings



<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	0402-060	2	BEARING 2 BOLT FLANGE 5/8" BORE
2	0402-774	10	BEARING 1" BORE STAT MOUNT
3	0402-763	10	BEARING HANGER 1" BORE PERM LUBE

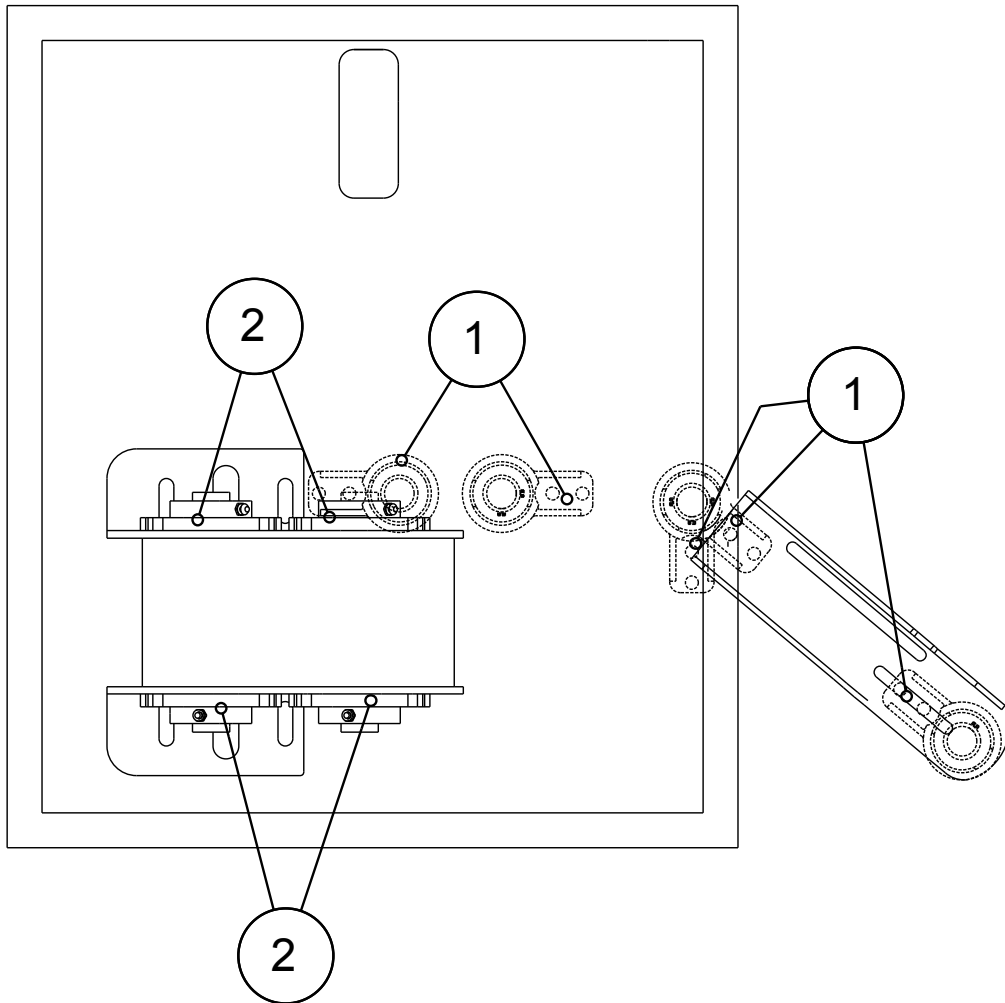
Drive Side Detail (L)



Drive Side Detail (L) continued...

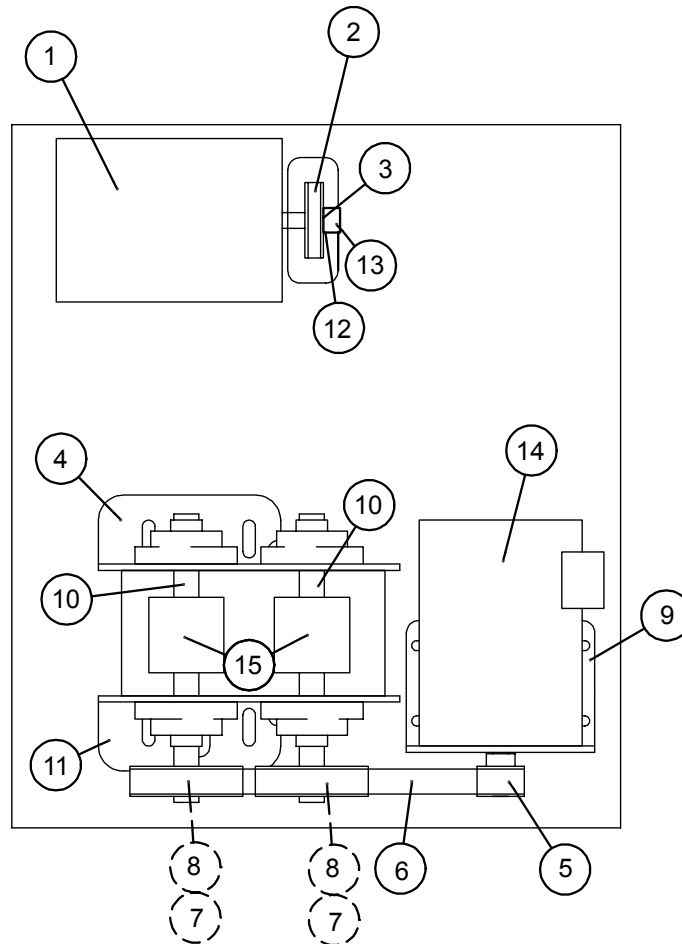
<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	1205-740	1	V BELT SHEAVE 1-3/4" OD 5/8" BORE
2	1205-909	1	V BELT SHEAVE 10" OD 1" BORE
3	1201-230	3	SPROCKET #40 16T 1" BORE KWAY 2 STSCRW
4	1201-201	1	SPROCKET #40 12T 1" BORE KWAY 2 STSCR
5	1205-025	2	PULLEY CROWN FACE 3" x 3" 1" BORE
6	1221-350	2	PULLEY 36 TEETH 1" WIDE
7	1215-250	2	BUSHING SDS 1" BORE
8	1223-300	1	BELT TIMING 1" WIDE
9	1221-151	1	PULLEY 14T 1" W REBORED 5/8" BORE W/KWAY
10	1223-900	1	BELT POLY CHAIN GT
11	1215-020	1	BUSHING 1108-5/8 BORE
12	1201-195	1	SPROCKET #40 12T 5/8"BORE KWAY 2 STSCR
13	1210-002	1	SHAFT 5/8" OD x 6" L W/KWAY
14	2801-390	1	MOTOR 1/2 HP 3/60/230/460 1725RPM FR 56C
15	1608-000	1	MACHINE SPEED SENSOR 8 MM ASSY
16	0608-161	1	RIGHT HAND BELT BEARING BRKT
17	0608-162	1	LEFT HAND BELT BEARING BRKT
18	0608-038	1	LH BRKT W/4 MOUNT HOLES & SLOT
19	1213-047	1	LEFT LOWER SPREADER MOTOR MOUNT
20	1210-147	2	SHAFT 1" x 11-1/2" W/ FULL KEYWAY
21	0402-774	4	BEARING 1" BORE STAT MOUNT
22	0608-039	1	SENSOR BRACKET 4" x 5" x 12 GA
23	1204-114	1	CHAIN #40 15 LINKS W/CONN LINK
24	1204-139	1	CHAIN #40 22-1/2 LINKS W/CONN LINK
25	1211-006	1	CHAIN RIDER SET #40 CHAIN
26	0608-034	1	RH BRKT W/4 MOUNT HOLES & SLOT
27	1221-250	2	PULLEY POWER GRIP

Right Side Bearings



<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	0402-763	10	BEARING HANGER 1" BORE PERM LUBE
2	0402-774	10	BEARING 1" BORE STAT MOUNT

Drive Side Detail (R)

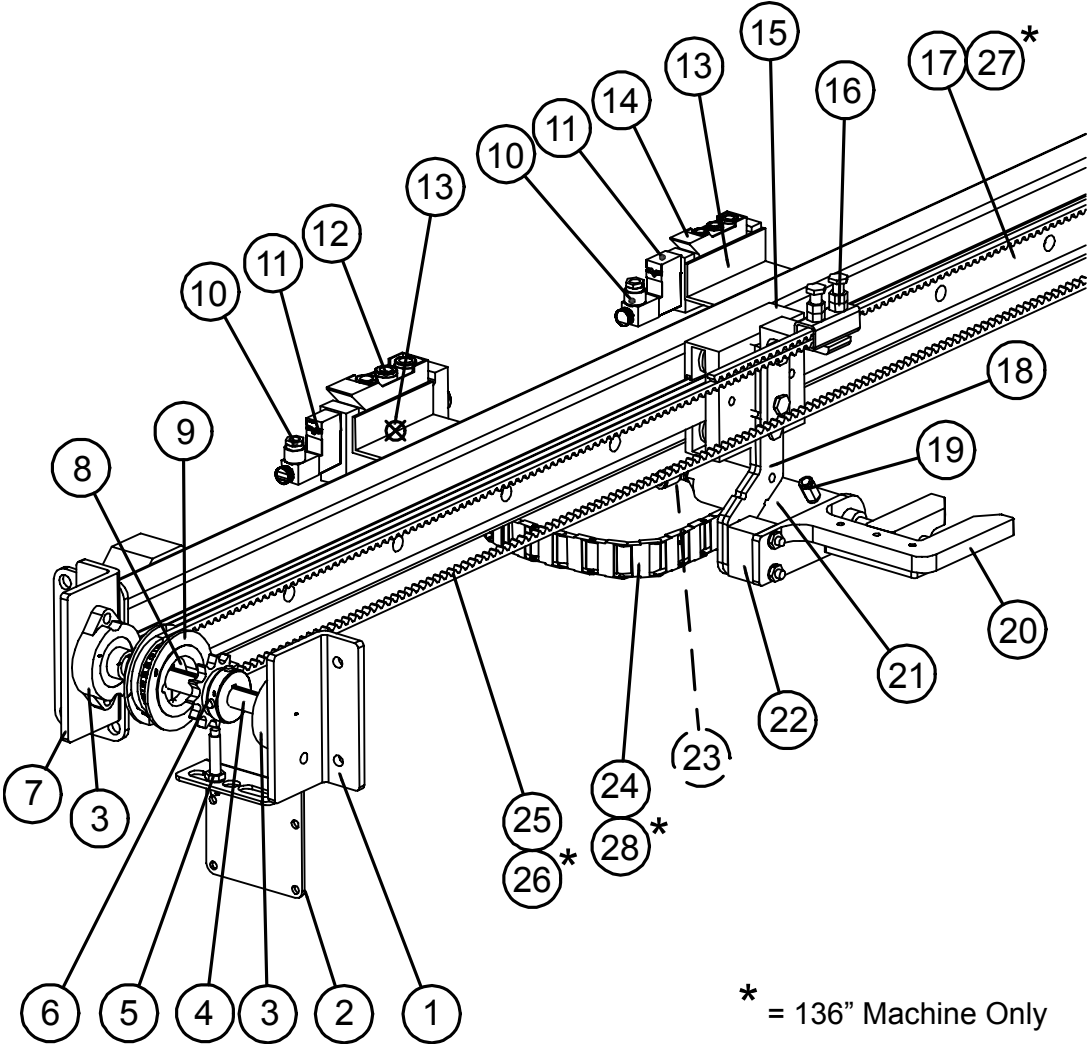


<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	2801-390	1	MOTOR 1/2 HP 3/60/230/460 1725RPM FR 56C
2	1223-900	2	BELT POLY CHAIN GT
3	1221-250	2	PULLEY POWER GRIP 25T FOR 1108 TYPE BSH
4	0608-034	1	RH BRKT W/4 MOUNT HOLES & SLOT
5	1221-151	2	PULLEY 14T 1" W REBORED 5/8" BORE W/KWAY
6	1223-300	2	BELT TIMING 1" WIDE
7	1221-350	4	PULLEY 36 TEETH 1" WIDE
8	1215-250	4	BUSHING SDS 1" BORE
9	1213-047	1	LEFT LOWER SPREADER MOTOR MOUNT
10	1210-147	4	SHAFT 1" x 11-1/2" W/ FULL KEYWAY
11	0608-038	1	LH BRKT W/4 MOUNT HOLES & SLOT
12	1215-020	2	BUSHING 1108-5/8 BORE
13	0614-150	1	COLLAR 5/8" ID LOCKING
14	2801-290	1	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
15	1205-025	2	PULLEY CROWN FACE 3" x 3" 1" BORE

Feed Station Assembly continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	5005-105	6	COUPLING 1/8"
2	0205-250	2	ELBOW 1/8" NPT x 1/4" OD
3	1608-002	1	MACHINE SPEED SENSOR-SHORT 12MM
4	0608-704	1	PROXIMITY SENSOR BRKT 6-3/16"x3-1/2"x12G"
5	0608-626	1	CYLINDER MOUNTING BRKT 2"x8-1/2"x7 GA
6	5202-560	4	1/8 STREET ELB 90 DEG BRASS
7	0205-075	2	STRAIGHT CONNECTOR 1/8" NPT x 1/4" OD
8	1607-220	2	SHARP CUTOFF SENSOR 8" W/CONNECTOR
9	0605-256	2	TAUT SENSOR MOUNT 6" x 1-7/16" x 12 GA
10	5001-002	2	NIPPLE 1/8" x CLOSE
11	5001-004	2	NIPPLE 1/8 x 2" PIPE
12	2007-102	1	INPUT FEEDER STATION TUBING 1"x2"x46" L
13	0204-200	2	N1 GRIP
14	0605-315	4	LOADING CLAMP TEFLON JAW BRACKET
15	0204-225	2	N2 GRIP
16	1414-560-01	1	START/STOP GREEN/RED BUTTON
17	3403-175	1	CONTROL PANEL COVER 7" x 10" x 18 GA
18	1608-005	1	PROXIMITY SWITCH CAPACITIVE W/CONNECTOR
19	1411-700	1	RED STOP BUTTON TURN RELEASE 1 N/C
or	1411-545		RED MUSHROOM BUTTON STOP TURN RELEASE
20	3603-100	2	COIL SPRING 3/8" x 2"
21	0608-597	1	CLAMPS SUPPORT BRACKET
22	0208-535	1	RODLESS AIR CYLINDER 26" STROKE
23	0219-310	2	NOZZLE BRASS 5/64 ORIFICE
24	5202-505	2	1/8 STREET ELB 45 DEG BRASS
25	0607-278	1	CENTER AIRBAR BRACKET ASSEMBLY
26	0608-651	1	UPPER RODLESS AIR CYLINDER MOUNTING BRKT

Upper Spreader - Left

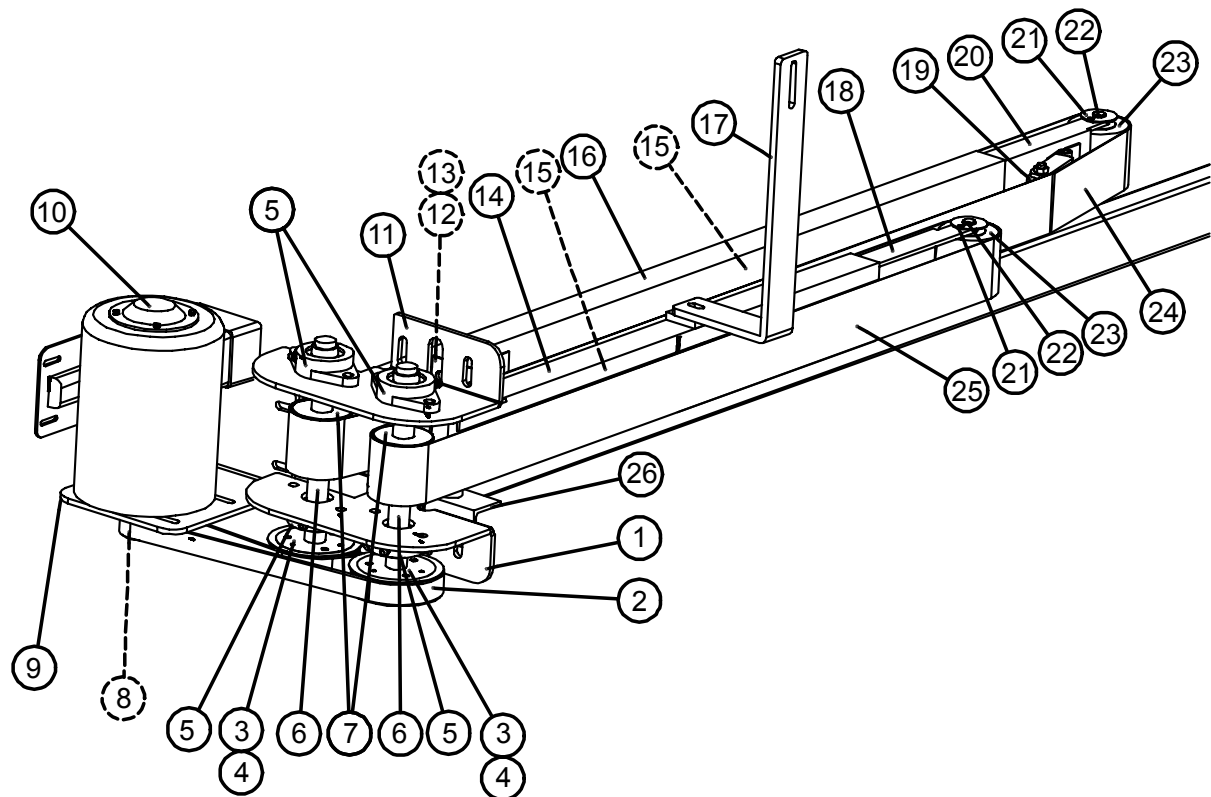


Upper Spreader - Left continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	0608-161	1	RIGHT HAND BELT BEARING BRKT
2	0608-039	1	SENSOR BRACKET 4" x 5" x 12 GA
3	0402-060	2	BEARING 2 BOLT FLANGE 5/8" BORE
4	1210-002	1	SHAFT 5/8" OD x 6" L W/KWAY
5	1608-000	1	MACHINE SPEED SENSOR 8 MM ASSY
6	1201-195	1	SPROCKET #40 12T 5/8"BORE KWAY 2 STSCR
7	0608-162	1	LEFT HAND BELT BEARING BRKT
8	1215-020	1	BUSHING 1108-5/8 BORE
9	1221-250	1	PULLEY POWER GRIP 25T FOR 1108 TYPE BSH
10	0202-500	2	PLUG IN FOR AIR VALVE
11	0202-490	2	SOLENOID 24 VAC
12	0202-510	1	VALVE PUSH IN LINE POWER 3/8"
13	0608-652	1	VALVE MOUNTING BRACKET
14	0202-450	1	VALVE IN LINE SPRING RETURN 1/4" OD
15	0204-402	1	LINEAR BEARING
16	0602-464	1	UPPER SPREADER BELT BRKT ASSY
17	0204-401	1	RAIL LINEAR 63"
18	0607-393	1	SPREADER CLAMP CARRIER ASSEMBLY
19	0205-075	1	STRAIGHT CONNECTOR 1/8" NPT x 1/4" OD
20	0204-265	1	SPREADER CLAMP LFT
21	0208-435	1	AIR CYLINDER 1-1/4" BORE 2" STROKE
22	4215-002	1	SPACER 1"x1-1/2" x1" THK W/2 MNT HOLES
23	0205-250	1	ELBOW 1/8" NPT x 1/4" OD
24	0206-830	1	E CHAIN
25	1223-900	1	BELT POLY CHAIN GT
26*	1223-905	1	BELT POLY CHAIN GT 130/135" LONG MACHINE
27*	0204-412	1	RAIL LINEAR 71"
28*	0206-023	1	E-CHAIN, 52 LINKS W/ CONN LINK

*** = 136" Machine Only**

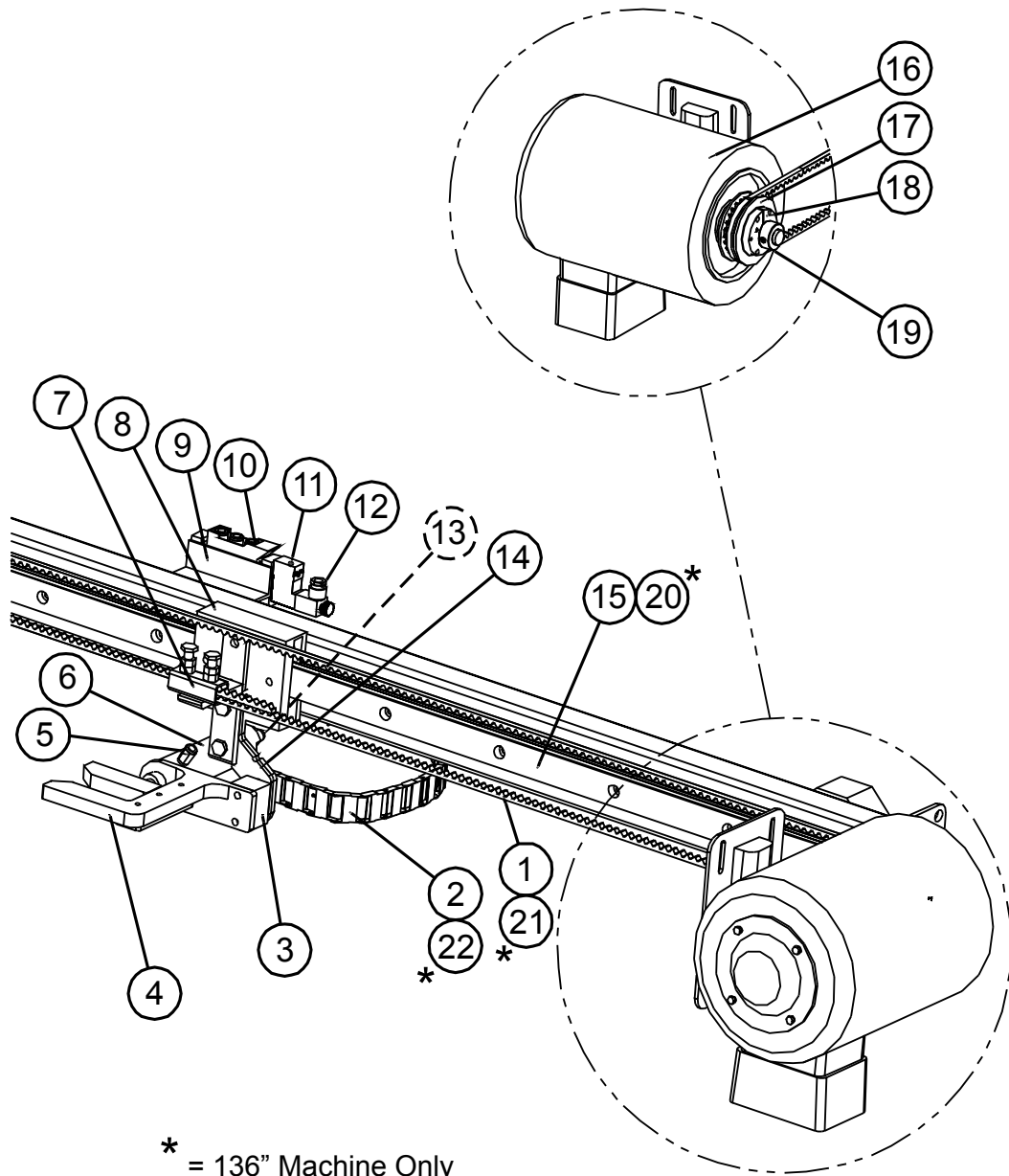
Lower Spreader - Left



Lower Spreader - Left continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	0608-034	1	RH BRKT W/4 MOUNT HOLES & SLOT
2	1223-300	1	BELT TIMING 1" WIDE
3	1221-350	2	PULLEY 36 TEETH 1" WIDE
4	1215-250	2	BUSHING SDS 1" BORE
5	0402-774	4	BEARING 1" BORE STAT MOUNT
6	1210-147	2	SHAFT 1" x 11-1/2" W/ FULL KEYWAY
7	1205-025	2	PULLEY CROWN FACE 3" x 3" 1" BORE
8	1221-151	1	PULLEY 14T 1" W REBORED 5/8" BORE W/KWAY
9	1213-047	1	LEFT LOWER SPREADER MOTOR MOUNT
10	2801-290	1	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
11	0608-038	1	LH BRKT W/4 MOUNT HOLES & SLOT
12	0608-164	1	BELT SPREADER BOTTOM BRKT 3"x2"x2"x7 GA
13	0614-150	4	COLLAR 5/8" ID LOCKING
14	0608-853	1	BELT SPREADER OUTSIDE HORIZONTAL BRACKET
15	3604-200	2	SPRING COMPRESSION 1-1/8" OD 5-1/2" LONG
16	0607-132	1	OUTSIDE BELT SPREADER ASSY
17	0608-650	1	OUTSIDE FRONT BELT SPREADER SUPPORT BRKT
18	0607-394	1	BELT SPREADER ARM ASSEMBLY
19	1205-028	2	ROLL 2-1/4" LONG W/ 3/8" BEARINGS
20	0607-363	1	L.H. BELT SPREADER ARM ASSY COMPLETE
21	4215-003	2	LOCKING WASHER 1-3/4"ODx5/8"ID x14GA
22	1210-066	4	SHAFT 5/8" OD x 3-7/8" L
23	1205-027	2	IDLER ROLL W/ 5/8" BEARINGS
24	1003-230	1	RUFF TOP RIBBON 3" x 126" W/PIN
25	1003-232	1	RUFF TOP RIBBON 3" x 92" W/PIN BLACK
26	0608-034	1	RH BRKT W/4 MOUNT HOLES & SLOT

Upper Spreader - Right

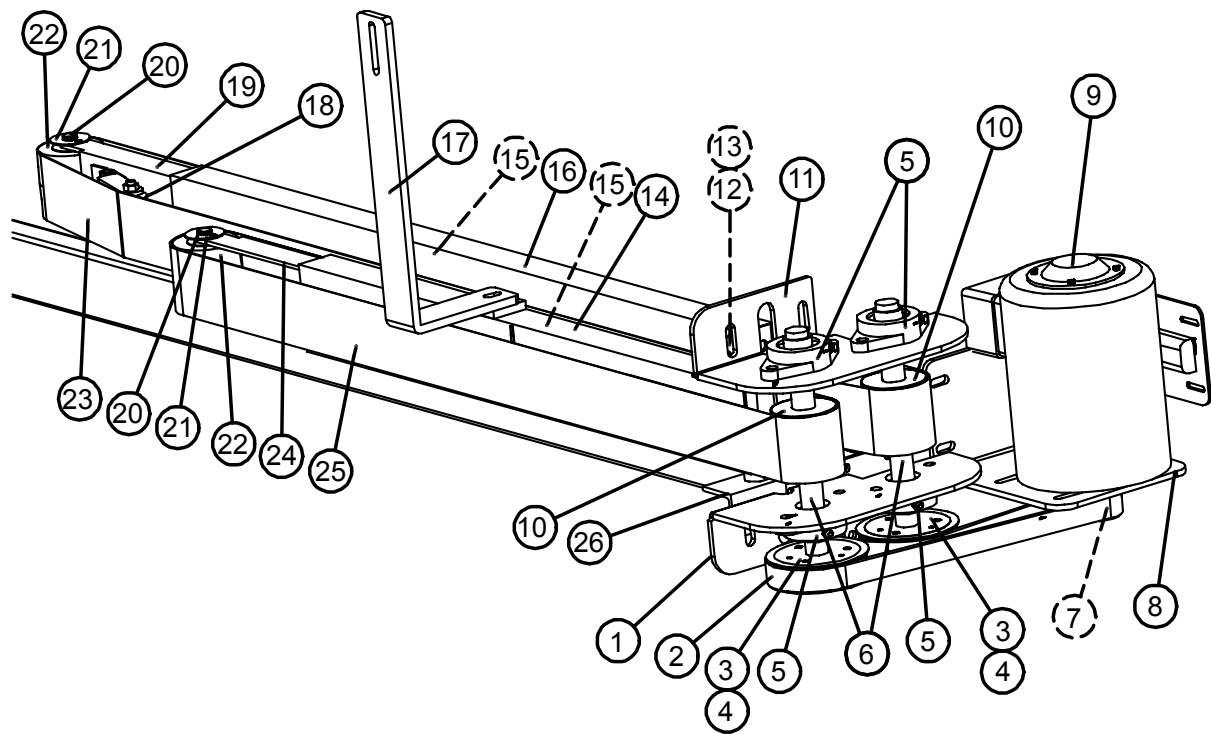


Upper Spreader - Right continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	1223-900	1	BELT POLY CHAIN GT
2	0206-830	1	E CHAIN
3	4215-002	1	SPACER 1"x1-1/2" x1" THK W/2 MNT HOLES
4	0204-260	1	SPREADER CLAMP RHT
5	0205-075	1	STRAIGHT CONNECTOR 1/8" NPT x 1/4" OD
6	0208-435	1	AIR CYLINDER 1-1/4" BORE 2" STROKE
7	0602-464	1	UPPER SPREADER BELT BRKT ASSY
8	0204-402	1	LINEAR BEARING
9	0608-652	1	VALVE MOUNTING BRACKET
10	0202-450	1	VALVE IN LINE SPRING RETURN 1/4" OD
11	0202-490	1	SOLENOID 24 VAC
12	0202-500	1	PLUG IN FOR AIR VALVE
13	0205-250	1	ELBOW 1/8" NPT x 1/4" OD
14	0607-393	1	SPREADER CLAMP CARRIER ASSEMBLY
15	0204-401	1	RAIL LINEAR 63"
16	2801-390	1	MOTOR 1/2 HP 3/60/230/460 1725RPM FR 56C
17	1221-250	1	PULLEY POWER GRIP 25T FOR 1108 TYPE BSH
18	1215-020	1	BUSHING 1108-5/8 BORE
19	0614-150	1	COLLAR 5/8" ID LOCKING
20*	0204-412	1	RAIL LINEAR 71"
21*	1223-905	1	BELT POLY CHAIN GT 130/135" LONG MACHINE
22*	0206-023	1	E-CHAIN, 52 LINKS W/ CONN LINK

*** = 136" Machine Only**

Lower Spreader - Right



Lower Spreader - Right continued...

<i>ID</i>	<i>Part Number</i>	<i>Qty</i>	<i>Description</i>
1	0608-038	1	LH BRKT W/4 MOUNT HOLES & SLOT
2	1223-300	1	BELT TIMING 1" WIDE
3	1221-350	2	PULLEY 36 TEETH 1" WIDE
4	1215-250	2	BUSHING SDS 1" BORE
5	0402-774	4	BEARING 1" BORE STAT MOUNT
6	1210-147	2	SHAFT 1" x 11-1/2" W/ FULL KEYWAY
7	1221-151	1	PULLEY 14T 1" W REBORED 5/8" BORE W/KWAY
8	1213-047	1	LEFT LOWER SPREADER MOTOR MOUNT
9	2801-290	1	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
10	1205-025	2	PULLEY CROWN FACE 3" x 3" 1" BORE
11	0608-034	1	RH BRKT W/4 MOUNT HOLES & SLOT
12	0608-163	1	BELT SPREADER TOP BRKT 3" x2" x2" x7 GA
13	0614-150	4	COLLAR 5/8" ID LOCKING
14	0608-853	1	BELT SPREADER OUTSIDE HORIZONTAL BRACKET
15	3604-200	2	SPRING COMPRESSION 1-1/8" OD 5-1/2" LONG
16	0607-132	1	OUTSIDE BELT SPREADER ASSY
17	0608-650	1	OUTSIDE FRONT BELT SPREADER SUPPORT BRKT
18	1205-028	2	ROLL 2-1/4" LONG W/ 3/8" BEARINGS
19	0607-364	1	R.H. BELT SPREADER ARM ASSY COMPLETE
20	1210-066	4	SHAFT 5/8" OD x 3-7/8" L
21	4215-003	2	LOCKING WASHER 1-3/4"ODx5/8"ID x14GA
22	1205-027	2	IDLER ROLL W/ 5/8" BEARINGS
23	1003-230	1	RUFF TOP RIBBON 3" x 126" W/PIN
24	0607-394	1	BELT SPREADER ARM ASSEMBLY
25	1003-232	1	RUFF TOP RIBBON 3" x 92" W/PIN BLACK
26	0608-164	1	BELT SPREADER BOTTOM BRKT 3"x2"x2"x7 GA

NOTE: *When ordering parts, please provide the serial number and a complete description of the O.P.L., including any non-standard features.*

O.P.L.

Schematic Parts List

Content

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Fold Circuit

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Pneumatic Diagram	SC-12
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Cable Detail	SC-15
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Electrical Panel

Main Electrical Panel	SC-16
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CHICAGO DRYER COMPANY



6220459 - C

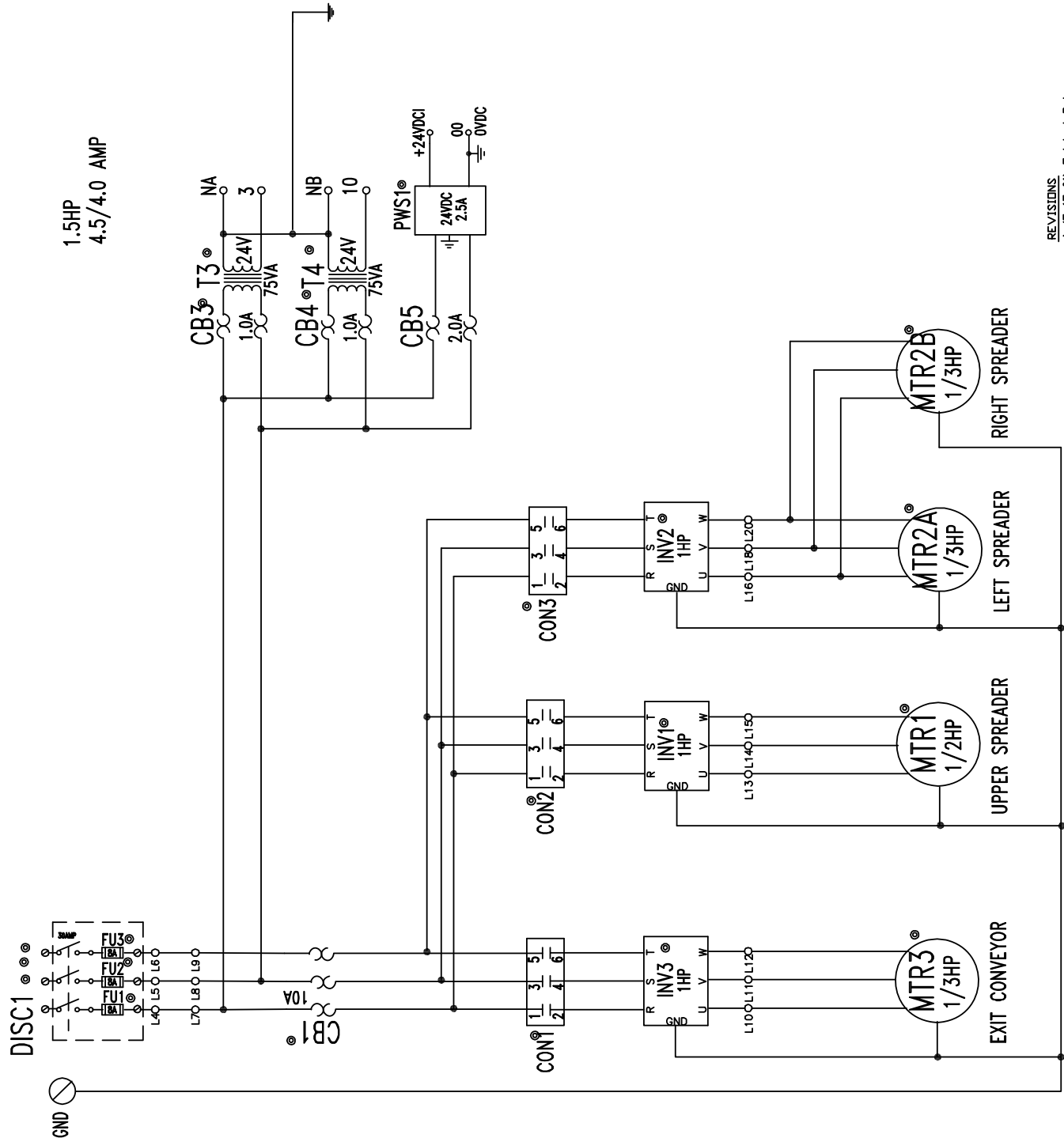
OPL MOTOR CONTROL
208-240VAC/60HZ

Txxx

Drawn By: JAM
Approved By: xxx

CAD By: JAM
Scale: -

NC Code: n/a
Date: 8-12-09



REVISIONS:
A (5-17-00) Original Release
B (12-04-07) update to E700 Inverters
C (8-12-09) add 24VDC power supply for lift interlock circuit

208-240V Motor Control (6220459)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
CB1	1410-391-01	CIRCUIT BREAKER 10 A 3 POLE
CB3	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CB4	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CON1	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON2	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON3	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
DISC1	1402-665	SWITCH DISCONNECT TYPE J 60 AMP
DISC2A	1402-652	KIT OPERATING SHAFT
DISC2B	1402-646	HANDLE OPERATING
FU1	1407-612	FUSE 10 AMP TYPE JLL 600 V
FU2	1407-612	FUSE 10 AMP TYPE JLL 600 V
FU3	1407-612	FUSE 10 AMP TYPE JLL 600 V
INV1	1615-170	INVERTER 1 HP AC 230 V TYPE E700
INV2	1615-170	INVERTER 1 HP AC 230 V TYPE E700
INV3	1615-170	INVERTER 1 HP AC 230 V TYPE E700
MTR1	2801-390	MOTOR 1/2 HP 3/60/230/460 1725RPM FR 56C
MTR2A	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
MTR2B	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
MTR3	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
T3	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V
T4	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V

CHICAGO DRYER COMPANY



6220460 - C

OPL MOTOR CONTROL

415V-50Hz/460V-60 Hz

Txxx

Drawn By: JAM

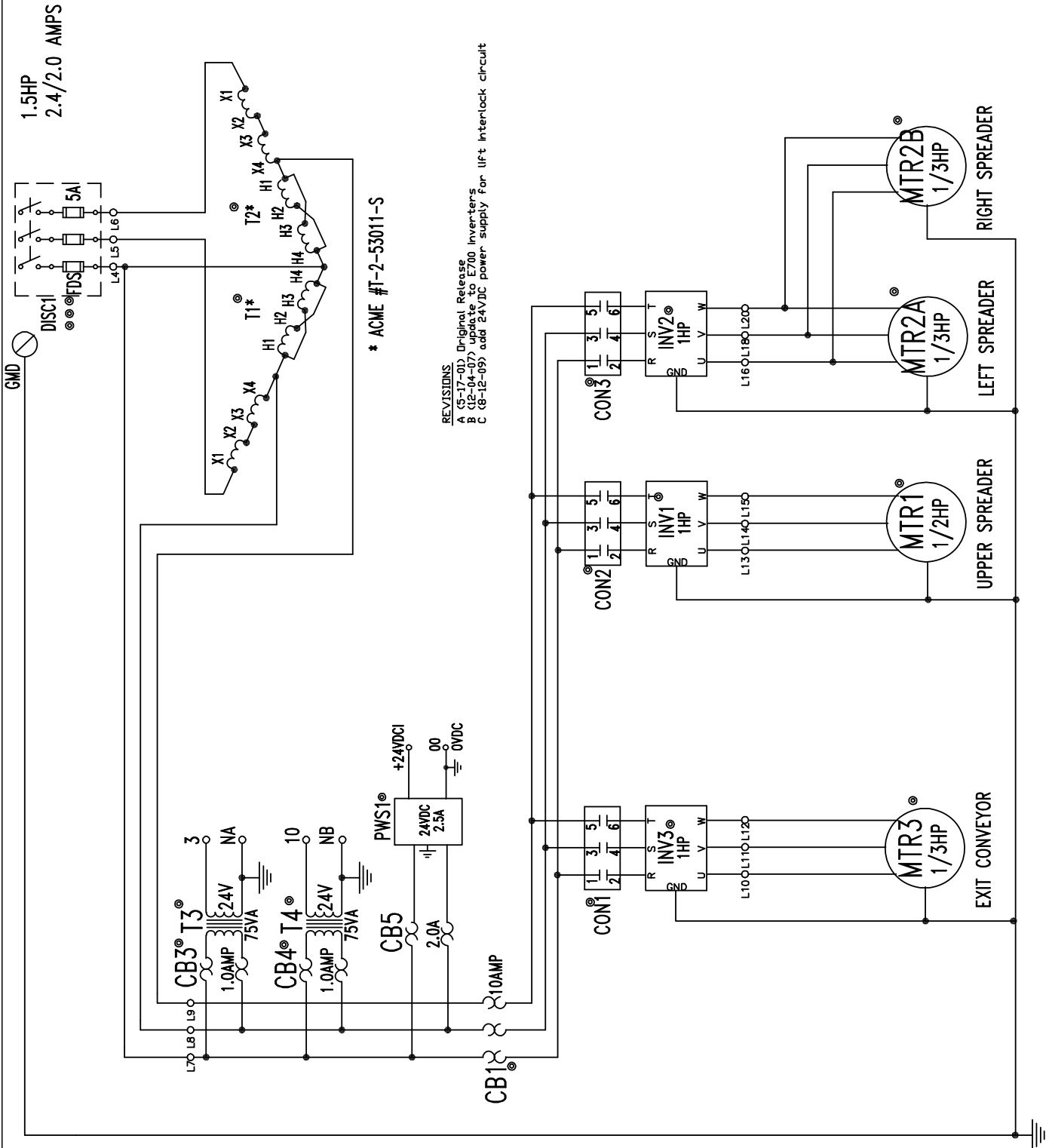
CAD By: JAM

NC Code: n/a

Approved By: xxx

Scale: -

Date: 08-12-09



* ACME #T-2-53011-S

REVISIONS
 A (8-12-09) Original Release
 B (12-10-07) Add AC Inverters
 C (8-12-09) add 24VDC power supply for lift interlock circuit

415V/460V Motor Control (6220460)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
CB1	1410-391-01	CIRCUIT BREAKER 10 A 3 POLE
CB3	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CB4	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CON1	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON2	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON3	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
DISC1	1402-665	SWITCH DISCONNECT TYPE J 60 AMP
DISC1A	1402-646	HANDLE OPERATING
DISC2B	1402-652	KIT OPERATING SHAFT
INV1	1615-170	INVERTER 1 HP AC 230 V TYPE E700
INV2	1615-170	INVERTER 1 HP AC 230 V TYPE E700
INV3	1615-170	INVERTER 1 HP AC 230 V TYPE E700
MTR1	2801-390	MOTOR 1/2 HP 3/60/230/460 1725RPM FR 56C
MTR2A	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
MTR2B	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
MTR3	2801-290	MOTOR 1/3 HP 3/60/230/460 1725RPM FR 56C
T1	1412-950	TRANSFORMER 1.5 KVA 240 x 480 120 x 240
T2	1412-950	TRANSFORMER 1.5 KVA 240 x 480 120 x 240
T3	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V
T4	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V



OPL FEEDER

Drawn By: JAM

CAD By: JAM

NC Code: n/a

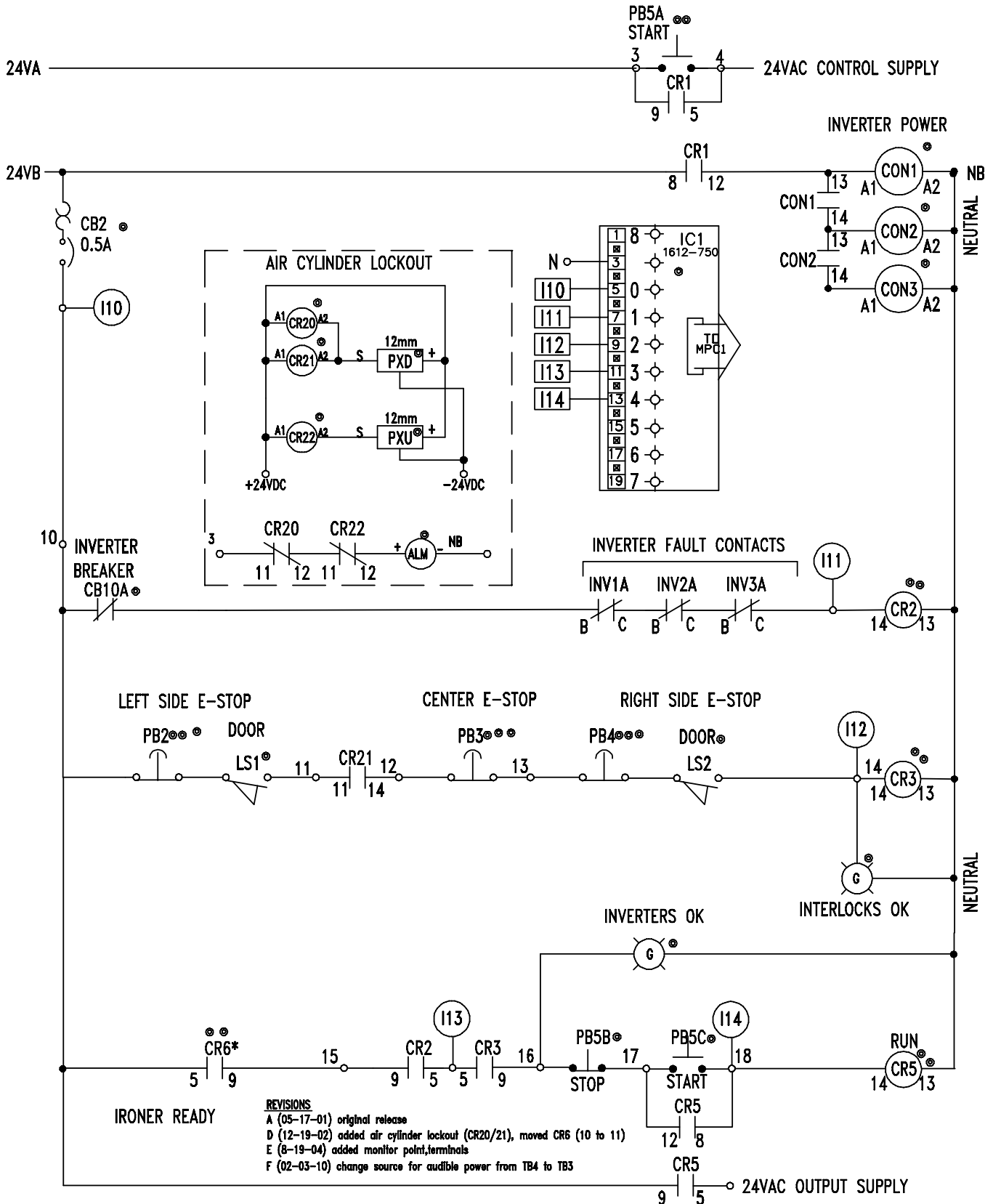
24VAC INTERLOCK CIRCUIT

Txxx

Approved By: xxx

Scale: -

Date: 02-03-10



*CR6 Located in ironer

24 Vac Interlock Circuit (6230348)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
ALARM	1417-575	ALARM AUDIBLE FAST
CB10A	1410-605	AUX CONTACT 2 NO/NC
CB3	1410-105-01	CIRCUIT BREAKER 0.5 A 1 POLE
CON1	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON2	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON3	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CR2	1401-509	RELAY 24 VAC 1 POLE
CR20	1401-275	RELAY 1 POLE 24VAC/DC
CR21	1401-275	RELAY 1 POLE 24VAC/DC
CR22	1401-275	RELAY 1 POLE 24VAC/DC
CR2B	1401-506	SOCKET FOR 1 POLE RELAY
CR3	1401-509	RELAY 24 VAC 1 POLE
CR3B	1401-506	SOCKET FOR 1 POLE RELAY
CR5	1401-502	RELAY 24 VAC 2 POLE
CR5B	1401-503	SOCKET FOR 2 POLE RELAY
CR6	1401-509	RELAY 24 VAC 1 POLE
CR6B	1401-506	SOCKET FOR 1 POLE RELAY
IC1	1612-750	INPUT BOARD 9 24VAC
LS1	1413-507	SWITCH W/ ACTUATOR W/M20 CONNECTOR
LS2	1413-507	SWITCH W/ ACTUATOR W/M20 CONNECTOR
LT2	1416-555	INDICATOR LIGHT GREEN 24 VDC
LT3	1416-555	INDICATOR LIGHT GREEN 24 VDC
PB1B	1414-135	MOUNTING BASE
PB2	1414-130	OPERATOR MUSHROOM HEAD TURN TO RELEASE
PB2C	1414-285	CONTACT BLOCK 1 N/C SEALED
PB3	1414-130	OPERATOR MUSHROOM HEAD TURN TO RELEASE
PB3B	1414-135	MOUNTING BASE
PB3C	1414-285	CONTACT BLOCK 1 N/C SEALED
PB4	1414-130	OPERATOR MUSHROOM HEAD TURN TO RELEASE
PB4B	1414-135	MOUNTING BASE
PB4C	1414-285	CONTACT BLOCK 1 N/C SEALED
PB5	1414-560-01	START/STOP GREEN/RED BUTTON
PB5A	1414-495	Call Factory
PB5B	1414-260	CONTACT BLOCK N/O
PB5C	1414-265	Call Factory
PXD	1608-100	SENSOR MACHINE SPEED
PXU	1608-100	SENSOR MACHINE SPEED

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OPL FEEDER
24VAC INTERLOCK CIRCUIT W/ E-STOP INTERCONNECT

Drawn By: JAM

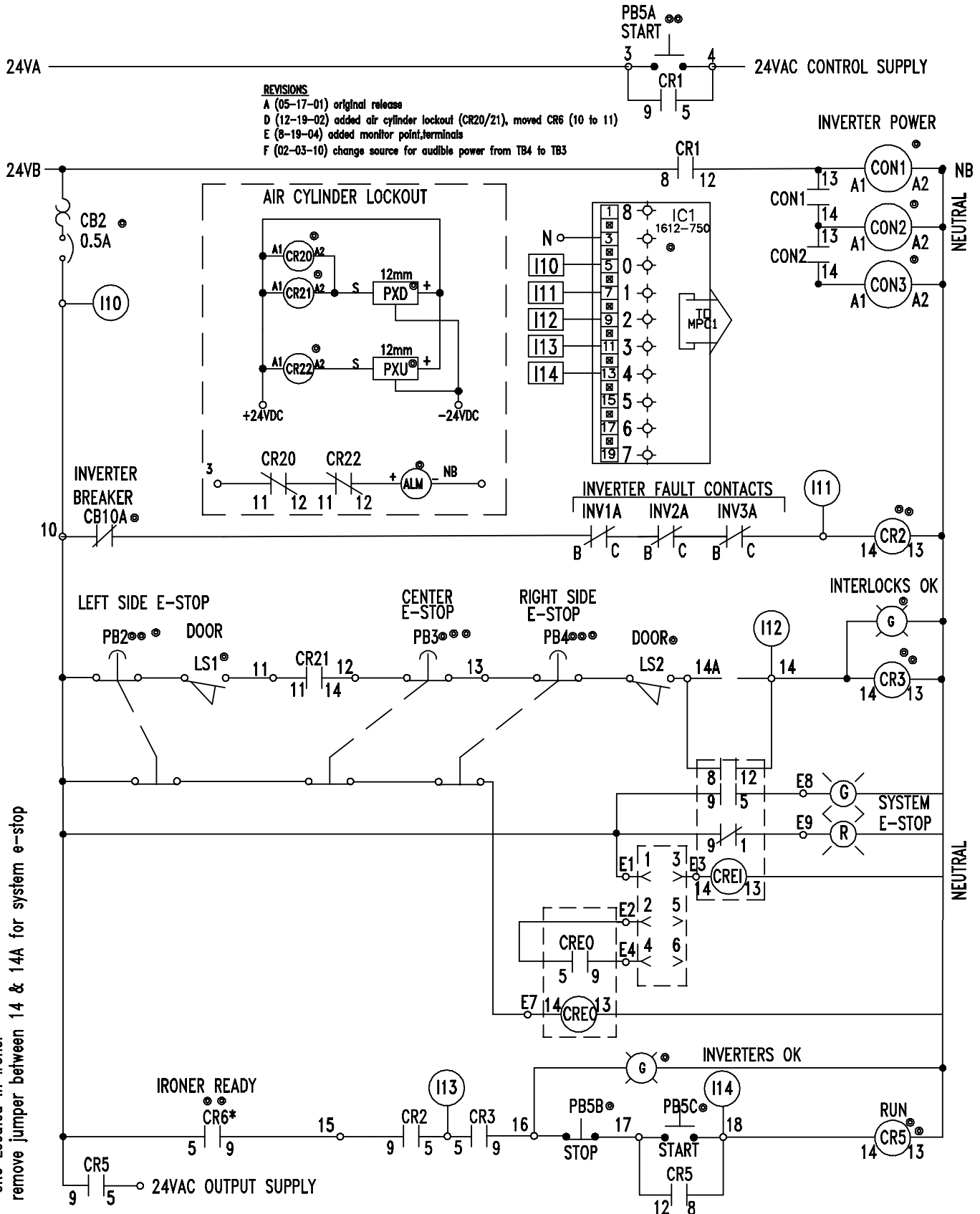
CAD By: JAM

NC Code: n/a

Approved By: xxx

Scale: -

Date: 02-03-10





OPL FEEDER

Drawn By: JAM

CAD By: JAM

NC Code: n/a

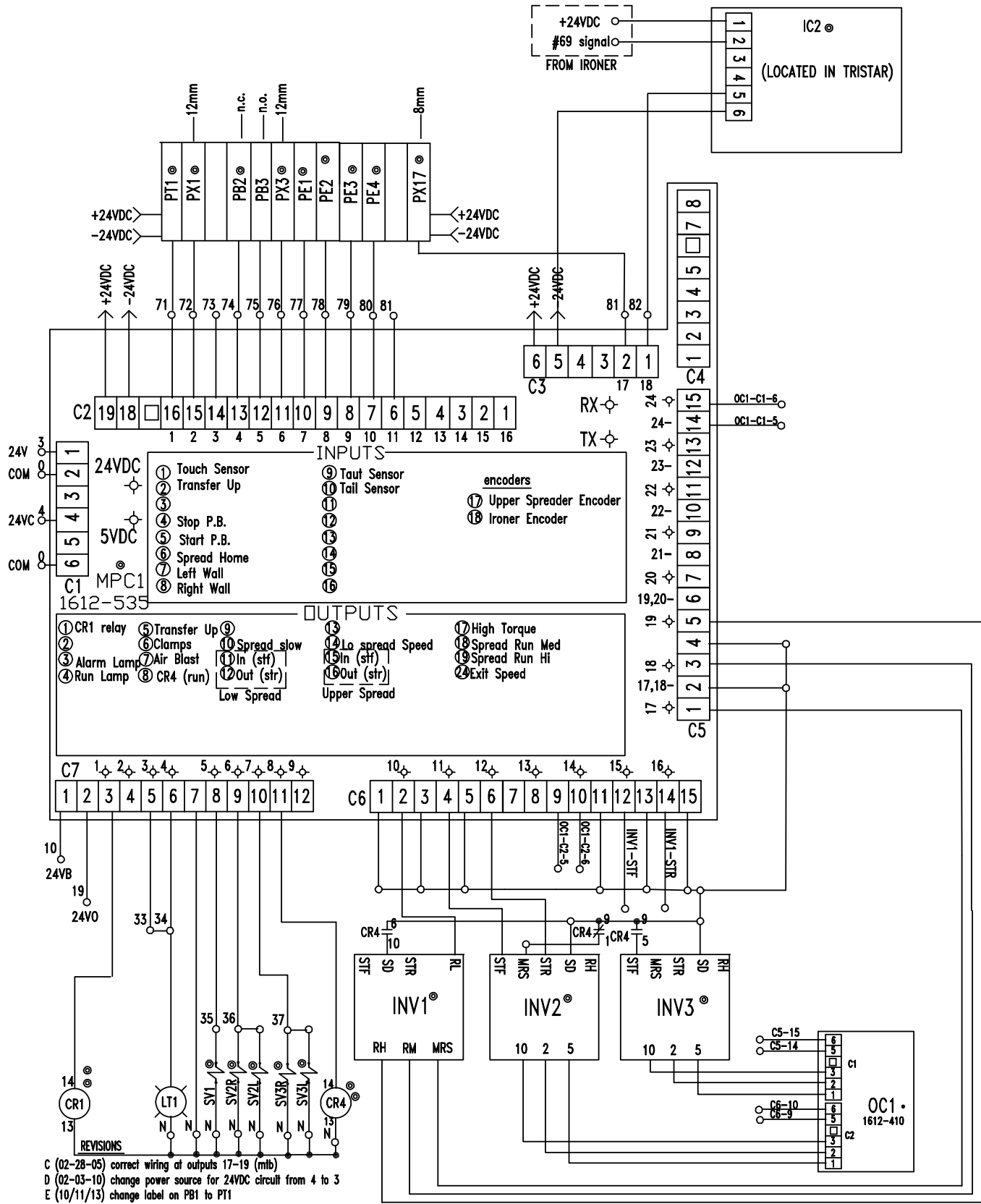
FOLD CONTROL CIRCUIT

Txxx

Approved By: xxx

Scale: -

Date: 10/11/13



Fold Control Circuit (6270317)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
CR1	1401-502	RELAY 24 VAC 2 POLE
CR1B	1401-506	SOCKET FOR 1 POLE RELAY
CR4	1401-502	RELAY 24 VAC 2 POLE
CR4B	1401-506	SOCKET FOR 1 POLE RELAY
IC2	1612-055	SPEED INTERCONNECT BOARD IMPERIAL
INV1	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
INV2	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
INV3	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
MPC1	1612-535	FOLD CONTROL BOARD
OC1	1612-410	SPEED CONTROL BOARD MASTER/SLAVE
PB2	1411-008	START/STOP ILLUM GREEN/RED 1 N/C 3 N/O
PE1	1607-215	PHOTOSENSOR DIFFUSED W/CONNECTOR
PE2	1607-215	PHOTOSENSOR DIFFUSED W/CONNECTOR
PE3	1607-230	SHARP CUTOFF SENSOR 1" W/CONNECTOR
PE4	1607-210	PHOTOSENSOR RETROREFLECTIVE W/CONNECTOR
PT1	1608-005	PROXIMITY SWITCH CAPACITIVE W/CONNECTOR
PX1	1608-002	MACHINE SPEED SENSOR-SHORT 12MM
PX18	1608-000	MACHINE SPEED SENSOR 8 MM ASSY
PX3	1608-002	MACHINE SPEED SENSOR-SHORT 12MM
SV1	0202-450	VALVE IN LINE SPRING RETURN 1/4" OD
SV2L	0202-450	VALVE IN LINE SPRING RETURN 1/4" OD
SV2R	0202-450	VALVE IN LINE SPRING RETURN 1/4" OD
SV3L	0202-360	SOLENOID 24VDC BANK
SV3R	0202-960	VALVE AIR 1/2" 24 VAC



PNEUMATIC DIAGRAM

Drawn By: GC

CAD By: GC

NC Code: n/a

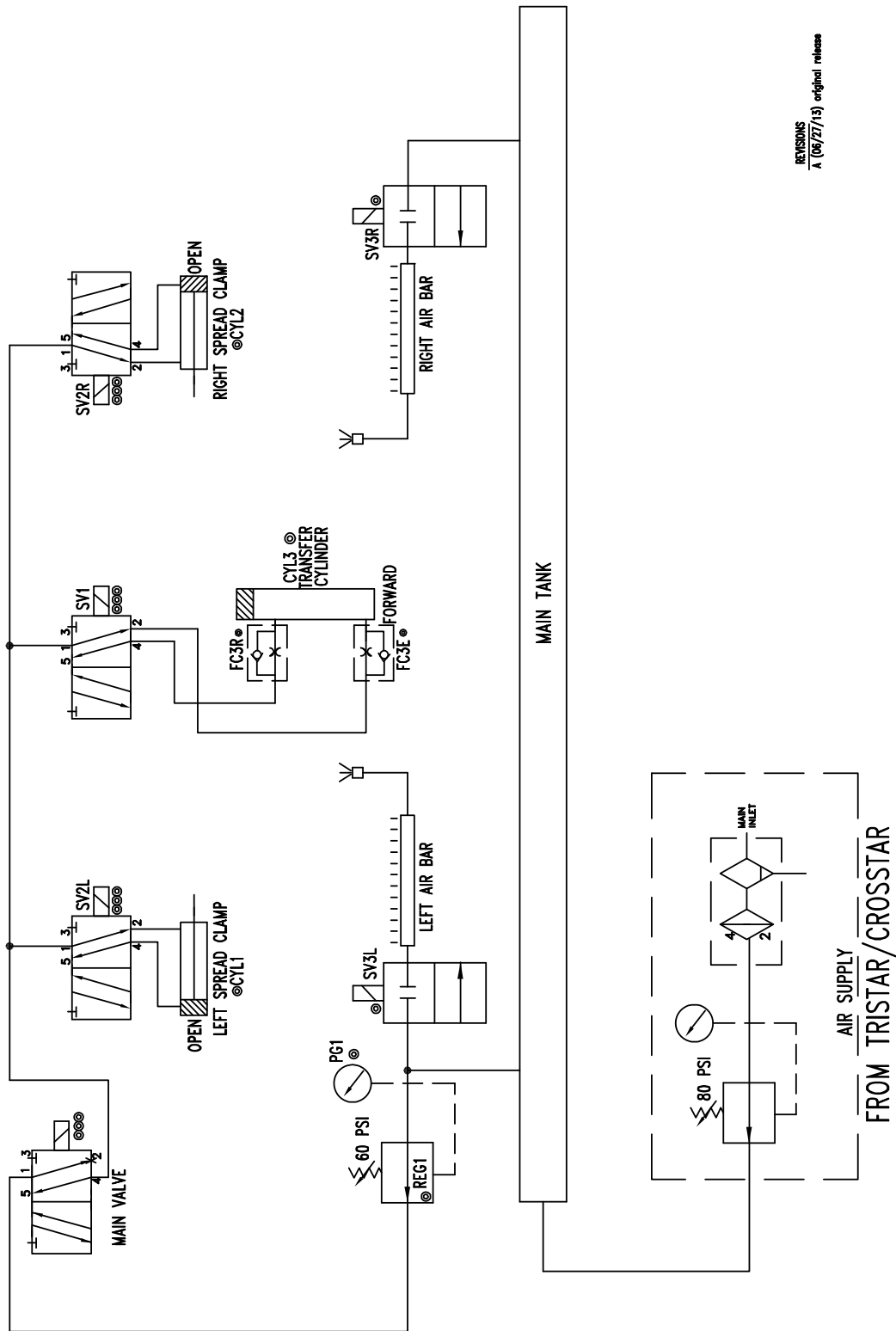
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Approved By: -

Scale: -

Date: 06/27/13



REVISIONS
A (06/27/13) original release

Pneumatic Diagram (6300053)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
CYL1	0208-435	AIR CYLINDER 1-1/4" BORE 2" STROKE
CYL3	0208-538	RODLESS AIR CYLINDER 26" STROK
FC3E	0203-200	ELBOW FLOW CONTROL 1/8" NPT
FC3R	0203-200	ELBOW FLOW CONTROL 1/8" NPT
PG1	0203-175	GAUGE 1/8" NPT 2-1/4" DIA 160 PSI
REG1	0203-195-01	REGULATOR 1/2" NPT
SV0	0202-510	VALVE PUSH IN LINE POWER 3/8"
SV0C	0202-500	PLUG IN FOR AIR VALVE
SV0S	0202-490	SOLENOID 24 VAC
SV1	0202-450	VALVE IN LINE SPRING RETURN 1/4" OD
SV1C	0202-500	PLUG IN FOR AIR VALVE
SV1S	0202-490	SOLENOID 24 VAC
SV2L	0202-450	VALVE IN LINE SPRING RETURN 1/4" OD
SV2LC	0202-500	PLUG IN FOR AIR VALVE
SV2LS	0202-490	SOLENOID 24 VAC
SV2R	0202-325	VALVE
SV2RC	0202-500	PLUG IN FOR AIR VALVE
SV2RS	0202-490	SOLENOID 24 VAC
SV3L	0202-080	VALVE SOL 24VDC / SCH:25
SV3R	0202-080	VALVE SOL 24VDC / SCH:25

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OPL FEEDER

Drawn By: JAM

CAD By: JAM

NC Code: n/a

CABLE DETAIL

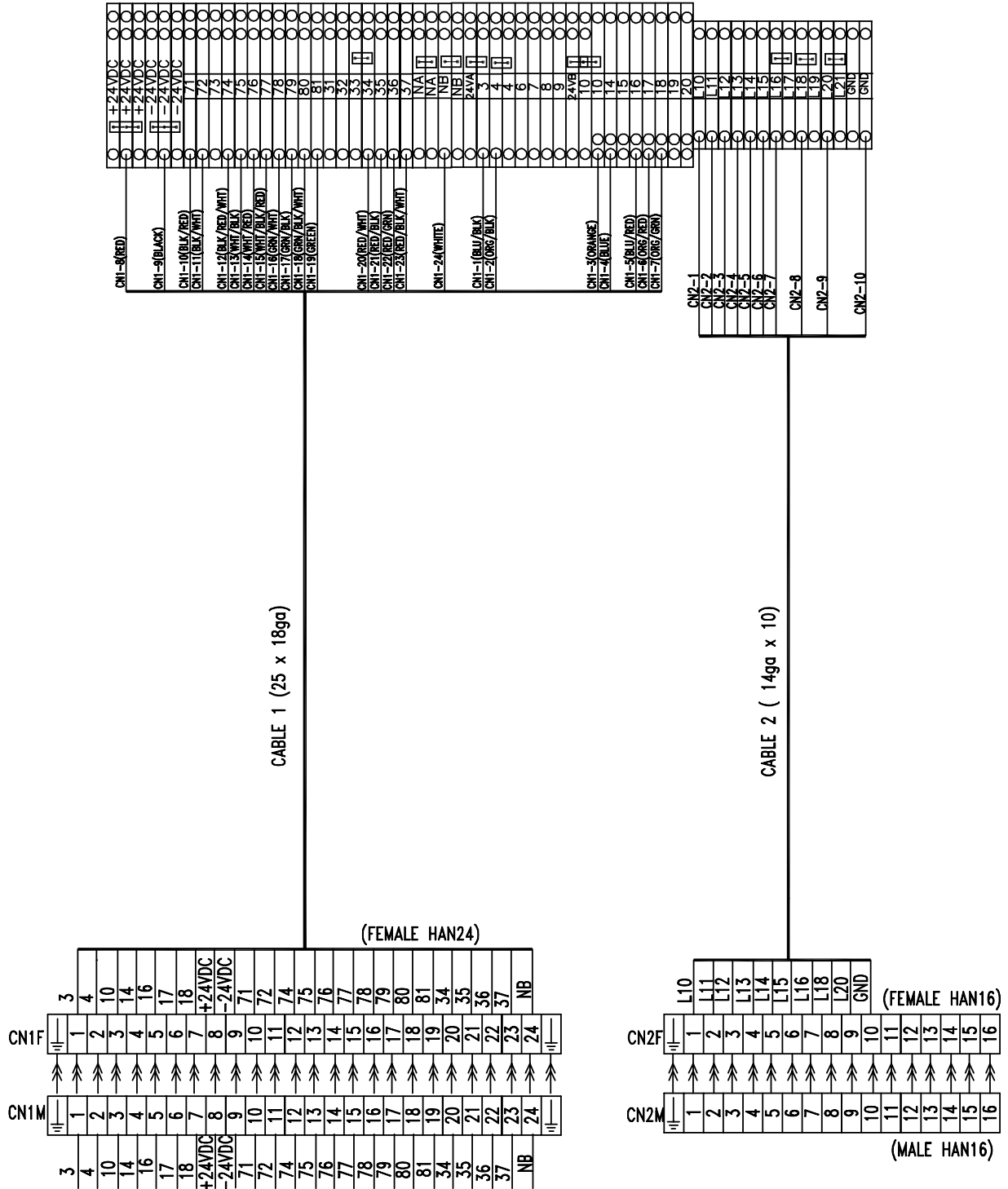
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Approved By: xxx

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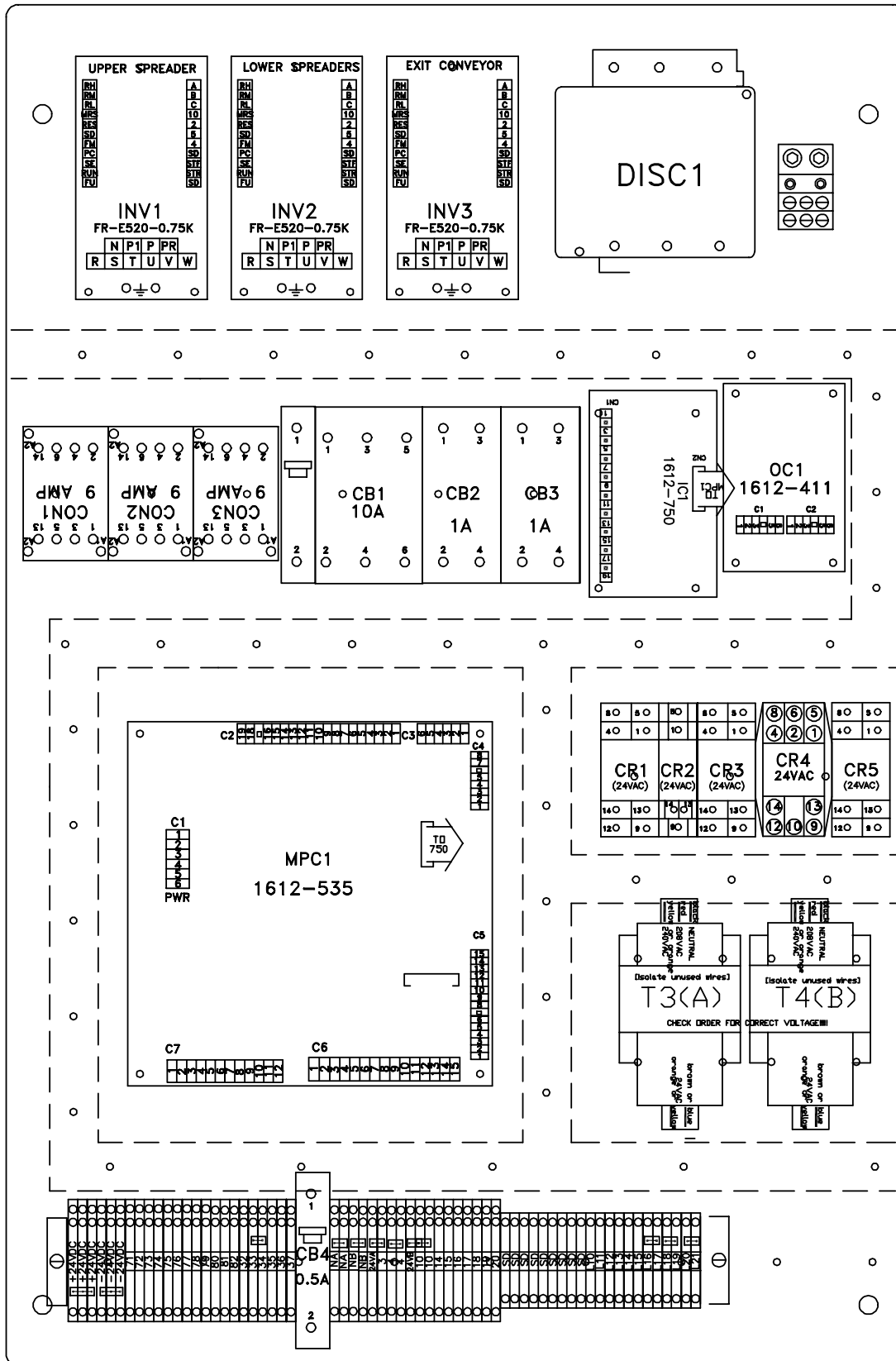
Date: 3-1-05

OPL PANEL



revision:

- A (7-03-01) original release
- B (8-19-04) revised connections, added color codes
- C (3-1-05) clarify female/male connectors (mtb)



OPL FEEDER
 MAIN ELECTRICAL PANEL
 12 GAUGE X = 54.5 Y = 31.6
 Changes 2

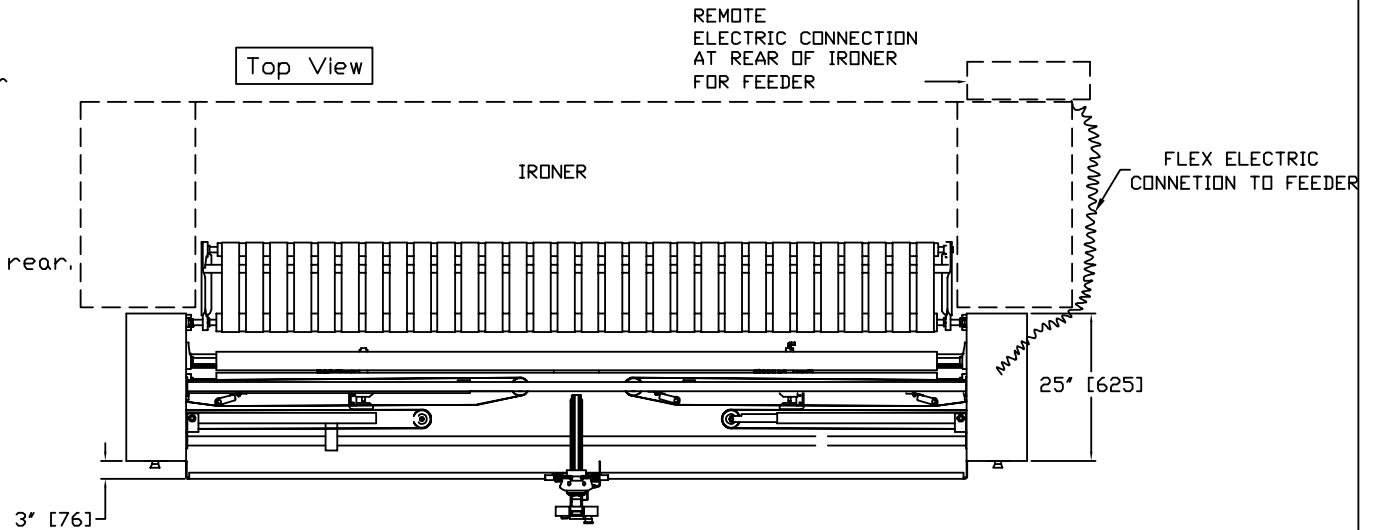
JAM 6280202 -C
 JAM 02-20-06
 app
 1-1 -

Main Electrical Panel (6260202)

<i>Reference</i>	<i>Part No.</i>	<i>Description</i>
CB1	1410-391-01	CIRCUIT BREAKER 10 A 3 POLE
CB10A	1410-605	AUX CONTACT 2 NO/NC
CB3	1410-105-01	CIRCUIT BREAKER 0.5 A 1 POLE
CB3	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CB4	1410-210-01	CIRCUIT BREAKER 1 A 2 POLE
CON1	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON2	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CON3	1404-450	CONTACTOR 9 AMP 24 VAC 50/60 HZ
CR1	1401-502	RELAY 24 VAC 2 POLE
CR1B	1401-506	SOCKET FOR 1 POLE RELAY
CR2	1401-509	RELAY 24 VAC 1 POLE
CR2B	1401-506	SOCKET FOR 1 POLE RELAY
CR3	1401-509	RELAY 24 VAC 1 POLE
CR3B	1401-506	SOCKET FOR 1 POLE RELAY
CR4	1401-502	RELAY 24 VAC 2 POLE
CR4B	1401-506	SOCKET FOR 1 POLE RELAY
CR5	1401-502	RELAY 24 VAC 2 POLE
CR5B	1401-503	SOCKET FOR 2 POLE RELAY
DISC1	1402-665	SWITCH DISCONNECT TYPE J 60 AMP
DISC1A	1402-646	HANDLE OPERATING
DISC2A	1402-652	KIT OPERATING SHAFT
DISC2B	1402-646	HANDLE OPERATING
DISC2B	1402-652	KIT OPERATING SHAFT
FU1	1407-612	FUSE 10 AMP TYPE JLL 600 V
FU2	1407-612	FUSE 10 AMP TYPE JLL 600 V
FU3	1407-612	FUSE 10 AMP TYPE JLL 600 V
IC1	1612-750	INPUT BOARD 9 24VAC
INV1	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
INV2	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
INV3	1615-170	INVERTER 1 HP AC 230 V TYPE E700
	or 1615-185	INVERTER 1 HP AC 230V W/BUL 3023-393
	or 1615-120	INVERTER 1/2 HP AC 230V
MPC1	1612-535	FOLD CONTROL BOARD
OC1	1612-410	SPEED CONTROL BOARD MASTER/SLAVE
T3	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V
T4	1412-430-01	TRANSFORMER 75 VA 208/480 TO 24 V

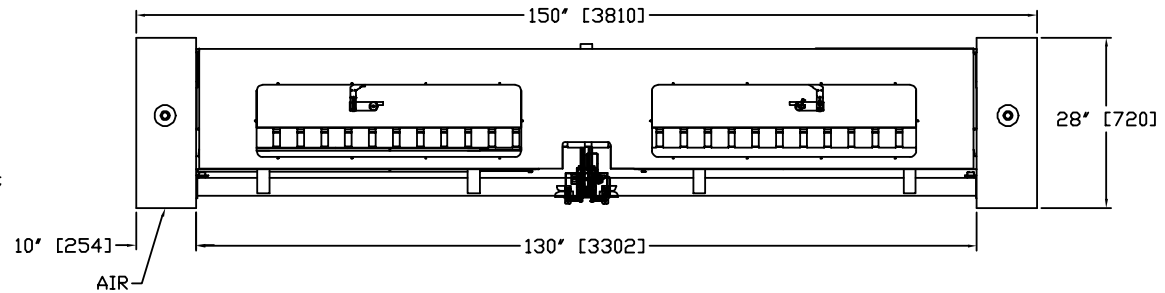
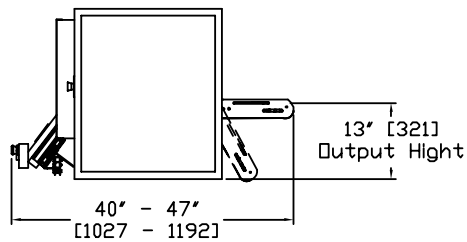
NOTE:

1. Specifications subject to change without notice. Consult factory for certified construction floorplan.
2. Millimeter dimensions are in [].
3. All dimensions are $\pm 1/2"$.
4. Utility connections are located at rear.



Side View

Front View



Txxx

CHICAGO



OPL Spreader/Feeder

Scale: 3/8"=1'

CAD By: MS

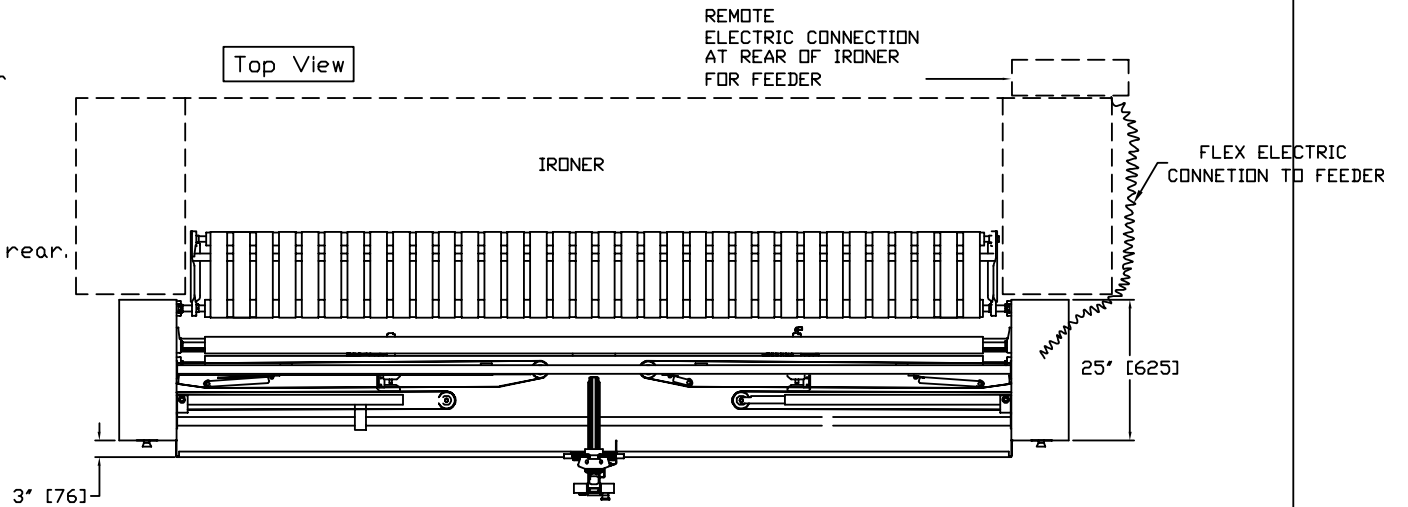
Approved By:

Date: 06/06/02

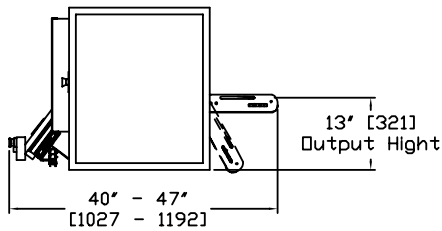
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NOTE:

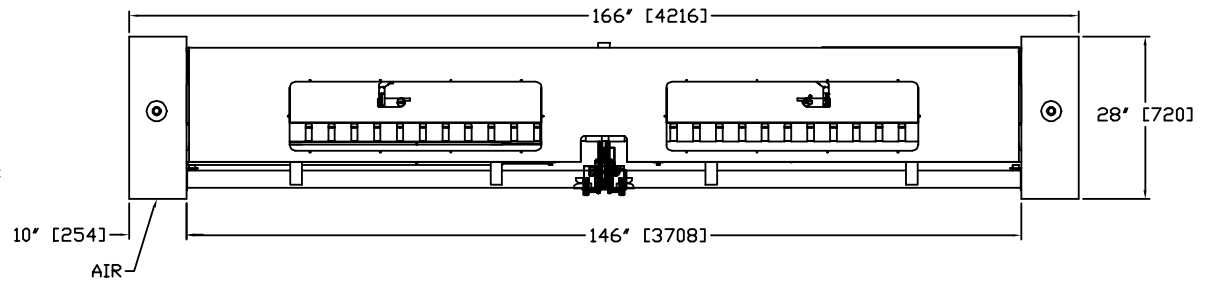
1. Specifications subject to change without notice. Consult factory for certified construction floorplan.
2. Millimeter dimensions are in [].
3. All dimensions are $\pm 1/2"$.
4. Utility connections are located at rear.



Side View



Front View



Txxx

CHICAGO



OPL Spreader/Feeder (136")

Scale: 3/8"=1'

CAD By: MS

Approved By:

Date: 10/14/05

6400-693-A

OPL Spreader Feeder	TECHNICAL SPECIFICATIONS 6500-306	07/08/09 App:GW
------------------------	--------------------------------------	--------------------

Production

Variable Speed Drive Output

Feet per Minute (m/min)

Minimum

Matches Machine mounted to

Maximum

Matches Machine mounted to

Motors

Total	1 1/2	(1.1)
Lower Spreader left Drive , HP (kW)	1/3	(0.25)
Lower Spreader right Drive, HP (kW)	1/3	(0.25)
Upper Spreader Drive , HP (kW)	1/2	(0.37)
Exit Conveyor , HP (kW)	1/3	(0.25)

Electrical

Frequency : All Models 60 Hz

Total Amps	4.5	4.0	2.0	1.6
Three Phase Voltage	208	230	460	575

Frequency : All Models 50 Hz

Total Amps	4.4	2.4	2.2
Three Phase Voltage	220	400	440

Compressed Air

Maximum Air use , CFM (l/min)	8	(227)
Operating Pressure , PSI (kPa)	85-120	(580-820)
Inlet Size , inch	1/2	
Drain Size , inch	1/4	
Upper Spreader Clamps PSI (kPa)	60	(410)
Factory recommended settings. Adjust	as necessary. Use caution when testing.	

Approximate Shipping Weight

Domestic , lb. (kg)	1600	(725)
Export , lb. (kg)	2100	(952)

OPL - 136 Spreader Feeder	TECHNICAL SPECIFICATIONS 6500-377	07/08/09 App:GW
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Production

Variable Speed Drive Output

Feet per Minute (m/min)

Minimum

Matches Machine mounted to

Maximum

Matches Machine mounted to

Motors

Total	1 1/2	(1.1)
Lower Spreader left Drive , HP (kW)	1/3	(0.25)
Lower Spreader right Drive, HP (kW)	1/3	(0.25)
Upper Spreader Drive , HP (kW)	1/2	(0.37)
Exit Conveyor , HP (kW)	1/3	(0.25)

Electrical

Frequency : All Models 60 Hz

Total Amps	4.5	4.0	2.0	1.6
Three Phase Voltage	208	230	460	575

Frequency : All Models 50 Hz

Total Amps	4.4	2.4	2.2
Three Phase Voltage	220	400	440

Compressed Air

Maximum Air use , CFM (l/min)	8	(227)
Operating Pressure , PSI (kPa)	85-120	(580-820)
Inlet Size , inch	1/2	
Drain Size , inch	1/4	
Upper Spreader Clamps PSI (kPa)	60	(410)
Factory recommended settings. Adjust	as necessary. Use caution when testing.	

Approximate Shipping Weight

Domestic , lb. (kg)	1800	(816)
Export , lb. (kg)	2300	(1040)

GENERAL TORQUE SPECIFICATION CHART

These torque values are approximate and should not be accepted as accurate limits. Indeterminate factors (surface finish, type of plating and lubrication) in specific applications preclude the publication of accurate values for universal use.

DO NOT USE the below values for gasketed joints or joints of soft materials.
DO NOT USE your torque wrench for values greater than its maximum scale reading.

FOR ENGLISH FASTENERS (In Foot Pounds)

SIZE	SAE 2	SAE 5	SAE 8	Socket Head Cap Screws	Brass	Stainless Type 303
1/4-20	6	11	12	13	5	5
1/4-28	7	13	15	16	6	7
5/16-18	13	21	25	27	8	9
5/16-24	14	23	30	33	9	10
3/8-16	23	38	50	52	15	17
3/8-24	26	40	60	60	16	18
7/16-14	37	55	85	86	23	25
7/16-20	41	60	95	95	25	28
1/2-13	57	85	125	130	32	37
1/2-20	64	95	140	145	34	40
9/16-12	80	125	175	180	44	50
9/16-18	91	140	195	210	48	54
5/8-11	111	175	245	255	68	75
5/8-18	128	210	270	290	73	80

FOR METRIC FASTENERS (In Newton Meters)

SIZE	4.6	4.8	5.8	8.8	9.8	10.9	12.9
M 5	3	4	5	7	8	11	12
M 6	5	6	8	12.5	14	17	20
M 8	12	16	20	30	34	44	50
M 10	23	32	40	60	70	85	100
M 12	40	56	70	103	120	150	180
M 14	65	90	110	167	190	240	280
M 16	100	140	170	270	290	380	440
M 20	200		330	520		740	860

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