

Operation and Maintenance Manual

Lumber Splicer



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Notice of Change

RETAIN THIS NOTICE AND INSERT BEFORE THE TABLE OF CONTENTS

Document(s)	Operation and Maintenance Manual
Part Number	001074
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The following pages of the above-referenced document have been revised. Please ensure that the most recent page revision is included in your document.*

New Page	Dated	Replaces Old Page	Manual Number

*This document has not been revised. When revisions are issued, you will receive a **Notice of Change** page (similar to this sheet) with the pages that have been modified.

Safety Indicators

The following symbols are used throughout this document to indicate safety hazards. Please pay careful attention when you see one of these symbols. Failure to comply with the accompanying instructions may result in property damage, personal injury, or even death. The graphic inside the icon may change to indicate the type of hazard, but the color of the icon will always indicate the hazard level described below. For example, an electrical hazard that may result in significant personal injury will be indicated by the following icon:



Personnel must follow all safety procedures and practices to ensure the safest possible operation and maintenance of this equipment. However, at no time is this document a substitute for common sense. Personnel must ensure that the work environment is safe and free of distractions.



DANGER

Could result in severe personal injury or death



WARNING

Likely to result in significant personal injury but generally less serious than loss of limb or life



CAUTION

May result in equipment damage



NOTICE

Calls attention to information that is significant to understanding the operation at hand



ENVIRONMENTAL

Applies to conditions that may affect the environment but does not have an immediate, direct effect on personnel or equipment

General Safety Rules

Read this manual completely before using this equipment. Do not operate this machine unless you have a thorough knowledge of the controls, safety devices, emergency stops, and general operating procedures outlined in this manual. All warnings and cautions should be read and observed before operating the machine or performing any maintenance work. Failure to comply with these instructions may result in economic loss, personal property damage, and/or serious personal injury including death. This manual must always be available to personnel operating and maintaining the machine.

- Check operation of all safety devices before each shift start.
- Note illegible labels. Labels that are worn or unreadable should be replaced immediately.
- Check for worn or damaged parts, and repair or replace them immediately.
- All protective guards and safety devices must be in place before and during use of the machine. Never disconnect or bypass any safety device or electrical interlock.
- Always wear safety glasses and hearing protection.
- Use caution when lifting heavy parts or material.
- Wear proper apparel. Do not wear loose clothing or jewelry. Confine long hair.
- When using solvents on and around the machine, remove power to the machine to eliminate the chance of sparking, which may result in explosion or fire. Wear a respirator approved for use with solvents. Wear protective clothing, gloves, and safety glasses.
- Keep children away. All visitors should be kept a safe distance from the work area. Hazards may not be apparent to individuals who are unfamiliar with the machine.
- In case of machine malfunction, stop the machine immediately and report the malfunction to a supervisor.
- Never leave the machine running unattended. **TURN POWER OFF!** Do not leave the machine until all parts have come to a complete stop and all electrical power has been shut off.
- Do not use in damp or wet locations, or expose the machine to rain.
- Keep work areas well lit.
- Only qualified personnel should attempt to perform any repair or maintenance. Compliance with minimum recommendations outlined throughout this manual is essential.
- Do not use any liquids in the interior of electrical cabinets.

Lockout and Tagout Guidelines

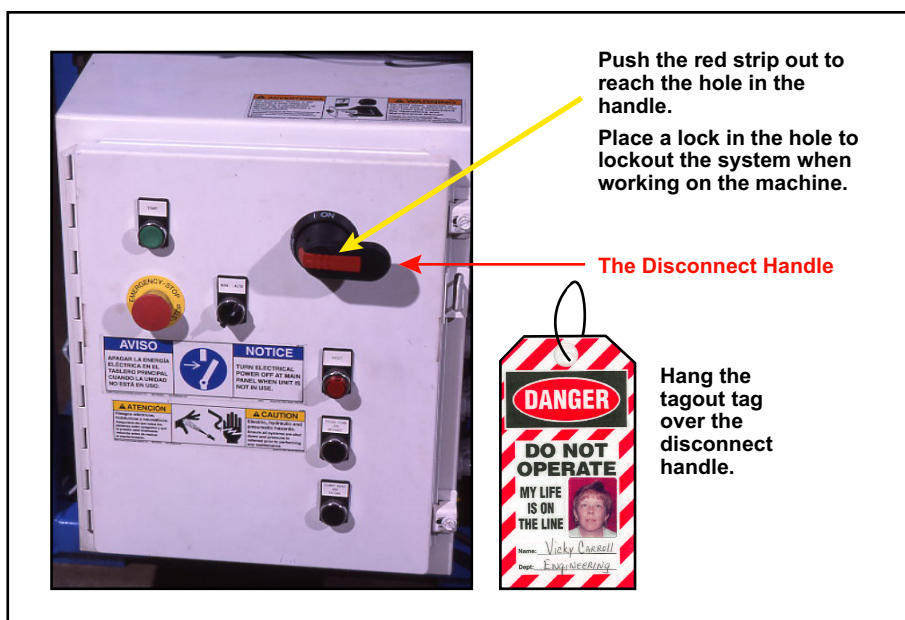
OSHA's Lockout and Tagout Guidelines

Before work is performed on the machine, all lockout and tagout guidelines must be met, according to OSHA 29 CFR 1910.147. These guidelines should be part of your company's energy control program, defined below.

The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.
—OSHA 29 CFR 1910.147

Performing Maintenance Outside the Enclosure

When performing any maintenance or adjustments outside of the electrical enclosure, turn off the disconnect handle. Notify other personnel in the area that you are working on the machine by tagging and locking the disconnect handle in the off position. Always use a lock that can be removed only by the person performing the maintenance.



Performing Maintenance Inside the Enclosure

Before opening an electrical enclosure, turn off the machine's disconnect handle and lockout and tagout the source of power. It is usually located in an electrical panel mounted on the building wall. When you open the electrical enclosure, check the voltage inside the enclosure using a multimeter to ensure that there is no live power.

Introduction

	DANGER
	Read this manual completely before using this equipment! Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual. All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury. This manual must always be available to personnel operating and maintaining this equipment.

Purpose

The primary function of the Lumber Splicer is to turn waste lumber into usable production material by splicing 2x4 pieces together at their ends. *MiTek*® connector plates are pressed into both sides of the lumber simultaneously by press platens while the lumber remains motionless to help ensure an accurate splice.

Components

The Lumber Splicer is a simple yet invaluable machine. It is one unit comprised of several systems or components that are described in Table 1-1 and labeled in Figure 1-1.

Table 1-1: Components of the Lumber Splicer Unit

Component	Purpose
Electrical enclosure	Supplies electrical power to the hydraulic motor and sends signals for the touch controls
Hydraulic system	Presses the plates into the lumber
Table tray	Holding area for supplies
Skatewheel rails	Allow the operator to quickly off-feed the lumber
Touch buttons	Initiate the pressing motion
Press area	Magnetic plates hold the connector plates for pressing into the lumber
Foot pedal	Initiates the clamping motion to hold the lumber in place
Infeed/Outfeed Conveyor System	Optional; if this option is not purchased from MiTek, a customer-supplied cart, table, or conveyor system must be used on both the operator and exit sides to hold the lumber before and after it is spliced

Figure 1-1: Overview of the Lumber Splicer Components

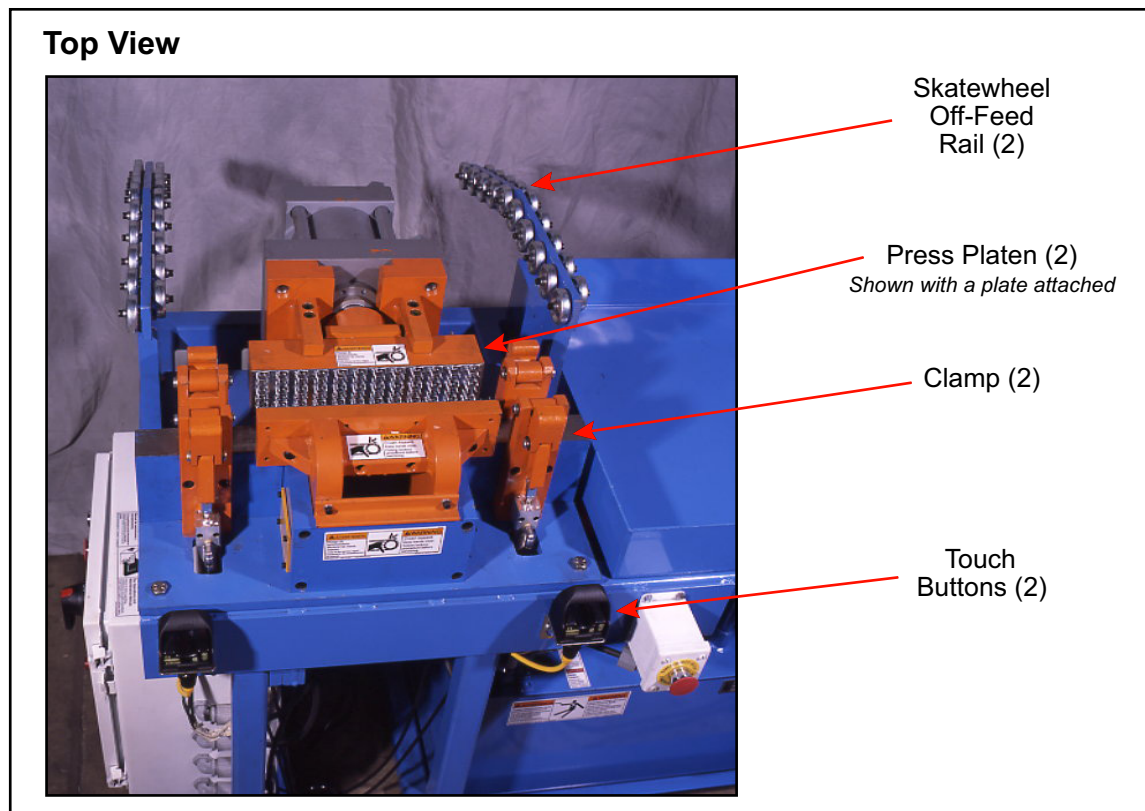
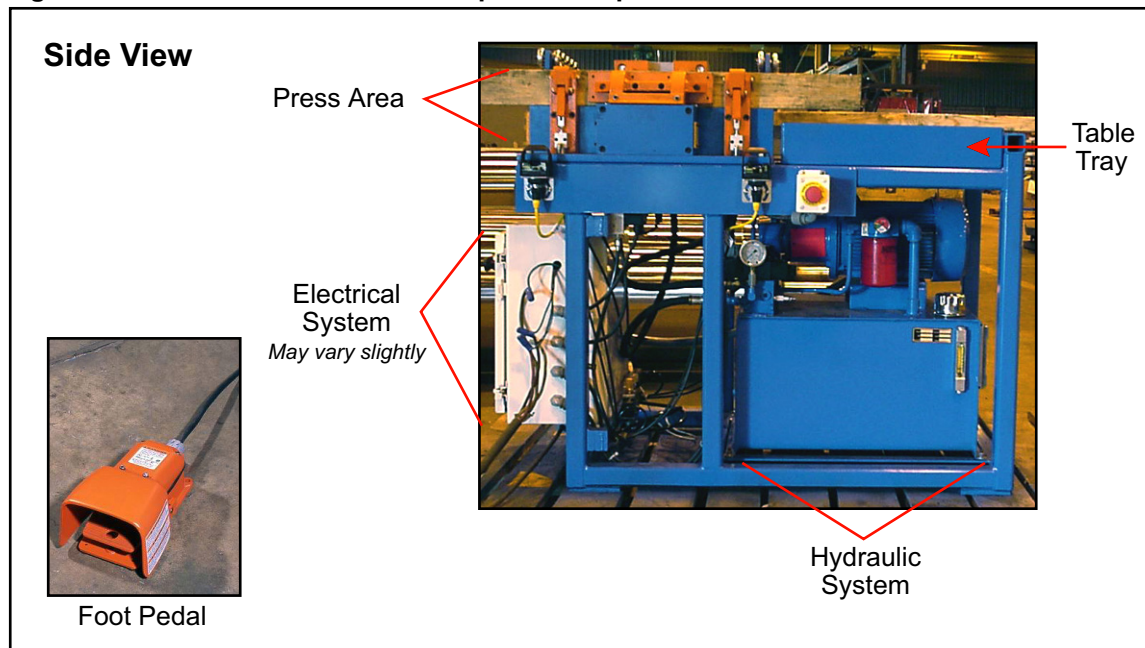


Table 1-2: General Specifications

GENERAL			
Dimensions After Installation	Length	54"	
	Depth	30" plus 8" extension @ skatewheels	
	Height	36" at tray, 45" at skatewheels	
Approx. Shipping Weight		1650 lb	
Lumber Width x Height		standard dimensions of 2x4 lumber	
Distance Between Clamps		17" center-to-center	
Press Platens (magnetic)		12-1/8" x 3"	
Connector Plates Required	Max. Size	12"x3"	
	Min. Size	N/A	
	Thickness	18 gauge high-strength (18HS) 20 gauge	
Min. Board Length	Before Splicing	N/A	Boards less than 17" long will not reach the clamps
	After Splicing	N/A	
Max. Board Length	Before Splicing	N/A	May need to support longer boards at ends
	After Splicing	N/A	
HYDRAULIC SYSTEM			
Recommended Hydraulic Oil		See Table 2-4	
Oil Reservoir Capacity		20 gal	
Recommended Operating Pressure		1500 psi	
HPU MOTOR - ELECTRIC			
See Table 2-3			
PNEUMATIC SYSTEM			
See Table 2-5			

Pre-Installation Requirements Overview

Due to the simplicity of installing and assembling this machine, this manual provides comprehensive instructions for the customer to independently complete the installation process. If you complete all requirements discussed in the *Prior to Installation* chapter, the installation process should be simple and seamless.

Before the installation of your machine, you must arrange for, purchase, or assemble every item or procedure discussed in this chapter. Table 2-1 provides an overview of the items that the customer must satisfy before the machine is installed. Each item is explained in the text following the table.

Table 2-1: Pre-Install Requirements

Space	The machine requires enough space to allow for the machine dimensions listed in Table 2-2 plus additional working space for operation and maintenance plus adequate space for optional equipment. Space should have adequate lighting.
Location	A level concrete floor is recommended. The machine should be enclosed to provide adequate protection from the elements, including adequate heating and ventilation to protect against extreme temperatures.
Electrical	The standard electrical requirements are shown in Table 2-3.
Hydraulic Oil	Customers must have enough oil on hand to fill the reservoir plus all of the hydraulic lines with a recommended oil. See Table 2-4.
Compressed Air	The pneumatic system requires a minimum amount of air pressure and air lines. Refer to Table 2-5.
Customer-Supplied Parts	It is the customer's responsibility to have the supplies listed in Table 2-6 on hand at the time of installation.

Space Requirements

Adequate space must be allocated for the Lumber Splicer and its accessories, and for safe operation and maintenance of the equipment. Refer to the guidelines below when planning your space allocation. *MiTek* will assist in plant layout and space utilization upon request.

Space for the Machine

It is the customer's responsibility to provide adequate space for the installation, operation, and protection of the Lumber Splicer. Physical space requirements are shown in Table 2-2, but additional space is required for operation, maintenance, and optional equipment.

Table 2-2: Dimensions After Installation

Dimension	Measurement at Machine Frame	Measurement at Skatewheel Rail
Length	54"	—
Depth	30"	38"
Height	36"	45"

Space for Operation and Maintenance

Additional space must be allocated for operation and maintenance. Operation space should provide safety, freedom of movement, storage, free flow of raw and finished materials, and ease of handling and shipping. Adequate space must be allowed on the infeed side to maneuver the boards into the clamps and for the operator to stand.

Space for Infeed and Outfeed Equipment

Additional space is required on the operator side and exit side of the machine. The customer needs to place a cart, table, or conveyor on both the operator and exit sides to hold the lumber before and after it is spliced.

Location Requirements

Floor Structure

A level, concrete floor is recommended to support this equipment. MiTek cannot guarantee the quality of the splice without a level, concrete surface directly beneath the machine.

Environment

The building to house the Lumber Splicer should be completely enclosed and provide adequate protection from the elements. Open-sided or shed-type buildings are not considered sufficient protection for this equipment. The *MiTek* warranty will be voided if equipment is used outdoors or without adequate temperature protection.

The machine should be installed in a well-lit area for proper operation, maintenance, and safety.

Electrical Requirements

The standard electrical requirements are shown in Table 2-3. Check the voltage at the location where the Lumber Splicer will operate as soon as possible and notify MiTek immediately if the electrical requirements can not be met. Certain revisions can be made to the machine to meet your electrical requirements before shipment occurs.

Table 2-3: Electrical Requirements Prior to Installation

Number of Electric Motors		1
Horsepower		5 hp
Voltage	Standard	230 VAC
	Option 1	208 VAC (requires 3 transformers, MiTek PN 509184)
	Option 2	460 VAC (requires 1 transformer, MiTek PN 509182)
Amperage (full-load)		14 amps at 230 VAC
Cycles (Frequency)		60
Phases		3-phase
Starting Switch		Full voltage
Electrical Protection on Machine at Disconnect Switch (supplied)		25-amp time-delay fuses (3)

Hydraulic Oil Requirements

The customer must have enough hydraulic oil to fill the reservoir and hydraulic lines for the initial charge.

Table 2-4: Hydraulic Oils Specification

Reservoir Capacity	20 gallons
Temperature	Operating temperatures shall not exceed 135°F
Grade of oil	ISO 68
Viscosity	97-450 SUS at 100°F
Recommended Oil	DTE 26 or equivalent

Compressed Air Requirements

The clamps are controlled by a pneumatic system powered by compressed air. The customer must supply the air source, and it must meet the minimum requirements shown in Table 2-5. Supplying and hooking up the compressed air is the customer's responsibility. You will need to determine the exact location of the compressed air source, the distance to the required drop points, and the hose and connection supplies required to install the system. Contact your *MiTek* representative for assistance if needed.

Table 2-5: Pneumatic Specifications

Air Source Tank (min.)	Pressure (min.)	Air Lines	Fitting
60 gal	80 psi	Minimum of 3/8" diameter pipe between air source and pneumatic connection.	1/4" 3-series industrial interchange

Customer-Supplied Parts

It is the customer's responsibility to supply all of the parts listed in Table 2-6 at the time of installation.

Table 2-6: Customer-Supplied Parts

Item	Description
Compressed Air Hose and Fittings	Piping or hose is required to connect the compressed air source to the equipment. The customer is responsible for supplying the air source and all supplies needed to connect the air source to the machine. See Table 2-5.
Electrical Wire and Fittings	All supplies needed for mounting, wiring, and connecting the main power source to the electrical enclosure on the machine are the customer's responsibility. MiTek supplies the overcurrent protection fuses. Refer to the electrical drawings and Table 2-3 for fuse information. It is also the customer's responsibility to provide a straight connector to bring the power cable through the wall of the electrical enclosure.
Transport Equipment	A one-ton capacity forklift or truck wrecker is needed to move the equipment from the truck to its exact location.

Due to the simplicity of installing and assembling this machine, this manual provides comprehensive instructions for the customer to independently complete the installation process. Follow the instructions in the *Installation* chapter to assemble and install your machine.

Before beginning the installation, read and complete all requirements in the *Prior to Installation* chapter.

Delivery

Unloading

It is the customer's responsibility to provide equipment and labor for unloading, placement, and wiring of the Lumber Splicer. Exercise extreme caution to avoid damage or misalignment during handling. Do not apply pressure on any moving parts or fittings. Support the weight at the bottom of the machine base.

A heavy-duty forklift with a capacity of one ton or greater will be required to move the machine during unloading and placement. If you have questions regarding the unloading or placement process, please contact your *MiTek* representative

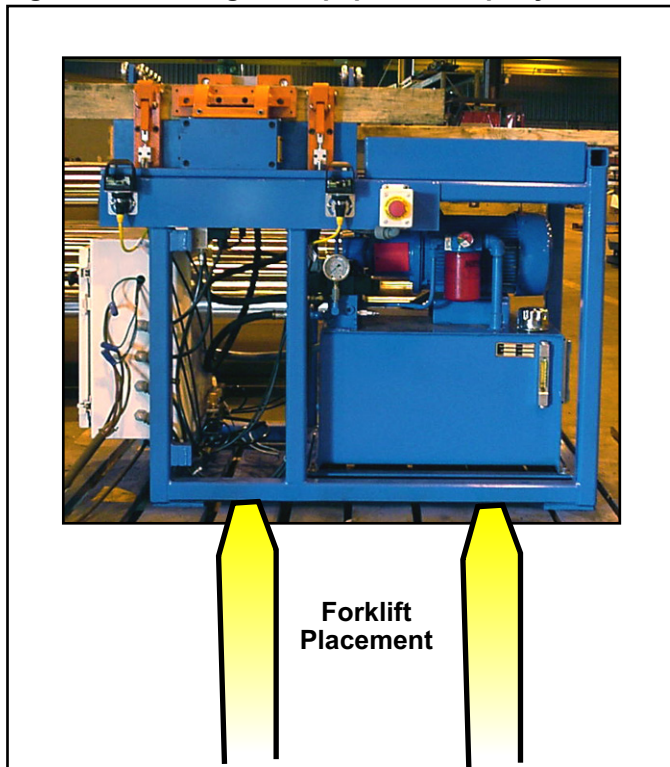
	CAUTION
	Chains used to lift and unload the equipment must be rated appropriately to lift 1700 lb. If a chain breaks while moving equipment, personal injury and equipment damage may result.

Unpacking

After successful unloading, remove the protective crating material from the pallets. Detach and set aside any loose parts. Move the equipment to the desired location using an appropriately rated forklift or crane. If using a forklift, refer to Figure 3-1.

The machine may be mounted to 4x4 lumber for shipping purposes only. Lift the equipment to remove the pallet and the 4x4 lumber, and gently place the machine in its operating location.

Figure 3-1: Moving the Equipment Properly



Electrical Connections

WARNING	
	Electrical hazard!
	All electrical work must be performed by a qualified electrician.
	Follow approved lockout and tagout procedures (OSHA 29 CFR 1910.147).

See Table 2-3 in the *Prior to Installation* chapter for the electrical requirements.

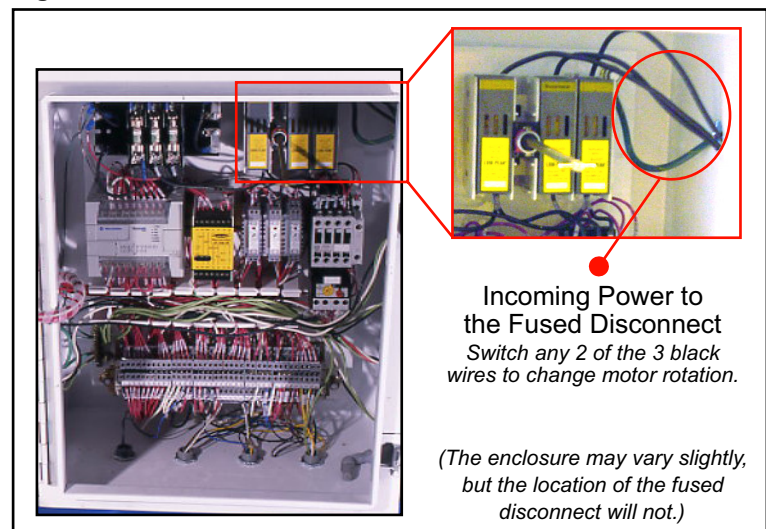
All supplies needed for mounting, wiring, and connecting the main power source to the Lumber Splicer's electrical enclosure are the customer's responsibility. Refer to the electrical drawings and Table 2-3 for full-load current and voltage information.

Time-delay fuses are used as over-current protection devices at the fused disconnect inside the electrical enclosure. Connect the main power source to the three fuses shown in Figure 3-2. Secure the incoming wires to the enclosure using a customer-supplied straight connector. The grounding lug is to the right of the fuses.

If your incoming power wires require a larger hole in the side of the enclosure, drill the hole to the correct size.

For 208 VAC or 460 VAC, one or more transformers are required to change the voltage from 230 VAC to match your voltage. Refer to Table 2-3.

Figure 3-2: Electrical Enclosure



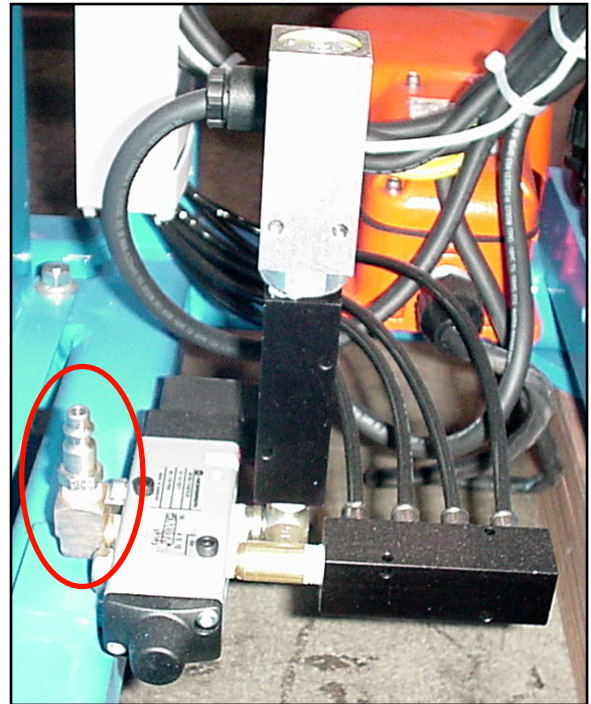
Pneumatic System

The pneumatic system controls the clamping device on the machine. For the minimum specifications required of the customer-supplied air source, refer to Table 2-5 in the *Prior to Installation* chapter.

Connect your air source to the 1/4-in. 3-series industrial interchange on the air block. It is circled in Figure 3-3.

You can unscrew the supplied fitting and replace it with your own NPT fitting if you prefer.

Figure 3-3: Connecting the Air Source



DANGER	
	Do not attempt to start the system without completing the procedures in the <i>Startup</i> chapter. Serious injury and/or equipment damage may result.

	DANGER
	Test the items discussed in this chapter before operating the machine to avoid injury and equipment damage.

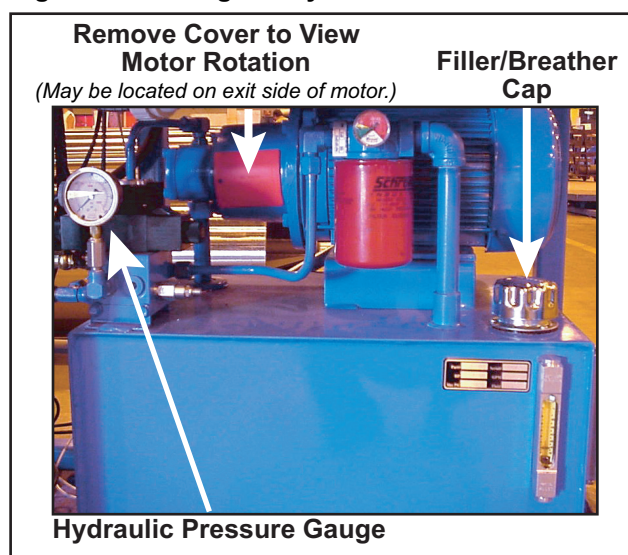
Adding Hydraulic Oil

	CAUTION
	Hydraulic tank must be filled with fluid before starting machine. Running the pump without fluid will damage the pump.

The reservoir holds approximately 20 gallons. Use the hydraulic oil recommended in Table 2-4 in the *Prior to Installation* chapter to fill the hydraulic reservoir using the following procedure.

1. Unscrew the filler/breather cap.
2. If pumping oil into the reservoir at a high rate of speed, remove the screen over the opening.
 - a) Remove the screws around the top edge of the screen.
 - b) Set the screen on a clean, dry surface free of lint.
3. Pour a recommended oil into the hydraulic oil reservoir until the reservoir is full, within approximately 2 in. from the top.
4. Replace the screen to prevent debris from falling into the reservoir if the cap is removed.
5. Replace the cap immediately

Figure 4-1: Filling the Hydraulic Reservoir



Checking the Motor Rotation

The motor must turn in the direction indicated on the motor. The following procedure describes how to check and adjust the motor rotation.

1. Fill the hydraulic oil reservoir before starting the machine. Refer to the *Adding Hydraulic Oil* section. **Do not attempt to start the motor without adding oil first!**

WARNING	
	Electrical Hazard!
	All electrical work must be performed by a qualified electrician.
	Follow approved lockout and tagout procedures (OSHA 29 CFR 1910.147).

2. Check the hydraulic power unit motor rotation.
 - a) Remove the orange cover on the hydraulic motor by pulling it out and away from the motor. See Figure 4-1.
 - b) Start the power unit motor.
 - 1) Turn the disconnect handle to the ON position.
 - 2) Turn the selector switch on the electrical enclosure to MAN. (manual).
 - 3) Press the green pushbutton on the electrical enclosure marked START.
 - c) View the direction the motor is turning through the hole under the orange cover.
 - d) Compare the direction of the motor rotation with the red arrow on the end of the motor indicating the correct rotation.
3. If the rotation is incorrect, adjust it.
 - a) Disconnect power to make the adjustment.
 - 1) Activate an emergency stop.
 - 2) Disconnect power at the main power source to the machine. Before opening the electrical enclosure, follow all lockout and tagout procedures to ensure power is disconnected.
 - b) Open the electrical enclosure and switch any two of the three wires extending from the top of the fused disconnect shown in Figure 3-2.
 - c) Restore power to the machine.
 - d) Restart the motor and recheck the rotation.
4. Check for leaks before operating the machine.

Checking the Hydraulic Pressure

The hydraulic pressure switch is set to 1500 psi at MiTek. If you want to verify that the pressure is correct, read the pressure gauge shown in Figure 4-1. If the pressure is incorrect, refer to the *Maintenance* chapter to adjust it.

Checking the Pneumatic Pressure

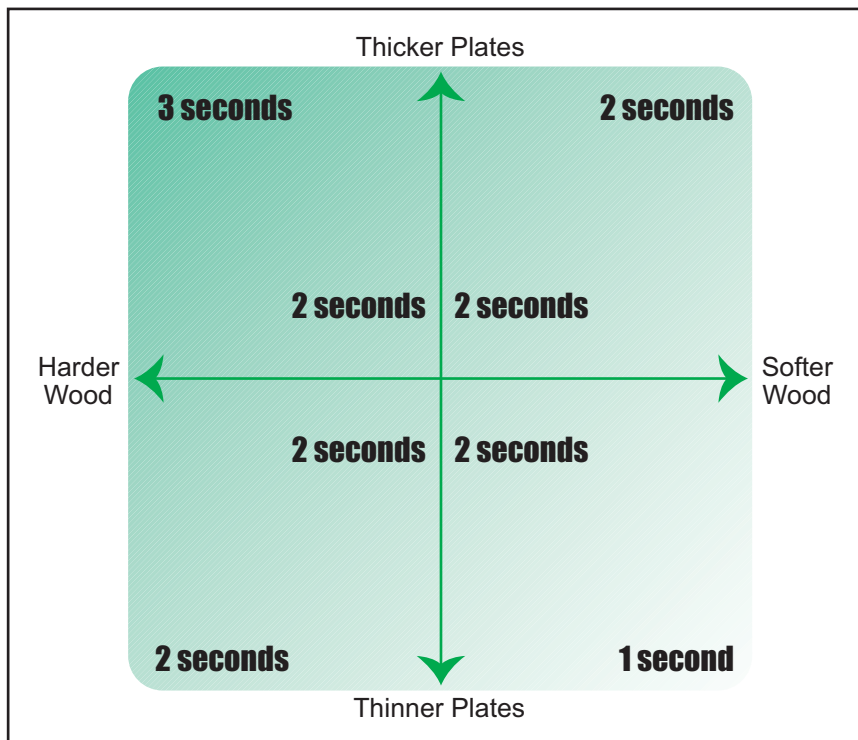
The pneumatic pressure switch is set to 60 psi at MiTek. If the pressure is incorrect, refer to the *Maintenance* chapter to adjust it.

Checking the Press Dwell Time

Depending on the plate you are using and the type of wood being spliced, the press dwell time may need to be adjusted. During the startup phase, operate the machine with the same lumber and plates you expect to use in normal production. If the machine is not pressing the plates in completely and evenly, the press dwell time should be increased. If you are using soft pine and 20-gauge plates, you may be able to decrease the dwell time to speed up the operation.

To adjust the press dwell time, refer to *Adjusting the Press Dwell Time* in the *Maintenance* chapter.

Figure 4-2: Dwell Times Needed for the Pressing Operation



Machine Capabilities and Features

	DANGER
	Read this manual completely before using this equipment! Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual. All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury. This manual must always be available to personnel operating and maintaining this equipment.

Once the installation and startup procedures are complete, the press is ready to operate. The Lumber Splicer is capable of splicing together two pieces of 2x4 lumber, end-to-end. Any *MiTek* connector plate that is 18-gauge high-strength steel or 20-gauge steel and has dimensions equal to or less than 12x3 in. can be used. The machine features a foot pedal that operates the clamps to hold the material in place and dual photoelectric touch buttons that control the pressing function. With this design, both sides are pressed simultaneously. Review the rest of this chapter for detailed instructions on operating this equipment.

Turning Off Power

E-Stops

Emergency stops (E-stops) immediately remove power to the hydraulic system and control circuits on the machine. The E-stops are used to turn off the machine during normal use as well as in emergency situations. There are two mushroom-shaped E-stop buttons. One is on the electrical enclosure door and the other is on the front (operator side) of the machine. **Note that when the disconnect handle is off, live power is still present on the line side of the disconnect switch.**

**Figure 5-1:
E-stop**



To activate an E-stop, push in the button. To restart the machine, you must release the E-stop by pulling straight out. Both E-stops must be in the released position to start the machine.

Disconnect Handle

The disconnect handle is on the electrical enclosure. It blocks electrical power from continuing into the electrical system, past the point of the fused disconnect. It must be turned off before performing any adjustments or maintenance to this equipment. **Note that when the disconnect handle is off, live power is still present on the line side of the disconnect switch.**

Operating Overview

DANGER	
	Ensure all personnel and equipment are clear of moving parts before turning on the press.

Choosing Connector Plates

The Lumber Splicer is designed to work with *MiTek* 20-gauge connector plates and 18-gauge high-strength connector plates up to a maximum size of 12x3 in.

Overview of the Equipment

Refer to Figure 5-2 and Figure 5-3 to see the operating controls. Indicators and buttons on the front of the electrical enclosure allow the operator and machine to communicate. The primary operating controls are a foot pedal, which controls the clamps, and two (2) optical touch buttons. The dual optical touch buttons are touch-activated photoelectric switches that must be touched within 1/2 second of each other for the pressing to occur. The touch buttons activate when the operator's hands break an optical light beam, so there is no need to apply pressure to the buttons with your hands.

Figure 5-2: Operating Controls and Indicators on the Electrical Enclosure

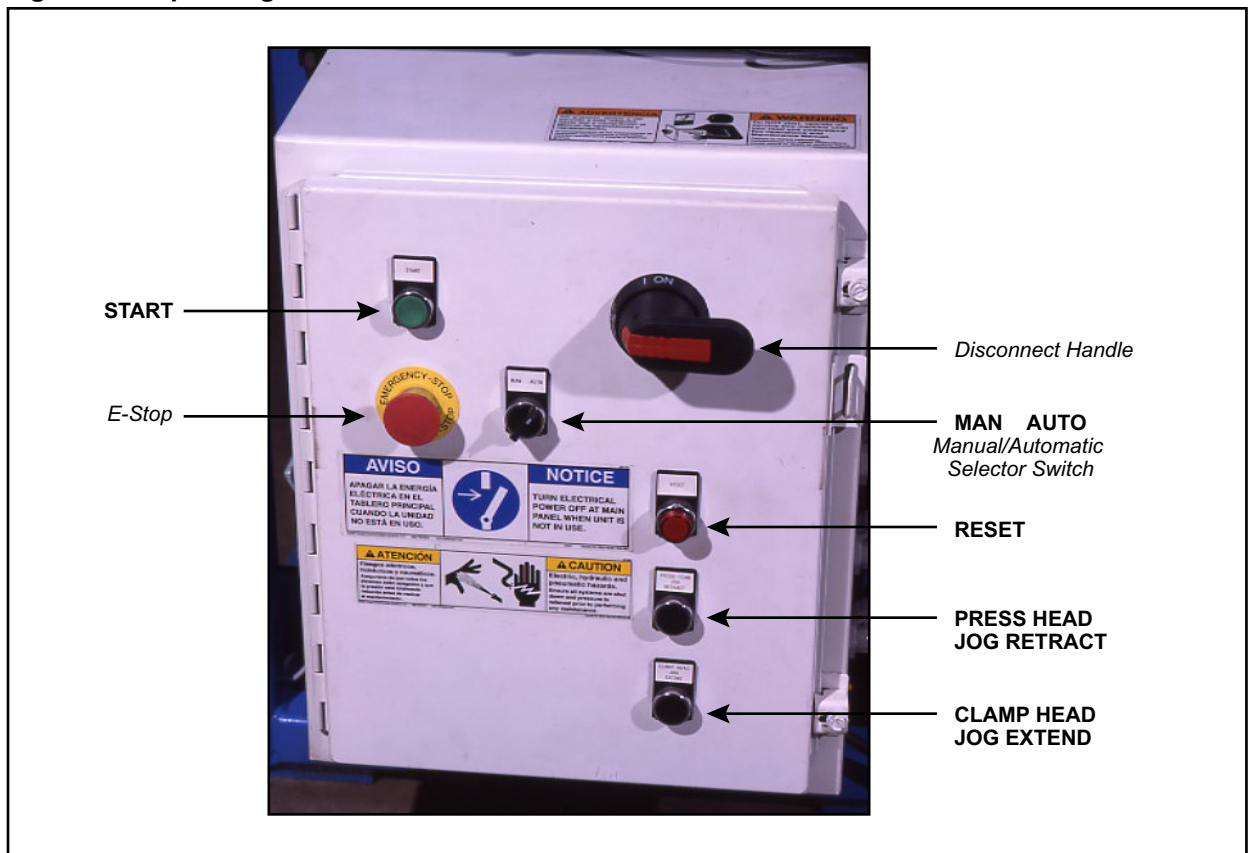


Table 5-1: Description of the Operating Controls and Indicators

Button or Switch	Function
Start	Starts the hydraulic system and allows the electrical system to begin communication
E-Stop	Stops all motion; a second E-stop is near the touch buttons
Disconnect Handle	When in the OFF position, stops all incoming power at the enclosure
Man/Auto	Selector switch that places the machine in manual or automatic mode
Reset	Not applicable on the current model
Press Head Jog Retract	Must be in manual mode to use; retracts press cylinders to their resting position
Clamp Head Jog Extend	Must be in manual mode; holding button in extends clamps and releasing buttons retracts clamps to their resting position
Foot Pedal	Must be in automatic mode
Dual Optical Touch Buttons	Located on the floor in front of the machine, operates the clamps
	Located on the front of the machine; operates the pressing function

Quick Start Operation

1. Turn the disconnect handle located on the electrical enclosure to the ON position.
2. Press the green START button located on the electrical enclosure.
3. Turn the MAN-AUTO selector switch to AUTO (automatic).
4. Place a connector plate on each of the two (2) press platens, so the teeth are facing each other. The magnetic platens will hold them in place. Position the plates so they are approximately centered on each platen. A guideline on the top edge of each platen shows the horizontal center.
5. Place the two pieces of lumber between the two platens in the following configuration:
 - Both boards are horizontal.
 - The seam between the two boards is at the platens' horizontal center.
 - The 3 1/2-in. side of the board is facing the operator.
6. Hold both pieces of lumber by placing one hand on the outside of each clamp. Keep your hands away from the clamps and the press platens.



This procedure is illustrated in Figure 5-3.

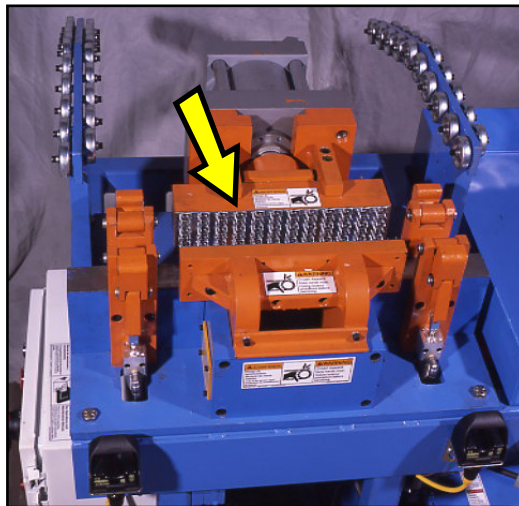
WARNING	
	The clamps and the press platens can crush or cut!
	Keep hands and body parts away from clamps and platens at all times.
	Be aware of the location of other personnel before activating the clamping or pressing features.
	The touch buttons require very little pressure. When the touch buttons sense both hands, the pressing function begins immediately.

7. Press the foot pedal to activate the clamps that hold the lumber in place.
8. Touch both touch buttons at the same time using one hand on each.
 - a) Both platens move in and press both plates into the lumber simultaneously.
 - b) After the connector plates are pressed, the clamps release automatically.
9. Pick up the spliced board and place it on the skatewheel rails.
10. Release the spliced lumber and it will slide down to the outfeed equipment.

A person, conveyor, table, or cart must be available to catch the spliced lumber from the skatewheel rail.

Figure 5-3: Operating the Lumber Splicer

1

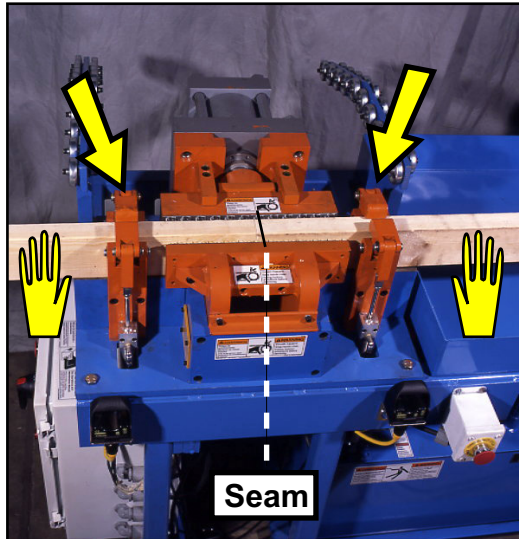


Place one connector plate on each magnetic platen.

Only one is showing in the photo.

Place the lumber between the platens as shown in Step 2, holding the boards at the yellow hands.

2



Hold the lumber until the clamps close around the lumber.

3



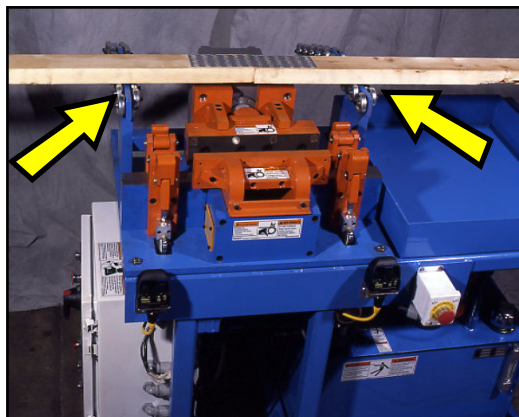
Press the foot pedal to activate the clamps.

4



Touch both touch buttons simultaneously to activate the pressing motion.

5



After the plates are pressed, remove the lumber from the pressing area and place it on the skatewheel rails for exiting.

Operating Functions

To manually retract the press head:

1. Turn the selector switch on the front of the electrical enclosure to MAN (manual mode).
2. Press the PRESS HEAD JOG RETRACT button.
3. Release the button when the press head is at the desired position.

To clamp a board without pressing plates into it:

1. Turn the selector switch on the front of the electrical enclosure to MAN (manual mode).
2. Press the CLAMP HEAD JOG EXTEND button.
3. Continue to depress the button until you are done with the clamps.
4. When you release the button, the clamps retract immediately and release the lumber.

To start a new cycle without completing the previous cycle:

There are two (2) methods for resetting the sequence of a cycle while in automatic mode.

1. Using an E-stop:
 - a) Push an E-stop button during an automatic cycle. The clamps will immediately retract and release the lumber.
 - b) Pull the E-stop button out to its original position.
 - c) Press the START button and operate as normal.
2. Using the selector switch on the front of the electrical enclosure:
 - a) Turn the selector switch to MAN (manual mode). The clamps will immediately retract and release the lumber.
 - b) Turn the selector switch back to AUTO. This restarts the automatic sequence at the beginning of a cycle.

To stop the machine in auto or manual mode:

1. Push an E-stop.
 - The clamps will immediately retract and release the lumber.
 - The hydraulic system will shut down, but the hydraulic cylinder will stop where it is and remain there until the hydraulic power is restored.
2. Release the E-stop before continuing. To release it, pull the button out to its original position.

To stop or jog the press heads only:

When the operator's hands are on both optical touch buttons, the press cylinders extend. If the operator removes one or both hands, the press cylinders stop their motion. To continue the extending motion, return both hands to the optical touch buttons. Continue this intermittent motion quickly to jog the press heads forward.

Infeed and Outfeed Conveyor System

Additional equipment is required on the operator side and exit side of the machine to act as a material handling system. The customer needs to place a cart, table, or conveyor on both the operator and exit sides to hold the lumber before and after it is spliced. Refer to the documentation for your specific infeed/outfeed conveyor system or material handling system for operating instructions.

Operating Software

The PLC (programmable logic controller) controls the operating software by communicating between the operating controls and the components on the machine. For an understanding of how the machine operates, refer to the If-Then columns in Table 5-2.

Table 5-2: Software Operating Sequence in Automatic Mode

Step #	If	Then
	the START button is pressed,	the contactor is closed which turns on the hydraulic system, and the auxiliary contact is closed which begins communication between the PLC and the rest of the electrical system.
	the auxiliary contact is closed,	the software looks for auto or manual mode selection. If AUTO is chosen, the sequence occurs, starting with the first step. If MANUAL is chosen, the software waits for the next instruction.
1	the proximity switch indicates that the press head is retracted,	the software waits for the foot pedal to be pressed.
2	you press the foot pedal,	the clamps extend.
3	the pneumatic pressure switch reaches its setting,	the software waits for the touch buttons to be activated.
4	you activate the touch buttons,	the press platens extend.
5	the hydraulic pressure switch reaches its setting and the dwell time is reached,	the press head retracts.
6	The proximity switch tells the PLC that the press cylinders are retracted,	the clamps automatically retract and release the lumber.
7	the foot pedal is in its relaxed state,	the sequence is ready to start over.

This Lumber Splicer manual contains sufficient information for proper operation and maintenance under most conditions. However, certain operating environments may necessitate additional maintenance at more frequent intervals.

	DANGER
	Read this manual completely before using this equipment! Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual. All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury. This manual must always be available to personnel operating and maintaining this equipment.

Lubrication

No regular lubrication is required on this machine.

Tips for the Hydraulic System

- A **hydraulic and pneumatic systems manual** (titled MITEK SPLICER or T-LOK SPLICER) is provided from the hydraulic system manufacturer, John Henry Foster. Refer to that manual for any information regarding the hydraulic system that is not provided in this manual.
- For **replacement parts** for the hydraulic system that are not called out in this section, refer to your drawings or the John Henry Foster manual.



Most hydraulic problems are due to poor preventive maintenance. A large number of service calls are due to easily avoidable issues such as:

- *Insufficient oil in the reservoir*
- *Clogged and dirty oil filters*
- *Loose intake lines*
- *Improper grades of oil*

Up to 70% of all hydraulic problems are traced back to the fluid. Sampling and testing fluid periodically is necessary to obtain reliable performance.

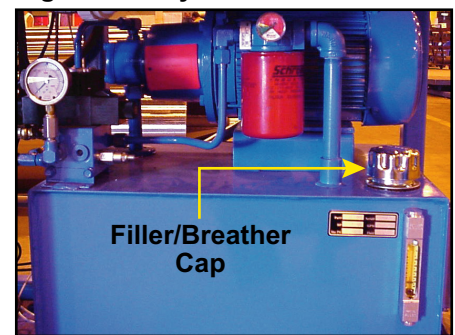
Hydraulic Oil

Checking and Filling the Hydraulic Oil

Check the hydraulic oil level daily by viewing the sight gauge attached to the reservoir. It is located on either the end or the side of the reservoir. When the reservoir is less than half full, fill it with a recommended oil listed in Table 6-1. The reservoir should be filled to within approximately 2 in. from the top of the tank.

1. Unscrew the filler/breather cap shown in Figure 6-1.
2. If pumping oil into the reservoir at a high rate of speed, remove the screen over the opening.
 - a) Remove the screws around the top edge of the screen.
 - b) Set the screen on a clean, dry surface free of lint.
3. Pour an oil recommended in Table 6-1 into the hydraulic oil reservoir until the reservoir is full, within approximately 2 in. from the top.
4. Replace the screen to prevent debris from falling into the reservoir if the cap is removed.
5. Replace the cap immediately.

Figure 6-1: Hydraulic Power Unit



CAUTION	
	Low oil levels can cause equipment damage. If the oil level is continually found to be low, identify the location of the oil loss and repair it.

Table 6-1: Hydraulic Oils Specification

Reservoir Capacity	20 gallons
Temperature	Operating temperatures shall not exceed 135°F
Grade of oil	ISO 68
Viscosity	97-450 SUS at 100°F
Recommended Oil	DTE 26 or equivalent

Changing the Hydraulic Oil

The frequency of hydraulic oil changes depends on the fluid used and the operating conditions involved, but it is recommended that the hydraulic oil be changed at least once a year.

When changing the hydraulic oil, first run the system until the fluid is at operating temperature. This will drain off as much of the dirt and impurities as possible. With all power turned off, drain the contaminated oil by removing the 3/4-in. NPT drain plug at the bottom of the reservoir. After all oil has drained out, replace the drain plug. To replace the oil, use an oil recommended in Table 6-1. Refer to the *Checking and Filling the Hydraulic Oil* section for instructions on adding oil.



The reservoir holds 20 gallons of hydraulic oil. The volume needed to fill the hydraulic lines varies with each system. Ensure there is an adequate amount of oil in stock to refill the reservoir and lines before beginning the oil changing procedure.

In general, fluid should be changed when contaminated with water or dirt. Periodic laboratory analysis is the most accurate method to determine when and how often fluid should be changed. The supplier can often run these tests, or check the condition of the used oil. A trained maintenance mechanic can quickly determine the fluid level in the reservoir sight gauge and possible water contamination. Dirt and discolored oil both indicate that the oil should be changed. Additional indicators that the fluid must be changed are unusual noises, excessive temperatures, excessive vibration, leaking lines and fittings, and oil deposits on or around the machine.

Replacing the Return Line Filter Element

The return line filter may be a *Schroeder* or *Hydrocraft* brand, but both can use a 10-micron *Schroeder P-10* replacement element. The part number can be found in the *Replacement Parts* appendix.

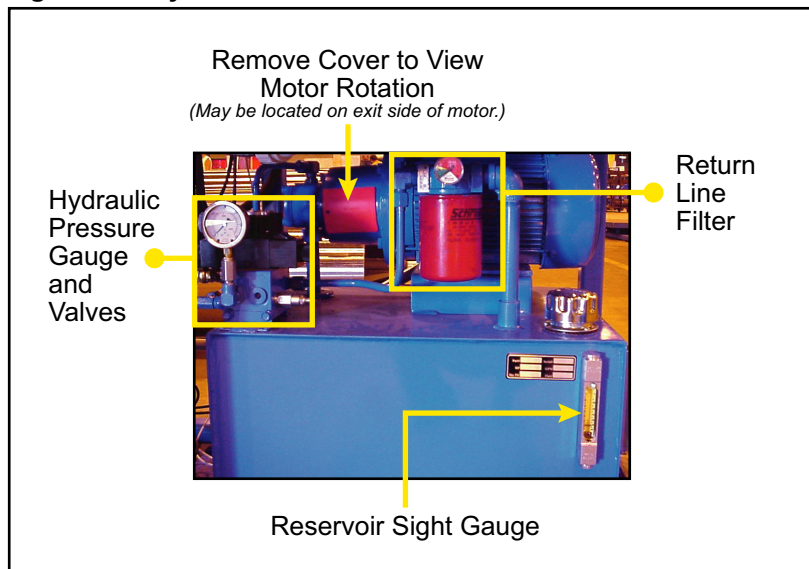
For machines without a filter gauge, replace the return line filter element every six (6) months. If your machine has a filter gauge, replace the filter element before the needle enters the red area on the gauge. To replace the element only, refer to Figure 6-2 and the procedure below.

1. Unscrew the entire canister housing the element from the filter assembly.
2. Dispose of the canister according to local environmental laws. Be careful not to spill oil out of the used canister.
3. Screw a new canister onto the threaded filter head.

Figure 6-2: Return Line Filter



Figure 6-3: Hydraulic Power Unit



Replacing the Oil Filter Assembly

Your original return line filter may be a *Schroeder* or *Hydrocraft* brand. A *Schroeder* filter assembly is shown in Figure 6-3. Both brands can be replaced with the *Hydrocraft* brand if the entire filter assembly needs to be replaced. The replacement part number can be found in the *Replacement Parts* appendix.

1. Remove the filter element by unscrewing the canister from the filter assembly.
2. Unscrew the filter assembly head from the NPT ports on both sides.
3. Screw a new filter assembly head onto both NPT ports and replace the canister.

Replacing the Reservoir Sight Gauge

If the reservoir sight gauge breaks or oil starts leaking out around the gauge, refer to the *Replacement Parts* appendix for the part number to replace the sight gauge.

Drain the reservoir before attempting to replace the sight gauge.

Hydraulic System

Adjusting the Hydraulic Pressure

The hydraulic relief valve limits the maximum pressure the system will allow. When this pressure is exceeded, the relief valve diverts flow back to the reservoir. The recommended setting for the relief valve is 1800 psi.

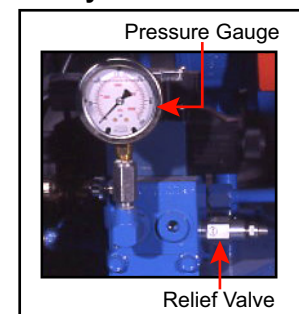
The hydraulic pressure switch allows for the optimum operating pressure. The recommended setting for the hydraulic pressure switch is 1500 psi. It must be set at a lower pressure than the hydraulic relief valve setting.

Follow the procedure below to adjust the hydraulic system pressure.

WARNING	
	Pressurized devices.
	Do not set the hydraulic relief valve at a pressure higher than 1800 psi.
	Always set the hydraulic pressure switch at a lower pressure than the hydraulic relief valve.

1. Locate the hydraulic pressure switch on the machine. For help with locating the pressure switch, refer to the *Pressure Switches* section later in this chapter.
2. Turn the locking screw with a small, slotted screwdriver to unlock the setting dial.
3. Using a 5-mm Allen wrench, turn the setting dial clockwise until it bottoms out. The dial is on top of the pressure switch block.
4. Follow regular operating procedures to perform the splicing operation. The machine attempts to complete the cycle, but stops once the press cylinder has extended because the switch contact closure is now set at the maximum setting.
5. With the machine on and the hydraulic power unit running (you must press the START button), locate the hydraulic relief valve and pressure gauge. They are shown in Figure 6-3.
6. Read the pressure gauge. If the gauge reads 1800 psi, the relief valve is already set at the maximum safe operating pressure and you may proceed to step 9.

Figure 6-4: Adjusting the Hydraulic Pressure



7. If the gauge reads something other than 1800 psi, continue with the remaining steps to adjust the relief valve pressure.

	CAUTION
	Pressurized device. Do not operate the machine at a pressure above 1800 psi.

8. Adjust the pressure relief valve.
 - a) Loosen the lock nut on the relief valve.
 - b) Using an Allen wrench, turn the relief valve clockwise to increase pressure or counter-clockwise to decrease pressure. The pressure gauge will respond to the adjustment of the relief valve.
 - c) When the gauge reads 1800 psi, tighten the relief valve lock nut.
9. Adjust the hydraulic pressure switch.
 - a) Slowly turn the hydraulic pressure switch counter-clockwise until the pressing cylinder responds by retracting.
 - b) Tighten the locking screw.
10. The machine is now ready for normal operation.

Replacing the Hydraulic Relief Valve

If the hydraulic pressure causes the press platens to extend but does not release them to retract, the hydraulic relief valve may require repair or replacement. Refer to the *Replacing Seals and Gaskets* section later in this chapter to repair the relief valve. Follow the procedure below to replace it.

1. Turn all power off so the press head is fully retracted and the pressure is relieved from the valve.
2. Make sure the pressure gauge shows “0” before continuing.
3. Unscrew the valve from its threaded port.
4. Screw the replacement valve in its place.

Refer to the *Replacement Parts* appendix for the part number of the valve.

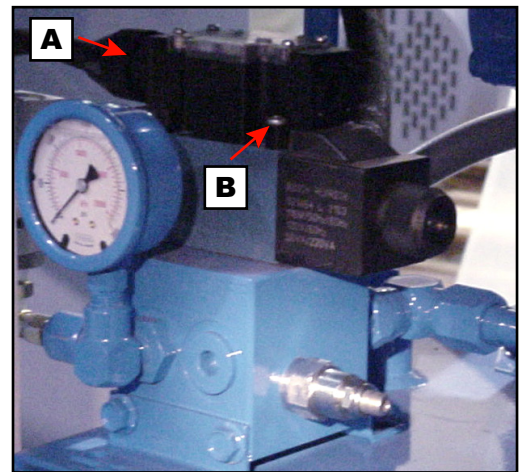
Replacing the Hydraulic Directional Control Valve

The hydraulic system's directional control valve is a direct-operated, solenoid-controlled directional spool valve. It is located near the hydraulic pressure gauge and relief valve.

Replace the hydraulic directional control valve if the hydraulic pressure is incorrect or the press head will not retract and all other reasons have been ruled out. Refer to the following procedure.

1. Turn all power off so the press head is fully retracted and the pressure is relieved from the relief valve.
2. Make sure the pressure gauge shows "0" before continuing.
3. Remove the electrical connection labeled "A" in Figure 6-5.
4. Remove the valve by unscrewing the four (4) screws labeled "B".
5. Reverse the steps above to install the new hydraulic directional control valve.

Figure 6-5: Removing the Control Valve



Adjusting the Press Cylinder

There is one (1) hydraulic press cylinder on this machine. There are no cushion adjustments on the press cylinder. The only adjustment that may be required is to adjust the pressure used by the press cylinders. To adjust the hydraulic pressure, refer to the *Adjusting the Hydraulic Pressure* section earlier in this chapter.

Adjusting the Press Dwell Time

The dwell time is the amount of time that the press platens remain in an extended position after the press cylinder reaches its maximum pressure. Dwell time is actually a function of the PLC, but it affects the pressing function. To adjust the press dwell time, follow the procedure below, referring to Figure 6-6 and Figure 6-7.

1. Open the PLC cover shown in Figure 6-6.
2. Using a small slotted screwdriver, turn the trim pot, labeled “0”, in the desired direction.
 - a) Turning it clockwise **increases** the dwell time, with a maximum setting of three (3) seconds.
 - b) Turning it counterclockwise **decreases** the dwell time, with a minimum setting of zero (0) seconds.

Figure 6-6: Adjusting the Press Dwell Setting

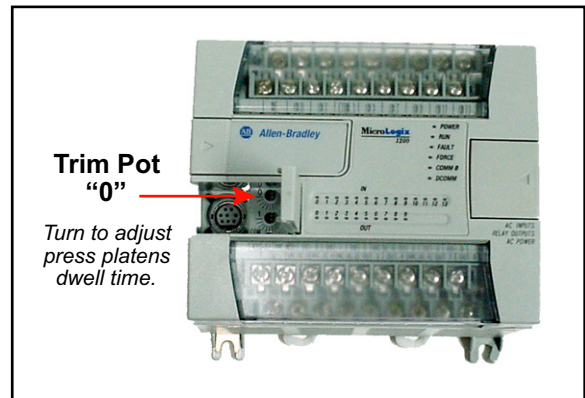
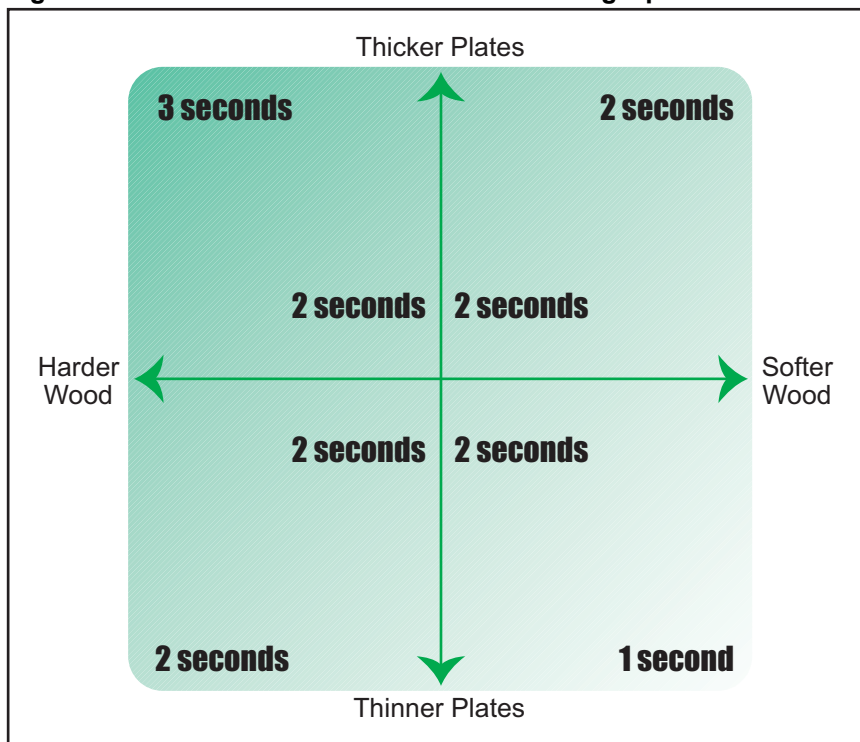


Figure 6-7: Dwell Times Needed for the Pressing Operation



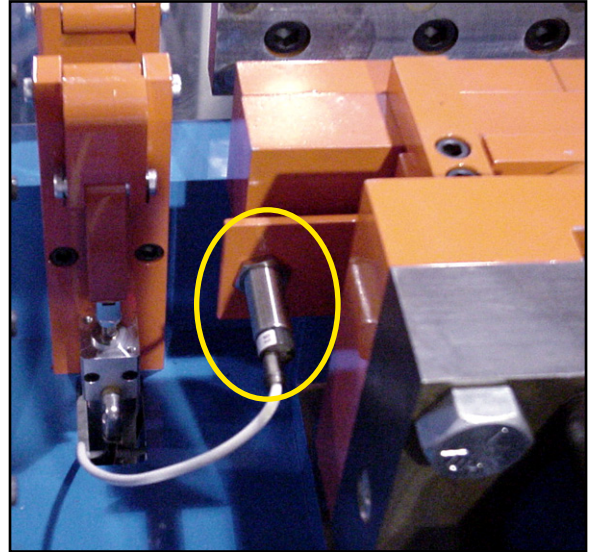
Replacing the Proximity Switch

There is one (1) proximity switch (prox switch) that tells the PLC when the press head is fully retracted. It is circled in Figure 6-8, between the press head and the clamp, on one side only. When the proximity switch senses the press head is fully retracted, the LED indicator will light up in yellow. If this switch is not working, the automatic mode will not be able to complete its sequence.

To replace the proximity switch, remove the wire, unscrew the switch from its threaded fitting, and screw a new proximity switch in place. Its maximum sensing range is .197 in., so the sensing end of the proximity switch must be less than .197 in. from the press head.

Refer to the *Replacement Parts* appendix for the part number.

Figure 6-8: Proximity Switch



Replacing the Press Cylinder

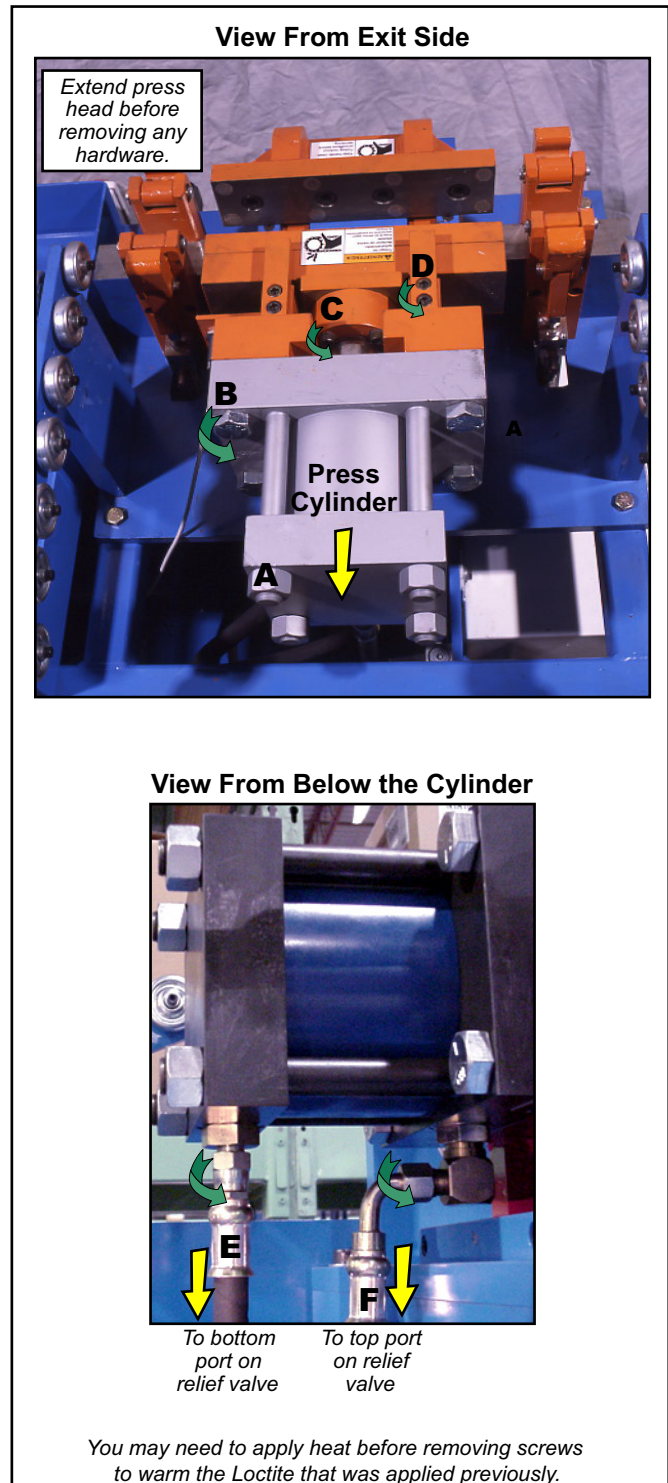


Blue Loctite should be used on all threaded connections.

Refer to Figure 6-9 to replace the press cylinder.

1. Extend the press head until you can reach all four (4) screws on the split collar (C).
 - a) Turn the disconnect handle to the ON position.
 - b) Press the green START button.
 - c) Turn the selector switch to MAN (manual).
 - d) Press both touch buttons simultaneously until the press platens are at the desired location.
 - e) Release the touch buttons and the press platens will stop.
2. Turn the disconnect handle to the OFF position and lockout/tagout all power to the machine.
3. Place a bucket under the press cylinder to catch the hydraulic oil as you remove the hoses.
4. Make note of which port each hose was attached to and remove the two (2) hoses from the press cylinder. They are labeled “E” and “F” in Figure 6-9.
5. Remove the four (4) screws on the press cylinder labeled “B”.
6. Remove the four (4) screws labeled “D”.

Figure 6-9: Removing the Press Cylinder



7. Pull the cylinder assembly off the machine frame.
8. Remove the four (4) screws labeled “C”.
9. Pull the cylinder off the hub.
10. Reverse the steps above to install the new cylinder.

Refer to Drawing 79720 for a schematic of the hydraulic system. Replacement part numbers can be found in the *Replacement Parts* appendix.

Replacing Seals and Gaskets

Refer to the John Henry Foster hydraulic system manual for instructions.

Refer to the *Replacement Parts* appendix for part numbers to replace the seal kits for the hydraulic cylinder and the hydraulic power unit.

Replacing the Hydraulic Pump and Motor

The pump and motor are connected by a three-piece coupling that is enclosed in a bell housing. You must remove the pump in order to remove the motor. Keep all hardware for the new pump and motor.



You must remove the pump to remove the motor.

1. Remove the pump.
 - a) Disconnect all hoses from the pump.
 - b) Remove the screws from the orange bell housing cover and remove the cover.
 - c) Loosen the set screws between the pump shaft and the coupling.
2. If you need to replace the motor:
 - a) Unscrew the mounting screws at the base of the motor.
 - b) Remove the motor from the base of the machine with a forklift.
3. Perform the following steps to replace the pump or to reinstall the existing pump on a new motor.
 - a) Slide the pump shaft into the coupling.
 - b) Insert the pump mounting screws between the bell housing and the motor.
 - c) Tighten the set screws between the pump shaft and the coupling.
 - d) Replace the bell housing cover.
4. Mount the motor onto the machine base.
 - a) Place the motor on the base of the machine.
 - b) Tighten the mounting screws.
 - c) Slide the bell housing onto the motor shaft and insert the mounting screws.
 - d) Tighten the set screws between the motor shaft and coupling.
5. Replace the bell housing cover.

Replacement part numbers can be found in the *Replacement Parts* appendix.

Pressure Switches

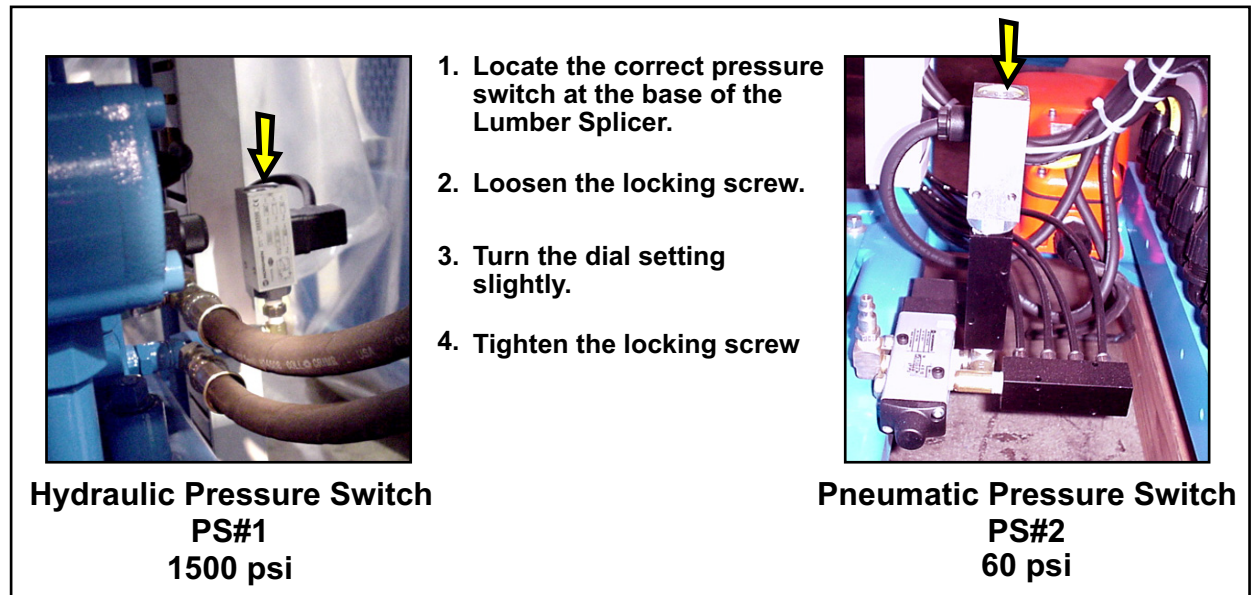
There are two (2) pressure switches on the Lumber Splicer. The hydraulic pressure switch is located under the table near the hydraulic pump. The pneumatic pressure switch is located on the air block near the floor. See Figure 6-10 for the location and pressure setting of each.

Adjusting a Pressure Switch

The hydraulic pressure switch is PS#1. It was set to 1500 psi during manufacturing. If additional adjustment is needed, refer to the *Adjusting the Hydraulic Pressure* section in this chapter.

The pneumatic pressure switch is PS#2. It was set to 60 psi during manufacturing. If additional adjustment is needed, refer to the *Adjusting the Pneumatic Pressure* section in this chapter.

Figure 6-10: Adjusting the Pressure Switches



Replacing a Pressure Switch

To replace a pressure switch, disengage the cable and unscrew the pressure switch from its 1/4-in. NPT port. Screw a new pressure switch into the threaded fitting.

Replacement part numbers can be found in the *Replacement Parts* appendix.

Pneumatic System

The pneumatic system controls the two (2) sets of clamps that hold the lumber in place. There is an extend and retract hose on each of the four (4) clamp cylinders. The recommended air pressure for normal operation is 60 psi.

Adjusting the Pneumatic Cylinders

There are no cushion adjustments on the pneumatic cylinders.

Adjusting the Pneumatic Pressure

The pneumatic pressure switch controls the air pressure. To adjust it, refer to Figure 6-10. The only other variable is the compressor used as the air source. If the pneumatic system does not perform correctly, the problem could be with the source compressor.

Replacing Seals and Gaskets

Refer to the John Henry Foster hydraulic system manual for instructions. This manual also includes pneumatic information.

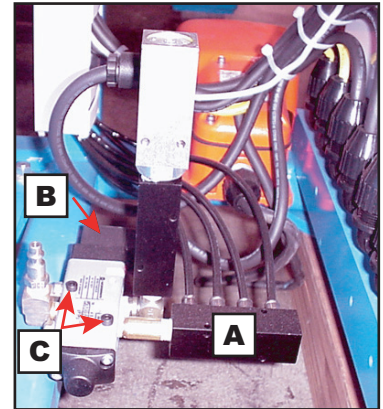
Refer to the *Replacement Parts* appendix for part numbers to replace the seal kits for the pneumatic cylinder.

Replacing the Pneumatic Directional Control Valve

The pneumatic system's directional control valve is a solenoid valve that controls the flow and direction of the air. It requires no adjustment, but you may need to replace the valve if the system is lacking air pressure and all other reasons have been ruled out. The components may be clogged or damaged due to condensation in the lines. To replace the pneumatic directional control valve, perform the following steps.

1. Release air pressure built up in the lines.
 - a) Remove one of the eight (8) hoses from one of the two (2) pneumatic manifolds long enough to release pressure. A manifold is labeled "A" in Figure 6-11.
 - b) Place the hose back on its port to ensure it is on the correct port.
 - c) Repeat the previous two (2) steps for the other seven (7) hoses.
2. Remove the electrical connection from the back of the solenoid valve. It is labeled "B" in Figure 6-11.
3. Unscrew the two (2) screws labeled "C" in Figure 6-11.
4. Remove the directional control valve from its 1/4-in. NPT port.
5. Remove the fitting for your air source from the valve, if necessary.
6. Screw the air source fitting onto the new valve, if necessary.
7. Screw the new valve onto its 1/4-in. NPT port.
8. Replace the electrical connection in the same order it was removed.

Figure 6-11: Pneumatic Directional Control Valve



Refer to Drawing 79720 for a schematic of the air lines. Refer to the *Replacement Parts* appendix for the directional control valve's part number.

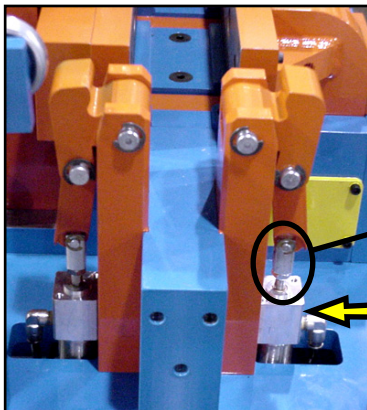
Replacing the Clamp Cylinders

To replace the pneumatic cylinders that control the clamps, perform the following procedure. Refer to the *Replacement Parts* appendix for a part number for the pneumatic cylinders.

1. Turn off all power to the machine and lockout/tagout the machine.
2. Remove the two (2) air hoses. Make note of which port each hose was attached to.
3. Remove the two (2) screws in the cylinder block.
4. Remove the rod clevis. Keep the rod clevis for use with the new cylinders.
5. Remove the faulty cylinder.
6. Reverse the steps to install the new cylinder.

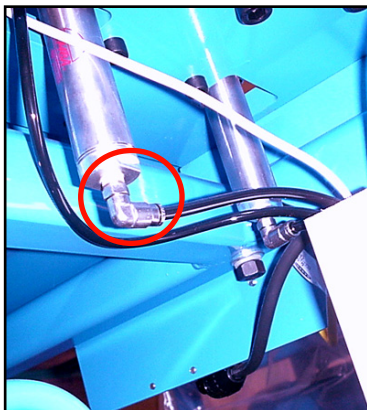
Figure 6-12: Pneumatic Clamps and Cylinders

To Remove the Pneumatic Cylinder from the Clamp:



1. Remove the clevis pin.
(Keep for use with the new cylinder.)
2. Remove the 2 screws.
3. Slide the cylinder down,
through the table.

To Remove the Air Hose from the Pneumatic Cylinder:

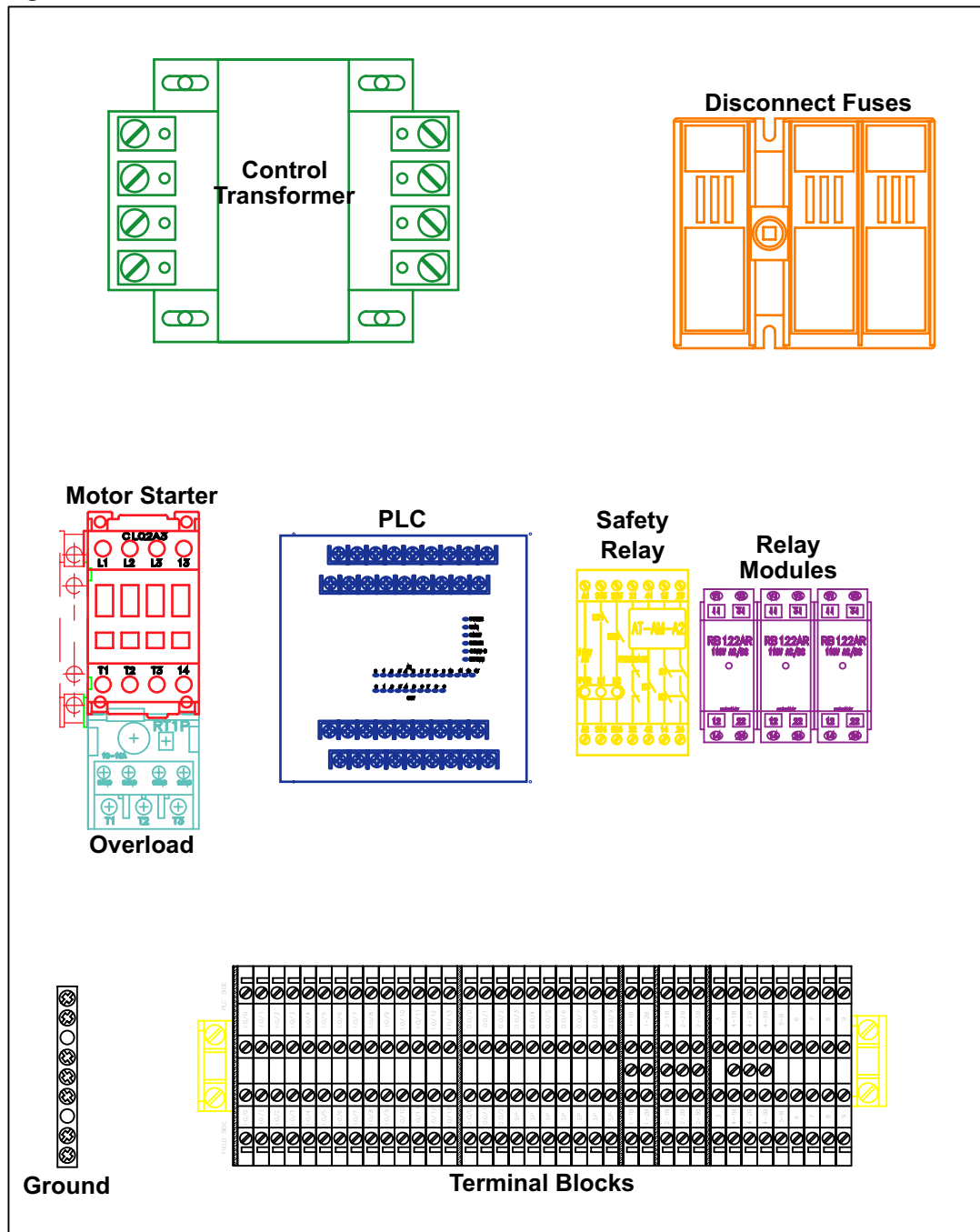


Unscrew the air hose from
the bottom of the cylinder.
(View from under the table.)

Electrical System

Contents of the Electrical Enclosure

Figure 6-13: Electrical Enclosure, Inside



This information can also be found on Drawing 90520, sheet 10.

Replacing Fuses

If a fuse blows, determine which fuse needs to be replaced by noting what functions are not working and referring to the electrical drawings. The part number is shown on the electrical drawings.

Replace the blown fuse by pulling it off of the fuse block or disc switch and snapping a new fuse in its place.

Overview of the PLC (Programmable Logic Controller)

The PLC (programmable logic controller) is shown in Figure 6-14. The part number can be found in the electrical portion of the *Replacement Parts* appendix as well as on the electrical drawings. If the PLC seems to be malfunctioning, start with the flowchart in Figure A-1 in the *Troubleshooting* appendix to determine a remedy to the problem.

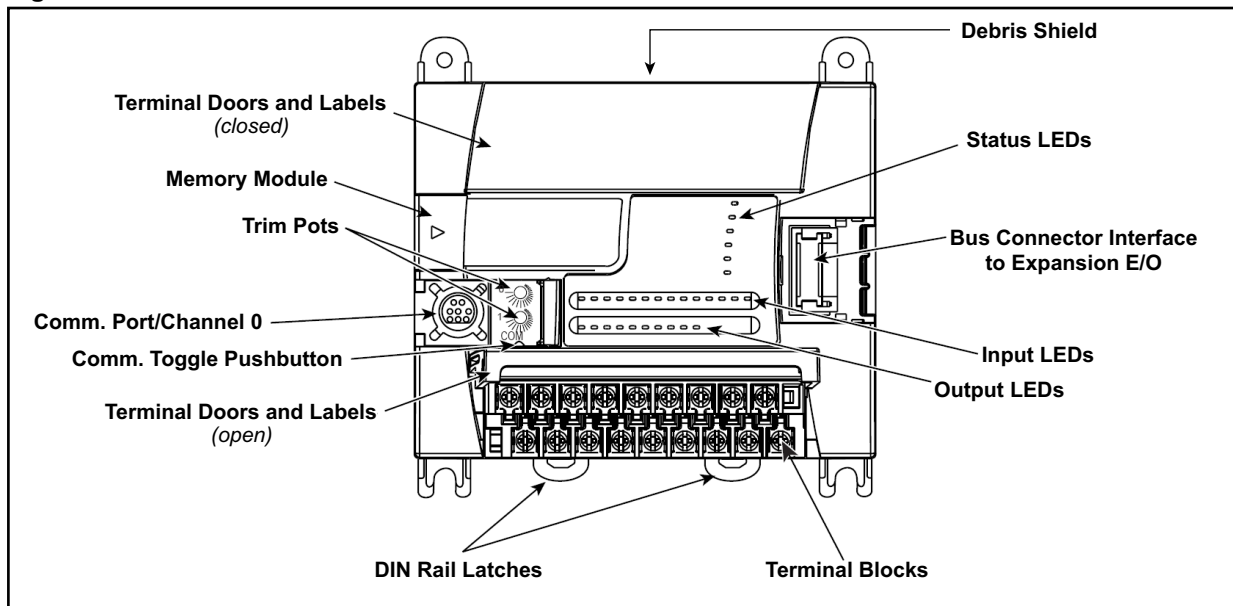
The PLC sends the signals that tell the machine what to do and controls most electronic functions of this machine. It has several indicators on the PLC to help monitor the system. Hitting an E-stop causes a signal to cease.

Table 6-2 identifies the indicator lights on the front of the PLC and what they communicate.

Table 6-2: PLC Indicator Lights

Power	off	No input power or power error condition
	green	Power is on, light should come on when the disconnect handle is turned to the ON position
Run	off	Not executing the user program
	green	Executing the user program in run mode; should come on and stay on when electrical power reaches the PLC
	green flashing	Memory module transfer is occurring
Fault	off	No fault is detected
	red flashing	Application fault is detected, must be reset by MiTek
	red	Indicates an internal fault, the PLC may need to be replaced
Force	applicable to MiTek only	The PLC is forced on by two-way communication by a programmer, light should never be on during normal operation
Comm 0	applicable to MiTek only	Indicates two-way communication is occurring, light should never be on during normal operation
DComm	applicable to MiTek only	Indicates if the communication was set at the manufacturer or at MiTek
Inputs	off	Input is not energized
	amber	Input is energized (terminal status)
Outputs	off	Output is not energized
	amber	Output is energized (logic status)

Figure 6-14: PLC Overview



Replacing the PLC

MiTek must load software on every new PLC. Refer to the Replacement Parts appendix for the part number of a PLC with the software loaded.

1. Check to ensure all wires connected to the PLC have a wire label on them.
2. Replace missing wire labels by referring to your electrical schematic, Drawing 90520.
3. Remove all wires from the PLC terminal blocks.
4. Remove the PLC from the DIN rail by pulling down on the DIN rail latches while pulling out on the PLC body.
5. Locate the new PLC.
6. Leave the protective debris shield attached to the PLC until you are finished wiring the controller and any other devices.
7. Hook the top slot over the DIN rail.
8. While pressing the controller down against the top of the rail, snap the bottom of the controller into position.
9. Remove the protective debris shield to prevent the PLC from overheating.

Maintaining the Touch Buttons

The operator's finger blocks a light beam when the operator touches a touch button. Both light beams (one for each touch button) must be blocked within 1/2 second of each other for the pressing motion to begin.

Refer to the *Replacement Parts* appendix to order a new set of touch buttons.

Resetting the Overload

The overload is inside the electrical enclosure and labeled in Figure 6-13. It has a safety feature that turns the system off if the bimetal switch inside the overload experiences an inordinate amount of heat. An indicator light tells you if the overload is tripped.

The bimetal switch will not allow the machine to operate until the metal has sufficiently cooled. The indicator light will stay on as long as the overload is tripped, so nothing indicates when the overload is cool enough to reset. Give the machine several minutes to cool down before attempting to reset the overload.

The reset button is located on the overload itself. It can be set to automatically reset the overload or you can leave the reset button in manual mode to manually reset the overload when needed. If the overload trips, wait several minutes to give the motor starter an adequate amount of time to cool, then reset the overload. Continue to turn on the machine and start operation as you normally would.

If the indicator light stays lit and is unable to reset, the overload may need to be replaced.

Skatewheels

The skatewheel rails mounted above the machine allow the operator to easily off-feed the lumber after it has been spliced. The skatewheel rails point away from the operator and down. No lubrication is required for the skatewheels. If a wheel is damaged, it can easily be replaced by removing the screw in the center with an Allen wrench.

Refer to the *Replacement Parts* appendix for the part number.

Appendices

<i>Appendix A</i>	<i>Troubleshooting</i>
<i>Appendix B</i>	<i>Replacement Parts</i>
<i>Appendix C</i>	<i>Maintenance Checklist</i>
<i>Appendix D</i>	<i>Drawing Set</i>
<i>Appendix E</i>	<i>Document Evaluation Form</i>

A sample of the troubleshooting table is shown in Table A-1.

Table A-1: Sample Troubleshooting Table

Problem	Possible Cause	Possible Solution
The clamps do not clamp when I press the foot pedal	The foot pedal is malfunctioning	Replace foot pedal
Scan the left column for the problem you are having.	Review the possible causes and determine which causes are most likely to be applicable to your machine.	Implement the appropriate solutions.

Table A-1: Troubleshooting

Problem	Possible Cause	Possible Solution
Clamps do not clamp when I press the foot pedal	Foot pedal is malfunctioning	Replace foot pedal
	Cable between the foot pedal and the machine is damaged or has a loose connection	Check cable Repair or replace cable
	Wires are damaged	Check wiring
	Air source is not transferring adequate amount of air pressure to the machine	Inspect air source Check for kinked hoses, condensation in the lines, or pressure in the air tank Replace entire air source if necessary
	Air manifold or valve is clogged or damaged	Replace the manifold or valve
	PLC is malfunctioning	Inspect the PLC and refer to PLC troubleshooting entries in this table
	Pneumatic cylinder is damaged	Inspect and replace damaged pneumatic cylinder
	Press head is not registering as fully retracted	See <i>Platens do not retract</i> section in this table
Clamps do not release after the board is spliced	Pneumatic cylinder is damaged	Replace the cylinder
	Clamp is bent or damaged	Replace the clamp
	PLC is malfunctioning	Inspect the PLC and refer to PLC troubleshooting entries in this table
	Press head is not registering as fully retracted	See <i>Platens do not retract</i> section in this table

Table A-1: Troubleshooting (Continued)

Problem	Possible Cause	Possible Solution
Clamps do not clamp the board with enough force to hold it steady	Setting for pneumatic pressure switch is too low	Raise the setting
	Pneumatic pressure switch is malfunctioning	Replace the pressure switch
	Pneumatic directional control valve is damaged	Replace the valve
	Air source is not providing adequate air	Inspect air source Check for kinked hoses, condensation in the lines, or pressure in the air tank Replace entire air source if necessary
	Air manifold is clogged or damaged	Clean or replace air manifold
	Pneumatic cylinder is damaged	Replace cylinder
	Clamp is bent	Replace the clamp
Clamps do not release	Proximity switch is malfunctioning	Adjust proximity switch detection zone Replace proximity switch
	PLC is malfunctioning	Inspect the PLC and refer to PLC troubleshooting entries in this table

Table A-1: Troubleshooting (Continued)

Problem	Possible Cause	Possible Solution
Platens do not move when the touch buttons are pressed	Touch buttons are malfunctioning	Inspect and repair wiring Check for and remedy faults on PLC Replace touch buttons if necessary
	Touch buttons are not actuated within 1/2 second of each other	Ensure operator's hands press the touch buttons within 1/2 second of each other
	Solenoid or electrical wires are damaged	Repair or replace faulty wires Replace solenoid
	Hydraulic pressure switch is malfunctioning	Replace pressure switch
	Hydraulic directional control valve is damaged	Replace valve
	Safety relay is not functioning	Replace safety relay
	Pneumatic pressure switch is not made	Refer to <i>Clamps do not clamp the board with enough force to hold it steady</i> section in this table
Plate is not being pressed with enough force to completely embed it	Dwell time is incorrect	Increase the dwell time
	Hydraulic pressure switch is malfunctioning	Replace pressure switch
	Hydraulic directional control valve is damaged	Replace valve
	Hydraulic manifold is clogged or damaged	Clean or replace manifold
	Hydraulic cylinder is damaged	Replace cylinder
Press is pushing the plate too far into the lumber	Dwell time is incorrect	Reduce dwell time
	Hydraulic pressure switch is malfunctioning	Replace pressure switch

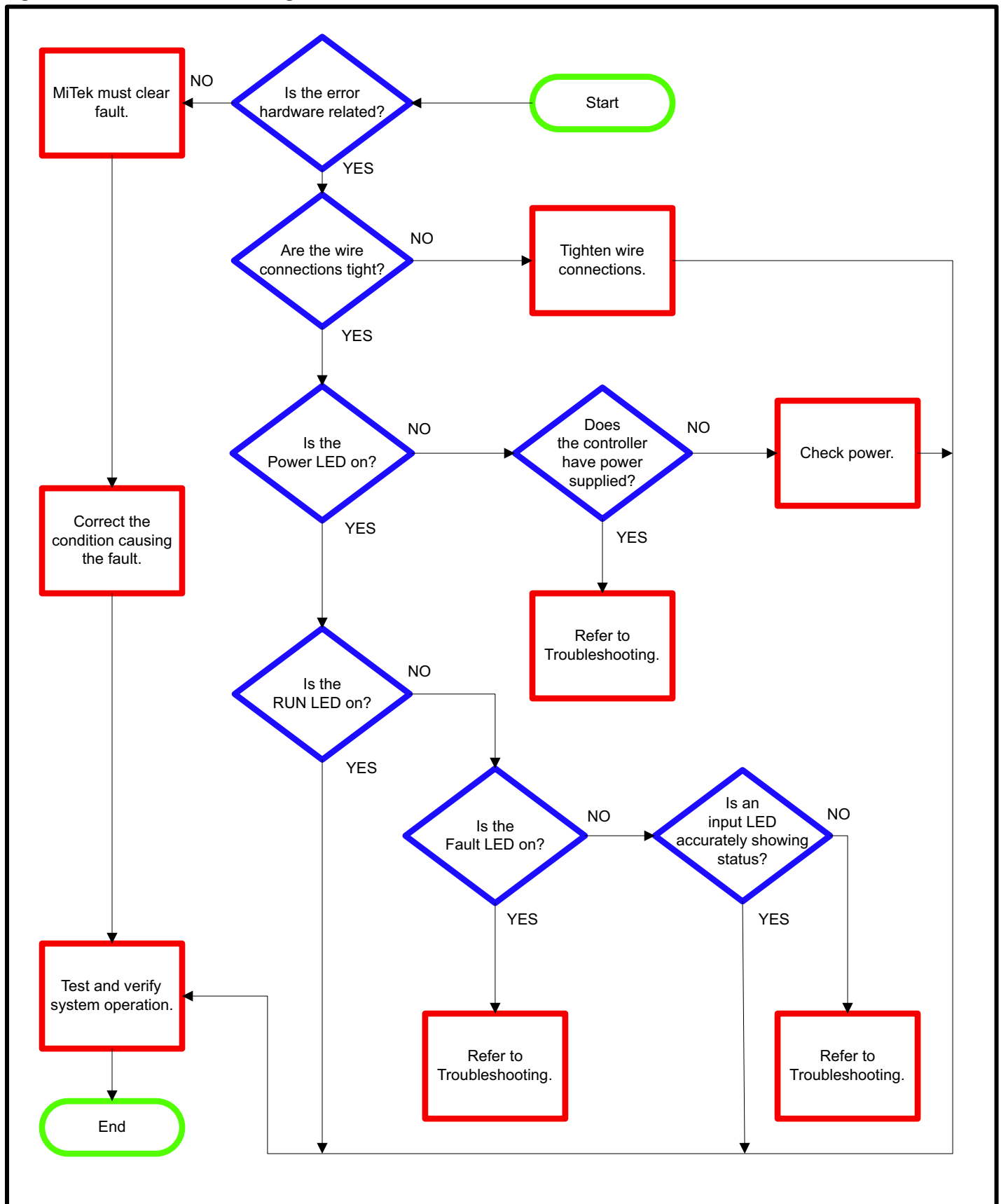
Table A-1: Troubleshooting (Continued)

Problem	Possible Cause	Possible Solution
Platens do not retract	Hydraulic pressure switch is damaged	Replace pressure switch
	Hydraulic directional control valve or solenoid is damaged	Replace valve or solenoid
	Hydraulic cylinder is damaged	Replace cylinder
	PLC is malfunctioning	Inspect the PLC and refer to PLC troubleshooting entries in this table
	Oil level is low	Fill the hydraulic oil reservoir
Hydraulic motor will not operate	An E-stop is activated	Pull out on both E-stop buttons
	Primary transformer fuse is blown	Replace fuse
	Overload is tripped	Wait until machine has cooled and reset the manual/auto button on the overload in the electrical enclosure
	Hydraulic oil supply is inadequate	Fill the hydraulic oil reservoir
	Motor is damaged	Replace motor
Fuses blow frequently	Electrical system is overloaded	Find the device(s) drawing excessive current and replace it
	Ground fault on short circuit	Find wire that is shorted out
	Transformer is damaged (if transformer fuse)	Replace transformer

Table A-1: Troubleshooting (Continued)

Problem	Possible Cause	Possible Solution
PLC: All LEDs are off	Control power is inadequate or missing	Verify proper control voltage and connections to the PLC Check output transformer for 120 VAC
	Electrical system is overloaded	Find the device(s) drawing excessive current and replace it
	Ground fault on short circuit	Find wire that is shorted out
	Transformer is damaged (if transformer fuse)	Replace transformer
PLC: Power and FAULT LEDs are on solid	Processor hardware error exists	Cycle power; contact <i>MiTek</i> Customer Service
PLC: Power LED on and FAULT LED is flashing	Hardware/software major fault was detected	Contact <i>MiTek</i> Customer Service
PLC: RUN FORCE FAULT LEDs are all flashing	Operating system is missing or corrupt	Contact <i>MiTek</i> Customer Service

Figure A-1: PLC Troubleshooting Flowchart



A sample of the Replacement Parts table with an explanation of each column is shown in Table B-1. To order a replacement part, follow the instructions below.

1. Determine the location category.
2. Find the correct part description in the Replacement Parts table.
3. Call **MiTek** Machinery Division Customer Service at 800-523-3380.
4. Tell the Customer Service Representative the number listed in the column titled “MiTek Part #”.

Table B-1: Sample Replacement Parts Table

Drawing # (Item # in Parentheses)	Location Category (Per Figure B-1)	Part Description	MiTek Part #	Keep In Stock
90520-505 (2) For more detail, look up this drawing number in the back of your manual. The number in parentheses is the specific item number.	A Determine the location category by referring to Figure B-1.	sample part Once you know the category location, look for a name or short description in the Replacement Parts table that matches the part you need.	12345 Use this number when ordering the part.	✓ MiTek recommends that you keep this item in stock to minimize downtime due to standard maintenance needs.

Figure B-1: Replacement Part Location Categories

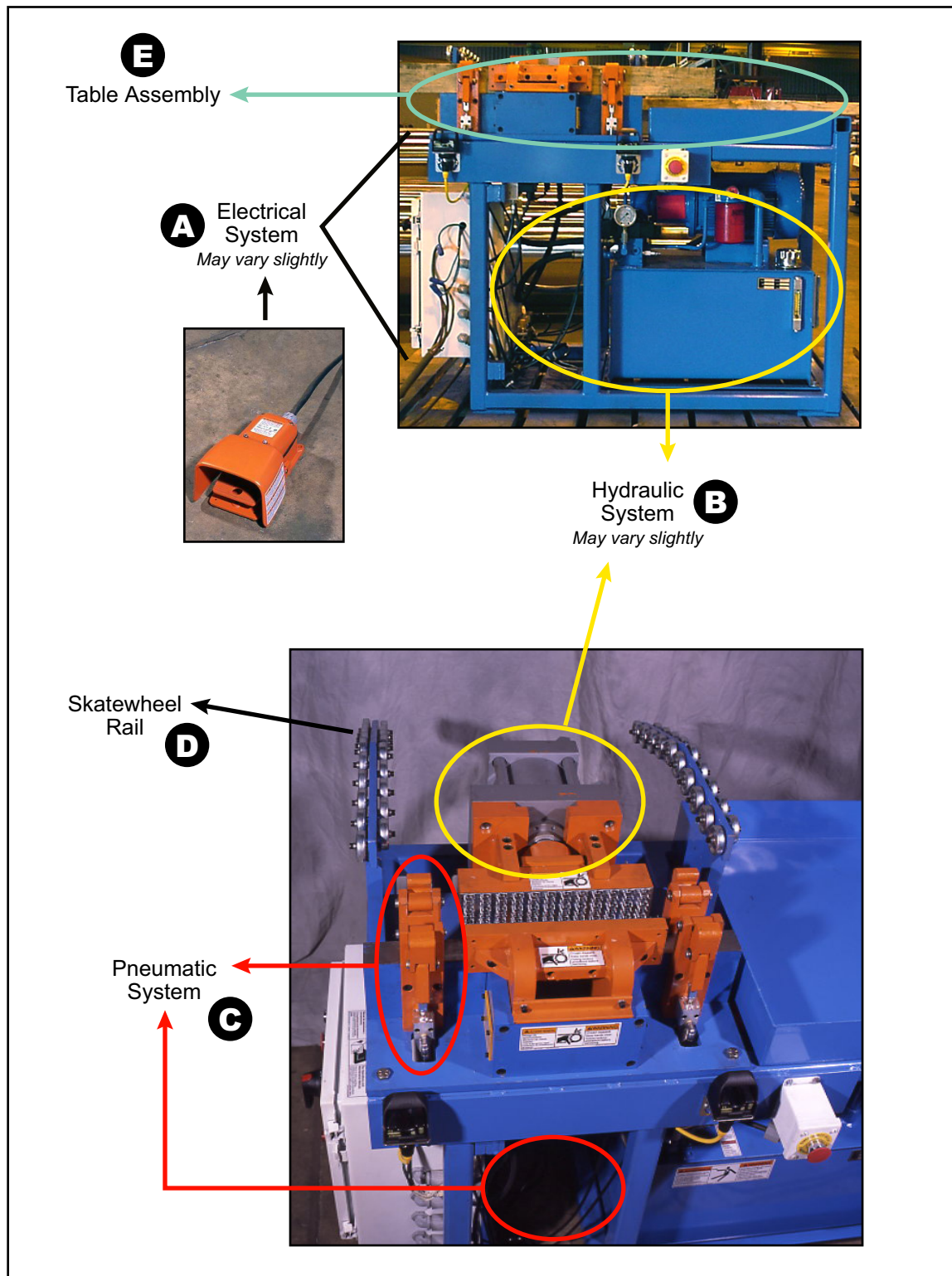


Table B-1: Replacement Parts

Drawing # (Dwg.) <i>(Item # in Parentheses)</i>	Location Category <i>(Per Figure B-1)</i>	Part Description	MiTek Part #	Keep In Stock
90520-505 (2)	A	cable to foot pedal	508097	
90520-502	A	everything inside the electrical enclosure	see Dwg.	
90520-505 (1)	A	foot pedal	528091	
90520-502	A	PLC, programmed by MiTek <i>(do not order unprogrammed number on the drawing)</i>	92162	
90520-503 (1-3)	A	touch buttons	see Dwg.	
—	A	Transformer for 208 VAC (qty of 3)	509184	
—	A	Transformer for 460 VAC	509182	
797270 (11)	B	directional control valve, hydraulic	802263	
—	B	filter element (for return line), Schroeder P10	805226	✓
797270 (16)	B	hydraulic oil sight gauge	806122	
797270 (4)	B	hydraulic relief valve	802268	
797270 (2)	B	hydraulic system pressure gauge	461211	
797270 (3)	B	motor, electric	471299	
—	B	power kit, hydraulic and pneumatic	797270	
797270 (18)	B	press cylinder	798527	✓
—	B	press cylinder piston and tube seal kit	798528	
—	B	press cylinder rod seals and bearings	798529	
797270 (5)	B	pressure switch, hydraulic	515389	
90520-501(11)	B	proximity switch	515856	✓
797270 (13)	B	pump	800341	
797270 (12)	B	return line filter head (entire filter assembly)	805225	
88534 (4)	C	air clamp support	88519	
88534 (5)	C	clamp	88528	
88534 (6)	C	clamp arm	88529	
797270 (20)	C	clamp cylinder	423601	✓
797270(22)	C	clamp cylinder rod clevis	423602	
88534 (1)	C	clevis pin for air clamp support	400353	
88534 (2)	C	clevis pin for clamp arm	400354	
797270 (24)	C	directional control valve, pneumatic	434570	
797270 (19)	C	pressure switch, pneumatic	515390	
88534 (8)	C	retaining ring	379030	
88530 (1)	D	rail, 10-wheel segment	88531	
88530 (2)	D	rail, 9-wheel segment	88532	
88530 (3)	D	wheel, for skatewheel rail	580220	
88535 (43)	E	bracket for proximity switch	88552	
88535 (26)	E	cam follower	412205	

Table B-1: Replacement Parts (Continued)

Drawing # (Dwg.) <i>(Item # in Parentheses)</i>	Location Category <i>(Per Figure B-1)</i>	Part Description	MiTek Part #	Keep In Stock
88535 (27)	E	connector, rear, follower-guide supports	88553	
88535 (19)	E	gear	544175	
88535 (20)	E	gear rack, lower	88544	
88535 (31)	E	gear rack, upper	88545	
88535 (32)	E	guard, follower wheel	88555	
88535 (30)	E	keeper, gear rack, upper	88526	

Lumber Splicer

Checklist for Preventive Maintenance

Splicer Maintenance Checklist

Preventive Maintenance Action	Frequency	Dates Completed				
Replace hydraulic return line filter element	every 6 months					
Drain and replace hydraulic oil	once a year					

Notes

Date

Drawing Set

Drawings are inserted at the back of the manual.

Table D-1: Attached Drawings

Drawing Description	Drawing Number
Skatewheel Rail	88530
Air Clamp Assembly	88534
Splicer Table Assembly	88535
Hydraulic Lumber Splicer, (top-level mechanical)	88560-501
MiTek Splicer, 230V (electrical drawing)	90520
JHF Hydraulics and Pneumatics	797270



Document Evaluation Form

Appendix E

This appendix contains a form you can use to give MiTek feedback on the usefulness of this manual. Please follow the instructions on the form to provide us with comments or suggestions that will improve the quality of our documentation services.

Document Evaluation Form

We invite your comments to make this document more useful.

Document Identification:

Lumber Splicer	Operation and Maintenance Manual	001074
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General Ratings:

	Poor	Fair	Good	Excellent
Content	☐	☐	☐	☐
Organization	☐	☐	☐	☐
Accuracy	☐	☐	☐	☐
Clarity	☐	☐	☐	☐
Completeness	☐	☐	☐	☐
Examples/Illustrations	☐	☐	☐	☐
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Compared to other truss machinery manufacturers' documentation, how would you rate this document?

☐ Poor ☐ Fair ☐ Good ☐ Excellent

Rate the quality of service you were given on the following topics:

	Poor	Fair	Good	Excellent
Delivered on time	☐	☐	☐	☐
Installation process	☐	☐	☐	☐
Service technician	☐	☐	☐	☐
Does the machine work as promised?	☐	☐	☐	☐
Does it handle the production load?	☐	☐	☐	☐

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Document Evaluation Form *(cont'd)*

Instructions Please provide as much information as possible. Identify the page and paragraph, and include a proposed rewrite if possible. Attach extra sheets as needed.	Lumber Splicer
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	001074
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<i>Reason for Recommendation</i>	
Your Name:	Date:
Company Name:	Address:
Phone:	
Please mail this form to: MiTek Industries, Inc. Machinery Operations 301 Fountain Lakes Industrial Drive St. Charles, MO 63301 Attn: Engineering Manager	
Or fax this form to: 636-328-9218 Attn: Engineering Manager	

If you do not receive a reply within 45 days, please call our Customer Service Department by phone and ask for the Documentation Specialist or Engineering Manager: 800-523-3380

Glossary

air source	the air compressor that supplies the pneumatic pressure to the machine
amperage	the strength of an electric current, expressed in amperes
cap screw	a threaded bolt or screw with an extruding head
connector plate	the nail-plate that is embedded into the lumber
cushion	an attribute of a hydraulic cylinder that allows adjustment of the pressure in each cylinder
dwel time	see press dwell time
exit side	the side of the machine where the lumber exits off the machine after being spliced
gauge	the thickness of sheet metal, as in connector plates
hydraulic	moved by fluid under pressure
layout	a scaled diagram of the location of components and the space that they occupy
lockout/tagout	a means of isolating a piece of equipment from its energy source so maintenance can safely occur; guidelines provided in OSHA 29 CFR 1910.147
operator side	the side of the machine where the operator stands to press the touch buttons
overcurrent protection device	the device, such as a fuse, that protects the machine components from being damaged by excess power from the electrical power source
plate	see <i>connector plate</i>
PLC	programmable logic controller; a solid-state control device that can be programmed to control process or machine operations and that has five basic components: processor, memory, input/output module, the power supply, and the programming device
pneumatic	of or relating to air; the clamps are controlled by pressurized air, making them part of a pneumatic system

Glossary

port	a connection point for a peripheral device
power source	the source of electrical power for your machine; usually an electrical panel on the building wall
press dwell time	the amount of time the press platens remain extended after the press cylinder reaches its operating pressure
pressure switch	a device that communicates with the PLC to control the pneumatic or hydraulic pressure applied
proximity switch	a switch that uses an electromagnetic field rather than physical contact to detect when an object is near; inductive proximity switches detect only metal objects, capacitive proximity switches can sense both metallic and non-metallic objects
qualified personnel	a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training, or experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work —ANSI B30.2-1983
skatewheel	a metal wheel that objects can easily slide over; when combined with other skatewheels, it acts as a non-mechanical conveyor
solenoid	an assembly used as a switch consisting of a coil and a metal core free to slide along the coil axis under the influence of the magnetic field
splice	to join at the ends, or the location or joint where parts have been joined
touch button	photoelectric button that is actuated by a finger breaking a tiny light beam when the button is touched
transformer	device used to use 208 VAC or 460 VAC power source with the 230 VAC machine
transport equipment	equipment that is capable of safely carrying all of the machinery to its proper location
voltage	equal to the difference of electric potential between two points on a conducting wire carrying a constant current of one ampere when the power between the points is one watt

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