

OPERATION AND INSTALLATION MANUAL

BUDGET LINE
COMPRESSION MOLDING PRESSES
MODELS 12, 20 & 30 TMB

IMPORTANT: PLEASE READ CAREFULLY BEFORE
ATTEMPTING TO INSTALL OR OPERATE EQUIPMENT

M # 25-1515-2 TMBX
S # 8054

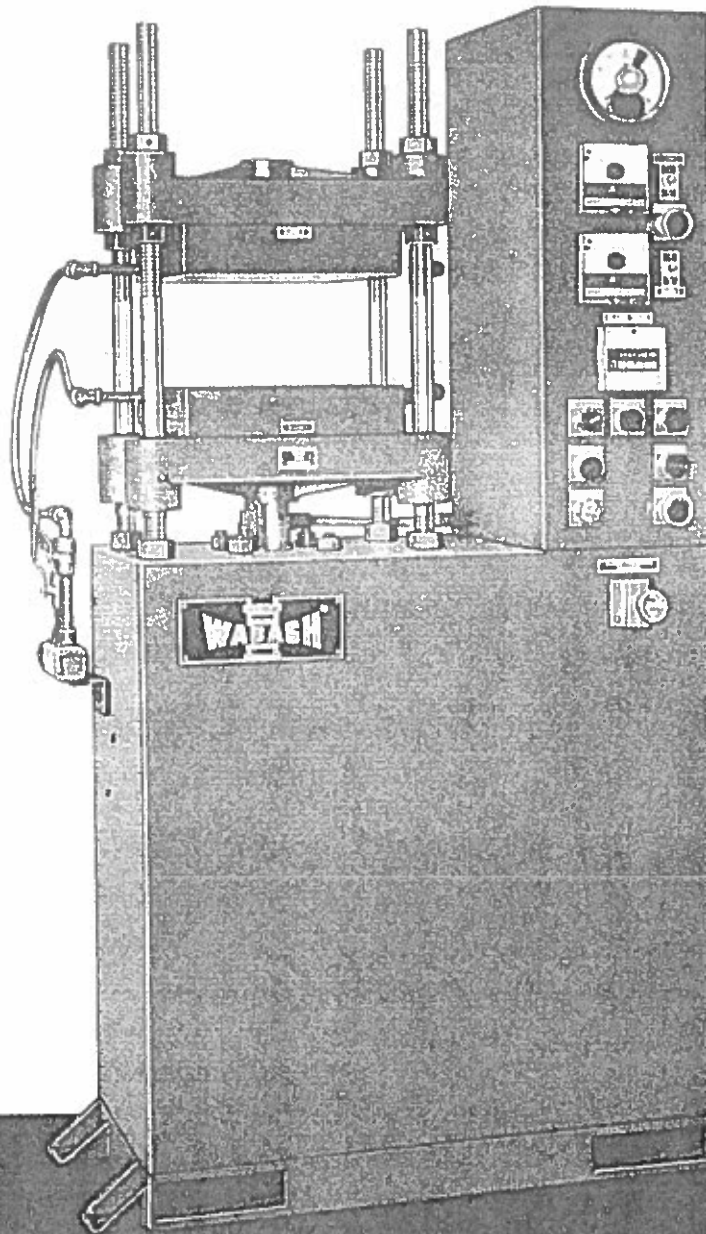


Hydr A820-00010C

WABASH MPI
PO Box 298
1569 Morris Street, Wabash, Indiana 46992-0298
Phone 260-563-1184 Fax 260-563-1396

ext 5243 - Service dept Tom Panning
5262 Cust Service

WABASH BUDGET LINE



Power operated,
double acting
hydraulic presses
for research and
development, proto-
type testing and
production

Model 25-1212-2TMB with electrically
heated, water cooled platens, solid
state temperature controls and cure
timer.



WABASH HYDRAULIC PRESS DIVISION

Wabash Metal Products, Inc.
1569 Morris Street, Wabash, Indiana 46992
Telephone 219-583-1184 TLX 23-2451

STANDARD FEATURES OF WABASH BUDGET LINE PRESSES

The Wabash Budget Line is designed to provide the economy of a standardized press. But, what a standard! Most every convenience and control you need is included as standard equipment. A selection of options lets you add special extra features to customize your Budget Line press to meet your particular application. There's operating economy built-in in addition to the savings on the modest initial investment. The motor and two pump hydraulic system shut off when desired pressure is attained, conserving energy and extending service life.

Wabash Budget Line presses hold desired pressure, even on compressible materials, without accumulators in the circuit. Exclusive automatic pressure control is repeatable and easily adjusted. You have a choice of 12-ton, 20-ton, 25-ton or 30-ton capacity, each easy to install, complete and ready to go to work, no extras to buy. Compare the standard and optional equipment shown below and we're sure you'll recognize that Wabash Budget Line presses offer the optimum equipment for laboratory use, prototype testing and production — precision at a budget price.

Columns are precision threaded so opening can be extended.

Semi-steel platen supports are precision ground and designed for minimum deflection. One inch insulation between platen support and heated platens.

Ground steel platens have replaceable long-life strip heating elements. Excellent heating pattern on entire platen area. Available drilled and with connections for water cooling, oil or steam heating. Platens can be closed completely when set at six inches.

Moving platen is guided by four precision machined corner strain rods.

Two pump hydraulic system. Motor and pumps shut off when desired pressure is attained, automatically hold pressure, even on compressible materials. Service life of pumps and motor is extended, energy is conserved. All models have one horsepower motor. (On applications requiring long pressing strokes, constant running system with relief valve can be used.)

Accurate, 4 1/2" diameter easy-to-read electric contact pressure gauge is calibrated in total force. Located at eye level and away from heat.

Precision pyrometer reads platen temperatures from 0°F to 600°F or 0°C to 300°C.

Two-way pyrometer selector switch to read temperature of top or bottom platen independently.

Platen heat switches and signal lights.

Optional 99.9 minute digital timer opens press at end of set time.

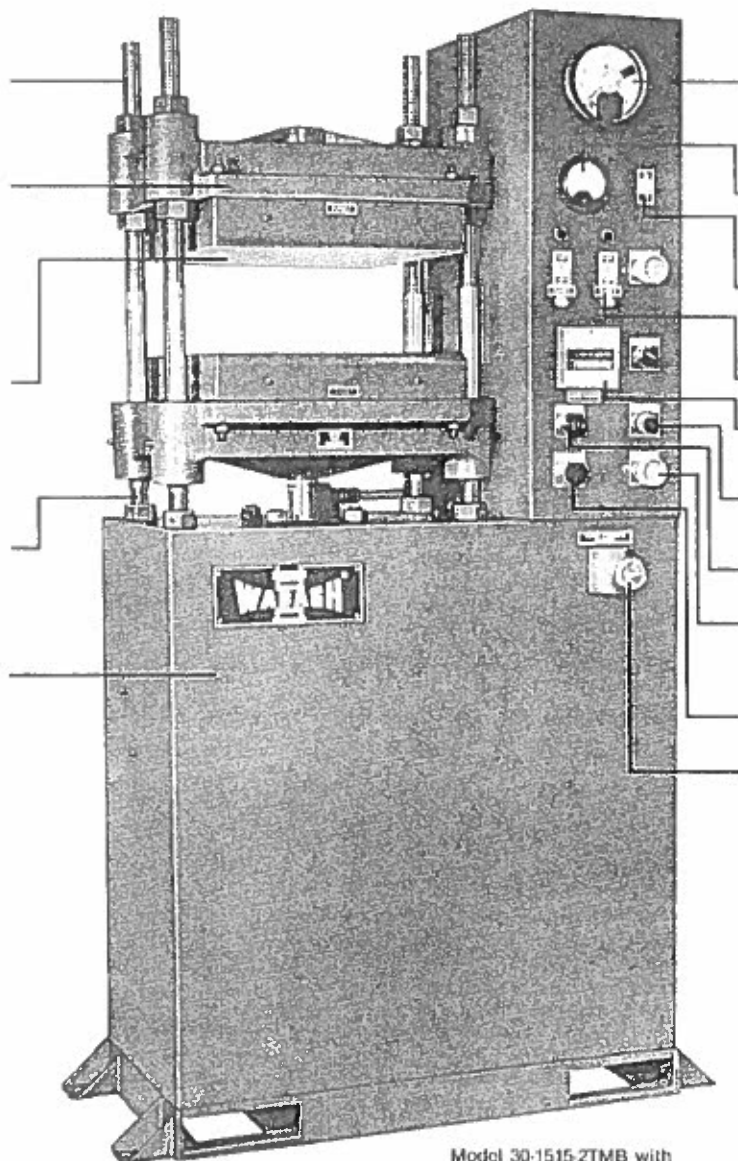
"Platens closed" light indicates push buttons can be released.

Illuminated power "on" switch.

Two-hand push button "close" controls are recessed and guarded to meet safety requirements.

Manual press "open" control button.

Adjustable relief valve for low pressure settings.



Model 30-1515-2TMB with optional cure timer.

Smallest capacity model, yet engineered to do a big job in testing and prototype work. Maximum force, 24,000 pounds, minimum 1,000. Platens, 12" x 12" available electrically heated, water-cooled, steam heated or unheated.

MODEL 12-1212-2TMB 12-TON BUDGET PRESS

Steam heated platen Model 12-1212-STMB
Platens not heated Model 12-1212-SMB

Increased capacity to handle a wider range of applications. Maximum force, 40,000 pounds, minimum 1,000. Platens, 12" x 12" available electrically heated, water-cooled, steam heated or unheated.

MODEL 20-1212-2TMB 20-TON BUDGET PRESS

Steam heated platen
Model 20-1212-STMB

Platens not heated
Model 20-1212-SMB

All of the standard features on the opposite page on a 25-ton model. Maximum force, 50,000 pounds, minimum 1,000. Platens, 12" x 12" available electrically heated, water-cooled, steam heated or unheated.

MODEL 25-1212-2TMB 25-TON BUDGET PRESS

Steam heated platen Model 25-1212-STMB

Platens not heated Model 25-1212-SMB

MODEL 30-1515-2TMB 30-TON BUDGET PRESS

Steam heated platen Model 30-1515-STMB

Platen not heated Model 30-1515-SMB

Largest capacity Budget Line model with larger platens and 6,000 watts of heat. Maximum force 60,000 pounds, minimum 1,000. Platens 15" x 15" available electrically heated, water-cooled, steam heated or unheated.

30

25

20

12

Model No. (electric platens)	30-1515-2TMB	25-1212-2TMB	20-1212-2TMB	12-1212-2TMB
Number of columns	4	4	4	4
Column diameter	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Daylight opening	6" to 10"	6" to 10"	6" to 10"	6" to 10"
Double acting cylinder dia.	5"	5"	4"	4"
Stroke length	6"	6"	6"	6"
Motor HP	1	1	1	1
Approximate floor area	16" x 32"	16" x 32"	16" x 32"	16" x 32"
Approximate height	70"	70"	70"	70"
Maximum psi on platen area	287	347	275	165
Approximate crated weight	1525#	1450#	1450#	1450#
Wattage, 2 platens	8000	4000	4000	4000
Temperature range	100°—600°F	100°—600°F	100°—600°F	100°—600°F
Approximate IPM speed	45" closing 1" pressing 50" opening	45" closing 1" pressing 50" opening	70" closing 1" pressing 75" opening	70" closing 1" pressing 75" opening

Note: Standard presses are wired for 230-460/3/50 (Other options available). Control circuit is 110V from included transformer. Engineering specifications subject to change without notice

OPTIONAL EQUIPMENT

Solid state temperature controllers
Steam manifolds and hoses
Water-cooled platens and manifolds

Steam valves
Water valves
Cycle control timers
Heat exchanger for hydraulic system

Adjustable pressing speed
Separately adjustable initial pressure
Extra daylight and cylinder stroke

MANUAL DISCLAIMER

NOTE: This manual contains all available electrical and hydraulic schematics; and general arrangement drawings. Some original documents were not available.

In addition, please be aware that any modifications made to this press in the field by others are likely not documented on the schematics or in this manual

NOTE: Performance figures stated in this manual are based on a Standard Atmosphere of 59° F. (15° C.) and 29.92" Hg (10,331 Kg/m²) at sea level and using 60 Hz electrical current. All of these factors are important considerations when selecting a hydraulic press. WABASH MPI can advise you on proper selection and sizing of systems for the operating environment at your location.

WABASH MPI is committed to a continuing program of product improvement. Specifications, prices, appearance, and dimensions described in this manual are subject to change without notice.

WABASH MPI

All Rights Reserved

Part #: 998.GENESIS

REV. 07

Effective: 05-07-02

TABLE OF CONTENTS

SECTION **TITLE**

ONE **INTRODUCTION**

- 1-1 Introduction
- 1-2 Models Covered
- 1-3 Optional Features
- 1-4 Customer Service
- 1-5 Unpacking and Inspection
- 1-6 Shipping Damages

TWO **SAFETY**

- 2-1 Management Safety Guidelines
- 2-2 General Operating Safety
- 2-3 Safeguarding the Point-of-Operation
- 2-4 Supervision and Safety Enforcement
- 2-5 Inspection and Maintenance
- 2-6 Training
- 2-7 Safety Equipment Directory
- 2-8 Point-of-Operation Safety Devices
- 2-9 Safety Precautions
- 2-10 Safety Guidelines for Operators
- 2-11 Before Starting Machine
- 2-12 Starting the Machine
- 2-13 Machine Operations

THREE **INSTALLATION**

- 3-1 Work Rules
- 3-2 Foundation
- 3-3 Unloading and Lifting
- 3-4 Cleaning
- 3-5 Lifting the Machine
- 3-6 Leveling the Machine
- 3-7 Connecting the Electrical Service
- 3-8 Water and Drain Connections
- 3-9 Hydraulic Oil and Lubrication
- 3-10 Lubricant Specifications and Supplies
- 3-11 Grease
- 3-12 Filling The Oil Reservoir
- 3-13 Recommended Hydraulic Oil

- 3-14 Check for Proper Pump Motor Rotation
- 3-15 Machine Specifications
- 3-16 Exhaust Gas or Dust Removal

FOUR OPERATION

- 4-1 Operator Safety
- 4-2 Pre Start-Up Checks
- 4-3 Operator Controls
- 4-4 Start-Up
- 4-5 Shut Down
- 4-6 Operating Instructions
- 4-7 Platen Reheat
- 4-10 Slow Down & Reset Switch Adjustment

FIVE MAINTENANCE

- 5-1 Servicing the Hydraulic System
- 5-2 Symptoms of Contaminated Oil
- 5-3 Heater Replacement
- 5-4 Platen Daylight Adjustment
- 5-5 Platen Parallelism
- 5-6 Mold size versus Tonnage Chart
- 5-7 Recommended Spare Parts
- 5-8 Recommended Preventive Maintenance

SIX TROUBLE SHOOTING

- 6-1 Press will not close
- 6-2 Platens will not heat
- 6-3 Press will not build pressure

SEVEN WABASH MPI PARTS and SERVICE INFORMATION

- 7-1 Technical Assistance
- 7-2 Returned Material Policy

EIGHT

WARRANTY PROCEDURES

- 8-1 Warranty Returns
- 8-2 Warranty Statement

APPENDIX

- Hydraulic Schematic
- Electrical Circuit
- General Arrangement Drawing

SECTION 1: INTRODUCTION

TABLE OF CONTENTS

1-1	Introduction	1
1-2	Models Covered	1
1-3	Optional Features	1
1-4	Customer Service	2
1-5	Unpacking and Inspection	2
1-6	Shipping Damages	3

SECTION ONE**INTRODUCTION**

1-1 INTRODUCTION

We are pleased to supply **WABASH** Equipment for your operation. **WABASH** presses are used in many applications including research and development, production, and quality testing. Thousands of presses are in use all over the world in many applications in the electronics, automotive, and aerospace fields wherever pressing is required.

1-2 MODELS COVERED

This manual provides instructions for the installation and operation of **WABASH MPI** “**GENESIS**” series hydraulic presses ranging in size from 15 to 150 tons.

Standard unheated presses do not include platens. The mold or die is attached directly to the bolsters with the optional tapped holes or T- slots, if necessary.

Presses equipped with heated platens, include steel platens, cartridge heaters and full insulation. Mounting holes and T-slots are optional.

1-3 OPTIONAL FEATURES

A variety of options are available for the “**BUDGET**” Series presses. **WABASH MPI** can tailor your equipment to meet the exact requirements of the task being performed.

STANDARD HEATED PLATENS with digital temperature controllers to precisely control platen temperature.

ADDITIONAL TEMPERATURE CONTROL ZONES for controlling platen temperatures within a narrower range of accuracy.

PRESSING SPEED CONTROL to accurately control the clamping speed of the press after Clamp Sealed or activation of the Slowdown proximity switch.

LOW PRESSURE SYSTEM allows the clamp to be closed under low pressure for a possible preheat application.

UPPER AND/OR LOWER CORE LIFTERS for hydraulically or mechanically lifting mold cores, or ejecting parts.

LOWER SLIDING PLATEN for indexing the bottom mold half out to the operator for ease of insert placement and part removal.

LEFT-TO-RIGHT SHUTTLE SYSTEMS for dual station operation and increased efficiencies for insert placement and part removal.

TAIL PUMP for powered secondary functions. (e.g. core pull)

AMMETERS for heater burn-out detection.

VACUUM PUMPS for evacuating mold cavities.

CENTRALIZED LUBRICATION SYSTEMS for ease of maintenance.

There were many variables considered in the selection of your molding press: including type of materials, cure time, ambient air temperature, molding pressure required, cure temperature, cooling requirements, and the altitude at the processing site.

Should your operating environment change, **WABASH MPI** can advise you on necessary equipment, as well as cure time and temperature modifications.

NOTE:	Many other options and features may be incorporated into your WABASH MPI machine. Special manual pages will be provided to cover the use of these features.
--------------	--

1-4 **CUSTOMER SERVICE**

The intent of this manual is to familiarize the operator and maintenance personnel with this equipment and help your organization get the maximum service from your press. If you have any questions regarding installation, service, repair, custom equipment or applications, please do not hesitate to call or write for the information required. Prices for presses, accessories, or repair parts will be furnished promptly on request.

NOTICE:	If you desire to use a press for an application other than that for which it was purchased, please contact our factory to verify compatibility of the equipment with the new process. Misapplication of the equipment could result in injury to the operator or damage to the equipment.
----------------	--

1-5 **UNPACKING and INSPECTION**

The **WABASH** Press should be inspected for possible shipping damage. If the container and packing materials are in reusable condition, save them for return shipment, if necessary.

Thoroughly check the equipment for any damage that might have occurred in transit (such as broken or loose wiring or components, loose hardware, mounting screws, etc.) Refer to the following section in case of damage, loss, shortage, or incorrect shipment.

1-6 SHIPPING DAMAGES**A. Freight, Express or Truck Delivery**

IMPORTANT:	According to the contract terms and conditions of the carrier, the responsibility of the shipper ends at the time and place of shipment. The carrier then assumes full responsibility for the shipment.
-------------------	---

1. Notify your local agent of the transportation company if there is damage.
2. Hold the damaged goods with the container and packing for inspection by the examining agent. Do not return any goods to **WABASH MPI** prior to the inspection and authorization of the transportation company.
3. File a claim against the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading will be attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.
4. Advise **WABASH MPI** Service Department at (260) 563-1184, Ext.5238, or the Customer Service Department at Ext. 5254 or 5262 regarding your wish for replacement.
5. Hold the damaged item(s) until a RMA number is issued and shipping instructions are received from our Service Department.

B. Parcel Post Shipment

1. Contact your local UPS or Federal Express office regarding damage and insurance claims.
2. Hold the damaged goods with the container and packing for possible inspection by postal authorities.
3. Hold the damaged item(s) until a RMA number is issued and shipping instructions are received.

C. United Parcel Service or Federal Express

1. Contact your local UPS or Federal Express office regarding damage and insurance claims.
2. Retain the container and package.

3. Notify WABASH MPI Service Department at (260) 563-1184, Ext. 238, immediately.
4. Hold the damaged item(s) until a RMA number is issued and shipping instructions are received.

D. Shortage

1. Check the packing list. The apparent shortage may be intentional, and back ordered items will be noted on the packing list.
2. Inspect the container and packing material to see if smaller items have been missed during unpacking.
3. Determine that the item was not taken from the area before the shipment was checked in.
4. Notify WABASH MPI immediately of the shortage.

E. Incorrect shipment

1. If the shipment was not what you ordered, contact the WABASH MPI Sales Department at (260) 563-1184, immediately. Include the order number and item descriptions.
2. Hold the incorrect item(s) until a RMA number is issued and shipping instructions are received.

F. Returns

DO NOT RETURN ANY DAMAGED OR INCORRECT ITEMS UNTIL A RMA NUMBER IS ISSUED AND SHIPPING INSTRUCTIONS ARE RECEIVED FROM WABASH MPI.
--

SECTION 2: SAFETY

TABLE OF CONTENTS

2-1	Management Safety Guidelines	1
2-2	General Operating Safety	1
2-3	Safeguarding the Point-of-Operation	2
2-4	Supervision and Safety Enforcement	3
2-5	Inspection and Maintenance	3
2-6	Training	5
2-7	Safety Equipment Directory	5
2-8	Point-of-Operation Safety Devices	6
2-9	Safety Precautions	7
2-10	Safety Guidelines for Operators	8
2-11	Before Starting Machine	8
2-12	Starting the Machine	9
2-13	Machine Operations	9

SECTION TWO**SAFETY**

2-1 MANAGEMENT SAFETY GUIDELINES

It would be impossible to cover every situation that could arise in the use of molding machines, this data is not intended to be complete, nor is it presented in any particular order of importance. It is good, safe practice to evaluate the safety concerns of every molding setup and operating procedure **before** starting the machine.

These guidelines are intended to define and point out specified areas of responsibility that should receive the participation and leadership of all levels of management concerned with machine operation. General and specific safety guidelines and cautions are included here and throughout the manual for your protection and to help avoid injury to you and to your co-workers. You are responsible for evaluating the total manufacturing process and identifying and implementing the best method of protecting the operator from injury at the point of operation in accordance with current federal, state and local codes and standards.

Machine owners, managers and supervisors, must accept the responsibility for the safe operation of the machines under their control. Read and understand the safety guidelines and checking procedures outlined in this section and in the sections for operators, die setters and maintenance personnel. Establish and promote a program of safety objectives with defined employee responsibilities that assure safe machine working practices in your plant.

Whether new to machines, or with many years of operating experience, this section is for your benefit.

It is your responsibility to immediately report any unsafe condition or unusual machine performance to your supervisor.

The terms **NOTICE**, **CAUTION**, **WARNING**, and **DANGER** have specific meanings in this manual. As explained in Section 2-9.

2-2 GENERAL OPERATING SAFETY

1. Management should promote safe practices and safe machine operating procedures by establishing an effective plant safety program.
2. A knowledgeable and well-trained safety coordinator should be responsible for plant safety requirements, regulations and enforcement.
3. The safety coordinator must investigate all accidents and "close calls". The causes should be analyzed, corrective action taken and accurate records maintained.
4. Establish machine safety rules and inform each employee of his responsibilities.

5. Display in prominent locations, the procedures to be followed in case of accidents. List names, addresses, and phone numbers of physicians, hospitals and personnel who are to be notified.
6. It is the employer's responsibility to provide an adequate work area around the machine that is clean, safe and uncluttered.
7. Provide safe and convenient methods and procedures for material handling.
8. Do not allow a machine to be operated if it is poorly maintained, malfunctioning or in need of guards or safety devices that protect the operator from potential hazards.
9. Pay strict attention to all caution, warning, and danger signs.
10. Do not wear loose clothing or jewelry of any kind which could get caught in moving parts.
11. Never reach into moving parts to clear a jam of any type.

2-3 SAFEGUARDING THE POINT-OF-OPERATION

1. It is the employer's responsibility to evaluate each molding setup and to determine and implement the best method of protecting the operator from injury at the point-of-operation.
2. Each molding application must be examined and evaluated to determine which type of safeguarding offers maximum operator protection.
3. The employer should become familiar with the many types of safety devices available in order to determine which type offers maximum operator protection for each molding application.
4. The use of automated loaders is highly recommended for handling work loads. Provisions for safe material removal are equally as important as safe feeding method.
5. Never allow machine guards or safety devices to be bypassed or removed.
6. Do not release the machine for production before installing and testing all protective guards, covers and safety devices.
7. Evaluate all point-of-operation guards, safety devices and work procedures frequently while the machine is in operation. Immediately correct any unsafe condition.

2-4 SUPERVISION AND SAFETY ENFORCEMENT

1. All levels of management must enforce every safety rule and regulation. To make machine safety effective, every violation should be reported, recorded and result in appropriate disciplinary action.
2. Never allow any operator, regardless of his experience, to start a new job assignment without a complete and detailed explanation of the job and the safe procedures to be followed.
3. It is the supervisor's responsibility to maintain absolute authority over the machine controls. The actuation of the main disconnect switch, mode selector switch and other keyed switches should always be under his supervision. The keys should be removed and in his possession at all times to prevent unauthorized use or adjustment of the machine.
4. Conduct frequent inspections of the machine operations. Be sure the operator and helpers are using proper safety devices and are working safely.
5. Never allow machine guards or safety devices to be removed, altered or bypassed.
6. Never allow untrained personnel to operate the machine.
7. Never allow personnel who are under the influence of drugs or alcohol, or otherwise not physically or mentally alert, to operate the machine.
8. Never allow minors to operate or assist in the operation of a machine.
9. Be alert to unsafe machine or operating conditions. A poorly maintained machine or a machine that is malfunctioning should be shut down until the safe condition has been corrected.

2-5 INSPECTION AND MAINTENANCE

1. To maintain a high level of machine reliability and to obtain advance warning of any possible hazards or malfunctions, a daily, weekly and monthly program of machine inspection and preventive maintenance should be established.
2. A check list should be used and records maintained of all maintenance and repair work performed.
3. Only highly qualified, competent personnel should be assigned this job of inspection and maintaining the machine. They should be specifically instructed and have thorough understanding of the controls and the operating and maintenance procedures outlined in this manual.

4. Establish and follow a safe shutdown procedure for machine inspection.
5. To ensure optimum performance and safe operating condition of the machine, careful inspections of the electrical and hydraulic systems should be made.
6. Auxiliary equipment and safeguards must be inspected and maintained in safe operating condition.
7. Releasing the machine for production after inspection and maintenance should be the responsibility of qualified personnel assigned by management.
8. Never perform maintenance or repair work until you are sure the power is turned off at the main control panel and cannot be turned back on without your knowledge. Use a padlock or other safe lockout device.
9. **Wabash MPI** recommends that annual calibrations and preventative maintenance checks be performed by the Wabash Service Department.

2-6 TRAINING

1. All personnel who will be associated with the operation of the machine must read and have complete understanding of the contents of this manual.
2. Management must assume the responsibility of training all personnel associated with machine operation to eliminate accidents and injuries.
3. Only employees who understand and can communicate their knowledge of the machine, its operation, its dies and safety requirements, should be assigned the responsibility of training.
4. A supervisor must be knowledgeable in machine operation, machine guarding, safety guidelines, operator supervision, job instructions, and causes of accidents. He is also responsible for promoting safe working habits and attitudes of machine operators.
5. An operator training program should include specific instructions in safety, safety devices, guarding, proper use of the machine and correct procedures in performing every machine job.
6. No operator should be given a machine assignment that they do not fully understand.
7. Only thoroughly trained and responsible personnel should be allowed to operate or work on the machine.

2-7 SAFETY EQUIPMENT DIRECTORY

In order to assist the end user select the type of additional machine guarding best suited for each installation, WABASH MPI has assembled the following list of manufacturers who can furnish machine guards and safety equipment. The list is not all-inclusive nor is it intended to be a recommendation or approval by WABASH MPI as to the merits of the products or other suitability for any particular application. This list is included in the interest of safety and to provide the end user with several sources and products in order to obtain the best possible solution for a safe machine installation.

2-8 POINT-OF-OPERATION SAFETY DEVICES

Manufacturer	Presence Sensing Device	Pull-Back Device	Interlocked Barrier Guards	Safety Blocks
Triad Controls, Inc. 174 Easy Street Carol Stream, IL 60188 708-462-0099 www.triadcontrols.com	X		X	
Rockford Systems, Inc. American Road Rockford, IL 61109-2658 800-922-7533 www.rockfordsystems.com	X		X	X
Link Electric & Safety Control Company 444 McNally Drive Nashville, TN 37211 615-833-4168	X			
Protech Systems 4035 Cheyenne Court Chino, CA 91710 714-590-9521 www.protechsystems.com	X	X	X	X
Banner Engineering Corp. 9714 10th Avenue North Minneapolis, MN 55441 612-544-3154 www.bannerengineering.com	X			
Data Instrument, Inc. 100 Discovery Way Acton, MA 01720 508-264-9550	X			
Weldotron Corporation 1532 S. Washington Avenue Piscataway, NJ 08854 201-752-6700	X			
Avalon Imaging, INC. 3417 Highway 5, Suite F Douglasville, GA 30135 800-842-4722 www.avalonimaging.com	X			
Sti 6550 Dumbarton Circle Freemont, CA 94555 888-510-4357 www.sti.com	X			
Omron Omron Management Center of America, Inc. (OMCA) Regional Management Centre 1300 Basswood, Suite 100 Schaumburg, Illinois 60173 U.S.A. 847-884-0322 www.omron.com			X	

2-9 SAFETY PRECAUTIONS

The terms **NOTICE**, **CAUTION**, **WARNING**, and **DANGER** have specific meanings in this manual.

A **NOTICE** is used to indicate a statement of company policy directly or indirectly related to the safety of personnel or protection of property.

A **CAUTION** indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

A **WARNING** indicates potentially hazardous situation that, if not avoided, could result in death or serious injury.

A **DANGER** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This word will be limited to the most serious situations(s).

The term **IMPORTANT** emphasizes areas where equipment damage could result, or provides additional information to make a step or procedure easier to understand. Disregarding information marked **IMPORTANT** would not be likely to cause personal injury.

Please refer to the enclosed "Safety...It's Everyone's Business" manual for important **SAFETY INFORMATION** for everyone in your organization who will have access to hydraulic machine equipment.

WARNING: BEFORE OPERATING THE MACHINE...Be sure that all personnel in your company who will have contact with hydraulic machine equipment thoroughly read and understand this Installation and Operation provided by WABASH MPI.

2-10 **SAFETY GUIDELINES FOR OPERATORS**

This section of the manual is directed to all personnel who are associated with the operation of **WABASH MPI** Compression Molding Presses. Whether you have years of experience working with presses or whether you are new on the job, this section is for your benefit. General and specific safety guidelines and caution notes are include here and throughout the manual for your protection and to help you avoid injury to yourself and to your co-workers. Since it would be impossible to cover every situation that could arise, the following list of points is not intended to be complete, nor does the order in which they are listed relate to their importance. It is your responsibility to immediately report any unsafe condition or unusual machine performance to your supervisor.

2-11 **BEFORE STARTING MACHINE**

1. Never operate the machine until you have read and fully understand the safety, control description and operating sections in this manual.
2. Make absolutely sure hydraulic pump motor is off and safety blocks are in place before servicing anything inside the clamp/molding area.
3. Inspect the machine before each shift for loose, worn or broken parts. Report any unsafe conditions to your supervisor immediately and do not operate the machine until the necessary repairs are made.
4. An important part of machine safety is good preventive maintenance. Keep your machine clean and in good condition by cleaning daily.
5. Clean your work area frequently. Keep it uncluttered and free of loose tools, discarded work pieces, rags, wires, oil, grease, water or anything that can inhibit your movement or cause you to trip or fall.
6. Be sure machine guards and safety devices are correctly installed in their proper position.
7. It is your employer's responsibility to evaluate each machine operation and to determine and implement the best method of protecting you from injury at the point-of-operation in accordance with current federal, state and local codes and standards.
8. Never attempt to bypass or remove any point-of-operation guard or safety device on your machine. They are there for your protection.
9. Be alert for possible hazards or safety irregularities that could cause injury.

2-12 STARTING THE MACHINE

1. Never start the machine until you have made the inspections outlined in Section 2-11.
2. Before you start the machine, be sure you know how to stop it instantly.
3. Follow the start-up procedures as outlined in Section 4-4.
4. Before starting production, be sure the machine is pre-heated to process temperature and then test-cycle the machine to verify proper operating sequence. Observe carefully that all functions are properly sequenced by the machine control. Report any unsafe condition or unusual machine performance to your supervisor.

2-13 MACHINE OPERATION

1. Never place hands, fingers, arms or any part of your body in the machine daylight area while it is moving, or near loading and unloading automation systems.
2. Pay attention to the warning tags on the machine. They are there for your benefit.
3. Do not reach around, under or over any guards while the machine is running.
4. Never bypass, remove or alter any machine guards or safety devices.
5. Never stack parts or other objects on the bolster or platens. Use part containers and scrap bins of sufficient size to accommodate the job.
6. Use care and judgment in the work you are doing. Take the time to evaluate the operation - **Is it safe? Are you working a safe procedure?**
7. Stay alert at all times. Do not become overconfident and careless. Avoid inattention, pre-occupation and distractions.
8. If you leave the machine for any length of time, always check to make sure the set-up parameters are as you left them before restarting the machine. They may have been modified during your absence.
9. Know who or where to call for immediate help in the event of any emergency or injury.
10. Have all injuries treated, no matter how small.

SECTION 3: INSTALLATION

TABLE OF CONTENTS

3-1	Work Rules	1
3-2	Foundation	1
3-3	Unloading and Lifting	2
3-4	Cleaning	2
3-5	Lifting the Machine	2
3-6	Leveling the Machine	5
3-7	Connecting the Electrical Service	6
3-8	Water and Drain Connections	7
3-9	Hydraulic Oil and Lubrication	12
3-10	Lubricant Specifications and Supplies	12
3-11	Grease	12
3-12	Filling The Oil Reservoir	13
3-13	Recommended Hydraulic Oil	14
3-14	Check for Proper Pump Motor Rotation	15
3-15	Machine Specifications	15
3-16	Exhaust Gas or Dust Removal	16

SECTION THREE**INSTALLATION****3-1 WORK RULES**

The installation, operation, and maintenance of this equipment must be conducted in accordance with all applicable work and safety codes for the installation location. This may include, but is not limited to OSHA, NEC, BSI, IEC, CEN/CENELEC, VDE, TUV, CSA, UL, NFPA and any other local, national, and international regulations.

Read and follow these operating instructions when installing, operating, and maintaining this equipment. If the instructions become damaged or unreadable, additional copies can be purchased from **WABASH MPI**.

To assist in the installation and operation of this press, an assembly drawing (including part numbers) is included in the appendix of this manual.

CAUTION:	Only qualified personnel who are familiar with this equipment should operate or work on this press.
-----------------	---

WARNING:	Work only with approved tools and devices.
-----------------	--

WARNING:	Disconnect the electricity before maintenance or service. If the press is installed with a power cord that can be disconnected, unplug it. If the press is permanently wired to a power main, a fused power disconnect must be installed to allow the disconnect to be locked in the OFF position.
-----------------	---

3-2 FOUNDATION

General assembly drawings are forwarded in advance of the machine shipment. The drawings show limiting dimensions and other details. Reinforced concrete details are to be determined by the customer to suit local soil conditions. The shipping skid mounting holes are not recommended for the attachment of machine leveling feet. A minimum of three feet must be allowed around the machine to provide access for servicing. When determining the location of the machine, the following additional requirements must be considered.

- A. The foundation must comply with applicable local codes regarding the load per square inch rating necessary to support the machine. Consult your building contractor or foundation consultants.
- B. Adequate space must be provided for the addition of any peripheral equipment that may be used with the machine.

3-3 UNLOADING AND LIFTING

All machine components should remain on shipping skids until ready for re-assembly.

WARNING: Check capacity of crane or hoist. Be sure it is capable of safely lifting the total weight of the machine.

Check the condition of cables, hooks and other lifting equipment. Adjust cable length so the machine will remain upright while suspended.

WARNING: Always use extreme caution when moving the machine. Do not lift one end only as this may cause the machine to fall over.

CAUTION: Do not remove any blocking or fasteners from the machine until it is set in its permanent location. Failure to follow this instruction may result in machine damage or personal injury.

3-4 CLEANING

Soon after delivery, each shipment should be thoroughly cleaned and staged near the machine foundation ready for re-assembly. Cleaning should be done using a good grade of commercial solvent to remove the rust preventive and any dirt that may have accumulated on the platens and guide rods during transport.

3-5 LIFTING THE MACHINE

DANGER: Failure to follow the following guidelines may result in fatal injury.

It is **STRONGLY** recommended that you employ a rigger who has experience installing this particular type of equipment. In addition, the following guidelines must be followed when lifting the machine:

If you are using an overhead crane, make sure the slings you are using are rated for weight capacities greater than the machine weight. (The term "sling" as used in this section refers equally to slings and chains.) The actual weight capacity of any sling is affected by the angle between the sling and the load it is lifting. This factor must be taken into account when determining whether or not a sling can lift a certain load. In order to maintain the maximum weight rating of a sling, the sling-to-load angle should be kept as close to 90° as possible. The following figure illustrates how the

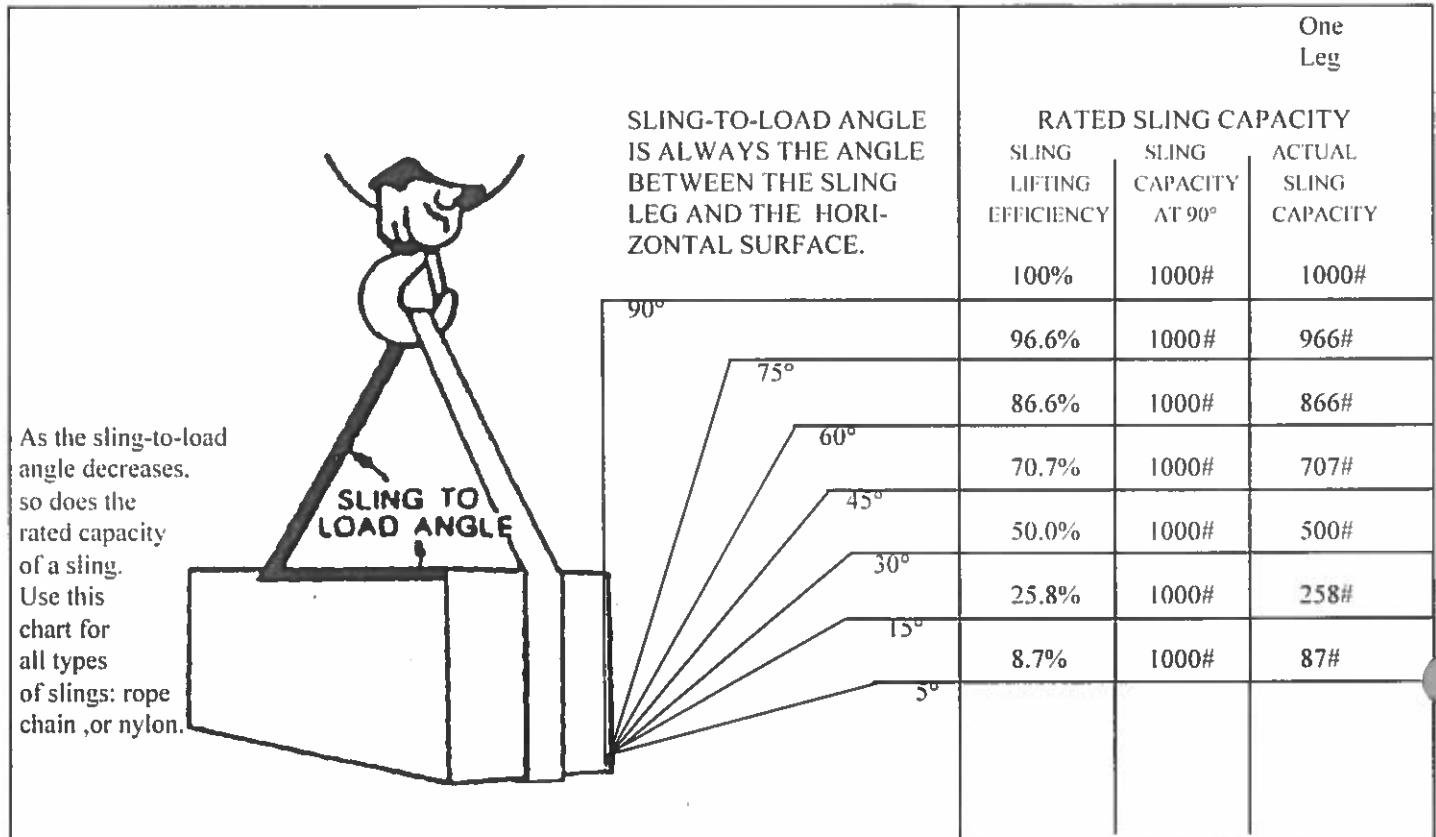
lifting capacity of a sling is decreased as the sling-to-load angle decreases.(see figure 3-1)

Before lifting the machine, make sure that all moving components are properly blocked to prevent them from moving while the machine is being lifted.

Lift the machine with an overhead crane only if there are tapped holes in the bolster of sufficient size to use with lifting eyebolts. Then using an appropriate lifting means, attachment can be made by hook/sling to the clevises for lifting from above.

On models supplied with lifting tubes built into the base of the machine, a forklift of suitable capacity, and with **forks long enough to extend fully beneath the frame,** can be used to lift and move the machine.

To lift the machine with a fork lift, spread the forks apart to match the lifting holes in the base of the machine. Lift the machine from the operator side, raising the machine only as high as necessary. Do not lift the machine higher than necessary.



LIFTING THE MACHINE - Figure 3-1

DANGER: Never place any part of your body under a suspended load. Failure to follow this instruction may result in serious personal injury.

IMPORTANT: Please contact the factory for special needs, advice, or consultation about rigging.

- A. Do not shorten the slings with knots, bolts or any other unproved methods.
- B. Never use a damaged sling.
- C. Correct kinks and twists in the slings before lifting.
- D. Make sure that the sling is securely attached to the load.
- E. Pack any sharp corners with material of sufficient strength to withstand the load and protect the sling.
- F. Attach the slings to the center of the lifting hook. Do not lift any load by attaching the slings to the point on the lifting hook.
- G. Make sure that the load is free to move before attempting to lift it. Also, make sure that there is a clear spot for depositing the load before lifting it.
- H. Avoid shock loading the slings - especially when working at temperatures below 40°F.
- I. Never place your hands or fingers between the sling and the load.
- J. Never place a suspended load over any part of another person's body.

3-6 LEVELING THE MACHINE

The machine must be leveled utilizing the platens or bolster as the leveling surface. When checking the machine level, use a graduated spirit level, or any good quality level. The machine should be as level as possible.

WARNING: Turn off and lock out the main disconnect switch before you begin the leveling procedure. Failure to follow this instruction may result in serious personal injury.

IMPORTANT: Failure to properly level the machine may result in machine damage. The machine must be leveled when it is installed, and the level should be checked at least once a year after installation.

When making adjustments to the machine level, always retract the screws on the necessary (optional) leveling pads (lower the machine). **Do not attempt to level the machine by extending these screws.**

3-7

CONNECTING THE ELECTRICAL SERVICE

WARNING: Only a qualified electrician should hook up or perform maintenance on the electrical system. Read and completely understand the electrical schematics for the machine before beginning.

DANGER: Turn off all electrical power to the circuit before making electrical connections. Failure to follow this instruction may result in fatal injury.

A positive earth grounding system for the machine/control is required for proper and safe operation. A correct grounding system minimizes the introduction of random electrical noise into low voltage, quick response electronic circuits. This noise could cause erratic operation.

The recommendations of this section are intended to conform to the grounding requirements of the National Fire Protection Association publication **NFPA-79-National Electrical Code**. The machine must be grounded in conformance to these codes and applicable national, state and local electrical codes.

All parts of the system, machine and control are tied to a single ground terminal of the ground block, which is located inside the door of the electrical cabinet. This terminal must be grounded upon installation of the machine. The methods of grounding which follow are listed in the order of preference ("a" is the most preferred, "b" is next, and "c" is least preferred).

- a. The central ground terminal is connected via a stranded conductor to the protective conductor.
- b. The central ground terminal is connected via a stranded conductor to a building column or electrical mass that is determined to be at "true earth" potential.
- c. The central ground terminal is connected via a stranded conductor directly to a grounding electrode installed for use with the particular machine to be installed. A separate grounding electrode should be used for each machine.

Water pipes should not be used as grounding electrodes since the use of plastic pipe and sealant may result in an inadequate ground.

The grounding conductor should be sized to conform to **NFPA-79** requirements and any applicable national, state, and local codes. The conductor size listed in these codes is the

minimum for safe operation of the equipment. However, larger size AWG No. 2 is recommended to minimize electrical noise.

If grounding electrodes are used, the maximum resistance to true earth potential should be three ohms or less. The resistance to true earth should be checked at the time of installation and after the third, sixth, ninth, and twelfth month of operation. This resistance should be checked annually thereafter, and any time the grounding electrode installation is altered. Refer to NFPA-79 for specific grounding electrode requirements.

WARNING: The earth ground must meet local code requirements. If this ground is not properly connected, erratic machine operation could result or a shock hazard could exist. Failure to follow this instruction could result in serious personal injury or machine damage.

Check the electrical prints for correct power requirements (voltage, phase, and frequency). If in doubt, check the electrical cabinet tags. The machine will operate with uniform accuracy at voltages within $\pm 10\%$ of normal, with maximum phase imbalance of 5%. This voltage tolerance is based on a line supply that is either constant at some voltage within the range, or that varies slowly within the range. Sharp line voltage changes (transients) caused, for example, by starting a welder or heavy compressor, may adversely affect performance of the equipment and must be avoided. Although the machine and the control are designed to minimize these effects, sharp drops and surges are dangerous. Additional equipment required to regulate the power supply, and to provide voltages within the acceptable tolerances, should be installed in the electrical system of the factory by the customer.

Connect the proper voltage to the circuit breaker in the electrical cabinet. (Refer to the wiring diagrams shipped with the machine.)

WARNING: Failure to connect the proper voltages to the machine may result in personal injury or machine damage.

WARNING: If, for any reason, the electrical work cannot be completed and the machine must be left unattended, always lock the main disconnect switch in the [OFF] position. Never bypass or wire around safety limit switches. Failure to heed these warnings may result in personal injury or machine damage.

3-8 WATER AND DRAIN CONNECTIONS - Hydraulic Oil Cooling

A water supply line and a drain line must be connected to the heat exchanger located on the hydraulic power unit on the rear of the machine.

Supply 5-6 GPM (19-23 LPM) of 60°-70°F (16°-21°C). water to 3/4" NPT on inlet side of the heat exchanger. Plumb 3/4" NPT from outlet side of heat exchanger to drain connection, or water recovery system. If the **optional** inlet strainer and WaterSaver valve are not purchased, then the customer **should** supply a 3/4" NPT water line strainer on the inlet equipped with some sort of throttling valve on the outlet to regulate water flow passing through the heat exchanger.

In addition, the water supply piping should be insulated to eliminate condensation.

If your machine is equipped with a WaterSaver valve on the outlet of the heat exchanger, it has been adjusted at the factory for optimum oil temperature.

If the oil temperature is too hot or cold, adjust the WaterSaver valve by turning the adjusting screw in the direction indicated on the valve body.

3-8-1 COMPRESSED AIR AND WATER CONNECTION - Platen Cooling

(Required for Optional Platen Cooling)

Connect a water line to the 3/4" NPT port in the solenoid valve labeled SOL-W1 (typically located on the top bolster). A water supply of 10 GPM @ 60° F. (38 LPM @ 16° C.) and 40 to 60 PSI (2.7-4.1 bar) is required for proper cooling.

Connect a clean, dry, regulated compressed air source to the 1/2" NPT port in the solenoid valve labeled SOL-P1 (typically on the top bolster). Approximately 0.5 SCFM (.014 M³/min.) of air is required for each cooling cycle.

Refer to the drawings on the following pages.

IMPORTANT:	The inlet manifold is typically mounted on the top bolster. Air and water solenoids should be plumbed with flexible connections to allow daylight adjustment, platen leveling and clamp closing.
	The outlet manifold (typically located on the lower left side of the press) must be vented for steam through a 3/4" NPT steel pipe.

DO NOT vent with copper or plastic. Use only steel pipe and install to standard steam specifications.

IMPORTANT: The outlet manifold must be plumbed downward to drain the platens properly. If the manifold is plumbed upward, **WABASH MPI** recommends the use of a check valve to eliminate back flow into the platens, or a pump to recirculate the drain water.

IMPORTANT: **WABASH MPI** will not guarantee proper cooling if the drain is not plumbed according to **WABASH MPI** recommendations.

A pressure gauge and regulator are recommended components for your plant air supply.

A manual shut-off valve in each line will aid in future maintenance procedures.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. Set air regulator BELOW water pressure. (approximately 10-15 PSI (.69-1.03 bar) less than water pressure) but at a minimum of 20 PSI.

The following is to be used when determining the cooling media required for the temperature being used.

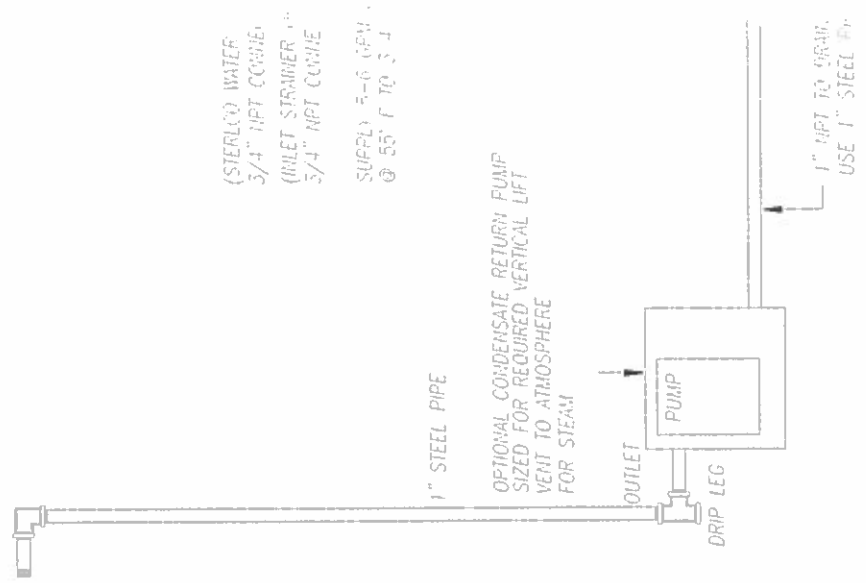
AIR ONLY when platen temperature is above 650° F.(343 ° C.)

AIR/WATER MIX when platen temperature is between 650° & 350° F. (343° & 177° C.)

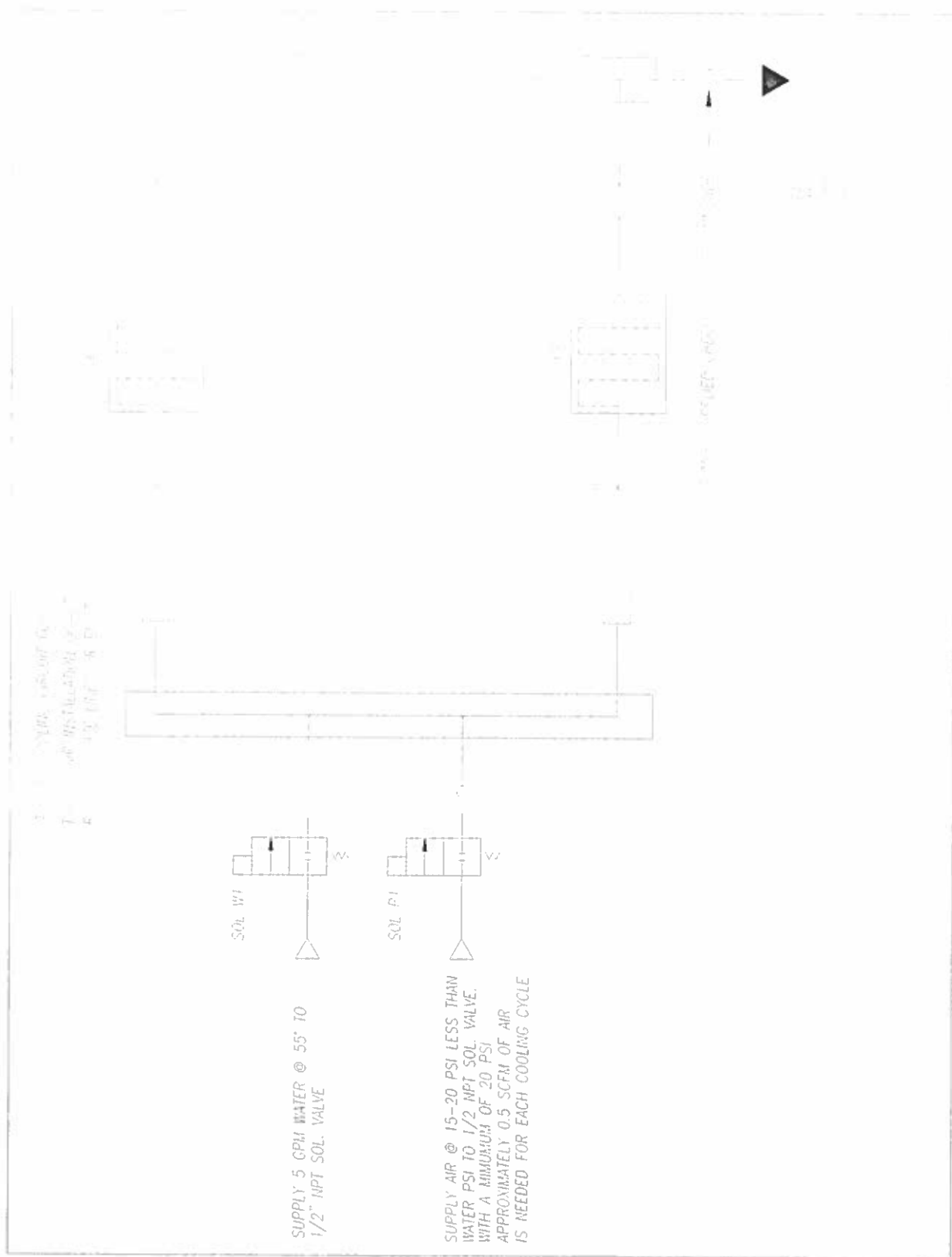
WATER ONLY when platen temperature is below 350° F. (177° C.)

TYPICAL DRAIN AND SUPPLY LINE HOOK-UP
FOR PRESSES THAT HAVE TO BE DRAINED UPWARD
TYPICAL AIR INSTALLATION @ 40% HUMIDITY AND 70 F
RUN FULL SIZE LINES OR BIGGER TO COMPONENTS

NOTE:
FOR DRAIN LINES THAT HAVE TO BE RUN UPWARD
A CONDENSATE RETURN PUMP SYSTEM IS RECOMMENDED
TO GET PROPER COOLING.
USE ONLY STEEL PIPE FOR THESE CONNECTIONS
REFER TO MANUAL FOR ADDITIONAL INFORMATION.



(STERILCO WATER
3/4" NPT COUPLER
(INLET STRAINER 1"
3/4" NPT COUPLER
SUPPLY 3-6 GPM
@ 55' F TO 5' F



3-9 HYDRAULIC OIL & LUBRICATION

The lubrication points, types of lubricants, and lubrication services required are listed below in Table 3-1. Refer to the **WABASH MPI** lubrication specifications at the end of this section for a listing of approved products for your machine. Use only new or refined, properly formulated oil in this machine. **Do not use recycled oil.** Turn off main disconnect switch before performing any maintenance or lubrication work.

IMPORTANT: All hydraulic oil should be pre-filtered to 10 microns before it is added to the system.

LUBRICATION POINT	LUBRICATION SERVICE
Oil reservoir	Fill oil reservoir through fill port on top of tank. Using an auxiliary filter unit with 10 micron filter is recommended. Fill tank with filtered oil until the oil level is approximately 3/4 of the way up on the sight gauge.
Electric motor	Two shots of grease.
Moving platen	After wiping away old grease from guide rods add grease until fresh grease is seen.

Table 3-1: Initial Lubrication

NOTE: Do not use high temperature grease on guide rods, damage to bushings may occur.

3-10 LUBRICANT SPECIFICATIONS AND SUPPLIES

The following, provides specifications and supplier information for each type of lubricant needed for your machine.

3-11 GREASE

Any premium quality multipurpose grease is recommended for proper lubrication. The following products are suggested for use with this machine.

RECOMMENDED GREASE

<u>SUPPLIER</u>	<u>PRODUCT NAME</u>
Chevron Rykon	Premium Grease EP
Shell	Alvania®EP-2
Phillips	Philube Polytac™EP-2
Marathon	Maratech®HDP

The following products are suggested for use with this machine when you need to use food grade grease instead of conventional grease. Therefore, it is strongly recommended that these products not be mixed.

WABASH MPI does not certify the food grade nature of these greases. Contact the fluid manufacturer for certification of properties.

RECOMMENDED FOOD GRADE GREASE

<u>SUPPLIER</u>	<u>PRODUCT NAME</u>
Fiske Brothers.....	Lubriplate ACL Series
JAX Industrial Lubricants	JAX Magna-Plate 36 Series
Kluber Lubricating Corp.	Paraliq GA 531 (NLGI #1.5 only)
Master Lubricants.....	Lubriko CW-606-B (NLGI #2 only)
Witco Chemical.....	Aluminum Complex EP2 Food Machinery Grease (NLGI #2)

3-12 FILLING THE OIL RESERVOIR

The oil reservoir should be filled with of hydraulic oil as specified below. Oil should be pumped through a filter cart with a 10 **micron absolute** filter element. **Do not** pour oil directly into the reservoir. After start-up, check oil level and add oil to full mark on oil level gauge if required.

STANDARD MODEL	APPROXIMATE OIL CAPACITY
15 / 30	5 gallons

NOTE: Presses equipped with special options, faster speeds, may require larger oil reservoirs.

3-13 RECOMMENDED HYDRAULIC OIL

A premium grade of mineral base, high pressure, hydraulic oil with anti-wear and anti-foaming additives with an ISO viscosity rating of 46 cSt (Centistokes) at 40°C (100°F) and a viscosity index of 90+ with equivalent or greater specification of the oil listed below, can be used, provided it is filtered through a 10 micron absolute filter, prior to being added to the hydraulic reservoir.

WARNING: If oil is not filtered through a **10 MICRON ABSOLUTE FILTER** before being placed into the hydraulic reservoir, the **WARRANTY MAY BE VOID.**

IMPORTANT: **Do not** use fire retardant ester based oils, transmission fluid, brake fluid, or water-glycol mixes.

Always add **clean** oil to the reservoir from a **clean** container through a 10 Micron absolute filter.

WARNING: If oil is not filtered through a **10 MICRON ABSOLUTE FILTER** before being placed into the hydraulic reservoir, the **WARRANTY MAY BE VOID.**

RECOMMENDED HYDRAULIC OIL

SUPPLIER

PRODUCT NAME

Exxon.....	NUTO H46
Gulf.....	Harmony 46AW
Kendall	Kenoil 051
Amoco	Rykon 46R or Amoco AW46
Shell.....	Tellus 46

NOTE: The oil temperature must be maintained between 105°F and 120°F. connect the cooling if necessary, for the machine to operate properly.

3-14 CHECK FOR PROPER PUMP MOTOR ROTATION

Verify the motor is rotating properly by looking through the slot in the motor housing at the direction of the cooling fan rotation. If the motor is rotating improperly, reverse any two wires at the disconnect.

IMPORTANT: DO NOT reverse the wires at the motor starter.

3-15 EXHAUST GAS OR DUST REMOVAL

If the product you use in the press produces dust or gases that could be harmful to the operator, attach an exhaust system to the press. This can be done by either attaching the exhaust vent hood to the top of the guard, or by cutting a hole in the back of the guard and attaching the exhaust vent over the cutout. The cutout must be completely covered. The vent hood could also be mounted to the top bolster with flexible tubing, to allow for daylight adjustment. Airflow will then be drawn up, around the material, and out through the exhaust system.

SECTION 4: OPERATION

TABLE CONTENTS

4-1	Operator Safety	1
4-2	Pre Start-Up Checks	1
4-3	Operator Controls	2
4-4	Start-Up	6
4-5	Shut Down	6
4-6	Operating Instructions	7
4-7	Platen Reheat	11
4-8	Temperature Controllers (West 6100)	12
4-9	Operator Interface	14
4-10	Slow Down & Reset Switch Adjustment	21

SECTION FOUR**OPERATION****4-1 OPERATOR SAFETY**

1. When operating a WABASH MPI press, proper personal protective equipment should be worn at all times.

CAUTION:	When using a press with heated platens, gauntlet gloves should be worn to protect the forearms and hands.
-----------------	---

CAUTION:	WABASH MPI recommends the use of safety glasses and guards while operating this equipment.
-----------------	---

4-2 PRE START-UP CHECKS

1. Check that all auxiliary equipment (such as the hot oil unit, steam generator, or chiller) are ready for operation.
2. Check the electrical and mechanical connections. Verify the electrical supply is the correct voltage, phase and frequency.
3. Check that all optional safety shields are installed and gates are closed.
4. Check that there are no objects in the mold area.
5. Check that the reservoir oil level is correct.

4-3 OPERATOR CONTROLS

* The following lists are an explanation of each pushbutton, pilot light and selector switch located on the operator panel and may not be on each unit.

Standard Unheated Press

1. "POWER ON" - This is a Red, illuminated push/pull button that, when pulled this will energize the control circuit. When the control circuit is energized, this button will be illuminated. When pressed will de-energize the control circuit.
2. MODE "MANUAL - SEMIAUTOMATIC" - This is a two position selector switch that selects the mode of operation of the press. "MANUAL" mode allows the press to operate by manual initiation of the controls. "SEMIAUTOMATIC" mode allows the press to operate with the operator entered values and requires the manual initiation of the closing of the press.
3. "CLOSE" - This is a green pushbutton that works in conjunction with item 7 Pressing and holding these two buttons simultaneously will close the press. Releasing one or both of these buttons before the "CLAMP SEALED" pilot light illuminates, will stop the closing of the press.
4. "CLOSE" - Same as item 6.
5. "CLAMP SEALED" - This is an amber pilot light that indicates the clamp is closed and under pressure. The operator can release the "CLOSE" buttons when this light illuminates.
6. "OPEN" - This is a yellow mushroom head pushbutton that, when pressed, in the "SEMIAUTOMATIC" mode of operation, will open the press. When the press is in the "MANUAL" mode of operation this button must be pressed and held to open the press. Releasing the button at any point before the full open position is reached will stop the opening of the press.

Standard Press With Optional Heated Platens, Low Pressure And Bump

1. "POWER ON" - This is a Red, illuminated push/pull button that, when pulled this will energize the control circuit. When the control circuit is energized, this button will be illuminated. When pressed will de-energize the control circuit.
2. "HEAT ON/OFF" - Illuminated push/pull button that, when pulled will energize the heat circuit. When the heat circuit is energized, the button light will be illuminated. When pressed will de-energize the power to the temperature controllers.

3. MODE "MANUAL - SEMIAUTOMATIC" - This is a two position selector switch that selects the mode of operation of the press. "MANUAL" mode allows the press to operate by manual initiation of the controls. "SEMIAUTOMATIC" mode allows the press to operate with the operator entered values and requires the manual initiation of the closing of the press.
4. "CLOSE" - This is a green pushbutton that works in conjunction with item 13. Pressing and holding these two buttons simultaneously will close the press. Releasing one or both of these buttons before the "CLAMP SEALED" pilot light illuminates, will stop the closing of the press.
5. "CLOSE" - Same as item 12.
6. "CLAMP SEALED" - This is a amber pilot light that indicates the clamp is closed and under pressure. The operator can release the "CLOSE" buttons when this light illuminates.
7. "OPEN" - This is a yellow mushroom head pushbutton that, when pressed, in the "SEMIAUTOMATIC" mode of operation, will open the press. When the press is in the "MANUAL" mode of operation this button must be pressed and held to open the press. Releasing the button at any point before the full open position is reached will stop the opening of the press.

Standard Press with Optional Heated and Cooled Platens, Auto Reheat, and Low Pressure

1. "POWER ON" - This is a Red, illuminated push/pull button that, when pulled this will energize the control circuit. When the control circuit is energized, this button will be illuminated. When pressed will de-energize the control circuit.
2. "HEAT ON/Off" - Illuminated push/pull button that, when pulled will energize the heat circuit. When the heat circuit is energized, the button light will be illuminated. When pressed will de-energize the power to the temperature controllers.
3. MODE "MANUAL - SEMIAUTOMATIC" - This is a two position selector switch that selects the mode of operation of the press. "MANUAL" mode allows the press to operate by manual initiation of the controls. "SEMIAUTOMATIC" mode allows the press to operate with the operator entered values and requires the manual initiation of the closing of the press.
4. "CLOSE" - This is a green pushbutton that works in conjunction with item 15. Pressing and holding these two buttons simultaneously will close the press.

Releasing one or both of these buttons before the "CLAMP SEALED" pilot light illuminates, will stop the closing of the press.

5. "CLOSE" – Same as item 9.
6. "CLAMP SEALED" - This is a amber pilot light that indicates the clamp is closed and under pressure. The operator can release the "CLOSE" buttons when this light illuminates.
7. When the "SLOWDOWN" position is actuated, the "CLAMP SEALED" light illuminates, indicating that the operator may release the "CLAMP CLOSE" push buttons. The press will continue to build pressure until the gauge needle makes contact with the setting on the gauge. At this time the motor will shut off. The motor will restart when ever the pressure would drop off from the gauge switch and the pressure will be maintained by the restarting of the motor.

INSTRUCTIONS FOR CONTROL-PRESSURE-CONTACT GAUGE & RELIEF VALVE

The contact gauge has built-in contacts on an adjustable pointer. The gauge is calibrated in tons, and has been adjusted to compensate for the weight of the ram, moving plate and platens by using an electronic load cell during assembly of the press.

The moving pointer is adjusted by turning the center knob to the desired tonnage. When the press closes, pressure will build until the gauge pointer corresponds with the set pointer. The presses pump motor will shut-off and the pressure will remain at this setting.

Due to small internal leakage across valve spools, cylinder seals, etc., the pressure will decline very slowly until the two pointers no longer correspond. The pump motor will then automatically restart and build the pressure back to the required pressure setting.

The obvious advantage of this system is not only power savings, since the pump motor is operating at a minimum of the closing time, but it also reflects a lower heat generation in the hydraulic system.

Since the above system does result in a slight pressure fluctuation, a more precise clamp pressure control may be obtained, by moving the contact gauge to a higher setting than desired, and adjusting the panel mounted relief valve under the control panel to the exact pressure setting required. With this method the pump motor will operate continuously, maintaining the desired pressure on the work surface. Oil temperature must be watched closely, since heat is being generated by the oil passing over the relief valve. Turn on your heat exchanger water if necessary.

8. "OPEN" - This is a yellow mushroom head pushbutton that, when pressed, in the "SEMI-AUTOMATIC" mode of operation, will open the press. When the press is in the "MANUAL" mode of operation this button must be pressed and held to open the press. Releasing the button at any point before the full open position is reached will stop the opening of the press.

4-4 START-UP

After the pre start-up checks in Section 4-2 have been completed, perform the following steps to start-up the press.

1. Turn on the water supply. (Required if contact gauge is not be used.)
2. Turn on (close) the disconnect switch.
3. Pull the "POWER ON" pushbutton.
4. Press and release both "CLAMP CLOSE" push button quickly. The motor should spin, confirm proper motor rotation by observing, the direction of the cooling fan rotation, through the slots in the motor housing. There is a directional arrow on the motor housing to indicate proper rotation. If motor is rotating improperly, reverse any two wires at the disconnect.

IMPORTANT: DO NOT reverse the wires on the motor starter.
--

IMPORTANT: The hydraulic pump can be damaged if the motor is running in the wrong direction.

4-5 SHUT DOWN

1. Press the "POWER" pushbutton off.

For maintenance or long-term shutdown, turn off (open) the disconnect switch and lock out. In addition, turn off the water and air supplies.

4-6 MANUAL OPERATION

1. “POWER ON” - This is a Red, illuminated push/pull button that, when pulled this will energize the control circuit. When the control circuit is energized, this button will be illuminated. When pressed will de-energize the control circuit.
2. Select the “MANUAL” position of the “MAN/SEMIAUTO” selector switch.
3. “HEAT ON/Off” – Illuminated push/pull button that, when pulled will energize the heat circuit. When the heat circuit is energized, the button light will be illuminated. When pressed will de-energize the power to the temperature controllers.
4. Adjust the temperature controller to the desired setpoint. Refer to controller manual for controller information.
5. Close the clamp by simultaneously depressing and holding the dual “CLAMP CLOSE” push buttons. The clamp will close at a rapid speed until the “SLOWDOWN” position is actuated.
6. When the “SLOWDOWN” position is actuated, the “CLAMP SEALED” light illuminates, indicating that the operator may release the “CLAMP CLOSE” push buttons. The press will continue to build pressure until the gauge needle makes contact with the setting on the gauge. At this time the motor will shut off. The motor will restart when ever the pressure would drop off from the gauge switch and the pressure will be maintained by the restarting of the motor.

**INSTRUCTIONS FOR CONTROL-PRESSURE-CONTACT
GAUGE & RELIEF VALVE**

The contact gauge has built-in contacts on an adjustable pointer. The gauge is calibrated in tons, and has been adjusted to compensate for the weight of the ram, moving plate and platens by using an electronic load cell during assembly of the press.

The moving pointer is adjusted by turning the center knob to the desired tonnage. When the press closes, pressure will build until the gauge pointer corresponds with the set pointer. The presses pump motor will shut-off and the pressure will remain at this setting.

Due to small internal leakage across valve spools, cylinder seals, etc., the pressure will decline very slowly until the two pointers no longer correspond. The pump motor will then automatically restart and build the pressure back to the required pressure setting.

The obvious advantage of this system is not only power savings, since the pump motor is operating at a minimum of the closing time, but it also reflects a lower heat generation in the hydraulic system.

Since the above system does result in a slight pressure fluctuation, a more precise clamp pressure control may be obtained, by moving the contact gauge to a higher setting than desired, and adjusting the panel mounted relief valve under the control panel to the exact pressure setting required. With this method the pump motor will operate continuously, maintaining the desired pressure on the work surface. Oil temperature must be watched closely, since heat is being generated by the oil passing over the relief valve. Turn on your heat exchanger water if necessary.

9. Open the clamp by depressing and holding the "CLAMP OPEN" pushbutton. The "CLAMPED SEALED" light will de-energize and the clamp will open until the pushbutton is released or the "CYCLE RESET" proximity switch is actuated.
10. When the "CYCLE RESET" limit switch is actuated, the press is ready for another cycle.

IMPORTANT:	Momentarily pressing the "CLAMP OPEN" pushbutton at any time will interrupt the cycle and the clamp will open.
-------------------	--

	Any timed portion of the semiautomatic cycle can be eliminated by selecting the "OFF" setting of that function. However, at least one of the pressure ranges, "LOW PRESSURE" or "HIGH PRESSURE", must be selected.
--	--

SECTION 5: MAINTENANCE

TABLE OF CONTENTS

5-1	Servicing the Hydraulic System	1
5-2	Symptoms of Contaminated Oil	2
5-3	Heater Replacement	2
5-4	Platen Daylight Adjustment	3
5-5	Platen Parallelism	6
5-6	Mold Size versus Tonnage Chart	8
5-7	Recommended Spare Parts	9
5-8	Recommended Preventive Maintenance	10

SECTION FIVE**MAINTENANCE****5-1 SERVICING THE HYDRAULIC SYSTEM**

CAUTION:	Remove hydraulic pressure from system before loosening any hydraulic fittings.
-----------------	--

IMPORTANT:	Operating the press without filters installed will void the warranty.
-------------------	---

IMPORTANT:	Filter cleaning or replacement is an important part of press maintenance.
-------------------	---

WABASH MPI Budget Series Presses are equipped with a 100 mesh filter on the suction lines. These filters protect the pumps from contamination. Regular filter cleaning and/or replacement will keep your press operating at peak efficiency.

The filter is located in the hydraulic oil reservoir.

To clean the filter:

- A. Open the press so the system is not under pressure.
- B. Turn off and lock out electrical power to the press.
- C. Drain the oil reservoir. Dispose of the contaminated oil following local and federal regulations.
- D. Loosen the clean-out door and remove it from the reservoir.
- E. Remove the filter element.
- F. Replace the filter if it is worn or cannot be cleaned. Empty any fines that may have collected on the filter element.
- G. Install the cleaned (or new) filter on the suction line.
- H. Replace and secure the clean-out door.
- I. Refill the oil reservoir with clean hydraulic oil pumped through a filter cart. (See Section 3-12)
- J. Jog the pump until primed. You may need to loosen a fitting on the outlet of the pump to bleed the air out of the system.

5-2 SYMPTOMS OF CONTAMINATED HYDRAULIC OIL

The hydraulic oil required for use in the **WABASH** press, like all hydraulic oils, degrades after an indefinite period of time. Useful life depends on variables such as moisture content, contamination, and operating conditions.

Your **WABASH** press may need new hydraulic oil if it exhibits any of the following symptoms:

- Elevated oil temperature with recommended cooling in operation.
- Milky color rather than clear.
- Burnt odor.

5-3 HEATER REPLACEMENT (WHERE APPLICABLE)

WARNING: Disconnect all power to the press before service.

1. DISCONNECT ALL POWER TO THE PRESS. "LOCK OUT" and "TAG OFF" the main breaker to the press.
2. Remove the thermocouple(s) from the adapter on the back of the platen and move away from the heater box.
3. Remove the heater box cover or complete heater box (whichever type is installed) from the back of the platen.
4. Locate the burned-out heater elements, and disconnect the wires.

IMPORTANT: Mark the wiring as necessary to ensure exact replacement to prevent heater imbalance.

5. Pull heater elements straight out the back of the platen. Some force will be required as heaters are peened in place at installation.
6. Before installing new heater elements, make sure to round out the heater hole with a file or reamer until the new heater slides easily into place.
7. Add a high temperature anti-seize compound on the new heater(s) and insert until 1/4" (6.5 mm) of the heater is protruding from the back of the platen. Push the heater in so that it is flush with back of the platen and peen it on place.

8. Rewire and retape the new heater(s). Use a high temperature electrical tape. We recommend 3-M #69 glass tape. Reverse items 1, 2 and 3.

NOTE:	Use only high temperature wire and electrical connectors if required.
--------------	---

WARNING:	If your press is equipped with a door in the guard, and the door requires a tool to be opened it is for maintenance purposes only. The press is not to be run with this door open.
-----------------	--

5-4 PLATEN DAYLIGHT ADJUSTMENT

CHANGING DAYLIGHT (DISTANCE BETWEEN BOLSTERS OR PLATENS)

When necessary to level platens or change daylight:

- A. Loosen 5/16" Allen-head set screws (Fig. 1) in both the top and bottom nuts serving the top head plate. (Fig. 2)

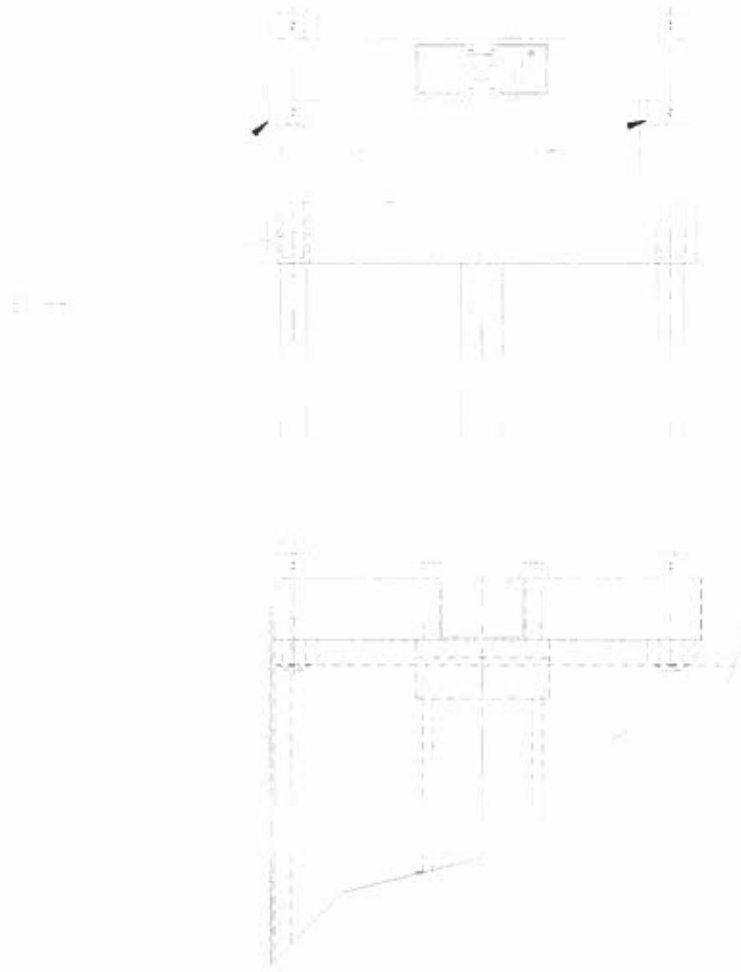
FIG. 1



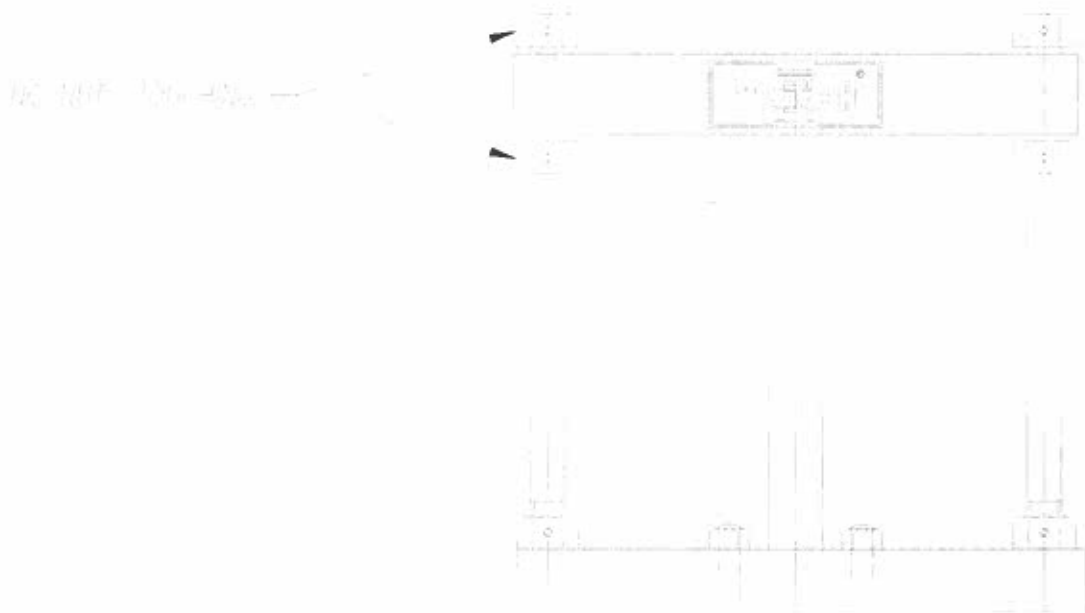
FIG. 2



- B. Close the press until the moving platen is touching the stationary platen. If the daylight is greater than the stroke, parallels will have to be used. (See Fig. 4)
- C. Set the relief valve, contact gauge or digital pressure setting to maximum press capacity, and close the press. Build pressure to the maximum setting.

FIG. 3

- D. The nuts on the bottom of the bolsters (Fig.3) will now be relieved of pressure and should be loosened by hand. (A wrench may be necessary to loosen the nuts.) Loosen the nut approximately 1/4" (6.5 mm). Relieve the hydraulic pressure until the top head is floating on the bottom platen. The platens are now parallel and none of the nuts should be touching the top head (Fig. 4).

FIG. 4

- E. Adjust the platens up or down as desired by positioning the hydraulic cylinder.
- F. When the stationary platen of the press is in the desired location, tighten the lower nuts evenly, using finger pressure only. (See Fig. 4)
- G. Evenly tighten the top nut finger tight and set the 5/16" Allen set screws so the large nuts will not turn.
- H. Close the press to full pressure and tighten the lower nuts finger tight. Tap a little tighter with a small hammer and secure the 5/16" Allen set screws. The press is now level and adjusted. Ensure that all set screws have been secured.

5-5 PLATEN PARALLELISM

EQUIPMENT REQUIRED:

- .125" (3mm) Solid Core Solder
- 1" (25mm) Micrometer
- Suitable sized wrench
- 5/32" Allen Wrench

CHECKING PRESS LEVEL

- (1) Platens are to be at room temperature.
- (2) Cut (9) strips of solder 1" (25mm) long.
- (3) Place the solder in the opening of the press. (In multi-opening presses, do one opening at a time.)
- (4) Solder should be placed approximately 2" (50mm) from the edge of the platen and one piece in the center.

1	4	7
2	5	8
3	6	9

- test spots

(FRONT)

Solder location on platen

- (5) Close press and put approximately 15 or 30 tons (13 to 27 metric tons) (depending on which model) of force on solder. (Maintain pressure for about 30 seconds)
- (6) Open the press.
- (7) Measure the thickness of the solder with a micrometer.
- (8) Solder should be compressed to approximately 2/3 of the original thickness for an accurate reading to be taken

EXAMPLE: Reading

1. = .033 (.837mm)	4. = .033 (.837mm)	7. = .033 (.837mm)
2. = .033 (.837mm)	5. = .033 (.837mm)	8. = .034 (.862mm)
3. = .032 (.812mm)	6. = .034 (.862mm)	9. = .037 (.939mm)

Based on these findings, the front right corner of the top head will have to be lowered.

- (9) If all four corners are within specifications and the platen is still not within specifications, the following changes will need to be made:
- (a) Use shims to level the platens.
 - (b) Have platens resurfaced. The insulation board should be replaced anytime the platens are removed to be resurfaced.

NOTE: Heated platen mounting bolts must be checked regularly for proper torque specifications. The thermal expansion and contraction of the platens and bolts have allowed the bolts to loosen in some instances. Platen mounting bolts should be checked weekly when in a standard production cycle.

RECOMMENDED HEATED PLATEN BOLT TORQUE SPECIFICATIONS

<u>SCREW SIZE</u>	<u>TORQUE</u>
INCHES	FT-LBS
.375	15
.500	15
.625	25
.750	40

5-6

MOLD SIZE VERSUS TONNAGE CHART

Maximum tonnage allowed on different mold sizes before platen coining occurs.

MOLD SHAPE				MOLD AREA		MAXIMUM ALLOWABLE FORCE	
SQUARE		ROUND				TONS	
IN.	CM	IN.	CM	IN. ²	CM ²	U.S.	METRIC
		3	7.62	7.07	45.62	4.25	3.86
3	7.62			9.00	58.07	5.50	4.99
		4	10.16	12.56	81.04	7.50	6.80
4	10.16			16.00	103.23	9.60	8.71
		5	12.70	19.64	126.72	11.75	10.66
5	12.70			25.00	161.30	15.00	13.61
		6	15.24	28.27	182.40	17.00	15.42
6	15.24			36.00	232.27	21.60	19.59
		7	17.78	38.48	248.27	23.00	20.87
7	17.78			49.00	316.15	29.40	26.67
		8	20.32	50.27	324.34	30.15	27.35
8	20.32			64.00	412.93	38.40	34.84
		9	22.86	63.62	410.48	38.17	34.63
9	22.86			81.00	522.61	48.60	44.09
		10	25.40	78.54	506.74	47.12	42.75
10	25.40			100.00	645.20	60.00	54.43
		11	27.94	95.03	613.13	57.02	51.73
11	27.94			121.00	780.69	72.60	65.86
		12	30.48	113.13	729.91	67.85	61.55
12	30.48			144.00	929.09	86.40	78.38
		14	35.56	153.94	993.22	92.35	83.78
14	35.56			196.00	1264.59	117.60	106.68
		16	40.64	201.06	1297.24	120.60	109.40
16	40.64			256	1651.71	153.60	139.34
		18		254.47	1641.84	152.65	138.48
18	45.72		45.72	324	2090.45	194.40	176.35

5-7 RECOMMENDED SPARE PARTS

The following parts should be kept in stock to minimize downtime:

- Heater Contactor
- Fuses
- Cartridge Heater(s)
- Thermocouple
- Filters
- Limits or Proximity Switches
- Cylinder Rod Seals
- Hydraulic, Water, or Air Valve Solenoids
- Pushbutton or Pilot Light Bulbs

Please consult the bill of materials provided with the original information packet supplied at time of machine shipment for a complete description and part number.

5-8 RECOMMENDED PREVENTIVE MAINTENANCE

1. Daily Maintenance Checks

- A. Clean platen surfaces of any foreign materials. Wipe with clean dry cloth.
- B. Check platen mounting bolts for tightness (180 in/lbs).
- C. Check for any hydraulic fluid or cooling water leakage.
- D. Check stress rod lubrication. (Do not over lubricate.)
- E. Check air line filters for water accumulation and drain if water is present.
- F. During platen heat up, at approximately 100-125°F use a hand held pyrometer to check for any HOT or COOL spots. HOT or COOL spots could indicate a bad heating element or water leaking by the valves into the platen.(If a HOT or COOL spot is detected, have Maintenance personnel check for a possible problem.)

2. Bi-Annual Inspections

PLATENS

- A. Check platen mounting bolts for tightness.
- B. Run solder test to check for flatness and parallelism. Clean all foreign material from platens before solder test is performed.
- C. Make proper adjustment if platens do not meet required specifications. (Refer to Section 5-5)
- D. Check for any leaks in the platen cooling system. (Replace cooling hoses with direct replacement.)

HEATERS

- A. Remove electrical power from press.
- B. Inspect heater wires and jumpers between heaters for broken or frayed leads.
- C. Repair or replace any broken or frayed wires.
- D. Use an ohmmeter to check all heaters for an open or short condition.
- E. Replace any defective heaters.

TEMPERATURE CONTROLLERS AND CONTACTORS

Check that temperature controller is displaying the proper temperature.

Check that temperature controller is controlling temperature at setpoint.

Check contactor fuses.

- D. Check for the proper operation of the mercury tube on each contactor. (3 per contactor) Remove the wires from each end of the mercury tube, energize the coil on the mercury relay. Using an ohmmeter, check for continuity through the mercury tube. A properly operating mercury tube, should have very little resistance through the tube with the coil energized. (If a mercury relay is found to be defective and is replaced, dispose of the defective mercury relay following all local and federal regulations.)
- E. Check for any loose wires or connections at the contactor terminals.

THERMOCOUPLE

- A. Remove the thermocouple from the platen, clean the tip with steel wool.
- B. Check for loose or damaged wires and conduit.
- C. Replace thermocouple if there is any noticeable damage.

HYDRAULIC SYSTEM

- A. Check for any leakage of hydraulic fluid.
- B. Repair or replace any defective hydraulic component.
- C. Check hydraulic fluid level, which should be $\frac{3}{4}$ full on the sight glass.
- D. Replace (optional) high pressure or return line filter element. Refer to hydraulic circuit.
- E. Clean hydraulic heat exchanger water inlet screen. Refer to hydraulic circuit.

CLEANING OF THE PRESS

- F. Painted surfaces should be cleaned with a household cleaner.
- G. Non-painted surfaces should be kept clean and wiped down with a light coat of oil or grease.

3. Annual Inspections

- A. Replace hydraulic fluid. Refer to sections 3-12 and 3-13.
- B. Clean the inside of the hydraulic reservoir.
- C. Clean or replace suction line screen.
- D. Calibrate the clamp pressure gauge. *
- E. Calibrate the platen temperature controllers. *

* This should be completed by a **WABASH MPI** service technician.

WABASH MPI PRESS PREVENTATIVE MAINTENANCE CHECK LIST

INSPECTION DATE: _____

Model # _____ Serial # _____

WEEKLY INSPECTION	WK 1	BY	WK 2	BY	WK 3	BY	WK 4	BY
Inspect all bushings for wear; replace if worn, grease weekly.								
Check all platen mounting bolts for proper tightness								
Check all mold mounting bolts for proper tightness								
Filter hydraulic oil with external filter cart.								

MONTHLY INSPECTION	Performed by	Date
Disconnect and lock out power. Check the heater element for continuity with an ohmmeter.		/ /
Check the temperature tracking with an external pyrometer.		/ /

YEARLY INSPECTION	Date of last Inspection	Next Scheduled Inspection
Replace hydraulic oil		
Calibrate Pressure Indicator*		
Level Platens*		

* Should be performed by WABASH MPI Service Technician.

SECTION 6: TROUBLESHOOTING

TABLE OF CONTENTS

Figure 6-1	Press Will Not Close	1
Figure 6-2	Press Platens Will Not Heat	2
Figure 6-3	Press Will Not Build Pressure	3

SECTION SIX

TROUBLESHOOTING

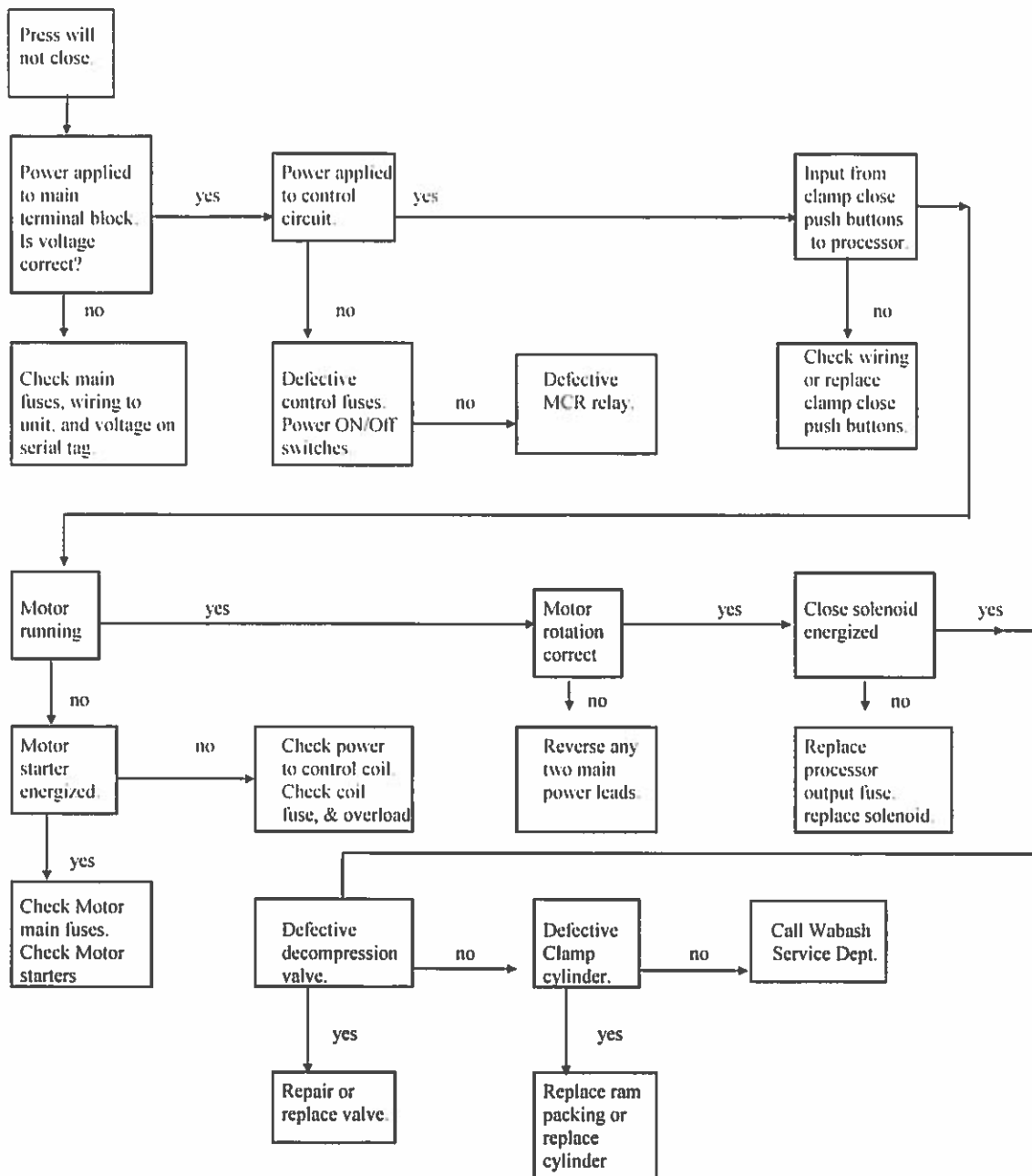
FIGURE 6-1: Press will not close.

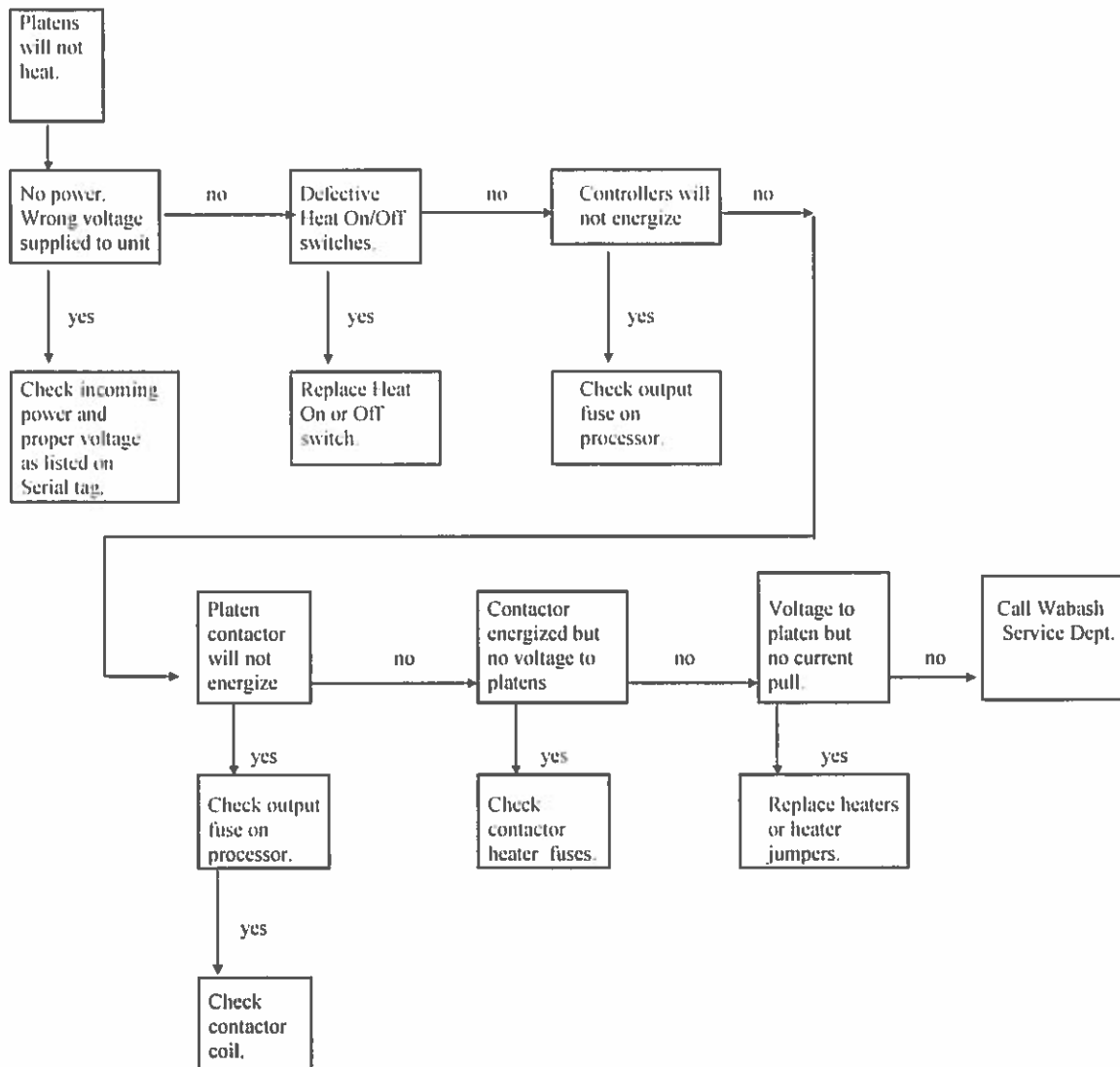
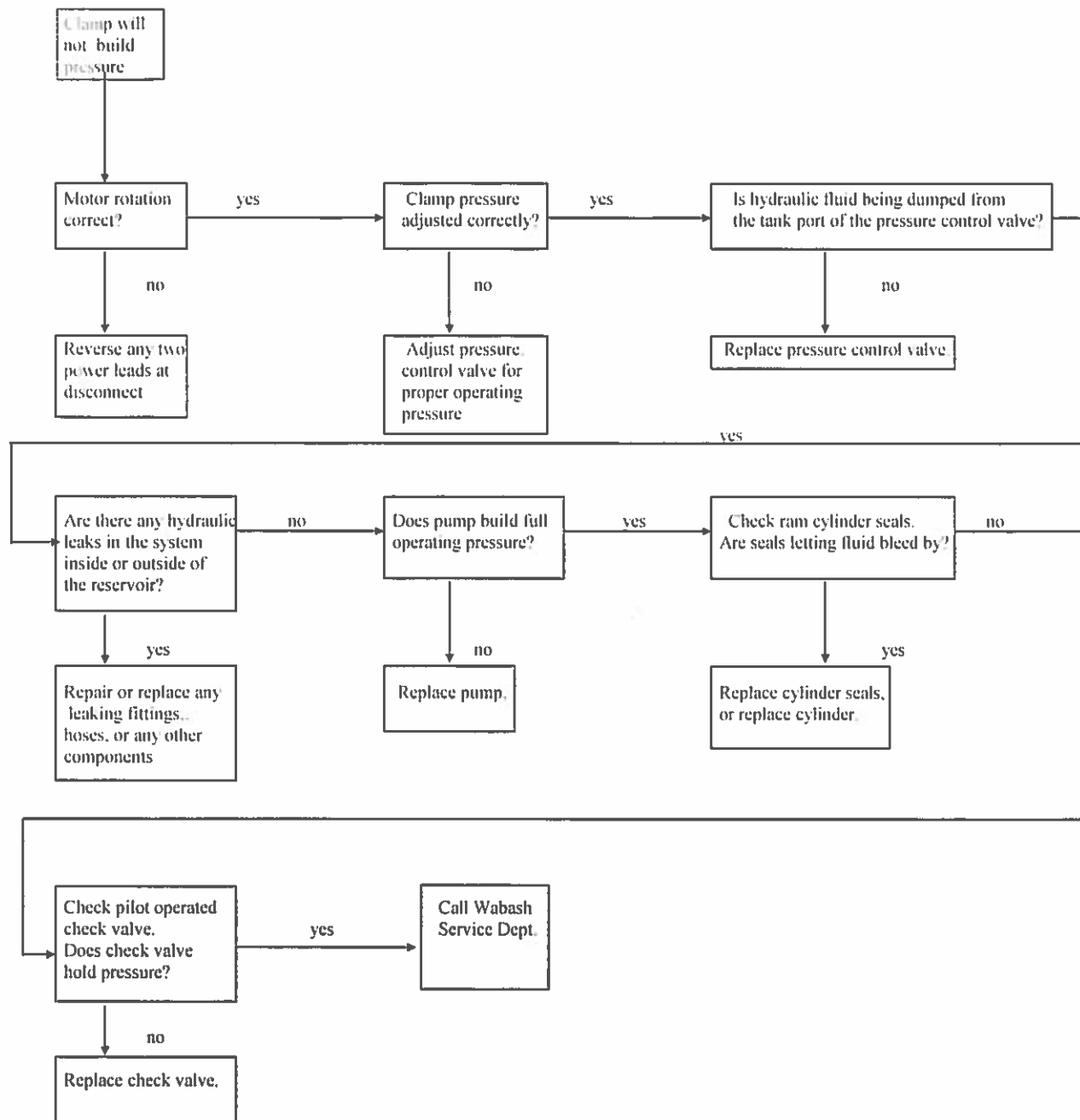
FIGURE 6-2: Press platens will not heat.

FIGURE 6 – 3: Press will not build pressure.



SECTION 7: WABASH MPI SERVICES

TABLE OF CONTENTS

7-1	Technical Assistance	1
7-2	Returned Material Policy	2

SECTION SEVEN**WABASH MPI SERVICES****7-1 TECHNICAL ASSISTANCE****WABASH MPI PARTS DEPARTMENT**

Call from 7:30 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-1184, Extension 5262
E-mail, wabashmpi@corpemail.com

The Parts Department at **WABASH MPI** is ready to provide the parts to keep your equipment up and running. Original replacement parts ensure operation at design specifications. Please have the model and serial number of your equipment available when you call. Consult the Parts List included in your information packet for replacement part numbers.

WABASH MPI SERVICE DEPARTMENT

Call from 7:30 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-1184, Extension 5238 or 5243
E-mail, service@corpemail.com

WABASH MPI has a qualified Service Department ready to install, start-up, or service your press. Gauge calibration services are available. Contact Service Department for details. Yearly calibration and preventive maintenance by a **WABASH MPI** service technician is recommended.

WABASH MPI SALES DEPARTMENT

Call from 7:30 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-1184
E-mail, wabashmpi@corpemail.com

WABASH MPI products are sold through a worldwide network of independent sales representatives and distributors, as well as in-house sales personnel. Contact our Sales Department for the name of the sales representative or distributor nearest you.

7-2 RETURNED MATERIAL POLICY

1. Prior to the return of any material, authorization must be given by **WABASH MPI**. An RMA number will be assigned for the equipment to be returned.
2. A reason for requesting the return must be given.
3. All returned material purchased from **WABASH MPI** is subject to a 15% restocking charge.
4. All Returns are to be shipped prepaid.
5. The invoice number and date, or purchase order number and date must be supplied.
6. No credit will be issued for material that is not within the manufacturer's warranty period, and/or in new and unused condition, suitable for resale.

SECTION 8: WARRANTY

TABLE OF CONTENTS

8-1	Warranty Returns	1
8-2	Warranty Statement	1

SECTION EIGHT**WARRANTY**

8-1 WARRANTY RETURNS

1. Prior to the return of any material, authorization must be given by **WABASH MPI**. An RMA number will be assigned for the part or equipment to be returned. All warranty returns require a Purchase Order.
2. Reason for requesting the return must be given.
3. All returns are to be shipped prepaid. Return freight, and replacement parts freight, are the responsibility of the customer.
4. The invoice number and date, or purchase order number and date, must be supplied.
5. After inspecting the material, a replacement or credit will be given at **WABASH'S** discretion, if the item is found to be defective in materials or workmanship and it was manufactured by **WABASH MPI**. Purchased components are covered under their specific warranty terms.

8-2 WARRANTY

WABASH MPI warrants all equipment we manufacture to be free from defects in workmanship and materials when used under recommended conditions. The Company's obligation under this warranty is limited to those parts which, within twelve (12) months from delivery of equipment to original purchaser, are returned to the factory with transportation prepaid, and upon examination shall be found to be defective.

WABASH MPI neither assumes, nor authorizes any other persons to assume any liability in connection with the sale of its equipment, except under the conditions of this warranty.

This warranty does not cover any labor charges for replacement of parts, adjustment, repair, or any other work done. This warranty shall not apply to any apparatus which, in our opinion, has been subjected to misuse, negligence, or pressures in excess of the limit recommended, or which shall have been repaired or altered outside of the factory.

Replacement of defective material(s) will be FOB from the **WABASH MPI** factory. Replacement of component parts not manufactured by **WABASH MPI** will be limited to the warranty of the manufacturer of such parts.

APPENDIX

Glossary of Terms
Hydraulic Schematic
Electrical Circuit
General Arrangement Drawings

GLOSSARY OF TERMS

AIR PURGE:

A timed cycle of air pressure used at the end of the cooling cycle or when the heat is turned on that purges (expels) any residual (left over) water left in the cooling cores of a platen after the cooling cycle.

BOLSTERS:

Base Bolster : The plate attached to the press frame that supports the clamp assembly.

Moving Bolster : The main moving press member that the platen or mold half is mounted to. (Normally actuated by the clamp cylinders.)

Top Bolster : The stationary press member that is mounted to the top of the stress/tie rods.

BUMP/BREATHE:

An operation in the cycle when the clamp pressure is relieved for a short time period to vent trapped gases from the material and/or mold. This operation can occur multiple times when it is initiated.

CARTRIDGE HEATER:

A cylindrical shaped electric resistive heating device that is typically inserted into drilled holes of a platen or mold.

CAUTION:

A term used to indicate a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

CLAMP:

The portion of the press that holds the two mold halves and opens and closes the mold.

CLOSING SPEED:

The speed at which the clamp travels until making the slowdown position.
Usually
stated in inches per minute (IPM).

CONTACT GAUGE:

A control feature that shuts the hydraulic system off at the manual setpoint of the gauge and restarts it if the pressure bleeds off.

COUNTERBALANCE SYSTEM:

A system that provides for slowing, stopping or supporting, or any combination thereof, of a bolster and its attachments.

CURE TIME:

The amount of time the press clamp stays closed and under pressure after making the slowdown position.

DANGER:

A term used to indicate an imminently hazardous situation that, if not avoided, will result in death or serious injury.

DAYLIGHT:

The distance between the platen or bolster work surfaces when the moving bolster is in its home or fully retracted position.

DOWN-ACTING CLAMP:

A clamp assembly where the moving bolsters travels downward to apply pressure.

FLOATER:

A bolster or platen assembly that is suspended in the clamp opening with cylinders or hanger rods to provide multiple daylights.

GUARD:

A barrier or barriers which prevents entry of an individual's hand or other body part into the point of operation or other hazard area.

RESET POSITION:

The position of the moving bolster when the clamp cylinder(s) has retracted to switch position. This is usually full open position.

RIGGER:

One that is familiar with the moving, transporting, and installation of machinery.

SAFETY BLOCK:

A prop that, when inserted between opposing machine or tool members, prevents the press from closing of its own dead weight.

SLING:

A device used to lift or support a machine or component.

SLOWDOWN POSITION:

The position of the moving bolster when the clamp speed slows to pressing speed. This is usually 1/8 inch of being fully closed.

STRESS/TIE ROD:

The round bar that is usually threaded at on both ends that the bolsters are mounted to and support the total load (tonnage) of the clamp assembly. The moving bolster slides on these rods also.

STRIP HEATER:

A flat rectangular shaped electric resistive heating device that is typically placed under a platen or mold.

STROKE:

The amount of travel the rod of a cylinder can extend and retract.

TWO HAND CONTROL:

The control that requires the concurrent use (at the same time) of both of the operator's hands to both initiate and continue the press cycle during the hazardous portion of the press cycle.

UP-ACTING CLAMP:

A clamp assembly where the moving bolsters travels upward to apply pressure.

WARNING:

A term used to indicate a potentially hazardous situation that, if not avoided could result in death or serious injury.

Seals

Check valve

Relief Valve

Check Valve in pump

$$f''(x) = 3x^2$$

$$f'''(x) = 6x$$

$$f^{(4)}(x) = 6$$

$$f^{(5)}(x) = 0$$