

CARVER[®]

INSTALLATION AND OPERATION INSTRUCTIONS HEATED or COOLED PLATENS

IMPORTANT:
PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING THIS
EQUIPMENT



**Fisher Scientific
Bioblock**

Part of Thermo Fisher Scientific

Parc d'innovation - BP 50111 - F67403 Illkirch cedex

France

tél 03 88 67 14 14

fax 03 88 67 11 68

bioblock.vente@thermofisher.com

www.bioblock.com

Belgique / België

tél 056 260 260

fax 056 260 270

bioblock.belgium@thermofisher.com

www.bioblock.be

España

tfno 91 515 92 34

fax 91 515 92 35

bioblock.ventas@thermofisher.com

www.es.fishersci.com

NOTE: Performance figures stated in this manual are based on a Standard Atmosphere of 59 degrees F. (15 degrees C.) and 29.92" Hg (10,331 Kg/m²) at sea level and using 50 Hz electrical current. All of these factors are important considerations when selecting a hydraulic press. **CARVER, INC.** can advise you on proper selection and sizing of systems for the operating environment at your location.

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

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SECTION ONE

INTRODUCTION

1.1 INTRODUCTION

We are pleased to supply **CARVER** Laboratory Equipment for your facility. **CARVER** presses are used in many applications including research and development, specialized or low volume development situations, and quality testing. Thousands of presses are in use all over the world for numerous applications in the chemical, physical, biological, and mechanical fields wherever pressing is required.

1.2 ACCESSORIES

CARVER, INC. offers a variety of standard accessories for your press including Heated Platens, Heating and Cooling, or Cored Platens, Test Cylinder Outfits, French Pressure Cells, Swivel Bearing Plates, and Cage Equipment. All original **CARVER** accessories are designed and manufactured by **CARVER, INC.** These accessories ensure precise results for many applications, such as oil determination tests in food products, crushing analysis on cement core samples, molding of plastic quality control specimens, and preparing KBr or tracer pellets, etc.

Each accessory allows you to tailor the hydraulic press to your specific application. In addition to these standard items, we also manufacture custom presses and accessories for unique applications.

1.3 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.

2.1 SAFETY CONSIDERATIONS

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 which, if not avoided, may result in minor or moderate injury.

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

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

REPORTING A SAFETY DEFECT

NOTICE: If you believe that your equipment has a defect which could cause injury, you should immediately discontinue its use and inform CARVER, INC., at our address listed in this manual.

The principle factors which can result in injury are:

1. Failure to center the work over the ram in the platen area, resulting in eccentric loading, tilting, and possible movement of the work piece, which can then become a projectile;
2. Failure to level the top head of the press after it has been repositioned, which can produce the same results as in Number One, above;
3. Fracture of a specimen or part of the apparatus due to overload, resulting in flying fragments;
4. Occasional squirting of liquid from a pressed specimen;
5. Contact with hot plates or heated apparatus can produce severe burns.

2.2 GENERAL RESPONSIBILITY

NO MATTER WHO YOU ARE...

Press safety is important. Press owners, operators, mold setters, and maintenance personnel must realize that every day, all day, safety is a vital aspect of their jobs.

If your main concern is productivity, remember this. Loss of production always follows an accident involving a press:

- loss of a skilled operator (temporarily or permanently)

- breakdown of shop morale
- costly damage to press and/or tooling
- down time.

An effective press safety program is not only humanitarian, but is also economically sound.

Organize a safety committee or group, and hold regular meetings. Promote this group from the management level. Through this group, the safety program can be continually reviewed, maintained, and improved. Keep minutes or a record of the meetings.

Hold daily press inspections in addition to regular maintenance checks. You will keep your presses safe for production and exhibit your commitment to safety.

Please read and use this manual as a guide to molding machine safety. This manual contains safety warnings throughout, specific to each function and point of operation. It is to promote and increase safe press operation in your company.

2.3 OPERATOR RESPONSIBILITY

It doesn't end with fast and efficient production. The press operator usually has the most daily contact with the press and intimately knows its capabilities and limitations.

Plant and personal safety is sometimes forgotten in the desire to meet incentive rates, or through a casual attitude toward machinery formed over a period of months or years. Your employer probably has established a set of safety rules in your workplace. Those rules, this manual, or any other safety information will not keep you from being injured while operating your press.

ONLY YOU can make safety work for you by constantly thinking about what is safe and what is not. It is often the "just once" that a press operator reaches into a press to remove or adjust material, or rest a hand in the ram area while talking to a co-worker that results in serious injury.

Learn and always use safe press operation. Cooperate with co-workers to promote safe practices. Immediately report any potentially dangerous situation to your supervisor or appropriate person.

REMEMBER:

- **NEVER** place your hands or any part of your body in the mold area or other dangerous locations.
- **NEVER** operate, service, or adjust press or molds without the appropriate training and first reading and understanding this manual.
- **NEVER** try to pull material (either a part or scrap) out of the mold with your hands! If a part sticks in the mold, stop the press and call your supervisor.
- Before you start the press, check the following:
 - remove all maintenance crew equipment from the press area;
 - make certain safety blocks are removed from the mold;

be sure no objects (tools, nuts, bolts, clamps, bars) are laying in the press clamp area;

carefully look for obstructions left in the mold;

- If your press has been inoperative or unattended, even for a moment, check all settings before starting the next cycle.
- If your press has multiple platens, be sure **ALL** floating platens are completely open before reaching into the clamp area.
- At the beginning of your shift and after breaks, cycle the press several times to verify that the controls, press parts, molds and auxiliary equipment are functioning properly.
- Keep all safety guards in place and in good repair. **NEVER** attempt to bypass, modify, or remove safety guards. Such alteration is not only unsafe, but will void the warranty on your equipment.
- When changing press control settings to perform a different mode of operation, be sure selector switches are correctly positioned. Test cycle the press to verify it will operate as planned. Locking selector switches should be adjusted only by authorized persons and the keys removed after setting.
- Do not talk to others while operating a press. If you must talk, stop the press and step away from it until the conversation is completed.
- Report the following occurrences **IMMEDIATELY**:
 - unsafe operation or condition
 - unusual press action
 - leakage
 - improper maintenance
- **NEVER** stand or sit where you could slip or stumble into the press while operating it.
- **DO NOT** wear loose clothing or jewelry which can be caught while operating a press. Also cover or tie back long hair.
- **DAILY** clean the press and surrounding area, and inspect the machine for loose, missing, or broken parts.
- Shut off power to the press when it is not in use. Lock the control panel or disconnect switch in the **OFF** position or unplug press from power source.

2.4 MOLD SETTERS RESPONSIBILITY

What they sometimes forget is their own safety during the installation or removal of a mold. To successfully perform this job, the mold setter must gain a good working knowledge of the press, molds, materials, and must know how to use a mold truck and other handling equipment. Technical knowledge is not enough. The mold setter's sense of personal

safety is crucial. Installing and testing mold guards and point of operation safety devices is as important as properly mounting the mold to the press.

DON'T FORGET:

- **NEVER** place your hands or other part of your body within the mold area unless the power is **OFF** to the press.
- If the press has multiple openings, be sure that **ALL** floating platens are completely open before installing tooling.
- **NEVER** install, adjust, or remove molds without the appropriate training and first reading and understanding this manual.
- **NEVER** move molds or service the press with the electric power on or without blocks in place.
- Clean bolsters, platens, and molds before installing the mold set. Dirt or foreign materials can cause misalignment, resulting in operator injury and/or press and mold damage.
- **ALWAYS** lock out the control panel or disconnect switch in the [OFF] position to prevent unauthorized use or accidental starting of the press.
- **NEVER** install worn or damaged molds. Make sure the clamp pressure is properly adjusted, relative to the mold size (refer to the "Mold Size vs. Tonnage" chart in the Maintenance Section of this manual).
- Secure all molds to the mold truck before you move them.
- When clamping molds to the press, use the appropriate number and size of clamps to hold the molds securely (please consult your mold manufacturer if in doubt about appropriate clamp usage).
- After installing molds, make all necessary adjustments **BEFORE** cycling the press.
- Make sure all persons are clear of the press and remove all objects from mold area (tools, nuts, bolts, clamps, bars) before cycling.
- Watch the press in operation to make sure molds and equipment are working properly.
- Before the press is used for production, replace all guards and applicable safety devices to protect the operator.
- If the press operator is required to load or unload parts, provide safe and appropriate tools (cotton gloves, safety tongs, vacuum lifters, pliers, or other mechanical devices) for his or her use.
- When changing press control settings to perform a different mode of operation, be sure selector switches are correctly positioned. Test cycle the press to verify it will operate as planned. Locking type selector switches should be adjusted only by authorized persons and the keys removed after setting.
- **NEVER** change selector switches on the press during a cycle.
- If the press has been inoperative or unattended, even for a moment, check all settings before starting the next cycle.
- Report the following occurrences **IMMEDIATELY**:

unsafe operation or condition

unusual press action
leakage
improper maintenance

2.5 MAINTENANCE RESPONSIBILITY

Safety is essential to the good health of both man and machine. If you are a maintenance worker, you must make safety a priority in order to effectively repair and maintain press equipment.

BEFORE REMOVING, ADJUSTING, OR REPLACING PARTS ON A MACHINE, REMEMBER TO:

- **BLEED** all pressure from system components (refer to the Maintenance Section of this manual.)
- **TURN OFF** all air, water, and hydraulic pressure supplies and all accessory equipment at the machine.
- **DISCONNECT AND LOCK OUT** electrical power and attach warning tags to the press disconnect switch and air shutoff valve.
- If the press has multiple openings, be sure **ALL** floating platens are completely open before servicing.

When you need to perform maintenance or repair work on a press above floor level, use a solid platform, portable scaffolding lashed to the press, or a hydraulic elevator. If there is a permanently installed catwalk on your press, use it. The work platform should have secure footing and a place for tools and parts. **DO NOT** climb on presses or work from ladders.

If you need to repair a large press component, use appropriate handling equipment. Before you use handling equipment (portable "a" frames, electric boom trucks, fork trucks, overhead cranes) be sure the load does not exceed the capacity of the handling equipment or cause it to become unstable.

Carefully test the condition of lifting cables, chains, ropes, slings, and hooks before using them to lift a load. Be sure that all non-current carrying parts of electrical apparatus, electrical component enclosures, and the press frame are correctly connected to earth ground with an electrical conductor which complies with current codes. Install in accordance with the national and local codes which apply.

When you have completed the repair or maintenance procedure, check your work, remove your tools, rigging, and handling equipment.

Do not restore power to the press until all persons clear the area. Start and run the press until you are sure all parts are functioning correctly.

BEFORE. you turn the press over to the operator for production, install and adjust all guards and safety devices.

3.1 GENERAL INSTALLATION

To assist in the installation and operation of the platen assemblies, drawings are included in the appendix of this manual.

WARNING: FAILURE TO FOLLOW PROPER SAFETY PRACTICES COULD RESULT IN INJURY.

WARNING: Principle factors resulting in injury are:

- 1 - Failure to properly mount the platen assembly to the press.
- 2 - Failure to properly connect electrical service if required.
- 3 - Failure to connect utilities (water and steam) if required.

CAUTION: Safety glasses are to be worn when the press is in use.

IMPORTANT: The gauge on the CARVER laboratory press shows the total force exerted by the press. It DOES NOT show the pressure on the specimen (PSI/BAR). To find the PRESSURE (P) on the specimen, the observed FORCE (F) reading on the gauge must be divided by the specimen AREA (A), per the equation $P = F/A$. When using a CARVER pressure cell, use the ID measurement to find the actual AREA (A) of the specimen.

For Platen assemblies that require cooling, a water supply of 1-1 ½ GPM (4-6 LPM) at 50-60 PSI (3.5-4.5 bar) and an air supply of 0.5 SCFM (.25 Liters/sec) at 60 PSI (4.5 bar) is required.

3.2 6 in X 6 in (15 cm X 15 cm) PLATEN ASSEMBLY DESCRIPTION

CATALOG #	DESCRIPTION	VOLTAGE	TEMPERATURE RANGE	AMPS	ELECTRICAL SCHEMATIC	STEAM/COOLING SCHEMATIC
2101-2CE	6 X 6 (15.24cm X 15.24cm) ALUMINUM, HEAT	115V-1PH	50-260° C	13	140572A	
2101-4CE	6 X 6 (15.24cm X 15.24cm) ALUMINUM, HEAT	230V-1PH	50-260° C	6.5	140573A	
2102-1-2CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT	115V-1PH	50-260° C	13	140572A	
2102-1-4CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT	230V-1PH	50-260° C	6.5	140573A	
2103-1-2CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT/COOL	115V-1PH	50-260° C	13	140572A	150025B
2103-1-4CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT/COOL	230V-1PH	50-260° C	6.5	140573A	150025B
2104CE	6 X 6 (15.24cm X 15.24cm) ALUMINUM, COOL					150026B
2105CE	6 X 6 (15.24cm X 15.24cm) ALUMINUM, STEAM		50-260° C			150027B
3772CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT/COOL	115V-1PH	0-343° C	15	140576B	150025B
3988CE	6X6 (15.24cm x 15.24 cm) STEEL, HEAT/COOL	230V-1PH	0-343° C	7.5	140634B	150025B
3796CE	6 X 6 (15.24cm X 15.24cm) STEEL, HEAT	115V-1PH	0-343° C	7.5	140576B	
4286CE	6X 6 (15.24cm x 15.24 cm) STEEL, HEAT	230V-1PH	0-343° C	7.5	140634B	

3.3 6 in X 6 in (15 cm X 15 cm) PLATEN ASSEMBLY GENERAL

The following should be provided in your electrically heated thermostatically controlled hot plate assembly (2101CE, 2102CE, 2103CE).

1. Hot plate set (2), complete with insulation boards, temperature control boxes and power cord.
2. Mounting bolt for attaching the upper hot plate to the press head.
3. Two dial type thermometers.
4. Four (4) flexible metal covered hoses 24 in (61cm) long with connections. (For 2103CE assemblies).

The following should be provided in your cooling plate assembly (2104CE).

1. Cooling plate set (2).
2. Mounting bolt for attaching the upper cooling plate to the press head.
3. A globe valve.
4. Three (3) flexible rubber hoses (2) 60 in and (1) 15 in (152cm and 38cm) long with fittings.

The following should be provided in your steam heated plate assembly (2105CE).

1. Steam heating plate set (2), complete with insulation boards.
2. Mounting bolt for attaching the upper heating plate to the press head.
3. Four (4) flexible metal covered hoses 24 in (61 cm) long with connectors.

The following should be provided in your electrically heated digitally controlled hot plate assembly (3772CE, 3796CE, 4286CE, 3988 CE).

1. Hot plate set (2) complete with insulation boards, heaters, thermocouples and connected to enclosure.
2. Mounting bolt for attaching the upper heating plate to the press head.
3. Electrical control enclosure, wired complete.
4. Four (4) flexible metal covered hoses 36 in (91 cm) long with connections. (For 3772CE and 4286CE assemblies).

3.4 6 in X 6 in (15 cm X 15 cm) PLATEN ASSEMBLY INSTALLATION

All platen assemblies come assembled and tested from the factory. Some disassembly is required to mount the assemblies. (Reference drawing 110496D)

The following procedures should be used for the electrically heated, thermostatically controlled hot plate assemblies (2101CE, 2102CE, 2103CE).

WARNING: The following should be performed by a qualified electrician
--

CAUTION: Customer is to provide short-circuit protection based upon the electrical current drawn from chart 3-2.

WARNING: Electrical supply must include a ground wire.

1. Remove the female turnlock connector, disassemble, and fit with cable and plug suitable for your plant service. Cord should be rated for current load based upon amp requirement from chart in section 3-2. Line voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.
2. Install the upper hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and insert the mounting bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
3. Install the lower hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in moving platen of press so that locating pins in bottom of plate, fit into the holes of the moving platen of the press.

IMPORTANT: Apply a heat resistant release compound to the thermometer stems to aid in removal in the future.

4. Install the thermometers into the threaded holes located in the front edge of the plate.

The following steps are for assemblies with cooling (2103CE). Reference drawing 150025B.

5. Attach two flexible metal covered hoses to each hot plate.
6. Determine which side of the platens you will use as the inlet. For this explanation the right side when facing the press will be considered the inlet side and the left outlet side. The hoses are teflon lined stainless steel, with a 1/4 inch NPT male fitting, on each end.

Each inlet hose will be used to supply water, air and water/air mix to the platen it is connected to. For this reason, the inlet hoses should be connected to a common manifold with the plant air and water supply connected to the manifold.

WARNING: Check valves should be installed in both water and air lines to prevent contaminating either supply line with the other.

The addition of shutoff valves in both water and air lines will facilitate operation and maintenance.

7. Each outlet hose will be used to drain the water, air and water/air mix from the platen it is connected to. The outlet hoses can be connected to a common manifold or separately connected to the plants drain system. The outlet manifold or hoses must be connected to a drain vented for steam with a steel pipe.

The following procedure should be used for the cooling plate assembly (2104CE). Reference drawing 150026B.

1. Install the upper cooling plate on the upper platen of the press. Align cooling plate and insert the provided bolt through the upper platen and screw it into plate. Do not tighten bolt until you are certain of alignment.
2. Install the lower cooling plate on the moving platen of the press. Align the plate so that the locating pins on the bottom fit into the holes of the moving platen of the press.
3. Using the 15 in (38cm) hose, connect the upper plate to the lower plate in the side opposite the control valve.
4. Connect the 60 in (153cm), hose to the control valve in the lower plate. Connect the other end of this hose to a 1/4 inch NPT cooling source.
5. Connect the other 60 in (152 cm) hose to the upper plate on the same side as the control valve, connect the other end of this hose to a 1/4 inch NPT drain.

IMPORTANT: A water outlet with an open drain is required.

The following procedure should be used for the steam heated plate assembly (2105CE). Reference drawing 150027B.

1. Install the upper steam plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and insert the mounting bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
2. Install the lower steam plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly on moving platen of press so that locating pins in bottom of plate, fit into the holes of the moving platen of the press.
3. Connect one set, 2 flexible metal covered hoses, to each plate.
4. Connect one hose on each plate to your 1/4 inch NPT steam source.
5. Connect one hose on each plate to your 1/4 inch NPT drain line preferably through a steam trap.

IMPORTANT: Do not vent steam lines with copper or plastic. Use only steel pipe and install to standard steam specifications.
--

CAUTION: Exhaust steam can cause severe burns or injury.
--

The following procedure should be used for the electrically heated, digitally controlled hot plate assembly (3772CE, 3988CE, 3796CE, 4286CE).

1. Position control cabinet near existing press. This can be done by mounting the four (4) supplied leveling feet to the cabinet or attaching the cabinet to the press with the supplied bracket.

WARNING: The following should be performed by a qualified electrician.

CAUTION: Customer is to provide short-circuit protection based upon the electrical current drawing from chart 3-2.

WARNING: Electrical supply must include a ground wire.

2. Connect the incoming power to the disconnect switch in the control enclosure. Line voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.
3. Install the upper hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and the provided bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
4. Install the lower hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in moving platen of press so that the locating pins in bottom of plate, fit into the holes of the moving platen of the press.

The following steps are for assemblies with cooling (3772CE and 3988CE). Reference drawing 150025B.

1. Attach two flexible metal covered hoses to each hot plate.
2. Determine which side of the platens you will use as the inlet. For this explanation the right side when facing the press will be considered the inlet side and the left the outlet side. The hoses are teflon lined stainless steel, with a 1/4 inch NPT male fitting, on the end.
3. Each inlet hose will be used to supply water, air and water/air mix to the platen it is connected to. For this reason, the inlet hoses should be connected to a common manifold with the plant air and water supply connected to the manifold.

WARNING: Check valves should be installed in both water and air lines to prevent contaminating either supply line with the other.

The addition of shutoff valves in both water and air lines will facilitate operation and maintenance

4. Each outlet hose will be used to drain the water, air and water, air mix from the platen it is connected to. The outlet hoses can be connected to a common manifold or separately connected to the plants drain system. The outlet manifold or hoses must be connected to a drain vented for steam with a steel pipe.

3.5 9 in X 9 in (23 cm X 23 cm) PLATEN ASSEMBLY DESCRIPTION

CATALOG #	DESCRIPTION	VOLTAGE	TEMPERATURE RANGE	AMPS	ELECTRICAL SCHEMATIC	STEAM/COOLING SCHEMATIC
2107-1-2CE	9 X 9 IN (23 X23cm) STEEL, HEAT	115V-1PH	50-260° C	25	140574A	
2107-1-4CE	9 X 9 IN (23 X23cm) STEEL, HEAT	230V-1PH	50-260° C	12.5	140575A	
2108-1-2CE	9 X 9 IN (23 X23cm) STEEL, HEAT/COOL	115V-1PH	50-260° C	25	140574A	150025B
2108-1-4CE	9 X 9 IN (23 X23cm) STEEL, HEAT/COOL	230V-1PH	50-260° C	12.5	140575A	150025B
2109CE	9 X 9 IN (23 X23cm) STEEL, STEAM		50-260° C			150027B
3972CE	9 X 9 IN (23 X23cm) STEEL, HEAT/COOL	230V-1PH	0-343° C	13.5	140577B	150025B
3973CE	9 X 9 IN (23 X23cm) STEEL, HEAT	230V-1PH	0-343° C	13.5	140577B	

3.6 9 in X 9 in (23 cm X 23 cm) PLATEN ASSEMBLY GENERAL

The following should be provided in your electrically heated thermostatically controlled hot plate assembly (2107CE, 2108CE).

1. Hot plate set (2), complete with insulation boards, temperature control boxes and power cord.
2. Mounting bolt for attaching the upper hot plate to the press head.
3. Two dial type thermometers.
4. Four (4) flexible metal covered hoses 24 in (61 cm) long with connections. (For 2108CE assemblies).

The following should be provided in your steam heated plate assembly (2109CE).

1. Steam heating plate set (2), complete with insulation boards.
2. Mounting bolt for attaching the upper heating plate to the press head.
3. Two dial type thermometers.
4. Four (4) flexible metal covered hoses 24 in (61 cm) long with connectors.

The following should be provided in your electrically heated digitally controlled hot plate assembly (3972CE, 3973CE).

1. Hot plate set (2) complete with insulation boards, heaters, thermocouples and connection enclosure.
2. Mounting bolt for attaching the upper heating plate to the press head.
3. Electrical control enclosure, wired complete.
4. Four (4) flexible metal covered hoses 36 in (91 cm) long with connections. (For 3972CE assemblies).

3.7 9 in X 9 in (23 cm X 23 cm) PLATEN ASSEMBLY INSTALLATION

All platen assemblies come assembled and tested from the factory. Some disassembly is required to mount the assemblies.

The following procedures should be used for the electrically heated, thermostatically controlled hot plate assemblies (2107CE, 2108CE).

WARNING:	The following should be performed by a qualified electrician.
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CAUTION:	Customer is to provide short-circuit protection based upon the electrical current drawing from chart 3-5.
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WARNING:	Electrical supply must include a ground wire.
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1. Remove the female turnlock connector, disassemble, and fit with cable and plug suitable for your plant service. Cord should be rated for current load based upon amp requirement from chart in section 3-5. Line

voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.

2. Install the upper hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and insert the mounting bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
3. Install the lower hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in moving platen of press so that locating pins in bottom of plate, fit into the holes of the moving platen of the press.

IMPORTANT: Apply a heat resistant release compound to the thermometer stems to aid in removal in the future.

4. Install the thermometers into the threaded holes located in the front edge of the plate.

The following steps are for assemblies with cooling (2108CE). Reference drawing 150025B.

5. Attach two flexible metal covered hoses to each hot plate.
6. Determine which side of the platens you will use as the inlet. For this explanation the right side when facing the press will be considered the inlet side and the left outlet side. The hoses are teflon lined stainless steel, with a 1/4 inch NPT male fitting, on each end.

Each inlet hose will be used to supply water, air and water/air mix to the platen it is connected to. For this reason, the inlet hoses should be connected to a common manifold with the plant air and water supply connected to the manifold.

WARNING: Check valves should be installed in both water and air lines to prevent contaminating either supply line with the other.

The addition of shutoff valves in both water and air lines will facilitate operation and maintenance.

7. Each outlet hose will be used to drain the water, air and water/air mix from the platen it is connected to. The outlet hoses can be connected to a common manifold or separately connected to the plants drain system.

The outlet manifold or hoses must be connected to a drain vented for steam with a steel pipe.

The following procedure should be used for the steam heated plate assembly (2109CE). Reference drawing 150027B.

1. Install the upper steam plate by:
 - A. Remove the bolt that holds the assembly together and discard.

- B. Align assembly in upper platen of press and insert the mounting bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
2. Install the lower steam plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly on moving platen of press so that locating pins in bottom of plate, fit into the holes of the moving platen of the press.
3. Install the thermometers into the threaded holes located in the front edge of the plate.

IMPORTANT: Apply a heat resistant release compound to the thermometer stems to aid in removal in the future.

4. Connect one set, 2 flexible metal covered hoses, to each plate.
5. Connect one hose in each plate to your 1/4 inch NPT steam source.
6. Connect one hose on each plate to your 1/4 inch NPT drain line preferably through a steam trap.

IMPORTANT: Do not vent steam lines with copper or plastic. Use only steel pipe and install to standard steam specifications.

IMPORTANT: Exhaust steam can cause severe burns or injury.

The following procedure should be used for the electrically heated, digitally controlled hot plate assembly (3972C3, 3973CE).

1. Position control cabinet near existing press. This can be done by mounting the four (4) supplied leveling feet to the cabinet or attaching the cabinet to the press with the supplied bracket.

WARNING: The following should be performed by a qualified electrician.

CAUTION: Customer is to provide short-circuit protection based upon the electrical current drawing from chart 3-5.

WARNING: Electrical supply must include a ground wire.

2. Connect the incoming power to the disconnect switch in the control enclosure. Line voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.
3. Install the upper hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and the provided bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.

4. Install the lower hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in moving platen of press so that the locating pins in bottom of plate, fit into the holes of the moving platen of the press.

The following steps are for assemblies with cooling (3972CE). Reference drawing 150025B.

5. Attach two flexible metal covered hoses to each hot plate.
6. Determine which side of the platens you will use as the inlet. For this explanation the right side when facing the press will be considered the inlet side and the left the outlet side. The hoses are teflon lined stainless steel, with a 1/4 inch NPT male fitting, on the end.

Each inlet hose will be used to supply water, air and water/air mix to the platen it is connected to. For this reason, the inlet hoses should be connected to a common manifold with the plant air and water supply connected to the manifold.

WARNING: Check valves should be installed in both water and air lines to prevent contaminating either supply line with the other.
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The addition of shutoff valves in both water and air lines will facilitate operation and maintenance.

7. Each outlet hose will be used to drain the water, air and water, air mix from the platen it is connected to. The outlet hoses can be connected to a common manifold or separately connected to the plants drain system.

The outlet manifold or hoses must be connected to a drain vented for steam with a steel pipe.

3.8 9 in X 12 in (23 cm X 30 cm) PLATEN ASSEMBLY DESCRIPTION

CATALOG #	DESCRIPTION	VOLTAGE	TEMPERATURE RANGE	AMPS	ELECTRICAL SCHEMATIC	COOLING SCHEMATIC
2644-2CE	9 X 12 (22.9cm X 30.5cm) ALUMINUM, HEAT	115V-1PH	50-260° C	25	140574A	
2644-4CE	9 X 12 (22.9cm X 30.5cm) ALUMINUM, HEAT	230V-1PH	50-260° C	12.5	140575A	
2645CE	9 X 12 (22.9cm X 30.5cm) ALUMINUM, COOLING					150026B

3.9 9 in X 12 in (23 cm X 30 cm) PLATEN ASSEMBLY GENERAL

The following should be provided in your electrically heated thermostatically controlled hot plate assembly (2644CE).

1. Hot plate set (2), complete with insulation boards, temperature control boxes and power cord.
2. Mounting bolt for attaching the upper hot plate to the press head.
3. Two dial type thermometers.

The following should be provided in your cooling plate assembly (2645CE).

1. Cooling plate set (2).
2. Mounting bolt for attaching the upper cooling plate to the press head.
3. A globe valve.
4. Three (3) flexible rubber hoses (2) 60 in and (1) 15 in (152cm and 38cm) long with fittings.

3.10 9 in X 12 in (23 cm X 30 cm) PLATEN ASSEMBLY INSTALLATION

All platen assemblies come assembled and tested from the factory. Some disassembly is required to mount the assemblies.

The following procedures should be used for the electrically heated, thermostatically controlled hot plate assemblies (2644CE).

WARNING: The following should be performed by a qualified electrician.

CAUTION: Customer is to provide short-circuit protection based upon the electrical current drawn from chart 3-8.

WARNING: Electrical supply must include a ground wire.

1. Remove the female turnlock connector, disassemble, and fit with cable and plug suitable for your plant service. Cord should be rated for current load based upon amp requirement from chart in section 3-8. Line voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.
2. Install the upper hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.
 - B. Align assembly in upper platen of press and insert the mounting bolt through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
3. Install the lower hot plate by:
 - A. Remove the bolt that holds the assembly together and discard.

- B. Align assembly in moving platen of press so that locating pins in bottom of plate, fit into the holes of the moving platen of the press.

IMPORTANT: Apply a heat resistant release compound to the thermometer stems to aid in removal in the future.

4. Install the thermometers into the threaded holes located in the front edge of the plate.

The following procedure should be used for the cooling plate assembly (2645CE). Reference drawing 150026B.

1. Install the upper cooling plate on the upper platen of the press. Align cooling plate and insert the provided bolt through the upper platen and screw it into plate. Do not tighten bolt until you are certain of alignment.
2. Install the lower cooling plate on the moving platen of the press. Align the plate so that the locating pins on the bottom fit into the holes of the moving platen of the press.
3. Using the 15 in (38cm) hose, connect the upper plate to the lower plate in the side opposite the control valve.
4. Connect the 60 in (153cm), hose to the control valve in the lower plate. Connect the other end of this hose to a 1/4 inch NPT cooling source.
5. Connect the other 60 in (152 cm) hose to the upper plate on the same side as the control valve, connect the other end of this hose to a 1/4 inch NPT drain.

IMPORTANT: A water outlet with an open drain is required.

3.11 12 in X 12 in (30 cm X 30 cm) PLATEN ASSEMBLY DESCRIPTION

CATALOG #	DESCRIPTION	VOLTAGE	TEMPERATURE RANGE	AMPS	ELECTRICAL SCHEMATIC	COOLING SCHEMATIC
3749CE	12 X 12 (30.5cm X 30.5cm) STEEL, HEAT/COOL	230V-1PH	0-343° C	24	140577B	150025B
3906CE	12 X 12 (30.5cm X 30.5cm) STEEL, HEAT	230V-1PH	0-343° C	24	140577B	

3.12 12 in X 12 in (30 cm X 30 cm) PLATEN ASSEMBLY GENERAL

The following should be provided in your electrically heated digitally controlled hot plate assembly (3749CE, 3906CE).

1. Hot plate set (2) complete with insulation boards, heaters, thermocouples and connected to enclosure.
2. (8) Mounting bolts for attaching the heating plates to the press.
3. Electrical control enclosure, wired complete.
4. Four (4) flexible metal covered hoses 36 in (91 cm) long with connections. (For 3749CE assemblies).

3.13 12 in X 12 in (30 cm X 30 cm) PLATEN ASSEMBLY INSTALLATION

The following procedure should be used for the electrically heated, digitally controlled hot plate assembly (3749CE, 3906CE).

1. Position control cabinet near existing press. This can be done by mounting the four (4) supplied leveling feet to the cabinet or attaching the cabinet to the press with the supplied bracket.

WARNING: The following should be performed by a qualified electrician.

CAUTION: Customer is to provide short-circuit protection based upon the electrical current drawing from chart 3-11.
--

WARNING: Electrical supply must include a ground wire.

2. Connect the incoming power to the disconnect switch in the control enclosure. Line voltage must be within $\pm 10\%$ of listed voltage. Phase imbalance must be within 5%. Fulfill all national, state and local safety and electrical code requirements.

IMPORTANT: Apply a heat resistant release compound to the thermometer stems to aid in removal in the future.

3. Install the upper hot plate by:
 - A. Remove the nuts from the bolt that holds the assembly together and discard. (Keep bolts).
 - B. Align assembly on upper platen of press put the mounting bolts through the upper platen and screw into plate. Do not tighten bolt until you are certain of alignment.
4. Install the lower hot plate by:
 - A. Remove the nuts from the bolts that holds the assembly together and discard. (Keep bolts).
 - B. Align assembly in moving platen of press so that the mounting bolts of plate, fit into the holes of the moving platen of the press.

The following steps are for assemblies with cooling (3749CE). Reference drawing 150025B.

5. Attach two flexible metal covered hoses to each hot plate.
6. Determine which side of the platens you will use as the inlet. For this explanation the right side when facing the press will be considered the inlet side and the left the outlet side. The hoses are teflon lined stainless steel, with a 3/8 inch NPT male fitting, on each end.

Each inlet hose will be used to supply water, air and water/air mix to the platen it is connected to. For this reason, the inlet hoses should be connected to a common manifold with the plant air and water supply connected to the manifold.

WARNING: Check valves should be installed in both water and air lines to prevent contaminating either supply line with the other.
--

The addition of shutoff valves in both water and air lines will facilitate operation and maintenance.

7. Each outlet hose will be used to drain the water, air and water, air mix from the platen it is connected to. The outlet hoses can be connected to a common manifold or separately connected to the plants drain system.

The outlet manifold or hoses must be connected to a drain vented for steam with a steel pipe.

4.1 OPERATOR SAFETY

1. The operator should wear safety glasses or a face shield when performing operations under high load conditions to prevent eye or face injury should a test specimen burst and scatter.
2. When using caustic or acid test specimens, a face shield, apron, and rubber gloves should be used for the protection of the operator.
3. The testing apparatus or test specimen must be centered on the press platen. This will prevent tilting of the platen and possible ejection of the work piece under pressure. Always avoid uneven loading of the press components. Locator plates are available from **CARVER, INC.** upon request.
4. When the top head has been repositioned, the height on both sides must be measured to be sure that the head bolster is parallel with the base.

CAUTION: CARVER recommends the use of safety glasses while operating this equipment.

Always check the pressure rating of the presses apparatus prior to pressing to be sure it is rated for the applied pressure.

IMPORTANT: The gauge on the CARVER laboratory press shows the total force exerted by the press. It DOES NOT show the pressure on the specimen (PSI/BAR). To find the PRESSURE (P) on the specimen, the observed FORCE (F) reading on the gauge must be divided by the specimen AREA (A), per the equation $P = F/A$. When using a CARVER pressure cell, use the ID measurement to find the actual AREA (A) of the specimen.

The probability for personal injury in the use of a manual press is very low because of the slow speed, however, failure to follow proper safety practices can result in injury in rare cases.

WARNING: FAILURE TO FOLLOW PROPER SAFETY PRACTICES COULD RESULT IN INJURY.

WARNING: Principle factors resulting in injury are:

- 1 - Failure to center the pressure cell on the platen will result in eccentric loading, tilting, and an occasional ejection of the piece. The pressure cell should be centered front to back, as well as side to side.
- 2 - Failure to level the top head of the press after it has been repositioned can produce the same results as stated in number 1, above.

PREVENTIVE MEASURES

1. Be sure that all apparatus are centered in the platen area before pressing. **CARVER** can supply an alignment frame to assure centering, or the user can paint a circle or square on the surface to indicate the proper position.
2. When the top head has been repositioned, the height on both sides should be measured to be sure the head is not tilted.

3. Always check the pressure rating of the presses apparatus before use to be sure it is adequate for the anticipated use.

CAUTION: Safety glasses should be worn when the press and pressure cell are in use.

4.2 6 in X 6 in (15 cm X 15 cm) PLATEN ASSEMBLY OPERATION

The following procedure should be used for the electrically heated, thermostatically controlled hot plate assemblies (2101CE, 2102CE, 2103CE).

WARNING: When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.

CAUTION: On presses with thermostat control, customer is to provide short-circuit protection properly sized for the electrical current draw.

1. Close (energize) the electrical disconnect switch. (Provided by customer).
2. Turn control knobs clockwise. The white pilot light will illuminate indicating the plates are heating.
3. Allow the temperature to stabilize. This is indicated when the white pilot light goes out. Adjust the temperature required by turning the control knobs clockwise to increase or counter clockwise to decrease the temperature based upon your requirements and the reading of the thermometer.

IMPORTANT: Heat up time can be decreased if hot plates are closed. Also press should not be located in an area of changing temperature or air drafts.

The following is for assemblies with cooling (2103CE).

4. When the cooling portion of the cycle is required, turn on your cooling supply based upon the following:

IMPORTANT: It is your responsibility to provide the type of cooling controls required for your process.

The air supply should be from a clean, dry, regulated compressed air source.

IMPORTANT: After cooling with water, residual water should be purged from the platen cores with compressed air before the next heating cycle.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. Set regulator below water pressure.

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

AIR ONLY when temperature is above 600° F (315°C)

AIR/WATER MIX when temperature is between 600° & 350°F (315° & 177°C)

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

The following procedure should be used for the cooling plate assembly: (2104CE)

1. Turn control valve counterclockwise to increase cooling fluid flow if work is not cooling properly.
2. Turn control valve clockwise to decrease or shutoff cooling fluid flow.

IMPORTANT: Make sure control valve is open. The control valve is normally left open when operating, a moderate flow of cooling fluid is all that is required to keep plates cool.
--

CAUTION: If cooling fluid is not present, plates will become hot.
--

The following procedure should be used for the steam heated plate assembly (2105CE).

No control devices are typically supplied with your steam plate. You are responsible for supplying any type of control devices required for your process.

A typical operation is as follows:

1. Turn on steam supply to plates.
2. Steam will enter the plates through the supplied inlet hoses. Steam will circulate through the platen and out the supplied drain hoses.

IMPORTANT: Heat up time can be decreased if steam plates are closed.

3. Turn off steam supply for plates to cool down.

NOTE: With proper steam controls, the temperature of the plates can be varied.

The following procedure should be used for the electrically heated, digitally controlled, hot plate assembly (3772CE, 3796CE).

WARNING: When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.
--

CAUTION: Customer is to provide short-circuit protection properly sized for the electrical current draw.

1. Close (energize) the electrical disconnect switch.
2. Press "Power On" push button. The green push button will illuminate.
3. Adjust the digital temperature controller(s) to the desired operating temperature for your process by depressing the [ARROW UP] or [ARROW DOWN] key on the temperature controller(s).

4. Allow the temperature to stabilize. Each heating plate has its own temperature controller. Temperature is sensed by type J thermocouples located in each plate. Each controller must be set individually. Heat to each plate will cycle on and off individually as controlled by its temperature controller.

IMPORTANT: Heat up time can be decreased if hot plates are closed, also press should not be located in and area of changing temperature or air drafts.

The following is for assemblies with cooling (3772CE).

5. When the cooling portion of the cycle is required, turn on your cooling supply based upon the following:

IMPORTANT: It is your responsibility to provide the type of cooling controls required for your process.

The air supply should be from a clean, dry, regulated compressed air source.

IMPORTANT: After cooling with water, residual water should be purged from the platen cores with compressed air before the next heating cycle.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. Set regulator below water pressure.

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

AIR ONLY when temperature is above 600° & (315°C)

AIR/WATER MIX when temperature is between 600° & 350°F (315° & 177°C)

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

4.3 **9 in X 9 in (23 cm X 23 cm) PLATEN ASSEMBLY OPERATION**

The following procedure should be used for the electrically heated, thermostatically controlled hot plate assemblies (2107CE, 2108CE).

WARNING:	When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.
-----------------	--

CAUTION:	On presses with thermostat control, customer is to provide short-circuit protection properly sized for the electrical current draw.
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1. Close (energize) the electrical disconnect switch. (Provided by customer).
2. Turn control knobs clockwise. The white pilot light will illuminate indicating the plates are heating.
3. Allow the temperature to stabilize. This is indicated when the white pilot light goes out. Adjust the temperature required by turning the control knobs clockwise to increase or counter clockwise to decrease the temperature based upon your requirements and the reading of the thermometer.

IMPORTANT:	Heat up time can be decreased if hot plates are closed. Also press should not be located in an area of changing temperature or air drafts.
-------------------	--

The following is for assemblies with cooling (2108CE).

1. When the cooling portion of the cycle is required, turn on your cooling supply based upon the following:

IMPORTANT:	It is your responsibility to provide the type of cooling controls required for your process.
-------------------	--

The air supply should be from a clean, dry, regulated compressed air source.

IMPORTANT:	After cooling with water, residual water should be purged from the platen cores with compressed air before the next heating cycle.
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IMPORTANT:	Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. <u>Set regulator below water pressure.</u>
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The following is to be used when determining the cooling medium required for the temperature being used.

AIR ONLY when temperature is above 600° F (315°C)

AIR/WATER MIX when temperature us between 600° & 350°F (315° & 177°C)

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

The following procedure should be used for the steam heated plate assembly: (2109CE)

No control devices are typically supplied with your steam plate. You are responsible for supplying any type of control devices required for your process.

A typical operation is as follows:

1. Turn on steam supply to plates.
2. Steam will enter the plates through the supplied inlet hoses. Steam will circulate through the platen and out the supplied drain hoses.

IMPORTANT: Heat up time can be decreased if steam plates are closed.

3. Turn off steam supply for plates to cool down.

NOTE: With proper steam controls, the temperature of the plates can be varied.

The following procedure should be used for the electrically heated, digitally controlled, hot plate assembly (3972CE, 3973CE).

WARNING: When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.

CAUTION: Customer is to provide short-circuit protection based upon the electrical current draw.

1. Close (energize) the electrical disconnect switch.
2. Press "Power On" push button. The green push button will illuminate.
3. Adjust the digital temperature controller(s) to the desired operating temperature for your process by depressing the [ARROW UP] or [ARROW DOWN] key on the temperature controller(s).
4. Allow the temperature to stabilize. Each heating plate has its own temperature controller. Temperature is sensed by type J thermocouples located in each plate. Each controller must be set individually. Heat to each plate will cycle on and off individually as controlled by its temperature controller.

IMPORTANT: Heat up time can be decreased if hot plates are closed, also press should not be located in and area of changing temperature or air drafts.

The following is for assemblies with cooling (3972CE).

5. When the cooling portion of the cycle is required, turn on your cooling supply based upon the following:

IMPORTANT: It is your responsibility to provide the type of cooling controls required for your process.

The air supply should be from a clean, dry, regulated compressed air source.

IMPORTANT: After cooling with water, residual water should be purged from the platen cores with compressed air before the next heating cycle.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. Set regulator below water pressure.

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

AIR ONLY when temperature is above 600° & (315°C)

AIR/WATER MIX when temperature is between 600° & 350°F (315° & 177°C)

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

4.4 9 in X 12 in (23 cm X 30 cm) PLATEN ASSEMBLY OPERATION

The following procedure should be used for the electrically heated, thermostatically controlled hot plate assemblies (2644CE).

WARNING: When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.

CAUTION: On presses with thermostat control, customer is to provide short-circuit protection properly sized for the electrical current draw.

1. Close (energize) the electrical disconnect switch. (Provided by customer).
2. Turn control knobs clockwise. The white pilot light will illuminate indicating the plates are heating.
3. Allow the temperature to stabilize. This is indicated when the white pilot light goes out. Adjust the temperature required by turning the control knobs clockwise to increase or counter clockwise to decrease the temperature based upon your requirements and the reading of the thermometer.

IMPORTANT: Heat up time can be decreased if hot plates are closed. Also press should not be located in an area of changing temperature or air drafts.

The following procedure should be used for the cooling plate assembly (2645CE).

1. Turn control valve counterclockwise to increase cooling fluid flow if work is not cooling properly.
2. Turn control valve clockwise to decrease or shutoff cooling fluid flow.

IMPORTANT: Make sure control valve is open. The control valve is normally left open when operating a moderate flow of cooling fluid is all that is required to keep plates cool.

CAUTION: If cooling fluid is not present, plates will become hot.

4-5 12 in X 12 in (30 cm X 30 cm) PLATEN ASSEMBLY OPERATION

The following procedure should be used for the electrically heated, digitally controlled, hot plate assembly (3749CE, 3906CE).

WARNING: When operating a press with heated platens, wear the appropriate personal safety gear, such as, insulated gloves to protect arms and hands from burns.

CAUTION: Customer is to provide short-circuit protection properly sized for the electrical current draw.

1. Close (energize) the electrical discount switch.
2. Press “Power On” push button. The green push button will illuminate.
3. Adjust the digital temperature controller(s) to the desired operating temperature for your process by depressing the [ARROW UP] or [ARROW DOWN] key on the temperature controller(s).
4. Allow the temperature to stabilize. Each heating plate has its own temperature controller. Temperature is sensed by type J thermocouples located in each plate. Each controller must be set individually. Heat to each plate will cycle on and off individually as controlled by its temperature controller.

IMPORTANT: Heat up time can be decreased if hot plates are closed, also press should not be located in and area of changing temperature or air drafts.

The following is for assemblies with cooling (3749CE).

5. When the cooling portion of the cycle is required, turn on your cooling supply based upon the following:

IMPORTANT: It is your responsibility to provide the type of cooling controls required for your process.

The air supply should be from a clean, dry, regulated compressed air source.

IMPORTANT: After cooling with water, residual water should be purged from the platen cores with compressed air before the next heating cycle.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. Set regulator below water pressure.

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

AIR ONLY when temperature is above 600° & (315°C)

AIR/WATER MIX when temperature is between 600° & 350°F (315° & 177°C)

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

4.6 ADJUSTING TEMPERATURE SETPOINT WEST 6100 TCU : DIGITAL CONTROL

1. Push the [POWER ON] pushbutton (located on front control panel) to turn “ON” the heat.
2. Depress the [MAN] key on the system controller keypad.
3. Depress the [FUNCTION] key located on the front of the WEST 6100 temperature controller, “SP” will appear on lower display of the temperature controller.
4. Using the [ARROW UP] - [ARROW DOWN] keys on the temperature controller, change the setpoint (SP) to the desired value. (While changing the “SP” value, it will appear in the upper display).
5. When the desired “SP” value has been entered, depress the [FUNCTION] key. The new “SP” value will appear in the lower display and the “PV” value will appear in the upper display.
6. Repeat steps 3, 4 and 5 for each temperature controller.

4.7 SELF-TUNE PROCEDURE - WEST 6100 TCU : DIGITAL CONTROL

The Pre-Tune and Self-Tune (Auto-Tune) features fine tune the temperature controller’s PID process settings. The controllers are Pre-Tuned and Self-Tuned by **CARVER, INC.** before the press is shipped. For maximum temperature control accuracy, the controller’s should be Pre-Tuned and Self-Tuned at the work site with the mold or tooling in place.

Refer to the West 6100 site manual - section two for Pre-Tune and Self-Tune Instructions.

IMPORTANT: When Pre-Tuning and Self-Tuning the TCU’S, either place the press in Manual Mode or turn heat power on only, not control power.

IMPORTANT: Refer to West Model 6100 site manual for additional information.
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IMPORTANT: Heat-up time can be decreased if the heating platens are closed. Better temperature control will result if the press is located in an area that is not subject to changing temperature or air drafts.

To shut down the press, press the 0 [POWER OFF] pushbutton (located on the front control panel) to turn the heat off. For maintenance or long term shutdown, open (de-energize) the ELECTRICAL DISCONNECT.

SECTION FIVE

ACCESSORY EQUIPMENT

Thank you for the opportunity to supply **CARVER** equipment for your requirements. If there are any questions regarding the operation of this press or other **CARVER** accessories, please contact us for assistance.

CARVER offers a wide range of accessory equipment to satisfy your specific application(s).

Swivel Bearing Plates	Test Cylinders	Heated Platens
Heating/Cooling Plates	Heated Test Cylinders	Filter Pads
KBr Buffer Plates	Tile Molds	Blotters
Polished Plates	Cage Equipment	Pressure Cells
Color Dispersion Molds	Pharmaceutical Die Fixtures	Low Range Gauges

(MOST ACCESSORIES AVAILABLE FROM STOCK)

Our applications Group can also be of assistance with custom instrumentation and special accessories for your application.

OTHER **CARVER** EQUIPMENT

Manual Pellet Presses	Laminating Presses
Laboratory Chillers	Custom Hydraulic Presses & Systems
Rubber Stamp Presses	AutoPellet Presses

6.1 TECHNICAL ASSISTANCE

CARVER, INC. PARTS DEPARTMENT

Call from 8:00 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-7577, Extension 237 or 254

The Parts Department at **CARVER, INC.** 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.

CARVER, INC. SERVICE DEPARTMENT

Call from 8:00 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-7577, Extension 238 or 243

CARVER, INC. has a qualified Service Department ready to install, start-up, or service your press. Gauge calibration services are available. Contact Service Department for details.

CARVER, INC. SALES DEPARTMENT

Call from 8:00 a.m. to 4:30 p.m., Eastern Standard Time
(260) 563-7577, Extension 252 or 237

CARVER 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.

6.2 RETURNED MATERIAL POLICY

CREDIT RETURNS

1. Prior to the return of any material, authorization must be given by **CARVER, INC.** A RMS 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 **CARVER, INC.** is subject to a 15% (\$75.00 minimum) 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.

7.1 WARRANTY RETURNS

1. Prior to the return of any material, authorization must be given by **CARVER, INC.** An RMS number will be assigned for the part or equipment to be returned.
2. Reason for requesting the return must be given.
3. All returns are to be shipped prepaid.
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 **CARVER's** discretion, if the item is found to be defective in materials or workmanship and it was manufactured by **CARVER, INC.** Purchased components are covered under their specific warranty terms.

7.2 WARRANTY

CARVER, INC. 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.

CARVER 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 limits recommended, or which shall have been repaired or altered outside of the factory.

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

WARNING TAGS



CRUSHING INJURY



HOT SURFACE



**HIGH VOLTAGE
INSIDE ENCLOSURE
ONLY**

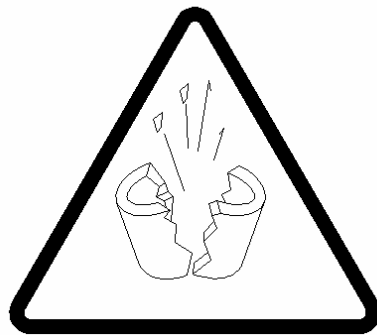
WARNING TAGS cont....



SHOCKING HAZARD

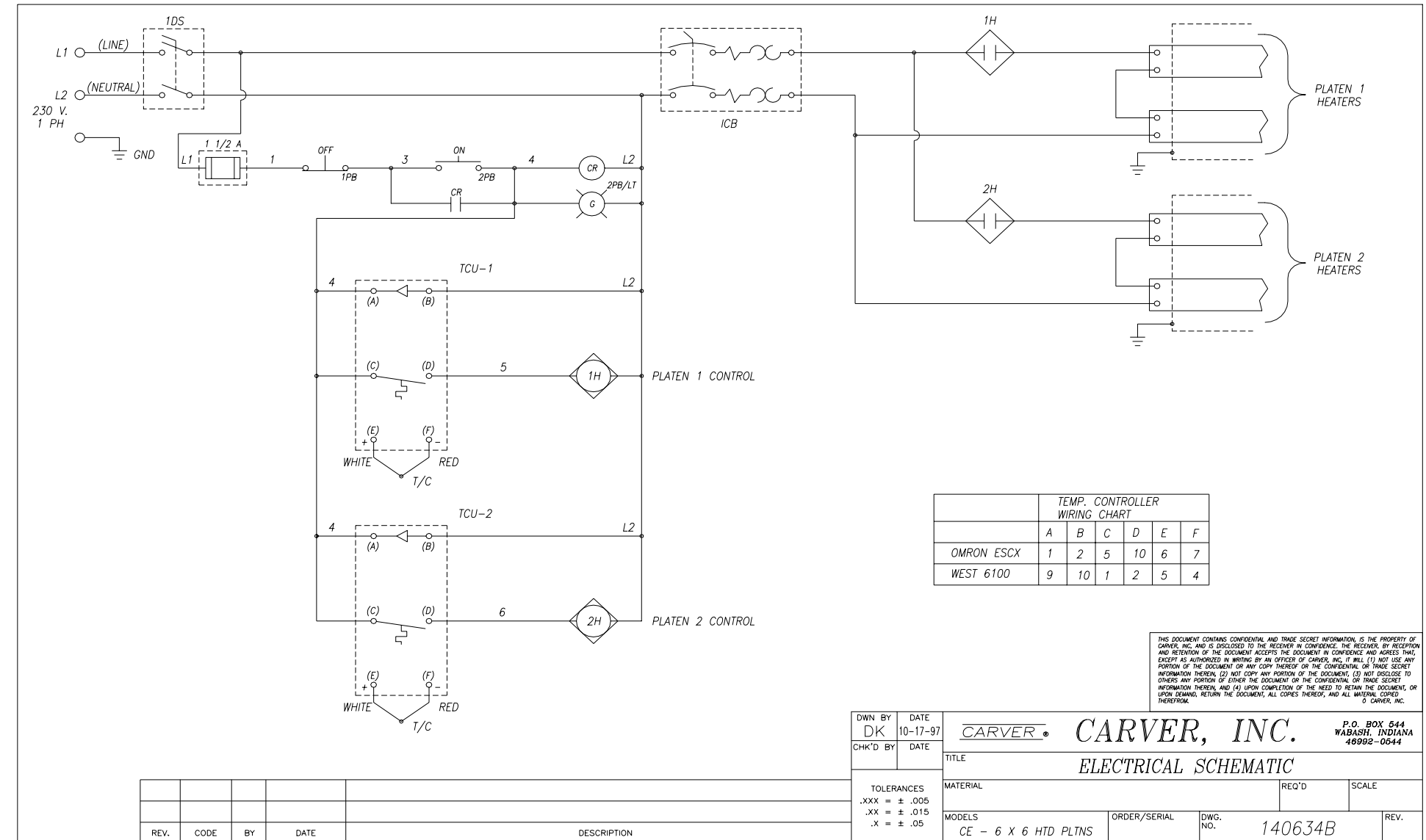


HIGH VOLTAGE

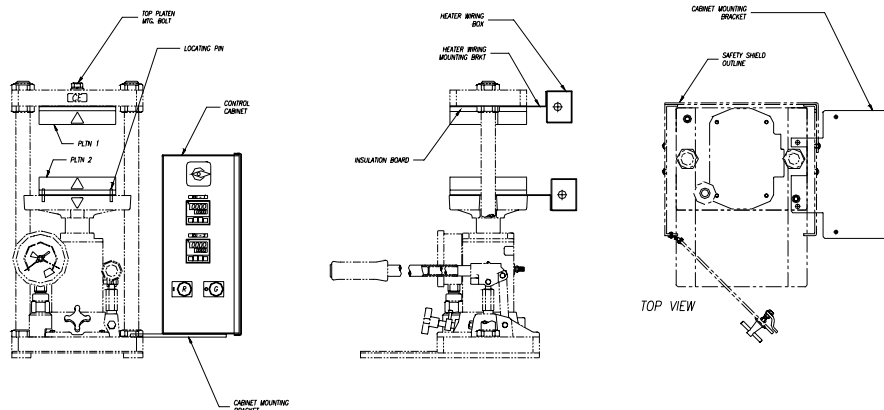


PRESSURE RATING

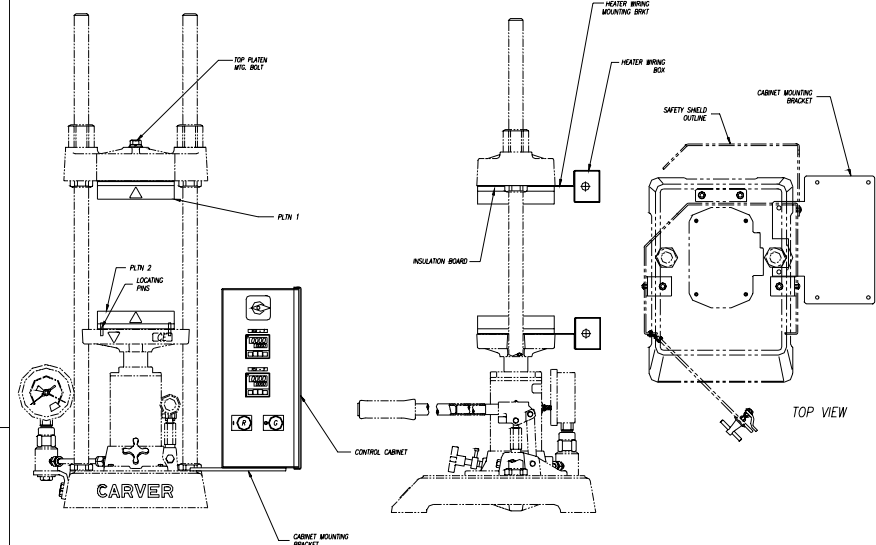
SECTION EIGHTPICTOGRAM/TAG INFORMATION



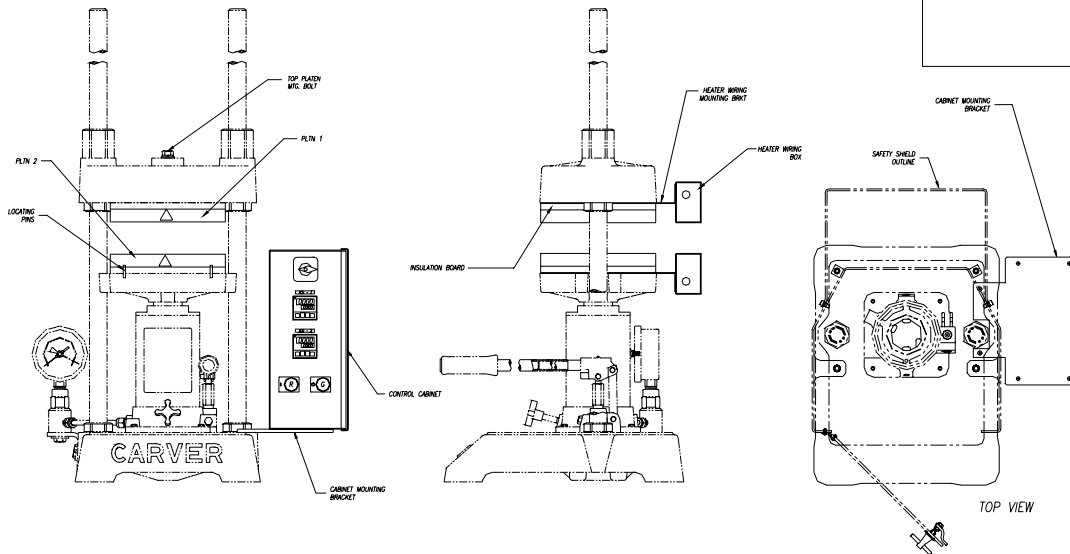
TYPICAL FOR MODEL 3850CE
6 X 6 PLATENS



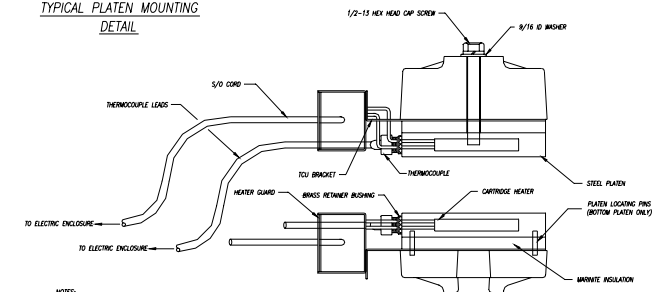
TYPICAL FOR MODEL 3851CE
6 X 6 PLATENS



TYPICAL FOR MODEL 3853CE
9 X 9 PLATENS



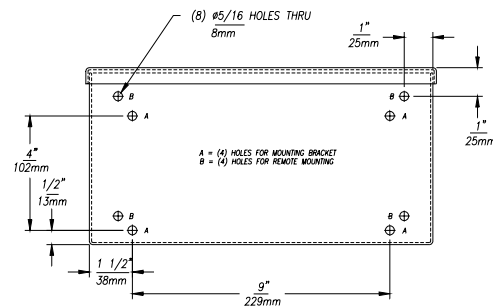
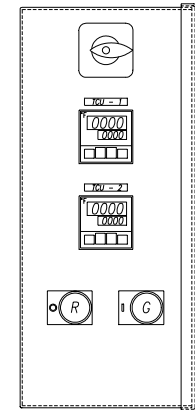
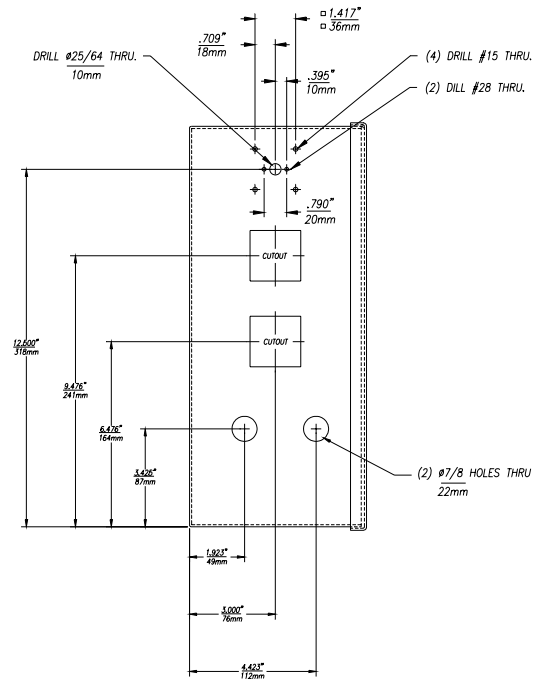
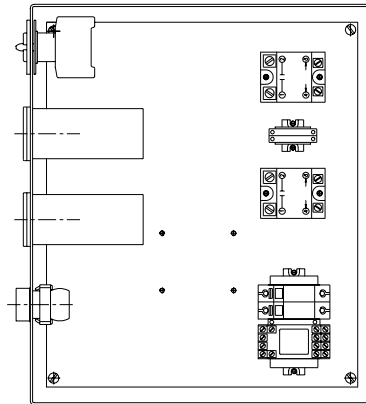
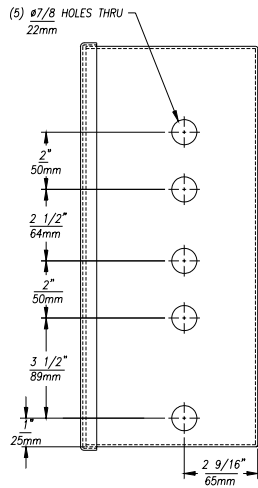
TYPICAL PLATEN MOUNTING
DETAIL



- NOTES:
- 1 - BOTTOM PLATEN ASSEMBLY MUST HAVE FULL SURFACE CONTACT WITH MOVING PLATE. (LOCATING PINS MUST BE FULLY SEATED.)
 - 2 - CUSTOMER CONNECTION TO A POWER SOURCE WITH SHORT CIRCUIT PROTECTION MUST BE MADE BY A QUALIFIED ELECTRICIAN.
 - 3 - READ AND UNDERSTAND INSTRUCTION MANUAL BEFORE INSTALLING PLATEN ASSEMBLY.
 - 4 - MOUNTING FEET ARE PROVIDED SO THAT CONTROL CABINET CAN BE MOUNTED ABOVE FROM PRESS.

REFERENCE ELECTRICAL SCHEMATICS

DATE BY DK	DATE 5-15-99	CARRIER CARVER, INC.		P.O. BOX 644 BIRMINGHAM, ALABAMA 35202-0644	
ORDER BY CWD	DATE	TITLE PLATEN MFG. REF. - DIGITAL CONTROL			
TOLERANCES X.XX = ± .005 X.X = ± .015 X.XX = ± .005		MATERIAL	FIG'D	SCALE	NONE
MODELS		QUANTITY/REMARKS	DWG. NO. 1104970		REV. 1



REV.	CODE	BY	DATE	DESCRIPTION

DWG BY DWK DATE 5-21-99	CARVER, INC. TITLE ENCLOSURE & SUB PANEL LAYOUT	MATERIAL ENCLOSURE (956027) & PANEL (956028)	SCALE 1/2"=1"
TOLERANCES: FRACTIONAL DECIMAL ANGLES	MODEL ENCLOSURE (956027) & PANEL (956028)	ORDER/SERIAL 2332820	REV. 1