
CARVER[®]

**OPERATION, INSTALLATION AND
MAINTENANCE MANUAL
“AUTO” SERIES AUTOMATIC HYDRAULIC PRESSES**

AUTO “C”, AUTO “M”, AUTOFOUR/15, AUTOFOUR/30

IMPORTANT:

PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING THIS EQUIPMENT.

CARVER, INC.
1569 Morris Street, PO Box 544
Wabash, IN 46992-0544
PH: 260-563-7577 FAX: 260-563-7625

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 seal 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.

CARVER, INC. 1996

All Rights Reserved

Part #: 1520.103 (CE)

Revision 03

Effective 08/07/96

TABLE OF CONTENTS

SECTION ONE	INTRODUCTION.....	1-1
1.1	INTRODUCTION.....	1-1
1.2	ACCESSORIES	1-1
1.3	CUSTOMER SERVICE	1-1
SECTION TWO	SAFETY.....	2-1
2.1	SAFETY CONSIDERATIONS	2-1
2.2	GENERAL RESPONSIBILITY	2-1
2.3	OPERATOR RESPONSIBILITY	2-2
2.4	MOLD SETTERS RESPONSIBILITY	2-3
2.5	MAINTENANCE RESPONSIBILITY.....	2-4
SECTION THREE	INSTALLATION.....	3-1
3.1	AUTO “C” and AUTO “M” PRESS DESCRIPTION	3-1
3.2	AUTO FOUR/15 and AUTOFOUR/30 PRESS DESCRIPTION.....	3-1
3.3	INSTALLATION.....	3-3
3.4	SETTING UP.....	3-3
3.5	RAM FORCE CALCULATION	3-3
3.6	FILLING THE OIL RESERVOIR.....	3-3
3.7	GASES OR DUST REMOVAL	3-4
3.8	CONNECTING UTILITIES	3-4
SECTION FOUR	CONTROL DESCRIPTION	4-1
4.1	CONTROL SYSTEMS DESCRIPTION OVERVIEW	4-1
4.2	DIGITAL CONTROL SYSTEM DESCRIPTION	4-2
4.2.1	ALARM FUNCTIONS - DIGITAL	4-2
4.2.2	OPERATOR INTERFACE - DIGITAL.....	4-3
4.2.3	PROCESS FUNCTIONS- DIGITAL	4-3
4.2.4	PROGRAMMING MENUS- DIGITAL	4-3
4.2.5	AUTO SERIES ‘DIGITAL CONTROL SYSTEM’	4-5
4.2.6	VIEW/EDIT CURRENT SETUP - DIGITAL	4-5
4.2.7	STORE A RECIPE - DIGITAL	4-5
4.2.8	RECALL A RECIPE - DIGITAL.....	4-6
4.2.9	ADJUSTING APPLIED - FORCE - DIGITAL	4-6
4.2.10	ADJUSTING PUMP SPEED - DIGITAL.....	4-7
4.2.11	ADJUSTING TIME BASE - DIGITAL.....	4-8
4.2.12	ADJUSTING DWELL TIME - DIGITAL	4-8
4.3	PROGRAMMABLE CONTROL SYSTEMS DESCRIPTIONS	4-8
4.3.1	ALARM FUNCTIONS - PROGRAMMABLE.....	4-8
4.3.2	OPERATOR INTERFACE - PROGRAMMABLE	4-9
4.3.3	PROCESS FUNCTIONS - PROGRAMMABLE.....	4-10
4.3.4	PROGRAMMING MENUS - PROGRAMMABLE.....	4-10
4.3.5	AUTO SERIES PROGRAMMABLE CONTROL SYSTEM PROGRAMMING MENU STRUCTURE.....	4-11
4.3.6	VIEW/EDIT CURRENT RECIPE - PROGRAMMABLE	4-11
4.3.7	STORE A RECIPE - PROGRAMMABLE	4-12
4.3.8	RECALL A RECIPE - PROGRAMMABLE	4-12
4.3.9	ADJUSTING APPLIED - FORCE - PROGRAMMABLE.....	4-12
4.3.10	ADJUSTING PUMP SPEED - PROGRAMMABLE	4-13
4.3.11	ADJUSTING TIME BASE - PROGRAMMABLE	4-14
4.3.12	ADJUSTING RECIPE TYPE - PROGRAMMABLE.....	4-14
4.3.13	ADJUSTING SEGMENT 1 - FORCE - PROGRAMMABLE	4-14
4.3.14	ADJUSTING SEGMENT 1 DWELL TIME - PROGRAMMABLE.....	4-15
4.3.15	ADJUSTING THE SEGMENT 1 TEMPERATURE SETPOINT - PROG.....	4-15

4.3.16	TEMPERATURE DEADBAND FOR SETPOINT - PROGRAMMABLE	4-15
4.3.17	TEMPERATURE SETPOINT FOR WATER COOLING - PROG.....	4-16
4.3.18	TEMPERATURE SETPOINT FOR AIR COOLING - PROGRAMMABLE.....	4-16
4.3.19	ADJUSTING THE AIR PURGE - PROGRAMMABLE.....	4-17
4.3.20	WATER VALVE OFF/ON - MANUAL CONTROL - PROGRAMMABLE.....	4-17
4.3.21	AIR VALVE OFF/ON - MANUAL CONTROL - PROGRAMMABLE	4-18
4.4	PLATEN HEAT TEMPERATURE CONTROL OVERVIEW.....	4-18
4.5	TEMPERATURE CONTROLLER WITH.....	4-19
4.5.1	ADJUSTING TEMPERATURE SETPOINT-.....	4-19
4.5.2	AUTO-TUNE PROCEDURE - OMRON E5CX TCU	4-19
4.6	TEMPERATURE CONTROLLER WITH.....	4-20
4.6.1	ADJUSTING TEMPERATURE SETPOINT	4-20
4.6.2	ADJUSTING TEMPERATURE SETPOINT	4-20
4.6.3	SELF-TUNE PROCEDURE - WEST 6100 TCU:.....	4-20
SECTION FIVE OPERATION		5-1
5.1	OPERATOR SAFETY.....	5-1
5.2	SEQUENCE OF OPERATION - DIGITAL “D” CONTROL SYSTEMS.....	5-1
5.2.1	AUTOMATIC MODE SEQUENCE OF OPERATION	5-1
5.2.2	MANUAL MODE SEQUENCE OF OPERATIONS	5-2
5.3	SEQUENCE OF OPERATION - PROG (“P”) CONTROL SYSTEMS	5-3
5.3.1	AUTOMATIC MODE SEQUENCE OF OPERATION	5-3
5.3.2	MANUAL MODE SEQUENCE OF OPERATION	5-6
5.4	DAYLIGHT ADJUSTMENT.....	5-7
SECTION SIX RECIPE RECORD.....		6-1
6.1	TEST RECIPES	6-1
6.2	RECIPE RECORD SHEETS	6-1
SECTION SEVEN MAINTENANCE.....		7-1
7.1	CARVER, INC. AUTO SERIES PRESS.....	7-1
7.2	TROUBLESHOOTING	7-2
7.3	ELECTRICAL	7-2
7.4	MOLD SIZE VERSUS TONNAGE CHART.....	7-3
SECTION EIGHT HYDRAULIC OIL.....		8-1
8.1	RECOMMENDED HYDRAULIC OILS FOR CARVER PRESSES	8-1
SECTION NINE ACCESSORY EQUIPMENT		9-1
SECTION TEN CARVER, INC. SERVICE.....		10-1
10.1	TECHNICAL ASSISTANCE	10-1
10.2	RETURNED MATERIAL POLICY.....	10-1
SECTION ELEVEN WARRANTY.....		11-1
11.1	WARRANTY RETURNS.....	11-1
11.2	WARRANTY	11-1
SECTION TWELVE PICTOGRAM/TAG INFORMATION		12-1
SECTION THIRTEEN DRAWING.....		13-1

1.1 INTRODUCTION

We are pleased to supply a **CARVER** “Auto” Series Press for your facility. **CARVER** presses are used in many applications including research and development, specialized or low volume production 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 **CARVER** presses, including Heated Platens, Heating/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, 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 press, accessories, or repair parts will be furnished promptly on request.

<p>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.</p>
--

SECTION TWO

SAFETY

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 removing work from 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 parts 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 bolster, 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.
- 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.

SECTION THREE

INSTALLATION

3.1 AUTO "C" and AUTO "M" PRESS DESCRIPTION

CATALOG#	3888CE	3889CE	3890CE	3891CE
MODEL	Auto "C"	Auto "C"	Auto "M"	Auto "M"
CLAMP FORCE	15 Kn	15 133.5	25 222.5	25 222.5
MAX. TEMP.	°F °C	N/A N/A	N/A N/A	650 343
PLATENS	IN. MM.	6 x 6 152 x 152	6 x 6 152 x 152	9 x 9 228 x 228
RAM STROKE	IN. MM.	6 152	6 152	6 152
DAYLIGHT (OPENING)	IN. MM.	.75-18 19-457	0-15 0-381	.75-16 19-406
FOOTPRINT W x D	IN. MM.	34.3 x 22.8 870 x 577	34.3 x 22.8 870 x 577	37 x 22.8 940 x 577
HEIGHT	IN. MM.	40 1016	40 1016	42.5 1080
WEIGHT	lbs kg	260 118	285 129	385 175
NOISE LEVEL		<70db(A)	<70db(A)	<70db(A)
FULL LOAD CURRENT	230V	5	11	5
MAX. SYSTEM PRESSURE	PSI BAR	5817 401	5817 401	7073 488

N/A = NOT APPLICABLE

3.2 AUTO FOUR/15 and AUTOFOUR/30 PRESS DESCRIPTION

CATALOG #		3892CE	3893CE	3894CE	3895CE
MODEL		AutoFour/15	AutoFour/15	AutoFour/30	AutoFour/30
CLAMP FORCE	US TONS Kn	15 133.5	15 133.5	30 267	30 267
MAX. TEMP.	°F °C	N/A N/A	650 343	N/A N/A	650 343
PLATENS	IN. MM.	12 x 12 305 x 305	12 x 12 305 x 305	12 x 12 305 x 305	12 x 12 305 x 305
RAM STROKE	IN. MM.	6 152	6 152	6 152	6 152
DAYLIGHT (OPENING)	IN. MM.	1-18.5 25.4-470	0-13.5 0-342	1-17 25.4 - 431	0-12 0-304
FOOTPRINT W x D	IN. MM.	42 x 22.8 1067 x 577	42 x 22.8 1067 x 577	42 x 22.8 1067 x 577	42 x 22.8 1067 x 577
HEIGHT	IN. MM.	45 1143	45-56 1143-1422	45 1143	45-56 1143-1422
WEIGHT	lbs kg	680 308	845 383	700 318	865 392
NOISE LEVEL		<70db(A)	<70db(A)	<70db(A)	<70db(A)
FULL LOAD CURRENT	230V	5	28	5	28
MAX. SYSTEM PRESSURE	PSI BAR	5817 401	5817 401	8488 586	8488 586

N/A = NOT APPLICABLE

3.3 INSTALLATION

To assist in the installation and operation of this press, an assembly drawing (including part numbers) is included with this manual. The appropriate assembly drawing for your press will be one of the following:

<u>MODEL</u>	<u>CATALOG#</u>	<u>DRAWING#</u>
Auto “C” 15 ton (133.5 Kn), (1) opening press, no heat	3888CE	100354D
Auto “C” 15 ton (133.5 Kn), (1) opening press, w/heat,cool	3889CE	100355D
Auto “M” 25 ton (222.5 Kn), (1) opening press, no heat	3890CE	100356D
Auto “M” 25 ton (222.5 Kn), (1) opening press, w/heat,cool	3891CE	100357D
AutoFour/15 15 ton (133.5 Kn), (1) opening press, no heat	3892CE	100358D
AutoFour/15 15 ton (133.5 Kn), (1) opening press, w/heat,cool	3893CE	100359D
AutoFour/30 30 ton (267 Kn), (1) opening press, no heat	3894CE	100360D
AutoFour/30 30 ton (267 Kn), (1) opening press, w/heat,cool	3895CE	100361D

3.4 SETTING UP

The **CARVER** Laboratory press was carefully designed with a low center of gravity to remain stable under normal operating conditions. For a permanent installation, hold-down bolts may be used to fasten the press to a work bench. Holes are conveniently provided in the base frame for this purpose.

The press is shipped with the hydraulic unit filled with special **CARVER 2170** hydraulic fluid. The press should be set on a sturdy bench, table, or **CARVER** press stand approximately 28” to 30” (71 to 76 cm) high. (Refer to the appropriate assembly drawing for your press, found in the appendix of this manual.) A properly sized electrical outlet will be required to operate the press. (Refer to the appropriate electrical schematic for your press.)

3.5 RAM FORCE CALCULATION

All **CARVER** pressure gauges and displays are calibrated for the specific ram diameter of the hydraulic cylinder. The Auto “C” and AutoFour/15 ram area is 5.157 in.² (33.27 cm²), (2.56”, 6.5 cm Dia.). The Auto “M” and AutoFour/30 ram area is 7.069 in.² (45.61 cm²), (3”, 7.62 cm Dia.).

The Digital and Programmable Control System (“D” & “P”) displays the load (force) applied between the moving bolster and the top bolster. Accordingly, all calibrations show the load (the force applied by the press to the material being pressed).

For example, a 10,000 lb. (44480n) load applied to material having an area of one square inch (one square mm) would be equal to a pressure of 10,000 pounds per square inch (44480n per square mm) applied to the material. Or, if the material being pressed has an area of four square inches (258.08 square mm), a 10,000 lb. (44480n) applied load would be equal to 2,500 pounds per square inch (172.35 bar) of material.

$$\text{EXAMPLE: } \frac{10,000 \text{ lbs}(44480\text{n})}{4 \text{ in}^2(258.08 \text{ mm}^2)} = 2,500 \text{ PSI}(172.35 \text{ bar})$$

IMPORTANT: The load or force units displayed on the Digital Control System (“D”) and Programmable Control System (“P”) can be changed to: LBS, US TONS, or KILOGRAMS. To change units, momentarily depress the [UNITS] key. [ARROW UP or DOWN] to display the desired unit, depress the[SET] key.

3.6 FILLING THE OIL RESERVOIR

The hydraulic unit is filled with oil at the factory and should not require additional oil. Only special **CARVER 2170** hydraulic fluid, or a brand name filtered **HYDRAULIC JACK OIL**, should be used. Refer to section eight for substitutes. In the event there is some oil loss:

1. Lower the moving bolster completely.
2. Turn off electrical supply and lock out.
3. The hydraulic unit is located in a separate enclosure on the back side of the control cabinet. A filler tube extends through the top of this enclosure making the filler plug accessible without removing a panel.
4. Thoroughly clean the area around the filler plug with a clean cloth to prevent contamination of the oil by foreign particles.
5. Remove the filler plug (insert a clean funnel if necessary). Fill with oil up to level of the filler hole (all air must be out of reservoir.)
6. Replace filler plug.
7. Clean up any spilled oil.

IMPORTANT: Tighten filler plug 1/2 to 1 turn after o-ring contacts sealing surface. Over tightening can cause pump damage.

IMPORTANT: Brake fluid and similar products will damage your unit and **VOID THE WARRANTY**. Verify oil level before turning hydraulic system on.

WARNING: Before replenishing the oil level, make certain that the cylinder is fully retracted to prevent overfilling the reservoir. An overfill may cause personal injury due to excessive reservoir pressure (the reservoir is a bladder) created when the cylinder is retracted.

3.7 GASES 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 to the top of the guard housing or by cutting a hole in the back of the guard housing and attaching the exhaust vent over the cutout. The cutout must be completely covered. Air flow will then be drawn up, around the material, and out through the top of the press.

IMPORTANT: Excessive air flow will affect platen temperature uniformity and heat up rate.

3.8 CONNECTING UTILITIES

Electrical Connection

This **CARVER** press is supplied with a main disconnect switch. A properly sized electrical supply will be required to operate the unit. Connect the incoming supply to this disconnect switch. Please refer to the electrical drawing provided with this manual.

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

The Voltage, Phase, and Current draw information is listed on the serial number tag. Line voltage must be within $\pm 10\%$ of the voltage listed on the serial number tag or damage may occur. Phase imbalance must be within 5%.

Install a fused disconnect with a lockout feature in the power main leading to the press. Connect main power to the press through the disconnect.

The power drop must include a ground wire.

WARNING: Connection should only be made by a qualified electrician.

**WATER AND AIR INLET CONNECTIONS FOR “D” DIGITAL
AND “P” PROGRAMMABLE CONTROL SYSTEMS
(for presses with cooling option)**

Connect a water supply line to the NPT port labeled “WTR ←”. Refer to the appropriate assembly drawing for the location of this port.

The “WTR ←” port is 3/8” NPT for single opening presses and 1/2” NPT for dual opening presses.

Connect a clean, dry, regulated compressed air source to the NPT port labeled “AR ←”. This port is 3/8” NPT or 1/8” NPT for single opening presses and 1/4” NPT for dual opening presses, if a regulator is supplied by **CARVER, INC.**

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

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

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

IMPORTANT: A ball valve located in each platen cooling line is preset by **CARVERINC.** to balance the flow of cooling medium to each platen, allowing the platen temperatures to drop evenly.

If an uneven cooling rate between platens is consistently experienced, it should be corrected by slightly adjusting the ball valves. If platen temperatures do not drop evenly on presses with the **PROGRAMMABLE CONTROL PACKAGE**, an unwanted hesitation may occur in the cooling portion of the programs.

IMPORTANT: Verify that the water pressure is greater than the air pressure or the water will not enter the platen cooling channels. The air regulator setting must be less than the water pressure.

**COOLING OUTLET MANIFOLD CONNECTIONS FOR,
DIGITAL AND PROGRAMMABLE CONTROL SYSTEMS
(for presses with cooling option)**

The outlet manifold must be connected to a drain and vented for steam with steel pipe. Refer to appropriate assembly drawing for the location of this NPT port and the appropriate cooling circuit for the size.

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

The outlet manifold must be plumbed downward to drain the platens properly. If the manifold is plumbed upward, **CARVER, INC.** recommends the use of a check valve to eliminate backflow into the platens and a pump to recirculate the drain water.

CARVER, INC. will not guarantee proper cooling if the drain is not plumbed according to **CARVER, INC.** recommendations.

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

A manual shutoff valve in each line will aid in future maintenance procedures.

SECTION FOUR

CONTROL DESCRIPTION

4.1 CONTROL SYSTEMS DESCRIPTION OVERVIEW

The “AUTO” Series presses are available with two different control systems, both are designed to automatically operate a programmed recipe after the cycle is manually initiated. Each system is capable of storing ten recipes.

DIGITAL (“D”) CONTROL SYSTEM

This control system allows programming of the desired applied force, speed and dwell time, it displays the press status in digital format.

The normal operating cycle of the Digital Control System consists of closing the press and building force to the programmed setpoint, maintaining this setpoint for a programmed period of time, and opening the press.

When heated platens are provided with a Digital Control System, a solid state P.I.D. temperature controller is supplied for each platen. These temperature controllers are programmed individually and control independently of the Digital Control System.

PROGRAMMABLE (“P”) CONTROL SYSTEM

This control system includes all aspects of the “D” control system plus allows for step programming of segments. Up to (20) segments in each recipe are available.

When heated platens are provided with a Programmable Control System, a solid state P.I.D. temperature controller is supplied for each platen. The setpoint for each platen may be entered in each segment of the recipe, and when in automatic mode will download to the temperature controllers through an interface.

If the heated platens are provided with the cooling option, the “P” control system will initiate cooling as required by the segment temperature setpoint.

One operating cycle of the Programmable Control System (When in the pressure based program) consists of closing the press and building force to the programmed setpoint of the first segment of the recipe, maintaining this setpoint for a dwell time specified for that segment (the dwell timer starts when the force setpoints are met), repeating this cycle of building/maintaining force for the other segments, and finally opening the press.

With the press in a pressure based program, the system controller will download the temperature setpoints at the beginning of each segment and drive for those setpoints. Since this is a pressure based program, temperature setpoints may never be achieved.

The other operating cycle of the “P” control system (when in the temperature based program) consists of closing the press and building force to the programmed setpoint of the first segment of the recipe, maintaining this setpoint, heating or cooling to the programmed segment temperature setpoints, maintaining these setpoints for a dwell time specified for that segment (the dwell timer starts when the temperature setpoints are met), repeating this cycle of building/maintaining force and temperature setpoints for the other segments, and finally opening the press.

The following items and functions are described as they apply in section **4.2 Digital Control System** and **4.3 Programmable Control System**:

AUTOMATIC MODE
MANUAL MODE
ALARM FUNCTIONS
OPERATOR INTERFACE

PROCESS FUNCTIONS
PROGRAMMING MENUS
VIEW EDIT CURRENT SETUP
STORE A RECIPE
RECALL A RECIPE
ADJUSTING APPLIED FORCE
ADJUSTING PUMP SPEED
ADJUSTING TIME BASE
ADJUSTING DWELL TIME

4.2 DIGITAL CONTROL SYSTEM DESCRIPTION

The following description pertains to the Digital (“D”) control package only. The press can be operated in either the Manual or Automatic Mode. Modes are selected by depressing the [AUTO] key or the [MAN] key before the beginning of the cycle. An indication of the current mode will be displayed.

4.2.1 ALARM FUNCTIONS - DIGITAL

The controller will monitor the following alarms:

1. Force greater than maximum operating range (Emergency Stop), the LCD screen will display:

HIGH-HIGH FORCE

2. If safety shield door is opened during cycle (Emergency Stop), the LCD screen will display:

CYCLE ABORTED

When an alarm occurs, the system controller will display the alarm message on the LCD screen, and sound the buzzer. The operator must acknowledge the alarm by depressing the [ACK] key. The controller will then clear the alarm message and silence the buzzer. If the [ACK] key has not been depressed after 25 seconds, the buzzer will also be silenced.

When an E-stop alarm occurs, the system controller will abort the cycle immediately. On shutdown alarms, the controller will only abort the cycle if the alarm condition still exists after the shutdown delay time.

ADJUSTING THE ALARM BUZZER DURATION:

The alarm buzzer duration can be adjusted through the MANUAL CONTROL submenu. This setting controls the alarm in both automatic and manual modes. The default buzzer duration is 5 seconds, the maximum setting is 25 seconds.

To adjust the alarm buzzer duration, do the following:

1. Depress the [MAN] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Repeatedly depress the [ARROW DOWN] key until the MANUAL CONTROL submenu is revealed.
4. Repeatedly depress the [SET] key until “ALARM BUZZER:XX SEC” parameter is revealed.
5. Use the [ARROW UP] - [ARROW DOWN] keys to adjust the time duration.

6. When the adjustment is completed, depress the [MENU] key two times to return to the main menu.

4.2.2 OPERATOR INTERFACE - DIGITAL

The operator interface includes a 12-key keypad for operator input, and the LCD screen for displaying any messages to the operator. The function of the interface includes the following:

- Process Display
- Entry of Control Parameters
- Recipe Management
- System Alarms

The interface will default to displaying the current state of the process and any alarms that occur, as previously described. Entering the control parameters and managing recipes can be performed at any time by utilizing the programming menus.

The layout of the 12-key keypad is as follows:



4.2.3 PROCESS FUNCTIONS- DIGITAL

The keys and pushbuttons used to control the process are defined below:

- [UNITS]Change displayed units to US Tons (TON), Pounds (LB), or Kilograms (KG). (Key)
- [MAN]Place the system in the Manual Mode. (Key)
- [AUTO] Place the system in the Automatic Mode. (Key)
- [DIAMOND]Toggle between fast and slow increment/decrement modes. The increments/decrements will either be 100 or 1000 for force parameters, and 1 or 10 for all other parameters. (Key).
- Close press and start the cycle. (Both must be depressed and held simultaneously). (Pushbutton). ↑
- Stop the cycle and open the press. (Pushbutton). ↓

4.2.4 PROGRAMMING MENUS- DIGITAL

The system includes user-friendly submenus for programming the following operations:

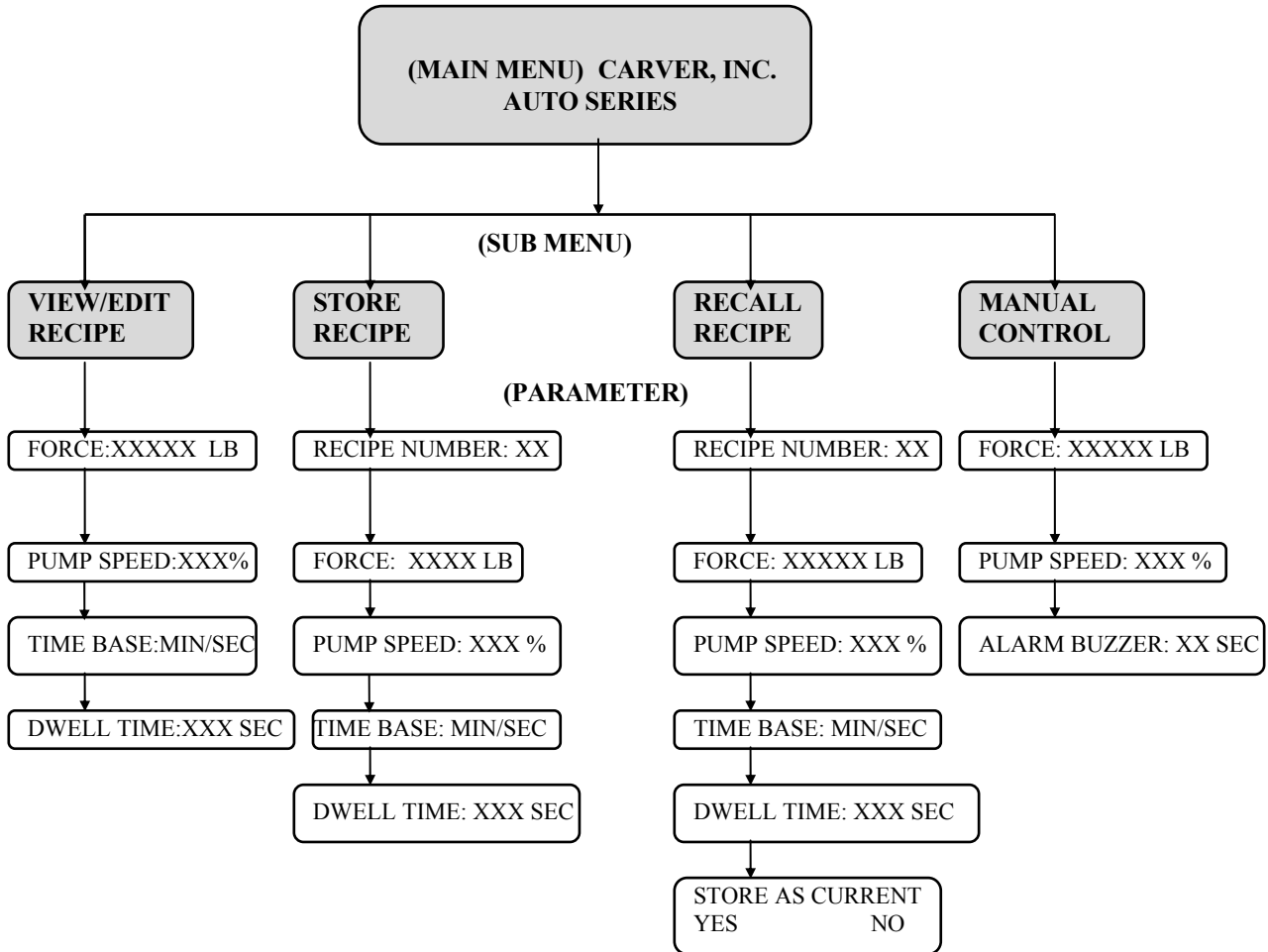
- View/Edit the Current Recipe (Automatic Mode).
- Store a Recipe
- Recall a Recipe
- Manual Control Parameters (Manual Mode).

The menus have an hierarchical structure which the operator can step through using the [MENU], [SET], and [ARROW UP] - [ARROW DOWN] and [DIAMOND] keys. This structure is presented in a flow chart form in Section 4.2.5.

The operator can access the Programming Menus as follows:

1. Depress the [MENU] key. This displays the first submenu provided.
2. Depress the [ARROW UP] - [ARROW DOWN] keys to cycle through the available submenus.
3. Depress the [SET] key to select the displayed submenu, the first parameter and its current value is displayed.
4. Depressing the [ARROW UP] - [ARROW DOWN] keys will change the parameter's value.
5. Depress the [SET] key to accept the value, the next parameter will be displayed.
6. Whenever the [MENU] key is depressed, the system takes the operator back up one level.

**4.2.5 AUTO SERIES ‘DIGITAL CONTROL SYSTEM’
PROGRAMMING MENU STRUCTURE**



Refer to ‘PROGRAMMING MENUS’ in Section 4.2.4 to better understand stepping through the menu.

4.2.6 VIEW/EDIT CURRENT SETUP - DIGITAL

This operation allows the operator to view or modify the current setup. Depressing the [SET] and [ARROW UP] - [ARROW DOWN] keys enables the operator to cycle through and change the values of the recipe parameters.

4.2.7 STORE A RECIPE - DIGITAL

To Store a Recipe in memory, do the following:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.

3. Depress the [ARROW DOWN] key repeatedly until the STORE RECIPE submenu is revealed.
4. Depress the [SET] key once to reveal the RECIPE NUMBER parameter.
5. After setting the recipe number, cycling through the other parameters displays the current values for the selected recipe. The operator can change the value of any parameter using the [ARROW UP] - [ARROW DOWN] keys. If the selected recipe number has not yet been stored in memory, the other parameters will display the values of the current recipe.
6. When all of the parameters have been set, depress the [MENU] key two times to return to the AUTOMATIC OPERATION MODE.

4.2.8 RECALL A RECIPE - DIGITAL

To recall a recipe from memory and make it current, do the following:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key repeatedly until the RECALL RECIPE submenu is revealed.
4. Depress the [SET] key once to reveal the RECIPE NUMBER parameter.
5. Select the desired recipe number by depressing the [ARROW UP] - [ARROW DOWN] keys.
6. Depress the [SET] key once to reveal the first parameter, PUMP SPEED.
7. The operator is able to view the recipe by cycling through the parameters. Changes are allowed to the recipe parameters before making it current. These changes only affect the current recipe not the stored recipe.
8. After viewing the last recipe parameter (or after viewing any of the recipe parameters, depress the [MENU] key once), the operator is prompted to make the recipe the current recipe.
9. Depressing the [SET] key confirms the recipe as current, depressing the [MENU] key cancels it.
10. Depress the [MENU] key to return to the AUTOMATIC OPERATION MODE.

4.2.9 ADJUSTING APPLIED - FORCE - DIGITAL

To adjust the force applied to the mold, choose one of the following options:

AUTOMATIC MODE:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [SET] key once to reveal the FORCE: parameter (pounds/tons/kilograms).
4. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the force setpoint.

5. When the adjustment is completed, depress the [MENU] key two times to return to the Automatic Operation Mode.

(see also, 4.2.7 STORE A RECIPE, or 4.2.8 RECALL A RECIPE)

MANUAL MODE:

1. Depress the [MAN] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Repeatedly depress the [ARROW DOWN] key until the MANUAL CONTROL submenu appears..
4. appears..
5. Depress the [ARROW DOWN] key to reveal the FORCE: parameter.
6. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the force.
7. When the adjustment is completed, depress the [MENU] key two times to return to the Manual Operation Mode.

4.2.10 ADJUSTING PUMP SPEED - DIGITAL

To adjust the speed at which the hydraulic pump closes the press and builds pressure, choose one of the following options:

AUTOMATIC:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [SET] key repeatedly to reveal the PUMP SPEED parameter.
4. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the percentage of speed.
5. When the adjustment is completed, depress the [MENU] key to return to the Automatic Operation Mode.

(See also, 4.2.7 STORE A RECIPE, or 4.2.8 RECALL A RECIPE)

MANUAL:

1. Depress the [MAN] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key until the MANUAL CONTROL submenu appears.
4. Depress the [SET] key to reveal the PUMP SPEED: parameter.
5. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the percentage of speed.
6. When the adjustment is completed, depress the [MENU] key to return to the Manual Operation Mode..

4.2.11 ADJUSTING TIME BASE - DIGITAL

To adjust the time base to either seconds or minutes, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key repeatedly until the TIME BASE parameter is revealed.
3. Use the [ARROW DOWN] key to change the time base from MIN (minutes) to SEC (seconds) or use the [ARROW UP] key to change from SEC (seconds) to MIN (minutes).
4. When the adjustment is completed, depress the [MENU] key two times to return to the operating mode.

(see also, 4.2.7 STORE A RECIPE, or 4.2.8 RECALL A RECIPE)

4.2.12 ADJUSTING DWELL TIME - DIGITAL

Dwell times is the amount of time the press is held at the force setpoint. Dwell time begins when the force setpoint is achieved. When the dwell time expires, the press opens.

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [SET] key repeatedly until the DWELL TIME parameter is revealed.
4. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the dwell time.
5. When the adjustment is completed, depress the [MENU] key two times to return to the Automatic Operation Mode.

(see also, 4.2.7 STORE A RECIPE, or 4.2.8 RECALL A RECIPE)

4.3 PROGRAMMABLE CONTROL SYSTEMS DESCRIPTIONS

The press can be operated in either the Manual or Automatic Mode. This can be selected by depressing the [AUTO] or [MAN] keys before the beginning of the cycle. An indication of the current mode will be displayed.

Depressing [AUTO] key puts the press in Automatic mode. The standard automatic operation of the press is detailed below.

4.3.1 ALARM FUNCTIONS - PROGRAMMABLE

The controller will monitor the following alarms:

1. Force greater than maximum operating range (Emergency Stop), the LCD screen will display:

HIGH-HIGH FORCE

2. If safety shield door is opened during cycle (Emergency Stop), the LCD screen will display:

CYCLE ABORTED

3. If the [HEAT] is turned “OFF” while running a recipe or the [HEAT] is “OFF” and a **Temperature Based Recipe** is initiated, the LCD screen will display:

COMMUNICATION ERROR
SYSTEM MUST BE RESET

When an alarm occurs, the controller will display the alarm message on the LCD screen and sound the buzzer. The operator must acknowledge the alarm by depressing the [ACK] key. The system controller will then clear the alarm message and silence the buzzer. If the [ACK] key has not been depressed after 25 seconds, the buzzer will also be silenced.

When an E-stop alarm occurs, the system controller will abort the cycle immediately. On shutdown alarms, the controller will only abort the cycle if the alarm condition still exists after the shutdown delay time.

ADJUSTING THE ALARM BUZZER DURATION:

The alarm buzzer duration can be adjusted through the SETUP PARAMETERS submenu. The default buzzer duration is 5 seconds, the maximum setting is 25 seconds. To adjust the alarm buzzer duration, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until the SETUP PARAMETERS submenu is revealed.
3. Depress the [SET] key once to reveal “ALARM BUZZER:XX SEC” parameter.
4. Use the [ARROW UP] - [ARROW DOWN] keys to adjust the time duration.
5. When the adjustment is completed, depress the [MENU] key to return to the main menu.

4.3.2 OPERATOR INTERFACE - PROGRAMMABLE

The operator interface includes a 12-key keypad for operator input, and the LCD screen for displaying any messages to the operator. The function of the interface includes the following:

- Process Display
- Entry of Control Parameters
- Recipe Management
- System Alarms

The interface will default to displaying the current state of the process, and any alarms that occur, as previously described. Entering the control parameters and managing recipes can be performed at any time by utilizing the programming menus.

The layout of the 12-key keypad is as follows:



4.3.3 PROCESS FUNCTIONS - PROGRAMMABLE

The keys and pushbuttons used to control the process are defined below:

[UNITS] Change displayed units to US Tons (TON), Pounds (LB), or Kilograms (KG). (Key)

[MAN] Place the system in the Manual Mode. (Key)

[AUTO] Place the system in the Automatic Mode. (Key)

[DIAMOND] Toggle between fast and slow increment/decrement modes. The increments/decrements will either be 100 or 1000 for force parameters, and 1 or 10 for all other parameters. (Key)

Close press and start the cycle. (Both must be depressed and held simultaneously). (Pushbutton). ↑

Stop the cycle and open the press. (Pushbutton). ↓

4.3.4 PROGRAMMING MENUS - PROGRAMMABLE

The system includes user-friendly menus for programming the following operations:

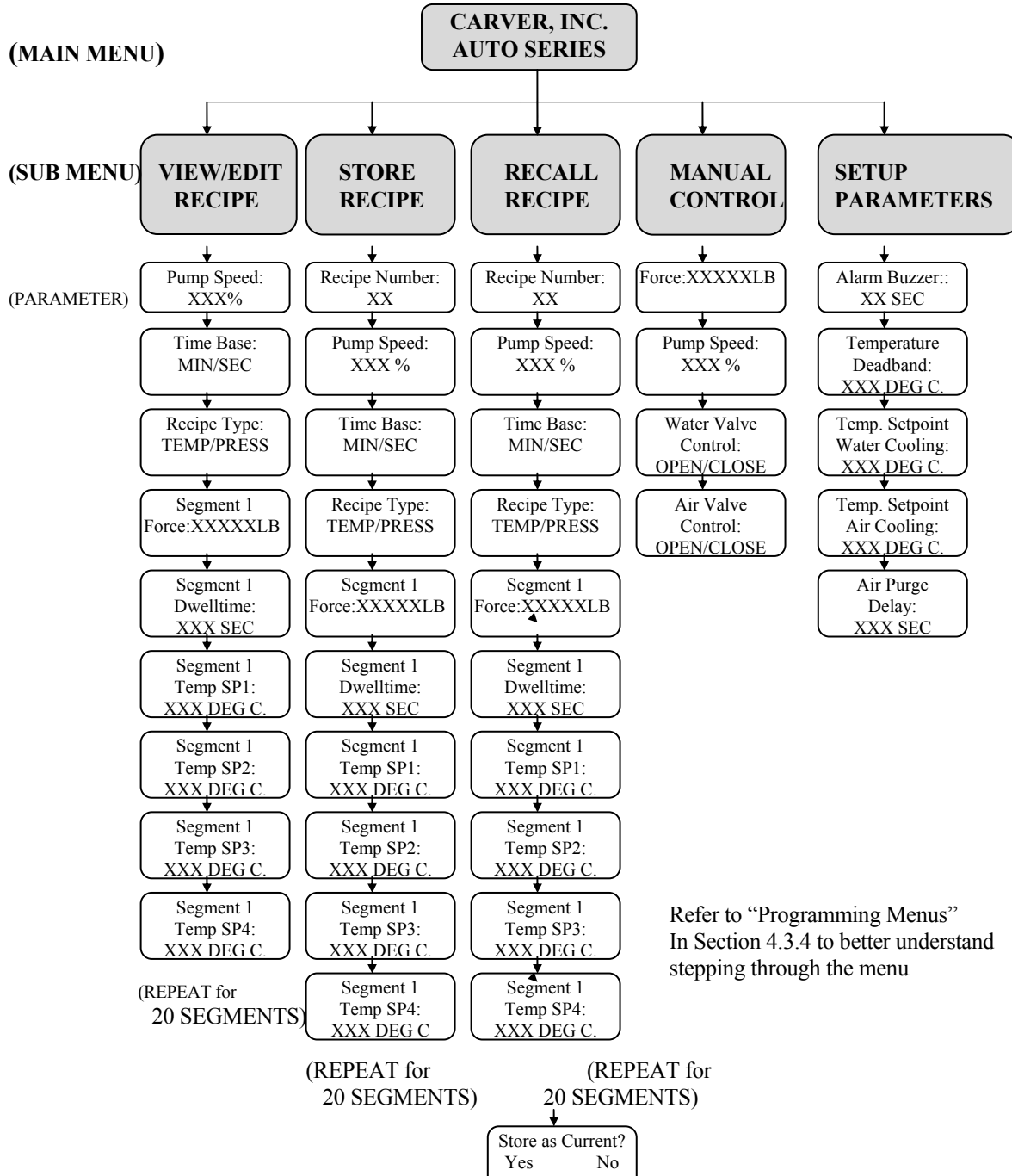
- View/Edit the Current Recipe (Automatic Mode)
- Store a Recipe
- Recall a Recipe
- Manual Control (Manual Mode)
- Setup Parameters

The menus have a hierarchical structure which the operator can step through using the [MENU], [SET], [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys. This structure is presented in flowchart form in section 4.3.5.

1. The operator can access the Programming Menus as follows:
2. Depress the [MENU] key. This displays the first submenu provided.
3. Depress the [ARROW UP] - [ARROW DOWN] keys to cycle through the available submenus.
4. Depress the [SET] key to select the displayed submenu, the first parameter and its current value is displayed.
5. Depressing the [ARROW UP] - [ARROW DOWN] keys will change the parameter's value.

6. Depress the [SET] key to accept the value, the next parameter will be displayed.
7. Whenever the [MENU] key is depressed, the system takes the operator back up one level.

4.3.5 AUTO SERIES PROGRAMMABLE CONTROL SYSTEM PROGRAMMING MENU STRUCTURE



4.3.6 VIEW/EDIT CURRENT RECIPE - PROGRAMMABLE

This operation allows the operator to view or modify the current setup. Depressing the [SET] and [ARROW UP] - [ARROW DOWN] keys enables the operator to cycle through and change the values of the recipe parameters.

4.3.7 STORE A RECIPE - PROGRAMMABLE

To store a recipe in memory, do the following:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key repeatedly until the STORE RECIPE submenu is revealed.
4. Depress the [SET] key once to reveal the RECIPE NUMBER parameter.
5. After setting the recipe number, cycling through the other parameters displays the current values for the selected recipe. The operator can change the value of any parameter using the [ARROW UP] - [ARROW DOWN] keys. If the selected recipe number has not yet been stored in memory, the other parameters will display the values of the current recipe.
6. When all of the parameters have been set, depress the [MENU] key two times to return to the AUTOMATIC OPERATION MODE.

IMPORTANT: Values entered into the current recipes are the values stored. The operator is responsible for zeroing out any segments that are not used before storing.

4.3.8 RECALL A RECIPE - PROGRAMMABLE

To recall a recipe from memory and make it current, do the following:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key repeatedly until the RECALL RECIPE submenu is revealed.
4. Depress the [SET] key once to reveal the RECIPE NUMBER parameter.
5. Select the desired recipe number by depressing the [ARROW UP] - [ARROW DOWN] keys.
6. Depress the [SET] key once to reveal the first parameter PUMP SPEED.
7. The operator is able to view the recipe by cycling through the parameters. Changes are allowed to the recipe parameters before making it current. These changes only affect the current recipe not the stored recipe.
8. After viewing the last recipe parameter (or after viewing any of the recipe parameters, depress the [MENU] key once), the operator is prompted to make the recipe the current recipe..
9. Depressing the [SET] key confirms the recipe as current, depressing the [MENU] key cancels it.
10. Depress the [MENU] key to return to the AUTOMATIC OPERATION MODE.

4.3.9 ADJUSTING APPLIED - FORCE - PROGRAMMABLE

To adjust the force applied to the mold, choose one of the following options:

AUTOMATIC MODE:

(SEE 4.3.13 ADJUSTING SEGMENT FORCE)

MANUAL MODE:

1. Depress the [MAN] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key repeatedly until the MANUAL CONTROL submenu is revealed.
4. Depress the [SET] key once to reveal the “FORCE: XXXX LB” parameter.
5. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the force.
6. When the adjustment is completed, depress the [MENU] key two times to return to the Manual Operation Mode.

4.3.10 ADJUSTING PUMP SPEED - PROGRAMMABLE

To adjust the speed at which the hydraulic pump builds pressure, choose one of the following options:

AUTOMATIC MODE:

1. Depress the [AUTO] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [SET] key once to reveal the PUMP SPEED parameter.
4. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the percentage of speed (and the [DIAMOND] key for faster adjustment).
5. When the adjustment is completed, depress the [MENU] key two times to return to the Automatic Operation Mode.

(See also, 4.3.7 STORE A RECIPE, or 4.3.8 RECALL A RECIPE)

MANUAL MODE:

1. Depress the [MAN] key.
2. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
3. Depress the [ARROW DOWN] key until the MANUAL CONTROL submenu appears.
4. Depress the [SET] key repeatedly to reveal the PUMP SPEED parameter.
5. Use the [ARROW UP] key to increase or the [ARROW DOWN] key to decrease the percentage of speed.

6. When the adjustment is completed, depress the [MENU] key to return to the Manual Operation Mode.

4.3.11 ADJUSTING TIME BASE - PROGRAMMABLE

To adjust the time base to either seconds or minutes, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key repeatedly to reveal the TIME BASE parameter.
3. Use the [ARROW DOWN] key to change the TIME BASE from MIN (minutes) to SEC (seconds) or use the [ARROW UP] key to change from SEC (seconds) to MIN (minutes).
4. When the adjustment is completed, depress the [MENU] key two times to return to the Operating Mode.

(See also, 4.3.7 STORE A RECIPE, or 4.3.8 RECALL A RECIPE)

4.3.12 ADJUSTING RECIPE TYPE - PROGRAMMABLE

On the “P” (Programmable) Control System, recipes can have either a Pressure or Temperature Base.

- If Pressure Based, dwell time will begin when the force setpoint is reached.
- If Temperature Based, dwell time will begin when the temperature setpoints are reached.

FOR TIME BASED RECIPE:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key three times to reveal the RECIPE TYPE parameter. The screen will read “0 = TEMP, 1 = TIME”.
3. Depress the [ARROW UP] key once to choose “1” and set a **Timed Based Recipe**.
4. When the adjustment is completed, press the [MENU] key two times to return to the Automatic Operation Mode.

FOR TEMPERATURE BASE RECIPE:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key three times to reveal the RECIPE TYPE parameter. The screen will read “0 = TEMP, 1 = TIME”.
3. Depress the [ARROW DOWN] key once to choose “0” and set a **Temperature Based Recipe**.
4. When the adjustment is completed, press the [MENU] key two times to return to the Automatic Operation Mode.

4.3.13 ADJUSTING SEGMENT 1 - FORCE - PROGRAMMABLE

In the Programmable Control System, there can be up to 20 segments per recipe. To **Adjust the Force in Segment 1**, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key repeatedly until the SEGMENT 1 FORCE: parameter is revealed.
3. Using the [ARROW UP] - [ARROW DOWN] and [DIAMOND] keys adjust the pressure.
4. When the adjustment is completed, depress the [SET] key to advance to the next parameter, or the [MENU] key two times to return to the Automatic Operation Mode.

4.3.14 ADJUSTING SEGMENT 1 DWELL TIME - PROGRAMMABLE

To adjust the amount of time at which the press is held at force setpoint in the first segment of the recipe, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key repeatedly to reveal the SEGMENT 1 DWELL TIME: parameter.
3. Using the [ARROW UP] - [ARROW DOWN] and [DIAMOND] keys, adjust the dwell time.
4. When the adjustment is completed, depress the [SET] key to advance to the next parameter, or the [MENU] key two times to return to the Automatic Operation Mode.

4.3.15 ADJUSTING THE SEGMENT 1 TEMPERATURE SETPOINT - PROG.

In the Programmable Control System, there can be as many temperature setpoints as there are platens. To adjust the first temperature setpoint for segment 1, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [SET] key repeatedly to reveal the SEGMENT 1 TEMP SP 1 parameter.
3. Using the [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys, adjust the temperature setpoint.
4. When the adjustment is made, depress the [SET] key to advance to the next parameter or the [MENU] key two times to return to the Automatic Operation Mode.

Follow the same sequence to make adjustments to additional temperature setpoints in segment 1.

Repeat the steps for the following settings in subsequent segments, as appropriate:

- SEGMENT 2 FORCE: XXXX
- SEGMENT 2 DWELL TIME: XX SEC
- SEGMENT 2 TEMP SP 1: XXX
- SEGMENT 2 TEMP SP 2, etc...

4.3.16 TEMPERATURE DEADBAND FOR SETPOINT - PROGRAMMABLE

The temperature deadband is the variance allowed on either side of a temperature setpoint during a cycle. The temperature deadband can be adjusted through the SETUP PARAMETERS submenu.

To adjust the temperature deadband setting, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW UP] key repeatedly to reveal SETUP PARAMETERS submenu.
3. Depress the [SET] key repeatedly to reveal the TEMP DEADBAND parameter.
4. Depress the [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys to adjust the temperature deadband.
5. When adjustment is completed, depress the [SET] key to advance to the next parameter or the [MENU] key two times to return to the Automatic Operation Mode.

4.3.17 TEMPERATURE SETPOINT FOR WATER COOLING - PROG.

When setting a temperature setpoint for water cooling, remember:

- When the average current temperature setpoint is above the temperature setpoint for air cooling, the controller will initiate air cooling only.
- When the average current temperature setpoint is between the temperature setpoint for water cooling and the temperature setpoint for air cooling, the controller will initiate both air and water cooling.
- When the average current temperature setpoint (of all the temperature controllers) is below the temperature setpoint for water cooling, the controller will initiate water cooling only.

The TEMP SP FOR WATER COOLING can be accessed through the SETUP PARAMETERS submenu.

To adjust the TEMP SETPOINT FOR WATER COOLING, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until the SETUP PARAMETERS submenu is revealed.
3. Depress the [SET] key repeatedly until the TEMP SP FOR WATER COOLING parameter is revealed.
4. Using the [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys, adjust the water cooling setpoint.
5. When the adjustment is completed, press the [SET] key to advance to the next parameter, or the [MENU] key two times to return to the Automatic Operation Mode.

4.3.18 TEMPERATURE SETPOINT FOR AIR COOLING - PROGRAMMABLE

When setting a temperature setpoint for air cooling, remember:

- When the average current temperature setpoint is above the temperature setpoint for air cooling, the controller will initiate air cooling only.
- When the average current temperature setpoint is between the temperature setpoint for water cooling and the temperature setpoint for air cooling, the controller will initiate both air and water cooling.
- When the average current temperature setpoint (of all the temperature controllers) is below the temperature setpoint for water cooling, the controller will initiate water cooling only.

The TEMP SP FOR AIR can be accessed through the SETUP PARAMETERS submenu.

To adjust the TEMP SETPOINT FOR AIR, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until SETUP PARAMETER submenu is revealed.
3. Depress the [SET] key repeatedly until the TEMP SP FOR AIR parameter is revealed.
4. Using the [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys, adjust the air cooling setpoint.
5. When the adjustment is completed, press the [SET] key to advance to the next parameter, or the [MENU] key two times to return to the Automatic Operation Mode.

IMPORTANT: A ball valve located in each platen cooling line is preset by **CARVER, INC.** to balance the flow of cooling medium to each platen, allowing the platen temperature to drop evenly. If an uneven cooling rate between platens is consistently experienced, it should be corrected by slightly adjusting the ball valves. If platen temperatures do not drop evenly on presses equipped with the PROGRAMMABLE CONTROL PACKAGE, an unwanted hesitation may occur in the cooling portion of the program. 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 is between 600° and 350°F (315° and 177°C).
WATER ONLY when temperature is below 350°F (177°C).

4.3.19 ADJUSTING THE AIR PURGE - PROGRAMMABLE

An air purge clears all residual water from the platen cooling cores after the cooling cycle. The AIR PURGE DELAY setting can be accessed through the SETUP PARAMETERS submenu. To adjust the AIR PURGE DELAY setting, do the following:

1. Depress the [MENU] key. The VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until the SETUP PARAMETER submenu is revealed.
3. Depress the [SET] key repeatedly until the AIR PURGE DELAY parameter is revealed.
4. Using the [ARROW UP] - [ARROW DOWN], and [DIAMOND] keys, adjust the air purge setpoint.
5. When the adjustment is complete, press the [SET] key to advance to next parameter, or the [MENU] key two times to return to the Automatic Operation Mode.

CAUTION: **CARVER, INC.** recommends a minimum of 45 seconds Air Purge. This is to purge any residual water from the platen cooling cores. Failure to do so can result in slower platen heat up time and will turn residual water to steam if the temperature setpoint is high enough.

4.3.20 WATER VALVE OFF/ON - MANUAL CONTROL - PROGRAMMABLE

The water valve can be turned off or on while in the manual control mode by doing the following:

1. Depress the [MENU] key, the VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until the MANUAL CONTROL submenu appears.
3. Depress the [SET] key repeatedly until the WATER VALVE CONTROL parameter appears.
4. Use the [ARROW UP] - [ARROW DOWN] keys to OPEN (this allows water to flow through the platens) and CLOSE (this stops the flow of water to the platens) the water solenoid valve. 0 = OPEN, 1 = CLOSE.
5. When the adjustment is complete, depress the [SET] key to advance to the next parameter, or the [MENU] key to return to the MANUAL CONTROL submenu.

4.3.21 AIR VALVE OFF/ON - MANUAL CONTROL - PROGRAMMABLE

The air valve can be turned off or on while in the manual control mode by doing the following:

1. Depress the [MENU] key, the VIEW/EDIT RECIPE submenu will appear.
2. Depress the [ARROW DOWN] key repeatedly until the MANUAL CONTROL submenu appears.
3. Depress [SET] key repeatedly until the AIR VALVE CONTROL parameter appears.
4. Use the [ARROW UP] - [ARROW DOWN] keys to OPEN (this allows air to flow through the platens) and CLOSE (this stops the flow of air to the platens) the air solenoid valve. 0 = OPEN, 1 = CLOSE.
5. When the adjustment is complete, depress the [SET] key to advance to the next parameter, or the [MENU] key to return to the MANUAL CONTROL submenu.

4.4 PLATEN HEAT TEMPERATURE CONTROL OVERVIEW

Each platen has a dedicated 1/16 DIN digital temperature controller located on the control panel. Platen temperature is sensed by a type J thermocouple located in each platen near the work surface. The controllers are modular and can be removed from their housings without disconnecting wires from terminals. The controllers are preset by **CARVER, INC.** Field adjustment, other than the temperature setpoints (SP) should not be necessary.

IMPORTANT: If platens are not preheated before force setpoint is achieved, pressure overshoot will occur due to thermal expansion of steel.

4.5 TEMPERATURE CONTROLLER WITH DIGITAL “D” CONTROL SYSTEM

The platen temperature controllers used with the Digital “D” Control System are discrete from the system controller. Platen heat temperature control is adjusted and operated the same with the Digital Control System in AUTO MODE or MANUAL MODE.

The 1/16 DIN Omron E5CX temperature controllers have “proportional - integral - derivative (PID)” control and have a self-tuning function.

4.5.1 ADJUSTING TEMPERATURE SETPOINT- OMRON E5CX TCU

Depress the [ARROW UP] - [ARROW DOWN] key to change the setpoint value. Depressing these keys for one second or more will continually increase or decrease the setpoint value. The changed value will become effective two seconds after the [ARROW UP] or [ARROW DOWN] keys are released.

4.5.2 AUTO-TUNE PROCEDURE - OMRON E5CX TCU

The Auto-Tune (self-tune) feature automatically fine tunes the temperature controllers PID process settings. The controllers are Auto-Tuned by **CARVER, INC.** before the press is shipped. For maximum temperature control accuracy, Auto-Tuning should be performed at the work site with the mold or tooling in place.

1. With heat power on, depress temperature controllers [ARROW UP] - [ARROW DOWN] keys to adjust setpoint to desired value.
2. Depress the temperature controllers [AT] key for a minimum of one second to start the Auto-Tuning function. The LED above the “AT” label will illuminate and flash to indicate auto-tuning is in progress. The LED will go out and the temperature controller will return to the normal operating mode after this function is complete.
3. After the “AT” Led has gone out, depress the [AT] key for a minimum of one second, this will complete the Auto-Tune function and return the controller to the normal operating mode.

IMPORTANT: Don’t be alarmed by the controller’s response. Auto-Tuning can take up to 30 minutes, and it may take the process temperature above and below the setpoint as many as three times before leveling off at the process setpoint.

IMPORTANT: Please refer to the enclosed Omron E5CX temperature controller instruction manual for additional information.

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.

4.6 TEMPERATURE CONTROLLER WITH PROGRAMMABLE “P” CONTROL SYSTEM

The platen temperature controllers used with the Programmable “P” Control System are interfaced with the system controller. When the Programmable Control System is in Auto Mode, temperature setpoints are changed through the system controller key pad and downloaded to the individual temperature controllers. The current platen temperature will be displayed on the system controller display.

When the system controller is in the Manual Mode, temperature setpoints must be changed via the individual temperature controller keypads.

The 1/16 DIN West 6100 temperature controllers have “proportional - integral - derivative (PID)” control and have a self-tuning function.

4.6.1 ADJUSTING TEMPERATURE SETPOINT

WHEN IN AUTO MODE - WEST 6100 TCU

Refer to section 4.3.15 ADJUSTING THE SEGMENT 1 TEMPERATURE SETPOINT. The temperature setpoints specified in the current recipe will be downloaded to the temperature controllers at the beginning of each recipe segment.

4.6.2 ADJUSTING TEMPERATURE SETPOINT

WHEN IN MANUAL MODE - WEST 6100 TCU

Push the **I** [POWER ON] and **→(0) ←**[HEAT ON] pushbuttons (located on front control panel) to turn “ON” both functions.

1. Depress the [MAN] key on the system controller keypad.
2. Depress the [FUNCTION] key located on the front of the WEST 6100 temperature controller, “SP” will appear on lower display of the temperature controller.
3. 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).
4. 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.
5. Repeat steps 3, 4 and 5 for each temperature controller.

4.6.3 SELF-TUNE PROCEDURE - WEST 6100 TCU:

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.

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.

SECTION FIVE

OPERATION

5.1 OPERATOR SAFETY

1. An integral safety shield is included for safe operation of your press.
2. 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.
3. When using caustic or acid test specimens, a face shield, apron and rubber gloves should be used for the protection of the operator.
4. 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 material being pressed. Locator plates are available on request.

IMPORTANT: CARVER, INC. recommends bolting the press to a work table whenever possible.

WARNING: Operating the press above the maximum design pressure will result in damage to the hydraulic system and clamp assembly and could cause personal injury.

CAUTION: When using a press with hot plates, gauntlet gloves should be worn to protect the forearms and hands. Steam can be released from a specimen when pressure is applied.

5. 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.
6. Always check the pressure rating of the pressed apparatus prior to pressing to be sure it is rated for the applied load.

5.2 SEQUENCE OF OPERATION - DIGITAL "D" CONTROL SYSTEMS

The following description pertains to the Digital ("D") control package only. The press can be operated in either the Manual or Automatic Mode. Modes are selected by depressing the [AUTO] key or the [MAN] key before the beginning of the cycle. An indication of the current mode will be displayed.

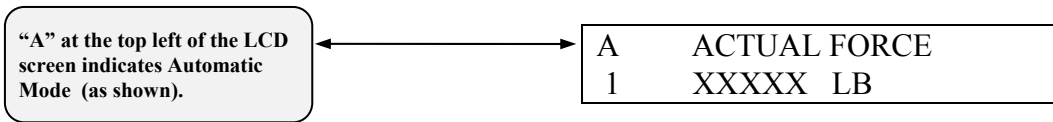
5.2.1 AUTOMATIC MODE SEQUENCE OF OPERATION

Depressing the [AUTO] key puts the press in Automatic Mode. The standard automatic operation of the press is detailed below:

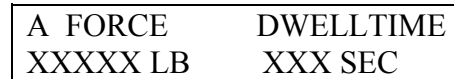
1. When the safety shield door is in the closed position, the operator can start the cycle by simultaneously depressing and holding both [CLOSE] pushbuttons until the press closes and begins to build pressure. (If either of the pushbuttons are released before pressure is built, the press will open.)
2. The press will build pressure until the clamp force setpoint is reached. The pump will then shut off, and the dwell time will start.

IMPORTANT: As force builds, the pump motor will slow down and may even toggle off and on as it nears the setpoint. This is designed into the unit and should not be reason for concern.

- Throughout this dwell time, the press will maintain clamp force setpoint by starting the pump when the force falls below the setpoint and stopping it when the force reaches setpoint.
- While the press is building force, the LCD screen will display the current applied force as shown below:



- After setpoint is reached and dwell timer starts, the LCD screen will display the current force and remaining dwell time as shown below:



- When the dwell time expires, the pump will be disabled, the buzzer will sound, the press will open and the LCD screen will display:



IMPORTANT: Press may be opened and cycle aborted at anytime during the AUTOMATIC CYCLE by momentarily depressing the [OPEN] pushbutton.

WARNING: Opening the safety door will have the same result as depressing the [OPEN] pushbutton. **CARVER, INC.** recommends, however, that the [OPEN] pushbutton be used to open the press before the safety shield is opened.

5.2.2 MANUAL MODE SEQUENCE OF OPERATIONS

This operation allows the operator to view or modify the manual control parameters. Depressing the [SET] and [ARROW UP - ARROW DOWN] keys enables the operator to cycle through and change the values of these parameters.

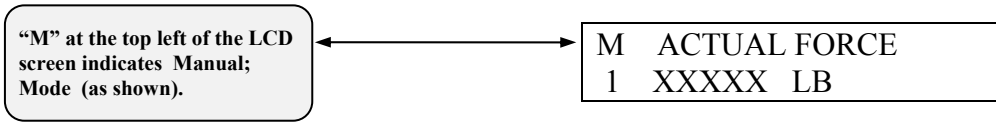
Depressing the [MAN] key puts the press in the Manual Mode. When your press is in Manual Mode, a programmable dwell time is not available, however, the elapsed dwell time will be displayed. The operation of the press in this mode is detailed below:

- When the safety door is in the closed position, the operator can start the cycle by simultaneously depressing and holding both [CLOSE] pushbuttons until the press closes and begins to build pressure. (If either of the pushbuttons are released before pressure is built, the press will stop and hold position - thus allowing the operator to jog the press closed if desired.)
- The press will build pressure until the clamp force setpoint is reached. The pump will then shut off.

IMPORTANT: As force builds, the pump motor will slow down and may even toggle off and on as it nears the setpoint. This is designed into the unit and should not be reason for concern.

- The press will maintain force setpoint by starting the pump when the force falls below setpoint, and stopping it when the force reaches setpoint.

4. While the press is building force, the LCD screen will display the current applied force as shown below:



5. After setpoint is reached, the LCD screen will display the current force and the elapsed dwell time as shown below:

M FORCE DWELLTIME
XXXXX LB XXX SEC

6. The press will remain closed with pressure maintained until the [OPEN] button is depressed. At this time the pump will be disabled, the buzzer will sound, the press will open and the LCD screen will display:

CYCLE COMPLETE

WARNING: Opening the safety door will have the same result as depressing the [OPEN] pushbutton. CARVER, INC. recommends, however, that the [OPEN] pushbutton be used to open the press before the safety shield is opened.

5.3 SEQUENCE OF OPERATION - PROG (“P”) CONTROL SYSTEMS

The following description pertains to the Programmable (“P”) control package only.

The Programmable Control System features a segmented recipe structure in which each recipe can contain up to 20 segments. Each segment will contain one temperature setpoint per platen, one force setpoint, and a dwell time setting. All segments need not be used for a given recipe. Recipes can be either temperature or pressure based, which is chosen as a recipe parameter. (see also, 4.3.12 ADJUSTING RECIPE TYPE).

5.3.1 AUTOMATIC MODE SEQUENCE OF OPERATION

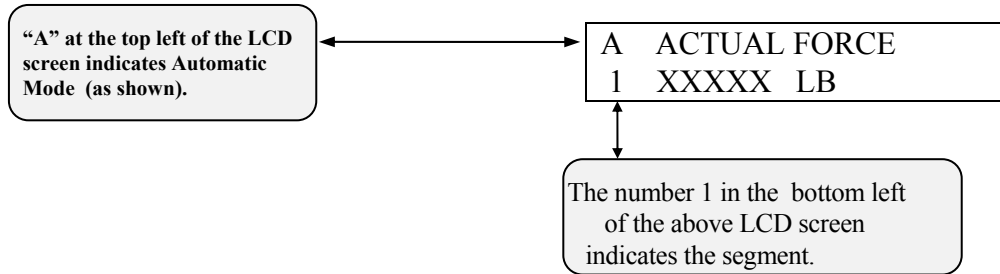
The press can be operated in either the Manual or Automatic Mode. This can be selected by depressing the [AUTO] or [MAN] keys before the beginning of the cycle. An indication of the current mode will be displayed.

Depressing the [AUTO] key puts the press in Automatic mode. The standard automatic operation of the press is detailed below:

1. When the safety shield door is in the closed position, the operator can start the cycle by simultaneously depressing and holding both [CLOSE] pushbuttons until the press closes and begins to build pressure. (If either of the pushbuttons are released before pressure is built, the press will open.)
2. The press will build pressure until the clamp force setpoint is reached. The pump will then shut off, and the dwell time will start.

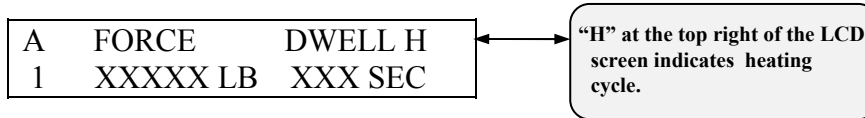
IMPORTANT: As the force builds, the pump motor will slow down and may even toggle off and on as it nears setpoint. This is designed into the unit and should not be reason for concern.

- Throughout this dwell time, the press will maintain clamp force setpoint by starting the pump when the force falls below the setpoint, and stopping it when the force reaches setpoint.
- While the press is building force, the LCD screen will display the current applied force as shown below:



For a **Temperature Base Recipe**; the system controller will start the dwell timer when the temperature setpoints have been achieved. For a **Pressure Based Recipe**; the controller will start the dwell timer when the force setpoint has been achieved.

- After setpoint is reached and the dwell timer starts, the LCD screen will display the current segment, current force, and remaining dwell time as shown below.



- When the dwell time expires, the system controller will build pressure until the force setpoint of the next segment is achieved. If the force setpoint of the next segment is lower, the force will first drop off (possibly to zero) and then rebuild to the force setpoint of the next segment.

The system controller will also download the temperature setpoints of next segment to the temperature controllers.

Depending upon the recipe type (Temperature Based or Pressure Based), the system controller will start the dwell time when either the temperature setpoints have been achieved, or when the force setpoint has been achieved

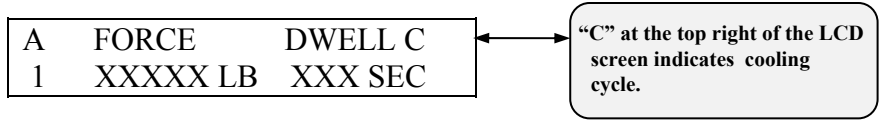
- For a **Temperature Based Recipe**; if the temperature setpoints of the current segment are lower than those of the previous segment, the system controller will initiate a cooling step.

For a **Pressure Based Recipe**; if the actual platen temperatures are greater than the temperature setpoints of the current segment, the system controller will initiate a cooling step.

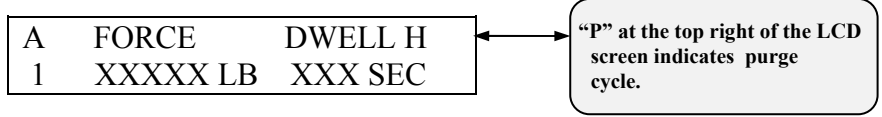
During the cooling step, the system controller will open either the air valve and/or the water valve, depending on the current average temperature readings. If the current average temperature is:

- Above the **AIR COOL ONLY** setpoint, only the air valve will be opened.
- Between the **AIR COOL ONLY** and the **WATER COOL ONLY** setpoints, both the air valve and water valve will be opened.
- Below the **WATER COOL ONLY** setpoint, only the water valve will be opened.

These temperature setpoints can be changed by the operator. The LCD screen will display the current segment, current force, and remaining dwell time as shown below:



8. During the cooling step, when the temperature controllers are within the temperature deadband (the margin of allowable degrees on either side of a setpoint), the system controller will initiate a cooling purge. During a cooling purge, the air valve will be opened and the water valve will be closed for a selectable purge delay. The LCD screen will display the current segment, current force, and remaining dwell time as shown below:



For a **Pressure Based Recipe**; an air purge will take place at the beginning of a segment if the previous segment required cooling, and after completion of the last segment of a recipe.

CAUTION: CARVER, INC. recommends a minimum of 45 seconds Air Purge. This is to purge any residual water from the platen cooling cores. Failure to do so can result in slower platen heat-up time and will turn residual water to steam if the temperature setpoint is high enough.

IMPORTANT: An air purge will complete its specified time regardless of dwell time expiring and the start of the next segment. When this occurs, the air purge designation “P” will not be displayed on the LCD screen.

9. When the dwell time of the last programmed recipes segment expires, the pump will be disabled, the buzzer will sound, the press will open and the LCD screen will display:

CYCLE COMPLETE

10. The operator may open the press at any time during the cycle by momentarily depressing the [OPEN] pushbutton. This will disable the pump, the buzzer will sound and the press will open. The LCD screen will display:

CYCLE ABORTED


11. Activating the CYCLE ABORT function will reset the segments. The sequence will start at the beginning of the recipe on the next cycle.

WARNING: Opening the safety door will have the same result as depressing the [OPEN] pushbutton. CARVER, INC. recommends, however, that the [OPEN] pushbutton be used to open the press before the safety shield is opened.

5.3.2 MANUAL MODE SEQUENCE OF OPERATION

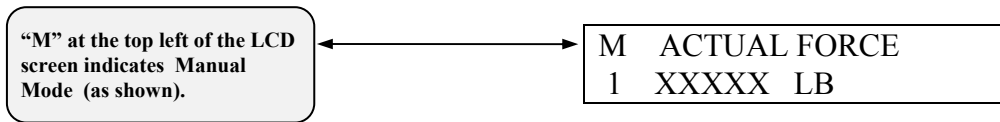
This operation allows the operator to view or modify the manual control parameters. Depressing the [SET] and [ARROW UP] - [ARROW DOWN] keys enables the operator to cycle through and change the values of these parameters.

Depressing the [MAN] key puts the press in the Manual Mode. When your press is in Manual mode, a programmable dwell time is not available, however, the elapsed dwell time will be displayed. The operation of the press in this mode is detailed below:

1. When the safety door is in the closed position, the operator can start the cycle by simultaneously depressing and holding both  [CLOSE] pushbuttons until the press closes and begins to build pressure. (If either of the pushbuttons are released before pressure is built, the press will stop and hold position - thus allowing the operator to jog the press closed if desired.)
2. The press will build pressure until the clamp force setpoint is reached. The pump will then shut off.

IMPORTANT: As force builds, the pump motor will slow down and may even toggle off and on as it nears the setpoint. This is designed into the unit and should not be reason for concern.

3. The press will maintain force setpoint by starting the pump when the force falls below setpoint, and stopping it when the force reaches setpoint.
4. While the press is building force, the LCD screen will display the current applied force as shown below:



5. After setpoint is reached, the LCD screen will display the current force and the elapsed dwell time as shown below:




6. The press will remain closed with pressure maintained until the open button is depressed. At this time the pump will be disabled, the buzzer will sound, the press will open and the LCD screen will display.



To perform manual platen heating, see section 4.6.1.

To perform manual platen cooling, see sections 4.3.20 and 4.3.21.

WARNING: Opening the safety door will have the same result as depressing the [OPEN] pushbutton. **CARVER, INC.** recommends, however, that the  [OPEN] pushbutton be used to open the press before the safety shield is opened.

5.4 DAYLIGHT ADJUSTMENT

Threaded columns allow for daylight adjustment between the moving bolster and the top bolster.

TO RAISE THE TOP (HEAD) BOLSTER:

1. Insert a spacer block with parallel surfaces between the moving bolster and top bolster, jog the hydraulic unit to build force to the maximum capacity of the press.
2. With the press at maximum applied force, loosen the column nuts located directly below the top bolster. On AutoFour/15 and AutoFour/30 presses, a brass tipped set screw must be loosened on each nut before nuts are loosened.
3. Release hydraulic force and remove the spacer, allowing the top bolster to rest on the lower column nuts.
4. Move the upper column nuts to the position required to create the desired daylight.
5. Raise the top bolster against the top nuts and tighten the lower nuts finger tight against the bottom of the top bolster.
6. Measure and equalize the distance from the bottom surface of the top bolster to the top surface of the base bolster at two points (four points on AutoFour presses) as far apart as possible. Adjust the lower nuts as needed to insure parallelism between the top bolster and base bolster. Turn the upper column nuts finger tight against the top bolster.
7. Insert a spacer block with parallel surfaces between the moving bolster and the top bolster (spacer must be tall enough to build force on the spacer), jog the hydraulic unit to build force to the maximum capacity of the press.
8. Tighten the lower nuts against the bottom surface of the top bolster as tight as possible.
9. This is a good time to check the nuts on top of the base bolster and if necessary, retighten.
10. Tighten the brass tipped set screws in the nuts (if your press is a AutoFour/15 or AutoFour/30. Open press and remove spacer, the press is now ready to operate.

TO LOWER THE TOP (HEAD) BOLSTER:

1. Insert a spacer block with parallel surfaces between the moving bolster and top bolster, jog the hydraulic unit to build force to the maximum capacity of the press.
2. With the press at maximum applied force, loosen the column nuts located directly below the top bolster. Move these column nuts to the position required to create the desired daylight. On AutoFour/15 and AutoFour/30 presses, a brass tipped setscrew must be loosened on each nut before nuts are loosened.
3. Release hydraulic force and remove the spacer allowing the top bolster to rest on the lower column nuts.
4. Tighten the upper column nuts finger tight against the top surface of the top bolster.
5. Follow steps 6 through 10 as described above.

<p>IMPORTANT: AutoFour models utilize a set screw in the column nuts. These must be loosened prior to adjusting daylight, and retightened after adjusting daylight.</p>
--

WARNING: After adjusting the daylight, be sure the top bolster is parallel to the top surface of the base bolster before applying pressure.

IMPORTANT: In all cases, size the spacer block so the maximum stroke of the hydraulic cylinder is not exceeded. Maximum cylinder stroke for Auto "C", Auto "M", and AutoFour is six inches (6", 152mm).

WARNING: Spacer block must be centered on moving bolster (or platen). Be certain that spacer is strong enough to withstand maximum applied force of the press and that its area is great enough to prevent coining the bolster (or platen) surface.

SECTION SIX

RECIPE RECORD

6.1 TEST RECIPES

Test recipes have been programmed into your press by **CARVER, INC.** The test recipes have been placed in recipe numbers 8,9 and 10 on “D” digital models and recipe 10 on “P” programmable models. You may reprogram the test recipes if desired.

6.2 RECIPE RECORD SHEETS

Sample Recipe Record Sheets have been provided for your convenience in recording new recipes you program into your **CARVER** press.

IMPORTANT: CARVER, INC. recommends that each recipe programmed into your press be recorded.
--

**SAMPLE RECIPE RECORD SHEET
CARVER AUTO SERIES - DIGITAL**

RECIPE NO.	FORCE	PUMP SPEED %	TIME BASE (MIN/SEC)	DWELL TIME
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

NOTES: _____

**SAMPLE RECIPE RECORD SHEET
CARVER AUTO SERIES - PROGRAMMABLE**

RECIPE NO. _____

RECIPE PARAMETERS						
PUMP SPEED %			TIME BASE (SEC/MIN)			
RECIPE TYPE - DEPENDENT (PRESSURE/TEMPERATURE)						
SEG.	FORCE SP.	DWELL TIME	TEMP. SP1	TEMP. SP2	TEMP. SP3	TEMP. SP4

SETUP PARAMETERS	
Alarm Buzzer Duration	
Temperature Deadband	
Water only Temp SP	
Air only Temp SP	
Air Purge Delay (SEC)	

Notes: _____

SECTION SEVEN

MAINTENANCE

7.1 CARVER, INC. AUTO SERIES PRESS

PREVENTATIVE MAINTENANCE CHECKLIST

INSPECTION DATE: _____

Model # _____ Serial # _____

WEEKLY INSPECTION	WK 1	BY	WK 2	BY	WK 3	BY	WK 4	BY
Check column nuts to make sure they are tight.								
Check Platen mounting cap screws to make sure they are tight.								

MONTHLY INSPECTION	PERFORMED BY	DATE
Disconnect and lock out power. Check heater elements for continuity with an ohmmeter.		/ /
Check platen temperature tracking with an external pyrometer.		/ /
Check hydraulic oil level.		/ /

YEARLY INSPECTION	DATE OF LAST INSPECTION	NEXT SCHEDULED INSPECTION
*Replace hydraulic oil		
*Calibrate Pressure Indicator		
*Level Platens		

*Should be performed by **CARVER, INC.** Service Technician.

7.2 TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	CORRECTION
Heating Platen does not have uniform heat distribution.	Defective cartridge heater.	Locate and replace defective heater.
	Wrong voltage or wattage heater.	Replace with correct heater.
	Residual water in platen cooling cores.	Purge residual water from platen cores with compressed air.
Heating platens do not reach temperature setpoint.	Thermocouple not fully engaged in platen.	Push Thermocouple in tight and secure bayonet fitting.
	Thermocouple lead connections loose.	Secure connections.
	Defective Thermocouple.	Replace defective Thermocouple.
	Bad heater lead connection.	Repair connection
	Defective or burned out heater	Locate and replace defective heater.
Heating platens do not heat.	Temperature controller setpoint is lower than current platen temperature.	Adjust setpoint.
	Blown heater fuses.	Replace heater fuses.
	Defective heat relay.	Replace heat relay.
	Defective heater wiring.	Repair wiring.
Temperature controllers will not energize.	No power or wrong voltage supplied to unit.	Voltage must be within 10% of voltage as stamped on electrical identification tag.
	Blown heat control circuit fuse.	Replace defective fuse.
	Defective heat off/on switch	Replace defective switch.
	Loose wire at terminal.	Secure wire at terminal.
Control power switch does not illuminate and system controller LCD display is blank.	No power or wrong voltage supplied to unit.	Voltage must be within 10% of voltage as stamped on electrical identification tag.
	Blown control power fuse.	Replace control power fuse.
	Defective control power switch.	Replace defective switch.
Press will not close. (Power is applied through control power switch.)	No force parameter entered.	Enter valve for force parameter.
	Defective CR1 relay.	Replace defective relay.
	Defective clamp close pushbutton(s).	Replace pushbutton(s).

7.3 ELECTRICAL

WARNING: Before performing any maintenance on the electrical system, turn “OFF” the main electrical disconnect.

1. Check all electrical connections. Make sure they are tight. Loose connections cause overheating which lead to component failures or short circuits.
2. Check all fuses or circuit breakers for open circuits and proper operation.
3. Check incoming supply for proper voltage and frequency.

7.4 MOLD SIZE VERSUS TONNAGE CHART

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

MOLD SHAPE				MOLD AREA		MAXIMUM ALLOWABLE TONS	
SQUARE		ROUND		IN. ²	CM ²	TONS	
IN.	CM	IN.	CM			SHORT	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

SECTION EIGHT

HYDRAULIC OIL

8.1 RECOMMENDED HYDRAULIC OILS FOR CARVER PRESSES

The hydraulic fluid is a special grade which conforms to MIL-SPEC #17672-A.

CARVER Special Hydraulic Fluid (Catalog #2170) is supplied in sealed one pint (.47 liters) containers. Contact **CARVER, INC.** Parts Department for information.

Any good grade of mineral base hydraulic oil with anti-wear and anti-foaming additives in the viscosity range of 150 SSU @ 100° F. (38° C) and a viscosity index of 90 + can be used, provided it is filtered prior to being added to the hydraulic reservoir.

IMPORTANT: DO NOT use fire retardant ester base oils, transmission fluid, brake fluid, or water-glycol mixes.

Always add clean oil to the reservoir from a clean container through a filter.

RECOMMENDED SUBSTITUTES

Standard Oil	Stanoil 21
Mobil	DTE 24
Amoco	PQ32
Exxon	Terrestic 32
Texaco	Rando HD 32
Other	Any brand name Hydraulic Jack Oil with above specifications

SECTION NINE

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

(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

SECTION TEN

CARVER, INC. SERVICE

10.1 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 252

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 customer 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. Preventative maintenance contracts and gauge calibration services are also available for most products.

CARVER, INC. SALES DEPARTMENT

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

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.

10.2 RETURNED MATERIAL POLICY

CREDIT RETURNS

1. Prior to the return of any material, **authorization** must be given by **CARVER, INC.** A RMA number will be assigned for the equipment to be returned.
2. Reason for requesting the return must be given.
3. ALL returned material purchased from **CARVER, INC.** returned is subject to 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.

SECTION ELEVEN

WARRANTY

11.1 WARRANTY RETURNS

1. Prior to the return of any material, authorization must be given by **CARVER, INC.** A RMA number will be assigned for the 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** desecration. 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.

11.2 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 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.

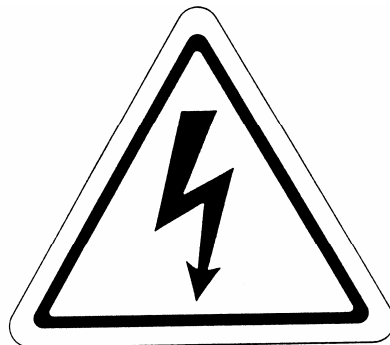
WARNING TAGS



CRUSHING INJURY



HOT SURFACE



**HIGH VOLTAGE
INSIDE ENCLOSURE
ONLY**

WARNING TAGS cont....



SHOCKING HAZARD



HIGH VOLTAGE

PUSHBUTTON TAGS



POWER ON



POWER OFF



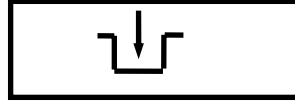
HEAT ON



HEAT OFF

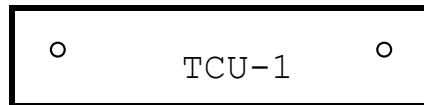


CLOSE

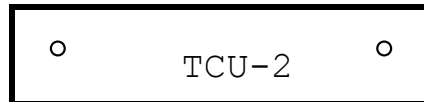


OPEN

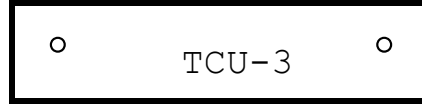
IDENTIFICATION TAGS



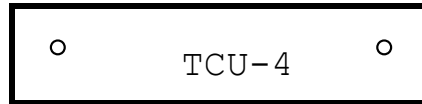
**TEMPERATURE CONTROL UNIT
NUMBER 1 FOR PLATEN 1**



**TEMPERATURE CONTROL UNIT
NUMBER 2 FOR PLATEN 2**



**TEMPERATURE CONTROL UNIT
NUMBER 3 FOR PLATEN 3**



**TEMPERATURE CONTROL UNIT
NUMBER 4 FOR PLATEN 4**



PLATEN NUMBER 1



PLATEN NUMBER 2



PLATEN NUMBER 3



PLATEN NUMBER 4

DS-1

DOOR SWITCH NUMBER 1

DS-2

DOOR SWITCH NUMBER 2

WTR ←

WATER IN

WTR →

WATER OUT

2SOL

SOLENOID NUMBER 2

3SOL

SOLENOID NUMBER 3

AR ←

AIR IN

CARVER®

MODEL S/N

FRED S. CARVER INC.
P.O. BOX 544, WABASH, IN. USA 46992-0544
TELEPHONE (219) 563-7577

PROTECTED BY U.S. AND FOREIGN PATENTS

PRESS IDENTIFICATION TAG

MODEL _____ SERIAL NO. _____
COMPRESSION FORCE _____ MFG. DATE _____
COMPRESSION CYLINDER _____" DIAMETER
VOLTAGE _____ FULL LOAD AMPS _____
MOTOR H.P. _____ (____) PLATEN(S) _____ WATTS EA.
ELECTRICAL DWG. _____
HYDRAULIC DWG. _____

MANUFACTURED BY:

CARVER® *CARVER, INC.*

1569 MORRIS STREET
WABASH, INDIANA U.S.A. 46992-0544
(219) 563-7577
CARVER, INC. PART NO.: 973147A

PRESS IDENTIFICATION TAG

ELECTRICAL DATA

VOLTS HZ

KW (HEAT) PH

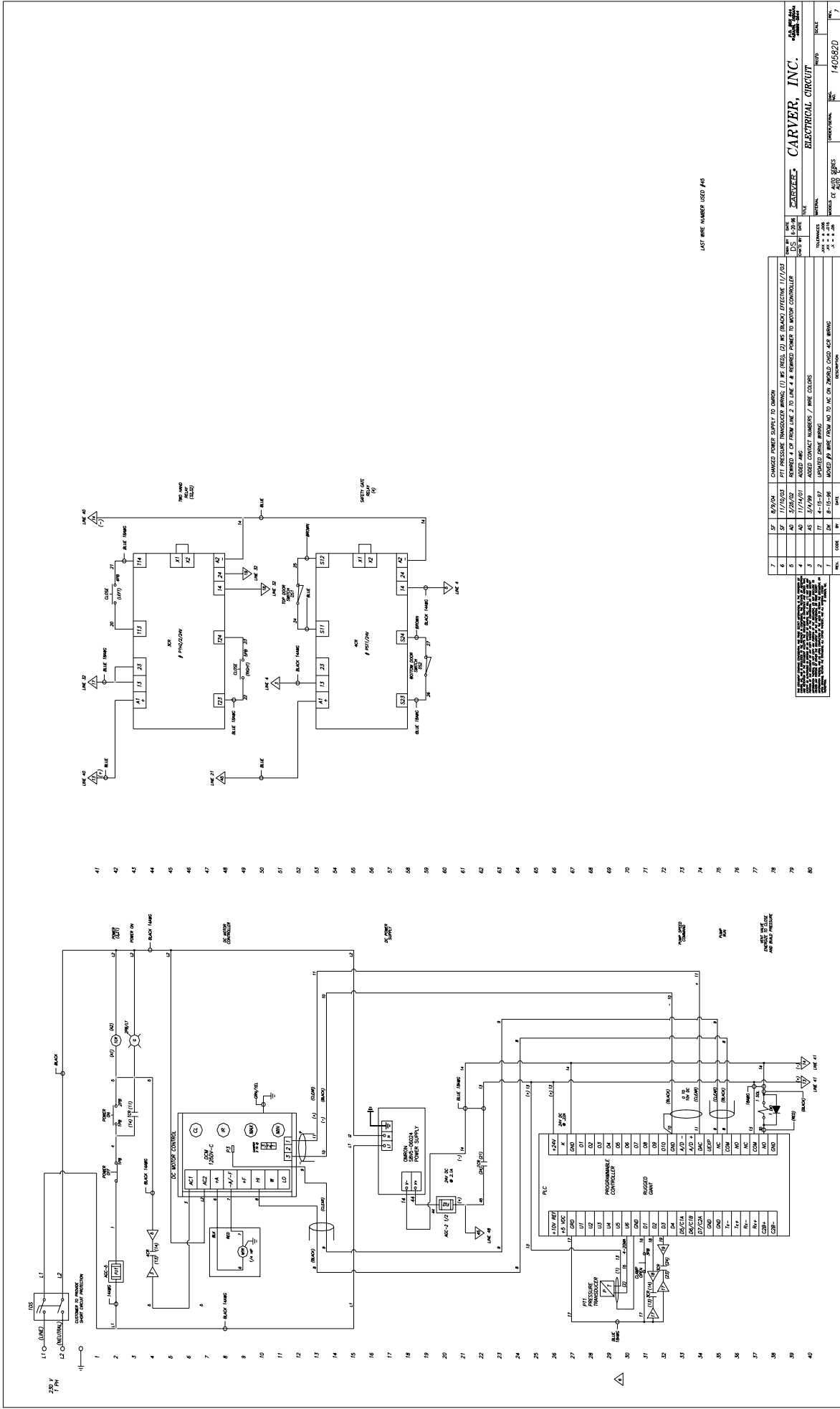
FULL LOAD AMPS

CARVER, INC.

ELECTRICAL INFORMATION TAG

SECTION THIRTEEN

DRAWING

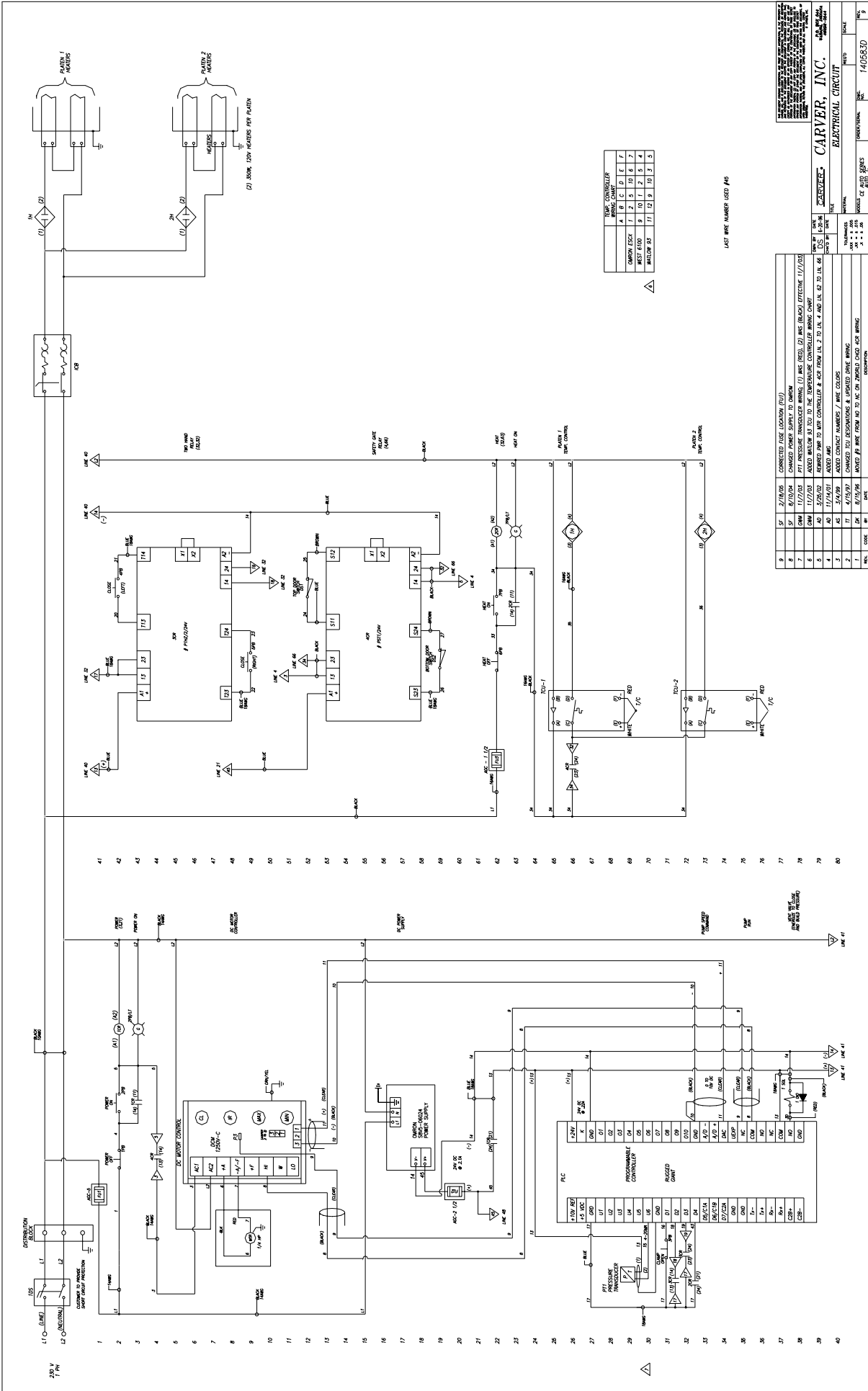


LAST REV NUMBER USED 445

NO.	DATE	BY	CHKD	DESCRIPTION
1	11/10/03			CHANGED POWER SUPPLY TO 240V
2	11/10/03			PIT PRESSURE TRANSDUCER WIRING (1) BE (RED), (2) BK (BLACK) DETECTIVE 11/10/03
3	11/10/03			REMOVED 4 OR FROM LINE 2 TO LINE 4 & REWOUND POWER TO MOTOR CONTROLLER
4	11/10/03			ADDED 4 OR FROM LINE 2 TO LINE 4 & REWOUND POWER TO MOTOR CONTROLLER
5	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
6	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
7	2/17/09			MOVED 4 OR WIRE FROM NO. 10 TO 24 ON 240VDC 400 WIRING

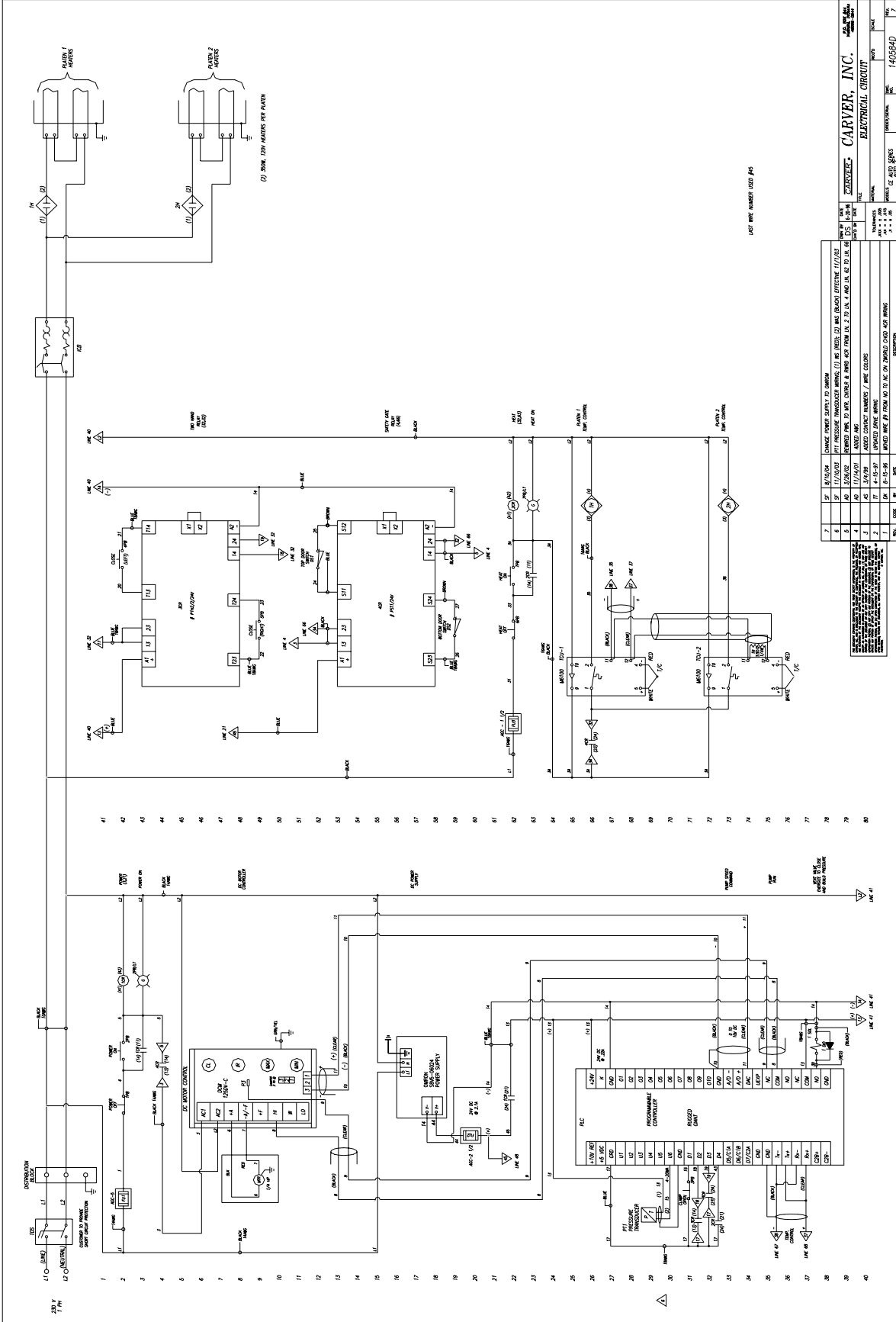
NO.	DATE	BY	CHKD	DESCRIPTION
1	11/10/03			CHANGED POWER SUPPLY TO 240V
2	11/10/03			PIT PRESSURE TRANSDUCER WIRING (1) BE (RED), (2) BK (BLACK) DETECTIVE 11/10/03
3	11/10/03			REMOVED 4 OR FROM LINE 2 TO LINE 4 & REWOUND POWER TO MOTOR CONTROLLER
4	11/10/03			ADDED CONTACT NUMBERS / WIRE COLORS
5	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
6	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
7	2/17/09			MOVED 4 OR WIRE FROM NO. 10 TO 24 ON 240VDC 400 WIRING

NO.	DATE	BY	CHKD	DESCRIPTION
1	11/10/03			CHANGED POWER SUPPLY TO 240V
2	11/10/03			PIT PRESSURE TRANSDUCER WIRING (1) BE (RED), (2) BK (BLACK) DETECTIVE 11/10/03
3	11/10/03			REMOVED 4 OR FROM LINE 2 TO LINE 4 & REWOUND POWER TO MOTOR CONTROLLER
4	11/10/03			ADDED CONTACT NUMBERS / WIRE COLORS
5	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
6	2/17/09			ADDED CONTACT NUMBERS / WIRE COLORS
7	2/17/09			MOVED 4 OR WIRE FROM NO. 10 TO 24 ON 240VDC 400 WIRING



LAST WIRE NUMBER USED #46

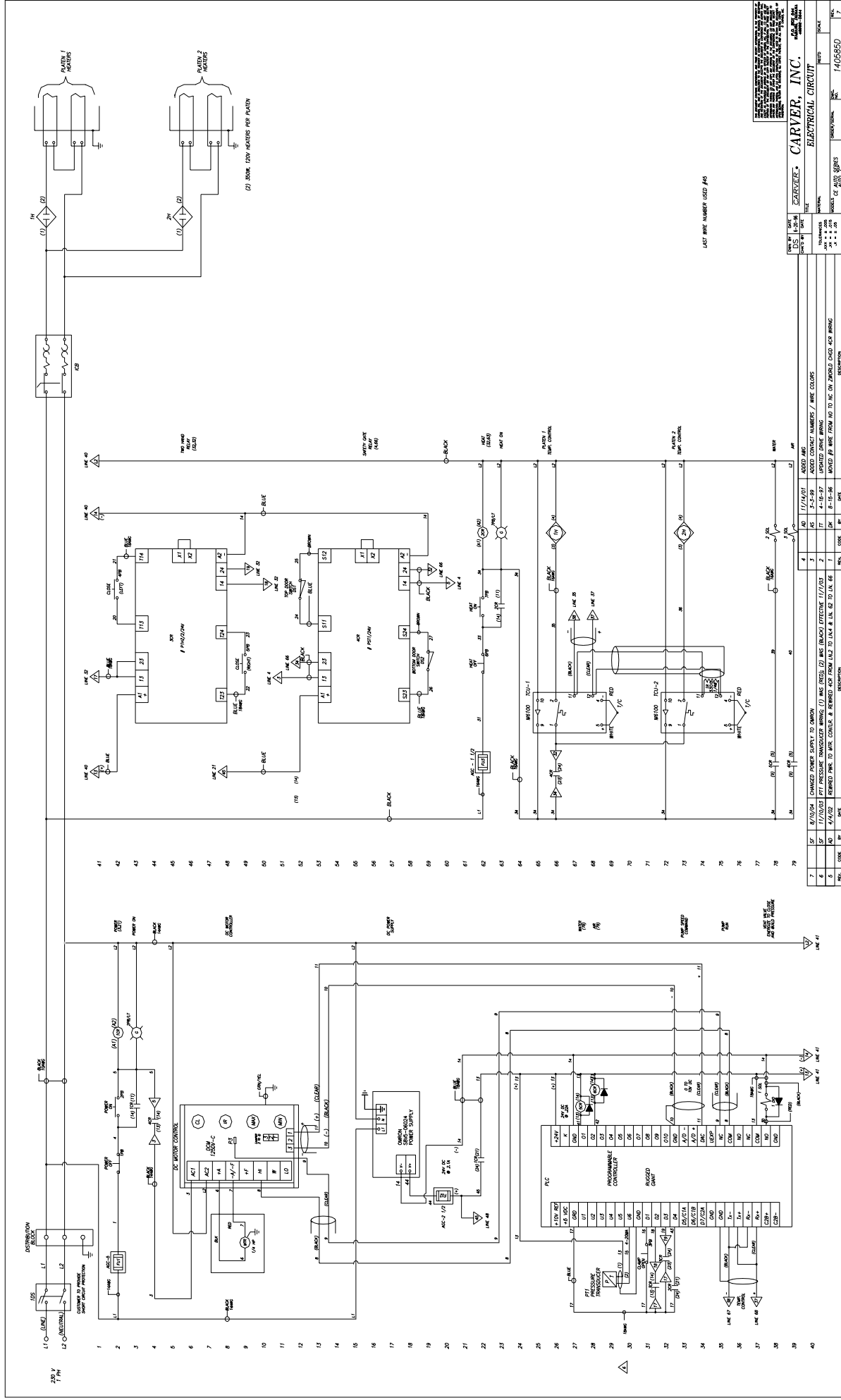
NO.	DATE	DESCRIPTION	BY	CHKD.	REV.
1	2/18/90	CONNECTED TO USE (EXISTING)			
2	7/17/91	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
3	8/11/91	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
4	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
5	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
6	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
7	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
8	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
9	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
10	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
11	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
12	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
13	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
14	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
15	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
16	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
17	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
18	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
19	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
20	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
21	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
22	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
23	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
24	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
25	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
26	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
27	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
28	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
29	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
30	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
31	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
32	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
33	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
34	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
35	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
36	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
37	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
38	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
39	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			
40	11/7/92	REPLACED PRT WITH PRT PRESSURE TRANSDUCER RELAY CHART			



LAST WIRE NUMBER USED 740

NO.	DATE	BY	DESCRIPTION
1	11/17/03	...	...
2	11/17/03	...	...
3	11/17/03	...	...
4	11/17/03	...	...
5	11/17/03	...	...
6	11/17/03	...	...
7	11/17/03	...	...

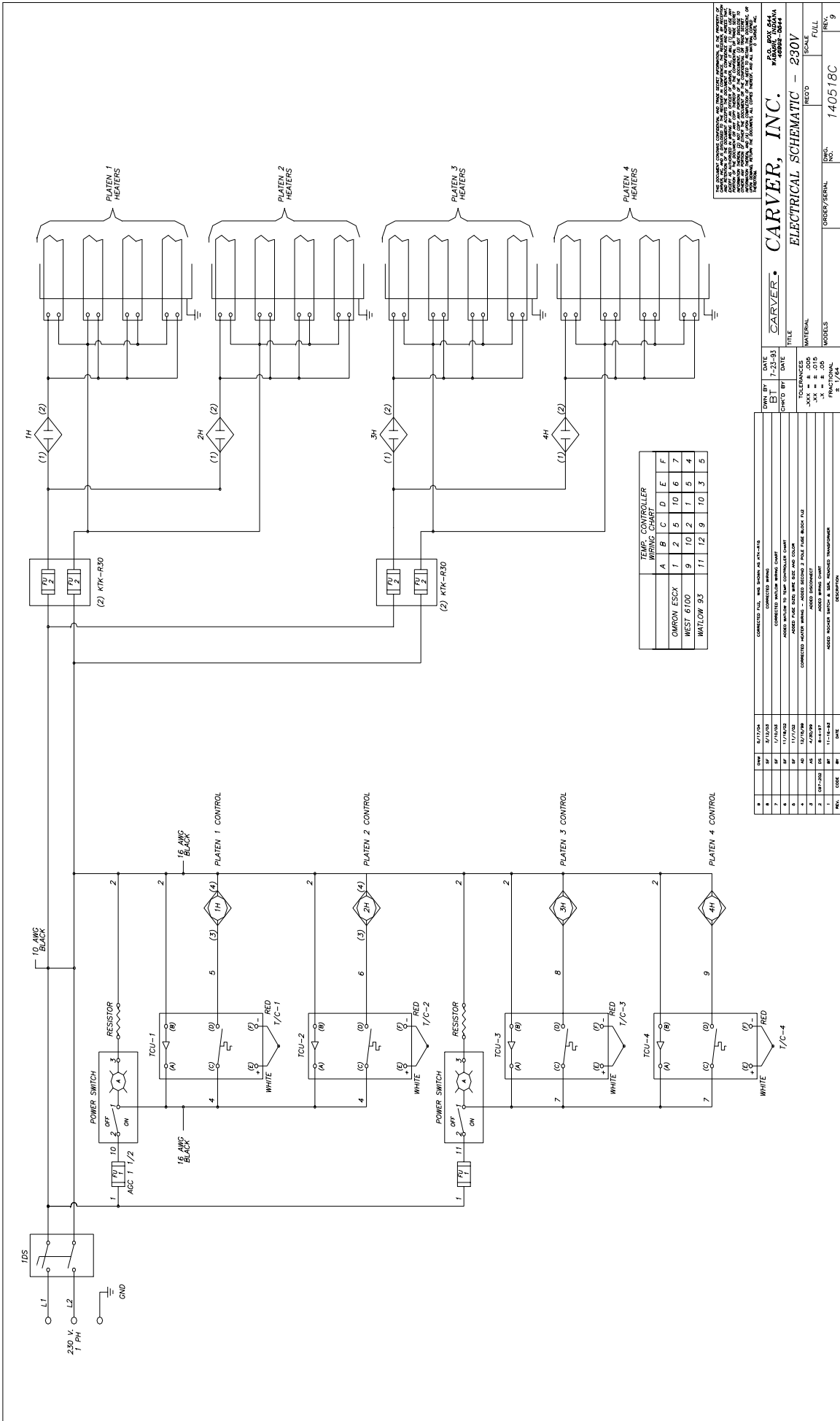
CARVER, INC.
 ELECTRICAL CIRCUIT
 140584D



LAST WIRE NUMBER USED #40

DATE	11/14/01	BY	DL
REVISED	11/14/01	BY	DL
DESCRIPTION	ELECTRICAL CIRCUIT		
PROJECT	1405650		
DRAWN	DL		
CHECKED	DL		
APPROVED	DL		

NO.	DATE	DESCRIPTION	BY	CHKD.	APP'D.
1	11/14/01	ISSUED FOR CONSTRUCTION	DL		
2	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		
3	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		
4	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		
5	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		
6	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		
7	11/14/01	REVISION: WIRE NUMBERS / WIRE COLORS	DL		

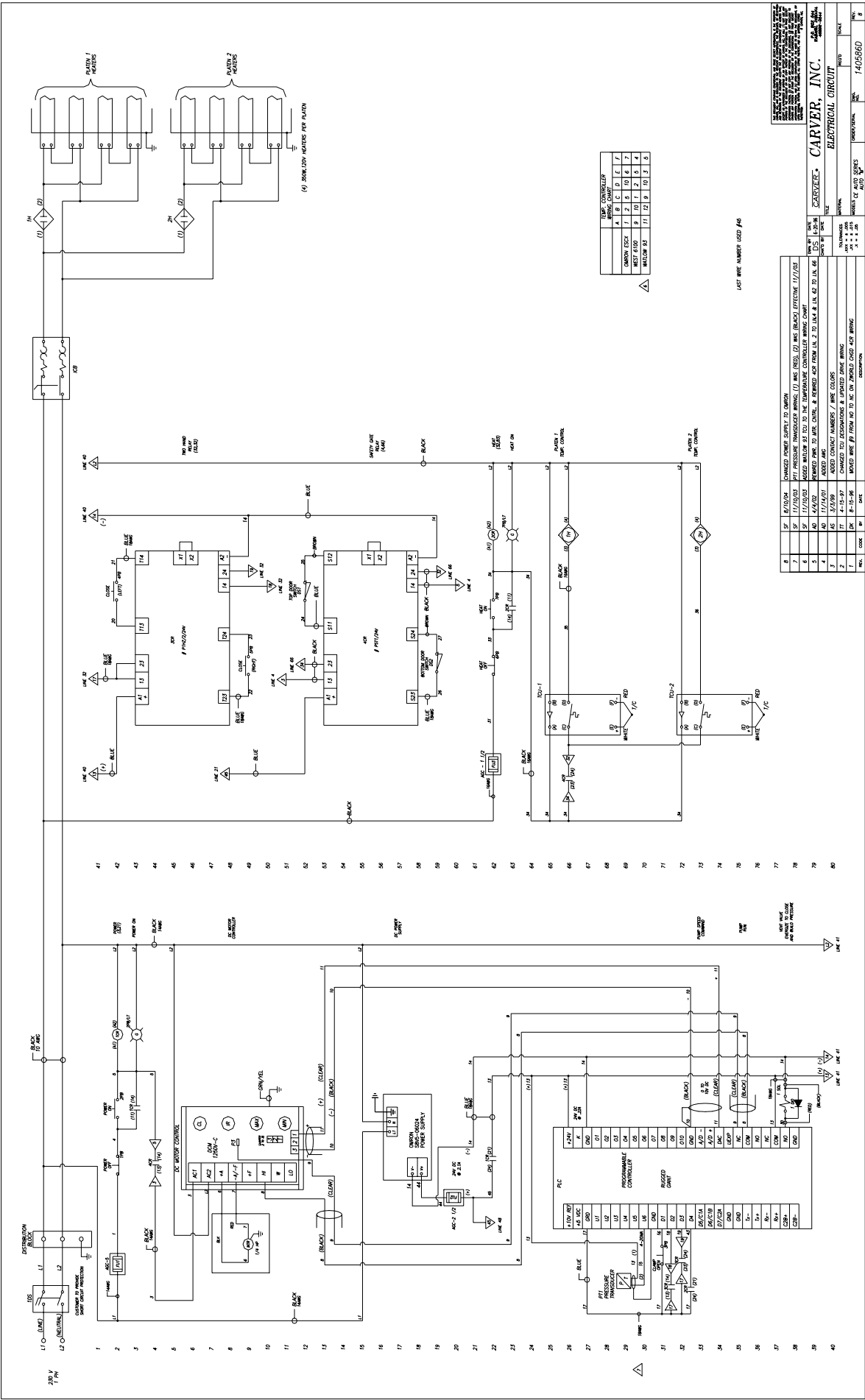


CARVER, INC.
 P.O. BOX 244
 48081-0244
 ELECTRICAL SCHEMATIC - 230V
 FULL SCALE
 140518C
 REV. 9

TEMP. CONTROLLER WIRING CHART

	A	B	C	D	E	F
OMRON ESCX	1	2	5	10	6	7
WEST 6100	9	10	2	1	5	4
WATLOW 93	11	12	9	10	3	5

REV.	DATE	DESCRIPTION
1	11-14-62	ADD SOCKET SWITCH & SOLE ENDED TRANSFORMER
2	11-14-62	
3	11-14-62	
4	11-14-62	
5	11-14-62	
6	11-14-62	
7	11-14-62	
8	11-14-62	
9	11-14-62	



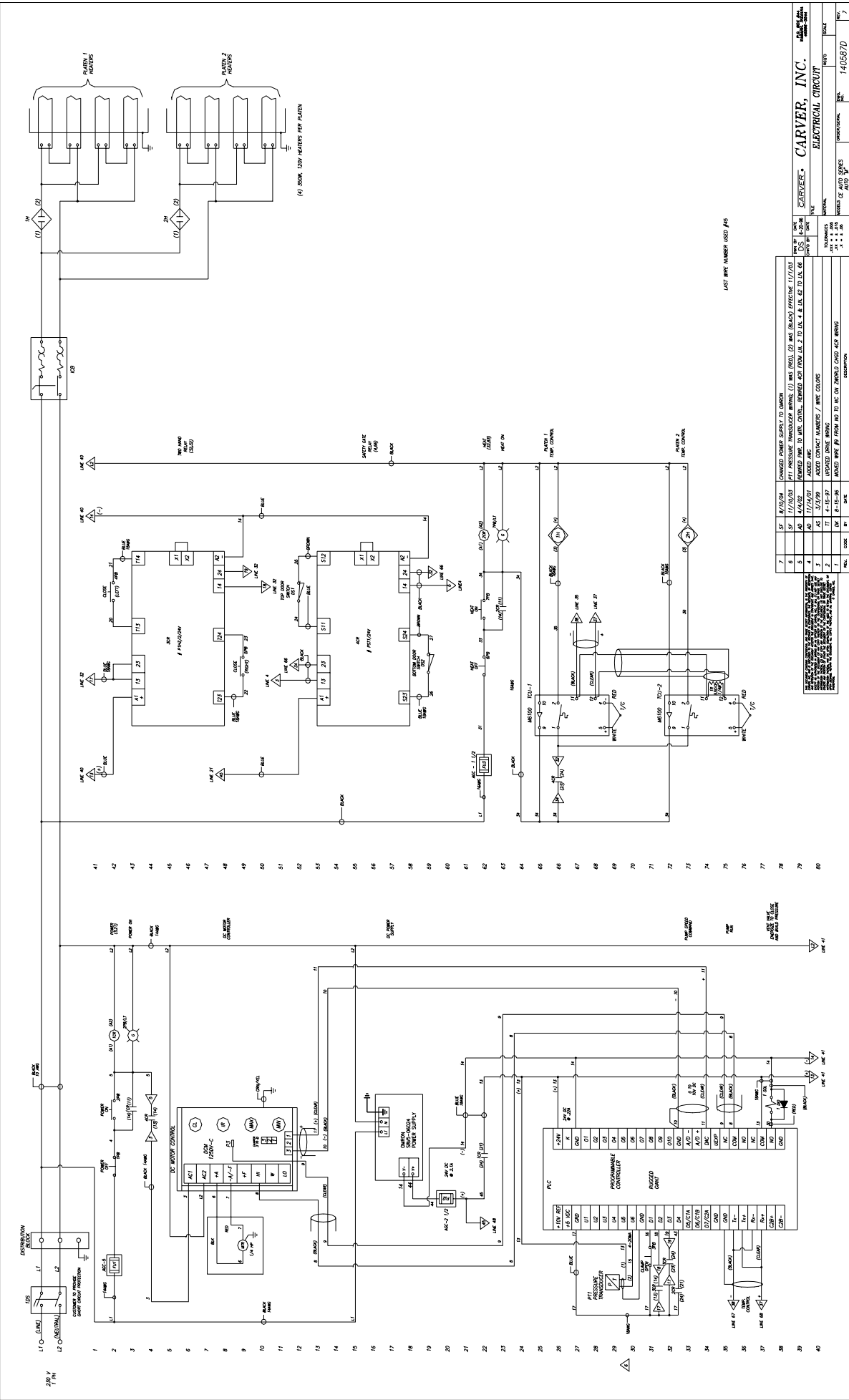
TEMP. CONTROLLER	
WIRE COLOR	A B C D E F
WIRE NO.	1 2 3 10 6 7
WIRE NO.	9 10 1 2 3 4
WIRE NO.	11 12 13 14 15 16

LAST WIRE NUMBER USED #48

REV.	CODE	DATE	BY	CHKD.	DESCRIPTION
1		8-15-96			ADDED WIRE #1 FROM NO. TO DC ON JUNCTION BOX FOR WIRING
2		4-15-97			CHANGED COIL ASSOCIATIONS & LAMPED DRIVE WIRING
3		11/19/00			ADDED CONTACT NUMBERS / WIRE COLORS
4		4/4/02			REMOVED WIRE TO WPT. CHANG. & REWIRING WPT FROM J.A. 2 TO J.A. 4 & J.A. 6
5		11/19/03			ADDED WIRING FOR WPT PRESSURE TRANSDUCER WIRING (U) WAS (RED, D) WAS (BLACK) (SEE NOTE 11/17/03)
6		5/1/04			CHANGED OTHER SUPPLY TO GROUND
7		12/1/04			

CARVER, INC.
ELECTRICAL CIRCUIT

PROJECT NO. 1406660

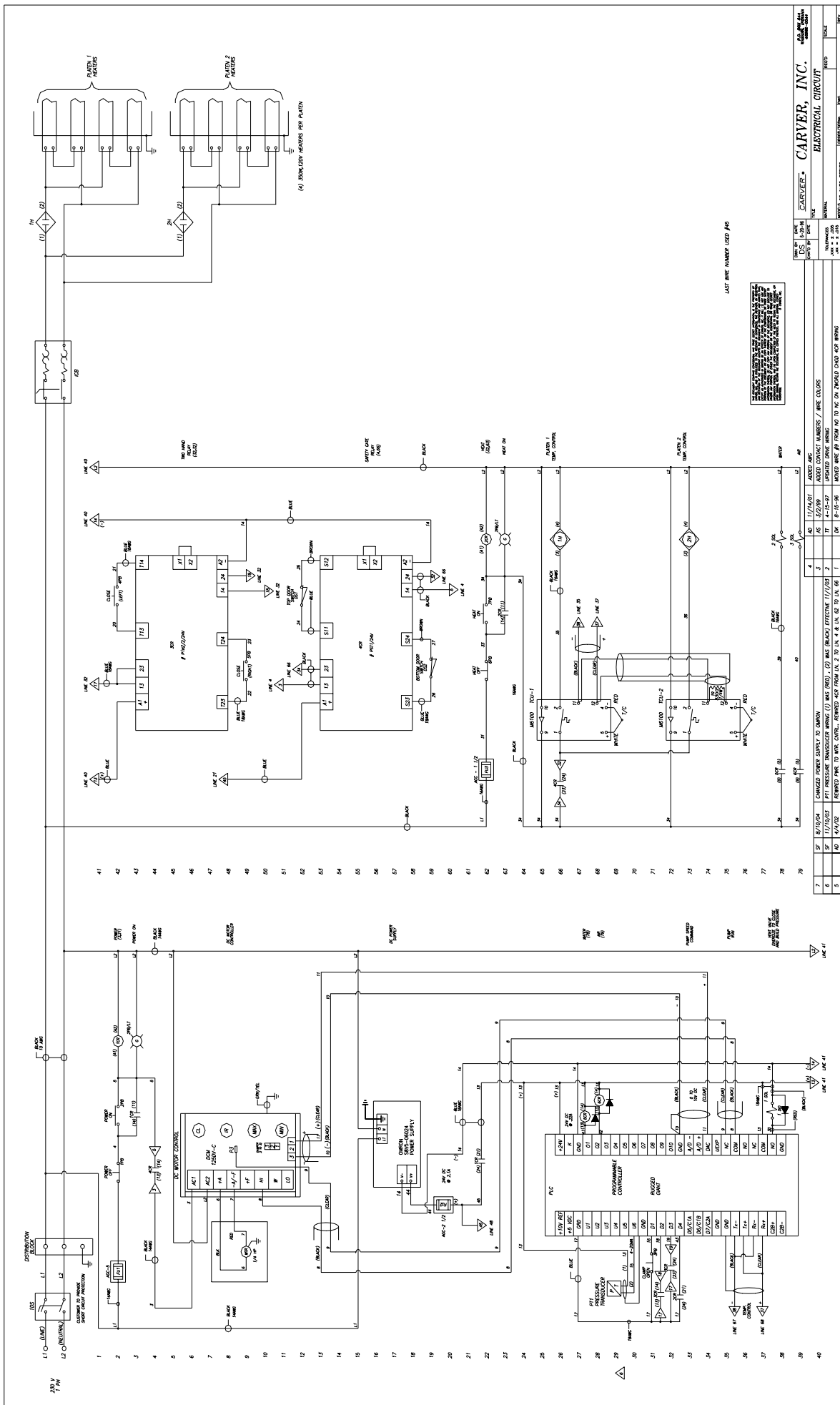


LAST WIRE NUMBER USED 745

NO.	DATE	BY	REVISION
1	11/1/79	...	...
2	11/1/79	...	...
3	11/1/79	...	...
4	11/1/79	...	...
5	11/1/79	...	...
6	11/1/79	...	...
7	11/1/79	...	...

SY	DESCRIPTION	DATE	BY
1	CHANGED POWER SUPPLY TO 240VAC	11/1/79	...
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40

CARVER, INC.
 ELECTRICAL CIRCUIT
 1406970
 1406970



LAST WIRE NUMBER USED #49

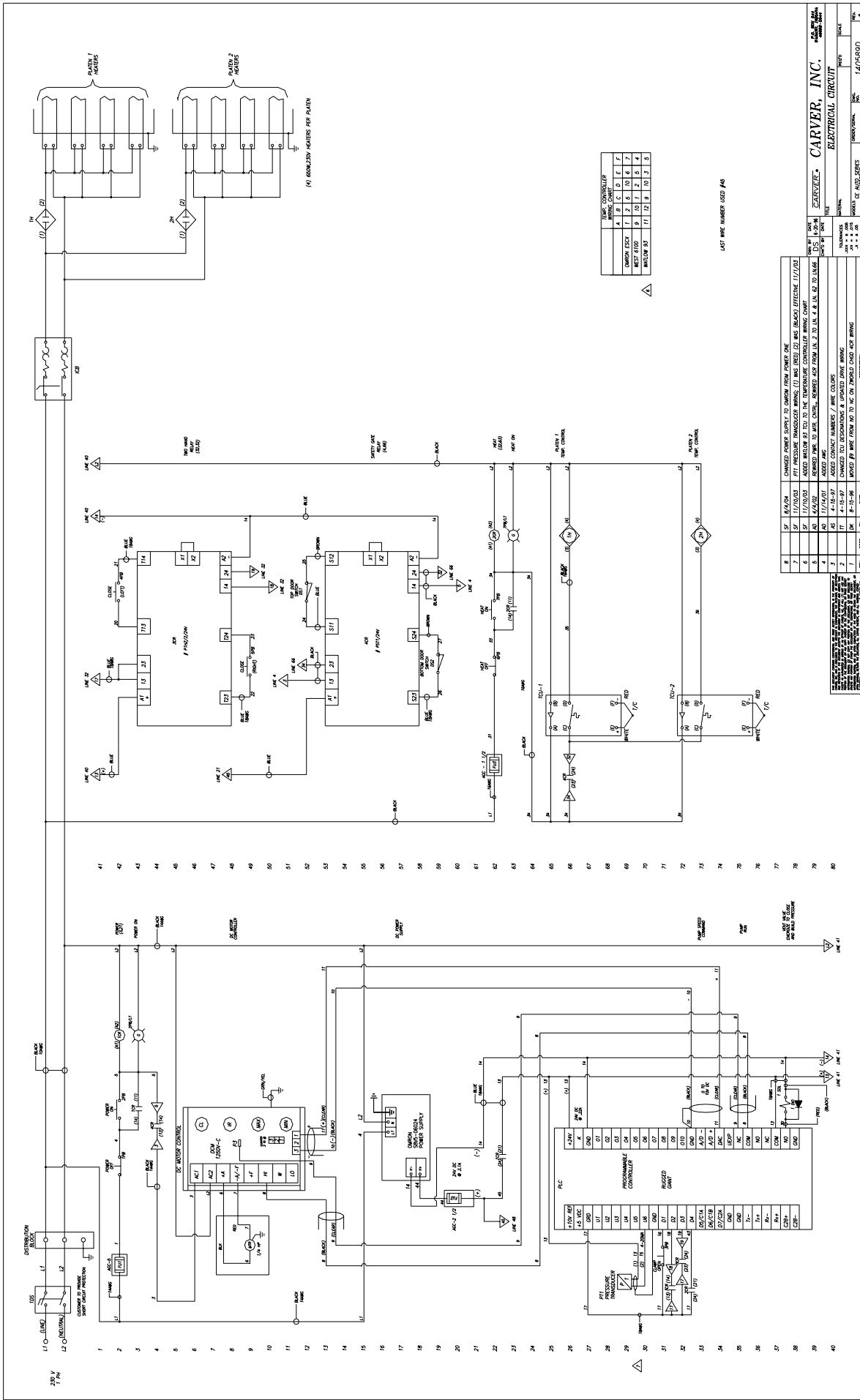
REVISIONS
 1 - 11-1-86
 2 - 1-1-86
 3 - 1-1-86
 4 - 1-1-86
 5 - 1-1-86
 6 - 1-1-86
 7 - 1-1-86

REV.	DATE	DESCRIPTION
1	11/1/86	ISSUED FOR CONSTRUCTION
2	1/1/86	ISSUED FOR CONSTRUCTION
3	1/1/86	ISSUED FOR CONSTRUCTION
4	1/1/86	ISSUED FOR CONSTRUCTION
5	1/1/86	ISSUED FOR CONSTRUCTION
6	1/1/86	ISSUED FOR CONSTRUCTION
7	1/1/86	ISSUED FOR CONSTRUCTION

REV.	DATE	DESCRIPTION
1	11/1/86	ISSUED FOR CONSTRUCTION
2	1/1/86	ISSUED FOR CONSTRUCTION
3	1/1/86	ISSUED FOR CONSTRUCTION
4	1/1/86	ISSUED FOR CONSTRUCTION
5	1/1/86	ISSUED FOR CONSTRUCTION
6	1/1/86	ISSUED FOR CONSTRUCTION
7	1/1/86	ISSUED FOR CONSTRUCTION

CARVER, INC.
ELECTRICAL CIRCUIT

140588D

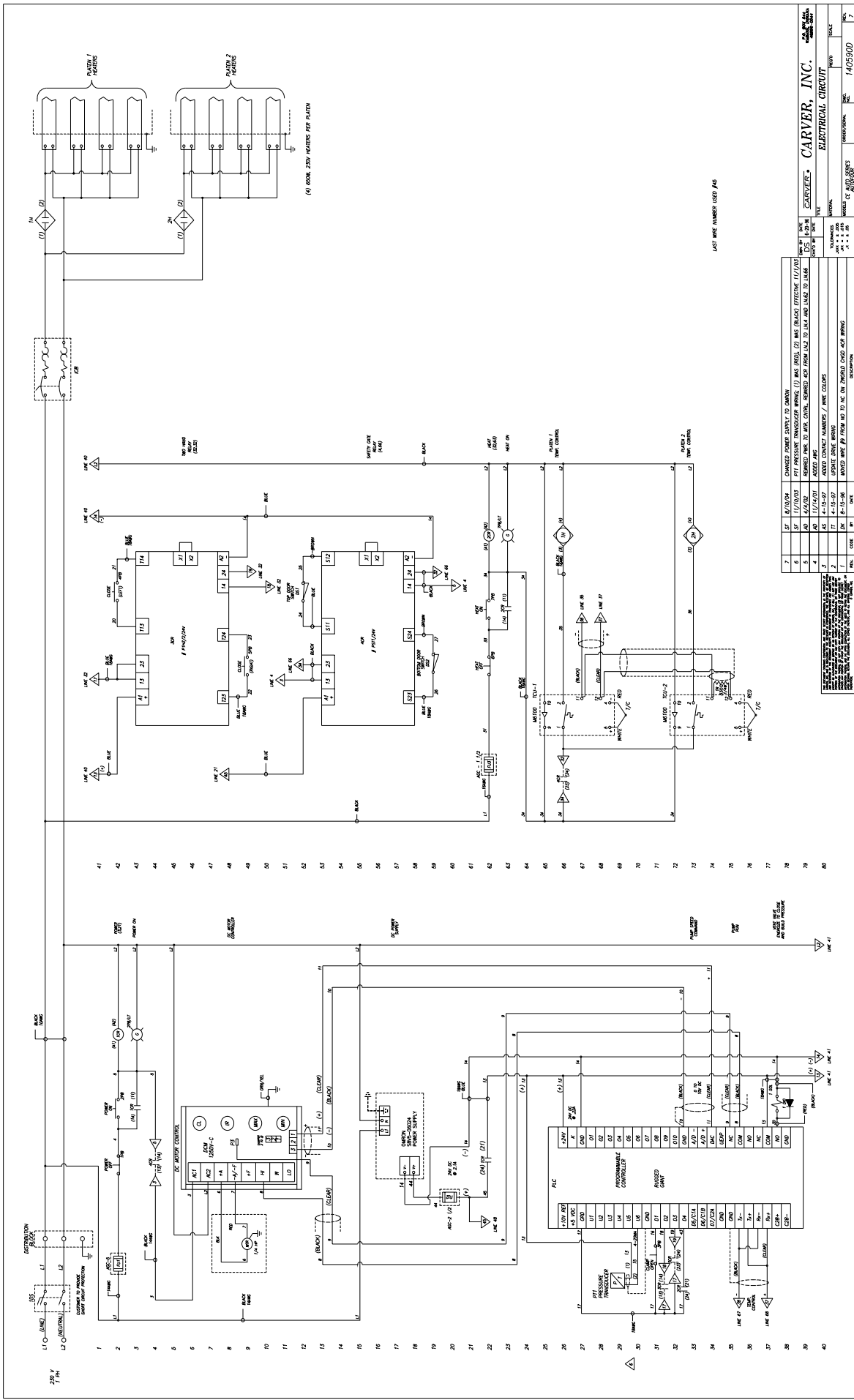


WIRE CONTROLLER	
A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
O	15
P	16
Q	17
R	18
S	19
T	20
U	21
V	22
W	23
X	24
Y	25
Z	26

LAST WIRE NUMBER USED #48

REV.	DATE	DESCRIPTION
1	11/10/03	CHANGED POWER SUPPLY TO COME FROM POWER ONE
2	11/10/03	P11 PRESSURE TRANSDUCER WIRING (U) WIRE USED (D) WAS BLACK INSTEAD OF WHITE
3	11/10/03	ADDED WIRING TO P11 TO THE TEMPERATURE CONTROLLER WIRING CHART
4	11/10/03	REMOVED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
5	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
6	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
7	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
8	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
9	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
10	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
11	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
12	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
13	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
14	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
15	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
16	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
17	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
18	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
19	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
20	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
21	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
22	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
23	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
24	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
25	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
26	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
27	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
28	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
29	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
30	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
31	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
32	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
33	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
34	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
35	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
36	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
37	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
38	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
39	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6
40	11/10/03	ADDED WIRING TO P11, CHANGED WIRING FROM IN. 2 TO IN. 4 & IN. 42 TO IN. 6

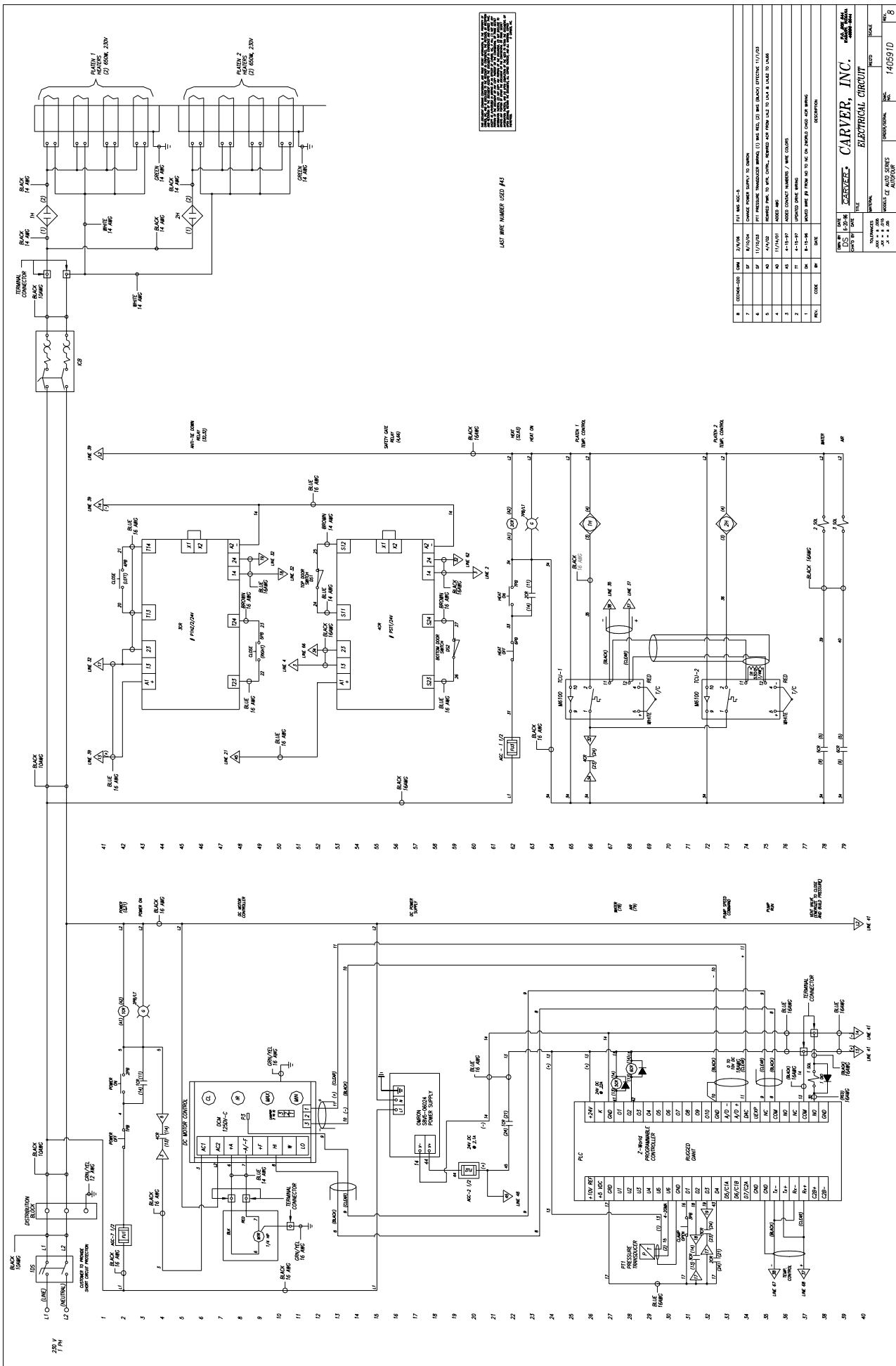
CARVER, INC.
ELECTRICAL CIRCUIT
140589D



LAST WIRE NUMBER USED 740

NO.	DATE	DESCRIPTION
1	11/10/03	CHANGED POWER SUPPLY TO MOTOR
2	11/10/03	REMOVED WIRE TO WIRE CONTROL, REWOUND AND FROM LINE 2 TO LINE 4 AND LINE 2 TO LINE 6
3	11/14/03	ADDED WIRE
4	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
5	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
6	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
7	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
8	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
9	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4
10	11/14/03	REMOVED WIRE FROM WIRE CONTROL TO WIRE 41 AND LINE 2 TO LINE 4

CARVER, INC.
ELECTRICAL CIRCUIT



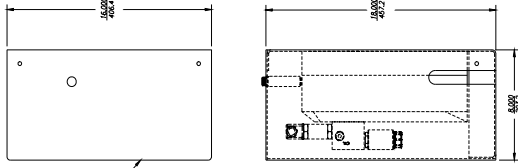
LAST WIRE NUMBER USED PAS

REV.	DATE	BY	CHKD.	DESCRIPTION
1	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
2	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
3	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
4	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
5	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
6	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
7	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
8	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS

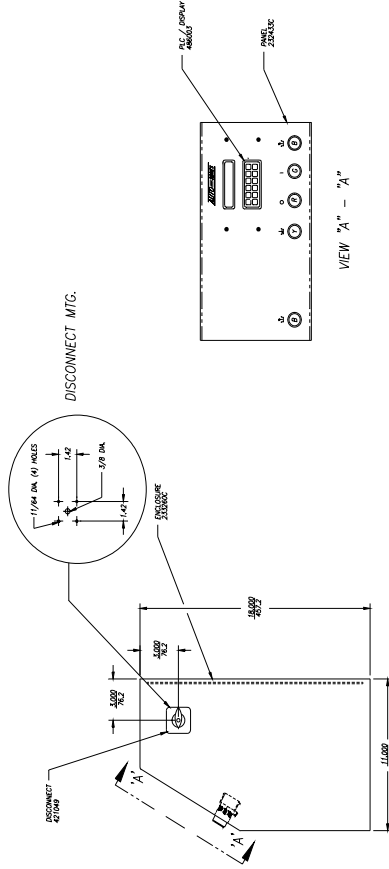
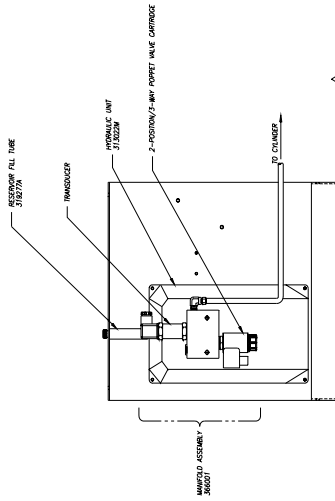
REV.	DATE	BY	CHKD.	DESCRIPTION
1	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
2	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
3	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
4	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
5	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
6	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
7	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS
8	04-11-06	DAK	DAK	ISSUED FOR PARTS / WIRE COUNTS

TITLE: **ELECTRICAL CIRCUIT**
 PROJECT: **230V 3PH MOTOR CONTROL**
 DRAWING NO: **140591D**
 SHEET NO: **8**

ENCLOSURE SHALL BE CONFORMANT WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS. THE ENCLOSURE SHALL BE MARKED WITH THE MANUFACTURER'S NAME, MODEL NUMBER, AND DATE OF MANUFACTURE.



POWER UNIT PANEL



NOTE: DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

OPERATOR PANEL

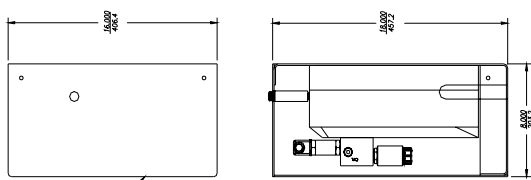
REV	DATE	DESCRIPTION
1	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
2	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
3	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
4	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
5	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
6	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
7	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.

OPERATOR PANEL

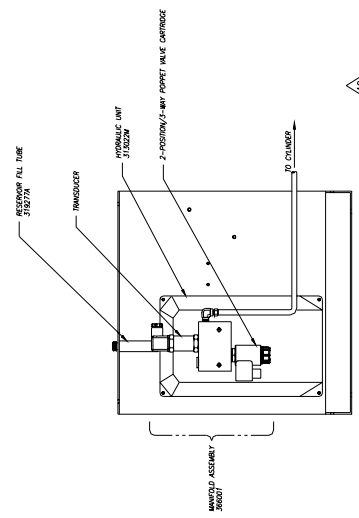
REV	DATE	DESCRIPTION
1	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
2	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
3	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
4	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
5	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
6	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.
7	08-11-13	REVISED PER THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.

ENCLOSURE SHALL BE CONFORMANT WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS. THE ENCLOSURE SHALL BE MARKED WITH THE MANUFACTURER'S NAME, MODEL NUMBER, AND DATE OF MANUFACTURE.

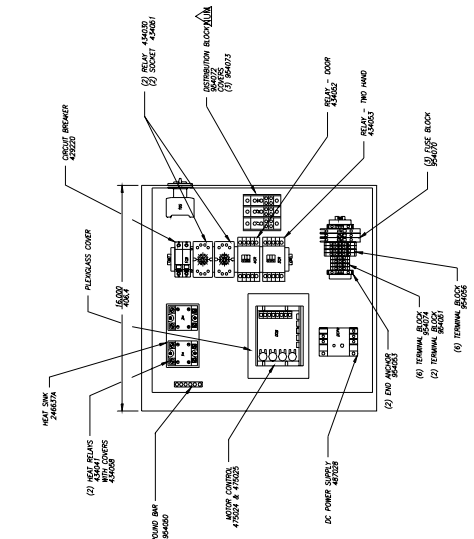
THIS DRAWING IS THE PROPERTY OF CARVER, INC. IT IS TO BE USED ONLY FOR THE PROJECT AND EQUIPMENT SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CARVER, INC.



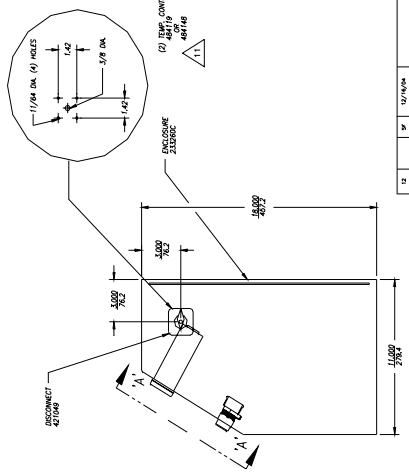
DISCONNECT 41040



POWER UNIT PANEL



DISCONNECT MFG.



VIEW "A" - "A"

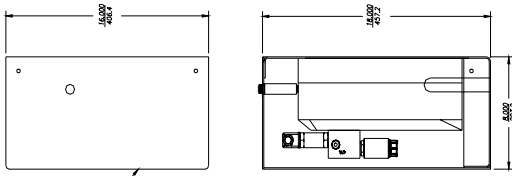
NOTE: DIMENSIONS ARE IN INCHES
 REFERENCE DRAWING: ELECTRICAL PANEL TEMPLATE - 81801C

REV	DATE	BY	CHKD	DESCRIPTION
12	12/14/04			CHANGE POWER SUPPLY TO 253253
11	08/17/03			TERMINAL BLOCK 41001 AND 41006 (REVISED 11/03)
10	11/17/03			REVISED POWER SUPPLY PART NUMBER TO 253253 (REVISED 11/03)
9	11/17/03			REVISED PART NUMBER TO 41003 (REVISED 11/03)
8	11/17/03			REVISED PART NUMBER TO 41002 (REVISED 11/03)
7	11/17/03			REVISED PART NUMBER TO 41004 (REVISED 11/03)
6	11/17/03			REVISED PART NUMBER TO 41005 (REVISED 11/03)
5	11/17/03			REVISED PART NUMBER TO 41007 (REVISED 11/03)
4	08-200	11-18-04		REVISED PART NUMBER TO 41002 (REVISED 11/03)
3	08-102	11-18-04		REVISED PART NUMBER TO 41002 (REVISED 11/03)
2	08-102	11-18-04		REVISED PART NUMBER TO 41002 (REVISED 11/03)
1	08-102	11-18-04		REVISED PART NUMBER TO 41002 (REVISED 11/03)

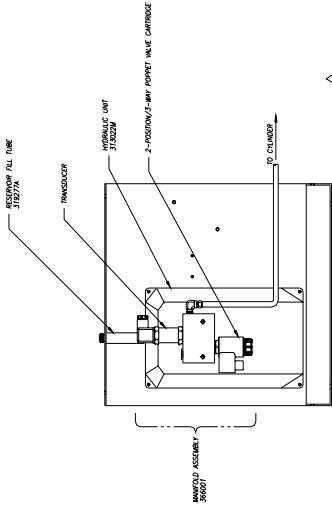
OPERATOR PANEL

CARVER, INC.
 PANEL LAYOUT - 220V
 ELECTRICAL PANEL TEMPLATE - 81801C
 233253D
 1/1
 1/1

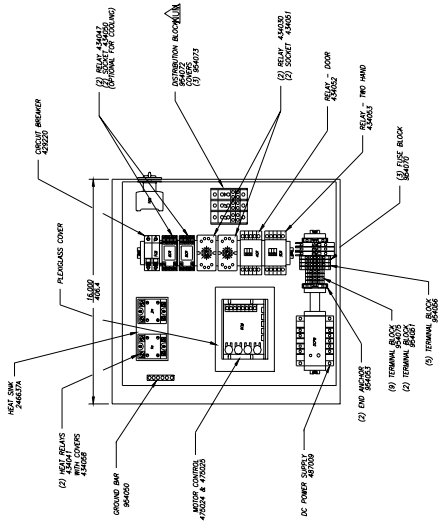
THIS DRAWING IS THE PROPERTY OF CARVER, INC. IT IS TO BE USED FOR THE PROJECT AND EQUIPMENT SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CARVER, INC.



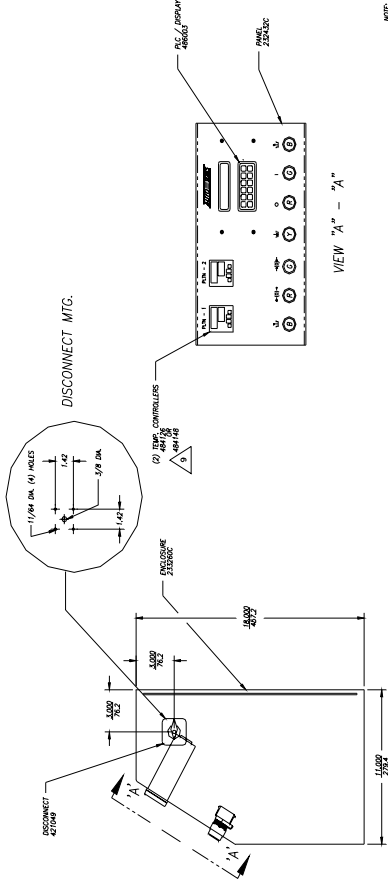
POWER UNIT PANEL



POWER UNIT PANEL



OPERATOR PANEL



VIEW "A" - "A"

NO.	REV.	DATE	DESCRIPTION
10	SP	11/17/02	REVISED POWER UNIT PANEL - POWER UNIT AND HYDRAULIC MANIFOLD AND TUBING.
9	AP	1/17/03	REMOVED OPERATOR PANEL FROM POWER UNIT AND TUBING WITH AIRLINE ADAPTER.
8	AP	1/17/03	TEMPORARY CONTROLLER ASSEMBLY AND AIRLINE ADAPTER.
7	AP	2/11/03	REVISED DIM. SLS. 8P.
6	AP	2/11/03	REVISED DIM. SLS. 8P.
5	AP	2/11/03	REVISED DIM. SLS. 8P.
4	AP	2/11/03	REVISED DIM. SLS. 8P.
3	AP	2/11/03	REVISED DIM. SLS. 8P.
2	AP	2/11/03	REVISED DIM. SLS. 8P.
1	AP	2/11/03	REVISED DIM. SLS. 8P.

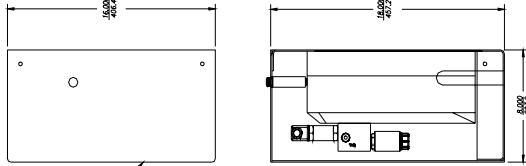
REVISIONS			
DATE	BY	DESCRIPTION	APPROVED BY
11/17/02	SP	REVISED POWER UNIT PANEL - POWER UNIT AND HYDRAULIC MANIFOLD AND TUBING.	
1/17/03	AP	REMOVED OPERATOR PANEL FROM POWER UNIT AND TUBING WITH AIRLINE ADAPTER.	
1/17/03	AP	TEMPORARY CONTROLLER ASSEMBLY AND AIRLINE ADAPTER.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	

DIMENSIONS AND MATERIALS			
DATE	BY	DESCRIPTION	APPROVED BY
11/17/02	SP	REVISED POWER UNIT PANEL - POWER UNIT AND HYDRAULIC MANIFOLD AND TUBING.	
1/17/03	AP	REMOVED OPERATOR PANEL FROM POWER UNIT AND TUBING WITH AIRLINE ADAPTER.	
1/17/03	AP	TEMPORARY CONTROLLER ASSEMBLY AND AIRLINE ADAPTER.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	

ELECTRICAL PANEL TEMPLATE - 01551C			
DATE	BY	DESCRIPTION	APPROVED BY
11/17/02	SP	REVISED POWER UNIT PANEL - POWER UNIT AND HYDRAULIC MANIFOLD AND TUBING.	
1/17/03	AP	REMOVED OPERATOR PANEL FROM POWER UNIT AND TUBING WITH AIRLINE ADAPTER.	
1/17/03	AP	TEMPORARY CONTROLLER ASSEMBLY AND AIRLINE ADAPTER.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	

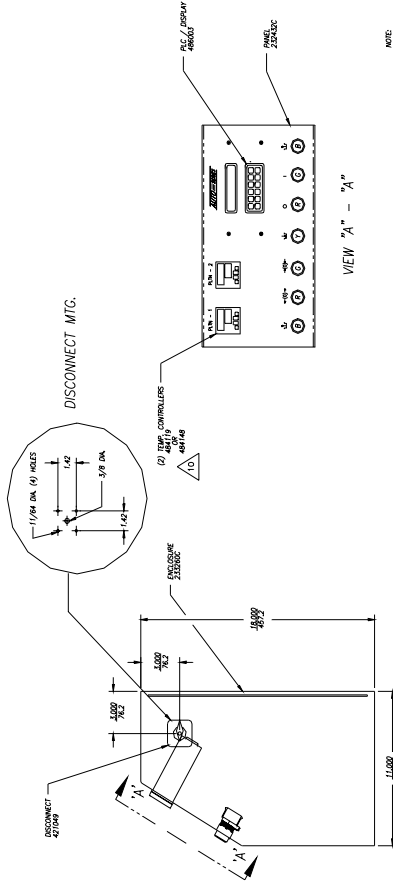
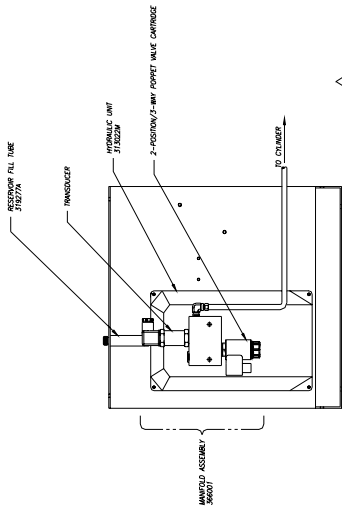
ELECTRICAL PANEL TEMPLATE - 2220			
DATE	BY	DESCRIPTION	APPROVED BY
11/17/02	SP	REVISED POWER UNIT PANEL - POWER UNIT AND HYDRAULIC MANIFOLD AND TUBING.	
1/17/03	AP	REMOVED OPERATOR PANEL FROM POWER UNIT AND TUBING WITH AIRLINE ADAPTER.	
1/17/03	AP	TEMPORARY CONTROLLER ASSEMBLY AND AIRLINE ADAPTER.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	
2/11/03	AP	REVISED DIM. SLS. 8P.	

THIS DRAWING IS THE PROPERTY OF CARVER, INC. IT IS TO BE USED ONLY FOR THE PROJECT AND AT THE LOCATION SPECIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CARVER, INC.



ENCLOSURE 2332550

POWER UNIT PANEL



VIEW "A" - "A"

NOTE:
DIMENSIONS
ARE
IN MILLIMETERS

REFERENCE DRAWING:
ELECTRICAL PANEL TEMPLATE - 81001C

REV	DATE	DESCRIPTION
1	11/15/03	REVISED POWER UNIT ENCLOSURE TO ACCOMMODATE 2332550, TERMINATOR AND 300071
2	11/15/03	TEMPERATURE CONTROLLER 46118 AND 46119 (DIFFERENTIAL 1/100)
3	11/15/03	REMOVED DIM. 16.000
4	11/15/03	UPDATED DIM. 16.000
5	11/15/03	ADDED DIM. 16.000
6	11/15/03	ADDED DIM. 16.000
7	11/15/03	ADDED DIM. 16.000
8	11/15/03	ADDED DIM. 16.000
9	11/15/03	ADDED DIM. 16.000
10	11/15/03	ADDED DIM. 16.000
11	11/15/03	ADDED DIM. 16.000
12	11/15/03	ADDED DIM. 16.000
13	11/15/03	ADDED DIM. 16.000
14	11/15/03	ADDED DIM. 16.000
15	11/15/03	ADDED DIM. 16.000
16	11/15/03	ADDED DIM. 16.000
17	11/15/03	ADDED DIM. 16.000
18	11/15/03	ADDED DIM. 16.000
19	11/15/03	ADDED DIM. 16.000
20	11/15/03	ADDED DIM. 16.000
21	11/15/03	ADDED DIM. 16.000
22	11/15/03	ADDED DIM. 16.000
23	11/15/03	ADDED DIM. 16.000
24	11/15/03	ADDED DIM. 16.000
25	11/15/03	ADDED DIM. 16.000
26	11/15/03	ADDED DIM. 16.000
27	11/15/03	ADDED DIM. 16.000
28	11/15/03	ADDED DIM. 16.000
29	11/15/03	ADDED DIM. 16.000
30	11/15/03	ADDED DIM. 16.000
31	11/15/03	ADDED DIM. 16.000
32	11/15/03	ADDED DIM. 16.000
33	11/15/03	ADDED DIM. 16.000
34	11/15/03	ADDED DIM. 16.000
35	11/15/03	ADDED DIM. 16.000
36	11/15/03	ADDED DIM. 16.000
37	11/15/03	ADDED DIM. 16.000
38	11/15/03	ADDED DIM. 16.000
39	11/15/03	ADDED DIM. 16.000
40	11/15/03	ADDED DIM. 16.000
41	11/15/03	ADDED DIM. 16.000
42	11/15/03	ADDED DIM. 16.000
43	11/15/03	ADDED DIM. 16.000
44	11/15/03	ADDED DIM. 16.000
45	11/15/03	ADDED DIM. 16.000
46	11/15/03	ADDED DIM. 16.000
47	11/15/03	ADDED DIM. 16.000
48	11/15/03	ADDED DIM. 16.000
49	11/15/03	ADDED DIM. 16.000
50	11/15/03	ADDED DIM. 16.000
51	11/15/03	ADDED DIM. 16.000
52	11/15/03	ADDED DIM. 16.000
53	11/15/03	ADDED DIM. 16.000
54	11/15/03	ADDED DIM. 16.000
55	11/15/03	ADDED DIM. 16.000
56	11/15/03	ADDED DIM. 16.000
57	11/15/03	ADDED DIM. 16.000
58	11/15/03	ADDED DIM. 16.000
59	11/15/03	ADDED DIM. 16.000
60	11/15/03	ADDED DIM. 16.000
61	11/15/03	ADDED DIM. 16.000
62	11/15/03	ADDED DIM. 16.000
63	11/15/03	ADDED DIM. 16.000
64	11/15/03	ADDED DIM. 16.000
65	11/15/03	ADDED DIM. 16.000
66	11/15/03	ADDED DIM. 16.000
67	11/15/03	ADDED DIM. 16.000
68	11/15/03	ADDED DIM. 16.000
69	11/15/03	ADDED DIM. 16.000
70	11/15/03	ADDED DIM. 16.000
71	11/15/03	ADDED DIM. 16.000
72	11/15/03	ADDED DIM. 16.000
73	11/15/03	ADDED DIM. 16.000
74	11/15/03	ADDED DIM. 16.000
75	11/15/03	ADDED DIM. 16.000
76	11/15/03	ADDED DIM. 16.000
77	11/15/03	ADDED DIM. 16.000
78	11/15/03	ADDED DIM. 16.000
79	11/15/03	ADDED DIM. 16.000
80	11/15/03	ADDED DIM. 16.000
81	11/15/03	ADDED DIM. 16.000
82	11/15/03	ADDED DIM. 16.000
83	11/15/03	ADDED DIM. 16.000
84	11/15/03	ADDED DIM. 16.000
85	11/15/03	ADDED DIM. 16.000
86	11/15/03	ADDED DIM. 16.000
87	11/15/03	ADDED DIM. 16.000
88	11/15/03	ADDED DIM. 16.000
89	11/15/03	ADDED DIM. 16.000
90	11/15/03	ADDED DIM. 16.000
91	11/15/03	ADDED DIM. 16.000
92	11/15/03	ADDED DIM. 16.000
93	11/15/03	ADDED DIM. 16.000
94	11/15/03	ADDED DIM. 16.000
95	11/15/03	ADDED DIM. 16.000
96	11/15/03	ADDED DIM. 16.000
97	11/15/03	ADDED DIM. 16.000
98	11/15/03	ADDED DIM. 16.000
99	11/15/03	ADDED DIM. 16.000
100	11/15/03	ADDED DIM. 16.000

OPERATOR PANEL

NOTE:
DIMENSIONS
ARE
IN MILLIMETERS

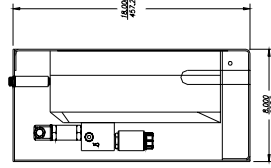
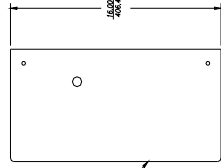
REFERENCE DRAWING:
ELECTRICAL PANEL TEMPLATE - 81001C

CARVER, INC.
PANEL LAYOUT - 220V

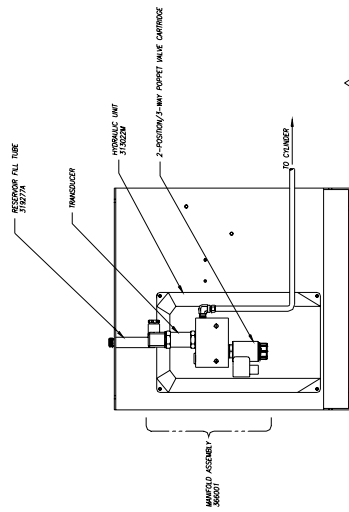
DATE: 11/15/03
DRAWN BY: [Signature]
CHECKED BY: [Signature]
APPROVED BY: [Signature]

PROJECT NO.: 2332550
DRAWING NO.: [Blank]

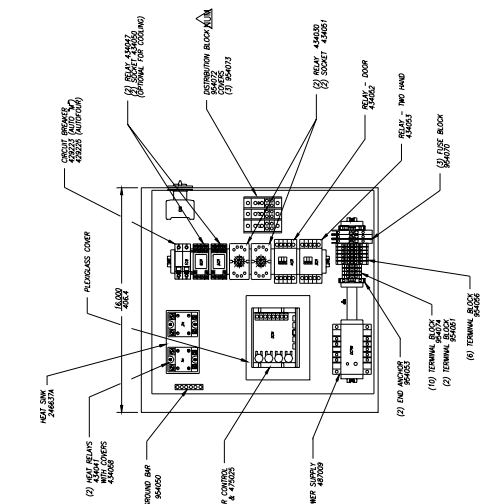
ENCLOSURE 2353910
 ENCLOSURE 42624
 ENCLOSURE 42927
 ENCLOSURE 42929



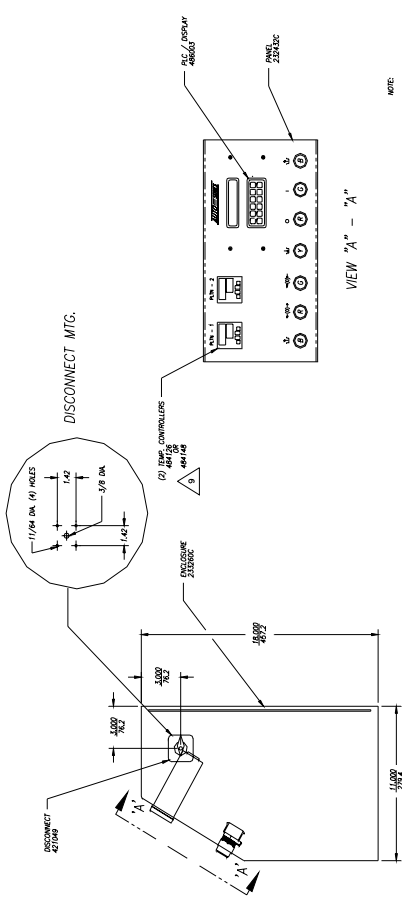
ENCLOSURE 2353910



POWER UNIT PANEL



OPERATOR PANEL



VIEW "A" - "A"

NOTE: DIMENSIONS IN INCHES

REFERENCE DRAWING: ELECTRICAL PANEL TEMPLATE - #1861C

NO.	REV.	DATE	DESCRIPTION
1	1	11/19/58	REvised PANEL FOR PANEL #1861C AND 1717A/50A. MANUFACTURE AND SERIAL
2	1	11/19/58	POWERTERM. CONTROLLER FROM 1717A/50A TO 3200000. MANUFACTURE AND SERIAL
3	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
4	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
5	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
6	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
7	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
8	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
9	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59
10	1	11/19/58	REvised DRAWING FOR 1717A/50A. MANUFACTURE AND SERIAL. DIFFERENTIAL 1/1/59

OPERATOR PANEL

ENCLOSURE 2353910
 ENCLOSURE 42624
 ENCLOSURE 42927
 ENCLOSURE 42929

ENCLOSURE 2353910
 ENCLOSURE 42624
 ENCLOSURE 42927
 ENCLOSURE 42929

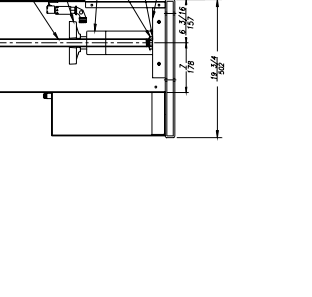
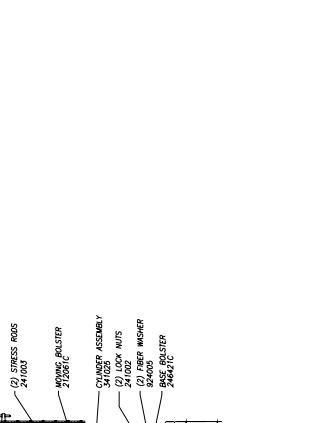
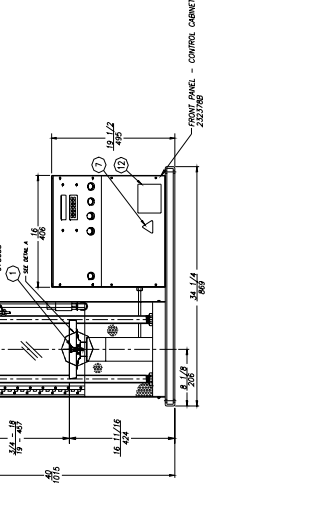
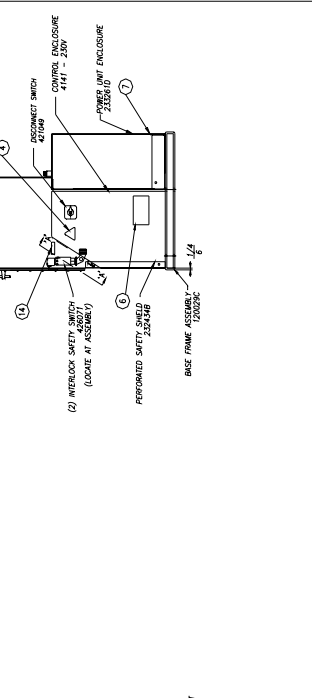
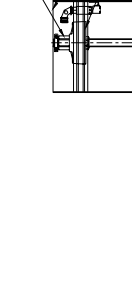
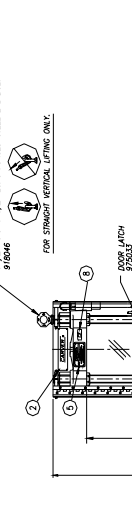
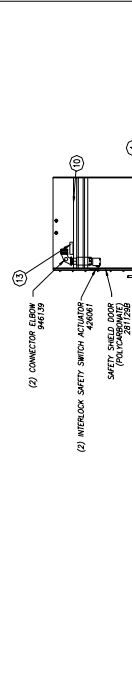
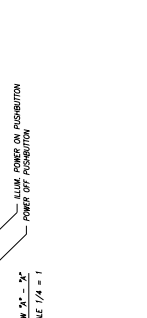
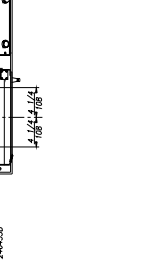
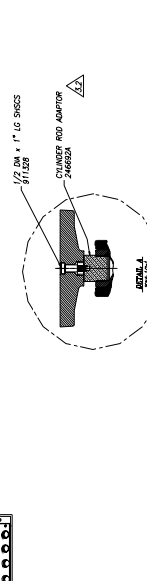
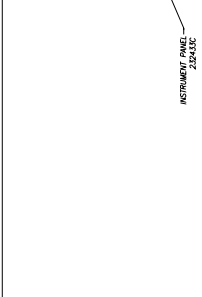
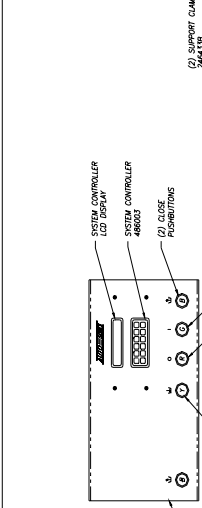
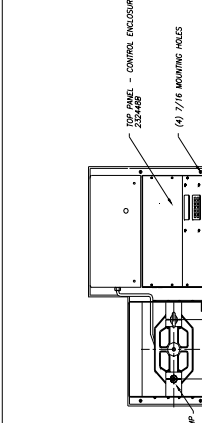
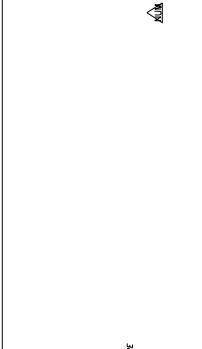
ENCLOSURE 2353910
 ENCLOSURE 42624
 ENCLOSURE 42927
 ENCLOSURE 42929

ENCLOSURE 2353910
 ENCLOSURE 42624
 ENCLOSURE 42927
 ENCLOSURE 42929

LABEL SET		
NO.	QTY	DESCRIPTION
1	1	HAND CROUCH "A"
2	1	COVER LOAD IMMEDIATE
3	1	COVER LOAD (INSIDE PANEL)
4	1	COVER DOOR (INSIDE PANEL)
5	1	COVER DOOR (INSIDE PANEL)
6	1	COVER DOOR (INSIDE PANEL)
7	1	COVER DOOR (INSIDE PANEL)
8	1	COVER DOOR (INSIDE PANEL)
9	1	COVER DOOR (INSIDE PANEL)
10	1	COVER DOOR (INSIDE PANEL)
11	1	COVER DOOR (INSIDE PANEL)
12	1	COVER DOOR (INSIDE PANEL)
13	1	COVER DOOR (INSIDE PANEL)
14	1	COVER DOOR (INSIDE PANEL)



- Insert the adaptor into the clamp and tighten the clamp. Insert the adaptor into the cylinder rod adaptor.
- Securely clamp the adaptor into the cylinder rod adaptor. The adaptor is secured by the clamp.
- Remove the adaptor from the cylinder rod adaptor.
- Remove the adaptor from the cylinder rod adaptor.
- Remove the adaptor from the cylinder rod adaptor.
- Remove the adaptor from the cylinder rod adaptor.
- Remove the adaptor from the cylinder rod adaptor.
- Remove the adaptor from the cylinder rod adaptor.



REFERENCES: DIMENSIONS
 HYDRAULIC CIRCUIT - 1071286
 ELECTRICAL PANEL - 2322020

MOLES
 DIMENSIONS
 COMPLETE LIST OF MATERIALS FOR

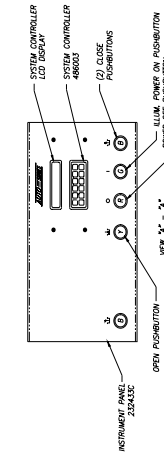
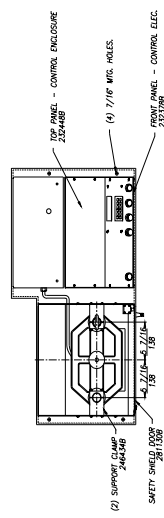
NO.	QTY	DESCRIPTION
1	1	CONNECTOR ELBOW
2	1	INTERLOCK SAFETY SWITCH ACTUATOR
3	1	INTERLOCK SAFETY SWITCH (LOCKED AT ASSEMBLY)
4	1	CONNECTOR ELBOW
5	1	CONNECTOR ELBOW
6	1	CONNECTOR ELBOW
7	1	CONNECTOR ELBOW
8	1	CONNECTOR ELBOW
9	1	CONNECTOR ELBOW
10	1	CONNECTOR ELBOW
11	1	CONNECTOR ELBOW
12	1	CONNECTOR ELBOW
13	1	CONNECTOR ELBOW
14	1	CONNECTOR ELBOW

PART NO.		DESCRIPTION	
1	1	CONNECTOR ELBOW	
2	1	INTERLOCK SAFETY SWITCH ACTUATOR	
3	1	INTERLOCK SAFETY SWITCH (LOCKED AT ASSEMBLY)	
4	1	CONNECTOR ELBOW	
5	1	CONNECTOR ELBOW	
6	1	CONNECTOR ELBOW	
7	1	CONNECTOR ELBOW	
8	1	CONNECTOR ELBOW	
9	1	CONNECTOR ELBOW	
10	1	CONNECTOR ELBOW	
11	1	CONNECTOR ELBOW	
12	1	CONNECTOR ELBOW	
13	1	CONNECTOR ELBOW	
14	1	CONNECTOR ELBOW	

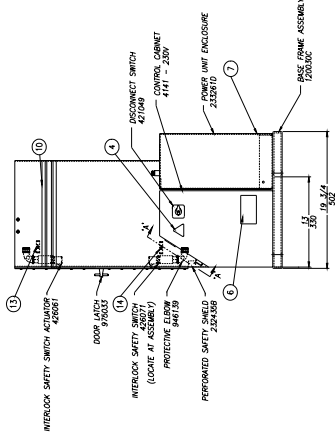
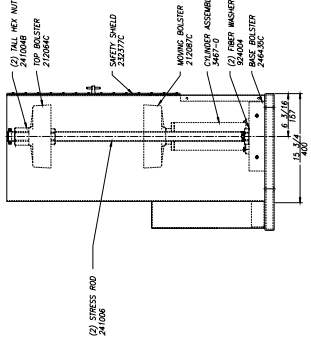
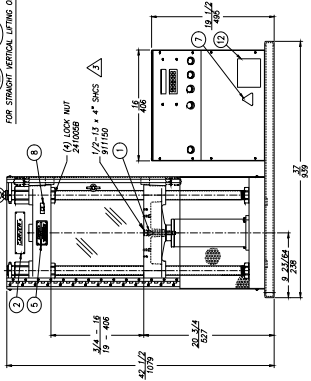
PART NO.		DESCRIPTION	
1	1	CONNECTOR ELBOW	
2	1	INTERLOCK SAFETY SWITCH ACTUATOR	
3	1	INTERLOCK SAFETY SWITCH (LOCKED AT ASSEMBLY)	
4	1	CONNECTOR ELBOW	
5	1	CONNECTOR ELBOW	
6	1	CONNECTOR ELBOW	
7	1	CONNECTOR ELBOW	
8	1	CONNECTOR ELBOW	
9	1	CONNECTOR ELBOW	
10	1	CONNECTOR ELBOW	
11	1	CONNECTOR ELBOW	
12	1	CONNECTOR ELBOW	
13	1	CONNECTOR ELBOW	
14	1	CONNECTOR ELBOW	

PART NO.		DESCRIPTION	
1	1	CONNECTOR ELBOW	
2	1	INTERLOCK SAFETY SWITCH ACTUATOR	
3	1	INTERLOCK SAFETY SWITCH (LOCKED AT ASSEMBLY)	
4	1	CONNECTOR ELBOW	
5	1	CONNECTOR ELBOW	
6	1	CONNECTOR ELBOW	
7	1	CONNECTOR ELBOW	
8	1	CONNECTOR ELBOW	
9	1	CONNECTOR ELBOW	
10	1	CONNECTOR ELBOW	
11	1	CONNECTOR ELBOW	
12	1	CONNECTOR ELBOW	
13	1	CONNECTOR ELBOW	
14	1	CONNECTOR ELBOW	

LABELS LIST			MATERIAL	
No.	QTY	PART NO.	DESCRIPTION	UNIT
1	1	921784	HAND CRUSH 1"	N/A
2	1	921785	CARRIER LOCK ASSEMBLY	N/A
3	1	921786	INTERLOCK SAFETY SWITCH (ROSE PANEL)	N/A
4	1	921787	DOOR LATCH	N/A
5	1	921788	CARRIER ID PLATE	N/A
6	1	921789	PRESS DATA TAG	N/A
7	1	921790	CE LABEL	N/A
8	1	921791	CE LABEL (INSIDE PANEL)	N/A
9	1	921792	CE LABEL (INSIDE PANEL)	N/A
10	14 FT	921793	MARKER TAPE	N/A
11	1	921794	MARKER TAPE	N/A
12	1	921795	MARKER TAPE	N/A
13	1	921796	MARKER TAPE	N/A
14	1	921797	MARKER TAPE	N/A



#1/2-13 x 1 1/2" LONG FORGED STEEL EYE BOLT
918646



REFERENCE DRAWINGS:
 HYDRAULIC CMT - 161128P
 ELECTRICAL CMT - 160200
 ELECTRICAL PANEL - 2330200

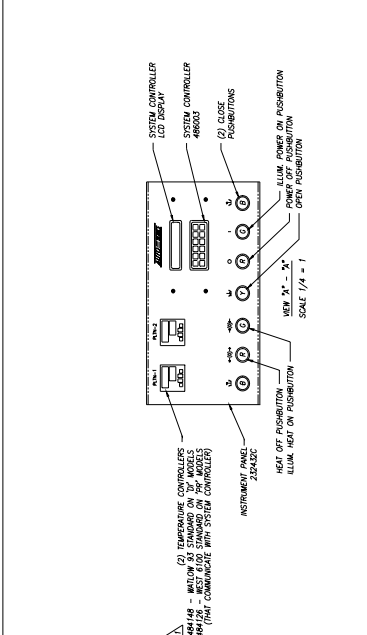
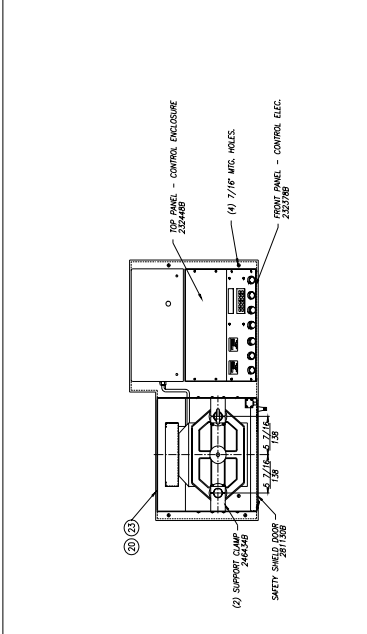
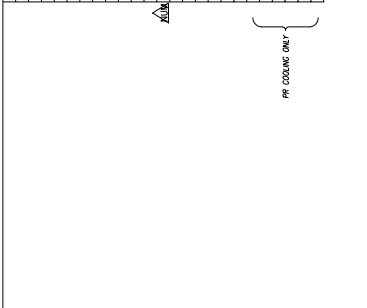
NOTES:
 MAX. RAM STROKE: 6" / 152 mm
 MAX. APPLIED FORCE: 50,000 LBS. / 22243 kN
 EST. WEIGHT: PRESS CMT P-300 LBS. / 135 kg
 EST. WEIGHT: PRESS WITH STAND - 500 LBS. / 224 kg
 REFER TO INDIVIDUAL BILL OF MATERIALS FOR COMPLETE LIST OF PARTS
 DIMENSIONS IN MILLIMETERS

REV. BY		DATE		DESCRIPTION	
1	11/17/04	1	11/17/04	1	11/17/04
2	11/17/04	2	11/17/04	2	11/17/04
3	11-18-04	3	11-18-04	3	11-18-04
4	11-18-04	4	11-18-04	4	11-18-04

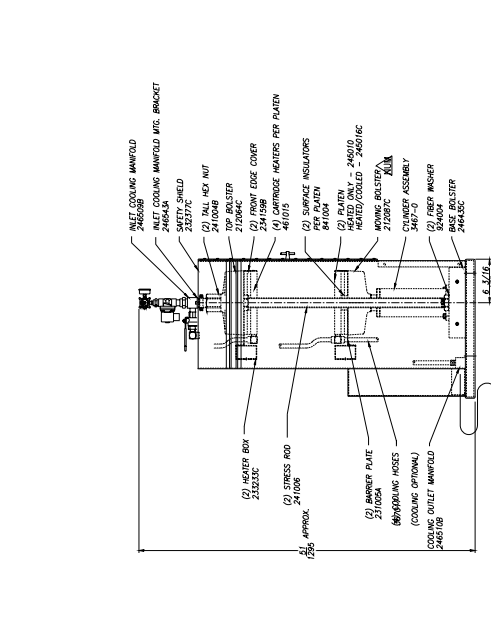
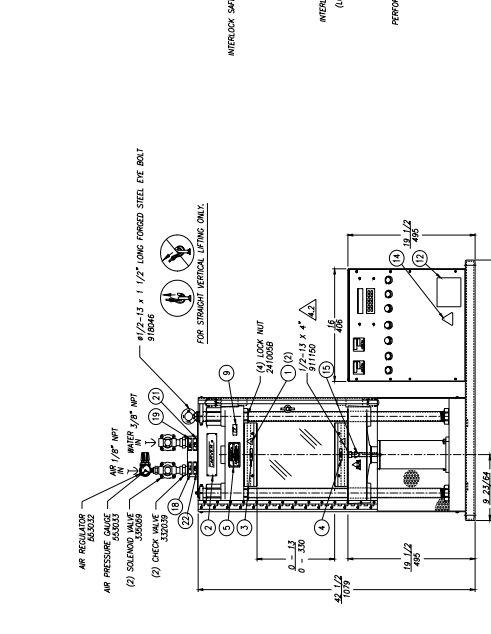
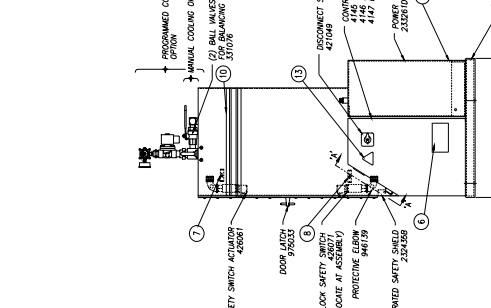
REV. BY		DATE		DESCRIPTION	
1	11/17/04	1	11/17/04	1	11/17/04
2	11/17/04	2	11/17/04	2	11/17/04
3	11-18-04	3	11-18-04	3	11-18-04
4	11-18-04	4	11-18-04	4	11-18-04

REV. BY		DATE		DESCRIPTION	
1	11/17/04	1	11/17/04	1	11/17/04
2	11/17/04	2	11/17/04	2	11/17/04
3	11-18-04	3	11-18-04	3	11-18-04
4	11-18-04	4	11-18-04	4	11-18-04

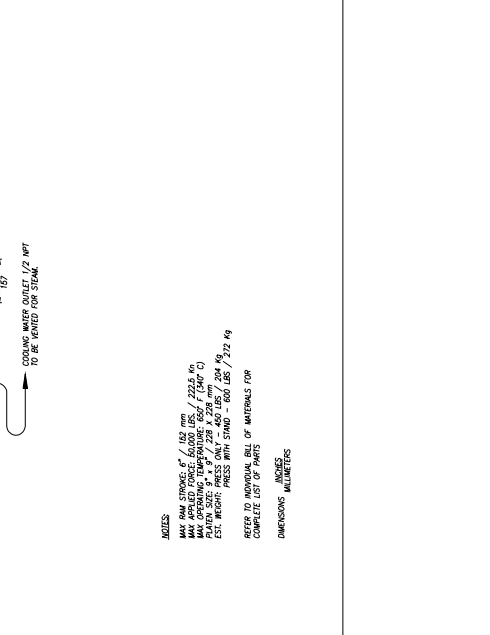
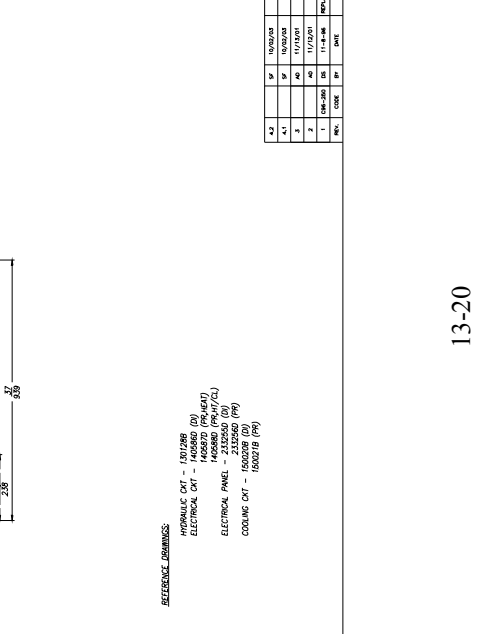
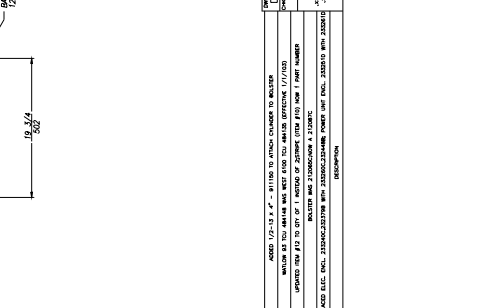
UN.	QTY.	DESCRIPTION	UNITS/PK
1	1	1" HAND HOLES	N/A
2	1	251108 CARVER LOGO NAMEPLATE	N/A
3	1	871904 PLIN-1	N/A
4	1	871904 PLIN-2	N/A
5	1	871904 CARVER B PLATE	N/A
6	1	871904 CARVER B LABEL	N/A
7	1	871904 DS-1	N/A
8	1	871904 DS-2	N/A
9	1	871724 CE LABEL	N/A
10	4 FT	CHARCOAL/AQUAPOSESSOR STRIPE	N/A
11	1	871724 MAKE IN USA	N/A
12	1	871764 BODY SHOCK	N/A
13	2	871764 HAND SHOCK	N/A
14	1	871904 HAND SHOCK	N/A
15	1	871904 HAND SHOCK	N/A
16	1	871904 HAND SHOCK	N/A
17	1	871710 CE LABEL (INSIDE PANEL)	N/A
18	1	872501A AR-MAG	N/A
19	1	871904 WIP-MAG	N/A
20	1	872508 WIP-MAG	N/A
21	1	872508 WIP-MAG	N/A
22	1	872508 WIP-MAG	N/A
23	1	871724 2" HAND HOLES	N/A



UN.	QTY.	DESCRIPTION	UNITS/PK
1	1	1" HAND HOLES	N/A
2	1	251108 CARVER LOGO NAMEPLATE	N/A
3	1	871904 PLIN-1	N/A
4	1	871904 PLIN-2	N/A
5	1	871904 CARVER B PLATE	N/A
6	1	871904 CARVER B LABEL	N/A
7	1	871904 DS-1	N/A
8	1	871904 DS-2	N/A
9	1	871724 CE LABEL	N/A
10	4 FT	CHARCOAL/AQUAPOSESSOR STRIPE	N/A
11	1	871724 MAKE IN USA	N/A
12	1	871764 BODY SHOCK	N/A
13	2	871764 HAND SHOCK	N/A
14	1	871904 HAND SHOCK	N/A
15	1	871904 HAND SHOCK	N/A
16	1	871904 HAND SHOCK	N/A
17	1	871710 CE LABEL (INSIDE PANEL)	N/A
18	1	872501A AR-MAG	N/A
19	1	871904 WIP-MAG	N/A
20	1	872508 WIP-MAG	N/A
21	1	872508 WIP-MAG	N/A
22	1	872508 WIP-MAG	N/A
23	1	871724 2" HAND HOLES	N/A

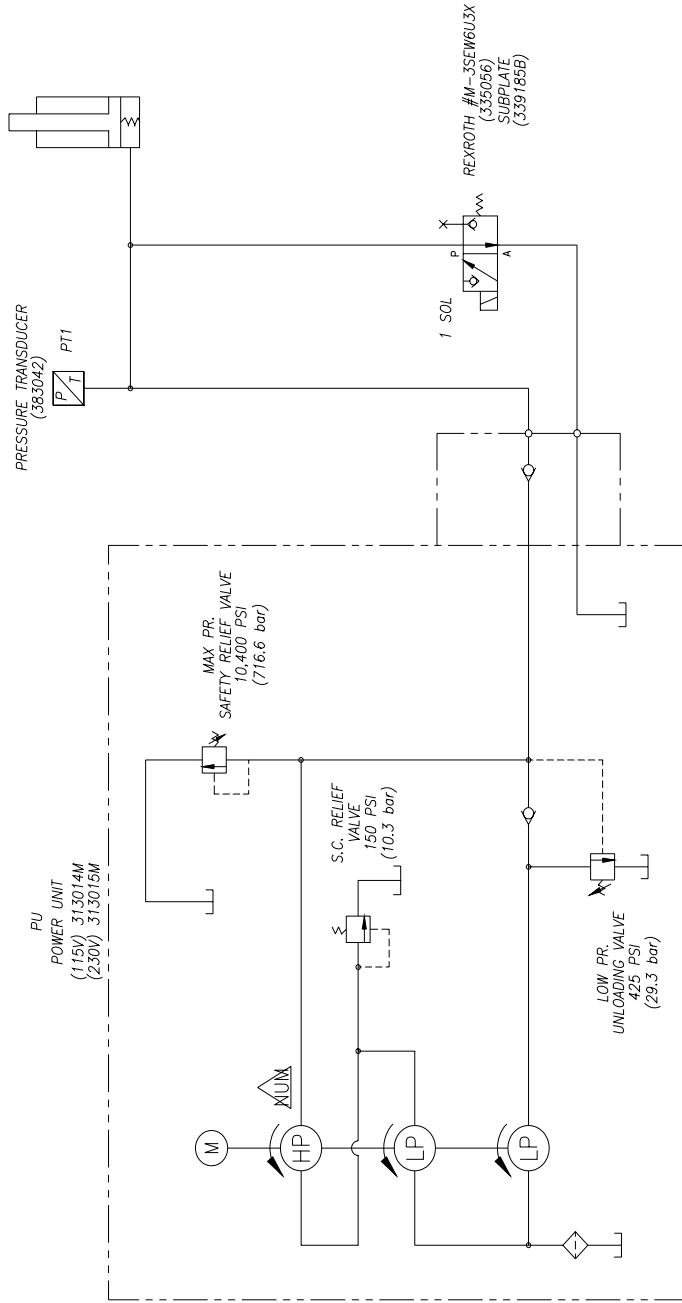


UN.	QTY.	DESCRIPTION	UNITS/PK
1	1	1" HAND HOLES	N/A
2	1	251108 CARVER LOGO NAMEPLATE	N/A
3	1	871904 PLIN-1	N/A
4	1	871904 PLIN-2	N/A
5	1	871904 CARVER B PLATE	N/A
6	1	871904 CARVER B LABEL	N/A
7	1	871904 DS-1	N/A
8	1	871904 DS-2	N/A
9	1	871724 CE LABEL	N/A
10	4 FT	CHARCOAL/AQUAPOSESSOR STRIPE	N/A
11	1	871724 MAKE IN USA	N/A
12	1	871764 BODY SHOCK	N/A
13	2	871764 HAND SHOCK	N/A
14	1	871904 HAND SHOCK	N/A
15	1	871904 HAND SHOCK	N/A
16	1	871904 HAND SHOCK	N/A
17	1	871710 CE LABEL (INSIDE PANEL)	N/A
18	1	872501A AR-MAG	N/A
19	1	871904 WIP-MAG	N/A
20	1	872508 WIP-MAG	N/A
21	1	872508 WIP-MAG	N/A
22	1	872508 WIP-MAG	N/A
23	1	871724 2" HAND HOLES	N/A



NOTES:
 MAX. PUMP STROKE: 6" / 152 mm
 MAX. PUMP SPEED: 1200 RPM / 75.5 C
 MAX. OPERATING TEMPERATURE: 150°C / 302°F (30°C)
 PLATE SIZE: 800 x 228 mm / 31.5" x 9"
 CIL. PART. PRESS. WITH STAND: 600 LBS / 272 kg
 REFER TO INDIVIDUAL BILL OF MATERIALS FOR COMPLETE LIST OF PARTS
 DIMENSIONS: INCHES
 MILLIMETERS

THIS DOCUMENT CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION, IS THE PROPERTY OF CARVER, INC. AND IS LOANED TO THE RECIPIENT IN CONFIDENCE. THE RECIPIENT SHALL NOT DISCLOSE, REPRODUCE, COPIY, OR TRANSMIT THIS INFORMATION IN ANY MANNER WITHOUT THE WRITTEN AUTHORIZATION OF CARVER, INC. IT WILL BE HELD IN STRICT CONFIDENCE AND NOT BE USED FOR ANY OTHER PURPOSES. THE RECIPIENT SHALL NOT COPY OR REPRODUCE THIS INFORMATION OR ANY PART THEREOF. THE RECIPIENT SHALL NOT DISCLOSE THIS INFORMATION TO ANY OTHER PERSON OR ENTITY WITHOUT THE WRITTEN AUTHORIZATION OF CARVER, INC. UPON DEMAND, RETURN THE DOCUMENT, ALL COPIES HEREOF, AND ALL MATERIAL CONTAINED THEREON.



REV.	CODE	BY	DATE	DESCRIPTION
4	AD		11/12/01	HP PUMP WAS LABELED LP
3	GWM		4-27-00	NEW SHEET
2	DWK		3-1-99	ADDED PART NUMBERS AND bar INFO
1	DWK			ADDED TANK SYMBOLS/UNLOAD VALVE TEXT

DWN BY	DATE	CHKD BY	DATE
SW	-/-/96	SW	-/-/96

TOLERANCES	
.XXX	= ± .005
.XX	= ± .015
.X	= ± .05

DATE	DATE	TITLE
-/-/96	-/-/96	TITLE

REQ'D	SCALE
130128B	SCALE

REV.	REV.
130128B	REV.

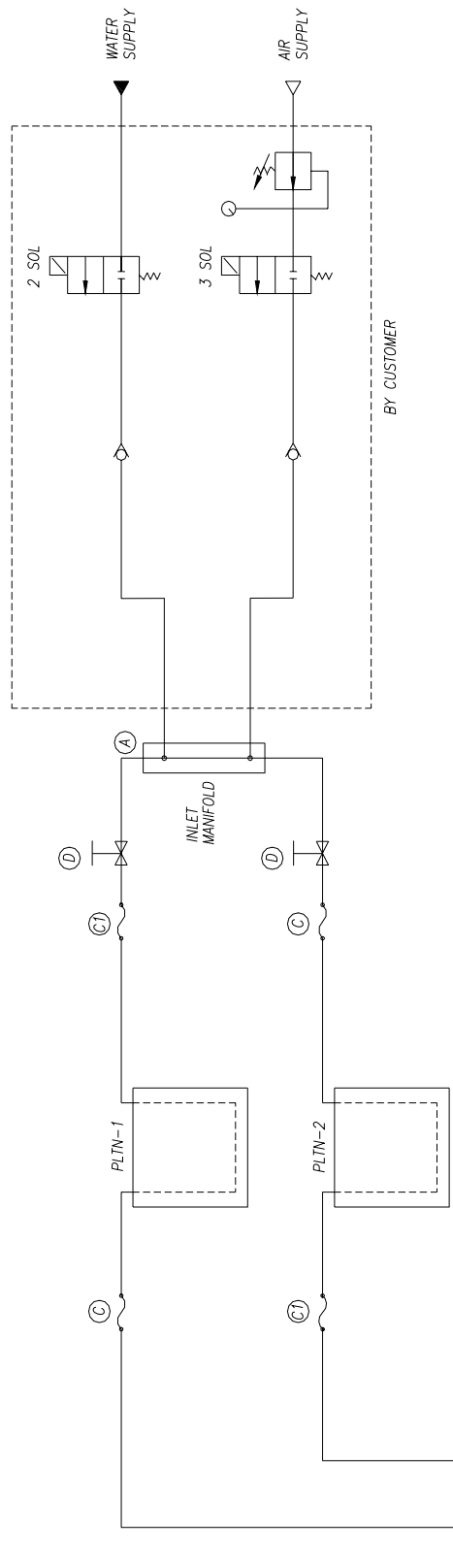
CARVER, INC.
P.O. BOX 644
WABASH, INDIANA
46982-0644

CARVER

MATERIAL
ORDER/SERIAL
ORD/SN

MODEL

THIS DOCUMENT CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION, IS THE PROPERTY OF CARVER, INC. AND IS NOT TO BE REPRODUCED, COPIED, DISSEMINATED, OR USED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF CARVER, INC. (1) ALL RIGHTS ARE RESERVED. (2) ANY REPRODUCTION OR TRANSMISSION OF THIS DOCUMENT WITHOUT THE WRITTEN PERMISSION OF CARVER, INC. IS PROHIBITED. (3) ANY REPRODUCTION OR TRANSMISSION OF THIS DOCUMENT WITHOUT THE WRITTEN PERMISSION OF CARVER, INC. IS PROHIBITED. (4) ANY REPRODUCTION OR TRANSMISSION OF THIS DOCUMENT WITHOUT THE WRITTEN PERMISSION OF CARVER, INC. IS PROHIBITED.



ITEM	QTY	PART #	DESCRIPTION
A	1	246509B	INLET MANIFOLD
B	1	246510B	OUTLET MANIFOLD
C	2	367147	HOSE - 3/8" x 36" LG.
C1	2	367237	HOSE - 3/8" x 48" LG.
C	4	367017	HOSE - 1/4" x 36" LG.
C1	4	367238	HOSE - 1/4" x 48" LG.
D	2	331076	DEWALD W/M48/8 3/8" BALL VLV

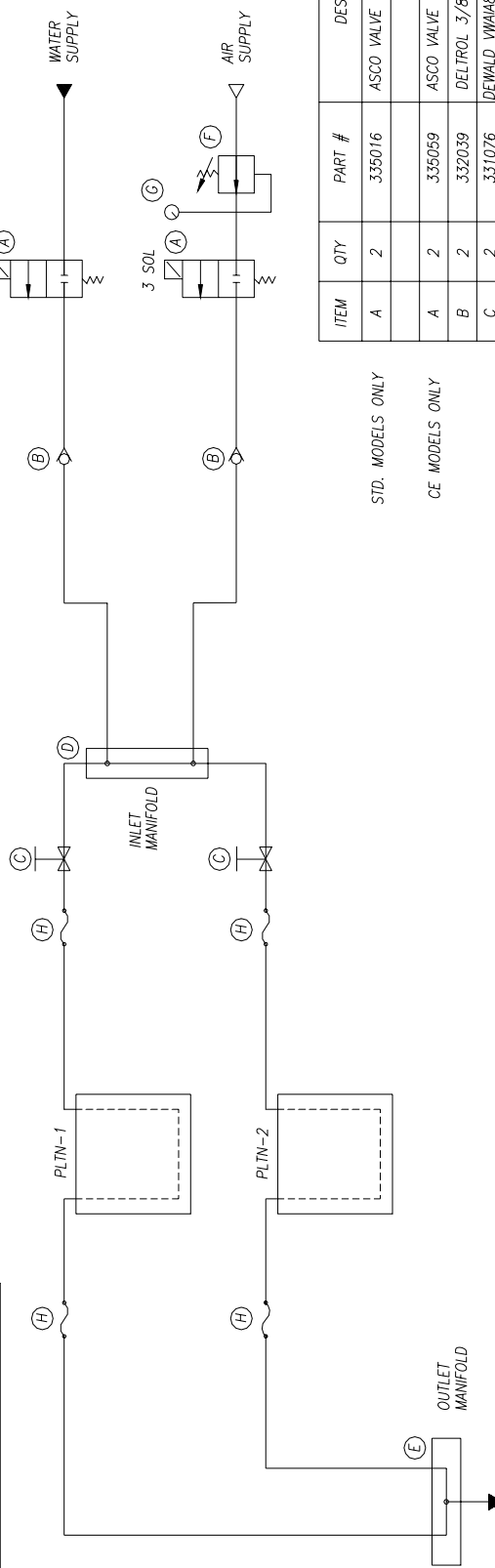
AUTOFLOUR ONLY
 AUTO "C" & "M" MODELS ONLY

DWN BY	DATE	CARVER, INC.		P.O. BOX 544
DS	6-11-96	COOLING CIRCUIT - AUTO SERIES		WABASH, INDIANA
CHK'D BY	DATE	TITLE		46882-0844
TOLERANCES		MATERIAL	REQ'D	SCALE
.XXX	= ± .005			FULL
.XX	= ± .015	ORDER/SERIAL		
.X	= ± .05	MODELS		
		AUTO DI - (1) OPENING	DWG. NO.	150020B
			REV.	1

1	GWM	10/10/02	ADDED 48" HOSES TO BOM - ITEMS C1 (DWG CORRECTION)	
REV.	CODE	DATE	DESCRIPTION	

NOTE: PLUMB, OUTLET DOWN AND VENT FOR STEAM WITH STEEL PIPE & FITTINGS.

THE FOLLOWING DRAWING, SPECIFICATIONS AND THIS EXHIBIT HEREBY, IS THE PROPERTY OF CARVER, INC. AND IS LOANED TO THE RECEIVER IN CONFIDENCE. THE RECEIVER, BY RECEIVING AND RETURNING OF THIS DOCUMENT, ACCEPTS THE DOCUMENT AS CONFIDENTIAL AND AGREES THAT IT WILL NOT BE REPRODUCED, COPIED, TRANSMITTED, DISCLOSED, OR IN ANY MANNER MADE A PART OF THE DOCUMENT OR ANY COPY THEREOF OR THE CONFIDENTIAL OR TRADE SECRET INFORMATION HEREIN, AND IT IS THE OBLIGATION OF THE RECEIVER TO RETURN THE DOCUMENT TO CARVER, INC. IMMEDIATELY UPON COMPLETION OF THE NEED TO RETAIN THE DOCUMENT OR INFORMATION HEREIN, AND TO OBTAIN THE DOCUMENT, ALL COPIES THEREOF, AND ALL INFORMATION THEREFROM.



NOTE: PLUMB OUTLET DOWN AND VENT FOR STEAM WITH STEEL PIPE & FITTINGS.

ITEM	QTY	PART #	DESCRIPTION
A	2	335016	ASCO VALVE 82636210/110VAC
A	2	335059	ASCO VALVE 82636210/220VAC
B	2	332039	DEL.TROL 3/8" INLINE CHK VLV
C	2	331076	DEWALD VMAA8/8 3/8" BALL VLV
D	1	246509B	INLET MANIFOLD
E	1	246510B	OUTLET MANIFOLD
F	1	553032	1/8" NPT, 5-125 PSI REGULATOR
G	1	553033	1/8 NPT, 0-60 PSI GAUGE
H	4	367147	HOSE
H	4	367017	HOSE

STD. MODELS ONLY

CE MODELS ONLY

AUTOFOUR ONLY

AUTO "C" & "M" MODELS ONLY

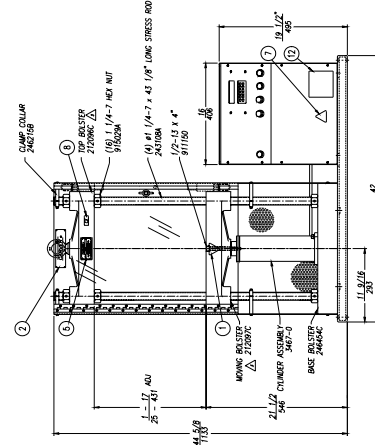
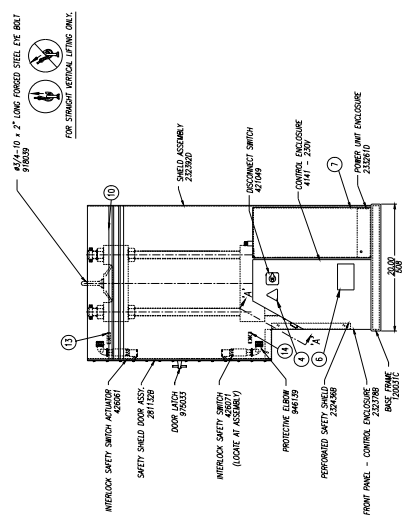
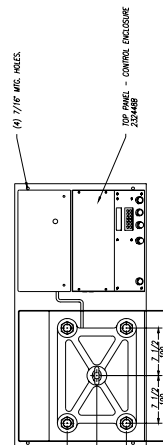
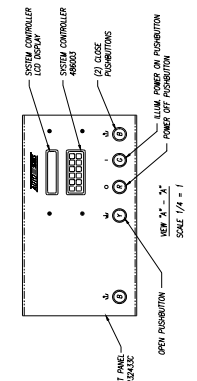
DWN BY	DATE	CARVER CARVER, INC.		P.O. BOX 644
DS	6-11-96			WABASH, INDIANA
CHK'D BY	DATE	TITLE		46992-0644
		MATERIAL		
		SCALE		FULL
		REV.		
		ORDER/SERIAL		
		DWG. NO.		150021B
		REV.		

COOLING CIRCUIT - AUTO SERIES

REV.	CODE	BY	DATE	DESCRIPTION

NO.	QTY	OMP. NO.	DESCRIPTION	REVISION #/D
1	1	921128	HAND DRIVE	N/A
2	1	921129	CARVER LOGIC MAIN PLATE	N/A
3	1	92117A	HIGH VOLTAGE (INSIDE PANEL)	N/A
4	1	92118A	STOP SWICH	N/A
5	1	92119A	EMERGENCY STOP	N/A
6	1	92112A	EMERGENCY STOP	N/A
7	2	92112A	EMERGENCY STOP	N/A
8	1	92117A	CE LABEL (INSIDE PANEL)	N/A
9	1	92119	EMERGENCY STOP	N/A
10	4	92127	EMERGENCY STOP	N/A
11	1	92118A	EMERGENCY STOP	N/A
12	1	92114S	EMERGENCY STOP	N/A
13	1	92119A	EMERGENCY STOP	N/A
14	1	92119A	EMERGENCY STOP	N/A

REVISIONS:
 1. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 2. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 3. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 4. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 5. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 6. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 7. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 8. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 9. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 10. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 11. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 12. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 13. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.
 14. CHANGED TO 1/2" HOLE SIZE FOR THE EMERGENCY STOP.



REFERENCE DRAWINGS:
 HYDRAULIC CIRCUIT - 431208
 ELECTRICAL CIRCUIT - 440520
 ELECTRICAL PANEL - 233292

NOTES:
 MAX DIM STROKE: 8" / 203 mm / 10.19"
 PLATE SIZE: 12" x 12" / 305 x 305 mm / 48"
 EST. MFGG. PRESS: BENTON/BLISS / 1560
 EST. MFGG. PRESS: BENTON/BLISS / 417 46
 CHECK TO DETERMINE USE OF MATERIALS FOR COMPLETE LIST OF PARTS

DATE:	1/17/01	BY:	9/21/01	REVISION:	10036500	PAGE:	3
DESCRIPTION:	AUTOMOUR/30 PRESS - NO HEAT CO.						
SCALE:	1/4" = 1"	UNITS:	INCHES	TOLERANCES:			