

AMP

***customer
manual***

AMP

CM 5830

**AMP*
Rotary Index
Table**

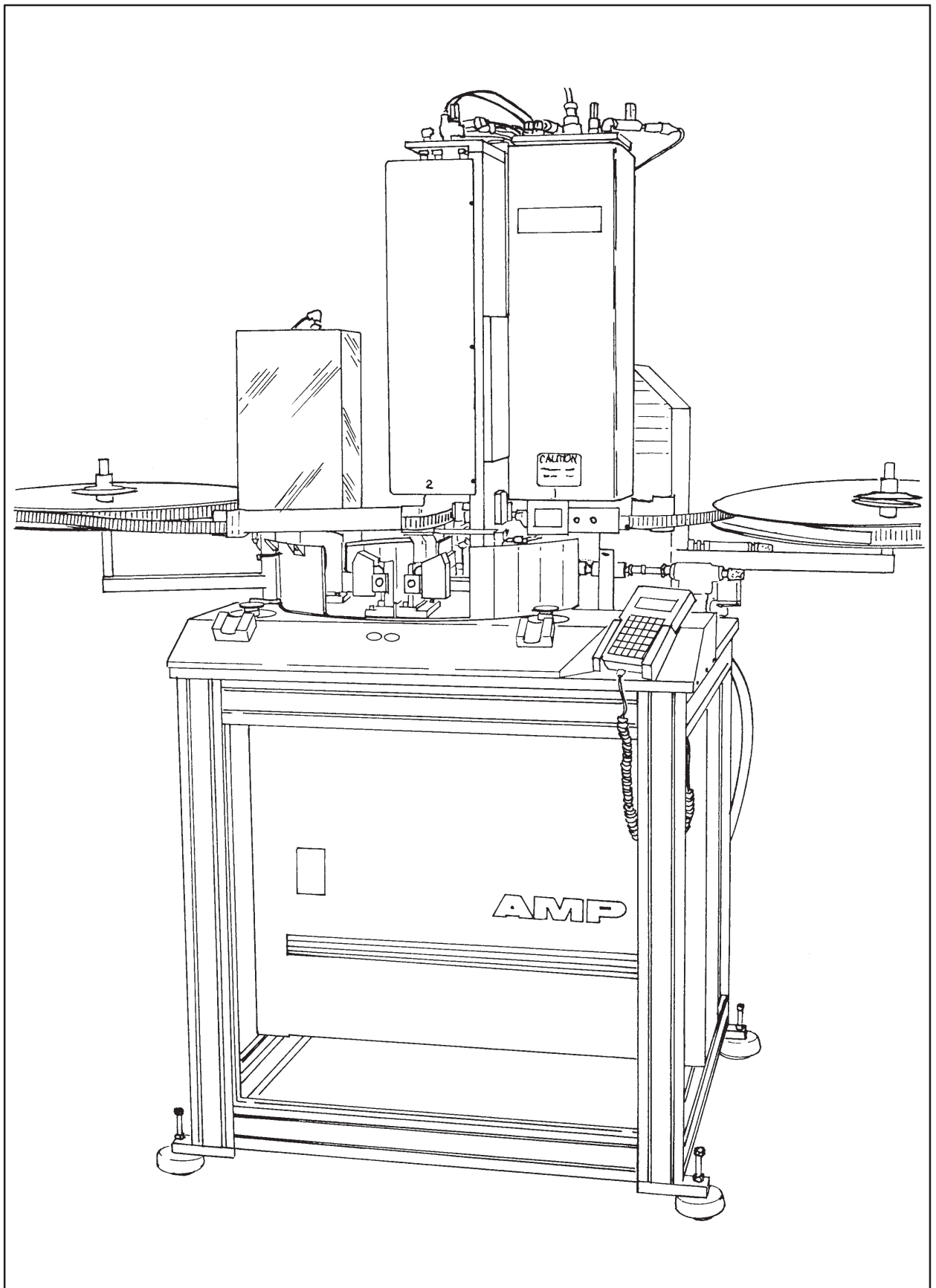
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customer manual

AMP | AMP INCORPORATED
Harrisburg, PA 17105

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**Prepared by
Technical Publications,
AMP Incorporated**



Frontispiece. AMP Rotary Index Table

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DANGER

SAFETY PRECAUTIONS PREVENT INJURY

Safeguards are designed into AMP machines to protect operating personnel from most hazards during normal machine operation. However, as with most machinery, certain precautions must be taken by the operator and repairman.

Never insert hands into an installed machine/applicator, or any part of a machine that is operated by electricity or compressed air, without first pulling the machine power cable plug from the outlet receptacle and/or shutting off the compressed air at the line valve and disconnecting the air hose. This will prevent injury in the event that switches or other controls are accidentally activated.

A grounded electrical outlet should always be used to receive the plug on the machine power cable.

To improve clarity, photographs and drawings may not show machine/applicator guards. In some cases, it is impractical to show the variety of guards designed to meet specific safety requirements, as set forth in codes and standards adopted by customers and/or enforced in a given locale.

Though a guard may not be shown, and procedures may not reflect the need for its removal, the guard **must** be in place during normal operation of the machine/applicator.

TOOLING ASSISTANCE CENTER MACHINE/PRODUCT SERVICE

CALL TOLL FREE 1 800 722-1111

(CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

GENERAL MACHINE POLICY

All machines remain the property of AMP Incorporated. The customer shall have no title to the machine(s) and his interest shall be limited to the use of said machine(s) for the purpose indicated, during the stated term, at the specified plant.

No major change or modification shall be made without written consent of AMP Incorporated. Spare and component parts are available at nominal prices.

A list of component parts is included in the instructional material or drawings supplied with each machine.

The customer shall be fully responsible for the maintenance of the machine(s) including servicing, repair, and replacement of damaged or broken parts. Each machine shall be returned in usable condition — reasonable wear and tear excepted. Before returning the machine, contact AMP Incorporated, Harrisburg, Pennsylvania requesting instructions for shipping and disposition.

AMP Field Engineers are available to provide assistance in the adjustment or repair of the machine when problems arise which your maintenance personnel are unable to correct. Contact AMP Incorporated Field Engineering Services for applicable fees.

INFORMATION REQUIRED WHEN CONTACTING FIELD ENGINEERING SERVICES

AMP Field Engineering Services offers the **Tooling Assistance Center** as a means of providing technical assistance when required.

When contacting AMP Field Engineering Services by telephone regarding service to a machine or tool, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be corrected in this manner.

When calling the Tooling Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number and extension)
4. Person calling
5. Machine or tool number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

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1. INTRODUCTION

This manual covers the AMP Rotary Index Table, which is used to apply AMP MAG–MATE* terminals to pre-wound magnetic field assemblies. Machine specifications are shown in Figure 1–1.

<u>Machine</u>	Rotary Index Table
<u>Product Applied</u>	Standard MAG–MATE Terminals Mini MAG–MATE Terminals Micro MAG–MATE Terminals
<u>Dimensions (approx)</u>	Height: 990.6 mm [39 in.] (1828 mm [72 in.] with modules installed) Width: 2133 mm [84 in.] with 2 reels installed Depth: 914 mm [36 in.] Weight: 363.6 kg [800 lb]
<u>Electrical Requirements</u>	117 Vac \pm 10%, 50 or 60 Hz, single phase, 10 amperes
<u>Pneumatic Requirements</u>	551.5 to 689.4 kPa [80 to 100 psi] @ 0.0103 m ³ /s [22 cfm] of clean, unlubricated air (machine furnished with filter/regulator and lubricator).
<u>Production Rate</u>	Assembly and operator dependent, but estimated at 606 assemblies per hour, assuming 6 insertions per assembly.

Fig. 1–1. Machine Specifications

NOTE

The machine can be configured to apply MAG–MATE Terminals to virtually any type of load coil, bobbin, or field assembly. To simplify terminology, the item that accepts the MAG–MATE Terminals shall be identified as a “housing” in this manual.

2. DESCRIPTION

2.1. Physical Description – Basic Machine

The basic machine includes a rotating table, a termination module, and a control unit.

The module can be one of several types (standard, mini, or micro) manufactured by AMP Incorporated for use in applying MAG–MATE Terminals. Contact your AMP Representative for assistance on selecting options and the correct module for your application.

A custom–designed fixture holds each housing in place. Up to four fixtures may be installed on the rotating table. The rotating table turns to position the appropriate fixture under the termination module.

The machine is programmed and operated with a small control unit, which is detachable for easy use while programming the machine.

NOTE

While the detachable control unit can be hand–held during machine programming, it should be placed into the cradle on the machine during machine operation.

Two optical sensors are located on the front of the machine. Both sensors must be triggered together to operate the machine.

Immediately above each optical sensor is an emergency stop button. When depressed, either button will cause the machine to stop immediately. Once depressed, the button must be turned and released before the machine can be reset with the control unit.

2.2. Optional Features

If desired, one or more of the following optional features may be installed on the basic machine:

<u>FEATURE</u>	<u>FUNCTION</u>
Continuity Check Station	Tests each completed assembly for electrical integrity. This station is shown in Figure 2–2.
Test Indicator Lights	Show the result of the continuity test on the completed assembly.
Second Module	Permits termination of an alternate type of MAG–MATE Terminal in a single application cycle. The mounting area for the module is seen in Figure 2–2.
Y Axis Travel	Allows the first module to move in the Y direction.
Rotary Positioning Fixture	Turns the fixture so that the module can insert the MAG–MATE Terminal at special angles and positions.
X Axis Travel	Allows the second module to move along the X axis. With this feature, the terminal can be placed in any position.
Bend Station	During the insertion process, the MAG–MATE Terminals can be bent at up to a 90° angle.

Contact your AMP Representative for assistance on selecting options.

2.3. Functional Description – Basic Machine

NOTE

For this description, it is assumed that the machine has been properly installed and setup, that the correct fixtures have been installed on the rotating table, and that the insertion sequence has been programmed and stored as a part number.

The machine refers to a pre-programmed part number to determine the appropriate machine movement and insertion pattern. After the desired part is selected on the control unit, the operator loads a housing onto the fixture.

When ready to cycle the machine, the operator simultaneously triggers the two optical sensors. The guarding door then closes, and the table rotates either 90° or 180°, depending on the program. The termination module then performs the termination process, also as programmed.

When the housing is in the correct (programmed) position, the insertion module feeds a MAG–MATE Terminal into position for insertion and shears it from the terminal strip. The module then fires the inserter downward. The insertion action pushes the terminal down into the housing cavity, shears the excess wire from the housing, cuts the nib away from the housing, and terminates the magnet wire. Refer to Figure 2–3.

Two vacuum devices, one on the module and one on the machine, remove the scrap from the termination and strip shear area during the termination.

NOTE

The actual sequence of the terminal feed and insertion may vary depending on the machine version.

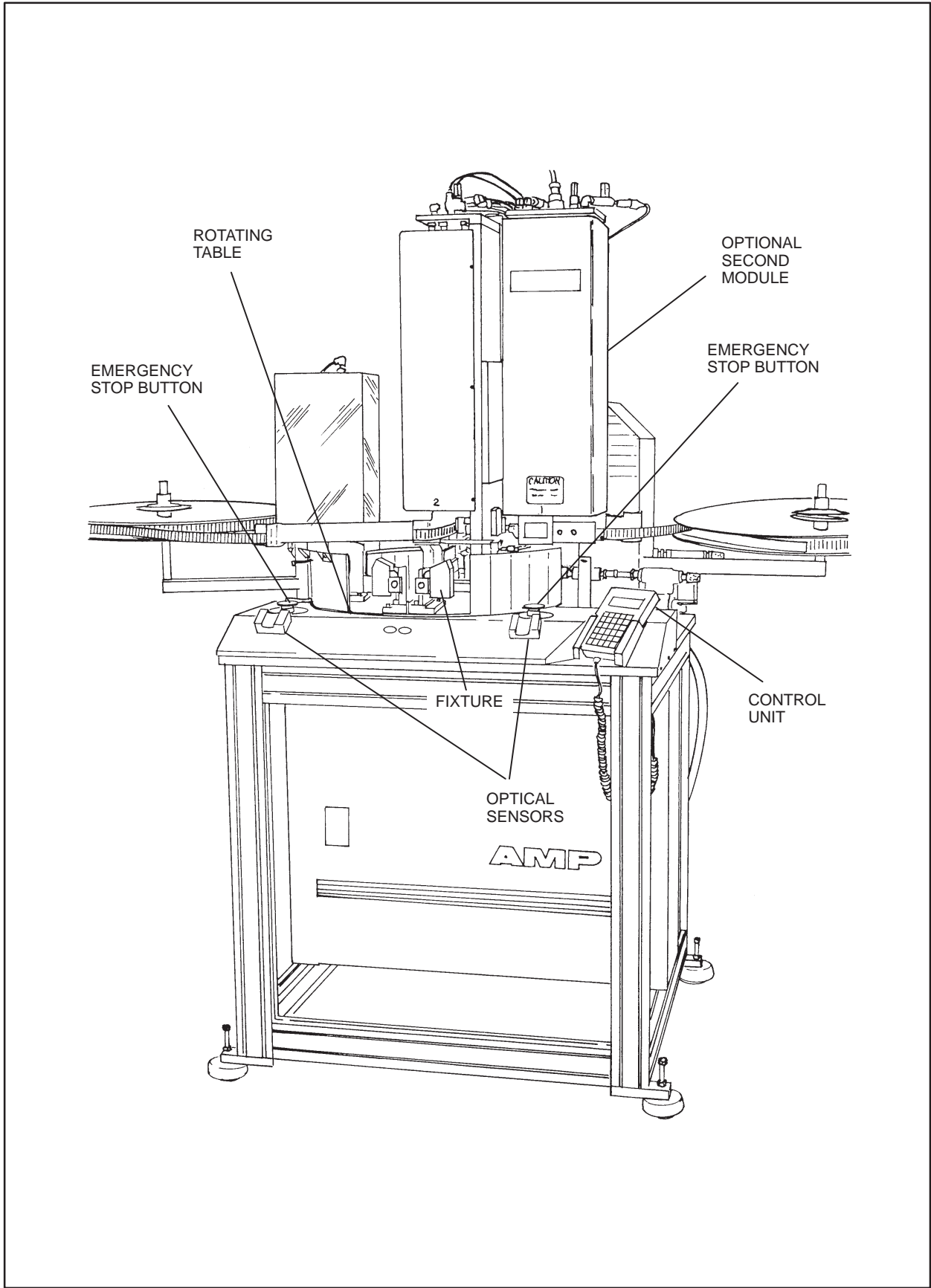


Fig. 2-1. Major Machine Components

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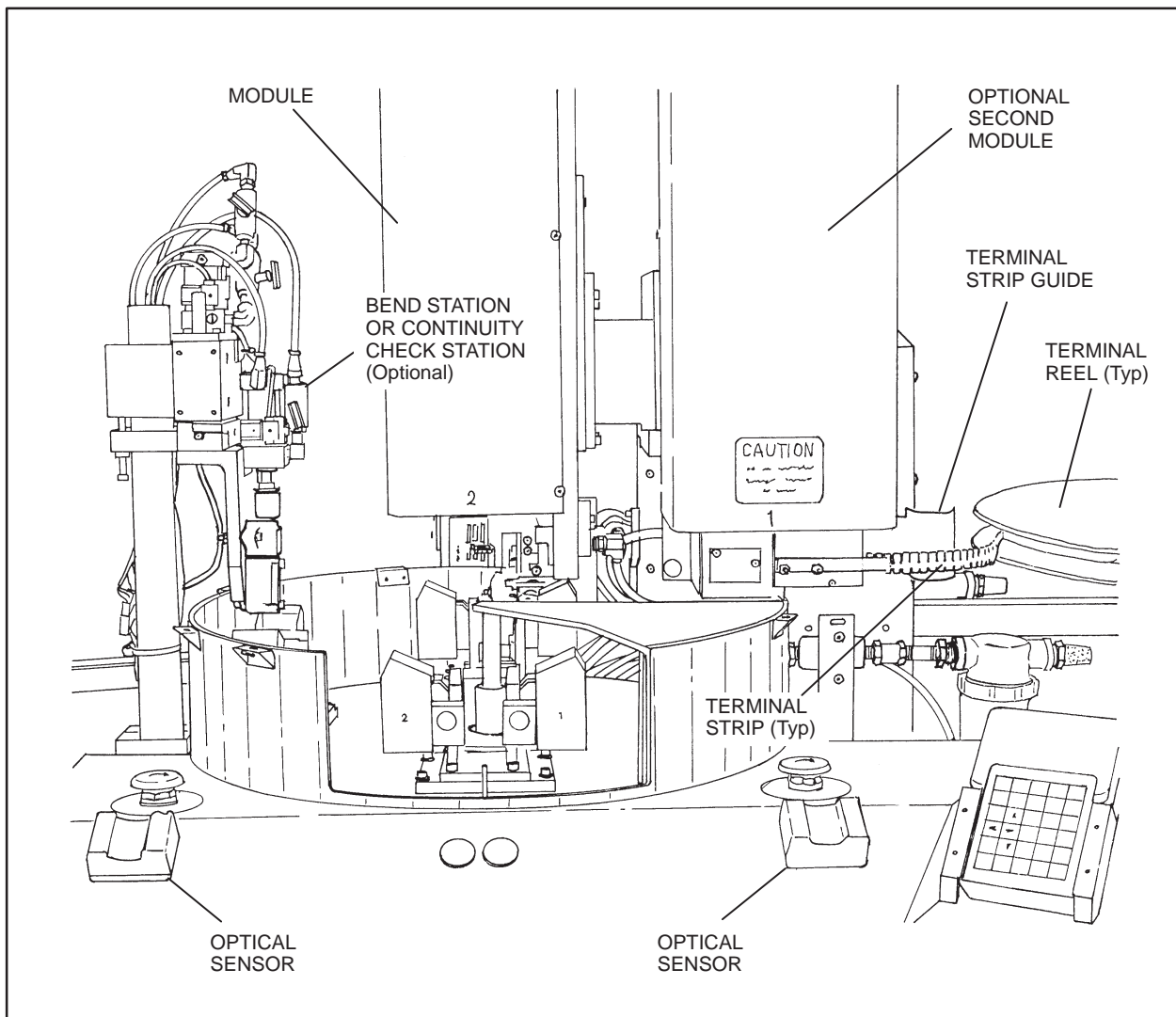


Fig. 2-2. Functional Components

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NOTE

The actual sequence of the terminal feed and insertion may vary depending on the machine version.

When the first fixture rotates away from the operator, another fixture rotates into the operator's working area. If another housing is to be terminated, the operator loads it onto the fixture, then triggers the optical sensors again. This continues until a completed assembly rotates to the operator's work area. If another housing is to be terminated, the operator replaces the completed assembly on the fixture with a new, un-terminated housing, and then triggers the optical sensors to cycle the machine.

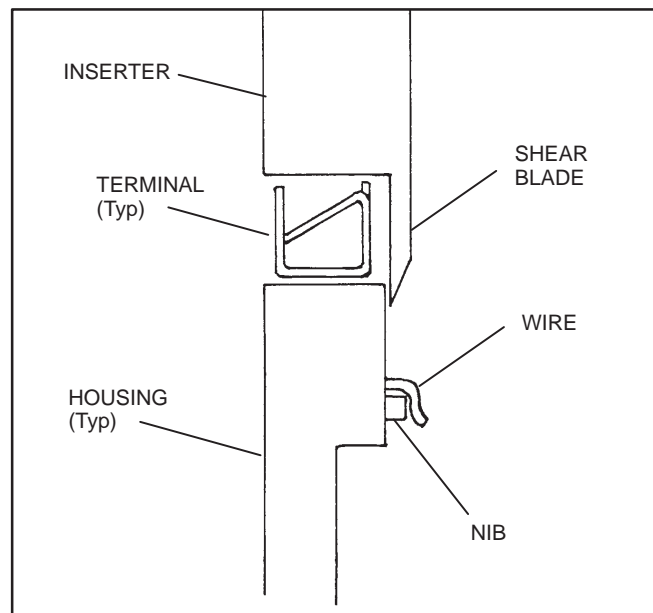


Fig. 2-3. Insertion Action

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2.4. Operating Modes

Four operating modes are available for selection from the main menu. The modes and their purposes are:

MODE	FUNCTION
Run	Used during production and normal machine operation.
Manual	Used to move machine components and force operating toggles. Most often used when setting up machine and troubleshooting.
Edit	Used to add part information to the machine's memory, specify part requirements, and to delete parts from the machine's memory.
Setup	Part selection is done through this mode. Software parameters and machine options can also be specified in this mode.

Additional information on using the operating modes, along with a diagram of menu operations, is provided in Section 4.2 of this manual.

3. RECEIVING INSPECTION AND INSTALLATION

CAUTION

When using a forklift to move the Rotary Index Table, be sure to place the forks under the leveling pad brackets, which are located under the vertical frame rails at the corners of the machine. Damage to the frame could occur if the machine is lifted on the center cross rails.

3.1. Receiving Inspection

Although the machine is thoroughly inspected during and after assembly, the following inspection should be done to safeguard against problems created during shipment:

1. Carefully uncrate the machine and place it in a location that will permit careful examination of the machine.
2. Thoroughly inspect the entire machine for evidence of damage that may have occurred during transit. If the machine is damaged, file a claim with the carrier and notify AMP Incorporated immediately.
3. Check all components and parts to be certain that they are secure.
4. Check all air lines for evidence of loose connections or leaks.

3.2. Considerations Affecting Machine Placement

Proper location of the machine in relation to the operator is essential to both safety and efficiency. The machine can be operated from either a standing position or a seated position. If a seated position is used, the operator's chair should swivel, and the seat and back rest should be padded and independently adjustable. The back rest should be large enough to support the back both above and below the waist.

3.3. Machine Setup

1. Select an appropriate location for the machine. The location should be well lighted, and should have a convenient and adequate air and power supply. Refer to Figure 1–1 for machine requirements.
2. Be certain that sufficient MAG–MATE Terminals and field assemblies for the production run are on hand.

3. Be certain that all of the required initial machine adjustments have been made. Refer to Section 3.4, Initial Adjustment, for detailed machine adjustment information.
4. Attach the machine to a 117 Vac, single-phase power supply (or other appropriate power supply, if so equipped). Make sure that the air supply is connected, then turn on the main air valve. The air pressure should be set at 552 kPa [80 psi].
5. Turn the main power ON.
6. Select the RUN mode on the control panel.

3.4. Tooling Installation

A. Fixtures

The fixtures used on the machine are held in place with four socket head cap screws. Refer to Figure 3-1. To install a fixture, position the fixture on the fixture mounting area, then insert and tighten the mounting screws. If the fixture is used with a new part, the part must be defined through the machine's Edit Mode.

B. Insertion Module

The insertion module for the MAG-MATE Terminals is mounted onto the machine by way of a plate on the back of the module. The mounting plate includes gibs that fit into mounting areas on the machine.

The modules mounting areas on the machine have preset stops to aid in module positioning. When installing a module, be sure to slide the module against the stops before securing the module to the machine's mounting area.

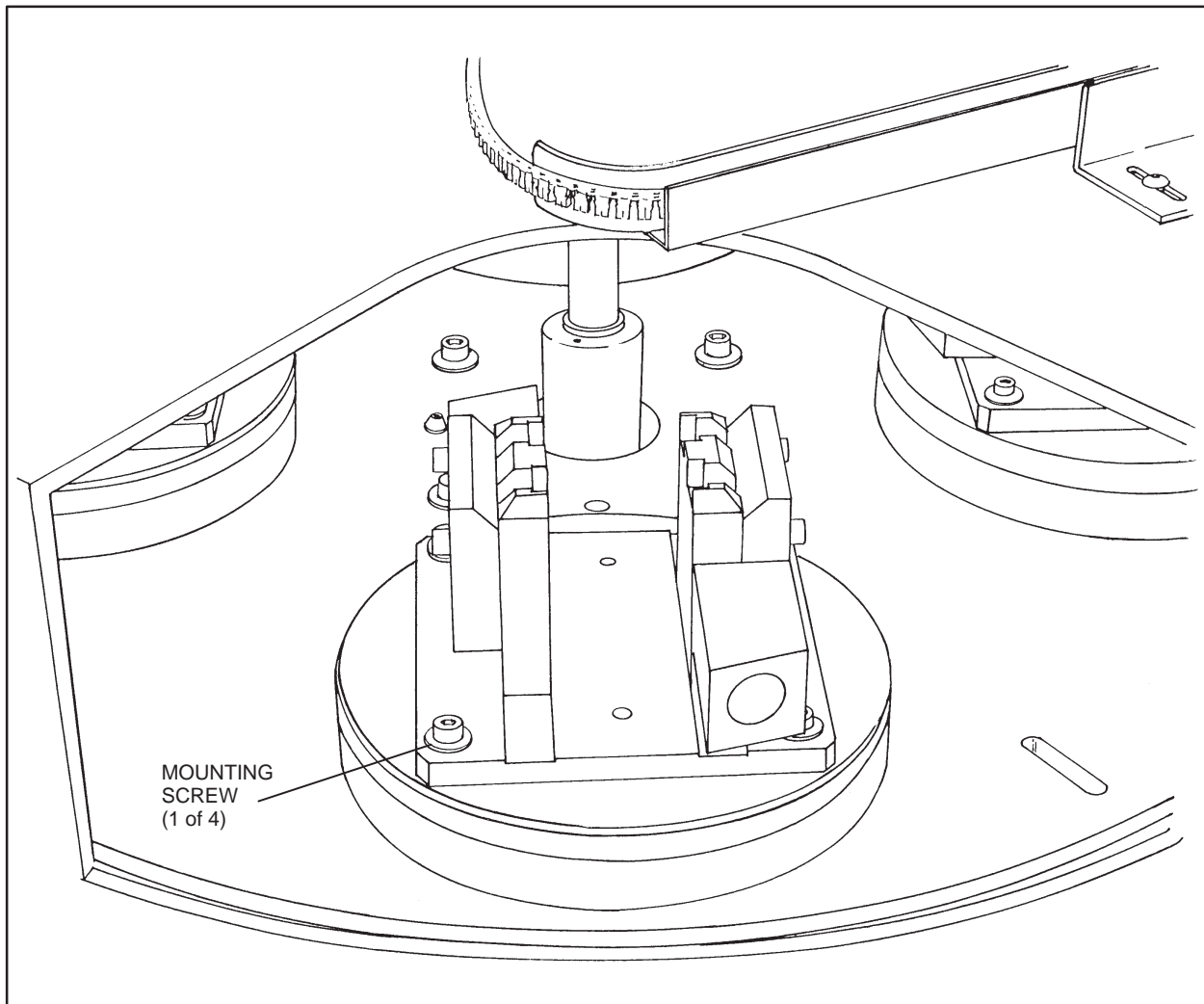


Fig. 3-1. Typical Fixture

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Once a module is mounted to the machine, connect the air lines to the pneumatic fittings on the module's flow control valves, and connect the electrical harness from the machine to the receptacle on the module.

For detailed information on loading, operating, maintaining, and adjusting the module, refer to the Customer Manual packaged with the module.

C. Terminal Reel

Place the reel of MAG-MATE Terminals onto the spool post, place the cover on the reel, and position the locking hub onto the post to secure the terminal reel. Make sure that the terminal strip exits the reel from the front, or operator's side, of the machine, and moves along the guide to the insertion module. Load the terminal strip as described in the instructions supplied with the module.

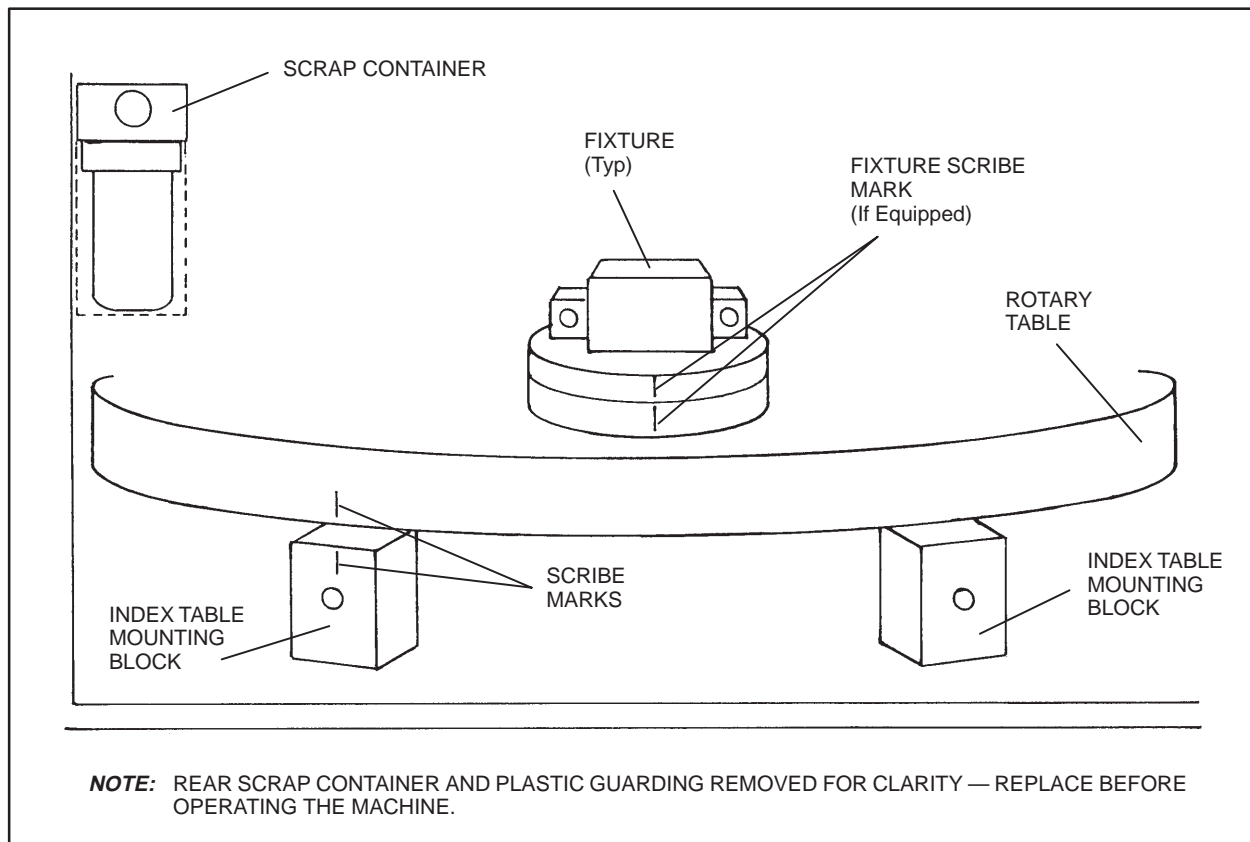


Fig. 3-2. Initial Position Adjustment

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3.5. Initial Adjustment (Figure 3-2)

Once the tooling is installed, the machine should be checked for alignment before running. Proceed as follows:

1. Turn the machine air and power ON.
2. Press "1" on the Main Menu to enter the Run Mode.
3. Place the index finger from each hand into the respective optical sensor and home the machine.
4. Check the scribe mark at the rear of the rotary table and verify that it aligns with the mark on the machine base. Also, check the alignment of the scribe marks on the rotating fixture cam and the movable modules (if the machine is so equipped).

If any of the marks do not align, then re-align them as follows:

1. Choose the Setup Mode from the Main Menu, then choose Home Positions.
2. Select the axis to be adjusted.
3. Using the "←" and "→" keys, manually step along the axis until the scribe marks align.

4. OPERATION

4.1. Control Unit (Figure 4-1)

NOTE

While the detachable control unit can be hand-held during machine programming, it should be placed into the cradle on the machine during machine operation.

All available machine functions are shown on the control unit's display. Each function is listed with the proper key used to perform that function. Operator responses, such as YES and NO may also be entered through the keypad.

Additional functions available on the keypad include:

- | | |
|------------|---|
| Stop | – Forces the machine to stop at the end of the current step. |
| Prev/Next | – Used to move through the menus shown on the control unit. |
| Jog | – Moves the machine in single-step increments. |
| ←/→/↑/↓ | – Used to move through the menus shown on the control unit. |
| Retrn | – Moves the display back one menu level. |
| Man Insert | – Causes the insertion module to perform an insertion cycle. |
| Head Cycle | – Toggles the operation of the insertion module. This key can be used to activate (and de-activate) the module. |
| Batch | – Permits the operator to keep track of production batch counts, if desired. |
| Cont | – Not used. |

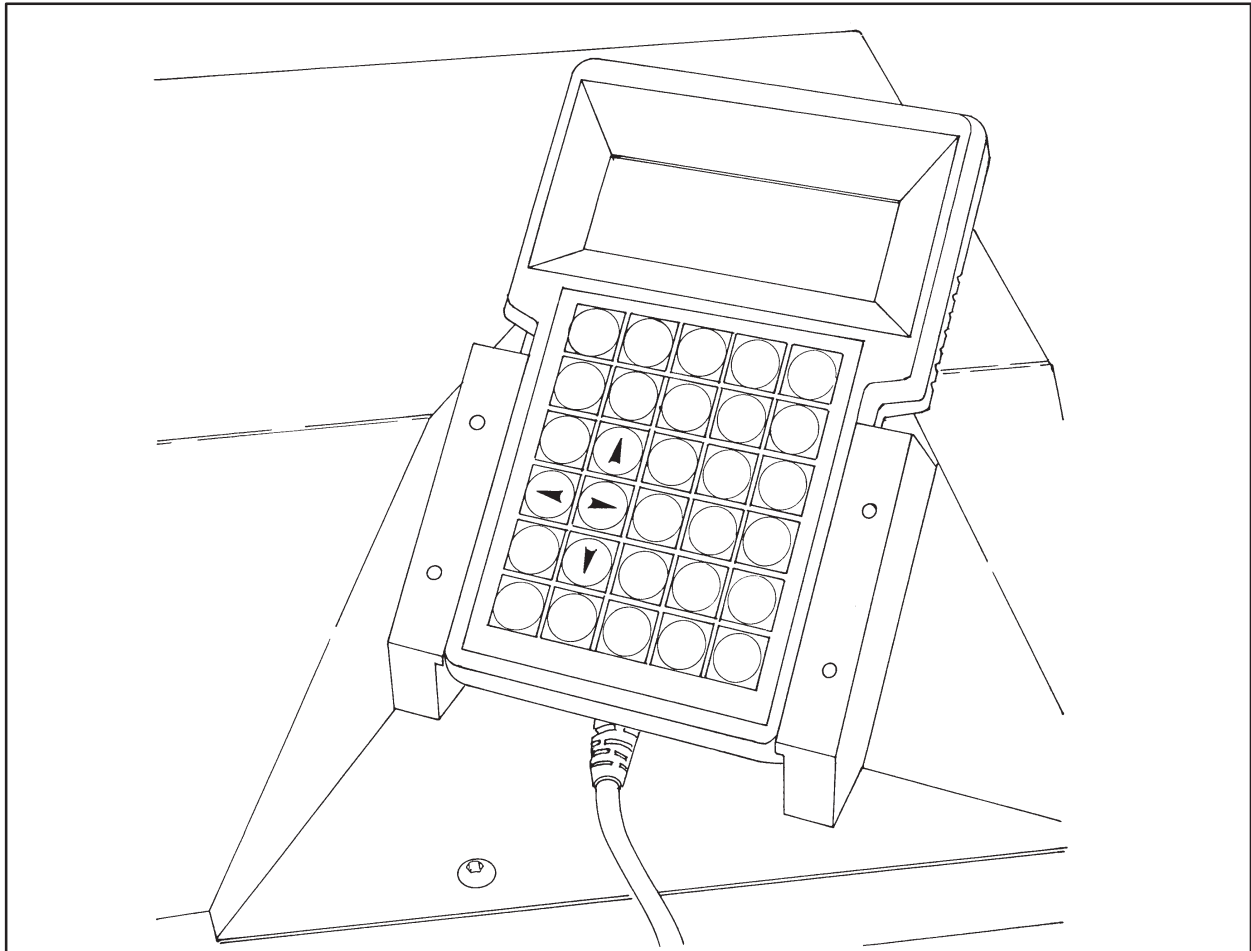


Fig. 4-1. Control Unit

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4.2. Use of Operating Modes

NOTE

A diagram of menu operations is provided in Figure 4–2.

A. Operating in the Run Mode

Selecting “1” at the Main Menu will cause the machine to enter the Run Mode.

NOTE

When the machine is first powered ON, or when it is reset from an emergency stop, the moving axes must be homed before continuing.

Place the index finger from each hand into the respective optical sensor to start the homing sequence. When the sequence begins, the guard door will close. Once the door has closed, the sensors can be released while the machine completes the homing sequence.

NOTE

If the machine has already been homed and no emergency stops have occurred, the machine will go directly into the Run Mode without homing the axes.

Once the homing sequence has been run (or skipped if already homed), the machine is ready for production. Activating both optical sensors will initiate the machine cycle.

B. Key Options for Run Mode

– Manual Insert Key

- Repair Mode (if available)

Allows the operator to put the housing through one or more of the selected operations in order to repair or complete an unfinished housing. The operator selects the desired operations by pressing the number keys indicated on the display. The part to be repaired is placed in the fixture. When the optical sensors are activated, the part will be cycled through all selected operations and returned to the operator.

- Manual Cycle

Manually cycles each individual station on the rotary table. Pressing the appropriate number key will cause the selected station to cycle. The choice in the display marked “45 deg.” will cause the rotary table to rotate 45°. A second press of the key will move the table 45° in the opposite direction, returning the table to its original position. This is useful for moving the fixture away from the insertion head to provide access to the tooling.

– Batch Key

Allows the operator to select a batch size for the machine to run. Pressing the key will allow the operator to enter a batch size or to clear the present batch count.

- Clear Out

Empties the rotary table of remaining (in-process) parts. Select batch, then clear out when no more housings are to be run. Activate the optical sensors. Remove the completed assembly. Continue until the table is empty.

– Head Cycle Key

Allows the operator to select which operations will be active during the run cycle. Pressing the number key associated with each station will alternately turn the station on or off.

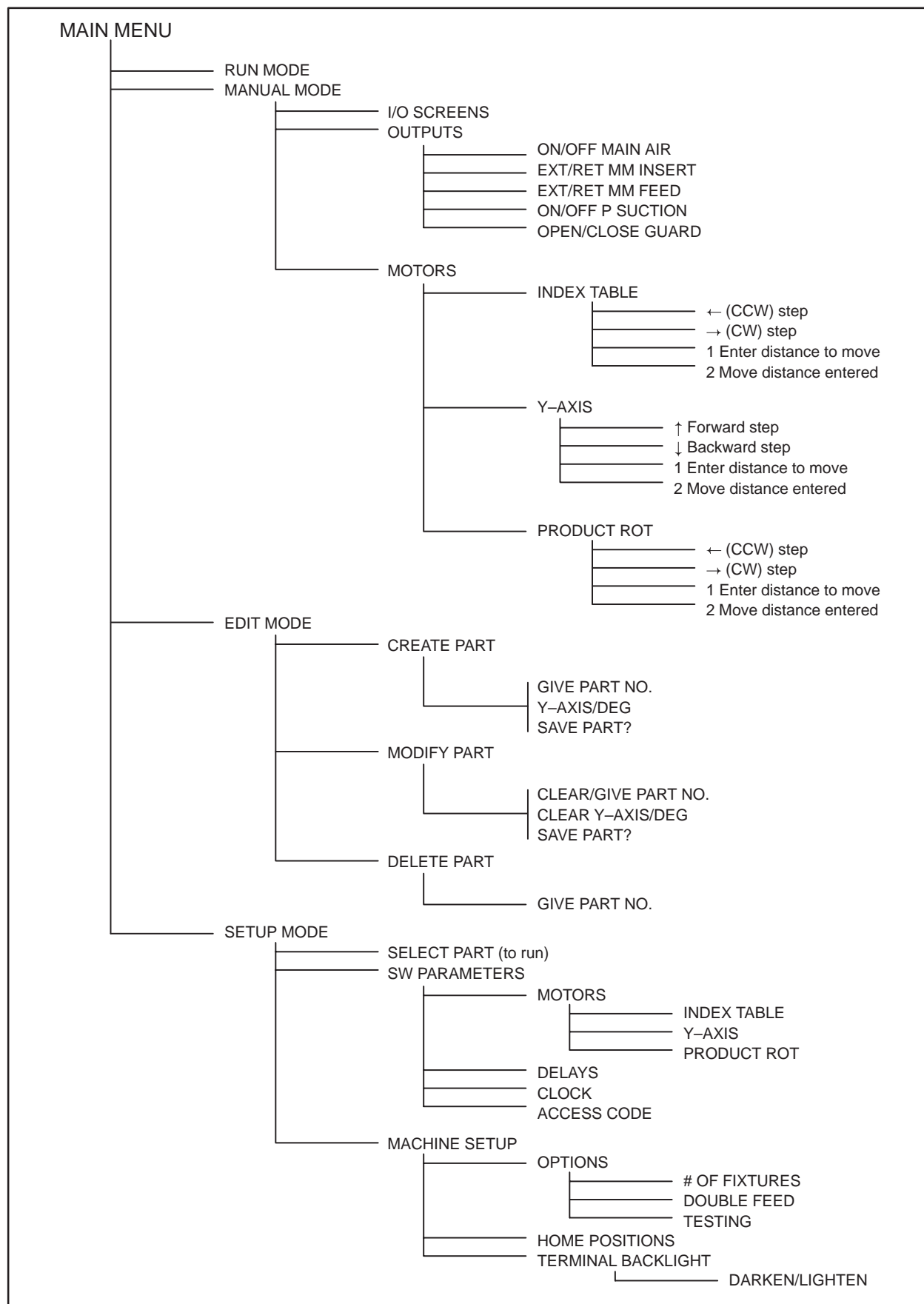


Fig. 4-2. Menu Operations

C. Key Options for Manual Mode

– I/O Screens

Allows the user to observe the state of the input and output signals. Upon entry, the display offers a choice of which bank of signals the user wishes to observe. Once a choice has been made, the display shows the state of the inputs and outputs in groups of 12. Each I/O point is labeled by its function. An open circle indicates that the signal point is off, a closed circle indicates that the signal point is on.

Pressing the NEXT key will display the next 12 I/O points. Pressing the PREV key will display the previous 12 I/O points. Continued presses of the NEXT key will display subsequent points. The display will wrap around to the first I/O points on the list when the end of the I/O list is reached.

– Outputs

Allows the user to manually operate each individual output. Pressing the number associated with the desired output as shown on the display will cause the action indicated in the display to occur.

– Motors

Operator chooses which motor to operate manually. The “\$” and “\$” buttons move the motor in single-step increments. Entering a “1” allows the user to input a distance to move (90\$ move is the default value). Entering a “2” causes the motor to move the distance shown in the display. As the motor moves, the actual position is shown at the top of the display.

D. Edit Mode

– Create a Part

The operator enters a part number to assign to the new part. The number of insertions is entered. Each insertion is then defined by entering the X axis position, the Y axis position, the fixture rotation angle in degrees, and the number of terminals (1 or 2). The operator is then prompted to move the X axis into the proper position for the first insertion location using the “←” and “→” keys to manually position the insertion module. Repeat for the Y axis. When this step is completed, the new part number is then saved to memory and is ready to be used.

NOTE

The X axis travel, Y axis travel, fixture rotation, and double/single feed are options. The machine will only ask for the parameters of the options that have been installed.

– Modify a Part

Allows the user to modify the insertion parameters of an existing part number. The display format is the same as in Create a Part. The user is permitted to step through each item and make any changes that are necessary.

– Delete a Part

Allows the user to delete part numbers from the computer memory.

E. Setup Mode

– Select a Part

User is presented with a list of programmed part numbers. Pressing the number associated with the desired part will load that part definition into memory. The machine is then ready to run the part.

– Software Parameters

- Motors

Permits the setting of the motor acceleration and speed values. Select the axis to adjust, then enter the new acceleration and speed values.

- Access Code

Allows the user to change the access code to the restricted menu areas. The user must know the current access code to get to this area.

– *Machine Setup*

- Options

- Define the number of fixtures on the rotary table.
- Double or single feed (if available).
- Enable or disable testing or bend station (if available).

- Home Positions

Set the position offset values that the motors will use as a final position location at the end of the homing sequence. Refer to Paragraph 3.5, Initial Adjustment.

- Terminal Backlight

Using the “←” and “→” keys, the backlight for the display can be brightened or darkened.

4.3. Operating the Machine

To operate the machine:

1. Make sure that the appropriate air and electrical power supplies are connected to the machine. Refer to Figure 1–1 for machine requirements.
2. Turn the machine's power switch ON.
3. Using the machine's Setup Mode, select a part for the production run.

NOTE

The machine's memory retains the number of the last part that was run. The Run Mode can be entered directly without selecting a new part if the same part number is to be run again.

4. Select the Run Mode from the Main Menu.
5. Place an unloaded housing into the fixture. Refer to Figure 4–3.
6. Place the index finger from each hand into the respective optical sensor to start the machine cycle. At the start of the cycle, the guard door will close, and the rotating table will turn as programmed. The optical sensors must remain activated until the guard door has closed completely, or the machine will not complete the cycle.
7. Repeat Steps 5 and 6 above until a completed assembly is presented at the load/unload station.
8. Remove the completed assembly.
9. Repeat Steps 5 through 8 until the required number of assemblies have been made.

If desired, the Clear Out can be selected after loading the last housing into the fixture. This function causes the machine to complete the parts currently in-process, without requiring the operator to add new housings. When the termination of the final assembly is complete, and the assembly removed by the operator, the machine is ready to start another production run.

5. PREVENTIVE MAINTENANCE

Preventive maintenance of the machine is limited to periodic cleaning, inspection, and lubrication. Depending on the amount of use, a maintenance program should be established and maintained. This will greatly reduce downtime for repairs and replacement of parts.

DANGER

When doing preventive maintenance, make sure that the electrical power and air supply to the machine are OFF.

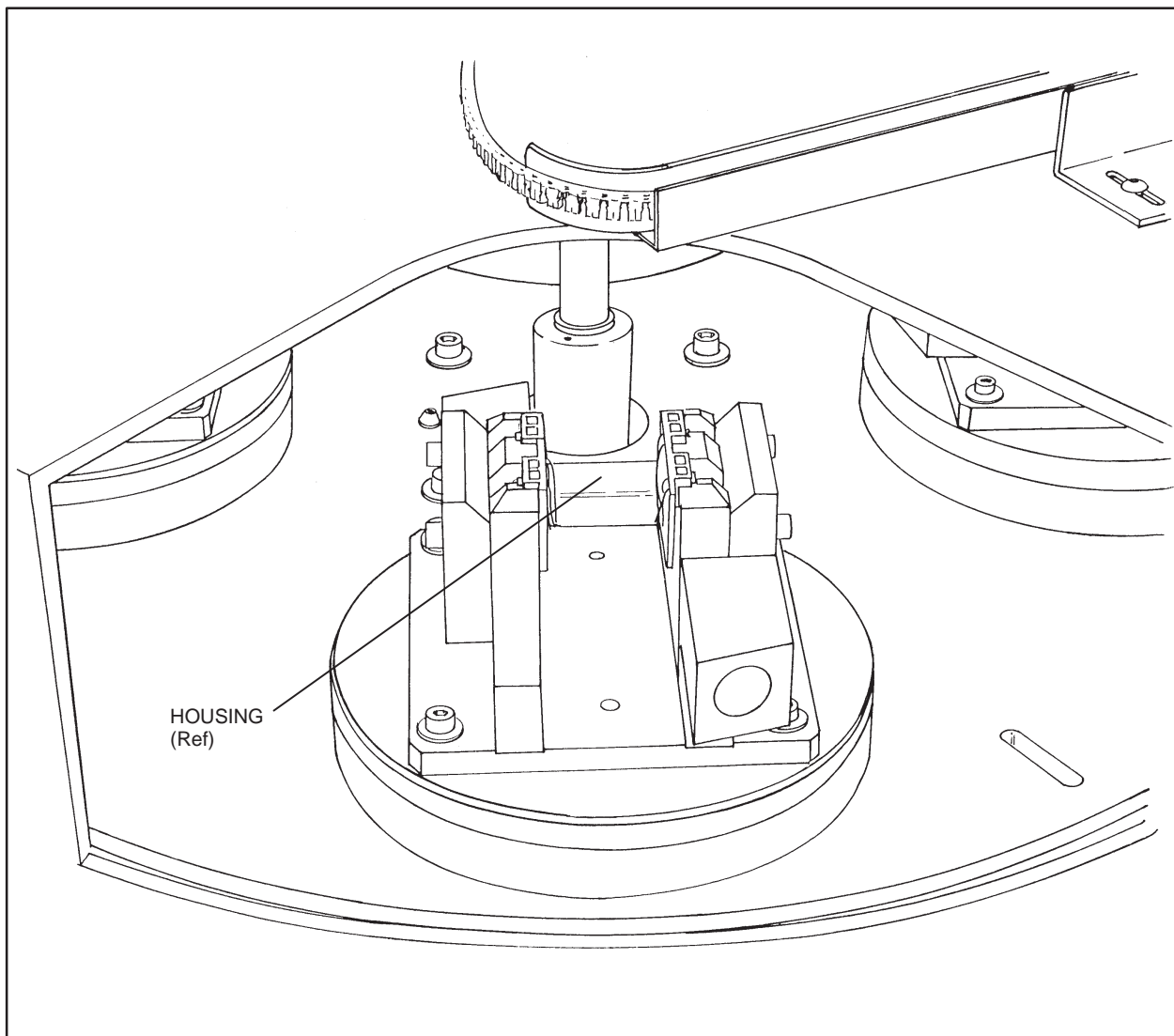


Fig. 4-3. Unloaded Housing in Fixture

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5.1. Cleaning

Prior to operation, or on an daily basis, perform the following procedure:

1. Using a clean, dry cloth, wipe the machine to remove accumulated dust or other contamination.
2. Using a solvent or similar cleaning fluid, remove accumulated oil or grease from areas not requiring lubrication.
3. Using an approved-type air hose, blow out any chips or metal particles that may be in the working area.

DANGER

Compressed air used for cleaning must be reduced to less than 207 kPa [30 psi], and effective chip guarding and personal protective equipment (including eye protection) must be used.

5.2. Inspection

1. Inspect the entire machine for evidence of loose or broken parts. Repair or replace as necessary.
2. Inspect all moving parts for excessive wear. Replace worn parts if required.
3. Inspect all air lines and connections for excessive leakage. Repair or replace as required.
4. Inspect all electrical wiring for loose connections or cracked or worn insulation. Repair or replace if required.

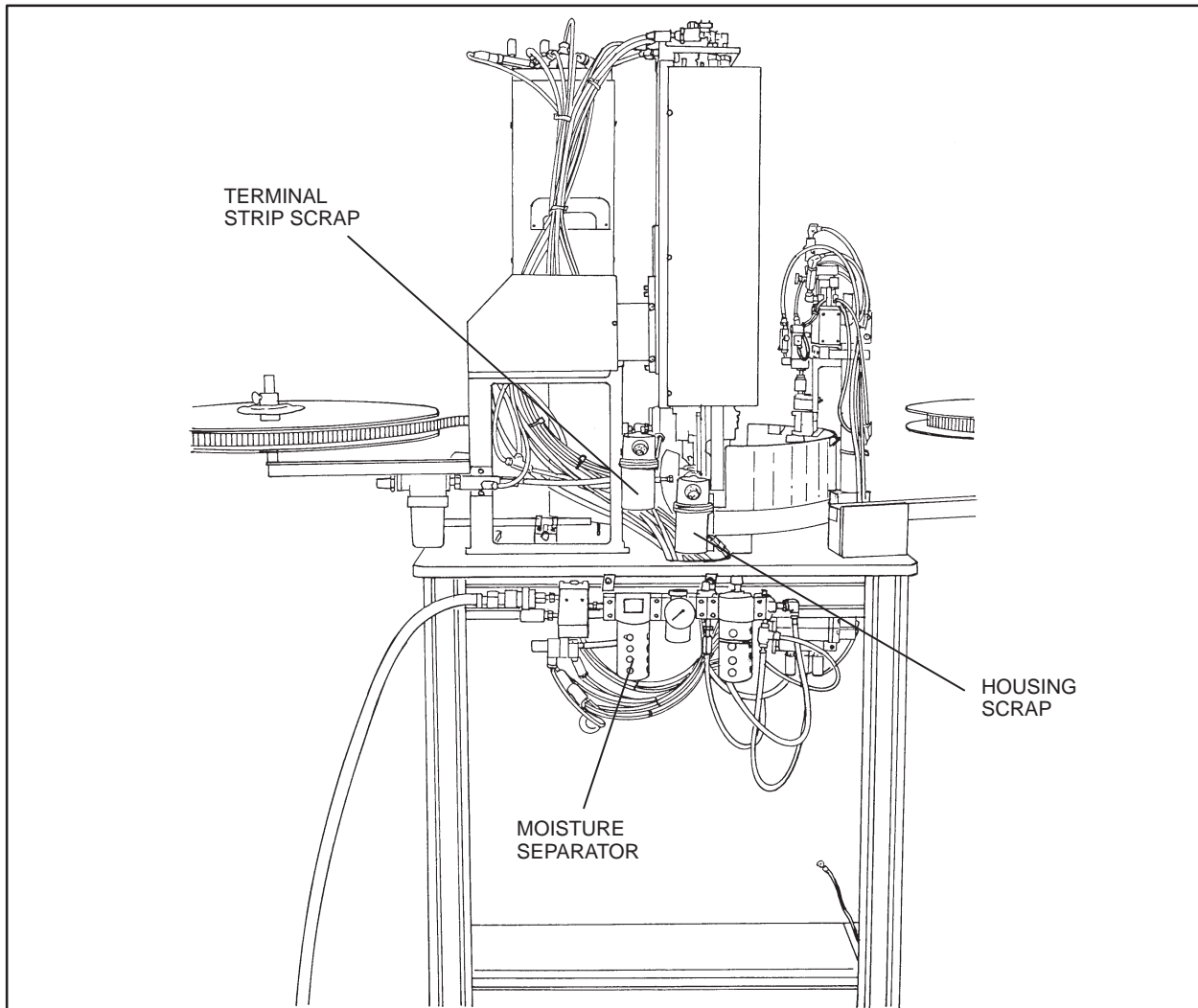


Fig. 5-1. Moisture and Scrap Collection Areas

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5.3. Lubrication

The Rotary Index Table is equipped with a grease fitting under the machine base. Access to the fitting is gained by removing the top of the plastic guard, then using a grease gun with a hose and fitting.

Lubricate the machine with Mobil HP Lithium 12 grease (or equivalent) every 20,000 rotations. Use the same grease to lubricate the drive screw on any optional moving insertion heads.

5.4. Moisture and Scrap Removal

Periodically check the moisture separators at the air supply inlet area of the machine, and drain if necessary. Also check the scrap containers shown in Figure 5-1. During normal operation of the machine, the scrap from the terminal strip is placed in the container on the side of the machine, and scrap from the housing (wire and nib) is placed in the container located at the back of the machine.

To remove the scrap from the container, carefully unscrew the container, remove the cylindrical screen from the inside of the container, and dispose of the scrap in an appropriate manner. Replace the cylindrical screen in the container and replace the container before resuming production.

6. REPLACEMENT PARTS

The engineering drawings supplied in the machine's documentation package indicate location and part numbers for replaceable parts. Contact your AMP Representative for detailed assistance on replacing machine parts.

7. TROUBLESHOOTING GUIDE

When checking for input/output signals, it may be helpful to observe the LED indicators on the input and output boards. The status of these lights matches the status of the signals shown in the I/O screens display. When troubleshooting problems, always check the indicator for output no. 24 (the system heartbeat), which should always be blinking. If the indicator is not blinking, the computer is not running.

PROBLEM	SUGGESTED ACTION
No display in control unit; system heartbeat indicator (output no. 24) IS NOT blinking.	<p>Check output no. 23. If it is lighted, the computer has lost contact with the control unit. Check the control unit and its cable connections at P10 on the electrical enclosure and at P1 on PCB4 on the CPU board.</p> <p>Check that the AC power cord is plugged in.</p> <p>If error occurred immediately after a software change, then verify the correct location and proper seating of the PROM chips in their sockets.</p> <p>Check for 115 Vac at TB1 terminals 1 and 11. If voltage is not present, check the main power switch/circuit breaker.</p> <p>Check for +5 Vdc at power supply (PSA). Note: pin 2 = +5 Vdc, pin 4 = Gnd.</p> <p>Check for +5 Vdc at connector J5 on CPU board (PCB4). Note: pin 1 = +5 Vdc, pin 4 = Gnd.</p> <p>Check for +5 Vdc at J10 connector for the control unit. Note: pin 9 = +5 Vdc, pin 7 = Gnd.</p>
No display in control unit; system heartbeat indicator (output no. 24) IS blinking.	<p>If a new unit has just been installed, it may need to be initialized. Follow the setup instructions included with the control unit.</p>
Machine stopped mid-cycle with inserter extended. Message displayed: "Insert rest made before insert was retracted."	<p>Replace the control unit.</p> <p>Check insert rest switch (S102).</p>
Machine stopped mid-cycle; inserter will not move. Message displayed: "Insert ext. was made before insert was extended."	<p>Check insert extended switch (S103).</p>
Machine stopped mid-cycle with feed cylinder extended. Message displayed: "Feed rest made before feed was retracted."	<p>Check feed rest switch (S104).</p>
Stopped mid cycle; feed cylinder does not move. Message displayed: "Feed extend was made before feed was extended."	<p>Check feed extend switch (S105).</p>

PROBLEM	SUGGESTED ACTION
Does not complete homing sequence. Message displayed: "Index table didn't home properly."	Check index table home switch (S106).
Does not complete homing sequence. Message displayed: "Prod rotate fixt. didn't home properly."	Check product rotate fixture home switch (S119).
Table indexed, but module did not insert. Message displayed: "Index table has not moved to the correct position."	Check index table in position switch (S107).
Rotary table motor does not move.	<p>With the machine power turned off, turn the index table by hand to verify that the table is not binding or jammed.</p> <p>Check 15–ampere fuse in 48 Vdc power supply (PSC).</p> <p>Check for +48 Vdc at axis motor driver.</p> <p>Note: Pin 13 = +48 Vdc, Pin 14 = Gnd.</p>
Outputs are dead.	<p>If entire board is dead, check 10–ampere fuse in 24 Vdc power supply (PSB). Check connector J2 on output board PCB2 for 24 Vdc.</p> <p>Note: Pins 4, 5, 8, 12, and 14 = +24 Vdc; Pins 1, 2, 9, and 10 = Gnd.</p>
Inputs are dead.	<p>If a portion of the board is dead, check appropriate fuse F1, F2, F3, F4, F5, or F6 on output board PCB2.</p> <p>If the whole board is dead, check for 12 Vdc at power supply (PSA).</p> <p>Note: Pin 1 = +12 Vdc; Pin 5 = Gnd.</p>
Display shows garbled characters; system heartbeat indicator (output no. 24) IS blinking, and output no. 23 is off.	<p>If a portion of the board is dead, check appropriate fuse (F1 or F2) on PCB1.</p> <p>Check the control unit setup according to the instructions packaged with the unit.</p>
Display shows garbled characters; system heartbeat indicator (output no. 24) IS NOT blinking, and output no. 23 is on.	<p>Check the control unit cable connector at P10 and also at connector P1 on PCB4 the CPU board.</p> <p>Replace the control unit.</p> <p>Check the control unit cable connector at P10 and also at connector P1 on the CPU board (PCB4).</p> <p>Replace the control unit.</p>