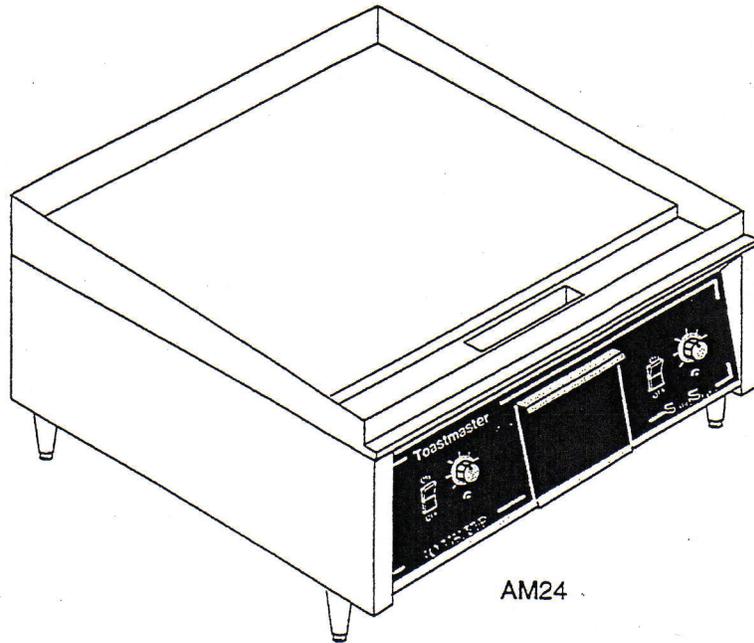


Toastmaster®

A Middleby Company

TECHNICAL MANUAL

AM24, AM36 & AM48 ACCU-MISER GRIDDLES



AM24

Toastmaster, 10 Sunnen Drive, St. Louis, MO 63143, (314) 781-2777

IN CASE OF FIRE

1. De-energize griddle at disconnect switch. This will cut off power to the heating elements allowing griddle to cool. This reduces the flash point temperature making it easier to stop the fire.
2. Cover the affected area with a heavy blanket or canvas. Play the fire extinguisher nozzle over the blanket or cover to seal off air thus smothering the fire.

CAUTION:

Do not attempt to fight a grease fire by playing the nozzle of the fire extinguisher directly on the burning grease. The force will cause the burning grease to be sprayed to adjoining equipment making it difficult to contain the fire. Only use a fire extinguisher filled with CO₂ which is for liquids and oils and suitable for electric powered equipment.

RETAIN THIS MANUAL FOR FUTURE REFERENCE

This manual provides detailed information for servicing the Accu-Miser griddle. It also contains information to assist the technician in diagnosing problems in the event of a malfunction. This manual is an important tool for the authorized technician and should be kept readily available.

**FOR YOUR SAFETY
DO NOT STORE OR USE GASOLINE
OR OTHER FLAMMABLE VAPORS OR LIQUIDS
IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE**

NOTICE

Using any parts other than genuine Toastmaster factory parts relieves the manufacturer of all liability.

NOTICE

Toastmaster (Manufacturer) reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment.

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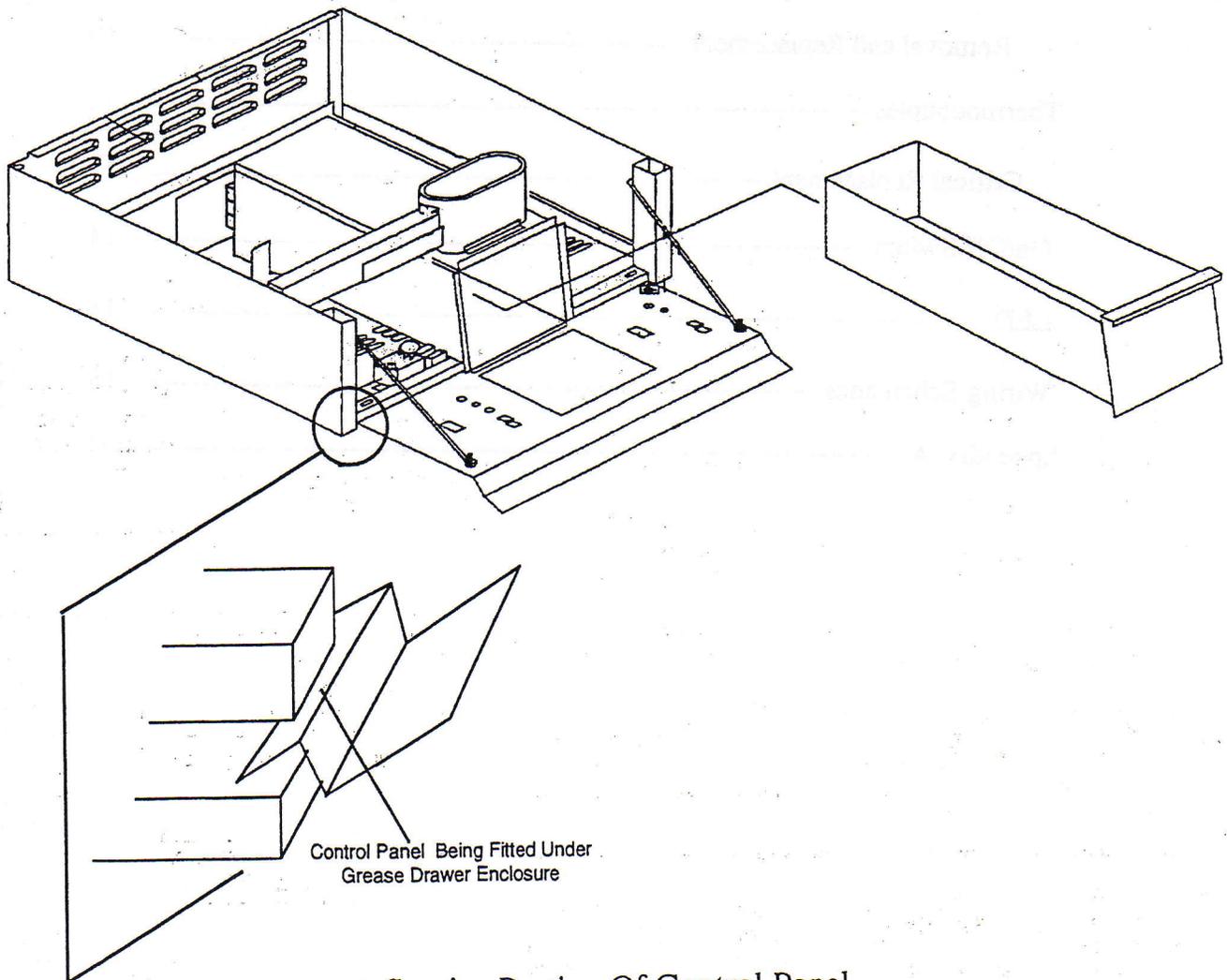
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IV. ACCESSING THE GRIDDLE FOR SERVICE

All AM Series griddles are front serviceable. All controls and elements are accessed through the front control panel.

First, the grease drawer must be removed from the front of the griddle. The panel can then be unscrewed and slid down to allow the top lip of the panel to drop free of the recess in which it is fitted. **CAUTION: The bottom of the panel is NOT hinged to the griddle. Take care not to drop the panel.**

Once the panel is free, the top edge of panel can be pulled out towards you. With the panel held in a horizontal position, the bottom lip of the panel can be fitted into the bottom front edge of the griddle cavity as shown below. The panel should be secure and should lay flat suspended from the cables as shown below.



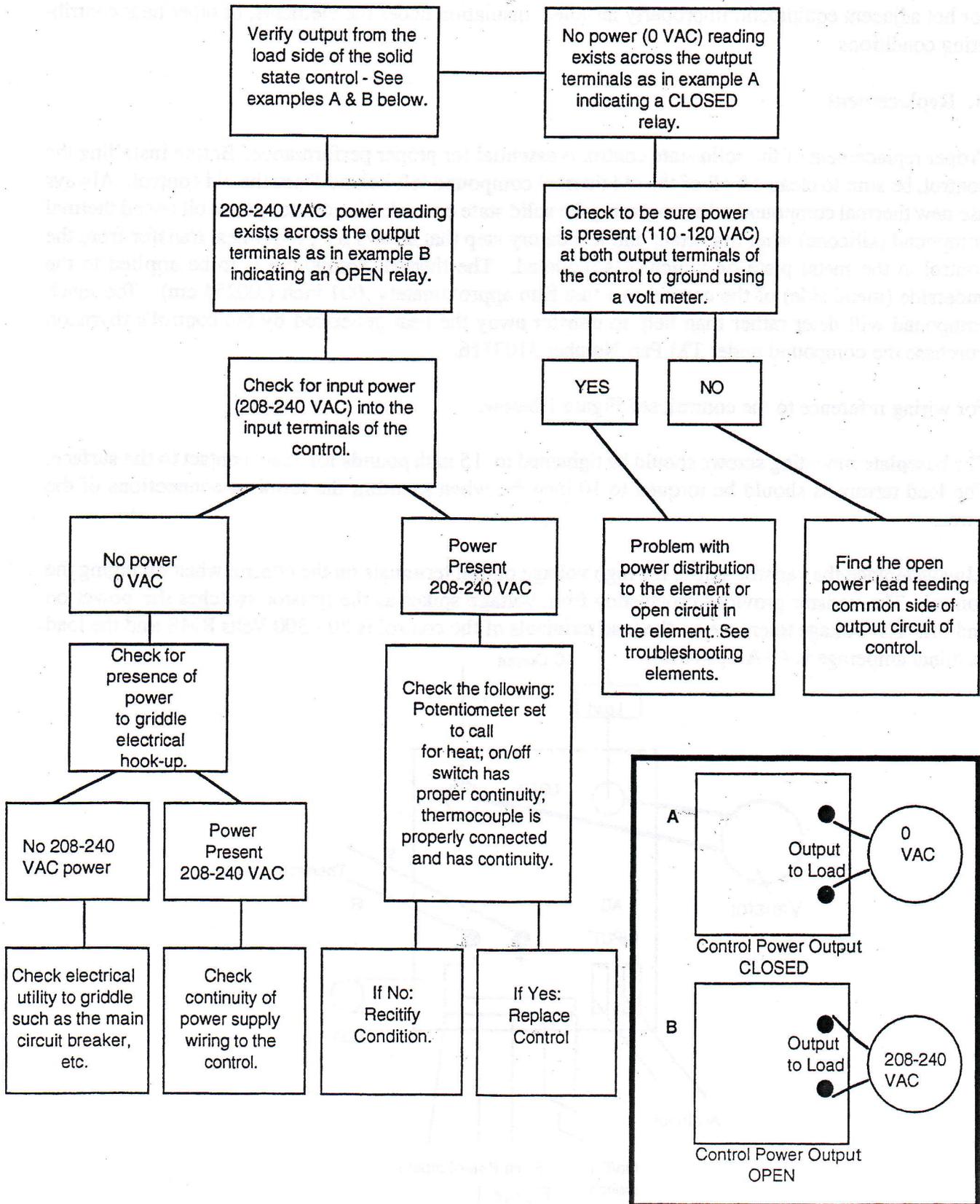
Service Position Of Control Panel

Note: Griddle Cooking Surface Not Shown In Figure

V. TEMPERATURE CONTROL

A. Troubleshooting

Troubleshooting The Solid State Temperature Control



Troubleshooting Cont.

In the event more than one solid state control fails at the same time, the line voltage supply to the control is suspect. Check for any blown varistors across the output terminals of the control. This is a good indication of a power spike on one of the phase lines to the griddle.

The control is designed to operate with a maximum heatsink temperature of 70°C. If the control exceeds 70°C, either the control's thermal compound has been improperly applied or the temperature in the compartment has exceeded maximum ambient. In addition to improperly installed controls, check for hot adjacent equipment, improperly installed insulation under the elements, or other heat contributing conditions.

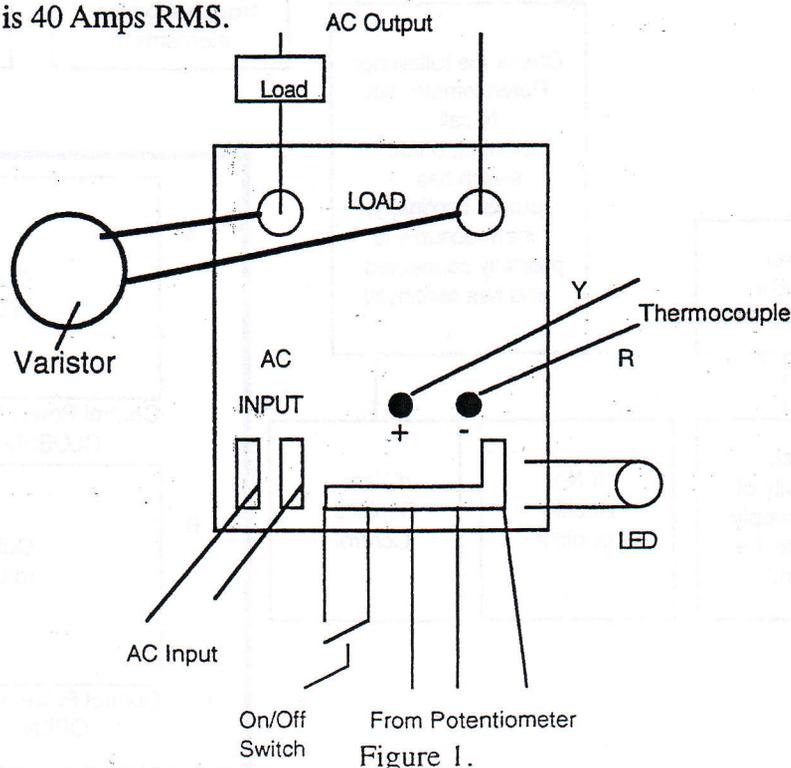
B. Replacement

Proper replacement of the solid state control is essential for proper performance. Before installing the control, be sure to clean off all of the old thermal compound left behind from the old control. Always use new thermal compound when replacing the solid state control. Use of the special oil based thermal compound (silicone) is an important and mandatory step that allows for proper heat transfer from the control to the metal plate on which it is mounted. The thermal compound is to be applied to the underside (metal side) of the control as a thin film approximately .001 inch (.00254 cm). Too much compound will deter rather than help to transfer away the heat generated by the control's thyristor. Purchase the compound under TM Part Number 3103116.

For wiring reference to the control, see Figure 1 below.

The baseplate mounting screws should be tightened to .15 inch pounds for exact contact to the surface. The load terminals should be torqued to 10 inch lbs when securing the terminal connections of the wires.

Always replace the varistor across the high voltage output terminals on the control when changing the control. The varistor provides protection from voltage spikes as the thyristor switches the power on and off. The voltage tolerance on the load terminals of the control is 20 - 300 Volts RMS and the load terminal amperage is 40 Amps RMS.



VI. CALIBRATION OF THE POTENTIOMETER

A. Troubleshooting

Calibration of the potentiometer is necessary only after replacement of the controller or if the calibration plate should become jarred loose from its factory calibrated position.

The allowable temperature range of the griddle is 150°F(65°C) to 450°F(230°C) for each zone. Within this temperature parameter the temperature should fluctuate no more than $\pm 14^\circ\text{F}(7^\circ\text{C})$ from the set point temperature.

B. Calibrating Procedure

Note: Before making any calibration adjustments, the griddle should be up to temperature and cycling and all panels including the front control panel must be in their closed position. Calibrating the griddle with any of the panels open will allow for a cooler junction temperature at the connection point of the thermocouple at the control. This may give an inaccurate indication. Keeping the panels closed will provide for a more accurate calibration even though the control does provide an ice point reference (calibration) as indicated in Appendix A. A good Type K temperature indicator source must be used when taking temperature readings off the griddle surface for calibration adjustments. Proper placement of the thermocouple test probe is crucial. See Figure 8 for proper probe placement on the griddle surface.

When taking the temperature of the griddle, the temperature probe should be placed at the center of the griddle surface OF THAT ZONE. The temperature probe should be held down by an aluminum weight with a piece of high temperature insulation (1000 degrees C) between the probe and the weight. This combination helps to acquire the most accurate readings possible without the weight absorbing temperature from the probe.

1) Determine if the temperature of the center of the griddle surface for that zone is more than $\pm 14^\circ\text{F}(7^\circ\text{C})$ above or below the set point of 350°F(175°C).

For Steps 2 -7 refer to figure 9

- 2) Remove the temperature control knob to gain access to the calibration adjustment screw.
- 3) Loosen the 1/2" nut around the potentiometer shaft and loosen the calibration screw but do not remove.
- 4) Turn the screw in its slot to the left to lower the temperature or to the right to raise the temperature.
- 5) Once proper calibration has been obtained, the call for heat LED will illuminate within 14°F(7°C) undershoot and cycle off within 14°F(7°C) of overshoot.
- 6) Tighten the calibration screw and the 1/2" potentiometer nut and paint the head of the calibration screw and the area next to the screw with a tamper proof shellack.
- 7) Replace the control knob making sure it aligns with the 350° dial indicator mark.

CALIBRATION SOURCE THERMOCOUPLE LOCATION CHART

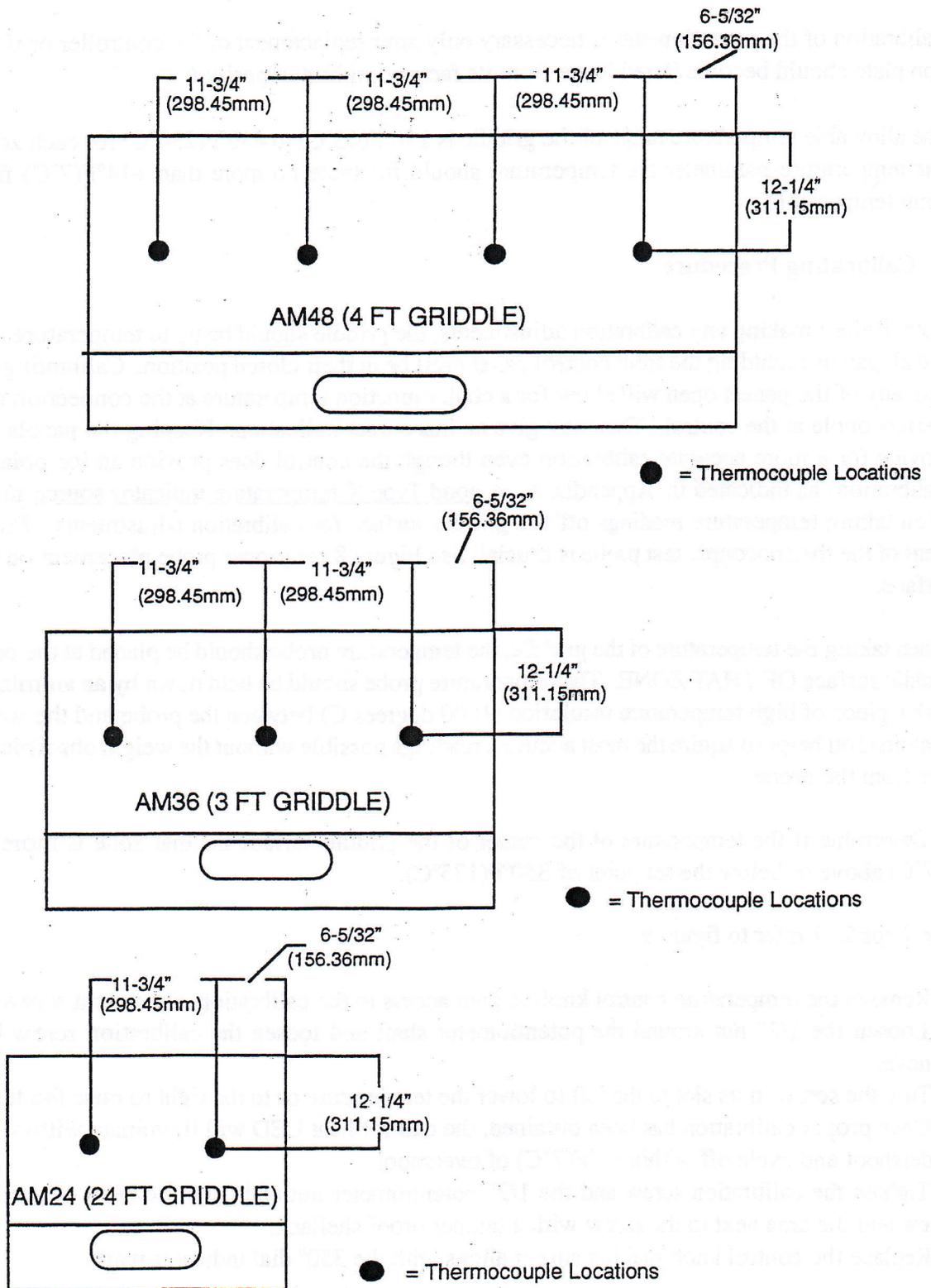
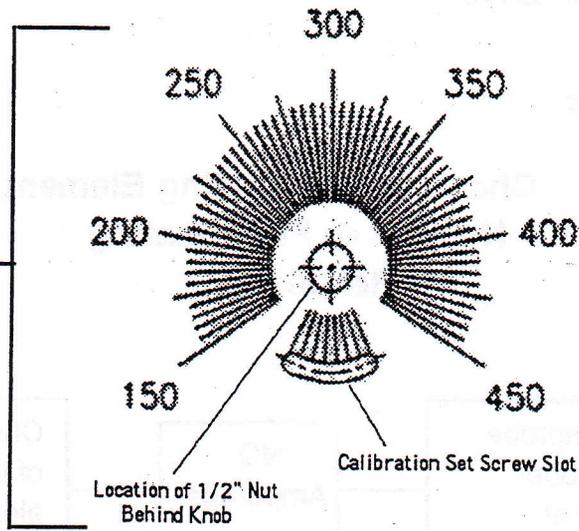


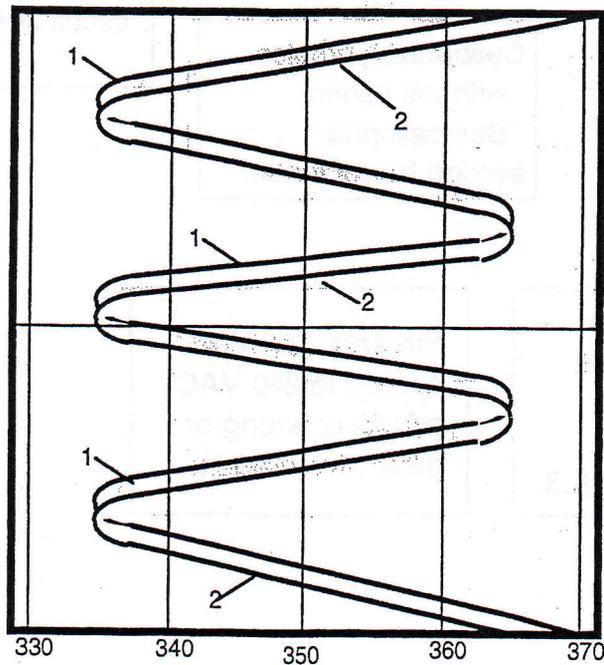
Figure 8

Potentiometer
Calibration
Figure 9



Note: The figure 10 below represents a temperature graph taken during the calibration of an AM24 Griddle.

Two waves numbered 1 & 2 are the individual zones of the 2 ft griddle. The griddle was calibrated at a common temperature setting of 350°F(175°C). A properly calibrated griddle will have a \pm tolerance of 14°F(7°C) as the graph reveals.

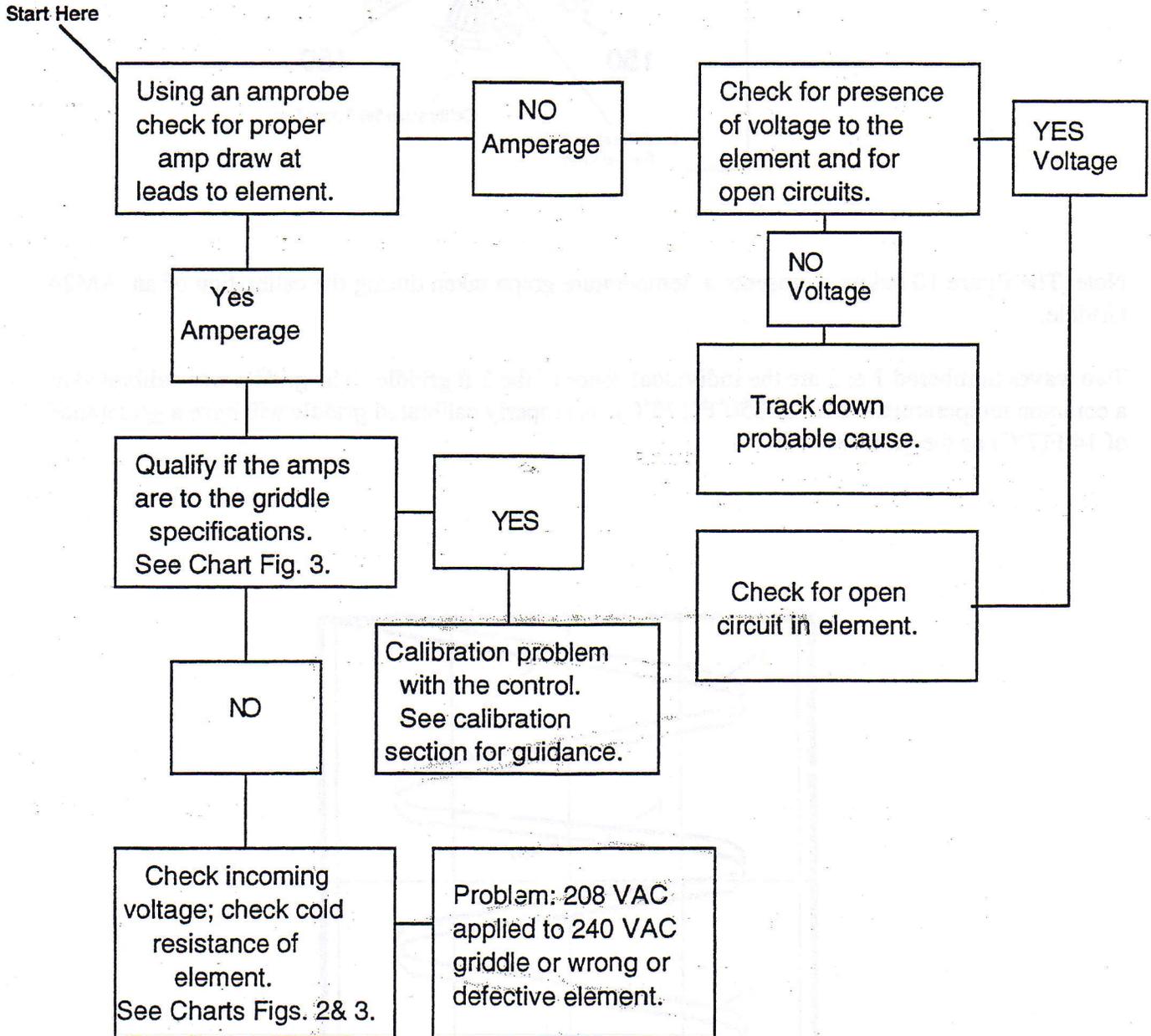


Temperature Swing At 350°F
Figure 10

VII. HEATING ELEMENTS

A. Troubleshooting

Checking The Heating Element No Heat or Poor Heating Response



The most common problems with electric heating elements are open connections, bad connections, short circuits or ground faults. A grounded or shorted element will normally trip a breaker. In some circumstances, the grounded element can continue to heat without tripping a breaker.

The only way to determine if an element is grounded or shorted is to disconnect all wires from the element. Check across the leads for the resistance reading and from one lead to ground for a shorted element. With an amp clip meter, check the griddle ground wire to see if there is any indication of current. If so, this is a good indication of a grounded element. Check to see if full power can be read when placing the volt meter from one element power lead to the element case. Keep in mind that many grounded or shorted element problems may NOT occur unless the element is up to operating temperature. Once the element is up to operating temperature the element can be checked with an ohm meter after disconnecting power to the griddle and disconnecting one element lead from the power distribution. Check continuity through the element for open circuits and/or ground faults and from the element lead to ground for short circuits.

As referenced below in figure 2, the Accumiser is a voltage specific griddle. The wrong voltage to the griddle can greatly reduce the life of the element and/or destroy the element immediately or cause poor performance depending on the element vs. the electrical service,

208 Volt Element	240 Volt Element
Maximum Allowable 215 VAC	Maximum Allowable 253 VAC
Minimum Allowable 192 VAC	Minimum Allowable 216 VAC

Element Voltage Tolerances

Figure 2

Figure 3 reveals important amperage and resistance ratings of the specific voltage elements. Tolerances of these ratings are $\pm 10\%$.

Accumiser Individual Element Ratings: Models AM24, 36 & 48			
Voltage 208	Watts 3120	Cold Resistance (Ohms) 13.87	Amp Draw At Element Leads 15.0
Voltage 240	Watts 3120	Cold Resistance (Ohms) 18.46	Amp Draw At Element Leads 13.0

Figure 3

B. Element Removal & Replacement

The elements are to be replaced as an assembly ALWAYS! Failure to do so will result in uneven heating of the griddle surface. The elements are specially compressed between the element package box assembly and the top heater plate. This provides even heat transfer to the griddle cooking surface and the elimination of air entrapment between the element and heater plate.

An element assembly can be removed through the front of the griddle. Refer to Figure 4 below. First, lower the front control panel to gain access to the elements. Second, remove the front insulation support bracket, item A, and then the insulation strip, item B. Third, loosen evenly, the 7/16" nuts on the Left and Right side of the heater assembly frame support. As the nuts are loosened, the front end of the frame support with the heater assembly will pivot down. It is not necessary to remove the insulation cover and insulation mounted below the frame support. Fourth, once the nuts are removed, the element assembly can be pivoted all the way down and the element assembly can be unwired and slid forward out of position.

Alignment

See figure 4 below for the following explanations.

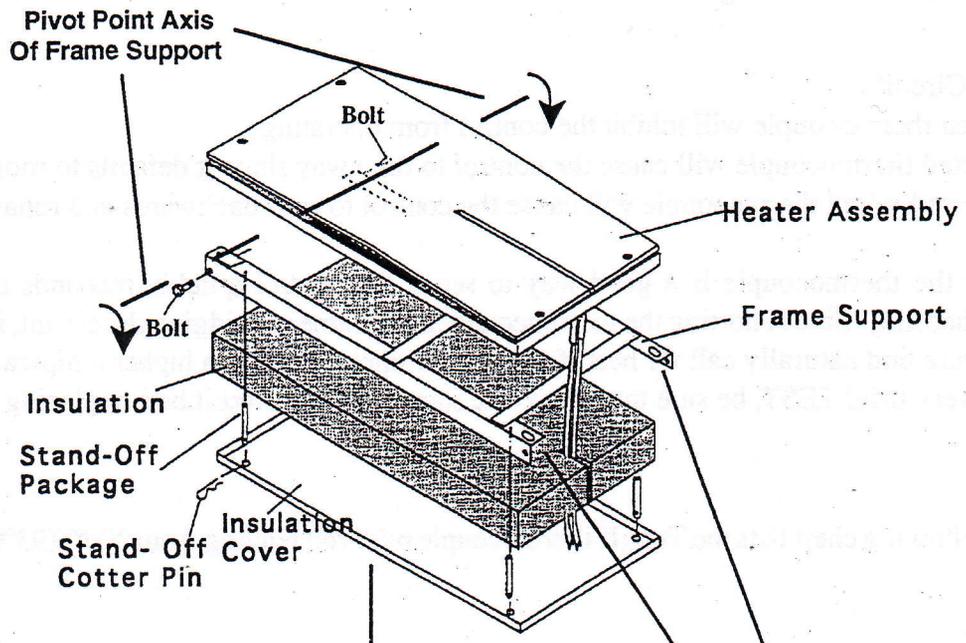
Proper alignment of the top heater plate and thermocouple tube is essential in order not to:

- a) crush the thermocouple mounting tube
- b) cause improper surface contact of the element assembly with the bottom of the griddle surface

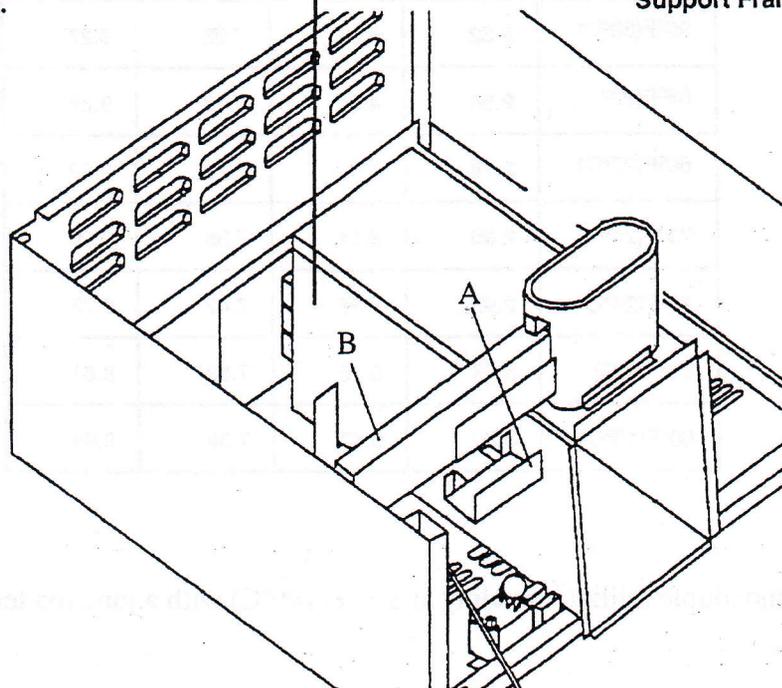
The heater plate has a long slot centered at the front. It is important that the slot centers around the thermocouple tube as the element assembly is lifted and secured back into its flush position under the griddle surface. As the new element in the package box is pivoted up into its installed position, be sure to tighten the package box retaining nuts evenly until the whole element assembly is level and tightly in place.

Insulation

After replacing the element assembly, be sure that the 1.5" thick insulation sheet is properly installed below the element frame support with the insulation cover. Make sure items A & B (front insulation and support bracket) are put back in place. Failure to properly install all insulation will result in abnormal compartment temperatures and heat loss from the element. This can result in: a) poor cooking performance and b) control component failure due to heat.



7/16" Nuts Under Support Frame



Element Assembly Removal/Replacement

Figure 4

VIII. THERMOCOUPLES

A. Troubleshooting

Control Circuit

- a) an open thermocouple will inhibit the control from operating
- b) a shorted thermocouple will cause the control to run away since it defaults to room temperature
- c) a reversed wired thermocouple will cause the control to read backwards and runaway

Shorting the thermocouple is a good way to see if the control quickly responds by coming on during troubleshooting. Since shorting the thermocouple is the same as bridging the circuit, it will default to room temperature and naturally call for heat if the potentiometer is set at a higher temperature. When performing this very brief TEST, be sure to remove the short from the circuit before placing the griddle back into service.

The following chart lists the Type K thermocouple millivolt reading from 200°F(93°C) to 500°F(260°C).

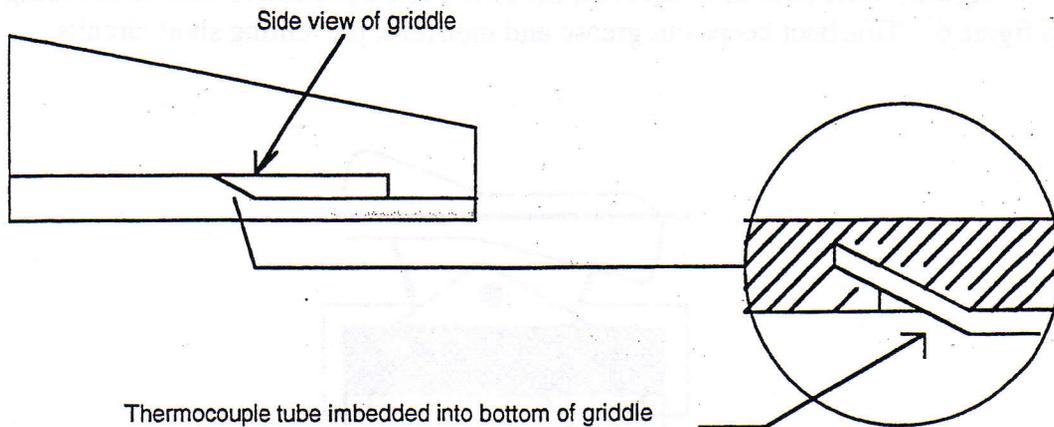
	Griddle Temperature			
Junction Temp	200°F (93°C)	300°F (149°C)	400°F (204°C)	500°F (260°C)
90°F(32°C)	2.52	4.80	7.02	9.27
85°F(29°)	2.64	4.91	7.13	9.38
80°F(27°C)	2.75	5.02	7.25	9.49
75°F(24°C)	2.86	5.14	7.36	9.60
70°F(24°C)	2.98	5.25	7.47	9.72
65°F(18°C)	3.09	5.36	7.58	9.83
60°F(16°C)	3.20	5.47	7.69	9.94

Example: The thermocouple millivolt reading at 300°F(149°C) with a junction temperature of 85°F(29°C) should be 4.91 mV.

At room temperature a good thermocouple will read between 5-8 ohms.
Cold resistance reading: 6.5 OHMS average.

B. Replacement

When replacing the thermocouple, it is imperative that it slides into the support tube and is inserted until the transition crimp touches the tube inlet. Refer to figure 5. Note that the thermocouple swings upward into a channel at the bottom of the griddle surface. This enables accurate temperature sensing of the surface. Failure to position the thermocouple all the way into the support tube will cause inaccurate temperature control of the griddle and adverse cooking results.



Thermocouple Placement
Figure 5

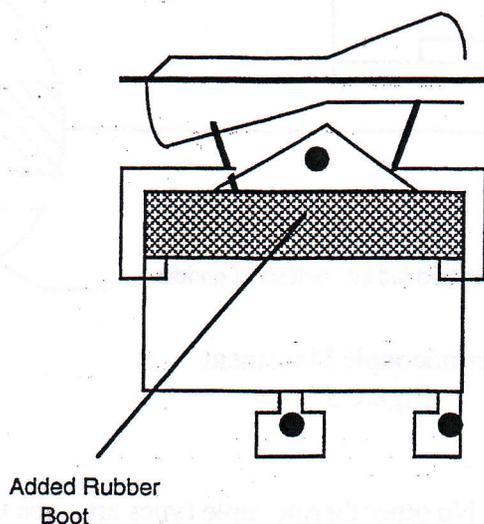
The thermocouples used are Type K. No other thermocouple types are to be used. Other type K thermocouples may also cause cooking problems since the control is calibrated to the length and value characteristics of the factory installed thermocouple.

Terminal connections of the thermocouple to the control are polarity sensitive and should be connected as follows: YELLOW WIRE + (POSITIVE) and RED WIRE (NEGATIVE) -.

IX. ON/OFF SWITCHES

The On/Off switch is designed to handle currents as high as 20 Amps. The current values running through the switch are very small at 12 VAC. Therefore when checking the switch for continuity, it is important to set the ohm meter on the R x 100 scale to read possible resistances up to 1.0 ohm. Any resistance reading of 1.0 ohms or greater will drop the 12 VAC and cause the control not to operate.

When replacing the rocker switch, be sure that the switch has a protective boot surrounding its body as shown in figure 6. This boot keeps out grease and moisture, preventing short circuits.

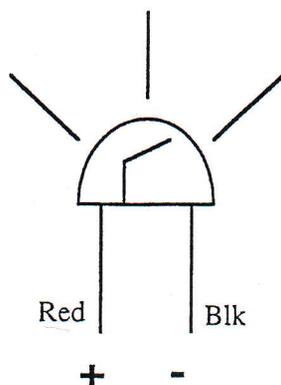


Switch Boot

Figure 6

X. LIGHT EMITTING DIODE (LED)

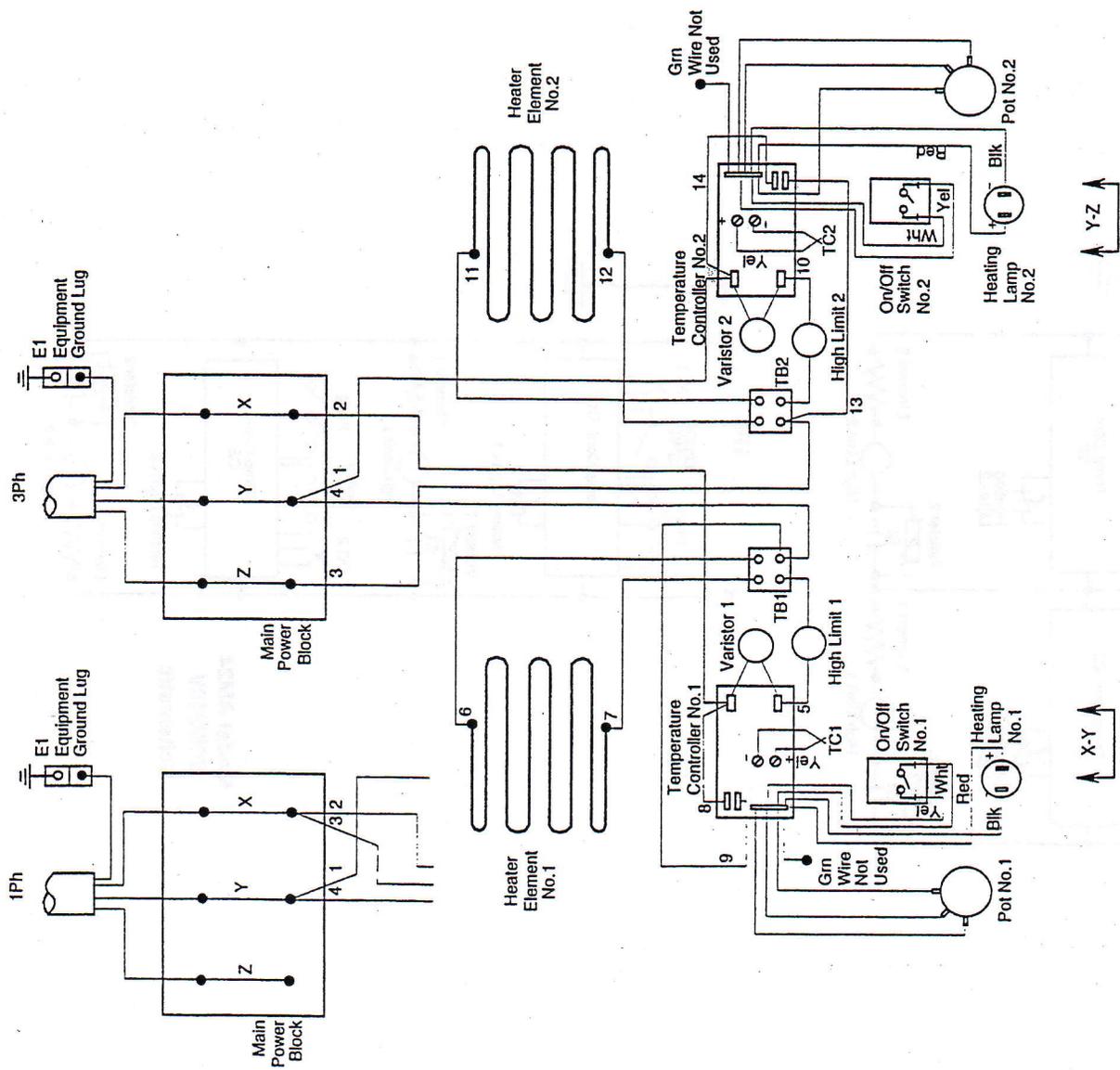
The LED below each temperature control knob illuminates when that zone of the griddle is calling for heat. If the griddle is heating and maintaining temperature yet the LED is not illuminating, check for 1.5 to 2.0 VDC to the LED. If the voltage is present, check to be sure the LED is wired properly. The light emitting diode is polarity sensitive and the wires should not be reversed. Wiring of the LED incorrectly may damage it. See figure 7. The red LED wire goes to the red terminal and the black to the black terminal. If the LED still does not illuminate, then it can be determined inoperative.



LED Polarity

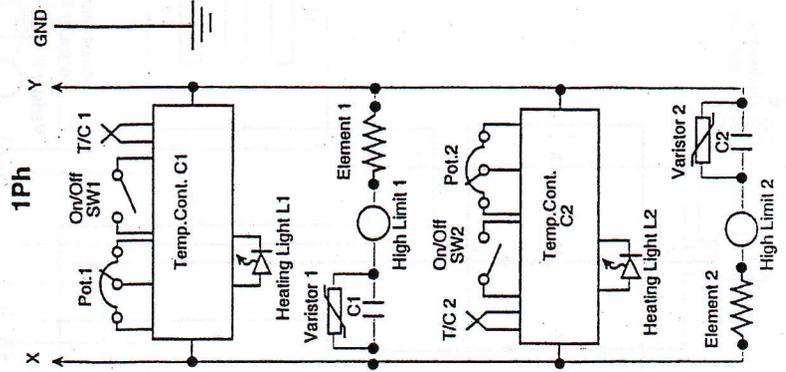
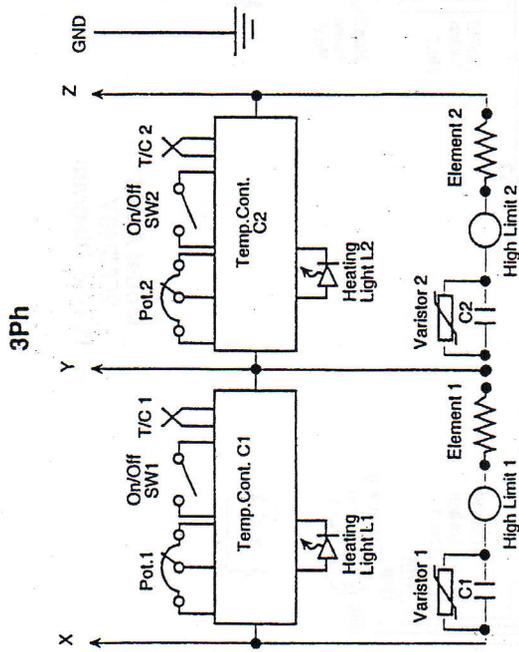
Figure 7

XI. SCHEMATICS



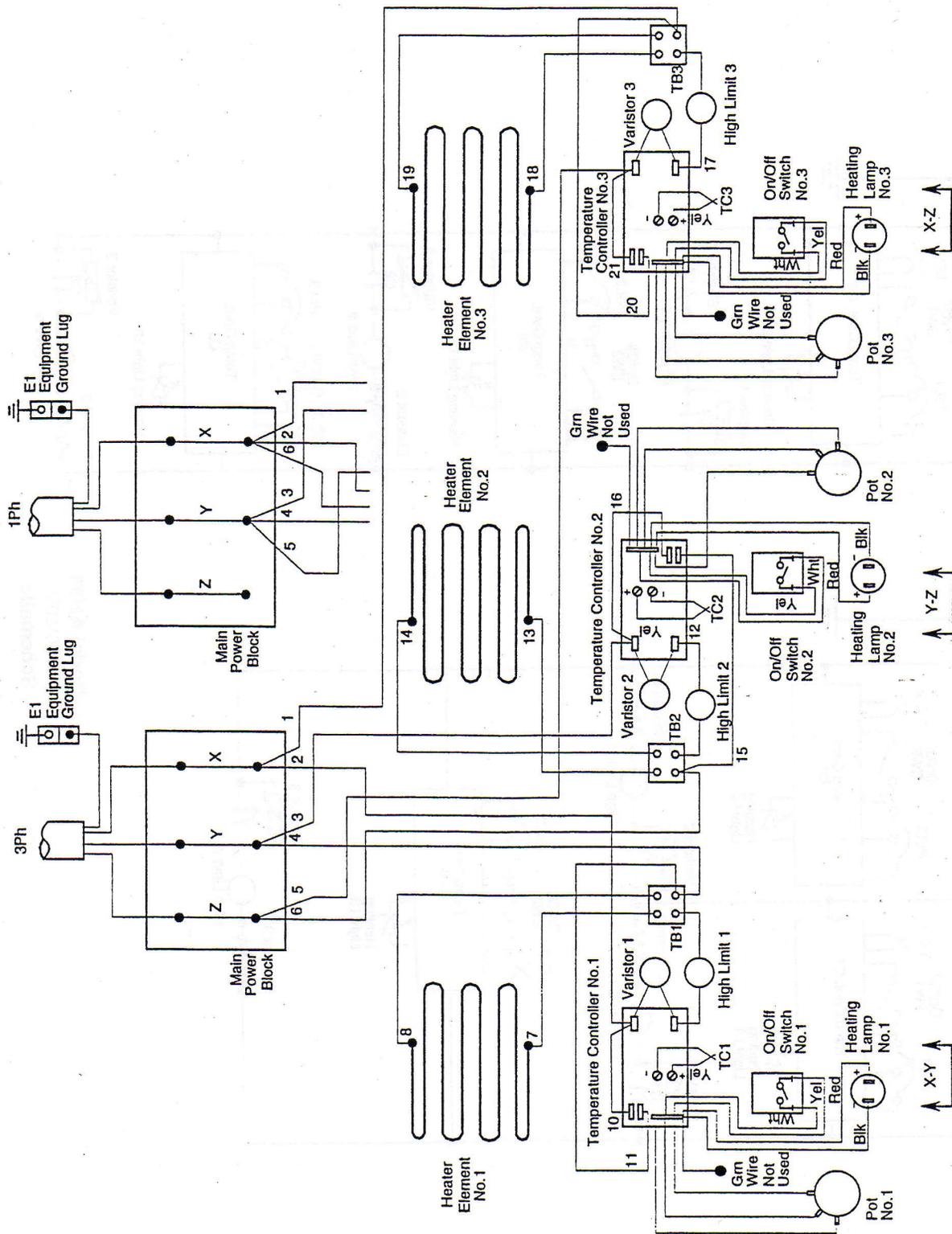
Model AM24
208/240V
Wiring Diagram

XI. SCHEMATICS



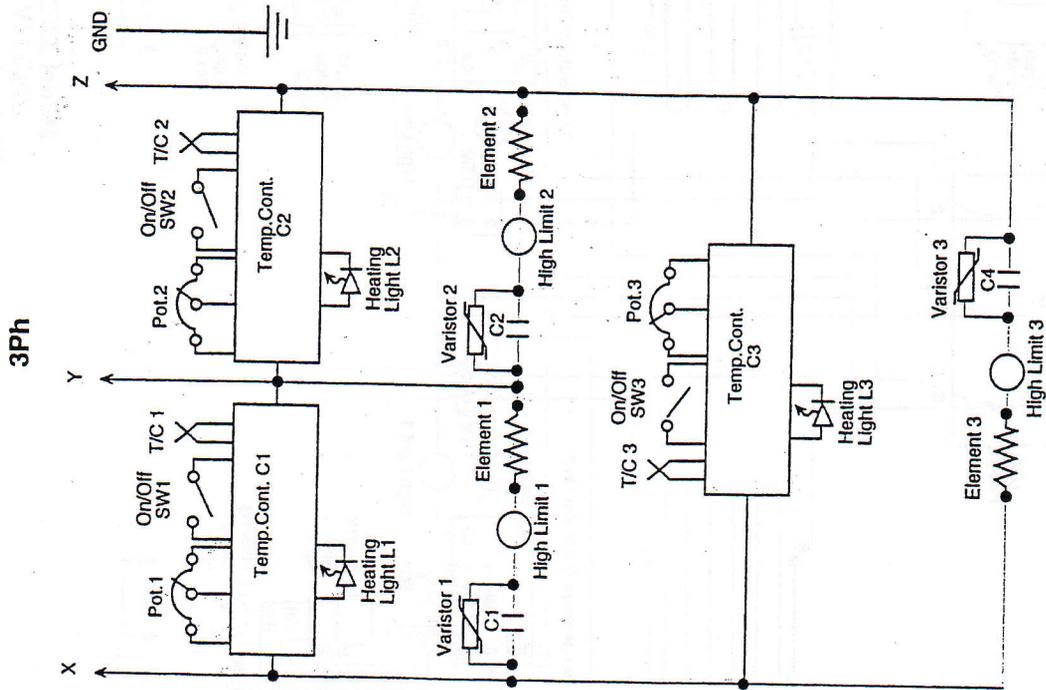
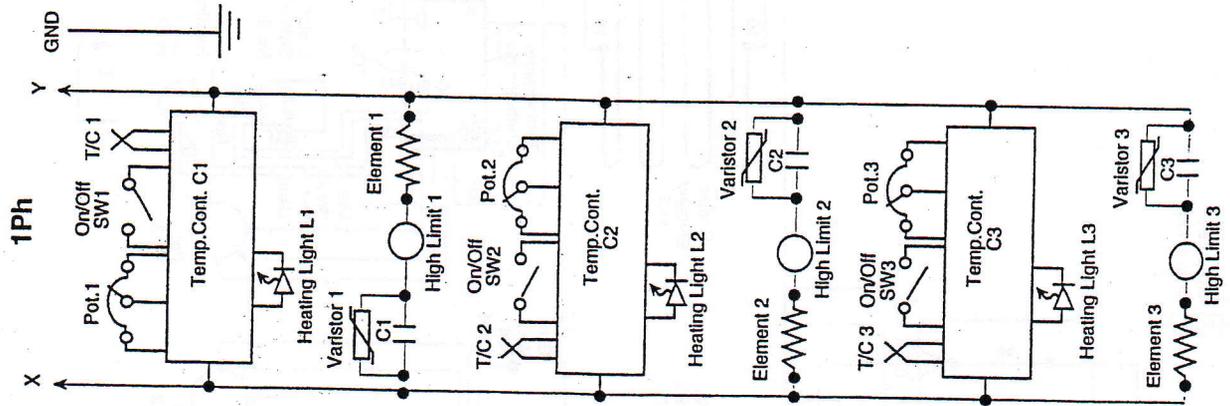
**Model AM24
208/240V
Schematic**

XI. SCHEMATICS



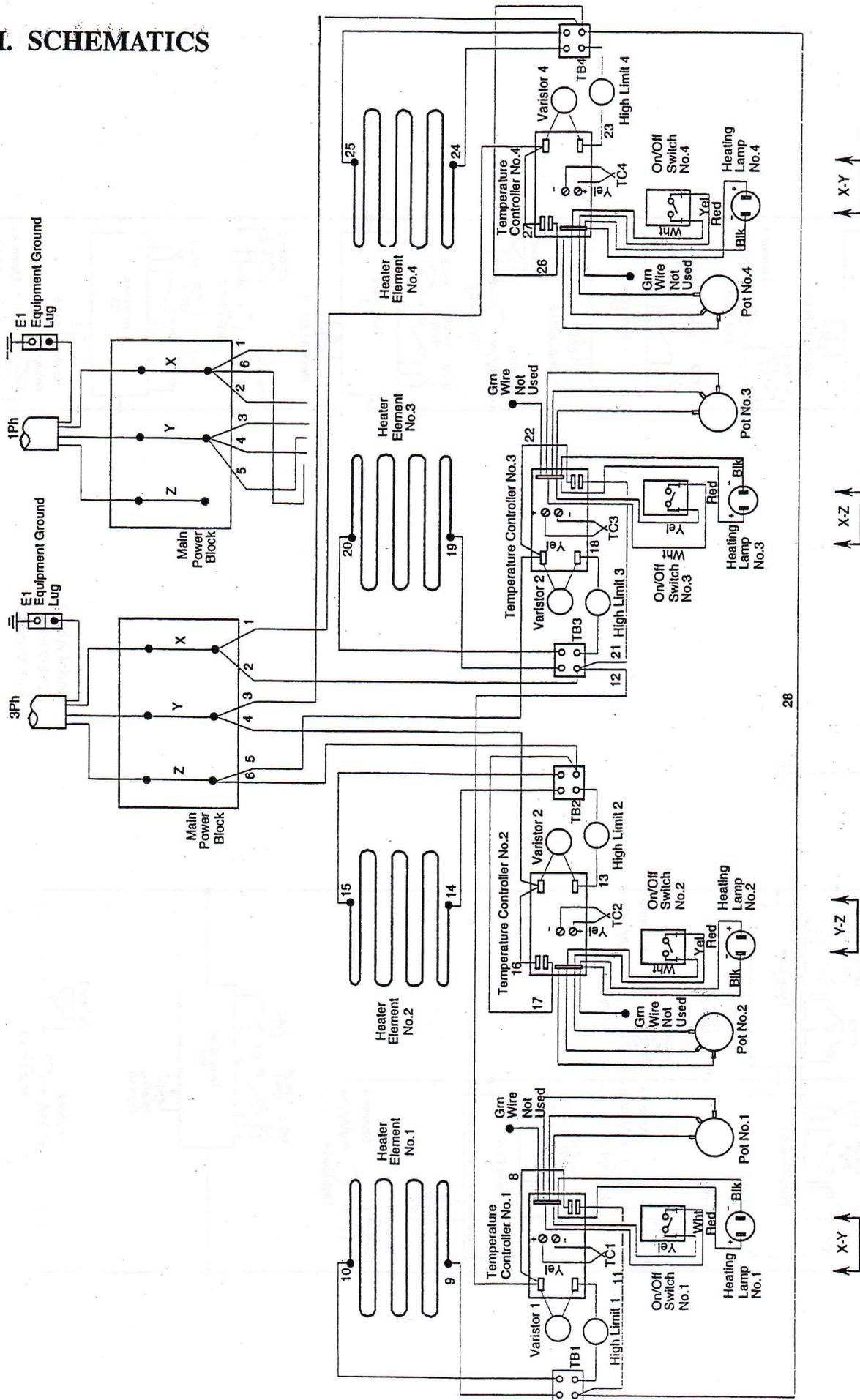
Model AM36
208/240V
Wiring Diagram

XI. SCHEMATICS



**Model AM36
208/240V
Schematic**

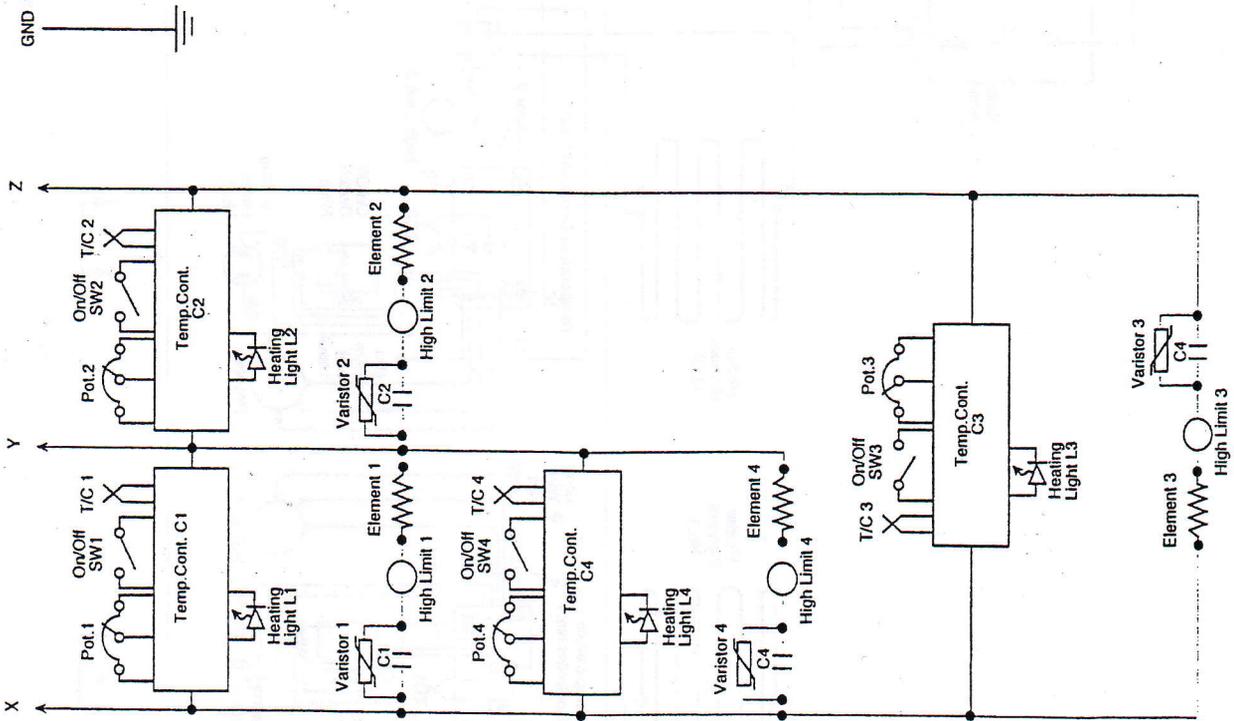
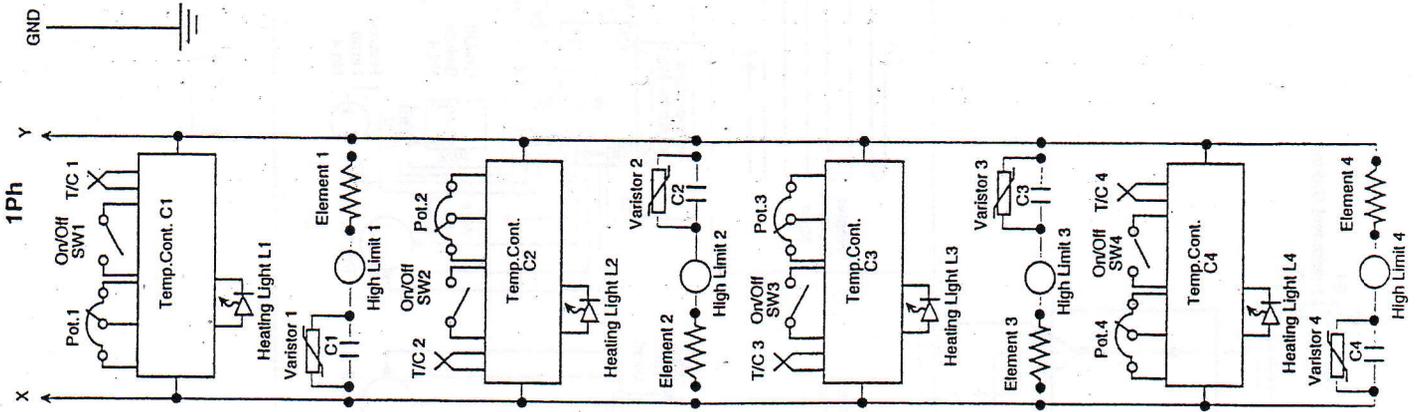
XI. SCHEMATICS



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**Model AM48
208/240V
Wiring Diagram**

XI. SCHEMATICS



**Model AM48
208/240V
Schematic**