



## SALAMANDER ELECTRIC BROILER

VULCAN - 36ESB

### - NOTICE -

This Manual is prepared for the use of trained Vulcan Service Technicians and should not be used by those not properly qualified.

This manual is not intended to be all encompassing. If you have not attended a Vulcan Service School for this product, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed by a trained Vulcan Service Technician.

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# GENERAL

## INTRODUCTION

This manual is for the Vulcan and Wolf Electric Salamander Broilers. Procedures in this manual will apply to all models unless specified. Pictures and illustrations will be of model 36ESB unless otherwise noted.

All of the information, illustrations and specifications contained in this manual are based on the latest product information available at the time of printing.

## INSTALLATION, OPERATION AND CLEANING

For detailed installation, operation and cleaning instructions, refer to Installation & Operation Manual sent with each unit. The manual is also available online at [www.vulcanequipment.com](http://www.vulcanequipment.com).

**NOTE:** Using accessory options, Salamander broilers can be mounted to the wall, over a range or placed onto an appropriate table top by using 4" legs.

## GRID POSITION AND HEAT CONTROL SETTING

For detailed information refer to OPERATING THE BROILER and GRID ADJUSTMENT in the Installation & Operation Manual.

## MODELS

### Vulcan

- 36ESB-208
- 36ESB-240
- 36ESB-480

## SPECIFICATIONS

3 PHASE MACHINE INFORMATION											
Model	Total KW	NOMINAL AMPS PER LINE WIRE									OHMS per Element
		208V			240V			480V			
		X	Y	Z	X	Y	Z	X	Y	Z	
36ESB-208	4.5	11.0	18.9	11.0	—	—	—	—	—	—	19.2
36ESB-240	4.5	—	—	—	9.4	16.4	9.4	—	—	—	25.6
36ESB-480	4.5	—	—	—	—	—	—	4.9	8.4	4.9	102.4
<b>NOTES:</b>	<ol style="list-style-type: none"> <li>1. Values in the table are nominal. Tolerance is +5/-10%.</li> <li>2. Voltage values are @ 60Hz.</li> <li>3. Resistance values (ohms) are @ 77° F.</li> <li>4. 2.25KW per element assembly (left or right).</li> </ol>										

1 PHASE MACHINE INFORMATION				
Model	Total KW	NOMINAL AMPS PER LINE WIRE		OHMS per Element
		208V	240V	
36ESB-208	4.5	21.6	—	19.2
36ESB-240	4.5	—	18.8	25.6
<b>NOTES:</b>	<ol style="list-style-type: none"> <li>1. Values in the table are nominal. Tolerance is +5/-10%.</li> <li>2. Voltage values are @ 60Hz.</li> <li>3. Resistance values (ohms) are @ 77° F.</li> <li>4. 2.25KW per element assembly (left or right).</li> </ol>			

## TOOLS

### Standard

- Standard set of hand tools
- VOM with ability to measure micro amp current. VOM with minimum of NFPA-70E CAT III 600V, UL/CSA/TUV listed. Sensitivity of at least 20,000 ohms per volt. Meter leads must also be rated at CAT III 600V.
- Clamp on type amp meter for measuring heating element current draw.
- Temperature tester (thermocouple type)

# REMOVAL AND REPLACEMENT OF PARTS

## FRONT PANEL



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove screws that secure front panel to broiler.
2. Remove INFINITE SWITCH / 3 HEAT SWITCH from front panel.
3. Reverse procedure to install.



Fig. 1

## LEFT SIDE PANEL



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove crumb tray.
2. Remove FRONT PANEL.
3. Position the rack assembly to access panel screws in the broiler opening area.



Fig. 2

4. Remove screws securing left side panel. Slide panel toward the front of broiler until panel clears front mounting area then remove the panel.

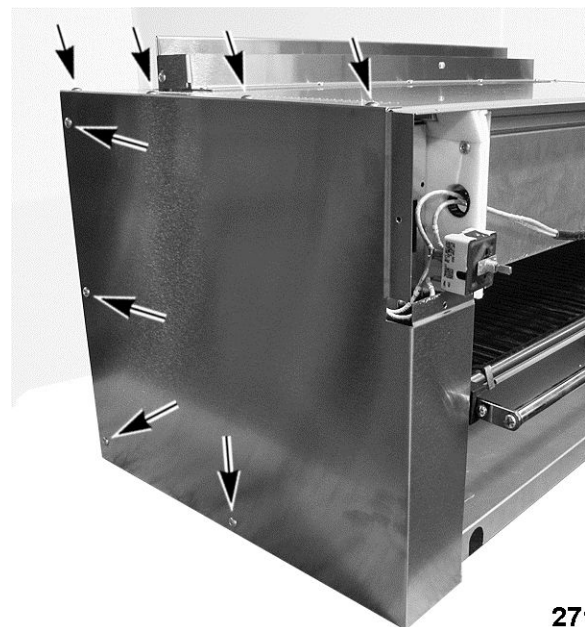


Fig. 3

5. Reverse procedure to install.

## RIGHT SIDE PANEL



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove crumb tray.
2. Remove FRONT PANEL.
3. Remove screws securing plate stop to broiler.

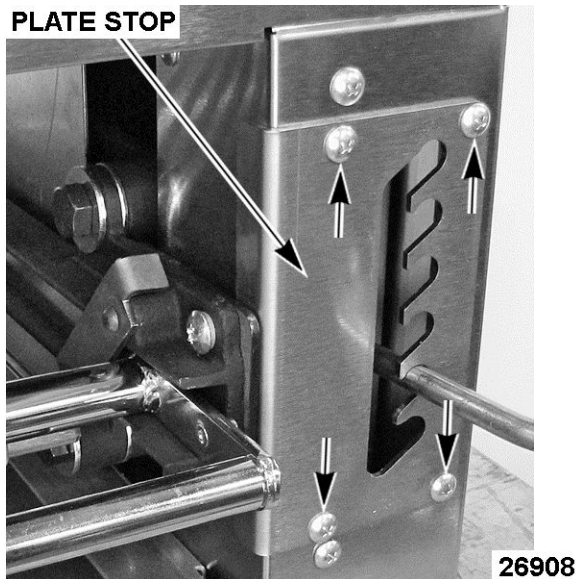


Fig. 4

4. Pull knob off the handle on rack positioning bracket then remove plate stop.
5. Position the rack assembly to access panel screws in the broiler opening area. Remove screws from this area and the front of panel.

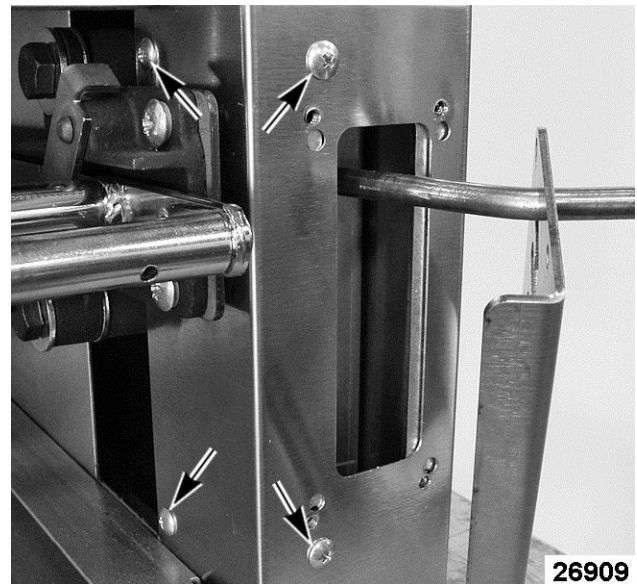


Fig. 5

6. Remove screws securing right side panel to broiler. Slide panel toward the front of broiler until panel clears front mounting area then remove the panel.

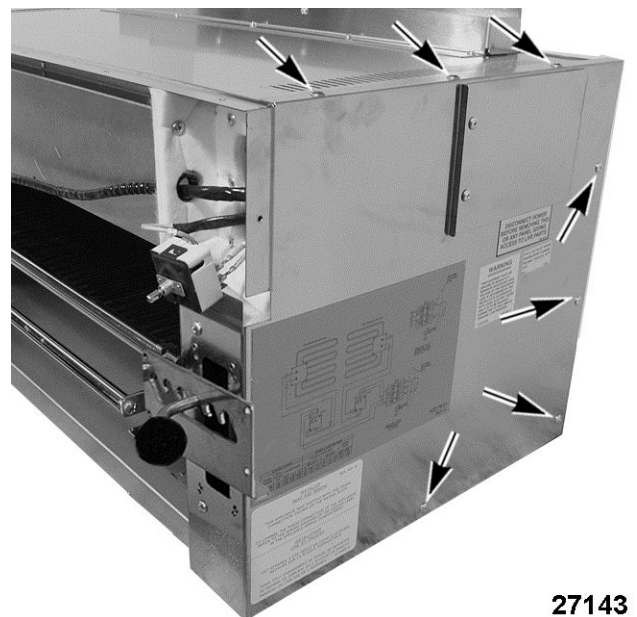


Fig. 6

7. Reverse procedure to install.

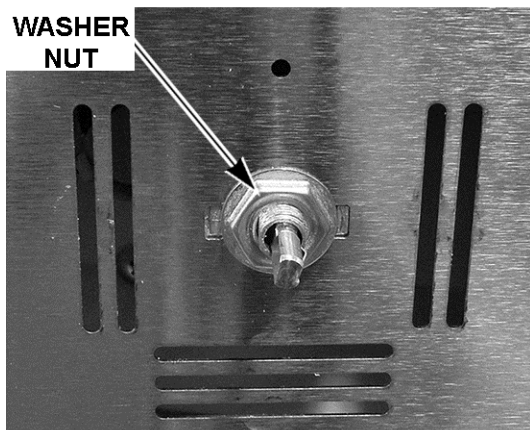
## INFINITE SWITCH / 3 HEAT SWITCH



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove knob from switch.

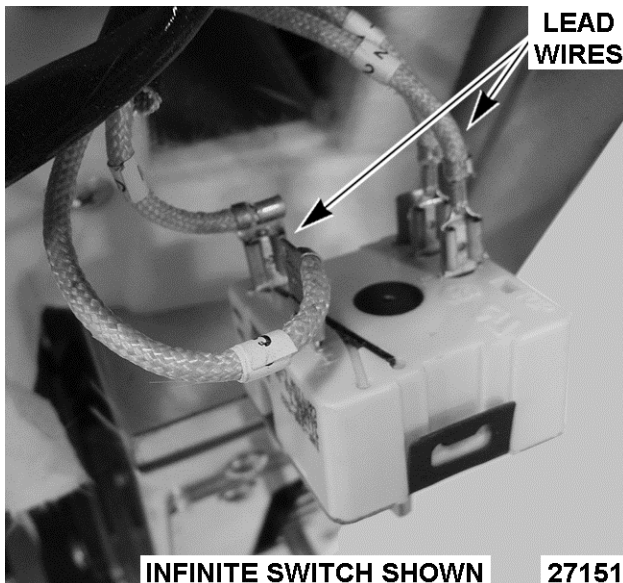
- Remove washer nut securing switch to front panel.



27150

Fig. 7

- Remove FRONT PANEL from broiler.
- Note wire locations then disconnect wires from switch being replaced.



INFINITE SWITCH SHOWN 27151

Fig. 8

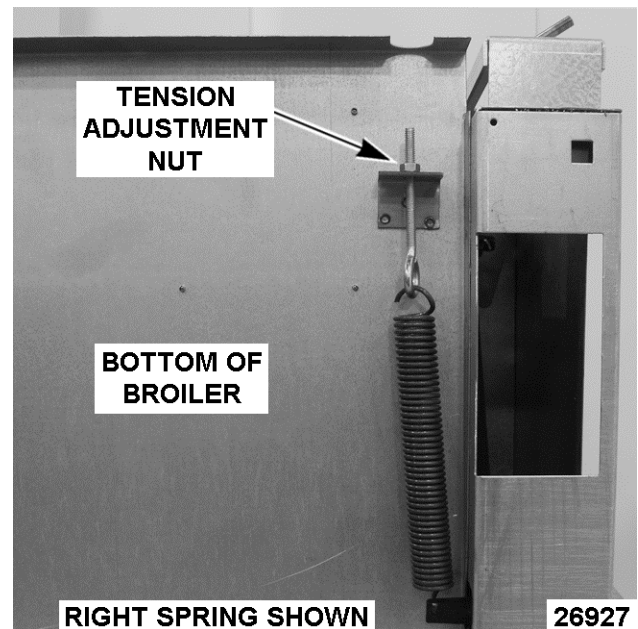
- Reverse procedure to install.
- Check for proper operation.

## RACK SPRINGS

**NOTE:** Springs should be replaced in pairs for proper operation of the rack lift assembly.

- Remove crumb tray to access tension adjustment nuts from the front of broiler.
- Raise the rack lift assembly to its highest position on stop plate to relieve spring tension.

- Loosen nuts to remove any remaining tension on springs.
- Access the bottom of broiler and remove springs from the lower arm casting and eye bolt.



RIGHT SPRING SHOWN

26927

Fig. 9

- Reverse procedure to install.
- Perform RACK SPRING TENSION ADJUSTMENT.

## HEATING ELEMENTS



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- Remove crumb tray from broiler.
- Adjust rack assembly to the center position.
- Pull rack assembly out and access the rack stops on the left and right sides of the rack assembly. Allow enough clearance at the rear of rack assembly to rotate the rack stops to a horizontal position. If the rack assembly is pulled all the way out the rack assembly will engage the rack stops and prevent removal.

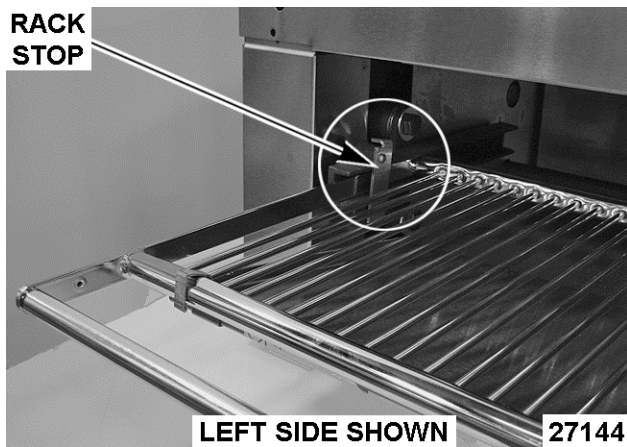


Fig. 10

4. Grasp the rack assembly near the broiler, rotate both the rack stops horizontally and pull the rack assembly out enough for the rack assembly frame to clear the rack stops.



Fig. 11

5. Grasp the rack assembly and drip tray on each side to support the tray and remove from broiler.



Fig. 12

6. From inside broiler cooking area, remove screws securing heating element to broiler.

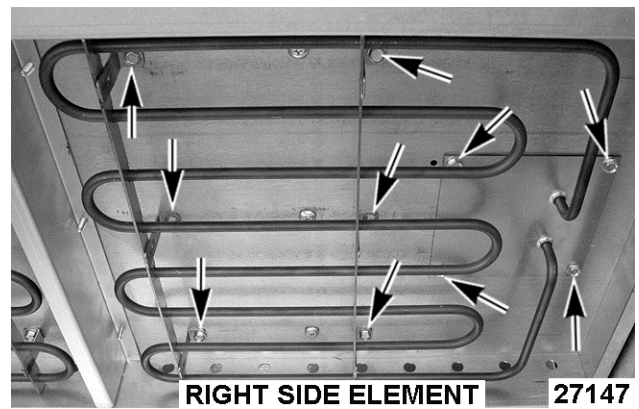


Fig. 13

7. Note wire locations and disconnect wires from heating element.

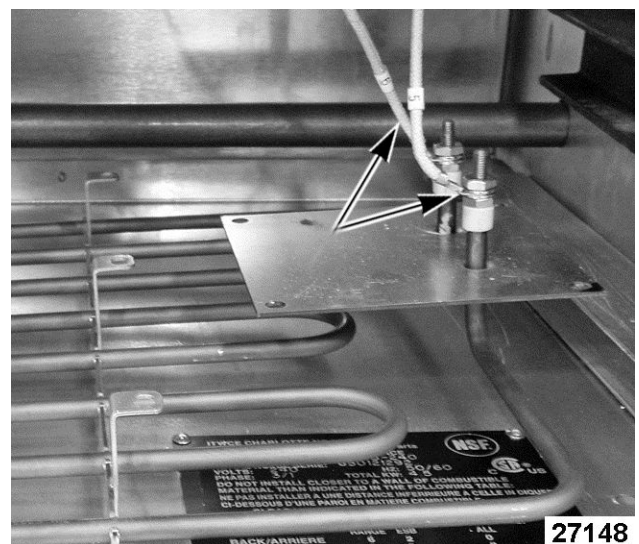


Fig. 14

8. Reverse procedure to install.
9. Check for proper operation.



# SERVICE PROCEDURES AND ADJUSTMENTS



**WARNING** Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times and follow Arc Flash procedures. If test points are not easily accessible, disconnect power and follow Lockout/Tagout procedures, attach test equipment and reapply power to test.

## INFINITE SWITCH TEST (208V/ 240V)



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

**NOTE:** Refer to AI3829 in WIRING DIAGRAMS for switch terminal locations.

1. Remove FRONT PANEL.
2. Connect a voltmeter to the output terminals H1 and H2.
3. Reconnect power to machine.
4. Turn knob to the desired setting.
5. Compare the percentage of ON time to OFF time.

**NOTE:** ±7.5% tolerance allowable.

Knob Setting	% on Time	Seconds on	Seconds off
Hi	100	ALL	0
Med.	48	15	15
Low	37	8	14
Med. Low	28	7	24
Very Low	7	3	33

6. If the percentage is not correct, replace the switch as outlined under INFINITE SWITCH / 3 HEAT SWITCH.

## 3 HEAT SWITCH TEST (480V)



**WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

**NOTE:** Refer to AI3830 in WIRING DIAGRAMS for switch terminal locations.

1. Remove FRONT PANEL.
2. Reconnect power to machine.
3. Check input voltage at L3 and L2 on the switch terminals.
4. Check for the correct output voltage at the output terminals for all knob settings of the switch.

Knob Settings	L3 Input - Output at Terminal(s)	L2 Input - Output at Terminal(s)
High	1 & 3	2
Med	1	2
Low	1	3

5. If the voltages are not correct, replace the switch as outlined under INFINITE SWITCH / 3 HEAT SWITCH.

## RACK SPRING TENSION ADJUSTMENT

1. Access the springs on the bottom of broiler.
2. Tighten nut to adjust rack spring tension. Adjust both springs equally so there is approximately 3/4" of thread above the nut. If additional rack spring tension is required, tighten each nut an additional 2-3 turns.
3. Check for proper operation.

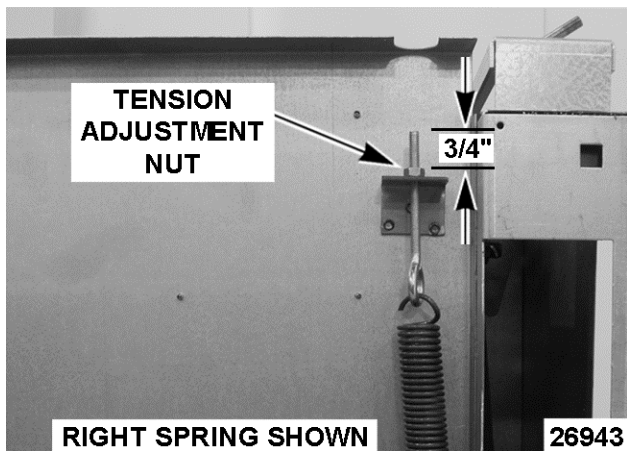


Fig. 15

## HEATING ELEMENTS TEST



**⚠ WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

**NOTE:** On 208V/240V broilers, the two heat controls are Infinite load switches; On 480V broilers, the two heat controls are 4 Position 3 Heat switches.

1. Access the HEATING ELEMENTS.
2. Reconnect power to machine.
3. Set broiler heat control switches to the highest setting.
4. Measure the voltage at the heating element terminals and verify it against the data plate voltage.
  - A. If voltage is *incorrect*, see TROUBLESHOOTING.
  - B. If voltage is *correct*, check current draw (amps) through the heating element lead wires at the X and Z phases on the outlet side of the broiler terminal block. The X phase value is the current draw for the left element and the Z phase value is the current draw for the right element.

See machine information tables under SPECIFICATIONS for proper current draw values and the appropriate 208/240V - WIRING DIAGRAM or 480V - WIRING DIAGRAM for heating element phase connections.

**NOTE:** Checking current draw is the preferred method over a resistance check when a clamp on type amp meter is available.

- 1) If both measured values are approximately the same as listed in the machine information table, then heating elements are functioning properly.
- 2) If one or both of the measured values do not agree with the values listed in the machine information table, then heating element is malfunctioning. Turn broiler control switches OFF.



**⚠ WARNING** Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- a. Install a replacement heating element then proceed to step 2.
- C. If unable to check current draw, a resistance check (ohms) at heating element terminals *may* indicate a malfunctioning element.
  - 1) Remove lead wires from the heating element and check resistance. See machine information tables under SPECIFICATIONS for proper resistance values at room temperature.
    - a. If resistance is *incorrect*, install a replacement heating element.
    - b. If resistance is *correct*, heating element has tested okay. If heating element is still suspect, see TROUBLESHOOTING.
5. Check broiler for proper operation.

# ELECTRICAL OPERATION

## COMPONENT FUNCTION

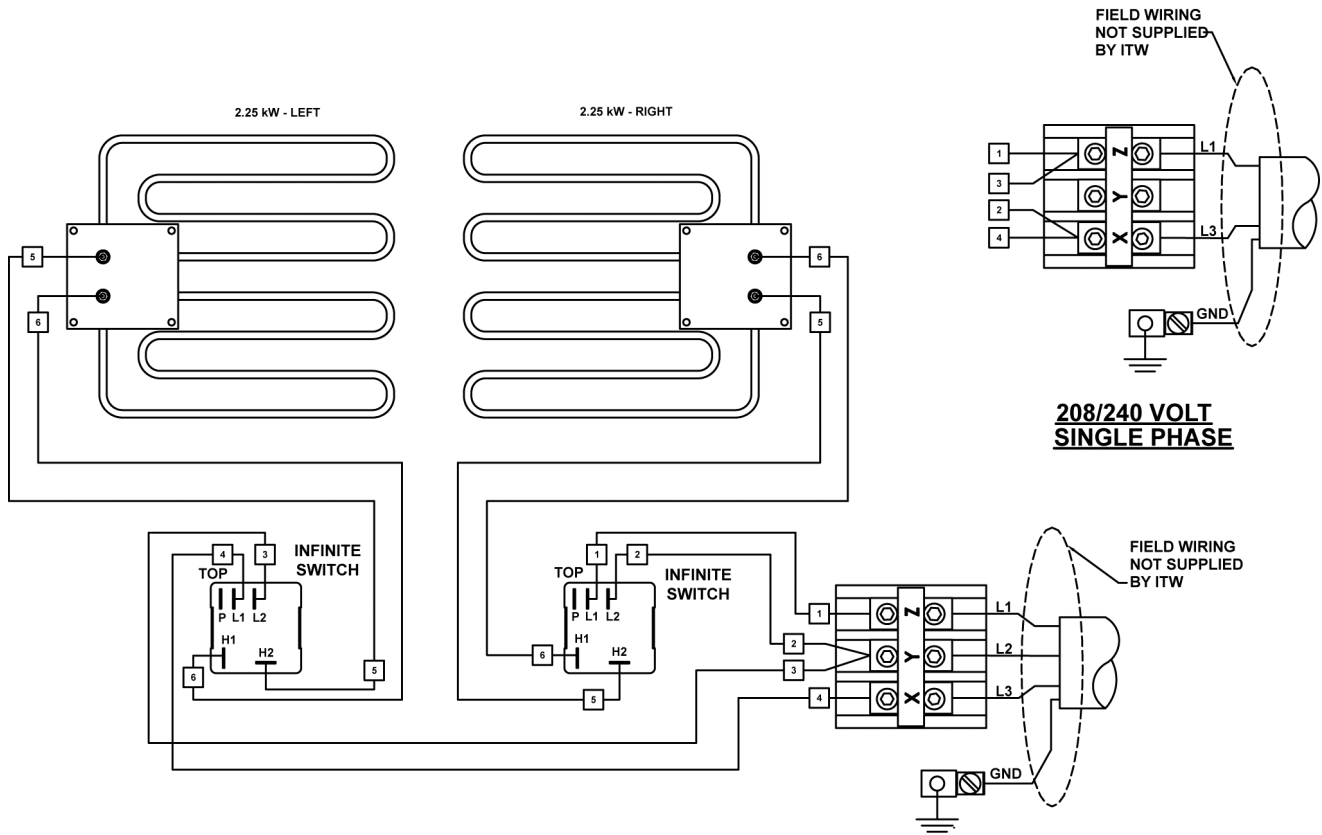
<b>Infinite Load Switch</b> . . .	Two switches independently control the left and right heating elements on 208V and 240V models. Depending on switch setting, provides a range of ON time from 7% to 100%.
<b>3 Heat, 4 Position Switch</b> . . . . .	Two switches independently control the left and right heating elements on 480 volt models. Provides approximately 100% of total available power of 4.5 KW with both switches set to HI position, 50% at MED position, 25% at LO position, and 0% at the OFF position.
<b>Heating Element Assemblies</b> . . . . .	Provides heat for broiling food product. There are 2 element assemblies per broiler.
<b>Terminal Block</b> . . . . .	Provides connections for supply voltage to the broiler.

## SEQUENCE OF OPERATION

**NOTE:** On 208V/240V broilers, the two heat controls are Infinite load switches; On 480V broilers, the two heat controls are 4 Position 3 Heat switches.

1. Conditions
  - A. Broiler connected to correct supply voltage.
  - B. Building circuit breakers ON (power to machine).
  - C. Broiler heat control switches are OFF.
  - D. Broiler at room temperature.
2. Broiler heat control switches are turned to desired heat setting.
  - A. Power to heating elements.
3. Broiler heat control switches reach desired heat setting.
  - A. Power removed from heating elements.
4. Broiler heat control switches drop below desired heat setting.
  - A. Broiler heat control switches will continue to cycle until turned to OFF or power is removed from broiler.

**208/240V - WIRING DIAGRAM**



MODEL NUMBER	TOTAL CONN. kW	3 PHASE LOADING			NOMINAL AMPS PER PHASE							
		X-Y	Y-Z	Z-X	3 PHASE CONNECTION						SINGLE PHASE	
					208 VOLT			240 VOLT			208 V	240 V
36ESB-208	4.50	2.25	2.25	0.00	X	Y	Z	X	Y	Z	208 V	240 V
36ESB-240	4.50	2.25	2.25	0.00	0.0	0.0	0.0	9.4	16.4	9.4	0.0	18.8

NOTE: CONNECT SUPPLY WIRES (90° MIN) TO THE BROILER AS SHOWN, IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, NFPA No. 70.

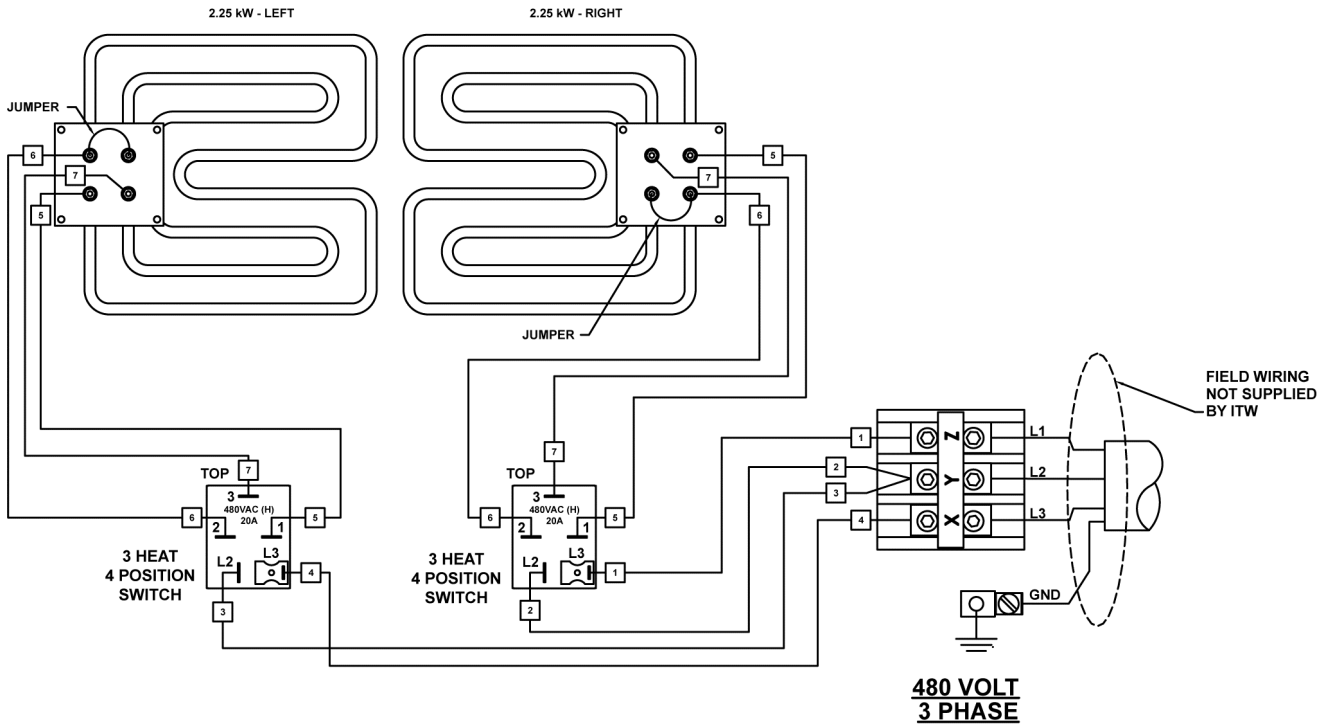
**208/240 VOLT  
3 PHASE**

DERIVED FROM:  
922778 REV B

**MODELS**  
36ESB - 208  
36ESB - 240  
AI3829

Fig. 16

## 480V - WIRING DIAGRAM



MODEL NUMBER	TOTAL CONN. KW	3 PHASE LOADING			NOMINAL AMPS PER PHASE		
		KW PER PHASE			3 PHASE CONNECTION		
		X-Y	Y-Z	Z-X	X	Y	Z
36ESB-480	4.50	2.25	2.25	0.00	4.9	8.4	4.9

NOTE: CONNECT SUPPLY WIRES (90°C MIN) TO THE BROILER AS SHOWN, IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, NFPA No. 70.

DERIVED FROM:  
922778 REV B

<b>MODEL</b>
<b>36ESB - 480</b>
<b>AI3830</b>

Fig. 17

# TROUBLESHOOTING

## TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES
No heat.	<ol style="list-style-type: none"><li data-bbox="662 426 954 457">1. No power to broiler.</li><li data-bbox="662 468 1401 541">2. Infinite (208V/240V) or 3 heat switches (480V) are OFF or malfunctioning.</li><li data-bbox="662 552 1279 583">3. Heating elements inoperative or malfunctioning.</li></ol>
Cooking problems (product not done/overdone).	<ol style="list-style-type: none"><li data-bbox="662 600 1466 657">1. Refer to <u>Installation &amp; Operation Manual</u> for recommended grid position and heat control switch settings .</li></ol>

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