



SECTIONS



SKUTT®



**SKUTT®**

*We help you make great things!*

# Basic Kiln Repair

# Overview

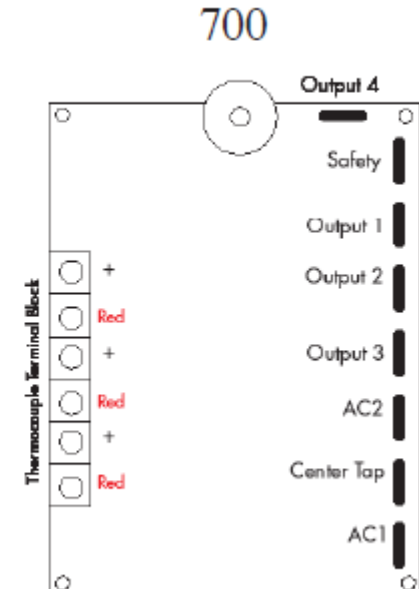
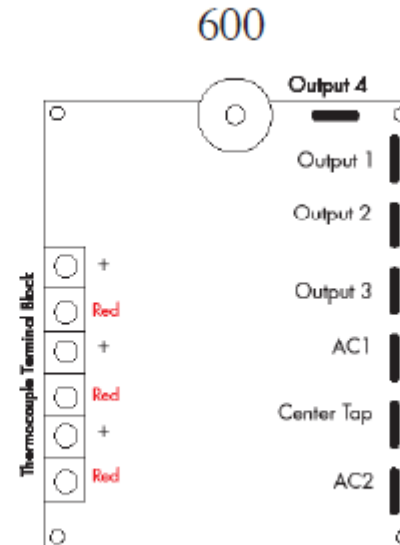
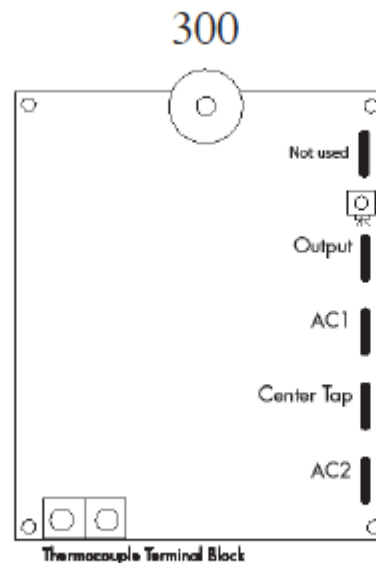
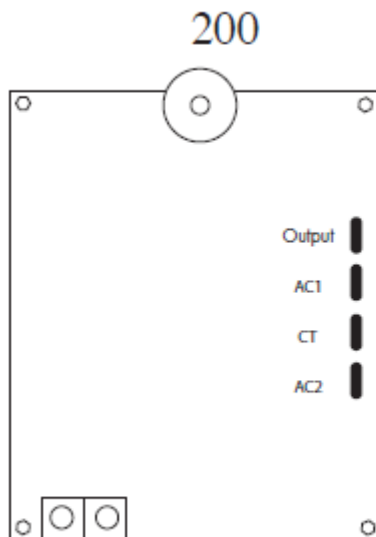
- **History of Models**
- **Electrical Basics and Safety**
- **Tracing Circuits and Parts Identification**
- **Controller Diagnostics**
- **Error Codes**
- **Using a Multi-Meter**
- **Hands On Repairs**
  - **Thermocouples**
  - **Elements**
  - **Relays**
  - **Brick**





# History of Models

- KilnSitter Kilns
- KM Kilns
  - 200 Boards – Single Output
  - 300 Boards
  - 600 Boards – Zone Control, Output 4
  - 700 Boards – Safety Output



# History of Models

- PK Kilns
- GM Kilns
- Scarab Kilns
- FireBox 8x6
- KMT Kilns

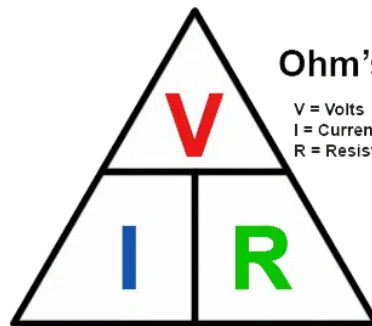


# Electrical Basics

- What is electricity?

**Electricity is the flow of electric charge carried by electrons through a conductor such as a wire.**

- Voltage
- Amperage
- Resistance



Ohm's Law

V = Volts  
I = Current (in Amps)  
R = Resistance (in Ohms)

$$V = I \cdot R \quad (\text{volts} = \text{amps times ohms})$$

$$I = \frac{V}{R} \quad (\text{amps} = \text{volts divided by ohms})$$

$$R = \frac{V}{I} \quad (\text{ohms} = \text{volts divided by amps})$$

- Wattage

$$\text{AMPS} \times \text{VOLTS} = \text{WATTS}$$

# Electrical Basics

- **Voltage –**
  - 208V or 240V (not 220V)
  - Low Voltage Situations
- **Amperage**
  - Do you have enough?
  - Wire and Breaker Sizing
- **Resistance**
  - Measuring to gauge the life of the elements
- **Wattage**
  - Will it really get to cone 10?

# Electrical Basics

## Electricity is like a water hose

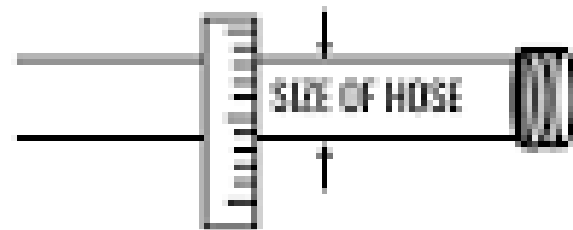
Voltage

Volts (V)



Current

Amps (A or I)



Resistance

Ohms (R or  $\Omega$ )



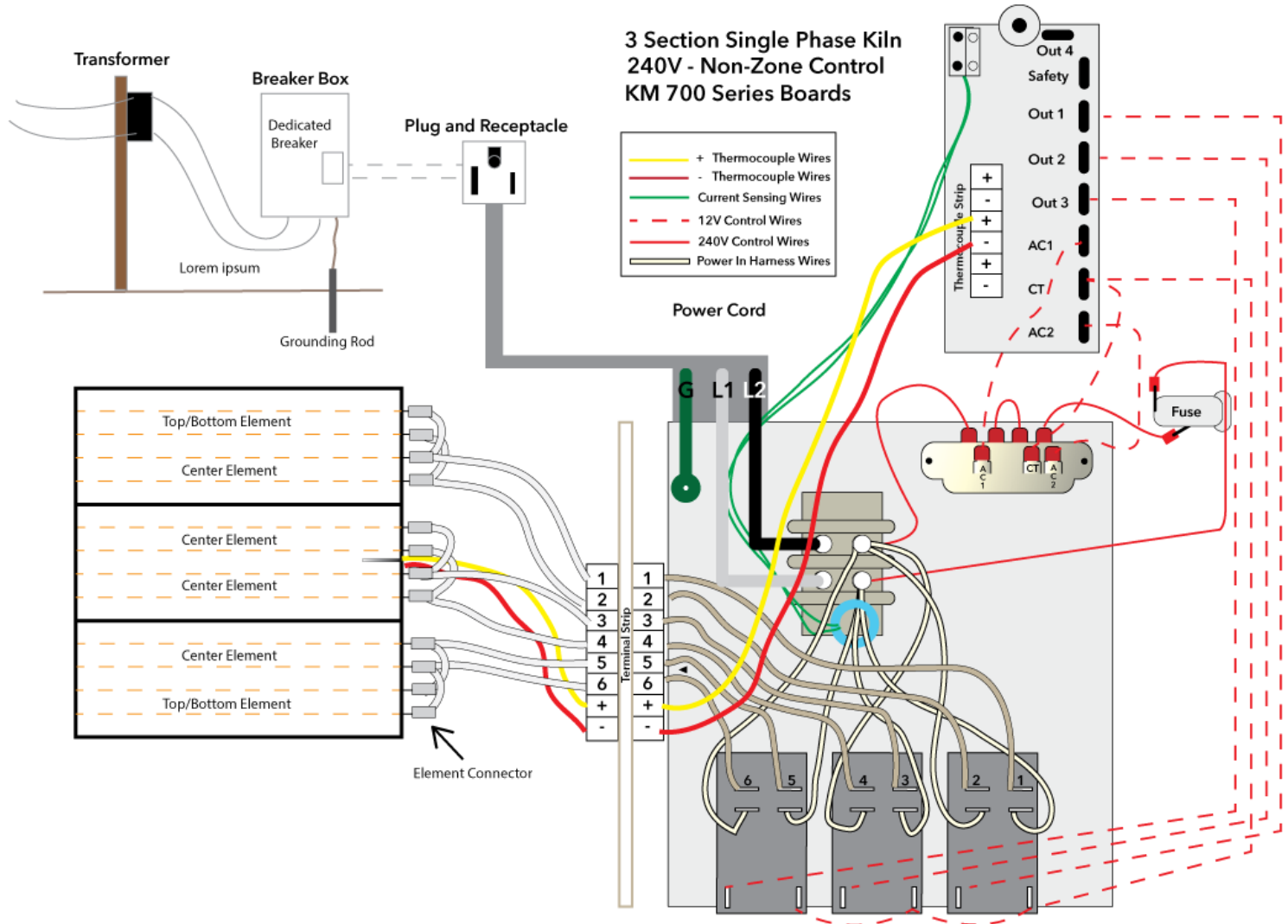
FREIND  
ENERGY



# Safety

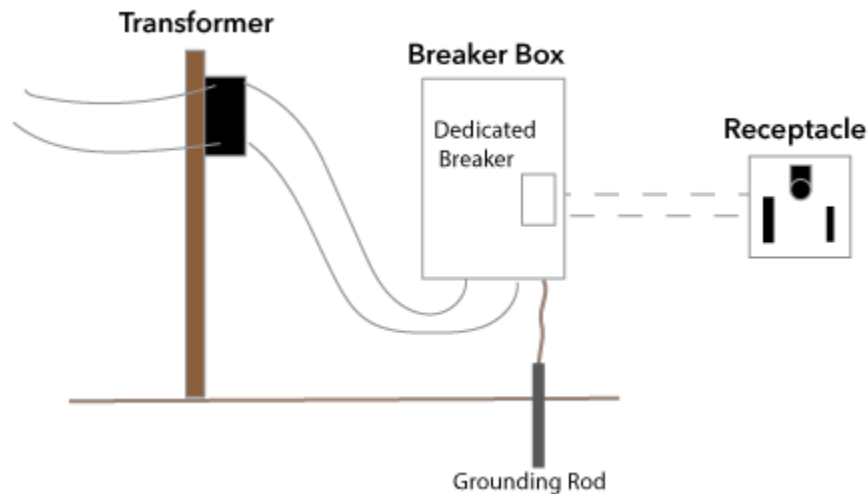
- **Unless you are a licensed electrician, never work on live voltage. Always unplug the kiln before exposing yourself to potentially live wires. Breakers can be labeled incorrectly.**
- **Avoid working on a wet floor and wear rubber soled shoes.**
- **Assume the kiln is hot until determined otherwise and be careful working around potentially other hot kilns in the room.**

# Tracing Circuits and Parts Identification



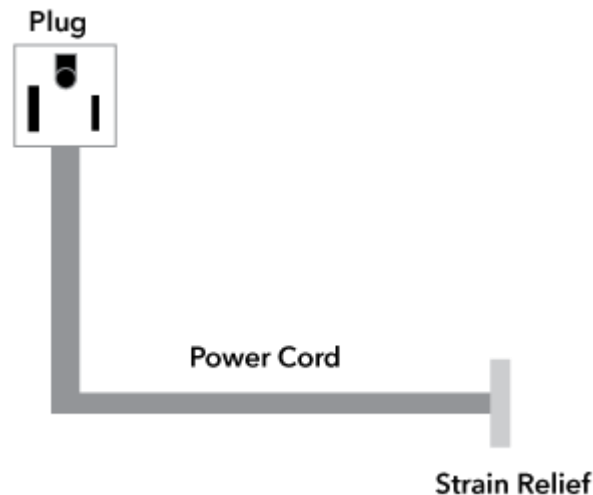
# Power to the Outlet

- Is the transformer supplying adequate voltage?
- Is the breaker box properly grounded?
- Is there a correctly sized, dedicated breaker?
- Is the wire gauge from the circuit breaker to the outlet properly sized?
- Is the outlet located according to code, properly oriented and match the specifications of the kiln?

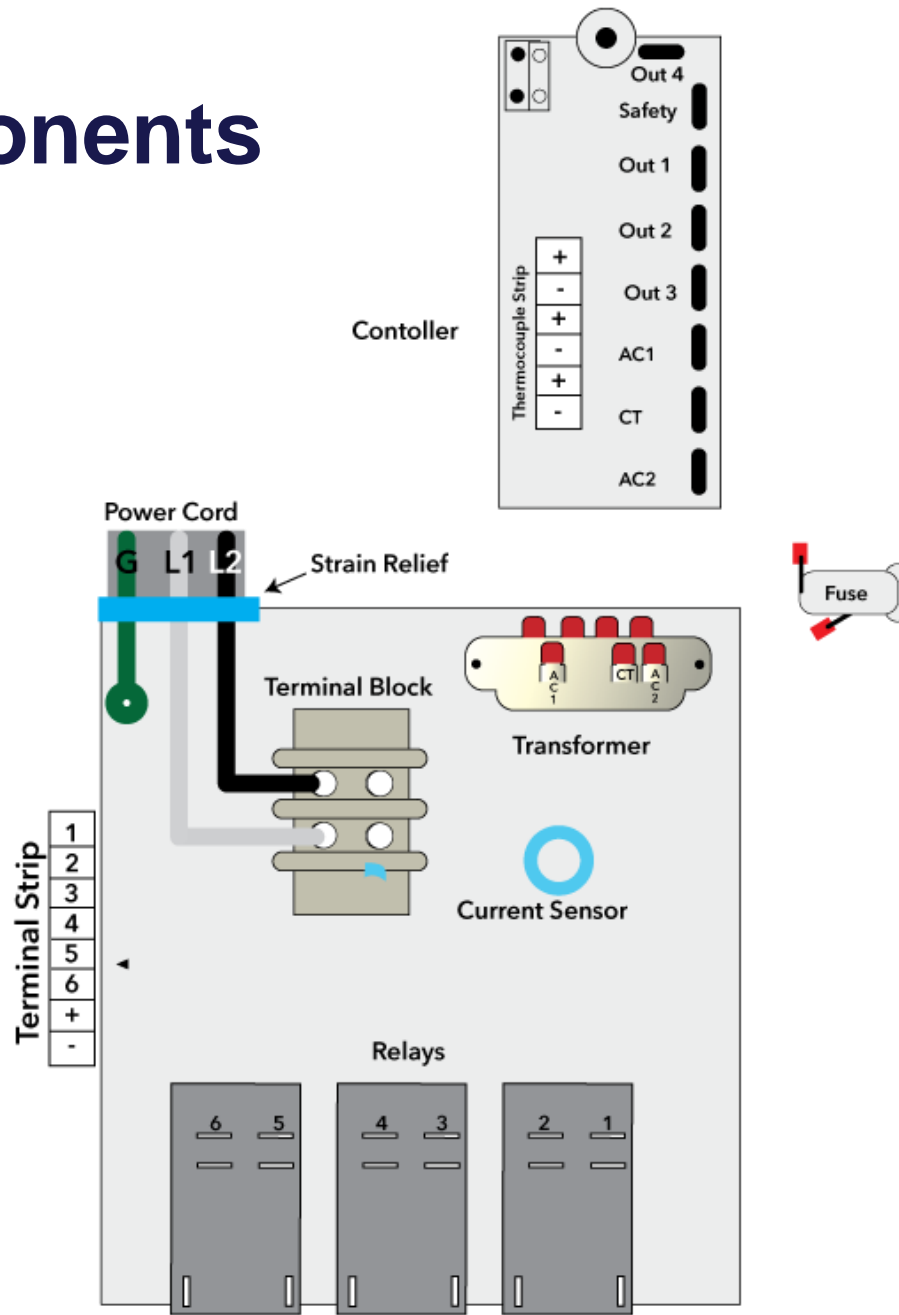


# Power to the Outlet

- Does the plug fit tight and are the blades tight in the plug?
- Are there any visual signs of over heating?
- Does the power cord show any signs of over heating?
- Can it plug into the outlet with 18" clearance from the wall and no contact with the kiln
- Is the strain relief tight with no visual signs of wire showing?



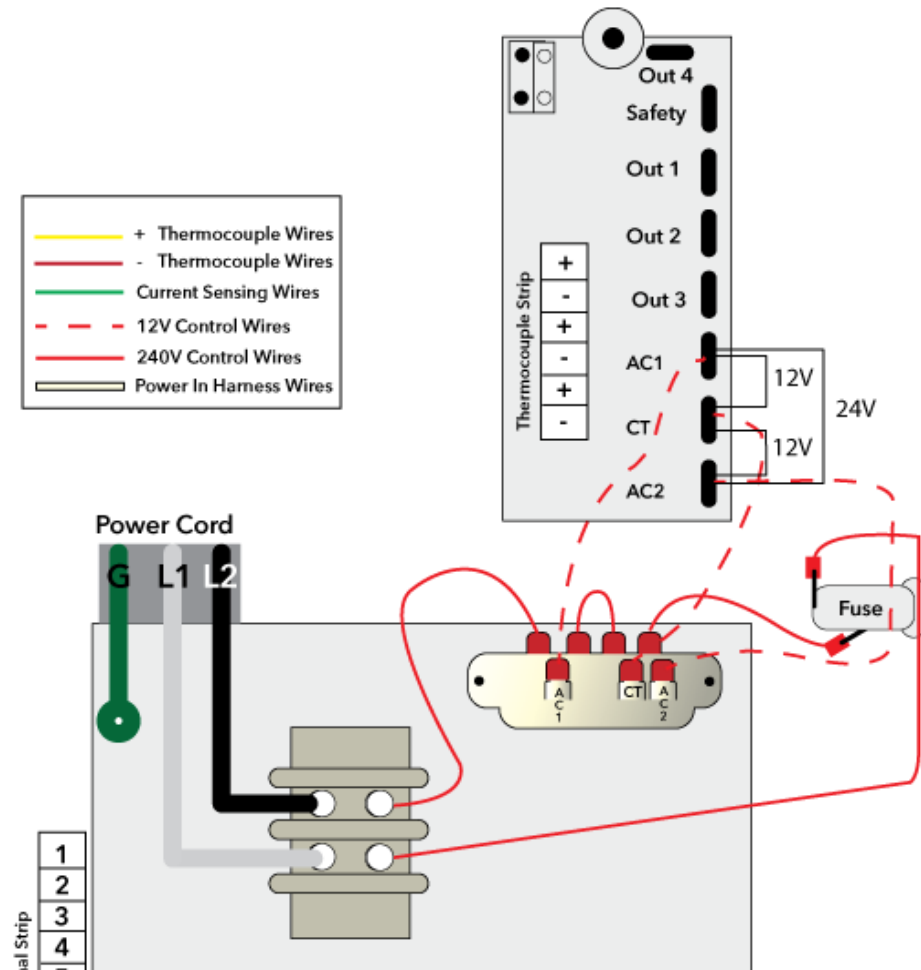
# Key Components





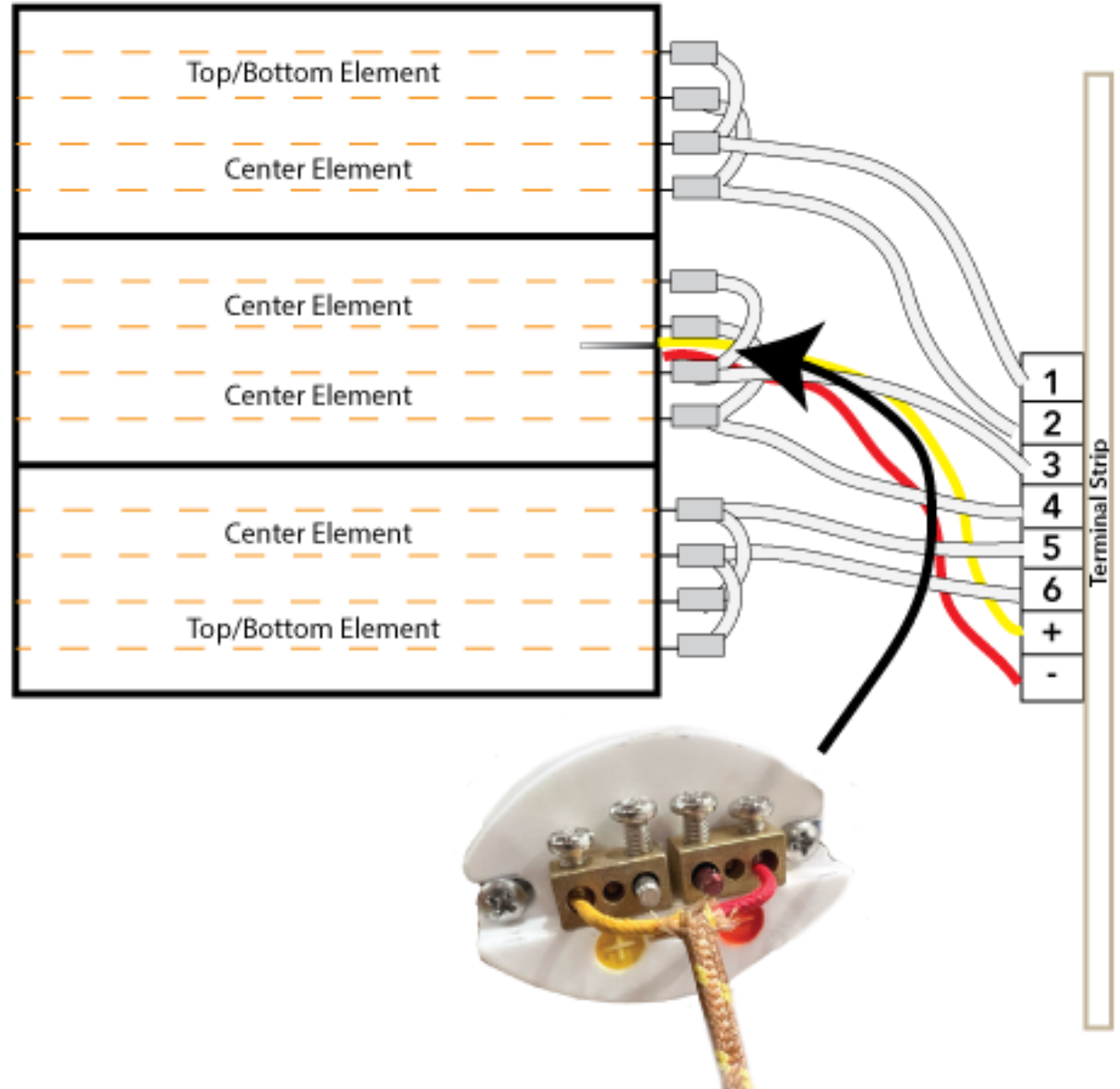
# Power to the Controller

- Are the connections to the terminal block tight?
- Are there any signs of overheating on the terminal block or the wires and connectors attached to it?





# Power to the Elements







# Diagnostics



# SKUTT®

Want to test drive the KMT Kiln Controller?

Here are  
the keys...



...try and have her back by Midnight



## **E-1**

### **Description**

Kiln temperature increasing slower than 12° F per hour when ramping up. The slow rate must persist for 22.5 minutes. Firing will be stopped. For some reason the kiln does not have the power it needs to reach temperature.

### **Possible Causes**

Element is broken

Relay is burned out

Voltage is low

Firing to a temperature beyond the kilns maximum rating

## E-1

### Troubleshooting Steps

Run Diagnostics

<https://skutt.com/skutt-resources/specifications/kilnmaster-kilns/>

- Amperage
  - 0=Relay
  - 50% or less = Element or connection
- Voltage
- Check element resistance
- Visual inspection

## **E-2**

### **Description**

Kiln temperature 50° F above hold temperature.  
Condition must persist for at least 18 seconds. The kiln is unable to turn off one or more of the elements.

### **Possible Causes**

Stuck relay

### **Troubleshooting Steps**

Yeah, it's a stuck relay

## **E-6**

### **Description**

This error indicates that the electrical leads from the thermocouple have been reversed somewhere in the circuit.

### **Possible Causes**

Replacement thermocouple put in backwards

Thermocouple lead wires reversed on thermocouple block, terminal strip, or controller



## **Description**

This error is triggered by a break in the thermocouple circuit. If the display is flashing it means that one of the thermocouple circuits on a Zone Control kiln has failed.

## **Possible Causes**

As thermocouples age they oxidize and the metal gets thinner and thinner. Eventually the thermocouple will develop a crack between the 2 dissimilar metals that make up the thermocouple and break the circuit. If changing the thermocouple does not solve the problem, look at all of the connections in the thermocouple circuit and make sure they are secure. Pay special attention to the screws that hold the thermocouple in place on the thermocouple block. These can loosen over time with thermal cycling or when the kiln is moved.



## **E-bd**

### **Description**

The board temperature has exceeded the temperature limit setting.

### **Possible Causes**

The kiln room got too hot. This could be caused by a number of factors. The most common is inadequate ventilation in the room. Ideally the kiln room ventilation system should be designed to keep the room under 100 ° F when the kiln is at it's maximum rated temperature.

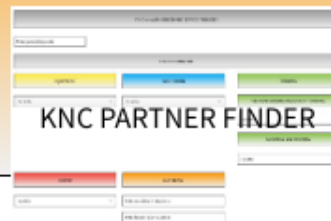
# KIDS NEED CLAY LANDING PAGE

VIDEO / PROGRAM DESCRIPTION / TAGLINE/

## About KNC / Program Overview

The role of clay in education and how to build a successful program

## Find a Partner/Distributor



The screenshot shows a web form titled "KNC PARTNER FINDER". It includes a search bar, a "SEARCH" button, and a "RESULTS" button. Below the search bar, there are several input fields for "Name", "Address", "City", "State", and "Zip". There are also checkboxes for "I am a teacher" and "I am a parent".



## Learn & Create

How-tos and lesson plans

## Grants, Fundraising, and Standards

Local resources for you!

SIGN UP FOR KNC EMAIL

JOIN US ON SOCIAL-IG/FB Group

Questions? We're here to help at [knc@skutt.com](mailto:knc@skutt.com)