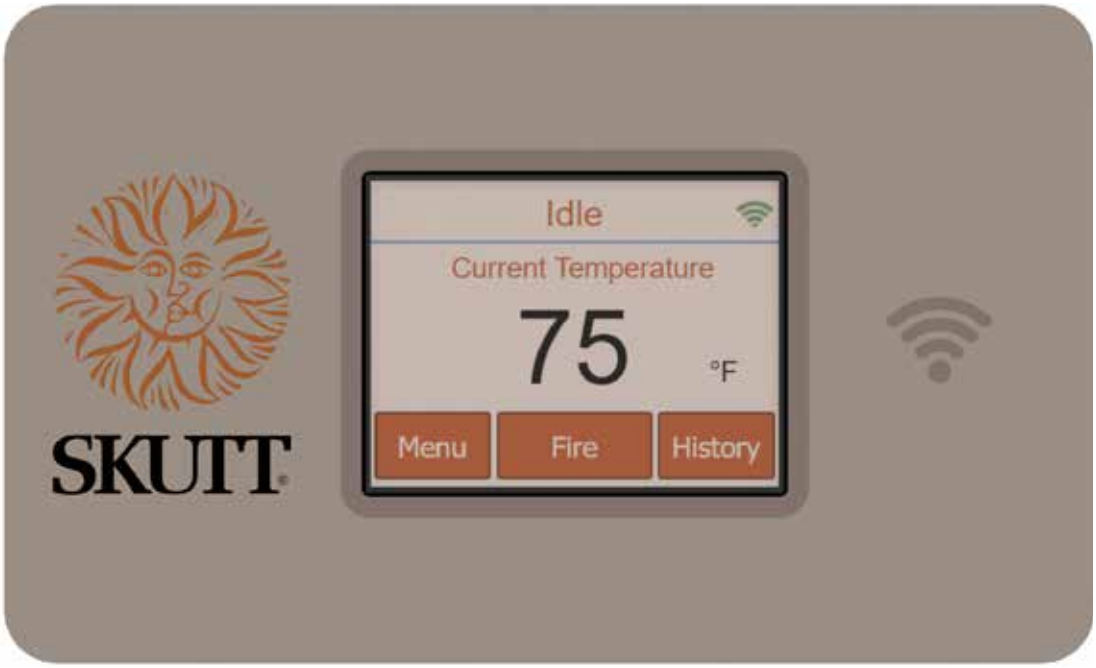
Mini Touchscreen

Controller Operating Manual

for Kiln Models FireBox 14, FireBox 8x6, FireBox 8x4
Glaze Tech and HotStart Pro



6441 SE Johnson Creek Blvd. Portland, OR 97206 (503) 774-6000 skutt@skutt.com

www.skutt.com

Revised 8/20/2024

Introduction

This manual covers the operation of the Mini Touchscreen kiln controller. The Mini Touchscreen is a versatile controller that regulates the temperature in your kiln so you can fire a variety of products like ceramics, glass, jewelry, and more. The Mini Touchscreen controller has preset ceramic programs with Cone Fire programming, preset glass firing profiles, and room for up to 30 custom programs, along with WiFi capabilities for software updating, built in diagnostics, and maintenance logging among other new features. This manual should be used in conjunction with the separate Kiln Operating Manual that has important installation and set-up instructions for your kiln.

Precautions

- The controller is used to control temperature; it is not a safety device.
- Always supervise your kiln during a firing.
- Everything is written for °F operation. Nothing is converted for °C. Will affect listed temps and heating rates.
- Do not operate the controller in temperatures above 100°F or below 32°F
- The controller contains electronic components which are sensitive to static electricity. Before handling the controller, dissipate any static charge you may have by touching metal such as the Kiln control box, the kiln lid, or some other grounded object.
- Always check the position of the thermocouple probe before starting a firing. The current temperature displayed on the controller is measured at the tip of the thermocouple which must extend into the firing chamber about 1" to 1-1/2". See Kiln Operating manual for required clearances.
- Always review the current program before firing to ensure the correct profile is programmed.
- Ensure the kiln and the areas around the kiln are clear of combustible material. Allow a minimum of 18 inches of clearance all around the kiln to any walls, shelves, or other kilns, etc.

First Firing of the Kiln

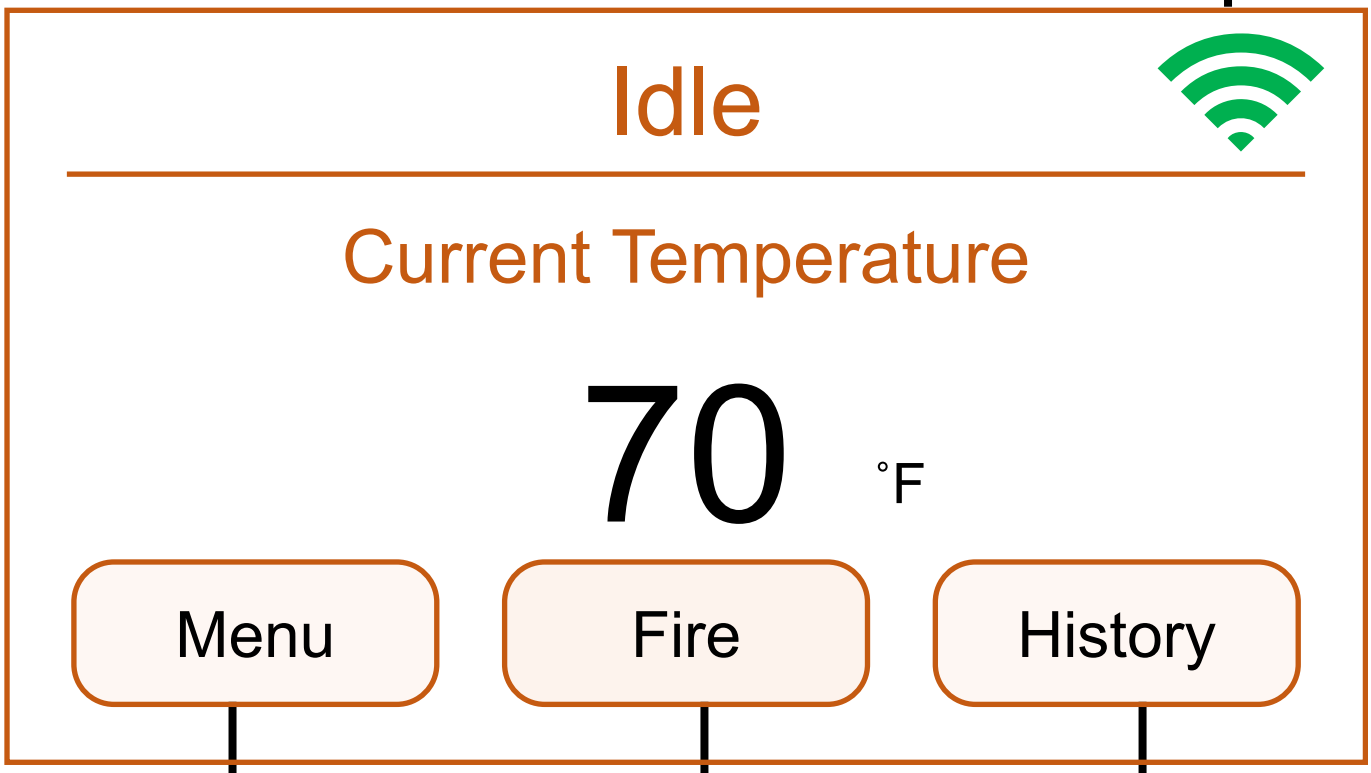
The purpose of the first firing is to put a protective oxide layer on the elements and thermocouple. The first firing is done without ware in the kiln that might give off fumes that contaminate the elements. This should be done for all new kilns and anytime the heating elements are replaced.

Instructions for this process are different for ceramic kilns vs. glass kilns with elements in the lid. **If your kiln does not have a heating element in the lid, perform a Ceramic Cone Fire program to Cone 04 on Medium speed with no clay or glaze in the kiln.**

If you have a glass kiln with a heating element in the lid, or any questions about this process, please contact Skutt Technical Support for details at (503) 774-6000.

Idle Screen Overview

WiFi Menu	Page
WiFi Status	17
Enable WiFi	17
WiFi Setup	17
Update Firmware	17
Reset WiFi	17
Manual WiFi Setup	17
Advanced WiFi	17



Menu	Page
Data Menu	6
Diagnostics	7
Adjustments	8
Configuration	8
Restore Presets	10
Factory Protected	10

Firing Menu*	Page
Cone Fire	11
Glass	11
PMC	11
Heat Treat	12
Custom	12
Library	12

Firing History *Page 16*

List of the recent firings so you can view data or start controller with the same configuration of a previous firing.

*Firing Options Menu options are configurable. For instructions on how to configure which options are viewed in the Firing Options Menu see Page 11.

Quick Start

Step 1: Load A Program*

- Press the **Fire** button to see the Firing Options Menu.
- Select the type of program.
  - **Cone Fire**
  - **Glass**
  - **PMC**
  - **Heat Treat**
  - **Custom**
  - **Library**

Step 2: Review or Edit the Program*

- After you have finished completing the program details you will see the Firing Review Screen.
- Press **Details** > **View Segments**, to see the full firing program, and use the **back arrows** to return to the Firing Review Screen.

Step 3: Start the Firing*

- Press the **Start** button to start the firing now, or enter optional Delay time.

*See pages 11-13 for more detailed programming instructions.

Menu

Press this button to see all of the menu sub-items in order to view, adjust and configure your controller.

Data Menu

The Data Menu holds 3 types of information: diagnostic, status, and kiln information.

Last Firing Status

Contains diagnostics information specific to the last firing of the kiln.

Last Error Status

Contains diagnostic information specific to the last error that was encountered by the controller when firing.

Last Manual Diagnostics

Contains diagnostic information from the last manual diagnostics test. This includes line voltage readings and board output.

Factory Diagnostics

Contains diagnostic information from factory. This includes line voltage readings, and board output. This information can be used for comparison when a manual diagnostic test is run.

Last Element Change

Contains diagnostic information from the last new elements diagnostics. This includes line voltage readings, and board output.

Export Log Files

Used to activate Server Mode. This allows the controller to "serve" a file to a computer/phone that is on the same access point as the controller. When **Export Log File** is pressed,the controller will list an IP address and a code. Type the address listed on the controller into your internet browser and then enter the code when prompted. A QR code will also be displayed that can be scanned to down load the same information.

The last 10 firings will be listed and each firing has 2 files – the temperature data and the event file. The temperature file collects data every 30 seconds. The event file collects data anytime an "event" occurs such as a hold or an error occurs. Click on the file to be observed to download it.

Kiln Info

Contains the controller firmware version plus the serial number and mac address required for registering and viewing your kiln in the KilnLink App. Updating firmware will NOT affect the firing programs.

Diagnostics

Board Temperature: *Display reads X °F*

Displays the current computer board temperature. Displaying the board temperature is a diagnostic function to check the operation of the board. The safe range for board temperature is between 0°F-180°F. Any temperatures below or above that range may cause damage to the controller and will trigger a board temperature error message.

Run Manual Diagnostics

This is used to manually begin a diagnostics test. It turns on each section of elements to read voltage. The results are stored under **Data Menu** – **Last Manual Diagnostics**.

New Element Diagnostics

Run **New Element Diagnostics** when the elements have been changed to record voltages for the new element. The results are stored under **Data Menu** – **Last Element Change.**

Run Power Test

This test is used to visually check the state of the elements, or as a continuous run test when measuring electrical specs. To set the controller for a full power test, press **Menu** > **Diagnostics** > **Run Power Test** > **Start** > **Start**.

For visual inspections, start the test with the lid propped open and let the kiln run for 30 minutes. Take a picture of the state of the elements and then turn the kiln off. Darker (Cool) spots along the elements indicates worn elements.

Contact Skutt Technical Support if you have questions about the results or need help with parts identification.

Relay Health: *Display reads X*

Keep track of the number of on/off cycles of the relays on your kiln. An on/off cycle will be counted as one. When a relay is replaced, press the corresponding zone and press **Reset Count** button to set the number of cycles back to 0.

Firing Hours: *Display reads X.X*

Shows the number of total hours and minutes fired by the controller.

Adjustments

Adjustments allows you to change the Cone and Thermocouple offsets as well as the PID Gain and Dampening Factor.

Cone Offsets

Cone offset is a procedure used to raise or lower the final cone temperature if necessary to calibrate the controller based on witness cone results. The Cone Offset will only affect the specific cone value being adjusted. To change a Cone Offset, press **Menu** > **Adjustments** > **Cone Offsets**, then use the **scroll arrows** to find the desired cone. After choosing the cone, enter the amount of offset and press **Save**. Use the **back arrows** to return to the Idle Screen. To correct an under-firing, set a positive cone offset. To correct an over-firing, set a negative (-) cone offset. The final cone temperature can be raised or lowered a maximum of 99°F.

TC Offset: *Display reads X °F*

Thermocouple offset is used to raise or lower the temperature indicated by the thermocouple. A Thermocouple Offset will affect every temperature read by the controller. It is not a common adjustment to make in most kilns. This is generally used to balance heat-work in a zone controlled kiln with multiple thermocouples. Please contact Skutt Technical Support for TC Offset decisions.

PID Gain: *Display reads X*

Check with Skutt Technical Support before making changes to this setting.

Dampening Factor: *Display reads X*

Acceptable factors are between 1-10; this is typically set by Skutt. If adjustment is needed, please contact Skutt Technical Support before making changes to this setting.

Configuration

Error Codes

This menu option is used to turn error codes on or off.

UI Theme

This menu option allows you to choose the User Interface color scheme for your controller. There are 5 color combination options. Each combination can be shown in light, dark or solid mode. Simply press the color and mode you prefer for your controller.

Customization

Customization allows you to change what Firing Options Menus are available. If none are selected only custom programs will be shown from the Firing Options Menu.

Cone Menu
Allows the user to enable or disable the Cone Fire programming menu for ceramic firings. When disabled, the ceramic firing programs will be removed from the Firing Options Screen.

Glass Menu
Allows the user to enable or disable the Glass programming menu. When disabled, the glass programs will be removed from the Firing Options Screen.

PMC Menu
Allows the user to enable or disable the Precious Metal Clay programming menu. When disabled, the glass programs will be removed from the Firing Options Screen.

Heat Treat Menu
Allows the user to enable or disable the Heat Treat programming menu. When disabled,the glass programs will be removed from the Firing Options Screen.

Temperature F/C

Choose which temperature scale to use with your kiln, Fahrenheit or Celsius. To change the temperature scale, press **Temperature F/C** to your desired selection and press **Save**.

Cost Setup

This menu option allows you to see the estimated cost for a firing. To set up this feature press **Menu** > **Configuration** > **Cost Set Up**. Next press **Cost/KWH** and enter the kilowatt hour rate that your power company charges you, then press **Save**. Next press **Watts** and enter the wattage listed on the serial name plate of your kiln. Use the **back arrows** to return to the Idle Screen.

Start Code

The Start Code is an optional two-step safety feature that requires a 4-digit number to be entered before the firing can begin. To set the code, press **Menu** > **Configuration** > **Start Code** > enter desired Start Code > **Save**. Use **back arrows** to return to Idle Screen. The number "1" is used as the default shut off code.

WiFi

To set up WiFi for the Mini Touchscreen, press **WiFi** and the controller will scan for nearby networks. Select your desired network and enter the password (if required) and press **Save**.

Calibrate Touch

Used to re-calibrate the touch screen if buttons aren't working properly. Press the **Calibrate Touch** button and follow the onscreen instruction to re-calibrate.

Software Reset

This option is used to reset the controller. Please contact Skutt Technical Support before using this feature.

Restore Presets

Restore all preset programs and offsets to factory settings.

Restore Cone Offsets

Reset cone offsets to factory settings. To reset: press **Menu** > **Restore Presets** > **Restore Cone Offsets** > **Yes**. Use **back arrows** to return to the Idle Screen.

Restore Factory Default

Restore the entire controller to the default factory settings. Take caution using this menu option as it will reset any customization.

Factory Protected

Factory configuration is used by Skutt to set kiln specific parameters for the controller such as thermocouple type, top temperature, and board temperature. For more information, see the technical specification section. Please contact Skutt Technical Support before making any changes that might damage the kiln.

Programming

Important: Pressing the Fire button does not immediately start a firing.

The **Fire** button takes you to the type of firing programs you can start. Each of these types are described below. To customize this menu, go to **Menu** > **Configuration** > **Customization**, then select which options you want visible on the Firing Options screen.

Figure 1. Firing Options Menu

Cone Fire

Programming for these type of preset ceramic firings consists of choosing a cone number, an optional preheat time, firing speed, and an optional hold time. The firing speed is chosen by the type of firing and thickness of the clay used. All 4 speeds below will calculate the firing rate at the end of a firing and adjust the final temperature for correct heat-work.

Cone Options: 022 - 10
Speed Options: Fast, Medium, Medium Slow, Slow

Glass

Programming consists of choosing the type of firing, firing speed, and COE (Coefficient of expansion) and an optional hold time. The firing speed is chosen by the size and thickness of the glass being fired.

PMC

Precious Metal Clay. The included PMC programs are listed in Appendix B: Firing Programs.

Heat Treat

The included heat treat programs for metal working are listed in Appendix B: Firing Programs.

Custom

The Mini Touchscreen has 30 Custom user programs slots, and each program may contain up to 16 segments. When you select **Custom**, you will first see a screen with all 30 custom programming slots. You must choose one of the 30 slots to add your custom program; if they are all full, you must choose one to override.

- If you select an Empty program slot, the controller will first ask for you to name for the custom program. The Custom Programming section below will outline how to enter the segments for your custom program.
- If you select a slot with a program, you will be taken to the firing review screen. Please refer to the Firing Review Screen (Page 13) section of the manual to continue firing with the selected, existing custom program.

Library

The Program Library includes some miscellaneous custom programs for ceramics, glass, PMC, and metal working processes. These include crystalline glaze firing, lost wax firings, and bottle slumping to name a few. The individual program schedules are listed in Appendix B: Firing Programs.

Custom Programming

To create a custom program, begin by using the keypad to title the new program. Then press **Save**. After you have entered a custom program name, individual segment details will need to be entered. Each program segment will consist of three details: a Heating Rate, Target Temperature, and Hold Time. Enter each value according to your needs. The minimum and maximum options for each value are listed here. After entering each piece of information, press the **forward arrow**. Use the **backward arrow** if you need to adjust any value you've entered.

	Min	Max
Ramp	1	9999
Temp	0	2400
Hold Time	0:00	99:00

After entering all three details for a segment, you can select the segment that you just entered or use the **back arrow** to take you to the Firing Review Screen (Fig. 2).

Selecting the segment gives you a review and the options to **Delete**, **Edit** the chosen segment or **Insert** a copy directly below the segment. This copy can then be edited for your next segment of the program. (Tap on **Edit** to enter the desired segment details. Keep adding segments until the program is fully entered, then use the **back arrows** to get to the Firing Review Screen (Fig. 2) to review and **Start**.

NOTES FOR CUSTOM PROGRAMMING:

1. A firing will start in the earliest segment that has a hold temperature greater than the current kiln temperature. If the current kiln temperature is above all hold temperatures, the controller will go directly to Complete.
2. To ramp up or down at the maximum rate, enter a rate of 9999.
3. To program a down ramp, enter the cooling rate per hour, then a temperature below the previous segment's temperature.
4. It is best to write out the firing profile that you plan to program before you begin programming. A blank form for writing your firing programs can be found in Appendix C: Blank Firing Program. Photo-copy as needed.

Calculating Ramp Rates for Custom Firing

The controller is set up to operate based on a specified heating rate listed in degrees per hour. If you want to heat to a specific temperature in a certain amount of time, then a calculation will need to be made to determine the number of degrees per hour to reach that temp goal in the desired amount of time.

For instance, if you want to go from room temperature to 750°F in 3 hours, use this method to calculate the ramp rate. Take the temperature that you want to go to (750°F) minus the starting temperature (70°F approximate room temperature) to get the number of degrees you want to increase in 3 hours (750 – 70 = 680). Divide this number by the time you want to get to 750 to give you the ramp rate (680°F ÷ 3 hrs = 227°F/hr). If you want to add another segment to go from 750°F to 1000°F in 4 hours, the same procedure is used. Take the end temperature minus the starting temperature (1000 – 750 = 250) and divide this number by the number of hours to reach 1000°F (250°F ÷ 4 hrs = 63°F/hr).

Firing Review Screen

After you have completed programming you will see a Firing Review Screen.

There are three actions you can take from this screen:

1. **Start** - Start the firing immediately.
2. **Details** - Allows you to **View/Edit** each individual segment for the program, **Copy Program**, or **Delete Program.**
3. **Graph** - View graph of program.

Figure 2. Firing Review Screen

Operation of the Controller During A Firing

The Mini Touchscreen controller eliminates much of the "babysitting" that is required with a manual kiln. To ensure the most consistent results from one firing to the next, you should understand how the controller operates and monitor the firing to ensure proper operation. The following diagram and flow chart show the basic components of a kiln's control system.

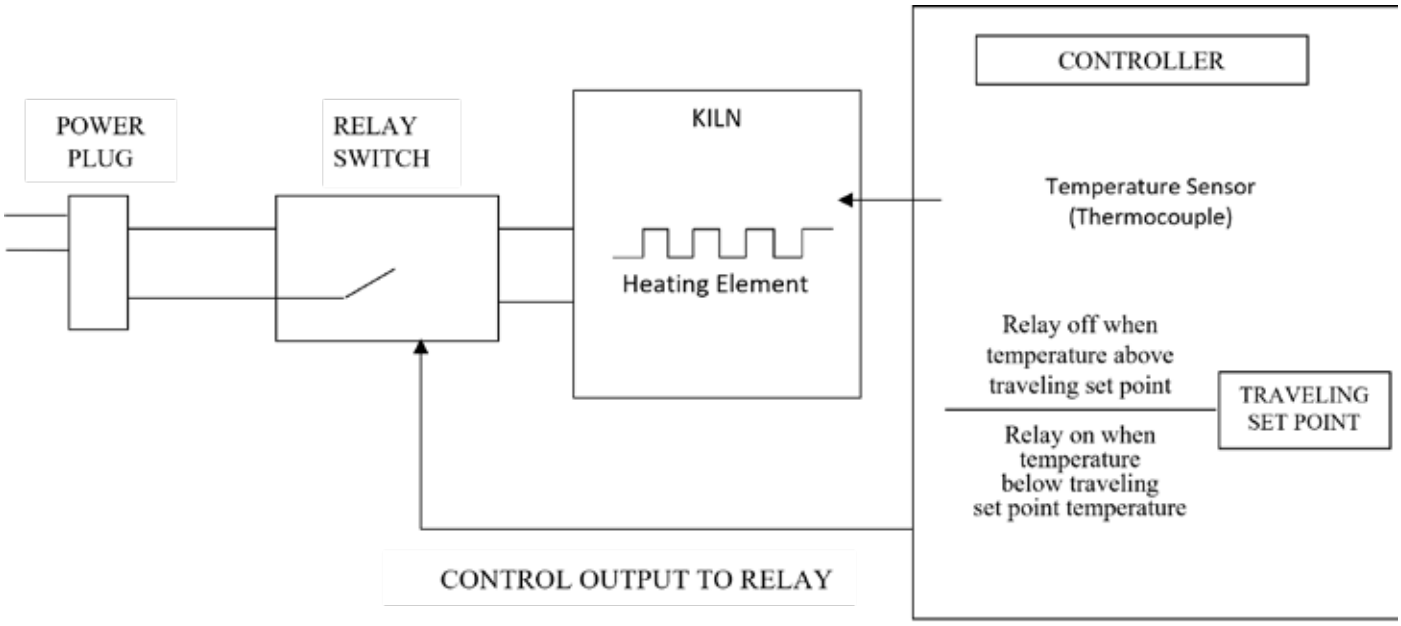


Figure 3. Kiln Operation

The diagram (Fig. 3) and flow chart show (Fig. 4) that the kiln control system, in its simplest form, works like your thermostat at home – when the temperature is too cool the heater comes on; when the temperature is too hot the heater turns off. The major components of the control system are the Mini Touchscreen controller, thermocouple temperature sensor, relay switch, power source, and heating elements.

The controller is the brain of the operation; the controller adjusts the traveling set point according to your program, reads the temperature in the kiln, cycles the relay on or off and determines when to end the program. The traveling set point is a short term target temperature goal that the controller continually moves forward as it reaches each temporary target.

Pressing **Start** begins the firing. The controller reads the kiln temperature and uses that temperature as a starting point for a traveling set-point. The displayed temperature is the temperature inside the kiln. You should then hear the relay(s) start cycling on and off to keep the temperature near the traveling set point, unless your kiln is equipped with Solid State Relays (SSR), which operate almost silently. As the firing progresses the controller moves the traveling set-point according to the programmed firing rate. The displayed temperature should increase with the traveling set-point. This sequence continues until the final temperature is reached and the controller turns off the kiln. *The display will show COMPLETE.*

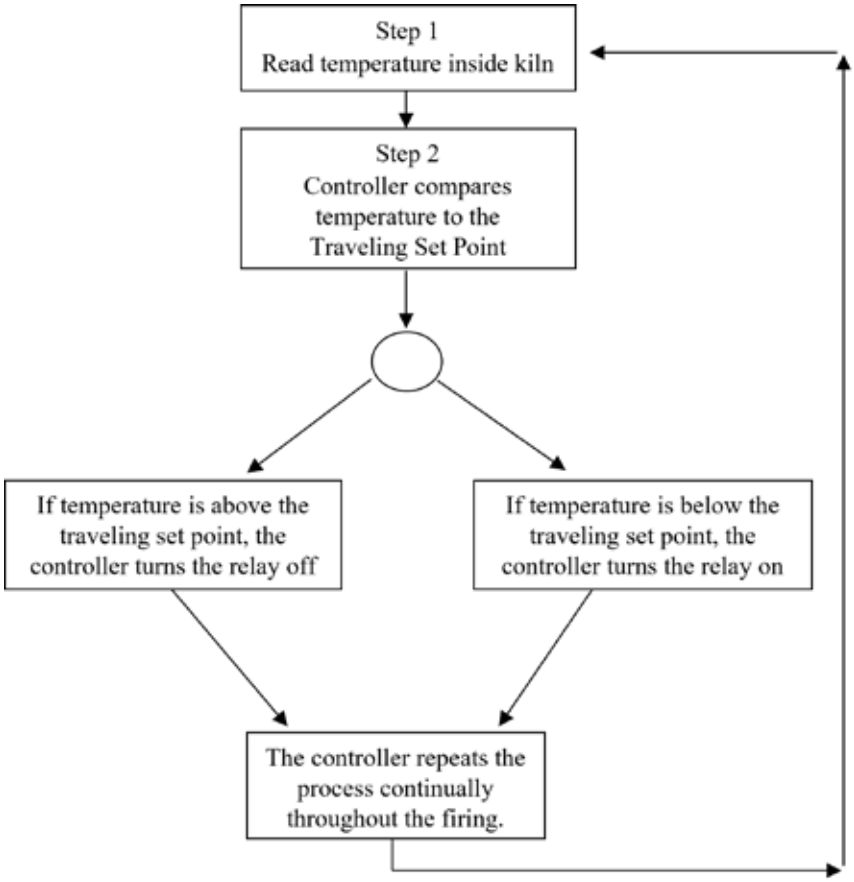


Figure 4. A flow chart of the control algorithm in its simplest form. Like your home thermostat.

Adjustments During a Firing

Once a firing has been started, the screen will change to the Firing Screen (Fig. 5). Viewing and making some adjustments to the program is still available.

Stop

Press **STOP** at any point in the firing to immediately stop the firing. The controller will return to the Idle Screen.

View

Arrows on the right and left side of the Firing Screen provide access to several different view screens for the firing, including: current temperature; the Firing Review Screen; the Segment Status screen; or a graph of the firing.

Adjust

Press **Adjust** to make adjustments to the program while a firing is in progress.

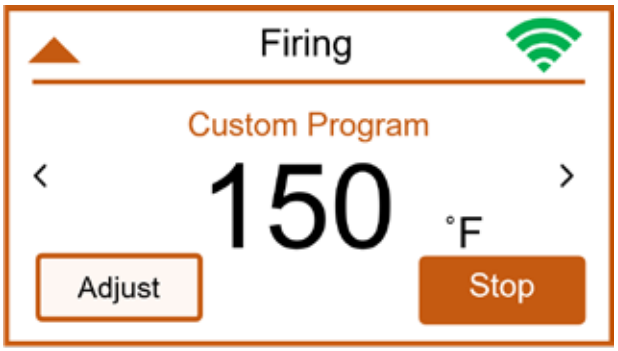


Figure 5. Firing Screen

During a Hold:

- **Add Time** will add 5 minutes to the hold.
- **Add Temperature** will increase the hold temperature by 5°F.

During a Temperature Ramp:

- **Skip Step** will skip the current segment and move to the next in the firing. This feature is used when enough heat work has been done at the current segment and you want to immediately go to the next ramp rate.

End of Firing – COMPLETE

When the firing is complete, the controller will display *Complete* with the current temperature (Fig. 6). To return to IDLE, press the **Home** button. You may open the kiln when the temperature has cooled to 125°F.

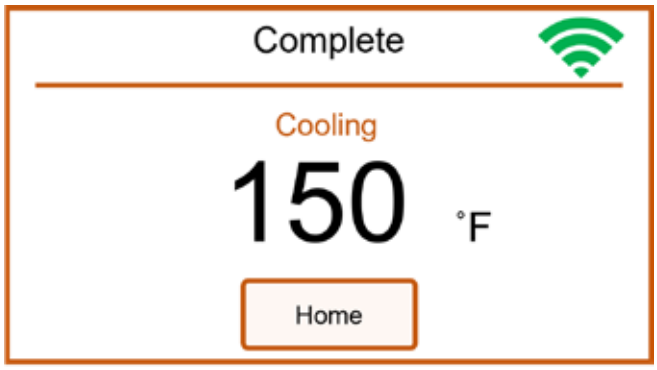


Figure 6. Complete Screen

Care of Thermocouple

The small metal rod protruding into the firing chamber is the temperature sensor, or thermocouple. Do not let shelves, posts, or ware touch the thermocouple; this could affect the temperature reading. **Be sure to leave a 2" clearance around the thermocouple when loading shelves, posts, ware and cones.**

Bumping the thermocouple during loading can damage it or push it out of the firing chamber. It should protrude into the firing chamber about 1 -1/2". A standard Type K thermocouple will wear out with use and will need to be replaced periodically. Exposure to high heat and fumes like sulfur will wear the thermocouple out quicker.

History

List of the recent firings so you can view data or start the controller with the same configuration from a previous firing. For each firing you can:

- **Start** will start the firing with the same settings.
- **Details** allows you to view and edit the program.
- **Graph** shows a graph of the firing.

WiFi Menu

WiFi Status

This menu option displays the WiFi network the controller is connected to, WiFi signal strength and if it is connected to the Cloud API.

Enable WiFi

Enable or **Disable** selection turns the WiFi feature On or Off.

WiFi Setup

To set up WiFi for the Mini Touchscreen, press the **WiFi Icon** > **WiFi Setup** and the controller will scan for nearby networks. Select your desired network and enter the password (if required) and press **Save**.

The Mini Touchscreen controller is compatible with the following types of networks:

- **802.11 b/g/n**
- **WEP/WPA/WPA2 Personal Authentication**
- **2.4 GHz connections**

The controller is NOT compatible with:

- **802.1X or WPA2 Enterprise Authentication**
- **5 GHz connections**

For some network situations, it is recommended to set up a 2.4 GHz guest network or to connect the controller to a separate logical network or VLAN, separate from other networks, routers, and hardware.

If your kiln is connected to a WiFi network, press the **WiFi Icon** > **Update Firmware** to see if there is an update available. Follow the screen directions to download. Once it has found the firmware, you have the option to update your controller. Updating firmware will NOT affect the firing programs.

Reset WiFi

Press the **WiFi Icon** > **Reset WiFi** when having trouble with the WiFi connection. The controller will reset the WiFi connection and attempt to reconnect to your currently saved connection.

Manual WiFi Setup

Used to manually set up a WiFi network that is hidden or otherwise not found when running WiFi Setup. Enter the network name under SSID and press **Save**. Under password, enter the network password at press **Save**.

Advanced WiFi

Used for network administrators this information can be used when firewall settings need adjusted to allow the controller to communicate with the KilnLink app.

Appendix A: Error Codes

If you get an error code, it is important to note the error letter or number. It will help you in diagnosing any problem with the kiln. When an error code is displayed, it will give a short description of the error. Press **Clear** to clear an error code.

NOTE: THESE ERRORS WILL ONLY BE DETECTED IF THE ERROR CODES ARE TURNED ON:

Error Code	Description	Possible Causes
ERROR 1	Kiln temperature rising too slowly when ramping up	This is usually a Kiln heating problem, not a controller problem. Do the Full power Test to check elements and relays. Low or dropping voltage to the Kiln could also be the cause. A thermocouple reading incorrectly or improperly placed may also be the cause.
ERROR 2	Kiln temperture 50°F above hold temperature	A relay latched in the "on" position may cause this error. Another rapid cooling, then closed, such as for glass firings. A worn or loose thermocouple connection can also trigger this error.
ERROR 3	Kiln temperature 50°F below hold temperature	Relay failure.
ERROR 4	Kiln temperautre 50°F above previous hold when ramping down	Same causes as for E-2.
ERROR 5	Kiln temperature 50°F below traveling set point when ramping down	Relay failure.
ERROR D	Kiln temperature 50°F above taveling set point	Stuck relay or stuck output. If using zone control, then the outputs or t/c's may be in the wrong zones.

NOTE: THE ERROR CODE SETTING DOES NOT AFFECT THESE ERRORS:

Error Code	Description	Possible Causes and/or Corrections
ERROR 0	Software error	Check the selected program and reprogram, if necessary. If error persist or program does not hold in memory, controller may need to be returend to factory for service.
ERROR 6	Probelm with thermoucple leads	This generally indicates the thermoucouple is connected incorrectly, possibly reveresed. Ensure the thermocouple extension wires are connected correctly to the controller and at all connection blocks back to thermcouple.
ERROR 8	Unexpected falling temperature near end of firing	If the Kiln as a Kiln-Sitter, it may have turned the Kiln off before the controller did. Other Possible causes are broken element or relay.

Error Code	Description	Possible Causes and/or Corrections
ERROR 9	Software thermocouple selection does not match the hardware thermocouple jumper selection.	The jumper on the circuit board and the setting for thermocouple Type in the software do not match.
E--	Power loss during Eeprom write	Turn the controller off and back on. Recheck selected program and reprogram, if necessary.
ERROR AT	Setting is out of range	One or more of the temperature settings is out of range. Please call Skutt Technical Support to get help correcting.
ERROR AU	Program number out of range	The custom program number is out of range, please select an in-range number for your custom program.
ERROR AO	Offset is out of range	On or more of the temperature offsets is out of range. Please correct your offsets.
ERROR AP	Max Program Temperature Out of Range	The max program temperature set for the kiln is out of range. Please call Skutt Technical Support to identify and set the correct max program temperature for your Kiln.
ERROR AG	Glass setting out of range	One or more of your glass settings is out of range. Please correct your settings to correct this error.
ERROR bd	Board temperature to high	The control box temperature may be too hot or the limit temperature may need to be reset. If the room temperature is very hot, aiming a fan at the control box may decrease the temperature.
ERROR E	Hardware error	Controller will need to be returend to the factory for service.
ERROR R	Microprocessor memory does not match program storage memory (Eeprom)	Reprogram and try to fire again. If error persists, controller may need to be returned to factory for service.
Thermocouple FAIL	**Thermocouple FAIL** indicates one or more t/c's have failed. If more than one thermocouple is connected, the controller will indicate which thermocouple has failed.	Check the board temperature under Dignositcs under menu, if the board temperarure is approximately room temperature, then the t/c is defective. If the board tempertaure shows a high temperature the circuit board is defective.
PF Long term Power Loss	Powe failure. Firing has stopped.	Power was lost during firing and the Kiln temperature was below 140° or the Kiln temperature dropped more than 250° during the power outage.

Appendix B: Firing Default Programs

Miscellaneous Programs

Firing schedule details for the built-in Library programs can be found below. You can access these programs by pressing **Fire** > **Library** > Select Program Type.

Options include: **Miscellaneous**, **Heat Treat**, or **PMC**.

CN6 CRYSTAL GLZ			
SEG	RATE	TEMP	HOLD
1	300	1000	0:00
2	500	2230	0:15
3	9999	2000	0:00
4	500	1800	4:00

CN10 CRYSTAL GLZ			
SEG	RATE	TEMP	HOLD
1	300	1000	0:00
2	500	2320	0:10
3	9999	2000	3:00
4	500	1800	1:00

LOST WAX SILVER			
SEG	RATE	TEMP	HOLD
1	500	300	2:00
2	500	700	1:00
3	500	1350	4:00
4	9999	900	8:00

LOST WAX GOLD			
SEG	RATE	TEMP	HOLD
1	500	300	2:00
2	500	700	1:00
3	500	1350	4:00
4	9999	800	8:00

BEAD ANNEALING			
SEG	RATE	TEMP	HOLD
1	9999	960	8:00
2	9999	960	0:45

WINE BOTTLE			
SEG	RATE	TEMP	HOLD
1	500	500	0:15
2	500	1000	0:15
3	600	1250	0:20
4	500	1475	0:15
5	9999	1100	0:30
6	200	970	0:30
7	120	750	0:10

Custom Programs : Heat Treat

154CM ATS34			
SEG	RATE	TEMP	HOLD
1	9999	1900	0:30

AISI 0-1			
SEG	RATE	TEMP	HOLD
1	9999	1450	0:20

440C S.S			
SEG	RATE	TEMP	HOLD
1	9999	1850	0:25

AISI D-2			
SEG	RATE	TEMP	HOLD
1	9999	1850	0:20

DRAW 900 X2			
SEG	RATE	TEMP	HOLD
1	9999	900	2:00
2	9999	125	0:00
3	9999	900	2:00

DRAW 500			
SEG	RATE	TEMP	HOLD
1	9999	500	2:00

DRAW 400			
SEG	RATE	TEMP	HOLD
1	9999	400	2:00

DRAW 375			
SEG	RATE	TEMP	HOLD
1	9999	375	2:00

DRAW 300			
SEG	RATE	TEMP	HOLD
1	9999	300	2:00

DRAW 275 X2			
SEG	RATE	TEMP	HOLD
1	9999	275	2:00
2	9999	120	0:00
3	9999	275	2:00

DRAW 220/200			
SEG	RATE	TEMP	HOLD
1	9999	220	2:00
2	9999	120	0:00
3	9999	200	2:00

Custom Programs: PMC

PMC STAND			
SEG	RATE	TEMP	HOLD
1	9999	1650	2:00

PMC +			
SEG	RATE	TEMP	HOLD
1	9999	1650	0:10

PMC 3			
SEG	RATE	TEMP	HOLD
1	9999	1290	0:10

PMC GOLD			
SEG	RATE	TEMP	HOLD
1	9999	1650	0:10

ARTCLAY SILVER			
SEG	RATE	TEMP	HOLD
1	9999	1436	0:05

ARTCLAY GOLD			
SEG	RATE	TEMP	HOLD
1	9999	1814	1:00

PMC + FAST			
SEG	RATE	TEMP	HOLD
1	9999	1650	0:10

PMC3 FAST			
SEG	RATE	TEMP	HOLD
1	9999	1290	0:10

Custom Programs: Cone Fire

Blank Firing Program

Keep this page as a Master and photocopy as needed.

Firing Program number _____

Segment	Rate Per Hour	Temperature	Hold
1			
2			
3			
4			
5			
6			
7			
8			

Firing Program number _____

Segment	Rate Per Hour	Temperature	Hold
1			
2			
3			
4			
5			
6			
7			
8			

Common Questions and Situations

Q. How do I clear an error message?

A. To stop the sounding alarm, press anywhere on the screen. Then to clear the message, press **Clear** and the controller will return to the IDLE screen.

Q. What is a segment?

A. A segment is the basic building block of a program. Each segment consists of a ramp rate in degrees per hour, a temperature you want to achieve, and whether you want to hold there or not. For example, a preheat only program for drying ware going at 60°F/ hour to 180°F and holding for 2 hours would be a one segment firing, the ramp is 60, the temperature is 180°F, and the hold is 2.00.

Q. Do I need to use witness cones for each firing?

A. After checking your kiln with witness cones for the first few firings, if you are satisfied with the results you are getting and how even the kiln is from top to bottom, then you do not need to use cones in each firing, unless you want to. It is a good practice to periodically place witness cones in the kiln to check for proper firing. If you suspect a problem or your results have changed, then it is a good idea to check the operation of the kiln with witness cones.

Make sure to use self-supporting witness cones and place them no more than 2" from the edge of the kiln shelf with the bending face pointed toward the center of the kiln. These guidelines will help ensure the consistency of your witness cone results.

Q. Who do I contact for parts for my kiln?

A. For replacement parts for your kiln (relays, elements, etc.), contact the Skutt (503) 774-6000. For any issues with your controller contact Skutt Technical Support.

GENERAL DESCRIPTION

The Mini Touchsceen controller regulates the temperature in a kiln according to the program set by the artist. It has six different programming modes, Cone Fire, Glass, PMC, Heat Treat, Custom and Library. It is a single zone controller (one thermocouple input) with Safety output. This controller can only use a Type K thermocouple, unless it was specifically built at the factory for use with a Type S thermocouple.

FACTORY PROTECTED SETTINGS

This hidden menu allows programming of options that are normally set at the factory. The options are listed in the order they appear in the menu with a description. This hidden menu can be entered by pressing **Menu** > **Factory Procted**, then type in the sequence 4, 4, 3, and the press **Save**. Use the scroll bar on the right to scroll through the options found below: **Rotate Display**, **Max Program Temp**, **SSR Mode**, **Cycle Time**, and **Run Factory Diag**. These options should not be adjusted without consulting Skutt Technical Support for assistance.

Rotate Display

When set to on, the display will rotate 180 degrees. To rotate the screen, press **On** and then press **Save**.

Max Program Temperature

Set the Max Program Temperature to the maximum temperature rating for the kiln. Check the the kiln's serial plate for its maximum temperature rating. The max controller setting is 2400°F (1316°C).

SSR Mode

SSR Mode can be turned on when solid state relays are being used on the kiln. When SSR mode is turned on, it cycles the relays at 500 millisecond intervals. This works the same with either 60hz or 50hz systems.

Cycle Time

Sets the output cycle time. The cycle time is the length of time between an output coming on two consecutive times. If the cycle time is set for 14 seconds the output will come on every 14 seconds as needed. Cycle time can be set from 10 seconds to 60 seconds. To change the cycle time in the Factory Protected Settings, press **Cycle Time**, type in the new time, and press **Save**.

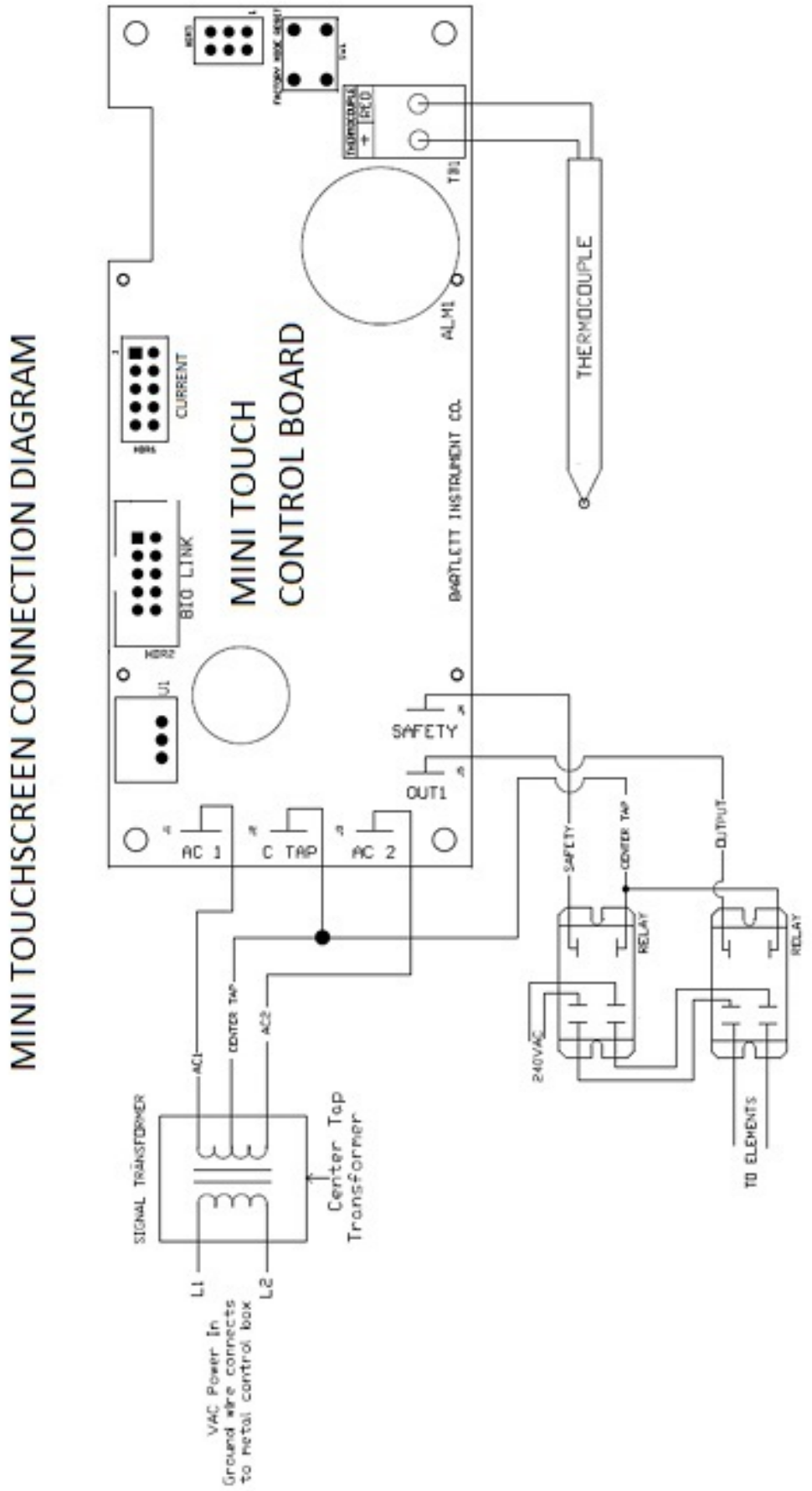
Run Factory Diag.

This is used by the Skutt. The factory diagnostics can be used for comparison when future diagnostics tests are ran. To view the voltages from the Factory Diagnostics test, press **Menu** > **Data Menu** > **Factory Diagnostic** to view the results.

FULL DIAGNOSTIC ROUTINE

The full diagnostic routine checks all the output voltages, the amperage or current draw of each section of the kiln, as well as the no load and full load kiln voltages. The amperage or current draw is used to measure the current draw of each section of the kiln. The diagnostic routines can only control each section separately if the outputs are wired for zone control. When checking the output voltages, the controller will turn on each section, starting with the top, for a few seconds. This allows checking to see if all elements are heating. The kiln voltages during load and without load are also measured. This helps to diagnose firing problems when the kiln is not able to reach a programmed temperature. First, it will read the voltages with the elements off, then the elements will come on momentarily and read the voltages again. To run a full diagnostics routine follow these steps:

1. Press the **Menu** button.
2. Press the **Diagnostics** button.
3. Press the **Run Manual Diag.** button and the controller will begin the diagnostics routine.
4. The controller will have an optional pop-up leading to the Idle Screen. If you return to the Idle Screen, *Check All* will be displayed across the firing banner. When the test is complete, it will return to *Idle*.
5. The result screen will be shown upon completion.


MINI TOUCHSCREEN CONNECTION DIAGRAM
MINI TOUCH
CONTROL BOARD
BARTLETT INSTRUMENT CO.
THERMOCOUPLE
CURRENT
BIO LINK
SAFETY
OUT1
AC 1
C TAP
AC 2
SAFETY
CENTER TAP
OUTPUT
RELAY
RELAY
240VAC
TO ELEMENTS
SIGNAL TRANSFORMER
AC1
CENTER TAP
AC2
Center Tap
Transformer
L1
L2
VAC Power In
Ground wire connects
to metal control box

Warranty

SKUTT CERAMIC PRODUCTS, INC. warrants this product to be free from defects in materials and workmanship for two full years from the date of the first retail purchase from an authorized Skutt dealer.

What Skutt will Do:
Skutt will repair or replace, at its expense, any defective part upon return, freight prepaid, to any authorized Skutt service center.

What is Not Covered:
This warranty does not cover (1) any defect not reported to an authorized Skutt dealer or distributor within 10 days of discovery; (2) Type K Thermocouples; (3) any damage caused by overfiring; (4) products subjected to abnormal strain, freight damage, neglect, abuse, improper storage, failure to follow instructions, or products altered from factory standard condition; (5) products whose identification number has been changed; (6) failures of, or failures caused by, parts or accessories not manufactured or supplied by Skutt Ceramic Products; (7) kilns used for purposes other than firing ceramic materials, glass materials, and certain metal heat treating processes; (8) kilns used for reduction or salt firing.

How to Obtain Warranty Service:
Notify your Skutt dealer or distributor within 10 days of discovery of any defect. Deliver any defective part, freight prepaid, to an authorized Skutt service center. A list of Skutt service centers may be obtained from your dealer or from Skutt Ceramic Products, Inc. at the address and telephone number below.

Other limitations. *ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING PROPERTY DAMAGE, LOST PROFITS, LOSS OF USE, OR OTHER ECONOMIC LOSS, ARE EXCLUDED TO THE FULL EXTENT PERMITTED BY STATE LAW. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you. ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Dealers are not authorized to modify this Warranty or to make any additional commitments. Skutt will not be responsible for promises not contained in this Warranty.*

State Law Rights. *This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.*

6441 S.E. JOHNSON CREEK BLVD, PORTLAND, OREGON 97206 (503) 774-6000

How to Request Warranty Service

All repair work must be authorized, either by Skutt, or by an authorized Skutt Distributor before the work is done. If you believe your kiln is going to require warranty servicing, the first step is to call the Distributor from whom you purchased the kiln. If they are unable to provide or coordinate service, call Skutt Ceramic Products and ask for our Technical Service Department 503-774-6000.

Skutt has one of the most extensive networks of Distributors in the country. However, not all areas have a trained kiln technician. We realize that re-packaging and shipping your kiln is not a realistic option for most of our customers. Many of our Distributors have trained kiln technicians either on staff or with which they contract. Often times these technicians will travel to your business or home to do the repair. Skutt will pay them for their time on the job. It is your responsibility to pay them for their travel time to and from your location.

PLEASE REGISTER YOUR WARRANTY AT WWW.SKUTT.COM
under the "Contact Us" tab to streamline future warranty requests.
You will need your SERIAL NUMBER, MODEL NAME, VOLTAGE, and PHASE.
All of this information can be found on the SERIAL PLATE,
which is located on the side of your control box.

6441 SE Johnson Creek Blvd. Portland, OR 97206 (503) 774-6000 skutt@skutt.com

www.skutt.com