AutoFire® Slide Kiln Controller

User's Guide

Model AF4TS

Orton Ceramic Foundation

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Introduction

This User's Guide explains the features and operation of the AutoFire Slide Touch Screen Controller.

Orton controllers use P-I-D control algorithms to tightly control kiln temperature. This eliminates temperature cycling. Cycling occurs when the controller turns the kiln on or off in a way where the actual temperature does not closely follow the desired firing schedule.

Orton controllers store the firing program information in memory when turned off. If power is lost during a firing, the controller remembers how far the firing has progressed and determines if it can resume the firing when power is restored.

Controller Models

There are two basic controller models:

Single Zone – These use a single thermocouple (temperature sensor) to control the kiln temperature
Multi Zone – These use 2 or 3 thermocouples to independently control sections of a kiln

Precautions

The controller is not a safety device. The controller operates relays to turn the kiln elements on and off. It is possible for relays to fail in the 'ON' position. The controller cannot protect against relay failure. To prevent over-firing, never leave the kiln unattended, especially at the end of a firing.

Controller accuracy and performance depends on the condition and position of the thermocouple sensors in use.

Getting Started

Read all precautions and instructions before using your controller.

If your kiln has manual control switches for the heating elements, turn all the dials to the highest settings.

If you have a Kiln-Sitter® on your kiln, you can use a Cone 10 bar under the sensing rod to shut off power if the kiln reaches high temperatures. This bar will last many firings and can act as a backup safety device for the firing.

Features

The AutoFire Slide includes many standard features, a user-friendly interface and robust temperature control software.

Firing Methods and Features

- **Cone-Fire** method: Select a preset program for a specific cone number from Cone 022 to Cone 12. These programs are designed specifically for ceramic firings.

- **User Program** method: Create up to 35 custom firing schedules with unique heating and cooling rates, target temperatures and hold times. This method can be used for ceramics, heat treating, glass fusing, enameling or jewelry applications.

- **Preheat** - Use with Cone-Fire mode to slowly dry ware and hold the kiln at 200°F (93°C) to remove moisture.

- **Speed** adjustments **-** Use with Cone-fire mode to speed up or slow down a firing and to adjust for load size or thick pieces of ware.

- **Delay** start - Use with either mode to delay start the kiln up to 100 hours (99hr.59min.)

- **Set-Point** Control - User Program option to hold kiln at temperature indefinitely.

- **Full On / Full Off** - User Program option to heat or cool the kiln as fast as possible.

- **Add Time –** Add additional hold time to firings already in progress.

- **Program edit –** User Program option to change the active program settings during the firing without having to stop and restart the controller.

- **Graph display –** Real time graphical display comparing the setpoint temperature to the actual firing temperatures.

- **Diagnostics –** Monitor and log the firing results, alarms and component life.

Advanced Options

- **Cone Offset -** Use with Cone-Fire to adjust the firing temperature of the kiln by ±11°C (±20°F) to fine tune the controller to your kilns performance.

- **Skip -** Skip ahead in the firing program

- **Alarm -** Program an alarm to sound when a specific temperature is reached.

- **Thermocouple Offset -** Adjust display temperature by as much as ±25°C (±45°F) to offset aging thermocouple(s).

- **Auxiliary Outputs -** Control a relay to switch on a vent fan or external alarm or safety relay.

- **Power Consumption –** Review the calculated cost or Kilowatt usage of the kiln firing.

Display Messages and Information

- **Cone Table -** Look up table for cone number temperatures

- **Status -** Displays the current status, setpoint and actual heating/cooling rates of the firing.

- **Temperature Units -** Display Temperature in Fahrenheit (°F) or Centigrade (°C) Units

- **Computer Interface –** Monitor/Analyze kiln data from a PC using *AutofireDLS4* datalog software.

Test Firing with Witness Cones

A test firing will help in learning the operation and features of the controller. Follow your kiln manufacturer's instructions for setting up your kiln.

Place a series of Orton Self-Supporting Cones on the middle shelf of your kiln so that they can be seen through a kiln peephole. Use a series of cones close to the final firing temperature (see Appendix C). For example, if firing to 1945°F (Cone 04), use a Cone 03, Cone 04, and Cone 05 for the test firing.

To evaluate heat distribution, place a set of cones on each shelf during the test firing. Most kilns fire more uniformly at Cone 06 than they do below Cone 06. Provide ventilation for the kiln in accordance with the kiln manual or VentMaster® instruction manual.

After the firing, examine the fired cones. Some variation in the bending of the cones may occur, depending on how the kiln was loaded and the location of the cones.

Cone-Fire – How it works

When firing to a cone number, the controller constantly monitors the actual heating rate of the kiln. If the kiln does not fire as rapidly as programmed, the controller re-calculates and adjusts the top firing temperature to compensate for the slower firing rate. This process more accurately fires to the cone number selected. When the heating rate slows, cones deform at slightly lower temperatures. At faster heating rates, cones deform at slightly higher temperatures. This ability to recalculate and to fire to a cone value is a unique, patented feature of all Orton controllers.

Orton Controllers contain three preset program groups for firing to a cone number – Low Fire, Mid Fire, and High Fire. Each of the programs can be adjusted for speed, hold time and cooling rate. The standard programs are designed to fire normal loads of thin ware ceramics. When a kiln is more heavily loaded or when thick ware is fired, additional firing time is needed. Experiment to determine the best firing conditions. The preset firing programs in the controller are:

Program	Product Fired	Cone Range	Firing Time
Low Fire	Decal, Luster, China	Cones 022 – 011	3 - 5 hours
Mid Fire	Glaze, Bisque, Earthenware	Cones 010 - 01	6 - 8 hours
High Fire	Stoneware, Porcelain	Cones 1 – 12	9 - 11 hours
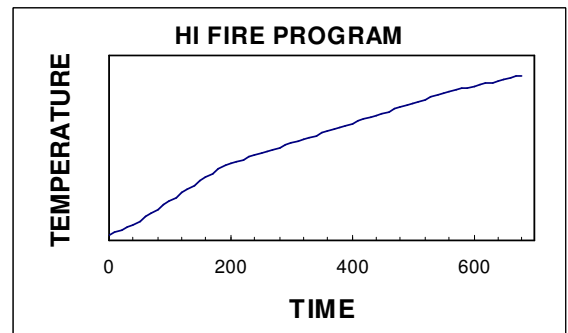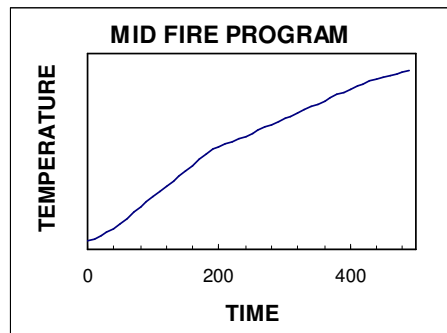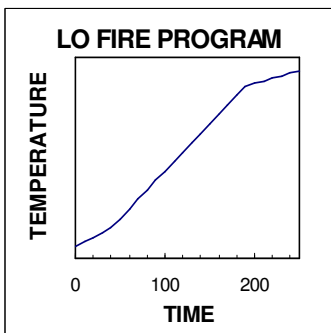
When the Controller is first turned on

The controller runs a brief self-diagnostic test and displays a Splash screen. After a few seconds, the display will show the Home screen and Standby mode where the controller is not actively firing the kiln or being programmed for a firing.

Sleep Screen

When the controller is in STANDBY mode, if the touchscreen is inactive for 5 minutes, the screen will go to sleep mode. The screen will go black and the main temperature will be the only thing reported. Touch the screen to awaken.

0100°F

Touch To Wake
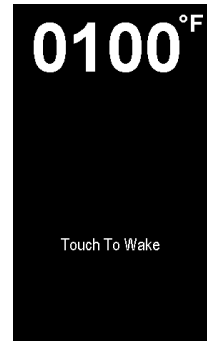
Home Screen

The Home screen provides access to all the features and status reports for the controller.

Temperature:
Touch to change color

Temperature Units:
F or C

0100°F

No Program Selected

STANDBY

Program name:
Active Program

START

Status:
Firing Status

START:
Begin a new Firing

PROGRAM

OPTIONS

Program:
Slide Left for Program setup or selection

Options:
Slide Right for Firing options

History:
Firing Results
Logs
Part status

Settings:
Configuration
Preferences
About Info
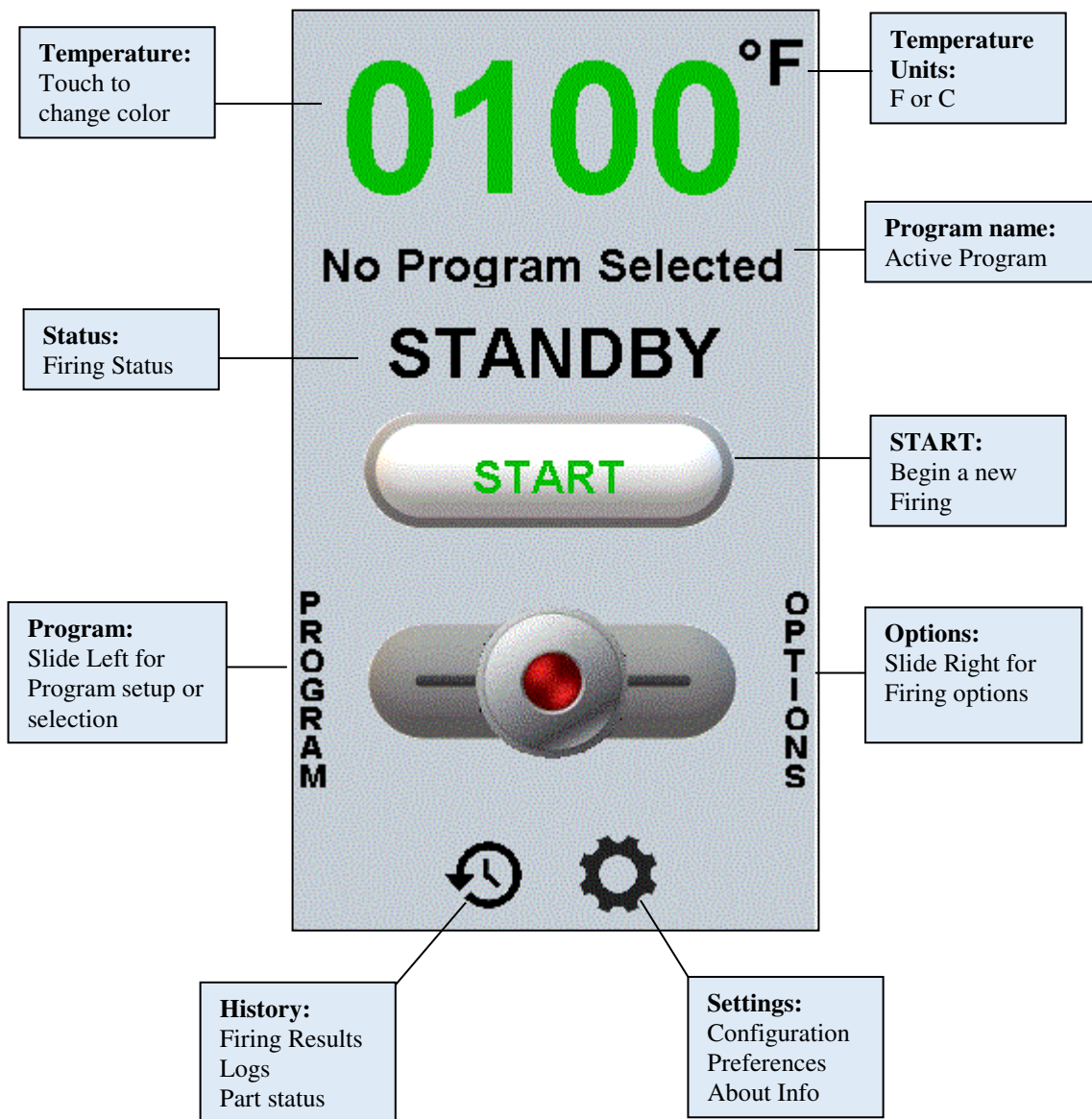
Temperature Display

The temperature display reports the thermocouple temperature or an average of the multiple thermocouple temperatures. The color of the main temperature display can be changed from Green to Red to Black by touching the display area.

(Four dashes) appear on the controller display during power up. The 4 dashes are in place of the normal thermocouple display temperature. This allows time for the initial temperature measurement to stabilize before it is displayed.

For Multizone, the temperature display will show the average thermocouple of all the thermocouple inputs.

Temperature Units

If your controller is configured to display temperature values in °F, heating rates will be programmed as Degrees Fahrenheit per hour and target temperatures will be programmed as Degrees Fahrenheit. If your controller is configured to display temperature values in °C, heating rates will be programmed as Degrees Centigrade per hour and target temperatures will be programmed as Degrees Centigrade. To change the temperature units, see the Units screen.

Program Name

The name of the active firing program appears below the temperature display. User Program names can have custom labels.

Status

the line below the Program name reports the status of the controller, this line will also provide access to alarm and other information during an active kiln firing.

Status Messages	STANDBY………………During idle operation
	DELAY …………………During a delay period
	RAMP #...........................During a heating or cooling ramp
	HOLD #........................... During a hold period
	COMPLETE…………….Firing completed
	ABORT…………………Alarm terminated the firing
	STOPPED………………Operator Stopped the firing

During an active firing, the info button (circled i) will bring up the Info Screen.

Start/Stop/Confirm

The button in the center of the screen is used to Start or Stop a firing. It is also used to clear and recognize alarm messages when they appear. During an active firing, the START button becomes the STOP button.
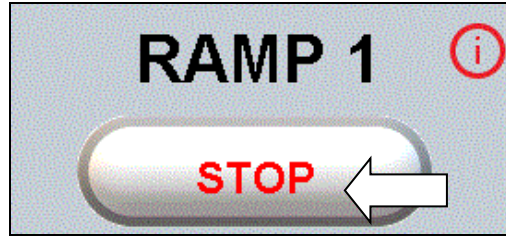
If the firing is stopped manually, the controller will ask for the command to be confirmed. Press the CONFIRM button to proceed with stopping the firing. If the stop command is not confirmed within 5 seconds, the stop command is ignored and the firing resumes.

Complete/Stopped/Abort

At the end of a firing, the controller will report the status and end results.

Status: Stopped Abort or Complete

Clear: Returns to Home screen and Standby status

Firing Time: Reports time from start to end

Final Temp: Reports end temperature

History Button
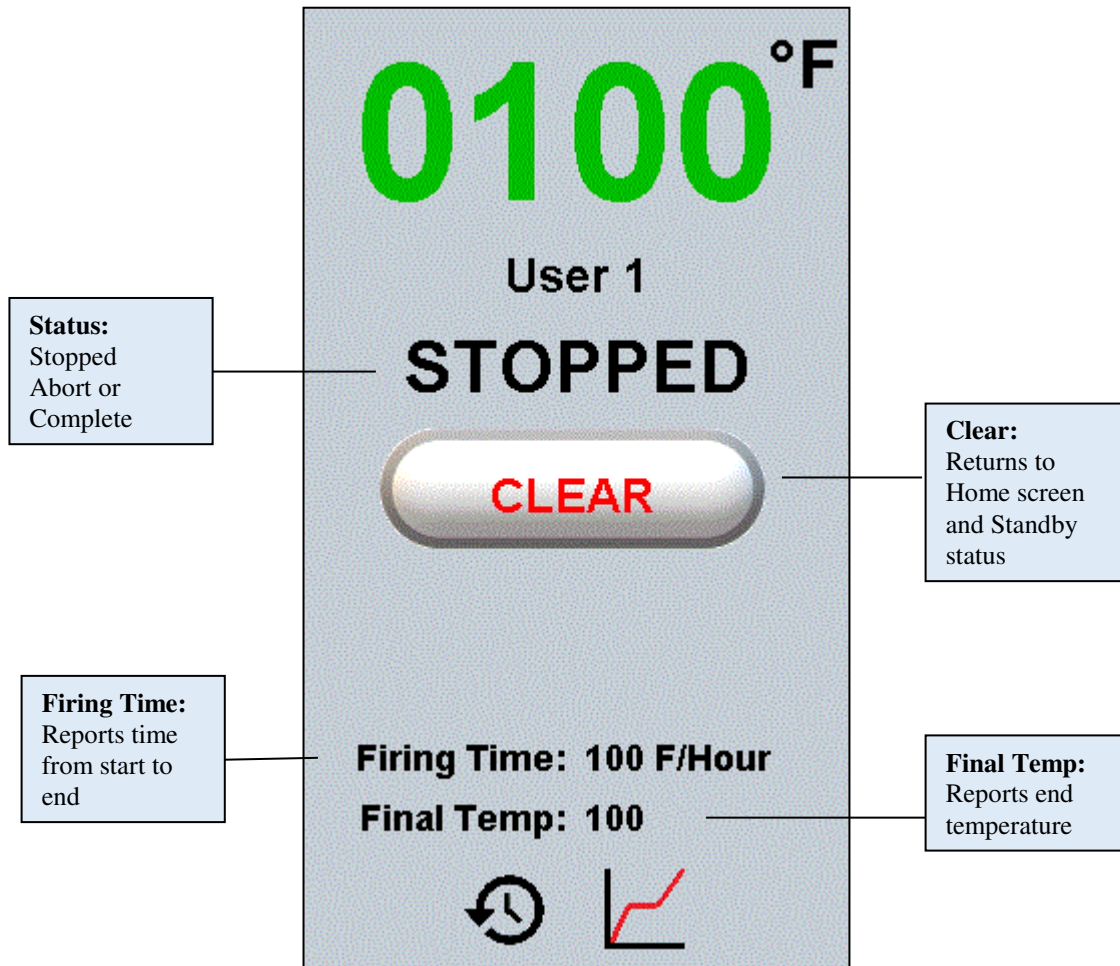
The clock icon at the bottom of the screen is used to access History logs and Parts screens for the controller.

Settings Button

The gear icon at the bottom of the screen is used to access setup and configuration settings for the controller.

Graph Button

During an active firing, the Settings button is replaced with a Graph button to view Time vs. Temp charts of the active firing.

Slide Button

The directional button provides access to controller Options and Program setup. To use the slide button, touch the center of the circle and drag it left or right.

Alarm Notifier

During an active firing, an alarm icon (circle A) appears on the status line to notify the user of active alarms.

Hold time Countdown

During an active firing, if the controller status is a Hold, the remaining hold time will count down above the temperature display. The time format is Hours:Minutes.

Expected firing Time

During Standby mode, if a program is loaded, the calculated firing time will appear above the temperature display. The time format is Hours:Minutes.

Delay time Countdown

During a delay period, the remaining delay time will count down above the temperature display. The time format is Hours:Minutes.
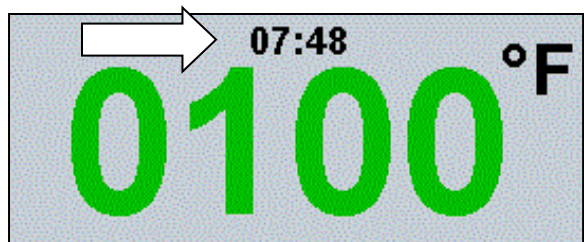
Program Selection Screen

To select a firing Program or to setup a new firing program, Use the Slide button on the Home screen to choose PROGRAM.

Delay:
Set a delay start time for the next firing.

Conefire:
Enable or disable Cone programs

High Limit:
Set a max temp limit for all programs

User Programs:
Slide Left for User Programs

Cone Programs:
Slide right for Cone Programs

Home button
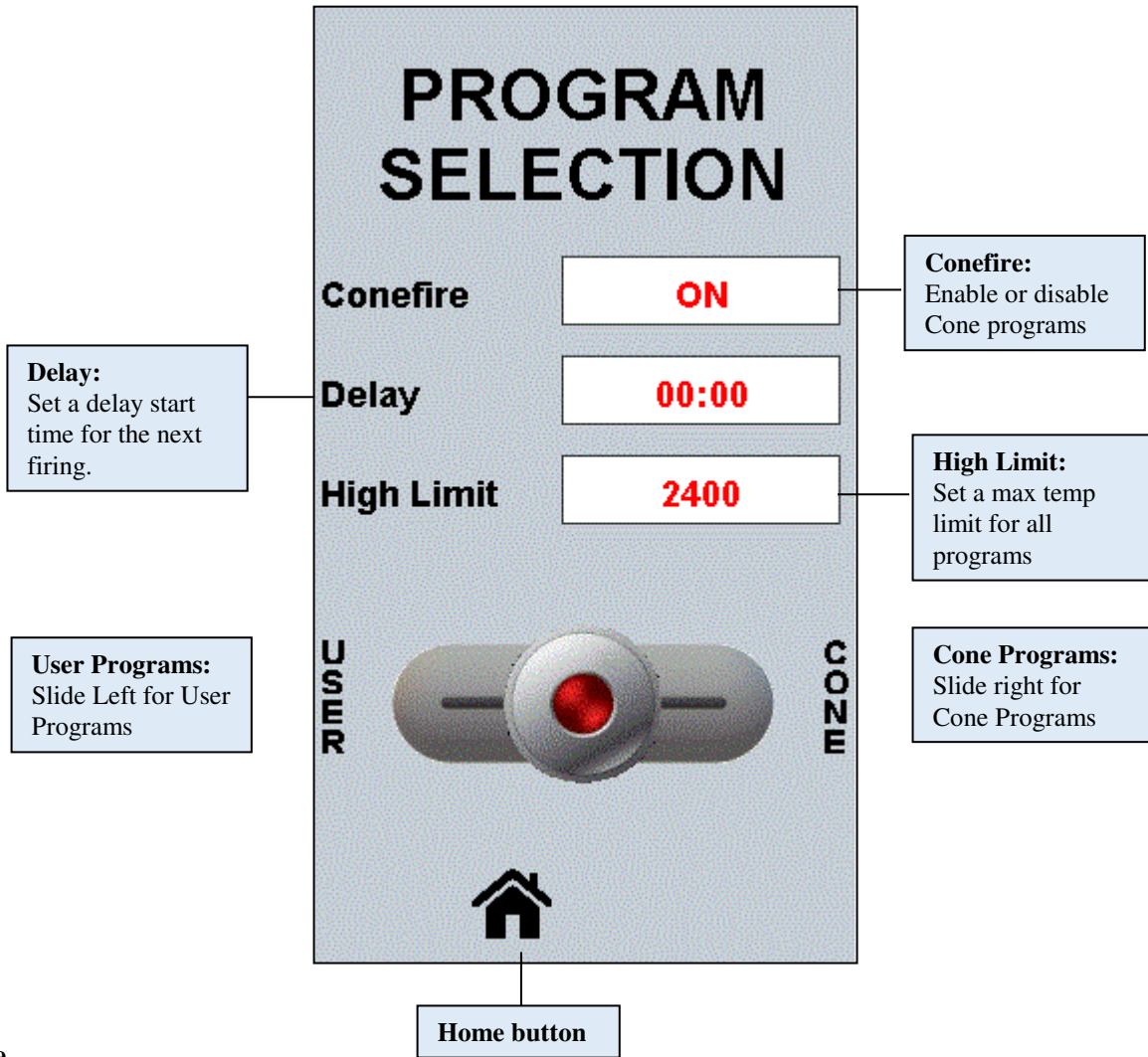
Conefire

If Conefire programming is not desired, this feature can be disabled on the Program Selection screen. Touch the setting field to switch ON or OFF.

Delay

Delay Start allows the operator to program a delay time prior to the firing. The delay time is initiated when the operator presses START from the HOME screen to begin the firing.

To set a delay time, Touch the delay time to bring up a keypad. Use the keypad to set a new delay time in Hours:Minutes format. Then press the SAVE button.

The maximum delay time is 99 hours and 59 minutes.

Delay time resets to zero after each firing.

High Limit

High Limit allows the User to set a maximum operating temperature for the firing. If the controller detects a higher temperature, it will abort the firing with a High Temp Limit alarm.

Home Button

Returns to the Home screen

Slide Button

The directional button provides the choice of selecting a preset Conefire program or a custom User program. To use the slide button, touch the center of the circle and drag it left or right.

Conefire Setup Screen

Preset firing schedules are easily selected for automatic programming of the controller heating rates, target temperatures and hold times.

Program:
Select a Cone number

Speed:
Select a firing speed

Preheat:
Set an optional preheat time

Hold:
Set an optional hold time at the end temperature

Cool:
Set an optional cooling rate for the end of the firing

Fan:
Choose a vent fan setting (if available)

Offset:
Set an optional offset

Load:
Load the program for the next active firing

Program Lock:
Allow or prevent program edits
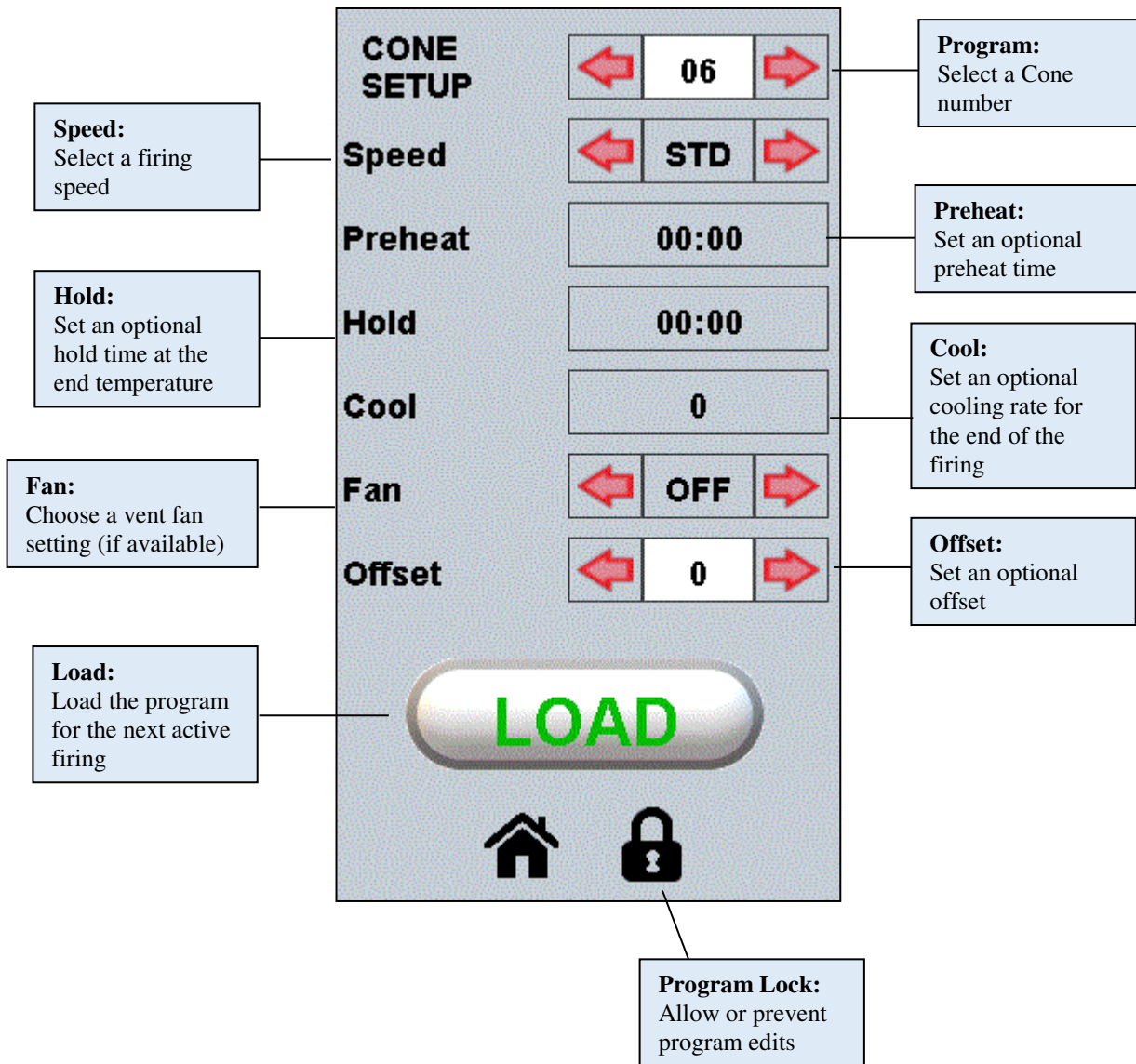
Cone Number

Select a cone number from 022 to 12. The Default Firing Program for the Cone Fire option is CONE 06.

Speed Adjustments

Speed allows the operator to increase or decrease the firing speed of a Cone-fire program. Early ramp rates can be increased or decreased up to 40%. The final ramp for a Cone-fire program is not chnaged. Preheat ramps are not affected by the Speed setting. Cooling ramps are not affected by the Speed setting.

Speed settings

F40	40% increase to Conefire Ramp rates (excluding preheat and final ramp rate)
FAST	20% increase to Conefire Ramp rates (excluding preheat and final ramp rate)
STD	0% change to Conefire Ramp rates
SLOW	20% decrease to Conefire Ramp rates (excluding preheat and final ramp rate)
S40	40% decrease to Conefire Ramp rates (excluding preheat and final ramp rate)

An example of the Cone 06 firing schedule with a 40% fast speed is shown below

Cone 06	Rate 1	Target	Rate 2	Target	Rate 3	Target	Rate 4	Target
STD	180C/hr	550	85C/hr	600	100C/hr	938	60C/hr	998
F 40	**252C/hr**	550	**119C/hr**	600	**140C/hr**	938	60C/hr	998

Preheat

A Preheat ramp is a fixed heating rate of 33ºC(60ºF)/hour to 93ºC/200ºF. The hold time is variable. The default setting for the Preheat hold time is zero. When the Preheat hold time is set to zero, there is no Preheat ramp.

The preheat hold time is set in the format of Hours:Minutes. The maximum preheat hold time is 99 hours.59 minutes.

Hold

Allows for an optional HOLD time at the final heating temperature. When the Hold time is set to zero, there is no Hold at the final heating temperature.

The preheat hold time is set in the format of Hours:Minutes. The maximum preheat hold time is 99 hours.58 minutes.

If the controller heat work function adjusts the final heating temperature, the programmed Hold time will be performed at the adjusted temperature.

Cool

allows the operator to have an optional cooling ramp for the Conefire programs. The maximum cooling rate is limited to 180F(100C)/hour. The cooling temperature is fixed at 392F(200C)

The cooling rate is set in units of degrees per hour, degrees per minute or Time to temperature dependent on the RATE setting on the UNITS screen.

Fan

allows for an optional vent fan control output that is controlled during the kiln firing. This option requires the appropriate hardware installed for one of the two Aux Outputs.

FAN settings

ON	Fan relay is on during entire firing and remains on until the firing is completed and cleared
OFF	Fan relay is off during entire firing
OPT	Fan relay is on until the beginning of the final heating ramp. Off for the remainder of the firing.

Note: If neither Aux Output1 or Aux Output2 are set to 'VFAN' the Fan option is inactive.

Offset

Cone Offset allows the operator to adjust the temperature range of the final heating ramp for Conefire programs. The offset is applied to both the starting ramp temperature and the ending ramp temperature.

Cone Offset settings

-20F or -11C	Final heating ramp temperatures reduced 20F / 11C
-15F or -8C	Final heating ramp temperatures reduced 15F / 8C
-10F or -6C	Final heating ramp temperatures reduced 10F / 6C
-5F or -3C	Final heating ramp temperatures reduced 5F / 3C
0	No Offset
+5F or +3C	Final heating ramp temperatures increased 5F / 3C
+10F or +6C	Final heating ramp temperatures increased 10F / 6C
+15F or +8C	Final heating ramp temperatures increased 15F / 8C
+20F or +11C	Final heating ramp temperatures increased 20F / 11C

LOAD Button

When program setup is complete, press the LOAD button to exit the setup screen and return to the Home screen. The firing can then be started from the Home screen.

LOCK Button

The padlock button allows the program firing options be locked to prevent edits. To lock a program, touch the lock icon and use the pop-up keypad to enter the passcode required to change the lock status.

When the keypad screen appears, you can key in the default passcode [3] to lock or unlock a program. Then press the ENTER button.

To change the passcode, you must first key in the current passcode, then press the SET button to key in a new passcode.

To reset the passcode to [3], use the RESET option on the ABOUT screen.

Note: When locked, program settings cannot be changed but the program can still be run.

Review or Edit a CONE Program

The operator can edit the active program while the firing is in process. During the active firing, use the Slide button to select Program. On the CONE SETUP screen, edit the parameters that are active as needed. Some parameters are not available for editing.

Press the UPDATE button to return to the HOME screen.

Note: When locked, program parameters cannot be changed.

User Program Setup Screen

Custom firing schedules are programmed by setting the desired heating rates, target temperatures and hold times. 35 User Programs are available. The User Program mode allows you to customize your firing schedule and specify how fast the kiln heats or cools to any temperature. All Programs allow 20 ramp steps. Each ramp step consists of a heating rate (or cooling rate), a target temperature and a hold time.

Program:
Select a Program number 1-35

Program Name:
Assign a program name/label

Rate:
Set ramp speed for each program step

Temp:
Set target temp for each program step

Fan:
Set Fan control for each program step

Hold:
Set Hold time for each program step

Load:
Load the program for the next active firing

Program Lock:
Allow or prevent program edits

USER SETUP — 1 — User 1

	Rate	Temp	Hold	Fan
1	100	800	00:00	OFF
2	0	32	00:00	OFF
3	0	32	00:00	OFF
4	0	32	00:00	OFF

LOAD

User Program Number

Select a program number from 1 to 35. The Default Firing Program is Program #1.

Program Name

Touch the name field and a pop-up window appears with keypad. Use the keypad to type a program name and SAVE. The program name will appear on the Home screen when the program is loaded.
Special keys on the keypad include;
Key [SP] provides a space for the entry.
Key [BK]is a Back key to back up one character.
Key [CLR] is a Clear key to clear the entire entry.

Table Entries

Touch any active field in the table to program a value. Use the pop-up keypad to type a value and SAVE.
The value will appear in the program table.
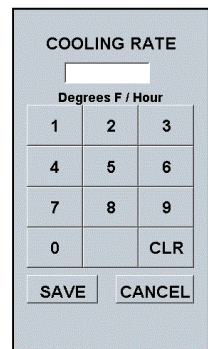
Rate

Each program step requires you to program the desired ramp rate.

Rate is the speed of the ramp step. Rate is programmed as Degrees per Hour if the RATE option is set to HOUR. Some calculations may be required to determine your desired heating rate.

Example; if you know that you want to heat the kiln from room temperature (75°F) to 212°F over a 2 hour period, First determine the amount of temperature rise:

$$\textbf{212 - 75} \qquad \textbf{=} \qquad \textbf{137 degrees}$$

Then divide the amount of temperature rise (or drop) by the number of hours you would like it to take to get there. (For Example, 2 hours)

$$\textbf{137 / 2} \qquad \textbf{=} \qquad \textbf{68.5 degrees per hour}$$

Round the calculated rate to the nearest whole number and your heating rate would be 69 degrees/hour.

If you prefer to program heating and cooling rates in 'degrees per minute', adjust the RATE option in the options menu to MIN.

If you prefer to program heating and cooling rates in 'Hours and Minutes', adjust the RATE option in the option menu to TIME.

Maximum Ramp Rates

When the Ramp Rate is set above **1798F(998C)** degrees per hour or **29.97F(16.65C)** degrees per minute or **00.00** Time, the controller will interpret this as full power for a heating ramp. This will allow the kiln to heat as fast as possible to the target temperature without rate control. If the ramp is a cooling, the controller will interpret the same values as <u>no</u> power and allow the kiln to cool as fast as possible without rate control.

A Program Review will show the message **MAX** to indicate the uncontrolled rate. Deviation alarms will not be active during the max heating/cooling ramp.

Caution: Overshoot in temperature may occur when heating at full power, especially at lower temperatures.

Target Temperatures

Each ramp step requires you to program the desired target temperature.

Caution: Do not program target temperatures that exceed the temperature rating for your kiln. The maximum programmable value for target temperatures can be viewed on the About screen 'Safety Temp' setting.

Cooling Ramps

Cooling ramps are programmed the same as heating ramps. You must program the Rate for the cooling and the target temperature. The criteria for a cooling ramp is the target temperature must be lower than the preceding target temperature.

If you program a target temperature at the end of the firing that is below your room temperature, the controller will never be able to complete the firing. This may result in a **'Firing Stalled'** alarm. To avoid this alarm, manually stop the firing by pressing the STOP button or program a higher temperature to complete the firing.

Hold Time

Hold time refers to the amount of time you want the kiln to remain at the target temperature. Hold Time is often referred to as Soak or Dwell Time. Each ramp allows the option of programming a hold time. Hold time is programmed in Hours and Minutes.

During a Hold time, the controller will count-down the remaining time of the Hold on the Home screen above the main temperature display.

Touch any active field in the table to program a value. Use the keypad to type a value and SAVE. The value will appear in the program table.

Indefinite Hold Times

Programming a hold time value of 99 hours 59 minutes will result in a Hold time that is indefinite. To end the hold, the operator must press STOP or use the SKIP feature to move forward to the next program ramp.

Review or Edit a USER Program

The operator can edit the active program while the firing is in process. During the active firing, use the Slide button to select Program. On the USER SETUP screen, edit the parameters that are active as needed. Some parameters are not available for editing.

Press the UPDATE button to return to the HOME screen.

Note: When locked, program parameters cannot be changed.

User Program Vent Fan (Optional)

If your controller has been configured to control an auxiliary vent fan, each ramp step will allow the fan to be

turned on or off during the specified ramp.

To set the fan to **On or OFF**, touch the field setting.

Options Screen

To set firing options, Use the slide button on the Home screen to choose OPTIONS.

TC Offsets: Thermocouple offsets for available thermocouples

Alarm Deviation: Sensitivity for non-terminating deviation alarms

Setpoint Alarm: Notification when a temperature is reached

Over Temp: Sensitivity for over temp shutdown

Power Balance: Regulate kiln temp/power top to bottom

Center Power: Regulate kiln temp/power center zone.

Settings: Configuration Preferences About Info

TC Offsets

Adjust for known thermocouple errors with an offset. This offset adjusts the thermocouple reading on the controller up to ± 45°F(25°C). Can be used to compensate for inaccurate temperature readings resulting from aged or poorly positioned thermocouples. Temperature offset applies to all firings.

To Program the offset, touch the arrow buttons to increase or decrease the offset value.

If you want the kiln to fire Hotter, the offset should be a negative value. The controller will think the temperature is lower than actual and this will cause the firing temperature to be hotter.

If you want the kiln to fire Cooler, the offset should be a positive value. The controller will think the temperature is higher than actual and this will cause the firing temperature to be cooler.

Alarm Deviation

Allows the operator to set a temperature deviation value for activating the non-terminating deviation alarms; Fail To Heat, Fail To Cool and Low Temp Deviation. To program the value, touch the field for a pop-up keypad. Key in the value and SAVE. The default value is 100F or 56C

Note: for MAX ramp rates the deviation alarms are disabled for the MAX ramp segment regardless of this setting. To disable the deviation alarms completely, set the value to 32F or 0C

Setpoint Alarm

Use this setting for an audible and visual alarm when the controller reaches a temperature. To program the value, touch the field for a pop-up keypad. Key in the value and SAVE. The alarm is disabled with a value setting below 32F or 0C. You can program the alarm before you start the firing or reset it during the firing.

When the kiln reaches the alarm temperature, the Threshold Alarm will appear and the buzzer will sound. Silence the alarm on the Status screen.

Over Temp

Allows the operator to set a temperature deviation value for activating the controller's terminating over-temperature alarm. To program the value, touch the field for a pop-up keypad. Key in the value and SAVE. The default value is 100F or 56C

Note: The overtemp alarm cannot be disabled. The maximum deviation value is 200F or 111C.

Power Balance

The balance option only appears if the controller is configured for 1 thermocouple and more than one relay output. The setting changes the amount of power being supplied to the top and bottom heating elements by selecting a power percentage between 0% and 200%. This is the percentage of power going to the top heating elements. Values less than 100 reduce power to the top, while higher values increase power to the top. The power to the bottom heating element is automatically changed. This feature can be used if the kiln is not heating uniformly.

100% is the factory default. This applies 100% of available power to both the top and bottom elements. Changing the setting to 150% would increase the power to the top elements by 50%, while decreasing power to the bottom elements by 50%. The balance can be changed in increments of 10%. To adjust the setting use the arrows to increase or decrease the value.

Center Power

The Center power option only appears if the controller is configured for 1 thermocouple and 3 relay outputs. The setting changes the amount of power being supplied to the center heating elements by selecting a power percentage between 0% and 200%. This is the percentage of power going to the center elements. Values less than 100 reduce power to the center, while higher values increase power to the center. This feature can be used if the kiln is not heating uniformly.

100% is the factory default. This applies 100% of available power to the center elements. Changing the setting to 150% would increase the power to the center by 50%, The balance can be changed in increments of 10%. To adjust the setting use the arrow to increase or decrease the value.

Info Screen

During an active firing. The info screen is available by touching the (Circle i) button that appears on the Status line.

Temperature: Current temperature

Setpoint: Control Setpoint

Rate/Hold: Actual ramp rate or remaining hold time

Status: Program status

Zone saturated: Symbol for zone control problem

Diagnostics: Shows Output power and amps

Diagnostics: Shows relay activity and thermocouple temperatures

Skip: Skip to the next program ramp step

Add time: Add 5 minutes to the current program ramp step

Sound: Silence the audible alarm

Temperature

Same as the Home screen. This is the main temperature display

Setpoint

Reports the controller setpoint to be compared with the actual temperature. The setpoint value should be close to the actual temperature if the kiln is performing well.

Rate/Hold

Reports the actual heating rate during a ramp or the remaining hold time during a hold.

Status

Reports the program segment in progress.

Zone control Performance

If a triangle appears next to a heating zone, this represents a problem with the zone falling behind the program

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ramp rate and the power to the zone is at maximum (100%). The controller will no longer maintain zone control for this zone. This condition typically occurs with a failed heating element or relay component.

Diagnostics

Reports the individual thermocouple temperatures, relay activity (ON or OFF) and reports the output power from 0-100% for each output. Amps are reported if the controller is equipped with optional current transformer hardware.

SKIP

To end a hold before the time has expired or to simply advance to the next program step, use the Skip button. Skip is not active if the program status is reporting the final program step.

Add Time

To increase the hold time before the time has expired. Add-Time allows the operator to increase the amount of hold time that is programmed for the current ramp segment in 5 minute increments. Each time the button is pressed, 5 minutes is added to the total hold time which is displayed directly below the ADD TIME button.

Add-Time changes that are programmed during the kiln firing are not retained in the program memory. These changes are not permanent and will not appear in the program review after the completion of the firing.

History Screen

The History screen is accessed from the Home screen. Touch the Clock icon at the bottom of the screen.

Recent Results:
Reports the last 3 firing results

Logs:
Slide left for performance logs and data

Parts:
Slide right for part monitors
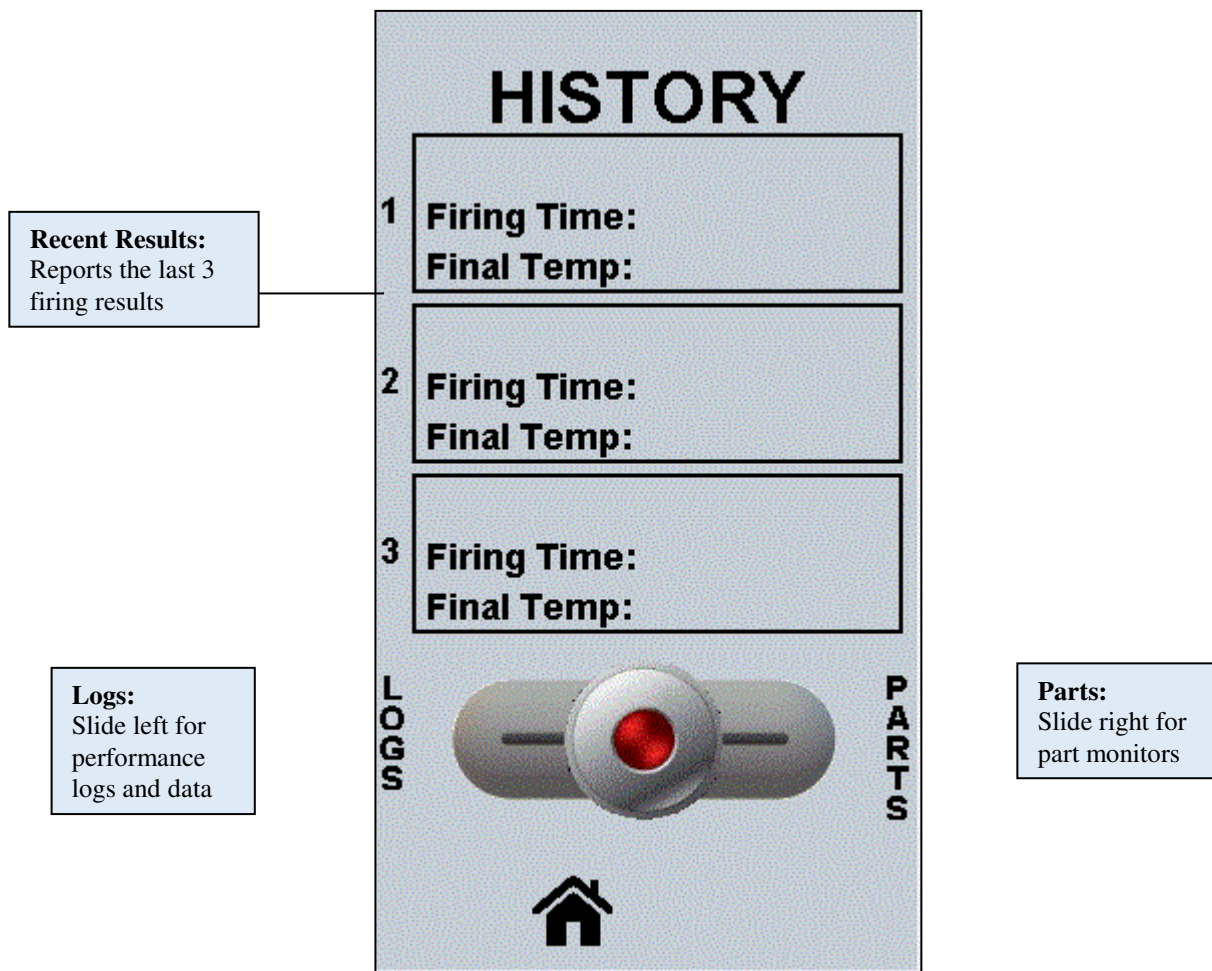
History Results

The completion status and results can be reviewed for the last 3 firings.

Slide Button

Use the Slide button to see additional logs and monitors

Log Screen

The Log screen displays performance data from past usage. Use the Slide button to select Logs from the History screen.

LOGS
(Most Recent Aborts)

1
2
3
4
5
6

Recent alarms:
Reports the last 6 alarms

Max Temp	0
Firing Hours	00:00
Resets	0

Max Temp:
Reports the highest temp recorded for active firings

Firing Hours:
Records the hours logged for all firings

Resets:
Records the number of resets performed
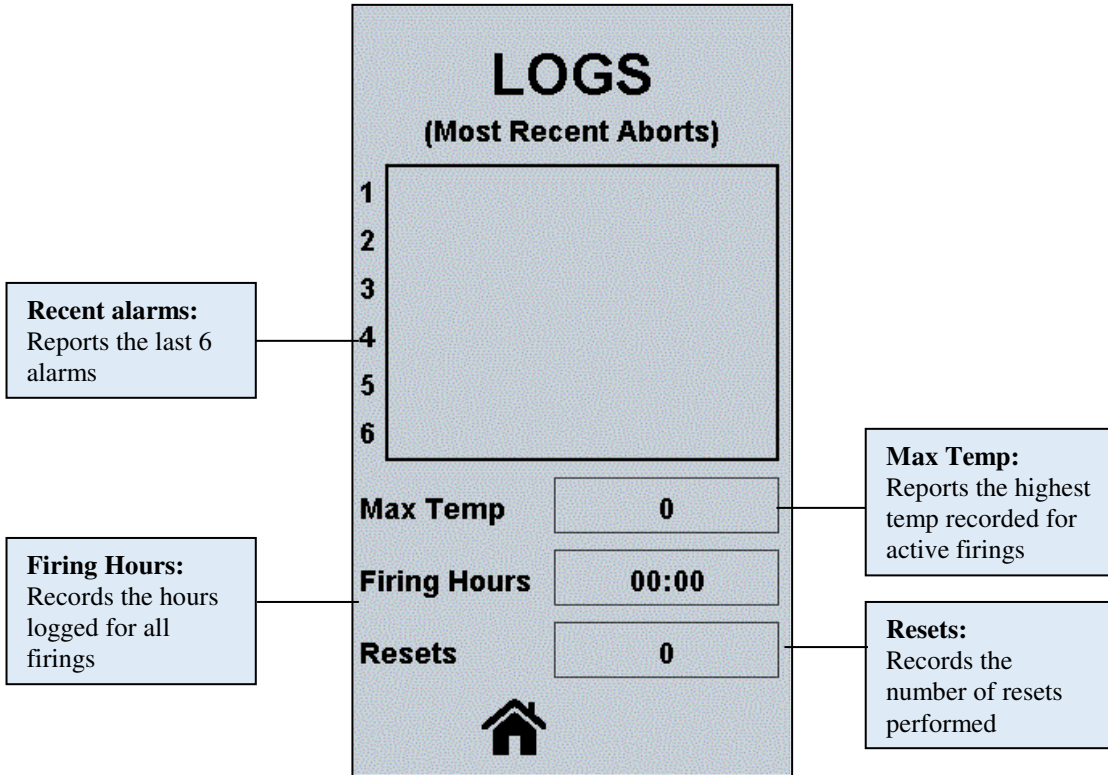
Parts Screen

The Parts screen monitors the usage of the thermocouples and relays. Over time, it can be a useful tool for preventive maintenance.

When new parts are installed, touch to zero out the usage monitors. These reports can provide an idea of how long parts may last with normal usage.

PARTS

Relay Cycles (Touch to Zero)

Top	0
Mid	0
Bot	0

TC Hours (Touch to Zero)

Top	0
Mid	0
Bot	0
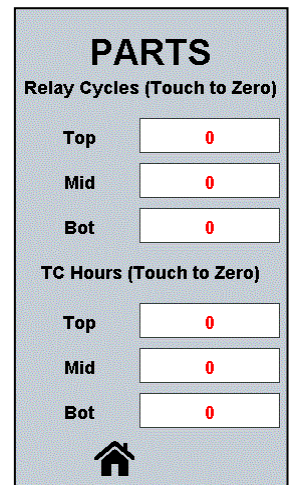
Graph Screen

During an active firing the Graph screen is available to view the progress and firing profile of the firing in real-time. The graph plots Time vs. Temperature for each thermocouple and for the controller setpoint. Touch the Graph button at the bottom of the Home screen.

Legend:
Color coded graph plots

Graph:
Real time plots of Time vs. Temp

Pan Left:
Slide Left to pan Left in the Zoom view graph

Pan Right:
Slide Right to pan Right in the Zoom view graph

View:
Switch between Full program view and zoom view.
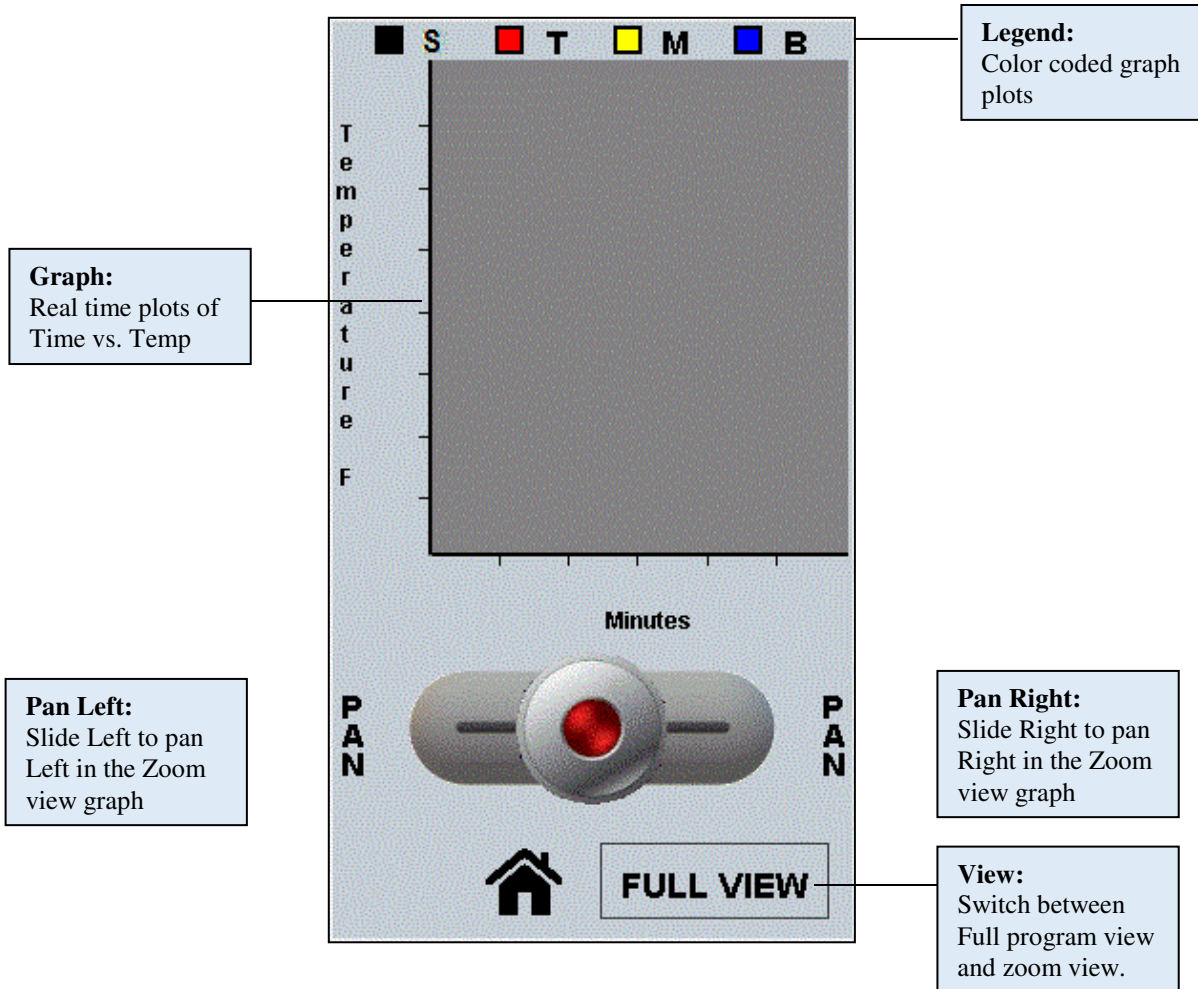
Legend

The color-coded legend identifies the graph plots. [S] is the control setpoint, [T] is the top thermocouple, [M] is the middle thermocouple, [B] is the bottom thermocouple. If the controller is configured for only one thermocouple, it is considered the middle thermocouple.

Graph area

As the firing progresses, the data will appear in real-time. Axis scaling is automatic.

Pan

In zoom view, Pan is used to view 1 hour increments of graph data. Slide the button left or right to move left or right along the X-axis. The slide switch appears when there is more than 1 hour of data available.

Full view
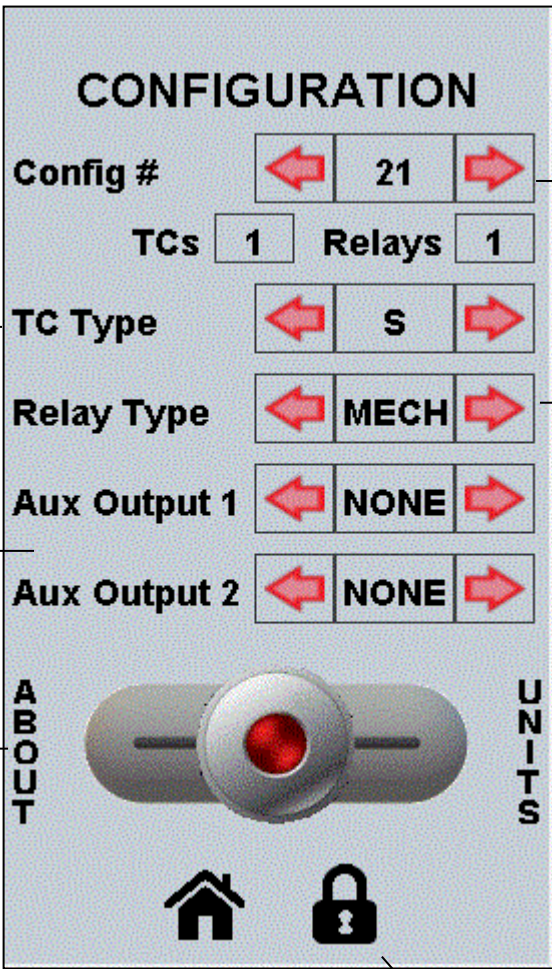
To see the entire graph, Touch the FULL view button to switch between a zoom view and full view. Full view requires more than 60 minutes of data.

Settings ⚙

The settings button is available from the Home screen and Options screen

Configuration Screen

The Configuration screen is accessed from the HOME or OPTIONS screen. Press the Setting button icon at the bottom of the screen to enter the configuration screen.

Config Number: Sets the number of relays outputs and thermocouple inputs

TC Type: Sets the input Thermocouple(s) type

Relay Type: Sets the output type

Aux Outputs: Sets the function for the Aux outputs

About: Slide Left for more controller information

Units: Slide Right for more user preferences

Program Lock: Unlock to change settings

Configuration Number

The configuration number establishes the input and output requirements for the controller.

CFG	Type	Heaters	Thermocouples
21	Single Zone	1	1
22	Single Zone	2	1
23	Single Zone	3	1
26	Multi-Zone	2	2
27	Multi-Zone	3	2
31	Multi-Zone	3	3

Thermocouple Type

This setting allows the operator to select a thermocouple type for the Analog input. Selecting the correct thermocouple type is critical for accurate temperature conversions.

Thermocouple Types

R	Type R (Platinum/Platinum-Rhodium 13%) Thermocouple
K	Type K (Chromel/Alumel) Thermocouple
N	Type N (Nicrosil/Nisil) Thermocouple
S	Type S (Platinum/Platinum-Rhodium 10%) Thermocouple

Relay Type

This option allows the operator to select a relay type for the controller top, middle and bottom zone outputs.

Relay Types

MECH	Mechanical relays	Slow on/off duty cycle (20 seconds)
SSR	Solid State Relay	Fast on/off duty cycle (5 Seconds)
4-20	SCR	Proportional

Aux Outputs

These settings allow the operator to select the control mode for the Auxiliary relay outputs. If the Relay type is configured for SSR or 4-20, Aux1 will default to the SAFE setting to allow only a safety relay function.

NONE	no function for Aux Output
SAFE	Safety relay function, output on during active firing only
VFAN	Activates Fan settings for USER programs Cone programs
ALRM	Output mimics the on-board buzzer for external alarm
CPT	Firing Complete function, output on when display is showing CPLT message

Slide Button

The directional button provides access to the ABOUT screen and the UNITS screen, touch the center of the circle and drag it left or right.

LOCK Button

The padlock button allows the configuration settings to be accessed. Touch the lock icon and use the pop-up keypad to enter the passcode required to unlock the screen. The passcode is 369.

When the keypad screen appears, key in the passcode. Then press the SAVE button. The configuration screen will reappear with fields that can be updated.

The configuration screen will automatically lock again when you exit the screen.

About Screen

The About screen is accessed from the Configuration screen Slide button.

Version:
Reports the
Autofire software
version

Board Temp:
Reports the circuit
board temperature

Safety Temp:
Reports the
maximum
programmable
temperature

Test:
Diagnostic test of
the inputs and
outputs

Reset:
Restore the
configuration
settings
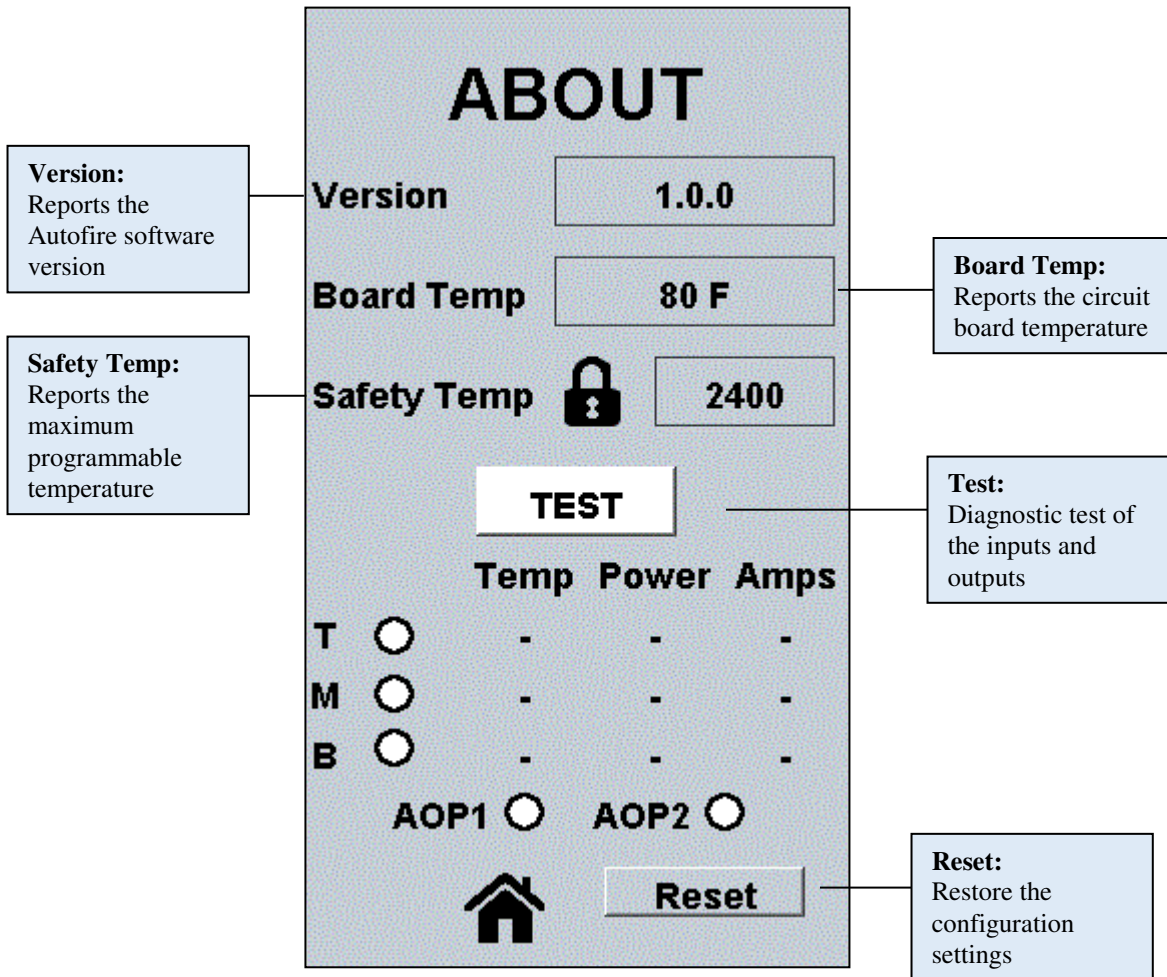
Version

Software version allows the operator to view the controller software version number.

Board Temp

Board Temperature allows the operator to view the measured board temperature. The on-board temperature is measured at the thermocouple junction.

Note: The 'Electronics Hot' alarm will activate with a board temperature above 176ºF (80ºC)

Safety Temp

Safety Temperature allows the operator to view the maximum programmable temperature limit for the programs.

Changing the Safety temperature requires a passcode. Touch the Lock image in the middle of the screen, key in the passcode 369 and SAVE to unlock the safety temp setting. When the screen returns to ABOUT, touch the setting field for a pop-up keypad. Key in the new max temp for the kiln and SAVE.

The Safety temp will automatically lock again when you exit the screen.

TEST

Test allows the operator to test the relay outputs and view the thermocouple temperature measurement. Test will also report the amperage for the system if the optional current transformer is available. Test functions are dependent on the controller configuration and Model numbers.

Test functions are active for 2 minutes or until the TEST button is pressed again to advance to the next test function. At the end of the final test function, the test completes.

When active. The controller will activate the specified relay output at 100% power.

Reset

Reset allows the operator to restore the Configuration settings.

Units Screen

The units screen is accessed from the Configuration screen Slide button.

Temperature: Select Fahrenheit or Celsius displays

$ / KWHR: Enter electricity usage cost from utility bill.

Last Cost: View calculated firing cost

Rate: Select degrees per hour, degrees per minute or Time for ramp rates

KW: Enter Wattage for kiln or oven

Cone Table: Look up temperature equivalent for Cones
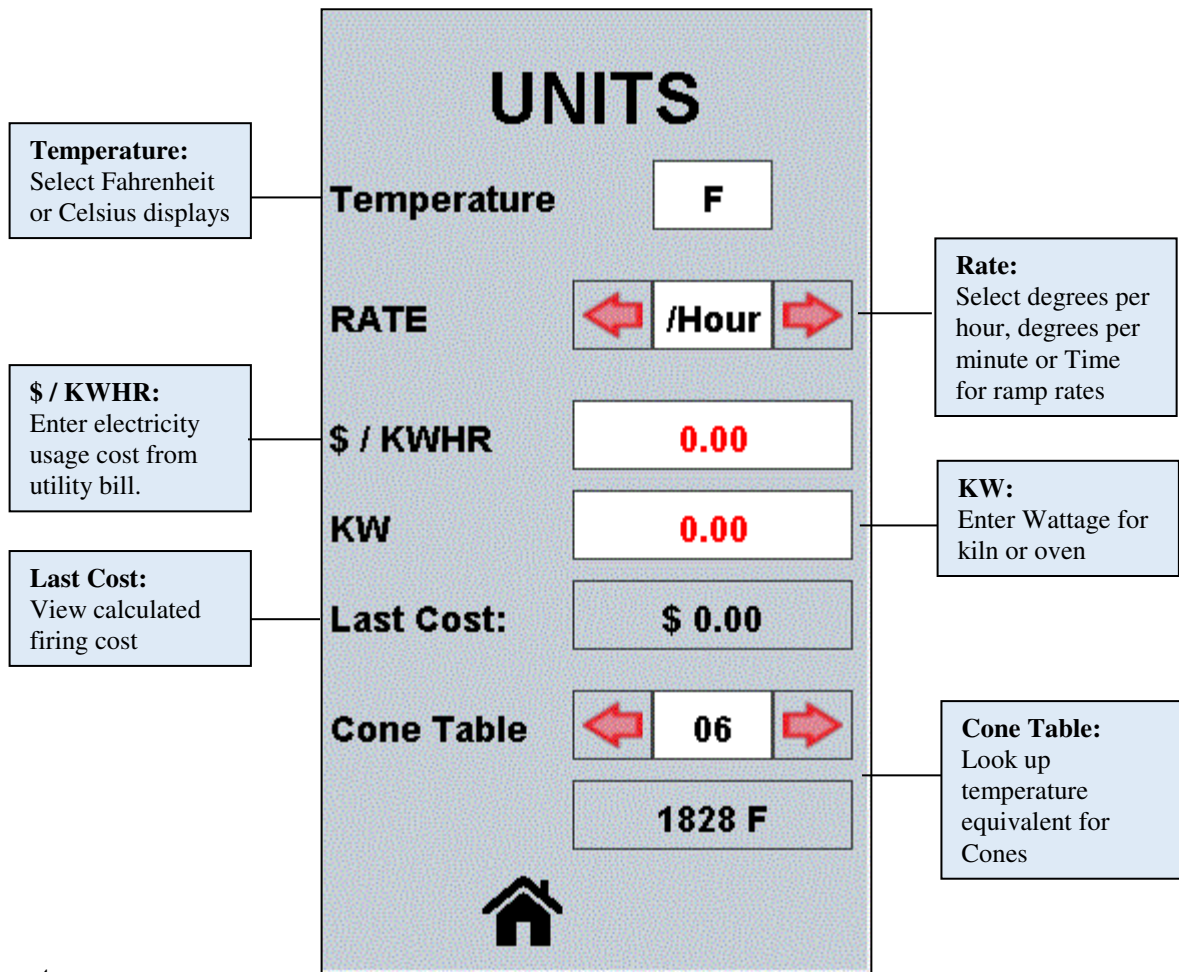
Temperature

Temperature units can be displayed in either degrees Fahrenheit (°F) or degrees Centigrade (°C). Touch to change the setting.

Rate

Rate units can be programmed as degrees per Hour, Degrees per Minute or Time to Temperature. Touch to arrows to change the setting.

$/KWHR

Allows the operator to set a cost value for Kilowatt Hour usage. This value is used to calculate a firing cost for review on the UNITS screen. The value must be entered by the user, it can usually be found on your electric bill. Cost calculations require a second value entry in the **KW** option. Cost calculations are only as accurate as the programmed variables. Touch the field to see a pop-up keypad. Key in the cost value and SAVE.

KW

Allows the operator to set a value for the Kilowatt rating of the kiln. This value is used to calculate a Kilowatt/Hour usage for review on the controller display. The wattage rating must be entered by the user, it can usually be found on the kiln's manufacturer identification label. Cost calculations require a second value entry in the **$/KWHR** option. Cost calculations are only as accurate as the programmed variables. Touch the field to see a pop-up keypad. Key in the wattage and SAVE.

Last Cost

allows the operator to view the calculated cost or calculated power consumption of a kiln firing. Calculations begin at the start of each new firing and are saved in memory until the start of the next firing. The operator can view the calculated value during the active kiln firing or after the kiln firing has completed while the controller is Standby.

Cost calculations require programmed variables for **KW** and **$/KWHR** options on the UNITS screen. If the known Kilowatt rating for the kiln is programmed into the **KW** option, the controller will calculate KWHR (kilowatt hours) and display the result. If a second variable of Cost per kilowatt hour is programmed into **$/KWHR** option, the controller will calculate the firing cost and display it in place of the kilowatt hours. If no values are programmed for both $/KWHR and KW, the controller will display nothing.

Cone Table

This lookup table displays the final firing temperature for a Cone number. Select the cone numbers and the equivalent target temperature will be displayed below. Values are based on self-supporting cones fired at the rate of 108°F (60°C) per hour during the final ramp step of the firing.

Alarms

Alarms are used to notify the operator of problems with the kiln performance or controller performance. Some alarms will terminate the kiln firing while others allow the firing to continue with the alarm condition on the display. Some alarms have no effect on the outcome of the kiln firing.

Thermocouple Alarms

|	
Thermocouple Failed	Thermocouple signal was lost during a firing, firing aborts **-**
-- -- -- --	Thermocouple failed while in Standby mode. Firing cannot start
TC Polarity -	Thermocouple polarity reversed, firing aborts
Thermocouple Response	Thermocouple is not heating, firing aborts
High Temp Limit	High Limit detected, firing aborts (check Program Selection screen High Limit)
Firing Stalled	Temperature is no longer increasing, firing aborts
Zone Temp Warning	Kiln is not firing evenly, firing aborts

Deviation Alarms

See Alarm Deviation and Over Temp on Options screen to adjust Deviations

Fail To Heat	Kiln is heating too slow, firing continues
Fail To Cool	Kiln is cooling too slow, firing continues
Low Temp Deviation	Kiln is losing hold temperature or cooling too fast, firing continues
Over Temp Warning	Kiln is overheating, firing aborts

Power Interruption Alarms

If a power interruption occurs, the firing may resume if all conditions are met when power is restored. To indicate a successful power recovery, The Home screen will show a lightning bolt in the top left corner.
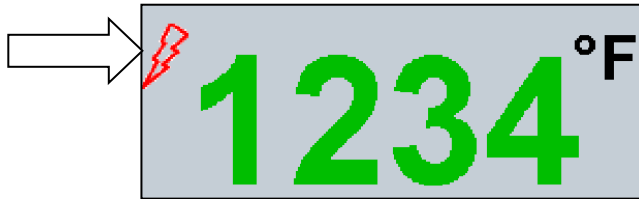
Power Failed – Temp Cool	Power failed during cooling, firing aborted because cooling temperature exceeded
Power Failed – Temp Low	Power failed, firing aborted because kiln is cool (below 212°F)
Power Failed – Temp Drop	Power failed during heating/hold, firing aborted because > 72°F temperature drop

Diagnostic Alarms

Bad Program	Invalid Program. Check kiln temperature is below program temperature.
Door Open	Safety door switch connection is open
Electronics Hot	Electronics above 80°C, firing aborts
Memory Device Fail	Failed to read or write to memory device, firing aborts, controller restarts
Thermocouple Noise	Thermocouple input signal is unstable, firing aborts, controller restarts

Note: For terminating alarms, the Home screen will show the status as ABORT. Press the CLEAR button to clear the alarm

Multi-Zone Control

Multi-zone controllers use more than one thermocouple to separately monitor and control different sections of the kiln. The temperature on the display represents the average temperature between the multiple thermocouples.

A multi zone controller can continue to operate as long as one thermocouple signal is present. However, thermocouple alarm messages should not be ignored. The controller can only perform zone control if all the thermocouple signals are available. If only one thermocouple signal is available, the controller will automatically switch to single-zone control.

Hardware Options

Audible alarm buzzer

The audible alarm can be disabled by removing the circuit board jumper on the back side of the controller. remove the jumper shunt labeled BUZZ ENABLE along the top edge of the circuit board.

Door/Lid switch

An optional door switch can be installed and connected to the controller. If not used, a jumper shunt is placed at circuit board location labeled LID.

The door switch acts as an optional safety device to prevent the relay outputs from being energized whenever the kiln door or lid is open.

Computer software

Computer software is available for remote monitoring and datalogging. The controller has a USB interface that outputs TIME, Temperature and Setpoint data. For more information on the optional computer software, contact Orton or visit www.ortonceramic.com

Reference Section

Appendix A – Low Fire Cone Programs

Cones O22 to O11

The low fire range is typically used to fire decals or decorations. Some decals, lusters, and gold have a limited firing range and may need to be fired more slowly.

The complete firing schedules for Cones **O22** to **O11** are shown below. The standard firing time is about 3-5 hours.

Degrees F

Low Fire Cone #	Ramp 1 Degrees/hour	Target °F	Ramp 2 Degrees/hour	Target °F
022	396	979	108	1087
021	396	1004	108	1112
020	396	1051	108	1159
019	396	1144	108	1252
018	396	1211	108	1319
017	396	1252	108	1360
016	396	1314	108	1422
015	396	1348	108	1456
014	396	1377	108	1485
013	396	1431	108	1539
012	396	1474	108	1582
011	396	1499	108	1607

Degrees C

Low Fire Cone #	Ramp 1 Degrees/hour	Target °C	Ramp 2 Degrees/hour	Target °C
022	220	526	60	586
021	220	540	60	600
020	220	566	60	626
019	220	618	60	678
018	220	655	60	715
017	220	678	60	738
016	220	712	60	772
015	220	731	60	791
014	220	747	60	807
013	220	777	60	837
012	220	801	60	861
011	220	815	60	875

Appendix B – Mid Fire Cone Programs

Cones O10 to O1

This firing range is used to fire earthenware and low temperature glazes. If the ware is not thoroughly dried, a preheat cycle can be added. With lead-free glazes, a 10 to 20 minute hold is beneficial.

Earthenware or other bodies containing ball clays, talc, and kaolin contain compounds such as water, carbon, and sulfur that are burned-off during the firing. The body will lose about 10% of its weight. In addition, a physical change in any silica present can cause cracking of ware unless the heating rate is slowed near 1063°F (573°C). This change occurs during both heating and cooling.

The complete firing schedules for Cones **O10** to **O1** are shown below. The standard firing time is about 7-9 hours.

Degrees F

Mid Fire	Ramp 1	Target	Ramp 2	Target	Ramp 3	Target	Ramp 4	Target
Cone #	Degrees/ hour	°F	Degrees/ hour	°F	Degrees/ hour	°F	Degrees/ hour	°F
010	324	1022	153	1112	180	1549	108	1657
09	324	1022	153	1112	180	1580	108	1688
08	324	1022	153	1112	180	1620	108	1728
07	324	1022	153	1112	180	1681	108	1789
06	324	1022	153	1112	180	1720	108	1828
05	324	1022	153	1112	180	1780	108	1888
04	324	1022	153	1112	180	1837	108	1945
03	324	1022	153	1112	180	1879	108	1987
02	324	1022	153	1112	180	1908	108	2016
01	324	1022	153	1112	180	1938	108	2046

Degrees C

Mid Fire	Ramp 1	Target	Ramp 2	Target	Ramp 3	Target	Ramp 4	Target
Cone #	Degrees/ hour	°C	Degrees/ hour	°C	Degrees/ hour	°C	Degrees/ hour	°C
010	180	550	85	600	100	843	60	903
09	180	550	85	600	100	860	60	920
08	180	550	85	600	100	882	60	942
07	180	550	85	600	100	916	60	976
06	180	550	85	600	100	938	60	998
05	180	550	85	600	100	971	60	1031
04	180	550	85	600	100	1003	60	1063
03	180	550	85	600	100	1026	60	1086
02	180	550	85	600	100	1042	60	1102
01	180	550	85	600	100	1059	60	1119

Appendix C – High Fire Cone Programs

Cones 1 to 12

The firing range of higher temperature bodies, such as stoneware and porcelain varies between Cone 4 and Cone 10. These bodies are fired nearly to vitrification and can shrink up to 16%. As with earthenware bodies, water, carbon, and sulfur are potential burnout materials and venting is important to remove gases generated. With the presence of silica, the firing needs to be slowed near 1063°F (573°C) to prevent cracking.

Typical porcelain bodies are formulated from kaolin, feldspars, silica, and ball clays. The weight loss during firing can be around 10 to 12% and shrinkage can approach 20%.

Porcelain bodies require good temperature uniformity at their final firing temperature. If slightly overfired, the body may warp or blister. On maturing, the body becomes its own "glaze." A hold time is usually desirable for best fired results.

The complete firing schedules for Cones **1** to **12** are shown below. The standard firing time is about 10-12 hours.

Degrees F

Hi Fire Cone #	Ramp 1 Degrees/ hour	Target °F	Ramp 2 Degrees/ hour	Target °F	Ramp 3 Degrees/ hour	Target °F	Ramp 4 Degrees/ hour	Target °F
1	324	1022	153	1112	162	1863	108	2079
2	324	1022	153	1112	162	1872	108	2088
3	324	1022	153	1112	162	1890	108	2106
4	324	1022	153	1112	162	1908	108	2124
5	324	1022	153	1112	162	1951	108	2167
6	324	1022	153	1112	162	2016	108	2232
7	324	1022	153	1112	162	2046	108	2262
8	324	1022	153	1112	162	2064	108	2280
9	324	1022	153	1112	162	2084	108	2300
10	324	1022	153	1112	162	2129	108	2345
11	324	1022	153	1112	162	2145	108	2361
12	324	1022	153	1112	162	2167	108	2383

Degrees C

Hi Fire Cone #	Ramp 1 Degrees/ hour	Target °C	Ramp 2 Degrees/ hour	Target °C	Ramp 3 Degrees/ hour	Target °C	Ramp 4 Degrees/ hour	Target °C
1	180	550	85	600	90	1017	60	1137
2	180	550	85	600	90	1022	60	1142
3	180	550	85	600	90	1032	60	1152
4	180	550	85	600	90	1042	60	1162
5	180	550	85	600	90	1066	60	1186
6	180	550	85	600	90	1102	60	1222
7	180	550	85	600	90	1119	60	1239
8	180	550	85	600	90	1129	60	1249
9	180	550	85	600	90	1140	60	1260
10	180	550	85	600	90	1165	60	1285
11	180	550	85	600	90	1174	60	1294
12	180	550	85	600	90	1186	60	1306

Appendix D – User Program Charts

User Program # 1

Ramp #	Rate: °/hr	Temperature	Hold Time	Vent Fan: on/off
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

User Program # 2

Ramp #	Rate: °/hr	Temperature	Hold Time	Vent Fan: on/off
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

User Program # 3

Ramp #	Rate: °/hr	Temperature	Hold Time	Vent Fan: on/off
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

User Program # 4

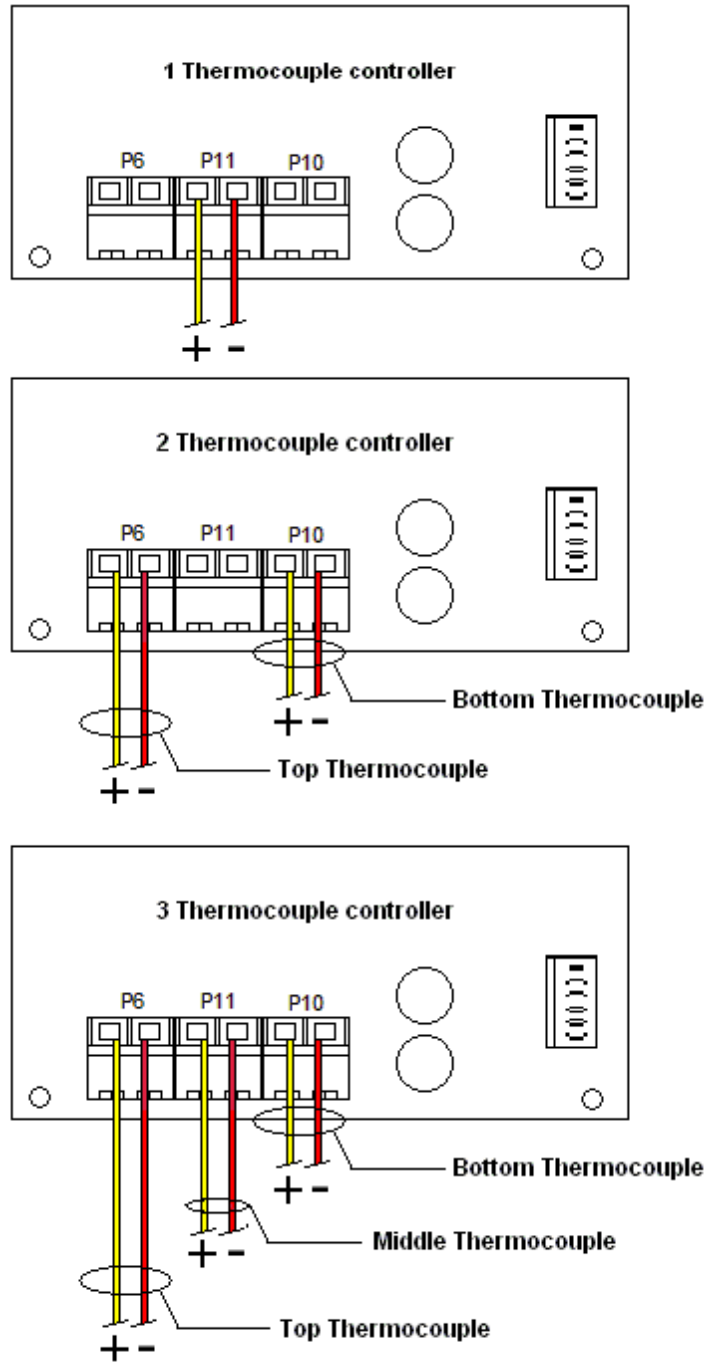| Ramp #	Rate: °/hr	Temperature	Hold Time	Vent Fan: on/off
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Appendix E – Connecting Thermocouples

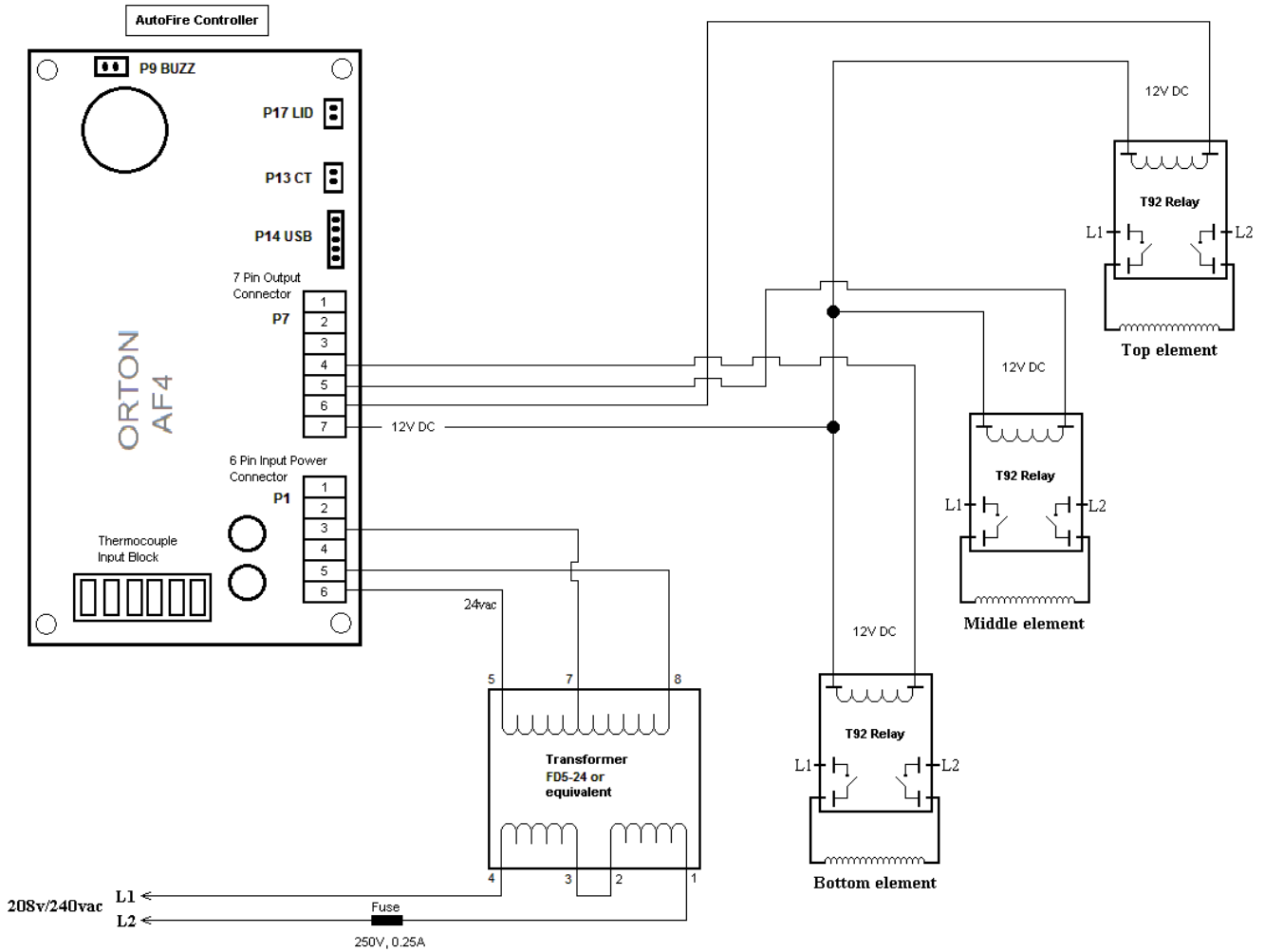For thermocouples, the color-coded wires should always include a red wire. The red wire is the negative leg.

For Type K, the positive leg is yellow.
For Type N, the positive leg is orange.
For Type S and Type R, the positive leg is black.
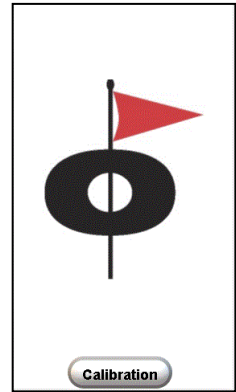
Appendix F – Typical Wiring Diagram

Appendix G – Calibration

For temperature calibrations, connect a precision DC millivolt source set to 0.000mv to input TC1 at terminal block P6.

Prior to calibration, check the Setting screen for Type K thermocouple setting

Power on the controller and press the CALIBRATION button that appears during the SPLASH screen.

A to D Calibration Span

1. Set DC millivolt input at P6 to 0.000mV
2. Press the CAL button next to the 0.000mV label on the CALIBRATION screen
3. Wait for the RUNNING message to show SUCCESS
4. Set DC millivolt input at P6 to 25.000mV
5. Press the CAL button next to the 25.000mV label on the CALIBRATION screen
6. Wait for the RUNNING message to show SUCCESS
7. Power off the controller or choose a new calibration procedure from CALIBRATION screen.
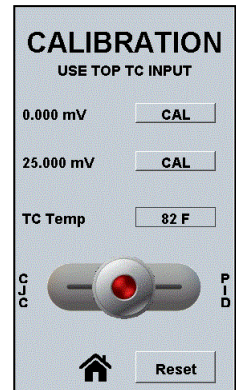
### CJC Board Temperature Correction - Cold Junction Compensation

1. From the CALIBRATION screen, use the Slide button to select CJC
2. Set DC millivolt input at P6 to 0.000mV or jumper TC1 input at P6
3. Observe the TC TEMP reported on the screen
4. Compare the TC TEMP with a known actual room TEMP reference
5. Enter an offset value into the CJC offset field to make the TC TEMP equal to room temp.
6. Set DC millivolt input at P6 to 50.000mV.
7. Observe the TC TEMP reported on the screen, it should be 2295F +/-5
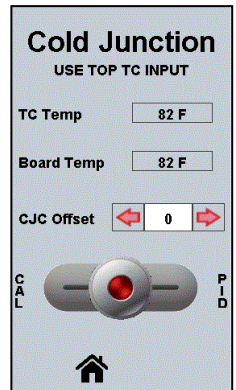
PID Tuning Parameters

The Default PID terms are;   P = 3.000, I = 0.010 and D = 0.010

1. From the CALIBRATION screen or CJC screen, use the slide button to select PID
2. Touch the value fields for a pop-up keypad
3. Key in new values for the P, I or D fields, Save the new values with each entry.
4. Press the HOME button to return to the HOME screen
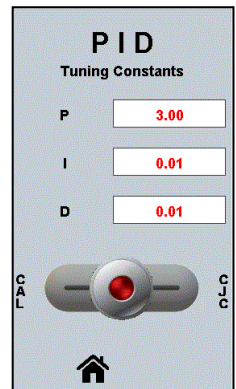
Limited Warranty

This limited warranty is given only to the immediate purchaser ("Buyer") of the Autofire® Slide Kiln Controller . This limited warranty is not transferable. The Edward Orton Jr. Ceramic Foundation ("Orton") warrants the controller motherboard and display installed on the Autofire® Kiln Controller ("Warranted Components") to be in good working order under normal operating conditions for a period of two (2) year from the date of purchase. Should the Warranted Components fail to be in good working order at any time during the stated two (2) year period, Orton will, at its option, repair or replace the Warranted Components as set forth below. The liability of Orton is limited to replacement and/or repair at its factory of the Warranted Components that does not remain in good working order. Repair parts or replacement products will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts or products become the property of Orton. Following receipt of notice from Buyer of a valid warranty claim and the Autofire® Kiln Controller containing the Warranted Components, Orton will perform its obligations under this limited warranty within 10 business days.

Limited warranty service may be obtained by delivering the Autofire® Kiln Controller during the warranty period to your Orton Autofire® Supplier or to The Edward Orton Jr. Ceramic Foundation, 6991 Old 3C Highway, Westerville, Ohio 43082 and providing written proof of purchase and a description of the defect or problem. Buyer must insure the shipment of the Autofire® Kiln Controller or assume the risk of loss or damage in transit, prepay shipping charges to the service location, and use the original shipping container or equivalent. Buyer will be responsible for shipping and handling charges in excess of US $50.00 incurred by Orton in returning the Autofire® Kiln Controller to the Buyer after completion of limited warranty service.

This warranty does not apply to any damage to the Autofire® Kiln Controller resulting from:

1. Operation beyond electrical rating.
2. External sources including, but not limited to, chemicals, heat abuse and improper care.
3. Improper or inadequate maintenance by Buyer.
4. Parts or equipment not supplied by Orton.
5. Unauthorized modification or misuse.
6. Operation outside environmental specifications.
7. Improper installation.
8. Over firing (melting of materials being fired) regardless of the cause of the over firing.

Warranted Components returned for service where no warranted defect is found will be subject to service, and shipping and handling fees.

If the Warranted Components are not in good working order as warranted above, Buyer's sole remedy shall be repair or replacement of the Warranted Components as provided above. To the extent permitted by law, ALL EXPRESS AND IMPLIED WARANTIES FOR THE WARRANTED COMPONENTS INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE TWO-YEAR WARRANTY PERIOD COMMENCING ON THE DATE OF PURCHASE, AND NO OTHER WARRANTY WHETHER EXPRESS OR IMPLIED WILL APPLY TO THIS PERIOD. To the extent permitted by law, ORTON'S REMEDY AND BUYER'S SOLE REMEDY IS LIMITED SOLELY AND EXCLUSIVELY TO REPAIR OR REPLACEMENT AS SET FORTH HEREIN. ORTON SHALL NOT BE LIABLE FOR, AND BUYER'S REMEDY SHALL NOT INCLUDE ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES OF ANY KIND WHATSOEVER, WHETHER A CLAIM IS BASED UPON THEORY OF CONTRACT, NEGLIENCE OR TORT. Buyer shall determine suitability of the Autofire® Kiln Controller for the intended use and assume all risk and liability therewith. Some states do not allow this exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

The above limitation does not apply in the event that any Warranted Components are determined by a court of competent jurisdiction to be defective and to have directly caused bodily injury, death or property damage; provided that in no event shall Orton's liability exceed the greater of $1,000.00 or the purchase price of the specific Autofire® Kiln Controller that caused such damage.

Service may also be obtained on Warranted Components no longer under warranty by returning the Autofire® Kiln Controller prepaid to Orton with a description of the problem and Buyer's name and contact information. Buyer will be contacted with an estimate of services charges before any work is performed.

Customer Satisfaction Policy

If for any reason you are not completely satisfied with the performance of the Orton Autofire® Kiln Controller or the conditions of this warranty, return the Autofire® Kiln Controller in good working condition, transportation and insurance prepaid, within 30 days of purchase date to your Orton Autofire® Kiln Controller supplier or The Edward Orton Jr. Ceramic Foundation, 6991 Old 3C Highway, Westerville, Ohio 43082 and your purchase price will be refunded. Prior to returning your Autofire® Kiln Controller contact Orton for an authorization number and include with your shipment. For Autofire® Kiln Controllers ordered in error, a restocking charge will apply.

Customer Support

Orton technicians are available by phone for support and troubleshooting. If you have questions regarding the performance or operation of the kiln controller. Contact your kiln supplier, kiln manufacturer or Orton directly at 614-895-2663. Tech Support hours are Monday-Friday 8:00AM – 4:30PM EST