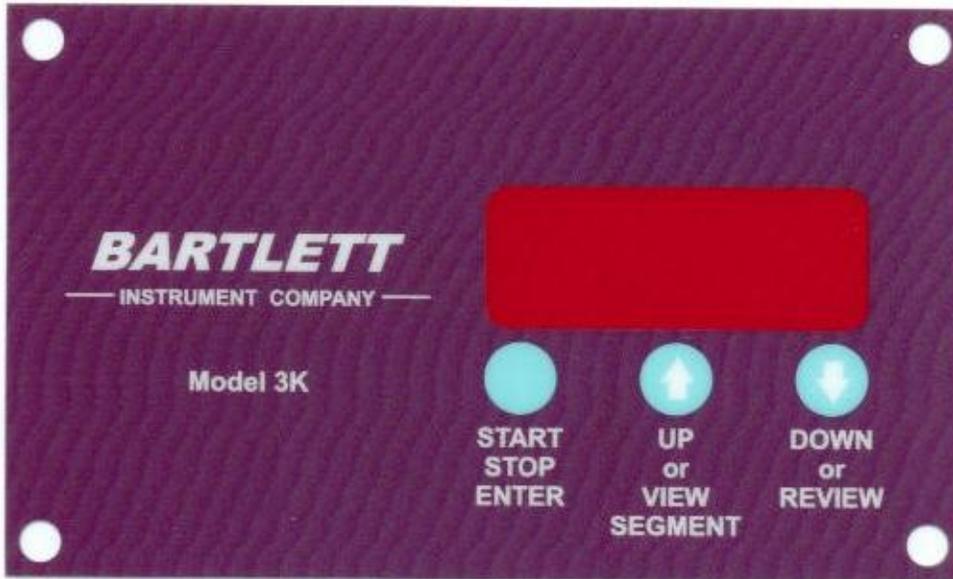


# Operation manual for Model 3K with Cone fire

## KEY PAD OPERATION



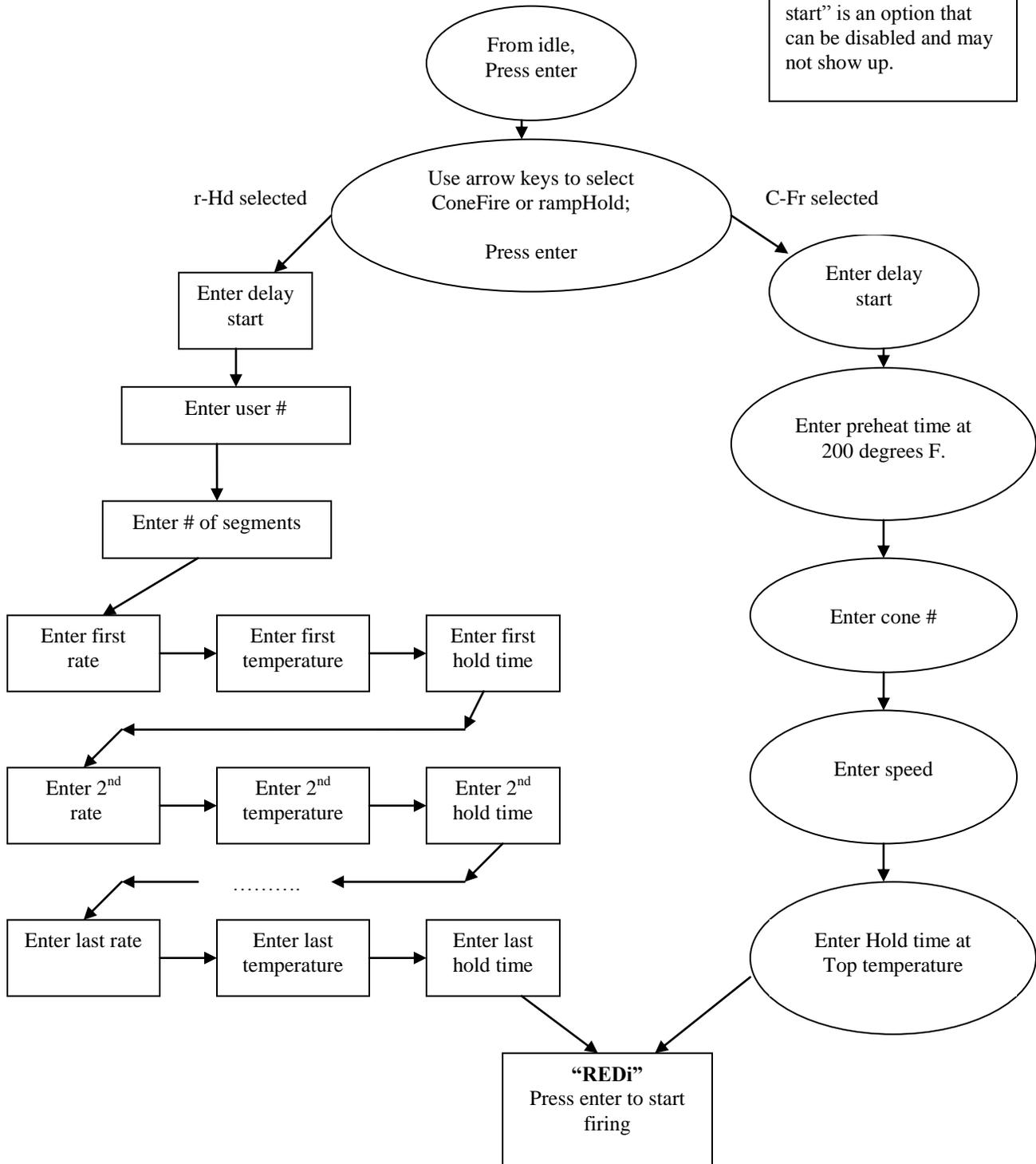
### Function of Each Key at Different Controller Stages

CONTROLLER STAGE	STOP/START KEY	UPARROW	DOWN ARROW
<b>IDLE</b>	Initiates programming	No function	Press once to review and refire last program. Press twice to go directly to "redi"
<b>PROGRAMMING</b>	Stores displayed value	Increases displayed value. Hold for rapid scrolling	Decreases displayed value. Hold for rapid scrolling
<b>At Ready (redi)</b>	Starts firing	No function	No function
<b>During firing</b>	<b>STOPS the firing</b>	Shows current segment and target temperature. Provides access to skip step and add time or temperature	Reviews current program
<b>At complete or error code</b>	Back to idle	No function	No function

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## PROGRAMMING FLOW CHART

Note – “enter delay start” is an option that can be disabled and may not show up.



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### GETTING TO IDLE

When power is applied, the display will show the controller's firmware version and then either ErrP, an error code, or IdLE or StOP, flashing with the current temperature. If ErrP is displayed press any key to clear this error message. If StOP or IdLE is alternating with the current temperature, you are ready to begin programming.

### CONE FIRE PROGRAMMING

STEP	DESCRIPTION
1.	Start with the display reading IdLE, Press "enter".
2.	<b>Select cone fire.</b> If "C-Fr" is displayed, press "enter", else press an arrow key to display "C-Fr" and then press "enter".
3.	<b>Set delay start</b> – The beginning of the firing can be delayed from the time you press "start". This allows the firing to start later and end when you can supervise the end. Use the arrow keys to adjust the amount of delay and press enter. <b>** Caution should be taken to make sure that no one can place anything around or on the kiln during the delay start. Treat the kiln as firing during the delay start. **</b>
4.	<b>Enter the preheat time.</b> The first segment of a cone fire program ramps to 200 F. The preheat time is the length of time you will hold at 200 F. Thin, dry clay may not need any preheat time and thick hand-built items may require several hours of preheat. Use the arrow key to adjust the preheat time and then press "enter" to store the value. REMEMBER the time is displayed in the form HH.mm. H= hours, m=minutes
5.	<b>Enter Cone #.</b> Use the arrow keys to display the desired cone number. The up arrow moves toward a hotter cone number. Press "enter" to store the displayed cone #.
6.	<b>Enter Heating rate.</b> Use the arrow keys to display Slow, Medium or Fast.
7.	<b>Enter hold time.</b> A hold at the top temperature adds heat work and can help produce a more even firing from top to bottom. Typical hold times are in the 10-15 minute range (00.15). Use the arrow keys to display the desired hold time and then press "enter" to store the value.
8.	<b>READY "rEdi"</b> You are now at ready. Press "enter" to start the firing.

The cone fire profiles are listed at the end of the manual

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### RAMP-HOLD PROGRAMMING

STEP	DESCRIPTION
1	Start with the display reading IdLE, Press “enter”.
2	<b>Select ramp-hold.</b> If “r-Hd” is displayed, press “enter”, else press an arrow key to display “r-Hd” and then press “enter”.
3	<b>Set delay start</b> – The beginning of the firing can be delayed from the time you press “start”. This allows the firing to start later and end when you can supervise the end. Use the arrow keys to adjust the amount of delay and press enter. <b>** Caution should be taken to make sure that no one can place anything around or on the kiln during the delay start. Treat the kiln as firing during the delay start. **</b>
4	<b>Enter user #.</b> The controller holds 4 user programs. This step chooses which of the 4 programs you are going to use. Use the arrow keys to display the correct user number and then press “enter”. To reuse a previously entered program simply press “enter” for each value. To change a program, just adjust the displayed value.
5	<b>Choose number of segments.</b> All programs consist of 1 or more segments as shown in the sample profile at the end of the manual. Each segment has 3 parts – ramp rate (speed of temperature rise in degrees per hour), soak temperature, and hold time at soak temperature. It is helpful to draw your profile to see how many segments you need. Then use the arrow keys to display the desired number of segments and press “enter” to store the value.
6	<b>ENTER RAMP RATE.</b> The rate is displayed in degrees per hour. Slow rates range from 1-50 degrees per hour and are used for thick glass projects. Medium rates range from 60 to 200 degrees per hour and are used for thick, hand-built ceramics. Fast rates range from 250 – 1000 degrees per hour and are used for glazes, thin ceramics and small glass projects. A rate of 9999 sets the kiln to ramp as fast as possible. Use the arrow keys to adjust the rate and press “enter” to store the value.
7	<b>ENTER SOAK TEMPERATURE.</b> For a single segment program, this is the top temperature of the firing. For multi-segment programs, this can be a temperature where you want to hold to dry the ware or for carbon burn-out, or equalize the temperature across the item or it can be where you just want to switch ramp rates without a hold. Adjust the temperature with the arrow keys and press enter to store the displayed value.
8	<b>ENTER HOLD TIME.</b> Use the arrow keys to adjust the hold time at the soak temperature. Hours are displayed to the left of the decimal point and minutes to the right (HH.mm). Use a zero (00.00) hold time to move to the next segment without holding. Drying ware can take several hours

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while holds at peak temperature usually range 10 – 15 minutes to even out the kiln temperature.

- 9 **REPEAT STEPS 5-7** for each segment.
- 10 **DISPLAY WILL SHOW “REDI”** (ready) when all segments have been entered. Press “enter” to start the firing.

To re-fire the last used program, press the DOWN key when StOP or IdLE is displayed. The program will be quickly reviewed and rEdi will be displayed. Press START to begin the firing. Note – pressing the down arrow twice will go directly to redi.

### KILN OPERATION DURING A FIRING

At the start of a firing, the controller sets its traveling set point to the current temperature in the kiln. The traveling set point is where the controller wants the kiln temperature to be. The controller will then move the traveling set point up at the programmed rate and cycle power to the elements to make the temperature follow the traveling set point. You will hear the relays clicking to regulate the kiln temperature. The elements will receive power when the temperature is below the traveling set point. The relays will click off when the temperature is above the traveling set point. The current segment and traveling set point can be viewed by pressing the up arrow during a firing.

#### Options During Firing

Displaying the current set-point and accessing the following options. During a firing you may advance from the current segment to the next ramp rate by using Skip Step or if you are in a hold period you may add time and temperature to the hold period. When the UP key is pressed during a firing the current ramp or hold is displayed followed by the current or traveling set-point, then "SStP" is displayed. If you do not press a key within several seconds the display will return to showing the current temperature in the kiln.

Skip Step. This option allows you to skip from the present segment to the next ramp rate. Press the UP key, the display will show the current segment, then the set-point, then "SStP". When "SStP" is displayed press ENTER to skip to the next ramp rate.

Add Time to Hold Period Available only during a hold period This option allows you to add time in 5 minute increments to a hold (soak) period. When in a hold period (during a hold or soak, the temperature in the kiln will be alternating in the display with the remaining hold time), press the UP key. When "SStP" is displayed press the UP key again and "tME" will be displayed. Press ENTER and 5 minutes will be added to the hold time. You may use this procedure as many times as necessary to get the hold time that you want.

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Add Temperature to Hold Period **Available only during a hold period** This option allows you to add temperature in 5 degree increments to a hold (soak) period. When in a hold period (during a hold or soak, the temperature in the kiln will be alternating in the display with the remaining hold time), press the UP key. When "SStP" is displayed press the UP key twice more and "tMP" will be displayed. Press ENTER and 5 degrees will be added to the hold temperature. You may use the add temperature procedure as many times as necessary to get the hold temperature that you want.

### Error Codes

tC FAIL tC alternating with FAIL indicates the thermocouple has failed. Replace the defective thermocouple. To clear the error, press any key.

Err1 Error 1 indicates the temperature in the kiln is rising slower than 15°F/hr during an up ramp. If this rate continues for 8 minutes, the firing will be stopped. Err1 may be an indication that the elements are worn or that a relay has stopped working.

ErrF Error F indicates the temperature in the kiln is decreasing less than 15°F/hr during a down ramp. If this rate continues for 8 minutes, the firing will be stopped. ErrF may be an indication that a relay has stuck in the on position.

Errd Error d indicates that the kiln temperature is 100°F above the traveling set-point, which is the current desired temperature in the kiln. The traveling set-point will increase or decrease according to the programmed rate. Errd may indicate a relay stuck in the on position or a problem with a thermocouple not reading correctly.

ErrP ErrP is displayed whenever there is a power interruption that is long enough to stop the firing. If the power interruption is brief the kiln will continue to fire when power is restored; in this case there will no indication of a power failure. To clear the error, press any key.

tC- - The red and yellow thermocouple wires are reversed.

### Messages

CPLt Firing Cycle Complete (firing time is alternately displayed).

dELA Delay. Displays when entering the delay time (hour:minutes) until the start of the firing.

DLy Delay. Alternates with the remaining delay time until the start of the kiln.

°F # Segment temperature in °F – Set temperature for a user program.

°C # Segment temperature in °C – Set temperature for a user program. A decimal point will display in lower right corner.

EdIt Edit the default options (beeping at complete, temperature scale, cone fire, delay, maximum programmable temperature)

ErrP There has been a power interruption that has stopped the firing. Press any key to clear.

FULL Beeps continuously at end of firing until a key is pressed.

HLd# Soak time in hours:minutes at a hold temperature.

OFF No beeping when firing is complete.

On Beeps for 15 seconds at end of firing.

rA # Ramp Number (rate per hour of temperature increase or decrease).

rEdl Ready to fire current program. Press START to begin firing.

SEG Short for Segments. You can enter up to 8 segments in a program.

SStP Skip Step (used to advance to the next ramp)

StOP The kiln is at idle and ready to be programmed. Stop alternates with the current kiln temperature.

USr # User program number displayed

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## CONE FIRE PROFILES

### FAST

SEGMENT	RAMP RATE °/HR	TEMPERATURE	HOLD
1	570	200	PREHEAT
2	570	1050	0
3	570	CT -256	0
4	200	CT	HOLD
NOTE		CT= CONE TEMPERATURE	

### MEDIUM

SEGMENT	RAMP RATE °/HR	TEMPERATURE	HOLD
1	120	200	PREHEAT
2	400	1050	00.10
3	300	CT -256	0
4	120	CT	HOLD
NOTE		CT= CONE TEMPERATURE	

### SLOW

SEGMENT	RAMP RATE °/HR	TEMPERATURE	HOLD
1	80	200	PREHEAT
2	200	1050	00.30
3	200	CT -256	0
4	108	CT	HOLD
NOTE		CT= CONE TEMPERATURE	

