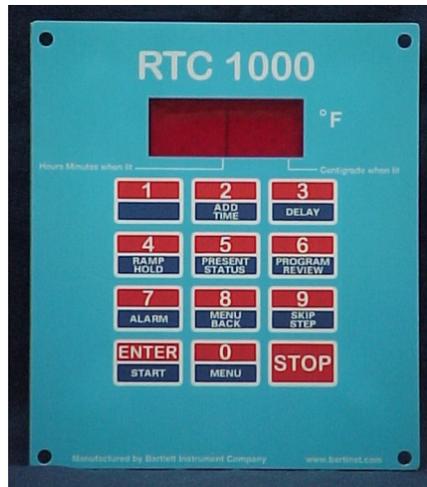


# Bartlett RTC-1000 Controller Manual



## Getting Started:

The Bartlett RTC-1000 is simple to use once you understand that the keys have two functions. The numbers are used to enter the rate, temperature and hold times for your program. When you flip the toggle switch to turn on your controller it will display WAIT and then a few seconds later it will display IdLE. It is from IdLE where you can enter a program. Before starting a program, check your thermocouple for proper placement and make sure the end of it is free of debris (like fiber blanket, fiber paper or glass). Never leave your kiln unattended.

## Ramp - Hold Firing Basics

The RTC-1000 controller has 6 User Programs and 32 segments per program. Each segment is a ramp rate, a target temperature and a hold time. Before you enter a program you will need to know how many segments you need for the firing. Make yourself copies of the **Firing Program Blank** provided on the last page of this manual. From IdLE in the display, press ENTER and the number 4 key (Ramp - Hold) button. It will display "USER". Meaning which User Program do you want. Select program 1 - 6 and press ENTER. It will display "SEGS". Enter the number of segments in your program and press enter. The display will read RA1 (ramp one) enter the first rate of climb in degrees per hour and press ENTER. The display will read °F (or °C). Enter the target temperature for this segment and press ENTER. The display will read "HOLD". Enter a hold time if needed and press ENTER. If your kiln is equipped with our automatic venting system the display will read "AOP" The display will either say "ON" or "OFF". to toggle the vent on or off for that segment press the 1 key. If you do not have the automatic venting system you will not see AOP. Press ENTER and the display will read RA2. Repeat entering the values for each segment. At the end of the program the display will read ALrM and flash to 9999. 9999 means the alarm is off. This is where you can set a temperature value like 1450 °F. When the kiln's temperature reaches 1450, it will start beeping to let you know to come check it. Press ENTER and the display will read IdLE and flash the current temperature. Press ENTER two more times and it will read -ON-. The kiln is now firing. When the program fires to completion, "CPLt" will be displayed. To stop a firing, press the STOP key.

# Function Keys

## **ADD TIME:**

The "ADD TIME" key will add 5 minutes to the hold period. So let's say you check your glass at top of process and you determine it needs more time to set paint, slump fully into the mold, etc. press "ADD TIME", TIME will be displayed, then the temperature alternating with the new hold time. Make sure you make a note on your program sheet that you added 5, 10, or 15 minutes to that hold segment. When that program is complete, you may want to change the hold time value for future projects.

## **DELAY:**

Using the Delay fire key programs the kiln to begin firing at a later time. Use it to suit your schedule or to take advantage of lower electrical rates at night. It zeros out after the firing is complete. Once you have entered your program, press ENTER then the DELAY key. Enter the delay time in hours and minutes. (i.e. 2 hours and 30 minutes = 2.30) To begin firing, press ENTER twice. Warning: Never leave your kiln unattended!

## **RAMP HOLD:**

Pressing the ramp hold key opens the user program area where you enter your stored programs. Press ENTER then RAMP HOLD. The display will read "USER". Select program 1 - 6 by pressing the appropriate key (See Ramp - Hold Firing Basics on the first page).

## **PRESENT STATUS:**

Pressing the present status key displays the current segment of a firing and the temperature of the control board. Knowing which segment you are at can be useful for firings with both heating up and cooling down segments. To use Present Status, press the key during a firing. It will first display your ramp or hold, followed by the segment number. Then the traveling set point (the temperature the controller is trying to reach) followed by the the circuit board temperature. High temperatures in the control box can damage the control circuit board. The circuit board is rated for a maximum 155 °F / 68 °C operating temperature. Maximum board temperature for accuracy is 125 °F / 53 °C. If the board temperature is above 125 °F / 53 °C, exhaust hot air from the room to lower the temperature of the board.

## **PROGRAM REVEIW:**

When you start a program and the kiln starts running, you can make sure you have the correct one by Pressing the Program Reveiw key. The controller will always run the last program you had it do. If you want to know which program that is; from IdLE in the display, press ENTER and the Program Reveiw key, It will display which program and the values you have set for that program.

**ALARM:**

After you have entered all the values in a user program, the display will read ALrM. here's where you can set a temperature if you want the controller to alert you for a specific reason. Use it to remind you to lower the lid from a venting position or check the glass at top of process. The alarm will beep when when the preset temperature is reached. When the alarm sounds, press ENTER to shut it off. You can only enter one alarm at a time. However, after the alarm beeps, you can set the alarm for another temperature. You can enter a higher or lower temperature than the current temperature. If you want to use the temperature alarm again, when it beeps press 7 (alarm button) and enter a new temperature. Then press ENTER. If you want the alarm off, enter 9999.

**MENU BACK:**

The Menu Back key has one function. Let's say you ran program 1 which is a full fuse program and now you want program 2, your slump program. You are using the recall program function by press ENTER and the Menu key, but you accidently went past RECL (recall) in the display. You can use the Menu Back key to go backward in the Menu funtion.

**SKIP STEP:**

Skip Step works only during a firing. To skip a segment, press the skip segment key. SKIP will appear in the display, then press ENTER. If you change your mind after pressing the skip segment key, do nothing and it will continue that segment.

**ENTER:**

The Enter Key is used in combination with most of the function keys and entering values for your firing programs.

**MENU:**

The Menu key has many functions. It is used to recall a stored program, change the temperature read out between °F and °C, check the circuit board temperature, set up your kiln for cost of firing. All of these functions will be explained in this manual.

**STOP:**

To stop the firing, press STOP. When you press STOP, IdLE will appear alternating with the temperature.

# Additional RTC-1000 Controller Features

## Turning Off Error Codes:

The RTC-1000 uses error codes to alert you to firing problems. In certain applications, it may be desirable to turn off some of the error codes. For instance, error code E-1 will appear if the temperature drops below the set point temperature. So, if these codes are on and you open the kiln to visualize your glass, the temperature will drop and the controller will display E-1 and shut the kiln down. With the Error codes off, it only shuts off those that cause problems with flash cooling, hand manipulation, raking, combing, etc. All the codes that deal with hardware errors are still on. **We have turned these error codes off for you.**

Setting Error Codes On or OFF:

1. From IdLE Press ENTER
2. Press the MENU key until you see ErCd
3. Press ENTER. On or OFF will appear. Press 1 to change the setting.
4. Press ENTER to return to IdLE

## Select a Stored User Program:

1. From IdLE Press ENTER
2. Press MENU key and display will read rECL (recall)
3. Press ENTER and the display will read USEr. Select your program (1 - 6)
4. Press ENTER. Display will read IdLE
5. Press ENTER two more times. Display will read -ON-

The kiln is now firing the program you selected. To check press the Program Reveiw Button

## Edit-on -the-Fly:

This feature allows you to make changes to your program while the kiln is firing. However, if the error codes are on, you might experience some problems. It is recommended the error codes be turned off. See turning on/off error codes above.

You can change the firing rate, the setpoint temperature, the hold time or a combination of these. To check the current segment press the Present Status key. If it is the segment you want to change, press the Ramp Hold key. RA followed by the current segment number will be displayed alternating with the firing rate. Make changes to the firing rate if desired then press ENTER or just press ENTER to proceed to the set point temperature. Make changes or press ENTER and it will move the the hold time. Make changes if needed and press ENTER. After pressing ENTER the controller will save the changes and return to firing. These changes are permanent and they become part of the stored program for all susequent firings. If there is no key pressed for forty seconds after entering the on the fly, the controller will return to the current program without any changes.

## Cost of Firing:

The RTC-1000 is able to track the cost of a firing based on your cost of electricity and the wattage rating of the kiln. The cost of firing can be viewed at any time by pressing the Program Review key. If the controller is at IdLE it will display the cost of the last firing. If it is pressed during a firing, it will display the cost up to that point. The cost of firing will be displayed at the end of the firing immediately after the message COST.

1. Press ENTER. The display will read - - - -
2. Press Menu key repeatedly until you see COST
3. Press ENTER. The display will alternate between COST and a four digit number. Enter the price per kilowatt hour. EXAMPLE: If your price is \$0.10, enter 0100. Press ENTER
4. The display will now be alternating between WATT and a four digit number. Enter wattage rating divided by 10. EXAMPLE: If the wattage of you kiln is 9,240 watts, enter 924.
5. Press ENTER

## Selecting °F or °C (CHG°)

The controller operates in your choice of °F or °C temperature. In °C, a lighted dot appears in the lower right corner of the display. In °F, it disappears. To switch from °F to °C or visa versa;

1. from IdLE, press ENTER
2. Press the MENU key until CHG° appears
3. Press ENTER. °F or °C will appear.
4. Press the 1 key to change
5. Press ENTER and display will return to IdLE

**°F / °C Temperature Conversion Formula:** Below are formulas for converting temperature between °F and °C. Converting firing rate is a different formula than converting temperature.

Firing Temperature:

Example: "fire to 1450 °F"  $1450\text{ °F} = 788\text{ °C}$   
 $(\text{°C} \times 1.8) \pm 32 = \text{°F}$   
 $(\text{°F} - 32) \div 1.8 = \text{°C}$

Firing Rate:

Example: 200 °F per hour = 111 °C per hour  
 $\text{°C per hour} \times 1.8 = \text{°F per hour}$   
 $\text{°F per hour} \div 1.8 = \text{°C per hour}$

## ERROR Codes

**NOTE:** If you get an error code it is important to note the error. It will help in diagnosing any problem with the kiln.

These Errors will only be detected if the error codes (ERCD) are on:

Error Code	Description	Possible Causes
E - 1	Kiln temperature increasing slower than 12 °F per hour	Kiln has a heating problem. Check for broken elements and wiring to the elements.
E - 2	Kiln temperature 50 °F above the hold temperature	A relay is stuck in the "on" position. Or, you had the kiln open for viewing and when you closed the lid it overshot the temperature by 50 degrees.
E - 3	Kiln temperature 50 °F below hold temperature	If you opened the kiln for any reason. Relay failure.
E - 4	Kiln temperature 50 °F above previous hold when ramping down	Same causes as for E-2
E - 5	Kiln temperature 50 °F below the set point when ramping down.	Relay has failed.
E - d	Kiln temperature 50 °F above the set point	Stuck relay or stuck output. If using zone control, the outputs or t/c's may be in the wrong zones.

If you see ErrP or PF in the display when you turn the controller on, press ENTER to clear. The display will go to IdLE and alternate with the current temperature. This occurs when you flipped the toggle switch off at the end of a program without pressing the STOP key first.

The controller saw this as a power failure

# ERROR Codes

The Error code setting does not affect these errors:

Error Code	Description	Possible Causes
E - 0	Software error.	Check the selected program and reprogram, if the error persists or program does not hold in memory, controller may need to be returned to Bartlett for service.
E - 6	Problem with thermocouple leads.	Thermocouple connected incorrectly, leads are reversed.
E - 9	Software thermocouple selection does not match the hardware selection.	The jumper on the circuit board and the setting for the thermocouple type in the software do not match.
E - 22 E - 26	Error in Readings.	Check for reversed thermocouple leads. If leads are correct, then the analog to digital converter on the circuit board may not be functioning and the controller may need to be returned to Bartlett for service.
E - -	Power loss during EEPROM write.	Turn the controller off and on. Recheck the selected program and reprogram if necessary.
E - A	Invalid program variable.	Reprogram all segments of the program. If error persists, controller may need to be returned to Bartlett.
E - bd	Board temperature too high.	The control box temperature is too hot. Open control box and aim a fan at the control board.
E - E	Hardware error.	Controller will need to be returned to the Bartlett for service.
E - R	Microprocessor memory does not match program storage memory.	Reprogram and try to fire again. If error persists, controller may need to be returned to Bartlett for service.
FAIL	Fail indicates the thermocouple has failed.	It is either broken or disconnected
PF	Power Failure. Firing has stopped.	Power was lost during the firing and the kiln temperature dropped more than 250 degrees during the outage.
ErrP	Power Failure. Kiln is still running.	This is telling you there was an intermittent power loss during the firing but not long enough for the temperature to drop so it continued the program. Press ENTER to clear.
STUC	Key was held too long or is stuck.	If the problem persists after releasing the key, controller may need to be returned to Bartlett for keypad replacement.

Firing Program Number \_\_\_\_\_ Glass Thickness \_\_\_\_\_

Glass Type \_\_\_\_\_ Process \_\_\_\_\_

Notes: \_\_\_\_\_

Segment	Rate per Hour	Temperature	Hold time	Vent (AOP)
1				
2				
3				
4				
5				
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