

CAHO SR-T4 Controller Manual

Single Program Degrees Per Minute Ramp Rate Controller with Soak



NOTE: Please read instructions before using your kiln.
Failure to do so may result in damage to the kiln and it's contents.

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SECTION 1 - Getting to know your Controller

The Caho Digital Temperature controller is designed to allow automatic firing to a set temperature at a set rate of rise. Once the Kiln has reached that temperature the Kiln can then Soak (dwell) at the set temperature for a set number of minutes.

The Controller has two rows of the digital read out:

The Top row is the **PV** or **Present Value**

This represents the Temperature of the Kiln at that moment. This is the temperature being measured at that moment by the Thermocouple (the internal thermometer that protrudes into kiln).

The Bottom row is the **SV** or **Set Value**

This is the Set Value for either the Temp, Soak or Ramp Rate.

The  button to the bottom left of the controller cycles through the three values. The "▲" or "▼" arrows adjust the Set Value.

The **Dot button** is not used (Please don't press this as it will likely cause issues)

The AL light indicates that the program has finished and the Kiln is cooling.

SECTION 2 – Programming your Controller

2.0 Turning the Kiln On

- I. Turn power ON at the power point (if not already hardwired).
- II. Turn the BLACK on/off Rocker switch on the front of the control panel to the ON position.
The "Cycle End" light should be illuminated.

2.1 Setting the Firing temperature

Set the Temperature you wish to fire to by pressing the "▲" or "▼" arrows on the front of the digital controller. The longer you hold the buttons down the faster the setting changes (Like an alarm clock).



2.2 Setting the ramp rate (or Heating rate)

Now press the ↻ Scroll Button in the bottom left corner of the controller again to advance to the "rAnP" Ramp Rate setting. This is indicated when the controller displays "rAnP" in the top display.

This is the rate at which the kiln heats to the desired firing temperature. This means that for every hour the kiln is running the temperature should increase by the rate set. To adjust this rate up or down simply use the "▲" or "▼" arrows on the front of the digital controller.



Note: The controller is set up to show the ramp rate (rAnP) in Deg C/min.

You can now or at any time during the firing press the ↻ Scroll Button in the bottom left corner of the controller to scroll through and see what settings you have programmed for the Temp, Soak (tinE) Time of Ramp Rate (RAnP)

2.3 Setting the Soak Period (soak time setting)

Now press the ↻ Scroll Button in the bottom left corner of the controller to advance to the Soak Point Timer. This is indicated when the controller display "tinE" in the top display (as shown below) This Soak time is measured in Minutes of Soak Time required.

The range is from 1 to 999 minutes. (Mins)



2.4 CONVERSION TABLE DegC/Hr to DegC/Min

Deg C/hr	Deg C/min	Deg C/hr	Deg C/min	Deg C/hr	Deg C/min
6	0.1	96	1.6	186	3.1
12	0.2	102	1.7	192	3.2
18	0.3	108	1.8	198	3.3
24	0.4	114	1.9	204	3.4
30	0.5	120	2	210	3.5
36	0.6	126	2.1	216	3.6
42	0.7	132	2.2	222	3.7
48	0.8	138	2.3	228	3.8
54	0.9	144	2.4	234	3.9
60	1	150	2.5	240	4
66	1.1	156	2.6	246	4.1
72	1.2	162	2.7	252	4.2
78	1.3	168	2.8	258	4.3
84	1.4	174	2.9	264	4.4
90	1.5	180	3	270	4.5

If this is your first firing we would recommend you begin learning you kiln in the 1-1.5 Deg/min range.

Green indicates recommended range for Bisque and Earthenware Firings

SECTION 3 - Running the Kiln

3.1 To Start the Firing

It is advised that you always turn the Kiln OFF and then back ON between or after each firing. This resets the controller so it knows to begin a new firing and ensures it does not become confused.

To begin Firing Press the square **RED** Start Button.

The "Cycle End" light will turn off.

The controller will indicate that the kiln elements are being turned on by illumination of a small square red indicator light (marked OP1) in the top right hand corner of the controller.

The bottom display will start to indicate the theoretical target temperature which the kiln chamber should be at any point during the programmed firing. Visual checking of the bottom theoretical program display with the top actual process value display will be helpful to the operator to ensure that the kiln is able to keep up with the program.

NOTE: The Kiln will not always show the PV and SV being equal. The Controller will attempt to keep these values being equal but may lag or overshoot from time to time. This is the normal function of the controller. If these do become separated by a large amount you may have an issue with the Kiln not being able to keep up with the program or there may be a problem with the Kiln.

3.2 Completion of Firing

At the moment that the kiln reaches the set value (set temperature) both the top display and the bottom display will show this value at the same time. The program has now moved into the "timed soak" stage of the program. When the "timed Soak" period has been completed, the small red alarm light and the END light will be ON. The Kiln will now "Turn Off" as the firing is now completed and the kiln temperature will begin to fall. The top display will continue to display the falling temperature and the bottom section will display the set temperature that the Kiln reached.

SECTION 4 - Firing Time

4.1 Influences on Firing Time

For kilns & kilns fitted with Non Indicating Control firing time depends upon many use factors including the type of ware, the mass of the ware and the temperature which the furnace is required to operate at. Once the operator has learned the heating time taken for the particular process for which the kiln is being used, this time should be noted so that in future, the kiln can be checked to observe that it is not taking an unusually long time to reach the set temperature- which could indicate a problem with the kiln.

NOTE: The firing time will vary slightly with variations in the mass of the load, but this is normal.

4.2 Firing Time - Influences on Firing Time

It is possible to set the firing rate to a speed that is faster than the kiln power can provide. Therefore it is important to learn what the kiln is capable of providing particularly at the very end of the firing. The maximum firing rate will be influenced by many factors including the type of ware, the mass of the ware and the maximum temperature to which the kiln is required to operate. Once the operator has learned the maximum heating rates and has the times, then the firing rate can be set so that it is always controlling the kiln and so the firing time (for a particular setting rate) from one firing to another will always be the same. The kiln can be checked to observe that it is not taking an unusually long time to reach the set temperature-which could indicate a problem with the kiln.

SECTION 5 - Suggested Firing Ramp Rates and Soaks.

	Top Temp	Soak (Sp3)	Ramp Rate (rr)
Bisque (Check Clay Recommendations)	980°C - 1000°C	10 mins	1°C – 1.6°C / min
Earthenware Glaze (Check Glaze recommendations)	1080°C - 1100°C	15 - 30 mins	1.6 °C – 2.5°C /min
Stoneware / Porcelain (Check Clay Recommendations)	1220°C - 1260°C	10 mins	1°C – 1.6°C / min
Stoneware / Porcelain Glaze (Check Glaze recommendations)	1220°C - 1260°C	0 - 15 mins	1.6 °C – 2.5°C /min