

Temperature Programmer User Handbook



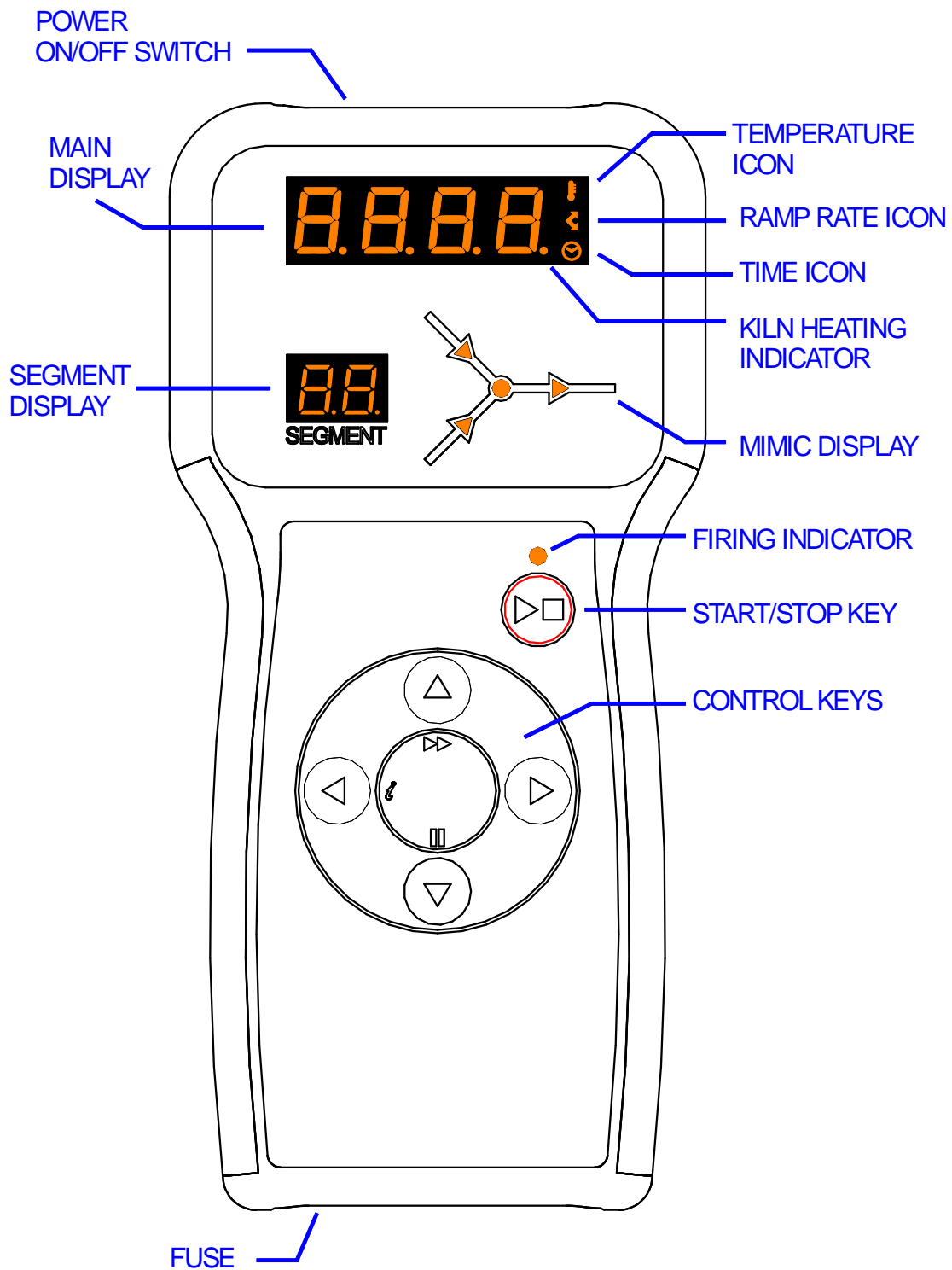
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See separate handbook for Installation Instructions
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At a Glance



Quick Start Guide

Switch on & wait for kiln temperature display

To run a firing program set up previously press the **■** key

To stop the firing at any time press the **■** key again

To review firing data press the **■** key to enter the programming mode

To change firing data press the **■** & **■** keys to change the displayed value

Use the **■** key again as necessary to step to the next firing value or segment to be reviewed or changed

To mark the end of a program set a ramp rate to End with the **■** key

To exit the programming mode either wait 20 seconds or press the **■** key to start firing

If the keyboard is locked then press the **■** & **■** keys together & hold down for 5 seconds to unlock

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Features

- Up to 10 programs each with up to 16 segments
- 1 controlled heating / cooling ramp + soak per segment
- Soak periods up to 99 hours 59 mins
- Ramp rates from 1 to 999°/hour + FULL
- Ideal for glass or ceramics use
- Programs can be altered while firing
- Program pause and advance facilities
- Keyboard lockable
- Delayed start facility - up to 99 hours 59 mins
- Power failure recovery
- Energy used display
- Setpoint display
- Alarm buzzer & alarm output
- °C/°F operation

Turning On



When turned on the CeraControl performs a display test by lighting all of the display segments and illuminating all of the front panel indicator lamps.



The version number of the software embedded within the CeraControl is now displayed. If you need technical support you might be asked for this code together with the serial number.





Next displayed is the thermocouple type setting. This should match the type of thermocouple fitted to the kiln and can be R, S, K or N type (r,S,H,n).






The final display will show the kiln temperature. All other lamps should be off.



If pressing any key causes LOC to appear then the keyboard has been locked. This is an anti-tamper feature. Press the  &  keys together & hold down for 5 seconds to unlock.



This now shows that the keyboard is UNLOCKED. To re-lock the keyboard press the  &  keys together & hold down for 5 seconds.

If any mimic panel lamps are on then the CeraControl is firing. To stop the firing press the  key.



During firing the right-hand decimal point will light to show when heating power is being applied to the kiln.

SEGMENT



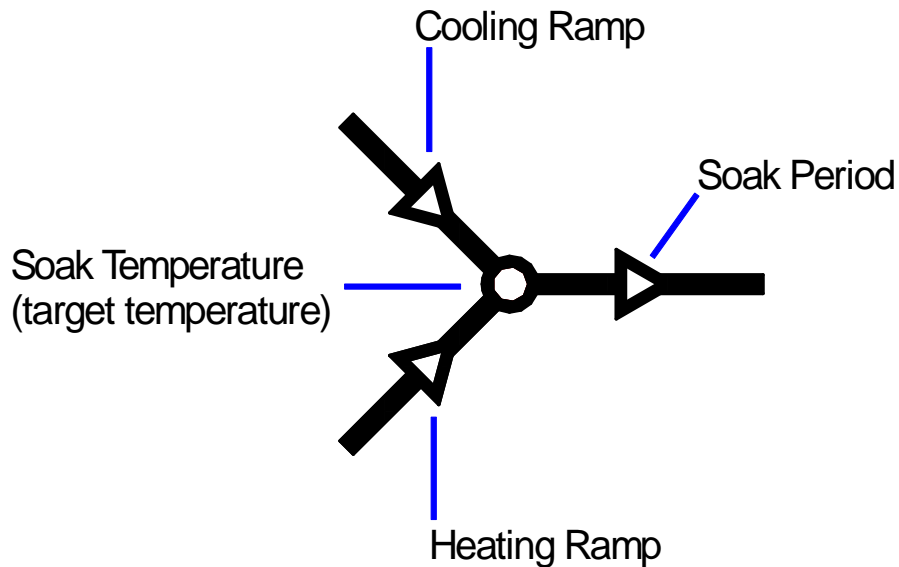
SEGMENT



Note: During power up the SEGMENT display shows the operating units (°C/°F) of the CeraControl (Installer adjustable).

Programming

A firing segment



A CeraControl firing segment comprises a ramp followed by a soak period. Two segments can be used for simple firing (biscuit firing for example) or several segments can be used per program for complex firing (crystal glazing or glass-making for example).

The CeraControl ramps the kiln temperature at the required ramp rate until the kiln reaches the soak / target temperature. It then soaks (dwells) at the soak temperature for the soak period. It then runs the next segment until the end of the program is reached.

The CeraControl is capable of both positive (heating) ramps and negative (cooling) ramps - as used in glassmaking for annealing. The type of ramp is clearly shown on the mimic display during firing.

The ramp rate is settable in the range 1°/hour to 999°/hour or FULL (full power) or End (end of program).

The soak / target temperature is settable over the range 0 to 1400°C (2552°F).

The soak period is settable over the range 00.00 (no soak) to 99 hours 59 mins.

Note: during soaking the CeraControl display alternates every 15 seconds between kiln temperature and soak period remaining.

Altering a program



When not firing there are no indicators lit on the mimic panel, the run indicator is off and the display shows the current kiln temperature.

The controller settings can be reviewed by pressing the **◀** key.



The first push of the **▶** key flashes the program number display. The required firing program can now be selected with the **▲** & **▼** keys.

*Note: holding down the **▲** or **▼** keys causes rapid change of the displayed value.*



The next push of the **▶** key displays the ramp rate in the range End, 1-999°/HR or FULL. This can be altered with the **▲** & **▼** keys. The heating ramp or the cooling ramp indicator on the mimic panel will flash. End marks

the end of the program. FULL heats or cools as fast as possible.



The next push of the **▶** key displays the soak temperature. This can be altered with the **▲** & **▼** keys. The soak temperature indicator on the mimic panel will flash.



The next push of the **▶** key displays the soak period in hours:minutes. This can be altered in the range 00:00 to 99:59 with the **▲** & **▼** keys. The soak period indicator on the mimic panel will flash.

SEGMENT The next push of the **▶** key increments the segment number digit and firing data for the next segment can be entered.



Program data entry is terminated if End is selected for a ramp rate with the **▶** key. Program data entry is also automatically terminated if the maximum number of segments have been entered.

*Note 1: available ramp rate displays are: End, 1 ... 999 & FULL. If End is shown but another segment is required then push the **▲** key to obtain the required ramp rate (in the range 1°/hr to 999°/hr). If full power is required then push the **▲** key until FULL is displayed. To mark the end of the program push the **▼** key until End is displayed*

*Note 2: to exit programming without cycling through all of the above steps wait 20 seconds without pressing any keys - the CeraControl will revert to the idle display. Alternatively press the **■** key to exit programming and to begin firing immediately.*

*Note 3: the **◀** key can be used to reverse through the programming steps to correct errors or to exit programming mode.*

Firing

To start a firing press the **■** key. The firing indicator lamp will flash.



With the firing indicator flashing an optional start delay up to 99 hours: 59 minutes can be entered with the **■** & **■** keys.

After 5 seconds, or immediately if the **■** key is pressed again, the firing will commence and the firing indicator lamp will remain lit.

To stop the firing prematurely at any time press the **■** key again. The firing indicator lamp will go out.

Hint: it is good practice to check that the program is correct by pressing the **▶** key & checking the program number & program contents before pressing the **▶■** key to start a firing. It is also a good idea to have a written record of the contents of the firing programs kept and displayed near the kiln especially if there is more than one user of the kiln.

Note: during ramping the CeraControl will perform either controlled heating or controlled cooling - as indicated on the mimic display. During soaking the CeraControl display alternates every 15 seconds between kiln temperature and soak period remaining. At the end of each segment the segment number display will be incremented.

Information: The CeraControl operates by calculating the amount of energy required by the kiln every 30 seconds (installer adjustable). If for example 40% of full energy is required to maintain a particular ramp rate or a particular soak temperature then the CeraControl will apply heating power to the kiln for 12 seconds every 30 seconds. The kiln heating indicator will light for 12 seconds every 30 seconds. If the kiln has a contactor then a loud click will be heard both when the kiln heating indicator lights up and when it goes out. If full heating power is required then the kiln heating indicator will remain lit. If full cooling is required the kiln heating indicator will remain off.

Cooling


Upon completion of firing the CeraControl lights all lamps on the mimic display and the kiln is allowed to cool naturally.



While the kiln temperature is above 40°C the display alternates every 5 seconds between the kiln temperature and HOT.



When the kiln has cooled to less than 40°C the display alternates every 5 seconds between the kiln temperature and End.

To return the CeraControl back to idle condition ready for the next firing press the  key (or turn off the power to the instrument).

Operating Notes

Kiln too slow

If the CeraControl is programmed to heat the kiln at a faster rate than the kiln is capable of then the CeraControl will turn on full power then wait until the kiln temperature has risen to the correct temperature before proceeding to the next ramp or soak segment.

Likewise if the CeraControl is programmed to cool the kiln at a faster rate than the kiln is capable of then the CeraControl will apply zero power then wait until the kiln has cooled to the correct temperature before proceeding to the next ramp or soak segment.

Heating & Cooling Ramps

The CeraControl is capable of controlled ramps for both heating and cooling. The type of ramp required is determined by comparing the required soak temperature to the soak temperature in the previous segment and is shown on the mimic display.

■ Key Operation

If the ■ key is pressed during a firing then the firing will be halted (not paused). Pressing the ■ key again will cause the CeraControl to restart the firing from the beginning. The CeraControl will look at the current kiln temperature and if this is greater than the required soak temperature then the CeraControl will automatically *cool* from current temperature to the soak temperature. This may not be what is desired so the ■ key should only be used to halt the firing in an emergency.

The program can be paused or program data can be changed while the controller is firing (see next section). This is a better option than using the ■ key. The program advance feature is however available to recover quickly from ■ key operation if required.

Memory

All programs & necessary data are remembered when the CeraControl is turned off. In the event of power failure during firing the CeraControl will automatically resume firing when power is returned (this feature can be disabled: see Installation Handbook).

Delayed Start

By default the delayed start time period is initialised to 00:00 for each firing. The CeraControl can however be configured to remember the delayed start time period (see Installation Handbook).

Adjusting While Firing

Firing values can be adjusted while the CeraControl is firing. Also there are program pause and program advance features that are particularly useful for glass work.

Adjusting Firing Values

While firing operate the **▲** key to select the required parameter as shown by a flashing lamp on the mimic display. The firing value is shown on the main display and can now be adjusted with the **▲** & **▼** keys in the usual way. The contents of the current segment or any segment still to be executed can be changed. Firing will still carry on as normal while these changes are being made. The CeraControl will return to its normal running display 20 seconds after key presses cease (or immediately after End is displayed).

Changes made to programs in this way are stored and are used for subsequent firings.

Program Advance Facility

While firing press and hold down the **▶▶** key for 3 seconds to obtain the **▶▶** (advance) function. The CeraControl will sound a short beep and the executing program will immediately advance one step as indicated by lamps on the mimic panel. The effect of this is as follows:-

If ramping then the CeraControl will switch to soak at the current kiln temperature. If soaking then the CeraControl will advance to the next segment if any, or else it will end the firing.

Changes made to the operation of the CeraControl in this way are temporary and are not stored.

Program Pause Facility

While firing press and hold down the **⏸** key to obtain the **⏸** (pause) function. The CeraControl will sound a short beep and the executing program will pause indefinitely at the current kiln temperature. To release the pause repeat the above action.



While paused, the kiln temperature display will alternate periodically with a scrolling PAUSED display and a beep will be sounded.

WARNING - PROGRAM PAUSE

The program pause facility should be used with care. Program execution is suspended and the kiln will be held at its current temperature. If left too long at high temperatures kiln damage could result. Pause will automatically release after an Installer defined time period (default: 2 hours - see Installation Handbook).

Error Messages

If the CeraControl detects a problem the buzzer will sound and an error message will be displayed. This error message will alternate with a display of kiln temperature. The segment number display will show where the error occurred.

To obtain more information on the error operate the **key**. The first press will display the maximum temperature reached in the firing. The second press will display the length of time that the error has been present. The buzzer will mute.



Heating error. The kiln temperature is not increasing as required. The kiln has been on full power for 15 minutes but the temperature has not increased by at least 2°C.

Possible causes: kiln door or lid not closed properly or door switch faulty or needs adjusting. Heater element open circuit or elements too old. Electrical power phase failure or contactor failure.



Thermocouple or thermocouple wiring open circuit. Get thermocouple and wiring checked. Replace thermocouple if necessary.



Thermocouple reversed (kiln temperature apparently less than -40°C). This is an installation fault. Get wiring checked.



Cooling error. The kiln has been on zero power for 30 minutes but the kiln temperature has not fallen by at least 1°C.

Possible causes: contactor failure (contacts welded?) or thermocouple connection intermittent or high resistance.



Kiln temperature overshoot. The kiln temperature exceeds the desired temperature by a preset limit as shown below:-

<u>Desired Temperature</u>	<u>Overshoot allowed</u>
Less than 100°C	+60°C
More than 100°C but less than 200°C	+50°C
More than 200°C but less than 600°C	+30°C
More than 600°C	+20°C



Maximum firing time exceeded. The length of the firing has exceeded an installer selectable limit.



Maximum room temperature exceeded. The internal temperature of the CeraControl has exceeded an installer selectable limit.

Possible causes: kiln room vent fan failure, kiln room too small, ventilation grills blocked, damper or bung left open, controller mounted too close to kiln.


All these error messages cause the CeraControl to terminate the firing. The alarm buzzer will sound once per second. To reset the CeraControl turn off the power to the instrument and have the fault investigated and rectified by your installer or kiln service engineer.



Note: these error messages are provided to detect kiln faults and so offer some protection to the kiln.

Technical note: these error messages will cause the alarm relay to open.

Firing Program Errors





Program Error. This error message is displayed if a potential error is detected within the firing program when the  key is pressed to start a firing. The alarm buzzer will sound 3 times and the segment display will show the suspect segment number.

To clear this error press the  key. The CeraControl will now enter programming mode to allow the suspect program to be viewed and altered if necessary. If a fault is found then correct it. If no fault is found then press the  key again to force the firing program to start. A potential programming error is defined as a very low ramp rate to a very low temperature. Such a programming fault might cause very long firing times with potential kiln damage.

Other Features

Energy Used & Setpoint Displays



Operate the  key at any time to show the amount of electrical energy used in kWh. If pressed during a firing it shows the energy used so far. After a firing it shows the total energy used for that firing. This information is stored while power is off and is only reset to zero when a new firing is started. If the value displayed is always 0.0 then the kiln power rating has not been configured - see installation handbook.

Operating the  key a second time shows the current set-point (the temperature which the CeraControl is currently trying to achieve).

Keyboard Lock Facility

The keys on the CeraControl can be locked so that pressing them has no effect. This is an anti-tamper feature used to ensure that the operation of the CeraControl or the program data cannot be altered by un-authorized people. The CeraControl can be locked when it is idle (not firing) or while it is firing. It cannot be locked while it is being programmed.



Press the  &  keys together & hold down for 5 seconds to lock or to unlock.

Power Failure Recovery

If power fails during firing then the CeraControl recovers as follows:-
For power failure during start delay the CeraControl times off the remaining start delay when power returns. For power failure during ramping the CeraControl continues the ramp it was previously executing. For power failure during soaking the CeraControl ramps back up to soak temperature at the correct ramp rate then applies the remaining soak period. This recovery scheme can be disabled if required (see installation handbook) - the CeraControl will then lock up with FAIL displayed and kiln off in the event of power failure.

Pre-Loaded Programs

Program Number	Program Name	Seg 1 Ramp Rate °C/hr	Seg 1 Soak Temp °C	Seg 1 Soak Time hr.mn	Seg 2 Ramp Rate °C/hr	Seg 2 Soak Temp °C	Seg 2 Soak Time hr.mn	Seg 3 Ramp Rate °C/hr	Seg 3 Soak Temp °C	Seg 3 Soak Time hr.mn	Seg 4 Ramp Rate °C/hr
1	Standard Bisque	70	70	01.00	60	600	00.10	200	1120	00.10	End
2	Low Fire Glaze	80	80	00.10	120	600	00.05	220	1020	00.15	End

Note

These sample programs are to be used as a general guide to firing. The top temperature should be as specified by your supplier for each clay, glaze or colour. All firings must start relatively slowly. In the biscuit firing the moisture is driven out and carbonaceous material burnt away in the early stages. Glaze firings must start slowly up to 600°C in order to avoid going too fast through the point of rapid expansion, (quartz inversion) which occurs in the ceramic at 573°C. A short soak at the end of the first segment evens out the kiln temperature. Soak periods at top temperature allows the glaze to smooth out and in stoneware it gives more time for the glaze and clay to bond into an integral layer.

The sample programs show only two segments. In multi-segment versions of the CeraControl more segments may be used for more complex firings. For example, where large pieces are biscuit fired it is a good idea to include a warming segment that will ensure the piece is dry and reduces the risk of the work shattering due to moisture boiling in the clay. A typical warming segment is: 70°C per hour to 75°C, soak for 1hour then continue with standard biscuit program. Additional segments are used after the top temperature to control the rate of cooling when firing very large pots, for crystal glazes and in glass annealing.

We strongly recommend that you test your kiln with pyrometric cones. Cones measure heatwork not just temperature. Heatwork is temperature and time together. In a fast firing the ware will be exposed to heat for a shorter period and will therefore have to be fired to a higher temperature than in a long slow firing. For example cone 06 will mature at 1243°C if fired at 150°C per hour whereas if it is fired at only 15°C per hour it will mature at 1185°C. These rates are for the last 100°C of the firing. All kilns will slow down at high temperature regardless of the rate of increase set so to be certain of the amount of heatwork achieved use a cone. Cones should be examined when the kiln is opened after the firing.

For more advice on programming your kiln call PotteryCrafts technical advisors.

Sample Glass Programs

Program No.	Program Description	Seg 1 Ramp Rate °C/hr	Seg 1 Soak Temp °C	Seg 1 Soak Time hr:mn	Seg 2 Ramp Rate °C/hr	Seg 2 Soak Temp °C	Seg 2 Soak Time hr:mn	Seg 3 Ramp Rate °C/hr	Seg 3 Soak Temp °C	Seg 3 Soak Time hr:mn	Seg 4 Ramp Rate °C/hr	Seg 4 Soak Temp °C	Seg 4 Soak Time hr:mn	Seg 5 Ramp Rate °C/hr
1	4-6mm Float Glass Fuse	150	538	00:10	FULL	840	00:20	FULL	538	00:45	182	427	00:15	End
2	4-6mm Float Glass Slump	150	538	00:00	200	700	00:15	FULL	538	00:15	182	427	00:00	End
3	6mm Bullseyei Fuse	222	677	00:30	333	795	00:10	FULL	482	01:00	83	371	00:01	End
4	6mm Bullseyei Slump	167	640	00:10	FULL	482	01:00	56	371	00:01	End	-	-	-
5	6mm Spectrum System 96i Fuse	200	500	00:00	FULL	804	00:12	FULL	540	00:40	150	510	00:20	End
6	6mm Spectrum System 96i Slump	155	704	00:20	FULL	540	01:30	FULL	510	00:10	26	371	00:00	End
7	Bottle Firing Cycle	170	510	00:00	250	780	00:10	FULL	510	01:00	70	400	00:30	End
8	Low Stain	200	570	00:10	FULL	516	00:30	100	300	00:00	End	-	-	-
9	High Stain	200	665	00:10	FULL	550	00:20	FULL	516	00:30	100	300	00:00	End