

CROMARTIE KILNS LIMITED

...at the centre of ceramics

Customer Safety Instructions

Perfect Fire II

Model DTP-56 DC-E

This Document should be read carefully before using your new Cromartie Controller.

The Perfect Fire II uses state of the art microprocessor technology which has been designed specifically for use with pottery kilns. The controller has a wide range of facilities which provide the user with a versatile, easy to use instrument. The controller contains a L.E.D display as a guide for both firing and programming.

Principal features include the following.

- Delay Start Facility, 0 to 99Hr. 59 mins.
- Heating Ramp, 1 to 1000°C/Hr, to fully adjustable 'Set Point'.
- Soak, 00:00 to 99Hr. 59 mins.
- Soft Fire feature.
- Constant temperature read-out.
- Built in fault detection and self test.

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The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING

To prevent fire or electrical shock hazard, Do not expose this unit to rain or moisture.

PLEASE...

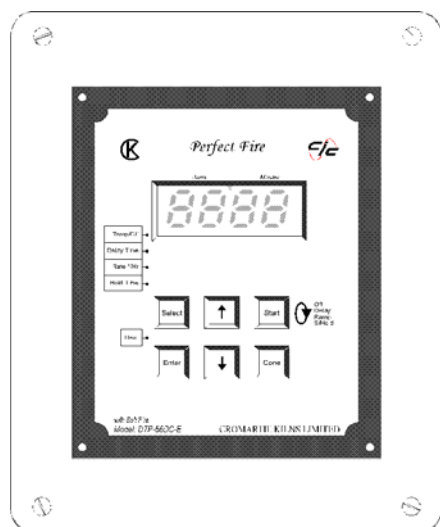


Familiarise yourself:

Scan the contents list and look through the manual, note sections of interest.



Controller connections to the kiln must be made in a workmanlike manner. Failure may result in damage to the controller or kiln.



For Great Results Every Time

Explanation of Graphical Symbols:

The lighting flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of non insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Such damage is not covered by warranty.

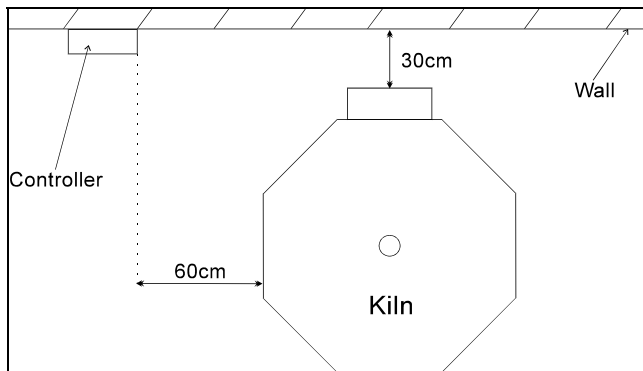
Installation



Check that the Perfect Fire II and thermocouple type match, otherwise proper control will not be possible. Check also that the Perfect Fire II if fitted with a plug is compatible to the kiln, check with kiln manufacturer. **Note!** Failure to do this may result in your controller being damaged.

The Perfect Fire II should be fixed to a wall near the kiln using the bracket found on the back of the instrument, number 8 screws should be used (not supplied).

Do not position closer than 600mm to the kiln or above the kiln, (so that the unit is not damaged by heat from the kiln).



N.B. Always isolate from the mains supply before opening the case (Note there are no user alterations that can be made inside the instrument and damage could be caused by unskilled tampering).

2 Connection to the Kiln

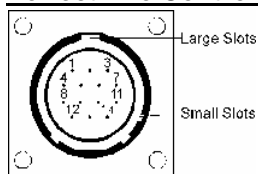
Ensure the Controller and Kiln are compatible, and simply plug the connection lead into the kiln. (If no plug is provided see below) If in doubt contact your kiln supplier or Cromartie. Connection to the kiln must only be carried out by a qualified electrician.



If no plug is provided connect as follows:-

Mains Supply			T/Couple	
Wire Colour	PCB Terminals	Function	Colour	Polarity
Brown	L	Supply	White	+
Green	E	Earth	Blue	-
Blue	N	Supply		
Black	C	Common		
White	0	Contact/Relay		

Perfect Fire Control Socket Pin Connections



- Pin 3. Transformer (8) Yellow
- Pin 4. Transformer (7) Orange
- Pin 5. Transformer (5) Red
- Pin 6. Relay - Brown
- Pin 7. Relay - Black
- Pin 11. Thermocouple + White

Pin 12. Thermocouple - Blue

L.E.D Lights

There are 4 L.E.D's on the unit that indicate different functions depending on the mode of the unit. The meanings are as follows:-

L.E.D	STEADY	SLOW FLASH
1	TEMP/OFF	Top Temp
2	DELAY TIME	Delay time entry (Hr/mins)
3	RATE °/HR	Ramp rate entry (Deg/Hr)
4	HOLD TIME	Soft Fire Soak Time

Key Functions

Used to increase the number in the display when setting. If held down, the speed of increase accelerates. If tapped, the speed stays the same. If left released for a brief time, the speed decelerates.

As above for decreasing.

Start/Stop the program. In particular, if the "off" light is not on, it forces the program to a segment 0, whereas if it is on, the program goes to segment 1. To start a program at a segment other than 1, the SEG key and UP \DOWN keys are used to select the desired segment, then ENTER starts the program at the desired segment.

To allow entry, into the programming mode. While it is held, it shows the current segment for entry, which starts at segment 1 (see below under SEG key for how to start at other than 1).

This key enters a number into the memory, which it retains even if the power is removed. If enter is not pressed the number is not changed/stored even if UP/DOWN keys are used.

This key enables the operator to select a Cone value from inside the Perfect Fire II for people who prefer to fire by cone numbers.

Programming Your Controller

1. Connect controller to kiln.
2. Switch power on to kiln. Set energy regulators to full (The kilns ambient temperature is now shown on the display. If you wish to fire by cone numbers go straight to No. 4.
3. Press SELECT button to enter program. This will cause "Temp/off" light to flash. Use Up & Down buttons to input top temperature, go to No. 5.
4. (Firing by cone numbers). Press CONE button. "C---" is now shown on the display. Use Up & Down keys to enter the cone value required. The temperature value of the cone selected will now be displayed on the screen. (If you wish to alter this use UP & DOWN keys to input the required

temperature). ***Details on Perfect Fire II, Seger, Orton & Bell cones are shown overleaf.***

5. Press ENTER button to score this information. The display will flash once to indicate storage.
6. Press SELECT button, the light moves down one to "Delay Time" which flashes. Use UP & DOWN keys to input delay start time in hours and minutes. This is not an actual time of day but the time elapsed from switching on the controller to the kiln coming on. If no delay start is required, ensure display is set to zero.
7. Press ENTER button to store, the display will flash once to indicate storage.
8. Press SELECT button, the light will move down one to "Rate/hr" which flashes. Use Up & Down keys to input rate of heating in degrees centigrade per hour. This rate operates all the way to the top temperature.
9. Press ENTER button to store, the display will flash once to indicate storage.
10. Press SELECT button, the light will move down to "Hold Time" which flashes. Use UP & DOWN keys to input soak period in minutes. If cone mode has been selected the display will read "Soft", for an explanation of *Soft Fire* see the glossary. If Soft Fire is not required press the UP key once. This will cause the controller to end the firing when the top temperature is reached. If you require a soak time use the UP & DOWN keys.
11. Press ENTER button to store, the display will flash once to indicate storage.
12. Press SELECT again - LED returns to "Temp/off" and the ambient temperature is displayed. You can now to review your program by pressing the SELECT button.
13. Close door/lid, turn interlock where fitted and press the START button. The LED will move to "Delay" if used, a flashing count down will appear in the display window. If no delay start is used, the light will momentarily pause at "Delay" and then move to "Ramp". The small red light "Heating" will come on and off whenever kiln power is fed (or not fed) to the kiln. If you wish to stop the controller of any point in the program press the START key twice

Error Messages

Error Code Message

- EEEE Thermocouple open circuit or connections reversed
- Err 1 Kiln on full power for 2 hours
- Err 2 Invalid Data in memory (Call Cromartie)

General Methods of Operation for Cromartie Kiln Controllers

The thermocouple generates a signal in electrical current which is detected by the controller. This signal is electrically converted into a temperature measurement in degrees centigrade which the controller reads and, according to the instructions given out, the controller will switch the relay/contacter on/off as required. When the controller is programmed

full power the contactor/relay is permanently on. When top temperature is reached the contactor/relay is switched off. In soak mode the contactor/relay will be switch on and off to maintain the kiln at the temperature desired by the user.



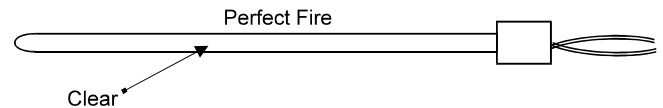
Our controllers derive their power from the kiln via the multi-pin plug and socket supplied.

Important Warranty Notes

Tampering inside controllers invalidates any warranty. Suspected faults should be reported as soon as possible.

Perfect Fire Thermocouple.

This type of thermocouple is only used on kilns fitted with perfect fire instruments. It has a CA sensor which is enclosed in a clear crystal shroud.



Approximate Bending Temperatures for Cones

018	696	706	717	720	705	696
017	727	736	747	770	730	727
016	764	776	792	795	755	763
015	790	797	804	805	780	789
014	834	836	838	830	805	833
013	852	860	869	860	835	868
012	876	880	884	885	860	866
011	886	990	894	-	900	886
010	-	-	-	910	920	887
09	915	919	923	930	935	914
08	-	-	-	950	955	944
07	973	978	984	990	970	972
06	991	995	999	1015	990	991
05	1031	1036	1046	1040	1000	1031
04	1050	1055	1060	1060	1025	1049
04A	1060	1065	1070	1070	-	-
04B	1068	1074	1080	1080	-	-
04C	1076	1082	1090	1090	-	-
04D	1084	1090	1100	1100	-	-
03	1086	1092	1101	1115	1055	1089
02	1101	1110	1120	1125	1085	1101
01	1117	1127	1137	1145	1105	1117
1	1136	1145	1154	1160	1125	1136
2	1142	1150	1162	1165	1150	1142
3	1152	1160	1168	1170	1170	1152
4	1168	1176	1186	1190	1195	1167
5	1177	1186	1196	1205	1215	1177
6	1201	1210	1222	1230	1240	1201
7	1215	1227	1240	1250	1260	1214
8	1236	1248	1263	1260	1280	1236
9	1260	1270	1280	1285	1300	1259
10	1285	1294	1305	1305	1320	1284

This current can be measured and translated electrically into a temperature read-out.

7 Glossary of Terms

Ambient Temperature	The temperature inside the firing chamber of the kiln.
Contactors / Relay	An electrical device used for switching electrical supply on/off to the elements. It is controlled by the controller.
L.E.D	Light Emitting Diode, a small bulb-like device which lights up to indicate a function or warning.
Ramp	This term is used to describe the rate of rise of temperature when firing. Some controllers do this in degrees per hour, others as a percentage of full power.
Set Point	This is a temperature at which a controller changes from one mode to another determined by the user e.g. for changing from ramp control to full power or from full power to soak.
Soak Time	The term 'soak' is an old pottery term used to describe the holding of a particular temperature at a steady level to 'soak' the products to be fired to ensure even heat distribution and maturity of glaze body or colour.
Soft Fire	The Soft Fire mode is an electronic means of simulating a soak. For approximately the last 30°C of the firing the controller pulses power to the kiln in short bursts. This extension of the firing cycle results in slightly longer firing, thus imitating a soak.



When firing to stoneware or Porcelain temperatures the soft Fire function is not recommended as this may affect the kiln top temperature capability.

Thermocouple	A temperature sensing device located through kiln wall into the kiln. Its outer sheath is a high temperature crystal tube. Inside are two fine wires held in a protective atmosphere to prevent them from being damaged during the firing process. These wires produce a minute electric current which varies according to temperature.
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Technical Specifications

Supply	230 volts \pm 15% 50 Hz ~
Thermocouple	Type C/A or K
Output	Single pole 12v DC to operate 12v DC kiln relay.
Temperature display	0-1300°C
Soak time	0-99Hr. 59 mins.
Temperature ramps	1°C/Hr to Full Power
Set point temperature	0-1300°C
Case Dimensions	168mmW x 220mmH x 80mmD.



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