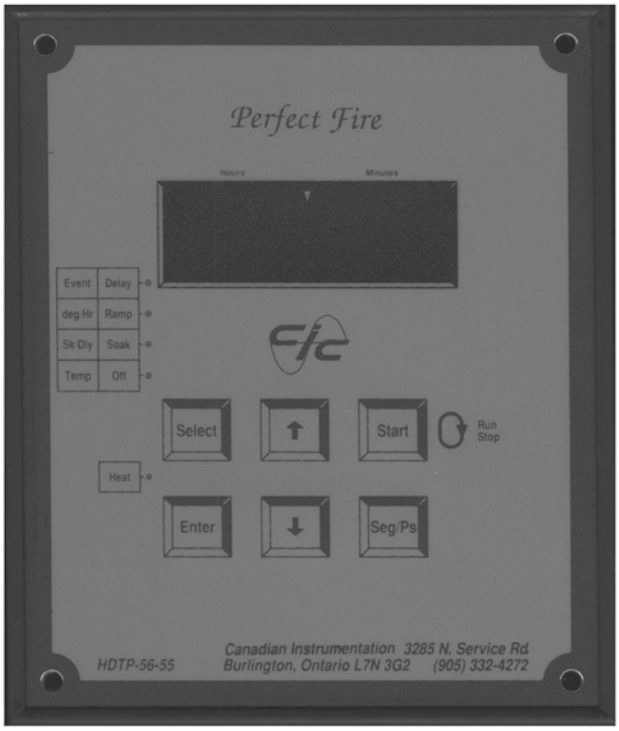
Perfect Fire III

HDTP-56-55

User's Manual



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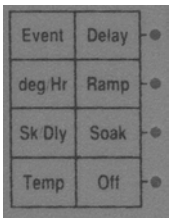
HDTP-56-55 Multi-Segment Control Programming Instructions

Thank you for your purchase of a kiln controlled by the Perfect Fire III. The following pages explain the many features of the control and how to program firings.

The Perfect Fire III control has 55 user programmable segments that can be linked together to make simple or elaborate and complex firings.

There are four LEDs on the left of the unit, which indicate different things depending on the mode of the unit.



When the LED is solid (not flashing) you may be running a program, completed a program, or sitting idle. Use the right column to indicate the meaning of the solid lit LED.

LED	1	Delaying
	2	Ramping
	3	Soaking
	4	Off

When flashing individually you are in the programming mode and you use the left column to indicate the meaning of the flashing LED.

LED	1	Programming or viewing the event (End, Cont, Dly, Conr)
	2	Programming or viewing the ramp rate (degrees/hour)
	3	Programming or viewing the soak or delay time (hours:minutes) depending on the event entered.
	4	Programming or viewing the temperature to heat to (degrees)

All four LEDs slow flashing indicate PAUSE mode

PAUSE MODE
While displaying the segment (press the SEG/PS key), the programmer enters the PAUSE mode and all four LEDs will flash at a slow rate. The clock is effectively stopped in this mode so that the setpoint will not change and the soak time will be extended indefinitely. The pause is removed by pressing the SEG/PS key once. LEDs will indicate this as they will stop flashing.

FUNCTIONS OF THE KEYS

The unit has six keys as follows:

Used to increase the number in the display when programming. 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.

Same as above for decreasing.

Starts and/or stops the running program. For example, if the off LED is on and you press the start key, it forces the program to start segment 1. If you press the start key when the off LED is not on, the program that is running is stopped and the off LED will then come on. THE START BUTTON CAN ONLY START SEGMENT ONE or stop a running program. To start a segment other than one, see the SEG/PS key.

Allows entry, examination or modification of a program. While it is held, it shows the current segment for entry, which starts at segment one. See the SEG/PS button for an explanation of how to go to a segment other than one.

This key stores a number into memory, which it retains even if the power is removed. If ENTER is not pressed during programming then the last entered value is retained, even if the up or down arrows are used. When pressing this key to store the new value into memory, it must be held long enough (one or two seconds) for the display to blink. A brief press of the key is not enough, you must hold the key depressed until you see the display blink. The ENTER key is also used in conjunction with the SEG/PS key to start a segment other than segment one. (see SEG/PS key)
If ENTER is pressed briefly while in the Soak portion of a segment or during a Delay segment, the display will change (after less than one second) to show the remaining time in hours:minutes. At the next press of the ENTER key or the beginning of the next segment, the display will revert to showing the measured temperature.

PRESSING WHILE A PROGRAM IS RUNNING: When pressed it changes the display to show the current segment that is running as "S-XX". All four LEDs flash to indicate the PAUSE MODE. A second press is used to return to the run mode.
PRESSING DURING PROGRAMMING: May be used as quick way to go a segment other than one. Pressing it with the off LED on will display "S- 0". Use the UP or DOWN key to change to the segment that you wish to program or view and press the SELECT key to program or view that segment. A double press of this key is used to terminate programming entry mode.
STARTING A SEGMENT OTHER THAN SEGMENT ONE: Press the SEG/PS key, then use the UP/DOWN keys to alter the segment number to the desired segment. Press the ENTER key to start the segment. Return to the temperature display by pressing the SEG/PS key.
PROGRAMMING A SEGMENT: Press the SEG/PS key, then use the UP/DOWN keys to alter the segment number to the desired segment. Press the SELECT key to enter into the programming mode for the segment displayed.

PROGRAMMING THE CONTROL

1. EVENT
   The event has four possible settings:
   END Indicates the end of a program. The program being run will stop when and END event is encountered.
   CONT Continue to do the ramp and soak as programmed. If the ramp speed programmed cannot be achieved, the elements will heat without cycling and the kiln will continue firing even though the kiln can't keep up to programmed ramp rate.
   DLY Delay segment. The ramp and temperature settings are ignored, the heat is held off for the time set for SOAK/DLY. Delay time can be set in increments of 1 minute, up to 50 hours. Time is set in HOURS:MINUTES.
   CONR Do not continue if the ramp speed cannot be achieved. If the kiln cannot achieve the ramp speed programmed, (the elements do not cycle) the unit will stop the firing being unable to perform the ramp exactly as programmed. This will result in a firing that will end prematurely, or if the temperature programmed is less than the room temperature, the unit will stop, not being able to complete the firing as programmed.

2. RAMP
   The ramp rate can be from 1 to 4000 degrees per hour. The total time for the ramp to take place must not exceed 40 hours. If the ramp rate is set below one, the display will show 'FULL'. This means that the full available heat will be used (no cycling). It is not necessary to enter a sign for the ramp rate. The unit will ramp up or down as required depending on the current temperature.

3. SOAK / DELAY TIME
   Time entered here will be a soak time or delay time in HOURS:MINUTES depending on the EVENT entered as a soak or a delay. Soak or delay time can be set to a maximum of 50 hours in one minute increments.

4. TEMPERATURE
   The temperature at the end of the ramp in a given segment (also the soak temperature) can be set to any number over the range of the unit.

SEGMENT 0

Segment 0 normally has the event set as END. When the power is applied to the unit, the unit will look at the event programmed in segment 0. If the event is set to something other than END, the unit will begin running the segment. If this is desired, it is recommended to set segment 0 as a one minute delay (set event setting to DLY and soak/dly to 1 minute) This will allow the unit to properly start up. A useful application for this would be where a mechanical 7-day timer is used to apply power to the unit and should begin the program automatically. Without requiring the START key to be pressed. If segment 0 is used, the START key will no longer have a useful function. To access segment zero, see the comments regarding the SEG/PS key. For most applications, leave segment zero as an END.

CAUTION ABOUT SEGMENT 0: Be advised of the danger of having a program in segment 0. If there is an accidental power interruption, when the interrupted power is restored the kiln will start. If you have a program in segment 0, be sure that the kiln lid is down when unattended.

ENTERING A SAMPLE PROGRAM

Example: When the START key is pressed, we want the temperature to increase at 500 degrees per hour to 800 degrees and then we want a 10 minute soak, followed by a ramp down to 200 degrees at 100 degrees per hour followed by a power off.

Press the SELECT key. While the key is held depressed the segment number '**S- 1**' is displayed. When it is released, the top light of the four menu LEDS will be flashing at a fairly slow rate. This indicates the event code entry. It can show "**END**", "**CONT**", "**DLY**", or "**CONR**". If the event code is set to END then the following ramp and soak temperature is not used. The program will run only until it reaches an END. Set the event code to "**CONT**" using the UP/DOWN arrow keys. Now press the ENTER key to store the newly programmed event code. Remember the ENTER key must be held long enough to see the display blink. Press the SELECT key to enter the ramp rate of 500, the soak time of 00:10, and the temperature of 800. In each case, use the UP/DOWN keys to make the display show the correct value, then press the ENTER key to store the new number. Press the SELECT key again (while it is held, it will show "**S- 2**" on the display). Again enter "**CONT**" followed by the ramp rate of 100, the soak time of 0, and the temperature of 200. Another press of the SELECT key will allow entry of the event code for "**S- 3**". Set it to "**END**" and press the ENTER key. This completes entry of the program. Press the SEG/PS key twice to exit from this mode. The display will show "**S- 0**" and then the temperature. Press the SELECT key again and run through the numbers to check them, exiting as before with the SEG/PS key.

The off LED will be on continuously (no flashing) when the unit is at the end of a program. In this case the unit will be at segment 0 (verify by pressing the SEG/PS key twice). To start the program, press the START key. The off LED should go off and the ramp LED will come on. As well, the unit will begin calling for heat and the heating LED will come on. Press the SEG/PS key twice to verify that you are running segment one. To stop the program, press the START key again. The off LED should come on. Try the alternate way of starting segment one using the SEG/PS key. Press the SEG/PS key and change the display to "**S- 1**" and press the ENTER key. After returning to the run mode (by pressing the SEG/PS key again) the ramp LED should be on again and the unit will begin heating.

Even then most complex programs use these simple components. Each program can consist of a number of segments from 1 to 55 followed by an END in the last segment. Remember that the unit stops before it gets to the ramp and soak in any segment with an END. That is why the event code is at the top of the menu.

DIAGNOSTICS AND ERROR CODES

The unit has built in diagnostics that help to assure that the memory and microprocessor are working properly. A watchdog timer monitors the operation and will reset the microprocessor if system upset occurs.

EEEE

If the thermocouple (temperature sensor) or the connections to it are faulty (open circuit) then the display will show "EEEE". If the thermocouple is connected in reverse, then the display will show temperature lower than room temperature as the load heats. When the temperature reaches about 150 degrees, the display will go from "-20" to "EEEE".

ERR1

If the heat is on continuously at 100% for more that 2 hours (and this feature is not disabled) the unit shuts down and the display shows "ERR1". To reset the unit, remove and reapply power.

ERR2

The non-volatile memory is checked once per second and if invalid data is found the error code "ERR2" is displayed and the program will shut down.

CONE TEMPERATURES

Heating Rate of 108 F Per Hour

Cone 022	1069 F	577 C	**Cone 06**	1816 F	992 C
Cone 021	1116 F	603 C	**Cone 05**	1888 F	1032 C
Cone 020	1157 F	626 C	**Cone 04**	1922 F	1051 C
Cone 019	1234 F	668 C	**Cone 03**	1987 F	1087 C
Cone 018	1285 F	697 C	**Cone 02**	2014 F	1102 C
Cone 017	1341 F	728 C	**Cone 01**	2043 F	1118 C
Cone 016	1407 F	764 C	**Cone 1**	2077 F	1137 C
Cone 015	1454 F	791 C	**Cone 2**	2088 F	1143 C
Cone 014	1533 F	834 C	**Cone 3**	2106 F	1153 C
Cone 013	1558 F	849 C	**Cone 4**	2134 F	1168 C
Cone 012	1591 F	867 C	**Cone 5**	2151 F	1178 C
Cone 011	1627 F	887 C	**Cone 6**	2194 F	1202 C
Cone 010	1629 F	888 C	**Cone 7**	2219 F	1216 C
Cone 09	1679 F	916 C	**Cone 8**	2257 F	1237 C
Cone 08	1733 F	946 C	**Cone 9**	2300 F	1261 C
Cone 07	1783 F	973 C	**Cone 10**	2345 F	1286 C