

POTCLAYS LTD FIREMASTER 3 TEMPERATURE PROGRAMMER

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1 DESCRIPTION

The Firemaster 3 is a combined Temperature controller and Programmer, designed to fire electrically heated pottery kilns to a precise temperature/time program. Control of the entire firing cycle is fully automatic, giving accurate and repeatable firings. The unit has 5 fixed and 5 user adjustable programs.

Each complete program can follow this sequence of 5 segments:

1. Start-up time delay.

2. A controlled heating ramp (in degrees/hour) from cold, up to the first set-point temperature.

3. A second controlled heating ramp (in degrees/hour), from the first set-point temperature, to the second set-point temperature.

4. A "soak" time, when the kiln temperature is held at the second set-point temperature.

5. The kiln will switch off at the end of this "soak" time, which completes the program (unless linked).

All the program values, which are chosen by the user, are stored in the unit's memory, and will remain there until changed.

Any segment of a program can be omitted if required.

During a firing, green lights on the graphic display show which part of the program is currently in operation. The display also shows when the program has finished.

2 SPECIFICATION

Temperature display	0 to 1600°C span.
Delay & Soak times	0 to 99 hours 59 minutes.
Ramp rates	1 to 1000°C per hour.
Set-point temperatures	0 to 1350°C.

All program values are retained in memory.
Automatic switch-off at completion of the program.
Display shows kiln temperature, program values and status.

Thermocouple cold junction compensation.
Available for use with type R,K,S thermocouples.
Wall mounting case.
Sealed membrane control panel.
Automatic continuation of firing after power cut.
Output relay provides power to kiln contactor coil.
220/240v 50/60 Hz AC input.

Options:

- 1 5 fixed and 5 user adjustable stored programs.
- 2 Linked programs.

NOTE For type K thermocouple versions, the following changes apply:

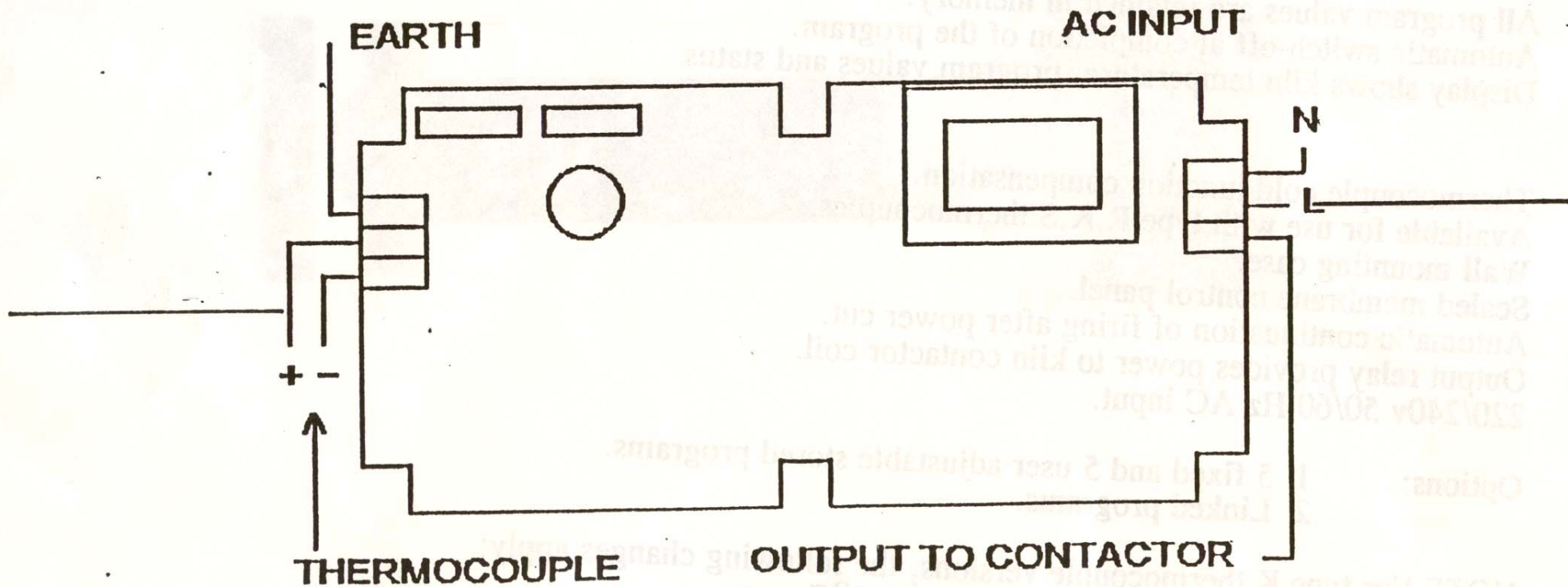
Temperature display	0 to 1300°C span.
Set-point temperatures	0 to 1200°C.

3 INSTALLATION

The unit should be fixed to a wall near to the kiln. Do not position it closer than 600mm to the kiln, to prevent damage due to radiated heat.

Hang the unit on two no.8 round head screws fixed to the wall, using the two "keyhole" slots on the rear face of the unit. The screws should be spaced 110mm apart.

CONNECTIONS



Note. The contactor output is a switched AC Live supply.

4 PROGRAMMING

When the instrument is switched on, the numeric display will show the kiln temperature.

To enter a program, press the STEP and UP/DOWN buttons as shown here:

STEP (display current program number P1 to P10)

UP or DOWN to change program number

STEP (display DELAY hours. minutes)

UP or DOWN to change delay

STEP (display 1st. RAMP RATE degrees/hr)

UP or DOWN to change ramp rate

STEP (display 1st. SETPOINT temperature)

UP or DOWN to change setpoint

STEP (display 2nd. RAMP RATE degrees/hr)

UP or DOWN to change ramp rate

STEP (display 2nd. SETPOINT temperature)

UP or DOWN to change setpoint

STEP (display SOAK TIME hours. minutes)

UP or DOWN to change soak time

STEP (display kiln temperature)

As the STEP button is pressed, red lights on the mimic diagram display will correspond to the displayed program value. An illustration of these displays is printed on the top left-hand corner of the mimic diagram on the instrument.

A single press of the UP or DOWN buttons will change the displayed value by 1. If the button is held down, the displayed value will continue to change, initially at a slow rate and then speeding up. When the approximate required value is shown, release the button. Final small corrections can then be made by single presses of the UP or DOWN buttons. Then press STEP when the correct value is shown, which will store the new value and then display the next program value in the sequence.

To omit a program segment (i.e. delay, 1st. ramp, 2nd. ramp or soak period) set the time or setpoint temperature to zero.

FIXED PROGRAMS

Note that program numbers P6 to P10 are fixed, and are not normally user adjustable. Please consult Potclays Ltd. if special values are required.

LINKED PROGRAM OPTION

This option enables the separate programs to be linked together, to form 1 or more complex programs.

After programming the SOAK TIME on any program, the next press of the STEP button displays the linking value L0 through to L10. This is changed by using the UP/DOWN buttons and STEP in the usual way.

L0 means that linking is off, i.e. the chosen program will finish after the soak time has completed. For L values between 1-10, this means that the selected program will jump to the L program number when the soak time has completed. The delay period for that next program will be ignored.

Programs can be linked in any sequence, but the last one selected must terminate in L0. If a program is linked to itself, it will repeat until switched off. Note that only the first DELAY time operates when linking is used - it is ignored for subsequent programs in the sequence.

5 RUNNING A PROGRAM

Program operation is shown by green lights on the mimic diagram display. No green lights showing means that the program is not operating, and the kiln is not firing.

A single green light shows that the program is operating (in the segment displayed). All 4 green lights showing indicates that the program has completed, and the kiln is switched off.

To stop or cancel a program, press RUN. This will turn off all the green lights and set the programmer ready for program operation.

To start a program, press the RUN button. One green light will show which of the program segments (i.e. delay, 1st. ramp, 2nd. ramp or soak) is in operation. The green light will move along the mimic diagram as the program progresses to the next segment.

When the program has completed, all the green lights will show together.

If the instrument has the linking option fitted, check that the first program number of the sequence is selected before starting.

6 NOTES

When a program is running, and the number display is showing kiln temperature, the UP and DOWN buttons have extra functions.

Pressing (and keeping down) the DOWN button causes the display to show the program setpoint temperature value, i.e. the temperature at which the kiln should be according to the program. When the DOWN button is released the display reverts to showing kiln temperature.

Pressing the UP button forces the program to advance to the next segment within each program segment. Each time the UP button is pressed the green light will move along the mimic diagram.

When a program is running, the remaining DELAY and SOAK TIMES may be checked by using the STEP button.

If the program is operating in either of these segments, then the displayed time will be the time remaining for that segment. The display will change back to kiln temperature automatically 15 seconds after the STEP button was pressed.

Note that when the kiln is firing, the extreme right-hand decimal point on the numeric display will light when the kiln contactor switches on. This is simply an indication of "power-on" to the kiln.

If the display is flashing on and off, this means that the program contains an out of range value. Press the STEP button until the display shows ----, which is the out of range value. Then re-enter the correct value, using the UP/DOWN buttons, and press STEP to enter. The display should stop flashing. If it continues to flash, another program value is affected, continue with this procedure until clear.

Firmaster 3
Appendix to Operating Instructions.

- 1) It is very important to check that the FM3 controller is correctly working and controlling the kiln. Use cones in the kiln to monitor heat work and to confirm that the firing is correct. Always be guided by the cone and use these to see that the kiln correctly shuts off until you are sure that the instrument is operating correctly.
- 2) If the FM3 causes the kiln to fire continuously at its maximum rate (instead of cutting the kiln on and off during firing) this is likely due to a capacitor having been fitted to the contactor in the kiln. Remove the capacitor and recheck.
- 3) If the kiln is fitted with energy regulators, these should normally be set 'full on' ie maximum setting since the FM3 controller will control firing rate. The energy regulators can still be set at different settings to each other to act as proportioning devices if this is desired.

Programs

The FM3 has 5 user adjustable programs (1 - 5) and 5 fixed programs (6-10). The parameters set into the fixed programs can be seen by repeatedly pressing the step button after the program number has been selected.

Fixed programs will be seen as follows:-

Program	-----Ramp1-----		-----Ramp2-----		Total firing time hrs.
	Ramp rate °C	Set point °C	Ramp rate °C	Set point °C	
6	125	450	140	750	5.7
7	80	200	120	1000	9.2
8	100	100	120	1060	9.0
9	100	160	115	1120	10.4
10	130	940	110	1255	10.5

Note

The firing time will vary slightly dependent upon kiln efficiency and supply voltage.

If the maximum firing speed of the kiln is lower than the program speed then the firing time will extend until the temperature set point is reached. The soak time will be unaltered.

Always check that your kiln has correctly shut off. Malfunction of kiln contactor or control instrument is always possible - and there is no warranty against overfires.