Provisional 02/11/04
Specifications

All models
Supply
207-265 VAC or
104 -127 VAC (To Order)
50/60Hz - 6VA max

Environment
0 to 40°C operating
-10 to +50 Storage

Outputs
Standard - (Single Pole N.O.)
• 230V 1A max
Control and Alarm outputs can switch
230VAC 30A Max when wired as
shown (See installation notes)
Option
• SSR > 5V @ 40mA

Connections
2 part removable connectors
Max wire Capacity - 2.5mm^2

Thermocouple
Selectable R, S, K, N
Range
R/S –20 to 1600 ^{O}C ^{O}F
K/N 0 to 1300 ^{O}C ^{O}F
Resolution 1 Degree
Accuracy
+/- 0.1% FSD +/-1digit
Control
Adaptive PID
Enclosure
Dimensions
W - 120 x H - 190 x D - 78 mm
Fixing
108mm on centre line
Material ABS
Alternate inserts allow Single or
Dual cable entry holes

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User Instructions

ST 3300 Temperature Programmer

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Models

	3300-1	3300-2	3300-3	3300-4	3300-5
Display Ident	1	2	3	4	5
No of programs	1	10	10	10	10
No of segments	2	4	16	16	16
Control Output	1	1	1	1	3
Alarm/Gas Output	1	1	1	1	1
Event Output				1	1

D:\DOC\TC3300 Manual (2).doc

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Contents

About this Manual
These instructions take you through the process step by step assuming you are using the controller for the first time.
Basic operations are shown first and more complex operations are shown at the end

Installation
A separate manual is available showing how to connect the unit and configure for particular applications. If you purchase this unit from a kiln supplier they will normally have done this for you.

D:\DOC\TC3300 Manual (2).doc

		Eng	German
Error 1	Kiln rises too slowly at start of firing ie T/C not in, or short cct, Kiln failed	Err1	F1
Error 2			
Error 3	T/C input above max	Open	F3
Error 4	T/C input below Min	Fail	F4
Msg 1	Program completed	End	Ende
Msg 2			

Error 1 (Slow Start)
When program is started, controller looks for a change in setpoint of $50^{O}C$. If the process has not changed by $>10^{O}C$ at this point then an error is raised. This function can be disabled by setting err1 to off.

Error 2 (Band Alarm only)
The measured temperature is differs from the setpoint by more than the value set in Alarm Temperature.

Error 3
This signals that the controller has seen a value above the maximum for the thermocouple. This will normally be caused by open circuit thermocouple wiring.

Error 4
This signals that the controller has seen a value below the minimum for the thermocouple. This will normally be caused by reverse connected thermocouple wiring.

Error 5 Trip Alarm only
The process temperature has exceeded the highest setpoint by the amount set in Alarm Temperature. 20OC default
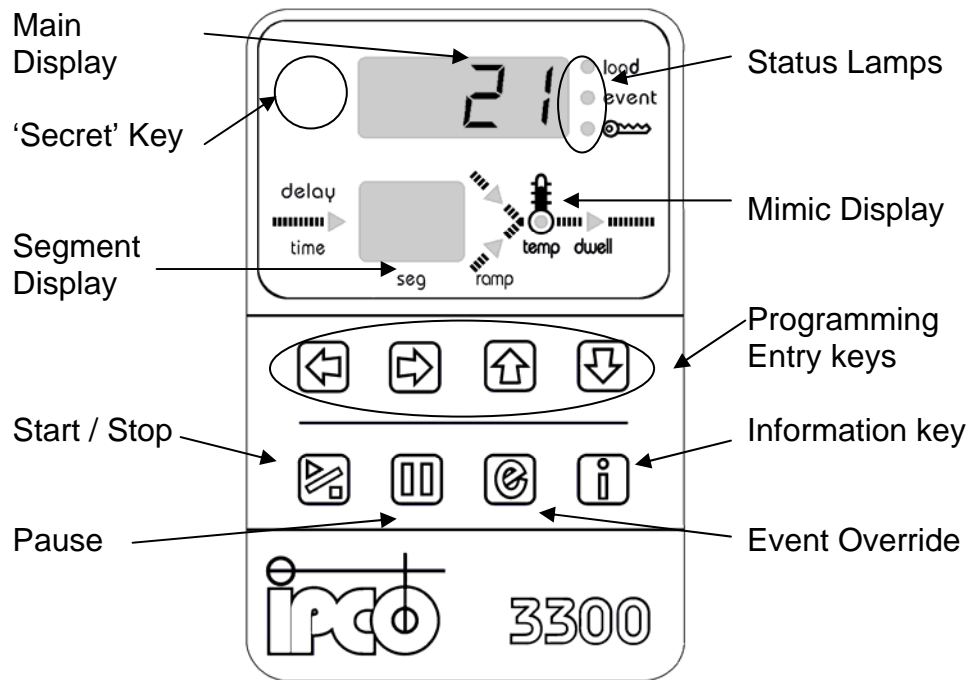
Configuration

Changing the values in the list should only be undertaken by an experienced operator or engineer.

- **With the instrument switched Off**
- **Press and hold the** ⓘ **key whilst turning on the power.**
- Wait until the first parameter is shown
    - Use the ⇨ key to move through the list
    - Use the ⇧ ⇩ keys to change parameters
- Press the ⊡ key to exit configuration and use the controller

	Display	Parameters
User Level		
Alarm Type	AL	OFF or bAnd or tr iP
Alarm Temp	At	NB The band alarm will not trigger during a Ramp if a ramp rate of Full is selected
Kiln Rating (Kw)	hr	0 (Default) to 99.9 Kw
Trip Temp (Option Board)	Ot	This value is above the highest point in the program
Engineer Level	EL	You are blocked at this point

User Controls

General View

Main Display

'Secret' Key

Segment Display

Status Lamps

Mimic Display

Programming Entry keys

Start / Stop

Information key

Pause

Event Override

The controller is a highly adaptable unit which allows the user much greater flexibility in program entry than has previously been possible.
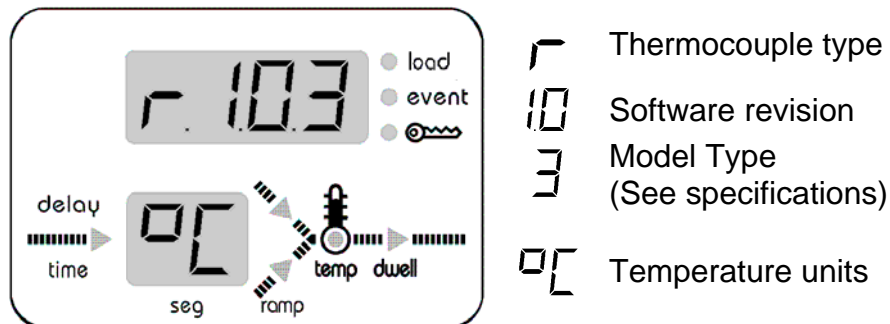
The user may freely create programs with segments consisting of either Up or Down Ramps and Dwells. Depending upon the model you may create up to ten programs each containing up to sixteen segments, where a segment is one ramp and one Dwell.

Additionally you can
- Create indefinite Dwells for a holding firing.
- Create your program using either ramp rates or elapsed times.
- With the Event version trigger events at each segment,

Switch On

The controller power switch is located below the unit.

When the unit is first switched on, all of the segments on the display and all of the indicators are illuminated, as a lamp test.

The displays then show information, which defines the particular instrument you have, for 3 seconds.

⌐   Thermocouple type

10   Software revision

3   Model Type
(See specifications)

°C   Temperature units

After 3 seconds the display will show the current kiln temperature.
You may then Run or Amend a program.

Important
If you phone for technical support we will need to know the information displayed above.

Switch Off

It is recommended that you ensure you have stopped the program (No mimic lights will be flashing) before switching off.

Note that if you switch off whilst the controller is running a program, the controller may start automatically when you switch on again.

Mounting

The controller should be mounted on a vertical surface away from heat. In particular ensure that it is not exposed to direct heat from an open kiln door or lid.

Mounting is via a removable bracket Slide the bracket from the rear of the unit and fix vertically, using No 8 wood screws.

108 mm

12 mm
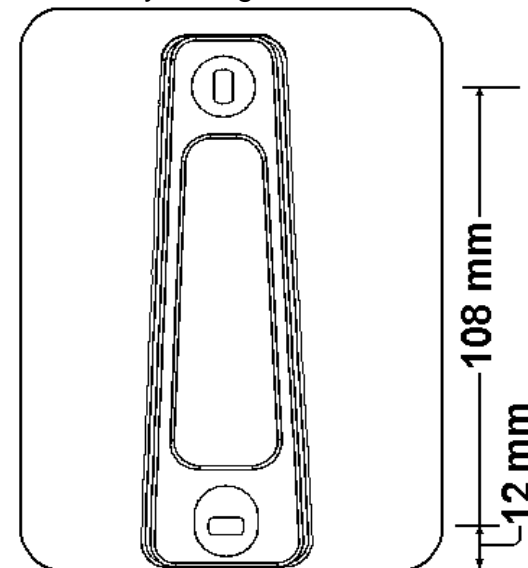
Connections

It is vital that all electrical installation is carried out in a professional manner.

In most instances the controller will either have a plug, which matches your kiln, or will be connected by your supplier.

If a plug is fitted check that the pin layout of the plug and socket are an exact match before plugging in.

We do not recommend DIY installation of this product. Wiring is best carried out by a kiln builder or supplier who will have experience of the product and access to all installation information.

For further information contact your kiln supplier.

3 Zone Control

The "3 Zone" controller may be used as a three or two zone control. Whichever is to be used the controller may be configured for two methods of control which we define as Absolute or Differential.

Comparison

	Diff (Default)	Abs
Best Uniformity	Yes - If main zone is slowest	No
Fastest firing	No – Restricted by slowest zone	Yes
Simple to set up	Interaction between zones may be a problem	Yes

Differential

The main zone is controlled directly by the program. The other zone(s) will attempt to follow what the main zone achieves.

(This is the equivalent of having differential controllers and back-to-back thermocouples for the slave zones)

With this configuration it is normal to make the main zone the slowest in the kiln. The controller will then provide the best uniformity by slowing down the faster zones to match the slowest.

Absolute

All zones follow the program profile directly. If they are not able to achieve the set rates then they will only achieve what each zone is inherently capable off.

Hardware Definition Code

The 3 Zone controller has five possible outputs
(Zone 1, Zone 2, Zone 3, Alarm, Event.)
However only four outputs may be used. The user must choose which are required and set the hardware definition code to define this choice. See the installation manual for details of setting the Hardware definition code.

Program Entry

To set a program you should first check that a program is not running.
If there are flashing lamps on the mimic
Press the Stop / Start key once to Stop

The key functions whilst entering a program are;-

Move forward and back through program segments

To change values for each segment

To Exit program mode and save the changes

To show the program number you are setting.

The programming form provides a convenient way of ensuring you have all the information required to hand. It also provides a record of what you have programmed into the controller.

Program Number	1							
Delay	**0:0**	1	2	3	4	5	6	
Ramp Rate		100	300	100	Full	End		
Temperature		300	600	800	550			
Dwell Time		:10	:15	:0	1:30	:	:	:
Event		r d	r d	r d	r d	r d	r d	r

Delay

Pick the program number you wish to use and set the initial delay prior to the firing.
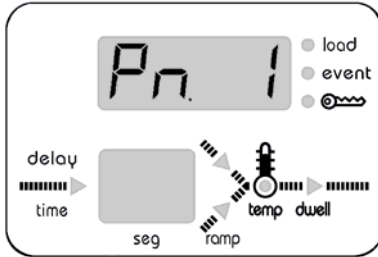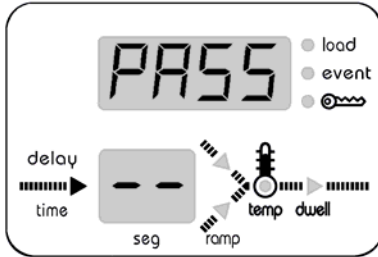
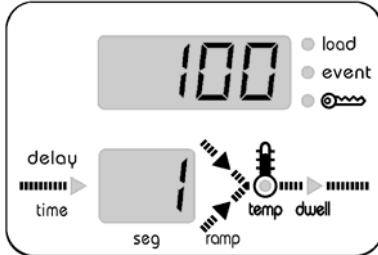| Action	Display	Values
➡ Program No?	Pn 1	⬆/⬇ • 1 to 10 (1 only on SP model 1-4 on Pottery model)
➡ Delay	PASS — —	⬆/⬇ • Pass (=0) or • 0.01 to 99.59 (HH.MM)

Segments

Enter the values for your firing as a sequence of segments (See the attached sample form.)
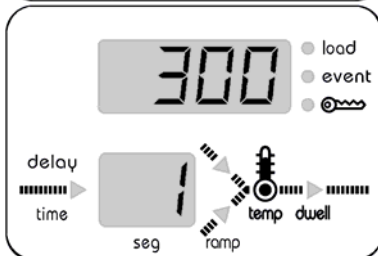
Action	Display	Values
➡ 1st Ramp Rate	100 1	⬆/⬇ • 1 to 999 °C/Hour * or • Full (=Max) * (0.01 to 99.59 HH.MM in time mode)
➡ 1st Temperature	300 1	⬆/⬇ • 1 to Setpoint limit or • End (=0)

eg. To have an initial Ramp to 600°C at 100°C per Hour, with a damper opening at the start, and closing at 300°C;-
Enter
Ramp 1 @ 100°C to 300°C, Dwell 1 = Pass, & Ramp event On
Ramp 2 @ 100°C to 600°C, Dwell 2 = as req'd, Ramp event Off

Info Key

ⓘ This key serves various purposes;-

- **Whilst entering a program**
  Whilst pressed the key will show the program number you are setting.
- **During a Firing**
  Scrolls through various parameters
  Pn   Program number currently running
  E   Energy used so far during Firing in KwH
  SP   The Current Setpoint value
  rd   Remaining time in Dwell (Dwell segment only)

- **Firing complete**
  E   Energy used in KwH
        This value is stored until a new firing is started

- **Parameter Setting**
  See the Installation manual

Kiln Energy

The display of energy used is an estimated usage based upon the value entered in configuration for the rating of your kiln. Since ageing of elements will affect this you should use this as a comparative value rather than an absolute measure.

Power Failure

If the power fails during a firing the controller will check to see the temperature upon restoration of power. If this has not changed by more than 100°C / 180°F the firing will continue. If the change is greater than 100°C the controller will show. PF

Advanced

Modifying a running program

You may modify a running program. The following points should be observed;-

- Make sure you are modifying the correct segment.
- If you change a dwell time you will re-start that Dwell from the new value.
- If you change an Up Ramp such that the new end temperature is lower than the current temperature then the ramp will change direction. (Similarly for the opposite case)
- If you change a Dwell setpoint when you are in the Dwell the controller will attempt to change as rapidly as possible. You may get Over or Undershoot in these conditions.

When modifying a running program.

- The segment number is the one you are changing.
- The static mimic lamp is the value you are viewing.
- The flashing mimic lamp indicates only if the controller is on a Ramp or a Dwell.

To accept the changes you have made you must press the Start / Stop key once only. (If you press it twice you will terminate the firing!)

Event Programming

The Event output is programmed as either On or Off in each part of every program segment. If a segment is programmed with E = r- then the relay will be turned On at the start of the ramp and Turned Off at the start of the Dwell.

- When the controller is first powered the event will be Off.
- When a program is run the event relay will respond to the entered values for each segment.
- The user may over ride the state at any time by pressing the "Event" key. (The 'event' lamp will show the current state)
- Whenever the power is turned off the current state of the event relay is stored, and restored upon return of power.
- When the program Ends the Event relay is left in its last state.

Whilst switching at a specific temperature is not directly supported, this may easily be achieved by adding extra segments.
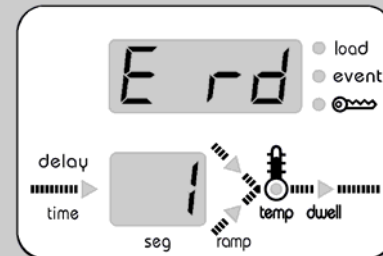
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1st Dwell Time
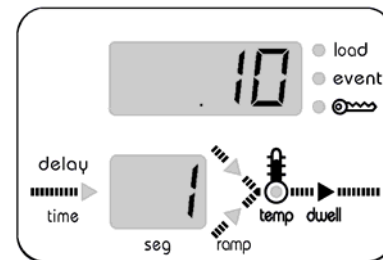
- Pass (=0)

or

- 0.01 to 99.59 (HH.mm)

or

- Hold (=Max)

Event version only.

1st Event sequence

The Relay will be on in;-

- -- = Event Off

or

- rd = Ramp & Dwell

or

- -d = Dwell only

or

- r- = Ramp only

For more detailed information on setting up events see later in this manual

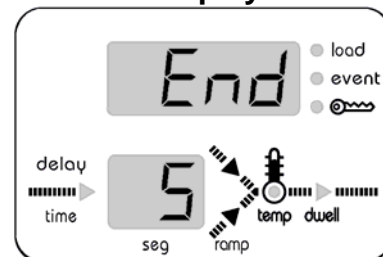**Continue entering segment information until the firing profile has been completed**

End

Mark the end of a firing sequence (This example has four segments in the program and so five is marked as the end)

Action	**Display**	**Values**

Ramp Rate

Press and hold until;-

- End

Exit Program mode

Caution

If you press this twice you will exit program mode and then run the program

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Starting The Firing

Either

To run the program last viewed or used

Or

To display program number

To select the required program

To Store the new program number

To Run the selected program

When the program starts the program number will be displayed for a short time and then the program will run.

Function	Display	Description
Delay		Remaining Delay Time
		Delay (Flashing)
Ramp		Current Temperature
		Up Ramp (Flashing)
Dwell		Current Temperature
		Dwell (Flashing)

Stopping the Firing manually

If the controller is running then one of the mimic lights will be flashing.

To stop the firing press the Start / Stop key once.

During the Firing

Pause

Press Once to Pause, Press Again to Continue

━ ━ ━ ━ Display will flash

This function can be disabled
A timed over-ride is also applied (15 minutes default)
See installation Manual – Configuration to change if required.

Info Key

Press to scroll through various parameters.

Pn	Program number currently running.
E	Energy used so far during Firing in KwH.
SP	The Current Setpoint value.
rd	Remaining time in Dwell. (Dwell segment only)

Segment Advance

The controller will move to the next step in the program.

Event Override

This key over rides the event relay state.
The 'Event' Lamp shows the current state.
If the program moves to a new segment the value set in the program will be applied.

Keypad Lock (Secret)

This key locks or unlocks the rest of the keys.
Press and hold for approximately a second.
The ⚿ Lamp is lit when locked.