Instruction Manual

For

and

HOME AND STUDIO KILNS

IMPORTANT CAUTIONS

INSTALLATION CAUTIONS

AMBIENT TEMPERATURES
Operate in an environment between 0°C and 38°C (32 - 100°F).

CLEARANCES
Install kiln a minimum of 30 cm (12") away from any wall, although a minimum of 45 cm (18") is preferable. Maintain a minimum of 90 cm (36") between two adjacent kilns especially if they are going to be used at the same time.

YOU MUST USE THE SUPPLIED KILN STAND
Never set a kiln on a floor without significant air space circulating under the kiln. This is part of the insulation system of the kiln. Level the stand while installing.

WALL AND FLOOR MATERIALS
Walls and floors must be non-combustible. Recommended floor surfaces are cement, ceramic tile, stone, slate, breeze blocks or brick. Do not install on a wood floor or on carpet. Vinyl flooring may also be combustible. Protect linoleum flooring from discoloration with a non-combustible covering. Remember that the kiln radiates heat over a long period of time and that this could start a fire under certain conditions. The continued heat of the kiln can dry out combustible surfaces over time and lower the temperature at which they could start burning. Temperatures at combustible ceilings and floors should be kept below 70°C (160°F). Check temperatures around the kiln while firing.

REQUIRED VENTILATION FOR THE KILN
It is important to vent the room that the kiln is operating in. Kilns generate harmful fumes and heat when firing ceramics. Fumes can include carbon monoxide, formaldehyde, sulphur dioxide, heavy metal vapours, and fluorides (all of which can be very toxic). Install kiln in a well-ventilated area. Never operate in an enclosed space (such as a closet) without proper ventilation. The heat in an enclosed room could present a significant fire hazard. Severe corrosion can be caused by kiln fumes, salt air or other environmental conditions. Ventilation must be to the outside (and not under a window).

USE COPPER WIRE FOR HOOK UP
Do not use aluminum wire.

PROTECT POWER CORD FROM KILN CASE
Route Power Cord away from kiln in such a way that it cannot touch the hot case of the kiln. Secure wires so they cannot move.

KEEP KILN DRY & IN PROTECTED SPACE
The kiln must be kept dry. Water in contact with a kiln can cause an electrocution hazard.

FIRE EXTINGUISHER
Keep an adequate fire extinguisher (rated for electrical fires) near the kiln and check it yearly or according to local codes

GENERAL ENVIRONMENT CAUTIONS

SURFACE IS HOT AND CAN CAUSE BURNS
Kiln surface can be extremely hot (up to 260°C/ 500°F) and can cause severe burns if touched.

KEEP CHILDREN & ANIMALS AWAY FROM KILN
Protect children, animals, and unqualified adults from the kiln.

KEEP FLAMMABLES AWAY FROM KILN
Avoid flammable or loose clothing around kiln.

PRE-FIRING CAUTIONS

PROPER USE OF KILN WASH
Make sure the floor of the kiln and the tops of the shelves are coated with kiln wash. This will protect these surfaces from melting glaze and ceramics. Do not coat the undersides or sides of the shelves. Do not apply kiln wash to the brick sides or element holders.

DO NOT USE SILICA SAND IN KILN
Silica can damage the kiln elements.

NEVER FIRE MOIST GREENWARE
We recommend using Preheat in your bisque programme to help dry out any moisture that you cannot see.

LOADING & UNLOADING CAUTIONS

UNPLUG KILN WHEN NOT IN USE

KEEP LID CLOSED WHEN KILN IS NOT IS IN USE
Do not store anything on the closed lid or in the kiln.

DO NOT OPEN THE LID WHEN KILN IS ABOVE 120°C (250°F)

FIRING CAUTIONS

DON'T FIRE KILN ABOVE Cone 10 (1290°C, 2350°F)
Note that the The Robin Kiln is rated to Cone 02 (1100°C, 2012°F).

ATTEND THE FIRING
No automatic safety device is foolproof! Be especially careful about attending the kiln while it is supposed to shut off. You can plan your firing using the Delay feature. If you can not be at the kiln all the time be sure to attend the end of the firing.

USE PROGRAMME REVIEW
Review the current programme prior to starting the kiln to ensure the correct profile is programmed. This is done by pressing the Review Prog button.

USE THE PROPER THERMOCOUPLE
Never use a different type of thermocouple with your controller unless it has been set up from the factory. Use of a type S thermocouple will over fire your kiln. The standard thermocouples that

come with the Fuego and The Robin kilns are type K.

USE WITH THE THERMOCOUPLE PROTECTION TUBE
Note that the control has been programmed with a 10°C thermocouple offset to compensate for the effect of the ceramic thermocouple protection tube. If for some reason you were to use the kiln without that protection tube the control would fire 10°C colder.

USE CAUTION WHEN VIEWING INTO THE KILN
Use dark glasses (shade number 1.7 to 3.0) to view inside the kiln through the peepholes when firing. These will protect you from the radiant infrared radiation and will also protect your eyes in case the ceramic ware explodes. Do not use regular sunglasses for this.

USE CAUTION WHEN OPENING THE KILN
1) Use heat resistant gloves when opening peephole plugs.
2) Use heat resistant gloves when opening a hot lid.
3) Do not open the lid when kiln is above 120°C (250°F).

POST FIRING CAUTIONS

CHECK FOR GLAZE AND CERAMIC CHIPS
Remove any glaze that has splattered on the firebrick or shelves. (Use safety glasses when doing this because glaze can be sharp like broken glass). Vacuum the kiln after each firing.

GENERAL MAINTENANCE CAUTIONS

ELECTRICAL SAFETY
Unplug kiln when servicing it. The elements carry high voltage when switched on and could electrocute you. Troubleshooting tests performed under power should ONLY be done by a licensed electrician.

THE WRONG PARTS CAN BE HAZARDOUS
Off-brand elements, if not designed properly, can present a hazard to the kiln (by drawing too much amperage). The wrong type of fuse, relay, switch or other component can cause a fire or other hazardous condition. An improperly rated cord can cause a fire. Do not substitute or replace any parts with unauthorized products.

KILN MODIFICATIONS
All customer modification is made solely at the risk of the customer. Modifications will void the warranty. L&L takes no responsibility for hazardous conditions created by unauthorized modifications. Any authorization for an engineering change must be in writing from the factory.

KILN MAINTENANCE
See the section at the end of this booklet on periodic maintenance you need to perform on your kiln.

OPERATION

HOW YOUR FUEGO OR THE ROBIN KILN WORKS

The automatic program control measures the temperature inside the kiln using the thermocouple probe. The control automatically adjusts power to evenly heat up the kiln according to one of the four programs you are firing. You do not typically have to adjust anything once you start firing. However, if you are manually venting the kiln by opening the top vent hole you will have to manually close this at the appropriate point in the program (typically about 500°C / 932°F).

DIFFERENCES BETWEEN FUEGO AND THE ROBIN KILN

Both the Fuego and The Robin use the same control system and the same elements and power supply. The Fuego is capable of reaching cone 10 temperatures (approximately 1290°C / 2350°F). The Robin is capable of reaching cone 02 temperatures (approximately 1100°F / 2012°F) because it is heating a larger chamber with the same power.

USING YOUR FUEGO OR THE ROBIN KILN

TURNING ON THE KILN

1) Make sure your circuit breaker or fused disconnect switch is turned on.

2) Make sure the kiln is plugged in.

3) Turn on kiln with the toggle On/Off switch on the front of the control box.

WHEN YOU FIRST TURN ON THE KILN

1) When the kiln is turned on you will see either **Err P** or **StOP** in the display. If you see **Err P** press any key to see **StOP**. When you see **StOP** or **IdLE** alternating with the temperature you are ready to begin programming. (NOTE: If the power was on recently the display might read what it said before power was turned off).

2) Press **ENTER** to begin.

3) The previously fired program will be displayed, either **USr 1, USr 2, USr 3, or USr 4**.

4) If you want to review that program hit the **DOWN** (Review) button.

5) If you want to fire that program hit **ENTER** and keep hitting **ENTER** to scroll through the program. At the end of the program you will see **rEd l**. Hit **ENTER** again to start the program.

6) If you make a mistake just hit **ENTER** again to **StOP** the program. (You can stop the program from firing at any time by doing this). This will return you to the **IdLE** alternating with temperature. Hit **ENTER** again to display the program you are in. You can then change the program (see "Editing a Program" below) or can hit **ENTER** again and review and edit the program you are in.

WHAT YOU SEE WHILE FIRING

1) If you have a Delay Time programmed you will see **dLAY** alternating with a time (i.e. **00.30**). This will count down until it hits **00.00**.

2) Then the display will show you the actual temperature inside the kiln as it begins to fire.

TO CHANGE TO A DIFFERENT PROGRAM

1) Select the program to change or fire with: When the display reads **IdLE** alternating with temperature hit **ENTER**. One of the four **USr** programs will display. Use the **UP** and **DOWN** arrows to scroll to the program you want to change.

2) Hit **ENTER** and you will scroll through that program. If you don't want to make any changes just keep hitting **ENTER** until **rEdl** displays. You must go through the entire program. You can make changes while you are doing this if you want (see "Editing a Program" below). This is actually a good way to review the program before firing. You cannot bypass this process. Once **rEdl** displays and you hit **ENTER** the program will fire.

3) NOTE: If the Display reads **rEdl** and you do not want to fire the program that the control is ready to fire then hit **ENTER** once to start that program and then again to **StOP** it. The display will then read **StOP** briefly and then alternate between **IdLE** and temperature and you can now choose a different program to run or edit.

EDITING A PROGRAM

1) The Delay Time will delay the start of your firing. **ENTER** a Delay Time: **dELA** is displayed alternating with a time like **03.00** (Hours. Minutes). Use the **UP** and **DOWN** keys to change the delay time. Press **ENTER** when the desired delay time is displayed. Note**: 00.00** equals no delay. **NOTE: The delay time is like a countdown timer - it will countdown the hours and minutes after you start the program before the program actually sends heat to the kiln.**

2) **ENTER** the number of segments your program will have. NOTE: Each segment consists of a ramp rate, a set point temperature and a hold time. There are 8 segments available for programming. You will see **SEG** alternating with the last selected number of segments. Use the **UP** and **DOWN** keys to select the number of segments, then press **ENTER**. Note that you can have as little as one segment (for instance a program that makes the kiln go as fast as possible to a single temperature and then holds there).

3) Now program the ramp rate for the first segment. You will see **rA 1** alternating with the ramp rate. Ramp rates are expressed in degrees per hour. Use the **UP** and **DOWN** keys to select the desired rate and press **ENTER**. A rate of **9999** will cause the kiln to heat (or cool if in a down ramp) as fast as the kiln is capable of. The first segment of a program must always be an "up" ramp.

4) Now program what Temperature to reach at the end of the first segment. You will see **°C 1** alternating with the currently selected temperature. Use the **UP** and **DOWN** keys to select the desired temperature and press **ENTER**.

5) Now program the Hold Time for the first segment. You will see **HLd1** alternating with the currently selected hold time. Use the **UP** and **DOWN** keys to select the desired hold time and press **ENTER**.

> **NOTE: These programs are pre-programmed:**
> **USr 1** is a slow bisque fire to 1015°C.
> **USr 2** is a fast bisque fire to 1020°C.
> **USr 3** is a slow glaze fire to 1180°C.
> **USr 4** is unprogrammed.
> All of the above can easily be changed.

IMPORTANT NOTE ABOUT HOLD TIMES DURING THE LAST SEGMENT: Be careful with hold times in the final segment of a program designed for ceramics - this will

add to the heat work and will typically mean you need to fire to a lower temperature to get the same cone result.

6) Repeat the above three steps for each additional segment for the ramp rate, temperature, and hold time.

7) **rEdl** will be displayed after the last segment is entered. Press **ENTER** to begin firing. Remember - if you don't want to fire that program just start it and then stop it. You will return to the **IdLE** display alternating with temperature and you can then change programs.

PREHEATING CERAMICS: We recommend you preheat any previously unfired ceramic work at a temperature of 65°C / 150°F for several hours. We have 3 hours programmed into our standard slow bisque program. This will help remove water from the work and could prevent an explosion in the kiln. There is no need to use this will glass or metal work.

REVIEWING THE PROGRAM WHILE FIRING

1) Once you have started a program firing you can review it by hitting the **DOWN** (Review) Button.

2) The program will scroll. You will see, in the following order, various aspects of the program.

   a) The program name (**USr 1, USr 2, USr 3, USr 4**)

   b) Number of Segments (**SEG** followed by some number, i.e. **0004**)

   c) **rA 1** alternating with the ramp rate.

   d) **°C 1** alternating with the temperature (i.e. **0900**).

   e) **HLd1** alternating hold time (i.e. **00.30**)

   f) The above three steps are repeated for each segment.

CONTROLLED COOLING

You can control the cooling of the kiln by having a segment in the program that ramps down. You ramp down by having the temperature of a segment be lower than the temperature of the previous segment. Note that the first segment has to start with an up ramp.

THE END OF THE PROGRAM

1) The control will shut off power to the elements at the end of the program.

2) At the end of the program the control will flash **CPtL** and a number like **7.34**. The 7 stands for hours and the 34 stands for minutes. This is how long it took for the kiln to reach final set point.

OPTIONS WHILE FIRING

SKIP A STEP

During a firing you may advance from the current segment to the next ramp rate by using **Skip Step** or if you are in a hold period you may add time and temperature to the hold period.

1) While firing (running a program) press the **UP** (View Segment) key. The current ramp or hold is displayed followed by the current or traveling set-point, then **SStP** is displayed.

2) If you do not press a key within several seconds the display will return to showing the current temperature in the kiln.

3) When **SStP** is displayed press **ENTER** to skip to the next ramp rate.

ADD TIME TO HOLD PERIOD
This option allows you to add time in 5-minute increments to a hold (soak) period.

    1) When in a hold period (during a hold or soak, the temperature in the kiln will be alternating in the display with the remaining hold time), press the **UP** (View Segment) key.

    2) When **SStP** is displayed press the **UP** key again and **tME** will be displayed.

    3) Press **ENTER** and 5 minutes will be added to the hold time.

    4) You will see the new hold time displayed.

    5) You may use this procedure as many times as necessary

PREHEATING CERAMICS:
We recommend you preheat any previously unfired ceramic work at a temperature of 65°C / 150°F for several hours. We have 3 hours programmed into our standard slow bisque program. This will help remove water from the work and could prevent an explosion in the kiln. There is no need to use this with glass or metal work.

IMPORTANT NOTE ABOUT HOLD TIMES DURING THE LAST SEGMENT:
Be careful with hold times in the final segment of a program designed for ceramics - this will add to the heat work and will typically mean you need to fire to a lower temperature to get the same cone result.

ADD TEMPERATURE TO A HOLD PERIOD
This option allows you to add temperature in 5-degree increments to a hold (soak) period.

    1) When in a hold period (during a hold or soak, the temperature in the kiln will be alternating in the display with the remaining hold time), press the **UP** key.

    2) When **SStP** is displayed press the **UP** key twice more and **tMP** will be displayed.

    3) Press **ENTER** and 5 minutes will be added to the hold time.

    4) If you hit the **UP** key again you will see the new hold temperature displayed briefly.

    5) You may use this procedure as many times as necessary to get the hold temperature that you want.

CHANGE PROGRAM WHILE FIRING
You can reprogram the control by stopping it and changing the program and then restarting it. The control will compare the current temperature with where the kiln should be in its new program.
To **StOP** the kiln hit **ENTER**. Then hit **ENTER** again and you will see your program name (i.e. **USr2**). Then hit **ENTER** again to reprogram your program. When you see rEdl press **ENTER** again to restart the program where you left off. NOTE IF YOU HAVE A DOWN RAMP IN YOUR PROGRAM: If there is a down ramp it will look for the first up ramp that has the temperature it is looking for. You may need to use **SKIP STEP** to get back to where you want to be if you have a down ramp in the program.

FIRST FIRING TO CONE 6

The first firing of the kiln should be a test fire. Fire it empty except for shelves and posts. NOTE: You may experience some smoking from the kiln on its first firing. This, if it occurs, is due to residual oil left on the element wire when the elements were made. The test firing should be done with nothing in the kiln except the furniture kit and a cone 6 self-supporting cone or cone pack in each zone of the kiln; top, middle, and bottom. Be sure to monitor the kiln from time to time. Especially watch it in the first few hundred degrees to be sure that the kiln was set up properly and then at the end of the firing to be sure the location you have chosen is safe and that everything is working properly. Run the **USr1** program for 8 hours. Then turn off that program and run the **USr3** program. This can be done at separate times or one after the next. The total time should be about 13 hours.

PRE - SET PROGRAMS

USR1 - SLOW BISQUE TO 1015°C WITH 30 MINUTE HOLD

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	0006		Six segments
rA 1	50	2 hours	Ramp up at 50°C per hour
°C1	100		100°C set point
Hld1	00.30	30 minutes	to ensure pieces are dry
rA 2	75	1.75 hours	Ramp up at 75°C per hour
°C2	230		230°C set point
Hld2	00.00		No hold - cristobalite inversion phase 223 ^{o}C
rA 3	180	1.75 hours	Ramp up at 180°C per hour
°C3	545		545°C set point
Hld3	00.00		No hold - moves immediately to next segment
rA 4	100	1 hour	Ramp up at 100°C per hour
°C4	645		645°C set point
Hld4	00.00		No hold - quartz inversion phase 575 ^{o}C
rA 5	180	1.50 hours	Ramp up at 180°C per hour
°C5	915		second to final temperature
Hld5	00.00		No hold - moves immediately to next segment
rA 6	100	1 hours	Ramp up at 100°C per hour
°C6	1015		1015°C - final temperature
Hld6	00.30	30 minutes	soak

Total Estimated Time: 10 hours Note: These are best possible times based on the program. Times will vary with load size, voltage, element age etc.

USR2 FAST GLAZE TO 1020 °C

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	0002		Two segments
rA 1	300	3 hours	Ramp up at 300°C per hour
°C1	900		900°C set point -second to Final Temp
Hld1	00.00		No hold - moves immediately to next segment
rA 2	100	1.2 hours	Ramp up at 100°C per hour
°C2	1020		1020°C set point - Final Temperature
Hld2	00.00		No hold - End of program, start natural cooldown

Total Estimated Time: 4.2 hours (4 hours 12 min) Note: These are best possible times based on the program. Times will vary considerably with load weight, voltage, element age, etc.

USR3 - SLOW GLAZE TO 1180 °C

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	0003		Three segments
rA 1	100	2.5 hours	Ramp up at 100°C per hour
°C1	250		250°C set point
Hld1	00.00		No hold - moves immediately to next segment
rA 2	230	3 hours	Ramp up at 230°C per hour
°C2	940		940°C set point - Second to Final Temp
Hld2	00.00		No hold - moves immediately to next segment
rA 3	100	2.4 hours	Ramp up at 100°C per hour
°C3	1180		1180°C set point - Final Temperature
Hld3	00.00		No hold - End of program, start natural cooldown

Total Estimated Time: 7.9 hours (7 hours 54 min) Note: These are best possible times based on the program. Times will vary considerably with load weight, voltage, element age, etc. NOTE: This program will not work on The Robin kiln because that kiln can only go up to 1100°C. You can change the final temperature of this program if you want to fire a slow glaze to a lower temperature.

OTHER SUGGESTED PROGRAMS

PROGRAM FOR SLUMPING GLASS

People have many different ways and programs for firing glass. Here is one recommendation for slumping that you can try. CAUTION: Be very careful not to over fire glass it can cause a real mess when it melts (like a big hole in your kiln floor) which we cannot be responsible for. Use your peepholes to observe the glass when it starts to slump and be sure to use proper safety glasses (See Cautions).

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	0003		Three segments
rA 1	204		Ramp up at 204°C per hour
°C1	760		760°C set point
Hld1	00.15	15 minutes	Hold for 15 minutes
rA 2	9999		Ramp down as fast as possible
°C2	510		510°C set point
Hld2	01.00	1 hour	Hold for 1 hour
rA 3	38		Slow Ramp down to anneal glass
°C3	38		38°C set point - to room temperature
Hld3	00.00		No hold - End of program

A FAST BISQUE PROGRAM TO CONE 05

This is a sample of how you would write a program to do a Fast Bisque to Cone 05. You may want to try this on very thin walled pieces but in general the Slow Bisque is a safer way to fire.

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	0005		Five segments
rA 1	50	1 hours	Ramp up at 50°C per hour
Hld1	0.50	30 minutes	This is the Preheat
rA 2	150	1 hours	Ramp up at 150°C per hour
°C2	200		200°C set point
Hld2	00.00		No hold - moves immediately to next segment
rA 3	100	30 minutes	cristobalite inversion phase 223 °C
°C3	250		250°C set point
Hld3	00.00		No hold - moves immediately to next segment
rA 4	310	2 hours	Ramp up at 310°C per hour
°C4	870		870°C set point - Second to Final Temperature
Hld4	00.00		No hold - moves immediately to next segment
rA 5	75	2 hours	Ramp up at 75°C per hour
°C5	1020		1020°C set point - Final Temperature
Hld5	00.00		No hold - End of program, start natural cooldown

On loads that are very important always use cones you can see through the peepholes in case of a failure of some kind.

A PROGRAM TO HEAT TO 980 ^{o}C AND HOLD FOR 8 HOURS

DISPLAY	VALUE	TIME	COMMENT
dLAY	00.00		Add a delay time in here if you want it
SEG	001		One segment
rA 1	9999	As fast as possible	
°C1	982		
Hld1	08.00	8 hours	8 Hour hold

OTHER CONTROL OPTIONS

DEFAULT SETTINGS
The Model 3K controller with RMPATE software has several selectable features. These features include:

1) Complete beeping sequence. This is the alarm sounding at the end of a firing. The default setting is "On".

2) Temperature scale, °F or °C. The default setting is °C.

3) Maximum temperature, 927°C, 1093°C, or 1288°C. The default setting is 1288°C.

NOTE: You do not normally have to change these settings. We include them in here only as reference.

COMPLETE BEEPING
There are three choices for the beeping, which occurs when the firing is complete.

1) **FULL** - this option causes a continuous beep when the firing is complete. Beeping stops with a key press.

2) **On** - this option causes a 15 second beep at complete.

3) **OFF** - with this option there is no audible beep at the end of firing.

TEMPERATURE SCALE

1) °F - this sets the controller to the Fahrenheit scale

2) °C - this sets the controller to the Celsius (centigrade) scale

MAXIMUM TEMPERATURE
With the Fahrenheit scale the maximum programmable temperatures are: With the Celsius scale the maximum programmable temperatures are:

1) 2350 °F   1288 °C

2) 2000 °F   1093 °C

3) 1700 °F   927 °C

PROGRAMMING THE OPTIONS
In order to program the above options the controller must first be turned OFF. Press and hold any key while you turn the power back ON. Continue to hold the key until **EdIt** is displayed, then

release the button. NOTE: There is NO beep when keys are pressed while programming the following options.

1) **FULL**, **On**, or **OFF** will be displayed depending on the currently selected option for Complete Beeping. Press the **UP** or **DOWN** keys to select the option you want and press **ENTER**.

2) **°F** or **°C** will be displayed depending on the currently selected option. Press the **UP** or **DOWN** keys to select the option you want and press **ENTER**.

3) **1288** will be displayed. Press the **UP** or **DOWN** keys to select the maximum programmable temperature you want and press **ENTER**. The options are now programmed. The controller will continue where it was prior to editing. The controller will fire if it was firing or be in the programming mode where it left off. NOTE: A beep will now be heard with each key press.

ENTERING AN OPTIONAL ALARM TEMP

You can make the control sound an audible sound at a specific temperature. This can be useful to alert you to do something like pay attention to the end of the firing. It is not very loud.

1) You can **ENTER** an Alarm Temperature at any time the control is not firing the kiln. It will apply to the next programme you run when you hit **START/STOP**.

2) Press the **Alarm** button in the Easy-Options Section at the bottom of the control. See **ALAr** and **9999** cycling over and over. A high value like that means the control will not sound an alarm.

3) **ENTER** a four-digit number like **1000**. (This represents 1000°C).

4) Hit **ENTER**

5) The display will say **CPL** for a few seconds and then start cycling **IdLE**, **TC2** and current temperature.

ERROR CODES

Err1	Error 1 indicates the temperature in the kiln is rising during an up ramp slower than 15°F/hr. If this rate continues for 8 minutes the firing will be stopped. Err1 may be an indication that the elements are worn or that a relay has stopped working.
ErrF	Error F indicates the temperature in the kiln is decreasing during a down ramp less than 15°F/hr. If this rate continues for 8 minutes the firing will be stopped. **ErrF** may be an indication that a relay has stuck in the on position.
Errd	Error d indicates that the kiln temperature is 100°F above the traveling set point, which is the current desired temperature in the kiln. The traveling set point will increase or decrease according to the programmed rate.
ErrP	Error P is displayed whenever there is a power interruption that is long enough to **StOP** the firing. If the power interruption is brief the kiln will continue to fire when power is restored; in this case there will no indication of a power failure. To clear the error, press any key.
tC FAIL	**tC** alternating with **FAIL** indicates the thermocouple has failed. Replace the defective thermocouple. To clear the error, press any key.
tC-	- The red and yellow thermocouple wires are reversed.

DISPLAY MESSAGES

CPLt	Firing Cycle Complete (firing time is alternately displayed).
dELA	Delay. Displays when entering the delay time (hour: minutes) until the start of the firing.
DLy	Delay. Alternates with the remaining delay time until the start of the kiln.
°F #	Segment temperature in °F - Set temperature for a user program.
°C #	Segment temperature in °C - Set temperature for a user program. A decimal point will display in lower right corner.
EdIt	Edit the default options (beeping at complete, temperature scale, maximum programmable temperature)
Err1	Error 1, kiln was heating less than 15°/hr and it has been stopped.
Errd	Error d, kiln temperature is 50° hotter than the set point temperature. Kiln has been stopped.
ErrF	Error F, similar to Err1 but during a down ramp the temperature is decreasing less than 15°/hr. Kiln has been stopped.
ErrP	There has been a power interruption that has stopped the firing. Press any key to clear.
FULL	Beeps continuously at end of firing until a key is pressed.
HLd#	Soak time in hours: minutes at a hold temperature.
OFF	No beeping when firing is complete.
On	
rA #	Ramp Number (rate per hour of temperature increase or decrease).
rEdl	Ready to fire current program. Press START to begin firing.
SEG	Short for Segments. You can **ENTER** up to 8 segments in a program.
SStP	Skip Step (used to advance to the next ramp)
StOP	The kiln is at **IdLE** and ready to be programmed. **StOP** alternates with the current kiln temperature.
USr #	User program number displayed
tMP	Temperature (used in the Skip Step Option. The display actually looks like two "U"s upside down)
tME	Time (used in the Skip Step Option. The display actually looks like two "U"s upside down)

THE KILN DESIGN

SECTIONAL CONSTRUCTION
The Fuego and The Robin kilns are made up of two separate sections that sit on top of a separate kiln bottom. They are attached together by the control panel and hinge.

CONTROL SYSTEM
The automatic programme control uses a thermocouples to sense temperature. The control then automatically adjusts power output (turns the contactor on and off) to heat up the kiln. The programme control varies the target set point for the temperature according to various ramps and soak
periods that are programmed in the control. Basic operating instructions are part of this manual.

THERMOCOUPLE
The standard thermocouple is a heavy-duty 8-gauge Type K thermocouple protected with an industrial grade mullite thermocouple protection tube.

REMOVABLE CONTROL BOX
The control panel can be easily removed and sent to your distributor for repairs if ever necessary.

HEATING ELEMENTS IN CERAMIC HOLDERS
The heating elements are designed to have a low watt density and good stretch ratio. These are supported in hard ceramic element holders (a unique L&L feature). This will promote long element and firebrick life.

STURDY ALUMINISED STEEL STAND
Aluminized steel resists corrosion at the high temperatures. The stand has a full plate of aluminized steel under the bottom brick. This allows the bottom brick to move freely while expanding and contracting - which helps prevent broken bottoms. The legs, which have two bends for stiffness, are bolted onto the stand plates. There are plastic feet that slip over the metal legs.

REVERSIBLE BOTTOM
The brick bottom can be easily reversed in case of a firing mishap.

STAINLESS STEEL CASE
This resists most corrosion and strengthens construction. Stainless steel screws are used in case construction.

THREE CASE CLAMPS PER SECTION
The case of each kiln section is held together by three adjustable stainless steel hose clamps. The clamps are easily accessible for occasional tightening.

STAINLESS CLIPS HOLD BRICK LID IN PLACE
Stainless steel "U" clips hold the firebrick in the lid band.

76 mm (3") OF INSULATION
The insulation is a special hand picked lightweight highly insulating firebrick, which is 76mm (3") thick for all European models. In addition a thin layer of non-RCF fibre paper is used as back-up insulation between the stainless case and the brick.

LARGE DIAMETER PEEP & VENT HOLES

There is one 25 mm (1") diameter peephole per section for ventilation and cone sighting. In addition there is one vent hole in the top of the European models for manual venting.

VENT-SURE VENT OPTION

The optional Vent-Sure automatic kiln ventilation system by L&L vents harmful fumes away from a kiln to the outside. Carbonaceous materials in clay, china paints and glazes containing oils, glue from decals, and certain glazes and other miscellaneous products generate fumes.

CE CERTIFIED

All Fuego and The Robin European model kilns are CE certified.

ELEMENT SHUT-OFF SAFETY SWITCH

A locking door safety switch shuts off all power to the elements when the door is open. This positive system breaks all power and does not rely on a relay.

SERVICE

WARRANTY

Fuego and The Robin kilns carry a three year limited warranty. Elements and thermocouples are warranted for one year.

TROUBLESHOOTING

See the separate TROUBLESHOOTING SECTION in the Reference Manual

ELECTRICAL SPECIFICATIONS & WIRING DIAGRAMS

See the Reference Manual.

REPLACEMENT PARTS

Parts can be obtained from your local distributor.

REPAIRING OR REPLACING THE CONTROL PANEL

The control panel is removable from the kiln. This unique L&L Kiln design feature allows easy repair of your control panel. Disconnect power, unplug the kiln, remove panel (see the reference manual for details), pack it carefully in a box with protective cushioning, and send it to your local distributor for inspection and/or repair.

CRACKS IN THE TOP & BOTTOM

It is quite normal to get hairline cracks in both the top and the bottom firebricks. They are caused by the expansion and contraction of the firebrick as it heats and cools. As long as the bottom is fully supported by the stand the cracks in the bottom will not adversely affect the operation of the kiln. It generally does not make sense to cement these hairline cracks.

REGULAR KILN MAINTENANCE

AFTER EACH FIRING

1) Unplug the kiln.
2) Check element holders and walls for glaze, clay chips or anything that could melt at a high

temperature. If melted clay or glaze comes in contact with an element, a rapid failure could result. To clean holders, a good shop vacuum will handle dust and loose crumbs. A very gentle chisel or grinder may help with glaze contamination on element holders, but remember that the elements themselves are quite brittle when they are cool. Replace the contaminated holder if you cannot clean it. Remove any glaze that has splattered on the firebrick or shelves. (USE SAFETY GLASSES WHEN DOING THIS BECAUSE GLAZE CAN BE LIKE BROKEN GLASS). Vacuum afterward. Make sure vacuum is grounded and periodically touch some grounded metal surface away from the kiln to discharge the energy while vacuuming (to protect control from static electricity).

3) Make sure the floor of the kiln and the tops of the shelves are coated with kiln wash. Kiln wash will keep running glaze from ruining a kiln shelf or the floor of the kiln. (Do not coat the undersides or the sides of the shelves because you do not want the kiln wash to fall off into the kiln).

4) Keep a kiln log of firings. Tracking the performance of your kiln over time may turn out to be an extremely valuable tool if you ever need to diagnose future problems.

AFTER 10 FIRINGS

1) Check temperatures of the power cord at the receptacle while the kiln is at its hottest. If these are hotter than normal, it could be a sign of a loose or corroded connection, or possibly the wire gauge used in the power hook-up is the wrong size for the amount of current being drawn by the kiln. Immediately diagnose and fix this because it could cause a fire.

2) Check plug for oxidation or any burn marks, discoloration or melted spots. If you see this replace the plug (and possibly the receptacle) before using the kiln again. Make sure the receptacle feels tight when you press the plug into the outlet. A loose receptacle indicates worn springs, which will lead to overheating. NOTE: you can put an oxidation inhibitor on the prongs.

3) Repair any firebrick problems.

AFTER 30 FIRINGS OR ANNUALLY

1) Check element resistance. You will need a digital multimeter (see the Troubleshooting Guide). Keep track of this information.

2) Check tightness of case and retighten if necessary. (the case will expand and contract during each firing and may eventually become loose. Brick also shrinks slightly with use - especially if used at the higher temperatures like cone 10).

3) Check internal wires for deterioration or oxidation. Replace any that seem brittle or where the wire insulation has deteriorated or fallen off. Check terminals for oxidation (discoloration). If you are near salt air or if you notice corrosion on the stainless exterior of the kiln for whatever reason (like certain fumes generated by your work) then do this far more frequently.

4) Check power connection terminals in the kiln and control box for tightness. Be sure to do this with the kiln unplugged. If these terminal connections get loose heat can be generated and this can cause a fire.

5) Check thermocouple connections for corrosion, tightness and oxidation as well. A bad thermocouple connection can change the accuracy of the temperature reading, which could cause an overfiring.

When replacing electrical components, replace the electrical connectors. At the very least check for discoloration (an indication of oxidation).

CHECK THERMOCOUPLE CALIBRATION

Thermocouples will drift in reading over time. This could potentially lead to an overfiring before the thermocouple actually fails. Although you cannot easily check thermocouple calibration, the general accuracy of the entire kiln system can be checked by firing with witness cones.