



**SKUTT**

# KilnMaster LT

Models FireBox 8x6 LT, FireBox 8x4 LT and GlazeTech

## Operating Manual



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## Be Safe

Tens of thousands of kilns are used safely in homes, schools, and professional studios throughout the world. With a good understanding of your kiln and a little common sense you can avoid any accidents. Please observe the following safety recommendations:

### Operation

- The stainless steel jacket and some of the other fixtures surrounding the kiln will get hot enough to burn your skin when the kiln is heated. Therefore it is important to be extremely careful when working close to the kiln. We recommend posting warning signs of this potential hazard in the kiln room.
- Keep anyone who cannot understand warning signs, such as small children and pets, away from the kiln when it is firing.
- Do not open the kiln door while the kiln is heated.
- The elements inside the kiln chamber will cause an electrical shock if touched. Never insert metal instruments or place any part of your body into the kiln while it is firing.
- Always be sure the kiln is disconnected from the power supply before working on the electrical components.
- Plan on being with the kiln when it is scheduled to turn off.
- Remove all potentially combustible materials from the kiln area.
- Long term viewing inside the kiln chamber can cause damage to your eyes. Therefore, it is recommended that you use IR and UV protective glasses when looking into the kiln for extended periods of time. #3 welders green or gray glasses will protect your eyes.
- In the event of a severe storm, unplug the kiln. Exposure to static shock or electrical surges can damage the circuit board in the controller.
- Do not place anything in the kiln you are unsure of. Certain items may potentially melt, explode, or release toxic fumes. Items that may be damp (i.e. greenware, kiln shelves) have the potential to crack or explode inside the kiln when the moisture is trapped inside them turns to vapor when heated.
- Never allow your kiln to exceed the temperature rating listed on the serial plate.
- For your safety, the protection of your kiln, and the protection of your ware inside the kiln, we recommend that you avoid unloading the kiln when it is above 125°F.

## Precautions for the KilnMaster LT Controller

- The controller is a temperature control device. It is not a safety device.
- The maximum operating temperature is 100°F (38°C). This temperature refers to the room temperature while the kiln is firing and does not pertain to the internal temperature of the kiln.
- The minimum operating temperature is 33°F (1°C).
- The controller contains static-sensitive parts that may be damaged by static electricity. Use caution to avoid creating static that may damage the equipment. In areas where static electricity is common, or during dry times of the year throughout the country, touch something metal before touching the controller to discharge the static.

## Installation

- As with all electrical products, there is danger of electrical shock. Use only properly sized and rated copper wire when installing the power supply for your kiln. We recommend this work be done by a licensed electrician.
- Kilns should always be located in a dry place to prevent electrical shock and corrosion.
- Follow all instructions for installation in this manual. Always observe fire and building safety codes when installing any Skutt Product.
- If there are fire sprinklers located in the kiln room, make sure they are rated high enough so they will not be set off when the kiln is at peak temperature. This should be tested with the kiln at peak temperature, the ventilation system turned off, the sprinklers disabled and all doors and windows closed for maximum assurance during test.
- We recommend having a fire extinguisher rated for electrical fires easily accessible near the kiln.
- Skutt Ceramic Products, Inc. will not assume liability for injury or damages caused by variations from the instructions put forth in this manual.
- Kilns get hot. Observe all the instructions to ensure proper clearances from flammable or temperature sensitive objects and living things.
- Ventilation is key to maintaining a healthy work environment and proper room temperature. To ensure proper ventilation and room temperature is maintained, consult a qualified HVAC professional.
- The proper placement of thermocouples is crucial to the operation of all automatically controlled kilns. Check all thermocouples for damage and correct placement. Thermocouples must protrude into the kiln chamber at least 1" to ensure an accurate reading.
- The power cord is sized correctly to handle the power for your particular kiln. Never use an extension cord.
- Make sure the power cord is routed in such a way as to not touch any portion of the kiln that gets hot.
- Be careful of pinch hazards when working on or assembling the kiln.

## Maintenance

- Always unplug the kiln before performing any repairs or general maintenance.
- Use only Skutt replacement parts. Improperly sourced parts may pose a hazard to you and your kiln and void your warranty.
- Never modify your kiln without first consulting Skutt. Improper modifications may pose a hazard to you and your kiln and void your warranty. Items such as alternative thermocouples, controllers, kiln coatings may ruin your kiln if improperly installed or applied.
- Replace any electrical components that are discolored, brittle, or corroded.
- Inspect all stainless steel bands to ensure they are tight. If they loosen, tighten them as much as possible to prevent the band from slipping or flexing.

## Read Your Manual

Reading your manual and watching your video before you start firing will improve your firing success. It will give you a sense of confidence that will make your kiln owning experience much more enjoyable and safe. Each programming section will give you a basic understanding of the technique (i.e. Bisque Fire, Slumping Glass, or Firing PMC Gold) along with step by step instructions for programming.

## Visit [www.kilnarts.org](http://www.kilnarts.org)

There is no way to cover everything you need to know in this kiln manual so we developed KilnArts.org as an additional resource. It has basic information about Ceramics, Glass and PMC along with web tools that help you locate places to take classes and find supplies in your area.

We highly suggest you take classes to further your knowledge and understanding of the world of Fired Arts. The more you learn, the more successful your projects will be and the more opportunities you will find for new and interesting projects.

## Box Includes:

### FireBox 8x4 LT and 8x6 Kiln

- 7" by 7" Kiln Shelf
- 3 - 1/2" Kiln Shelf Posts
- Operating Manual
- 1 lb Kiln Wash
- \*Instructional DVD
- Spare Thermocouple

### GlazeTech Kiln

- Operating Manual
- \*Instructional DVD
- Spare Thermocouple

*\*DVD was specifically made to introduce the FireBox 8x6. All the information is still current however the kilns no longer include a cone with them.*

## Inspecting your Kiln

Your kiln may have traveled a long way to get to you and on rare occasion, freight damage may occur. Inspect your kiln for any obvious physical damage when you unpack the kiln. Minor imperfections in the brick are normal and expected, large cracks and broken out chunks are not. If you notice damage to your kiln or any missing items call your Skutt Distributor right away. Be sure to have your kiln's serial number on hand. This is located on the side of the control box.

## Warranty Registration

Your Skutt kiln comes with a 2 year limited warranty. You can find the details of this warranty on the back of this manual. Please be sure to go to [www.skutt.com](http://www.skutt.com) and click on Warranty Registration to register your warranty. This will speed up the processing of any warranty claims and ensure you are notified of any product change information.

## Locating the Kiln

- Install in a well ventilated, sheltered area such as a carport, garage, utility or hobby room. Allow a minimum 18 inches (46 cm) of space between your kiln and adjacent walls, other kilns, shelving, etc. When multiple kilns will be installed in the same room, make sure the control boxes on the kiln are not facing adjacent kilns. Radiant heat from nearby kilns can damage the controller.
- For small rooms, monitor the firing so room temperatures do not exceed 100°F (38°C). Do not fire if room temperatures are 32°F (0°C) or less as damage to the kiln may result.
- Locate the kiln on a noncombustible surface such as bare cement or ceramic tile. If a non combustible surface is not available, the uniform mechanical code requires two inches of masonry below the kiln extending a minimum of 12" (31 cm) beyond the outside circumference of the kiln.
- When installing a kiln in a room with a fire control sprinkler system, do not place kilns within a 10 ft. (3m) radius below sprinkler heads. If this is not possible, contact Skutt for alternative solutions before installing.
- All kilns are vulnerable to the highly corrosive effects of marine air. If you live near salt water, locate the kiln indoors and protect it from damp air.

## Coating Shelves With Kiln Wash

Kiln wash is a high alumina powder that you mix with water then paint on your kiln shelf. When dry it has a powdery look and feel to it. It is designed to protect your kiln shelf in case something melts onto it. The kiln wash acts as a barrier, protecting the shelf from the molten material.

1. Mix kiln wash with water until it is the consistency of heavy cream.
2. Use a brush to paint a thin layer on one side of the shelf and let it dry.
3. Brush on another thin layer making your strokes perpendicular to the first brush strokes and let dry.

## Placing the Shelf

The shelf should be placed in the center of the kiln on top of the 3 evenly spaced shelf posts. Be careful not to hit the thermocouple when placing the shelf. Do not try to load the shelf while there is power to the kiln.

## Test Firing the Kiln

It is always a good idea to run a test fire before you fire your kiln with valuable art inside. Place an 04 Self Supporting Pyrometric Cone on a posted shelf about 2 inches from the thermocouple and chamber wall, close the lid, and follow the instructions in this manual for programming a Cone 04 (Medium Speed) Cone Fire Mode program.

After you press **START** the kiln will run the program. It should take approximately 7.5 hours to fire (Medium Speed), then needs to cool. You may see a little smoke. This is just some residual oil burning off the elements. When the kiln has cooled to room temperature open the lid and inspect the cone. It should now be bent over. The more it bends the more heatwork. Below are images of cones with varying degree of bends. If your cone falls within the acceptable range you are good to go. If your cones do not fall within this range chances are your kiln just needs a slight adjustment. Contact a Skutt Technician at (503) 774-6000. To purchase cones when needed go to [www.kilnarts.org](http://www.kilnarts.org) and find a dealer near you.

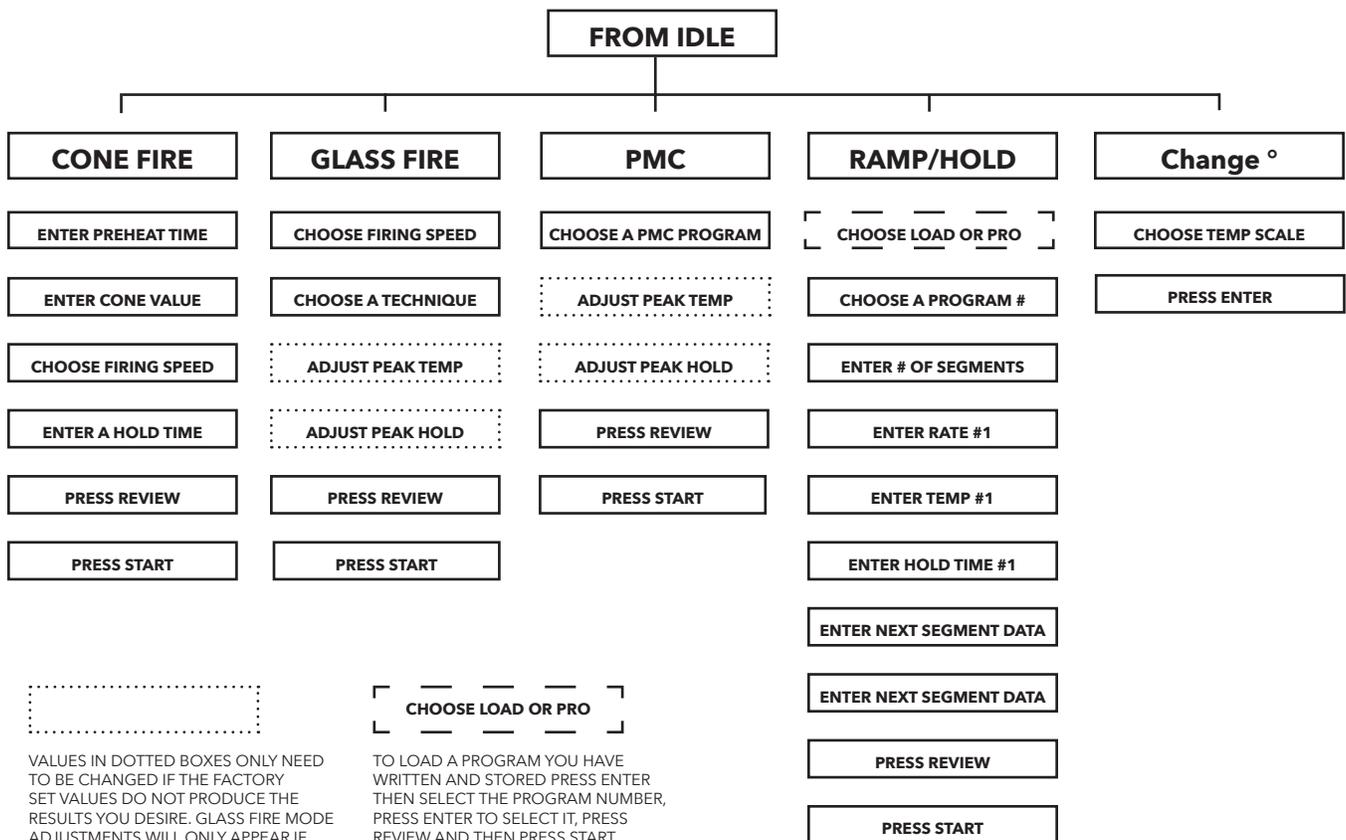


## Programming Modes

Your kiln is equipped with the KilnMaster LT Controller, one of the most advanced 3 Button Controllers in the industry. As you can see in the diagram below, it offers you 4 different programming modes and an option to change the temperature scale to either Celsius or Fahrenheit. The diagram illustrates the various programming steps. For more detailed instructions on entering a particular program, refer to the instructions for programming later in the manual.

Three of these modes, Cone Fire, Glass Fire and PMC have firing programs designed by experts already stored in the controllers permanent memory. All you have to do is give it some basic information specific to your project and press start. It really is that easy.

For those of you that want to design your own programs there is Ramp/Hold programming mode. With Ramp/Hold you can input programs with up to 8 segments and store up to 5 programs for future use.



VALUES IN DOTTED BOXES ONLY NEED TO BE CHANGED IF THE FACTORY SET VALUES DO NOT PRODUCE THE RESULTS YOU DESIRE. GLASS FIRE MODE ADJUSTMENTS WILL ONLY APPEAR IF KILN IS IN MODIFY GLASS FIRE MODE. SEE ADVANCED PROGRAMMING

TO LOAD A PROGRAM YOU HAVE WRITTEN AND STORED PRESS ENTER THEN SELECT THE PROGRAM NUMBER, PRESS ENTER TO SELECT IT, PRESS REVIEW AND THEN PRESS START.

TO WRITE A NEW PROGRAM PRESS THE UP ARROW. THE DISPLAY SHOULD READ PRO. PRESS ENTER TO SELECT IT AND THEN CONTINUE TO WRITE YOUR PROGRAM

## Button Descriptions

The **START/STOP/ENTER** key is used for exactly those purposes. Use it to “Start” programming your kiln or to “Start” a firing. If the kiln is firing and you need to shut it down, use it to “Stop” the firing. Lastly, it is used to “Enter” a selection.

Use the **UP** or **DOWN** buttons to scroll through menu options or scroll to a time or temperature value. In certain controller modes they can also serve a single function action or provide access to a sub-menu. Consult the table below.

## Entering Time and Temperature

When using the **UP** and **DOWN** arrows to select a time or temperature it is helpful to know that the longer you hold the button down, the faster it moves through the numbers. This helps you reach numbers quickly when the currently stored value is far away from the desired value. It can be easy to overshoot your value so you will want to release the button before you arrive at your value and then slowly approach it. Releasing the button automatically reverts it back to the slowest advancing speed. For single increments simply press and release the key each time.

When entering a Hold Time it is extremely important to know that, unlike a microwave, everything to the left of the decimal light is hours and everything to the right is minutes. Entering excessive hold times can cause damage to your kiln and its contents.

## Controller Modes

A “Controller Mode” (as opposed to a Programming Mode) is simply the current state of the controller. This chart shows you the basic functions of the keys at five different Modes. You will notice that the function of the key can vary depending on which Mode is active. When you first plug the kiln into the receptacle the controller will be in **Idle Mode**. This means it is ready to be programmed. Once you press **ENTER** you will move into **Programming Mode**. After you have entered the data for your program it will switch to **Ready Mode**. This means the kiln is ready to run the program when you push **START**.

CONTROLLER MODE	START/STOP KEY	UP ARROW	DOWN ARROW
<b>Idle</b>	Initiates Programming	No Function	Press once to review Press twice to go to “redi”
<b>Programming</b>	Stores Displayed Value	Increases Value	Decreases Value
<b>Ready</b>	Starts Firing	No Function	Reviews Current Program
<b>Firing (during)</b>	Stops the Firing	Shows Current Segment Access to Skip Segment Add Time Add Temp	Reviews Current Program
<b>Complete</b>	Back to Idle	No Function	No Function

During the **Firing** you can access certain features that tell you where you are in the program and allow you to make adjustments while the kiln is firing. The final mode is **Complete**. The display will flash “CPLT” alternately with the temperature of the kiln chamber and the amount of time it took to fire the program. To return to **Idle Mode** just press **ENTER**. When the kiln first enters **Complete Mode** the alarm will beep 14 times.

## Getting to back to Idle

**Idle Mode** is where all programming starts. When power is applied, the display will briefly flash “Lt2G” and then flash “Idle” along with the current temperature. Sometimes you make a mistake when programming and want to start over. To get back to Idle, you will need to finish entering all of the information for that program, **START** the program and then **STOP** the program. You can also unplug the kiln. When you plug it back in it will return to “Idle”.

## Cone Fire Overview

Cone Fire Mode was developed by Ceramic Engineers to provide artists with an easier way to fire their kiln. In the past artists had to use Pyrometric Cones. Pyrometric Cones are pyramid shaped clay formulations which were designed to bend when they received the appropriate amount of heatwork for the clay or glaze inside the kiln. The artist would look into the kiln through peep holes and when the cone softened and bent, they would shut off the kiln. This is why every clay and glaze has a cone value associated with it.

Cones used in electric kilns range from 022 to 10. It is helpful to think of the "0" as a minus sign. The higher the number, the higher the temperature. For example a Cone 04 is hotter than a Cone 06 and a Cone 6 is much hotter than a cone 06.

Thanks to modern electronics we can now simulate the heatwork measured by cones with Electronic Kiln Controllers. Cones are used primarily for testing and troubleshooting your kiln today. An added bonus of controllers is that we can more accurately control the firing speeds before and after the kiln reaches peak temperature to produce special glaze effects and protect fragile pieces through critical firing ranges.



## Preheat

The first question the controller asks you when you are using ConeFire Mode is "How Long Do You Want To Pre-Heat?". Preheat was introduced to help prevent ceramic pieces in the kiln from cracking due to rapidly escaping moisture in the piece. Water turns to steam at 212 °F (100 °C). If you fire fast, the steam wants to escape, and when it does, it can crack or shatter your ware.

An easy way to tell if a piece is still wet is to hold it up to your cheek. If it feels cool it still has moisture in it. Under normal conditions smaller pieces (like the ones that would fit in your kiln) take about a week to dry.

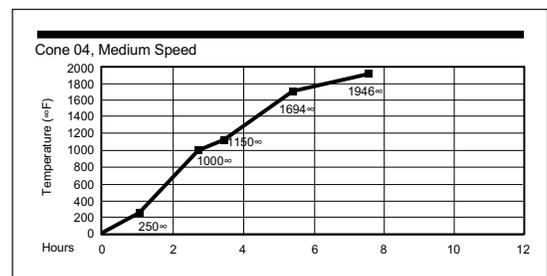
If you are not sure if your ware is completely dry, adding a preheat time is good insurance. Usually 1 to 2 hours is sufficient. When a Preheat time is entered the kiln rises in temperature at a much slower rate than normal until it reaches 180°F (82 °C) and then holds at that temperature for the amount of time you entered. During this Hold time you will see the kiln counting down the time alternately with the current temperature of the kiln.

Remember that when you are entering time in your controller that the numbers to the left of the decimal equal hours and the numbers to the right of the decimal equal minutes.



## Entering Cone Value

Every commercial clay and glaze should have a cone value of or range of cones printed on the label. It is very important not to exceed this rating. Raw materials used in clay and glazes can vary drastically on their melting point. Earthen Ware clays generally fire in the 04 - 06 range. Porcelain and Stoneware generally fire in the 6 - 10 range. If you fired earthen ware to Stoneware temperatures it would most likely melt all over the shelf. If you are ever unsure of the cone value of a particular clay or glaze ask your clay supplier. They should also have good knowledge of the preferred Cone Values to use when firing greenware (Bisque Firing) or when firing glazed bisque (Glaze Firing).



## Entering Firing Speed

With Ceramics there are certain critical temperature ranges where it is important to slow down the firing rate. Cone Fire Mode takes care of most of this for you. All you have to do is select one of three firing speeds; Slow, Medium or Fast.

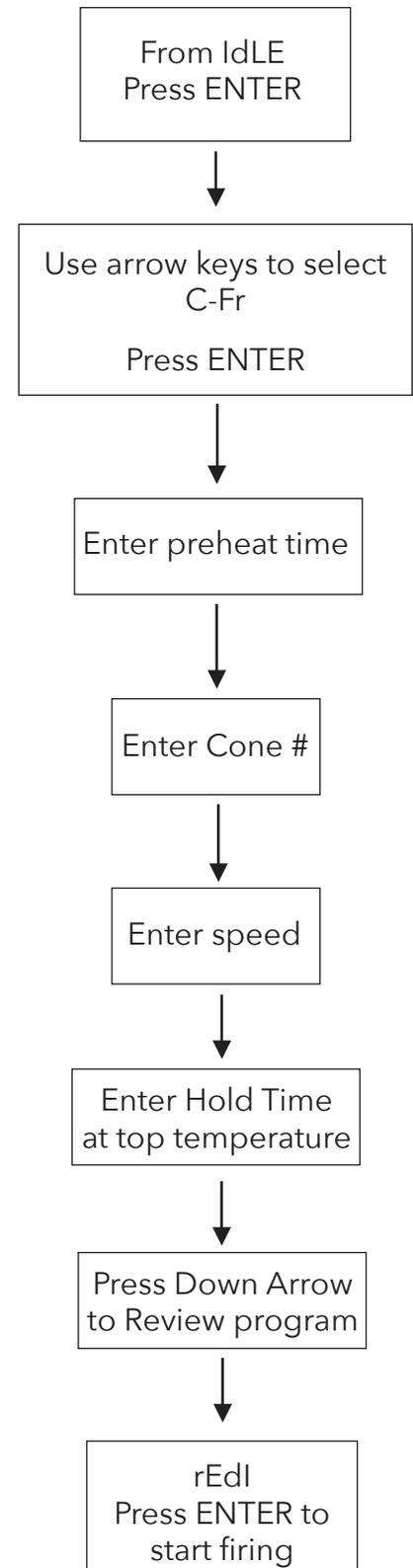
Slow is generally for your bisque firing (clay is dried but has not yet been fired). Medium is recommended for your glaze firing. All the water should be completely out of the piece and most of the organics have burned out so you can fire a bit faster. If you have an unusually large or thick piece you may want stick with Slow just to be safe. Fast is only recommended for Decals and Lusters.

## Selecting a Hold Time

When you enter a hold time, you are telling the kiln to maintain the peak temperature for the amount of time you have entered. A 5 minute hold time can allow the kiln time to even out and make sure all the glazes are flowing nice. If you Hold too long, you start to affect the amount of heatwork. Just as you wouldn't want to cook food too long, don't enter too long of a hold time. Remember, the numbers to the left of the decimal represents hours and everything to the right of the decimal represents minutes.

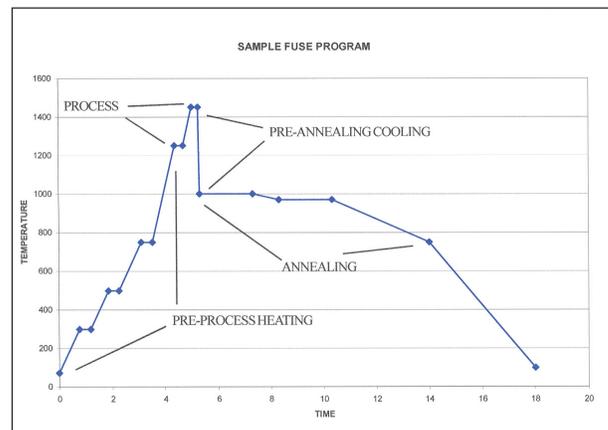
## Cone Fire Programming

1. Start with the display reading "IdLE", press **ENTER**.
2. If "C-Fr" is displayed, press **ENTER**, or press an **arrow key** to display "C-Fr" and then press **ENTER**.
3. Display reads "PrHt". The Preheat Time is the length of time you will hold at 180 °F (82 °C). Use the **arrow keys** to adjust the Preheat Time and then press **ENTER** to store the value. *REMEMBER: the time is displayed in the form HH.mm. H= hours, m=minutes.*
4. Display reads current stored Cone #. Enter new Cone #. Use the **arrow keys** to display the desired Cone #. The **Up Arrow** moves toward a hotter Cone # and the **Down Arrow** moves toward a cooler Cone #. Press **ENTER** to store the displayed Cone #.
5. Display reads current stored Heating Rate. Use the **arrow keys** to display "SLo" (Slow), "MEd" (Medium) or "FASt" (Fast) and then press **ENTER**.
6. Display reads current stored Hold Time. Typical hold times are in the 5 minute (00.05) to 10 minute (00.10) range. Use the **arrow keys** to display the desired hold time and then press **ENTER** to store the value.
7. The display will read "rEdI". Press the **Down Arrow** to Review the program.
8. If the program is correct, press **ENTER** to start the firing.



## Glass Fire Overview

Glass Fire Mode was developed by Skutt in order to provide glass artists with a simple way to fire their glass projects without having to be an expert in programming. The built-in programs were designed by glass artist Gil Reynolds to work with the two most popular types of fusible glass, COE 90 and COE 96. Fusible glass is glass that is specifically designed to be "compatible" when fused together. Glass that is compatible will have the same Coefficient of Expansion (COE). This means it will expand and contract at the same rate when it is heated and cooled. Glass that has different COE's will create stress in the piece when it is fired and will likely crack. So when choosing glass for your project be careful never to mix your COE 90 and COE 96 and never use glass that was not specifically designed to be compatible.



Glass Fire Mode has programs available for Slumping, Fusing, and Tac Fusing. All the programs are carefully designed to prevent shocking the piece while it is heating or cooling and for proper annealing. The programs vary based on the size and thickness of the piece you are firing. The wider and/or thicker the piece, the slower you need to fire it and the longer you need to anneal it.

Glass gets "shocked" when one portion of the glass heats or cools faster than another portion. By slowing the firing you limit the potential for this to happen.

Annealing has more to do with the glass transforming from a fluid state back to a rigid state when it is cooled. You want all the molecules to go through this transition at the same time and at the same rate. This happens generally between 750°F (399 °C) and 1000°F (538 °C). The controller will slow down the cooling rate of the kiln through this period by cycling the heating elements on and off. Once past this range the kiln will shut off and cool at a natural rate. Never open the lid until the kiln has cooled completely.

To program the kiln you will need to give it two pieces of information; What Speed and What Process?. You may have to make slight adjustments to the peak temperature and hold time to adjust for certain projects but for the most part you will stick with the factory settings.

## Speed

As mentioned earlier, the speed you choose will depend on the size of the project. We have made it simple for you by providing this chart to make your selection. If you have multiple pieces in the kiln at once, use the speed that corresponds with the largest piece. You rarely have problems firing too slow.

FAST	1/8" THICK - 18" DIAMETER OR SMALLER 1/4" THICK - 4" DIAMETER OR SMALLER 3/8" THICK - NOT RECOMMENDED
MEDIUM	1/8" THICK - 20" DIAMETER OR SMALLER 1/4" THICK - 8" DIAMETER OR SMALLER 3/8" THICK - 5" DIAMETER OR SMALLER
SLOW	1/8" THICK - 24" DIAMETER OR SMALLER 1/4" THICK - 18" DIAMETER OR SMALLER 3/8" THICK - 12" DIAMETER OR SMALLER 1/2" THICK - 8" DIAMETER OR SMALLER

## Process

Process refers to what you want to do with the glass; Slump, Tac Fuse or Full Fuse

### Slumping

Slumping is when you place glass over or into a mold (specifically designed for slumping) and heat the glass until it becomes soft enough to conform to the shape of the mold. You can slump into a concave ceramic mold or over a convex metal mold. Both molds need to be coated with kiln wash which is available at most Art Glass and Ceramic Supply locations. The ones made specifically for glass tend to work a little better than the ones used for ceramics.

You can slump a single piece of glass or multiple pieces that have been previously fused together. When fusing over a convex mold be sure the glass will clear the thermocouple as it falls over the mold.

### Tac Fusing

Tac Fusing, otherwise known as Fuse to Stick, is used when you want to soften two or more pieces of glass to the point where they stick together but the glass components do not deform. A variation on Tac Fusing is Texture Fusing. This is where you increase the temperature to the point where the pieces start to join together but do not become one individual piece.

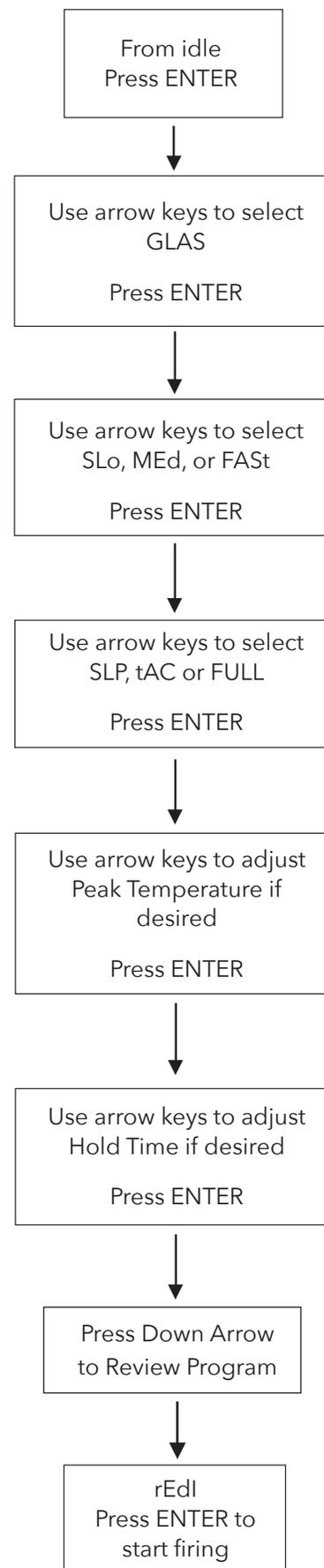
### Full Fusing

Full Fusing is exactly what it sounds like. This is when multiple pieces of glass are fully fused together to the point they become one piece.

Most glass comes in 1/8th inch (3.2 mm) thick sheets. Fused glass will try to achieve a thickness of 1/4 inch (6.4 mm). Therefore, if you are fusing 3 or more layers you will need to plan on the glass spreading out as it becomes fluid. Plan your shelf space accordingly so the glass does not flow off the shelf or into other pieces.

## Glass Fire Programming

1. Start with the display reading "IdLE", press **ENTER**.
2. Select Glass Fire Mode. If "GLAS" is displayed, press **ENTER**, or press an **arrow key** to display "GLAS" and then press **ENTER**.
3. Display reads Firing Speed currently stored. Use the **arrow keys** to scroll to the desired Speed and press **ENTER**.
4. Display reads Process currently stored. Use the **arrow keys** to scroll to the desired Process and press **ENTER**.
5. Adjust Temperature. Use the **arrow keys** to adjust the peak temperature if desired and press **ENTER**. To keep factory Temperature Setting press **ENTER**.
6. Adjust Hold Time. Use the **arrow keys** to adjust the peak temperature Hold Time if desired and press **ENTER**. To keep factory Hold Time Setting press **ENTER**.
7. The display will read "rEdI". Press the **Down Arrow** to Review the program.
8. If the program is correct, press **ENTER** to start the firing.



## PMC Overview

PMC or Precious Metal Clay was developed in 1990 in Japan. It is made of fine particles of precious metal which are mixed with organic binders to form a clay like substance that can be molded into jewelry. Once you have the shape you want, you place it in the kiln and fire it until the binder burns out and the particles sinter together. The result is a nearly pure metal object.

The most common versions shrink about 12% to 15% from their original form and are composed of Silver or Gold. There is also PMC made of Copper and Bronze. These metals require a reduction atmosphere to develop properly. Reduction Atmospheres have the potential to reduce the life of your heating elements and therefore we are not recommending their use in your kiln.

## Choosing a Program

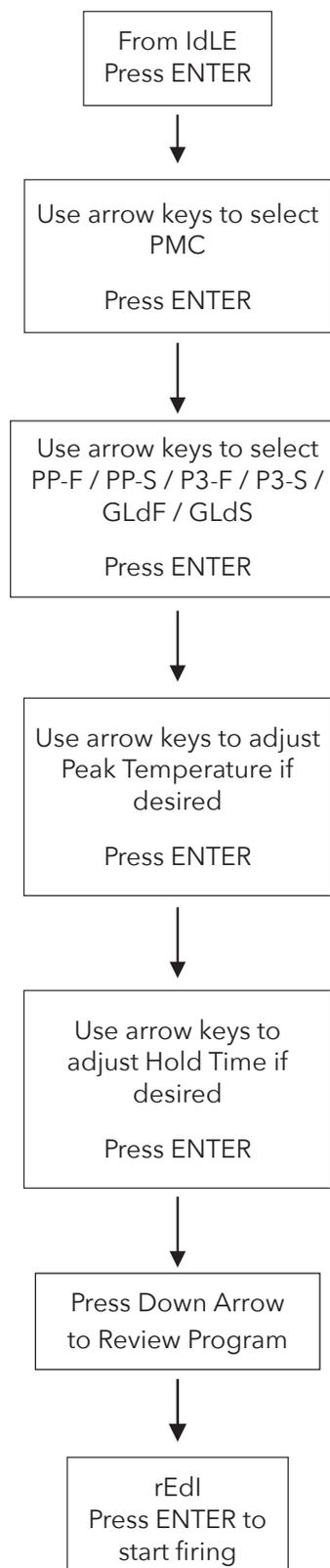
Your controller has built in programs to fire the most commonly used PMC brands, PMC+, PMC3 and PMC Gold. There is a Fast and Slow program for each type of PMC. Choose the Fast speed if you want quick results and the Slow speed if you have a little more time. The Slower speed should produce a stronger and more pure piece. Like regular clay it is important to let your piece dry completely before placing it in the kiln. When it is done firing it will be necessary to use a wire brush to remove a whitish film that develops on the piece during the firing. The 6 programs are as follows:

### PROGRAM DETAILS

DISPLAY	PROGRAM	RATE	TEMP	HOLD
PP - F	PMC+ - Fast	9999	1650 °F (899 °C)	10 Min
PP - S	PMC+ - Slow	9999	1650 °F (899 °C)	2 Hr
P3 - F	PMC3 - Fast	9999	1290 °F (699 °C)	10 Min
P3 - S	PMC3 - Slow	9999	1650 °F (899 °C)	2 Hr
GLdF	PMC Gold - Fast	9999	1380 °F (749 °C)	1 Hr
GLdS	PMC Gold - Slow	9999	1650 °F (899 °C)	10 Min

## PMC Programming

1. Start with the display reading "IdLE", press **ENTER**.
2. Select PMC Mode. If "PMC" is displayed, press **ENTER**, or press an **arrow key** to display "PMC" and then press **ENTER**.
3. Select Desired Program. Use the **arrow keys** to scroll to the desired program and press **ENTER**.
4. Adjust Temperature. Use the **arrow keys** to adjust the peak temperature if desired and press **ENTER**. To keep factory Temperature Setting, press **ENTER**.
5. Adjust Hold Time. Use the **arrow keys** to adjust the peak temperature Hold Time if desired and press **ENTER**. To keep factory Hold Time Setting, press **ENTER**.
6. The display will read "rEdI". Press the **Down Arrow** to Review the program.
7. If the program is correct, press **ENTER** to start the firing.



## Ramp/Hold Overview

Ramp/Hold is a programming mode that allows you to write your own firing programs. It is used when you are firing something that requires programs different from the factory programs found in Cone Fire, Glass Fire or PMC Programming Modes.

Whenever possible we suggest you use the built in firing modes but if you want to do something different like growing Crystals in a ceramic glaze, casting thick pieces of glass, or tempering custom made tools, you will need to use Ramp/Hold Mode.



Before you get started it is a good idea to know a little about firing programs. A firing program consists of a series of one or more segments that are strung together to form the program. A segment consists of a Firing rate (expressed in degrees per hour), a temperature that you are trying to reach at that rate, and an amount of time you want to hold at that temperature.

A program can be as simple as telling the kiln to fire as fast it can to a specific temperature and then turn off. Most items you fire in a kiln however require you to speed up, slow down, or hold during critical parts of the firing. You can find recommended programs for firing in books, on manufacturers websites, on blogs, from a class...they are every where. You may find two programs that look completely different but accomplish the same results. The key is testing. Just with recipes, some programs are better than others.

Another thing you need to consider when trying out a Ramp/Hold program is that kilns can fire different. A large kiln with a very large load of shelves and ware may cool slower than a small kiln. In order to get the same results, you may need to program a cooling segment that slows down the cooling of the kiln. Again testing is the key. It is impossible to fit everything you need to know about firing in this manual, so we highly recommend you contact your local distributor and find out where you can take classes to advance your knowledge.

Below is an example of a program written for firing a specific crystal glaze recipe like the one in the picture. It is a 5 segment program with varying rates and hold times. With Crystal glazes it is important to hold at specific temperatures on the cooling side of the program. You can see that between segment 3 and 4 that the temperature drops 210 °F (117 °C) to 2000 °F (1093 °C) and then holds at that temperature for 1 hour and then drops another 100 °F (55 °C) and holds for 3 hours. When the last segment in the program is complete the kiln shuts off and cools to room temperature.

### Sample Ceramic Crystal Glaze Program

SEGMENTS	1	2	3	4	5
RATE	350°F/HR	750°F/HR	150°F/HR	750°F/HR	750°F/HR
TEMPERATURE	700°F	2000°F	2210°F	2000°F	1900°F
HOLD	00.00	00.00	00.10	01.00	03.00



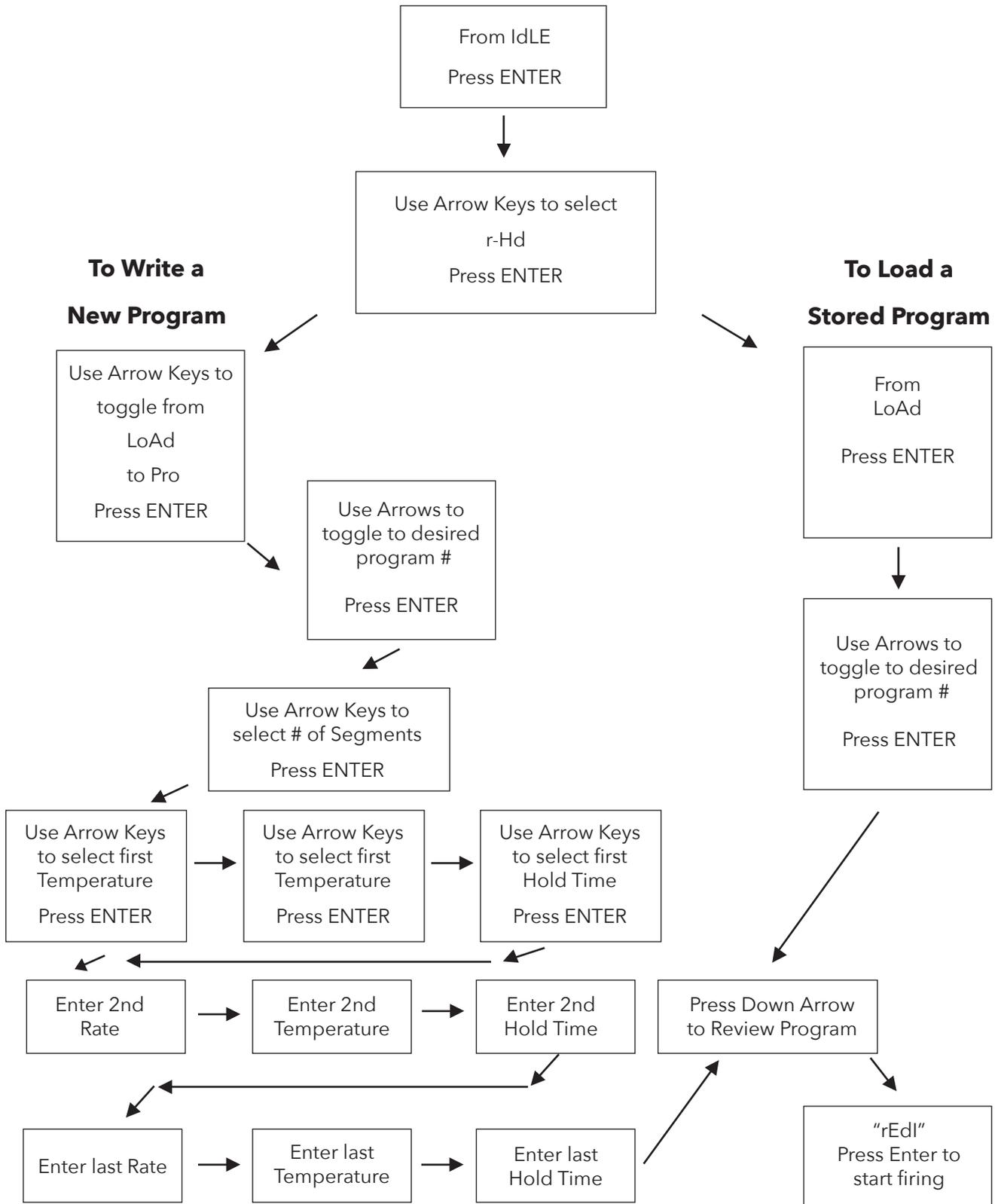
### Ramp/Hold Programming

1. Start with the display reading "IdLE", press **ENTER**.
2. If "r-Hd" is displayed, press **ENTER**, or press an **arrow key** to display "r-Hd" and then press **ENTER**.
3. Display will read "LoAd". Press **ENTER** to run a previously stored program (See *Load Stored Program below*), or press an **arrow key** to toggle to "Pro" and press **ENTER**. Use the **arrow keys** to display the correct Program Number and then press **ENTER**.
4. Display will read "SEGS". Use the **arrow keys** to display the desired Number of Segments and press **ENTER**.
5. Display will read "rA 1". Use the **arrow keys** to scroll to the desired Rate and press **ENTER**. Rates are entered in °/hr and can be a heating rate or a controlled cooling rate. A rate of 9999 sets the kiln to ramp as fast as possible.
6. Display will read "°F 1" or "°C 1" depending on how you have your temperature scale set. Use the **arrow keys** to select a temperature for the kiln to go to in your first rate and press **ENTER**.
7. Display will read "HLd1". Use the **arrow keys** to choose the Hold Time at the soak temperature for your first segment and press **ENTER**. Hours are displayed to the left of the decimal point and minutes to the right (HH.mm).
8. REPEAT STEPS 5-7 for each segment.
9. The display will read "rEdI" after you have entered the the last segment data. Press the **Down Arrow** to Review the program.
10. Display will read "rEdI", press **ENTER** to start the firing.

To re-fire the last used program, press the **Down Arrow** key when "StOP" or "IdLE" is displayed. The program will be quickly reviewed and "rEdI" will be displayed. Press **START** to begin the firing.

### Load Stored Program

1. Start with the display reading "IdLE", press **ENTER**.
2. If "r-Hd" is displayed, press **ENTER**, else press an **arrow key** to display "r-Hd" and then press **ENTER**.
3. Display will read "LoAd". Press **ENTER**.
4. Display will read "Pro". Use the **arrow keys** to display the correct Program Number and then press **ENTER**.
5. The display will read "rEdI". Press the **Down Arrow** to Review the program.
6. Display will read "rEdI". Press **ENTER** to start the firing.



There are a few advanced programming features we have left out of the main programming instructions in order to help simplify them. Most kiln users will not need or use these features however if you find them useful we have listed them below.

### Change Temperature Scale

Change temperature scale by pressing **ENTER** from "IdLE" and using the **arrow keys** to toggle to "CHG°" and press **ENTER**. Use the **arrow keys** to toggle to "°C" (Celsius) or "°F" (Fahrenheit) and press **ENTER** to make the change. When Celsius is selected a light will appear in the bottom right corner of the display.

### Traveling Set Point

At the start of a firing, the controller sets its Traveling Set Point to the current temperature in the kiln. The Traveling Set Point is where the controller wants the kiln temperature to be. The controller will then move the Traveling Set Point up at the programmed rate and cycle power to the elements to make the temperature follow the Traveling Set point. The Traveling Set Point can be viewed while the kiln is firing by pressing the **Up Arrow**. The first information you will see is where you are in the program (i.e. "rA 1") and the second is the Traveling Set Point temperature. This can be a very useful diagnostic tool.

### Edit Menu

There are 3 additional features that may be accessed through the Edit Menu: Skip Segment (SSEG), Add Time (TME) and Add Temperature (TMP). The Edit Menu is only accessible in GlassFire, PMC and Ramp/Hold Modes. The Add Time and Add Temp features are only available when the program is in the Hold portion of a segment and only available during the peak temperature segment of the program. To access the Edit Menu press the **Up Arrow** while the kiln is firing. It first displays the current segment, then the Traveling Set Point and then (if accessible) the Edit prompt. This will remain on the screen for 5 seconds. You must press the **ENTER** key while the Edit prompt is displayed to access the menu. Use the **arrow keys** to toggle to the feature you would like to access and select it by pressing **ENTER**. If the feature is not accessible it will not be displayed.

### Skip Segment

Often times Glass Artists want to visually inspect the glass when it is at or near the process temperature so they can manually control how much a project is fused or slumped. Skip Step allows you to skip to the next segment in the program before the previous one has completed to set your glass. When you select it from the Edit menu and press **ENTER**, it will advance one segment in the program to the next ramp rate.

### Add Time (tME)

If you feel the Hold time in a particular segment of a program is not long enough, you can extend it in increments of 5 minutes by using the Add Time feature while the program is in that hold period. You may use this procedure as many times as necessary to get the hold time that you want. Access the Add Time feature using the instructions for the Edit Menu and press **ENTER**.

### Add Temperature (tMP)

If you feel the temperature in a particular segment of a program is not high enough, you can extend it in increments of 5 °F (3 °C) by using the Add Temperature feature while the program is in that hold period. You may use this procedure as many times as necessary to get the hold temperature that you want. Access the Add Temperature feature using the instructions for the Edit Menu and press **ENTER**.

## Display Messages

Because we are working with an LED display with limited characters, some of the messages displayed can look a little cryptic. Hopefully this section will help explain some of the messages you are seeing.

**C-Fr** - Indicates that if you press **ENTER** you will begin programming a Cone Fire Mode program. Press **ENTER** to select it or use the **arrow keys** to scroll to another selection.

**PrHt** - Stands for Preheat. It is asking you to enter an amount of time for how long you want to preheat the kiln before it runs a Cone Fire Mode program.

**ConE** - Is asking you to enter a Cone Value that you would like to fire to in Cone Fire Mode. Enter a value between Cone 022 and Cone 10 (or whatever the maximum temperature rating of your kiln is).

**SLo** - The message indicates the choice to run a slow speed program in either Cone Fire Mode or Glass Fire Mode.

**MEd** - The M is represented by two n's. The message indicates the choice to run a medium speed program in either Cone Fire Mode or Glass Fire Mode.

**FASt** - The message indicates the choice to run a fast speed program in either Cone Fire Mode or Glass Fire Mode.

**HLd** - This prompt represents Hold and is asking you to enter a hold time in hours and minutes. Hours are to the left of the decimal and minutes are to the right.

**rEdI** - This indicates the kiln is ready to run a program you have just entered. Press **START** to begin firing. You have 30 seconds to activate the program before it reverts back to IdLE mode.

**IdLE** - This stands for IDLE and means the kiln is sitting IDLE waiting to be programmed.

**GLAS** - Indicates that if you press **ENTER** you will begin programming a Glass Fire Mode program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**FULL** - Indicates the controller is in Glass Fire Mode and it is asking if you would like to run a Full Fuse program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**SLP** - Indicates the controller is in Glass Fire Mode and it is asking if you would like to run a Slump program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**tAC** - Indicates the controller is in Glass Fire Mode and it is asking if you would like to run a Tac Fuse program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**PMC** - The M is represented by two n's. Indicates that if you press **ENTER** you will begin programming a Precious Metal Clay (PMC) program. Press **ENTER** to select it or an press **arrow key** to scroll to another selection.

**PP-F** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC+ Fast program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**PP-S** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC+ Slow program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**P3-F** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC3 Fast program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**P3-S** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC3 Slow program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**GLdF** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC Gold Fast program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**GLdS** - Indicates the controller is in PMC Mode and it is asking if you would like to run a PMC Gold Slow program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**°F** - It is asking you to enter a temperature value in degrees Fahrenheit

**°C** - It is asking you to enter a temperature value in degrees Celsius.

**r-Hd** - Indicates that if you press **ENTER** you will begin programming a Ramp/Hold Mode program. Press **ENTER** to select it or press an **arrow key** to scroll to another selection.

**LoAd** - Indicates that if you press **ENTER** you will load a stored Ramp/Hold program. Press **ENTER** to select it or press an **arrow key** to scroll to scroll to "Pro" to write a new Ramp/Hold program.

**Pro** - Pro stands for Program. When you see this, you are in Ramp/Hold programming mode and it is asking you to select a program between 1 and 5 to store your program, or if you have selected "LoAd", it is asking you which Ramp/Hold program number you would like to run.

**SEG** - This represents Segment. If you see this, you are in Ramp/Hold mode and it is asking you to input how many segments are included in your program. You can enter up to 8 segments in a program, so choose a number between 1 and 8.

**rA** - This represents Rate. If you see this, you are in Ramp/Hold mode and it is asking you to input a rate in degrees per hour for a segment. It will be accompanied by the number value of the particular segment number you are programming.

**CHG°** - This stands for Change. The display is asking you if you would like to change the current temperature scale from Fahrenheit to Celsius. Press **ENTER** if you would like to change the scale then use the **arrow keys** to toggle to the selection you want and press **ENTER** to select it. The display will then return to "Idle". If Celsius is selected you will see a small light illuminated in the bottom right hand corner of your display.

**CPLt** - This stands for Complete and means that your program has finished running. This message will be alternately flashing with the amount of time in hours and minutes that it took to complete the firing program as well as the current temperature of the kiln. Press **ENTER** to clear and return to "Idle". Remember that just because the program is complete, it does not mean that the kiln is cool enough to unload.

**StOP** - "StOP" will appear when you press the **STOP** key to stop a program while it is firing.

**Edit** - See *Advanced Programming*.

**SSEG** - See *Advanced Programming*.

**tME** - See *Advanced Programming*.

**tMP** - See *Advanced Programming*.

## Error Codes

Error Codes are your kilns way of telling you that something is wrong. Below is a list of error codes along with their description and potential fixes. Unlike refrigerators, you will not find a kiln in every house, therefore it may be harder to find and schedule a repair. That is why our technicians here at Skutt have become very good at walking people through simple repairs over the phone. Parts can be shipped the same day, so you can be up and going in no time at all.

Thermocouples and elements are the most common maintenance items that will need to be replaced. Like brakes in your car they will eventually need to be replaced. The most common error messages you find below can quickly be resolved by learning to replace these two items. You can find videos on how to do these repairs at [www.skutt.com](http://www.skutt.com).

**tC FAIL** - "tC" alternating with "FAIL" indicates the thermocouple has failed. Replace the defective thermocouple. To clear the error, press **any key**.

**PF** - Is displayed whenever there is a power interruption that causes the kiln to drop below 140 °F (60 °C) or before the kiln reaches 140 °F (60 °C). Press **ENTER** to clear the error. If you know the reason for the power failure was not related to the kiln just restart your program. If there is a temporary power interruption that does not cause the kiln to fall below 140 °F (60 °C), the kiln will continue to fire the program entered.

**tC-** - Is displayed when the red and yellow thermocouple wires are reversed. This usually occurs when the thermocouple is installed backwards but can also occur if the red and yellow wires are reversed at any point in the thermocouple circuit.

**Err1** - Is displayed when the kiln is unable to achieve a rise in temperature of at least 12 °F/Hr (7 °C/Hr). This can be triggered by many different things. The most common are aging elements, intermittent or faulty relays, and low voltage.

**Errh** - This message indicates a problem with the hardware on the controller itself. This is pretty rare. We suggest you call a Skutt technician to resolve this problem.

**Errf** - This error is triggered by the kiln not decreasing in temperature at the rate programmed. This message only occurs during a segment when the kiln is programmed to be decreasing in temperature at a controlled rate. It is usually caused by a Solid State Relay failing in the closed position (ON). The FireBox LT kilns have a built-in safety relay to prevent your kiln from overheating if your relay fails closed. If you receive this message it is most likely that your Solid State Relay needs to be replaced.

**Errd** - This error is triggered by the kiln rising in temperature at a faster rate than the kiln is programmed. This message only occurs during a segment when the kiln is programmed to be increasing in temperature. It is usually caused by a Solid State Relay failing in the closed position (ON). The FireBox LT kilns have a built-in safety relay to prevent your kiln from overheating if your relay fails closed. If you receive this message it is most likely that your Solid State Relay needs to be replaced.

**Errr** - This one is very rare. Call a Skutt technician for more information.

**Stuc** - This error is triggered when a key is held depressed for too long and usually indicates the key is stuck. Sometimes this is a temporary situation, but sometimes it may require a new controller.

## No Display

No display can be caused by a number of factors. The first thing to check obviously is to make sure the kiln is plugged into the wall. If it seems secure, plug a light or radio into the same outlet to make sure the outlet is live. If you find that it is not live, check your breaker. If you find that it has tripped, reset it and then restart your kiln. If it trips again, call a Skutt technician for further troubleshooting.

There is a fuse holder on the side of your control box that holds a 0.5 amp fuse on the side of the box. Check first to see if the fuse is fully engaged by pushing it in and turning it clockwise. If it seems secure, twist it counter clockwise and remove the fuse to see if it is good. If you find that it is bad, replace the fuse.

## Pieces Over Fired

If you find that your pieces are over fired, the first step is to press the **down arrow** to review the program and make sure you ran the correct program for the materials you are firing. If it is correct, the next step is to run another test fire. This will require a new test cone which you can find at most ceramic supply businesses. Once you have completed your test fire and find that the kiln is over firing, the next step is to replace your thermocouple.

Thermocouples will begin to slowly drift towards an over fire after a certain number of firings. This number will vary depending on how hot you are firing your kiln and the amount of contaminants it is exposed to.

You can purchase a replacement thermocouple from your local distributor or directly from Skutt. There are many different types and shapes of thermocouples so be sure to order one for your specific model. Instructions for replacing a thermocouple can be found on our website in the video section at [www.skutt.com](http://www.skutt.com).

Once you have replaced the thermocouple you will want to do another test fire. If you find the kiln is still over firing, call a Skutt technician for further troubleshooting.

## Pieces Under Fired

If you find that your pieces are under fired the first step is to press the **down arrow** to make sure you ran the correct program for the materials you are firing. If it is correct, the next step is to run another test fire. This will require a new test cone which you can find at most ceramic supply businesses. Once you have completed your test fire and find that the kiln is under firing, the next step is to call a Skutt technician for further troubleshooting.

## Warranty Information

Your Skutt kiln is covered for two years to be free of defects. Be sure to read the warranty details on the back cover of this manual, and register your warranty at [www.skutt.com](http://www.skutt.com). The first step in any warranty claim is to call the distributor where you purchased your kiln. Be sure to have your serial number, model, voltage and phase available. All of this information can be found on the Skutt Serial Plate, which is located on the side of your control box.

## Customer Service and Technical Support

PH: (503) 774-6000      [skutt@skutt.com](mailto:skutt@skutt.com)

**Cone Fire Mode Programs**

FAST	RAMP RATE°/HR	TEMPERATURE	HOLD
1	570	200	PREHEAT
2	570	1050	0
3	570	CT - 256	0
4	200	CT	HOLD
NOTE		CT = CONE TEMPERATURE	

MEDIUM	RAMP RATE°/HR	TEMPERATURE	HOLD
1	120	200	PREHEAT
2	400	1050	00.10
3	300	CT - 256	0
4	120	CT	HOLD
NOTE		CT = CONE TEMPERATURE	

SLOW	RAMP RATE°/HR	TEMPERATURE	HOLD
1	80	200	PREHEAT
2	200	1050	00.30
3	200	CT - 256	0
4	108	CT	HOLD
NOTE		CT = CONE TEMPERATURE	

**Glass Fire Mode Programs**

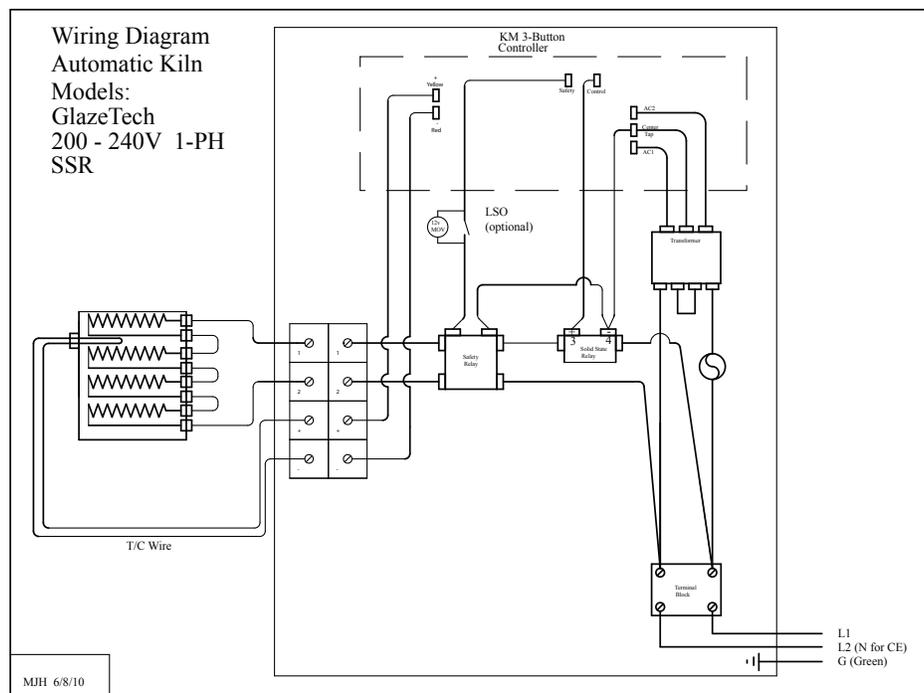
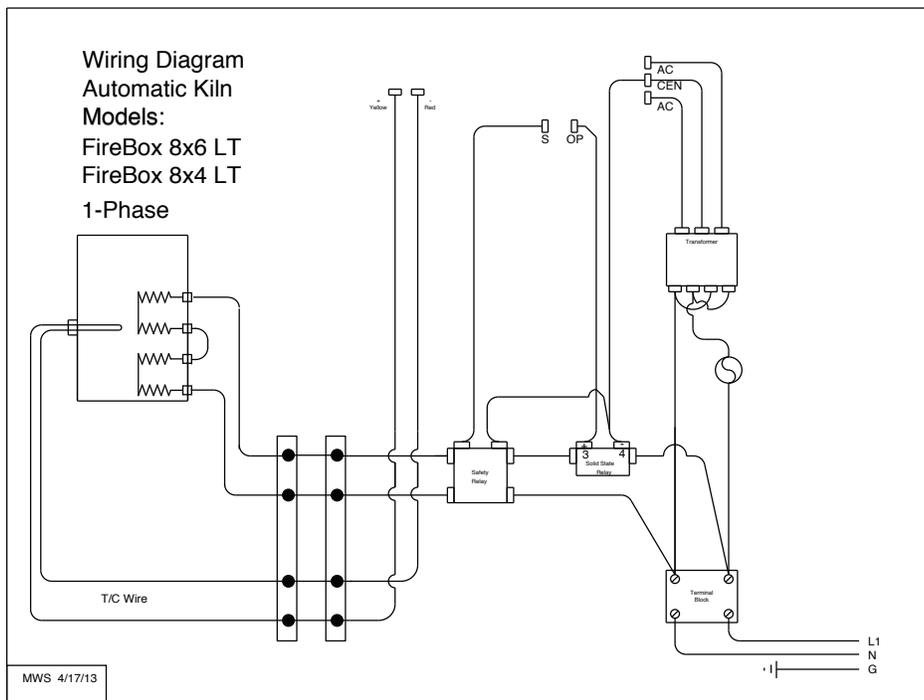
FAST	RAMP RATE°/HR	TEMPERATURE	HOLD
1	500	300	5
2	800	By Process	By Process
3	9999	950	30
4	175	800	10

MEDIUM	RAMP RATE°/HR	TEMPERATURE	HOLD
1	350	300	10
2	600	By Process	By Process
3	9999	950	30
4	150	800	10

SLOW	RAMP RATE°/HR	TEMPERATURE	HOLD
1	250	300	10
2	400	By Process	By Process
3	9999	950	60
4	100	800	15

**PMC Mode Programs**

PROGRAMS	RAMP RATE°/HR	TEMPERATURE	HOLD
PMC+ - FAST	9999	1650	00.10
PMC+ - SLOW	9999	1650	02.00
PMC3 - FAST	9999	1290	00.10
PMC3 - SLOW	9999	1650	02.00
GOLD - FAST	9999	1380	00.60
GOLD - SLOW	9999	1650	00.10



**Specifications**

**Model - FireBox 8x6 LT**

115 Volts AC 2W 15 Amps 1800 Watts  
Rated Max Temperature: 2250 °F (1232 °C)

**Model - FireBox 8x4 LT**

115 Volts AC 2W 15 Amps 1800 Watts  
Rated Max Temperature: 2350 °F (1288 °C)

**Model - GlazeTech**

240V Volts AC 2W 17 Amps 4000 Watts  
208V Volts AC 2W 20 Amps 4000 Watts  
Rated Max Temperature: 2350 °F (1288 °C)

**PROGRAM 1**

SEGMENT	RATE	TEMP	HOLD	NOTES
1				
2				
3				
4				
5				
6				
7				
8				

**PROGRAM 2**

SEGMENT	RATE	TEMP	HOLD	NOTES
1				
2				
3				
4				
5				
6				
7				
8				

**PROGRAM 3**

SEGMENT	RATE	TEMP	HOLD	NOTES
1				
2				
3				
4				
5				
6				
7				
8				

**PROGRAM 4**

SEGMENT	RATE	TEMP	HOLD	NOTES
1				
2				
3				
4				
5				
6				
7				
8				

**PROGRAM 5**

SEGMENT	RATE	TEMP	HOLD	NOTES
1				
2				
3				
4				
5				
6				
7				
8				

# Warranty

SKUTT CERAMIC PRODUCTS, INC. warrants this product to be free from defects in materials and workmanship for two full years from the date of the first retail purchase from an authorized Skutt dealer.

## **What Skutt will Do:**

Skutt will repair or replace, at its expense, any defective part upon return, freight prepaid, to any authorized Skutt service center.

## **What is Not Covered:**

This warranty does not cover (1) any defect not reported to an authorized Skutt dealer or distributor within 10 days of discovery; (2) Type K Thermocouples; (3) any damage caused by overfiring; (4) products subjected to abnormal strain, freight damage, neglect, abuse, improper storage, failure to follow instructions, or products altered from factory standard condition; (5) products whose identification number has been changed; (6) failures of, or failures caused by, parts or accessories not manufactured or supplied by Skutt Ceramic Products; (7) kilns used for purposes other than firing ceramic materials, glass materials, and certain metal heat treating processes; (8) kilns used for reduction or salt firing.

## **How to Obtain Warranty Service:**

Notify your Skutt dealer or distributor within 10 days of discovery of any defect. Deliver any defective part, freight prepaid, to an authorized Skutt service center. A list of Skutt service centers may be obtained from your dealer or from Skutt Ceramic Products, Inc. at the address and telephone number below.

**Other limitations.** ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING PROPERTY DAMAGE, LOST PROFITS, LOSS OF USE, OR OTHER ECONOMIC LOSS, ARE EXCLUDED TO THE FULL EXTENT PERMITTED BY STATE LAW. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you. ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Dealers are not authorized to modify this Warranty or to make any additional commitments. Skutt will not be responsible for promises not contained in this Warranty.

**State Law Rights.** This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**6441 S.E. JOHNSON CREEK BLVD, PORTLAND, OREGON 97206 (503) 774-6000**

## **How to Request Warranty Service**

All repair work must be authorized, either by Skutt, or by an authorized Skutt Distributor before the work is done. If you believe your kiln is going to require warranty servicing, the first step is to call the Distributor from whom you purchased the kiln. If they are unable to provide or coordinate service, call Skutt Ceramic Products and ask for our Technical Service Department 503-774-6000.

Skutt has one of the most extensive networks of Distributors in the country. However, not all areas have a trained kiln technician. We realize that re-packaging and shipping your kiln is not a realistic option for most of our customers. Many of our Distributors have trained kiln technicians either on staff or with which they contract. Often times these technicians will travel to your business or home to do the repair. Skutt will pay them for their time on the job. It is your responsibility to pay them for their travel time to and from your location.

**PLEASE REGISTER YOUR WARRANTY AT [WWW.SKUTT.COM](http://WWW.SKUTT.COM)  
under the "Contact Us" tab to streamline future warranty requests.  
You will need your SERIAL NUMBER, MODEL NAME, VOLTAGE, and PHASE.  
All of this information can be found on the SERIAL PLATE,  
which is located on the side of your control box.**