Set-Pro

Control Operating Manual

Thank you for purchasing a Set-Pro equipped kiln from Evenheat. The Set-Pro offers Custom Mode programming to allow the glass artist complete control over all firing decisions. Please take some time to read this manual. Not only does it cover the basics, it also contains some little gems that are sure to make your command of the Set-Pro a thoroughly rewarding experience.

CAUTION: The Set-Pro is used to control temperature, it is not a safety devise. Never leave the kiln unattended while firing. Check on the kiln at the end of the firing to ensure firing program has completed as planned.

CAUTION: Throw control power switch, located on kiln control panel, to the OFF position (O) when not in use.

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Use this Quick Guide to Immediately Begin the Custom Mode Programming Process

The Custom Mode allows the creation of your own, individual firing programs. You choose the rate of temperature increase or decrease, the temperature you want to achieve and any hold time once you're there. These 3 items, taken together create what's known as a segment. Segments are basically chained together to create a multi-segment program. Enjoy full artistic control with Custom Mode Programming.

Quick Steps for Custom Mode Programming

1. Throw the power switch on the kiln control panel to the On position.

2. The Set-Pro begins its initialization process and the display will illuminate.

3. The Set-Pro will finish its initialization process and then display **IdLE** (Idle).

4. Press the Enter key. **USr** is displayed along with some number.

5. Use the Up arrow key to choose. You're choosing which of the 4User program numbers will be used to store your program. Your choices are 1 thru 4.

6. Press the Enter key. **SEG** is displayed along with some number.

7. Use the Up or Down arrow keys to choose. You're choosing the total number of segments used in the program. Your choices are 1 thru 8.

8. Press the Enter key. **rA 1** is displayed along with some number.

9. Use the Up and Down arrow keys to choose. You're programming the temperature rate (°/hr.) for this segment.

10. Press the Enter key. **°F 1** is displayed along with some number. *(**°C** is displayed when using the Celsius scale)*

11. Use the Up and Down arrow keys to choose. You're programming the temperature set point for this segment.

12. Press the Enter key. **HLd 1**is displayed along with some number.

13. Use the Up and Down arrow keys to choose. You're programming the hold time for this segment.

14. Press the Enter key. **rA 2**is displayed. Repeat steps 9 thru 14 for all remaining segments.

15. Once all remaining segments have been programmed the display will read **rEdI** (Ready).

16. Press the Enter key to begin the firing. The Set-Pro is now running your Custom Mode program.

*You may stop the firing at any time by pressing the Enter key. Doing so will cause the firing to stop and **StOP** will briefly be displayed.*

Set-Pro Key Layout& Key Descriptions

F or °C -The Set-Pro can be set to display in either Fahrenheit or Celsius.

Display - Large, bright LED display can be seen from a distance.

Start/Stop - Enter

The Start/Stop key starts and stops the firing process. It's also used to enter or store firing program information during the programming process.

UP Arrow – VIEW SEG – SKIP SEG

Used to select values when programming and allows for Viewing the current running segment as well as performing the Skip Ahead feature.

Down Arrow – REVIEW

Used to select values when programming and allows for the Review program feature.

See the Set-Pro Key Function Table on page 11, for more detailed key information.

Custom Mode Programming

The Custom Mode is a method of programming that allows the artist to precisely define every aspect of the firing. You're creating a custom firing program designed for the work at hand. Creating a custom program is not difficult. It does, however, require some knowledge and forethought about what you want to do and how to go about it. We have included a "Basic Glass Firing Guide" with your new kiln that goes through the basics. But these are just the basics and you will want to seek out more detailed information. Having said that, you do need to know how to translate what you want into a firing program and we're going to show you how to do it.

First Things First: Segments - What are They?

Most glass firing programs require the kiln to go to multiple temperatures and to use multiple heating rates throughout the firing. In order for the Set-Pro to perform all these changes, it breaks the entire program down into smaller chunks called "Segments". Your program will consist of many segments, chained together, one after another, to create the finished program. During firing, the Set-Pro works from one segment to the next until all segments have been completed.

A Segment consists of these 3 questions: How fast am I supposed to get to temperature? What temperature am I going to? And, once I'm there, should I stay there for any amount of time? Once you understand this concept that a segment includes a rate of temperature change, a particular temperature you want to reach and a hold at the temperature, you've got it. Now we can show you how to program!

Custom Mode Programming

With the display reading **IdLE**, press the Enter key one time to begin the programming process.

The display will read **USr** along with some number. The Set-Pro is asking which of the 4 available locations you would like to store your custom program. In other words: a program number. You're choices are 1 thru 4. Use the UP arrow only to choose and press the Enter key.

SEG is displayed along with some number. The Set-Pro wants to know the total number of segments you would like to use for the program. You can use up to 8 segments for your program. Your choices are 1 thru 8. Use the Up and Down arrow keys to choose and press the Enter key. *Most glass firing programs usually use less than 8 segments for a firing program.*

rA 1 is displayed. rA stands for Rate and the 1 means you're programming the rate of temperature change for segment 1. Rate means speed and you need to tell the Set-Pro how fast you want the temperature to change. Rate for the Set-Pro is programmed in degrees per hour (°/hr.). The choice is yours. Use the UP and DOWN arrow keys to choose your rate and press the Enter key.

°F 1 is displayed. °F stands for the temperature set point (**°C** is displayed if you're using Celsius) and the 1 means you're programming the temperature you would like to reach in segment 1. The choice is yours. Use the Use the UP and DOWN arrow keys to choose your temperature and press the Enter key.

HLd1 is displayed. HLd stands for Hold (a.k.a. soak or dwell) and the 1 means you're programming the amount of time you want the temperature to stay at the segment 1 temperature once you reach it. Hold time is programmed in hours and minutes. You do not have to hold at temperature if you don't want to, in which case hold time would be 0. Use the UP and DOWN arrow keys to choose your hold time and press the Enter key.

rA 2 is displayed. The Set-Pro is now asking for the rate of temperature increase or decrease in segment 2. Simply key in the rate you want to use for segment 2 and press the Enter key.

°F 2 is displayed. The Set-Pro is now asking for the temperature set point to use on segment 2. Simply key in the temperature and press the Enter key.

HLd2 is displayed. The Set-Pro is now asking for the amount of time you want to hold at your segment 2 temperature. Simply key in the amount of hold time and press the Enter key.

As you can see from the emerging pattern, the Set-Pro will continue to ask the same three questions: rate, temp and time for all remaining segments. Just keep answering the questions. Doing so creates that beautiful chain of events called a firing program! Once all your segments are programmed the Set-Pro will display **rEdI** which means it's ready to fire your Custom Mode program.

To run the Custom Mode firing program press the Start/Stop key one time.

The Custom Mode program that you created is now running and operating the kiln.

When the firing is complete the display alternates between **CPLt** along with total firing time. Pressing the Start/Stop key at this point will cause the display to briefly read **StOP** and then **IdLE**.

On-The-Fly Features

The Set-Pro contains a set of features that allow you to adjust and tweak the firing while it's actually running! We've dubbed these features as "On-the-Fly". With these features it's possible to add a little bit of time to a hold if needed, add a little bit of temp to a hold or just leave the segment entirely and move to the next segment (like anneal).

Knowing that these features are available, and using them, will positively affect your glass firing skills and allow you to create the glass you want to create.

Adding Time to a Hold

During a hold period it's sometimes necessary to add just a little more time to the programmed hold time. The Set-Pro allows you to add time to a hold in 5 minute increments. It's a handy little feature that you should really get to know.

To Use the Add Time Feature

While holding at a temperature (display reads temperature along with remaining hold time), repeatedly press the UP arrow key until the display reads **tME** (stands for time). Press the ENTER key one time. You have now added 5 minutes to the hold time. The display will go back to reading temperature and remaining hold time and you will notice that 5 minutes has been added to the hold. You may use this procedure as often as necessary during a hold to get the hold time you desire. *It should be noted that the Adding Time to a Hold feature is a temporary adjustment only. That is, it does not change the program stored in memory.*

Adding Temperature to a Hold

During a hold period it's sometimes necessary to add just a little extra temperature to the programmed set point temperature. The Set-Pro allows you to add more temperature in °5increments.

To Use the Add Temperature Feature

While holding at a temperature (display reads temperature along with remaining hold time), repeatedly press the UP arrow key until the display reads **tMP** (stands for temperature). Press the ENTER key one time. You have now added 5 degrees to the set point temperature. Once set, the display will go back to reading temperature and remaining hold time. You may use this procedure as often as necessary during a hold to get the hold temperature you desire. *It should be noted that the Adding Temperature to a Hold feature is a temporary adjustment only. That is, it does not change the program stored in memory.*

Skipping Ahead to the Next Segment

During firing it's often desired to stop what you're currently doing and skip ahead to another segment in the program. For instance, when firing glass you may have the perfect result before your hold time completes. Allowing the hold time to complete would further change the glass and lead to disappointment. In such a case the Set-Pro allows you to skip ahead to the next segment in the program for the annealing or cooling portion of the program. It's a handy little feature that you should really get to know.

To Use the Skip Ahead Feature

At any time during the firing press the UP arrow key one time. The display will eventually read **SStP** (stands for Skip Step). When it does, press the ENTER key one time. You have now skipped to the next programmed segment. If you need to continue to skip ahead even further feel free to do so. Once you skip the display will go back to reading temperature.

View Segment Feature

At any point during the firing you may press the UP arrow one time to display the current action (ramping or holding) and current segment. This will tell you if you're ramping or holding and which segment you're doing this in. After a moment or two the display will go back to normal operation.

Programming and Use Features

Initialization (Boot-Up)

When the Set-Pro is powered up it goes through an initialization process. Various data is displayed until the initialization is complete and the display reads **IdLE**.

IdLE (Idle)

Idle simply means the Set-Pro is not running any firing programs at the moment.

Program Review

It's always best to review your program before starting it. When the controller is reading **IdLE** just press the REVIEW key and the display will automatically show you what's programmed. Just watch. When it's done reviewing **rEdI** will be displayed. Press Start/Stop key to start the program. If it's not what you want, Press the Start/Stop key again to get to **IdLE** and enter a new program.

Start Now

For you brave souls out there who want to skip the program review you can get to the **rEdI** command quickly by pressing the REVIEW key twice (when **IdLE** is displayed). This bypasses the review process and gets you directly to **rEdI**. Just press the Start/Stop to start the program.

Storing a Custom Mode Program

As you go through the Custom Mode programming process and complete it, your program is automatically stored in the program number you selected at the beginning of the programming process.

Selecting and Running a Custom Mode Program

At some point you are likely to have set all 4 Custom Mode programs set to something you like and want to run again and again. The Set-Pro allows you to quickly select the program you desire.

To Select a Custom Mode Program

From **IdLE** press the Enter key one time. Use the UP arrow key to choose the Custom Mode program you wish to run and then press the DOWN arrow key. The Set-Pro display automatically cycles through the chosen program settings and then displays **rEdI**. Simply press Start to begin the firing.

Stopping the Program

At any time you may stop the program while it's running by pressing the Start/Stop key. The display will briefly read **StOP** and then read **IdLE** along with chamber temperature.

4 User Programs in Custom Mode

The Set-Pro allows the artist to save up to 4 Custom Mode programs in memory. Your programs remain in these 4 locations indefinitely and can be recalled or changed at any time.

8 Segments per Custom Mode Program

Firing programs are built using segments. The Set-Pro allows you to use up to 8 segments for each Custom Mode firing program. *Typical glass programs generally use 8 segments or less.*

Programming and Use Features Continued from Previous Page

Programming a Time Value

The Set-Pro accepts time as Hours and Minutes. When programming a time value, a red dot will illuminate in the middle of the four display digits. Numbers to the left of the dot indicate hours and numbers to the right of the dot indicate minutes.

Temperature Rate Options

Temperature rate is programmed in degrees per hour (°/hr.). At some point you may like to go as fast as possible. You can do this in two ways. You can program in the maximum rate of 9999 which works fine or use the **FULL** command. The **FULL** command instructs the controller to go Full on (or Full off) to the set point temperature. To set your rate to **FULL** simply press the down arrow key until the display stops at 0000, then release the key. Wait a moment or two, then press the down arrow one time. The display will read **FULL**.

Using the UP and DOWN Arrow Keys

When using the arrow keys, especially when holding them down, the "tens" position will change first then the "hundreds" position will change then the "thousands" position will change. This process is designed to get you where you want to go a little faster, and easier. Another twist to this feature allows you to "tap" the button to change the position slowly. For instance: let's say you're holding down the up arrow key and the hundreds position is changing. Simply let go of the arrow key and press it once to increment the hundreds up by 1. Press it once again and it moves up by 1 again. And so on and so forth. This feature is true when any position is the one being changed. We hope you find it useful.

Number of Segments

The Set-Pro can control up to 8 segments per use or program. However, that doesn't mean that you need to use all 8. If your program only needs 1 or 2 segments to operate, great, use only 1 or 2. When it comes time to choose just select the number of segments you need.

Writing Over Data

You will want to change the data in your Custom Mode programs at some point. We expect this as you try new techniques and fine tune your skills. When you do, you'll see the old firing data as you're programming in the new data. Simply key in the new data as though the old never existed.

Clearing Function

There is no feature that allows you to perform an "ALL CLEAR" function, i.e. set all the settings to 0. Sorry. We understand the desire for such a feature but it's really not necessary.

Fahrenheit or Celsius

Your Set-Pro was set at the factory for use in the Fahrenheit or Celsius temperatures scales. If programmed to the Fahrenheit scale you will see **°F** when programming your set point temperatures. If set to Celsius you will see **°C** when programming your set point temperature. You will also note that a small, red dot will be illuminated at the bottom right of the Set-Pro display area to indicate a Celsius temperature. This small, red dot is not illuminated when using the Fahrenheit scale. If you would like to change which temperature scale you are using please consult Evenheat if you wish to adjust this setting.

Maximum Programmable Temperature

Depending upon the glass kiln model, the maximum temperature that can be programmed in the Set-Pro is either 1700°F (927°C) or 2000°F (1093°C). These maximums are factory set to limit glass kiln operation. These maximums can be set higher for non-glass kiln applications. Please consult Evenheat if you wish to adjust this setting.

Programming and Use Features Continued from Previous Page

Firing Down to Room Temperature

Over the years we've seen users attempt to program their kilns to come down to room temperature at the end of the firing. They have literally programmed in 72° as the last segment temperature. Don't do this. If your actual room temperature goes above what you have programmed the firing won't end until the room temp drops, you get an error or you stop the firing. If you want to control the cooling down to some low, final temperature don't make it room temperature. We suggest 200° or above.

Delay Start Feature

The Set-Pro can delay the start of your firing for up to 100 hours. This feature becomes valuable when different electrical rates are charged at different times of the day.

To Use the Delay Start feature

With the display reading **rEdI** press the DOWN arrow key one time. **dELA** is displayed. Use the UP and DOWN arrow keys to select the amount of delay start time. Press the Enter key. The display will read **rEdI**. Press the Start/Stop key one time. The Set-Pro will display **dLY** along with remaining delay start time. When the delay start counts down to 0 the firing program will start.

To stop the delay start feature press the Start/Stop one time.

Set-Pro Display Conditions

Display Alternating Between IdLE (Idle) and Temperature

Program is not running: kiln chamber temperature is displayed.

Display Reading Temperature

Program is running and is ramping to temperature: kiln chamber temperature is displayed.

Display Alternating Between Time Value and Temperature

Program is running and is holding at temperature: kiln chamber temperature is displayed along with the time value counting down remaining hold time.

Dot Displayed Between the 10's and 100's Digits

Indicates the value being displayed is a time value.

Dot Displayed to the Right of the 1's Digit

Indicates that a Celsius temperature is being displayed. If no dot is displayed the Set-Pro is displaying in Fahrenheit.

Set-Pro Display Messages

Listed below are all display messages you will encounter while using the Set-Pro. Some are self explanatory. To learn more about the messages go to the page number indicated.

°C	Celsius (Centigrade), page 8	°F	Fahrenheit, page 5	StOP	Stop, page 7
CPLt	Firing Complete, page 5	FULL	Full, page 8	tC	Thermocouple, page 11
dELA	Delay Start, page 9	HLd	Hold, page 5	tC/FAIL	Thermocouple Failure, page 11
dLY	Delay Start, page 9	IdLE	Idle, page 7	tME	Time, page 6
Errd	Error D, page 11	rA	Rate, page 5	tMP	Temperature, page 6
6ErrF	Error F, page 11	rEdI	Ready, Page 5	USr	User, page 5
ErrP	Error P, page 11	SEG	Segments, page 5		
Err1	Error 1, page 11	SStP	Skip Segment, page 6		

Key Function Table

Start/Stop - ENTER		
While at the Idle Position (IdLE)	While Running a Program	At Any Other Position
Pressing once begins the Custom Mode programming process	Stops the currently running program	Pressing once with **rEdI** displayed starts the currently loaded firing program. While programming, it stores the currently displayed data and moves programming to the next step.

UP Arrow – VIEW SEG – SKIP SEG		
While at the Idle Position (IdLE)	While Running a Program	At Any Other Position
No Function	Allows you to access the View Segment, Add Temperature, Add Time and Skip Segment features.	Used to select various program values while programming.

DOWN Arrow - REVIEW		
While at the Idle Position (IdLE)	While Running a Program	At Any Other Position
Pressing twice takes you Directly to the **rEdI** position	Allows you to view entire currently running program.	Used to select various program values while programming. Pressing once while rEdI is displayed allows for setting of any delay time.

Set-Pro Error Messages

The Set-Pro monitors each firing and compares performance to a set of standards. If the firing does not meet performance standards the Set-Pro automatically stops the firing and displays a corresponding Error Code describing the fault. These codes are identified and described below.

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

Err1 – Error 1 indicates the temperature in the kiln is rising slower than 15°F/hr during an up ramp. If this rate continues for 8 minutes, the firing will be stopped. **Err1** may be an indication that elements are worn or defective or that a relay has stopped working.

ErrF – Error F indicates the temperature in the kiln is decreasing less than 15°F/hr during a down ramp. 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. **Errd** may indicate a stuck relay in the on position or a problem with a thermocouple not reading properly.

ErrP – ErrP 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 be no indication of a power failure. To clear the error, press any key.

tC – The Red and Yellow thermocouple wires are reversed.

Kiln Trouble Shooting

Listed below are some of the more probable kiln problems you'll encounter along with their most common cause and repair advice. Please feel free to contact Evenheat for assistance when dealing with these and other potential kiln problems.

No Display

Check to see that the kiln is actually plugged in. It happens! Also check the circuit protection (breakers or fuses) to see that they are not tripped or open. Breakers and fuses don't trip or open for no reason. They indicate a fault which should be investigated by licensed personnel. See below.

Kiln Won't Reach Temperature

A low voltage will certainly slow a kiln down and, if the drop is low enough, it may cause failure to reach temperature. Low voltage is generally associated with your power service or provider and is rarely a fault in the kiln.

A failed element reduces the heat produced. Failed elements tend to be very visual and are easily seen. With the kiln off (not running and unplugged) have a look at the elements for any breaks. If you see no breaks in the heating element then suspect a relay problem.

A failed relay (fails to close) reduces the heat produced. While a relay failure acts like an element failure, a relay is not visible. If the heating elements appear to be intact replace the relay.

Kiln won't stop firing (won't shut off)

Most likely a failed relay (failed closed). A failed relay may cause the kiln temperature to increase when it should be decreasing. Depending upon your particular kiln model you may see up to 3 relays used in its design. Identifying the failed relay is fairly simple as the element connected to it will remain on. Unplug the kiln and remove the kiln control panel. Simply follow the element leads to the relay to identify it. Relays are maintenance items and we recommend replacing all of them when needing to replace one.

Check your program.

tC/Fail is Displayed

The thermocouple (temperature sensor) circuit is faulty. The thermocouple circuit is broken at some point, usually the thermocouple itself. The thermocouple circuit consists of the thermocouple, any connecting blocks and the thermocouple lead wire connecting to the Set-Pro.

Circuit Protection Opens ("Blown" Breaker or Fuse)

Circuit protection can open for various reasons. The BIG TWO are a short circuit and overheating. We'll look at each separately.

Short circuits occur when line voltage finds it's way to another line or ground. They are usually violent occurrences with lots of noise, flashes of light and maybe a bit of smoke! During a short circuit the amperage goes very high. This increase in amperage exceeds your breaker/fuse rating which causes them to open ("blow"). *That's exactly why they're there*. Short circuits generally happen immediately upon plugging the kiln in or running the firing. They generally do NOT happen after the kiln has been on for some time.

Overheating of the breakers/fuses can cause them to open ("blow"). Overheating needs time to happen. If the kiln is running fine for a while and then the breakers or the fuses open we can be fairly confident that the problem is overheating and not a short circuit. Overheating reduces the amount of amperage a breaker/fuse will allow to pass before it opens. Overheating is caused by many factors, the most common are: loose wire connections at the breakers/fuses, the size of the wire "feeding" the kiln is too small, the electrical receptacle is faulty or breaker/fuse is faulty.

Reasons for a Failed Heating Element

Glass kiln elements rarely fail on their own. When they do fail it's usually from contamination. Contamination is stuff like glass bits, glass separator, fiber paper, etc. that finds its way into the element groove. If you do have an element failure, double check the groove at the point of failure. Remove power form the kiln and attempt to remove any debris from the groove with a sharp tool. Not doing so may allow the debris to destroy the replacement element.

Reasons for a Failed Relay

Relays are the switches that turn the heating elements on and off. They are moving parts and they're working all the time. Long, slow firings and extended anneals make the relays work more which shortens their overall lifespan. Relay replacement is expected at some point.