



# **FUSER 87E**

## **INSTRUCTIONS**

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### **IMPORTANT**

#### **UNPACK SHIPMENT IMMEDIATELY**

When this shipment was given to the carrier, neither the carton nor contents were damaged. If the carton is punctured or damaged, unpack immediately. In case of obvious damage, please describe it on the bill of lading before signing. If merchandise is unusable, contact Cress Mfg. Company prior to accepting delivery. In the case of concealed damage, save all packing material and notify carrier as soon as possible (within 15 days) and have them make an inspection report. Failure to report such a damage or loss within 15 days places the burden of proof upon the claimant to show this damage or loss was caused while in the carrier's possession. Call us if a freight problem occurs so we may help. Call 1-800-423-4584.

### **CONGRATULATIONS!**

Congratulations on being the owner of a new CRESS kiln. Cress has been at the forefront of firing processes for over 50 years. Cress was first in our field with UL listing of ceramic kilns, first with ultra reliable element connections and first with infinitely variable power controls.

We sincerely wish you many years of creative and rewarding use of your CRESS kiln.

CRESS MANUFACTURING COMPANY, INC.

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## IMPORTANT SAFEGUARDS!

**Notice: Please read and observe the following safety warnings before operating your kiln.**

1. Install kiln 18” or more from any wall or combustibles. Do not place under any shelf or other obstruction.
2. Never fire hotter than cone 03 or 2000°F.
3. Do not fire hotter than the manufacturer’s recommendation for your glass, clay, glazes, decals or other material or permanent damage may result to your kiln or ware.
4. Before opening lid, turn off switch(es), allow the kiln to cool completely then carefully open until the lid brace that locks the lid is securely in place before allowing it to stand freely. Do not let the lid stand open while the kiln is in use or unattended.
- 5. Do not leave kiln unattended while firing.**
6. Never use an extension cord.
7. Operate kiln only in a well-ventilated room.
8. Unplug kiln before servicing or cleaning.
9. ***Dangerous Voltage*** – Do not touch heating element with anything.
10. Do not touch hot sides of kiln or hot lid. Burns may result.
11. Never store anything against or on top of the kiln; never lean objects against the kiln.
- 12. Do not store or use flammable liquids or sprays in the same room with your kiln.**
13. Do not store or use your kiln outside – keep rain, water and moisture away from kiln.
- 14. Do not use kiln, if cord is damaged.**
15. Wall receptacle must not be corroded. This can cause dangerous heating of plug, cord and wall receptacle.
16. Use kiln only with adequate electrical supply of the correct voltage (check kiln label for voltage rating), amperage and correct fuse size. Avoid aluminum wiring.
17. The kiln must be grounded properly. The wall receptacle must have a separate ground terminal. Do not use a two (2) wire receptacle. Do not alter or change the plug on the kiln.
18. Wear protective welding goggles when looking into a heated kiln. Infrared heat may otherwise damage your eyes.
19. When firing material containing lead and/or other toxic matter, avoid breathing fumes. Fumes may also contain carbon monoxide.
20. Keep children away from the kiln at all times.
21. Maintain kiln in perfect operating condition. Do not fire if the kiln, cord and wall receptacle are not all in perfect operating condition.

# E87 INSTRUCTIONS

**SPECIFICATIONS:** 2000°F MAXIMUM INTERMITTENT TEMPERATURE, 1700°F MAXIMUM CONTINUOUS TEMPERATURE.

**NOTICE:** PLEASE READ, UNDERSTAND AND OBSERVE THE FOLLOWING INSTRUCTIONS AND SAFETY WARNINGS BEFORE OPERATING THE KILN.

## INSTALLATION:

### Electrical Specifications:

Proper electrical wiring is necessary to safely and efficiently operate a kiln. Even though the voltage is a full 120 volts or 234 volts at the meter, the voltage on which the kiln operates will be somewhat lower at the kiln location. Make sure your electrical outlet has the correct electrical capacity and voltage to handle your kiln. See electrical specification table below for the requirements on your particular electronic kiln. It is necessary to measure the voltage at the location of the kiln with the kiln turned on. Voltage drops occur on all wiring. Proper electrical wiring will provide an adequate operation voltage and current at the kiln without significant voltage drop. Voltage may be temporarily low during brownouts especially on a hot day in the summer when all your neighbors have their air conditioning turned on and during peak electrical usage period in your area. If the wire coming from your power source to the kiln is too small or too long the kiln will not operate properly, even if the wire meets national electrical safety codes. If the voltage is low, the kiln may not reach the maximum desired temperature or will fire too slowly. This may reduce element life. 230 volt and 240 volt kilns may be used with 220 volt to 245 volt power.

Do not attempt to change the receptacle on an existing line without using the services of a licensed electrician. The electrician will know whether the wire size is correct. It is advisable to use a larger wire size than absolutely necessary to prevent voltage drop especially if the run to the meter is long. The increase in cost is usually very small compared to the long term savings in firing times and line loss. Never cut the plug off and replace it. If the plug becomes damaged, change the entire cord with a CRESS factory supplied cord, which meets temperature as well as electrical requirements. The outlet must be in good condition or heating of the cord and plug cap will occur. Do not use an extension cord at any time.

For your convenience, we have listed the voltage, amperage and fuse or breaker required for each kiln. See the following table for this information. Your electrician must make sure all local codes are met with your house and/or business wiring.

**ELECTRICAL SPECIFICATIONS TABLE**

MODEL	VOLTS	AMPS	KILOWATTS	SHORT RUN (<40 FT.) COPPER WIRE SIZE	LONG RUN (40-100 FT.) COPPER WIRE SIZE	CIRCUIT FUSE SIZE	CORD SIZE	PLUG SIZE
E87	120	18	1.8	No. 12	No. 10	20	20	NEMA 5-20R

## **PLACEMENT:**

The kiln must be located a minimum of 18 inches from every wall or vertical surface. Care should be taken to keep the kiln away from combustible surfaces. Do not use the kiln under a shelf or other obstruction to the flow of air. All kilns should be located in an area free from flammable materials such as drapes, boxes, paper, spray cans, paint, gasoline, etc. Keep all flammable liquids out of the room with the kiln. Be sure no curtains or other material that could change position with wind or opening of a door or window can come within an unsafe distance of the kiln. The room in which the kiln is operated should be well ventilated. Before plugging the kiln into your outlet or connecting the kiln to a power source, be sure that the kiln's power switch is "off". Be certain that your electrical wiring, receptacle, circuit breaker and fuses are in good condition before plugging it into the wall socket. If you are not sure, consult a qualified, licensed electrician. The metal case of the kiln is grounded through the three (3) wire cord ground terminal on the plug.

Good housekeeping must be observed at all times in the kiln area for safety.

Choose a location carefully. A cement floor, ceramic tile with cement grout, brick or stone is best. If it is necessary to put your kiln on a synthetic or wooden surface, use a sheet of fireproof material underneath your kiln that extends 24 inches beyond the kiln in all directions. This material must be suitable for woodstove application. A layer of hard firebrick is also acceptable for this purpose. Note: floor coloration may be sensitive to heat and may change color.

Your kiln must be fired only on the metal stand provided. It has been designed specifically for the height and weight of your kiln. Do not use any other stand. Be sure to center the kiln on the stand so that it is stable and position it so that the cord does not touch the sides of the kiln, which will be hot during firing. It is also important that the kiln is level (use a bubble level for this purpose); otherwise, there is a possibility of pieces falling during firing. Screw the stand to the kiln with the screws provided. Use your kiln only in a well-ventilated room. Vapors containing poisonous gases are possible when firing certain materials. Do not breathe fumes from kiln when firing.

## **OPERATION:**

**LOADING:** Turn off power to the elements before the door is opened. Avoid the possibility of shock by not touching the heating elements with your hand or tongs.

Load should be placed as near the center of the chamber as possible to give you a uniform temperature. For those operations requiring very accurate temperatures, a ceramic shelf should be placed on the floor of the kiln and supported on ceramic blocks to provide air circulation below the shelf.

Do not fire small thin pieces of glass and large thick pieces in the same load. Glass sagging is very sensitive to variation in temperature. If possible, keep bottom shelf 3" or more off the kiln floor. Do not crowd pieces at any time. Terra cotta molds, dusted with whiting (calcium carbonate) to prevent the glass from adhering to the mold, are used in sagging sheet glass to shape. Do not use ceramic bisque molds for sagging glass.

Load must not touch the thermocouple (2 wires covered by ceramic beads which projects through the kiln from inside the control panel), as this will tend to give you the temperature of the load rather than the air and cause overheating. Thermocouples should not be bent against the wall, but remain as originally installed. Space your load as much as possible for air circulating between parts to give you even heating throughout the chamber.

Do not heat the kiln to temperatures higher than necessary for your process and not for longer periods than required. The higher the temperature and the longer the time in use the shorter the element life and the thermocouple life.

The thermocouple should be replaced about once a year in heavy use. The calibration of the thermocouple can be affected by contaminants fired in the kiln. We do not recommend changing heating elements until they burn out or are so worn that they slow the heating time materially.

All controls, switches and electrical components are subject to failure; therefore, you should check the kiln periodically to be sure it is heating properly.

## MODEL 3K CONTROLLER

**General Information:** The Model 3K controller with RMPate software has four User programs. Each program can have up to eight segments with each segment consisting of a ramp rate, a target temperature and a hold time. Programming consists of choosing the User program (1, 2, 3 or 4), choosing how many segments you want (up to 8), then programming the ramp (rA), temperature (°F) and hold time (HLD) for each segment.

### Programming the Model 3K Controller:

1. When the power is first turned on either ErrP or StOP/current temperature is displayed.
2. If **ErrP** is displayed press any key to clear this error message.
3. If **StOP** alternating with the **current temperature** is displayed, you are ready to begin programming.
4. Press **Enter** to begin.
5. The previously fire program will be displayed, USr1, USr2, USr3 or USr4.
6. Select the user number you want to program by using the UP and DOWN keys and press ENTER.
7. **dELA** is displayed alternating with 00:00. Press ENTER if no delay is wanted. **When firing glass no delay is used.** Use the UP and DOWN keys to delay the start of the firing (Hours:Minutes). Press ENTER when the desired delay time is displayed.
8. **SEG** alternating with the last selected number of segments is displayed. Use the UP and DOWN keys to select the number of segments, then press **ENTER**. NOTE: Each segment consists of a ramp rate to a temperature and a hold time. There are 8 segments available for programming.
9. **rA 1** alternates with ramp rate. 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) at maximum rate. **The first segment must always be an “up” ramp.**
10. **°F 1** alternates with the currently selected temperature. Use the UP and DOWN keys to select the desired temperature and press ENTER.
11. **HLD1** alternates with the currently selected hold time. Use the UP and DOWN keys to select the desired hold time and press ENTER.
12. Repeat the above 3 steps for each additional segment for the ramp rate, temperature and hold time.
13. **rEdl** will be displayed after the last segment is entered. Press ENTER to begin firing.

**During Firing:** Press the UP key to see the current segment, set-point and SStP; pressing UP while SStP is displayed will advance the program to the next ramp rate. If you are in the last ramp, using Skip Step (SStp) will stop the firing. Press the DOWN key to REVIEW the current program.

**To re-fire the last used program**, press the DOWN key when **StOP** is displayed. The program will be quickly reviewed and **rEdl** will be displayed. Press **START** to begin firing.

## Error Codes

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

## 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).
- 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** Beeps for 15 seconds at end of firing.
- 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.

## FIRING GLASS

Glass is very sensitive to variations in temperature of only a few degrees. Glass must be allowed to pass through the lower temperatures slowly to prevent shattering. Then, it may be fired rapidly up to temperature (firing rapidly at this point helps preserve colors). Glass softens quickly once the critical temperature is reached and sagging begins (usually approximately 1500°F for glass slumping). It is wise to check it often at this point (at 10 minute intervals) and when it has slumped properly, turn off all switches, crack the lid at the lower lid prop position for up to ten minutes to prevent over softening of the glass, then close the lid and allow to cool completely. Glass is slumped onto terra cotta molds dusted with whiting (calcium carbonate) to prevent sticking. Be sure to read the glass loading section.

## **FIRING CHARTS:**

It is a valuable practice to keep a written record of each firing, noting the settings (even the degree of deformation of witness cones and their locations). This firing chart allows you to repeat good results and successful firings and avoid repeating less than satisfactory firing results.

## **AFTER FIRING:**

Always turn the switches to off and observe the pilot lights to ensure that they are off. Always allow plenty of time for the kiln to cool (at least twice as long as it took to fire) before opening the lid. Do not unload it until you can do so with bare hands.

## **UNLOADING:**

Avoid the possibility of shock by not touching the heating elements with your hand or tongs. **Turn switch “off” before opening the door.** The kiln brick may develop cracks due to the heat shock of the cold air if loaded or unloaded when hot.

When opening the lid while the kiln is “hot”, you should wear fire protective gloves to prevent burns on hands and arms. If very hot, you should wear a face shield also. Wear welder’s goggles to prevent infrared heat from damaging your eyes. Do not wear loose clothing that could catch on fire should it come in contact with very hot air or heated kiln parts or heated kiln loads.

Keep your face and eyes as far away from the hot opening as possible. Be sure your tongs or lifting tool has a secure electrically insulated grip. Never use them without turning off the kiln. Do not touch the heating elements, which can cause electrical shock.

## **GENERAL**

Parts placed in kiln must be degreased and dry. Oil, paint, wax or other matter that could give off fumes may coat elements or bricks with enough conductive material to cause arcing between the element coils. Zinc or tin plated articles should not be placed in kilns exceeding 800°F. The chamber should be cleaned whenever a deposit or oxide or other material collects on floor or walls. Acid or other corrosive particles in room atmosphere will react with metal elements causing them to fail.

Reasonable care should be taken in opening and closing the kiln lid. If the kiln is operating at high temperatures, fire proof gloves or other protective material should be used by the operator when touching the kiln. The insulating brick will last longer if not subjected to excessive thermal shock (opening the lid at high temperatures) or allowing the lid to “bang” open or closed.

Combustible materials must not be placed on or close to the kiln. Heat will build up over a period of time if the air circulation around the kiln is impaired and combustion will result.

## **KILN ACCESSORIES**

There are several items which are either necessary or are commonly used in conjunction with your kiln. The important are shown below:

**Kiln Wash:** Kiln wash is a refractory material that is used as a coating on parts of the kiln and kiln shelves to prevent ware or glazes from adhering to them. It is usually purchased as a dry powder, and then is mixed with water to a consistency of heavy cream and applied with a paintbrush.

**Kiln Furniture:** Kiln furniture consists of shelves and posts (available in a variety of shapes and heights). They are used so that ware may be fired in several layers to take full advantage of the space in the firing chamber of the kiln. Kits containing the most commonly needed assortment of furniture for each kiln model are available.

**Pyrometric Cones and Cone Holders:** For firing ceramics, pyrometric cones are the most widely used method of indicating temperature in the kiln. They are small elongated pyramid shaped indicators made of ceramic material especially formulated to melt at various specific heats. They are available in a wide range of temperatures. Various types of holders for the large cones are available to insure that they are held uniformly at the correct angle. Also available in some cone numbers are self supporting large cones with wide bases, which do not require cone holders. Cones may be used to double check your pyrometer calibration.

## **KILN MAINTENANCE**

You can protect your kiln and add many extra years to its life by using this maintenance guide.

Before each loading, visually check the kiln and its furniture.

Remove glaze spots on shelves, posts and kiln bottom and sidewalls. Clean the kiln by removing chips and dust. A vacuum cleaner works well for this purpose. Check the kiln shelves for cracks. Sand any rough spots on shelves and retouch with kiln wash. Also, retouch areas where the kiln wash has worn off. Avoid thick kiln wash layers. There is no need to kiln wash shelves every time you fire. Kiln wash the floor where it has worn thin. This may not be required for every firing. Sand rough spots and retouch. Keep a smooth layer not over 1/16" thick. Kiln wash built up to a thick layer, may damage the kiln floor by pitting due to differential thermal expansion. Whenever possible, use a clean kiln-washed shelf on the kiln floor to protect it.

**WARNING** – Do not use the kiln if it is not in perfect operating condition.

**Pilot Light:** Replace the pilot light if the lens becomes damaged or it fails to operate.

**Cord:** Check the cord every three (3) months for heating. If the cord becomes hot during firing, replace the cord and wall receptacle. Check the cord for heat near the wall plug after the kiln has been firing for over three (3) hours. Have a licensed electrician replace the cord with a CRESS cord and a wall receptacle to make sure the heat specifications as well as the amperage and voltage specifications are met.

**Thermocouple Replacement Instructions:** The temperature meter indicates the temperature at the tip of the thermocouple. That is the point the two (2) alloy wires are welded. The thermocouple has been marked with a minus sign (-) on the end of the large white bushing. The thermocouple lead wires must be connected with the red wire to the minus (-) and the yellow wire to the plus (+) side of the thermocouple. **RED TO THE “-“ AND YELLOW TO THE “+”**. The thermocouple must extend into the kiln to obtain a correct temperature reading. It should be bent out of the way to make room for larger roads. You should keep in mind contamination from products fired by alter its calibration. Change the thermocouple should you doubt the temperature control readings. Pyrometric cones are an inexpensive way to check the meter reading.



If you hook up the thermocouple incorrectly, your pyrometer will not operate properly. If your thermocouple is not marked, or if you believe it is incorrectly marked, you can check it with a magnet. The magnetic side is always the minus (-) and must be connected to the red wire.

After the replacement of your thermocouple, we advise that you do a test fire without a load to be sure that the thermocouple is connected properly. Otherwise, the indicator needle will go in the wrong direction.

Be careful not to hit the thermocouple when loading and unloading your kiln. We advise that you periodically check the thermocouple visually for cracks and thinning of the wire.

**WARNING** – Do not use the kiln if the lid brace is not in perfect operating condition.

**Lid Band:** Tighten the lid band when necessary. The normal differential expansion and contraction of the brick and lid band, will cause a gradual loosening of the lid band.

**Stainless Steel Case:** Normally the case never needs tightening from normal use but tighten if needed. Keep the outside of the kiln clean. It is easier to clean the outside surface before contaminants are burnt onto the surface.

**CRESS MANUFACTURING COMPANY, INC.**  
**A Nevada Corporation**

**E87 LIMITED KILN WARRANTY**

Your Cress kiln is warranted for three (3) years from the date of purchase to the original purchaser. If any defects in workmanship or material appear during this time, Cress Manufacturing Company, Inc., will replace or repair defective parts. Written proof of purchase date is required. This warranty is limited to the original purchaser. Warranty repairs are normally handled through the dealer from whom the kiln was purchased. Otherwise, the purchaser may return the defective part to Cress Manufacturing Company, Inc., 4736 Convair Dr., Carson City, NV 89706 along with the serial number, model number, voltage, proof of purchase date and a statement of what is thought to be wrong with the product. If a defect is confirmed, a new or repaired part will be shipped, postage aid by Cress Manufacturing Company. A Cress kiln may be returned for warranty work to Cress Manufacturing Company, Inc., 4736 Convair Dr., Carson City NV 89706. All transportation costs will be borne by the purchaser. Before shipment, the purchaser will notify Cress Manufacturing Company – phone (775)884-2777 – so that we may help advise in order to keep costs at a minimum, should it not be necessary to ship the entire kiln to us. An RMA (return material authorization) number is required before a return may be accepted. This number must be placed on the outside of the returned part or kiln. Repair or replacement of defective kiln parts shall be considered as a complete fulfillment of this warranty. Warranty does not cover over-firing (exceeding the melting temperature of the material being fired) regardless of the cause, kilns damaged by transporting, abuse, improper use, reactive materials being fired (i.e., reduction firing, salt firing or carbon contamination), moisture, contents being fired, improper electrical installation, kilns used for any purpose other than firing ceramic materials, or ware, kiln furniture or contents being over-fired. Kiln elements warranted during the three (3) year period is limited to one set – the second set is not warranted for nay reason.

Cress Manufacturing Company is not responsible for consequential damage to contents being fired. Cress Manufacturing Company does not authorize any wholesaler, retailer or employee to assume any other obligation or liability in regard to Cress kilns.

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