Cress Manufacturing Company, Inc.
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Carson City, Nevada
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OPERATING & MAINTENANCE MANUAL

Electrically Heated Furnace

Model No.:

Serial No.

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INTRODUCTION

This manual has been prepared for your **CRESS FURNACE**. Single chamber models are rated for 2250° F maximum intermittent temperature. For continuous operation, this furnace is rated for 2100° F maximum. **Draw models** are rated for 1250° F maximum intermittent and 1100° F continuous temperature.

High Temperature Draws are rated for 2000° F maximum intermittent temperature and 1850° F of continuous temperature.

Dual chambers: These units have a combination of a heat treating upper chamber and a drawing lower chamber. The upper chamber is rated for 2250° F maximum intermittent temperature. For continuous operation, the furnace is rated for 2100° F maximum. The lower draw chamber is rated for 1250° F maximum intermittent and 1100° F continuous temperature. Some of the dual chamber furnaces may have a high temperature lower chamber; in that case, they are rated for 2000° F maximum intermittent temperature and 1850° F of continuous temperature.

Before attempting to install or operate this equipment, the operator must first have **READ THE ENTIRE CONTENTS OF THIS MANUAL** and have become familiar with the safe operation of the equipment. Failure to do so can result in damage to the furnace equipment or even possible injury to personnel.

The Instructions in this manual are intended to serve as a guide to the safe and efficient use of your ***Cress*** Furnace. The information provided in the Temperature Control Manuals should be consulted for instruction how to operate the control instruments.

For all your furnace spare parts, call *Cress Manufacturing Company, Inc*:

Tel.: **(775) 884-2777**

Toll Free: **(800) 423-4584**

Or Fax: **(775) 884-2991**

Or e-mail: **cressmfg@earthlink.net**

The Serial Number and Model Number of the furnace should be furnished whenever information or spare parts are requested. This will aid in expediting the request at our factory. These numbers are also stamped on the Data Plate mounted on the furnace. Serial Numbers and Model Numbers of instruments will be found on the respective instruments.

GENERAL DESCRIPTION

Single Chamber Furnaces may be use for hardening and process temperatures of up to 2250° F. **Single Chamber Draw Furnaces:** These furnaces come equipped with a recirculation fan, which helps to achieve an even temperature through the chamber. These furnaces are suitable for hardening and other heat treating metal processing applications that do not exceed 1250° F or 2000° F if it has a high temperature fan.

The Dual Chamber Furnace is designed to provide two separately controlled heating chambers within a minimum amount of floor space. The upper chamber is typically rated for temperatures of up to 2250° F: The lower chamber is rated for temperatures of up to 1250° F unless the furnace is equipped with a high temperature fan. If that is the case, then the maximum temperature will be 2000° F.

The dual chamber furnaces are capable of performing two separate heat treating functions at the same time. The high temperature upper chamber may be used for hardening. The lower chamber is a separate furnace that may be used for tempering or drawing. While a hardening process is on going in the upper chamber; drawing or tempering of another item can be accomplished in the lower chamber. This dual chamber concept allows for immediate drawing or tempering after quench. The operator no longer has to wait for the hardening furnace to cool to a lower temperature required for drawing or tempering.

During your purchase of this furnace you were given the choice of either a set-point temperature controller, or an optional programmable temperature controller. Therefore, the instrumentation purchased can vary from customer to customer.

For electrical safety, the chamber door has an electrical limit switch. If the chamber door is opened, it will activate the limit switch to interrupt power supply to the heating chamber, disabling the elements from heating.

Some furnaces are not supplied with a power cord and must be “hard wired” to your electrical service. The furnace must also be grounded electrically. All electrical work needs to be done in compliance with Building Code standards.

WARNINGS & PRECAUTIONS

- *Electrical voltage is dangerous! Do not work on the furnace while electrical power is turned "ON."*
- *Consider all electrical leads to be energized until positively proven they are de-energized.*
- *Be certain that your electrical wiring, receptacles, switches, circuit breakers, or fuses are in good condition and are adequate for this furnace.*
- *To prevent accidental shock during loading or unloading of the heating chamber, the power switch must be in the "OFF" position.*
- *To prevent burns on hands or arms, protective gloves should be worn while loading or unloading a "HOT" chamber. If heat is excessive, a face shield should also be worn.*
- *Keep face and eyes away from the opening of a "HOT" chamber.*
- *Opening chamber door while chamber is at high temperature or allowing the door to "SLAM" during opening or closing may cause thermal shock and cause damage to the insulating brick.*
- *Combustible material must not be placed in, on or near the furnace.*
- *Do not set any materials, tools or liquids on top of the furnace.*

STEP #1 - INSPECTION

Inspection: Before unpacking the furnace visually inspect each item to see if there is any freight damage.

Freight Claim: If any damage to the exterior of these items is noted at this time (or to the interior of any of these items when inspected later), it is the responsibility of the receiving party to file a freight claim with the shipping company. Do not continue the installation if freight damage is found at any point of the INSTALLATION and/or OPERATION procedures.

Uncrating: When taking items out of the crates, check that each item in each crate is accounted for per the packing list provided. Remove all material that may be packed in the heating chamber.

STEP #2 - INSTALLATION

The entire furnace has been integrally wired to control panel to require a single electrical service connection.

The furnace should be lifted from the side opposite the control panel (dual chamber) and supported or stabilized while moving to avoid falling. We recommend the use of a single 1,000 lbs. or more capacity forklift. There is no lifting point on the roof of the furnace and it is not recommended because of the way the furnace is built (the roof or top structure is attached only by sheet metal screws).

Please verify clearances through your building doors and corridors before moving the furnace to avoid any damage to the control panel or to the furnace structure.

Prior to installation, make certain that the floor beneath the furnace is level. The furnace should not be placed closer than 18" to any wall or vertical surface or under shelving or other projections.
If using Cress furnace stand, it must be secured to the floor using stand's mounting holes.
Dual chamber furnaces must be anchor to the floor.
The room in which the furnace is operated should be well ventilated. Before plugging the furnace into your outlet or connecting the furnace to a power source, be sure that the toggle switch or electrical timer is in the

"off" position. Be certain that your electrical wiring, receptacle, circuit breaker, and fuses are in good condition and adequate for the furnace before connecting. If you are not sure, consult a qualified, licensed electrician. On furnaces equipped with a power cord, the metal case is grounded by the power cord ground connection.

Furnaces not equipped with cords must be grounded by a separate grounding wire of a suitable wire gauge to handle the entire amperage possible on the incoming power line. Power should come from a fused disconnect switch in the immediate vicinity of the

Care should be taken to keep the furnace away from flammable surfaces. A good rule is to keep the furnace at least 18" or more from all vertical surfaces. Do not use the furnace under a shelf or other obstruction to the flow of air. Keep all flammable liquids out of the room with the furnace. 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 furnace.

If the furnace is to be used for a lost wax process, wax burnout or assaying, and its not equipped with a Cress Vent System, drill a 1" hole through the center top of the furnace chamber.
WARNING: "DO" NOT USE FOR LOST WAX PROCESS OR ASSAYING UNLESS A VENT HOLE IS DRILLED THROUGH THE TOP OF THE FURNACE. REMOVE ALL WAX EXCEPT RESIDUE BELOW 400° F (205° C) TO PREVENT EXCESS CONCENTRATION OF CONTAMINANTS FROM DESTROYING THE ELEMENTS.

STEP #3 - HEATING ELEMENT INSTALLATION

The heating elements are already installed in this furnace. Therefore, all you need to do is make sure to remove any packing materials inside of the heating chamber.

STEP #4 - POWER CONNECTION

Connect the furnace to the exact electrical voltage described on the Data Plate attached to the furnace.
A copy of it is also in the preceding pages. Be sure that you're wiring and fusing to the furnace is sufficiently over-sided consistent with local building codes.

Power cables should be attached to furnace Control Cabinet according to state and local codes.

STEP #5 - TEMPERATURE CONTROLLER SET-UP

All you have to do is set your temperature values and/or install a program and events (if any) into the model of temperature controller(s) you have chosen to purchase.

The temperature control indicates the temperature at the tip of the thermocouple.

STEP #6 – THERMOCOUPLE(S)

Thermocouple must extend into the furnace 1-1/2" to 2" to obtain a correct temperature reading. You should keep in mind that contamination from products fired may alter its calibration. Change the thermocouple should you doubt the temperature control readings. Pyrometric cones are another inexpensive way to check the control reading.
Check to ensure that the thermocouple is connected to its respective temperature controller. Remember that for instrument control signals, a red wire means negative while black wire means positive (unlike power wiring).
NOTE: thermocouples should be replaced after 200-300 heating cycles.

FURNACE FIRST TIME USE

NOTE: Before attempting to operate this equipment, the operator must first have READ THE ENTIRE CONTENTS OF THIS MANUAL and have become familiar with the recommended safe operating practices. Failure to do so can result in damage to the equipment or even possible injury to personnel!

WARNINGS and PRECAUTIONS

To prevent accidental shock during loading or unloading of chambers, power switches must be in the "OFF" position.

To prevent burns on hands or arms, protective gloves should be worn while loading or unloading a "HOT" chamber. If heat is excessive, a face shield should also be worn.

Keep face and eyes away from the opening of a "HOT" chamber.

Opening chamber door while chamber is at high temperature or allowing the door to "SLAM" during opening or closing may cause thermal shock and cause damage to the insulating brick.

During the 1st firing the furnace may emit smoke and odor from burning off small amounts of binder, but will subside after an hour or so. This is normal with a new furnace.

NOTES ON DOOR ROPE SEAL:

The KAOWOOL^{R} rope seal on the furnace door will give off an odor and some smoke when it is first heated. This is a normal burning off of a very small amount of sizing/binder and will subside with use.

Also, during this seal burnout/break-in process the seal will flatten out. When this occurs, the door will lower slightly onto the door limit switches. For this reason, the door limit switch brackets are adjusted for only a slight depression of the switches when new. Because of this, along with chamber expansion during heat up (when the door seal is new); the limit switches may disengage causing the furnace to stop heating. To minimize this possibility during the break in process, simply push downward on the door handle, to help flatten the seal.

The elements are made of a very high temperature alloy wire. If your chamber is rated for 2250^{o}F, you should fire the chamber without a load to 2000^{o}F and allow cooling slowly with the door closed. This does not apply to draw chambers or chambers with a temperature rating of below 2000^{o}F. This allows the elements to achieve a good oxide coating that protects the elements on subsequent firings. The high temperature also stabilizes the wire element to set into the element plate or groove securely. High temperature wire elements tend to grow when only fired to low temperatures (below 1600^{o}F) and may creep out of the element plate or groove. If after low temperature firings, you notice any tendency of the elements to creep out of the plate or groove, you should again fire the chamber empty to 2000^{o}F. This will also help heal any thin areas of protective oxide coating on the element. This process should also be repeated when new elements are installed

OPERATION

NOTE: Before attempting to operate this equipment, the operator must first have READ THE ENTIRE CONTENTS OF THIS MANUAL and have become familiar with the recommended safe operating practices. Failure to do so can result in damage to the equipment or even possible injury to personnel!

WARNING: Do not operate furnace until the dry out process has been performed

THEORY OF OPERATION

Your Cress Furnace has been designed and engineered to provide a simple, safe, efficient and convenient operation. Operating the furnace requires very little training or skill and a minimum of physical effort. You will need to read the operating manual for the temperature controllers so you may set and operate them correctly.

During the heating process, the controller's digital readout will reflect the temperature within the chamber. The controls are proportioning and will start cycling "ON" and "OFF" before reaching the set point. This cycling will hold the chamber temperature at the desired setting.

YOUR CRESS FURNACE COMES WITH ONE OFTHE FOLLOWING CONTROLS:

1._____F4 CONTROL. Your control was programmed for a test at the factory prior to shipping. Read the Watlow Users Manual before programming.

2._____SD4 CONTROL. To change the set temperature press the up or down arrows until the lower display reads the desired temperature. The upper display will show the chamber temperature. The control operating parameters were factory adjusted for normal operation. For other functions or to change the operating parameters, please see the Watlow SD Users Manual.

3._____935 CONTROL. To operate the control see the 935 quick start guide sheet shipped with your furnace. For full control information see the Watlow model 935 users manual.

4._____ZONE CONTROL PACKAGE. For operating and programming information see the master control owner's manual.

5._____CRESS LV HIGH LIMIT CONTROLS. Set high limit control by pressing and holding the set/reset button, rotate the dial so the digital display reads the desired temperature. High limit temperature should be set slightly above the temperature set on the main controller.

6._____SERIES 3K CONTROL. For operational information see control information shipped with your furnace.

7._____INPUT CYCLING SWITCH. This is a percentage switch; which cycles the elements off and on. (i.e. low =20%, medium=50%, high=100 %.)

8._____PYROMETER METER. This is an analog (Needle Movement) temperature-indicating meter.

Optional chamber exhaust systems, temperature recorders, multi-zone controllers, 2000° F convection fans, higher power elements and control circuits and various thermocouple types other than standard may be provided to meet specific applications.

GENERAL OPERATING INFORMATION

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

Caution should be taken when opening and closing the chamber door. We recommend that the furnace operator wear protective gloves. The insulating brick will last longer if not subjected to thermal shock or allowing the door to "SLAM" open or shut.

As a safety precaution, the heating chamber is equipped with a door limit switch. Whether the power switch is in the "OFF" or "ON" position, the heating elements will not heat while the chamber door is open. Opening the chamber door during the heating process will disengage the limit switch enabling the power to the elements. To avoid the possibility of electrical shock due to failure or maladjustment of the door limit switch, always turn the power switch to the "OFF" position before opening chamber door.

Do not place combustible materials on, near or in the furnace. Heat will build up over a period of time if the air circulation around the furnace is blocked, resulting in a hazardous environment.

OPERATING INSTRUCTIONS

1. Turn power switch to "ON". The indicator light on the front of the control panel indicates power to the chamber only. Power to the elements is under the control of the controller and the door limit switch. As chamber temperature reaches set temperature, the controller will start to cycle the heating process "ON" and "OFF". This cycling will maintain set temperature. (Refer to instrument manual).

2. Determine temperature and heating time required for the heat-treating process. **The instruments HAVE NOT been preset at the factory**. Therefore, you must choose your own temperature settings.

3. Inspect thermocouple(s) and heating elements for damage. If either require repair, do not proceed with heat-treating process. Refer to "Maintenance Section" for replacement procedures.

4. Place material to be heated into the chamber. The load should be placed as near center as possible to receive a uniform temperature. For operations requiring accurate temperatures, the hearth plate should be raised on ceramic blocks. This will provide air circulation below the hearth plate. The load must not touch the thermocouple. This may cause the controller to register the temperature of the load rather than the chamber air and the furnace will over-heat. Thermocouples must not be bent against the wall, but remain at least 1 to1½ inches into the chamber. The load must not be placed against walls or elements. For even heating through the chamber, space the load to allow for air circulation between parts.

5. When your product is done heating for the required time, turn power switch to "OFF".

6. Open chamber door and remove material. Be certain that the lifting tool or tongs have a secure grip on the material being removed.

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

8. If the furnace is used at temperatures over 1600^{o}F, the thermocouple and the elements will eventually burn out. 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 furnace. 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 furnace periodically to be sure it is heating properly

9. **UNLOADING:**

   Furnace may be unloaded hot or cold. Avoid the possibility of shock by not touching the heating elements with your hand or tongs. The furnace brick may develop cracks due to the heat shock of the cold air if loaded or unloaded when hot.

   When opening the door "hot", you should wear 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 eyes. Do not wear loose clothing that could catch on fire should it come in contact with very hot air or heated furnace parts or heated furnace 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 grip on the parts being removed.

   Have a temperature resistant surface on which to place parts removed from the furnace.

MAINTENANCE

CAUTION!

Combustible materials must not be placed in, on or near the furnace.

Do not set or place any materials, tools or liquids on top of the furnace.

All controls, switches and pyrometers are subject to failure. You should check the furnace periodically to be sure it is heating properly.

GENERAL PREVENTATIVE MAINTENACE

1. Turn power switch “OFF.”
2. Clean front and rear ventilation ports and louvers.
3. Clean interior of control panel if dirty.
4. Use hands that are free of dirt, oil, chemicals, etc., while setting the temperature selector.
5. Use care not to damage the heating elements or thermocouples while loading or unloading the chamber.
6. Remove any spills or deposits from the chamber walls.
7. Re-grease fan shaft bearings (located behind the chamber) with High Temperature (lithium) grease every 3 months.
8. Inspect condition of fan belt and tension. Replace fan belt if it appears cracked or worn.
9. Do not heat furnace higher than intended maximum operating temperature of 1250°F.
10. Inspect the door seal so it prevents excessive heat loss.

HEATING ELEMENTS

WARNING: Always disconnect power before servicing electrical parts

Check every 3 months for open circuit by current or resistance type measurements. Elements can be checked visually to see if they are glowing or giving off heat. Heating elements should be replaced ONLY when they are damaged or are deteriorated.

PROCEDURE FOR REPLACING HEATING ELEMENTS

1. Disconnect power and tag-out circuit breaker.

2. Remove terminal cover on back of furnace, being careful not to damage internal wiring.

3. Remove the OUTER element mounting nut from the ceramic mounting "BOB bushing". Remove the power wire. Leave INNER element mounting nut and element mounting machine bolt in the ceramic mounting "BOB bushing".

4. Unwind the element leads from around the element mounting machine bolt. Straighten the element leads so that the leads will pass through the ceramic mounting "BOB bushing".

5. Remove the ceramic mounting "BOB bushing" attaching screws. Remove the ceramic “BOB bushing” from the back panel; pulling it off of the element leads.

6. Open chamber door all the way and remove the elements plates forward and out.

7. Replace the element and element plates as a complete assembly.

8. Slide element plates into the grooves of the firebrick as far as they will go. Make certain the plates do not protrude forward of the chamber/door mating surface.

9. With element leads protruding through the back panel, thread the leads through the small opposing holes in the ceramic mounting “BOB bushing.”

10. Attach ceramic “BOB bushing” to back panel with two attaching screws.

11. Pull tight and twist element leads around element mounting machine bolt. Attach power line. Attach outer machine nut. Make certain that the elements leads are between the inner and outer machine nuts.

12. Replace terminal cover on back of furnace. Be careful not to damage any wires.

13. Turn power “On” to the furnace.

THERMOCOUPLES

We suggest you replace the thermocouple(s) once a year or immediately when damaged, burned out or when the LED display on the control instrument shows “OPEN”.

PROCEDURE FOR REPLACING THERMOCOUPLES

NOTE: Thermocouples age from use, become increasingly inaccurate after 200-300 heating cycles. The higher the furnace operating temperature thermocouples ages faster. After 200-300 heating cycles it is highly recommended the thermocouples be replaced with new ones.

1. Disconnect power and tag-out circuit breaker.
2. Remove rear cover, being careful not to damage internal wiring.
3. Disconnect wires that connect to the thermocouple leads. (Red to – and Yellow to +)
4. Remove the ceramic mounting “BOB bushing” (or compression fitting) attaching screws.
5. Pull ceramic mounting “BOB bushing” (or compression fitting) and thermocouple out and through the rear panel.
6. Discard old thermocouple.
7. Connect leads of new thermocouple by reversing Steps 1 - 6, above.

LIMIT SWITCH

The door limit switch is installed as a safety device. Proper function of this switch is essential for safe operation of the furnace. The switch must be replaced or adjusted, as required, when they no longer operate properly.

WARNING: Always disconnect power before servicing electrical parts

PROCEDURE FOR REPLACING LIMIT SWITCH

1. Disconnect power and tag-out circuit breaker.
2. Open the chamber door.
3. Unscrew exterior locking collar from limit switch.
4. Pull limit switch out from back side of limit switch mounting bracket.
5. Adjust position of interior locking collar on limit switch and re-insert limit switch into mounting bracket. If limit switch is defective, replace with a new switch.
6. Screw exterior locking collar onto limit switch.

INSTRUMENTATION AND CONTROL ENCLOSURE

WARNING: Always disconnect power before servicing electrical parts.

Keep the control compartment clean and free of dust. Clean it at least once a year with a vacuum cleaner. Always disconnect power to enclosure before opening it. Check regularly for proper operation of the enclosure cooling-fan in the control panel. For all other instruments and electrical components consult the manufacturer’s instruction manuals in the Appendix A of this manual.

PROCEDURE FOR REPLACING INSTRUMENTATION

1. Disconnect power and tag-out circuit breakers.
2. Follow instructions in the Instrument Manual for removing the instrument from panel in which it is installed.

IMPORTANT SAFEGUARDS

NOTICE: please read and observe the following safety warnings before operating your furnace.

1. **Install furnace 18" or more from any wall or combustibles.**
2. **No flammable liquids, sprays, or gases can be used or stored in the same room as the furnace.**
3. Never fire hotter than the furnace rating specified on the furnace or the instruction sheets.
4. Do not fire hotter than the manufacturer's recommendation for any material put into the furnace or permanent damage may result to your furnace.
5. Do not open door until furnace has cooled.
6. When opening a vertically rising door, carefully open the door vertically while holding firmly onto the handle. Carefully test that the door is safely in place before allowing the door to stand open by itself. Do not let the door stay in an open position while the furnace is unattended. Turn off power to the furnace before opening its door. Do not touch heating elements with anything.
7. **Do not leave furnace unattended while operating.**
8. Never use an extension cord.
9. Operate furnace only in a well ventilated room.
10. Unplug or disconnect power from the furnace before servicing or cleaning.
11. ***Dangerous Voltage*** - Do not touch heating elements with anything.
12. Do not touch hot sides of furnace or hot door - Burns may result.
13 Keep children away from furnace at all times.
14. Never store anything under furnace; never lean objects against furnace.
15. **Do not store or use flammable liquids or sprays in the same room with your furnace. Do not operate while wearing flammable loose fitting clothes.**
16. Do not store or use your furnace outside - keep rain and moisture away from furnace.
17 **Do not use furnace if cord or any other part is not in perfect working condition. Replace anything that is not is perfect working condition immediately. Keep furnace unplugged or power source disconnected when the furnace is not in perfect operating condition.**
18 Wall receptacles must not be corroded. It must be in perfect operating condition in all respects. Have the wall receptacle changed by a licensed and qualified electrician if any doubt exists that the wall receptacle is in perfect condition. Check for heating of the plug and cord during each furnace or operation even if you believe the wall receptacle and cord are fine. Do not unplug cord by pulling on the cord. Unplug by carefully pulling straight out using only the plug cap itself.
19. Use furnace only with adequate electrical supply - with the correct voltage, amperage and correct fuse size (not too large or small). Be sure the wire size is large enough (avoid aluminum wiring). Do not use a 208 volt furnace on 220 volts.
20. Furnace must be properly grounded.
21. Wear welder goggles when viewing inside furnace to protect your eyes from infrared heat.
22. Avoid breathing fumes from material fired. Do not fire any materials that are toxic or that are not fully explained by manufacturer on all products considered for possible firing. Do not fire any product that is not fully known and properly labeled and known to be safe to be fired.

Please read and review instructions before each use of the furnace.

TROUBLESHOOTING

The following table will assist the operator in identifying and correcting general problems.

Symptom	Cause	Remedy
Chamber won't heat; output (green) light is on.	Element burned out.	Replace element per Maintenance Instructions.
	Thermocouple burned out.	Replace thermocouple per Maintenance Instructions.
	Door limit switch out of adjustment or faulty.	Re-adjust or replace limit switch per Maintenance Instructions.
Chamber won't heat; output (green) light is off.	No Power to furnace.	Check circuit-breaker / wiring.
	Faulty power (on/off) switch.	Replace power switch per Maintenance Instructions.
Chamber won't reach set temperature.	Heating element burned out.	See "Element burned out" above.
	Controller malfunction.	Reset or replace (if necessary) per Maintenance Instructions.
Chamber temperature exceeds set temperature.	Frozen/defective solid state relay or magnetic contactor.	Replace contact per Maintenance Instructions.
	Material to be heated is touching thermocouple.	Re-position load away from thermocouple.
	Controller malfunction.	Reset or replace (if necessary) per Maintenance Instructions.
Erratic temperature readings on controller.	Faulty thermocouple or thermocouple lead wires or connections.	Replace or correct as required.

Limited furnace warranty

Your Cress furnace is warranted for one year 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 with date is required. Warranty repairs are normally handled through the dealer from whom the furnace was purchased. Otherwise, the purchaser may obtain an RMA number and return the defective part to Warranty Repair Department, Cress Manufacturing Company, Inc., 4736 Convair Dr., Carson City, NV 89706 along with the RMA number, serial number, model number, voltage, proof of purchase date, and 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 paid by Cress Manufacturing Company. A Cress Furnace may be returned for warranty work to Furnace Repair Department, Cress Manufacturing Company, 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 at (775) 884 2777 so that we may help advice in order to keep costs at a minimum, should it not be necessary to ship the entire furnace to us. Repair or replacement of defective furnace parts shall be considered as complete fulfillment of this warranty.

This warranty does not include: furnace damaged by overfiring (exceeding the melting temperature of the material being fired) regardless of cause; furnaces damaged by transporting, abuse, improper use, reactive materials being fired (i.e. reduction, salt firing, or carbon contamination), moisture, contents other than ceramic materials, glass, or heat treating clean metals; damage to ware, furnace furniture or contents, or furnace elements.

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 liabilities in regard to Cress Furnaces.

ELECTRICAL DIAGRAM